



# NASIFF ASSOCIATES CARDIORESTING USER GUIDE

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Printed in the USA by Nasiff Associates, Inc.  
Brewerton, New York.

## General Information

Safety of the Cardio systems is discussed in the indications for use section with electrical safety detailed in the Specifications section.

Specifications of the Cardio systems is detailed in the specifications section.

Packaging is discussed in the Returning your system for service in the warranty section. Care should be taken to make sure the devices are protected from physical damage including crushing, immersion, etc.

Storage is discussed in the specifications section. Of note are the temperature and humidity. In general, like all electronic devices, the devices should be kept in low-humidity environments.

Handling and distribution, shipping of the devices should be with packaging mentioned above and with shipping companies that do small packages like the device packages. Shippers such as Fedex, UPS, DHL, Post Office have proven records.

The devices do the measurements and monitoring functions described in this manual. Installation is discussed in the Installation section. There are no user serviceable parts inside the Cardio systems. Refer to the Service section to obtain service.

## Safety Warnings

1. These devices capture data reflecting a patient's physiological condition that when reviewed by a trained medical professional can be useful in determining a diagnosis. However, the data should not be used as sole means for determining a patient's diagnosis.
2. Use of accessories other than those recommended by NAI may compromise product performance.
3. To maintain designed operator and patient safety, any peripheral equipment and accessories that can come in direct patient contact must be in compliance with IEC 60601-1.
4. Hardware is designed to meet or exceed IEC 60601-1-2, however, some environmental electrical interference may cause an artifact in the ECG. The quality of ECG signals may be adversely affected by electromagnetic interference from environmental sources resulting in non-physiological waveforms with the potential for misinterpretation.
5. This device is not intended for use during an MRI.
6. Before performing defibrillation or applying any high frequency surgical equipment to a patient, remove leads and electrodes from the chest area. Cable leads or electrodes trapped under defibrillator pads or paddles during defibrillation or electrodes in contact with high frequency electro-surgical equipment can cause patient burns.

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## Safety Warnings Continued

7. Once one or more patient leads are connected to a patient, do not allow patient leads to meet with any grounded or live parts. Contact could cause unacceptable levels of electrical current to flow to the patient.
8. The equipment is not intended for infants weighing less than 10 kg.
9. Strangulation hazard. Route excess patient cable away from neck area. Avoid having excess cable near machinery where it could be snagged. Select the shortest cable for usable for electrode placement and patient comfort.

## Cautions

1. Although the plastic enclosures are designed for a clinical environment and can resist moisture, neither the device nor patient cables should be subjected to autoclaving or steam cleaning.
2. Recommended cleaning procedure is to wipe the exterior surfaces with a cloth dampened with warm water and mild detergent solution and then dry with a clean soft cloth.
3. No serviceable parts are inside. The case cannot be opened without destroying it.
4. Do not pull or stretch patient cables, as this could result in mechanical and/or electrical failures. Store patient cables after use by forming them into a loose loop. It's good to keep the patient cables connected to the devices to minimize damaging the connectors to the devices.

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## Cautions Continued

5. Align patient cable connector key and enclosure key before plugging in patient cable. Forcing misaligned connectors can damage connector pins.
6. Avoid shock or sudden impact.

## Notes

1. Excessive patient movement could interfere with the operation of the devices.
2. Proper patient preparation is important to successful application of ECG electrodes and operation of the devices.
3. Changes or modifications not expressly approved by NAI for compliance could void the users authority to operate the equipment.
4. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in commercial and residential installations. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. This equipment should not cause harmful interference to radio or television reception, and can be tested by turning the wireless transmission off and on. If any interference is detected, the operator is encouraged to consult NAI.

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## For Customer Support

**GO TO CARDIOCARD**  
**CLICK ON HELP**  
**MAIN HELP MENU**  
**CLICK ON THE SECTION YOU NEED**

[www.nasiff.com](http://www.nasiff.com)

**SERVICE & SUPPORT**  
**ONLINE HELP**

**CALL US**  
**315-676-2346**  
**CUSTOMER SERVICE**  
**IS AVAILABLE**  
**MONDAY - FRIDAY**  
**9:00 AM TO 4:00 PM**  
**EASTERN STANDARD TIME**

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# CardioCard® System: User Manual

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## The intended use and relationship of the CardioCard® Products.

The CardioCard® System performs the main cardiology tests in one system. The intended use is to acquire, analyze, display and print short-term and long-term ECGs and non-invasive blood pressure, during resting, stress, and holter/ambulatory/mobile conditions. To get a quick diagnostic 12-second ECG strip, to monitor for an extended period, or perform a long term rhythm, the CardioResting™ mode is ideal. Simply click the CardioResting™ Button. CardioStress™ mode is best to monitor during stress/exercising the patient and storing strips at timed intervals for ease of tracking the patient's heart response to stress/exercise. Simply click the CardioStress™ Button. The CardioHolter™ is best for recording the patient's ecg over longer periods to catch long-term rhythm conditions. Simply click the CardioHolter™ Button. Sometimes Medical Professionals want a blood pressure on the patient as well. NIBP is integrated for ease of use. Medical professionals may choose to use anyone or any combination of these modes as they see fit.

CardioCard® / CardioSuite® is the brand name of the family of Cardio products marketed as CardioResting™ ECG, CardioStress™, CardioHolter™, and CardioVitals™ NIBP. The product has buttons in its user interface that allow all of these tests to be done in a common integrated screen for ease of use. All CardioCard® ECGs come with a small electronics box that acquires the ECGs (and NIBP for units using NIBP), a software CD, patient connection cables, and a manual.

In all cases, the system is used to determine the Cardiovascular condition of patients. Medical professionals use this information to determine if a patient has Cardiac disease and if so, the extent. For example, if a resting ECG shows abnormal V5, V6 leads that indicate Left Myocardial Infarction (LMI), the clinician knows to look closer at that part of the heart. This may show also in other leads (e.g. V3, V4) during stressing the patient that will tell the clinician that the anterior part of the heart is also in danger. If the patient is elderly and not a candidate to stress, they may put the CardioHolter™ on for the patient to wear all day. The change that came during stress may show then, indicating the same possibility. CardioHolter™ is also good for detecting intermittent complaints such as chest pain, palpitations, etc that may occur during the day or at night.

The intended use of the **CardioResting™ ECG System** is to diagnosis ECG medical conditions that are primarily detections of normal and abnormal ECG waveforms during rest. The systems are used to find the cause of chest pain or pressure etc., to diagnose heart attacks and rhythm problems, and to obtain clues about other heart conditions. The main diagnosis categories are blocks, MI's, axis deviations, enlargements, and arrhythmias. A full list of interpretive statements is in the Cardio ECG manual. Typically these tests are only for about 10 seconds, but long-term recordings can be used as well to follow rhythm. The patient is first typically attached with tab electrodes to the PC connected CardioCard® device and then Start ECG is selected to view the ECGs. There are buttons to store and print as well.

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The intended use of the **CardioStress™ System** is to diagnosis ECG medical conditions that are primarily the same detections that didn't appear in a patient's resting ECG test, but may show while stressing the patient for a few minutes and after stressing (recovery). It is used for patients who have been experiencing chest pains or other symptoms of coronary heart disease. It also helps to determine if the heart is receiving enough oxygen and has proper blood flow when it needs it the most, such as when the patient is stressed/exercising. The patient is first attached to the PC connected CardioCard® device with snap type electrodes in similar positions to the resting ECG test described above. The test is started with a button being pressed that stores a resting baseline ECG and then a button is pressed to stress the patient. The baseline resting ECG is compared to the stressed ECGs over time. When the patient is done being stressed, the patient is then allowed to go back resting post test (recovery). The ECGs are normally recorded during recovery as well to be sure the patient recovers well or to detect that the heart is not recovering well.

The intended use of the **CardioHolter™ System** is to diagnosis medical conditions that are primarily detections of ECG rhythm abnormalities (such as VE beats, Afib, bradycardia, tachycardia, etc) that may not be caught by shorter tests like the resting or stress ECG testing. A CardioHolter™ monitor is a battery-operated portable ecg device that measures and records the heart's activity (ECG) continuously for usually 24 hours or longer while you do daily activities. The main diagnosis categories are Arrhythmias such as VEs (ventricular ectopics), Atrial fibrillation, SVEs (supraventricular ectopics), tachycardias, and bradycardias, etc.

The intended use of the **CardioVitals™ NIBP** is primarily to measure ECG and blood pressure by use of a typical reusable arm cuff. NIBP is typically in millimetres of mercury (mmHg) pressure units and is given as two figures: systolic pressure (the pressure when the heart pushes blood out) and diastolic pressure (the pressure when the heart rests between beats). If the blood pressure is too high, it is putting extra strain on the arteries and on the heart. This may also cause complications such a heart attack, stroke, kidney problems, and vessel damage. If the blood pressure is too low, there is not enough pressure to get blood to all cells of the body and therefore they can die.

These devices can be used multiple times.

The intended users are medical professionals such as physicians, nurses, medical technicians, etc.

The systems are sold as packages and users can buy the supplies locally as they are standard industry wide.

## Nasiff CardioResting™ ECG Package Contents

Figure 1  
CardioCard® ECG



Figure 2  
Resting ECG Leads



Figure 3  
Banana Clips



Figure 4  
USB Cable



Figure 5  
CC Software

Please follow the install instructions for the Resting ECG on the following pages.

**Do NOT plug-in the USB Cable to your computer until installation of software is complete!**

1. After installation is complete, please insert banana clips Banana Clips (Figure 3) onto Lead Wires (Figure 2)
2. Plug Lead Wires (Figure 2) into digital ECG box (Figure 1)
3. Connect USB Cable (Figure 4) into digital ECG box (Figure 1)  
Then Connect the USB Cable (Figure 4) into the USB Port of your computer
4. Store the CardioCard® Software (Figure 5) in a safe place for the event you want to install on another computer. The CardioCard® Software (Figure 5) will install on multiple computers.

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## CardioCard® System User Interface

WELCOME and thank you for sharing our vision for PC-Based Diagnostics

The CardioCard® System is the most advanced medical instrument available. With this system, you can acquire and manage in your databases multiple diagnostic tests for multiple patients over long time periods.

Tests performed and managed by the CardioCard® include:

- Interpretive 12- lead ECG (when running the ECG interpretations, please note the following: no automated analysis is completely reliable and a physician should over read the ECG)
- Stress Testing ECG System
- Holter Monitoring ECG System
- Non-invasive Blood Pressure System (NIBP)
- Your interest in our PC-Based ECG Diagnostic Systems indicates

Your interest in our PC-Based ECG Diagnostic Systems indicates that we share the same VISION for ECG Cardiology and for that matter many other Diagnostic Tests. Namely, by merging the superior ECG Diagnostics of the CardioCard® with the power and flexibility of a PC, Notebook or Tablet, an **“unbeatable partnership is formed”!**

Nasiff Associates believes that while the innovation of ECG Technology has been significantly enhanced over the years, similar progress has **not** been demonstrated with regard to the “Device” dimensions of the product, and still furthers its ability to integrate into today’s medical “System” environment.

Today, it is no longer acceptable for an ECG Recorder “just to take an ECG”. Physicians and their Business Administrators want and expect diagnostic equipment to not only compliment the respective medical application, but to successfully integrate into the business aspect of the practice as well.

Nasiff Associates with its CardioCard® System is positioned to offer the Physician USER its **CardioSuite®** PC-Based Devices with FDA 510K and ISO Registrations:

The CardioSuite® with WINDOWS\* or iOS\* "Point and Click" USER Interface includes:

- Resting ECG Device
- Exercise Stress Testing Device (treadmill can be included upon request)
- Holter Monitoring Diagnostic Device (cassette, digital or BOTH, 3 Lead, Full Disclosure Recorder(s))
- Non-Invasive Blood Pressure and many others...
- **ALL Test Data seamlessly integrates into an inclusive Database and Clinical/Telecommunication Management System**

By merging the diagnostics of the CardioCard® System with the power and low cost of the PC, Nasiff Associates is able to offer **more features at a lower price** than any other ECG System on the market today! Don't forget, ALL CardioCard® Diagnostic Modules come with their own "Paperless" **DataBase Clinical Management System** solution, which allows virtually unlimited Patient ECG Record Storage, Networking, Batch ECG Transmission, Electronic Measurement Calipers, Full Complex Measurements, Fax, Modem and **Internet** transmission capability and much more. AND, as you add more CardioCard® Diagnostic Modules, your existing DataBase **seamlessly integrates** the new diagnostic data into your existing DataBase.

### **Finally a Diagnostic System that your practice can grow into, not out of!**

If your IT Department is going to make changes on your computer make sure they inform you and when they are done please test the Nasiff CardioCard® completely to make sure it is still working fine.

It is strongly suggested to protect your computer and your Nasiff CardioCard® with a Battery Back-Up and Surge Protector. (Such as an APC).

CardioCard® Systems run on **WINDOWS** XP, Vista 32/63 bit, Windows 7, Windows 8, Windows 10, and **IOS** with Boot Camp, Dual Boot, VMware, Fusion, or Parallels.

