About the User's Manual

The User's Manual serves for operating this instrument only. Our company shall not be responsible for any consequences and liabilities caused by using this user's manual for other purposes.

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Based on the need of product technical improvement or the file updates, we reserve the right to modify the contents contained in this manual; if the changes do not involve safety issues, the contents are subject to amend without notification

Due to technical upgrade or special requirements from users and with the precondition that the performance of the instrument will not be lowered, some components may vary from the description of configuration in the User's Manual.

The explain for tagging in this manual

Marning : You should know the information for how to avoid the animals and medical staff may suffer injury.

Note: You should know the information for how to avoid possible damage to equipment.

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Chapter 1 Cautions in General Operation

- \star The device is for the exclusive use of licensed physicians or personnel.
- \star Please read the following precautions thoroughly prior to using this instrument.
- ★ Applicability: It is applicable to perform the routine record and diagnosis via electrocardiogram.
- \star .ALL the ECG waveform in this manual are the Human's, it is only for reference.

A Warning: The following measures should be taken when installing or storing the instrument:

- Keep the instrument away from splashing water, and do not use or install it where air pressure, humidity, temperature, ventilation, air containing dust, sulfur, salt, alkaline gas and chemicals might affect it.
- Install the instrument on a stable plane, and prevent it from vibration and mechanical shock when moving it.
- Install it in a room with complete infrastructure.
- There should be no high capacity machine such as high voltage cable, X-ray &ultrasound device as well as diathermy machine around this electrocardiograph.

A Warning:

- The power supply should be capable of providing the proper voltage and frequency as required in the instruction manual as well as sufficient capability.
- Do not install the instrument in a chemical storage area or where gas is generated.

A Warning: Prior to operation:

- Check that the instrument is in a complete and normal condition
- Check that the instrument is properly installed.
- Check that all cables are connected correctly and the instrument is grounded correctly.
- It should be given particular attentions when using this instrument with other devices to avoid misdiagnosis or other problems.
- All circuits that contact the animals directly should be examined closely.
- When battery used, please check the voltage and condition of battery first, charge and

discharge the battery, and keep the battery fully charged.

Please tear the protective film before using the instrument.

A Warning: In operation

- The physician should observe the animals closely without leaving during the operation. Turn off the power supply and remove the electrodes when necessary to ensure the safety of animals.
- Prevent the animals from contacting the other parts of the instrument and other conductors except the electrodes.

A Warning: After operation:

- Turn all functional status back to the initial status , then turn off the power supply.
- Remove the electrodes gently and do not pull the lead cable emphatically when removing the electrodes.
- Clear up the instrument and all accessories for the trouble-free operation for the next use.

A Warning:

The maintenance and servings of this instrument should be performed by the experienced technicians. When there is any functional abnormality with this instrument, it should be clearly identified to prevent the instrument from running with fault.

A Warning:

Do not make any modification to this instrument.

A Warning:

Maintenance and servicing

- The instrument should be subject to the maintenance and servicing regularly (Once half a year at least)
- Since the electrocardiograph is a measurement instrument, the users should have it verified by the legal unit of measurement according to the Verification Regulation of Digital Electrocardiograph, and the verification cycle should not be longer than 1 year.

- The signal input/output ports (when needed to use) are only permitted to be connected with devices of Class I which is in compliance with the standard IEC60601-1, and the total leak current should be measured by the users to determine if it conforms with the requirement and can be used after connection.
- The electrical basic circuit and the list of parts are exclusively provided to the qualified maintenance stations and personnel confirmed by our company.

⚠ Marning:

Products treated after scrapped: the relevant packaging materials, depleted batteries and scrapped products are treated, please remember to follow local laws, The user dispose properly of the scrapped products and materials on the basis of the requirements of local laws, and to support them recovery separation work.

The use of rechargeable lithium batteries:

▲ Warning:

Improper operation may cause the battery becomes hot, fire, explosion, destruction or attenuation of the battery capacity. The use of Rechargeable lithium-ion battery (hereinafter referred to as "Battery"), please read these instructions carefully and use precautions.

A Warning:

Polarity of the batteries can not be reversed, or could cause an explosion.

A Warning:

Do not fire near the source or the environmental temperature exceeds 60 $^{\circ}$ C battery, do not heat the battery or thrown it into the fire. Taken to avoid the battery by water splashes, do not drop the battery into the water.

A Warning:

Don't chisel into the battery with metal chisel, hammering, or drop the battery or use the other ways to damage the battery, otherwise it will create fat cells Heat, smoke, deformation or combustion hazard.

A Warning:

When you find the battery leakage or emit unpleasant odors, please go away immediately. If the fluid leak into the skin or clothes on, immediately wash with water. If the electrolyte leakage and enter the eyes, do not rub the eyes, immediately with a clean water and see a doctor.

A Warning:

Only authorized installation or maintenance engineer can open the battery compartment, replace the battery; and must use the same type of rechargeable lithium batteries which our company's division to provide.

A Warning:

When the battery lifetime to reach, or find the battery, smell, deformation, discoloration or distortion, you should stop using the battery, And used batteries according to local regulations for processing.

A Warning:

You must turn off lithium battery before plugging; otherwise it will appear black and white, hang and so on.

Note:

- Taken to avoid the equipment being splashed with water.
- During the half-way operation of touch the screen, if the users re-change the touch screen display resolution or display mode, or adjust the touch screen controller, the refresh frequency, felt the cursor with the touch point can not correspond to the time, you must re-touch screen system calibration operation.
- The touch screen can not have watered and sticky surface, or other properties of soft material, or likely to cause surface acoustic wave touch screen display are not allowed

Note:

In this manual, the subsequent amendments (not including the corrections) or revised editions of the dated reference documents are not applicable to this manual, and the latest versions of the reference documents not dated apply to this manual.

Warranty:

For product warranty issues please refer to that "warranty cards" were provides the content

in accompanying document, if you have any questions, please call our customer service consulting, customer service hotline: 800-830-6643.

Maintenance Warranty

The manufacturer claims that all parts and materials as well technology of our products, except for the accompanying standard accessories for 6 months, the main unit are fully guaranteed for 18 months dating from shipment. This warranty does not apply to the products modified, disassembled, innovated, and repaired without our authorization or instructions from our company, and the products damaged due to accident, fire, thunder and lightning, flood, intentional destruction, improper installation or operation.

★ Matters need attention on electromagnetic compatibility (EMC)

This instrument conforms with the IEC60601-1-2, a safety standard for medical electronic devices or systems. However, the electromagnetic environment exceeding the limit or level defined by the standard IEC60601-1-2 will introduce the unwanted interference to the instrument, disable its intended functions or compromise its intended performance. Thus, if there is any discrepancy with this instrument compared to its intended functions during operation, please do not use it for longer until the adverse affect is identified and eliminated. The appropriate preventing measures are given bellow by this manual for such cases:

■ Affect from radiated electromagnetic wave

The use of mobile phone may affect this instrument. Do instruct all the people around to turn off their mobile phone or mini-radio devices when any medical electronic device is installed.

■ Affect from shock and conductible electromagnetic wave

The high frequency noise produced by other devices can be introduced into this instrument through the alternating current socket. Please identify the noise source first, and if possible, stop the working of related devices. If they are not allowed to be stopped, measures such as application of noise abatement device should be taken to minimize the influence.

■ Affect from static electricity

The static electricity in a dry environment (indoor) may affect this instrument, especially in winter. Humidifying eh indoor air or pre-discharge the static electricity on the cable and the Operation Manual for Electrocardiograph of ECG-8080 --5--

electrocardiogram recording personnel prior to using this instrument.

Affect from thunder and lightning

If there is thunder and lightning occurring around this instrument, a voltage shock may be caused in this instrument. If it is considered as dangerous, you can pull off the plug of power supply from the alternating current socket to run this instrument by its internal power supply.

★ Instrument classification

- 1) By type of shock proof: Class II, internal power supply
- 2) By degree of shock proof: Type CF device
- 3) By degree of unwanted liquid proof: Ordinary device (closed device without liquid proof)
- 4) By safety degree when using in the presence of inflammable anesthetics mixed with air, oxygen or N2O: This instrument should not be used in the presence of inflammable anesthetics mixed with air, oxygen or N2O
- 5) By running mode: Continuously running instrument
- ★ Interpretation for symbols related to this instrument





on/off



÷ USB Port



SD Port SD.

ENTER



Attention (consult operating instructions for details)



Typy IEC, CF equitment



Typy IEC, CF equitment with protector against defibrillation

Note:

Refer to the menu of status setting for Information items and interpretations on the display screen.

This manual is subject to change, customers may not be notified in time. Inconvenience, please forgive!

Chapter 2 Cautions in Operation

★ To assure proper operation of the unit, please read through this manual, and pay special attention to the following operating precautions.

