

NB-Link & NB-Pro

User Manual



© 2015 American Auto-Matrix, A Cylon Energy Inc. Company. All Rights Reserved.

NB-Link & NB-Pro (MAN0122US Rev 5)

Information in this document is subject to change without notice. The software described in this document is furnished under a license agreement or nondisclosure agreement. The software may be used only in accordance with the terms of those agreements. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or any means electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of American Auto-Matrix.

TRADEMARKS

All trademarks and trade names used in this document are acknowledged to be the copyright of their respective holders.



Contents

SECTION 1 : Using the NB-Link	5
Interfacing with Controllers	6
Connecting The BACnet Network	7
Connecting NB-Link to a PC.....	8
NB-Link Set-Up	9
SECTION 2 : USING NB-PRO	13
NB-Pro System Requirements	15
Installing NB-Pro.....	16
Polling for objects	21
File Menu	24
Settings Menu	26
Discovery Menu.....	30
Utilities Menu.....	33
Modifying Trend Point Values	56
Capture Menu	66
SPL Menu.....	74
Help Menu.....	75
SECTION 3 : THE SPL EDITOR	77
The SPL Editor.....	78
File Menu.....	79
Edit Menu.....	81
View Menu.....	82
Utilities Menu	83
Window Menu	87
Toolbar	88
SECTION 4 : APPENDIX A: STANDARD OBJECT AND PROPERTY IDENTIFIERS	89
A. 1 Standard BACnet Object Identifier Numbers	90
A.2 Standard Bacnet Property Identifier Number	91
SECTION 5 : APPENDIX B: TREND VIEWER	93
Control.....	94
Layout.....	102
Channels.....	103
Cursors	118
Limits	122
Labels	125
X- and Y-Axes	126
Legend	137
Toolbar	141
Data View.....	142
SECTION 6 : APPENDIX C: COMMISSIONING TIPS	147
SECTION 7 : APPENDIX D: TROUBLESHOOTING COMMON PROBLEMS	149

SECTION 1 : USING THE NB-LINK

This section describes the overall functionality of the **NB-Link** communications device. Step by step instructions are provided for connecting and configuring the **NB-Link**.

Interfacing with Controllers

NB-Pro employs standard point-and-click navigation found in most Microsoft Windows applications. Using **NB-Pro**, end-users can configure Native BACnet devices, as well as manage an entire network.

In order for end-users to interface with Native Series Unitary Controllers using **NB-Pro**, devices must be connected to **NB-Link**. **NB-Link** is an external, Native BACnet MS/TP to UDP protocol transporter. It is used to offload the communication overhead of BACnet MS/TP from the host PC. Used in conjunction with **NB-Pro** commissioning software, this provides a direct interface to a BACnet MS/TP network that is free of packet loss and communication errors.

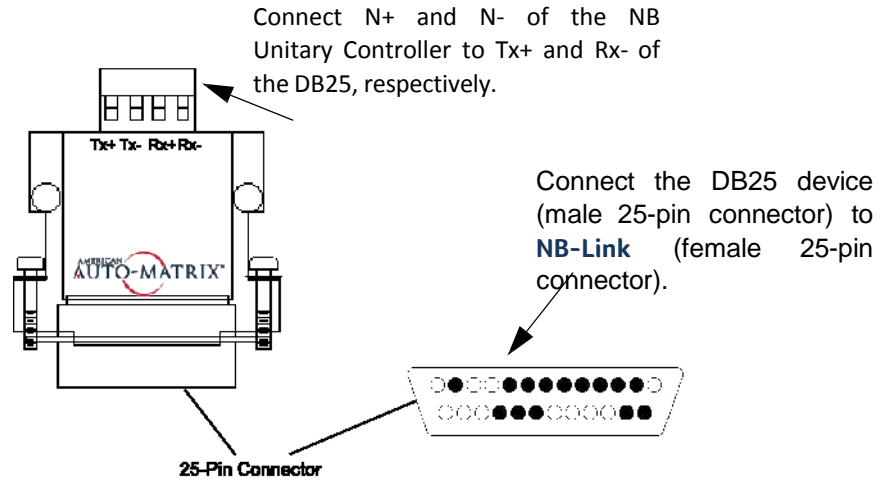
When the connection between **NB-Pro** and **NB-Link** is established, BACnet MS/TP packets are transmitted from **NB-Link** directly to the **NB-Pro** user PC via a direct TCP socket connection. When the TCP packets are received by **NB-Pro**, the data packets are then converted to 'upper layer' PDUs (Protocol Data Units) relative to BACnet MS/TP.

Requests made to an MS/TP device are then sent as TCP packets to the **NB-Link**. Once received by **NB-Link**, the data request (write, property updates, etc.) is made to the MS/TP device. The connection between **NB-Pro** and **NB-Link** is a dedicated one-to-one connection. **NB-Pro** also allows users to perform capture upload/download, controller based SPL programming, as well as flash maintenance.

Native Series Unitary Controllers or third party BACnet MS/TP devices connect to **NB-Link** using 18-22AWG, two-wire, shielded twisted-pair RS-485 (EIA-485). The physical connection to the **NB-Link** from the MS/TP network is made using the DB25, a simple converting device that is supplied by AAM with **NB-Link**. Enhancements and updates to **NB-Link** can be applied through **NB-Pro** via an Internet connection to the American Auto-Matrix product server.

Connecting The BACnet Network

To connect the controller network to **NB-Link**, use the supplied DB25 device. Connect N+ of the Unitary Controller network to the Tx+ terminal of the DB25, and N- of the controller network to the Rx- terminal of the DB25. The DB25 is illustrated in Figure 1-1.



Connecting NB-Link to a PC

NB-Link is equipped with an RJ-45 connector for Ethernet connection. If you are connecting **NB-Link** directly to your PC, you must use a network crossover cable. Otherwise, use a patch cable to connect the **NB-Link** to a hub or switching device located on your local area network. Refer to Figure 1-2 for more information on connection ports.

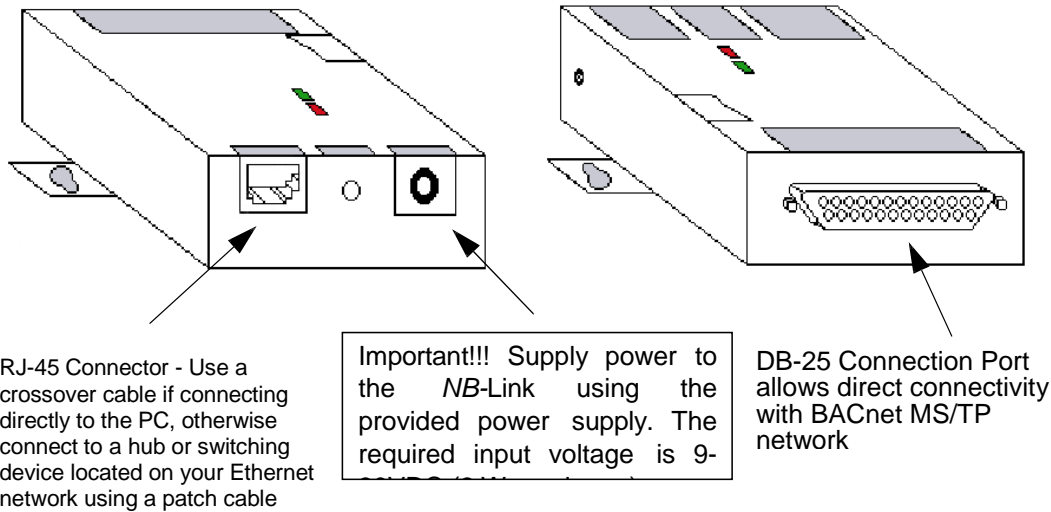


Figure 1-2: NB-Link Connections

Once you have connected the BACnet MS/TP device network to the DB25, the DB25 to **NB-Link**, and **NB-Link** to your Ethernet network, you are ready to install the **NB-Pro** software.

NB-Link Set-Up

Configuration of the **NB-Link** device is performed through the **NB-Pro** software. To properly configure the **NB-Link**, you must determine the IP address of your computer, connect to the **NB-Link** using **NB-Pro**, and configure the **NB-Link** to communicate with your computer.

The IP Address of your PC is found in the **Control Panel**. To determine the IP address:

1. Open **Control Panel** in Windows by select **Start>Control Panel**. If you are working in Classic Mode, click on **Start**, then point to **Settings**, then click on **Control Panel**.
2. Double-click on the **Network Connections** icon.
3. Double-click on the network card.
4. Click on the **Properties** button.

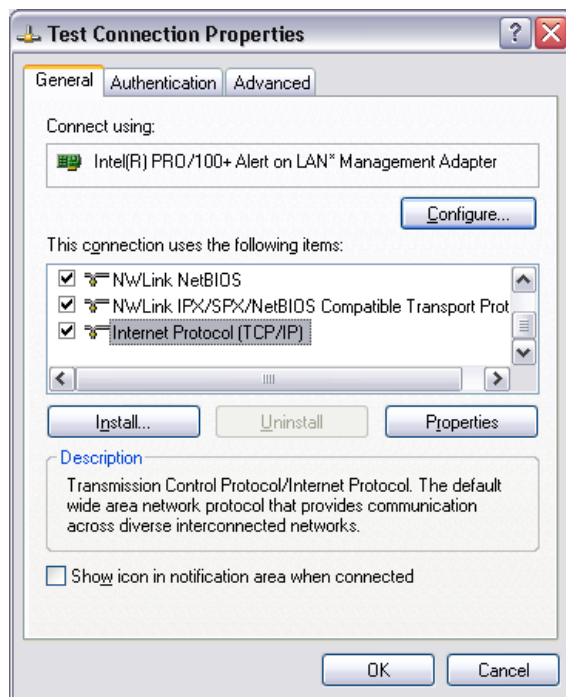


Figure 1-3: Network Settings

5. Select TCP/IP from the Configuration dialog box.
6. Click on the Properties button.

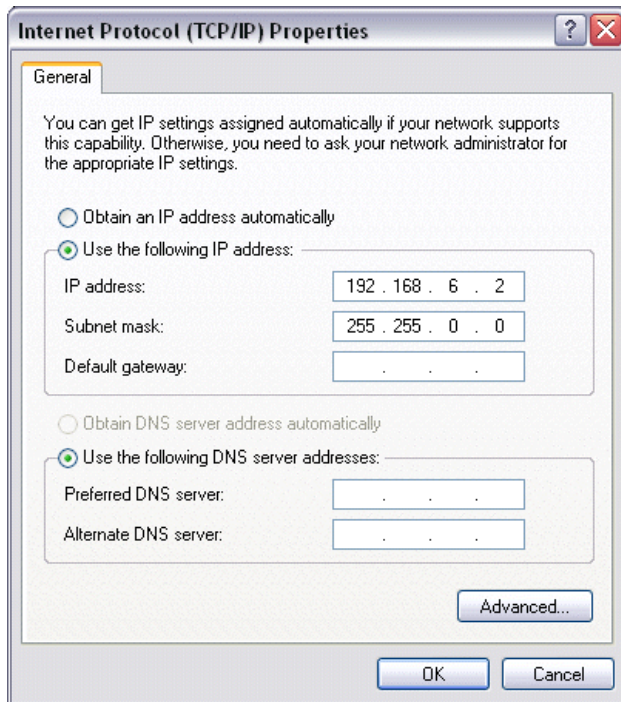


Figure 1-4: TCP/IP Properties

7. The IP address of the computer will be listed in the IP Address field.

Once you know the IP address of your PC, you must connect to the **NB-Link** through the **NB-Pro** software. To do this:

1. Open the **NB-Pro** application.
2. Select the **NB-Link** Preferences from the **NB-Link** menu or press F7. You will see the window shown in

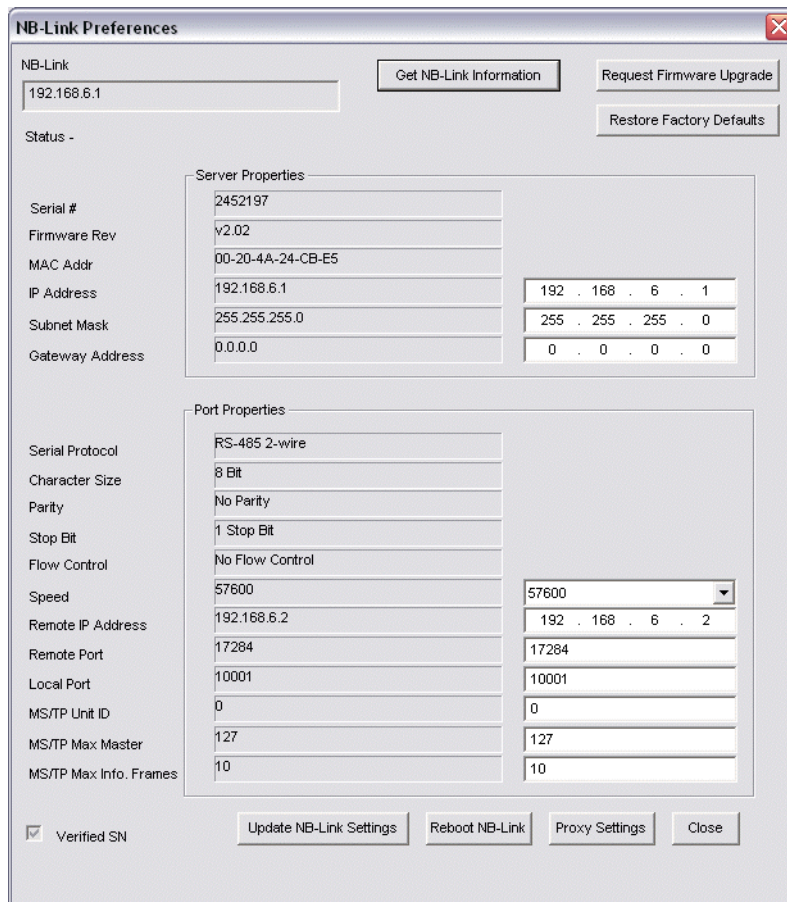


Figure 1-5 NB-Link Preferences

3. If the IP address of your PC is not 192.168.6.1, enter the IP address of your PC in the Remote IP Address field.
4. Click the Get **NB-Link** Properties button.

You can now configure the **NB-Link** to communicate with your PC by entering the IP address and other network configuration information in the preferences window.

1. You may change the default IP address of the **NB-Link** by entering the desired address and subnet mask in the IP Address and Subnet Mask field. The default IP address is 192.168.6.1.
2. Enter the IP address of your PC in the Remote IP Address field if you did not do so earlier.
3. Enter the baud rate of your controller network using the Speed drop-down menu.
4. If desired, you can change default unit ID number by entering the desired value in the MS/TP Unit ID field. The default value is zero (0) and, for most applications, should be left at that value to facilitate efficient token recovery.
5. The Max Master field specifies the address up to which the **NB-Link** will attempt to communicate with controllers. For example, if Max Master were set to 99, **NB-Link** will discover devices with ID numbers ranging from 0 to 99 only. It is recommended that you first assign all unit ID numbers to controllers on the MSTP network and then set Max Master to be just higher than the last assigned unit ID to allow discovery of all possible master devices

without sacrificing network performance polling unused addresses. For more suggested practices for commissioning, please refer to Appendix C: Commissioning Tips.

6. When you are finished configuring the settings for the **NB-Link**, you must click the **Update NB-Link Setting** button to write the configuration information to the **NB-Link**

The **NB-Link** should now be communicating with the PC and you should now be able to use the **NB-Pro** software to communicate with controllers using the **NB-Link**.

SECTION 2 : USING NB-PRO

This section describes the functionality of the **NB-Pro** software package. Step by step instructions are provided for discovering and configuring networked BACnet devices using **NB-Pro**.

NB-Pro System Requirements

To run the **NB-Pro** software, your system must meet the following minimum requirements:

- 500 MHz Pentium III processor
- 256 MB RAM
- Microsoft Windows 2000 or Windows XP
- Microsoft Internet Explorer (version 5.0 or higher) or Netscape Navigator (version 6.0 or higher) or Mozilla Firefox (version 1.0 or higher)
- 1024x768 monitor resolution
- Available USB port for license key. (If a license key is not present, **NB-Pro** will run in a reduced mode)

Installing NB-Pro

Note: When installing Cylon Engineering Center, v6.76 or later, you will be offered a choice to automatically run the NB-Pro installer as part of that installation.

If you are upgrading from a version of **NB-Pro** prior to 2.0, you must uninstall your old copy of **NB-Pro**, install the new version of **NB-Pro**, and update the firmware on the **NB-Link**. If you are installing a clean copy of **NB-Pro**, there will be no prior version to remove and your **NB-Link** should have the most recent firmware release, so you can ignore the instructions in *To uninstall your old version of NB-Pro* on page 16 and *To update the NB-Link firmware* on page 20.

To uninstall your old version of NB-Pro

1. Open the Control Panel by selecting **Start>Control Panel** in **Windows XP**, or by selecting **Start>Settings>Control Panel** in the classic Windows menus.
2. Choose **Add or Remove Programs**.
3. Scroll down and select the **NB-Pro** application.
4. Click on the **Change/Remove** button.

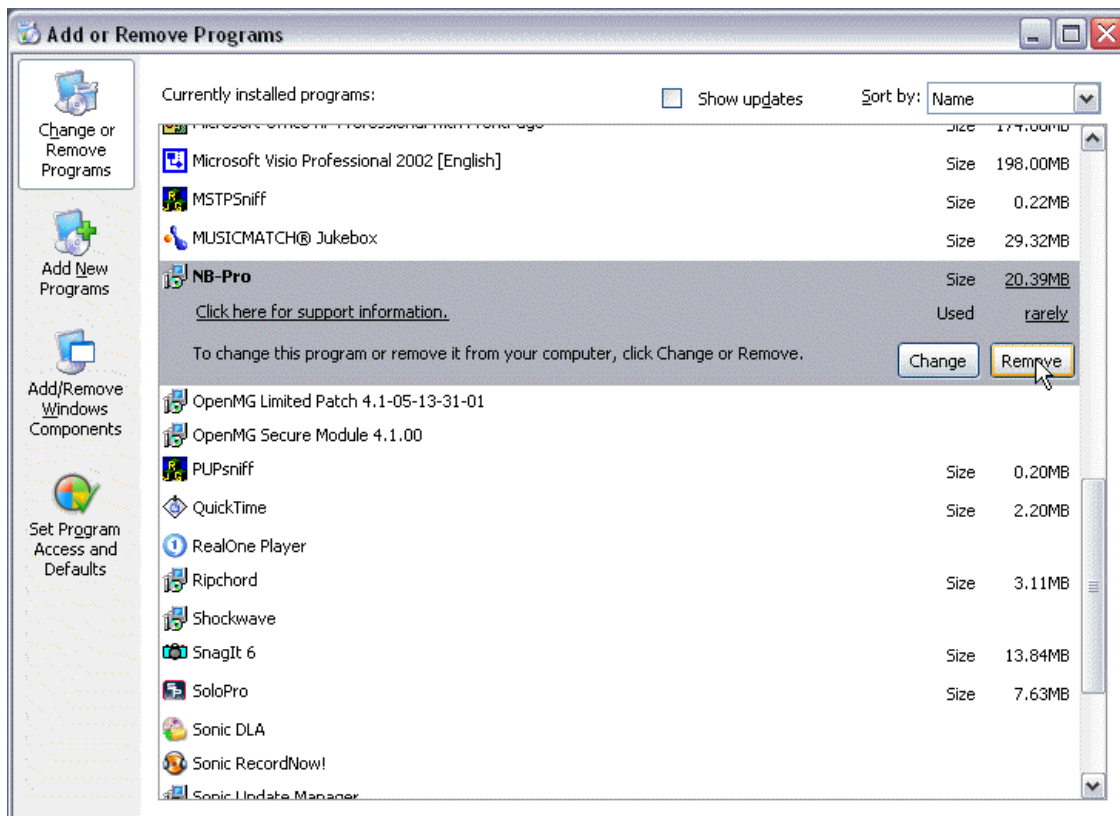


Figure 2-1 Remove Old NB-Pro

5. A dialog will come up asking if you want to completely remove the selected application. Click **OK**.

To Install the new version of NB-Pro

1. Insert the **NB-Pro** 2.0 CD into the CD drive on your computer. The installer should run automatically. If it does not, navigate to the CD and run the setup.exe program.
2. You will then be prompted with an End User License Agreement. After reading the agreement, select the I accept the terms in the license agreement option and click the Next> button.

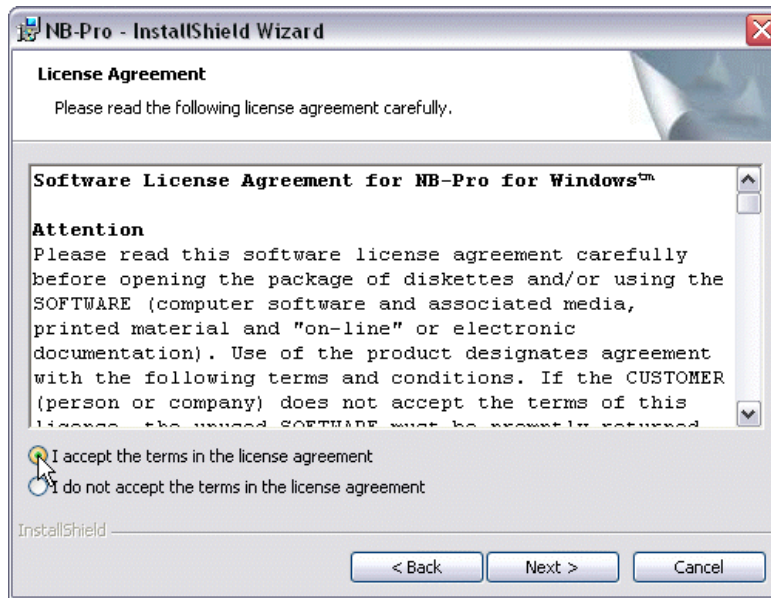


Figure 2-2 License Agreement

3. You must then enter your customer information. If multiple users have accounts on the computer that you are installing **NB-Pro** onto, you can make the program available to all users or only the account which is being used during the installation. This is also selected in this window. Once the information is entered, click the **Next>** button.



Figure 2-3 Customer Info

4. You will then choose the Setup type. Choosing **Complete** will install **NB-Pro** into its default location (the \Program Files\American Auto-Matrix\NBPro directory on the same drive on which Windows is installed). Choosing **Custom** will allow you to select a different location for the installation.

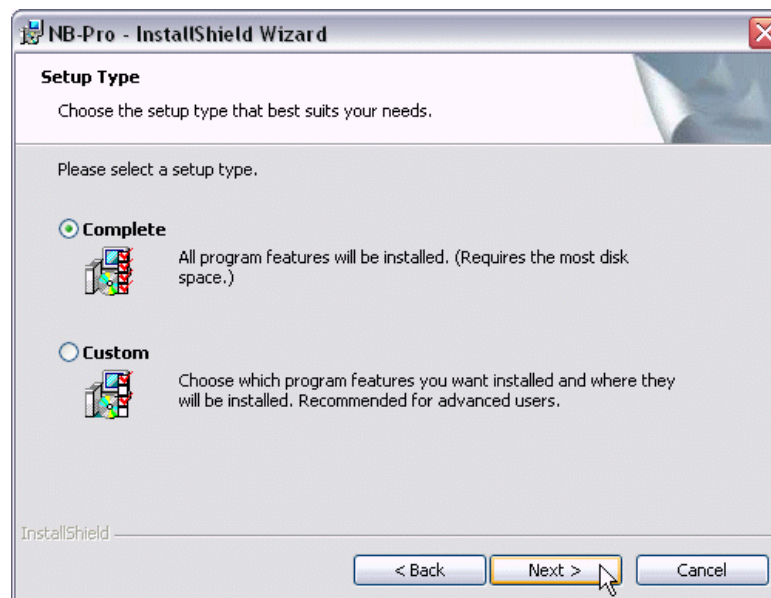


Figure 2-4 Setup

5. The Installer should now be ready to install the **NB-Pro** software. Make sure to remove any and all USB SuperPro Keys before continuing with the installation.
6. After you have confirmed that no keys are attached, click the **Install** button.



Figure 2-5 Ready to Install

7. When the installation is finished, click the **Finish** button.

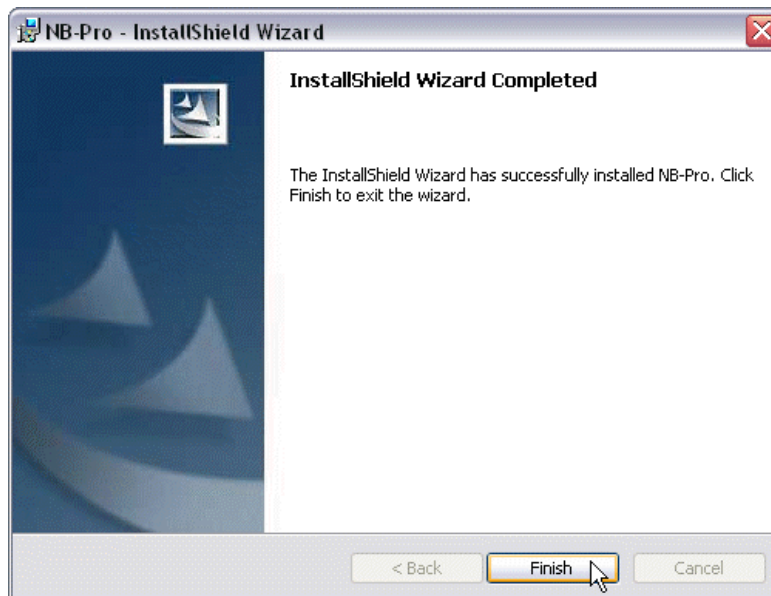


Figure 2-6 Installation Successful

After the **NB-Pro** software is installed, you must update the firmware in the **NB-Link**. If the firmware is not updated, the **NB-Pro** software will be able to connect to the **NB-Link**, but it will not be able to discover objects or properties or communicate in any way.

To update the NB-Link firmware

1. Launch the **NB-Pro** software by clicking on the shortcut on your desktop or by selecting it from the **Start** menu.
2. Select the **NB-Link Preferences** option from the **Settings** menu.

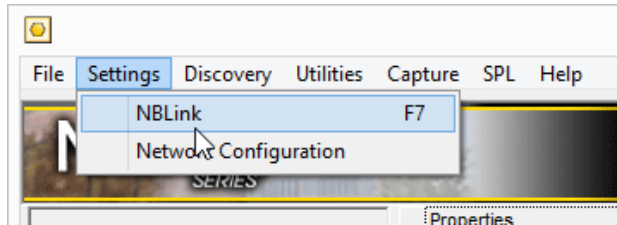


Figure 2-7 NB-Link Preferences

3. When the **NB-Link Preferences** window is opened for the first time, it will detect whether or not you have the latest firmware in your **NB-Link**. If you do not have the latest firmware, it will automatically install the firmware.
4. The **NB-Link** will then be reset.
5. You are now ready to use the **NB-Pro** software.

Polling for objects

NB-Pro has two avenues by which you can bring up a list of the devices on your BACnet network. You may either manually poll the network to discover which devices are present or you can load a previously saved list of devices.

Detecting Devices

There are two ways to have **NB-Pro** detect the devices on your network, issuing a Who-Is or locating devices. Issuing a Who-Is command, either by selecting **Discovery>Send “Who Is”** or pressing Ctrl-W, will send a Who-is command to the network. Controllers on the network will respond to this with an I-am message, making **NB-Pro** aware of the controller. As **NB-Pro** receives the I-am responses from the controllers, those devices will be added to the device list.

The **Discovery>Locate Devices** option can also be used to discover devices on the BACnet network. This option first clears the current device list, removing any devices that have already been added, and then sends a Who-is as described above.

NB-Pro waits thirty seconds after starting up before automatically sending a Who-Is and building a Device list. This allows you time to load a previously saved Device list before communications commence.

Saving/Loading Device Lists

Once the devices on the network have been discovered, you can save the device list to avoid having to rediscovering them in the future. To save a device list you would select the **File>Save Device List** option or press the F1 key. You will then be prompted for the location where you wish to save the device list. The device list will be saved as a text file (.txt extension). Once a device list has been saved, you can load it in at any time using the **File>Load Device List** option or by pressing the F2 key. Loading the device list eliminates the need to discover each device, greatly speeding up your access to the devices. This feature is especially helpful when a large number of devices are present.

Discovering Object Lists

Once the object list has been built or loaded, you can discover the object list for the devices listed. For GPC controllers and third party devices, the object list must be discovered the first time the controller is accessed, but will be loaded automatically after that. For ASC, VAV, and V3T controllers, the object list is built into **NB-Pro**. If you wish to force **NB-Pro** to reload the object list for a controller, you must select the **Discovery>Discover Object Lists** option. When this option is selected, a checkmark will appear next to it in the menu as shown in Figure 2-8.

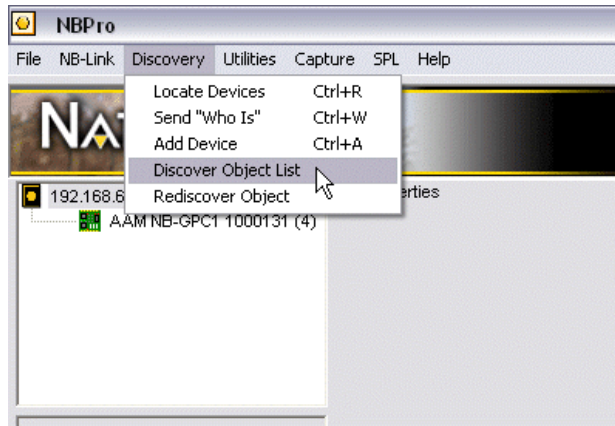


Figure 2-8: Discover Object Lists Option Selected

The next time a controller is selected while this option is checked, the object list will be reloaded. The **Discover Object Lists** option will then become inactive. If you wish to rediscover the object list from more than one controller, you will need to select the **Discover Object Lists** option again.

You would need to use the **Discover Object Lists** option, for example, after changing an object's **object_name** property. Once a program is loaded, the object name will change, requiring the object list to be rediscovered. The **Discover Object Lists** option would force **NB-Pro** to reload the object list making such changes visible.


NOTE


When working with a GPC controller, if you change the sensor type of a Universal Input from digital to analog or from analog to digital, you must reset the controller and then rediscover the object list for the change to take effect. To save time, you may change the sensor type on multiple inputs before rediscovering the object list.

Working With Object Properties

After all objects have loaded into the Object Name panel, you can select an object from the object panel to view its corresponding properties to the right side of the split pane window.

When monitoring properties, users can encounter the following icons:

Each property that successfully displays its updated value will be marked .

A property that is not defined or does not exist in the controller will be marked .

To update all object properties, click on the selected object name from the Object Panel.

To change the value of a property, simply select the property and edit the value using the Value edit box, or corresponding menu.

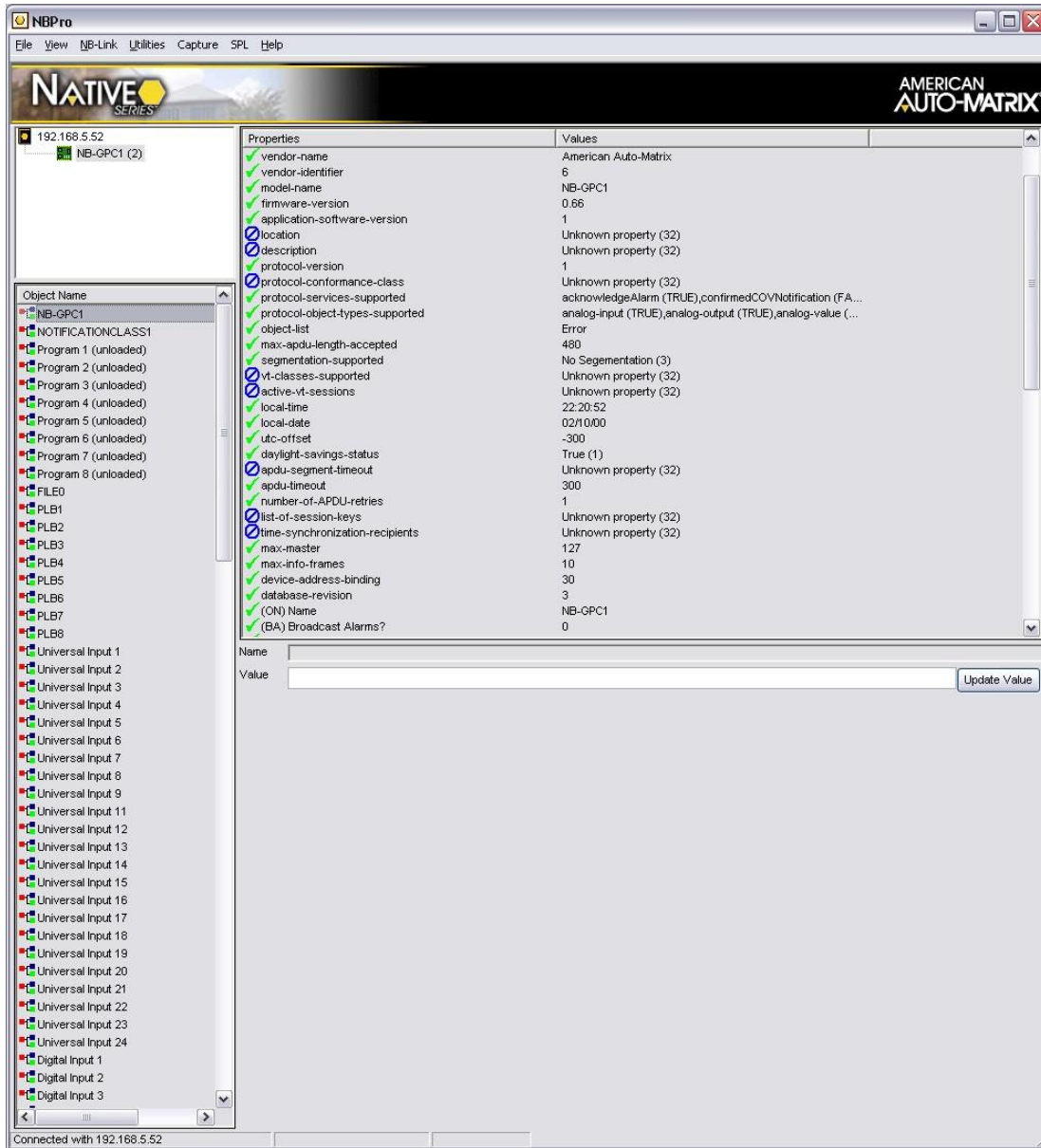


Figure 2-9: Devices, Objects, and Properties Displayed in NB-Pro

File Menu

Using the **File** menu, you can load or save device lists. You can also exit the **NB-Pro** program from this menu.

Save Device List

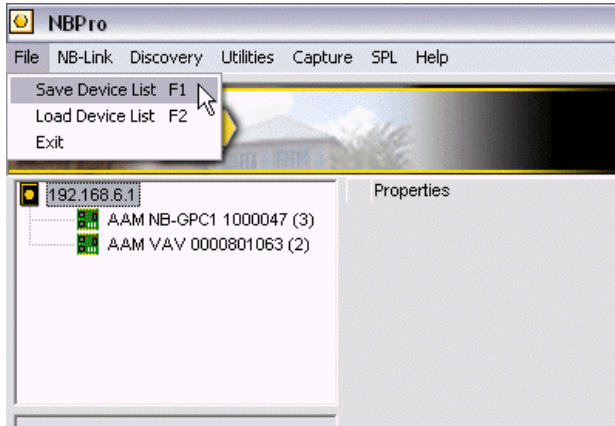


Figure 2-10: Save Device List

The **Save Device List** option allows you to save a list of the currently discovered devices to a text file. The list will be saved as a plain text (.txt) file. This list can be loaded at a later time using the **Load Device List** option, eliminating the need to discover devices.

