ECG Viewer Manager

**User Manual** 

# **Introductions to User**

Dear Users,

Thank you very much for purchasing our Easy ECG Monitor series products. This manual is intended to assist the user in uploading ECG Data from Easy ECG Monitor to computer in a safe and effective manner. Please read this manual carefully before running the system, and follow it to operate.

The Manual is published in English and we have the ultimate right to explain the Manual. No part of this manual may be photocopied or modified without the prior written consent. We reserve the right to improve and amend it at any time without prior notice.

ECG Viewer Manager is application software running on a personal computer with Microsoft Windows operating system, so the user should be acquainted with some knowledge to operate computer.

Version of the Manual: Ver1.8

Issue date: July 22, 2019

ECG Viewer Manager Software version: V5.4.0.0 or higher

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The version of this user manual is applicable to the computer software "ECG Viewer Manager" with version V5.1.0.1 or higher which can be used to connect the "Easy ECG Monitor" device with version V4.0 or higher (for model PC-80B/Prince-180B), or version V1.2 or higher (for model PC-80D/Prince-180D).

#### **Information for Operation**

- > Please make sure the well connection of the data cable between computer and Easy ECG Monitor before uploading data, do not pull out the data cable arbitrarily during the data upload.
- > Data transmission may be interrupted during uploading the data in case of low battery voltage for Easy ECG monitor.
- > Do not do the key operation on Easy ECG Monitor during the data upload.
- > While installing printer driver on computer, please quit "ECG Viewer Manager" software firstly if it's running.

#### Notes:

> 1. Connect/Disconnect the data cable to Easy ECG Monitor gently and carefully, do not bring or shake the data cable plug with force to insert into or unplug from data interface port.

> 2. Before updating the software "ECG Viewer Manager", please uninstall the previous version if there is and manually delete all the files in the default installation folder ("C: \ECG Viewer Manager\") or your customized installation folder.

For example: "ECG Viewer Manager" is installed under the file folder of "C:\ECG Viewer Manager". At first, uninstall the "ECG Viewer Manager" software from "Control Panel  $\rightarrow$  Add/Uninstall Programs", and then manually delete the all files under the directory "C:\ECG Viewer Manager". Next, install the new version of "ECG Viewer Manager".

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# **1 Overview**

# **1.1 Features**

The waveforms and data saved in Easy ECG Monitor which have been uploaded to computer through ECG data cable can be archived and reviewed by ECG Viewer Manager. It is convenient for user to browse the stored data records, review the ECG waveforms and back up the uploaded data.

# **1.2 Operating Condition**

#### **Computer Hardware Requirement:**

Computer with Intel Pentium III CPU, 800MHz speed or higher; 256MB or higher memory; CD-ROM drive; at least 1GB space available in the hard disk to install "ECG Viewer Manager" software.

#### **Requirement for Operating System:**

Microsoft Windows XP, Windows 2000, Windows Vista, Windows 7 and Windows 10.

# 1.3 Procedure of Data Uploading

1. Install "ECG Viewer Manager" software and "USB Driver".

2. Set the resolution of screen display as "1280×768" pixel or higher.

3. Connecting the Easy ECG monitor to computer with the data cable provided. (As shown in the figure 2-8);

4. Double-click the icon "Control on desktop to start running "ECG Viewer Manager" Software and click " Control on the main menu screen to add a new user.

5. Click " 6" (button for data import) on the main menu screen to preview the ECG records to be uploaded,

select the record needed to upload, click the "**Read**" button to load the data into computer. After that the user can do further review and analysis on those records dumped into computer.

Notes: The software "ECG Viewer Manager" described in this manual supports wireless transmission function. More information about the operation refers to the following sections in detail.

# 2 Installation, Connection and Settings

# 2.1 Installation of ECG Viewer Manager

Insert the CD-ROM which contains the installation software into CD-ROM drive, the software installation will be automatically running or directly running the program "setup.exe" in the root directory of CD-ROM drive, then the window

of "ECG Viewer Manager Setup" will be prompted on the screen as shown in Figure 2-1A.

**Note:** This ECG Viewer Manager is applicable to the device "Easy ECG Monitor" with model of PC-80B, Prince 180B with hardware version is V4.0 or higher, and PC-80D, Prince 180D with hardware version is V1.2 or higher.

(Checking the hardware version of the device: power on the device and enter into main menu $\rightarrow$ " Setting" $\rightarrow$ "Version")



Figure 2-1A ECG Viewer Manager Setup Screen

On "ECG Viewer Manager Setup" screen, unlike the previous version, it's unnecessary to select the display language because the installing program will use the language same as the current operating system language to complete the installation (Note: Only three languages English, Simplified Chinese and Traditional Chinese are supported currently). The initializing screen is as shown in figure 2.1B.



Figure 2-1B ECG Viewer Manager Setup Screen

According to the prompts of installation of ECG Viewer Manager to operation, as shown in figure 2-2-figure 2-6;



Figure 2-2



Figure 2-3

Ready to Install the Program The wizard is ready to begin inst	allation.	
	Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit th wizard.	ie
InstallShield	< <u>B</u> ack [Install] Cancel	

Figure 2-4

Ecg Viewer ∎anager – Inst	allShield Tizard	×
Setup Status		
	Ecg Viewer Manager is configuring your new software installation.	
	Installing C: \Ecg Viewer Manager\ECGDM.exe	
InstallShield	Can	ce

Figure 2-5

Ecg Viewer Banager - Insta	ullShield Tizard
	InstallShield Wizard Complete
	The InstallShield Wizard has successfully installed Ecg Viewer Manager. Click Finish to exit the wizard.
InstallShield	< Back Finish Cancel

Figure 2-6

**Note:** If "Complete" (default) installation is selected, the installed program files will be located in the disk path "C: \ECG Viewer Manager". If user doesn't want to use default installation, please select "Custom" and click "Next" to choose the root directory for locating the program files as shown in Figure 2-3.