Note:

This instrument should be installed on a smooth and stable working bench, and be prevented from the intense vibration and shock when moving it.

Note:

The frequency and voltage of the alternating current should meet the requirement, and the current capacity should be sufficient.

Note:

When the integrity of the protective wire is unsure, please use the internal DC power supply.

Note:

The applied part of circuit works in a floating ground condition, and the design conforms with the safety standard for Type CF, thus it is able to record and display the electrical signal of body surface generated by the activity of cardiac, but can not directly act on cardiac.

Note:

For the accuracy of the electrocardiogram tracing, this instrument should be installed in a quiet and comfortable environment.

Note:

Turn off the instrument immediately if there is any abnormality occurring during the operation.

A Warning:

The power supply cable should be 3-core cable when using this instrument with the alternating current, otherwise the hazards of electric shock may be introduced to the animals and operators. When the available 3-core cable is unusable, please use the battery for power supply.

A Warning:

The room should be equipped with the complete power supply system and grounding system, otherwise it might be harmful to the animals.

A Warning:

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When it is used in combination with the cardiac defibrillator, the contact with animal or hospital bed should be avoided. All the electrodes which are connected or unconnected to the animals as well as the animals themselves are not necessary to be grounded .All the electrodes for use should be the Ag-Cl electrodes provided by our company . The animal cable specially provided by our company should also be used for ensuring the protection against the charging of the cardiac defibrillator. It is not recommended to use this instrument in combination with the other electric stimulators. However, if necessary, they should be used in the presence of professionals and under the appropriate directions. When the instrument is used in combination with the cardiac defibrillator or the other electric stimulators (such as HF surgical units), it is recommended to use the disposable chest electrodes in the shape of plate to prevent the adhesive metal electrodes from burning the skin of animal.

A Warning:

Be cautious when the animal is connected with more than one instrument, because the total leak current may be harmful to the animal. Only the Class I devices in compliance with the standard of IEC60601-1 are allowed to be connected to this instrument, and the total leak current should be measured by the users to determine that if it meets the requirement and can be used after connection.

A Warning:

When the animal is connected with a cardiac peacemaker, the accuracy of ECG testing and the analysis result might be affected. In this case, it is recommended for physicians to perform the identification and analysis in combination with the waveform. However, the potential risk will be increased in this case. Thus it should be given particular attention to the safety problem when recording the ECG in this case, and the appropriate measures should be taken to ensure the leak current at a acceptable level.

▲ Warning:

Keep the high frequency electric knife away from the electrodes to prevent the animals from burning. Make the electric resistance between the high frequency electric knife and animals' body as low as possible, and be cautious particularly. If necessary, the plate electrodes can be used because of its larger contact area to limit the high frequency current density into an acceptable range. .

Δ	Do not use this instrument in presence of inflammable gas such as anaesthetics , oxygen, hydrogen or in presence of inflammable chemicals, otherwise it may cause the explosion or fire disaster.
Δ	Do not use this instrument in the medical hyperbaric chamber, otherwise it may cause the explosion and fire disaster.

-

Δ	Especial intention:The cardiac defibrillazing &monitoring unit not exit in this instrument, you must use our company's lead lines which has the electric defibrillation function.
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Chapter 3 Features and Operating Principles

- 3.1 Name and function for various parts of the instrument
 - Front view



1. Color LCD touch screen

For displaying the electrocardiogram, information of the animal tested as well as the instrument status.

2. Lead connector

For connecting the lead lines

3. Shuttle

For moving the optional menu and the functional button.

4. Enter Button

For confirming the current input.

5. Operating buttons

For controlling the operations to this instrument and information input

Note:

- Do not place the heavy things onto the LCD or strike it, or else the LCD will be damaged.
- Do not use too much force on the touch screen, using the touch pen slightly as soon as you can.
- Put it away or cover it when this instrument is unused to keep it away from the splashing water.
- Do not press the buttons with the sharp or hard articles, or it may cause the permanent damage to the buttons.
 - Undersurface and lateral surface



1. Slot for SD card

For identifying and reading the SD card, to support capacity 2G.

2 and 3. USB port

With the printer (supports USB Interface) connection, for analysis of ECG and direct printing; with USB hard drive connected to the storage of ECG data; connect with the scanner which has USB interface, it can scan the animal ID number.

4. LAN Port

For network connection. LAN to transfer data to ECG editing workstation and management of data transmission and sharing local area network

5. AC Interface

Connect the AC power cord

6. Grounding terminal:

For connect the equipotential grounding wire.

7. Embedded handle:

For moving or carrying this instrument.

8. Thermal windows

Machine inlet ventilation openings

9. Battery compartment:

For loading the rechargeable lithium battery with high performance, (14.8V/4400mAh)

Operating buttons area



1. Power supply indicator light:

For indicate the current power supply status for this instrument (Plug the power cord blinking green light that is charging, green light without flash to indicate the battery capacity is full.)

2. ON/OFF button:

For turn on or turn off this instrument. If there is a failure with during the operation, you can hold down this button for 3 sec. then release it to shut down this instrument by force.

3. Sensitivity switch/Back button:

For switching the sensitivity manually in the non-setting status. The sensitivity can be divided into 4 levels as 2.5 mm/mV, 5 mm/mV, 10 mm/mV, 20 mm/mV.

4. Lead shutting off/Direction button:

For stabilizing the lead input signals instantly and resetting the printing of the lead output signals in the non-setting status.

5. Freeze button

Freeze the current lead waveform display for easy observation and diagnosis.

6. EXIT Button

Press this button to go back to the main menu.

7. Shuttle

For moving the optional menu and the functional button

8. Enter Button

For confirming the current input.

3.2 Principle introduction and block diagram

1 Amplification (collection box)

- (1) Principle introduction for the amplifying unit
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The floating ground circuit of the whole instrument is a signal capture system which consists of analogue circuit and A/D converting system. The analogue circuit is composed of lead signal amplifier, anti-aliasing low-pass filter, channel switch, lead shut-off, lead- fail detector, etc. The CPU system of the whole instrument is responsible to coordinate the various circuits such as A/D converter, channel switch, lead shut-off and lead-failure detector to perform the signal capturing and lead-fail detecting. The control information between the floating ground and ground circuit and A/D converting data is transmitted by the photocoupler.

The sampling rate for lead signal is 1000/960Hz, while the sampling rate for lead-fail signal is 100/120Hz, and the cut-off frequency for anti-aliasing low-pass filter(-3dB) is 200Hz. The sampling rate conforms with the standards of AHA (American) and CSE (European) which require that the sampling rate of electrocardiograph with the analysis function should be no less than 500Hz. The anti-aliasing low-pass filter can limit the input bandwidth of A/D converter while ensuring the wanted signal bandwidth to avoid the signal aliasing caused by the sub-sampling of high frequency signal.

(2) Block diagram for the amplifying unit



2 Controlling

(1) Principle introduction for the control unit

The control system is composed of printing controller, keyboard controller, liquid crystal controller and CPU system, etc. The lead signal acquired by the signal capture system is transmitted by the high speed photocoupler to the CPU system, then subject to the processes of digital filtering, gain controlling and printing driving, finally transmitted to the printing controller to perform the printing of the waveform. After printing, the waveform will be measured, analyzed and processed by the CPU system. The CPU system can also receive the interrupt signals and the key coding from the keyboard to perform the key interruption processing. In addition, such functions as lead fail detection and paper compartment empty detection, battery voltage control, automatic turning off the power supply, CRO analogue output, sampling and printing for EXT input are all administrated by the CPU system. The keyboard controller produces the keyboard scanning signals to perform the processing of key-jitter elimination, then the key coding and the interrupt signal is received and processed by the CPU system. The liquid crystal controller is responsible to the data and commands from the CPU system to perform the displaying the control status of the whole instrument.

(2) Block diagram of the control unit



Chapter 4 Preparation before Operation

4.1 Location selection

ECG-8080 is not to be limited to be used in hospitals and clinics. Because of the portable feature it can be used anywhere with the battery. It is applicable to outdoor occasions such as group examination.

■ The following aspects should be considered when selecting the location to install this instrument to recording the electrocardiogram accurately.

■ Keep the instrument and the bed for testing away from the high voltage cable. The substantial radiation source around this instrument may introduce the noise interference to this instrument.

■ Keep this instrument away from devices such as X-ray, ultrasound, radio machines and fluorescence light because they are probably the substantial radiation sources.

- Please use this instrument with the ambient temperature of $5^{\circ}C \sim 40^{\circ}C$.
- Please use this instrument with the ambient humidity of 25%~95% (without condensation).

4.2 Connection of the power supply

1) Using the AC power supply

ECG machine will be provided with one end of the power cord into the machine's power outlet, the other end into a wall socket, the ground where the environment pillar and ground machines reliable connection (as shown).



