DSI

JET Option Manual

Model: PNM-P3P-JET
Manual: MU00257-001
Revision 52

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System Overview

JET Acquisition Interface

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. The interface is compatible with Windows 7 (See the P3 Plus manual for the specific requirements). A single JET system will allow up to 16 sources (devices) to be acquired and analyzed simultaneously when using multiple JET Bluetooth Receivers. Multiple systems may be used to acquire up to 36 sources (devices) within one room or area.

This software manual refers only to the JET Acquisition Interface. Refer to the JET System User Guide (003114-002) for specifications on the hardware.

For detailed information on the Ponemah Physiology Platform (P3 Plus) or Analysis software modules, please refer to their specific Reference Manuals.

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 Bluetooth Receivers, JET devices, and the Ponemah Physiology Platform Software. The P3 Plus software allows setup and control of supported JET Bluetooth Receivers and devices.

System Requirements

The minimum requirements for the JET Acquisition Interface system are the same as the main P3 Plus software. View the P3Plus Manual (MU00060) for the minimum requirements.

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

Configuring the System

Initial Inspection

Prior to attempting operation, visually examine the items outlined in the Parts List below.

Parts List

The following items comprise the JET Acquisition Interface:

1. PNM-P3P-xxx software on DVD-ROM
2. CD with license file
3. P01989-1 software key for the USB port
4. Reference Manuals
5. JET Bluetooth Receiver(s) models 2239 or 272-0241-001
6. JET Device(s)

Software Installation

The JET software is installed when P3 Plus is installed. If a complete system was not purchased with everything installed and tested, the P3 Plus system software will need to be installed. The procedures are outlined in the P3 Plus Manual (MU00060).

Getting Started

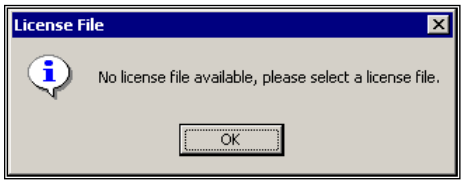
Introduction

Once the P3 Plus acquisition system has been installed and configured, power up the JET Bluetooth Receivers and devices and start the P3 Plus application. The user is now ready to proceed to the system configuration process.

Starting the P3 Plus Program

After the software has been installed, start the P3 Plus system by double clicking on the **P3 Plus** icon. At any point the user can connect the hardware.

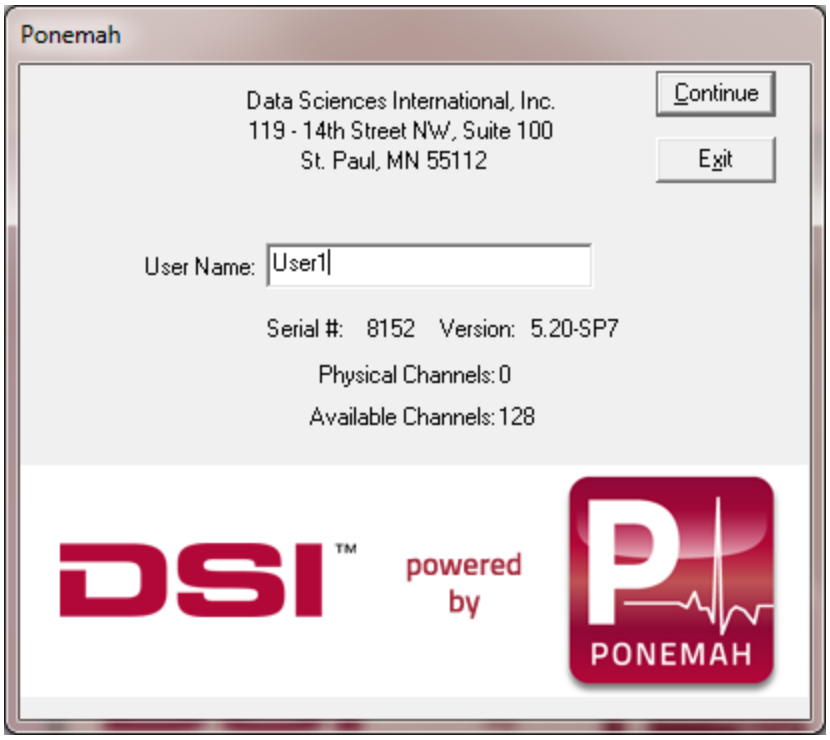
If the software has been installed correctly, the system will display a dialog which states that the application needs a license file.



License File message

After selecting the **OK** button, the user will be prompted to enter a license file. Insert the supplied license CD, and select the license file.

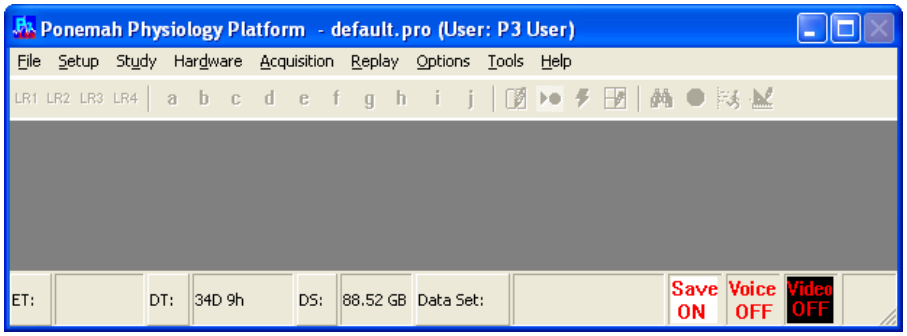
After the license has been loaded, the P3 Plus user name dialog will appear as displayed here:



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 or Jet-OpenART). The user is now ready to begin setting up, acquiring, and analyzing data.



P3 Plus Main Window

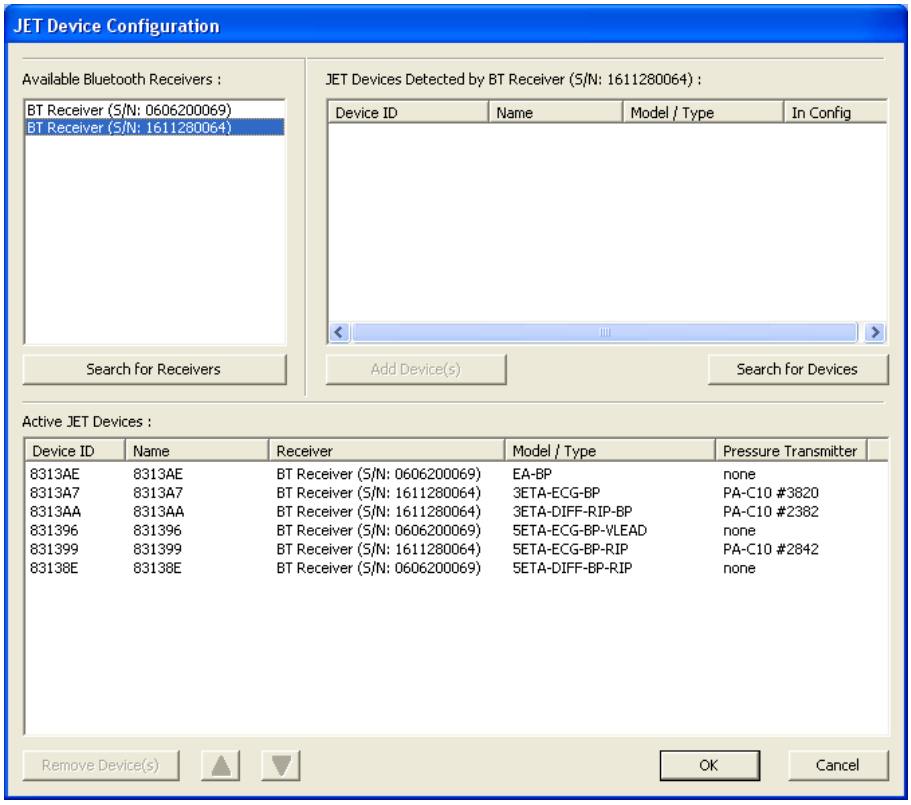
Ponemah software includes a "default" test setup to help the user get started. If a problem occurred during the installation, the system will report the error. See the Troubleshooting appendix at the end of the P3 Plus Manual (MU00060) for more information.

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 Bluetooth Receivers that the computer can see. This configuration is saved in the protocol file.



JET Device Configuration

Available JET Bluetooth Receivers

This section will list all of the JET Bluetooth Receivers that the current computer has access to. If another JET Bluetooth 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 Bluetooth Receivers.

If a JET Bluetooth Receiver has been correctly configured but it does not show up in the JET Bluetooth Receiver list, the computers' Firewall settings may need to be modified. See Appendix C Configuring Firewall Settings for modifying the computers' Firewall settings.

NOTE: Both models of JET Bluetooth Receivers, the 22

JET Devices Detected

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

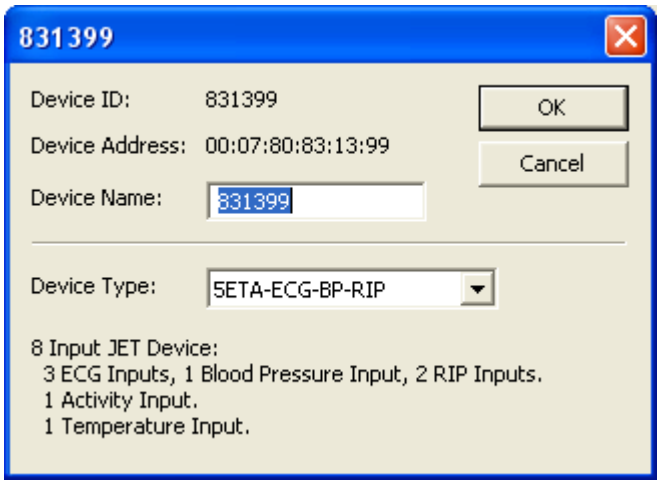
The table of information includes the Device ID (Serial Number), Name (which can be modified), Model number of the device, and if the device is in the Active JET Devices section.

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 Bluetooth 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. The information listed depends on the model of JET Device and which type of lead set is connected. See the Section "Software Model Type Information" for more details.



Device dialog

This dialog lists the Device ID, Address, Name, Device Type, and channels available. The Name of the device can be changed for easier reference. The Device Name can handle 9 characters. The device name configured will appear on the tab for each device in the calibration dialog.

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 Bluetooth Receiver that the device is connected to, and the Model/Type of the device.

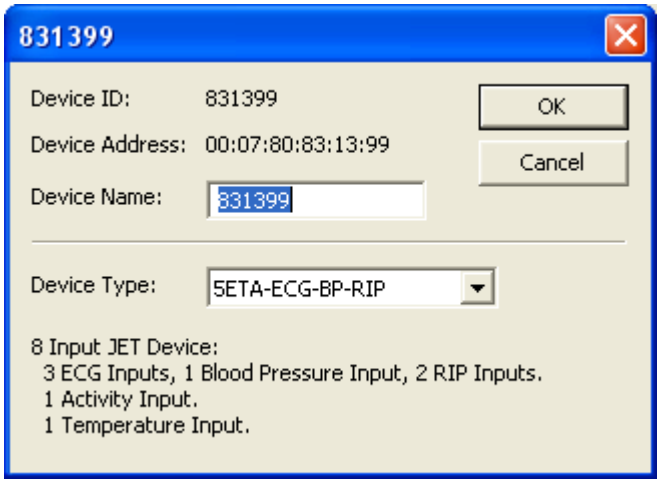
The **Remove Device(s)** button allows the user to remove any unwanted devices that are listed.

The Up and Down arrow buttons allow the user to move the devices around. The order listed here is the order in which P3 Plus will populate the Channel Input Setup configuration on the **PPP3 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 Bluetooth 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 P3 Plus, 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.

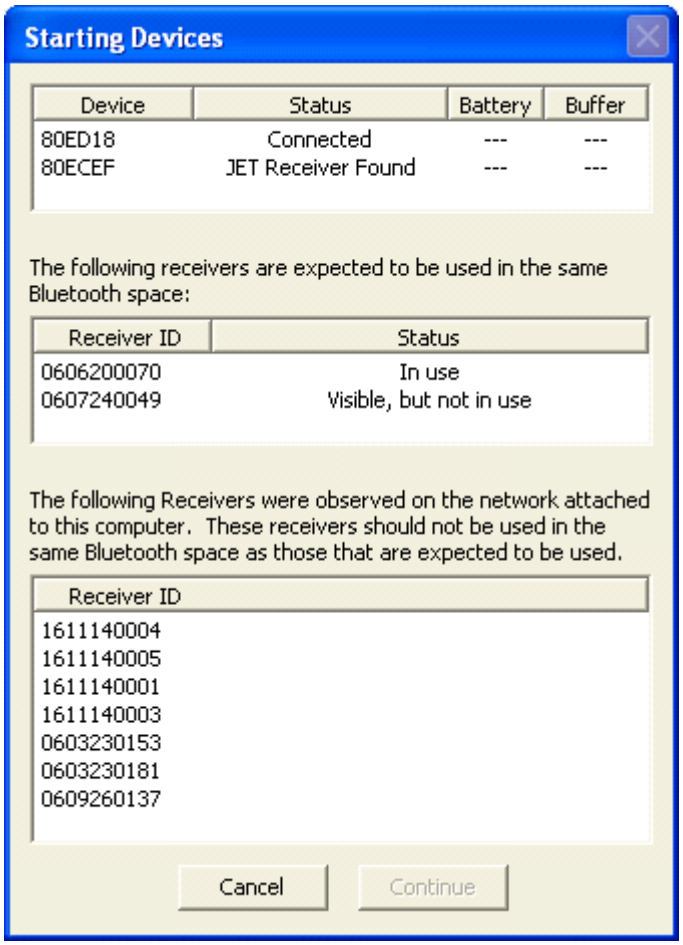
Calibration

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.

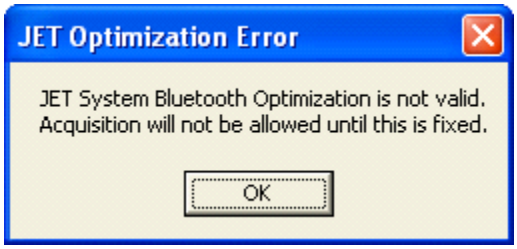
When the **7700 Amplifier Setup** selection is selected, a message will appear asking to start the devices. This allows the software to pull in the correct information.

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.

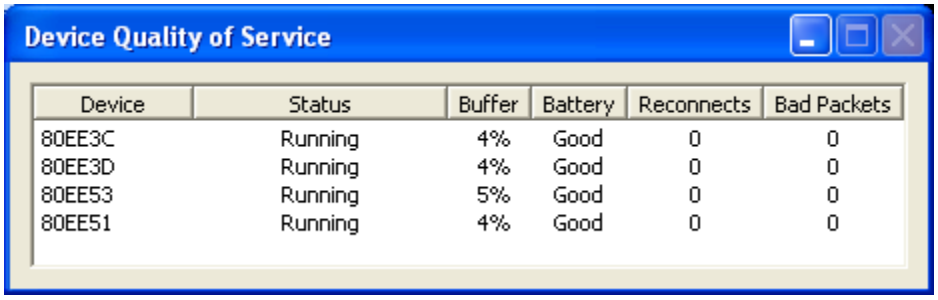


This dialog lists the status of the current devices on study. The JET startup dialog also provides a list of receivers that are expected to be used in the same Bluetooth space. If the receivers that are used for the current acquisition and the visible receivers listed in their optimization information do not have identical optimization information, Ponemah shall post the following error message and shall not allow the acquisition to continue.



After the devices have been found and the **Buffer** has reached 100% for at least one of the devices, click on the **Continue** button. This dialog will also appear prior to an acquisition being started.

During the calibration (and acquisition) a quality of service dialog appears as shown below.

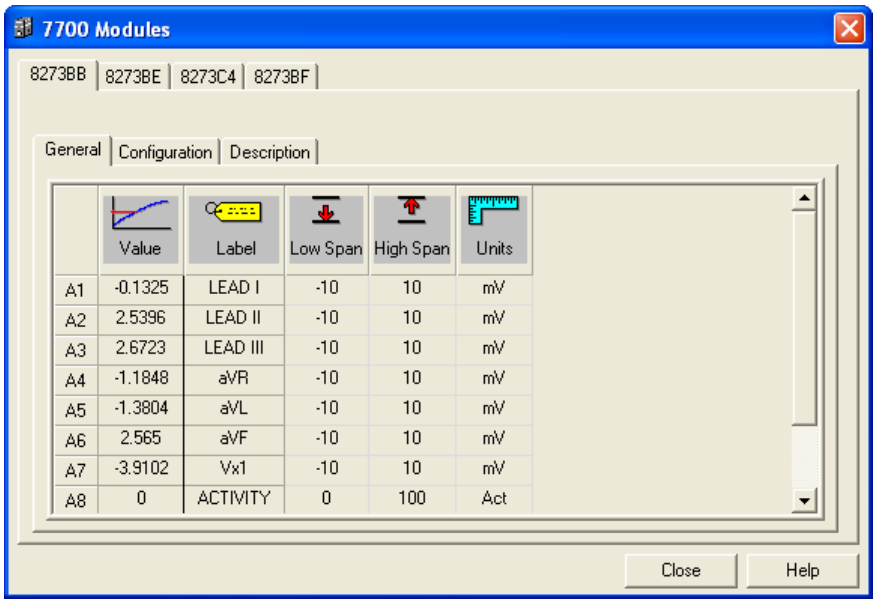


This dialog will show the Device name, Status of the device, the current Buffer size that is being used by the device, Battery state, how often the device needed to reconnect, and how many Bad Packets were sent while acquiring data.

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 Bluetooth Receiver.

General Tab

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



General Tab

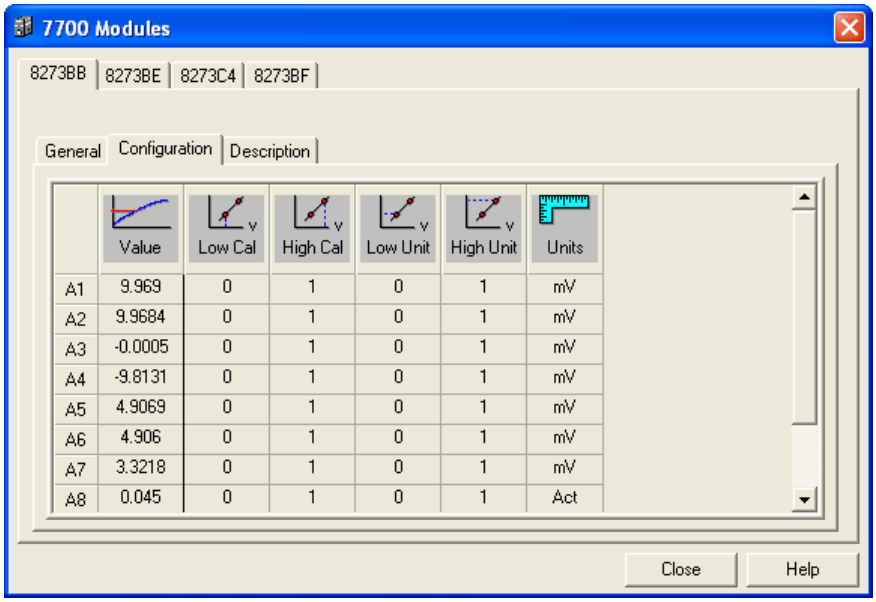
The **Value** column lists the current value reported from the device.

The **Label** column lists a label that will appear in the Input column of the PPP3 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

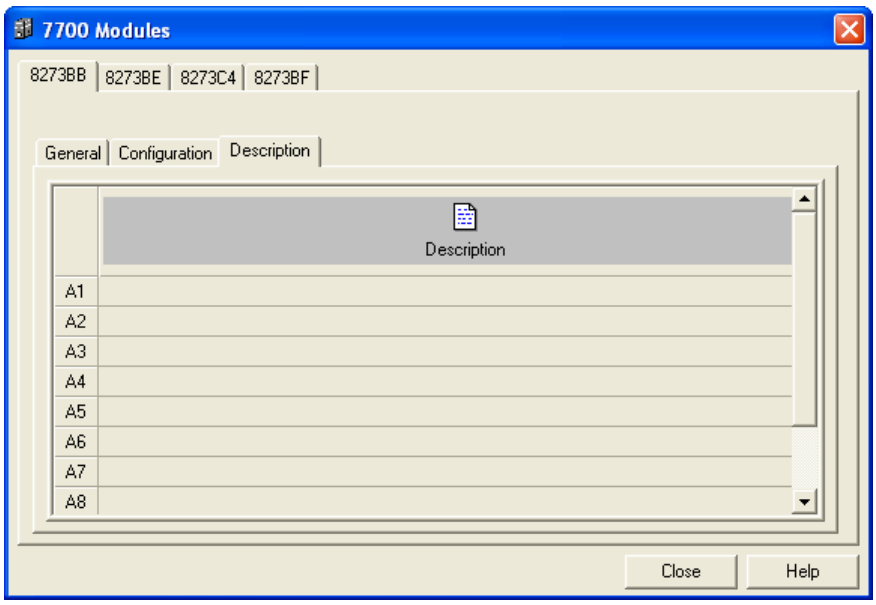
The **Value** column lists the current value reported from the device.

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

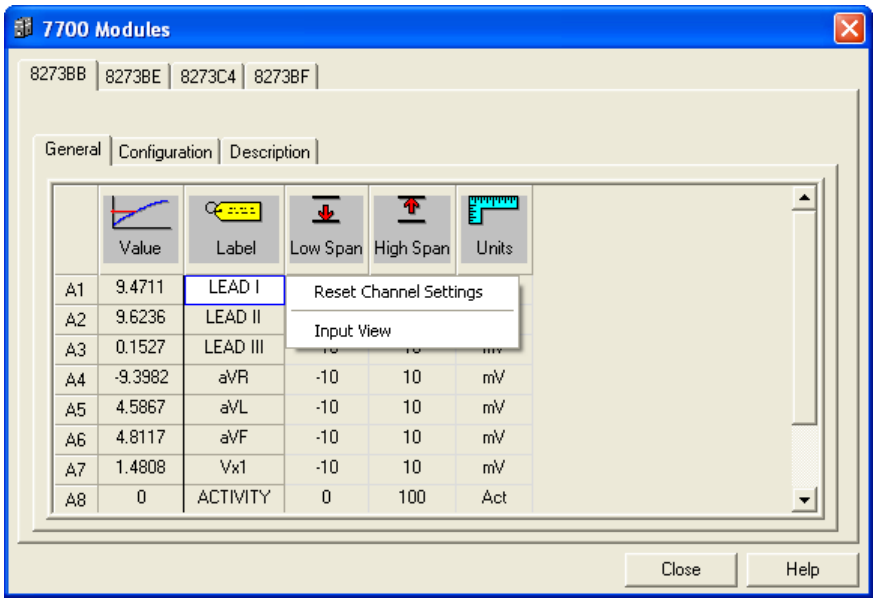
The **Description** column allows the user to enter any miscellaneous information needed. This information is not used in any other location.

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.