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During Test:

- F8 - Start Acquisition, ECG (1st Run)
- F1 - Help
- F2 - Start / Stop NIBP Cycle
- F3 - Store
- F4 - Print
- F7 - Log time of Event
- F8 - Read in from Scale (After Acquisition Start)
- F9 - Start Stress Test
- F10 - Change ECG Time Base
- F11 - Change ECG Gain
- F12 - Change Leads Viewed

During Retrieve / Database:

- F1 - Help
- F2 - Open Holter Editor
- F3 - Go to Next Holter Arrhythmia
- F4 - Print Graph Report
- F5 - Print / View Summaries
- F6 - Store Measurements, Interps, Edits
- F7 - Run Autoanalysis
- F9 - View Interps / Measurements ECG & Stress
- F10 - Change Time Base
- F12 - Change Leads Viewed Backspace
- Toggle Measure cursors Alt-m
- Set Measurement Cursor Datum



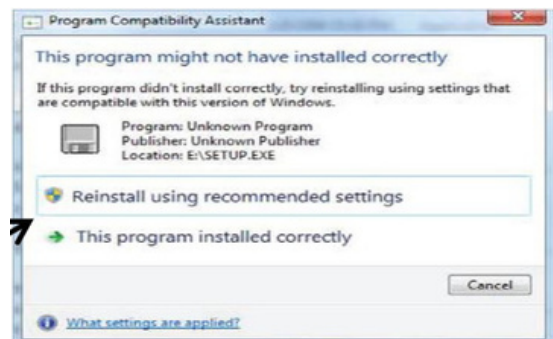
## Installing The CardioCard® Software

To insure an easy installation please follow the following instructions:

1. Make sure that you pause your version of Anti Virus and that you have full administrative rights to your computer prior to the install.
2. Place the Nasiff CardioCard software into the USB drive of your computer.
3. Open the Drive with the folder "Cardio 639", open the setup application and answer ok or yes to all questions.
4. Install the drivers for the devices you will use on the pc and look for the "Nasiff Reports" folder on your desktop. If it is not on your desktop, you can find the folder on your C:\ Drive and send it to your desktop. You should also see the CardioCard application icon on your desktop.
5. Remember to save your CardioCard™ Installation Thumb Drive in a safe place.



If this message appears:  
Click "This program installed correctly"



When the Installation is Complete, you will see the Nasiff CardioCard® icon on your desktop



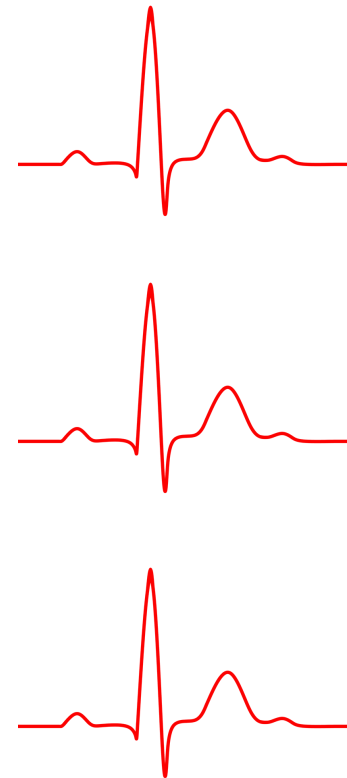
**Do NOT plug-in the USB Cable to your computer until installation of software is complete!**

## Installing Digital ECG

- Click on the Windows “Icon” or “Start Button” located at the bottom left of your screen, then click on “Computer” and locate “Devices with Removable Storage”. Highlight the “CardioCard” software in the “DVD” drive and RIGHT-click on the “DVD drive”
- This will open a drop-down view, click on “Explore” or “Open”. You will see many files in alphabetical order. Scroll down to “CDM20600” — double click on — “CDM20600” — if prompted, click “Continue” and “Yes” to all questions
- Click “Finish” and close all programs

## Checking Digital ECG Installation

- Plug the USB cable (Figure 4) into the digital ECG box, then plug into the USB port of your computer
- Be sure you have a good connection to the digital ECG box and your computer
- Unpack your lead wires and plug wires into the 12 pin round connector located on your ECG CUSB box
- Double click on CardioCard icon on your desktop (square icon with red heart)
- With the CardioCard software open locate the ECG button
- Click once on the ECG button and you should have lines running across the screen (click on ECG button to stop)
- You are now ready to begin!



## Nasiff CardioCard® ECG

### Getting Familiar with the ECG Buttons



### Buttons Used for ECG Testing



To start an ECG Press this button  
Be sure to prep the patient well to reduce artifact and assure good results



To start a Stress Test Press this button  
Be sure to prep the patient well to reduce artifact and assure good results



To Set-Up a Holter Test Press this button  
Be sure to prep the patient well to reduce artifact and assure good results



To retrieve patient data at anytime, click on "Patient", then highlight the patient, and click "Open" find the test by date and time and click "OK"



When satisfied with an ECG on-screen click "Save"  
Note: You must have a clean ECG on-screen for 12 seconds  
You can check "Enter Demographics Before" in settings to be prompted to enter a patients information before recording an ECG



To print an ECG report, click on "Printer".  
To Print and Retrieve an ECG report within your EMR, make sure to have the send to and read from path filled out in "Set-Up"

## Nasiff CardioCard® ECG

### Getting Familiar with the ECG Buttons (Continued)



Always be sure to click "OK" or "Save" to hold changed settings



### **Set-Up**

Under the "Advanced" tab in "Set-Up" you can fill out the letterhead to appear as wanted on your ECG Reports

Under the "Resting" tab in "Set-Up" you can choose to be prompted to enter demographics before or after acquiring an ECG

Under the "EMR" tab in "Set-Up" you can choose to send your PDF Reports to the "Nasiff\_Reports" folder on your desktop automatically

Under the "R&S" tab in "Set-Up" you can turn on pacemaker detection

Under the "Advanced" in "Set-Up" tab, click on "Default Settings" to reset all "Set-Up" Settings to factory default

## Preparing a Patient

Proper preparation of the patient's skin is absolutely essential to obtain a quality ECG recording.

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***Note:*** Without good skin preparation, both noise and artifact will frequently degrade the patient's ECG to the point of being unusable by the physician.

---

### Recommended Steps:

a) Select the sites for electrode application.  
The electrodes must be applied over bone or cartilage.



b) Dry shave the electrode areas well.

c) Using the scribe pad (or a small square piece of abrasive material, such as 220 grit sandpaper or equivalent) to remove the top layer of skin. Use moderate pressure, abrade the skin at the electrode sites by making 3 or 4 crossing strokes. The strokes should cross at the chosen electrode site. Lightly brush the areas with a dry gauze-pad to remove any debris.

You can also use Nuprep.

d) Wipe the skin in the electrode areas with an alcohol prep pad.



e) Allow the skin to dry thoroughly.



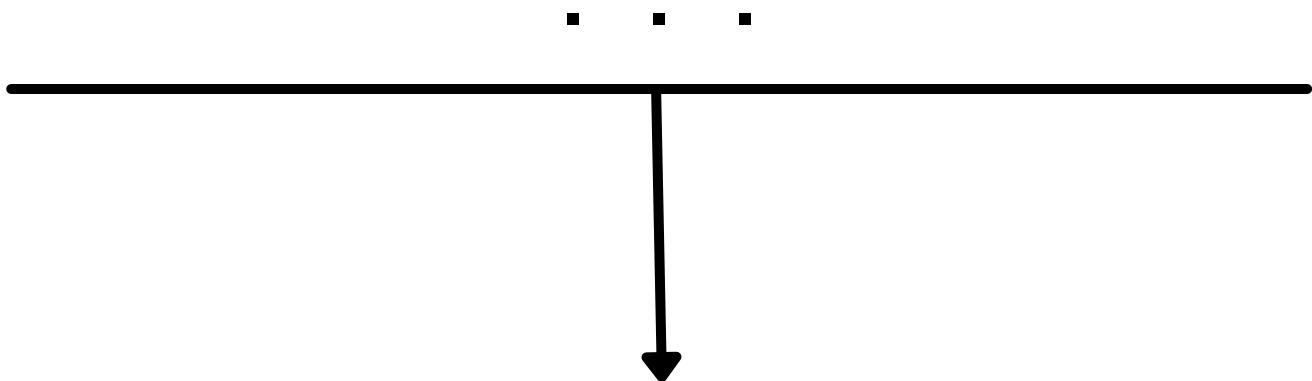
## Nasiff Electrode Placement

### CardioCard® Resting and Stress ECG Lead Placement

Select the sites for electrode application. The electrodes must be applied over bone or cartilage. Refer to the Electrode Placement Chart below.

*Proper prep is Essential*

- V1** 4th intercostals space, right sternal border
- V2** 4th intercostals space, left sternal border
- V3** Midway between V2 and V4 on a line joining these two points
- V4** Interspace in which apex is located(5th or 6th); mid clavicular line
- V5** Anterior auxiliary line; on same level with V4
- V6** Mid auxiliary line; on same level with V4 and V5

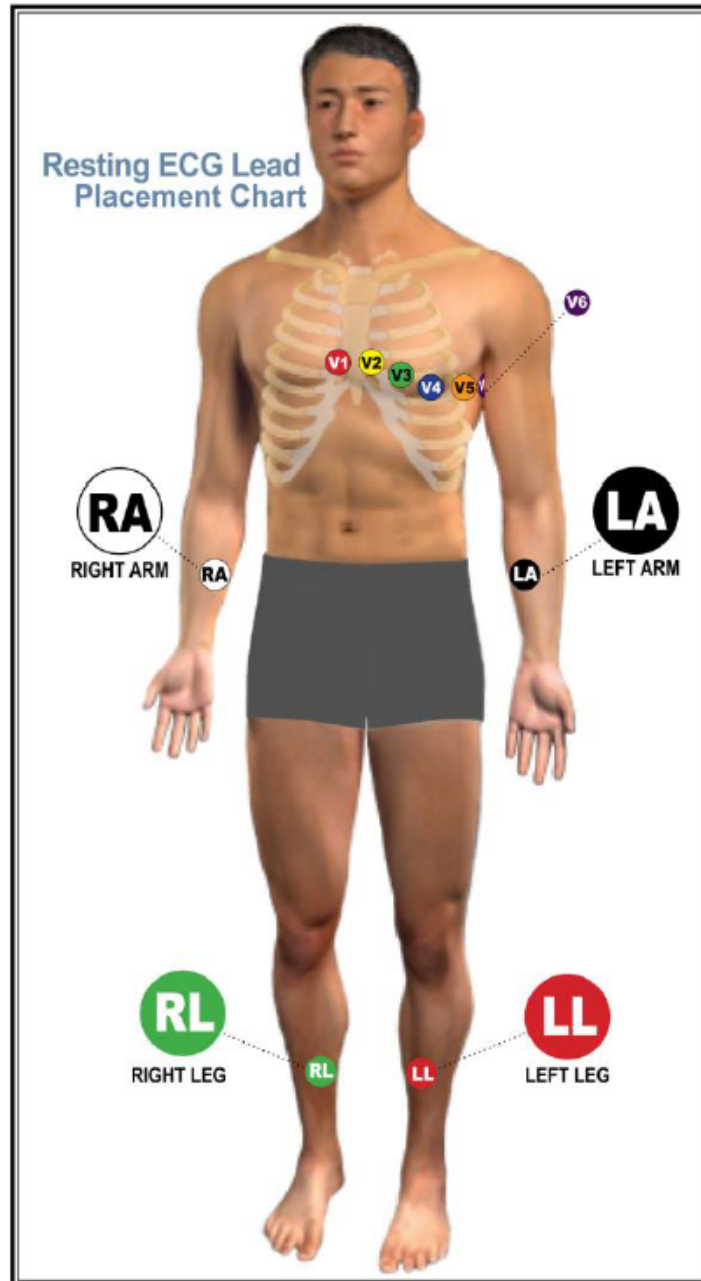


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## Nasiff Electrode Placement Chart

### CardioCard® Resting and Stress ECG Lead Placement

*Proper prep is Essential*



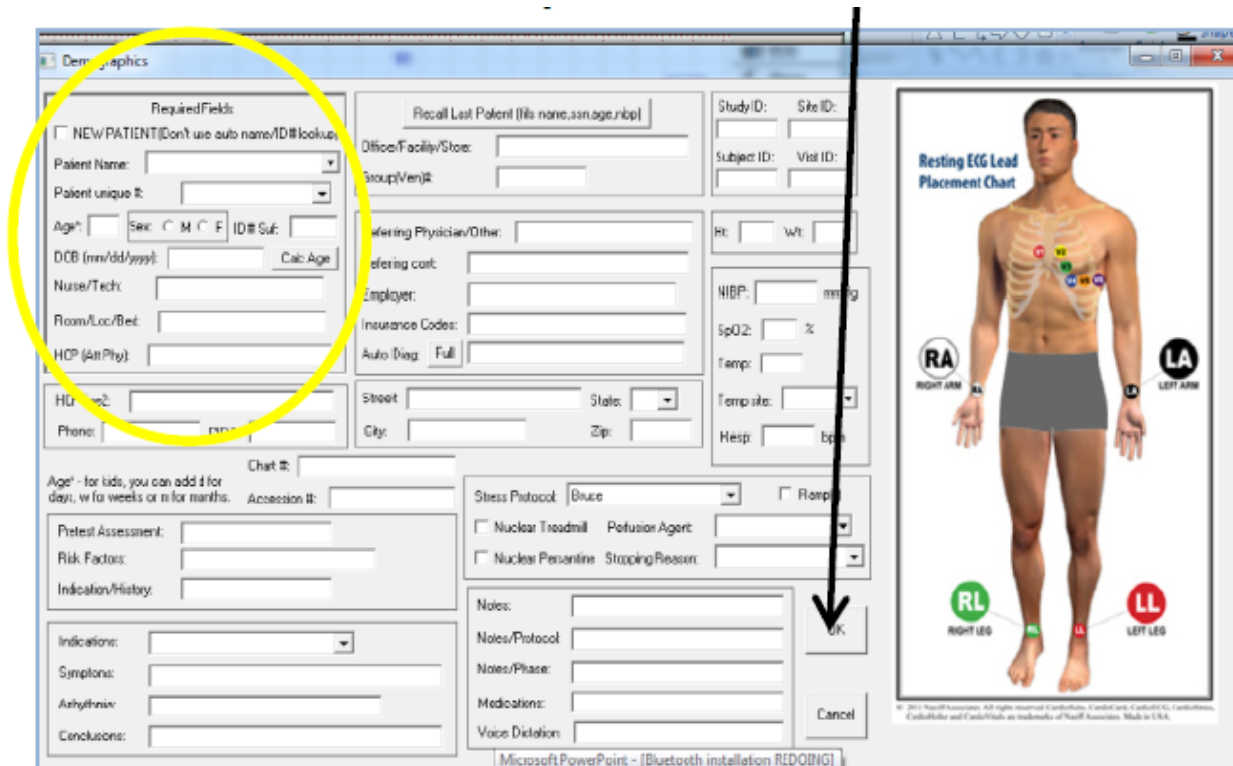
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## Performing an ECG