When this instrument is used with other medical devices, please use the external grounding cable provided together with this instrument. Connect the grounding terminal of this ECG with the same grounding terminal of the other devices to prevent the animal from the electrical shock. When there is any leak current with the other devices, this connection will induce it into the ground for protection.

2) Using the battery

When the battery is required to be used as a power supply, Users can use the specify high-performance rechargeable lithium battery. Please check the capacity and status of the batter. Charge and recharge it before using the battery.

Note:

The reliability of grounding for this instrument can be enhanced by connecting one end of the accessorial grounding cable onto the grounding column of the instrument while connecting the other end to the ground. Do not use the water pipe or the other pipes as a grounding cable, or else the safety protective measure of first level of this instrument is ineffective, and the animals might be in danger of electrical shock.

Storage battery

When the battery pack not be used more than 90 days , please store it at temperatures between -20 ~ 30 $^{\circ}$ C dry; when the battery storage for more than a month, due to battery self-discharge, charge before use.

Battery scraps

Before the disposal of waste batteries from your local solid waste management officials for recycling or for proper handling. The battery pack can be recycled, after the end of the battery life, according to the state or local law can not be attributed to this cell treatment of municipal waste is illegal.

4.3 Connection of lead lines

Connect the lead lines of the accessories into the lead port of the instrument and tighten the screw as the following picture.



Note:

- Do not use the other types of lea lines except the designated special lead lines provided together with this instrument.
- The lead port is exclusively for connecting the ECG signal, Not used for other purposes.

4.4 Select and connect the printer

The instrument can be connected directly through the USB interface to the printer, the recommended printer model are:

HP 1010

HP P1505n

HP P2035

4.5 Start the instrument

As the flowing picture, press the operating button of (ON/OFF), the power supply indicator light will light and the instrument turns to be in initial status,



When the instrument enters into the system and the following initial picture is displayed on the LCD screen, it indicates that this instrument has entered into the stand-by status and you can start operating.



4.6 Animal cable connection

The identifier and color code of electrodes used comply with IEC requirements. In order to Operation Manual for Electrocardiograph of ECG-8080 --21--

avoid incorrect connections, the electrode identifier and color code are specified in as follow	
table. The equivalent code of American standard is given too.	

	Internation	al Standard	American Standard		
Electrode	Identifier Color Code		Identifier	Color Code	
Front Right Leg	R	Red	RA	White	
Front Left Leg	L	Yellow	LA	Black	
Back Right Leg	Ν	Black	RL	Green	
Back left Leg	F	Green	LL	Red	
	C1	Red	V1	Red	
	C2	Yellow	V2	Yellow	
V Chest lead (Any one of	C3	Green	V3	Red	
V1,2,3,4,5,6)	C4	Palm	V4	Blue	
	C5	Black	V5	Orange	
	C6	Purple	V6	Purple	

4.7 Connection between Electrode and Animal Body

Veterinary electrode adapter is required for ECG-1103 VET, the end with clip is for connection to the animal, and the end with connector is for connection to Animal cable,

illustrated as below .The contacting resistance between the animal and the electrode will affect the quality of ECG waveform greatly. In order to get a high-quality ECG waveform, the skin/electrode resistance must be minimized while connecting electrodes.

- 1) Only use the attached electrode or the one-off electrode in good quality;
- 2) Do not mix the attached electrode and the one-off electrode;
- 3) Do not use the oxidized electrode;
- 4) Do not mix the new and old electrode;
- 5) Use medicinal alcohol to clean the contact part of the animal body and electrode, in order to reduce the contact resistance;
- 6) Do not stick any spacer to the contact part of the electrode and animal body;
- Prevent a short circuit between electrodes in signal acquisition (the chest electrode is likely to be touched);
- 8) Make sure the electrode is reliably connected to the lead.

4.7.1 Connection between Limb Electrode and Aniaml Body

Install each electrode to the position (wrist, ankle) on the corresponding limb specified in the table below:



А

В

4.7.2 Connection of electrode

Connect the electrode to front right leg(R/Red), front left leg(L/yellow), back left leg(F/green) and back right leg(N/black), illustrated as below



Note:

Please apply some alcohol to the clip skin for optimal connection.

PROBLEM SOLVING WITH CATS

Unlike humans and most dogs, the cardiac axis is not aligned top right to bottom left in cats. The heart has a tendency to lie more centrally with its apex more ventral than the atria, i.e., the heart points downward towards the ground when the animal stands.

This gives rise to one of the common problems with monitoring cats, finding the strongest signal

to present to the R and F electrodes.

The best signal is derived top/bottom axis i.e. Lead II in humans, with R looking at the top of the heart and F at the bottom. In cats, as stated, the axis may not lie across the body.



As lead II may not align with the cat's axis, the signal is small and sometimes cancels. Therefore, by moving R more centrally onto the cat's body above the top, and F onto the cat's body below the bottom of the heart, a much larger signal will be obtained.

The plane in which the cat's heart lies within its body may also vary.

The "top" of the heart may be more dorsal and the "bottom" more ventral. In this case, we would refer to the base/apex axis (see figure as below) when the following instructions should be followed.

1. Move F to the left apex of the heart.

2. Move R to the V10 position (over the dorsal spinous process of the seventh thoracic vertebra) and F to the V4 position (sixth left intercostal space at the costochondrail junction). It will be necessary to annotate the printouts, if any, with actual configurations used to avoid later confusion.



\triangle WARNING:

The ECG is provided for the use of qualified physicians or personnel professionally trained. The operator is supposed to be familiar with the contents of this Operation Manual before Operation Manual for Electrocardiograph of ECG-8080 --25-- use.

4.8 Indication for channel overflow

The saturation of amplifying unit will occur when the amplitude of input is over the range of the instrument. The instrument will display indication for overflow as the following picture. This phenomenon often occurs in the following two situations: one is the time connecting the lead lines to the animal, the other is the time that the body of animal moves when operating.



You can press the Lead Shut-Off Button (if necessary, press it many times) to handle the overflow. After the waveform of each channel instantly stabilizing, you can operate it for other use.

4.9 Indication for lead fail

This instrument can detect the lead connecting status continuously, and if any lead fail is detected, the corresponding lead code will be displayed on the top right corner of the LCD. The following picture will be displayed on the LCD:



If any lead fail is detected, the corresponding leading waveform will not be displayed. The users should reconnect the electrodes or the electroes leading based on the given information about the electroes or electrodes leading detachment.

Note:

1. [DISCONNECTED:*]:

 When the lead line with the animals or host is not reliable connectivity, ECG can not correctly send, that "*" of the symbols is displayed to warn, "*" indicates the current lead;
when polarization voltage is over specified value of equipment, the symbols is displayed to warn.

2. In the course of use, "DISCONNECTED:*" of the symbols is displayed to warn the screen, to dealt with according to the following approach:

① Press "lead shutting off " button to intervene manually, to eliminate the effects of strength exceeds the value of the polarization voltage on the amplifier products, will enable amplifiers rapid return to normalcy; ② Press "lead shutting off " button to intervene manually, still can not lift a state of alert, they should double-check the connection of the corresponding electrode and the skin of animal , the electrodes and I the lead lines or host of is reliable, when such a reliable connection, the state of alert lifted .

Chapter 5 Operation Procedures

5.1 Inspection before Operation

- Is there any electrical equipment which may introduce the radio-frequency or the power supply interference such as X-ray, ultrashort wave device around this instrument? If there is, they may introduce the interference to the ECG instrument. If necessary, please turn off this equipment or perform the test in another location without interference.
- Is the ambient temperature and humidity in compliance with the requirements for using this instrument?
- Is the connection of power supply cable good? Or is it nter twisted with other cables?
- Is the connection of lead lines good? Or are the lead lines close to the AC power supply cable?
- Is the connection between the lead line pins and appropriate electrodes correct?
- Is the connection of electrodes good?
- Is the electrode contacting skin of the tested animal subject to the appropriate pretreatment?
- Have the electrodes been contaminated? If they have, please remove the stains with the alcohol and the soapsuds.
- Is the connection of electrodes too loose? If it is, please tighten them.
- Are the new and old electrodes used together?
- Is there any contact between different electrodes (particularly in the chest area)
- Is the tested animal too nervous? If he (she) is, please explain to the animal that the ECG test is a simple process without any harm to the animal to relax him (her).
- Is the tested animal acting or speaking?
- Is the bed too narrow for the animal?
- Do the naked parts of the animal body such as hand an foot contact the metal part of the bed? If they do, the AC interference may be introduced to the electrocardiogram tracing.
- Is the examination room comfortable?
- Is the quantity of the recording paper sufficient?

Note:

For the safety of the examined animal and stability of the electrocardiogram recording, the above inspection should be finished before operation. Make sure all the conditions about the instrument and animal normal before electrocardiogram recording.

