



# SunTech<sup>®</sup> *CT40*<sup>™</sup>

VITAL SIGNS



## **Spot-check Vital Signs Device**

### Advanced Configuration Application

## Changes

This manual is identified as Part number: 80-0072-00. The most recent is available for download from the SunTech Medical website. Should you notice errors or omissions in this manual, please notify us at:

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## User Responsibility

Your SunTech CT40 is designed to perform in conformity with the description contained in this operation manual and accompanying labels and inserts, when assembled, operated, maintained and repaired in accordance with the instructions provided.

Further, the user of the device bears sole responsibility for any malfunction that results from improper use, faulty maintenance, improper repair, damage or alteration by anyone other than SunTech Medical or authorized service personnel.

## Copyright Information

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## Welcome to the SunTech CT40

Thank you for choosing this SunTech CT40 for accurate spot checking of vital signs.

The SunTech CT40 is designed to be very easy and efficient to use. The mobile device provides a lot of functionality in a compact, cost-effective package. The device can perform automatic blood pressure checks, including averaging of multiple blood pressure readings. It also offers an option to use a stethoscope for traditional auscultatory blood pressure measurement. The SunTech CT40 offers robust memory and also can connect to your EMR system. In addition, there are options for pulse oximetry and temperature measurement. The device can easily connect to a barcode scanner or printer.

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# 1. Introduction

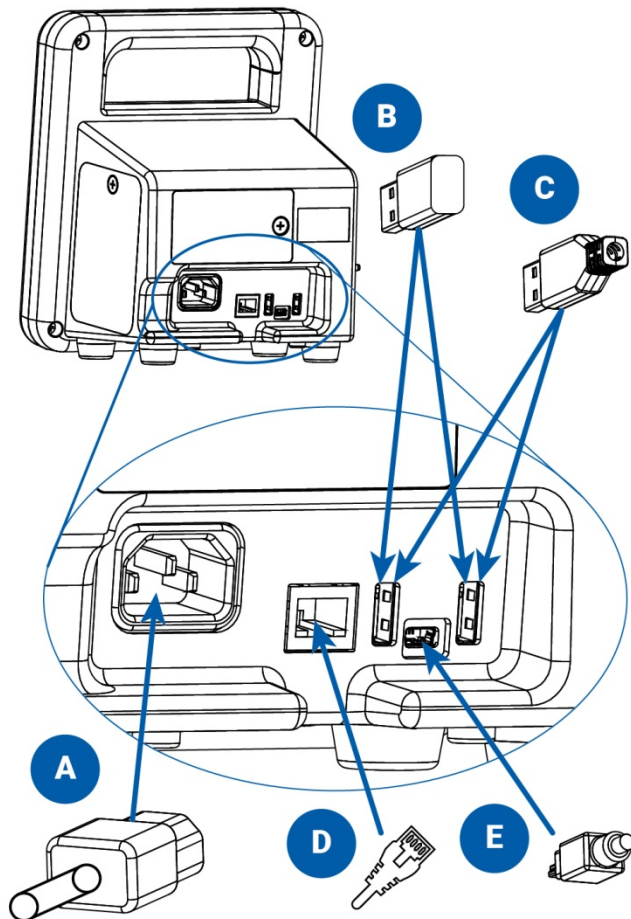
While the SunTech CT40 Spot Vital Signs Device can be used out of the box without any additional programming, the CT40 also has an Advanced Configuration Application that can be used to make changes to the device's advanced settings if necessary. The Advanced Configuration Application is a web-server application inside the CT40, and does not require the installation of any external software programs. This document explains these advanced settings and functions, including how to upgrade the CT40 firmware, and how to configure the device to connect to an EMR.

## System Requirements

1. Computing device such as a PC, laptop, or tablet
2. Windows 7, 8, 10
3. SunTech CT40 Spot Vital Signs Device
4. Mini-USB to USB cable

## 2. Connecting the CT40

In order to access the CT40's Advanced Configuration Application, the user must connect a Windows-based computing device to the CT40 using a Mini-USB to USB connection cable (one of these cables comes with the CT40 Main Unit). Connect the Mini-USB end of the cable to the plug on the back of the CT40 device shown in (E) below:



- A. AC power cord
- B. WIFI USB dongle (optional)
- C. Printer or barcode scanner USB cable (optional)
- D. Ethernet cable (optional)
- E. Mini USB cable

Connect the other end of the cable to a USB port on the Windows-based Computing device.

**NOTE:** Please visit <http://www.suntechmed.com/ct40-drivers> to download and install the driver required for connecting the CT40 to a PC. The driver **MUST** be installed in order to access the application.

### 3. Accessing the application

After connecting the USB cable, open a web browser such as Internet Explorer or Google Chrome on the Windows-based computing device. In the address bar, enter the address <http://model260.local/> to launch the Advanced Configuration Application.

#### Login

#### Login



The screenshot shows a login form with a blue header bar containing the text "Enter username and password to proceed". Below the header, there are two input fields: "User" and "Password". The "User" field has a dropdown menu with two options: "Service" and "Medical". The "Password" field contains the text "Password". Below the input fields is a "Sign in" button.

Figure 3.1: Login page

The login page has two options:

- 1) Medical:** The Medical profile allows the user to make changes to clinically-related advanced settings, and also allows access to review patient information. The Medical Profile does NOT include functions for network settings or service-related functions. Details about the **Medical Profile** are listed in **Section 4** of this manual.
- 2) Service:** The Service profile allows the user to make changes to all advanced device settings, including network and other service-related functions, but does not allow access to any patient information. Details about the **Service Profile** are listed in **Section 5** of this manual.

After choosing one of the two profiles, enter the appropriate password and click the 'Sign in' button.

*NOTE: The first time the Advanced Configuration Application is used, the default password should be entered ("service" and "medical", respectively). The user will then be prompted to change the password before continuing.*

*NOTE: It is strongly recommended that the user change the passwords to both the Service and Medical accounts to a new (not "service" or "medical") password before using to ensure the unit is secured from tampering.*

## Change password

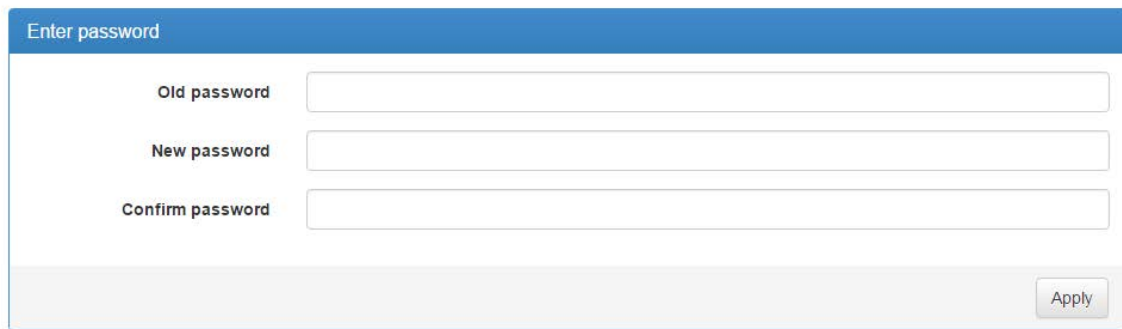
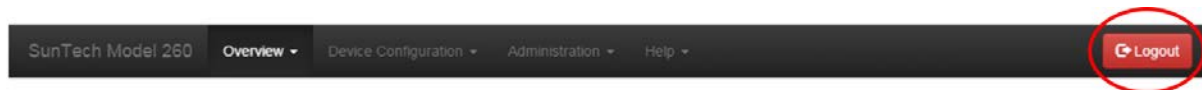


Figure 3.2: Change password page

## Logout

To logout at any time, simply click on the red 'Logout' button in the upper right corner of the Menu Bar:



After pressing the 'Logout' button, the Logout confirmation screen will appear:

## Logout

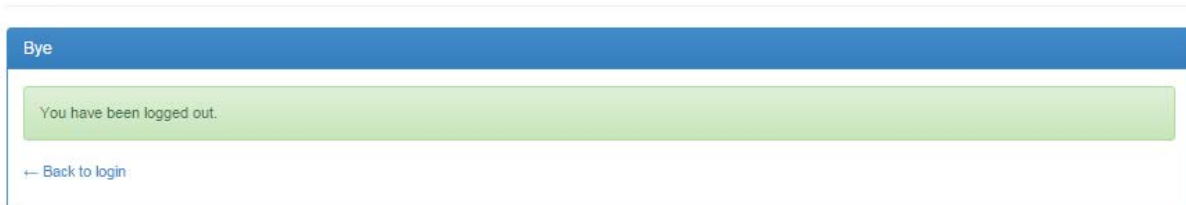


Figure 3.3: Logout confirmation

The user can return to the Login screen by clicking "Back to login."

## Session Timeout

After 10 minutes of inactivity, the device will automatically log the user out.



