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**Caution**

US Federal law restricts this device to sale by or on the order of a physician.

Instructions for use

The information contained in this manual is subject to change without notice. All changes will be in compliance with regulations governing manufacture of medical equipment.

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User responsibility

This product is designed to perform in conformity with the description thereof contained in this operation manual and accompanying labels and inserts, when assembled, operated, maintained and repaired in accordance with the instructions provided. A defective product should not be used. Parts that are broken, plainly worn, missing or incomplete, distorted or contaminated should be replaced immediately. Should any repair or replacement become necessary, we recommend that service be performed at the nearest factory approved service center. The user of the product shall have the sole responsibility for any malfunction, which results from improper use, faulty maintenance, improper repair, damage or alteration by anyone other than WelchAllyn or their authorized service personnel.

Warranty, Service, and Spare Parts

Warranty

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

Assistance and Parts

If the product fails to function properly or if assistance, service, or spare parts are required, contact the nearest Welch Allyn Technical Support Center.

USA	1-800-535-6663	Canada	1-800-561-8797
Latin America	(+1) 305-669-9591	South Africa	(+27) 11-777-7509
European Call Center	(+353) 469-067-790	Australia	(+61) 2-9638-3000
United Kingdom	(+44) 207-365-6780	Singapore	(+65) 6291-0882
France	(+33) 1-60-09-33-66	Japan	(+81) 3-5212-7391
Germany	(+49) 7477-927-173	China	(+86) 21-6327-9631

Before contacting Welch Allyn it is helpful to attempt to duplicate the problem and to check all accessories to ensure that they are not the cause of the problem.

When calling, please be prepared to provide:

- Product name and model number and complete description of the problem
- The serial number of your product (if applicable)
- The complete name, address and phone number of your facility
- For out-of-warranty repairs or spare parts orders, a purchase order (or credit card) number
- For parts order, the required spare or replacement part number(s)

Repairs

If your product requires warranty, extended warranty, or non-warranty repair service, please call first the nearest Welch Allyn Technical Support Center. A representative will assist you troubleshooting the problem and will make every effort to solve it over the phone, avoiding potential unnecessary return.

In case the return cannot be avoided, the representative will record all necessary information and will provide a Return Material Authorization (RMA) number, as well as the appropriate return address. A Return Material Authorization (RMA) number must be obtained prior to any return.

Packing Instructions

If you have to return goods for service, follow these recommended packing instructions:

- Remove all hoses, cables, sensors, power cords, and ancillary products (as appropriate) before packing, unless you suspect they are associated with the problem.
- Wherever possible use the original shipping carton and packing materials.
- Include a packing list and the Welch Allyn Return Material Authorization (RMA) number.

It is recommended that all returned goods be insured. Claims for loss or damage to the product must be initiated by the sender.

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Welcome

Welcome to CardioPerfect Pocket ECG, a Pocket PC-based Resting ECG recording system, a mobile extension of the Welch Allyn CardioPerfect Workstation software.

With the CardioPerfect Pocket ECG, you can record, view and interpret Resting ECGs with your Pocket PC. You can also use it to send and receive ECGs through the Welch Allyn CardioPerfect Workstation Telemedicine functionality.

This manual contains specific information about the Welch Allyn CardioPerfect Pocket ECG. The ECGs recorded with your Pocket ECG can be imported into the Workstation Software with the Pocket ECG plug-in for Welch Allyn CardioPerfect Workstation as described in this manual. For other information about the Workstation software please refer to the appropriate Workstation manuals.

Intended use

The device is specifically intended for the recording of standard 12-lead electrocardiograms. Please note that the word “device” is used to indicate the Welch Allyn CardioPerfect recording hardware in combination with the Pocket ECG software.

Indications

Because of the widespread availability and application of the generic kind of device, the user is assumed knowledgeable enough to determine if use of the device is indicated.

Contraindications

There are no known contraindications for the recording of a resting ECG.

Precautions

Due to summation of leakage currents, it is possibly hazardous to connect several devices to the patient simultaneously.

Notations used in the manual

In this manual the following notations are used:

Dialog boxes:

- The names of dialog boxes, windows and tabs are displayed in **bold**.
- When referring to check boxes in dialogs, the term “selected” means that a check is displayed in the check box, and therefore that the option is active.
- When referring to a certain button, setting or menu option the text in this control is displayed in **bold**.

Stylus:

- *Tap* means to press the stylus to the screen and quickly release.
- *Tap and hold* means point to an item and then press and hold the stylus to the screen.
- *Drag* means to point, press and then hold down while moving the stylus.

Entering data:

- Data can be entered via the keypad or handwritten with the stylus

Keypad:


- The keypad is located on the right in the status bar. You can operate the keypad by briefly touching it with the stylus.

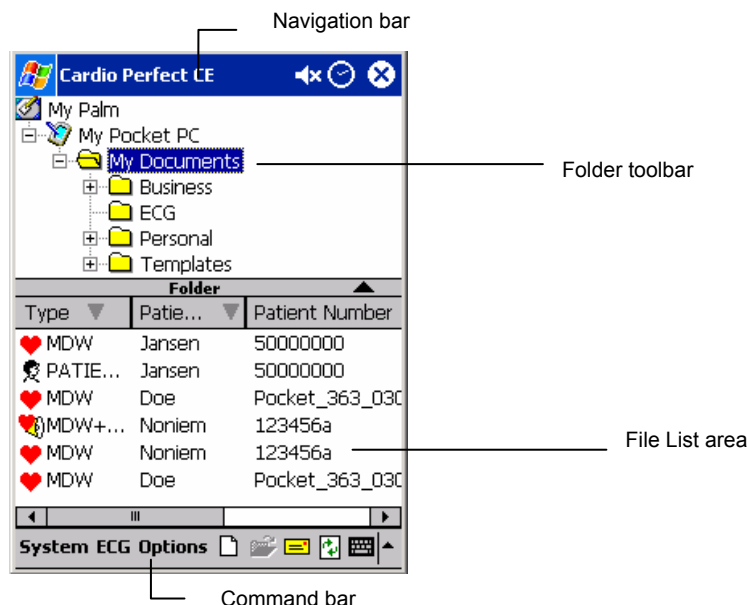
Handwriting recognition:

- Touch the arrow button next to the keypad icon in the status bar and select the desired writing mode in the pop-up menu.

1. Getting started

1.1 The Pocket ECG window

This section will guide you around the various parts of Pocket ECG. By tapping on the Pocket ECG icon  either in the start menu or in the command bar at the bottom of the screen you can start the Pocket ECG program.



Navigation bar The top bar is called the navigation bar. In the navigation bar you can read which program is currently active. In addition, the time is also displayed here. To the left of the time you will find the loudspeaker icon. To the right of it, depending on the application, you will see an icon closing the application or confirming entries.

Command bar This bar is located at the bottom of the display. Each menu in the command bar contains a number of tasks that you can perform with Pocket ECG.

File list area The file list area lets you easily retrieve patients and tests. In this area, you can see all your recorded ECG files and Patient cards, select a file and open it for review or delete it.

