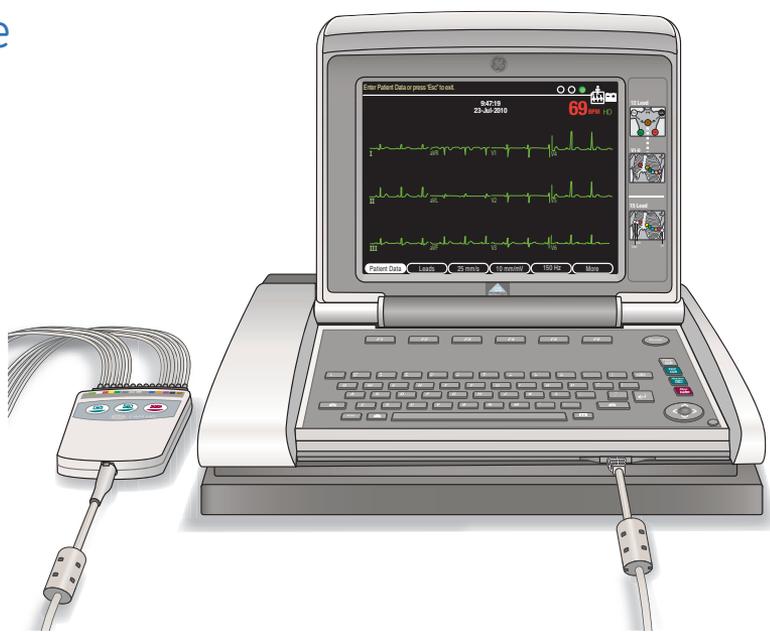




MAC[®] 5500 HD ECG Analysis System

Quick Reference Guide



Education Services
Clinical Development





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.

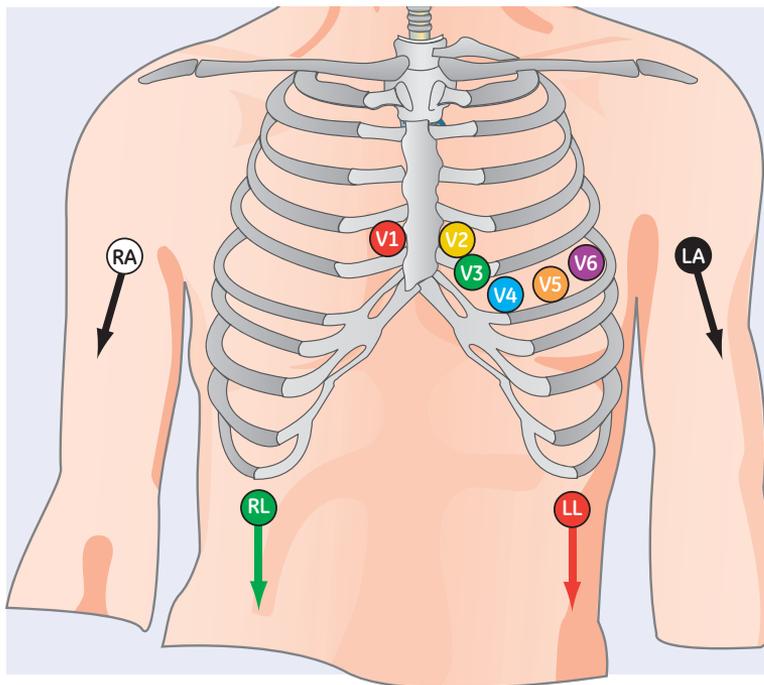
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12 lead Preparation and Placement

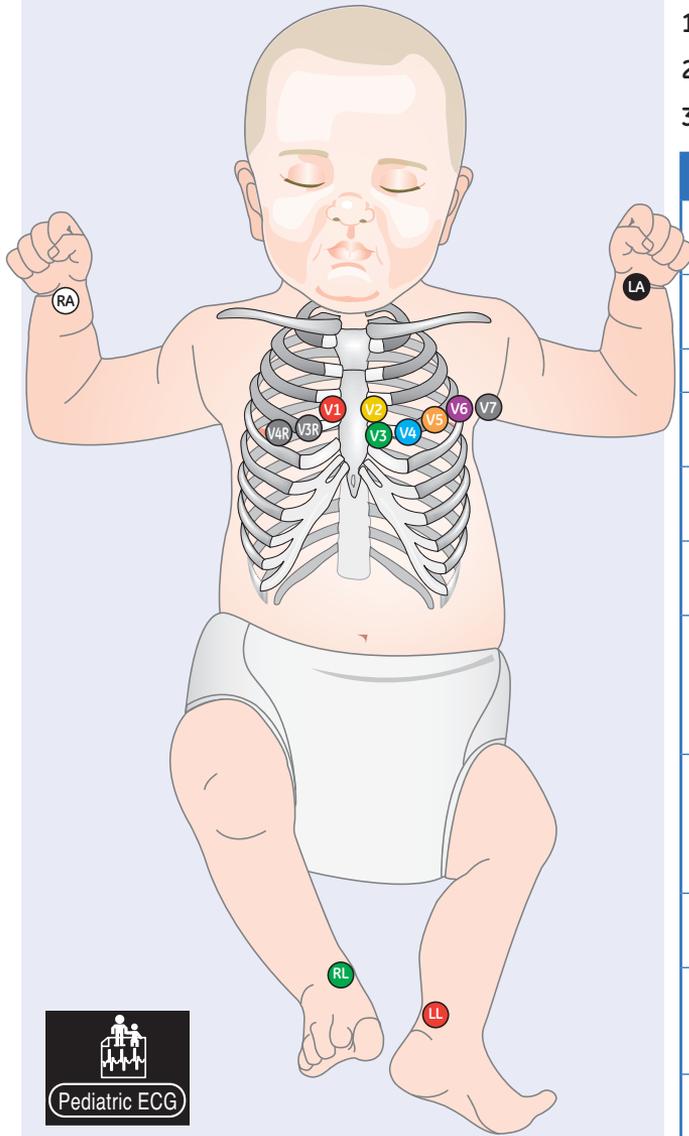
The quality of your ECG tracing is a direct result of skin preparation and lead placement.

1. Shave hair from application site.
2. Gently rub area to remove dead skin cells.
3. Cleanse the site with alcohol solution.
4. Dry skin completely.