Within the demographics page, it is required to fill the following:

1. Patient Name, Last Name, First Name. No special characters.
2. Patient ID, only number and letters
3. Age
4. Gender "M" or "F" then press "OK"

These four fields are required to start an ECG



1. When you get a clean ECG tracing click "Save".  
This is the Aqua color icon with the Monitor and Red Arrow
2. You will be prompted to print, you can set this to create a PDF and auto-save in folder.
3. Comments can be added by clicking on "Comments" located on the right of the CardioCard® program while you are in the Patient Test.
4. After Comments are saved you can set up auto save and PDF reports will automatically be saved to the "Nasiff Reports Folder and can be uploaded to your EMR when ready. (The PDF will be sent to the "Nasiff\_Reports" folder on the desktop)

## CardioResting™ ECG Extras

- F12 on your keyboard allows you to view different lead options
- F10 on your keyboard will view condensed leads
- To store multiple ECG strips click on "Options" located at the top of the CardioCard® and scroll down to "12-second strips during store". This will allow you to store multiple ECG strips.
- To view measurements: go to "Options" and scroll down to "Display Measurements"
- To change the patient's name: go to "Options" and scroll down to "Display Measurements"
- To Increase or Decrease Gain: go to "Options" and scrolls down to "Gain" then adjust
- To View selected leads: click on "Leads" at the top of the CardioCard® and scroll down to preference.
- To Print-Red grid lines: click on "Leads" at the top of the CardioCard ® and scroll down to preference.
- To Send Report by Fax: click on "File" located at the top left of the CardioCard® screen, scroll down to "Print to a Selected Printer/Fax" (Your PC needs to be connected to a Fax Machine).
- What do the abbreviations for interpretations mean? Click on "Help at the top of the CardioCard® then click on "Main Help Menu" then locate and click on "Appendix and Examples".
- For networking go to your C: Drive and find your (Patient Database" which is the car12wd folder, and move it to your network. Make sure you make a backup of the original "car12wd" folder.
- Pacemaker Detection: turn on in "Set-Up"
- Calipers (Measurement Cursors) can be used by pressing "Backspace" using arrow keys to move the cursor, or by pressing "ALT + M to mark. Arrows over measurements will appear on the screen.

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## ECG Interpretive Abbreviation and Definitions

- **ECG Interpretation Abbreviation Meanings.**

The meanings of the codes are entered here for easy access. By looking at the codes, they are abbreviations of the typical cardiac diagnostic statement. This format was chosen to make the need for this list almost nonexistent. Obvious meanings are the intent for ease of use.

- **Special Note**

Computer ECG analyses are an aid for ECG classification. Unconfirmed computer ECG analysis reports SHOULD NOT be used for prescribing patient treatment or nontreatment without review by a qualified physician. No computerized interpretation is completely reliable and Physicians trained in ECG interpretation should over-read the ECG results.

- **Actual Reported Code/Statement Meanings:**

The program takes as input the standard output of the CardioCard® Measurements program and outputs the codes in a character string to be read as is.

- On the ECG report and screen following statement is made: "No automated analysis is completely reliable and a physician should over-read the results"



## ECG Interpretive Abbreviation and Definitions (Continued)

<u>Code/STMT</u>	<u>Meaning</u>
<b>Normal ECG</b>	Normal ECG
<b>Measurement data not available</b>	Measurement Data not Available
<b>Susp Arm Lead Reversal</b>	Suspected Arm Lead Reversal
<b>RS</b>	RSR/QR pattern in V1 suggests possible Right Ventricular Conduction Delay
<b>IRB</b>	Probable IRBBB (Incomplete Right Bundle Branch Block)
<b>RB</b>	Probable RBBB
<b>RBV</b>	Probable RBBB + RVE
<b>ILB</b>	Probable ILBBB (Incomplete Left BBB)
<b>LB</b>	Probable LBBB
<b>LA</b>	Probable Left Anterior Fascicular Block
<b>LP</b>	Probable Left Posterior Block (LPFB)
<b>BA</b>	Probable Bifascicular Block (RBBB & LAFB)
<b>BP</b>	Probable Bifascicular Block (RBBB & LPFB)
<b>ID</b>	Nonspecific Intraventricular Delay
<b>IB</b>	Nonspecific Intraventricular Block
<b>PA</b>	Probable Anterior MI, Age Undetermined

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## ECG Interpretive Abbreviation and Definitions (Continued)

<u>Code/STMT</u>	<u>Meaning</u>
<b>OA</b>	Possible Anterior MI, Age Undetermined
<b>SDSE</b>	Possible ST Depression
<b>TA</b>	Possible Nonspecific T wave abnormality
<b>TAA</b>	T Wave Abnormality (Possible Anterior Ischemia)
<b>MAA</b>	Marked T Wave Abnormality (Possible Anterior Ischemia)
<b>TAL</b>	T Wave Abnormality (Possible Lateral Ischemia)
<b>MAL</b>	Marked T Wave Abnormality (Possible Lateral Ischemia)
<b>TAAL</b>	T Wave Abnormality (Possible Anterolateral Ischemia)
<b>LAD</b>	Abnormal Leftward Axis Deviation
<b>RAD</b>	Right Axis Deviation
<b>MRD</b>	Minor Rightward Axis Deviation
<b>EAD</b>	Extreme Axis Deviation
<b>MLD</b>	Minor Left Axis Deviation
<b>SLV</b>	Suspected Left Ventricular Hypertrophy
<b>SRV</b>	Suspected Right Ventricular Hypertrophy

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## ECG Interpretive Abbreviation and Definitions (Continued)

<u>Code/STMT</u>	<u>Meaning</u>
<b>SBV</b>	Suspected Biventricular Hypertrophy
<b>SE</b>	Nonspecific ST Elevation Abnormality
<b>SEP</b>	ST Elevation (Possible Early Repol or Pericard)
<b>PAP</b>	Possible Acute Pericarditis
<b>AP</b>	Acute Pericarditis
<b>SI</b>	Septal Injury
<b>AI</b>	Anterior Injury
<b>LI</b>	Lateral Injury
<b>ASI</b>	Antero Septal Injury
<b>ALI</b>	Antero Lateral Injury
<b>II</b>	Inferior Injury
<b>JSD</b>	Junctional ST Depression (Probably Normal)
<b>JSDA</b>	Junctional ST Depression (Probably Abnormal)
<b>SAD</b>	ST Abnormality (Possible Digitalis)
<b>NSD</b>	Nonspecific ST Depression (Possibly Normal)
<b>MSDS</b>	Marked T Depression (Possible Septal Subendocardial Injury)

[27]

## ECG Interpretive Abbreviation and Definitions (Continued)

<u>Code/STMT</u>	<u>Meaning</u>
<b>MSDA</b>	Marked ST Depression (Possible Anterior Subendocardial Injury)
<b>MSDL</b>	Marked ST Depression (Possible Lateral Subendocardial Injury)
<b>MSDI</b>	Marked ST Depression (Possible Inferior Subendocardial Injury)
<b>QRSA</b>	Abnormal QRS-T Angle (Consider Primary T Wave)
<b>RAE</b>	Probable Right Atrial Enlargement
<b>PLAE</b>	Possible Left Atrial Enlargement
<b>LAE</b>	Probable Left Atrial Enlargement
<b>BAE</b>	Probable Batrial Enlargement
<b>RSAD</b>	Abnormal Right Superior Axis Deviation
<b>IA</b>	Indeterminate Axis
<b>LVA</b>	Low Voltage QRS (Consider Pulmonary Disease)
<b>S1</b>	S1, S2, S3 pattern (Consider Pulmonary Disease, RVH, or Normal Variant)
<b>PD</b>	Probable Pulmonary Disease
<b>CAI</b>	Cannot Rule Out Septal Infarction (Age Undetermined)

[28]

## ECG Interpretive Abbreviation and Definitions (Continued)

<u>Code/STMT</u>	<u>Meaning</u>
<b>CSI</b>	Cannot Rule Out Septal Infarction (Age Undetermined)
<b>SIF</b>	Probably Septal Infarction (Injury or Ischemia, Age Undetermined)
<b>PLI</b>	Possible Lateral Infarction (Injury or Ischemia, Age Undetermined)
<b>LIF</b>	Probable Lateral Infarction (Injury or Ischemia, Age Undetermined)
<b>ASIF</b>	Probable Anteroseptal Infarction (Injury or Ischemia, Age Undetermined)
<b>ALIF</b>	Probable Pos Anterolateral Infarction (Age Undetermined)
<b>CI</b>	Cannot Rule Out Inferior Infarction (Masked by Left Anterior Fascicular Block)
<b>PPAC</b>	Possible PAC
<b>PRWP</b>	Low Voltage in Limbs

## ECG Interpretations

### There are FOUR main classes of classical 12 lead ECG

Axis deviations, enlargements, blocks, and MIs. Board-certified Cardiologists do not always agree on interpretations and machine interpretation programs make mistakes and are not as good as physicians. A physician should over-read the results because no machine is correct all of the time. The program calls most of the abnormalities it recognizes, but some may not be listed if numerous are found. It tries to list the most significant, and if a statement occurs more than once, it is probably even more significant as more than one set of tests detected it. In any case, always know that a machine interpretation is a tool to assist the medical professional. Actual patient diagnosis and treatment require a medical professional's expert opinion, interpretation. And as we all know; more than one medical professional is needed in many cases to confirm diagnosis and treatment options.

The Cardio ECG systems state first if it thinks the ECG is normal (PNORM = probably normal) or abnormal (ABN, ABNORM). Abnormal occurs when the program detects a significant deviation from normal measurements. If the program states ABN, then it is very important that a physician over read to see what they think is actually happening with the patient. A NORM as the first statement should still be looked at by a physician, but the Cardio ECGs usually are a bit sensitive to try to be sure to flag any possible abnormal for checking.

The next statement is the rhythm. If the program thinks it is normal sinus it'll say NSR, Sinus or normal sinus. It can also state that it thinks it is Afib, Brady, or Tachy.

### **The next statements are details of the analysis when Abnormal (ABN)**

For example, the sample on the next page has abbreviated ABN, Sinus, LAD, 1st DegBlk or full interps: ABN, Sinus, Left Axis Deviation, probable 1st-degree block, Lateral Infarction, age undetermined, nonspecific ST-elevation ABN, ST elevation, early repolarization, acute pericarditis, poor R wave progression. The system states the ECG is ABN abnormal for the reasons given. Note that numerous classes are listed meaning the ECG has numerous conditions that are abnormal. Sinus indicates at least the main heart rate appears regular and somewhat normal. (note that the Cardio systems allow the operator to set the afib sensitivity, Brady and Tachy rates, etc.). Note lead II in the sample. It's inversion from normal is causing the system to report left axis deviation. In the sample, note that the PR interval is a bit over 200ms. This indicates the patient is probably in 1st-degree block. Note especially how V5 and V6 are very small compared to the rest of the channels. This shape indicates a lateral infarction. ST elevations above 3-4 mm indicate an abnormality. Note this is in numerous channels: e.g. II, v3-v6. Poor R wave progression occurs when the R wave is not getting more and more positive from V1-V6.

[30]



Office/Facility:  
 Physician:  
 Patient Name:   
 Patient unique number:   
 Age: 76, Sex: M, Ht: , Wt: , DOB:   
 Nurse/Tech: , Room:  
 Medications:  
 Meds (cont):  
 Blood pressure: na. Chart: .