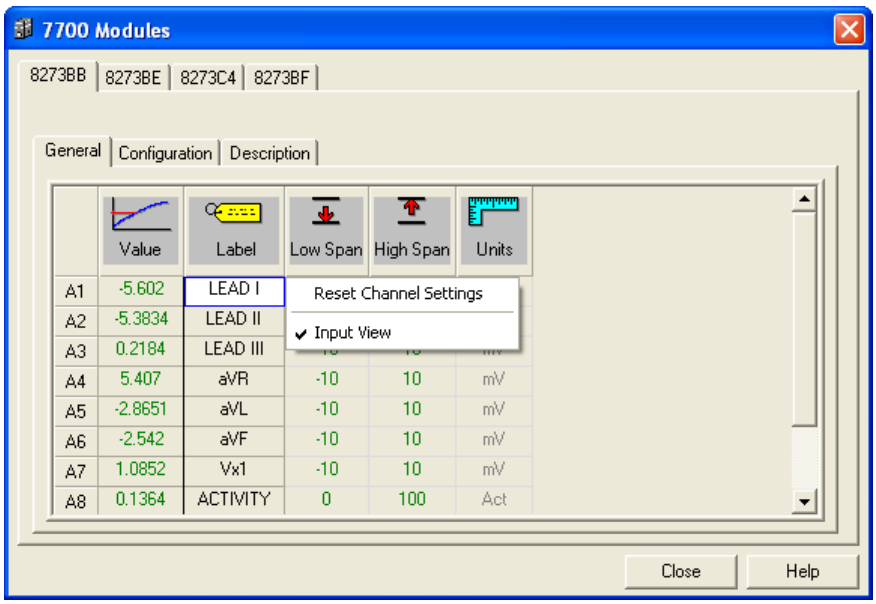
Input View

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

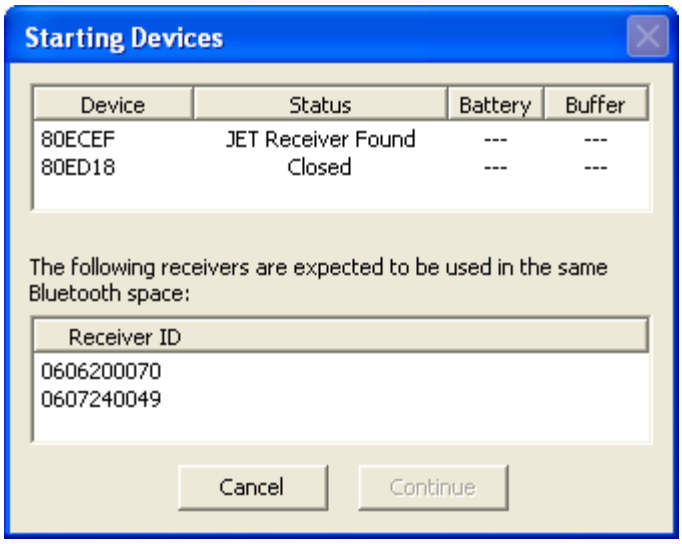
This selection allows the user to reset the settings of the channel selected. When selected, the channel will reset all columns. The default settings are dependent on which model and type are selected. When this selection is selected, a message box will appear asking if the channel should be reset. This 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.

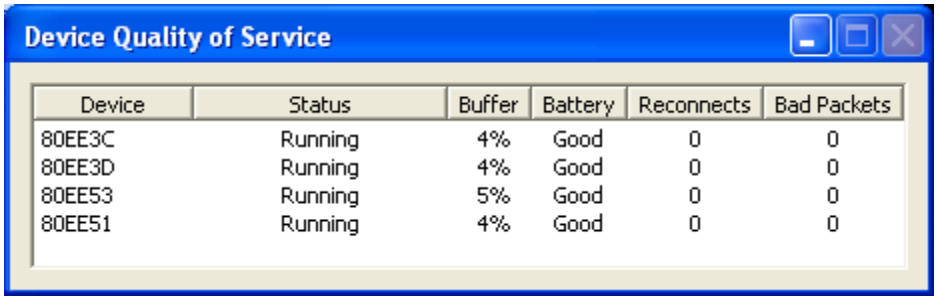
Starting Devices dialog

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.

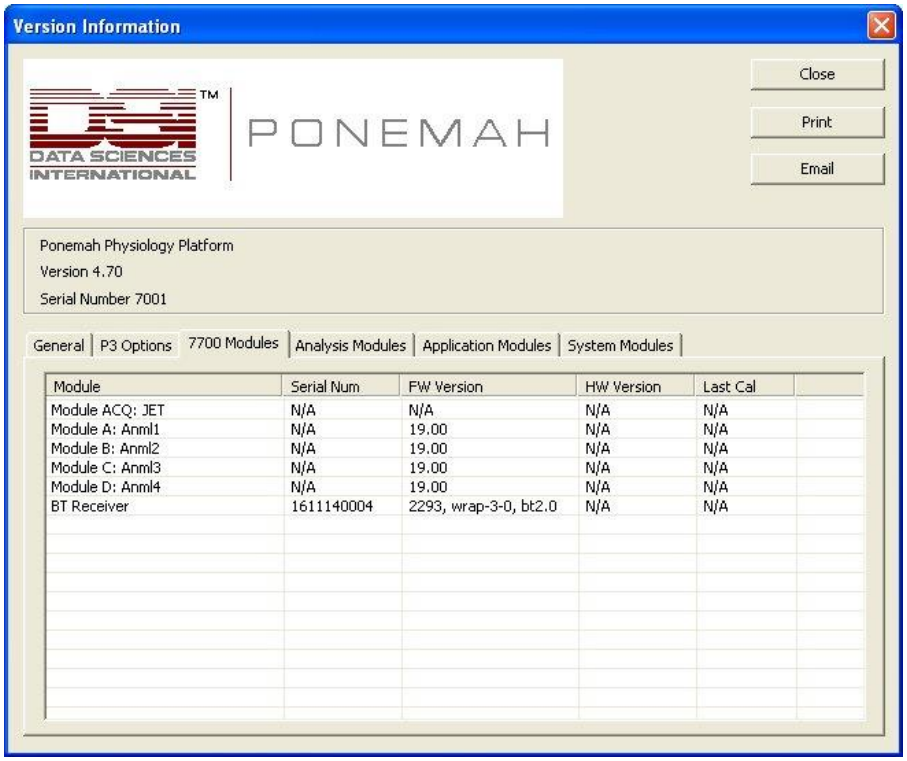


This dialog will show the Device name, Status of the device, the current Buffer size that is being used by the device, Battery state, how often the device needed to reconnect, and how many Bad Packets were sent while acquiring data.

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 Bluetooth Receiver.

Product Information

More information can be viewed regarding each device and JET Bluetooth 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 Bluetooth 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 Bluetooth 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.

1. Devices should be no more than 10 meters from the JET Bluetooth Receiver that they will be connected to. Five meters is typical.
2. A clear line of sight between JET Bluetooth Receiver and device is recommended. RF signal strength is reduced when it is being transmitted through objects.
3. If multiple JET Bluetooth Receivers are used, it is recommended to connect those receivers to the computer via an Ethernet switch.
4. If multiple JET Bluetooth Receivers are used, keep the receivers as far apart as possible (the minimum recommended distance is 1 meter).
5. If multiple JET Bluetooth 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.

Software Model Types

Software Model Type Information

There are 7 different models of JET Devices and 3 different lead sets. The different models may have multiple types based on the lead set used. Each of the different lead sets and models and model types are listed below.

Once the lead set has been connected to device a search for the devices can be done from the **JET Device Configuration** dialog. Each of the available types of models can either be selected by right clicking on the device and selecting the **Set Type To** submenu, or by right clicking on the device and selecting the **Device Properties** selection. This selection will bring up the device dialog with a **Device Type** drop down list box. From this list box, the available selections are listed.

Lead Sets

There are 3 different lead sets available. The **EA** and **EA-BP** models have 1 lead set, a **Differential Lead Set**. The **3ETA, 3ETA-BP, 5ETA-BP**, and **6ETA** devices have 2 lead sets available, a **Differential Lead Set** and **ECG Lead Set**.

Using a **Differential Lead Set** allows the user to acquire a signal using differential inputs; the negative wires for each input need to be connected separately. This harness is typically (but not always) used when acquiring non-ECG biopotential or RIP (Respiratory Inductive Plethysmography) signals.

Using an **ECG Lead Set** allows the user to acquire a signal using the same negative; all negative wires for each input are electrically connected. This harness is typically used when acquiring ECG biopotential signals and calculations of augmented leads are to be performed.

If a device has been configured within P3 Plus with one type of lead set connected and the user changes the lead set, the user must go to the **JET Device Configuration** dialog and research for the device and add it to the **Active JET Devices** list. Once that is done the user must click on the **OK** button for the changes to take effect.

3ETA-EXP

The 3ETA-EXP device inputs 8 channels of information to the P3 Plus application. The only lead set available is the individual leads that are supplied with the device. Additional longer leads are available for purchase. The available type is:

- **3ETA-EXP** - This device will input 8 channels into P3 Plus (3 ECG + 3 calculated ECG, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, ACTIVITY, and TEMP.

EA

The EA device inputs 2 channels of information to the P3 Plus application. The only lead set available is the **Differential Lead Set**. The available type is:

- **EA** - This device will input 2 channels into P3 Plus (1 biopotential and 1 activity channel). The channels are CHANNEL 1 and ACTIVITY.

EA-BP

The EA-BP device inputs 3 channels of information to the P3 Plus application. The only lead set available is the **Differential Lead Set**. The available type is:

- **EA-BP** - This device will input 3 channels into P3 Plus (1 biopotential, 1 blood pressure, and 1 activity channel). The channels are CHANNEL 1, BP, and ACTIVITY.

3ETA

The 3ETA device inputs either 5 or 9 channels of information into the P3 Plus application dependent on the lead set used.

If the **Differential Lead Set** is connected, 5 channels will be available to P3 Plus. The available types are:

- **3ETA-DIFF** - This device will input 5 channels into P3 Plus (3 biopotential, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, ACTIVITY, and TEMP. Channels 1, 2, and 3 are Black, White, and Red respectively.
- **3ETA-DIFF-RIP** - This device will input 5 channels into P3 Plus (1 biopotential, 2 RIP Inputs, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, RIP CHEST, RIP ABDO, ACTIVITY, and TEMP. Channel 1 is represented by the black leads, the chest by the white leads, and the abdomen by the red leads.

If the **ECG Lead Set** is connected, either 5 or 9 channels will be available to P3 Plus dependent on the type selected. The available types are:

- **3ETA-DIFF** - This device will input 5 channels into P3 Plus (3 biopotential, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, ACTIVITY, and TEMP. In this configuration the White lead is the negative for all biopotentials and Black, Red, and Brown are associated with Channels 1, 2, and 3 respectively.
- **3ETA-ECG** - This device will input 9 channels into P3 Plus (7 ECG, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, ACTIVITY, and TEMP. This 7 lead ECG requires specific placement of the electrodes to

correctly compute the calculated leads, specifically white approximating the right arm, black approximating the left arm, red approximating the left leg, green approximating the right leg, and brown for the desired v lead.

The default device type when using an ECG lead set is 3ETA-ECG.

The default device type when using a differential lead set is 3ETA-DIFF.

3ETA-BP

The 3ETA-BP device inputs either 6 or 10 channels of information into the P3 Plus application dependent on the lead set used.

If the **Differential Lead Set** is connected, 6 channels will be available to P3 Plus. The available types are:

- **3ETA-DIFF-BP** - This device will input 6 channels into P3 Plus (3 biopotential, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, BP, ACTIVITY, and TEMP. Channels 1, 2, and 3 are Black, White, and Red respectively.
- **3ETA-DIFF-RIP-BP** - This device will input 6 channels into P3 Plus (1 biopotential, 2 RIP Inputs, 1 Blood Pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, RIP CHEST, RIP ABDO, BP, ACTIVITY, and TEMP. Channel 1 is represented by the black leads, the chest by the white leads, and the abdomen by the red leads.

If the **ECG Lead Set** is connected, either 6 or 10 channels will be available to P3 Plus dependent on the type selected. The available types are:

- **3ETA-DIFF-BP** - This device will input 6 channels into P3 Plus (3 biopotential, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, BP, ACTIVITY, and TEMP. In this configuration the White lead is the negative for all biopotentials and Black, Red, and Brown are associated with Channels 1, 2, and 3 respectively.
- **3ETA-ECG-BP** - This device will input 10 channels into P3 Plus (7 ECG, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, BP, ACTIVITY, and TEMP. This 7 lead ECG requires specific placement of the electrodes to correctly compute the calculated leads, specifically white approximating the right arm, black approximating the left arm, red approximating the left leg, green approximating the right leg, and brown for the desired v lead.

The default device type when using an ECG lead set is 3ETA-ECG-BP.

The default device type when using a differential lead set is 3ETA-DIFF-BP.

6ETA

The 6ETA device inputs either 8 or 12 channels of information into the P3 Plus application dependent on the lead set used in the rightmost jack.

If two **Differential Lead Sets** are connected, 8 channels will be available to P3 Plus. The available type is:

- **6ETA-DIFF** - This device will input 8 channels into P3 Plus (6 biopotential, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, CHANNEL 4, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. Channels 1, 2, and 3 are Black, White, and Red respectively from the rightmost jack (jack closest to the temperature probe jack). Channels 4, 5, and 6 are Black, White, and Red respectively from the leftmost jack.

If the **ECG Lead Set** is connected, either 8 or 12 channels will be available to P3 Plus dependent on the type selected. The user has the capability of selecting the type of inputs that will be available. The available types are:

- **6ETA-ECG-VLEAD** - This device will input 12 channels into P3 Plus (10 ECG, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, Vx2, Vx3, Vx4, ACTIVITY, and TEMP. The recommended connections are 2 ECG lead sets. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the limb leads. The lead set in the leftmost jack will be used for V leads 2-4 and should have the white lead attached at the same location as the white lead from the rightmost jack.
- **6ETA-ECG-DIFF** - This device will input 12 channels into P3 Plus (7 ECG, 3 biopotential, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, CHANNEL 8, CHANNEL 9, CHANNEL 10, ACTIVITY, and TEMP. The user can use either 2 ECG lead sets or 1 ECG and 1 differential lead set. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the limb leads. The lead set in the leftmost jack will be used for channels 8-10.
- **6ETA-DIFF** - This device will input 8 channels into P3 Plus (6 biopotential, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, CHANNEL 4, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. The recommended connections are 2 differential lead sets. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for channels 1-3 and the lead set in the leftmost jack will be used for channels 4-6.
- **6ETA-DIFF-RIP-DIFF** - This device will input 8 channels into P3 Plus (1 biopotential, 2 RIP Inputs, 3 biopotential, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, RIP CHEST 2, RIP ABDOMEN 3, CHANNEL 4, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the channel 1 and the RIP leads. The lead set in the leftmost jack will be used for channels 4-6.
- **6ETA-DIFF-DIFF-RIP** - This device will input 8 channels into P3 Plus (4 biopotential, 2 RIP Inputs, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, CHANNEL 4, RIP CHEST 5, RIP ABDOMEN 6, ACTIVITY, and TEMP. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the channels 1-3. The lead set in the leftmost jack will be used for channels 4 and the RIP leads.

- **6ETA-ECG-VLEAD-RIP** - This device will input 12 channels into P3 Plus (8 ECG, 2 RIP Inputs, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, Vx2, RIP CHEST 9, RIP ABDOMEN 10, ACTIVITY, and TEMP.

The default device type when using an ECG lead set is 6ETA-ECG-VLEAD.

5ETA-BP

The 5ETA-BP device inputs either 8 or 12 channels of information into the P3 Plus application dependent on the lead set used in the rightmost jack.

If two **Differential Lead Sets** are connected, 8 channels will be available to P3 Plus. The available type is:

- **5ETA-DIFF-BP-DIFF** - This device will input 8 channels into P3 Plus (5 biopotential, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, BP, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. Channels 1, 2, and 3 are Black, White, and Red respectively from the rightmost jack (jack closest to the temperature probe jack). Channels 4 is blood pressure and channels 5 and 6 are White and Red respectively from the leftmost jack. The black leads from the leftmost jack are not used.
- **5ETA-DIFF-RIP-BP-DIFF** - This device will input 8 channels into P3 Plus (3 biopotential, 2 RIP Inputs, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, RIP_CHEST, RIP_ABDO, BP, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. Channel 1 is represented by the black leads, the chest by the white leads, and the abdomen by the red leads from the rightmost jack (jack closest to the temperature probe jack). Channel 4 is blood pressure and channels 5 and 6 are White and Red respectively from the leftmost jack. The black leads from the leftmost jack are not used.
- **5ETA-DIFF-BP-RIP** - This device will input 8 channels into P3 Plus (3 biopotential, 2 RIP Inputs, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, BP, RIP_CHEST, RIP_ABDO, ACTIVITY, and TEMP. Channels 1, 2, and 3 are Black, White, and Red respectively from the rightmost jack (jack closest to the temperature probe jack). Channels 4 is blood pressure and the chest is represented by the white leads, and the abdomen by the red leads from the leftmost jack. The black leads from the leftmost jack are not used.

If the **ECG Lead Set** is connected, either 8 or 12 channels will be available to P3 Plus dependent on the type selected. The user has the capability of selecting the type of inputs that will be available. The available types are:

- **5ETA-ECG-BP-VLEAD** - This device will input 12 channels into P3 Plus (9 ECG, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, BP, Vx2, Vx3, ACTIVITY, and TEMP. The recommended connections are 2 ECG lead sets. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the limb leads as described previously. The lead set in the leftmost jack will be used for V leads 2-3 with red and brown coloring respectively and

should have the white lead attached at the same location as the white lead from the rightmost jack. The black lead from the rightmost jack is not used.

- **5ETA-ECG-BP-DIFF** - This device will input 12 channels into P3 Plus (7 ECG, 2 biopotential, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, BP, CHANNEL 9, CHANNEL 10, ACTIVITY, and TEMP. The user can use either 2 ECG lead sets or 1 ECG and 1 differential lead set. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for the limb leads. The lead set in the leftmost jack will be used for channels 9-10 using the white, red, and brown (if using an ECG leadset) leads. The black leads from the leftmost jack are not used. If using a differential leadset in the rightmost jack the white and red leads represent channels 9 and 10 respectively.
- **5ETA-DIFF-BP-DIFF** - This device will input 8 channels into P3 Plus (5 biopotential, 1 blood pressure, 1 activity, and 1 temperature channel). The channels are CHANNEL 1, CHANNEL 2, CHANNEL 3, BP, CHANNEL 5, CHANNEL 6, ACTIVITY, and TEMP. The recommended connections are 2 differential lead sets. The lead set in the rightmost jack (jack closest to the temperature probe jack) must be used for channels 1-3 and the lead set in the leftmost jack will be used for channels 5-6 using the white and red leads respectively.
- **5ETA-ECG-BP-RIP** - This device will input 12 channels into P3 Plus (7 ECG, 1 blood pressure, 2 RIP Inputs, 1 activity, and 1 temperature channel). The channels are LEAD I, LEAD II, LEAD III, aVR, aVL, aVF, Vx1, BP, RIP CHEST, RIP ABDO, ACTIVITY, and TEMP. An ECG lead set must be used in the rightmost jack (jack closest to the temperature probe jack) and must be used for the limb leads. A differential lead set must be used in the leftmost jack with the chest represented by the white leads and the abdomen by the red leads. The black leads from the leftmost jack are not used.

The default device type when using an ECG lead set is 6ETA-ECG-BP-VLEAD.

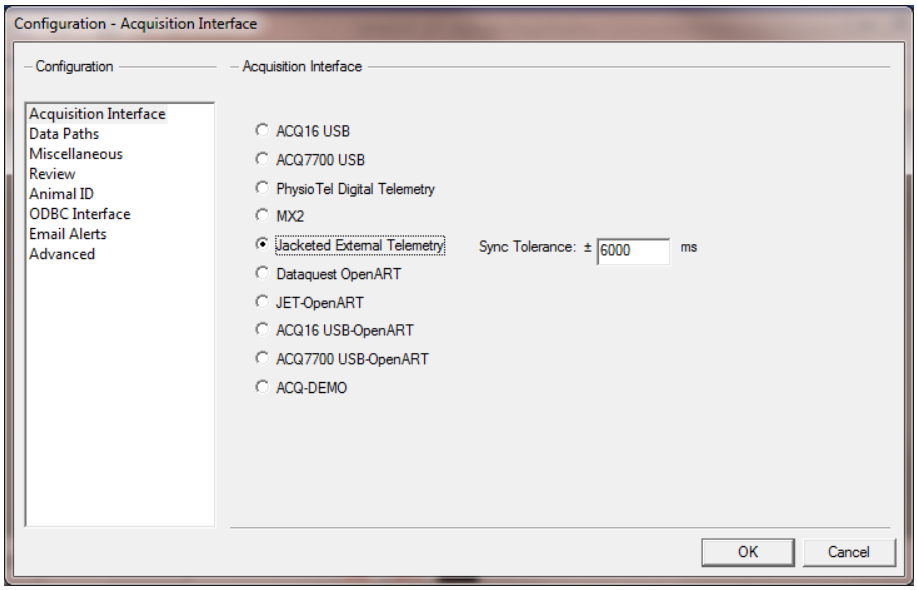
JET Tutorial

Setup

For this tutorial we will configure P3 Plus with the JET hardware, configure a Study, run acquisitions, and view the data through Summary. The Study and Summary sections are optional. The first step is to obtain all of the hardware needed. We will be using 1 computer, 1 JET Bluetooth Receiver, and 4 JET devices.

Protocol Setup - Configuring Devices

Start the P3 Plus application. Select the JET hardware option in the Application Configuration dialog if this has not already been done.

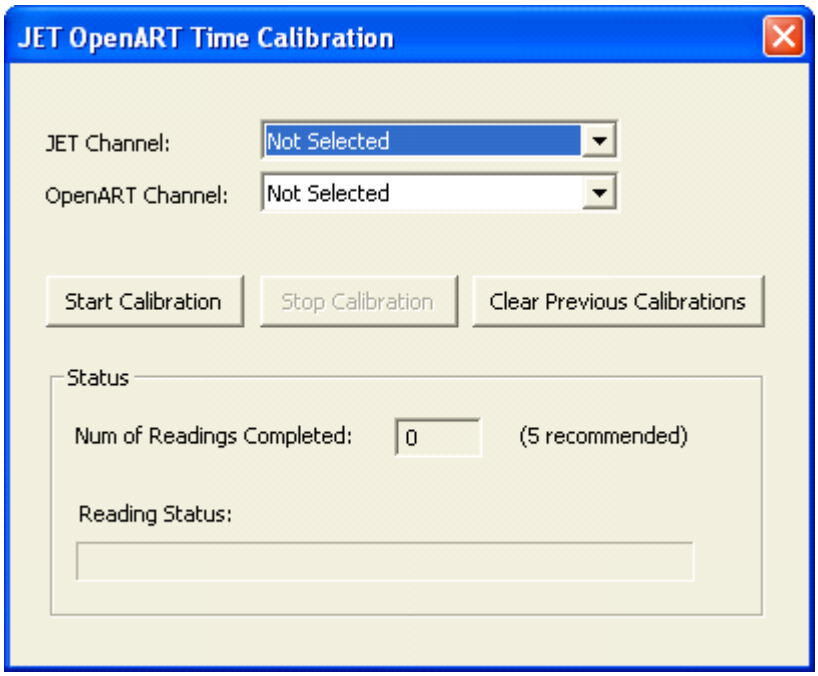


When selecting JET interfaces, a **Sync Tolerance** value is available for editing. This field allows drift among the JET devices to be corrected to the level of synchronization specified in the **Sync Tolerance** edit box. The default value for Jacketed External Telemetry is +/-6000ms and the default value for JET-OpenART is +/-100ms.

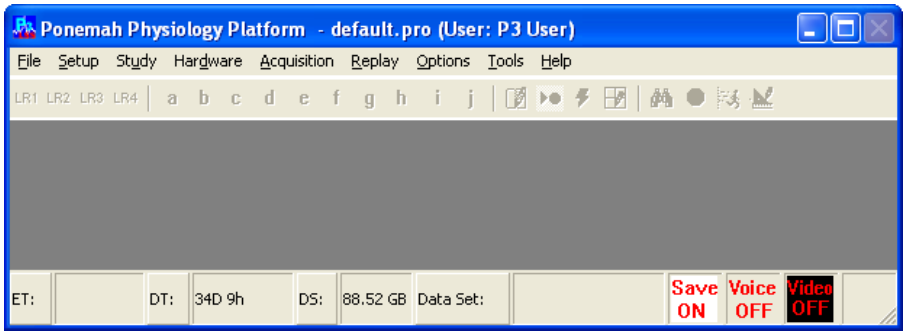
When this synchronization occurs, data will be railed (signal forced out of range of the device to ensure that it will not be treated as a physiological signal) to account for positive or negative drift. This data will be bracketed by Bad Data Marks. These data points are not shown in the Device Quality of Service dialog.

If this synchronization is not desired, entering a very large value will essentially disable this feature. Minimum tolerance is +/-20ms.