# 2.2 Display Setting for Computer

## 1. Setting Display Properties

On desktop screen of Windows operating system, click the right button of the mouse, it will bring up a quick menu, then move the cursor to select "Properties". Choose "Settings" on the "Display Properties" window, then set the "Screen resolution" option as "1280 by 768 pixels", and set the "Color quality" option as 16bit or higher, as shown in Figure 2-7.

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Plug and Play Monitor Screen resolution Less 1024 by 768	More	Color qua Highest (	ity 32 bit) ot Adva	<b>▼</b> anced

Figure 2-7 Display Properties Setup

# 2.3 Device Connection

After "ECG Viewer Manager" software is installed, refer to Figure 2-11 to perform cable connection:



Figure 2-8A Connection with PC-80B/Prince-180B



Figure 2-8B Connection with PC-80D/Prince-180D

**Note**: connect the device at first time, the system prompts that "Found New Hardware Your new hardware is installed and ready to use." on the right side of task bar, as shown in Figure 2-12, it means that USB Driver is installed successfully.



Figure 2-9

# 2.4 Easy ECG Monitor Setting

Please power on the Easy ECG Monitor before uploading data.

# **3** Operations

# 3.1 Main Menu



Double-click the icon "Freener" of "ECG Viewer Manager" on the desktop with the Mouse, then ECG Viewer Manager will run automatically and the main menu screen pops up on the desktop, as shown in Figure 3-1.



Figure 3-1 Main Menu Screen

#### Description of menu bar:

ECG Device	User Info	ECG Record	Config	Help
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#### **♦Menu items**

Menu name	Pull-down menu	Function description
	Import device data	Directly upload the data to computer from the device through provided USB data cable.
ECG Device	Wireless data	Upload or transmit the data to computer by wireless.
	Exit	Exit the manager system
User info	User record	Create a new user archive, delete or modify user archive
	Delete ECG info	For deleting the ECG records
ECC record	Print	Print the ECG records, statistical result and irregular rhythm
ECG record		event plot.
	Print all ECG	Print all ECG waveforms
	System configuration	Set the system date format and language
Config.	Event setup	Set the condition for triggering PE and SE

	Online update	Update the software to the latest version
	User Manual	Click it to read the User Manual for this ECG Viewer
Help		Manager
	About system	Display the ECG Viewer Manager version, the disk space
		information and so on.

#### **♦** Menu operations:

Select the functional buttons from the pull-down menu to enter the corresponding operation screen.

#### **Description of tool bar:**

No Ta	<b></b>	Fig.	2	<u>\$</u>	4	Ē?	ę	3	🗁 Wireless Enabled
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♦ The Tool bar contains shortcuts for menu selection, the user can operate from the menu bar or shortcut keys for quick operation. Click "Exit" to exit the manager system.

## **3.2 User Archive Management**

On user archive management screen, the operations: adding new user ID, modifying, finding and deleting archive can be performed. On the left of screen is the list of user name.

#### 3.2.1 Create New User

Click the submenu "User record" in the pull-down menu of the "User info" button, or click the Tool bar icon " <sup>4</sup>/<sub>4</sub>", and then the window appears on the desktop, as shown in the figure 3-2.

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	Name :			Sex:	•	07/19/201	914:37:09	1 S	lhort Time	Enhan	В	8	0 No irregular rhyt	III
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	Age :	Blood Type :	<b>•</b>	Phone No. :		07/19/201	9 13:47:54	1 S	hort Time	Norma	1 B		0 Poor Signal	
	Height :	cm Weight	ka			07/19/201	913:46:54	1 S	hort Time	Norma	1 B	7	9 Waveform base	
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						01710/201	0 10.11.00			erman	P		- caspected meg	*
													*	att

Figure 3-2 Create a new user

#### **Screen Description:**

**Name:** User name; display or enter user name; length of name is less than 30 bytes or 15 characters.

**♦ ID:** Identification number; display or enter ID number; length of ID is less than 30 bytes.

**♦ Sex:** Choose Male/Female in submenu "▼"

**♦Age:** display or enter user's age. Please enter Arabic numerals.

 $\diamond$  Blood type: Display or enter user's blood type in the submenu " $\checkmark$ ", you can also enter manually.

**Telephone:** Display or enter User's telephone number.

**Height:** User's height; display or enter user's height. Please enter Arabic numerals.

**Weight:** User's weight; display or enter user's weight. Please enter Arabic numerals.

♦ Remark: Display or enter the contents of the note; the length of the contents is less than 160 bytes or 80 characters.
Functional button:

New: create new patient account; if user needs to add a new account, please click this button and then fill the blank line with the patient's detailed data in blank.

**♦ Delete:** delete the selected file in archive list.

 $\diamond$ **OK:** confirm and save the new file or modification about patient's information.

**♦ Exit:** Exit from Patient Record screen.

#### Notes:

<sup>①</sup> Patient ID and Name can not be modified for the existed patient account.

② If the selected patient account is deleted, all data records bond to it will be deleted and can not be recovered.

③ Enter into the patient's weight and height, and click "OK" button, then the corresponding BMI will be displayed on the patient account.

#### 3.2.2 Modify the User Info

After enter the information of the selected user, click the "OK" button. The user name list is on the upper side of window, the detail of User Info and ECG Info is on the lower side of window, as shown in figure 3-3, in this screen, you can modify the user information, finally click the "OK" buttons.



**Note:** ID and name cannot be modified.

Figure 3-3 User info

### 3.2.3 Search User

On the upper right corner of the User Record screen, select "Name" or "ID" to search user archive, and enter the key word on the input field, then the searching result will be displayed on the left of the screen.

The user can type a character, number or word on input field to search user archive. If no key word is typed in the searching field, then all user archive will be displayed.

After entering the searching condition, if the user archive exists, then it will be displayed on the left of the screen. Otherwise, no list will be displayed.

♦ List all: click it to list all user archives.

