



User Manual

Manual Ver: 1.3

Release Date: Oct. 2009

Part Number: MS1R-110286-1.3

P/N: MS1R-110286-1.3

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#### **Statement**

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### **Product Information**

**Product Name:** Electrocardiograph

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

### Responsibility of the Manufacturer

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

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

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

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

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

### **Using This Label Guide**

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

I

# **⚠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.

# **Revision History**

Date	ECO# / ECR#	Version	Description
2008/12		1.0	1st edition
2009/01	ECO-SE-9001	1.1	Added some information according to EC11
2009/03	ECO-SE-9005	1.2	Replaced the <b>Filter Setup</b> interface and the <b>More Setup</b> interface.
2009/10	ECR-SE-9044	1.3	Replaced the <b>Patient Information</b> window and the <b>Record Setup</b> interface. Added the interfaces of SE-601A.

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# **Chapter 1 Safety Guidance**

This chapter provides important safety information related to the use of 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 interpreted ECG with measurements and interpretive statements is only intended to be used on adult patients and is offered to clinicians on an advisory basis only.

# 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.

**NOTE:** This device is not intended for home use.

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

### 1.2.1 Safety Warnings

### **MARNING**:

- 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.
- 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.
- This device is not intended for treatment.
- 5. **EXPLOSION HAZARD** Do not use the electrocardiograph in the presence of flammable anesthetic mixtures with oxygen or other flammable agents.
- 6. **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.
- 7. If the integrity of the external protective conductor is in doubt, the equipment should be powered by a built-in rechargeable battery.
- 8. Do not use this equipment in the presence of high static electricity or high

- voltage equipment which may generate sparks.
- 9. This equipment is not designed for internal use or direct cardiac application.
- 10. 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.
- 11. Make sure that all electrodes are connected to the patient correctly before operation.
- 12. 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.
- 13. Electrodes with defibrillator protection should be used while defibrillating.
- 14. If reusable electrodes with electrode gel are used during defibrillation, ECG recovery will take more than 10 seconds. The manufacturer recommends the use of disposable electrodes at all times.
- 15. Electrodes of dissimilar metals should not be used; otherwise it may cause a high polarization voltage.
- 16. There is no danger for patients to use pacemakers. However, if a pacemaker is used, the results given by the equipment may be invalid, or lose the clinical significance.
- 17. Do not touch the patient, bed, table or the equipment while using the ECG together with a defibrillator or a pacemaker.
- 18. In order to avoid being burnt, please keep the electrodes far away from the radio knife while using electrosurgical equipment.
- 19. 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.
- 20. The summation of leakage current should never exceed leakage current limits while several other units are used at the same time.
- 21. 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.
- 22. The EQUIPMENT is protected against malfunctions caused by electrosurgery according to the clause 36.202.101 in the standard IEC60601-2-25.
- 23. The disposable electrodes can only be used for one time.

### 1.2.2 Battery Care Warnings

### **⚠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. 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. 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.
- 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. Only when the device is off can the battery be installed or removed.

#### 1.2.3 General Cautions

# **CAUTION**:

- 1. Avoid liquid splash and excessive temperature. The temperature must be kept between 5 °C and 40 °C during operation, and it should be kept between -20 °C and 55 °C during transportation and storage.
- 2. Do not use the equipment in a dusty environment with bad ventilation or in the presence of corrosive.
- 3. 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.
- 4. Before use, the equipment, patient cable and electrodes etc. should be checked. Replacement should be taken if there is any evident defectiveness or aging symptom which may impair the safety or the performance.

- 5. The following safety checks should be performed at least every 24 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 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: 0.1 ohm.
  - f) Test the earth leakage current according to IEC/EN 60601-1: Limit: NC  $500 \mu A$ , SFC  $1000 \mu A$ .
  - g) Test the enclosure leakage current according to IEC/EN 60601-1: Limit: NC 100μA, SFC 500μA.
  - 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.
  - 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 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.

- 6. Ruptured fuse must only be replaced with that of the same type and rating as the original.
- 7. Federal (U.S.) law restricts this device to sale by or on the order of a physician.

### 1.2.4 Cleaning & Disinfection Cautions

## **OCAUTION**

- 1. Turn off the power before cleaning and disinfection. If the mains supply is used, the power cord should be dragged out of the outlet. Prevent the detergent from seeping into the equipment.
- 2. Do not immerse the unit or the patient cable into liquid under any circumstances.
- 3. Do not clean the unit and accessories with abrasive fabric and avoid scratching the electrodes.
- 4. Any remainder of detergent should be removed from the unit and the patient cable after cleaning.
- 5. Do not use chloric disinfectant such as chloride, sodium hypochlorite etc.

# 1.3 List of Symbols

$\rightarrow$	External output	
<b>—</b>	External input	
<b>-  ●</b>   <b>-</b>	Equipment or part of CF type with defibrillator proof	
$\triangle$	Attention – general warning (see accompanying document)	
<b>₩</b>	Potential equalization	
$\sim$	Mains Supply	
	Battery indicator	
→□	Battery recharging indicator	
<b>←</b>	Delete key	
Enter	Enter key	
ESC	Esc key	
Space	Space key/Feed paper key	
<b>★</b> Shift	Shift key	
Fn	Fn key	

### SE-601 Series Electrocardiograph User Manual

<b>(</b> \$∕®)	Power On/Off key	
MODE	MODE key	
RESET	RESET key	
1mV/COPY	1mV/COPY key	
START/STOP	START/STOP key	
Tab	Tab key	
	Recycle	
P/N	Part Number	
SN	Serial Number	
	Manufacturer	
wl	Date of Manufacture	
<b>C</b> € <sub>0123</sub>	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	

### SE-601 Series Electrocardiograph User Manual

<u> </u>	The symbol indicates that the device should be sent to the special agencies according to local regulations for separate collection after its useful life and that this unit was put on the market after 13 August 2005.	
	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 built-in rechargeable lithium 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 lithium battery.

### **MARNING**:

- 1. This equipment is intended for use on adult and pediatric patients only.
- 2. This equipment is not designed for internal use or direct cardiac application.
- 3. 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.

## 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.
В		Battery indicator	When the device is powered by the built-in rechargeable lithium battery, this indicator is lit.
С	→□	Battery recharging indicator	When the battery is being recharged, this indicator is lit.

# 2.2 Keyboard and Keys

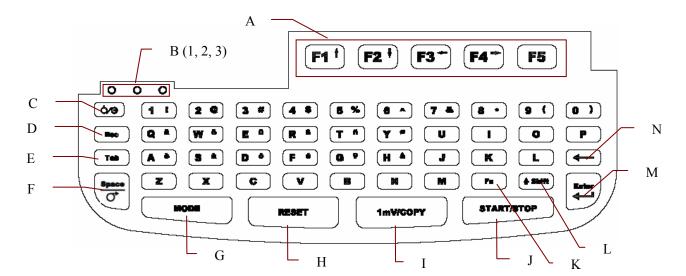


Figure 2-3 SE-601A / SE-601B / SE-601C Keyboard

	Name	Explanation	
A	Function Key	Selecting menu functions on the screen (Pressing <b>F1</b> , <b>F2</b> , <b>F3</b> or <b>F4</b> can move the cursor)	
В	Indicator	1 indicates that the device is powered by the mains supply 2 indicates that the device is powered by the battery 3 indicates the battery charging status	
С	Ġ <b>/</b> 9	Power on / off	
D	Esc	Canceling operation	
Е	Tab	Pressing <b>Tab</b> can move the cursor forward, and pressing <b>Shift</b> + <b>Tab</b> can move the cursor backward.	
F	Space	Space: adding a space between typed characters Feed Paper: before printing, if <b>Paper Marker</b> is set to <b>Style1</b> or <b>Style2</b> , you can press the <b>Space</b> key to advance the recorder paper to the next paper marker; if <b>Paper Marker</b> is set to <b>No</b> , you can press the <b>Space</b> key to advance the paper for about 2cm. Press the <b>Space</b> key again to stop advancing the paper.	
G	MODE	Press this key to select a working mode among AUTO, MANUAL and RHYTHM.  Note: Only on the Work Mode Setup interface can the R-R mode be selected.	
Н	RESET	Draw the baseline to zero quickly in the case of baseline drift	
I	1mV/COPY	In the <b>AUTO</b> mode, pressing the <b>1mV/Copy</b> key can print the ECG report which was printed out last time.  In the <b>Manu</b> mode, pressing the <b>1mV/Copy</b> key can insert a 1mV calibration mark in the printing course.	
J	START/STOP	Start/Stop printing reports	
K	Fn	Inputting special characters. Press $\mathbf{Fn} + \mathbf{a}$ to type $\grave{\mathbf{e}}$ .	
L	Shift	Inputting a capital letter. Press <b>Shift</b> + <b>p</b> to type a capital <b>P</b> .	
M	Enter	Confirming operation	
N	Delete	Deleting characters	

# 2.3 Rear Panel

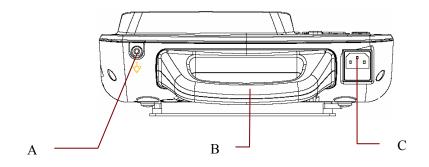


Figure 2-4 SE-601A / SE-601B / SE-601C Rear Panel

	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.
В	Handle	Part for people to hold
С	Mains Supply Socket	AC SOURCE: alternating current supply socket

# 2.4 Right Panel

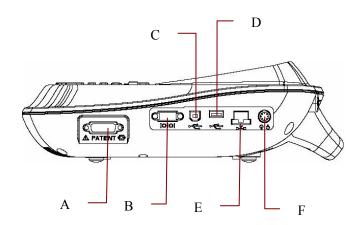
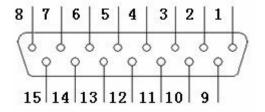


Figure 2-5 SE-601A / SE-601B / SE-601C Right Panel

	Name	Explanation
A	Patient Cable Socket	Connecting to the patient cable
В	Serial Port 1	Connecting to a PC
С	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
Е	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

⚠: Attention – see accompanying document

Definitions of corresponding pins:

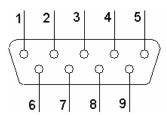
Pin	Signal	Pin	Signal	Pin	Signal
1	C2 / V2	6	SH	11	F/LL
2	C3 / V3	7	NC	12	C1 / V1
					or NC
3	C4 / V4	8	NC	13	C1 / V1
4	C5 / V5	9	R / RA	14	RF (N) /RL
					or NC
5	C6 / V6	10	L/LA	15	RF (N) / RL

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

#### 2) Serial Port 1

# **MARNING**:

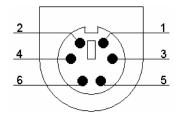
The isolated intensity of serial port 1 is 1500V AC and the maximum voltage applied should not exceed +15V DC.



