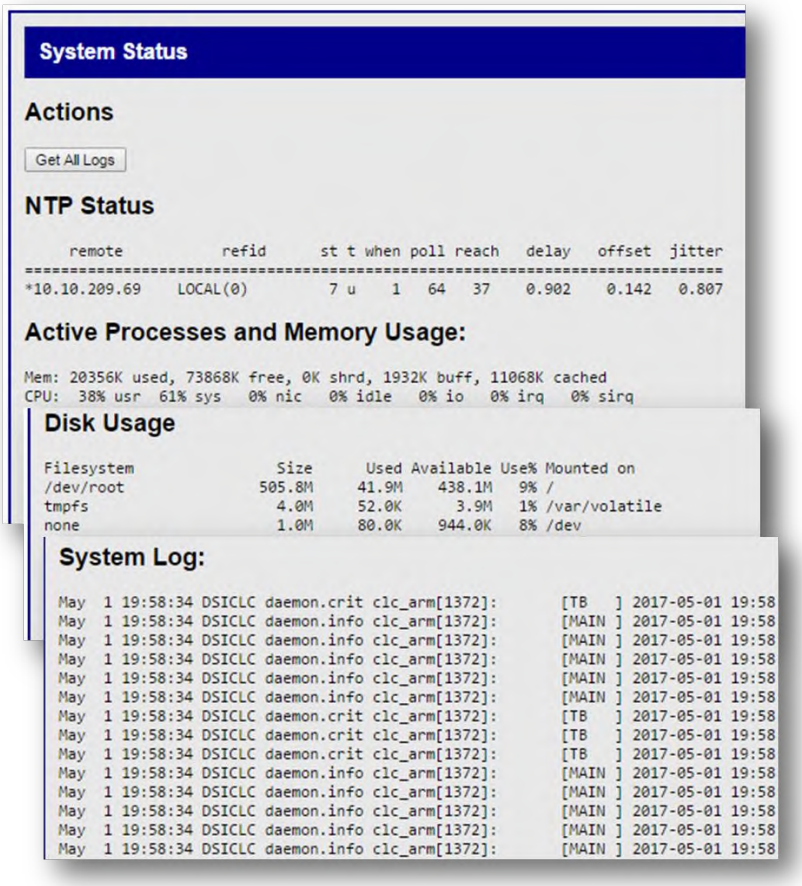

Contents:

- Get All Logs – downloads the CLC log file.
- NTP Status – Reports the last time the CLC received an update from the NTP Server
- Active Processes and Memory Usage
- System Log

Settings

The Settings page allows the user to set the RF Mode, Clear Channel Assessment, Enable Multiple Beacons, set the Maximum Implant Count per CLCs, and Enable Logging.

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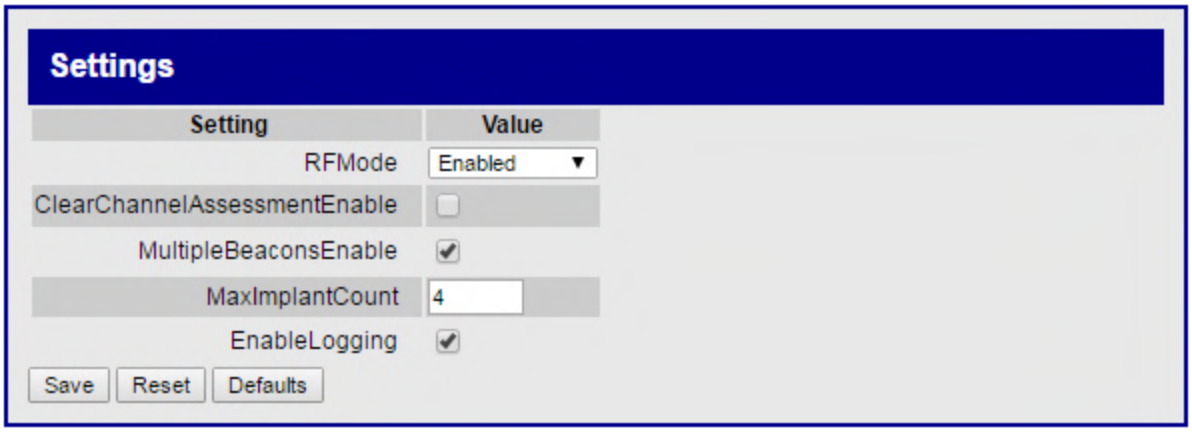

RF Mode

- **Enabled** – Normal operating mode
- **Disabled** – Halts communication between the TRXs and the implants
- **Assessment** – Allows the user to sample individual frequencies to assess the level of background RF interference. The Assessment mode is used for the TRX RSSI History function

Clear Channel Assessment

- For European and Japan customers this function is enabled by default and cannot be changed.
- For North American customers this function is not enabled by default, but can be with no effect on performance. This will allow the user the ability to detect if there are competing RF devices that have the potential of interfering with the Digital system. Reference the TRX CCA RSSI History section below for more detail.
- For customers in China, Clear Channel Assessment is not enabled by default and is not needed.

Multiple Beacons

- Multiple Beacons was an enhancement made to the system to maximize the number of attempts in communicating with the PhysioTel Digital implants. It is enabled by default.

Max Implant Count

- Defines the maximum number of Implants that may be assigned to a CLC. Default is 4. With certain combinations of Implant and CLC firmware, the maximum may be set to 6.
- The default maximum implant count for China is 5, which is also the maximum number of implants that may be assigned to CLCs in China.
- See the PhysioTel Digital Telemetry Platform Broadcasting Frequencies section of this manual for more details on supported frequencies.

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REBOOT

This function allows the user to perform a complete reboot of the CLC. A Reboot of the system is required to:

- Activate a firmware upgrade
- Change the IP settings
- To reboot the CLC left click the Reboot button

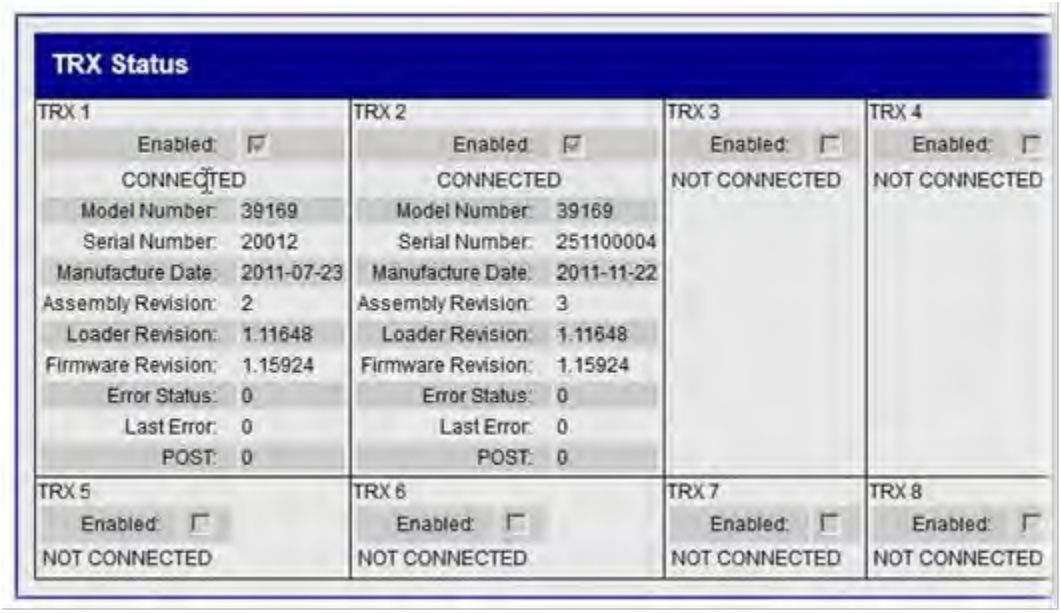
Note: the Reboot process may take several minutes to complete. There are no progress indicators that appear on this page, However there are indicator lights on the back of the CLC box itself.

TRX Options

The TRX is the three letter designation for a Transceiver: the component in the system that receives Radio-Frequency (RF) signals and converts it into digital form that is sent, via cable, to the Communication Link Controller.

TRX STATUS

The TRX Status screen is a non-interactive snapshot of the current status of the TRXs that are connected to the CLC. Each CLC is capable of interfacing with eight TRXs. This arrangement follows the layout on the rear panel of the CLC unit. The following is the TRX Status screen indicating that two TRX units are connected and enabled.



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The line items are as follows:

TRX (#):	Number 1-8.
Enabled:	A check mark in the box indicates that the TRX is connected and available to communicate with the implants
Connected:	Indicates whether the TRX is physically CONNECTED or NOT CONNECTED to the CLC
Model Number:	Displays a numeric value representing the TRX model.
Serial number:	Displays the TRX serial number.
Manufacture Date:	Displays the date the CLC was manufactured at DSI. Format is YYYY-MM-DD.
Assembly Revision:	Displays the current Assembly revision.
Loader Revision:	Displays the current Loader revision.
Firmware Revision:	Displays the firmware version the TRX is currently running.
Error Status:	Indicates that at least one error has occurred.
Last error:	Displays the most recent error encountered.
POST:	Power On Self-Test (0 =Passed, OK)

TRX COMMAND

This dialog screen allows the user to perform two functions that affect the performance of the TRX. The user can upload a different version of the on-board read-only software (firmware). Additionally the user can adjust the telemetry receiver thresholds to optimize RF communications.

There are four commands available in this window.

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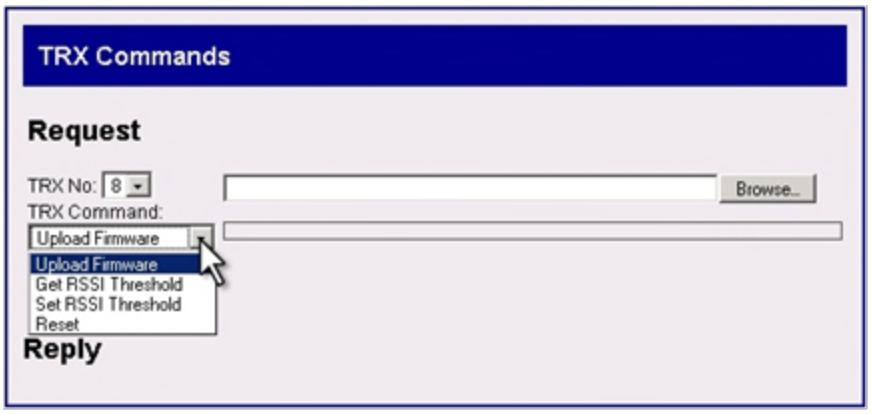

UPLOAD FIRMWARE

To update or change the firmware version in the TRX, follow these steps:

1. Select the **TRX No**: drop-down menu and select the **TRX number** you wish to communicate with.
2. Select the **TRX Command**: drop-down menu and select **Upload Firmware**.
3. Select **Browse…** button and use the file upload window to locate the firmware file.
4. Navigate to the specific filename and click **Open**
5. Message 1: Uploaded.
6. Message 2: Validating
7. Message 3: Updating TRX Firmware...
8. Message 4: Command Completed

GET RSSI THRESHOLD

RSSI stands for Received Signal Strength Indicator. It is a quantitative measure of the strength of the RF signal that the TRX is receiving from the implants. The Get RSSI Threshold command retrieves the current threshold value from the TRX. The default value = 12.

1. Select **Get RSSI Threshold** from the **TRX Command:** drop-down menu.
2. Select **Send**.
3. A successful operation is indicated by a blue colored Command Completed banner at the top of the screen and a text string below the word Reply at the bottom of the screen.
4. The reported text value **OK "xx"** is the Hexadecimal value of the **RSSI Threshold**.

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SET RSSI THRESHOLD

The Set RSSI Threshold command allows the user to adjust the lower limit of signal strength that the TRX will accept as viable information from the implants. The default value = 12.

Note: Anytime the TRX is unplugged, or the CLC is rebooted, or the CLC goes through the Configuration Wizard, the RSSI threshold value will revert back to the hexadecimal default value of 0x12.

1. Select **Set RSSI Threshold** from the **TRX Command**: drop-down menu.
2. Select the **TRX #** from the **TRX No**: drop-down menu.
3. Enter a **hexadecimal** value in the small text box above the **Send** button.
4. Select the **Send** button.
5. A successful operation is indicated by a blue colored Command Completed banner at the top of the screen and a text string "**OK**" below the word Reply at the bottom of the screen.

RESET

The Reset function returns the TRX settings to the factory default values.

1. Select **Reset** from the **TRX Command**: drop-down menu.
2. Select the **TRX #** from the **TRX No**: drop-down menu.

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3. Change the value in the dialog box below the letters TRX from **“ff”** to **“02”.**
4. Click the **Send** button.
5. A successful operation is indicated by a blue colored Command Completed banner at the top of the screen and a text string **“OK”** below the word Reply at the bottom of the screen.

RFMODE (NOT PICTURED ABOVE)

The RFMode command is only available to EU users. It can be used to change the transmission power of the TRX. By default the TRX leaves the DSI factory with the maximum allowable transmission power. In some cases, that power is too much and it should be decrease to improve RF performance where multiple PhysioTel Digital systems are located in close proximity. The power can be changed from any value of 00 to 08, with the default value of 08. The default value in the United States, Japan, and China is 00.

1. Select **RFMode** from the **TRX Command**: drop-down menu.
2. Select the **TRX #** from the **TRX No**: drop-down menu.
3. Enter a **hexadecimal** value in the small text box above the **Send** button.
4. Select the **Send** button.
5. A successful operation is indicated by a blue colored Command Completed banner at the top of the screen and a text string “**OK**” below the word Reply at the bottom of the screen.

TRX RSSI HISTORY

This option allows the user to sample how well the TRXs are receiving RF signals from the implants, or as a tool to detect the amount of RF noise that may be present near the PTD system. In an actively running system (**Enabled**) these graphs continually update according to a user prescribed auto refresh rate.

There will be one RSSI graph displayed for each of the enabled TRXs connected to the CLC. The TRXs will display the received signals from all of the implants it is communicating with.

Follow this procedure to utilize the **TRX RSSI History** option:

1. Click on the Settings link under the **CLC Options** heading.
2. In the dropdown box to the right of the words **RF Mode**, select the word “**Assessment** ”and click the **Save** button below.
3. Using the mouse cursor, click on the link marked **TRX RSSI History**.
4. This will open the RSSI graph screen.

   Warning! When you are finished with the TRX RSSI History function you MUST return the CLC to the “Enabled” mode!

5. Select the **Settings** link under the **CLC Options** heading.
6. Return to the dropdown box and select “**Enabled**”, and click on the **Save** button below.
7. Verify the **CLC status** by **Home** link under the under the **CLC options** heading.
8. The **Operating Mode**: line item in the center of the screen should read **Enabled**, if it does not, refresh the internet page, or repeat steps 6-7 above.

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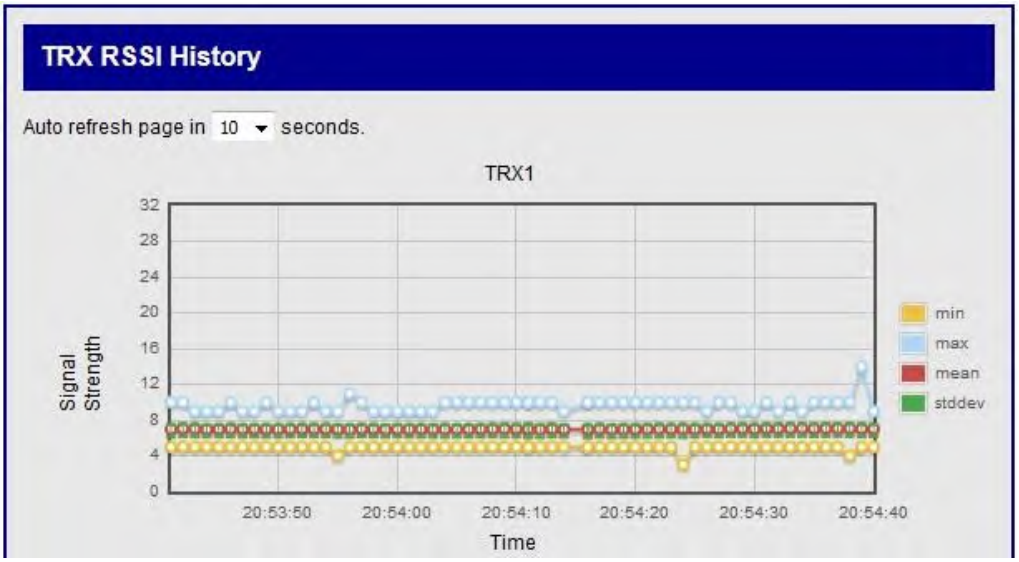
The following is a graphical representation of the ability of the TRX to detect RF noise. To set the auto refresh rate of the graph click on the drop-down menu at the top of the screen and select a new value.



TRX CCA RSSI HISTORY

CCA is an acronym for Clear Channel Assessment. According to certain RF regulation environments, it is necessary to invoke a "listen before you talk" policy. The Clear Channel Assessment operation determines whether the wireless medium is busy or idle. The CLC can then make a decision on whether to attempt communication.

The CLC will display the RSSI value of what the TRX is receiving. If the TRX picks up a significant signal from a competing device the CLC delays the transmission of a command to the implant. If the interfering signal persists, communication with the implants may be disrupted.

- The CLC will try to avoid talking in a noisy RF environment.
- The CLC will display an RSSI value of what the TRX is picking up in the Listening window.
- In Europe and Japan the "Listen Before Talk" function is enabled by default.
- In the United States the "Listen Before Talk" function is disabled by default.
- There will be one plot for each of the TRXs assigned to the CLC.
- To set the auto refresh rate of the graph click on the drop-down menu at the top of the screen and select a new value.

Implant Options

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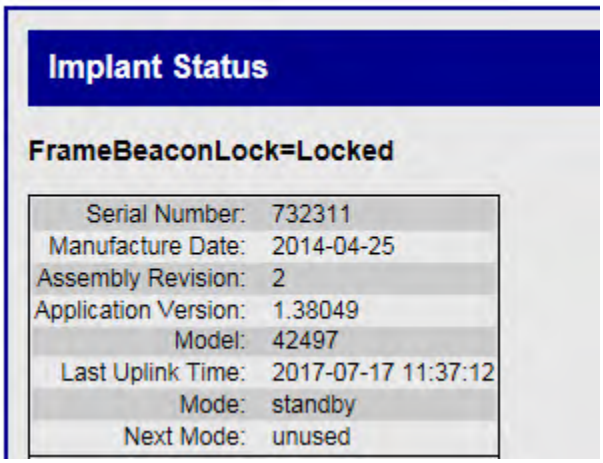
IMPLANT STATUS

Implant Status is a non-interactive table which reports the operational status of all implants communicating with a CLC.



Frame Beacon Lock is a new feature that will prevent implants from being "stolen" by a configured system. Once a CLC with firmware v0.1.28 is configured, the Accept List of that CLC will become "Locked" and that is indicated on the Implant Status page. If an implant with firmware v1.62816 or later hears a beacon from a locked CLC (that isn't its intended CLC) it will disregard that beacon/CLC, and continue to listen for its intended beacon/CLC.