☆ Export: click it to export the user information list to a data file, the file name will be ""xxx.csv" which can be opened by software "Excel".

## **3.3 Device Management**

#### **3.3.1 Read Device Data**

Ensure correct connection between the device and computer via USB data cable, select the ECG records you want to upload from the user name list, click the submenu "Read device data" in the pull-down menu of the "ECG device" or click the Tool

Search the device automatically			
	Ok	🗙 Cancel	
F	Figure	3.4	1
	Searching E(	CG data	

bar icon "<sup>6</sup>", then a window appears on the desktop, as shown in the figure 3-4.

Figure 3.5

 $\bigcirc$  On figure 3.4, the user can select "Search the device automatically", then the software will search the connected device automatically, the searching screen is as shown in figure 3.7.

Notes: The scanning time of for ECG device will be different from the data storage and computer speed. Please wait for a moment! If ECG device has not been searched in 2 or 5 minutes, then the system will exit from data importing.

<sup>(2)</sup> The user can also read data via uploading it from device, that's to say, unselect "Search the device automatically", and click "OK" to find the nominated root directory. Double click this disk name, you will find there four file folders and one text file: ECG0, ECG1, ECG2, ECG3 and README.TXT", as shown in figure 3.6. Click "README.txt" and click "OK"

button, the system will enter into searching data screen (as shown in figure 3.6), and then enter into screen as shown in figure 3.7.

The data stored in the device can be copied to computer directly. After uploading, the data memory can be cleared at device side, meanwhile, the user can use software "ECG Viewer Manager" to review and analyze the imported data records while the device isn't connected to computer.

Note: if the connected device is PC-80B/Prince-180B, then the disk volume is "EASY ECG", and if the connected device is

PC-80D/Prince-180D, then the disk volume is "Movable disk".



button to load the data into computer. After

On figure 3-7, select the records needed to upload, click the that the user can review the records in the user name list.

00         00:04:46         1           19         16:08:16         1           19         15:10:14         1           19         15:12:16         1           19         15:12:26         1           19         13:18:25         1           19         13:35:06         1           19         13:35:05         1           19         14:19:35         1           19         11:28:52         1           19         11:13:33         1           19         11:39:55         1           19         11:39:55         1           19         11:47:01         1		Short Time Short Time Short Time Short Time Short Time Short Time Short Time Short Time	B B B B B B B B B	83 71 75 83 0 85 83	Suspected short beat interval Waveform baseline wander No irregular rhythm found Suspected irregular beat interval with baseline wander Poor Signal Waveform baseline wander Suspected irregular beat interval
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19 11:39:55 1 19 11:47:01 1		Short Time	В	74	No irregular rhythm found
19 11:47:01 1		Short Time	B	73	No irregular rhythm found
		Short Time	В	0	Poor Signal
19 11:58:16 1		Short Time	В	59	Waveform baseline wander
19 13:26:59 1		Short Time	В	75	No irregular rhythm found
19 14:05:43 1		Short Time	В	0	Poor Signal
19 14:07:28 1 👘		Short Time	В	73	Waveform baseline wander
19 14:10:12 1 🔰 🎽	Select	Short Time	В	74	No irregular rhythm found
19 14:15:35 1 🛛 🖄	Unselect	Short Time	В	78	No irregular rhythm found
19 14:49:16 1		Short Time	В	76	Waveform baseline wander
19 14:58:54 1		Short Time	В	0	Poor Signal
19 15:17:02 1		Short Time	В	0	Poor Signal
19 15:17:53 1		Short Time	В	72	Suspected irregular beat interval
19 15:18:43 1		Short Time	В	0	Poor Signal
19 15:19:42 1		Short Time	В	45	Suspected slow beat with baseline wander
19 15:20:47 1		Short Time	В	0	Poor Signal
19 13:43:39 1		Short Time	В	79	Suspected irregular beat interval with baseline wander
19 13:46:54 1		Short Time	В	79	Waveform baseline wander
	019 14/05/43 1 019 14/07/28 1 019 14:10:12 1 019 14:15:35 1 019 14:58:54 1 019 15:17:02 1 019 15:17:53 1 019 15:18:43 1 019 15:18:42 1 019 15:20:47 1 019 13:43:39 1 019 13:46:54 1 I key to multiselect. Ri	019       14:05:43       1         019       14:10:12       Image: Constraint of the second secon	019       14/07/28       1       Short Time         019       14/07/28       1       Short Time         019       14/10:12       1       Short Time         019       15/17/02       1       Short Time         019       15/17/02       1       Short Time         019       15/18/43       1       Short Time         019       15/18/42       1       Short Time         019       15/19/42       1       Short Time         019       15/20:47       1       Short Time         019       13/40:54       1       Short Time         019       13/40:54       1       Short Time         1       key to multiselect.       Right Click to Select or Uns	019       14/05/43       1       Short Time       B         019       14/07/28       1       Select       Short Time       B         019       14/10/12       1       Select       Short Time       B         019       14/10/28       1       Short Time       B         019       14/10/28       1       Short Time       B         019       14/10/28       1       Short Time       B         019       14/15/35       1       Short Time       B         019       15/17/02       1       Short Time       B         019       15/17/53       1       Short Time       B         019       15/18/42       1       Short Time       B         019       15/18/42       1       Short Time       B         019       15/19/42       1       Short Time       B         019       15/19/42       1       Short Time       B         019       15/19/42       1       Short Time       B         019       13/43/39       1       Short Time       B         019       13/46/54       1       Short Time       B         1       k	O19       14/07/28       O19         O19       14/07/28       O19         O19       14/07/28       Select         O19       14/10:12       Select         O19       14/10:12       Unselect       Short Time       B       73         O19       14/10:12       Unselect       Short Time       B       74         O19       14/10:12       Unselect       Short Time       B       74         O19       14/10:12       Unselect       Short Time       B       74         O19       14/10:12       Unselect       Short Time       B       76         O19       15/17:02       Short Time       B       0       0         O19       15/17:02       Short Time       B       0         O19       15/17:42       Short Time       B       0         O19       15/18:43       Short Time       B       0         O19       15/19:42       Short Time       B       0         O19       15/19:42       Short Time       B       73         O19       13:43:39       Short Time       B       79         I key to multiselect.       Right Click to Select or Unselect.

