Notice
The materials contained in this document are intended for educational purposes only. This document does not establish specifications, operating procedures or maintenance methods for any of the products referenced. Always refer to the official written materials (labeling) provided with the product for specifications, operating procedures and maintenance requirements.

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The quality of your ECG tracing is a direct result of skin prep and lead placement.

1. Ensure that skin is dry, clean and remove excessive hair.
2. Mark each electrode site with a felt tip pen.
3. Degrease each site with a skin preparation cream.
4. Use a mild abrasion to remove the mark left by the felt tip pen.
5. Apply the electrodes to the prepared sites.
6. Look at the hook-up advisor and on-screen messages for indication of lead problems.

### Skin Preparation and Resting 12-lead Placement

<table>
<thead>
<tr>
<th>Lead</th>
<th>AHA Label</th>
<th>IEC Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V1 red</td>
<td>C1 red</td>
<td>Fourth intercostal space at the right sternal border</td>
</tr>
<tr>
<td>2</td>
<td>V2 yellow</td>
<td>C2 yellow</td>
<td>Fourth intercostal space at the left sternal border</td>
</tr>
<tr>
<td>3</td>
<td>V3 green</td>
<td>C3 green</td>
<td>Midway between location 2 and 4</td>
</tr>
<tr>
<td>4</td>
<td>V4 blue</td>
<td>C4 brown</td>
<td>Mid-clavicular line in the fifth intercostal space</td>
</tr>
<tr>
<td>5</td>
<td>V5 orange</td>
<td>C5 black</td>
<td>Anterior axillary line on the same horizontal level as 4</td>
</tr>
<tr>
<td>6</td>
<td>V6 purple</td>
<td>C6 purple</td>
<td>Mid-axillary line on the same horizontal level as 4 and 5</td>
</tr>
<tr>
<td>7</td>
<td>LA black</td>
<td>L yellow</td>
<td>Left wrist</td>
</tr>
<tr>
<td>8</td>
<td>LL</td>
<td>F green</td>
<td>Above left ankle (Alternate placement, upper leg as close to torso as possible)</td>
</tr>
<tr>
<td>9</td>
<td>RL green</td>
<td>N black</td>
<td>Above right ankle (Alternate placement, upper leg as close to torso as possible)</td>
</tr>
<tr>
<td>10</td>
<td>RA white</td>
<td>R red</td>
<td>Right wrist</td>
</tr>
</tbody>
</table>
Skin Preparation and Stress ECG Lead Placement

Preparing the patient correctly of their ECG is a critical part of making sure that the reading is accurate and free of noise. Here is what is suggested for a proper patient prep.

1. Ensure that skin is dry, clean and remove excessive hair.
2. Mark each electrode site with a felt tip pen.
3. Degrease each site with a skin preparation cream.
4. Use a mild abrasion to remove the mark left by the felt tip pen.
5. Apply the electrodes to the prepared sites.
6. Look at the hook-up advisor and on-screen messages for indication of lead problems.
<table>
<thead>
<tr>
<th>Lead</th>
<th>Electrode Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fourth intercostal space at the right sternal border</td>
</tr>
<tr>
<td>2</td>
<td>Fourth intercostal space at the left sternal border</td>
</tr>
<tr>
<td>3</td>
<td>Midway between 2 and 4</td>
</tr>
<tr>
<td>4</td>
<td>Mid-clavicular line in the fifth intercostal space</td>
</tr>
<tr>
<td>5</td>
<td>Anterior axillary line on the same horizontal level as 4</td>
</tr>
<tr>
<td>6</td>
<td>Mid-axillary line on the same horizontal level as 4 and 5</td>
</tr>
<tr>
<td>7</td>
<td>Recommend placing in the soft fleshy area just below the left clavicle</td>
</tr>
<tr>
<td>8</td>
<td>Recommend placing on the corresponding left side of the thorax at the lower edge of the rib cage, or at the lower level of umbilicus at the left mid-clavicular line.</td>
</tr>
<tr>
<td>9</td>
<td>Recommend placing on the corresponding right side of the thorax at the lower edge of the rib cage, or at the lower level of umbilicus at the right mid-clavicular line.</td>
</tr>
</tbody>
</table>
Patient Data (ADT)

The MAC 2000 allows you to download patient demographics via an ADT interface. You can download patient demographics using internal or external keyboard, or barcode reader. Use the following procedures to query the database and select patient demographic for each.