3:09:27 PM, 2015\_07\_15, Run:0  
 HR (bpm): 85 (lead II)  
 R-R (ms): 705  
 P dur (ms): 116  
 PR int (ms): 206  
 QRS dur (ms): 117  
 P/R/T axis: 0/0/53. QT:360.  
 QTcb:428. QTcf:404. QTch:403. QTcfr:360.  
 Referring Physician:  
 \*\*\* Confirmed by:  
 \*\*\* DIAG: ABN, Sinus, LAD, 1stDegBlk,

Interp/Comments/Annot:

10mm/mV, 0.05-150Hz. 40HzLFPF, 25mm/sec  
 Indications:



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A physician should overread the results

Page 1

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To review Full Diagnosis click on the comments

Full Diagnosis

The screenshot displays the CardioSuite software interface. A 'MEMOECG' window is open, showing a 'Full Diagnosis' field with the following text: 'ABN, Sinus, Left Axis Deviation, Probable 1st degree block, Lateral infarction, age undetermined, Nonspecific ST elevation abn, ST elevation, early repolarization, Acute pericarditis, Poor R wave Progression.' Below this is an 'Abbrev Diagnosis' field containing 'ABN, Sinus, LAD, 1st Deg Blk'. To the right of the diagnosis fields is a table of 'Interval Measurements':

Interval Measurement	Value
HR (bpm)	85
PD (msec)	116
PR int (msec)	206
QS dur (msec)	117
QT int (msec)	360
QTc int (msec)	428
P axis	0
R axis	0
T axis	53

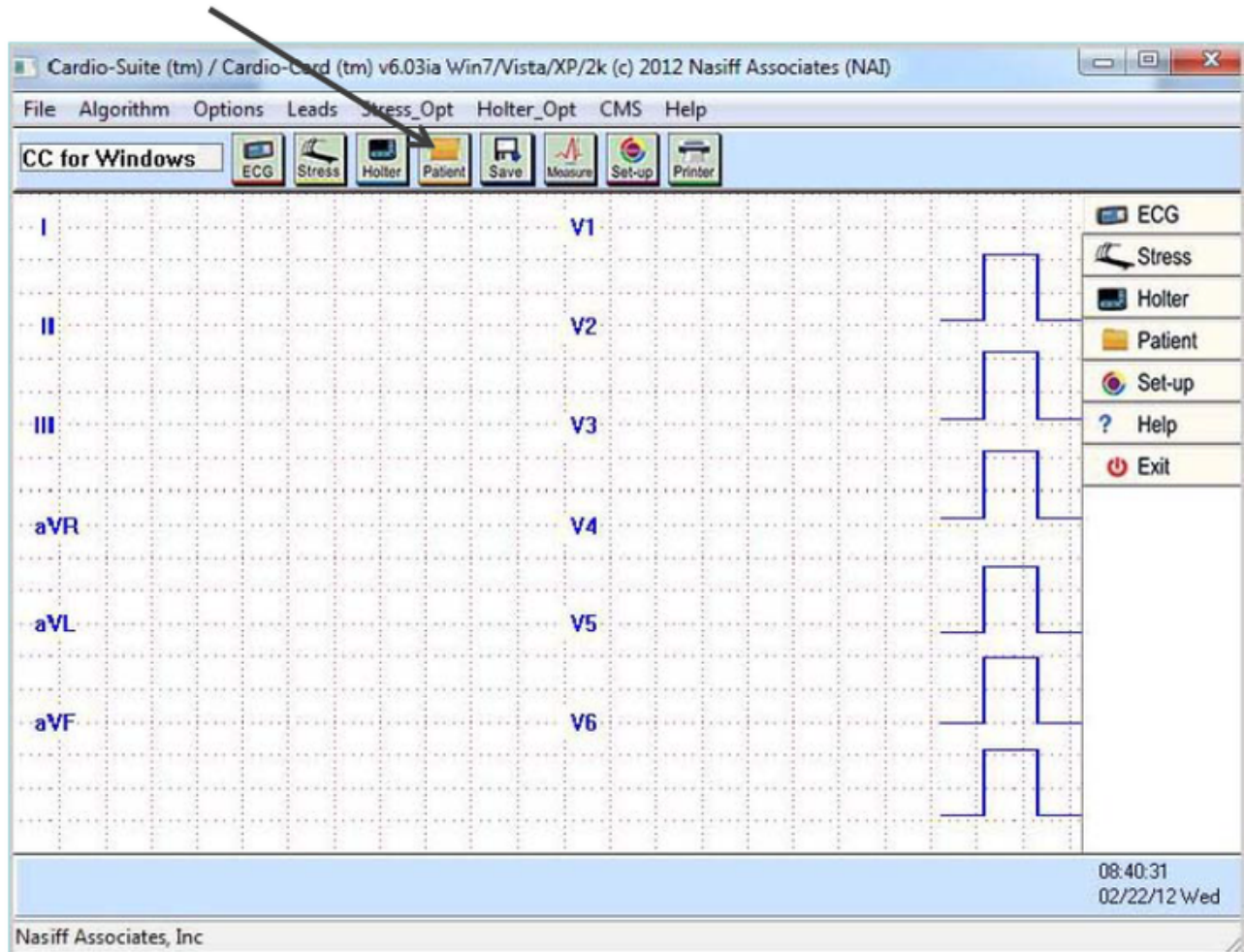
The background shows an ECG strip with leads aVF and V6. The time is 3:09:27 PM. The status bar at the bottom indicates 'Begin strip time: 3:09:27 PM' and '13:51:15'.

## Database Operations

There are **FOUR** main classes of classical 12 lead ECG

For Program Capability or Windows Stability, it is strongly recommended that all screen savers and power savers are turned off, and that the computer is rebooted at the beginning of each day

1) To open database click on Patient to open the database



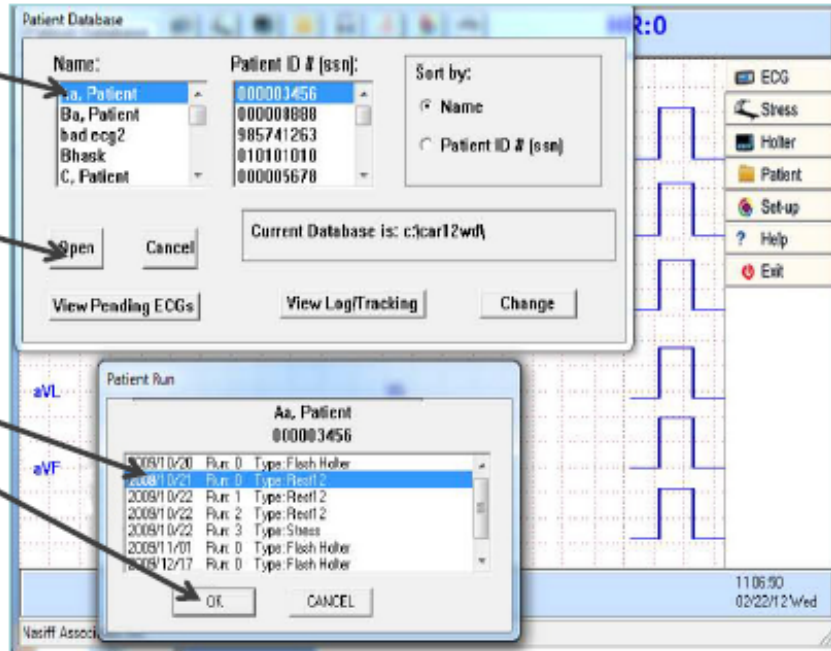
[33]



## Database Operations

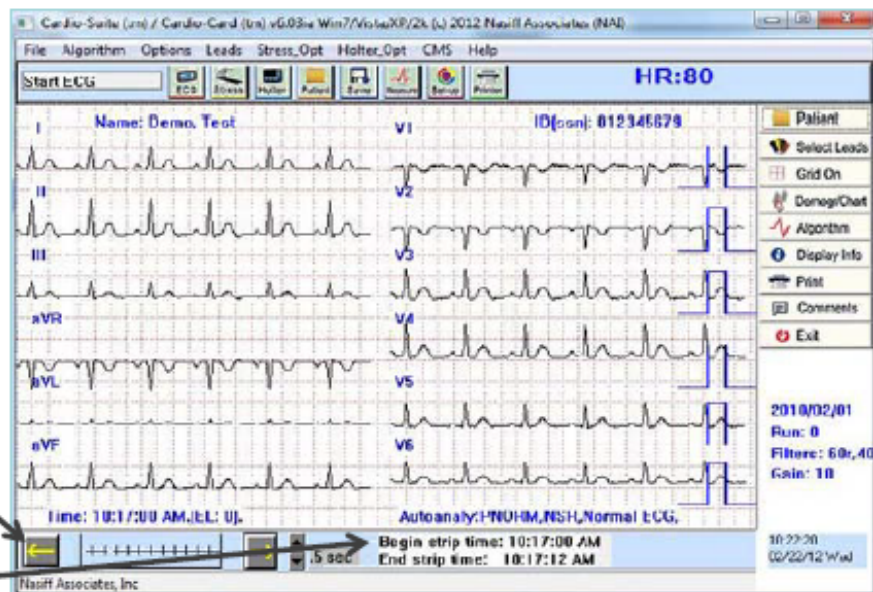
2) Click on any patient name and a list of test "runs" come up by date and type (eg. "Flash Holter", Stress and Rest12) then click "Open"

3) Click on the "run" and click "OK"



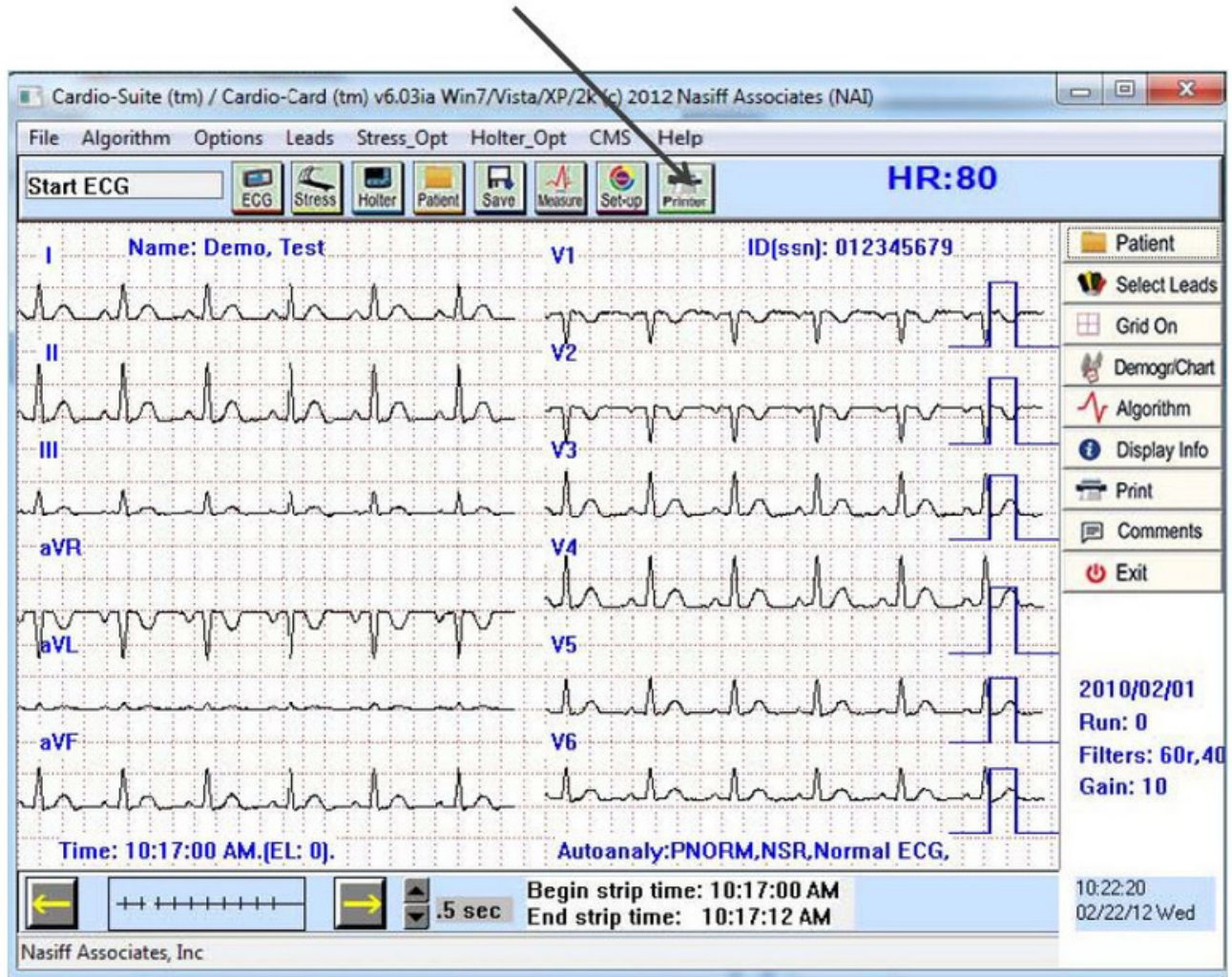
### 3) Note:

After storing any test (for example: "Rest12", "Stress", "Flash Holter"), the test will appear on the screen. You are in the database when you see the arrows at the bottom of the screen and the begin and end strip time.