5.2 Electrocardiogram recording screen

Start the instrument and make sure all the lead connection is correct, while the electrocardiogram can be recorded. The following electrocardiogram recording screen will be displayed on the LCD.



Users can touch sensitivity; filter status code leads to change its settings. Select the Exit option, or press the panel by "EXIT" button to exit.

5.3 Basic Operation

User can operate the ECG instrument by a touch pen or use the shuttle knob, when turn the shuttle and the liquid crystal display the cursor in the "menu option" back and forth move or use the touch pen directly, the selected "option will be displayed as orange, press the" Enter" button to enter into the next level menu, the related operation and interface as following below::

Shuttle and buttons





In the main interface, you can turn the shuttle to touch pen, or the name, gender, age options, see the pop-up a software disc, enter the animal's name, sex, age, detailed operation method refer to Chapter 7 of the animal information input: parameter setting method : ID number, medical record number, name

From the main menu interface into the next level, the various interfaces as shown below,

"Menu" interface

"ID" interface

Set of system parameters and data management operations

Input animal information

Settings	Patietn informatio	n		
System	ID	20110114001	Height	
Network	Record NO.		Weight	
Lead(V)	Name		Blood Pre.	
	Sex	○ Male	Symptom 1	None
Audio	Age		Symptom 1	None
Print Settings	Туре	Dog	Medication1	None
AC Freq	Other	None	Medication2	None
Storage		Save		Exit
Hospital Info				
evice Information				
Exit				

"Freeze" interface

Freeze and Browse the currently displayed, ECG waveform (Can freeze the current time of 60 seconds ahead of data

🥑 60	пт	10 mm,	/m∨ H5	90 d 75Hz	ID: 20800114	002		16	8 - 180s (15/1	\$)
VET ECG	لمتمل	~	-h-	-h~	-h-	-	- <u> </u> _		-l-	~~
ID										
Васк	<u>^</u>	لمــ	L	h	-h-	_l_	_h_	h	_l_	\neg
Next										
Report		L	_^	-^-	_^	_^	_^	-^-	_^	_^_
Exit	🗌 aVR									
	\sim	\sim	$\gamma \sim$	$\gamma \sim$	γ	~~~~	γ	$\gamma \sim$	$\gamma \sim$	~~~
	∏ aVL									
Name		~~~	~~~	~~~		~~~	~~~		~~~~	~~~
Sex 🗸	ΠX			1				1	1	1
Age	1	\sim	\sim	-1	-h	-h-	~l~	-lr	~l^_	\sim
	Transferration of the local division of the	NAME AND ADDRESS OF	NAME AND ADDRESS OF		THE OWNER WHEN PARTY	NAME AND ADDRESS OF	NAME AND ADDRESS OF	NAMES AND ADDRESS OF	THE OWNER WHEN THE OWNER	THE OWNER ADDRESS

"Report" interface

Automatic Analysis of the ECG

"Upload" interface

v 60	3+1 Report ID: 2010/05/001 2010-10-14 16/22124	🥪 60 10 mm/mV H50 d 7942 10 - 26804114600 2888-81-34 (2r- 21- 21
VET ECG	Tentinetration 78 bpm 10 sa/st	
Upload		Edt Andrahadrahadrahangrapangrapangrap
10	91 m I _ L _ N R - Y	
NEXT	588/ 419 ms	
	-89/ 69/ 30	Bring acquisited, please wait 8 s
FIRE	I - In - VL	
Print		
save		and the second s
Exit	I - Le "Le	
Name		
144		🔤 🚽 🛛 🚺 🕹 🗠 🗠 🗠 🗠 🗠 🗠 🗠 🗠
Apa		AN TANKA ANA ANA ANA ANA ANA ANA ANA

5.4 Electrocardiogram recording operation

The instrument provides standard 6-lead and 7-lead mode; two modes can be made to collect an automatic analysis of ECG, and gives a detailed analysis report.

1) standard 7-lead mode

The machine factory default measurement mode to "standard 7 lead" mode, the LCD display shows the machine working status;, as the following picture:



a. The users can examine that if the ECG waveform of leading is stable through the displaying of the heart rate. If necessary, you can stabilize the leading waveform instantly by pressing the "Lead Shut-Off Button" $\overset{\circ}{\mathbb{O}}$.

b. Press the "sensitivity switch" button or use a touch pen at the top of the screen to set the sensitivity. There are fourth levels:2.5mm/Mv、5mm/Mv、10mm/Mv and 20mm/Mv;

c. Turn the shuttle knob, select "Report" option in the operation of the menu bar, press the "Enter" button, or use the touch pen directly on the screen. It will automatic analysis ECG waveforms and displays a detailed analysis report. As the following picture:


In the "report" interface, you can select the "upload", "ID", "Next," "print" "save" or "exit" and other operations.

Move the cursor to the "Upload" and Click "Enter" button or use the touch pen directly, the copies of ECG data can be uploaded to the ECG management software, to ensure the accuracy of the data can be uploaded, please check the "Network" Setting, whether the local IP and network server address in the same sub-network segment, even whether the network server address in the instrument same to the IP address in the receiving computer.; and please connect the network correctly.

Move the cursor to the "ID" and click "Enter" button or use the touch pen directly to enter the "animal information" interface, as shown below: (detailed operation see Chapter 7)

Patietn informatio	n		
ID	20110114001	Height	
Record NO.		Weight	
Name		Blood Pre.	/ mmHg
Sex	○ Male ⊙ Female	Symptom 1	None
Age		Symptom 1	None
Туре	Dog	Medication1	None
Other	None	Medication2	None
	Save		Exit

Click "Save" to save the animal information, and click "Exit" to animal exit.

If the printer is connected well, you can use the touch pen or use the shuttle to move the cursor to "Print", then click "Enter" button to print the report.

Turn the Shuttle or use touch pen to move the cursor to the "Next", and then Click "Enter" button, it will be displayed a copy of the data as follows:



Use the touch pen or turn the shuttle to move the cursor to "Save" and press the "Enter" button. In the system menu, users can select storage according to the actual situation; the -- 34-- Operation Manual for Electrocardiograph of ECG-8080

instrument will automatically save this report data to the specified storage. Use the touch pen or turn the shuttle to move the cursor to the top of the screen as 3+1 Report (Print mode settings), this instrument supports for three kinds of printing modes:6/7 channel print, 3 +1 channel print, heart print. Use the touch pen directly or turn the shuttle to move the cursor to "exit" and press the "Enter" button to exit to the main interface.

2) Upload

Using the touch pen or turn the "shuttle" to move the cursor in the menu option bar to select "Upload" and press the "Enter" button, then the LCD will be displayed the working status of instrument as following:



The instrument will analyze the collected data and saving, uploading.

If the device or network connection untreated well, it will be displayed the following information:



At this time, please check the adequacy of equipment and the network connections, if the network settings are correct, collect data and then re-upload.

5.5 Freeze Waveform

Only in the standard 12-lead mode, the freeze waveform function can be exit; Uses can analysis the frozen waveform data in the past 180 seconds.

In the standard 12-lead mode, if the acquisition wave length is not less than 12 seconds, you can press the "Freeze" button on the instrument or turn the shuttle options screen to "freeze" and press "Enter" button, the operation icon displayed as shown below:



The main Screen will be displayed the following wave frozen picture:



Use the touch pen or turn the "shuttle" to move the cursor to select "ID", "Back", "Next," "Report" or "Exit" operation.

"ID" operation is the same as the "standard 7-lead mode ".

The "Back" and "Next" (red rectangular section) is tabbed browsing the frozen waveform data, each page showing the lead of 12 seconds of data, there are 15 page waveform data of these.

You can edit the animal's name, sex, age settings and so on. Please reference to Chapter VII of the input ID-animal information input.

Select the "Report" and press the "Enter" button, and the system will automatically analysis the current 12 seconds data.

"3+1 channel" Print format as shown below Lead-V open

Chapter 5 Operation Procedures



Lead-V closed



"6/7 channel" Print format as shown below:

Lead-V open



Lead-V closed



"Heartbeat" print format as shown below:

Chapter 5 Operation Procedures



Note:

Barcode information on print report is the animal ID number, the barcode can be scanned by the scanner, please refer to 7.4 Barcode scanning.

5.6 Attention options

The following items should be given particular attention when performing the ECG waveform measurement and analysis

(1) If the myoelectricity or AC interference is significant, the identification for P wave and Q wave might be unreliable sometimes. The identification for ST section and T wave might be unreliable because of the baseline drift.

(2) If the ending point of S wave and T wave is bended and not clear, the measurement error might be caused sometimes.

(3) If the R wave is undetected because of QRS low voltage, the significant deviation might be caused in the heart rate measurement.

