# Nexus Communicator 2.0

Software for Windows®

User Manual Version 1.24

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## Electro Industries/GaugeTech

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"The Leader in Web Accessed Power Monitoring and Control"

#### Nexus Communicator User Manual Version 1.24

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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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#### 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 1262/1272 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<sup>®</sup> is an integral part of the Nexus System. Use it to custom configure Nexus 1262/1272 meters, multiple Nexus 1250/1252 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 Displays 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 1250/1252) (Chapter 4 1262/1272);
- 4. Configure, retrieve and view data from the Futura+ Monitor (Chapter 5);
- 5. Retrieve and view data from the Nexus Monitor(s) (Chapters 7, 8 and 10);
- 6. EIG Script and Scheduler Program for Automated Data Retrieval and Processing (Chapter 15).
- **NOTE:** See the Table of Contents for specific topics.

## Chapter 1 Installing Nexus Communicator

#### **1.1: System Requirements**

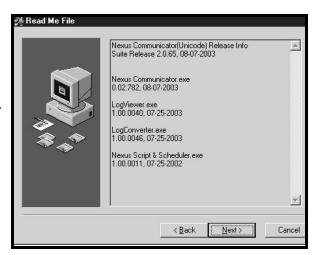
- IBM-PC Compatible, Pentium 200MHz or better
- Windows<sup>®</sup> 98 with Service Pack 1 or Release 2; NT 4 with Service Pack 5; Windows<sup>®</sup> 2000 with at least Service Pack 1
- 32 MB RAM
- XVGA Card and Monitor with 1024x768 and 65k colors
- Available RS-232 Serial Port

#### **1.2: Installing Nexus Communicator Software**

- 1. Start Windows<sup>®</sup>. Insert the Nexus Communicator CD into your computer's CD drive.
- 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".

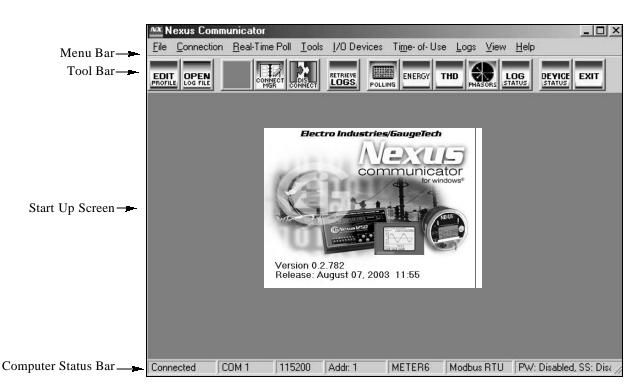
3. When the installation is complete, run Nexus Communicator from the Windows<sup>®</sup> Start menu.



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 additonal 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 Chapters 3, 4, 5.



#### **Open:**

Opens a previously stored Nexus Log File. Same as selecting File, Open, Nexus Log File. See Chapter 8.



#### **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 8.



#### **Polling:**

Displays instantaneous polling data from the currently connected Nexus Monitor. Same as selecting Real-Time Poll, Instantaneous Polling. See Chapter 7.



#### **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 7.



#### Log Status:

Displays logging statistics for the currently connected Nexus Monitor. Same as selecting Logs, Statistics. See Chapter 8.



#### **Device Status:**

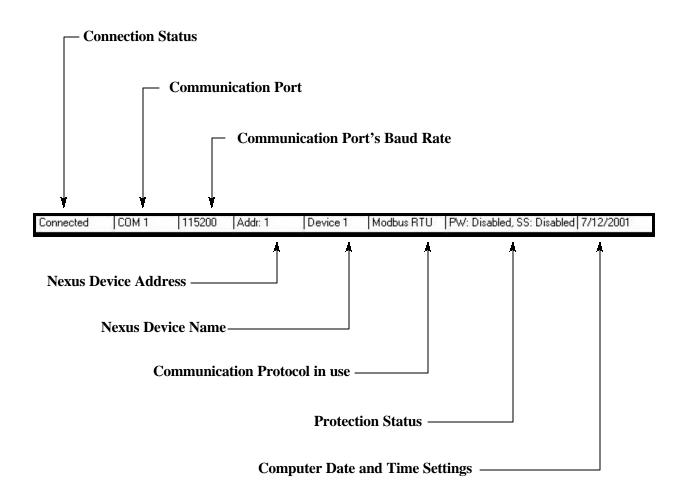
Displays list of the currently connected Nexus Monitor(s). Same as selecting Tools, Device Status. See Chapter 2.