Previous versions of the CLC would allow implants that were not configured onto its Accept List if the implant heard the beacon and attempted to join (assuming there was room on the list). If the Accept List was already full, the implant would continuously attempt to become a part of that Accept List until it either a.) it timed out and eventually turned off, or b.) started to hear its intended beacon again. With the new version of the implant firmware, the implant will attempt to hears its intended beacon right away.

A table will be displayed for each implant with the following content:

Serial Number	Displays the serial number of the implant.
Manufacture Date	Displays the date the implant was manufactured at DSI. Format is YYYY-MM-DD.
Assembly Revision	Displays the assembly revision.
Application Version	Displays the application version.

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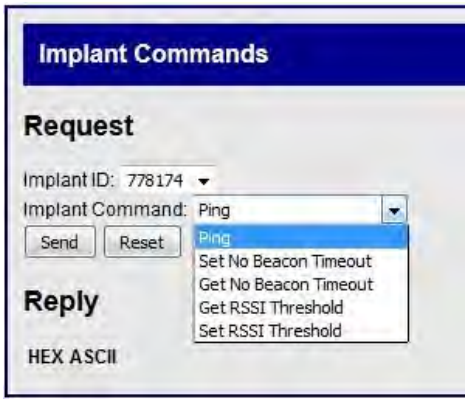
Model	Displays the implant model.
Last Uplink Time	The latest time that the CLC received an uplink from the implant.
Mode	Displays the current mode of the implant: • Standby – On, but not actively transmitting data. • Active – On and actively transmitting data. • Unused – Configured but either out or range or off.
Next Mode	Will only update when using scheduled sampling in Ponemah.

IMPLANT COMMANDS

There are three commands with which the user can communicate with individual implants. They are **Ping**, **Get/Set RSSI Threshold**, **Get/No Beacon Timeout**.



- The **Ping** command allows the user to select an individual implant and request a confirmation message that the implant is operating within range.
- The **Get RSSI Threshold** command retrieves the current threshold value from the implant.
- The **Set RSSI Threshold** command allows the user to adjust the lower limit of signal strength that the implant will accept as viable information from any of the TRXs.

PING COMMAND

The **Ping** command allows the user to send a request to an individual implant to reply with a confirmation message that the implant is operating within range.

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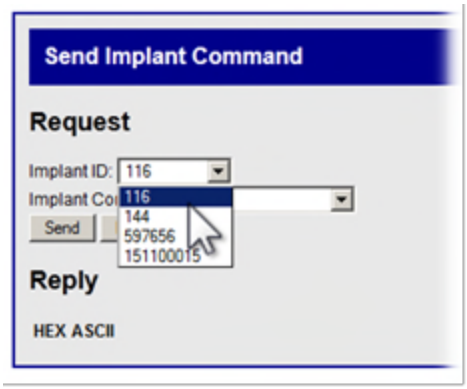

To **Ping** the implant:

1. Click on the drop-down menu labeled Implant ID:
2. Select a device by left clicking on an implant serial number.
3. Click on the drop-down menu labeled Implant Command.
4. Left click the Ping command
5. Click the Send button

If the Ping dialog is successful:

- A blue colored banner with the word **OK!** will appear at the top of the screen.
- The implant will report back with a Hexadecimal value which is displayed in the Reply table at the bottom of the screen.

If the Ping dialog is unsuccessful:

The Ping will be automatically repeated several times.

- A red colored banner with the word ERROR will appear at the top of the screen.
- The more common error codes are listed at the end of this section.

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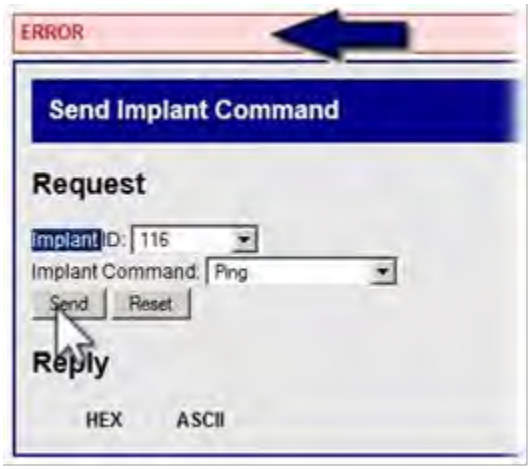
- The implant will not report with a Hex value at the bottom of the screen.

Note: It may take several seconds for an unsuccessful Ping command to generate an error message.



GET RSSI THRESHOLD

The Get RSSI Threshold command retrieves the current threshold value from the implant. Get RSSI Threshold reads the signal strength value that allows the implant to hear commands from the CLC/TRX.

To **Get RSSI Threshold**:

1. Click on the drop-down menu labeled **Implant ID**:
2. Select a device by left clicking on an implant serial number.
3. Click on the drop-down menu labeled **Implant Command**.
4. Left click the **Get RSSI Threshold** command.
5. Click the **Send** button
6. A successful operation is indicated by a blue colored **OK** banner at the top of the screen.

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7. A Hexadecimal value will also be reported in a table below the word **Reply**.
8. If the command cannot be successfully completed an error code may be displayed. Refer to the common error codes below.

SET RSSI THRESHOLD

RSSI stands for Received Signal Strength Indicator. It is a quantitative measure of the strength of the RF signal that the implant is receiving from the TRXs. The Set RSSI Threshold command allows the user to adjust the lower limit of signal strength that the implant will accept as viable information from the CLC/TRX.

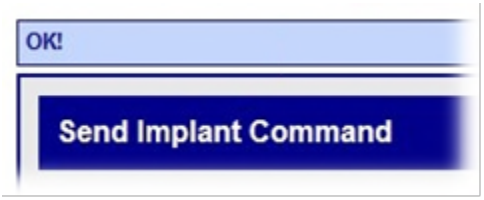
1. Click on the drop-down menu labeled **Implant ID**:
2. Select a device by left clicking on an implant serial number.
3. Click on the drop-down menu labeled **Implant Command**.
4. Left click the **Set RSSI Threshold** command.
5. A small text-entry box will appear below the **Implant Command**: line.
6. Allowable values for **RSSI Threshold** are between 12 and 28 (values must be entered in Hexadecimal format).

Decimal	Hexadecimal
12	0C
28	1C

7. Adjusting the **RSSI Threshold** value will affect the implant performance in the following manner.

RSSI value	Sensitivity	Range	Susceptibility to RF Noise
Increase	Decrease	Decrease	Decrease
Decrease	Increase	Increase	Increase

8. Enter a new value for the **RSSI Threshold** and click the **Send** button (values must be entered in Hexadecimal format).
9. A blue colored banner with the word **OK!** will appear at the top of the screen.



10. Repeat the **Get RSSI Threshold** procedure for verification.
11. If the command cannot be successfully completed an error code may be displayed. Refer to the common error codes below.
12. The RSSI Threshold value will revert to the default value anytime the implant turns off, or if it is assigned a new frequency.

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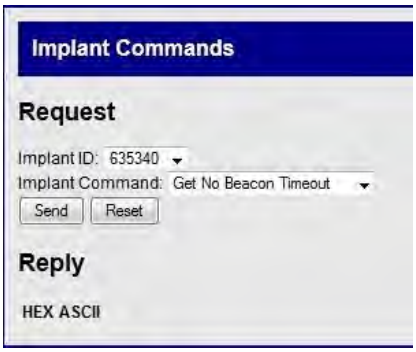
GET NO BEACON TIMEOUT

The Get No Beacon Timeout command retrieves the amount of time that the implant can be out of RF range of the TRXs before it turns off. The returned value is in hexadecimal format and corresponds to minutes. The default value is set in the factory by DSI at a value of 60 minutes



To **Get No Beacon Timeout**:

1. Click on the drop-down menu labeled **Implant ID**:
2. Select a device by left clicking on an implant serial number.
3. Click on the drop-down menu labeled **Implant Command**.
4. Left click the **Get No Beacon Timeout** command.
5. Click the **Send** button
6. A successful operation is indicated by a blue colored **OK** banner at the top of the screen.
7. A Hexadecimal value will also be reported in a table below the word **Reply**.
8. If the command cannot be successfully completed an error code may be displayed. Refer to the common error codes below.

SET NO BEACON TIMEOUT

The Set No Beacon Timeout command sets the amount of time that the implant can be out of RF range of the TRXs before it turns off. The table below outlines some common values that could be entered with the hexadecimal conversion.

Minutes	Hexadecimal
60	3C
120	78
180	B4
240	F0
480	FF
Infinite (Doesn't Turn Off)	00

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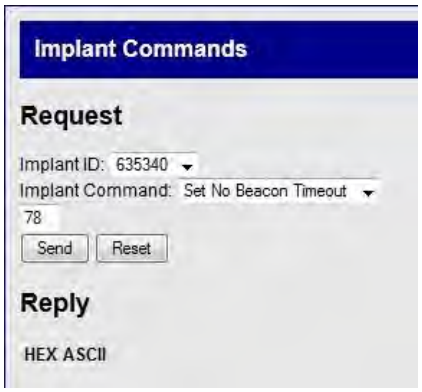

To **Set No Beacon Timeout**:

1. Click on the drop-down menu labeled **Implant ID**:
2. Select a device by left clicking on an implant serial number.
3. Click on the drop-down menu labeled **Implant Command**.
4. Left click the **Set No Beacon Timeout** command.
5. Click the **Send** button
6. A successful operation is indicated by a blue colored **OK** banner at the top of the screen.
7. A Hexadecimal value will also be reported in a table below the word **Reply**.
8. If the command cannot be successfully completed an error code may be displayed. Refer to the common error codes below.

COMMON ERROR CODES

The implant commands in this section are capable of generating an error code if the command cannot be successfully executed. Below is a list of the more common error codes.

Error code	Description	Solution
900	Unknown Error	
901	Implant Not Found	Make sure implant in range
902	Timeout	Make sure implant in range
903	Send Fail	Make sure implant in range, in standby mode, Ponemah is not trying to send a lot of commands to the implant
905	Implant in Active Mode	Make sure the implant is in standby mode
906	Queue Full	Make sure implant is in range, Ponemah is not trying to send a lot of commands to the implant

IMPLANT RSSI HISTORY

Similar to the TRX RSSI History, the Implant RSSI History generates graphs in which the received signal strength from each of the TRXs is plotted for each implant. These graphs allow the user to track how well the implants are being received by each of the TRXs. In an actively running system these graphs continually update according to a user prescribed auto refresh rate.

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- There will be one RSSI graph for each of the recognized implants in the system.
- Each TRX will report the received signal strength from each of the implants it is communicating with. The RSSI graph will display one data set for each of the implants.
- To Set the Auto refresh rate of the graph, click on the drop-down menu at the top of the screen and select a new value.

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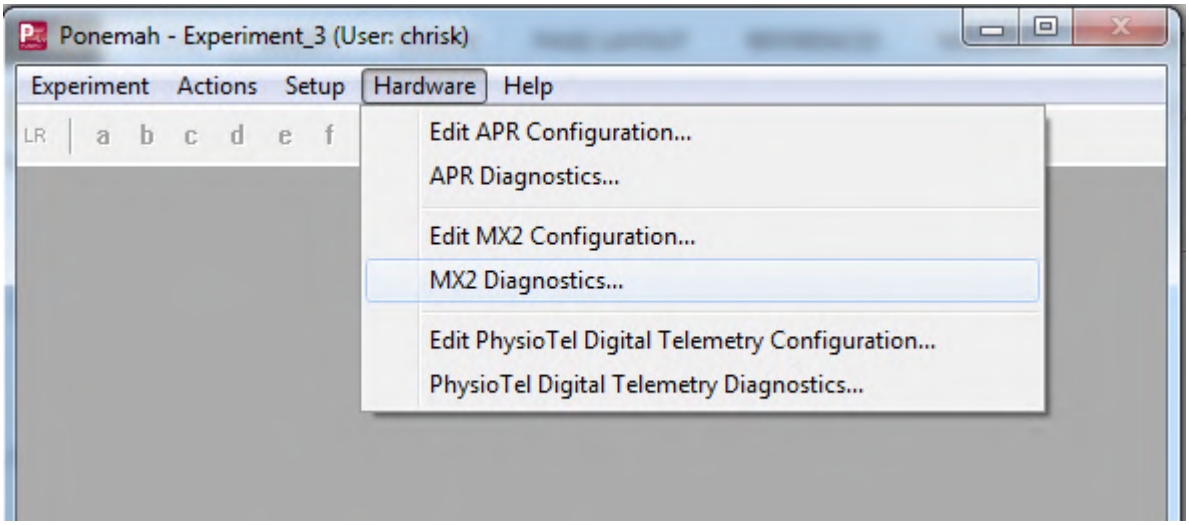
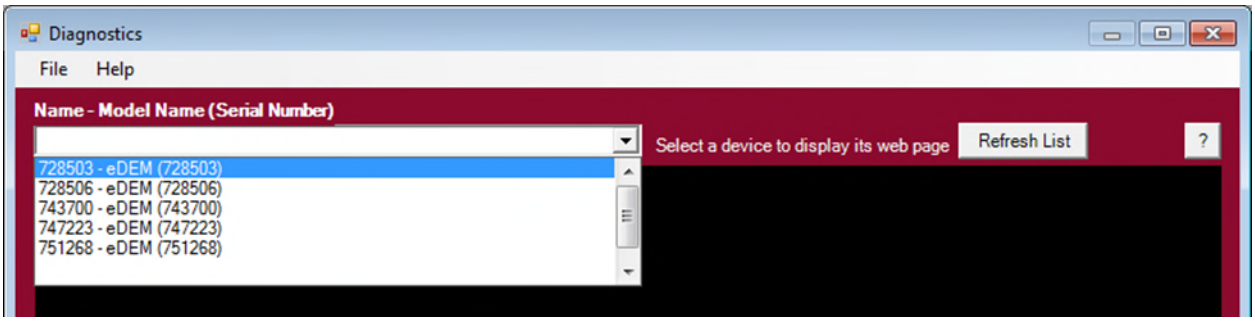
MX2 Diagnostics

The **MX2 Diagnostics** user interface is a browser based webpage that allows the user to check the status of the MX2, Check network connections, update firmware, and perform diagnostic tests to optimize the performance of the system components.

Selecting **MX2 Diagnostics…** from the Hardware menu will open the **MX2 Diagnostics** web browser.



To select a specific MX2 click on the drop-down menu located in the top left corner of the diagnostics window. All of the configured MX2s that are connected to the system will appear in this list.



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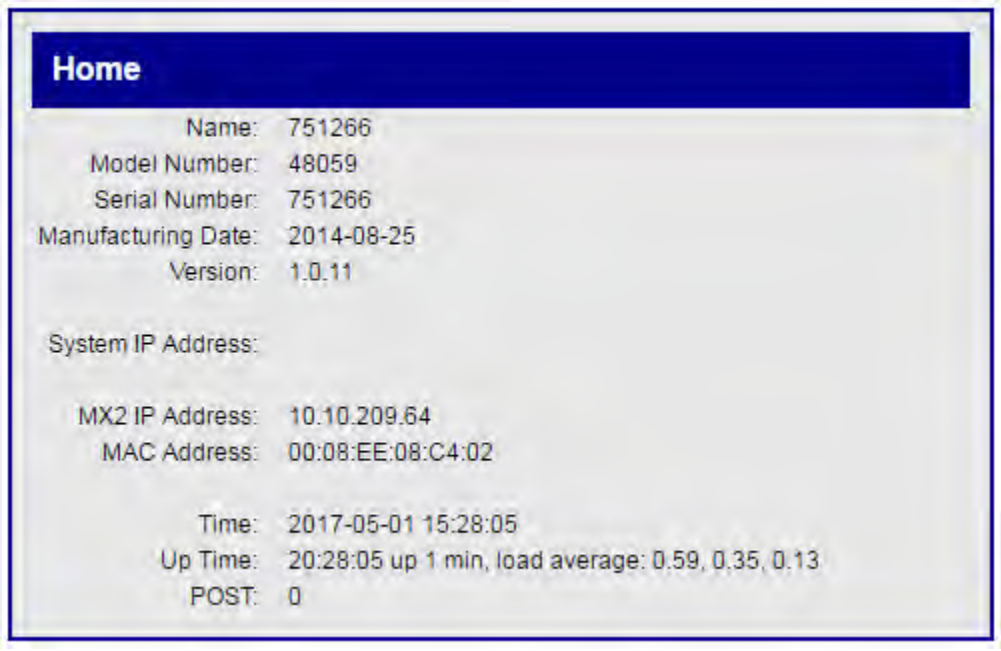
MX2 OPTIONS

The MX2 section of the Diagnostics webpage options are describe below.

HOME

The **Home** section lists the general information pertinent to the selected MX2.



The information listed on the Home page is as follows:

Name: Displays the user defined name assigned to the MX2.

Model Number: Displays the MX2 model number.

Serial Number: Displays the MX2 serial number.

Manufacturing Date: Displays the date the MX2 was manufactured at DSI. Format is YYYY-MM-DD.

Version: Displays the firmware version the MX2 is currently running.

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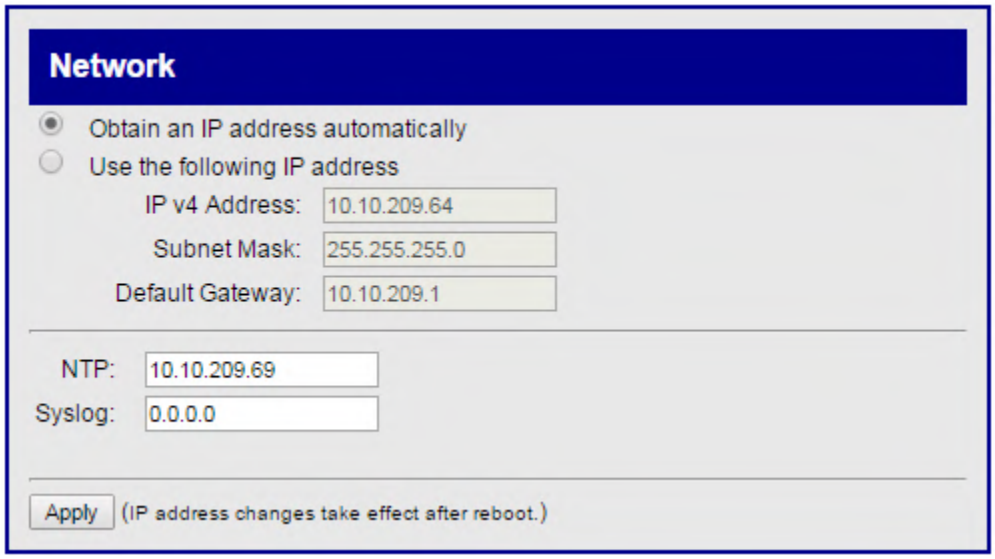
System IP Address:	Displays the IP address of the acquisition computer.
MX2 IP Address	Displays the IP address of the MX2.
MAC Address	Displays the unique identifier for the MX2 network interface
Time:	Current Date & Time (Format = YYYY-MM-DD HR:MN:SC)
Up Time:	Status information since last reboot.
POST:	Power On Self-Test (0 = Passed, OK …)

NETWORK

The **Network** page allows the User to adjust the network communication settings.



- **Obtain an IP address automatically**

  This is the normal operating mode for the MX2. With this option selected the MX2 is queried and the values that it reports back are displayed in the appropriate text boxes:
  - IP v4 Address:
  - Subnet Mask:

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- Default Gateway:

Note: A new IP address can be generated by performing an "extended" reset: push and hold the reset button on the back of the MX2 for 5-15 seconds.