(4) The calculation of electrical axis of heart and the identification for the QRS dividing point might be unreliable because of low voltage of QRS

(5) Occasionally, the frequent (repetitive) ventricular premature beat might be detected as the representative beat.

(6) When the multiple arrhythmias occur simultaneously, the identification for P wave might be difficult, and the relative parameters might be unreliable.

Chapter 6 System Parameters Setting

With this instrument, you can set the various system parameters in the menu. The various parameters in the menu are defaulted as the factory values, and the users can set the parameters to be wanted values prior to ECG recording.

6.1 Main menu

After starting the instrument, you can use the touch pen or turn the shuttle to move the checkbox to the "Menu" option, and press the "Enter" button to enter into the screen of system menu as the following picture.

There are 9 sub-menu options: "System", "Network ", "Audio", "Rhythm", "Print ", "AC Freq," "Storage", "hospital information," Device information", "Exit" under this interface.



6.2 System setting

In the "Menu" screen, select "System" Setting (blue box), press Enter" button to enter into the system setting interface as shown below:

System
Language
T-screen calibration
Acqusition time
Background color
Acqusition mode
Power save mode
System Upgrade
Exit

Parameter List

Parameter	Setting Value	Defaulting Value	Comment
Language	Chinese/English/Russian	English	For setting the displayed language on screen
T-screen calibration			For the touch screen's calibration
Acquisition time	1、2、3. 。。12	12	Setting the time of data collection
Background color	None, Blue, Red	Blue	Set the background of the screen grid color (restart it after setting)
Acquisition mode	Forward, Back	Back	Set up data acquisition sequence
Power save mode	Disable, Enable	Enable	The machine's power-saving mode setting, open the access to power saving mode
System Update			Update software

6.3 Network setting

After the network cable connected well, in the "menu" interface, select the "Network"

Settings (blue box), and press "Enter" button to enter into the Network setting interface as shown below:



Parameter List

Parameter		Setting Value	Defaulting Value	Comment	
		IP address	XXX.XXX.XXX.XX X	192.168.1.190	Set the local IP LAN
Network	Subnet mask	XXX.XXX.XXX.XX X	255.255.255.0	Subnet mask setting	
setting	ng	Default	XXX.XXX.XXX.XX X	192.168.1.1	Gateway Setting
	Net Server	IP address/port	XXX.XXX.XXX.XX X/xxx	192.168.1.190	Server Address settings

Note:

Before using the function of upload, you must set down the "Local" and "Server" items in the "NET IP Address", and make the local and server address in the same sub-network segment. (e.g. local address: 192.168.1.xxx, server address: 192.168.1.xxx).

Local Network

In the Network Settings interface, select the "local network" with a touch pen or turn the shuttle and press the "Enter "button to enter into the Local Network setting as shown below:

Local networking				
Automatic IP				
🔾 Specifies IP				
IP address 192	168	1	• 190	
Subnet mask 255		255	• 0	
Default 192	168	1	. 1	
OK Cancel				

There are two ways to obtain IP addresses, one is automatically access: Select the option to automatically obtain IP address, and press "Enter" button, available IP addresses. Another is to specify the IP address, the need to set their own IP address, subnet mask, and gateway settings. Click "OK" to Save Settings. Click "Cancel" to exit. The input method reference to Chapter 7 of ID-animal information input.

Network Server:

In the Network Settings interface, select the "network server" setting, and press "Enter" button to enter into the network server setting interface as shown below:

Net server	
IP address 192 16	8 1 187
Port 8000	
2000	Quart
Save	Canel

The input method reference to Chapter 7 of ID-animal information input.

After setting up the IP address and Port, please click "OK" to Save Settings. Click "Cancel" to exit.

6.4 Audio setting

In the "Menu" screen, select "Audio" Setting (blue box), and press the "Enter" button to enter into the Audio setting interface as shown below:

Audio
Key Beep
Exit

Parameter List

Parameter	Setting Value	Defaulting Value	Comment
Кеу Веер	off, tone 1, tone 2, tone 3	tone 2	Key beep tone setting

6.5 Lead setting

In the "Menu" interface, select the "lead (V) "(blue box), with the touch pen or press the "OK " button to go into the settings screen as shown below:



Users can choose whether to open the lead V.

6.6 Print setting

In the "Menu" screen, select "Print" Setting (blue box), and press the "Enter" button to enter into the Print setting interface as shown below:



Parameter List

Parameter		Setting Value	Defaulting Value	Comment
Print setting	Print mode	6/7 channel, 3 +1channel, , heart print,	6/7 channel	Select print mode data acquisition

Baseline width	1, 2, 3, 4	1	Select the width of the waveform baseline
-------------------	------------	---	---

6.7 AC frequency setting

In the "Menu" screen, select" AC frequency" Setting (blue box), and press the "Enter" button to enter into the AC frequency setting interface as shown below:

Ac Freq	
50Hz	
60Hz	
Exit	

Parameter List

Parameter	Setting Value	Defaulting Value	Comment
AC frequency	50Hz、60 Hz	50Hz	Select the AC frequency

6.8 Select Storage setting

In the "Menu" screen, select "Storage" Setting (blue box), and press the "Enter" button to enter into the Select storage setting interface as shown below:



Users can set the storied location of the data; there are three storage locations: memory, SD card, USB. Select the appropriate storage location; reliable storage device must be connected well. (SD card or USB)

6.9 Hospital information setting

In the "Menu" screen, select "Hospital information Setting" (blue box), and press the "Enter" button to enter into the Hospital information setting interface as shown below: -- 46-- Operation Manual for Electrocardiograph of ECG-8080

Hospital Info.	
Hospital name	None
Clinical Department	None
Inspection Dortor	None
Operating Doctor	None
Save	

Hospital name

Turn the shuttle or click the space with the touch pen; it will pop up a software Keyboard as shown below:

uobilM									
12		Sign		Eng		abc	123		
q	w	e	r	t	y u	i o	p 🖨		
a	s	d	f	g	h j	k 1			
,	•	z	x	c	v b	n m			

keyboard input:

In the software keyboard, select "Eng" with a touch pen, enter the desired text spelling, press the "Enter" button to confirm input; You can choose the software keyboard icon in the top plate Symbols software interface, you can select the hide items (to hide the soft keyboard). Use the touch pen to select the "Eng", may enter the letter; select "Sign", can input the symbols; select "abc " or "123" that can enter numbers and punctuation marks. Use the touch pen, you can move around the cursor position. Software key 🖂 is the back plate on the grid button, click it to clear the front of a word or letter symbols. The icon is the "Enter" key, the icon is the space bar; click it to enter a space symbol. And click the "Save" button to save, click "Cancel" button to return.

Note:

You can use touch pen to move the location of the soft keyboard.

6.10 Device information

The Manufacturer, Device Name and Version of the instrument.

6.11 Sensitivity and the filter parameter setting

1. Sensitivity

Users can use a touch pen lightly to hit the sensitivity location in the interface. And it will pop up as follows:



Users can set four different level sensitivity: 2.5mm/mv, 5mm/mv, 10mm/mv, 20mm/mv_o Press "Exit" option to exit setup interface.

2. filter parameter setting

Users can use a touch pen lightly to hit the filter parameter location in the interface. And it will pop up as follows:



Press "Exit" option to exit setup interface.

Filter parameter

Status or Items	Control	Setting Value	Comment
		0.05-150Hz	All filters are off.
		H50 d	Only AC filter and drift inhibition (0.5 z High pass) are on.
Filter Setting		H50 d 75Hz	All filters are on, and the frequency of the myoelectrical filter is 0.5 -75Hz
		H50 d 35Hz	All filters are on , and the frequency of the myoelectrical filter is 0.5 -35Hz

Note:

- The "H60" in the "H60 d 75Hz" is changeable based on the set AC frequency. For example, H50 d 75Hz might be displayed.
- AC frequency setting must match with the AC frequency of the local, if set incorrectly, it will affect the result signal acquisition and analysis.

6.12 Date and time setting

Users can use the touch pen lightly above the date and time parameters, and then it will pop up the following interface:

Time setting	
2011 - 1 - 14	17 : 13
Save	Canel

The Time setting interface will be displayed (The input method referred to the Hospital information input), after setting, click the "OK" to save, and click the "cancel" to cancel the time setting.

Chapter 7 Animal Information and Data Administration

In the Checking interface or analysis report interface, ECG waveform, the results and animal electrocardiogram data constitute a file, which can be saved in memory for easy data management and query.

7.1 Inputting of Animals' Information

In the ECG measurement interface, use the touch pen, or turn the shuttle to move the cursor to the "ID" and press the "enter" button, the instrument goes into the "ID" interface; you can input the detailed animal information in this interface. For instructions and the screen displays as the following picture:

Patietn infor	mation			
ID	20110114001		Height	
Record	NO.		Weight	
Name		_	Blood Pre.	/ mmHg
Sex	O Male 💿	Female	Symptom 1	None
Age			Symptom 1	None
Туре	Dog	•	Medication1	None
Other	None	•	Medication2	None
	Sa	ve		Exit

Scan the barcode for animal ID number, animal's ID number will be uploaded in the animal information window, ID number is automatically uploaded.