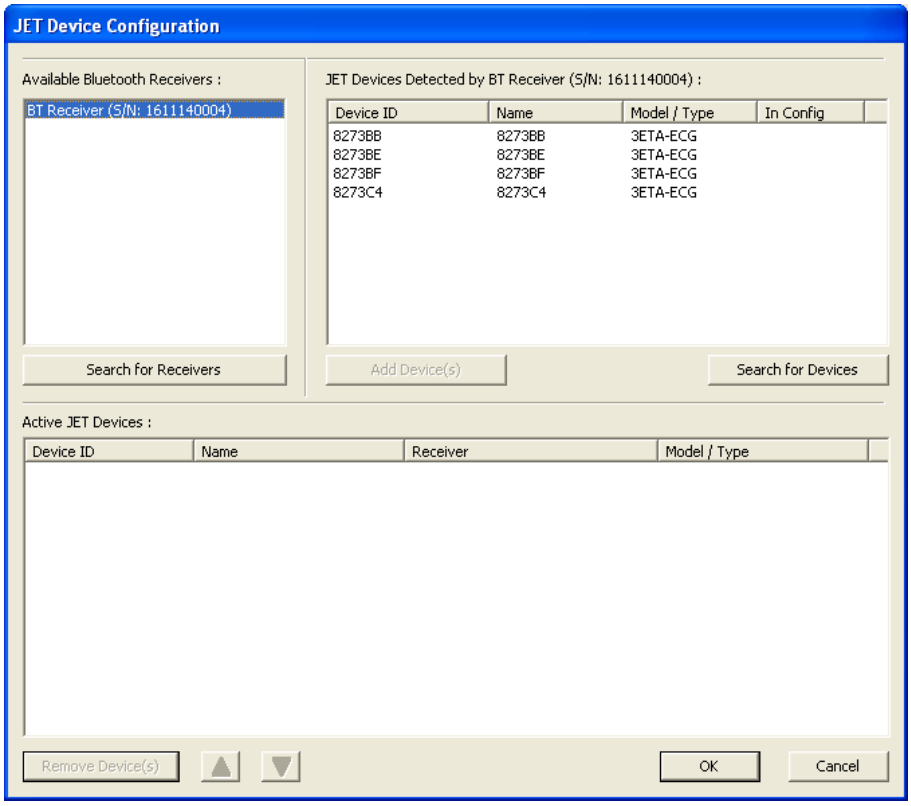
JET OpenART Time Calibration Dialog



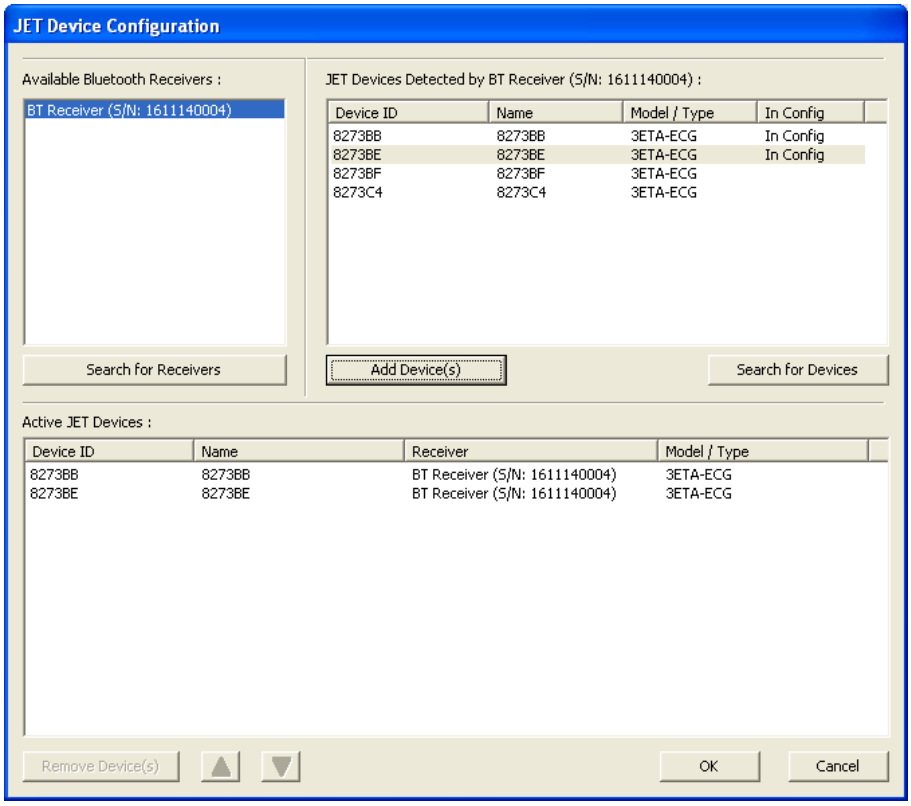
This features allows the user to enter a square wave (device is not provided) into both channels in order to character the environment. It determines delays or offsets introduced by the network environment. This information is stored within the database and is used for subsequent acquisitions.



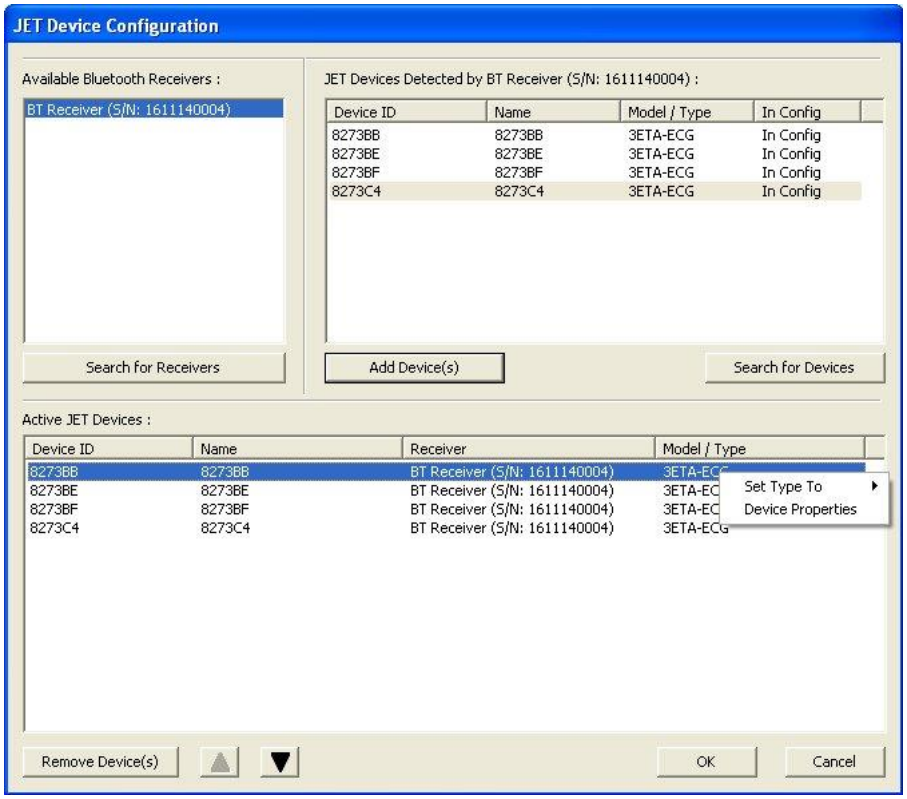
Select **JET Device Configuration** from the **Hardware** menu. At this point the user should have the lead sets connected to the devices that will be used.



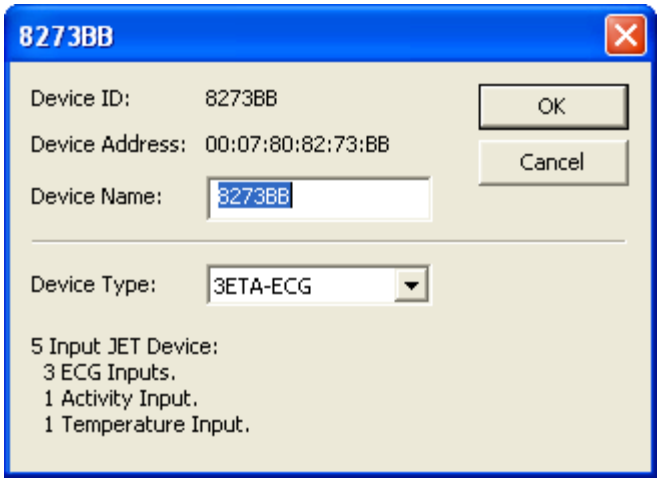
Now the user must search for the devices by clicking on the **Search for Devices** button. Once all of the devices have been found and the model number comes in for each of the devices, they can be added to the Active JET Devices section. This is done by selecting each device and clicking on the **Add Device(s)** button. In the screen capture below two of the four devices have been added. Multiple devices can be added to the Active JET Devices section by selecting multiple devices and clicking on the **Add Device(s)** button.



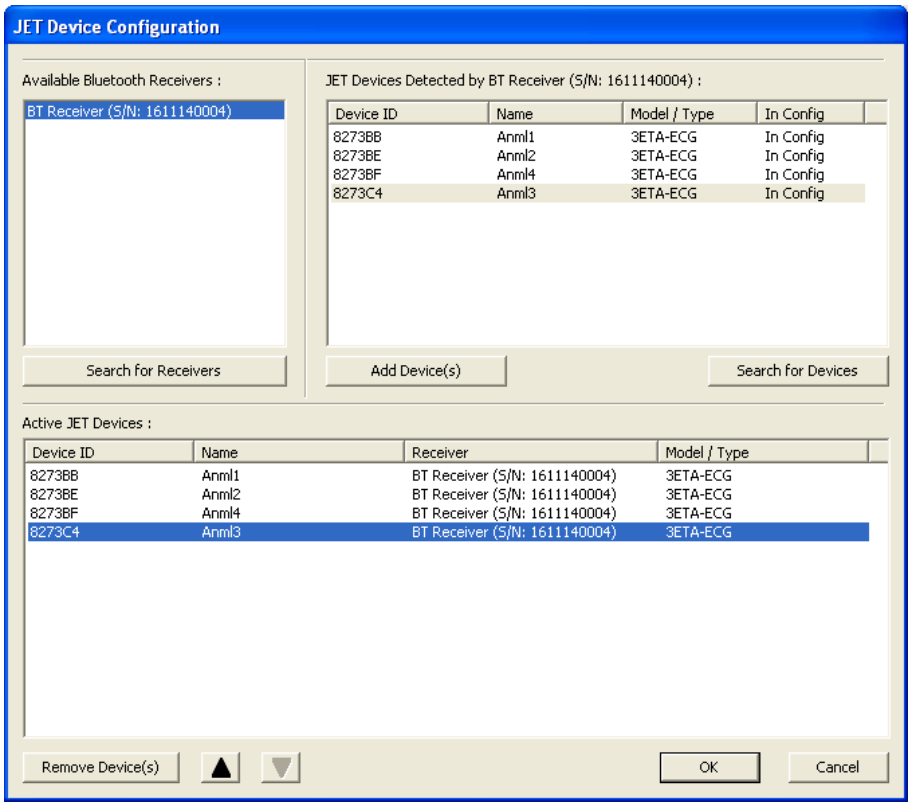
By default the name of each device is set to the serial number. The user has the capability of changing the name shown by right clicking on the device and selecting **Device Properties**. Shown below is the right click menu that is available.



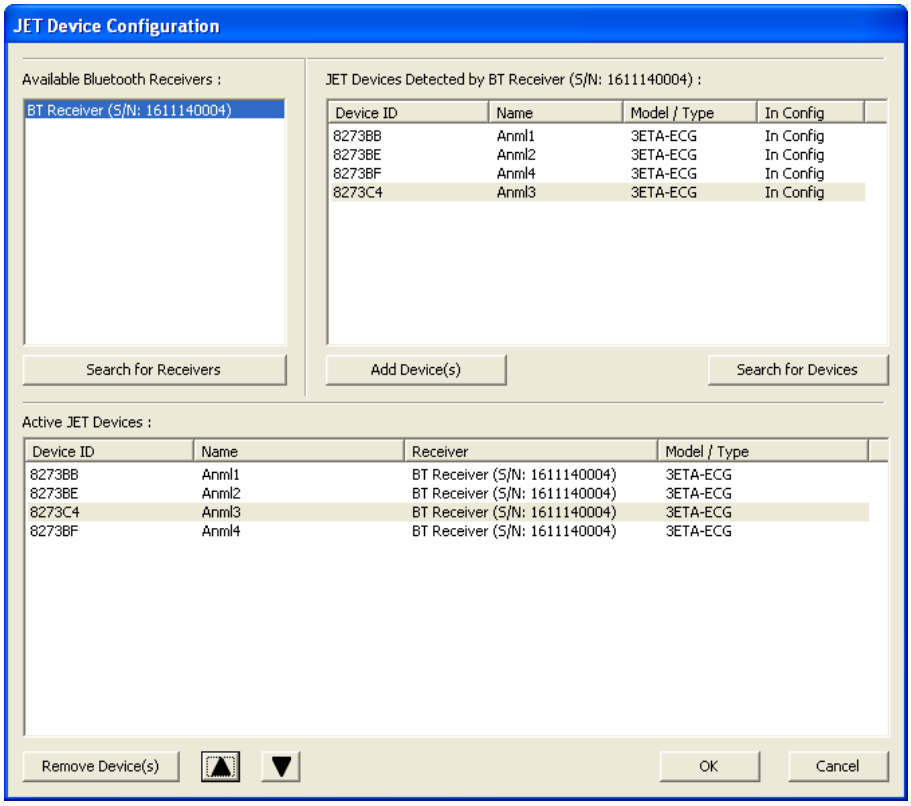
When the user selects the **Device Properties** selection, the following dialog appears.



For this tutorial we will configure Anml1 to Anml4. As shown below, in the **Active JET Devices** section, the animals are not in order.



The user has the capability of selecting the device in the **Active JET Devices** section and moving it up and down the list. This is done by selecting a device (for our example it is Anml#3), and then clicking on the Up arrow.



The user could have also added the devices from the **JET Devices Detected** section to the **Active JET Devices** section in the order needed.

Select the **OK** button when you are done. The configuration of the devices is complete.

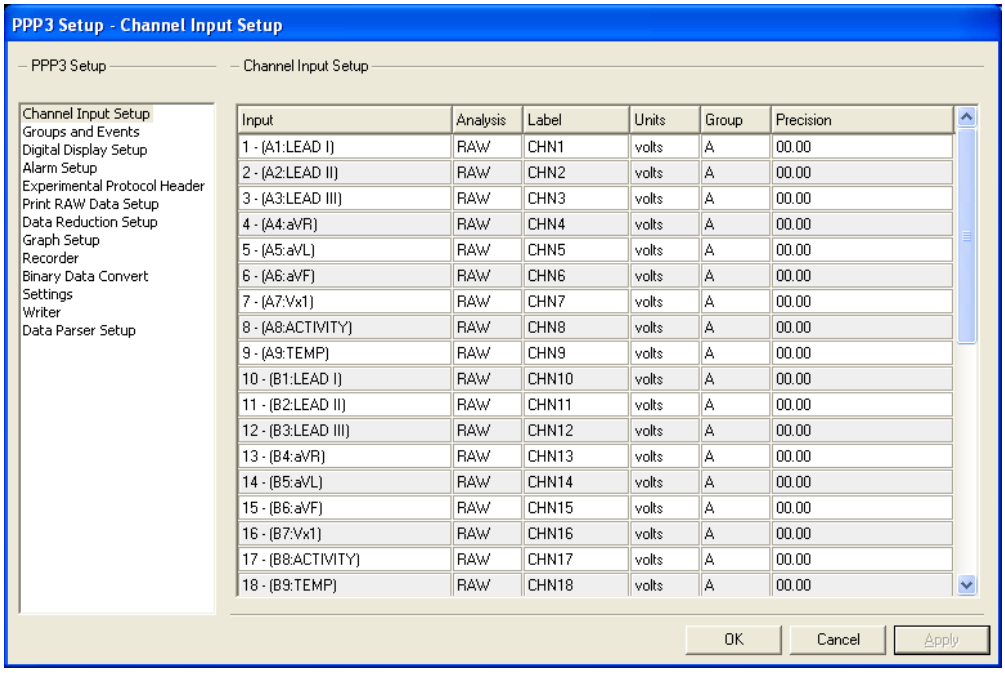
Save the protocol file.

Protocol Setup - Non JET Information

Now the Non JET protocol information can be set up. The protocol for this tutorial will be set up to be run through Study. Study is an optional feature. For Study support, view the separate Study Manuals.

For each protocol configuration (Graphs, Data Reduction, etc,) view the appropriate sections within the P3 Plus Manual for details.

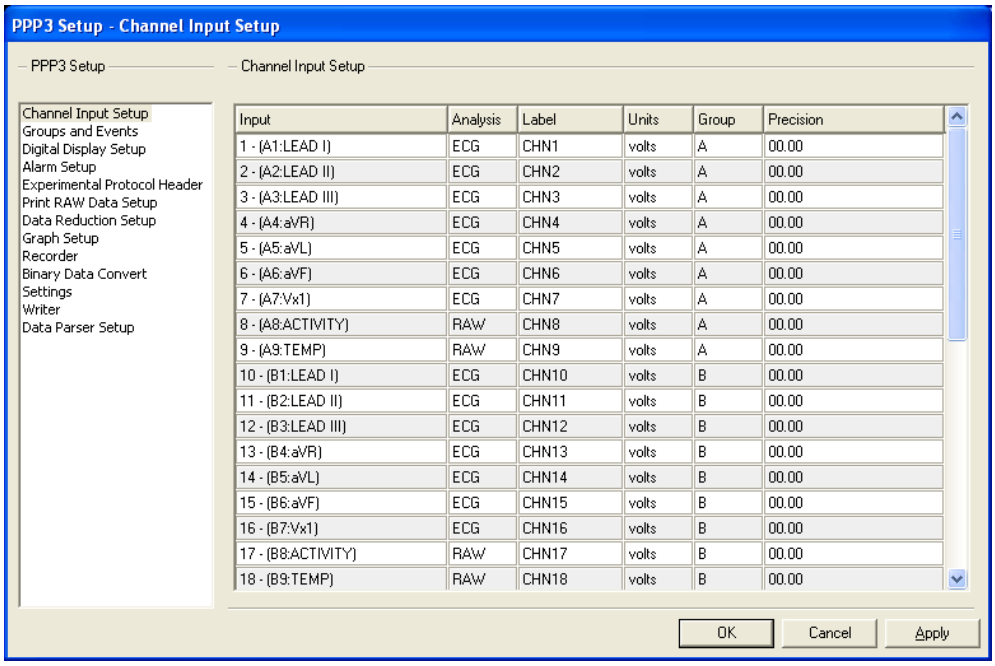
Select **P3 Setup** from the **Setup** menu and select the **Channel Input Setup** configuration on the left portion of the dialog. The following dialog will appear.



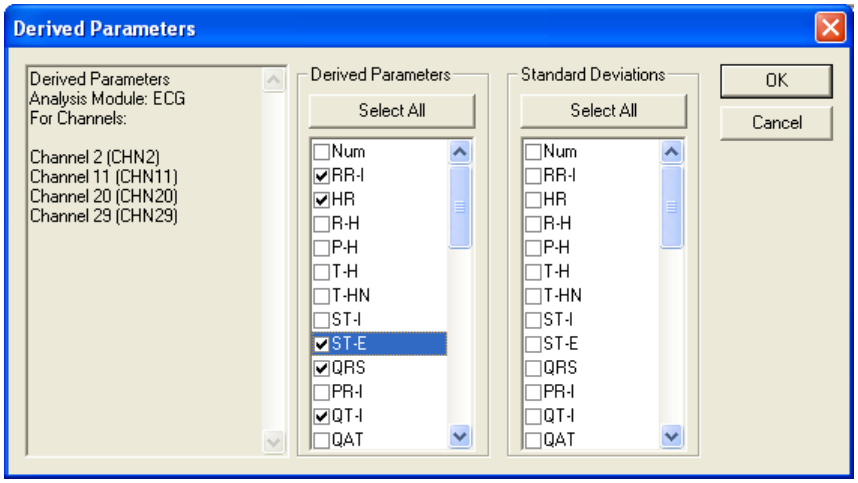
Configure each animal into a separate group, set the analysis to ECG for the ECG based channels (the first 7 of each animal), and RAW for any temperature and activity channels. The first 7 channels are ECG based when using a 3ETA device with the type configured to 3ETA-ECG. This will change based on the model and type the user is using. (If you are using Blood Pressure or Respiratory Add-Ons see sections below for additional information on setting up those channels.)

Note that three channels for JET devices have been added to display the accelerations in Gs for the X, Y, and Z directions for version 5.00. Previously, the only output for Activity was the sum of these three directions. If opening an old protocol file (prior to 5.00), Ponemah will set the new X, Y, and Z channels to inactive through channel mapping to maintain the original protocol setup.

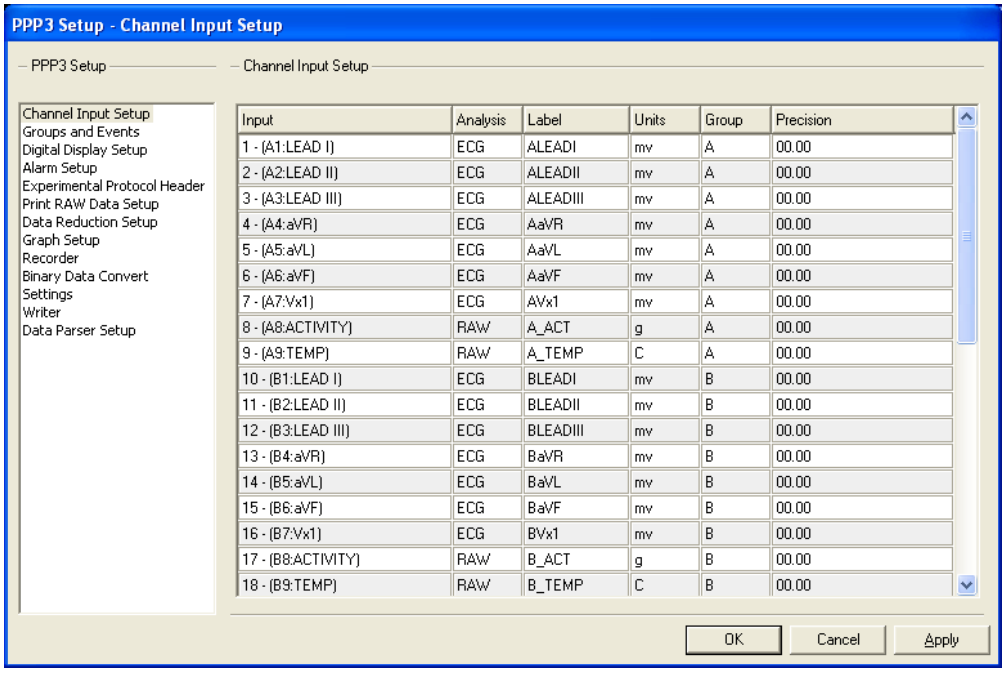
The user can select multiple inputs to make modifications to all inputs selected. This is done by holding down the Control key and selecting each input that requires modification. This can be done in multiple areas.