- **Use the following IP address**

If the user wishes to manually assign a specific IP address to the MX2, click this radio button and type a new IP address in the text box.

If you wish to perform this operation, follow this procedure:

4. Click the radio button for Use the following IP address
5. Enter the desired values in the text boxes labeled:
   - IP v4 Address:
   - Subnet Mask:
   - Default Gateway:
6. Click Apply.

Note: A reboot of the system will have to be performed in order for the new IP Address to activate.

 *Caution*: If the user-assigned IP address is not accessible, this diagnostics tool will lose contact with the MX2. To generate a new IP address, the user must perform an "extended" reset: push and hold the reset button on the back of the MX2 for 5-15 seconds.

- **NTP**

The MX2 keeps synchronization with the PC using Network Time Protocol (NTP). By default, Ponemah will set the NTP IP address to be the IP address of the PC. If it is desired, the NTP IP address can be set manually.

- **Syslog**

This is an IP address that can be set by DSI personal for on-site troubleshooting. It is not needed for normal operation.

UPLOAD MX2 FIRMWARE

This page allows the user to update the MX2 firmware. From time to time it may be advantageous to upgrade the internal read-only program instructions through a firmware upgrade. This often results in improved performance.

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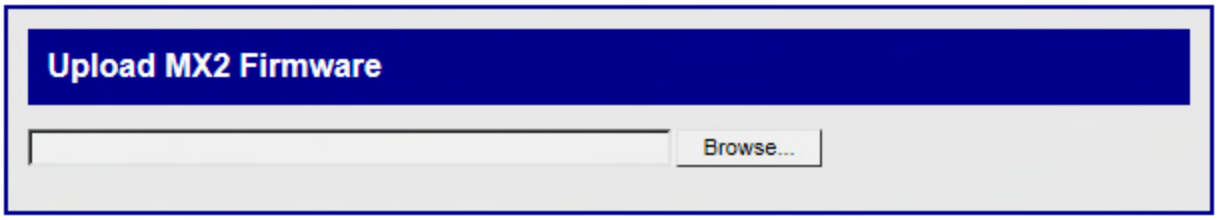

To update or change the firmware version in the MX2, follow this procedure:

1. Click on the **Browse** button and use the file upload window to locate the firmware file.
2. Navigate to the specific filename and click **Open**
3. Message 1: Uploaded, Validating
4. Message 2: Validated. Upgrade will be applied during reboot.

Note: A reboot of the system will have to be performed in order for the update to activate.

SYSTEM STATUS

The System Status is a continuously updating "log" file of the MX2's communication activity. It can be used to monitor communication issues in the event of discontinuities.

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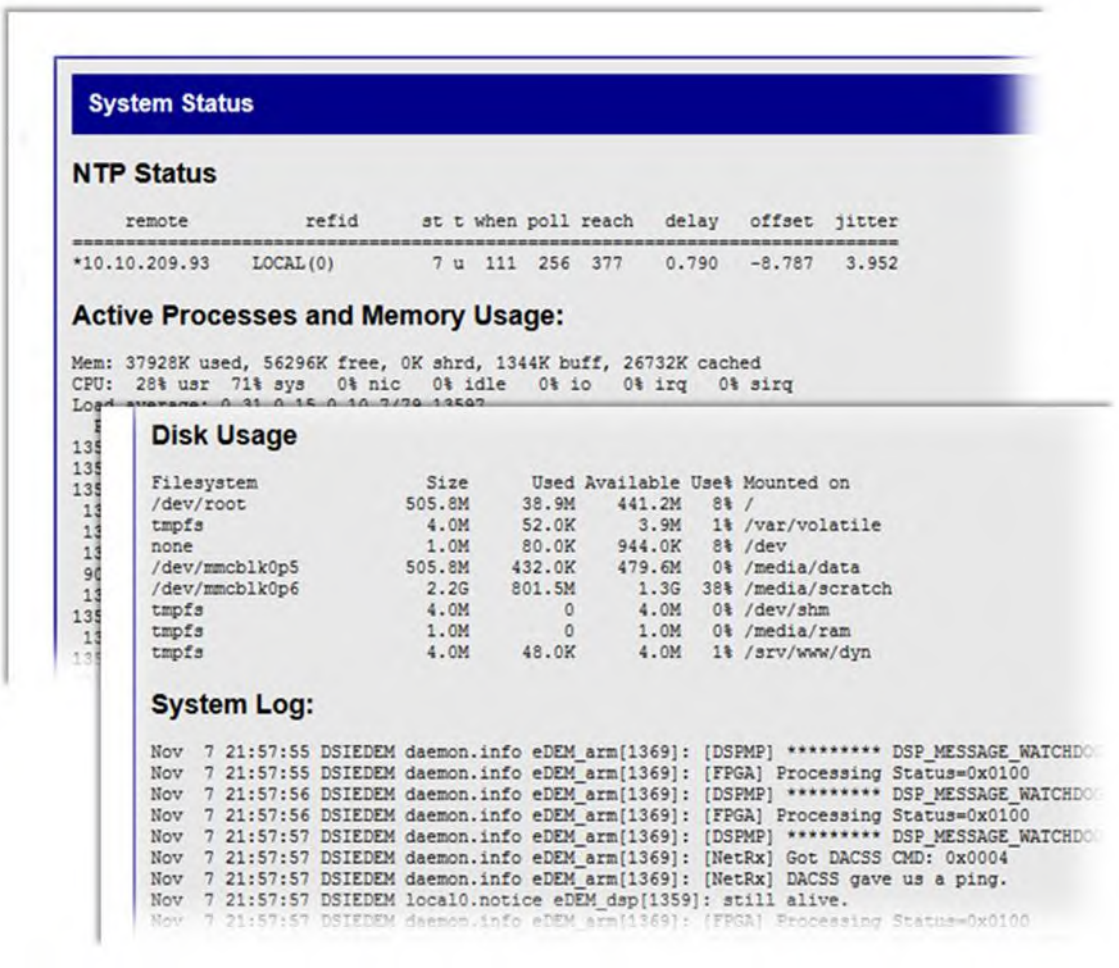

Contents:

- NTP Status – Reports the last time the MX2 received an update from the NTP Server
- Active Processes and Memory Usage
- Disk Usage
- System Log

REBOOT

This function allows the user to perform a complete reboot of the MX2. A Reboot of the system is required to:

- Activate a firmware upgrade.
- Change the IP settings.
- To reboot the MX2 left click the Reboot button

Note: the Reboot process may take several minutes to complete. There are no progress indicators that appear on this page, However there are indicator lights on the back of the MX2 box itself

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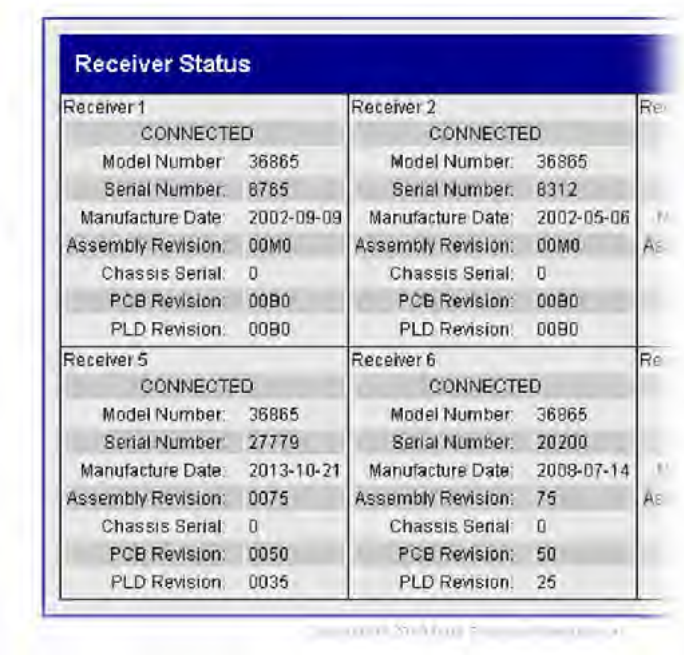
Receiver Options

RECEIVER STATUS

The Receiver Status screen is a non-interactive snapshot of the current status of the receivers that are connected to the MX2. Each MX2 is capable of interfacing with eight receivers. This arrangement follows the layout on the rear panel of the MX2 unit.



The line items are as follows:

Receiver (#): Number 1-8.

CONNECTED: Indicates whether the receiver is physically CONNECTED or NOT CONNECTED to the MX2.

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Model Number: Displays the Receiver model number.

Serial number: Displays the Receiver serial number.

Manufacture Date: Displays the date the Receiver was manufactured at DSI. Format is YYYY-MM-DD.

Assembly Revision: Displays the Assembly revision.

Chassis Serial: Not implemented.

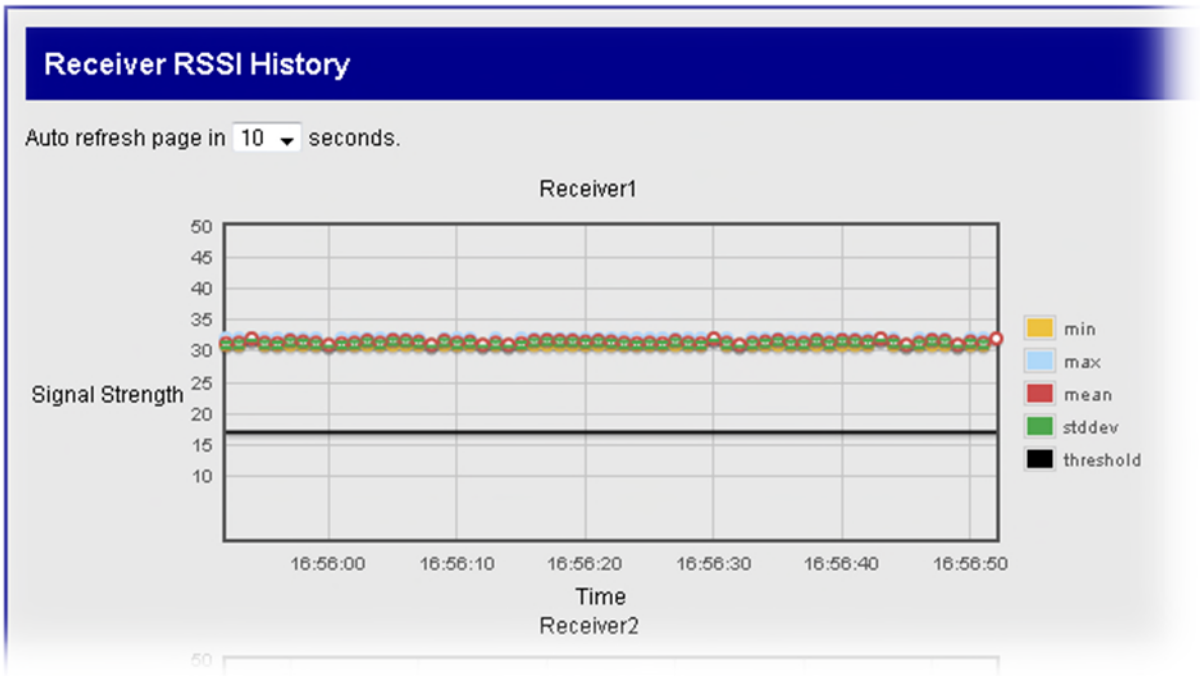
PCB Revision: Displays the Printed Circuit Board revision.

PLD Revision: Displays the Programmable Logic Device revision.

RECEIVER RSSI HISTORY

This option allows the user to view how well the receivers are receiving RF signals from the implants. In an actively running system these graphs continually update according to a user prescribed auto refresh rate.

There will be one RSSI graph displayed for each of the receivers connected to the MX2.



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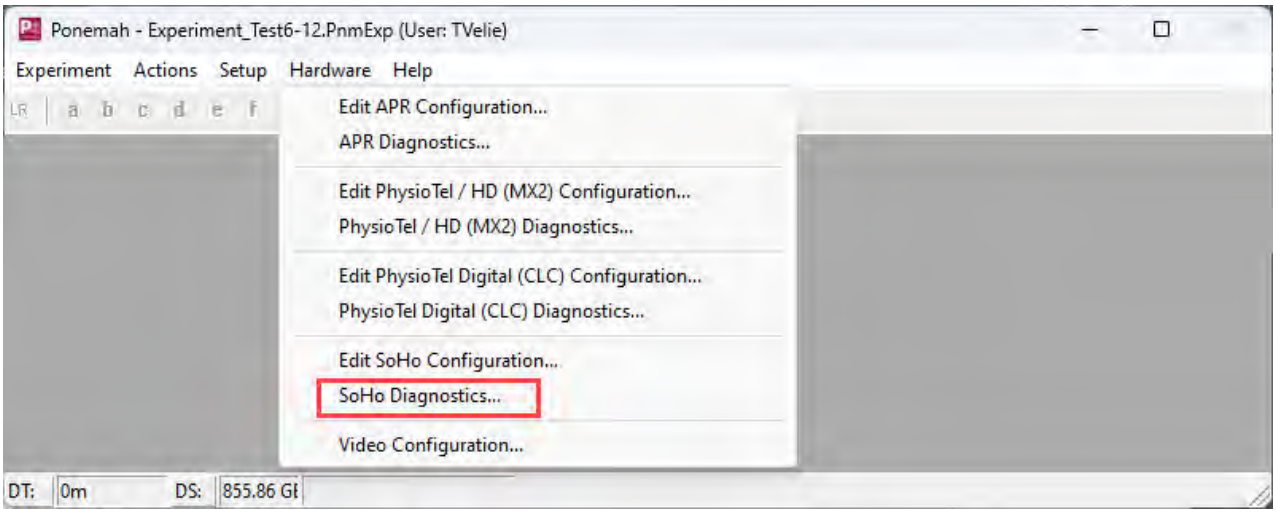
SoHo Diagnostics

The **SoHo Diagnostics** user interface launches a new window that allows the user to check the status of the SoHub and SoHo implants, update firmware, and perform diagnostic tests to optimize the performance of the system components.

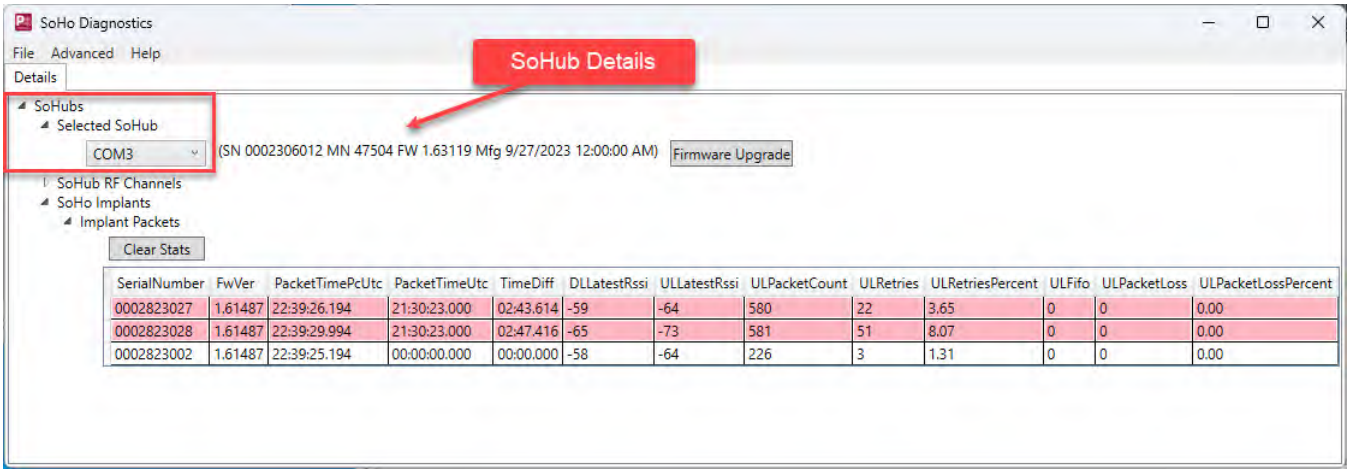
The Diagnostic user interface is accessed from the Ponemah Hardware menu.

Launching SoHo Diagnostics in Ponemah v6.x:



SoHub Selection

In the Details tab of the SoHo Diagnostics there is one main heading called SoHubs. A SoHub can be selected under the Selected SoHub heading by clicking on the drop-down menu. All the SoHubs that are connected to the system will appear in this list and are designated with a specific COM port. To the right of the COM port selection the SoHub Serial Number, Model Number, Firmware and Manufacture date are displayed.



SoHub RF Channels

Displays real time information on the RF channels being used. This information may be needed for Technical Support troubleshooting.

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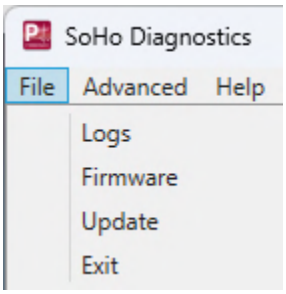
SoHo Implants

Under the Implant Packets heading a table is displayed showing the currently connected implants. This table contains signal strength and data packet statistics that may be needed for Technical Support troubleshooting.

SoHo Diagnostics menus

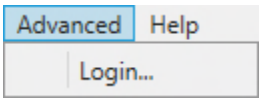
FILE

The file menu options will be implemented in a future Ponemah update.



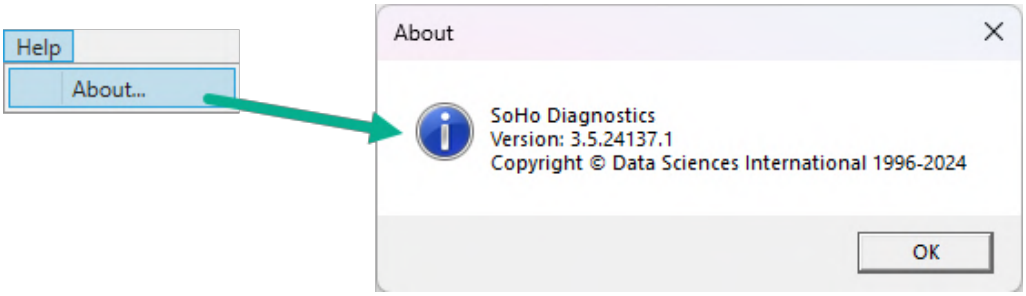
ADVANCED

The advanced menu contains a login that is only used by DSI Technical Services.



HELP

The Help menu contains the version information.



APR Diagnostics

The **APR Diagnostics** user interface allows the user to obtain relevant information regarding the APR. To view the information, select the desired APR from the dropdown.

The following is an example of the diagnostic information from an APR-2:

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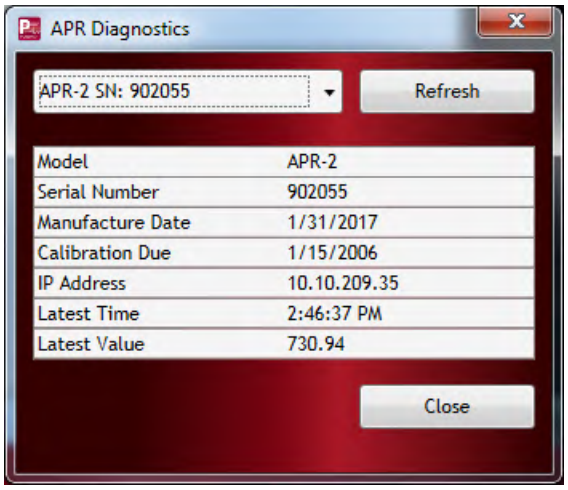

Note: The Latest Time and Latest Value provide the real-time display of the current ambient pressure detected by the APR. This will update at 1 Hz.