Lead	Electrode Placement
V1	Fourth intercostal space next to the sternum on the right side.
V2	Fourth intercostal space next to the sternum on the left side.
V3	Midway between locations V2 and V4.
V4	At the mid-clavicular line in the fifth intercostal space.
V5	At the anterior axillary line on the same horizontal level as V4.
V6	At the mid-axillary line on the same horizontal level as V4 and V5.
RA and LA	Place on the corresponding right and left wrist. An alternate placement to reduce muscle artifact is midway between the elbow and the shoulder.
RL and LL	Place on the corresponding right and left ankle. An alternate placement to reduce muscle artifact is on the upper leg as closed to the torso as possible.



Pediatric Lead Preparation and Placement

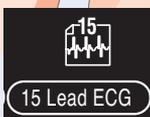
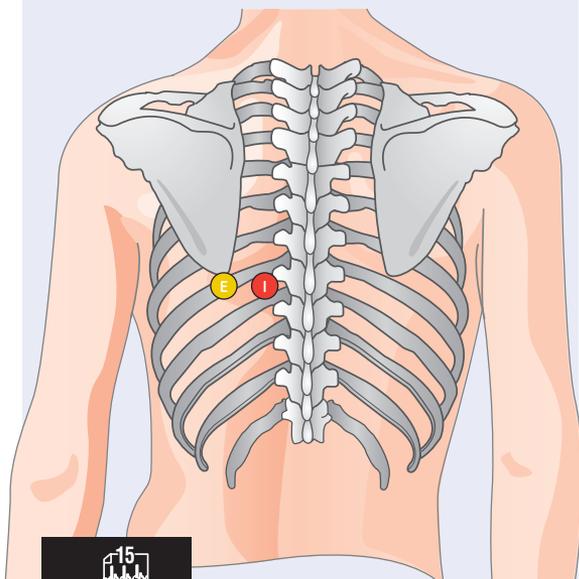
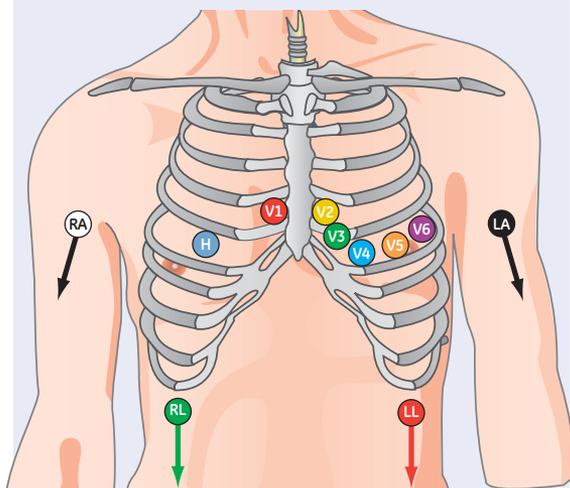


The quality of your ECG tracing is a direct result of skin preparation and lead placement.

1. Gently rub area to remove dead skin cells.
2. Cleanse the site with alcohol solution.
3. Dry skin completely.

Lead	Electrode Placement
V1	Fourth intercostal space next to the sternum on the right side.
V2	Fourth intercostal space next to the sternum on the left side.
V3	Midway between locations V2 and V4.
V4	At the mid-clavicular line in the fifth intercostal space.
V5	At the anterior axillary line on the same horizontal level as V4.
V6	At the mid-axillary line on the same horizontal level as V4 and V5.
RA and LA	Place on the corresponding right and left wrist. An alternate placement to reduce muscle artifact would be the right and left deltoid respectively.
RL and LL	Place on the corresponding right and left ankle. An alternate placement to reduce muscle artifact is on the upper leg as closed to the torso as possible.
V3	Midway between locations V1 and V4R on the right side of the chest
V4R	Mid-clavicular line in the fifth intercostal space on the right side of the chest.
V7	Left posterior axillary line, at the same horizontal level as V6.

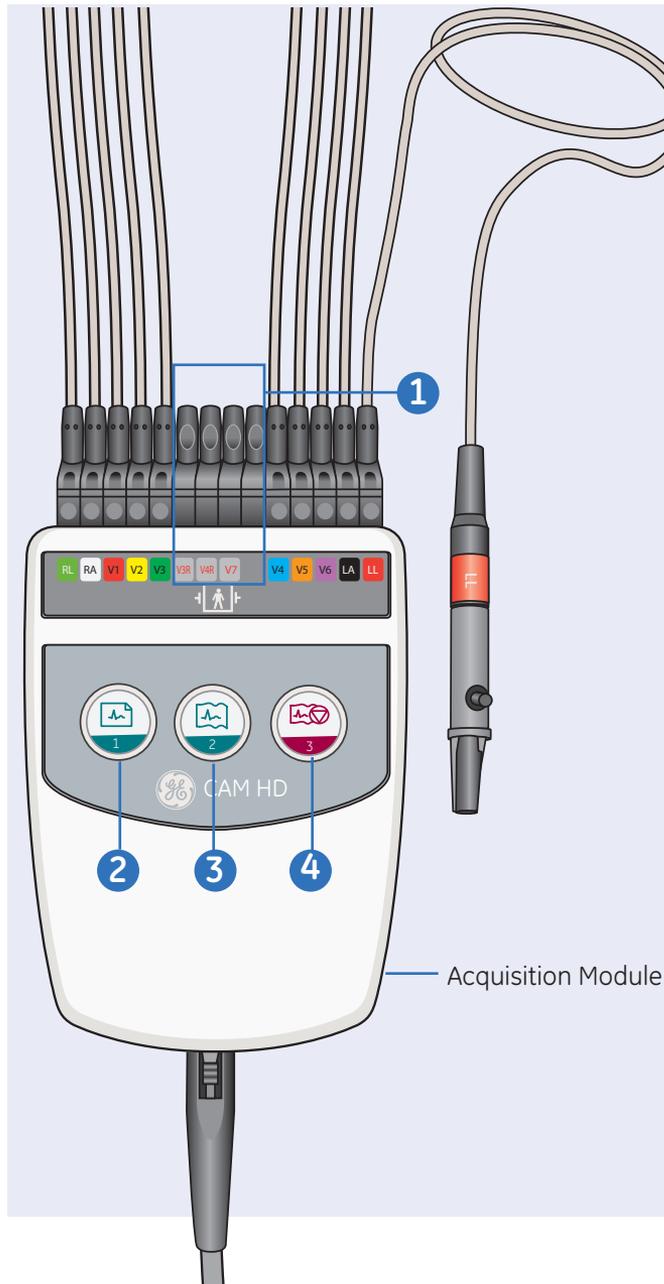
15 lead Preparation and Placement



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

1. Shave hair from application site.
2. Gently rub area to remove dead skin cells.
3. Cleanse site with alcohol solution.
4. Dry skin completely.