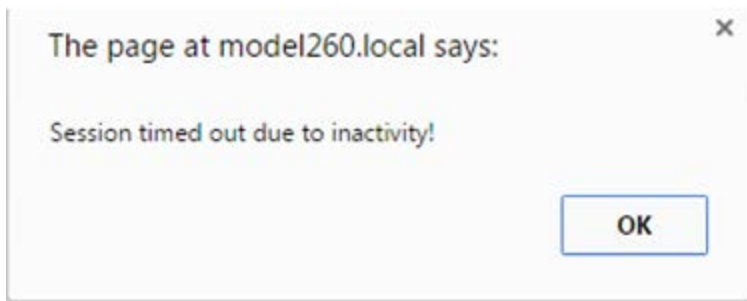


Figure 3.4: Timeout logout

Clicking "OK" will bring the user to Login page (see Figure 3.1.)

## Connection Lost

When the CT40 loses connectivity to the computer, the "Connection lost!" message will be displayed.

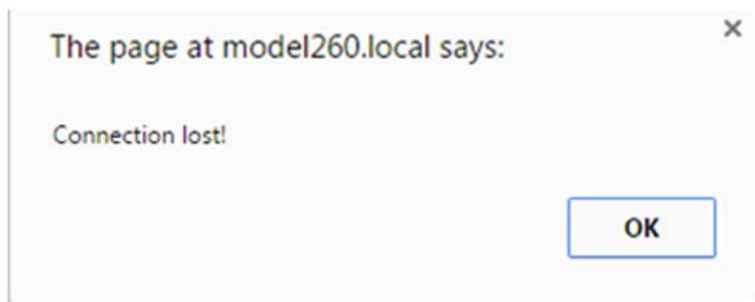


Figure3.5: Connection Lost

The CT40 could lose its connection because the device was turned off, or the Mini-USB Cable was disconnected from either the CT40 or the computer. Check to make sure that the CT40 is powered on, and that the USB cable is securely connected. Clicking "OK" will bring the user to the Login page (see Figure 3.1.)

## Help

The Help menu can be used to download the SunTech CT40 User Manual:

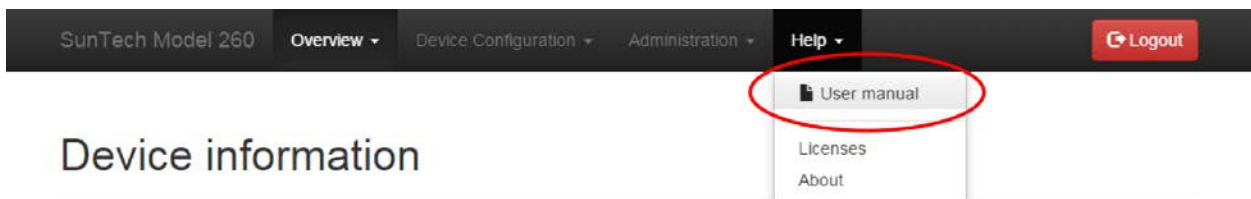


Figure3.6: Download User manual link

Clicking on "**User manual**" will open the Downloads page on SunTech's web site for the CT40, where the manual can be downloaded.

Clicking on "**Licenses**" will open a page containing all of the license information for the SunTech CT40 Advanced Configuration Application.

Clicking on "**About**" will open a window showing basic copyright information.

## 4. Medical Profile

The Medical Profile allows access to clinically-relevant functions in the CT40 Advanced Configuration Application:

- **Overview** menu
  - **Device Information**
  - **Measurements**
- **Device Configuration** menu
  - **Measurements / Display** settings
- **Administration** menu
  - **Change Password** function
  - **System Log**
- The entire **Help** menu

**Change Password** and **Help** functions are covered in Section 3 of this guide.

### Overview: Device Information

The screenshot shows the SunTech Model 260 interface. The navigation bar includes 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help' menus, along with a 'Logout' button. The 'Device Information' menu is expanded, showing 'Device Information' and 'Measurements'. The main content area is titled 'Device information' and contains three sections: 'General', 'Parameters', and 'Accessories'. Each section has a table of device details and their status.

General	
Serial number	UUT-10
Ethernet address	00:00:00:00:00:00
Uptime	0 days, 0 hours, 24 minutes, 22 seconds
Battery charge	Not available
Kernel	3.19.0
OS Version	CS50158 GE20

Parameters	
	Status
NIBP ⓘ	OK
SpO2 ⓘ	OK
Temperature	Not available

Accessories	
	Status
Wifi	Not available
Bluetooth	Not available
Printer	Not available
Barcode reader	Not available

Figure 4.1: Device Information main page

The **Device Information** page shows information about the device such as the device Serial Number, the amount of time the device has been on (Uptime), what Parameters are installed, and what kinds of Accessories are connected to the device.

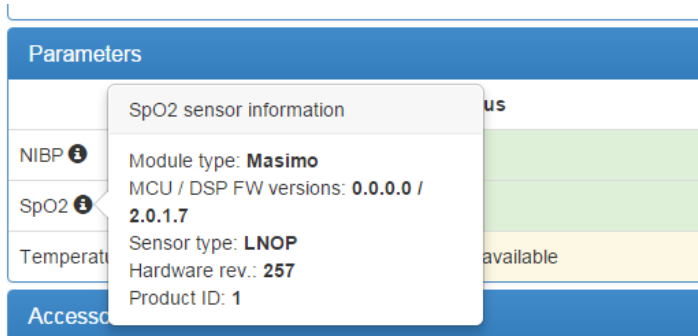



Figure 4.2: Hovering over 

Hovering over the  next to NIBP, SpO<sub>2</sub>, or Temperature gives information about that parameter such as the module firmware versions and module serial number.


Parameters	
	Status
NIBP 	OK
SpO <sub>2</sub>	Error (150)
Temperature	Not available

Figure 4.3: Error with SpO<sub>2</sub>

If there is an error with the device, the parameter or accessory will be highlighted in red, and the Error Code will be shown in parentheses—"Error (150)" in the example above.

*NOTE: A complete list of Error Codes can be found on both the Quick Reference Cards attached to the device or in Section 12 of the CT40 User Manual.*

If the parameter or accessory is working as expected, it will be highlighted in green and will be labeled 'OK'. If the parameter or accessory is not communicating to the CT40 because it is not connected, it will be highlighted in yellow and will be labeled 'Not available'.

## Overview: Measurements

SunTech Model 260 Overview Device Configuration Administration Help Logout

Device Information Measurements

### Measurements

Latest	
ID	Value
Patient ID	
Time	17:33:46
Date	2016-03-21
Systolic BP	126
Diastolic BP	85
Average Measurement	Yes
MAP Mode	No
Pulse rate	96
Pulse rate source	NIBP
MAP	99
SpO2	0%
Temperature	0.00 °C
Temperature site	Not set

Stored 17 / 17	
ID	Value
Patient ID	
Time	17:25:00
Date	2016-03-21
Systolic BP	133
Diastolic BP	96
Average Measurement	No
MAP Mode	No
Pulse rate	104
Pulse rate source	NIBP
MAP	108
SpO2	-
Temperature	-
Temperature site	Not set
EMR status	No transmission

Figure 4.4: Measurements main page

The **Measurements** page allows the user to view the measurements saved on the device and the current measurement being displayed. The “Latest” table shows the measurement currently displayed on the CT40. This measurement can be in memory or before a measurement is saved. The “Stored” table allows the user to navigate through and view the stored measurements.

The user is able to download the measurements from the “Stored” table to the computer or any connected network location. To begin the download process, click the download icon in the “Stored” table header:

Stored 17 / 17	
ID	Value
Patient ID	
Time	17:25:00
Date	2016-03-21

Figure 4.5: Download Stored Measurements Icon

Clicking the download icon will open the Windows Save As window, where you can choose the computer or network location where vital signs information is stored.

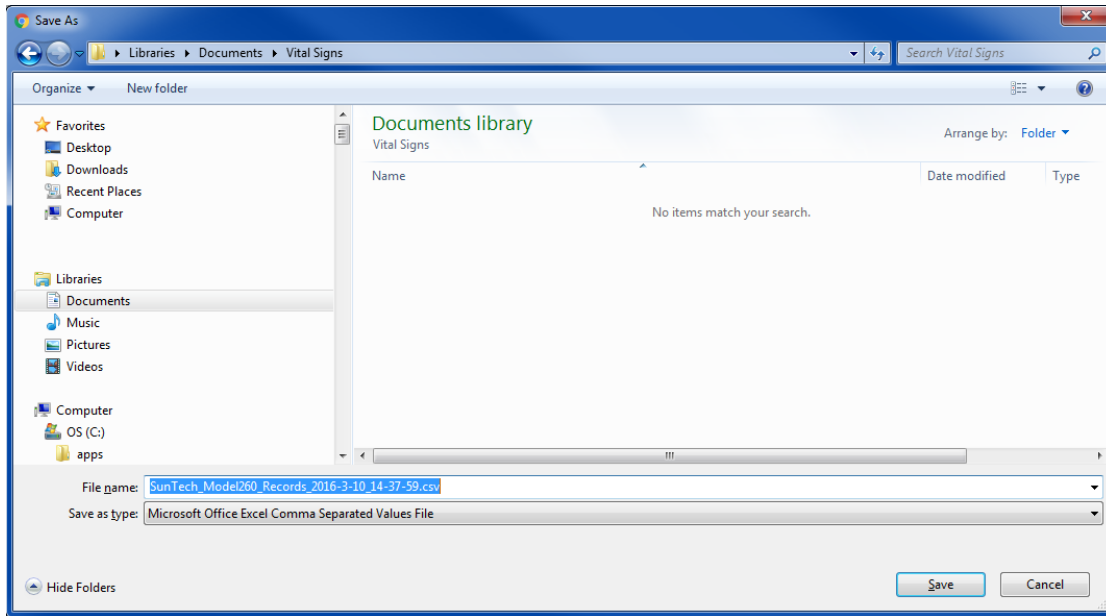


Figure 4.6: “Save As” window showing default file name

Downloaded files will be in .csv (comma delimited) format. The default file name will be in the following format:

SunTech\_Model260\_Records\_YYYY-MM-DD-HH-MM-SS.csv

The file name can be changed as desired, but should retain the .csv file extension.