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

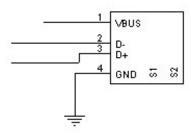


Definitions of corresponding pins:

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. The summation of leakage current should never exceed leakage current limits while several other units are used at the same time.

### 2.5 Bottom Panel

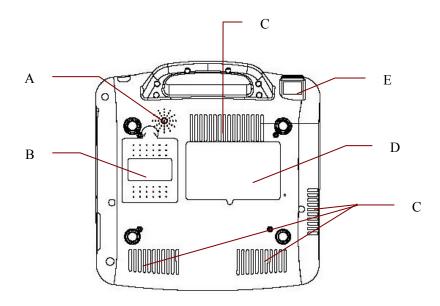


Figure 2-6 SE-601 A / SE-601B / SE-601C Bottom Panel

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

#### 1) Battery Compartment

The rated voltage and the rated capacity of the rechargeable lithium 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.
- 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  $\emptyset$ 5×20.

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

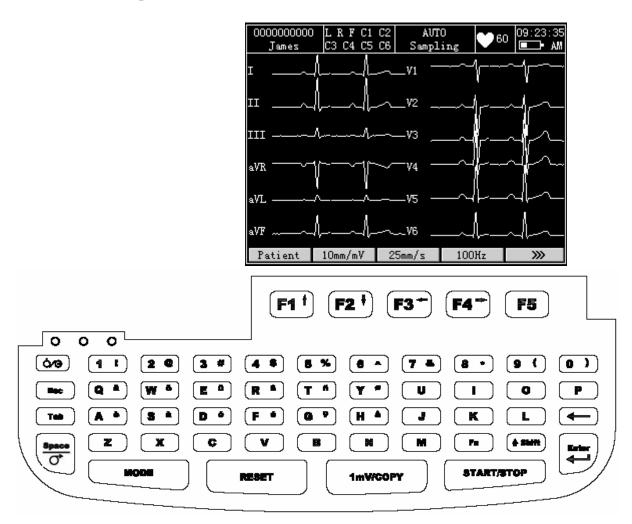
### 2.6 Function Features

- ♦ 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 capability QWERTY 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.
- Built-in rechargeable lithium 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

# **Chapter 3 About SE-601 Application**

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

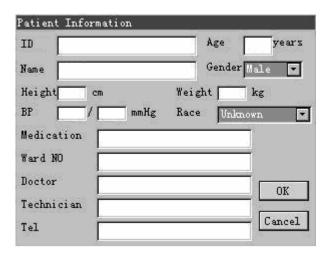
# 3.1 Selecting Menu Functions



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

To select \_\_\_\_\_\_, press the function key **F5** below \_\_\_\_\_\_.

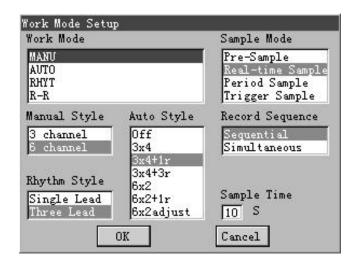
## 3.2 Entering Data



- 1. When the main interface 1 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  $\mathbf{Fn}$  and a letter key to input the special character in the top right corner of the key. Press  $\mathbf{Shift}$  and a number key to input the special character in the top right corner of the key. Press  $\mathbf{Shift}$  and a letter key to input a capital letter. For example, press  $\mathbf{Fn} + \mathbf{a}$  to input  $\mathbf{\grave{e}}$ , press  $\mathbf{Shift} + \mathbf{3}$  to input  $\mathbf{\#}$ , and press  $\mathbf{Shift} + \mathbf{a}$  to input a capital  $\mathbf{A}$ .
- 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, RHTY 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

Work Mode	AUTO
Manual Style	6 channel
Auto Style	6x2
Rhvthm Stvle	# Three Lead

- 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**, **RHTY** 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 Interface

After you turn on the device, the main interface1 pops up. Press the function key **F5** below to open the main interface2.

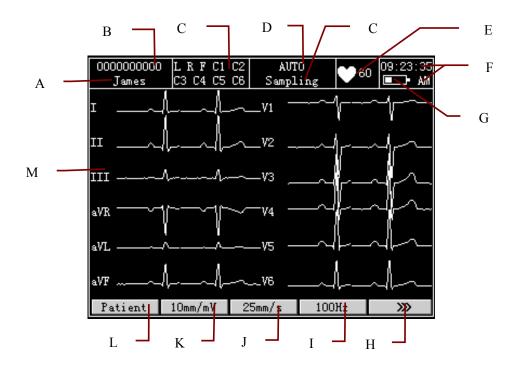


Figure 3-1 SE-601B / SE-601C Main Interface1

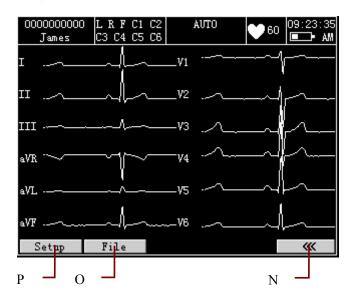


Figure 3-2 SE-601B / SE-601C Main Interface2

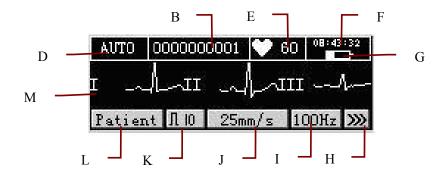


Figure 3-3 SE-601A Main Interface1

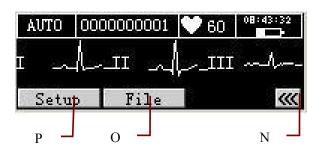


Figure 3-4 SE-601A Main Interface2

	Name	Explanation
A	Name	Patient Name: within 12 characters (for SE-601B/C) within 10 characters (for SE-601A)
В	ID	Patient ID: within 10 characters
С	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
Е	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 rechargeable battery
Н	<b>&gt;&gt;&gt;</b>	Press the function key <b>F5</b> below to open the main interface2
I	100Hz	EMG Filter: 25Hz, 35Hz or 45Hz Lowpass Filter: 75Hz, 100Hz or 150Hz
J	25mm/s	Paper Speed: 5 mm/s, 6.25 mm/s, 10 mm/s, 12.5 mm/s, 25 mm/s or 50mm/s
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 <b>F1</b> below <b>Patient</b> to display the <b>Patient Information</b> window

M	ECG waveform	Display ECG waveform
N	<b>«</b>	Press the function key <b>F5</b> below to return to the main interface1
О	File	Press the function key <b>F2</b> below <b>File</b> to open the <b>File Manage</b> interface. For details, please refer to Chapter 8, "Managing Files".
P	Setup	Press the function key <b>F1</b> below <b>Setup</b> to display the <b>System Setup</b> interface. For details, please refer to Chapter 9, "System Setup".

#### **To Open the Main Interface3**

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 interface3 after a complete ECG report is printed.

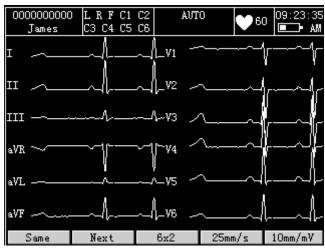


Figure 3-5 SE-601B / SE-601C Main Interface3



Figure 3-6 SE-601A Main Interface3

On the main interface3, pressing the function key **F1** below **Same** can return to the main interface1, and all the patient information will keep the same; pressing the function key **F2** below **Next** can return to the main interface1, all the patient information will be cleared, and patient ID will be refreshed

On the main interface3, 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 interface. 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 interface2 is displayed, press the function key **F1** below **Setup** to open the **System Setup** interface.

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

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 Interface

When the main interface1 is displayed, press the function key **F5** below to open the main interface2. When the main interface2 is displayed, press the function key **F1** below **Setup** to open the **System Setup** interface.

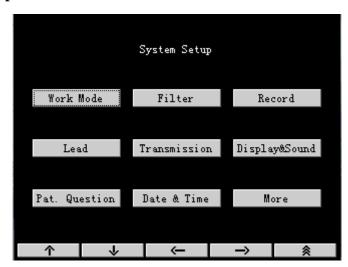


Figure 3-7 SE-601B / SE-601C System Setup Interface

System Setup			
Work Mode	Work Mode Filter		
Lead	Transmit	Sound	
Patient	Date&Time	More	

Figure 3-8 SE-601A System Setup Interface

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

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

On the **System Setup** interface, 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** interface.

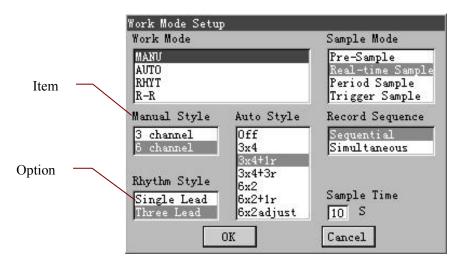


Figure 3-9 SE-601B / SE-601C Work Mode Setup Interface

Work Mode	AUTO	Sample Mode	Real-time
Manual Style	6 channel	Record Sequence	Sequential
Auto Style	6x2	Sample Time	10 S
Rhythm Style	Three Lead		

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

#### For SE-601B/C

- 1. On the **Work Mode Setup** interface, 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. On the **Work Mode Setup** interface, 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 Interface

When the main interface1 is displayed, press the function key **F5** below to display the main interface2. Press the function key **F2** below **File** to open the **File Manage** interface1.

- 1. Press the function key **F5** below to display the **File Manage** interface2. Then press the function key **F5** below to return to the **File Manage** interface1.
- 2. Or press F1, F2, Shift + F1 or Shift + F2 to highlight a file on the File Manage interface1,

and then press the function key **F4** below **Select** to select the file and display the **File Manage** interface3. For SE-601B/C, press **Esc** to return to the **File Manage** interface1. For SE-601A, press **Esc** or the function key **F5** below to return to the **File Manage** interface1.