Load Device List

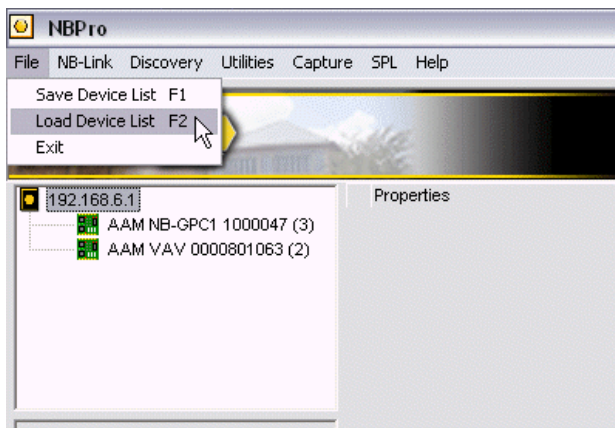


Figure 2-11: Load Device List

By using the **Load Device List** option, you can load a previously saved device lists into **NB-Pro**. This eliminates the need to discover controllers on the network and, if there are more than a few devices, will greatly reduce the time before you can begin working with them.

Exit

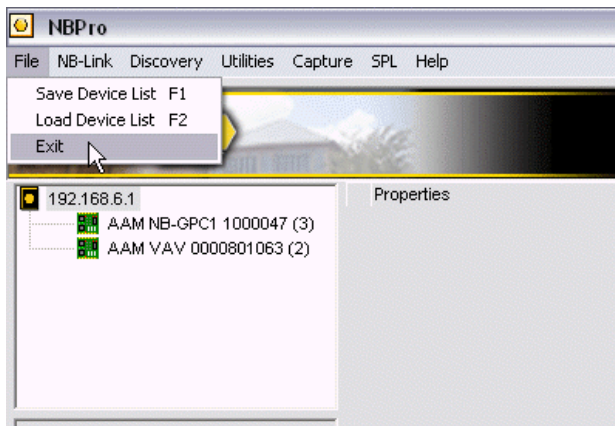


Figure 2-12: Exit

The Exit option is used to close the **NB-Pro** program.

Settings Menu

NB-Link Preferences

To set the preferences for NB-Link, select **NBLink** from the **Settings** menu:

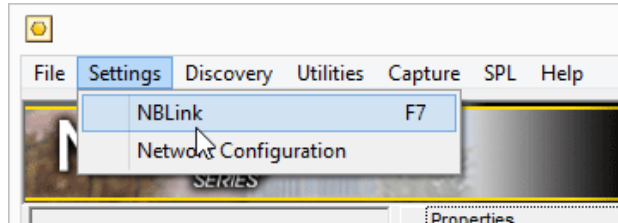


Figure 2-13: NB-Link Preferences

This opens the **NB-Link Preferences** dialog:

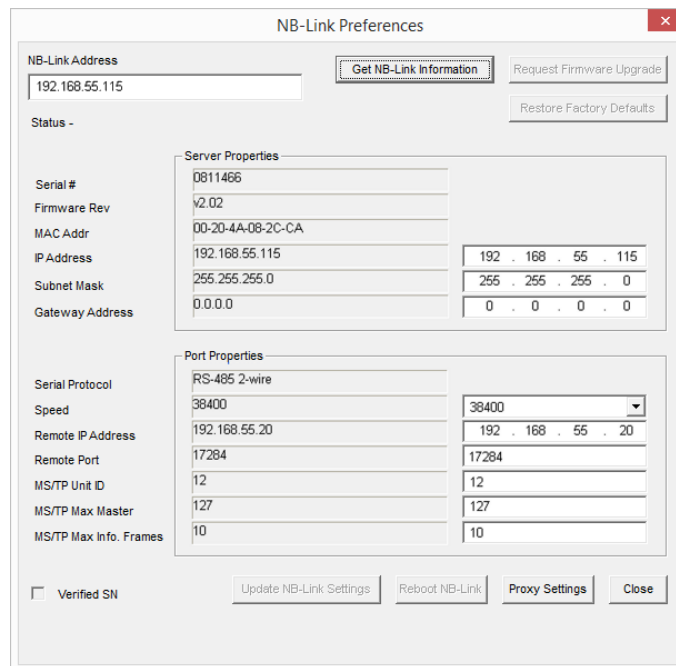


Figure 2-14: NB-Link Preferences

This window has a number of fields that allow you to enter configuration information for **NB-Link**:

IP Address - The IP address of the **NB-Link** on your local network. The default **IP Address** for the **NB-Link** is 192.168.6.1.

Subnet Mask - The subnet mask associated with the **NB-Link**'s IP address. The default **Subnet Mask** for the **NB-Link** is 255.255.255.0.

Gateway Address - If your IP network is configured in such a way that communication between the **NB-Link** and the remote PC are routed through a gateway, the address of the gateway is entered here. If your installation does not use a gateway, you should leave the **Gateway Address** set to the default value of 0.0.0.0.

Speed - The speed of the MS/TP network to which the **NB-Link** is connected.

Remote IP Address - The IP address of the remote PC running **NB-Pro**. The default **Remote IP Address** for the **NB-Link** is 192.168.6.2.

Remote Port - The network port on the remote PC used for communications with the **NB-Link**. In almost all cases, you should not change this value from its default setting of 17284.

Local Port - The network port on the **NB-Link** used for communications with the remote PC. In almost all cases, you should not change this value from its default setting of 10001.

MS/TP Unit ID - The unit ID number for the **NB-Link**. The default **MS/TP Unit ID** is 80, but it is recommended that you change this to a value of 0 to aid in token recovery.

MS/TP Max Master - Specifies the address up to which the **NB-Link** will attempt to communicate with controllers. The default value for **MS/TP Max Master** is 127, but it is recommended that, after you assign all unit ID numbers to controllers on the MSTP network, you then set **MS/TP Max Master** to be just higher than the last assigned unit ID to allow discovery of all possible master devices without sacrificing network performance polling unused addresses.

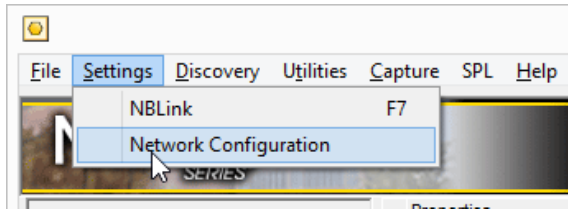
MS/TP Max Info. Frames - The maximum number of data frames that will be sent at before the **NB-Link** passes the token. The default value for **MS/TP Max Info. Frames** is 10 and that value should be adequate in most situations.

When enhancements to **NB-Link** are made available, it can be upgraded through **NB-Pro**. **NB-Link** updates are made via an Internet connection to the AAM product server. Perform the following procedure to upgrade the **NB-Link**:

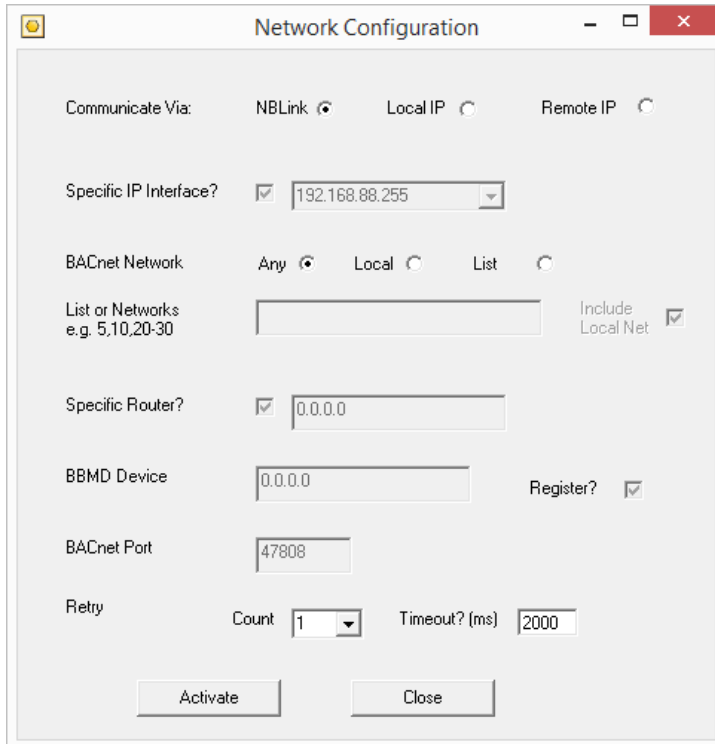
1. Click on **NB-Link** in the **NB-Pro** menu bar.
2. Highlight and click on **NB-Link Preferences** (or simply press the F7 key).
3. If you are connected, the IP address, serial number, MAC Address and firmware revision are displayed. If this information does not appear, click on **Get NB-Link Information**. The steps for configuring the link can be found in *NB-Link Set-Up* on page .

Network Configuration

Selecting **Network Configuration** from the **Settings** menu



Opens the **Network Configuration** dialog:

A screenshot of the 'Network Configuration' dialog box. The dialog has a title bar with a close button. The main area contains several configuration options: 'Communicate Via:' with radio buttons for 'NLink' (selected), 'Local IP', and 'Remote IP'; 'Specific IP Interface?' with a checked checkbox and a dropdown menu showing '192.168.88.255'; 'BACnet Network' with radio buttons for 'Any' (selected), 'Local', and 'List'; 'List or Networks e.g. 5,10,20-30' with an empty text box and an 'Include Local Net' checked checkbox; 'Specific Router?' with a checked checkbox and a text box containing '0.0.0.0'; 'BBMD Device' with a text box containing '0.0.0.0' and a 'Register?' checked checkbox; 'BACnet Port' with a text box containing '47808'; and 'Retry' with a 'Count' dropdown set to '1' and a 'Timeout? (ms)' text box containing '2000'. At the bottom are 'Activate' and 'Close' buttons.

This dialog allows the following parameters to be configured:

Communicate Via:

Choose whether **NB-Pro** will connect to the BACnet network through **NLink**, over a **Local IP** connection or using a **Remote IP** connection. **Local IP** is used when the PC is attached to the same network as the BACnet router (or connected via a WAN or similar) - so that IP broadcasts can be used to and from the router. If the PC is not on the same IP network, then **Remote IP** is used to allow relaying of broadcasts via a **BBMD** or **Foreign Device**-capable router.

Note: If **NB-Pro** is being used with the **Cylon Engineering Center**, it is necessary to set this to **Remote IP** so that **NB-Pro** does not attach to the BACnet UDP port of the PC, which would block the **Engineering Center**.

Specific IP Interface?

This parameter is required if the PC has multiple Network Interfaces.

- If the PC has a single interface, this option is inactive and cannot be selected.
- If this option is selected, then one of the PC's Network Interfaces must be specified for NB-Link communications.
- If this option is not selected, network routing rules are used.

BACnet Network

Set to **Any**, **Local** or **List**

List or Networks e.g. 5.10,20-30

This becomes active if **BACnet Network** is set to **List**, allowing a list of networks to be defined, with an option to **Include Local Net**.

Specific Router?

If multiple routers are present on the network, this will restrict communications to a single router.

If this option is not selected, all routers are available.

BBMD Device

This allows for a **BBMD / Foreign Device**-enabled router to be used to relay broadcast messages, when local IP connectivity does not provide broadcast capability to the BACnet router.

This is required when **Remote IP** is checked.

Note: If **NB-Pro** is being used with the **Cylon Engineering Center**, it is necessary to register **NB-Pro** as a foreign device on a **CBR** on the network by entering the **CBR's IP address** in this field and checking the **Register?** box.

Register?

This checkbox indicates that **NB-Pro** should register as a **Foreign Device**, in order to receive broadcast messages. It should usually be checked.

BACnet Port

This parameter defines the **UDP** port number that the routers are configured to use. It is usually 47808

Retry

If no response is received from a device, **NB-Pro** will retry **Count** number of times with a delay of **Timeout? (ms)** between each retry.

Discovery Menu

Locate Devices

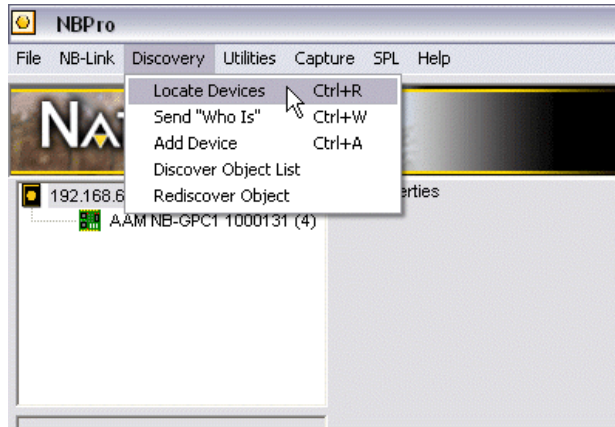


Figure 2-15: Locate Devices

The **Locate Devices** option is used to discover devices on the BACnet network. This option clears the current device list, removing any devices that have already been added, and then sends a Who-is to the network. As controllers respond with an I-am message, they will be added to the device list.

Send "WHO IS"

Send "Who Is" commands **NB-Link** to send a Broadcast Who-Is message on the BACnet MS/TP network to locate additional devices.

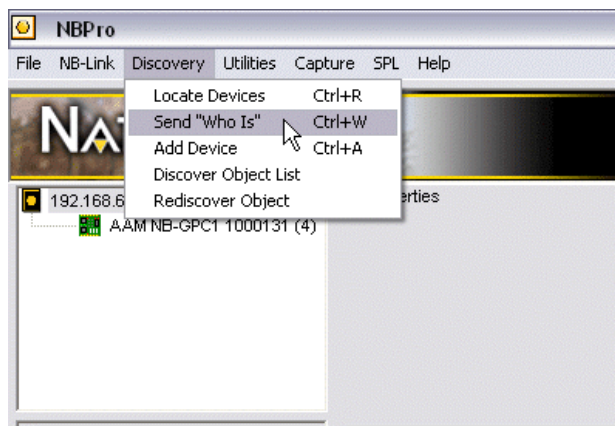


Figure 2-16: Send "Who Is"

Add Device

After using the **Locate Devices** or **Send "Who Is"** options, all devices which respond will be added to the device list. Because devices configured as slave devices never get the token, they will not respond to the Who-is and not be added to the device list. If your network consists of any MS/TP slave devices, you must add the slave device manually using the Add Device function.

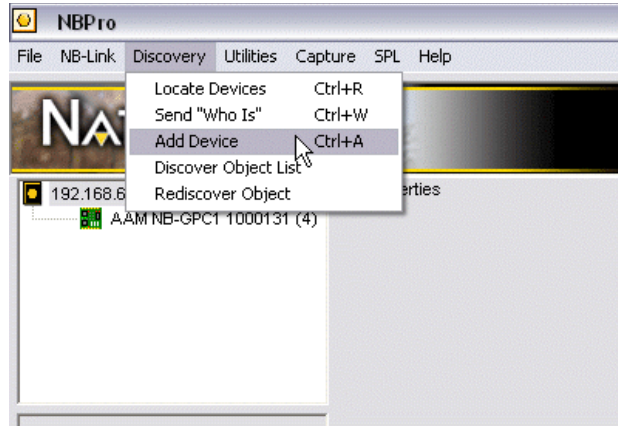


Figure 2-17: Add Device

To add an MS/TP slave device:

1. Click on **Utilities** on the **NB-Pro** menu bar then select **Add Device** from the drop-down menu. The **Add Device** window, shown in Figure 2-18, will appear.

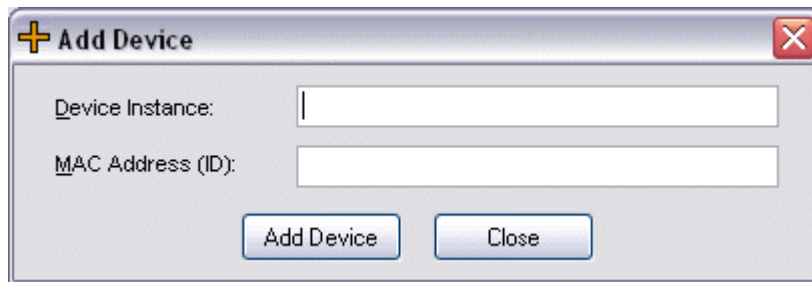


Figure 2-18: Add Device Window

2. Enter the **Device Instance** number of the device in the **Device Instance** field.
3. Enter the Unit ID number of the device in the **MAC Address (ID)** field.
4. Click on the **Add Device** button.

NOTE

AAM Native Series controller's device instance defaults to the controller's serial number. The MAC Address (ID) defaults to the last two digits of the controller's serial number.

Discover Object List

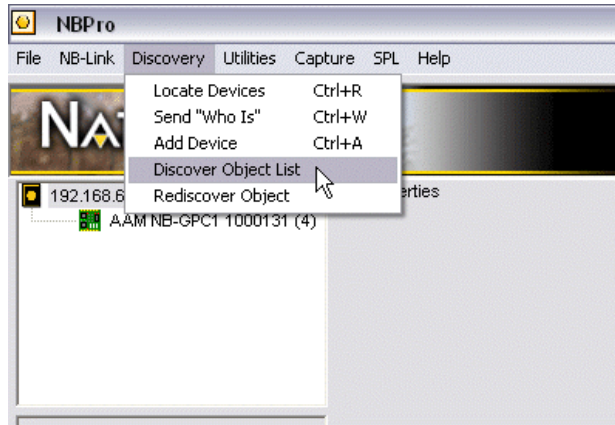
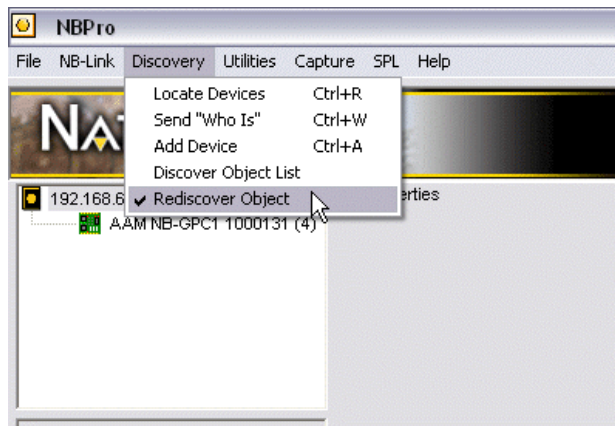


Figure 2-19: Discover Object Lists

NB-Pro is designed to store the object list for a device after the first time it is loaded. This speeds access by eliminating the need to rediscover the object list each time a device is selected. The first time a device is selected, the object list will be read, and stored in memory so that it will not have to be read again after that. However, there are instances when you want to force **NB-Pro** to re-discover the object list. If, for example, you change an object's **object_name** property, you would have to re-discover the object list for that change to be visible. As another example, when working with **NB-GPC** controllers, if a universal input is changed from a digital to analog input or from an analog to a digital input, you would have to reset the controller and then re-discover the object list to see the properties for the new input object.

Rediscover Object



There are times, for example when you change the sensor type on a GPC controller, when you would want to reload a particular object without having to go through the lengthy process of rediscovering the entire object list. The **Rediscover Object** option allows you to selectively rediscover the properties of a single object from the object list. To rediscover the properties of an object, select the **Rediscover Object** option. A checkmark will be placed to the left of the option in the Discovery menu. The next time you click on an object's name in the object list, **NB-Pro** will rediscover the properties for that object. After the properties are rediscovered, the checkmark will be cleared and **NB-Pro** will function normally. If you wish to rediscover the properties from another object, simply select the **Rediscover Object** option again.

Utilities Menu

Flash Update

NB-Pro's Flash Updating feature allows you to flash controllers with the latest firmware or application templates.

To Flash Update one or more controllers, perform the following steps:

1. Click on **Utilities** on the **NB-Pro** menu bar then highlight and click on *Flash Update*. Alternately, you can press Ctrl-F. The **Flash Update** window will appear.

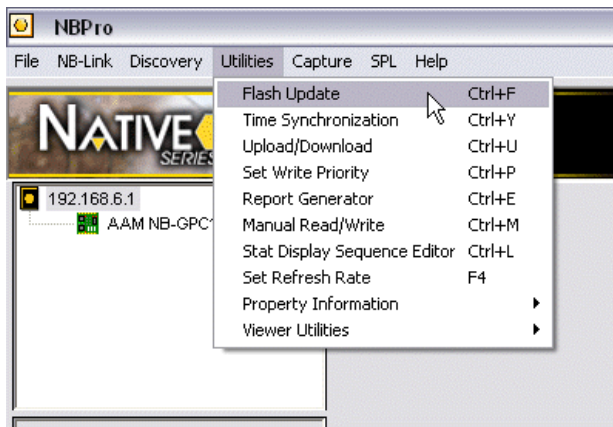


Figure 2-20: Flash Update

2. Click on the **Browse** button in the **Flash Update** window to browse to the Flash Update Library (*.flb) file. Once you have selected a Flash Library file, the Library entries will be displayed in the upper pane of the **Flash Update** window.
3. Select the desired update from the list of Flash Library Entries.
4. In the lower pane, select the controller(s) you wish to update. You can hold down the Shift or Ctrl key while clicking to select more than one controller.

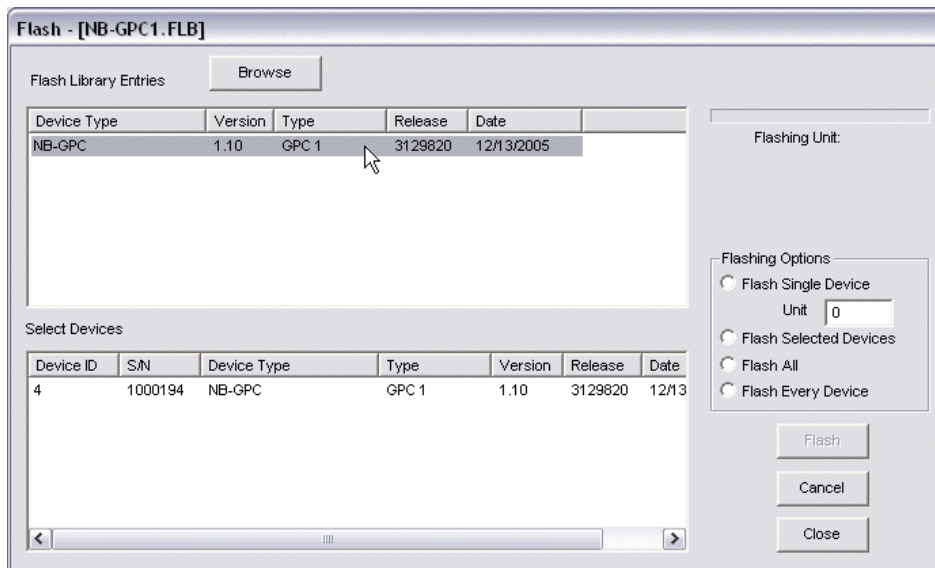


Figure 2-21 Flash Update Window

1. Choose the methodology for the flash update:

Flash Single Device –Flashes a specific controller from the controller list window. You may specify a controller by entering the device ID in the Unit field under the “Flash Single Controller” or by selecting it in the Select Devices pane. Selecting a single controller in the Select Devices pane will automatically set the Unit field to the unit number of the selected controller.

Flash Selected Device – Flashes multiple controllers selected in the controller list window with the flash file selected.

Flash All – Flashes all controllers of the selected type. For example, if you select NB-VAV (r/t/a/f) from the Flash Libraries, all NB-VAV controllers would be flashed.

Flash Every Device – Flash updates all controllers in the controller list. Each controller will be updated with the library entry corresponding to its current firmware. If there is not an update for a given controller or the controller has a newer firmware version than the flash library, then an error message will be displayed and **NB-Pro** will move on to the next controller.

NOTE

The *Flash Single Device* option is the only one which will allow you to “backwards flash” an ASC controller, that is flash it to a lower firmware version. The *Flash Selected Device*, *Flash All*, and *Flash Every Device* options will only work if the flash file has a higher version or a higher release number of the same version of the firmware that is currently installed in the controller.

2. Once you have selected a Flash entry, selected the controller(s) to be updated, and selected the flash method, click on the **Flash** button. A status bar and the percentage of completion is shown for each controller/controller group.

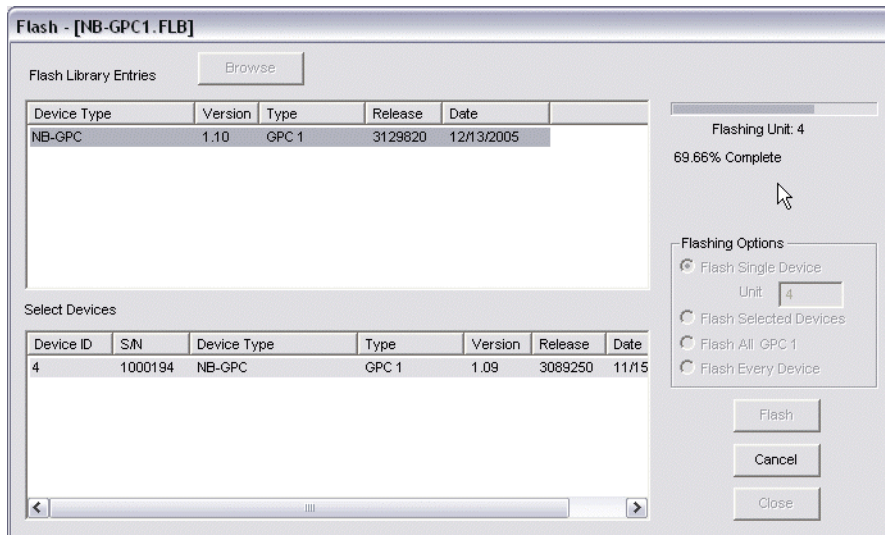


Figure 2-22: Flash Update Status

When the flash update is complete, the **Flash Report** dialog will be displayed.

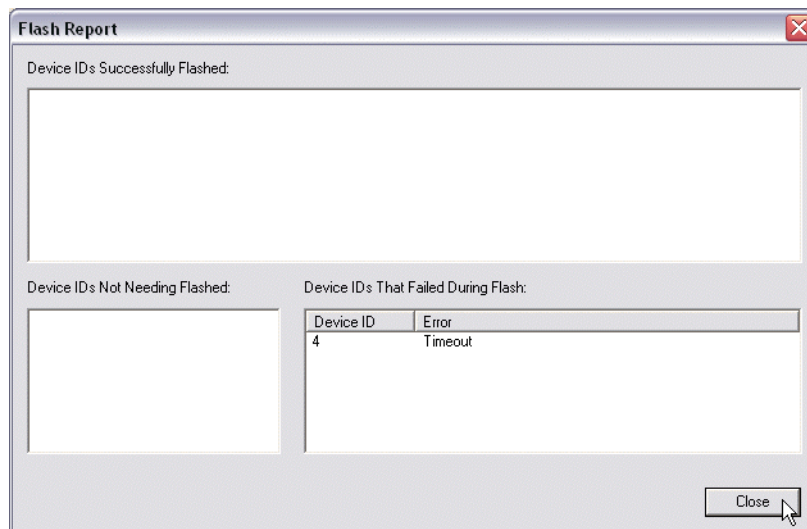


Figure 2-23 Flash Report Dialog

This dialog has three parts to it. The ID numbers of devices successfully flashed will be displayed in the **Device IDs Successfully Flashed** pane at the top of the window. The ID numbers of any devices that did not require the flash update will be listed in the **Device IDs Not Needing Flashed** pane in the lower left portion of the window. If any errors were detected during the flash update, they will be listed in the **Device IDs that Failed During Flash** pane in the lower right portion of the window. The Device ID will be displayed as well as a brief description of the error which occurred when trying to flash that device.

Time Synchronization

To synchronize the `local_time` of devices connected to the BACnet MS/TP network, click on **Utilities** on the **NB-Pro** menu bar, then highlight and click on **Time Synchronization** or pressing Ctrl-Y.

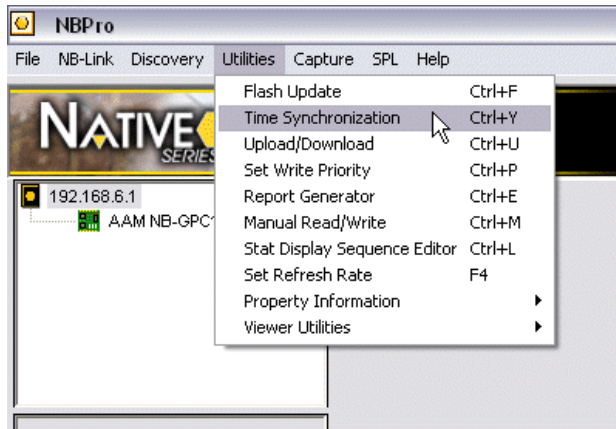


Figure 2-24: Time Synchronization

Once the **Time Sync** window is displayed, click on the **Send Current Time and Date** button, or manually enter the current time and date in the appropriate fields, then click on the **Send** button

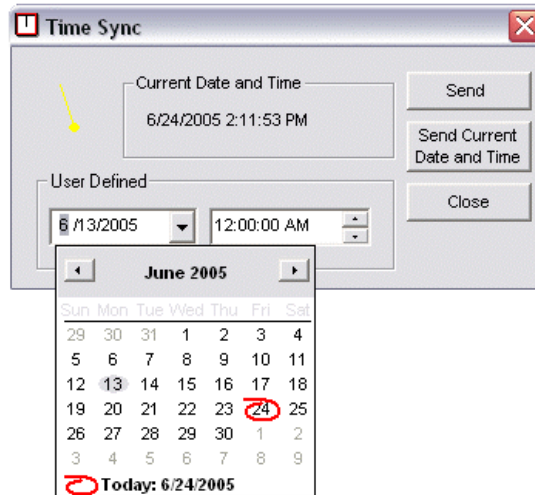


Figure 2-25: Time Sync Window

Upload/Download

The Upload/Download feature allows you to move files between the controller and the computer workstation running **NB-Pro**. Most of the time the files uploaded or downloaded will be SPL programs or Logo files, but some controllers also allow flash updates to be installed by uploading a file to the controller.

NOTE

You must load the object list for the controller before you will be able to upload or download files to that controller.

To download a file to a controller, perform the following steps:

1. Click on **Utilities** on the **NB-Pro** menu bar. Select **Upload/Download**. Alternately, you can press Ctrl-U.

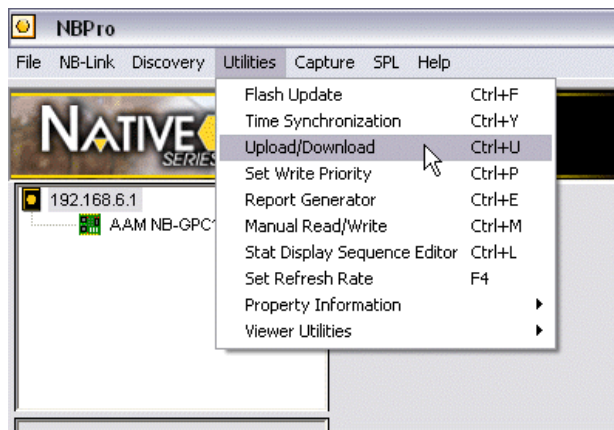


Figure 2-26: Upload/Download

2. The **Program Operations** dialog will be displayed:

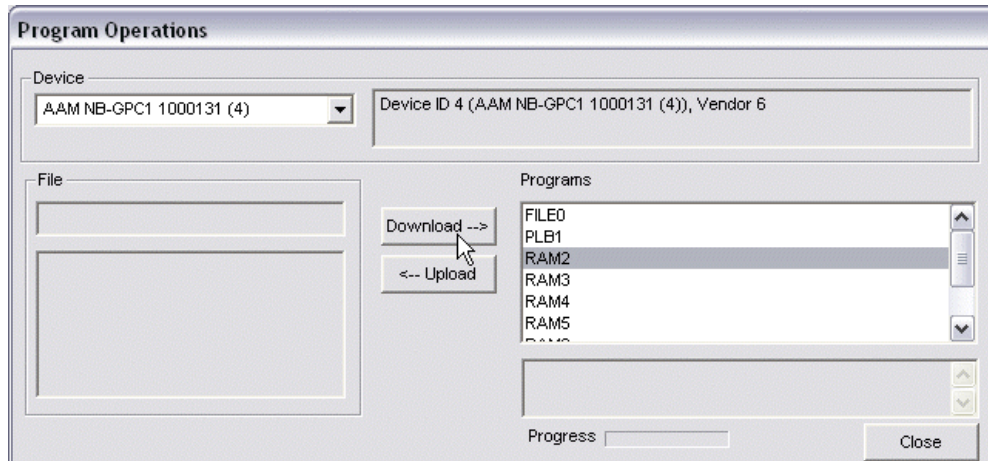


Figure 2-27: Program Operations window

3. Select the controller to which you wish to download a file using the **Unit** drop-down.
4. Select where in the controller you wish the file to be downloaded using the **Programs** list.
5. Click the **Download-->** button.
6. A file browser window will open for you to select the file you wish to download to the controller.

Once selected the file name will be displayed in the box below the Programs field and the program will begin to download. The download progress will be displayed by the Progress bar as well as a percentage next to the bar. When the program is successfully transferred to the controller, the name of the object will be changed to the name of the program. For GPC controllers, the object list must be rediscovered for this change to be visible.

To upload a file from a controller, perform the following steps:

1. Click on **Utilities** on the **NB-Pro** menu bar. Select **Upload/Download**. Alternately, you can press CTRL-U. The **Program Operations** dialog will be displayed.
2. Select the controller from which you wish to upload a file using the **Unit** drop-down.
3. Select where in the controller you wish the file to be uploaded using the Programs list.
4. Click the **<--Upload** button.
5. A file browser window will open for you to select where you wish to save the uploaded file.

Set Write Priority

In BACnet, it is possible for many different devices to try to modify the same device's object property values. If multiple devices tried to write to the same object property, errors could occur and values could be set incorrectly. To avoid this, BACnet uses priority arrays to determine the order in which property changes will be performed.

A priority array assigns unique levels of priority to the different types of devices that could write values to a device. There are 16 prioritizations with Level 1 being highest and Level 16 the lowest. A complete list of BACnet Priority Array Levels and their uses is given in Table 2-1.

Table 2-1 : Priority Array Levels

Priority Level	Application	Priority Level	Application
1	Manual-Life Safety	9	Available
2	Automatic-Life Safety	10	Available
3	Available	11	Available
4	Available	12	Available
5	Critical Equipment Control	13	Available
6	Minimum On/Off	14	Available
7	Available	15	Available
8	Manual Operator	16	Available

By default, **NB-Pro** writes at Priority Array Level 8. This level can be modified to a different priority if you desire.

The **Set Write Priority** option determines the Priority Array Level at which values are written to the controller. The relative Priority Array Level of a value written to the controller determines how the value is handled by the controller. For example, control loops typically write at a Priority Array Level of 11 meaning that a manually written value with a default Priority Array Level of 8 will have a higher priority (lower priority level number) than the control loop and will, therefore, override the value written by the control loop.

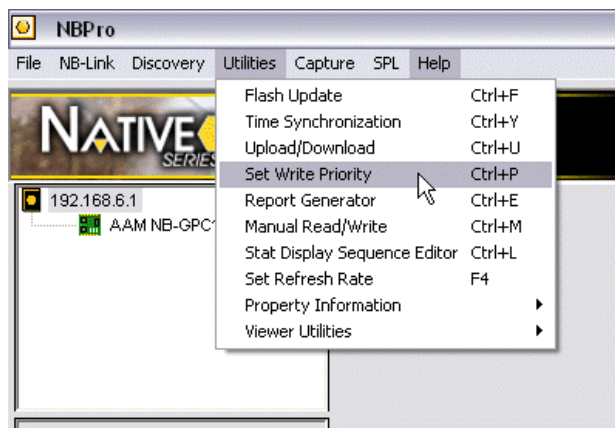


Figure 2-28: Set Write Priority

The desired Priority Array Level for writing can be set using the drop-down menu in the **Set Writing Priority** dialog.