Animal information parameter list

Parameter	setting	default	explain
Birthday	XXXX Y XX M XX D	Animal date of birth	Based on the actual input
ID NO	Any numbers or letters	None	Based on the actual input
Record NO	Any numbers or letters	None	Based on the actual input
Name	Any characters, letters or numbers	None	Based on the actual input
Sex	Male and female	Male	Select the sex of the animal
Туре	Dog, cat, Sheep, Rabbit, Cattle, H orse, Deer, Monkey, Wolf, Bear, P ig, Other	Dog	Choose the animal type.
Other	None	None	Select other information for animals
Height	1~250cm	175cm	Based on the actual input
weight	1~400kg	70kg	Based on the actual input
D.O.B	1~998 / 1~998mmHg	75/120mmHg	Based on the actual input
Symptom1/2	Unknown 0 [—] 8	Unknown 0	Select the relevant descriptions of the symptoms
Medication 1/2	Unknown 0 [—] 8	Unknown 0	Select the relevant drug description

- Parameter setting method
- 1. ID NO 、Record NO 、Name

Chinese input:

keyboard input:

In the software keyboard, select "Eng" with a touch pen, enter the desired text spelling, press the "Enter" button to confirm input; You can choose the software keyboard icon in the top plate Symbols software interface, you can select the hide items (to hide the soft keyboard). Use the touch pen to select the "Eng", may enter the letter; select "Sign", can input the symbols; select "abc " or "123" that can enter numbers and punctuation marks. Use the touch pen, you can move around the cursor position. Software key 📻 is the back plate on the grid button, click it to clear the front of a word or letter symbols. The icon is the "Enter" key, the icon is the space bar; click it to enter a space symbol. And click the "Save" button to save, click "Cancel" button to return.

Note:

You can use touch pen to move the location of the soft keyboard.

2. Type, Other, Height, Weight, Blood pressure, Symptom 1/2, Medication 1/2

Users can use the touch pen of rotate the shuttle to move the cursor to point to set the parameters, press the "Enter" button to select the parameters, then turn the shuttle to change the parameter settings, at last press the "Enter" button to complete the parameter settings. Click the "Save" button to save, click "Cancel" button to return.

3. Age, Height Weight Blood pressure

Users can turn the Shuttle or the touch pen to move the cursor pointing to set the parameters to complete the input, turn the Shuttle to select the next setting, click the "Exit" to exit the parameter setting. Finally, click "Save" to save.

4. Sex

Select Male or Female.

7.2 Database Administration

ECG-8080 can make the waveform, animal information and analysis results as a file stored in memory or SD card or USB hard drive for future data query and management purposes.

In the "Menu" screen, select "Data Management" (blue box), click "OK " into the data management interface as shown below:

Storage:		Memeory			Ameunt:	20	
Date	Time	ID	Name	Sex	Age	Type	•
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead	
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead	
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead	
2011-01-14	17:14:14	20110114004	Amy	Female	61	Lead	
2011-01-14	17:54:15	20110114005	Lucv	Female	15	Lead	
2011-01-14	18:14:12	20110114006	Lilv	Female	12	Lead	
2011-01-14	16:14:15	20110114007	zhangsan	male	35	Lead	
2011-01-14	16:14:13	20110114008	lisi	male	45	Lead	
2011-01-14	16:14:15	20110114009	wanger	male	12	Lead	
2011-01-14	19:14:17	20110114010	huanghua	male	46	Lead	
2011-01-14	19:14:15	20110114011	lida	male	34	Lead	
2011-01-14	19:14:18	20110114012	zhongvang	male	70	Lead	
2011-01-14	19:14:15	20110114013	chenyang	male	45	Lead	
2011-01-14	19:14:16	20110114014	gugou	male	43	Lead	
2011-01-14	19:65:18	20110114015	didu	male	42	Lead	
2011-01-14	19:45:17	20110114016	dada	male	41	Lead	
2011-01-14	20:17:16	20110114017	anci	male	39	Lead	
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead	
2011-01-14	21:14:15	20110114019	livi	male	36	Lead	
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead	
]		
Select all	Delete	Search	Open	Uplload	Print	Exit	

Users can do the "select all", "delete", "search", "Open" "Upload", "Print" operation. (Darker background color for the currently selected operation). If you want to exit the data management interface, select the "Exit"

In the top of the data management interface, you can use the touch pen or rotate the shuttle to choose data storied location: memory, SD card or USB, for example, if you want to open the memory data, please select the "memory";

When the files stored in more than 20 (for a maximum of 20), you can use the right side scroll bar in the screen to moved up and down.

Turn the shuttle or using the touch pen to select "Open Wave", press the "Enter" button, you can browse the appropriate file, as shown below:



In this interface, you can choose the "upload", "Next," "print" "save" or "exit" of the operation. Detailed operations, please refer to the "standard 7-lead mode"

Delete File

Use the touch pen to select a data, and then select "Delete", it will appear an warning to confirm the removal of the prompt. Select "Yes", you can delete the selected file. If you delete this record, the later data storage will be stored in the deleted position. If you delete the record, this record will not recover, please exercise caution!

Storage:		Memeory	-		Amount:	20	
Date	Time	ID	Name	Sex	Age	Type	
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead	
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead	
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead	
2011-01-14	17:14:14	20110114004	Amy	Female	61	Lead	
2011-01-14	17:54:15	20110114005	Lucy	Female	15	Lead	
2011-01-14	18:14:12	20110114006	Lilv	Female	12	Lead	
2011-01-14	16:14:15	20110114007	zhangsan	male	35	Lead	
2011-01-14	16:14:13	20110114008	lisi	male	45	Lead	
2011-01-14	16:14:15	201101140		ок 🔀	12	Lead	
2011-01-14	19:14:17	201101140 🔥	Are you sure to car	cel 1 item?	46	Lead	
2011-01-14	19:14:15	201101140	Are you sure to cu		34	Lead	
2011-01-14	19:14:18	20110114012	zhongvang	male	70	Lead	
2011-01-14	19:14:15	20110114013	chenyang	male	45	Lead	
2011-01-14	19:14:16	20110114014	gugou	male	43	Lead	
2011-01-14	19:65:18	20110114015	didu	male	42	Lead	
2011-01-14	19:45:17	20110114016	dada	male	41	Lead	
2011-01-14	20:17:16	20110114017	anci	male	39	Lead	
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead	
2011-01-14	21:14:15	20110114019	livi	male	36	Lead	
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead	[
Select all	Delete	Search	Open	Uplload	Print	Exit	

Search File

Select "Search" option, press "Enter" button to enter into the file search interface; here you can use the ID, Name, and Date and Age s of four methods to find the required files.

Chapter 7 Animal Information and Data Administration

Storage:		Memeory		▼	Amount:	20	
Date	Time	ID	Name	Sex	Age	Туре	
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead	
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead	
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead	
2011-01-14	17:14:14	20110114004	Amy	Female	61	Lead	
2011-01-14	17:54:15	20110114005	Lucy	Female	15	Lead	
2011-01-14	18:14:12	20110114006	Lilv	Female	12	Lead	
2011-01-14	16:14:15	20110114007	zhangsan	male	35	Lead	
2011-01-14	16:14:13	Search			45	Lead	
2011-01-14	16:14:15	o o on on			12	Lead	
2011-01-14	19:14:17		ID	T	46	Lead	
2011-01-14	19:14:15	mode	ID Name		34	Lead	
2011-01-14	19:14:18	keyword	Time		70	Lead	
2011-01-14	19:14:15	_	Age		45	Lead	
2011-01-14	19:14:16	s	earch	Exit	43	Lead	
2011-01-14	19:65:18	20110114010		лате	42	Lead	
2011-01-14	19:45:17	20110114016	dada	male	41	Lead	
2011-01-14	20:17:16	20110114017	angi	male	39	Lead	
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead	
2011-01-14	21:14:15	20110114019	livi	male	36	Lead	
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead	

Name search

By the Name method, you can use the popped up soft keyboard to find the ID number, as shown below:

Storage:		Memeory		•	Amount:	20	
Date	Time	ID	Name	Sex	Age	Туре	
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead	
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead	
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead	
2011-01-14	17:14:14	20110114004	Amy	Female	61	Lead	
2011-01-14	17:54:15	20110114005	Lucv	Female	15	Lead	
2011-01-14	18:14:12	20110114006	Lilv	Female	12	Lead	
2011-01-14	16:14:15	20110114007	zhangsan	male	35	Lead	
2011-01-14	16:14:13	Search			45	Lead	
2011-01-14	16:14:15				12	Lead	
2011-01-14	19:14:17	Search	Name	-	46	Lead	
2011-01-14	19:14:15	mode			34	Lead	
2011-01-14	19:14:18		Lucy		70	Lead	
2011-01-14	19:14:15	Sign	Eng at	6 123	45	Lead	
2011-01-14	19:14:16	q w e	r t y u i	o p 👄	43	Lead	
2011-01-14	19:65:18	as d	fghj	k 1 🛥	42	Lead	
2011-01-14	19:45:17	20 , . z :	xcvbn	m	41	Lead	
2011-01-14	20:17:16	20110114017	anci	male	39	Lead	
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead	
2011-01-14	21:14:15	20110114019	livi	male	36	Lead	
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead	
Cala et a III	Dalat	- Commit	0		Print	Exit	
Select all	Delete	Search	Open	Uplload	Print	Exit	

The edit method please refer to Chapter 7.1; when the name is edit well, press "Enter "button, then rotate the shuttle moving the cursor to the "Search" option, then press "Enter" button again, the system will automatically find the appropriate file, if it found ,the list of files would be displayed, , or it said "not found."