**Database Query Using Barcode Reader**

1. Select *Resting ECG*.
2. Select the *Patient Data*.
3. Scan the patient barcode using the barcode reader. A dialog box opens with the scanned Patient ID.
4. Click *OK* to accept the selection.
5. The patient demographic data is populated. Modify any fields as necessary.
6. Select *Save*.

**Database Query Using Internal or External Keyboard**

1. Select *Resting ECG*.
2. Select the *Patient Data*. A dialog box opens instructing you to enter the Patient ID.
3. Enter the Patient ID using the internal keypad or external keyboard. A dialog box opens with the Patient ID you entered.
4. Click *OK* to accept the selection.
5. The patient demographic data populated. Modify any fields as necessary.
6. Select *Save*.
Simple Orders

Simple Orders provides an interface to quickly download and execute one order at a time. Use the following steps to execute a simple order.

1. Select **Resting ECG**
2. Select **More**.
3. Select **Orders**.

**Note!** If Auto Execute Single Order setting is enabled in Resting ECG Setup and only one open order for that given location is present the system will automatically download that single order and populate the Patient Information screen.

4. Select an order from the list.
5. Select **Load**.
6. The order will download and populate the Patient Data screen. Modify as patient data as necessary.
7. Select **Save**.
Advanced Order Manager

Advanced Order Manager provides an interface to download and store multiple orders on the system and execute them later. Use the following procedure to execute an advanced order.

1. From the Main Menu, select More.
2. Select Order Manager.
3. Select Load Orders.
4. Enter the location(s).
5. Select Ok.

Note! To query multiple locations, add a comma between each location number e.g. 1,2,5,7.
6. Select the order(s) from the list.

7. Select **Load Orders**.

8. Select **Select**.

9. Select an order.

10. Select **Ok** to confirm the order selection.

11. Select **Patient Data** to open with the patient information screen which will be populated from the selected order.

12. Modify the patient and test data as necessary.

13. Select **Save**.
Acquire an ECG

1. Prepare the patient.
2. Open the Resting ECG function in one of two ways:
   - Power on the unit or
   - From Main Menu select Resting ECG.
3. Verify waveform quality by:
   - Checking Hook-up Advisor. Green indicates a good quality waveform.
   - Cycle through the lead groups to visually verify lead quality by selecting the Leads key on the keyboard.
4. Use the appropriate keys to make adjustments to (if necessary):
   - Speed
   - Gain
   - Filter
5. Select Patient Data to enter the patient information.
6. Select Page Down to access other Test Information windows.
7. Select Save to save and close the Patient Data window.
8. Select the ECG key on the keyboard to record and print an ECG.
9. If you have your system set to Preview before Analysis, select Continue to proceed to analyze and print an ECG or Cancel to cancel the analysis.
10. If finished, continue with step 11, or continue with these options:
    - Select Print to print another copy
    - Select Save if the unit is not set to save the ECG automatically.
11. When finished, do one of two things:
    - Select Transmit to transmit that single record to the default transmit location.
    - Select Next Patient to start a new patient or Select the ECG key to take another ECG on the same patient.

Note! Steps 1, 5 and 8 are the minimal basic steps for acquiring an ECG. All other steps are only used as required depending on options and features turned on.
Print Continuous Rhythm

1. Prepare the Patient.

2. Open the Resting ECG function in one of two ways:
   - If the select default power on option is Resting ECG, simply power on the unit or
   - From Main Menu select Resting ECG

3. Verify waveform quality by:
   - Checking Hook-up Advisor. Green indicates a good quality waveform.
   - Cycle through the lead groups to visually verify lead quality by selecting the Leads key on the Keyboard.

4. Use the keys to make adjustments to (if necessary):
   - Speed
   - Gain
   - Filter

5. Select Patient Data to enter patient information.

6. Select Page Down to access other Test Information windows

7. Select Save to save and close the Patient Data window.

8. Select the Rhythm key on the keyboard to print a continuous rhythm.

9. Select the Stop button to stop printing.

Note! Rhythm reports are not stored to File Manager.
Printing an RR Analysis Report (not sold in all countries)

Use the following steps to generate an RR Analysis report.

