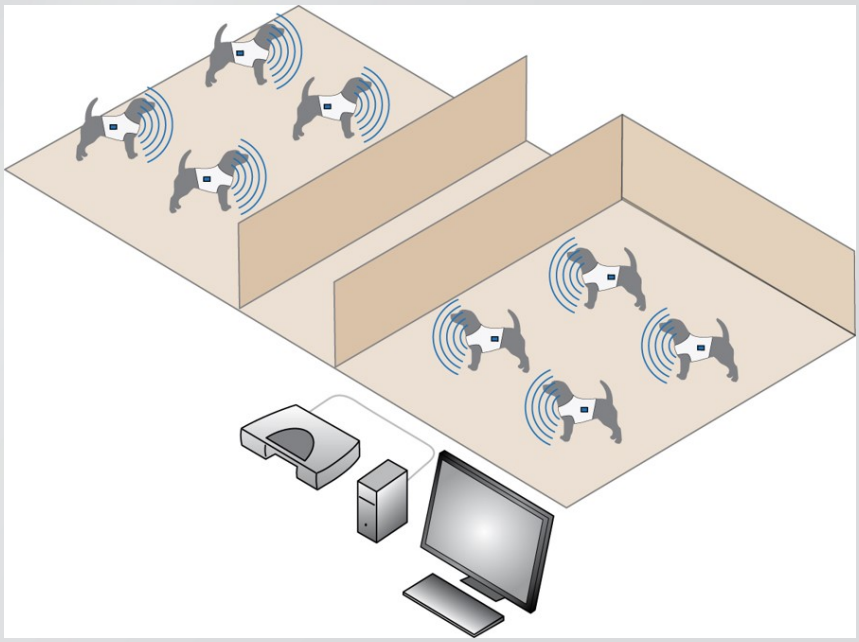


USER MANUAL

JET Software Manual

MU00257-001 Rev 54

Table of Contents

Welcome

Congratulations on joining the community of users worldwide who rely on DSI products to perform preclinical physiologic research. Thank you for your interest in DSI products. We are committed to providing you with quality products and services.

The JET (Jacketed External Telemetry) Acquisition Interface is an excellent choice for customers who want to use surface lead ECG telemetry and would like to interface to Ponemah the telemetered signals for non-invasive telemetry. This software manual refers only to the JET Acquisition Interface. Refer to the JET System User Guide for specifications on the hardware.

For detailed information on the Ponemah or Analysis software modules, please refer to their specific Reference Manuals.

This manual will help you get to know your Jacketed External Telemetry (JET) Acquisition Interface system. The structure of the manual was designed to sequentially guide you through setting up your DSI system.

System Configuration

The JET Acquisition Interface is a software interface between the JET devices and the Ponemah Physiology Platform. A complete system configuration would consist of JET Receivers, JET devices, and the Ponemah software. The Ponemah software allows setup and control of supported JET Receivers and devices.

System Requirements

The minimum requirements for the JET Acquisition Interface system are the same as the main Ponemah software. Please Refer to the DSI Support Center for minimum computer specifications (https://support.datasci.com/hc/en-us/articles/230049328)

For information on DSI products and services, check out the website at http://www.datasci.com/.

Software Installation

The JET software is installed when Ponemah is installed. If a complete system was not purchased with everything installed and tested, the Ponemah system software will need to be installed. The procedures are outlined in the Ponemah Install Notes

System Components

The JET Acquisition Interface is a software interface between the JET devices and the Ponemah Physiology Platform. A complete system configuration would consist of JET Receivers, JET devices, and the Ponemah software. The Ponemah software allows setup and control of supported JET Receivers and devices.

Getting Started

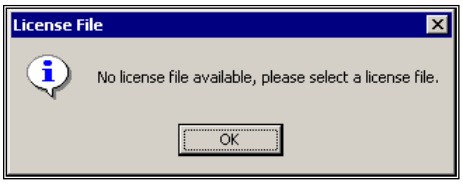
Introduction

Once the Ponemah acquisition system has been installed and configured, power up the JET Receivers and devices and start the Ponemah application. The user is now ready to proceed to the system configuration process.

Starting the Ponemah Program

After the software has been installed, start the Ponemah system by double clicking on the **Ponemah** icon. At any point the user can connect the hardware.

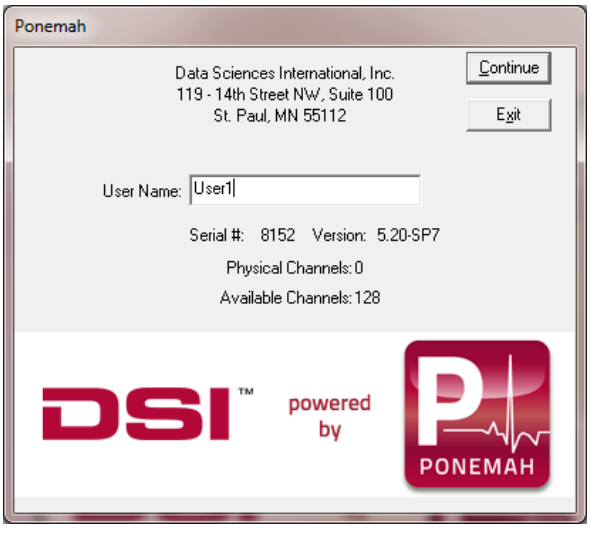
If the software has been installed correctly, the system will display a dialog which states that the application needs a license file.



License File message

After selecting the **OK** button, the user will be prompted to enter a license file. Select the supplied license file (*.LIC), and select the license file.

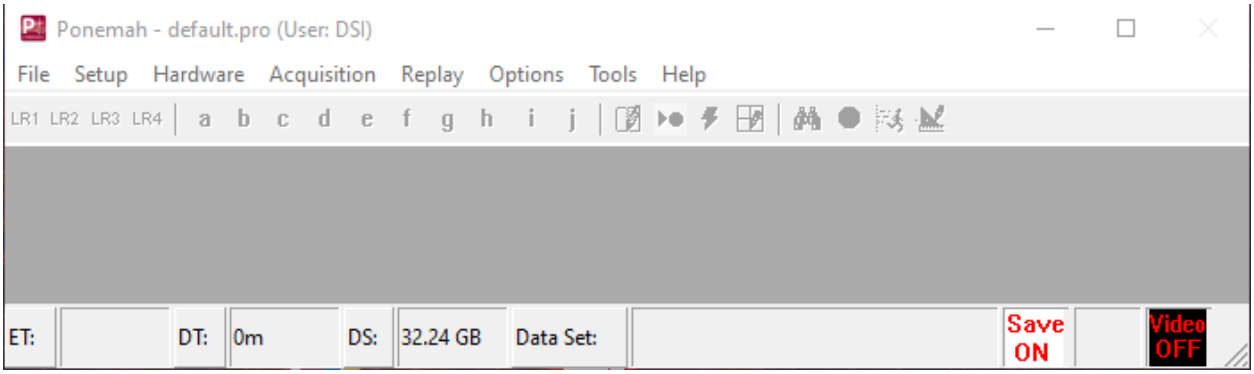
After the license has been loaded, the Ponemah user name dialog will appear as displayed here:



User Name Dialog

The User Name that is entered will be recalled automatically the next time the system has been started. The name entered here will be used on all printouts and audit logs for identification of the data collected.