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

3. Press **Esc** on the **File Manage** interface1 to return to the main interface1.

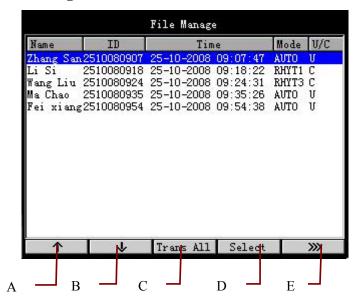


Figure 3-11 SE-601B / SE-601C File Manage Interface1

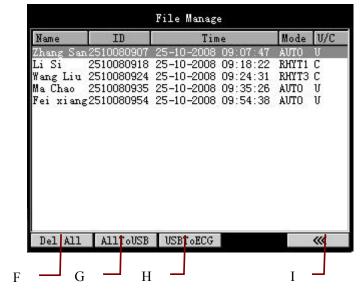


Figure 3-12 SE-601B / SE-601C File Manage Interface2

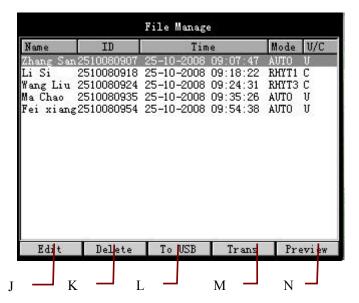


Figure 3-13 SE-601B / SE-601C File Manage Interface3

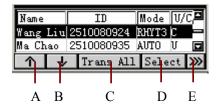


Figure 3-14 SE-601A File Manage Interface1

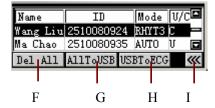


Figure 3-15 SE-601A File Manage Interface2

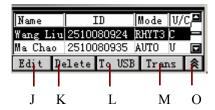


Figure 3-16 SE-601A File Manage Interface3

	Name	Explanation
A	^	Press the function key <b>F1</b> below to highlight a file.
В	<b>\</b>	Press the function key <b>F2</b> below to highlight a file.
С	Trans All	Press the function key <b>F3</b> below <b>Trans All</b> to transmit all the files to the PC.
D	Select	Press the function key <b>F4</b> below <b>Select</b> to open the <b>File Manage</b> interface3.

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Е	<b>****</b>	Press the function key <b>F5</b> below <b>w</b> to display the <b>File Manage</b> interface2.
F	Del All	Press the function key <b>F1</b> below <b>Del All</b> to delete all the files.
G	AllToUSB	Press the function key <b>F2</b> below <b>AllToUSB</b> to copy all the files into the ECGDATA folder of the U disk.
Н	USBToECG	Press the function key <b>F3</b> below <b>USBToECG</b> to copy files in the ECGDATA folder of the U disk to SE-601.
I	<b>***</b>	Press the function key <b>F5</b> below to return to the <b>File Manage</b> interface1.
J	Edit	Press the function key <b>F1</b> below <b>Edit</b> to open the <b>Patient Information</b> interface, and then edit the patient information manually.
K	Delete	Press the function key <b>F2</b> below <b>Delete</b> to delete the selected file.
L	To USB	Press the function key <b>F3</b> below <b>To USB</b> to copy the selected file into the ECGDATA folder of the U disk.
M	Trans	Press the function key <b>F4</b> below <b>Trans</b> to transmit the selected file to the PC.
N	Preview	For SE-601B/C, press the function key <b>F5</b> below <b>Preview</b> to preview the selected file.
О	*	For SE-601A, press the function key <b>F5</b> below  to return to the <b>File Manage</b> interface1.

# **Chapter 4 Operation Preparations**

# **CAUTION**:

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

### **MARNING**

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

#### **Power Supply**

The electrocardiograph can be powered by either the mains supply or the built-in rechargeable lithium 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. Then the mains supply indicator  $(\sim)$  will be lit.

If the built-in rechargeable battery is weak when the mains supply is used, it will be recharged automatically at the same time. Both the mains supply indicator  $(\sim)$  and the battery recharging indicator  $(\sim)$  will be lit.

#### **♦** Built-in Rechargeable Battery

When the built-in rechargeable lithium 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 about 6 hours, and print about 280 ECG reports of  $3\times4+1$ rhy 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.

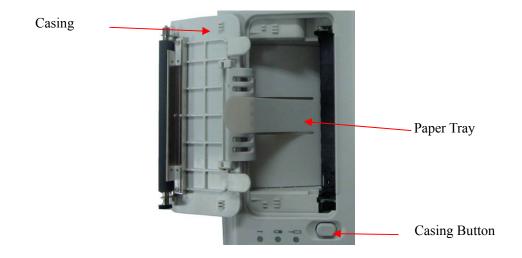
# 4.2 Loading/Replacing Recorder Paper

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.

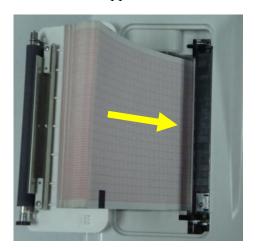


#### **Loading/Replacing Process of Folded Paper:**

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 paper 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.



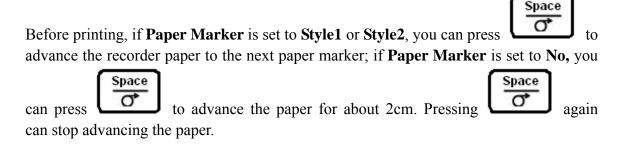
5. Press down the recorder casing firmly.

#### 6. To select Paper Marker.

- 1) When the 6-channel electrocardiograph is powered by the mains supply or a built-in rechargeable lithium battery, press on the keyboard to turn on the unit.
- 2) After the main interface1 is displayed, press the function key **F5** below below open the main interface2. On the main interface2, press the function key **F1** below **Setup** to open the **System Setup** interface.
- 3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor to **Record** on the **System Setup** interface, and then press **Enter** to open the **Record Setup** interface.
- 4) For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item on the **Record Setup** interface, 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 on the **Record Setup** interface, and then press **F3** or **F4** to select an option.
- 6) Press **Enter** to confirm, and then the **System Setup** interface appears. Then press **Esc** or the function key **F5** below to return to the main interface1.

For details of the paper marker, please refer to Section 9.3.2, "Selecting Paper Marker".

#### 7. Advance the recorder 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.

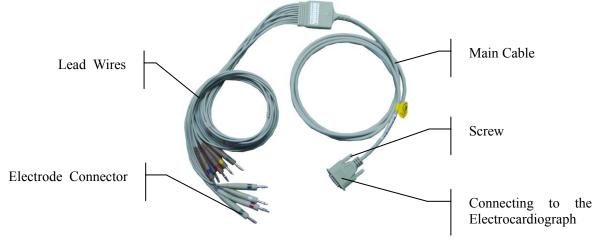
#### To Prepare the Skin

- 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 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.

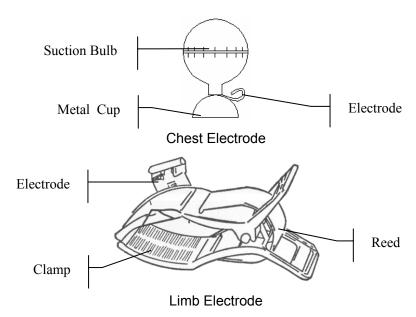
Table 4-1 Electrode Connectors and Their Identifiers and Color Codes

	European		American	
<b>Electrode Connectors</b>	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.



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

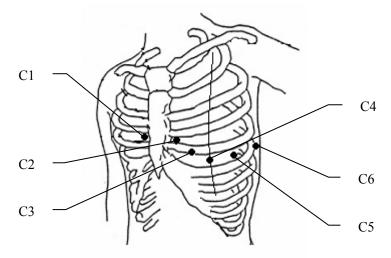
- C1: Fourth intercostal space at the right border of the sternum
- C2: Fourth intercostal space at the left border of the sternum

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

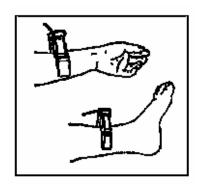


#### **Chest Electrode Connection:**

- 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:**



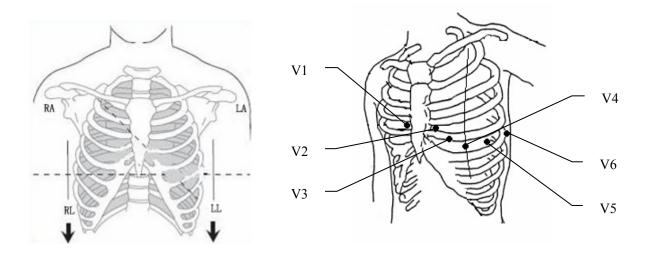
## **Alligator Clip:**



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**

- 8) Align all lead wires of the patient cable to avoid twisting, and connect the alligator clips to the lead wires.
- 9) Clean the electrode areas on the body surface with 75% alcohol.
- 10) Attach the disposable electrodes to the electrode positions on the body surface.
- 11) Clip the disposable electrodes with the alligator clips.

The quality of ECG waveform will be affected by the contacting 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.

## **MARNING**:

- 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.

**CAUTION**: The disposable electrodes can only be used for one time.

# 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.

#### 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 built-in rechargeable lithium 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 interface1 appears.

# 6.1 Entering Patient ID

- 1. By default, the system generates the patient ID automatically. The range of the patient ID is  $0 \sim 1999, 999, 999$ .
- 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 **w** to display the main interface2.
- 2) Press the function key **F1** below **Setup** to open the **System Setup** interface.
- 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 interface. 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 interface1.

Then the system will generate the patient ID according to the time that 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 **w** to display the main interface2.
- 2) Press the function key **F1** below **Setup** to open the **System Setup** interface.
- 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 interface. 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 interface1.
- 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 interface 1 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.

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.

## 7.1 Auto Mode

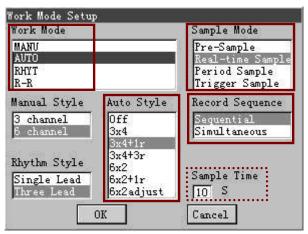
#### **Operation Method:**

- When the main interface1 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.
- 2. To set Auto Style, Sample Mode, Record Sequence, Sample Time, Rhythm Lead1/2/3, or Lead Sequence (Optional)
  - When the main interface1 is displayed, press the function key **F5** below to open the main interface2. Press the function key **F1** below **Setup** to display the **System Setup** interface and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** interface.
  - 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 **Sample Mode** 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.

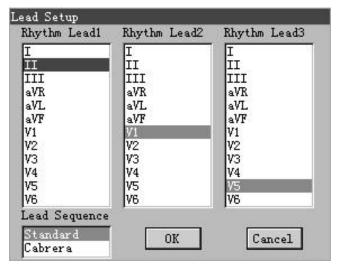


SE-601B / SE-601C Work Mode Setup Interface

Work Mode	AUTO	Sample Mode - Real-time
Manual Style	6 channel	Record Sequence Sequential
Auto Style	6x2	Sample Time 10 S
Rhythm Style	Three Lead	

SE-601A Work Mode Setup Interface

- 7) On the **System Setup** interface, 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** interface.
- 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 Interface

Rhythm Lead1	i i i i
Rhythm Lead2	V1
Rhythm Lead3	V5
Lead Sequence	Standard

SE-601A Lead Setup Interface

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

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.

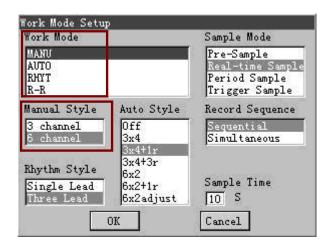
## 7.2 Manual Mode

#### **Operation Method:**

- 1. When the main interface1 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.
- 2. To set **Manual Style** or **Lead Sequence** (Optional)

When the main interface1 is displayed, press the function key **F5** below **>>>** to open the main interface2. Press the function key **F1** below **Setup** to display the **System Setup** interface and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** interface.