#### Exit:

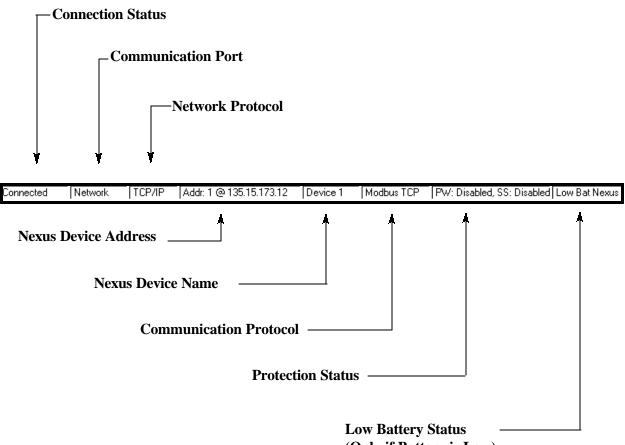
Terminates the Nexus Communicator program. Same as selecting File, Exit.

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



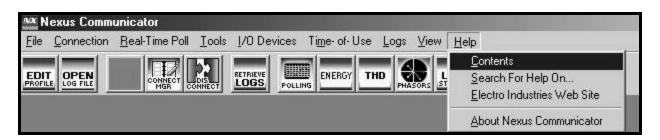
- Connection Status: displays either "Connected", "Disconnected" or "Not Found".
- **Communication Port**: displays the computer port currently in use for the connection.
- **Baud Rate**: displays the baud rate of the computer's communication port.
- Device Address: displays the address of the connected 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.



(Only if Battery is Low)

- 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.



#### 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.

## <u>Contents Index Back Print G</u>lossary

#### **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 TopDisplay History Window: Help history.Font: Small, Normal or Large.Use System Colors: Must Restart to make this change.

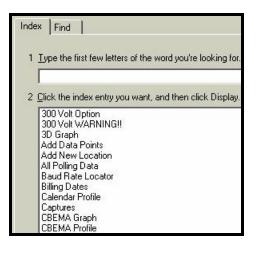
#### Index: Index/ Find Tabs

**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<sup>®</sup> systems information. It is similar to the Start Up screen in section 1.3.



#### **1.5: Feature Comparison for Nexus Models**

■ The Nexus Monitor is available in a number of models, each with an array of features. The Table below shows each model with the possible features unique to that model.

Nexus Monitor Models with Features										
Feature	Nexus 1250	Nexus 1252	Nexus 1262	Nexus 1272						
Limit Full Scales	Yes	Yes	Yes	Yes						
Waveform Full Scales	Yes	Yes		Yes						
Transformer Loss Compensation	Yes	Yes	Yes	Yes						
*Trending Setup for Historical Logs	Yes	Yes	Yes	Yes						
**PQ & Waveform Thresholds	Yes	Yes		Yes						
Pulse Accumulations	Yes	Yes		Yes						
Program External I/O Modules	Yes	Yes	Yes	Yes						
Programmable Onboard Display			Yes	Yes						
Test Mode			Yes	Yes						
DNP Level 1 + Custom Class Map	Yes									
DNP Level 2 + Custom Class Map		Yes	Yes	Yes						
Internal KYZ Output Option			Yes	Yes						
Custom Modbus Map	Yes	Yes	Yes	Yes						
***Network Card Runtime Update	Yes	Yes	Yes	Yes						
INP100 Total Web Solutions	Yes	Yes	Yes	Yes						
INP2 Modem with Dial Out Option	Yes	Yes	Yes	Yes						
****View Logs	Yes	Yes	Yes	Yes						
Flicker		Yes		Yes						
****Energy Billing Module	Yes	Yes	Yes	Yes						
****Script & Scheduler	Yes	Yes	Yes	Yes						
17V Internal Power for I/O Modules	to 12VA	to 12VA								

- \* With 512 K or higher memory.
- \*\* With 2 MEG or higher memory.
- \*\*\* INP10 & INP100 Only.

\*\*\*\* NOT Available using Nexus Programmer (MUST use Nexus Communicator).

## NOTE: Nexus 1262 and 1272 have replaced Nexus 1260 and 1270 and have additional features as noted above.

### 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 1250/1252 and 1262/1272 Installation and Operation Manuals* for details on the hardware requirements of each configuration.

## NOTE: The Enhanced Versions of the Nexus, 1252, 1262 and 1272, include customizable DNP V3.00 Level 2. Nexus 1262 and 1272 have replaced Nexus 1260 and 1270.