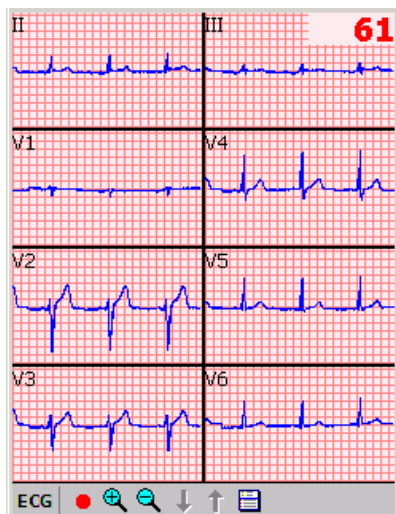
Folder list area In the folder list area the document tree is shown. The ECG and patient files are shown per default in the My Documents folder.

Basic principles of Pocket ECG.

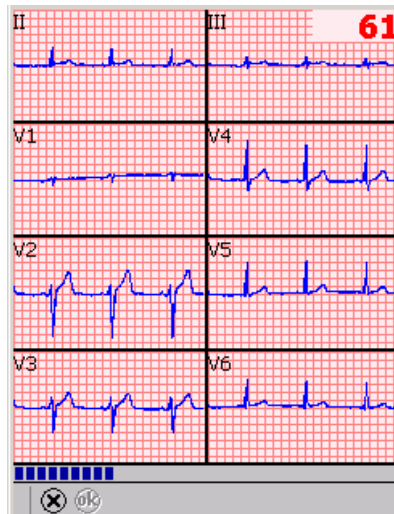
In Pocket ECG you are working in one of three main modes, each having different window layout and control button functionality:

- MONITOR mode
- REVIEW mode
- FILE LIST mode

Monitor mode



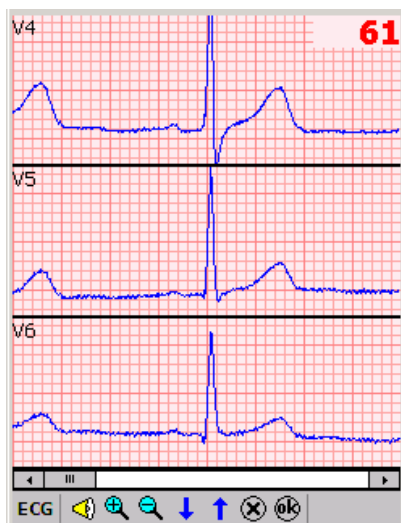
Monitor window



Monitor during ECG recording

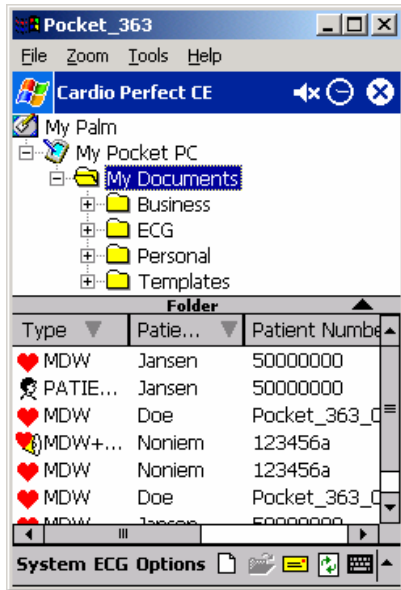
Monitor mode is used to evaluate the quality of traces see average pulse rate and start **ECG Recording**. In some cases it can be used for long term monitoring. You may also enter Patient data or change **Settings** before **Recording** in this mode.

Review mode



Review mode allows you to evaluate recorded ECGs, scroll through all recorded segments, provide measurements, enter or edit Patient data and Texts, listen or add voice comments or change Settings.

File list mode



File list mode allows you to see all your recorded ECG files and patient files. Select an ECG file, open it for **Review** or delete or select a patient file and open it. From here you may create new files for recording.

The files from the selected folder in the **Folder list area** are shown in the file list area. In the picture above the files in the My Documents folder are shown. If Pocket ECG is started by default the My Documents folder will be opened and any new recordings will be stored in this folder. To add, rename or delete a file or folder select a folder in the Folder list area then tap Folder in the Folder toolbar. You can now select New, Rename or Delete.

To enlarge or decrease the size of the **File list area** you can either tap on the corresponding arrow symbol ▲ ▼ in the Folder toolbar, or you can drag the toolbar with your stylus.

2. Recording ECGs


2.1 Record an ECG

Pocket ECG records ECGs fast, easily and reliably. The only thing you have to do is make sure the electrodes are placed correctly and switch on the recorder. Pocket ECG takes care of recording and saving the recording.

To record an ECG, you need to follow these global steps. Each step is explained in more detail on the following pages.

1. Place electrodes on the patient (see § 2.2).

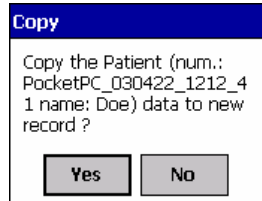
2. In Pocket ECG, create a **New** ECG test.

If there are no recordings for this patient on your Pocket PC start with To create a new test. If a previous test is available for the patient for whom you want to record an ECG or if a Patient card is available for this patient, select the (latest) test or the patient card, indicated with , in the File list area then continue with To create a new test.

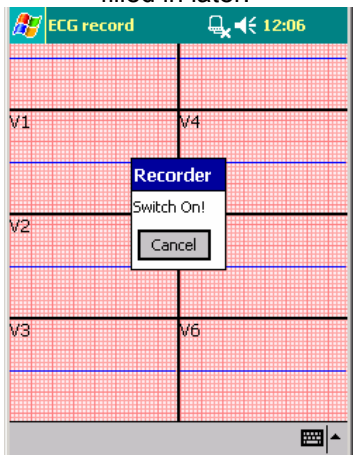
To create a new test:


In the Command bar, tap on the **ECG menu** and tap **New**.

If you have selected a patient/file in the File list area, Pocket ECG will ask if you want to copy the Patient data from the selected file to the new ECG.



If you select Yes the Patient data will be copied into the Patient card for the new test. If you select No or if no file was selected the Patient card will be empty and has to be filled in later.



3. The Real-time monitor is displayed. Pocket ECG asks you to switch on the recorder. Switch on the recorder.
4. The **Real-time monitor** displays the ECG traces and average pulse rate.
5. Select which leads should be displayed and adjust your view on the ECG traces in the **ECG** menu (see § 2.4).
6. Create or adjust a **Patient Card** (see § 2.3).
7. If necessary, apply a **Notch filter** to remove possible noise due to AC mains interference (see § 2.5).
8. In the **Real-time monitor**, wait until the signal is stabilized and, tap the  **Record** button to start recording. The progress of the recording is shown in the gauge at the bottom of the window.
9. When the recording is finished, Pocket ECG will ask you to switch of the recorder. Switch of the recorder. Pocket ECG automatically saves the ECG and the recorded ECG is automatically displayed in the **Review window**.
10. If you are satisfied with the recording disconnect the patient.
11. You can add interpretations, comments and voice comments. Save the recording by tapping the **OK** button. If not previously filled in the Pocket ECG will now ask for a User name and e-mail address to sign the ECG file.

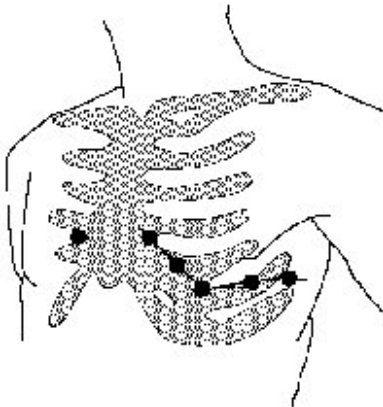
2.2 Place electrodes on the patient

Important: Because Pocket ECG is a 12 lead electrocardiograph all electrodes must be connected! Proper skin preparation (abrasion if necessary) and proper electrodes are very important for a good signal quality.