After selecting **Continue**, the Main Menu screen is displayed as below. Next, select the **Options** pull-down menu and select **Application Configuration**. Within this dialog, select Acquisition Interface and choose the appropriate **JET interface (Jacketed External Telemetry)**. The user is now ready to begin setting up, acquiring, and analyzing data.



Ponemah Main Window

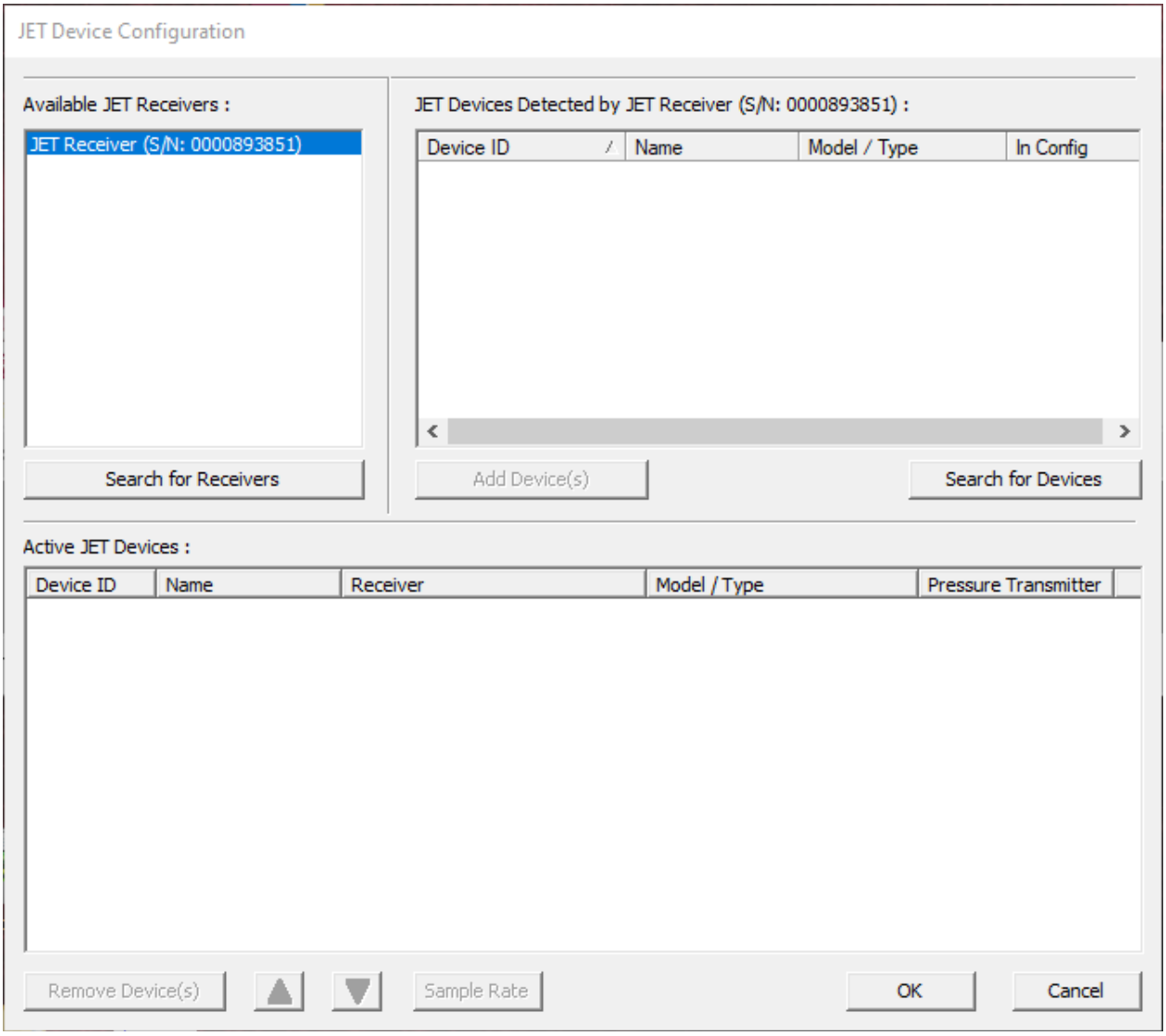
Ponemah software includes a "default" test setup to help the user get started. If a problem occurred during the installation, the system will report the error. Review related articles on the DSI Support Center or contact Technical Support.

Differences in Menu System

The following items outline how the JET Acquisition Interface menu system differs from the traditional Acquisition Interfaces.

JET Device Configuration

Under the **Hardware** menu is the **JET Device Configuration** selection. When the **JET Device Configuration** dialog appears, it will automatically search for all JET Receivers that the computer can see. This configuration is saved in the protocol file.