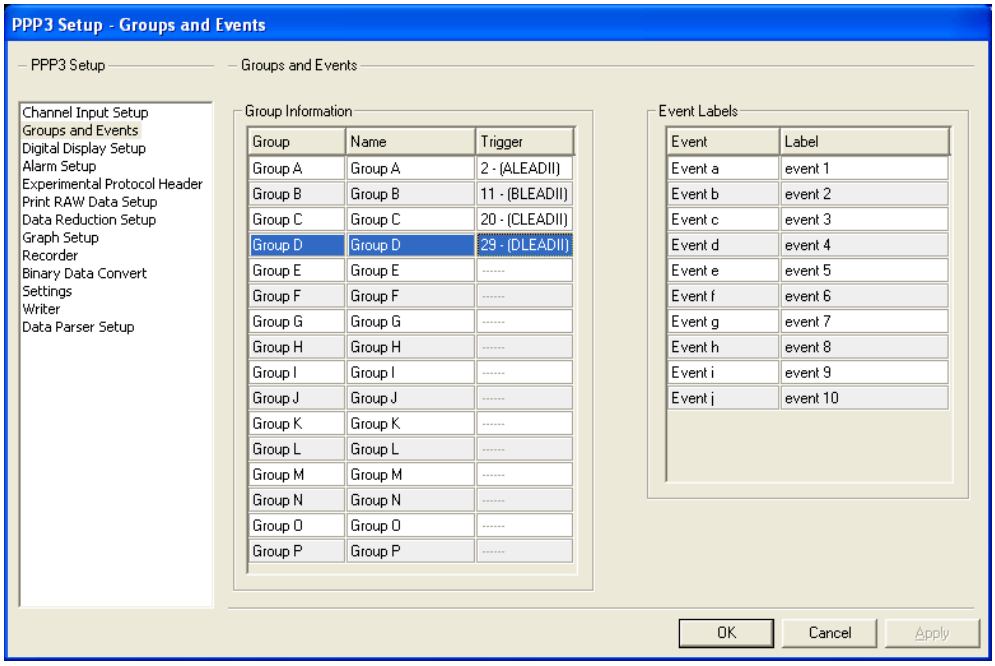
Now configure the derived parameters for each channel. For this configuration, only the derived parameters **RR-I**, **HR**, **QRS**, **QT-I**, and **ST-E** will be enabled for Lead II of each animal. This is done by right clicking on the desired channels and selecting **Derived Parameters**. All other derived parameters will not be enabled. The user can select every Lead II input and right click to select the **Derived Parameters**. The multi select capability will set the derived parameters for every selected input, as noted in the dialog below:



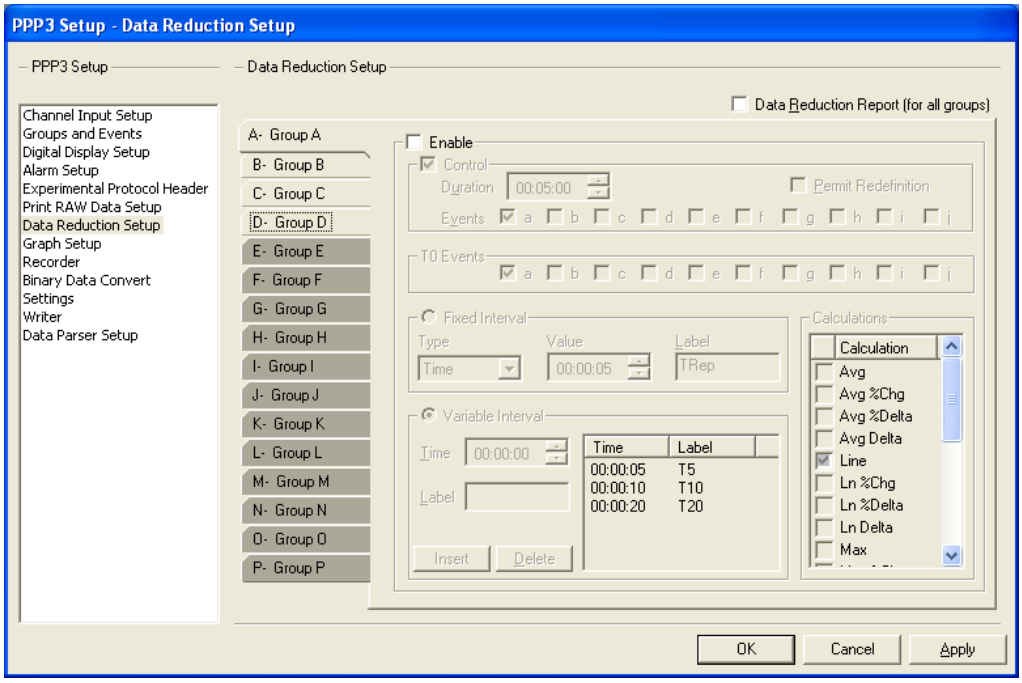
The Label for each of the channels can be configured. For this example, the labels were configured as shown below. Also, the Units for each of the channels can be configured similar to the derived parameters (by selecting the inputs that are the same, right clicking, selecting **Set Units To**, entering a value, and clicking on the **OK** button).



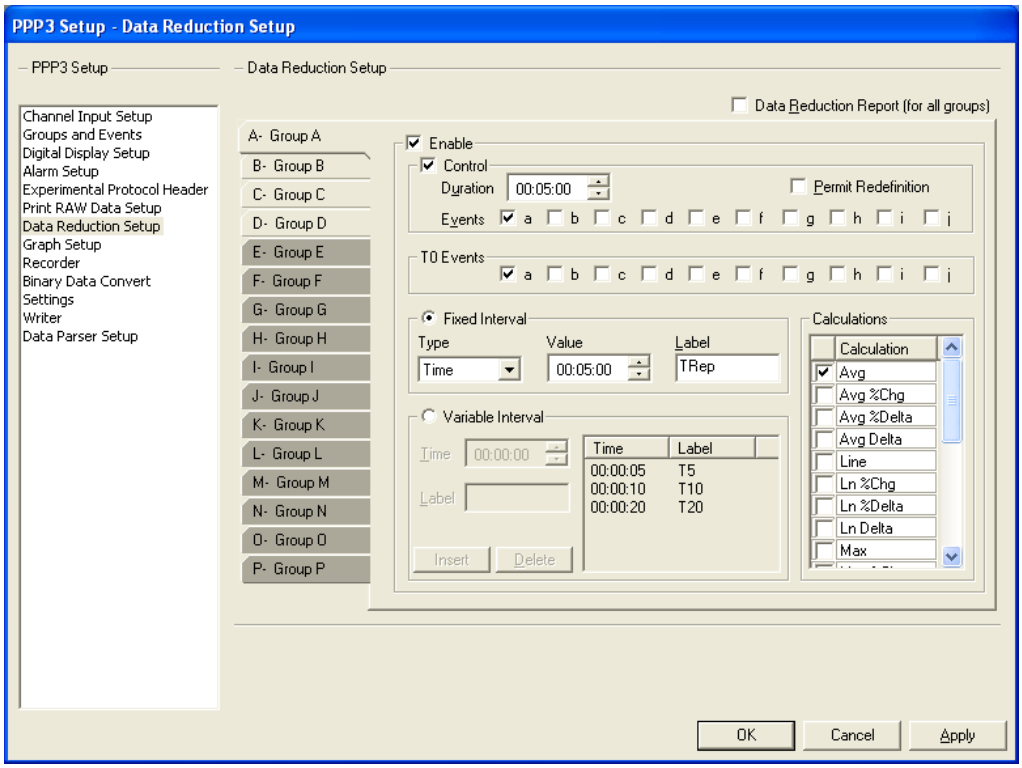
Now the groups and events can be configured. Since this tutorial is based on Lead II, it is recommended to set the trigger channel to that channel. Select the **Groups and Events** configuration. Set the trigger channel to LEAD II for each group and configure any known events.



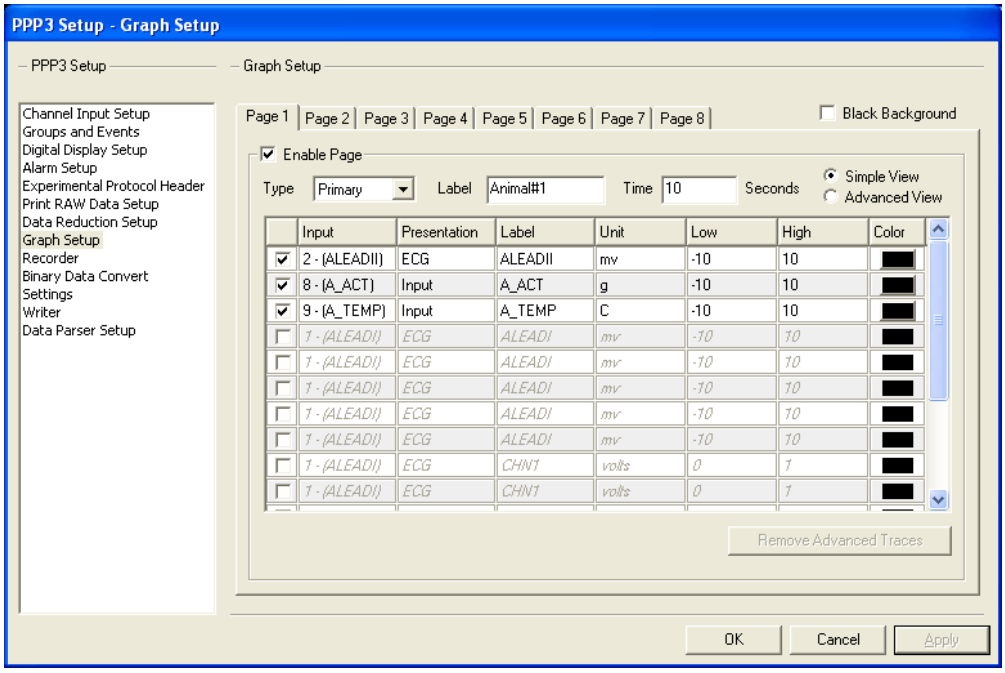
If using the Study Option, Data Reduction will now need to be configured. Select the **Data Reduction Setup** configuration. Since each group will need to be configured the same, perform a multi-select and select Groups A to D. This is done by selecting one of the groups, holding down the Shift key, and selecting the other groups as shown below.



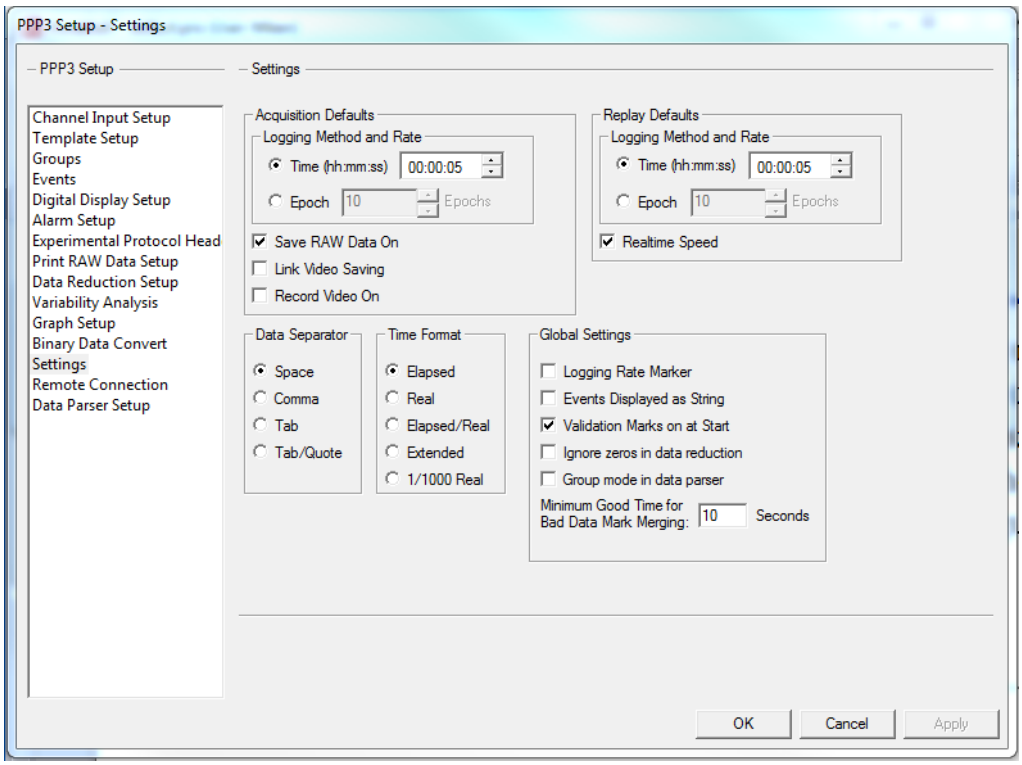
Configure the Data Reduction Setup. Whatever is selected will be applied to each of the four groups. For this example, configure the average and standard deviation calculations to be reported every 5 minutes based on Event "a". Below is the setup.



Now that Data Reduction is completed, the graphs can now be configured. Select the **Graph Setup** configuration. Configured below are four separate primary graphs showing Lead II, Activity, and Temperature for each animal (Page 1 is displayed).

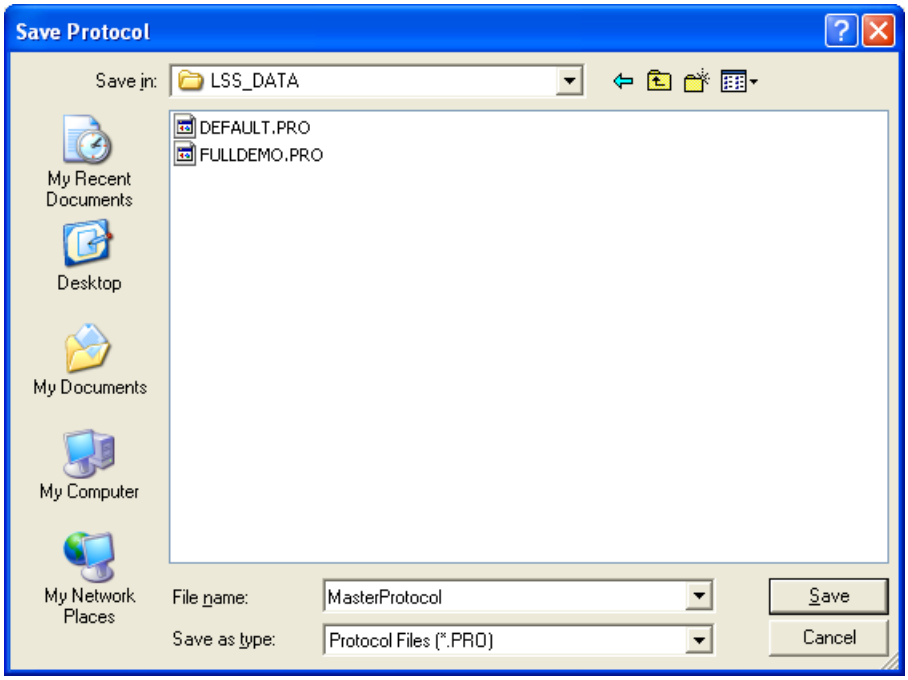


Now the basic settings can be configured. Select the **Settings** configuration. Below is a basic setup that will average data every 5 seconds. The logging rate settings listed here differ from the settings set up for Data Reduction. Every 5 seconds P3 Plus will log data into the .DRx files and when Data Reduction is triggered, data will be averaged over a 5 minute period.



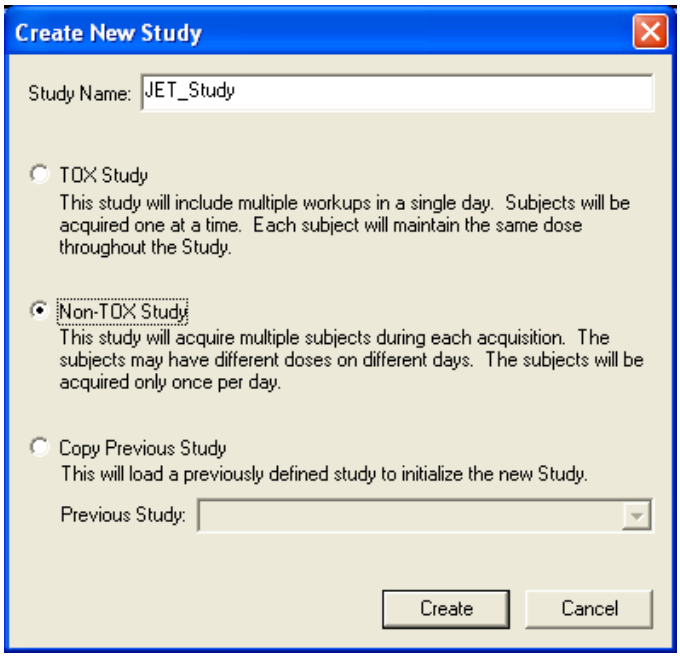
The configuration of the protocol is done. Select the **OK** button to close the dialog. The protocol can now be saved. Select **Save As** from the **File** menu, type in a name, and click on the **Save** button. Since this protocol will be used for a study protocol,

save the protocol file with a unique name. This file will be used later in the Study configuration.

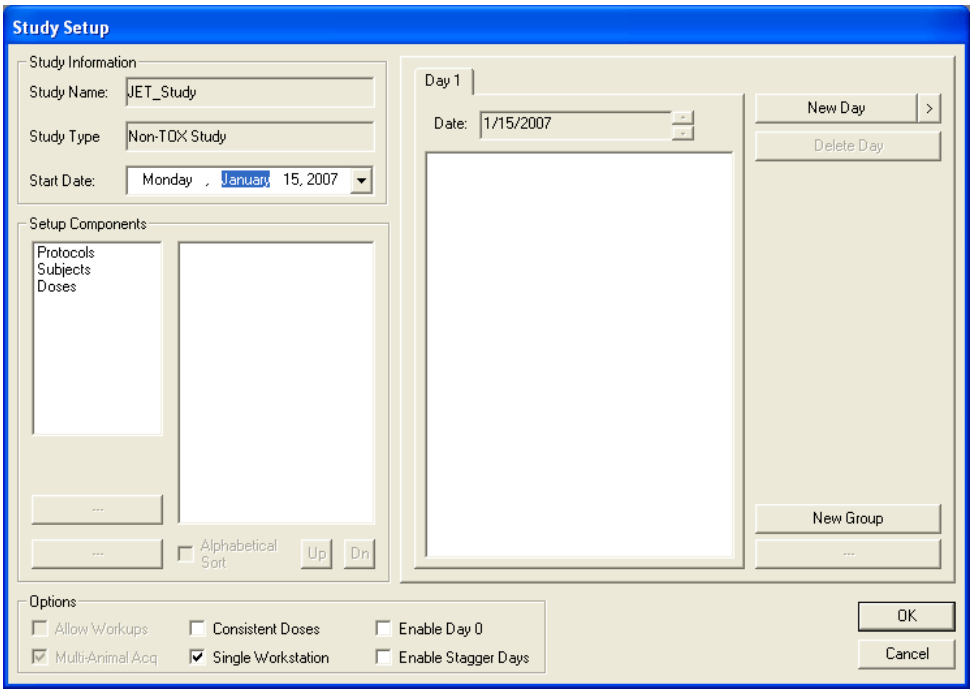


Study Setup/Acquisition (Optional)

To configure a Study, select **New Study** from the **Study** menu. The following dialog will appear. The Study menu will not be available if the Study Option was not purchased.



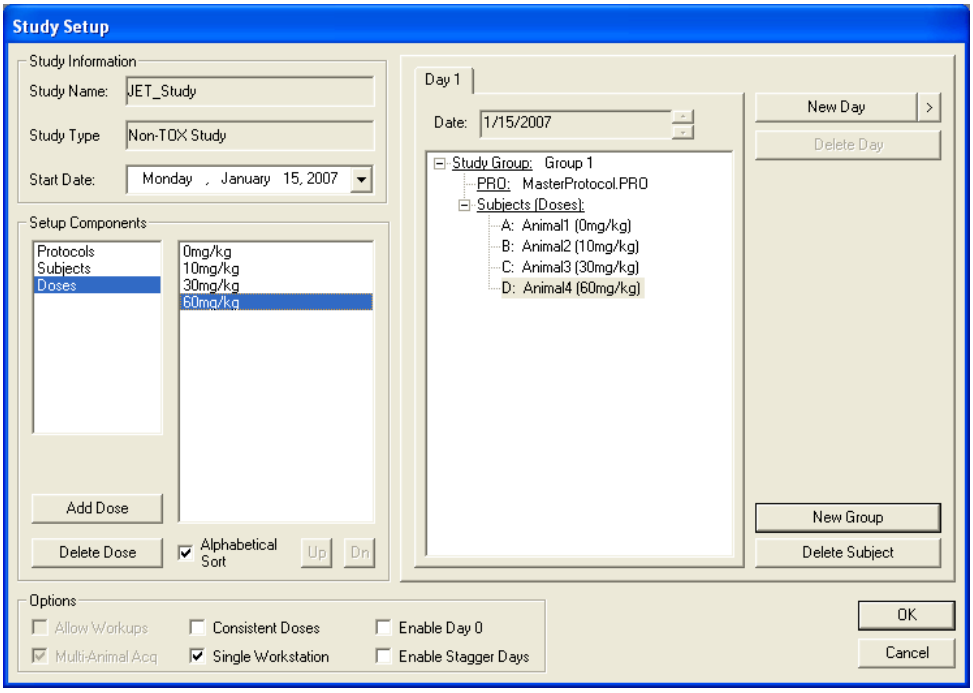
Type in a name (JET_Study), select a study type (Non-TOX Study), and click on the **Create** button. The following dialog will appear. Either type of study can be configured. For this tutorial a Non-TOX study will be used.



Configure the study as needed. For the tutorial, four subjects and four doses are configured.

NOTE: See the Study Manual for more details.

Select the protocol (for this tutorial MasterProtocol.PRO is used), add the appropriate subjects and doses, add a new group, and drag and drop the items to the new group.



Click on the **OK** button. The Study has been configured. Select **Run Study** from the **Study** menu. Acquire the required data for the study.

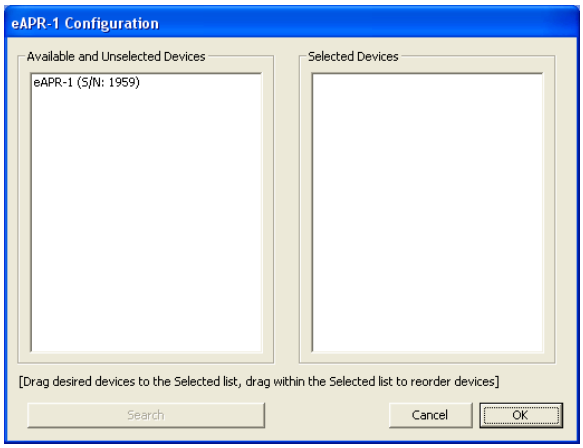
Protocol Setup – Blood Pressure (BP)

Placement of the JET Blood Pressure Add-On receiving antenna attached to an electronics module that connects to the JET device is depicted in the JET User Guide (003114). This antenna should be within 5 inches of the implant location, closer if possible.

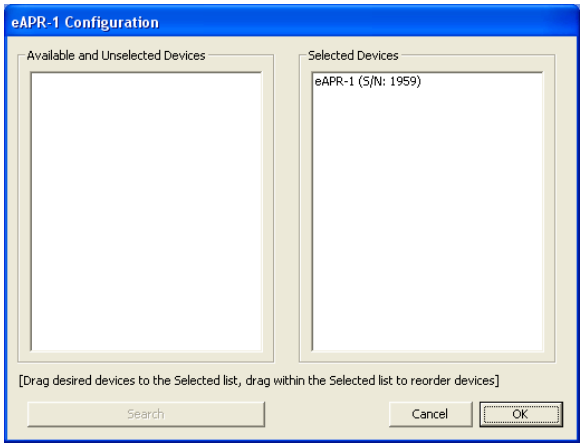
For each protocol configuration (Graphs, Data Reduction, etc,) view the appropriate sections within the P3 Plus Manual for details. In particular, please note that the hardware setup and channel analysis attributes have some critical settings in order to collect BP data correctly into JET. In particular, an ambient pressure reference is strongly recommended, implant calibration values are required, and measurement of implant offset prior to implantation is recommended.

Assigning an Ambient Pressure Reference

To implement an Ambient Pressure Reference, the use of an APR-1 with an E2S-1 is required. Once they are connected to your Ponemah system through the same Ethernet network as your JET Receivers and after your JET Devices are defined using the JET Device Configuration, you must then select **eAPR-1 Configuration** from the **Hardware** menu. If the JET/OpenART acquisition interface is being used this capability is disabled and the user is required to use an APR-1 that interfaces through the OpenART interface.



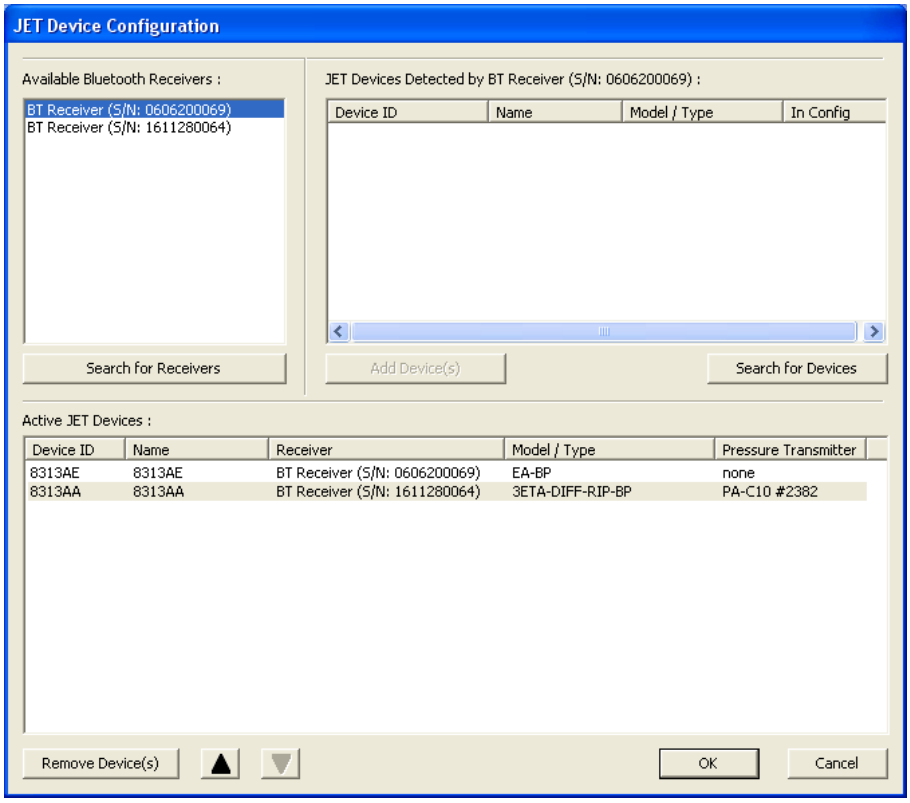
To assign an APR-1 within Ponemah it must first be selected. To select a device you must search for available APR-1's by clicking on the **Search** button. Once the appropriate APR-1 has been found simply drag it from the Available and Unselected Devices section and drop it into the Selected Devices section.