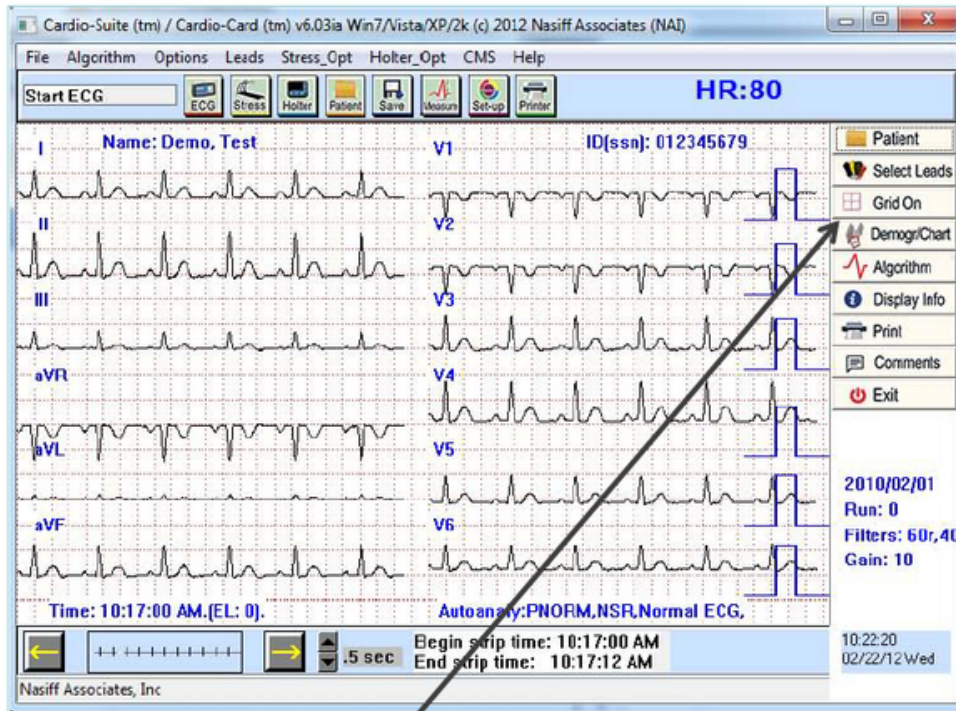
## Printing

1) To open database click on Patient to open the database

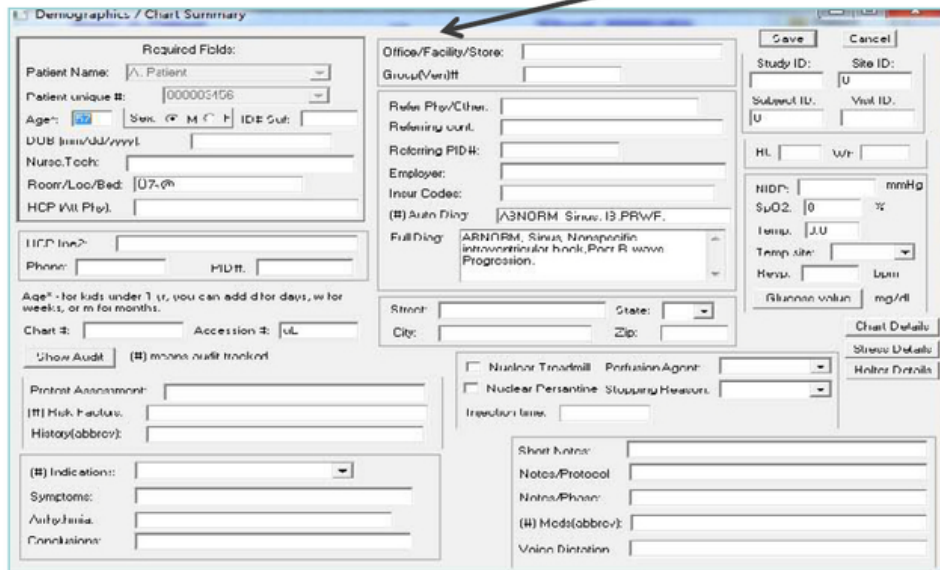




## Demographics Chart



2) Clicking the "Demographics Chart" button displays detailed patient information and provides entry into the Cardio EMR Chart program

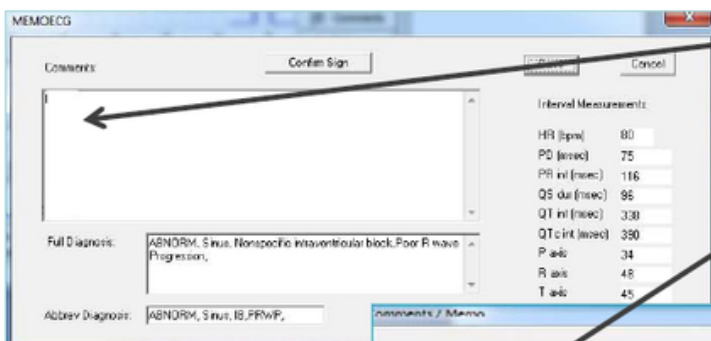
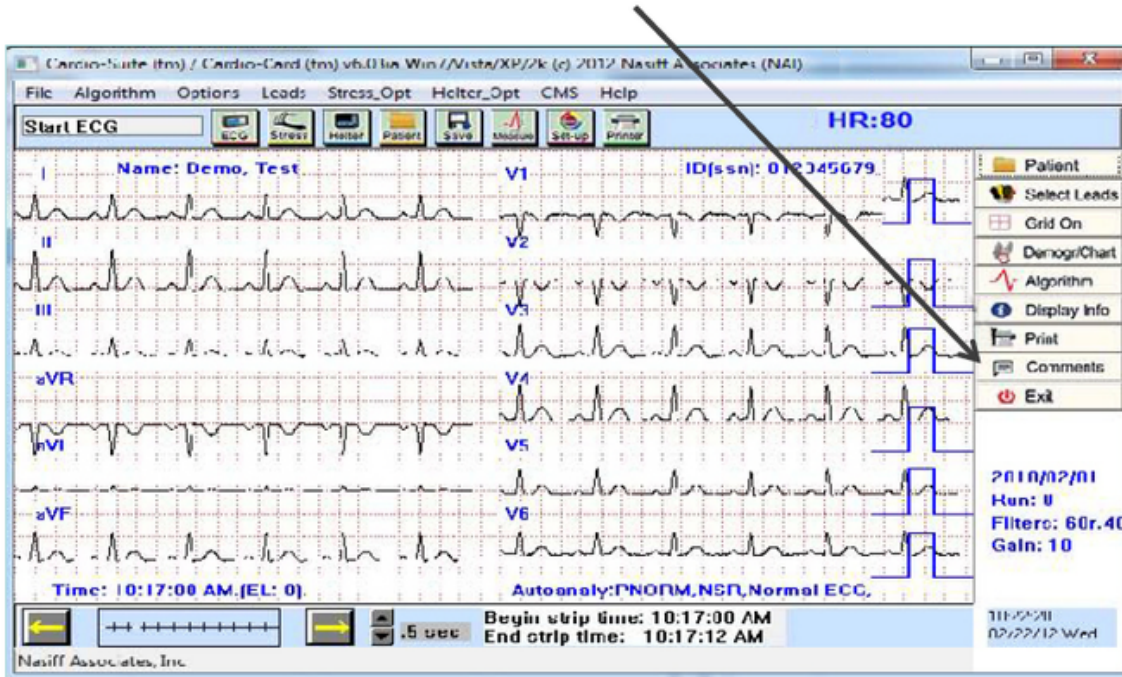


[36]



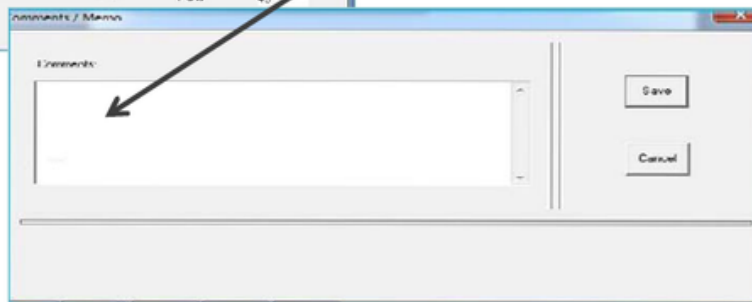
## Demographics Chart

3) Clicking the "comments" button allows the inputting of unlimited notes, comments, diagnoses, etc. (Copy and paste from other programs is also permitted in this area)



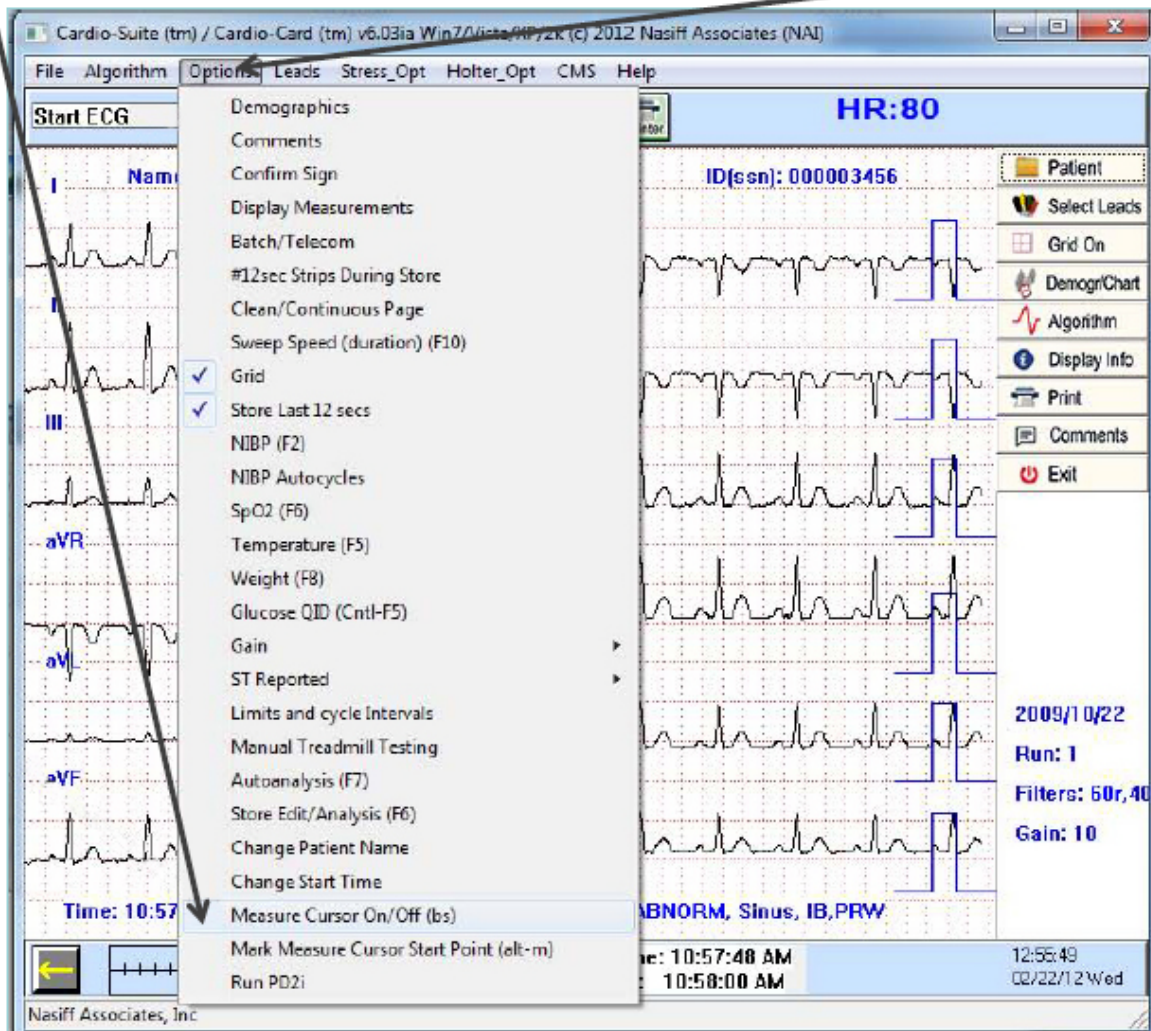
This is the "Comments" field for ECG/EKG

This is the "Comments" field for Stress and Holter



## Measurement "Cursors"

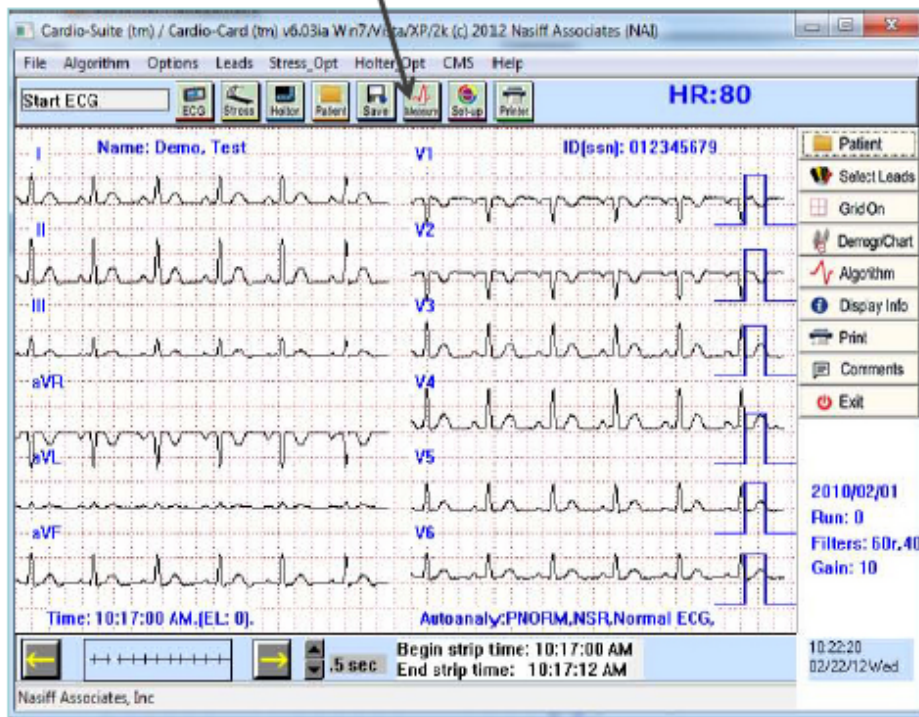
4) Measurement "cursors" are available providing wave measuring capability (e.g.amplitudes, duration, rr values...). to activate or deactivate click "Options" then "Measure Cursor On/Off". Cursor navigation is accomplished by using the "arrow", "page up", and "page down" keys. Mark the cursor start point by clicking "Options" then "Mark Cursor Start Point".