Lead	Electrode Placement
V1	Fourth intercostal space next to the sternum on the right side.
V2	Fourth intercostal space next to the sternum on the left side.
V3	Midway between locations V2 and V4.
V4	At the mid-clavicular line in the fifth intercostal space.
V5	At the anterior axillary line on the same horizontal level as V4.
V6	At the mid-axillary line on the same horizontal level as V4 and V5.
RA LA	Place on the corresponding right and left wrist. An alternate placement to reduce muscle artifact is midway between the elbow and the shoulder.
RL LL	Place on the corresponding right and left ankle. An alternate placement to reduce muscle artifact is on the upper leg as closed to the torso as possible.
H (V3R)	Mid-clavicular line in the fifth intercostal space on the right side of the chest
E (V8)	Posterior: Under the left mid-scapular line, at the same horizontal level as V6.
I (V9)	Posterior: Left paraspinal border, at the same horizontal level as V6.

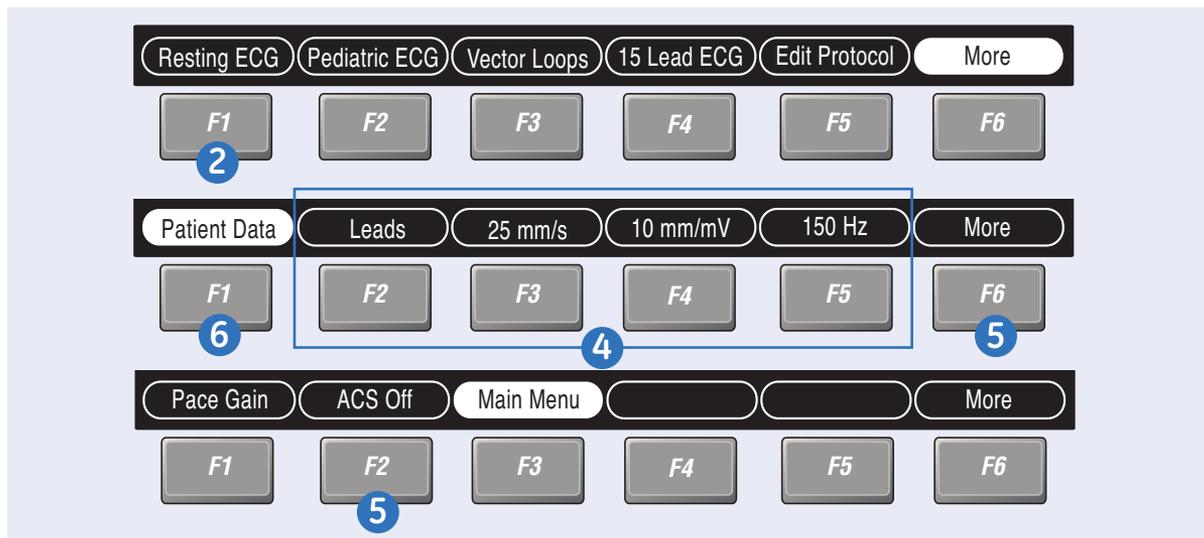


15 lead Preparation and Placement (continued)

For your convenience, you can acquire ECGs from the Acquisition Module.

To use the Acquisition Module:

1. If you use the Posterior Leads, place them into the H, E, I & M Leads on the Acquisition Module:
 - V4R into **H**
 - V8 into **E**
 - V9 into **I**
 - Place a lead blocker into **M**
2. Press to acquire Resting ECG.
3. Press to acquire a continuous rhythm strip.
4. Press to stop the writer.

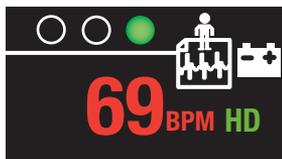


Acquire an ECG

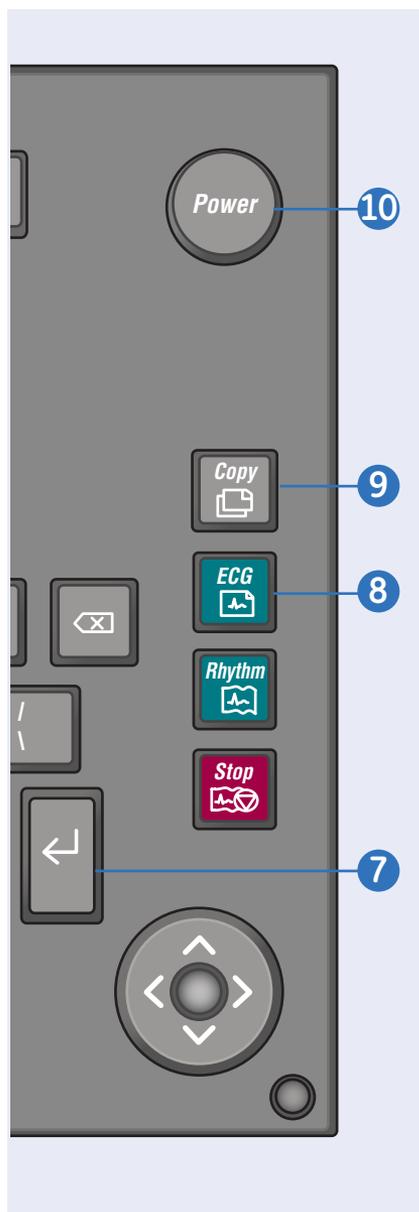
1. Prepare the patient, as discussed on **pages 1-4**.
2. Open the Resting ECG function in one of two ways:
 - Power on the unit, **or**
 - From the **Main Menu**, select **Resting ECG (F1)**.
3. Verify wave quality by checking the Hook-Up Advisor. **Green** indicates a good quality waveform.
4. Use the Function Keys to make adjustments (if necessary).
 - **F2 = Leads**
 - **F3 = Speed**
 - **F5 = Gain**
 - **F5 = Filter**
5. If you have the option and wish to turn on ACS, press **More (F6)** and select **ACS Off (F2)** to enable the ACS analysis. Select **More (F6)** to return to the Resting ECG menu.
6. Press **F1** to open Patient Data window. Enter patient information. If you have a bar code or mag card reader setup you will be prompted to swipe those here.