- 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.

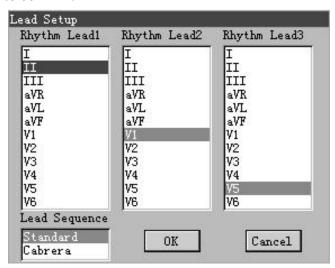


SE-601B / SE-601C Work Mode Setup Interface

Work Mode	MANU
Manual Style	6 channel
Auto Style	6x2
Rhythm Style	Three Lead

SE-601A Work Mode Setup Interface

- 4) On the **System Setup** interface, 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** interface.
- 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 Interface

Rhythm Lead1	T T
Rhythm Lead2	V1
Rhythm Lead3	V5
Lead Sequence	Standard

SE-601A Lead Setup Interface

After setup, press Esc or the function key F5 below to exit the System Setup

interface.

- 3. Press the **START/STOP** key to print an ECG report.
- 4. Press the **START/STOP** key to stop printing the report.

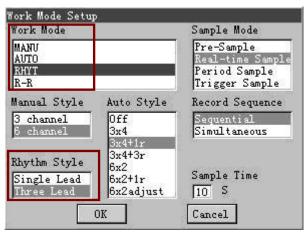
# 7.3 Rhythm Mode

#### **Operation Method:**

- 1. When the main interface1 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.
- 2. To set **Rhythm Style**, **Rhythm Lead1/2/3** or **Lead Sequence** (Optional)

When the main interface1 is displayed, press the function key **F5** below **>>>** to open the main interface2. Press the function key **F1** below **Setup** to display the **System Setup** interface and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** interface

- 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.



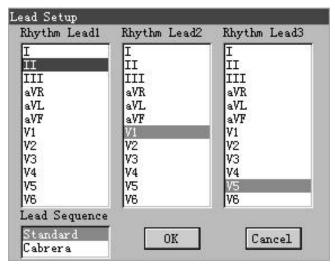
SE-601B / SE-601C Work Mode Setup Interface

Work Mode	RHYT
Manual Style	6 channel
Auto Style	6x2
Rhythm Style	Three Lead

SE-601A Work Mode Setup Interface

4) On the **System Setup** interface, 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** interface.

- 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 Interface

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

SE-601A Lead Setup Interface

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

- 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.

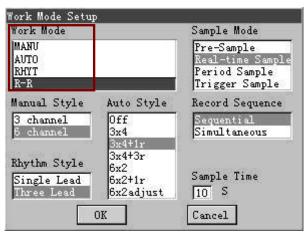
## 7.4 R-R Mode

#### **Operation Method:**

- 1. When the main interface1 is displayed, press the function key **F5** below **>>>** to open the main interface2. Press the function key **F1** below **Setup** to display the **System Setup** interface and the cursor is on **Work Mode**. Press **Enter** to open the **Work Mode Setup** interface.
  - 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.

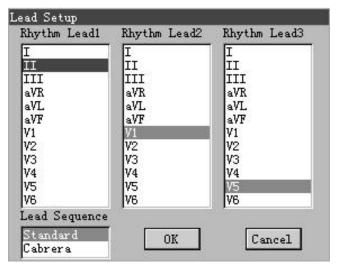


SE-601B / SE-601C Work Mode Setup Interface

Work Mode	R-R
Manual Style	6 channel
Auto Style	6x2
Rhythm Style	Three Lead

SE-601A Work Mode Setup Interface

- 3) On the **System Setup** interface, 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** interface.
- 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 Interface

Rhythm Lead1	i i i i
Rhythm Lead2	V1
Rhythm Lead3	V5
Lead Sequence	Standard

SE-601A Lead Setup Interface

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

- 2. When the main interface1 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.
- 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

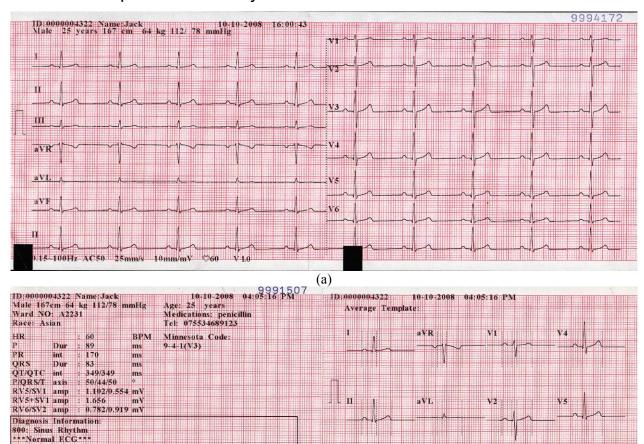
In the **AUTO** mode, pressing the **1mV/Copy** key can print the ECG report which was printed out last time. Pressing the **START/STOP** key can stop printing the ECG report.

**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



Report Reviewed by: Math

Ш

V6

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  $6\times2+1$ rhy.

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

 $\Pi$  (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:

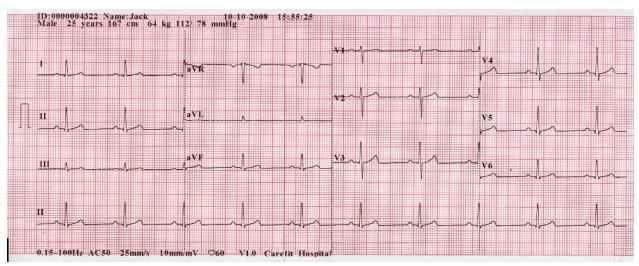
Diagnosis information shows the auto diagnosis result.

#### 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)

 $3 \times 4 + 1$ rhy ECG wave

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

25mm/s (Paper Speed)

♥60 (Heart Rate)

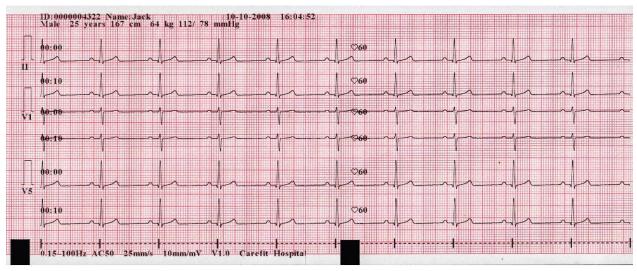
Carefit Hospital (Institution Name)

V1.0 (Version number)

AC50 (50Hz AC Filter)

10mm/mV (Gain)

## 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)

 $\Pi$  (1mV calibration mark)

II、V1、V5 (Rhythm Lead name)

20s rhythm waveform of lead II / V1 / V5

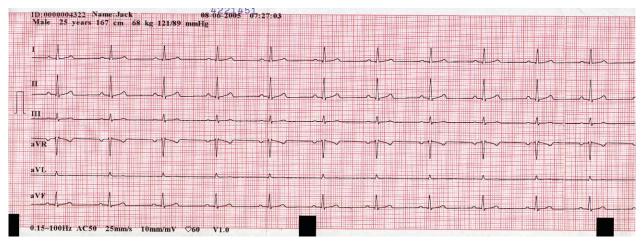
0.15~100Hz (0.15Hz DFT Filter, 100Hz Lowpass Filter)

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

 $\Pi$  (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)

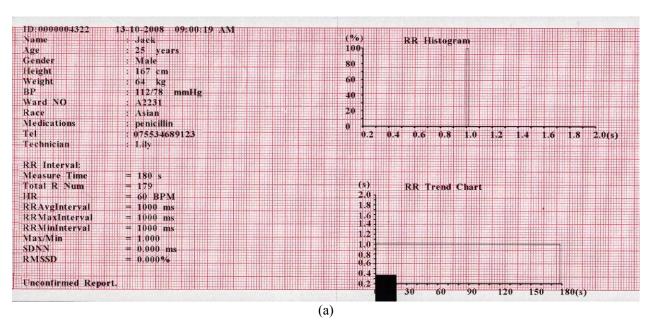
10mm/mV (Gain)

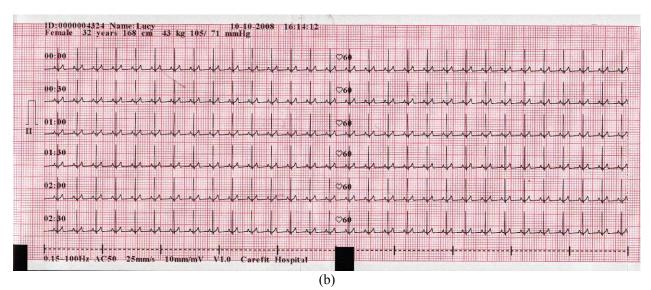
♥60 (Heart Rate)

Carefit Hospital (Institution Name)

V1.0 (Version number)

## 7.7.4 ECG Reports in the R-R Mode





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)

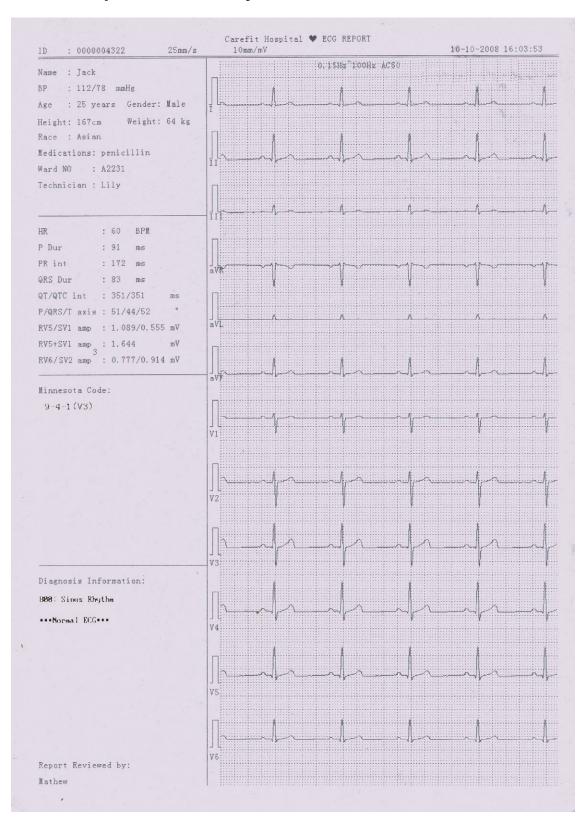
Gain, Speed, Filter

 $\Pi$  (1mV calibration mark)

II (Lead name)

180s ECG wave of Rhythm Lead 1

# 7.7.5 ECG Reports Printed by the USB Printer



#### **SE-601 Series Electrocardiograph User Manual**

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** interface automatically.