- 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.

#### ■ SERIAL CONNECTIONS

- 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 (1250/1252 Port 1) (1262/1272 Optical Port). Set 1250/1252 selector switch. See Chapter 6 of the *Nexus* 1262/1272 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 1250/1252. If you use Port 1, set the selector switch to RS-485. For Nexus 1262/1272, 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.

3.

onnect		
🛛 Serial Por	t 🌒 N	etwork
Device Add	Iress <sup>1</sup>	
Baud Rate	57600	<u> </u>
Port	COM2	<u>.</u>
Protocol	Modbu	ıs RTU <u> </u>
C <u>o</u> nnect	<u>C</u> ancel	<u>H</u> elp

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. Nexus units are programmed for your applications. Some Nexus 1250/ 1252 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 (fixed Optical Port on Nexus 1262/1272)

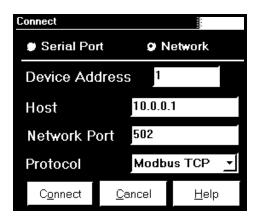
Port 3: Address 1, 9600 baud (1250/1252 Only) (for External Display or I/O Modules) Port 4: Address 1, 57600 baud, Master/Slave (for Nexus External I/O Modules)

- Note: You may use a connected Nexus External Display to view the baud rate, address and communication protocol of each port. See the *Installation and Operation Manuals* for details. See Chapter 3 (1250/1252) or Chapter 4 (1262/1272) 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.

#### ■ NETWORK CONNECTIONS

- Insert an RJ-45 line into the RJ-45 Port on the face of a Nexus 1250/1252 with Internal Network Option. A connection for Nexus 1262/1272 with the Ethernet Option is made by inserting an RJ-45 line into the RJ-45 Network cable coming from the back of the socket meter.
- 2. Click the Network radio button on this screen. The screen changes for Network settings.
- 3. Enter settings for **Network Connection**: (see your **Network Administrator** for correct settings!)
  - In the **Device Address** field, enter 1.

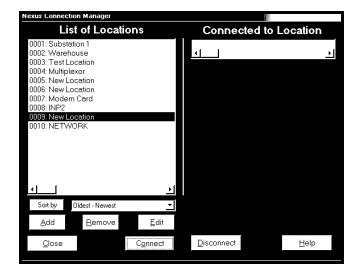


- In the **Host** field, enter an IP Address or a Registered Name (see your Network Administrator).
- In the **Network Port and Protocol** fields, the example settings are probably correct. Check with your Network Administrator to be sure.
- 4. Click Connect. Nexus Communicator locates the Nexus Monitor and the Device Status screen appears, confirming the connection. (See section 2.8 for details).
- 5. Click OK. The computer is now connected to the Nexus Monitor.
- 6. 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 1250/1252 and 1262/1272 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 (1250/1252) and Chapter 4 (1262/1272) 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 1250/1252 and 1262/1272 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 Modern Manager, set both moderns 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.

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				
❷ <u>S</u> erial Port ● <u>N</u> etwork	✓ <u>U</u> se Data Switch String(s)			
Com Port COM1	Connect "%%%"PTnn 🔺			
Baud Rate 57600 🗾				
Flow Control Hardware 🗾				
Data Bits 8 🗾 Parity None 🗾				
✓ Use Modern ✓ Use Password	Disconnect _			
Phone Number 102				
Setup String				
Password password				
Devices At Location				
Add Bemov				
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			
<u>C</u> lose	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)</cr>

- 6. Click on the Add button in the Devices at Location section to add Nexus Monitors to this location.
- 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 Monitor's** communications settings.

Connection Manager	Location Device Editor	
De	vice Properties	
Address	1	
Name	Device 1	12
Description	Device 1	
Protocol	Modbus ASCII	-
Device Type	NEXUS	-
<u>C</u> lose	<u>H</u> elp	

- 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.
- 8. 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.

Nexus Connection Manager	
List of Locations	Connected to Location
0001: Substation 1 0002: Warehouse 0003: Test Location 0004: Multiplexor 0005: New Location 0006: New Location 0007: Modern Card 0008: INP2 0009: New Location 0010: NETWORK	<u> </u>
Sort by Oldest - Newest	
<u>A</u> dd <u>R</u> emove <u>E</u> dit	
<u>C</u> lose Connect	Disconnect Help

- 9. To add additional locations, click on the Add Button. To Sort locations, use the pull-down menu to select a sort method, A-Z, Z-A, Newest-Oldest or Oldest-Newest. Click Sort By. 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:

odbus Status	
Sending Data String	

- 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 1250/1252 and 1262/1272 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.)