Note! If you are using orders/ADT your workflow may change here. See Orders/ADT for further details on how to acquire an ECG using a order or ADT.



Acquire an ECG continued



Acquire an ECG

7. Select **Return** and press the **Return** Key to close the Patient Data window.



Note! You may also press the **Esc** key to save and close the Patient Data window. Be sure to press **Return** after entering any data into a field prior to pressing **Esc**, otherwise you may lose the last data entered.

8. Press the **ECG** key on the keyboard to record the ECG. One of two things will happen:
 - The ECG prints immediately.
 - A preview before printing screen will appear. Press **Continue** (prints and saves the record), or **Cancel** (returns you to Step 8).

9. If finished, go to step 8. or continue with these options:

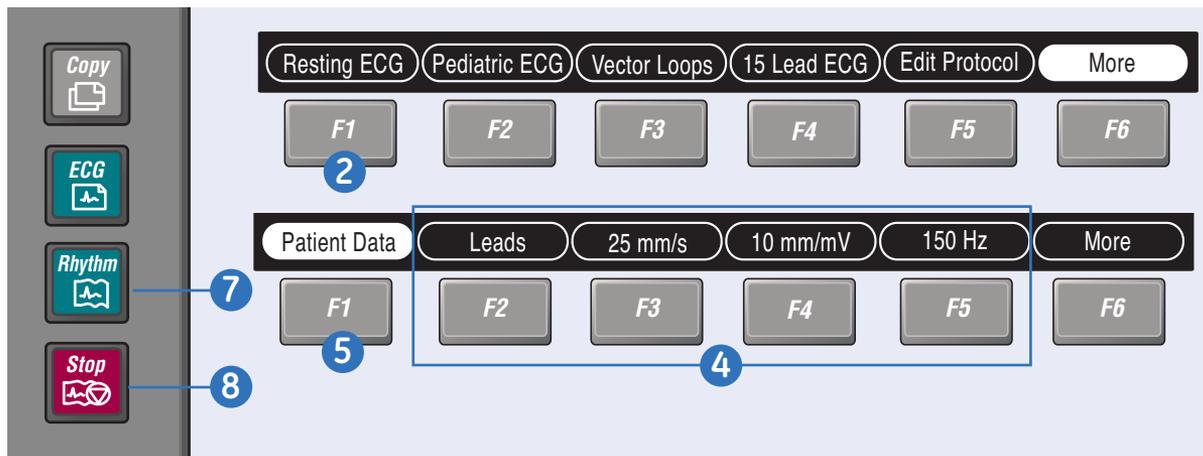
- Press the **Copy** key to print another copy.
- Select **Same Patient** or **Next Patient** to continue with more tests.
- Select **Store** if not set up to store automatically.

10. When finished, do one of two things:

- Proceed to **File Manager** to transmit records. (See Transmit ECG Records).
- Turn the unit off and plug it into AC power.



Note! To acquire a **Pediatric** or **15 lead ECG**, select **Pediatric ECG** or **15 Lead ECG** from the Main Menu. Then continue with **Step 3 through Step 10**.



Print a Continuous Rhythm

- Prepare the patient, as discussed on [pages 1-4](#).
- From the **Main Menu**, select the **ECG** mode:
 - F1** = Resting ECG
 - F2** = Pediatric ECG
 - F4** = 15 lead ECG
- Verify wave quality by checking Hook-Up Advisor. Green indicates a good quality waveform.
 
- Use the Function keys to make adjustments:
 - F2** = Leads: selections are printed in rhythm. You can toggle through the leads, if desired, use the leads function button.
 - F3** = Speed
 - F4** = Gain
 - F5** = Muscle Filter
- Press **F1** to open Patient Data window. Enter patient information. If you have a bar code or mag card reader setup you will be prompted to swipe those here.
- Select **Return** and press the **Return** Key to close the Patient Data window.
 
- Press the **Rhythm** key on the keyboard to print a continuous rhythm.
- Press the **Stop** key on the keyboard to stop printing.



Note! Rhythm reports are not stored and cannot be transmitted to the MUSE system.