Figure 3.7 Extract the summary of data records within device



Figure 3.8 The prompt after reading data records

If you want to upload data for another user account, you can change user first and then perform data uploading as with the following steps. Step1: click on "Change User" "icon, an edit box pops up on the screen, as shown in figure 3.9, then you can select the user in user information list (if there is no the user you want, then you can create a new user account in figure

3.9.), click on "X" icon to close the current window. Step 2: go back to window shown in figure 3.7, select the data you

want to upload, then click on "Read" icon to read data. The user can perform data uploading (step 2) firstly, and change user (step 1) later.

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										2	ч.	
(11)					10- 10-					• [-		
-User Info					84			Meas	ureme	nt Record		
10. <b>[12</b> ]					Time		30 sec	Mode	Filter	Realtii Devici	SpO2 HR	Result
Name : June			Sex: F	•	07/19/2019	14:37:09	1	Short Time	Enhan	В	80	l No irregular rhyt≡
					07/19/2019	13:50:21	1	Short Time	Norme	1 B	77	Waveform base
Age :  33	Blood Type : B		Phone No. :  1958	745323	07/19/2019	13:47:54	1	Short Time	Norme	1 B	(	Poor Signal
Height 165	cm Weight: 65 kc	BML= 23.9			07/19/2019	313:46:54	1	Short Time	Norme	1 B	79	Waveform base
neight.[105	cin Weight: po	1 Divil 23.3			07/17/2019	9 15:19:08	14	Continuous	Enhan	1 B		
Remarks :					07/17/2019	9 15:09:38	7	Continuous	Enhan	1 B		
					0//17/2019	14:22:00	9	Continuous	Enhan	1 B		
1					07/17/2019	114:16:06	2	Continuous	Enhan	1 B		
			2		07/16/2019	115:20:47	1	Short Lime	Enhan	В	l	Poor Signal
	S New X Delete	🧹 ок		Exit	07/16/2019	9 15:19:42	1	Short Lime	Enhan	В	45	Suspected slow
					07/16/2019	9 15:18:43	1	Short Lime	Enhan	В	l 	Poor Signal
					07/16/2019	115:17:53	1	Snort Lime	⊏nhan	В	12	Suspected irreg +
					•							N 13



## 3.3.2 Wireless Reception

If real time data transmission by wireless is used, please set the "Wireless" function to "On" in the "Easy ECG Monitor", then "to icon and message "Found New Hardware. Your new hardware is installed and ready to use" will prompt on the lower right of the computer(as shown in Figure 3-10), which indicates that the wireless device is found and being connected to the computer. The icon " reminds the user of a successful connection, and the gray icon " and " Wireless Enabled" will change into " Tut" and " Wireless Enabled".

Note 1: If the computer is not bluetooth enabled, you need to install a bluetooth module (normally a bluetooth dongle with USB interface) to your computer and install the necessary driver before using its bluetooth data transmission function.



#### Figure 3-10

Note 2: When message "Allow the device connecting" and "Found new hardware"appear, no user intervention needs to be done for wireless connection, because the wireless device will be searched and matched automatically. Note 3: if the icons " and " Wireless Enabled " fail to turn to " Tut" and " Wireless Enabled ", it means the ECG Viewer Manager can not perform wireless transmission, in this case, the user should re-open this software, and the software will

### reconnect the wireless transmission function automatically.

3.3.2.1. Real-time wireless transmission

When the device is in continuous measurement mode, after click the icon " $\mathbf{T}_{it}$ " or " $\mathbf{T}_{it}$ " wireless Enabled", the screen of real-time wireless reception displays on the interface, meanwhile, it displays the real-time ECG waveform (As shown in Figure 3-11). The real-time ECG waveform will be saved in a new record every 30 seconds, and the data record will be displayed on the left lower list, if you select one piece of the record on the left lower list, you can also view the snapshot of this record on the right lower column (as shown in Figure 3-11).



Figure 3-12 Display screen during measurement (short period ECG record)

User manual for ECG Viewer Manager



Figure 3-12 Display screen during measurement (long period ECG record)

## 3.3.2.2 Non-real-time wireless uploading

When the ECG monitor is under "Review"  $\rightarrow$  "Measurement result" status, press the " $\blacksquare$  OK" button, the device will display "Sending......" Click the icon " $T_{al}$ " or " $\Box$  Wireless Enabled" on PC side, the non-real-time wireless reception screen appears on the interface with a display of "user (sb) is receiving the wireless data" as shown in Figure 3-13. The appearance of Figure 3-14 means the data record has been received and saved in computer successfully. The user can review it later in the user name list.

NOTE: 1.After the device is switched off, the window "Receiving wireless data..." should be closed, or the next operation of non-real-time wireless transmission cannot be performed.

2. If the Bluetooth driver is damaged or the simplified GOHOST Bluetooth driver is being used, it may result in inoperable wireless reception.

3. Click Vireless Enabled to search the serial port of real-time ECG data.











### 3.3.3 Backup, Restore and Delete the ECG Records

Select the corresponding user account in the user name list and click the " ECG Info " icon to review the ECG record list, you can delete the selected records, backup multipile data records to a single data file and restore a given data file as shown in Figure 3-15.

Specify the file folder to be backed up on the left side, click the "ECG Backup" to back up the selected records to the corresponding file folder within the computer. The name of the backed file including device model, user

ID, recording time, the pieces of 30-second, data type (SpO<sub>2</sub> data or real-time data), and lead type.