This APR-1 will then appear as a channel within Ponemah.

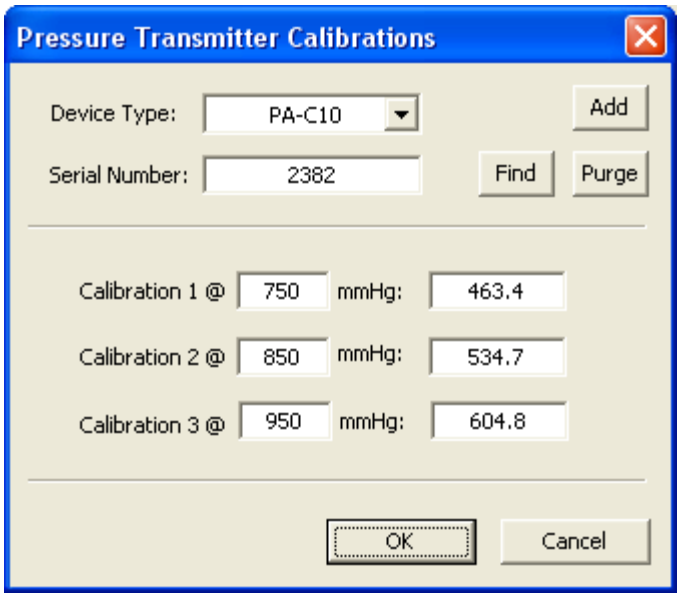
Associating a Pressure Transmitter with a JET Device and Entering Its Calibration Values

Select **JET Device Configuration** from the **Hardware** menu



For the device of interest either double-click in the Pressure Transmitter column or right-click and select Pressure Transmitter Calibrations.

NOTE: When configuring pressure transmitters, the symbols '!!!' in the JET Device Configuration menu means that default values (0) are listed for the pressure transmitter.



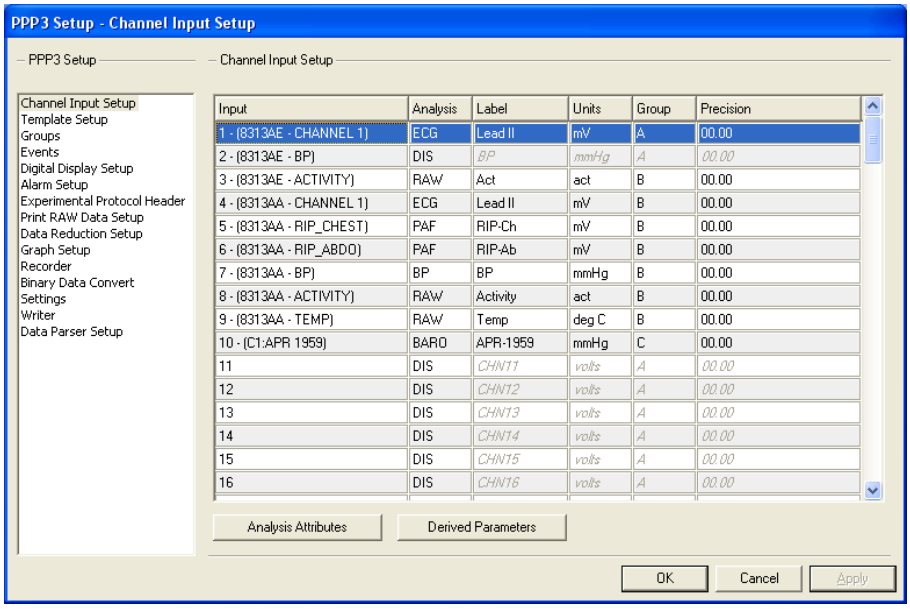
Enter the device type (PA-C10, PA-C40, PA-D70, etc), serial number, and calibration values and press OK. Note: If values have been previously entered for this implant you can retrieve them by filling in the device type and serial number and then pressing the find button.

Repeat as needed for all devices for which you are collecting blood pressure data.

NOTE: Calibration values are stored in the PressureCalibration.ini file. If stored in a network location, Window's users must have write access to this file in order for this feature to function. If stored locally, installing new versions will result in the pointer for this file to be pointing to the newest installed directory. Therefore, any previously stored values will not be accessible unless the ini file is updated with the previous information, the previous ini file is moved to the new location (newest installed directory) or the location is changed in the Advanced menu in the Application Configuration dialog (Directories.CalValueDatabase).

Defining the Analysis Attributes

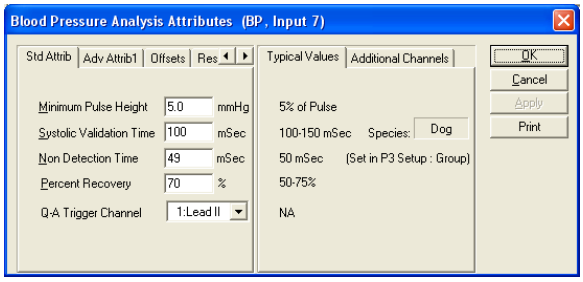
It is then necessary to provide channel input setup data. To do this select P3 Setup from the Setup menu option and then select the Channel Input Setup.



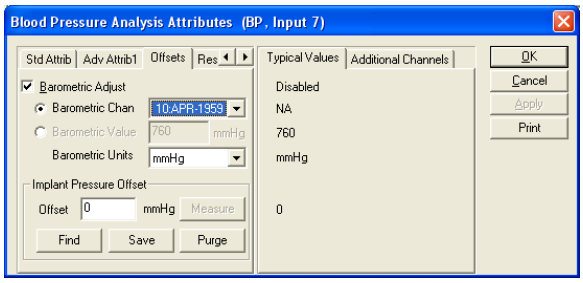
For any devices that are Blood Pressure capable, and not collecting blood pressure data, you must disable the appropriate channel in the P3 Setup channel input setup screen by selecting DIS as the analysis type. This is shown in the above image for the 2nd channel of the first device.

For devices from which you will be collecting blood pressure, you must define the analysis type as BP. You also must define the APR as having an analysis type of BARO. Adding appropriate labels, units, groups and precision is also recommended.

The next step is to then select the BP row and click on the Analysis Attributes button to bring up the Blood Pressure Analysis Attributes dialog.



Select the Offsets Tab.



Define the ambient pressure adjustment by checking the Barometric Adjust box and defining a barometric channel (the APR-1 is desired). If no APR-1 is available, a constant value may be typed into the Barometric Value box.

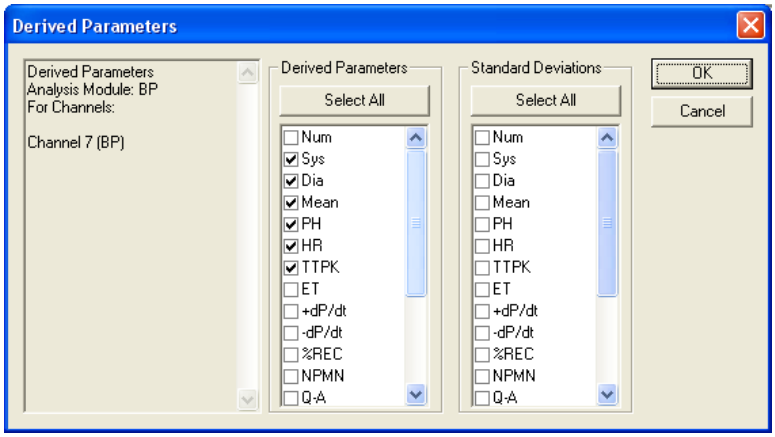
If the pre-implant pressure offset value is known it may be entered at this time. If it is not known and the implant has not been implanted it is recommended to determine the offset as defined below.

Determining the Pre-Implant Pressure Offset

Once a JET device is setup to collect blood pressure data from an implant and prior to implantation, you may determine the pre-implant pressure offset by simply placing the implant horizontally on a level surface near the BP Add-On antenna and running an acquisition. Then, with the pressure implant turned on and with an ambient pressure defined, the measured pressure will represent the offset.

While in acquisition, select the BP channel of interest from the Status window. Click on the Offsets tab and click on the Measure button. The system will then measure the average offset from the ambient pressure reference over a few seconds and enter that value into the offset box.

Configure the derived parameters for each channel by right clicking on the desired channel and selecting Derived Parameters from the popup menu. Enable desired parameters using the check box to the left of each parameter abbreviation (see Ponemah Analysis Manual for definition of parameter abbreviation).

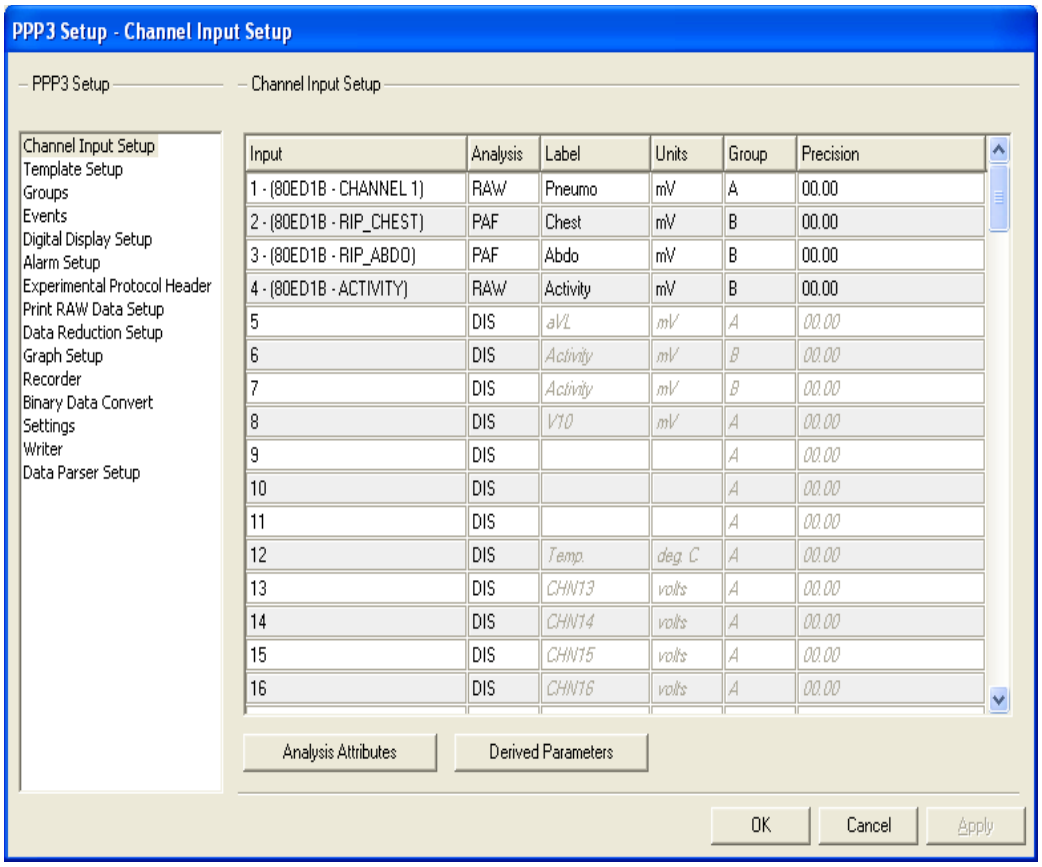


Protocol Setup - Respiratory Inductive Plethysmography (RIP)

Placement of RIP bands and attachment of electronics modules and JET differential lead set is depicted in the JET User Guide (003114).

For each protocol configuration (Graphs, Data Reduction, etc,) view the appropriate sections within the P3 Plus Manual for details. In particular, please note that the analysis attributes have some critical settings in order to collect RIP data correctly into JET.

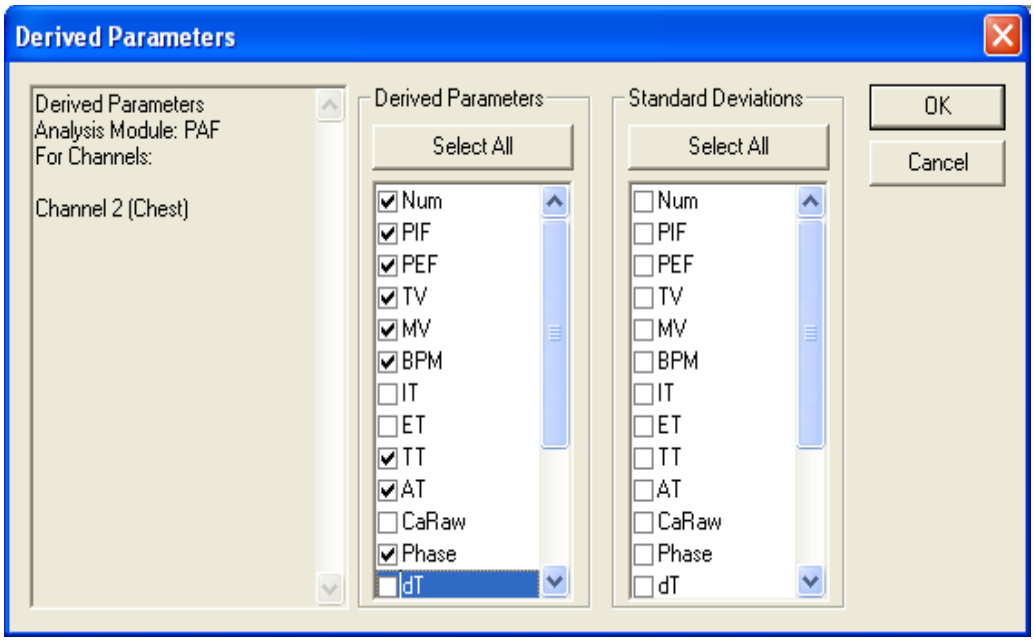
Select **P3 Setup** from the **Setup** menu and select the **Channel Input Setup** configuration on the left portion of the dialog. The following dialog will appear:



The Analysis module used for the RIP bands (chest and abdomen) is PAF (pulmonary air flow).

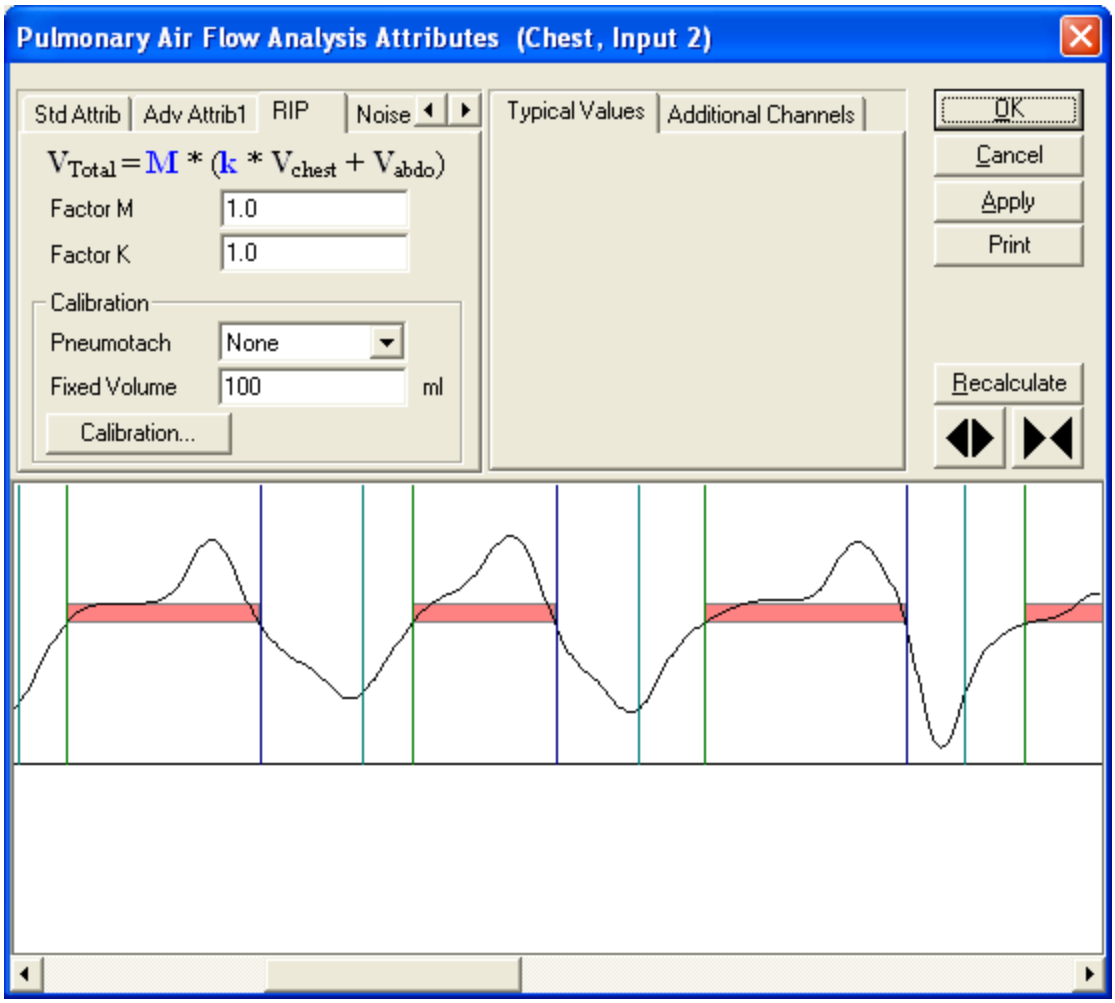
If using a pneumotachograph in association with RIP configure the pneumotachograph on a separate Group from RIP even though both apply to the same test subject. Separate group configuration is required in order to activate a trigger channel for the pneumotachograph and obtain derived parameters.

Derived Parameters. Configure the derived parameters for each channel by right clicking on the desired channel and selecting Derived Parameters from the popup menu. The PAF derived parameters are pictured below. Enable desired parameters using the check box to the left of each parameter abbreviation (see Ponemah Analysis Manual for definition of parameter abbreviation).

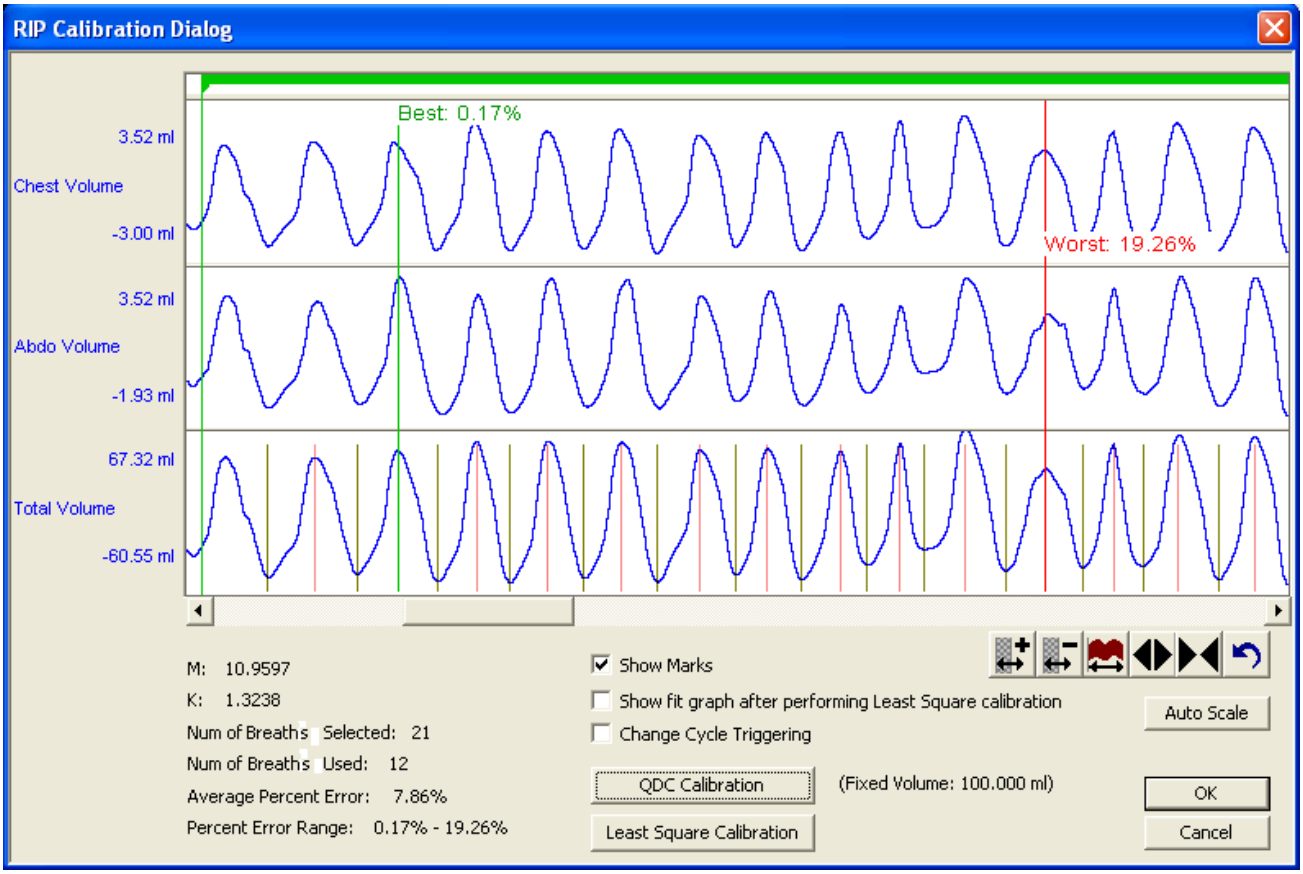


RIP Calibration. There are two methods of calibration, Qualitative Diagnostic Calibration (QDC) and Least Squares.

Qualitative Diagnostic Calibration (QDS). Following data collection open the Review file and locate a portion of data that displays normal respiratory waveforms. Within the Primary graph screen right click on the Chest Flow graph and from the menu select Analyze [Attributes]. The Pulmonary Air Flow Analysis Attributes display will appear:



Select the RIP tab from the upper left portion of the display. If a typical tidal volume value for the test subject is known it can be entered into the Fixed Volume box else select the pneumotach channel to use as a reference for this RIP channel. A Fixed Volume value entered prior to acquisition applies the coefficients to the acquisition parameter values. The Pneumotach combination box will list all channels that have PAF analysis. Select the channel that corresponds to the animal companion to the channel selected as the primary chest channel signal. Then click on the Calibration button just under the Fixed Volume box. A new display window (RIP Calibration Dialog) will appear:



The RIP Calibration Dialog will display a five minute segment of data from the user selected area of normal waveforms. The green bar located near the top of the dialog is the Calibration Segment Bar. The Calibration Segment Bar allows the user to select typical breaths that fit the Fixed Volume value. The bar can be shorted or elongated using the computer mouse. Multiple segments can be added so as to maximize the number of typical breaths used in the calibration. Additional segments are added by right clicking in the Calibration Segment Bar portion of the dialog.

After placing the Calibration Segment Bar(s) select the QDC Calibration button. Values for M and K used in the formula calculations are displayed in the lower left of the dialog window. Also displayed are the Number of Breaths Selected (determined by the placement of the Calibration Segment Bar(s)); Number of Breaths Used in the calibration; the Average Percent Error [$(V_{total} - V_{Pneumo})/V_{Pneumo}$] of the breaths used in the calibration and the Percent Error Range.