Network Time Protocol (NTP) & Process Utilities Application

When connected to a CLC or MX2, Ponemah uses a **Network Time Protocol** as a time source instead of **Windows Time** for the sampling of data.

During the installation of Ponemah the needed Network Time Protocol software is installed as a service that will start up and run automatically when Windows is booted. The specifics of the service are:

- **Service Name**: NTP
- **Display Name**: Network Time Protocol Daemon
- **Startup Type**: Automatic

The installation will also turn off Windows Time by setting the startup type to disable. This is needed so there is only a single time source in the system to accurately collect data.

The installation will also add an entry in the Windows Firewall to allow the NTP service to communicate with the connected CLC/MX2 hardware devices. The specifics of the Windows Firewall settings are:

- **Type**: Inbound Rule
- **Name**: NTP UDP Datagram
- **Protocol type**: UDP
- **Local port**: 123
- **Profile**: Domain, Private and Public

Messages

During the startup of Ponemah, the application will check that certain services are in the correct state in order for the application to collect data correctly.

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If Windows Time is started and NTP is not, the application will try to change this to Windows Time disabled and NTP enabled. If those states cannot be achieve a message will be posted notify the user of the issue.

Troubleshooting NTP

During the startup the application if the needed service states cannot be set an error message will be displayed for the user.

If the user starts an acquisition and the system displays all of the signals with a flat line this can also point to a problem with the NTP time source.

Typically the user can verify that there is an issue by going to the Diagnostic Web page and viewing the Home Page Time. If this time is in the range of 1/30/2012 the hardware device is not synchronized to the NTP time. Try rebooting the hardware device by power cycling the device.

If that does not work exit the application and run a system check by running the Ponemah Process Utilities application which is available in the Ponemah folder under All Applications.

Ponemah Process Utilities Application

To aid in troubleshooting the user can run the application to view the needed system settings in order to have a valid configuration.

The **Ponemah Process Utilities** application will display the current state of the system settings and the user can select **Verify Required** to see if any of the system setting are not correct and then take appropriate action.

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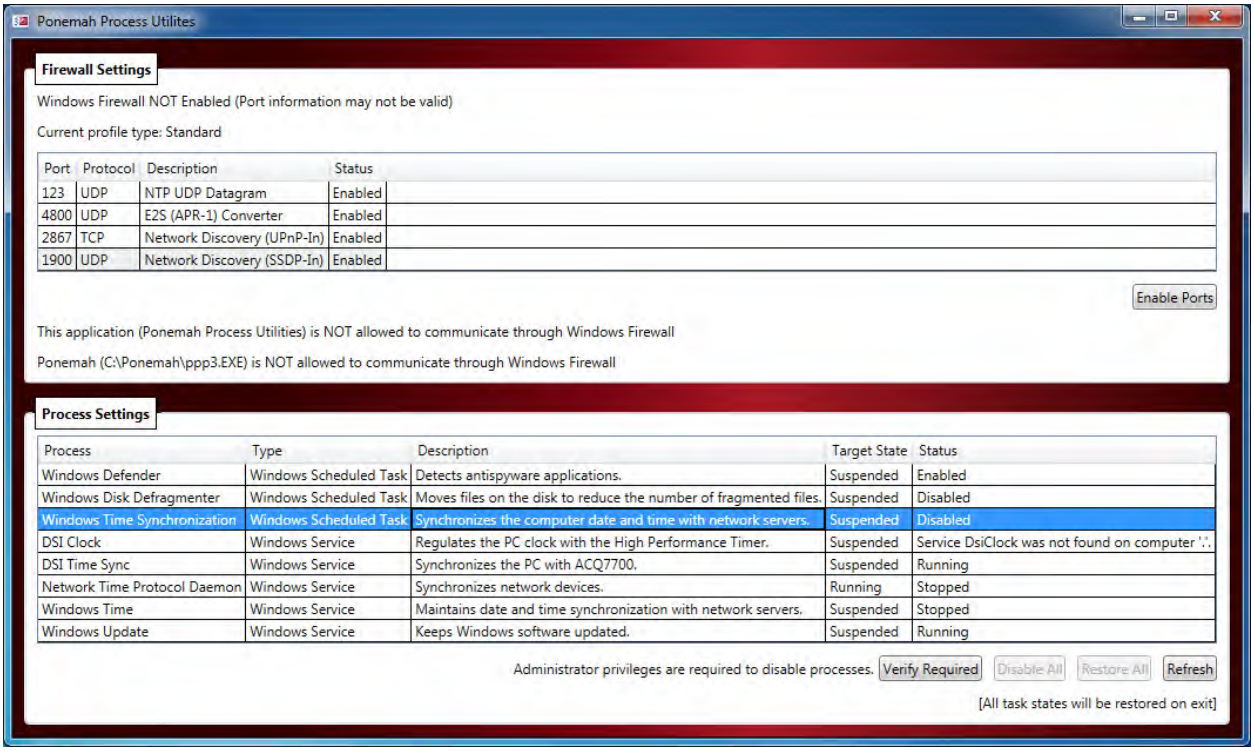
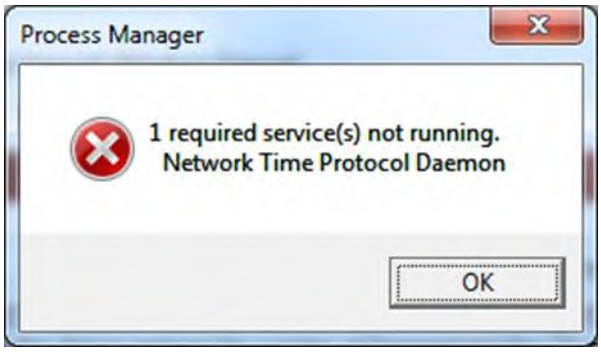
A typical display of a system is shown below.



After selecting **Verify Required** in the above condition, the application responded with:



At this time the user can try to change certain settings to resolve the issue. This can be accomplished by contacting the IT group that supports the computer.

For more information, contact DSI Technical Support by seeing the Getting Technical Support section of this manual.

Files Types

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This section describes the folders and files types created by Ponemah during Installation and Acquisition.

Main Data Folder

The default installation of Ponemah creates a folder that all data will be collected in. The default location and name of this folder is on the root drive with a name of **Ponemah_Data**.

The user has the ability to change both the location of the folder and the name of the folder after the application is started.

Experiment Folder

When a user creates a new Experiment, a new folder is created in the data folder that will contain all of the needed files for that Experiment and each file created in this folder will have the base name of the Experiment in the filename.

Ponemah will default the new Experiment name to **Experiment_nnn** where **nnn** is a numeric value of that particular Experiment name. The user can choose to change this name before the Experiment is created.

Experiment Files

Once an Experiment has been created and an acquisition is started, Ponemah will create a set of files with a specific filename structure. Depending on the contents of the file, the extension of that file will designate its usage.

Each file created for the Experiment will have as the first part of the filename the Experiment name itself. For example, with an Experiment name of **RatCardioStudy**, then all of the Experiment files will be in the form of **RatCardioStudy_SubjectName_infromation.filespecific_extension**.

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FILENAME EXTENSION MEANINGS

The following table list the definitions for the files that are created.

Extension	Description
.PnmExp	This is a SQLite database that contains all the needed information for the Experiment setup. This replaced Ponemah's protocol file (.PRO).
.PnmExpLog	This is a SQLite database that contains the complete Experimental log. The log contains all information that defines the Experiment such as analysis settings, subject setup and hardware configuration. The log also contains any hardware errors that are generated during the acquisition of data that can impact data.
.PnmMarks	This is a SQLite database that is generated per subject and contains all of the analysis validation marks, event and user notes, bad data marks for each input. The database can be updated with new marks during a Review session over the range of data that is loaded.
.PnmWav	This is a binary file that contains all of the signal data for a particular subject. There can be multiple files generated for a subject. A new file is generated every time the subject starts a new sampling collection or when it reaches a predefined size that is user settable in the application or when a predefined time is reached that is user settable in the application.
.PnmResults	This is a SQLite database that is generated per subject and contains all of the parameter values, data reduction values and variability results. The database can be updated with new values during a Review session over the range of data that is loaded.
.mrs	This is a settings file containing the setup information defined within the Noldus Media Recorder dialog; i.e. camera name, frame rate, resolution, etc.
.mp4	This is the video data file. The name is in the following format: [Camera Name].[yyyymmddhhmmss]
.XML	This is an XML file containing the meta data necessary to associate the video file with the appropriate subject, experiment, and other pertinent information Ponemah requires for video playback. An .XML will exist for every .mp4 file and its file name will be the same as the .mp4.

For Waveform files and Results files, there will also be a file created per subject. If an Experiment has four subjects then the four initial waveform files will be created and four result files would be created.

The waveform files will also have a date and time component associated with the filename.

For the results:

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- **RatCardioStudy_Rat1.PnmResults** where Rat1 is the Subject designation
- **RatCardioStudy_Rat1**.

Many of the files are generated as SQLite files and can be viewed with simple SQLite browser. This browser is included on the release CD and is installed along with the application and is accessible in the Ponemah runtime folder in the Utils folder. Below is the browser that is released with Ponemah 6.10.

Ponemah\Utils\SQLitreBrowser.exe

Note: Depending on the version of the SQLite browser, the images in this document may be different than what is shown when running the browser.

Printing

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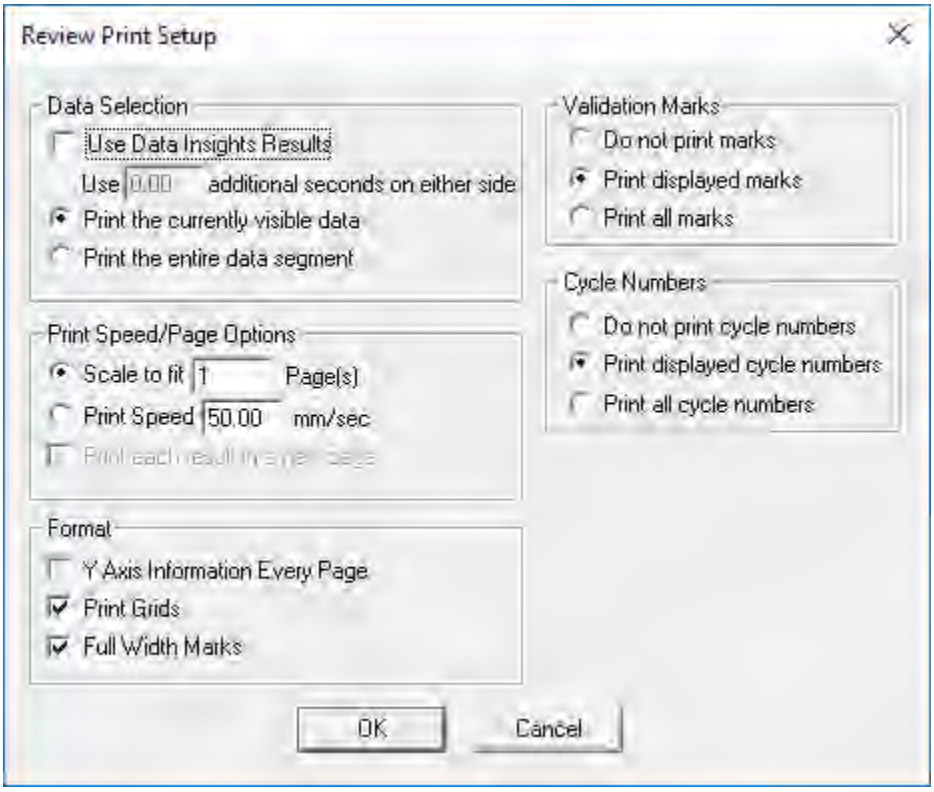
Data can be printed on any external printer that has been previously set up. From the main Ponemah menu, select **Review Print Setup** from the **Setup** menu to obtain the **Review Print Setup** dialog. Once configured, select **File | Print** from the *Primary Graph* page.



The following defines the different options within the dialog:

Data Selection This group is used to select the data that will be printed. It permits the selection of either the data as seen in the Review graph page window or the entire data segment.

The default is **Print the currently visible data**.

Check the **Use Data Insights Results** checkbox to print only the Data Insights Match Results contained within the *Primary Graph*. The user **MUST** enable the background color for the searches desired for printing. To enable background colors, please see the Data Insights **Processing Results** section of this manual.

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The time entry box permits users to enter the number of seconds of additional data to be included in the print prior to and following each search result.

When Use Data Insights Results is checked, the Data Selection options will update to the following:

- Print results from the currently visible data, which will print any highlighted (colored background) match results from the data currently displayed in the *Primary Graph*.
- Print results from the entire data segment, which will print any highlighted (colored background) match results from the entire data channel loaded into Ponemah Review.

Notes: The user may specify to **Print each result in a new page** by checking the associated checkbox in the *Print Speed/Page Options* section.

Print Speed Selection

This group is used to adjust the X-axis scale on the printout. The selected data may either be printed on a specified number of pages by regulating the print speed or by setting the print speed and letting the printout span the necessary amount of pages required to print the data.

The defaults for this group are **50 mm/sec** for **Print Speed** and **1 Page(s)** for **Scale to fit**.

Format

This group contains the formatting options for printing Review data.

Y axis scaling information and labels are always printed on the first page. If **Y Axis Information Every Page** is selected, the Y axis information will be displayed on each page of a multiple page printout. The default is disabled.

When **Print Grids** is enabled, grids are printed on the printout. The default is enabled.

When **Full Width Marks** is enabled, validation marks are represented as vertical lines spanning across the channel area. When the **Full Width Marks** check box is disabled, the validation marks are represented as short lines at the bottom of the channel area. The default is enabled.

Validation Marks

This group controls the three options for printing validation marks. Printing **Validation Marks** may be suppressed by enabling **Do not print marks**. **Validation Marks** may be printed as seen

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in the Review window by enabling **Print displayed marks.** All **Validation Marks** may be printed by enabling **Print all marks**.

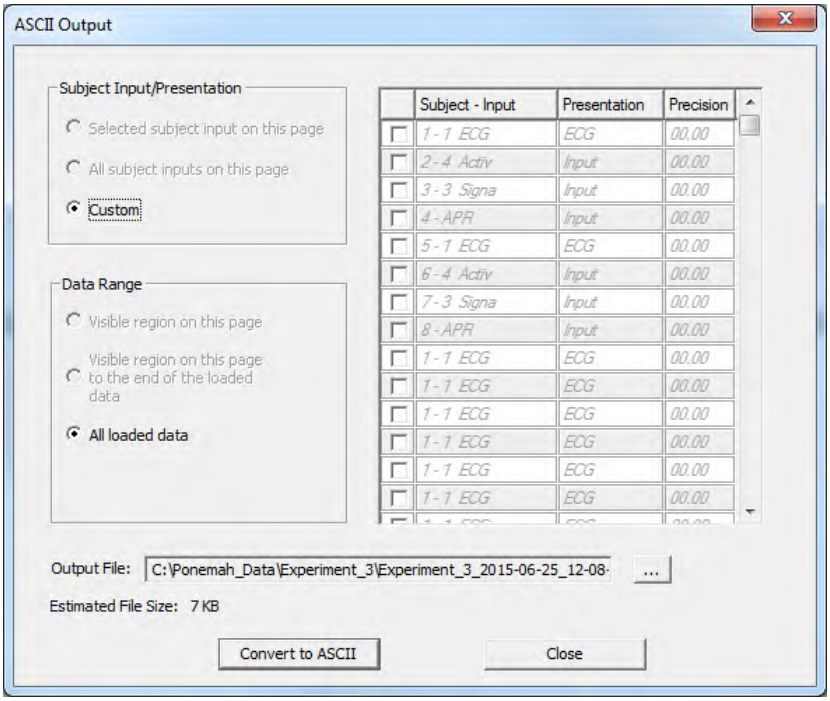
The default is **Print displayed marks**.

Cycle Numbers This group controls the options for printing cycle numbers. Printing cycle numbers may be suppressed by enabling **Do not print cycle numbers**, cycle numbers may be printed, as seen in the Review window, by enabling **Print displayed cycle numbers**, or all cycle numbers may be printed by enabling **Print all cycle numbers**.

The default is **Print displayed cycle numbers**.

ASCII Output

Review has the capability of converting the graphically displayed information into an ASCII file. Each graph page has a button (hovering over the buttons will show tool tips) that allows access to the **ASCII Output** dialog. The dialog can also be accessed from the **Primary** graph **File** menu and Ponemah **Actions** menu. Shown below is an example of the **ASCII Output** dialog.



The following defines the different options within the dialog:

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Subject Input /Presentation	The **Subject Input/Presentation** allows the user to select which channels and presentations will be converted. The **Selected display channel** in this page will only convert the highlighted channel from the graph page. The **All display channels** in this page will convert every channel that is listed in the graph page. The **Custom** option will enable the grid on the right of the dialog. This will allow the user to configure any Subject Input and/or Presentation even if it is not configured on a graph.
Data Range	The **Data Range** allows the selection of the specific section of data that will be converted. The **Visible range in this page** will only convert the data that is visible in the page. The **Visible range in this page till the end of the data** will convert the data from the beginning of the graph page all the way to the end of the data. The **All loaded data** option will convert all of the data loaded into the current Review session.
Output File	The **Output File** allows the user to specify the location where the file will be generated. The button to the right can be used to change the name and directory of the output file. Listed below the **Output File** is an estimation of the file size of the ASCII file that will be generated based on the currently selected options.
Convert to ASCII	The **Convert to ASCII** button will convert the data based on the settings selected. The dialog will not close once a conversion is done. This allows the user to run multiple conversions without having to reopen the dialog. Clicking on the **Close** button will close the dialog.

Note: The **ASCII Output** dialog will change based on the location from where it is opened. If the dialog is opened from a graph page, all available options will be enabled. If the dialog is opened from the main Ponemah window, the only available selection within the **Channel/Presentation** section will be **Custom**. Also, only **All data and Parser Segments** will be available within the **Data Range** section. The **Parser Segments** option will only be available if data parser segments exist in the Review file.