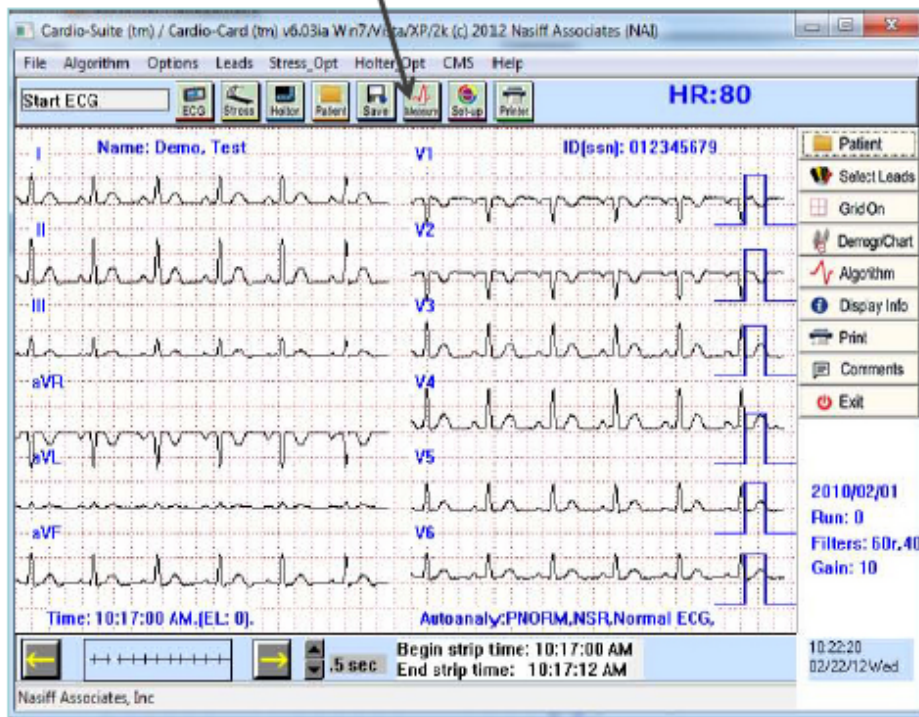
## ECG Database Functions

5) Clicking on "Options" then "Display Measurement" will bring up the full measurement tables (pressing F4 will print these tables to the default printer)



## ECG Database Functions

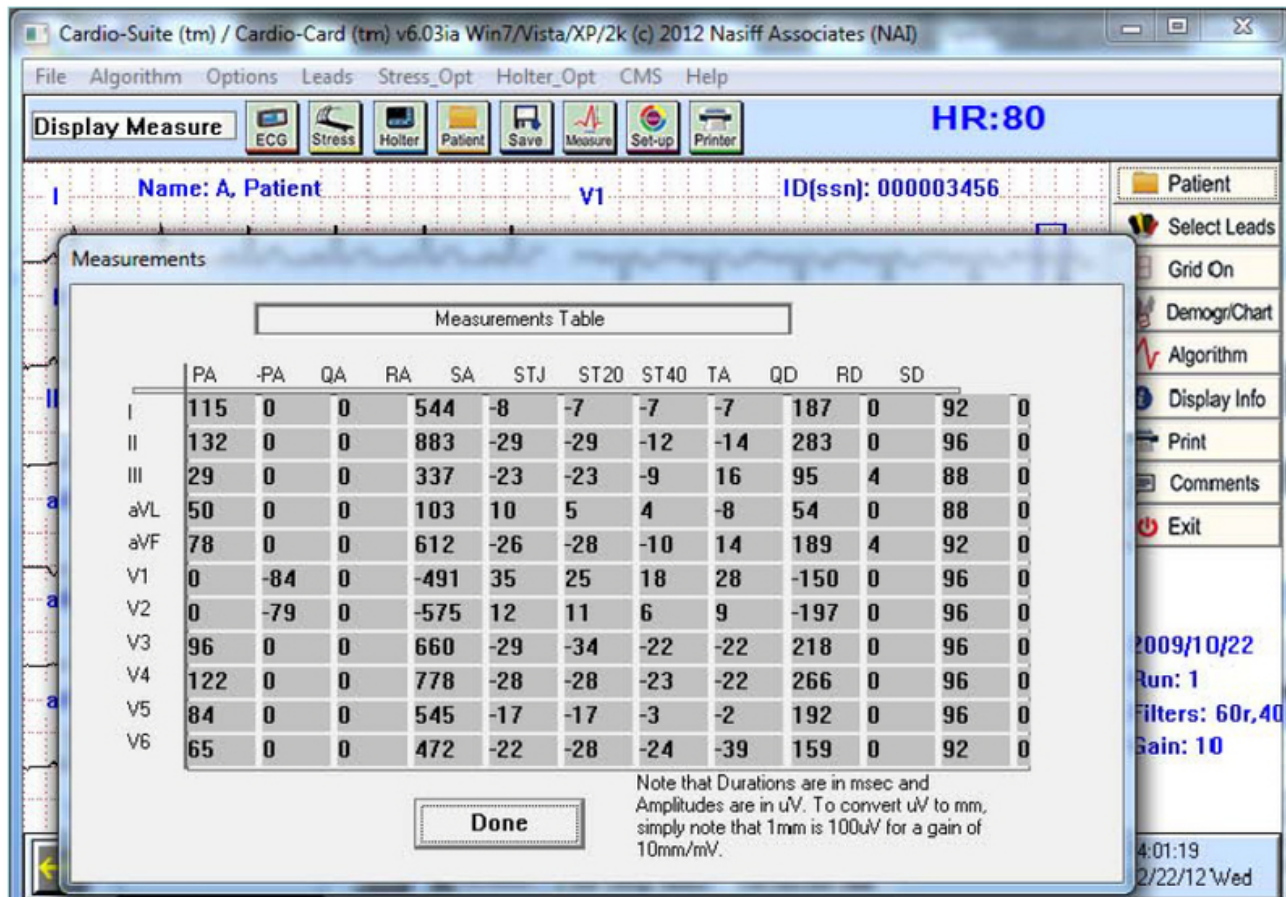
5) Clicking on "Options" then "Display Measurement" will bring up the full measurement tables (pressing F4 will print these tables to the default printer)



[40]











## Measurement Table



Cardio-Suite (tm) / Cardio-Card (tm) v6.03ia Win7/Vista/XP/2k (c) 2012 Nasiff Associates (NAI)

File Algorithm Options Leads Stress\_Opt Holter\_Opt CMS Help

Display Measure         **HR:80**

Name: A. Patient V1 ID(ssn): 000003456

Measurements

	PA	-PA	QA	RA	SA	STJ	ST20	ST40	TA	QD	RD	SD
I	115	0	0	544	-8	-7	-7	-7	187	0	92	0
II	132	0	0	883	-29	-29	-12	-14	283	0	96	0
III	29	0	0	337	-23	-23	-9	16	95	4	88	0
aVL	50	0	0	103	10	5	4	-8	54	0	88	0
aVF	78	0	0	612	-26	-28	-10	14	189	4	92	0
V1	0	-84	0	-491	35	25	18	28	-150	0	96	0
V2	0	-79	0	-575	12	11	6	9	-197	0	96	0
V3	96	0	0	660	-29	-34	-22	-22	218	0	96	0
V4	122	0	0	778	-28	-28	-23	-22	266	0	96	0
V5	84	0	0	545	-17	-17	-3	-2	192	0	96	0
V6	65	0	0	472	-22	-28	-24	-39	159	0	92	0

Note that Durations are in msec and Amplitudes are in uV. To convert uV to mm, simply note that 1mm is 100uV for a gain of 10mm/mV.

Done

2009/10/22  
Run: 1  
Filters: 60r,40  
Gain: 10  
4:01:19  
2/22/12\Wed

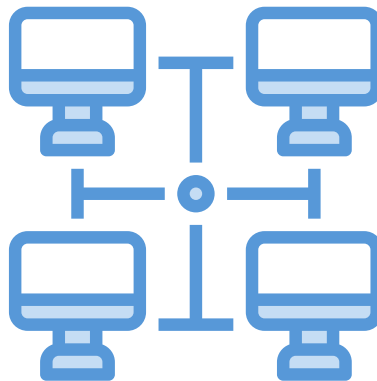
[41]

## Network & Database Utilities



**The purpose of this section is to show you the Network and Database Utilities.**

**For Program Capability or Windows Stability it is strongly recommended that all screen savers and power savers are turned off, and that the computer is rebooted at the beginning of each day,**



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## **Database**

All patient data and indexes are stored in the CAR12WD folder on the drive where the selected database resides. This folder can be easily copied to any other Windows-compatible drive using standard windows "copy" functions.

## **Procedure**

The CardioCard® Software Suite Uses standard Windows networking protocols. All users must have windows network access (read and write) in order to use the software in a network environment.

All CAR12WD database folders must be directly off the root database drive. CAR12WD cannot be in a sub-directory because the software looks for CAR12WD to be a folder directly off the root of the drive letter.

## **Transferring Data**

To transfer data from one computer to another computer make sure the CardioCard software is installed on the other computer. All data goes to "CAR12D" in your C: Drive (Make sure to back up the folder). Go to my Computer, Click on the C: Drive Right-click on "CAR12WD" Highlight "Send To" Pick what function you will use to copy on.

## Sharing CardioCard® Data on a Network

- Got o your server and make a folder ex: "Cardiodata"
- Share the Folder by right-clicking on the folder and go-to "Share and Security". Under Sharing go to Network Sharing and Security. Make sure both boxes are checked (Share and Allow).
- Click "Apply"
- Click "OK"
- Give the folder a drive letter on the client. To do this go-to "My Computer" then "Tools" then "Map Network Drive" then pick a drive letter. To do this go to CardioCard®. Open System Setup, then database. This will bring you to a question screen. The question "Which database would you like to change to?" Arrow down to the new drive letter. Then click "OK".
- Closeout everything and reboot your computer.

## **DICOM WORKLIST AND TRANSFER**

To allow CardioCard® Data to transfer or receive data from your DICOM System, you will need to enter Nasiff's AETitle: NAI\_CC. In System Setup go to the EMR tab, Enter a Valid IP Address, Port, and AETitle. Check the box for Send DICOM by IP and DICOM Embed PDF, and if needing JPG Check the box for DICOM JPG too. After entering the information click Save.

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## **Batch / Telecom**

### **Entering Batch / Telecom:**

(From the opening Cardio Screen) Click on "Options" then "Batch / Telecom" to enter Utilities.

### **Build a List:**

Click "C" button "Clear batch list". Click "Yes" to question "Are you sure?" Then Click on the "1" button "Edit batch list" to build a batch list of tests. The list can be built by clicking on individual tests and clicking the "add" button. You can also select "like" tests (all Resting, all Stress, all Holter), or the entire database. Once the list is built, there are additional operations that can be formed as noted in subsequent operations.

### **Serial Compare of resting ECGs:**

Click "C" button "Clear batch list". Click "Yes" to question "Are you sure?" Then Click on the "1" button "Edit batch list". Click ONLY once on the test you want to compare. Click "Add" you will see the test in the box then click "OK". Click on the "G" button to compare "like" tests on the screen or "H" to print the comparison of batch tests previously selected.

### **Delete Batched Files:**

Click "C" button "Clear batch list". Click "Yes" to question "Are you sure?" Then Click on the "1" button "Edit batch list". Click ONLY once on the test you want to delete. Click "Add" you will see it in the box then click "OK" then click "9" "Delete batch files" click "Yes" to the question "Are you sure you want to delete the batch list of runs?"

### **Pack and ZIP selections:**

Click on the "Z" button to create a ZIP file for emailing selected tests.

### **Rebuild the index:**

Click on the "R" button to recreate the database index. This should (theoretically) never be necessary. However, situations like power failures, Windows freeze-ups, etc. do occur. If you receive the message "database has become corrupted", you must use this function to rebuild the index.

## **Trouble Shooting Before Installing CardioCard®**

Turn off all virus protection, firewalls; and spyware. You need to be a Power user on the network. Make sure all other applications are closed. If the Cardio application will not start up after installation and shows the error message "cannot load giveio.sys", your network firewall may be blocking the program.

**Contact your network manager.**

**Common causes are:**

The user does not have "kernel mode" rights to run the hardware driver. This can be assured by giving them local administrator rights to their own computer.

**OR**

Your antivirus or anti-spyware software is blocking the service.

**OR**

The firewall is set so strictly that the CARDWIN.exe program is not being allowed to execute.

This program must be included in your firewall's list of allowed programs or made less strict.

**BEFORE STARTING ALLOW EXCEPTION FOR CARDWIN, CARCOM, AND CAR12WD FOLDERS IN YOUR ANTIVIRUS. ALLOW FULL CONTROL FOR CARDWIN, CARCOM, AND CAR12WD.**

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## **NO REMOVABLE DISK**

If there is no Removable Disk listed, try unplugging the card reader from the USB port and plug it in again.

## **PRINTING PROBLEMS**

You need to check to make sure the printer that you are using is the default printer. To check this go to start then click printers and faxes. Make sure the printer that you are using has a checkmark. Or go to Start then Control Panel then click on printer and faxes.

## **TO TEST PRINTER**

Right Click on the printer that you are using as your default printer.

Click on Properties

Click Print Test Page

Click "OK"

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## What Version of Windows

To check what version of windows you have, go to "My Computer", or "Control Panel". Then "Help" then "About Windows". This will tell you the version you are using.