## To Set Save Option to On

- 1. When the main interface 1 is displayed, press the function key **F5** below to open the main interface 2. Press the function key **F1** below **Setup** to open the **System Setup** interface.
- 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** interface, press **Esc** or the function key **F5** below to return to the main interface1.

#### To Switch to the File Manage Interface 1/2/3

When the main interface1 is displayed, press the function key **F5** below to open the main interface2. Press the function key **F2** below **File** to open the **File Manage** interface1.

- 1. Press the function key **F5** below to display the **File Manage** interface2. Then press the function key **F5** below to return to the **File Manage** interface1.
- 2. Or press **F1**, **F2**, **Shift** + **F1** or **Shift** + **F2** to highlight a file on the **File Manage** interface1, and then press the function key **F4** below **Select** to select the file and display the **File Manage** interface3. For SE-601B/C, press **Esc** to return to the **File Manage** interface1. For SE-601A, press **Esc** or the function key **F5** below to return to the **File Manage** interface1.

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

3. When the **File Manage** interface1 is displayed, press **Esc** to return to the main interface1.

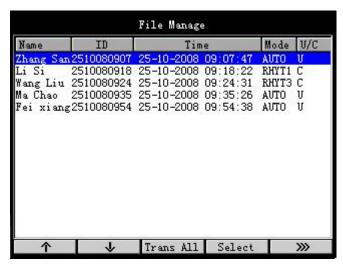


Figure 8-1 SE-601B / SE-601C File Manage Interface1

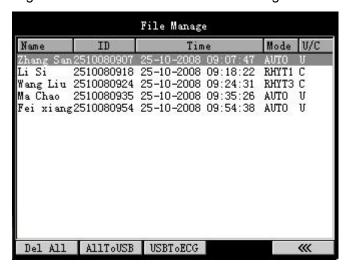


Figure 8-2 SE-601B / SE-601C File Manage Interface2

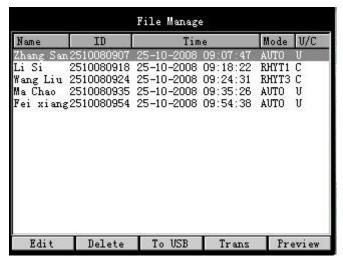


Figure 8-3 SE-601B / SE-601C File Manage Interface3

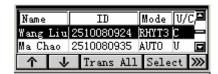


Figure 8-4 SE-601A File Manage Interface1



Figure 8-5 SE-601A File Manage Interface2



Figure 8-6 SE-601A File Manage Interface3

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

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



# **Q**CAUTION **1**:

- 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

#### Notes:

- 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.

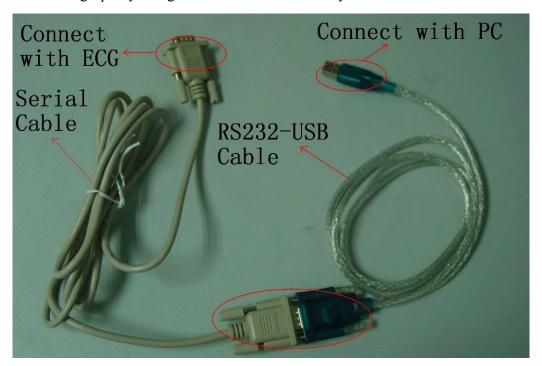


Figure 8-7 RS232-USB Assembly

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 interface 1 is displayed, press the function key **F5** below to open the main interface 2.
- 2) Press the function key **F1** below **Setup** to open the **System Setup** interface.
- 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** interface.
- 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 interface1.
- 5. Press the function key **F5** below to open the main interface2. Press the function key **F2** below **File** to display the **File Manage** interface1.
- 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** interface3. 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.
- 2. Log into the Smart ECG Viewer software.

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



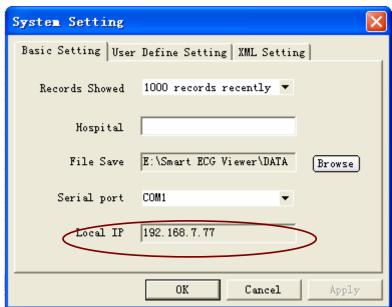
3. Set the transmission mode and the IP address.

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

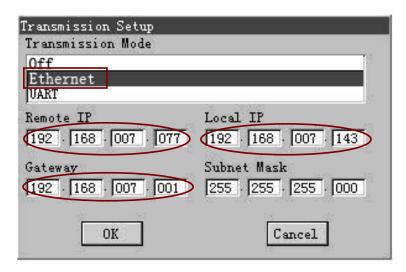


- 1) When the main interface 1 is displayed, press the function key **F5** below to open the main interface 2.
- 2) Press the function key **F1** below **Setup** to open the **System Setup** interface.
- 3) Press **F1**, **F2**, **F3**, **F4**, **Tab** or **Shift** + **Tab** to move the cursor. When the cursor is on **Transmission**, press **Enter** to open the **Transmission Setup** interface.
- 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 Smart ECG Viewer.
- 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 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.
- 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 Smart ECG Viewer. The last section of the **Gateway** item must be set to **001**. **Subnet Mask** must be set to **255.255.255.000**.

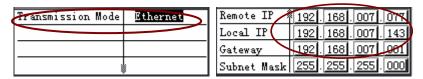
For example, view the local IP on the **System Setting** interface of the Smart ECG Viewer software.



On the **Transmission Setup** interface, select **Ethernet**. Set the **REMOTE IP** item to the local IP of Smart ECG Viewer. Set the first three sections of the **Local IP** and **Gateway** items 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. 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 Interface



SE-601A Transmission Setup Interface

- 8) Press **Enter** to confirm.
- 9) Press **Esc** or the function key **F5** below to return to the main interface1.
- 4. Press the function key **F5** below to open the main interface2. Press the function key **F2** below **File** to display the **File Manage** interface1.
- 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** interface3. 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

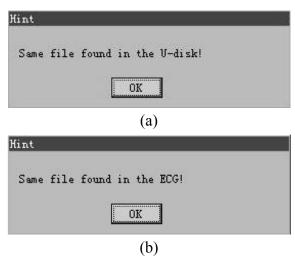
- 1. Insert the U disk recommended by the manufacturer to USB socket 2 of the electrocardiograph.
- 2. Copy files between SE-601 and the U disk
- 1) When the main interface 1 is displayed, press the function key **F5** below when to open

the main interface2.

- 2) Press the function key **F2** below **File** to open the **File Manage** interface1. Press the function key **F5** below to display the **File Manage** interface2.
- 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 interface1 is displayed, press the function key **F5** below to open the main interface2.
- 2) Press the function key **F2** below **File** to open the **File Manage** interface1.
- 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** interface3.
- 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.



## **CAUTION**:

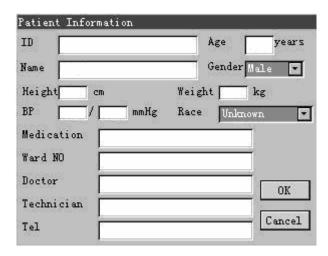
It is forbidden to connect or disconnect a U disk or a USB printer during the copying course.

#### Notes:

- 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 interface1 is displayed, press the function key **F5** below to open the main interface2. Press the function key **F2** below **File** to open the **File Manage** interface1. 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** interface3. 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.

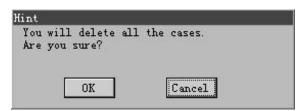
- 1. Press **Tab** or **Shift** + **Tab** to move the cursor to a textbox, and then enter information.
- 2. Press **Tab** or **Shift** + **Tab** to move the cursor to an item, and then press **F1** or **F2** to select an option.
- 3. For SE-601A, press **Tab** or **Shift** + **Tab** to move the cursor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

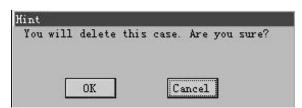
For details on inputting data, please refer to Section 3.2, "Entering Data".

# 8.5 Deleting Files

- 1. Delete all the files from the electrocardiograph
- 1) When the main interface1 is displayed, press the function key **F5** below **>>>** to open the main interface2.
- 2) Press the function key **F2** below **File** to open the **File Manage** interface1.
- 3) Press the function key **F5** below to display the **File Manage** interface2.
- 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 interface 1 is displayed, press the function key **F5** below to open the main interface 2
- 2) Press the function key **F2** below **File** to open the **File Manage** interface1.
- 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** interface3.
- 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 interface1 is displayed, press the function key **F5** below to open the main interface2. Press the function key **F2** below **File** to open the **File Manage** interface1. 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** interface3. Press the function key **F5** below **Preview** to open the preview interface. Press the **START/STOP** key to print the file.

#### Notes:

- 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 interface. For SE-601C, ECG data of the first 9 seconds or so is displayed on the preview interface.

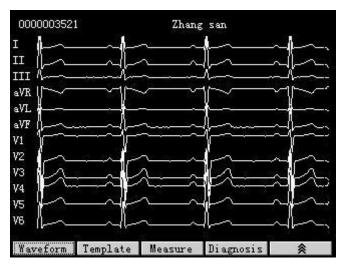


Figure 8-8 Waveform Preview Interface

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

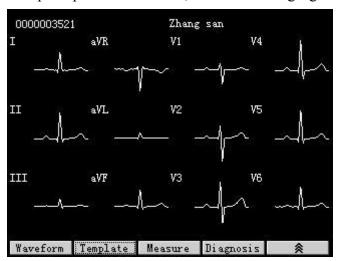


Figure 8-9 Template Preview Interface

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

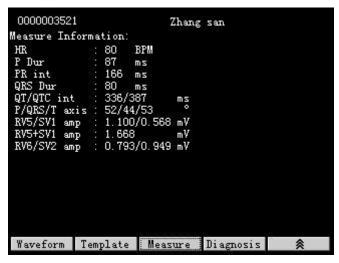


Figure 8-10 Measure Preview Interface

The measure preview interface 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 interface, as the following figure shows.



Figure 8-11 Diagnosis Preview Interface

The diagnosis preview interface shows patient name, patient ID, minnesota code and diagnosis information.

# 8.7 File Printing

- 1. When the main interface1 is displayed, press the function key **F5** below to open the main interface2.
- 2. Press the function key **F2** below **File** to open the **File Manage** interface1.
- 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** interface3.
- 4. Press the **START/STOP** key to print the selected file.

# **Chapter 9 System Setup**

After you turn on the device, the main interface1 pops up. Press the function key **F5** below wo to open the main interface2. Then press the function key **F1** below **Setup** to open the **System Setup** interface.

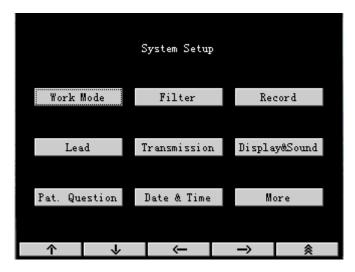


Figure 9-1 SE-601B / SE-601C System Setup Interface



Figure 9-2 SE-601A System Setup Interface

After setup, press **Esc** or the function key **F5** below to return to the main interface1.