Application Configuration

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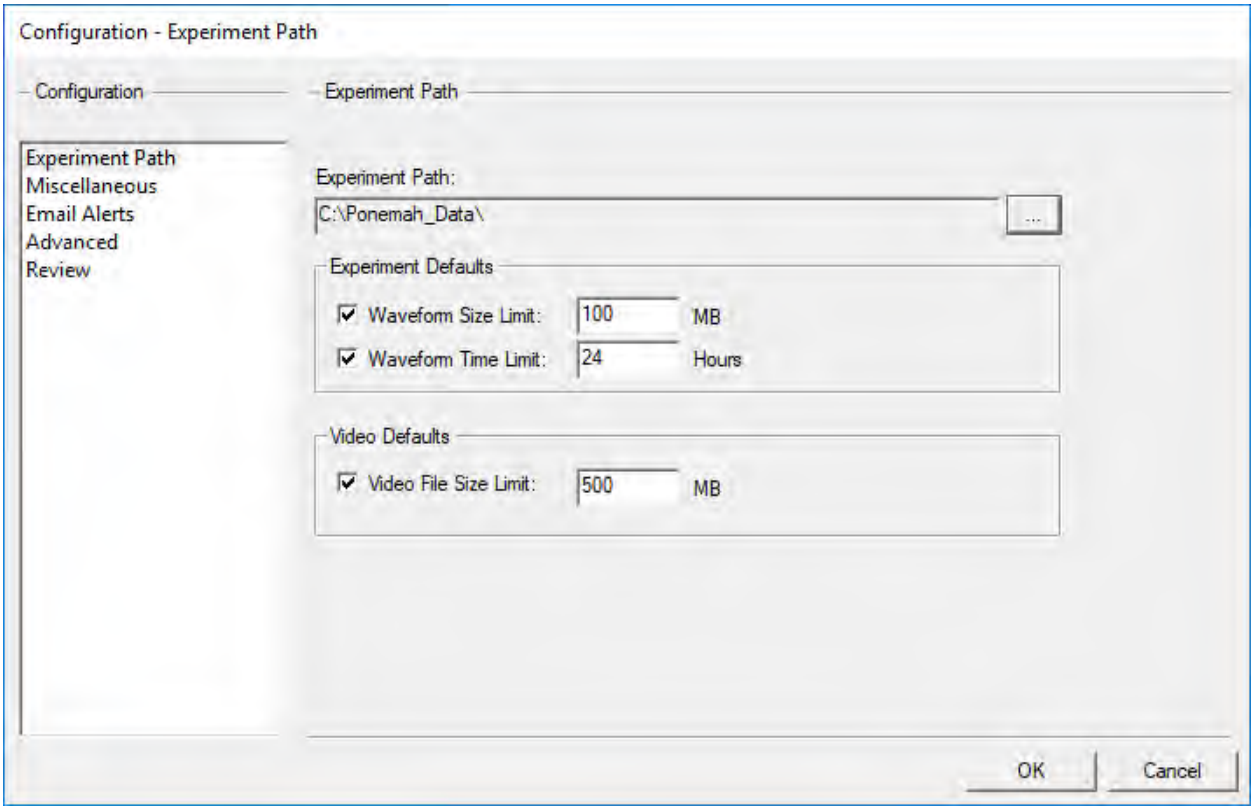
The **Application Configuration** allows the user to define the various settings for an **Experiment**. To access the Application Configuration, select **Setup | Application Configuration…** to display the **Configuration** dialog. Select a category from those listed in the column on the left-hand side of the dialog.

EXPERIMENT PATH

This allows the user to define the default location to which the Experiment Folder will be saved.



The **Experiment Defaults** and **Video Defaults** sections allow users to choose the limiting factor to determine the maximum file size for the Experiment. A new iterative data file will be created at which ever limit is reached first.

MISCELLANEOUS

The Miscellaneous configuration allows the default **DSI Technical Support** email account to be modified. This is the default account that system information will be mailed to when sending information from Ponemah such as **Product Information**.

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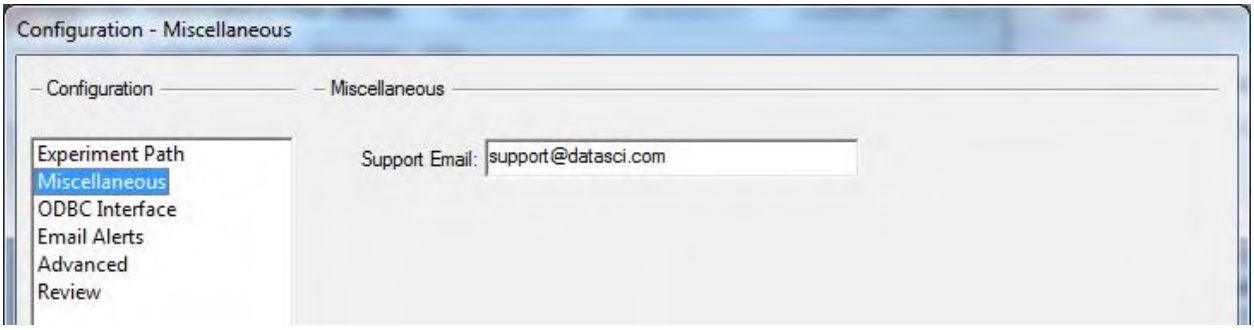
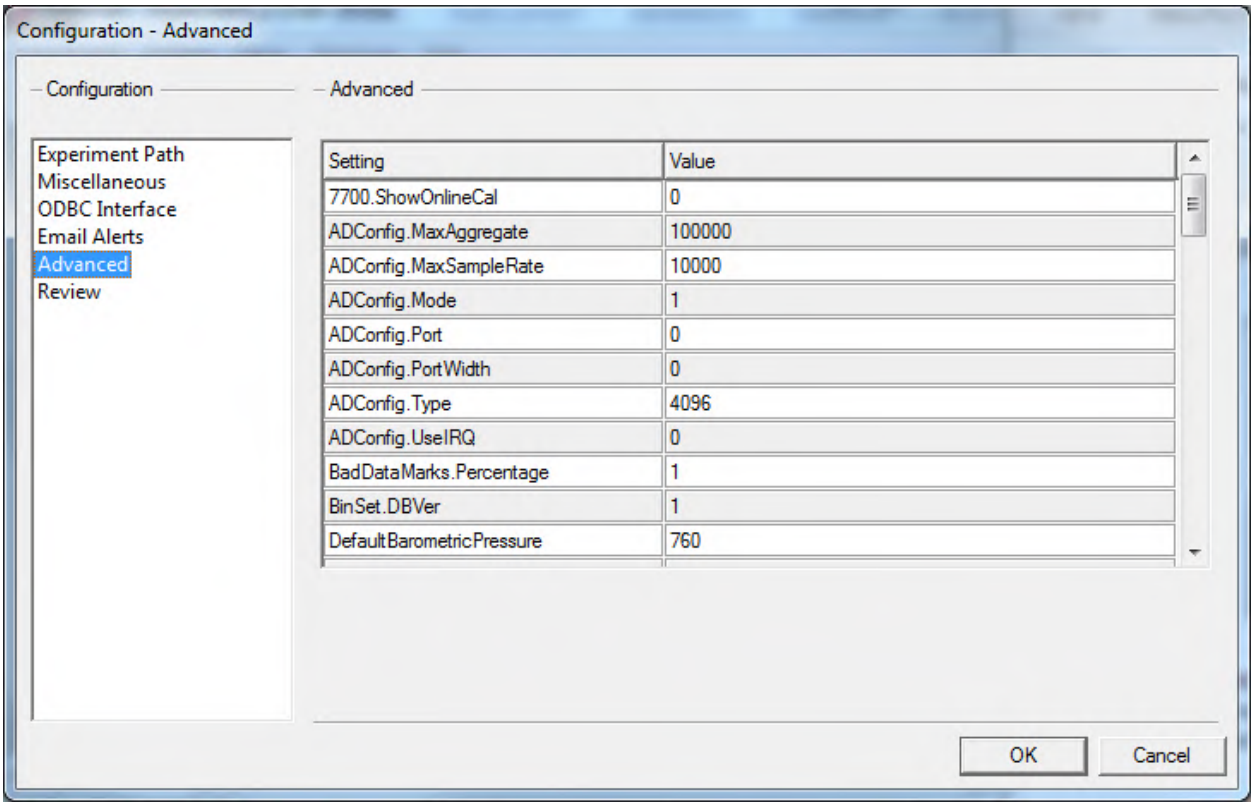


EMAIL ALERTS

See the *Remote Notifications – Email Alerts* section for information on what this feature provides and how it can be configured. Please note that the use of this feature is controlled by the **License File**.

ADVANCED

The **Advanced** configuration shows a list of the other tabs using an advanced configuration. These options should not be changed by the typical user with several exceptions.



The **SystemMonitor.Processes.Level** allows the user to monitor system processes during acquisition. This feature helps to determine what processes are running during acquisition when issues occur such as buffer overflow errors. The default setting of 1 for the process logger will log processes that are running when an overflow occurs and place this information in the Application Log. The information will be logged in five second intervals for the

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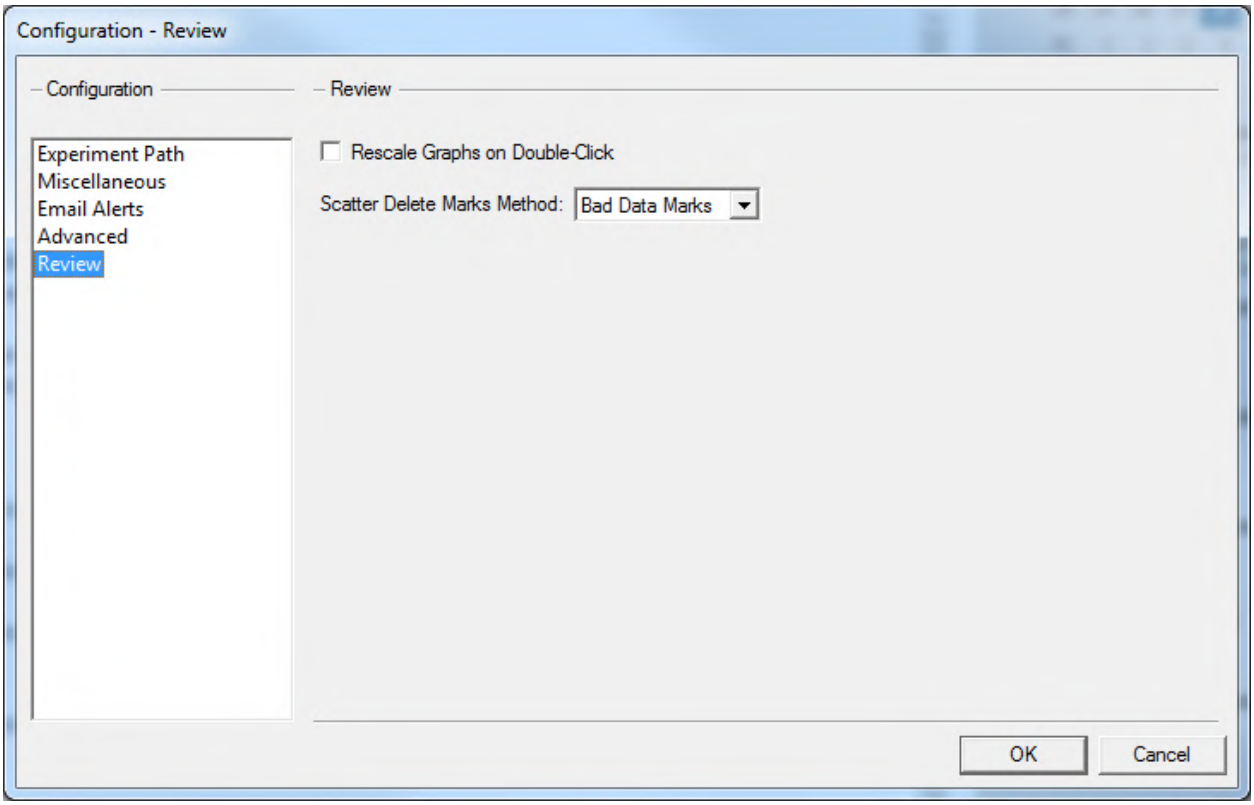
previous two minutes prior to the overflow. If the setting is changed to 2, the system shall log any processes whose CPU usage exceeds a certain threshold as well as the information obtained with a setting of 1 and place this information in a separate file with the file information, <dataset name>_ProcessLog.txt. A setting of 0 will not log any information.

BadDataMarks.Percentages will output the percentage of Bad Data Marks across channels in Review. The default setting is 1 which enables this feature. The setting is disabled when changed to 0. When enabled, a new menu item under Experiment called **BDM Percentage** will display a dialog with **Bad Data Mark** information. This information can be copied to clipboard and pasted into other documents.

REVIEW

The Review configuration allows the setup of various review based options.



Below is a basic description of the options.

- **Rescale Graphs on Double-**Click check box allows the user to enable or disable rescaling of the graphical data when double-clicking on the Derived list views or the Data Reduction list views in Review mode.

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- The Scatter **Delete Marks Method** drop down list box has the options **Bad Data Marks** and **Delete Cycles**. The **Bad Data Marks** option inserts **Bad Data Marks** in the locations that were **lassoed** and the **Delete Cycles** option deletes the validation marks from the cycles that were **lassoed**.

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Tutorials

The following sections provides examples of how to use certain Ponemah features to achieve an example goal.

Glucose Calibration Process

Overview

It is necessary to perform an initial multi-point calibration and to collect periodic calibration points at least once, preferably twice, per week throughout the duration of a glucose study. Calibration data is collected using blood samples from the tail or other appropriate sampling point with analysis performed by the StatStrip Xpress glucose meter or an equivalent analytical method. Calibration reference points should always be collected while the Ponemah Acquisition program is actively collecting data, and ideally, while the Subject is on or within range of the telemetry receiver (typically within about 25 cm of the receiver).

PURPOSE

The purpose of this tutorial is to step you through some of Ponemah's basic glucose analysis functions to familiarize yourself with DSI's HD-XG glucose calibration process.

This tutorial assumes you have:

- Created an Experiment.
- Configured PhysioTel HD hardware.
- Added the HD-XG implants to your hardware configuration.
- Created Subjects.

WHAT YOU WILL BE LEARNING

The following processes will be outlined in the order they are recommended to be performed:

1. Graph setup
2. Verify you are getting a signal from the implant.
3. Enter glucose calibration data into the Ponemah software system.
4. View your glucose tolerance test (GTT) results, graphs, and calibrations for a multi-point calibration
5. Maintain the accuracy of your glucose signal using single-point calibrations

When you've finished the tutorial and complete your initial glucose calibration, you will be able to do the following:

- Run your own GTTs.
- Start collecting data from multiple Subjects.

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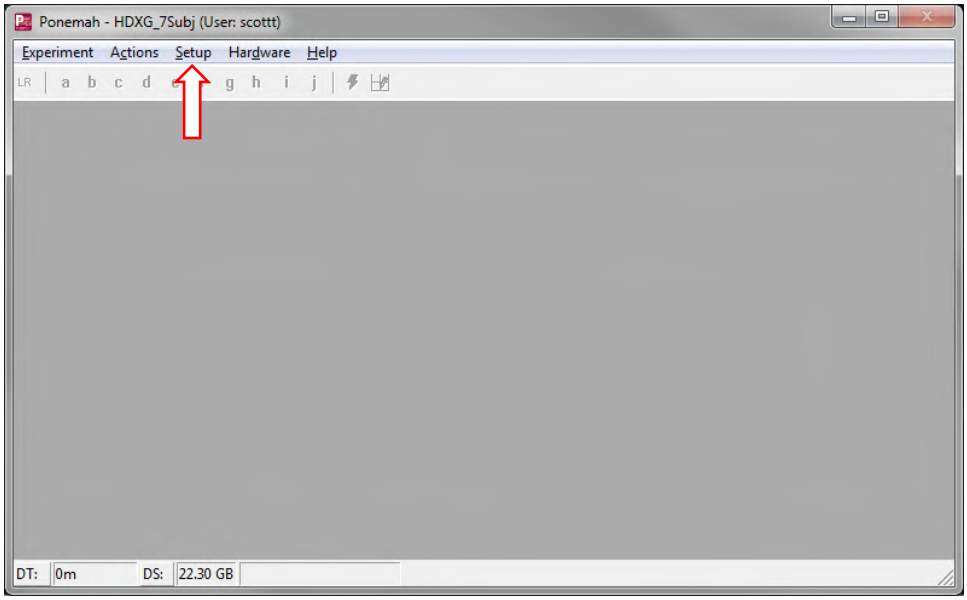
- View your test subjects' dose response curves.

Graph Setup

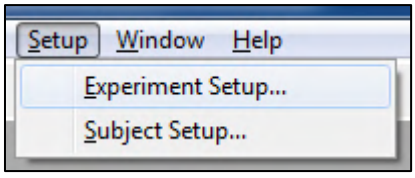
Let's begin by setting up the graph pages to ensure we can view the HD-XG signal over a span of at least 1 hour. This will provide enough data to view the OGTT.

To do this, configure a graph page and start an Acquisition.

1. From the Ponemah main window, select the **Setup** menu.



2. Select **Experiment Setup…** from the dropdown menu.



3. Select **Graph Setup**.
4. Click **Arrange by Subjects** to create a separate **Primary** graph for each **Subject** within the **Experiment** to display the raw waveform signal from the implant.

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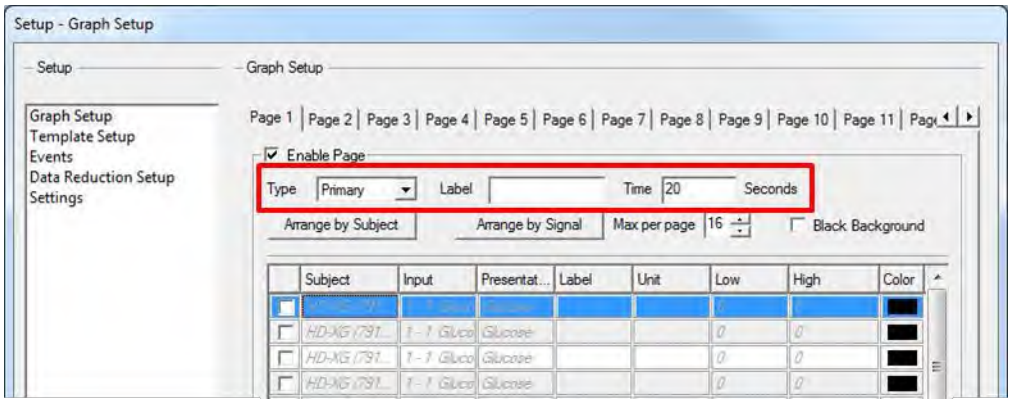
Note: If using more than 16 Subjects, each graph page with contain multiple Subjects; e.g. 2 Subjects per page for and Experiment configured with 32 Subjects.



5. Click the appropriate **Page** tab associated with the name of your **Subject**.
6. Locate the **Time** entry box and enter in the length you expect your OGTT to last in **seconds**. For example, if your OGTT will last one hour, enter a time interval of 3,600 seconds (1 hours x 60 minutes x 60 seconds).
7. Update the graph page setup's **Presentation** signal dropdown menu to ensure the page displays Subject's **nA Presentation** signal.
8. Ensure the **Low** and **High** units are set to **0** and **5**, respectively; update if necessary.

   Note: As a general rule, these starting values (0–5 nA) provide a good amplitude range for most glucose studies. If your subjects are very hyperglycemic, you may need a larger **High** value.