## If your computer goes into "Power Save Mode" You need to turn this off

- Go to Properties
- Go to Screen Saver
- Click on Power
- Under Power Schemes, arrow down to "Always On"
- Under Turn off Monitor, arrow down to "Never"
- Click "Apply"
- Click on the Hibernate tab and disable it
- Click "Apply"
- Close out of this and reboot your computer

## When you have Corrupted Files

- Go to "Start"
- Click "Run"
- Type "CMD"
- Click "OK"
- Then type CHKDSK /F E:
- The E is where you will type your Drive Letter that your Reader is in.
- Hit Enter
- It may ask you to reboot (if so reboot).
- Type EXIT to get out of this
- Hit "ENTER"

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## Error Messages

### **“Database has become Corrupted”:**

You need to rebuild the index. Go to the CardioCard® Screen Click on "Options" then "Batch / Telecom" Click on the "R" button to recreate the database index. This should (theoretically) never be necessary. However, situations like power failures, Windows freeze-ups, etc. do occur. Make sure it is on your drive letter. Then click “OK”.

### **“No USB Cardio Card devices(s) attached. Please plugin”:**

Unplug and plug back in.

### **“Invalid Flash Recorder Path”:**

Make sure the card and reader are plugged in.  
You need to make sure you are in the correct path.

### **“Cardwin.exe no disk”.**

There is no disk in the card reader. You need to take the card out and put it back in making sure it is in all the way.

### **“Call NAI Support”.**

You need to install the Security key (thumb drive).

### **“Can’t load Giveio.Sys”:**

Your network firewall may be blocking the program.  
You need to turn off the firewall and any security while you are installing.

### **“There is no disk in the drive. Please insert a disk into drive A. a:\car12wd not found. Please correct the Database letter in System Setup. Data can only be stored to a valid database drive”:**

You need to check the Database drive letter. Go to System Setup.  
Then to Database. Check the current database. If it is wrong change it and click “OK”.

### **“You must run event detector first”:**

Open the database and bring up your patient and the test. If there are flat lines go to the arrows and try to move the screen. If nothing moves you may have a corrupted card. You need to “CHKDSK”. In there are beats then go to holter opt then to auto analysis change channel increase gain and analyze

## **Technical Support / Service**

### **General**

The intention of Technical Support is to assist the USER in solving difficulties which may be encountered while using the CardioCard® System.

In the event of an Operational or "How To" Question, the following STEP are suggested:

- 1) Reference the USER Manual
- 2) Fax (315)-676-4711 or Email [nasales@nasiff.com](mailto:nasales@nasiff.com)
- 3) Tel# Operational Questions: (315)-676-2346
- 4) Tel# Engineering/Involved Tech Questions

### **CUSTOMER SUPPORT POLICY**

Our customer support mission is to provide professional, timely, complete, and cost-effective telephone support for resolving problems or questions related to the use of Nasiff Associates Products.

### **OBTAINING CUSTOMER SUPPORT**

To obtain support, call into any of the customer support numbers given above. Our Hours of Operation are **9:00 AM to 3:30 PM** EST at our National Services Center, Monday through Friday, except holidays. Our Systems department is staffed until 4:30 PM. The telephone numbers are given above. The Support FAX numbers are also given.

We have a dedicated team of "Front Line" technicians that triage all incoming calls. If your call is a simple Application question, our Front Line Team is usually able to provide you with an answer. If your question is more complex, they may have to schedule a callback. If you are experiencing an emergency, they will immediately escalate your call to a "Back Line" technician that will take ownership of your call until the problem is resolved.

Generally speaking, calls are returned according to the priority and in the order they are received. We make a best effort to return all calls promptly. Because of the complex and time-consuming nature of some of the calls received, we cannot guarantee a specific turnaround time. If we cannot get to your call immediately, you will normally receive a call within 4 business hours either to support your call or to notify you that we have not had a chance to address the call and the anticipated time frame for resolution.

Non-urgent questions may be e-mailed to [support@nasiff.com](mailto:support@nasiff.com). Responses will be e-mailed back to the sender (unless otherwise specified) within one business day. We do not check the e-mail in-boxes of support technicians in their absence. Therefore, do not send e-mails to individual technicians unless specifically requested.

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We prioritize calls based on the urgency of the situation. Unless otherwise informed, we will use the following protocol to determine the urgency of the call:

- 1) System is down
- 2) Employee cannot perform their work
- 3) Month-end closing
- 4) Program termination
- 5) Insurance claim revision
- 6) Questions or training over the phone
- 7) Custom form changes

Many times we receive suggestions and requests to make a change to the standard system. To guarantee the integrity of the system, changes to standard programs cannot be made Online. Also, since changes to standard programs affect all clients, these changes need to be carefully considered. We strongly encourage your suggestions and we track all requests, by product and client, for inclusion in a future release of the software. We will make our best effort to respond to frequently requested or "urgent requests as quickly as possible. Revisions to the stand systems will be made under the following conditions:

- 1) The requested change follows standard system conventions
- 2) The requested change will only be made available as part of a standard software upgrade
- 3) We reserve the right to make the requesting client(s) a beta site for new releases
- 4) The time spent on programming, testing, and documenting new features may be billed to the requesting client at our standard rates
- 5) The revision will become available as an option to all clients as part of a future release

As a service to our clients, we can sometimes create customized user reports within the standard system when requested to do so. These customized reports will be developed in-house then supplied to a client via modem, email, or diskette. Optionally, a customer may request assistance via telephone in order to customize their own reports; in either event, a report noting an estimated cost and time frame will be generated, and upon receipt of authorization, the task will be assigned to a support representative. Custom-designed reports may be made available to other clients at our discretion.

Should you decide that your organization wishes to design and utilize a custom form or label not supported by our standard forms utilities, our support staff will provide a cost estimate, and the estimated time-frame for completion of the custom programming, in the form of a Programming Request Response (PRR) or Work Order. Upon approval, the work will be assigned to a support representative. Software modifications will customarily be made via diskette or modem, not on-site.

**Your Service Agreement covers the following:**

- Problem resolution and answers to quick "how-to" questions
- Modem toll calls and emails
- Periodic upgrades/enhancements to the applications software
- User documentation updates
- Invitation to company-sponsored user meetings
- Access to our most recent technical documentation and guidelines for the covered product
- Assisting a knowledgeable on-site representative (Client-Designated) in diagnosing problems with the software (including third-party database management systems integrated with Nasiff Software and approved by Nasiff Associates)
- Advice about configuring Nasiff software for maximum performance
- Assisting a knowledgeable-site representative (Client-Designated) in installing or configuring Nasiff Software (including third-party database management systems integrated with Nasiff software and approved by Nasiff Associates) to our latest specifications.
- Periodic issues of Nasiff Company Newsletters

**The Service Agreement does not cover:**

- User training (on-site or extended telephone training)
- Custom software
- Custom form modifications performed via modem or diskette
- Any assistance related to the diagnosis and/or resolution of problems concerning 3rd party hardware, remote communications, operating systems, and cabling or network software.
- Problems caused by misuse of the program or lack of adherence to commonsense standards (improper system shutdown, failure to maintain system backups, etc.)
- On-line database integrity verification; database repair/restoration
- Support for third-party software provided by vendors other than Nasiff
- Equipment relocation
- Assistance with product updates. Routine updates are to be performed by the client. Nasiff will bill at its standard hourly rate if asked to assist with an update.
- Operating system upgrades including Microsoft service packs
- On-Site installation of software updates
- Data repair and/or restoration; Online database integrity verification
- Tape Verification
- Equipment Relocation
- On-Site assistance

**Note:** The only on-site service covered under the Service Agreement is Nasiff Application Updates that Nasiff Technical Services chooses to perform on-site.

A major mission of SERVICE is to promptly assist the customer in solving problems that they may encounter while using the CardioCard®.

At this time we have established our main TECHNICAL SUPPORT ADDRESS is at:

NASIFF ASSOCIATES, INC.  
CARDIOCARD® SYSTEM TECHNICAL SUPPORT  
P.O.BOX 88, BREWERTON, N.Y. 13029.

Please feel free to call or write anytime for any special questions and projects. We welcome any suggestions you may have.



## Nasiff Associates: Two Year Limited Warranty

**It is very important to Register your CARDIO System with Nasiff Associates. Not only does it activate the Warranty Benefits of the CARDIO System, BUT it also adds your CARDIO System to the list for FREE Software Product enhancements as they become available during the two-year limited warranty.**

Nasiff Associates, Inc. warrants the CardioCard® System (See below for CardioCard® System Definition) against defects in materials and workmanship for a period of TWO years from receipt by the end USER (Please retain purchase Records in event of Warranty Claim). if Nasiff Associates is given notice of such defects during the Warranty period, Nasiff Associates will either, at their option, repair or replace products that prove to be defective.

The Nasiff CardioCard® System Includes:

Product Description	Warranty Conditions
CARDIO System PC Board Electronics	TWO Year Limited Warranty
CARDIO System Digital Holter Recorder	TWO Year Limited Warranty
CARDIO System Diagnostic Software	TWO Year Limited Warranty
CARDIO System Patient Cable and Leads	90 Day Limited Warranty
CARDIO System Holter Electrode Leads	90 Day Limited Warranty
CARDIO System Holter Recorder	See Recorder User Manual

Nasiff shall not be liable for defects or support of any third-party devices (e.g. computers treadmills, printers, other company's Holter recorders, etc) used with a CardioCard® System. This includes operating system incompatibilities and hardware incompatibilities (e.g. for PCMCIA systems, the computer has to support PCMCIA I/O standards, etc). Warranty and support for these devices is the responsibility of their Manufacturers.

### General

Nasiff Associates, Inc. warrants the CardioCard® System against defects in materials and workmanship for a period of two years from receipt by the by the end-user (proof of purchase is require). If Nasiff Associates is given notice of such defects during the warranty period, Nasiff Associates will either, at their option, repair or replace products that prove to be defective.



## GENERAL

Nasiff Associates, Inc. warrants the CardioCard® System against defects in materials and workmanship for a period of two years from receipt by the by the end-user (proof of purchase is require). If Nasiff Associates is given notice of such defects during the warranty period, Nasiff Associates will either, at their option, repair or replace products that prove to be defective.

## EXCLUSIONS

The above warranty shall not apply to defects resulting from: improper or inadequate maintenance by the customer; customer-supplied software or interfacing; unauthorized modification or misuse; operation outside of the environmental specifications for the product; or improper site preparation or maintenance. Only service personnel authorized by Nasiff Associates, Inc. directly are allowed to service Nasiff equipment. If customer desires to have someone other than Nasiff Associates, Inc. service the equipment they must get prior written authorization from Nasiff Associates, Inc., otherwise anyone other than Nasiff Associates, Inc. providing service voids the warranty.

## OBTAINING WARRANTY SERVICE

To obtain warranty service, return the product to a service facility designated by Nasiff Associates. Nasiff Associates may repair on-site at the option of the customer. The customer is responsible for travel charges when on-site repair is requested. Customer shall prepay shipping charges for products returned to Nasiff Associates for warranty service and Nasiff Associates shall pay for the return of the products to the customer. However, the customer shall pay all shipping charges, duties, and taxes for products returned to Nasiff Associates from another country.

## WARRANTY LIMITATIONS

Nasiff Associates makes no other warranty, either expressed or implied, with respect to this product. Nasiff Associates specifically disclaim the implied warranties of merchantability and fitness for a particular purpose. Some states or provinces do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. However, any implied warranty of merchantability or fitness is limited to the 1-year duration of this written warranty. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state, or province to province.

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## OBTAINING SERVICE DURING WARRANTY

If your hardware should fail during the warranty period, follow the service procedures in this manual, then take the failed piece to an Authorized Nasiff Associates Repair Center or send the equipment to one of the Nasiff Associates Field Repair Centers. (Nasiff Associates may repair on-site at your option, in which case you are responsible for travel charges).

## OBTAINING SERVICE AFTER WARRANTY PERIOD

If your hardware should fail after the warranty period, follow the service procedures in this manual, then contact an Authorized Nasiff Associates Repair Center or call your Nasiff Associates Sales and Service Office for details of the services available.

## DETERMINING IF YOUR CARDIO - CARD SYSTEM NEEDS SERVICE

Your CardioCard® system is designed to give you years of reliable service. If you are having a problem with your system, however, follow the service procedures in this manual.

## RETURNING YOUR SYSTEM FOR SERVICE

If your system needs service, contact the Nasiff Associates Support Office where you purchased the system for complete service information. If you need to ship your system, be sure it is packed in a protective carton. We recommend that you save the original shipping container for this purpose. If needed, packaging materials and a carton may be obtained from Nasiff Associates. In-transit damage is not covered by the warranty. We suggest that you always insure shipments.

**You can help assure effective servicing of your system by following these guidelines:**

1. Follow the instruction in this manual to make certain the malfunction in your CardioCard® system and not the result of an interference error or a malfunction in your computer or software. If possible, identify the defective area or function.
2. If you determine that repair is required, please include the following items when you return your systems for service:
  - a. A description of the exact configuration at the time of the malfunction, including interface cable, computer, peripherals, and software (programs) in use.
  - b. A brief description of symptoms for service personnel.
  - c. Hard copy produced on a printer that might help illustrate the problem area.
  - d. The serial numbers for the components in your CardioCard® system.
  - e. If purchased through a Nasiff Associates dealer, a copy of the sales slip or other proof of purchase to establish the warranty coverage period.
3. Include your name, address, and phone number where you may be reached during the bay.
4. You do not include any operating accessories with the system unless the problem relates to an accessory. Do include your CardioCard® BOX12 patient connector, ISOTR1 isolation transformer, any other equipment that is part of your CardioCard® system (Holter recorders, playback hardware, NIBP modules, etc), and original CardioCard® software disks.