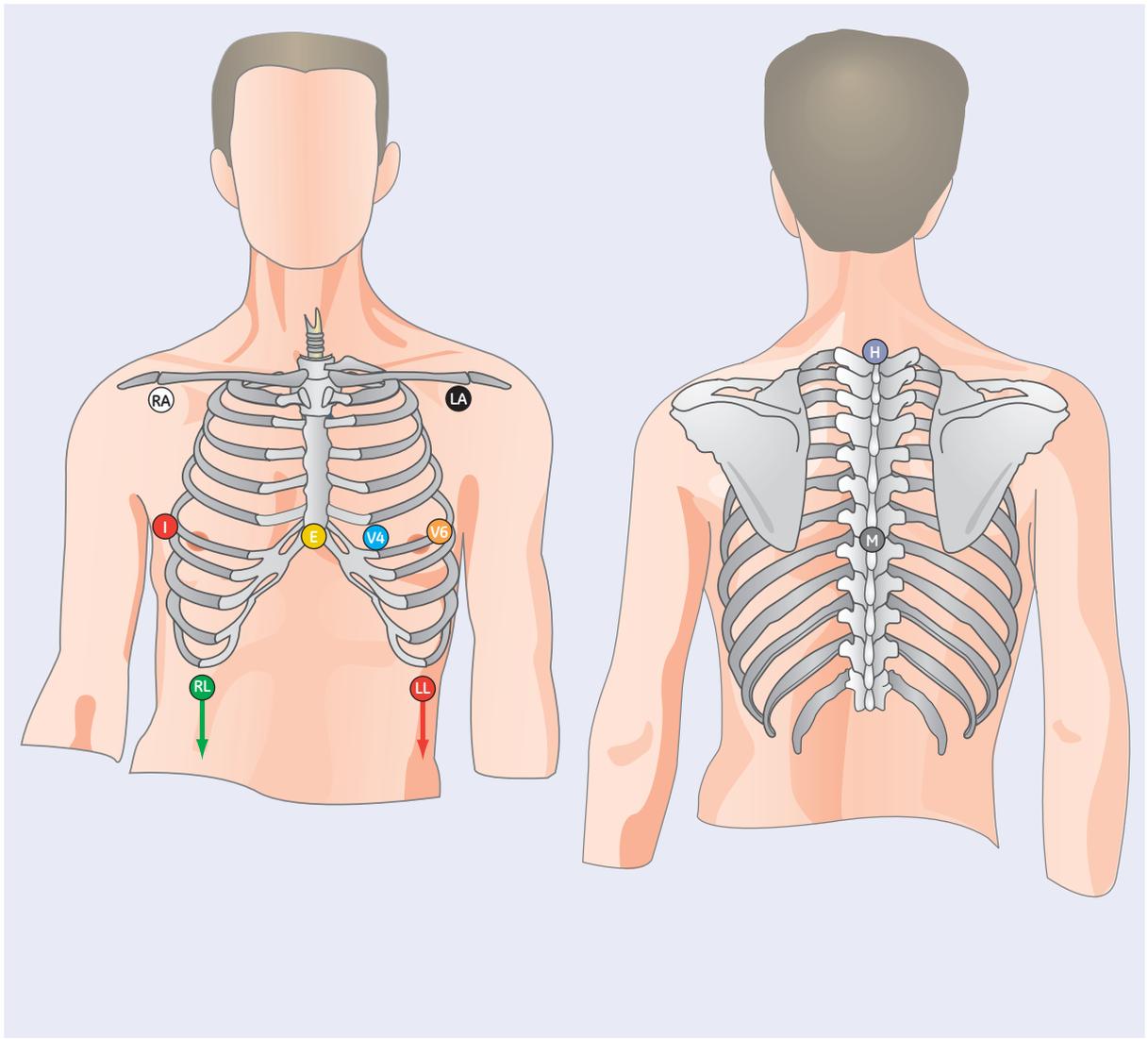


Hi-Res Preparation and Placement

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

1. Shave hair from application site.
2. Gently rub area to remove dead skin cells.
3. Cleanse site with alcohol solution.
4. Dry skin completely.
5. Use the Frank X, Y, Z electrode placement.

Lead	Electrode Placement
V4	At the mid-clavicular line in the fifth intercostal space.
V6	At the mid-axillary line on the same horizontal level as V4.
RA and LA	Just below the right and left clavicles respectively.
RL and LL	Right and left leg respectively, lower abdominal quadrant.
E	Mid-sternum on same horizontal level as V4 and V6.
I	At the right mid-axillary line on the same horizontal level as V4 and V6.
H	Posterior: Back of the neck. Avoid carotid artery and jugular view.
M (V9)	Posterior: Center of spine on the same horizontal level as V4 and V6

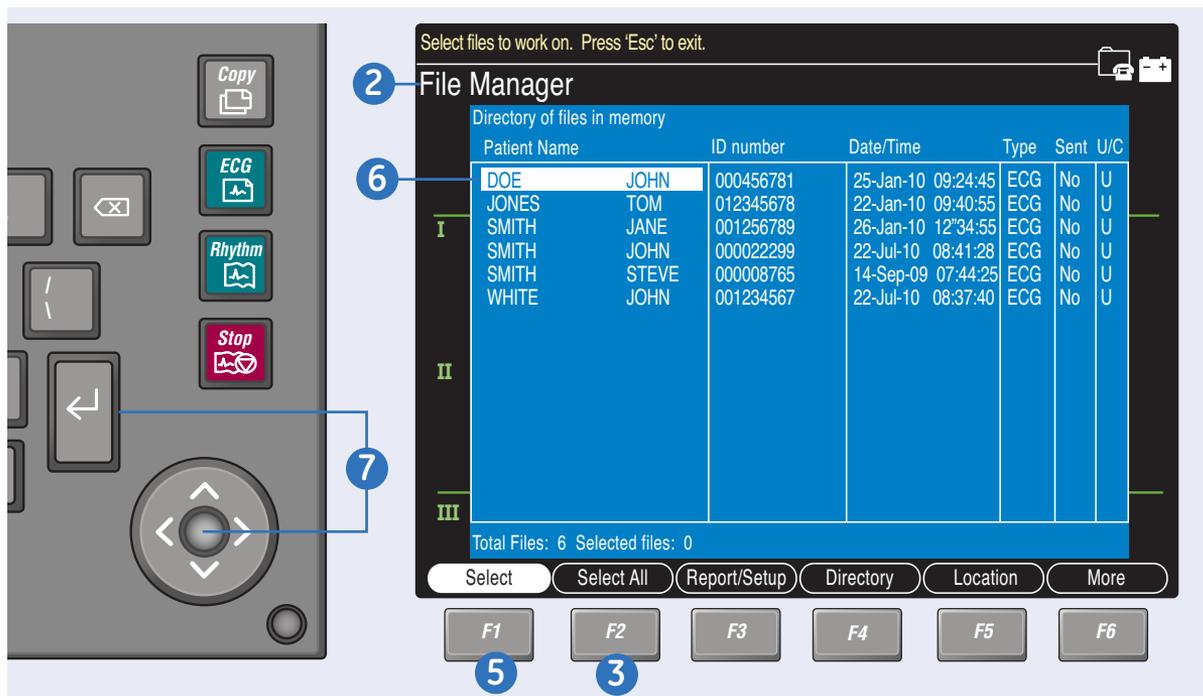




Acquire a Hi-Res ECG

1. Prepare the patient.
2. From **Main Menu**, select **Hi-Res** or **PHi-Res** depending on the test you wish to conduct.
3. Verify wave quality by checking Hook-Up Advisor. Green indicates a good quality waveform.
4. If necessary, use the Function Keys to make adjustments.
 - Press **Options** to change filter and averaging target.
 - Press **Target** to change target beat count.
5. Press **F1** to open the **Patient Data** window. Enter patient information.
6. Select **Return** and press the **Return** Key to close Patient Data window.
7. Press **Template (f5)** to generate the reference template used for the Hi-Res test.