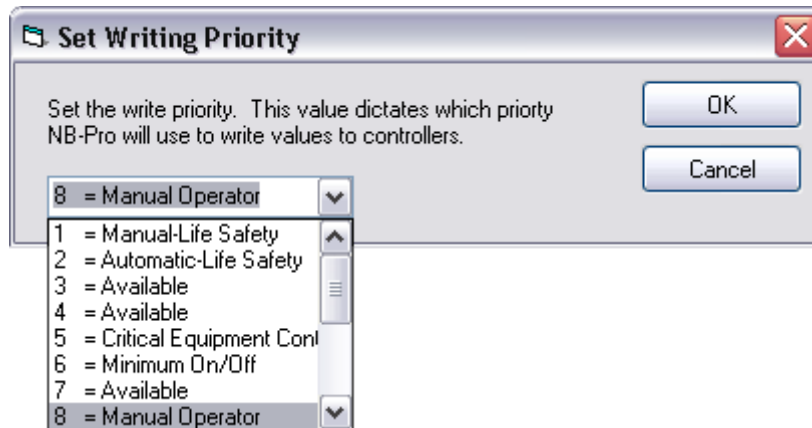


Figure 2-29: Set Writing Priority

This Priority Array Level will be used for all values written to the controller.

Standard Commandable Properties

A BACnet device may have certain object properties, known as “Standard Commandable Properties”, that may only be written to with a priority and only if control is relinquished, provided that the device supports priority and control relinquishment. When you finish modifying a Standard Commandable Property in a BACnet device, control must be relinquished from that property.

To relinquish control, the value of ‘NULL’ must be written to the **present_value** of the object, at the Priority level you have written with. (For example, if you commanded an Analog Output’s Present_Value to 100.0 at a Priority Level of 8, you must write the value NULL with a Priority Level of 8 in order to successfully relinquish control of that property). Please note that “NULL” is case sensitive and must be written in all capitals. Table 2-2 lists the Standard Commandable Properties that fall under this guideline.

Table 2-2 : Commandable Properties

Object	Commandable Property
Analog Output	present_value
Analog Value	present_value
Binary Output	present_value
Binary Value	present_value
Multi-state Output	present_value
Multi-state Value	present_value

Report Generator

The Report Generator option is used to create a listing of the properties in a controller, their values and how those values are interpreted.

To generate a report, perform the following steps:

1. Click on **Utilities** on the **NB-Pro** menu bar and select **Report Generator**. Alternately, you can press Ctrl-E.

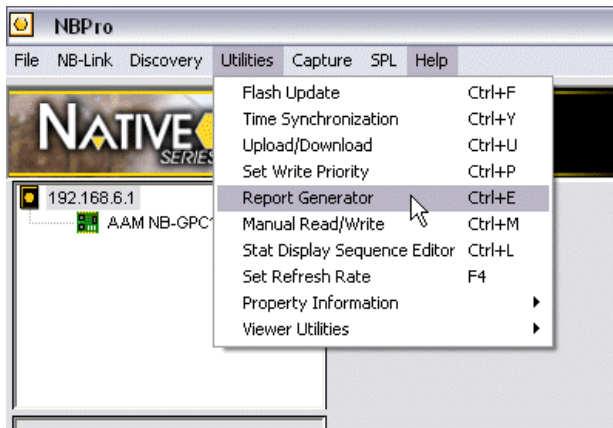


Figure 2-30: Report Generator

The **Report Generator** dialog will open:

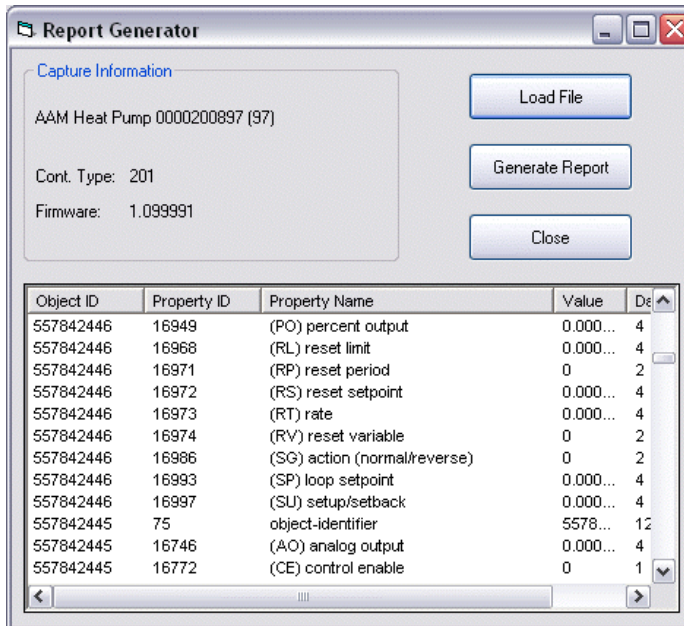
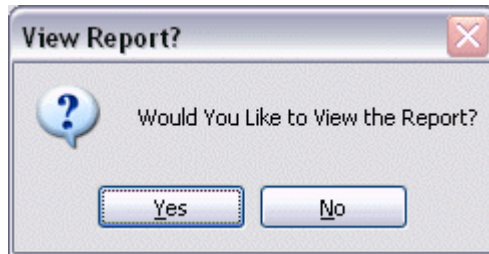


Figure 2-31: Report Generator dialog

2. Click on the **Load File** button.
3. A file browser will open for you to select the controller capture file for which you wish to generate a report. The controller name, controller type and firmware version will be shown in the **Capture Information** box and a list of all of the properties in the capture file are displayed at the bottom of the window.
4. Press the **Generate Report** button to create the report. A file browser window will be opened and you will be prompted for where you wish to save the report.
5. You will be asked whether you wish to view the report that has been generated.



6. If you select **Yes**, the report will be opened, by default, using Internet Explorer.



Exported from NBPro on 12/15/05 03:12 PM
Device Type 205 (NB-GPC), version 1.09
Capture File Contains 3304 Saved Properties

Object/Channel	Property Description	Property ID	Value	Value Interpretation
Device (8), Instance 1000194	(CR) Configure Remote I/O	50002	0	Normal
	(PF) Priority for fault alarms	53318	3	n/a
	(PN) Priority for normal alarms	53326	4	n/a
	(PO) Priority for off normal alarms	53327	2	n/a
	(PI) Process ID for alarms	53321	0	n/a
	(DD) Device Instance to send alarms to	50244	0	n/a
	(UD) Use Device	54596	1	Device Instance
	(IA) Intrinsic Alarming	51521	4	Confirmed to Device
	(RS) Reset the NB-GPC?	53843	0	n/a
	(PS) Power-up state	53331	0	Unoccupied
	(PD) Control and Alarm Power-on Delay	53316	15	n/a
	(TF) Time to Remain in Fire Mode	54342	0	n/a
	(FA) Faults Detected	50753	00000000000000000000000000000000	n/a

Figure 2-32: Generated Report

Manual Read/Write

The Manual Read/Write option allows you to read or write the value of a property given its object instance and property ID number. This can be particularly useful when trying to work with the values of proprietary properties in other vendor's controllers or user-defined properties in an SPL program

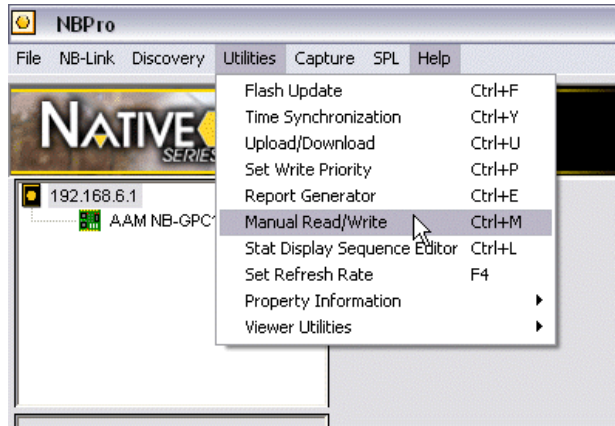


Figure 2-33: Manual Read/Write

Selecting **Manual Read/Write** from the **Utilities** menu or pressing Ctrl-M will bring up the **Manual Read/Write** dialog:

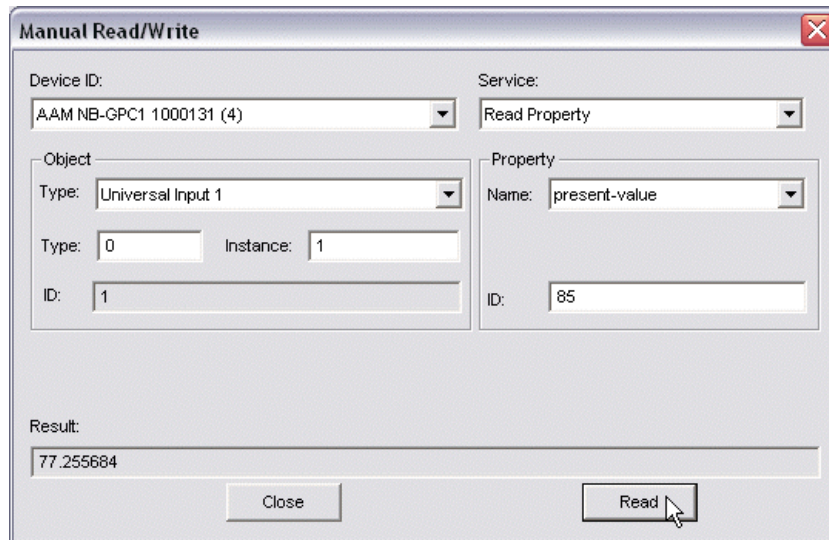


Figure 2-34: Reading a Property with the Manual Read/Write Window

Reading A Property Value

To read a property value:

1. Select the unit which contains the desired property using the **Unit ID** drop-down menu.
2. Select "Read Property" from the **Service** drop-down menu.

3. Select the type of object in which the desired property is located. You may either use the **Type** dropdown menu or enter the object identifier number in the **Type** field. If you use the **Type** drop-down menu, the instance will be filled in automatically. If you manually enter the type, you must also enter the object instance of the chosen object type in the **Instance** field. The ID number for the selected property will be displayed in the **ID** field.
4. Select the property you wish to read. You may either use the **Name** drop-down menu to select a property in the chosen object or you may manually enter the property ID number or, for AAM proprietary properties, the two-letter abbreviation corresponding to the desired property in the **ID** field.
5. Once all the necessary information has been entered, the **Read** button will appear at the bottom of the window.
6. Press the **Read** button.
7. The value read will be displayed in the Result Field.

Writing A Property Value

To write a value to a property:

1. Select the unit which contains the desired property using the **Unit ID** drop-down menu.
2. Select **Write Property** from the **Service** drop-down menu. The **Manual Read/Write** dialog should look like this:

The screenshot shows a 'Manual Read/Write' dialog box. At the top, there are two dropdown menus: 'Device ID' (selected: AAM NB-GPC1 1000131 (4)) and 'Service' (selected: Write Property). Below these are two columns. The left column is for 'Object' selection, with a 'Type' dropdown (Digital Output 1), 'Type' text input (4), 'Instance' text input (1), and 'ID' text input (16777217). The right column is for 'Property' selection, with a 'Name' dropdown (empty) and 'ID' text input (85). Below the object and property fields is a 'Value to Write' text input containing '1'. At the bottom, there is a 'Result' text input containing 'Value successfully written'. Two buttons, 'Close' and 'Write', are at the bottom right.

Figure 2-35: Writing a Property with the Manual Read/Write Window

3. Select the type of object in which the desired property is located. You may either use the **Type** dropdown menu or enter the object identifier number in the **Type** field. If you use the **Type** drop-down menu, the instance will be filled in automatically. If you manually enter the type, you must also enter the object instance of the chosen object type in the **Instance** field. The ID number for the selected property will be displayed in the **ID** field.
4. Select the property you wish to write. You may either use the **Name** drop-down menu to select a property in the chosen object or you may manually enter the property ID number or, for AAM proprietary properties, the two-letter abbreviation corresponding to the desired property in the **ID** field.
5. Enter the value you wish to write in the **Value to Write** field.

6. Once all the necessary information has been entered, the **Write** button will appear at the bottom of the window.
7. Press the **Write** button.

A “value successfully written” message will be displayed in the **Result** field unless an error occurs during the write operation.

Reading And Writing Bitmap Values

The manual read/write capabilities in **NB-Pro 2.0** have been expanded to include bitmap properties. To read or write the value of an individual bit in a bitmap:

1. Select the unit which contains the desired property using the **Unit ID** drop-down menu.
2. Select whether you wish to read or write the property using the **Service** drop-down menu.
3. Select the type of object in which the desired property is located. You may either use the **Type** dropdown menu or enter the object identifier number in the **Type** field. If you use the **Type** dropdown menu, the instance will be filled in automatically. If you manually enter the type, you must also enter the object instance of the chosen object type in the **Instance** field. The ID number for the selected property will be displayed in the **ID** field.
4. Select the property you wish to read or write. You may either use the **Name** drop-down menu to select a property in the chosen object or you may manually enter the property ID number or, for AAM proprietary properties, the two-letter abbreviation corresponding to the desired property in the **ID** field.
5. Select the bit that you are interested in reading or writing using the **Bitmap** drop-down menu in the Property box. If you do not select a bit, you will read or write the full bitstring. The screenshot below shows the **Manual Read/Write** window configured to read the third bit of the **(OB) Output Channel Bitmap** property from the **Thermostatic Control 4** object.

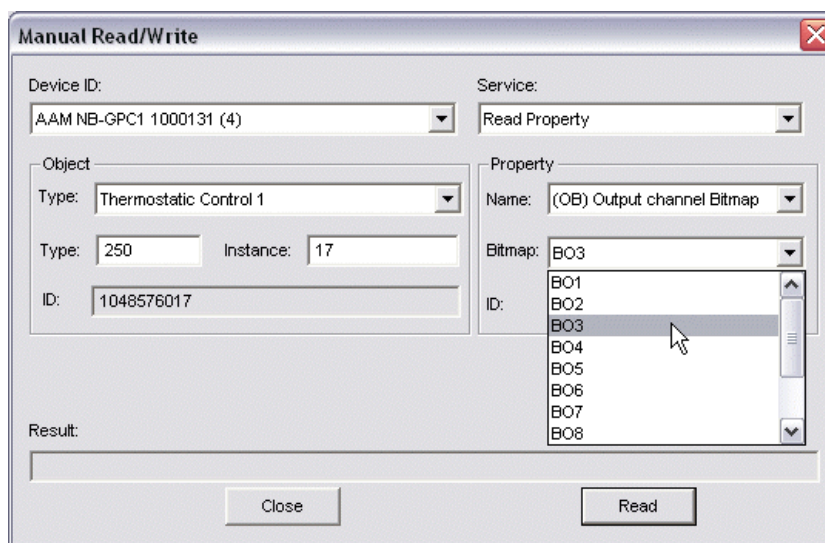


Figure 2-36 Manually Reading the Value of a Bitmap

6. If you are writing a value to the chosen property, enter the binary value you wish to write in the **Value to Write** field. For individual bits, enter either 0 or 1. Bitstrings are entered with the right-most bit being the least significant bit. When entering full bitstrings, if the value entered is shorter than the total length of the bitstring, the value will be padded with leading zeros.

NOTE

When working with GPC controllers, the least significant bit is the left-most bit in the bitstring not the right-most bit like in other controllers. When writing to a bitstring on a GPC, you must enter a value for all 24 bits of the bitstring or leading zeros will be added, resulting in an incorrect value being written.

7. Press the **Read** or **Write** button, as appropriate.

If you are reading a value, the value will be displayed in the **Result** field unless an error occurs, at which point the error will be displayed. If you are writing a value, a “value successfully written” message will be displayed in the **Result** field unless an error occurs during the write operation.

Stat Display Sequence Editor

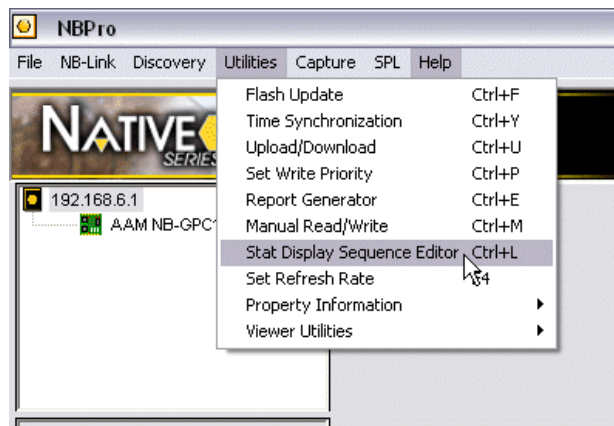


Figure 2-37: STAT Display Sequence Editor

The STAT Display Sequence Editor option is used to configure custom display sequences to be displayed on SBC-STAT3, SBC-RH3s, and SBC-RHTs connected to controllers in the GPC family. Please refer to *Section 4: Custom Display Sequences* in the STAT User Manual (AAM part # 1E-04-00-0103) for a complete discussion of the creation and configuration of custom display sequences.

Set Refresh Rate

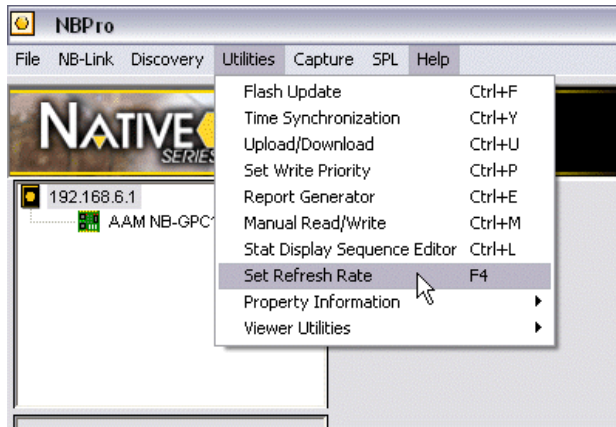


Figure 2-38: Set Refresh Rate

In previous versions of **NB-Pro**, if changing one property's value affected the values of other properties, to see the effects of the change, you had to click on the object and reload the property list. **NB-Pro** now can be configured to automatically update the values of properties displayed in the right hand pane of the **NB-Pro** window. Selecting the **Set Refresh Rate** option from the **Utilities** menu will open the **Refresh Rate** dialog:

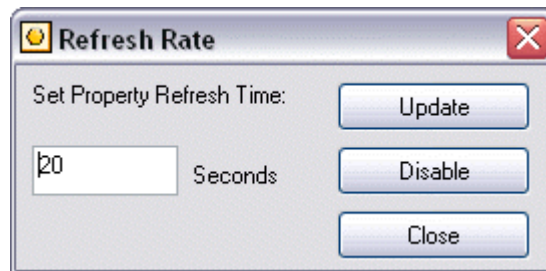


Figure 2-39: Set Refresh Rate Dialog

You may enter the number of seconds you wish to elapse between refreshes in the box. You may also disable the automatic refreshing by clicking the **Disable** button. The current state of the refresh, either enabled or disabled, will be displayed in the lower left corner of the dialog.

NOTE

For AAM ASC-based controllers and other controller which do not support ReadPropertyMultiple, setting the refresh interval to too small a value may cause an disproportionate amount of time to be spent refreshing values. This can adversely affect the ability of the user to operate NB-Pro.

Property Information

Prop ID Lists

The Prop ID Lists option provides a way for you to look up the property identifier numbers for any property contained in your controller.

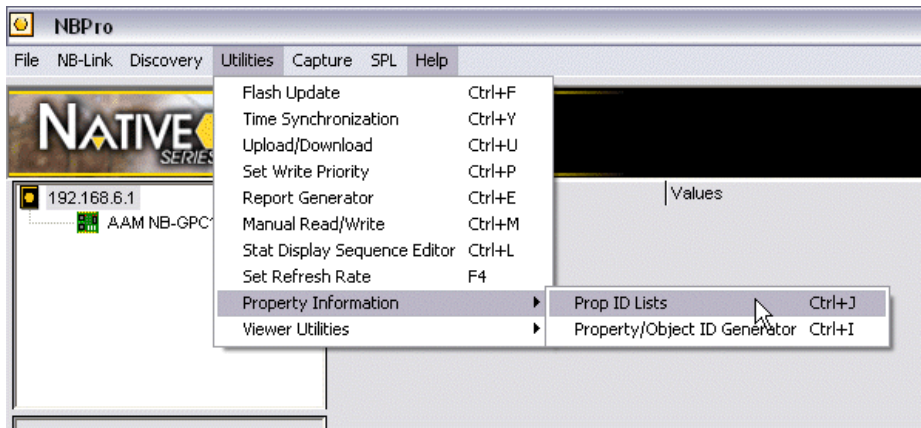


Figure 2-40: Prop ID Lists

To view a list of the property ID numbers:

Select **Prop ID Lists** from the **Utilities** menu. Alternately, you can press Ctrl-L.

This will bring up the **Property ID Lists** dialog:

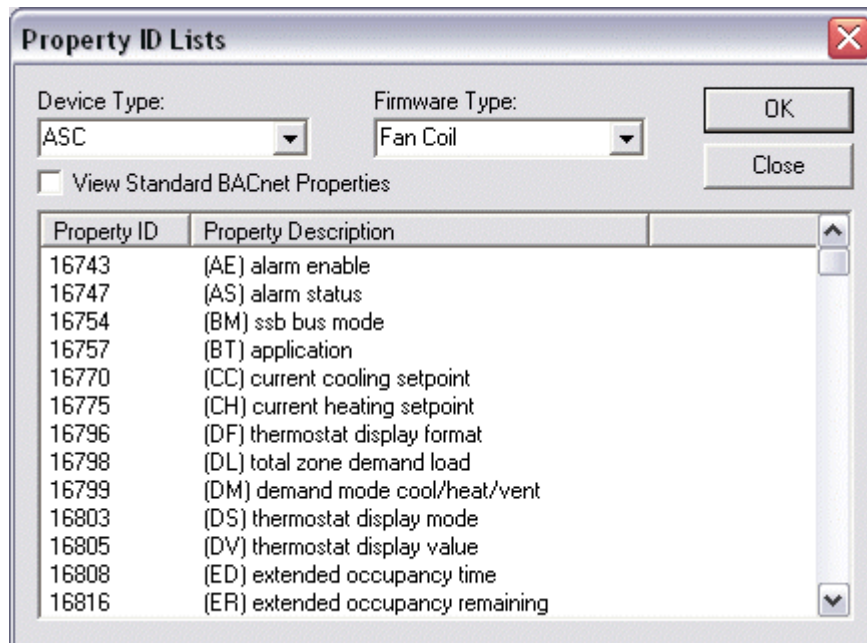


Figure 2-41: Property ID Lists dialog

Select the controller type using the **Device Type** drop-down menu.

Select the type of firmware installed in the controller using the **Firmware Type** drop-down menu.

NOTE

Currently, *NB-Pro* supports the ASC and GPC families of controllers. The ASC family consists of the *NB-ASC*, *NB-VAV* and the *NB-V3T* models. The GPC family consists of the *NB-GPC1*, *NB-GPC2*, and *NB-GPC3*.

If you wish to see the property ID numbers for the standard BACnet properties as well as the proprietary ones, select the View Standard BACnet Properties option.

Click OK and the property ID numbers will then be displayed in the window.

When you are finished, click Close to close this window.

Property/Object Id Generator

The Property/Object ID Generator option calculates BACnet property object identifier numbers and property identifier numbers from PUP attributes and channels. Device object identifiers can also be calculated from the device's instance number.

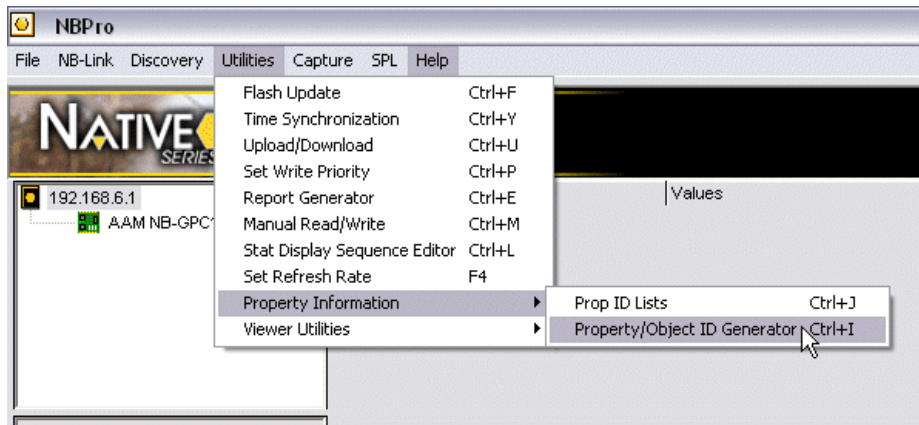


Figure 2-42: Property/Object ID Generator

Select the **Property/Object ID Generator** option from the **Utilities** menu, or press Ctrl-I, to open the **Property/Object ID Generator** dialog.

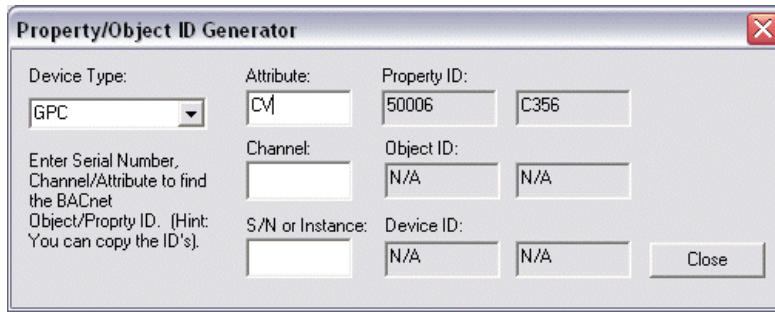


Figure 2-43: Property/Object ID Generator dialog

From this window you can calculate the property or object ID number for a given object or property for a Native Series GPC or ASC controller.

NOTE

The decimal and hexadecimal values displayed in the Property/Object ID Generator can be copied and pasted where they are need, for example, in an SPL program.

To determine a [property ID](#) number, [object ID](#) number, or [device ID](#) number:

1. Select the type of controller (**GPC** or **ASC**) using the **Device Type** drop down.
2. For a property ID, enter the two-letter attribute name into the **Attribute** field. The property ID will be shown to the right of the field in both decimal and hexadecimal.
3. For a object ID, enter the PUP channel name (i.e. FF00, F901, etc.) into the **Channel** field. The object ID will be shown to the right of the field in both decimal and hexadecimal.
4. For a device ID, enter the device serial number or instance number into the **S/N or Instance** field. The device ID will be shown to the right of the field in both decimal and hexadecimal.
5. When you are done, click **Close** to exit the **Property/Object ID Generator** dialog.

Viewer Utilities

TREND VIEWER

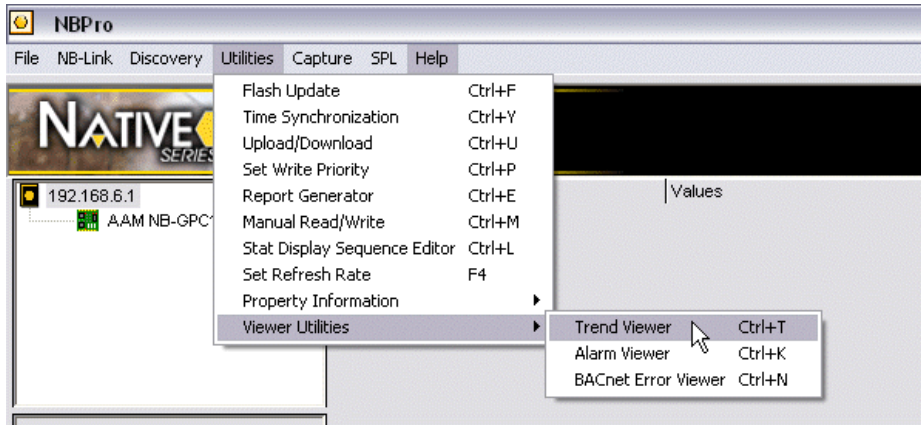


Figure 2-44 Trend Viewer

Selecting the **Trend Viewer** option or pressing Ctrl-T brings up the **Trend Viewer** dialog:

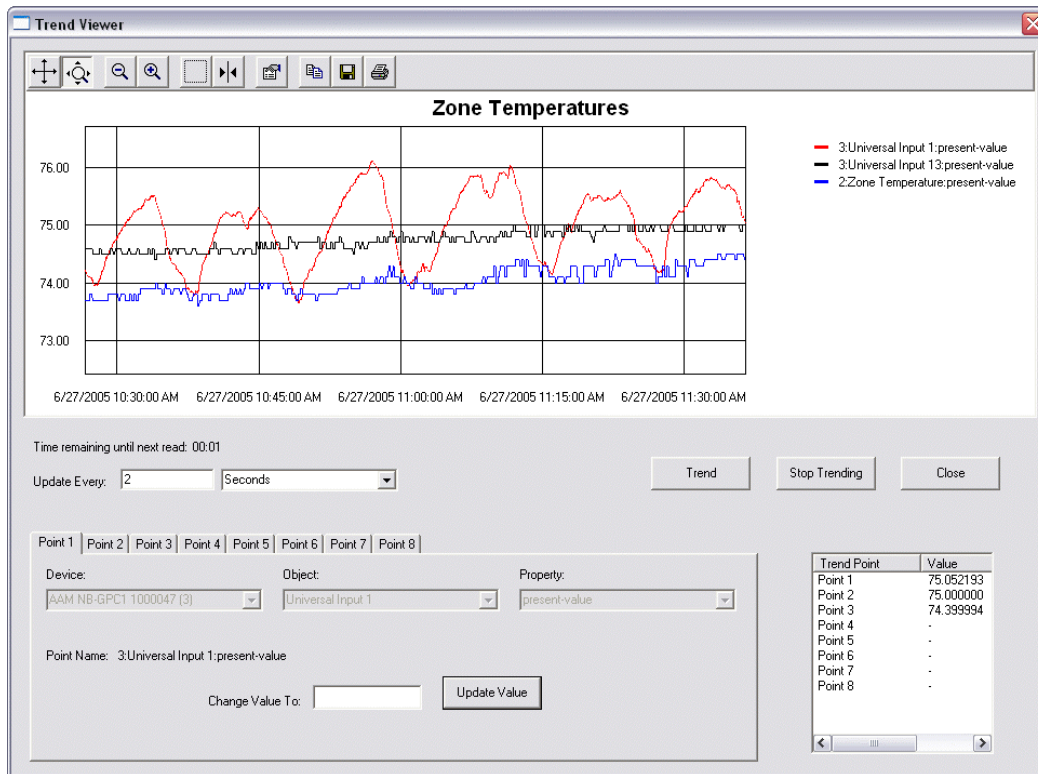
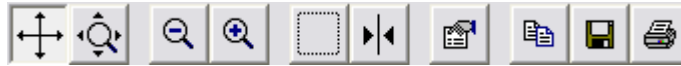


Figure 2-45 Trend Viewer Window

This window allows users to plot the values of up to eight (8) controller parameters. The plotted values can be updated as frequently as once every two seconds. This can be especially useful for monitoring general system performance or when doing such things as tuning PID loops.

- **TREND VIEWER TOOLBAR**



The Toolbar provides convenient access to a number of commonly used features of the Trend Viewer. From here you can select the tools for adjusting the portion of the plot window that is displayed, bring up plot preferences, as well as copy, save and print the plot. The Trend viewer toolbar has the following buttons:



Scroll (Axes) - The Scroll (Axes) button is used to manually adjust the portion of the axis that is visible without changing the scaling. To scroll an axis in the Plot Window, select the Scroll (Axes) button and click on either the x- or y-axis of the plot. While still holding the mouse button, you can drag the axes to change the portion that is displayed.



Zoom (Axes) - The Zoom (Axes) button is used to change the scaling on the axes. Clicking on the x-axis and dragging to the left will zoom out, increasing the amount of the plot that is visible, while dragging to the right will zoom in, decreasing the amount of the plot that is visible. Similarly, clicking on the y-axis and dragging down will zoom out, increase the amount of the plot that is visible, while dragging up will zoom in, decreasing the amount of the plot that is visible.



Zoom Out All Axes - Clicking the Zoom Out All Axes button will double the amount the axes visible in the plot window, keeping the center of the axes the same. For example, if the x- and y- axes both ranged from 0 to 100, clicking the Zoom Out All Axes button would change them to a range of -50 to 150.



Zoom In All Axes - Clicking the Zoom In All Axes button will halve the amount the axes visible in the plot window, keeping the center of the axes the same. For example, if the x- and y-axes both ranged from 0 to 100, clicking the Zoom Out All Axes button would change them to a range of 25 to 75.



Zoom Box - The Zoom Box button is used to manually select an area of the plot and scale it to fill the Plot Window. The x- and y-axes will be scaled independently to fit the selected area to fill the Plot Window.



Cursor - Pressing the Cursor brings up a tool that can be used to view the data values shown in the plot. The default setting is to show the x- and y-values for the data point. In this mode a vertical line is displayed which can be moved to display the data values for the data point intersected by the vertical line.

By right clicking on the cursor line, you can change the Style to alternately display only the x-value, or only the y-value of the data point. There are also Style options to display a period, peak to peak value, or frequency. When one of these options are chosen, two lines will be displayed along with a measurement of the distance between them.

By right clicking on the cursor line, you can also use the Channel option to select which point to measure when multiple points are being trended at the same time.



Properties - The Properties button brings up the Plot options window which allows you to change the settings for many aspects of the plot.



Copy to Clipboard - Copies the contents of the Plot Window to the clipboard.



Save to File - Saves the content of the Plot Window as a bitmap (.bmp) graphics file.



Print - Sends the contents of the Plot Window to the printer.

- *TREND VIEWER PLOT WINDOW*

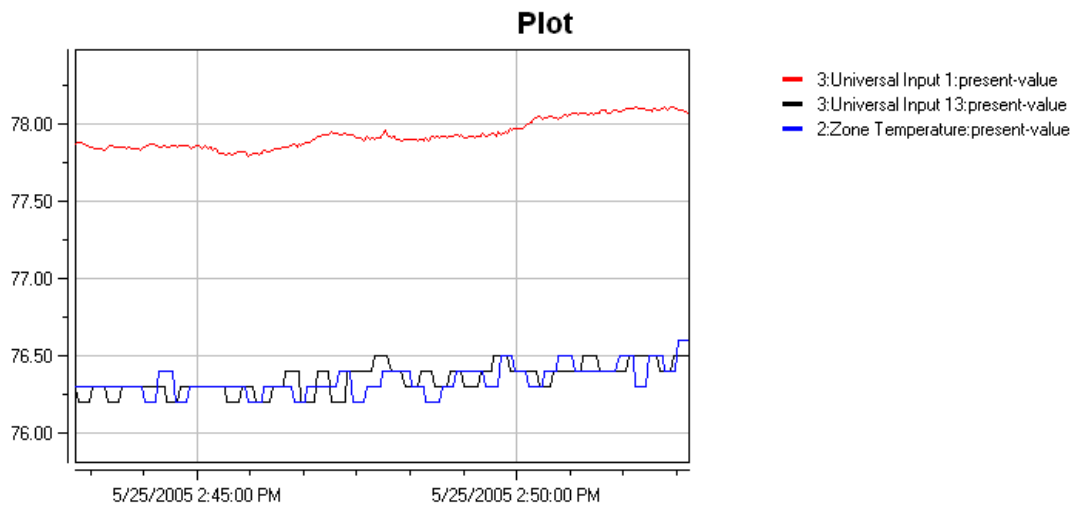


Figure 2-46 Plot Window

The **Plot** window is the main area of the **Trend Viewer** and is used to graphically display the trend data, the legend information, and the x- and y-axes. By right-clicking on an object in the plot, a window will be displayed which lets you set a number of preferences for the object clicked on.

- **TREND POINT SELECTION**

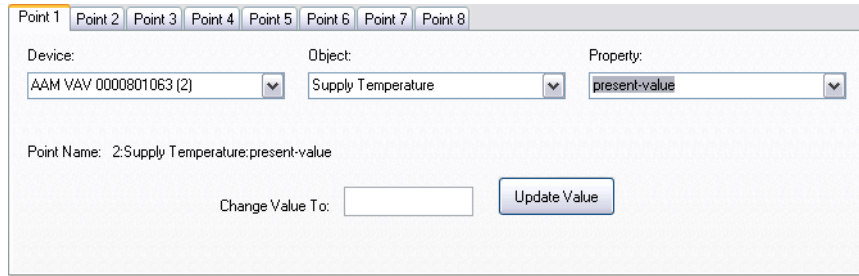


Figure 2-47 Point Selection Tabs

The Point Selection tabs are used to define which values will be trended in the plot window. You must select the device, object and property corresponding to each point that you wish to trend.