## 9.1 Work Mode Setup

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

On the Work Mode Setup interface, you can set Work Mode, Manual Style, Rhythm Style, Auto Style, Sample Mode, Record Sequence and Sample Time.

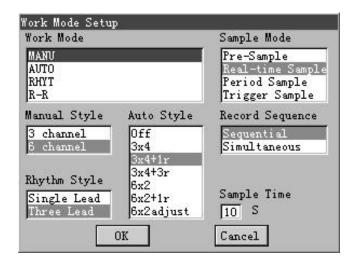
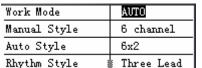


Figure 9-3 SE-601B / SE-601C Work Mode Setup Interface



Sample Mode	Real-time
Record Sequence	Sequential
Sample Time	10 S

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

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

For SE-601A, if you press **Esc** to exit the **Work Mode Setup** interface 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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 on the

Work Mode Setup interface, 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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 ECG waves of the rhythm lead selected in the **Rhythm Lead1** item are on the bottom of the ECG reports.

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 in the **Rhythm Lead1/2/3** item are on the bottom of the ECG reports.

When **Auto Style** is set to  $6\times2$ , ECG waves of 12 leads are printed in 2 groups of 6.

When **Auto Style** is set to  $6\times2+1$ **r**, ECG waves of 12 leads are printed in 2 groups of 6, and ECG waves of the rhythm lead selected in the **Rhythm Lead1** item are on the bottom of the ECG reports.

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 printing time can be adjusted according to **Sample Time**, which is different from the above styles. For example, when **Sample time** on the **Work Mode Setup** interface 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 on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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** on the **Date & Time Setup** interface. 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.

#### Notes:

- 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.

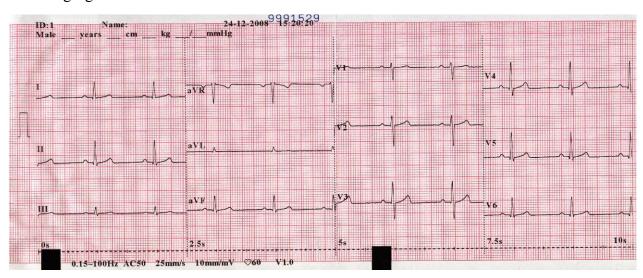
When **Sample Mode** is set to **Trigger Sample**, after pressing the **START/STOP** key, if Arrhythmia ECG data, including Asystole, Ventricular Fibrillation/Ventricular Tachycardia, 5>PVCS>=3, Paired PVCS, Bigeminy, Trigeminy, R ON T, single PVC and Missed Beat, is detected during the learning course,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

## 9.1.6 Specifying Recording Sequence

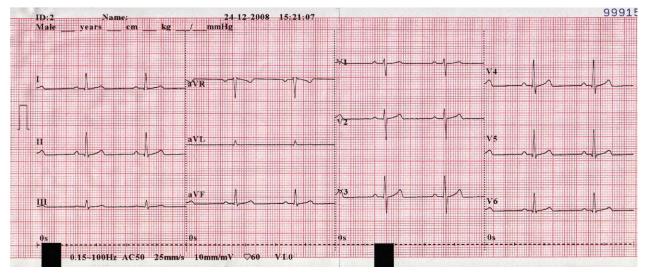
For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item on the **Work Mode Setup** interface, and then press **F1** or **F2** to select **Sequential** or **Simultaneous**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Record Sequence** item on the **Work Mode Setup** interface, 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 on the **Work Mode Setup** interface, 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  $6\times2$  adjust.

# 9.2 Filter Setup

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

On the Filter Setup interface, you can set AC Filter, EMG Filter, DFT Filter, and Lowpass Filter.

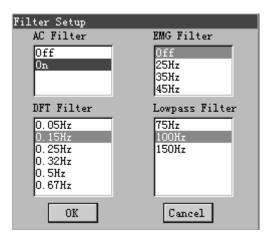


Figure 9-5 SE-601B / SE-601C Filter Setup Interface

AC Filter	<u>On</u>
EMG Filter	Off
DFT Filter	0.15Hz
Lowpass Filter	100Hz

Figure 9-6 SE-601A Filter Setup Interface

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

For SE-601A, if you press **Esc** to exit the **Filter Setup** interface 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 on the **Filter Setup** interface. 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 on the **Filter Setup** interface. 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 on the **Filter Setup** interface. 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 on the **Filter Setup** interface. 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 on the **Filter Setup** interface. 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 on the

**Filter Setup** interface. 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**, **0.25Hz**, **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 on the **Filter Setup** interface. 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 on the **Filter Setup** interface. 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 interface, and then press Enter to open the Record Setup interface.

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

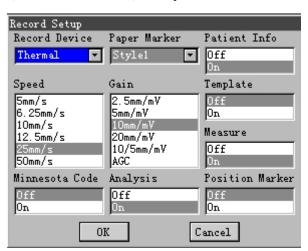


Figure 9-7 SE-601B / SE-601C Record Setup Interface

Record Device	Thermal	Patient Info	) On
Speed	25mm/s	Template	Off
Gain	10mm/mV	Measure	0n
Paper Marker	Style1	Minnesota Code	₩ Off

Figure 9-8 SE-601A Record Setup Interface

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

For SE-601A, if you press **Esc** to exit the **Record Setup** interface 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 on the **Record Setup** interface. 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 on the **Record Setup** interface. Press **F3** or **F4** to select an option.

You can set Record Device to Thermal, HP2468, HP2568, HP4368 or HP2015.

**HP2468**, **HP4368** and **HP2015** are the types of the USB printer, when **HP2468**, **HP4368** or **HP2015** 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.

#### Notes:

- 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** interface.
- 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.

# **OCAUTION**

- 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 Selecting Paper Marker

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

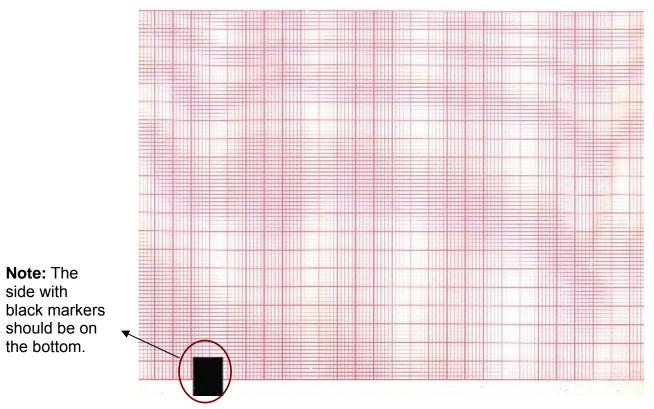
For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Paper Marker** item on the **Record Setup** interface, and then press **F3** or **F4** to select an option.

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

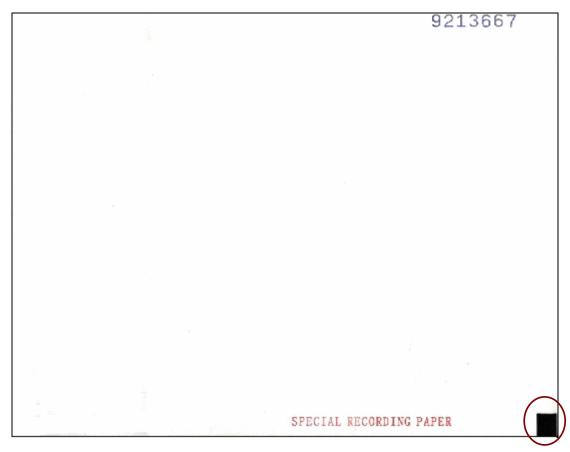
When the paper with black markers on the bottom is used and **Paper Marker** is set to **Style1** or **Style2**,

- 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 paper 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 paper 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.



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 paper 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 on the **Record Setup** interface, 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 interface, and then press Enter to open the Lead Setup interface.

On the Lead Setup interface, you can set Rhythm Lead 1/2/3 and Lead Sequence.

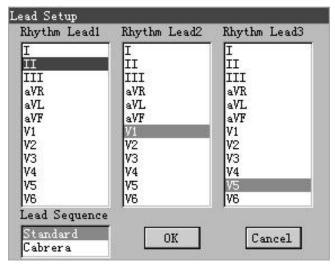


Figure 9-9 SE-601B / SE-601C Lead Setup Interface

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

Figure 9-10 SE-601A Lead Setup Interface

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

For SE-601A, if you press **Esc** to exit the **Lead Setup** interface 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 on the **Lead Setup** interface, 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 on the **Lead Setup** interface, and then press **F3** or **F4** to select an option.

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

In the **AUTO** mode, when **Auto Style** is set to  $3\times4+1\mathbf{r}$  or  $6\times2+1\mathbf{r}$ , the rhythm lead selected in the **Rhythm Lead1** item will be printed in the ECG reports; when **Auto Style** is set to  $3\times4+3\mathbf{r}$ , 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 on the **Lead Setup** interface, 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 on the **Lead Setup** interface, 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	І, ІІ, Ш	aVR, aVL, aVF	V1, V2, V3	V4, V5, V6
Cabrera	aVL, I, -aVR	II, aVF, Ш	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 interface, and then press Enter to open the Transmission Setup interface.

On the Transmission Setup interface, you can set Transmission Mode, Remote IP, Local IP, Gateway and Subnet Mask.

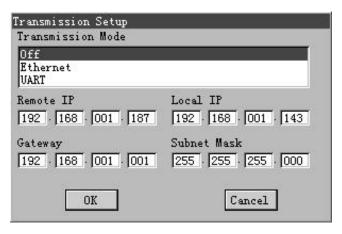


Figure 9-11 SE-601B / SE-601C Transmission Setup Interface

Transmission Mode Ethernet	Remote IP \$ 192   168   007   077
	Local IP 192. 168. 007. 143
	Gateway 192. 168. 007. 001
*	Subnet Mask 255 . 255 . 255 . 000

Figure 9-12 SE-601A Transmission Setup Interface

#### **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 on the **Transmission Setup** interface. 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 1 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** on the **Transmission Setup** interface. **Subnet Mask** must be set to **255.255.255.000**.

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

For SE-601A, if you press **Esc** to exit the **Transmission Setup** interface 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 interface, and then press Enter to open the Display&Sound Setup interface.