9. Select **OK** to close the **Experiment Setup** dialog.

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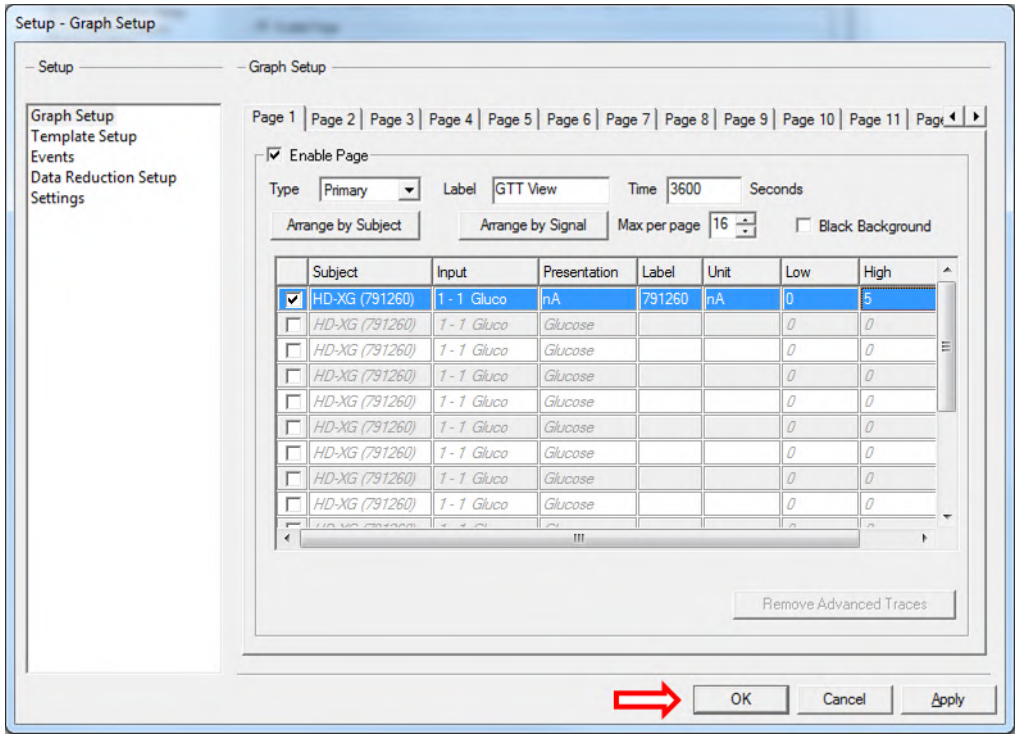

10. Start Acquisition for the Subject(s) of interest by selecting **Actions | Start Sampling | Continuous - Selected** from the **main Ponemah** dialog.

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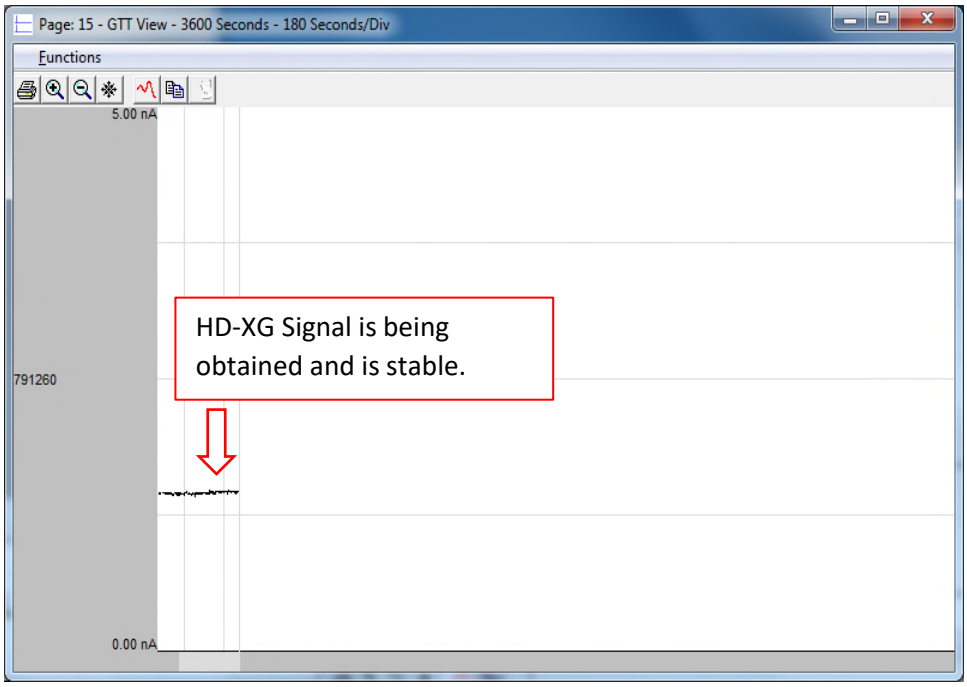
11. Ponemah will display the graphs you just created. After a few minutes you will start to see data appear. After approximately five minutes the implant-signal graph should look something like this:



NEXT STEP

Now that you know you are receiving a good, stable signal, the next step in the process is to perform the initial glucose calibration for each Subject.

Performing a Multi-point Glucose Calibration

In this section, the initial glucose calibration procedure is described. For the first calibration of your HD-XG implant, a Multi-point calibration is required. DSI recommends using an Oral Glucose Tolerance Test (OGTT) for a successful Multi-point calibration; however, an Intraperitoneal Glucose Tolerance Test (IPGTT) may also be used. The following describes performing an OGTT on a group of subjects and *simultaneously* entering the blood-glucose values obtained from the glucose reference into the Ponemah software. DSI recommends that at least two people are involved in the calibration process.

PERSON 1 OVERVIEW

Manages the subjects, collects the samples, and reports the measurements.

- Take a pre-dose (fasted) blood glucose reading and inform Person 2 of the values and time of blood draw.
- Administers the glucose challenge dose orally or intraperitoneally.
- Wait until Person 2 informs them it is time for a second reading.
- Take a post-peak blood glucose reading and inform person 2 of the values and time of blood draw.
- Wait for additional times to draw blood, if applicable and inform Person 2 of the values and time of the blood draw.

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PERSON 2 OVERVIEW

Manages recording the calibration reference values within Ponemah and provides direction on the appropriate sample times. Person 2's responsibilities are explored in more detail in the following section, but at a high level consist of the following:

- Enters the calibration references values obtained from the glucose reference device into the dialog for the appropriate time.
- Monitors the implant signal to identify the peak of the OGTT response curve.
- Informs person 1 to take another blood sample 3-5 minutes following peak
- Enters the second set of calibration references values obtained from the glucose reference device.
- Calls out additional blood-draw times, if applicable.

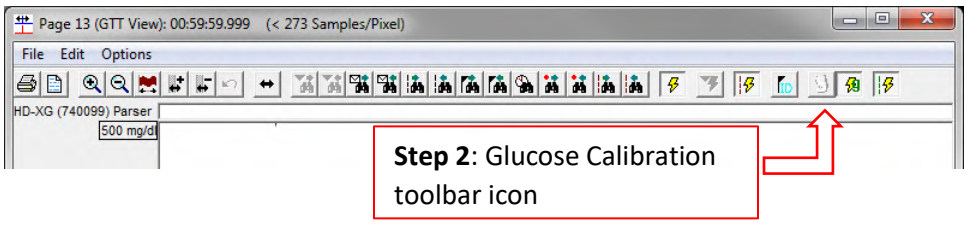
Entering Blood Glucose Readings into Ponemah during OGTT

Person 2 will enter the blood glucose readings obtained by the glucose reference device into Ponemah and Calibration Reference Values. Doing this will convert the nA signal obtained by the HD-XG into meaningful physiologic values. The software will then calculate and graphically display each Subjects' OGTT-response curves in the user defined units (mg/dL or mmol/L).

Note: The preferred method for creating calibration data files is to directly enter the calibration data into the Ponemah software interface. Calibration files can also be created offline by entering the values in a spreadsheet using a prescribed format compatible Ponemah program. See the **Import/Export Calibration Data** located within the **Glucose Analysis Module** section of this manual.

To begin Person 2 will:

1. Start the acquisition for the Subjects that will be given the OGTT.
2. Verify that a stable glucose signal is being obtained from the Subjects.
3. From the **Primary** graph page of **Subject 1**, select the **Glucose Calibration toolbar icon** to display its dialog.



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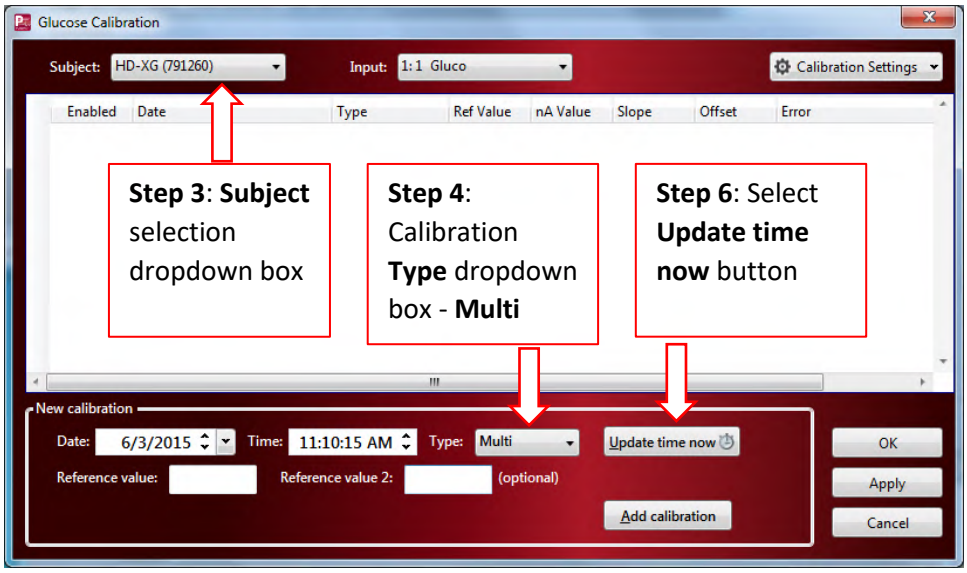
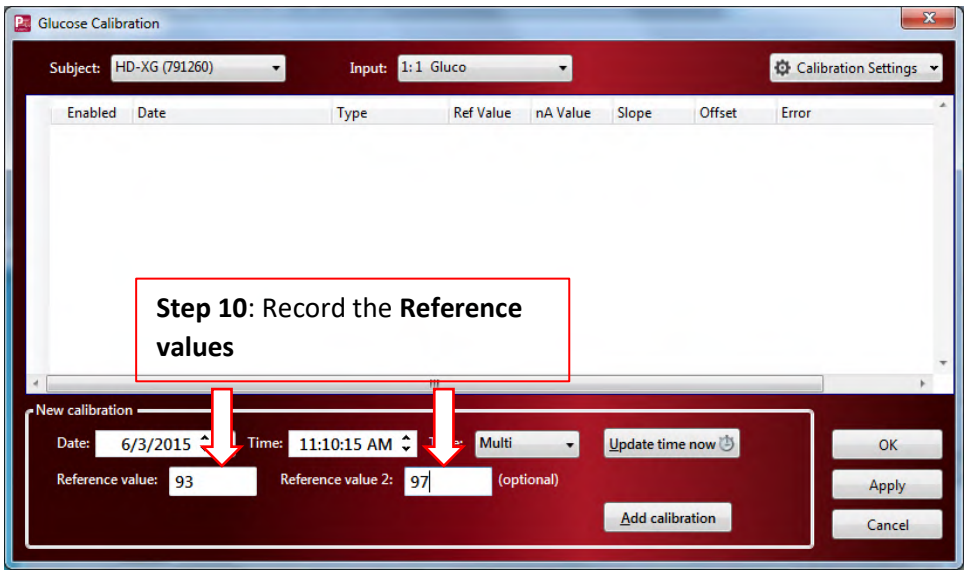
4. Using the **Subject** dropdown box, select the **Subject** whose blood sample will be taken first.



5. Using the **Type** dropdown box, select the glucose reference **Type** as **Multi**.
6. Instruct **Person 1** to draw a blood sample and inform you when it has been taken.
7. When informed, select the **Update time now** button. This will put the correct **Date** and **Time** in the associated fields for exactly when the sample was taken.
8. Obtain 2 blood glucose readings measured by the glucose reference device from **Person 1**.

   Note: Use of duplicate samples is highly recommended at each calibration time point. If duplicate samples differ by more than 10%, a third sample is recommended. Use only the two closest samples as your **Reference Values**.

9. Record the reference values into the **Glucose Calibration** dialog's **Reference value** and **Reference value 2** fields.



10. Select the next **Subject** using the **Subject** dropdown box.

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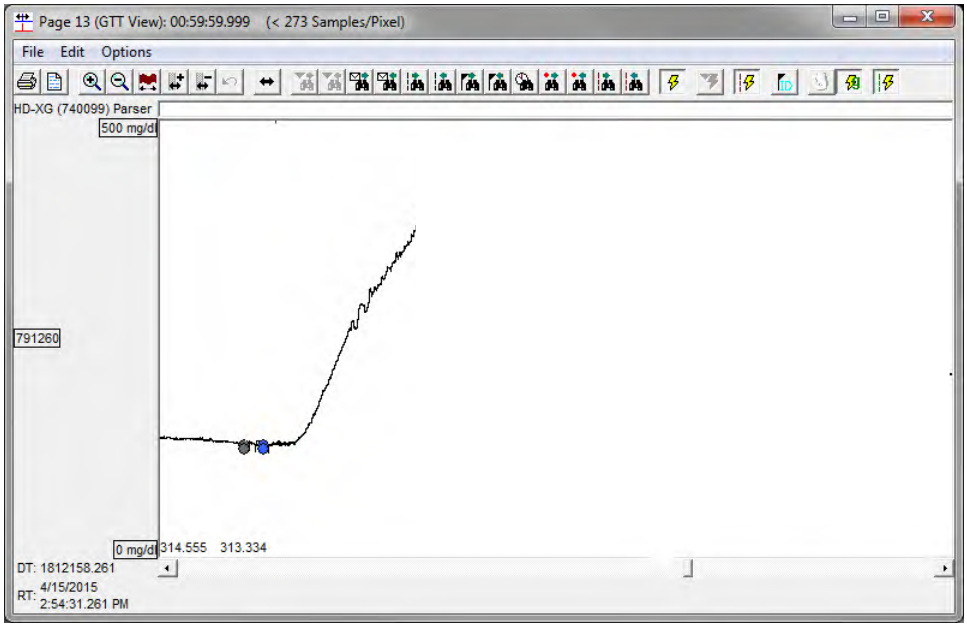
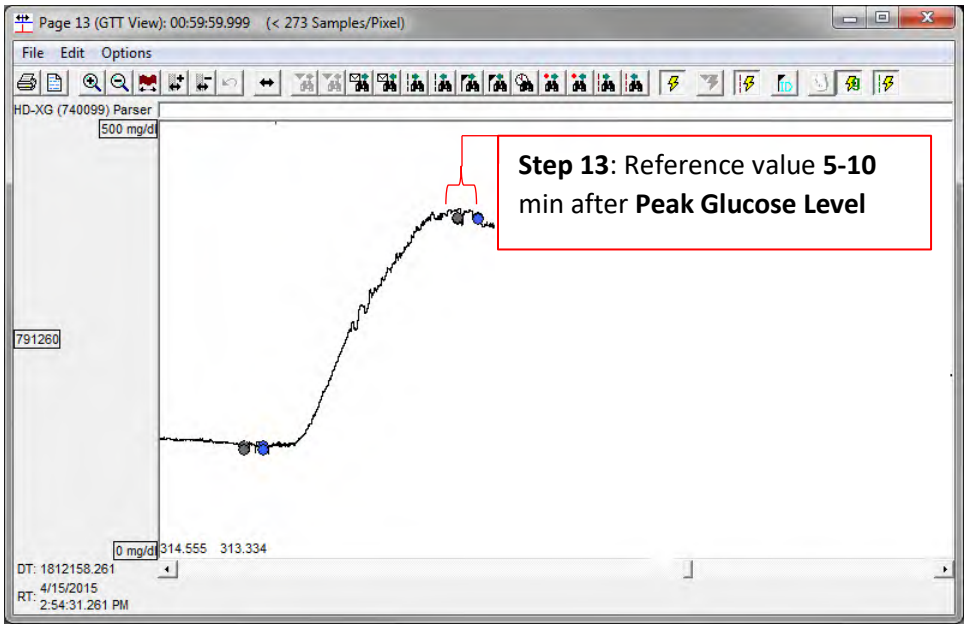
11. Repeat steps 6-9 for each subsequent **Subject**.

    The Primary graphs should look similar to the following:



12. Instruct **Person 1** to dose the Subject. For normal, healthy rodents, administering 3-6 g dextrose/kg will increase the blood glucose level by at least 200 mg/dL (11 mmol/L).
13. Once all OGTT have been administered, monitor the **Subjects' Primary** graphs for the **Peak Glucose Level**. **Peak Glucose Levels** will typically occur **12-16 minutes post-dose** during an OGTT in a healthy rodent.
14. Approximately 3-5 minutes after the glucose level peaks or begins to plateau, instruct **Person 1** to draw blood samples again. The Primary graphs should look like the following:



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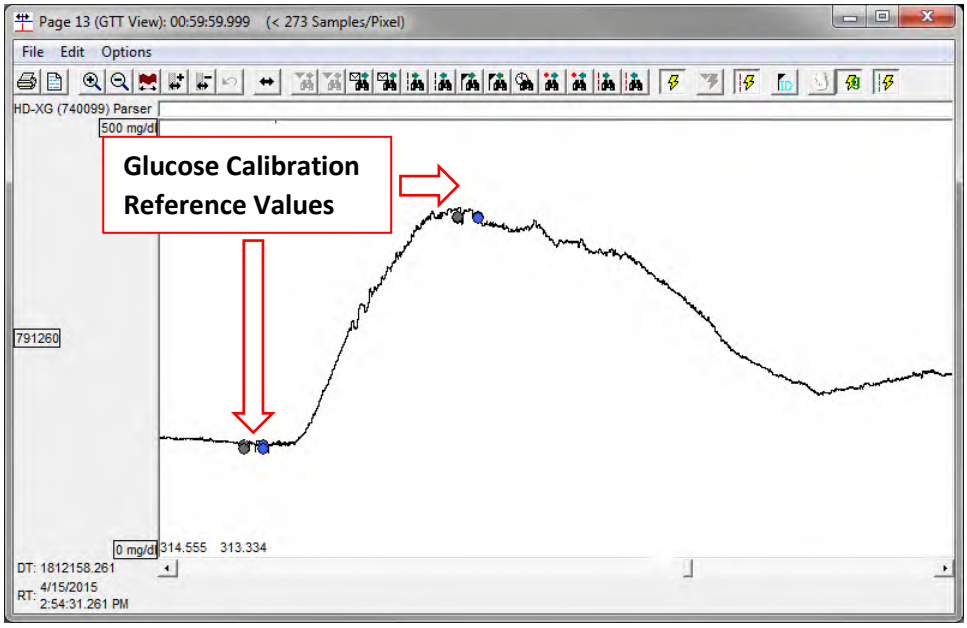
15. Repeat steps 6-9 for each subsequent **Subject**, ensuring you are allowing for the 3 to 5 minute time delay from **Peak Glucose Level** prior to taking the blood glucose readings

This completes the **Mult-point** glucose calibration procedure. The following displays the resultant **Primary** graph of a **Subject** that has completed an OGTT, along with its associated **Multi-point calibration** reference values. To learn more about Glucose Calibration, please see the **Best Practices** and **Considerations & Alternatives** sections of this manual.

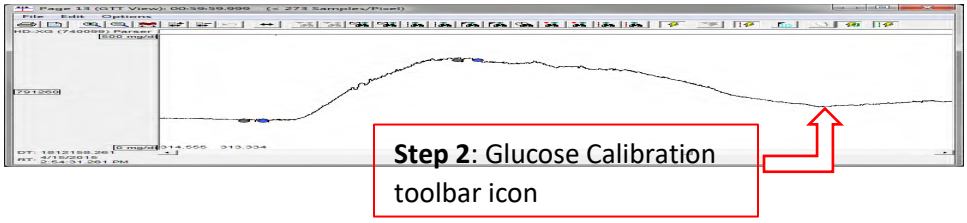


Performing a Single-point Glucose Calibration

After the initial **Multi-point** calibration process, DSI recommends performing **Single-point** calibrations at least twice per week at the same time of day and during a time period when the Subject's blood glucose is relatively stable.