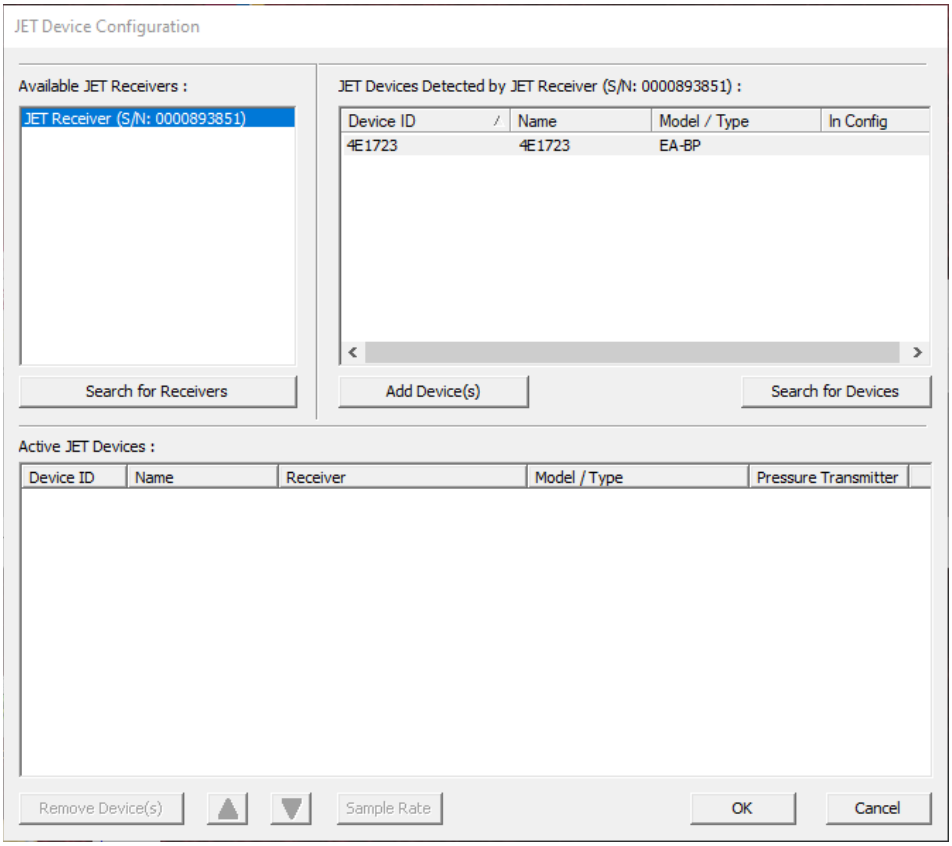
JET Device Configuration

AVAILABLE JET RECEIVERS

This section will list all of the JET Receivers that the current computer has access to. If another JET Receiver is connected after this dialog is opened, the user can click on the **Search for Receivers** button to establish connection to the new JET Receivers.

If a JET Receiver has been correctly configured but it does not show up in the JET Receiver list, the computers' Firewall settings may need to be modified. See the Ponemah Workstation Configuration IT Guide for computer settings.

JET DEVICES DETECTED



The JET Devices Detected section will list the available devices for the current JET Receiver that is selected. The device that is selected in the JET Receiver section is also listed above the table of information.

The table of information includes the Device ID (Serial Number), Name (which can be modified), Model number of the device, and if the device is in the Active JET Devices section.

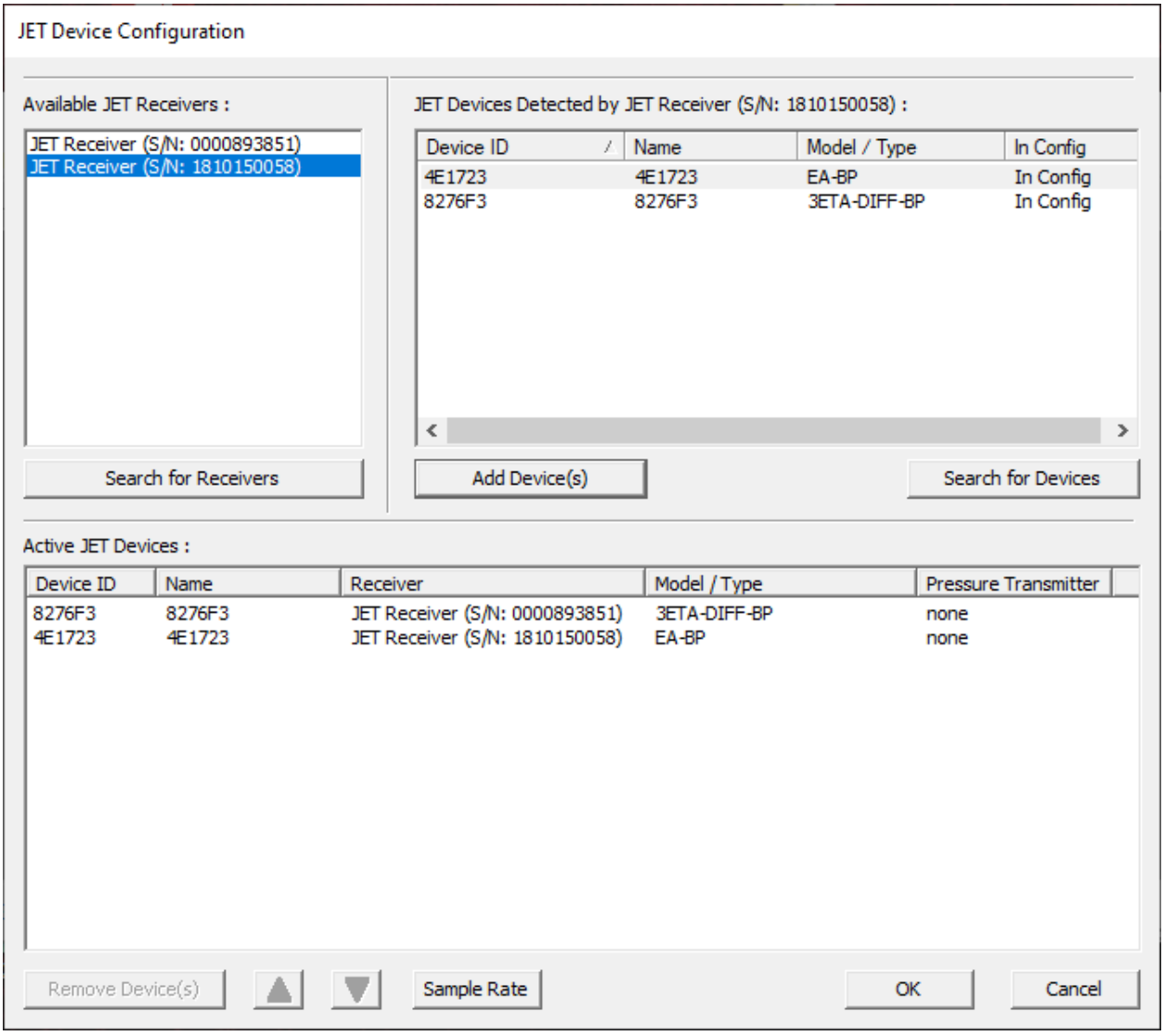
The **Add Device(s)** button allows the user to add the currently selected devices to the Active JET Devices section. When the button is selected, the information will be listed in the Active JET Devices section.

The **Search for Devices** button will allow the user to search for new devices. If any devices are not powered, power the devices, and then select the **Search for Devices** buttons. The currently selected JET Receiver will go through the search routine and find any new devices within range.

ACQUISITION DEVICES

The user also has the ability to right click on a device in the JET Devices Detected list and select the option **Device Properties**. This will bring up the properties of the device as shown below. See Device Properties Dialog section. The information listed depends on the model of JET Device and which type of lead set is connected. See the Section Software Model Types for more details.