Clicking the **Device** drop down menu will show a list of all controllers to which **NB-Pro** is currently connected. You can choose any of the controllers by selecting it from the drop down menu. Once the Device has been chosen, the Object drop down menu will be populated with a list of all the objects present in that device. Select the object associated with the desired property by selecting it from the drop down menu. Finally, the property to be trended is selected using the Property drop down menu. As you make your selections, the Point Name, located below the row of drop down menus will be populated with the values you choose. This point name will be the label used in the Legend of the plot.

The Point Selection tabs can also be used to select bitmap properties. When you select a property that is bitmap, and additional drop down menu labeled **Bitmap** will be displayed just below the **Property** drop down.

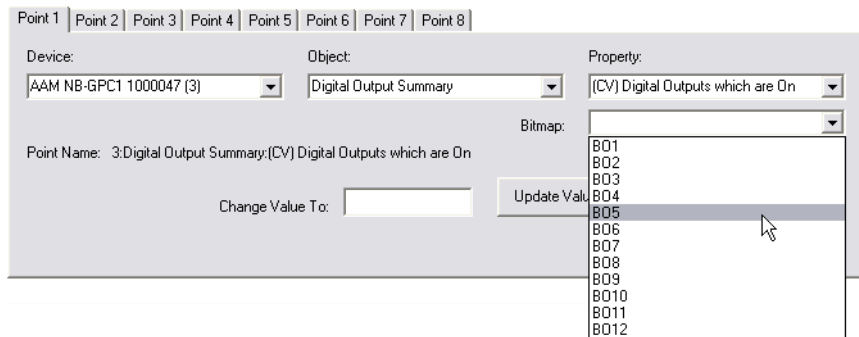


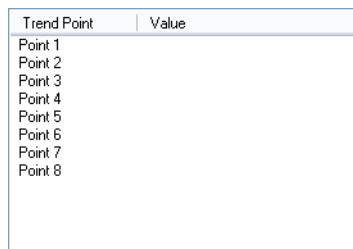
Figure 2-48 Selecting a Bitmap Property in the Point Selection Tabs

Using this menu, you can select which bit of the bitmap property you wish to trend.

Modifying Trend Point Values

The point selection tabs can also be used to adjust the values of properties without leaving the Trend Viewer. This is needed because the trend data is not saved and, if the window is closed, all previous trend information will be lost. Because of this, you have the ability to change values from within the trend viewer. This can be used, for example, to adjust loop PID parameters while watching the input and output values in the plot window. To edit a property's value, you must choose the device, object and property just as you would if you were trending the value. Then you enter the new value into the Change to Value field located in the lower portion of the point selection tab. Once the value has been entered, click the Update Value button to change the value of the chosen property.

- **TREND POINT VALUE DISPLAY**



Trend Point	Value
Point 1	
Point 2	
Point 3	
Point 4	
Point 5	
Point 6	
Point 7	
Point 8	

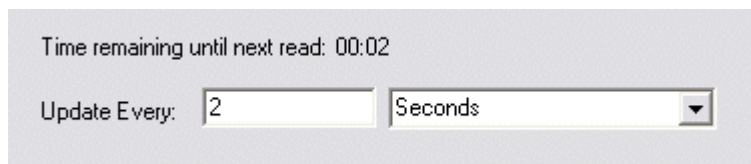
Figure 2-49 Trend Point Values Window

The Trend Point Values window provides a convenient place to view the current values of the points being plotted in the plot window. Each point is listed in the left hand column and the value of that point is displayed in the column to the right.

- **CONFIGURING TRENDING**

To configure the Trend Viewer to plot the values of one or more properties, you must first choose the points to be plotted, set the refresh interval for the plot, and start the trend. To configure and start a trend, you must perform the following steps:

1. For each point you wish to include in the trend, select the device, object, and property in the point selection tabs. The Trend Viewer can be configured to plot up to 8 points simultaneously. Each value to be trended must be entered into a different point tab.
2. Using the **Update Every** field you can set the interval between updates in the **Trend Viewer**.



Time remaining until next read: 00:02

Update Every: Seconds

Figure 2-50 Trend Update Interval

The drop down menu allows you to select whether the value you entered is measured in minutes or seconds. If the interval is measured in seconds, the minimum refresh interval is 2 seconds. If the interval is measured in minutes, the minimum refresh interval is 1 minute.

3. Once the trend points have been selected and the update interval set, you must click the **Trend** button to begin trending the data. The trend will continue to update until you press the **Stop Trending** button or you close the Trend Viewer window.

ALARM VIEWER

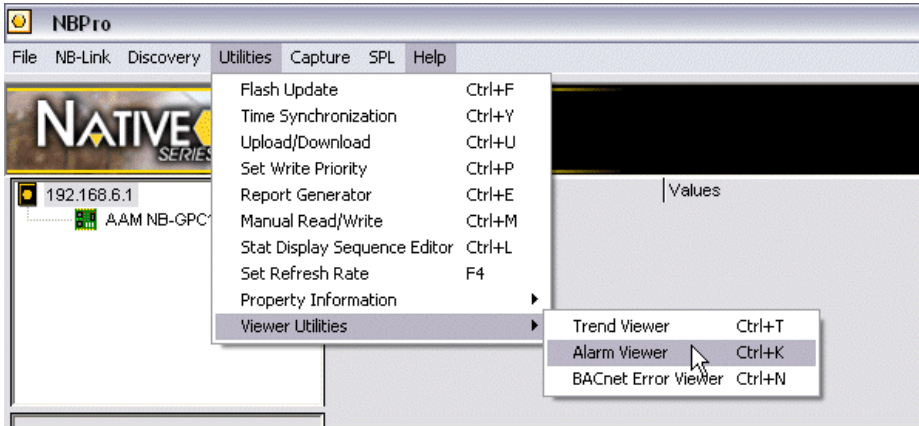


Figure 2-51 Alarm Viewer

Selecting the **Alarm Viewer** option or pressing CTRL-K brings up the **Alarms** dialog:

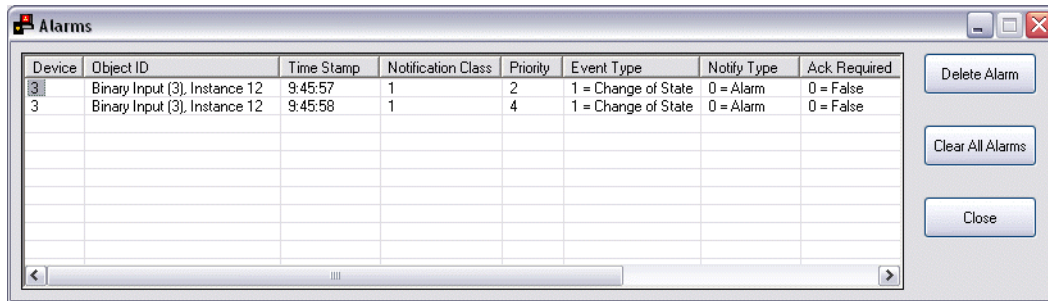


Figure 2-52 Alarms Viewer Window

While this window is open, you can view the details of broadcast BACnet alarms.

If the Alarm Viewer window is not open when an alarm is received, a balloon will appear in the toolbar indicating the number of unviewed alarms.



Figure 2-53 Alarm Balloon Notification

In the Alarm Viewer, each alarm is listed on its own line. Each column corresponds to a property of the alarm listing. The alarm properties are:

Device - The ID number (MAC address) of the device which generated the alarm.

Object ID - The type of object and instance which generated the alarm. The possible object types are listed in Table 2-3.

Table 2-3 : Object IDs

Object ID	Type
0	Analog Input
1	Analog Output
2	Analog Value
3	Binary Input
4	Binary Output
5	Binary Value
6	Calendar
7	Command
8	Device
9	Event Enrollment
10	File
11	Group
12	Loop
13	Multi State Input
14	Multi State Output
15	Notification Class
16	Program
17	Schedule
18	Averaging
19	Multistate Value
20	Trend Log
> 20	Proprietary

Time Stamp - The time when the alarm was generated.

Notification Class - The number of the notification class through which the alarm was sent.

Priority - This is the priority array level associated with the alarm.

Event Type - The kind of alarm that is received. A list of the possible types of alarms is given in Table 2-4.

Table 2-4 : Event Types

Value	Event Type
0	Change of Bitstring
1	Change of State
2	Change of Value
3	Command Failure
4	Floating Limit
5	Out of Range
6	Complex Event Type
7	Buffer Ready
8	Change of Life Safety

Notify Type - Displays whether the alarm that was received was an alarm, an event, or an acknowledgement notification. The different notify types are listed in Table 2-5

Table 2-5 : Notify Type Types

Value	Notify Type
0	Alarm
1	Event
2	Ack-Notification

Ack Required - Indicates whether or not this alarm needs to be acknowledged.

From State - Displays the state before the alarm was sent. The state listed is not the actual state of the property, but the BACnetEventState value. The possible From State values and the states associated with them are listed in Table 2-6

Table 2-6 : From State Values

From State Value	State
0	Normal
1	Fault
2	Offnormal
3	High Limit
4	Low Limit
5	Life-Safety Alarm

To State - Displays the state of the property after the change that generated the alarm. Like the From State, the state listed is not the actual state of the property, but the BACnetEventState value. The values for the To State are the same as the From State listed in Table 2-6.

Event Value - Displays the values for high- and low-limit alarms, the value, the deadband, the status flag bitmap, and the limit will be displayed.

BACNET ERROR VIEWER

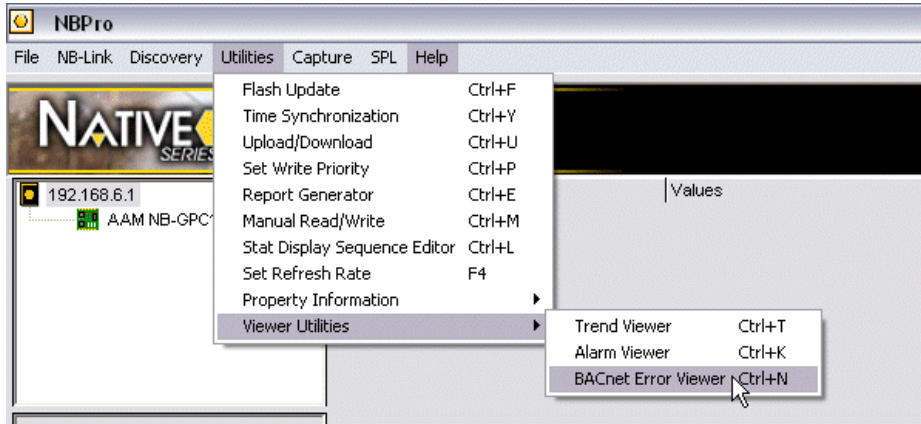


Figure 2-54 BACnet Error Viewer

Selecting the **BACnet Error Viewer** option from the **Utilities** menu or pressing Ctrl-N brings up the **BACnet Error Viewer** window.

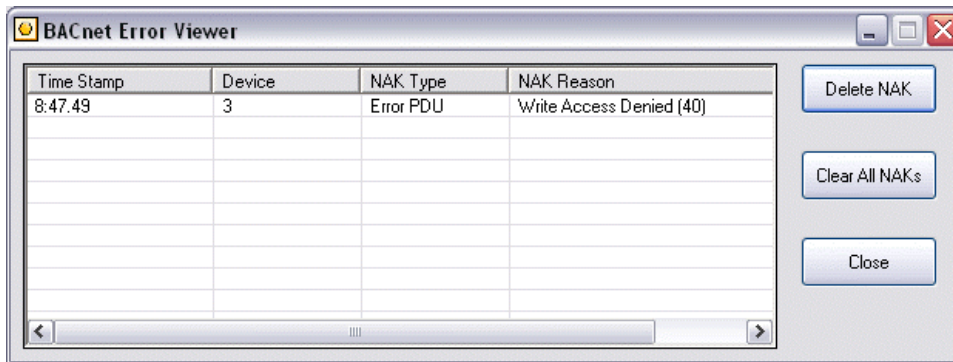


Figure 2-55: BACnet Error Viewer Window

Upon opening the error viewer, all errors received since opening **NB-Pro** will be displayed.

If the viewer is open when a BACnet error message is received, errors will automatically be displayed in the viewer as soon as they are received.

Each error displayed in the BACnet Error Viewer window has the following properties: **Time Stamp** - This indicates the time at which the error occurred.

Device - The ID number of the device from which the error was received.

NAK Type - This is the type of error received. The NAK types are listed in Table 2-7.

Table 2-7 : NAK Types

NAK Type	Meaning
Error PDU	Used to communicate errors that occur during specific operations between BACnet entities
Abort PDU	Used to terminate transactions between BACnet devices.
Reject PDU	Used to communicate the rejection of a confirmed request based on inconsistencies with the message sent or protocol errors that prevent the request from being carried out.

NAK Reason - The NAK Reason columns gives a description of why the error occurred. Table 2-8 lists all the possible NAK Reasons.

Table 2-8 : NAK Reason

Nak Reason	Vale	Meaning
Other	0	An error has occurred that does not match any other error type.
Authentication Failed	1	The message being authenticated was not generated by the apparent service provider.
Configuration In Progress	2	The service request has been declined because the addressed device is in the process of being configured, either locally or by means of other protocol services.
Device Busy	3	A service request has been declined because the addressed device expects to be involved in higher priority processing for an amount of time in excess of the usual request/confirm timeout period.
Dynamic Creation Not Supported	4	An attempt has been made to create an object of a type that cannot be created dynamically.
File Access Denied	5	An AtomicReadFile or AtomicWriteFile service request has been made to access a file that is currently locked or otherwise not accessible.
Incompatible Security Levels	6	The two clients do not have the same security authorization level.
Inconsistent Parameters	7	A conflict exists in the parameters specified in the service request.

Table 2-8 : NAK Reason

Nak Reason	Vale	Meaning
Inconsistent Selection Criterion	8	A reference has been made to a property using a datatype which is inconsistent with the 'Comparison Value' specified in an 'Object Selection Criteria' service parameter.
Invalid Data Type	9	The datatype of a property value specified in a service parameter does not match that of the property referenced by the Property_Identifier.
Invalid File Access Method	10	Generated in response to an AtomicReadFile or AtomicWriteFile request that specifies a 'File Access Method' that is not valid for the specified file.
Invalid File Start Position	11	An AtomicReadFile or AtomicWriteFile request has specified an invalid 'File Start Position' or invalid 'File Start Record' parameter.
Invalid Operator Name	12	The 'Operator Name' does not match any known operators.
Invalid Parameter Datatype	13	The datatype of a value specified for a service parameter is not appropriate to the parameter.
Invalid Time Stamp	14	The 'Time Stamp' parameter conveyed by an AcknowledgeAlarm service request does not match the time of the most recent occurrence of the event being acknowledged.
Key Generation Error	15	The key server was unable to generate a Session Key for the request.
Missing Required Parameter	16	A parameter required for the execution of a request was not supplied.
No Objects Of Specified Type	17	The device's object database has no objects of the object type specified in the service request.
No Space For Object	18	An attempt to create an object has failed because not enough dynamic memory space exists in the device.
No Space To Add List Element	19	An attempt to add an element to a list has failed because there is insufficient dynamic memory space in the addressed device.
No Space To Write Property	20	An attempt to write a property has failed because there is insufficient dynamic memory space in the addressed device.
No VT Sessions Available	21	This error indicates that the target device could not fulfill a VT-Open request because of resource limitations.
Property Is Not A List	22	An AddListElement service or the RemoveListElement service request has been made of a property that does not have a list datatype.

Table 2-8 : NAK Reason

Nak Reason	Vale	Meaning
Object Deletion Not Permitted	23	An attempt has been made to delete an object that cannot be deleted.
Object Identifier Already Exists	24	An attempt has been made to create a new object using an object identifier that is already in use.
Operational Problem	25	The service request has been declined because the addressed device has detected a problem that prevents it from carrying out the requested service.
Password Failure	26	The 'Operator Password' did not match the value associated with the 'Operator Name'.
Read Access Denied	27	An attempt has been made to read the properties of an object defined as inaccessible.
Security Not Supported	28	The remote client does not support any BACnet security mechanisms.
Service Request Denied	29	The requesting device does not have the appropriate authorization to execute the requested service.
Timeout	30	The APDU with the expected Invoke ID was not received before the waiting time expired.
Unknown Object	31	The object_identifier which has been specified does not exist in the object database of the addressed device.
Unknown VT Class	34	The 'VT-Class' specified in a VT-Open request was not recognized by the target device.
Unknown VT Session	35	The 'VT-Session ID' specified in a VT-Data or VT-Close request was not recognized by the target device.
Unsupported Object Type	36	An object type has been specified that is unknown or unsupported in the addressed device.
Value Out Of Range	37	An attempt has been made to write to a property with a value that is outside the range of values allowed for the property.
VT Session Already Closed	38	An attempt has been made to close a VT-session that has been previously terminated.
VT Session Termination Failure	39	One of the 'VT-Sessions' specified in a VT-Close request could not be released for some implementation-dependent reason.
Write Access Denied	40	An attempt has been made to write to a property of an object defined as inaccessible.
Character Set Not Supported	41	A character string value was encountered that is not part of a supported character set.

Table 2-8 : NAK Reason

Nak Reason	Vale	Meaning
Invalid Array Index	42	An attempt was made to access an array index that is outside the range permitted for this array.
COV Subscription Failed	43	The subscription to the change of value service has failed.
Not COV Property	44	The property specified does not support COV notification.
Optional Functionality Not Supported	45	An attempt has been made to write a value to a property that would require the device to exhibit optional functionality which is not supported.
Invalid Configuration Data	46	The configuration data provided with the service request was invalid or corrupt.

When you are done viewing the errors, you can manually clear individual errors or clear all errors displayed by clicking the **Delete NAK** or **Clear All NAK** buttons respectively. Closing the BACnet Error Viewer will clear all displayed errors.

Capture Menu

Using **NB-Pro's** Capture feature, users can capture all property values of a particular device. Users can then save captured data to a .cap file on their PC. The .cap format generated by **NB-Pro** is a standard text-based format, which allows users to easily modify values of a controller offline, or serve as a template for multiple controllers. Captures can then be downloaded back directly to devices.

Capture File Generation

To capture the values of a device, perform the following procedure:

1. Click on **Capture** on the **NB-Pro** menu bar or press Ctrl-J.

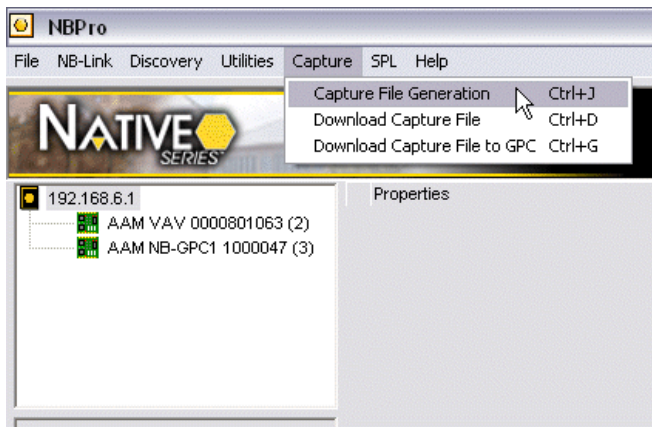


Figure 2-56 Capture File Generation

2. Highlight then click on Capture File Generation. The Capture window will appear.
3. Click on the down arrow in the **Device** field and select the device whose values you wish to capture from the drop-down box.
4. If you wish to capture all of the properties in the device, select the **Capture all Properties** box. Otherwise, only the writable properties will be written to the capture file. For controllers which support ReadPropertyMultiple, all properties will always be captured.

NOTE

Capturing all properties in a controller can significantly increase the time needed to capture the controller and, subsequently, download the capture file to a controller at a later time. This option is usually only needed when generating a report.

- If you wish to immediately generate a report of the capture file, select the Generate Report box. You may also choose launch the report generator by selecting the Generate Report button.
- Click on the **Capture** button. The progress will be displayed using the two green bars in the middle of the screen. As properties from an object are captured, the detail will be displayed in the lower window and the lower progress bar will increment. When **NB-Pro** begins capturing an object, the name of the object will be listed in the upper window. When the object is captured, the upper progress bar will increment and the name of the next object will be added to the upper window.

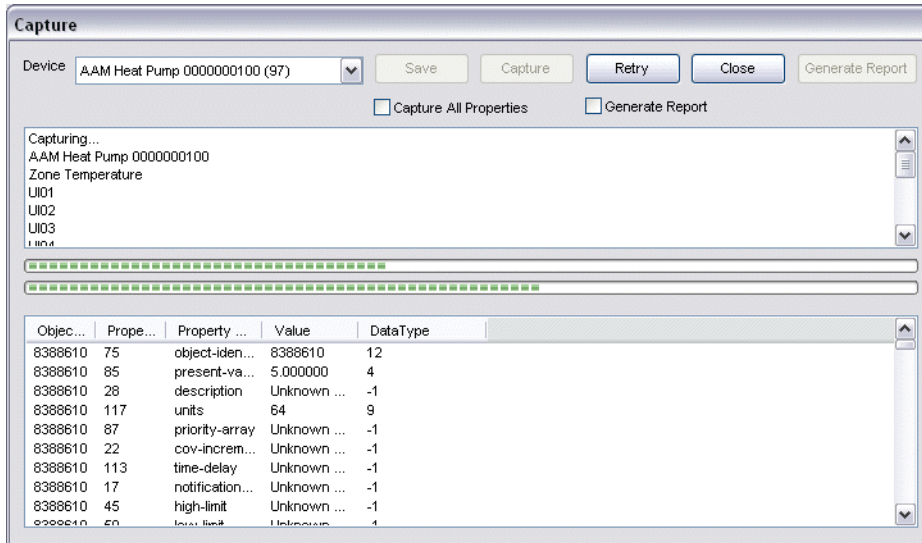


Figure 2-57: Capturing Device Property Values

- A dialog box will appear once the capture is completed. Click on the **OK** button in the **Capture Completed** dialog box

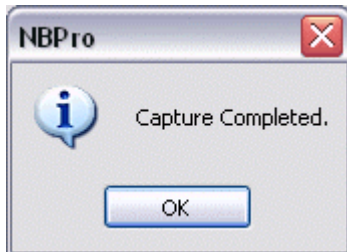


Figure 2-58: Capture Completed

- Click the **Save** button. You will then be prompted to choose the location where you wish to save your report, as a .xml file, on your PC's hard disk drive. If you selected the Generate Report option, you will see a dialog asking you if you would like to view the report. If you click on **Yes** the report will be displayed using **Internet Explorer**.



Figure 2-59: View Report? dialog

9. If, for some reason, the capture is not successful you may try to capture the device again using the **Retry** button.
10. When you are finished capturing devices, press the Close button to exit from the capture window.

Download Capture File

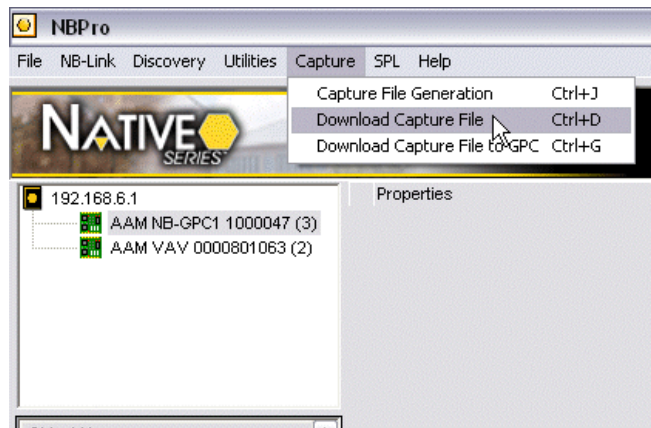


Figure 2-60: Download Capture File

The **Download Capture File** option is used to write property values stored in a capture file to NB-ASC and NB-VAV devices. If you wish to download a capture file to an NB-GPC controller, see **Error! Reference source not found.** on page **Error! Bookmark not defined.**

1. Click on **Capture** on the **NB-Pro** menu bar and highlight then click on **Download Capture File** or press Ctrl-D. The **Download to Unit(s)** dialog will be displayed:

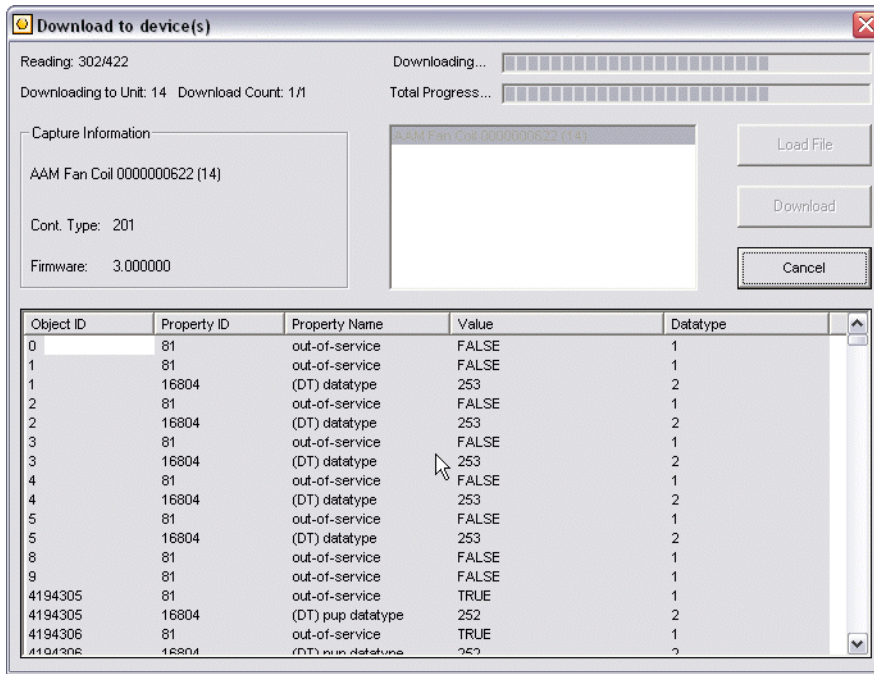


Figure 2-61: Download to Device(s)

2. Click on the **Load File** button.
3. Browse to the location of the capture file you wish to load to another device (or devices) and click on the **Open** button in the **Open Capture File** window. The Download to unit(s) window will appear. The characteristics of the capture file will appear in the lower portion of the **Download to unit(s)** dialog.
4. Select (click on) the device(s) to which you wish to download the capture file from the **Devices** field.
5. Click on the **Download** button. The status of the download is indicated in the status indicator located to the left of the **Load File** button. The **Download Complete** dialog box will appear upon completion of the download process.

Download Capture File To GPC

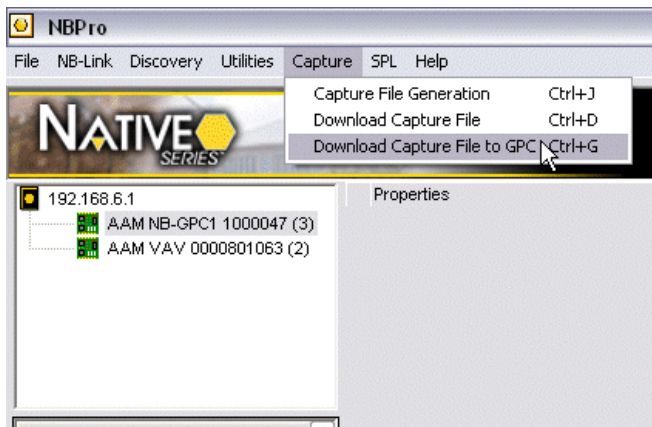


Figure 2-62: Download Capture File to GPC

Click on **Capture** on the **NB-Pro** menu bar and highlight then click on **Download Capture File to GPC** or press Ctrl-G. The **Download Capture File to GPC** window will open:

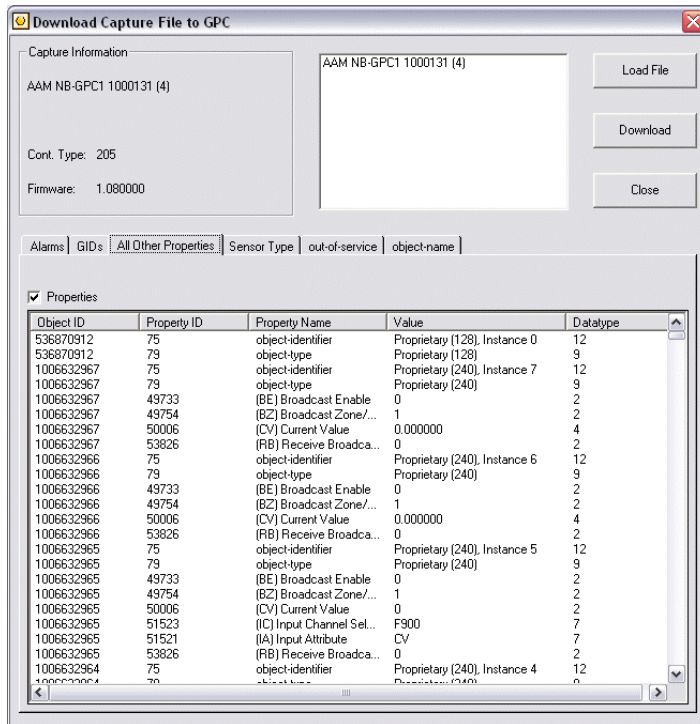


Figure 2-63: Download Capture File to GPC window

A list of available controllers will be shown in the box to the right of the **Capture Information** pane.

Click on the **Load File** button.

The information about the capture file, including the controller type and firmware version will be displayed in the **Capture Information** pane.

Browse to the location of the capture file you wish to load to another device (or devices) and click on the **Open** button in the **Open Capture File** window. The **Download Capture File to GPC** dialog will appear. The characteristics of the capture file will appear in the panes in the lower portion of the **Download Capture File to GPC** dialog.

Select (click on) the device(s) to which you wish to download the capture file from the filed to the right of the **Capture Information** pane.

If you wish to disable the download of alarm settings, GID assignments, property values, sensor type, out-of-service information, or object names that should be done now. For more information, see *Disabling Download Information* on page 71.

Click on the **Download** button.

The download complete dialog will appear.

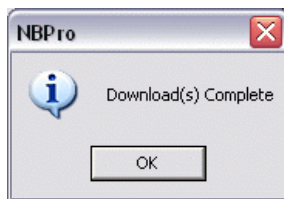


Figure 2-64

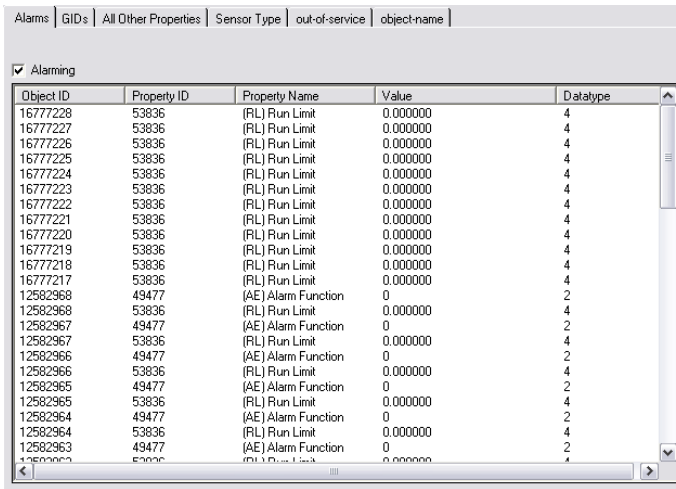
Click on **OK**.

Disabling Download Information

When downloading a capture file to a GPC controller, you have the option of downloading the alarm settings, GID assignments, property values, sensor type information, out-of-service settings, and object names. You can also disable the download of “All Other Properties” which will decrease the time needed if you are only interested in downloading specific information from one of the other categories. By default, all of these types of information will be downloaded. If you do not wish to download a particular type of information, you must specifically disable that type of download.