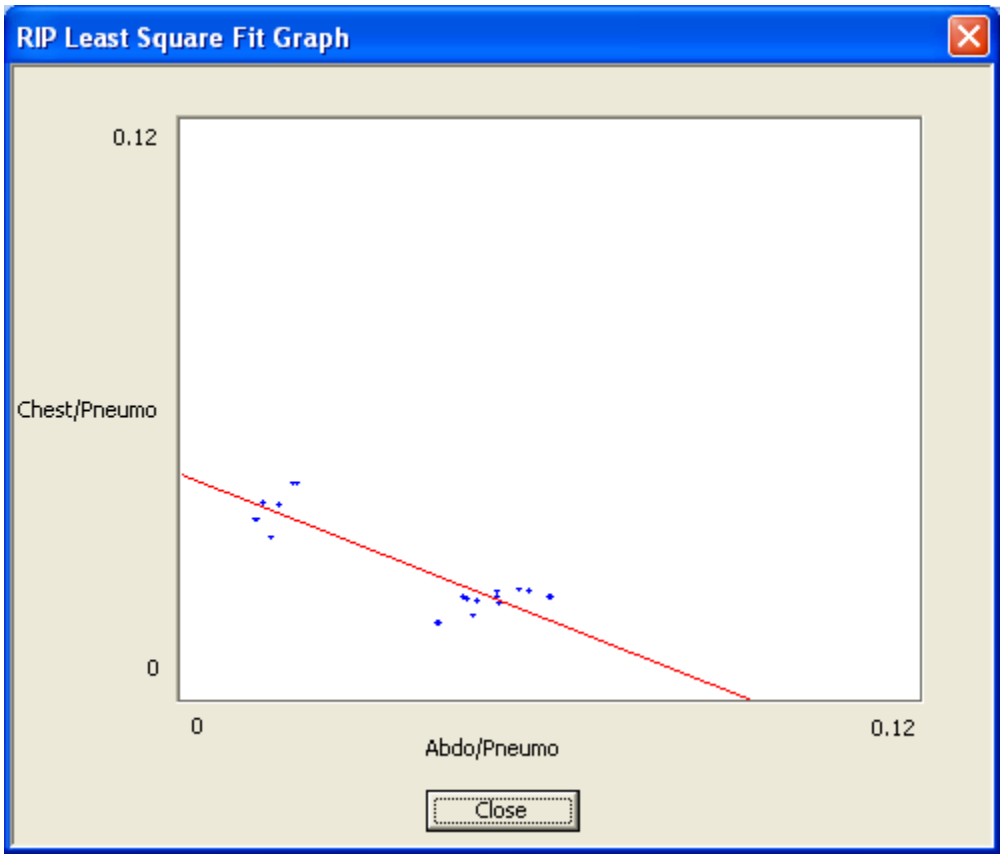
If pneumotachograph data was collected simultaneously with the RIP data the user can then calibrate the RIP data to the pneumotachograph data. From the Pulmonary Air Flow Analysis Attributes dialog select the RIP tab. Under Calibration on the left side of the display is a Pneumotach box. From the pull down menu select the channel in which the pneumotachograph data was collected then select the Calibration button. From the RIP Calibration Dialog place the Calibration Segment Bar(s) and then select the QDC Calibration button. The factor M value for the QDC calibration formula will be derived from the peaks of the pneumotachograph data and applied to RIP. The Fixed Volume entry is disabled when using the Pneumotach option.

The Qualitative Diagnostic Calibration is based from formulas found in R. Sartene, C. Dartus, J.L. Bernard, M. Mathieu, and M.D. Goldman. Comparison of thoracoabdominal calibration methods in normal human subjects. J. Appl. Physiol. 63(5): 1853-1861, 1987. A. DeGroote, M. Paiva, and Y. Verbandt. Mathematical assessment of qualitative diagnostic calibration for respiratory inductive plethysmography. J. Appl. Physiol. 90: 1025-1030, 2001.

Least Squares Calibration. This method of calibration is based on the assumption of two degrees (chest and abdomen) of motion for the respiratory system as described by Abraham et al. To calibrate using Least Squares requires a change in the distribution of the rib cage and abdominal components. Varying the contribution from the chest or abdomen can be accomplished by cinching a wide belt around the test subjects rib cage or abdomen and capturing at least 10 breaths during this distribution change.

Open the Review file and from the Primary Graph screen locate the data in which respiratory distribution change occurred. Activate the Pulmonary Air Flow Analysis dialog as described previously and select Calibration. From the RIP Calibration Dialog place the Calibration Segment Bar(s) to include typical respiratory waveforms and waveforms in which the distribution changes occurred. Check the Show fit graph after performing Least Squares calibration box then select the Least Square Calibration button.

When acceptable waveforms have been selected a RIP Least Square Fit Graph will be displayed:



The M and K values are determined from the slope of the fitted line.

If the distribution of the waveforms selected for the Least Squares Calibration does not have adequate deviation the regression line will not be applied and the following message will appear:

Least Squares Calibration are based on the reference by W.M. Abraham, H. Watson, A. Schneider, M. King, L. Yerger, and M. A. Sackner. Noninvasive ventilatory monitoring by respiratory inductive plethysmography in conscious sheep. J. Appl. Physiol. 51(6): 1657-1661, 1981.

The principals of RIP are described by Konno, K., and J. Mead. Measurement of the separate volume changes of rib cage and abdomen during breathing. J. Appl. Physiol. 22: 407-422, 1967.

Appendix A

Specifications

Refer to the JET System User Guide (003114-002) for specifications.

Troubleshooting

JET Bluetooth Receiver Not Found

A JET Bluetooth Receiver not being found could be caused by multiple issues:

1. The JET Bluetooth Receiver power cable is not connected.
2. The Ethernet connection is not plugged into the back of the JET Bluetooth Receiver, computer network connection, or network.
3. An incorrect network cable is being used. Typically a standard Ethernet cable is sufficient. In instances where the JET Bluetooth Receiver is directly connected to a computer the use of a Ethernet crossover cable may be required.
4. Incorrect network configuration. See Appendix B Configuring a JET Bluetooth Receiver as Point to Point.
5. The local computer's Firewall configuration needs to be modified. See Appendix C Configuring Firewall Settings.

Device Not Found

A device not being found could be caused by multiple issues:

1. The device does not have the lead set connected. Reconnect the lead set. Most devices require the lead set to be connected to turn on the device.
2. The battery is not connected to the device. Reconnect the battery, recharge the battery, or make sure the battery is not defective.
3. The device is out of range of the JET Bluetooth Receiver. Move the device closer to the JET Bluetooth Receiver.
4. There is RF interference with the device/JET Bluetooth Receiver. Remove the RF interference. Examples include other Bluetooth devices, microwave ovens, and cordless phones.

Ambient Pressure Reference Not Found

An APR-1 not being found could be caused by multiple issues:

1. The E2S-1 and/or APR-1 are not connected to the network and/or the cables are connected incorrectly to the network.
2. The E2S-1 and thus APR-1 are not powered. Supplying power to the E2S-1 via the supplied power cable or via the use of a Power-Over-Ethernet (PoE) network should resolve this issue.
3. An incorrect network cable is being used. Typically a standard Ethernet cable is sufficient.
4. Incorrect network configuration. See Appendix D Configuring a JET Bluetooth Receiver as Point to Point.
5. The local computer's Firewall configuration needs to be modified. See Appendix C Configuring Firewall Settings.

Calibration/Acquisition Could Not Start

An error occurring when the calibration dialog is opened or when acquisition can be started could be caused by multiple issues:

1. At least one device must be powered and within range of the JET Bluetooth Receiver. This is based on which channels are enabled in the PPP3 Setup dialog. If all of the channels for a specific device are disabled in the PPP3 Setup dialog, it will not be acquired.
2. An error may have occurred when the JET Bluetooth Receiver was communicating with the device. Reopen the calibration dialog or restart acquisition.
3. If the error occurs all of the time, a serious error may have occurred between P3 Plus and the JET hardware. Reset every device in use, reset the JET Bluetooth Receiver, and restart P3 Plus.

Appendix B

Configuring a JET Bluetooth Receiver as Point to Point

This section will go through the process of configuring a second NIC card and setting up the JET Bluetooth Receiver to that NIC card. This process is done so that no other computers on the main network will have access to the JET Bluetooth Receiver that is to be used by the current computer.

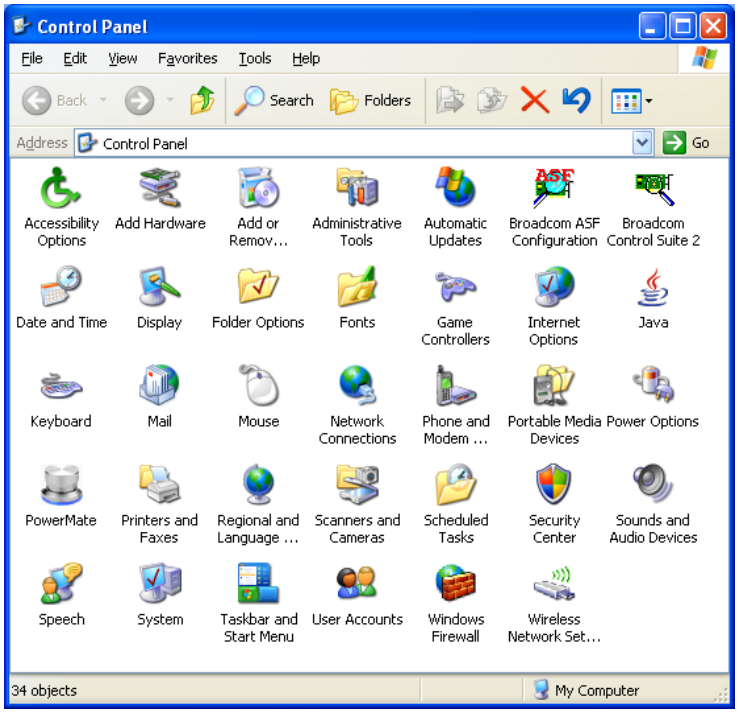
If a user is going to configure multiple JET Bluetooth Receivers to one computer, it is recommended to use an Ethernet Switch. This will allow the user to connect the hardware without having to modify the settings listed below. Connect the Ethernet Switch to the computers secondary NIC card and connect the JET Bluetooth Receivers to the switch. With this configuration cross over cables are not required. The Ethernet Switch will work with its default zero config and automatically assign IP Addresses to the computer and connected JET Bluetooth Receivers.

Step 1 Install Second NIC Card

Follow the hardware installation procedure provided by the manufacturer of the NIC card.

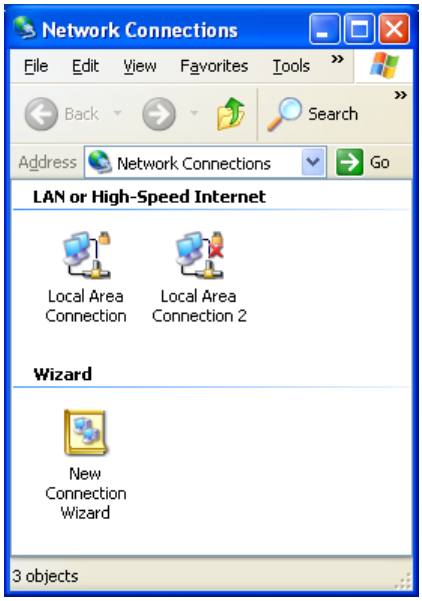
Step 2 Configure Second NIC Card Settings

From the **Start** button, select **Control Panel**. The menus listed below are for Windows XP SP2. If this is not the operating system that is being used, the menus may be different.



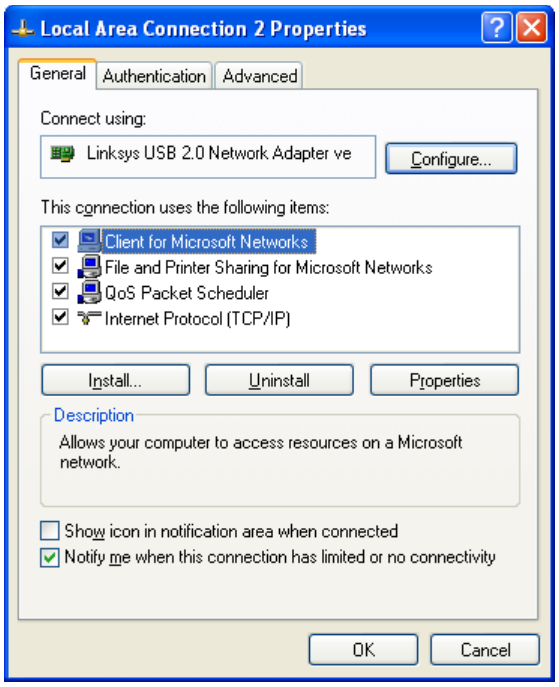
Control Panel Dialog

Double click on **Network Connections**.



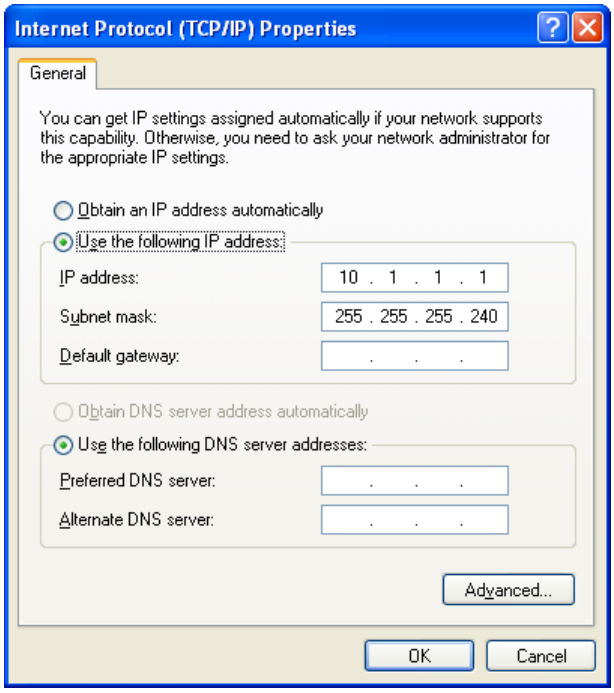
Network Connections Dialog

Right click on **Local Area Connection 2** and select **Properties**.



Local Area Connection 2 Properties Dialog

Select **Internet Protocol (TCP/IP)** and click on the **Properties** button.



Internet Protocol (TCP/IP) Properties Dialog

Select the **Use the following IP address automatically** option, type in an **IP address**, and type in a **Subnet mask**.

The IP address configured can include the following selections:

10.0.0.0 to 10.255.255.255

172.16.0.0 to 172.31.255.255

192.168.0.0 to 192.168.255.255

The above addresses are private addresses. View the web site ftp://ftp.rfc-editor.org/in-notes/rfc1918.txt for information on private addresses.

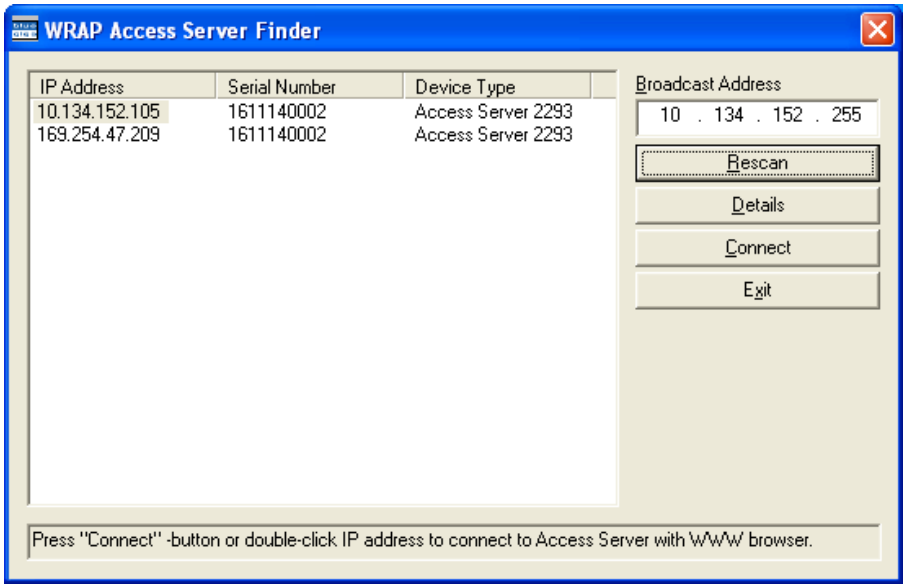
The Subnet mask that needs to be entered is 255.255.255.240.

Click on the **OK** button and close all other open windows.

Step 3 Configure JET Bluetooth Receiver

Connect the JET Bluetooth Receiver to the main network (the same network that the current computer is configured) and apply power. It must be configured to the main network to be able to configure it to the secondary network because of the default settings.

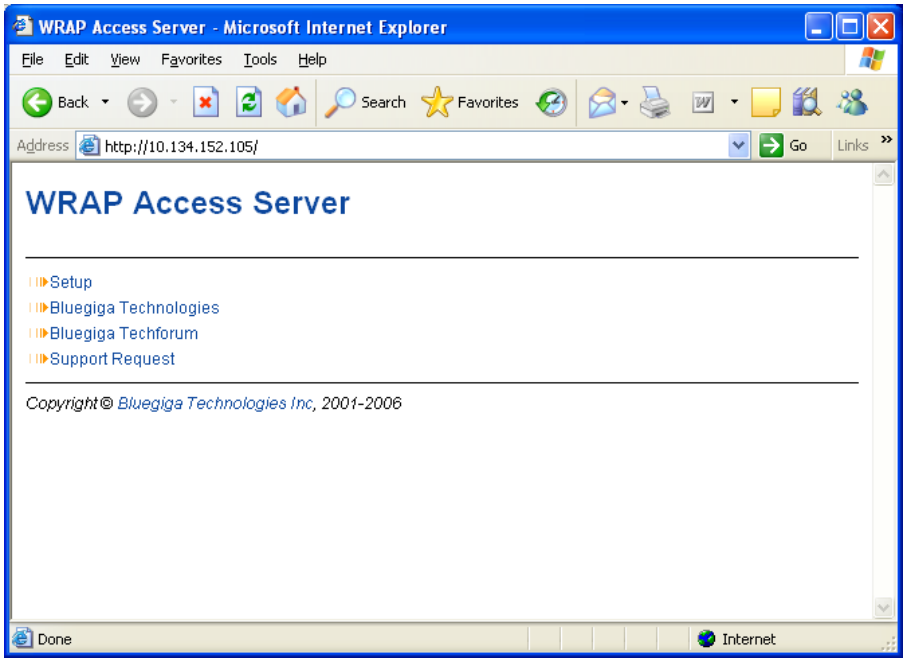
Start the WRAP Access Server Finder application which is provided in the Utilities folder. The following dialog will appear.



WRAP Access Server Finder Dialog

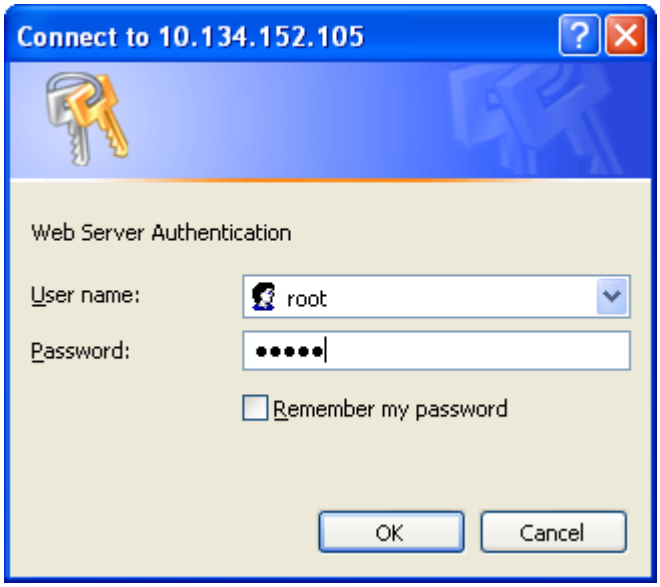
On the **WRAP Access Server Finder** dialog select one of the addresses for the JET Bluetooth Receiver and click on the **Connect** button, or double click on the address.

The connection to the JET Bluetooth Receiver will appear.



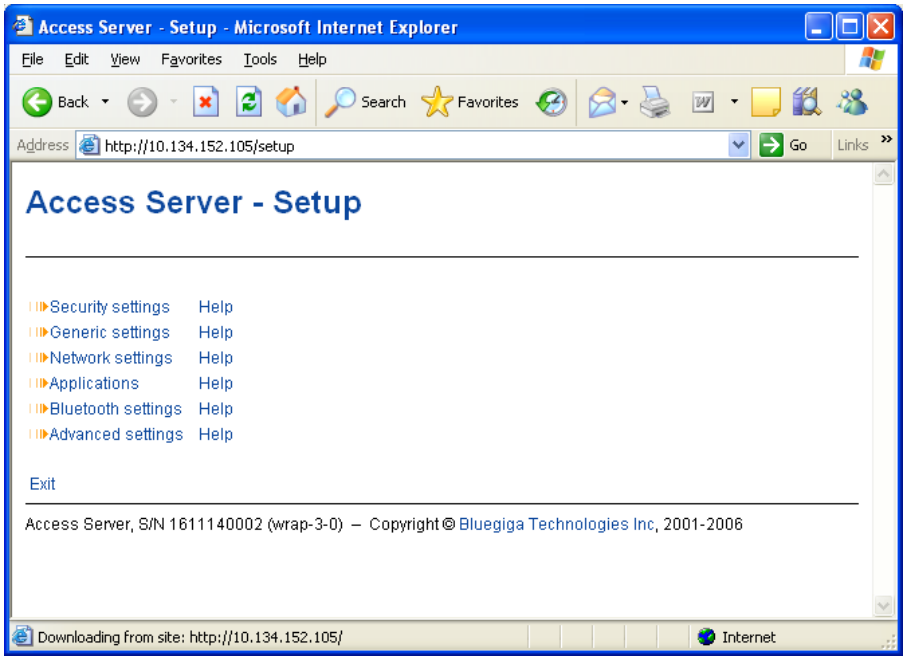
WRAP Access Server Configuration

Select the **Setup** option.



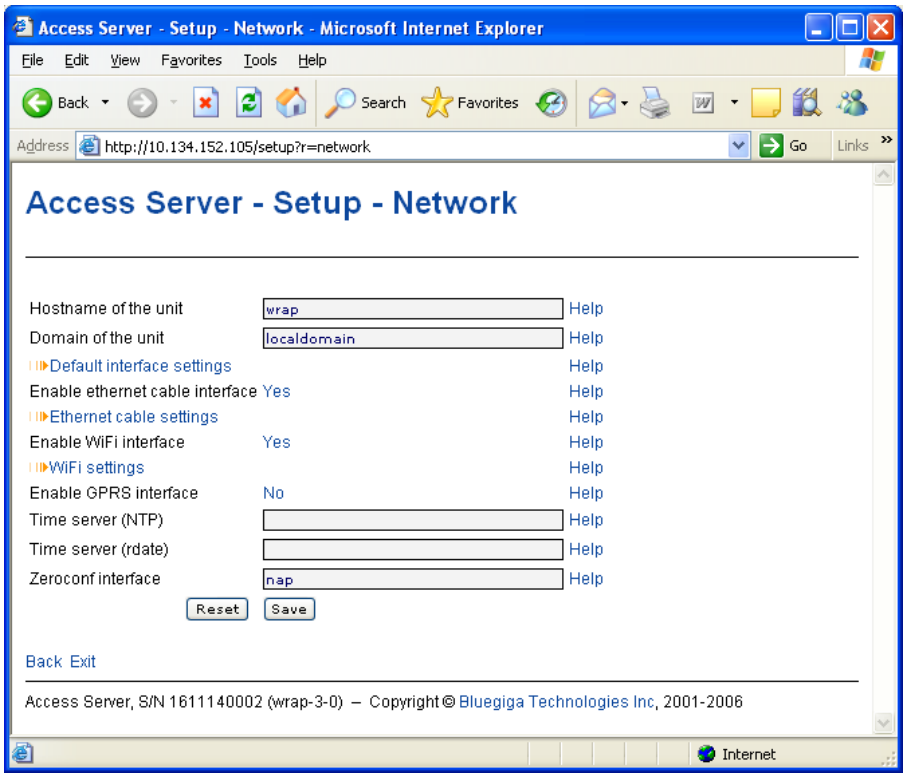
Connection Dialog

Type in the **User name** of "root", the **Password** of "buffy", and click on the **OK** button.