ACTIVE JET DEVICES

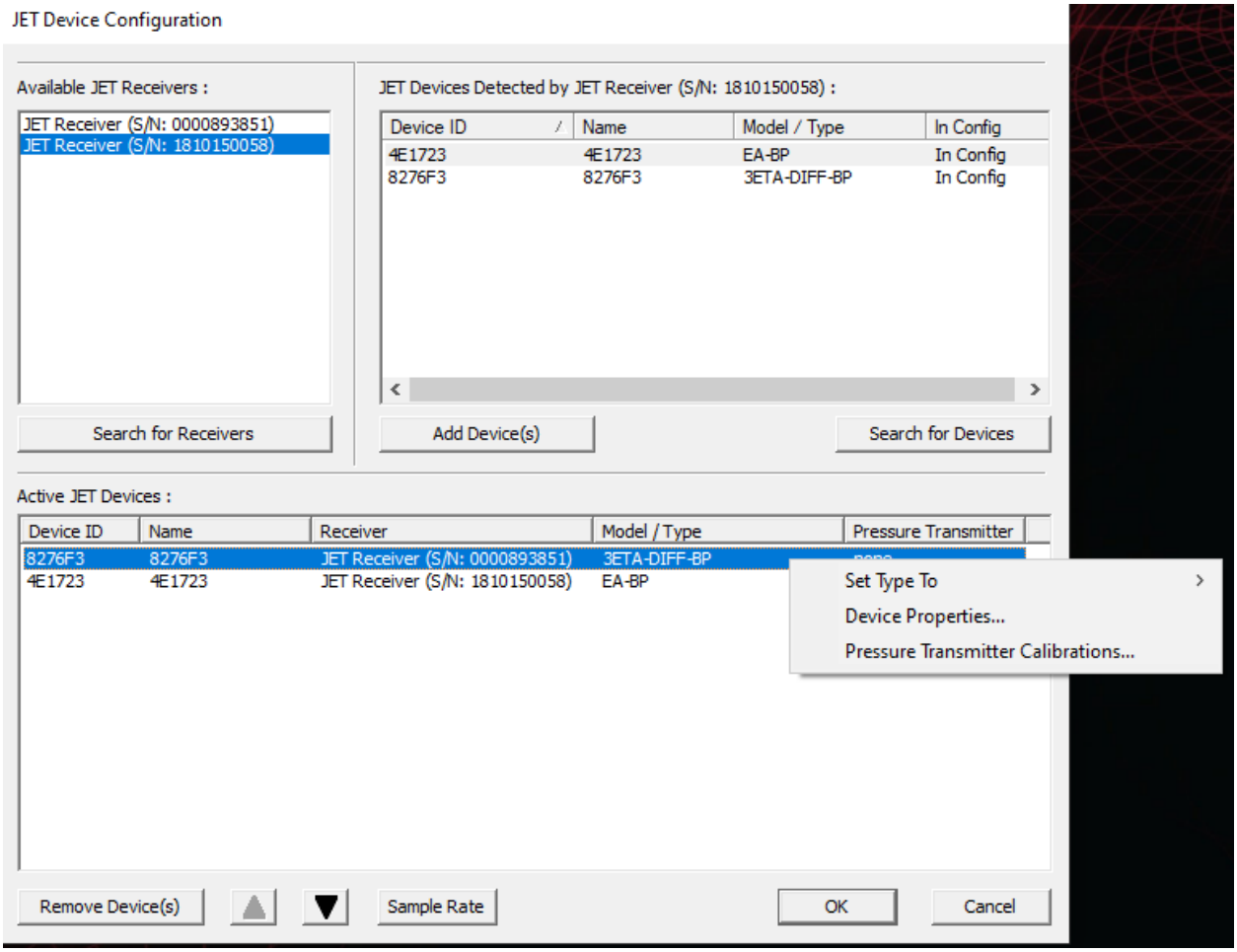


The Active JET Devices section lists the current devices that will be used in the acquisition. The list will include the Device ID, Name, JET Receiver that the device is connected to, and the Model/Type of the device.

The **Remove Device(s)** button allows the user to remove any unwanted devices that are listed.

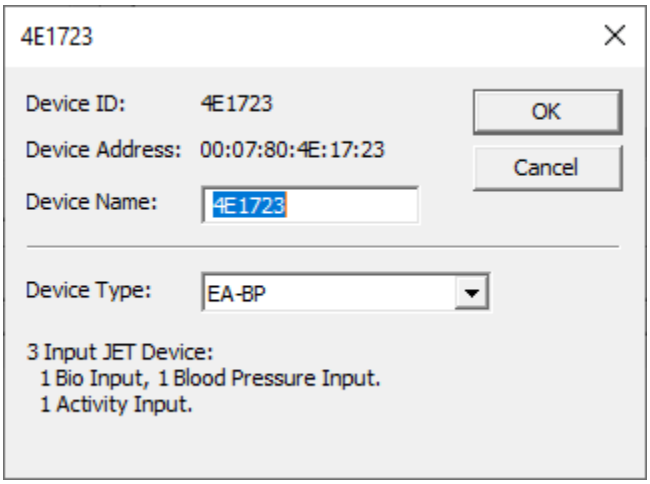
The Up and Down arrow buttons allow the user to move the devices around. The order listed here is the order in which Ponemah will populate the Channel Input Setup configuration on the **P3 Setup** dialog.

The user also has the capability of accessing the device properties by right clicking on a device and selecting **Device Properties**. See the **JET Devices Detected** section above for more detailed information of the device properties.



Device Properties Dialog

This dialog lists all information related to the device. The dialog is opened by right clicking on a device in the **JET Device Configuration** dialog.



The **Device ID** is the serial number of the current device.

The **Device Address** is the unique MAC address that has been assigned to the device.

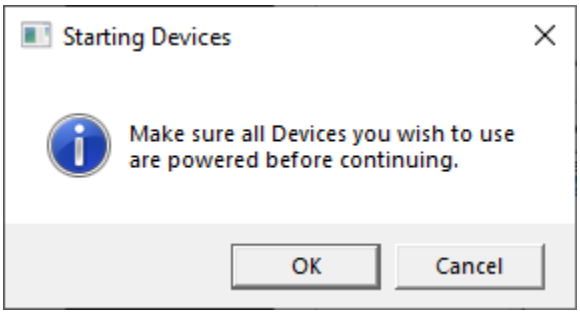
The **Device Name** is the user changeable name configured to the device. This name is not saved on the device. If a device is configured with a specific name on one computer with Ponemah, that name will **NOT** appear on other computers. The device name text box can hold up to 9 characters.