Nexus Connection Manager	
List of Locations	Connected to Location
0001: Substation 1	
0002: Warehouse 0003: Test Location	<u> </u>
0003: Test Location 0004: Multiplexor	
0005: New Location	
0006: New Location	
0007: Modem Card	
0008: INP2	
0009: New Location 0010: NETWORK	
BOTO, NETWORK	
<u> </u>	
Sort by Oldest - Newest	
<u>A</u> dd <u>R</u> emove <u>E</u> dit	
<u>C</u> lose <u>Connect</u>	Disconnect <u>H</u> elp

- 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:

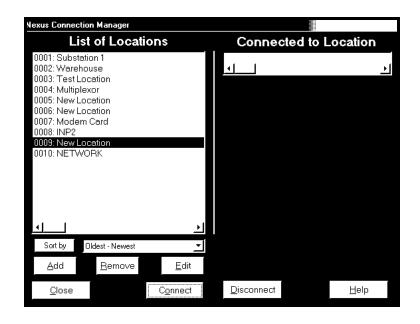
Connection Manager Location Editor				
Location Name Modem Card				
❷ <u>S</u> erial Port ● <u>N</u> etwork	✓ <u>U</u> se Data Switch String(s)			
Com Port COM2 -	Connect &F1			
Baud Rate 57600 🗾				
Flow Control Hardware	-1			
Data Bits 8 🚽 Parity None 🗾				
	Disconnect 📩			
Phone Number 102				
Setup String	-1			
Password password				
Devices At Location				
<u>A</u> dd <u>B</u> emo				
Device Address Device Name	Description			
1 Device 1	Device 1			
2 Device 2 3 Device 3	Device 2 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 (1250/1252) or Port 3 (1262/1272) of the Internal Modem Option Nexus to add additional units. Each unit must be configured to speak Modbus ASCII and set to the same baud rate as the 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.

Dev	vice Prop	perties	
Address	1		
Name	Device 1		
Description	Device 1		12
Protocol	Modbus A	SCII	-
Device Type	NEXUS		(†
Close	72	<u>H</u> elp	

- 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 Sort locations, use the pull-down menu to select a sort method, A-Z, Z-A, Newest-Oldest or Oldest-Newest. Click Sort By. 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 1250/1252 and 1262/1272 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.
- 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.)

Nexus Connection Manager	
List of Locations	Connected to Location
0001: Substation 1	
0002: Warehouse 0003: Test Location	
0004: Multiplexor	
0005: New Location	
0006: New Location	
0007: Modem Card	
0008: INP2	
0009: New Location 0010: NETWORK	
0010.14E100014	
<u> </u>	
Sort by Oldest - Newest	
Add <u>R</u> emove <u>E</u> dit	
	Disconnect
<u>C</u> lose <u>Connect</u>	<u>D</u> isconnect <u>H</u> elp

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			
♀ <u>S</u> erial Port ● <u>N</u> etwork	■ <u>U</u> se Data Switch String(s)		
Com Port COM1 -	Connect 🔟		
Baud Rate 9600 🗾			
Flow Control None			
Data Bits 8 💌 Parity None 💌	Disconnect		
<u>∎ U</u> se Modem <u>∎</u> Use <u>P</u> assword			
Phone Number			
Setup String	-1		
Password			
Devices At	Location		
<u>A</u> dd <u>B</u> emov	/e <u>E</u> dit		
Device Address Device Name	Description		
1 Device 1	Device 1		
2 Device 2 3 Device 3	Device 2 Device 3		
3 Device 3	Device 3		
Qlose	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:

Connection Manager	Location Device Editor	
Dev	vice Properties	
Address	1	
Name	Device 1	
Description	Device 1	
Protocol	Modbus RTU	-
Device Type	NEXUS	*
Close	<u>H</u> elp	

- 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.

