

# MGH Wireless ECG Machine with Barcode Scanner - Troubleshooting Guide

## DEPARTMENT OF BIOMEDICAL ENGINEERING

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### ➤ MGH Wireless ECG Machine Components:

#### 1. Silex Bridge:

This component should be located on the trolley EKG MAC5500 HD machine. The component can be identified by locating 3 distinct lights as shown in Figure 1 (highlighted in green circle).

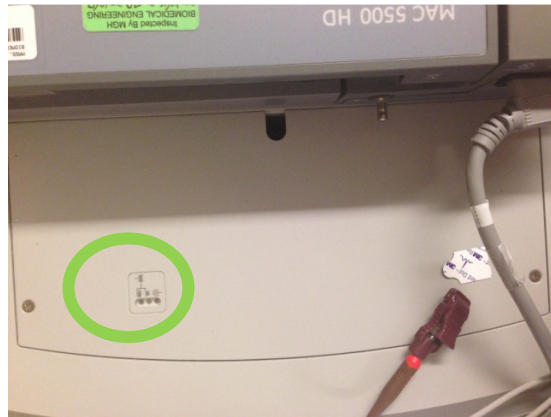


Figure 1: Silex bridge on the MAC5500 HD Trolley

Each Silex bridge should have the reset button (A), serial port (B), Ethernet Port (used with crossover cable for configuration C), LED Status Indicators (D and green circle) and power connector (E) as shown in Figure 2. For configuration of the Silex Bridge, refer to the document: [Configuration of Wireless ECG Machine with Barcode Scanner](#); located on the Partners Biomedical Engineering Main webpage, under MGH Call Tech Resources.

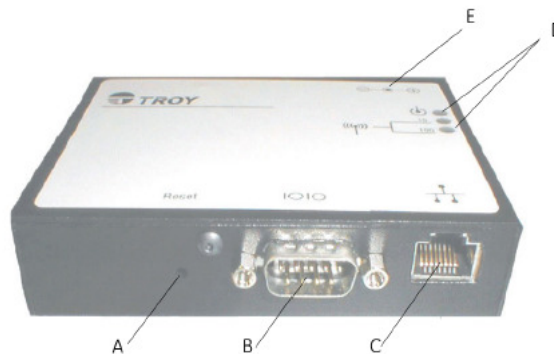


Figure 2: Silex Bridge and different ports on it.

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Each wireless MAC5500 machine with Barcode Scanner will have a label with following information on it.

AREA OF OPERATION: *All locations*  
MAC ADDRESS: *00-40-17-6D-2D-9A*  
IP ADDRESS: *10.17.3.254*  
SUBNET MASK: *255.255.252.0*  
GATEWAY: *10.17.0.1*  
MUSE PORT: *3001*

Figure 3: Label on each Wireless ECG Machine with Barcode Scanner

## **2. Barcode Scanner:**

The scanner will be mounted on a separate arm on the MAC5500 trolley juts like the Acquisition module. Please see picture of the scanner in Figure 4. For configuration of the Barcode scanner, refer to the document: *Configuration of Wireless ECG Machine with Barcode Scanner*; located on the Partners Biomedical Engineering Main webpage, under MGH Call Tech Resources.



Figure 4: Barcode scanner used with MAC5500 for scanning Patient MRN

### **➤ Support and Troubleshooting:**

The EKG Cart has multiple components. This trouble shooting guide will specifically focus on the Silex bridge wireless component and the Barcode scanner.

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**Troubleshooting Workflow:** MUSE and EKG Wireless system consists of multiple components that are supported by 3 MGH Biomedical Engineering groups:

- Inpatient Team
- Ambulatory Team
- Danvers Ambulatory Team

To prevent duplication of troubleshooting the following workflow must be followed when receiving a MUSE or EKG machine call.