The **Device Type** drop down list box shows the available types that can be configured based on the type of lead set that is connected. See the section Software Model Type Information for more information. This information is only saved on the current computer. The information configured on one computer will **NOT** carry over to other computers.

The information listed below the **Device Type** drop down list box are the physical inputs to the device.

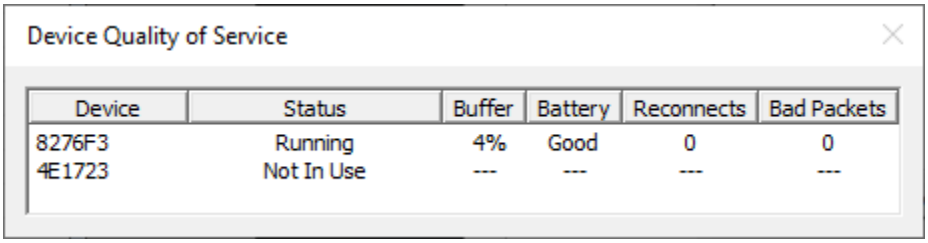
Calibration

Under the Hardware menu is the selection **7700 Amplifier Setup**. Each device configured will have a main tab with the serial number of the device. Each device has a General, Configuration, and Description tab. If the device name has been modified, the name configured will be listed for each tab. When the **7700 Amplifier Setup** selection is selected, a message will appear asking to start the devices. This allows the software to pull in the correct information.



Starting Devices dialog

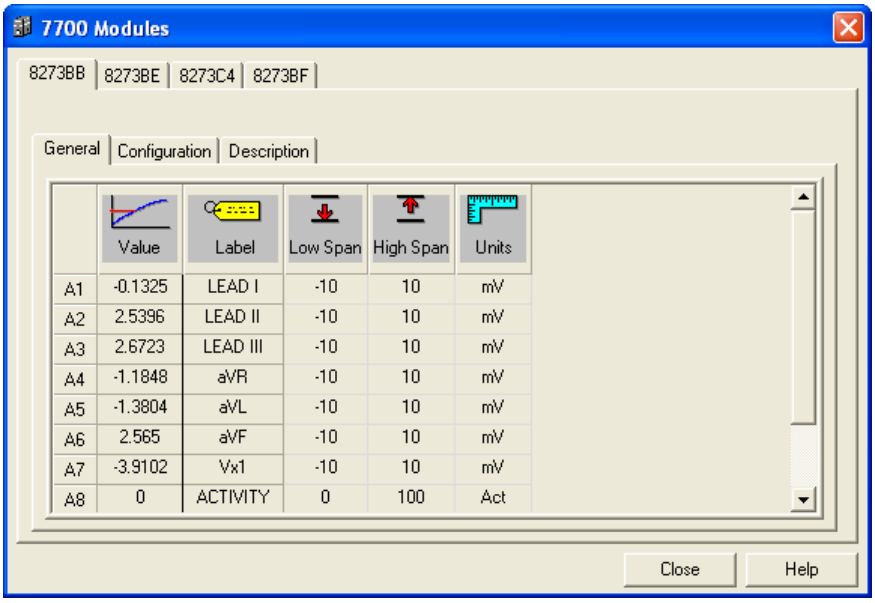
Once all of the devices are powered, click on the **OK** button. Once the **OK** button is pressed, another dialog will appear which shows the status of the devices.



This dialog lists the status of the current devices on study. The JET startup dialog also provides a list of receivers that are expected to be used in the same 2.4GHz RF space.

ENERAL TAB

The General Tab lists general information. There should be no need to make any modifications to the values in any of the tabs.



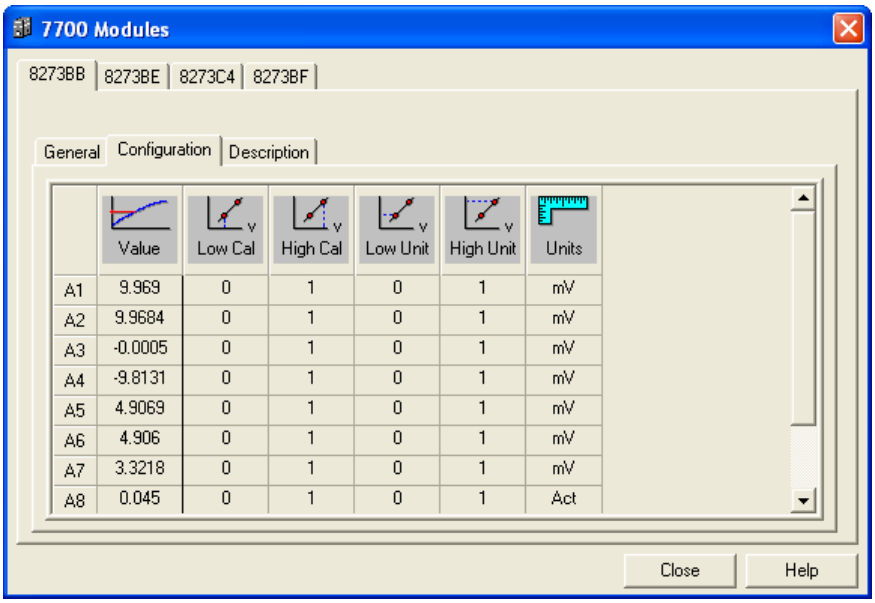
The **Value** column lists the current value reported from the device.

The **Label** column lists a label that will appear in the Input column of the P3 Setup dialog. This column can be modified.

The **Low Span** and **High Span** columns list the minimum and maximum values that the channel can report. These columns cannot be modified.

The **Units** column lists the units of that channel.

CONFIGURATION TAB



Configuration Tab

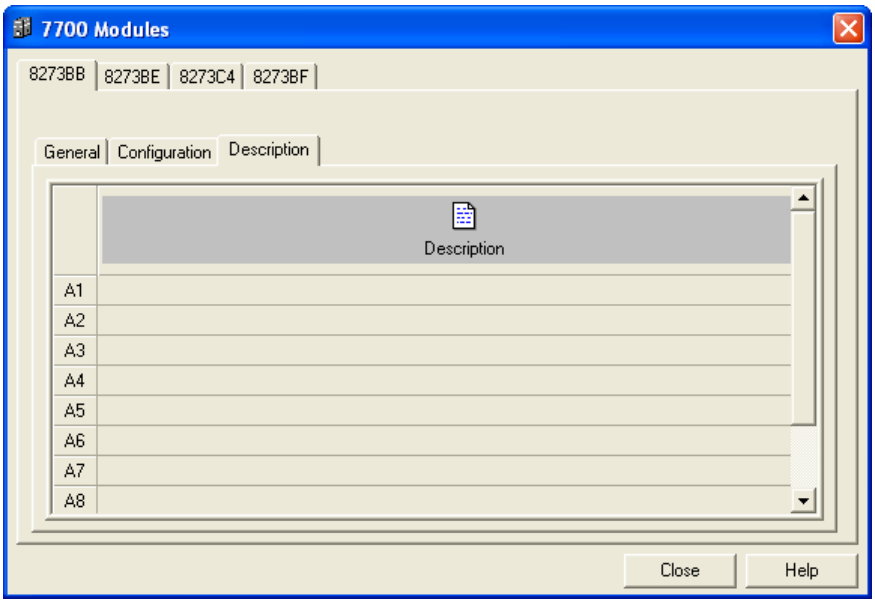
The **Value** column lists the current value reported from the device.

