User Manual

EDANUSA

# SE-601 Series

Electrocardiograph

Version 1.0

CE 0123

# About this Manual

P/N: 01.54.455420-10

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# 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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EDAN holds the rights to modify, update, and ultimately explain this manual.

# Product Information

**Product Name:** Electrocardiograph

**Model:** SE-601A, SE-601B, SE-601C

# Responsibility of the Manufacturer

EDAN 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 EDAN, 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, EDAN may provide, with compensation, necessary circuit diagrams, and other information to help qualified technician to maintain and repair some parts, which EDAN 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 Safety Guidance

This chapter provides important safety information related to the use of SE-601 series electrocardiograph (hereinafter called SE-601).

## 1.1 Intended Use

The intended use of SE-601 is to acquire ECG signals from adult and pediatric patients through body surface ECG electrodes. The electrocardiograph is only intended to be used in hospitals or healthcare facilities by doctors and trained healthcare professionals. The cardiogram recorded by the electrocardiograph can help users to analyze and diagnose heart disease. However, the ECG with measurements and interpretive statements is offered to clinicians on an advisory basis only.

**WARNING**

1. This equipment is not designed for internal use or direct cardiac application.
2. This equipment is not intended for home use.
3. This equipment is not intended for treatment or monitoring.
4. This equipment is intended for use on adult and pediatric patients only.
5. The results given by the equipment should be examined based on the overall clinical condition of the patient, and they can not substitute for regular checking.

## 1.2 Warnings and Cautions

In order to use the electrocardiograph safely and effectively, and avoid possible dangers caused by improper operation, please read through the user manual and be sure to be familiar with all functions of the equipment and proper operation procedures before use.

Please pay more attention to the following warning and caution information.

### 1.2.1 Safety Warnings

**WARNING**

1. The electrocardiograph is intended to be used by qualified physicians or personnel professionally trained. They should be familiar with the contents of this user manual before operation.
2. Only qualified service engineers can install this equipment, and only service engineers authorized by the manufacturer can open the shell.

**WARNING**

3. **EXPLOSION HAZARD** - Do not use the electrocardiograph in the presence of flammable anesthetic mixtures with oxygen or other flammable agents.
4. **SHOCK HAZARD** - The power receptacle must be a hospital grade grounded outlet. Never try to adapt the three-prong plug to fit a two-slot outlet.
5. Make sure that the power is turned off and the power cord is disconnected from the AC socket before connecting or disconnecting equipment. Otherwise, electrical shock or other injuries may happen to the patient or operator.
6. If the integrity of the external protective conductor is in doubt, the equipment should be powered by an internal rechargeable battery.
7. Do not use this equipment in the presence of high static electricity or high voltage equipment which may generate sparks.
8. Only the patient cable and other accessories supplied by the manufacturer can be used. Or else, the performance and electric shock protection can not be guaranteed.
9. Make sure that all electrodes are connected to the patient correctly before operation.
10. Ensure that the conductive parts of electrodes and associated connectors, including neutral electrodes, do not come in contact with earth or any other conducting objects.
11. If reusable electrodes with electrode gel are used during defibrillation, electrocardiograph recovery will take more than 10 seconds. The manufacturer recommends the use of disposable electrodes at all times.
12. Electrodes of dissimilar metals should not be used; otherwise it may cause a high polarization voltage.
13. The disposable electrodes can only be used for one time.
14. The electrocardiograph has been safety tested with the recommended accessories, peripherals, and leads, and no hazard is found when the electrocardiograph is operated with cardiac pacemakers or other stimulators.
15. Do not touch the patient, bed, table or the equipment while using the ECG together with a defibrillator.
16. Do not touch accessible parts of non-medical electrical equipment and the patient simultaneously.
17. The use of equipment that applies high frequency voltages to the patient (including electrosurgical equipment and some respiration transducers) is not supported and may produce undesired results. Disconnect the patient cable from the electrocardiograph, or detach the leads from the patient prior to performing any procedure that uses high frequency surgical equipment.

**WARNING**

18. If the wireless AP technology is used, the minimum distance between the radiator and the human body should be not less than 20cm. Use the supplied antenna only. There should be no shield in or around the room where the wireless AP is used.
19. Fix attention on the examination to avoid missing important ECG waves.
20. **SHOCK HAZARD** - Don't connect non-medical electrical equipment, which has been supplied as a part of the system, directly to the wall outlet when the non-medical equipment is intended to be supplied by a multiple portable socket-outlet with an isolation transformer.
21. **SHOCK HAZARD** - Don't connect electrical equipment, which has not been supplied as a part of the system, to the multiple portable socket-outlets supplying the system.
22. Do not connect any equipment or accessories that are not approved by the manufacturer or that are not IEC/EN 60601-1-1 approved to the electrocardiograph. The operation or use of non-approved equipment or accessories with the electrocardiograph is not tested or supported, and electrocardiograph operation and safety are not guaranteed.
23. Any non-medical equipment (such as the external printer) is not allowed to be used within the patient vicinity (1.5m/6ft.).
24. Do not exceed the maximum permitted load when using multiple portable socket-outlets to supply the system.
25. Multiple portable socket-outlets shall not be placed on the floor.
26. Do not use the additional multiple portable socket-outlet or extension cord in the medical electrical system, unless it's specified as part of the system by manufacturer. And the multiple portable socket-outlets provided with the system shall only be used for supplying power to equipment which is intended to form part of the system.
27. Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment). Furthermore all configurations shall comply with the valid version of the standard IEC/EN 60601-1-1. Therefore anybody, who connects additional equipment to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1-1. If in doubt, consult our technical service department or your local distributor.

**WARNING**

28. Parts and accessories used must meet the requirements of the applicable IEC/EN 601 series safety standards, and/or the system configuration must meet the requirements of the IEC/EN 60601-1-1 medical electrical systems standard.
29. Connecting any accessory (such as external printer) or other device (such as the computer) to this electrocardiograph makes a medical system. In that case, additional safety measures should be taken during installation of the system, and the system shall provide:
    a) Within the patient environment, a level of safety comparable to that provided by medical electrical equipment complying with IEC/EN 60601-1, and
    b) Outside the patient environment, the level of safety appropriate for non-medical electrical equipment complying with other IEC or ISO safety standards
30. If multiple instruments are connected to a patient, the sum of the leakage currents may exceed the limits given in the IEC/EN 60601-1 and may pose a safety hazard. Consult your service personnel.
31. The potential equalization bar can be connected to that of other equipment when necessary. Make sure that all these devices are connected to the potential equalization terminal.

## 1.2.2 Li-ion Battery Care Warnings

**WARNING**

1. Improper operation may cause the internal li-ion battery (hereinafter called battery) to be hot, ignited or exploded, and it may lead to the decrease of the battery capacity. It is necessary to read the user manual carefully and pay more attention to warning messages.
2. Only qualified service engineers authorized by the manufacturer can open the battery compartment and replace the battery, and batteries of the same model and specification should be used.
3. **DANGER OF EXPLOSION** -- Do not reverse the anode and the cathode when installing the battery.
4. Do not heat or splash the battery or throw it into fire or water.
5. Do not destroy the battery; do not pierce battery with a sharp object such as a needle; do not hit with a hammer, step on or throw or drop to cause strong shock; do not disassemble or modify the battery.

**WARNING**

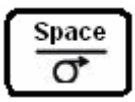
6. When leakage or foul smell is found, stop using the battery immediately. If your skin or cloth comes into contact with the leakage liquid, cleanse it with clean water at once. If the leakage liquid splashes into your eyes, do not wipe them. Irrigate them with clean water first and go to see a doctor immediately.
7. Properly dispose of or recycle the depleted battery according to local regulations .
8. Only when the device is off can the battery be installed or removed.
9. Remove the battery from the electrocardiograph when the electrocardiograph is not used for a long time.
10. If the battery is stored alone and not used for a long time, we recommend that the battery should be charged at least once every 6 months to prevent overdischarge.

## 1.2.3 General Cautions

**CAUTION**

1. Visually examine the package prior to unpacking. If any signs of mishandling or damage are detected, contact the carrier to claim for damage.
2. Avoid liquid splash and excessive temperature. The temperature must be kept between 5 ºC and 40 ºC during operation, and it should be kept between -20 ºC and 55 ºC during transportation and storage.
3. Do not use the equipment in a dusty environment with bad ventilation or in the presence of corrosive.
4. Make sure that there is no intense electromagnetic interference source around the equipment, such as radio transmitters or mobile phones etc. Attention: large medical electrical equipment such as electrosurgical equipment, radiological equipment and magnetic resonance imaging equipment etc. is likely to bring electromagnetic interference.
5. Ruptured fuse must only be replaced with that of the same type and rating as the original.
6. The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal. Batteries are hazardous waste. Do NOT dispose of them together with house-hold garbage. At the end of their lives hand the batteries over to the applicable collection points for the recycling of waste batteries. For more detailed information about recycling of this product or battery, please contact your local Civic Office, or the shop where you purchased the product.
7. Federal (U.S.) law restricts this device to sale by or on the order of a physician.

# 1.3 List of Symbols

| | |
|---|---|
|  | External output |
|  | External input |
|  | Equipment or part of CF type with defibrillator proof |
|  | Caution |
|  | Consult Instructions for Use |
|  | Potential equalization |
|  | Mains Supply |
|  | Battery indicator |
|  | Battery recharging indicator |
|  | Delete key |
|  | Enter key |
|  | Esc key |
|  | Space key/Feed paper key |
|  | Shift key |

| | |
|---|---|
|   | Fn key |
|  | Power On/Off key |
|   | MODE key |
|   | RESET key |
|   | 1mV/COPY key |
|   | START/STOP key |
|   | Tab key |
|  | Recycle |
| P/N | Part Number |
|   | Serial Number |
|  | Manufacturer |
|  | Date of Manufacture |
| CE 0123 | The symbol indicates that the device complies with the European Council Directive 93/42/EEC concerning medical devices. |

| | |
|---|---|
| EC REP | Authorized Representative in the European Community |
| CLASSIFIED C UL US 3XM9 | With respect to electrical shock, fire and mechanical hazards only in accordance with UL 60601-1and CAN/CSA C22.2 No. 601.1 |
|  | It 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 |

# Chapter 2 Introduction

The 6-channel electrocardiograph gathers ECG signals of 12 leads simultaneously. It displays the operation menu, ECG parameters as well as electrocardiograms.

The 6-channel ECG waves can be viewed on the LCD screen and printed out by using a high-quality thermal recorder.

The manual, auto, rhythm or R-R mode can be chosen freely.

SE-601 can be powered by the mains supply or a battery.

With a high resolution thermal recorder, a 32-bit processor and a large-capacity memorizer, the 6-channel electrocardiograph has advanced performance and high reliability. The compact size makes it suitable for clinic and hospital uses.

The 6-channel electrocardiograph has three models: SE-601A, SE-601B and SE-601C.

SE-601A adopts 192×64 dot single color LCD screen; SE-601B adopts 320×240 dot single color LCD screen; SE-601C adopts 640×480 dot multicolor TFT LCD screen.

**Configuration**: main unit, power cord, patient cable, chest electrodes, limb electrodes, disposable electrodes, alligator clips, thermal recorder paper, fuses and battery.

**NOTE:** The pictures and windows in this manual are for reference only.

# 2.1 Top Panel


Figure 2-1 SE-601A


Figure 2-2 SE-601B / SE-601C

**Indicator**

| | Symbol | Name | Explanation |
|---|---|---|---|
| A | ~ | Mains supply indicator | When the device is powered by the mains supply, this indicator is lit. |
| B | | Battery indicator | When the device is powered by the battery, this indicator is lit. |
| C | | Battery recharging indicator | When the battery is being recharged, this indicator is lit. |

# 2.2 Keyboard and Keys

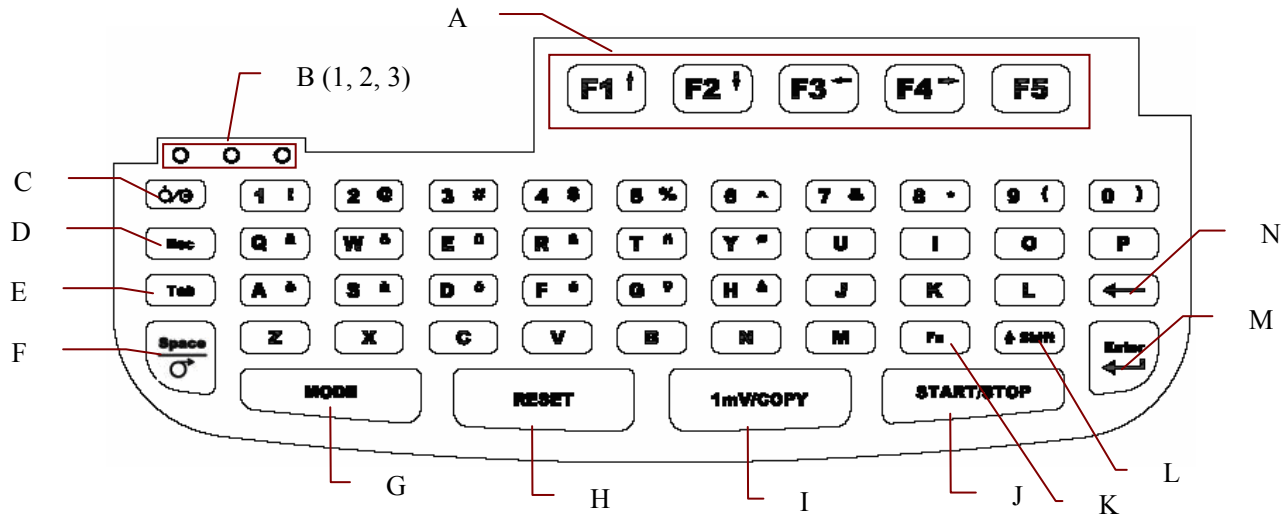



Figure 2-3 SE-601A / SE-601B / SE-601C Keyboard

| | Name | Explanation |
|---|---|---|
| A | Function Key | Selecting menu functions on the screen (Pressing **F1, F2, F3** or **F4** can move the cursor) |
| B | Indicator | 1 indicates that the device is powered by the mains supply<br>2 indicates that the device is powered by the battery<br>3 indicates the battery charging status |
| C | | Power on / off |
| D | Esc | Canceling operation |
| E | Tab | Pressing **Tab** can move the cursor forward, and pressing **Shift** + **Tab** can move the cursor backward.<br>In the **MANU** mode, press **Tab** to switch the lead group. |
| F | Space | Space: adding a space between typed characters<br>Feed Paper: before printing, if **Paper Marker** is set to **Style1** or **Style2**, you can press the **Space** key to advance the recorder paper to the next black marker; if **Paper Marker** is set to **No,** you can press the **Space** key to advance the paper for about 2cm. Press the **Space** key again to stop advancing the paper. |
| G | MODE | Press this key to select a working mode among **AUTO**, **MANUAL** and **RHYTHM**.<br>**NOTE:** Only in the Work Mode Setup window can the **R-R** mode be selected. |
| H | RESET | Draw the baseline to zero quickly in the case of baseline drift |
| I | 1mV/COPY | In the **AUTO** mode, pressing the **1mV/Copy** key can print the ECG report which was printed out last time. |

| | | |
|---|---|---|
| | | In the **MANU** mode, pressing the **1mV/Copy** key can insert a 1mV calibration mark in the printing course. |
| J | START/STOP | Start/Stop printing reports |
| K | Fn | Inputting special characters. Press **Fn** + **a** to type **è**. |
| L | Shift | Inputting a capital letter. Press **Shift** + **p** to type a capital **P**. |
| M | Enter | Confirming operation |
| N | Delete | Deleting characters |

# 2.3 Rear Panel

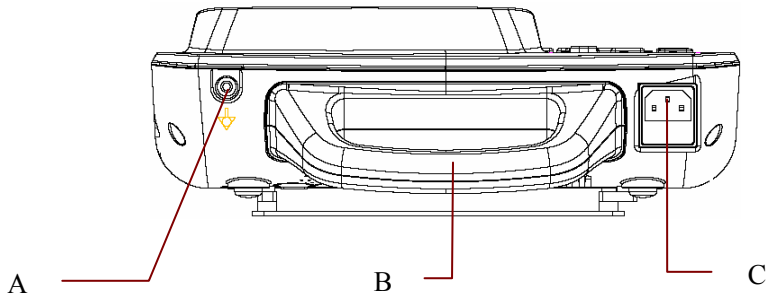



Figure 2-4 SE-601A / SE-601B / SE-601C Rear Panel

| | **Name** | **Explanation** |
|---|---|---|
| A |  Potential Equalization Conductor | Potential equalization conductor provides a connection between the unit and the potential equalization bus bar of the electrical installation. |
| B | Handle | Part for people to hold |
| C | ~ Mains Supply Socket | AC SOURCE: alternating current supply socket |

# 2.4 Right Panel

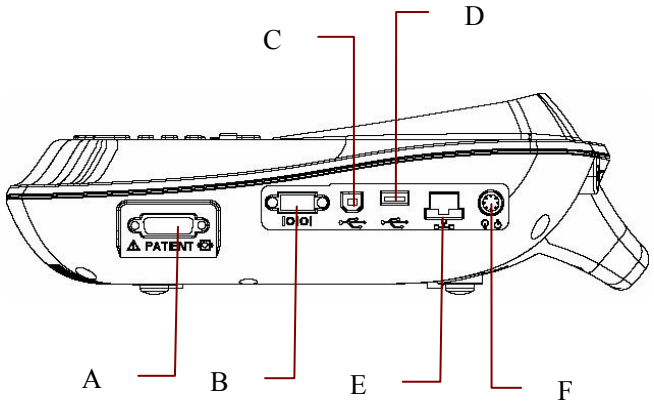
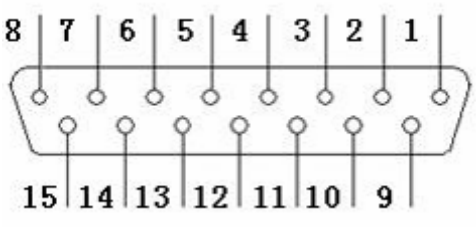



Figure 2-5 SE-601A / SE-601B / SE-601C Right Panel

| | Name | Explanation |
|---|---|---|
| A | Patient Cable Socket | Connecting to the patient cable |
| B | Serial Port | Connecting to a PC |
| C | USB Socket 1 (Optional) | Standard USB socket, connecting to a PC |
| D | USB Socket 2 (Optional) | Standard USB socket, connecting to a U disk or a USB printer recommended by the manufacturer |
| E | Net port | Standard net port, connecting to a PC |
| F | External Input / Output Socket | Connecting to the external signal device |

**1) Patient Cable Socket**




: Applied part of type CF with defibrillator proof

: Caution

Definitions of corresponding pins:

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| **1** | C2 / V2 | **6** | SH | **11** | F / LL |
| **2** | C3 / V3 | **7** | NC | **12** | C1 / V1 or NC |

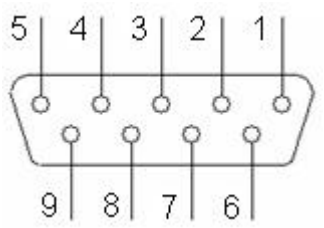
| | | | | | |
|---|---|---|---|---|---|
| **3** | C4 / V4 | **8** | NC | **13** | C1 / V1 |
| **4** | C5 / V5 | **9** | R / RA | **14** | RF (N) /RL or NC |
| **5** | C6 / V6 | **10** | L / LA | **15** | RF (N) / RL |

**NOTE:** The left side of "/" is European standard; and the right side is American standard.

**2) Serial Port**

**WARNING**

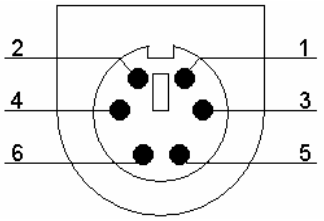
The isolated intensity of serial port is 1500V AC and the maximum voltage applied should not exceed +15V DC.




Definitions of corresponding pins:

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| **1** | NC | **4** | NC | **7** | NC |
| **2** | RxD (input) | **5** | GND | **8** | NC |
| **3** | TxD (output) | **6** | NC | **9** | NC |

**3) External Input / Output Socket**



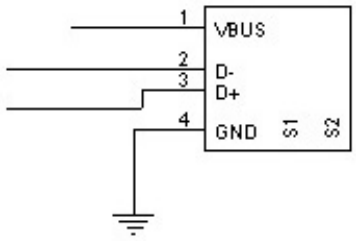

Definitions of corresponding pins:

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | GND | **4** | GND |
| **2** | GND | **5** | ECG Signal (input) |
| **3** | GND | **6** | ECG Signal (output) |

**4) USB Socket 1 / USB Socket 2 (Optional)**

**WARNING**

Only the USB equipment recommended by the manufacturer can be connected to the USB interface.




Definitions of corresponding pins:

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | VBUS | **3** | D+ |
| **2** | D- | **4** | GND |

**WARNING**

1. Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment). Furthermore all configuration shall comply with the valid version of the standard IEC/EN 60601-1-1. Therefore anybody, who connects additional equipment to the signal input or output connector to configure a medical system, must make sure that it complies with the requirements of the valid version of the system standard IEC/EN 60601-1-1. If in doubt, consult our technical service department or your local distributor.
2. If multiple instruments are connected to a patient, the sum of the leakage currents may exceed the limits given in the IEC/EN 60601-1 and may pose a safety hazard. Consult your service personnel.

# 2.5 Bottom Panel

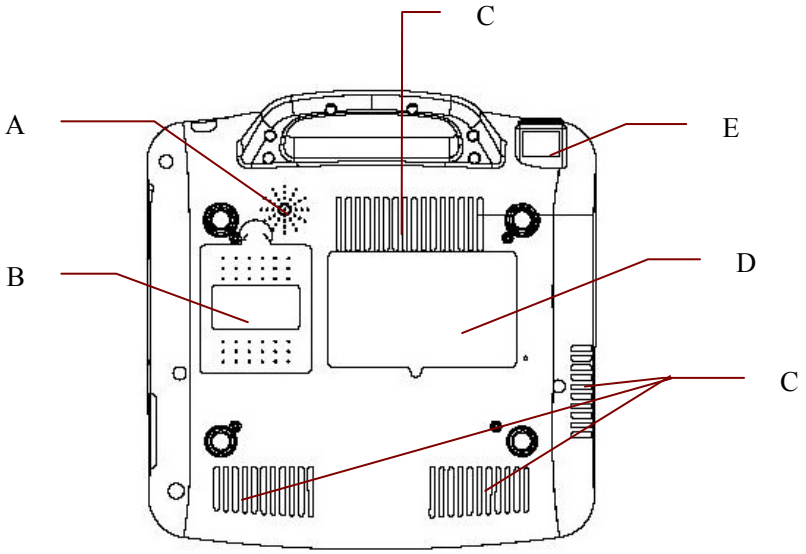



Figure 2-6 SE-601 A / SE-601B / SE-601C Bottom Panel

| | Name | Explanation |
|---|---|---|
| A | Speaker Hole | Path for sound from speaker (Only for SE-601B/C) |
| B | Battery Compartment | Compartment for battery |
| C | Heat Emission Hole | Path for internal heat emission |
| D | Label | Position for product information label |
| E | Fuse | The fuse specification is T1AL250VP Ø5×20. |

**1) Battery Compartment**

The rated voltage and the rated capacity of the battery are as follows:

Rated Voltage: 14.8V; Rated Capacity: 2200mAh.

**WARNING**

1. Improper operation may cause the battery to be hot, ignited or exploded, and it may lead to the decrease of the battery capacity. Therefore, it is necessary to read the user manual carefully and pay more attention to warning messages.
2. When leakage or foul smell is found, stop using the battery immediately. If your skin or cloth comes into contact with the leakage liquid, cleanse it with clean water at once. If the leakage liquid splashes into your eyes, do not wipe them. Irrigate them with clean water first and go to see a doctor immediately.

**WARNING**

3. Only qualified service engineers authorized by the manufacturer can open the battery compartment and replace the battery, and batteries of the same model and specification must be used.
4. Only when the device is off can the battery be installed or removed.

**NOTE:** If the battery has not been used for two months or more, you should recharge it before using it again.

**2) Fuse**

There is a fuse installed on the bottom of the main unit. The specification is T1AL250VP Ø5×20.

**WARNING**

Ruptured fuse must only be replaced with that of the same type and rating as the original.

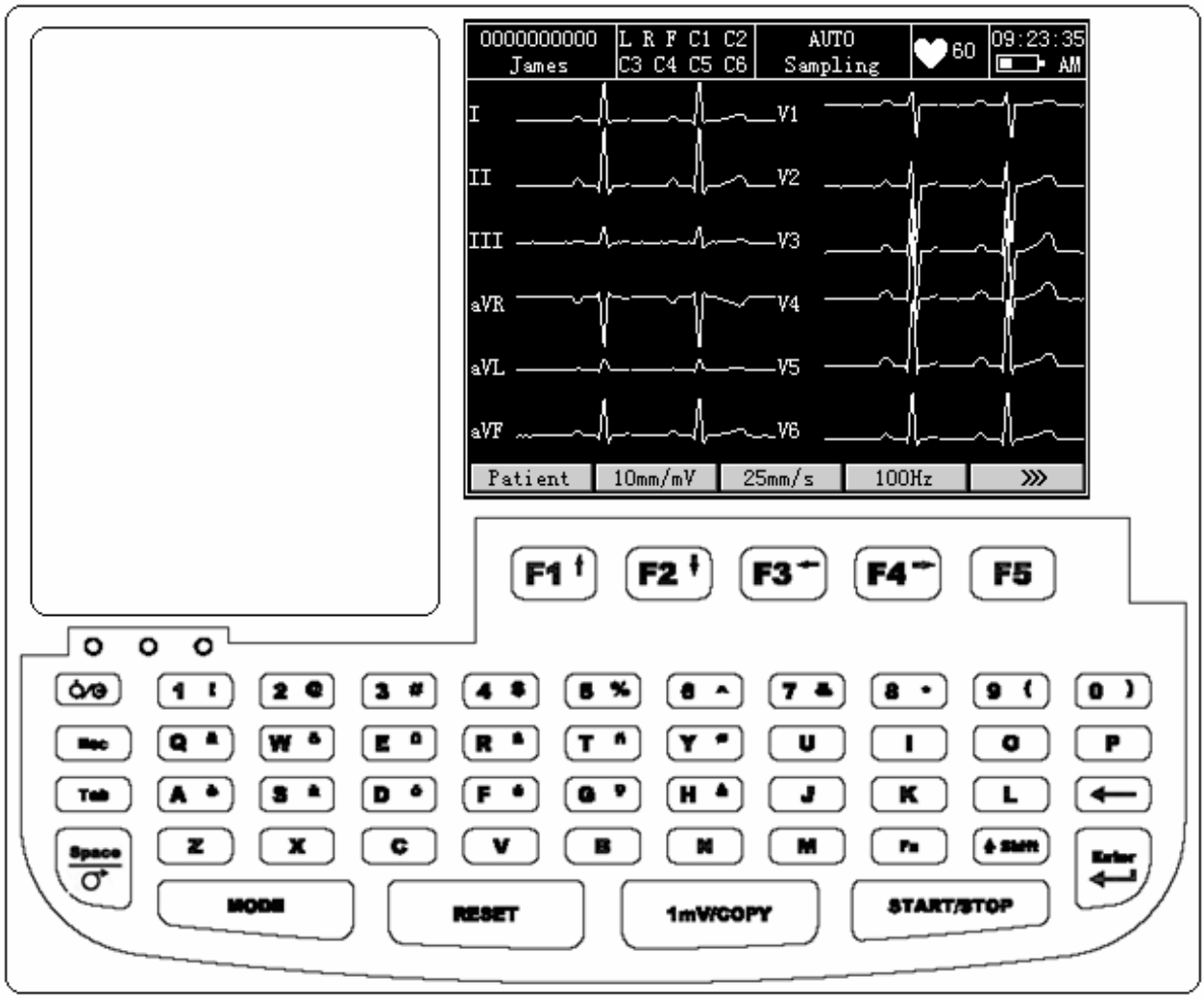
# 2.6 Function Features

- Low weight and compact size
- Multi-language support
- ECG signals of 12 leads are gathered and amplified simultaneously, 6-channel waves are displayed and recorded simultaneously
- High resolution thermal recorder, recording frequency response ≤150Hz
- Flexible printing formats
- Full alphanumeric keyboard
- The auto, manual, rhythm, and R-R modes are optional
- Convenient operation of system setup and file management
- Measurement function and interpretation function are optional
- Hint information of lead off, lack of paper and low battery capacity etc.
- Battery with large capacity
- Automatic baseline adjustment for optimal printing
- Supporting real-time sampling, pre-sampling, period sampling and arrhythmia triggering sampling
- LCD backlight and the device can be turned off automatically according to the set time
- The patient information to be printed is optional
- ECG data can be transmitted to the PC software through the serial cable, net cable, or wireless AP (optional).

# Chapter 3 About SE-601 Application

The following sections provide an overview of the main operations and functions in the SE-601 application.

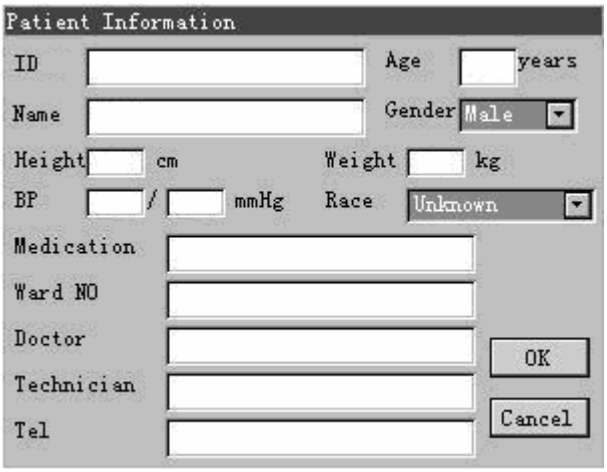
## 3.1 Selecting Menu Functions




To select **Patient**, press the function key **F1** below **Patient**.