- For example: devB\_123\_20190717\_151908\_14\_R.ESK
  - ♦ devB: it means the records is from device PC-80B/Prince-180B;
  - $\diamond$  123: the user ID;
  - $20190717_{151908}$ : the recording time;
  - $\diamond$  14: it means the record contains ECG waveform with length of 14 \* 30 seconds;
  - $\diamond$  R: it is a real-time record;
  - ♦ ESK: it means the ECG record via single lead (built-in metal electrode) measurement;
  - ♦ EMK: it means the ECG record via limb lead (external lead wire) measurement.
- Click " Delete " to delete the selected record(s).
- Select data file in the backup file list, click the "Restore ECG" to restore that data file into the current user account.

> The user can right click the mouse to "Select", "Unselect" or "Delete" the selected records.

L. ECG Viewer Manager ( V5.4.0.0 )							
ECG Device User Info ECG Reco	ord Config Help						
🥵 T <sub>ul</sub> 🕵 🐘 🥭 🗐	k   @ 🔟 🔋   💹	🕅 Wireless E	Inabled				
E-6 [123] June	- 🖸 User Info 🔍 ECG Info						
	No. Time	Mode Filter	RealTime [	Device Version	n SpO2 HR	Result	<b></b>
E 22 [133] III	17 07/15/2019 11:28:52 1	Short Time Normal	E	В	0	Poor Signal	
	16 07/13/2019 14:19:35 1	Short Time Normal	E	В	82	No irregular rhythm found	
	15 07/13/2019 13:35:06 1	Short Time Normal	E	В	83	Suspected irregular beat interval	
	14 07/13/2019 13:19:39 1	Short Time Normal	E	B	85	Waveform baseline wander	
	13 07/13/2019 13:18:25 1	Short Time Normal	E		0	Poor Signal	
	12 07/13/2019 11:53:26 1	Short Time Normal	E		83	Suspected irregular beat interval with baseline wander	
	11 07/09/2019 16:10:14 1	Short Time Normal			75	No irregular rhythm found	
	10 07/09/2019 16:08:16 1	Short Time Normal		B	71	Waveform baseline wander	
	85 07/26/2018 16:51:06 24	Limb lead		0 31.0.0	)		
	84 07/26/2018 16:25:30 4	Limb lead		D 3.1.0.0			
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	Press Shift or Ctri key to multisele	ct. Right Click to select or i	Record Col	Int : 89			
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ECG Info	Select ECG Backup file:	devB_123_2		Restore ECG			
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Figure 3-15 ECG data records mainpulation

# 3.4 Review ECG Waveforms and Statistical Result, Plot Trend Graphs for Irregular Heart Beats

Select the ECG record you want to review in user name list on the left of main menu, and then you can not only review this record in detail, but also enter some remarks and store them. On the left of main menu is user name list and the detail of ECG record information. The information such as ECG waveform record, all ECG waveforms, statistical result, irregular rhythm heart beats, trend graphs for  $SpO_2$  & PR and zoom of QRS complex etc. is displayed on the right of the main menu. Notes:

1. In ECG record list,

- $\diamond$  " $\mathbb{B}$ " in front of each ECG record means it is a short period ECG record;
- ☆ "B" means the record(s) is from device model PC-80B/Prince-180B;

- ↔ "Ф" means ECG record via external leadwire measurement (3 channels);
- $\diamond$  "D" means the record(s) is from device model PC-80D/Prince-180D;
- ☆ The record name with suffixing letter "S" means the record includes SpO2 data, and suffix "R" means it's real-time record. The number suffixed to each record name means the total quantity of 30s-piece of ECG waveform that the given record contains. For example, "3B 2018/01/06 23:15:02 1194" means this record contains ECG waveform with length of 1194 \* 30 seconds.

2. For the short measurement/single lead measurement ECG record and real-time ECG record, only "ECG Wave" and "All ECG Wave" can be review. While for the long period (non real-time) ECG record, "ECG Wave", "All ECG Wave", "ECG Analysis", "Irregular Rhythm Trend" and "SpO<sub>2</sub> and PR Trend" can be reviewed. The dash box on the waveform interlinks with the other tabs. (Only for the device with SpO<sub>2</sub> measuring function, like PC-80D/Prince-180D, "SpO<sub>2</sub> and PR Trend" can be reviewed).

## 3.4.1 ECG Waveform Review (Page by Page)

Click the icon "ECG Wave," to view the ECG waveform as shown in Figure 3-16

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Figure 3-17 the ECG Waveform Screen---with R wave marked

According to different measurement modes, there are two display modes for ECG waveform record: Quick measurement by built-in electrodes and continuous measurement by lead wire. Corresponding specifications are as follows:

area.

(2) Mark all R wave : for the continuous records uploaded from device, click it to select or unselect to mark all R wave. The R wave (QRS complex) list will be displayed on the right lower corner of the screen if the QRS complex is detected.

(3) Click any point within the ECG waveform area, a dashed box will display on waveform area, and the zoomed signal within this box will show on the waveform zooming area. Right click this dashed box, the waveform within it can be fixedly displayed on a new movable window. The doctor or professionals can observe the detail of the ECG waveform by moving the dashed box.



The heart rate value will be displayed for the records of continuous measurement;

HR: the average heart rate value of ECG waveform in waveform zooming area.

Irregular Rhythm List: the type of irregular rhythm of ECG waveform in waveform zooming area.

If the waveform on this dashed box is identified with any irregularity, Irregular Rhythm List will show the type of irregularity. The segment of irregular ECG waveform will be displayed in striking red and marked by an upside-down triangle above it. If you want to cancel this mark, click the button "Cancel", then a dialog box pops up on the screen and reminds you that "Are you sure to cancel the irregular rhythm mark?", finally, click the "OK" button to cancel this mark and corresponding event. After that a normal triangle will be shown beside the upside-down triangle, and the statistical result and irregular rhythm event plot will skip this event. If you want to re-mark the canceled irregular rhythm event, click the "Cancel" button, then a dialog box pops up on the screen and reminds you that "Are you sure to restore this irregular rhythm mark?", finally, click the "OK" button to remark this event. After that the normal triangle will disappear, and this irregular rhythm event will be taken into account in the statistical result and irregular rhythm event plot again.