Important: When you connect the electrodes to the patient, make sure that the electrodes and their connectors (also the RL/N electrode) do not contact other conducting parts (including earth).

Extremity electrodes

When you record a Resting-ECG, the extremity electrodes should be connected to the ankles and wrists.



Precordial electrodes

Connect the precordial electrodes in the following positions:

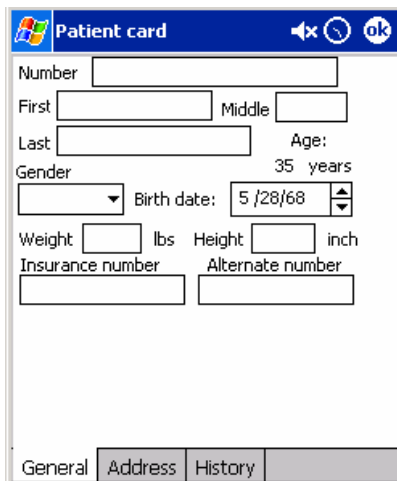
- V1 : Fourth intercostal space, at the right sternal margin.
- V2 : Fourth intercostal space, at the left sternal margin.
- V3 : Fifth rib, between leads V2 and V4.
- V4 : Fifth intercostal space, on the left midclavicular line.
- V5 : Left anterior axillary line, at the horizontal level of V4.
- V6 : Left midaxillary line, at the horizontal level of V4.


2.3 Patient card

It is advisable to fill in the patient card or check if the patient data are still accurate before recording an ECG. After opening an existing ECG or creating a new ECG you can enter or edit the patient data in the **Patient card** in **Monitor** mode or **Review** mode.

To fill in a new patient card or edit an existing one:

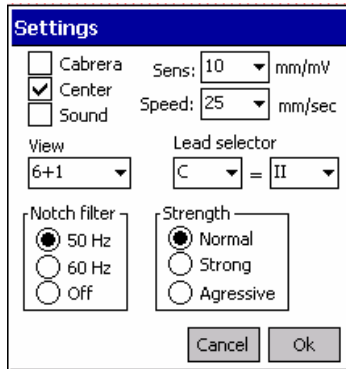
1. In **Monitor** or **Review** mode select **Patient card** in the ECG menu. A patient card will be displayed.



2. In the **General** tab of the patient card, enter the patient's number, name, insurance number, gender, birth date, weight and height. The patient number is mandatory.
3. In the **Address** tab, enter the patient's address information.
4. In the **History** tab, you can enter some information on the patient's history, for instance whether the patient is a smoker, and the amount of exercise a patient gets. You can start typing straight under the previous comment.
5. Tap on the  button to save the patient information.
6. Tap on the **OK** button in the command bar to save the recording.

2.4 Select how you want to view leads

Once you have created a new ECG, the Real time monitor displays the ECG traces. Before you start the actual recording, you can select how you want to view the traces. Pocket ECG offers these views: 2x4, 3, 6+1 and 2. In addition, you can set different chart speeds and different sensitivities. To adjust these settings go to the **ECG** menu, select **Display** and **Settings**.



To select a different view:

- In the **Real-time monitor**, select a view from the list in the **Lead** drop-down menu and select OK. The new view is immediately displayed.
- With the option **Constant** you can adjust the following leads:
 - 2x4 Leads: the leads shown in the upper left (P1) and upper right (P2) window
 - 6+1 Leads: the lead shown in the bottom (C) window.
 - 3 Leads: L1, L2,L3
 - 2 Leads: P1, P2

To select a different chart speed or sensitivity for the view:

- In the **Real-time monitor**, select a chart **speed** or **sensitivity** from the list. The speed and sensitivity are immediately displayed.

2.5 Apply a notch filter

ECG traces can contain noise due to AC mains interference. This makes the traces harder to read. You can filter out noise by applying a notch filter. When you apply a filter, the original ECG signal is not permanently changed. You only change the way it is displayed on the monitor. You can always restore the original signal.

To apply a notch filter:

- In the **ECG** menu select **Display** and **Settings**. Select the appropriate **Notch filter** and **Strength**.

2.6 Cancel a recording

You can cancel a recording at any time in the recording process.

To cancel a recording:

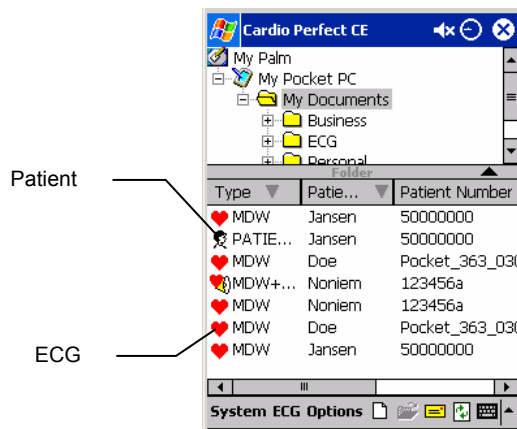
- Click the **Cancel** button in the **Real-time monitor**. The recording is cancelled. If you leave **Monitor** mode you are asked to switch off the recorder. The test is not saved.

3. Viewing ECGs

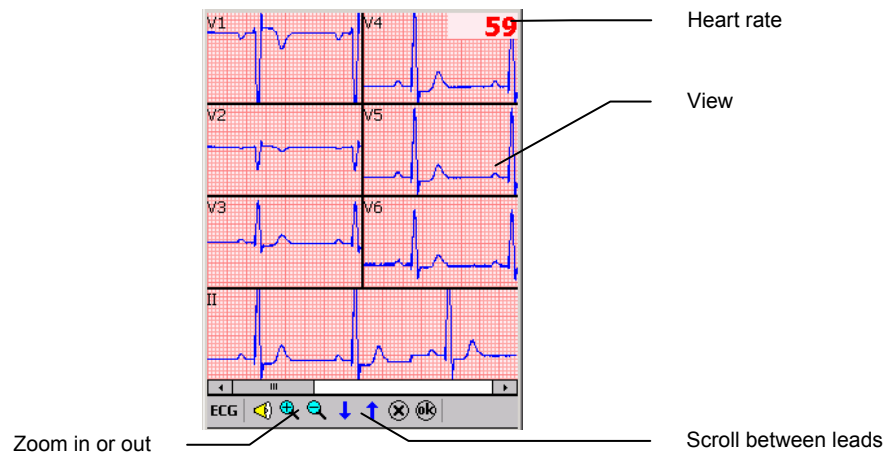
Pocket ECG offers a wealth of viewing possibilities. You can view an ECG in a number of formats, also called views, and perform a number of actions, such as zooming in and out on a complex and making measurements between two points.