To perform a **Single-point** calibration while acquiring data:

1. Verify that a stable glucose signal is being obtained from the Subjects.
2. From the **Primary** graph page of **Subject 1**, select the **Glucose Calibration toolbar icon** to display its dialog.



3. Using the **Subject** dropdown box, select the **Subject** whose blood sample will be taken first.

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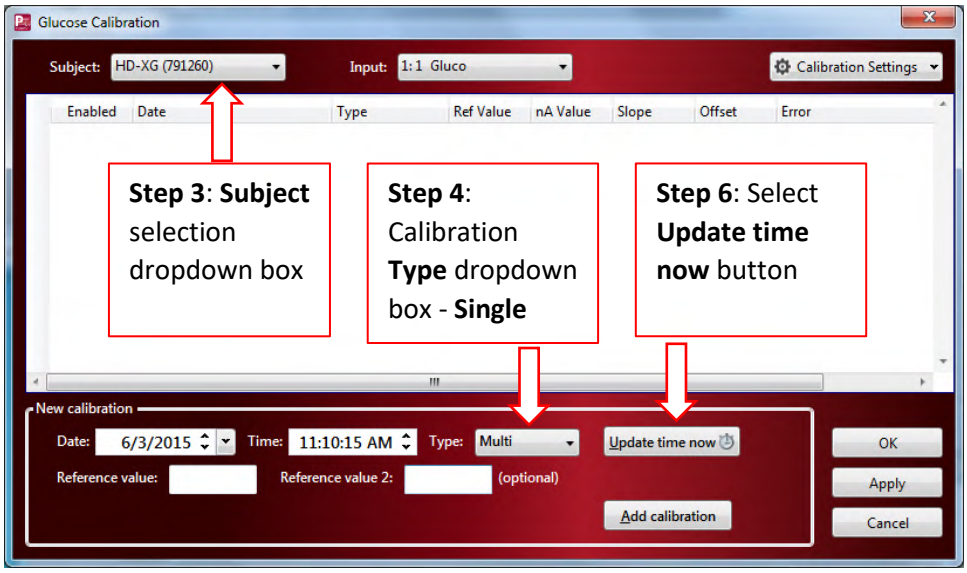

4. Using the **Type** dropdown box, select the glucose reference **Type** as **Single**.
5. Instruct **Person 1** to draw a blood sample and inform you when it has been taken.
6. When informed, select the **Update time now** button. This will put the correct **Date** and **Time** in the associated fields for exactly when the sample was taken.
7. Repeat these step for each subsequent **Subject**.

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Data Insights

Finding Second Degree AV Block

Background

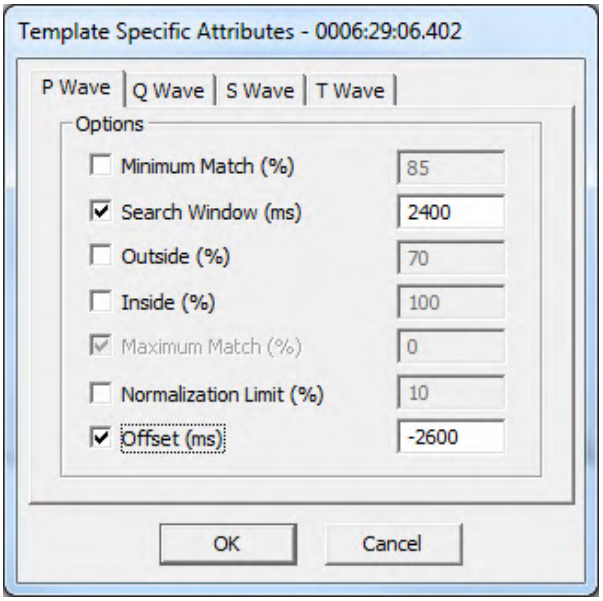
To locate and mark instances of Second Degree AV Block (isolated P waves), a new concept has been introduced in ECG PRO called Template Specific Attributes. Ponemah uses these attributes to mark an isolated P wave by shifting the marks from valid P wave to the isolated P wave. Data Insights can then be used to search for instances of abnormally large PR intervals to find isolated P waves.

This approach is needed as Ponemah will currently only mark one P wave per ECG cycle. When an isolated P is present in the signal, Ponemah is required to choose which P to mark. When using the attribute-based ECG analysis or ECG PRO analysis with standard settings, Ponemah will mark the P wave associated with QRS complex. Isolated P wave will be passed over since they are not directly associated with a valid ECG cycle.

Understanding Template Specific Attributes

When locating instances of Second Degree AV Block (isolated P waves), normal P waves will need to be temporarily ignored. The P marks are instead placed on one of the isolated P waves without affecting the mark placement of surrounding cycles' Q, R, S, and T waves. This is achieved using Template Specific Attributes to shift and extend the P match Search Region past the normal P wave to an area where the isolated P wave is expected to exist.

To do this, the P wave **Search Window** and **Offset** attributes within the **Template Specific Attributes dialog** need to be enabled. These are defaulted to appropriate durations for an initial search for isolated Ps, but may be augmented based on your data, if necessary.



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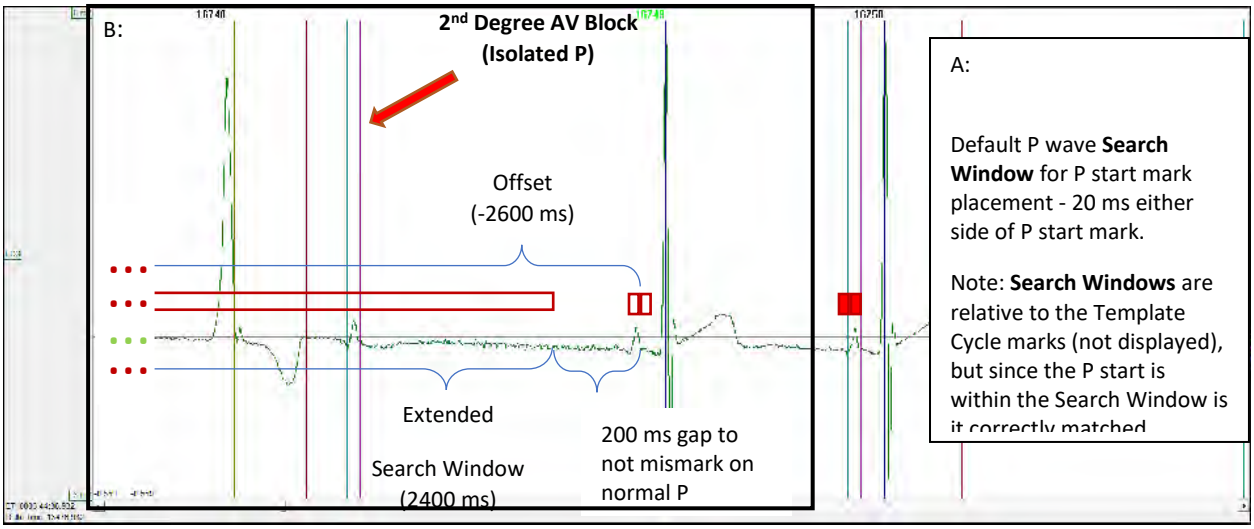
Note: The **Search Window** and **Offset** attributes are species specific. Values displayed in the example screenshot (right) are for **Dog** and **Monkey**.

To better understand how Template Specific Attributes work, it is important to understand how the **Search Window** and **Offset** Template attributes work under normal conditions. The **Search Window** is the time range over which Template Analysis searches for the best match and is centered on the mark trying to be matched; e.g. P Start mark. The **Offset** attribute then shifts the **Search Window** center point by the time in milliseconds (ms) entered in the associated text field. The images below illustrates the typical ECG PRO Search Window case (A) and how these attributes are applied when updated for isolated P wave searches (B) visually.



In B, the **Search Window** extends past the data being displayed on the graph. The R wave of the previous cycle acts as a hard cutoff for the **Search Window**. This algorithm has additional logic built in to prevent ECG PRO from marking the T wave of the previous cycle as the isolated P wave.

Note: **Template Specific Attributes** are available for all Search Regions, however the current use case is for isolated P waves.

Process

ECG PRO's Template Specific Attributes provide the user a mechanism to override the global/general ECG PRO Match attributes (Match % and Advanced Setup) for one or more of the Templates within the Template Library, while keeping the global/general Match attributes for the remaining Templates.

The process to find instances of Second Degree AV Block (isolated P waves) is:

1. Run ECG Attribute based analysis with ECG analysis module
2. Use ECG PRO to accurately mark the ECG cycles' Q and S waves
   (Optional: Required to identify Ventricular and Junctional beats)
3. Use ECG PRO to accurately mark the ECG cycles' P wave

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4. Save Marks Section
   (Saving at this time will save the derived data and mark placement prior to shifting the P marks to the isolated P waves for a more accurate representation of the interval-base analysis. See Derived Output Impact section below for more details.)
5. Choose one or more of the Template Cycles used for P wave mark placement for use with Template Specific Attributes.
   a. Template Cycles with the largest match percentage should be used.
   b. Enable the **Search Window** and **Offset** attributes. DSI recommends starting with the default values.
6. Execute ECG PRO, enabling only the P wave Match Region.
7. Use Data Insights to find and report on instances of AV Block.

Data Output Impact

Using ECG PRO Template Specific Attributes may impact your Derived Output. This is due to the shifting of the P wave marks from the ECG cycles associated P wave to the isolated P wave, as this will result in an abnormally large PR interval being calculated for that cycle. This will be averaged into the Log Line averages reported to the Derived Parameter and Data Reduction List Views (spreadsheets).

If only a few isolated P waves exist, then the large PR intervals will not have much of an effect on the derived parameters (based on species and logging rate). However, if a large number of these exist in the data set or are clustered together, the reported PR interval in the Derived Data and Data Reduction List Views will be misrepresented. It is recommended to Save a Mark Section prior to using ECG PRO to search and report on Second Degree AV Block. Once your Second Degree AV Block search is complete, the Template Specific Attributes can be disabled and P wave Match Template analysis can be re-run to return to a state where the normal P waves are marked and reported appropriately.

If you should have any questions, please contact DSI Technical Support.

Finding Unique Cyle Morphologies using Template Tags

ECG PRO allows **Tags** to be applied to Template cycles when saved to the Template library. Tags allow identification of specific cycle morphologies. By associating Tags to specific cycles, Data Insights can be used to quantify these Tagged cycles. This is useful in instances where count or other derived parameters are desired that are not included in the analysis module's derived parameter list. Tags can also be used to exclude certain morphologies from analysis. By Tagging unwanted morphologies, Searches can be constructed to eliminate these cycles from analysis. Once the desired results have been obtained, use the Report feature to obtain an output file.

To add Template Tags and create a Data Insights Search to locate Tagged cycles:

1. Select a cycle of interest from the **Primary Graph** page and add this to the **Template Graph** page by right-clicking the cycle and selecting **Add Template Cycle**.

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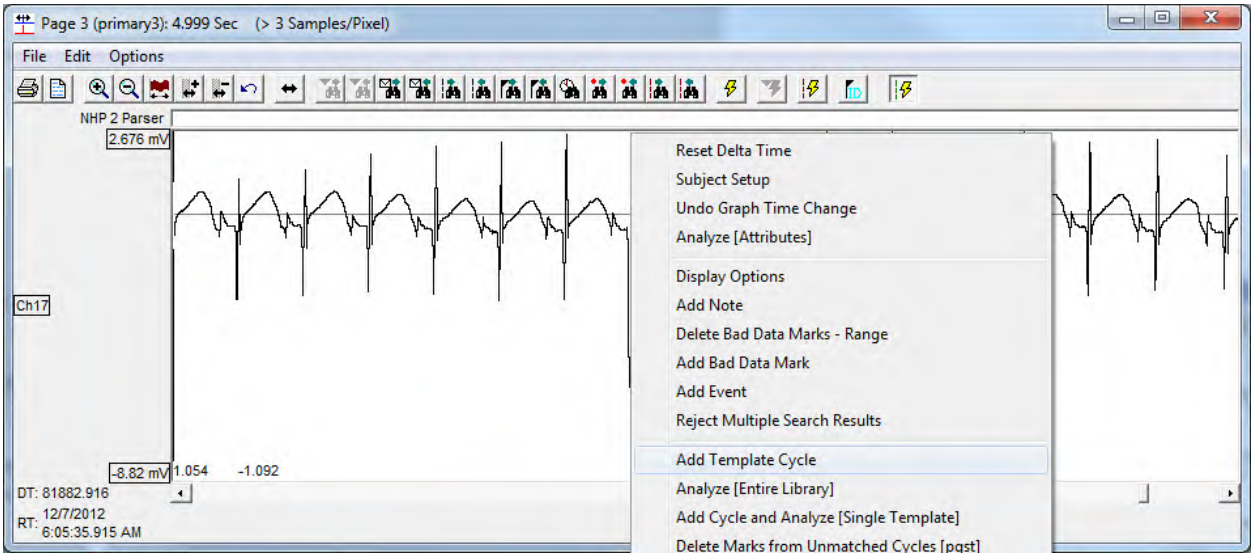
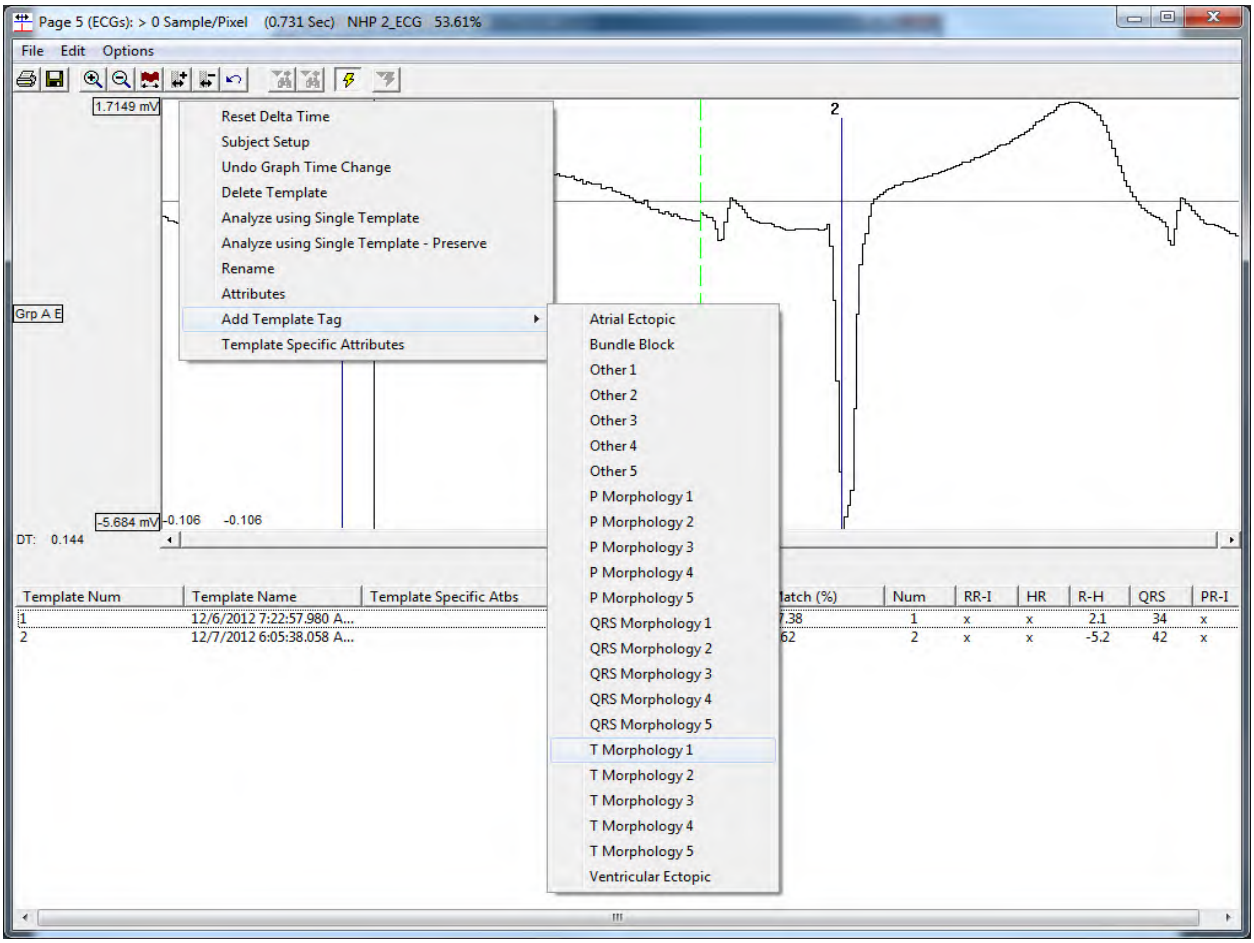


2. Within the **Template Graph** page, right-click and select **Add Template Tag**. Select one of the predefined Tags to mark the cycle and associated Matches, for example T Morphology 1.



The Tag will be listed under the Template Tag column with its associated Template cycle row within the Template Graph List View.