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

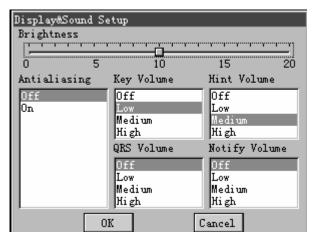


Figure 9-13 SE-601B Display & Sound Setup Interface

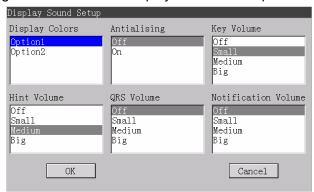


Figure 9-14 SE-601C Display & Sound Setup Interface

Key Volume	On
Hint Volume	On
QRS Volume	Off
Notification Volume	Off

Figure 9-15 SE-601A Sound Setup Interface

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

For SE-601A, if you press **Esc** to exit the **Display&Sound Setup** interface 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 on the **Display&Sound Setup** interface, and then press **F3** or **F4** to adjust the brightness of the LCD screen. You can set the brightness within  $0\sim20$ .

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

Press **Tab** or **Shift** + **Tab** to move the cursor to the **Display Colors** item on the **Display&Sound Setup** interface, 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 on the **Display&Sound Setup** interface, 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 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 on the **Display&Sound Setup** interface, 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 on the **Sound Setup** interface, and then press **F3** or **F4** to select **On** or **Off**.

#### 9.6.5 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 on the **Display&Sound Setup** interface, 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 on the **Sound Setup** interface, and then press **F3** or **F4** to select **On** or **Off**.

#### 9.6.6 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 on the **Display&Sound Setup** interface, 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 on the **Sound Setup** interface, and then press **F3** or **F4** to select **On** or **Off**.

#### 9.6.7 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 on the **Display&Sound Setup** interface, 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 on the **Sound Setup** interface, 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 interface, and then press Enter to open the Patient Question interface.

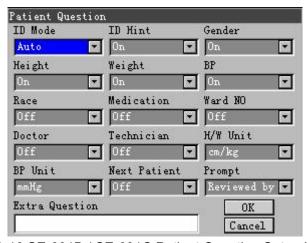


Figure 9-16 SE-601B / SE-601C Patient Question Setup Interface

ID Mode	Auto	Weight	) On
ID Hint	On	BP	On
Gender	On	Race	Off
Height	0n	Medication	0ff
		•	
	<b>.</b>	TOTAL 1	0 10
Ward NO	Off	BP Unit	nmHg
Ward NO Doctor	Off Off	BP Unit Next Patient	nm <b>H</b> g Off
		21 01111	

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

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

For SE-601A, if you press **Esc** to exit the **Patient Question** interface 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 on the **Patient** 

**Question** interface, 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 on the **Patient Question** interface, 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 that 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 on the **Patient Information** interface.

#### 9.7.2 Selecting ID Hint

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **ID Hint** item on the **Patient Question** interface, 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 on the **Patient Question** interface, 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 on the **Patient Question** interface, 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 on the **Patient Question** interface, 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.

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.

#### 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 on the **Patient Question** interface, 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 on the Patient Question interface, and then press F3 or F4 to select cm/kg or inch/lb.

#### 9.7.5 Specifying BP Unit

For SE-601B/C, press **Tab** or **Shift** + **Tab** to move the cursor to the **BP Unit** item on the **Patient Question** interface, 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 on the **Patient Question** interface, 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 on the **Patient Question** interface, 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 on the **Patient Question** interface, 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 interface3 after a complete ECG report is printed.

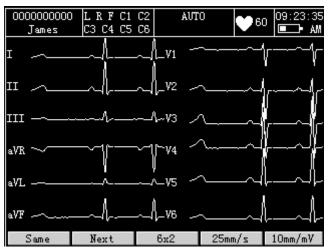


Figure 9-18 SE-601B / C Main Interface3



Figure 9-19 SE-601A Main Interface3

On the main interface3, pressing the function key **F1** below **Same** can return to the main interface1, all the patient information will keep the same; pressing the function key **F2** below **Next** can return to the main interface1, 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 interface3, 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 interface.

When **Next Patient** is set to **Off**, in the **AUTO** mode, the system will not display the main interface3 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 on the **Patient Question** interface, 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 on the **Patient Question** interface, and then press **F3** or **F4** to select **Reviewed by** or **Unconfirmed Report**.

When **Prompt** is set to **Reviewed by**, if **Doctor** on the **Patient Question** interface is set to **On**, and the doctor name is input in the **Patient Information** window, 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 on the **Patient Question** interface, and then manually input extra information such as **Tel**, which will be displayed in the **Patient Information** window.

## 9.8 Date & Time Setup

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

On the Date&Time Setup interface, you can set Current Date, Current Time, Date Mode, Time Mode, Period Interval, Period Duration, Power Off and LCD Off.

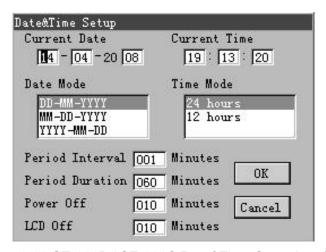


Figure 9-20 SE-601B / SE-601C Date&Time Setup Interface

Current Date	<b>21</b> - 04 -20 08
Current Time	09 : 20 : 06
Date Mode	DD-MM-YYYY
Time Mode	24 hours

Period Interval	01	Minutes
Period Duration	60	Minutes
Power Off	10	Minutes
LCD Off	10	Minutes

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

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

For SE-601A, if you press **Esc** to exit the **Date&Time Setup** interface 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 on the **Date&Time Setup** interface, and then input the date or time manually.

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 on the **Date&Time Setup** interface, and then press **F1** or **F2** to select **DD-MM-YYYY**, **MM-DD-YYYYY** or **YYYY-MM-DD**.

For SE-601A, press **F1**, **F2**, **Tab** or **Shift** + **Tab** to move the cursor to the **Date Mode** item on the **Date&Time Setup** interface, 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 on the **Date&Time Setup** interface, 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 on the **Date&Time Setup** interface, 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 on the **Date&Time Setup** interface, 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 on the Work Mode Setup interface, 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 on the **Date&Time Setup** interface, and then input the power-off time manually.

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

#### Notes:

- 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 built-in rechargeable lithium 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 on the **Date&Time Setup** interface, and then input the LCD off time manually.

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

**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 interface, and then press Enter to open the More Setup interface.

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

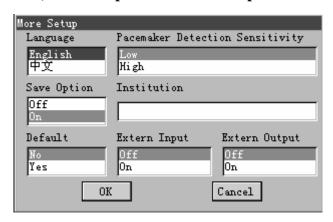


Figure 9-22 SE-601B / SE-601C More Setup Interface

Language	English	Extern Input	Off
Save Option	On	Extern Output	Off
Institution		Pacemaker Detection	Low
Default	<b>N</b> o	30	

Figure 9-23 SE-601A More Setup Interface

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

For SE-601A, if you press **Esc** to exit the **More Setup** interface 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 **6x2 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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 on the **More Setup** interface, 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)
	Time volume	On (SE-601A)
21	Key Volume	Low (SE-601B/C)
	-	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	H/W Unit	cm/kg
27	BP/Unit	mmHg

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28	Prompt	Reviewed By
29	Period Interval	001
30	Period Duration	060
31	Power Off	010
32	LCD Off	010
33	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 on the **More Setup** interface, 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 on the More Setup interface, 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 built-in 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.

#### Notes:

- 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 we 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 fall off the unit.
Battery Weak	The built-in battery is weak.
No Paper	Recorder paper runs out or is not loaded or the casing is not firmly closed.
Paper Error	In the <b>AUTO</b> or <b>RHYT</b> mode, when <b>Paper Marker</b> is set to <b>Style 1</b> or <b>Style 2</b> , the recorder can not find the next paper 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 <b>Trigger Sample</b> mode
Transmitting	ECG data is being transmitted from the electrocardiograph to the PC through the net or serial port in the <b>AUTO</b> or <b>RHYT</b> mode.
Transmit Fail	ECG data fails to be transmitted from the electrocardiograph to the PC through the net or serial port in the <b>AUTO</b> or <b>RHYT</b> mode.
Detecting	The examining process of arrhythmia data in the <b>Trigger Sample</b> mode
Memory Full	The amount of files on the <b>File Manage</b> interface 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** interface, 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  $\mathbf{Shift} + \mathbf{F1}$  or  $\mathbf{Shift} + \mathbf{F2}$  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, which is just as what the Microsoft Windows operating system does.

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

A3: Yes, in the **AUTO** mode, set **Auto Style** to **Off** on the **Work Mode Setup** interface, set **Patient Info**, **Template**, **Minnesota code**, **Measure** and **Diagnosis** to **Off** on the **Record Setup** interface, and then return to the main interface, 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 have been 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** interface, 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 on 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 on the **Patient Question** interface, e.g.: "Tel". Then return to the main interface, and open the **Patient Information** window, the **Tel** item will be displayed on this interface. 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 paper 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 **RHTY** 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 **RHTY** mode happens frequently, **Paper Marker** on the **Record Setup** interface 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 paper markers, first open the paper casing so as to clear the error information, and then check whether the paper 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 paper marker is just facing the paper maker detection window on the thermal printing head, as the following figure shows.



Reload the paper in the paper tray, close the paper 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** interface, and move the cursor to the **Institution** textbox, and then input the hospital name. The content you inputted 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 has been transmitted.

If none of the above-mentioned information is shown on the screen, please check whether **Sample Mode** is set to **Pre-Sample** on the **Work Mode Setup** interface. 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.

#### 3. Transmitting Problems

Q1: The ECG doesn't respond to any keys after a long time of transmitting. It transmits nothing for there is no new data appearing on the interface 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 interface and doesn't open the main interface. I have reset 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.

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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 leads are not connected well. Please find out which lead is off by checking the Lead Name area on the main interface (please refer to Section 3.4, "About the Main Interface"). Those leads whose name is highlighted are off. Please check whether the electrodes of the corresponding leads are 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 take effect, please contact the manufacturer or the local distributor for further disposal.

# **Chapter 13 Cleaning, Care and Maintenance**

# 13.1 Cleaning

# **PCAUTION**:

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

The surfaces of the main unit and the patient cable can be wiped with a clean soft cloth damped in soapy water or non-caustic neutral detergent. After that, remove detergent remainder with a clean dry cloth.

#### 13.1.2 Cleaning the Reusable Electrodes

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

#### 13.1.3 Cleaning the Print Head

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

Open the recorder casing and remove the paper. 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. After air dried, load the recorder paper and shut the recorder casing.

# CAUTION .

- 1. 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.
- 2. Do not clean the unit and accessories with abrasive fabric and avoid scratching the electrodes.

## 13.2 Disinfection

To avoid permanent damage to the equipment, disinfection can be performed only when it is considered as necessary according to your hospital's regulations.

Before disinfection, clean the equipment first. Then wipe the surfaces of the unit and the patient cable with hospital standard disinfectant.

### **CAUTION**:

Do not use chloric disinfectant such as chloride, sodium hypochlorite etc.