To disable the download of alarming information:

1. Click on the **Alarms** tab.



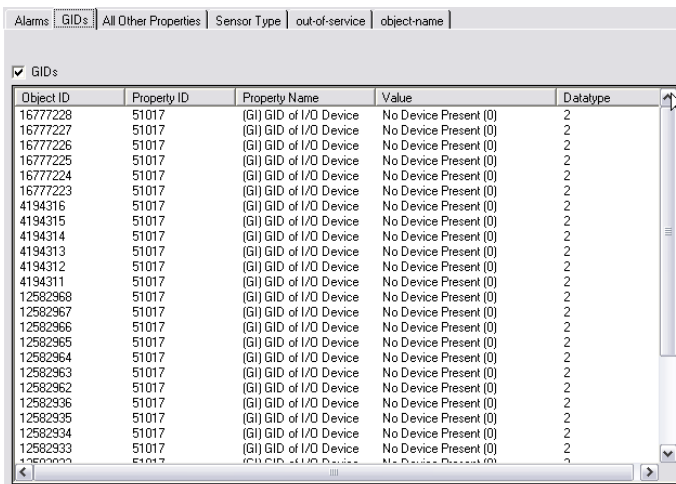
Object ID	Property ID	Property Name	Value	Datatype
16777228	53836	(RL) Run Limit	0.000000	4
16777227	53836	(RL) Run Limit	0.000000	4
16777226	53836	(RL) Run Limit	0.000000	4
16777225	53836	(RL) Run Limit	0.000000	4
16777224	53836	(RL) Run Limit	0.000000	4
16777223	53836	(RL) Run Limit	0.000000	4
16777222	53836	(RL) Run Limit	0.000000	4
16777221	53836	(RL) Run Limit	0.000000	4
16777220	53836	(RL) Run Limit	0.000000	4
16777219	53836	(RL) Run Limit	0.000000	4
16777218	53836	(RL) Run Limit	0.000000	4
16777217	53836	(RL) Run Limit	0.000000	4
12582968	49477	(AE) Alarm Function	0	2
12582968	53836	(RL) Run Limit	0.000000	4
12582967	49477	(AE) Alarm Function	0	2
12582967	53836	(RL) Run Limit	0.000000	4
12582966	49477	(AE) Alarm Function	0	2
12582966	53836	(RL) Run Limit	0.000000	4
12582965	49477	(AE) Alarm Function	0	2
12582965	53836	(RL) Run Limit	0.000000	4
12582964	49477	(AE) Alarm Function	0	2
12582964	53836	(RL) Run Limit	0.000000	4
12582963	49477	(AE) Alarm Function	0	2
12582963	53836	(RL) Run Limit	0.000000	4

Figure 2-65: Alarms tab

2. Make sure that the **Alarming** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

To disable the download of GID number assignments:

1. Click on the **GIDs** tab.



Object ID	Property ID	Property Name	Value	Datatype
16777228	51017	(GI) GID of I/O Device	No Device Present (0)	2
16777227	51017	(GI) GID of I/O Device	No Device Present (0)	2
16777226	51017	(GI) GID of I/O Device	No Device Present (0)	2
16777225	51017	(GI) GID of I/O Device	No Device Present (0)	2
16777224	51017	(GI) GID of I/O Device	No Device Present (0)	2
16777223	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194316	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194315	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194314	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194313	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194312	51017	(GI) GID of I/O Device	No Device Present (0)	2
4194311	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582968	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582967	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582966	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582965	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582964	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582963	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582962	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582961	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582960	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582959	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582958	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582957	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582956	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582955	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582954	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582953	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582952	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582951	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582950	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582949	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582948	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582947	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582946	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582945	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582944	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582943	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582942	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582941	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582940	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582939	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582938	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582937	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582936	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582935	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582934	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582933	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582932	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582931	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582930	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582929	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582928	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582927	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582926	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582925	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582924	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582923	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582922	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582921	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582920	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582919	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582918	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582917	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582916	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582915	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582914	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582913	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582912	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582911	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582910	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582909	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582908	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582907	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582906	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582905	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582904	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582903	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582902	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582901	51017	(GI) GID of I/O Device	No Device Present (0)	2
12582900	51017	(GI) GID of I/O Device	No Device Present (0)	2

Figure 2-66: GIDs tab

2. Make sure that the **GIDs** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

To disable the download of properties not specifically addressed by another option:

1. Click on the **All Other Properties**.

Object ID	Property ID	Property Name	Value	Datatype
536870912	75	object-identifier	Proprietary (128), Instance 0	12
536870912	79	object-type	Proprietary (128)	9
1006632967	75	object-identifier	Proprietary (240), Instance 7	12
1006632967	79	object-type	Proprietary (240)	9
1006632967	49733	(BE) Broadcast Enable	0	2
1006632967	49754	(BZ) Broadcast Zone/...	1	2
1006632967	50006	(CV) Current Value	0.000000	4
1006632967	53826	(RB) Receive Broadca...	0	2
1006632966	75	object-identifier	Proprietary (240), Instance 6	12
1006632966	79	object-type	Proprietary (240)	9
1006632966	49733	(BE) Broadcast Enable	0	2
1006632966	49754	(BZ) Broadcast Zone/...	1	2
1006632966	50006	(CV) Current Value	0.000000	4
1006632966	53826	(RB) Receive Broadca...	0	2
1006632965	75	object-identifier	Proprietary (240), Instance 5	12
1006632965	79	object-type	Proprietary (240)	9
1006632965	49733	(BE) Broadcast Enable	0	2
1006632965	49754	(BZ) Broadcast Zone/...	1	2
1006632965	50006	(CV) Current Value	0	2
1006632965	51523	(IC) Input Channel Sel...	F900	7
1006632965	51521	(IA) Input Attribute	CV	7
1006632965	53826	(RB) Receive Broadca...	0	2
1006632964	75	object-identifier	Proprietary (240), Instance 4	12
1006632964	79	object-type	Proprietary (240)	9

Figure 2-67: All Other Properties tab

2. Make sure that the **Properties** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

To disable the download of sensor type information:

1. Click on the **Sensor Type** tab.

Object ID	Property ID	Property Name	Value	Datatype
12582936	54100	(ST) Sensor Type	0	2
12582935	54100	(ST) Sensor Type	0	2
12582934	54100	(ST) Sensor Type	0	2
12582933	54100	(ST) Sensor Type	0	2
12582932	54100	(ST) Sensor Type	0	2
12582931	54100	(ST) Sensor Type	0	2
12582930	54100	(ST) Sensor Type	0	2
12582929	54100	(ST) Sensor Type	0	2
12582928	54100	(ST) Sensor Type	0	2
12582927	54100	(ST) Sensor Type	0	2
12582926	54100	(ST) Sensor Type	0	2
12582925	54100	(ST) Sensor Type	0	2
12582924	54100	(ST) Sensor Type	0	2
12582923	54100	(ST) Sensor Type	0	2
12582922	54100	(ST) Sensor Type	0	2
12582921	54100	(ST) Sensor Type	0	2
12582920	54100	(ST) Sensor Type	0	2
12582919	54100	(ST) Sensor Type	0	2
12582918	54100	(ST) Sensor Type	0	2
12582917	54100	(ST) Sensor Type	0	2
12582916	54100	(ST) Sensor Type	0	2
12582915	54100	(ST) Sensor Type	0	2
12582914	54100	(ST) Sensor Type	0	2
1	54100	(ST) Sensor Type	7	2

Figure 2-68: Sensor Type tab

2. Make sure that the **Sensor Types** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

To disable the download of the out-of-service settings:

1. Click on the **out-of-service** tab.

Object ID	Property ID	Property Name	Value	Datatype
16777228	81	out-of-service	False (0)	1
16777227	81	out-of-service	False (0)	1
16777226	81	out-of-service	False (0)	1
16777225	81	out-of-service	False (0)	1
16777224	81	out-of-service	False (0)	1
16777223	81	out-of-service	False (0)	1
16777222	81	out-of-service	False (0)	1
16777221	81	out-of-service	False (0)	1
16777220	81	out-of-service	False (0)	1
16777219	81	out-of-service	False (0)	1
16777218	81	out-of-service	False (0)	1
16777217	81	out-of-service	False (0)	1
4194316	81	out-of-service	False (0)	1
4194315	81	out-of-service	False (0)	1
4194314	81	out-of-service	False (0)	1
4194313	81	out-of-service	False (0)	1
4194312	81	out-of-service	False (0)	1
4194311	81	out-of-service	False (0)	1
4194310	81	out-of-service	False (0)	1
4194309	81	out-of-service	False (0)	1
4194308	81	out-of-service	False (0)	1
4194307	81	out-of-service	False (0)	1
4194306	81	out-of-service	False (0)	1
4194305	81	out-of-service	False (0)	1

Figure 2-69 out-of-service tab

2. Make sure that the **out-of-service** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

To disable the download of the object names:

1. Click on the **object-name** tab.

Object ID	Property ID	Property Name	Value	Datatype
536870912	77	object-name	Mfg. Channel	7
1006632967	77	object-name	Broadcast 7	7
1006632966	77	object-name	Broadcast 6	7
1006632965	77	object-name	Broadcast Schedule	7
1006632964	77	object-name	Broadcast 4	7
1006632963	77	object-name	Broadcast 3	7
1006632962	77	object-name	Broadcast Enthalpy	7
1006632961	77	object-name	Broadcast Outside Air Humidity	7
1006632960	77	object-name	Broadcast Outside Air Temp	7
1006632980	77	object-name	Input Select 4	7
1006632979	77	object-name	Input Select 3	7
1006632978	77	object-name	Input Select 2	7
1006632977	77	object-name	Input Select 1	7
1019215875	77	object-name	Min/Max/Avg 3	7
1019215874	77	object-name	Min/Max/Avg 2	7
1019215873	77	object-name	Min/Max/Avg 1	7
1019215890	77	object-name	Math 2	7
1019215889	77	object-name	Math 1	7
1019215908	77	object-name	Logic 4	7
1019215907	77	object-name	Logic 3	7
1019215906	77	object-name	Logic 2	7
1019215905	77	object-name	Logic 1	7
103593090	77	object-name	Piecewise Curve 2	7
103593090	77	object-name	Piecewise Curve 1	7

Figure 2-70 object-name tab

2. Make sure that the **object-name** box is unchecked.
3. Disable any other information types you do not wish to download or proceed with the download.

SPL Menu

Open SPL File

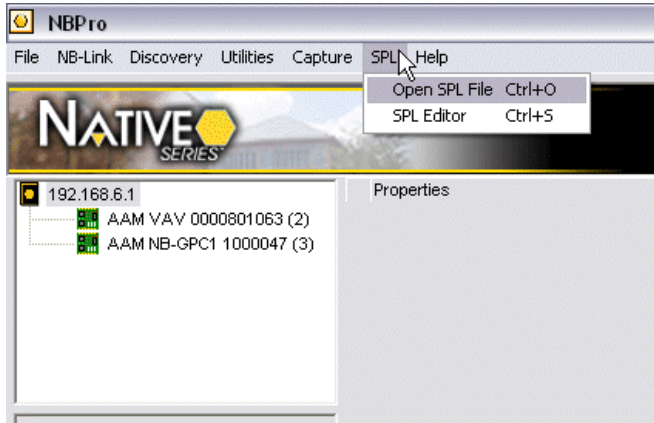


Figure 2-71 Open SPL File

The **Open SPL File** option is used to browse for a text file containing SPL code. Selecting this option will bring up a standard Windows file browser which you use to select the file you wish to open. Once the file is selected, it will be opened in the **SPL Editor**.

SPL Editor

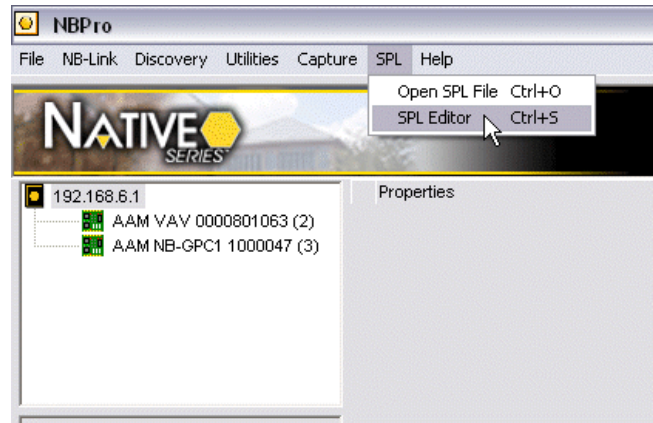


Figure 2-72 SPL Editor

Selecting the **SPL Editor Option** will launch the **SPL Editor** if it is not already running and switch to that application. For More information on the **SPL Editor**, see *The SPL Editor* on page 78.

Help Menu

About

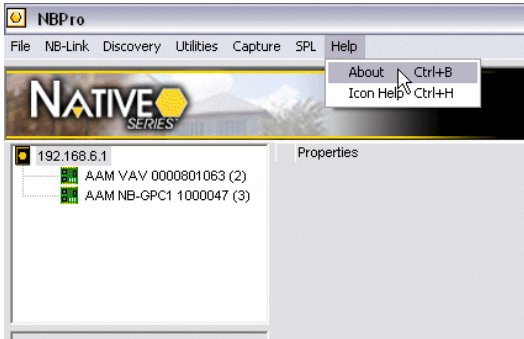


Figure 2-73 About

Selecting the **About** option under the Help menu or pressing Ctrl-B brings up the **NB-Pro** splash screen which will show the current version number of the **NB-Pro** software and the site name, serial number and expiration date read from the USB licence key.

Icon Help

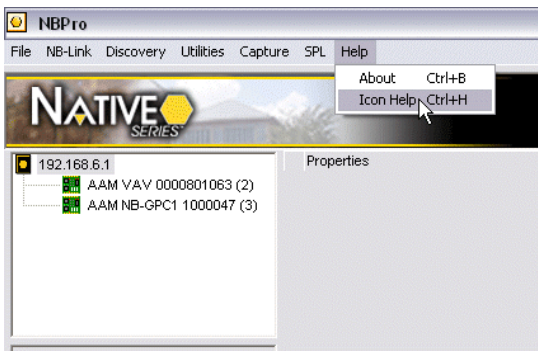


Figure 2-74 Icon Help

When using **NB-Pro**, you may encounter some of the following icons. Selecting the **Icon Help** option under the Help menu or pressing Ctrl-H brings up the **Icon Help** dialog, which displays the icons found in **NB-Pro**, and their meaning.



Figure 2-75: NB-Pro Icons

SECTION 3 : THE SPL EDITOR

This section describes the functionality of the **SPL Editor** software package and includes descriptions of all the menus and toolbar options available. The use of the **SPL Editor** will also be discussed.

The SPL Editor

Selecting the **SPL Editor** option from the Utilities menu in **NB-Pro** will launch the **SPL Editor** if it is not already running and switch to the window shown below:

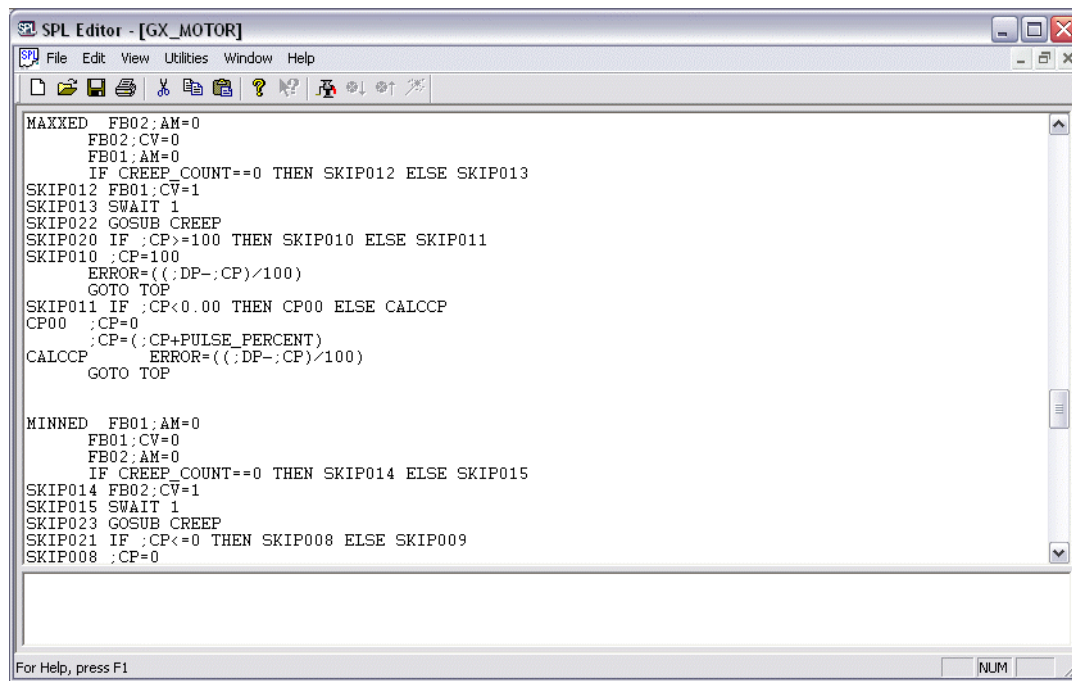


Figure 3-1: SPL Editor Window

File Menu

The File menu is used to open and close documents in the **SPL Editor** as well as configure the printer and print documents.



Figure 3-2 File Menu

New... - Opens a new, untitled SPL document in the **SPL Editor**.

Open... - Opens an SPL document which has been previously saved.

Close - Closes the current SPL document. If changes have been made since the document was last saved, you will be asked if you want to save those changes.

Save - Saves the current file. If the file is new and has not been saved, a file browser window will be opened and you will be prompted to choose a location and filename for the program.

Save As... - Saves the current file with a different filename. A file browser window will be opened and you will be prompted to choose a location and filename for the program.

Print... - Prints the current SPL document.

Printer Color/Font Selection... - Allows you to specify options for the automatic color coding of text in an SPL document to be used when the file is printed.

NOTE

The colors selected with the *Printer Color/Font Selection...* options can be different from those for display on the screen specified using the *Utilities>Select font/colors...* option

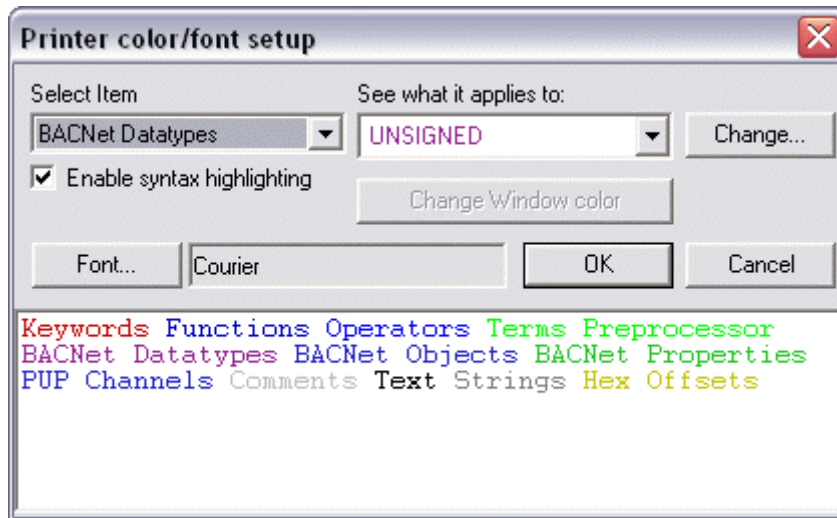


Figure 3-3 Printer color/font setup

To set the **SPL Editor** to automatically color code text for printing, perform the following steps:

1. Select **Printer Color/Font Selection...** from the **File** menu.
2. Click the **Enable syntax highlighting** checkbox.

To change the way in which a type of text is printed, perform the following steps:

1. Select **Printer Color/Font Selection...** from the File menu.
2. Choose the type of item you wish to change the coloring for by selecting it in the **Select Item** drop down list.
3. Choose the specific item to apply the coloring to by selecting it in the **See what it applies to:** drop down.
4. Click the **Change...** button.
5. Choose the desired color and click **OK**.
6. If you wish to change the font used for that type of item, click the **Font...** button and choose the desired font, style, and size.
7. When you are finished setting all you desired color choices, click **OK**.

Print Setup - Opens the standard Windows **Print Setup** dialog where you may specify the options for your printer.

Exit - Closes the **SPL Editor** application.

Edit Menu

The Edit menu provides many functions for manipulating text when writing SPL programs.

Edit	
Undo	Ctrl+Z
Redo	
<hr/>	
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Delete
<hr/>	
Find	Ctrl+F
Replace	
Select All	Ctrl+A
<hr/>	
Next error	Ctrl+E
Previous error	

Figure 3-4 Edit Menu

Undo - Erases any changes made by the last action and resets the text to the state before that action was performed.

Redo - Performs the last action that was undone.

Cut - Removes the currently selected text from the active SPL document and stores it so that it may be pasted at a later time.

Copy - Stores the currently selected text from the active SPL document without deleting it.

Paste - Copies the previously cut or copied text into the currently active SPL document at the insertion point.

Delete - Removes the currently selected text from the active SPL document but does not store the deleted text. If text is deleted, it may not be pasted at a later time.

NOTE

The Find and Replace options do not function in the current release of the **SPL Editor**.

Select All - Selects all text in the active SPL document.

Next Error - Moves the insertion point forward to the next error found in the currently active SPL document.

Previous Error - Moves the insertion point backwards to the previous error found in the currently active SPL document.

View Menu

The View menu is used to control which toolbars are displayed. You can also reapply the selected text highlighting with the Re-highlight option.

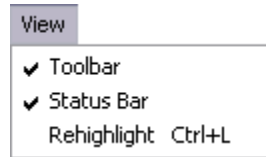


Figure 3-5 View Menu

Toolbar - Toggles visibility for the toolbar in the **SPL Editor** window.

Status Bar - Toggles visibility for the status bar in the **SPL Editor** window.

Rehighlight - Redraws the screen, applying any relevant highlighting.

Utilities Menu

The Utilities menu allows you to compile and decompile SPL source code. The options display and file storage are also set in this menu.

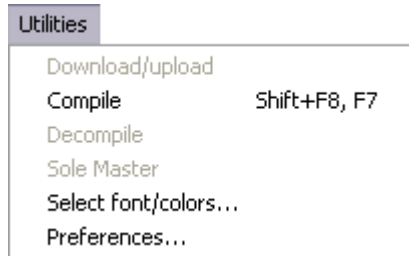


Figure 3-6 Utilities Menu

NOTE

The Download/upload option is disabled in this release of the SPL Editor and cannot be selected.

Compile - Compiles the code in the currently active SPL document and saves the resulting PLB and LST files according to the options set in the Preferences.

Decompile - Decompiles the current PLB file. Decompiling a PLB file will result in the creation of SPL code

NOTE

The Sole Master option is disabled in this release of the SPL Editor and cannot be selected.

Select font/colors... - Allows you to specify options for the automatic color coding of text in an SPL document to be used when the displaying the file on the screen.

NOTE

The colors selected with the *Select font/colors...* options can be different from those for display on the screen specified using the *File>Printer Color/Font Selection...* option

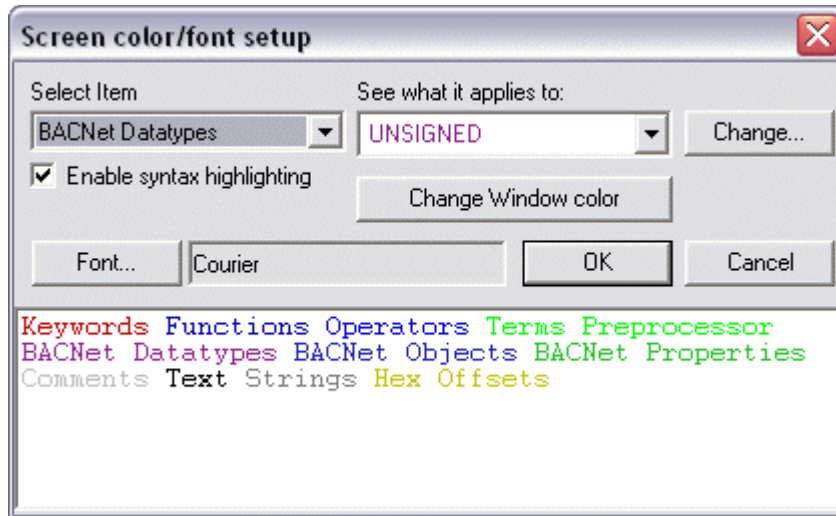


Figure 3-7 Screen color/font setup Window

To set the **SPL Editor** to automatically color code text for viewing, perform the following steps:

1. Select **Select Font/Color...** from the **Utilities** menu.
2. Click the **Enable syntax highlighting** checkbox.

To change the way in which a type of text is displayed, perform the following steps:

1. Select **Select Font/Color...** from the **Utilities** menu.
2. Choose the type of item you wish to change the coloring for by selecting it in the **Select Item** drop down list.
3. Choose the specific item to apply the coloring to by selecting it in the **See what it applies to:** drop down.
4. Click the **Change...** button.
5. Choose the desired color and click **OK**.
6. If you wish to change the font used for that type of item, click the **Font...** button and choose the desired font, style, and size.
7. When you are finished setting all you desired color choices, click **OK**.

Preferences... - This opens the **Directories** window shown in Figure 3-8. Here is where you specify how the **SPL Editor** handles PLB and LST files which it generates. You may also specify how hexadecimal numbers are handled.

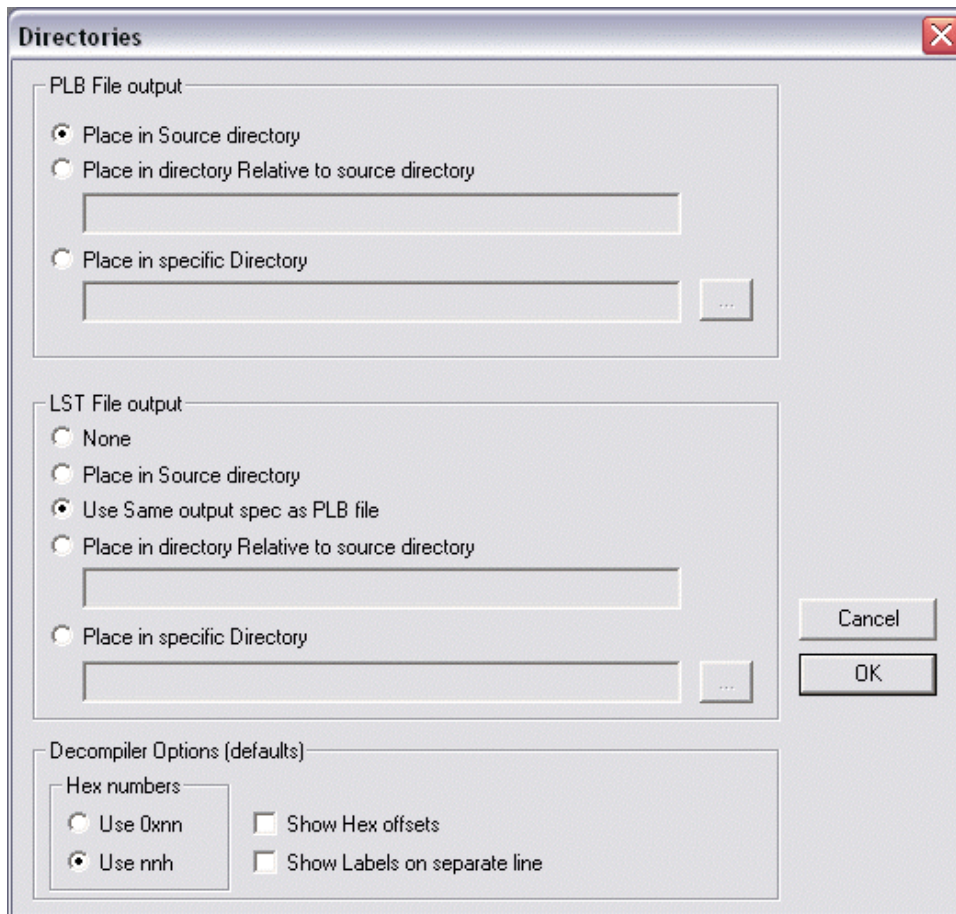


Figure 3-8: Directories Window

PLB File output

Place in Source directory - When this option is selected, compiled PLB files will be saved in the directory which contains the source code.

Place in a directory Relative to source directory - This option allows you to save the PLB file into a subdirectory which you specify. A subdirectory located in the same directory as the source file is specified by entering the name of the subdirectory, starting from the source directory and separating any further subdirectories with the “\” character, into the field below this option. If you wish to save the PLB file in a directory one or more levels above the directory which contains the source file, you may enter “..\” into the field to indicate a level up from the directory of the current directory. The “..\” term may be used multiple times to indicate multiple levels above that of the source file.

Place in specific Directory - When this option is selected, the compiled PLB files will be saved in the directory shown in the field immediately below this option. Clicking the “...” button next to the field opens a folder browser which lets you select the desired folder.

LST File output

None - When this option is selected, no LST file will be generated.

Place in Source directory - When this option is selected, LST files will be saved in the directory which contains the source code.

Use Same output spec as PLB file - When this option is selected, LST files will be saved to the location specified in the PLB File output pane.

Place in a directory Relative to source directory - This option allows you to save the LST file into a subdirectory which you specify. A subdirectory located in the same directory as the source file is specified by entering the name of the subdirectory, starting from the source directory and separating any further subdirectories with the “\” character, into the field below this option. If you wish to save the LST file in a directory one or more levels above the directory which contains the source file, you may enter “..\” into the field to indicate a level up from the directory of the current directory. The “..\” term may be used multiple times to indicate multiple levels above that of the source file.

Place in specific Directory - When this option is selected, the LST file will be saved in the directory shown in the field immediately below this option. Clicking the “...” button next to the field opens a folder browser which lets you select the desired folder.

Decompiler Options (defaults)

Hex numbers - These options specify how you wish for hexadecimal numbers to be displayed.

Show Hex offsets - If this option is checked, the hexadecimal offsets will be displayed in the decompiled SPL code. These addresses can be useful for debugging.

NOTE

With this option checked, the decompiled file cannot be compiled until the hex offset information is removed.

Show Labels on separate line - If this option is checked, the **SPL Editor** will display the tab after a program label as a carriage return. This will cause any SPL code following the label to be displayed on the next line.

Window Menu

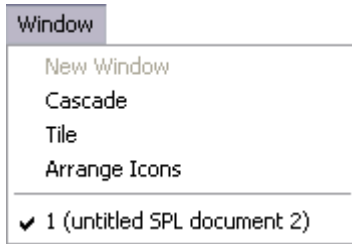


Figure 3-9 Window Menu

Cascade - Arranges all the open SPL documents such that the title bar of the first window is at the upper leftmost corner of the **SPL Editor** window and each other window is offset downwards and to the right of the one above it in such a way as to have all the title bars visible, but the windows overlapping.

Tile - Arranges all the open SPL document windows so that each takes up an equal amount of space in the main **SPL Editor** window and does not overlap with another document window.

Arrange Icons - Arranges all minimized windows along the bottom of the screen.

A List of currently open SPL documents will be shown below the divider underneath the Arrange Icons option.

Help Menu

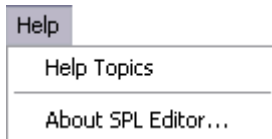


Figure 3-10 Help Menu

Help Topics

NOTE

The Help Topics option is disabled in this release of the SPL Editor and does not function correctly.

About SPL Editor... - Brings up the About **SPL Editor** window which displays the copyright information for the **SPL Editor** as well as the version number, registration information and a listing of your system configuration.













Toolbar

The toolbar in the **SPL Editor** provides quick access to many of the most commonly used features and functions of the program. The toolbar may be hidden using the View:Toolbar option.



Figure 3-11: SPL Editor Toolbar

The **SPL Editor** toolbar is shown in Figure 3-11. The buttons have the following functions:

-  New - Creates a blank SPL document in the **SPL Editor**.
-  Open – Opens a browser to select an SPL file to open in the **SPL Editor**.
-  Save - Opens a browser to select where to save the currently active file in the **SPL Editor**. If the file already exists in this location, this will save over the previous copy.
-  Print - Prints the currently active file in the **SPL Editor**.
-  Cut - Removes the highlighted text from the currently active file in the **SPL Editor**.
-  Copy - Copies the highlighted text from the currently active file in the **SPL Editor**.
-  Paste - Copies the contents of the clipboard into the current file at the insertion point.
-  About - Brings up the About SPL dialog box.
-  SPL Compiler - Compiles the current file.
-  Next Error - Jumps forward to the next error found in the current file.
-  Previous Error - Jumps backwards to the first error before error.
-  Decompile - Decompiles the current PLB file to an SPL document.

**SECTION 4 : APPENDIX A:
STANDARD OBJECT AND PROPERTY
IDENTIFIERS**

This section contains the BACnet Identifier numbers for all standard objects and properties. These values are needed when using the Manual Read/Write option in **NB-Pro**.

A. 1 Standard BACnet Object Identifier Numbers

analog-input	0
analog-output	1
analog-value	2
averaging	18
binary-input	3
binary-output	4
binary-value	5
calendar	6
command	7
device	8
event-enrollment	9
file	10
group	11
life-safety-point	21
life-safety-zone	22
loop	12
multi-state-input	13
multi-state-output	14
multi-state-value	19
notification-class	15
program	16
schedule	17
trend-log	20

A.2 Standard Bacnet Property Identifier Number


acked-transitions	0
ack-required	1
action	2
action-text	3
active-cov-subscriptions	152
active-text	4
active-vt-sessions	5
alarm-value	6
alarm-values	7
all	8
all-writes-successful	9
apdu-segment-timeout	10
apdu-timeout	11
application-software-version	12
archive	13
attempted-samples	124
average-value	125
backup-failure-timeout	153
bias	14
buffer-size	126
change-of-state-count	15
change-of-state-time	16
client-cov-increment	127
configuration-files	154
controlled-variable-reference	19
controlled-variable-units	20
controlled-variable-value	21
cov-increment	22
cov-resubscription-interval	128
current-notify-time	129
database-revision	155
datelist	23
daylight-savings-status	24
deadband	25
derivative-constant	26
derivative-constant-units	27
description	28
description-of-halt	29
device-address-binding	30
device-type	31
direct-reading	156
effective-period	32
elapsed-active-time	33
error-limit	34

event-enable	35
event-parameters	83
event-state	36
event-time-stamps	130
event-type	37
exception-schedule	38
fault-values	39
feedback-value	40
file-access-method	41
file-size	42
file-type	43
firmware-version	44
high-limit	45
inactive-text	46
in-process	47
instance-of	48
integral-constant	49
integral-constant-units	50
issue-confirmednotifications	51
last-restore-time	157
life-safety-alarm-values	166
limit-enable	52
list-of-group-members	53
list-of-object-property-references	54
list-of-session-keys	55
local-date	56
local-time	57
location	58
log-buffer	131
log-device-object-property	132
log-enable	133
log-interval	134
low-limit	59
maintenance-required	158
manipulated-variable-reference	60
max-apdu-length-accepted	62
maximum-output	61
maximum-value	135
maximum-value-timestamp	149
max-info-frames	63
max-master	64
max-pres-value	65

max-segments-accepted	167
member-of	159
minimum-off-time	66
minimum-on-time	67
minimum-output	68
minimum-value	136
minimum-value-timestamp	150
min-pres-value	69
mode	160
model-name	70
modification-date	71
notification-class	17
notification-threshold	137
notify-type	72
number-of-APDU-retries	73
number-of-states	74
object-identifier	75
object-list	76
object-name	77
object-property-reference	78
object-type	79
operation-expected	161
optional	80
out-of-service	81
output-units	82
polarity	84
present-value	85
previous-notify-time	138
priority	86
priority-array	87
priority-for-writing	88
process-identifier	89
profile-name168	
program-change	90
program-location	91
program-state	92
proportional-constant	93
proportional-constant-units	94
protocol-conformance-class	95
protocol-object-types-supported	96
protocol-revision	139
protocol-services-supported	97

protocol-version	98
read-only	99
reason-for-halt	100
recipient	101
recipient-list	102
record-count	141
records-since-notification	140
reliability	103
relinquish-default	104
required	105
resolution	106
segmentation-supported	107
setpoint	108
setpoint-reference	109
setting	162
silenced	163
start-time	142
state-text	110
status-flags	111
stop-time	143
stop-when-full	144
system-status	112
time-delay	113
time-of-active-time-reset	114
time-of-state-count-reset	115
time-synchronization- recipients	116
total-record-count	145
tracking-value	164
units	117
update-interval	118
utc-offset	119
valid-samples	146
variance-value	151
vendor-identifier	120
vendor-name	121
vt-classes-supported	122
weekly-schedule	123
window-interval	147
window-samples	148
zone-members	165

SECTION 5 : APPENDIX B: TREND VIEWER

The Trend Viewer has a number of display options which can be used to fine tune the display of your trend data. The options window is accessed by clicking on the  button or by right-clicking anywhere in the plot window and selecting the **Edit...** option. Right clicking on a specific object, such as an axis, or the legend, will bring up the options specific to that object. This section explains the options associated with the various components of the trend.

Control

Control>General

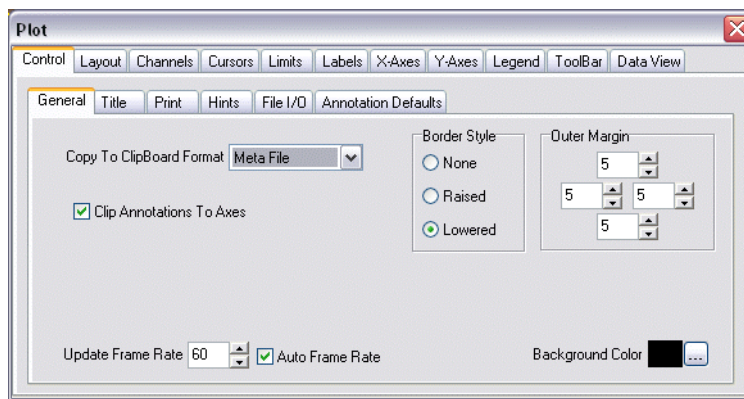


Figure B-1 Control>General Tab

The General sub-tab in the Control tab controls some of the features of how the plot is displayed as well as the program's behavior when copying the plot to the clipboard. The General sub-tab has the following options:

Copy To Clipboard Format: specifies the image format that will be used when the current plot is copied to the clipboard. The format options are Meta File, Bitmap, and JPEG.

Clip Annotations To Axes: specifies whether annotations clip to the axes they are assigned to or whether they can be drawn outside of the axes bounds. This only has a real effect if the associated X- and/or Y-Axis of the annotation does not span 100% of the plot window, for example if you are using stacked axes.

Auto Frame Rate: The Auto Frame Rate button specifies whether the control automatically activates the repaint frame rate control. When the Auto Frame Rate is set to true, the control automatically calls BeginUpdate when the control is performing its next repaint. From then on, the control repaint frame rate is equal to the UpdateFrameRate no matter how many changes are made to the control every second.

Update Frame Rate: The Update Frame Rate controls the number of times the plot is redrawn per second.

Border Style: The Border Style option allows you to add a three-dimensional beveled look to the plot window.

Outer Margin: The Outer Margin option is used to set the margin between the left, right, top, and bottom edge of the plot window and the plot itself. The values are specified in pixels.