## Device Configuration: Measurements / Display

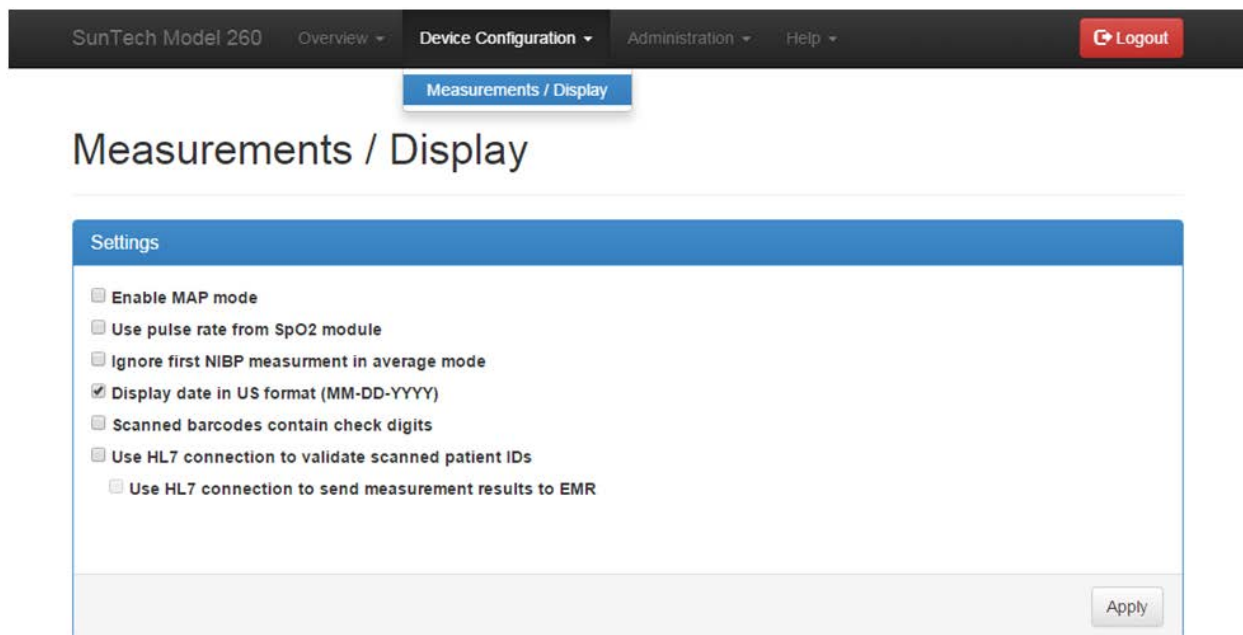


Figure 4.7: Measurements / Display main page

To make changes, check the box next to the desired settings and click the “Apply” button.

**Enable MAP mode:** Checking this box will activate the Mean Arterial Pressure (MAP) feature for blood pressure measurements. **NOTE: The MAP function is not validated for use within the United States or its territories.**

**Use pulse rate from SpO<sub>2</sub> module:** Checking this box will cause the displayed heart rate to be sourced from the pulse oximetry (SpO<sub>2</sub>) module instead of blood pressure. Heart rate displayed will be from the SpO<sub>2</sub> sensor UNTIL a heart rate is available from the NIBP measurement. Then, when a heart rate measurement is available after an NIBP reading, the heart rate from NIBP will be displayed. See Section 7 of the SunTech CT40 User Manual (p/n 80-0067-00) for details on the SpO<sub>2</sub> pulse rate function.

**Ignore first NIBP measurement in average mode:** Checking this box will result in the exclusion of the first NIBP measurement from the average blood pressure measurement calculation when the SunTech CT40 is in Averaging Measurement Mode. See Section 3 of the SunTech CT40 User Manual (p/n 80-0067-00) for details.

**Display date in US format (MM-DD-YYYY):** The date format can be changed by checking or unchecking this box. If unchecked, the date format will be YYYY-MM-DD.

**Scanned barcodes contain check digits:** Check this box if the last digit will be used as a check digit. Certain barcode types will use this feature, others will not. If unsure, leave this box unchecked.

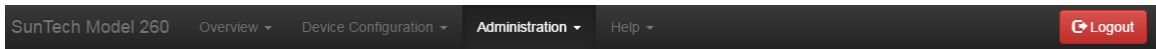
**Use HL7 connection to validate scanned patient IDs:** Checking this box will cause the Patient ID to be automatically sent to the EMR system for validation when it is entered. This ensures that the entered ID exists in the database.

*NOTE: The SunTech CT40 must be configured to communicate with the EMR in order for this function to work properly (this can be done by IT personnel using the Service Profile). See Section 4 of this manual for additional information.*

**Use HL7 connection to send measurement results to EMR:** Checking this box will cause the measurement and patient information displayed on the SunTech CT40 screen to be automatically sent to the EMR system when the Memory Button is pressed.

*NOTE: The SunTech CT40 must be configured to communicate with the EMR in order for this function to work properly (this can be done using the Service Profile). See Section 4 of this manual for additional information.*

## Administration: System Log



### System Log

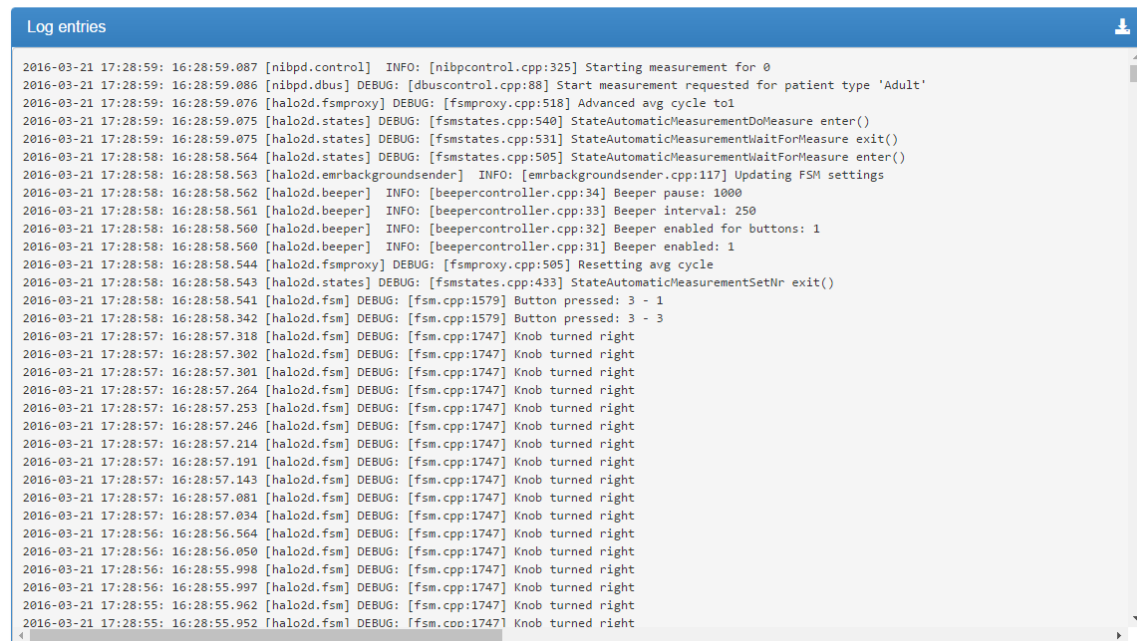


Figure 4.8: System Log page

The System Log can be used for troubleshooting by service personnel. The log can be viewed by using the scroll bar, or it can be downloaded as a .csv (comma delimited) file by clicking on the download icon.



Figure 4.9: Download System Log icon

## 5. Service Profile

The Service Profile allows access to service-related functions in the CT40 Advanced Configuration Application:

- **Overview** menu
  - **Device Information**
- **Device Configuration** menu
  - **Ethernet (LAN)** network settings
  - **Wi-Fi (WLAN)** network settings
  - **NIBP Calibration** function
  - **Measurements / Display** settings
  - **EMR settings**
  - **EMR server certificates**
  - **EMR client certificates**
  - **EMR connection test**
  - **Date / Time and Language** settings
  - **Power Management** settings
- **Administration** menu
  - **Change Password** function
  - **System Log**
- The entire **Help** menu

**Change Password** and **Help** functions are covered in Section 3 of this guide.



## Overview: Device Information

SunTech Model 260 Overview Device Configuration Administration Help Logout

Device Information Measurements

### Device information

General	
Serial number	UUT-10
Ethernet address	00:00:00:00:00:00
Uptime	0 days, 0 hours, 24 minutes, 22 seconds
Battery charge	Not available
Kernel	3.19.0
OS Version	CS50158 GE20

Parameters	
	Status
NIBP ⓘ	OK
SpO2 ⓘ	OK
Temperature	Not available

Accessories	
	Status
Wifi	Not available
Bluetooth	Not available
Printer	Not available
Barcode reader	Not available

Figure 5.1: Device Information main page

The **Device Information** page shows information about the device such as the device Serial Number, the amount of time the device has been on (Uptime), what Parameters are installed, and what kinds of Accessories are connected to the device.

Parameters

SpO2 ⓘ

SpO2 sensor information

Module type: **Masimo**

MCU / DSP FW versions: **0.0.0.0 / 2.0.1.7**

Sensor type: **LNOP**

Hardware rev.: **257**

Product ID: **1**

Figure 5.2: Hovering over ⓘ

Hovering over the **1** next to NIBP, SpO<sub>2</sub>, or Temperature gives information about that parameter such as the module firmware versions and module serial number.

Parameters	
	Status
NIBP <b>1</b>	OK
SpO <sub>2</sub>	Error (151)
Temperature	Not available

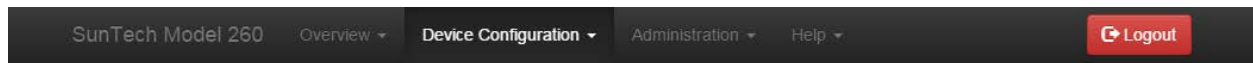
Figure 5.3: Error with SpO<sub>2</sub>

If there is an error with the device, the parameter or accessory will be highlighted in red, and the Error Code will be shown in parentheses—“Error (151)” in the example above.

**NOTE:** A complete list of Error Codes can be found on both the Quick Reference Cards attached to the device or in Section 12 of the CT40 User Manual.

If the parameter or accessory is working as expected, it will be highlighted in green and will be labeled ‘OK’. If the parameter or accessory is not communicating to the CT40 because it is not connected, it will be highlighted in yellow and will be labeled ‘Not available’.

## Device Configuration: Ethernet



### Ethernet

Ethernet configuration

Use DHCP

**IP-address**

**Subnet mask**

**Gateway**

**DNS**

Figure 5.4: Ethernet page (Use DHCP not selected)

**NOTE:** Ethernet functionality should only be used with the approval and under the supervision of qualified IT personnel within your healthcare facility. Check with IT before connecting this device to your network.

In order to configure the SunTech CT40 for a LAN network, first choose whether or not DHCP should be enabled. If DHCP is disabled, then the user must enter the appropriate IP-address, Subnet mask, Gateway and DNS server. After entering all of the necessary settings, click the “Apply” button.

## Device Configuration: Wi-Fi

The screenshot shows the 'Wi-Fi configuration' page for the SunTech Model 260. The page has a dark header with navigation links: 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help'. A 'Logout' button is in the top right. The main content area is titled 'Wi-Fi' and contains a 'Wi-Fi configuration' form. The form has a blue header and the following fields: 'SSID' (with placeholder 'Enter SSID' and a warning icon), 'Key' (with placeholder 'Enter encryption key'), a 'Use DHCP' checkbox (which is unchecked), 'IP-address' (with value '192.168.1.1'), 'Subnet mask' (with value '24'), 'Gateway' (with placeholder 'Enter gateway'), and 'DNS' (with placeholder 'Enter DNS server'). An 'Apply' button is located at the bottom right of the form.

Figure 5.5: Wi-Fi settings page (Use DHCP not selected)

**NOTE:** Wireless Ethernet functionality should only be used with the approval and under the supervision of qualified IT personnel within your healthcare facility. Check with IT before connecting this device to your wireless network.

In order to configure the SunTech CT40 for a WLAN network, enter the SSID for the appropriate wireless router, along with the router’s encryption key.

Then choose whether or not DHCP should be enabled. If DHCP is disabled, then the user must enter the appropriate IP-address, Subnet mask, Gateway and DNS server. After entering all of the necessary settings, click the “Apply” button.

## Device Configuration: NIBP calibration

This function should only be performed by qualified personnel using a calibrated pressure sensor. It is essential that a calibration verification is performed after calibrating to ensure device accuracy. See Section 11.1 in the SunTech CT40 Service Manual for detailed information on NIBP calibration setup and function.

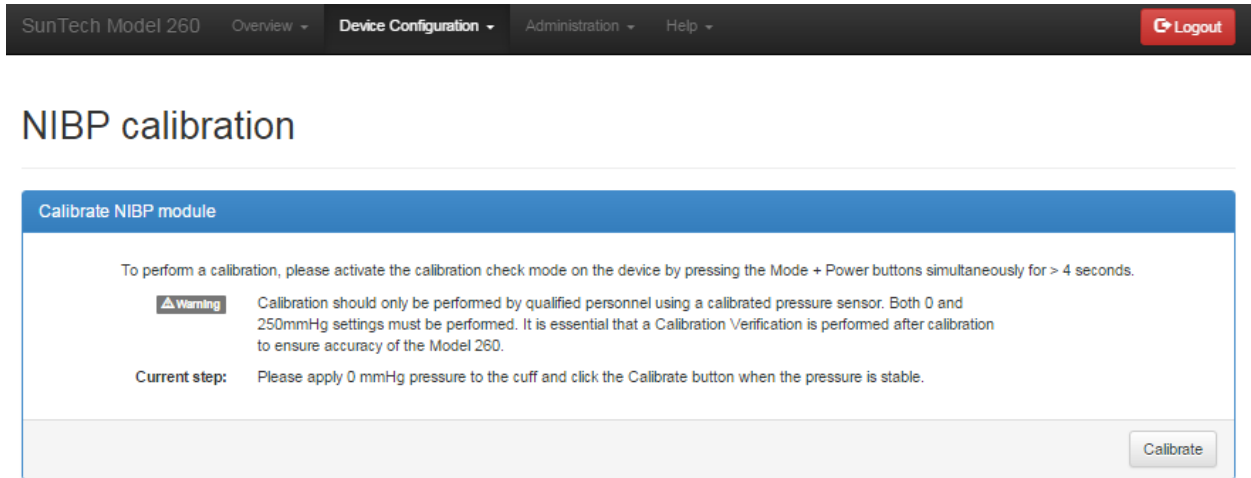


Figure 5.6: Initial NIBP Calibration screen

Activate calibration check mode on the SunTech CT40 by follow the instructions on the screen. After a calibrated pressure sensor has been connected to the CT40, ensure that the manometer reads 0 mmHg, then click the Calibrate button. If the 0 mmHg calibration process is successful, the following screen will appear:

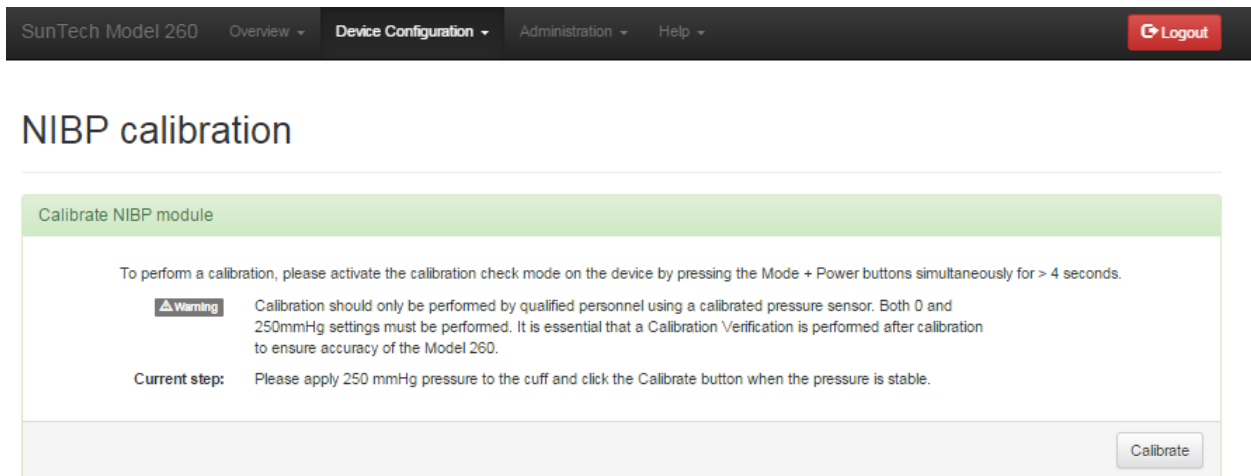


Figure 5.7: Post 0mmHg calibration screen

After the 0 mmHg calibration has successfully completed, the user will be prompted to conduct another calibration at 250 mmHg. If there is an error during the 0mmHg calibration process, the Calibrate NIBP module screen will re-appear with a red screen header:

## NIBP calibration

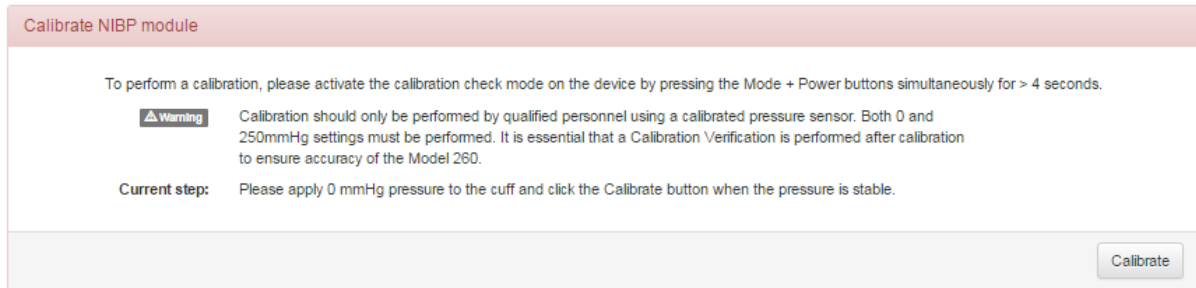


Figure 5.8: Calibration Error screen

If this screen appears, the user should recheck all tubing and device connections and retry 0 mmHg calibration.

When the 250 mmHg calibration process has been successfully completed, the following screen will appear:

## NIBP calibration

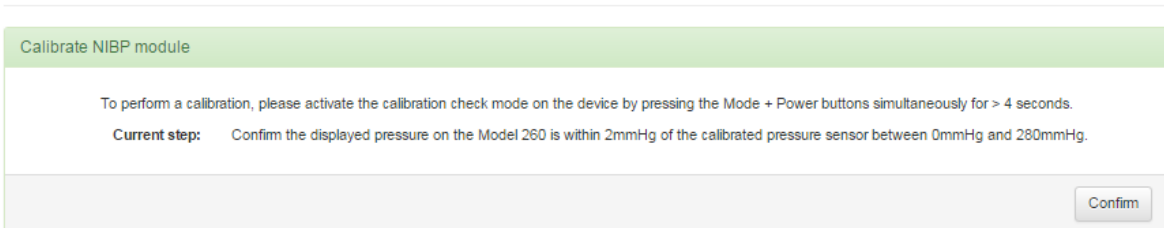


Figure 5.9: Post 250 mmHg calibration screen

After successful calibration at both 0 mmHg and 250 mmHg, it is absolutely vital to immediately perform a calibration check of the CT40 device. Follow the instructions on the screen, and/or refer to Section <XX> in the CT40 Service Manual (p/n 80-0068-00) . If the pressure displayed on the CT40 varies more than 2 mmHg from the target check pressures, then repeat the NIBP calibration process. Otherwise, press the "Confirm" button. The following screen will appear indicating that the calibration and verification process are complete:

## NIBP calibration

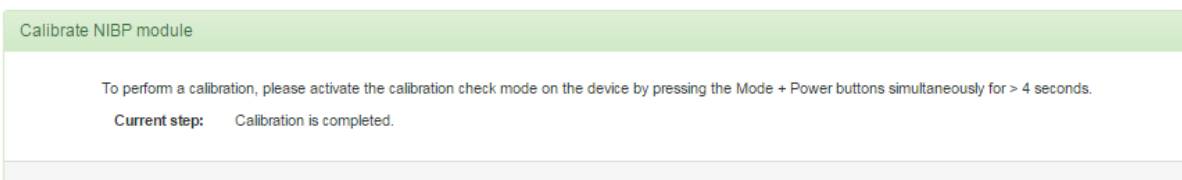


Figure 5.10: Calibration & Verification complete

## Overview: Measurements / Display

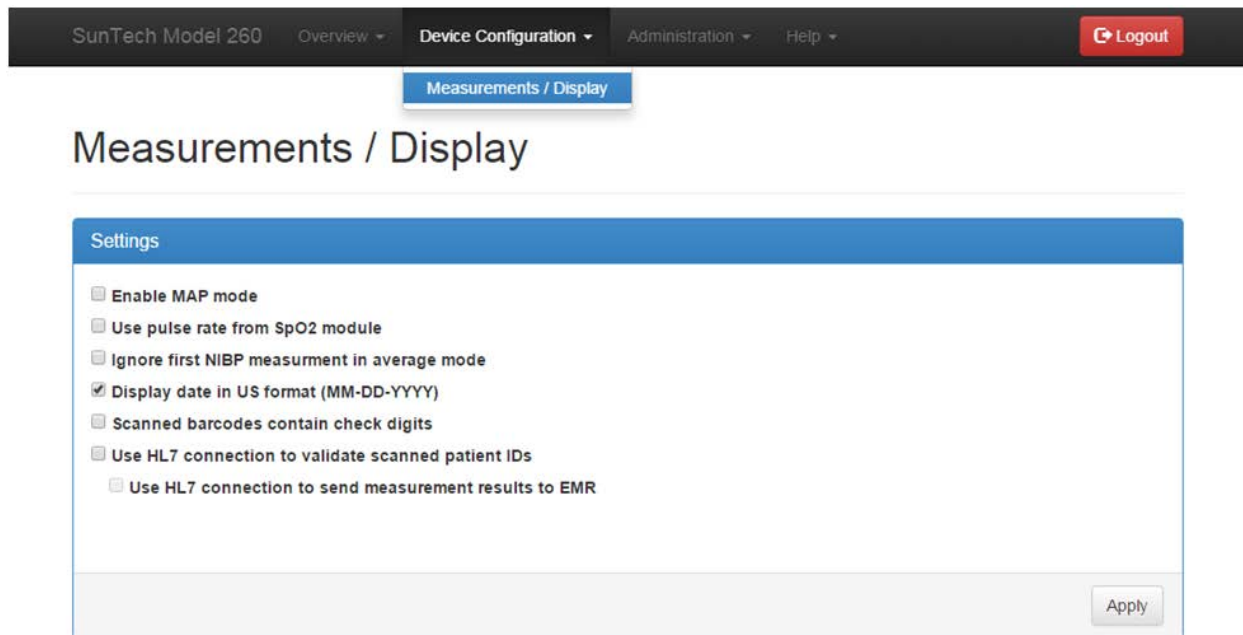


Figure 5.11: Measurements / Display main page

To make changes, check the box next to the desired settings and click the “Apply” button.

**Enable MAP mode:** Checking this box will activate the Mean Arterial Pressure (MAP) feature for blood pressure measurements. **NOTE: The MAP function is not validated for use within the United States or its territories.**

**Use pulse rate from SpO<sub>2</sub> module:** Checking this box will cause the displayed heart rate to be sourced from the pulse oximetry (SpO<sub>2</sub>) module instead of blood pressure. Heart rate displayed will be from the SpO<sub>2</sub> sensor UNTIL a heart rate is available from the NIBP measurement. Then, when a heart rate measurement is available after an NIBP reading, the heart rate from NIBP will be displayed. See Section 7 of the SunTech CT40 User Manual (p/n 80-0067-00) for details on the SpO<sub>2</sub> pulse rate function.

**Ignore first NIBP measurement in average mode:** Checking this box will result in the exclusion of the first NIBP measurement from the average blood pressure measurement calculation when the SunTech CT40 is in Averaging Measurement Mode. See Section 3 of the SunTech CT40 User Manual (p/n 80-0067-00) for details.

**Display date in US format (MM-DD-YYYY):** The date format can be changed by checking or unchecking this box. If unchecked, the date format will be YYYY-MM-DD.

**Scanned barcodes contain check digits:** Check this box if the last digit will be used as a check digit. Certain barcode types will use this feature, others will not. If unsure, leave this box unchecked.

**Use HL7 connection to validate scanned patient IDs:** Checking this box will cause the Patient ID to be automatically sent to the EMR system for validation when it is entered. This ensures that the entered ID exists in the database. **NOTE: The SunTech CT40 must be configured to communicate with the EMR in order for this function to work properly (this can be done using the Service Profile). See the next section of this manual for additional information.**

**Use HL7 connection to send measurement results to EMR:** Checking this box will cause the measurement and patient information displayed on the SunTech CT40 screen to be automatically sent to the EMR system when the Memory Button is pressed.

*NOTE: The SunTech CT40 must be configured to communicate with the EMR in order for this function to work properly (this can be done by IT personnel using the Service Profile). See the next section of this manual for additional information.*

## **Device Configuration: EMR Settings**

In order to validate Patient ID's and push patient measurements to an EMR, the SunTech CT40 must be set up to communicate with the EMR system. This setup will require specific information about your network configuration and EMR implementation. Specifically, there will be two sets of information you will need:

- Information required for the Patient ID validation function
- Information required for reporting measurement data to the EMR.

For both of these functions, you will need to know the following:

- A network IP address used to connect to the EMR.
- A port number used to connect to the EMR.
- Definition of the actual HL7 message fields used in these transfers.

The actual data entered must be exactly what is expected by the EMR system, and will need to be provided by your EMR administrator. The SunTech CT40 has implemented communications profiles from Integrating the Healthcare Enterprise (IHE), a consortium of healthcare and medical device professionals dedicated to improving the way the healthcare information systems share information. The IHE Integration Statement for the CT40 can be downloaded from SunTech's web site <http://www.suntechmed.com/support/document-library/category/63-suntech-ct40>.

The IHE profiles implemented by the SunTech CT40 are:

### **IHE Domain**

[IT Infrastructure \(ITI\)](#)

[Patient Care Devices \(PCD\)](#)

[IT Infrastructure \(ITI\)](#)

### **Integration Profile**

[Consistent Time \(CT\)](#)

[Device Enterprise Communication \(DEC\)](#)

[Patient Demographics Query \(PDQ\)](#)

### **Actor**

Time Client

Device Observation Reporter (DOR)

Patient Demographics Consumer (PDC)

# EMR settings

Configure common fields

**MSH-3 Sending application**  ⚠

**MSH-4 Sending facility**  ⚠

Configure DEC (Reading Reports)

**IP/Hostname**  ⚠

**Port**

**Use SSL**

**Timeout**

**Retries**

**Retry interval**

**MSH-5 Application name**

**MSH-6 Facility name**

**Prefix for OBR-3.1**

**OBR-3.2**

**OBR-3.3**

**OBR-3.4**

Configure PDQ (Patient Queries)

**IP/Hostname**  ⚠

**Port**

**Use SSL**

**Timeout**

**MSH-5 Application name**

**MSH-6 Facility name**

**QPD-[3]8].4.1 Domain assigning authority NamespaceID**

**QPD-[3]8].4.2 Domain assigning authority UniversalID**

**QPD-[3]8].4.3 Domain assigning authority NamespaceID type**

**Set assigning authority in QPD-3**

**Set assigning authority in QPD-8**

Figure 5.12: EMR settings page



### **Common Field Configuration:**

- MSH-3 Sending application: Facility data relating to the sending application. Unique per instance.
- MSH-4 Sending facility: Facility data relating to the sending application.

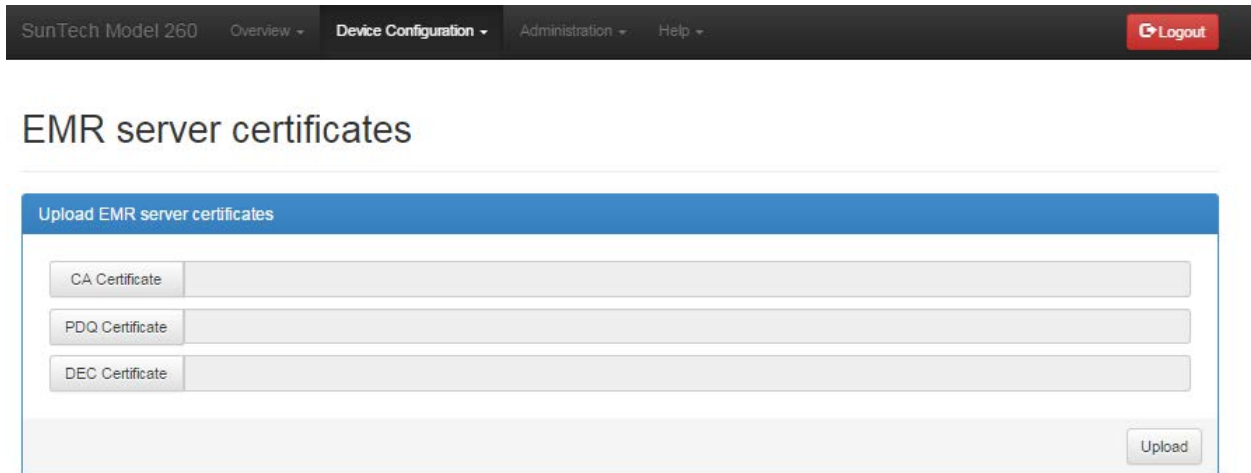
### **Configure DEC (Reading Reports):**

- IP/Hostname: The EMR Server address where CT40 readings will be reported to. Provided by EMR configuration specialist.
- Port: Additional port information for the EMR Server, Provided by EMR configuration specialist.
- Use SSL: Use encryption on the connection between the CT40 and the EMR server. Provided by EMR configuration specialist.
- Timeout: Time in seconds before a connection attempt to the EMR server is declared a "Timeout"
- Retries: Number of attempts to connect to the EMR server and send a reading.
- Retry interval: Time in seconds between connection attempts to the EMR server.
- MSH-5 Application name: "Receiving Application Name" that the EMR is expecting when processing the HL7 ORU\_R01 message of the PCD-01 transaction.
- MSH-6 Facility name: "Receiving Facility Name" that the EMR is expecting when processing the HL7 ORU\_R01 message of the PCD-01 transaction.
- Prefix for OBR-3.1: Optional EMR Parameter supplied by facilities EMR configuration specialist.
- OBR-3.2: Optional EMR Parameter supplied by facilities EMR configuration specialist.
- OBR-3.3: Optional EMR Parameter supplied by facilities EMR configuration specialist.
- OBR-3.4: Optional EMR Parameter supplied by facilities EMR configuration specialist.

### **Configure PDQ (Patient Queries)**

- IP/Hostname: The EMR Server address on the network where the PatientID is validated. Provided by EMR configuration specialist.
- Port: Additional port information for the EMR Server. Provided by EMR configuration specialist.
- Use SSL: Use encryption on the connection between the CT40 and the EMR server. Provided by EMR configuration specialist.
- Timeout: Time in seconds before a Patient ID lookup is declared a "Timeout". Provided by EMR configuration specialist.
- MSH-5 Application name: "Receiving Application Name". EMR Parameter supplied by facilities EMR configuration specialist.
- MSH-6 Facility name: "Receiving Facility Name". EMR Parameter supplied by facilities EMR configuration specialist.
- QPD-[3|8].4.1 Domain assigning authority NamespaceID: Specify which query domain to use when requesting patient information from the EMR. The query domain's Namespace ID needs to be what the EMR is expecting for a patient lookup with an HL7 QBP\_Q22 message.
- QPD-[3|8].4.2 Domain assigning authority UniversalID: Specify which query domain to use when requesting patient information from the EMR. The query domain's Universal ID needs to be what the EMR is expecting for a patient lookup with an HL7 QBP\_Q22 message.
- QPD-[3|8].4.3 Domain assigning authority NamespaceID type: Specify which query domain to use when requesting patient information from the EMR. The query domain's Namespace ID type needs to be what the EMR is expecting for a patient lookup with an HL7 QBP\_Q22 message.
- Set assigning authority in QPD-3 EMR Parameter supplied by facilities EMR configuration specialist.
- Set assigning authority in QPD-8: EMR Parameter supplied by facilities EMR configuration specialist.

## Device Configuration: EMR Server Certificates



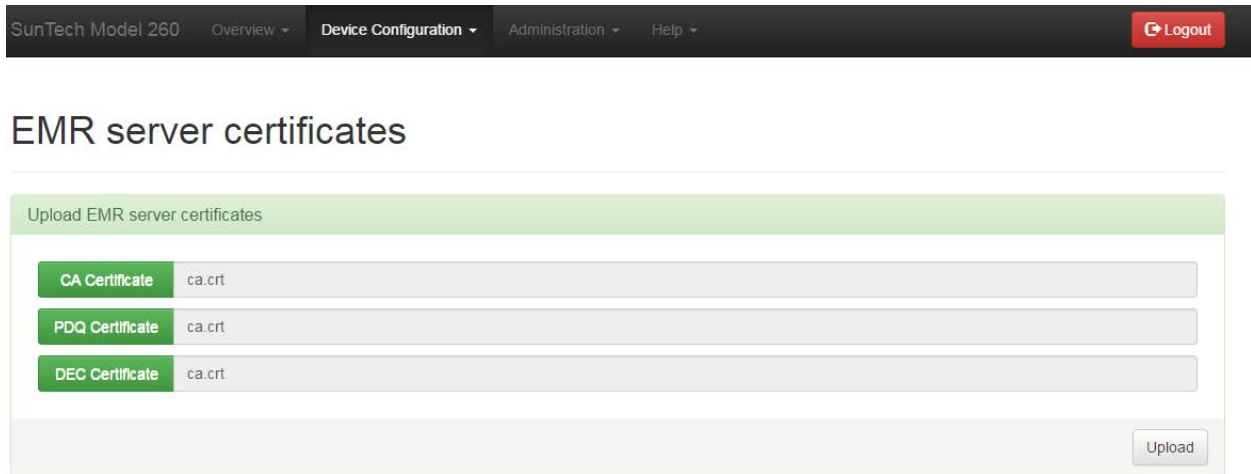
The screenshot shows the 'Device Configuration' section of the SunTech Model 260 interface. The page title is 'EMR server certificates'. Below the title is a form titled 'Upload EMR server certificates'. The form contains three input fields for certificate uploads: 'CA Certificate', 'PDQ Certificate', and 'DEC Certificate'. Each field is currently empty. An 'Upload' button is located at the bottom right of the form.