1. **Prepare the patient.**

2. From the Main Menu select **More**.

3. Select **RR Analysis**. You can also access RR Analysis from the Resting ECG mode after an ECG has been acquired.

4. Select **Patient Data** and enter the patient data.

5. Adjust the setup options (target, record lead, gain, speed, filter, pacemaker detection, rhythm record, and RR table) as necessary by selecting **RR Analysis Setup**.

6. **Select Start Test** to start the test.

   When the target is achieved, a preview of the summary results, histogram, and trendgram are shown on the display.

   **Note!** You may select **Stop Test** to stop the test prior to reaching the target.

7. While reviewing the preview, do any of the following:
   - To discard the reading and begin over, select **Return** and repeat from Step 5.
   - To discard the reading and return to the Main Menu, select **Main Menu**.
   - To accept the reading and print the report on the thermal printer, select **Print**.
   - To accept the reading and export the results as a PDF file, select **PDF Export**.

**Note!** Steps 1, 4 and 6 are the minimal basic steps for acquiring RR Analysis.
Acquire an Arrhythmia

1. Prepare the Patient.

2. Open the Arrhythmia function in one of two ways:
   - If the select default power on option is Arrhythmia, simply power on the unit or
   - From Main Menu select Arrhythmia

3. The Patient Data window automatically opens. Enter the desired information.

4. Select Page Down to access other Test Information windows.

5. Select Save to save and close the Patient Data window.

6. Verify waveform quality by:
   - Checking Hook-up Advisor. Green indicates a good quality waveform.
   - Cycle through the lead groups to visually verify lead quality by selecting the Leads key on the Keyboard.

7. Make adjustments to (if necessary):
   - Speed
   - Gain
   - Filter

8. Select Start Recording.

9. Select Stop Recording.

10. Select Confirm Stop to stop the recording or Continue Recording to continue to collect information.

11. After the recording is stopped, select the type of Arrhythmia report you wish the printout to include: Summary Report, Table Report, or Episode Report.

12. Select Main Menu.

Note! Steps 1, 3 and 8 are the minimal basic steps for acquiring an ECG.
Stress ECG Testing Keyboard

The Stress ECG test keys are located at the top of the stress test keyboard. These keys are used to control the functions of the stress test as well as the connected stress device.

1. **Pretest**: Advanced the test to the Pretest Phase or while in the Pretest Phase if selected will advance to the next stage in that phase.

2. **Recall**: Prints a one-page rhythm strip report using the previous 10 secs of data from the point from which you select the Recall key.

3. **Exercise**: Advanced the test to the Exercise Phase or while in the Exercise Phase if selected will advance to the next stage in that phase.

4. **12 Ld**: Prints a 12 lead report.

5. **Recovery**: Advances to the Recovery phase or while in the Recovery Phase if selected will advance to the next stage.

6. **Medians**: Prints a median report. Set the type of median report you wish to print in the Stress Setup window under In-test Reports.

7. **Test End**: Ends the current test. When a confirmation message appears on the screen, select the desired function key.

8. **Comment**: Allows you to enter comments about the test. Comments are printed on the Tabular Summary Report. You can enter up to 100 characters.
9. **Hold Stage**: Maintains the current test stage and doesn’t allow the protocol to go to next stage. Select again to remove the stage hold and to go back to programmed protocol staging.

10. **Enter BP**: Allows you to enter a Blood Pressure reading manually or triggers a reading for a supported external device.

11. **Speed W+**: Increase treadmill speed or ergometer load. Selecting this button will result in the system no longer following the selected protocol and places the system in manual mode.

12. **Speed W-**: Decreases treadmill speed or ergometer load. Selecting this button will result in the system no longer following the selected protocol and places the system in manual mode.

13. **Grade↑**: Increase treadmill incline. Selecting this button will result in the system no longer following the selected protocol and places the system in manual mode.

14. **Grade↓**: Decrease treadmill incline. Selecting this button will result in the system no longer following the selected protocol and places the system in manual mode.

15. **Tmil >**: Starts the Treadmill

16. **Tmil •**: Stops the Treadmill
Acquire a Stress ECG Test

Accessing Stress ECG Mode

The Stress ECG mode is a purchasable option and allows you to conduct a Stress ECG test with a direct connection to treadmill or ergometer. Regardless of the devices the basic procedure for conducting a Stress ECG test is the same. Now let’s access the Stress ECG menu.

1. Select **Stress ECG** from the Main Menu.
2. Select **Patient Data** and enter the appropriate data.
3. Select **More**.
4. Select **Protocol** to choose desired protocol. The default protocol will be chosen, however you can select another protocol from the list. If you do select a new protocol, select **Save**.
5. You can also turn Pace Enhance On or Off, select the Printer Leads, select Report Formats or change the Target HR.

**Note!** In setups you can automatically set the Target HR % that you wish to achieve. This number is calculated against the patient’s age.
Pretest Phase

A Stress ECG protocol typically is composed of 4 phases. These include Pretest, Exercise Recovery and Test End.

Pretest allows the user to take ECG and blood pressure measurements in a variety of patient positions. Depending on the protocol, it is also a phase that could be used to allow the patient to warm-up before the Exercise portion of the Stress ECG test.

1. Select the **Pretest** button on the keyboard to enter the Pretest Phase.
2. Select the **BP** button on the keyboard and enter patient’s blood pressure.
3. Select the **12 ld** button on the keyboard to take a 12-lead ECG.
4. Select the **Pretest** button to advance through the Standing and Hypervent stages a BP and 12-lead as required.
5. Select the **Pretest** button to advance to Warm-up.
6. Select the **Tmil>** button to start the treadmill.
7. Have the patient start to walk at speed based on the selected protocol.
**Exercise Phase**

Once the patient is comfortable walking on the treadmill or peddling on the ergometer, select the Exercise key on the keyboard to start the Exercise Phase. The phase will now indicate Exercise and the stage time and workload will be dictated by the protocol.

1. Select the **Exercise** button on the keyboard. The system will now enter the exercise phase and follow the selected protocol. Select the **Exercise** button a second time to advance the protocol to the next stage.

**Note!** Selecting the Speed or Grade controls for the treadmill or ergometer will result in the system dropping out of the protocol. At this point the user must manually control the treadmill or ergometer’s workload.

2. Select the **Hold Stage** button will result in the stage being held at that workload for as long as the stage is held. Select **Hold Stage** a second time to release the stage to follow the selected protocol.

3. A blood pressure will be automatically prompted for based on the protocol or you can select the **Enter BP** button on the keyboard to enter a BP.

4. A 12 lead will be automatically taken by the system based on the protocol or you can select the **12 Id** button on the keyboard to take a 12 lead. You may also take a median report at any time by selecting **Medians**.

5. Select the **Recall** button to capture the previous 10 sec of ECG that just pasted on the screen.

6. Select **Comment** on the keyboard to enter a patient related comment.
Recovery Phase

Once it is determined that the Exercise portion of the stress test has been completed, you will now select the Recovery button and enter into the recovery phase. The Recovery phase is an opportunity to continue to monitor the patient to make sure their blood pressure, heart rate, symptoms and ECG return to their pre-test values. The length of the Recovery Phase will depend on your clinician protocol.

1. Select the **Recovery** key on the function keyboard when the patient has reached peak exercise, or when you are ready to advance to the Recovery Phase.

2. On supported treadmills the speed and grade of the treadmill will gradually decrease according to the protocol.

3. The system will automatically print a peak 12-lead or median report according to the protocol.

4. BP will automatically be prompted based on the protocol.

5. Enter comments or take extra 12 leads or medians as needed.

6. Select **Tmil** on the keyboard to stop the belt. If using an ergometer, have the patient stop peddling.
**Test End**

Once the Recovery phase is completed you can select Test End on the keyboard and disconnect the leads from the patient.

1. Select the **Test End** key on the keyboard when ready to end the test.

2. Confirmation of ending the test appears. Select **Confirm Test End** to end test or select **Continue Test** to continue collecting data for the current patient.

3. Once you have selected **Confirm Test End** the following menu selections appear.
4. Select **Print** to print the default Summary Report Format.

5. If you desire to select different Summary Report components then originally chosen in the Stress Testing Setup, select **Report Format** to override those default selections. The following screen appears to allow you to select the different components.