Refer to the Name search operation when you want to search the files by the ID and Age.

Date search

When you search files by the date, move the cursor on the "Date" option, then press the -- 56-- Operation Manual for Electrocardiograph of ECG-8080

Storage:		Memeory	•		Amount:	20	
)ate	Time	ID	Name	Sex	Age	Type	
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead	
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead	
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead	
2011-01-14	17:14:14	20110114	arch			Lead	
2011-01-14	17:54:15	20110114				Lead	
2011-01-14	18:14:12	20110114	earch Time	Ŧ		Lead	
2011-01-14	16:14:15			0-15 💌 - 2010-1	0-15 💌	Lead	
2011-01-14	16:14:13	20110114				Lead	
2011-01-14	16:14:15	20110114	Search	Exit		Lead	
2011-01-14	19:14:17	20110114	bearen			Lead	
2011-01-14	19:14:15	20110114		1		Lead	
2011-01-14	19:14:18	20110114012	zhongvang	male	70	Lead	
2011-01-14	19:14:15	20110114013	chenyang	male	45	Lead	
2011-01-14	19:14:16	20110114014	gugou	male	43	Lead	
2011-01-14	19:65:18	20110114015	didu	male	42	Lead	
2011-01-14	19:45:17	20110114016	dada	male	41	Lead	
2011-01-14	20:17:16	20110114017	anci	male	39	Lead	
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead	
2011-01-14	21:14:15	20110114019	livi	male	36	Lead	
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead	
Select all	Delete	Search	Open	Uplload	Print	Exit	

"Enter" button, you can see the screen as follow.

When the Date is edit well, press "Enter" button, then rotate the shuttle moving the cursor to the "Search" option, then press "Enter" button again, the system will automatically find the appropriate file, if it found ,the list of files would be displayed, , or it said "not found."

Upload

Select "Upload" option, press "Enter" button to enter into the file upload interface, as shown below:

Chapter 7 Animal Information and Data Administration

Sterage:		Memeory		*	Amount:	20
Date	Time	ID	Name	Sex	Age	Type
2011-01-14	16:14:15	20110114001	Tina	Female	35	Lead
2011-01-14	16:15:16	20110114002	wendv	Female	15	Lead
2011-01-14	16:25:15	20110114003	Etta	Female	47	Lead
2011-01-14	17:14:14	20110114004	Any	Female	61	Lead
2011-01-14	17:54:15	2011011400	ips		15	Lead
2011-01-14	18:14:12	2011011400			12	Lead
2011-01-14	16:14:15	2011011400	Uploa	ding	35	Lead
2011-01-14	16:14:13	20110114008	Ca	nel	45	Lead
2011-01-14	16:14:15	20110114005			12	Lead
2011-01-14	19:14:17	20110114010	huanghua	male	46	Lead
2011-01-14	19:14:15	20110114011	lida	male	34	Lead
2011-01-14	19:14:18	20110114012	zhongvang	male	70	Lead
2011-01-14	19:14:15	20110114013	chenyang	male	45	Lead
2011-01-14	19:14:16	20110114014	gugou	male	43	Lead
2011-01-14	19:65:18	20110114015	didu	male	42	Lead
2011-01-14	19:45:17	20110114016	dada	male	41	Lead
2011-01-14	20:17:16	20110114017	anci	male	39	Lead
2011-01-14	20:14:15	20110114018	vivi	male	38	Lead
2011-01-14	21:14:15	20110114019	livi	male	36	Lead
2011-01-14	22:14:15	20110114020	hongbing	male	37	Lead
		· · · · · · · · · · · · · · · · · · ·				·
Select all	Delete	Search	Open	Uplicad	Print	Exit

If you want to see the detailed operations, please refer to Chapter7: 7.3 Data Transmission.

Print

Select "Print" option, if the printer is connected in the right circumstances, the selected data can be directly printed the ECG report.

Note:

If you want to exit the operation, please press the "EXIT" button to exit.

SD card plugging and unplugging

As the following picture, position the SD card to the slot and plug it into the slot with the front surface of card upward till the sound of "Ka" is heard which indicated that the SD card has been plugged into the slot correctly.



After data storage, remove the SD card by pressing the margin of SD card with the fingers and push it slightly inward, then the SD card will leave the slot automatically.

7.3 Data Transmission

This instrument can be connected onto the PC through the LAN port to upload file and process the ECG data.

Before using the function of upload, you must set down the "Local" and "Server" items in the "NET IP Address", and make the local and server address in the same sub-network segment. (e.g. local address: 192.168.001.xxx, server address: 192.168.001.xxx). You also need to make the server address in the instrument same to the IP address in the receiving computer. The instrument should be connected onto the PC through LAN port, and the software and driver for

ECG administration should be installed in the PC before using it. (Please refer to the instruction for ECG administration software for the detailed operation.)



As shown in the right side of the instrument's network interface to plug network cable, please use Category 5 UTP cable.

7.4 Barcode scanning

The instrument supports barcode scanning. Through the USB interface to connect the scanner with the ECG-8080 instrument correctly, scanning the existing animal ID number barcode, barcode corresponding to the animal ID number will be transmitted ECG instrument.



Note:

- When server address changed and correctly connected, if upload unsuccessfully, please reboot the instrument or the ECG administration software.
- The ECG administration software is optional for users to purchase, and if needed, please contact the post-sale department of our company for purchasing.

7.5 Wireless Setting

The instrument can also be connected to a computer through a wireless router (has ECG management software) for data uploading, editing the data for printing on the electrocardiogram, management, and diagnostics, local area network data transmission and sharing.

1. with a network label connecting wireless router to computer, such as: set the computer's IP address is 192.168.0.148 Mask: 255.255.255.0, gateway is set to: 192.168.0.1.



2. Open the ECG-8080 instrument, select the menu - network setting - server address, such as setting the server address is 192.168.0.148, the address of the machine automatically.

3. Connected with the USB wireless card, when the wireless network card light always lights,

or fast flashing, indicating that the wireless card is working.

4.. Running ECG management software in the computer, after entering the interface, it can receive data, select upload, the data will be transmitted to the ECG management software which in the computer's wirelessly.

Note :

The instrument and a wireless router can not be too far away, as several rooms (depending on the environment), when the wireless card light is off, or long flashes (4,5 seconds, flash once, regular blinking), indicating that the wireless network card is not working properly, please make sure:

1. Whether the router power is normal;

2. Whether the ECG-8080 is within range;

Solution:

Open the power of the route, making the effective range of ECG, or re-inserting the wireless Network card into the electrocardiogram instrument.

Chapter 8 Servicing and Maintenance

8.1 Charging, Capacity Displaying and Replacement of Battery

ECG-8080 built-in high-performance high-capacity rechargeable lithium battery (14.8V/4400mAh), full of power could be used for> 8 hours. The instruction for charging, capacity displaying and replacement of battery is given as follows:

1) Battery charging

ECG-8080 instrument should be offline charging. During the charging time, the battery required to remove, the machine is equipped with a special charger (charging specific steps see chapter IV). At least every three months, the battery should be charged and discharged for one time.

2) Battery capacity displaying

When using the battery as the power supply, a symbol indicating the battery capacity will be displayed in the top arrow on the LCD screen as the following picture after starting the instrument. This symbol can indicate the battery capacity in 3 different shapes. See the following picture for details.





: The battery charge is sufficient

: More than half the battery power consumption, selectable charge;

: Complete consumption battery faster, please charge

3) Battery replacement

The battery should be replaced by the servicing personnel and according to the following

procedures

(1) Shot down (press the on / off button for more than 1 second);

(2) According to the following prompt, press and hold the battery doors of the thumb on the push button to the direction of the arrow, while the index finger in the bottom of the instrument to pull out the arrow protruding Office, you can open the doors of the battery;

- (3) Unplug the battery plug and take out the batter
- (4) Replace the existing battery with a new one, Plug in the battery socket with attention to polarity and good connection;
- (5) Fix the battery compartment door.



Note:

- Do not connect the positive and negative electrodes of the battery directly of else it may cause the fire.
- Do not put the battery closely to the open fire or else it may cause the explosion.
- Unauthorized disassembly is not allowed.
- Handle the battery cautiously, and do not drop it on the floor at discretion or hit the other articles.

8.2 Instrument maintenance after using

The following maters should be given particular attention after using the ECG instrument: (1) Press the (ON/OFF) button on the control panel to set the instrument in the stand-by

status.

- (2) Hold the plug to pull off the power supply cable and the lead lines instead of holding the cable.
- (3) Clean up the instrument and accessories, then place the dust cover on it.
- (4) Keep the instrument in the dry and cool environment. Prevent it from intense shock when moving it.
- (5) Do not soak this instrument into the detergent when cleaning it. Please cut off the power supply first when cleaning the outer shell of the instrument. Please clean the instrument with the neutral detergent instead of using the detergent containing alcohol or using the sterilizer.

8.3 Inspection and maintenance of lead lines and electrodes

1 lease inspect the continuity condition of the lead lines regularly, since the damage of any one line among them will cause the false waveform of corresponding lead or the entire lead in the electrocardiogram. The lead lines can be cleaned with the water and soap as well as sterilized with 75% alcohol (do not soak the lead lines into the liquid for sterilization).

Note: The electric resistance of the lead line with the protective function of anti-defibrillation is $10K\Omega$ approximately.

Symbol for connector plug	R	L	F	RF	C1	C2	С3	C4	C5	C6
Position for plug and pin	9	10	11	14	12	1	2	3	4	5

Note: Users can select any one of C1-C6 for the V lead.

- 2. Bending the lead line in the sharp angle or knotting will decrease the service life of the lead line, thus please perform the electrodes connection after tidying the lead line as possible.
- 3. The electrodes should be stored well. After using for long term, the oxidation color change of the electrodes may occur due to corrosion and so on, and the electrocardiogram may be affected. If this happens, please replace the electrodes in time.

Chapter 9 Common Fault and Troubleshooting

9.1 Machine of Death

System software conflict caused by the instrument operator crashes occur, the screen display still, the operation button is invalid, please press (b) button for 3 seconds and release, it can force the shutdown, reboot the instrument back to normal. If this fault occurs frequently, please contact our service department or the designated service point of contact.

9.2 Malfunction of the silicon rubber buttons partially or entirely

It might be caused by the loosened-off connector for the silicon rubber button circuit board and the main control board. In this case, the top cover of this instrument should be opened to reconnect the connector of the silicon rubber button circuit board and the instrument main control board by the professional servicing personnel .In addition, please check if any stuck key appears because of aging, and if it is , it should be addressed. If the problem still exits after addressing by the above methods, please contact the service department of our company or the designated maintenance stations.

9.3 AC interference

Phenomenon: The regular interference with a certain degree of amplitude occurs during the electrocardiogram tracing, and the shake of the baseline can be observed obviously as the following electrocardiogram:



- (1) Is the grounding of the ECG instrument reliable?
- (2) Is the connection of electrodes and lead lines correct?

- (3) Are the electrodes and the skin coated with the electrodes cream?
- (4) Is the grounding of the metal bed reliable?
- (5) Does the animal contact the wall or the metal part of bed?
- (6) Does the patent contact the other animal?
- (7) Is there any high power electrical equipment working around this instrument such as the X-ray or the ultrasound device?
- (8) Does the animal wear any ornaments made of glass or jewel?

Note:

If the AC interference can still not eliminated after taking the above mentioned measures, the AC interference filter can be used for filtering the interference.

9.4 Myoelectric interference

Phenomenon: There is irregular shake in the recorded electrocardiogram waveform as the following picture:

This phenomenon may be caused by the following reasons, please check them one by one to eliminate it :

- (1) Is the examination room comfortable?
- (2) Is the animal nervous?
- (3) Is the bed too narrow?
- (4) Is the animal speaking during the recording?
- (5) Are the electrodes clips of the limbs too tight?

Note:

If the interference can still not be eliminated after taking the above mentioned measures, the myoeletric filter can be used for filtering the interference. When using this filter, there will be slight attenuation of the recorded electrocardiogram waveform, particularly for the R wave.

9.5 Baseline instability

Phenomenon: There is irregular up and down shift in the baseline of the recorded electrocardiogram waveform as the following picture:



This phenomenon can be leaded by the following reasons, and please check them one by one to eliminate it:

- (1) Are the electrodes connected well?
- (2) Is the connection of the lead lines and the electrodes well?
- (3) Are the electrodes and the skin of animal clean?
- (4) Are the electrodes and the skin of the animal coated with the electrodes cream?
- (5) Is the animal moving his or her body or breathing during the recording?
- (6) Are the new electrodes and the old electrodes used together?

Note:

If this phenomenon can still not be eliminated after checking the above mentioned reasons, the baseline drift filter can be used for filtering.

Appendix A Package and Accessories

A1. Accessories accompanying the instrument

The following items should be included in the intact package then the instrument is delivered from the factory:

Name	Unit
Instrument of animal ECG-8080	1 unit
Packing List	1 сору
Qualified Certificate	1 сору
Grounding Cable	1 piece
Power adapter	1 piece
Touch pen	1 piece
Power Cable	1 piece
Limb Electrode	4 pieces
Chest Electrode	1 piece
Operation Manual	1 сору
Paper shaft	1 piece
Animal cable	1 piece
Battery	1 piece

A2. Matters needs attention

- 1 Operating as the tips given on the package box when unpacking.
- 2 Please check the accessories and accompanying document according to the package checklist after unpacking before inspecting the instrument.
- 3 If the contained items do not accords with checklist or the instrument can not work normally after unpacking, please contacting the marketing department or the service department immediately.
- 4 Please use the accompanying accessories provided by out company, of else the performance and the safety of this instrument might be affected. Please consult the service department of our company first when using the accessories provided by the other companies.
- 5 For immediate service provided by our company, please fill out the maintenance warranty card in detail (the copy) and send it to our company.
- 6 The package box should be kept well for the regular inspection or maintenance for the instrument.

Appendix B Technical Specification

B.1 Specifications

1 Main unit

Lead:	Standard 12-lead		
Acquisition mode	Simultaneous 12-lead acquisition		
Recording format	Standard 7lead mode/transport mode		
Recording mode	Automatic	Record in appropriate format and automatic lead switch with measurement	
Measurement	Ventricular rate, PR interval, QRS time limit, QT/QTC interval,		
parameters:	P/QRS/T axis, RV5/SV1 amplitude and RV5+SV1 amplitude		
Filters	AC, drift and myoelectric filters		
Input CIR current	≤0.1µA		
Input impedance	>50MΩ		
Animal leak current	<10µA		
Time constant	≥3.2s		
Frequency response	0.05 Hz—150Hz		
Noise level	<15µV _{p-p}		
Sensitivity threshold:	≤20µV		
Sensitivity	Four levels as (2.5, 5, 10, 20) mm/mV		
Calibration voltage	1mV±3%		
Input circuit:	Floating circuit input		
Paper speed	Rhythm mode: rhythm recording time is set to 60 seconds, the		
	paper speed is 25mm / s, rhythm recording time is set to 120 seconds, the paper feed speed is 12.5mm / s. Paper speed is 25m / s under the other modes.		

1. others:

Lead lines	ECG-9801.F01.00
Display on LCD	The whole instrument work status, time, heart rate, and with the backlight
Safety Classification	GB 9706.1-2007 class II Type CF
AC	100V-240V, 50/60Hz, 40VA
DC	Rechargeable battery 19V-2200mAh

B.2 Dimensions and weight

Length × width × height	230mm×180mm×61mm
Weight:	About 2.5 kg

B.3 Environment requirements

1	Transportation				
	Environment temperature	-20℃—+55℃			
	Relative humidity	25%—95% (No condensation)			
	Air pressure	50KPa~106KPa			
	In accordance with the requirements stipulated in the contract order, the transport				
	process to prevent rain and sun.				
2	Storage				
	Environment temperature	-10°C −+40°C			
	Relative humidity:	25%—80%			
	Air pressure	50KPa—106KPa			
	The packaging of ECG stored in the non-corrosive gases and well-ventilated room.				
3	Using				
	Environment temperature	+5°C−+40°C			
	Relative humidity:	25%-95%			
	Air pressure	70KPa—106KPa			