Note! *The Reference Beat will be labeled with an asterisk. You can select a different beat by selecting Display and then select QRS.*
8. Press **Average** to begin test.
9. A completed report will print at the conclusion of the test based on System Setup.
10. If finished, continue with these options.
 - Select **Store**, if not set up to store automatically.
 - Select **Print**.
 - Select **New Format**.
 - Select **Target**.
 - Select **More**, and then either **Restore** or **Main Menu**.
11. When finished, do one of two things:
 - Proceed to **File Manager** to transmit records. (See Transmit ECG Records.)
 - Turn the unit off and plug into AC power.



File Manager

- From the **Main Menu**, press **More** to reach File Manager.
- Press **File Manager**. Select Records to:
 - Transmit
 - Print
 - Edit
 - Display
 - Delete

To Select All:

- Press **Select All (F2)**.
All records are selected.
- Press the **F** key for the desired function, such as **Transmit (F4)**.

To Select Individual Records:

- Press **Select (F1)**.
- Use the **Arrow Pad** to highlight the record. Highlighted records are shaded in white.

- Press the **Return** key or the center of the **Arrow Pad** to select the record.



Note! Selected records are shaded in gray.

- If needed, continue to select other records.
- Press the **F** key for the desired function, such as **Transmit (F4)**.

1 File Manager

Select files to work on. Press 'Esc' to exit.

Directory of files in memory

Patient Name	ID number	Date/Time	Type	Sent	U/C
DOE JOHN	000456781	25-Jan-10 09:24:45	ECG	No	U
JONES TOM	012345678	22-Jan-10 09:40:55	ECG	No	U
SMITH JANE	001256789	26-Jan-10 12:34:55	ECG	No	U
SMITH JOHN	000022299	22-Jul-10 08:41:28	ECG	No	U
SMITH STEVE	000008765	14-Sep-09 07:44:25	ECG	No	U
WHITE JOHN	001234567	22-Jul-10 08:37:40	ECG	No	U

Total Files: 6 Selected files: 0

Select Select All Report/Setup Directory Location More

F1 F2 F3 F4 F5 F6

3

2

5

Select files to work on. Press 'Esc' to exit.

File Manager

Directory of files in memory

Patient Name	ID number	Date/Time	Type	Sent	U/C
DOE JANE	000456789	22-JAN-10 09:40:55	ECG	No	U
DOE JOHN	000456781	25-Jan-10 09:24:45	ECG	No	U
JONES TOM	012345678	22-Jan-10 09:40:55	ECG	No	U
SMITH JANE	001256789	26-Jan-10 12:34:55	ECG	No	U
SMITH JOHN	000022299	22-Jul-10 08:41:28	ECG	No	U
SMITH STEVE	000008765	14-Sep-09 07:44:25	ECG	No	U
WHITE JOHN	001234567	22-Jul-10 08:37:40	ECG	No	U

Total Files: 7 Selected files: 2

Print Edit Display Transmit Delete More

F1 F2 F3 F4 F5 F6

4

To Transmit Stored Records:

1. From the **Main Menu** press the **F** key for **File Manager**.
2. Press Print **Directory (F4)** to print a list of stored files
3. Press **Select All (F2)** to select all records to transmit or press **Select (F1)** to select individual records.
4. Press **Transmit (F4)** to transmit selected records.
5. The cart will connect to the default location defined and transmit the selected records.



Note! If you wish to send to location other than the default location define select **Location (F5)** from the main File Manager Menu and select new location.

Selected records are shaded in gray



First Tier of File Manager Keys



Second Tier of File Manager Keys

**To Print Stored ECG Records:**

1. From the **Main Menu**, press More to reach File Manager.
2. Press **File Manager**.
3. Press **F1** to Select individual records to edit. Press **F2** to Select All records.
4. Press **Print**.

To Edit Stored ECG Records:

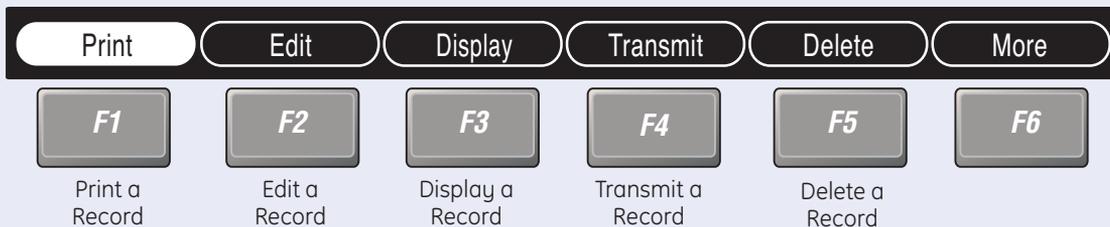
1. Press **F1** to select individual records to edit.
2. Press **F2** to **Select All** records.
3. Press **Edit**.
4. Use the **Arrow Pad** to select an item to edit. Press the **Return** Key or the center of the arrow pad.



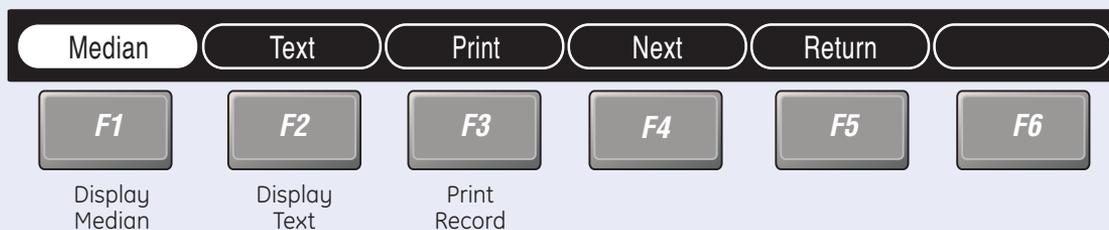
Note! If you select ECG Measurements or Diagnostic Statements you will be required to enter a password then a Reviewer Number and Review Name

5. Edit the data.
6. Select the **Return** Key and press **Enter** to close the Data Window.
Select another item to edit, if needed, and continue with **Step 4**.
7. When finished editing, select **Return** and press the **Return** Key to exit the Edit Function.
8. A message will prompt you to **Save or Discard** the changes.
9. Press **Store** to Save the changes, or press **Cancel** to Discard the changes.

Second Tier of File Manager Keys



Third Tier of File Manager Keys

**To Display Stored ECG Records:**

1. Press **F1** to select individual records to display.
2. Press **Display (F3)**. The 12-lead for that record will be displayed.
3. Press **Medians (F1)** to see the median displayed.
4. Press **Text (F2)** to see the interpretation displayed.