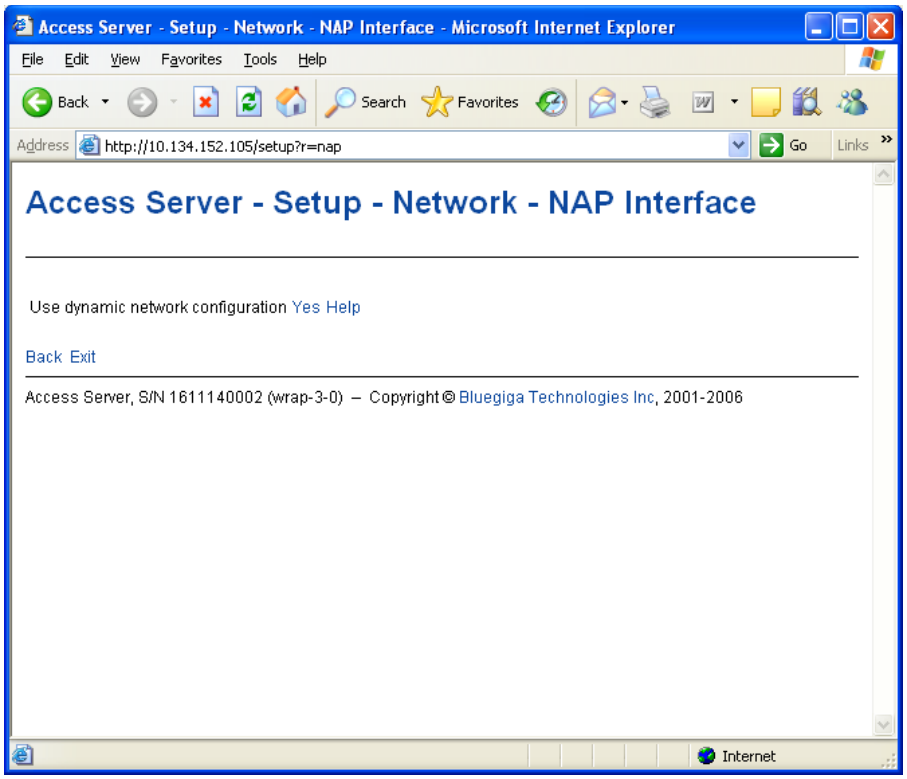
Access Server Setup

Select the **Network settings** option.



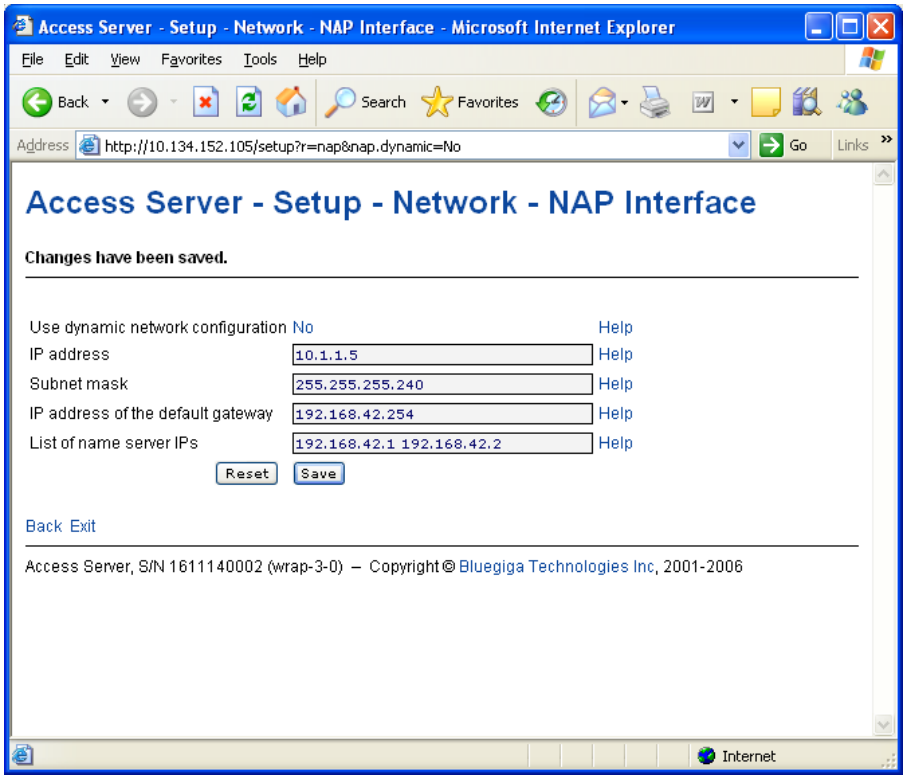
Access Server Setup Network

Select the **Default interface settings** option.



Access Server Setup Network NAP Interface

Select the **Yes** option for **Use dynamic network configuration**.



Access Server Setup Network NAP Interface

Enter an **IP address** based on which network connection mask is being used. In "Step 2 Configure Second NIC Card Settings" the configuration used was 10.1.1.1. For this instance, set the **IP address** to the value 10.1.1.x where 'x' is any number between 2 and 254. The value of '1' cannot be used because the network card was configured to that address.

Next, enter the **Subnet mask** 255.255.255.240. This value is required.

Click on the **Save** button. The configuration of the JET Bluetooth Receiver is now complete.

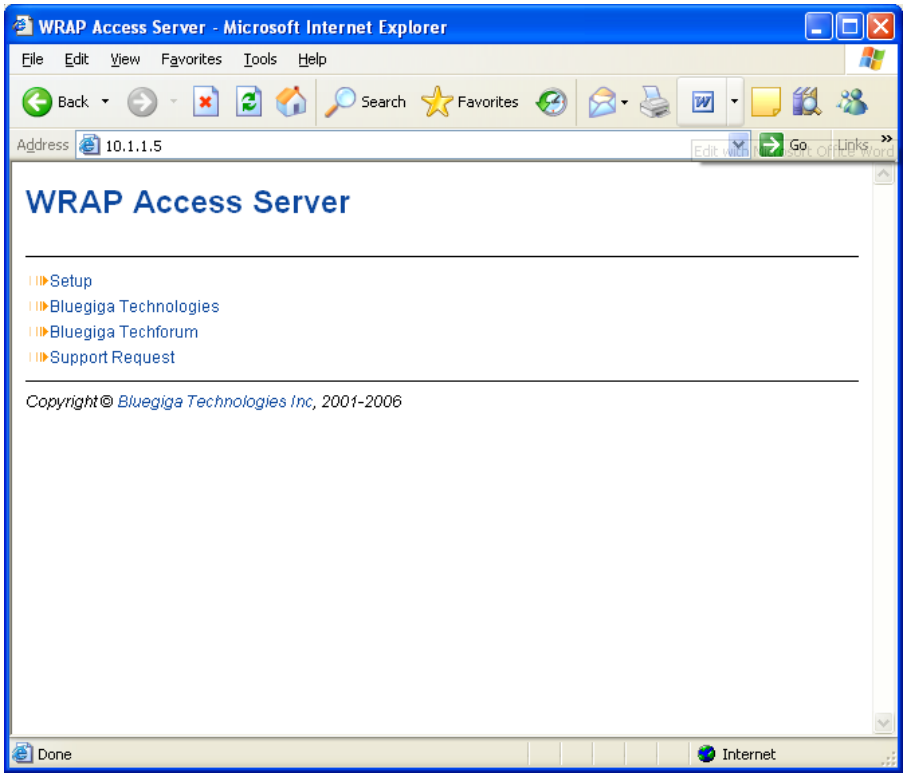
Disconnect the JET Bluetooth Receiver from the main network and connect it to the secondary NIC card using a cross over cable. The JET Bluetooth Receiver will need to be reset by disconnecting and reconnecting power. The JET Bluetooth Receiver can now be used with P3 Plus.

Configuring a JET Bluetooth Receiver Back to Default Settings

If a JET Bluetooth Receiver has been configured as Point to Point and it needs to be reset to be used on the network, follow the steps below.

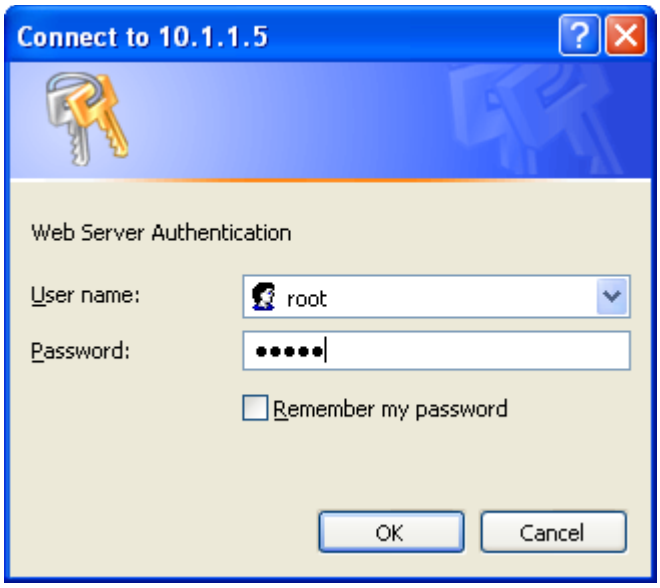
Obtain the address of the JET Bluetooth Receiver.

Start an Internet Explorer window, type in the address of the JET Bluetooth Receiver and press the **Enter** key. If the address is not known, follow the instructions listed in the Obtaining Point to Point JET Bluetooth Receiver Address section below. For this case the address being used by the JET Bluetooth Receiver is 10.1.1.5.

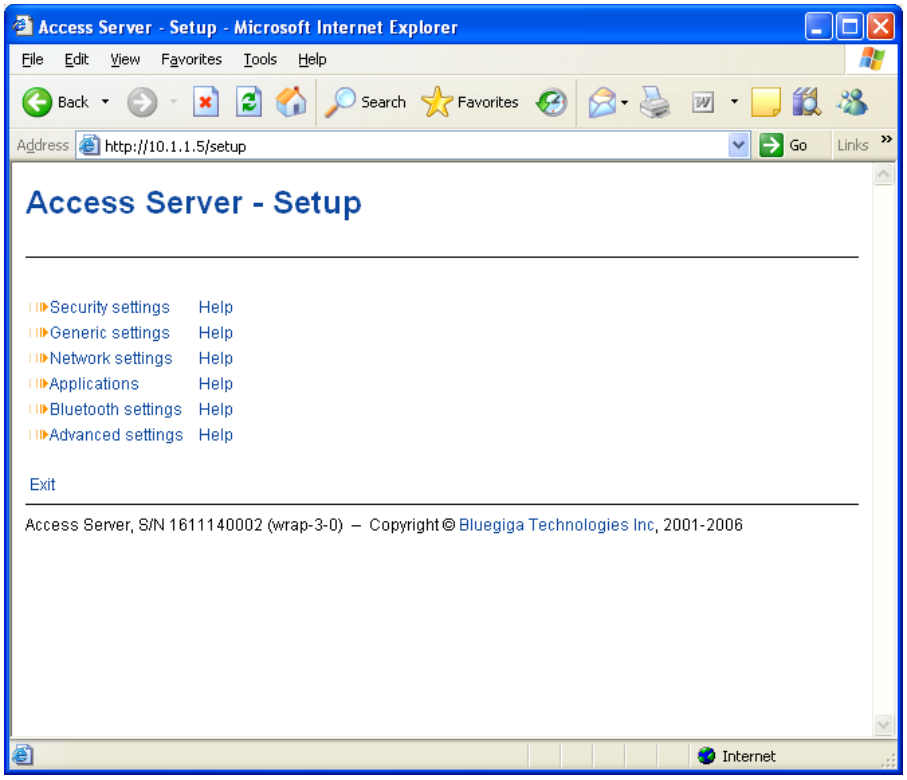


WRAP Access Server Configuration

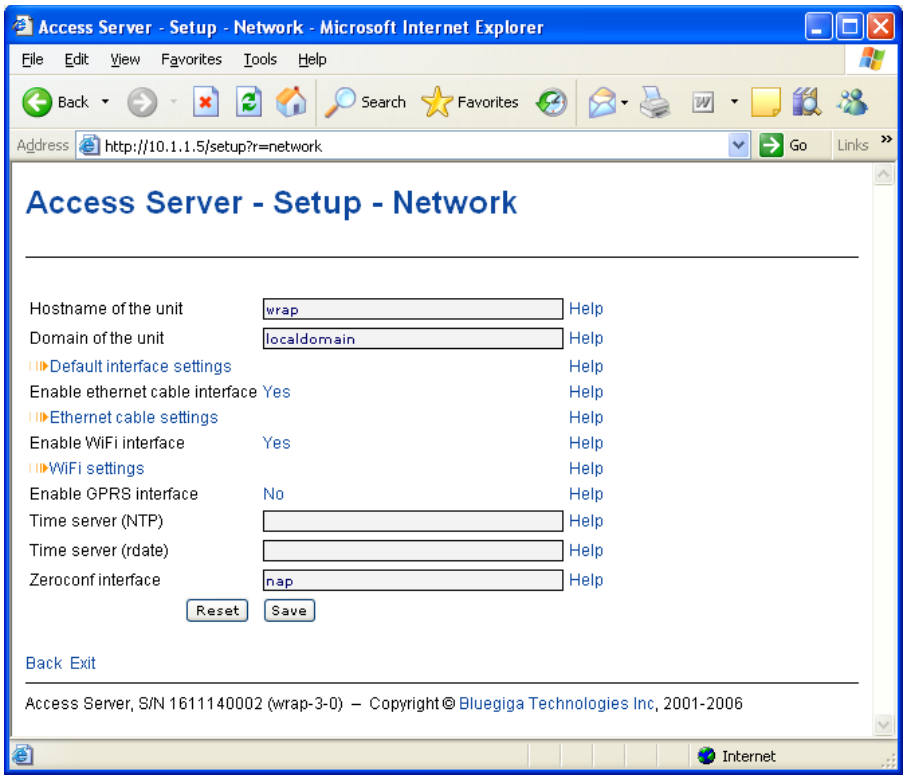
Select the **Setup** option.



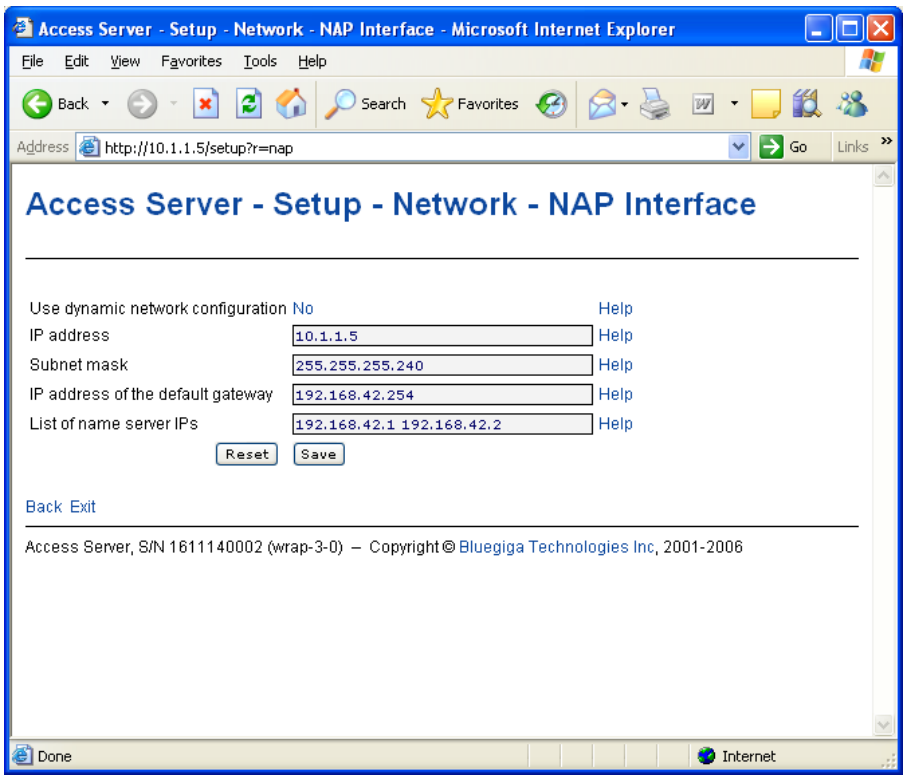
Type in the **User name** of "root", the **Password** of "buffy", and click on the **OK** button.



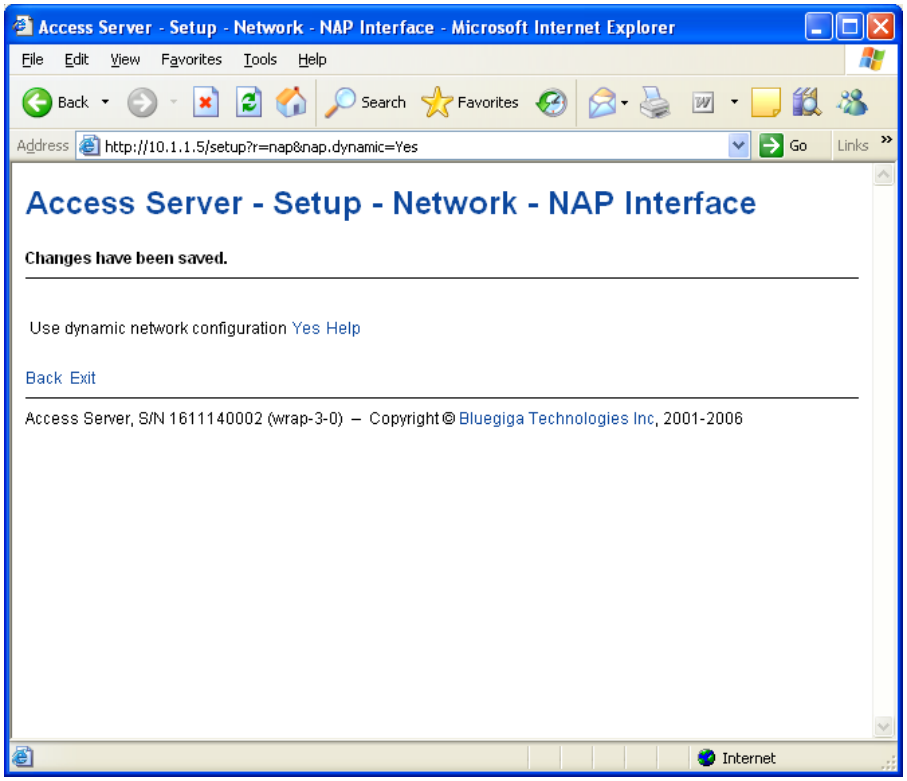
Select the **Network settings** option.



Select the **Default interface settings** option.



Select the **No** option for **Use dynamic network configuration**.



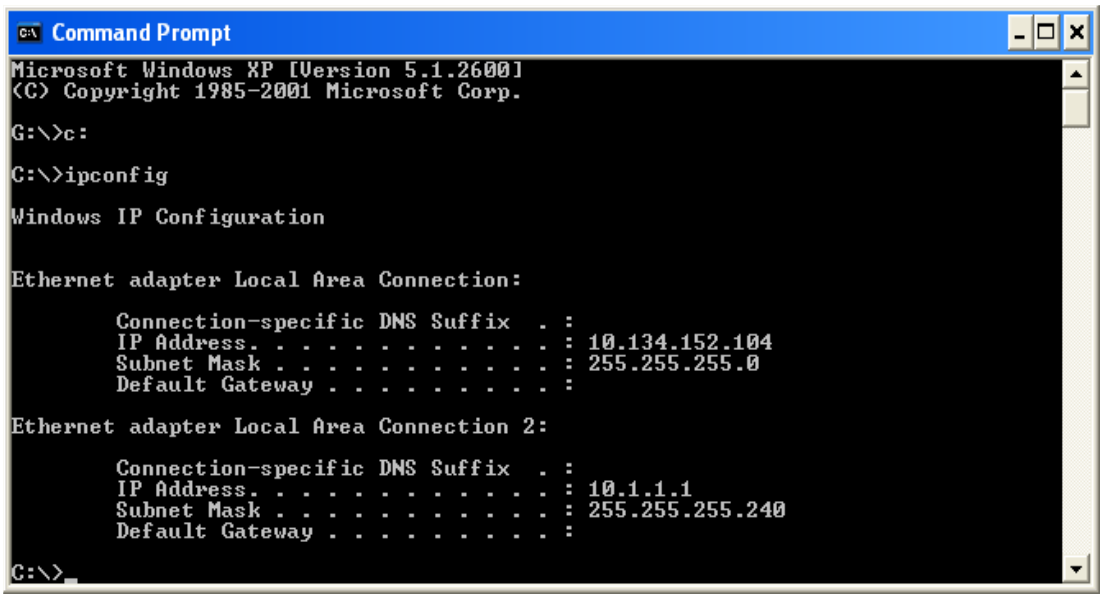
The configuration of the JET Bluetooth Receiver is now complete.

Disconnect the JET Bluetooth Receiver from the secondary NIC card and connect it back to the main network with a normal network cable. The JET Bluetooth Receiver will need to be reset by disconnecting and reconnecting power. The JET Bluetooth Receiver can now be used with P3 Plus.

Obtaining Point to Point JET Bluetooth Receiver Address

If the JET Bluetooth Receiver address is not known, follow the steps below.

Select the **Start** button, select **All Programs**, select **Accessories**, and then select **Command Prompt**. Type in **ipconfig** and hit the **Enter** key. The following will appear.

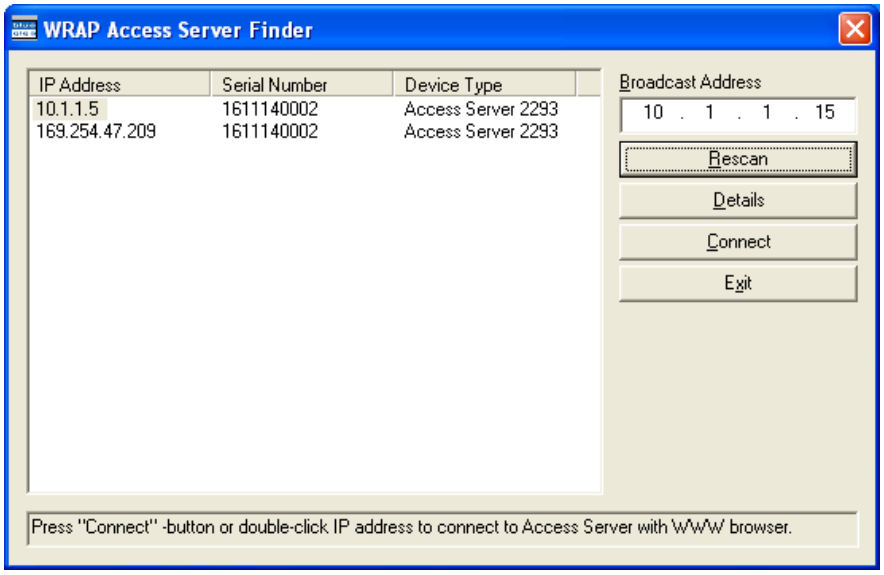


Take note of the **IP Address** and **Subnet Mask** for the Local Area Connection that the JET Bluetooth Receiver is currently connected. For this case the **Local Area Connection 2** is the connection so the IP Address is 10.1.1.1 and the Subnet Mask is 255.255.255.240.

Take the **Subnet Mask** and perform a binary NOT operation. For the Subnet Mask value of 255.255.255.240 a binary NOT operation would result in 0.0.0.15.

Now perform a binary add and add that value (0.0.0.15) to the **IP Address** of 10.1.1.1 to get a result of 10.1.1.15.

Start the WRAP Access Server Finder application, use the value of 10.1.1.15 for the Broadcast Address and select the **Rescan** button. The IP Address should be listed for the JET Bluetooth Receiver that needs to be reconfigured.