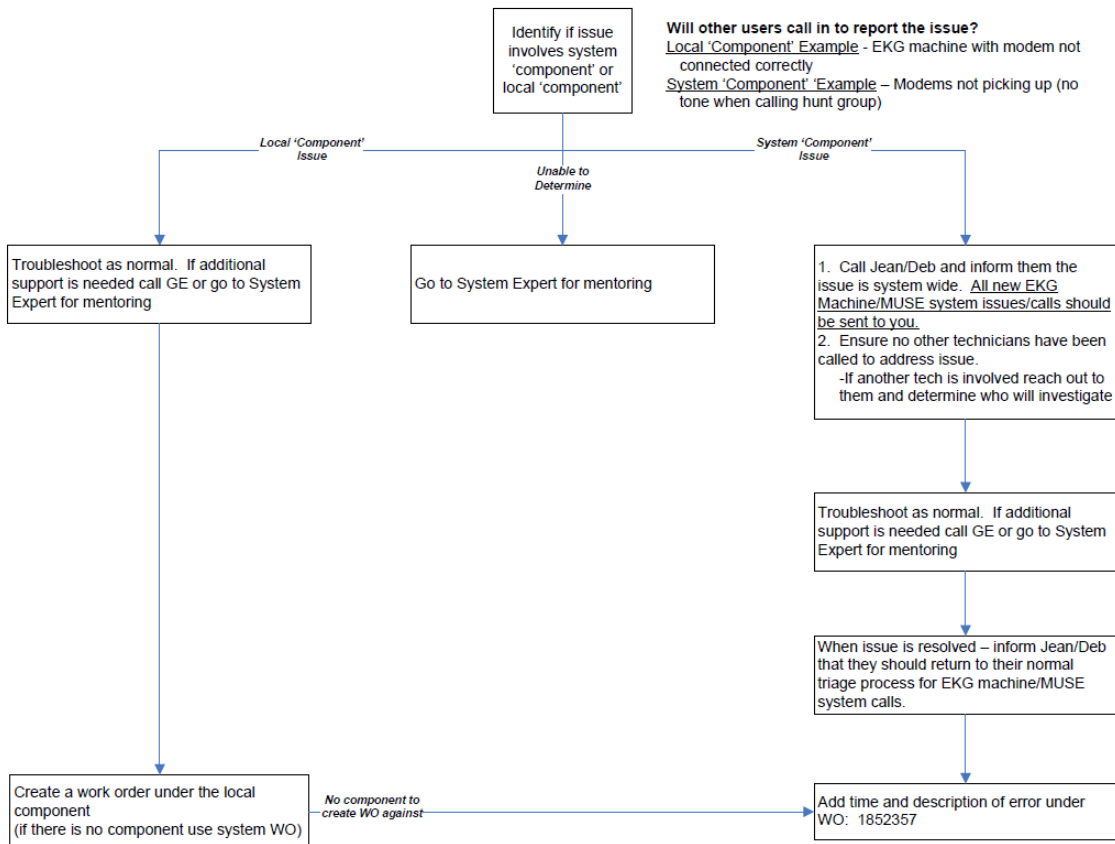


Figure 5: MUSE and Wireless ECG Cart Troubleshooting Workflow.

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### LOCAL PROBLEMS

#### 1. Transmission Problems:

Problem	Cause	Resolution
Users Cannot Transmit a Record	Silex Bridge is not connected to the Network.	<ul style="list-style-type: none"> <li>○ Make sure EKG cart modem is plugged in and working properly.</li> <li>○ Check Green and Yellow LED Indicators on the Silex. If both are OFF, then there is no wireless connection.</li> <li>○ IF Green is OFF and Yellow is ON; wireless connection is made but the Silex is not authenticated to the network. This could be a problem with the CERTIFICATE. Request the Care unit to transmit ECG's using Analog line. You may have to reload the certificates. The certificates are located here - <a href="L:\DBEMAIN\Resource Book\MGH\MGH MUSE\Wireless ECG Certificates">L:\DBEMAIN\Resource Book\MGH\MGH MUSE\Wireless ECG Certificates</a>. If you have never loaded Certificates on the ECG machines, call the CE on call or MUSE Resource Engineer.</li> <li>○ If GREEN is OFF and Yellow is BLINKING, the Silex is attempting to authenticate or communicate with the Wireless network. Wait until either the GREEN LED turns ON (go to next step) or YELLOW BLINKING is turned OFF (go to previous step).</li> <li>○ If GREEN and YELLOW, both are ON; unit was authenticated and a wireless connection has been made. You should now see the YELLOW LED BLINKING and GREEN LED ON; this means data is being transmitted or being received using wireless network.</li> </ul>
	Silex Bridge is connected to the Network, but still cannot transmit.	<ul style="list-style-type: none"> <li>○ Make sure that the cable connection to the Silex Bridge is good.</li> <li>○ Make sure the serial port is connected to COM2</li> <li>○ Make sure network - phswifi10 is available and has strong connection (can check on your phone)</li> <li>○ Make sure EKG is in proper location for its IP address, check the "AREA OF OPERATION" label on the cart. Ensure that your cart is actually in that area.</li> <li>○ Make sure the Transmission setup on the ECG Machine is correct:               <ul style="list-style-type: none"> <li>- Serial Baud Rate should be 115.2k</li> <li>- Default Location should be Serial Line (MUSE)</li> </ul> </li> <li>○ Contact CE on call to ensure no changes have been made to the firewall exception of the IP address on the cart and that the port number on the cart matches MUSE configuration.</li> <li>○ IP and MUSE port number are available on the label.</li> <li>○ Lastly, you can try moving the machine to a better spot within the area to get desired transmission results.</li> <li>○ If nothing works, you can provide loaner or change configuration file to transmit using analog phone lines so EKG's can still be transmitted to MUSE.</li> </ul>