To select »», press the function key **F5** below ».

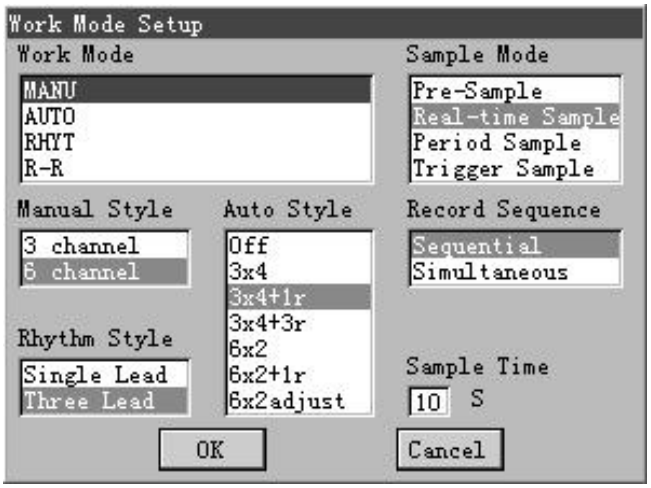
# 3.2 Entering Data




1. When the main screen1 is displayed, press the function key **F1** below **Patient** to open the **Patient Information** window.
2. Press **Tab** or **Shift** + **Tab** to move the cursor to the **Name** textbox.
3. Press ← on the keyboard to erase the typed information.
4. Press the letter or number keys on the keyboard to input patient name. Press **Fn** and a letter key to input the special character in the top right corner of the key. Press **Shift** and a number key to input the special character in the top right corner of the key. Press **Shift** and a letter key to input a capital letter. For example, press **Fn** + **a** to input **è**, press **Shift** + **3** to input **#**, and press **Shift** + **a** to input a capital **A**.
5. Press **Enter** to confirm, or press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to confirm.
6. Press **Esc** to cancel the operation, or press **Tab** or **Shift** + **Tab** to move the cursor to the **Cancel** button, and then press **Enter** to cancel the operation.

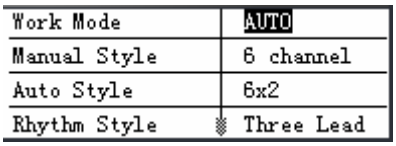
# 3.3 Selecting an Option from a List

**For SE-601B/C**




1. Press **Tab** or **Shift** + **Tab** to move the cursor to the **Work Mode** item.
2. Press **F1** or **F2** to select **MANU**, **AUTO**, **RHYT** or **R-R**.
3. Press **Enter** to confirm, or press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to confirm.
4. Press **Esc** to cancel the operation, or press **Tab** or **Shift** + **Tab** to move the cursor to the **Cancel** button, and then press **Enter** to cancel the operation.

**For SE-601A**




1. Press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Work Mode** item.
2. Press **F3** or **F4** to select **MANU**, **AUTO**, **RHYT** or **R-R**.
3. After setup, press **Enter** to confirm, or press **Esc** to display a hint to prompt you to save these modifications.

# 3.4 About the main Screen

After you turn on the device, the main screen1 pops up. Press the function key **F5** below »» to open the main screen2.

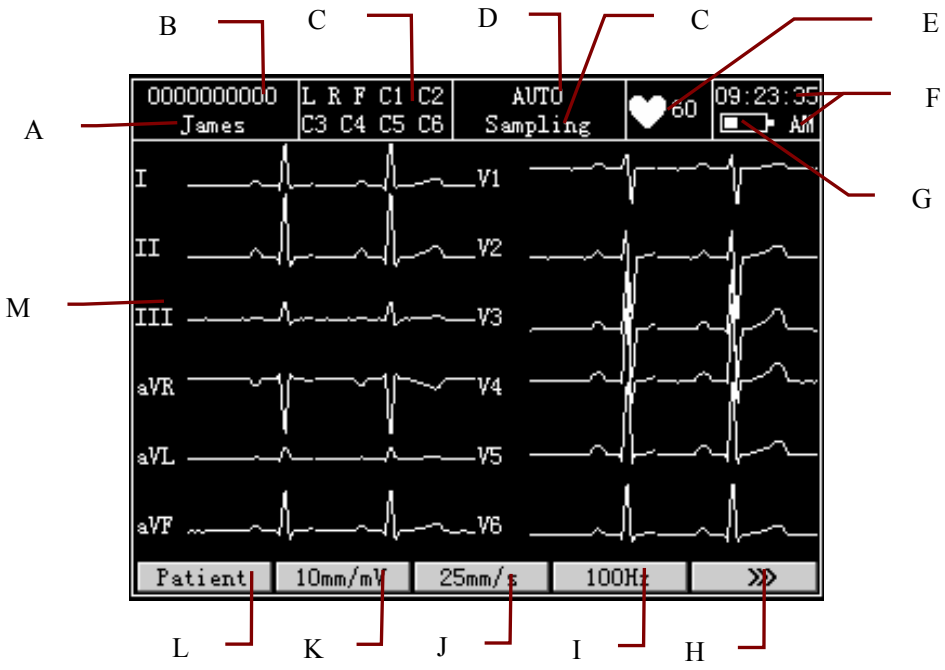



Figure 3-1 SE-601B / SE-601C Main Screen1

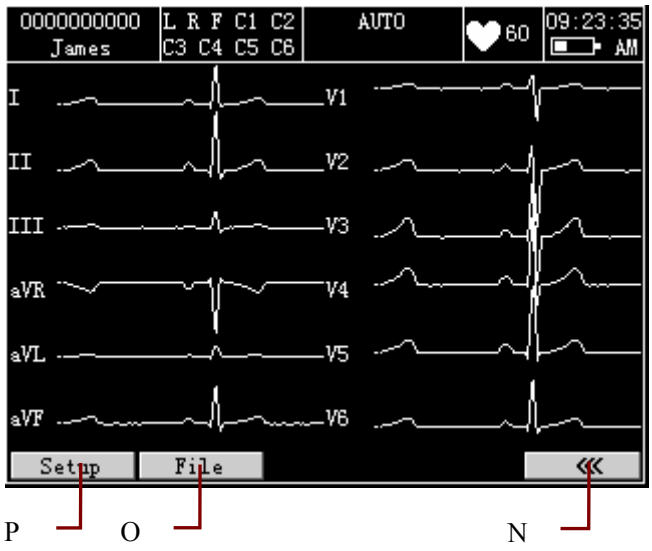



Figure 3-2 SE-601B / SE-601C Main Screen2

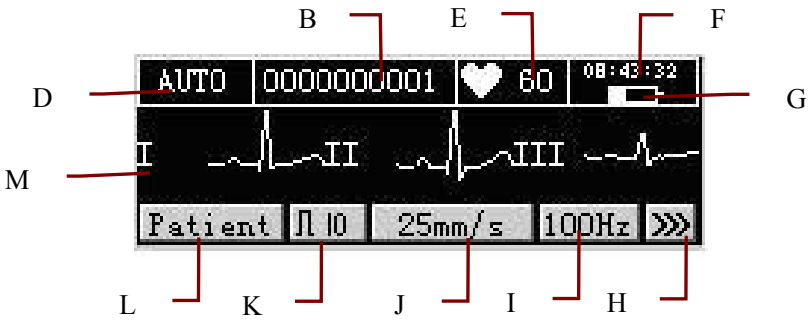



Figure 3-3 SE-601A Main Screen1

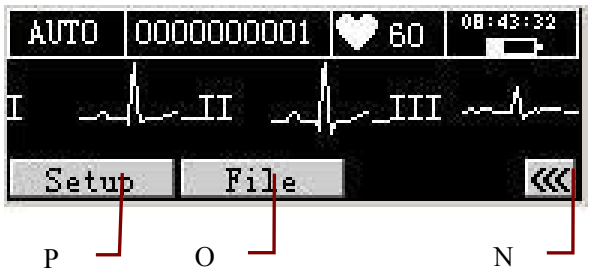



Figure 3-4 SE-601A Main Screen2

| | **Name** | **Explanation** |
|---|---|---|
| A | Name | Patient Name: within 12 characters (for SE-601B/C)<br>within 10 characters (for SE-601A) |
| B | ID | When **ID Mode** is set to **Auto** or **Time**, the patient ID is within 10 characters.<br>When **ID Mode** is set to **Manu**, the patient ID is within 18 characters. |
| C | Hint Information | Including *Lead Off*, *No Paper*, *Paper Error*, *Battery Weak*, *Modu Error*, *Demo*, *Sampling*, *Analyzing*, *Recording*, *Learning*, *Transmitting*, *Transmit Fail*, *Detecting*, *Memory Full*, *Overload*, *U Disk*, *USB Printer*, *Testing* |
| D | Work Mode | **MANU**, **AUTO**, **RHYT** or **R-R** |
| E | Heart Rate | Actual Heart Rate |
| F | Current Time | Refer to Section 9.8, “Date & Time Setup” |
| G | Battery Symbol | Identify the current capacity of the battery |
| H |  | Press the function key **F5** below  to open the main screen2 |
| I | 100Hz | EMG Filter: 25Hz, 35Hz or 45Hz<br>Lowpass Filter: 75Hz, 100Hz or 150Hz |
| J | 25mm/s | Paper Speed: In the **MANU** mode, you can set **Speed** to **5mm/s**, **6.25mm/s**, **10mm/s**, **12.5mm/s**, **25mm/s** or **50mm/s**. In the **AUTO** and **RHYT** modes, only **25mm/s** and **50mm/s** are available. In the R-R mode, only **25mm/s** is available. |
| K | 10mm/mV | Gain: 10 mm/mV, 20 mm/mV, 10/5 mm/mV, AGC, 2.5 mm/mV or 5 mm/mV |

| | | |
|---|---|---|
| L | Patient | Press the function key **F1** below **Patient** to display the **Patient Information** window |
| M | ECG waveform | Display ECG waveform |
| N | « | Press the function key **F5** below « to return to the main screen1 |
| O | File | Press the function key **F2** below **File** to open the **File Manage** screen. For details, please refer to Chapter 8, "Managing Files". |
| P | Setup | Press the function key **F1** below **Setup** to display the **System Setup** screen. For details, please refer to Chapter 9, "System Setup". |

**To Open the main Screen3**

If **Next Patient** is set to **On**, in the **AUTO** mode, press the **START/STOP** key to print ECG reports, and the system will automatically open the main screen3 after a complete ECG report is printed.

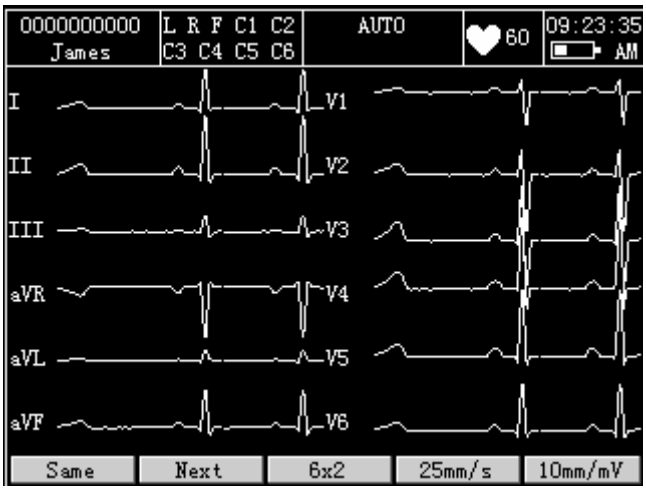



Figure 3-5 SE-601B / SE-601C Main Screen3

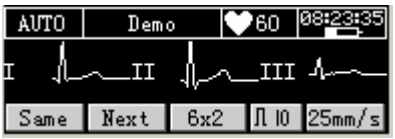



Figure 3-6 SE-601A Main Screen3

On the main screen3, pressing the function key **F1** below **Same** can return to the main screen1, and all the patient information will keep the same; pressing the function key **F2** below **Next** can return to the main screen1, all the patient information will be cleared, and patient ID will be refreshed.

On the main screen3, you can print the previous ECG report again according to the set style, paper speed and gain which are shown on the bottom of the screen. Pressing the function key **F3** can switch the auto style, pressing the function key **F4** can switch the paper speed, and pressing the function key **F5** can switch the gain.

**To Select the Next Patient Function**

When the main screen2 is displayed, press the function key **F1** below **Setup** to open the **System Setup** screen.

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Pat. Question** on the **System Setup** screen, and then press **Enter** to open the **Patient Question** window.

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Next Patient** item, and then press **F1** or **F2** to select **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Next Patient** item, and then press **F3** or **F4** to select **On**.

# 3.5 About the System Setup Screen

When the main screen1 is displayed, press the function key **F5** below » to open the main screen2. When the main screen2 is displayed, press the function key **F1** below **Setup** to open the **System Setup** screen.

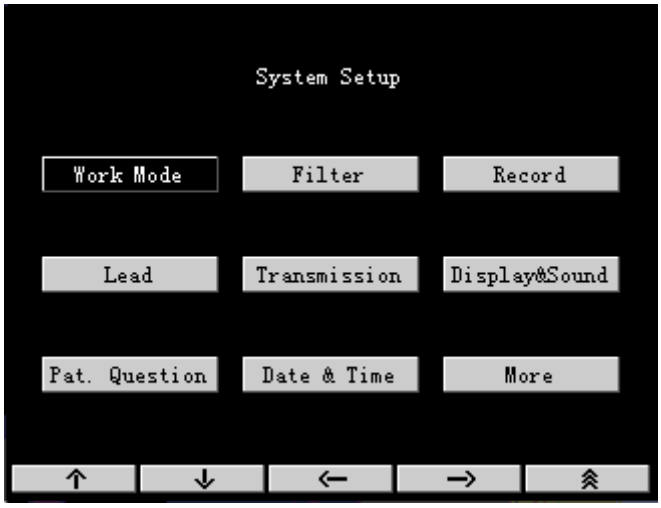



Figure 3-7 SE-601B / SE-601C System Setup Screen

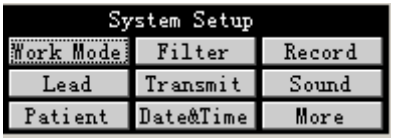



Figure 3-8 SE-601A System Setup Screen

On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to a button, and then press **Enter** to open the setup window related to the button.

Take the **Work Mode Setup** window for example:

On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Work Mode**, press **Enter** to display the **Work Mode Setup** window.

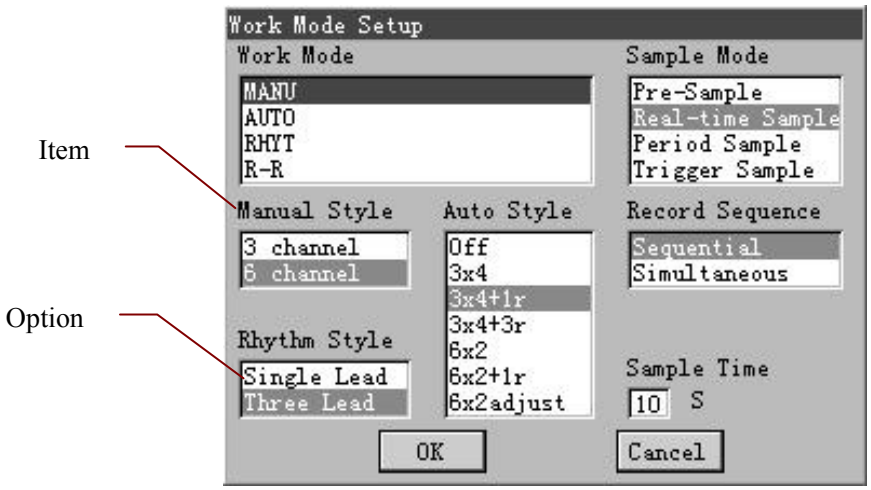



Figure 3-9 SE-601B / SE-601C Work Mode Setup Window


Figure 3-10 SE-601A Work Mode Setup Window

**For SE-601B/C**

1. in the Work Mode Setup window, press **Tab** or **Shift** + **Tab** to move the cursor among different setup menus.
2. Press **F1** or **F2** to select an option in a setup menu.
3. Press **Enter** to confirm, or press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to confirm.
4. Press **Esc** to cancel the operation, or press **Tab** or **Shift** + **Tab** to move the cursor to the **Cancel** button, and then press **Enter** to cancel the operation.

**For SE-601A**

1. in the Work Mode Setup window, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor among different setup menus.
2. Press **F3** or **F4** to select an option in a setup menu.
3. Press **Enter** to confirm, or press **Esc** to display a hint to prompt you to save these modifications.

# 3.6 About the File Manage Screen

When the main screen1 is displayed, press the function key **F5** below » to display the main screen2. Press the function key **F2** below **File** to open the **File Manage** screen1.

1. Press the function key **F5** below » to display the **File Manage** screen2. Then press the function key **F5** below « to return to the **File Manage** screen1.
2. Or press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file on the **File Manage** screen1, and then press the function key **F4** below **Select** to select the file and display the **File Manage** screen3. For SE-601B/C, press **Esc** to return to the **File Manage** screen1. For SE-601A, press **Esc** or the function key **F5** below ⇈ to return to the **File Manage** screen1.

**NOTE:** Pressing **Shift+F1** or **Shift+F2** can move the cursor quickly.

3. Press **Esc** on the **File Manage** screen1 to return to the main screen1.

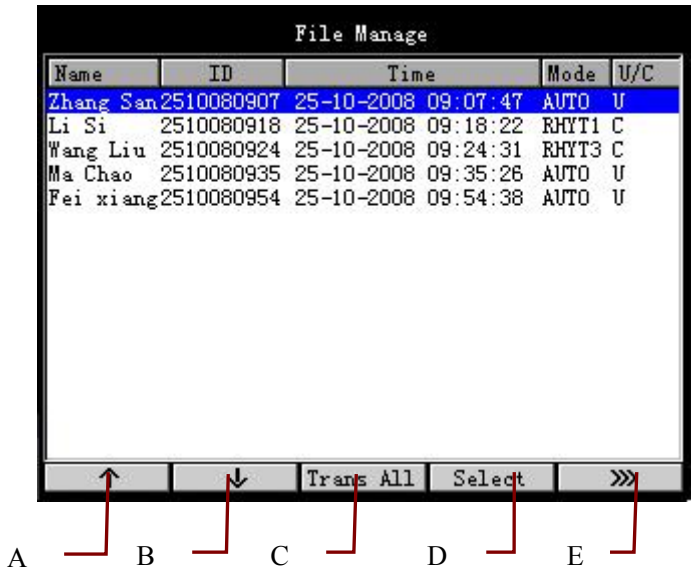



Figure 3-11 SE-601B / SE-601C File Manage Screen1

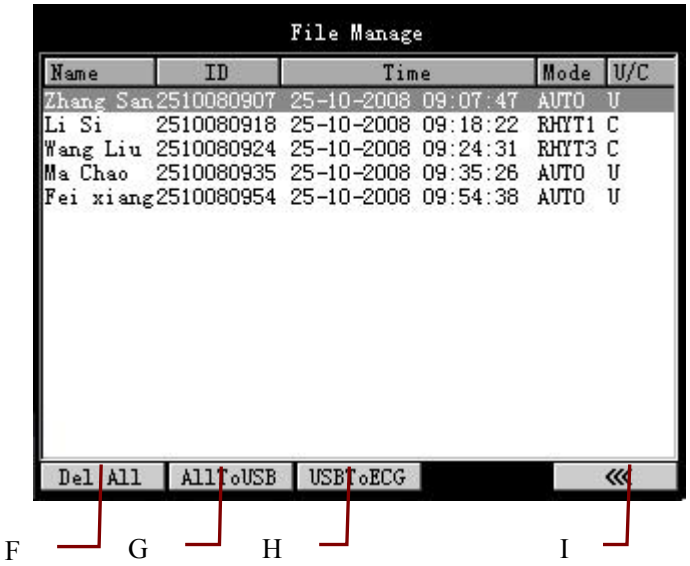



Figure 3-12 SE-601B / SE-601C File Manage Screen2

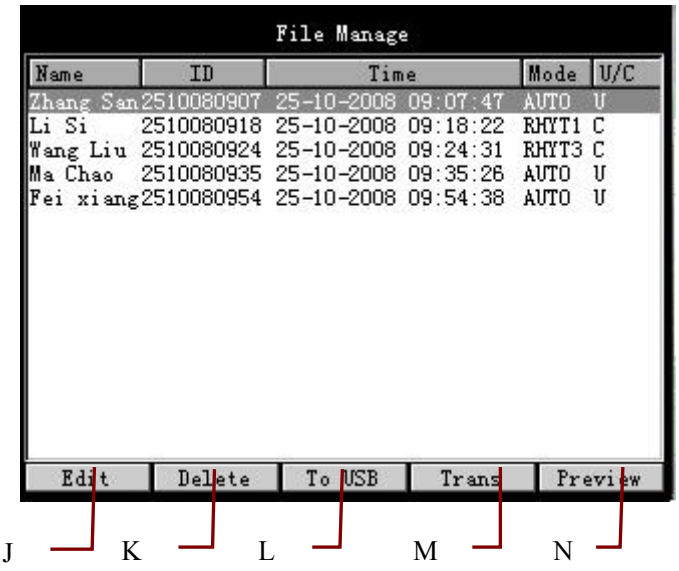



Figure 3-13 SE-601B / SE-601C File Manage Screen3

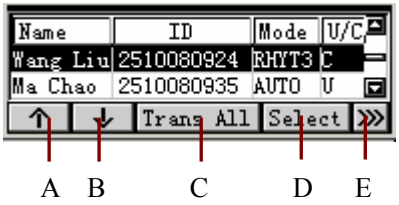



Figure 3-14 SE-601A File Manage Screen1

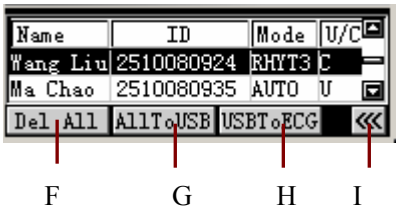



Figure 3-15 SE-601A File Manage Screen2

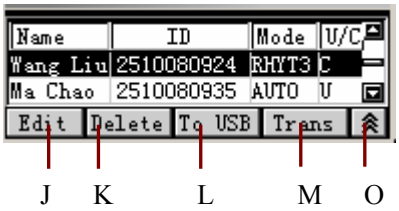



Figure 3-16 SE-601A File Manage Screen3

| | **Name** | **Explanation** |
|---|---|---|
| A | ↑ | Press the function key **F1** below ↑ to highlight a file. |
| B | ↓ | Press the function key **F2** below ↓ to highlight a file. |
| C | Trans All | Press the function key **F3** below **Trans All** to transmit all the files to the PC. |
| D | Select | Press the function key **F4** below **Select** to open the **File Manage** screen3. |

| | | |
|---|---|---|
| E | » | Press the function key **F5** below » to display the **File Manage** screen2. |
| F | Del All | Press the function key **F1** below **Del All** to delete all the files. |
| G | AllToUSB | Press the function key **F2** below **AllToUSB** to copy all the files into the ECGDATA folder of the U disk. |
| H | USBToECG | Press the function key **F3** below **USBToECG** to copy files in the ECGDATA folder of the U disk to SE-601. |
| I | « | Press the function key **F5** below « to return to the **File Manage** screen1. |
| J | Edit | Press the function key **F1** below **Edit** to open the **Patient Information** window, and then edit the patient information manually. |
| K | Delete | Press the function key **F2** below **Delete** to delete the selected file. |
| L | To USB | Press the function key **F3** below **To USB** to copy the selected file into the ECGDATA folder of the U disk. |
| M | Trans | Press the function key **F4** below **Trans** to transmit the selected file to the PC. |
| N | Preview | For SE-601B/C, press the function key **F5** below **Preview** to preview the selected file. |
| O | ⇞ | For SE-601A, press the function key **F5** below ⇞ to return to the **File Manage** screen1. |

# Chapter 4 Operation Preparations

**WARNING**

Before use, the equipment, patient cable and electrodes should be checked. Replace them if there is any evident defectiveness or aging which may impair the safety or the performance, and make sure that the equipment is in proper working condition.

## 4.1 Power and Earthing

**WARNING**

If the integrity of the external protective conductor is in doubt, the equipment should be powered by the battery.

**Power Supply**

The electrocardiograph can be powered by either the mains supply or the battery.

- **Mains Supply**

  The mains socket is on the rear panel of the unit. If the mains supply is used, connect the power cord to the socket first, and then connect the power cord to the hospital grade outlet.

  | | |
  |---|---|
  | Operating voltage: | 100V-240V~ |
  | Operating frequency: | 50Hz/60Hz |
  | Input power: | 70VA |

  Make sure that the mains supply meets the above requirements before power-on, and then press on the keyboard to power on the unit. The mains supply indicator (~) is lit.

  If the battery is weak when the mains supply is used, it will be recharged automatically at the same time. Both the mains supply indicator (~) and the battery recharging indicator (→▭) will be lit.

- **Battery**

  When the battery is used, turn on the unit by pressing on the keyboard. Then the battery indicator (▭) will be lit and the battery symbol will be displayed on the LCD screen. Because of the consumption during the storage and transport course, the battery capacity may not be full. If the symbol ▬ and the hint information Battery Weak are displayed, which means the battery capacity is weak, please recharge the battery first.

  When the battery is fully charged, the electrocardiograph can work normally for nearly 6 hours; and it can continually print about 2 hours in the **MANU** mode or print about 280 ECG reports of 3×4+1rhy in the **AUTO** mode.

Please refer to the maintenance section for how to recharge the battery. When the battery is being recharged, the electrocardiograph can be powered by the mains supply.

**WARNING**

Potential equalization bar of the unit should be connected to the potential equalization terminal of the electrical installation when necessary.

**CAUTION**

1. If the electrocardiograph is turned off automatically because of low battery capacity, the settings may not be saved.
2. If the battery has been fully charged and requires recharging after printing only a few ECGs, consider replacement.
3. The use of electrocardiograph accessories (such as barcode reader) will deplete battery power at a faster rate. The battery will require more frequent charging if these accessories are used with the electrocardiograph.

## 4.2 Loading/Replacing Recorder Paper

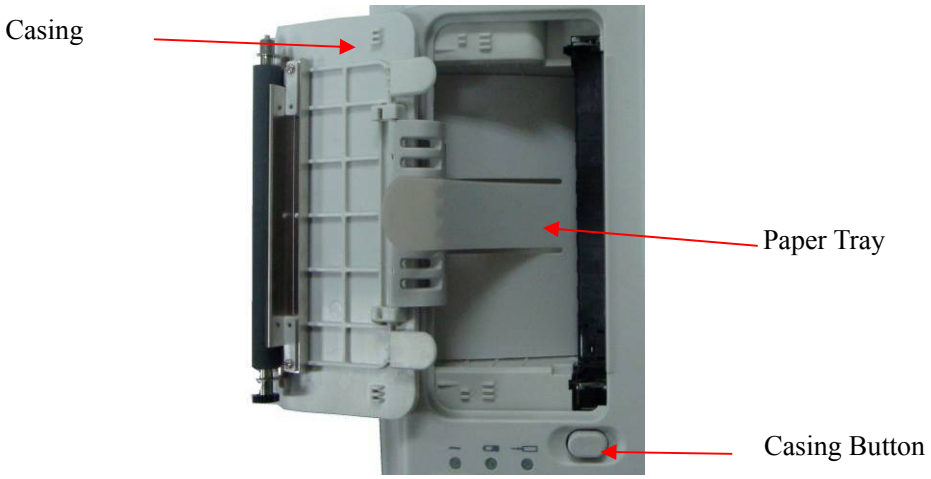
The recorder paper is the folded thermal paper.

**NOTE:** The exit edge can help you tear the recorder paper.

**CAUTION**

Make sure that the recorder paper is installed in the center of the recorder, and the paper edge is parallel with the casing edge in the direction of advancing paper, in order to avoid paper deviation or damage to the paper edge.

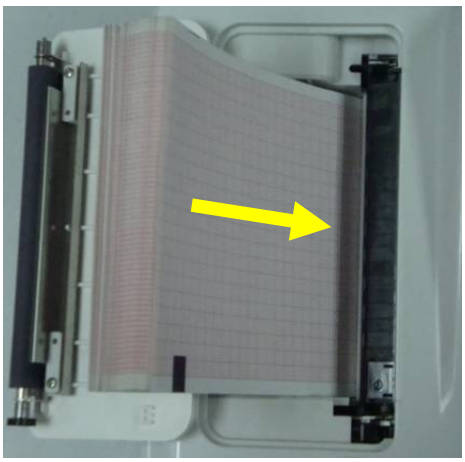
When the recorder paper runs out or is not loaded, or the casing is not closed properly, the hint message *No Paper* appears on the screen. Then you should load or replace the recorder paper immediately.

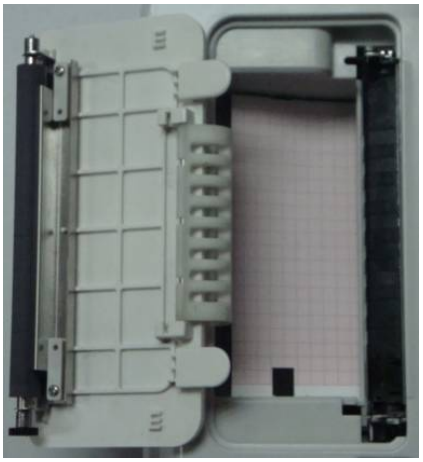



**Loading/Replacing Process of Folded Paper:**

1. Press the casing button downwards with one hand and pull the casing upwards with the other hand to open the recorder.

2. Remove remainder paper from the paper tray if necessary.
3. Take off the wrapper of the new folded paper, and then put it in the paper tray.