6. Select **Save** to save your changes and select **Print** to print that Summary report.

7. Select **Next Patient** to conduct a Stress ECG test on the next patient. The system will verify that *The previous test data will be lost. Do you wish to continue with the Next Patient?*
Select **Yes** to continue

---

**Note!** Stress ECG test are not saved to the File Manager. Once you select to do you next patient all test data will be lost.
To Select Records:
1. From Main Menu select File Manager.
2. From File Manager you can select records to:
   • Edit
   • Preview
   • Delete
   • Print
   • Transmit
   • Import
   • Export

To Select All:
1. Select Select All. All records are selected.
2. Select the menu key of the desired function, such as Print.

To Select Individual Records:
1. Select Select.
2. Use the circles on the trimpad to highlight the record. Highlighted records are shaded in dark blue.
3. Select the middle of the trimpad to select the records. Selected records are then shaded in gray.
4. If needed, continue to select other records.
5. Select the menu key of the desired function, such as Print.
**Edit Stored ECG Records**

1. From Main Menu select *File Manager*.
2. Select *Select* to highlight the individual record to edit. You may only select one record to edit at a time.
3. Select *Edit* to edit the selected record.
4. Use the keys on the Trimpad to select the Patient Information to be edited.
5. Edit the data as required.
6. Select *Page Down* to access other Test Information Windows.
7. Edit the data as required.
8. Select *Save* to save edited fields and close the data window.
9. Highlight the record using the Trimpad and select *Print* to print the edited record.

**Delete Stored ECG Records**

1. From Main Menu select *File Manager*.
2. Select *Select* to select individual records to delete.
3. Select *Delete*.
4. A message will appear verifying whether you want to delete the selected record(s).
5. Select *Yes* to delete the record(s). Select *No* to cancel the delete function.
### Tier 3 F Keys for File Manager

<table>
<thead>
<tr>
<th>Edit</th>
<th>Preview</th>
<th>Delete</th>
<th>Print</th>
<th>Transmit</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Preview record(s)**

**Print record(s)**

**Transmit record(s)**

---

**Print Stored ECG Records**

1. From Main Menu select the key for **File Manager**.
2. Select **Select** to highlight an individual records to print. **Select All** to select all records.
3. Select **Print** to print the selected record(s) to the thermal printer.

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**Transmit Stored Records**

1. From **Main Menu** select the key for **File Manager**.
2. Select **Print Directory** to print a list of stored files.
3. Select **Select All** to select all records to transmit or select **Select** to select individual records.
4. Select **Transmit** to transmit selected records.
5. One of two things will happen:
   - If only one location is defined, the file(s) will be transmitted to the default location.
   - If multiple locations are defined, select the desired location and select **Ok**.

---

**Preview Stored ECG Records**

1. From the Main Menu select the key for **File Manager**.
2. Select **Select** to highlight the record to preview.
3. Select **Preview**.
4. The 12 lead display of the ECG record will be displayed.
5. Select **Return** to return to the File Manager main screen.
Exporting to SD Card

1. Select Select to highlight individual records to export. Select All to select all records.

2. If you are exporting to an SD card, insert the card into the MAC 2000 SD Card Slot. Make sure the card has sufficient free space for the selected records and that it is not write protected. If there is no sufficient space on the SD card a message will appear indicating that.


4. Select Export. The F keys change to allow you to select the format in which to export the data.
   - To export the data in XML, skip to step 5.
   - To export the data in PDF, proceed to step 8.

5. To export the data in XML, select Hilltop XML. One of two things happens:
   - If a shared directory was defined, a window opens for you to select the destination.
Exporting to SD Card

Skip to step 6.

- If a shared directory was not defined, the selected records are exported to the SD card.

A window opens to inform you of the export’s progress. The window closes when the export is complete.

6. Do one of the following:

- To export to the SD card, select SD Card in the window.

- To export to the shared directory, select Shared Directory in the window.

7. Select OK. The selected records are exported to the selected destination. A window opens to inform you of the export’s progress. The window closes when the export is complete.

8. To export the data as a PDF, select PDF.

9. Follow steps 6 through 7.

Note! When exporting to a shared directory, the MAC 2000 device logs on to the directory with the user name and password defined on the Communications Setup window. If either of those values are incorrect, you will receive an error message. Correct the user name and password on the Communication Setup window and repeat the export process.
GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care.

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In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

imagination at work

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