Figure 5.13: EMR server certificates page

The EMR server certificates are used to authenticate EMR messages. In order to use this feature, SSL must be enabled in the EMR settings.

Clicking on either “CA Certificate”, “PDQ Certificate” or “DEC Certificate” will open the Windows Explorer ‘Open’ dialog box. Choose the corresponding Certificate and click “Open”. The Certificate file will appear in the field next to the corresponding Certificate button. When all necessary Certificate files have been selected, click “Upload”.

A successful import of a certificate will be noted with a “Green” Highlighted Certificate field.



The screenshot shows the 'Device Configuration' section of the SunTech Model 260 interface. The page title is 'EMR server certificates'. Below the title is a form titled 'Upload EMR server certificates'. The form contains three input fields for certificate uploads: 'CA Certificate', 'PDQ Certificate', and 'DEC Certificate'. Each field now contains the text 'ca.crt' and is highlighted with a green background. An 'Upload' button is located at the bottom right of the form.

Figure 5.14: EMR server certificates ‘Success’ page

However, a failed import will be noted with a “Red” highlighted certificate field.

## EMR server certificates

The screenshot shows a web interface titled "Upload EMR server certificates". At the top, there is a red error message: "Verification of uploaded CA certificate failed". Below this, there are three input fields for certificates: "CA Certificate" (containing "Invalid\_Certificate.CA"), "PDQ Certificate", and "DEC Certificate". An "Upload" button is located at the bottom right of the form.

Figure 5.15: EMR server certificates 'Failed' page

These certificates, if needed, will be supplied by the EMR configuration specialist. A valid date/time MUST be specified on the CT40 to enable SSL Certificates, and the supplied Certificates cannot be expired.

## Device Configuration: EMR Client Certificates

## EMR client certificates

The screenshot shows a web interface titled "Upload EMR client certificates". It features two input fields: "Certificate" and "Key file". An "Upload" button is positioned at the bottom right of the form.

Figure 5.16: EMR Client Certificates page

EMR client certificates are used to authenticate CT40 messaging to the EMR. In order to use this feature, SSL must be enabled in the EMR settings.

*NOTE: These features are not currently used, and are provided for future functionality.*

Clicking on either "Certificate" or "Key file" will open the Windows Explorer 'Open' dialog box. Choose the corresponding Certificate and click "Open". The Certificate file will appear in the field next to the corresponding Certificate button. When all necessary Certificate files have been selected, click "Upload".

## Device Configuration: EMR connection test

The screenshot shows the 'EMR connection test' page. At the top, there is a navigation bar with 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help'. A 'Logout' button is in the top right. The main heading is 'EMR connection test'. Below it is a section titled 'Test PDQ (Patient Queries)'. This section contains a form with a label 'Patient ID' and an input field containing 'Patient ID'. An 'Apply' button is located at the bottom right of the form area.

Figure 5.17: EMR connection test page

This page allows the user to enter a test Patient ID in order to ensure that the CT40 is configured correctly. Enter the test Patient ID in the Patient ID field and click “Apply”. If the test is successful, the following message will appear:



Figure 5.18: EMR Connection Test succeeded

The sole purpose of this function is to verify that the device is able to be connected to the EMR. If the user enters an ID that would not be acceptable (e.g. it is in the PDQ or it is too long) then the status bar will be green, but will notify the user that is unacceptable (e.g. “Patient not found”). If there is an issue with the communication with the EMR, a red bar will appear:



Figure 5.19: EMR Connection Test failed

## Device Configuration: Date/Time and Language

This page allows a user to change date, time, region and language settings. The majority of this page is self explanatory. The NTP server is used over network communication to synchronize the device time with the network host. The NTP server address should be provided by the facilities IT department.

*NOTE: Daylight Savings Time is automatic, based upon the time zone selected by the user.*

The screenshot shows the configuration interface for a SunTech Model 260 device. At the top, a navigation bar includes 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help', along with a 'Logout' button. The main heading is 'Date / Time and Language'. The interface is divided into three sections: 'Date and Time', 'NTP Settings', and 'Region and Language'. In the 'Date and Time' section, the 'Automatically synchronize date / time via network (NTP)' checkbox is checked. The 'Date' is set to '2015-12-21' and the 'Time' is set to '11:23:47'. The 'NTP Settings' section shows 'NTP Servers' set to '192.168.0.10'. The 'Region and Language' section shows 'Timezone' set to 'America/New\_York' and 'Language' set to 'English'. Each section has an 'Apply' button at the bottom right.

Figure 5.20: Date/Time and Language

## Device Configuration: Power management

The screenshot shows the 'Power management' settings page in the SunTech Model 260 configuration application. The navigation bar at the top includes 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help', along with a 'Logout' button. The main heading is 'Power management'. Below it is a 'Settings' panel with the following options:

- Display timeout (AC) [s]: 600
- Display timeout (Battery) [s]: 120
- Auto-shutdown timeout (Battery) [s]: 3600
- Save current measurement before Shutdown timeout (on both AC and Battery):

An 'Apply' button is located at the bottom right of the settings panel.

Figure 5.21: Power management settings

The Power management allows the user to change the amount of time until the display, and auto-shutdown timeout, with AC power and with the Battery. The default, maximum, and minimum timeouts are listed below. All timeouts are listed in seconds.

	Default	Maximum	Minimum
Display timeout (AC)	600	3600	30
Display timeout (Battery)	120	3600	30
Auto-shutdown timeout (Battery)	3600	36000	300

## Administration: Update firmware

The screenshot shows the 'Update firmware' section in the SunTech Model 260 configuration application. The navigation bar at the top includes 'SunTech Model 260', 'Overview', 'Device Configuration', 'Administration', and 'Help', along with a 'Logout' button. The main heading is 'Update firmware'. Below it is a 'Upload firmware' section with a 'Choose File' button and the text 'No file chosen'.

Figure 5.22: Update Firmware

When the CT40 firmware needs to be updated, the user will go here to update the firmware. Instructions on how to update the firmware are found in the release notes for the new firmware supplied by SunTech Medical.