The **Low Cal** and **High Cal** columns are the calibration values for each channel. Default values are loaded. This column can be modified.

The **Low Unit** and **High Unit** columns are the user units for each channel. Default values are loaded. This column can be modified.

The **Units** column shows the units for each channel. This column can be modified.

DESCRIPTION TAB



Description Tab

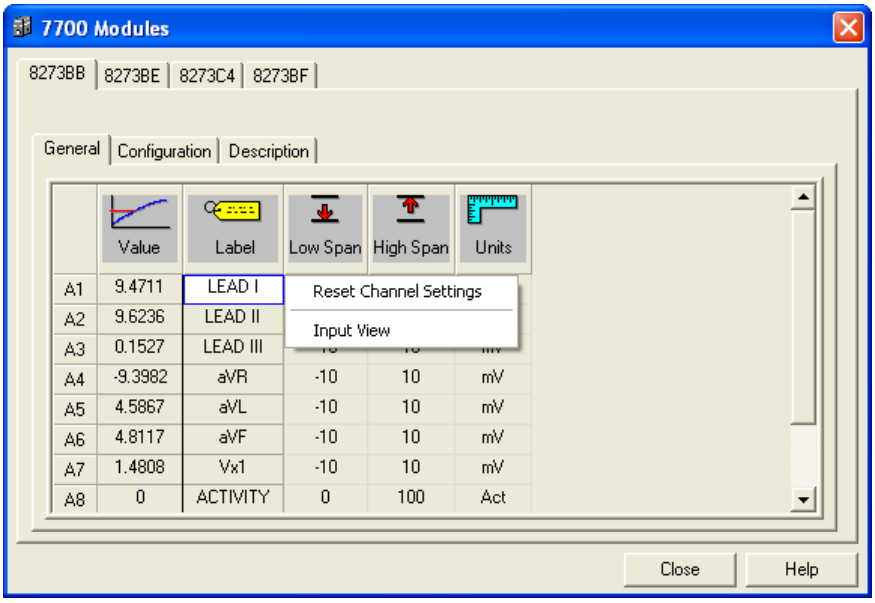
The **Description** column allows the user to enter any miscellaneous information needed. This information is not used in any other location.

Input View and Resetting

The JET devices have the capability of viewing their values for debugging purposes and also resetting each channel if a problem has occurred during setup.

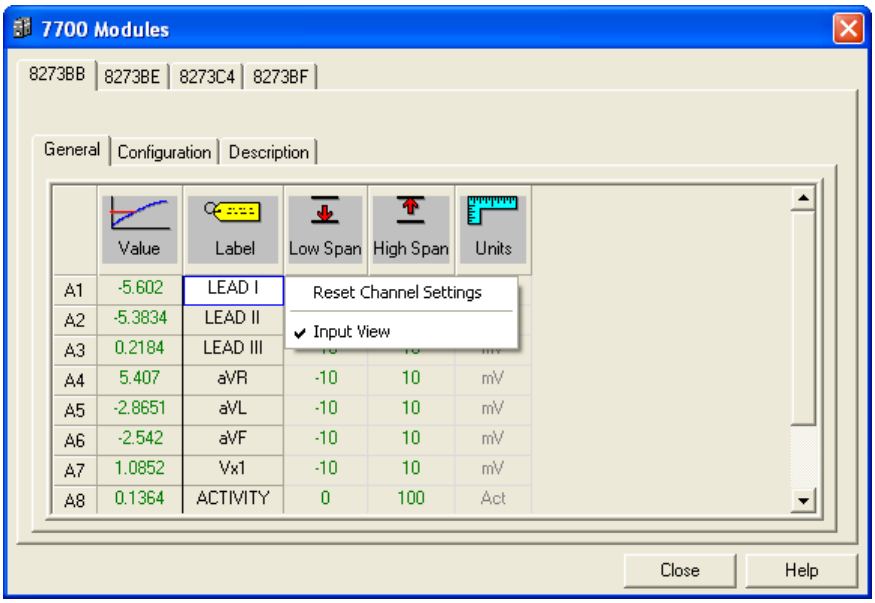
INPUT VIEW

This view allows the user to see the raw voltage that is being inputted into the channels. Right click on one of the channels' cells that can be modified (in the dialog below, the only modifiable cell is the Label cell) and select Input View. Below is an example of the right click menu that will appear.



Input View Menu

Once input view has been selected the values listed for Value, Low Span, and High Span are listed in millivolts. Those columns values will change from black numbering to green numbering to notify the user that they are running in input view. Also, the Units column entry will change from black lettering to gray lettering. When input view has been set, the units of the values shown are in millivolts. Shown below is an example of the 7700 Modules dialog with input view set.

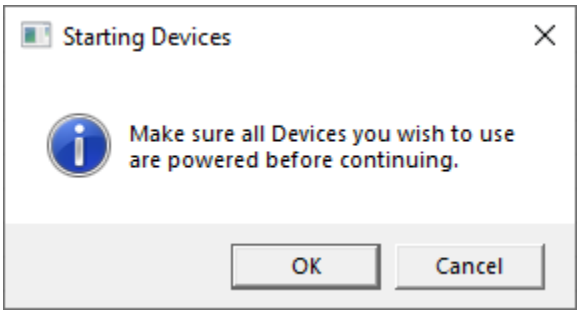


RESET

This selection allows the user to reset the settings of the channel selected. When selected, the channel will reset all columns. The default settings are dependent on which model and type are selected. When this selection is selected, a message box will appear asking if the channel should be reset. This allows the user to select **No** to cancel the resetting of the channel and **Yes** to reset the channel.