**NOTE:** If the paper with black markers is used, make sure that the markers are on the bottom.

4. Pull the paper out with the grid side facing the thermal print head, and shut the recorder casing.

5. Press down the recorder casing firmly.
6. To select **Paper Marker**.
   1) When the 6-channel electrocardiograph is powered by the mains supply or a battery, press on the keyboard to turn on the unit.
   2) After the main screen1 is displayed, press the function key **F5** below » to open the main screen2. On the main screen2, press the function key **F1** below **Setup** to open the **System Setup** screen.
   3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Record** on the **System Setup** screen, and then press **Enter** to open the **Record Setup** window.
   4) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item in the Record Setup window, and then press **F1** or **F2** to select an option.
   5) For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item in the Record Setup window, and then press **F3** or **F4** to select an option.
   6) Press **Enter** to confirm, and then the **System Setup** screen appears. Then press **Esc** or the function key **F5** below « to return to the main screen1.

   For details of the paper marker, please refer to Section 9.3.2, “Selecting Paper Marker”.
7. Advance the recorder paper.

   Before printing, if **Paper Marker** is set to **Style1** or **Style2**, you can press Space to advance the recorder paper to the next black marker; if **Paper Marker** is set to **No,** you can press Space to advance the paper for about 2cm. Pressing Space again can stop advancing the paper.

# 4.3 Preparing the Patient

## 4.3.1 Instructing the Patient

Before attaching the electrodes, greet the patient and explain the procedure. Explaining the procedure decreases the patient's anxiety. Reassure the patient that the procedure is painless. Privacy is important for relaxation. When possible, prepare the patient in a quiet room or area where others can't see the patient. Make sure that the patient is comfortable. The more relaxed the patient is, the less the ECG will be affected by noise.

## 4.3.2 Preparing the Skin

Thorough skin preparation is very important. The skin is a poor conductor of electricity and frequently creates artifact that distorts the ECG signals. By performing methodical skin preparation, you can greatly reduce the possibility of the noise caused by muscle tremor and baseline drift, ensuring high-quality ECG waves. There is natural resistance on the skin surface due to dry, dead epidermal cells, oils and dirt.

**To Prepare the Skin**

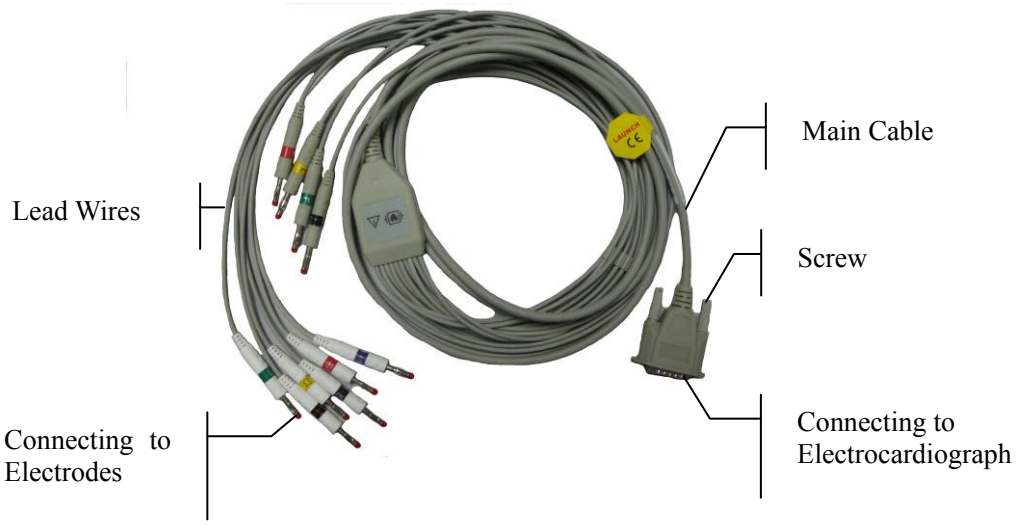
1. Shave hair from electrode sites, if necessary. Excessive hair prevents a good connection.
2. Wash the area thoroughly with soap and water.
3. Dry the skin with a gauze pad to increase capillary blood flow to the tissues and to remove the dead, dry skin cells and oils.

# 4.4 Connecting the Patient Cable to the Electrocardiograph and Electrodes

**WARNING**

The performance and electric shock protection can be guaranteed only if the original patient cable and electrodes of the manufacturer are used.

The patient cable includes the main cable and lead wires which can be connected to electrodes.




**1. Connecting the Patient Cable to the Electrocardiograph**

Connect the patient cable to the patient cable socket on the right side of the main unit, and then secure them with two screws.

**2. Connecting the Patient Cable to Electrodes**

Align all lead wires of the patient cable to avoid twisting, and connect the lead wires to the electrodes or the alligator clips. Firmly attach them.

# 4.5 Attaching Electrodes to the Patient

The identifiers and color codes of electrode connectors used comply with IEC/EN requirements. In order to avoid incorrect connection, the identifiers and color codes are specified in Table 4-1. Moreover the equivalent code according to American requirements is given in Table 4-1 too.

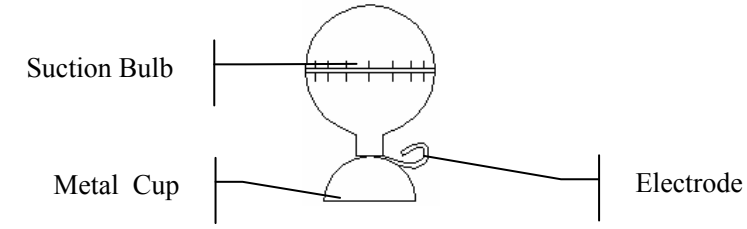
Table 4-1 Electrode Connectors and Their Identifiers and Color Codes

| | **European** | | **American** | |
|---|---|---|---|---|
| **Electrode Connectors** | **Identifier** | **Color Code** | **Identifier** | **Color Code** |
| Right arm | R | Red | RA | White |
| Left arm | L | Yellow | LA | Black |
| Right leg | N or RF | Black | RL | Green |
| Left leg | F | Green | LL | Red |
| Chest 1 | C1 | White/Red | V1 | Brown/Red |
| Chest 2 | C2 | White/Yellow | V2 | Brown/Yellow |
| Chest 3 | C3 | White/Green | V3 | Brown/Green |
| Chest 4 | C4 | White/Brown | V4 | Brown/Blue |
| Chest 5 | C5 | White/Black | V5 | Brown/Orange |
| Chest 6 | C6 | White/Violet | V6 | Brown/Violet |

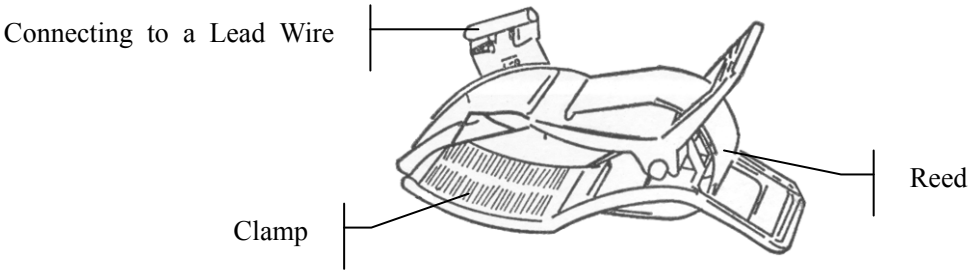
Two types of electrode can be used, one is the reusable electrodes, and the other is the disposable electrodes.

## 4.5.1 Reusable Electrodes

Reusable electrodes include limb electrodes and chest electrodes, as the following figures show.




Chest Electrode




Limb Electrode

As the following figure shows, the positions of chest electrodes on the body surface are

C1: Fourth intercostal space at the right border of the sternum

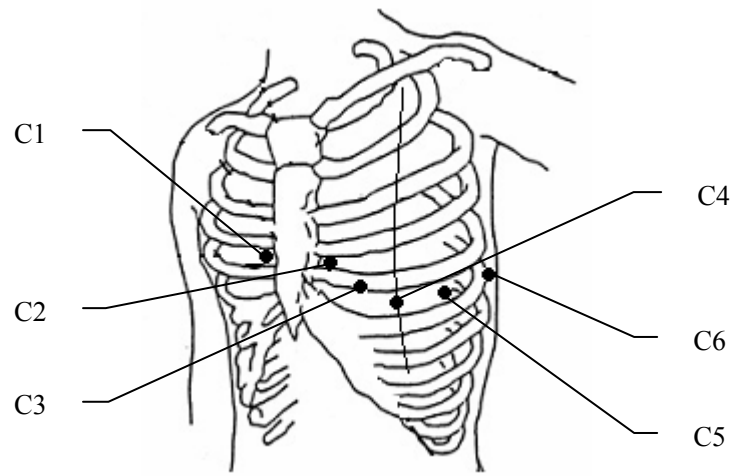
C2: Fourth intercostal space at the left border of the sternum

C3: Fifth rib between C2 and C4

C4: Fifth intercostal space on the left midclavicular line

C5: Left anterior axillary line at the horizontal level of C4

C6: Left midaxillary line at the horizontal level of C4



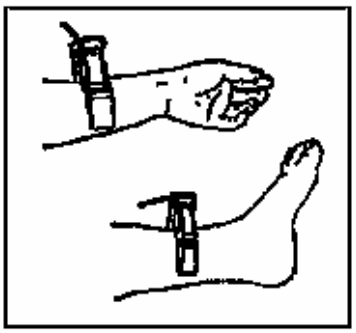

**NOTE:** Long-time measurement with a strong negative pressure on the suction bulb may cause reddening of the skin. When using the electrode on small children or patients with delicate skin, squeeze the suction ball lightly.

**Chest Electrode Connection:**

1) Ensure that the electrodes are clean;
2) Align all lead wires of the patient cable to avoid twisting, and connect the lead wires to the corresponding electrodes according to the colors and identifiers;
3) Clean the electrode area on the chest surface with 75% alcohol;
4) Daub the round area of 25mm in diameter on each electrode site with gel evenly;
5) Place a small amount of gel on the brim of chest electrode's metal cup;
6) Place the electrode on the chest electrode site and squeeze the suction bulb. Unclench it and the electrode is adsorbed on the chest;
7) Attach all chest electrodes in the same way.

**Limb Electrode Connection:**

1) Ensure that the electrodes are clean;
2) Align all lead wires of the patient cable to avoid twisting, and connect the lead wires to the corresponding electrodes according to the colors and identifiers;
3) Clean the electrode area which is a short distance above the ankle or the wrist with 75% alcohol;
4) Daub the electrode area on the limb with gel evenly;
5) Place a small amount of gel on the metal part of the limb electrode clamp;
6) Connect the electrode to the limb, and make sure that the metal part is placed on the electrode area above the ankle or the wrist;
7) Attach all limb electrodes in the same way.



## 4.5.2 Disposable Electrodes

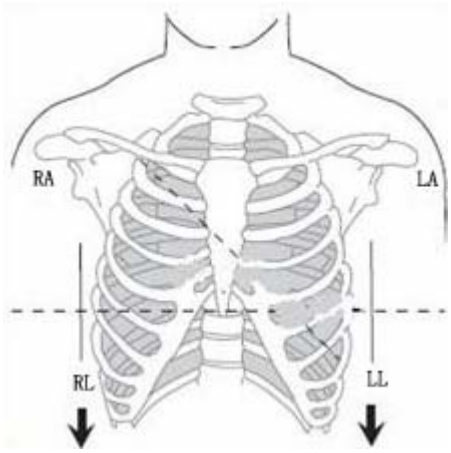
**Disposable Electrode**

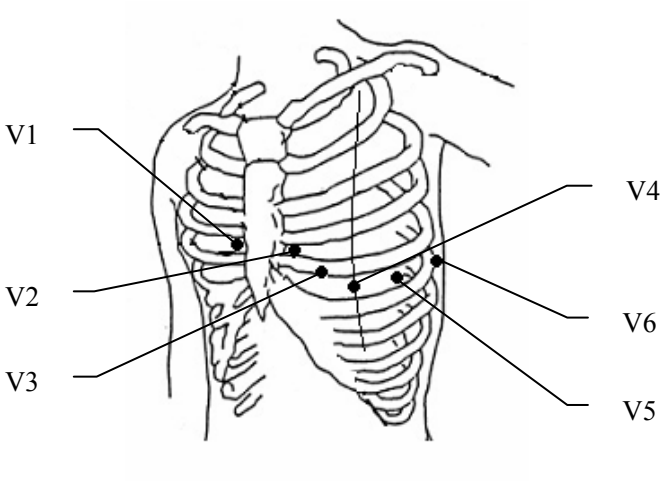

**Alligator Clip**

Disposable electrodes must be used together with alligator clips.

The electrodes' positions on the body surface are shown in the following table and figures.

| American Label | European Label | Electrode Placement |
|---|---|---|
| RA | R | Right deltoid |
| LA | L | Left deltoid |
| RL | N or RF | Above the right ankle (Alternate placement, upper leg as close to torso as possible) |
| LL | F | Above the left ankle (Alternate placement, upper leg as close to torso as possible) |
| V1 | C1 | Fourth intercostal space at the right border of the sternum |
| V2 | C2 | Fourth intercostal space at the left border of the sternum |
| V3 | C3 | Fifth rib between V2 and V4 |
| V4 | C4 | Fifth intercostal space on the left midclavicular line |
| V5 | C5 | Left anterior axillary line at the horizontal level of V4 |
| V6 | C6 | Left midaxillary line at the horizontal level of V4 |




**Disposable Electrode Connection**

1) Align all lead wires of the patient cable to avoid twisting, and connect the alligator clips to the lead wires.
2) Clean the electrode areas on the body surface with 75% alcohol.
3) Attach the disposable electrodes to the electrode positions on the body surface.
4) Clip the disposable electrodes with the alligator clips.

The quality of ECG waveform will be affected by the contact resistance between the patient and the electrode. In order to get a high-quality ECG, the skin-electrode resistance must be minimized while connecting electrodes.

**WARNING**

1. Make sure that all electrodes are connected to the patient correctly before operation.
2. Ensure that the conductive parts of electrodes and associated connectors, including neutral electrodes, do not come in contact with earth or any other conducting objects.

# 4.6 Inspection before Power-On

In order to avoid safety hazards and get good ECG records, the following inspection procedure is recommended before power-on and operation.

**WARNING**

The electrocardiograph is intended to be used by qualified physicians or personnel professionally trained, and they should be familiar with the contents of this user manual before operation.

1) **Environment**:

- ♦ Make sure that there is no electromagnetic interference source around the equipment, especially large medical electrical equipment such as electrosurgical equipment, radiological equipment, magnetic resonance imaging equipment etc. Switch off these devices when necessary.
- ♦ Keep the examination room warm to avoid muscle tremor voltages in ECG signals caused by cold.

2) **Power Supply**:

- ♦ If the mains supply is used, please check whether the power cord is connected to the unit well. The grounded three-phase outlet should be used.
- ♦ When the battery capacity is low, recharge the battery before use.

3) **Patient Cable**:

- ♦ Make sure that the patient cable is connected to the unit firmly, and keep it far away from the power cord.

4) **Electrodes**:

- ♦ Make sure that all electrodes are connected to lead wires of the patient cable correctly.
- ♦ Ensure that the chest electrodes do not contact.

5) **Recorder Paper**:

- ♦ Ensure that there is enough recorder paper loaded correctly.

6) **Patient**:

- ♦ The patient should not come into contact with conducting objects such as earth, metal parts etc.
- ♦ Ensure that the patient is warm and relaxed, and breathes calmly.

**WARNING**

The electrocardiograph is intended to be used by qualified physicians or personnel professionally trained, and they should be familiar with the contents of this user manual before operation.

# Chapter 5 Switching On the Electrocardiograph

- When the mains supply is used, connect the power cord, and the mains supply indicator (∿) is lit. Then press on the keyboard to turn on the unit. The equipment information such as the device name, the version number will be displayed on the LCD screen after self-test. Then the electrocardiograph is ready for use.
- When a battery is used, press on the keyboard directly to turn on the unit, and then the battery indicator ( ) is lit. The equipment information such as the device name, the version number will be displayed on the LCD screen after self-test. Then the electrocardiograph is ready for use.

# Chapter 6 Entering Patient Information

After the electrocardiograph is switched on, the main screen1 appears.

## 6.1 Entering Patient ID

1. By default, the system generates the patient ID automatically. The range of the patient ID is 0 ~ 1999, 999, 999.
2. Or the system can generate the patient ID according to the current time.

The procedures are as follows:

1) Press the function key **F5** below » to display the main screen2.
2) Press the function key **F1** below **Setup** to open the **System Setup** screen.
3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Pat. Question**, press **Enter** to open the **Patient Question** window. The cursor is on the **ID Mode** item.
4) For SE-601B/C, press **F1** or **F2** to select **Time**. For SE-601A, press **F3** or **F4** to select **Time**.
5) Press **Enter** to confirm.
6) Press **Esc** or the function key **F5** below « to return to the main screen1.

Then the system will generate the patient ID according to the time when you press the **START/STOP** key to print an ECG report.

3. Or you can enter the patient ID manually.

The procedures are as follows:

1) Press the function key **F5** below » to display the main screen2.
2) Press the function key **F1** below **Setup** to open the **System Setup** screen.
3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Pat. Question**, press **Enter** to open the **Patient Question** window. The cursor is on the **ID Mode** item.
4) For SE-601B/C, press **F1** or **F2** to select **Manu**. For SE-601A, press **F3** or **F4** to select **Manu**.
5) Press **Enter** to confirm.
6) Press **Esc** or the function key **F5** below « to return to the main screen1.
7) Press the function key **F1** below **Patient** to open the **Patient Information window**. Press **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is in the **ID** textbox, enter the patient ID manually.
8) Press **Enter** to confirm.

**NOTE:** In the **AUTO** or **RHYT** mode, when **ID Mode** is set to **Manu** and **ID Hint** is set to **On**, if you do not input the patient ID, the hint will pop up to remind you to input the patient ID when you press the **START/STOP** key.

## 6.2 Entering Other Information

When the main screen1 is displayed, press the function key **F1** below **Patient** to open the **Patient Information** window.

1. Press **Tab** or **Shift** + **Tab** to move the cursor to a textbox.
2. Fill in the selected textbox.
3. For SE-601A, press **Tab** or **Shift** + **Tab** to move the cursor to the **Next** or **Prev** button, and then press **Enter** to turn the page.
4. After inputting all the information, press **Enter** to confirm.

# Chapter 7 Printing ECG Reports

There are four modes to print ECG reports.

In the **AUTO** mode, the lead groups are switched automatically according to the lead sequence during the printing course. After the ECG signals of one lead group are printed within a certain time, the system switches to print ECG signals of another lead group automatically. A 1mV calibration mark will be printed at the beginning of ECG reports.

In the **MANU** mode, you should switch the lead group manually. You can determine the lead group to be displayed and printed by pressing the **Tab** key.

In the **RHYT** mode, you can print 60s rhythm-lead ECG waveform of one lead in the **Single Lead** style or 20s rhythm-lead ECG waveform of three leads in the **Three Lead** style.

In the **R-R** mode, you can select a lead to print its 180s ECG waveform, R-R histogram and R-R trend chart.

**NOTE:** The electrocardiograph can not print ECG reports when transmitting data through USB socket 2.

## 7.1 Auto Mode

**Operation Method:**

1. To set **Auto Style**, **Sample Mode**, **Record Sequence**, **Sample Time**, **Rhythm Lead1/2/3**, or **Lead Sequence** (Optional)

   When the main screen1 is displayed, press the function key **F5** below »» to open the main screen2. Press the function key **F1** below **Setup** to display the **System Setup** screen and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** window.

   1) For SE-601B/C, press **F1** or **F2** to select **AUTO**. For SE-601A, press **F3** or **F4** to select **AUTO**.
   2) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Auto Style** item, and then press **F1** or **F2** to select a style.

      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Auto Style** item, and then press **F3** or **F4** to select a style.
   3) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Mode** item, and then press **F1** or **F2** to select a sampling mode.

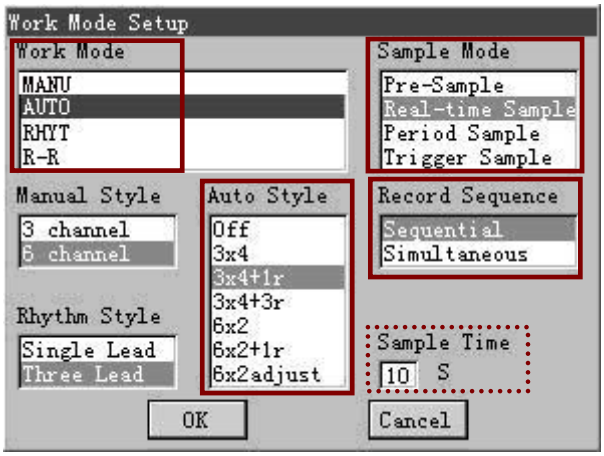
      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Mode** item, and then press **F3** or **F4** to select a sampling mode.

      For details of the sampling mode, refer to Section 9.1.5, “Specifying Sampling Mode”.
   4) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item, and then press **F1** or **F2** to select a recording sequence.

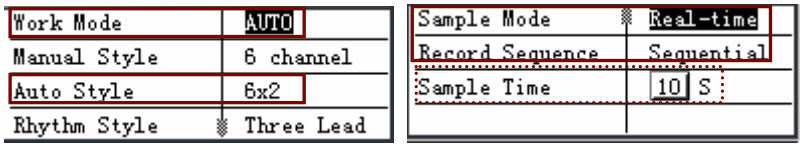
      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item, and then press **F3** or **F4** to select a recording sequence.

For details of the recording sequence, please see Section 9.1.6, "Specifying Recording Sequence".

5) If you set **Auto Style** to **6×2 adjust**, press **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Time** textbox, and then enter the sampling time within 10-24s.
6) Press **Enter** to confirm.




SE-601B / SE-601C Work Mode Setup Window

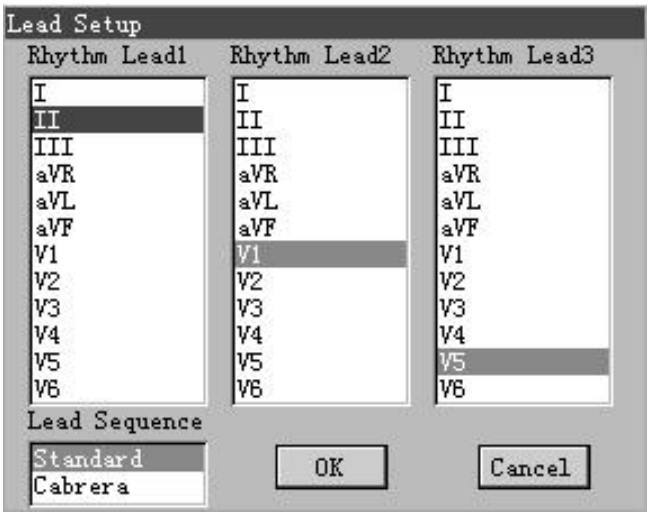



SE-601A Work Mode Setup Window

7) On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Lead**, press **Enter** to open the **Lead Setup** window.
8) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item, and then press **F1** or **F2** to select a lead.

   For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item, and then press **F3** or **F4** to select a lead.
9) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F1** or **F2** to select a sequence.

   For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F3** or **F4** to select a sequence.
10) Press **Enter** to confirm.




SE-601B / SE-601C Lead Setup Window

| | |
|---|---|
| Rhythm Lead1 | II |
| Rhythm Lead2 | V1 |
| Rhythm Lead3 | V5 |
| Lead Sequence | Standard |

SE-601A Lead Setup Window

After setup, press **Esc** or the function key **F5** below ⩔ to exit the **System Setup** screen.

2. When the main screen1 is displayed, press the **MODE** key to select the **AUTO** mode. Press **F2** to switch the gain. Press **F3** to select a paper speed. Press **F4** to set the EMG filter and the Lowpass filter.
3. Press the **START/STOP** key to print an ECG report. It will stop automatically after printing a complete ECG report of 12 leads. Or press the **START/STOP** key again to stop printing the report.

# 7.2 Manual Mode

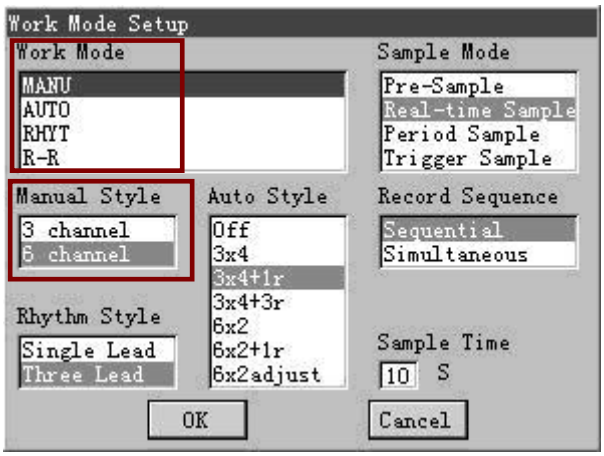
**Operation Method:**

1. To set **Manual Style** or **Lead Sequence** (Optional)

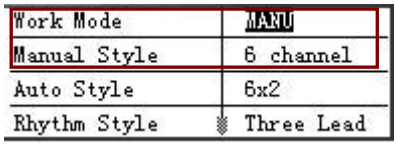
   When the main screen1 is displayed, press the function key **F5** below ⩓ to open the main screen2. Press the function key **F1** below **Setup** to display the **System Setup** screen and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** window.

   1) For SE-601B/C, press **F1** or **F2** to select **MANU**. For SE-601A, press **F3** or **F4** to select **MANU**.
   2) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Manual Style** item, and then press **F1** or **F2** to select a style.

      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Manual Style** item, and then press **F3** or **F4** to select a style.
   3) Press **Enter** to confirm.



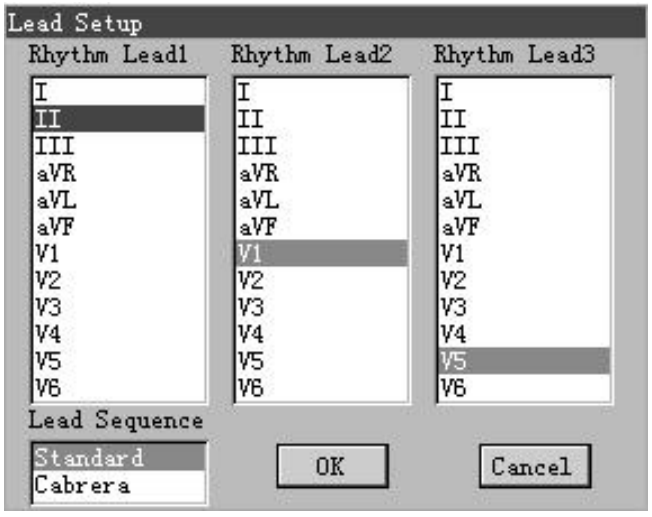

SE-601B / SE-601C Work Mode Setup Window



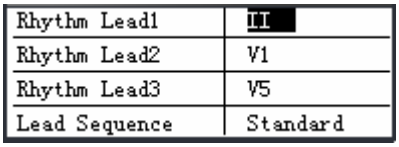

SE-601A Work Mode Setup Window

4) On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Lead**, press **Enter** to open the **Lead Setup** window.
5) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F1** or **F2** to select a sequence.

   For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F3** or **F4** to select a sequence.
6) Press **Enter** to confirm.




SE-601B / SE-601C Lead Setup Window




SE-601A Lead Setup Window

After setup, press **Esc** or the function key **F5** below ⩔ to exit the **System Setup** screen.

2. When the main screen1 is displayed, press the **MODE** key to select the **MANU** mode. Press **F2** to switch the gain. Press **F3** to select a paper speed. Press **F4** to set the EMG filter and the Lowpass filter.
3. Press **Tab** to select the lead group to be printed.
4. Press the **START/STOP** key to print an ECG report.
5. Press the **START/STOP** key to stop printing the report.

# 7.3 Rhythm Mode

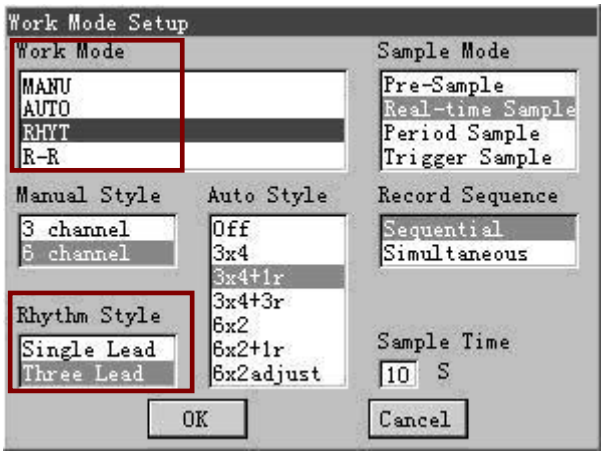
**Operation Method:**

1. To set **Rhythm Style**, **Rhythm Lead1/2/3** or **Lead Sequence** (Optional)

   When the main screen1 is displayed, press the function key **F5** below ⩓ to open the main screen2. Press the function key **F1** below **Setup** to display the **System Setup** screen and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** window.

   1) For SE-601B/C, press **F1** or **F2** to select **RHYT**. For SE-601A, press **F3** or **F4** to select **RHYT**.
   2) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Style** item, and then press **F1** or **F2** to select a style.