To Delete Stored ECG Records:

1. Press **F1** to select individual records to delete.
2. Press **F2** to select all records.
3. Press **Delete**.
4. You will be required to type a password to delete the record. Type the password and press the **Return** key.

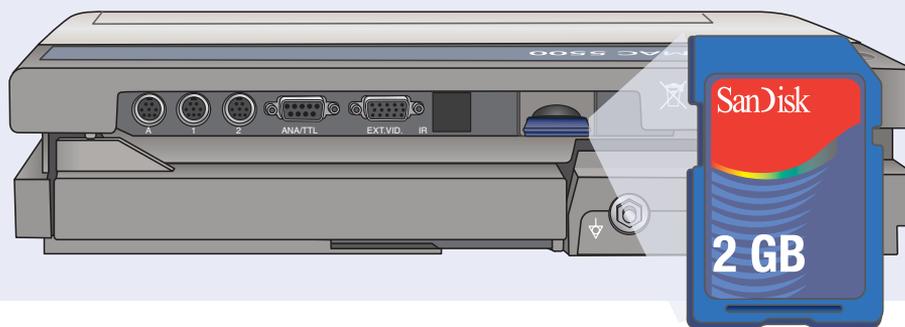
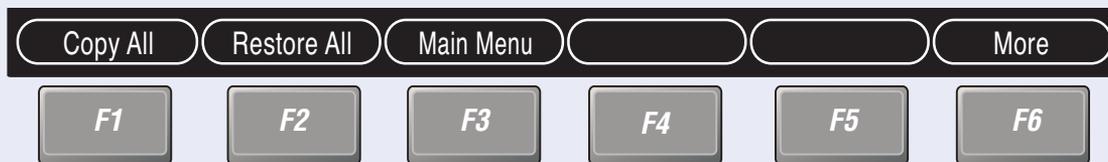


Note! The password is the same password to access System Setup. See your system administrator for the password.

5. A warning message will appear indicating you have selected files to delete.
6. Press **Yes** to delete. Press **No** to cancel the delete command.



Fourth Tier of File Manager Keys

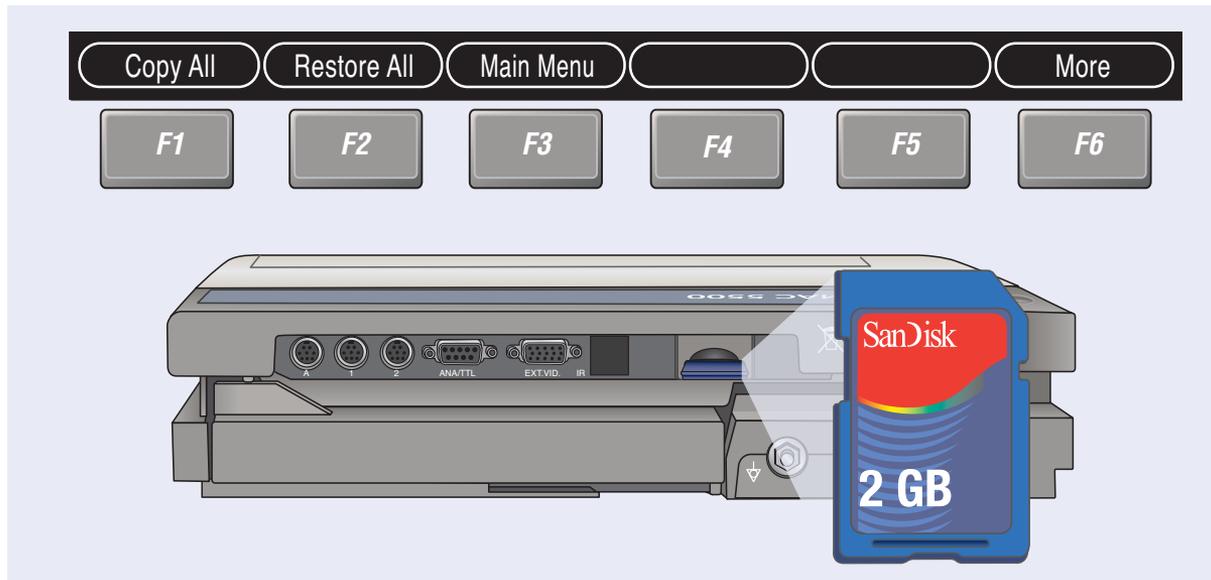
**To Copy All:**

1. From the **File Manager** menu select **More (F6)**.
2. Select **Copy All (F1)** and press the **Return** Key.
3. A message will appear indicating that existing records on the SD card will be deleted.
4. Select **Yes** to continue. Select **No** to cancel copying.

5. If **Yes** is selected a message will appear indicating the existing records are being deleted.
6. Once the existing records are deleted the copying process will start.
7. The SD card can be removed from the MAC 5500 and downloaded to the MUSE system through a Secure Digital Card Reader.



Note! It is important to understand that all existing records on the Secure Digital Card will be overwritten when you perform the **Copy All** function. If you wish to keep records on this Secure Digital Card, it is recommended to use another card that does not have any existing records on it.



To Restore All:

1. From the File Manager Menu select **More (F6)**.
2. Select **Restore All (F2)** and press the **Return** Key.
3. A message will appear indicating that existing records on the SD card will be deleted.
4. Select **Yes** to continue. Select No to cancel restoring.
5. If **Yes** is selected a message will appear indicating the existing records are being read and deleted.
6. A message will appear indicating records are being restored.



Note! It is important to understand that all existing records on the Secure Digital Card will be overwritten when you perform the **Restore All** function. If you wish to keep records on this Secure Digital Card, it is recommended to use another card that does not have any existing records on it.

Orders and ADT Download (Optional)

The MAC 5500 HD has the option of connecting to card reader or bar code reader. The system may be setup to simply load the patient data directly from the card or bar code. Or, it may be set up to use either the **Patient ID** or **Visit Number** to retrieve orders or ADT data.

Retrieving Orders from the MUSE via Visit Number

1. Select **Patient Data (F1)**.



2. If using a Bar Code a message will appear stating **Scan visit number bar code.**

Scan the Visit Number bar code.