Control>Title

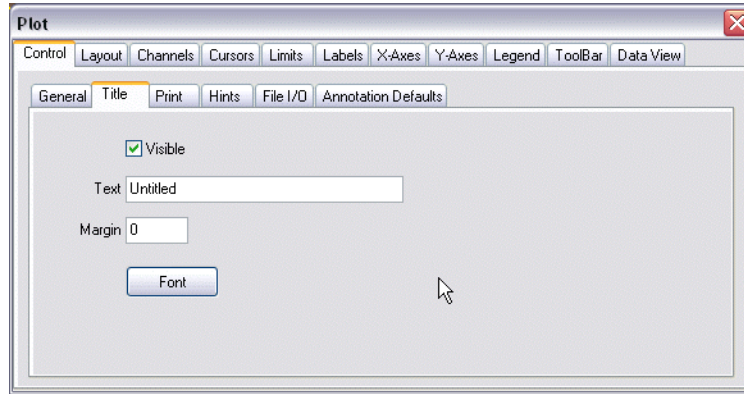


Figure B-2 Control>Title Tab

The Title sub-tab in the Control tab allows you to customize the display of your plot's title. The Title sub-tab has the following options:

Visible: Deselecting this check box will hide the main chart title displayed above the plot.

Text: This box is used to set the text of the plot title.

Margin: This value is the number of lines (the same size as the title) that will be used as the margin between the bottom of the title and the plot.

Font: Clicking this button will bring up the dialog shown in Figure B-3. This window can be used to select the font family, style, size, and color of the font used for the title. Additionally, you can apply the strikeout or underline effects to the title text.

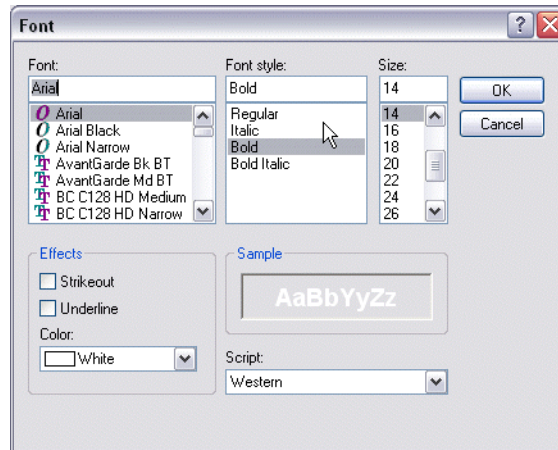


Figure B-3 Control>Title Font Window

Control>Print

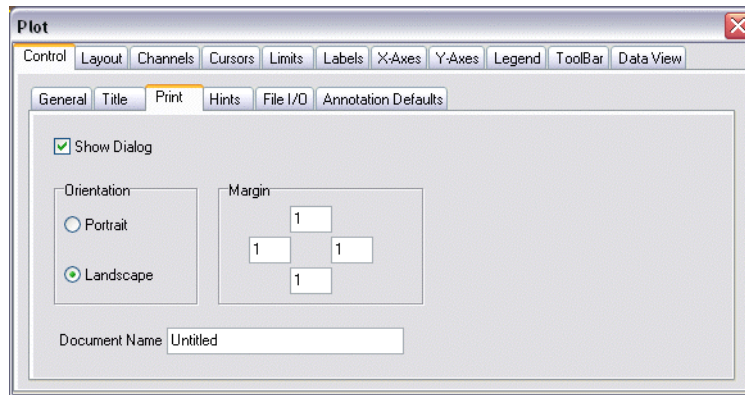


Figure B-4 Control>Print tab

The Print sub-tab in the Control tab allows you to specify options used when printing the plot. The Print sub-tab has the following options:

Show Dialog: This button specifies whether or not the printer setup dialog is shown when the plot is printed.

Orientation: Sets the orientation of the plot when it is printed.

Margin: Specifies the left, right, top, and bottom margins on the printed page.

Document Name: Used to set the document name displayed on some printer displays when the document is being printed.

Control>Hints

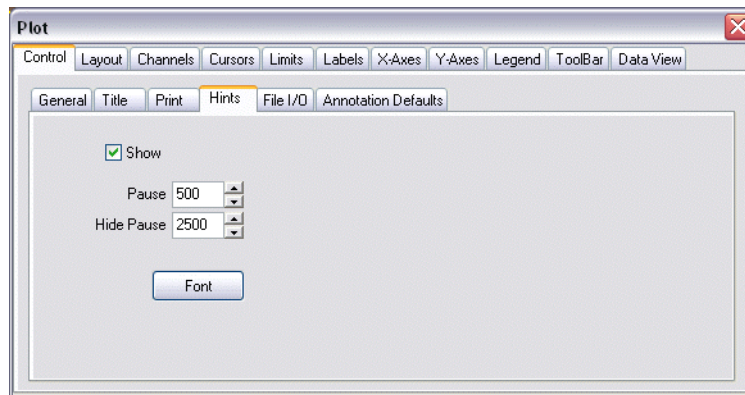


Figure B-5 Control>Hints sub-tab

The Hints sub-tab in the Control tab specifies the behavior of the pop-up tips associated with the button in the Trend Viewer. The Hints sub-tab has the following options:

Show: Specifies whether or not pop-up tool tips are shown.

Pause: Sets the time, in milliseconds, that the user must hold the mouse over a certain object before the tool tip is displayed.

Hide Pause: Sets the time, in milliseconds, that must elapse before a display tool tip is erased.

Control>File I/O

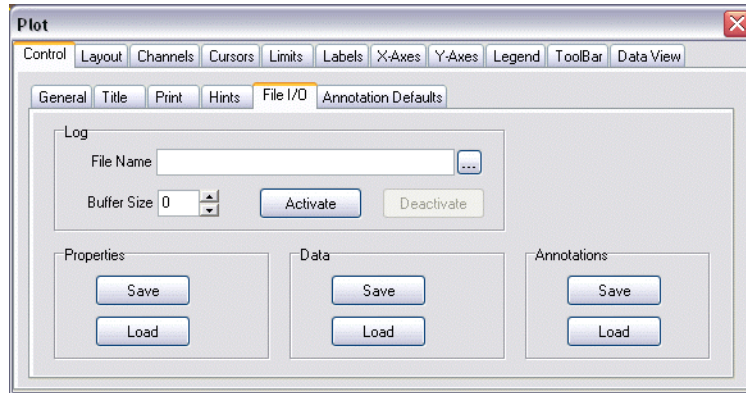



Figure B-6 Control>File I/O Tab

The File I/O sub-tab in the General tab is used to control the Trend Viewer's ability to save logged data to a text file for future use. The File I/O sub-tab has the following options:

Log File Name: Sets the filename (including path) for the log file. Pressing the button  allows you to specify the location of the log file on your computer. By entering a filename into the "File Name:" field, a new .log file will be created.

Log Buffer Size: Used to set the size of the log buffer, in number of data points. When trending is active, data will flow into the log buffer. When the buffer is filled, the data will be written to the log file and the buffer cleared. This is useful if you want to regulate how often data is written to the log file. If this value is 0, then data is written to the log file after every new data point is added to the chart.

Properties Save/Load: Used to save or load the preferences for the plot.

Data Save/Load: Used to save or load the data points from the plot.

Annotations Save/Load: Used to save or load the annotations for the plot.

Control>Annotation Defaults

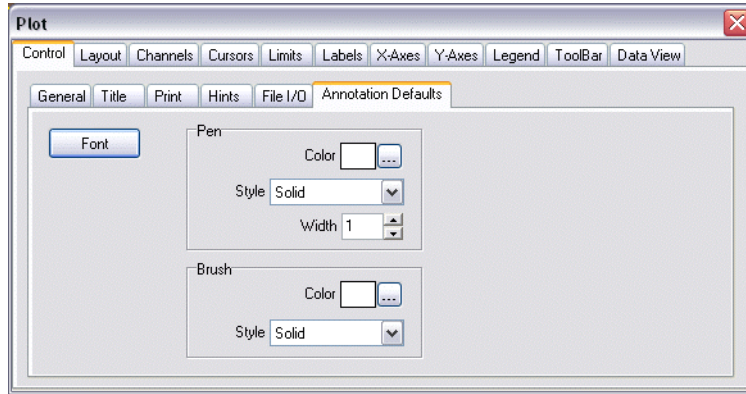


Figure B-7 Control>Annotation Defaults Tab

The Annotation Defaults sub-tab in the General tab is used to define the styles used for annotations added to the plot. The Annotation Defaults sub-tab has the following options:

Font: Clicking this button will bring up the dialog shown in Figure B-8. This window can be used to select the font family, style, size, and color of the font used for the title. Additionally, you can apply the strikeout or underline effects to the title text.

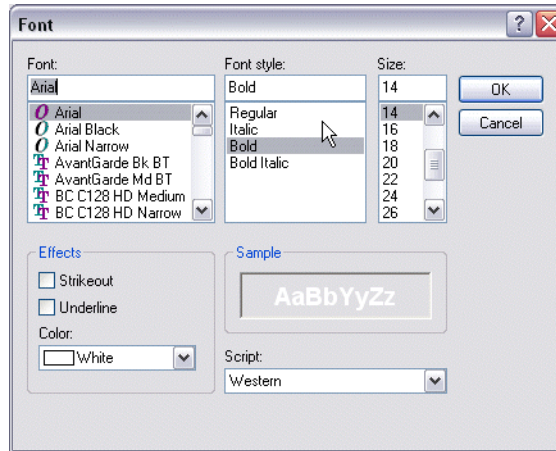



Figure B-8 Control>Annotation Font Window

Pen Color: Specifies the pen color used when drawing the annotation object. Pressing the  button will bring up the color window shown in Figure B-9.

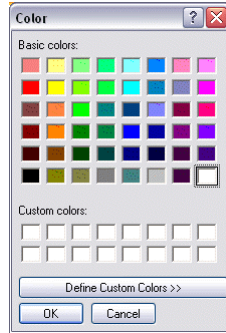


Figure B-9 Color Picker

Using this window, you can select the color of the line drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-10 will be displayed.

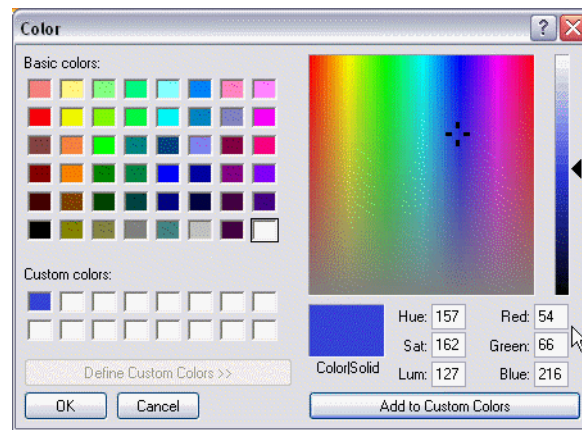


Figure B-10 Define Custom Color





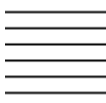
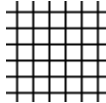

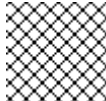
First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Pen Style: Used to set the pen style used when drawing data markers. You can choose from solid, dash, dot, dash-dot, and dash-dot-dot styles.

Pen Width: Used to set the pen width used when drawing data markers.

Brush Color: Used to set the brush color used to draw data markers. The color is chosen using the same dialogs as the Pen Color above.

Brush Style: The Brush Style specifies the fill pattern to be applied to the annotation. The brush choices are:

Brush Style	Pattern	Brush Style	Pattern
Solid		FDiagonal	
Clear		BDiagonal	
Horizontal		Cross	
Vertical		DiagCross	

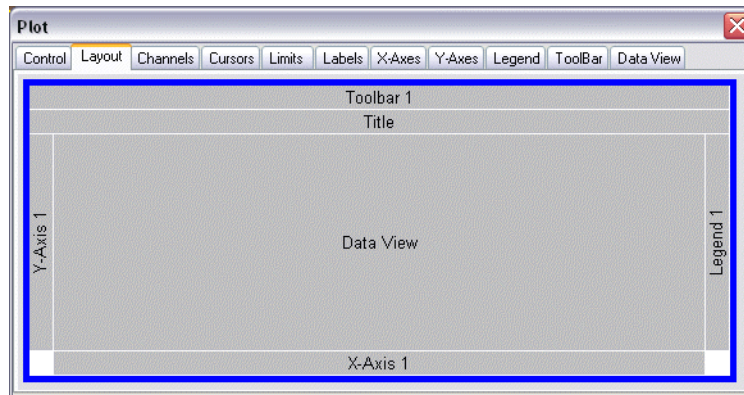


Figure B-11 Layout Tab

The Layout tab is a graphical representation of the individual plot components as they are drawn in the plot window. You can drag-and-drop individual items to reposition them within the control. You can also change the width and height of objects by placing your mouse cursor over one of the ends of the objects (look for the cursor to change to a double arrow) and dragging them to the desired size. If you drop one axes object on another, and they do not overlap, then the axes will stack on top of one another. To flip the X- and Y- Axes, right click anywhere in the Layout tab and select the "XY-Axes Reverse" option to rotate the X- and Y-Axes. The Layout tab has the following options:

ToolBar: The ToolBar is the row of buttons at the top of the plot window. This item cannot be moved.

Title: The Title is the title assigned to the plot.

Data View: The Data View is the area where the data is plotted. All objects move in relation to this object, so it is fixed.

X-Axis: An individual X-Axis. If you have added multiple X-Axes, there would be multiple X-Axis objects which you could reorder or stack. For most applications, however, there will only be a single X-Axis.

Y-Axis: An individual Y-Axis. If you have added multiple Y-Axes, there would be multiple Y-Axis objects which you could reorder or stack. For most applications, however, there will only be a single Y-Axis.

Legend: The Legend displays the color legend for the points being plotted in the Data View.

Channels

Channels>General

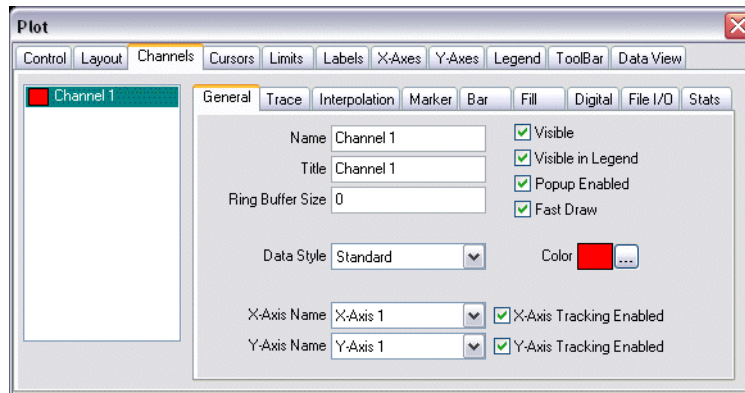


Figure B-12 Channels>General Tab

The General sub-tab of the Channel tab is used to set the names, labels, and color used when plotting the channel's data. You can also specify whether the channel is displayed in the plot and/or the legend. You can also set whether the x-and y-axes will track as new data is acquired. The General sub-tab has the following options:

Channel List: Located along the left hand side of the window, this is a listing of the channels that have been added to the Chart.

Name: This is the name assigned to the channel. There is no restrictions on the length of the name or the characters that can be used.

Title: The title is the text that is displayed in the legend for this channel. It can be any descriptive title that you choose and does not have to be the same as the name.

Ring Buffer Size: The Ring Buffer Size sets the size of the data buffer, measured in number of data points, used for storing channel data.

Data Style: Use to set the type of dataset that the channel will use.

X-Axis Name: Specifies the name used when plotting the x-axis data.


Y-Axis Name: Specifies the name used when plotting the y-axis data.

Visible: The Visible checkbox determines whether or not the channel selected in the Channel List will be displayed on the plot.

Visible In Legend: The Visible in Legend checkbox specifies whether or not the channel will be listed in the plot legend.

Popup Enabled: The Popup Enabled checkbox enables the plot options for the channel. If Popup Enabled is unchecked, you will not be able to right click on the channel name in the index to bring up the options for that channel.

Fast Draw: Enables or disables the Fast Draw feature. This feature dramatically speeds up redraws to the screen if you are displaying large data sets (>100000 data points).

Color: Specifies the pen color used for plotting the channel. Pressing the  button will bring up the color window shown in Figure B-13.

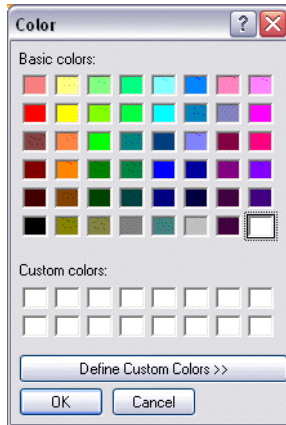


Figure B-13 Color Picker

Using this window, you can select the color of the line drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-14 will be displayed.

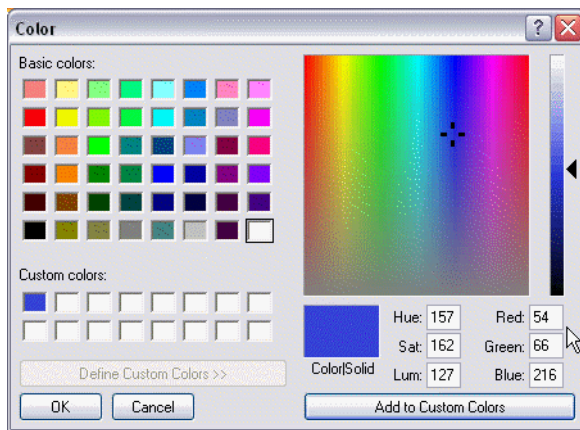


Figure B-14 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

X-Axis Tracking Enabled: The X-Axis Tracking Enabled checkbox specifies whether the x-axis tracks changes in the selected channel.

Y-Axis Tracking Enabled: The Y-Axis Tracking Enabled checkbox specifies whether the y-axis tracks changes in the selected channel.

Channels>Trace

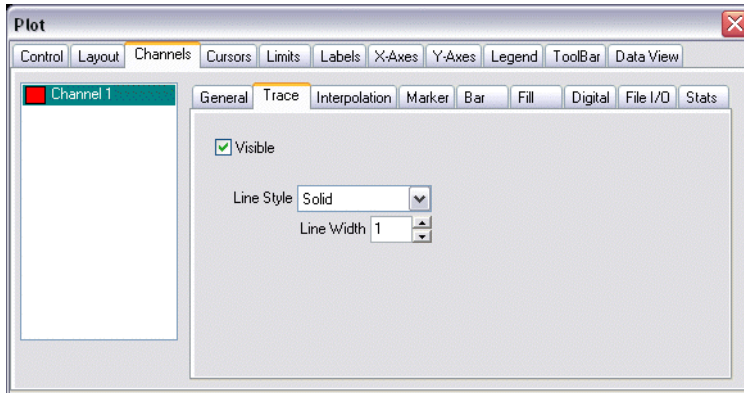


Figure B-15 Channels>Trace Tab

The Trace sub-tab of the Channel tab is used to configure the line drawn connecting the channel's data points. In this tab, you can specify the line style as well as its width for each channel as well as determine if that channel will be visible or not. The Trace sub-tab has the following options:

Channel List: Located along the left hand side of the window, this is a listing of the channels that have been added to the Chart.

Visible: The Visible checkbox determines whether or not the channel selected in the Channel List will be displayed on the plot.

Line Style: Used to set the pen style used when plotting the data for the selected channel. You can choose from solid, dash, dot, dash-dot, and dash-dot-dot styles.

Line Width: Used to set the pen width used when drawing the channel trace line.

Channels>Interpolation

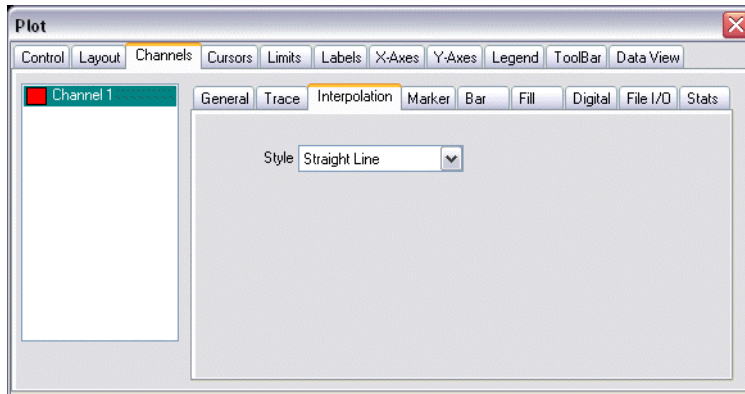


Figure B-16 Channels>Interpolation Tab

The Interpolation sub-tab in the Channel tab determines how the line connecting the individual data points will be determined. The Interpolation sub-tab has the following option:

Style: The Style option defines which method will be used for interpolating the line connecting the channel's data points. The options are straight line, cubic spline, polynomial, rational, and differential. For most applications, the default setting of "straight line" will be the correct choice.

Channels>Marker

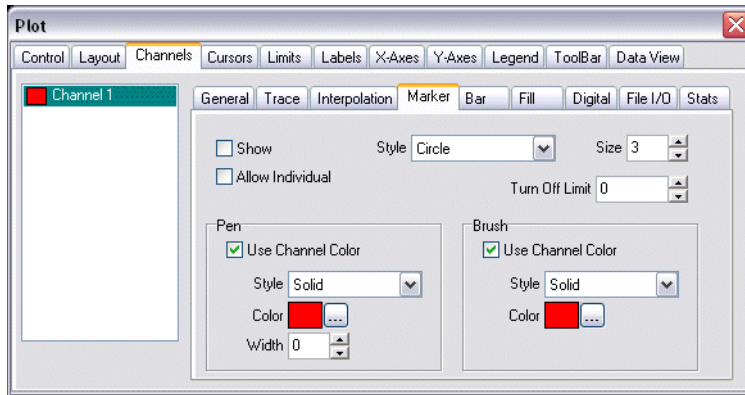


Figure B-17 Channels>Marker Tab

The Marker sub-tab of the Channels tab is used to configure the markers plotted for the channel's data points. You can specify whether or not to use markers for each data point, set the maximum number of markers to be drawn and specify the color, size, and style of the markers. The Marker sub-tab has the following options:

Show: Specifies whether or not a marker will be drawn at each data point.

Allow Individual: Specifies whether the DataMarkerShow and DataMarkerStyle properties are used to draw individual data point data markers. When this property is set to True, then the data markers are


initially drawn using the MarkersStyle property but can be modified individually with the DataMarkerShow and DataMarkerStyle properties. When this property is set to False, then all of the data markers are drawn using the MarkersStyle property of the channel.

Style: Used to set the pen style used when plotting the data markers for the selected channel. You can choose from solid, dash, dot, dash-dot, dash-dot-dot, clear, and inside-frame styles.

Size: Used to set the size of data markers. The Size value is measured in pixels.

Turn off Limit: Sets the maximum number of data markers that will be drawn.

Pen Use Channel Color: Specify whether markers use the channel's color for the color used to outline the markers. If the Pen Use Channel Color button is selected, the marker will be outlined in the channel's color. If the box is unchecked, the pen color will be specified by the Pen Color option below.

Pen Color: Specifies the pen color used for plotting the channel. Pressing the  button will bring up the color window shown in Figure B-18.

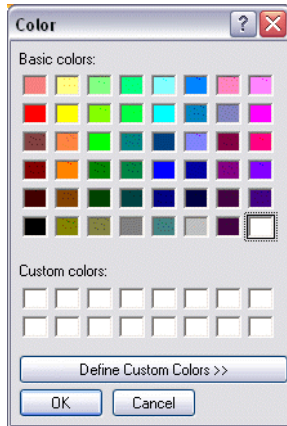


Figure B-18 Color Picker

Using this window, you can select the color of the line drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-19 will be displayed.

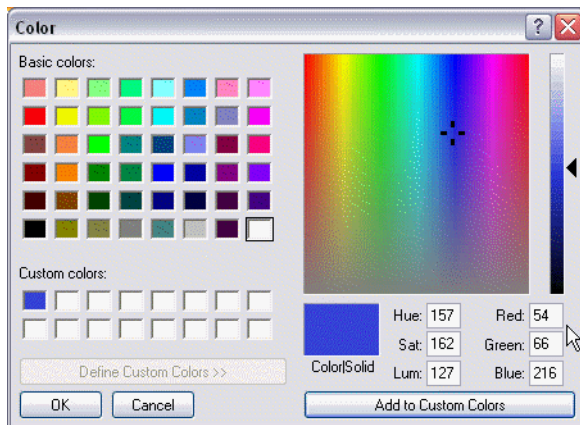





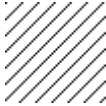

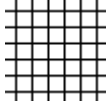
Figure B-19 Define Custom Color

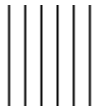
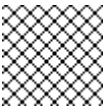
First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Pen Width: Used to set the pen width used when drawing data markers.

Brush Use Channel Color: Specifies whether markers use the channel color for the brush color. When the Brush Use Channel Color checkbox is checked, the brush uses the color set in the Pen Color property. When the Brush Use Channel Color checkbox is unchecked, the brush uses the channel's color.

Brush Style:The Brush Style specifies the fill pattern to be applied to the marker. The choices are:

Brush Style	Pattern	Brush Style	Pattern
Solid		FDiagonal	
Clear		BDiagonal	
Horizontal		Cross	

Brush Style	Pattern	Brush Style	Pattern
Vertical		DiagCross	

Channels>Bar

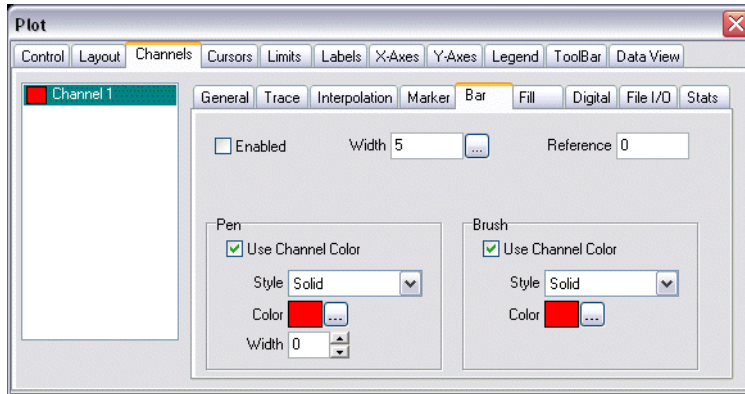


Figure B-20 Channels>Bar Tab


The Bar sub-tab of the Channels tab is used to configure the drawing of bars beneath the channel's data points. You can specify the width, color, and pattern to use when drawing the bars. The Bars sub-tab has the following options:

Enabled: Use to turn on the bar feature of the channel. When the feature is turned on, a bar with width specified using the Width property will be drawn from a y-value specified in the Reference property to the channel's y-value.

Width: Use to specify the width of the bar in units of the x-axis.

Reference: Use to specify the point at which the bar begins to draw in units of the y-axis.

Pen Use Channel Color: Specify whether the bar will use the channel's color for the color used to outline the bar. If the Pen Use Channel Color button is selected, the bar will be outlined in the channel's color. If the box is unchecked, the pen color will be specified by the Pen Color option below.

Pen Color: Specifies the pen color used for plotting the bar. Pressing the  button will bring up the color window shown in Figure B-21.

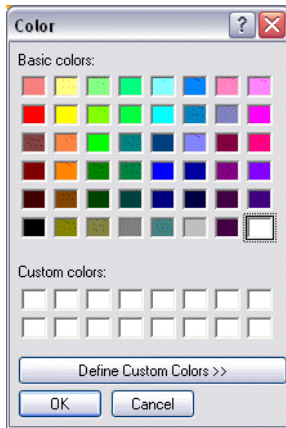


Figure B-21 Color Picker

Using this window, you can select the color of the bar drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-22 will be displayed.

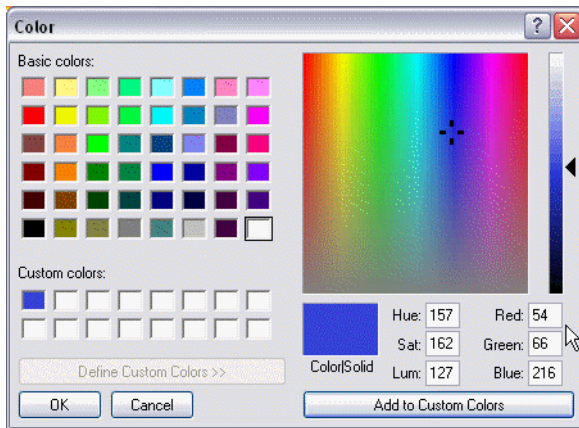




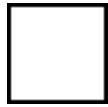

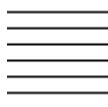
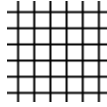
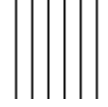

Figure B-22 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Pen Width: Used to set the pen width used when drawing the bar.

Brush Use Channel Color: Specifies whether bars use the channel color for the brush color. When the Brush Use Channel Color checkbox is checked, the brush uses the color set in the Pen Color property. When the Brush Use Channel Color checkbox is unchecked, the brush uses the channel’s color.

Brush Style:The Brush Style specifies the fill pattern to be applied to the bar. The choices are:

Brush Style	Pattern	Brush Style	Pattern
Solid		FDiagonal	
Clear		BDiagonal	
Horizontal		Cross	
Vertical		DiagCross	

Channels>Fill

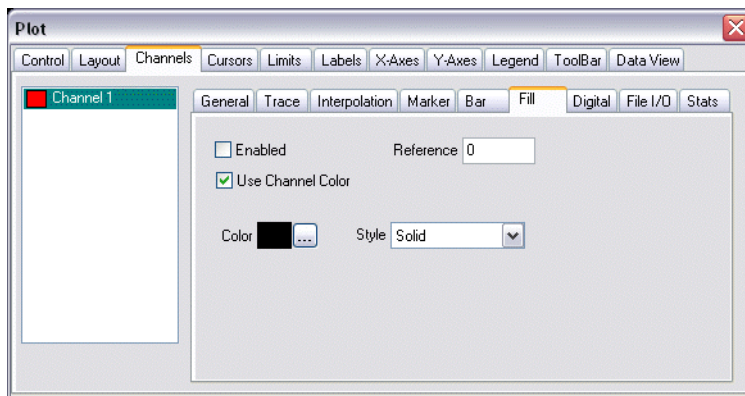


Figure B-23 Channels>Fill Tab

The Fill sub-tab of the Channels is used to create a fill beneath the data line drawn in the plot window. The color and pattern used for the fill can be specified as well as the lower bound for the fill pattern. The Fill sub-tab has the following options:

Enabled: Specifies to draw a filled bar beneath the channel data points.

Use Channel Color: Specifies whether the fill will use the channel color for the brush color. When the Use Channel Color checkbox is checked, the fill uses the color set in the Color property. When the Use Channel Color checkbox is unchecked, the fill uses the channel's color.

Reference: Use to specify the point at which the fill begins to draw in units of the y-axis.


Color: Specifies the pen color used for fill. Pressing the  button will bring up the color window shown in Figure B-24.



Figure B-24 Color Picker

Using this window, you can select the color of the bar drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-25 will be displayed.

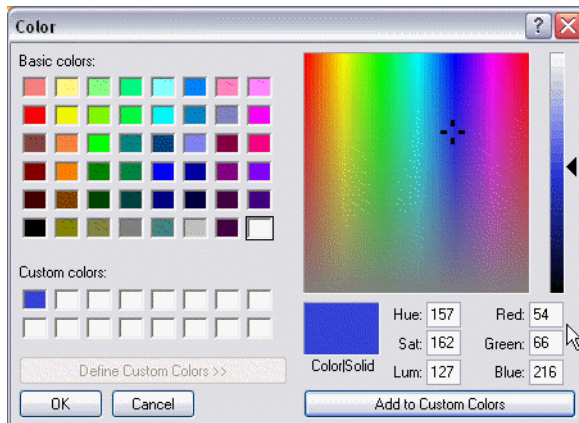





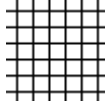
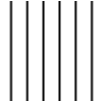
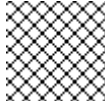


Figure B-25 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the crosshairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Style: The Style specifies the fill pattern to be applied to the fill. The choices are:

Brush Style	Pattern	Brush Style	Pattern
Solid		FDiagonal	
Clear		BDiagonal	
Horizontal		Cross	
Vertical		DiagCross	

Channels>Digital

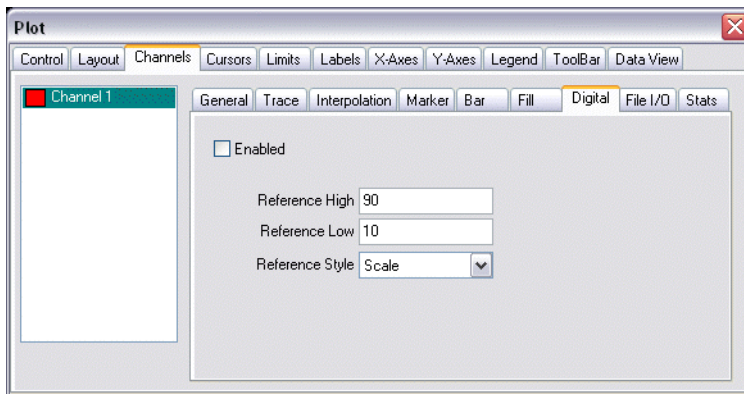


Figure B-26 Channels>Digital Tab

The Digital sub-tab of the Channels tab is used to configure the behavior of channels that are reading digital signals. Since a digital signal would be read as either a 1 or a 0 it would be inconvenient to expand the

scale to include those values along with other data points. Because of that, the Digital sub-tab allows you to scale the value to fit with the rest of your plotted data. You have the option of setting absolute values for the on and off states of the output or you can choose to have the values be expressed as a percentage of the full scale of the y-axis, keeping the digital channel's data visible even if you resize the axis. The Digital sub-tab has the following options:

Enabled: Used to specify whether the data in the channel is interpreted as digital or analog data. If Enabled is checked, then values of 0 and 1 are plotted as the Reference Low and Reference High values respectively.

Reference High: Specifies the y-value for digital high values or Logic = TRUE. This is the value used for plotting data points while in Digital Mode when the value is not equal to 0.

Reference Low: Specifies the y-value for digital low values or Logic = FALSE. This is the value used for plotting data points while in Digital Mode when the value is equal to 0.

Reference Style: The Reference Style is used to specify whether the digital data will be plotted as absolute values or plotted relative to the full scale of the y-axis.

If Reference Style is set to "Scale", then the data will be plotted such that a 0 will be plotted at the value of Reference Low and a 1 will be plotted at Reference High. These are absolute values and will adjust if the axis is scaled. For example, if the Reference Low and Reference High Values were set to 10 and 50 respectively, zooming the axis using the Zoom Out All Axes button would decrease the height of the digital input by half.

If, Reference Style is set to "Percent", the values of Reference Low and Reference High will be interpreted as the percentage of the y-axis associated with the 0 and 1 states. These percentages will be used even if the axis is resized, meaning the digital data will always have the same height though other, analog inputs can be scaled as usual.

Channels>File I/O

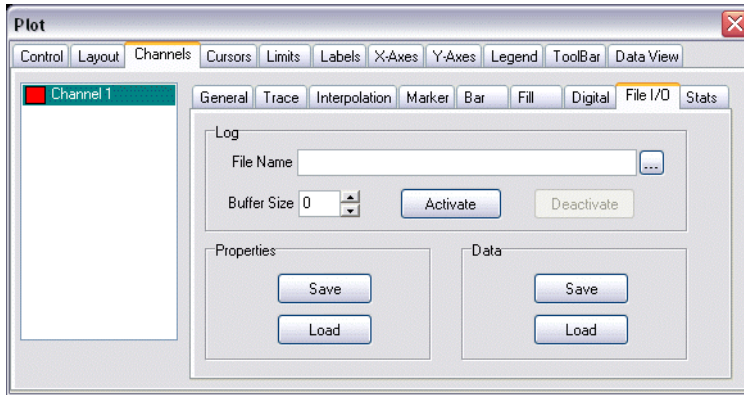



Figure B-27 Channels>File I/O Tab

Log File Name: Sets the filename (including path) for the log file. Pressing the  button allows you to specify the location of the log file on your computer. By entering a filename into the "File Name:" field, a new log file will be created.

Log Buffer Size: Used to set the size of the log buffer, in number of data points. When trending is active, data will flow into the log buffer. When the buffer is filled, then data will be written to the log file and the buffer cleared. This is useful if you want to regulate how often data is written to the log file. If this value is 0, then data is written to the log file after every new data point is added to the chart.

Properties Save/Load: Used to save or load the preferences for the plot.