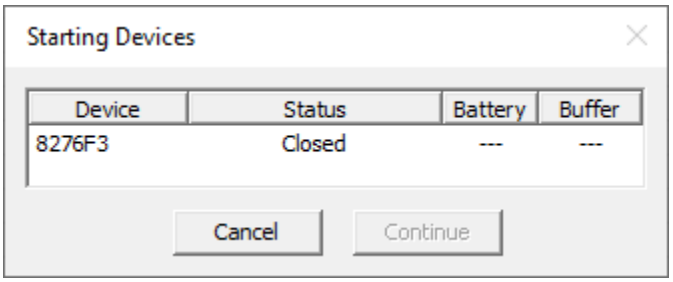
Acquisition

When an acquisition is started a message will appear asking to start the devices. This allows the software to pull in the correct information.



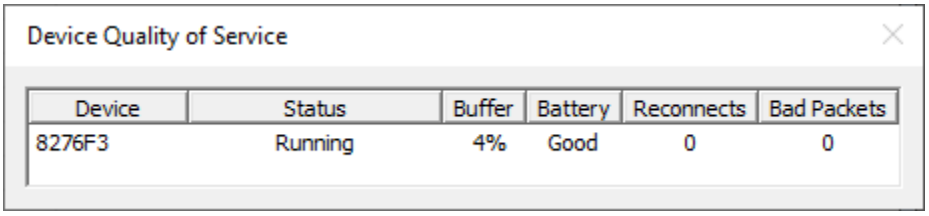
Starting Devices dialog

Once all of the devices are powered, click on the **OK** button. Once the **OK** button is pressed, another dialog will appear which shows the status of the devices.



After the devices have been found and the **Buffer** has reached 100% for at least one of the devices, click on the **Continue** button.

During the acquisition a quality of service dialog appears as shown below.

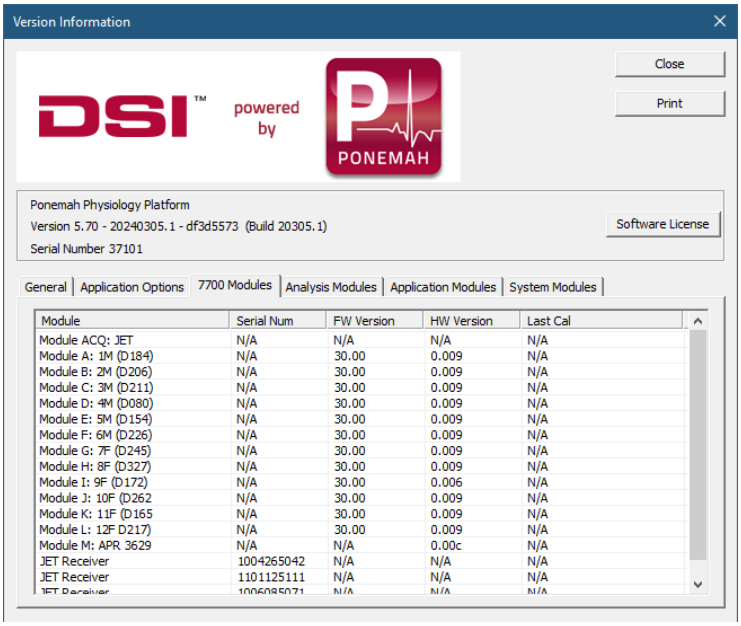


This dialog will show the Device name, Status of the device, the current Buffer size that is being used by the device, Battery state, how often the device needed to reconnect, and how many Bad Packets were sent while acquiring data.

If a device goes out of range, or the battery needs to be replaced, once the device is back in range, or the battery is replaced, the device will automatically reconnect to the JET Receiver.

Product Information

More information can be viewed regarding each device and JET Receiver. If the user selects **Product Information** from the **Help** menu and selects the **7700 Modules** tab, a dialog similar to the one listed below will appear. If a JET Receiver is connected to the computer, but no device is configured for that receiver, the receiver will not be listed.



This tab lists each device, the serial number, the firmware and hardware version of each, and the Last Cal Date of each JET device. If the calibration date cannot be stored electronically on the device it will be listed as (NA).

Failure to Find Device

An acquisition can still be started if at least one device is found. If an acquisition is started and a selected device is not found by a JET Receiver, a message will appear when acquisition starts to tell the user that a device was not found. This allows the user to continue running acquisitions even if some devices are not found.

Throughout the acquisition this device will always be assumed to be missing since it was not present at the start of acquisition.

Layout of Hardware

There are several recommendations regarding the layout of the hardware.

- Devices should be no more than 10 meters from the JET Receiver that they will be connected to. Five meters is typical.
- A clear line of sight between JET Receiver and device is recommended. RF signal strength is reduced when it is being transmitted through objects.
- If multiple JET Receivers are used, it is recommended to connect those receivers to the computer via an Ethernet switch.
- If multiple JET Receivers are used, keep the receivers as far apart as possible (the minimum recommended distance is 1 meter).
- If multiple JET Receivers and multiple devices are used, keep the devices that are connected to the specific receiver closest to that specific receiver. The best configuration would be a cluster of devices next to the receiver that is receiving and to have each cluster physically isolated from other clusters.

Appendix 1: Referencing the APR-2

Summary

The collection of Blood Pressure data via JET requires specific hardware and software configurations in order to properly account for ambient pressure. This document will provide you with the necessary instructions.

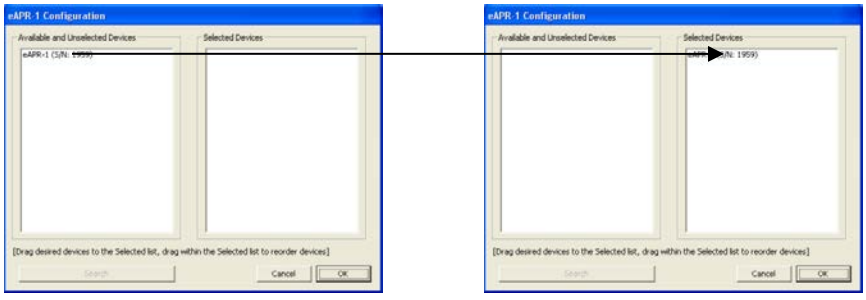
Instructions

The instructions below are valid for Ponemah versions 4.9 and newer. Instructions are broken up into two different sections depending upon the Application Configuration which is in use.