      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Style** item, and then press **F3** or **F4** to select a style.
   3) Press **Enter** to confirm.




SE-601B / SE-601C Work Mode Setup Window


SE-601A Work Mode Setup Window

   4) On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Lead**, press **Enter** to open the **Lead Setup** window.

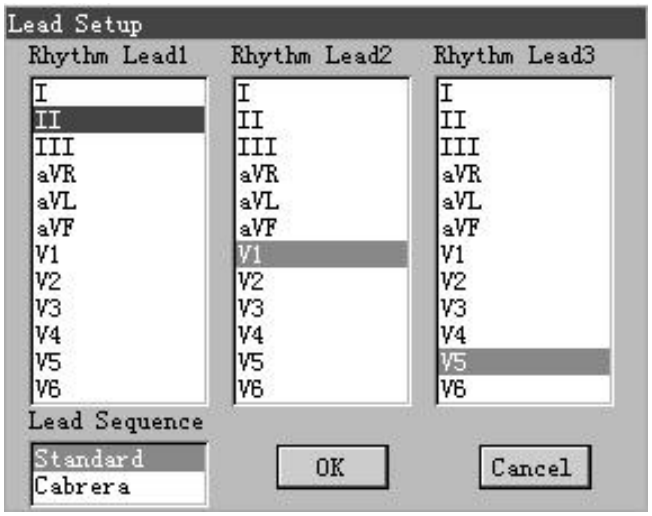
5) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item, and then press **F1** or **F2** to select a lead.

   For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item, and then press **F3** or **F4** to select a lead.

6) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F1** or **F2** to select a sequence.

   For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item, and then press **F3** or **F4** to select a sequence.

7) Press **Enter** to confirm.




SE-601B / SE-601C Lead Setup Window

| | |
|---|---|
| Rhythm Lead1 | II |
| Rhythm Lead2 | V1 |
| Rhythm Lead3 | V5 |
| Lead Sequence | Standard |

SE-601A Lead Setup Window

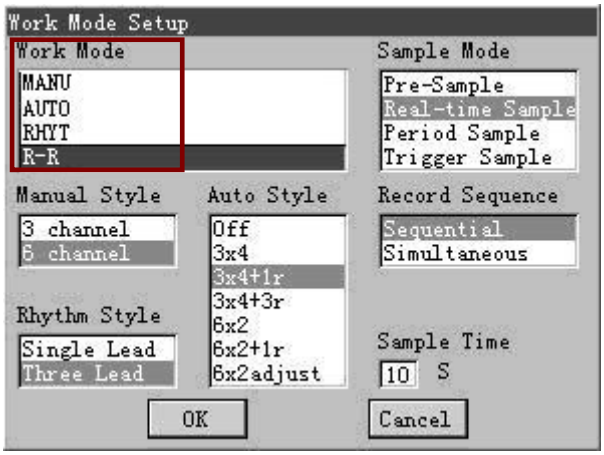
After setup, press **Esc** or the function key **F5** below ⩓ to exit the **System Setup** screen.

2. When the main screen1 is displayed, press the **MODE** key to select the **RHYT** mode. Press **F2** to switch the gain. Press **F3** to select a paper speed. Press **F4** to set the EMG filter and the Lowpass filter.
3. Press the **START/STOP** key and the hint information *Sampling* will be displayed on the LCD screen, and the sampling time will be counted. When the sampling time reaches 60s in the **Single Lead** style or 20s in the **Three Lead** style, it begins to print an ECG report.
4. It will stop automatically after printing a complete report of rhythm-lead ECG waveforms. Or press the **START/STOP** key again to stop printing the report.

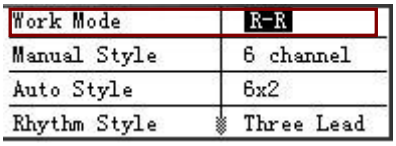
# 7.4 R-R Mode

**Operation Method:**

1. When the main screen1 is displayed, press the function key **F5** below » to open the main screen2. Press the function key **F1** below **Setup** to display the **System Setup** screen and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** window.
   1) For SE-601B/C, press **F1** or **F2** to select **R-R**. For SE-601A, press **F3** or **F4** to select **R-R**.
   2) Press **Enter** to confirm.



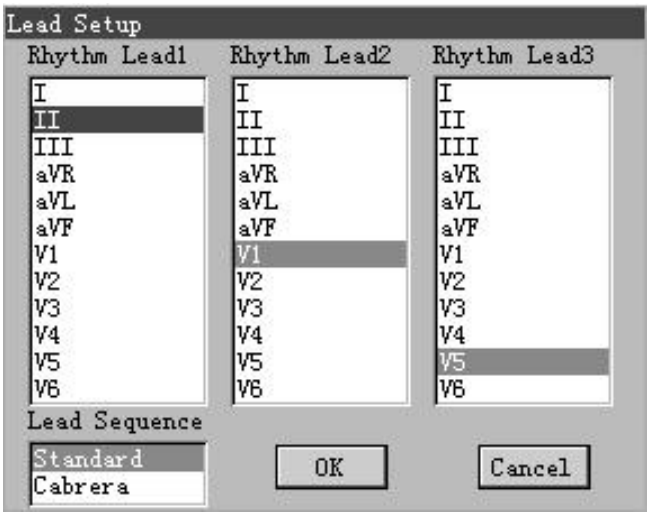

SE-601B / SE-601C Work Mode Setup Window




SE-601A Work Mode Setup Window

   3) On the **System Setup** screen, press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Lead**, press **Enter** to open the **Lead Setup** window.
   4) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1** item, and then press **F1** or **F2** to select a lead.

      For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1** item, and then press **F3** or **F4** to select a lead.
   5) Press **Enter** to confirm.




SE-601B / SE-601C Lead Setup Window

| | |
|---|---|
| Rhythm Lead1 | II |
| Rhythm Lead2 | V1 |
| Rhythm Lead3 | V5 |
| Lead Sequence | Standard |

SE-601A Lead Setup Window

After setup, press **Esc** or the function key **F5** below ⇞ to exit the **System Setup** screen.

2. When the main screen1 is displayed, press **F2** to switch the gain. Press **F4** to set the EMG filter and the Lowpass filter.
3. Press the **START/STOP** key to begin to count the sampling time. When the sampling time reaches 180s, it begins to print an ECG report.
4. It will stop automatically after a complete R-R analysis report is printed, or press the **START/STOP** key to stop printing the report.

**NOTE:** In the **R-R** mode, you can not set the speed. The constant speed is 25mm/s, because in the **R-R** mode, the ECG wave length is compressed to one third of the original wave length.

# 7.5 Transmitting ECG Data to the PC

**NOTE:** To transmit ECG data to the PC, the Smart ECG Viewer software of the manufacturer must be installed in the PC. You should log into the Smart ECG Viewer software before transmission.

## 7.5.1 Transmitting ECG Data through the Serial Port

1. Connect the RS232 socket of the PC to the RS232 socket of the electrocardiograph with an RS232 cable.
2. Or if the PC has no RS232 socket, connect the USB socket of the PC to the RS232 socket of the electrocardiograph by using the RS232-USB assembly. For details of the RS232-USB assembly, please refer to Section 8.2.1, “Transmitting Files Through the Serial Port”

.

3. Select the transmission mode. For details on selecting the transmission mode, please see Section 8.2.1, “Transmitting Files Through the Serial Port”.
4. Log into the Smart ECG Viewer software.
5. In the AUTO or RHYT mode, ECG data will be transmitted through the serial port automatically after an ECG report is printed out.

### 7.5.2 Transmitting ECG Data through the Net Port

1. Connect the PC to the electrocardiograph with an Ethernet cable recommended by the manufacturer. If the wireless AP transmission is used, connect the PC to one wireless AP, and connect the electrocardiograph to the other wireless AP. Only the wireless AP recommended by the manufacturer can be used.
2. Set the transmission mode and the IP address. For details on setting the transmission mode and the IP address, please see Section 8.2.2, “Transmitting Files Through the Net Port”.
3. Log into the Smart ECG Viewer software.
4. In the AUTO or RHYT mode, ECG data will be transmitted through the net port automatically after an ECG report is printed out.

## 7.6 Copy Printing

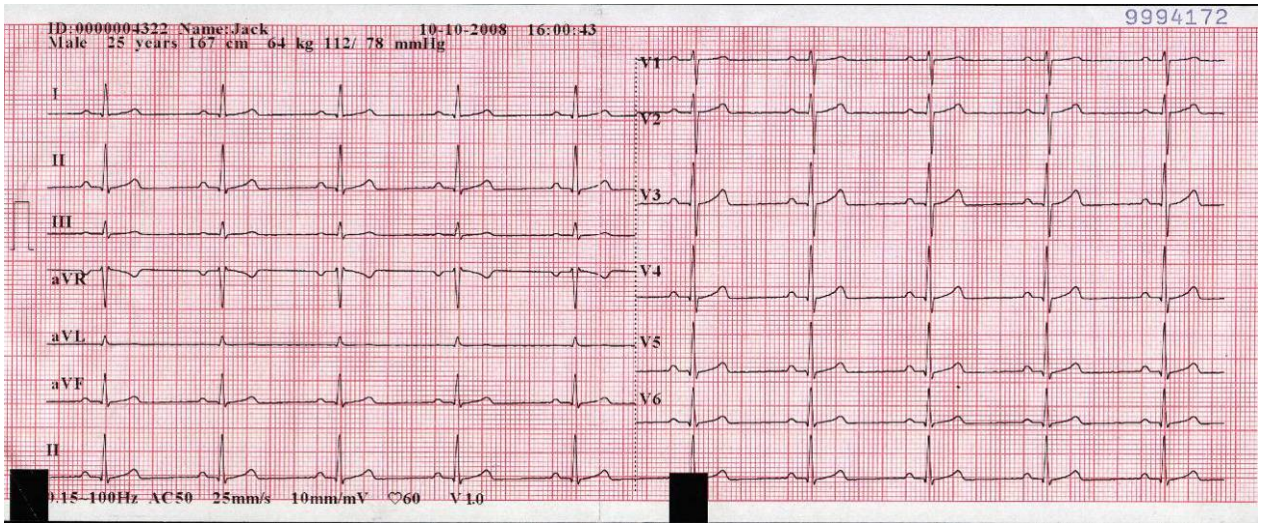
In the **AUTO** mode, pressing the **1mV/Copy** key can print the ECG report which was printed out last time. Pressing the **START/STOP** key can stop printing the ECG report.

**NOTE:** After an ECG report is printed out in the **AUTO** mode, if you press the function key or the **MODE** key, no copy printing can be carried out until the next ECG report is printed in the **AUTO** mode.

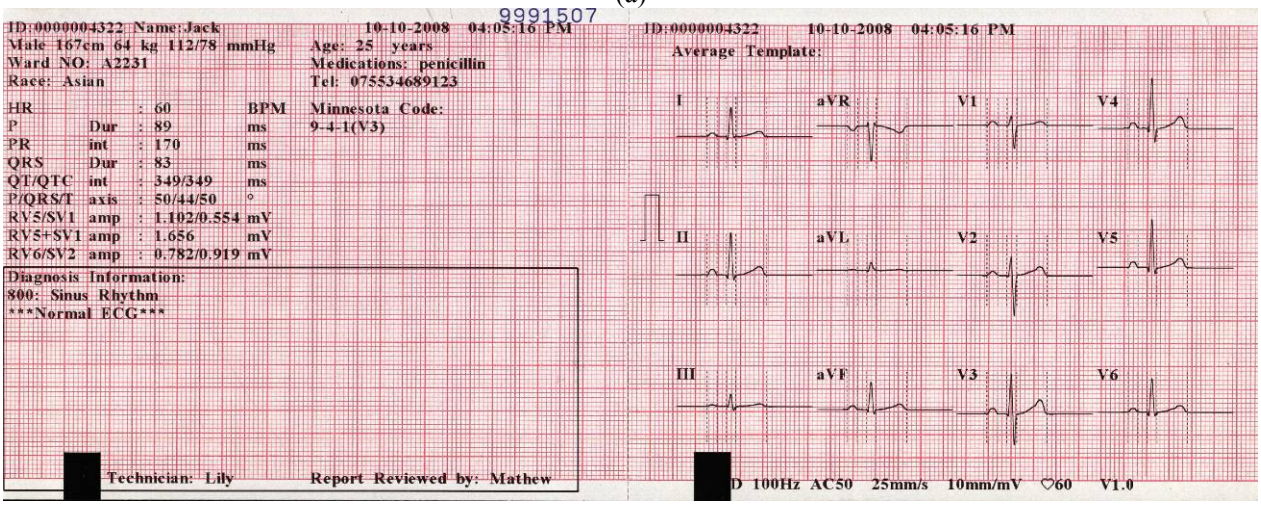
# 7.7 ECG Reports

## 7.7.1 ECG Reports in the Auto Mode

### 7.7.1.1 Examples of 6×2+1rhy




(a)




(b)

The above figures (a) and (b) show the ECG reports in the **AUTO** mode. **Template** is set to **On**, and **Auto Style** is set to **6×2+1rhy**.

Figure (a) shows:

ID: 0000004322 (Patient ID)

10-10-2008 16:00:43 (Current Date & Current Time)

Gender: Male, Age: 25 years, Height: 167cm, Weight: 64kg, BP: 112/78mmHg

⎍ (1mV calibration mark)

I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6 (12 standard Leads) and ECG waves

II on the bottom (Rhythm Lead) and rhythm wave

0.15~100Hz (0.15Hz DFT Filter, 100Hz Lowpass Filter)

AC50 (50Hz AC Filter)

25mm/s (Paper Speed)

10mm/mV (Gain)

♡60 (Heart Rate)

V1.0 (Version number)

**NOTE:** The version number in the ECG reports is just for reference. The real version number can be found on the screen of the electrocardiograph when you turn on the device.

Figure (b) shows: Patient Information, Measure Information, Minnesota Code, Diagnosis Information, Average Template, Report Reviewed by, Doctor Name, Current Date and Current Time, 0.15Hz (DFT Filter), 100Hz (Lowpass Filter), AC50 (50Hz AC Filter), 25mm/s (Paper Speed), 10mm/mV (Gain), V1.0 (Version number).

Patient Information includes:

ID, Name, Age, Gender, Height, Weight, BP, Race, Medication, Ward NO, Tel (Extra Information)

Measure Information includes:

HR (Heart Rate)

P Dur----P wave duration: the average P-wave duration from several selected dominant beats;

PR int----P-R interval: the average P-R interval from several selected dominant beats;

QRS Dur----QRS complex duration: the average QRS complex duration from several selected dominant beats;

QT/QTC int----Q-T interval: the average Q-T interval from several selected dominant beats / Normalized QT interval;

P/QRS/T axis----Dominant direction of the average integrated ECG vectors;

RV5/SV1 amp----The maximum value of the amplitude of R and R' wave from the average beat of lead V5 / The maximum absolute value of the amplitude of S and S' wave from the average beat of lead V1;

RV5+SV1 amp----Sum of RV5 and SV1;

RV6/SV2 amp----The maximum value of the amplitude of R and R' wave from the average beat of lead V6 / The maximum absolute value of the amplitude of S and S' wave from the average beat of lead V2.

Diagnosis Information:

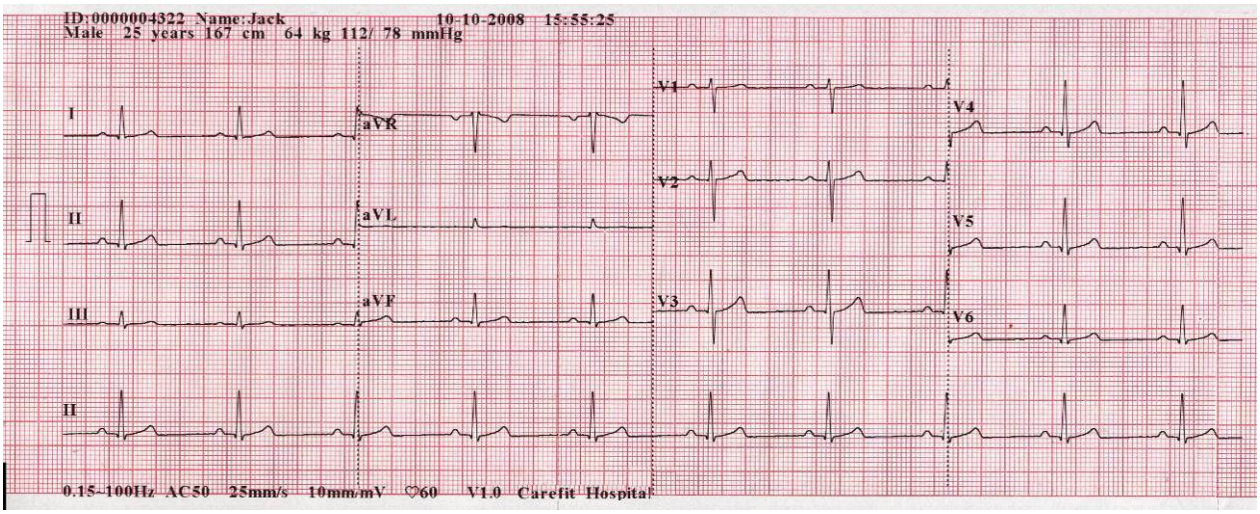
Diagnosis information shows the auto diagnosis result.

Average Template:

Average template shows the average value of 10s sampled ECG signals of every lead.

The broken lines on the template are position markers. They respectively mark the start and end points of the P wave and the QRS wave, and the end point of the T wave.

### 7.7.1.2 Example of 3×4+1rhy




The above figure shows the ECG report in the **AUTO** mode. **Auto Style** is set to **3×4+1rhy**. The ECG report includes:

10-10-2008 15: 55: 25 (Current Date and Current Time)

3×4+1rhy ECG wave

0.15~100Hz (0.15Hz DFT Filter, 100Hz Lowpass Filter) AC50 (50Hz AC Filter)

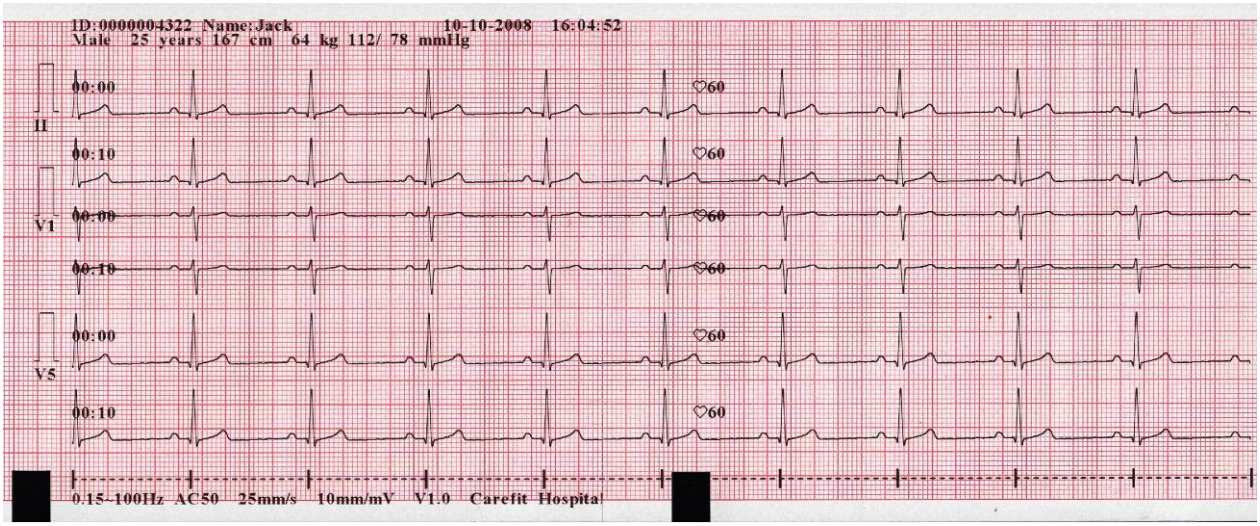
25mm/s (Paper Speed) 10mm/mV (Gain)

♡60 (Heart Rate)

Carefit Hospital (Institution Name)

V1.0 (Version number)

## 7.7.2 ECG Reports in the Rhythm Mode




The above figure shows the ECG report in the **RHYT** mode, and **Rhythm Style** is set to **Three Lead**.

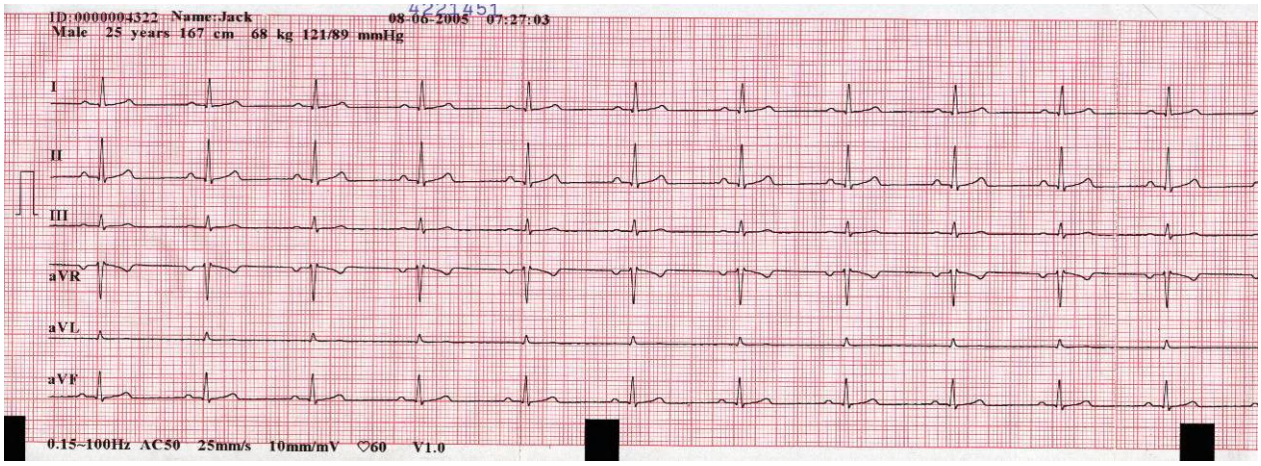
The figure shows:

ID: 0000004322 (Patient ID)

10-10-2008 16:04:52 (Current Date & Current Time)

Gender: Male, Age: 25 years, Height: 167cm, Weight: 64kg, BP: 112/78mmHg
00:00, 00:10 (Timer)
♡60 (Heart Rate)
⎍ (1mV calibration mark) II、V1、V5 (Rhythm Lead name)
20s rhythm waveform of lead II / V1 / V5
0.15~100Hz (0.15Hz DFT Filter, 100Hz Lowpass Filter)
AC50 (50Hz AC Filter) 25mm/s (Paper Speed)
10mm/mV (Gain) Carefit Hospital (Institution Name)
V1.0 (Version number)

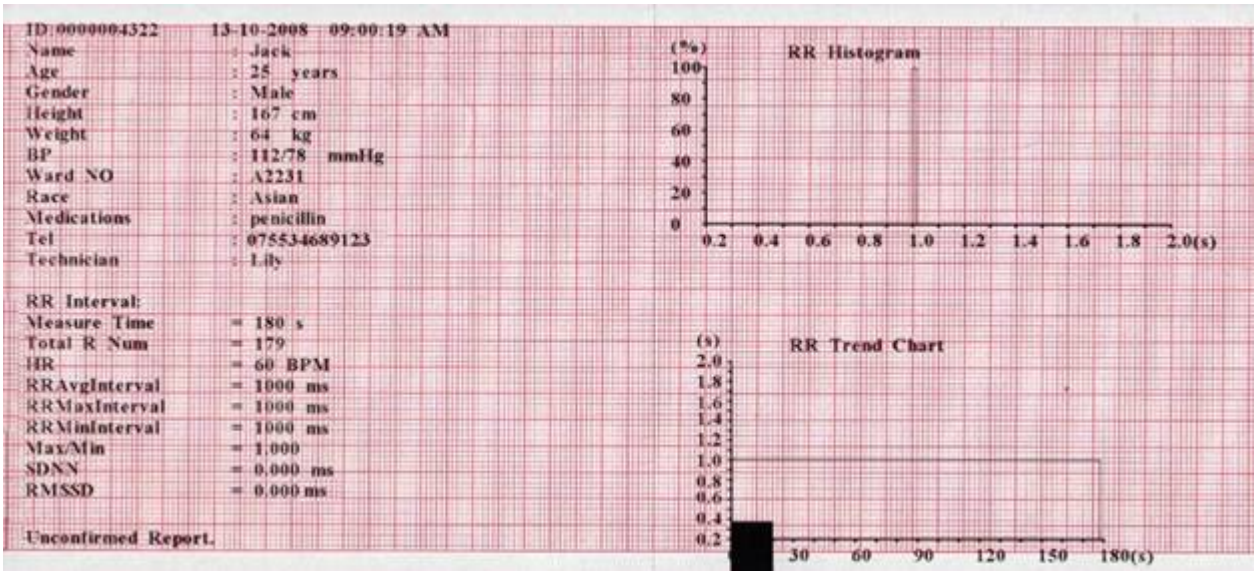
## 7.7.3 ECG Reports in the Manual Mode



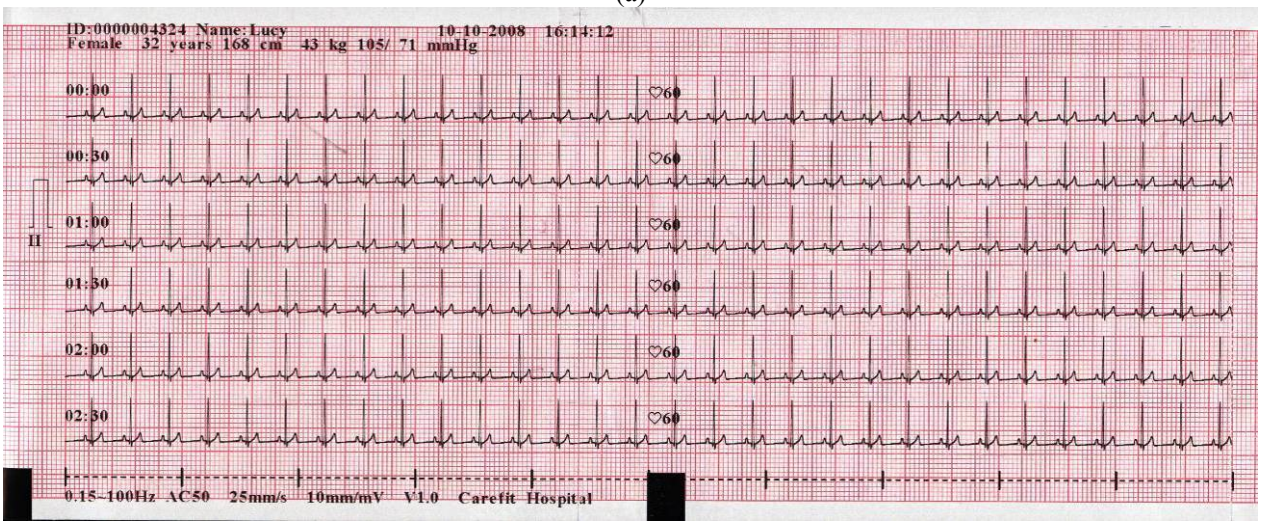

The above figure shows the ECG report in the **MANU** Mode, and **Manual Style** is set to **6-channel**.

The above figure shows:
ID: 0000004322(Patient ID)
08-06-2005 07:27:03 (Current Date & Current Time)
Gender: Male, Age: 25 years, Height: 167cm, Weight: 68kg, BP: 121/89mmHg
⎍ (1mV calibration mark)
I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6 (12 standard Leads)
ECG waveform of 12 standard leads
0.15~100Hz (0.15Hz DFT Filter, 100Hz Lowpass Filter)
AC50 (50Hz AC Filter)
25mm/s (Paper Speed)
10mm/mV (Gain)
♡60 (Heart Rate)
Carefit Hospital (Institution Name)
V1.0 (Version number)

## 7.7.4 ECG Reports in the R-R Mode




(a)




(b)

The above figures (a) and (b) show the ECG reports in the **R-R** mode.

Figure (a) shows:

Current Date & Current Time

Patient Information (Name, ID, Gender, Age, Height, Weight, BP, Ward NO, Race, Medications, Technician)

Measure Time

Total R Num (Total R-wave number)

HR (Heart Rate)

RR Avg Interval (Average RR interval)

RR Max Interval (Maximum RR interval)

RR Min Interval (Minimum RR interval)

Max/Min (Ratio of Maximum RR interval to Minimum RR interval)

SDNN (Standard Deviation of Normal to Normal intervals)

RMSSD (the Root Mean Square of Successive Difference)

RR Histogram
RR Trend Chart
Figure (b) shows:
Current Date & Current Time
Patient Information (Name, ID, Gender, Age, Height, Weight, BP)
Gain, Speed, Filter
⎍ (1mV calibration mark)
II (Lead name)
180s ECG wave of Rhythm Lead 1

## 7.7.5 ECG Reports Printed by the USB Printer

As the above figure shows, the ECG report printed by the USB printer includes:

ID, Paper Speed, Gain, Date and Time;

Name, BP, Age, Gender, Weight, Height, Race, Medications, Ward No, Technician;

Heart Rate, P duration, PR interval, QRS duration, QT/QTC interval, P/QRS/T axis, RV5/SV1 amplitude, RV5+SV1 amplitude, RV6/SV2 amplitude;

Minnesota Code;

Diagnosis Information;

Report Reviewed by;

Doctor Name;

DFT Filter, Lowpass Filter, AC Filter;

ECG waveform of 12 leads

# Chapter 8 Managing Files

If you want to save the ECG data in the electrocardiograph, you should set the **Save Option** item to **On**. The default value is **On**. Then the ECG data in the **AUTO** or **RHYT** mode will be saved on the **File Manage** screen automatically.

**To Set Save Option to On**

1. When the main screen1 is displayed, press the function key **F5** below » to open the main screen2. Press the function key **F1** below **Setup** to open the **System Setup** screen.
2. Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **More**, press **Enter**.
3. Press Tab or Shift + Tab to move the cursor to the Save Option item.
4. For SE-601B/C, press F1 or F2 to select On. For SE-601A, press F3 or F4 to select On.
5. Press Enter to confirm.
6. On the System Setup screen, press Esc or the function key F5 below « to return to the main screen1.

**To Switch to the File Manage screen 1/2/3**

When the main screen1 is displayed, press the function key **F5** below » to open the main screen2. Press the function key **F2** below **File** to open the **File Manage** screen1.

1. Press the function key **F5** below » to display the **File Manage** screen2. Then press the function key **F5** below « to return to the **File Manage** screen1.
2. Or press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file on the **File Manage** screen1, and then press the function key **F4** below **Select** to select the file and display the **File Manage** screen3. For SE-601B/C, press **Esc** to return to the **File Manage** screen1. For SE-601A, press **Esc** or the function key **F5** below « to return to the **File Manage** screen1.

   **NOTE:** Pressing **Shift+F1** or **Shift+F2** can move the cursor quickly.
3. When the **File Manage** screen1 is displayed, press **Esc** to return to the main screen1.

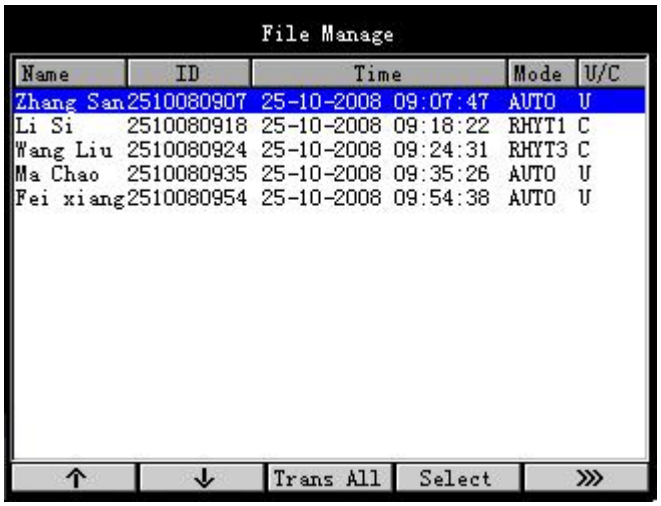



Figure 8-1 SE-601B / SE-601C File Manage Screen1

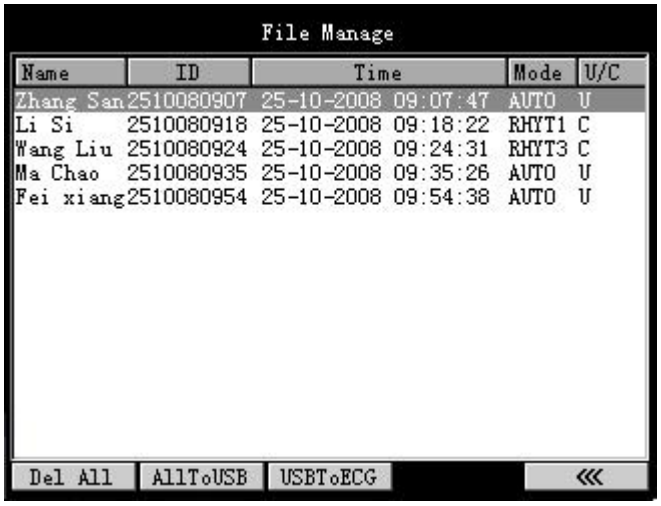



Figure 8-2 SE-601B / SE-601C File Manage Screen2

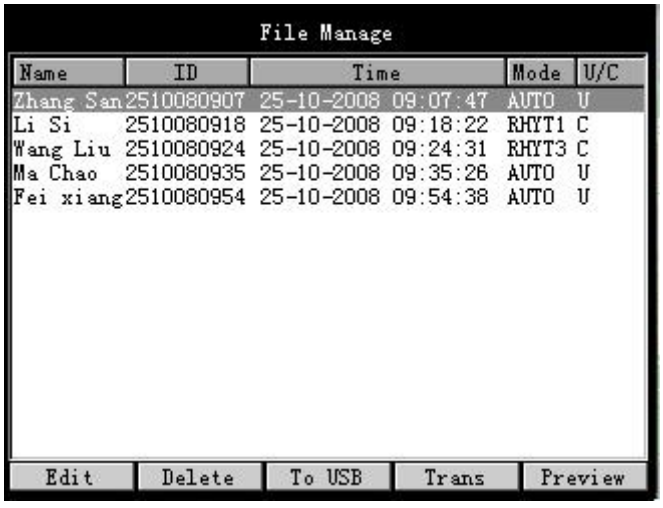



Figure 8-3 SE-601B / SE-601C File Manage Screen3

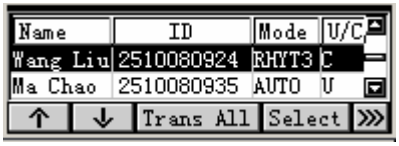



Figure 8-4 SE-601A File Manage Screen1

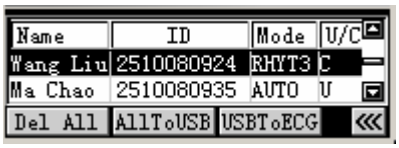



Figure 8-5 SE-601A File Manage Screen2

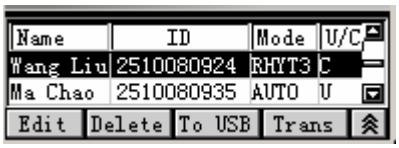



Figure 8-6 SE-601A File Manage Screen3

On the **File Manage** screen, files can be printed, transmitted or deleted.

If there is no file on the **File Manage** screen, the following dialog box will pop up when you press function keys.


**CAUTION**

1. When files are being printed, transmitted, deleted or copied, you can not turn off the electrocardiograph.
2. Do not cut off the mains supply directly when no battery is installed in the device, or else, the stored data may be lost.

# 8.1 Storage Upgrade Function

SE-601A can accommodate 50 files, SE-601B can accommodate 100 files, and SE-601C can accommodate 200 files. For SE-601A/B, you can input special password to enable the storage upgrade function, which can extend the storage to 200.

If you need this function, please contact the local distributor to purchase it.

# 8.2 Transmitting Files to the PC

**NOTE:**

**1.** To transmit files to the PC, the Smart ECG Viewer software of the manufacturer must be installed in the PC. You should log into the Smart ECG Viewer software before transmission.

**2.** If necessary, you can press **Esc** to cancel the operation during the course of transmitting all the files.

**CAUTION**

It is forbidden to connect or disconnect a U disk or a USB printer during the transmission course.

### 8.2.1 Transmitting Files through the Serial Port

1. Connect the RS232 socket of the PC to the RS232 socket of the electrocardiograph with an RS232 cable.
2. Or if the PC has no RS232 socket, connect the USB socket of the PC to the RS232 socket of the electrocardiograph by using the RS232-USB assembly.

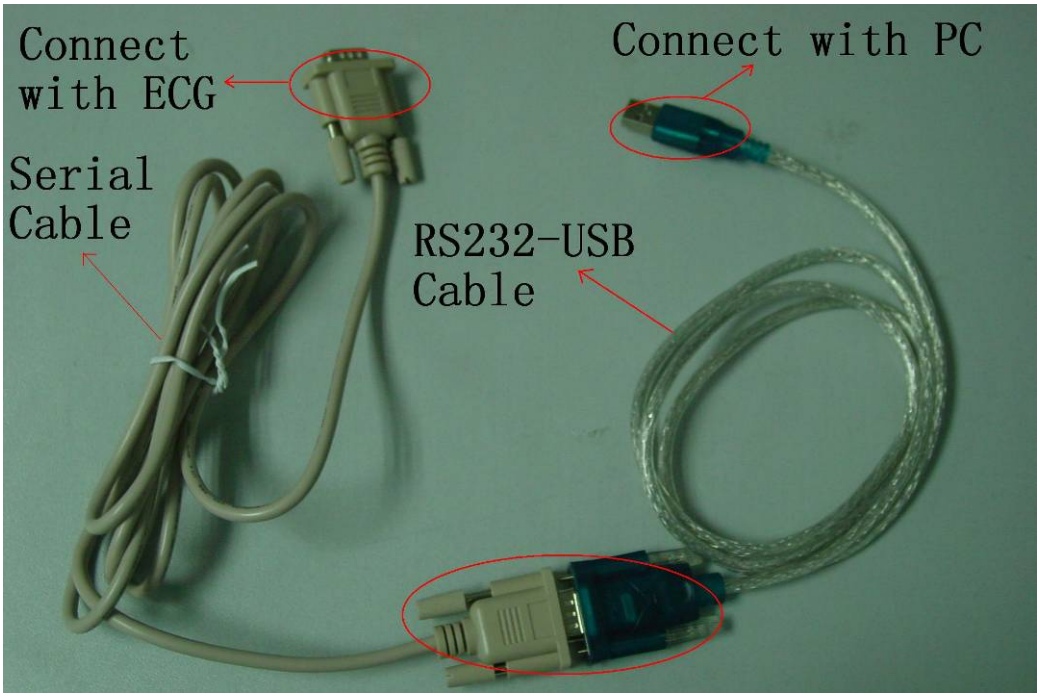
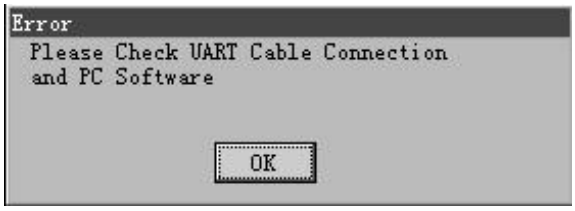



Figure 8-7 RS232-USB Assembly

3. Log into the Smart ECG Viewer software.

**NOTE:** If you don't connect the RS232 socket of the electrocardiograph to the PC, or you do not log into Smart ECG Viewer before transmission, the following hint will pop up.




4. Select a transmission mode.

**NOTE:** If you don't select a transmission mode before transmission, the following hint will pop up.


1) When the main screen1 is displayed, press the function key **F5** below » to open the main screen2.
2) Press the function key **F1** below **Setup** to open the **System Setup** screen.
3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Transmission**, press **Enter** to open the **Transmission Setup** window.
4) For SE-601B/C, press **F1** or **F2** to select **UART**. For SE-601A, press **F3** or **F4** to select **UART**.
5) Press **Enter** to confirm.
6) Press **Esc** or the function key **F5** below « to return to the main screen1.

5. Press the function key **F5** below » to open the main screen2. Press the function key **F2** below **File** to display the **File Manage** screen1.
6. Press the function key **F3** below **Trans All** to transmit all the files to the PC.
7. Or press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3. Press the function key **F4** below **Trans** to transmit the selected file to the PC.

## 8.2.2 Transmitting Files through the Net Port

1. Connect the PC to the electrocardiograph with an Ethernet cable recommended by the manufacturer. If the wireless AP transmission is used, connect the PC to one wireless AP, and connect the electrocardiograph to the other wireless AP. Only the wireless AP recommended by the manufacturer can be used.
2. Log into the Smart ECG Viewer software.

   **NOTE:** If you don't connect the net port of the electrocardiograph to the PC (or if you don't connect the electrocardiograph/PC to the wireless AP), or you do not log into Smart ECG Viewer before transmission, the following hint will pop up.


3. Set the transmission mode and the IP address.

**NOTE:** If you don't set the transmission mode before transmission, the following hint will pop up.


1) When the main screen1 is displayed, press the function key **F5** below »» to open the main screen2.

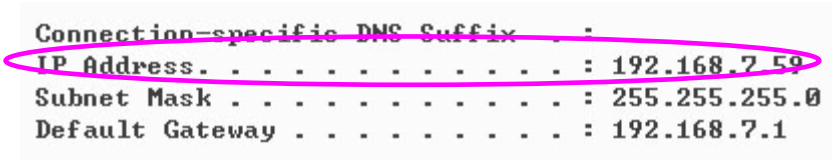
2) Press the function key **F1** below **Setup** to open the **System Setup** screen.

3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Transmission**, press **Enter** to open the **Transmission Setup** window.

4) For SE-601B/C, press **F1** or **F2** to select **Ethernet**. For SE-601A, press **F3** or **F4** to select **Ethernet**.

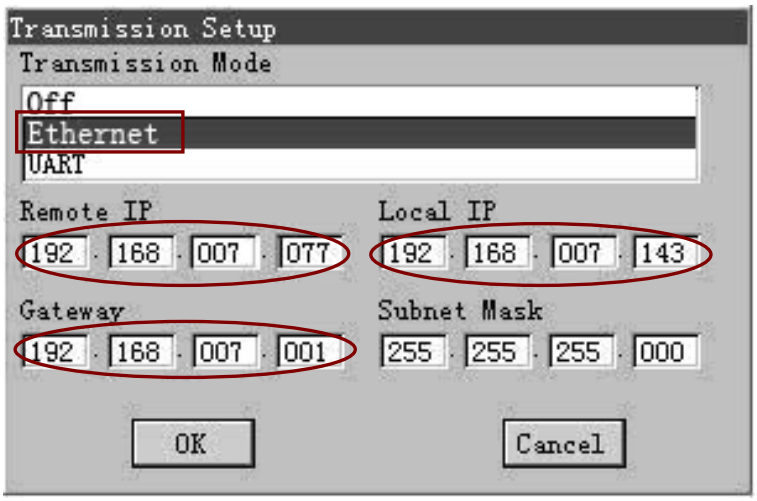
5) Press **Tab** or **Shift** + **Tab** to move the cursor to the **Remote IP** item. Set the **REMOTE IP** item to the local IP of the PC:.

   For example, to view the local IP of the PC: Select **Start -> Run**, and input "cmd" in the text box. Click on **OK**, and input "ipconfig" and press **Enter**, Then, the IP address of the PC shows as follows:

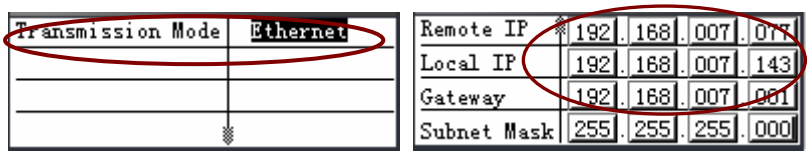



6) Press **Tab** or **Shift** + **Tab** to move the cursor to the **Local IP** item. Set the first three sections of the **Local IP** item to the first three sections of the local IP of the PC:. The last section of the **LOCAL IP** item can be set at random, but it can't be the same as the last section of the local IP of the PC:.

7) Press **Tab** or **Shift** + **Tab** to move the cursor to the **Gateway** item. Set the first three sections of the **Gateway** item to the first three sections of the local IP of the PC. The last section of the **Gateway** item must be set to **001**. **Subnet Mask** must be set to **255.255.255.000.**




SE-601B/C Transmission Setup Window




SE-601A Transmission Setup Window

8) Press **Enter** to confirm.

9) Press **Esc** or the function key **F5** below ⩔ to return to the main screen1.

**NOTE:**

1. For details on configuring the wireless AP, please refer to the user manual delivered with the wireless AP.
2. There should be no shield in or around the room where the wireless AP is used, or else the wireless transmission may fail.

4. Press the function key **F5** below ⩓ to open the main screen2. Press the function key **F2** below File to display the **File Manage** screen1.
5. Press the function key **F3** below **Trans All** to transmit all the files to the PC.
6. Or press **F1**, **F2**, **Shift** + **F1** or **Shift** + **F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3. Press the function key **F4** below **Trans** to transmit the selected file to the PC.

# 8.3 Copying Files between SE-601 and the U Disk

1. Insert the U disk recommended by the manufacturer to USB socket 2 of the electrocardiograph.
2. Copy files between SE-601 and the U disk

   1) When the main screen1 is displayed, press the function key **F5** below ⩓ to open the main screen2.

2) Press the function key **F2** below **File** to open the **File Manage** screen1. Press the function key **F5** below »» to display the **File Manage** screen2.

3) Press the function key **F2** below **AllToUSB** to copy files from SE-601 to the ECGDATA folder of the U disk. Or press the function key **F3** below **USBToECG** to copy files from the ECGDATA folder of the U disk to SE-601.

3. Or copy a file from SE-601 to the U disk

1) When the main screen1 is displayed, press the function key **F5** below »» to open the main screen2.

2) Press the function key **F2** below **File** to open the **File Manage** screen1.

3) Press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3.

4) Press the function key **F3** below **To USB** to copy the selected file from SE-601 to the ECGDATA folder of the U disk.

If the U disk is not connected well, the hint *U disk is not ready!* will be displayed on the LCD screen of the electrocardiograph, and then you should connect the U disk again. If it fails to copy files, the hint *file copying fails!* will pop up. After the electrocardiograph successfully copy files, the hint *file copying succeeds!* will be displayed.

During the copying course, if there are cognominal files in the U disk and the electrocardiograph, the following hint (a or b) will pop up. Press **Enter** to close the hint. You should remove all cognominal files from the U disk or the electrocardiograph, and then continue to copy files.


(a)


(b)

**CAUTION**

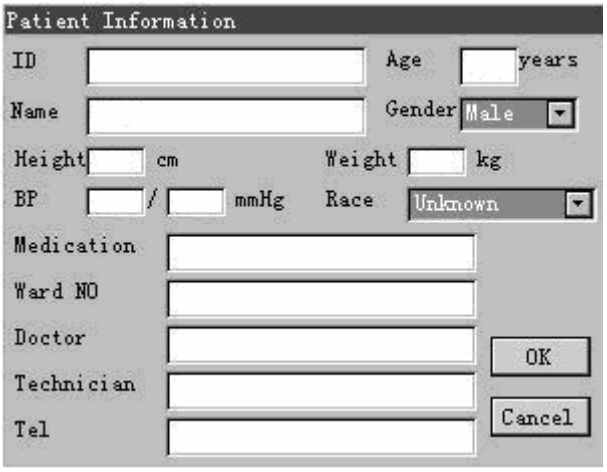
It is forbidden to connect or disconnect a U disk or a USB printer during the copying course.

**NOTE:**

1. If necessary, you can press **Esc** to cancel the operation during the copying course.
2. Please insert the U disk or the SD card reader that the manufacturer recommends.
3. Only the U disk with the capacity of 1GB or below is supported. Please set the format to **FAT** when formatting the U disk.
4. In order to protect the U disk, you should insert the U disk after power-on, and pull out the U disk before power-off.

# 8.4 Editing Patient Information

When the main screen1 is displayed, press the function key **F5** below »» to open the main screen2. Press the function key **F2** below **File** to open the **File Manage** screen1. Press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3. Press the function key **F1** below **Edit** to open the **Patient Information** window.




SE-601B/C Patient Information Window


SE-601A Patient Information Window

You can edit the patient information in the **Patient Information** window.

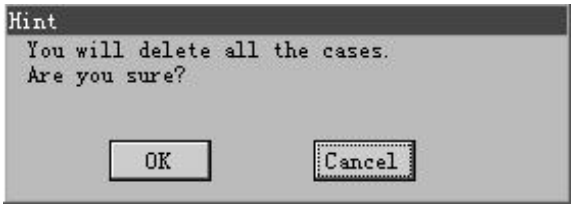
1. Press **Tab** or **Shift** + **Tab** to move the cursor to a textbox, and then enter information.
2. Press **Tab** or **Shift** + **Tab** to move the cursor to an item, and then press **F1** or **F2** to select an option.
3. For SE-601A, press **Tab** or **Shift** + **Tab** to move the cursor to the **Next** or **Prev** button, and then press **Enter** to turn the page.

4. Press **Enter** to confirm, or press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to confirm.
5. Press **Esc** to cancel the operation, or press **Tab** or **Shift** + **Tab** to move the cursor to the **Cancel** button, and then press **Enter** to cancel the operation.

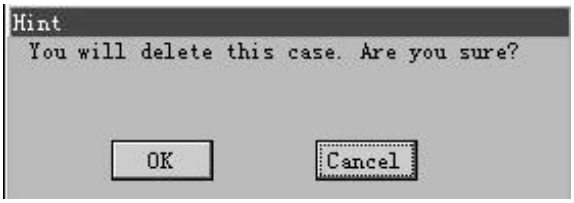
For details on inputting data, please refer to Section 3.2, "Entering Data".

# 8.5 Deleting Files

1. Delete all the files from the electrocardiograph
   1) When the main screen1 is displayed, press the function key **F5** below » to open the main screen2.
   2) Press the function key **F2** below **File** to open the **File Manage** screen1.
   3) Press the function key **F5** below » to display the **File Manage** screen2.
   4) Press the function key **F1** below **Del All** to display the following hint, press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to delete all the files from the electrocardiograph.




2. Delete a file from the electrocardiograph
   1) When the main screen1 is displayed, press the function key **F5** below » to open the main screen2.
   2) Press the function key **F2** below **File** to open the **File Manage** screen1.
   3) Press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3.
   4) Press the function key **F2** below **Delete** to display the following hint, press **Tab** or **Shift** + **Tab** to move the cursor to the **OK** button, and then press **Enter** to delete the selected file from the electrocardiograph.



# 8.6 Previewing a File (Only for SE-601B/C)

When the main screen1 is displayed, press the function key **F5** below »» to open the main screen2. Press the function key **F2** below **File** to open the **File Manage** screen1. Press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below **Select** to select the file and open the **File Manage** screen3. Press the function key **F5** below **Preview** to open the preview screen. Press the **START/STOP** key to print the file.

**NOTE:**

1. The ECG data in the **RHYT** mode can not be previewed.
2. For SE-601B, ECG data of the first 4 seconds or so is displayed on the preview screen. For SE-601C, ECG data of the first 9 seconds or so is displayed on the preview screen.

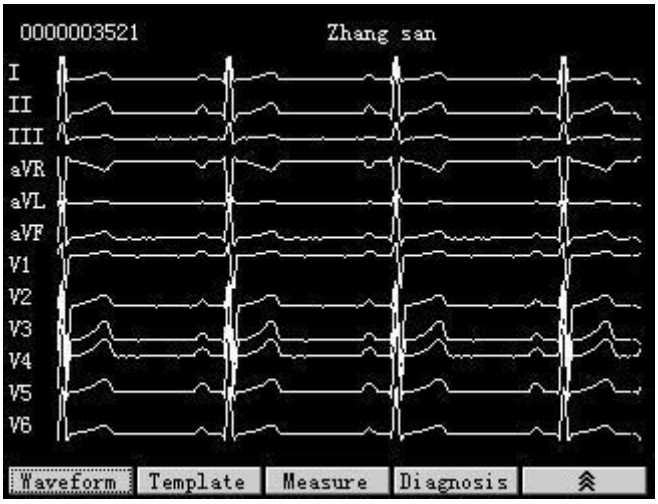



Figure 8-8 Waveform Preview Screen

If you want to view the average template of the selected file, press the function key **F2** below **Template** to display the template preview screen, as the following figure shows.

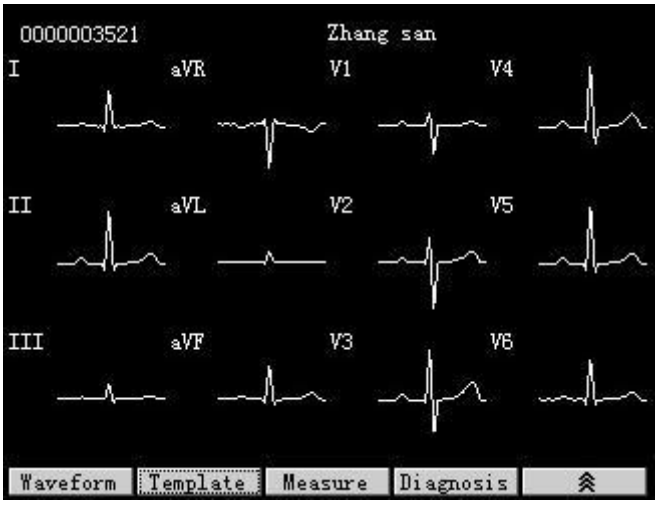



Figure 8-9 Template Preview Screen

If you want to view the measure information of the selected file, press the function key **F3** below **Measure** to open the measure preview screen, as the following figure shows.


Figure 8-10 Measure Preview Screen

The measure preview screen shows patient name, patient ID, and measure information including heart rate, P duration, PR interval, QRS duration, QT/QTC interval, P/QRS/T axis, RV5/SV1 amplitude, RV5+SV1 amplitude, and RV6/SV2 amplitude.

If you want to view the diagnosis information of the selected file, press the function key **F4** below **Diagnosis** to display the diagnosis preview screen, as the following figure shows.

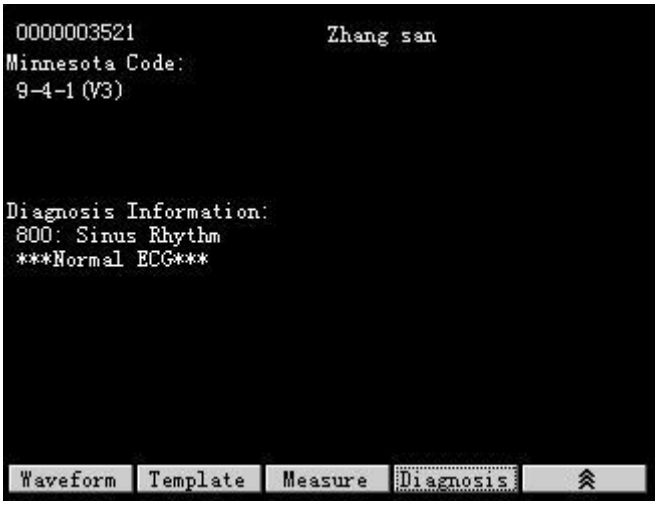



Figure 8-11 Diagnosis Preview Screen

The diagnosis preview screen shows patient name, patient ID, Minnesota code and diagnosis information.

# 8.7 File Printing

When the main screen1 is displayed, press the function key **F5** below » to open the main screen 2.

Press the function key **F2** below File to open the File Manage screen 1.

Press **F1**, **F2**, **Shift + F1** or **Shift + F2** to highlight a file, and then press the function key **F4** below Select to select the file and open the **File Manage** screen3.

Press the **START**/**STOP** key to print the selected file.

**NOTE:** When **Auto Style** is set to **Off** in the Work Mode Setup window, the files in the **AUTO** mode can not be printed on the **File Manage** screen.

# Chapter 9 System Setup

After you turn on the device, the main screen1 pops up. Press the function key **F5** below » to open the main screen2. Then press the function key **F1** below **Setup** to open the **System Setup** screen.

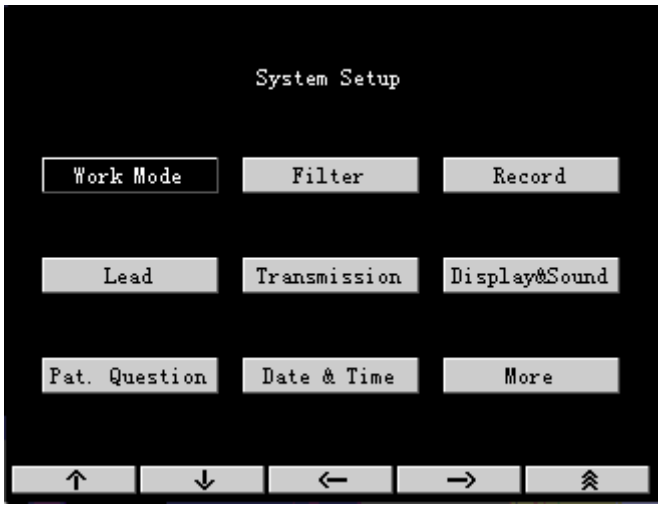



Figure 9-1 SE-601B / SE-601C System Setup Screen

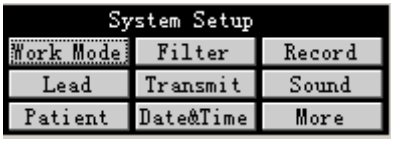



Figure 9-2 SE-601A System Setup Screen

After setup, press **Esc** or the function key **F5** below « to return to the main screen1.

## 9.1 Work Mode Setup

When the cursor is on **Work Mode** on the **System Setup** screen, press **Enter** to open the **Work Mode Setup** window.

In the Work Mode Setup window, you can set **Work Mode**, **Manual Style**, **Rhythm Style**, **Auto Style**, **Sample Mode**, **Record Sequence** and **Sample Time**.

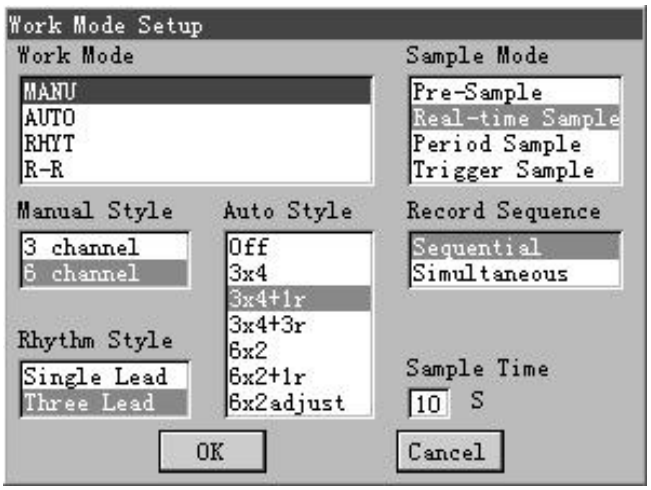



Figure 9-3 SE-601B / SE-601C Work Mode Setup Window


Figure 9-4 SE-601A Work Mode Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Work Mode Setup** window after setup, a hint will pop up to prompt you to save these modifications.

## 9.1.1 Specifying Work Mode

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Work Mode** item in the Work Mode Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Work Mode** item in the Work Mode Setup window, and then press **F3** or **F4** to select an option.

**Manual:** In the **MANU** mode, you can select 3-channel ECG waves or 6-channel ECG waves to be displayed and printed.

**Auto:** In the **AUTO** mode, the lead groups are switched automatically according to the lead sequence during the printing course. After the ECG signals of one lead group are printed within a certain time, the system switches to print ECG signals of another lead group automatically.

**Rhythm:** In the **RHYT** mode, you can select rhythm leads to print 60s or 20s rhythm-lead ECG waveform.

**R-R:** In the **R-R** mode, you can select a lead to print its 180s ECG waveform, R-R histogram and R-R trend chart.

## 9.1.2 Specifying Manual Style

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Manual Style** item in the Work Mode Setup window, and then press **F1** or **F2** to select **3 channel** or **6 channel**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Manual Style** item in the Work Mode Setup window, and then press **F3** or **F4** to select **3 channel** or **6 channel**.

When **Manual Style** is set to **3 channel**, ECG waves of 3 leads are displayed and printed simultaneously in the **MANU** mode.

When **Manual Style** is set to **6 channel**, ECG waves of 6 leads are displayed and printed simultaneously in the **MANU** mode.

## 9.1.3 Specifying Rhythm Style

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Style** item in the Work Mode Setup window, and then press **F1** or **F2** to select **Single Lead** or **Three Lead**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Style** item in the Work Mode Setup window, and then press **F3** or **F4** to select **Single Lead** or **Three Lead**.

When **Rhythm Style** is set to **Single Lead**, in the **RHYT** mode, 60s ECG waves of the appointed single rhythm lead will be printed.

When **Rhythm Style** is set to **Three Lead**, in the **RHYT** mode, 20s ECG waves of three appointed rhythm leads will be printed.

## 9.1.4 Specifying Auto Style

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Auto Style** item in the Work Mode Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Auto Style** item in the Work Mode Setup window, and then press **F3** or **F4** to select an option.

When **Auto Style** is set to **Off**, no ECG wave is printed.

When **Auto Style** is set to **3×4**, ECG waves of 12 leads are printed in 4 groups of 3.

When **Auto Style** is set to **3×4+1r**, ECG waves of 12 leads are printed in 4 groups of 3, and the ECG wave of the rhythm lead selected in the **Rhythm Lead1** item is on the bottom of the ECG report.

When **Auto Style** is set to **3×4+3r**, ECG waves of 12 leads are printed in 4 groups of 3, and ECG waves of the three rhythm leads selected respectively in the **Rhythm Lead1/2/3** item are on the bottom of the ECG report.

When **Auto Style** is set to **6×2**, ECG waves of 12 leads are printed in 2 groups of 6.

When **Auto Style** is set to **6×2+1r**, ECG waves of 12 leads are printed in 2 groups of 6, and the ECG wave of the rhythm lead selected in the **Rhythm Lead1** item is on the bottom of the ECG report.

When **Auto Style** is set to **6×2 adjust**, ECG waves of 12 leads are printed in 2 groups of 6. **6×2 adjust** means that the time period can be adjusted according to **Sample Time**, which is different from other styles. For example, when **Sample Time** in the Work Mode Setup window is set to **12s,** each lead group is printed for about 6 seconds in this style.

**NOTE:** The ECG reports of the **6×2 adjust** style can only be printed, and can not be saved or transmitted. **6×2 adjust** only supports the real-time sampling mode.

## 9.1.5 Specifying Sampling Mode

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Mode** item in the Work Mode Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Mode** item in the Work Mode Setup window, and then press **F3** or **F4** to select an option.

When **Sample Mode** is set to **Pre-Sample**, 10s ECG data sampled before pressing the **START/STOP** key will be printed out.

When **Sample Mode** is set to **Real-time Sample**, 10s ECG data sampled from the time of pressing the **START/STOP** key will be printed out.

When **Sample Mode** is set to **Period Sample**, first you should set **Period Interval** and **Period Duration** in the Date & Time Setup window. For example, if **Period Interval** is set to **2 minutes**, and **Period Duration** is set to **24 minutes**, after pressing the **START/STOP** key, the printing will be performed every two minutes and come to 12 times.

**NOTE:**

1. There is no saving, copying or transmitting in the **Period Sample** mode.
2. ID and patient information will not be changed while carrying out the period printing.
3. **Period Duration** must be an integral multiple of **Period Interval**, or else the settings will not be effective.

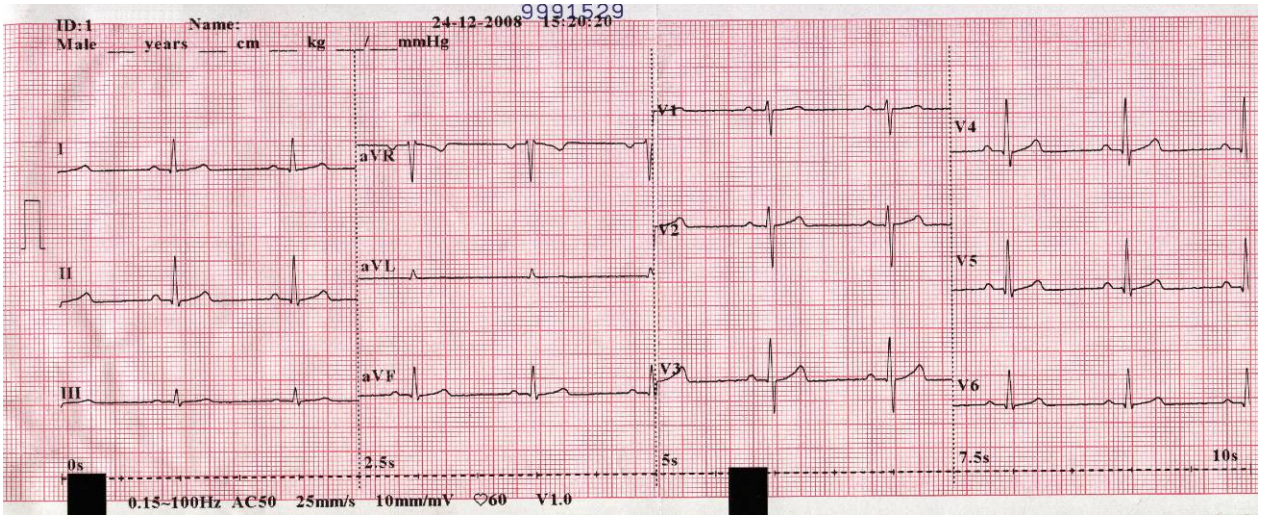
When **Sample Mode** is set to **Trigger Sample**, after pressing the **START/STOP** key, if Arrhythmia ECG data, including Asystole, Ventricular Fibrillation/Ventricular Tachycardia, 5>PVCS>=3, Paired PVCS, Bigeminy, Trigeminy, R ON T, single PVC and Missed Beat, is detected during the learning course, printing will be triggered automatically.

## 9.1.6 Specifying Recording Sequence

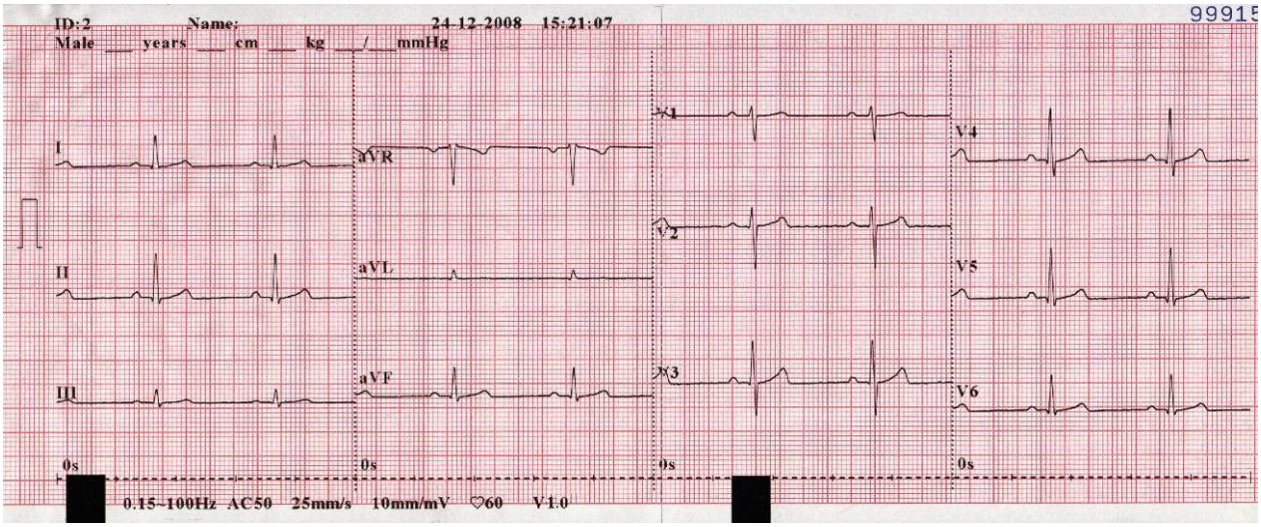
For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item in the Work Mode Setup window, and then press **F1** or **F2** to select **Sequential** or **Simultaneous**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item in the Work Mode Setup window, and then press **F3** or **F4** to select **Sequential** or **Simultaneous**.

When **Record Sequence** is set to **Sequential**, the lead group is printed one by one in a certain sequence. The start time of a lead group is just the end time of the previous lead group, as the following figure shows.




When **Record Sequence** is set to **Simultaneous**, all leads are printed simultaneously. The start time of each group is the same. All the start time is 0s, as the following figure shows.




## 9.1.7 Inputting Sampling Time

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Sample Time** textbox in the Work Mode Setup window, and then enter the sampling time. The range of the sampling time is 10-24s.

The sampling time is only valid in the auto style of **6×2 adjust**.

# 9.2 Filter Setup

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Filter** on the **System Setup** screen, and then press **Enter** to open the **Filter Setup** window.

In the Filter Setup window, you can set **AC Filter**, **EMG Filter**, **DFT Filter**, and **Lowpass Filter**.

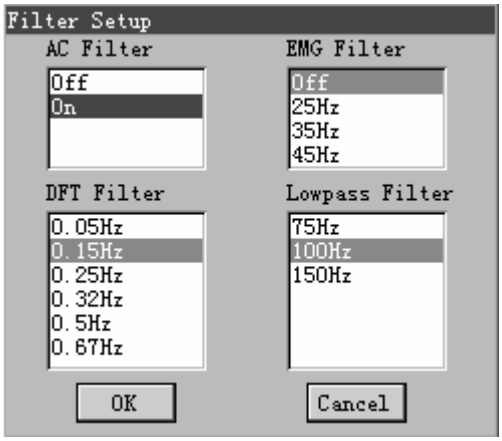



Figure 9-5 SE-601B / SE-601C Filter Setup Window

| | |
|---|---|
| AC Filter | On |
| EMG Filter | Off |
| DFT Filter | 0.15Hz |
| Lowpass Filter | 100Hz |

Figure 9-6 SE-601A Filter Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Filter Setup** window after setup, a hint will pop up to prompt you to save these modifications.

## 9.2.1 Setting AC Filter

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **AC Filter** item in the Filter Setup window. Press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **AC Filter** item in the Filter Setup window. Press **F3** or **F4** to select **Off** or **On**.

AC Filter suppresses AC interference without attenuating or distorting the ECG signals. Select **On** to turn on the function and select **Off** to turn it off.

## 9.2.2 Setting EMG Filter

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **EMG Filter** item in the Filter Setup window. Press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **EMG Filter** item in the Filter Setup window. Press **F3** or **F4** to select an option.

EMG Filter suppresses disturbances caused by strong muscle tremor. The cutoff frequency can be set to **25Hz**, **35Hz** or **45Hz**. Select **Off** to turn off the function.

### 9.2.3 Setting DFT Filter

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **DFT Filter** item in the Filter Setup window. Press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **DFT Filter** item in the Filter Setup window. Press **F3** or **F4** to select an option.

DFT Filter greatly reduces the baseline fluctuations without affecting the ECG signals. The purpose of this filter is to keep the ECG signals on the baseline of the printout. The setting value is the low limit of the frequency range, including **0.05Hz**, **0.15Hz**, **0.25H**z, **0.32Hz**, **0.5Hz**, and **0.67Hz**.

### 9.2.4 Setting Lowpass Filter

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Lowpass Filter** item in the Filter Setup window. Press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** move the cursor to the **Lowpass Filter** item in the Filter Setup window. Press **F3** or **F4** to select an option.

Lowpass Filter restricts the bandwidth of input signals. The cutoff frequency can be set to **150Hz**, **100Hz** or **75Hz**. All the input signals whose frequency is higher than the set cutoff frequency will be attenuated.

**NOTE:** Only when **EMG Filter** is set to **Off**, can the setting of **Lowpass Filter** be effective.

## 9.3 Record Setup

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Record** on the **System Setup** screen, and then press **Enter** to open the **Record Setup** window.

In the Record Setup window, you can set **Record Device**, **Paper Marker**, **Patient Info**, **Speed**, **Gain**, **Template**, **Measure**, **Minnesota Code**, **Analysis** and **Position Marker**.

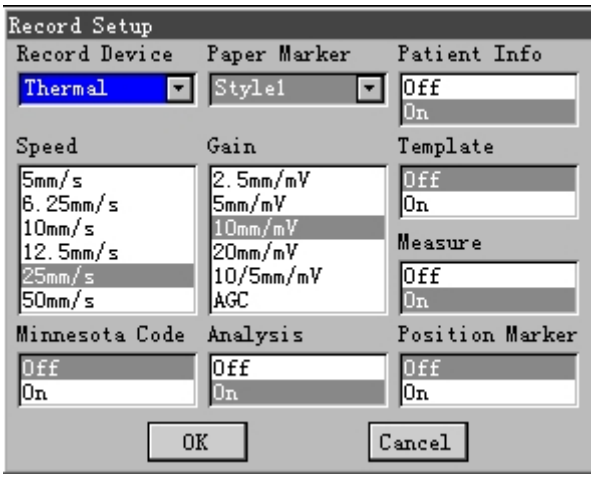



Figure 9-7 SE-601B / SE-601C Record Setup Window

| | | | |
|---|---|---|---|
| Record Device | Thermal | Patient Info | On |
| Speed | 25mm/s | Template | Off |
| Gain | 10mm/mV | Measure | On |
| Paper Marker | Style1 | Minnesota Code | Off |

Figure 9-8 SE-601A Record Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Record Setup** window after setup, a hint will pop up to prompt you to save these modifications.

**NOTE:** The **Patient Info**, **Template**, **Measure**, **Minnesota Code**, **Analysis**, and **Position Marker** items are valid only in the **AUTO** mode.

## 9.3.1 Specifying Recording Device

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Record Device** item in the Record Setup window. Press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Record Device** item in the Record Setup window. Press **F3** or **F4** to select an option.

You can set **Record Device** to **Thermal**, **HP Deskjet D2468**, **HP Deskjet D5568**, **HP Deskjet D2668**, **HP Deskjet D4368** or **HP Laserjet P2035**. The last five options are the types of the USB printer, when any of them is selected, you should connect the corresponding USB printer to USB socket 2 of the electrocardiograph with a special cable. Press the **START/STOP** key to print ECG reports by using the USB printer.

**WARNING**

If the printer used is not the type listed above, additional safety measures (such as applying an isolation transformer to supply the medical system) should be taken when the safety of the medical system has not been evaluated. If in doubt, consult our technical service department or your local distributor

**NOTE:**

1. During the USB printing course，pressing the **START/STOP** key again can not stop printing ECG reports.
2. USB printing only works in the auto real-time sampling mode, auto pre-sampling mode, and auto trigger sampling mode. It also supports copy printing, and file printing in the **AUTO** mode on the **File Manage** screen.
3. Make sure that paper is installed in the USB printer before printing. Error may occur if no paper is loaded in the USB printer.

**CAUTION**

1. In order to protect the USB printer, you should connect the USB printer after power-on, and disconnect the USB printer before power-off.
2. It is forbidden to frequently connect or disconnect the U disk or the USB printer after power-on.

## 9.3.2 Setting Paper Marker

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item in the Record Setup window, and then press **F1** or **F2** to select an option.

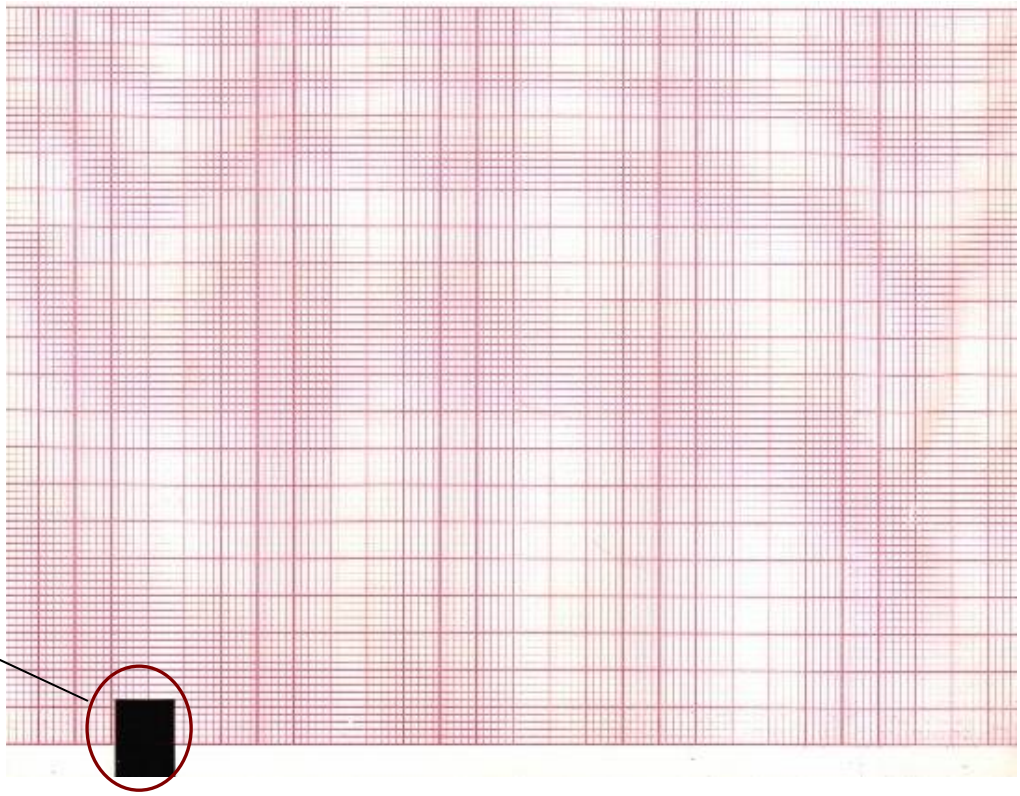
For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item in the Record Setup window, and then press **F3** or **F4** to select an option.

**Paper Marker** is used to identify the paper style.

When the paper with black markers on the bottom is used and **Paper Marker** is set to **Style1** or **Style2**,

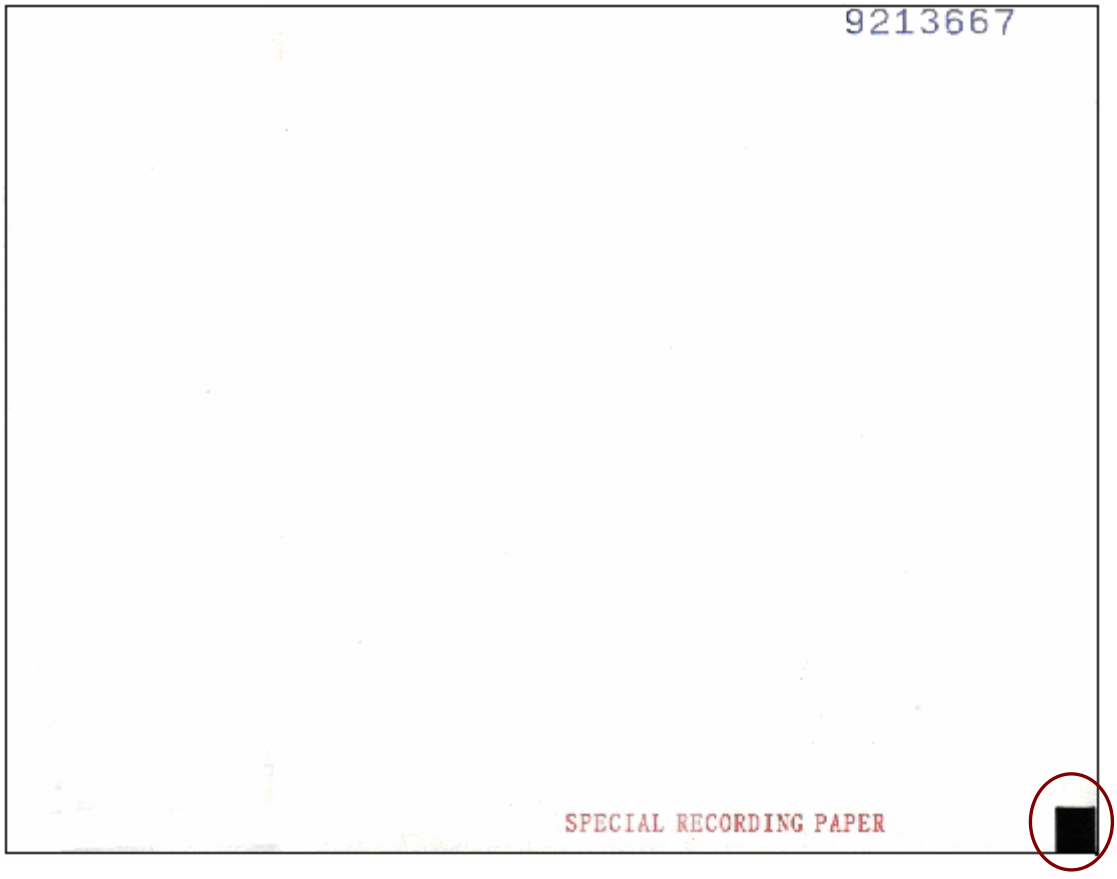
1) In the **AUTO** or **RHYT** mode, the device rolls back the recorder paper to the start point of each page at the beginning of the printing course, and it advances the paper to the next black marker at the end of the printing course.
2) Before printing, you can press the **Space** key to advance the recorder paper to the next black marker.

When **Paper Marker** is set to **Style1**, only the paper with black markers around the bottom left corner of each page can be used, which is shown in the following figure.



**NOTE:** The side with black markers should be on the bottom.

When **Paper Marker** is set to **Style2**, only the paper with black markers in the bottom right corner of each page can be used, which is shown in the following figure.




**NOTE:** The style of the loaded thermal paper should consist with the set paper style; otherwise the advance of the paper may be blocked.

When **Paper Marker** is set to **No**,

1) The device does not roll back the recorder paper to the start point of each page at the beginning of the printing course, and it does not advance the paper to the next black marker at the end of the printing course.
2) Before printing, you can press the **Space** key to advance the paper for about 2cm.

### 9.3.3 Selecting Patient Information

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Patient Info** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Patient Info** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Patient Info** is set to **On**, the patient information will be printed in the ECG reports.

In the **AUTO** mode, when **Patient Info** is set to **Off**, the patient information will not be printed in the ECG reports.

### 9.3.4 Setting Speed

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Speed** item in the Record Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Speed** item in the Record Setup window, and then press **F3** or **F4** to select an option.

In the **MANU** mode, you can set **Speed** to **5mm/s**, **6.25mm/s**, **10mm/s**, **12.5mm/s**, **25mm/s** or **50mm/s**. In the **AUTO** and **RHYT** modes, only **25mm/s** and **50mm/s** are available. In the R-R mode, only **25mm/s** is available.

### 9.3.5 Setting Gain

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Gain** item in the Record Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Gain** item in the Record Setup window, and then press **F3** or **F4** to select an option.

You can set the indicated height of 1mV ECG on the paper.

You can set **Gain** to **10mm/mV**, **20mm/mV**, **10/5mm/mV**, **AGC**, **2.5mm/mV** or **5mm/mV**.

**AGC** means auto gain control. When ECG signals vary greatly, **AGC** can be selected to adjust the gain automatically according to actual signals.

**10/5mm/mV** means that the gain of limb leads is set to **10mm/mV**, while the gain of chest leads is set to **5mm/mV**.

## 9.3.6 Selecting Template

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Template** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Template** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Template** is set to **On**, average template will be printed in the ECG reports.

In the **AUTO** mode, when **Template** is set to **Off**, average template will not be printed in the ECG reports.

## 9.3.7 Selecting Measure

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Measure** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Measure** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Measure** is set to **On**, the measure information will be printed in the ECG reports.

In the **AUTO** mode, when **Measure** is set to **Off**, there will be no measure information in the ECG reports.

## 9.3.8 Selecting Minnesota Code

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Minnesota Code** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Minnesota Code** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Minnesota Code** is set to **On**, Minnesota Code will be printed in the ECG reports.
In the **AUTO** mode, when **Minnesota Code** is set to **Off**, Minnesota Code will not be printed in the ECG reports.

## 9.3.9 Selecting Analysis

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Analysis** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Analysis** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Analysis** is set to **On**, the auto diagnosis information will be printed in the ECG reports.

In the **AUTO** mode, when **Analysis** is set to **Off**, the auto diagnosis information will not be printed in the ECG reports.

### 9.3.10 Selecting Position Marker

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Position Marker** item in the Record Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Position Marker** item in the Record Setup window, and then press **F3** or **F4** to select **Off** or **On**.

In the **AUTO** mode, when **Position Marker** is set to **On**, the position marker will be printed while printing template, and the time ruler will be printed on the bottom of ECG reports, which indicates whether **Record Sequence** is **Sequential** or **Simultaneous**. For details of the recording sequence, please refer to Section 9.1.6, "Specifying Recording Sequence".

In the **AUTO** mode, when **Position Marker** is set to **Off**, the position marker and the time ruler will not be printed in the ECG reports.

**NOTE:** To get more information about the above contents, please refer to Section 7.7, "ECG Reports".

## 9.4 Lead Setup

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Lead** on the **System Setup** screen, and then press **Enter** to open the **Lead Setup** window.

In the Lead Setup window, you can set **Rhythm Lead1/2/3** and **Lead Sequence**.

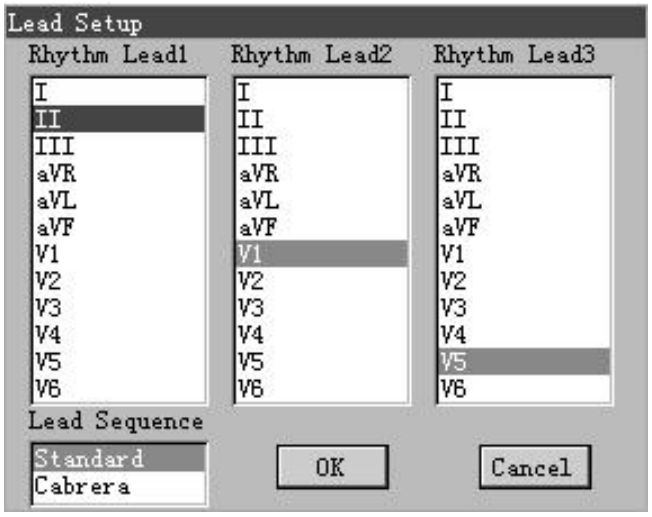



Figure 9-9 SE-601B / SE-601C Lead Setup Window

| | |
|---|---|
| Rhythm Lead1 | II |
| Rhythm Lead2 | V1 |
| Rhythm Lead3 | V5 |
| Lead Sequence | Standard |

Figure 9-10 SE-601A Lead Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Lead Setup** window after setup, a hint will pop up to prompt you to save these modifications.

## 9.4.1 Setting Rhythm Lead1/2/3

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item in the Lead Setup window, and then press **F1** or **F2** to select an option.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Rhythm Lead1/2/3** item in the Lead Setup window, and then press **F3** or **F4** to select an option.

The rhythm lead can be one of 12 standard leads: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, or V6.

In the **AUTO** mode, when **Auto Style** is set to **3×4+1r** or **6×2+1r**, the rhythm lead selected in the **Rhythm Lead1** item will be printed in the ECG reports; when **Auto Style** is set to **3×4+3r**, 3 rhythm leads selected respectively in the **Rhythm Lead1/2/3** item will be printed in the ECG reports.

In the **RHYT** mode, when **Rhythm Style** is set to **Single Lead**, 60s waveform of the rhythm lead selected in the **Rhythm Lead1** item will be printed in the ECG reports; when **Rhythm Style** is set to **Three Lead**, 20s waveform of three rhythm leads selected respectively in the **Rhythm Lead1/2/3** item will be printed in the ECG reports.

In the **R-R** mode, the R-R analysis report of the rhythm lead selected in the **Rhythm Lead1** item will be printed.