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### 2. Retrieval Problems

Problem	Cause	Resolution
User cannot retrieve Orders from MUSE	Silex Bridge is connected to the Network, but still cannot retrieve.	<ul style="list-style-type: none"> <li>○ Make sure EKG cart modem is plugged in and working properly.</li> <li>○ Check LED Indicators to ensure Red light is Solid, Green Light is solid and yellow blinks intermittently</li> <li>○ Turn the machine OFF and switch is back ON.</li> <li>○ Make sure that the cable connection to the Silex Bridge is good.</li> <li>○ Make sure the serial port is connected to COM2</li> <li>○ Try and transmit and if does not work, check if the Transmission setup on the ECG Machine is correct:               <ul style="list-style-type: none"> <li>- Serial Baud Rate should be 115.2k</li> <li>- Default Location should be Serial Line (MUSE)</li> </ul> </li> <li>○ Contact CE on call to ensure no changes have been made to the firewall exception of the IP address on the cart and that the port number on the cart matches MUSE configuration.</li> <li>○ IP and MUSE port number are available on the label.</li> <li>○ Lastly, you can try moving the machine to a better spot within the area to get desired retrieval results.</li> </ul>
	No matching order exists in Muse, ADT should still fill	<ul style="list-style-type: none"> <li>○ MUSE system requires the order before it can be retrieved to the cart. It is highly likely that the Order was not created in EPIC. Ask the clinician to check if relevant Order was created for that patient in EPIC.</li> <li>○ If there is no Order, Patient ADT should still fill in the window. The clinician can continue to acquire the ECG without Order. The Order when created will be associated to the appropriate ECG by the ECG Lab.</li> <li>○ There is an interface between EPIC and MUSE, if an order is created correctly in EPIC, it will makes it way to MUSE almost immediately.</li> </ul>
	Wrong MRN	<ul style="list-style-type: none"> <li>○ Make sure they are scanning the correct barcode--&gt;see barcode Problems in the table below.</li> <li>○ MRN should have 9 digits beginning with double 0's/ 00 and fill in the ID number.</li> </ul>

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### 3. Barcode Scanner Problems

Problem	Cause	Resolution
Barcode Scanner not filling in ADT information	Silex Bridge connection is an issue	<ul style="list-style-type: none"> <li>○ Make sure that the Silex Bridge is connected to the network as desired. Refer the 2 tables above.</li> <li>○ If the Silex is not connected as desired, then even if the barcode is scanning correctly, you will not be able to see any Patient information loaded automatically on the cart.</li> </ul>
	Wrong barcode	<ul style="list-style-type: none"> <li>○ Make sure they are scanning the 2D barcode if in an Inpatient Setting.</li> <li>○ Make sure they are scanning the MRN (top right) of the patient EKG order if in an Outpatient Setting.</li> </ul>
	Error in Configuration of the Barcode.	<ul style="list-style-type: none"> <li>○ Check the configuration of the Barcode Scanner on the MAC 5500. Go to System setup; Input Method; Manual Barcode and see if the configurations is as desired.</li> <li>○ For the correct configuration of the Barcode Scanner in Inpatient and Outpatient Setting; refer the document: <u><i>MGH Wireless ECG Cart with Barcode Scanner Configuration Guide</i></u>; located on the Partners Biomedical Engineering Main webpage, under MGH Call Tech Resources</li> </ul>
	Not connected to correct port	<ul style="list-style-type: none"> <li>○ Ensure the barcode is connected to port A on the back</li> </ul>
	Not holding the scanner properly	<ul style="list-style-type: none"> <li>○ Ensure the user is appropriate distance from barcode</li> </ul>