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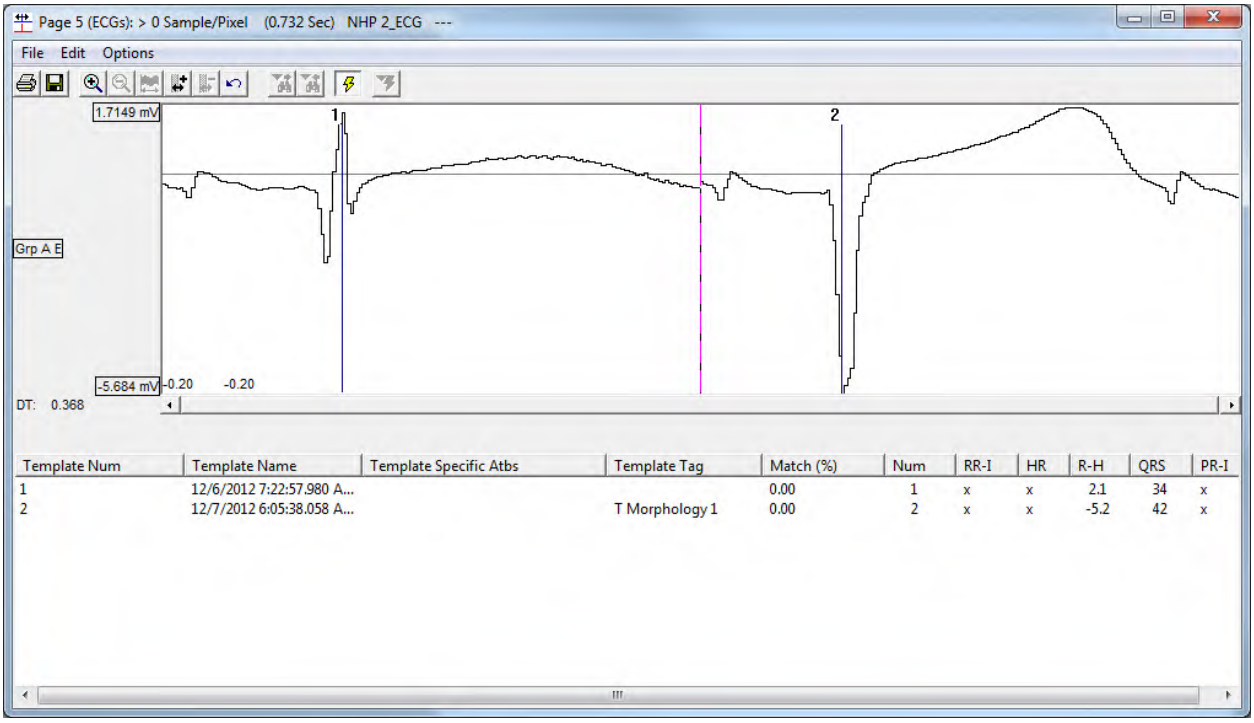
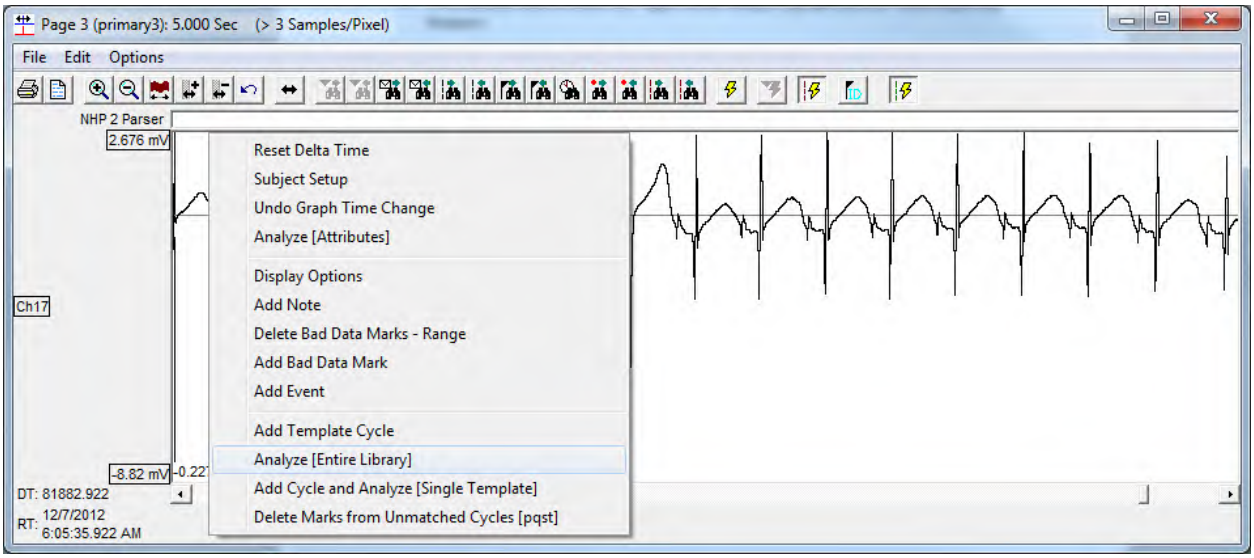
Note: Multiple Tags may be associated with a single Template cycle.



3. Execute the **Template Analysis** from the **Primary Graph** page by right-clicking the ECG signal and selecting **Analyze [Entire Library].**



4. In this example, select **T Wave** as the *Match Region*, as the Template Tag used was for a T wave Morphology. Use the default 85% *Minimum Match (%).* Choose **All loaded data** as the *Data Range*, select **Unmatched** for *Cycles to Analyze,* and **Region** for *Match Method*. Then, click **OK**.

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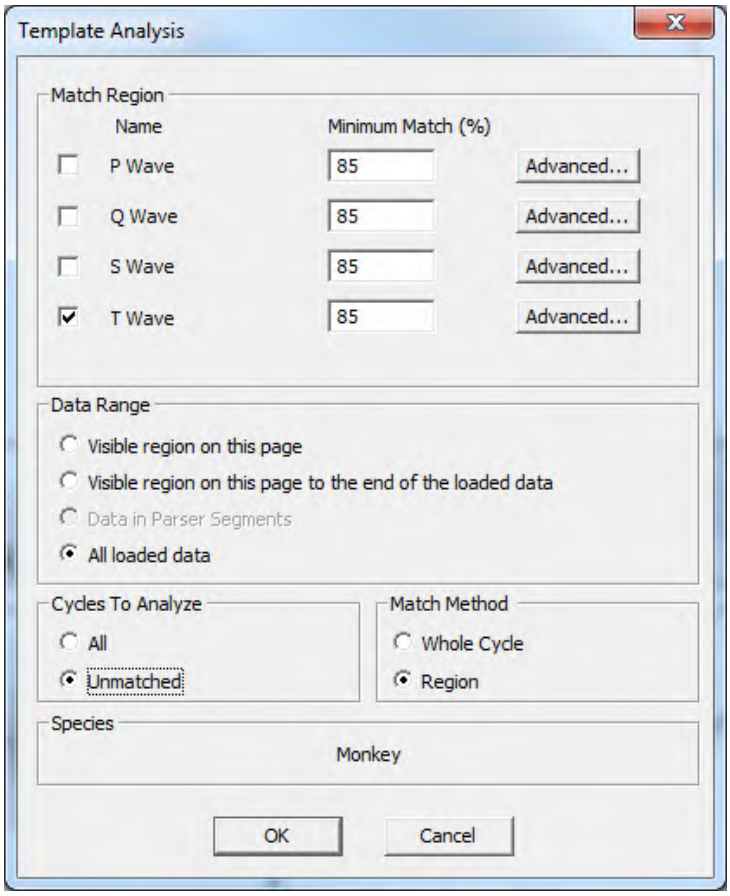
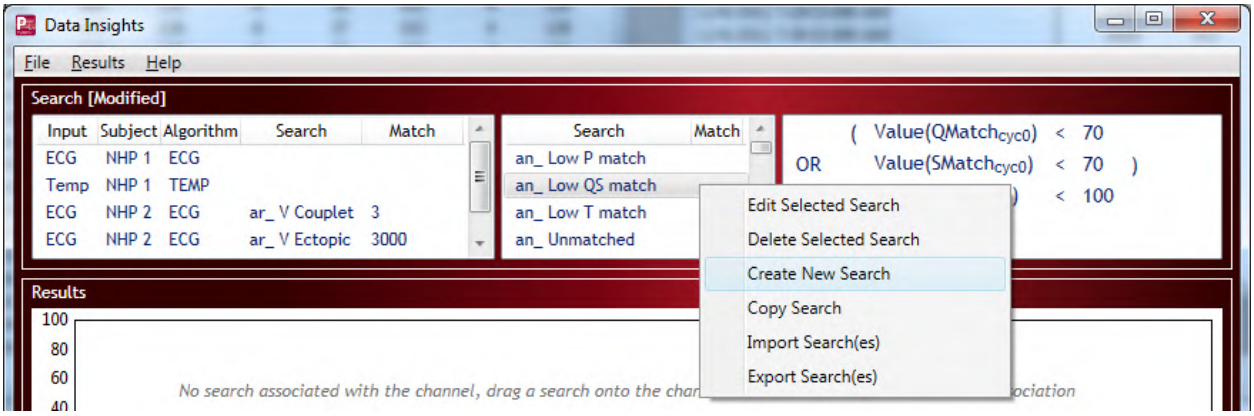


5. Repeat Steps 1-4 for all cycle types of interest.
6. Launch **Data Insights** from the **Experiment** menu.
7. Right-click the **Search and Match Grid** and choose **Create New Search**.



8. Within the *Search Entry* dialog, enter a unique **Search Name**.
9. Right-click within the large white area and select **Add New Clause**.

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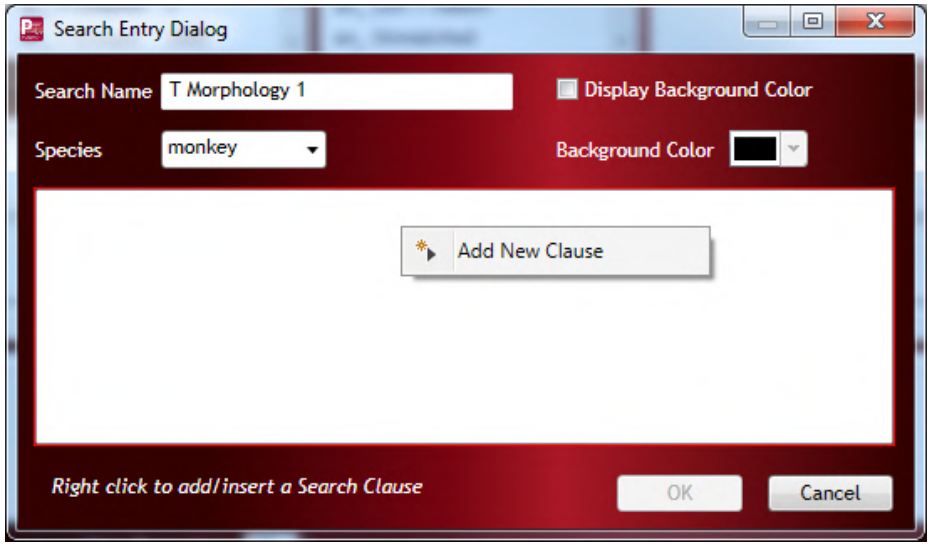
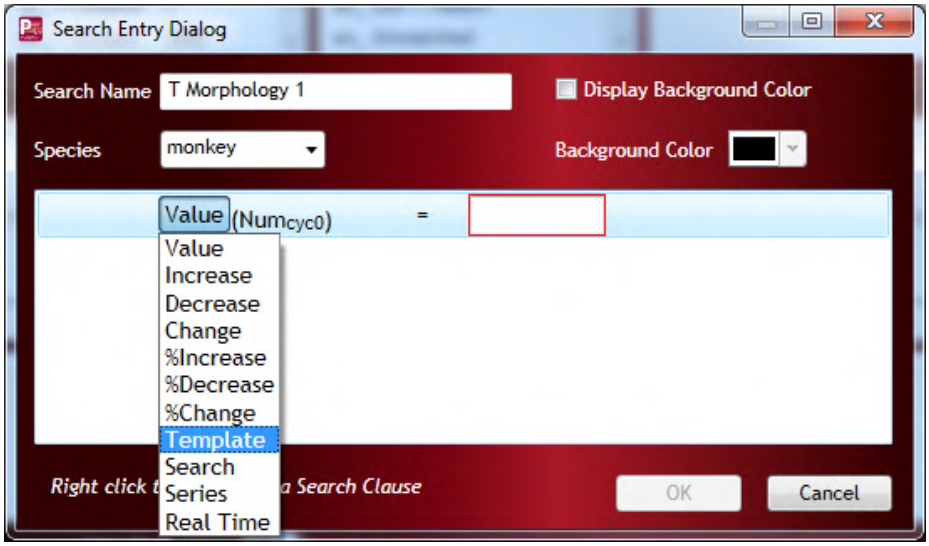


10. Left-click the Value function and select Template.



11. Select the Input dropdown and choose the appropriate Template Tag used; e.g. T Morphology 1.
Optional: Check the **Display Background Color** and choose a light shaded **Background Color** to more easily identify match results from the **Primary Graph** page.

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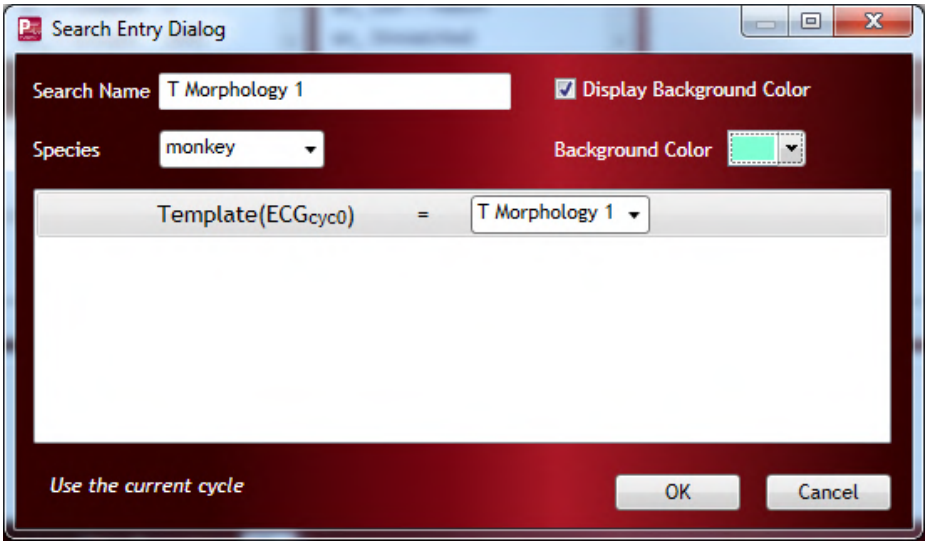
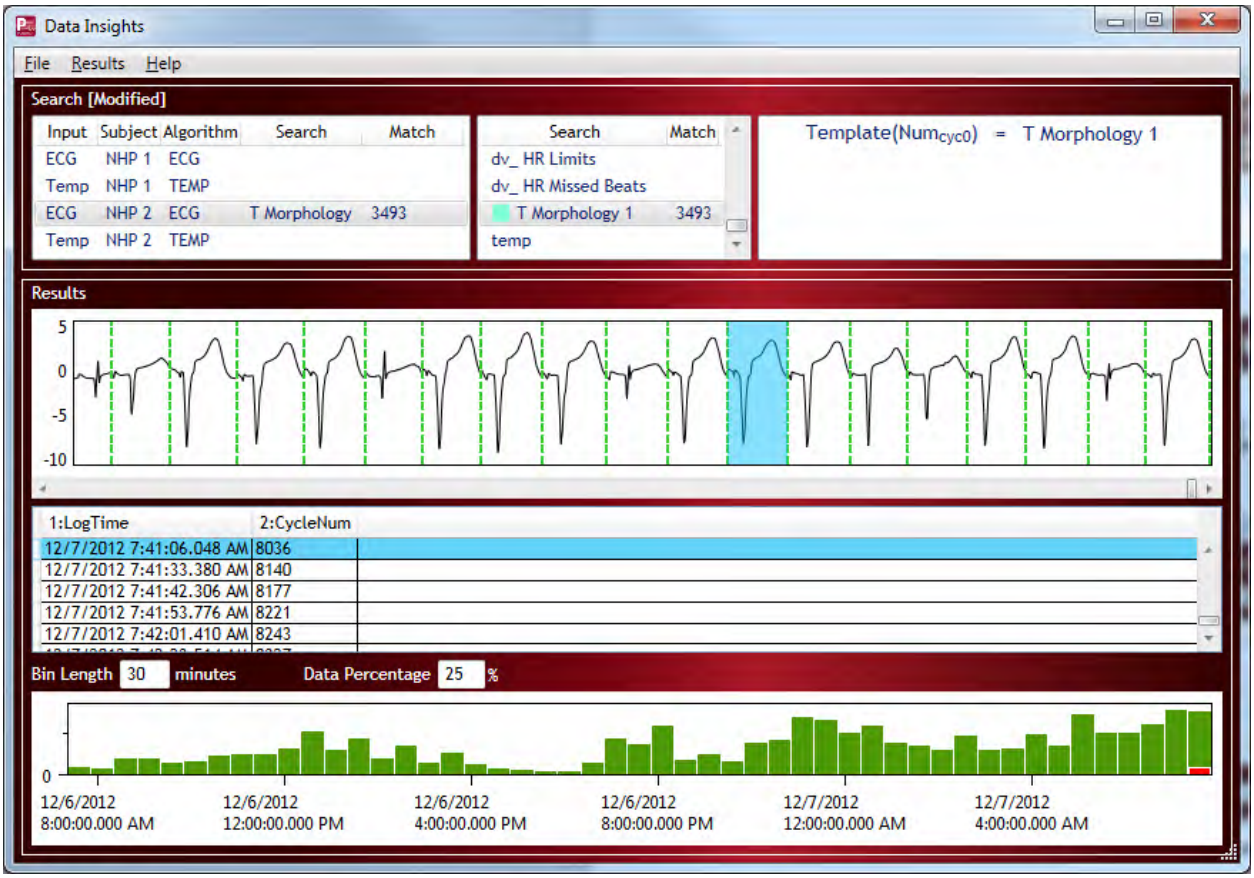
12. Click **OK**.



13. Drag-and-drop the new Search onto the appropriate channel within the **Channel/Search Pair Grid** to execute the Search.



14. Double-click a Search Result from the Results Wave View to view the match within the context of the waveform amongst adjacent beats.

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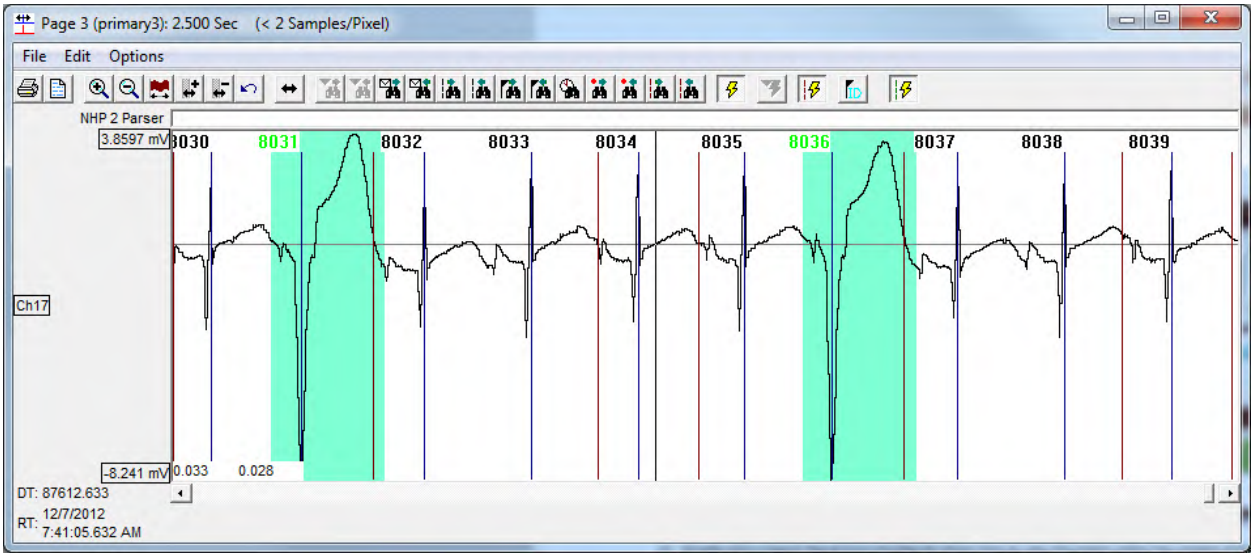

15. Use the Data Insight dialog to review match results. Reject matches if necessary; e.g. the morphology of the cycle is not a close enough match based on desire.
16. Once match results have been reviewed, generate a **Report** via the **File** menu.

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Contact Information

We are available to help you with your questions and concerns. Should you hit a roadblock or need some additional training, please feel free to visit the **DSI Support Center at https://support.datasci.com** to find articles and helpful information in our knowledge base, Chat with an agent, or setup time to receive one-on-one consultation. We are happy to help!

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