## 9.4.2 Setting Lead Sequence

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item in the Lead Setup window, and then press **F1** or **F2** to select **Standard** or **Cabrera**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Lead Sequence** item in the Lead Setup window, and then press **F3** or **F4** to select **Standard** or **Cabrera**.

| Lead Sequence | Lead group 1 | Lead group 2 | Lead group 3 | Lead group 4 |
|---|---|---|---|---|
| **Standard** | I, II, III | aVR, aVL, aVF | V1, V2, V3 | V4, V5, V6 |
| **Cabrera** | aVL, I, -aVR | II, aVF, III | V1, V2, V3 | V4, V5, V6 |

# 9.5 Transmission Setup

**NOTE:** To transmit ECG data to the PC, the Smart ECG Viewer software of the manufacturer must be installed in the PC.

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Transmission** on the **System Setup** screen, and then press **Enter** to open the **Transmission Setup** window.

In the Transmission Setup window, you can set **Transmission Mode**, **Remote IP**, **Local IP**, **Gateway** and **Subnet Mask**.

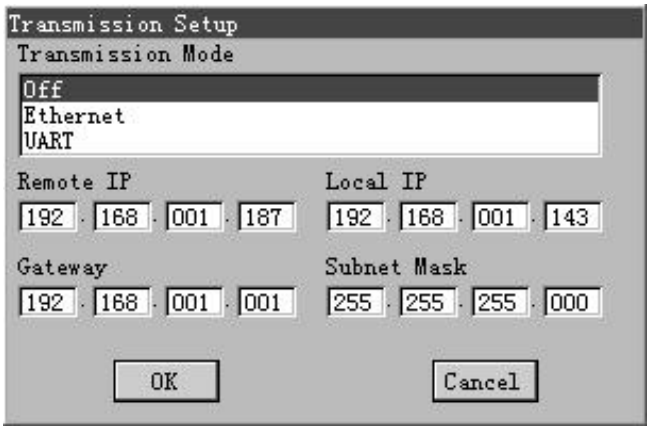



Figure 9-11 SE-601B / SE-601C Transmission Setup Window

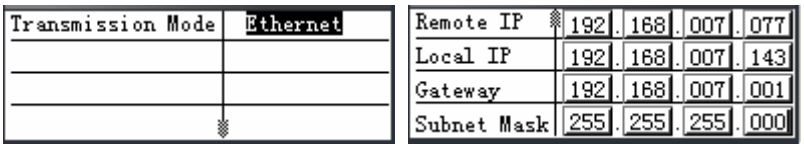



Figure 9-12 SE-601A Transmission Setup Window

**To Specify Transmission Mode**

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Transmission Mode** item, and then press **F1** or **F2** to select **Off**, **Ethernet** or **UART**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Transmission Mode** item, and then press **F3** or **F4** to select **Off**, **Ethernet** or **UART**.

When **Transmission Mode** is set to **Off**, ECG data can not be transmitted.

When **Transmission Mode** is set to **Ethernet**, first connect the net port of the electrocardiograph to the net port of the PC by using an Ethernet cable recommended by the manufacturer. Log into the Smart ECG Viewer software. Then set all the items in the Transmission Setup window. In the **AUTO** or **RHYT** mode, ECG data can be transmitted through the net port automatically after ECG reports are printed.

When **Transmission Mode** is set to **UART**, first connect serial port of the electrocardiograph to the serial port of the PC by using a serial cable recommended by the manufacturer. Log into the Smart ECG Viewer software. In the **AUTO** or **RHYT** mode, ECG data can be transmitted through the serial port automatically after ECG reports are printed.

**To Set Remote IP**

Set the **REMOTE IP** item to the local IP of Smart ECG Viewer.

**To Set Local IP**

Set the first three sections of the **Local IP** item to the first three sections of the local IP of Smart ECG Viewer. The last section of the **LOCAL IP** item can be set at random, but it can't be the same as the last section of the local IP of Smart ECG Viewer.

**To Set Gateway**

Set the first three sections of the **Gateway** item to the first three sections of the local IP of Smart ECG Viewer. The last section of the **Gateway** item must be set to **001**.

**To Set Subnet Mask**

You can set **Subnet Mask** in the Transmission Setup window.. **Subnet Mask** must be set to **255.255.255.000**.

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.
For SE-601A, if you press **Esc** to exit the **Transmission Setup** window after setup, a hint will pop up to prompt you to save these modifications.

# 9.6 Display & Sound Setup

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Display&Sound** on the **System Setup** screen, and then press **Enter** to open the Display&Sound Setup window.

In the Display&Sound Setup window, you can set **Brightness**, **Display Colors**, **Antialising**, **Key Volume**, **Hint Volume**, **QRS Volume** and **Notify Volume**.

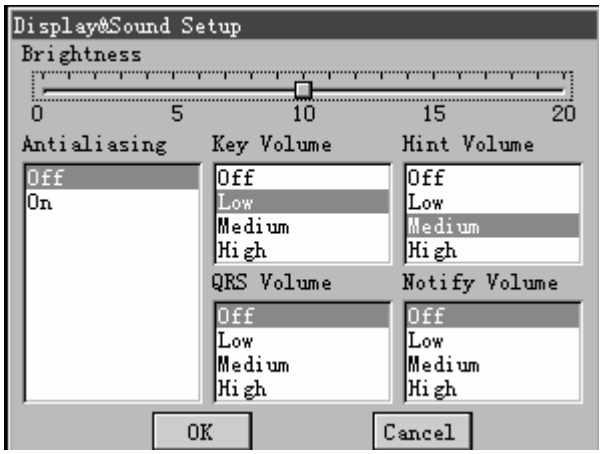



Figure 9-13 SE-601B Display & Sound Setup Window

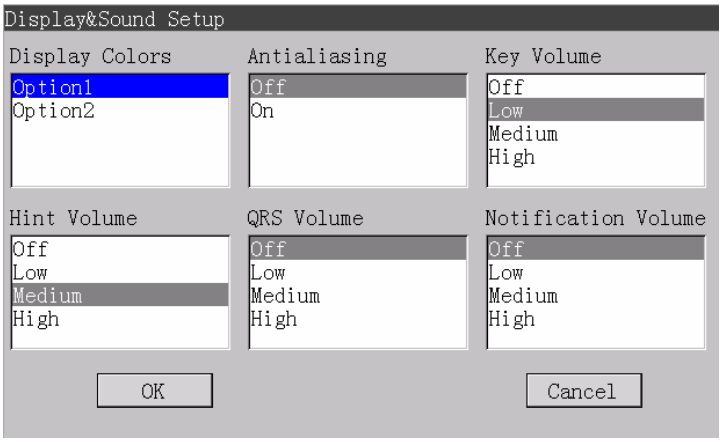



Figure 9-14 SE-601C Display & Sound Setup Window

| | |
|---|---|
| Key Volume | On |
| Hint Volume | On |
| QRS Volume | Off |
| Notification Volume | Off |

Figure 9-15 SE-601A Sound Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the Display&Sound Setup window after setup, a hint will pop up to prompt you to save these modifications.

## 9.6.1 Setting Brightness (Only for SE-601B)

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Brightness** progress bar in the Display&Sound Setup window, and then press **F3** or **F4** to adjust the brightness of the LCD screen. You can set the brightness within 0~20.

## 9.6.2 Selecting Display Colors (Only for SE-601C)

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Display Colors** item in the Display&Sound Setup window, and then press **F1** or **F2** to select **Option1** or **Option2**.

## 9.6.3 Selecting Antialising (Only for SE-601B/C)

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Antialising** item in the Display&Sound Setup window, and then press **F1** or **F2** to select **Off** or **On**.

When **Antialising** is set to **On**, the system will automatically make the waveform smooth.

When **Antialising** is set to **Off**, the system will not make the waveform smooth.

## 9.6.4 Setting Key Volume

When you press keys on the keyboard, the electrocardiograph gives a short sound. When **Key Volume** is set to **Off**, there is no sound when you press keys.

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Key Volume** item in the Display&Sound Setup window, and then press **F1** or **F2** to select an option. You can set **Key Volume** to **Low**, **Medium**, **High** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Key Volume** item in the Sound Setup Window, and then press **F3** or **F4** to select **On** or **Off**.

### 9.6.5 Setting Hint Volume

When the electrocardiograph displays a hint such as *Lead Off*, *Overload*, *Battery Weak* etc., there is a sound. When **Hint Volume** is set to **Off**, there is no hint sound.

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Hint Volume** item in the Display&Sound Setup window, and then press **F1** or **F2** to select an option. You can set **Hint Volume** to **Low**, **Medium**, **High** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Hint Volume** item in the Sound Setup Window, and then press **F3** or **F4** to select **On** or **Off**.

### 9.6.6 Setting QRS Volume

When an R wave is detected, there is a sound to simulate a heartbeat. When **QRS Volume** is set to **Off**, there is no sound when an R wave is detected.

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **QRS Volume** item in the Display&Sound Setup window, and then press **F1** or **F2** to select an option. You can set **QRS Volume** to **Low**, **Medium**, **High** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **QRS Volume** item in the Sound Setup Window, and then press **F3** or **F4** to select **On** or **Off**.

### 9.6.7 Setting Notification Volume

After a complete ECG wave is printed, the electrocardiograph gives a short sound. When **Notification Volume** is set to **Off**, there is no notification sound.

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Notification Volume** item in the Display&Sound Setup window, and then press **F1** or **F2** to select an option. You can set **Notification Volume** to **Low**, **Medium**, **High** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** move the cursor to the **Notification Volume** item in the Sound Setup Window, and then press **F3** or **F4** to select **On** or **Off**.

## 9.7 Patient Question

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Pat. Question** on the **System Setup** screen, and then press **Enter** to open the **Patient Question** window.

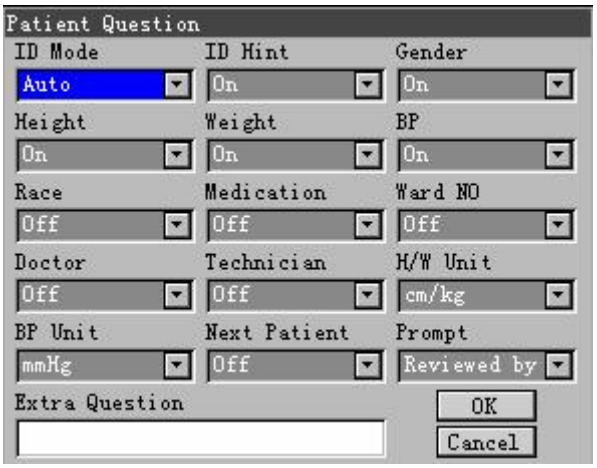



Figure 9-16 SE-601B / SE-601C Patient Question Setup Window

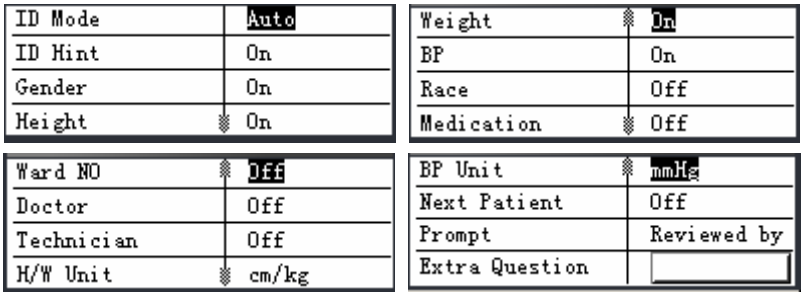



Figure 9-17 SE-601A Patient Question Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Patient Question** window after setup, a hint will pop up to prompt you to save these modifications.

## 9.7.1 Specifying ID Mode

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **ID Mode** item in the Patient Question window, and then press **F1** or **F2** to select a mode.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **ID Mode** item in the Patient Question window, and then press **F3** or **F4** to select a mode.

You can set **ID Mode** to **Auto**, **Time** or **Manu**.

When **ID Mode** is set to **Auto**, the patient ID can be automatically generated. The patient ID range is 0~1999, 999, 999.

When **ID Mode** is set to **Time**, the patient ID can be automatically generated according to the time when you press the **START/STOP** key to print an ECG report.

When **ID Mode** is set to **Manu**, you can enter the patient ID manually in the Patient Information window.

## 9.7.2 Selecting ID Hint

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **ID Hint** item in the Patient Question window, and then press **F1** or **F2** to select **On** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **ID Hint** item in the Patient Question window, and then press **F3** or **F4** to select **On** or **Off**.

In the **AUTO** or **RHYT** mode, when **ID Mode** is set to **Manu** and **ID Hint** is set to **On**, if you do not input the patient ID, the hint will pop up to remind you to input the patient ID when you press the **START/STOP** key.

### 9.7.3 Selecting Gender/Height/Weight/BP/Race/Medication/Ward NO/Doctor/Technician

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to an item in the Patient Question window, and then press **F1** or **F2** to select **On** or **Off**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to an item in the Patient Question window, and then press **F3** or **F4** to select **On** or **Off**.

When **Gender**, **Height**, **Weight**, **BP**, **Race**, **Medication**, **Ward NO**, **Doctor** or **Technician** is set to **On**, the items will be displayed in the **Patient Information** window and printed in the ECG reports.

When **Gender**, **Height**, **Weight**, **BP**, **Race**, **Medication**, **Ward NO**, **Doctor** or **Technician** is set to **Off,** these items will not be displayed in the **Patient Information** window or printed in the ECG reports.

### 9.7.4 Specifying H/W Unit

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **H/W Unit** item in the Patient Question window, and then press **F1** or **F2** to select **cm/kg** or **inch/lb.**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **H/W Unit** item in the Patient Question window, and then press **F3** or **F4** to select **cm/kg** or **inch/lb.**.

**NOTE:** When you change the **H/W Unit** item, the height and weight values in the **Patient Information** window will be cleared.

### 9.7.5 Specifying BP Unit

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **BP Unit** item in the Patient Question window, and then press **F1** or **F2** to select **mmHg** or **kpa**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **BP Unit** item in the Patient Question window, and then press **F3** or **F4** to select **mmHg** or **kpa**.

When **BP** is set to **kpa**, two extra edit boxes will be displayed in the **Patient Information** window for inputting decimal fraction.

## 9.7.6 Selecting Next Patient

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Next Patient** item in the Patient Question window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Next Patient** item in the Patient Question window, and then press **F3** or **F4** to select **Off** or **On**.

When **Next Patient** is set to **On**, in the **AUTO** mode, press the **START/STOP** key to print an ECG report, and the system will automatically open the main screen3 after a complete ECG report is printed.

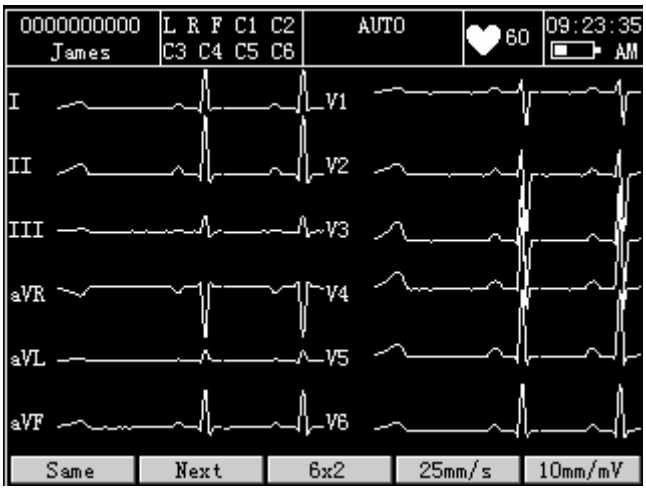



Figure 9-18 SE-601B / C Main Screen3

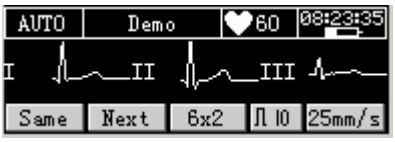



Figure 9-19 SE-601A Main Screen3

On the main screen3, pressing the function key **F1** below **Same** can return to the main screen1, all the patient information will keep the same; pressing the function key **F2** below **Next** can return to the main screen1, all the patient information will be cleared, and the patient ID will be refreshed; pressing the function key **F3** can switch the auto style, pressing the function key **F4** can switch the paper speed, and pressing the function key **F5** can switch the gain.

On the main screen3, you can print the previous ECG report again, according to the settings of the auto style, speed and gain which are shown on the bottom of the screen.

When **Next Patient** is set to **Off**, in the **AUTO** mode, the system will not display the main screen3 after a complete ECG report is printed.

## 9.7.7 Setting Prompt

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Prompt** item in the Patient Question window, and then press **F1** or **F2** to select **Reviewed by** or **Unconfirmed Report**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Prompt** item in the Patient Question window, and then press **F3** or **F4** to select **Reviewed by** or **Unconfirmed Report**.

When **Prompt** is set to **Reviewed by**, if **Doctor** in the Patient Question window is set to **On**, and the doctor name is input in the **Patient Information** window, **Report Reviewed by** and the doctor's name is printed on the bottom of ECG reports.

When **Prompt** is set to **Unconfirmed Report**, **Unconfirmed Report** is printed on the bottom of ECG reports, and doctor name will not be printed on the bottom of ECG reports.

### 9.7.8 Inputting Extra Question

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Extra Question** textbox in the Patient Question window, and then manually input extra information such as **Tel**, which will be displayed in the **Patient Information** window.

## 9.8 Date & Time Setup

**NOTE:** Please set DATE&TIME correctly when it's the first time you use the electrocardiograph.

**WARNING**

We recommend that the electrocardiograph should be working on AC power supply at least 8 hours per month to avoid DATE&TIME missing.

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Date & Time** on the **System Setup** screen, and then press **Enter** to open the **Date&Time Setup** window.

In the Date&Time Setup window, you can set **Current Date**, **Current Time**, **Date Mode**, **Time Mode**, **Period Interval**, **Period Duration**, **Power Off** and **LCD Off**.

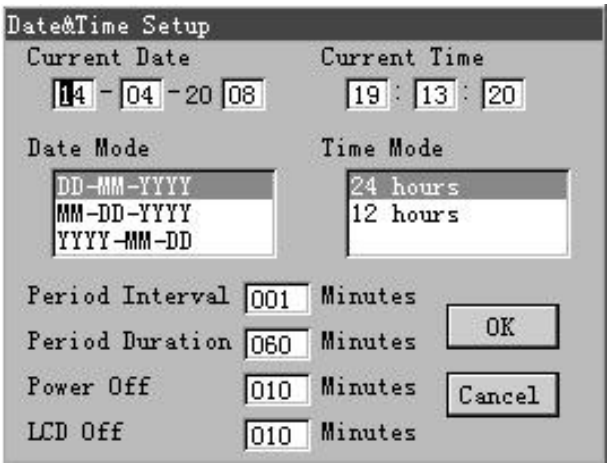



Figure 9-20 SE-601B / SE-601C Date&Time Setup Window

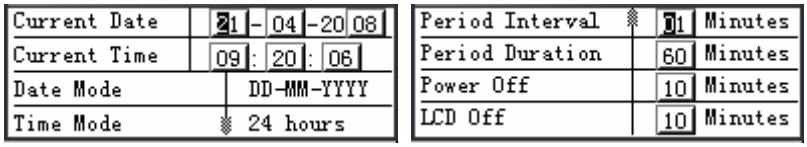



Figure 9-21 SE-601A Date&Time Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **Date&Time Setup** window after setup, a hint will pop up to prompt you to save these modifications.

### 9.8.1 Setting Current Date/Current Time

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Current Date** or **Current Time** textbox in the Date&Time Setup window, and then input the date or time manually.

The current time will be displayed on the main screen, and the current date and time will be printed in the ECG reports.

### 9.8.2 Setting Date Mode

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Date Mode** item in the Date&Time Setup window, and then press **F1** or **F2** to select **DD-MM-YYYY**, **MM-DD-YYYY** or **YYYY-MM-DD**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Date Mode** item in the Date&Time Setup window, and then press **F3** or **F4** to select **DD-MM-YYYY**, **MM-DD-YYYY** or **YYYY-MM-DD**.

### 9.8.3 Setting Time Mode

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Time Mode** item in the Date&Time Setup window, and then press **F1** or **F2** to select **24 hours** or **12 hours**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Time Mode** item in the Date&Time Setup window, and then press **F3** or **F4** to select **24 hours** or **12 hours**.

**NOTE:** After setup, press **Enter** to confirm. Then the new setup will become effective.

### 9.8.4 Setting Period Interval and Period Duration

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Period Interval** and **Period Duration** textboxes in the Date&Time Setup window, and then input the period interval and the period duration manually.

**NOTE:** **Period Duration** must be an integral multiple of **Period Interval**, or else the settings will not be effective.

In the **AUTO** mode, when **Sample Mode** is set to **Period Sample** in the Work Mode Setup window, if **Period Interval** is set to **2 minutes**, **Period Duration** is set to **24 minutes**, after pressing the **START/STOP** key, the printing will be performed every two minutes and come to 12 times.

### 9.8.5 Setting Power-Off Time

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Power Off** textbox in the Date&Time Setup window, and then input the power-off time manually.

When **Power Off** is set to **000 Minutes**, this function will not be effective.

**NOTE:**

1. Power-off time is counted from the time when you last press the keys on the keyboard.
2. Only when the device is powered by the battery, can the set automatic power-off time be effective.

### 9.8.6 Setting LCD Off Time

Press **Tab** or **Shift** + **Tab** to move the cursor to the **LCD Off** textbox in the Date&Time Setup window, and then input the LCD off time manually.

When **LCD Off** is set to **000 Minutes**, this function will not be effective.

When the LCD screen is off, pressing any key can illuminate the LCD screen, except simply pressing **Fn** or **Shift**.

**NOTE:** LCD Off time is counted from the time when you last press the keys on the keyboard.

## 9.9 More Setup

Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **More** on the **System Setup** screen, and then press **Enter** to open the **More Setup** window.

In the More Setup window, you can set **Language**, **Pacemaker Detection Sensitivity**, **Save Option**, **Institution**, **Default**, **Extern Input** and **Extern Output**.

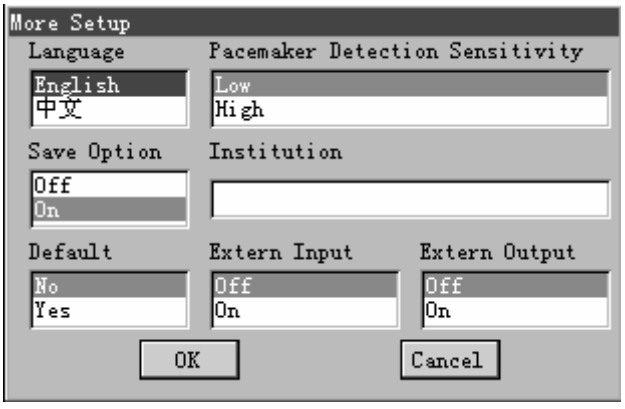



Figure 9-22 SE-601B / SE-601C More Setup Window

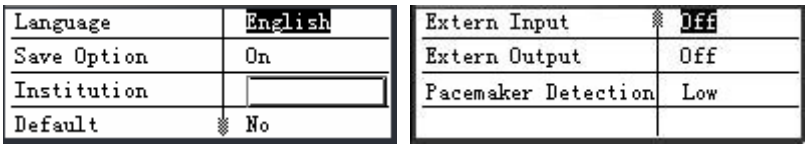



Figure 9-23 SE-601A More Setup Window

After setup, press **Enter** to confirm. Then the **System Setup** screen appears.

For SE-601A, if you press **Esc** to exit the **More Setup** window after setup, a hint will pop up to prompt you to save these modifications.

## 9.9.1 Choosing a Language

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Language** item in the More Setup window, and then press **F1** or **F2** to select a language.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Language** item in the More Setup window, and then press **F3** or **F4** to select a language.

## 9.9.2 Setting Pacemaker Detection Sensitivity

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Pacemaker Detection Sensitivity** item in the More Setup window, and then press **F1** or **F2** to select **Low** or **High**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Pacemaker Detection Sensitivity** item in the More Setup window, and then press **F3** or **F4** to select **Low** or **High**.

When **Pacemaker Detection Sensitivity** is set to **High**, the pacemaker signals are easy to be detected.

When **Pacemaker Detection Sensitivity** is set to **low**, the pacemaker signals are not easy to be detected.

For more information about the detectable parameter ranges, please refer to Appendix 1, “Technical Specifications”.

## 9.9.3 Setting Save Option

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Save Option** item in the More Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Save Option** item in the More Setup window, and then press **F3** or **F4** to select **Off** or **On**.

When **Save Option** is set to **On**, ECG data in the **AUTO** or **RHYT** mode will be saved into the flash memory of the device automatically after an ECG report is printed out.

When **Save Option** is set to **Off**, ECG data will not be saved into the flash memory of the device.

**NOTE:** In the period sampling mode and in the auto style of **6×2 adjust**, the ECG data will not be saved.

## 9.9.4 Entering Institution

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Institution** textbox in the More Setup window, and then manually input the institution name. For SE-601B/C, the range is within 20 characters. For SE-601A, the range is within 10 characters.

## 9.9.5 Restoring Default Settings

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Default** item in the More Setup window, and then press **F1** or **F2** to select **No** or **Yes**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Default** item in the More Setup window, and then press **F3** or **F4** to select **No** or **Yes**.

If **Default** is set to **Yes**, the system restores the default settings shown in the following table.

Table 9-1 System Setup Defaults

| | **Setup** | **Default** |
|---|---|---|
| 1 | Work Mode | Auto |
| 2 | Sample Mode | Real-time Sample |
| 3 | Sample Time | 10s |
| 4 | AC filter | On |
| 5 | EMG filter | Off |
| 6 | DFT filter | 0.67Hz |
| 7 | Lowpass filter | 100Hz |
| 8 | Gain | 10mm/mV |
| 9 | Speed | 25mm/s |
| 10 | Measure | On |
| 11 | Analysis | On |
| 12 | Transmission Mode | Off |
| 13 | Lead Sequence | Standard |
| 14 | Rhythm Lead 1 | II |
| 15 | Rhythm Lead 2 | V1 |
| 16 | Rhythm Lead 3 | V5 |
| 17 | Display Colors | Option 1 |
| 18 | Antialising | Off |
| 19 | QRS Volume | Off |
| 20 | Hint Volume | Medium (SE-601B/C)<br>On (SE-601A) |
| 21 | Key Volume | Low (SE-601B/C)<br>On (SE-601A) |
| 22 | Notification Volume | Off |

| | | |
|---|---|---|
| 23 | ID Mode | Auto |
| 24 | ID hint/Gender/Height/Weight/BP | On |
| 25 | Race/Medication/Ward NO/Doctor/Technician/Next Patient | Off |
| 26 | Prompt | Reviewed By |
| 27 | Period Interval | 001 |
| 28 | Period Duration | 060 |
| 29 | Power Off | 010 |
| 30 | LCD Off | 010 |
| 31 | Save Option | On |

## 9.9.6 Setting Extern Input/Extern Output

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Extern Input** or **Extern Output** item in the More Setup window, and then press **F1** or **F2** to select **Off** or **On**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Extern Input** or **Extern Output** item in the More Setup window, and then press **F3** or **F4** to select **Off** or **On**.

The extern input and output sockets are equipped in the electrocardiograph, through which the electrocardiograph can receive signals from the external equipment, and send signals to the external equipment.

# Chapter 10 Switching Off the Electrocardiograph

When the battery is used, press the key for 1 second or more to display the hint *System is shutting down…* on the screen. Then the device will be off a few seconds later.

When the mains supply is used, press the key for 1second or more to display the hint *System is shutting down…* on the screen. Then the device will be off a few seconds later. Remove the plug from the wall outlet.

**NOTE:**

1. When switching off the device, please follow the above sequence strictly, or else there will be something wrong on the screen.
2. Do not press the key when the device displays the hint information *System is shutting down…* on the screen.

# Chapter 11 Hint Information

Hint information and the corresponding causes provided by the electrocardiograph are listed in Table 11-1.

Table 11-1 Hint Information and Causes

| **Hint Information** | **Causes** |
|---|---|
| Lead off | Electrodes fall off the patient or the patient cable falls off the unit, or a high polarization voltage occurs. |
| Battery Weak | The battery is weak. |
| No Paper | Recorder paper runs out or is not loaded or the casing is not firmly closed. |
| Paper Error | In the **AUTO** or **RHYT** mode, when **Paper Marker** is set to **Style 1** or **Style 2**, the recorder can not find the next black marker at the end of the printing course. |
| Sampling / Analyzing / Recording | ECG signals are being sampled / analyzed / recorded. |
| Learning | The self-study process of arrhythmia arithmetic in the **Trigger Sample** mode |
| Transmitting | ECG data is being transmitted from the electrocardiograph to the PC through the net or serial port in the **AUTO** or **RHYT** mode. |
| Transmit Fail | ECG data fails to be transmitted from the electrocardiograph to the PC through the net or serial port in the **AUTO** or **RHYT** mode. |
| Detecting | The examining process of arrhythmia data in the **Trigger Sample** mode |
| Memory Full | The amount of files on the **File Manage** screen exceeds the capacity limit. (SE-601A can accommodate 50 files, SE-601B can accommodate 100 files, and SE-601C can accommodate 200 files. For SE-601A/B, you can input special password to enable the storage upgrade function, which can extend the storage to 200.) |
| Testing | The period sampling is running. |
| Modu Error | There is something wrong with the ECG board. |
| Demo | The system is in the demonstration mode. |
| Overload | The direct current offset voltage on an electrode is too high. |
| U Disk / USB Printer | A U disk or a USB printer is connected to the USB interface. |

# Chapter 12 Troubleshooting

### 1. Operating Problems

**Q1**: I was trying to select a file from the file list on the **File Manage** screen, but the file was in the middle of the long list. Is there any way to make the selection faster?

**A1**: Actually, the system provides a method for fast moving: pressing **Shift** + **F1** or **Shift** + **F2** can move the cursor up or down in the file list very fast.