### 13.3 Care and Maintenance

### 13.3.1 Recharge and Replacement of Battery

#### 1) Capacity Identification

Current capacity of the rechargeable 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.

**:** Capacity is low, and the hint information *Battery Weak* is displayed on the LCD screen. The battery should be recharged immediately.

#### 2) Recharge

The 6-channel electrocardiograph is equipped with the recharge control circuit together with the built-in rechargeable lithium 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.

#### 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. 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.

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

The following safety checks should be performed at least every 24 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 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: 0.1 ohm.
- f) Test the earth leakage current according to IEC/EN 60601-1: Limit: NC  $500\mu A$ , SFC  $1000\mu A$ .
- g) Test the enclosure leakage current according to IEC/EN 60601-1: Limit: NC  $100\mu A$ , SFC  $500\mu A$ .
- h) Test the patient leakage current according to IEC/EN 60601-1: Limit: NC a.c.  $10\mu A$ , d.c.  $10\mu A$ ; SFC a.c.  $50\mu A$ , d.c.  $50\mu A$ .
- i) Test the patient auxiliary current according to IEC/EN 60601-1: Limit: NC a.c.  $10\mu A$ , d.c.  $10\mu A$ ; SFC a.c.  $50\mu A$ , d.c.  $50\mu A$ .
- 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 1: Failures on the part of the responsible individual hospital or institution employing the use of 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**

### 14.1 Standard 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.

Table 14-1 Standard Accessory List

Accessory	Part Number
Power cord (European)	M13R-36014
Power cord (American)	M13-36015
ECG Cable (European)	MS1R-110265-A0
ECG Cable (American)	MS1R-110266-A0
Adult Chest electrodes	M15R-040163
Adult Limb electrodes	M15R-040162
Thermal recording paper	MS1R-107560-A0
Fuse	M21-64073
Rechargeable Lithium Battery	M21R-064114

### **14.2 Optional Accessories**

Table 14-2 Optional Accessory List

Accessory	Part Number
F.G.C. (1.1. (F	MS1R-107581-A0 (Snap Style)
ECG Cable (European)	MS1R-107583-A0 (Grabber Style)
	MS1R-107582-A0 (Snap Style)
ECG Cable (American)	MS1R-107584-A0 (Grabber Style)
Pediatric Chest Electrodes	M15R-040168
Pediatric Limb Electrodes	M15R-040169
Snap/Banana Socket Adapters	MS1R-107449-A0
Clip/Snap/Banana Socket Adapter	M15R-040172
Alligator Clip/Banana Socket Adapters	M15R-040173
Adult Disposable Adhesive Electrodes	M15-040159
Pediatric Disposable Adhesive Electrodes	M15-40024
Disposable Resting Tab electrodes (1 piece)	M15-040189
Electrode gel	M50-78047
Input/Output connector	MS1-19907
Grounding Wire	MS1-20016
Smart ECG Viewer	MS9-38952
Smart ECG viewei	MS9-38953
Smart ECG Viewer Software Key	M17-47116 (TINY-SPRO)
Smart ECG Viewer Software Rey	M17-47194 (USB)
RS232 download Cable	MS2-20117
Ethernet download cable	MS2-20096
External Ink-jet Printer (HP2568)	M18-052192
U disk	M50-078204
SD Card (1G)	M18-052199
SD Card Reader	M17-047324
ECG bag	MS1R-110351-A0
MT-202 Trolley	MS9-107403
12V Vehicle-carried Inverter	M21-64056

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

### **Chapter 15 Warranty & Service Policy**

### 15.1 Warranty

EDAN warrants that EDAN's products meet the labeled specifications of the products and are free from defects in materials and workmanship that occur within warranty period. The warranty period begins on the date the products are shipped to distributors.

The warranty is void in the cases of:

- a) damage caused by handling 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 found 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 Service Policy

All repairs on products must be performed or approved by EDAN. Unauthorized repairs will void the warranty. In addition, whether covered under warranty or not, any product repair shall be exclusively be performed by EDAN certified service personnel.

If the product fails to function properly, or if you need assistance, service, or spare parts, contact EDAN's service center. A representative will assist you in troubleshooting the problem and will make every effort to solve it over the phone or by email, avoiding potential unnecessary returns.

In case a return can not be avoided, the representative will record all necessary information and will provide a Return Material Authorization (RMA) form that includes the appropriate return address and instructions. An RMA form must be obtained prior to any return.

#### Freight policy:

Under warranty: the service claimer is responsible for freight & insurance charges when a return is shipped to EDAN for service including custom charges. EDAN is responsible for freight, insurance & custom charges from EDAN to service claimer.

Out of warranty: the service claimer is responsible for any freight, insurance & custom charges for product.

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### 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 60601-1: 1988+A1+A2, EN 60601-1:1990+A1+A2, IEC/EN60601-1-2: 2001+A1, IEC/EN60601-2-25, ANSI/AAMI EC11, IEC/EN 60601-2-51	
Anti-electric-sho	ock type:	Class I with internal power supply	
Anti-electric-shock degree:		Type CF	
Degree of proharmful ingress	otection against 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	NC	<10μA (AC) / <10μA (DC)	
Current: SFC		<50μA (AC) / <50μA (DC)	
Patient Auxiliary	NC	<10μA (AC) / <10μA (DC)	
Current:	SFC	<50μA (AC) / <50μA (DC)	
Dielectric Strength:		4000V rms	

### **A1.2 Environment Specifications**

	Transport & Storage	Working
Temperature:	-20°C (-4°F) ~ +55°C (+131°F)	+5°C (+41°F) ~ +40°C (+104°F)
Relative Humidity:	25%~93%	25%~80%
Relative Humbury.	Non-Condensing	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 SE-601B: 5.7 inch STN LCD 320*240 dot SE-601C: 5.7 inch TFT color LCD 640*480 dot		

# **A1.4 Power Supply Specifications**

	Operating Voltage = 100V-240V~	
Mains Supply:	Operating Frequency = 50Hz/60Hz	
	Input Power = 70VA	
	Rated voltage = 14.8V	
	Rated capacity = 2200mAh	
Built-in Lithium Battery Pack:	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 <b>Manu</b> mode or print about 280 ECG reports of 3×4+1rhy in the <b>AUTO</b> mode.	
	Charge mode: Constant current/voltage	
	Charge current (standard) = $0.28 \text{ C}_5\text{A} (600\text{mA})$	
	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) 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:	2.5, 5, 10, 20, 10/5, AGC (mm/mV)			
Input Impedance:	≥50MΩ(10Hz)			
Input Circuit Current:	≤0.01µA			
Input Voltage Range	<±5 mVpp			
Calibration Voltage:	1mV±2%			
DC Offset Voltage:	±600mV			
Noise:	≤12.5μVp-p			
Multichannel crosstalk	≤0.5mm			

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	AC Filter: On/Off		
Filter	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	$\pm 2$ to $\pm 700$ mV		
Width	0.1 to 2.0 ms		
Sampling Frequency	10,000 /sec/channel		
External Input/Output (Optional)			
Input	≥100kΩ; Sensitivity 10mm/V±5%;		
Input	Single ended		
Output	≤100 Ω; Sensitivity 1V/mV±5%;		
Output	Single ended		

**Note:** 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.

# **Appendix 2 EMC Information**

### Guidance and manufacture's declaration – electromagnetic emissionsfor all EQUIPMENT and SYSTEMS

	Guidance and manufacture's declaration – electromagnetic emission			
	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			
ı	it is used in such an environment			

<b>Emission test</b>	Compliance	Electromagnetic environment – guidance	
RF emissions CISPR 11	Group 1	The <i>SE-601 Electrocardiograph</i> 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.	
RF emission CISPR 11	Class A	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	
Harmonic emissions IEC 61000-3-2	Class A		
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	supplies buildings used for domestic purposes.	

### 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 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic	±6 kV contact	±6 kV contact	Floors should be wood,
discharge (ESD)	±8 kV air	±8 kV air	concrete or ceramic tile. If
IEC 61000-4-2			floor are covered with
			synthetic material, the
			relative humidity should be
Electrical fast	12137.6	12X/ C	at least 30%.
transient/burst	±2 kV for power supply lines	±2V for power	Mains power quality should be that of a typical
IEC 61000-4-4	supply fines	supply lines	commercial or hospital
120 01000 1 1			environment.
Surge	±1 kV line to line	±1 kV line to line	Mains power quality
IEC 61000-4-5	±2 kV line to ground	±2 kV line to	should be that of a typical
		ground	commercial or hospital
			environment.
Power frequency	3A/m	3A/m	Power frequency magnetic
(50Hz)			fields should be at levels
magnetic field IEC61000-4-8			characteristic of a typical location in a typical
1EC01000-4-8			commercial or hospital
			environment.
Voltage dips, short	<5% U <sub>T</sub>	<5% U <sub>T</sub>	Mains power quality
interruptions and	(>95% dip in U <sub>T</sub> )	(>95% dip in U <sub>T</sub> )	should be that of a typical
voltage variations	for 0.5 cycle	for 0.5 cycle	commercial or hospital
on power supply	400 ( **	4007.77	environment. If the user of
input lines	40% U <sub>T</sub>	40% U <sub>T</sub>	the SE-601
IEC 61000-4-11	(60% dip in U <sub>T</sub> ) for 5 cycles	(60% dip in U <sub>T</sub> ) for 5 cycles	Electrocardiograph
	101 5 cycles	101 3 Cycles	requires continued operation during power
	70% U <sub>T</sub>	70% U <sub>T</sub>	mains interruptions, it is
	$(30\% \text{ dip in } U_T)$	$(30\% \text{ dip in } U_T)$	recommended that the
	for 25 cycles	for 25 cycles	SE-601
			Electrocardiograph be
	<5% U <sub>T</sub>	<5% U <sub>T</sub>	powered from an
	(>95% dip in U <sub>T</sub> )	(>95% dip in U <sub>T</sub> )	uninterruptible power
NOTE II ' '	for 5 sec	for 5 sec	supply or a battery.
NOTE U <sub>T</sub> 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.

used in such an environment.				
Immunity	IEC 60601 test level	Compliance	Electromagnetic environment -	
test	TEC OUDUI test level	level	guidance	
Conducted RF IEC 61000-4-6  Radiated RF IEC 61000-4-3	3 V <sub>rms</sub> 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3V <sub>rms</sub>	Portable and mobile RF communications equipment should be used no closer to any part of the <i>SE-601 Electrocardiograph</i> , including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. <b>Recommended separation distance</b> $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz  Where <i>P</i> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in metres (m).  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. Interference may occur in the vicinity of equipment marked with the following symbol:	

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.

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*.

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.

	Separation distance according to frequency of transmitter		
Rated	(m)		
maximum	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
output power of	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
transmitter			•
$(\mathbf{W})$			
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 2These 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	



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