## Administration: Reset to factory defaults

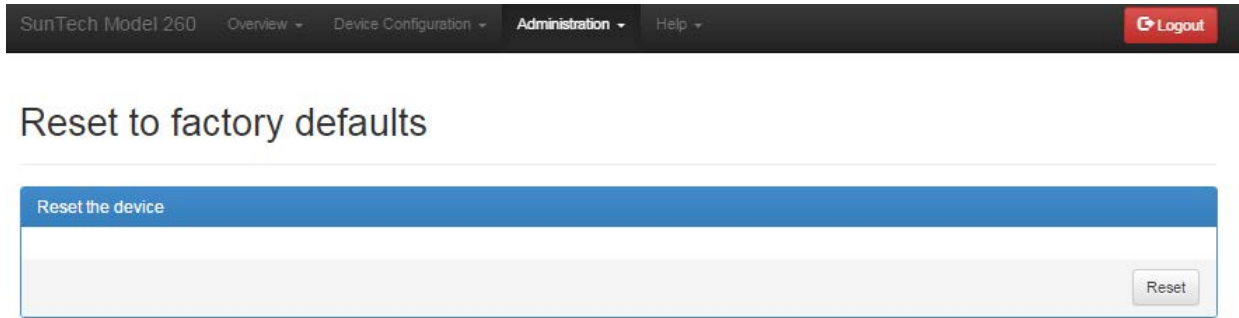


Figure 5.23: Reset to Factory defaults initial page

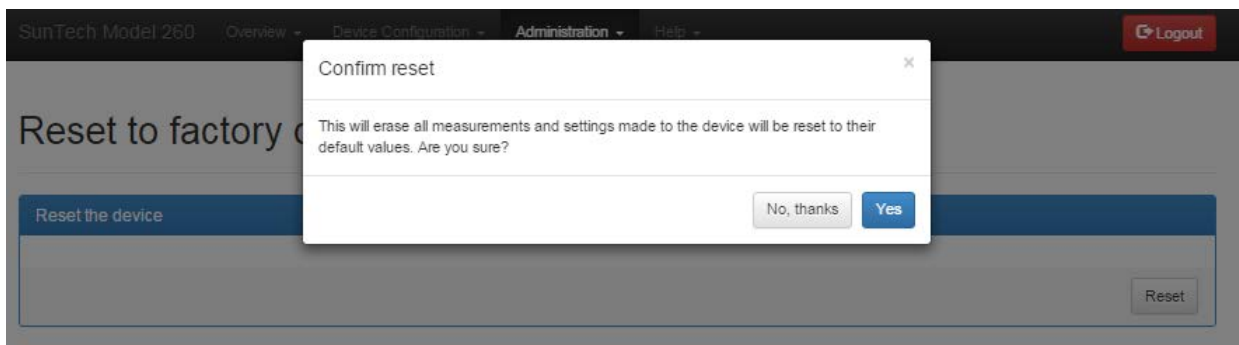


Figure 5.24: Reset confirmation

**NOTE:** Be aware that Wi-Fi, Ethernet, and Encryption settings will also be cleared.

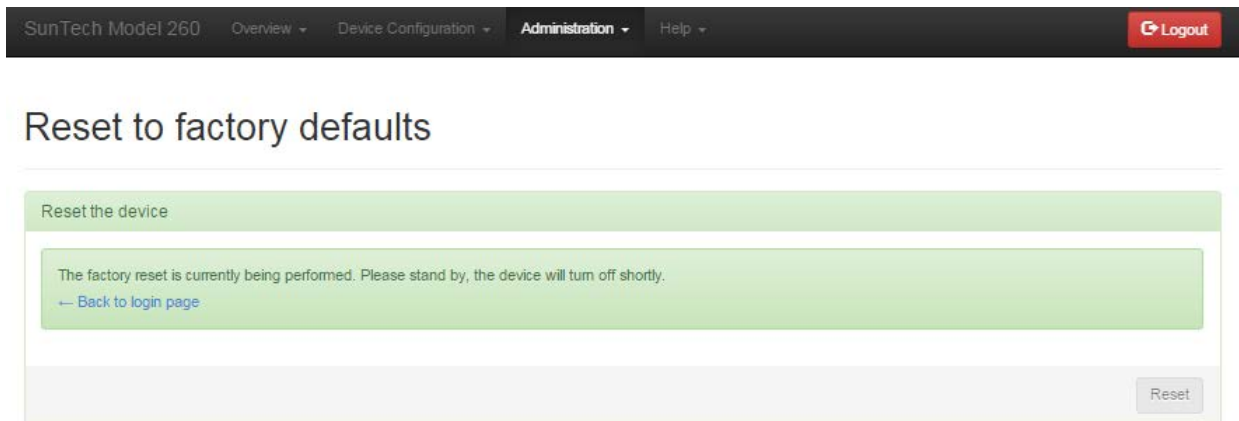
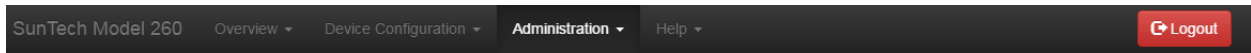


Figure 5.25: Reset in progress

If the user of the CT40 wants to reset the device to its original factory settings with the current firmware, this feature is where it can be done. There are six steps.

1. Click Reset
2. Click Yes to confirm the reset
3. Go to login page
4. Wait for the device to finish resetting
5. Set the device Date and Time on the CT40
6. The device has been reset

## Administration: System Log



### System Log

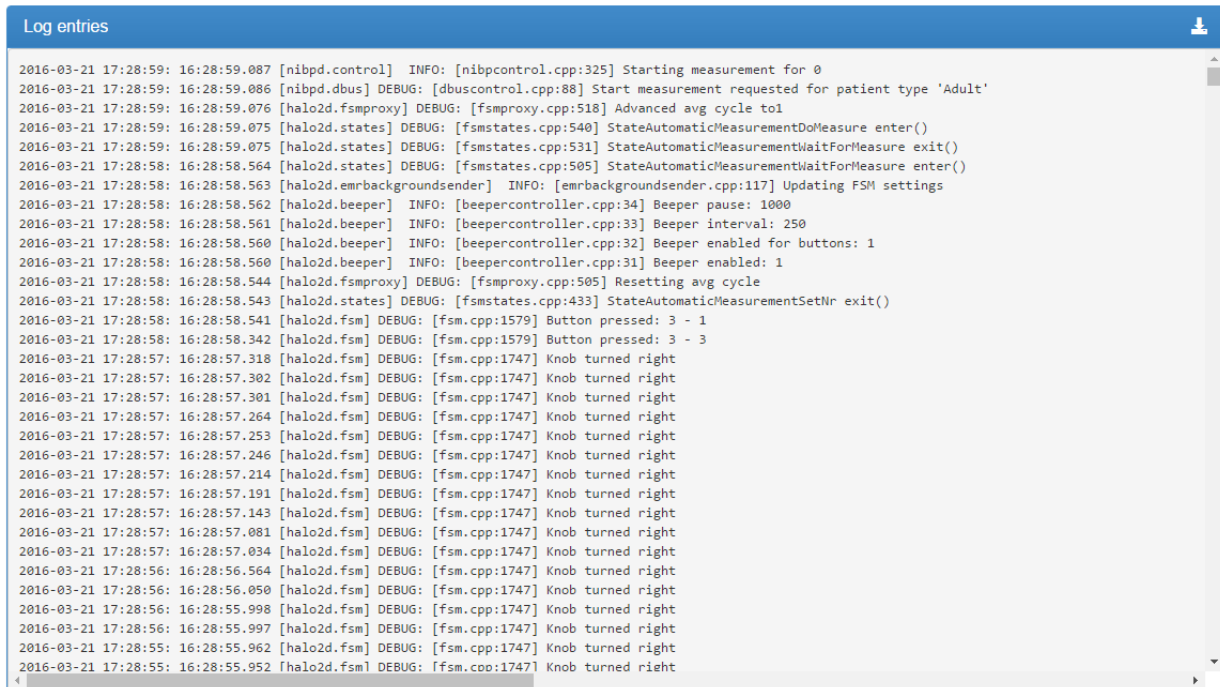


Figure 5.26: System Log page

The System Log can be used for troubleshooting by service personnel. The log can be viewed by using the scroll bar, or it can be downloaded as a .csv (comma delimited) file by clicking on the download icon.



Figure 5.27: Download System Log icon



## Administration: Security Alerts

```
May 25 09:33:13 model260 kernel: Booting Linux on physical CPU 0x0
May 25 09:33:30 model260 firewall.sh[170]: Starting firewall..
May 25 11:56:20 model260 systemd-logind[153]: System is rebooting..
May 25 11:56:21 model260 firewall.sh[352]: Stopping firewall..
May 26 16:09:11 model260 kernel: Booting Linux on physical CPU 0x0
May 26 16:09:29 model260 firewall.sh[169]: Starting firewall..
May 27 08:38:20 model260 systemd-logind[154]: System is rebooting..
May 27 08:38:22 model260 firewall.sh[495]: Stopping firewall..
May 27 08:38:49 model260 kernel: Booting Linux on physical CPU 0x0
May 27 08:39:09 model260 firewall.sh[171]: Starting firewall..
May 27 09:25:40 model260 systemd-logind[154]: System is rebooting..
May 27 09:25:41 model260 firewall.sh[303]: Stopping firewall..
May 27 09:26:27 model260 kernel: Booting Linux on physical CPU 0x0
May 27 09:26:45 model260 firewall.sh[170]: Starting firewall..
May 27 09:45:42 model260 systemd-logind[154]: System is rebooting..
May 27 09:45:43 model260 firewall.sh[289]: Stopping firewall..
May 27 11:11:34 model260 kernel: Booting Linux on physical CPU 0x0
May 27 11:11:52 model260 firewall.sh[169]: Starting firewall..
May 27 11:12:14 model260 dropbear[272]: Password auth succeeded for 'root' from 169.254.164.164:60095
May 27 11:14:18 model260 dropbear[282]: Password auth succeeded for 'root' from 169.254.164.164:60266
May 10 09:48:56 model260 kernel: Booting Linux on physical CPU 0x0
May 10 09:49:21 model260 firewall.sh[204]: Starting firewall..
May 10 09:01:27 model260 systemd-logind[185]: System is rebooting..
May 10 09:01:31 model260 firewall.sh[331]: Stopping firewall..
May 10 09:19:20 model260 kernel: Booting Linux on physical CPU 0x0
May 10 09:19:40 model260 firewall.sh[173]: Starting firewall..
May 11 08:46:44 model260 dropbear[554]: Bad password attempt for 'root' from 169.254.59.170:59995
May 11 08:46:46 model260 dropbear[554]: Bad password attempt for 'root' from 169.254.59.170:59995
May 11 08:46:49 model260 dropbear[554]: Bad password attempt for 'root' from 169.254.59.170:59995
May 11 08:47:00 model260 dropbear[554]: Bad password attempt for 'root' from 169.254.59.170:59995
May 11 08:47:22 model260 dropbear[554]: Password auth succeeded for 'root' from 169.254.59.170:59995
May 11 08:50:44 model260 dropbear[566]: Password auth succeeded for 'root' from 169.254.59.170:60117
May 11 16:28:04 model260 dropbear[671]: Password auth succeeded for 'root' from 169.254.59.170:56162
May 12 08:40:14 model260 dropbear[2826]: Password auth succeeded for 'root' from 169.254.59.170:53830
May 17 11:12:53 model260 dropbear[4517]: Password auth succeeded for 'root' from 169.254.59.170:62548
```

Figure 5.28: System Log page

Security Alerts can also be accessed by service personnel. The alerts can be viewed by using the scroll bar, or they can be downloaded as a .csv (comma delimited) file by clicking on the download icon.

Figure 5.29: Download System Log icon

**NOTE :** It is recommended that Security Alerts be checked monthly to ensure that there are no active cyber security threats.

SunTech regularly issues firmware updates for the CT40. Check for recent firmware updates by clicking the « Check for Firmware Update » button just above the Download Button.