**Q2**: I was just about to input the age when I suddenly realized that I had entered the **Name** textbox unintentionally, can I just go back without pressing **Tab** for a whole circle?

**A2**: As a matter of fact, the system does take such unintentionalities into consideration by providing **Shift** + **Tab** as the way back, as the Microsoft Windows operating system does.

**Q3**: I want to save the ECG data without printing, could it be possible?

**A3**: Yes, in the **AUTO** mode, set **Auto Style** to **Off** in the Work Mode Setup window, and then return to the main screen, and press **START/STOP** to activate the sampling. The ECG data will be collected and saved without printing. In the same way, if the transmission settings are configured, the ECG data could be transmitted to the PC without printing.

**Q4**: The screen of SE-601B is too shiny. Could it be possible to weaken the brightness of the screen?

**A4**: There is a setup item named brightness on the **Display & Sound Setup** Window, you can press **F3** or **F4** to change the value, which would lead to the change of the brightness of the screen of SE-601B. For details, please refer to Section 9.6.1, “Setting Brightness”.

**Q5**: I want to input the patients’ phone number in the Patient Information window, but there is no such item. Can I add it manually?

**A5**: Yes, there is a customized item of patient information. It works in this way: first input the name of the item in the **Extra Question** textbox in the Patient Question window, e.g. Tel. Then return to the main screen1, and open the **Patient Information** window, the **Tel** item will be displayed in this window. Now it’s possible to input the phone number of the patient in the **Tel** textbox. For details, please refer to Section 9.7.8 “Inputting Extra Question” and Section 3.2 “Entering Data”.

## 2. Printing Problems

**Q1**: I was encountered with paper-jam, what was I supposed to do?

**A1**: If it happened for the first time, it might be the result of an inappropriate placement of the paper. In this case, please open the recorder casing, pull the paper out of the paper tray, tear the pages with rumples, and then put the paper in the paper tray again, adjust the position of the paper carefully and close the casing.

If it happened several times, it might have something to do with your operating. If **Paper Marker** is set to **Style1** or **Style2**, and the printing course is often stopped manually in the **AUTO** or **RHYT** mode, it may cause paper-jam sometimes because of the back-rolling of the thermal recorder. In this case, if the manual termination of the printing course in the **AUTO** or **RHYT** mode happens frequently, **Paper Marker** in the Record Setup window should be set to **No**, which brings no back-rolling at the beginning of the printing course.

If none of the above-mentioned situations is applicable, there might be some problem with the printing module. Please contact the manufacturer or the local distributor for further disposal.

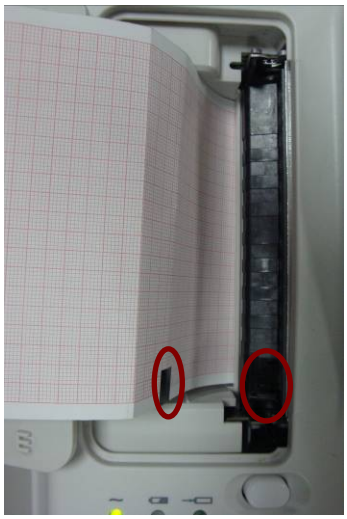
**Q2**: The hint *Paper Error* is displayed on the screen, what should I do?

**A2**: It might be the result of unsuccessful detection of the black markers, first open the recorder casing so as to clear the error information, and then check whether the black marker is on the bottom of the paper. Reload the paper in the paper tray. If it doesn't work, change the paper.

If the problem still exists, please contact the manufacturer or the local distributor for further disposal.

**Q3**: The hint *No Paper* is displayed on the screen, what should I do?

**A3**: Check whether the paper runs out, or the black marker is just facing the black marker detection window on the thermal printing head, as the following figure shows.



Reload the paper in the paper tray, close the recorder casing firmly. If the problem still exists, please contact the manufacturer or the local distributor for further disposal.

**Q4**: I want to print the hospital name in the report, but I can't find the place to enter it, where is it?

**A4**: Please open the **More Setup** window, and move the cursor to the **Institution** textbox, and then input the hospital name. The content you input in this textbox will be printed in the report. For details, please refer to Section 9.9.4, "Entering Institution".

**Q5**: I pressed the **START/STOP** key, but the ECG didn't start printing, what's wrong with it?

**A5**: Please check whether there is any error information displayed on the screen.

If the hint *No Paper* or *Paper Error* is shown on the screen, please deal with it according to the above-mentioned measures.

If the hint *Transmitting…* is shown on the screen, which means that the ECG is transmitting the data to the PC, please wait a few seconds. You can start the printing after the data is transmitted.

If none of the above-mentioned information is shown on the screen, please check whether **Sample Mode** is set to **Pre-Sample** in the Work Mode Setup window. If it is so, the system will not respond to the **START/STOP** key unless 10s data has been collected. In this case, all you have to do is to wait a few seconds, and then you are able to start the printing by pressing the **START/STOP** key again.

If the problem still exists, please contact the manufacturer or the local distributor for further disposal.

**Q6**: I set the filter, speed and gain on the main screen1, but these settings were changed after printing.

**A6**: The filter, speed and gain which are set on the main screen1 will not be saved, and they are changed when you exit the main screen1 or after printing. If you want to save these settings, please set them in the Record Setup window and the **Filter Setup** window.

**3. Transmitting Problems**

**Q1**: The ECG doesn't respond to any keys after a long time of transmission. It transmits nothing for there is no new data appearing in the window of the PC software. What should I do?

**A1**: Some error may occur during the transmission course, for example, the connection between the ECG and the net cable may loosen. In this case, please restart the ECG. If it doesn't work, please restart the PC.

If the problem still exists, please contact the manufacturer or the local distributor for further disposal.

### 4. Main Unit Problems

**Q1**: After power-on, the ECG stays on the logo screen and doesn't open the main screen. I have restarted the machine several times, but there is no better change.

**A1**: The reason for this problem might be: there is a key pressed down, without springing up. Find that key, and make it spring up, the problem should be solved.

**Q2**: I was doing the examination when the machine suddenly gave out a sound and displayed the hint *Lead Off*. What should I do?

**A2**: The corresponding electrodes are not connected well. Please find out which lead is off by checking the Lead Name area on the main screen (please refer to Section 3.4, "About the main screen"). The lead whose name is highlighted is off. Please check whether the corresponding electrode of the lead is connected to the patient skin well, and then make sure that the patient cable socket is connected to the patient cable firmly.

If none of the above-mentioned measures takes effect, please contact the manufacturer or the local distributor for further disposal.

# Chapter 13 Cleaning, Care and Maintenance

## 13.1 Cleaning

**CAUTION**

Turn off the power before cleaning and disinfection. The mains supply must be switched off if it is in use.

### 13.1.1 Cleaning the Main Unit and the Patient Cable

**To clean the electrocardiograph:**

1. Unplug the AC power cord.
2. Wipe the external surfaces of the electrocardiograph with a soft cloth dampened in any of the approved cleaning solutions listed below.

**To clean the patient cable:**

1. Dampen a soft cloth with one of the disinfectants or cleaning agents listed below.
2. Wring excess moisture from the cloth before cleaning.

**Recommended Cleaning Solutions**

- Mild soap and water
- 75% alcohol

### 13.1.2 Cleaning the Reusable Electrodes

**To clean reusable electrodes:**

1. Remove the remainder gel from the electrodes with a clean soft cloth first.
2. Take suction bulbs and metal cups of chest electrodes apart, and take clamps and metal parts of limb electrodes apart.
3. Clean them in warm water and make sure there is no remainder gel.
4. Dry the electrodes with a clean dry cloth or air dry naturally.

**CAUTION**

Do not clean the unit and accessories with abrasive fabric and avoid scratching the electrodes.

### 13.1.3 Cleaning the Print Head

**To clean the print head:**

1. Open the recorder casing and remove the paper.
2. Wipe the print head gently with a clean soft cloth damped in 75% alcohol.
   For stubborn stain, soak it with a little alcohol first and wipe it off with a clean soft cloth.
3. After air drying, load the recorder paper and shut the recorder casing.

Dirty and soiled thermal print head will deteriorate the printing definition. So it should be cleaned at least once a month regularly.

**CAUTION**

Prevent the detergent from seeping into the main unit while cleaning. Do not immerse the unit or the patient cable into liquid under any circumstances.

# 13.2 Disinfection

Disinfection of the main unit is not necessary need in daily maintenance, it is only necessary in operating room. In that case, please use hospital standard disinfectant.

**NOTE:** Clean and disinfect the chest and limb electrodes after each use.

**CAUTION**

1. Do not use high-temperature, high-pressure vapour or ionizing radiation as disinfection methods.
2. Do not use chloric disinfectant such as chloride, sodium hypochlorite etc.

# 13.3 Care and Maintenance

**CAUTION**

Operate the electrocardiograph, charge the battery, and store the battery at a temperature of 40℃(104ºF) or lower. Exposure to higher or lower temperature may reduce battery life, damage the battery, and degrade overall electrocardiograph performance.

## 13.3.1 Recharge and Replacement of Battery

**1) Capacity Identification**

Current capacity of the battery can be identified according to the battery symbol in the top right corner of the LCD screen.

 **:** Full capacity

 **:** Capacity is low, and recharge should be taken into account.

 **:** Empty

**2) Recharge**

The 6-channel electrocardiograph is equipped with the recharge control circuit together with the battery. When the unit is connected to the mains supply, the battery will be recharged automatically. Then the battery recharging indicator (⇥▭) and the mains supply indicator (∿) will be lit at the same time. During the recharging course, the symbol ▭ flashes in the top right corner of the LCD screen. After the battery is fully recharged, the symbol stops flashing, and the battery recharging indicator (⇥▭) is black.

Because of the capacity consumption during the storage and transport course, the battery capacity is not full when it is used for the first time. Battery recharge should be considered before the first use.

**CAUTION**

Repeated undercharging of the battery will damage the battery and reduce battery life.

**3) Replacement**

When the useful life of the battery is over, or foul smell and leakage are found, please contact the manufacturer or the local distributor for replacement.

**WARNING**

1. Only qualified service engineers authorized by the manufacturer can open the battery compartment and replace the battery. The battery of the same model and specification provided by the manufacturer must be used.
2. Danger of explosion -- Do not reverse the anode and the cathode when installing the battery.
3. Remove the battery from the electrocardiograph when the electrocardiograph is not used for a long time.
4. If the battery is stored alone and not used for a long time, we recommend that the battery should be charged at least once every 6 months to prevent overdischarge.
5. When the battery's useful life is over, contact the manufacturer or the local distributor for disposal or dispose of the battery according to local regulations.

**CAUTION**

If the battery has been fully charged and requires recharging after printing only a few ECGs, consider replacement.

## 13.3.2 Recorder Paper

**NOTE:** Recorder paper provided by the manufacturer should be used. Other paper may shorten the life of the thermal print head. The deteriorated print head may lead to illegible ECG reports and block the advance of the paper.

**Storage Requirements:**

- Recorder paper should be stored in a dry, dark and cool area, avoiding excessive temperature, humidity and sunshine.
- Do not put the recorder paper under fluorescence for a long time.
- Make sure that there is no polyvinyl chloride or other chemicals in the storage environment, which will lead to color change of the paper.
- Do not overlap the recorder paper for a long time, or else the ECG reports may trans-print each other.

## 13.3.3 Visual inspection

Perform a visual inspection of all equipment and peripheral devices daily. If you notice any items that need repair, contact a qualified service engineer to make the repairs.

- Check the case and display screen for cracks or other damage.
- Regularly inspect all plugs, cords, cables, and connectors for fraying or other damage.
- Verify that all cords and connectors are securely seated.
- Inspect keys and controls for proper operation.

## 13.3.4 Maintenance of Main Unit, Patient Cable and Electrodes

**CAUTION**

Besides the maintenance requirements recommended in this manual, comply with local regulations on maintenance and measurement.

The following safety checks should be performed at least every 12 months by a qualified person who has adequate training, knowledge, and practical experience to perform these tests.

a) Inspect the equipment and accessories for mechanical and functional damage.

b) Inspect the safety related labels for legibility.

c) Inspect the fuse to verify compliance with the rated current and circuit-breaking characteristics.

d) Verify that the device functions properly as described in the instructions for use.

e) Test the protection earth resistance according to IEC/EN 60601-1: Limit: 0.1ohm.

f) Test the earth leakage current according to IEC/EN/UL 60601-1: Limit: NC/SFC 300μA.

g) Test the enclosure leakage current according to IEC/EN/UL 60601-1: Limit: NC 100μA, SFC 300μA.

h) Test the patient leakage current according to IEC/EN 60601-1: Limit: NC a.c. 10μA, d.c. 10μA; SFC a.c. 50μA, d.c. 50μA.

i) Test the patient auxiliary current according to IEC/EN 60601-1: Limit: NC a.c. 10μA, d.c. 10μA; SFC a.c. 50μA, d.c. 50μA.

j) Test the patient leakage current under single fault condition with mains voltage on the applied part according to IEC/EN 60601-1: Limit: 50μA (CF).

The leakage current should never exceed the limit. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of the above tests, the device has to be repaired.

**WARNING**

Failures on the part of the responsible individual hospital or institution employing this equipment to implement a satisfactory maintenance schedule may cause undue equipment failures and possible health hazards.

**1) Main Unit**

- Avoid excessive temperature, sunshine, humidity and dirt.
- Put the dustproof coat on the main unit after use and prevent shaking it violently when moving it to another place.
- Prevent any liquid from seeping into the equipment; otherwise the safety and the performance of the electrocardiograph can not be guaranteed.

**2) Patient Cable**

- Integrity of the patient cable, including the main cable and lead wires, should be checked regularly. Make sure that it is conductible.
- Do not drag or twist the patient cable with excessive stress while using it. Hold the connector plug instead of the cable when connecting or disconnecting the patient cable.
- Align the patient cable to avoid twisting, knotting or crooking in a closed angle while using it.
- Store the lead wires in a big wheel to prevent any people from stumbling.
- Once damage or aging of the patient cable is found, replace it with a new one immediately.

**3) Reusable Electrodes**

- Electrodes must be cleansed after use and make sure there is no remainder gel on them.
- Keep suction bulbs of chest electrodes away from sunshine and excessive temperature.

- After long-term use, the surfaces of electrodes will be oxidized because of erosion and other causes. By this time, electrodes should be replaced to achieve high-quality ECG records.

**CAUTION**

The device and accessories are to be disposed of according to local regulations after their useful lives. Alternatively, they can be returned to the dealer or the manufacturer for recycling or proper disposal.

# Chapter 14 Accessories

**WARNING**

Only the patient cable and other accessories supplied by the manufacturer can be used. Or else, the performance and electric shock protection can not be guaranteed.

| Accessory | Part Number |
|---|---|
| ECG Cable (European) | 01.57.107581 (Snap Style) |
| | 01.57.107583 (Grabber Style) |
| ECG Cable (American) | 01.57.107582 (Snap Style) |
| | 01.57.107584 (Grabber Style) |
| ECG Cable (European) | 01.57.471016 |
| ECG Cable (American) | 01.57.471017-11 |
| ECG Chest Electrodes | 02.04.110842 |
| ECG Limb Electrodes | 02.04.110843 |
| Pediatric Disposable Adhesive Electrodes | 11.57.40024 |
| Disposable Neonatal Electrode | 11.57.40109 |
| Adult Disposable Adhesive Electrodes | 11.57.040159 |
| Disposable Resting Tab electrodes (1 piece) | 11.57.040189 |
| Power cord (European) | 01.13.36014 |
| Power cord (American) | 11.13.36015 |
| Rechargeable Li-ion Battery | 21.21.064149 |
| Thermal recording paper | 01.57.107560 |
| Fuse | 11.21.64073 |
| Electrode gel | 11.25.78047 |
| Snap/Banana Socket Adapters | 01.13.107449 |
| Clip/Snap/Banana Socket Adapter | 01.57.040172 |
| Alligator Clip/Banana Socket Adapters | 01.57.040173 |
| Input/Output connector | 11.13.19907 |
| Grounding Wire | 11.13.114114 |

| | |
|---|---|
| Smart ECG Viewer | 03.24.38952 |
| | 03.24.38953 |
| Smart ECG Viewer Software Key | 11.18.47116 (TINY-SPRO) |
| | 12.01.47194 (USB) |
| RS232 download Cable | 11.13.20117 |
| Ethernet download cable | 11.13.20096 |
| Wireless AP | 11.17.047338 |
| External Ink-jet Printer (HP Deskjet D2668) | 11.18.052215 |
| U disk | 11.18.078204 |
| SD Card (1G) | 11.18.052199 |
| SD Card Reader | 11.17.047324 |
| ECG bag | 01.56.110351 |
| MT-202 Trolley | 03.28.111848 |
| 12V Vehicle-carried Inverter | 11.21.64056 |

The 6-channel electrocardiograph and accessories are available by contacting the manufacturer or your local distributor.

**NOTE:** The reusable electrodes are not available in the U.S.

# Chapter 15 Warranty & Service

## 15.1 Warranty

EDAN warrants that EDAN's products meet the labeled specifications of the products and will be free from defects in materials and workmanship that occur within warranty period.

The warranty is void in cases of:

a) Damage caused by mishandling during shipping.

b) Subsequent damage caused by improper use or maintenance.

c) Damage caused by alteration or repair by anyone not authorized by EDAN.

d) Damage caused by accidents.

e) Replacement or removal of serial number label and manufacture label.

If a product covered by this warranty is determined to be defective because of defective materials, components, or workmanship, and the warranty claim is made within the warranty period, EDAN will, at its discretion, repair or replace the defective part(s) free of charge. EDAN will not provide a substitute product for use when the defective product is being repaired.

## 15.2 Contact information

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 Technical Specifications

## A1.1 Safety Specifications

| | | |
|---|---|---|
| Comply with: | | IEC/EN 60601-1+A1+A2, IEC/EN 60601-1-2+A1, IEC/EN60601-2-25, ANSI/AAMI EC11, IEC/EN 60601-2-51, UL 60601-1, CAN/CSA C22.2 No.601.1 |
| Anti-electric-shock type: | | Class I with internal power supply |
| Anti-electric-shock degree: | | CF type with defibrillation-proof |
| Degree of protection against harmful ingress of water: | | Ordinary equipment (Sealed equipment without liquid proof) |
| Disinfection/sterilization method: | | Refer to the user manual for details |
| Degree of safety of application in the presence of flammable gas: | | Equipment not suitable for use in the presence of flammable gas |
| Working mode: | | Continuous operation |
| EMC: | | Group I, Class A |
| Patient Leakage Current: | NC | <10μA (AC) / <10μA (DC) |
| | SFC | <50μA (AC) / <50μA (DC) |
| Patient Auxiliary Current: | NC | <10μA (AC) / <10μA (DC) |
| | SFC | <50μA (AC) / <50μA (DC) |

# A1.2 Environment Specifications

| | Transport & Storage | Working |
|---|---|---|
| Temperature: | -20℃ (-4ºF) ~ +55℃ (+131ºF) | +5ºC (+41ºF) ~ +40ºC (+104ºF) |
| Relative Humidity: | 25%~93%<br>Non-Condensing | 25%~80%<br>Non-Condensing |
| Atmospheric Pressure: | 700hPa ~1060hPa | 860hPa ~1060hPa |

# A1.3 Physical Specifications

| | |
|---|---|
| Dimensions | 310mm×322mm×101mm (12.2in×12.7in×3.98in) |
| Weight | Approx. 2.6kg (5.7lbs) (excluding recorder paper and battery) |
| Display | SE-601A: 3.5 inch STN LCD 192*64dot<br>SE-601B: 5.7 inch STN LCD 320*240 dot<br>SE-601C: 5.7 inch TFT color LCD 640*480 dot |

# A1.4 Power Supply Specifications

| | |
|---|---|
| Mains Supply: | Operating Voltage = 100V-240V~ |
| | Operating Frequency = 50Hz/60Hz |
| | Input Power = 70VA |
| Internal Li-ion Battery Pack: | Rated voltage = 14.8V |
| | Rated capacity = 2200mAh |
| | When the battery is fully charged, the electrocardiograph can work normally for nearly 6 hours; and it can continually print about 2 hours in the **MANU** mode or print about 280 ECG reports of 3×4+1rhy in the **AUTO** mode. |
| | Charge mode: Constant current/voltage |
| | Charge current (standard) = 0.28 $C_5$A (600mA) |
| | Charge voltage (standard) = (16.8-0.1V) |
| | Necessary Charge time: 5 hours |
| | Cycle life ≥ 300 times |
| Power Consumption: | 70VA (max) |
| Fuse: | T1AL250VP Ø5×20 |

# A1.5 Performance Specifications

| | |
|---|---|
| **Recording** | |
| Recorder: | Thermal dot-matrix recorder |
| Printing Density | 8 dots per mm / 200 dots per inch (amplitude axes)<br>40 dots per mm / 1000 dots per inch (time axes, @ 25 mm/s) |
| Recorder Paper: | Folded thermal paper: 110mm×140mm×144pages |
| Effective Width: | 104mm |
| Paper Speed: | 5mm/s, 6.25mm/s, 10mm/s, 12.5mm/s, 25mm/s, 50mm/s（±3%） |
| Accuracy of data: | ±5% (x-axis), ±5%(y-axis) |
| **HR Recognition** | |
| Technique: | Peak-peak detection |
| HR Range: | 30 BPM ~300 BPM |
| Accuracy: | ±1 BPM |
| **ECG Unit** | |
| Leads: | 12 standard leads |
| Acquisition Mode: | simultaneously 12 leads |
| A/D Resolution: | 24 bits |
| Time Constant: | ≥3.2s |
| Frequency Response: | 0.05Hz ~ 150Hz (-3dB) |
| Gain: | 2.5mm/mV, 5mm/mV, 10mm/mV, 20mm/mV, 10/5mm/mV, AGC |
| Input Impedance: | ≥50MΩ (10Hz) |
| Input Circuit Current: | ≤0.01μA |
| Input Voltage Range | ≤±5mVpp |
| Calibration Voltage: | 1mV±2% |
| DC Offset Voltage: | ±600mV |
| Noise: | ≤12.5μVp-p |

| | |
|---|---|
| Multichannel crosstalk | ≤0.5mm |
| Filter | AC Filter: On/Off |
| | DFT Filter: 0.05Hz / 0.15Hz / 0.25Hz / 0.32Hz / 0.5Hz / 0.67Hz |
| | EMG Filter: 25Hz/35Hz/45Hz/OFF |
| | LOWPASS Filter:150Hz/100Hz/75Hz |
| CMRR | ≥115dB |
| Sampling Frequency | 1000 Hz |
| **Pacemaker Detection** | |
| Amplitude | ±2 to ±700 mV |
| Width | 0.1 to 2.0 ms |
| Sampling Frequency | 10,000 /sec/channel |
| **External Input/Output (Optional)** | |
| Input | ≥100kΩ; Sensitivity 10mm/V±5%;<br>Single ended |
| Output | ≤100Ω; Sensitivity 1V/mV±5%;<br>Single ended |

**NOTE:**

1. Test the accuracy of input signal reproduction according to the methods described in clause 4.2.7.2 in ANSI/AAMI EC11:1991/(R) 2001, and the result complies with the clause 3.2.7.2 in ANSI/AAMI EC11:1991/(R) 2001.
2. Overall System Error is tested using the method described in AAMI EC11 3.2.7.1. Overall System Error is not more than ±5%.
3. Frequency Response is tested using the method described in AAMI EC11 3.2.7.2 methods A and D.

# Appendix 2 EMC Information

**Guidance and manufacture's declaration - electromagnetic emissions- for all EQUIPMENT and SYSTEMS**

<table>
<tr><th colspan="3">Guidance and manufacture's declaration - electromagnetic emission</th></tr>
<tr><td colspan="3">The SE-601 Electrocardiograph is intended for use in the electromagnetic environment specified below. The customer or the user of the SE-601 Electrocardiograph should assure that it is used in such an environment.</td></tr>
<tr><th>Emission test</th><th>Compliance</th><th>Electromagnetic environment - guidance</th></tr>
<tr><td>RF emissions<br>CISPR 11</td><td>Group 1</td><td rowspan="4">The SE-601 Electrocardiograph uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emission<br>CISPR 11</td><td>Class A</td><td rowspan="3">The SE-601 Electrocardiograph is suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td></tr>
<tr><td>Harmonic emissions<br>IEC/EN 61000-3-2</td><td>Class A</td></tr>
<tr><td>Voltage fluctuations/ flicker emissions<br>IEC/EN 61000-3-3</td><td>Complies</td></tr>
</table>

**Guidance and manufacture's declaration - electromagnetic immunity - for all EQUIPMENT and SYSTEMS**

| **Guidance and manufacture's declaration - electromagnetic immunity** | | | |
|---|---|---|---|
| The *SE-601 Electrocardiograph* is intended for use in the electromagnetic environment specified below. The customer or the user of *SE-601 Electrocardiograph* should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC/EN 60601 test level** | **Compliance level** | **Electromagnetic environment - guidance** |
| Electrostatic discharge (ESD) IEC/EN 61000-4-2 | ±6 kV contact<br>±8 kV air | ±6 kV contact<br>±8 kV air | Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%. |
| Electrical fast transient/burst IEC/EN 61000-4-4 | ±2 kV for power supply lines | ±2 kV for power supply lines | Mains power quality should be that of a typical commercial or hospital environment. |
| Surge IEC/EN 61000-4-5 | ±1 kV line to line<br>±2 kV line to ground | ±1 kV line to line<br>±2 kV line to ground | Mains power quality should be that of a typical commercial or hospital environment. |
| Power frequency (50Hz/60Hz) magnetic field IEC/EN 61000-4-8 | 3A/m | 3A/m | Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. |
| Voltage dips, short interruptions and voltage variations on power supply input lines IEC/EN 61000-4-11 | <5% $U_T$<br>(>95% dip in $U_T$)<br>for 0.5 cycle<br><br>40% $U_T$<br>(60% dip in $U_T$)<br>for 5 cycles<br><br>70% $U_T$<br>(30% dip in $U_T$)<br>for 25 cycles<br><br><5% $U_T$<br>(>95% dip in $U_T$)<br>for 5 sec | <5% $U_T$<br>(>95% dip in $U_T$)<br>for 0.5 cycle<br><br>40% $U_T$<br>(60% dip in $U_T$)<br>for 5 cycles<br><br>70% $U_T$<br>(30% dip in $U_T$)<br>for 25 cycles<br><br><5% $U_T$<br>(>95% dip in $U_T$)<br>for 5 sec | Mains power quality should be that of a typical commercial or hospital environment. If the user of the *SE-601 Electrocardiograph* requires continued operation during power mains interruptions, it is recommended that the *SE-601 Electrocardiograph* be powered from an uninterruptible power supply or a battery. |
| NOTE $U_T$ is the a.c. mains voltage prior to application of the test level. | | | |

**Guidance and manufacture's declaration - electromagnetic immunity - for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING**

| **Guidance and manufacture's declaration - electromagnetic immunity** | | | |
|---|---|---|---|
| The *SE-601 Electrocardiograph* is intended for use in the electromagnetic environment specified below. The customer or the user of *SE-601 Electrocardiograph* should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC 60601 test level** | **Compliance level** | **Electromagnetic environment - guidance** |
| Conducted RF<br>IEC/EN<br>61000-4-6 | 3 $V_{rms}$<br>150 kHz to 80 MHz | 3$V_{rms}$ | Portable and mobile RF communications equipment should be used no closer to any part of the *SE-601 Electrocardiograph*, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.<br>**Recommended separation distance**<br>$d = 1.2\sqrt{P}$ |
| Radiated RF<br>IEC/EN<br>61000-4-3 | 3 V/m<br>80 MHz to 2.5 GHz | 3 V/m | $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz<br>$d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz<br>Where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and $d$ is the recommended separation distance in metres (m).<br>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b]<br>Interference may occur in the vicinity of equipment marked with the following symbol:<br>  |
| NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. | | | |

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the *SE-601 Electrocardiograph* is used exceeds the applicable RF compliance level above, the *SE-601 Electrocardiograph* should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the *SE-601 Electrocardiograph*.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

**Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM - for EQUIPMENT or SYSTEM that are not LIFE-SUPPORTING**

**Recommended separation distances between portable and mobile RF communications equipment and the *SE-601 Electrocardiograph***

The *SE-601 Electrocardiograph* is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the *SE-601 Electrocardiograph* can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the *SE-601 Electrocardiograph* as recommended below, according to the maximum output power of the communications equipment.

| **Rated maximum output power of transmitter (W)** | **Separation distance according to frequency of transmitter (m)** | | |
|---|---|---|---|
| | **150 kHz to 80 MHz** $d = 1.2\sqrt{P}$ | **80 MHz to 800 MHz** $d = 1.2\sqrt{P}$ | **800 MHz to 2.5 GHz** $d = 2.3\sqrt{P}$ |
| 0.01 | **0.12** | **0.12** | **0.23** |
| 0.1 | **0.38** | **0.38** | **0.73** |
| 1 | **1.2** | **1.2** | **2.3** |
| 10 | **3.8** | **3.8** | **7.3** |
| 100 | **12** | **12** | **23** |

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

# Appendix 3 Abbreviation

| Abbr | English |
|---|---|
| LCD | Liquid Crystal Display |
| BP | Blood Pressure |
| ECG | Electrocardiogram/Electrocardiograph |
| HR | Heart Rate |
| aVF | Left Foot Augmented Lead |
| aVL | Left Arm Augmented Lead |
| aVR | Right Arm Augmented Lead |
| LA | Left Arm |
| LL | Left Leg |
| RA | Right Arm |
| RL | Right Leg |
| ID | Identification |
| AC | Alternating Current |
| USB | Universal Serial Bus |
| AGC | Auto Gain Control |
| SFC | Single Fault Condition |
| NC | Normal Condition |

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