If using a card reader the message will be **Slide the patient ID card.**

3. Scan the bar code or swipe the patient ID card. The cart will immediately connect to the MUSE system.

4. **If there is only one patient with visit number:**
 - a. If there is only one patient with this visit number, then that patient's order(s) will appear.
 - b. Select the order if there are multiple orders showing to download to the cart.
 - c. After the order is downloaded, the MUSE will disconnect with the cart and the patient information window will open with the patient demographics populated.
 - d. Edit the patient data if necessary.

Retrieving Orders from the MUSE via ID Number

1. Select *Patient Data (F1)*.



2. If using a bar code a message will appear stating, **Scan patient ID bar code.**

Scan the patient ID bar code

If using a card reader the message will be **Slide the patient ID card.**

3. Scan the bar code or swipe the patient ID card. The cart will immediately connect to the MUSE system.
4. One of two things will occur:

If there is only one order for that patient:

- a. You will see a message indication the order is being received.

- b. There will be a message stating **Disconnecting modem from line. Please wait.**
- c. The **Patient Data** screen will open with the patient data populated.

Last name	Doe		
First name	James		
ID number	123456789		
Visit	99666		
Age	51 years		
Gender	Male	Race	Caucasian
Medications	-----		
Referred by	Dosch		Justin
Test indication	-----		
Technician	-----		
Order number	001CSXB4		
Comment	ordering comments		
Return	-----		

- d. Edit the data as needed.

If there is more than one order for that patient:

- a. You will see a message indicating, **Select from the list of matching orders.**
- b. A list of available orders for the patient will be shown on the screen.

- c. Select the desired order from the list
- d. There will be a message stating; **Disconnecting modem from line. Please wait.**
- e. The **Patient Data** screen will open with the patient data populated.
- f. Edit the data as needed.

Retrieving Orders via Keyboard Entry

1. Select Patient Data (F1).

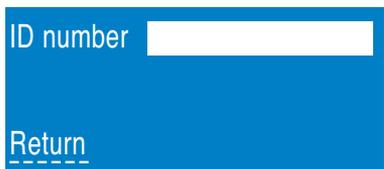


2. Depending on which option you chose under Query Key in the Input Method Select configuration, you would see one of the following messages:

- If you selected Visit you would see:



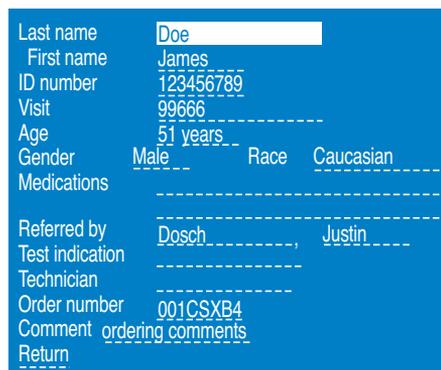
- If you selected Patient ID you would see:



3. Enter the **Visit** or **ID number**, depending on your configuration.
4. Once the cart has established connection with the MUSE one of two things may occur:

If there is only one order for that patient:

- a. You will see a message indication the order is being received.
- b. The message: **Disconnecting modem from line. Please wait** will appear.
- c. The Patient Data screen



will open with the patient data populated.

- d. Edit the data as needed.

If there is more than one order for that patient

- a. The message: **Select from the list of matching orders** will appear.
- b. A list of available orders for the patient will be shown on the screen.
- c. Select the desired order from the list.
- d. A message: **Disconnecting modem from line.** Please wait will appear.
- e. The Patient Data screen will open with the patient data populated
- f. Edit the data as needed.

Retrieving Order List from MUSE.

Order Manager Interface

List of orders

Patient Name	ID number	Location Room	Time	Type
Miller, Bruce	333555555		11:50 Nov-23	ECG
*Ross, Betsy	987479495		09:38 Oct-29	ECG
Smith, John	339660194		09:37 Oct-29	ECG
Smith, John	339660195		09:38 Oct-29	ECG
*Smith, John	600827637		13:47 Oct-29	ECG

Total Orders: 5 *--Completed order.

Select Load Orders Delete Orders Sort Orders Print More

F1 F2 F3 F4 F5 F6

←

Order Manager Interface

Orders can be downloaded to the cart via the Order Manager Interface using any of the following methods:

- SD card
- Modem (Internal or External)
- Local Area Network
- Direct Serial Connection
- Wireless.

Regardless of the method of communication with the MUSE, the method of downloading orders are the same.

Loading Orders

1. Select **Main Menu**.
2. Press **More** within **Main Menu** until you reach **Ord Mgr Int**.
3. Select **Ord Mgr Int** to open list of orders window.

4. Select **Load Orders (F2)**. A popup window appears.
5. Enter the **Location(s)** from which you wish to receive orders. If you enter more than one location number separate the location numbers with a comma eg. 1,2,4.
6. Press the **Return** key.
7. Select from the list of open orders to record patient ECGs.



Retrieving Order List from MUSE.

Order Manager Interface

Select from the list of ALL open orders.

Patient Name	ID number	Location Room	Time	Type
HOBBS, MIRANDA	123456789		0627 08:27 Nov-23	ECG
WALLER, BARBARA	222333444		08:29 Nov-23	ECG

Total Orders: 2 Selected Orders: 1 *--Completed order.

Cancel

Page Up

Page Down

Return

F1

F2

F3

F4

F5

F6

Order Manager Interface

Acquiring ECG from Order

- From the **List of Order** screen, press **Select (F1)**.
- Use the **Arrow Pad** to move throughout the list to highlight the desired order.
- Press the **Return** key or the center of the **Arrow Pad** to select the order.
- A message will appear confirming the order information you just selected.
- Press **Continue (F2)** to run the test with current order information or press **Cancel (F1)** to select a different order.
- If you press **Continue**, the **Patient Data** window opens with the order information populated.
- Edit the information as needed and select **Return**.



Order Manager Interface

Delete an Order

- From the **List of Order screen**, press **Delete Orders (F3)**.

Delete Orders

F3

- Select from the following:

- Select (F1):** Selects individual orders to delete
- Delete All (F2):** will select all orders and prompt you to delete them
- Del Completed (F3):** Select the orders that have been used to complete an ECG and prompt you to delete

them. Completed orders will be denoted with an asterisk*

- Cancel (F4):** will return to the previous menu



Note! You can chose to have completed orders automatically deleted.



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PN: 2020786-244 Rev A
Printed in U.S.A.