Data Save/Load: Used to save or load the data points from the plot.

Channels>Stats

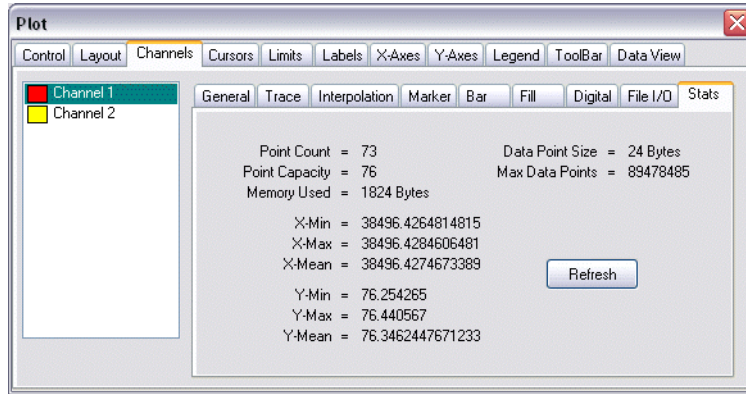


Figure B-28 Channels>Stats Tab

The Stats sub-tab in the Channels tab displays a number of useful statistics. These include such things as the number of points in the plot, the amount of memory taken up by each data point, the maximum number of data points possible, the total memory used to store the points currently plotted, and the minimum, maximum, and mean values for both the x- and y-axes. Pressing the Refresh button will update the counts and recalculate the values displayed in the Stats tab.

Cursors>General

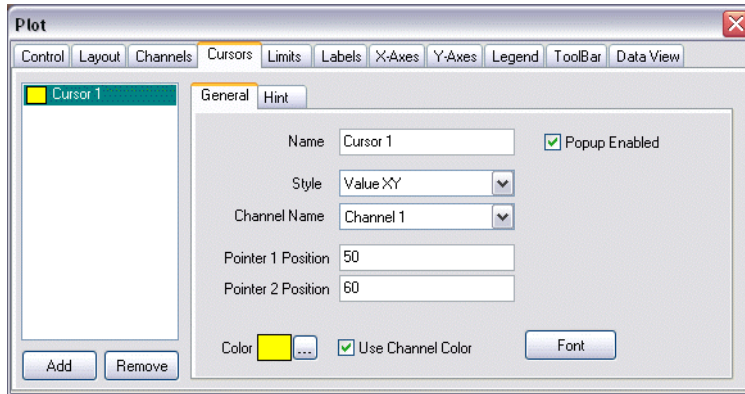


Figure B-29 Cursors>General Tab

The General sub-tab in the Cursors tab allows you to create cursor objects and define their color and style. The General sub-tab has the following options:


Name: Used to set the name of the cursor object. There is no restrictions on the length of the name or the characters used.

Style: The Style property determines what type of cursor will be created. You can choose from Value XY, Value X, Value Y, Delta X, Delta Y, and Inverse Delta X. The Value X, Value Y, and Value XY options will create a line cursor that, when moved through the plot window will display the value(s) associated with the point where the cursor crosses the plot. The Delta X and Delta Y options create two lines that can be positioned independently and the distance between them will be displayed. The Inverse Delta X operates like the Delta X option except that it reports the inverse of the value measured, useful for frequency measurements.

Pointer 1 Position: The Pointer 1 Position can be used to set the initial position of the first cursor. The value entered is a percentage of the full scale of the appropriate axis; therefore the only valid values are between 0 and 100. If the data cursor is horizontal, the position is in reference to the y-axis side of the plot window area with 0 being the bottom of the plot and 100 being the top of the plot. If the data cursor is vertical, the position is in reference to the x-axis side of the plot area with 0 being the left side of the plot and 100 being the right side of the plot.

Pointer 2 Position: The Pointer 2 Position can be used to set the initial position of the second cursor. The value entered is a percentage of the full scale of the appropriate axis, therefore the only valid values are between 0 and 100. If the data cursor is horizontal, the position is in reference to the y-axis side of the plot window area with 0 being the bottom of the plot and 100 being the top of the plot. If the data cursor is vertical, the position is in reference to the x-axis side of the plot area with 0 being the left side of the plot and 100 being the right side of the plot.

Use Channel Color: Specify whether the cursors use the channel's color. If the Use Channel Color button is checked, the cursor will be drawn in the channel's color. If the box is unchecked, the cursor color will be specified by the Color option below.

Color: Specifies the color used for drawing the cursor. Pressing the  button will bring up the color window shown in Figure B-30.

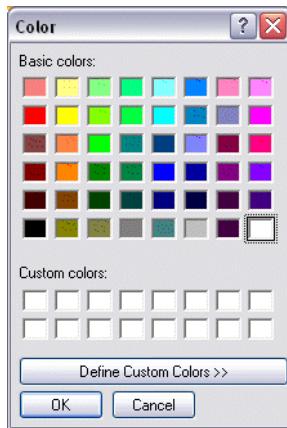


Figure B-30 Color Picker

Using this window, you can select the color of the line drawn from the Basic Colors or you can define a custom color. By clicking the “**Define Custom Color>>**” button, the color picker shown in Figure B-31 will be displayed.

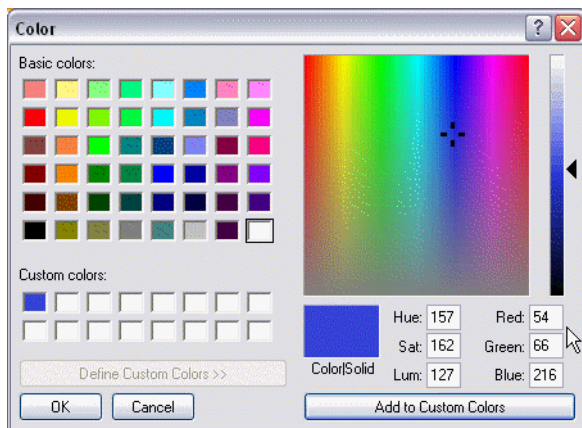


Figure B-31 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the crosshairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block.

When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Font: Clicking this button will bring up the dialog shown in Figure B-32. This window can be used to select the font family, style, size, and color of the font used for the cursor. Additionally, you can apply the strikeout or underline effects to the text.

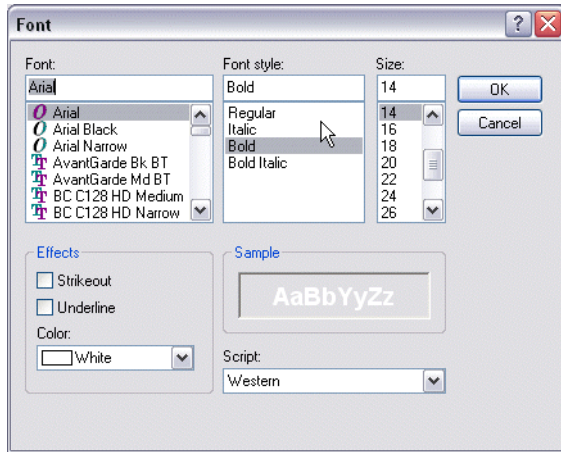


Figure B-32 Cursor>General>Font Window

Popup Enabled: The Popup Enabled checkbox enables the plot options for the cursor. If Popup Enabled is unchecked, you will not be able to right click on the cursor to bring up the options for that cursor.

Cursors>Hints

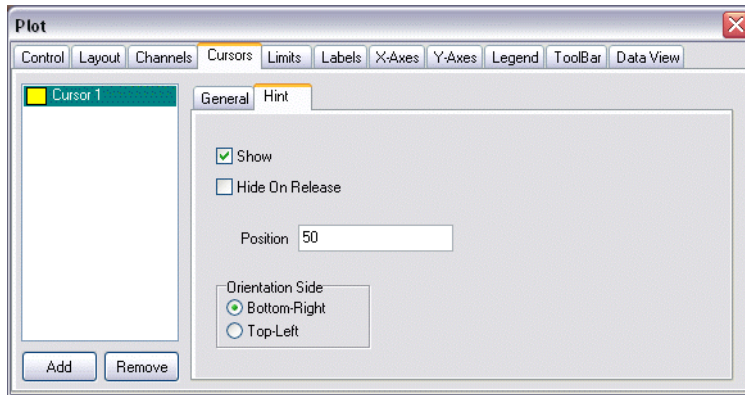


Figure B-33 Cursors>Hints Tab

The hint is the label drawn with the cursor that displays the plot value. The Hints sub-tab of the Cursor tab allows you to configure the behavior of the Hint associated with the selected cursor. The Hints sub-tab has the following options:

Show: Specifies whether or not the value display associated with the cursor will be displayed.

Hide On Release: Specifies whether the value display will be automatically hidden when the user releases the mouse button. The value will only be shown when the user selects and is moving the cursor. If this property is set to True, then the hint will immediately be hidden when the mouse is released.

Position: Use the Position property to set the initial position of the data value next to the chosen cursor. The value is specified in percent of the horizontal or vertical range of the plot window. If Position = 25 and the cursor is horizontal, then the left-side of the hint will be 25% of the distance from the left side of the plot window. If Position = 60 and the cursor is vertical, then the top side of the hint will be 60% of the distance from the top side of the plot window

Orientation Side: The Orientation Side property is used to set the initial orientation of the value displayed next to the cursor. The orientation will flip automatically if a cursor is moved in such a way as to move the hint window outside of the plot window.

Limits>General

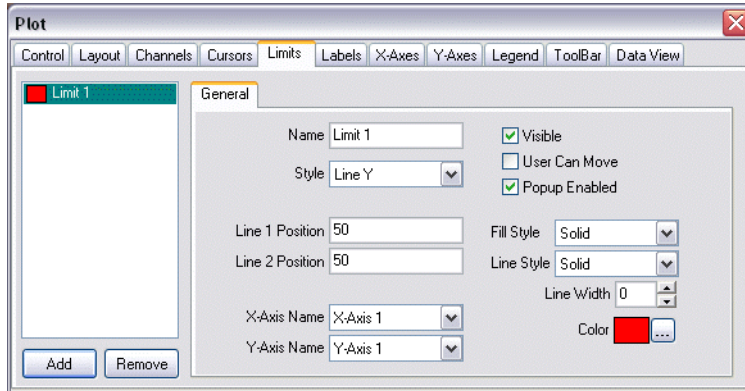


Figure B-34 Limits>General Tab

The Limit tab is used to draw guidelines or to shade areas on the plot. You can create guides parallel to the x- or y-axes and specify their position and color. Filled areas can also be created to highlight portions of the data plot. The Limits tab has the following options:



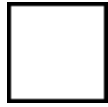
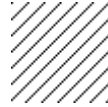
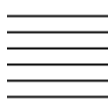
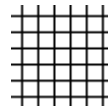
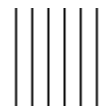
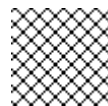
Name: Used to set the name of the Limit object. There is no restrictions on the length of the name or the characters used.

Style: The Style property determines what type of cursor will be created. You can choose from Line X, Line Y, Band X, Band Y, Poly Band X, and Poly Band Y. The Line X and Line Y options will draw a guide line at the specified value. The Band X and Band Y will create a shaded vertical or horizontal band, respectively.

Line 1 Position: The Line 1 Position is used to set the position of the limit line or the first line of a band. The value entered is a percentage of the full scale of the appropriate axis, therefore the only valid values are between 0 and 100. If the data cursor is horizontal, the position is in reference to the y-axis side of the plot window area with 0 being the bottom of the plot and 100 being the top of the plot. If the data cursor is vertical, the position is in reference to the x-axis side of the plot area with 0 being the left side of the plot and 100 being the right side of the plot.


Line 2 Position: The Line 2 Position is used to set the position of the second line of a band. The value entered is a percentage of the full scale of the appropriate axis, therefore the only valid values are between 0 and 100. If the data cursor is horizontal, the position is in reference to the y-axis side of the plot window area with 0 being the bottom of the plot and 100 being the top of the plot. If the data cursor is vertical, the position is in reference to the x-axis side of the plot area with 0 being the left side of the plot and 100 being the right side of the plot.

Fill Style:The Fill Style specifies the fill pattern to be applied to the limit. The choices are:

Brush Style	Pattern	Brush Style	Pattern
Solid		FDiagonal	
Clear		BDiagonal	
Horizontal		Cross	
Vertical		DiagCross	

Line Style: Used to set the style used when drawing the line(s) for the limit. You can choose from solid, dash, dot, dash-dot, and dash-dot-dot styles. Please note, the dotted or dashed pen styles are not available when the Width property is not 1 or 0.

Line Width: Used to set the pen width used when drawing the limit line or lines. This property is ignored if the Style property is set to Band X, Band Y, Poly BandX, Poly BandY.

Color: Specifies the color used for drawing the Limit line or area. Pressing the  button will bring up the color window shown in Figure B-35.

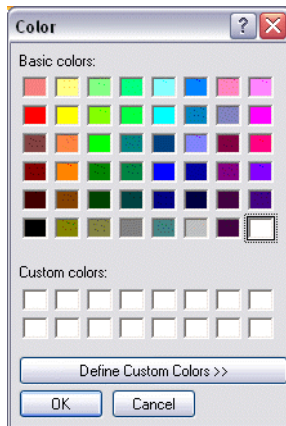


Figure B-35 Color Picker

Using this window, you can select the color of the line drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-36 will be displayed.

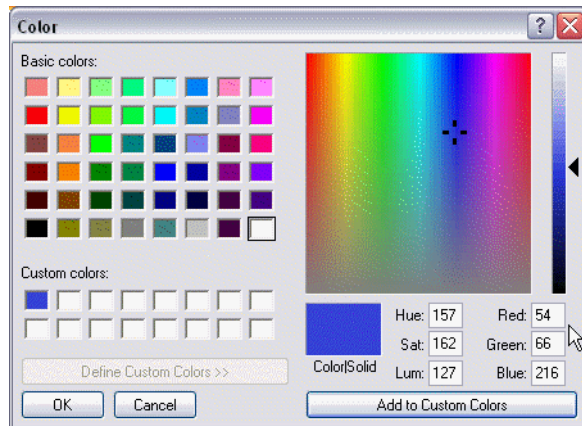


Figure B-36 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

X-Axis Name: If the plot is configured to have multiple x-axes, the X-Axis Name is used to select which axis the values to which the entered values for Line 1 Position and Line 2 Position refer.

Y-Axis Name: If the plot is configured to have multiple y-axes, the Y-Axis Name is used to select which axis the values to which the entered values for Line 1 Position and Line 2 Position refer.

Labels

Labels>General

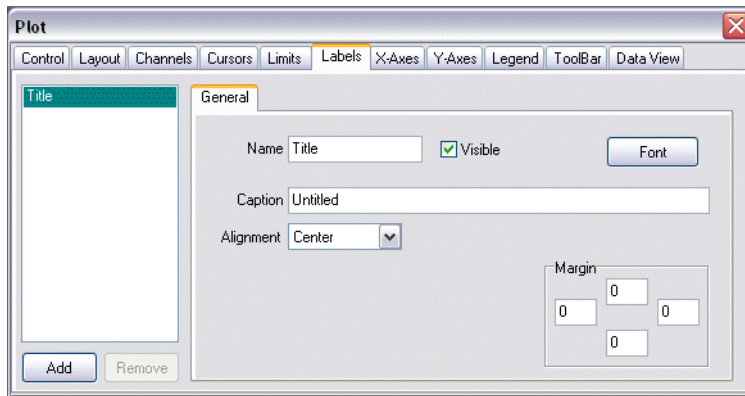


Figure B-37 Labels>General Tab

Name: The Name property is used to assign a name to the Label object. There is no restrictions on the length of the name or the characters used.

Visible: The Visible property is used to specify whether or not the label is visible in the plot window.

Font: Clicking this button will bring up the dialog shown in Figure B-38. This window can be used to select the font family, style, size, and color of the font used for the label. Additionally, you can apply the **strikeout** or **underline** effects to the text.

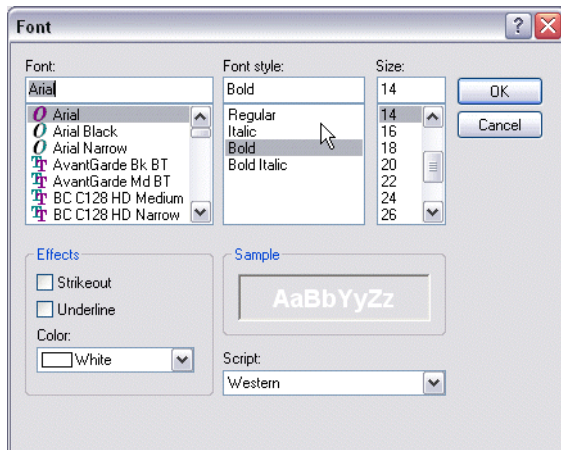


Figure B-38 Labels>General>Font Window

Caption: The Caption property contains the text that is displayed in the plot window when the Visible property is checked.

Alignment: The Alignment property specifies how the caption text will be aligned when it is drawn.

Margin: Use Margin to get or set the margin between the Caption and the top, bottom, left, and right of the Label Object. The Margin values is in percent of the title font height or width.

X- and Y-Axes

X- And Y-Axes>General

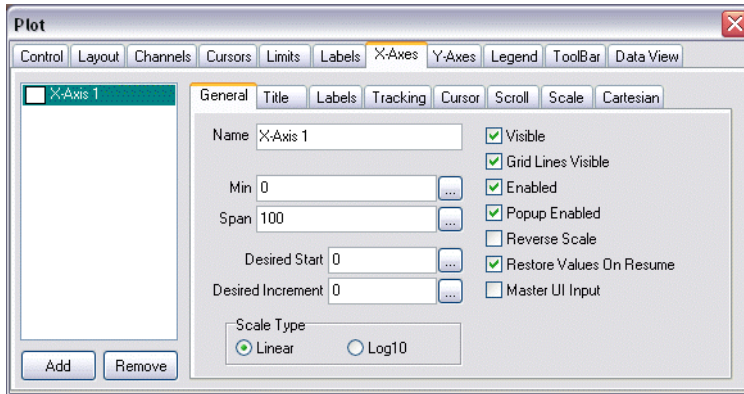


Figure B-39 X- and Y-Axes>General Tab

The General sub-tab in the X- and Y-Axes tabs is used to specify the parameters of the axes such as the limits of the scale on the axis, whether the scale is normal or logarithmic, and whether the scale is normal or reverse reading. The General sub tab has the following options:

Name: The Name property is the name assigned to the x- or y-axis object. You can configure the plot to have multiple axes

Min: Used to set the minimum value that will be displayed on the axis.

Span: Used to set the range displayed on the axis. The maximum value displayed will be equal to the Min plus the Span.

Desired Start: The Desired Start property specifies the desired value for the first major tick on the axes. For example, when your axis ranges from 0 to 100, as it does in the default plot window, major ticks occur in increments of 10 starting at 0. However, if you set the Desired start to 6, the major ticks would occur at 6, 16, 26, 36, etc. Setting Desired Start to 0 returns the plot to its normal method of determining the placement of ticks.

Desired Increment: The Desired Increment property allows you to manually specify the spacing between major ticks. In the default window, the axis ranges from 0 to 100 with a major tick in increments of 10. If you wished to only display major ticks at 0, 25, 50, and 100, you could set the Desired increment to 25.

Scale Type: The Scale Type specifies whether the chosen axis is a normal or a logarithmic axis.

Visible: The Visible property is used to specify whether or not the axis is visible in the plot window.

Grid Lines Visible: The Grid Lines Visible property is used to specify whether or not the grid lines will be drawn.

Enabled: The Enabled property is used to enable or disable the interface to the axis. If the Enabled Property is unchecked, the axis will be locked and will not be able to be scrolled or zoomed. When the Enabled property is checked, the axis behaves as normal.

Popup Enabled: The Popup Enabled checkbox enables the plot options for the channel. If Popup Enabled is unchecked, you will not be able to right click on the axis to bring up the options for that axis.

Reverse Scale: The Reverse Scale option is used to reverse the direction that the scale on the axis increases. If Reverse Scale is checked the axis will proceed from right to left rather than the normal left to right progression.

Restore Values On Resume: Use Restore Values On Resume to set whether or not the axis restores the original axis parameters and values that were in effect when the Pause All Tracking Button is clicked. All parameters (such as axis min and span) are restored when the Resume All Tracking Button is clicked and this property is set to TRUE.

Master UI Input: The Master UI Input property allows you to configure multiple axes to all take the same input. What this means is that if you scroll one axis then all of the axes with the Master UI Input selected will be scaled by the same amount.

X- And Y-Axes>Title

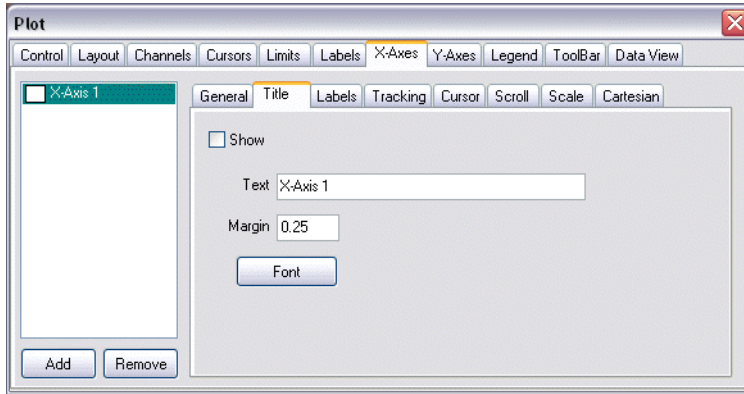


Figure B-40 X- and Y-Axes>Title Tab

The Title sub-tab in the X- and Y-Axes tabs is used to specify a title for the axis. The Title tab has the following options:

Show: Specifies whether or not the axis title is shown.

Text: Specifies the text that will be displayed if the Show property is checked.

Margin: Sets the margin between the axis title and axis scale labels. The Margin represents the percentage of a character size and is based on the font used for the axis. A value of 0.5 is equal to half the size of a character.

Font: Clicking this button will bring up the dialog shown in Figure B-41. This window can be used to select the font family, style, size, and color of the font used for the axis title. Additionally, you can apply the strikeout or underline effects to the text.

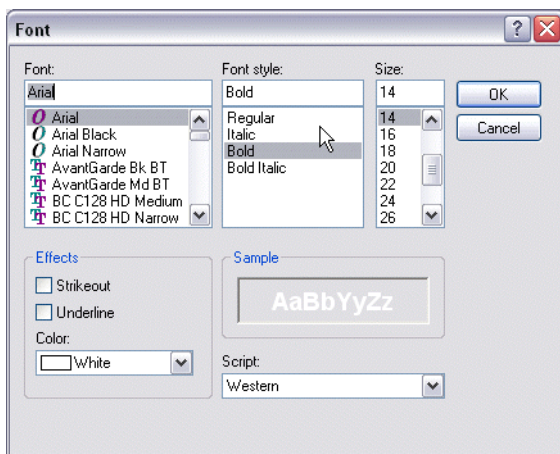


Figure B-41 X- and Y-Axes>Title>Font

X- And Y-Axes>Labels

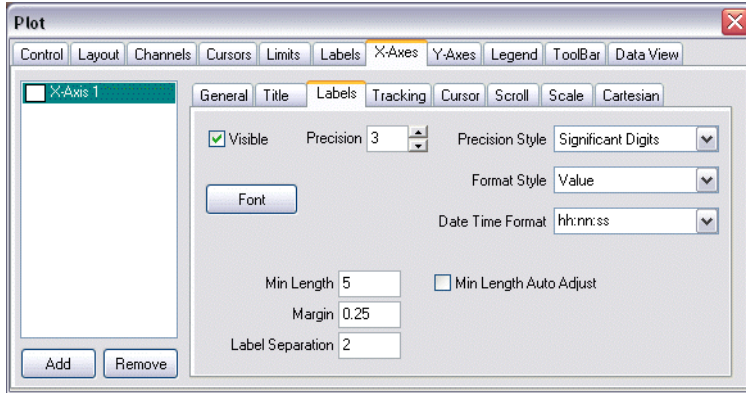


Figure B-42 X- and Y-Axes>Labels Tab

The Labels sub-tab of the X- and X-Axis tabs is used to configure how the axis labels for will be displayed. You can specify the precision, display style, font, and spacings for the label text. The Labels sub-tab has the following options:

Visible: Specifies whether or not the axis labels are displayed.

Font: Clicking this button will bring up the dialog shown in Figure B-43. This window can be used to select the font family, style, size, and color of the font used for the axis labels. Additionally, you can apply the **strikeout** or **underline** effects to the text.

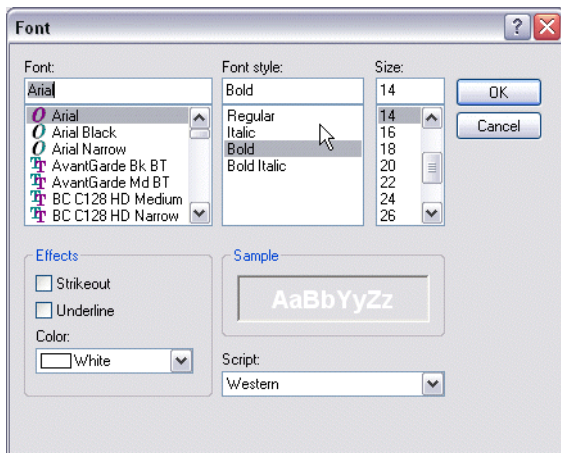


Figure B-43 X- and Y-Axes>Labels>Font

Min Length: Used to set the minimum label length used in calculating the number of scale labels. The Trend Viewer's automatic scaling calculates the number of scale labels based on the Font, Separation, and Min Length to ensure labels that are readable.

Margin: The Margin property is used to set the spacing between the major tick and major tick labels. The Margin is represented the percentage of a character size and is based on the Font used for the axis. A value of 0.5 is equal to half the size of a character.

Label Separation: The Label Separation property is used to set the minimum separation between scale labels. Label Separation represents the percentage of a character size and is based on the Font used for the axis. A value of 0.5 is equal to half the size of a character. The actual separation maybe greater due to the Trend Viewer automatically reducing the number of major ticks to keep the scale readable.

Precision: The Precision property is used to set the precision of the axis labels. The precision will represent either the number of significant digits or the number of decimal places, depending on the setting of the Precision Style property.

Precision Style: The Precision Style property specifies how the Precision property is interpreted when formatting scale labels. When Precision Style is set to Significant Digits, the number of digits to the right of the decimal point is automatically calculated to ensure that the span of the values will show enough significant digits. When the Precision Style is set to Fixed Decimal Points, then the labels will be displayed with a number of decimal places equal to the value of the Precision property.

Format Style: The Format Style property sets the formatting style of scale labels. You can choose from value, exponent, prefix, date/time, and pricing 32nds. The Value option simply uses the raw value as the tick label. The exponent setting uses scientific notation of the form X.XXe+NNN. A value of 1500 with this setting would be written as 1.50e+002. The prefix setting will express the axis ticks using a shorthand of adding a K for values over 1000 and M for millions. With this setting, 1500, for example, would be written as 1.5K. The date/time setting tells the Trend Viewer to display the axis ticks as date information.

Min Length Auto Adjust: The Min Length Auto Adjust property specifies whether the Min Length property is automatically adjusted as the minimum required label length increases.

While the Trend Viewer is plotting, or the user is scrolling or zooming the plot, the actual minimum label length may become greater than the Min Length value. This will result it the axis growing to accommodate the wider label. If the displayed data changes so as to cause the label width to vary, it may cause an annoying oscillation of the display plot objects sizes. To prevent this oscillation, check this property. The Min Length property is stored when the Tracking Enabled property is set to False. The Min Length property will be restored to the previous value when Tracking Enabled property is set back to True.

X- And Y-Axes>Tracking

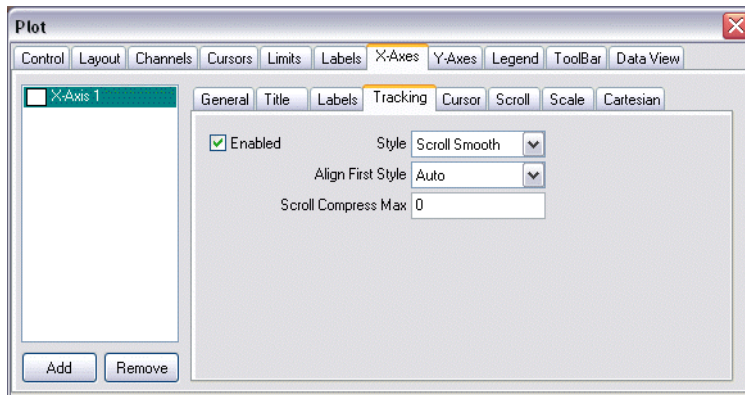


Figure B-44 X- and Y-Axes>Tracking Tab

The Tracking sub-tab of the X- and Y-Axis tabs is used to configure the behavior of the plot when data has been collected that cannot currently fit in the plot window. Using the properties in the Tracking sub-tab, you can configure how the plot will be adjusted to account for the additional data. The Tracking sub-tab has the following options:

Enabled: Specifies whether or not the axis will automatically adjust itself as new data points are read from the channel. Depending on the Style, When the Tracking is enabled, the axis will scroll or compress based on the new tracking data.

Style: The Tracking Style specifies how the axis adjusts itself in response to new tracking data if off scale. The Style options are Scale Min & Max, Scale Max, Scale Min, Scroll Smooth, Scroll Page, and Expand Collapse. The Scale Min, Scale Max, and Scale Min & max will adjust the axes if the data goes below the minimum, above the maximum, or both. When this occurs, the scale will be adjusted to include the new data point. The Scroll Smooth option will simply shift the area of the plot for each new data point added. Once the data fills the plot window, as each new data point is read, the oldest point will be scrolled off the screen. The Scroll Page option works in a similar fashion, except that instead of scrolling a single point, it will shift the plot entirely such that the new data point starts at the left hand side of the plot window.

Align First Style: The Align First Style property is used to specify how the axis aligns itself when it receives its first data points from the channel(s) being plotted. If there is more than one channel sending tracking data, only the data from the first channel is used to determine the first alignment.

Scroll Compress Max: The Scroll Compress Max property is used to set the maximum span value when compressing the scale. When new data is read in from the channel being plotted and Tracking has been enabled, the Span property will be Compressed to include the data if the current Span property is less than the value of the Scroll Compress Max property. To disable this feature, set Scroll Compress Max to 0.

X- And Y-Axes>Cursor

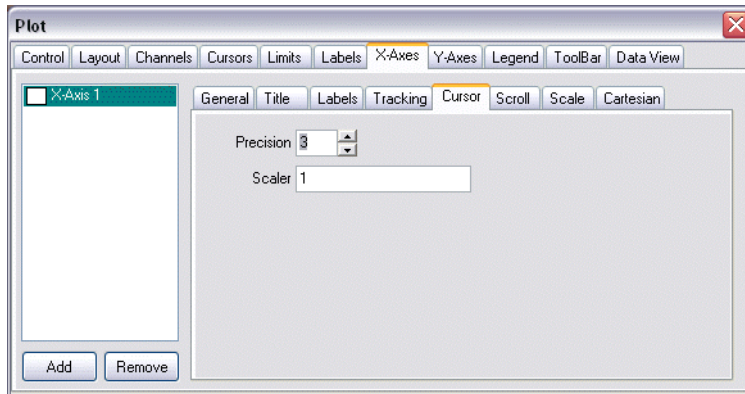


Figure B-45 X- and Y-Axes>Cursor Tab

The Cursor sub-tab of the X- and Y-Axis tabs are used to configure the behavior of cursors associated with the axis. The number of significant digits as well as a scaling factor for frequency calculations are entered in this sub-tab. The Cursor sub-tab has the following options:

Precision: The Precision property specifies the number of significant digits to be displayed by Cursor object that measure values on the chosen axis. For example, a Precision of 3 would give a reading of 11.8 whereas a Precision of 5 would give a value of 11.757.

Cursor Scaler: The Cursor Scaler property is used with cursors that have their Style property set to InverseDeltaX, typically used for frequency calculations. The Cursor Scaler is a multiplier used to convert this axis' units to seconds format so that the cursor can properly display the frequency calculation.

X- And Y-Axes>Scroll

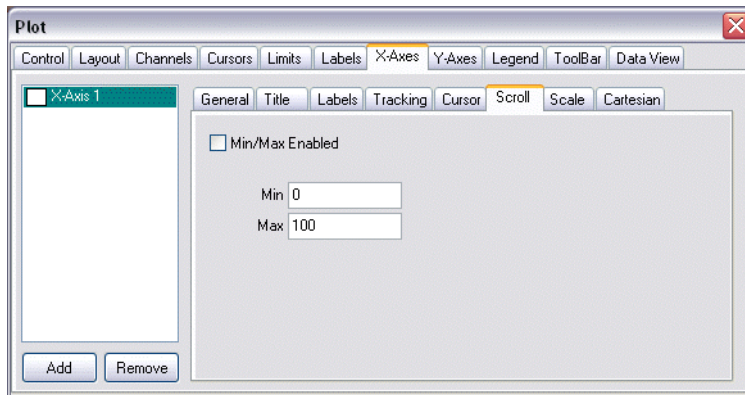


Figure B-46 X- and Y-Axes>Scroll Tab

The Scroll sub-tab of the X- and Y-Axis tabs is used to set limits on the user's ability to scroll the plot. The Scroll sub-tab has the following options:

Min/Max Enabled: Use Min/Max Enabled to specify a fixed range for the scrolling of the selected axis. If Min/Max Enabled is checked, then the axis will stop scrolling when Max and/or Min are reached on the scale.

Min: Specifies a fixed maximum limit on scrolling of the axis. If the user attempts to scroll the axis past this point on the axis and Min/Max Enabled is checked, the axis will not scroll past the specified maximum point.

Max: Specifies a fixed maximum limit on scrolling of the axis. If the user attempts to scroll the axis past this point on the axis and Min/Max Enabled is checked, the axis will not scroll past the specified maximum point.

X- And Y-Axes>Scale

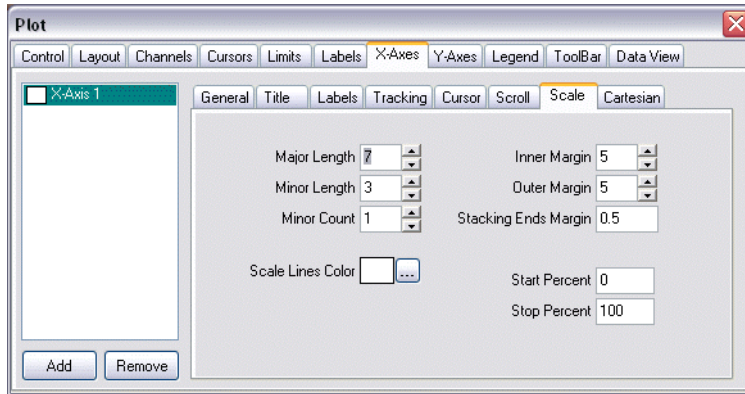



Figure B-47 X- and Y-Axes>Scale Tab

The Scale sub-tab of the X- and Y-Axis tabs is used to set a number of parameters dealing with how the scales for the chosen axis will be displayed. The Scale sub-tab has the following options:

Major Length:The Major Length property is used to set the length of the major ticks for the axis. This value is measured in pixels.

Minor Length: The Minor Length property is used to set the length of the minor ticks for the axis. This value is measured in pixels.

Minor Count: The Minor Count property sets the number of minor divisions between each major division. Minor Count should be set to one less than the desired number of minor sections. For example, if you want 5 minor sections, set Minor Count to 4 since 4 divisions would result in 5 sections.

Scale Lines Color: Specifies the color used for drawing the tick marks for the axis. Pressing the button  will bring up the color window shown in Figure B-48.

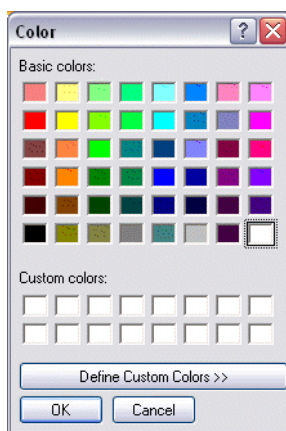


Figure B-48 Color Picker

Using this window, you can select the color of the line and tick marks drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-49 will be displayed.

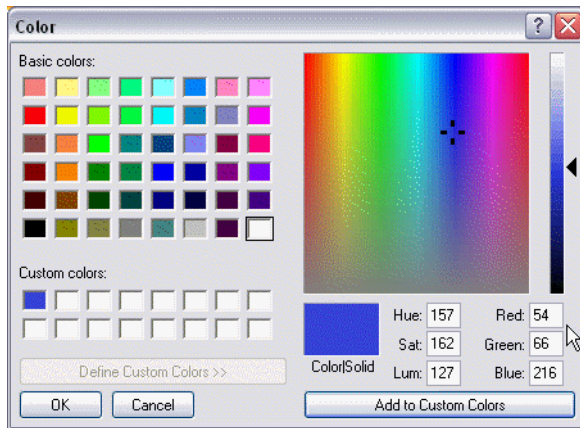


Figure B-49 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Inner Margin: Sets the margin between the axis line and the data plot window. The Inner Margin value is measured in pixels.

Outer Margin: Sets the margin between the axis line and the axis label. The Outer Margin value is measured in pixels.

Stacking Ends Margin: The Stacking Ends Margin property sets the margin at the end of the axis when stacked. Stacking Ends Margin is measured as a percentage of a character size and is based on the Font used for the axis. A value of 0.5 would, therefore, be equal to half the size of a character.

Start Percent: The Start Percent property specifies where, relative to the axis, to begin drawing the scale. For example, a Start Percent of 20 will cause the scale to start one fifth of the way along the axis.

Stop Percent: The Stop Percent property specifies where, relative to the axis, to end drawing the scale. For example, a Stop Percent of 75 will cause the scale to end one quarter of the way from the end of the axis.

X- And Y-Axes>Cartesian

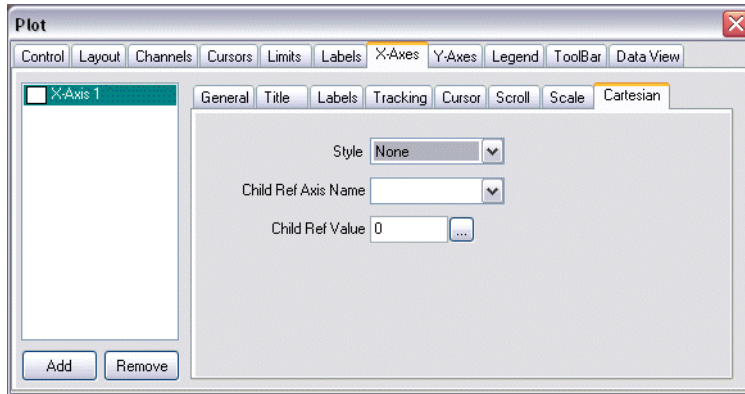


Figure B-50 X- and Y-Axes>Cartesian Tab

Style: Use MajorLength to get or set the axis major ticks length.

Child Ref Axis Name: Use CartesianChildRefAxisName to get or set the name of the Axis used for referencing the axis. The specified Axis Name refers to the perpendicular axis scale that will be used to position this Child Cartesian Axis when using the CartesianChildRefValue property. This property only affects Axes that have their CartesianStyle set to ipcsChild.

Child Ref Value: Use CartesianChildRefValue to get or set the position of a Child Cartesian Axis along its perpendicular reference axis specified by the CartesianChildRefAxisName property. This property only affects Axes that have their CartesianStyle set to ipcsChild.

Legend

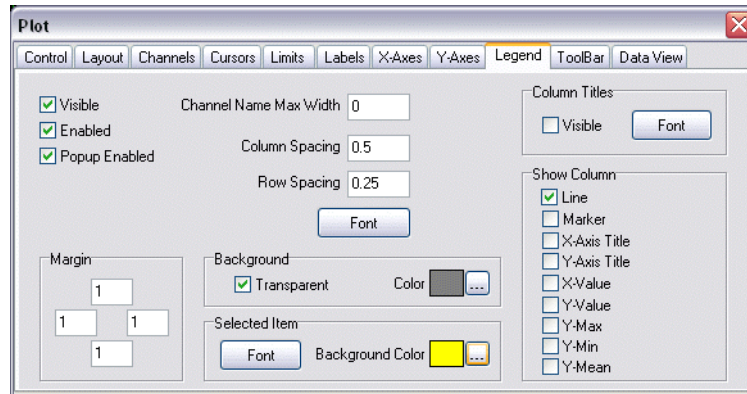


Figure B-51 Legend Tab

The Legend tab is used to configure the display of the plot legend. Using the properties in this tab, you can specify the fonts, color, and spacings used when displaying the legend. The Legend tab has the following options:

Visible: Use the Visible property to show or hide the plot legend.

Enabled: The Enabled property is used to enable or disable the plot legend. If the Enabled property is unchecked, the legend will not be displayed in the plot window. When the Enabled property is checked, the legend will be shown in the position specified in the Layout tab.

Popup Enabled: The Popup Enabled checkbox enables the popup menu for the plot legend. If Popup Enabled is unchecked, you will not be able to right click on the channel name in the index to bring up the options for the plot legend.

Channel Name Max Width: Use Channel Name Max Width to specify the maximum channel name width allowed in the Legend before word wrapping occurs. This property allows you to set a maximum width of the Channel Name column, allowing those channel names that exceed this width to word-wrap to the next line.

Column Spacing Specifies the spacing between columns in the legend. Column Spacing is measured as a percentage of a character size and is based on the Font used in the Legend. A value of 0.5 is equal to half the width of a character.

Row Spacing: Specifies the spacing between rows in the legend. Column Spacing is measured as a percentage of a character size and is based on the Font used in the Legend. A value of 0.5 is equal to half the width of a character.

Column Font: Clicking this button will bring up the dialog shown in Figure B-52. This window can be used to select the font family, style, size, and color of the font used for the legend entries. Additionally, you can apply the strikethrough or underline effects to the text.

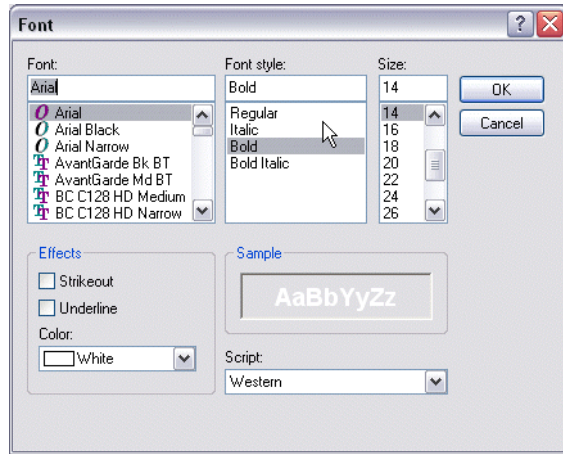


Figure B-52 Legend>Font

Margin: The Margin option is used to set the margin around the left, right, top, and bottom edge of the legend. The values are measured as multiples of a character size and is based on the Font used in the Legend.

Background Transparent: The Background Transparent property is used to specify whether the background behind the legend shows through or if the legend will have its own background color.

Background Color: The Background Color property sets the background color of the legend to be used if the Background Transparent option is unchecked. Pressing the button will bring up the color window shown in Figure B-53.



Figure B-53 Color Picker

Using this window, you can select the color of the line and tick marks drawn from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-54 will be displayed.

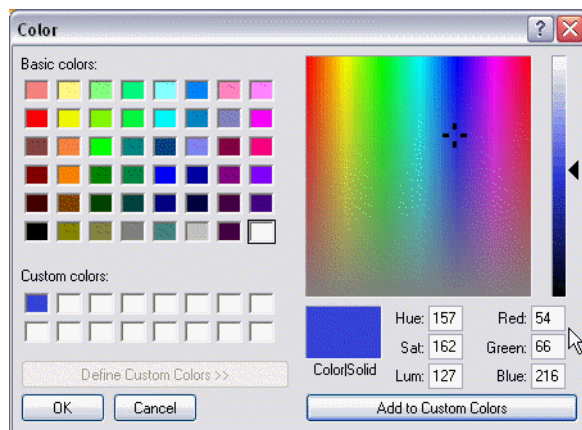


Figure B-54 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Selected Item Background Color: The Selected Item Background Color property is used to set the background color of the selected items in the legend. The color is selected in the same manner as the Background Color.

Selected Item Font: The font to be used when an item in the legend is selected. The font is selected in the same manner as the Column Font.

Titles Visible: The Titles Visible property specifies whether or not the column titles are visible in the legend.

Titles Font: The Titles Font is the font which will be used when drawing the column titles in the legend. The font is selected in the same manner as the Column Font and the Selected Item Font.

Show Column Line: The Show Column Line property specifies whether or not the column for the line segment showing the channel’s color is displayed in the legend.

Show Column Marker: The Show Column Marker property specifies whether or not the column for the channel’s marker symbol is displayed in the legend.

Show Column X-Axis Title: The Show Column X-Axis Title property specifies whether or not the column for the x-axis title associated with the channel is displayed in the legend.

Show Column Y-Axis Title: The Show Column Y-Axis Title property specifies whether or not the column for the y-axis title associated with the channel is displayed in the legend.

Show Column X-Value: The Show Column X-Value property specifies whether or not the column for the value of the most recently added x-value is displayed in the legend.

Show Column Y-Value: The Show Column Y-Value property specifies whether or not the column for the value of the most recently added y-value is displayed in the legend.

Show Column Y-Max: The Show Column Y-Max property specifies whether or not the column for the value of the maximum y-value is displayed in the legend.

Show Column Y-Min: The Show Column Y-Min property specifies whether or not the column for the value of the minimum y-value is displayed in the legend.

Show Column Y-Mean: The Show Column Y-Mean property specifies whether or not the column for the value of the mean y-value is displayed in the legend.

Toolbar

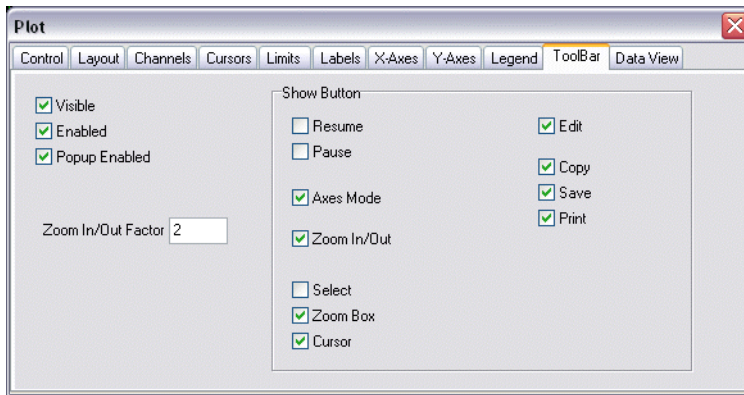


Figure B-55 Toolbar Tab

The Toolbar tab is used to configure the display of the components on the toolbar in the plot window. Using the options in this tab, you can specify which button you want on the toolbar or if you want the toolbar to be visible at all. You can also specify the zoom factor associated with the Zoom In and Zoom Out buttons.

Visible: Shows or hides entire tool bar in the plot window.

Enabled: The Enabled checkbox enables the plot options for the toolbar. If Enabled is unchecked, you will not be able to right click on the toolbar to bring up the options for the plot legend.

Popup Enabled: Use the Popup Enabled property to enable or disable the Popup Menu of a Plot Object. The Popup Menu is shown when a user right-clicks on this Plot Object. Setting this property to FALSE is useful if you don't want the Popup Menu functionality of this Plot Object in your particular application.

Zoom In/Out Factor: The Zoom In/Out Factor property determines how much the axes will be zoomed in or out when the Zoom In All Axes or Zoom Out All Axes buttons are pressed. The zoom factor is expressed in relation to the original scale, so a zoom factor of 2 would increase or decrease the axes by a factor of two. For axes with logarithmic scales, this property has no effect. Log based scales will always zoom by a factor of 2 regardless of this property's value.

Show Button: Determines whether a specific button is shown on the tool bar or not. Placing a check in the box next to a button's name will cause the button to be visible in the toolbar.

NOTE

The Resume, Pause, and Select buttons are, by default, not visible in the toolbar as they do not do anything. Enabling them in the Trend Viewer will make the buttons visible, but they will have no function.

Data View>General

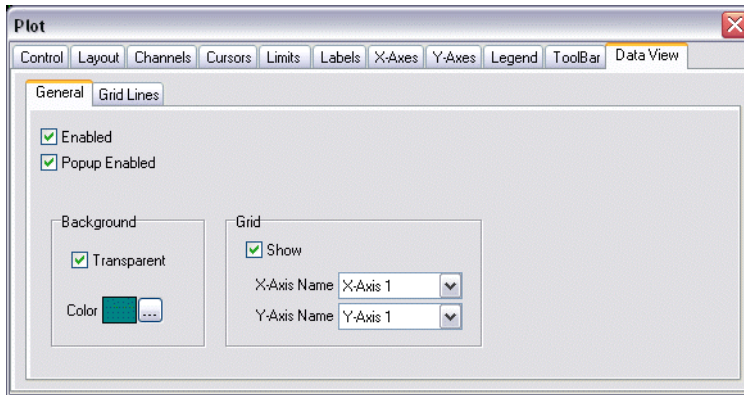


Figure B-56 Data View>General Tab

The General sub-tab of the Data View tab is used to specify the background color for the plot window as well as whether gridlines will be drawn and the axes to which they are connected. The General sub-tab has the following options:

Enabled: The Enabled property is used to enable or disable the plot legend. If the Enabled property is unchecked, the legend will not be displayed in the plot window. When the Enabled property is checked, the legend will be show in the position specified in the Layout tab.

Popup Enabled: The Popup Enabled checkbox enables the popup menu for the plot legend. If Popup Enabled is unchecked, you will not be able to right click on the channel name in the index to bring up the options for the plot legend.

Background Transparent: Use Background Transparent to specify whether the background behind the data view shows through.


Background Color: Use Background Color property to set the background color of the data view. Pressing the  button will bring up the color window shown in Figure B-57.



Figure B-57 Color Picker

Using this window, you can select the color of the background from the Basic Colors or you can define a custom color. By clicking the “Define Custom Color>>” button, the color picker shown in Figure B-58 will be displayed.

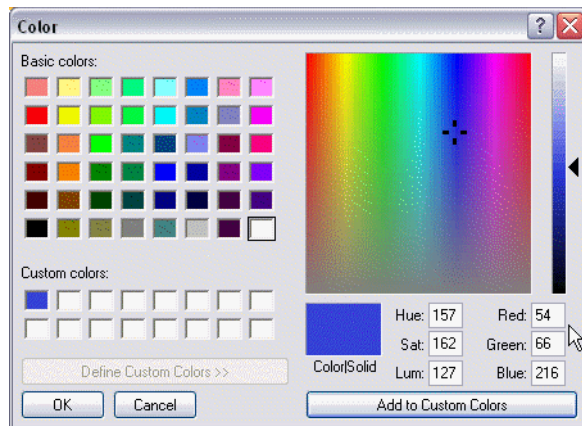


Figure B-58 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Grid Show: Unchecking the Grid Show checkbox will hide the gridlines drawn on the plot.

Grid X-Axis Name: If you are configuring a plot with multiple x-axes, the Grid X-Axis Name property specifies which axis will be used to determine the grid lines that will be drawn in the plot.

Grid Y-Axis Name: If you are configuring a plot with multiple y-axes, the Grid Y-Axis Name property specifies which axis will be used to determine the grid lines that will be drawn in the plot.

Dataview>Grid Lines

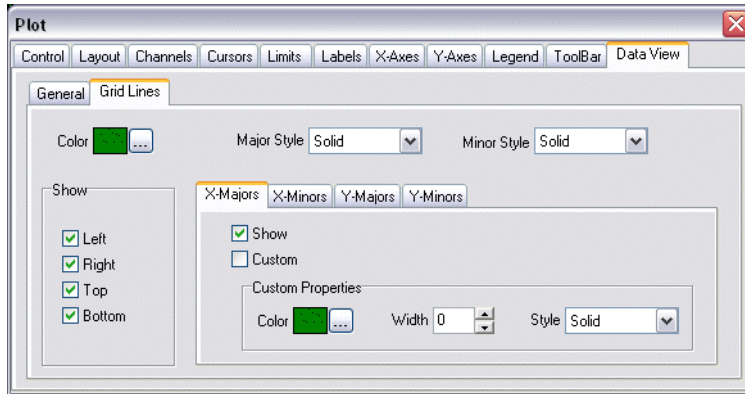


Figure B-59 Data View>Grid Lines Tab

The Grid Lines sub-tab in the Data View tab is used to configure the display of the grid lines associated with the major and minor divisions along the axes. The Grid Lines sub-tab has the following options:


Color: Use to specify the overall/default color of the grid lines. You can override specific X-Axis major and minor tick line settings using properties in the X-Majors, X-Minors, Y-Majors, and Y-Minors sub-tabs. Pressing the  button will bring up the color window shown in Figure B-60.



Figure B-60 Color Picker

Using this window, you can select the color of the grid lines from the Basic Colors or you can define a custom color. By clicking the "Define Custom Color>>" button, the color picker shown in Figure B-61 will be displayed.

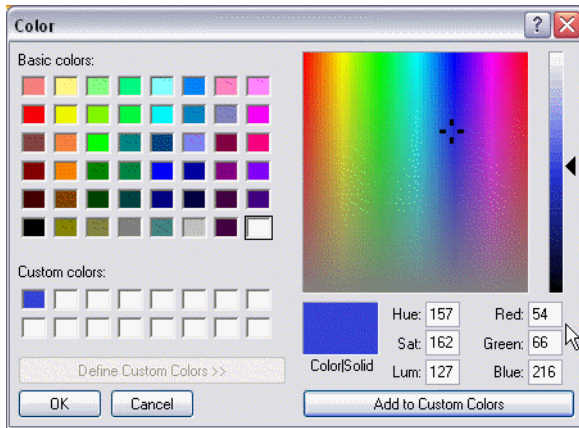


Figure B-61 Define Custom Color

First select the Custom Color block you wish to define and then select the desired color by moving the cross-hairs cursor in the color block. The slider on the right hand side varies from white to the chosen color to black to allow you to select the desired shade of your color. Alternately, you can directly enter the Hue, Saturation and Luminance or Red, Green and Blue values directly into the fields below the color block. When you are satisfied with the chosen color, click the “Add to Custom Colors” button to transfer the color to the Custom Color box you selected earlier.

Show Left/Right/Top/Bottom: Specifies whether the left, right, top, and bottom borders will be drawn on the plot.

Major Style: The Major Style property is used to set the line style for the major grid lines. You can choose from solid, dash, dot, or small dot styles. You can override specific X-Axis and Y-Axis major tick line settings using properties in the X-Majors and Y-Majors sub-tabs.

Minor Style: The Minor Style property is used to set the line style for the minor grid lines. You can choose from solid, dash, dot, or small dot styles. You can override specific X-Axis and Y-Axis minor tick line settings using properties in the X-Minors and Y-Minors sub-tabs.

X-Major, X-Minor, Y-Major, Y-Minor Sub-Tabs

The X-Major, X-Minor, Y-Major, and Y-Minor sub-tabs are used to override the drawing options for specific major or minor divisions of a single axis.

Show: Use to specify whether grid lines for this specific axis tick type are shown.

Custom: Use to specify whether the options in the Custom Properties box override the grid settings specified previously for this Axis tick type.

Custom Properties - Color: Use to specify the grid line color for this Axis tick type. The color is selected in the same manner as for the Grid Line Color property.

Custom Properties - Width: Use to specify the grid line width, in pixels, for this Axis tick type.

Custom Properties - Style: Use to specify the grid line style for this Axis tick type. You can choose from solid, dash, dot, or small dot styles.

SECTION 6 : APPENDIX C: COMMISSIONING TIPS

DEVICE NUMBERING

The way in which you assign unit ID numbers to the controllers on your MSTP network can have an effect on the overall communications performance. To understand why this is the case, you need to understand MSTP token passing and what happens when a token is dropped.

In a normally functioning MSTP network, the token is passed to each controller sequentially by unit ID number. After a device passes the token to the next device on the network, it waits to see if the recipient is using the token. If a specified timeout is exceeded, 300 mS for BACnet, then a Poll for Master request will be generated. When this request is made the devices are sequentially interrogated, starting with the next ID number until a master device is found which can receive a new token. If your devices are numbered such that the devices which will respond to the Poll for Master request are numbered lower, it will take less time for a master device to be found and a new token generated. This translates to improved performance of your BACnet network.

Ideally, devices should be numbered sequentially, starting with zero. If an **NB-Link** device is being used, it should be numbered 0. If no **NB-Link** is being used, any area controllers, such as a SAGE, should have the lowest numbers. With an **NB-Link**, any SAGEs or other area controllers would be numbered starting with 1. In either case, these devices should be followed by any controllers which have programs which access the network. Finally, any other controllers would be included last in the numbering.

MAX_INFO_FRAMES

The value of Max_Info_Frames specifies the maximum number of information frames the node may send before it must pass the token. Max_Info_Frames may have different values on different nodes. This may be used to allocate more or less of the available link bandwidth to particular nodes.

MAX_MASTER

The **max_master** property represents the highest identifier number that can be a master device on the network. This number is the highest identifier number to which the token will be passed. Network performance will be slowed if the controllers are polling for master to identifier numbers which do not have devices associated with them. To prevent this, the **max_master** should be set to a value one higher than the highest numbered master device on your network. This will improve network performance by reducing the time needed to poll for master to devices on the network.

**SECTION 7 : APPENDIX D:
TROUBLESHOOTING COMMON
PROBLEMS**

PROBLEM: NB-Pro cannot connect to the NB-Link.

SOLUTION:

- Test and determine if your PC can 'see' the **NB-Link**, try a PING test. To perform a ping test, go to the Windows START button and select the RUN option. Type the word COMMAND at the Open dialog box and hit OK. This will bring you to a DOS Prompt. Type "ping <IP address of **NB-Link**>" substituting the address for your link. If the unit is live on the network, you should receive replies back from the IP address that **NB-Link** is assigned to. If you do not, it is recommended that you check the power source where the **NB-Link's** adapter is plugged into, as well as all network cabling between your PC and the **NB-Link**.
- Verify network-addressing information of your PC's network interface card. If you are unsure of the address configuration, consult a network administrator for more help.

PROBLEM: When I start NB-Pro, I can see the IP address of my NB-Link in the Device Panel. However, I cannot see any MS/TP devices.

SOLUTION:

- Check the baud rate at which your **NB-Link** is set to communicate at.
- Verify that the DB25 device is wired properly (N+ to TX+ and N- to RX-)
- Verify that your MAC Address (TS) is set to a unique number that is not assigned to any other MS/TP Device on the network. Note that Native Series devices default ID numbers to the last two digits of the unit's serial number.

PROBLEM: NB-Pro cannot seem to find some devices on the MS/TP network.

SOLUTION:

- Check to make sure all devices have unique ID numbers. If two devices have the same ID number, network communications is likely to degrade.
- Verify all network wiring along the MS/TP network. Make sure all controllers are connected in a daisy chain format. **NB-Pro/NB-Link** supports up to 32 MS/TP controllers without the use of a repeater. With the use of an EIA-485 repeater, you may communicate with up to 64 devices. Pay close attention to the distance of wire runs in your network. All wiring must conform to the RS-485 wiring standards. In addition, it is recommended that **NB-Pro/NB-Link** connect electrically at the end of the network. 'T-tapping' can result in network communication errors.
- Users can send a Who-Is to devices on the network from the Utilities menu to find additional devices that may have been added to the network.
- Verify that all devices on the MS/TP network are set to master mode. If a device is set to slave, you must add the device manually.
- Confirm that all devices are configured to operate at the same baud rate.

PROBLEM: I changed my controller's ID number and now I can no longer communicate to the device.

SOLUTION:

- When you change a unit ID number on a Native Series device, the change takes effect immediately. This causes the controller to be non-responsive when attempting to communicate with it. Users should access the Discovery menu and select Locate Devices to find the controller.

PROBLEM: NB-Pro will only discover devices up to a certain unit number. If I try to add the device manually or perform a 'Send Who Is', the controller cannot be discovered.

SOLUTION:

- The Max Master value in the **NB-Link** and/or your controllers is set to a number lower than the unit ID number of the device you are trying to discover. It is recommended that you assign all unit ID numbers to controllers on the MSTP network and then set Max Master to be just higher than the last assigned unit ID.

PROBLEM: When I attempt to open my capture file offline, I receive a message from Windows stating that I need to select a program to open it with. What program can I use to edit capture files?

SOLUTION:

- Any standard text editor program can open the .cap file format that **NB-Pro** generated when saving a capture file.

SECTION 8 : APPENDIX E: GLOSSARY

10BASET, 10BASE2, 10BASEF, 100BASET

See Ethernet.

American National Standards Institute (ANSI)

Founded in 1918, ANSI is administrator and coordinator of the United States private sector voluntary standardization system. ANSI facilitates development of American National Standards, such as BACnet, by establishing consensus among qualified groups. The Institute ensures that its guiding principles-consensus, due process and openness-are followed by the more than 175 distinct entities that it accredits (organizations, committees, and canvasses).

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

An organization with chapters throughout the world, ASHRAE advances the arts and sciences of heating, ventilation, air conditioning, and refrigeration for the public's benefit through research, standards writing, continuing education, and publications. Through its membership, ASHRAE writes standards that set uniform methods of testing and rating equipment and establish accepted practices for the industry worldwide.

ARCNET

Short for Attached Resources Computer NETwork (ANSI/ATA 878.1). ARCNET is one of the oldest, simplest, and least expensive types of local area network (LAN). Datapoint Corporation introduced ARCNET in 1968. It uses a token-ring architecture, supports data rates up to 2.5 Mbps, connects up to 255 devices, and runs on a variety of media, including twisted-pair, coaxial cable, and fiber-optic cable.

BACnet®

Short for the Building Automation and Control networking protocol (ANSI/ASHRAE Standard 135-1995). BACnet is a non-proprietary communication protocol standard conceived by a consortium of building managers, system users, and manufacturers under the auspices of ASHRAE.

BACnet Interest Group (BIG)

Associations formed by BACnet users for the benefit of BACnet users. BIGs enable individuals to exchange information and share experiences about the implementation and application of BACnet. Many BACnet Interest Groups have formed around the world to support BACnet users. There is BIG-NA, North America (www.big-na.org); BIG-EU, Europe (www.big-eu.org), and BIG-AA, AustralAsia (www.big-aa.org).

BACnet Interoperability Building Blocks (BIBBS)

Collections of one or more BACnet services that function to define the interoperational capabilities of a BACnet device. Certain BIBBs may also be predicated on the support of certain, otherwise optional, BACnet objects or properties. BIBBs may also constrain allowable values of specific properties or service parameters.

BACnet Manufacturers Association™ (BMA)

An organization of companies that design, market, and install BACnet-based building automation products.

BACnet Testing Laboratories™ (BTL)

The BACnet Manufacturers Association formed the BACnet Testing Laboratories to test building automation products and certify them as BACnet compliant.

Bridge

A device that connects two LANs or two segments of the same LAN. The LANs can be alike or different. A bridge can connect an Ethernet and token-ring network, for example. Unlike routers, bridges are protocol independent. They forward messages without analyzing or rerouting them.

Client/Server

Occasionally called a two-tier architecture. Clients rely on servers for resources, such as files, devices, and processing power. Servers are usually more powerful computers or processors.

Coaxial Cable

A round, flexible, two-conductor cable that consists of a copper wire (at the center), a layer of protective insulation, a braided mesh sleeve, and an outer shield, or jacket. Coaxial cable is used in 10Base2 Ethernet applications and in some ARCNET applications.

Conformance Class

Like BIBBs, conformance classes provide a method of describing various capabilities of a device for communicating data and interoperating with other BACnet devices. A device's protocol implementation conformance statement (PICS) details its conformance class.

Device, BACnet

Any equipment that supports digital communication using the BACnet protocol.

Ethernet

The IEEE 802.3 standard for contention networks. Ethernet is one of the most widely implemented LAN standards in the world. It is based on a local area network (LAN) protocol developed by Xerox Corporation in cooperation with DEC and Intel in 1976. Ethernet networks have a bus or star topology, provide for baseband data transmission at 10 Mbps, and use a variety of physical media: twisted pair (10BaseT), fiber-optic cabling (10BaseF) and coaxial cable (10Base2). To regulate communications on the network, Ethernet uses a form of access known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD). The Ethernet standard continues to develop and evolve, with the emergence of 100BaseT (or Fast Ethernet, which operates at 100 Mbps) and Gigabit Ethernet (IEEE 802.3z, which operates at 1000 Mbps, or 1 Gbps).

Extranet

An intranet that is partially accessible, with restricted access, to authorized outsiders. You can access an extranet only if you have a valid username and password. Your identity determines which parts of the extranet you can view.

Fiber Optics

Optical technology that transmits data using radiant light through fibers made of transparent materials such as glass, fused (vitreous) silica, or plastic. Fiber-optic cable can transmit signals at speeds up to 2 Gbps and is immune to eavesdropping and electromagnetic interference. Fiber-optic systems are either single-mode or multimode. Multimode is most often encountered in site LAN applications, while single-mode is mostly employed by Telcos.

Firewall

A security mechanism, or combination of mechanisms, designed for network access control and authentication. Firewalls detect and prevent unauthorized or unwanted traffic from a protected network. Mechanisms, functions, configurations, and effectiveness of firewalls vary widely.

Gateway

In networking, a device (usually a combination of software and hardware) that connects networks using different communication protocols so that information can be passed from devices on one network to the other.

Half-router

In BACnet, a device that can participate as one partner in a point-to-point (PTP) connection. Two half-routers form an active PTP connection and act as a single router.

Hub

A common connection point for nodes on a network. Hubs connect segments of a LAN and contain multiple ports. When a packet (message) arrives at one port, it is copied to all other ports. A passive hub is simply a conduit for data, much like a repeater. An intelligent hub (also called a manageable hub) offers features that enable an administrator to monitor traffic and configure ports.

Instance

In BACnet, a number that uniquely identifies an object within a device or a device on an internetwork.

Internetwork

A network made up of smaller, interconnected networks. Internetwork often refers to communication between one LAN and another over the Internet or another wide-area network (WAN).

Intranet

A network based on TCP/IP (an Internet) belonging to an organization and accessible only to members of that organization. Intranets appear just as any other web site, but are surrounded by a firewall that fends off unauthorized access.

IP

Acronym for Internet Protocol. IP handles the breaking up of data messages into packets (also called datagrams), the routing of the packets from their origin to the destination network and node, and the reassembling of the packets into the data message at the destination. IP operates at the internetwork layer of the TCP/IP model, which is equivalent to the network layer of the ISO/OSI reference model.

ISO/OSI Reference Model

Short for International Standards Organization Open Systems Interconnection reference model. The model is the foundation of most network standards. It breaks down network communications into seven manageable, conceptual levels, each concerned with a specific aspect of network communications. The seven layers are Application, Presentation, Session, Transport, Network, Data Link, and Physical.

LAN

Acronym for Local Area Network. A distance-limited network for transferring data between computers or other digital devices. BACnet supports four types of LANs-Ethernet, ARCNET, MS/TP, and LonTalk.

LONTALK®

One of the LAN types BACnet devices may use. Like Ethernet and ARCNET, LonTalk uses a chipset for communications. However, unlike these network types, special development environments and tools available only from the Echelon Corporation are required to develop applications and nodes for it. LonTalk, like the other LAN types, is simply used to transmit BACnet messages from one device to another. LonTalk is often confused with LonMark and LonWorks, and all are often confused as being BACnet-compliant. An Ethernet device is not BACnet-compliant simply by virtue of using Ethernet, nor is a LonWorks or LonMark device BACnet-compliant simply by virtue of using LonTalk. LonMark products are not BACnet-compliant and require a gateway to interoperate.

Media Access Control (MAC)

The part of a network that handles access to the physical network (media). In BACnet, each device has a unique MAC Address/Network Number combination that identifies it on the BACnet internetwork.

Metropolitan Area Network (MAN)

A data network designed for a town or city. In terms of geographic size, MANs are larger than LANs, but smaller than WANs. MANs usually employ high-speed fiber-optic cabling and public networks.

MS/TP LAN

Acronym for Master-Slave/Token Passing Local Area Network, a LAN developed by the BACnet committee specifically for use on BACnet. MS/TP is a twisted-pair LAN based on the Electronic Industries Association (EIA) RS-485 signaling standard. It uses a token passing scheme for network communications. To initiate communications on the network, a node must have an electronic "token" (actually a small packet), which is passed from one node to another around the network. Master devices are allowed to have the token, whereas slaves are allowed only to respond to requests from masters.

National Institute of Standards and Technology (NIST)

An agency of the U.S. Department of Commerce's Technology Administration. The NIST charter is to strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements, and standards. NIST has played an integral role in the development of BACnet.

Network

A group of devices (computers, controllers, or other digital units) that are connected by communication facilities, such as twisted-pair cabling, coaxial cable, fiber-optic cable, or wireless means.

Network Interface Card (NIC)

Also called a network adapter, network card or expansion card. A device that connects a computer or other device to a LAN. For computers, the NIC is usually installed in an expansion slot and has a chip that handles the physical and data-link layers of network communications.

Node

A device (such as a computer or a controller) on a network that is capable of communicating with other network devices.

Objects, Object Model

Representing data in a defined data structures called objects. Each object has a set of properties and a group of functions that can be applied to them. BACnet defines objects to represent control system data. BACnet objects can represent information about a physical input or output, a file or a logical grouping of data that performs some function (a setpoint or schedule, for example). By prescribing an object-model method to represent all control system data, BACnet facilitates interoperability and extensibility.

Peer-to-Peer

A type of network in which each node has equivalent capabilities and responsibilities.

Point-to-Point (PTP)

A method of data transmission developed by the BACnet committee to provide serial communications between BACnet devices. Typically used for remote and roaming access to BACnet systems-dial-up communications over modems or a portable computer connection to a controller, for example.

Property

In object-oriented systems, a characteristic or parameter of an object. Properties of a file object in BACnet, for example, may include file size, type, and modification date. In BACnet, certain properties of an object may be required, while others may be optional.

Protocol Implementation Conformance Statement (PICS)

A document that details the particular BACnet objects, services, and capabilities supported by a type of BACnet device. Every BACnet-compliant device has an associated PICS published by the manufacturer.

Repeater

A network device that regenerates or replicates a signal. Repeaters are used in transmission systems to regenerate analog or digital signals distorted by transmission loss. A hub can operate as a repeater by relaying messages to all connected computers. A repeater cannot perform the intelligent routing performed by bridges and routers.

Router

A device that connects two LANs. Routers are similar to bridges, but provide additional functions, such as message filtering and forwarding based on various criteria.

Services, BACnet

Services control the transfer of information such as scheduled commands and alarms between BACnet devices. The services provided by a BACnet device are generally described by the device's Conformance Class and detailed in its PICS.

Switching Hub (SWITCH)

In networking, a special type of hub that forwards packets to the appropriate port based on the packet's address. Switching hubs offer better performance than conventional hubs. Most switching hubs also support load balancing, which dynamically reassigns ports to LAN segments based on traffic patterns.

TCP/IP

Acronym for Transmission Control Protocol/Internet Protocol. TCP/IP is the de facto protocol standard used by the Internet. Whereas IP deals only with packet transmission, TCP enables two hosts to establish a connection and exchange streams of data. TCP handles delivery and order of data streams.

Wide Area Network (WAN)

A geographically widespread network, usually comprising one or more LANs. WANs are often connected through public networks, leased lines, and satellite or microwave communications.



AMERICAN AUTO-MATRIX
ONE TECHNOLOGY LANE
EXPORT, PA 15632
(877) AAM-HVAC [P]
(724) 327-6124 [F]

CYLON ENERGY INC.
8025 SOUTH WILLIAM STREET,
SUITE 107,
MANCHESTER, NH 03103
T + 603-782-8870

WWW.AAMATRIX.COM