<u>If Application Configuration is set to Jacketed External Telemetry (JET)</u>

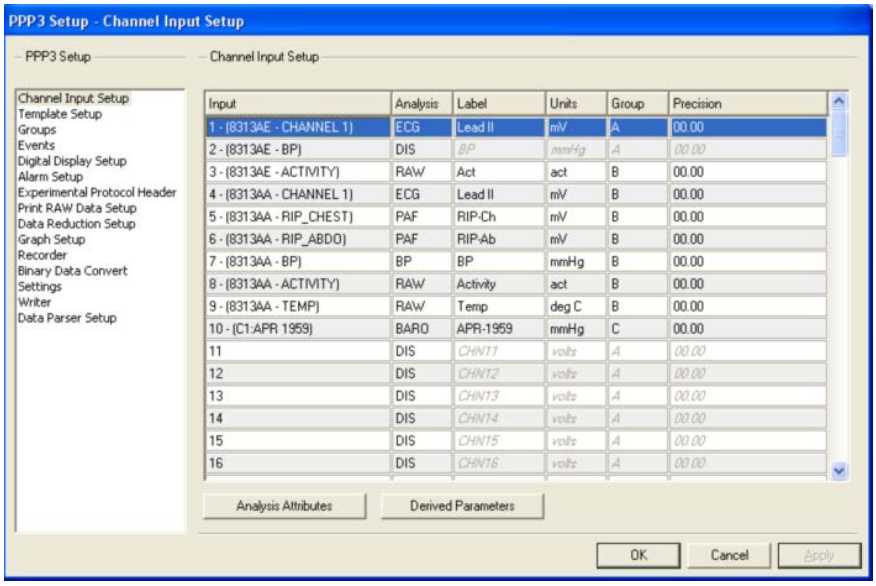
To correctly reference an APR-2 for ambient pressure the following is required:

1. Hardware Setup
    a. Connect the APR-2 to an ethernet network with DHCP server on it
        i. The simplest method of doing this is to use a router (which is basically a switch with DHCP capability) on a dedicated network.
        ii. Another method of doing this is to use the corporate network if it has a DHCP server on it.
        iii. As a last resort, a Static IP address may be defined to get around the requirement for a network with DHCP server.
    b. If the APR-2 is installed on a network, it will have both the ready and power lights illuminated. If the ready light on the APR-2 is not illuminated, there is likely a network issue preventing the APR-2 from obtaining an IP Address.
2. Software Setup
    a. Enable the APR-2 by performing the following
        i. Using the menu system access **Hardware –APR Configuration**
        ii. Press Search to locate Available and Unselected Devices
            1. If your hardware is set up incorrectly you will not find any APR-2s.
            2. If your hardware is already located in the Selected Devices box the next step is not required.
        iii. Click on the desired APR-2 and drag it to the Selected Devices



    b. APR-2 Channel Setup
        i. Configure the APR-2 channel by performing the following
            1. Using the menu system access **Setup – P3 Setup** and select **Channel Input Setup**
            2. The APR-2 should appear as an available channel with reference to its serial number.

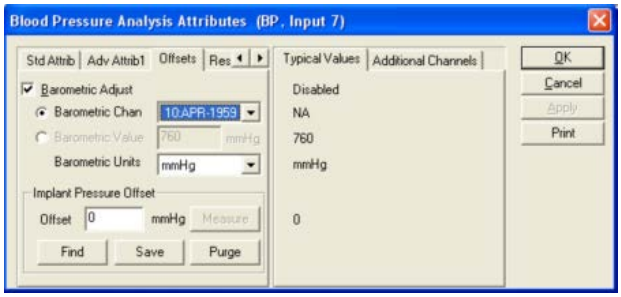
3. Select this channel and set the Analysis type to "BARO", Label to something you desire, units to mmHg, and Group to something distinct.
4. Then click on Apply



c. BP Analysis Attributes Setup

i. Following the setup of the APR-2 as a BARO channel the BP channel analysis attributes must be set to reference this APR-2. This is done by selecting the BP channel, assuring the Analysis type is set to BP, then clicking on Analysis Attributes and then selecting the Offsets tab.

ii. At this point the user must place a check mark in the Barometric Adjust box, select the option button for Barometric Chan, and then define that channel as the channel number for the APR-2 that should be referenced.



1. Note: Each JET-BP channel requires these changes.
2. Special Note: If no channels are available then the hardware setup and/or channel setup for the APR-2 were not done correctly (or the Apply button was not clicked).

iii. Then click on OK in the BP Analysis Attributes window.

iv. Then click on OK in the P3 Setup window.

v. And finally, save your protocol.

Appendix 2: Blood Pressure Channel Crosstalk Mitigation

Background

The JET Devices capable of measuring blood pressure (BP) exhibit some unique characteristics when all components are not properly connected together. The following connections are expected by the system and when these are all made correctly only Blood Pressure data will appear on the BP channel within the data collection software.

- DSI Pressure only Implant in range of the JET-BP Antenna
- JET BP Antenna plugged into the JET BP Module
- JET BP Module plugged into the JET Device

Crosstalk Prevention

The use of a JET Securement Strap, part number 005842-001, ensures these connections are maintained throughout use and is recommended by DSI. When not used crosstalk within a JET Device between the BP channel and a biopotential channel could occur.

Note: When using the JET Securement Strap the BP Module should not be placed under the strap or damage to a connector could occur.

Symptoms and Troubleshooting

When these connections are not made correctly the following could occur*. Highlighted cells indicate the failed connection leading to the result.

BP Implant to BP Antenna	BP Antenna to BP Module	BP Module to JET Device	Result	Troubleshooting	Noise Filtering
Implant on and in range of antenna	Antenna plugged into BP module	BP Module plugged fully into JET Device	BP signal observed	Not needed	Not needed
Implant is off or out of range	Antenna plugged into BP module	BP Module plugged fully into JET Device	BP signal rails low	Assure implant is on and within 3-5 inches of BP antenna	Set Min Signal
Implant on and in range of antenna	Antenna is unplugged from BP module	BP Module plugged fully into JET Device	BP signal rails low	Assure antenna is plugged into BP module	Set Min Signal
Implant on and in range of antenna	Antenna plugged into BP module	BP Module is *slightly* unplugged from JET Device	Crosstalk from prior channel**	Assure BP Module is *fully* plugged into JET Device	See Below
Implant on and in range of antenna	Antenna plugged into BP module	BP Module is unplugged from JET Device	BP signal rails high	Assure BP Module is *fully* plugged into JET Device	Set Max Signal

* This table assumes all components are built to the DSI standard and do not exhibit any physical damage. It is possible for devices with physical damage to exhibit similar behavior without any connections being compromised.

** Channel 1 if using a JET-EA-BP, Channel 3 if using a JET-3ETA-BP or JET-5ETA-BP.

In all the cases described above, it is important to take action and fix the appropriate connection through use of the troubleshooting methods or accept the data as it comes in.

It is important to note that when incorrect data (ECG, Biopotential, or Respiratory Inductive Plethysmography (RIP)) appears on the BP Channel, it would not have been possible to collect BP data during this time, as one of the connections mentioned above is not correct.

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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