**Note: A Valid RMA Number is REQUIRED for ACCEPTANCE of SHIPMENT**

**COSTS**

<b>Descripton</b>	<b>Hourly Rate</b>
Initial Telephone Customer Traning as part of the initial software purchase.	Included in Purchase
Follow-Up Training On-Site requested any time after the purchase of the software.	\$200 Per Hour
Technical Support In-House Phone Support or On-Site Support for Nasiff Software, Third Party Software, Hardware, Training via Phone, Forms Modification, Data Manipulation/Repair or EMC Support.	\$185 Per Hour
Consulting On-Site, In-House or Telephone Consultation requested with senior-level personnel (5 plus years experience).	\$225 Per Hour
Programming Including Software Modification for New Features, Custom Programming, or Database Repair that requires a Programmer.	\$225 Per Hour
Production Includes In-House Preparation of Equipment Prior to On-Site Installation.	\$225 Per Hour
Network Engineering. Includes On-Site or In-House, as well as Support of Network Operating Systems	\$225 Per Hour
Travel Includes Time Necessary to Travel to and From Customer Site. If Travel includes Multiple Customer Sites then Travel Time is Equally Distributed among Customers.	\$125 Per Hour
<b>NOTE: Minimum Charge for any provided service is 1/4 hour. Cabling is not Provided.</b>	

Unless disputed in writing, customer with support payments 30 days or more past due will have their technical support temporarily suspended pending payment of their past-due balance. Customers without a valid Service Agreement will be provided with assistance at Nasiff's discretion and/or upon the reinstatement of a valid Service Agreement. If your support coverage has lapsed, please contact our Finance and Administration Department for additional information regarding the terms and conditions for reinstating a Service Agreement.

## Specifications

### MINIMUM PC SYSTEM REQUIREMENTS

- IBM Compatible Pentium or Higher
- 4GB of RAM for Windows 10/8/7/2000/XP/VISTA and MAC
- USB Ports
- 250GB Hard Drive Space
- Any Windows Compatible Display
- Any Windows Compatible Printer
- Any Windows Compatible Mouse
- Any Windows Compatible Keyboard

### MEDICAL SYSTEM (ECG, HOLTER, NIBP) FEATURES

- Leads:
  - 12-Lead System: 12 (+ XYZ Optional) On CUSB with Pacemaker Detection
  - Holter Systems: 3 to 12 Leads.
  -
- Display
  - LCD, Color, Monochrome.
  -
- Monitor Quality Defib Protection
- ECG Storage to any device that appears to the pc as a drive.  
e.g. hard drives, floppies, optical, etc
- Data Stored:
  - ECG waveforms, time and date, and patient information (i.e. demographics).
- ECG transmission by email, modem, fax, internet, CardioHospital
- Measurement's tolerances
  - Time: +/- 4msec
  - Amplitude: +/- 1.22uV at 10mm/mV gain
- Holter Analysis
  - Standard Arrhythmia Classification of all Beats Detected.

- NIBP Tolerances
  - Time: +/- 3msec
  - pressures: +/- 2mmHg
  - Pulse Rate: +/- 1bpm
- NIBP Limits 45-300 mmHg (System cut-off at 300mmHg)
- NIBP Cuff, Tubes, and Connectors:
  - **Cuff Length: For Bandage Cuffs:**  
The full cuff length extends beyond the end of the inflatable bladder by at least the equivalent of the length of the bladder. The length of the cuff is long enough that when inflated to 300mmHg, it does not slip or become loose.
  - **For Hook and Contact Closure Cuffs:**  
The cuff is long enough to completely encircle the largest circumference limb (44cm), and maintains its full width throughout this length.  
**Pressure Capacity:** the cuff completely retains the bladder when the bladder is inflated to a minimum pressure of 330mmHg. The tubes and connectors remain intact at 330mmHg.
- **Cuff Closures/Construction for Non-Disposable Cuffs:** The cuff integrity is maintained after 1000 open-close cycles and after 10,000 cycles to 300mmHg. The cuff bladder length encircles much of the circumference of the limb throughout its length and maintains its much of its width throughout its length.  
The bladder length is at least 0.80 times the circumference of the limb at the midpoint of the cuff application.  
The cuff bladder width is at least 0.37 (preferable 0.40) times the circumference of the limb at the midpoint of the cuff application.  
System leakage (cuff bladder, tubing, and connectors, etc is less than 1mmHg per second.)

Cables: all electrical cables have individually insulated wires and a jacket (usually PVC). All cables can withstand a stretch force of up to 5lbs.

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- Connectors: all electrical connectors have at least 0.025" spacing between conductors
- NIBP Features:
  - Report: Systolic pressure, Diastolic pressure, Heart Rate, and in full disclosure pulse and pressure waveforms.

**Indications:**

- Ages: Infant - Adult
- Arms Circum: 8-44cm
- Contraindications: Open wounds to limb distal to cuff application.

**MEDICAL ELECTRICAL PERFORMANCE & SAETY**

- frequency response: .05 - 120 Hz upper 3db at 120 Hz (AAMI & AHA Stds.)
- Lead Leakage: <10 uA (AAMI Standards)
- Chassis Leakage < 100 uA (AAMI Standards)
- Input Impedance > 100M (AAMI Standards)
- Gain Sesity: 5,10, 10/5, and 20mm/mV (AAMI)
- CMRR: 120DB (AAMI)
- 12-Lead ECG Sampling Rate: 250-1000 Hz
- A/D Resolution: 13 bits
- A/D Rate: 1- kHz
- Time Base: 25 & 50 mm/sec (AAMI)

**GENERAL SYSTEM**

- Power Consumption:
  - < 300 mA from the pc bus
- **CC-Holter Recorder:**
  - 1 AA battery for 24/48 hours
- Dimensions:
  - CUSB: 4.9" x 2.7" x 1.25"
  - CCHolter Rev A: 6.25" x 2.75" x 0.75"
  - Flash Holter Recorder: 4.4" x 2.6" x .95"
  - CCNIBP-I 7" x 5" x 1.5"

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- Weights
  - CUSB: 120g (0.26lbs)
  - CCHolter Rev A: 268g (9.5oz) + 1 AA Battery
  - Flash Holter Recorder: 5oz with Batteries
  - CCNIBP-I 350g (1lb)
- Environmental:
  - Max Temperature Range: 10°C (50°F) to 40°C (104°F)
  - Recommended Range: 15°C (59°F) to 35°C (95°F)
  - Storage Range: -40°C (-40°F) to 60°C (140°F)
  - Humidity: 10-70% RH non-condensing.
  - Vibration: < 0.3G over a 10 min period (Holter Recorder and NIBP Modules)
  - Altitude: -500 to +5,000 feet w.r.t sea level.

**Note:** The instrument's specifications may degrade if operated outside of these environmental specifications.

## SpO2

### SpO2 SPECIFICATIONS

- Oxygen Saturation Range: 0-100%
- Accuracy: +/- 2% for 70-100%. +/- 3% for 50-69%
- Pulse Rate: 30-250
- Probes: finger, ear, non-disposable

### TEMPERATURE SPECIFICATIONS

- Range: 80°F to 115°F (26°C to 45°)
- Accuracy: +/- 0.2°C
- Self-test between each monitor reading: about 2 sec.
- Probes: oral and rectal

### WEIGHT SPECIFICATIONS

- Range: 400lbs (180kg)
- Accuracy: +/- 0.5lb (0.2kg)
- Platform Size: 12" x 12.25" x 2.25" (30.5cm x 31.1cm x 5.7cm)

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## HOLTER FLASH RECORDER

### HOLTER FLASH RECORDER SPECIFICATIONS

#### Functional

- Channels: 3
- Resolution: 8-bit (13-bit in the CardioCard® System)
- Recording: Full Disclosure
- Minimum Recording Time: 24 hours / 48 hours
- Storage Medium: Removable FLASH Memory
- Download Interface: std card interface

#### Physical

- Dimensions: 4.4" x 2.6" x .95"
- Weight: 5 Ounces with Batteries
- Enclosure: Molded Plastic
- Operating Position: Any Orientation
- Operating Temperature: 0°C to 45°C
- Non-Operating Temperature: -40°C to 60°C
- Operating Humidity: 10% to 90% (non-condensing)

#### Electrical

- Battery: One AA Alkaline (disposable)
- Connector: 50 to 7 Lead Wires
- Test Jacks: 3 Channels

### Special Features

#### Special File Export Files

When File Export is selected the following files are created from the retrieved Resting ECG run (note that the "ASCII" root filename is user-defined during export):

ascii.txt - 500hz file exported from File Export Selection. Outputs data (4 chars plus sign per sample.) for each lead tab-delimited in order:

I\II\III\taVR\taVL\taVF\tV1\tV2\tV3\tV4\tV5\tV6\n

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ascii.hed - ASCII tab delimited file of patient demographics. The Order of Fields:

- name: Patient Name
- ssn: Social Security Number
- street: Street Address
- csz: City State Zip
- phone: Phone Number
- dob: Date of Birth
- ashw: Age, Sex, Height, Weight
- doc: Doctor
- orb: Office Room Bed
- empl: Employer
- insure: Insurance Codes
- med: Medications
- notes: Notes
- notesp: Notes Protocol
- notesph: Notes Phase
- np: Blood Pressure
- autodia: Auto Diagnostics
- voicedict: Voice Dictation

ascii.rr - File Export list of R-R times in msec. (limits allowed are entered by the user).

ascii.rrv - File Export of R-R average times for user-defined intervals (1-1000sec).

ascii.rrs - File Export of R-R limit status. Gives # beats, # outside limits, etc.

ascii.hrv - File Export of HR average bpm for user-defined intervals (1-1000sec).

ascii.evt - File Export list of times of events being hit.

(during real-time, pressing F7 causes a log of this time to be saved).

Times in ascii.evt are in 2msec sample number (i.e. 500hz sample number)

ascii.ibp - 500hz file exported from File Export selection outputs data from ibp/cnibp

Tab Delimited goes through entire file until done.

Puts out 4 chars plus sign per sample. from tempio.t

ascii.rsp - 500hz file exported from File Export selection outputs data for respiration

tab delimited, goes through entire file until done, and puts out 4 chars plus

sign per sample from tempio.e.

ascii.sp - ASCII tab delimited file of SpO2 values for every 10 sec from tempio.s.

## Real-Time Pointer File - ptrf

During the start-up of the program a file called ptrf is produced in the running directory (usually c:/cardwin). It has the following 32-bit pointers to the data in the device driver that assist programs that may want access to the real-time sampled data:

int \* data - int ptr to where vxt (the driver) is loading ecg data

uint \* table[0] - lead I data. 4msec apart. 3180 unsigned ints.  
Data is 13-bit to represent +/- 5mV FS rti.

uint \* table[1] - lead II data

uint\* nbpil - unitptr to where vxd is loading bp pulse data.

uint \* nbpbuf - bp pulses. 4msec apart. Loads locations 25-250.  
Data is 13-bit as in ECG lead data in table[].

uint \* SpO2pp - ptr to where vxd is loading SpO2 pulse data.

uint \* SpO2pleth - sio data. 4msec apart. Loads locations0-99.  
Data is 8-bit and relative in intensity.

For example, the pointer data is the first 4 bytes of the ptrf file. The table[0] pointer in the next 4 bytes. The table[1] pointer is the next 4 bytes, and so on.

Note that the first pointer called data gives the position in the table[0] and table[1] where the driver is loading the ECG data. Notes that the SpO2pleth buffer is loaded with a different pointer (SpO2pp and the SpO2pleth buffer is loaded with a different pointer (SpO2pp) and the SpO2pleth buffer is only 100 points long and only 8-bits (1 byte per point). While the table[] ECG data is 3180 points long and 13-bits (2bytes per point).

## Calling the CardioCard® from External Programs

### File i/o:

A user program can load a file called ccio to have the CardioCard® do just acquisition, retrieve, use tempios, deleting, etc.

Structure:

When calling cardwin.exe (all ASCII):

"company code" ab "patient last, first, mi name" cccccccmmddyyyr

Where company code (get from the factory).

a is either a,r,t, or d where a is the acquisition, r is retrieved, t is tempio retrieve, and d is delete the selected file.

b is the database drive letter.

cccccccc is the 9 digit patient number (ssn).

mm is month.

dd is day.

yyyy is year

r is run number (starts with 0 for each patient each day).

on exit from cardwin.exe, ccio contains:

char opcode - 0=no store, 1= data saved

char ecgf - 1=ecg taken

short heartr - heart rate bpm

short syp - systolic bp mmHg

short meanp - mean bp

short diasp - diastolic bp

short spo2 - SpO2 percent

short pulse- pulse rate ppm

short temp - temperature \* 10 degrees F (e.g. for 98.6, this would be 986)

**Message API:** When both the CardioCard® and another program are running at the same time, the other program can command the CardioCard® to perform many of its functions. A very fast, easy to use, full-featured API has been defined that performs this task.

Note that the CardioCard® program can be run in any standard Windows mode (e.g. normal, hidden, minimized, etc).

Contact Nasiff Associates at (315)-676-2346 for a copy of this API document.

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## **Product Update Policy**

One of the major advantages offered by the CardioCard® System is its ability to incorporate Product Updates, Enhancements, New Features, and Modifications via Software. The CardioCard® System is Technology Expansive, no longer is your Diagnostic Equipment obsolete the day it is purchased.

It is the Policy of Nasiff Associates to extend Software to the Purchaser on a No change basis for the TWO-year period of the Warranty.

This Software will include:

- Product Updates
- Product Enhancements
- Product Modifications

All subsequent Software Enhancement and Major Feature additions to the Product will be extended to the USER on a favorable term basis.

**It is important for the USER to Register his CardioCard® System not only to activate his / her Warranty with Nasiff Associates, BUT to also be eligible for the above mentioned Software Updates.**

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