If the waveform is normal, only the heart rate value will be shown and the display area of Irregular Rhythm List is blank.

④ Enter remarks on the remark area, click "update" to save.

(5) On the lower left corner of the ECG info screen displays the record time, period, measurement mode, filter mode and device type. (No HR calculation and measurement interpretation during real-time wireless ECG data transmission)

(6) Below the ECG waveform record screen, display the record time, average HR value, total pages and the current page

## 3.4.2 ECG Waveforms Review (Record by Record)

Click the icon " All ECG Wave" to browse all signal waveforms for this ECG record as shown in figure 3-18. Each page contains 15 segments of ECG waveform. If there are more than 15 segments for display, you can review other segments on the next page by moving the slider " 1 •••• 8 " to turn the page up and down. The number "1" on this bar indicates the first page, and the "8" is the number of total pages. Double click any segment of ECG waveform on this screen to return to its corresponding ECG waveform screen for a particular review.

L. ECG Viewer Manager ( V5.4.0.0 )														-				-				×
ECG Device User Info ECG Record	9 (	Config	Help																			
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User Info		CG ) (ava		3 Wave		Analusia	l làs Inc	aular Ph	uthm Trop	al.				1 🖬	1			0				
	- C	cu mare			in cca	Andiysis	<u></u> ine	syulai m	iya ini mer	iu l		v		1 _				0				
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<b>18</b> 07/13/2019 13:18:25 1												~										
	• 1	I-tr	-tr	tr	hr	tr	-tr	-dr	ahr	de	-dr-	-da	-tr	-tr-	-tr	the	-lr-	-tr-	the	-dr	dr_	
10 07/09/2019 16:10:14 1 10 07/09/2019 16:09:16 1																						
40 07/26/2018 16:51:06 24	• 1	1				4.				4.						1.	Num		4.			
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40 07/24/2018 09:38:07 5	2									v												
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an 07/02/2010 14:05:16 26	2																					
· · · ·	4	l_u	-th-th	Arch	Andr	when	where	And	whent	uland	retride	Andr	when	hala	retrain	Andreh	Andreh	Andr	Andr	Andr	Andr	
ECG Info																						
[123] June *	4	1 dr	hah	Andr	Andr	Arda	shade	unt	utral	utral	ritriti	Andr	whent	when	rdada	And	And	Ard	And	alash	Anth	
Record Time: 07/24/2018 09:42:39 Period: 18 m 30 s																						
Mode: Limb lead	4	I	- to - to	4- 10	10.00	1-1-	-h-n -h-n		un an		<u> </u>	<b></b>		- <b>4</b>	- <del>4</del> .	4. 4.	4	+- +0			<u> </u>	
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Source Device: PC-80D / Prince																						
180D	5	الملم	Indrah	Andr	Andr	Inde	Inde	Ard	hal	whent	rdril	And	und	adrah	alada	And	whent	Anda	Ander	ulado	alsals	
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								_														

Figure 3-18 View All ECG Waveforms for One Record

### 3.4.3 Statistical Result

The statistical result is for ECG records which are uploaded by the method of non-real-time wireless reception and measured

by mode of continuous measurement. Click the icon " ECG Analysis ", to get the statistical result for this ECG record as shown in Figure 3-19.

In the statistical result screen, you can not only browse the HR trend graph and the irregular rhythm event list, but also read the maximal, minimal and average heart rate value which is displayed within the time in current trend graph.

Move the blue line to browse the HR value measured in different time. The number "87" is the current HR value. Right click the mouse at this time to shift the screen to the corresponding ECG waveform screen. Click the pull-down button of "Scale" to select the time scale of horizontal coordinate, or click " " " " button to zoom in/zoom out the statistical trend graph, move the slide " " or click " " " " " to turn the page up and down so as to view the HR trend graph. The irregular rbuthm event and whether the listed events event a pot

The irregular rhythm event list displays all irregular rhythm events and whether the listed events occur or not.

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Figure 3-19 View Statistical Result

### 3.4.4 Irregular Rhythm Event Plot

Irregular Rhythm Trend function is available if the waveform records are received by continuous measurement method via non-real-time wireless transmission. Click the icon "Irregular Rhythm Trend", to enter the irregular rhythm event plot screen where the distribution and types of irregular rhythm event can be reviewed as shown in Figure 3-20. Move the blue line to browse the irregular rhythm event occurring in different time, "Type No: 14" in the screen indicates the irregular rhythm type "Suspected short beat interval with baseline wander" which is displayed with yellow background in the list. Right click any point in the event plot at this time, the screen will be shifted to ECG waveform screen whose measuring time is corresponded with that the blue line pointed. Meanwhile, click the pull-down button of "Scale" to select the time scale of horizontal coordinate, or click "'''"" " button to zoom in/zoom out the trend graph, move the slide "

down so as to view the HR trend graph.

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Figure 3-20 Irregular Rhythm Trend Graph Screen

## 3.4.5 SpO2 and PR Trend Graph

If the device has the optional accessory to measure  $SpO_2$  and the  $SpO_2$  data has been uploaded to the PC, the user can review the trend graph of  $SpO_2$  and pulse rate as well as detailed information of  $SpO_2$  event and pulse rate event in the screen shown in figure 3-21A.

In the SpO<sub>2</sub> and PR trend graph screen, the value of SpO<sub>2</sub> and pulse rate measured in different time can be viewed by moving the blue line. The number "97" in the screen shows the current value of SpO<sub>2</sub>, and the "84" is the current value of pulse rate. Meanwhile, the user can click the pull-down button of "Scale" to select the time scale of horizontal coordinate, move the slide " The maximal" to turn the page up and down so as to view the SpO<sub>2</sub> and PR trend graph. Besides, some information such as the maximal, minimal and average value of SpO<sub>2</sub> and pulse rate, the occurring times of SpO<sub>2</sub> event and pulse rate event and so on, can be displayed in this screen.

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If the SpO<sub>2</sub> Event occurred, the icon "Desaturation Report" would be activated. Click this icon to preview the oxygen desaturation report as shown in figure 3.24.

In SpO<sub>2</sub> and PR trend graph screen, click icon "<sup>2</sup>", then the report option pops up on the screen, as shown in following figure .

-Report Opti	on	
⊙ SpO2 ar	ıd PR Trend Report	
C Desatura	ation Report	

♦ Preview all: click "Preview all" button to preview all reports, as shown in figure 3.22.

♦ Preview: click "Preview" button to preview the SpO<sub>2</sub> and PR Trend Report (figure 3.23) and Desaturation Report (figure 3.24).

 $\diamond$  Quit: exit from report option screen.



Figure 3.22 Preview all

ID No.: 123			Sex: F	Age: 33	BMI = 23.9		
me : June			Print Out Time	e: 07/26/2019 10:33:1	17		
Start at: 07/04/2018 14	4:29:46	End at: 07	7/04/2018 15:03:16	Duration: Analyzed:	0 00:33:30 0 00:18:56		
100 95 90 85 80 75 70							
200 150 100		~~]		~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
14:32:30 14:35:51	14:39:12 14:	42:33 14:45:54	14:49:15 14:52:36	14:55:57 14:59:	18 15:02:39		
SE: Drop in SpO2 by at least 3 PE: Change in rate by at least SpO2 Max:98	3 % for a minimum 3 bpm for a minimu PR	duration of 1 seco um duration of 1 s Max : 93	onds seconds	ODI : 3.17			
SpO2 Min : 93 PR Min : 74			SE Count : 1				
SpO2 Average : 97	rage : 84	PE Count: 20					
SpO2< 8§ emarks:	9 Time(%): 0.00			SpO2< 89 Event: 0			

Figure 3.23 SpO<sub>2</sub> and PR Trend Report

29:46	End at: 07/04 Sa ntion On 0:06 96	Pri 4/2018 15:0 aturation: set Lov 5 93	int Out Time: 03:16 N Doc	07/23/2019 Pulse R Low 90	9 13:12:28 Duration: 0 Analyzed: 0 ange: High 91	00:33:30 00:18:56
29:46 Ind time Dura 14:38:07 00:00	End at: 07/04	4/2018 15:0 aturation: set Lov 5 93	03:16 N Doc	Pulse R Low 90	Duration: 0 Analyzed: 0 <b>ange:</b> High 91	00:33:30 00:18:56
ind time Dura 14:38:07 00:00	Sa ation On 0:06 96	aturation: set Lov 3 93	N Doc	Pulse R Low 90	ange: High 91	
ind time Dura 14:38:07 00:00	tion On 0:06 96	set Lov 5 93	N Doc	Low 90	High 91	
14:38:07 00:00	0:06 96	5 93	Doc	90 etor:	91	
			Doc	otor:		

### Figure 3-24 Desaturation report

# 3.5 Delete and Print ECG Waveform Records

## 3.5.1 Delete the ECG Waveform Records

Select the corresponding record, click the submenu "Delete" in the pull-down menu of the "ECG record" or click the Tool bar icon "<sup>1</sup>, then a window appears on the desktop, as shown in the Figure 3-25. Please follow the prompts to operate.



Figure 3-25 Delete the Records

### 3.5.2 Print the ECG Waveform Records and Statistical Analysis

At first, select a record, then if you want to print the ECG waveform record, statistical result or irregular rhythm event plot, the next step you should take is clicking the submenu "print record" in the pull-down menu of "ECG record" or click the Tool bar icon " ". But if your choice is to print the all ECG waveforms for this record, the next step is clicking the submenu "Print all ECG" in the pull-down menu of "ECG record" or click the Tool bar icon " , finally, their preview screen windows will appear on the desktop, as shown in the Figure 3-26A, Figure 3-26B, Figure 3-27 and Figure 3-28.

#### **Operation Description:**

"\*\*" Fit to width: Preview the report in proper width.

"I" Fit to page: Full screen preview the report in proper proportion.

" Zoom in: Click it to zoom in the report.

" Zoom out: Click it to zoom out the report.

"103%" Zooming proportion: Displays the zooming proportion for the current report preview.

" 💾 ": Print the current report displayed. If the content of records is more than one page, click this button to set the start,

end page and the printing copies according to your need.

"I": Save. Click this button can save the ECG records in picture format on computer.

"\*" The content of records is more than one page, click this button to turn the page up and down so as to

preview all records.

" " Close. Close the current preview.



#### Figure 3-26A Print Preview (single ECG Waveform)



Figure 3-26B Print Preview (all ECG Waveforms)



#### Figure 3-27 Print Preview (ECG Statistical Result)



# **3.6 Configuration**

Configuration includes System configuration and Event setup.

Click the submenu "System Config." in the pull-down menu of the "Configuration", or click the Tool bar icon "<sup>2</sup>/<sub>2</sub>" and select "System Config.", to bring up the system configuration screen, as shown in figure 3-29. There are two tabs, click on the tab to shift to the relevant page.

#### System parameter

Date Format: select the date format. The "mm/dd/yyyy", "yyyy/mm/dd" and "dd/mm/yyyy" format are optional

#### Language

The operator can change the display language of the ECG Viewer Manager, English, Traditional Chinese, and Simplified Chinese for optional.

System Config	L. System Config	X
System Para 🛦 Language	System Para <u>A</u> Language	○简体中文
mm/dd/yyyy	English	◎ English ○ 繁體中文
OK Default Cancel	OK Def	ault Cancel

Figure 3-29A Date Format

Figure 3-29B Language Setting

Click the submenu "Event setup" in the pull-down menu of the "Configuration", or click the Tool bar icon "🗐" and select "Event setup", to enter the event setup screen which include three tabs: SpO<sub>2</sub> Event (SE), Pulse Rate Event (PE) and SpO<sub>2</sub> Comparing Rule. Click the tab to shift page to its relevant page as shown in Figure 3-30A, Figure 3-30B and Figure 3-30C.

🕵 Event setup
SpO2 Event (SE) Pulse Rate Event (PE) SpO2 Comparing Rule
SE: Drop in SpO2 by at least 4 % for a minimum duration of 10 seconds
drop in SpO2 by at least (%)
minimum duration (sec) 10
OK Default Cancel
Figure 3-30A SpO <sub>2</sub> Event Screen
Le Event setup
SpO2 Event (SE) Pulse Rate Event (PE) SpO2 Comparing Rule
PE: Change in rate by at least 6 bpm for a minimum duration of 8 seconds
change in rate by at least (bpm) 6
minimum duration (sec) <b>8</b>
OK Default Cancel
Figure 3-30B Pulse Rate Event Screen
L. Event setup
SpO2 Event (SE) Pulse Rate Event (PE) SpO2 Comparing Rule
SpO2 Comparing Rule:as comparison basis for statistical analysis in report
Comparison basis for statistical analysis(%) 88
OK Default Cancel

Figure 3-30C SpO<sub>2</sub> Comparing Rule Screen

### SpO<sub>2</sub> Event (SE)

If the SpO<sub>2</sub> value exceeds the preset "drop in SpO<sub>2</sub> by at least (%)" and this status lasts not less than the preset "minimum duration (sec)", it will be recorded as a SpO<sub>2</sub> event. For example, set "drop in SpO<sub>2</sub> by at least (%)" as "4" and set "minimum duration (sec)" as "10", when drop in SpO<sub>2</sub> by at least 4% for a minimum duration of 10 seconds, SpO<sub>2</sub> event will be triggered and recorded as a SpO<sub>2</sub> event.

#### Pulse Rate Event

If the PR value exceeds the preset "change in rate by at least (bpm)" and this status lasts not less than the preset "minimum duration (sec)", it will be recorded as a Pulse Rate event. For example, set "change in rate by at least (bpm)" as "6" and set minimum duration as "8", when change in PR rate by at least 6bpm for a minimum duration of 8 seconds, PR event will be triggered and recorded as a PR event.

#### > SpO2 Comparing Rule

You can define a  $SpO_2$  value as a comparison base for statistical analysis according to your own needs. For example, if you set "Comparison basis for statistical analysis (%)" as "88"), you can know how many times the  $SpO_2$  event occur ( $SpO_2 < 88\%$  Event Count: 4) and the time percentage below 88% in measuring time.

## 3.7 Help

On main menu window, select "Help" to enter into the sub-menu, as shown in figure 3-31. Click the sub-menu to bring up the corresponding window.

He	elp	
	Online Update	
2	User Manual	3
	About System	

Figure 3-31 Help menu

## ♦ Online Update

If the internet is accessible, then clicking "Online Update" will check if the current software is the latest version. If it's checked as the latest version software, then figure 3.32 pops up. If not, then software update information pops up on the screen, click "OK" to update to the latest version.

Note: do not operate the ECG Viewer Manager when updating the software, please wait for about 2 minutes.



Figure 3-32

If the internet is not accessible, then clicking "Online Update" will show connection failure.

Note: When downloading the updated file (ECGVM\_files.exe), if the antivirus program (eg. 360 antivirus program) shows it

as the computer virus, then choose "Trust in" and re-click "Online Update".

#### • User Manual

On sub-menu, click on "User Manual", then the User Manual for ECG Viewer Manager pops up, which is a document with ".pdf" format.

Note: your computer should install PDF reader, or the User Manual can not be opened.

#### ♦ About System

Click it to view software information, including software version, disk space and so on.

## 3.8 Exit the System

Click the submenu "Exit" in the pull-down menu of the "ECG device", or click the Tool bar icon "**S**", and then the dialog box about the system appears, as shown in the figure 3-33.

System Warning	g 🔀
Are you sure to e	xit the system?
ОК	Cancel
Figure 3-33 Ex	it the System

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# 3.9 Troubleshooting

No.	Misinformation	Possible Reason	Solution
1	Failing to search the device!	<ol> <li>The ECG monitor and the PC USB interface dose not contact well!</li> <li>The device isn't switched on!</li> <li>The PC USB interface is damaged.</li> <li>The provided PC USB cable is damaged!</li> <li>The device is in trouble.</li> </ol>	<ol> <li>Please try again to check whether the USB cable is well contacted with the PC and the unit.</li> <li>Please switch on the device.</li> <li>Please upload the data again after replacing a USB interface</li> <li>Please contact the local dealer in case of any problems.</li> <li>Please contact the local dealer in case of any problems.</li> </ol>
2	No searched ECG information!	No ECG waveform record is detected in the device.	Please upload the data after the device detects the ECG waveforms.
3	No searched the ECG device!	<ol> <li>The USB cable is damaged.</li> <li>The device is in trouble!</li> <li>The PC USB interface is damaged.</li> </ol>	<ol> <li>Please contact the local dealer in case of any problems.</li> <li>Please contact the local dealer in case of any problems.</li> <li>Please upload the data again after replacing the USB in interface.</li> </ol>
4	No found printer in the system, please try again after installing!	The system does not install the printer.	Please install a printer.
5 (for wireless receptio n)	Please check whether the device is in communication status	<ol> <li>The device is not switched on</li> <li>Plug or unplug the wireless adapter while the software "ECG Viewer Manager" is being used.</li> <li>The USB interface is damaged</li> </ol>	<ol> <li>Please switch on the device</li> <li>Please restart the computer</li> <li>Please restart the computer after replacing the interface.</li> </ol>