### 4. Common problems and resolutions with Wireless ECG Machine with Barcode Scanner:

The most common and redundant problems have been fixed by turning the MAC5500 machine OFF and then turning is back ON after 2-3 minutes. This causes loss of power to the Silex Bridge and it starts afresh to connect to the wireless network. Once connected, you should see the RED and GREEN LED to be ON and YELLOW to be BLINKING. If at this stage you still experience transmission problem, moving the Cart within the area to a different point can also help in successful transmission.

If you experience problems with the Silex Bridge as per the tables above, ensure the Certificate is still active (certificate validity is for 2 years), if it is and problems still persist; open a Service now ticket for “Network Security”;

- Assignment group: network security – phs;
- Configuration Item: NetEng Services – mgh
- Description: Certificate Authentication Issue.

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Call the CE on call for any help that you need. Remember, while the issue is being resolved, you can always change the MAC cart configuration to allow it to transmit using analog fax line. For Analog Transmission settings on the MAC 5500 cart, go to Transmission setup on the ECG Machine and select –

- Serial Baud Rate to be 9600
- Default Location should be #1

### ➤ **Summary of ECG System Functionality**

#### **ECG Transmission to MUSE**

ECG records are acquired and transmitted to the Application Server (PHSQLMUSE10) via different modalities and protocols. Patient bedside monitors, EKG carts, Stress test machines are devices that transmit ECGs to MUSE at MGH.

#### **Barcode and Wireless Transmission**

The use of the barcode scanner with wireless transmission should enable more efficient processes. The Patient MRN is now scanned using the Barcode instead of being typed, as soon as the MRN appears on the Patient Data window, with the Wireless option on the machine; Patient Orders followed by ADT information is retrieved from MUSE. If no Orders are available, only ADT information appears on the Patient Data Window. The technician acquiring the ECG can validate this information. The acquired ECG with correct demographics and Orders number is transmitted to MUSE wirelessly. This not only saves time for the user (as ECG's are transmitted immediately after acquiring) but also saves time for the EKG Lab as for these records they do not have to match Orders and ADT.

Remember, each ECG acquired needs to have a corresponding Order to be resulted from MUSE into EPIC. ECG's without Orders get resulted by Administrative Accounts (888 – PROCESS ECG WITH NO ORDERS) or (999 – PROCESS DO NOT READ; locations who have their own Cardiologists and do not need interpretation from Department of Cardiology).

#### **After Transmission**

After the records are transmitted to MUSE and stored in the Application Server, they can be processed and read by ECG lab editors, cardiologists or other clinicians. Users can access the records using thick or thin client services which interact with the Application Server.

Thick Clients directly interact with MUSE Application Server and are able to edit and confirm records in the system depending on the users' privilege settings. These clients use "MUSE Editor – MGH" application which is found under Partners Apps. The application can be granted to users by PAS key givers (Carlos Vasco, Cardiology Admin Manager). The name of the application in PAS is "MUSECVTC"



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Thin Client can view read-only PDF version of records by reaching MUSE CV Web server (PHSWEBMUSE10). Thin clients use “MUSE CV Web - MGH” application that is also found under Partners App. MUSE web can also be accessed by going to url: <http://mghmuse.partners.org> in any web browser and from any Partners station. Users are authorized through their Partners username and password. The application can be granted to users by PAS key givers (Carlos Vasco, Cardiology or Stan Grzybek, Biomed). The name of the application in PAS is “MGMUSECV”.

### **Confirming EKG records and sending to Billing (ICM) and Results (EPIC)**

ADT Data and orders, Billing and Results are interfaced to Application Server through MUSE HL7 Interface Server (PHSMGHMUSE10). ADT data and EKG orders from EPIC are pushed into the system while Billing and Results are pushed out upon record confirmation and depending of MUSE report distribution settings for each location.

MGH MUSE Overview document can be reviewed for details on workflow and data flow. Follow the link below to view the document –

\\Sfa1\sfa\DBEMAIN\Resource Book\MGH\MGH MUSE\2. Support Documents\_to be posted on Biomed Website\Under Call Tech Resources – MUSE System Overview.pdf