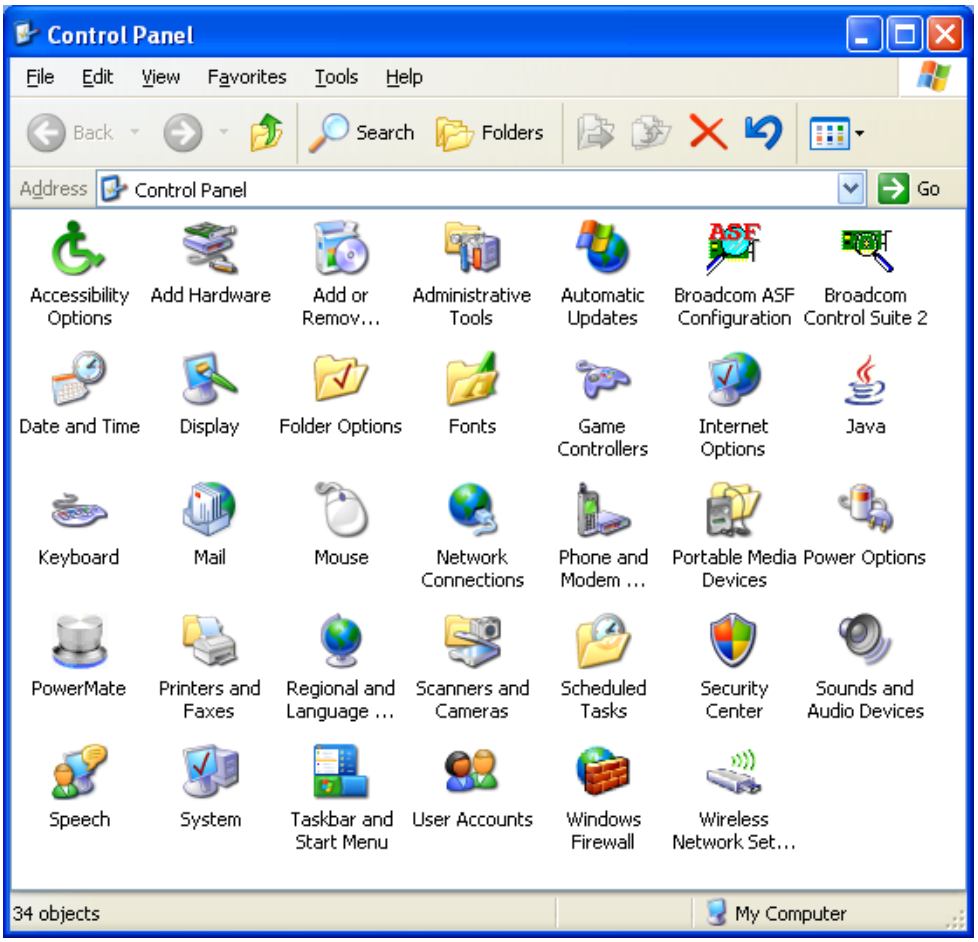


The IP Address for the JET Bluetooth Receiver is 10.1.1.5. Return to the beginning of the Configuring a JET Bluetooth Receiver Back to Default Settings Section with this address.

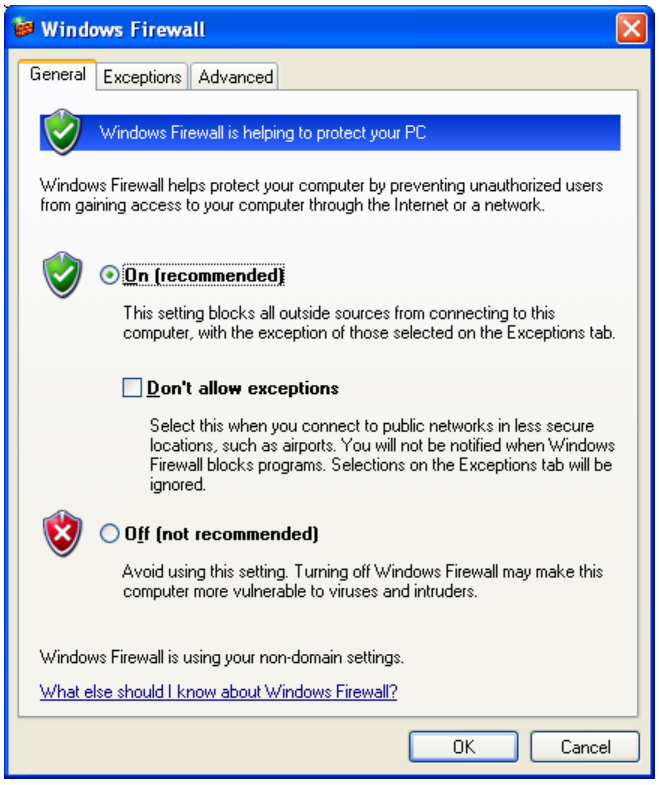
Appendix C

Configuring Firewall Settings

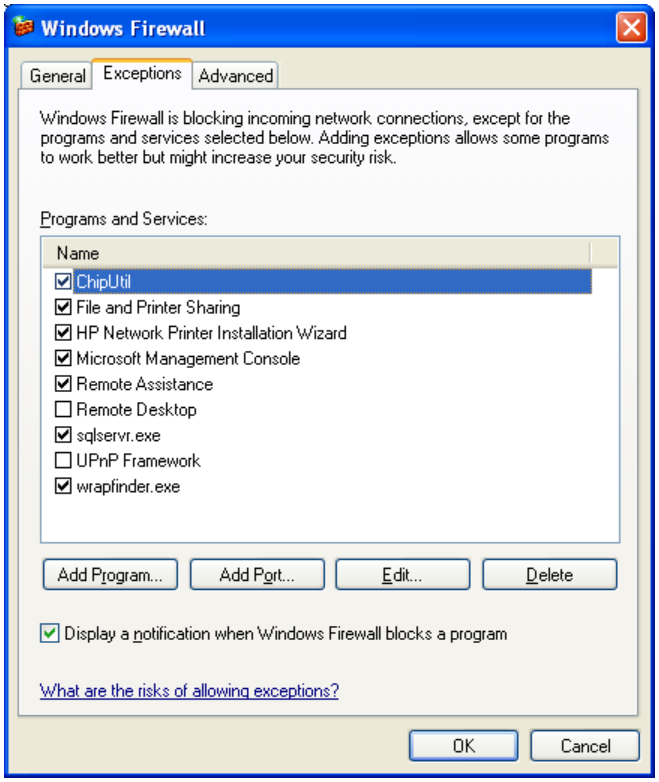
In certain instances when searching for the JET Bluetooth Receivers that are connected correctly, the JET Bluetooth Receivers will not be found. This can be caused by Firewall settings that are too strict. Below lists the steps required to change the Firewall settings to see the JET Bluetooth Receiver. Different software firewalls have different ways of enabling and blocking ports. The steps listed below are for the Windows Firewall. Select the **Start** button, and click on **Control Panel**.



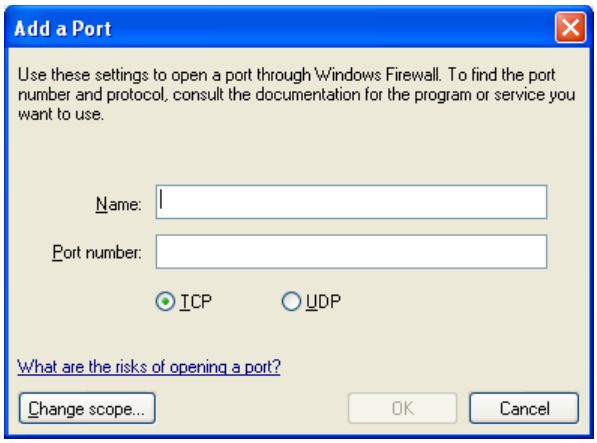
Double click on the **Windows Firewall** option.



Select the **Exceptions** tab.



Select the **Add Port** button.



Type in any name, set the **Port number** to 9990, select the **UDP** option, and click on the **OK** button.

The Firewall has been configured and P3 Plus should be able to search and find the JET Bluetooth Receiver.

Appendix D

NOTE: The E2S-1 requires that a DHCP server be active on the network that it is plugged into. When using JET in a dedicated network, a DHCP server is not typically present. The simplest means to add a DHCP server to a dedicated network is to use a router (instead of a switch) which has this feature built in. A second means of adding a DHCP server is to install and run a DHCP server on one of the computers.

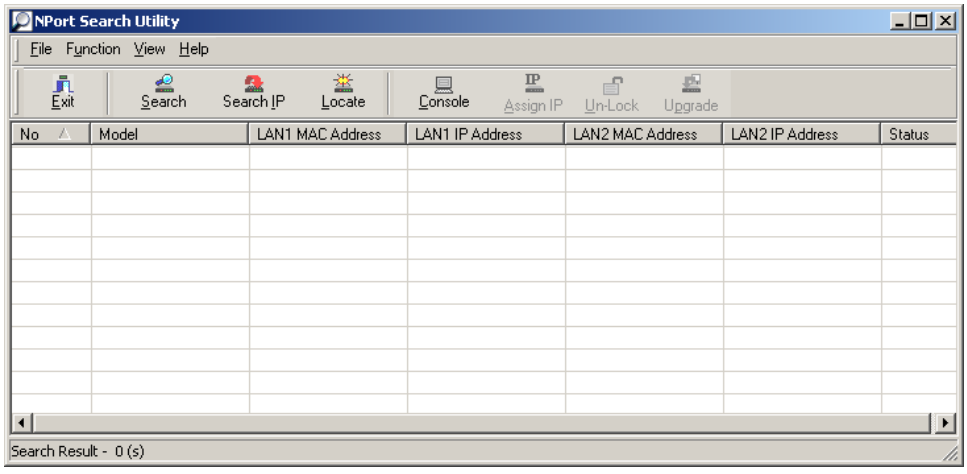
If you are not using your corporate network, rather than a dedicated network, a DHCP server is typically in place and active. In order for the E2S-1 to be visible, all components of the system must appear on the same subnet. The IT Group at your company may be required to ensure this criterion is met.

Configuring an E2S-1 as Point to Point

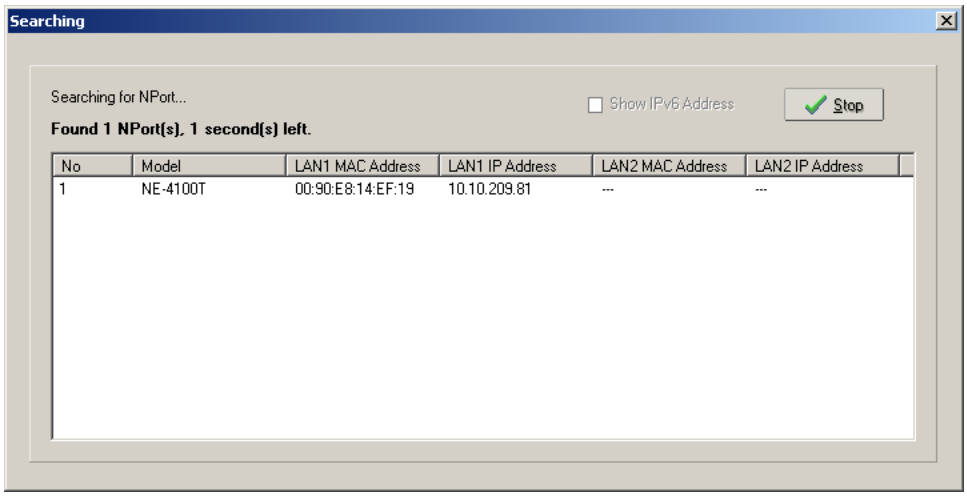
Reference Appendix B for the process of configuring a second NIC card and setting up the JET Bluetooth Receiver to that NIC card. This section will build upon that section with regards to setting up the E2S-1 to use a static IP address.

Connect E2S-1 to the main network (the same network that the current computer is configured) and apply power. It must be configured to the main network to be able to configure it to the secondary network because of the default settings.

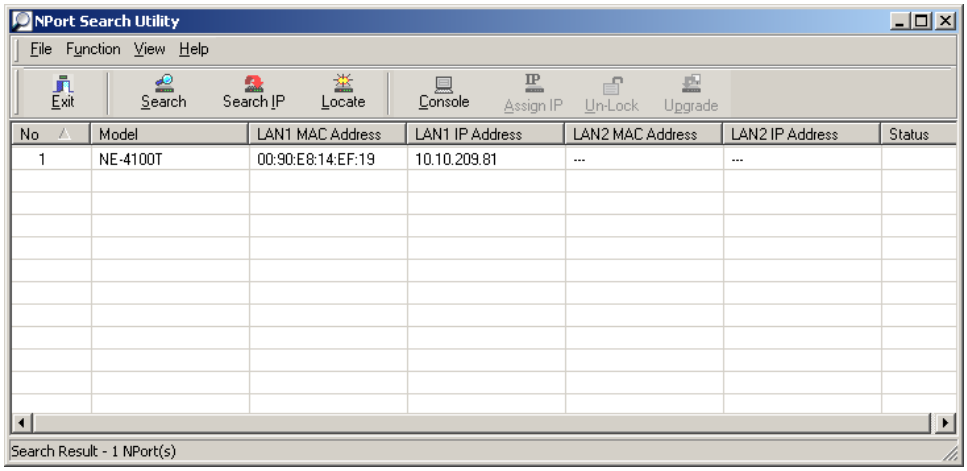
Start the NPort Search Utility application. The user may need to download the program from the Internet. It is available by visiting moxa.com and searching for the NE-4100T product and then finding the associated drivers and software. (On November 2008 this was located at http://www.moxa.com/product/ne-4100t.htm and clicking on Drivers and Software.) After starting the program the following dialog will appear.



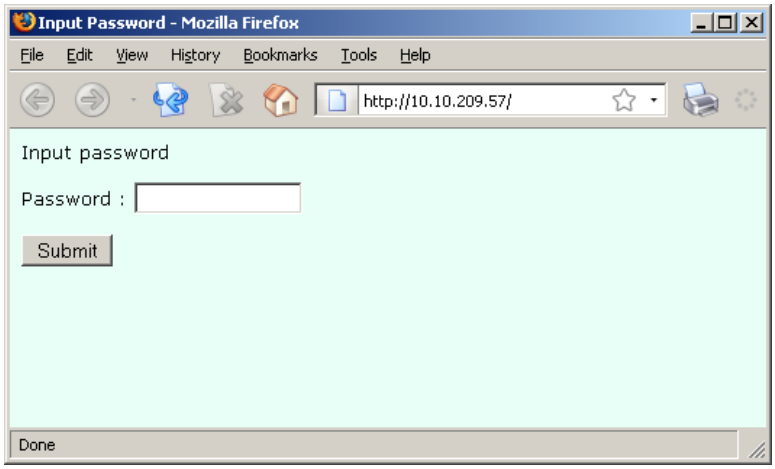
Click on Search to find available products with Moxa 4100-T in them (i.e.our E2S-1 product). A status window will appear showing that it is searching for NPorts.



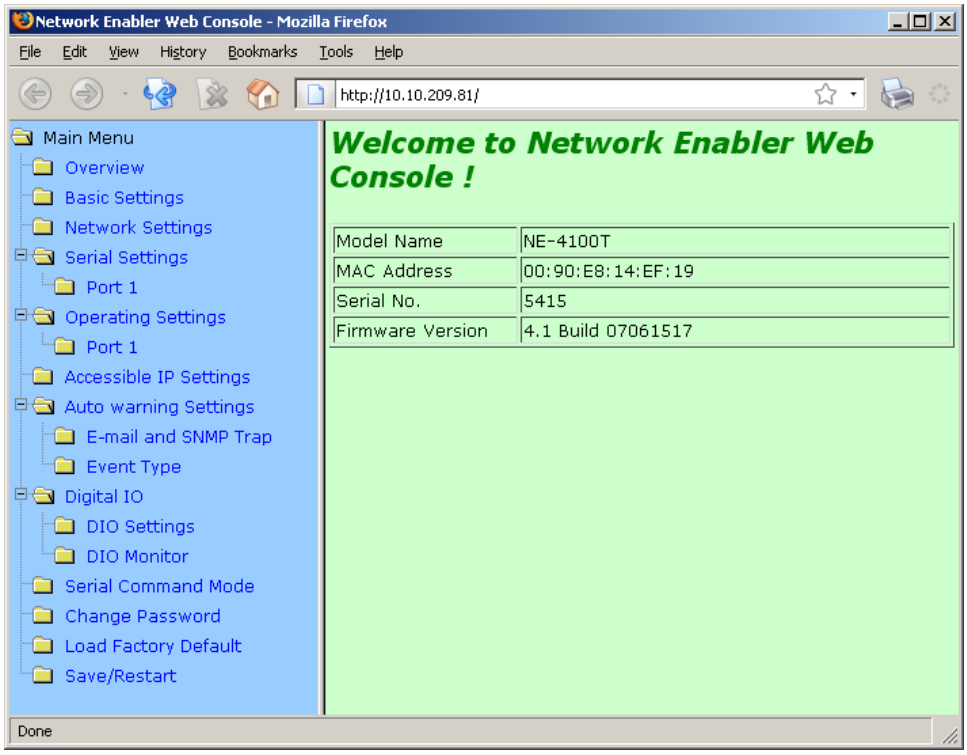
The NPort application window will then show all available Moxa NPorts. Double click on the MAC Address that matches the E2S-1 you need to modify.



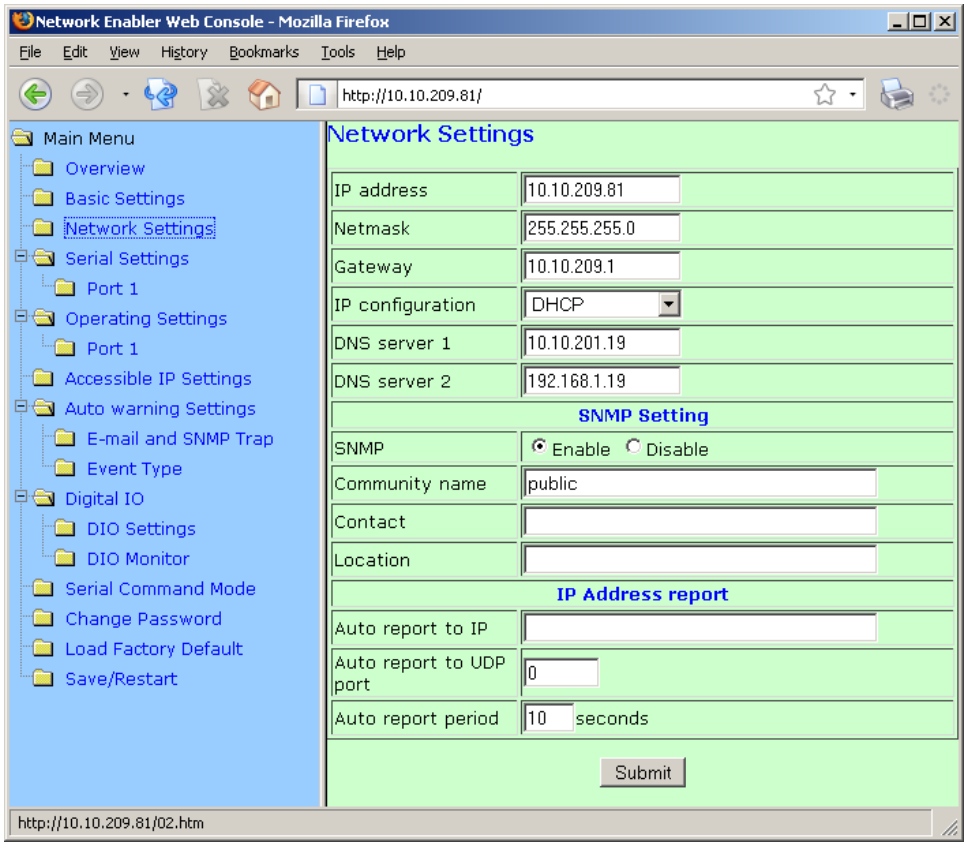
A web interface will then pop up requesting a password.



Enter “buffy” without the quotes and press Submit. You’ll then see the below screen.



Click on Network Settings



To set for a static IP Address you must define the parameters below and press submit and then click on save/restart.

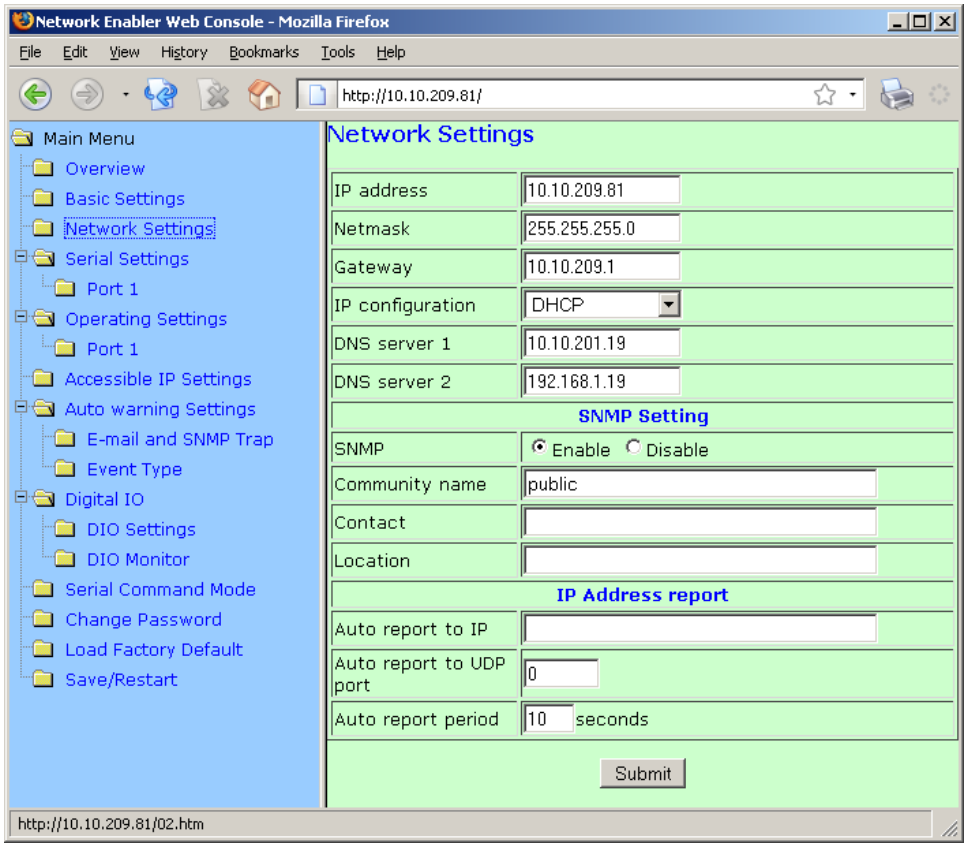
- IP Address
  Note that the IP address should be based on which network connection mask is being used. In "Step 2 Configure Second NIC Card Settings" the configuration used was 10.1.1.1. For this instance, set the IP address to the value 10.1.1.x where 'x' is any number between 2 and 254. The value of '1' cannot be used because the network card was configured to that address. You also should not use the same value as used for the JET Bluetooth Receiver.
- Netmask
- Gateway
- IP Configuration (set as “Static”)
- DNS Server 1
- DNS Server 2

Disconnect the E2S-1 and APR-1 from the main network and connect it to a switch which is connected to the secondary NIC card and the JET Bluetooth Receiver(s). The E2S-1 will need to be reset by disconnecting and reconnecting power. The E2S-1 and APR-1 can now be used with P3 Plus.

Please reference the NE-4100 Series Users Manual version 9 Chapter 6 for detailed instructions on IP Address Configuration. This file is also available from moxa.com.

Configuring an E2S-1 Back to Default Settings

If an E2S-1 has been configured as Point to Point and it needs to be reset to be used on the network, follow the steps defined in the prior section to get to the Network Settings screen.



Then set the IP Configuration to DHCP submit and save/restart.

Note: Do NOT Load Factory Default as that will make the device inoperable.

Product Issue Report

Product Issue Report Form

Sales Person:
Customer Name:
Company:
Address:

Phone Number:
Email Address:

P3 Plus Version (including Service Pack):
Serial Number:
Priority:
Date:
Hardware:

Status of issue (check one)
[] Unreproduced [] Reproduced
[] Needs repair [] As intended

Computer hardware/software
Brand/Model:
CPU Speed:
RAM:
Operating System (including Service Pack):

Networked
[] Yes [] No

Issue:

Steps to Repeat

Feature Request

Feature Request Form

Sales Person:
Customer Name:
Company:
Address:

Phone Number:
Email Address:

P3 Plus Version (including Service Pack):
Serial Number:
Priority:
Date:
Hardware:

Feature (check one)

[] Unevaluated [] Pending
[] Implement [] Already Exists

Description: