

Nexus Communicator 2.0

SOFTWARE FOR WINDOWS®

User Manual
Revision 1.22

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Electro Industries/GaugeTech

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“The Leader in Web Accessed Power Monitoring and Control”

**Nexus Communicator
User Manual
Revision 1.22**

Published by:
Electro Industries/GaugeTech
1800 Shames Drive
Westbury, NY 11590

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Customer support is available 9:00 am to 4:30 pm, eastern standard time, Monday through Friday. Please have the model, serial number and a detailed problem description available. If the problem concerns a particular reading, please have all meter readings available. When returning any merchandise to EIG, a return authorization number is required. For customer or technical assistance, repair or calibration, phone 516-334-0870 or fax 516-338-4741.

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Our instruments are inspected and tested in accordance with specifications published by Electro Industries/GaugeTech. The accuracy and a calibration of our instruments are traceable to the National Institute of Standards and Technology through equipment that is calibrated at planned intervals by comparison to certified standards.

Disclaimer

The information presented in this publication has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. The information contained in this document is subject to change without notice.

About Electro Industries/GaugeTech

Electro Industries/GaugeTech was founded in 1973 by Dr. Samuel Kagan. Dr. Kagan's first innovation, an affordable, easy-to-use AC power meter, revolutionized the power-monitoring field. In the 1980s Dr. Kagan and his team at EIG developed a digital multifunction monitor capable of measuring every aspect of power.

EIG further transformed AC power metering and power distribution with the Futura+ device, which supplies all the functionality of a fault recorder, an event recorder and a data logger in one single meter. Today, with the Nexus 1270 transformer-rated, polyphase meter, EIG is a leader in the development and production of power-monitoring products. All EIG products are designed, manufactured, tested and calibrated at our facility in Westbury, New York.

Products

EIG product applications include:

- Multifunction power monitoring
- Single and multifunction power monitoring
- Power-quality monitoring
- Onboard data logging for trending power usage and quality
- Disturbance analysis

Futura+ Series

- Power-quality monitoring
- High-accuracy AC metering
- Onboard data logging
- Onboard fault and voltage recording

DM Series

- Three-phase multifunction monitoring
- Wattage, VAR and amperage
- Modbus, Modbus Plus, DNP 3.0 and Ethernet protocols
- Analog retransmit signals (0–1 and 4–20mA)

Single-Function Meters

- AC voltage and amperage
- DC voltage and amperage
- AC wattage
- Single-phase monitoring with maximum and minimum demands
- Transducer readouts

Portable Analyzers

- Power-quality analysis
- Energy analysis

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Glossary

Introduction to Nexus Communicator

Nexus Communicator for Windows® is an integral part of the Nexus System. Use it to custom configure Nexus 1270 meters, multiple Nexus 1250 meters and Futura+ monitors at local or remote sites and retrieve data from them for analysis. Data is available as Instantaneous Polled Readings, Logs, Waveform Captures, XY Graphs and Circular Graphs. Other components of the the Nexus System include the Nexus External Display and the Nexus External I/O Modules.

■ The following is an outline for using Nexus Communicator:

1. **Install** Nexus Communicator software on your computer (Chapter 1);
2. **Connect** your computer to one or more Nexus Monitors (Chapter 2);
3. **Configure** the Nexus Monitor(s) (Chapter 3 - Nexus 1250) (Chapter 4 - 1270);
4. **Configure, retrieve and view data** from the Futura+ Monitor (Chapter 5);
5. **Retrieve and view data** from the Nexus Monitor(s) (Chapters 6, 7 and 9);
6. **EIG Script and Scheduler Program** for Automated Data Retrieval and Processing (Chapter 13).

NOTE: See the Table of Contents for specific topics.

Chapter 1

Installing Nexus Communicator

1.1: System Requirements

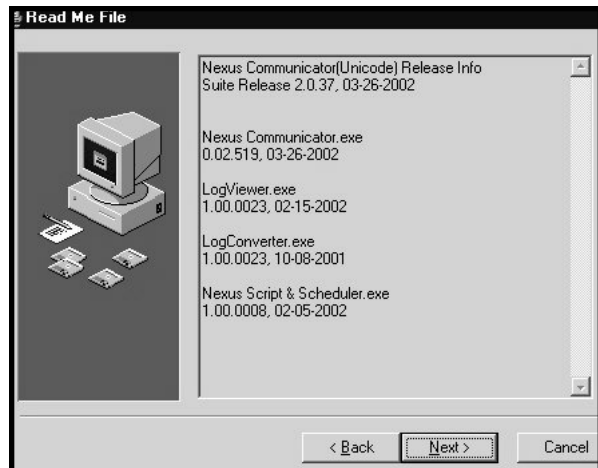
- IBM-PC Compatible, Pentium 200MHz or better
- Windows® 98 with Service Pack 1 or Release 2; NT 4 with Service Pack 5; Windows® 2000 with at least Service Pack 1
- 32 MB RAM
- X VGA Card and Monitor with 1024x768 and 65k colors
- Available RS-232 Serial Port

1.2: Installing Nexus Communicator Software

1. Start Windows®. Insert the Nexus Communicator CD into your computer's CD drive.

2. Double-click on the Nexus Communicator Setup.exe icon and follow the on-screen instructions. Nexus Communicator and Log Viewer will be installed on your computer. The Read Me File (shown here) provides Version Numbers and Dates for the Nexus Communicator Setup and the component files.

To continue the Setup, select "Next". To cancel the Setup, select "Cancel".

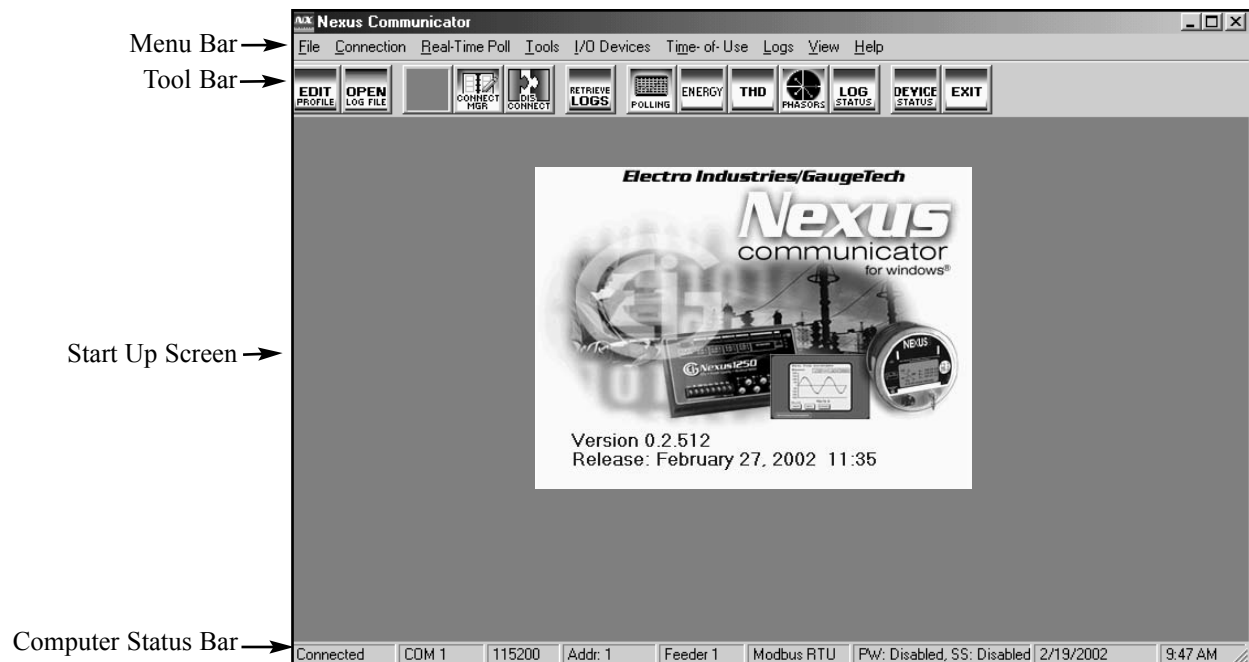


3. When the installation is complete, run Nexus Communicator from the Windows® Start menu.

❖ **Note:** If necessary, Setup will update your computer's Windows® files to make them compatible with Nexus Communicator. After the Windows® files have been updated, Nexus Communicator must sometimes be installed a second time. Screen messages will guide you through this process.

1.3: Nexus Communicator Basic Screen Elements

- **Start up Screen:** Displays the version number of the Nexus Communicator software. To view a similar screen at any time, select Help, About Nexus Communicator. An additional button, System Info, provides Microsoft system information, if selected. Or, click OK to exit the screen.
- **Menu Bar:** Accesses all Nexus Communicator commands and screens.
- **Computer Status Bar:** Displays communication information about the **computer**—not the Nexus Monitor connected to it. Enable or disable the Status Bar from the View menu.



■ Menu Bar Icons:

Access to all Nexus Communicator features.



Edit Profile:

Retrieves the Device Profile from the currently connected Nexus Monitor. Same as selecting Tools, Edit Current Device Profile. Use to configure the Nexus Monitor. See Chapter 3.



Open:

Opens a previously stored Nexus Log File. Same as selecting File, Open, Nexus Log File. See Chapter 5.



Connect:

Establishes communication between the computer and one directly connected Nexus Monitor. Same as selecting Connection, Quick Connect. See Chapter 2.



Connection Manager:

Establishes communication between the computer and multiple Nexus Monitors at local or remote sites. Same as selecting Connection, Connection Manager. See Chapter 2.

**Disconnect:**

Terminates the connection between the computer and the currently connected Nexus Monitor(s). Same as selecting Connection, Disconnect. See Chapter 2.

**Retrieve Logs:**

Downloads logs from the currently connected Nexus Monitor to the computer. Same as selecting Logs, Retrieve Log(s) from Device. See Chapter 5.

**Polling:**

Displays instantaneous polling data from the currently connected Nexus Monitor. Same as selecting Real-Time Poll, Instantaneous Polling. See Chapter 4.

**Energy:**

Displays Power and Energy readings from the currently connected Nexus monitor.

**THD:**

Displays 128 Magnitude and Angle readings for Volts and Current values. Spectrum presents selected Magnitude in bar graph. Waveform combines Magnitudes and Angles in a graph.

**Phasors:**

Displays three-phase phasor diagram and data from the currently connected Nexus Monitor. Same as Real-Time Poll, Phasors. See Chapter 4.

**Log Status:**

Displays logging statistics for the currently connected Nexus Monitor. Same as selecting Logs, Statistics. See Chapter 5.

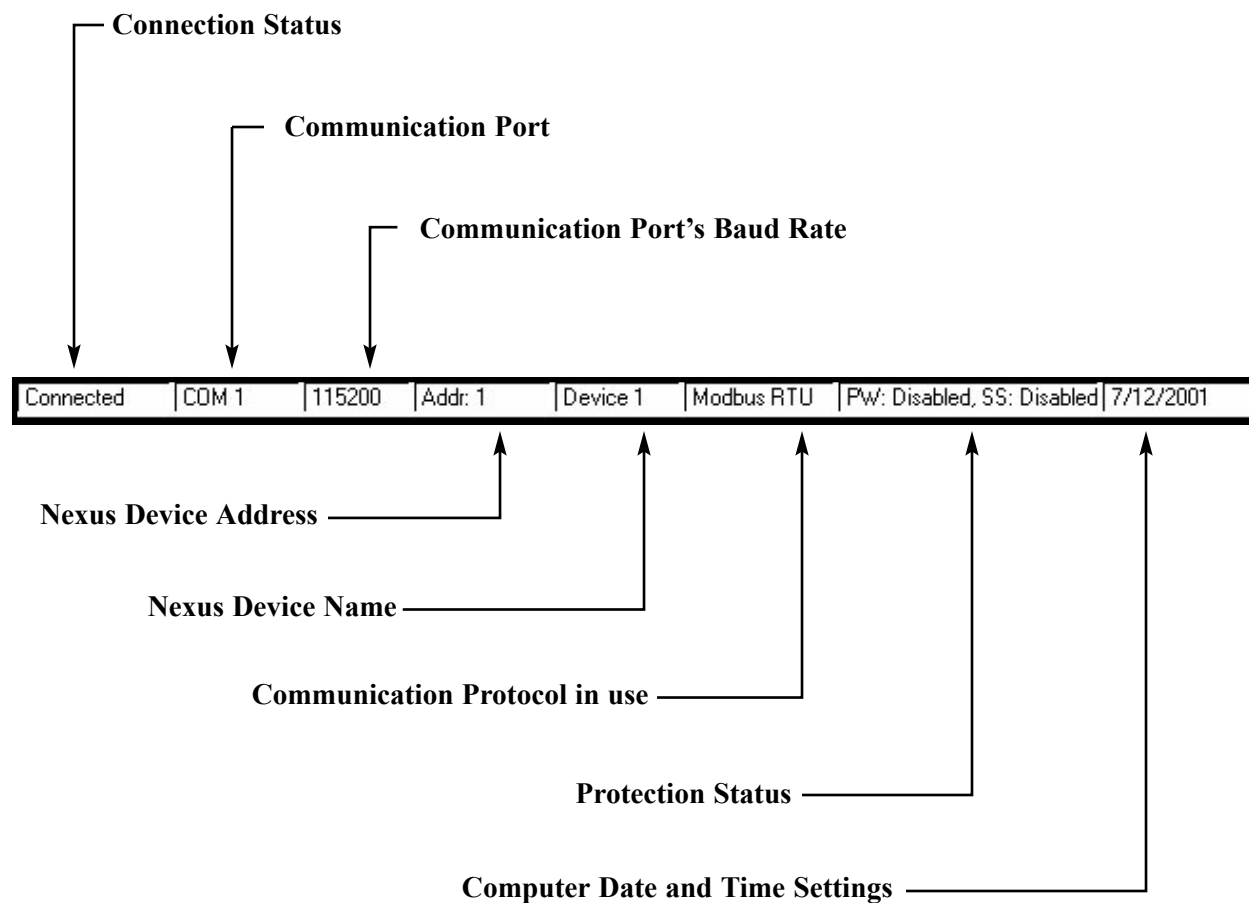
**Device Status:**

Displays list of the currently connected Nexus Monitor(s). Same as selecting Tools, Device Status. See Chapter 2.

**Exit:**

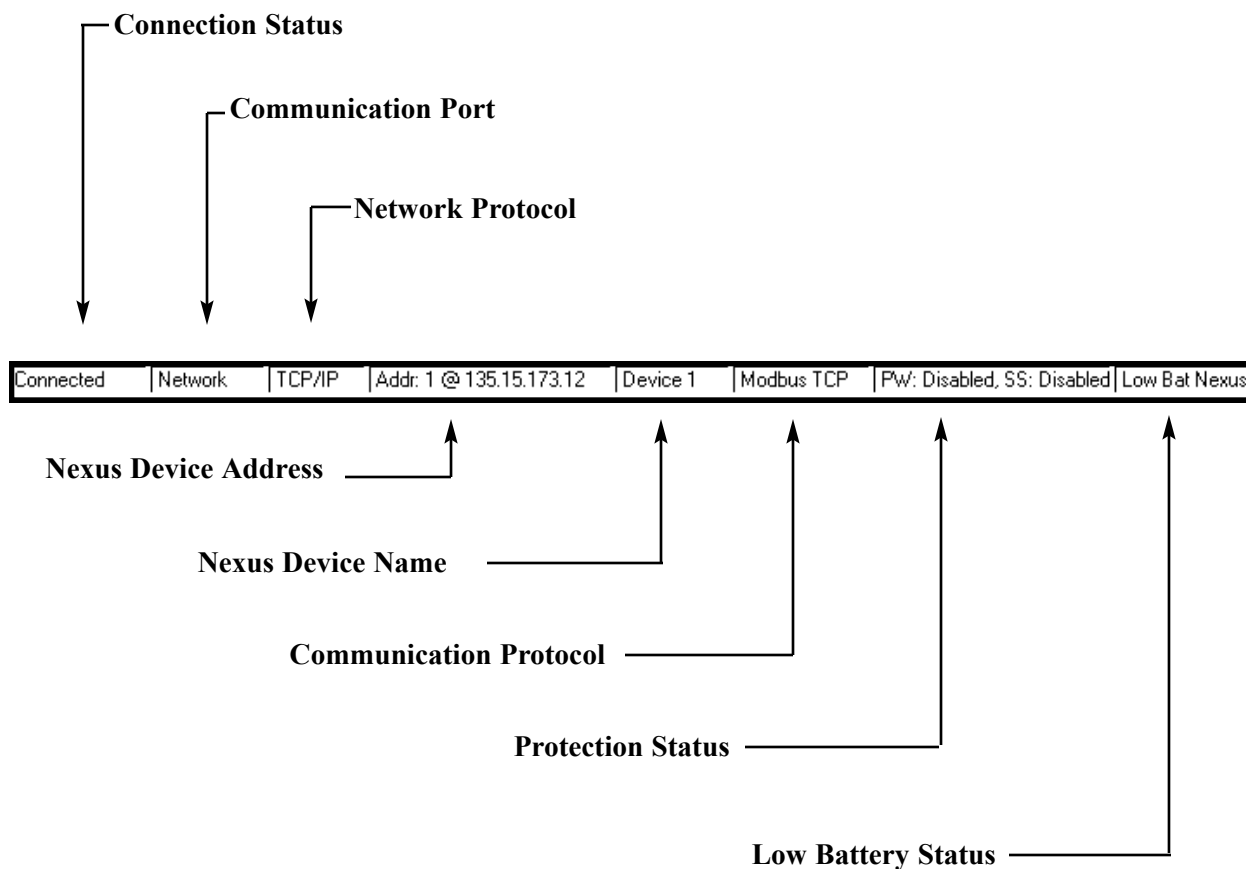
Terminates the Nexus Communicator program. Same as selecting File, Exit.

■ **Computer Status Bar - When using Serial Port or Modem Connection to the Nexus Monitor.**



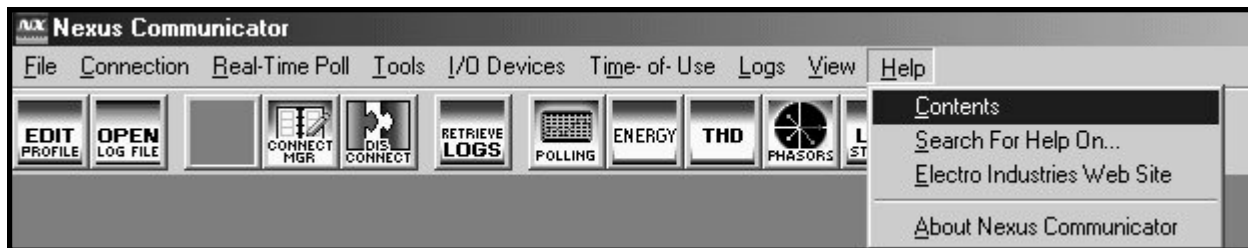
- **Connection Status:** displays either “Connected”, “Disconnected” or “Not Found”.
- **Communication Port:** displays the computer port currently in use for the connection.
- **Baud Rate:** displays the baud rate of the computer’s communication port.
- **Device Address:** displays the address of the connected Nexus device.
- **Device Name:** displays the name of the connected Nexus device.
- **Communication Protocol:** displays the communication protocol currently in use.
- **Date and Time:** displays the computer’s current date and time.
- **Protection Status:** displays whether the password protection feature is enabled or disabled.

■ **Computer Status Bar - When using Network Connection to the Nexus Monitor.**



- **Connection Status:** displays either “Connected”, “Disconnected” or “Not Found”.
- **Communication Port:** displays the computer port currently in use for the connection.
- **Network Protocol:** displays the protocol for communication to the network.
- **Device Address:** displays the address of the connected Nexus device.
- **Device Name:** displays the name of the connected Nexus device.
- **Communication Protocol:** displays the protocol used for communication to other devices.
- **Protection Status:** displays whether the password protection feature is enabled or disabled.
- **Low Battery Status:** displays the Nexus 1270’s Low Battery Status, if the Nexus has a battery and only if the battery is low.

1.4: Help



■ Help Menu:

Displayed above, it provides the following sources of information:

■ Contents:

Click on the Contents button to display the Help Files. Each screen has the following components:

File - Open: Browse for a file.

Print Topic: Print the displayed screen.

Exit: To exit.



Edit - Copy: Control + C

Annotate: Add information to the page. Paperclip symbol at upper left of screen.

Click on paperclip to view annotation. Save, Cancel and Copy/Paste Buttons.

Bookmark: Create a bookmark.

Options

Keep Help on Top

Display History Window: Help history.

Font: Small, Normal or Large.

Use System Colors: Must Restart to make this change.

Index: Index/ Find Tabs

Index: Type the first few letters of term or click on an entry in list of terms.

Find: Use the Find Setup Wizard to create list.

Back: Click to go to a previous screen.

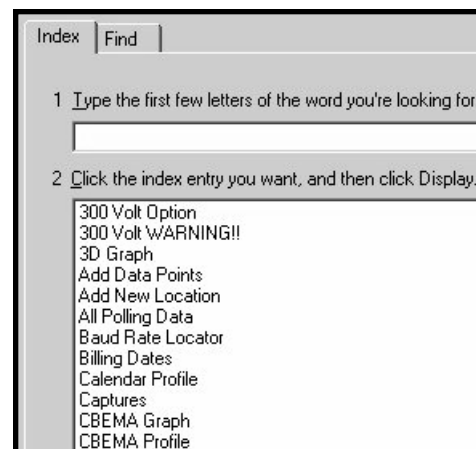
Print: Click to print current screen.

Glossary: Displays a glossary of technical terms.

■ Search for Help on: Index/Find Tabs.

■ Electro Industries Web Site: Link to Web Site.

■ About Nexus Communicator: Screen displays software version number and Microsoft® systems information. It is similar to the Start Up screen in section 1.3.



Chapter 2

Connecting to the Nexus Monitor

2.1: Overview

- There are six ways to connect to a Nexus Monitor:
 - RS-232 Direct Connect (section 2.2)
 - RS-485 Direct Connect (section 2.2)
 - RS-232 Modem Connect (section 2.3)
 - RS-485 Modem Connect (section 2.3)
 - RS-485 Internal Modem Option (section 2.4)
 - RS-485 Internal Network Option (section 2.6)
- **Direct Connections** made through Nexus Communicator must use either Modbus RTU or Modbus ASCII protocol. Modbus RTU is recommended.
- **Modem Connections** (Internal or External) made through Nexus Communicator **must use Modbus ASCII only**.
- **Network Connections** made through Nexus Communicator must use **Modbus TCP**.
- Section 2.5 details connecting to multiple Nexus Monitors on an RS-485 bus.
- Consult the *Nexus 1250 and 1270 Installation and Operation Manuals* for details on the hardware requirements of each configuration.
- ❖ **Note:** If you are using the **Connection Manager** to connect a PC to a Nexus, you may want to copy the Connection Manager Settings to other PCs. Simply copy the file **Cnexcom.mdb** from Computer A to Computer B using the same directory for source and destination. Use the following steps:
 1. Using the originate computer, go to the drive where the file is installed.
For example: C:\Program Files\Electro Industries\Nexus Communicator directory.
 2. Copy the file **Cnexcom.mdb** (this is the database containing the Connection Manager Settings).
 3. Replace the **Cnexcom.mdb** file on the destination computer with the copy from Step 2.

Make sure Nexus Communicator is not running on the destination computer when replacing the file.

2.2: RS-232, RS-485 and Network Connections

- This section details connecting directly to one Nexus device. See sections 2.3 and 2.4 for modem connections. To connect to multiple Nexus units on an RS-485 bus, see sections 2.4 and 2.5.

1. Insert an RS-232 cable into an available serial port on the computer.
 - **RS-232:** Insert the opposite end of the cable into the Nexus Monitor's RS-232 port (1250 - Port 1) (1270 - Optical Port). Set the selector switch on the 1250. See Chapter 6 of the *Nexus 1270 Installation and Operation Manual* for details on the special Optical Port connection.
 - **RS-485:** Insert the opposite end of the cable into the RS-232 port of an RS-232/RS-485 converter, such as EIG's Unicom 2500 (see the *Nexus Installation and Operation Manuals* for details). Use an RS-485 cable to connect the converter to any port on the Nexus 1250. If you use Port 1, set the selector switch beneath it to RS-485. For Nexus 1270, use Port 1 or Port 4.
2. Click the Connect button on the tool bar or select Connect, Quick Connect. The screen on the left, below, appears. If you click the Network button, the screen changes to the right example.

The 'Connect' dialog box has two tabs: 'Serial Port' (selected) and 'Network'. Under 'Serial Port', the fields are: 'Device Address' with value '1', 'Baud Rate' with a dropdown showing '57600', 'Port' with a dropdown showing 'COM2', and 'Protocol' with a dropdown showing 'Modbus RTU'. At the bottom are 'Connect', 'Cancel', and 'Help' buttons.

The 'Connect' dialog box has two tabs: 'Serial Port' and 'Network' (selected). Under 'Network', the fields are: 'Device Address' with value '1', 'Host' with value '135.15.173.99', 'Network Port' with value '502', and 'Protocol' with a dropdown showing 'Modbus TCP'. At the bottom are 'Connect', 'Cancel', and 'Help' buttons.

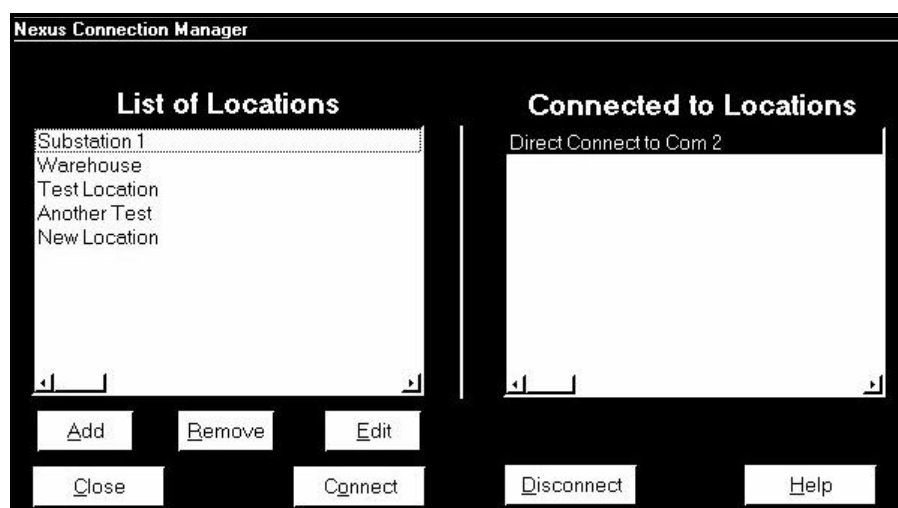
3. Enter settings for **Serial Port Connection**:
 - In the **Device Address** field, enter the address of the Nexus device's port to which the computer is connected. All Nexus units are shipped programmed with the following pre-set addresses and baud rates:
 - Port 1: Address 1, 57600 baud (first time connection, leave Address set at 1)
 - Port 2: Address 1, 57600 baud
 - Port 3: Address 1, 9600 baud (for Nexus External Display)(may be used for I/O Modules)
 - Port 4: Address 1, 57600 baud, Master/Slave (for Nexus External I/O Modules)
- ❖ **Note:** You may use a connected Nexus External Display to view the baud rate, address and communication protocol of each port. See the *Nexus 1250 Installation and Operation Manual* for details. See Chapter 3 for details of how to configure the Nexus Monitor's communication ports.

- In the **Baud Rate** field, enter a baud rate that **matches** the baud rate of the Nexus device's port to which your computer is connected. The port's baud rate, address and protocol must **always** match the baud rate, address and protocol of the computer. See Pre-set Addresses above.
 - In the **Serial Port** field, enter the computer's communication port into which the RS-232 cable is inserted. Most computers use Com 1 or Com 2 for the serial port.
 - In the **Protocol** field, enter the type of communication the Nexus Monitor port is using. Direct Connections made through Nexus Communicator must use either Modbus RTU or Modbus ASCII. Modbus RTU is recommended. All Nexus Monitor port defaults are Modbus RTU and the monitors are shipped set to Modbus RTU.
- ❖ **Example:** in the sample screen above, the computer's Com Port 2 has been set to operate at 57600 baud, using Modbus RTU to communicate with a Nexus Monitor port located at address 1. The baud rate, address and protocol set for the computer's Com Port 2 match those of the Nexus Monitor port.
- If the connection failed, make sure an approved Category 5 Cable is connected to the Network Jack and that the Link Light on the Nexus Device is illuminated.
4. Enter settings for **Network Connection:** (see your **Network Administrator** for correct settings!)
 - In the **Device Address** field, enter 1.
 - In the **Host** field, enter an IP Address or a Registered Name (see your Network Administrator).
 - In the **Network Port and Protocol** fields, the example settings are probably correct. Check with your Network Administrator to be sure.
 5. Click Connect. Nexus Communicator locates the Nexus Monitor and the Device Status screen appears, confirming the connection. (See section 2.8 for details).
 6. Click OK. The computer is now connected to the Nexus Monitor.
 7. The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters. Status Bars will differ slightly for the two connections.
- ❖ **Note:** You may use a connected Nexus External Display to view the baud rate, address and communication protocol of each port. See Chapter 3 for details of how to configure the Nexus Monitor's communication ports.
- ❖ **Note:** For details on Network Hardware Connections, refer to the Network sections of the *Nexus 1250 and 1270 Installation and Operation Manuals*.

2.3: RS-232 and RS-485 Modem Connections

■ MODEM CONNECTIONS REQUIRE MODBUS ASCII PROTOCOL.

1. The Nexus Monitor communication port that you will use for the modem connection must be configured to speak/listen to **Modbus ASCII** and operate at **9600 baud or match the speed of the remote modem**. (Modbus RTU does not support modem communication. If you use Modbus RTU to communicate with a modem, it will fail or be unreliable.) To set the configuration, you must:
 - First establish a direct RS-232 or RS-485 connection to the Nexus Monitor (see section 2.2).
 - After you have established a direct connection, refer to Chapters 3 (1250) and 4 (1270) for details on how to configure the Nexus Monitor's communication ports. Set the port to Modbus ASCII at 9600 baud. (If you are connecting to multiple Nexus Monitors on a bus, you must also assign a unique address to each Monitor; see section 2.5.)
2. Install the modem connected to the computer (the "originate modem") and the modem connected to the Nexus Monitor (the "remote modem"). See the *Nexus 1250 and 1270 Installation and Operation Manuals* for details on the hardware requirements. At the remote site:
 - EIG recommends using RS-485 communication with a Modem Manager. Set both the originate and the remote modem to operate at 9600 baud; enable Hardware Flow Control for both. If you are using a Modem Manager, you can set the baud rate for the Nexus higher (up to 38400). Generally, it will provide reliable communication.
 - If you are using RS-232 communication **without** a Modem Manager, set both modems to operate at 9600 baud; disable Flow Control for both.
3. Click on the Connection Manager icon, or select Connection, Connection Manager. The following screen appears: (To copy the Connection Manager Settings to other PCs, see Note on page 2-1.)



4. Select the "New Location" listing in the Locations Field.

- Click on the Edit button. The Location Editor screen appears, displaying the **computer's** communications settings:

Connection Manager Location Editor

Location Name: Modem Card

Serial Port (selected) | Network

Com Port: COM1
 Baud Rate: 57600
 Flow Control: Hardware
 Data Bits: 8 | Parity: None

☒ Use Modem | ☒ Use Password
 Phone Number: 102
 Setup String:
 Password: password

☒ Use Data Switch String(s)
 Connect: .,%%%,PTnn
 Disconnect:

Devices At Location

Add Remove Edit

Device Address	Device Name	Description
1	Device 1	Device 1
2	Device 2	Device 2
3	Device 3	Device 3
4	Device 4	Device 4

Close Help

- Enter a **Location Name** in the field at the top of the screen.
- In the **Com Port** field, enter the **computer's** communication port that is connected to the computer's modem (the originate modem).
- In the **Baud Rate** field, enter a baud rate for the computer's modem that will **match** the baud rate of the remote modem and the Nexus Monitor port.
- In the **Flow Control** field, select the originate modem's configuration.
- Leave the **Data Bits** field at 8 for Modbus ASCII. Other protocols may require a different setting.
- Leave the **Parity** field at None for Modbus ASCII. Other protocols may require a different setting.
- Click the **Use Modem** box.
- Enter the phone number of the remote modem.
- Enter a setup string in the Setup String field, if the originate modem has been used for another program and needs to be reset.
- Use the Data Switch section to send any Data Switch Strings to the remote modem. The typical Data Switch String from Nexus to the Substation Multiplexor to a PC: „%%%,PTnn

Check with the manual of the device you are using to create the Data Switch String appropriate for the device. Typical characters used at Electro Industries include:

,	(pause one second)
%%%	(escape sequence <i>or</i> switch to command mode)
PTnn	(command) (number 01-16)
Enter	(<CR> ASCII character 13)

- Click on the Add button in the Devices at Location section to add Nexus Monitors to this location.
- Select the new device and click on the edit button to edit its location information. The Location Device Editor screen appears, displaying the **Nexus Monitor's** communications settings.

Connection Manager Location Device Editor

Device Properties

Address: 1

Name: Device 1

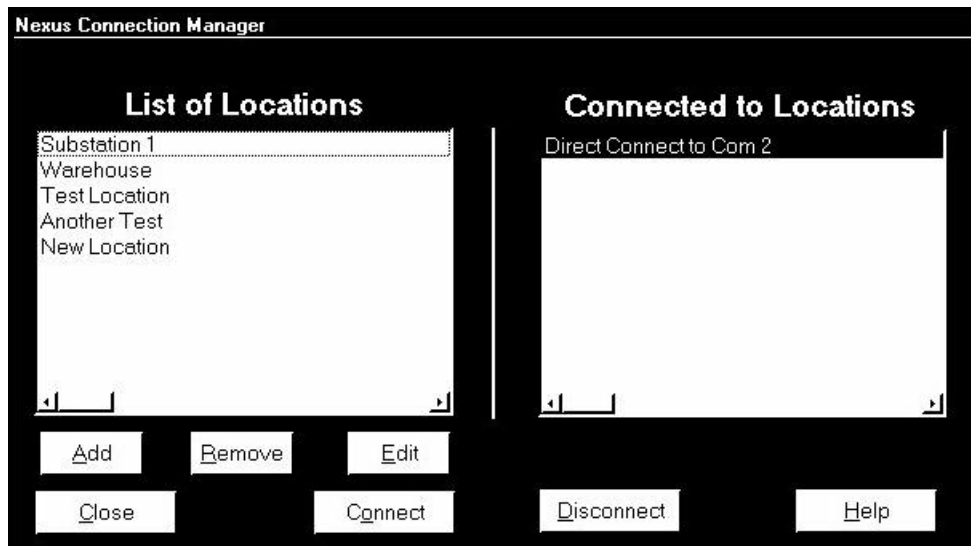
Description: Device 1

Protocol: Modbus ASCII

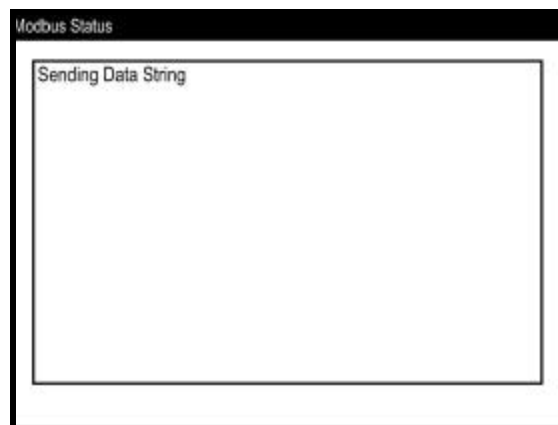
Device Type: NEXUS

Close Help

- In the **Device Address** field, enter the address assigned the Nexus Monitor port you will use for this connection. If you are connecting to multiple Nexus Monitors, each one should have a unique address; see section 2.5.
 - In the **Name field**, enter a name for the device that will differentiate it from any others at the location.
 - IN THE **PROTOCOL FIELD**, SELECT **MODBUS ASCII**. Be sure the port has been previously set to Modbus ASCII, as detailed in step 1.
 - Leave the **Device Type** field set to Nexus.
 - Click on the **Close** button when all information is entered.
- If you are connecting to multiple Nexus Monitors at this location, repeat the above process for all Nexus Monitors that are on the bus. Each Nexus device **MUST** have a unique address. To remove devices, select and click Remove. Click on the close button when you have finished adding or removing devices. The first Connection Manager screen returns.



9. To add additional locations, click on the Add Button. To remove locations, select and click Remove.
10. Click once on the location to which you would like to connect your computer. You may only connect to one location at a time. To change to a different location, you must first disconnect from the current location by clicking on the Disconnect button or by selecting Disconnect from the Connection menu.
11. Click Connect. The computer begins dialing:



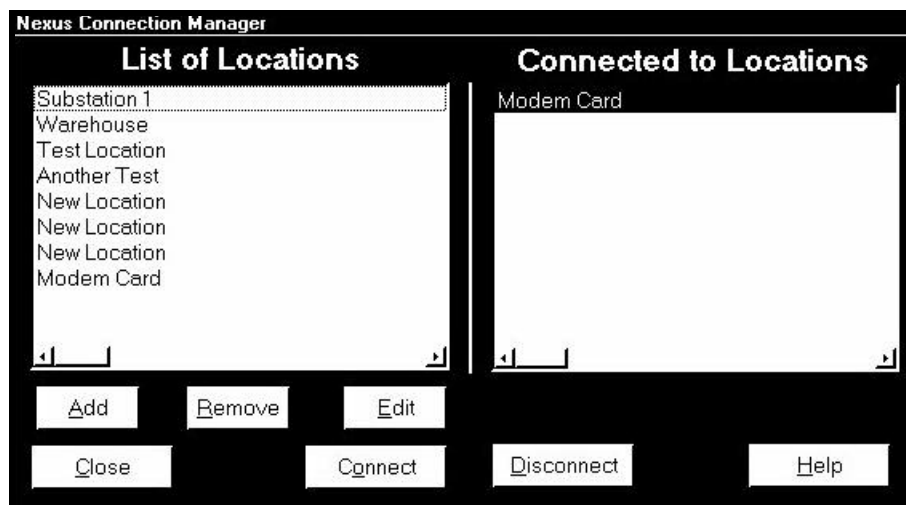
12. When Nexus Communicator has located the Nexus Monitor(s) at the location, the Device Status screen appears, confirming the connection (see section 2.8 for details). The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.
- If the connection failed, check that all cables are secure; that the RS-232 cable is connected to the correct Com Port on the computer; that the computer and the Nexus device(s) is set at 9600 baud using Modbus ASCII.

2.4: RS-485 Internal Modem Option Connection

■ INTERNAL MODEM OPTION CONNECTION REQUIRES MODBUS ASCII PROTOCOL.

The Nexus Monitor offers an Internal Modem Option, which eliminates all the modem hardware and cable that used to be required for a modem connection. A modem connection is now as easy as plugging in a phone. Simply install the modem connected to the computer (the originate modem) and add a phone line. The Nexus must be configured to speak **Modbus ASCII**. (Modbus RTU does not support modem communication. If you use Modbus RTU to communicate with a modem, it will fail or be unreliable.) The Internal Modem Option may operate at a programmable baud rate up to 57600. We recommend a baud rate of **57600**. To set the configuration, you must:

1. Install the modem connected to the computer (the “originate modem”). See the *Nexus 1250 and 1270 Installation and Operation Manuals* for details on the hardware requirements.
 - Set the originate modem to operate at 57600 baud; enable Hardware Flow Control. See NOTE about Baud Rate in Step 5 below.
2. At the remote site, just plug a phone line into the Nexus. The address will be **1**. (If you are connecting to multiple Nexus units on a bus, you must also assign a unique address, other than **1**, to each unit; see section 2.5.)
3. Click on the Connection Manager icon, or select Connection, Connection Manager. The following screen appears: (To copy the Connection Manager Settings to other PCs, see Note on page 2-1.)



4. Select the “New Location” listing in the Locations Field.
5. Click on the Edit button. The Location Editor screen appears, displaying the **computer’s** communications settings:

Connection Manager Location Editor

Location Name: Modem Card

Serial Port (selected) | Network

Com Port: COM2
 Baud Rate: 57600
 Flow Control: Hardware
 Data Bits: 8 | Parity: None

☒ Use Modem | ☒ Use Password
 Phone Number: 102
 Setup String:
 Password: password

☒ Use Data Switch String(s)
 Connect: &F1
 Disconnect: &F1

Devices At Location

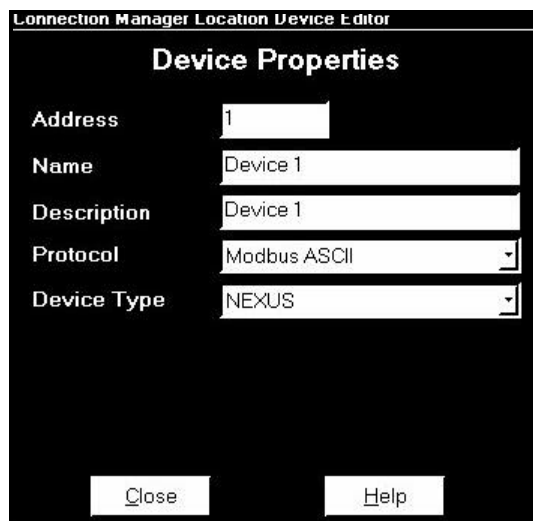
Add Remove Edit

Device Address	Device Name	Description
1	Device 1	Device 1
2	Device 2	Device 2
3	Device 3	Device 3
4	Device 4	Device 4

Close Help

- Enter a **Location Name** in the field at the top of the screen.
 - In the **Com Port** field, enter the **computer's** communication port that is connected to the computer's modem (the originate modem).
 - In the **Baud Rate** field, enter **57600 (recommended baud rate)** for internal modem connections). **NOTE:** For modems prior to **V.90**, use a lower baud rate. For example: 38400 for a 33.6k modem, 19200 for a 14.4k modem.
 - In the **Flow Control** field, select the originate modem's configuration.
 - Leave the **Data Bits** field at 8 for Modbus ASCII. Other protocols may require a different setting.
 - Leave the **Parity** field at None for Modbus ASCII. Other protocols may require a different setting.
 - Click the **Use Modem** box.
 - Enter the phone number for the location of the Internal Modem Option Nexus.
 - Enter a setup string in the Setup String field, if required. For U.S. Robotics modems, the data switch string is: **&F1** Or, check with the manual of the device you are using to create the Data Switch String appropriate for the device.
6. Click on the Add button in the Devices at Location section to add up to 31 additional Nexus units at that location. Use Port 2 of the Internal Modem Option Nexus to add additional units. Additional Nexus units must be configured to speak Modbus ASCII and set to the same baud rate as the Internal Modem Option Nexus. **NOTE:** Additonal units DO NOT have to be Internal Modem units.

7. Select the new device and click on the edit button to edit its location information. The Location Device Editor screen appears, displaying the **Nexus unit's** communications settings.



Connection Manager Location Device Editor

Device Properties

Address: 1

Name: Device 1

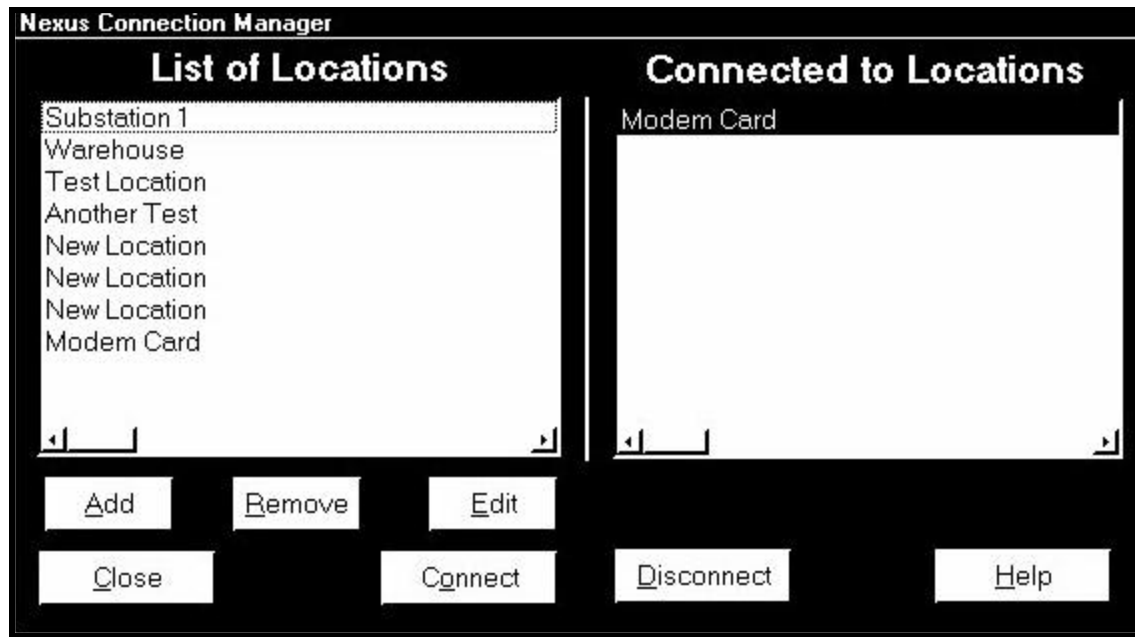
Description: Device 1

Protocol: Modbus ASCII

Device Type: NEXUS

Close Help

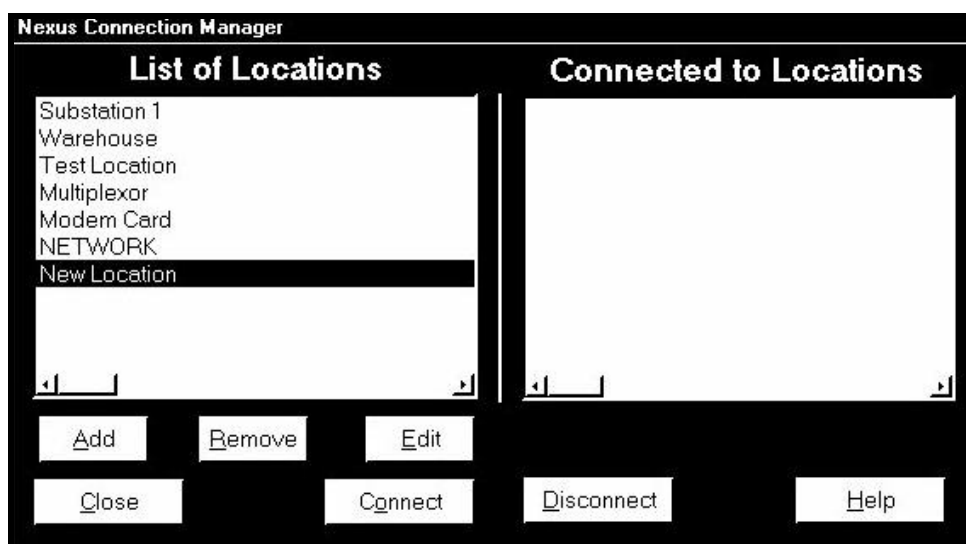
- In the **Device Address** field, enter the address assigned to the additional Nexus unit. Again, each unit **MUST** have a unique address other than **1**; see section 2.5.
 - In the **Name field**, enter a name for the device that will differentiate it from any others at that location.
 - **IN THE PROTOCOL FIELD, SELECT MODBUS ASCII.**
 - Leave the **Device Type** field set to Nexus.
 - Click on the **Close** button when all information is entered.
8. If you are connecting to multiple Nexus units at this location, repeat the above process for all Nexus units that are on the bus. Each Nexus device **MUST** have a unique address. To remove devices, select and click Remove. Click on the close button when you have finished adding or removing devices. The first Connection Manager screen returns.



9. To add additional locations, click on the Add Button. To remove locations, select and click Remove.
 10. Click once on the location to which you would like to connect your computer. You may only connect to one location at a time. To change to a different location, you must first disconnect from the current location by clicking on the Disconnect button or by selecting Disconnect from the Connection menu.
 11. Click Connect. The computer begins dialing.
 12. When Nexus Communicator has located the Nexus device(s) at that location, the Device Status screen appears, confirming the connection (see section 2.8 for details). The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.
- If the connection failed, check that all cables are secure; that the RS-485 cable is connected to the Modem Gateway on the Modem Nexus; and that the Nexus unit(s) is set at 57600 baud using Modbus ASCII.

2.5: Connecting to Multiple Nexus Monitors on an RS-485 Bus

1. Individually program a **unique address**, the **same baud rate** and the **same communication protocol** for each Nexus Monitor that will be on the bus. Because a Nexus device's four ports operate independently, you need only configure the address and baud rate of the port that will be connected to the bus. To do this:
 - First, connect directly to each Nexus Monitor individually, as detailed in section 2.2;
 - Configure the Nexus Monitor communication port you will use for the connection as shown in Chapter 3. **Each port MUST be programmed with a different address. Each port must be programmed with the same baud rate and protocol** as the Nexus devices on the bus (Modbus RTU for direct connections; Modbus ASCII for modem connections—see sections 2.2, 2.3 and 2.4 for details on connections).
2. Consult the *Nexus 1250 and 1270 Installation and Operation Manuals* for the hardware requirements of an RS-485 bus. You must link the port of one Nexus Monitor to the port of the next throughout the chain. The ports used must be those that were individually configured with a unique address in step 1 of this section.
3. When the bus is hooked up to the computer, click on the Connection Manager button, or select Connection, Connection Manager. The following screen appears:
(To copy the Connection Manager Settings to other PCs, see Note on page 2-1.)



4. Select the “New Location” listing in the List of Locations Field. Your selection will be highlighted.
5. Click on the Edit button. The Location Editor screen appears, displaying the **computer's** communication settings:

Connection Manager Location Editor

Location Name: New Location

Serial Port | Network

Com Port: COM1
 Baud Rate: 9600
 Flow Control: None
 Data Bits: 8 | Parity: None

☐ Use Modem | ☐ Use Password
 Phone Number:
 Setup String:
 Password:

☐ Use Data Switch String(s)
 Connect:
 Disconnect:

Devices At Location
 Add Remove Edit

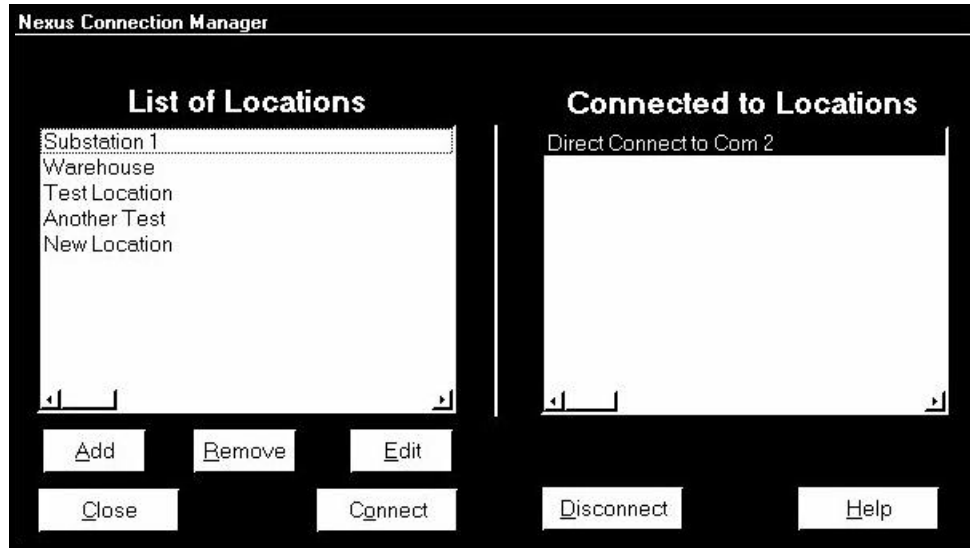
Device Address	Device Name	Description
1	Device 1	Device 1
2	Device 2	Device 2
3	Device 3	Device 3

Close Help

- Enter the **Location Name** in the field at the top of the screen.
 - In the **Com Port** field, enter the name of the **computer's** communication port that will be used for this connection.
 - In the **Baud Rate** field, enter a baud rate for the **computer** that will **match** the baud rate of all the devices on the bus.
 - **Data Bits:** for Modbus RTU and ASCII, leave the Data Bits at 8.
 - **Parity:** for Modbus RTU and ASCII, leave the Parity at None.
 - If you are using a **modem**, see section 2.3.
6. Click on the Add button in the Devices at Location section to add the first Nexus Monitor device.
 7. Click on the new device to select it, then click on the edit button to edit its location information. The Location Device Editor screen appears, displaying the **Nexus Monitor's** communication settings:

The screenshot shows a window titled "Connection Manager Location Device Editor". Inside, there is a sub-window titled "Device Properties". This sub-window contains five labeled input fields: "Address" with the value "1", "Name" with "Device 1", "Description" with "Device 1", "Protocol" with a dropdown menu showing "Modbus RTU", and "Device Type" with a dropdown menu showing "NEXUS". At the bottom of the "Device Properties" window are two buttons: "Close" and "Help".

- In the **Device Address** field, enter the unique address assigned to the Nexus Monitor's communication port in Step 1.
 - In the **Name and Description** fields, enter a name and brief description for the device that will differentiate it from others at the location.
 - In the **Protocol** field, enter the protocol the Nexus Monitor will be using (Modbus RTU for direct connections, Modbus ASCII for modem connections—see sections 2.2, 2.3 and 2.4 for details). All protocols across the bus must be the same.
 - Leave the **Device Type** field set at Nexus.
 - Click on the **Close** button when the information is complete.
8. Repeat this process for all the Nexus Monitors that are on the bus, making sure each device has a unique address. To remove devices, select and click Remove. Click on the close button when you have finished adding or removing devices. The first Connection Manager screen returns.



9. To add other locations, click on the Add Button and follow the above procedure to edit them. To remove locations, select and click Remove.
 10. Click once on the location to which you would like to connect your computer. You may only connect to one location at a time. To change to a different location, you must disconnect from the current location by selecting it and clicking Disconnect.
 11. Click Connect. When the connection is made, the selected location appears in the Connected To Locations section. Click Close.
 12. The Device Status screen appears, confirming the connection (see section 2.8 for details). The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.
 13. See section 2.6 for information on viewing data from the different Nexus Monitor devices included in the location.
- If the connection failed, check that all cables are secure, that the RS-232 cable is connected to the correct Com Port on the computer and that the computer is set to use the same baud rate and protocol as the Nexus Monitors to which the computer is connected.

2.6: Internal Network Option Connection

■ INTERNAL NETWORK OPTION CONNECTION REQUIRES MODBUS TCP PROTOCOL.

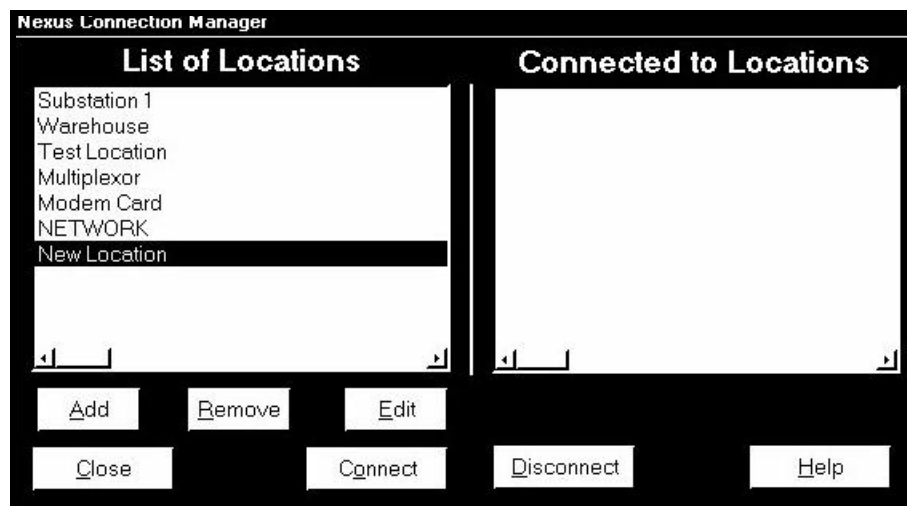
The Nexus Monitor offers an Internal Network Option, which enables the Nexus to communicate over a network. A Nexus connection to a network is now as easy as plugging in a phone. Simply connect a Nexus to a computer using Port 1 to configure the network parameters and add a network connection. The Nexus must be configured to speak **Modbus TCP**. (Modbus TCP is the common protocol used for Modbus communication over a network.)

NOTE: The Internal Network Option operates internally at a fixed Baud Rate of 115200. The Gateway operates as a Modbus RTU Master with a programmable Baud Rate up to 115200.

NOTE: For **Direct Connection**, refer to section 2.2 of this manual.

■ To set the configuration:

1. Connect the Nexus to the computer using Port 1. See the *Nexus 1250 and 1270 Installation and Operation Manuals* for details on the hardware requirements.
2. At the RJ-45 Ethernet connection on the front of the Nexus, plug in a network connection.
3. Click on the Connection Manager icon, or select Connection, Connection Manager. The following screen appears: (To copy the Connection Manager Settings to other PCs, see Note on page 2-1.)



4. Select the “New Location” listing in the Locations Field. Your selection will be highlighted.
5. Click on the Edit button. The Location Editor screen appears, displaying the **computer’s** communications settings:

Connection Manager Location Editor

Location Name: New Location

☒ Serial Port ☐ Network

Com Port: COM1

Baud Rate: 115200

Flow Control: None

Data Bits: 8 Parity: None

☐ Use Modem

Phone Number:

Setup String:

☐ Use Data Switch String(s)

Connect:

Disconnect:

Devices At Location

Add Remove Edit

Device Address	Device Name	Description
1	Device 1	Device 1
2	Device 2	Device 2
3	Device 3	Device 3
4	Device 4	Device 4

Close Help

6. Enter a **Location Name** in the field at the top of the screen, if desired.

- Click on the **Network** button. The screen will change to the following:

Connection Manager Location Editor

Location Name: NETWORK

☐ Serial Port ☒ Network

Host: 135.15.173.99

Network Port: 502

Devices At Location

Add Remove Edit

Device Address	Device Name	Description
1	Device 1	Device 1
2	Device 2	Device 2
3	Device 3	Device 3
4	Device 4	Device 4

Close Help

7. In the **Host** field, enter the **computer's IP Address**.

- In the **Network Port** field, enter **502** (assigned port for Modbus TCP).
- To add or remove devices from the network, click on the **Add** or **Remove** buttons. If you are adding a device, click on **Edit** to change the device Name, Address and/or Description. The following screen will appear:

The screenshot shows a window titled "Connection Manager Location Device Editor" with a sub-header "Device Properties". The form contains the following fields:

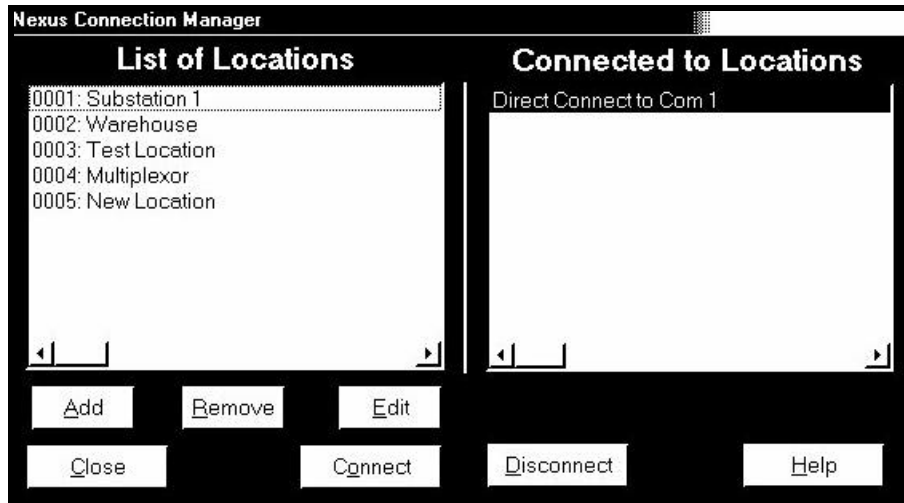
- Address:** A text box containing the number "2".
- Name:** A text box containing "Device 2".
- Description:** A text box containing "Device 2".
- Protocol:** A dropdown menu with "Modbus TCP" selected.
- Device Type:** A dropdown menu with "NEXUS" selected.

At the bottom of the dialog are two buttons: "Close" and "Help".

- **Ethernet Gateway** (Port 2) of the Internal Network Option Nexus is used to add multiple additional units. Additional Nexus units must be configured to speak **Modbus RTU** and set to the **same Baud Rate** (up to 115200) as the Internal Network Option Nexus (set in section 3.5).

NOTE: A computer “talks” to the Internal Network Option Nexus via Modbus TCP. This Nexus receives data in Modbus TCP “incoming message format” and communicates with other devices via Modbus RTU. They do not have to be Internal Network Option units.

8. If additional devices are required, in the **Device Address** field enter the address assigned to the additional Nexus unit. Again, each unit **MUST** have a unique address other than **1**; see section 2.5. “1” is reserved as the address of the Nexus connected to the network.
 - In the **Name field**, enter a name for the device that will differentiate it from any others at that location.
 - **IN THE PROTOCOL FIELD, SELECT MODBUS TCP.**
 - Leave the **Device Type** field set to Nexus.
 - Click on the **Close** button when all information is entered.
9. If you are connecting to multiple Nexus units at this location, repeat the above process for all Nexus units. Each Nexus device **MUST** have a unique address. To remove devices, select and click Remove. Click on the close button when you have finished adding or removing devices. The first Connection Manager screen returns.

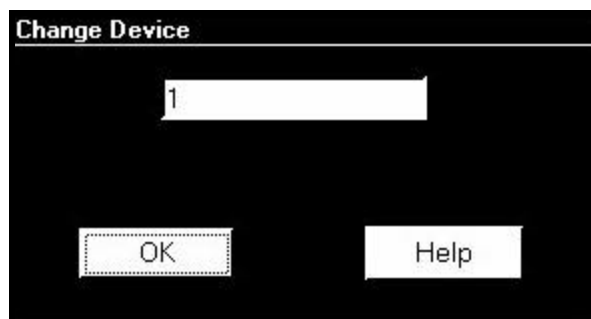


10. Click once on the location to which you would like to connect your computer. You may only connect to one location at a time. To change to a different location, you must first disconnect from the current location by clicking on the Disconnect button or by selecting Disconnect from the Connection menu.
 11. Click Connect. The computer connects to the Nexus via the network.
 12. When Nexus Communicator has located the Nexus device(s) at that location, the Device Status screen appears, confirming the connection (see section 2.9 for details). The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.
- **Troubleshooting the Connection:** If the connection failed, check the connection with the Internal Network Option Nexus first. Once that connection is established, check the connections with other devices. Suggested checkpoints:

- **Internal Network Option Nexus**
 1. Check cables
 2. Check IP Address, Subnet Mask and Default Gateway settings configured in section 3.5.
 3. Check that the Address is **1** (this section).
 4. Check that Modbus TCP was selected in Device Properties (this section).
- **Other Devices**
 1. Check all the above except #3.
 2. Check that the Address is unique and **not set to 1**.
 3. Check that the Baud Rate settings for the Ethernet Gateway (Port 2) and the Devices are the same (configured in section 3.5).
- **Try "Pinging" to a known good network device, such as another computer, to verify that your computer is connected properly to the network.**
 1. Go to the DOS Prompt (or, Console, if you are using Windows® NT).
 2. Ping IP Address. Example: "Ping 135.15.173.19".

2.7: Changing the Primary Device

- One copy of the Nexus Communicator connected to multiple Nexus devices (section 2.5) may only view data or edit Device Profiles from one device at a time—the Primary Device. (An exception is the Poll Multiple Devices screen; see Chapter 4 for details.) To change the Primary Device:
 1. Select Connection, Change Primary Device. The following screen appears.



2. Enter the unique address of the device you would like to designate as the Primary Device.
3. Click OK.
4. The Device Status screen, reached by clicking on the Device Status button or by selecting Tools, Retrieve Device Status, will now list the new Primary Device first. See section 2.8 for details on the Device Status screen.

2.8: Disconnecting from a Nexus Monitor

- To disconnect from a Nexus Monitor or to disconnect from a location, do one of the following:

Click on the Disconnect Icon.

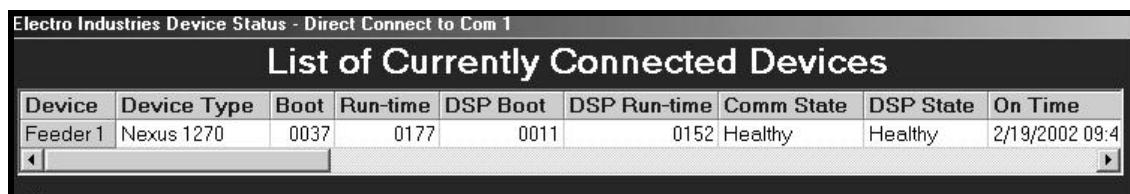
From the menu bar select Connection, Disconnect.

Click on the Connection Manager icon, or from the menu bar select Connection, Connection Manager. Select the location from the List of Locations and click the Disconnect button.

- ❖ **Note:** When using a modem, it is important to disconnect from communicating so that the remote modem receives a “hang up” command. Some modems may “freeze” when improperly disconnected.

2.9: Device Status

- The Device Status screen displays information about the Nexus devices connected to your computer. To access, click on the Device Status button or select Tools, Retrieve Device Status.



The screenshot shows a window titled "Electro Industries Device Status - Direct Connect to Com 1". Inside, there is a section titled "List of Currently Connected Devices" which contains a table with the following data:

Device	Device Type	Boot	Run-time	DSP Boot	DSP Run-time	Comm State	DSP State	On Time
Feeder 1	Nexus 1270	0037	0177	0011	0152	Healthy	Healthy	2/19/2002 09:4

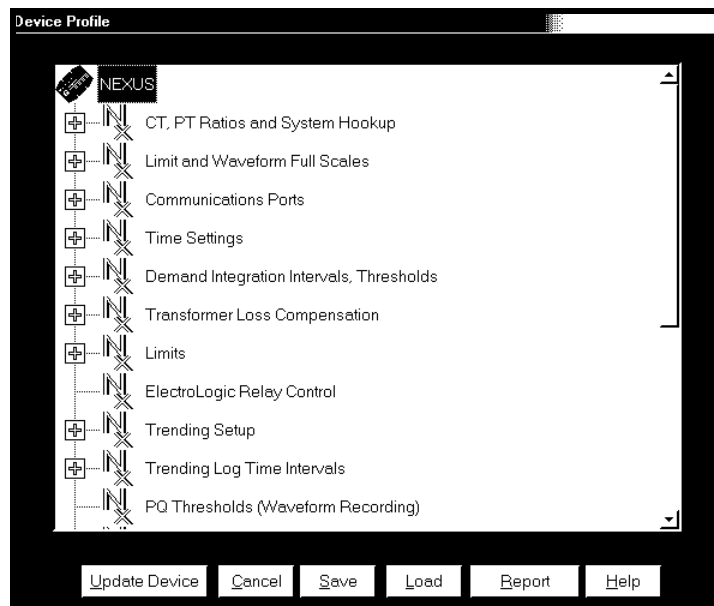
- **Device:** the Primary Device is listed first. See section 2.5 for details.
- **Device Name:** the name that you give to the Primary Device.
- **Boot:** version number of the Nexus initialization and diagnostic firmware. This firmware runs first on power-up. This firmware is **not field upgradeable**.
- **Run-time:** version number of the Nexus Communicator operating firmware. See Chapter 6 for details on upgrading firmware.
- **DSP Boot:** version number of the DSP initialization and Flash Reprogrammer. This firmware runs first on power-up. This firmware is **not field upgradeable**.
- **DSP Run-time:** version number of the DSP operating firmware. See Chapter 6 for details on upgrading firmware.
- **Com State:** health status of the communication processor.
- **DSP State:** health status of the DSP processor.
- **On Time:** date and time at which the Nexus Monitor was last powered up.
- **Serial Number:** the device's unique identification number.
- **NVRAM:** amount of NVRAM (nonvolatile RAM) available to the device. This memory is used for Logs.
- **Protection:** status of the Password Protection function (see Chapter 9). Scroll to right to find.

Chapter 3

Configuring the Nexus 1250 Monitor

3.1: Overview

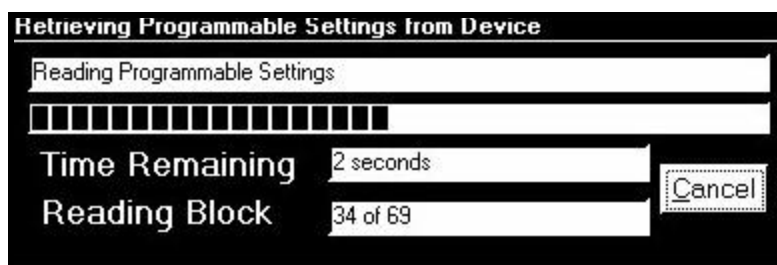
- Nexus Communicator enables you to configure a Nexus 1250 Monitor's programmable settings, which are stored in the unit's Device Profile. Scroll down to view the rest of the menu (see section 3.2). To configure the Nexus 1270, see Chapter 4. See Chapter 5 for Futura+.



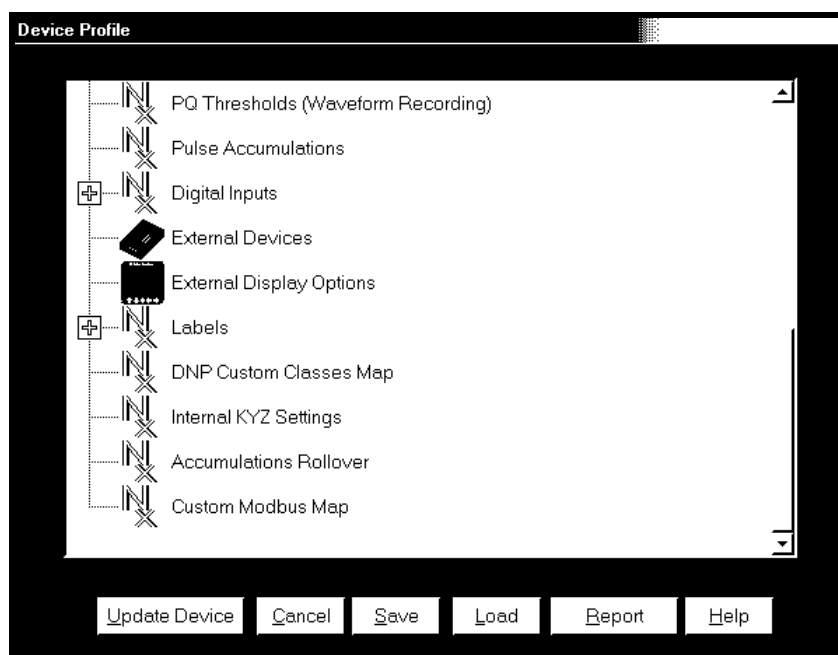
- The following is an outline of the procedure for configuring a Nexus Monitor:
 1. **Retrieve** the Nexus Monitor's Device Profile (section 3.2);
 2. **Configure** the programmable settings stored in the Device Profile (sections 3.3–3.22);
 3. **Send** the new Device Profile back to the Nexus Monitor (section 3.2).
- ❖ **Note:** If you click the Save, Load or Update buttons, you **MUST** have a unique Meter Destination Label so that the file is saved, loaded or updated to the intended device.
- This chapter also covers:
 - Resetting Max/Min/Demand, Hour Counters, Logs, Time-of-Use, Internal Input (section 3.23)
 - Setting and Retrieving Nexus Time (section 3.24)
 - Test Pulse (section 3.25)
 - Path Options (section 3.26)
- ❖ **Note:** The External Devices section of the Device Profile is covered in Chapter 10, Nexus External I/O Modules. For DNP, refer to DNP V3.00 Protocol Assignments for Nexus Rev 1.3 or higher.

3.2: Retrieving and Sending Device Profiles

1. Click on the Edit Profile button, or select Tools, Edit Current Device Profile. Nexus Communicator retrieves the programmable settings from the currently connected Nexus Monitor. The following screen appears:



2. A dialogue box appears to confirm that the profile was retrieved successfully. Click OK. The Device Profile screen appears:



3. This screen contains all the programmable settings currently stored in the connected Nexus Monitor. Configure each of the programmable settings by clicking on the (+/-) icon and then double-clicking on the selected parameter. (See sections 3.3–3.22 for details on editing each setting.)

4. After you have finished configuring any or all of the programmable settings, use the **BUTTONS** at the bottom of the screen to execute the following tasks:
 - **Implement the changes** by clicking on the **Update Device** button. This sends the new, edited Device Profile to the Nexus Monitor. **YOU MUST UPDATE THE NEXUS DEVICE PROFILE FOR ANY OF THE PROGRAMMABLE SETTINGS TO TAKE EFFECT.** A **Warning** will appear asking you if you want to **Save Connected Device Settings**. Click on the settings you would like to save, then proceed with the Update.
 - **Store the profile for later use** by clicking on the **Save** button. A dialogue box will ask where you would like to save the profile.
 - **Open a previously saved profile** by clicking on the **Load** button. A dialogue box will ask for the location of the saved profile.
 - **Print a copy of the profile** by clicking on the **Report** button. The Report screen will appear:

The screenshot displays the 'Device Profile Report' window. The report content is organized into several sections with tables:

- General Information:** Includes fields for Device Name, Device ID, and Device Type.
- Hardware Settings:** A table listing various hardware parameters and their values.
- Communication Settings:** A table detailing communication parameters like baud rate and parity.
- Device Settings:** A table listing specific device configurations.

At the bottom of the window, there is a control bar with the following elements:

- Page 1 of 18
- Navigation arrows (back, forward, first, last)
- Zoom: Whole Page
- Print Pages: 1 to 18
- Buttons: Print, Save, Done

Page Arrows: Select a page to view.

Zoom: Adjust the Viewing Magnification.

Print Pages: Adjust the Range of Pages to be printed at 100%.

Print: Print selected pages. This screen sends you to Print Setup screen where you will select printer, properties, paper and orientation. Click OK to Print.

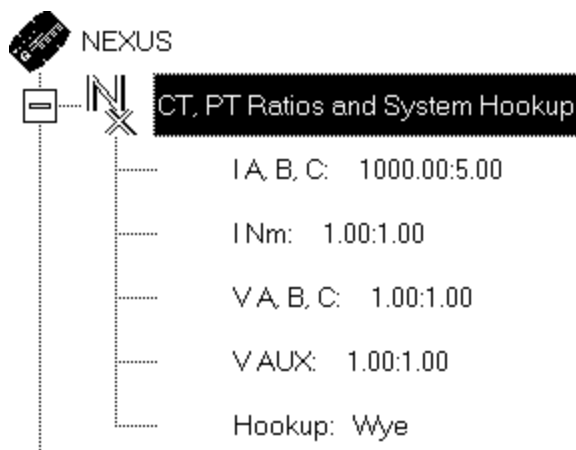
Save: Save these selections for future use.

Done: Exit the screen and return to the Device Profile screen.

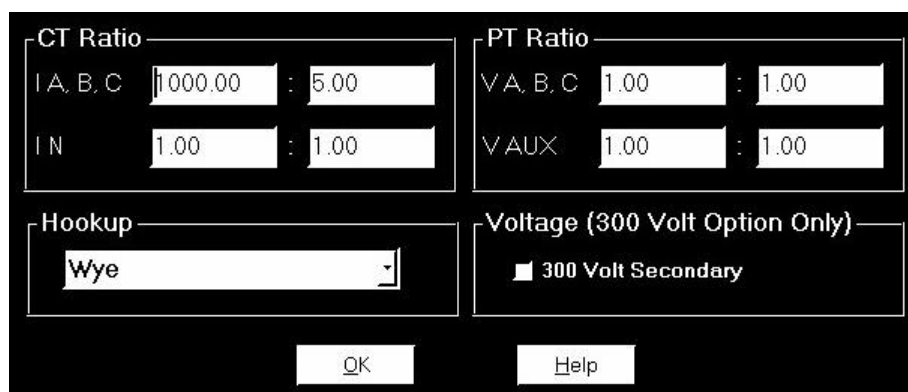
- ❖ **Note:** If you change the Com settings for the Nexus, you will not be able to communicate with the Nexus. You will have to sign off and sign on again with the new settings.

3.3: Programming the CT and PT Ratios and System Hookup

1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the “CT, PT Ratios and System Hookup” line. The following submenu appears:



- This screen displays the current Device Profile’s settings for CT, PT ratios and connection type. The values shown are for example only.
2. Double-click on any of the settings; the CT and PT Ratios screen appears:



3. Make changes to this screen according to the requirements of your application.
- When you change a PT or CT Ratio, Nexus Communicator updates the corresponding Full Scale value entered in the Limit and Waveform Full Scales setting (see section 3.4).
 - Using the pull down menu, choose the hook up mode that matches the connection you have to the Nexus. Choose from one of the following: Wye, Delta 3CTs, 4-Wire Delta, 2.5 Element or Delta 2CTs. See the *Nexus 1250 Installation and Operation Manual* for diagrams.
 - Click OK. The following screen asks you to verify the K_b/K_e Ratio for the Test Pulse Setting. K_b/K_e Ratio is Secondary watt-hour constant over kWh (the energy).

Ke setting for KYZ test pulse

Do you want to use the following Kh / Ke for the test pulse setting?

Kh/Ke = $\frac{1000}{\text{PT Ratio} \times \text{CT Ratio}}$

Kh/Ke = 5.000000

Yes No

- Click Yes. Or, Click No and re-enter values in the CT & PT Ratio screen.

❖ **WARNING: ONLY SELECT THE 300 VOLT OPTION IF YOU ORDERED THE NEXUS WITH THE “G” OPTION!!!** If you connect 300 volts to a Nexus that does not have the “G” option, you will damage the Nexus. Please check the **label** on the side of your Nexus and your invoice to make sure you have the “G” Option!

“G” must be in the part number for a 300 volt direct connection.

Max Voltage also shows the max voltage the unit can measure.

Electro Industries/GaugeTech
Westbury, NY USA

MODEL NUMBER

NEXUS 1250-G-D2-60HZ-2meg

SERIAL NUMBER	POWER INPUT
04-20347	90-276 Volts AC or DC
MAX VOLTAGE	MAX CURRENT
300V L-N 600V L-L	10A
C.T. RATIO	P.T. RATIO
NOTES	

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ELECTRICAL & ELECTRONIC
MEASURING & TEST EQUIP
84JA

- To select the 300 Volt Option, check the “300 Volt Secondary” box. Are you **sure** you want to select this box?
- When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile.

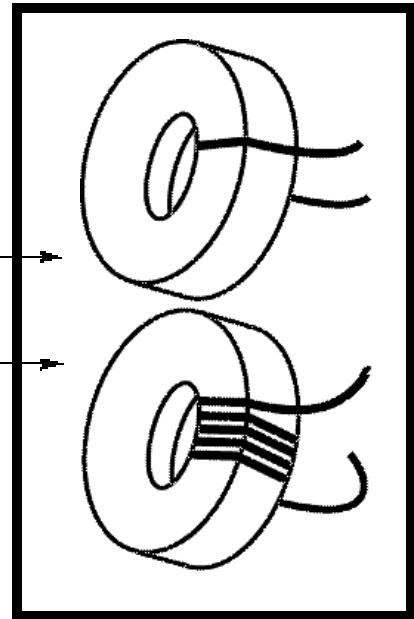
3.3(a): One Amp Current Input Addendum (Modification Number M10.0)

- For special circumstances, the Nexus can be ordered to operate with one amp current transformers. This will give the Nexus Power Monitor a range of 0 - 1 amps with an additional over-range of 1 amp. The following lists the method used to program the CT Ratios in the Nexus to reflect the hardware change:

Standard 5 amp Input (One wind —————→ around the internal Nexus toroid)

Modified 1 amp Input (Five winds —————→ around the internal Nexus toroid)

In order to maintain maximum accuracy with one (1) amp current inputs, the wire is wound around the internal toroids five (5) times, instead of the usual one time. This effectively multiplies the current input by five (5) times, to maintain maximum resolution.



■ Configuring CT Ratios with Modification Number M10.0:

Because the Nexus Communicator “sees” the one (1) amp input as five (5) amps, it is necessary to configure the CT secondary to five (5) amps.

Example:	Normal One Amp CT Ratio:	1000:1
	Nexus M10.0 One Amp CT Ratio:	1000:5

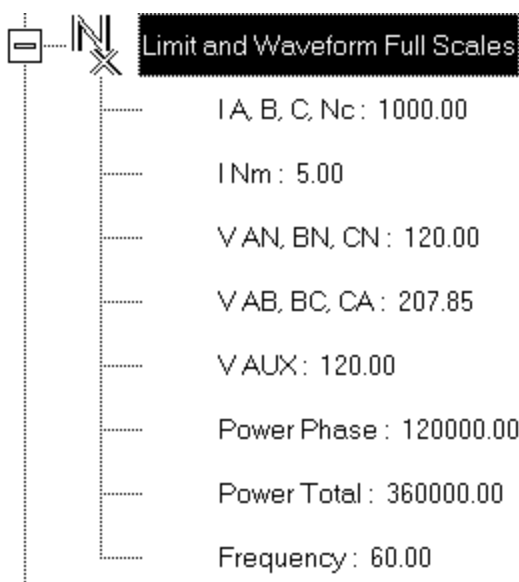
The CT Ratio screen below shows the correct input for the typical one amp user:

CT Ratio		PT Ratio	
I A, B, C	1000.00 : 5.00	V A, B, C	1.00 : 1.00
I N	1.00 : 1.00	V AUX	1.00 : 1.00
Hookup Wye		Voltage (300 Volt Option Only) <input checked="" type="checkbox"/> 300 Volt Secondary	
OK		Help	

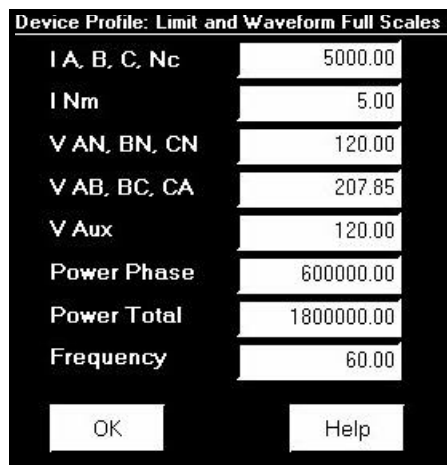
- ❖ **Note:** Even though the software is configured from 1000:5, it is actually displaying current from 1000:1 amps. If you are not concerned with maximum accuracy, you can use the standard Nexus (without specially ordering the M10.0 option) to display readings from a 0-1 amp CT.

3.4: Programming Limit and Waveform Full Scales

- All Limit and Waveform settings (sections 3.9 and 3.12, respectively) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see section 3.3).
 - **Be sure to set the CT and PT ratios first;** Nexus Communicator automatically recalculates the Full Scales every time the CT and PT ratios change.
1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside “Limit and Waveform Full Scales” or double-click on the “Limit and Waveform Full Scales” line. The following submenu appears:



- This screen displays the current Device Profile’s settings for the Limit and Waveform Full Scales. The values shown are for example only.
2. Double-click on any of the settings; The Limit and Waveform Full Scales screen appears.



3. Enter the Full Scale for each parameter:
 - The Limits and Waveform settings (section 3.9 and 3.12, respectively) will be based on a percentage of the Full Scales entered here.
 - Nexus Communicator automatically recalculates the Full Scales every time the CT and PT ratios change.
 - Power Phase is the amount of power per each phase.
 - Power Total is the power of all phases combined.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.
5. Reset Logs after changing any settings that will effect the Logs. From the Menu Bar select Tools, Reset Nexus Information. Click Reset All Logs. Click OK. See Section 3.22.

3.5: Programming the Communication Ports

1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the “Communications Ports” line. The following submenu appears:



- This screen displays the current Device Profile’s settings for the Nexus Monitor’s four Communications Ports: Address, Baud Rate, Data Bits, Parity, Stop Bits, Transmit Delay, Communication Protocol, Network Option and Internal Modem Option. You may use a connected Nexus External Display to learn the current baud rate, address and communication protocol of each Nexus Monitor port. See the *Nexus 1250 Installation and Operation Manual* for details.
- **Port 2 settings are ignored** when the Internal Network and Internal Modem options are installed and the address is 1. **Port 3** is factory set to the Nexus External Display’s baud rate of **9600**. The External Display only communicates to Address 1. You must use **Port 3 or Port 4** to connect any external devices, such as a Nexus External I/O module. Port 3 and Port 4 are Master/Slave selectable. If you use Port 3 as a Master Port, you can use one of the other ports for the display (change the baud rate to 9600 and set address to 1). For all External I/O Devices, set the Communication Protocol to Modbus RTU.

- Double-click on any of the settings (“Serial Port 1”); the Communications Settings screen appears:

Device Profile: Communications Settings

Port 1	Port 2	Port 3	Port 4(Ext Devices)
Address: 1	Address: 1	Address: 1	Address: 1
Baud Rate: 115200	Baud Rate: 57600	Baud Rate: 57600	Baud Rate: 57600
Data Bits: 8	Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms
Protocol: Modbus RTU	Protocol: Modbus ASCII	Protocol: Modbus ASCII	Protocol: Modbus ASCII
	<small>If the Modem or Network option is installed, Port 2 settings here will not be used. See below</small>	Mode: Slave	Mode: Slave

Network Settings (If network option was purchased)

IP Address: 255.255.255.255	Ethernet Gateway Baud Rate: 9600
Subnet Mask: 255.255.255.255	Ethernet Gateway Delay: 255 x 15 ms
Default Gateway: 255.255.255.255	

Internal Modem Settings (If internal Modem option was purchased)

Answer Phone on: 3 Rings	Modem Gateway Baud Rate: 57600
	Dial Out Profile

OK Help

- Make changes to this screen according to the requirements of your application by clicking on the box or pull-down menu of any of the following settings:
 - Address:** Assign an address to each port to communicate with other devices. Multiple Nexus Monitors on an RS-485 bus must each have a unique address set for the port that is connected to the bus. Type in unique address.
 - Baud Rate:** The baud rate entered in this field must match the baud rate of the device that will be connected to the Nexus Monitor at this port. Use 9600 for modem connections. From the pull-down menu, select 4800, 9600, 19200, 38400, 57600, or 115200.
 - Data Bits:** for Modbus RTU and ASCII, leave the Data Bits at 8. Other protocols may require a different setting. Use the pull-down menu to select from: 5, 6, 7 or 8.
 - Parity:** for Modbus RTU and ASCII, leave the Parity at None. Other protocols may require a different setting. Use the pull-down menu to select from: None, Even, Odd, Mark or Space.
 - Stop Bits:** for Modbus RTU and ASCII, leave the Stop Bits at 1. Other protocols may require a different setting. Use the pull-down menu to select from: 1, 1.5 or 2.
 - TxDelay (Transmit Delay):** leave the TxDelay at 0ms unless you are using equipment that requires a delay in the response time, such as a radio modem. Use the pull-down menu to select from: 0ms, 10ms, 20ms, 30ms, 40ms, 50ms, 60ms, 60ms or 70ms.

- **Protocol:** Direct Connections made through Nexus Communicator must use either Modbus RTU or Modbus ASCII protocol (Modbus RTU is recommended). Modem Connections made through Nexus Communicator **must use Modbus ASCII only**. Use the pull-down menu to select from: Modbus RTU, Modbus ASCII or DNP 3.0. See Chapter 2 for details.
- **Mode** (Port 3 or Port 4 only): If you are using I/O modules, set one of these ports in Master mode. Set the port to operate at 57600 baud. To change the setting, use the pull-down menu to select Slave or Master. Make other changes for your application.
- **Internal Network Option:** If your Nexus has the Internal Network Option, see your Network Administrator for the correct settings. Settings will vary from network to network.
- **Internal Modem Option:** If your Nexus has this option, set the number of Rings to Answer from the pull-down menu. Set the Baud Rate to 57600, or to match your system baud rate.
- **Dial Out Profile:** Click the Dial Out Profile button and the following screen appears. Details on programming this screen and on the Modem Dial In/Dial Out Function are in Chapter 12 of this manual.

The screenshot shows the 'Modem Programming' window with the following sections:

- Primary phone number settings:**
 - Number: 516-334-0870
 - Retry delay: 1 Minutes
 - Retry limit: 1 Attempts
 - Connection type: Computer
- Secondary phone number settings:**
 - Number: [Empty]
 - Retry delay: 1 Minutes
 - Retry limit: 1 Attempts
 - Connection type: Computer
- Communications settings:**
 - Activity timeout limit: 30 Minutes
 - Call delay timer limit: [Empty] Seconds
 - Callback type: Playback
 - Call failure reset limit: 49 Hours
 - Share the phone line: ☒
- Modem settings:**
 - Rings to answer: 9 Rings
 - Identification: [Empty]
 - Password: [Empty]
 - Enable password: ☒
 - Violation limit: 3 Attempts
 - Violation lockout time: 32 Hours
- Dial out on the following conditions:**
 - ☒ Limits status change
 - ☒ CBEMA Power quality event
 - ☒ Cycling of control power
 - ☒ High speed input change
 - ☒ Control output change
 - ☒ Modem password failure
 - ☒ Waveform record captured
 - ☒ Filling of meter memory
 - ☒ Failure of communication with Nexus
- Log full limit threshold (All Logs):** 90 %

Buttons: OK, Help

- ❖ **Note:** Any changes you make here may adversely affect communications. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate. If you change a port's address, be sure to update the address settings of any device that communicates with the port. The baud rate of the port used by the Nexus External Display should always be set to **9600 and the address set to 1**.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

3.6: Time Settings

■ To edit a Device Profile's time settings:

1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the "Time Settings" line. The following submenu appears:



- This screen displays the current Device Profile's time settings:
 - DST=Daylight Savings Time.
2. Double-click on any of the programmable settings ("Time Zone", etc.); the Time Settings screen appears.



3. Make changes to this screen according to the requirements of your application:

- **Zone Descriptor:** sets the Time Zone for the Nexus Monitor. 0=Greenwich Mean Time.

GMT Greenwich Mean Time Table (Dublin, London)			
- 1:00	Azores	+ 1:00	Brussels, Paris, Warsaw
- 2:00	Mid-Atlantic	+ 2:00	Athens, Cairo, Helsinki
- 3:00	Buenos Aires, Georgetown	+ 3:00	Baghdad, Kuwait, Moscow, Tehran
- 4:00	Atlantic Time (Canada) Santiago	+ 4:00	Kabul, Baku
- 5:00	Eastern Time (US & Canada), Lima	+ 5:00	Karachi
- 6:00	Central Time (US & Ca), Mx City	+ 6:00	Dhaka
- 7:00	Mountain Time (US & Canada)	+ 7:00	Bangkok, Hanoi, Jakarta
- 8:00	Pacific Time (US & Ca), Tijuana	+ 8:00	Beijing, Hong Knog, Singapore
- 9:00	Alaska	+ 9:00	Osaka, Sapporo, Seoul
- 10:00	Hawaii	+ 10:00	Brisbane, Melbourne, Guam, Hobart
- 11:00	Midway Island	+ 11:00	Magadan, Solomon Islands
- 12:00	Eniwetok	+ 12:00	Auckland, Fiji

- **Daylight Savings Information:**

Enable: Enables an automatic adjustment for daylight savings.

Disable: Disables an automatic adjustment for daylight savings.

Auto DST: Sets Daylight Savings Time automatically for the **United States only**. Time changes automatically occur at 2:00 AM (your local time), on the first Sunday in April and the last Sunday in October.

User Defined: Allows you to set the Daylight Savings Time manually.

Begin: Set the Month, Day and Hour when the adjustment for Daylight Savings will commence.

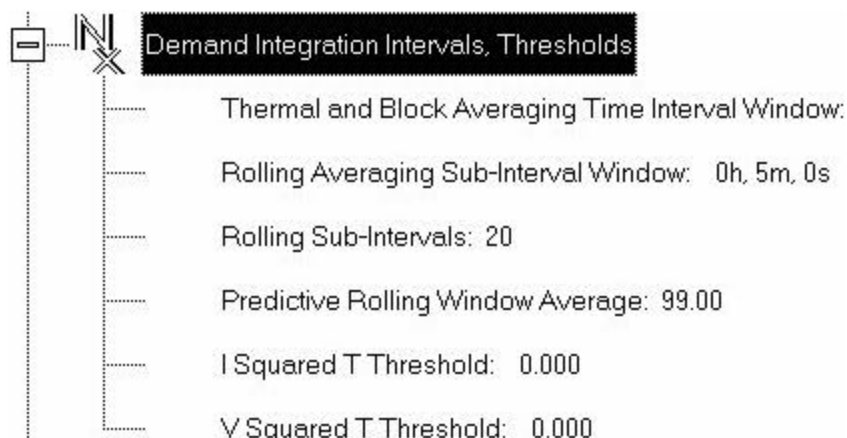
End: Set the month, day and hour when the adjustment for Daylight Savings will conclude.

4. To set the Nexus on-board clock, use Set Nexus Time from the Tools Menu. (See section 3.22).
5. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

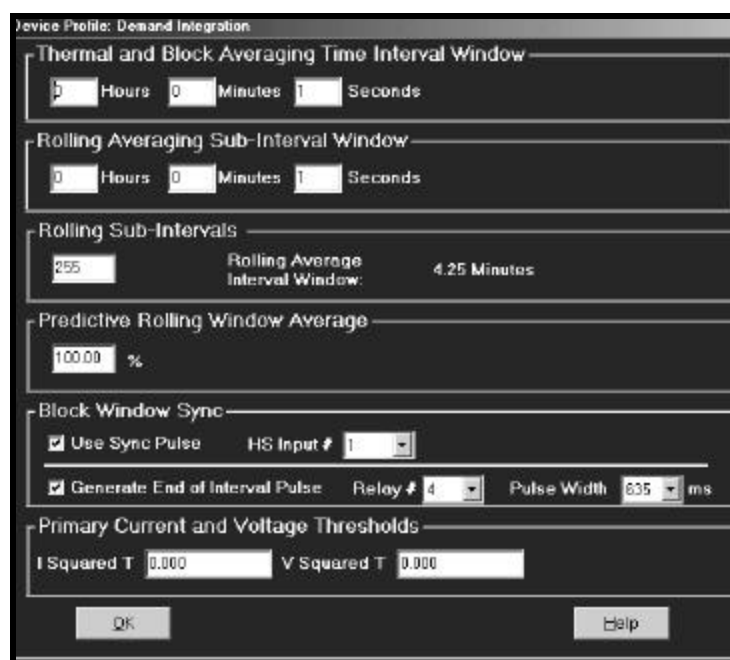
3.7: Programming Demand Integration Intervals

■ See the *Nexus 1250 Installation and Operation Manual* for details on Demand Integration Intervals.

1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the “Demand Integration Intervals” line. The following submenu appears:



2. Double-click on any of the settings (“Rolling Sub-Intervals”, etc.) and the Demand Integration Programming Screen appears:

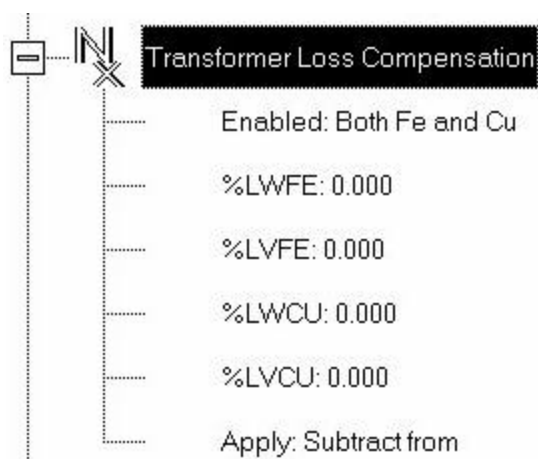


3. Make changes to this screen according to the requirements of your application.
 - Following is a brief description of each window and its function.

- **Thermal and Block Time Interval Window:** allows you to set hours, minutes and seconds for a precise thermal and block window of demand data.
 - **Rolling (Sliding) Window:** allows you to set hours, minutes and seconds for a rolling window, which will give you a precise sliding view of demand data.
 - **Rolling (Sliding) Window Number:** allows you to set the number of rolling windows you would like to “string together”.
 - **Predictive Rolling Window Average:** Nexus gives you a precise (100% accurate) prediction of your demands.
 - **Block Window Sync:** synchronizes the Nexus Monitor with pulses from a High Speed Input connected to another meter. Click the Use Sync Pulse box and select the Input number (Block Window Demand Only). Click the Generate End of Interval Pulse to produce a synchronizing output and select a Relay and Pulse Width for the output.
 - **Thresholds:** Numbers programmed into these windows will effect the accumulation of data.
I Squared T: data won’t accumulate until current reaches programmed level.
V Squared T: data will stop accumulating when voltage falls below programmed level.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button to send the new profile to the Nexus Monitor.

3.8: Programming Transformer Loss Compensation

1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside “Transformer Loss Compensation” or double-click on the “Transformer Loss Compensation” line. The following submenu appears:



2. This screen displays the current values for the Nexus Monitor's Transformer Loss Compensation.
 - %LWFE = Percent Loss of Watts due to Iron
 - %LVFE = Percent Loss of Vars due to Iron
 - %LWCU = Percent Loss of Watts due to Copper
 - %LVCU = Percent Loss of Vars due to Copper
3. Consult this manual's Appendix B for an overview of Transformer Loss Compensation.
4. Double-click on any of the loss values "%LWFE" etc; the following screen appears.

Device Profile: Transformer Loss Compens.

Percent Loss of Watts

Due to Iron 0.000

Due to Copper 0.000

Percent Loss of VARS

Due to Iron 0.000

Due to Copper 0.000

Both Fe and Cu

☒ Add to

☐ Subtract from

OK TLC Calculator Help

5. Click on TLC Calculator to find the values to enter into the Percent Loss windows. The Calculator button will launch an Excel Spreadsheet which will do the calculations for you once the required data is entered. A copy of the Excel Spreadsheet is in Appendix B.

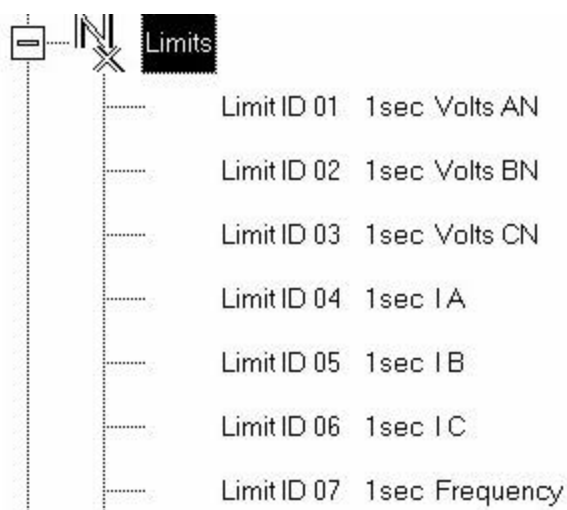
Warning! Communicator will automatically launch the Excel Spreadsheet as part of its software package. But, for the TLC Button to work, you must have the Excel program in your system. If you do not have Excel software or if the spreadsheet file is not in the Communicator directory, a Warning will be displayed instead of the worksheet. You can do your own calculations using the hardcopy Transformer Loss Compensation Worksheet in Appendix B.

6. Enter the percent Loss of Watts and Vars for copper and iron in the appropriate fields. Enable Transformer Loss Compensation by selecting Iron only, Copper Only or Both Iron and Copper from the pull-down menu at the bottom of the screen.
 - **To add the compensation values to the measured watts and vars for delivered power, click the Add to radio button.**

- To subtract the compensation values from the measured watts and vars for received power, click the **Subtract from** radio button.
7. When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

3.9: Programming Limits

- Limit settings are based on a percentage of the Full Scales (% of FS), which are set in the Limit and Waveform Full Scales section of the Device Profile (section 3.4). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup section of the Device Profile (section 3.3).
 - **Before programming Limits, set the CT and PT ratios first. Then, set the Limit and Waveform Full Scales.** The software automatically updates the Full Scale. However, you can set it separately from the CT and PT Ratios.
1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside “Limits” or double click on the “Limits” line. The following submenu appears:



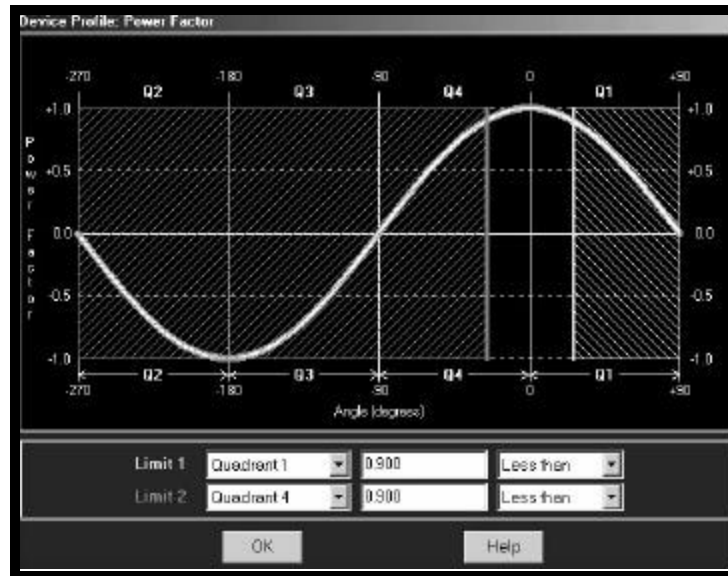
- This screen displays the current Device Profile’s settings for Limits. Not all limits are shown above; “Limit ID” extend to 32.
2. Double-click on any of the settings (“Limit ID 01:”, etc.); The Limits screen appears.
- **Percentage of Full Scale settings:** The limits are set in % of full scale (% of FS) so that when a user creates a profile, that limit setting will be constant. That is true, even though the CT and PT Ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT Ratios will not effect the % of full scale limits previously set. This is useful when using large numbers at meters.

Device Profile: Limits									
Limit ID	Type	Channel	Limit 1			Limit 2			Combination Limit 3
			Setting	Setpoint		Setting	Setpoint		
				% of FS	Primary		% of FS	Primary	
1	1sec	Volts AN	Below	2.50	3.00	Below	2.50	3.00	AND
2	1sec	Volts BN	Above	99.50	119.40	Above	76.25	91.50	AND
3	1sec	Volts CN	Below	75.00	90.00	Below	75.00	90.00	AND
4	1sec	I A	Above	25.50	255.00	Above	25.50	255.00	AND
5	1sec	I B	Below	50.00	500.00	Below	50.00	500.00	AND
6	1sec	I C	Below	50.00	500.00	Below	50.00	500.00	AND
7	1sec	Frequency	Above	50.00	30.00	Above	50.00	30.00	AND
8	1sec	I Nm	Below	50.00	2.50	Below	50.00	2.50	AND
9	Block Win Avg	Status	Below	-50.00		Below	-50.00		AND
10	Block Win Avg	Max VA	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
11	Block Win Avg	Max +VAR	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
12	Rolling Win Av	Pred VA	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
13	Rolling Win Av	Pred VAR	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
14	Rolling Win Av	Pred Watt	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND

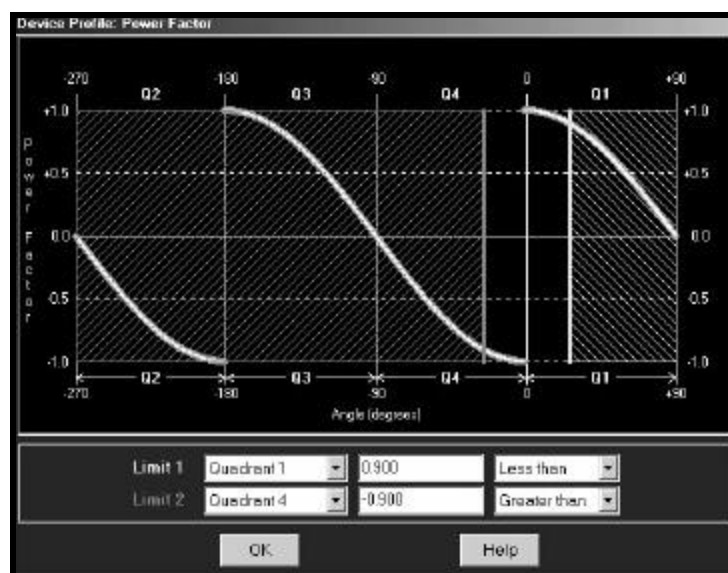
Channels	Primary Values at 100%
I A, B, C, Nc	1000.00
I Nm	5.00
V Phase to Neutral	120.00
V Aux	120.00
V Phase to Phase	207.85
Power Phase	120000.00
Power Total	360000.00
Frequency	60.00

3. Make changes to this screen according to the requirements of your application:

- **To set the type of limit and the channel assigned to it**, double click in either the Type or Channel column. From the pop-up menu, choose the desired settings and click OK.
- **To designate the limit as either Above or Below a percentage of the Full Scale**, click once in each Settings column and select the desired setting from the pull-down menu.
- **To set the percentage of the Full Scale at which the limit will trip**, enter the value in the % of FS column. Nexus Communicator automatically calculates the Primary value.
- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (section 3.4).
- **To set the Power Factor Limits**, double click on any of the Power Factor settings in the Limit 1 or Limit 2 Column and the Power Factor Programming Screen will appear:



4. Power Factor is broken into four quadrants. The screen lets you set a limit in two of the four quadrants. **To set a limit:** from the pull-down menus, select a Quadrant and Less Than or Greater Than (Full Scales). Type in the Power Factor Number. The graph will illustrate your selections by shading the Out of Limit bands. The area of the graph not covered by shading is within **Normal Operational Range**. **Method 1 Quadrants:** Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead.
5. To display a graph of **Method 2 Quadrants:** Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead, go to the Programming Labels screen (section 3.18) of the Device Profile. In the lower drop down menu, click on Method 2. Then, return to the Limits screen. Click on any PF setting.



- ❖ **Note:** This meter is a real four quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.

- When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. (Make sure you save Connected Device Settings.) A pop-up screen will ask if you want to Reset Logs. It is recommended that you reset logs when you change any settings that effect logs. See sections 3.2 and 3.22.

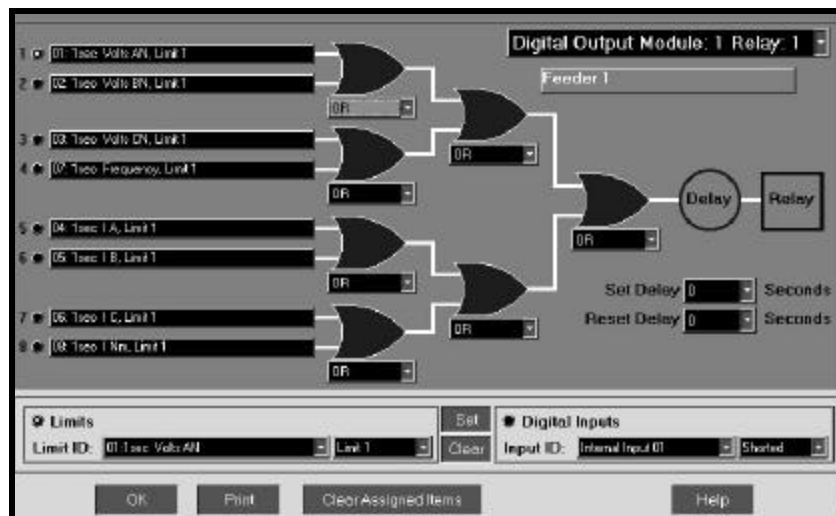
3.10: ElectroLogic Relay Control

- To edit a Device Profile's ElectroLogic Relay settings:

- From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the "ElectroLogic Relay" line.



- The following screen appears. This screen displays the current Device Profile's settings:



- To assign an item to the Relay Logic Tree, select an Input for the tree by clicking on a bullet next to numbers 1 through 8.
 - Next, choose Limits or Digital Inputs by clicking on the bullet in front of the word.

- Next, select the Limit or Input you want to assign to the Relay Logic Tree Input you selected.
 - Press Set to confirm your selection and the software will place the selection in the appropriate window in the screen.
 - After you have assigned all the Relay Logic Inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate, click on the gate or choose one from the pull-down menu below the gate.
3. To change items on the Relay Logic Tree, use the following steps:
- To change the selected relay and/or relay modules, select from the drop-down menu at the upper right hand corner of the screen.
 - To change the relay Set Delay, select from the drop-down menu to the right of the Set Delay Label.
 - To change the Relay Reset Delay, select from the drop-down menu to the right of the Reset Delay Label.
 - To clear an item from the Relay Tree, click on that item then click the Clear Button.
 - To clear ALL ITEMS from the Relay Tree, click the “Clear Assigned Items” Button.

NOTE: In order to use this screen, you must have purchased at least one External Relay Out module. For more details on External Modules, see Chapter 10 of this manual.

3.11: Programming the Trending Setup for Historical Logs 1 and 2

- The Trending Setup controls the channel assignments for Historical Logs 1 and 2. To set the Time Intervals for these Logs, see section 3.12. See Chapter 7 for how to view logs.

1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside “Trending Setup” or double-click on the “Trending Setup” line. The following submenu appears:



2. To change the settings for Log 1 double-click on “Log 1”. To change the settings for Log 2 click on “Log 2”. The Snapshot Channel Assignment Log 1 or 2 screen appears:

Device Profile: Trending Channel Assignment Log 1

Type	Channel
1s Readings	Volts AN
<div>Add Remove</div>	
Type	Channel
1s Readings	Volts AN
1s Readings	Volts BN
1s Readings	Volts CN
THD	Volts AN
K-Factor	IA
K-Factor	IA
K-Factor	IA
K-Factor	IA
K-Factor	IA
K-Factor	IA

Total bytes used 42

Bytes remaining 214

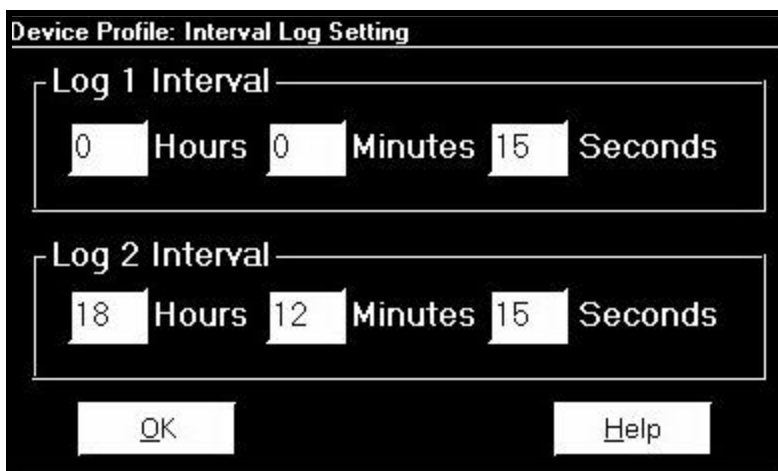
3. Make changes to this screen according to the requirements of your application:
 - **Type:** Using pull down menu, select the type of snapshot.
 - **Channel:** Using pull down menu, select a channel for the snapshot.
 - Click on Add to include the selections in the Log; click on Remove to delete.
 - To Remove multiple items, hold Control while clicking items to be removed. Click Remove.
 - To Remove a range of items, click the first item, hold Shift, then last item. Click Remove.
 4. When all changes are entered, click OK to return to the main Device Profile screen. Click on the **Update Device** button. This sends the new profile. Reset Logs (see section 3.22).
- Total bytes used and Bytes remaining screens display the memory status for that particular file. Nexus assumes 256 bytes of memory for each file. Total memory is determined at time of purchase.

3.12: Programming the Trending Log Time Intervals

- Trending Log Time Intervals determine the interval at which Historical Logs 1 and 2 will take a snapshot. To set the parameters for the logs, see section 3.10.
 - See Chapter 7 for how to view and retrieve logs.
1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside “Trending Log Time Intervals” or double-click on the “Trending Log Time Intervals” line. The following submenu appears:



- This screen displays the current Device Profile’s Trending Log Time Intervals. The values shown are for example only.
2. Double-click on either “Log 1 Interval” or “Log 2 Interval”; the Interval Log Setting screen appears:



3. Enter the hours, minutes and seconds for each log. The logs will be time-stamped based on the Nexus Monitor’s time, which is set using the Tools menu. See section 3.22.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. Reset Logs (see section 3.22).

3.13: Programming the Power Quality and Waveform Recording Thresholds

- The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus Monitor will execute a waveform capture and/or record a power quality event. See Chapter 8 for how to view logs.
 - PQ and waveform thresholds are given as a percentage of the Full Scales (% of FS). Set the Full Scales in the Limits and Waveform Full Scales section of the Device Profile (section 3.4). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup (section 3.3).
 - **Before programming the PQ and Waveform Thresholds, set the CT and PT ratios. Then, set the Limits and Waveform Full Scales.**
- ❖ **Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, users will set the monitor to 128 samples per cycle for this purpose. Lower sampling rates have advantages because they allow you to record more cycles of information per event screen. Low sampling rates are better for long duration events, like motor starts or distribution faults. The Nexus enables users to tailor the recording for both these applications. For more information on Sampling Rate, see the graph on page 3-28.
1. From the Device Profile screen (see section 3.2), double-click on the “PQ Thresholds (Waveform Recording)” line; the Waveform—CBEMA Profile screen appears:

Device Profile: Waveform - CBEMA Profile

Channel	Waveform Above Setpoint		Waveform Below Setpoint		PQ Enable
	Value(%)	Enable	Value(%)	Enable	
Volts AN	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BN	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CN	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IA	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IB	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IC	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
INm	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts AB	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BC	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CA	110.00	<input checked="" type="checkbox"/>	90.00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Input	Waveform Enable	PQ Enable
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Sampling Rate Samples / Cycle @ 60Hz

Total Captures

A limit value of 100 % equals the following primary value

IA,B,C VP-N VP-P

■ Software Triggers:

2. To set the threshold for a PQ event and waveform capture, enter the desired percentage of Full Scale in the Value(%) column of the Above Setpoint and Below Setpoint sections. Full Scales are shown in the lower right corner of the screen.

❖ **Note on CBEMA:** The CBEMA plotting is a power quality standard known world-wide for recording the amount of damage voltage transient conditions have done to the equipment being monitored. The Nexus automatically records this information. For CBEMA purposes, the user programs internal set points for voltage below 90% and above 110% of full scale (+/- 10% from the nominal voltage). These setpoints are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI) and is available at:

http://www.itic.org/iss_pol/techdocs/curve.pdf.

A user can set a recording with tighter voltage limits to trigger a waveform recording. However, CBEMA plotting will be based only on the limits internally set.

❖ **Note on Setting the Nexus to Record Current Faults:** As discussed, the voltage setpoints are used to record voltage type events, such as voltage surges, sags and transients. The current settings are used to record faults on the line or in-rush currents from devices such as motors. Typically, to catch these events, set the limit to above 200% of full scale.

❖ **Waveform Clipping Threshold**

- Nexus 1250 5 Amp Standard Hardware - 61.9437A Peak before clipping.
- Nexus 1250 1 Amp Hardware - 12.09A Peak before clipping.

■ Hardware Triggers:

3. To enable a Waveform or PQ recording for any of the 8 High Speed Inputs, click in the appropriate box. This will trigger a recording based on a contact trigger. This is useful to monitor an open device and to capture the waveform during that operation.

■ Samples per Cycle

4. To choose the **Samples per Cycle** to be recorded at 60 Hz, click on the Sampling Rate pull down menu. Choose from 16, 32, 64, 128, 256 and 512 samples per cycle. The number of samples per cycle you choose will inversely effect the number of cycles per capture.
 - If you select 256, a Capture Only pop up screen will ask you to select Volts A, B, C or I A, B, C.
 - If you select 512, a Capture Only pop up screen will ask you to select one of the individual channels.

As you increase the number of samples, you will record more detailed information. The graph below illustrates the “Effects of Sampling Rate”:

Effects of Sampling Rate					
Samples per Cycle	Channels		Samples per Channel	Cycles per Capture	Time (Approx)
	Analog	HSI			
16	7	8	1024	64	1 Second
32	7	8	1024	32	1/2 Second
64	7	8	1024	16	1/4 Second
128	7	8	1024	8	1/8 Second
256	3	8	2048	8	1/8 Second
512	1	8	4096	8	1/8 Second

- ❖ **Note on Waveform Event Captures:** A screen of data is one capture. If you set Total Captures to 3 and you are recording at 16 samples per cycle, you will record:

$$16 \text{ Samples} \quad 3 \quad \times \quad 64 = \quad 192 \text{ cycles of recorded waveforms}$$

$$128 \text{ Samples} \quad 3 \quad \times \quad 8 = \quad 24 \text{ cycles of recorded waveforms}$$

With the 2 meg module, you have a total of 64 total captures. With the 4 meg module, you have a total of 96 captures. You can partition the memory in any fashion required for the specific application. There is no limitation on the amount of cycles that can be recorded per event.

- To choose the total amount of captures, click on the Total Captures pull down menu. Select from 0 to 96 captures. The higher the number, the more information you will be “stringing together”.
- When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. Reset Logs (see section 3.22).

3:14: Pulse Accumulations

- This section of the Device Profile displays a series of eight running totals. Each total can be added to (or subtracted from) other totals. This allows you to set the high speed inputs located directly on the Nexus monitor to pulse accumulate. Note: If you use these inputs for pulse accumulations, do not set them to record waveforms. If you do, you will record endless waveforms.
1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the “Pulse Accumulations” line. The following screen will appear:

Device Profile: Nexus Internal Input Pulse Accumulators Setup

Source	Units/Pulse	Accumulator	User Assigned Label
1	100	Add to 2	Apartment #1
2	100	Add to 1	Apartment #2
3	100	None	Apartment #3
4	100	Subtract from 3	Apartment #4
5	1	None	
6	1	None	
7	1	None	
8	1	None	

Source	Hour Reading	Accumulator
Nexus	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label
1	Apts #1 & 2
2	Apts #3 & 4
3	
4	

OK

- **Purpose for Pulse Accumulations:** This feature allows users to accumulate and aggregate polls from any pulse-generating device. For energy, other motors can be accumulated and aggregated together (or separately) with the Nexus internal energy registers. The pulse inputs can also be used to accumulate other utilities, such as water, gas, steam, etc.
2. Source: This is the particular input on the Nexus which will be accumulated.

Units/Pulse: This is the scale factor which normalizes the pulses so that they can be aggregated, if desired. Pulses are stored in primary values.

Accumulator: This allows you to place the pulse register into a separate accumulation register, which can aggregate or net values.

User assigned label: This window allows a user to enter a label designation so that when reading the Aggregator, the Nexus will display the source.

3. To add or subtract data, use pull down menu in each window of Accumulator column(s).
4. When all data has been entered, click OK to return to the main Device Profile screen. **For these changes to take effect, you must click on the Update Device button.** This sends the new profile to the Nexus Monitor.

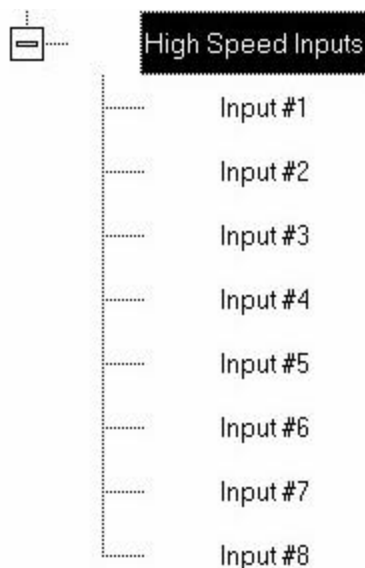
3.15: Programming Labels for the Digital Inputs

- This section of the Device Profile enables you to label the eight High Speed Inputs. Using this storage field allows a user to label the inputs so that when the data is later analyzed, the user knows the source of the status change.

1. From the Device Profile screen (see section 3.2), click on the (+/-) button or double-click on the “Digital Inputs” line. The following submenu appears:



2. Double-click on “High Speed Inputs”; the following submenu appears.



3. Double-click on any of the “Input #” lines; the High Speed Digital Input Assignments screen appears.

Device Profile: High Speed Digital Input Assignments

Input ID	Name	Open Label	Shorted Label	Normal Condi
1	HSI Input 1	Open	Shorted	Shorted
2	HSI Input 2	Open	Shorted	Shorted
3	HSI Input 3	Open	Shorted	Shorted
4	HSI Input 4	Open	Shorted	Shorted
5	HSI Input 5	Open	Shorted	Shorted
6	HSI Input 6	Open	Shorted	Shorted
7	HSI Input 7	Open	Shorted	Shorted
8	HSI Input 8	Open	Shorted	Shorted

OK Help

- Double-click on the Input you would like to label. Enter text in each field. Click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

3.16: External Devices

- This setting of the Device Profile configures the Nexus External Devices, a variety of I/O Modules configurable using the screen below.

- From the Device Profile screen (see section 3.2), double-click on the “External Devices” line.



- The following screen appears:

Device Profile: I/O Modules

Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Nexus Port	Log / Limit ID
1	Analog Out 0 - 1mA 4 ch	1	Edit	Edit	4	AO Module 1
2	Analog Out 0 - 1mA 8 ch	1	Edit	Edit	4	AO Module 2
3	Analog Out 0 - 20mA 4 ch	1	Edit	Edit	4	AO Module 3
4	Analog Out 0 - 20mA 8 ch	1	Edit	Edit	4	AO Module 4
5	Digital Input	1	Edit	Edit	4	DI Module 1
6	Digital Output	1	Edit	Edit	4	DO Module 2
7	KYZ Output	1	Edit	Edit	4	KYZ Module 1
8	Analog In 0 - 1mA 8 ch	1	Edit	Edit	4	AI Module 1
9	Analog In 0 - 20mA 8 ch	1	Edit	Edit	4	AI Module 2
10	Analog In 0 - 5V 8 ch	1	Edit	Edit	4	AI Module 3
11	Analog In 0 - 10V 8 ch	1	Edit	Edit	4	AI Module 4
12	No Device Assigned				4	
13	No Device Assigned				4	
14	No Device Assigned				4	
15	No Device Assigned				4	
16	No Device Assigned				4	

OK Help

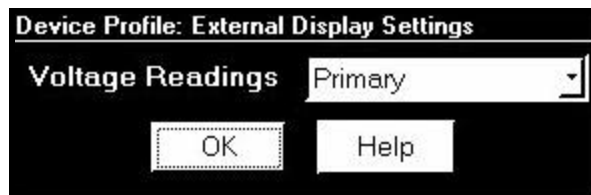
- Click in the Type column and use the pull down menu to select the specific I/O you wish to add and enter a unique address for each. Use the Edit buttons to configure each module further. Click Ok to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. For more details on I/O Modules, refer to Chapter 10.

3.17: External Display Options

- This setting of the Device Profile configures the Nexus External Display to read either Primary or Secondary volts. All other readings will be in the Primary, regardless of this setting.



- Many utility companies want to read secondary volts and primary power readings. This feature enables this to be accomplished.
- From the Device Profile screen (see section 3.2), double-click on the “External Display Options” line. The following pop-up appears.

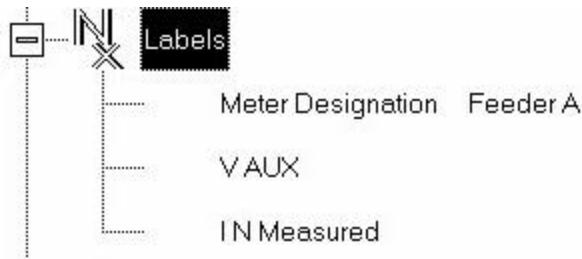


- Use the pull down menu to select either Primary or Secondary units for voltage. Click Ok to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

- Note:** There is no External Display Option icon for the Nexus 1270. External displays can be used with the meter but not set through the Device Profile.

3.18: Programming Labels

- Labels are user-defined names for the Nexus Monitor, the Auxiliary Voltage terminal and the I N Measured terminal.
 - Note:** It is important to label the Nexus Monitor (under “**Meter Designation**”) with a Unique Name because that label will become the name of the file for any **logs** retrieved from that Monitor. Duplicate Meter Designations interfere with retrieved log databases. See Ch. 7 for details on logs.
- From the Device Profile screen (section 3.2), click on the (+/-) button beside “Labels” or double-click on the “Labels” line. The following submenu appears:



2. Double-click on any of the designation names; the following screen appears.

The screenshot shows the 'Device Profile: Labels' dialog box. It contains a table with two columns: 'Label Name' and 'User Defined Label'. The table has three rows: 'Meter Designation' with 'Meter 1', 'V Aux' with 'V Aux 1', and 'I N Measured' with 'I N 1'. Below the table are two dropdown menus: 'Power Direction' set to 'Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received' and 'Power Factor Display' set to 'Method 1 Q2-Lag, Q3-Lead, Q4+Lead'. At the bottom are 'OK' and 'Help' buttons.

Label Name	User Defined Label
Meter Designation	Meter 1
V Aux	V Aux 1
I N Measured	I N 1

Power Direction: Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received

Power Factor Display: Method 1 Q2-Lag, Q3-Lead, Q4+Lead

OK Help

3. Enter the labels in the appropriate fields. Meter Designation **must** be set for Partial Log Retrieval.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor.

❖ **Note:** For meter designations, you can use any character allowed by Windows Operating System for a File Name (since that meter designation will be used as the File Name).
 In English versions the following characters will not work: \ / : * ? " < > |.
For meters used internationally by multilingual users, it is recommended that you use ONLY alphanumeric characters allowed by your Operating System.

3.19: DNP Custom Classes Map

- The DNP Custom Classes Map is a useful tool for prioritizing the readings in your system and the frequency of the readings. The DNP Custom Classes Map also keeps your system free from thousands of unwanted readings.
1. From the Device Profile screen (section 3.2), click on the (+/-) button beside “DNP Custom Classes Map” or double- click on the “DNP Custom Classes Map” line. The screen appears:

Items	Port 1 Class	Port 2 Class	Port 3 Class	Port 4 Class
Volts AN, BN, CN	1	Not Used	Not Used	Not Used
Volts Aun	Not Used	Not Used	Not Used	Not Used
I A, B, C	Not Used	Not Used	Not Used	Not Used
I Nn	Not Used	Not Used	Not Used	Not Used
I Nc	Not Used	Not Used	Not Used	Not Used
Volts AB, BC, CA	1	Not Used	Not Used	Not Used
VA A, B, C	Not Used	Not Used	Not Used	Not Used
VA Total	Not Used	Not Used	Not Used	Not Used
VAR A, B, C	1	Not Used	Not Used	Not Used
VAR Total	Not Used	Not Used	Not Used	Not Used
Watt A, B, C	1	Not Used	Not Used	Not Used
Watt Total	Not Used	Not Used	Not Used	Not Used
Frequency	Not Used	Not Used	Not Used	Not Used
Power Factor A, B, C	1	Not Used	Not Used	Not Used
Power Factor Total	1	Not Used	Not Used	Not Used
Volt & Current Imbalance	Not Used	Not Used	Not Used	Not Used

2. Click on the arrow of the pull-down menu next to Edit/View. Select the type of **reading** you want to edit or view. Then select a Port and a Class (0, 1, 2 or 3) for that reading. Click OK. Each type of reading will have its own screen.
3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1250 Meter.

Example: The screen above shows the selection of 1 Second Readings for Volts AN, BN, CN, IA, B, C and Frequency from Port 1 as a Class 1. Those readings will be collected by an RTU (or similar device) and displayed on your PC. Other readings will be displayed in other classes at other frequencies or not at all.

3.20: Internal KYZ Outputs

- The Nexus 1250 has no Internal KYZ Outputs. The Internal KYZ Outputs settings allow you to assign a channel and determine other settings for the Heartbeat LED. (The Nexus 1270 is available with the KYZ Output Option.)
1. From the Device Profile screen (section 3.2), click on the (+/-) button beside “Internal KYZ Settings” or double- click on the “Internal KYZ Settings” line. The screen appears:

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode
HB LED	Quad (1 + 4) Watthour	1.8000	5	Enable

OK Help

2. Using the pull-down menu next to HB LED, assign a channel to the Heartbeat LED. Then, make changes to Watt Hour per Pulse, Pulse Width and Mode for the Heartbeat LED. There may also be a Form column on your screen. Form A = Transition. Form C = Pulse.
3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the Update Device button. This sends the new profile to the Nexus 1250 Meter.

❖ **Note:** For Nexus 1250 Only: To make the Nexus 1250 follow the settings on this screen, go to the Test Pulse screen after the Device Profile has been updated. On the Test Pulse screen, click the “On” button. Ignore the settings on this screen (see section 3.23).

3.21: Accumulations Rollover

- The Accumulations Rollover screen in the Device Profile (section 3.2) allows you to enter a value at which the accumulations will rollover. (If the number that appears on this screen is too large, a warning screen will ask for a smaller number.) Click OK.

Accumulations rollover

Enter the Number at which roll over will occur

10000

Example: Entering 10000 the displays will show 0000 - 9999

OK Cancel

3.22: Nexus Custom Modbus Map

- The Custom Modbus Map allows you to position up to 256 Registers (or the equivalent of 2K, whichever is lower) to readily provide the functionality you want from your Nexus.

Item	Modbus Map Line	Point	Registers	Modbus Register	Description	Channel
1	0	0	8	412289	Device Name	
2	18	0	2	412297	Tenth Second Phase to Neutral Volts	Volts AN
3	18	1	2	412299	Tenth Second Phase to Neutral Volts	Volts BN
4	18	2	2	412301	Tenth Second Phase to Neutral Volts	Volts CN
5	20	0	2	412303	Tenth Second Current(A, B, C)	IA
6	20	1	2	412305	Tenth Second Current(A, B, C)	IB
7	20	2	2	412307	Tenth Second Current(A, B, C)	IC
8	22	0	2	412309	Tenth Second Phase to Phase Volts	Volts AB
9	22	1	2	412311	Tenth Second Phase to Phase Volts	Volts BC
10	22	2	2	412313	Tenth Second Phase to Phase Volts	Volts CA
11	25	0	2	412315	Tenth Second VAR (A, B, C)	VAR A
12	25	1	2	412317	Tenth Second VAR (A, B, C)	VAR B
13	25	2	2	412319	Tenth Second VAR (A, B, C)	VAR C
14	27	0	2	412321	Tenth Second Watts (A, B, C)	Watts A
15	27	1	2	412323	Tenth Second Watts (A, B, C)	Watts B
16	27	2	2	412325	Tenth Second Watts (A, B, C)	Watts C
17	29	0	2	412327	Tenth Second Frequency	Frequency
18	32	0	1	412329	Tenth Second V aux Phase Angle	V Aux

OK Clear all Clear Cancel Print Help Registers 41 of 256

The screen is simple to use. Select any Register from the Nexus Modbus Map that has a Line and Point. Enter the selected Line and Point numbers (see below). The software enters the number of Registers, Register Number, Description and Channel. The software also keeps a total of Registers Used in the lower right corner. Click OK to Update the Nexus.

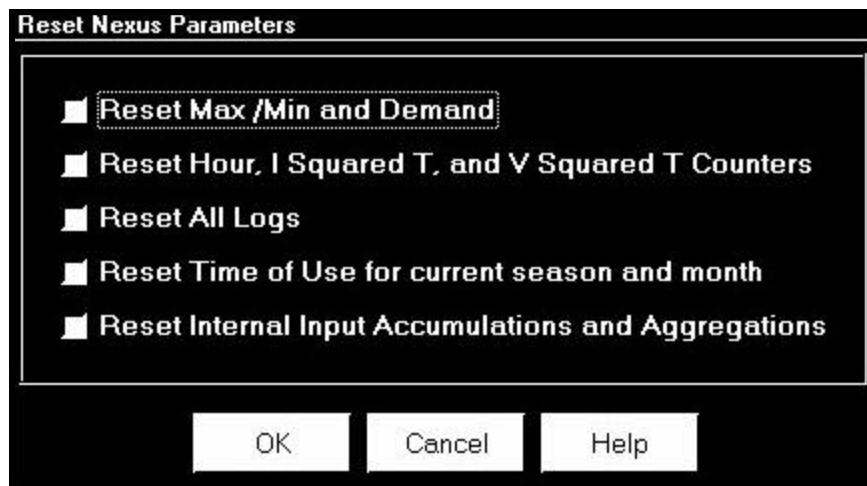
1	Address	Line	Pt	Description	Range	Units	Type	R/W	Notes
2	Device Identification Block								
3	00001-00008	0	0	Device Name			F1	R	
4	00009-00016	1	0	Firmware Variation String 1			F1	R	
5	00017-00024	1	1	Firmware Variation String 2			F1	R	
6	00025-00032	1	2	Firmware Variation String 3			F1	R	
7	00033-00040	1	3	Firmware Variation String 4			F1	R	

Next, enter the Modbus Register Number and Data Type (412289 F1, for example) into your SCADA software. If you have difficulty entering the Register Number, update your software. The Data Type is found in the Type column (see above) of the Modbus Register Map (which can be found on our website at electroind.com in the Free Downloads section).

You are now ready to easily access the data you use most often through your SCADA software.

3.23: Resetting Max/Min and Demand, Hour Counters, Logs, Time-of-Use and Internal Input

1. From the menu bar select Tools, Reset Nexus Information. The following screen appears.

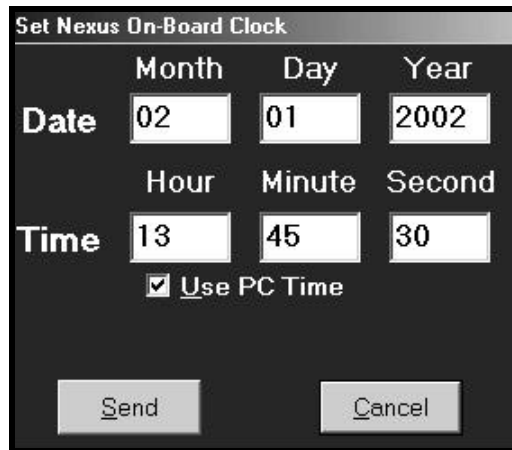


2. Click in the box beside the values you would like to reset. Click OK.
- ❖ **Note:** If you click Reset Logs, a **Warning** will appear asking you if you want to **Save Connected Device Settings**. Click on the settings you would like to save, then proceed with the Update. If you do not save the settings, they will be overwritten.
3. For each box you select, a window will appear which states that the “Reset is Completed”. Click OK. The reset is completed.
4. You can password protect this feature by enabling the Password feature of the Nexus. (See Chapter 11 for details).

3.24: Set and Retrieve Nexus Time

- The Nexus Monitor uses its on-board clock for time-stamping any logs it is recording. To **set** the Nexus clock:

1. Select Tools, Set Nexus Time. The Nexus On-board Clock screen appears:



The screenshot shows a dialog box titled "Set Nexus On-Board Clock". It contains two rows of input fields. The first row is labeled "Date" and has three fields for "Month", "Day", and "Year" with values "02", "01", and "2002" respectively. The second row is labeled "Time" and has three fields for "Hour", "Minute", and "Second" with values "13", "45", and "30" respectively. Below these fields is a checkbox labeled "Use PC Time" which is checked. At the bottom of the dialog are two buttons: "Send" and "Cancel".

- To synchronize the Nexus Monitor and your computer, leave the Use PC Time box checked.
 - To set the date and time independent from the PC, deselect the Use PC Time box and enter the time and date settings.
2. Click the Send button to update the Nexus Monitor's time settings.

- To **retrieve** the Nexus Monitor device's current time and date settings:

1. Select Tools, Retrieve Nexus Time. The following screen appears. Date and running time are displayed in LEDs. If the IRIG-B signal is present on the IRIG-B Input of the Nexus Device, a green IRIG-B appears next to the time.



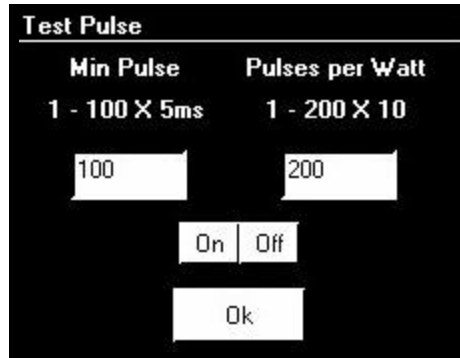
The screenshot shows a dialog box titled "Current Nexus Device Time". It contains two rows of display fields. The first row is labeled "Date" and shows "02/01/2002 Friday". The second row is labeled "Time" and shows "14:07:53.70". Below these fields is a small square indicator. At the bottom of the dialog are two buttons: "OK" and "Help".

2. Click OK to return to the main Nexus Communicator screen.

3.25: Test Pulse

- The Test Pulse sets the Nexus Monitor's Heartbeat LED to flash in proportion to the secondary watt-hours. This feature is generally used to test the meter for revenue accuracy. **Please Note: You MUST have an accurate source in order to retrieve accurate information.**

1. Select Tools, Test Internal KYZ Pulse. The following screen appears:



The screenshot shows a screen titled "Test Pulse". It has two columns: "Min Pulse" and "Pulses per Watt". Under "Min Pulse", it says "1 - 100 X 5ms" and there is a text input field containing "100". Under "Pulses per Watt", it says "1 - 200 X 10" and there is a text input field containing "200". Below these fields are two buttons labeled "On" and "Off", and at the bottom is a button labeled "Ok".

2. The **Min Pulse** field represents how long the heart-beat light will remain illuminated, from a minimum of 5 ms up to a maximum of 500 ms.
3. The **Pulses per Watt** field represents how many pulse flashes will occur per watt-hour, up to 2000 pulses maximum. This pulse is based on secondary watt readings.
4. Click On to enable the pulse function. Click Off at any time to disable it.
5. Click OK to return to the main Nexus Communicator screen.

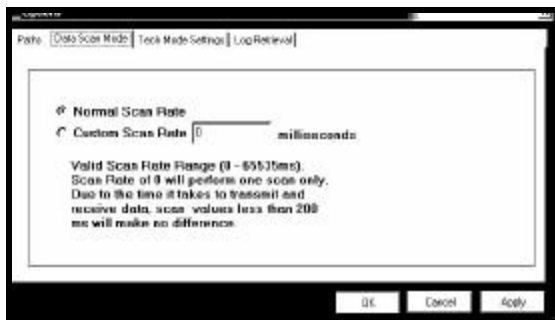
- ❖ **Note:** For Nexus 1250 Only: If settings from section 3.20 are being used, ignore the settings displayed on this screen.

3.26: Options

- Select Options from the View menu. Click tabs to show the following screens:



Paths: View or change the paths Nexus Communicator uses to store any copied, exported or retrieved data.



Data Scan Mode: Select Normal Scan Rate or create Custom Scan Rate between 0 - 65535 scans per millisecond.



Tech Mode Settings: Enter Password to Enable Tech Mode. If a Password is not entered, Tech Mode will remain disabled.



Log Retrieval: Click the box on this screen to keep a log from being updated while it is being retrieved.

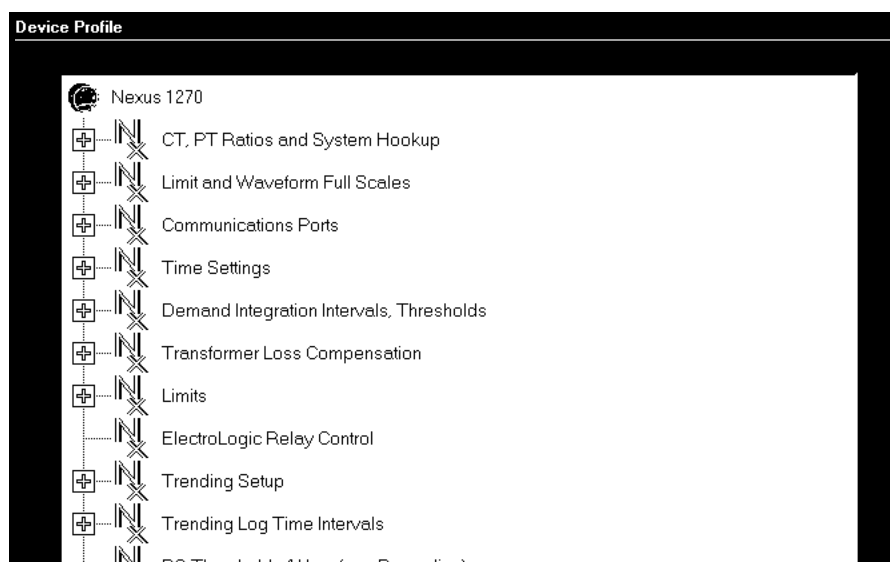
- Make any adjustments using the browse buttons. Click Apply to execute the changes; click OK to return to the main Nexus Communicator screen.

Chapter 4

Configuring the Nexus 1270 Meter

4.1: Overview

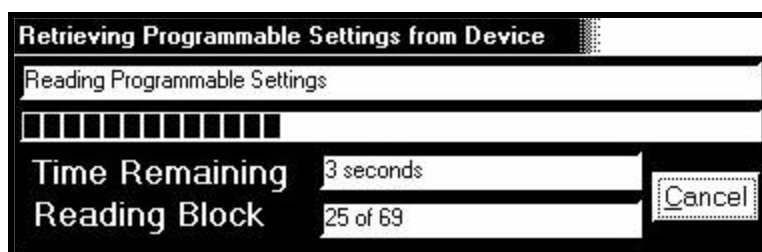
- Nexus Communicator enables you to configure a Nexus 1270 Socket Meter's programmable settings, which are stored in the unit's Device Profile. Scroll down to view the rest of the menu (see section 4.2). To configure the Nexus 1250, see Chapter 3. See Chapter 5 for Futura+.



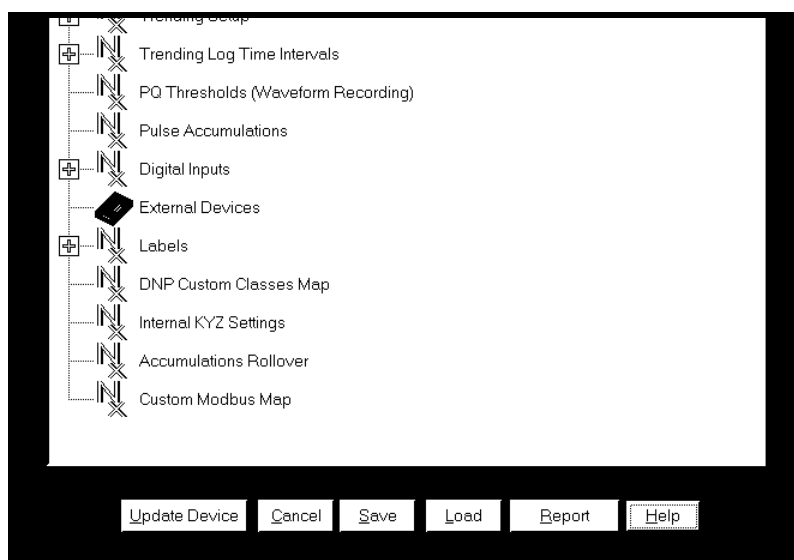
- The following is an outline of the procedure for configuring a Nexus 1270 Meter:
 1. **Retrieve** the Nexus Meter's Device Profile (section 4.2);
 2. **Configure** the programmable settings stored in the Device Profile (sections 4.3–4.16);
 3. **Send** the new Device Profile back to the Nexus Monitor (section 4.2).
- ❖ **Note:** If you click the Save, Load or Update buttons, you **MUST** have a unique Meter Destination Label so that the file is saved, loaded or updated to the intended device.
- This chapter also covers:
 - Resetting Max/Min/Demand, Hour Counters, Logs, Time-of-Use, Internal Input (section 4.21)
 - Setting and Retrieving Nexus Time (section 4.22)
 - Test Pulse (section 4.23)
 - Options (section 4.24)
- ❖ **Note:** The External Devices section of the Device Profile is covered in Chapter 10, Nexus External I/O Modules. For details on DNP, refer to DNP V3.00 Protocol Assignments for Nexus Rev 1.2.

4.2: Retrieving and Sending Device Profiles

1. Click on the Edit Profile button, or select Tools, Edit Current Device Profile. Nexus Communicator retrieves the programmable settings from the currently connected Nexus Monitor. The following screen appears:



2. A dialogue box appears to confirm that the profile was retrieved successfully. Click OK. The Device Profile screen appears:



3. This screen contains all the programmable settings currently stored in the connected Nexus Monitor. Configure each of the programmable settings by clicking on the (+/-) icon and then double-clicking on the selected parameter. (See sections 4.3–4.16 for details on editing each setting.)
4. After you have finished configuring any or all of the programmable settings, use the **BUTTONS** at the bottom of the screen to execute the following tasks:
 - **Implement the changes** by clicking on the **Update Device** button. This sends the new, edited Device Profile to the Nexus Monitor. You must update the Nexus Device profile for any of the programmable settings to take effect. A **Warning** will appear asking you if you want to **Save Connected Device Settings**. Click on the settings you would like to save, then proceed with the Update.
 - **Store the profile for later use** by clicking on the **Save** button. A dialogue box will ask where you would like to save the profile.

- **Open a previously saved profile** by clicking on the **Load** button. A dialogue box will ask for the location of the saved profile.
- **Print a copy of the profile** by clicking on the **Report** button. The Report screen will appear:

Page Arrows: Select a page to view.

Zoom: Adjust the Viewing Magnification.

Print Pages: Adjust the Range of Pages to be printed at 100%.

Print: Print selected pages. This screen sends you to Print Setup screen where you will select printer, properties, paper and orientation. Click OK to Print.

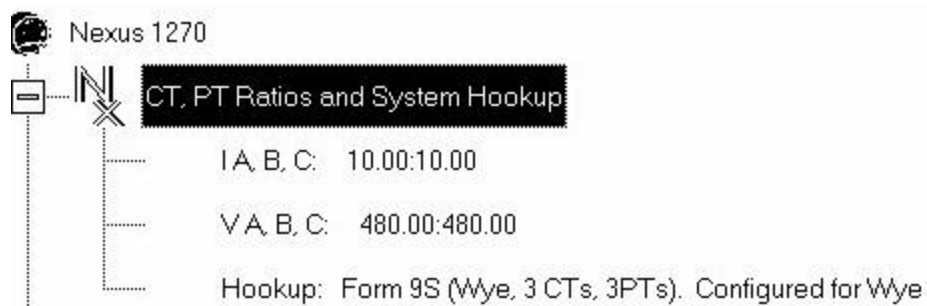
Save: Save these selections for future use.

Done: Exit the screen and return to the Device Profile screen.

❖ **Note:** If you change the Com settings for the Nexus, you will not be able to communicate with the Nexus. You will have to sign off and sign on again with the new settings.

4.3: Programming the CT and PT Ratios and System Hookup

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the “CT, PT Ratios and System Hookup” line. The following submenu appears:



- This screen displays the current Device Profile's settings for CT, PT ratios and the meter form used for hookup. The values shown are for example only.

2. Double-click on any of the settings; the CT and PT Ratios screen appears:

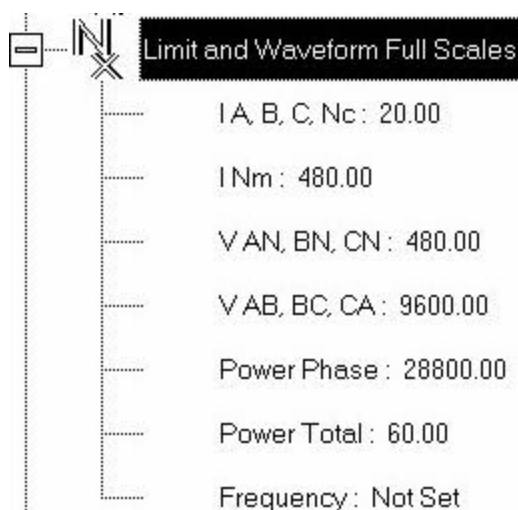
3. Make changes to this screen according to the requirements of your application.

- When you change a PT or CT ratio, Nexus Communicator updates the corresponding Full Scale value entered in the Limits and Waveforms Full Scales setting (see section 4.4).
- Using the pull down menu, choose the hook up service that matches the connection you have to the Nexus 1270. Selections may include: Wye, Delta 3CTs, Delta 2 CTs, 2.5 Element, 4 Wire Delta. The Device Profile screen will change to reflect your selection. See the *Nexus 1270 Installation and Operation Manual* for diagrams of these forms.
- Click OK. The following screen asks you to verify the K_h/K_e Ratio for the Test Pulse Setting. K_h/K_e Ratio is Secondary Watthour Constant over kWh (the energy).

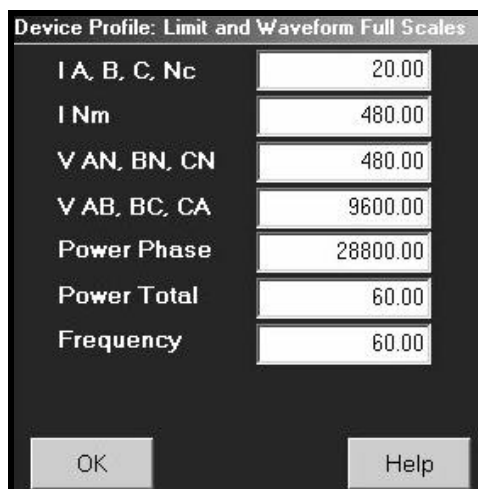
- Click Yes. Or, Click No and re-enter values in the CT & PT Ratio screen.
4. When all changes are entered, click OK to return to the main Device Profile screen. Click on the **Update Device** button. This sends the new profile to the Nexus Monitor. Then, Reset Logs.

4.4: Programming Limit and Waveform Full Scales

- All Limit and Waveform settings (sections 4.9 and 4.12, respectively) are based on a percentage of the Full Scale. Full Scales are based on the CT and PT ratios (see section 4.3).
 - **Be sure to set the CT and PT ratios first;** Nexus Communicator automatically recalculates the Full Scales every time the CT and PT ratios change.
1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside “Limit and Waveform Full Scales” or double-click on the “Limit and Waveform Full Scales” line. The following submenu appears:



- This screen displays the current Device Profile’s settings for the Limit and Waveform Full Scales. The values shown are for example only.
2. Double-click on any of the settings; The Limit and Waveform Full Scales screen appears.



3. Enter the Full Scale for each parameter:
 - The Limit and Waveform settings (section 4.9 and 4.12, respectively) will be based on a percentage of the Full Scales entered here.
 - Nexus Communicator automatically recalculates the Full Scales every time the CT and PT ratios change.
 - Power Phase is the amount of power per each phase.
 - Power Total is the power of all phases combined.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. To Reset Logs, see section 4.21.

4.5: Programming the Communications Ports

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the “Communications Ports” line. The following submenu appears:



2. Double-click on port you would like to change; the Communications Settings screen appears:
 - This screen displays the Device Profile’s settings for the Nexus 1270’s three programmable Communications Ports: Address, Baud Rate, Data Bits, Parity, Stop Bits, Transmit Delay, Communication Protocol, Network Option and Internal Modem Option. You may use the on-board display or one of the Nexus External Displays to learn the current baud rate, address and communication protocol of each Nexus Meter port. **The settings for the Optical Port are fixed and cannot be changed. Port 1 and Port 4** are the meter’s RS-485 ports and are used for RS-485 communication with a variety of devices. Port 3 is optional and can be ordered as an additional RS-485 port, Internal Modem or Ethernet. Ports 1, 3 and 4 are factory set at 115200 baud rate, Modem Gateway is 38,400 maximum. See the *Nexus 1270 Manual* for hardware.

Device Profile: Communications Settings

Port 1	Port 3 (Optional)	Port 4 (Ext Devices)
Address: 1	Address: 1	Address: 1
Baud Rate: 115200	Baud Rate: 38400	Baud Rate: 115200
Data Bits: 8	Data Bits: 8	Data Bits: 8
Parity: None	Parity: None	Parity: None
Stop Bits: 1	Stop Bits: 1	Stop Bits: 1
Tx Delay: 0ms	Tx Delay: 0ms	Tx Delay: 0ms
Protocol: Modbus RTU	Protocol: Modbus ASCII	Protocol: Modbus RTU
	Mode: Slave	Mode: Slave

Network Settings (If network option was purchased)

IP Address: 10 0 0 1
Subnet Mask: 255 255 255 0
Default Gateway: 255 255 255 255

Internal Modem Settings (If internal Modem option was purchased)

Answer Phone on: 7 Rings
Modem Gateway Baud Rate: 38400

OK Help

3. Make changes to this screen according to the requirements of your application by clicking on the box or pull-down menu of any of the following settings:

- **Address:** Assign an address to each port to communicate with other devices. Multiple Nexus Monitors on an RS-485 bus must each have a unique address set for the port that is connected to the bus. Type in unique address.
- **Baud Rate:** The baud rate entered in this field must match the baud rate of the device that will be connected to the Nexus Monitor at this port. Use 9600 for modem connections. From the pull-down menu, select 4800, 9600, 19200, 38400, 57600, or 115200.
- **Data Bits:** for Modbus RTU and ASCII, leave the Data Bits at 8. Other protocols may require a different setting. Use the pull-down menu to select from: 5, 6, 7 or 8.
- **Parity:** for Modbus RTU and ASCII, leave the Parity at None. Other protocols may require a different setting. Use the pull-down menu to select from: None, Even, Odd, Mark or Space.
- **Stop Bits:** for Modbus RTU and ASCII, leave the Stop Bits at 1. Other protocols may require a different setting. Use the pull-down menu to select from: 1, 1.5 or 2.
- **TxDelay** (Transmit Delay): leave the TxDelay at 0ms unless you are using equipment that requires a delay in the response time, such as a radio modem. Use the pull-down menu to select from: 0ms, 10ms, 20ms, 30ms, 40ms, 50ms, 60ms, 60ms or 70ms.
- **Protocol:** Direct Connections made through Nexus Communicator must use either Modbus RTU or Modbus ASCII protocol (Modbus RTU is recommended). Modem Connections made through

Nexus Communicator **must use Modbus ASCII only**. Use the pull-down menu to select from: Modbus RTU, Modbus ASCII or DNP 3.0. See Chapter 2 for details.

- **Mode** (Port 4 only): If you are using I/O modules, set one of these ports in Master mode. Set the port to operate at 57600 baud. To change the setting, use the pull-down menu to select Slave or Master. Make other changes for your application.
- **Internal Network Option:** If your Nexus has the Internal Network Option, see your Network Administrator for the correct settings. Settings will vary from network to network.
- **Internal Modem Option:** If your Nexus has the Internal Modem Option, set the Phone Rings from the pull-down menu. Set the Baud Rate to 38400, or to match your system baud rate.
- **Dial Out Profile:** Click the Dial Out Profile button and the following screen appears. Details on programming this screen and on the Modem Dial In/Dial Out Function are in Chapter 12 of this manual.

Modem Programming

Primary phone number settings Number: 516-334-0870 Retry delay: 1 Minutes Retry limit: 1 Attempts Connection type: Computer	Secondary phone number settings Number: Retry delay: 1 Minutes Retry limit: 1 Attempts Connection type: Computer									
Communications settings Activity timeout limit: 30 Minutes Call delay timer limit: Seconds Callback type: Playback Call failure reset limit: 49 Hours Share the phone line: <input checked="" type="checkbox"/>	Modem settings Rings to answer: 3 Rings Identification: Password: Enable password: <input checked="" type="checkbox"/> Violation limit: 3 Attempts Violation lockout time: 32 Hours									
Dial out on the following conditions <table border="0"> <tr> <td><input checked="" type="checkbox"/> Limits status change</td> <td><input checked="" type="checkbox"/> CBEMA Power quality event</td> <td><input type="checkbox"/> Cycling of control power</td> </tr> <tr> <td><input type="checkbox"/> High speed input change</td> <td><input type="checkbox"/> Control output change</td> <td><input type="checkbox"/> Modem password failure</td> </tr> <tr> <td><input type="checkbox"/> Waveform record captured</td> <td><input type="checkbox"/> Filling of meter memory</td> <td><input type="checkbox"/> Failure of communication with Nexus</td> </tr> </table> Log full limit threshold (All Logs): 90 %		<input checked="" type="checkbox"/> Limits status change	<input checked="" type="checkbox"/> CBEMA Power quality event	<input type="checkbox"/> Cycling of control power	<input type="checkbox"/> High speed input change	<input type="checkbox"/> Control output change	<input type="checkbox"/> Modem password failure	<input type="checkbox"/> Waveform record captured	<input type="checkbox"/> Filling of meter memory	<input type="checkbox"/> Failure of communication with Nexus
<input checked="" type="checkbox"/> Limits status change	<input checked="" type="checkbox"/> CBEMA Power quality event	<input type="checkbox"/> Cycling of control power								
<input type="checkbox"/> High speed input change	<input type="checkbox"/> Control output change	<input type="checkbox"/> Modem password failure								
<input type="checkbox"/> Waveform record captured	<input type="checkbox"/> Filling of meter memory	<input type="checkbox"/> Failure of communication with Nexus								
<div style="text-align: center;"> <input type="button" value="OK"/> <input type="button" value="Help"/> </div>										

- ❖ **Note:** Any changes you make here may adversely affect communications. For example, if you change the baud rate of the port connected to a computer, be sure to make the same change to the computer port's baud rate. If you change a port's address, be sure to update the address settings of any device that communicates with the port. The baud rate of the port used by an Nexus External Display should always be set at **9600**.
4. When all changes are entered, click OK to return to the main Device Profile screen. Click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter. Then, Reset Logs.

4.6: Time Settings

■ To edit a Device Profile's time settings:

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the "Time Settings" line. The following submenu appears:



- This screen displays the current Device Profile's time settings:
 - DST=Daylight Savings Time.
2. Double-click on any of the programmable settings ("Time Zone", etc.); the Time Settings screen appears.



3. Make changes to this screen according to the requirements of your application:

- **Zone Descriptor:** sets the Time Zone for the Nexus Monitor. 0=Greenwich Mean Time. For a Greenwich Mean Time Table, see page 3-12 of this manual.

GMT Greenwich Mean Time Table (Dublin, London)			
-1:00	Azores	+1:00	Brussels, Paris, Warsaw
-2:00	Mid-Atlantic	+2:00	Athens, Cairo, Helsinki
-3:00	Buenos Aires, Georgetown	+3:00	Baghdad, Kuwait, Moscow, Tehran
-4:00	Atlantic Time (Canada) Santiago	+4:00	Kabul, Baku
-5:00	Eastern Time (US & Canada) Lima	+5:00	Karachi
-6:00	Central Time (US & Ca) Mx City	+6:00	Dhaka
-7:00	Mountain Time (US & Ca)	+7:00	Bangkok, Hanoi, Jakarta
-8:00	Pacific Time (US & Ca) Tijuana	+8:00	Beijing, Hong Kong, Singapore
-9:00	Alaska	+9:00	Osaka, Sapporo, Seoul
-10:00	Hawaii	+10:00	Brisbane, Melbourne, Guam, Hobart
-11:00	Midway Island	+11:00	Magadan, Solomon Islands
-12:00	Eniwetok	+12:00	Auckland, Fiji

- **Daylight Savings Information:** From the pull-down menu, select **Auto DST**, **Disabled** or **User Defined**.

Auto DST: Sets Daylight Savings Time automatically for the **United States only**. Time changes automatically occur at 2:00 AM (your local time), on the first Sunday in April and the last Sunday in October.

Disable: Disables an automatic adjustment for daylight savings.

User Defined: Allows you to set the Daylight Savings Time manually.

Begin: Set the Month, Day and Hour when the adjustment for Daylight Savings will commence.

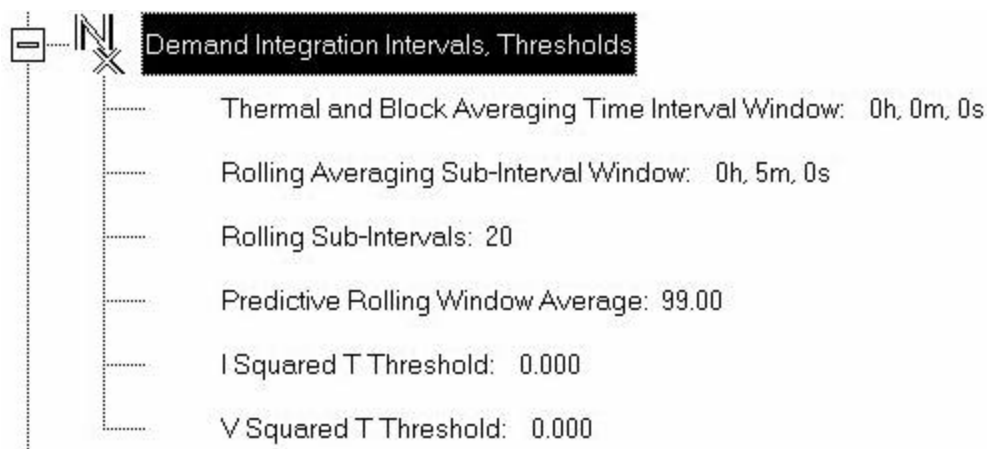
End: Set the month, day and hour when the adjustment for Daylight Savings will conclude.

4. To set the Nexus on-board clock, use Set Nexus Time from the Tools menu. (see section 4.22).
5. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. To Reset Logs, see section 4.21.

4.7: Programming Demand Integration Intervals

■ See the *Nexus 1270 Installation and Operation Manual* for details on Demand Integration Intervals.

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the “Demand Integration Intervals” line. The following submenu appears:



2. Double-click on any of the settings (“Thermal and Fixed Averaging Window:”, etc.) and the Demand Programming Screen appears:

A screenshot of the "Device Profile: Demand Integration" programming screen. The screen is divided into several sections with input fields and checkboxes:

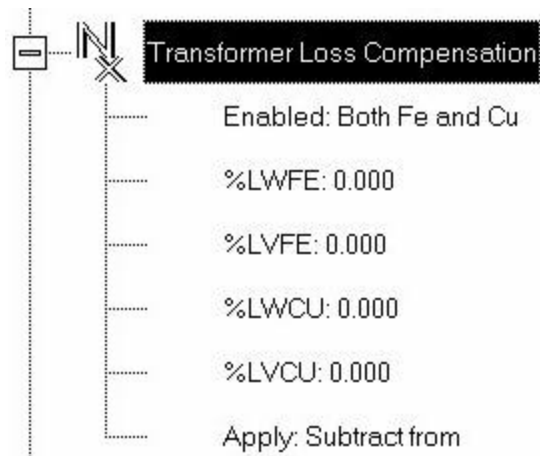
- Thermal and Block Averaging Time Interval Window:** 0 Hours, 0 Minutes, 1 Seconds
- Rolling Averaging Sub-Interval Window:** 0 Hours, 0 Minutes, 1 Seconds
- Rolling Sub-Intervals:** 255. Rolling Average Interval Window: 4.25 Minutes
- Predictive Rolling Window Average:** 100.00 %
- Block Window Sync:**
 - ☒ Use Sync Pulse HS Input #: 1
 - ☒ Generate End of Interval Pulse Relay #: 4 Pulse Width: 635 ms
- Primary Current and Voltage Thresholds:**
 - I Squared T: 0.000
 - V Squared T: 0.000

At the bottom are "OK" and "Help" buttons.

3. Make changes to this screen according to the requirements of your application.
 - Following is a brief description of each window and its function.
 - **Thermal and Block Averaging Time Interval Window:** allows you to set hours, minutes and seconds for a precise thermal and block window of demand data.
 - **Rolling (Sliding) Window:** allows you to set hours, minutes and seconds for a sliding window, which will give you a precise rolling view of demand data.
 - **Rolling (Sliding) Window Number:** allows you to set the number of rolling windows you would like to “string together”.
 - **Predictive Rolling Window Average:** Nexus gives you a precise (100% accurate) prediction of your demands.
 - **Block Window Sync:** synchronizes the Nexus Monitor with pulses from a High Speed Input connected to another meter. Click the Use Sync Pulse box and select the Input number (Block Window Demand Only). Click the Generate End of Interval Pulse to produce a synchronizing output and select a Relay and Pulse Width for the output.
 - **Thresholds:** Numbers programmed into these windows will effect the accumulation of data.
I Squared T: data won't accumulate until current reaches programmed level.
V Squared T: data will stop accumulating when voltage falls below programmed level.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button to send the new profile to the Nexus Monitor.

4.8: Programming Transformer Loss Compensation

1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside “Transformer Loss Compensation” or double-click on the “Transformer Loss Compensation” line. The following submenu appears:



2. This screen displays the current values for the Nexus Monitor’s Transformer Loss Compensation.
 - %LWFE = Percent Loss of Watts due to Iron
 - %LVFE = Percent Loss of Vars due to Iron
 - %LWCU = Percent Loss of Watts due to Copper
 - %LVCU = Percent Loss of Vars due to Copper
3. Consult Appendix B on Transformer Loss Compensation in the appendix pages of this manual.

4. Double-click on any of the loss values “%LWFE” etc; the following screen appears.

Device Profile: Transformer Loss Compensation

Percent Loss of Watts

Due to Iron

Due to Copper

Percent Loss of VARS

Due to Iron

Due to Copper

▼

☒ Add to

☐ Subtract from

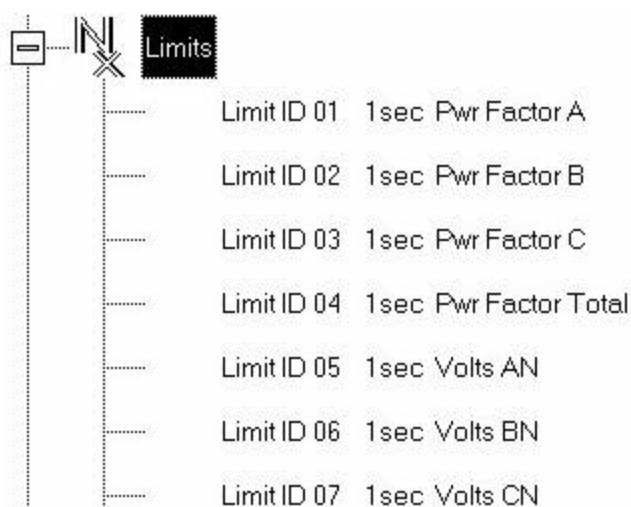
5. Click on TLC Calculator to find the values to enter into the Percent Loss windows. The Calculator button will launch an Excel Spreadsheet which will do the calculations for you once the required data is entered. A copy of the Excel Spreadsheet is in Appendix B.

Warning! Communicator will automatically launch the Excel Spreadsheet as part of its software package. But, for the TLC Button to work, you must have the Excel program in your system. If you do not have Excel software or if the spreadsheet file is not in the Communicator directory, a Warning will be displayed instead of the worksheet. You can do your own calculations using the hardcopy Transformer Loss Compensation Worksheet in Appendix B.

6. Enter the percent Loss of Watts and Vars for copper and iron in the appropriate fields. Enable Transformer Loss Compensation by selecting Iron only, Copper Only or Both Iron and Copper from the pull-down menu at the bottom of the screen.
 - **To add the compensation values to the measured watts and vars for delivered power,** click the **Add to** radio button.
 - **To subtract the compensation values from the measured watts and vars for received power,** click the **Subtract from** radio button.
7. When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter.

4.9: Programming Limits

- Limit settings are based on a percentage of the Full Scales (% of FS), which are set in the Limit and Waveform Full Scales section of the Device Profile (section 4.4). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup section of the Device Profile (section 4.3).
 - **Before programming Limits, set the CT and PT ratios first. Then, set the Limit and Waveform Full Scales.** The software automatically updates the Full Scale. However, you can set it separately from the CT and PT Ratios.
1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside “Limits” or double click on the “Limits” line. The following submenu appears:



- This screen displays the current Device Profile’s settings for Limits. Not all limits are shown above; “Limit ID” extend to 32.
2. Double-click on any of the settings (“Limit ID 01:”, etc.); The Limits screen appears.
- **Percentage of Full Scale settings:** The limits are set in % of full scale (% of FS) so that when a user creates a profile, he can keep his settings. This is true, even though the CT and PT Ratios change when the meter (or a new meter) is placed in a different location. Changing the CT and PT Ratios will not effect the % of full scale limits previously set. This is useful when using large numbers at meters.

Device Profile: Limits

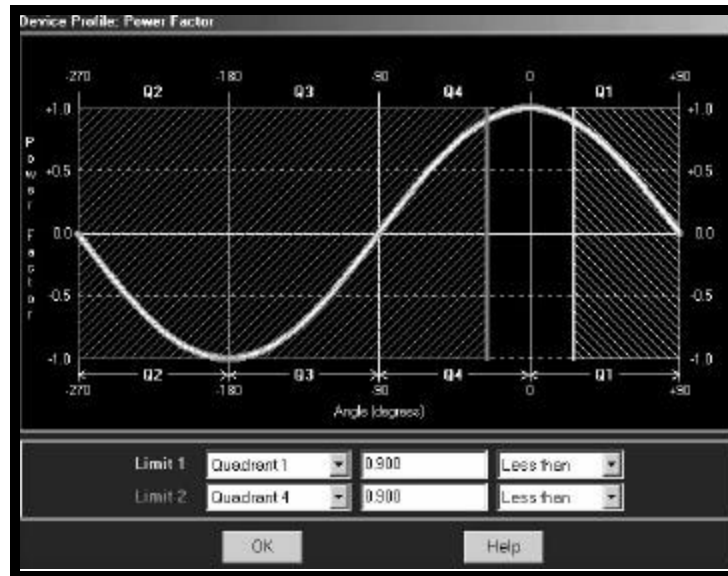
Limit ID	Type	Channel	Limit 1			Limit 2			Combination Limit 3
			Setting	Setpoint		Setting	Setpoint		
				% of FS	Primary		% of FS	Primary	
1	1sec	Volts AN	Below	2.50	3.00	Below	2.50	3.00	AND
2	1sec	Volts BN	Above	99.50	119.40	Above	76.25	91.50	AND
3	1sec	Volts CN	Below	75.00	90.00	Below	75.00	90.00	AND
4	1sec	I A	Above	25.50	255.00	Above	25.50	255.00	AND
5	1sec	I B	Below	50.00	500.00	Below	50.00	500.00	AND
6	1sec	I C	Below	50.00	500.00	Below	50.00	500.00	AND
7	1sec	Frequency	Above	50.00	30.00	Above	50.00	30.00	AND
8	1sec	I Nm	Below	50.00	2.50	Below	50.00	2.50	AND
9	Block Win Avg	Status	Below	-50.00		Below	-50.00		AND
10	Block Win Avg	Max VA	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
11	Block Win Avg	Max +VAR	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
12	Rolling Win Av	Pred VA	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
13	Rolling Win Av	Pred VAR	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND
14	Rolling Win Av	Pred Watt	Below	-50.00	-180000.00	Below	-50.00	-180000.00	AND

Channels	Primary Values at 100%
I A, B, C, Nc	1000.00
I Nm	5.00
V Phase to Neutral	120.00
V Aux	120.00
V Phase to Phase	207.85
Power Phase	120000.00
Power Total	360000.00
Frequency	60.00

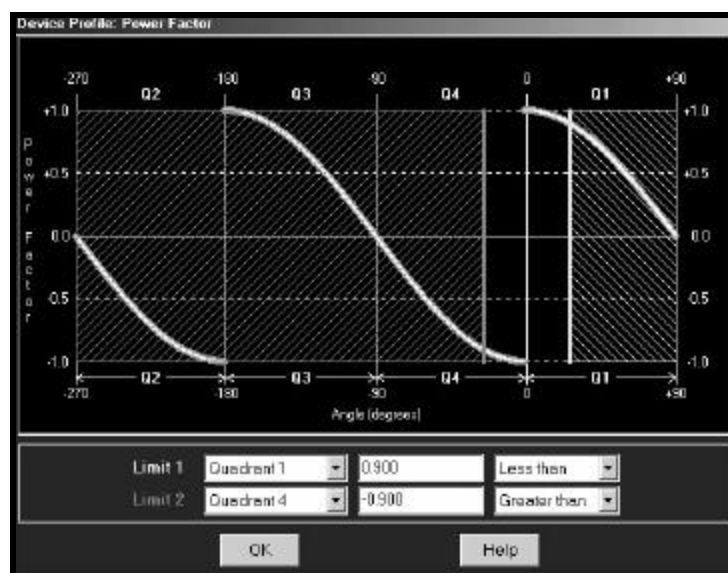
OK Help

3. Make changes to this screen according to the requirements of your application:

- **To set the type of limit and the channel assigned to it**, double click in either the Type or Channel column. From the pop-up menu, choose the desired settings and click OK.
- **To designate the limit as either Above or Below a percentage of the Full Scale**, click once in each Settings column and select the desired setting from the pull-down menu.
- **To set the percentage of the Full Scale at which the limit will trip**, enter the value in the % of FS column. Nexus Communicator automatically calculates the Primary value.
- Full Scales settings are shown in the lower left of the screen. These values are set in the Limits and Waveform Full Scales section of the Device Profile (section 4.4).
- **To set the Power Factor Limits**, double click on any of the Power Factor settings in the Limit 1 or Limit 2 column and the Power Factor Programming Screen will appear:



4. Power Factor is broken into four quadrants. The screen lets you set a limit in two of the four quadrants. **To set a limit:** from the pull-down menus, select a Quadrant and Less Than or Greater Than (Full Scales). Type in the Power Factor Number. The graph will illustrate your selections by shading the Out of Limit bands. The area of the graph not covered by shading is within **Normal Operational Range**. **Method 1 Quadrants:** Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead.
5. To display a graph of **Method 2 Quadrants:** Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead, go to the Programming Labels screen (section 3.18) of the Device Profile. In the lower drop down menu, click on Method 2. Then, return to the Limits screen. Click on any PF setting in the Limit 1 or Limit 2 column.



- ❖ **Note:** This meter is a real four quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.
5. When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. You may **Reset Logs** after updating the device. See section 4.21.

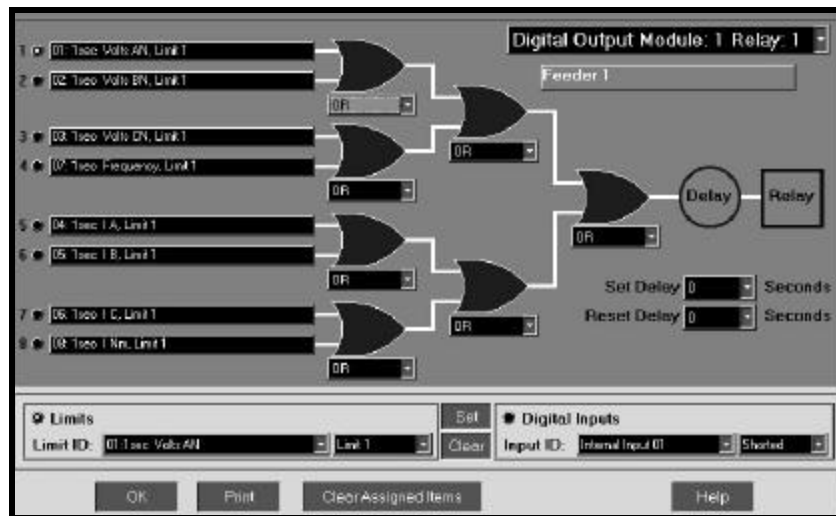
4.10: ElectroLogic Relay Settings

- To edit a Device Profile's ElectroLogic Relay settings:

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the "ElectroLogic Relay" line.



- The following screen appears. This screen displays the current Device Profile's settings:



2. To assign an item to the RelayLogic Tree, select an Input for the tree by clicking on a bullet next to numbers 1 through 8.
 - Next, choose Limits or Digital Inputs by clicking on the bullet in front of the word.

- Next, select the Limit or Input you want to assign to the RelayLogic Tree Input you selected.
 - Press Set to confirm your selection and the software will place the selection in the appropriate window in the screen.
 - After you have assigned all the RelayLogic Inputs, select the gates that will be used to combine the logic to trigger the relay. To select a gate, click on the gate or choose one from the drop-down menu below the gate.
3. To change items on the RelayLogic Tree, use the following steps:
- To change the selected relay and/or relay modules, select from the drop-down menu at the upper right hand corner of the screen.
 - To change the relay Set Delay, select from the drop-down menu to the right of the Set Delay Label.
 - To change the Relay Reset Delay, select from the drop-down menu to the right of the Reset Delay Label.
 - To clear an item from the Relay Tree, click on that item then click the Clear Button.
 - To clear ALL ITEMS from the Relay Tree, click the “Clear Assigned Items” Button.

NOTE: In order to use this screen, you must have purchased at least one External Relay Out module. For more details on External Modules, see Chapter 10 of this manual.

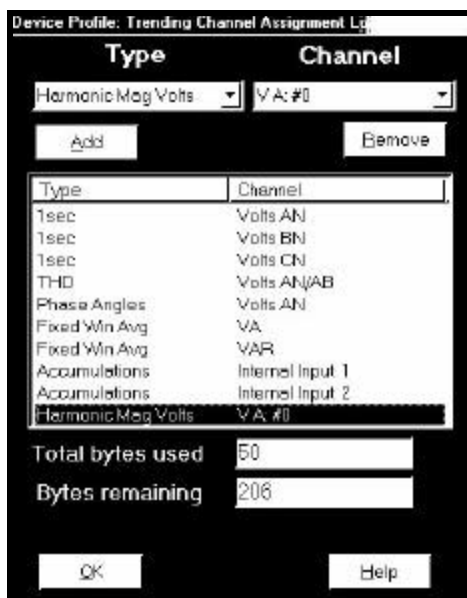
4.11: Programming the Trending Setup for Historical Logs 1 and 2

- The Trending Setup controls the channel assignments for Historical Logs 1 and 2. To set the Time Intervals for these Logs, see section 4.12. See Chapter 7 for how to view logs.

1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside “Trending Setup” or double-click on the “Trending Setup” line. The following submenu appears:



2. To change the settings for Log 1 double-click on “Log 1”. To change the settings for Log 2 click on “Log 2”. The Snapshot Channel Assignment Log 1 or 2 screen appears:



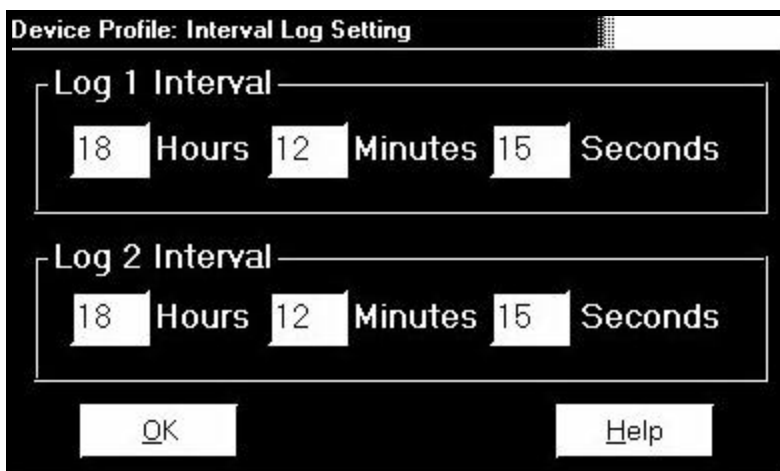
3. Make changes to this screen according to the requirements of your application:
 - **Type:** Using pull down menu, select the type of snapshot.
 - **Channel:** Using pull down menu, select a channel for the snapshot.
 - Click on Add to include the selections in the Log; click on Remove to delete.
 - To Remove multiple items, hold Control while clicking items to be removed. Click Remove.
 - To Remove a range of items, click the first item, hold Shift, then last item. Click Remove.
 4. When all changes are entered, click OK to return to the main Device Profile screen. Click on the **Update Device** button to effect changes. **Resetting Logs** is recommended (see section 4.21).
- Total bytes used and Bytes remaining screens display the memory status for that particular file. Nexus assumes 256 bytes of memory for each file. Total memory is determined at time of purchase.

4.12: Programming the Trending Log Time Intervals

- Trending Log Time Intervals determine the interval at which Historical Logs 1 and 2 will take a snapshot. To set the parameters for the logs, see section 4.10.
 - See Chapter 7 for how to view and retrieve logs.
1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside “Trending Log Time Intervals” or double-click on the “Trending Log Time Intervals” line. The following submenu appears:



- This screen displays the current Device Profile’s Trending Log Time Intervals. The values shown are for example only.
2. Double-click on either “Log 1 Interval” or “Log 2 Interval”; the Interval Log Setting screen appears:



3. Enter the hours, minutes and seconds for each log. The logs will be time-stamped based on the Nexus Monitor’s time, which is set using the Tools menu. See section 4.22.
4. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. It is recommended that you Reset Logs (see section 4.21) when changing settings that effect the logs.

4.13: Programming the Power Quality and Waveform Recording Thresholds

- The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus Monitor will execute a waveform capture and/or record a power quality event. See Chapter 7 for how to view logs.
 - PQ and waveform thresholds are given as a percentage of the Full Scales (% of FS). Set the Full Scales in the Limits and Waveform Full Scales section of the Device Profile (section 4.4). Full Scales are based on the CT and PT ratios set in the CT, PT Ratios and System Hookup (section 4.3).
 - **Before programming the PQ and Waveform Thresholds, set the CT and PT ratios. Then, set the Limits and Waveform Full Scales.**
- ❖ **Note on Sampling Rate:** A higher sampling rate allows for transients to be monitored. Generally, users will set the monitor to 128 samples per cycle for this purpose. Lower sampling rates have advantages because they allow you to record more cycles of information per event screen. Low sampling rates are better for long duration events, like motor starts or distribution faults. The Nexus enables users to tailor the recording for both these applications. For more information on Sampling Rate, see the graph on page 4-26.
1. From the Device Profile screen (see section 4.2), double-click on the “PQ Thresholds (Waveform Recording)” line; the Waveform—CBEMA Profile screen appears:

Device Profile: Waveform - CBEMA Profile

Channel	Waveform Above Setpoint		Waveform Below Setpoint		PQ Enable
	Value(%)	Enable	Value(%)	Enable	
Volts AN	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BN	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CN	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IA	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IB	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IC	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
INm	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts AB	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts BC	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volts CA	0.05	<input checked="" type="checkbox"/>	0.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Input	Waveform Enable	PQ Enable
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Sampling Rate Samples / Cycle @ 60Hz

Total Captures

A limit value of 100 % equals the following primary value

IA,B,C	<input type="text" value="20.00"/>	V P - N	<input type="text" value="480.00"/>	V P - P	<input type="text" value="831.00"/>
--------	------------------------------------	---------	-------------------------------------	---------	-------------------------------------

OK Help

■ Software Triggers:

2. To set the threshold for a PQ event and waveform capture, enter the desired percentage of Full Scale in the Value(%) column of the Above Setpoint and Below Setpoint sections. Full Scales are shown in the lower right corner of the screen.

❖ **Note on CBEMA:** The CBEMA plotting is a power quality standard known world-wide for recording the amount of damage voltage transient conditions have done to the equipment being monitored. The Nexus automatically records this information. For CBEMA purposes, the user programs internal set points for voltage below 90% and above 110% of full scale (+/- 10% from the nominal voltage). These setpoints are defined by the ITI (CBEMA) specification. The ITI (CBEMA) Curve is published by Information Technology Industry Council (ITI) and is available at:

http://www.itic.org/iss_pol/techdocs/curve.pdf.

A user can set a recording with tighter voltage limits to trigger a waveform recording. However, CBEMA plotting will be based only on the limits internally set.

❖ **Note on Setting the Nexus to Record Current Faults:** As discussed, the voltage setpoints are used to record voltage type events, such as voltage surges, sags and transients. The current settings are used to record faults on the line or in-rush currents from devices such as motors. Typically, to catch these events, set the limit to above 200% of full scale.

■ Waveform Clipping Threshold

- Nexus 1270 Standard Hardware - 91.0924A Peak before clipping.

■ Hardware Triggers:

3. To enable a Waveform or PQ recording for any of the 8 High Speed Inputs, click in the appropriate box. This will trigger a recording based on a contact trigger. This is useful to monitor an open device and to capture the waveform during that operation.

■ Samples per Cycle

4. To choose the **Samples per Cycle** to be recorded at 60 Hz, click on the Sampling Rate pull down menu. Choose from 16, 32, 64, 128, 256 and 512 samples per cycle. The number of samples per cycle you choose will inversely effect the number of cycles per capture.
 - If you select 256, a Capture Only pop up screen will ask you to select Volts A, B, C or I A, B, C.
 - If you select 512, a Capture Only pop up screen will ask you to select one of the individual channels.

As you increase the number of samples, you will record more detailed information. The graph below illustrates the “Effects of Sampling Rate”:

Effects of Sampling Rate					
Samples per Cycle	Channels		Samples per Channel	Cycles per Capture	Time (Approx)
	Analog	HSI			
16	7	8	1024	64	1 Second
32	7	8	1024	32	1/2 Second
64	7	8	1024	16	1/4 Second
128	7	8	1024	8	1/8 Second
256	3	8	2048	8	1/8 Second
512	1	8	4096	8	1/8 Second

- ❖ **Note on Waveform Event Captures:** A screen of data is one capture. If you set Total Captures to 3 and you are recording at 16 samples per cycle, you will record:

$$16 \text{ Samples} \quad 3 \quad \times \quad 64 = \quad 192 \text{ cycles of recorded waveforms}$$

$$128 \text{ Samples} \quad 3 \quad \times \quad 8 = \quad 24 \text{ cycles of recorded waveforms}$$

With the 2 meg module, you have a total of 64 total captures. With the 4 meg module, you have a total of 96 captures. You can partition the memory in any fashion required for the specific application. There is no limitation on the amount of cycles that can be recorded per event.

- To choose the total amount of captures, click on the Total Captures pull down menu. Select from 0 to 96 captures. The higher the number, the more information you will be “stringing together”.
- When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter.

4:14: Pulse Accumulations

- This section of the Device Profile displays a series of eight running totals. Each total can be added to (or subtracted from) other totals. This allows you to set the high speed inputs located directly on the Nexus monitor to pulse accumulate. Note: If you use these inputs for pulse accumulations, do not set them to record waveforms. If you do, you will record endless waveforms.
1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the “Pulse Accumulations” line. The following screen will appear:

Device Profile: Nexus Internal Input Pulse Accumulators Setup

Source	Units/Pulse	Accumulator	User Assigned Label
1	100	Add to 2	Apartment #1
2	100	Add to 1	Apartment #2
3	100	None	Apartment #3
4	100	Subtract from 3	Apartment #4
5	1	None	
6	1	None	
7	1	None	
8	1	None	

Source	Hour Reading	Accumulator
Nexus	Quadrant(1 + 4) Watt Hour	None

Aggregator	User Assigned Label
1	Apt #1 & 2
2	Apt #3 & 4
3	
4	

OK

- **Purpose for Pulse Accumulations:** This feature allows users to accumulate and aggregate polls from any pulse-generating device. For energy, other motors can be accumulated and aggregated together (or separately) with the Nexus internal energy registers. The pulse inputs can also be used to accumulate other utilities, such as water, gas, steam, etc.

2. Source: This is the particular input on the Nexus which will be accumulated.

Units/Pulse: This is the scale factor which normalizes the pulses so that they can be aggregated, if desired. Pulses are stored in primary values.

Accumulator: This allows you to place the pulse register into a separate accumulation register, which can aggregate or net values.

User assigned label: This window allows a user to enter a label designation so that when reading the Aggregator, the Nexus will display the source.

3. To add or subtract data, use pull down menu in each window of Accumulator column(s).
4. When all data has been entered, click OK to return to the main Device Profile screen. **For these changes to take effect, you must click on the Update Device button.** This sends the new profile to the Nexus 1270 Meter.

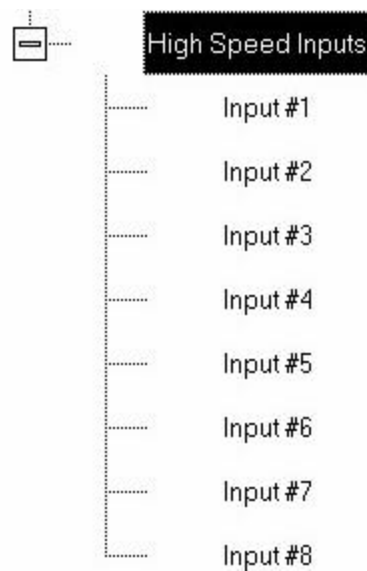
4.15: Programming Labels for the Digital Inputs

- This section of the Device Profile enables you to label the eight High Speed Inputs. Using this storage field allows a user to label the inputs so that when the data is later analyzed, the user knows the source of the status change.

1. From the Device Profile screen (see section 4.2), click on the (+/-) button or double-click on the “Digital Inputs” line. The following submenu appears:



2. Double-click on “High Speed Inputs”; the following submenu appears.



3. Double-click on any of the “Input #” lines; the High Speed Digital Input Assignments screen appears.

Device Profile: High Speed Digital Input Assignments

Input ID	Name	Open Label	Shorted Label	Normal Condi
1	HSI 1	Open	Shorted	Shorted
2	HSI 2	Open	Shorted	Shorted
3	HSI 3	Open	Shorted	Shorted
4	HSI 4	Open	Shorted	Shorted
5	HSI 5	Open	Shorted	Shorted
6	HSI 6	Open	Shorted	Shorted
7	HSI 7	Open	Shorted	Shorted
8	HSI 8	Open	Shorted	Shorted

OK Help

- Double-click on the Input you would like to label. Enter text in each field. Click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter.

4.16: External Devices

- This setting of the Device Profile configures the Nexus External Devices, a variety of I/O Modules configurable using the screen below.

- From the Device Profile screen (see section 4.2), double-click on the “External Devices” line.



- The following screen appears.

EXTERNAL DEVICES

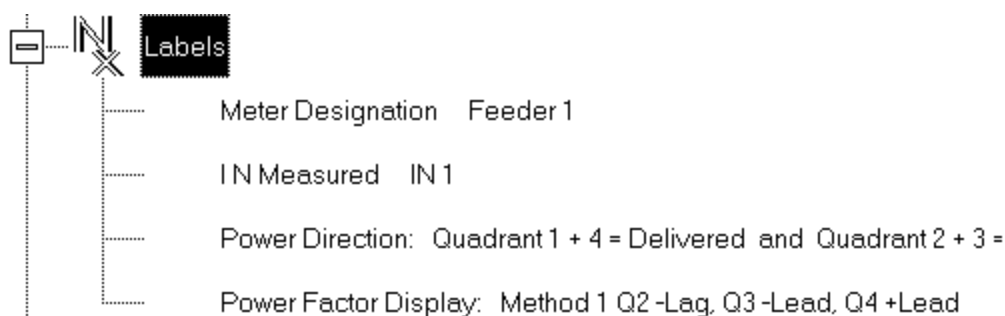
Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Nexus Port	Log / Limit ID
1	Analog Out 0 - 1mA 4 ch	1	Edit	Edit	4	AO Module 1
2	Analog Out 0 - 1mA 8 ch	1	Edit	Edit	4	AO Module 2
3	Analog Out 4 - 20mA 4 ch	1	Edit	Edit	4	AO Module 3
4	Analog Out 4 - 20mA 8 ch	1	Edit	Edit	4	AO Module 4
5	Analog In 0 - 1mA 8 ch	1	Edit	Edit	4	AI Module 1
6	Analog In 0 - 20mA 8 ch	1	Edit	Edit	4	AI Module 2
7	Analog In 0 - 5V 8 ch	1	Edit	Edit	4	AI Module 3
8	Analog In 0 - 10V 8 ch	1	Edit	Edit	4	AI Module 4
9	KYZ Output	1	Edit	Edit	4	KYZ Module 1
10	Digital Input	1	Edit	Edit	4	DI Module 1
11	Digital Output	1	Edit	Edit	4	DO Module 1
12	No Device Assigned				4	
13	No Device Assigned				4	
14	No Device Assigned				4	
15	No Device Assigned				4	
16	No Device Assigned				4	

OK Help

- Click in the Type column and use the pull down menu to select the specific I/O you wish to add and enter a unique address for each. Use the Edit buttons to configure each module further. Click Ok to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter. For more details on I/O Modules, refer to Chapter 10.

4.17: Programming Labels

- Labels are user-defined names for the Nexus Monitor, the Auxiliary Voltage terminal and the I N Measured terminal.
 - Note:** It is important to label the Nexus Monitor (under “**Meter Designation**”) because the label given will become the name of the file for any **logs** retrieved from that Monitor; see Chapter 7 for details on viewing stored logs.
- From the Device Profile screen (section 4.2), click on the (+/-) button beside “Labels” or double-click on the “Labels” line. The following submenu appears:



- Double-click on any of the designation names; the following screen appears.

Device Profile: Labels	
Label Name	User Defined Label
Meter Designation	Feeder 1
I N Measured	IN 1
Power Direction: Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received	
Power Factor Display: Method 1 Q2 -Lag, Q3 -Lead, Q4 +Lead	
<div>OK</div> <div>Help</div>	

- Enter the labels in the appropriate fields. Meter Designation **must** be set for Partial Log Retrieval.
- When all changes are entered, click OK to return to the main Device Profile screen. Click on the **Update Device** button to effect changes. This sends the new profile to the Nexus monitor.

- ❖ **Note:** For meter designations, you can use any character allowed by Windows Operating System for a File Name (since that meter designation will be used as the File Name).
In English versions the following characters will not work: \ / : * ? “ < > |.
For meters used internationally by multilingual users, it is recommended that you use ONLY alphanumeric characters allowed by your Operating System.

4.18: DNP Custom Classes Map

- The DNP Custom Classes Map is a useful tool for prioritizing the readings in your system and the frequency of the readings. The DNP Custom Classes Map also keeps your system free from thousands of unwanted readings.
1. From the Device Profile screen (section 4.2), click on the (+/-) button beside “DNP Custom Classes Map” or double-click on the “DNP Custom Classes Map” line. The screen appears:

Items	Port 1 Class	Port 3 Class	Port 4 Class
Volts AN, BN, CN	1	Not Used	Not Used
Volts Aux	Not Used	Not Used	Not Used
I A, B, C	1	Not Used	Not Used
I Nm	Not Used	Not Used	Not Used
I Nc	Not Used	Not Used	Not Used
Volts AB, BC, CA	Not Used	Not Used	Not Used
VA A, B, C	Not Used	Not Used	Not Used
VA Total	Not Used	Not Used	Not Used
VAR A, B, C	Not Used	Not Used	Not Used
VAR Total	Not Used	Not Used	Not Used
Watt A, B, C	Not Used	Not Used	Not Used
Watt Total	Not Used	Not Used	Not Used
Frequency	1	Not Used	Not Used
Power Factor A, B, C	Not Used	Not Used	Not Used
Power Factor Total	Not Used	Not Used	Not Used
Volt & Current Imbalance	Not Used	Not Used	Not Used

2. Click on the arrow of the pull-down menu next to Edit/View. Select the type of **reading** you want to edit or view. Then select a Port and a Class (0, 1, 2 or 3) for that reading. Click OK. Each type of reading will have its own screen.
3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter.

Example: The screen above shows the selection of 1 Second Readings for Volts AN, BN, CN, IA, B, C and Frequency from Port 1 as a Class 1. Those readings will be collected by an RTU (or similar device) and displayed on your PC. Other readings will be displayed in other classes at other frequencies or not at all.

4.19: Internal KYZ Outputs

- The Internal KYZ Outputs Settings allow you to assign channels to the KYZ Outputs and to the Test LED Test. The settings also allow you to determine the frequency and the duration of the pulse for each output and for the Test LED.

1. From the Device Profile screen (section 4.2), click on the (+/-) button beside “Internal KYZ Settings” or double- click on the “Internal KYZ Settings” line. The screen appears:

KYZ Output	Assigned Channel	Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form
1	Quad 1 VAhour	0.1000	100	Enable	A
2	Quad 1 VARhour	0.1000	100	Enable	A
3	Quad (1 + 4) Watthour	0.1000	100	Enable	A
4	Quad (2 + 3) Watthour	0.1000	100	Enable	A
Test LED	Quad (1 + 4) Watthour	0.0200	20	Enable	A

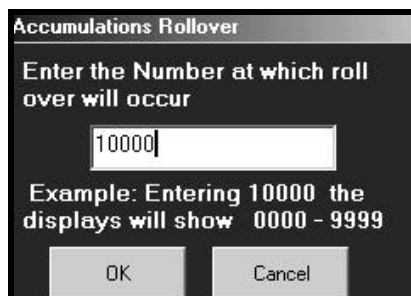
OK Help

2. Click on the arrow of the pull-down menu next to KYZ Output you would like to assign a channel. Make changes to Watt Hour per Pulse, Pulse Width, Mode and Form for each output and for the Test LED. Note on Form: Form A = Transition. Form C = Pulse.
3. When all changes are entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus 1270 Meter.

- ❖ **Note:** If your 1270 meter is equipped with the KYZ Output Option, the KYZ Output Settings will appear. Otherwise, just the Test LED will appear on the screen.

4.20: Accumulations Rollover

- The Accumulations Rollover screen in the Device Profile (section 3.2) allows you to enter a value at which the accumulations will rollover. (If the number that appears on this screen is too large, a warning screen will ask for a smaller number.) Click OK.



Accumulations Rollover

Enter the Number at which roll over will occur

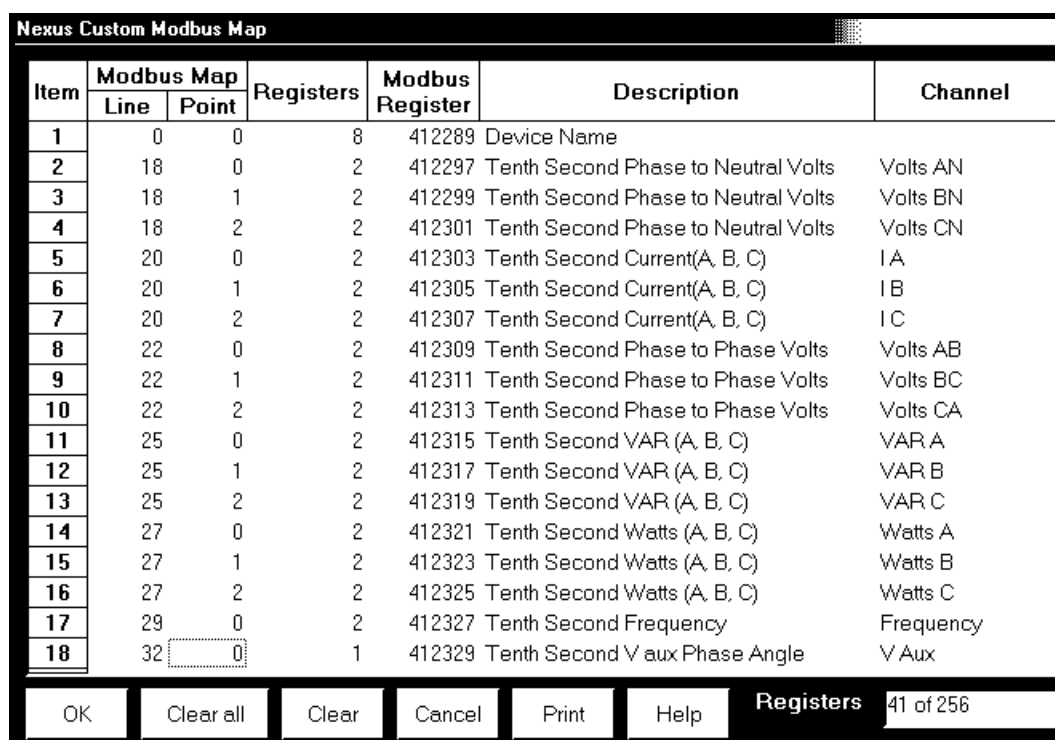
10000

Example: Entering 10000 the displays will show 0000 - 9999

OK Cancel

4.21: Custom Modbus Map

- The Custom Modbus Map allows you to position up to 256 Registers (or the equivalent of 2K, whichever is lower) to readily provide the functionality you want from your Nexus.



Item	Modbus Map		Registers	Modbus Register	Description	Channel
	Line	Point				
1	0	0	8	412289	Device Name	
2	18	0	2	412297	Tenth Second Phase to Neutral Volts	Volts AN
3	18	1	2	412299	Tenth Second Phase to Neutral Volts	Volts BN
4	18	2	2	412301	Tenth Second Phase to Neutral Volts	Volts CN
5	20	0	2	412303	Tenth Second Current(A, B, C)	IA
6	20	1	2	412305	Tenth Second Current(A, B, C)	IB
7	20	2	2	412307	Tenth Second Current(A, B, C)	IC
8	22	0	2	412309	Tenth Second Phase to Phase Volts	Volts AB
9	22	1	2	412311	Tenth Second Phase to Phase Volts	Volts BC
10	22	2	2	412313	Tenth Second Phase to Phase Volts	Volts CA
11	25	0	2	412315	Tenth Second VAR (A, B, C)	VAR A
12	25	1	2	412317	Tenth Second VAR (A, B, C)	VAR B
13	25	2	2	412319	Tenth Second VAR (A, B, C)	VAR C
14	27	0	2	412321	Tenth Second Watts (A, B, C)	Watts A
15	27	1	2	412323	Tenth Second Watts (A, B, C)	Watts B
16	27	2	2	412325	Tenth Second Watts (A, B, C)	Watts C
17	29	0	2	412327	Tenth Second Frequency	Frequency
18	32	0	1	412329	Tenth Second V aux Phase Angle	V Aux

OK Clear all Clear Cancel Print Help Registers 41 of 256

The screen is simple to use. Select any Register from the Nexus Modbus Map that has a Line and Point. Enter the selected Line and Point numbers (see below). The software enters the number of Registers, Register Number, Description and Channel. The software also keeps a total of Registers Used in the lower right corner. Click OK to Update the Nexus.

1	Address	Line	Pt	Description	Range	Units	Type	R/W	Res
2	Device Identification Block								
3	00001-00008	0	0	Device Name			F1	R	
4	00009-00016	1	0	Firmware Variation String 1			F1	R	
5	00017-00024	1	1	Firmware Variation String 2			F1	R	
6	00025-00032	1	2	Firmware Variation String 3			F1	R	

Next, enter the Modbus Register Number and Data Type (412289 F1, for example) into your SCADA software. If you have difficulty entering the Register Number, update your software. The Data Type is found in the Type column (see above) of the Modbus Register Map (which can be found on our website at electroind.com in the Free Downloads section).

You are now ready to easily access the data you use most often through your SCADA software.

4.22: Resetting Max/Min and Demand, Hour Counters, Logs, Time-of-Use and Internal Input

1. From the menu bar select Tools, Reset Nexus Information. The following screen appears.



2. Click in the box beside the values you would like to reset. Click OK.

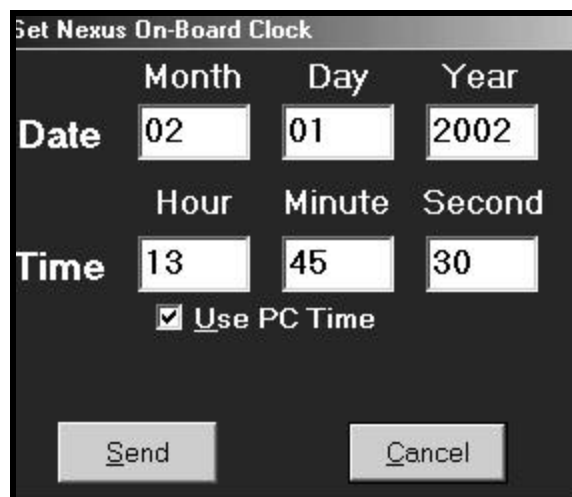
❖ **Note:** If you click Reset Logs, a **Warning** will appear asking you if you want to **Save Connected Device Settings**. Click on the settings you would like to save, then proceed with the Update. If you do not save the settings, they will be overwritten.

3. For each box you select, a window will appear which states that the “Reset is Completed”. Click OK. The reset is completed.
4. You can password protect this feature by enabling the Password feature of the Nexus. (See Chapter 12 for details).

4.23: Setting and Retrieving Nexus Time

- The Nexus 1270 Meter uses its on-board clock for time-stamping any logs it is recording. To **set** the Nexus clock:

1. Select Tools, Set Nexus Time. The Nexus On-board Clock screen appears:



Set Nexus On-Board Clock

	Month	Day	Year
Date	02	01	2002
	Hour	Minute	Second
Time	13	45	30

☒ Use PC Time

Send Cancel

- To synchronize the Nexus Monitor and your computer, leave the Use PC Time box checked.
 - To set the date and time independent from the PC, deselect the Use PC Time box and enter the time and date settings.
2. Click the Send button to update the Nexus Monitor's time settings.
- To **retrieve** the Nexus Monitor device's current time and date settings:
1. Select Tools, Retrieve Nexus Time. The following screen appears. Date and running time are displayed in LEDs.



Current Nexus Device Time

Date	02/01/2002 Friday	
Time	14:07:53.70	

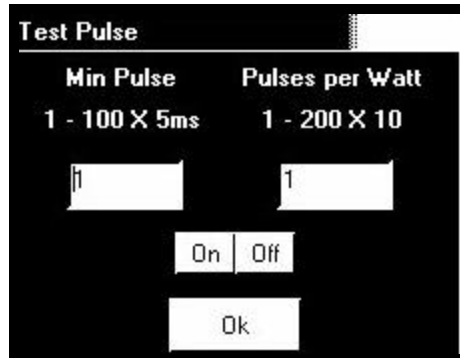
OK Help

2. Click OK to return to the main Nexus Communicator screen.

4.24: Test Pulse

- The Test Pulse sets the Nexus Monitor's Test Pulse light to flash in proportion to the secondary watt-hours. This feature is generally used to test the meter for revenue accuracy. **Please Note: You MUST have an accurate source in order to retrieve accurate information.**

1. Select Tools, Test Internal KYZ Pulse. The following screen appears:

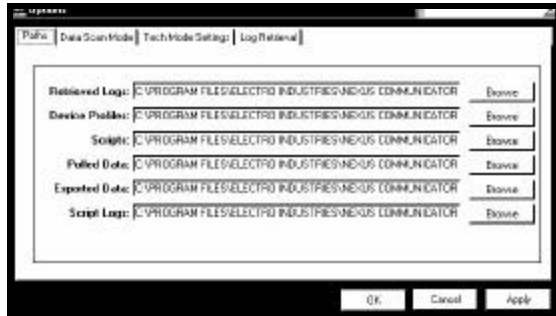


The screenshot shows a screen titled "Test Pulse". It has two columns of settings. The first column is labeled "Min Pulse" with a range of "1 - 100 X 5ms" and a numeric input field containing "1". The second column is labeled "Pulses per Watt" with a range of "1 - 200 X 10" and a numeric input field containing "1". Below these fields are two buttons labeled "On" and "Off", and at the bottom is a button labeled "Ok".

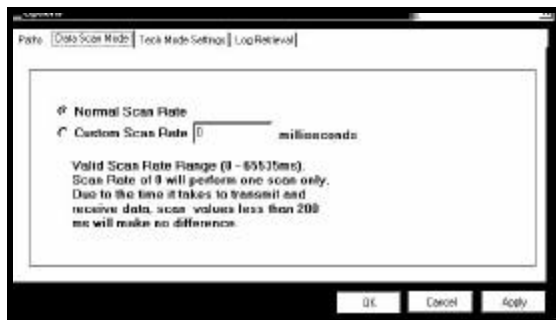
2. The **Min Pulse** field represents how long the heart-beat light will remain illuminated, from a minimum of 5 ms up to a maximum of 500 ms.
3. The **Pulses per Watt** field represents how many pulse flashes will occur per watt-hour, up to 2000 pulses maximum. This pulse is based on secondary watt readings.
4. Click On to enable the pulse function. Click Off at any time to disable it.
5. Click OK to return to the main Nexus Communicator screen.

4.25: Options

- Select Options from the View menu. Click tabs to show the following screens:



Paths: View or change the paths Nexus Communicator uses to store any copied, exported or retrieved data.



Data Scan Mode: Select Normal Scan Rate or create Custom Scan Rate between 0 - 65535 scans per millisecond.



Tech Mode Settings: Enter Password to Enable Tech Mode. If a Password is not entered, Tech Mode will remain disabled.



Log Retrieval: Click the box on this screen to keep a log from being updated while it is being retrieved.

- Make any adjustments using the browse buttons. Click Apply to execute the changes; click OK to return to the main Nexus Communicator screen.

Chapter 5

Configuring the Futura+

5.1: Overview

- Communicator Software enables you to configure a Futura+'s programmable settings, which are stored in the unit's Device Setup. To access this screen, click on Edit Profile button of the Communicator Software main screen or Tools, Edit Current Device Profile. The following screen will appear. To move from screen to screen, click on the tabs at the top of each folder. Click on the Tool Bar at the bottom of the screen to perform tasks. **To configure the Nexus 1250, see Chapter 3. To configure the Nexus 1270, see Chapter 4. Note: If you cannot make a connection, make sure your communication settings match those below.**

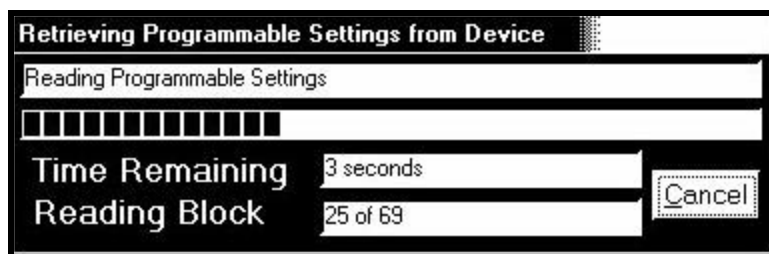
- Selections you make on these screens will not take effect until you click the Update Button to send the settings to the Futura+ (after you have already connected to the Futura+). If you click the Save, Open or Update buttons, you **MUST** have a unique Meter Destination Label so that the file is saved, loaded or updated to the intended device. **Warning:** It is possible to make mistakes here that can only be rectified by reprogramming the Futura+ through the optional P34 display.

❖ SPECIAL NOTES REGARDING FUTURA+:

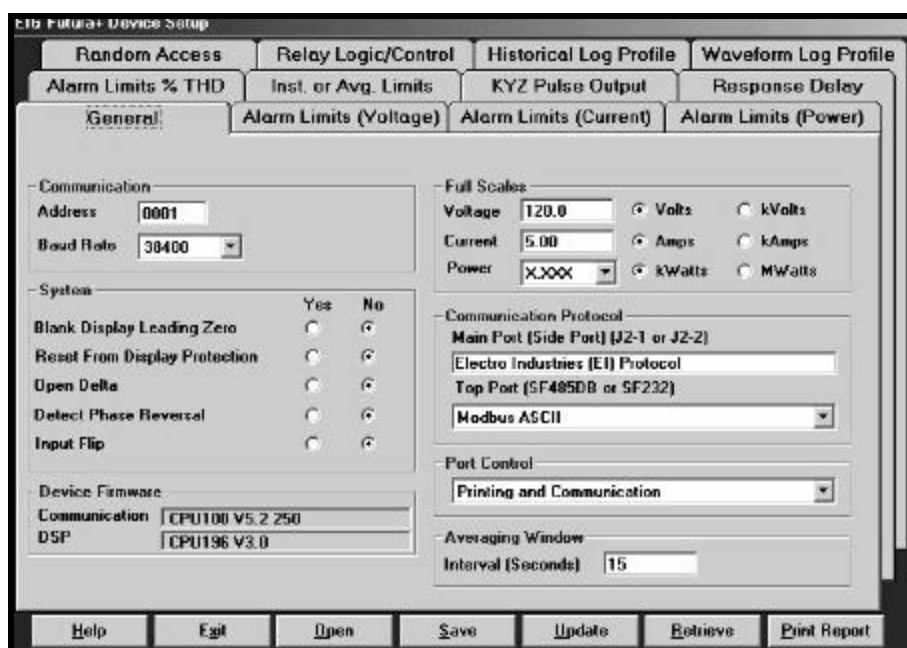
1. Futura+ Polling screens are similar to those of the Nexus 1250 meter but may contain slightly less data.
2. For details on DNP, refer to Futura and DMMS DNP V3.00 Protocol Rev 1.12.
3. For details on the Script and Scheduler, refer to Chapter 12 of this manual.

5.2: Retrieving and Sending Device Profiles

- Click on the Edit Profile button, or select Tools, Edit Current Device Profile. Nexus Communicator retrieves the programmable settings from the currently connected Futura+ Monitor. The following screen appears:



- A dialogue box appears to confirm that the profile was retrieved successfully. Automatically, the Device Setup screens appear:



- This group of screens contains all the programmable settings currently stored in the connected Futura+ Monitor. Configure each of the programmable settings by clicking on the appropriate button, selecting from a pull-down menu or entering the proper data. A detail of each screen follows. To move from screen to screen, click on the tabs at the top of each folder. Click on the Tool Bar at the bottom of the screen to perform tasks.

- After you have finished configuring any or all of the programmable settings, you may either:
 - **Implement the changes** by clicking on the **Update** button. This sends the new, edited Device Profile to the Futura+ Monitor. **YOU MUST UPDATE THE NEXUS DEVICE PROFILE FOR ANY OF THE PROGRAMMABLE SETTINGS TO TAKE EFFECT.**
 - **Store the profile for later use** by clicking on the **Save** button. A dialogue box will ask where you would like to save the profile.
 - **Open a previously saved profile** by clicking on the **Open** button. A dialogue box will ask for the location of the saved profile.
 - **Print or save a copy of the profile** by clicking on the **Print Report** button.

NOTE: If you change the Com settings for the Nexus, you will not be able to communicate with the Nexus. You will have to sign off and sign on again with the new settings.

5.3: General

■ Communications

Address: The Futura+ can be programmed with a unique four-digit address (0001 through 9999). Futura+ monitors are shipped with address 0001 and a baud rate of 9600, unless otherwise specified. To change the Futura+'s address, establish a connection (using the current address) and upload the new address to the device. In a Modbus RTU or ASCII system, valid addresses are limited to 0001 through 0247.

Baud Rate: From the pull-down menu, select the device baud rate (1200, 2400, 4800, 9600, 19200 or 38400).

■ System

Toggle the following options on and off by selecting Yes or No. If you select Yes:

- **Blank Leading Zero:** Leading zeros will appear as blanks (on the Futura's display).
- **Reset Protection:** A password must be entered (through the keypad) before it will be possible to use the keypad to reset maximum/minimum and hour readings. (This password will not effect software resets.)
- **Open Delta:** If you are using an open-delta connection (between the meter and the PTs and CTs), check Yes to disable the phase-to-neutral readings on the Futura+ display. (For more information, see the Futura+ Installation and Operation Manual.)

- **Detect Phase Reversal:** If a phase reversal is detected, the Limit 1 (LM1) light on the Futura+'s optional display will blink. If you select Yes, you can then use the Current Set Points screen to link the occurrence of a phase reversal to the tripping of a relay output.
- **Input Flip:** This will change the contact-sensing status from N.O. (normally open) to N.C. (normally closed).

SETTING	N.O.	N.C.
YES	OFF	ON
NO	ON	OFF

■ Device Firmware

Each power monitor has two types of firmware:

- **COMM:** The version of the connected power monitor's communications firmware (CPU1000 V4.0 250, for example).
- **DSP:** The version of the connected power monitor's digital signal processing firmware (CPU 196 V2.8, for example).

■ Full Scales

The Futura+ uses a scaling factor to convert secondary measurements to primary readings. To set full scales, you must know the PT and CT ratios relative to the full-scale secondary values of 120V (or 75V or 300V) and 5A.

For a table of full-scale settings for typical voltages, see Appendix 3. For more detailed information, refer to the *Futura+ Installation and Operation Manual*.

If the PT ratio is 4:1, the CT ratio is 100:1 and the Futura+ is calibrated for 1200V and 5A:

(PT Ratio) (V)=Full-Scale V	(CT Ratio) (A)=Full-Scale A
(4/1) (120V)=480V=0480V	(100/1) (5)=500A=0500A

Programming Full Scales for Voltage, Current and Power

- Because the Futura+ bases its power calculation on the full scales of the voltage and current, you may need to adjust the resolution (decimal point placement) of the power.
- For example, if the PT=480/120, the CT=500/5 and there are three phases:

(PT) (CT) (number of phases) = power
(480) (500) (3) = 720 kilowatts = 0720kW (full scale)
Therefore, you would select XXXX kW

- Resolution: 2000 Counts

Where the load is normally very low, increase the watt resolution by moving the decimal point to the left.

If the FSW is too small a value for a megawatt meter, move the decimal point (1.440MW = 1440kW): Change X.XXX MW to XXXX kW.

If the FSW is too large a value for a kilowatt meter (the range is 0000 to 2000 *with the decimal point omitted*), change it to a megawatt meter (43200kW = 043.2MW).)

NOTE: The labels on your Futura+'s display should reflect the selected scales.

FSW (full-scale wattage) is the product of FSV (full-scale voltage), FSA (full-scale amperage) and the number of phases:

FSW= (FSV) (FSA) (number of phases).

■ Communication Protocols

- **Main Port:** Side Download Port

This port only supports EI Protocol, which is used by all EIG software.

The maximum baud rate is 38400.

The interfaces to this port are clearly labeled J2-1 (RS-232) or J2-2 (RS-485). Both access the same port; only one can be used at a time.

This port handles downloading, uploading and programming.

- **Polling Port:** Top Port

The Top Port (Polling Port) is an option for the Futura+. For this port to function, the monitor must also be equipped with the appropriate RS-232 or RS-485 communications interface.

Select from the following protocols:

DNP 3.0

EI Protocol: Used by all EIG software, such as Futura+ Communicator and Power System Supervisor.

Modbus (ASCII): Modicon ASCII protocol.

Modbus (RTU): Modicon binary protocol.

Maximum baud rate is 9600. If the baud rate of the main port is set at 9600 or greater, the baud rate of the top port will default to 9600.

In a Futura+, this port handles only real-time polling. With either Modbus protocol, some programming functions can be handled.

■ **Port Control (for Main and Top Ports): For either port, select Printing and Communication or Communication Only.**

- **Communication Only:** Prevents (accidental) meter keypad input from interfering with communications.
- **Printing and Communication:** Used for troubleshooting.

■ **Averaging Window Interval:** This is the four-digit interval (in seconds) over which average readings are to be calculated for volts, amps and power functions.

5.4: Programming Limits

Use the Limit Settings screens to program the limits and establish links between the limits and relays. Each set point can be linked to any combination of relays (1 through 3) on your Futura+.

NOTE: If your Futura+ is set up to generate KYZ pulses, the linked relays will not respond to exceeded set points.

Limits (or set points) are divided into four groups (voltage, current, power and THD). All limits (all four groups) can be set to be triggered by either instantaneous or average readings.

Exit: Click Exit to save changes and return to the General EIG screen.

WARNING: Make sure that full scales are set for the device (in the EIG Programmer) before you establish limits; limits are dependent on full scales. If you change a full scale after you set up limits, the results may be unpredictable. The labels and decimal point placement on the set-point screens will reflect your full scale settings.

5.5: Alarm Limits (Voltage)

EIG Future+ Device Setup

Random Access | Relay Logic/Control | Historical Log Profile | Waveform Log Profile

Alarm Limits % THD | Inst. or Avg. Limits | KYZ Pulse Output | Response Delay

General | **Alarm Limits (Voltage)** | Alarm Limits (Current) | Alarm Limits (Power)

	Volts Limit 1		Trigger Relay	Limit 2	Trigger Relay	
	Value	% of FS				
A-N	15.0	12.50	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	30.0	25.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
B-N	15.0	12.50	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	30.0	25.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
C-N	15.0	12.50	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	30.0	25.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
A-B	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
B-C	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
C-A	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	0.0	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below

Help | Exit | Open | Save | Update | Retrieve | Print Report

- This screen consists of six voltage phase-to-neutral limits (two limits each for Van, Vbn and Vcn) and six voltage phase-to-phase limits (two limits each for Vab, Vbc, Vca).
- For each limit, specify whether it is above or below, and optionally select any combination of trigger relays (1, 2 and 3).

5.6: Alarm Limits (Current)

EIG Future+ Device Setup

Random Access | Relay Logic/Control | Historical Log Profile | Waveform Log Profile

Alarm Limits % THD | Inst. or Avg. Limits | KYZ Pulse Output | Response Delay

General | Alarm Limits (Voltage) | **Alarm Limits (Current)** | Alarm Limits (Power)

	Amps Limit 1		Trigger Relay	Limit 2	Trigger Relay	
	Value	% of FS				
A	0.00	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	10.00	200.0	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
B	0.00	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	10.00	200.0	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
C	0.00	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	10.00	200.0	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
N	0.00	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below	0.00	0.00	<input checked="" type="radio"/> Above <input checked="" type="radio"/> Below
Phase Imb	999.9		<input checked="" type="radio"/> Above			
Phase Rev						

Help | Exit | Open | Save | Update | Retrieve | Print Report

- This screen consists of eight current limits (two limits each for Amps A, Amps B, Amps C and Amps N) and one phase-imbalance limit.
- For each current limit, specify whether it is above or below, and optionally select any combination of trigger relays (1, 2 and 3). You can also have a phase reversal trigger a relay (see section 5.3).

5.7: Alarm Limits (Power)

The screenshot shows the 'EIG Futura+ Device Setup' window with the 'Alarm Limits (Power)' tab selected. The window is divided into sections for 'Limit 1 Settings' and 'Limit 2 Settings', each with a 'Trigger Relay' section. The parameters being configured are Watt, VAR, VA, P.F., and Freq. For each parameter, there is a numerical input field, a radio button to select 'Above' or 'Below', and three checkboxes for trigger relays 1, 2, and 3. In the current state, the 'Below' radio button is selected for all parameters, and no trigger relays are selected. The bottom of the window contains a row of buttons: Help, Exit, Open, Save, Update, Retrieve, and Print Report.

- This screen consists of two limits each for Watt (MWatt), VAR (MVAR), VA (MVA), Power Factor (PF) and Frequency (Freq).
- For each limit, specify whether it is above or below and, optionally select any combination of trigger relays (1, 2 and 3).

5.8: Alarm Limits % THD

The screenshot shows the 'EIG Futura+ Device Setup' window with the 'Alarm Limits % THD' tab selected. The window has a menu bar with 'General', 'Alarm Limits (Voltage)', 'Alarm Limits (Current)', and 'Alarm Limits (Power)'. Below the menu bar are sub-tabs: 'Random Access', 'Relay Logic/Control', 'Historical Log Profile', and 'Waveform Log Profile'. The 'Alarm Limits % THD' sub-tab is active, showing 'Inst. or Avg. Limits' and 'KYZ Pulse Output' options. The main area is divided into two columns: 'Limit 1 Settings' and 'Limit 2 Settings'. Each column has a 'THD' label, a 'Limit 1 Settings' section with input fields for VA, VB, VC, IA, IB, and IC, and a 'Trigger Relay' section with three checkboxes labeled 1, 2, and 3. The 'Limit 2 Settings' section is identical. At the bottom are buttons for 'Help', 'Exit', 'Open', 'Save', 'Update', 'Retrieve', and 'Print Report'.

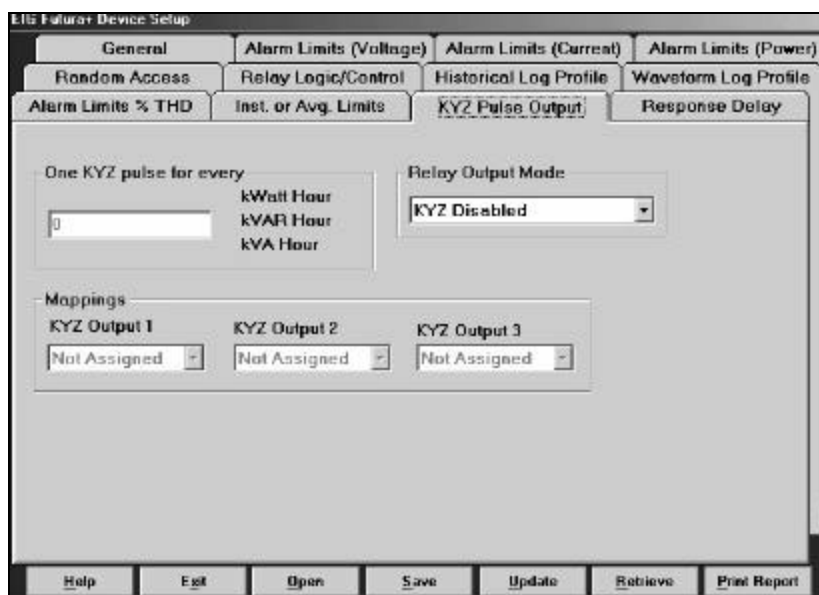
- This screen consists of six limits for voltage (two each for Volts A, B and C) and six for Current (two each for I A, B and C)
- For each limit, specify whether it is above or below and, optionally select any combination of trigger relays (1, 2 and 3).

5.9: Instantaneous or Average Limits

The screenshot shows the 'EIG Futura+ Device Setup' window with the 'Inst. or Avg. Limits' sub-tab selected. The main area is titled 'Limits Triggered On:' and contains two radio buttons: 'Instantaneous Readings' (which is selected) and 'Average Readings'. At the bottom are buttons for 'Help', 'Exit', 'Open', 'Save', 'Update', 'Retrieve', and 'Print Report'.

- This screen allows the user to choose Limits Triggered On: Instantaneous Readings or Average Readings. Click Update to update the Futura+; click Exit to exit this screen.

5.10: KYZ Pulse Output



- Use this screen to set or change the KYZ output settings of a Futura+ that has been equipped with the optional KYZ Module and has been set for KYZ. Once you have connected to the Futura+ device, on the menu bar select Tools, EIG Programmer and click the KYZ Output tab. You can then set the pulse scale and map the function for each channel. Save changes by clicking Save. Click Exit to return to the main screen.

NOTE: The Futura+ will not be programmed with these settings until you update the programming to it by clicking Update. Updating can be done after all settings on all tabs are complete; Futura+ will remember all the changes.

■ Pulse Scale

The Pulse Scale represents the magnitude of each transition of the KYZ relay. Select the number of hours each KYZ pulse will represent for the three pulse outputs: One KYZ Pulse for every (enter number) kilowatt-hour, kVAR-hour or kVA-hour.

Example:

Scaling:	One KYZ pulse for every 20 kilowatt-hours
KYZ Output 1:	Mapped to Kilowatt-hour
KYZ Output 2:	Mapped to - Kilowatt-hour
KYZ Output 3:	Mapped to kVA-hour

If, over the course of an hour, +kilowatt-hours increased by 400, -kilowatt-hours increased by 20 and kVA-hours increased by 1200, during that hour: Output 1 would have pulsed 20 times (400/20), Output 2 would have pulsed once (20/20) and Output 3 would have pulsed 60 times (1200/20).

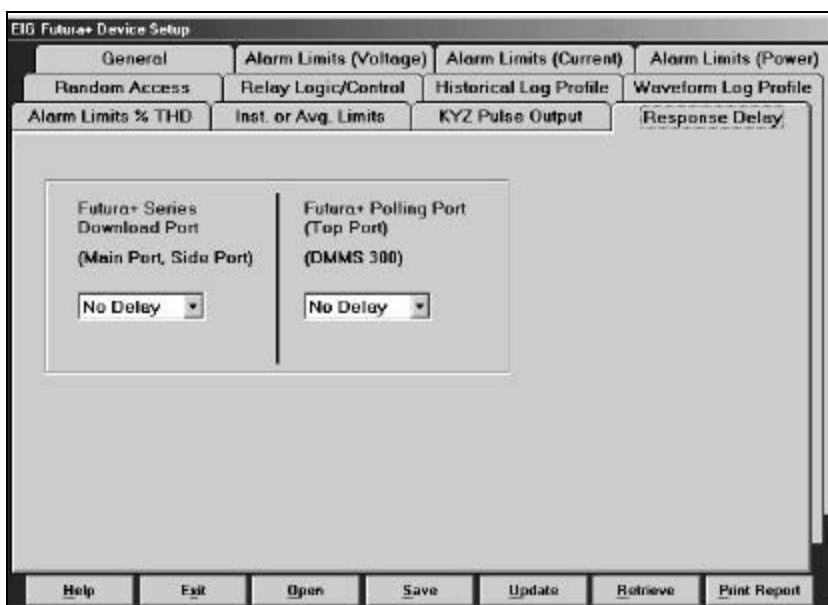
NOTE: A pulse is one change of state: from N.O. (normally open) to N.C. (normally closed) or from N.C. to N.O.

■ Mappings

Use mappings to assign hour function to relays. Each KYZ output (1, 2 and 3) can be assigned to output any of the following:

- Kwatt-hour
- KVAR-hour
- KVA-hour
- -Kwatt-hour
- -KVAR-hour

5.11: Response Delay



- Use the Response Delay Settings screen to specify the delay the Futura+ is to use before responding to queries. When operating an EIG device over a two-wire RS-485 (half-duplex) connection, the RS-485 converter (or card) may require a delay before it can receive information. If you do not program a delay, the Futura+ will respond as quickly as possible and data may be lost. The possible data loss is due to the two-wire converter's delay in changeover from transmit to receive mode.

NOTE: The required delay will depend on your equipment and/or software that is conducting the polling. If you are losing information, enter a long delay.

- **Download Port:** From the scroll list on the left, select a delay of from None (or 0) to 400ms (available in 10ms increments) for the download port of the Futura+.
- **Polling Port:** From the scroll list on the right, select a delay for the polling port (which is an option for the Futura+).

5.12: Random Access

EIG Future+ Device Setup

Alarm Limits % THD Inst. or Avg. Limits KYZ Pulse Output Response Delay

General Alarm Limits (Voltage) Alarm Limits (Current) Alarm Limits (Power)

Random Access Relay Logic/Control Historical Log Profile Waveform Log Profile

Programming Block:

Byte Number:

Byte Description:

Current Setting:

New Setting:

Hex Value:

Decimal Value:

For advanced setup only. Using this feature without EIG's permission is prohibited.

- Random Access is not required for normal operation and is designed to be used **ONLY** with the direction and supervision of an EIG engineer or technician.

Inappropriate use of this feature, which makes otherwise inaccessible areas of the programming block available, may disable communications or render a meter inoperable.

5.13: Relay Logic /Control

EIG Future+ Device Setup

Alarm Limits % THD Inst. or Avg. Limits KYZ Pulse Output Response Delay

General Alarm Limits (Voltage) Alarm Limits (Current) Alarm Limits (Power)

Random Access Relay Logic/Control Historical Log Profile Waveform Log Profile

Relay	Delay (Sec)		Computer Control	Logic Control	Hysteresis	Logic Type
	Set	Reset				
1	<input type="text"/>	<input type="text"/>	<input type="button" value="Yes"/>	<input type="button" value="OR"/>	<input type="button" value="Disabled"/>	<input type="button" value="Positive"/>
2	<input type="text"/>	<input type="text"/>	<input type="button" value="Yes"/>	<input type="button" value="OR"/>	<input type="button" value="Disabled"/>	<input type="button" value="Positive"/>
3	<input type="text"/>	<input type="text"/>	<input type="button" value="Yes"/>	<input type="button" value="OR"/>	<input type="button" value="Disabled"/>	<input type="button" value="Positive"/>

- Use the Relay Logic / Control Settings screen to set or change the characteristics of relays. Each of the Futura's three relays (1, 2 and 3) can be programmed individually.

- **Delay** (in seconds):

Set: Delay before setting (energizing) the relay when the linked limit is exceeded.

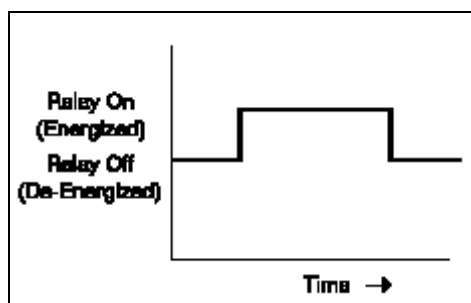
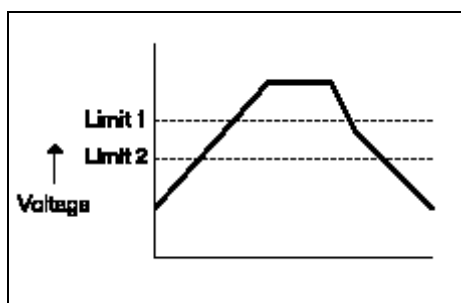
Reset: Delay before resetting (de-energizing) the relay when the linked limit is no longer being exceeded.

- **Computer Control:** Use this Yes/No toggle to enable or disable the control of relays through the software.
- **Logic Control:** Use the AND/OR toggle for logic control.

AND: For the relay to set, all limits linked to this relay must be exceeded.

OR: For the relay to set, at least one limit linked to relay must be exceeded.

- **Hysteresis:** This Enabled/Disabled toggle uses two limits to determine whether the relay will be turned on or off. When hysteresis is enabled (and two limits are set), the relay will not be turned on until the value of the parameter exceeds the higher limit. The relay will not be turned off until the value of the parameter falls below the lower limit.



- **Logic Type:** This is a Negative/Positive toggle.

Positive:

Relay Reset Position: Continuity between the common and N.C. (Normally Closed) pins.

Relay Set Position: Continuity between the common and N.O. (Normally Open) pins.

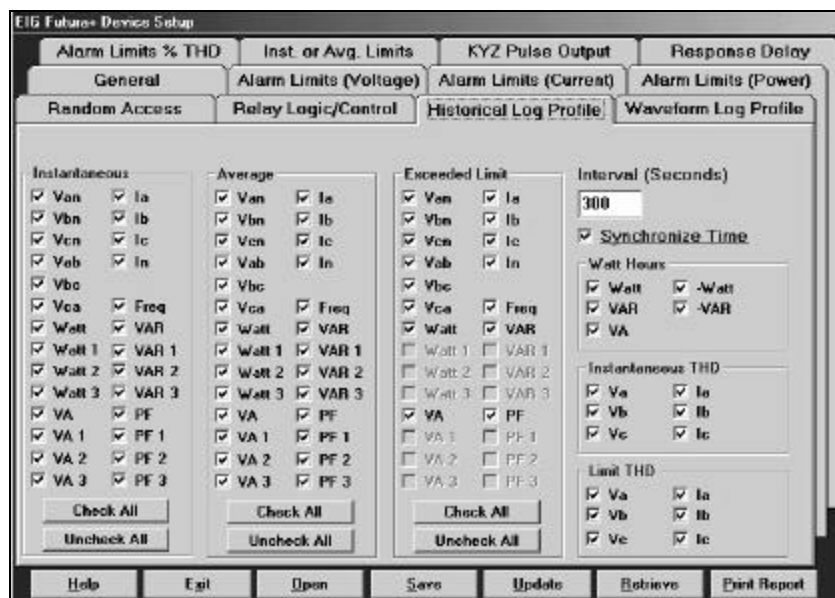
Negative:

Relay Reset Position: Continuity between the common and N.O. (Normally Open) pins.

Relay Set Position: Continuity between the common and N.C. (Normally Closed) pins.

Exit: Click Exit to return to the main screen.

5.14: Historical Log Profile



- An Historical Log is used to track any parameter over time. (See the *Futura+ Installation and Operation Manual* for information about storage capacity.)
- An Historical Log is a collection of time-stamped records. Each record contains up to 55 data items, which are recorded at a specified interval and stamped with the time of the recording. The following criteria determine when a record will be made (in other words, when a snapshot will be taken):

The user-specified interval.

A parameter's exceeding of a limit or a return to within limits.

The capture of a waveform.

An I/O event(the change of state of a relay or input).

■ The Historical Profile

An Historical Profile is used to specify the readings a Futura+ device is to record and the intervals at which they are to be recorded. In this profile, you can also stipulate which channels' exceeded limits are to cause a recording of data (regardless of specified interval).

- In order for data to be stored and retrieved, a valid profile must be stored in the Futura+ device. (See *Creating an Historical Profile*.)
- The Futura+ can be programmed to store average as well as instantaneous values in its historical log.

- In addition to storing data at a user-specified interval, the Futura+ can also take snapshots when a limit is exceeded and when the value returns to within the limit. So, if snapshots are scheduled to be taken at fifteen-minute intervals and a dip or surge occurs during the interim (the voltage drops five minutes after a scheduled recording was made), the Futura+ will also take a snapshot when the voltage drops below your set limit and when it returns to within limits.

NOTE: For the snapshots discussed above to be taken, you must also have your limits set to trip (see sections 5.4 - 5.9).

- A Futura+ stores up to 101,171 pieces of historical data in its mass memory. For example, if your historical profile has ten values logged every fifteen minutes, it would take from three months to nearly a year (depending on its memory option) to fill the Futura+ device's memory.

■ Creating an Historical Profile

- In the Historical Profile screen, use the check boxes next to the channel name to specify the recording (the taking of a snapshot) of instantaneous and/or average readings.
- In the Exceeded Limit column, check the box next to a channel name to have a snapshot stored when the channel's limit is exceeded.
- Enable or disable the recording of hour counters, Instantaneous THD and Limit THD.
- Specify the recording interval (in seconds) and enable or disable Sync Time.

Without Sync Time, the first recording will occur immediately and recordings will continue to be made at the specified interval.

With Sync Time:

The first recording will be made immediately.

Subsequent recordings will be made starting at the next point in time that the end of an interval would have been reached, had recording started at the top of the current hour (based on the meter's clock).

Recordings will continue to be made at the specified interval until the end of the hour. The start of each new hour will trigger a recording and restart the interval counter.

Example:

If it is now 06:04 and the interval is 0900 seconds (or 15 minutes), recordings will be made at 06:04 (immediately), 06:15 (the first end of an interval, had recording started at 06:00), 06:30 and 06:45. Recordings will start on the hour at 07:00 and continue with 07:15, 07:30, 07:45, etc.

- Once you've specified all your choices, click Save.
- In a waveform profile, you can select a link to an historical recording if a particular limit is exceeded (see Waveform Profile).

■ **Editing an Historical Profile**

- In the Historical Profile screen, use the check boxes next to the channel name to specify the recording (the taking of a snapshot) of instantaneous and/or average readings.
- In the Exceeded Limit column, check the box next to a channel name to have a snapshot stored when the channel's limit is exceeded (You may find it expedient to make use of the Check All or Uncheck All buttons).
- Enable or disable the recording of hour counters, Instantaneous THD and Limit THD.
- Specify the recording interval (in seconds) and enable or disable Sync Time.

■ **Updating (Sending) an Historical Profile to a Futura+**

- Use the Update button on any of the Device Profile screens to update the Futura+.
- Updating the Futura+ can be done at one time for all changes made to the Device Profile. After you have made any changes to any or all of the Device Profile screens, click the Update button. Futura+ will remember all your selections.

5.15: Waveform Log Profile

The screenshot shows the 'Waveform Log Profile' tab in the 'CIG Futura+ Device Setup' application. The interface includes several tabs at the top: 'Alarm Limits % THD', 'Inst. or Avg. Limits', 'KY2 Pulse Output', 'Response Delay', 'General', 'Alarm Limits (Voltage)', 'Alarm Limits (Current)', 'Alarm Limits (Power)', 'Random Access', 'Relay Logic/Control', 'Historical Log Profile', and 'Waveform Log Profile'. The 'Waveform Log Profile' tab is active, displaying settings for 'Voltage High-Speed' and 'Current High-Speed' limits. Each section has two limits, each with a 'Value' field, a '% of FS' field, and radio buttons for 'Above' and 'Below' trigger states. The 'Waveform Capture Number' is set to 3, and 'Waveform Mode' is set to 'Normal'. At the bottom, there are buttons for 'Help', 'Exit', 'Open', 'Save', 'Update', 'Retrieve', and 'Print Report'.

Section	Limit	Value	% of FS	Trigger State
Voltage High-Speed	Limit 1	110.4	92	<input type="radio"/> Above <input checked="" type="radio"/> Below
	Limit 2	129.6	100	<input checked="" type="radio"/> Above <input type="radio"/> Below
Current High-Speed	Limit 1	0.00	0	<input type="radio"/> Above <input checked="" type="radio"/> Below
	Limit 2	0.00	0	<input type="radio"/> Above <input checked="" type="radio"/> Below

Waveform Capture Number: 3
Waveform Mode: ☒ Normal ☐ Extended

The Futura+ stamps waveform information with the date and time. The waveform log file (.WLG) is a collection of time-stamped records. Each record contains six 960-point waveforms in Wye configuration or five 960-point waveforms in Delta configuration. Waveforms are captured when the RMS calculated over two cycles exceeds the high-speed limits set in the waveform profile. The voltage channels (Van, Vbn and Vcn or Vab and Vbc) share two limits and the current channels (Ia, Ib and Ic) share two limits.

A waveform profile is used to specify the conditions that will trigger a waveform capture. The profile consists of two limits for voltage channels and two limits for current channels. Each limit can be set to trigger either below or above the limit value. To disable a limit, set it to 0000 and below or 9999 and above.

■ Creating a Waveform Profile

- Use the Waveform Profile screen to specify:

Voltage Limit 1, its trigger state (above or below) and whether a snapshot is to be taken if this limit is exceeded.

Voltage Limit 2, its trigger state (above or below) and whether a snapshot is to be taken if this limit is exceeded.

Current Limit 1, its trigger state (above or below) and whether a snapshot is to be taken if this limit is exceeded.

Current Limit 2, its trigger state (above or below) and whether a snapshot is to be taken if this limit is exceeded.

- **The waveform capture number** (the number of waveforms that will be stored, depending on the waveform mode).

In Normal Mode, this specifies the maximum number of consecutive waveforms that will be captured while a given limit is being exceeded. Fewer waveforms will be captured if the limit does not remain exceeded.

In Extended Mode, this specifies the absolute number of consecutive waveforms that will be captured when a given limit is exceeded. This number of captures is guaranteed, even if the limit does not remain exceeded.

- **The waveform mode:**

In Normal Mode, waveforms will be captured for an exceeded limit only until **either:**

The limit is no longer exceeded.

The number of captures specified in the waveform capture number have been made.

In Extended Mode, waveforms will be captured for an exceeded limit until the number of captures specified in the waveform capture number have been made.

5.16: Real-Time Poll

- After connecting to the Futura+ device, on the menu bar, select Real-Time Poll button. A menu of screens allows the user to select one of the following polling screens:

- Instantaneous Polling
- Poll Max and Min Readings
- Poll Power Readings
- Poll Harmonics
- Poll Internal Inputs
- Poll Limit Status

The individual screens are readings that result from the settings in the Device Profile which were discussed in the earlier sections of this chapter. The screens are very similar to the Nexus 1250 and 1270 screens. Occasionally, the Futura+ screens will have slightly fewer readings. For directions on how to utilize the data on the screens, see sections 6.3, 6.5, 6.6, 6.7, 6.8 and 6.11 of this manual.

5.17: Tools

- After connecting to the Futura+ device, on the menu bar, select Tools. A menu of the following tools will appear:

Edit Current Device Profile (covered in earlier sections of this chapter)
Set Futura+ Time
Retrieve Futura+ Time
Reset EI Device Information
Retrieve Device Status
Low Level Access
Futura+ Analog Output Programmer

Each of these Tools will be described in the following sections, with the exception of Edit Current Device Profile, which was described in detail in sections 5-1 to 5-15 of this chapter.

5.18: Set Futura+ Time

- After connecting to the Futura+ device, on the menu bar, select Tools and click Set Futura+ Time.

Set Futura+ On-Board Clock

	Month	Day	Year
Date	10	09	2001

	Hour	Minute	Second
Time	10	43	38

☒ Use PC Time

Send Cancel

- Set the Month, Day, Year, Hour Minute and Second or click Use PC Time.
- Click Send to send the new settings to the Futura+ or click Cancel.

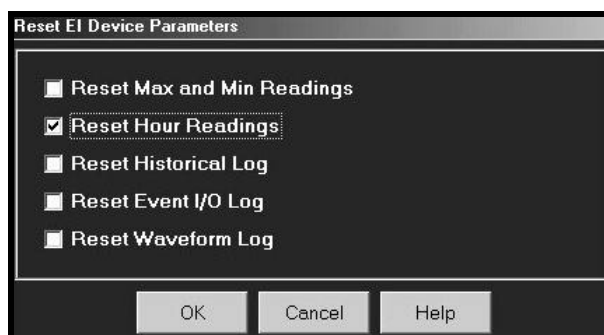
5.19: Retrieve Futura+ Time

- After connecting to the Futura+ device, on the menu bar, select Tools and click Retrieve Futura+ Time. The following screen will appear. Click OK to return to the main screen. To adjust Futura+ Time, see section 5.18.



5.20: Reset EI Device Information

- After connecting to the Futura+ device, on the menu bar, select Tools and click Reset EI Device Information. The following screen will appear.



- Select the parameters that you want to reset. Click OK. A screen will appear that confirms the reset. Click OK to return to the main screen.

5.21: Retrieve Device Status

- After connecting to the Futura+ device, on the menu bar, select Tools and click Retrieve Device Status. The following screen will appear.

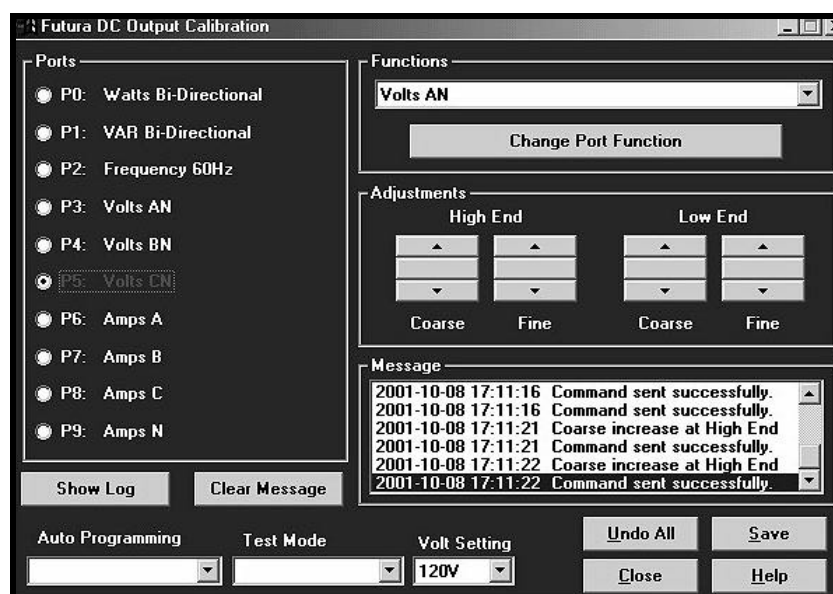


5.22: Low Level Access

- After connecting to the Futura+ device, on the menu bar, select Tools, EIG Programmer and click Low Level Access.

Low Level Access is not required for normal operation and is designed to be used **ONLY** with the direction and supervision of an EIG engineer or technician. Inappropriate use of this feature can cause inaccurate readings.

5.23: Futura+ Analog Output Programmer



NOTE: This feature is for use only with a Futura+ with a 0-1 or 4-20mA Analog Output module.

- After connecting to the Futura+ device, on the menu bar, select Tools and click the Futura+ Analog Output Programmer button. Use the above screen to assign channels to analog outputs and calibrate and test analog outputs. For more information, see the *Futura+ Installation and Operation Manual*. The procedure for using this screen follows:
 1. Select a port (or channel).
 2. Assign a function to the port (using the Change Port Function button).
 3. Save the setting. You will receive a message that the command has been sent successfully.
 4. Using an ammeter, calibrate (adjust) the port.
 5. Verify the calibration (an external portable DC ammeter must be correctly connected to the port to view the results).

- A. Select a port to test.
- B. Select the test type from the test mode list box. (This selection will be used by all ports until another test mode is selected. In other words, if you select Low-End Output, all channels will output the low end of the scale):

Low-End Output (-1 or 4mA)
Bi-directional, -1mA (Ports 0 through 2)
Unidirectional, 0mA (Ports 3 through 9)

Midpoint Output (0 or 12mA)
Bi-directional, 0mA (Ports 0 through 2)
Bi-directional, .5mA (Ports 3 through 9)

High-End Output (1 or 20mA)

WARNING! The Futura+ will not leave test mode until you terminate it by selecting another option (Save or Port) or exiting.

■ Ports and Functions

- The function assigned to each port is indicated on the left side of the screen. To alter the function of a port:
 1. Select a Port (P0 through P9).
 2. Select a function (Volts an , bn , cn , ab, bc, or ca ; Amps a , b , c or n ; Watts Unidirectional or Bi-directional, VAR Unidirectional or Bi-directional; VA, Power Factor; or Frequency 60 Hz or 50Hz).
 3. Click the Change Port Function button.

NOTE: Only one frequency (either 50 or 60Hz) can be assigned at any given time.

NOTE: Be sure to assign the Power Factor and Frequency functions to Bi-directional ports (Ports 0 through 2).

■ Adjustments (Calibration)

- High-End (Coarse and Fine) and Low-End (Coarse and Fine) adjustments are usually done on a bench using a calibrated DC ammeter.
- The Adjustment buttons are arranged in two sets (high and low end) of Up and Down arrows.

High End = 1mA (or 20mA).

Low End = 0mA (Unidirectional), -1mA (Bi-directional) or 4mA.

- Each set of Adjustment buttons has Coarse and Fine Adjustments.

Click Up to increase the adjustment or Down to decrease it.

Alternatively, use the PgUp/PgDn and Up and Down arrows on the keyboard to make these adjustments.

- Once you have made an adjustment, you will receive the message:

“Coarse (or Fine) increase (or decrease) at High (or Low) End Command sent successfully.”

NOTE: Once you have finished calibrating the port, be sure to save the settings.

■ Auto Program

WARNING! Before you use this function, please contact EIG for more information.

From the list box, select 10 channels (1 or 20mA) to recalibrate the Futura+ to factory values.

■ Volt Setting (Back Module)

Match this setting to the label on the DSP (power) module connected to the Futura+. From the list box, select 75V (Suffix L), 120V (Suffix 120) or 300V (Suffix G).

■ Editing and Saving Calibration Settings

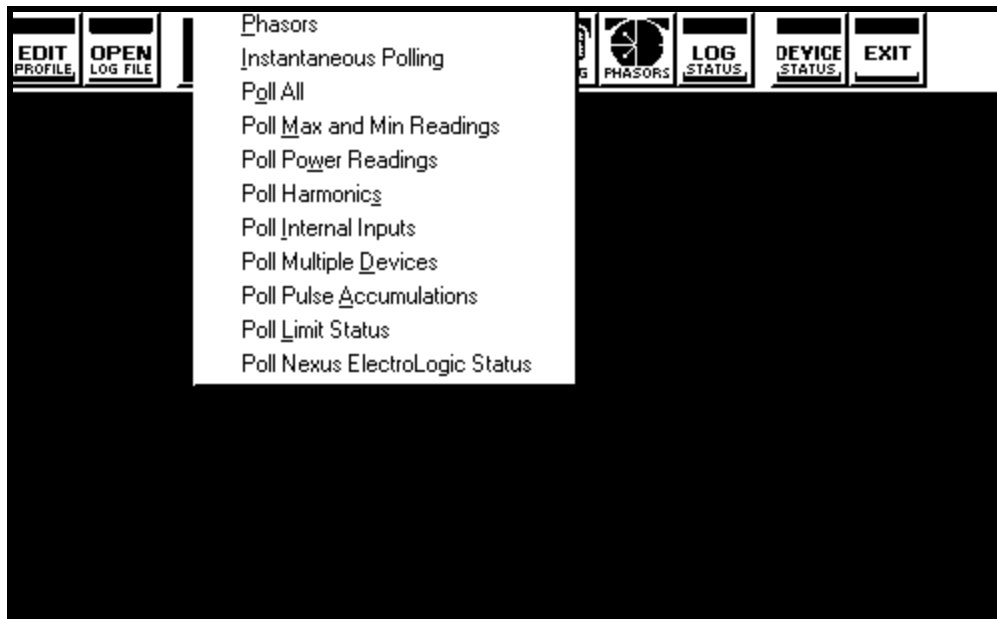
- Undo All: If you have made changes to this screen but have not yet sent the changes to the Futura+ (by clicking Save), click Undo All to revert to the previously saved settings.
- Save: Click Save to update the Futura+ with the new settings and adjustments. Once you receive the message “Command sent successfully,” click Exit.
- Exit: Click Exit to leave the Output Calibration screen. When you are prompted to save any changes before you exit, click OK. (If you neglected to save the new settings, click Cancel. When you’re back in the EIG Device Programmer screen, click Save.)

Chapter 6

Real-Time Polling

6.1: Overview

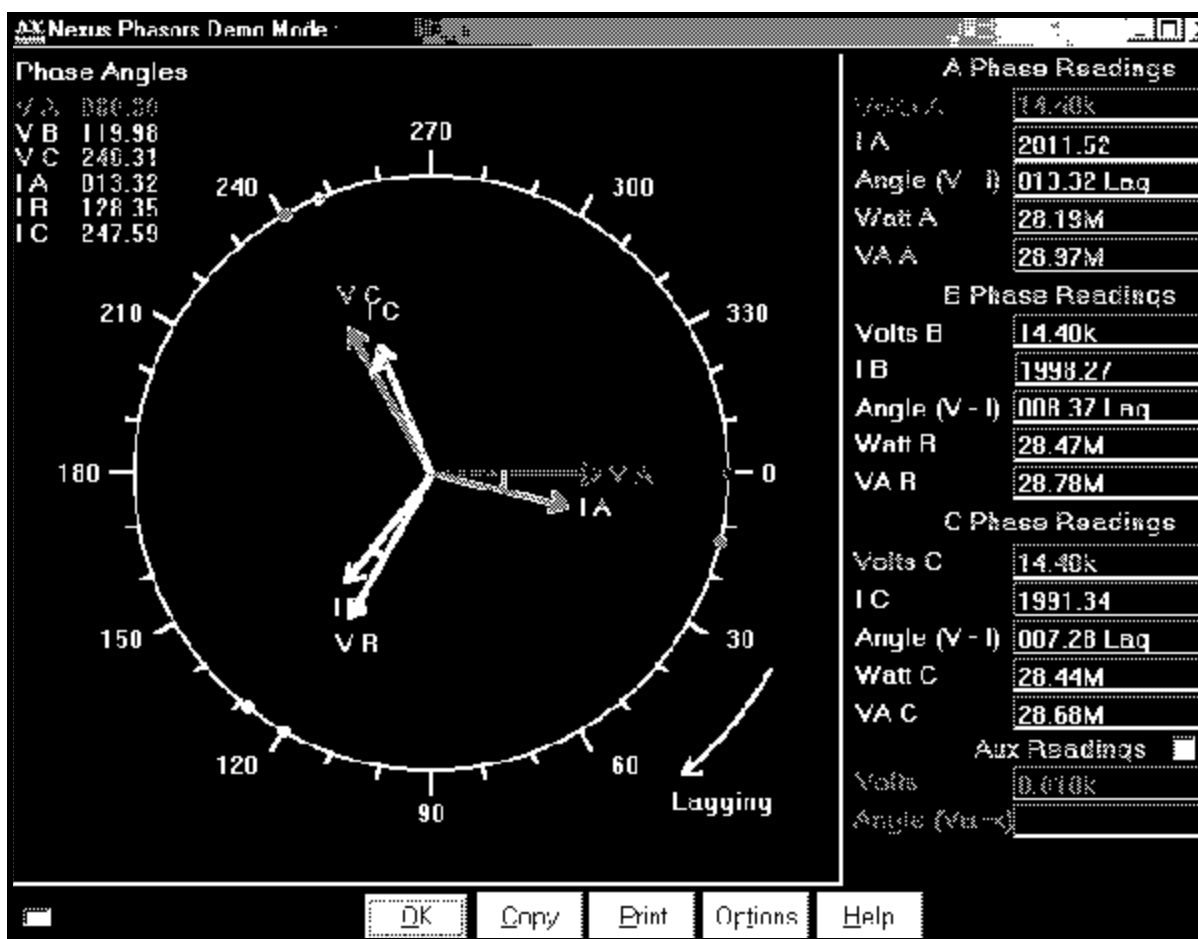
- The Real-Time Polling features of Nexus Communicator consist of thirteen data arrangements. Eleven screens appear under the Real-Time Polling menu:



- Two additional polling screens can be accessed from the I/O Devices menu: Poll External Digital Inputs (Section 6.13) and Poll External Analog Inputs (Section 6.14).
- Nexus Communicator polls from one connected Nexus Monitor device at a time—the Primary Device. To view polling data from multiple devices, either select Poll Multiple Devices (section 6.8) or change the Primary Device (select Connection, Change Primary Device; see section 2.7).
- ❖ **Note:** Clicking the Polling button on the Tool Bar is the same as selecting Instantaneous Polling from the menu bar. Clicking the Phasors button on the Tool Bar is the same as selecting Phasors from the menu bar.

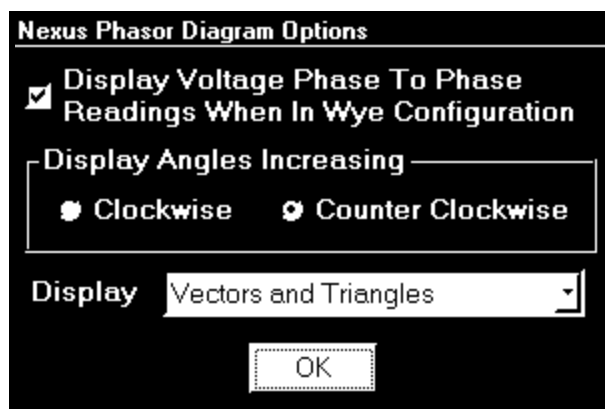
6.2: Phasors

- The Phasors screen displays the phase relationships of the currently connected Nexus Monitor device.
- ❖ **Note:** The Nexus 1270 screen will display the Form and Configuration at the top of the screen.
- Select Phasors from the Real-Time Poll menu, or click the Phasors button on the tool bar. The Phasors screen appears:



- If you have an auxiliary voltage reading (i.e. generator and bus where the V Aux is the generator), Aux box and the V Aux phasor will be displayed. The V Aux phasor is referenced to V A phase.

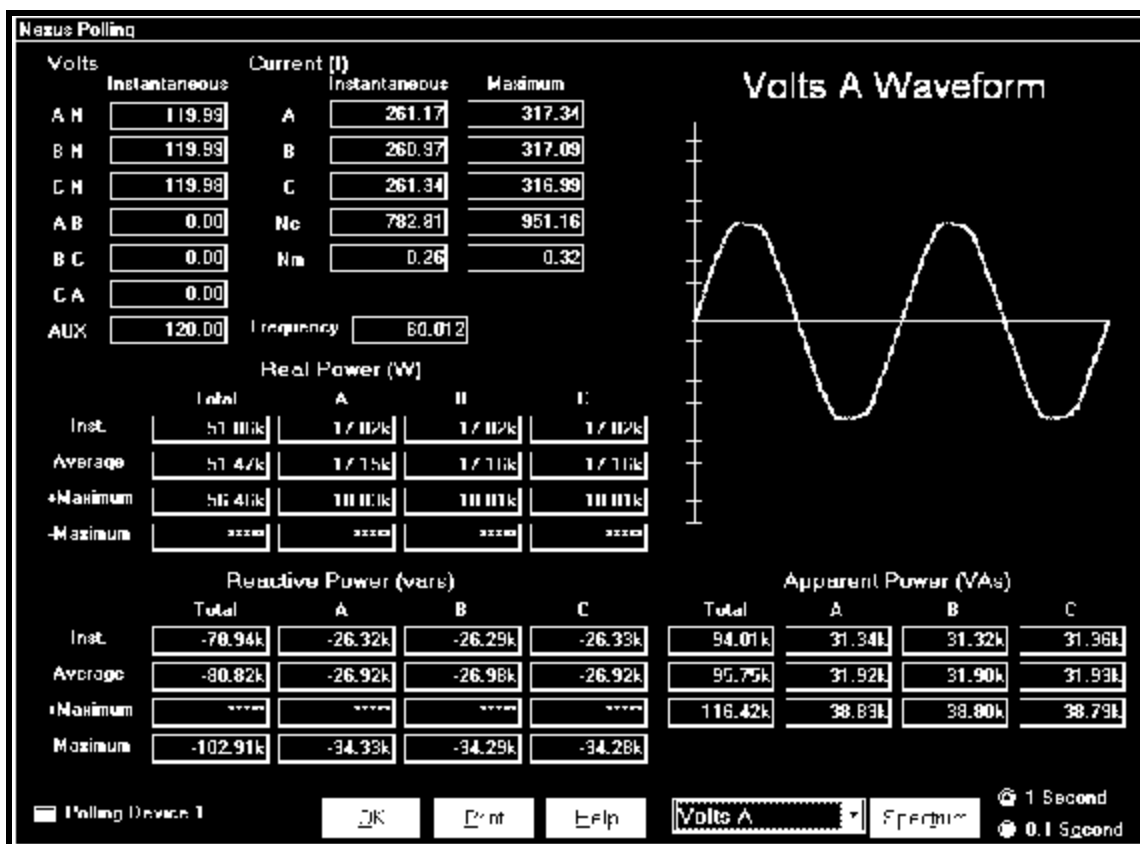
- From the buttons at the bottom of the screen, click on **Options**. A pop-up window, Nexus Phasor Diagram Options, appears.



- Check Display Voltage Phase To Phase Readings When In Wye Configuration, if you want to include that reading in the graph.
 - In the Display Angles Increasing box, select either Clockwise or Counter Clockwise.
 - From the pull-down menu at the bottom of the screen, select Vectors, Triangles or Vectors and Triangles to change the graphic representation of the data.
- Click OK to save your selections and return to the main Phasors screen. Use the Buttons at the bottom of the screen to complete the following tasks:
 - Click Copy to save a copy of the screen to the clipboard.
 - Click Print to send a copy of the graph to a printer.
 - Click OK to return to the main Nexus Communicator screen.

6.3: Instantaneous Polling

- To view instantaneous polling data for the primary Nexus Monitor device, either select Instantaneous Polling from the Real-Time Polling menu, or click the Polling button on the Tool Bar. The Instantaneous Polling screen appears.



- The graphic representation on the right side of the screen displays any of the options listed in the pull-down menu beneath it (Volts A, B, C; Current A, B, C). Select either spectrum or waveform view by clicking on the Spectrum/Waveform button.
- Click the radio button in the lower right corner to select either 1 Second or 0.1 Second measurements for all data.
- Click Print to send a copy of the screen to a printer.
- Click OK to return to the main Nexus Communicator screen.

6.4: Poll All

- To view all available polling data of the currently connected Nexus Monitor device, select Poll All from the Real-Time Polling menu. The Poll All screen appears.

Channel	0.1 second	1 second	Average	+Maximum	+Minimum	-Maximum	-Minimum	1 Cycle
Volts AN	119.95	119.96	119.96	123.35	116.55			119.94
Volts UN	119.96	119.96	119.96	123.35	116.56			119.97
Volts CN	119.95	119.95	119.95	123.34	116.55			119.83
Volts AUX	119.95	119.97	119.97	123.36	116.57			0.00
IA	266.05	264.16	263.81	312.34	215.74			259.29
ID	266.05	264.04	263.70	312.09	215.61			263.09
IC	266.05	264.08	263.75	316.99	215.87			260.75
INa	0.27	0.26	0.26	0.32	0.22			0.26
INc	N/A	791.95	790.18	951.78	646.51			0.00
Volts AB	0.00	0.00	0.00	0.00	0.00			0.00
Volts UB	0.00	0.00	0.00	0.00	0.00			0.00
Volts CA	0.00	0.00	0.00	0.00	0.00			0.00
VA A	31.91k	31.69k	31.65k	10.07k	26.06k			
VA H	31.92k	31.67k	31.64k	38.80k	26.05k			
VA C	31.91k	31.60k	31.64k	30.79k	26.07k			
VA Total	85.75k	85.04k	84.92k	116.42k	78.18k			
VAR A	-26.70k	-26.61k	-26.56k	*****	*****	-34.33k	-21.32k	
VAR H	-26.69k	-26.56k	-26.52k	*****	*****	-34.29k	-21.31k	
VAR C	-26.66k	-26.56k	-26.51k	*****	*****	-34.28k	-21.38k	
VAR Total	-80.05k	-79.73k	-79.59k	*****	*****	-102.91k	-64.09k	
Watt A	17.47k	17.81k	17.81k	18.83k	14.91k	*****	*****	
Watt D	17.50k	17.26k	17.25k	10.01k	14.02k	*****	*****	
Watt C	17.54k	17.86k	17.86k	18.87k	14.91k	*****	*****	
Watt Total	52.51k	51.73k	51.72k	56.46k	44.64k	*****	*****	
Frequency	59.986	59.996	59.996	60.029	59.957			
Power Factor A	0.547 LEAD	0.542 LEAD	0.543 LEAD					
Power Factor H	0.540 LEAD	0.541 LEAD	0.541 LEAD					
Power Factor C	0.540 LEAD	0.545 LEAD	0.546 LEAD					
Coincident Channel	P Max Watt	N Max Watt	P Min Watt	N Min Watt				
Channel Average VAR	85.49k	0.00k	85.77k	0.00k				
Fixed Window Average VAR	-82.10k	0.00k	-65.77k	0.00k				
Sliding Window Average VAR	-92.44k	0.00k	-76.57k	0.00k				

- Scroll left/right and up/down to access all data.

- ❖ **Note:** To adjust the column widths, position the cursor on a line between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.
- Click Pause to temporarily stop the screen update and enable the Copy button. Click Resume to continue the real-time update.
- Click Print to send the data to a printer.
- To Copy the data into another program, click Pause to enable the Copy button; then click Copy. Paste into your new document.
- Click OK to return to the main Nexus Communicator screen.

6.5: Poll Max and Min Readings

- To view the Maximum and Minimum readings for the currently connected Nexus Monitor device, select Poll Max and Min Readings from the Real-Time Polling menu. The Max and Min Readings with Time Stamps screen appears.

Note: The Max/Min is the Max/Min of the Thermal Average in the profile.

■ Nexus Max and Min Readings with Time Stamps
■ Polling Device: 1

Channel	Value	Positive Maximum Time	Value	Positive Minimum Time	Value	Negative Maximum Time	Value	Negative Minimum Time
Volts AN	123.35	4/24/2000 16:41:31.06	116.55	4/24/2000 16:46:25.09				
Volts BN	123.35	4/24/2000 16:41:31.06	116.55	4/24/2000 16:46:25.09				
Volts CN	123.34	4/24/2000 16:41:31.06	116.55	4/24/2000 16:46:25.09				
Volts ABX	123.36	4/24/2000 16:41:31.06	116.57	4/24/2000 16:46:25.09				
IA	217.34	4/24/2000 16:09:37.07	215.61	4/24/2000 00:54:03.10				
IB	317.09	4/24/2000 16:09:37.07	215.61	4/24/2000 00:54:03.10				
IC	216.99	4/24/2000 16:09:37.07	215.62	4/24/2000 00:54:03.10				
INa	0.32	4/24/2000 16:09:37.07	0.22	4/24/2000 00:54:03.10				
INb	951.16	4/24/2000 16:09:37.07	646.51	4/24/2000 00:54:03.10				
Volts AR	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
Volts UR	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
Volts CR	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
VAA	20.03k	4/24/2000 16:09:37.07	20.00k	4/24/2000 00:54:03.10				
VAB	38.80k	4/24/2000 16:09:37.07	26.05k	4/24/2000 00:54:03.10				
VAC	20.79k	4/24/2000 16:09:37.07	26.07k	4/24/2000 00:54:03.10				
VATotal	116.42k	4/24/2000 16:09:37.07	26.18k	4/24/2000 00:54:03.10				
VAR A	-----	0/0/0 00:00:00.00	-----	0/0/0 00:00:00.00	-34.33k	4/24/2000 16:09:37.07	-27.34k	4/24/2000 16:09:37.07
VAR B	-----	0/0/0 00:00:00.00	-----	0/0/0 00:00:00.00	102.91k	4/24/2000 16:09:37.07	5.46k	4/24/2000 16:09:37.07
VAR C	-----	0/0/0 00:00:00.00	-----	0/0/0 00:00:00.00	102.91k	4/24/2000 16:09:37.07	5.46k	4/24/2000 16:09:37.07
VAR Total	-----	0/0/0 00:00:00.00	-----	0/0/0 00:00:00.00	102.91k	4/24/2000 16:09:37.07	5.46k	4/24/2000 16:09:37.07
Watt A	18.03k	4/24/2000 09:05:40.08	14.97k	4/24/2000 07:43:20.10				
Watt B	18.81k	4/24/2000 09:05:40.08	14.82k	4/24/2000 07:43:20.10				
Watt C	18.07k	4/24/2000 09:05:40.08	14.97k	4/24/2000 07:43:20.10				
Watt Total	56.46k	4/24/2000 09:05:40.08	44.64k	4/24/2000 07:43:20.10				
Frequency	60.029	4/24/2000 14:55:11.04	59.957	4/24/2000 09:05:40.08				
Imbalance V	100.00	4/24/2000 07:43:20.10	99.98	4/24/2000 13:02:18.06				
Imbalance I	100.00	4/24/2000 07:43:20.10	99.97	4/24/2000 13:02:18.06				
THN Volts AN	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
THN Volts BN	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
THN Volts CN	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				
THN I A	0.00	4/24/2000 13:48:12.06	0.00	4/24/2000 13:48:12.06				

- Scroll left/right and up/down to access all data.

- ❖ **Note:** To adjust the column widths, position the cursor on a line between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.
- Click Pause to temporarily stop the screen update and enable the Copy button. Click Resume to continue the real-time update.
- Click Print to send the data to a printer.
- To Copy the data into another program, click Pause to enable the Copy button; then click Copy. Paste into your new document.
- Click OK to return to the main Nexus Communicator screen.

- To reset the Max/Min and Demand Readings, see Chapter 3.

6.6: Poll Power Readings

- To view power and demand readings (Read Only) for the currently connected Nexus Monitor, select Poll Power Readings from the Real-Time Polling menu. The Power and Energy screen appears.

The screenshot shows the 'Power and Energy' screen with the following sections:

- Real Time**: A table with columns for Instant, Thermal, Block, Rolling, and Predicted. Rows include Watts, VARS, VA, and PF.
- Peak Demand**: A table with columns for Thermal, Block, and Rolling. Rows include Del Watts, Rec Watts, Del Watts Coincident VARS, Rec Watts Coincident VARS, iVARS, and -VARS.
- Energy**: A table with columns for Thermal, Block, and Rolling. Rows include VArh, VAh, Rec Wh, Del Wh, VAh, and -VAh.
- Quadrant Sums**: A section with buttons for 'Quadrant Sums', 'OK', and 'Print'.

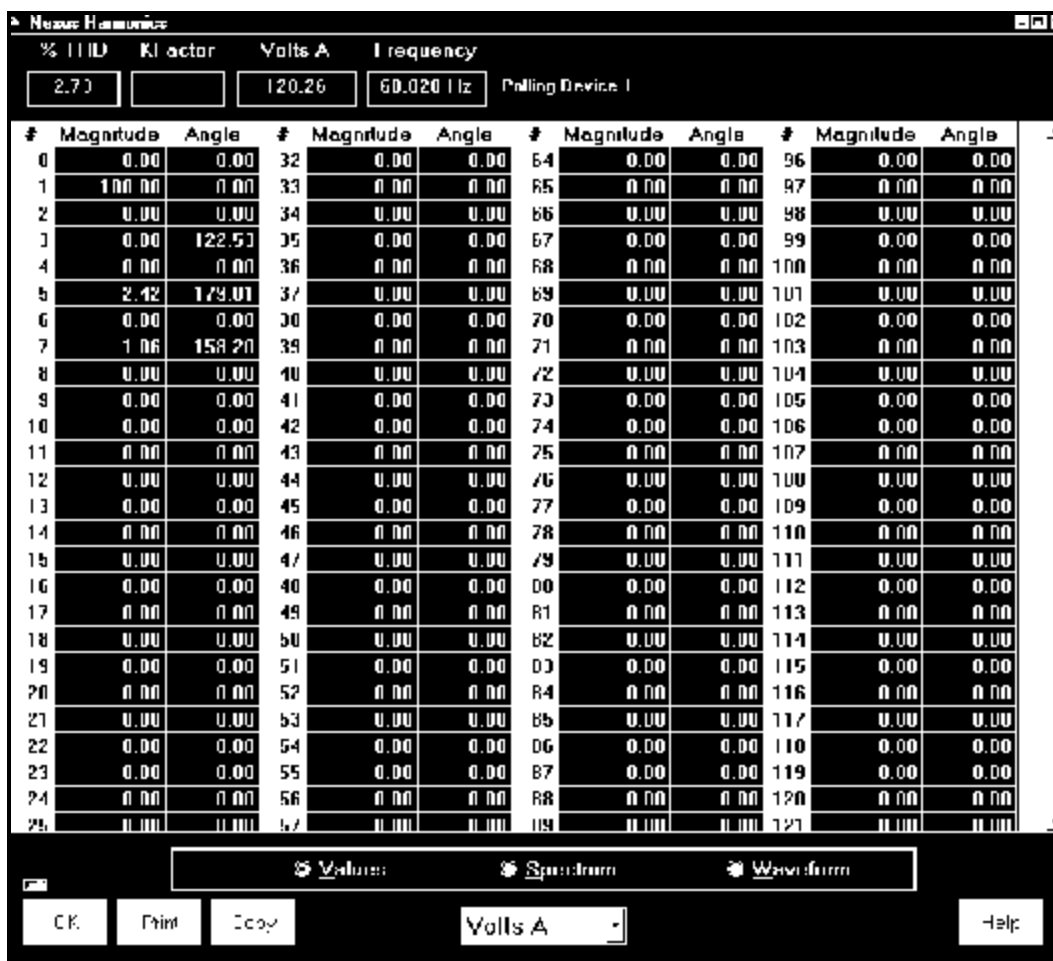
- The Nexus 1250 is a true four-quadrant power meter. It displays the Vars and VA for each quadrant:

<u>Quadrant</u>	<u>Power Factor</u>	<u>Watts</u>	<u>Vars</u>
1	Lag	+	+
2	Lead	-	+
3	Lag	-	-
4	Lead	+	-

- The Quadrant section of the screen can display Individual Quadrants (Primary Readings) or Quadrant Sums (Secondary Readings). Click the button above OK to change that section.
 - Click Print to send a copy of the screen to a printer.
 - Click OK to return to the main Nexus Communicator screen.

6.7: Poll Harmonics

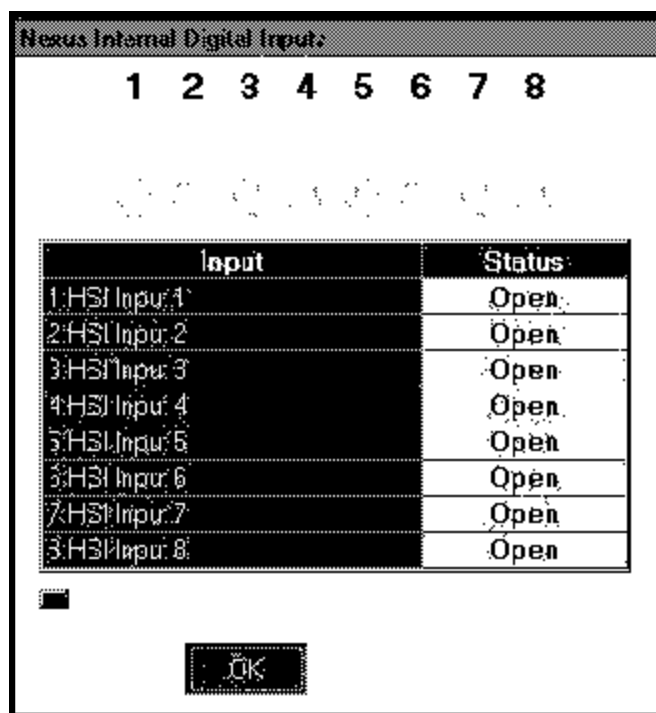
- To view harmonics data for the currently connected Nexus Monitor device, select Poll Harmonics from the Real-Time Polling menu. The Harmonics screen appears.



- To change the presentation format, click on the Values, Spectrum or Waveform buttons. The screen above is in Values mode.
- To change the channel, use the pull-down menu beneath the Spectrum radio button. Select from Volts A, B, C or Current (I) A, B, C.
- Use the scroll bar at the right side of the screen to access all the values. The Nexus Monitor polls harmonics to the 127th order.
 - Click Print to send the data to a printer.
 - Click Copy to send the contents of the screen to the clipboard.
 - Click OK to return to the main Nexus Communicator screen.

6.8: Poll Internal Inputs

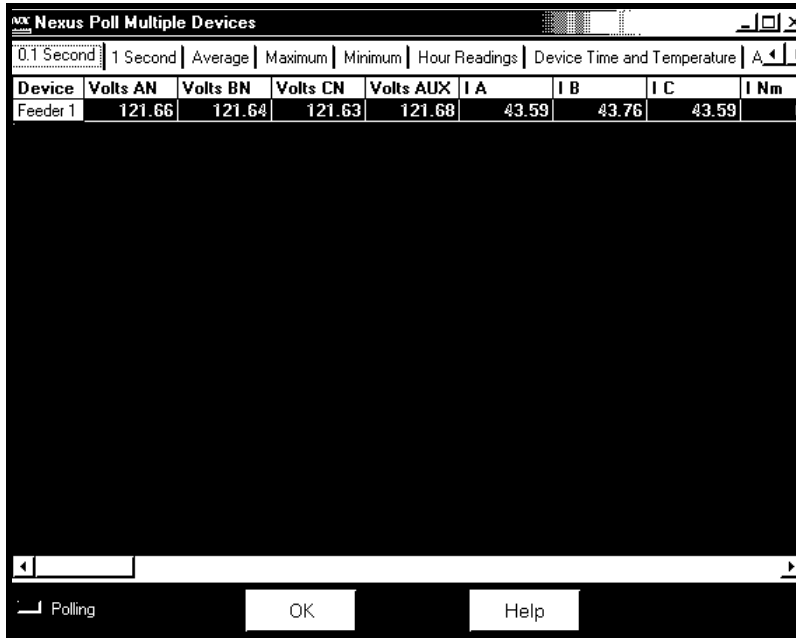
- To view internal input data for the currently connected Nexus Monitor device, select Poll Internal Inputs from the Real-Time Polling menu. The Internal Inputs screen appears.



- To change the screen in any way, click OK to return to the Nexus Communicator screen and click on Edit Profile. See section 3.15 for details.
 - Click OK to return to the main Nexus Communicator screen.

6.9: Poll Multiple Devices

- To view polled data from multiple Nexus Monitor devices connected to your computer, select Poll Multiple Devices from the Real-Time Polling menu. The Poll Multiple Devices screen appears.



- Click on the tabs to access the following readings:

0.1 Seconds: Volts AN, BN, CN, Aux, IA, B, C, Nm, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, VAN Aux, Update Time.

1 Second: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, Imb V, I, Update Time.

Average: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, VAR A, B, C, Total, Watt A, B, C, Total, Freq, Power Factor A, B, C, Total, Imb V, I, Update Time.

Maximum, Minimum: Volts AN, BN, CN, Aux, IA, B, C, Nm, Nc, Volts AB, BC, CA, VA A, B, C, Total, P VAR A, B, C, Total, N VAR A, B, C, Total, P Watt A, B, C, Total, N Watt A, B, C, Total, Update Time.

Hour Readings: Quad (1+4) Watthour, Quad 1 VAhour, Quad 1 VARhour, Quad 4 VAhour, Quad 4 VARhour, Quad (2+3) Watthour, Quad 2 VAhour, Quad 2 VARhour, Quad 3 VAhour, Quad 3 VARhour.

Device Time and Accumulations: Date and Time, Internal Temperature.

Accumulations: I SquaredTA, TB, TC, V Squared TA, TB, TC.

- Use the scroll bar at the bottom of the screen to access all the values.
- Click OK to return to the main Nexus Communicator screen.

6.10: Poll Pulse Accumulations

- To view the Pulse Accumulations readings for the currently connected Nexus Monitor device, select Poll Pulse Accumulations from the Real-Time Polling menu. The Nexus Pulse Accumulations screen appears:

Nexus Pulse Accumulations					
Source	Totals	Average	Maximum	Time Stamp	Acc To
Apt 1	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	+2
Apt 2	0000000000000000	0	0	0/0/0 00:00:00.00	+1
Apt 3	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	+4
Apt 4	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	+3
Input Acc 5	0000000000000002	0	3600	11/3/2000 15:47:25.14	None
Input Acc 6	0000000000000000	0	0	0/0/0 00:00:00.00	None
Input Acc 7	0000000000000000	0	0	0/0/0 00:00:00.00	None
Input Acc 8	0000000000000000	0	0	0/0/0 00:00:00.00	None
Nexus Watt Hour		Energy		Acc To	
Feeder 1		0000000061869758		None	
Aggregator	Totals	Average	Maximum	Time Stamp	
Apt 1+2	0000000000000000	0	0	0/0/0 00:00:00.00	
Apt 3+4	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	
None	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	
None	0000000000000200	0	360.000 k	11/3/2000 15:47:25.14	

- This screen displays the scaled Pulse Accumulations from the Nexus' eight internal digital inputs. It also displays the Fixed Window Average and Max Demand for the eight Pulse Accumulations. At the bottom of the screen, you will also find four Totalizers, which are combinations of the eight internal inputs and the Nexus watt-hour counter.
- This screen is the result of configuring the Pulse Accumulations settings in the Device Profile. See Chapter 3:13 for details on settings and to edit settings. The Nexus can be programmed to accumulate and aggregate poles from any pulse generating device.
 - Click OK to return to the main Nexus Communicator screen.
 - Click Print to print this screen.
 - Click Export to save a text file of the Input Readings. Your computer will ask you to name the file and choose a "save in" location.
 - Click Save or Cancel to return to the main Nexus screen.

6.11: Poll Limit Status

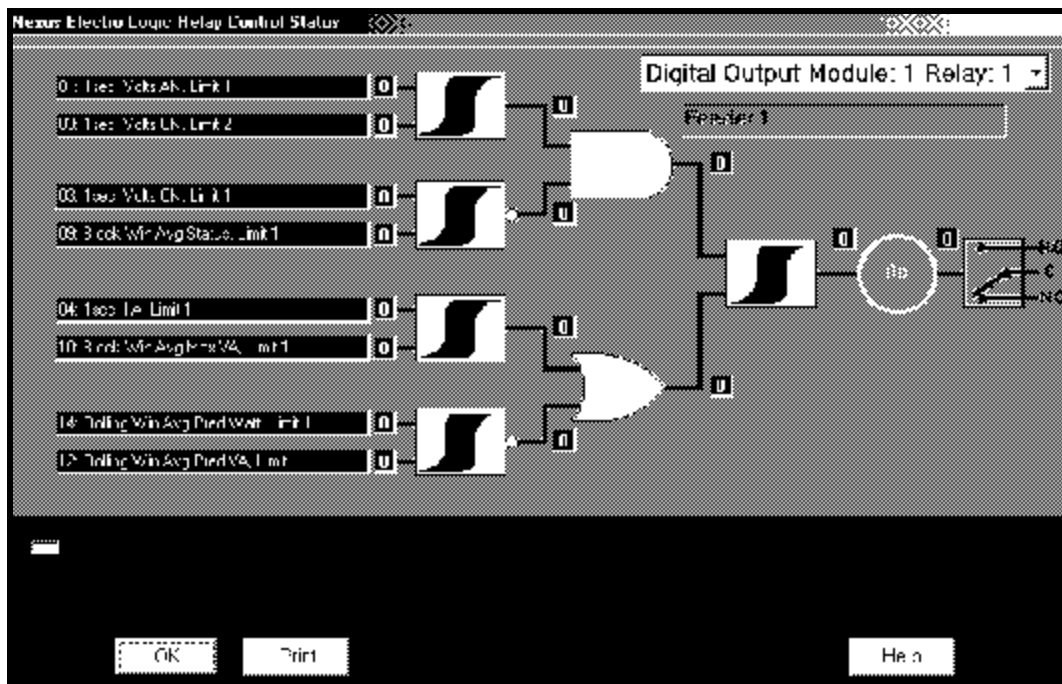
- To view the Limit Status of the currently connected Nexus Monitor device, select Poll Limit Status from the Real-Time Polling menu. The Nexus Limit Status screen appears:

Nexus Limit Status										
Limit ID	Item	Value	Status		Limit 1		Limit 2		Combination	
			Limit 1	Limit 2	Setting	Setpoint	Setting	Setpoint	Type	Status
1	1sec Volts AN	121.77	In	In	Below	3.00	Below	3.00	AND	In
2	1sec Volts BN	121.74	Out	Out	Above	119.40	Above	91.50	AND	Out
3	1sec Volts CN	121.74	In	In	Below	90.00	Below	90.00	AND	In
4	1sec I A	46.92	In	In	Above	255.00	Above	255.00	AND	In
5	1sec I B	46.92	Out	Out	Below	500.00	Below	500.00	AND	Out
6	1sec I C	46.90	Out	Out	Below	500.00	Below	500.00	AND	Out
7	1sec Frequency	60.00	Out	Out	Above	30.00	Above	30.00	AND	Out
8	1sec I Nm	0.23	Out	Out	Below	2.50	Below	2.50	AND	Out
9	Block Win Avg Status		In	In	Below	-0.01	Below	-0.01	AND	In
10	Block Win Avg Max VA	23.35k	In	In	Below	-36.00	Below	-36.00	AND	In
11	Block Win Avg Max +VAR	*****	Out	Out	Below	-36.00	Below	-36.00	AND	Out
12	Rolling Win Avg Pred VA	17.31k	In	In	Below	-36.00	Below	-36.00	AND	In
13	Rolling Win Avg Pred VAR	-14.60k	Out	Out	Below	-36.00	Below	-36.00	AND	Out
14	Rolling Win Avg Pred Watt	9087.00	In	In	Below	-36.00	Below	-36.00	AND	In
15			In	In						In
16			In	In						In
17			In	In						In
18			In	In						In
19			In	In						In
20			In	In						In
21			In	In						In
22			In	In						In
23			In	In						In
24			In	In						In
25			In	In						In
26			In	In						In
27			In	In						In
28			In	In						In
29			In	In						In
30			In	In						In
31			In	In						In
32			In	In						In

- This screen displays the Status of the Limits set in the Programming Limits section of the Device Profile (section 3.9). Up to 32 Limits can be set. To change any of the settings, click OK, which will return you to the main Nexus Communicator screen. Click Edit Profile. Double click on Limits and any of the settings to access the programming screen.
- ❖ **Note:** To adjust the column widths, position the cursor on a line between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.

6.12: Poll ElectroLogic Status

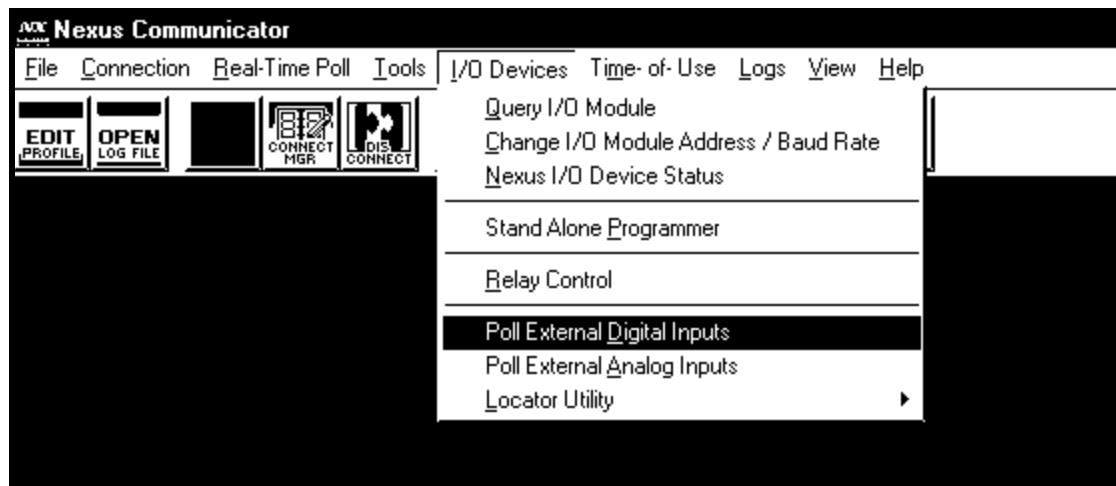
- To view the ElectroLogic Status of the currently connected Nexus Monitor device, select Poll ElectroLogic Status from the Real-Time Polling menu. The Nexus ElectroLogic Status screen appears:



- This screen displays the Status of the ElectroLogic Settings set in the Programming ElectroLogic Relay section of the Device Profile (section 3.10). Up to 8 assignments can be set per relay. If there are no relays installed, a note “Relay Module Not Installed” will appear on the screen.
- To print this screen, click on the Print button.
- This is a Read Only screen. To change any of the settings, click OK, which will return you to the main Nexus Communicator screen. Click Edit Profile. Double click on ElectroLogic Relay to access the programming screen.
- To select a different relay, click on the pull-down menu in the upper right corner of the screen. Click on your selection.

6.13: Poll External Digital Inputs

- To view the polling screens for the External Digital Inputs, select Poll External Digital Inputs or from the I/O Devices menu shown below.



- The following screen appears:

Input	Name	State	Transitions	Reset Counters
1	M 1-M 1	Open	000000000002	Module [v] Reset
2	M 1-M 2	Open	000000000028	
3	M 1-M 3	Open	000000000002	
4	M 1-M 4	Open	000000000010	
5	M 1-M 5	Open	000000000006	
6	M 1-M 6	Open	000000000018	
7	M 1-M 7	Open	000000000008	
8	M 1-M 8	Open	000000000014	
9	M 2-M 1	Open	000000000000	
10	M 2-M 2	Open	000000000000	
11	M 2-M 3	Open	000000000000	
12	M 2-M 4	Open	000000000000	
13	M 2-M 5	Open	000000000000	
14	M 2-M 6	Open	000000000000	
15	M 2-M 7	Open	000000000006	
16	M 2-M 8	Open	000000000004	
17	M 3-M 1	Open	000000000004	
18	M 3-M 2	Open	000000000014	
19	M 3-M 3	Open	000000000050	
20	M 3-M 4	Open	000000000002	
21	M 3-M 5	Open	000000000002	
22	M 3-M 6	Open	000000000002	
23	M 3-M 7	Open	000000000002	
24	M 3-M 8	Open	000000000002	
25	M 4-M 1	Closed	000000000031	
26	M 4-M 2	Open	000000000000	
27	M 4-M 3	Open	000000000000	
28	M 4-M 4	Open	000000000000	
29	M 4-M 5	Closed	000000000019	
30	M 4-M 6	Closed	000000000011	
31	M 4-M 7	Open	000000000007	
32	M 4-M 8	Open	000000000001	

Buttons: OK, Help, Copy

Footer: P.Inq 0007 508

- Information appearing on the screen will include: Input number, Name given to the device, State and Transitions. With buttons on the right side of the screen, you can use the pull-down menu to Reset Counters or Copy the data from up to 32 inputs and paste it into a document.
 - Click OK to return to the main screen.

6.14: Poll External Analog Inputs

- To view the polling screens for the External Analog Inputs, select Poll External Analog Inputs from the I/O Devices menu. The following screen appears:

External Analog Inputs			
Input	Name	Raw Value	Primary Value
1	M 1:Temp Sensor 1, C	0.000 mA	0.000
2	M 1:Temp Sensor 2, K	0.000 mA	0.000
3	M 1:Temp Sensor 3, F	0.000 mA	0.000
4	M 1:Pres Sensor, Hg	0.000 mA	0.000
5	M 1:Light Sensor, Lu	0.000 mA	0.000
6	M 1:Humidity Sensor	0.000 mA	0.000
7	M 1:Sea Level, Ft	0.000 mA	0.000
8	M 1:Sound Level, dB	0.000 mA	0.000
9	M 2:	0.000 V	0.000
10	M 2:	0.000 V	0.000
11	M 2:	0.000 V	0.000
12	M 2:	0.000 V	0.000
13	M 2:	0.000 V	0.000
14	M 2:	0.000 V	0.000
15	M 2:	0.000 V	0.000
16	M 2:	0.000 V	0.000

- Information on the screen includes: Input number, Name assigned to the input, Raw Value (Actual Value the input is measuring) and Primary Value (Scaled Value from the Device Profile).
 - The Copy button at the right of the screen will allow you to copy the information from up to 32 Inputs and paste that data into a document.
 - Click OK to return to the main screen.

Chapter 7

Viewing Logs

7.1: Overview

■ The Nexus 1250 and 1270 Monitors record the following logs:

- **Historical Trends Logs 1 and 2**

These logs are two separate collections of time-stamped records (or “snapshots”) used to track any parameter over time. Each record or snapshot can contain multiple data items, which are recorded at specific intervals and stamped with the time of recording. The following programmable criteria determine when the Nexus Monitor will take a snapshot:

- The user-specified time interval
- A parameter’s exceeding of a limit or a return to within limits
- The capture of a waveform
- An I/O event (a change in a relay or input)

- **Limits Log**

The Limits Log retrieves independent out-of-limit information, creating a sequence of events for any occurrence.

- **Event-Triggered Waveform Log**

The Event-Triggered Waveform log records a waveform when a user-programmable value goes out of limit and when the value returns to normal. All information is time-stamped to the nearest 1msec. A new feature for interharmonic analysis observes further frequencies.

- **Power Quality (CBEMA) Log**

This log records magnitude and duration of voltage and current surges and sags for every power quality (PQ) event. The associated waveform is also recorded.

- **Status Change (Input) Log**

This log displays the input change status for a selected meter file and time range.

- **Control Output (Relay) Log**

This log displays the relay change status for a selected meter file and time range.

- **AiReports**

AiReports 2.0 is an optional power quality analysis software package used in conjunction with the Nexus Logs. It provides a comprehensive report on the status of the equipment being monitored and it uses artificial intelligence to diagnose PQ events and provide the possible cause of the event.

- The following is the general sequence for working with all logs:
 1. **Program** parameters specific to each log in the Nexus Monitor's Device Profile (section 7.2). Logs run automatically.
 2. **Retrieve** the logs manually from the Nexus Monitor (section 7.3); or retrieve logs automatically using the **Nexus Script & Scheduler Program**. See Chapter 13 for further details.
 3. **View and analyze** log data with Nexus Communicator's **Log Viewer** (sections 7.5–7.17).
 4. **Diagnose PQ Events** from Nexus logs, **create comprehensive report**, transmit, modify, print or export file with **optional AiReports software** (section 7.15).
- **Free Space Calculation Feature:** Nexus Log Converter automatically checks your computer and calculates the amount of free space on your hard drive. This calculation is performed to insure enough hard drive space for the Log Converter to operate. Below are the parameters for the calculations and the actual calculation performed by the Nexus.

FREE SPACE CALCULATION PARAMETERS		
ITEM	DESCRIPTION	MINIMUM VALUE
THDS	Total Hard Disk Space	
THDFS	Total Hard Disk Free Space	
MIN%THDS	Minimum % of Free Space of Total Space (Min%ofFreeSpace)	1 (After 3/19/2002)
MinSetFS	Minimum Free Space (MinFreeSpace)	50M
CalMinFS	Calculated Minimum Free Space	

NOTE: Min%ofFreeSpace and MinFreeSpace Values are set in the LogConverter.ini file.

CALCULATION:

Min%THDS x THDS = CalMinFS

If CalMinFS < MinSetFS then CalMinFS = MinSetFS

If CalMinFS <= THDFS then OK

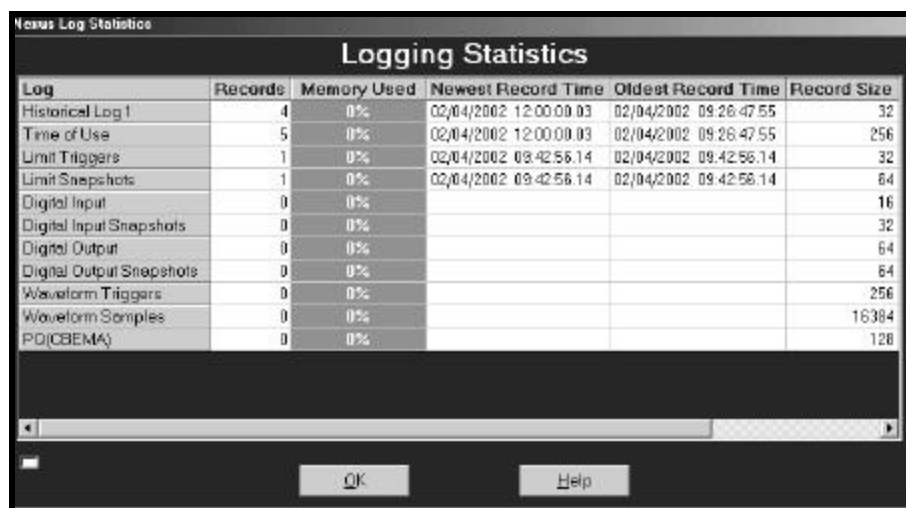
If CalMinFS > THDFS then Need More Space on your HD

7.2: Programming and Running Logs

1. Program the following parameters specific to each type of log in the Nexus Monitor's Device Profile. See Chapter 3 for details.

NOTE: Anytime you update the Device Profile, a pop-up screen will announce that the logs are not being reset and would you like to reset them? Resetting the logs is recommended if you make changes to CT & PT Ratios, Limits or Limit Full Scales.

- Limit and Waveform Full Scales (section 3.4)
 - Limits (section 3.9)
 - Trending Setup (section 3.11)
 - Trending Log Time Intervals (section 3.12)
 - Power Quality and Waveform Thresholds (section 3.13)
 - Labels (section 3.15)—YOU **MUST** LABEL THE NEXUS MONITOR
2. You do not need to start the logs; **the Nexus Monitor is always recording.**
 3. To confirm the parameters and track the progress of the logs, select Statistics from the Logs menu (or click on the Log Status icon on the tool bar). The Log Statistics screen appears.



The screenshot shows a window titled "Nexus Log Statistics" with a sub-header "Logging Statistics". It contains a table with the following data:

Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size
Historical Log 1	4	0%	02/04/2002 12:00:00.03	02/04/2002 09:26:47.55	32
Time of Use	5	0%	02/04/2002 12:00:00.03	02/04/2002 09:26:47.55	256
Limit Triggers	1	0%	02/04/2002 09:42:56.14	02/04/2002 09:42:56.14	32
Limit Snapshots	1	0%	02/04/2002 09:42:56.14	02/04/2002 09:42:56.14	64
Digital Input	0	0%			16
Digital Input Snapshots	0	0%			32
Digital Output	0	0%			64
Digital Output Snapshots	0	0%			64
Waveform Triggers	0	0%			256
Waveform Samples	0	0%			16384
PD(CBEMA)	0	0%			128

At the bottom of the window are "OK" and "Help" buttons.

7.3: Retrieving Logs

■ To retrieve logs from the Nexus Monitor and convert them for viewing and analysis:

1. Click on the Retrieve Logs button, or select Logs, Retrieve Log(s) from Device. The following screen appears.

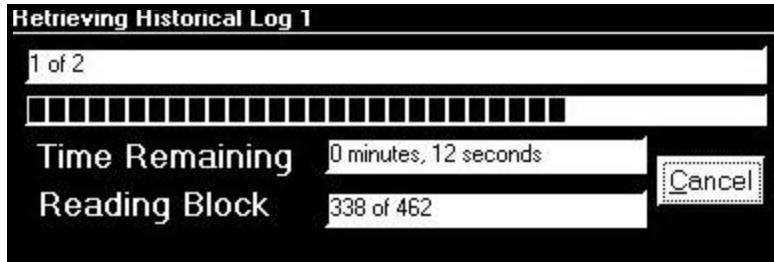
Select Log(s) to be Retrieved from Nexus

Meter Designation: Feeder 1

Log Type	Status	Retrieve
Historical Log 1	Available	No
Time of Use	Available	No
Limits	Available	No
Digital Inputs	Available	No
Digital Outputs	Available	No
Waveform / PQ	Available	No

Start Cancel Help

2. Double-click on the logs you would like to retrieve from the Nexus Monitor. The “No” in the Retrieve column will become a “Yes”; double-click again to change the “Yes” back to a “No.” Nexus Communicator will only retrieve those logs with a “Yes” in the Retrieve column.
3. Note the Meter Designation field:
 - If you have entered a label for the Nexus Monitor in the Labels section of the Device Profile (Chapter 3), the label will appear here. Nexus Communicator will apply this name to the file containing the logs you choose to retrieve, placing the file in the Retrieved Logs folder.
 - If the Nexus Monitor **does not** have a meter designation or label, this field will appear blank and Nexus Communicator will ask you to name the log file and supply a destination. See Chapter 3, section 3.15 for how to give the Nexus Monitor a label.
4. Click Start. Nexus Communicator begins to retrieve the log. The following screen appears:



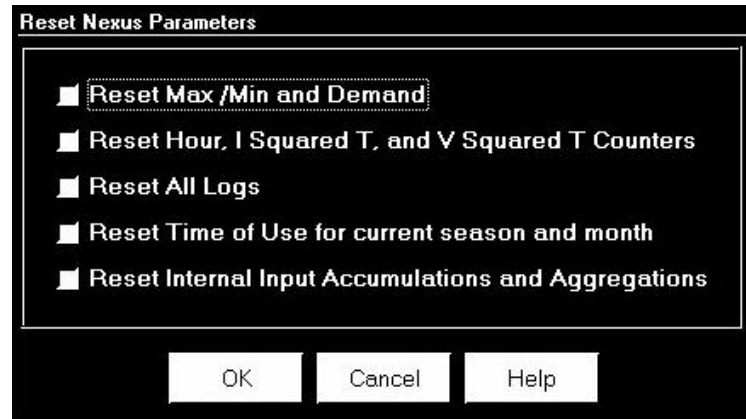
5. After Nexus Communicator has retrieved the log it converts the data. The log converter application runs automatically.



6. Nexus Communicator then runs Log Viewer: See sections 7.5–7.17 for information on using Log Viewer.
- ❖ **Note:** Retrieve logs as often as you want. Each time you retrieve a log file, Nexus Communicator appends only the newest records and captures to the existing database. These “partial downloads” are listed in Log Viewer’s Database Status screen (see section 7.14). Snapshots, or partial downloads, must be a time frame within the database dates. Otherwise, there is no data from which to retrieve the snapshot.

7.4: Manually Resetting Logs

1. Select Reset Nexus Information from the Tools Menu. The following screen appears.



2. Click in the box beside the Reset All Logs. Click OK.

NOTE: Anytime you update the Device Profile, a pop-up screen will announce that the logs are not being reset and would you like to reset them? You can click Yes or use this screen.

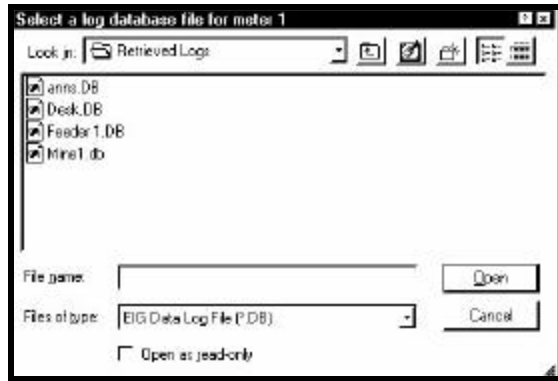
Resetting the logs is recommended if you make changes to CT & PT Ratios, Limits or Limit Full Scales.

7.5: Viewing Logs with Nexus Communicator's Log Viewer

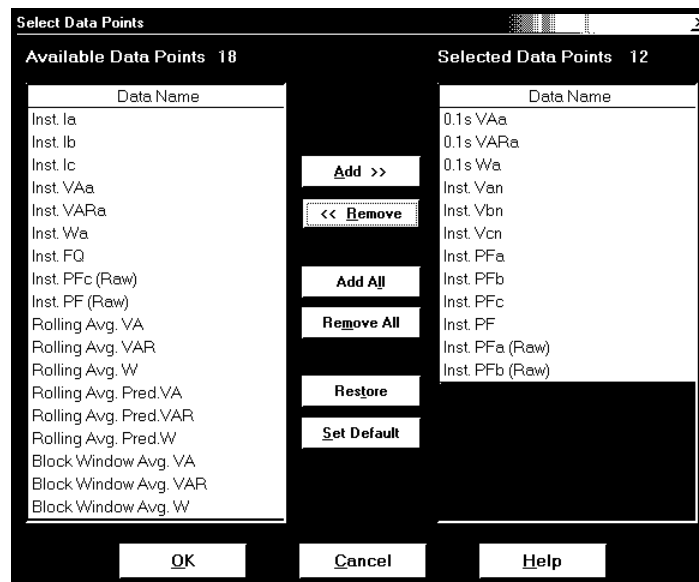
- Nexus Communicator's Log Viewer displays retrieved logs in a variety of formats.
- To access Log Viewer, either:
 - Retrieve logs from a connected Nexus Monitor, as in section 7.3.
 - Click the Open Log File button, or from the File Menu select Open Nexus Log File. Communicator will ask you to select a previously stored log file. Communicator defaults to the Retrieved Logs directory.
 - Run Log Viewer from the Windows® Start menu.
- Log Viewer's main screen appears:



1. Choose the log data file(s) you would like to view:
 - If you have retrieved a log from Nexus Communicator, that file is selected for Meter 1, as in the example above ("Feeder 1");
 - Or click on either Meter button. Log Viewer will ask you to select a log database file:

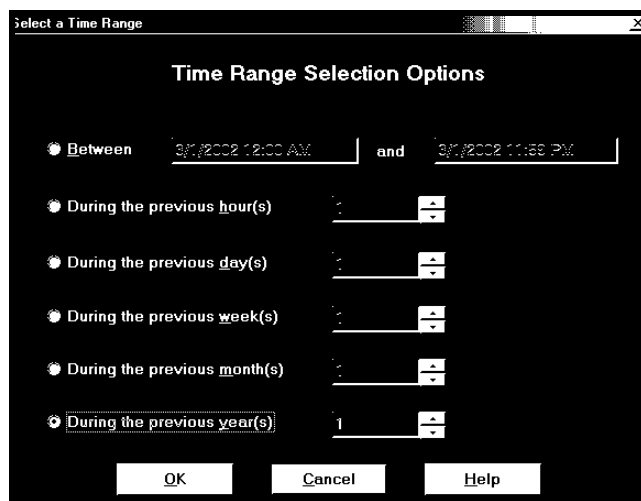


- You may choose a different log file for Meter 1 and for Meter 2. **You may only load one log file per Meter.**
 - The log file assigned to each Meter is listed in the pull-down menu above the button. Select No Meter from the pull-down menu to close a log file.
2. **Select what log data points you would like to view** by clicking on the Data Points button in the Select Data section. The following screen appears:

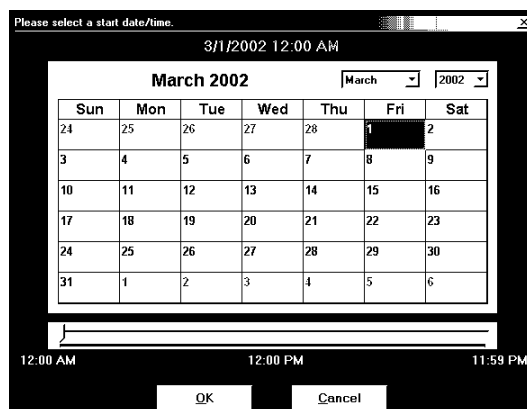


- The Data Points available will vary with the type of log and the parameters set for it. From the Available Data Points column, click on the data points you want to include when viewing the log file. To select multiple points, hold down the Ctrl key while clicking. To select a sequence of points, hold down the Shift key while clicking.
- Click on the Add button to move the Data Points to the Selected Data Points column.
- Click on the Restore button to return the selection to its previous setting.

3. When you have made your selection, click OK to return to Log Viewer's main screen.
 - The pull-down menu above the Data Points button lists the points you have selected.
4. **Select what portion of the log(s) you wish to view by specifying a time range.** Log Viewer bases its time/date format on your computer's Regional Settings (Windows® Control Panel). Click on the Time Range button in the Select Time section. The following screen appears:



- **To select a specific time range,** click the Between radio button and enter a date and time in each field. Double-click either date/time field to bring up the following calendar. Click the selected day and use the slide at the bottom of the screen to select a time. Click OK.



- **To select a range of hours, days, months or years only,** click the appropriate radio button and the counter menu beside it.
 - **To return to the main screen,** click OK. The time range you selected is displayed above the button.
5. After you have loaded the log file(s), selected data points and chosen a time range, you may begin viewing the data. The following sections detail the different viewing formats for each type of log.

7.6: Viewing Historical Trends and Snapshots

- From Log Viewer's main screen, click on the Historical Trends button or View Data, Snapshots. Log Viewer will display Snapshot Information for the selected log file(s) based on the **time range and data points** specified in the Select Data and Time Range windows of the main screen (section 7.5).

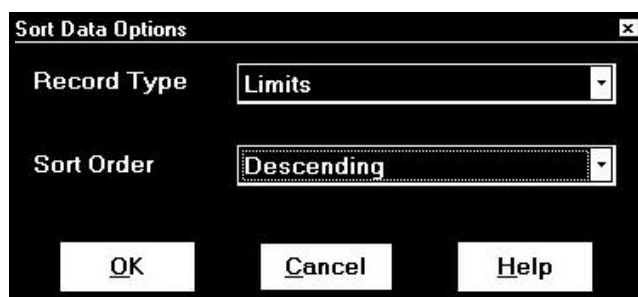
Snapshot Type	All Snapshots	Time Range	05/03/2000 3:04:30.000 PM to 05/03/2000 12:00:00.020		
Sort Criteria	Descending		Up	Down	
Date/Time	Record Type	Feeder 1 - Inst. Van	Feeder 1 - Inst. Vbn	Feeder 1 - Inst. Vcn	
05/03/2000 3:04:30.000 PM	Log 1	119.97	119.97	119.97	
05/03/2000 3:04:15.020 PM	Log 1	119.77	119.77	119.77	
05/03/2000 3:04:00.000 PM	Log 1	119.86	119.87	119.86	
05/03/2000 3:03:45.000 PM	Log 1	119.83	119.83	119.83	
05/03/2000 3:03:30.020 PM	Limits	119.46	119.46	119.46	
05/03/2000 3:03:30.000 PM	Log 1	119.40	119.40	119.40	
05/03/2000 3:03:29.050 PM	Limits	119.40	119.40	119.40	
05/03/2000 3:03:27.040 PM	Limits	119.44	119.45	119.44	
05/03/2000 3:03:25.030 PM	Limits	119.27	119.28	119.27	
05/03/2000 3:03:15.010 PM	Log 1	119.84	119.85	119.84	
05/03/2000 3:03:00.020 PM	Log 1	120.05	120.06	120.05	
05/03/2000 3:02:45.030 PM	Log 1	120.13	120.13	120.12	
05/03/2000 3:02:30.000 PM	Log 1	120.00	120.00	120.00	
05/03/2000 3:02:15.000 PM	Log 1	119.83	119.83	119.84	
05/03/2000 3:02:00.010 PM	Log 1	120.07	120.08	120.07	
05/03/2000 3:01:45.040 PM	Log 1	119.58	119.59	119.58	
05/03/2000 3:01:34.030 PM	Limits	119.76	119.76	119.76	
05/03/2000 3:01:32.020 PM	Limits	118.71	118.71	118.71	
05/03/2000 3:01:30.010 PM	Log 1	119.98	119.99	119.98	
05/03/2000 3:01:15.000 PM	Log 1	119.85	119.85	119.85	
05/03/2000 3:01:00.020 PM	Log 1	119.72	119.73	119.72	

- The name of the log file ("Feeder 1" in this example) and the type of data point are listed in the top row.
- The viewer can move columns, so that the most important data is most accessible. Right-click on the column title and drag it to the desired location on the table. Repeat as desired to customize the table.
- To save the data to your clipboard, right-click with the cursor positioned anywhere in table.
- To sort the data by record type in either ascending or descending order, click on the Sort button and use the pull-down menu to make your selection.

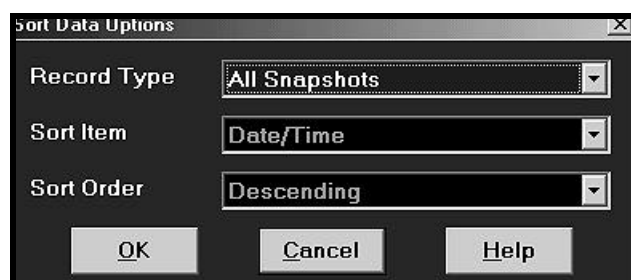
- See the following section 7.8 for details about viewing Snapshot Graphs.

7.7: Sort

- At the bottom of all the display pages for the selected log file(s), including the Historical Trends display page, you'll find a **Sort** button. The **Sort** button allows you to customize the Log Viewer data to your needs by using the pull-down menus to set the criteria for the sort.



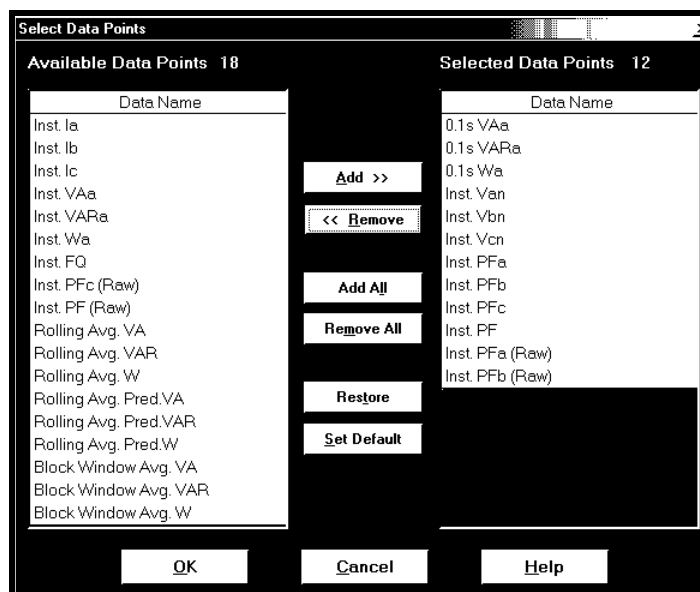
- Click on the pull-down menu next to Record Type to select from a variety of Record Types, determined by the type of log being viewed. For example, the Historical Trends Log includes the following choices in the Record Type menu: All Snapshots, Group by Type, Log 1, Log 2, Limits, Input, Relay, Flicker



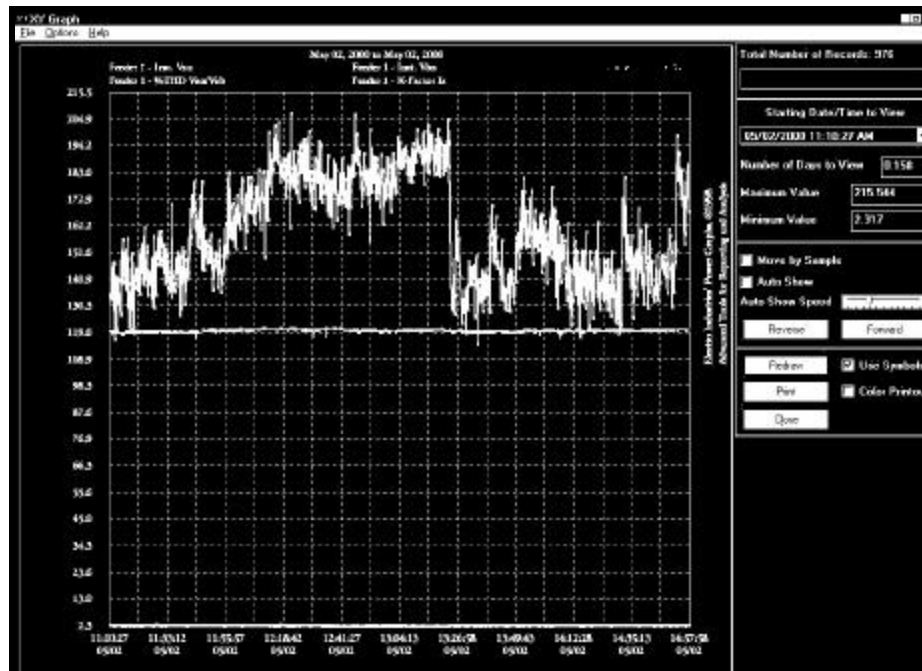
- Sort Item appears on some screens. Click on pull-down menu next to Sort Item to select Date/Time or Readings for the currently selected Meter.
 - Click on pull-down menu next to Sort Order to select Ascending or Descending Order.
 - Click OK.
- In a few moments, the customized data will load on to your screen.

7.8: Viewing Trending and Demand Graphs (XY and Circular)

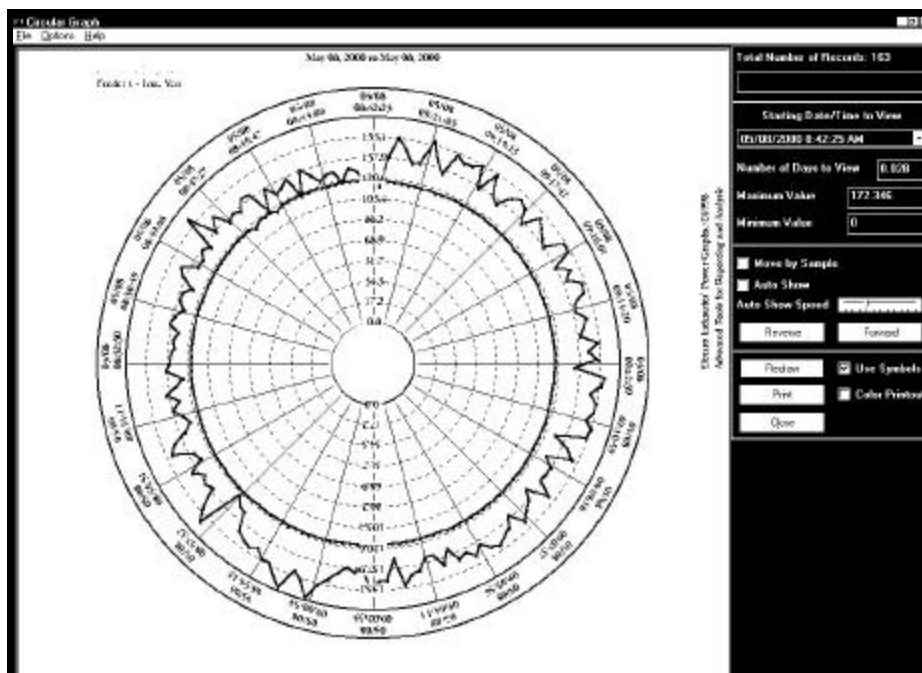
1. To display Trending or Demand data as either an XY or Circular graph, click on the Graph button in the main Trending or Demand screen. The following screen appears:



- The Available Items column lists the data points that have been selected for the log file. To add a new data point, return to Log Viewer's main screen and click on the Data Points button (see section 7.5).
 - From the Available Data Points column, click on the data points you want to graph. Then, click the Add button. The items will appear in the Graph Items column. To select multiple points, hold down the Ctrl key while clicking. To select a sequence of points, hold down the Shift key while clicking.
- ❖ **Note:** Only a total of six pens may be used at one time. If there are two log files open, you will only be allowed to select three data points from the left column.
2. To view the graph, press either the Circular or XY Graph button:



XY Graph

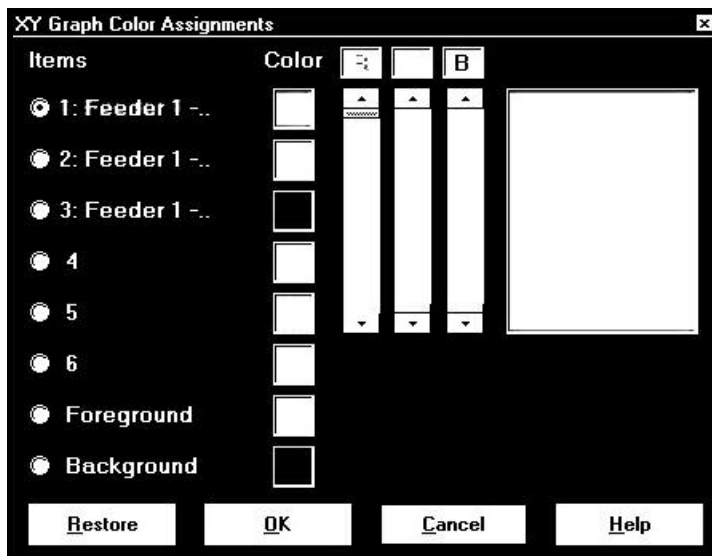


Circular Graph

■ The following pertain to either type of graph:

- **To change the starting point of the graph**, choose a new date/time segment from the Starting Date/Time to View pull-down menu.

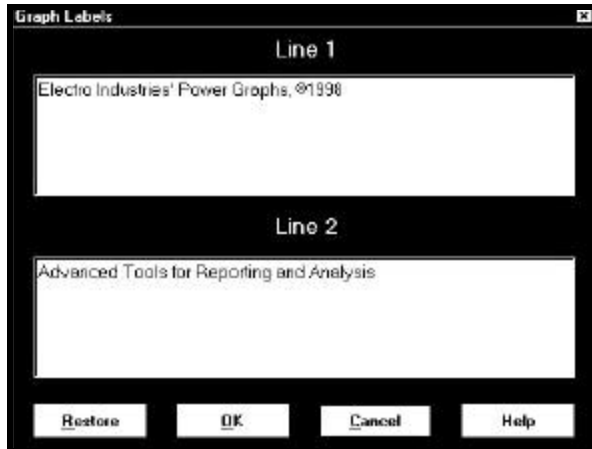
- **To change the amount of time represented on the graph**, enter a value in the Number of Days to View field and press enter or click on the Redraw button.
- **To change the scale of the graph**, enter a value in the Minimum Value and Maximum Value fields and press enter or the Redraw button.
- **To view one sample at a time**, click in the Move by Sample box; then click on the Forward or Reverse buttons each time you would like to view the next (or previous) sample.
- **To view a continuous, sample-by-sample rendering of the graph**, click the Move by Sample box and the Auto Show box. Select a speed by sliding the Auto Show Speed bar left or right; click on the Forward or Reverse button to determine the direction of the Auto Show. To stop Auto Show, deselect the Auto Show box.
- **To print the graph on a color printer**, check the Color Printout box and click Print.
- **To print the graph on a black-and-white printer**, click the Use Symbols box and click Print.
- **To copy the graph data to the computer's clipboard**, select Copy from the File menu. Paste the data into a spread sheet, such as Excel.
- **To export the graph's data**, select Export Data from the File menu.
- **To change the graph's color assignments**, select Select Colors from the Options menu. The following screen appears:



The small squares under the Color heading represent the color currently assigned to each component of the graph. To make adjustments to an Item's color, click the radio button beside it and create a new color by moving the red, green and blue sliders. Create black by moving all sliders down, white by moving all sliders up.

The large square on the right shows the color you have created. Click OK to return to the graph; Log Viewer will redraw using the new color scheme. Click the Restore button to return all color schemes to default values.

- **To create a label for the graph**, select User Labels from the Options menu. The following screen appears:



Enter a label in each line and click OK. The two-line label will appear on the right side of the graph. Click Restore to enter the previous label.

- **To view a summary of data for any point on the graph**, position the cursor on the graph and hold down the mouse button.

7.9: Viewing the Limits Log

- From Log Viewer's main screen click on the Limits button or View Data, Limits. Log Viewer displays limit information for the selected log file(s) based on the **time range specified** in the Select Time Range section of its main screen (see section 7.5).

Start Date/Time	Enc	Duration (S)	Device	Set Index	Limit ID	State	Data	Value	Set Point
1/23/2002 8:56:06.140 AM		0	Feeder 1	7	Limit 2	Below	Inst. Vcn	0.00	Below 360 or 75
1/23/2002 8:56:06.140 AM		0	Feeder 1	4	Limit 2	Above	Inst. PF (Raw)	1.00	Above 0 or 0%
1/23/2002 8:56:06.140 AM		0	Feeder 1	4	Limit 3	True	Inst. PF	1.00	AND, L1=Above
1/23/2002 8:56:06.140 AM		0	Feeder 1	4	Limit 3	True	Inst. PF (Raw)	1.00	AND, L1=Above
1/23/2002 8:56:06.140 AM		0	Feeder 1	5	Limit 1	Below	Inst. Van	0.00	Below 12 or 2.5
1/23/2002 8:56:06.140 AM		0	Feeder 1	5	Limit 2	Below	Inst. Van	0.00	Below 12 or 2.5
1/23/2002 8:56:06.140 AM		0	Feeder 1	4	Limit 2	Above	Inst. PF	1.00	Above 0 or 0%
1/23/2002 8:56:06.140 AM		0	Feeder 1	7	Limit 1	Below	Inst. Vcn	0.00	Below 360 or 75
1/23/2002 8:56:06.140 AM		0	Feeder 1	10	Limit 2	Below	Inst. Ic	0.01	Below 10 or 50%
1/23/2002 8:56:06.140 AM		0	Feeder 1	7	Limit 3	True	Inst. Vcn	0.00	AND, L1=Below
1/23/2002 8:56:06.140 AM		0	Feeder 1	9	Limit 1	Below	Inst. Ib	0.01	Below 10 or 50%
1/23/2002 8:56:06.140 AM		0	Feeder 1	9	Limit 2	Below	Inst. Ib	0.01	Below 10 or 50%
1/23/2002 8:56:06.140 AM		0	Feeder 1	9	Limit 3	True	Inst. Ib	0.01	AND, L1=Below
1/23/2002 8:56:06.140 AM		0	Feeder 1	10	Limit 1	Below	Inst. Ic	0.01	Below 10 or 50%
1/23/2002 8:56:06.140 AM		0	Feeder 1	10	Limit 3	True	Inst. Ic	0.01	AND, L1=Below
1/23/2002 8:56:06.140 AM		0	Feeder 1	5	Limit 3	True	Inst. Van	0.00	AND, L1=Below
1/23/2002 8:56:06.140 AM		0	Feeder 1	2	Limit 2	Below	Inst. PFb (Raw)	1.00	Below 2 or 50%
1/23/2002 8:56:06.140 AM		0	Feeder 1	1	Limit 2	Below	Inst. PFa	1.00	Below 0 or 50%

- Click the Show Snapshots box on the left side of the screen to display the limits snapshot information.
- To copy the data to the computer's clipboard, right-click with the cursor positioned anywhere in the table.
- To sort the data by record type in either ascending or descending order, click on the Sort button and use the pull-down menus to make your selection.

7.10: Viewing the Waveform Log

- From Log Viewer's main screen (section 7.5), click on the Waveform button or View Data, Waveform. Log Viewer will display waveform information for the selected log file(s) based on the **time range** specified in the Select Time Range section of its main screen. Futura+ Waveform Time Precision is 1 second.

Start Date/Time	End Date/Time	Duration ms	Trigger Date/Time	Device	Waveform Trig
2/27/2002 11:00:37.078 AM	2/27/2002 11:00:37.212 AM	133	2/27/2002 11:00:37.095 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 11:00:36.944 AM	2/27/2002 11:00:37.078 AM	133	2/27/2002 11:00:36.961 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 11:00:36.812 AM	2/27/2002 11:00:36.945 AM	133	2/27/2002 11:00:36.845 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 10:54:19.496 AM	2/27/2002 10:54:19.630 AM	133	2/27/2002 10:54:19.511 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 10:54:19.362 AM	2/27/2002 10:54:19.496 AM	133	2/27/2002 10:54:19.378 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 10:54:19.230 AM	2/27/2002 10:54:19.363 AM	133	2/27/2002 10:54:19.263 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 10:52:31.581 AM	2/27/2002 10:52:31.715 AM	133	2/27/2002 10:52:31.598 AM	Feeder 1	Ia=Sag, Ib=Sag
2/27/2002 10:52:31.449 AM	2/27/2002 10:52:31.583 AM	133	2/27/2002 10:52:31.466 AM	Feeder 1	Ia=Sag, Ib=Sag

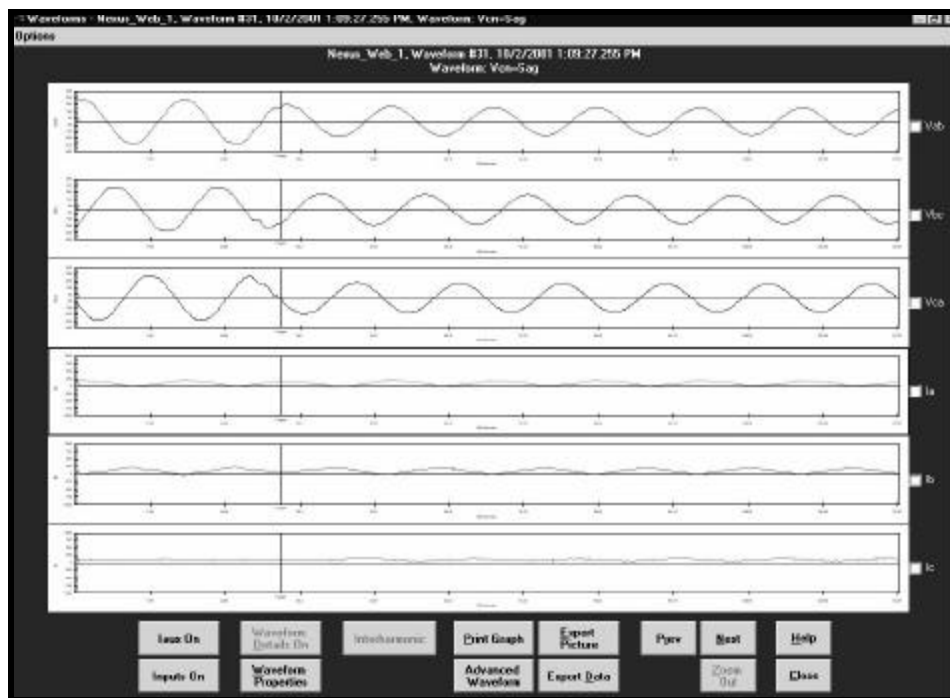
Device	HookUp	Sampling Rate	Capture Num
Feeder 1	Y Wye	128	3

Waveform Setpoint 1				Waveform Setpoint 2			PQ	Inputs	En
Channel	States	% of Full Scale	Enabled	States	% of Full Scale	Enabled	Enabled	Inputs	En
Van	Above	110	Yes	Below	90	Yes	Yes	1	Y
Vbn	Above	110	Yes	Below	90	Yes	Yes	2	Y
Vcn	Above	110	Yes	Below	90	Yes	Yes	3	Y

- To save the data to your clipboard, right-click anywhere in table.
- To view the Waveform Settings, click on a waveform record and then click the Show Waveform Settings box on the left side of the screen.
- To adjust the column widths, position the cursor between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.
- To sort the data by record type in either ascending or descending order, click on the Sort button and use the pull-down menus to make your selection.
- To view the waveform graphs, see the following section.

7.11.1: Viewing Waveform Graphs

- To view any waveform in the main Waveform Log screen (section 7.10), click on the desired record and then click the Graph button (or double-click on the desired record).



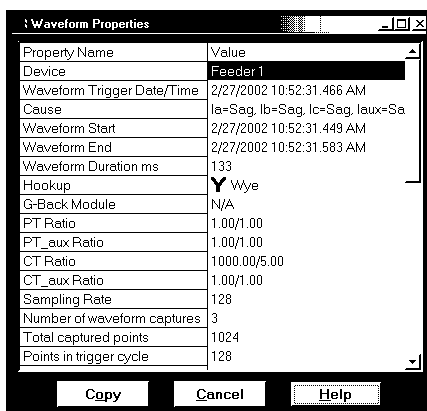
- To change the Waveform Display Settings, click the Options button in the upper left corner of the screen. The Waveform Options screen will appear:

Subsets	Item Names	Overlay Select	Item Colors	Item Line Types	Item Point Types
1	Va	<input checked="" type="checkbox"/>		Thin Solid	Plus
2	Vb	<input checked="" type="checkbox"/>		Thin Solid	Cross
3	Vc	<input checked="" type="checkbox"/>		Thin Solid	Circle
4	Ia	<input checked="" type="checkbox"/>		Thin Solid	Solid Circle
5	Ib	<input checked="" type="checkbox"/>		Thin Solid	Square
6	Ic	<input checked="" type="checkbox"/>		Thin Solid	Solid Square
7	Ixxx	<input checked="" type="checkbox"/>		Thin Solid	Diamond
8	Input 1	<input checked="" type="checkbox"/>		Thin Solid	Solid Diamond
9	Input 2	<input checked="" type="checkbox"/>		Thin Solid	Upward Triangle
10	Input 3	<input checked="" type="checkbox"/>		Thin Solid	Solid Upward Triangle
11	Input 4	<input checked="" type="checkbox"/>		Thin Solid	Downward Triangle
12	Input 5	<input checked="" type="checkbox"/>		Thin Solid	Solid Downward Triangle
13	Input 6	<input checked="" type="checkbox"/>		Thin Solid	Dash
14	Input 7	<input checked="" type="checkbox"/>		Thin Solid	Pixel
15	Input 8	<input checked="" type="checkbox"/>		Thin Solid	Plus

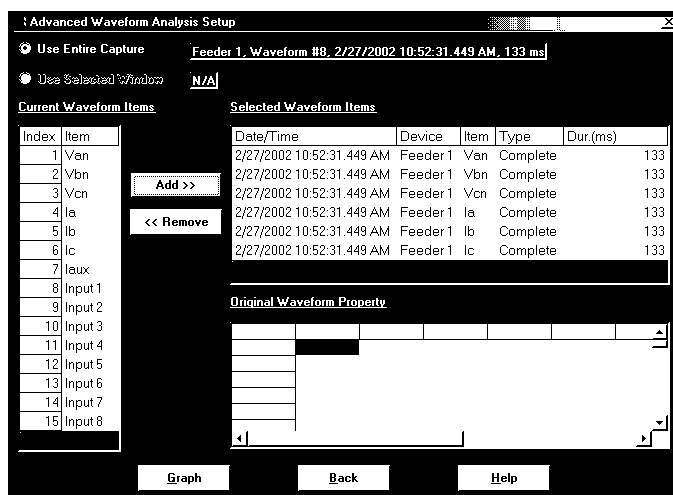
FUTURA+ NOTE: To display Futura+ meter's waveform (line 7), the user must select a system frequency on the Waveform Display Settings screen before displaying the waveform. If the setting does not match the user's system, incorrect time labels will be displayed for the x-axis.

Configurable options include:

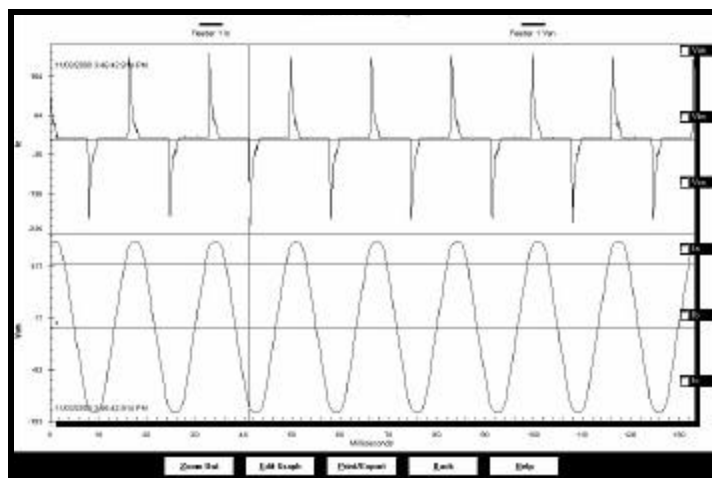
1. Start Up Mode: Classic, Overlay or Overlay (group)
 2. Overlay Mode: Overlay or Group
 3. Plotting Method: Line, Point or Line and Point (Line and Point is slower than the other two options.)
 4. Colors: Background, Foreground, Subsets (User can reverse the colors.)
 5. Point Sizes for Each Subset: Small, Medium, Large or Micro
 6. Line Types for Each Subset: Pull-down menu offers Dashed, Dot, Dash Dot, Dash Dot Dot, Medium Solid, Thick Solid, Medium Thin Solid, Medium Thick Solid, Extra Thick Solid.
 7. Item Point Types for Each Subset: Pull-down menu offers Plus, Cross, Solid Circle, Square, Solid Square, Diamond, Solid Diamond, Upward Triangle, Solid Upward Triangle, Downward Triangle, Solid Downward Triangle, Dash or Pixel.
- **To include the Iaux in the graph**, click the Iaux On button; click the Iaux Off button to remove. Double click on the Iaux graph for a closer view.
 - **To include the High Speed Inputs in the graph**, click the Inputs On button. Double click on the Inputs graph for a closer view. Each input is listed on the Y axis followed by a 1 or 0—a 1 denotes that the input is open; a 0 denotes that the input is closed. Click Inputs Off to remove.
 - **To Print the graph**, click the Print Graph button.
 - **To Export an image from the screen**, click the Export Picture button.
 - **To Export the data only**, click the Export Data button.
 - **To view the previous or next waveform record**, click the Previous or Next buttons.
 - **To Zoom In on a portion of the graph**, click and drag to form a box; then, double click.
 - **To Zoom Out**, click the Zoom Out button.
 - **To view the Waveform Properties**, click Waveform Properties button. The following screen appears:



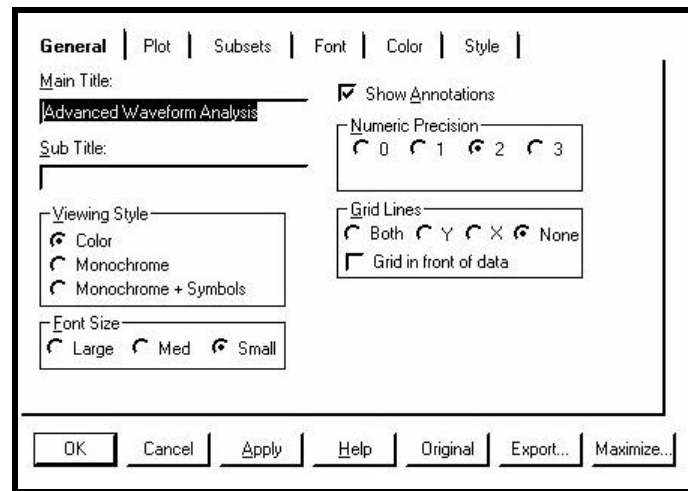
- To view the **Advanced Waveform** screen, click Advanced Waveform. This screen appears:



- The user can select a complete or partial waveform from multiple devices, different channels and different times for a single graph. Up to six sets of waveforms can be graphed together.
- **To select items for the Advance Waveform Setup:**
 1. Use radio buttons to select the Entire Capture or a Selected Window. Selected Window is enabled if if a user set **mark 1 and mark 2** for a given channel. The waveform for that channel between those marks will be graphed in the overlaid advanced graph.
 2. To add to the Selected Waveform Items list, from the Current Waveform Items indexed on the left of the screen, click on an item and click on Add.
 3. To remove an item from Selected Waveform Items, click on the item and click Remove.
 4. To view the Original Waveform Property of a Selected Waveform Item, click on one of the list items. The Waveform Property for that item will appear.
- **To return to the main Waveform Graph**, click the Back button.
- **To create an Advanced Waveform Graph**, click the Graph button. This screen appears:

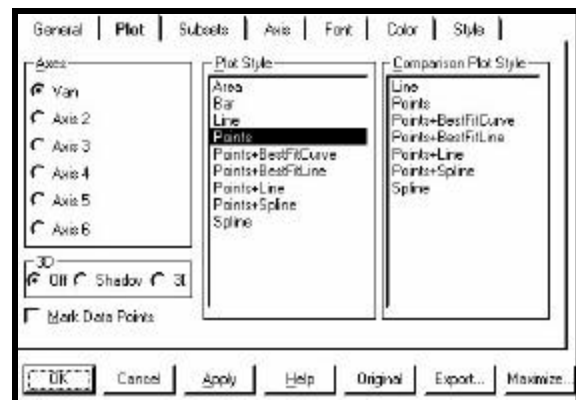


- **To edit the Advanced Waveform Graph**, click on Edit Graph. The first of a series of screens appears. These screens assist the user in **Customization of Advanced Waveform Graphs**.



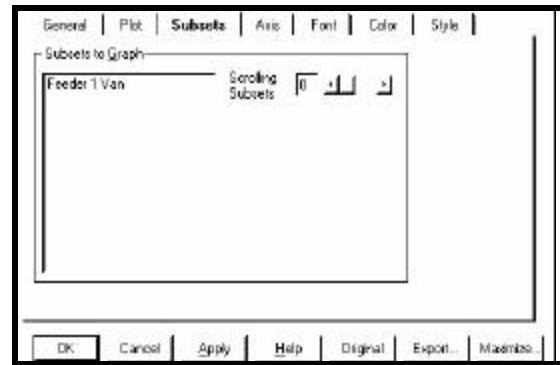
- This screen's special features include:
 1. Main Title: user can edit the Main Title of the graph..
 2. User Annotation: user can add a line of text inside the graph in the form of a Sub Title. This feature applies to graph with single Y axis, non-overlaid.
 3. Viewing Style: Color, Monochrome or Monochrome and Symbols.
 4. Font Size: Large, Medium or Small
 5. Numeric Precision: digits behind the decimal (from 0-3).
 6. Grid Lines: All (Both), Y, X, None, Grid in Front of Data.
- **To Apply changes**, click Apply.
- **To return to the Original screen**, click Original. (This will erase any changes.)
- **To Export**, click Export (see details below.)
- **To Maximize the screen**, click Maximize. The graph will fill your screen.
- **To add style and dimension to graphs**, use the **Plot Screen** and follow these steps:

1. Choose one or more axes.
2. From the 3D buttons, choose Shadow, 3D or Off.
3. Choose to Mark Data Points or not.
4. Choose a Style for Plot Style.
5. Choose a Comparison Plot Style.



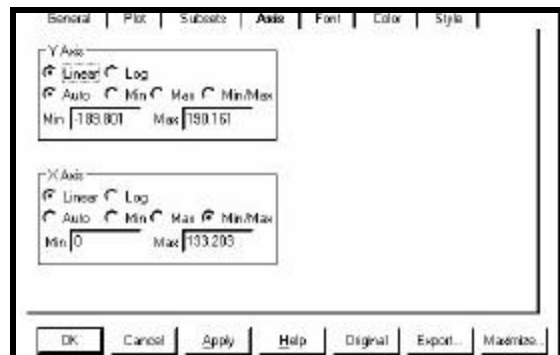
- **To Add Subsets to the Graph**, use the **Subsets** screen.

1. From Available Subsets, choose Subsets to be graphed.
2. Choose number of Scrolling Subsets to be graphed.



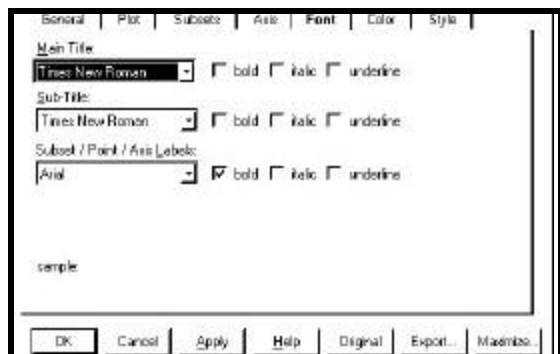
- **To Set the Configuration of the Y Axis and the X Axis**, use the **Axis** screen.

1. Set Linear or Log Axis.
2. Set Auto, Min, Max or Min/Max.
3. Set Numeric Min and Max for each axis.



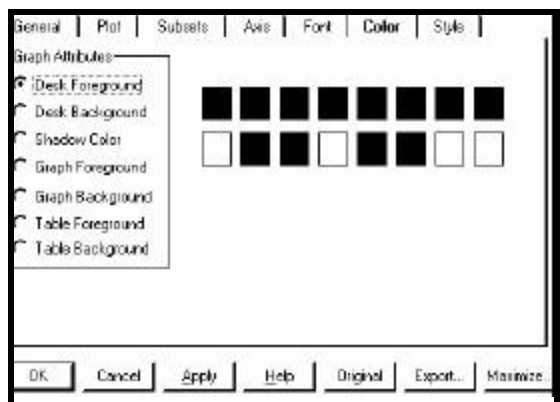
- **To Set the Fonts for the Graph**, select from 152 different font styles in Bold, Italic or Underline for:

1. Main Title
2. Sub-Title
3. Subset / Point / Axis Labels

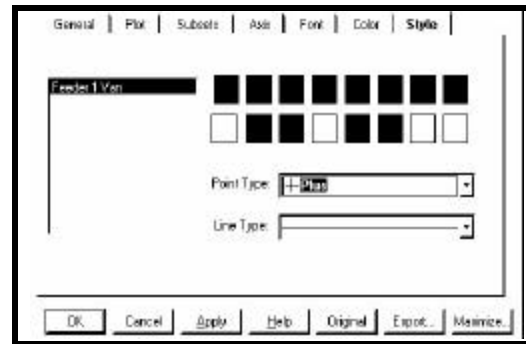


- **To Choose Colors for Graph Attributes**, select from 16 colors for:

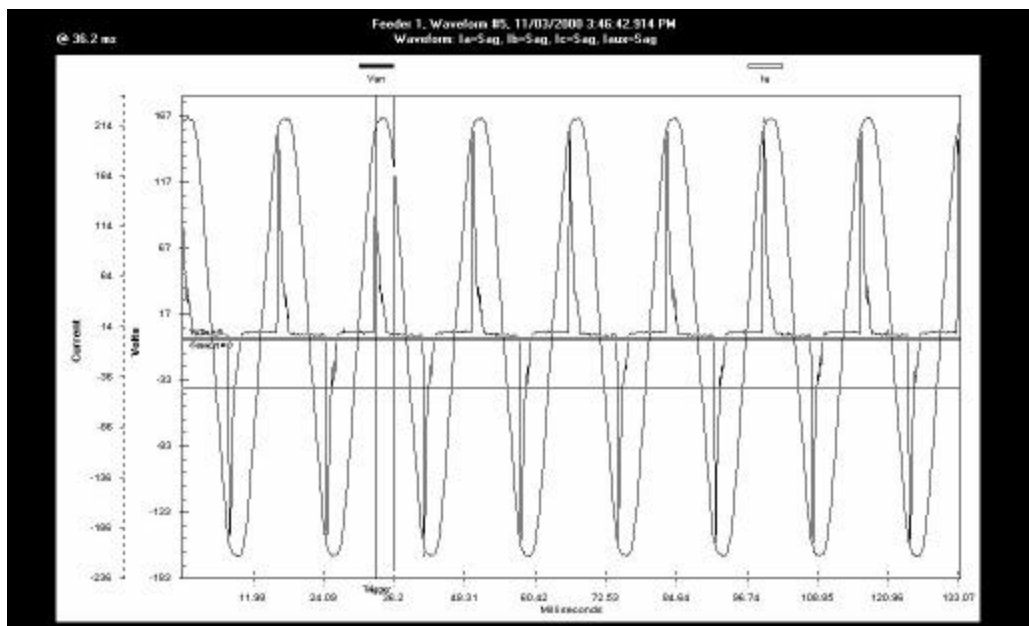
1. Desk Foreground and Background (area surrounding graph).
2. Shadow Color
3. Graph Foreground (lines and points)
4. Graph Background
5. Table Foreground and Background



- To select **Color, Point Type and Line Type** from a wide selection, use the **Style** screen.



- To combine **multiple waveforms into one graph**, click the check boxes on the right side of the screen for each waveform you wish to include. Then double-click on one of the selected graphs. The following example screen shows the Van and Ic channels:

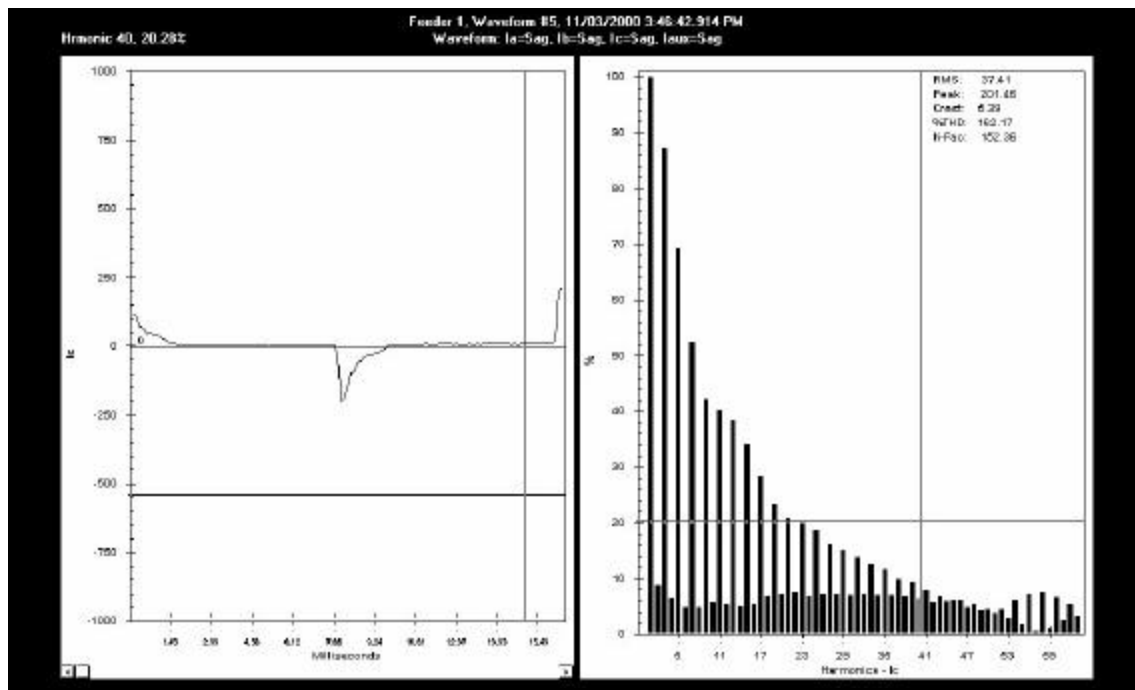


- To move **Hash Marks on the screen**, move the mouse. Duration is calculated from mark 2 to mark 1 in milliseconds.
- To **zoom in on a portion of the graph**, draw a box around the desired area by dragging the mouse and holding down the left button. Release the mouse button to activate the zoom. Click the Zoom Out button to decrease the resolution.
- To include the **Iaux in the graph**, press the Iaux On button; click Iaux Off to remove it.
- To include the **High Speed Inputs in the graph**, click Inputs On. Double click on the Inputs graph for a closer view. Each input is listed on the Y axis followed by a 1 or 0—a 1 denotes that the input is open; a 0 denotes that the input is closed. Click Inputs Off to remove the graph.

- **To Print the graph**, click the Print Graph button.
- **To Export an image from the screen**, click the Export Picture button.
- **To Export the data only**, click the Export Data button.

■ **To view a detailed graph of one Item**, double-click on the desired Item.

- **To view details for this waveform**, click on the Waveform Details On button. The following screen appears:



- **To return to the previous graph**, click Back or click Waveform Details Off.
- **To Zoom In on a portion of the graph**, draw a box around the desired area by dragging the mouse and holding down the left button. Release the mouse button to active the zoom.
- **To Zoom Out on a portion of the graph**, click the Zoom Out button to decrease the resolution.

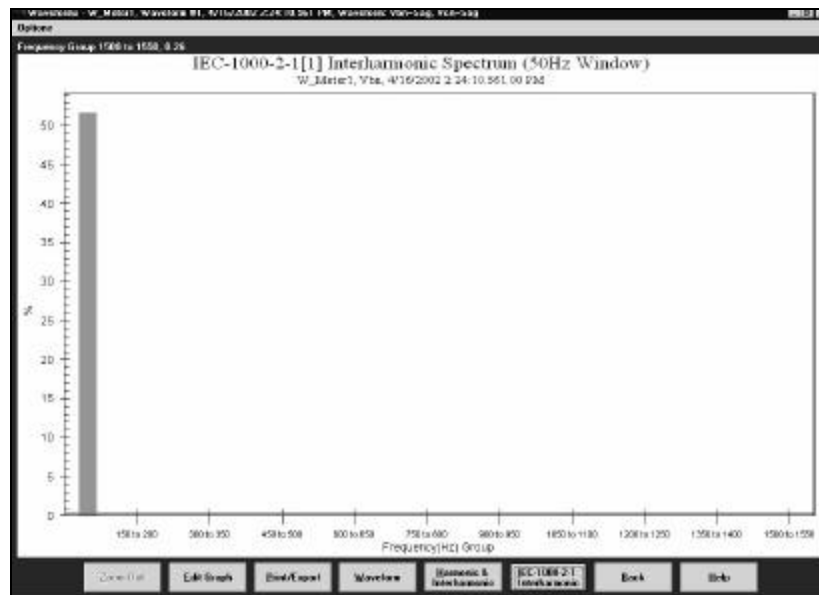
7.11.2: Interharmonic Analysis

- A new feature has been added to the Log Viewer program for Interharmonic Analysis. It is only available for Nexus type meters on Voltage (V_A , V_B , V_C) and Current channels (I_A , I_B , I_C , I_{AUX}).

IEC-1000-2-1 [1] defines Interharmonics as follows: “Between the harmonics of the power frequency voltage and current, further frequencies can be observed which are not an integer multiple of the fundamental. They can appear as discrete frequencies or as a wide-band spectrum.”

To perform the analysis, there must be a waveform record with a 200ms duration. For a 50Hz system, the waveform is 10 cycles; for a 60Hz system, the waveform is 12 cycles. By default, the starting point for Interharmonic Analysis of a Waveform is its first point. But, a user can set a starting point (place the mark) anywhere in the waveform, assuming that there will be enough sample points available after the starting point. If there are not enough points in this waveform capture, the software will check the next waveform record(s) stored in the database. If it is contiguous, additional points up to 200ms will be retrieved for analysis. For a waveform with sampling rate equal to or less than 64, the software will only check the next (1) contiguous record. For a waveform with a sampling rate equal to or greater than 128, the software will check the next two contiguous records. Resetting the mark will set the starting point back to the waveform’s first point.

- From Log Viewer’s main screen, click the Interharmonic Analysis button. The following screen will appear.



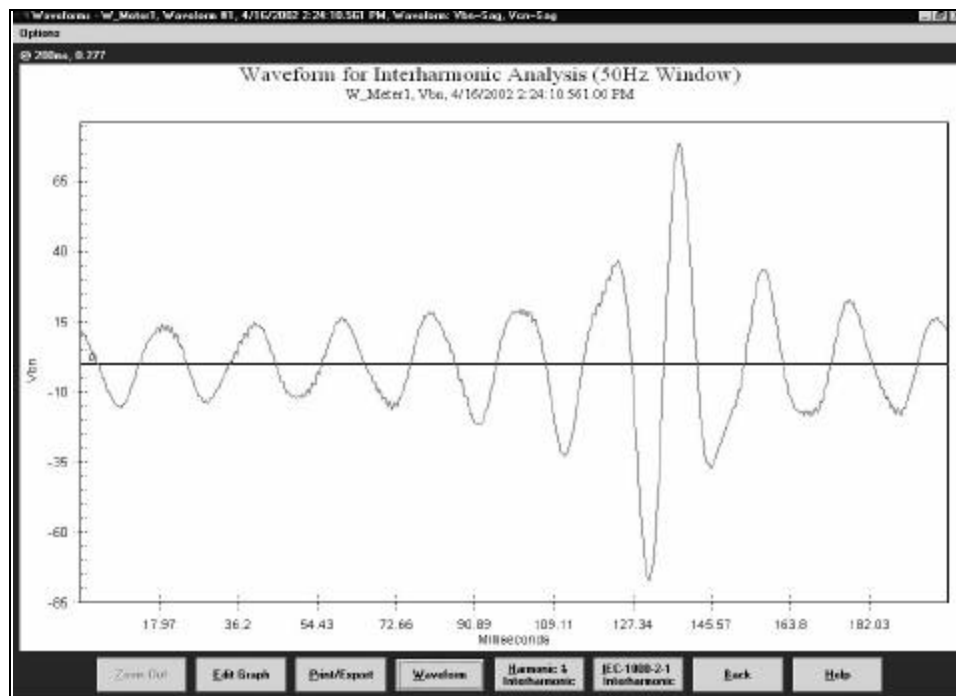
- **To view a graph:**

Select a Starting Point, if it is other than the first point of the waveform (default).

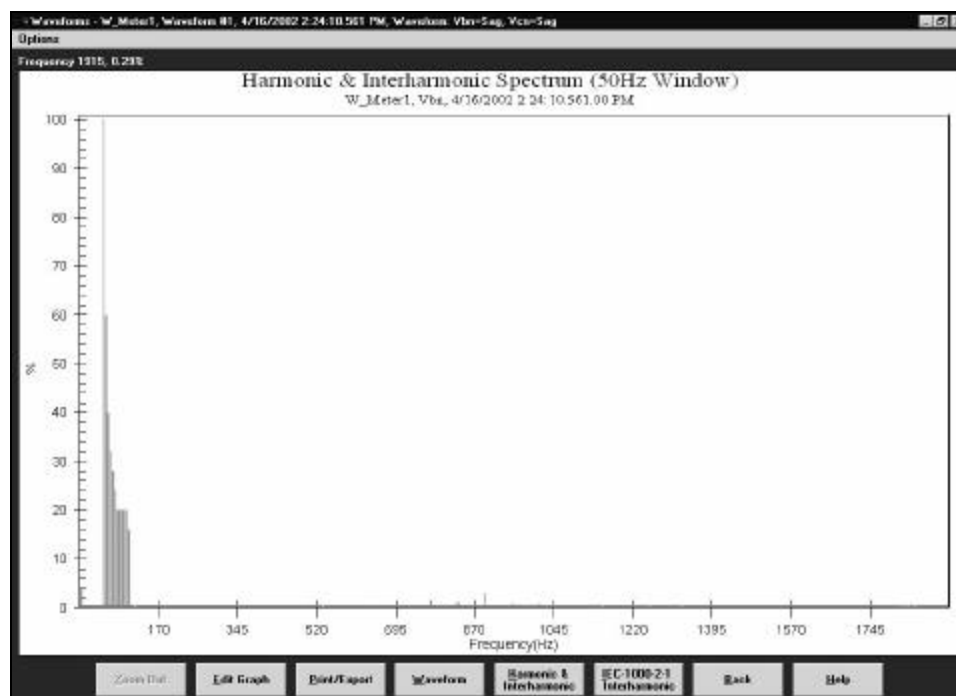
Select System Frequency (50Hz or 60Hz) before performing the analysis by clicking Options (at the top of the screen) and clicking 50Hz or 60Hz.

(The last frequency set will be the default until it is changed.)

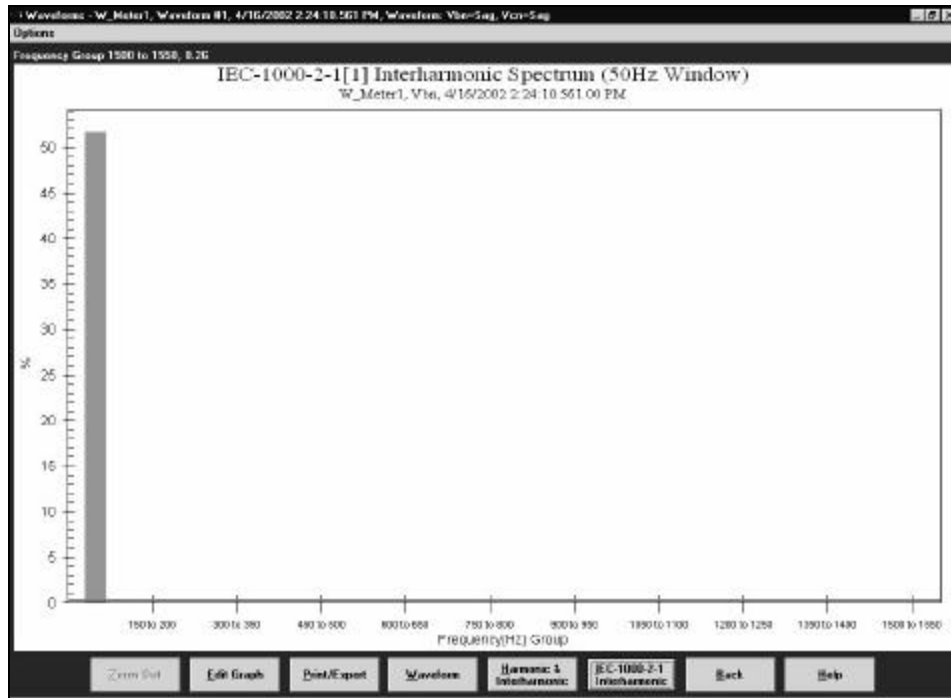
Three graphs will be displayed:



The 200ms Waveform (10 cycles or 12 cycles)



Normalized Harmonic Spectrum of the Waveform



Interharmonic Spectrum with Grouped Frequencies

- **Measurement:** IEC 61000-4-7 ([ref] First Edition) establishes a well disciplined measurement method for harmonics which utilizes 10 (50Hz systems) or 12 cycle (60Hz systems) sample windows upon which to perform the Fourier transform. The result is a spectrum with 5Hz resolution for both 50Hz and 60Hz systems. The standard further defines ways of combining individual 5 Hz bins to produce various groupings and components for referenced limits and guidelines.

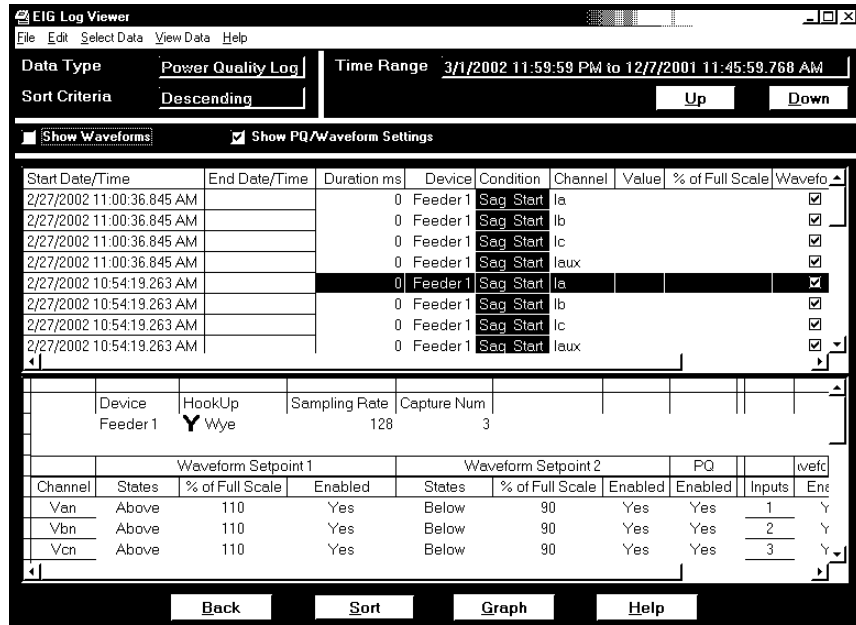
The IEC Measurement Method defines interharmonic groups. These indices are the RMS values of the interharmonic components between adjacent harmonic components. The frequency bins directly adjacent to the harmonic bins are omitted. This relationship is defined by the following equation:

$$x_{IH}^2 = \sum_{i=2}^8 x_{10n+i}^2 \quad (50\text{Hz systems})$$

$$x_{IH}^2 = \sum_{i=2}^{10} x_{12n+i}^2 \quad (60\text{Hz systems})$$

7.12: Viewing the Power Quality Log

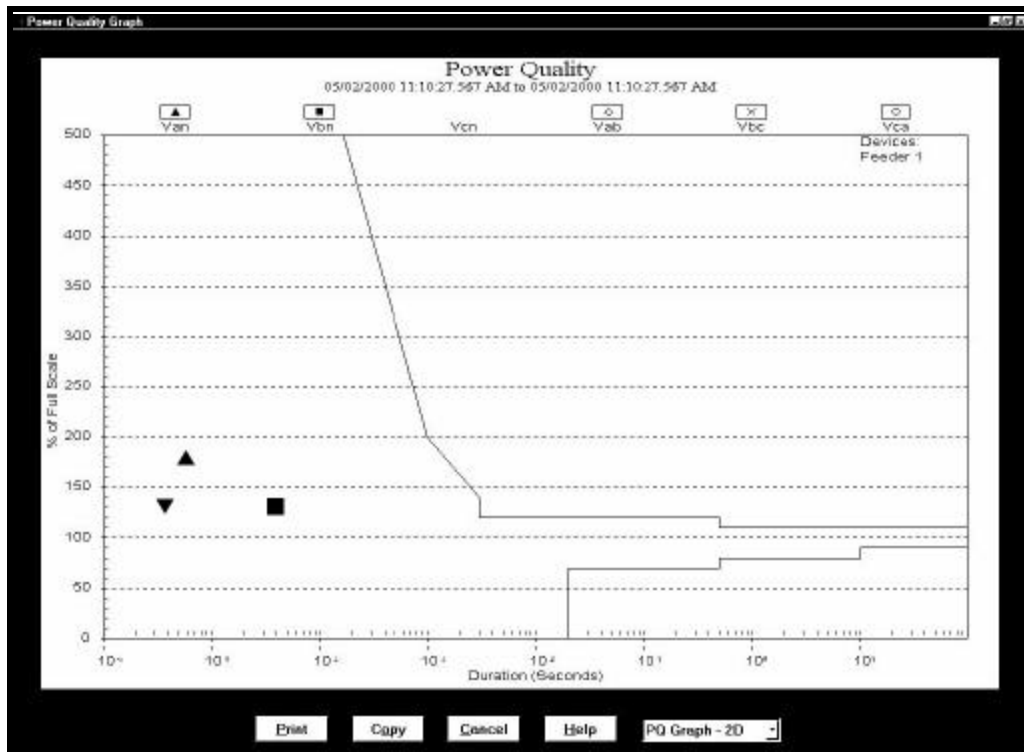
- From Log Viewer's main screen, click on the PQ button or View Data, Power Quality. Log Viewer will display power quality information for the selected log file(s) based on the **time range** specified in the Select Time Range section of its main screen (see section 7.5).



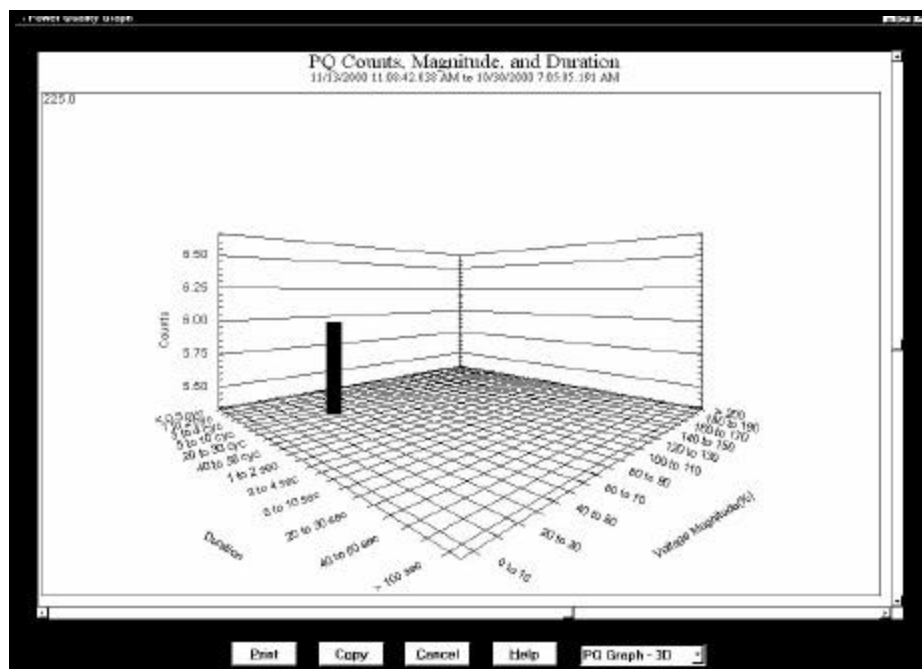
- To save the data to your clipboard, right-click with the cursor positioned anywhere in table.
- To view waveform information associated with a record or a range of records, click on the record(s) and then click the Show Waveform Settings box on the left side of the screen.
- To view the PQ/Waveform Settings, click on the record(s) and then click the PQ/Waveform Settings box.
- To view a waveform, double-click on the waveform record. See section 7.10 for details on viewing waveforms.
- To adjust the column widths, position the cursor between columns at the top of the screen. When the cursor changes to a left/right arrow, hold down the left mouse button and drag the column border left or right. Release the button when the column is at the desired width.

7.13: Viewing the Power Quality Graph

- To view a graph of any PQ record, click on the desired record and then click the Graph button. The following screen appears. Use the pull-down menu on the lower right of the screen to access a 3D graph and a Histogram of the record.



Power Quality Graph



Power Quality Graph in 3D

7.14: Database Status

- The Database Status screen provides statistical information about the selected log(s).
- Click on the Database button or View Data, Database Status. The following screen appears:

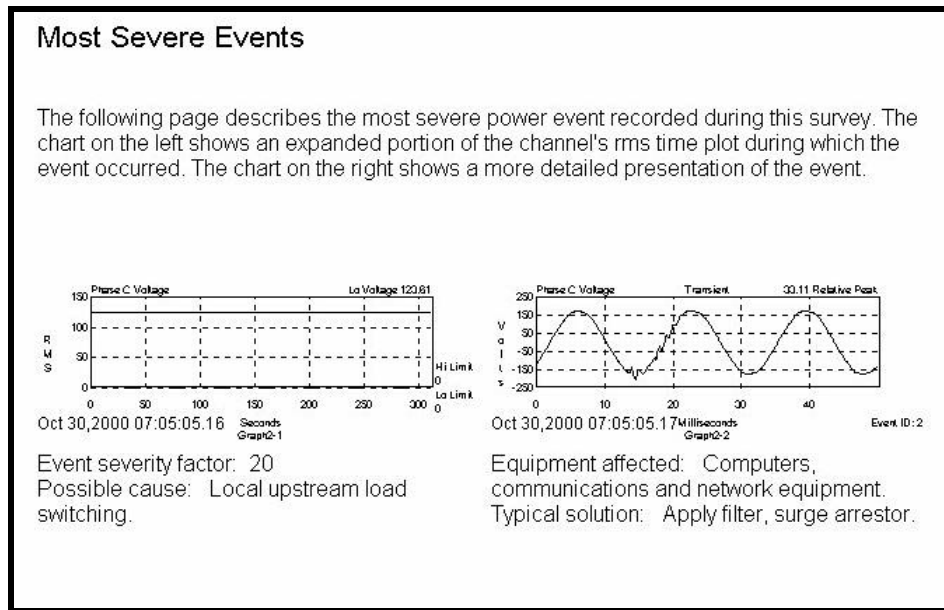
Device #1				
Device Type	Nexus			
Device Name	Feeder 1			
Device ID	00000000			
File Name	s:\Nexus Communicator\Retrieved Logs\Feeder 1.DB			
Data file size	22,042,624 Bytes			
Number of downloads	9			
First download	9/4/2001 11:07:54 AM			
Last download	3/1/2002 10:10:17 AM			
Number of data points	30			
Database file version	8.0			
Database file description	Update Database to V8.0, 08/06/2001			
Data Log	First Date	Last Date	Number of Days	Number of P
Snapshots	8/22/2001	3/1/2002	54	
Limits	9/14/2001	1/23/2002	10	
Status Change (Inputs)	N/A	N/A		
Control Output (Relays)	N/A	N/A		
Waveforms	12/7/2001	2/27/2002	2	
Power Quality	12/7/2001	2/27/2002	3	

At the bottom of the window, there are four buttons: **Back**, **Sort**, **Graph**, and **Help**.

- A partial download consists of the newest records and captures appended to the existing records in the log database. The snapshot must be a time frame within the database dates. Otherwise, there is no data from which to retrieve the snapshot.
- To copy the data to the computer's clipboard, right-click with the cursor positioned anywhere in the table.
- To return to Log Viewer's main screen, click Back.

7.15: AiReports

- AiReports 2.0 is an optional power quality analysis software package used in conjunction with Nexus Communicator Logs. It provides a comprehensive report on the status of the equipment being monitored and **it uses artificial intelligence to diagnose PQ events and provide the possible cause of the event**. The screen below is an example of one of the screens.



- AiReports 2.0 must be installed on your computer for the view button to be enabled. Otherwise, the button will be disabled.
- To view the AiReport: From the EIG Log Viewer, you must select a meter database file for Meter 1 and set a Time Range. Click on the AiReports button and the report will be generated.
- Once the detailed report is generated, you can transmit it to a colleague, modify the report with your favorite word processing software, print it and/or export the file using PDF format.
- Reasons for Incomplete Analysis:
 - AiReports for Nexus Communicator analyzes the voltage waveform records in the meter database file. If the file does not contain any voltage waveform records, AiReports will not run.
 - AiReports will not perform a valid analysis on a waveform record if it was converted by the Log Converter program with a version of v1.0.11 (June 26, 2000) or older.

7.16: PQDIF Converter

- The latest release of AiReports includes a new useful feature, PQDIF Converter. Power Quality Data Interchange Format (PQDIF) is a tagged, compressible binary file format which offers a platform-neutral, flexible means of exchanging power quality data between instruments and data management and analysis software. PQDIF is currently under adoption by EPRI as the standard file format for power quality data and under consideration by IEEE as its standard file format.
- Using the PQDIF Export Feature with Log Viewer.
 - **System Requirements:** Installation of AiReports with NEXAIPWR.DII file version 2.1.0.8 or higher. PQDIF Viewer Program optional.
 - **Meters Supported:** Electro Industries Nexus Series.
 - **Operation:**
 1. Use the Meter 1 button, select a DB file with waveform data.
 2. Select a Time Range.
 3. Press the “PQDIF Format” button.
 4. Select a PQDIF file name (*.PQD) to which you will export data.
 5. Click OK. PQDIF exports the waveform data and converts it to PQDIF format.

7.17: Status Change Log (Inputs)

- The Status Change Log (Input Log) displays the input change status for a selected meter file and time range.

Start Date/Time	End Date/Time	Switch Name	Device Name	Module Index	Input Name	State
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 1	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 2	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 3	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 4	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 5	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 6	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 7	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	0	Feeder 1	HSI Input	HSI Input 8	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1570	Feeder 1	HSI Input	HSI Input 9	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1570	Feeder 1	HSI Input	HSI Input 10	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1590	Feeder 1	HSI Input	HSI Input 11	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1590	Feeder 1	HSI Input	HSI Input 12	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1740	Feeder 1	HSI Input	HSI Input 13	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1740	Feeder 1	HSI Input	HSI Input 14	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1740	Feeder 1	HSI Input	HSI Input 15	Open
11/03/2008 1:47:25.040 PM	11/03/2008 1:47:25.040 PM	1750	Feeder 1	HSI Input	HSI Input 1	Open

Item	Setting
Module Index	HSI Input
Input Name	HSI Input 1
Module Index	0
Input Name	0
Module Address	0
Module Port	0
Open/Shorted	Open
Shorted/Shorted	Shorted
Module State	Shorted 00

- To view the Status Change Log: From the EIG Log Viewer, you must select a Meter Database File and set a Time Range. Then, click the Status Change Log button or View Data, Status Change (Inputs). The above screen will appear.
 - Usually, if a record being displayed in the grid box has a start date/time and an end date/time, the state being displayed is out of normal state.
 - If a record does not show the start time/date or the end date/time, this means that at the time of the log conversion by the Log Converter it could not find the start or end record. This situation can be caused by log roll over and/or other interruptions. Without a start or end record, this will not be a complete record and no duration will be calculated.

NOTE: Module Index 0 refers to HSI Internal Meter Inputs.

7.18: Control Output Log (Relays)

- The Control Output Log (Relay Log) displays the relay change status for a selected meter file and time range.

Trigger Time	Duration ms	Command Time	Duration ms	Acknowledge Time	Device Name	Relay Name	Start State	End State
11/03/2000 8:22:46.220 AM	500	11/03/2000 8:22:46.800 AM	50	11/03/2000 8:22:46.950 AM	Pwr down	R1	NO Active	NC Inactive
11/03/2000 8:22:42.060 AM	70	11/03/2000 8:22:42.120 AM	50	11/03/2000 8:22:42.170 AM	Pwr down	R1	NC Inactive	NO Active
11/03/2000 8:22:36.840 AM	170	11/03/2000 8:22:37.010 AM	50	11/03/2000 8:22:37.060 AM	Pwr down	R1	NO Active	NC Inactive
11/03/2000 8:22:33.720 AM	190	11/03/2000 8:22:33.910 AM	60	11/03/2000 8:22:33.970 AM	Pwr down	R1	NC Inactive	NO Active

- To view the Control Output Log: From the EIG Log Viewer, you must select a Meter Database File and set a Time Range. Then, click on the Control Output Log button or View Data, Control Output (Relays). The above screen appears.

- There are three stages in the relay process:

Stage 1 = Trigger

Stage 2 = Command

Stage 3 = Acknowledgement

Stage 1: the change relay state process starts.

Stage 2: a meter responds to the change relay request and sends out the change relay command to the relay device.

Stage 3: the meter gets a response back from the relay device.

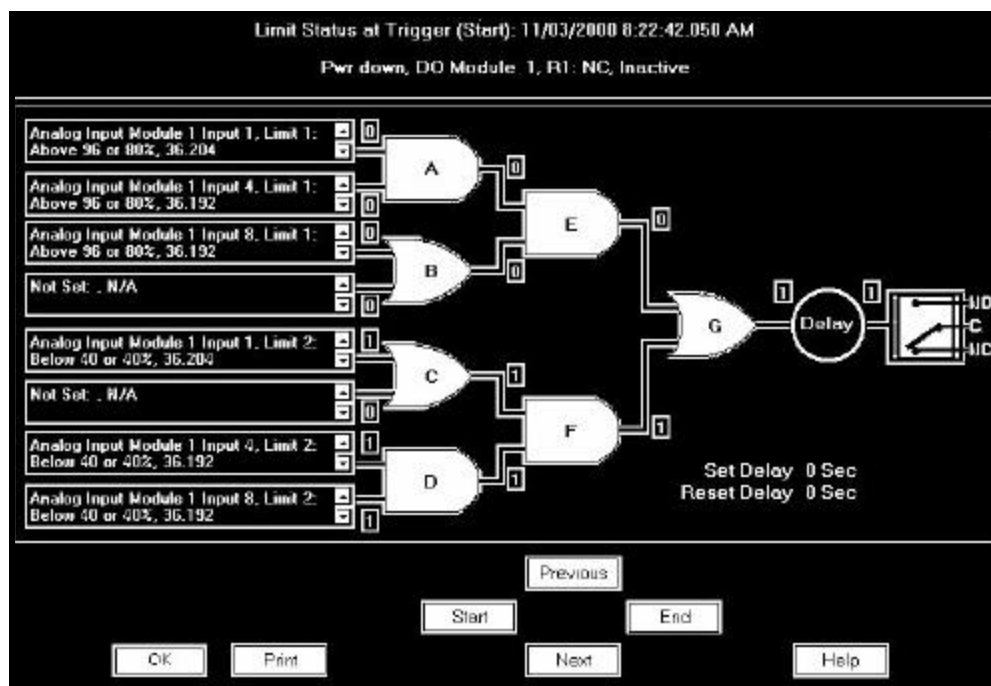
A complete record should have all three stages' date/time stamp. The Start State is the relay state at the time of the Trigger. The End State is the relay state at Stage 3 or the Acknowledgement Stage.

- Reasons for Incomplete Records:

- At the time of the log conversion process, if the Log Converter cannot find the Stage 1 record (which can be caused by log roll over), the Trigger date/time and the Start State will not be displayed.

- At the time of log conversion, if the Log Converter cannot find the Stage 1 record, the Inputs, Gates and the Relay Start State will not be displayed.
- If the Log Converter program cannot find the Stage 2 record, the Command date/time will not be displayed.
- If the Log Converter cannot find the Stage 3 record, the Acknowledgement date/time and End State will not be displayed and the appropriate duration will not be calculated.
- If any one stage is missing, the appropriate duration will not be calculated.

■ To view the ElectroLogic Graph, click on an event and click on the Graph button. The following screen will appear:



■ Key Functions for the ElectroLogic Graph:

- Page Up = Previous Relay Record
- Page Down = Next Relay Record
- Home = Current Relay Start State
- End = Current Relay End State

Chapter 8

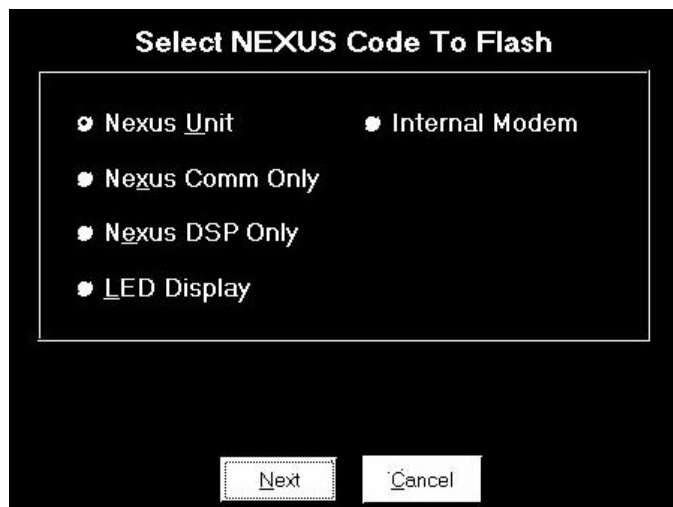
Flash Upgrading

8.1: Overview

- The Flash command allows you to upgrade the following firmware components:
 - Nexus Communication Processor (“Nexus Comm”). This processing chip performs all tasks related to communication and storing data.
 - Nexus Digital Signal Processor (“Nexus DSP”). This processing chip performs all tasks related to data calculation.
 - LED Display. This processing chip is installed in the Nexus External LED Display.
 - Internal Modem Card. This optional card is installed in the Nexus and enables the Nexus to act as **Nexus and modem** in one device. This card must be upgraded in addition to upgrading the Nexus Comm and DSP. (Refer to section 8.5.)
 - Internal Network Option. This Nexus option allows a Nexus to communicate with multiple PC’s concurrently. This card must be upgraded in addition to upgrading the Nexus Comm and DSP. (Refer to section 8.6.)
- ❖ **Note:** The new **Nexus Unit** button upgrades the Nexus Comm and Nexus DSP firmware files at the same time and provides the checksum **automatically** (see section 8.2). Again, the optional **Internal Modem Card or Internal Network Card must be upgraded separately**.
- There are 3 ways to learn what firmware versions are currently installed in your Nexus Monitor:
 - Click on the Device Status icon (or select Retrieve Device Status from the Tools Menu). The “Run-time” field shows the current Nexus Comm firmware version number; the “DSP Run-time” field shows the current Nexus DSP firmware version number.
 - Click on the Edit Profile icon to retrieve the current Device Profile from the connected Nexus Monitor. Click on Report. The Nexus Comm and Nexus DSP firmware are listed in the Runtime column.
 - If you have a Nexus External Display connected to the Nexus Monitor, see the *Nexus Installation and Operation Manuals* for details on using it to access firmware version numbers.
- To flash upgrade, you must have the most recent upgrade file from Electro Industries.
- Flash upgrading erases the existing firmware and replaces it with the new version.
- ❖ **WARNING:** Flash Upgrading should **only** be done with the proper firmware. Otherwise, data may be lost! Backup your stored data **prior** to installing new flash programming into your unit.

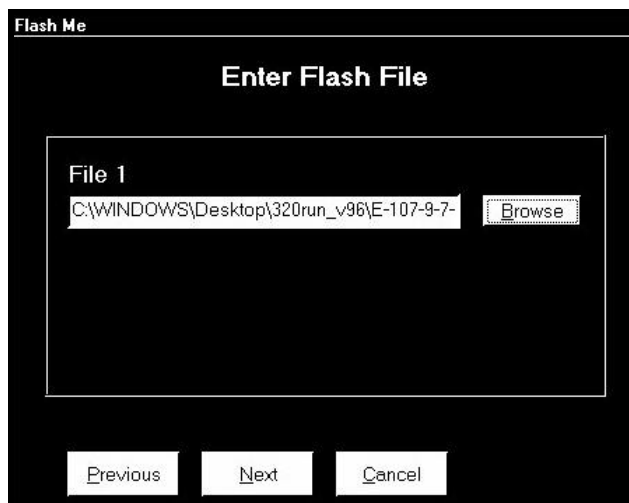
8.2: Flash Upgrading the Nexus Unit

1. Contact EIG to receive the most recent Nexus 1250 firmware upgrade. Be sure your version of Nexus Communicator is compatible with the firmware upgrade you want to perform. You can download the latest software version through the internet site at: www.electroind.com. Click on the Free Downloads button.
 2. Copy the new firmware upgrade files to a directory on your computer. The Nexus Comm firmware upgrade is divided into two files. The DSP upgrade is a single file. The Nexus Unit button will upgrade all three files (Nexus Comm and Nexus DSP) at the same time. Generally, when you perform an update, update all firmware at the same time.
 3. Be sure to read the text file accompanying the firmware files for important information such as the checksum code. Write down the Checksum Code. If you are flashing “Nexus Comm Only” or “Nexus DSP Only”, you will need it later in the Flash upgrade process. Flash upgrading will fail, if an incorrect checksum code is entered. **If you are flashing using “Nexus Unit”, the checksum will be entered automatically.**
- ❖ **Note:** The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or I, which are often confused for zeros and ones.
4. Connect to the Nexus Monitor. From the Tools Menu, select Flash Me. The following screen appears: (If you have not upgraded your software, you will not have a Nexus Unit button). To Flash Upgrade Nexus Comm Only or Nexus DSP Only, see section 8.3.

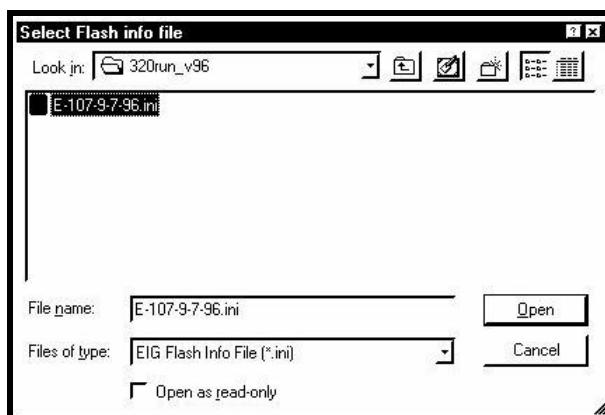


5. Choose the type of upgrade you want to perform: Nexus Unit, Nexus Comm or Nexus DSP. See section 8.3 to Flash Upgrade Nexus Comm Only or Nexus DSP Only. See section 8.4 to Flash Upgrade the Nexus External Display, section 8.5 to Flash Upgrade the Internal Modem Card and section 8.6 to Flash Upgrade the Internal Network Option. Click Next. The following screen appears:

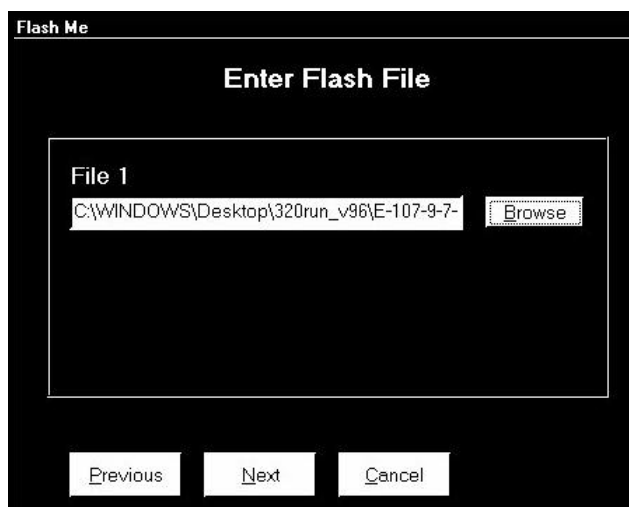
NOTE: If your Nexus has the Internal Network Option, that option will appear instead of Internal Modem (see example above). Your Nexus cannot have both of those options.



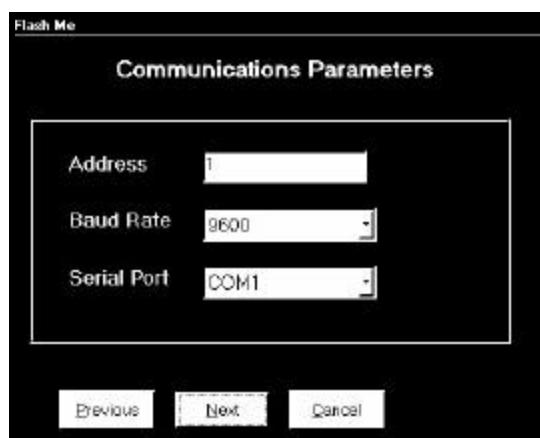
6. Click the Browse button beside File 1.



7. Locate the firmware file on your computer. You will need only one file (*.ini file) for the Nexus Unit upgrade. File names and formats may vary from the example screen above. Be sure to read the text file accompanying the firmware files.
8. Select the file and click Open.



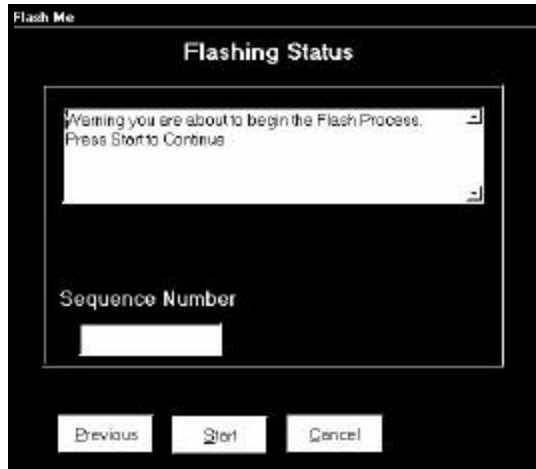
9. When the files have been entered, click Next. The following screen appears:



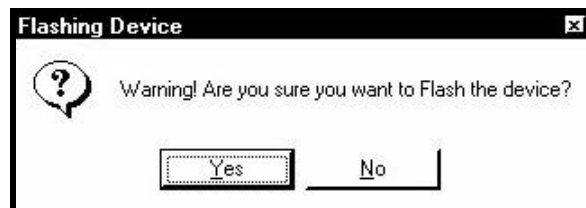
10. If you are already connected to the Nexus Monitor you want to upgrade, disregard this screen, click Next and skip to step 11. If you are **not** connected to the Nexus Monitor and/or you have a series of Nexus Monitors to upgrade, this screen avoids the reloading of files.

- In the Address field, enter the Address of the Nexus Monitor to which your computer is connected that you want to Flash upgrade.
- In the Baud Rate field, enter the baud rate of the Nexus Monitor port to which your computer is connected that you want to Flash upgrade.
- In the Serial Port field enter the computer's comm port you are using.
- Click Next.

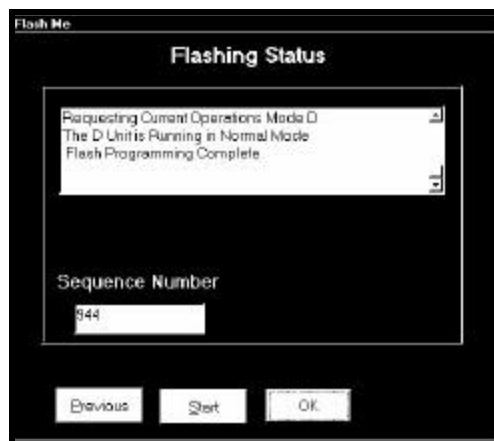
❖ **Note:** If you want to Flash upgrade using a modem, connect with a modem connection first; then, enter the Flash sequence mode.



11. Click Start to begin the upgrade. A final warning screen appears; click Yes.



12. Flash upgrading begins. The following screen displays the progress of the upgrade:

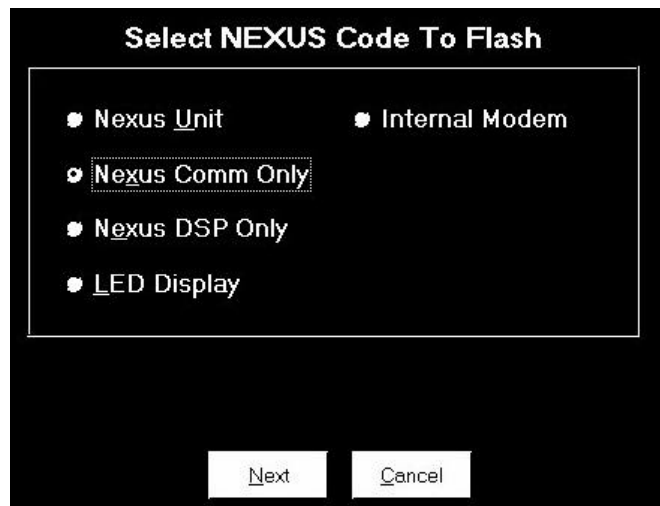


13. When the Flash upgrade is complete, the Cancel button changes to OK. Click OK.

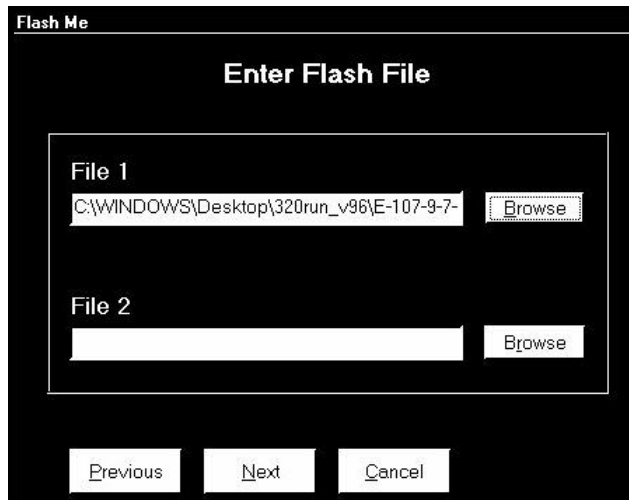
❖ **Note:** To upgrade additional Nexus Monitors, click Previous and return to the Communications Parameters screen. Repeat the steps as needed, entering a **unique address** for each unit.

8.3: Flash Upgrading the Nexus Communicator and Nexus DSP Firmware

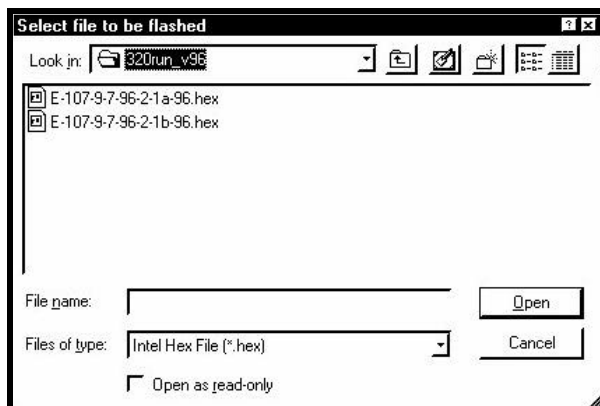
1. Contact EIG to receive the most recent Nexus 1250 firmware upgrade. Be sure your version of Nexus Communicator is compatible with the firmware upgrade you want to perform. You can download the latest software version through the internet site at: www.electroind.com. Click on the Free Downloads button.
 2. Copy the new firmware upgrade files to a directory on your computer. The Nexus Comm upgrade is divided into two files. The DSP upgrade is a single file. The Nexus Unit upgrade will upgrade all three files (Nexus Comm files and Nexus DSP file) at the same time. Generally, when you perform an update, update all firmware at the same time.
 3. Be sure to read text file accompanying the firmware files for important information such as the checksum code. **Write down the Checksum Code. If you are flashing “Nexus Comm Only” or “Nexus DSP Only”, you will need it later in the Flash upgrade process. Flash upgrading will fail if an incorrect checksum code is entered.**
- ❖ **Note:** The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or I, which are often confused for zeros and ones.
4. Connect to the Nexus Monitor. From the Tools Menu, select Flash Me. The following screen appears: (If you have not upgraded your software, you will not have a Nexus Unit button).



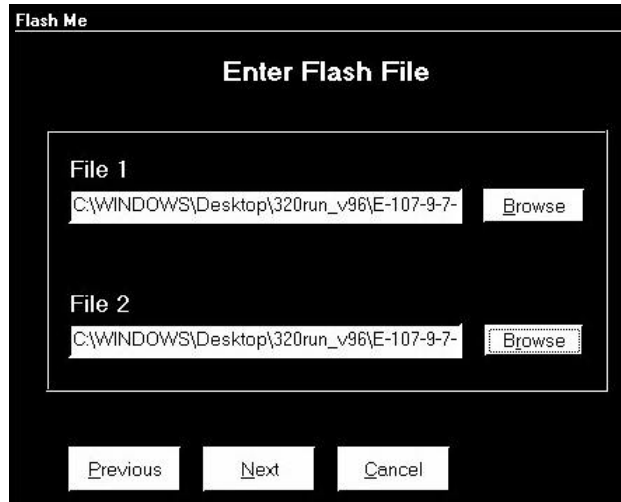
5. Choose the type of upgrade you want to perform: Nexus Comm or Nexus DSP. See section 8.2 for how to Flash upgrade the Nexus Unit. See section 8.4 to Flash Upgrade the Nexus External Display, section 8.5 to Flash Upgrade the Internal Modem Card and section 8.6 to Flash Upgrade the Internal Network Option. Click Next. The following screen appears:



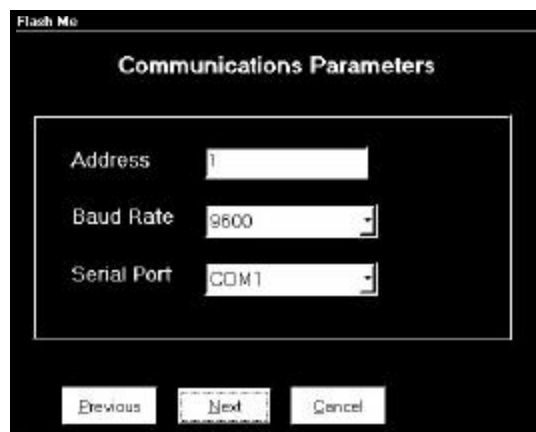
6. Click the Browse button beside File 1.



7. Locate the firmware files on your computer. File names and formats may vary from the example screen above; be sure to read the text file accompanying the firmware files.
8. Select the file and click Open. If you are upgrading:
 - **Nexus Comm firmware**, repeat the process for File 2.
 - **Nexus DSP firmware** requires only one file. The example screen below shows two files entered for a Nexus Comm upgrade.



9. When the files have been entered, click Next. The following screen appears:

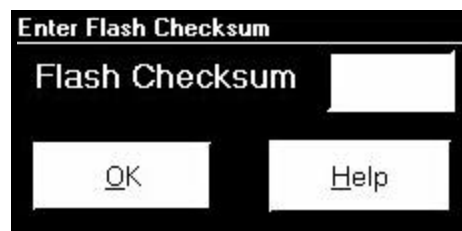


10. If you are already connected to the Nexus Monitor you want to upgrade, disregard this screen, click Next and skip to step 11. If you are **not** connected to the Nexus Monitor and/or you have a series of Nexus Monitors to upgrade, this screen avoids the reloading of files.

- In the Address field, enter the Address of the Nexus Monitor to which your computer is connected that you want to flash upgrade.
- In the Baud Rate field, enter the baud rate of the Nexus Monitor port to which your computer is connected that you want to flash upgrade.
- In the Serial Port field enter the computer's comm port you are using.
- Click Next.

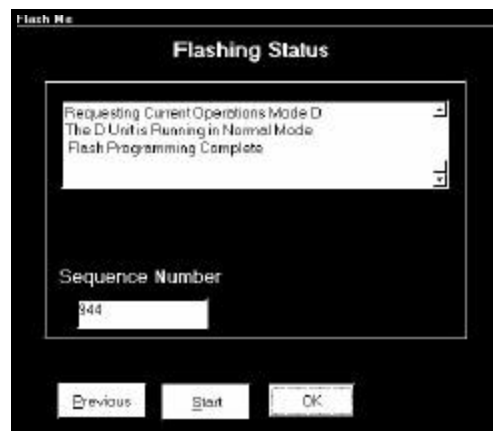


11. Click Start to begin the upgrade. A final warning screen appears; click Yes. This screen appears:



12. Enter the checksum code from the text file accompanying the firmware files. **If you do not enter the correct checksum code, the flash upgrade will fail.**

13. Click OK. Flash upgrading begins. The following screen displays the progress of the upgrade:



14. When the Flash upgrade is complete, the Cancel button changes to OK. Click OK.

❖ **Note:** To upgrade additional Nexus monitors, click Previous and return to Communications Parameters screen. Repeat the steps as needed, entering a **unique address** for each unit.

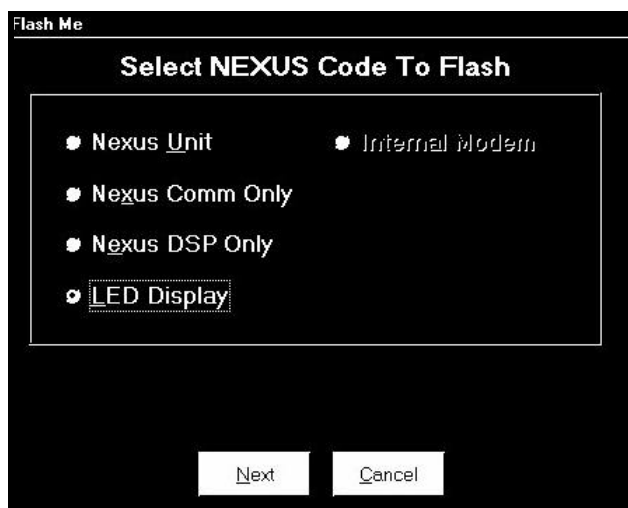
8.4: Flash Upgrading the Nexus External Display

■ Flash upgrading the Nexus Display takes approximately 15 minutes.

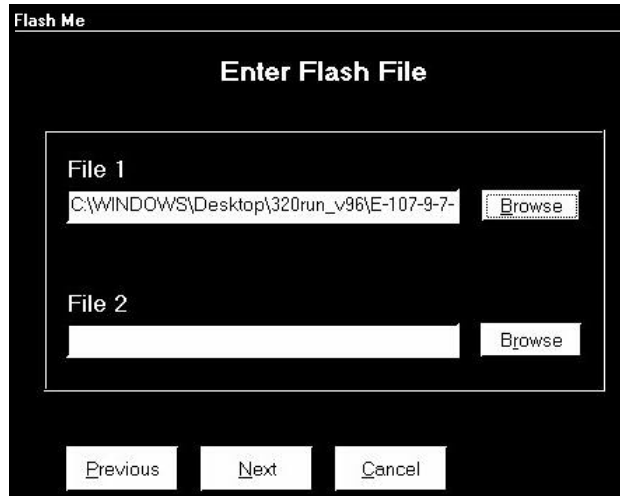
1. Contact EIG to receive the most recent Nexus External Display firmware upgrade. Be sure your version of Nexus Communicator is compatible with the firmware upgrade you want to perform.
2. Copy the new firmware upgrade file to a directory on your computer. Be sure to read the accompanying text file for important information, such as the checksum code. **Write down the Checksum Code; you will need it later in the Flash upgrade process. Flash upgrading will fail, if an incorrect checksum code is entered.**

❖ **Note:** The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or I, which are often confused for zeros and ones.

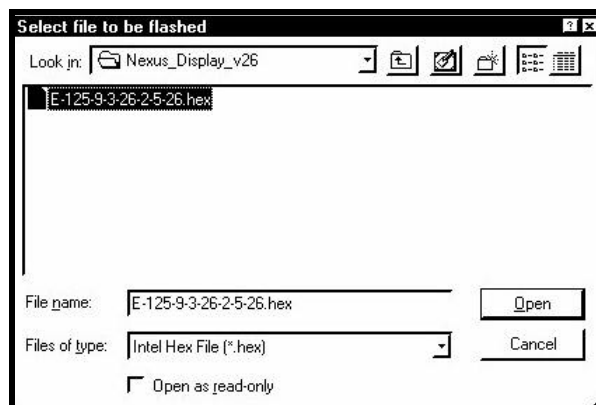
3. Make sure the External Display is connected to a Nexus Monitor port operating at **9600** baud. See Chapter 3 for details on configuring the Nexus Monitor's communication ports.
4. Connect to the Nexus Monitor. From the Tools Menu, select Flash Me. The following screen appears:



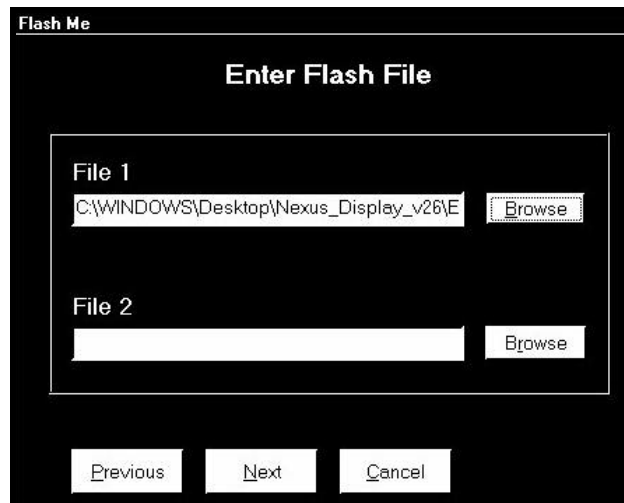
5. Click the LED Display radio button. Click Next. The following screen appears:



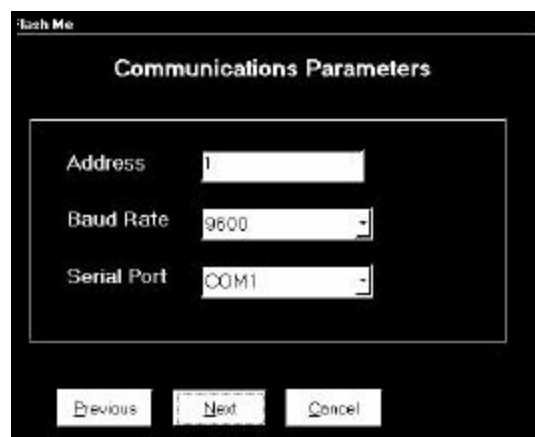
6. The Nexus External Display firmware upgrade requires only one File. Click the Browse button beside File 1.



7. Locate the Nexus External Display file on your computer. Select the file and click Open. File names and formats may vary from the example screen above; be sure to read the text file accompanying the firmware files. The following screen appears:



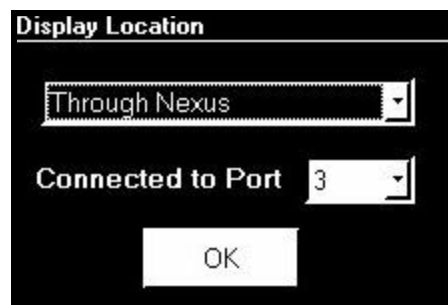
8. Click Next. The following screen appears:



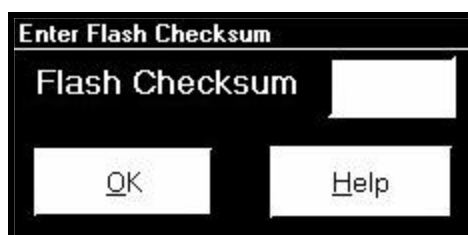
9. If you are already connected to the Nexus Monitor, disregard this screen, click Next and skip to step 10. If you are **not** connected to the Nexus Monitor:
 - In the Address field, enter the Address of the Nexus Monitor to which your computer is connected and that you want to flash upgrade.
 - In the Baud Rate field, enter the baud rate of the Nexus Monitor port to which your computer is connected and that you want to flash upgrade.
 - In the Serial Port field enter the computer's comm port you are using.
 - Click Next.



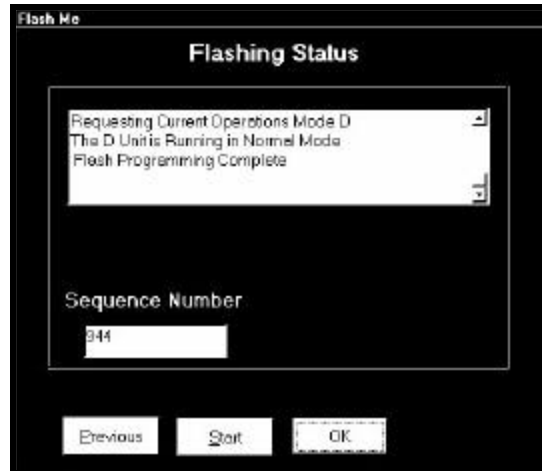
10. Click Start to begin the upgrade process. A final warning screen appears; click Yes. The following screen appears:



11. From the pull-down menus, select Through Nexus and the port to which the External Display is connected. Click OK. In a moment the following screen appears:



12. Enter the checksum code from the text file accompanying the firmware upgrade file. If you do not enter the correct checksum code, **the flash upgrade will fail**. Click OK. Flash upgrading begins. The following screen displays the progress of the upgrade:



13. When the Flash upgrade is complete, the Cancel button changes to OK. Click OK.

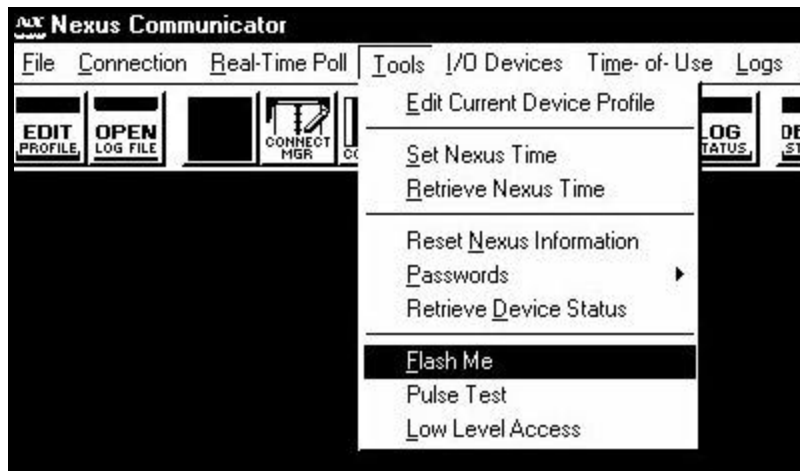
- ❖ **Note:** To upgrade additional Nexus External Displays, click Previous and return to Communications Parameters screen. Repeat the steps as needed, entering a **unique address** for each unit.

8.5: Flash Upgrading the Internal Modem Card

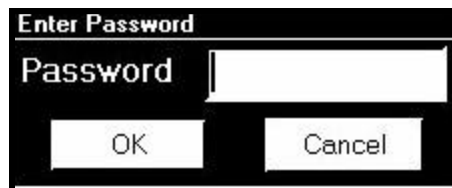
1. Contact EIG to receive the most recent Internal Modem Option Flash firmware upgrade. This Flash Upgrade effects **ONLY** the Internal Modem Card within the Nexus. This Flash Upgrade **DOES NOT UPGRADE THE NEXUS UNIT**. To upgrade the Nexus device, refer to sections 8.2, 8.3 and 8.4 of this manual.

You can download the latest software version through our internet site at: www.electroind.com. Click on the Free Downloads button.

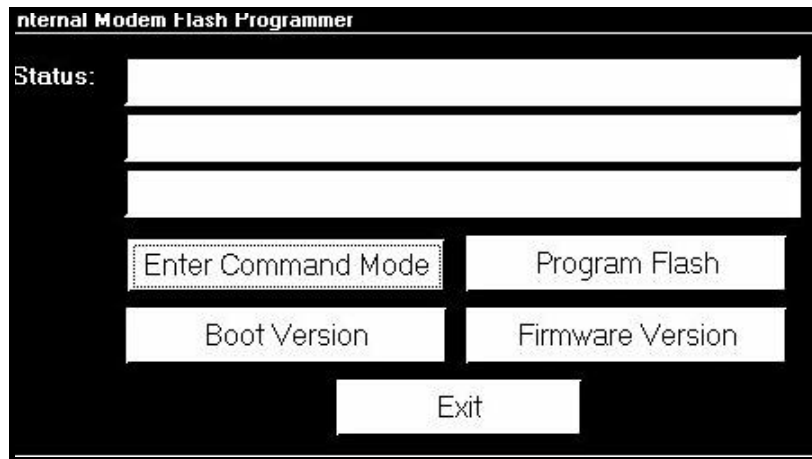
2. Copy the new firmware upgrade file to a directory on your computer. The Internal Modem firmware upgrade is a single file.
 3. Be sure to read the text file accompanying the firmware files for important information such as the checksum code. Write down the Checksum Code. You will need to verify it later in the Flash Upgrade process.
- ❖ **Note:** The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or I, which are often confused for zeros and ones.
4. Connect to the Nexus Monitor. From the Tools Menu, select **Flash Me**.



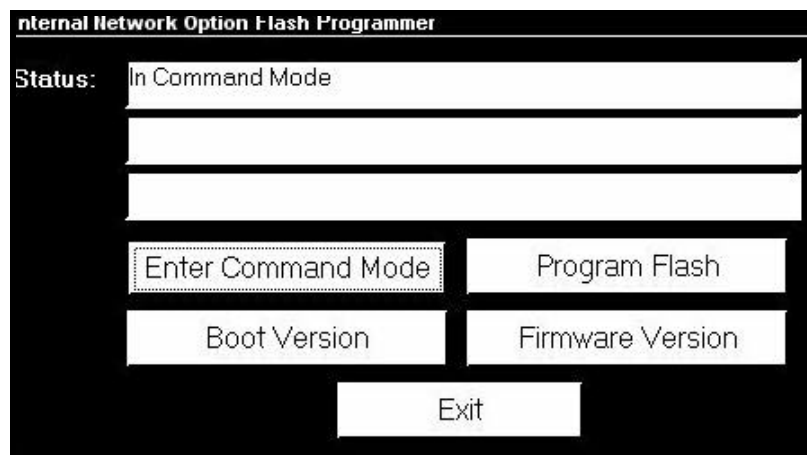
If the Password Feature is Enabled, the following Password screen appears:



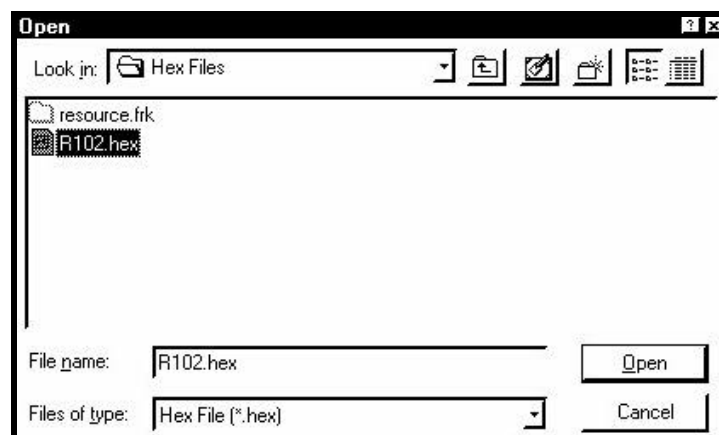
5. The Password is the number **2**. Enter **2** and click OK. The Internal Modem Flash Programmer screen appears. Enter Command Mode is highlighted.



6. Click on Enter Command Mode. In the Status windows, the words “Entering Command Mode” and “Sending Escape Sequence” will appear. Then, “In Command Mode” appears on the screen.



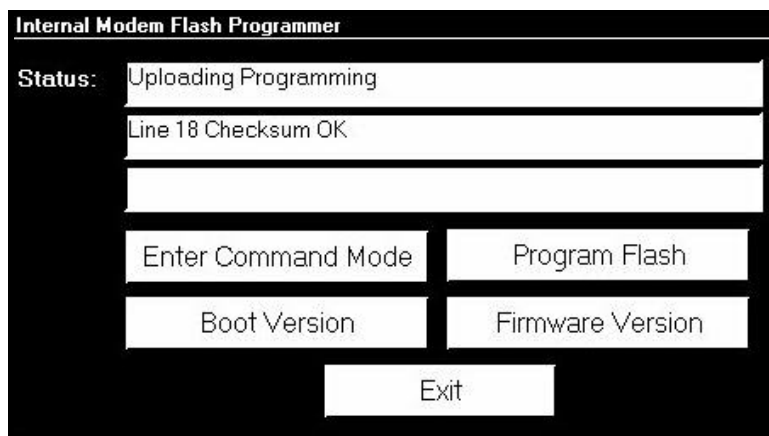
7. Click on Program Flash. The following screen appears:



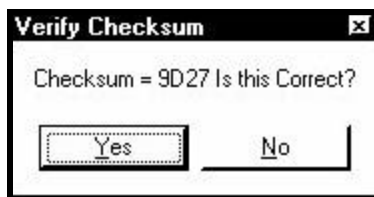
NOTE: In this example, the hex file is in a file on the desktop. The hex file may be stored anywhere in your system, on disk or CD. This screen browses your system to find the file.

Locate the firmware file on your computer. You will need only one file (*.hex file) for the Internal Modem Upgrade. File names and formats may vary from the example screen above. Be sure to read the text accompanying the firmware files.

Select the file name and click Open.



The program automatically uploads the data. Lines 1 and 2 of the Status window display the progress of the upgrade. When the Flash Upgrade is complete, the Status window will say "Flash has been Programmed" and the Checksum verification window appears:



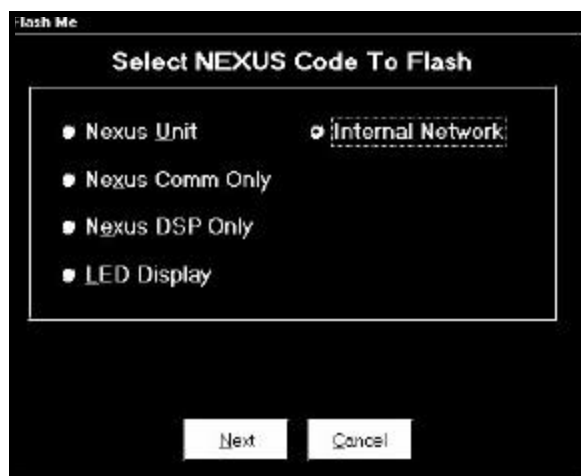
7. Click Yes. If you click No, the Flash will fail.
8. Click Exit to exit the program and return to the Main Nexus screen.

8.6: Flash Upgrading the Internal Network Option

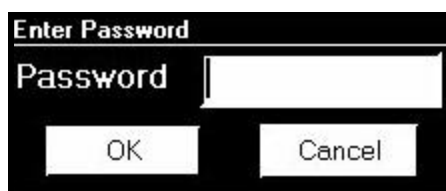
- Flash upgrading the Internal Network (Ethernet) Option takes approximately 30 minutes.
- 1. Contact EIG to receive the most recent Internal Network (Ethernet) Option firmware upgrade. This Flash Upgrade effects **ONLY** the Internal Network Option within the Nexus. This Flash Upgrade **DOES NOT UPGRADE THE NEXUS UNIT**. To upgrade the Nexus device, refer to sections 8.2, 8.3 and 8.4 of this manual.

You can download the latest software version through our internet site at: www.electroind.com. Click on the Free Downloads button.

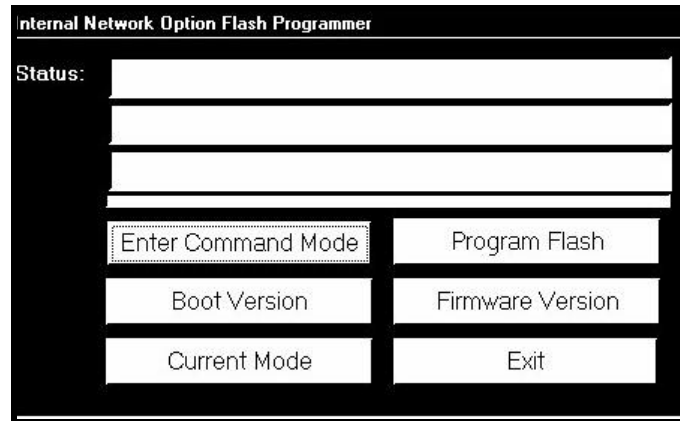
- 2. Copy the new firmware upgrade file to a directory on your computer. The Internal Network firmware upgrade consists of two files - an **.ini** and a **.hex** file.
- 3. Connect to the Nexus Monitor. From the Tools Menu, select **Flash Me**. This screen appears:



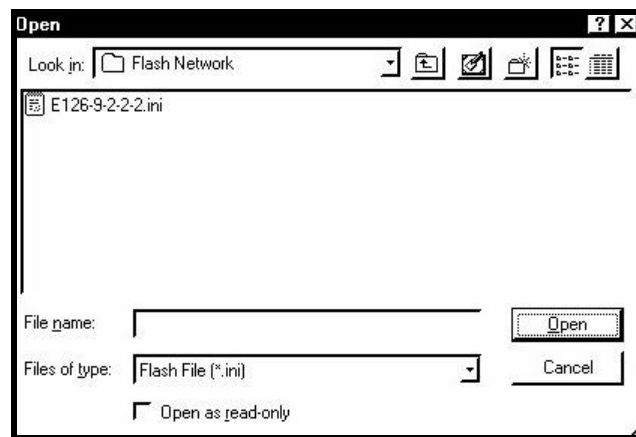
- 4. Click Internal Network and the Next button.
If the Password Feature is Enabled, the following Password screen appears:



- 5. Enter your Level 2 Password. Click OK. The Internal Network Flash Programmer screen appears. Enter Command Mode is highlighted.



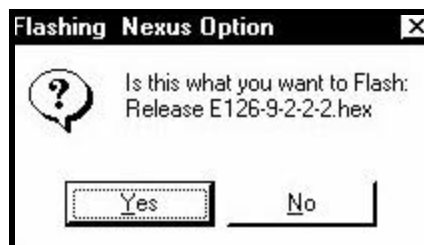
6. Click on Enter Command Mode. After a moment “In Command Mode” appears on the screen. Click on Program Flash. The following screen appears:



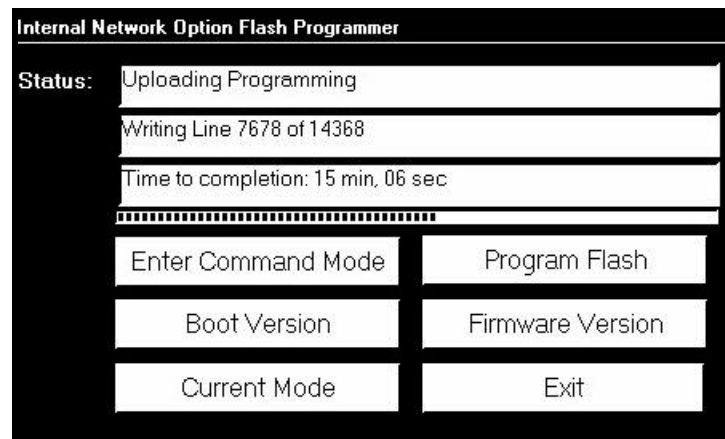
NOTE: In this example, the *.ini file is in a file on the desktop. The *.ini file may be stored in your system, on disk or on CD. Use the “Look In:” window at the top of the screen to browse your system.

Locate the firmware file on your computer. You will need two files (*.ini and .hex files) for the Internal Network Upgrade. **Both files must be in the same directory.** File names and formats may vary from the example screen above. Be sure to read the text accompanying the firmware files.

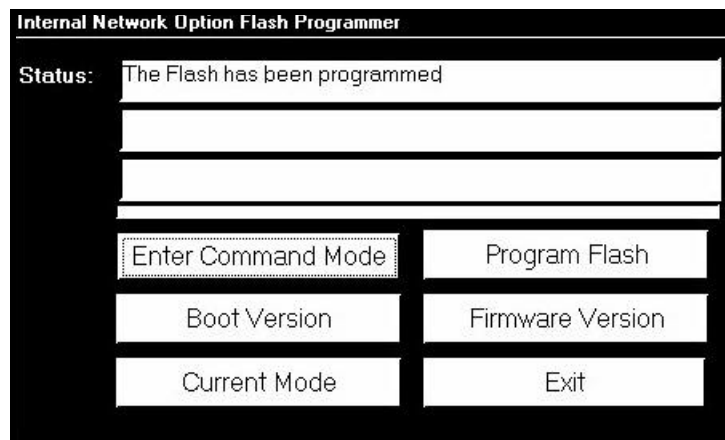
7. Select the file name and click Open. A warning screen will appear.



8. Click Yes. The program automatically uploads the data. Lines 2 and 3 of the Status window and the Status Bar below them display the progress of the upgrade. It will automatically retrieve the Checksum from the device. Again, flash uploading takes about 30 minutes.



When the Flash Upgrade is complete, the Status window will say “The Flash has been Programmed” as below.



9. Click Exit to exit the program and return to the Main Nexus screen.

Chapter 9

Nexus Time-of-Use

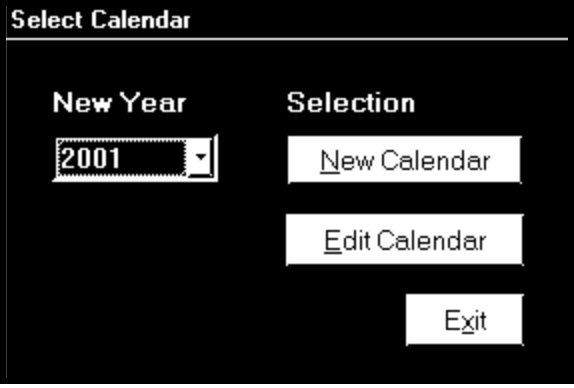
9.1: General Procedure

- See the *Nexus 1250 Installation and Operation Manual* for a detailed discussion of the Nexus Time-of-Use (TOU) function.
 - The following is a general outline for programming Nexus TOU. Each step is described in detail in subsequent sections.
 - From the Tool Bar, select Time-of-Use, Calendar Settings.
1. Create a TOU calendar profile using the following elements:
 - Usage registers (eg “Peak,” “Off Peak,” “Shoulder Peak”) for each fifteen-minute block of the day;
 - Demand Integration Averaging for Block (Fixed) or Rolling (Sliding) Window;
 - Programmable start dates for four seasons per year;
 - Programmable bill dates for each month of the year;
 - TOU schedules—eg, “Weekday,” “Weekend,” “Holiday”—for each day of the year.
 2. Send the TOU calendar profile to the Nexus Monitor. TOU accumulations will begin.
 3. View, print or export the TOU accumulations.
- Reset the TOU accumulations at any time by selecting Reset Nexus Information from the Tools Menu (see Chapter 3 for details). Resetting clears all accumulations of the current month or season, and causes the accumulations to use the present date as the start-date and accumulate to the next new end-date, which will be taken from the new calendar.
 - To use Daylight Savings Time, you must enable it in the Nexus Monitor’s Device Profile (see Chapter 3) and enter the associated dates or use Auto DST, which sets Daylight Savings Time automatically for the United States only.
 - If GPS Time (IRIG-B) is connected, you must set the appropriate time zone. Date and time settings (except year) are overridden by GPS Time.
- ❖ **Note:** An IRIG-B signal-generating device connected to the GPS satellite system will synchronize Nexus Monitors located at different geographic locations. See the *Nexus Installation and Operation Manuals* for installation instructions.

9.2: Creating a TOU Calendar Profile

- The TOU calendar profile sets the parameters for TOU data accumulation. You may store up to twenty calendars in the Nexus Monitor and an unlimited amount on your computer. To create a new calendar, follow the steps below. To edit an existing calendar, see section 9.3.

1. From the Time-of-Use menu, select Calendar Settings. The following screen appears:



The "Select Calendar" screen features a title bar at the top. Below it, on the left, is a "New Year" section with a pull-down menu currently showing "2001". To the right of this is a "Selection" section containing three buttons: "New Calendar", "Edit Calendar", and "Exit", arranged vertically.

2. From the pull-down menu, choose the year for which you would like to create a TOU usage structure.
3. Click on New Calendar. The following screen appears:



The "Edit Calendar (New)" screen has a title bar. Below the title bar is a "CURRENT YEAR" label next to a pull-down menu showing "2001". The main area is divided into a table with two columns. The left column contains labels: "LADCLS", "DEMAND", "SELF READ", "DAILY SETUP", and "STORE". The right column contains corresponding options: "TOU Rec starts", "Averaging", "Season Start", "Monthly Bill Date", "TOU Structure", "Co-encr Assignments", "Update Nexus", and "Save to File". At the bottom of the screen are two buttons: "Cancel" and "Help".

4. Click on TOU Registers. The following screen appears:



The "Assign Register Labels" dialog box features a title bar with the text "Assign Register Labels". Below the title bar is a header "Register Label". The main area contains eight rows, each with a label from #1 to #8 on the left and a text input field on the right. The input fields for #1 and #2 contain the text "On-Peak" and "Off-Peak" respectively. The input fields for #3 through #8 are empty. At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Help".

5. A **register** is a type of rate structure, for example “Peak”, “Off-Peak” or “Shoulder Peak.” You will assign one register to each fifteen-minute interval of the day when you set up the TOU **schedule** (see below).
- Enter a name for each different register (up to eight).
 - Click OK to return to the main Edit Calendar screen.
6. Click Averaging. The following screen appears:



The "Set Demand Window" dialog box has a title bar with the text "Set Demand Window". Below the title bar is a header "Demand Windows". The main area contains two radio button options: "Block Window" and "Rolling Window". The "Block Window" option is selected, indicated by a filled radio button. At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Help".

7. Select the type of Demand Averaging to be applied to the TOU accumulations. For a discussion on Demand, see the *Nexus Installation and Operation Manuals*.

8. Click OK to return to the main Edit Calendar screen.
9. Click Season Start. The following screen appears:

Season Start

TOU Year 2001

Start Date

Season #1	01/01/01
Season #2	04/01/01
Season #3	07/01/01
Season #4	10/01/01

10. Assign a Start Date for up to four seasons per year. All Start Dates also act as the End Date of the prior season or month. A season ends at midnight of the day before the start of the next season. You may double-click on one of the text-boxes to bring up a calendar. Select the month and day you would like to assign as the Season Start Date and click OK.
- ❖ **Note:** The date format you use here should be the same the date format set for your computer. To change or view your computer's date settings, click on the Windows® Start Menu and select Settings, Control Panel, Regional Settings. Click on the Date tab.
11. Click OK to return to the main Edit Calendar screen.
12. Click on Monthly Bill Date. The following screen appears:

Monthly TOU Report Dates

Current Year: 2001

January	No Billing yet	July	No Billing yet
February	No Billing yet	August	No Billing yet
March	No Billing yet	September	No Billing yet
April	No Billing yet	October	No Billing yet
May	No Billing yet	November	No Billing yet
June	No Billing yet	December	No Billing yet

OK Cancel Help

13. To program a specific Bill Date for each month, use the pull-down menus. If you do not select a specific billing date for a given month, accumulations will continue until the next monthly billing date is reached or December 31, if there is no next year spanning calendar.
14. When you have entered all Monthly Bill Dates, click OK to return to the main Edit Calendar screen.
15. Click TOU Schedules. The following screen appears:

Edit TOU Schedules

Label	Schedule_1	Schedule_2	Schedule_3	Schedule_4	Schedule_5
	Weekday	Weekend	Holiday	Vacation	
00:00:00 - 00:14:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
00:15:00 - 00:29:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
00:30:00 - 00:44:59	On-Peak	On-Peak	On-Peak	On-Peak	
00:45:00 - 00:59:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
01:00:00 - 01:14:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
01:15:00 - 01:29:59	On-Peak	On-Peak	On-Peak	On-Peak	
01:30:00 - 01:44:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
01:45:00 - 01:59:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
02:00:00 - 02:14:59	On-Peak	On-Peak	On-Peak	On-Peak	
02:15:00 - 02:29:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
02:30:00 - 02:44:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
02:45:00 - 02:59:59	On-Peak	On-Peak	On-Peak	On-Peak	
03:00:00 - 03:14:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
03:15:00 - 03:29:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
03:30:00 - 03:44:59	On-Peak	On-Peak	On-Peak	On-Peak	
03:45:00 - 03:59:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
04:00:00 - 04:14:59	Off-Peak	Off-Peak	Off-Peak	Off-Peak	
04:15:00 - 04:29:59	On-Peak	On-Peak	On-Peak	On-Peak	

OK Cancel Edit Help

- The first column lists each fifteen-minute block of a 24-hour day.
- The Individual Registers defined in step 5 will be applied to each fifteen-minute block.

- A schedule is the type of accumulation structure you will apply to individual days. You may program up to 16 different schedules.

16. Double-click on one of the Schedule Headings—for example: “Schedule_1”. The following screen appears:

17. Enter a Name for the schedule, such as “Weekday,” “Weekend” or “Holiday”. Click OK.

18. Double-click on one of the fifteen-minute blocks in the schedule. The following screen appears:

19. From the pull-down menu, select the Register Name you would like to apply to this fifteen-minute block. Click OK.

20. Repeat the above procedure until all fifteen-minute blocks in the schedule(s) are assigned registers.

21. When all schedules are formatted, click OK to return to the main Edit Calendar screen.

22. Click on Calendar Assignments. The following screen appears:

Time-of-Use Profile

January 2001

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Prev Month Next Month

S1 Weekday	S2 Weekend	S3 Holiday	S4 No schedule name
S5 No schedule name	S6 No schedule name	S7 No schedule name	S8 No schedule name
S9 No schedule name	S10 No schedule name	S11 No schedule name	S12 No schedule name
S13 No schedule name	S14 No schedule name	S15 No schedule name	S16 No schedule name

OK Cancel Multi Date Help

- The schedules created in steps 16–20 are shown beneath the calendar. Each schedule is color-coded.

23. Assign a particular Schedule to each day by clicking on the day. The following screen appears:

Assign a schedule to a date

Current Date: _____

Available Schedules: S01: Weekday

OK Cancel Help

24. From the pull-down menu, select the Schedule you would like to apply to this day. Click OK to return to the calendar.

25. To apply a Schedule to a **Range of Dates** or to selected days of the week, click Multi Date. The following screen appears:

- ❖ **Note:** With this tool, you can quickly program a whole year by selecting, for instance, all the weekdays (Mon - Fri) and in the Date Range type 01/02 to 12/31 for the year you're programming. Do the same for the weekend days. Fill in holidays and vacations for each month.

Assign a schedule to a date

Date Range: 11/22/01 to 11/23/01

Available Schedules: S03: Holiday

Day of Week: ☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☒ Thursday ☒ Friday ☐ Saturday

OK Cancel Help

26. Enter a Time Range; select the type of Schedule and, if desired, choose a Day of the Week. Click OK.
27. Use the color-coded key below the calendar to review which Schedules have been applied to the month. Click Next Month and repeat the process for the year.
28. When the calendar settings are complete, click OK to return to the main Edit Calendar screen.
29. You may now:
 - Click Save to File to send the calendar to the computer for future use. See section 9.3 for how to edit a previously saved calendar.
 - Click on Save to File to store the file in your computer. Your computer screen will ask you the File Name, Save In and Save as Type information. Enter data. Click Save or Cancel.
 - Click Update Nexus to send the calendar to the Nexus Monitor. The following screen appears:

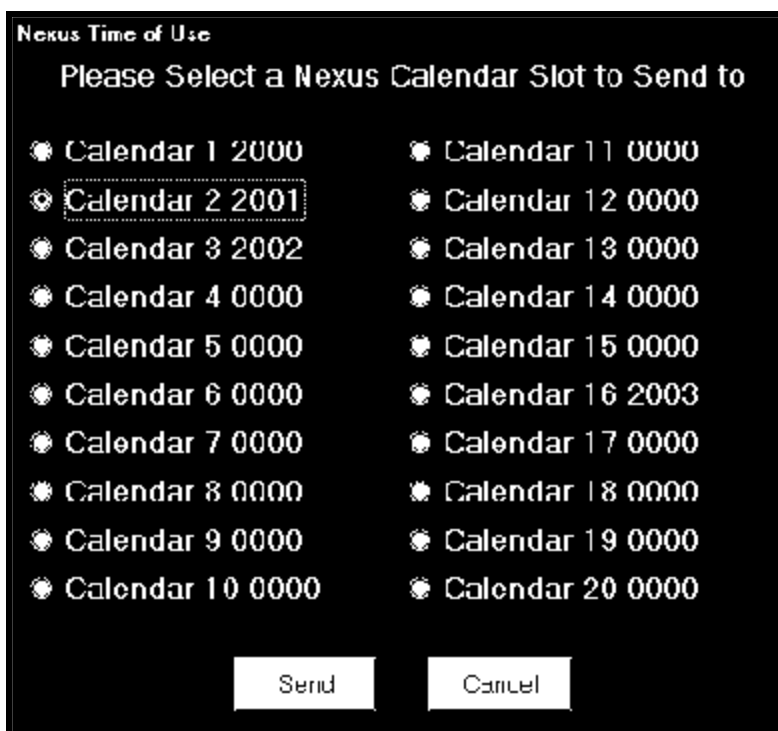
Current Nexus TOU Setup Status

Item Name	Status	Value(s)
Year	Passed	2001
Reasons	Passed	01/01/2001, 04/01/2001, 07/01/2001, 10/01/2001
Bill Days	Passed	No billing dates set.
Daily Setup	Passed	Daily profile set after 01/31/2001
Register Names	Warning	Register name not set for R0, R4, R5, R6, R7, R8
Schedule Names	Warning	Schedule name not set for S4, S5, S6, S7, S8, S9, S10, S11
Schedule Setup	Passed	

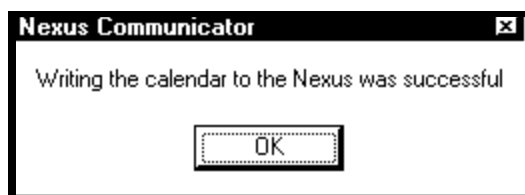
Continue Back

- Before updating the Nexus Monitor, Communicator checks that the data entered is valid. It will warn you if any data is not correct. If one of the Status Screens fails, Communicator will not let you update the device. A pop-up screen will tell you that it is an Invalid Calendar. Click OK. You will return to the Edit Calendar screen to create another calendar.

30. Click Continue. The following screen appears:



31. Select the slot you would like to use. Click Send.

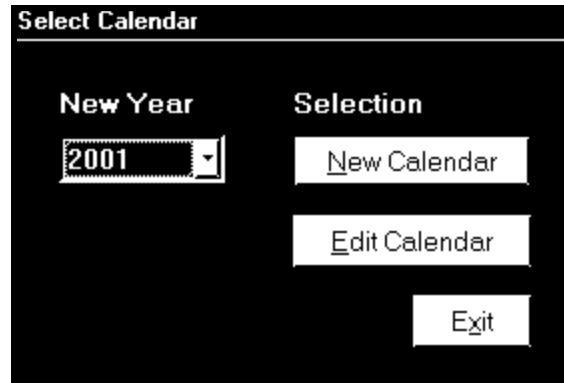


32. Communicator will send the calendar to the Nexus Monitor. The above pop-up window will tell you that the calendar was received. Click OK. The Nexus Monitor will use the calendar for the designated year, based on the date settings of your computer.

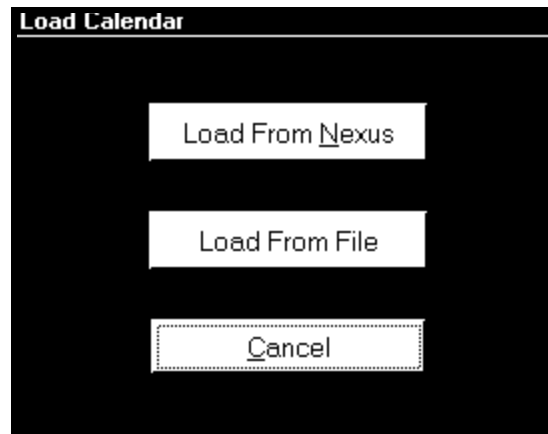
❖ **Note:** Do **not** enter more than one calendar for the same year (ie, do not store two calendars for 2002). If this occurs, Nexus will use the first calendar entered.

9.3: Update a TOU Calendar Profile

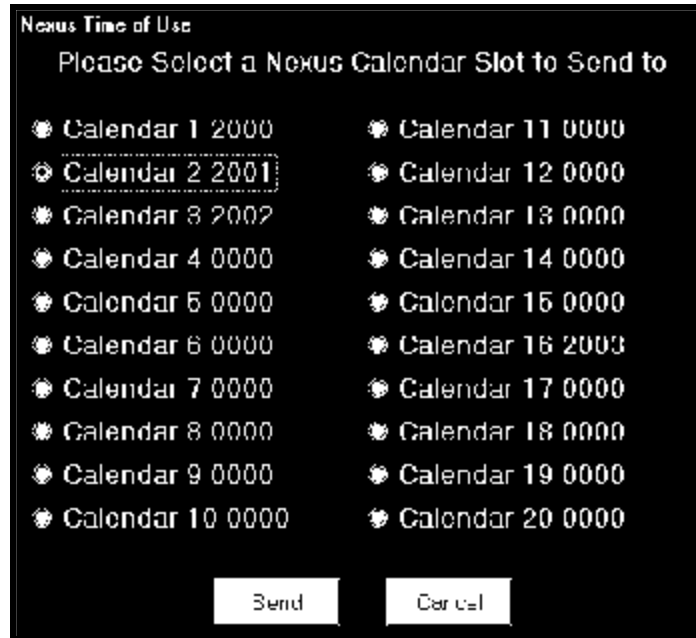
1. From the Time-of-Use menu, select Calendar Settings. The following screen appears:



2. Click Edit Calendar. The following screen appears:



- To edit a calendar saved on the computer's hard drive, click Load From File. Nexus Communicator will ask you to locate the calendar. After the calendar has loaded, see section 9.2 for details on programming the calendar.
- To edit one of the calendars stored in the Nexus Monitor, click Load from Nexus. The following screen appears:



3. Select the calendar year you would like to edit and click Retrieve. After the calendar year has been retrieved, see section 9.2 for details on editing.

9.4: Viewing TOU Accumulated Data

- From the Time-of-Use menu select Poll Time of Use Registers. The following screen appears:

Delivered
Watt Hour,
Quadrant
2+3

Time of Use Readings

Status: Active

Group: Current Month

Start Time: 01/02/2002 00:00:00

End Time: 12/31/2002 23:59:59

Register: Register Totals

Register Accumulations

<table style="width: 100%; border-collapse: collapse;"> <tr><td style="border: 1px solid black;">VARh</td><td style="border: 1px solid black;">0000000014793518</td></tr> <tr><td style="border: 1px solid black;">VAh</td><td style="border: 1px solid black;">0000000014793658</td></tr> <tr><td style="border: 1px solid black;">Rec W/h</td><td style="border: 1px solid black;">0000000000053866</td></tr> <tr><td style="border: 1px solid black;">VAh</td><td style="border: 1px solid black;">0000000015928365</td></tr> <tr><td style="border: 1px solid black;">-VARh</td><td style="border: 1px solid black;">0000000015928237</td></tr> </table>	VARh	0000000014793518	VAh	0000000014793658	Rec W/h	0000000000053866	VAh	0000000015928365	-VARh	0000000015928237	Q2	Q1	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="border: 1px solid black;">VARh</td><td style="border: 1px solid black;">0000000098321000</td></tr> <tr><td style="border: 1px solid black;">VAh</td><td style="border: 1px solid black;">0000000098326590</td></tr> <tr><td style="border: 1px solid black;">Del W/h</td><td style="border: 1px solid black;">0000000000901673</td></tr> <tr><td style="border: 1px solid black;">VAh</td><td style="border: 1px solid black;">0000000114735564</td></tr> <tr><td style="border: 1px solid black;">-VARh</td><td style="border: 1px solid black;">0000000114730145</td></tr> </table>	VARh	0000000098321000	VAh	0000000098326590	Del W/h	0000000000901673	VAh	0000000114735564	-VARh	0000000114730145
VARh	0000000014793518																						
VAh	0000000014793658																						
Rec W/h	0000000000053866																						
VAh	0000000015928365																						
-VARh	0000000015928237																						
VARh	0000000098321000																						
VAh	0000000098326590																						
Del W/h	0000000000901673																						
VAh	0000000114735564																						
-VARh	0000000114730145																						

Received
Watt Hour,
Quadrant
1+4

Register Peak Demand

Delivered Watt	0.30W	01/08/2002 09:28:00
Delivered VAR	17.43W	01/07/2002 17:06:30
Received VAR	-21.76W	01/07/2002 17:37:00
Received Watt	-0.07W	01/07/2002 18:09:50
Delivered Watt Coincident VAR	-2.77W	
Received Watt Coincident VAR	-13.12W	

☐ Polling 00000098

OK
Copy
Export
Print
Help

- From the Group pull-down menu, select the month or season accumulations you would like to view.
- From the Register pull-down menu, select the individual register accumulation (or the total of all registers) you would like to view for the selected month or season.
 - The Nexus 1250 is a true four-quadrant power meter. It displays the VARs and VA for each quadrant:

<u>Quadrant</u>	<u>Power Factor</u>	<u>Watts</u>	<u>VARs</u>
1	Lag	+	+
2	Lead	-	+
3	Lag	-	-
4	Lead	+	-

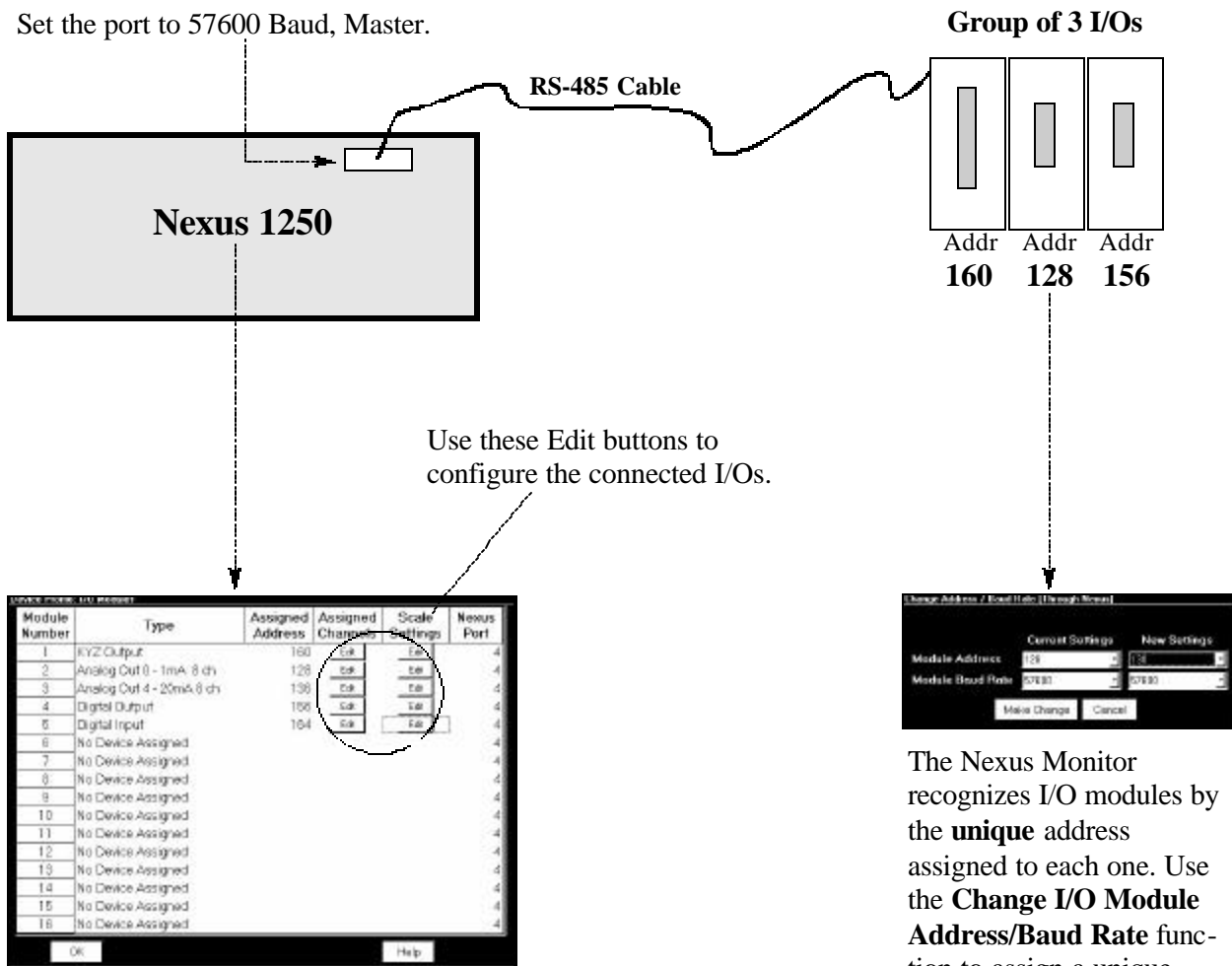
- Print or Export the data by clicking the appropriate button at the bottom of the screen.

Chapter 10

Nexus External I/O Modules

10.1: Overview

I/Os must use the Nexus Monitor's Port 4.
Set the port to 57600 Baud, Master.



The **External Devices** section of the Nexus Monitor's **Device Profile** (Chapter 3) tells the Nexus which I/O Modules are connected to it at which addresses. This profile must reflect what is physically attached to the unit. Revise the Nexus Monitor's Device Profile each time an I/O is added, removed or configured.

The Nexus Monitor recognizes I/O modules by the **unique** address assigned to each one. Use the **Change I/O Module Address/Baud Rate** function to assign a unique address to each I/O **before** connecting the group to the Nexus Monitor.

10.2: Outline of the Procedure for Installing I/O Modules

■ The steps below are detailed in subsequent sections of this chapter.

1. Review I/O hardware details in the *Nexus Installation and Operation Manuals*.
2. Before connecting any I/Os to the Nexus Monitor, you **must** be sure each one has its own unique address. All I/Os are shipped with a pre-set address and a baud rate of 57600. See section 10.5 for a list of factory-set addresses and baud rates. To assign or change I/O addresses, see section 10.6.
3. Write down the name and unique address of each I/O you will be using. (You will need to know the addresses for the Nexus Monitor's Device Profile.)
4. Connect the I/O or group of I/Os to the Nexus 1250 Monitor's port 3 or 4 or Nexus 1270 Monitor's port 4. You must use the correct port. Be sure ports are set to operate at the same baud rate as the I/O modules. The ports must also be configured as Masters. See Chapters 3 (Nexus 1250) and 4 (Nexus 1270) for how to configure the communication ports.
5. Retrieve the Nexus Monitor's Device Profile. In the External Devices section, enter the name of each I/O and its unique address. Use the Edit buttons to configure the I/Os. Each I/O connected to the unit **must** be included in the Device Profile. Update the Device Profile to record the changes. See section 10.7.

NOTE: Updating the Device Profile will reset all logs.

■ This chapter also covers the following I/O utilities:

- **Nexus I/O Device Status** (section 10.13): lists all registered I/Os currently in use.
- **Query I/O Module** (section 10.14): locates an I/O's address and baud rate.
- **Locator Utility** (section 10.15–16): locates an I/O's address and baud rate without using the reset button.
- **Stand Alone Programmer** (section 10.17): allows you to configure all I/O parameters directly from a computer, not through a Nexus Monitor.

10.3: Using Multiple I/O Modules

- Each type of I/O module is shipped with a factory-set address (see section 10.5). **If you plan to use more than one I/O module of the same type (such as three KYZ modules), you must change the address of each module individually before connecting the group to the Nexus Monitor.** See section 10.6 for how to change a module's address and baud rate.
- Each I/O module in a group must have its own **unique address**. Each module must be set to operate at the same baud rate as the Nexus Monitor's port 3 or 4 (57600 is recommended).
- If you do not know an I/O module's address or baud rate, use the Query I/O function detailed in section 10.14. This function works **only** on Port 4.
- To connect multiple I/Os together, attach the male RS-485 port of one module to the female RS-485 port of another. Secure by tightening built-in fasteners. Attach mounting brackets to the outside modules. Use the steps below (section 10.4) to determine if you must use a separate power source (for example, EIG PSIO) to supply added power to the group.
- To connect a group of I/Os to the Nexus Monitor, connect an RS-485 cable to the group's available female RS-485 port. Connect the other end of the cable to the Nexus Monitor's **port 3 or 4**.
- You may combine different types of I/O modules together in a group.
- After all modules have been assigned a unique address and connected to the Nexus Monitor, you must enter them in the Nexus Monitor's Device Profile. See section 10.7.

10.4: Steps to Determine Power Needed

- **Available power for All Ports is 12 VA.**
- Refer to the table in the next section (Section 10.5) to determine the VA Ratings for I/O modules and displays.
- **Add together the VA Ratings for I/Os and Displays in use.**
- **Compare Available Power to Power Needed.**

See the *Nexus Installation and Operation Manuals* for details.

10.5: I/O Modules' Factory Settings and VA Ratings

- All I/Os are shipped pre-programmed with a baud rate of 57600 and addresses. The table below details the factory-set address for each module and the VA Ratings for I/O modules and Nexus displays. Refer to the previous section (section 10.4) for the steps to determine if you must use an additional power source.
- To temporarily reset an I/O module to address 247 and 57600 baud (program defaults), press and hold the reset button for 3 seconds. The module will remain in reset mode for 30 seconds.

I/O MODULES' FACTORY SETTINGS and VA RATINGS			
MODEL NUMBER	MODULE	ADDRESS	VA RATING
1mAON4	0-1mA, 4 Analog Outputs	128	2.7 VA
1mAON8	0-1mA, 8 Analog Outputs	128	3.2 VA
20mAON4	4-20mA, 4 Analog Outputs	132	5.0 VA
20mAON8	4-20mA, 8 Analog Outputs	132	8.5 VA
8AI1	0-1mA, 8 Analog Inputs	136	2.3 VA
8AI2	0-20mA, 8 Analog Inputs	140	2.3 VA
8AI3	0-5 VDC, 8 Analog Inputs	144	2.3 VA
8AI4	0-10 VDC, 8 Analog Inputs	148	2.3 VA
4RO1	4 Latching Relay Outputs	156	2.7 VA
4PO1	4 KYZ Pulse Outputs	160	2.7 VA
8DI1	8 Status Inputs (Wet/Dry)	164	1.0 VA
NEXUS DISPLAYS' VA RATINGS			
P40N	Nexus LED Display		8 VA
P60N	Nexus Touch Screen Display		5 VA

10.6: Assigning Addresses and Baud Rates to an I/O Module

- ❖ **Note:** The utility described below requires the I/O to be connected to the Nexus Monitor at port 3 or 4. To configure an I/O module by connecting it directly to your computer, use the Stand Alone Programmer utility, section 10.17.
 - You must know the current address and baud rate of the I/O you want to change. See section 10.5 for a list of factory-settings, if the I/O is new, or use the Query I/O function (section 10.14)(Port 4 only), if the address and/or baud rate has been changed or is no longer known. When you have determined the current address and baud rate, proceed with the steps listed below.
1. Make sure the Nexus Monitor's port 3 or 4 is configured to communicate with the I/O module at the same baud rate (57600 recommended). Port 3 or 4 must also be set to Master mode. See Chapter 3 for details on configuring the Nexus Monitor's communication ports.
 2. Connect the I/O to the Nexus Monitor's Port 3 or 4.
- ❖ **Note:** You may connect a group of I/Os to the Nexus Monitor to make address/baud rate changes only if each I/O already has a unique address. If the I/Os have the same address—such as three new KYZ modules—you must connect and change their addresses individually. See section 10.3 for details on using multiple I/O modules.
3. From the Tools menu select Change I/O Module Address/Baud Rate. The following screen appears:

	Current Settings	New Settings
Module Address	128	130
Module Baud Rate	57600	57600

Make Change Cancel

4. From the pull down menus, enter the module's current address and baud rate. Then enter the address and baud rate you would like to assign. Enter an address from 1 to 247, being sure that the address is not already assigned to any other I/O you will be using.
5. Click Make Change. A confirmation screen appears after the module has been updated. Repeat the procedure for all I/Os in the group.
6. Write down the module's new address and baud rate.
7. Proceed to section 10.7 to enter the I/O in the Nexus Monitor's Device Profile and configure all other I/O parameters.

10.7: Entering I/O Modules in the Nexus Monitor's Device Profile

- The Nexus Monitor uses a Master/Slave polling architecture when communicating with the I/O modules; therefore you **must** enter all I/Os in the Nexus Monitor's Device Profile. This procedure tells the unit what types of modules are connected to it, what parameters you have set for them and at what address they may be found.
1. Write down the name and unique address of each I/O you plan to use. Be sure all baud rates match that of the Nexus Monitor's port 3 or 4 (57600 is recommended). Be sure all addresses are unique. See section 10.6 for how to assign addresses and baud rates.
 2. Connect the I/O module(s) to the Nexus Monitor's Port 3 or 4; see the *Nexus 1250 Installation and Operation Manual* for hardware and installation details. Be sure Port 3 or 4 is configured to operate at 57600 baud and is set in Master mode (see Chapter 3 for how to configure Port 3 or 4).
 3. Click on the Edit Profile button (or select Edit Current Device Profile from the Tools Menu) to retrieve the Nexus Monitor's Device Profile. (See Chapter 3 for details about the Device Profile).
 4. When Nexus Communicator has retrieved the Device Profile from the Nexus Monitor, double click on "External Devices". The following screen appears.

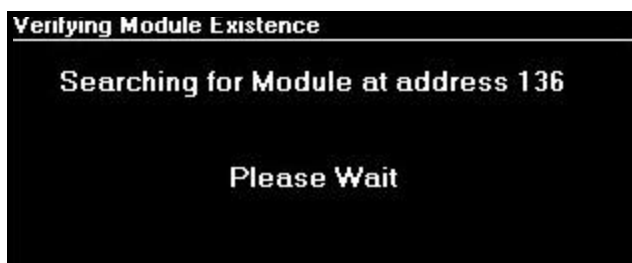
Device Profile: I/O Modules						
Module Number	Type	Assigned Address	Nexus Settings	Module Settings	Nexus Port	Log / Limit ID
1	KYZ Output	160	Edit	Edit	4	KYZ Module 1
2	Analog Out 4 - 20mA 4 ch	132	Edit	Edit	4	AO Module 1
3	Analog Out 4 - 20mA 8 ch	132	Edit	Edit	4	AO Module 3
4	Digital Output	156	Edit	Edit	4	DO Module 1
5	Analog In 0 - 1mA 8 ch	10	Edit	Edit	4	AI Module 1
6	Analog In 0 - 5V 8 ch	11	Edit	Edit	4	AI Module 2
7	No Device Assigned				4	
8	No Device Assigned				4	
9	No Device Assigned				4	
10	No Device Assigned				4	
11	No Device Assigned				4	
12	No Device Assigned				4	
13	No Device Assigned				4	
14	No Device Assigned				4	
15	No Device Assigned				4	
16	No Device Assigned				4	

OK
Help

5. Click in the Type column and use the pull-down menu to select the specific I/O you wish to enter. You may enter up to 16 modules.

6. Enter each module's unique address. If you have not assigned a unique address to each module, see section 10.6. Each module's address must be unique, otherwise communication will not function properly.
7. You may now configure the modules using the Edit buttons. See the following sections (10.8–10.12) for details on how to configure each type of module. Check the Table of Contents for the type of module you want to configure and read the corresponding section. After you have configured all modules, click OK.

NOTE: Log / Limit ID is an internal identification based on the order in which the modules are entered into the profile.



8. The Nexus Monitor will begin to look for the modules at the addresses listed. If all are present, the main Device Profile screen will appear. If an incorrect address is given, a warning screen appears and the changes are rejected. Determine the correct address of any missing I/O using the Query I/O function (section 10.14) (Port 4 only) or the Locator Utility (section 10.15 - 10.16), and enter the correct information in the External Devices section of the Nexus Device Profile.
9. **You MUST now Update the Nexus Monitor's Device Profile to enter the Modules.** Click on **Update Device**. This sends the new Device Profile, with the I/O information, to the Nexus Monitor.
 - Click Report to print out a copy of the I/O information.
 - Click Save to save these parameters to your computer.
 - Click Load to enter a previously saved set of parameters.

10.8: Configuring the Analog Output Module

1. Be sure each module has a unique address and is connected to the Nexus Monitor's port 3 or 4 at the same baud rate as the port (57600 recommended); see section 10.6.
2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (see Chapter 3 for more detail on the Device Profile and section 10.7).
3. After you have entered the type of Analog Output Module in the Type column and its address in the assigned address column, click on the Edit button in the Assigned Channels column. The following screen appears:

Output	Type	Channel
1	1s Readings	Volts BN
2	Average	Volts AN
3	THD	Volts CN
4	0.1s Readings	Volts CN
5	THD	Volts AN
6	Phase Angles	Volts AB
7	K-Factor	I C
8	K-Factor	I A

Channel Update 1

OK

4. From the pull down menus, select the type of reading and the channel to which it will be applied. Click OK when all channels are set. The Device Profile: I/O Modules screen appears.
5. Click on the Edit button in the Scale Settings. Nexus Communicator retrieves the settings from the I/O module. The following screen appears:

Analog Output 0 to 1 mA External Module Programmer

Module Type: Analog Output Module 8 Channel

Version: 0021, Build 114

Address: 128

Baud Rate: 57600

Transmit Delay: 0.0 ms

Channel #	Scale High Value(1mA)	Scale Low Value(-1mA)
1:1s Readings Volts BN	120.000	-120.000
2:Average Volts AN	120.000	-120.000
3:Average Volts AN	120.000	-120.000
4:0.1s Readings Volts CN	120.000	-120.000
5:0.1s Readings Volts AN	120.000	-120.000
6:1s Readings I Nm	120.000	-120.000
7:1s Readings I A	120.000	-120.000
8:1s Readings I B	120.000	-120.000

Update Cancel Help

- For each channel, enter the scale setting according to the needs of your application. The scale High Value refers to the high end of the module; the scale Low Value refers to the low end of the module. For example, if you have a 4–20mA module, the scale High Value determines what 20mA equals. The scale Low Value determines what 4mA equals. (See note below on How to Set Scale Values.)

- To change the I/O's Transmit Delay, you must use the Stand Alone Programmer, section 10.17.

- When you have entered the scale settings, click Update. Nexus Communicator will send the new scale settings to the module and then reset it.

- Be sure to send the updated Device Profile to the Nexus Monitor after you have finished configuring all I/Os. Click on the Update Device button.**

❖ **Note on How to Set Scale Values:** Enter values for volts, current and power in secondary. All other values should be set in primary.

10.9: Configuring the Analog Input Module

The Analog Input Module can measure any type of reading, once it is converted to an electrical signal (within limits of the I/O Module). Below is an example of a reading and its conversion to a value:

CONVERSION TO VALUE		
READING	SIGNAL	VALUE
100 ^o	1mA	100%
50 ^o	0.5mA	50%
0	0.0mA	0%
50 ^o	-0.5mA	-50%
110 ^o	-1mA	-100%

Following are the steps to configure the Analog Input Module:

1. Be sure each module has a unique address and is connected to the Nexus Monitor's port 3 or 4 at the same baud rate as the port (57600 recommended) (see section 10.6).
2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (section 10.7).
3. After you have entered the type of Analog Input Module in the Type column and its address in the Assigned Address column, click on the Nexus Settings Edit button. The following screen appears:

Device Profile: Analog Input			
Input	Channel Label	High Value (1mA)	Low Value (-1mA)
1	Temp Sensor 1, C	100.0000	-100.0000
2	Temp Sensor 2, K	300.0000	-300.0000
3	Temp Sensor 3, F	500.0000	-500.0000
4	Pres Sensor, Hg	50.0000	-50.0000
5	Light Sensor, Lu	5000.0000	-5000.0000
6	Humidity Sensor	100.0000	-100.0000
7	Sea Level, Ft	24.0000	-24.0000
8	Sound Level, dB	250.0000	-250.0000
OK		Help	

4. Enter label and scaling factor for each input. The Value columns will appear in either milliamps or Volts, depending on the type of input chosen in the Device Profile.
5. Click OK when done.
6. Click on the Module Settings button and the following screen will appear, reflecting the settings for Address, Baud Rate and Transmission Delay.

Analog Input 0 to 5V External ModuleProgrammer

Module Type	Analog Input Module 8 Channel, 0 to 5V
Version	0013, Build 104
Address	144
Baud Rate	57600 ▾
Transmit Delay	0.0 ms ▾

10.10: Configuring the KYZ Output Module

1. Be sure each module has a unique address and is connected to the Nexus Monitor's port 3 or 4 at the same baud rate as the port (57600 recommended); see section 10.6.
2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (see Chapter 3).
3. After you have entered the KYZ module in the Type column and its address in the Assigned Address column, click on the Edit button in the Assigned Channels column. The following screen appears:

Relay	Accumulation
1	Quad (1 + 4) Watthour
2	Quad 1 VARhour
3	Quad 4 VARhour
4	Quad (2 + 3) Watthour

OK

4. Assign an accumulation to each relay based on the needs of your application. Click OK to return to the main I/O Device Profile screen.
5. Click on the Edit button in the Scale Settings. Nexus Communicator retrieves the settings from the I/O module. The following screen appears:

KYZ External Module Programmer

Module Type

Version

Address

Baud Rate

Transmit Delay

KYZ Output	Watt/Pulse	Roll Over	Min Pulse Width (ms)
1:Quad (1 + 4) Watthour	1	9999999999999999	500
2:Quad 1 VARhour	1	9999999999999999	500
3:Quad 4 VARhour	1	9999999999999999	500
4:Quad (2 + 3) Watthour	1	9999999999999999	500

6. For each output, enter the Watt per Pulse and the Minimum Pulse Width in milliseconds. Leave the roll over at the default value of sixteen 9s. This value matches the Roll Over of the Nexus Monitor. **It is important that the roll over of the module match the roll over of the device to which it is connected.** Change the roll over only if you are using the module with a device other than a Nexus Monitor or if you are using the module as a stand-alone unit.
 - To change the I/O's Transmit Delay you must use the Stand Alone Programmer, section 10.17.
7. When you have entered the scale settings, click Update. Nexus Communicator will send the new scale settings to the module and then reset it.
8. **Be sure to send the updated Device Profile to the Nexus Monitor after you have finished configuring all I/Os. Click on the Update Device button.**

10.11: Configuring the Digital Dry Contact Relay Output

1. Be sure each module has a unique address, is entered in the Nexus Monitor's Device Profile and connected to port 3 or 4 at the same baud rate. See section 10.7.
2. From the I/O Devices menu select Relay Control. The following screen appears:

Relay	Name	State	Change
1	M2R1	Common Shorted to N.O. "Locked"	<input type="checkbox"/>
2	M2R2	Common Shorted to N.C.	<input checked="" type="checkbox"/>
3	M2R3	Common Shorted to N.C. "Locked"	<input type="checkbox"/>
4	M2R4	Common Shorted to N.C.	<input type="checkbox"/>
5	M1R1	Common Shorted to N.C.	<input type="checkbox"/>
6	M1R2	Common Shorted to N.C.	<input type="checkbox"/>
7	M1R3	Common Shorted to N.C.	<input type="checkbox"/>
8	M1R4	Common Shorted to N.C.	<input type="checkbox"/>
9	M4R1	Common Shorted to N.C.	<input type="checkbox"/>
10	M4R2	Common Shorted to N.C.	<input type="checkbox"/>
11	M4R3	Common Shorted to N.C.	<input type="checkbox"/>
12	M4R4	Common Shorted to N.C.	<input type="checkbox"/>
13	M3R1	Common Shorted to N.C.	<input type="checkbox"/>
14	M3R2	Common Shorted to N.C.	<input type="checkbox"/>
15	M3R3	Common Shorted to N.C.	<input type="checkbox"/>
16	M3R4	Common Shorted to N.C.	<input type="checkbox"/>

Select New State: Unlock Apply

☐ Polling 00001440 OK Help

3. Each module has four relays that can be configured using this screen.
4. To change the state of one or more relays, click the box next to the relay(s) you want to change.
4. Use the pull down menu next to Select New State to assign a "Lock Common to N.C.", "Lock Common to N.O." or an "Unlock" state to the relay(s).
5. Click on the Apply button to send the new setting to one or more relays of one or more modules.
6. Click OK when you have finished configuring all Relay Outputs.

10.12: Using the Digital Input Module

- ❖ **Note:** If you are using a Digital Input module with a Nexus Monitor, **you only need to enter the module in the Nexus Monitor's Device Profile (section 10.7); you do not need to configure the module unless you want to change the roll over.** The module's roll over should always match the roll over of the device to which the module is connected. The Digital Input's default roll over parameters are set for use with a Nexus Monitor; therefore they do not need to be changed.
1. To change the roll over, be sure each module has a unique address, has been entered in the Nexus Monitor's Device Profile and is connected to port 3 or 4 at the same baud rate as the port (57600 recommended); see section 10.7.
 2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (see Chapter 3).
 3. After you have entered the Digital Input module in the Type column and its address in the Assigned Address column, click on the Edit button in the Assigned Channels column. The following screen appears:

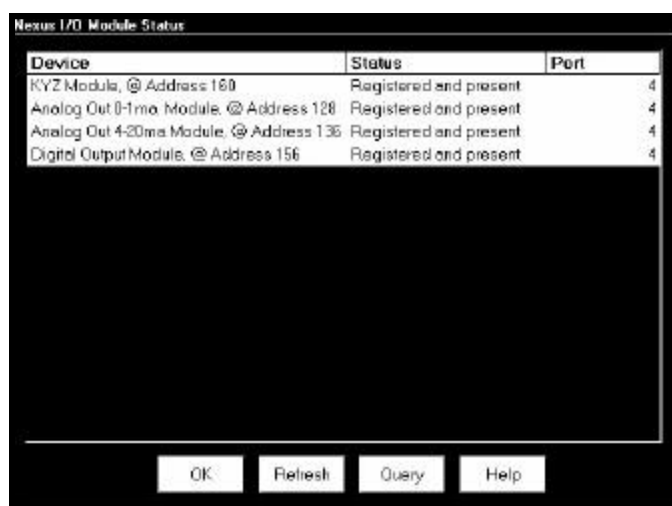
Digital Input	Roll Over
1	99999999
2	99999999
3	99999999
4	99999999
5	99999999
6	99999999
7	99999999
8	99999999

- To change the I/O's Transmit Delay, you must use the Stand Alone Programmer, section 10.17.
4. Assign a roll over to each relay based on the needs of your application. **If the module is connected to a Nexus Monitor, you do not need to change the roll over from the default.** Click Update to send the new roll over settings to the module.
 5. **Be sure to send the updated Device Profile to the Nexus Monitor after you have finished configuring all I/Os. Click on the Update Device button.**

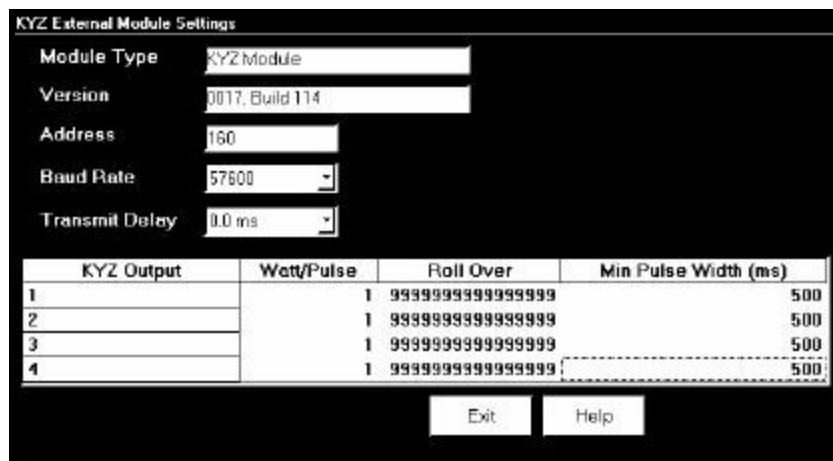
10.13: Nexus I/O Device Status

- This utility allows you to view a list of all the modules that have been entered (“registered”) in the Nexus Monitor’s Device Profile (see section 10.7).

1. From the I/O Devices menu, select Nexus I/O Device Status. Nexus Communicator searches for all entered I/O modules. The following screen appears (the listings shown are for example only):



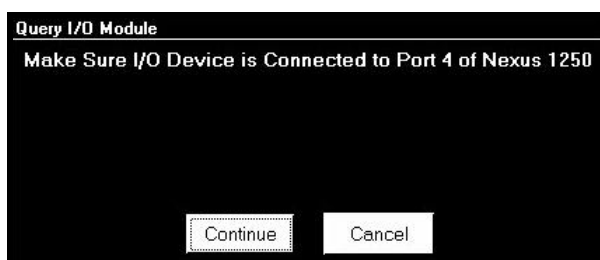
2. To view the current programmable settings of a particular module, select it and click Query. For example, a query the KYZ module at address 160 yields the following:



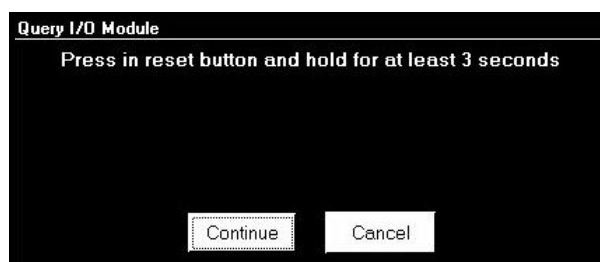
- To change the I/O’s Transmit Delay, you must use the Stand Alone Programmer, section 10.17.
3. Query screens are read-only. To change any parameters you must edit the Nexus Monitor’s Device Profile (see section 10.7).
 4. Click Refresh to initiate a new search and listing of connected I/Os.

10.14: Query I/O—Locating an Unknown Address and Baud Rate

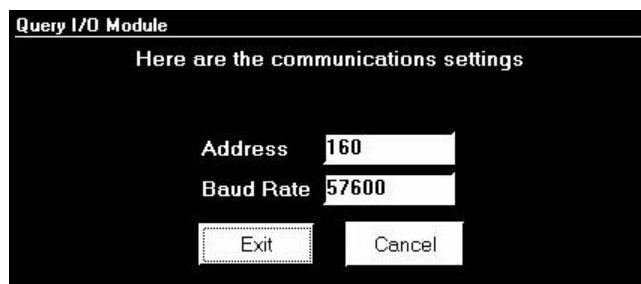
- ❖ **Note:** This utility requires you to press the I/O module's reset button. If you are off-site, or can not access the reset button, use the Locator Utility described in section 10.15–16.
- 1. I/Os may be connected to either the Nexus Monitor's port 3 or 4. However, **ONLY Port 4** is programmed to query. Be sure the port is configured to operate at 57600 and is set to Master mode; see Chapter 3 for how to configure the Nexus Monitor's communication ports.
- 2. Select I/O Devices, Query I/O. The following screen appears:



- 3. Click continue. The following screen appears:



- 4. Use a fine point to depress the I/O module's reset button. Hold it in for at least three seconds. This resets the I/O module to address 247 at 57600 baud for thirty seconds, allowing Nexus Communicator to retrieve the stored address and baud rate.
- 5. Click OK. The Nexus Monitor will begin looking for the device at the temporary address of 247. When the I/O's programmable information is located, the following screen appears:



- 6. Write down the address and baud rate.

10.15: Locator Utility—Through Nexus Method

- Use this utility if you do not have access to an I/O module's reset button; otherwise use the Query I/O function. The Through Nexus Locator Utility searches each address in succession **only at the baud rate at which the computer and the Nexus Monitor are connected.**

❖ **Note:** The Locator Utility—Stand Alone Locator method (section 10.16) allows you to search for an I/O's address **and** baud rate **without** a Nexus Monitor by connecting the I/O directly to the computer.

1. Connect the module to the Nexus Monitor at port 4.
2. Establish a connection between the computer and the Nexus Monitor. **The baud rate at which the computer and the Nexus Monitor are connected is the baud rate Locator will use to search for the I/O's address.**
3. From the I/O Devices menu, select Locator Utility, Through Nexus. The following screen appears:

Device Type	Address	BaudRate
-------------	---------	----------

4. Set the Address range for the search. Nexus Communicator will begin at the start address, searching every address up to and including the End Address.
5. Device Locator lists any device it finds:

Through Nexus Device Locator

Start Address End Address

Start Baud Rate End Baud Rate

Searching for a device at Address 216, 115200

Device Type	Address	BaudRate
0-1 mA Analog Out	128	N/A
4-20 mA Analog Out	136	N/A
Digital Output Module	156	N/A
KYZ Module	160	N/A

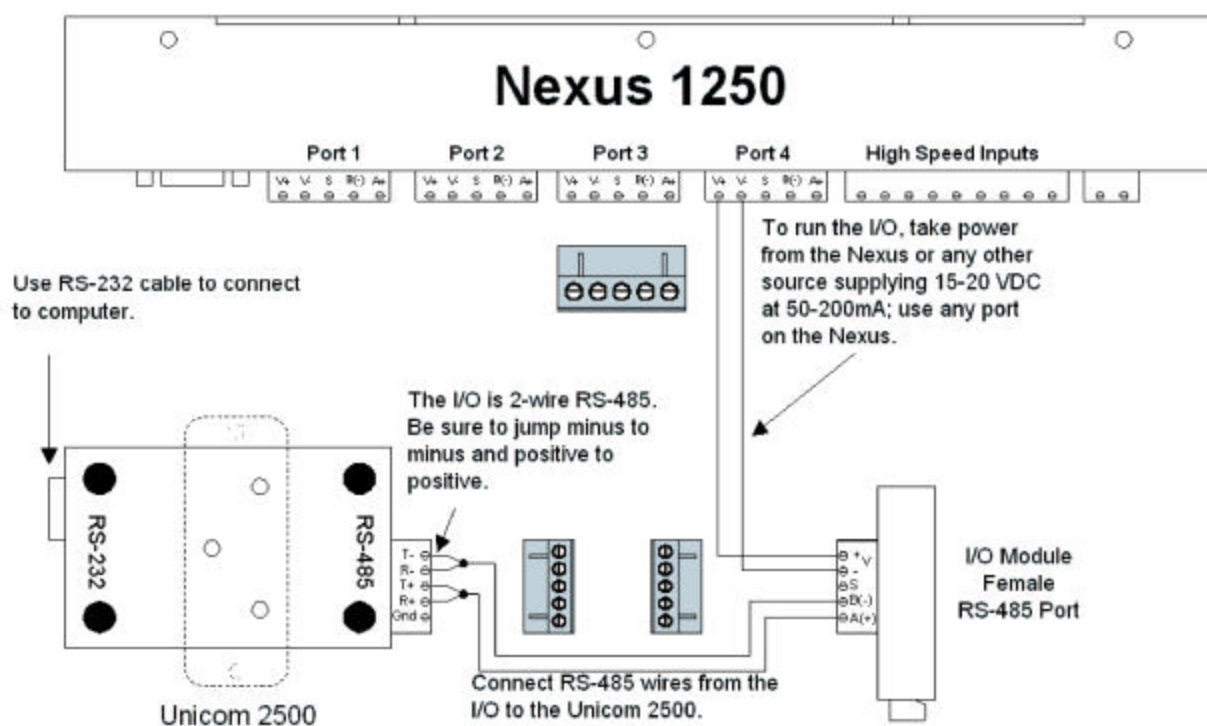
Start Stop Exit Help

6. Device Locator will continue to search for devices until it reaches the end of the specified criteria or until you click Stop. Click OK to return to the main Nexus Communicator screen.

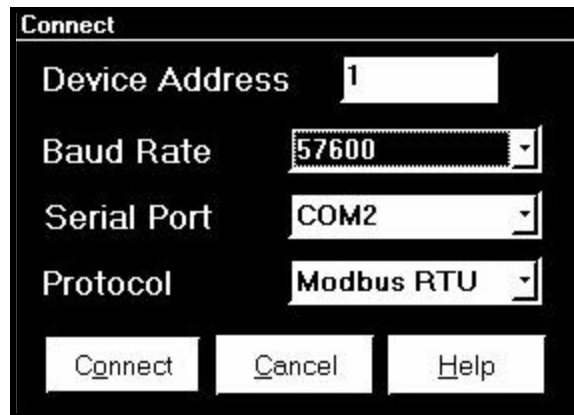
10.16: Locator Utility—Stand Alone Method

- The Stand Alone Locator utility searches for any I/O device connected directly to your computer (it is not for use with remote connections). The search criteria is a programmable range of baud rates and addresses. When a device is found, Locator displays its name, baud rate and address.
- To make a Stand Alone connection you will need the following:
 - RS-232 Cable
 - EIG's Unicom 2500 (or similar RS-232/RS-485 converter)
 - An RS-485 cable with power wires separated from communication wires; see diagram below.
 - A 15–20 VDC at 50–200 mA power source for the I/O module, such as EIG model PB1; you may also use any port on a Nexus Monitor as a power source.

1. Wire the Unicom, I/O module and computer as shown:



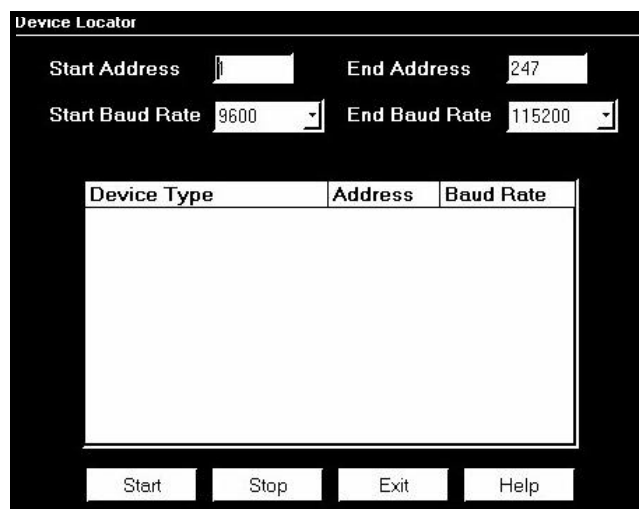
2. Use an RS-232 cable to connect the Unicom 2500 and your computer:
 - Set the Unicom to operate at 57600 baud.
 - Set the Unicom to DCE and HD.
3. Click on the Nexus Communicator Connect icon on the tool bar, or select Connect, Quick Connect. The following screen appears:



The 'Connect' dialog box contains the following fields and buttons:

- Device Address:** A text field containing the value '1'.
- Baud Rate:** A dropdown menu with '57600' selected.
- Serial Port:** A dropdown menu with 'COM2' selected.
- Protocol:** A dropdown menu with 'Modbus RTU' selected.
- Buttons:** 'Connect', 'Cancel', and 'Help'.

4. This screen displays your **computer's** communications settings.
 - Leave the **Device Address** field at 1.
 - In the **Baud Rate** field enter 57600 (or the baud rate to which the RS-232/RS-485 converter is set).
 - In the **Serial Port** field enter the computer's communication port into which the RS-232 cable is inserted.
 - Leave the **Protocol** field set at Modbus RTU.
5. Click Connect. Nexus Communicator will be unable to locate the device; after a few seconds a No Device Found At This Location dialogue box will appear; click OK.
6. From the I/O Devices menu select Locator Utility, Stand Alone. The following screen appears:



The 'Device Locator' dialog box contains the following fields and buttons:

- Start Address:** A text field containing the value '1'.
- End Address:** A text field containing the value '247'.
- Start Baud Rate:** A dropdown menu with '9600' selected.
- End Baud Rate:** A dropdown menu with '115200' selected.
- Table:** A table with 3 columns: 'Device Type', 'Address', and 'Baud Rate'. The table body is currently empty.
- Buttons:** 'Start', 'Stop', 'Exit', and 'Help'.

- Set the Address and baud rate ranges for the search. Nexus Communicator will begin at the start address and baud rate, searching every address up to and including the End Address; then it will begin the same address search at the next baud rate in the range.

NOTE: If you include ALL BAUD RATES, the Device Locator will take about 12 hours to complete the search. If you know the baud rate of the device (Nexus monitors are normally 115200, I/O's are 57600), just look in that baud rate. The search will take minutes instead of hours.

- Click Start. The Device Locator begins searching for devices within the specified baud rate and address range.

Device Locator

Start Address 1 End Address 247

Start Baud Rate 115200 End Baud Rate 115200

Searching for a device at Address 11, 115200

Device Type	Address	BaudRate
Nexus 1250	1	115200

Start Stop Exit Help

- The Device Locator will continue to search for devices until it reaches the end of the specified criteria or until you click Stop. Write down the address and baud rate. Click Exit to return to the main Nexus Communicator screen.

10.17: Stand Alone Programmer

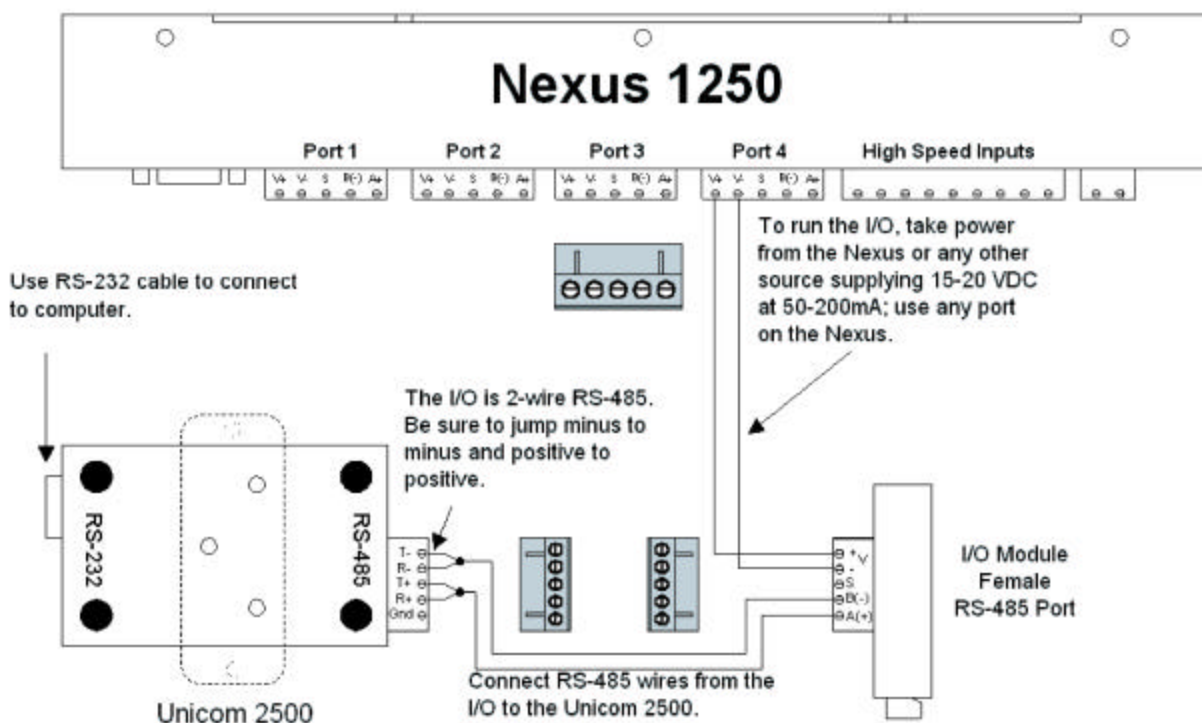
- The Stand Alone programmer allows you to configure all parameters of an I/O module or group of I/O modules by connecting the I/O(s) directly to the computer.

❖ **Note:** If you plan to connect the module(s) to a Nexus Monitor in the future, you **must** still enter them in the External Devices section of the Nexus Monitor's Device Profile. See section 10.7.

- To use the Stand Alone Programmer, you will need the following:

- RS-232 Cable
- EIG's Unicom 2500 (or similar RS-232/RS-485 converter)
- An RS-485 cable with power wires separated from communication wires; see diagram below.
- A 15–20 VDC at 50–200 mA power source for the I/O module, such as EIG model PB1; you may also use any port on a Nexus Monitor as a power source.

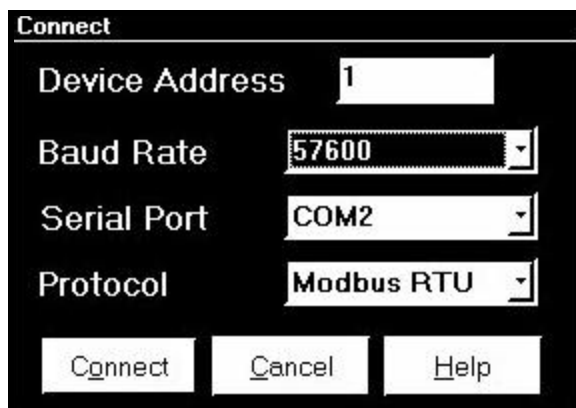
1. Wire the Unicom, I/O module(s) and computer as shown:



2. Use an RS-232 cable to connect the Unicom 2500 and your computer:

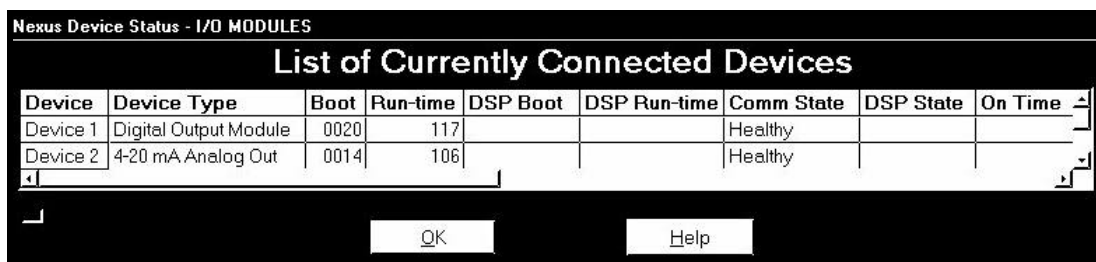
- Set the Unicom to operate at 57600.
- Set the Unicom to DCE and HD.

- Click on the Nexus Communicator Connect icon on the tool bar, or select Connect, Quick Connect. The following screen appears.



The 'Connect' dialog box is a black window with white text and controls. It contains four labeled fields: 'Device Address' with a text box containing '1', 'Baud Rate' with a dropdown menu showing '57600', 'Serial Port' with a dropdown menu showing 'COM2', and 'Protocol' with a dropdown menu showing 'Modbus RTU'. At the bottom are three buttons: 'Connect', 'Cancel', and 'Help'.

- This screen displays your **computer's** communications settings.
 - In the **Device Address** field, enter the current address of one of the I/O modules in the group. If you do not know the address, use the Stand Alone Locator utility (section 10.16).
 - In the **Baud Rate** field, enter a baud rate that **matches** the baud rate of the I/O(s)—57600 recommended. If you do not know the baud rate, use the Stand Alone Locator utility (section 10.16).
 - In the **Serial Port** field, enter the computer's communication port into which the RS-232 cable is inserted.
 - Leave the **Protocol** field set to Modbus RTU.
- Click Connect. Nexus Communicator searches for a module at the specified baud rate and address.
 - When it has located the I/O(s), the following screen appears (see NOTE below):

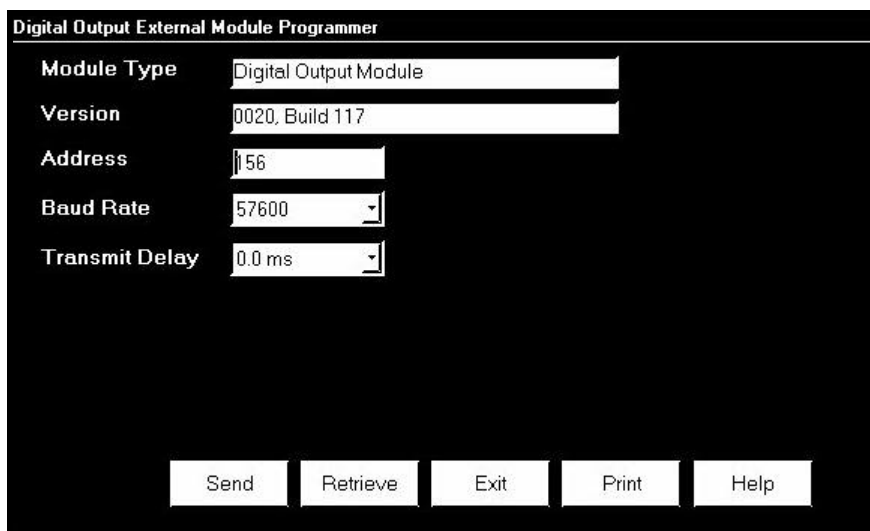


The 'Nexus Device Status - I/O MODULES' window displays a table titled 'List of Currently Connected Devices'. The table has columns for Device, Device Type, Boot, Run-time, DSP Boot, DSP Run-time, Comm State, DSP State, and On Time. It lists two devices: Device 1 (Digital Output Module) and Device 2 (4-20 mA Analog Out). Both are in a 'Healthy' communication state. At the bottom are 'OK' and 'Help' buttons.

Device	Device Type	Boot	Run-time	DSP Boot	DSP Run-time	Comm State	DSP State	On Time
Device 1	Digital Output Module	0020	117			Healthy		
Device 2	4-20 mA Analog Out	0014	106			Healthy		

NOTE: Nexus Communicator will find a group of I/Os, if they have been added together on the Connection Manager screen.

6. Click OK to close the status screen. From the I/O Devices menu, select Stand Alone Programmer. Nexus Communicator retrieves the current settings from the specified I/O and displays them in the Module Programmer screen. **The contents of this screen will vary, depending on the type of module in use. The example below shows the Digital Output Module Programmer screen.** See sections 10.8–10.12 for details on the specific programming functions of each module.



Digital Output External Module Programmer

Module Type	Digital Output Module
Version	0020, Build 117
Address	156
Baud Rate	57600
Transmit Delay	0.0 ms

Send Retrieve Exit Print Help

7. Make changes to this screen according to the needs of your application.
8. When you have finished configuring the address, baud rate and other programmable settings, click Send to send the new settings to the I/O module.
9. If you have connected a group of I/O modules to the computer, click Retrieve. At the prompt, enter the address of the next module you wish to program. Click OK; Nexus Communicator will retrieve the programmable settings of that device.
10. When you have finished with all programming, click Exit. **Be sure to enter any I/Os in the External Devices section of the Nexus Monitor's Device Profile when you connect them.** See section 10.7.

Chapter 11

Passwords

11.1: Overview

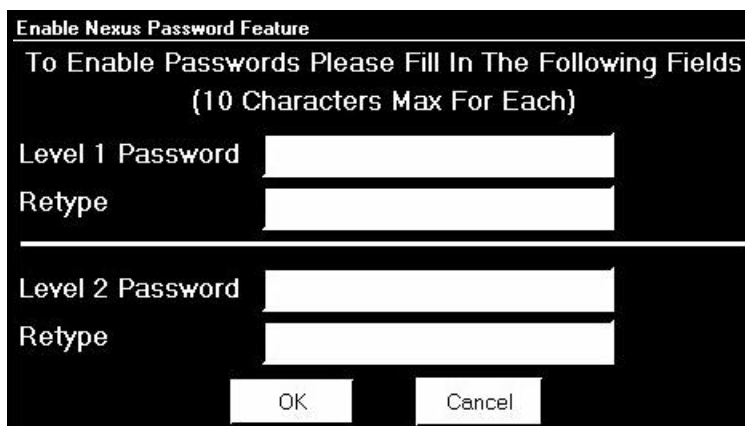
- ❖ **Note:** The use of the Password feature is recommended **ONLY** if there are security issues and **ONLY** if you have a secure place in which to save the password. If you have forgotten your meter password, you **cannot** call the factory for help. There is no “back door”. If you lose or forget your password, you must send the unit back to the factory to have the Flash RAM that stores the password replaced.

If you are not using this meter for primary revenue metering or for protective functions, you do not need to put a password protection scheme in the unit. If you do, make sure you archive the meter location and associated passwords carefully!

- Nexus Communicator’s password feature protects the following from unauthorized use:
 - Changes to the Nexus Monitor’s Device Profile
 - Setting Nexus Time
 - Resetting Nexus Information (Max/Min/Demand, Hour Counters, Logs and Time-of-Use)
 - Flash Upgrades
 - Pulse Test
 - Relay Control and I/O Utilities
 - Time-of-Use Accumulations and changes to the Time-of-Use calendar settings
- Password protection has **two** levels:
 - **Level 1** accesses Time-of-Use Accumulations only. These are billing functions.
 - **Level 2** accesses **all** password-protected functions (listed above). The Level 2 password also allows a user to enable or disable the password function.
- When the password feature is enabled, Nexus Communicator will ask for the appropriate password each time a user attempts to perform a protected operation.
- The password feature is on a **two-minute timer**: after exiting from a password-protected area, the user has two minutes to access another protected area **without** re-entering the password. If more than two-minutes elapse, Nexus Communicator will ask for the appropriate password. Use the Log On/Off feature (section 11.4) to renew password protection immediately.

11.2: Enabling Passwords

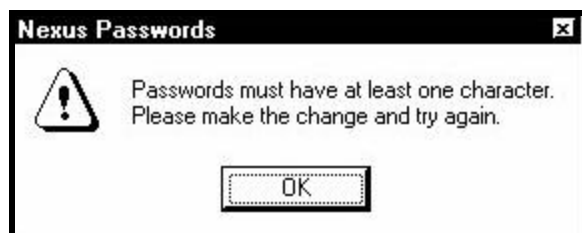
1. From the Tools Menu select Passwords, Enable/Disable:

The dialog box is titled "Enable Nexus Password Feature". Below the title, it says "To Enable Passwords Please Fill In The Following Fields (10 Characters Max For Each)". There are two sections for password entry. The first section is for "Level 1 Password" with a text input field and a "Retype" label next to another text input field. The second section is for "Level 2 Password" with a text input field and a "Retype" label next to another text input field. At the bottom, there are two buttons: "OK" and "Cancel".

2. Passwords may contain up to 10 characters and may include the digits 0–9 and/or the letters A–Z. Passwords are **not** case-sensitive.

- Enter a password for Level 1 and then retype it. The Level 1 password blocks a user access to the Poll Time-of-Use Registers screen **only** without a password.

- ❖ **Note:** If you enter only a Level 1 Password **or** Level 2 Password, retype it and click OK, the following screen will appear:



You **must enter passwords in both fields** for the system to accept any password.

- Enter a password for Level 2 and then retype it. The Level 2 password blocks a user access to **all** password-protected functions listed in section 10.1 without a password. **Only the Level 2 10password can disable the password feature.**
3. Click OK. A warning screen appears;



4. Click Yes.

5. The Password Status screen appears:



6. Click OK.

❖ **Note:** The password function is now enabled. The computer status bar at the bottom of the screen will read PW: Enabled. See section 11.4 for how to disable passwords.

11.3: Password Status

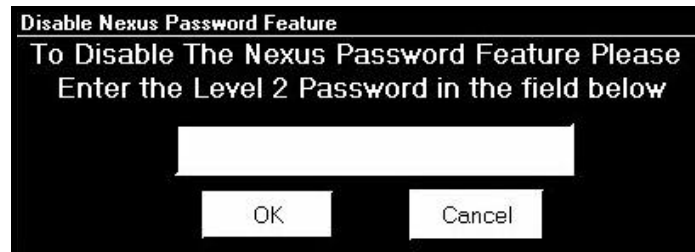
1. To confirm if the password protection feature is enabled or disabled, do either of the following:
 - From the Tools menu, select Passwords, Status. One of two screens will appear -- either the screen stating Password Protection Enabled or the screen stating Password Protection Disabled. Click OK.
 - Check the computer status bar at the bottom of the screen. If passwords are enabled, it will read “PW: Enabled”. If passwords are disabled, it will read “PW: Disabled.” (Access the computer status bar from the View menu).

Connected	COM 2	115200	Addr: 1	Feeder 1	Modbus RTU	PW: Disabled	01/12/2001
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11.4: Disabling Passwords

■ To disable the password function, you must use the Level 2 password.

1. From the Tools menu select Passwords, Enable/Disable Passwords. The following screen appears:



2. Enter the Level 2 password and click OK.

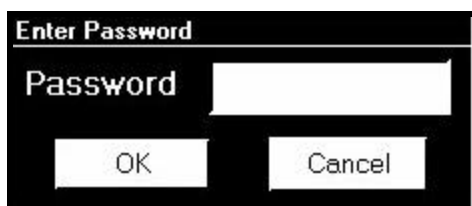


3. The password function is now disabled. The status bar at the bottom of your screen will now read: PW: Disabled.

11.5: Logging On and Off

- When passwords are enabled, you may Log On using **either** password level to gain access to protected areas. The two-minute timer described in section 11.1 will still run. Log Off to end your password session and renew password protection immediately (rather than wait for the two-minute timer to expire).

1. Enable Passwords.
2. Select Tools, Passwords, Log On.



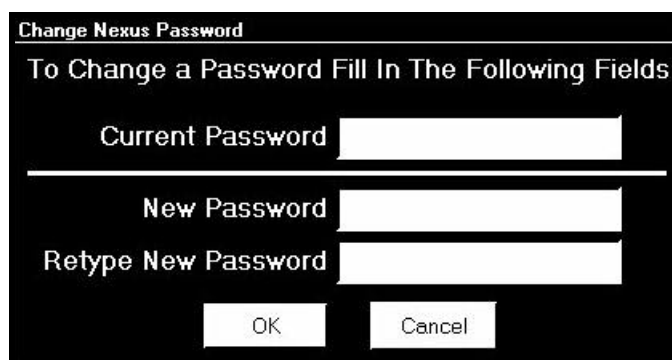
3. Enter a Level 1 or Level 2 password. Click OK.
4. To Log Off, select Tool, Passwords, Log Off. The status screen returns to remind you that password protection is still enabled.



5. Click OK.

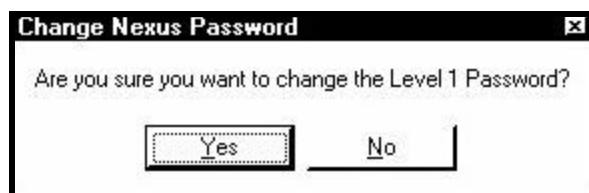
11.6: Changing Passwords

1. If you are going to use Passwords, it is a good idea to change them from time to time. From the Tools menu select Passwords, Change.



A dialog box titled "Change Nexus Password" with a subtitle "To Change a Password Fill In The Following Fields". It contains three text input fields: "Current Password", "New Password", and "Retype New Password". At the bottom are "OK" and "Cancel" buttons.

2. Enter the password you would like to change in the "Current Password" field. You may enter either the Level 1 or the Level 2 password.
3. Type the new password in the "New Password" field, and then retype it below. Click OK.
4. The following screen will appear: Click Yes.



A dialog box titled "Change Nexus Password" with a question "Are you sure you want to change the Level 1 Password?". It has "Yes" and "No" buttons.

- ❖ **Note:** If you forget to type in a new password before you click OK in the Change Nexus Password screen, the following screen will appear. The password has to have at least one character and not more than ten.



A dialog box titled "Nexus Communicator" with a message "The New Password is too small". It has an "OK" button.

5. Click OK. Type in new password, retype it, click OK, click Yes. You now have a new password.

Chapter 12

Modem Dial In / Dial Out Function

12.1: Overview

The Nexus with Internal Modem Option offers a series of screens on which you can set the parameters for Modem Dial In/Dial Out Function;

- Modem Dial Out Programming (12.3)**
- Dial In Programming (12.4)**
- Disable Email / Page Generation (12.5)**
- Modem Monitor (12.6)**
- Alarm Server (12.7)**

12.2: Connection

Install the modem connected to the computer (the "originate modem"). See the Nexus 1250 and 1270 Installation and Operation Manuals for details on hardware requirements.

- Set Baud Rate to 57600.
- Enable Hardware Flow Control.
- Plug phone line into Nexus; address will be 1.
- Click on the Connection Manager icon, or select Connection, Connection Manager.
 - The Connection Manager screen appears.
- Select "New Location" and click the Edit button.
 - The Location Editor screen appears.
- Click once on Location to which you want to connect your computer.
- Click Connect. The computer begins dialing.
 - When Nexus Communicator locates the Nexus Monitor at that location, the Device Status screen appears to confirm the connection.
 - The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.

NOTE: If the connection failed, check the following:

- That all cables are secure.
- That the RS-232 cable is connected to the correct Com Port on the PC.
- That the PC and the Nexus Monitor are using Modbus ASCII.

12.3: Modem Dial Out Programming

Modem Programming

Primary phone number settings

Number: 234-4301

Retry delay: 1 Minutes

Retry limit: 5 Attempts

Connection type: Computer

Secondary phone number settings

Number: 234-4302

Retry delay: 2 Minutes

Retry limit: 5 Attempts

Connection type: Computer

Communications settings

Activity timeout limit: 30 Minutes

Call delay timer limit: 5 Seconds

Callback type: Playback

Call failure reset limit: 3 Hours

Share the phone line: ☒

Modem settings

Rings to answer: 2 Rings

Identification: Evergreen Substation

Password: 7843211344

Enable password: ☒

Violation limit: 5 Attempts

Violation lockout time: 1 Hours

Dial out on the following conditions

☒ Limits status change ☒ CBEMA Power quality event ☐ Cycling of control power

☒ High speed input change ☒ Control output change ☒ Modem password failure

☒ Waveform record captured ☐ Filling of meter memory ☒ Failure of communication with Nexus

Log full limit threshold (All Logs): 80 %

OK Help

The Modem Programming screen helps you configure the Dial Out Profile. It has five sections and each is detailed below.

■ View

To view this screen, Connect with Nexus Communicator.
Select Edit Device Profile from the Tool Bar.
Select Communication Ports and click on one of the settings.
From the Device Profile Communications Settings screen, click on Dial Out Profile in the Internal Modem Settings section.

■ Primary Phone Number Settings

Number: The first phone number (up to 50 characters) called for automated callout.
Retry Delay: The number of minutes (1-1000) between retries.
Retry Limit: The user-set limit for retry attempts (0-1000).
Connection Type: Fixed on Computer.

■ Secondary Phone Number Settings

Number: The second phone number (up to 50 characters) for automated callout.

Retry Delay: The number of minutes (1-1000) between retries.

Retry Limit: The user-set limit for retry attempts (0-1000).

Connection Type: Fixed on Computer.

■ Communication Settings

Activity Timeout Limit: User-set value that is the number of minutes of inactivity (no communication activity) that is allowed on an open modem connection before the modem will terminate the connection (1-30 minutes).

Call Delay Timer Limit: User-set variable that defines the number of seconds the modem will wait before processing a callback event (0-240 seconds).
Applies to calls caused by Limit or Input Status conditions.

Callback Type: Two types of callback.

Playback: Modem waits 500ms after connection and will playback the Modem ID string displayed (if programmed) and reason for the call.

Standard: When performing a callback and connection is established, the modem waits to be queried from the PC it has called.

NOTE: User can override Playback Mode by turning Playback off. User will not be able to override the setting to Playback Mode if the Modem ID string is blank ("-----").

Call Failure Reset Limit: User-set value for the number of hours the modem will lock out incoming calls if the Incoming Connection Failure Limit is reached (1-50 hours).

Share the Phone Line: If checked, the modem will monitor phone line voltage during all calls. If the phone line voltage drops by more than 30% during a call (indicating that someone else has taken another phone off-hook) the modem will disconnect and return to normal polling operation.
If not checked, the modem will not watch for line voltage deviations.

■ Modem Settings

Rings to Answer: User-set value for the number of Rings (0-9) before the modem will go off-hook and attempt to answer an incoming call.

Zero = Never Answers. Ring is a Voltage Change.

Identification: Up to 32 Western Alphabet Characters (16 Asian Characters).

Password: Up to 10 alphanumeric characters (user-set) in addition to passwords that affect access to certain levels of the Nexus meter. If the password is not entered correctly, the modem asks the user to enter the password again up to three times and disconnects after the third incorrect attempt.

Enable Password: If checked, Password must be entered.

Violation Limit: User-set value for number of times the modem will allow unsuccessful connection attempts (unable to supply correct password in three attempts) before locking up to incoming calls (1-10). Modem will disconnect from the incoming call and will not accept incoming calls for a period of time equal to the Violation Lockout Time.

Violation Lockout Time: User-set time limit for the number of hours (1-32) modem will be inaccessible. The Violation Lockout provides a level of security against bad passwords.

■ Dial Out on the Following Conditions:

Limits Status Change
High Speed Input Change
Waveform Record Captured
CBEMA Power Quality Event
Control Output Change
Filling of Meter Memory
Cycling of Control Power
Modem Password Failure
Failure of Communication with Nexus

Log Full Limit Threshold (Covers All Logs): Percent that a log is full before a call is triggered.

12.4: Dial In Settings

The Nexus Dial In Settings screen is divided into 9 possible event or problem sections. Any one event/problem or a combination of event/problems can trigger a call.

Nexus Communicator Dial In Settings

Limits status change Retrieve: <input type="text" value="Nothing"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	High speed input change Retrieve: <input type="text" value="All logs"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager	Control output change Retrieve: <input type="text" value="PQ(CBEMA) log"/> <input type="checkbox"/> Reset all logs after retrieval <input checked="" type="checkbox"/> Generate email <input type="checkbox"/> Call pager
Waveform record capture Retrieve: <input type="text" value="All logs"/> <input type="checkbox"/> Reset all logs after retrieval <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager	CBEMA Power quality event Retrieve: <input type="text" value="PQ(CBEMA) log"/> <input type="checkbox"/> Reset all logs after retrieval <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager	Filling of log memory Retrieve: <input type="text" value="All logs"/> <input type="checkbox"/> Reset all logs after retrieval <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager
Cycling of control power <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager	Modem password failure <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager	Failure of communication with Nexus <input type="checkbox"/> Generate email <input type="checkbox"/> Call pager

Email and pager settings
Outgoing mail server: Sender: Pager ID #:
Reply address: Port number:

Recipients

Name	Mail address	Pager number	Filter(Double Click to Edit)
John Smith	jsmith@electricity.com	1-732-323-3444	0
Jim Jones	jjones@aol.com		0

User defined message

The settings on this screen tell the PC what to do when the Modem calls with one or more problems: Who to call, where and what message to send.

NOTE: The user must have installed Dial In Server software for the Dial In screens to work.

■ View

From the View menu on the Toolbar, Click Dial In Settings.

■ Settings

Events/Problems

Limits Status Change: Nexus contains up to 64 monitored limit conditions. One or more limit states had a change.

High Speed Input Change: One or more of the 8 High Speed Inputs had a change.

Control Output Change: When a control event occurs, an integer counter increments (range of 0-65,536).

Waveform Record Capture: A Waveform Record Capture was triggered in response to observed transient conditions. An integer counter increments each time a waveform record is captured (range of 0-65,536).

CBEMA Power Quality Event: Nexus captures CBEMA event records in response to observed transient conditions. The counter has a range of 0-65,536.

Filling of Log Memory: When any one log reaches or exceeds the user-set download level, the modem will call to report a log fill condition and perform an automated download of all stored data.

Cycling of Control Power: (1270 Only) If control power voltage is low, the modem will initiate a callback.

Modem Password Failure: When the Password Limit is reached, the modem will initiate a callback with no delay (because there is no opportunity for the condition to reset). If the phone line is available, the modem will attempt a reporting call. If the phone line is unavailable, the modem will continue polling.

Failure of Communication with Nexus: If Nexus fails to respond in the allotted time to the modem, the modem will initiate a callback with no delay (because there is no opportunity for the condition to reset). If the phone line is available, the modem will attempt a reporting call. If the phone line is unavailable, the modem will continue polling.

Event/Problem Settings

Retrieve: For those events that trigger log retrieval, six of the screens have pulldown menus to select logs to be retrieved.

Reset All Logs after Retrieval: Check those sections that apply. (NOTE: In order to use the Reset Function, you must select "All Logs" from the pull down menu next to the word Retrieve.

Generate Email: Send an email message to designated recipient.

Call Pager: Call designated recipient's pager number.

NOTE: Selecting "All Logs" from multiple events sections does not cause duplication in log retrieval.

■ Email and Pager Settings

Outgoing Mail Server: Enter name of Valid Email Server that does not require password and user name to send mail (POP3 type).

Sender: Nexus Communicator

Pager ID#: User-set numeric value used to identify this meter when a numeric page is issued (up to 5 digits, 00000 to 99999).

Reply Address: None or Email Address to let recipient know where to send replies.

Port Number: 25 is normal for email servers.

Test Email: Sends a Test Message to a recipient to test the email settings (uses email of the first recipient only).

Test Pager: Sends a Test Message to a recipient to test the paging (uses the number for first recipient only).

Recipients: List Name, Email Address and Pager Number.

Filter: Double-click and the Edit screen will appear. Click in front of message(s) you want to exclude from highlighted recipient.

Add: Click to Add a Recipient.

Remove: Click to Remove a Recipient.

User Defined Message: Type in message for highlighted recipient.

■ Buttons

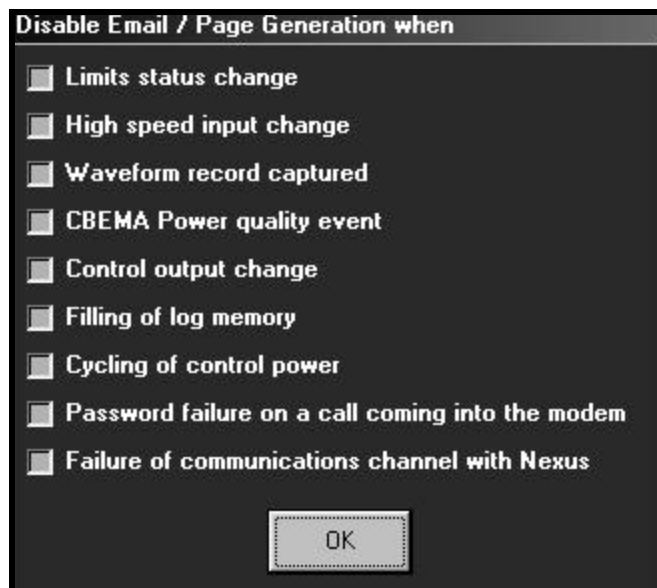
OK: To Save Settings and return to Nexus main screen.

Cancel: To Exit the screen without saving the settings.

Print: To Print the screen.

12.5: Filter Screen

The Filter Screen allows you to exclude a highlighted recipient from receiving one or more messages.



■ View

From the View menu on the Toolbar, click Dial In Settings.
The Dial In Settings screen will appear.
Double-click Filter and the Filter screen will appear.

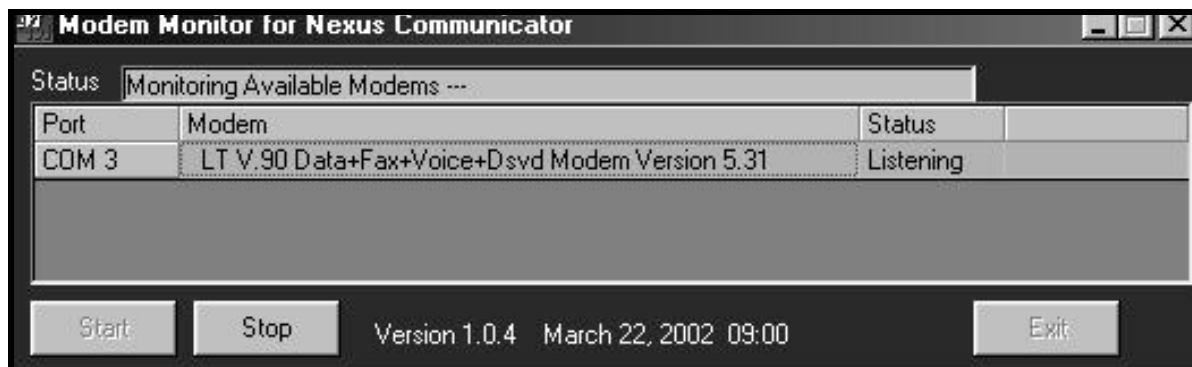
■ Operation

This screen disables email and/or page generation for one or more particular items to the high lighted recipient when one or more of the following items is checked:

- Limits Status Change
- High Speed Input Change
- Waveform Record Capture
- CBEMA Power Quality Event
- Control Output Change
- Filling of Log Memory
- Cycling of Control Power
- Password Failure on a Call Coming into the Modem
- Failure of Communications Channel with Nexus

12.6: Modem Monitor

The Modem Monitor, as the name implies, checks the PC for connected modems and monitors available modems for incoming calls. The Status line coaches you in setting up the modem and keeps you informed of the status of the available modems.



■ Start Up

To Start the Modem Monitor screen, click Start, Programs, Electro Industries, Modem Monitor icon. After the screen appears, press Start to allow the Modem Monitor to monitor available modems. After a search for modems, the software will continue to locate the modems that were found for a Call Back.

■ **Operation**

The main screen lists the available modems with the Ports to which they are connected and the Status. When an incoming call is detected, the Modem Monitor starts Nexus Communicator which answers the call and processes it.

■ **Command Line Switches**

/S: Autostart Modem Monitoring when program is started.

/M: Minimize program when started. Program will appear as icon in the system tray on your computer screen.

NOTE: When program is minimized, it appears as an icon in the system tray. Click on this icon to restore to normal size window.

■ **Example Command Line Switches**

Nexusmonitor.exe /S:

Nexusmonitor.exe /M:

Nexusmonitor.exe /S: /M:

NOTE: Spaces are required between the components.

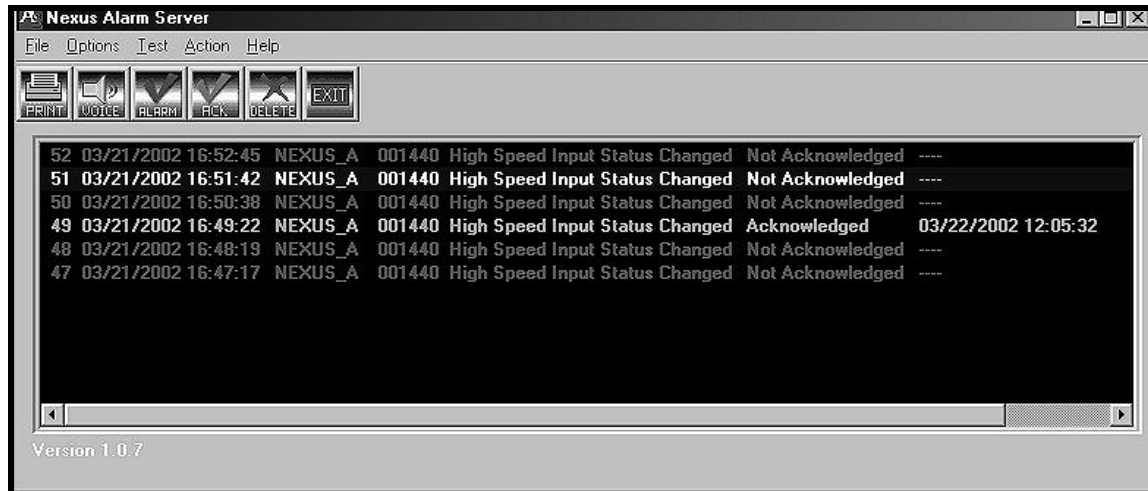
■ **Buttons**

Click Stop to disconnect the Modem Monitor.

Click Start to connect the Modem Monitor.

12.7: Nexus Alarm Server

Nexus Alarm Server lists on the main part of the screen all Call Back Events that have occurred. Data included with each event entry: Number of the Alarm on the list, Date, Time of the Call Back Event, Name of Modem, Type of Event/Problem, whether that Event has been acknowledged and the Time of the Acknowledgement.



■ Start Up

To Start the Nexus Alarm Server screen, click Start, Programs, Electro Industries, Nexus Alarm Server icon.

■ Tool Bar

File: Select one of the following

Export - Excel Compatible Values file.

Print - Print the contents of the box of events.

Exit - Exit the program.

Options:

Items

Insert to Top of the list of events.

Append to Bottom of the list of events.

Alarm - Enable or Disable Audio or Visual

Audio - Can replace with another 2 second sound file with the same name (alarm.wav in the directory where Nexus Communicator is installed).

Visual - Text box display

Test - Generate a Test Message.

Action

Silence Alarm - Turn Noisemaker and/or Alarm Message off (not mute).

Acknowledge Item - Red to Green color change.

Acknowledge All - Red to Green color change.

Remove All - Erase All Alarms.



Icons

Print: Click to select Setup Options.

Voice: Microsoft Speech Properties, if installed. (Windows® XP includes Speech Properties.)

(For Windows® 98, Millenium and 2000 Speech Properties can be installed.)

Alarm Silencer: To stop audio and/or visual alarm until next entry arrives.

Acknowledge Event

Delete Entry in Server Box

Exit

Chapter 13

EIG Script & Scheduler Program

Automated Data Retrieving and Processing

13.1: Overview

- EIG Script & Scheduler software program serves as a stand-alone module for the Communicator software package. The EIG Script & Scheduler program is Automated Data Retrieving and Processing software which automatically retrieves data from EIG Power Monitors.
- With this easy-to-use application, you can set up multiple scripts and schedules that command an EIG device to automatically execute scheduled scripts, retrieve stored data files from installed devices and manage batch log conversions. The data retrieved and converted by the Scheduler, as well as other retrieved data, is in Access format and can be viewed in the device Log Viewer.
- This is the main screen for the Scheduler. This one screen gives you an overview of the program by displaying the current active scripts and the current status and it provides the links to all the programming features in the sections at the bottom of the screen.

EIG Scheduler

Scheduler is running | Run/Stop

Active scripts

Schedule #	Script Name	Frequency	Next Run Time	Last Run Time
1	New script 1	Weekly, Day of week: Sunday, Time: 3:04:33 PM	9/9/2001 3:04:33 PM	
2	New script 3	Weekly, Day of week: Friday, Time: 3:06:25 PM	9/7/2001 3:06:25 PM	
3	New script 4	Daily, Time: 3:15:53 PM	9/5/2001 3:15:53 PM	9/4/2001 3:15:53 PM
4	New script 5	Monthly by date, Date: 1, Time: 3:50:53 PM	10/1/2001 3:50:53 PM	
5	New script 7	Daily, Time: 4:22:59 PM	9/5/2001 4:22:59 PM	9/4/2001 4:22:59 PM
6	New script 8	Weekly, Day of week: Sunday, Time: 3:51:53 PM	9/9/2001 3:51:53 PM	
7	New script 6	Daily, Time: 4:00:25 PM	9/5/2001 4:00:25 PM	9/4/2001 4:01:14 PM
8	New script 7	Daily, Time: 4:15:23 PM	9/5/2001 4:15:23 PM	9/4/2001 4:15:29 PM
9	New script 8	Daily, Time: 4:00:43 PM	9/5/2001 4:00:43 PM	9/4/2001 4:01:59 PM
10	New script 9	Daily, Time: 4:00:22 PM	9/5/2001 4:00:22 PM	9/4/2001 4:00:22 PM

Current status

3/4/2001 4:23:39 PM Log Converter Manager started
 3/4/2001 4:23:40 PM Log Converter Manager stopped
 3/4/2001 4:23:53 PM Scheduler stopped
 3/4/2001 4:24:10 PM Scheduler is running

SCRIPT | **SCHEDULE** | **STATUS** | **Help**

Add Script | Edit Script | View Log | Help
 Scripts | Delete Script | Clear status | Exit

- There are two supporting programs: Communicator software program and Log Converter program. After Communicator finishes retrieving a log or finishes a script, the Log Converter program automatically translates the binary logged data into a database file (Access format).

■ Features:

At the top of the screen, the Run/Stop button turns the Scheduler On and Off. To add scripts to the Scheduler or edit existing scripts, the Scheduler must be turned **OFF**. You can perform only one of the following tasks at a time; set up scripts, set up scheduler or run scheduler.

Active Scripts window displays the scripts that are currently running on the Scheduler. Using the buttons at the bottom of the screen, those scripts can be edited or deleted and new scripts can be added.

Current Status displays the Script & Scheduler operations.

■ Using the EIG Scheduler:

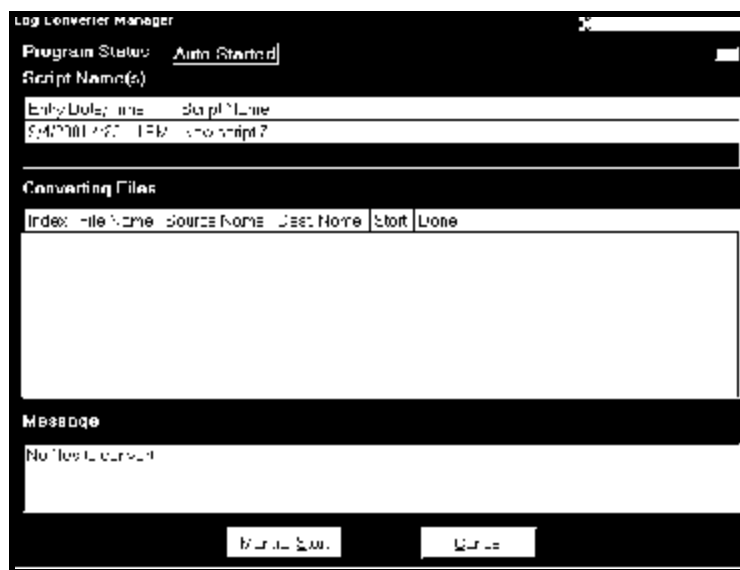
- A. Access the EIG Script & Scheduler program from Drive C:\ Program Files \ Electro Industries \ Communicator \ Script & Scheduler. Click on it. The main screen (above) will appear.
- B. There are four sections at the bottom of the screen: Script, Scheduler, Status and the Help/Exit section. The components in these sections enable the user to set up all the elements of the Script & Scheduler program and view the resulting logs. Step by step directions are given in the following sections and Help buttons are on each screen.
 - 1. **Set Up Script:** Create a new script, open an existing script or delete a script (sections 13.3 - 13.5); Set up Script Devices and Script Commands with buttons on the Set Up Script screen.
 - 1.a **Set Up Script Devices:** Add, edit or delete script devices (sections 13.6 - 13.8);
 - 1.b **Set Up Script Commands:** Add, edit or delete script commands (sections 13.9 - 13.12);
 - 2. **Set Up Scheduler:** Once a script is created, you must add it to the Scheduler. Add a script to the Scheduler, edit a script or delete a script from the Scheduler (sections 13.13 - 13.15);
 - 3. **Status:** View the Scheduler Log and clear Current status (section 13.16);
 - 4. **Exit:** Exit from the program (section 13.17). Help Files appear on each page.
- C. **Appendix A** lists the **Component Files** of the EIG Script & Scheduler program with each file's location in your system.

13.2: Operational Overview

The user creates the scripts with the software, adding devices and commands, and sets up the Scheduler. Once this is accomplished, the Scheduler runs automatically, executing the script with the oldest scheduled run time first.

When the script is run by the Scheduler, small windows appear on your PC to advise you that the script is running and data switch strings (if needed) and commands are being sent. A new scheduled run time is calculated. If the Frequency Type is “Once”, this script will be removed from the Scheduler immediately. Any failures to connect or complete commands will be noted in the Scheduler log (see **Process Log** below). A multiple page Script Report will be generated when a user selects a script from the list box and clicks the **Report** button.

After Communicator finishes the script, the Scheduler starts the Log Converter Manager to convert the binary logs to Microsoft Access format. The Scheduler automatically launches the Log Converter program which converts the log files one at a time to a database file after a download has succeeded.



After the Log Converter Manager finishes its conversion, the Scheduler can resume its process and run the next script with the oldest run time. If there are no files to convert, the screen will appear as above.

- ❖ **Note on Log Converter:** The log converter’s purpose is to convert the binary data accumulated from the EIG device into the ODBC compliant (Access) database for later retrieval. This is done automatically within the software.
- ❖ **Note on Devices:** The EIG Script & Scheduler can be used with many EIG devices, including Nexus 1250 and 1270, SM1-16 (Substation Multiplexor) and Futura+.

The Scheduler Log can be viewed by clicking View Log on the main Scheduler screen. The script logs produced by the Scheduler can be found in Drive:\ Program Files\ Electro Industries\ Communicator\ Retrieve\ Logs. The files produced by the Log Converter program can be accessed in Drive:\ Program Files\ Electro Industries\ Communicator in a default sub-directory.

EIG Script and Scheduler has a new **Process Log**, which is in Html format and carries the .Html extension. The Process Log consists of three top level files that work together to signal an error and provide links to detailed script logs and detailed log converter logs. Following are the files that make up the Process Log:

NexusSchedulerLog - Main.Html: Software generated top layer file with frame set linked to NexusSchedulerLog - Detail.Html and NexusSchedulerRun-TimeLog.Html.

NexusSchedulerLog - Detail.Html: Software generated blank frame file.

NexusSchedulerRun-TimeLog.Html: Software generated schedule process log with hypertext link to detailed script logs and detailed Log Converter logs.

If any type of error occurs during the execution of a scheduled script, NexusSchedulerRun-Time Log.Html will have an entry in red with the appropriate hypertext link to its detailed logs. The **Reset Alarm** button will also create a visual alarm (red background color) and a continuous beep (until the user clears it), if an error occurs. To clear the contents of a current Nexus SchedulerRun-TimeLog.Html file, the user deletes that file from its location.

NOTE: It is strongly recommended that the user back up that file before deleting it.

- **For a list of all the component files of the EIG Script & Scheduler Program and their default locations, see Appendix A (section 13.18).**
- **Default locations can be changed but, you must also change the associated programs so they know where to find the files.**
- **To change default locations:**

EIG Communicator: View, Options

- **Scheduler Auto Run and Hide on Windows Start-up:**

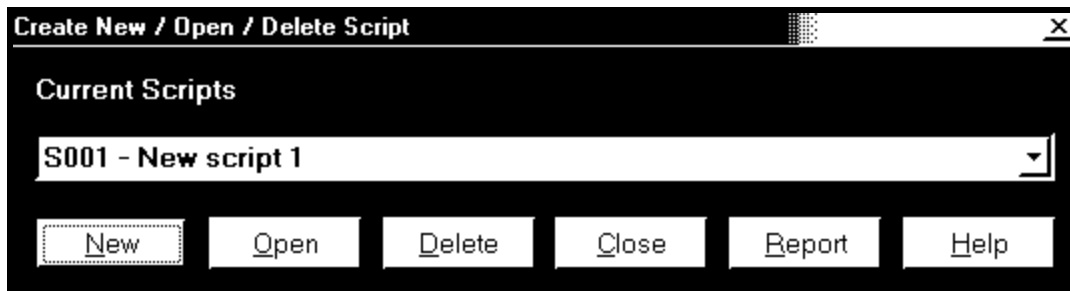
The Scheduler runs automatically whenever Windows starts up, if desired. The program will hide the main screen and add an icon to the system tray (lower right hand corner of your screen) and will run unattended. To open the main screen, click on the icon in the system tray. The following are the procedures to set up Auto Run and/or Hide:

1. Create a shortcut for this program and place it in the Windows' Startup folder.
2. Add the following to the command line: /auto /hide.

After the Windows operating system has restarted, this program will automatically start.

13.3: Scripts

- This application will enable you to set up as many as 300 independent scripts. Each script tells the software to make a connection to a particular EIG device and retrieve data from that device. By making selections from the windows on the script screens, you can easily create scripts that automatically retrieve the data you need. This screen is a window to the other script screens.
- ❖ **Note:** Each single script can be used to retrieve data from multiple EIG monitors. You need to assign one script for each telephone number.
- The pull down menu lists all the scripts that have been created and are currently in use with the number the Scheduler assigns to it. If you currently have no scripts, a screen will appear that shows “New Script 1” in the window. “#” is not a valid character for a script name.



- To create a new script, click New. The Set Up Script screen will appear (see section 13.5). After the new script is created, Scheduler will add it to the pull-down menu.
- To edit an existing script, use the pull-down menu to select a script. Click on the script name. Click Open. The Set Up Script screen will appear (see section 13.5). Make desired changes.
- To delete an existing script, use the pull-down menu to select a script. Click on the script name. Click Delete. A Warning window will appear which asks, "Are you sure you want to delete this script?" Click Yes or No.
- To exit either screen and return to the main screen, click Close.
- To generate a multiple page Script Report, select a script from the pull-down menu and click the Report button. An example of a Script Report appears in the next section.

13.4: Script Report

EIG Script Report - New script 1

New script 1

EIG Script Report

General Settings

Item	Property
Name	New script 1
Index	1
Connection Type	Direct - Single COM Port
Number of Retries	2
Log Conversion	Starts when script is finished
COM Port	COM1
Baud Rate	3500
Flow Control	None
Data Bits	8
Parity	None

Device Settings

ID	Address	Type	Name	Connection	Protocol	PW-1	PW-2	
1	1	\EXLS	Device 1	COM For.	Modbus ASCII	Not set	Not set	
2	1	\EXLS	Device 2	COM For.	Modbus ASCII	Not set	Not set	
3	1	\EXLS	Device 3	COM For.	Modbus ASCII	Not set	Not set	

Print pages 1 To 1 Page 1 of 1
Zoom 100%

Print
Save
Cancel
Help

- The Script Report provides a detail of a particular script. For scripts that have many devices and/or many commands, the report may be quite lengthy.

■ Features:

Print: To print all or part of the report, type the page numbers and click on Print.

Save: To save the report to a particular file, click on Save.

Cancel: To exit the report and return to the main screen, click Cancel.

Scroll Bar: To move from page to page in the report, click the Back or Forward Arrows.

Zoom: Use the pull-down menu to select from a variety of magnifications (from Thumbnail to 400%). The screen capture above shows a **Zoom of 100%**.

13.5: Set Up a Script

- In the Script Name window, type in a name for the script. Each script must have a unique name. If the script is not named, a default name is assigned by the software. Most users assign the name of the substation where the device is located as the name. (# is not a valid character for a script.)
- To select a Connection Type, use the pull-down menu to select either Remote - Dial Up or Direct - Single COM Port. The Script Connection Properties are disabled until you enter this selection. If the script connection type is not set, the EIG Communicator program will treat it as an empty script.
- From the pull-down menu, select the Number of Retries (the number of times the software will try to connect) from 0 to 5. In some situations, connecting lines are shared by other programs or telephones. The retries enable the software to try to connect more than once (over a period of a few seconds). If the retries fail, the log will automatically note the date, time and script name for which the connection was not completed. The script will fail.

Setup Script

Script Name: New script 1

Connection Type: Please select your connection type

Number of Retries: 0

☒ Start Log Converter after this script is finished

Script Connection Properties - Disabled

Comm Port: COM1

Baud Rate: 9600

Flow Control: None

Data Bits: 8

Parity: None

Buttons: Devices, Commands, Close, Help

- Connection Type: Direct - Single COM Port

Using the pull-down menus, enter the following selections:

Comm Port	Select from Com 1 to Com 99. (See note below).
Baud Rate	Select 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200.
Flow Control	Select None or Hardware.
Data Bits	Select 7 or 8.
Parity	Select None, Even or Odd.

■ Connection Type: Remote - Dial Up

Two additional screens will appear. Enter the following selections:

Phone Number	Type in Phone Number.
Setup String	Type in Data Strings, if needed.

■ New Connection Type: **Ethernet**.

■ To add, edit or delete devices, click Devices button.

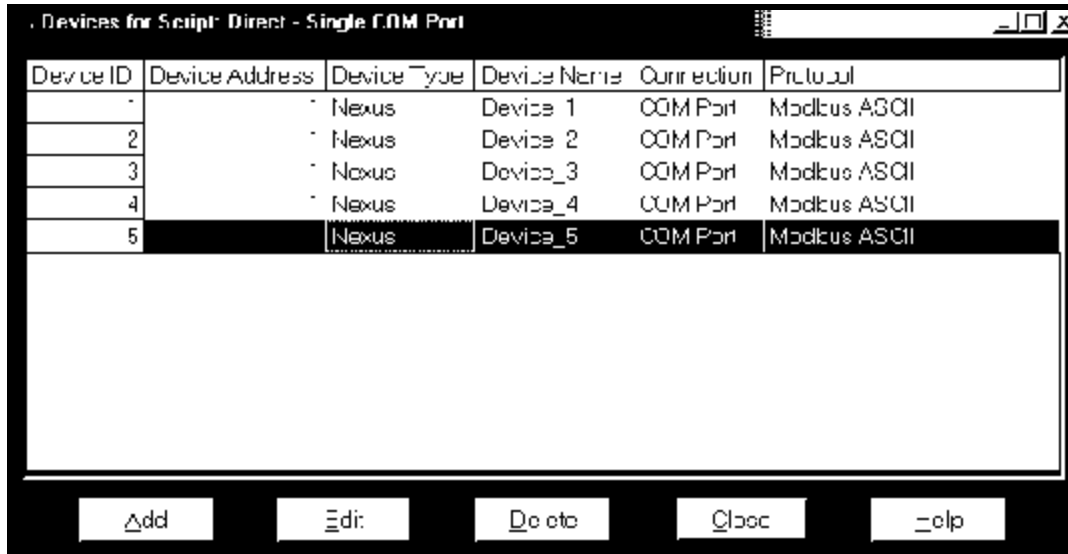
■ To add, edit or delete commands, click Commands button.

■ To exit the screen and return to the main screen, click Close.

❖ **Note on choosing a port:** The script opens and closes a PC communication port, creates a log and creates a database for the script. When you run the Scheduler, if the port your script is using is already open (i.e. being used by a different program), the script's command will fail.

13.6: Devices

- This screen lists the current devices for a particular script. Columns shown include: the device's number or identification, the device's unique address, the device type and the device's unique name.



Device ID	Device Address	Device Type	Device Name	Connection	Protocol
1		Nexus	Device_1	COM Port	Modbus ASCII
2		Nexus	Device_2	COM Port	Modbus ASCII
3		Nexus	Device_3	COM Port	Modbus ASCII
4		Nexus	Device_4	COM Port	Modbus ASCII
5		Nexus	Device_5	COM Port	Modbus ASCII

Buttons: Add, Edit, Delete, Close, Help

- You can enter up to 256 devices for each script. The Add, Edit and Delete buttons on this screen facilitate the adding of new devices and the editing and deleting of current devices.
- You **must** set up an address, protocol, device type and a unique name for each device. Optional settings for each device are passwords for a Nexus-type device and data switch strings for EIG's Substation Multiplexor. When the EIG Communicator retrieves a log from an EIG device and it does not have a predefined name, it will use the device name assigned here as the file name for the retrieved log file. If you already named your device, you do not have to assign it a name in this section. We recommend that you keep both names the same.
- To add a device, click Add. The Edit Script Device screen will appear.
- To edit a device, select a device from the list by clicking on it. Then, click Edit. The Edit Script Device screen will appear.
- To delete a device, select a device from the list by clicking on it. Then, click Delete. A window will appear that asks, "Are you sure you want to delete this device?" Click Yes or No.
- If you Click Edit or Delete before you select a device, a window will appear that says, "Please select a device." Click OK. Select a device and follow the above steps.
- Click Close to return to the Set Up Script screen.

13.7: Adding a Script Device

- This screen facilitates the adding of new devices to a particular script. You can enter up to 256 devices for each script. For editing of devices, see section 13.8.

The screenshot shows a software window titled "Add Script Device". It contains the following fields and sections:

- Script Connection type:** Direct Single COM Port
- Connection type for this device:** COM Port
- Device Name:** Device 8
- Device Information:**
 - Address:** [Empty text box]
 - Protocol:** Modbus RTU (selected from a dropdown menu)
 - Type:** Nexus (selected from a dropdown menu)
- Password:**
 - Level 1:** [Empty text box]
 - Level 2:** [Empty text box]
- Data Switch Strings:**
 - Connect:** [Empty text box]
 - Disconnect:** [Empty text box]

At the bottom of the window are three buttons: "<<", "<=>", and ">=>".

- You **must** set up an address, protocol, device type and a unique name for each device. Optional settings for each device are passwords for a Nexus-type device and data switch strings for EIG's Substation Multiplexor. When the EIG Communicator retrieves a log from an EIG device and it does not have a predefined name, it will use the device name assigned here as the file name for the retrieved log. If you have a name already designated in the Nexus, the device name shown here will not be used. **Note:** The Futura Device will use the name shown here.

■ Add a Nexus Device

Type in a unique Device Name.

Under Device Information, type in a unique Address.

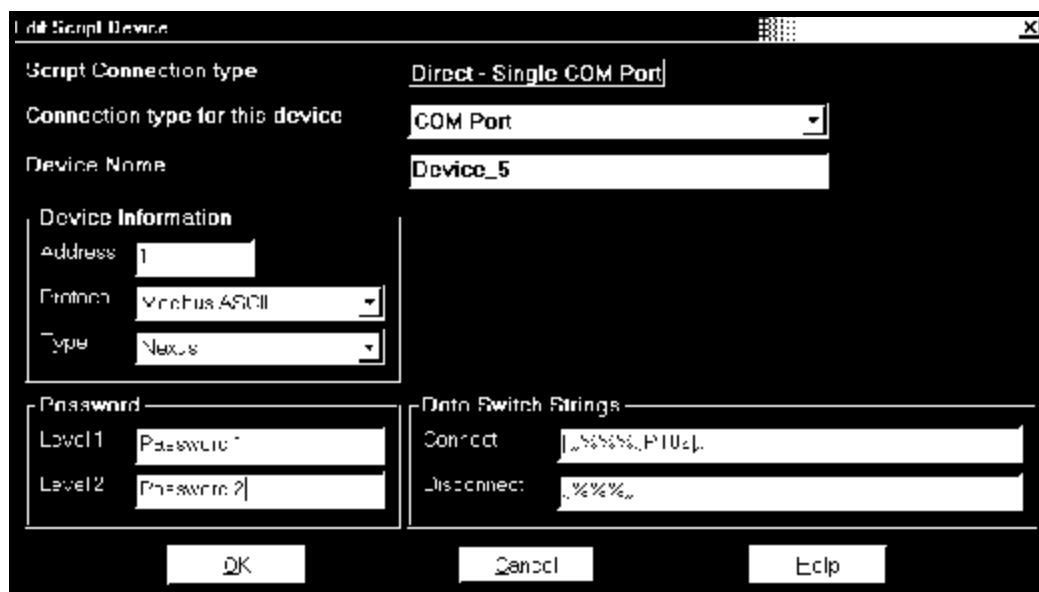
To select a protocol, use the pull-down menu. Select Modbus RTU, Modbus ASCII or Modbus TCP EI Protocol.

To select a Type (of device), use the pull-down menu. Click your selection.

Add Level 1 Password and/or Level 2 Password, if desired. (Not required.)

- ❖ **Note:** The device you choose will determine what data is required for this screen. When you add a device, passwords are not required. Also, Data Switch Strings will probably not be necessary. Data Switch Strings tell EIG Communicator how to connect to and disconnect when a data switch is present. It already knows how to connect to a single device.

❖ **Note:** For Help with hardware connections for the Substation Multiplexor, please refer to *EIG's SM1-16 (Substation Multiplexor) User Manual*.



- You **must** set up an address, protocol, device type and a unique name for each device. Optional settings for each device are passwords for a Nexus-type device and data switch strings for EIG's Substation Multiplexor. When the Communicator retrieves a log from a device and it does not have a predefined name, it will use the device name assigned here as the file name for the retrieved log.

■ Add a Data Switch (Substation Multiplexor) or Multiple Devices

Type in a unique Device Name.

Under Device Information, type in a unique Address.

To select a protocol, use the pull-down menu. Select Modbus RTU or Modbus ASCII.

To select a Type (of device), use the pull-down menu. Click your selection.

Add Level 1 Password and/or Level 2 Password, if desired. (Not required.)

Type in Data Switch Strings to Connect and to Disconnect, if needed.

- ❖ **Note:** You can enter up to 255 characters for each data switch string. Special characters are “&” for line feed and “\r” for carriage return.

■ Sample data switch strings:

a) Connect string via SM1-16 (Electro Industries' Data Switch)

Format: <CR><CR>,,% % %,,PT02<CR>,,

Actual string: ||,,% % %,,PT02|,,

b) Switch a connection via SM1-16

Format: <CR><CR>,,% % %,,,PT02<CR>,,<CR>,,% % %,,,PT01<CR>,,<CR>

Actual string: ||,,% % %,,,PT02|,,|,,% % %,,,PT01|,,|

c) Disconnect string

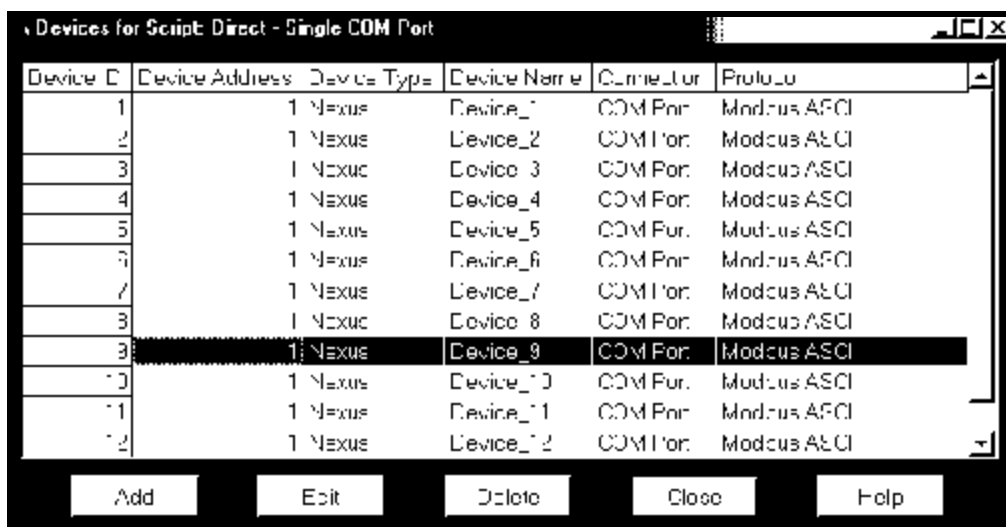
Format: ,,% % %,,

Actual string: ,,% % %,,

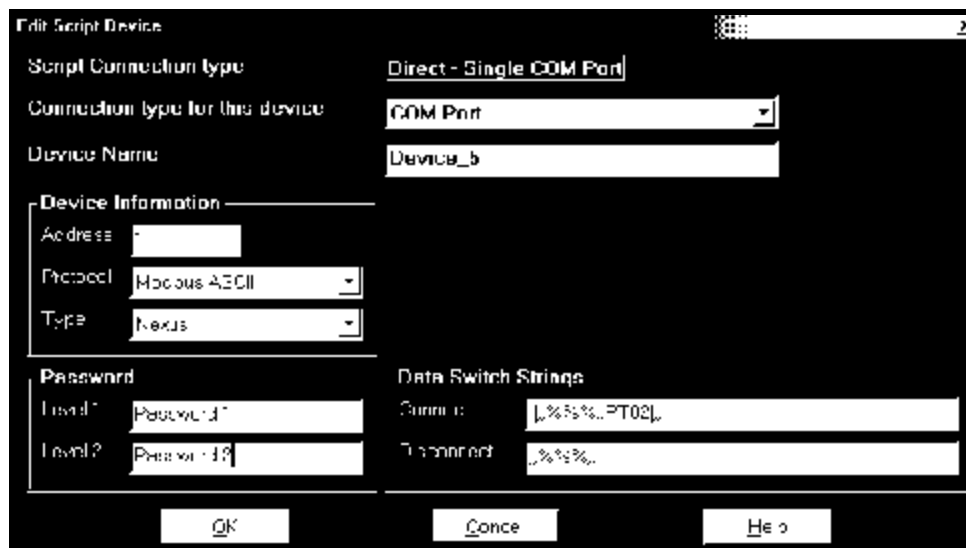
❖ **Note:** For further Help with setting data switch strings, please refer to *EIG's SM1-16 (Substation Multiplexor) User Manual*.

■ Click OK or Cancel to return to the Devices for Scripts screen.

13.8: Editing a Script Device



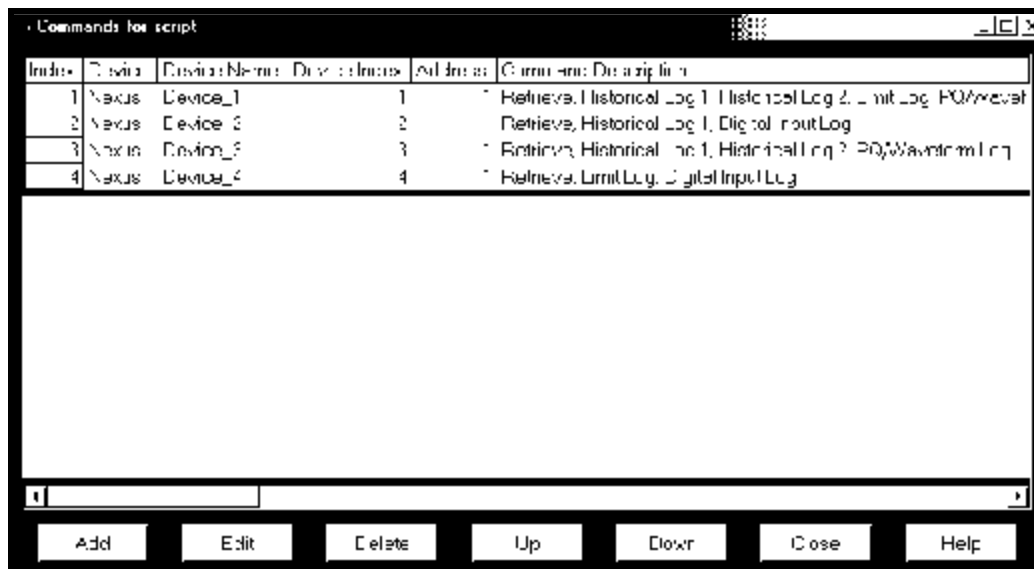
- Select a device that you would like to edit, by clicking on it. The Edit Script Device screen will appear. If you click Edit before you select a device, a window will appear that reminds you to “Please select a device.”



- Using the windows available, select or deselect the item(s) you would like to change.
- Edit the items.
- Click OK.

13.9: Script Commands

- This screen lists all the current commands for a particular script. You can enter up to 1000 commands for each script and each command is assigned to a selected device for that script. Each device is listed by Index Number, Type, Name and Address and the Command Description follows the device information.
- You cannot set up multiple retrieve commands for a single device. But, you can have up to 256 devices for each script.



- The sequence of the commands listed on the screen must be valid. To move a command record to a different sequence, click on the command, then click the Up or Down buttons to move it. The new sequence will be saved to the database when the window is closed.

Note: If the sequence is not correct, you may clear the device's log before retrieving it.

- To add a command, click Add. The Edit Script Command screen will appear.
- To edit a command, select a command by clicking on it. Click Edit. The Edit Script Command screen will appear.
- To delete a command, select a command by clicking on it. Click Delete. A Warning window will appear which asks, "Are you sure you want to delete this command?" Click Yes or No.
- To exit the screen, click Close.

13.10: Add a Script Command

- This screen enables you to add or edit a script command. This section will discuss adding a script, Section 13.10 will discuss editing a script command.

Name	String
1 System data switch string	, %%%%, P10z

■ Add a script command

Use the pull-down menu to select a Device. The device you choose in this window will determine the choices available for the other screens:

Use the pull-down menu to select the Number of Retries (from 0 to 5). This is the number of times the software will attempt to connect.

Use the pull-down menu to select a Primary Command.

Type in or click to select the Secondary Command(s).

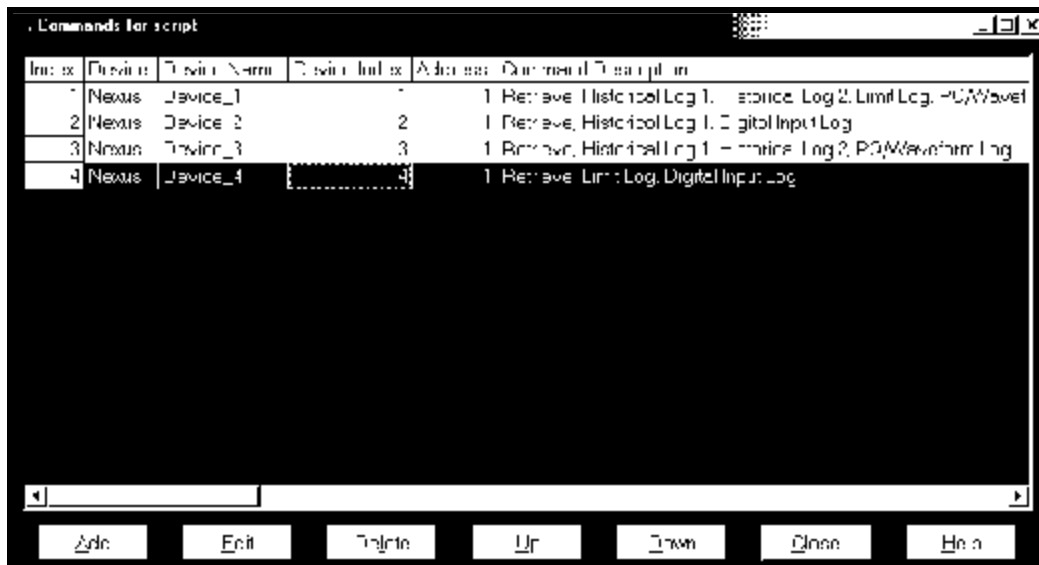
When you add a Nexus Device, the Primary Command will be "Retrieve" and the Secondary Commands will be a selection of logs.

Click OK.

■ Add a Futura+ Device script command

If you have a Futura+ Device connected to the EIG Script & Scheduler, the above screen will appear slightly different. The process is the same as for a Nexus device.

13.11: Edit a Script Command



- Select a command that you would like to edit, by clicking on it. If you click the Edit button before you select a command to edit, a window will appear to remind you to select a command.

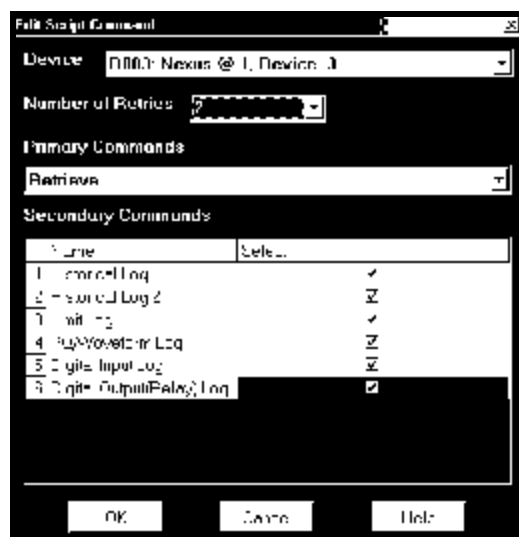
- Click OK. Select a command.

- Click Edit. The command you choose will determine the screen that appears



- **Edit a Nexus script command**

If you selected a Nexus script command to edit, the following window will appear:



When you edit a Nexus device, the Primary Command will be “Retrieve” and the Secondary Commands will be a selection of logs. Using the windows available, select or deselect the item(s) you would like to change. Make the change(s).

Click OK.

■ Editing a Data Switch or System Device Command

If you select a Data Switch or System Device Command to edit, the following screen will appear:

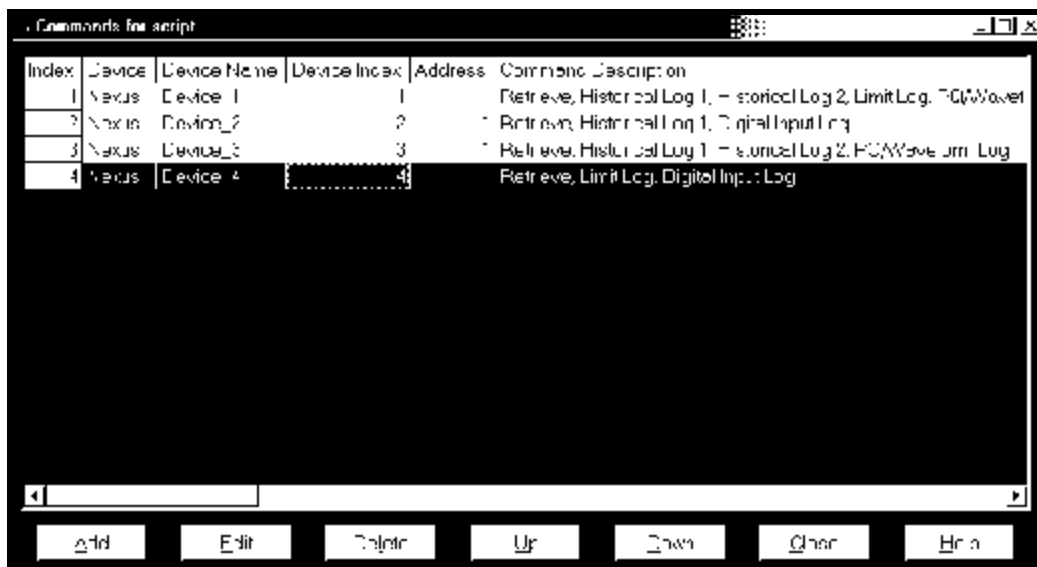
The screenshot shows a dialog box titled "Edit Script Command". It has a "Device" dropdown menu set to "0000: System Device". Below it is a "Number of Retries" dropdown set to "2". The "Primary Commands" section contains a text field with "Send switch string". The "Secondary Commands" section contains a list with one item: "1 - System Data Switch String" followed by the string "||.\\%\\%..P102". At the bottom of the dialog, there is a tooltip that says "Use \\r for line feed, \\n for carriage return". At the very bottom are three buttons: "OK", "Cancel", and "Help".

If you edit a Data Switch or System Device Command, the Primary Command will be "Send Switch String" and the Secondary Commands will request a System Data Switch String. A tool-tip screen will display special characters to be used in the Data Switch Strings: “&” = line feed, “|” = carriage return. Select or deselect to make changes. Click OK.

■ Editing a Futura+ Device Command

If you have a Futura+ Device connected to the EIG Script & Scheduler, the above screen will appear slightly different. The editing process is the same as for a Nexus device.

13.12: Delete a Script Command



- Select a command you would like to delete by clicking on it.

- Select a command. Click the Delete button.

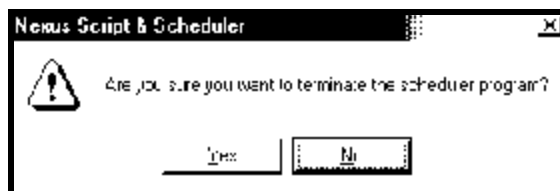
A warning window will appear.

- Click Yes or No.



- Click Close to return to the main script screen.

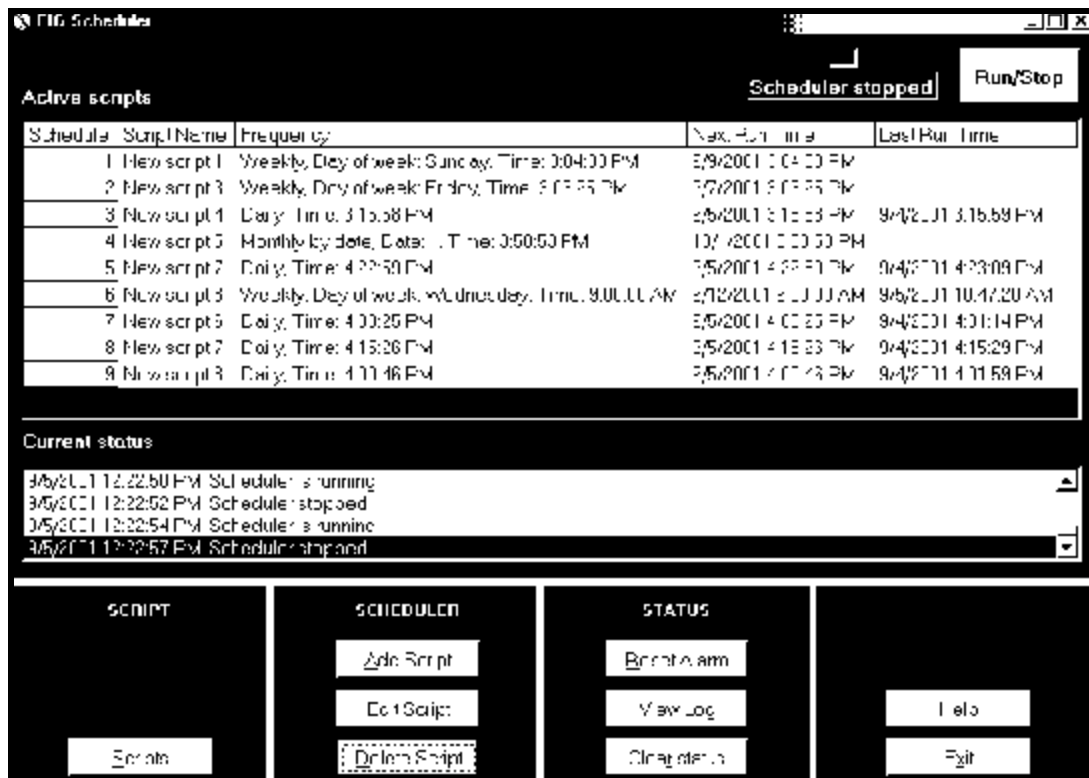
A warning window will appear. Click Yes or No to return to the Set Up Script screen.



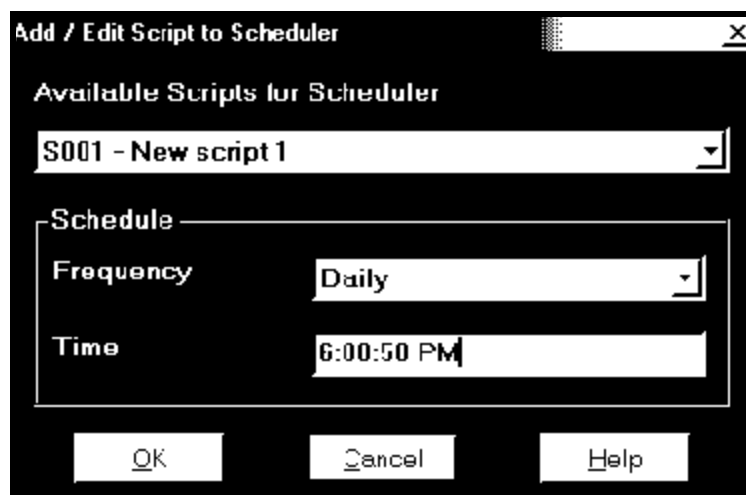
- Click Close to return to the main Scheduler screen.

13.13: Add Scripts to the Scheduler

- Once you have created the scripts, they have to be added to the Scheduler. From there, the Scheduler sends the scripts to the Nexus Communicator to be executed. It is at this stage that you set the time and interval for the automatic data retrieval. First, Stop the Scheduler.



- On the main Scheduler screen, click the Add Script in the Scheduler section of the screen. The following screen will appear:



- To add a script to the Scheduler, select an Available Script from the pull-down menu. By changing the Frequency, you can create additional versions of the script and add the updated version(s) to the Scheduler.

- In the Schedule section of the screen, use the pull-down menu to select the desired **Frequency**.

Select from: Yearly, Once, Interval, Daily, Weekly, Monthly by Date, Monthly by Day or Last Day of the Month.

- **Based on the desired frequency**, the screen will change to offer the following selections: Month, Date, Day and/or Time (if appropriate). Following are sample windows of those that will appear:

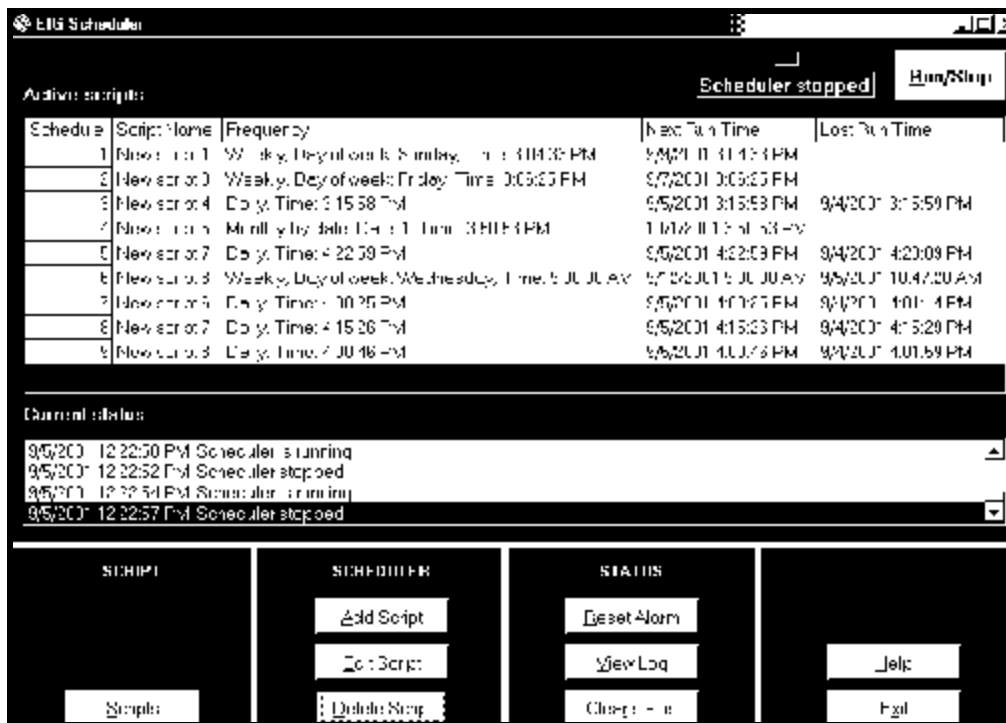
- Use the pull-down menus to make selections.

- Type in desired time.

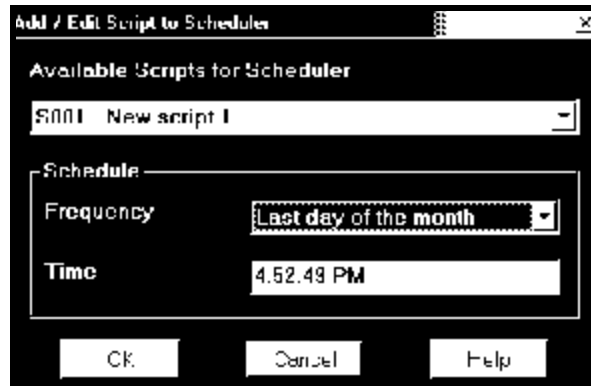
- Click OK to add to the Scheduler. Or, click Cancel.

- If you click OK, the new scripts will immediately be added to the Scheduler and you will return to the main Scheduler screen. Repeat steps to add additional scripts to the Scheduler.

13.14: Edit Scheduler Scripts

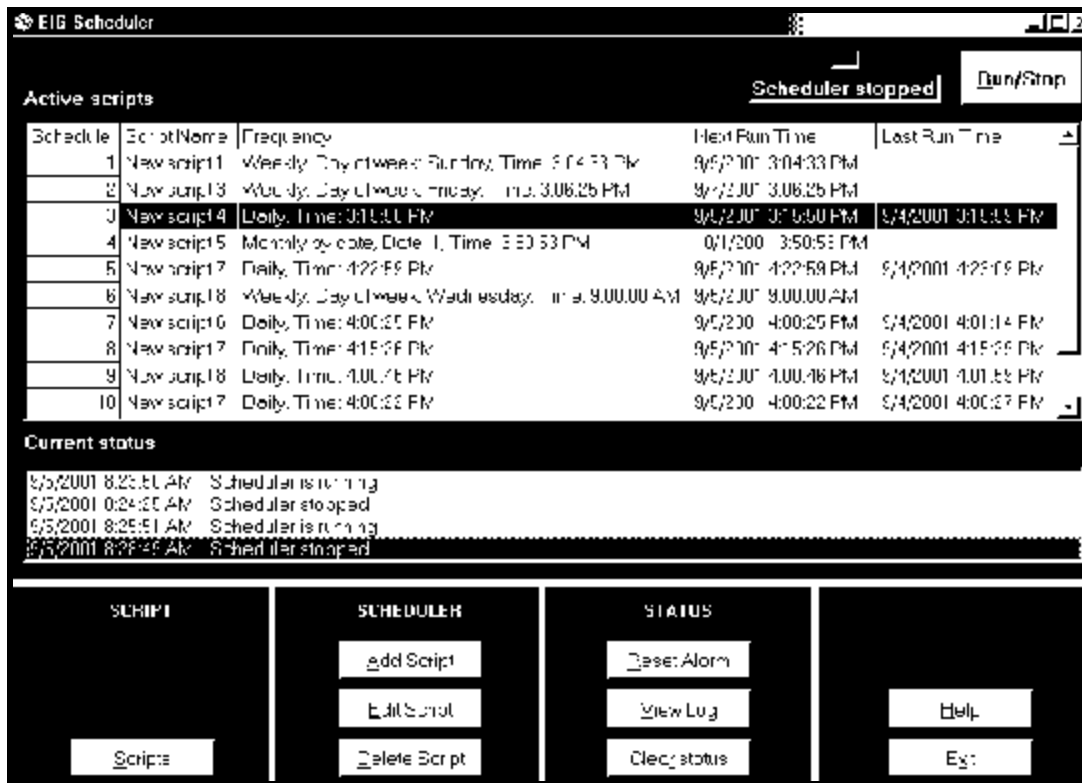


- To edit a script currently running on the Scheduler, first **Stop the Scheduler**.
- Next, select a script from the Active Scripts window.
- Click Edit Script. One of the Add/Edit Script to Scheduler screens will appear, the one that is appropriate for the **Frequency** of the selected script. (Refer to section 13.12 to see a sampling of Add/Edit Script to Scheduler screens.) Below is the screen for the selected script in the illustration above:

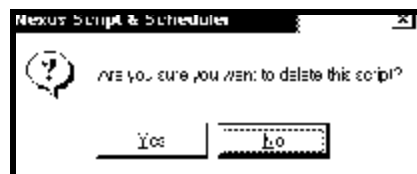


- To change the frequency, click the pull-down menu for Frequency and make a selection. If you change the frequency, the screen will change to offer the appropriate selections (Refer to section 13.12 to see a sampling of Add/Edit Script to Scheduler screens).
- Using the available pull-down menus, make selection(s).
- Type in the time, if you want it to change.
- Click OK to add to the Scheduler. Or, click Cancel.

13.15: Delete Scheduler Scripts



- To delete a script that is currently running on the Scheduler, first **Stop the Scheduler**.
- Next, select a script from the Active Scripts window by clicking on it.
- Click Delete Script. A Warning window will appear: Click Yes.



- The script will be deleted immediately from the Active Scripts window and you will return to the main Scheduler screen.

13.16: Status

Active scripts

Script no	Script Name	Frequency	Next Run Time	Last Run Time
1	New script 1	Weekly, Day of week: Sunday, Time: 3:04:33 PM	9/9/2001 3:04:33 PM	
2	New script 2	Weekly, Day of week: Friday, Time: 3:03:25 PM	9/7/2001 3:03:25 PM	
3	New script 4	Daily, Time: 3:15:57 PM	9/5/2001 3:15:57 PM	9/4/2001 3:15:59 PM
4	New script 5	Monthly by date, Date: 1, Time: 3:50:53 PM	10/1/2001 3:50:53 PM	
5	New script 7	Daily, Time: 4:22:59 PM	9/5/2001 4:22:59 PM	9/4/2001 4:23:09 PM
6	New script 8	Weekly, Day of week: Wednesday, Time: 9:00:00 AM	9/12/2001 9:00:00 AM	9/5/2001 10:47:20 AM
7	New script 6	Daily, Time: 4:00:25 PM	9/5/2001 4:00:25 PM	9/4/2001 4:01:14 PM
8	New script 7	Daily, Time: 4:15:29 PM	9/5/2001 4:15:29 PM	9/4/2001 4:15:29 PM
9	New script 6	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:59 PM

Current status

9/5/2001 12:22:50 PM Scheduler is running
 9/5/2001 12:22:52 PM Scheduler stopped
 9/5/2001 12:22:54 PM Scheduler is running
 9/5/2001 12:22:57 PM Scheduler stopped

SCRIPT

Scripts

SCHEDULER

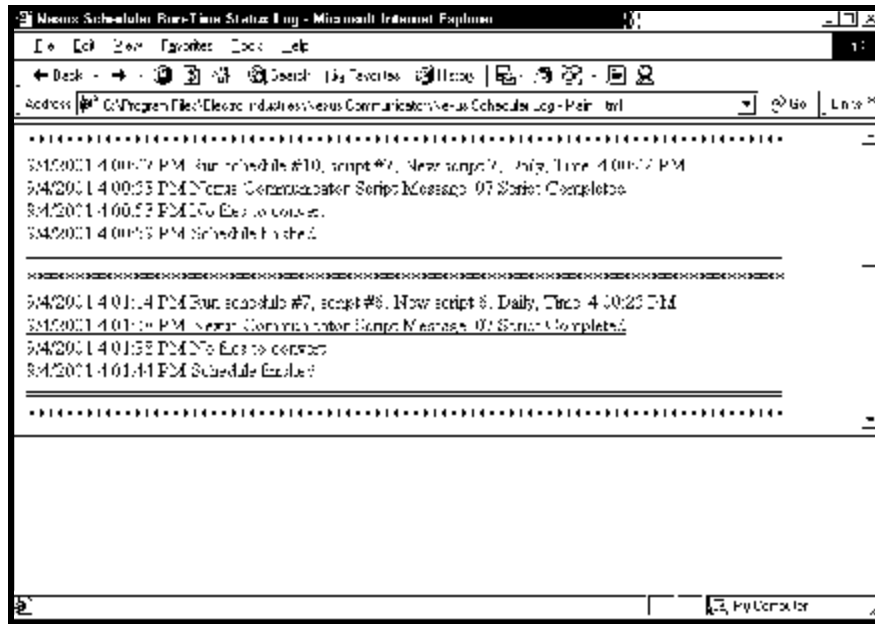
Add Script
 Edit Script
 Delete Script

STATUS

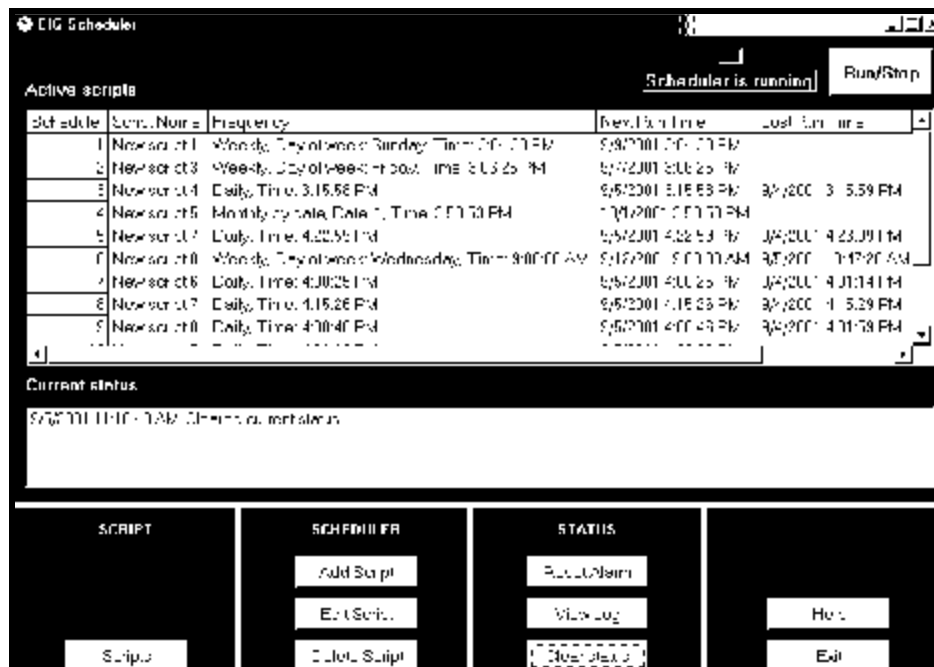
Reset Alarm
 View Log
 Clear status

Hold
 Exit

- The Current Status window on the Scheduler screen displays entries in the Nexus Scheduler Log. It shows the date, time in minutes and seconds and the status or action performed. The Nexus Scheduler Log records all the activities for the Nexus Script & Scheduler program.
- To view the entire Scheduler Log, click the View Log button. The following screen will appear:



- Scroll down to find a particular date, time or action.
- To clear the Current Status window, click the Clear Status button. The screen will be cleared as follows:

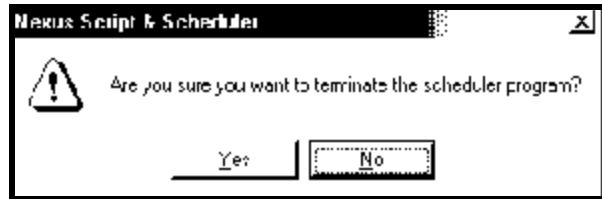


❖ **Note:** Individual logs for each script can be found by the name of the script in Drive C:\ Program Files \ Electro Industries \ Communicator \ Script Logs.

13.17: Exit

How to Exit

- The best way to Exit the EIG Script & Scheduler software program is to **click the Exit button** on the main Scheduler screen.
- **First, you must Stop the Scheduler.** If you are on a screen other than the main Scheduler screen, click the Close button until you return to the main Scheduler screen.
- Click Close.
- Click Exit.
- A Warning window will appear:
- Click Yes to Exit.
- Click No to remain on the screen.



- ❖ **Note:** You can also Minimize the program, if you want the Scheduler to continue to run but not appear on your PC, by clicking the Minimize button in the upper right hand corner of the screen. The icon will appear at the bottom of your screen. To restore the Scheduler to view on your screen, click the icon at the bottom of your screen.

Appendix A

EIG Script & Scheduler Component Files

- The EIG Script & Scheduler software program is a stand-alone module for the Communicator software package. There are two supporting programs; the Communicator program and the Log Converter program. Below is a list of the component files that complete this software program with a brief description of each and their location in your system.

1. Nexus Script & Scheduler.Exe

Nexus' script and scheduler software program.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator

2. Nexus Communicator.Exe

Nexus Communicator software program.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator

3. Log Converter.Exe

EIG's log converter program. After the Nexus Communicator finishes retrieving a log or finishes executing a script, the Log Converter program translates the binary log into a database file (Access format).

Location: Drive C:\ Program Files \ Electro Industries \ Log Viewer

4. Nexus Scheduler.Log

Nexus Script & Scheduler program generated log file (Text format). It records all activities of the Nexus Script & Scheduler program.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator

5. [script name].Html (New format) [script name].Log (Old format)

Nexus Communicator generated log file (Text format). It records all activities when the Nexus Communicator runs a script. Each log file is for a specific script only. Future activities for the same script will be appended to the same log file.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator \ Script Logs

6. [Log_yyyy_mm].Html (New format) [Log_yyyy_mm].Txt (Old format)

Log Converter generated log. It records the activity of the Log Converter program. The yyyy and mm in the file name are for the year and month when the Log Converter runs.

Location: Drive C:\ Program Files \ Electro Industries \ Log Viewer \ Converter Activity Logs

7. Nexus_Script_Schedule.Template

Template database file for Nexus Script & Scheduler program and Nexus Communicator program in Access 97 format.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator

8. Nexus_Script_Schedule.DB

Run time database file for Nexus Script & Scheduler program and Nexus Communicator program. Generated by Nexus Script & Scheduler program, it holds the scripts and scheduler information.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator \ Scripts

9. NexusScriptDLFiles.Template

Template database file for Nexus Communicator and Nexus Script & Scheduler program in Access 97 format.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator

10. NexusScriptDLFiles.DB

Run time database for the Nexus Communicator and Nexus Script & Scheduler program.

Generated by Nexus Communicator program, it holds the retrieved log files' locations and the addresses for the converted logs. If all processes are done, the Nexus Script & Scheduler program will delete this file.

Location: Drive C:\ Program Files \ Electro Industries \ Nexus Communicator \ Scripts

11. NexusSchedulerLog - Main.Html

Software generated top layer file with frame set linked to Nexus Scheduler Log - Detail.Html and Nexus Scheduler Run-Time Log.Html.

12. NexusSchedulerLog - Detail.Html

Software generated blank frame file.

13. NexusSchedulerRun-TimeLog.Html

Software generated schedule process log with hypertext link to detailed script logs and detailed Log Converter logs.

Appendix B

Transformer Loss Compensation

B.1: Introduction

- The Edison Electric Institute's *Handbook for Electricity Metering, Ninth Edition* defines Loss Compensation as:
A means for correcting the reading of a meter when the metering point and point of service are physically separated, resulting in measurable losses including I²R losses in conductors and transformers and iron-core losses. These losses may be added to or subtracted from the meter registration.
- Loss compensation may be used in any instance where the physical location of the meter does not match the electrical location where change of ownership occurs. Most often this appears when meters are connected on the low voltage side of power transformers when the actual ownership change occurs on the high side of the transformer. This condition is shown pictorially in Figure B.1.

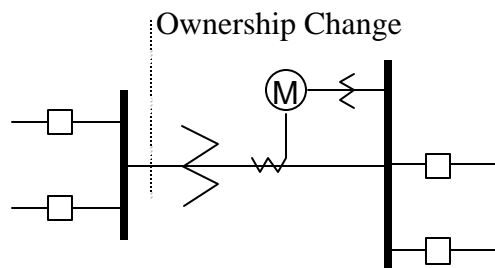


Figure B.1: Low Voltage Metering Installation Requiring Loss Compensation

- It is generally less expensive to install metering equipment on the low voltage side of a transformer and in some conditions other limitations may also impose the requirement of low-side metering even though the actual ownership change occurs on the high-voltage side.
- The need for loss compensated metering may also exist when the ownership changes several miles along a transmission line where it is simply impractical to install metering equipment. Ownership may change at the midway point of a transmission line where there are no substation facilities. In this case, power metering must again be compensated. This condition is shown in Figure B.2.

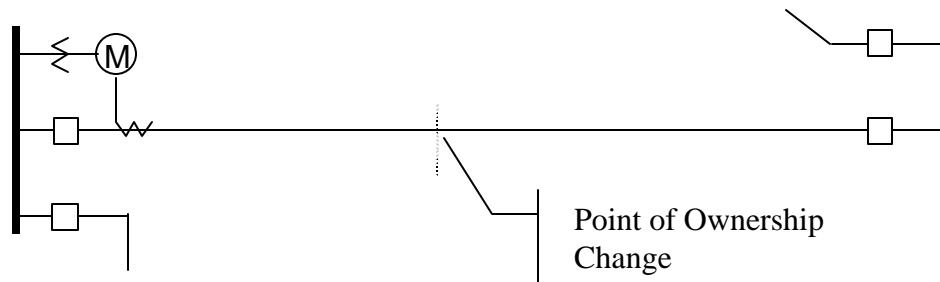


Figure B.2: Joint Ownership Line Metering Requiring Loss Compensation

- A single meter cannot measure the losses in a transformer or transmission line directly. It can however, include computational corrections to calculate the losses and add or subtract those losses to the power flow measured at the meter location. This is the method used for loss compensation in the Nexus meter.
- The computational corrections used for transformer and transmission line loss compensation are similar. Generically, no-load losses and full-load losses are evaluated and a correction factor for each loss level is calculated. However, the calculation of the correction factors that must be programmed into the meter differ for the two different applications. For this reason, the two methodologies will be treated separately in this chapter.
- In the Nexus meter, Loss Compensation is a technique that computationally accounts for active and reactive power losses. The meter calculations are based on the formulas below. These equations describe the amount of active (Watts) and reactive (VARs) power lost due to both iron and copper effects (reflected to the secondary of the instrument transformers).

Total Secondary Watt Loss =

$$(((\text{Measured Voltage}/\text{Cal point Voltage})^2 \times \% \text{LWFE}) + ((\text{Measured Current}/\text{Cal Point Current})^2 \times \% \text{LWCU})) \times \text{Full-scale Secondary VA}$$

Total Secondary VAR Loss =

$$(((\text{Measured Voltage}/\text{Cal point Voltage})^4 \times \% \text{LVFE}) + ((\text{Measured Current}/\text{Cal Point Current})^2 \times \% \text{LVCU})) \times \text{Full-scale Secondary VA}$$

- The Values for %LWFE, %LWCU, %LVFE, %LVCU are derived from the transformer and meter information, as demonstrated in following sections.
- The calculated loss compensation values are added to or subtracted from the measured Watts and VARs. The selection of adding or subtracting losses is made through the meter profile when programming the meter. The meter uses the combination of the add/subtract setting and the directional definition of power flow (also in the profile) to determine how to handle the losses. Losses will be "added to" or "subtracted from" (depending on whether add or subtract is selected) the Received Power flow. For example, if losses are set to "Add to" and received power equals 2000 kW and losses are equal to 20kW then the total metered value with loss compensation would be 2020 kW; for these same settings if the meter measured 2000 kW of delivered power the total metered value with loss compensation would be 1980 kW.
- Since transformer loss compensation is the more common loss compensation method, the meter has been designed for this application. Line loss compensation is calculated in the meter using the same terms but the percent values are calculated by a different methodology as described in a subsequent section below.
- Nexus Transformer Loss Compensation:
 - Performs calculations on each phase of the meter for every measurement taken. Unbalanced loads are accurately handled.
 - Calculates numerically, eliminating the environmental affects that cause inaccuracies in electromechanical compensators.

- Performs Bi-directional Loss Compensation.
 - Requires no additional wiring; the compensation occurs internally.
 - Imposes no additional electrical burden when performing Loss Compensation.
- Loss Compensation is applied to 1 second per phase Watt/VAR readings and, because of that, affects all subsequent readings based on 1 second per phase Watt/VAR readings. This method results in loss compensation be applied to the following quantities:
- Total Power.
 - Demands, per phase and Total (Thermal, Block (Fixed) Window, Rolling (Sliding) Window and Predictive Window).
 - Maximum and Minimum Demands.
 - Energy Accumulations.
 - KYZ Output of Energy Accumulations.

NOTE: Loss Compensation is disabled when the meter is placed in Test Mode.

B.2: Nexus Transformer Loss Compensation

- The Nexus meter provides compensation for active and reactive power quantities by performing the numerical calculations using factors derived in two ways; using the TLC Calculator button on the Transformer Loss screen of the Nexus Profile or using the worksheet found in section B.2.1, (Calculating Transformer Loss Compensation Percentages Work Sheet). Enter the derived values in the Device Profile screen of the Nexus Communicator software.
- The Nexus Communicator software allows you to enable Transformer Loss Compensation for Losses due to Copper and Iron, individually or simultaneously. Losses can either be added to or subtracted from measured readings.
- Loss compensation values must be calculated based on the meter installation. As a result transformer loss values must be normalized to the meter by converting the base voltage and current and taking into account the number of elements used in the metering installation. For three element meters, the installation must be normalized to the phase-to-neutral voltage and the phase current; in two element meters the installation must be normalized to the phase-to-phase voltage and the phase current. This process is described in the following sections.

B.2.1: Loss Compensation in Three Element Installations

- Loss compensation is based on the loss and impedance values provided on the transformer manufacturer's test report. A typical test report will include at least the following information:
- Manufacturer
 - Unit Serial Number
 - Transformer MVA Rating (Self-Cooled)
 - Test Voltage
 - No Load Loss Watts
 - Load Loss Watts (or Full Load Loss Watts)
 - % Exciting Current @ 100% voltage
 - % Impedance

- The transformer MVA rating is generally the lowest MVA rating (the self-cooled or OA rating) of the transformer winding. The test voltage is generally the nominal voltage of the secondary or low voltage winding. For three phase transformers these values will typically be the three-phase rating and the phase-to-phase voltage. All of the test measurements are based on these two numbers. Part of the process of calculating the loss compensation percentages is converting the transformer loss values based on the transformer ratings to the base used by the meter.
- Correct calculation of loss compensation also requires knowledge of the meter installation. In order to calculate the loss compensation settings you will need the following information regarding the meter and the installation:
 - Number of meter elements
 - Potential Transformer Ratio (PTR)
 - Current Transformer Ratio (CTR)
 - Meter Base Voltage
 - Meter Base Current
- This section is limited to application of Nexus meters to three-element metering installations. As a result, we know that:
 - Number of metering elements = 3
 - Meter Base Voltage = 120 Volts
 - Meter Base Current = 5 amps
- The loss compensation values can be calculated in two ways:
 - Click the TLC Calculator button on the Transformer Loss screen of the Nexus Device Profile. The TLC Calculator button activates an Excel Spreadsheet, ONLY if you have MS Excel installed on your computer. A copy of the Excel Spreadsheet with Example Numbers is included at the end of this Appendix.
 1. Enter the required data into the Excel Spreadsheet. The Excel program will calculate the values needed for the Transformer Loss screen of the Device Profile.
 2. Enter the values into the Device Profile.
 - Use the worksheet found in section B.2.1.1, “Three Element Loss Compensation Worksheet” to calculate the values by hand. Notes under each section will assist you.
 1. Enter values based on the transformer manufacturer’s test report. The worksheet is progressive and notes under each section will guide you to the next section.
 2. Enter the values into the Device Profile.

NOTE: See sections 3.8 (Nexus 1250) and 4.8 (Nexus 1270) for more details.

B.2.1.1: Three Element Loss Compensation Worksheet

(Use MS Excel Worksheet discussed in sections 3.8 and 4.8 if you have Excel installed on your PC.)

Company		Station Name	
Date		Trf Bank No.	
Trf Manf		Trf Serial No.	
Calculation by			

■ Transformer Data (from Transformer Manufacturer's Test Sheet)

Winding	Voltage	MVA	Connection
HV - High			Δ - Y
Xv - Low			Δ - Y
YV - Tertiary			Δ - Y

Value	Watts Loss		
	3-Phase	1-Phase	1-Phase kW
No-Load Loss			
Load Loss			

Enter 3-Phase or 1-Phase values. If 3-Phase values are entered, calculate 1-Phase values by dividing 3-Phase values by three. Convert 1-Phase Loss Watts to 1-Phase kW by dividing 1-Phase Loss Watts by 1000.

Value	3-Phase MVA	1-Phase MVA	1-Phase kVA
Self-Cooled Rating			

Enter 3-Phase or 1-Phase values. If 3-Phase values are entered, calculate 1-Phase values by dividing 3-Phase values by three. Convert 1-Phase Self-Cooled MVA to 1-Phase kVA by multiplying by 1000.

% Exciting Current	
% Impedance	

Value	Phase-to-Phase	Phase-to-Neutral
Test Voltage (volts)		
Full Load Current (Amps)		

Test Voltage is generally Phase-to-Phase for three-phase transformers. Calculate Phase-to-Neutral Voltage by dividing Phase-to-Phase Voltage by $\sqrt{3}$. Calculate Full Load Current by dividing the (1-Phase kW Self-Cooled Rating) by the (Phase-to-Neutral Voltage) and multiplying by 1000.

■ Meter/Installation Data

Instrument Transformers	Numerator	Denominator	Multiplier
Potential Transformer			
Current Transformer			
Power Multiplier [(PT Multiplier) times (CT Multiplier)]			

Enter the Numerator and Denominator for each instrument transformer. For example, a PT with a ratio of 7200/120 has a numerator or 7200, a denominator or 120 and a multiplier of 60 (7200/120 = 60/1).

Meter Secondary Voltage (volts)	120
Meter Secondary Current (amps)	5

■ Base Conversion Factors

Quantity	Transformer	Multiplier	Trf IT Sec	Meter Base	Meter/Trf
Voltage				120	
Current				5	

For Transformer Voltage, enter the Phase-to-Neutral value of Test Voltage previously calculated. For Transformer Current, enter the Full-Load Current previously calculated. For Multipliers, enter the PT and CT multipliers previously calculated.

TrfIT Secondary is the Base Value of Voltage and Current at the Instrument Transformer Secondary of the Power Transformer. These numbers are obtained by dividing the Transformer Voltage and Current by their respective Multipliers. The Meter/Trf values for Voltage and Current are obtained by dividing the Meter Base values by the TrfIT Secondary values.

■ Load Loss at Transformer

No-Load Loss Watts (kW) = 1-Phase kW No-Load Loss = _____

No-Load Loss VA (kVA) = (%Exciting Current) * (1-Phase kVA Self-Cooled Rating) / 100

= (_____) * (_____) / 100

= _____ kVA

No-Load Loss VAR (kVAR) = SQRT((No-Load Loss kVA)² - (No-Load Loss kW)²)

= SQRT((_____)² - (_____)²)

= SQRT((_____) - (_____))

= SQRT (_____)

= _____

Full-Load Loss Watts (kW) = 1-Phase Kw Load Loss = _____

Full-Load Loss VA (kVA) = (%Impedance) * (1-Phase kVA Self-Cooled Rating) / 100
 = (_____) * (_____) / 100
 = _____ kVA

Full-Load Loss VAR (kVAR) = SQRT((Full-Load Loss kVA)² - (Full-Load Loss kW)²)
 = SQRT((_____)² - (_____)²)
 = SQRT((_____) - (_____))
 = SQRT (_____)
 = _____

■ Normalize Losses to Meter Base

Quantity	Value at Trf Base	M/T Factor	M/T Factor Value	Exp	M/T Factor w/ Exp	Value at Meter Base
No-Load Loss kW		V		^2		
No-Load Loss kVAR		V		^4		
Load Loss kW		I		^2		
Load Loss kVAR		I		^2		

Enter Value at Transformer Base for each quantity from calculations above. Enter Meter/Trf Factor value from Base Conversion Factor calculations above. Calculate M/T Factor with Exponent by raising the M/T Factor to the power indicated in the “Exp” (or Exponent) column. Calculate the “Value at Meter Base” by multiplying the (M/T Factor w/ Exp) times the (Value at Trf Base).

■ Loss Watts Percentage Values

Meter Base kVA = 600 * (PT Multiplier) * (CT Multiplier) / 1000
 = 600 * (_____) * (_____) / 1000
 = _____

■ Calculate Load Loss Values

Quantity	Value at Meter Base	Meter Base kVA	% Loss at Meter Base	Quantity
No-Load Loss kW				% Loss Watts FE
No-Load Loss kVAR				% Loss VARs FE
Load Loss kW				% Loss Watts CU
Load Loss kVAR				% Loss VARs CU

Enter “Value at Meter Base” from Normalize Losses section. Enter “Meter Base kVA” from previous calculation. Calculate “% Loss at Meter Base” by dividing (Value at Meter Base) by (Meter Base kVA) **and multiplying by 100.**

Enter calculated % Loss Watts values into Nexus meter using Communicator software.

B.2.1.2: MS Excel Spreadsheet with Example Numbers

- If you have MS Excel installed in your computer, use the TLC Calculator button on the Transformer Loss screen of the Device Profile. A copy of the MS Excel Spreadsheet with Example Numbers on the following pages will assist you.

Appendix C

Nexus Communicator Command Line Arguments

Version 1.06

Current 02-02-2002

■ Script Command Line Methods

/s

- Example 1: Nexus Communicator /s1234 (/s Script ID Number)

■ Citect Command Line Methods

/c

Make sure a space appears between parameters.

- **Example 1:**

Nexus with address 2 on network with IP address 135.15.173.79 using Modbus TCP
Start on device status screen

Nexus Communicator /c cm:1 ad:2 pr:3 ip:135.15.173.12 np:502

- **Example 2:**

Nexus with address 2 at remote location with Phone Number 555-545-5110 using Modbus ASCII
Start on device status screen

Nexus Communicator /c cm:0 ad:2 pr:1 cp:3 BR:3 um:1 pn:555-545-5110

cm: Connect Mode
0 Serial Port
1 Network

If left out of command line, Serial Port assumed.

ad: Address
1 - 247

If left out of command line, Address 1 assumed.

nm: Network Mode
0 One IP Address for n Devices

If left out of command line, 0 assumed.

pr: Protocol
0 Modbus RTU
1 Modbus ASCII
2 DNP 3.0 (Not Supported)
3 Modbus TCP
4 EI Protocol

If left out of command line, Modbus RTU assumed.

ip: IP Address or Host Name
xxx.xxx.xxx.xxx or 1 - 16 Alphanumeric characters with no spaces.

If left out, error assumed.

np: Network Port
502 Open Modbus (Modbus TCP)

If left out, Port 502 assumed.

cp: Com Port
1 - 98

If left out, com port 1 assumed.

br: Baud Rate
0 1200
1 2400
2 4800
3 9600
4 19200
5 38400
6 57600
7 115200

If left out, Baud Rate is 9600.

um: Use Modem
0 No
1 Yes

If left out, No modem selected.

pn: Phone Number
Use No spaces. To be defined.

ms: Modem Setup String
To be defined.

dc: Data Switch Connect string

To be defined.

dd: Data Switch Disconnect string

To be defined.

ss: Start screen

- 0 Device Status
- 1 Phasors Diagram (Nexus Only)
- 2 Instantaneous Polling
- 3 Poll All (Nexus Only)
- 4 Poll Max/Min
- 5 Poll Power Readings
- 6 Poll Harmonics
- 7 Poll Internal Inputs
- 8 Poll Multiple Devices (Nexus Only)
- 9 Poll Pulse Accumulations (Nexus Only)
- 10 Poll Limit Status
- 11 Poll Time of Use Readings (Nexus Only)
- 12 Poll Nexus External Digital Inputs (Nexus Only)
- 13 Poll Nexus External Analog Inputs (Nexus Only)
- 14 Poll Nexus ElectroLogic Status (Nexus Only)
- 15 Poll Relay Control

If left out, Start screen is Device Status.

dn: Device Name

Must use period as place holder for a space.

ln: Location Name

Must use period as place holder for a space.

vm: View Mode

- 0 Normal
- 1 Hide Main Window and Exit upon closing of Start Screen.

If left out, Normal is the View Mode.

am: Answer Modem

- 0 No
- 1 Open Port. Wait for Modem to ring and attempt to answer modem if ringing.

If Left out, software does not answer modem.

dr: Dial Out Receive Call

0 No

1 After Software successfully answers the call, look for reason of call code.
(based on the code Perform Automated functions).

Upon completion of all functions place Remote Modem into command mode send
acknowledgment and hang up.

Close Port and exit software.

mp: Modem Password

Must use period as place holder for a space.

Glossary

0.1 Second Values:	These values are the RMS values of the indicated quantity as calculated after approximately 50 milliseconds (3 cycles) of sampling.
1 Second Values:	These values are the RMS values of the indicated quantity as calculated after one second (60 cycles) of sampling.
Alarm:	An event or condition in a meter that can cause a trigger or call-back to occur.
Annunciator:	A short label that identifies particular quantities or values displayed, for example kWh.
Average (Current):	When applied to current values (amps) the average is a calculated value that corresponds to the thermal average over a specified time interval. The interval is specified by the user in the meter profile. The interval is typically 15 minutes. So, Average Amps is the thermal average of amps over the previous 15-minute interval. The thermal average rises to 90% of the actual value in each time interval. For example, if a constant 100amp load is applied, the thermal average will indicate 90 amps after one time interval, 99 amps after two time intervals and 99.9 amps after three time intervals.
Average (Input Pulse Accumulations):	When applied to Input Pulse Accumulations, the “Average” refers to the block (fixed) window average value of the input pulses.
Average (Power):	When applied to power values (watts, VARs, VA), the average is a calculated value that corresponds to the thermal average over a specified time interval. The interval is specified by the user in the meter profile. The interval is typically 15 minutes. So, the Average Watts is the thermal average of watts over the previous 15-minute interval. The thermal average rises to 90% of the actual value in each time interval. For example, if a constant 100kW load is applied, the thermal average will indicate 90kW after one time interval, 99kW after two time intervals and 99.9kW after three time intervals.
Bit:	A unit of computer information equivalent to the result of a choice between two alternatives (Yes/No, On/Off, for example). Or, the physical representation of a bit by an electrical pulse whose presence or absence indicates data.
Binary:	Relating to a system of numbers having 2 as its base (digits 0 and 1).
Block Window Avg: (Power)	The Block (Fixed) Window Average is the average power calculated over a user-set time interval, typically 15 minutes. This calculated average corresponds to the demand calculations performed by most electric utilities in monitoring user power demand. (See Rolling Window Average.)

Byte:	A group of 8 binary digits processed as a unit by a computer (or device) and used especially to represent an alphanumeric character.
CBEMA Curve:	A voltage quality curve established originally by the Computer Business Equipment Manufacturers Association. The CBEMA Curve defines voltage disturbances that could cause malfunction or damage in microprocessor devices. The curve is characterized by voltage magnitude and the duration which the voltage is outside of tolerance. (See ITIC Curve.)
Channel:	The storage of a single value in each interval in a load profile.
CRC Field:	Cyclic Redundancy Check Field (Modbus communication) is an error checksum calculation that enables a Slave device to determine if a request packet from a Master device has been corrupted during transmission. If the calculated value does not match the value in the request packet, the Slave ignores the request.
CT (Current) Ratio:	A Current Transformer Ratio is used to scale the value of the current from a secondary value up to the primary side of an instrument transformer.
Demand:	The average value of power or a similar quantity over a specified period of time.
Demand Interval:	A specified time over which demand is calculated.
Display:	User-configurable visual indication of data in a meter.
DNP 3.0:	A robust, non-proprietary protocol based on existing open standards. DNP 3.0 is used to operate between various systems in electric and other utility industries and SCADA networks.
EEPROM:	Nonvolatile memory. Electrically Erasable Programmable Read Only Memory that retains its data during a power outage without need for a battery. Also refers to meter's FLASH memory.
Energy Register:	Programmable record that monitors any energy quantity. Example: Watthours, VARhours, VAhours.
Ethernet:	A type of LAN network connection that connects two or more devices on a common communications backbone. An Ethernet LAN consists of at least one hub device (the network backbone) with multiple devices connected to it in a star configuration. The most common versions of Ethernet in use are 10BaseT or 100BaseT as defined in IEEE standards. However, several other versions of Ethernet are also available.
Exception Response:	Error Code (Modbus communication) transmitted in a packet from the Slave to the Master if the Slave has encountered an invalid command or other problem.
Form:	Wiring and Hookup configuration for the Nexus 1260/1270.

Harmonics:	Measuring values of the fundamental current and voltage and percent of the fundamental.
Heartbeat Pulse:	Energy indicator on the face of the Nexus 1250; pulses are generated per the programmed K_e value.
Infrared Test Pulse:	Energy indicator located on the upper left side of the face of the Nexus 1260 /1270 meter; pulses are generated per the programmed K_e value.
Integer:	Any of the natural numbers, the negatives of those numbers or zero.
Internal Modem:	An optional modem within the meter's enclosure that connects to the RJ-11 telephone connector.
Invalid Register:	In the Nexus Modbus Map there are gaps between Registers. For example, the next Register after 08320 is 34817. Any unmapped Register stores no information and is said to be invalid.
ITIC Curve:	An updated version of the CBEMA Curve that reflects further study into the performance of microprocessor devices. The curve consists of a series of steps but still defines combinations of voltage magnitude and duration that will cause malfunction or damage.
K_e :	kWh per pulse; i.e. the energy.
kWh:	kilowatt hours; kW x demand interval in hours.
KYZ Output:	Output where the rate of changes between 1 and 0 reflects the magnitude of a metered quantity.
LCD:	Liquid Crystal Display.
LED:	Light Emitting Diode.
Master Device:	In Modbus communication, a Master Device initiates and controls all information transfer in the form of a Request Packet to a Slave Device. The Slave responds to each request.
Maximum Demand:	The largest demand calculated during any interval over a billing period.
Modbus ASCII:	Alternate version of the Modbus protocol that utilizes a different data transfer format. This version is not dependent upon strict timing, as is the RTU version. This is the best choice for telecommunications applications (via modems).
Modbus RTU:	The most common form of Modbus protocol. Modbus RTU is an open protocol spoken by many field devices to enable devices from multiple vendors to communicate in a common language. Data is transmitted in a timed binary format, providing increased throughput and therefore, increased performance.

Network:	A communications connection between two or more devices to enable those devices to send and receive data to one another. In most applications, the network will be either a serial type or a LAN type.
NVRAM:	Nonvolatile Random Access Memory is able to keep the stored values in memory even during the loss of circuit or control power. High speed NVRAM is used in the Nexus to gather measured information and to insure that no information is lost.
Optical Port:	A port that facilitates infrared communication with a (1260/1270) meter. Using an ANSI C12.13 Type II magnetic optical communications coupler and an RS-232 cable from the coupler to a PC, the meter can be programmed with Nexus Communicator software.
Packet:	A short fixed-length section of data that is transmitted as a unit. Example: a serial string of 8-bit bytes.
Percent (%) THD:	Percent Total Harmonic Distortion.
Protocol:	A language that will be spoken between two or more devices connected on a network.
PT Ratio:	Potential Transformer Ratio used to scale the value of the voltage to the primary side of an instrument transformer. Also referred to as VT Ratio.
Pulse:	The closing and opening of the circuit of a two-wire pulse system or the alternate closing and opening of one side and then the other of a three-wire system (which is equal to two pulses).
Quadrant: (Programmable Values and Factors on the Nexus)	Watt and VAR flow is typically represented using an X-Y coordinate system. The four corners of the X-Y plane are referred to as quadrants. Most power applications label the right hand corner as the first quadrant and number the remaining quadrants in a counter-clockwise rotation. Following are the positions of the quadrants: 1st - upper right, 2nd - upper left, 3rd - lower left and 4th - lower right. Power flow is generally positive in quadrants 1 and 4. VAR flow is positive in quadrants 1 and 2. The most common load conditions are: Quadrant 1 - power flow positive, VAR flow positive, inductive load, lagging or positive power factor; Quadrant 2 - power flow negative, VAR flow positive, capacitive load, leading or negative power factor.
Register:	An entry or record that stores a small amount of data.
Register Rollover:	A point at which a Register reaches its maximum value and rolls over to zero.
Reset:	Logs are cleared or new (or default) values are sent to counters or timers.
Rolling Window Average (Power):	The Rolling (Sliding) Window Average is the average power calculated over a user-set time interval that is derived from a specified number of sub-intervals,

each of a specified time. For example, the average is calculated over a 15-minute interval by calculating the sum of the average of three consecutive 5-minute intervals. This demand calculation methodology has been adopted by several utilities to prevent customer manipulation of kW demand by simply spreading peak demand across two intervals.

RS-232:	A type of serial network connection that connects two devices to enable communication between devices. An RS-232 connection connects only two points. Distance between devices is typically limited to fairly short runs. Current standards recommend a maximum of 50 feet but some users have had success with runs up to 100 feet. Communications speed is typically in the range of 1200 bits per second to 57,600 bits per second. RS-232 communication can be accomplished using the Optical port on the face of the 1260/1270 Nexus.
RS-485:	A type of serial network connection that connects two or more devices to enable communication between the devices. An RS-485 connection will allow multi-drop communication from one to many points. Distance between devices is typically limited to around 2,000 to 3,000 wire feet. Communications speed is typically in the range of 120 bits per second to 115,000 bits per second.
Sag:	A voltage quality event during which the RMS voltage is lower than normal for a period of time, typically from 1/2 cycle to 1 minute.
Secondary Rated:	Any Register or pulse output that does not use any CT or VT Ratio.
Serial Port:	The type of port used to directly interface with a PC.
Slave Device:	In Modbus communication, a Slave Device only receives a Request Packet from a Master Device and responds to the request. A Slave Device cannot initiate communication.
Swell:	A voltage quality event during which the RMS voltage is higher than normal for a period of time, typically from 1/2 cycle to 1 minute.
THD:	Total Harmonic Distortion is the combined effect of all harmonics measured in a voltage or current. The THD number is expressed as a percent of the fundamental. For example, a 3% THD indicates that the magnitude of all harmonic distortion measured equals 3% of the magnitude of the fundamental 60Hz quantity.
Time Stamp:	A stored representation of the time of an event. Time Stamp can include year, month, day, hour, minute and second and Daylight Savings Time indication.
TOU:	Time of Use.
Voltage Imbalance:	The ratio of the voltage on a phase to the average voltage on all phases.

Voltage Quality Event:	An instance of abnormal voltage on a phase. The events the meter will track include sags, swells, interruptions and imbalances.
VT Ratio:	The Voltage Transformer Ratio is used to scale the value of the voltage to the primary side of an instrument transformer. Also referred to as PT Ratio.
Voltage, Vab:	Vab, Vbc, Vca are all Phase-to-Phase voltage measurements. These voltages are measured between the three phase voltage inputs to the meter.
Voltage, Van:	Van, Vbn, Vcn are all Phase-to-Neutral voltages applied to the monitor. These voltages are measured between the phase voltage inputs and Vn input to the meter. Technologically, these voltages can be “measured” even when the meter is in a Delta configuration and there is no connection to the Vn input. However, in this configuration, these voltages have limited meaning and are typically not reported.