To view an ECG:

1. Select an ECG from the list. ECGs are indicated with a ♥ sign.

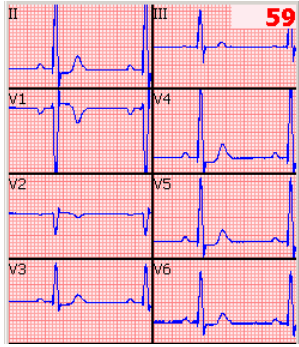
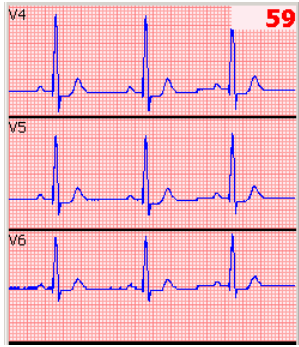
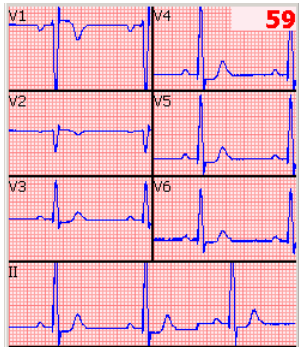
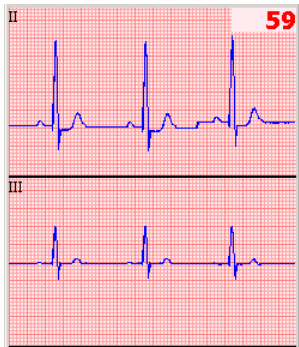


2. From the **ECG menu** select **Open**. Pocket ECG automatically starts the **Review** mode, the test is displayed in the workspace.



3.1 Views

Pocket ECG offers various views on an ECG. You can have a look at all twelve leads in three different formats (6+1, 2 or 3 lead view). The fourth format, the 2x4 format, shows eight leads.

	<p>2x4 lead view The leads are shown in a 2x4 configuration. V1-V6 are shown by default. The leads in the upper left and right window are adjustable (P1&P2 in the Settings menu).</p>
	<p>3 lead view The 3 lead view displays 3 leads, you can switch between the displayed leads with the arrows in the command bar. In sequence the following leads are shown: I, II, III aVR, aVL, aVF V1-V3 V4-V6 L1-L3 (adjustable in the settings menu)</p>
	<p>6+1 lead view The 6+1 lead view displays 7 leads. The lead at the bottom can be used as a kind of rhythm strip. You can switch between the displayed leads in the 6 smaller windows with the arrows in the command bar. In sequence the following leads are shown: V1-V6 → I, II, III, aVR, aVL, aVF In the bottom window lead C is shown, which is adjustable in the settings menu.</p>
	<p>2 lead view The 2 lead view displays 2 leads, you can switch between the displayed leads with the arrows in the command bar. In sequence the following leads are shown: I, II → III, aVR → aVL, aVF → V1, V2 → V3, V4 → V5, V6 → P1, P2 P1 & P2 are adjustable in the settings menu.</p>

3.2 Viewing ECGs

There are a number of things you can do while viewing ECGs in Monitor mode or Review mode. They fall apart in the following groups of actions:

Action	Function	Mode
Adjusting scales and magnitude of the view	Zoom in and out	Monitor and Review
	Set chart speed	Monitor and Review
	Set sensitivity	Monitor and Review
Switch between displayed leads	Lead selector	Monitor and Review Not available in the 2x4 configuration
Improving signal quality	Apply notch filter	Monitor and Review
Studying the ECG	Make measurements	Review

On the next pages, each action is described in detail.

3.3 Zoom in and out on an ECG

If you want to get a closer look at the traces, you can adjust the size of the leads by zooming in and out of the ECG in **Monitor** or **Review** mode.

To see leads in more detail:

- Tap on the zoom in icon 

To see a larger part of the ECG:

- Tap on the zoom out icon 

To switch to single lead view:

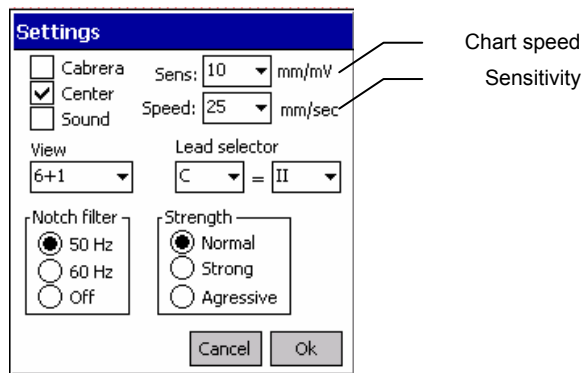
- Tap on the requested lead in the **View** area.

To switch back to multi-lead view:

- Tap and hold the stylus in the **View** area.

3.4 Set chart speed and sensitivity



Pocket ECG offers a wide range of speed and sensitivity. You can adjust the scale of the ECG by adjusting the chart speed and the sensitivity.



To set the chart speed or sensitivity:

- In the **ECG** menu, select **Display** and **Settings**. Tap on the drop down box and select a value.

3.5 Lead selector

Except for the 2x4 configuration you can scroll between leads with the blue arrows   in the command bar. For the order in which the leads are shown see paragraph 3.1 .

3.6 Apply a notch filter

ECG traces can contain noise that is due to AC mains interference. This makes the traces harder to read. You can filter out noise by applying a notch filter. When you apply a filter, the original ECG signal is not permanently changed. You only change the way it is displayed on the monitor. You can always restore the original signal.

To apply a notch filter while you view an ECG:

- In the **ECG** menu, select **Display** and **Settings**. And select a **Notch filter** and **Strength**. The Notch filter can be set on 50Hz (Europe), 60Hz (USA) or Off. If no extensive AC mains interference exists we recommend setting the Notch filter Off.
- In case of interference, first try to eliminate that interference as much as possible. If eliminating is not possible try using a notch filter set to normal strength or in case of very strong interference set it to strong or aggressive.



Caution

Extensive filtering may affect the shape of the ECG trace

3.7 Make measurements

In Review mode you can make measurements between two points.

To make a measurement between two points:

1. Enlarge a single lead by tapping in the view.
2. Select the optimal view of the trace(s) using Scroll and Zoom.
3. Tap the stylus on the starting point of your measurement on the trace.
4. Tap the stylus on the end point of your measurement.
5. Pocket ECG draws a line between the two points and displays the measured values. The time in milliseconds (ms) and the amplitude in micro volts (μV or mkV) will be displayed with the vector.
6. To make a new measurement repeat step 2 and 3. To return to the original view: tap and hold the stylus in the view.

3.8 Set Colors

To change the appearance of the screen, go to the ECG menu in **Monitor** or **Review** mode and select **Display** and **Colors**. You can specify individual colors for the background, grid lines, grid dots, ECG trace, lead name text and measurements. Select the item which color you want to change and then adjust the color or choose one of the five predefined color formats.

3.9 Other settings

In the settings menu there are a few options that are previously not discussed. These options have no effect on the recording, only on the trace visualization.

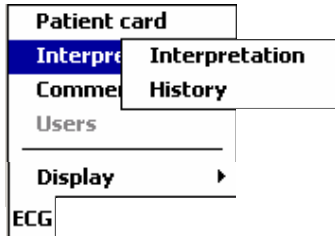


You can select:

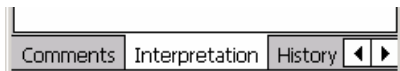
- Standard or Cabrera view
- Centering option; active only during Monitoring and Recording. When selected the QRS complex is centered in the window.
- “Beep” sound on “QRS”; active in Monitor and Record.
NB Due to resource limits in some Pocket PC's some “Beeps” will fall out if the Pulse rate is higher than 90 beats per min. We therefore recommend using this option only for long time monitoring if necessary.

4. Interpreting ECGs

While monitoring or reviewing an ECG you can add or edit an interpretation or comment or look at the patient history. You can open the Interpretations or Comments editor in the ECG menu.

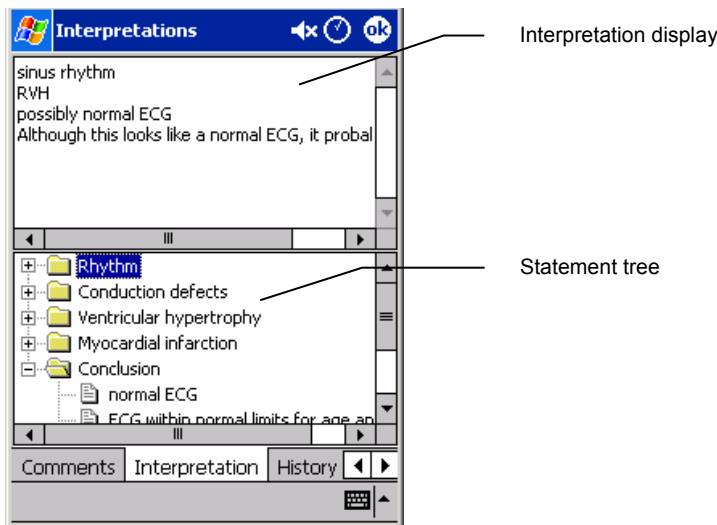


Once you have opened either the Interpretation or Comments editor or the Interpretation history you can switch between these fields by tapping on the tabs at the bottom of the screen.



4.1 Edit and confirm an interpretation

You can edit an interpretation in the Interpretation editor. In this editor, you can enter your own texts. Alternatively, you can use the statement tree to select and enter common interpretation statements. Once you edit an interpretation, you must confirm it. Otherwise, your changes will not be saved.



To edit and confirm an interpretation:



1. In the **ECG** menu, select **Interpretations** and **Interpretation**. The Interpretation editor is displayed.

2. In the Interpretation display

Editing manually:

- at the pointer, start entering text. This can be done either by using the keypad or the handwriting recognition.

Editing with the statement tree:

1. From the statement tree, tap on the square  before one of the categories to display all possible statements for that category.
2. From a category, tap twice on the statement that you want to include in the interpretation. The statement is added.
3. To delete a statement from the interpretation, select the statement text and press BACKSPACE  to delete it.
4. Tap the **OK** button. The **User** list will be displayed.
5. To save your comments and to return to the ECG select a user and tap on the **OK** button.

Tips for editing and confirming an interpretation:

- The current date and time is automatically saved by saving the interpretation.
- When you return to the ECG after confirming an interpretation, the interpretation history shows the date and time of confirmation and the name of the person (user) that confirmed it.
- The statement tree can be changed. Please consult your system administrator or local dealer for new or changed statements.

4.2 Add comments

In the comments editor you can enter your own texts. This can be general information about the condition of the patient. Once you edit a comment, you must confirm it. Otherwise, your changes will not be saved.

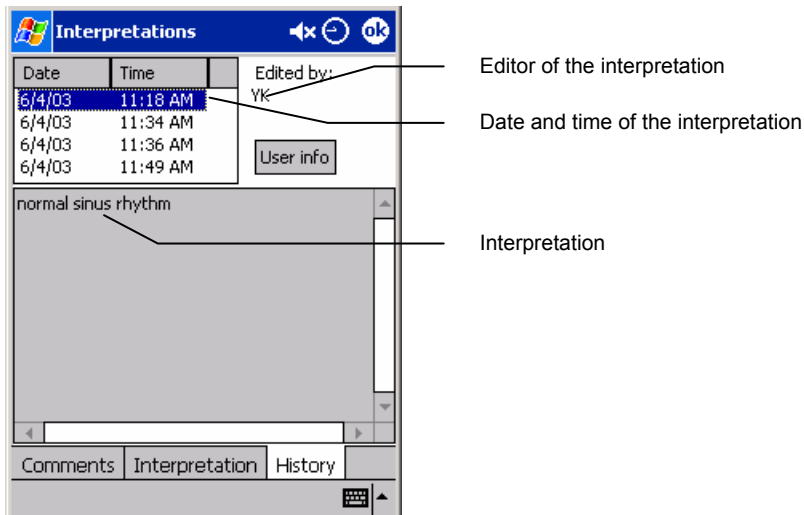
To edit and confirm comments:

1. In the **ECG** menu, select **Comments**. The Comments editor is displayed.
2. In the display, at the pointer, start entering text. This can be done either by using the keypad or the handwriting recognition.
3. Tap the **OK** button. The **User** list will be displayed.
4. To save your comments and to return to the ECG select a user and tap on the **OK** button.

4.3 View interpretation history

When you change something in an interpretation, Pocket ECG does not change the original interpretation, but creates a new one. This way, you never lose any information. A copy of all


interpretations is kept in the interpretation history.




To view the interpretation history:

1. In the **ECG** menu, select **Interpretations** and **History**. The **Interpretation history** window is displayed. The top left pane displays the interpretations sorted by date and time. The bottom window shows the content of the selected interpretation. At the top right the editor of the interpretation is shown. The editor data, like name and e-mail, can be displayed with the **User info** button.
2. Tap on a date to view an interpretation.


4.4 Work with voice comments

With Pocket ECG it is also possible to add voice comments in **Review** mode. ECGs with voice comments are displayed with a combined ECG/Speaker symbol  in front of the Patient name in the File list area. You can listen to existing voice comments and replace them with new comments, the old voice comments will then be deleted. Once you change a voice comment, you must confirm it. Otherwise, your changes will not be saved.


To listen to voice comments:

1. In Review mode select the Speaker symbol  in the Command bar. The Voice message bar will appear in the middle of the screen.








2. Tap on the Play button  to listen to the recorded voice comments.
3. Tap the **OK** button when finished.

To add and confirm voice comments:

1. In Review mode select the Speaker symbol  in the Command bar. The Voice message bar will appear in the middle of the screen.



2. Tap on the **Record** button  and speak in the microphone of your Pocket PC to add your voice comments.
3. Tap on the **Stop** button  when you are finished recording.
4. Tap on the **Play** button  to listen to the recorded voice comments.
5. To save your comments tap on the **OK** button , to disregard changes tap on the cancel button .

5. Transfer of ECGs


There are multiple configurations and solutions for transferring ECGs to and from your Pocket PC, in this chapter only one possible solution using a mobile phone with a dial-up connection for establishing an Internet connection is described.

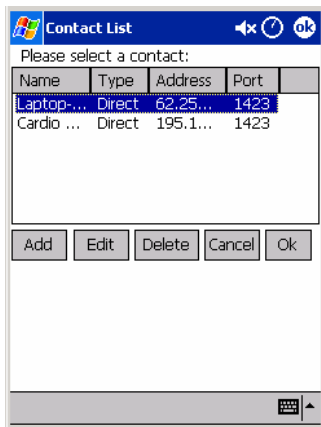
For help with further options please refer to the chapter on Troubleshooting or contact our Customer service & Technical support department. Please consult § 8 for the Installation and Setup description.

5.1 Send and Receive ECGs

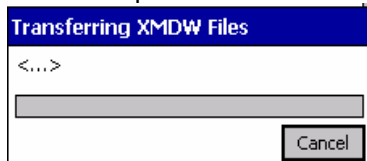
The Pocket ECG application can transmit and receive ECG's to and from a remote host PC. For this it uses a direct socket connection that is established using the Internet. The Pocket PC itself is responsible for setting up a correct Internet connection. The Pocket ECG application will use this to establish a connection with the remote host.

To transfer ECGs follow these steps

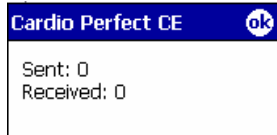
1. In **File list mode** select the file you want to send, only one file at a time can be selected. If no file is selected, Pocket ECG will only check for files coming in.
2. Select **Send/Recv** from the **ECG menu** or tap the  Send/Receive button.
3. Select a preinstalled Contact from the **Contact list** and tap the **OK** button.



4. Select a previously installed connection. Usually the Internet connection is used.
5. Tap on the **Connect** button.



6. The program will now establish an Internet connection and send the selected files and retrieve the waiting files.



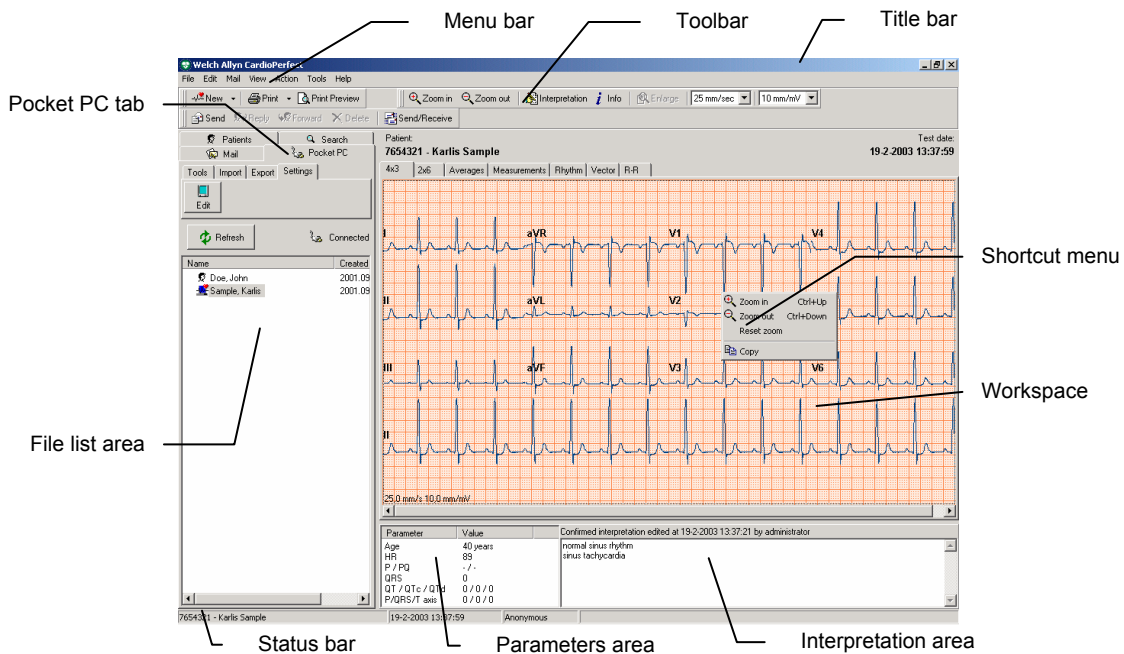
7. If only files were sent and no files received you are now ready. Your Pocket PC will stay connected until you disconnect. For handling of items sent to Welch Allyn CardioPerfect Workstation see §6 and the Workstation manual for further information.
8. If files were received they appear in the File list area with an envelope icon in front of the file name. Select a file from the File list area, from the ECG menu you can now select Info, Delete or Open.
9. If you Open the file the received interpretation will be added to the corresponding ECG.
10. Make sure you do not forget to disconnect as this is not done automatically.

6. Workstation

If you have connected your Pocket PC directly to a PC, this symbol will appear in the Pocket PC tab . You are then able to view and process the ECG and Patient files on your Pocket PC with the Workstation Program. For general information on the Workstation software please refer to the Workstation manual. For information on the installation and configuration of the Workstation software please refer to the Workstation Installation & Configuration manual.

6.1 The Welch Allyn CardioPerfect Pocket ECG window

Select the Pocket PC tab to work with the files on your Pocket PC.



- Title bar** The title bar displays the name of the program. The title bar contains three buttons that you can use to maximize, minimize and close the Workstation window.
- Menu bar** Each menu in the menu bar contains a number of tasks that you can perform with Welch Allyn CardioPerfect. Sometimes, menus are gray. This means that you cannot access that functionality at that particular point, either because it is not available, or because you are not authorized to use it. Each module has its own menu bar.
- Tool bar** The tool bar contains buttons that give you easy access to the most common tasks in Welch Allyn CardioPerfect.
- File list area** The file list area lets you easily retrieve tests. In this area, you can see all your recorded ECG files and Patient cards, select an ECG file and open it for review or delete it.

Workspace The workspace is the core part of Welch Allyn Cardio Perfect. It displays the ECG in various formats. These formats, that are also called views, are each displayed on a separate tab in the Welch Allyn Cardio Perfect workspace. The workspace is the place where you view and measure ECGs.

Parameters area
The parameters area contains some details of the ECG, such as the age and the heart rate of the patient, and the global measurements for the ECG (P duration, QRS duration, PQ duration, QT duration, corrected QT duration, P-axis, QRS-axis, T-axis and QTd or JTd duration).

Interpretation area
The Interpretation area contains the interpretation, entered by the physician. It displays whether the interpretation has been confirmed yet, any age corrections that have been made and the interpretation.
If installed Means will provide an unconfirmed interpretation in this area after the selected ECG file is reanalyzed. For further information about the optional Means interpretation please refer to the Welch Allyn CardioPerfect resting ECG module User manual.

Shortcut menu In the workspace, you can use shortcut menus to access the most common tasks. You can access these tasks by clicking on the workspace with your right mouse button.

Status bar The status bar shows important information about the patient and test that are currently selected, such as patient name and number and the recording date and time of the test. Additionally, the status bar displays the name of the user that is currently logged on to Welch Allyn Cardio Perfect.




To update the view click on the refresh button.



The connected symbol gives the status of the connection. When connected you can transfer files directly to and from your Pocket PC

To view the files from your Pocket PC on a PC:

1. Transfer the files to a PC containing the Workstation software, see previous chapter.
2. Open the Welch Allyn CardioPerfect Workstation program
3. Select the Pocket PC tab
Note: If you switch between languages please restart the Workstation software after selecting the preferred language.
4. Select the file you want to view, the Pocket PC files are indicated with: 



5. Select the **Tools** tab and click on **View**
6. The selected file is shown in the Workspace, if not all views are available select **Tools** from the CPWS Toolbar and select **Reanalyze**.
For further help on viewing options please refer to the chapter on Viewing ECGs in the Welch Allyn CardioPerfect Workstation Resting ECG Module User Manual.

6.2 Tools tab



In order from left to right the Tools tab shows these buttons:

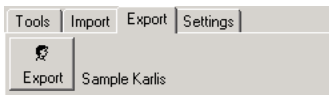
- **View** (see 6.1)
- **Print ECG** this button will import and print the ECG from your Pocket PC
- **Delete** the selected file will be deleted from your Pocket PC. Once files are imported into the Workstation database only an administrator can delete them.
- **Play** Play voice comments
- **Stop** Stop playing voice comments


6.3 Import tab



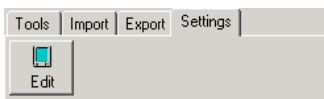
With the import tab you can import one (**Import** button) or all (**Import all**) files from your pocket PC to the Workstation database. If you select the **Delete after import** option the files will be deleted from your Pocket PC after they are imported to the Workstation database. Once files are imported into the Workstation database only an administrator can delete them.

6.4 Export tab



To export a patient file, simply select a Patient file from the patients tab  Patients in the Workstation Window. Then select the Pocket PC tab and click on **Export** in the **Export** tab. The Patient info will be transferred to the connected Pocket PC.

6.5 Settings tab



The in previous chapters discussed settings from your Pocket ECG program can be edited in the Workstation. Select **Edit** from the **Settings** tab.

7. Maintaining the recorder

To keep your Welch Allyn CardioPerfect recorder in good working condition, please observe the following:

- Remove the battery when you do not use the recorder for a longer period of time.
- Do not expose the recorder to temperatures lower than -15°C or higher than 45°C , at a maximum non-condensing humidity of 95%.
- Clean the cables regularly.
- Replace the battery of the recorder when the power indicator light is red.

7.1 Clean the cables

When you use electrodes that need electrode gel, make sure that the cables and the non-disposable electrodes are cleaned regularly. Otherwise, the gel may build up on the wires.

- Use a moist cloth to clean the cables and the electrodes.

7.2 Replace or charge the battery of the recorder

The Welch Allyn CardioPerfect Portable recorders are powered by a 9V alkaline battery. The Welch Allyn CardioPerfect Pro recorder has a rechargeable battery. You need to replace or charge the battery when the power indicator light becomes red instead of green. Do not use the recorder when the power indicator led is red.

After you replaced or recharged batteries, let the Pocket ECG software run in Monitor mode for a few seconds. This verifies that the recorder functions properly and the cable is undamaged.

To replace the battery of Welch Allyn CardioPerfect portable recorders:



The battery compartment is located at the bottom of the unit.

1. Remove the battery lid with a pair of tweezers.

2. Remove the battery.
3. Insert a new 9V alkaline battery.
4. Click the lid back into place.

To charge the battery of Welch Allyn CardioPerfect Pro recorders:

The battery compartment is located at the bottom of the unit.

1. Pull the battery compartment from the recorder by holding the recorder with one hand and pressing on both sides of the battery compartment with your other hand.
2. Connect the battery compartment to an electrical outlet using the power adapter by inserting the charger cable into the top of the compartment and charge your battery. Charging is finished when led goes off.
3. Click the battery compartment back into place after the battery is recharged.

8. Installation and setup

8.1 Requirements

To work with Pocket ECG, you need the following minimum configuration:

Hardware

- Cassiopeia E115, ipaq model 36/37/38/39 2210 or 55xx5500

Software

- Pocket ECG 2.3

8.2 Installing Pocket ECG

To install Pocket ECG on your Pocket PC:

Connect your Pocket PC to a host PC using an activesync connection (activesync should be on the CD that came along with your Pocket PC or can be downloaded from the Microsoft website).

Run the **CardioCEsetup.exe** and follow the instructions on your screen.

Note! : When activesync is running but no Pocket PC is attached the program installation will automatically be suspended until you connect the Pocket PC.

8.3 Setup your Pocket PC

Before you can use the Pocket ECG application you have to setup your Pocket PC and some application settings. Some of these settings are optional or only needed when you are going to use telemedicine.

1. Give your Pocket PC a suitable name (*only needed when using telemedicine*)
 The name of your Pocket PC is used for uniquely identifying your Pocket PC when doing telemedicine.
 You can edit this setting by going to the main menu → select **Settings** → select Tab System → select About → select Tab device ID
 Here you can edit the **Device Name** field to reflect a suitable name for your Pocket PC.
2. Setup a connection to the internet (*only needed when using telemedicine*)
 The Pocket ECG application can transmit and receive ECG's to and from a remote host workstation. For this it uses a direct socket connection that is established using the Internet. The Pocket PC itself is responsible for setting up a correct Internet connection. Whereas the Pocket ECG application will use this to establish a connection with the remote host.

There are multiple configurations and solutions possible for establishing an Internet connection with your Pocket PC. It is not our intention to provide a complete reference for this so we will limit to a connection using a mobile phone with a dial-up connection.

What do you need?

You will need a mobile phone with a connection to the Pocket PC (this might be a cable to the expansion slot, it might be an infrared connection or a bluetooth connection).

The mobile phone must call an Internet provider, so you will have to get an account with a local provider. This provider will give you all the information you need to fill in the different fields mentioned below.

Setting up a dial up connection

You can create/edit a connection by going to the main menu → select settings → select Tab Connections → select Icon Connections

Here you have to find the **Internet settings** dropdown box and select **Internet settings**

Select this item and press **Modify**

Now you can either create a new connection or edit one. For this you have to use the settings provided by the Internet provider.

You can test for a proper connection setup by using **Internet explorer** on your Pocket PC. If you have trouble connecting to the Internet check the following things:

- Are your dialing patterns ok, you can check this by going to main menu → select settings → select Tab Connections → select Tab dialing locations → select Dialing patterns
- Is your mobile phone enabled for communication with your Pocket PC? (some phones must be enabled for infrared communications)
- Is your Pocket PC communication modem activated? (Infrared port or Bluetooth port). Check your Pocket PC user's manual on how to activate this.

3. Setup the Pocket ECG application settings

Activating your Pocket ECG application can be done by going to the main menu → select Programs → select the icon Pocket ECG.

Before you can do anything you should register the program. For this you should have received a serial number and a registration code. You can fill this information in the proper fields by going to the Pocket ECG application system menu → select about → select Registration.

Enter E-mail address, Serial number and Key. Please note that the E-mail address registered at Welch Allyn forms a unique combination with the serial number to provide the key. Therefore only use this combination to fill in the three registration fields.

After registration we recommend that you enter the contact list, the user list and the recording hardware in advance, see next paragraph.

8.4 Customizing Pocket ECG

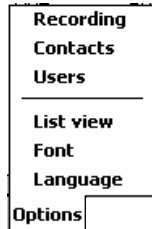
You can customize Pocket ECG and your Pocket PC to your own preferences. The features that you can customize for Pocket ECG are located in the **Options** Menu in **File list mode** and in the **ECG** menu under option **Display** in **Monitor mode** and **Review mode**.

The last features are discussed in paragraph 0:

Viewing ECGs. These settings have only effect on how the ECG traces are displayed, they

have no effect on the original signal.
After registration we recommend that you enter at least the user list, the contact list and the recording hardware in advance.

The settings in the Options menu:



Recording Here you can configure your CardioPerfect recorder. The following options can be set:

- Model** The recorder model that is used.
- Port** The communication port of the Pocket PC to which the recorder is connected. Depending on the hardware configuration the port is usually Com 1.
- Max. record length** The maximum recording length of the ECG in seconds. You can select a value between 10 and 300 seconds.

Contacts Here you can modify the telemedicine contact list, this is the list of persons or host machines that you would like to exchange files with while doing telemedicine. You can Add Edit or Delete contacts. Enter Display name, Address, Password, Port and Device name.

- IMPORTANT** If a socket connection is used, the address field on the Host PC must match this Pocket PC **Device Name** (See Windows CE Settings→ System→ About→ DeviceID→ Device Name)
- NOTE** Do not use space, underline or other separators; only letters and numbers! The **Device Name** is case sensitive!

For a correct setup of a contact you have to get some information that your Welch Allyn CardioPerfect host administrator can provide you. Please note that the administrator must also perform some tasks in Welch Allyn CardioPerfect to allow you to send/receive ECG's to that host.

The information you will need is:

- o Address: the IP address of the Welch Allyn CardioPerfect host,
- o Password: the password that only you and the administrator should know about.

Port: The port to which the host is listening.

Users Modifies the user list, you can enter information about the practitioner or technician who is going to perform the actual ECG recording. This information is then used to 'sign' the ECG. You can Add, Edit or Delete users. For each user at least the User field and E-mail field should be filled in.

List view	Select visible file properties. Here you can select which file properties are shown in the file list. Available properties are: Date/Time, Size, Patient name, Patient number, Type, File Name.
Font	Change displayed font type, size and style.
Language	Select in which language you want to work with Pocket ECG.

8.5 Installing the plug-in for Welch Allyn CardioPerfect

To install the special Pocket ECG plug-in on the host machine where you run Welch Allyn CardioPerfect you have to run the setup program. Make sure that you closed Welch Allyn CardioPerfect before running the setup.

Run **CardioCEPlugInSetup.exe**

Follow the instructions on the screen.

8.6 Configure Welch Allyn CardioPerfect

In this paragraph the minimum setup for your Pocket PC is described. Before setting up your Pocket PC we assume that you are familiar with the basic use of your Pocket PC as described in the User manual of your Pocket PC.

The Welch Allyn CardioPerfect program can be setup to work with the Pocket PC in two different configurations. When the Pocket PC is attached to the host computer by means of activesync it is possible to control the settings on the Pocket PC by using the special Pocket ECG tab in Welch Allyn CardioPerfect. For this you have to install the special plug-in, see previous paragraph.

The Pocket ECG application has numerous settings that can be used to customize the program to your specific needs. Some of these affect trace display, others are needed for telemedicine or for signing ECG's. You can edit these parameters in two ways. The first is directly using the Pocket ECG application. The second is by using Welch Allyn CardioPerfect that has access to the Pocket PC by means of activesync.

We recommend using the Welch Allyn CardioPerfect program to edit the settings. Please read the user's manual for an explanation of all settings.

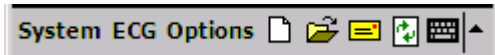
The other configuration is when the Pocket PC is connected to Welch Allyn CardioPerfect by means of a remote direct socket connection. In this case it need not be physically attached to the host computer. But to do this you have to give the Pocket PC access to the program. This can be done by the configuration tool and the administrator tool that came along with Welch Allyn CardioPerfect. Please read the Welch Allyn CardioPerfect users manual for more details. To be able to act as a host Welch Allyn CardioPerfect must be setup as a direct socket host, the computer must have an Internet connection with a fixed IP address and all Pocket PC's that are allowed to connect must be added to the contact list.

9. Short description

In this chapter the menu options are discussed briefly.

File list mode

Manage folders, ECG record files and settings.



System menu:

- Help Opens the Pocket ECG Help file
- About Information about the installed software and the Registration
- Close Closes Pocket ECG

ECG menu:

- Info Shows the properties of the selected file
- New Starts a blank ECG record or a new ECG record for the selected patient
- Open Opens the selected file
- Rename Change the name of the selected file
- Delete Deletes the selected files or folders
- Send/Receive Transfers ECGs using socket connection or places ECG in outbox

Options menu

- Recording Modify recording settings
- Contacts Modify telemedicine contact list

IMPORTANT:







If socket connection is used, address field on Host PC must match the Pocket PC Device Name (Windows CE Settings: System, About, Device ID, Device Name)

Note:

Do not use space, underline or other separators; only letters and numbers! Device name is case sensitive!
iF

- Users Modify users list
- List view Select display options
- Font Change displayed font size and type
- Language Select used language

Icons

-  Starts a blank ECG record or a new ECG record for the selected patient
-  Opens the selected file
-  Transfers ECGs using socket connection or places ECG in outbox
-  Refresh the file list and settings. Tap if ECG files or settings were managed from an external PC.
-  Activates on screen keyboard
-  Activates on screen handwriting

Monitor mode







Displays traces or selected ECG leads and average pulse rate in real time.



ECG menu:

- Patient Card Add or change Patient card and history (Anamnesis)
- Interpretations
 - Interpretation Opens the Interpretation editor
 - History View interpretation history
- Comments Opens the Comments editor
- Users Modify user list
- Display
 - Settings Modify settings
 - Colors Modify colors on screen

Icons

-  Start recording an ECG
-  Zoom in or zoom out
-  Scroll down or up between the leads
-  Back to File list mode
-  Stop recording
-  Save and quite

Review mode











Displays traces or selected ECG leads and average pulse rate of recorded ECGs.



ECG menu:

- Patient Card Add or change Patient card and history (Anamnesis)
- Interpretations
 - Interpretation Opens the Interpretation editor
 - History View interpretation history
- Comments Opens the Comments editor
- Users Modify user list
- Display
 - Settings Modify settings
 - Colors Modify colors on screen

Icons

-		Opens the voice comment toolbar
-		Start recording
-		Stop recording
-		Play
-		Save voice comments
-		Cancel, disregard changes
-		Zoom in or zoom out
-		Scroll down or up between the leads
-		Cancel and quite, disregard changes
-		Save and quite

10. Troubleshooting

In this chapter, some problems and possible solutions are described.

The program does not respond when the recorder is switched on.

- Check the battery and replace it when necessary. Make sure that the cable is properly connected.
- When you work with a Unilink, check whether you have configured the software to use the correct COM port.

When you start a recording you do not see the ECG traces on the screen and you receive a number of errors.

- Make sure that the setting for the sampling frequency in the 'Hardware' tab of the ECG settings matches the sampling frequency of your recorder. The sampling frequency can be either 300, 600 Hz.

When you start a recording you do not see the ECG traces on the screen and you see Discon. in the upper right corner of your screen.

- Check the COM port setting
- Make sure that the cables are properly connected.
- If you are working with the CardioPerfect Pro recorder, check if the batteries are charged and properly installed.

Some buttons or menu entries are inactive.

- This is probably caused by the fact that your user role does not allow you to perform the actions of those buttons or menu entries.

Technical Support

If you have a technical question that you cannot answer with the provided tools, please contact our Installation & Support department or contact your local distributor.

When you contact the Installation & Support department via phone, e-mail or fax, please provide the following information:

- Your name, company name, address, phone number, fax number and e-mail address.
- Product serial number.
- Exact product name and version number.
- Type of operating system.
- Type of installation (network or standalone).
- Complete description of the problem and the steps to reproduce it. If applicable we would also like to have the exact error message.

To view the Pocket ECG information:

1. In the **System** menu, select **About**. The version and expiration date will appear.
2. Tap on the **Registration** button, the serial number, key and e-mail address combination will appear.

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