Nexus Connec	tion Manager						
Li	st of Locat	tions	Connected to Location				
0001: Subst 0002: Ware 0003: Test I 0004: Multip 0005: New I 0006: New I 0006: New I 0006: New I 0007: Mode 0008: INP2 0009: New I	house .ocation lexor .ocation .ocation m Card .ocation		<u>4</u>		<b>→</b>		
<mark>. ↓</mark> Sort by Add	Oldest - Newest Remove	<b>⊥</b> 					
<u>C</u> lose		Connect	Disconnect	<u>H</u> elp			

- 9. To add other locations, click on the Add Button and follow the above procedure to edit them. To Sort locations, use the pull-down menu to select a sort method, A-Z, Z-A, Newest-Oldest or Oldest-Newest. Click Sort By. 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 (1250/1252) or Port 3 (1262/1272) 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 1250/1252 and 1262/1272 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.)

ions	Connee	cted to L	ocation		
			<u>ب</u>		
۲					
<u> </u>					
Edit					
East					
Connect	<u>D</u> isconnect		<u>H</u> elp		
	ions	▲ ▲ ▲ ▲ ▲ ▲	<u>دا</u> <u>د</u> <u>E</u> dit		

- 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	
♥ <u>S</u> erial Port ♥ <u>N</u> etwork	■ <u>U</u> se Data Switch String(s)
Com Port COM1 -	لم_ Connect
Baud Rate 115200	
Flow Control None	
Data Bits 8 🚽 Parity None 🚽	Disconnect
Use Modem	Disconnect 🛆
Phone Number	
Setup String	
Devices At	Location
Add Bemo	ve <u>E</u> dit
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	<b>ø</b> <u>N</u> etwork	(	<u> </u>	/itch String(s)			
Host 10.0.1	0.1		Connect		≜		
Network Port 502							
					<u>_</u>		
			Disconnect		<u> </u>		
					⊥		
	Device	es At L	ocation				
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			
Close				Tielb			

- 7. In the Host field, enter the Nexus' 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:

onnection Manager	Location Device Editor
De	vice Properties
Address	2
Name	Device 2
Description	Device 2
Protocol	Modbus TCP
Device Type	NEXUS
<u>C</u> lose	Help

• Ethernet Gateway (Port 2 - 1250/1252) (Port 3 - 1262/1272) 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 (1250/1252) or 4.5 (1262/1272)).

**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.

Nexus Connection Manager						
List of Locatior	1S	Connected to Location				
0001: Substation 1 0002: Warehouse 0003: Test Location 0004: Multiplexor 0005: New Location 0006: New Location 0007: Modern Card 0008: INP2 0009: New Location 0010: NETWORK	1	<u>م</u>		<u>~</u>		
Sort by Oldest - Newest	<u> </u>					
<u>A</u> dd <u>R</u> emove	<u>E</u> dit					
Close	C <u>o</u> nnect	Disconnect		<u>H</u> elp		

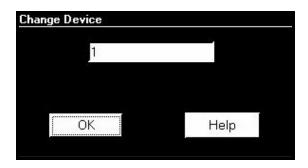
- 10. Click once on the location to which you would like to connect your computer. You may only connect to one location at a time. To change to a different location, you must first disconnect from the current location by clicking on the Disconnect button or by selecting Disconnect from the Connection 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 1250/1252) (Port 3 1262 /1272) and the Devices are the same (configured in section 3.5 or 4.5).
- 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 7 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.

List of Currently Connected Devices								
Device	Device Type	Boot	Run-time	DSP Boot	DSP Run-time	Comm State	DSP State	On Time
Feeder1	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 13 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 13 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 12). Scroll to the right to find this section of the Device Status Bar.

# Chapter 3 Configuring the Nexus 1250/1252 Monitor

# 3.1: Overview

■ Nexus Communicator enables you to configure a Nexus 1250/1252 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 1262/1272, see Chapter 4. See Chapter 5 for Futura+.

ce Profile								
								,
ratter Nexu	s 1250							<b>^</b>
e-N	CT, PT Ratios and Syste	em Hookup						
¢-N	Limit and Waveform Full	Scales						
•N	Communications Ports							
Ð-N	Time Settings							
¢-N	Demand Integration Inte	Demand Integration Intervals, Thresholds						
N	Cold Load Pickup							
Ð-N	Transformer Loss Comp	ensation						
ÐN	Limits							_
N	ElectroLogic Relay Con	trol						
¢-N	Trending Setup							
e-N	Trending Log Time Inter	vals						
N	PQ Thresholds (Wavefo	rm Recordi	ng)					
N	Pulse Accumulations							
- N.	Digital Inputs							<u>-</u>
	Update Device	<u>C</u> ancel	<u>S</u> ave	Load	<u>R</u> eport	<u>H</u> elp		

- 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 3.3–3.24);
  - 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 3.25)
  - Setting and Retrieving Nexus Time (section 3.26)
  - Test Pulse (section 3.27) and Path Options (section 3.29)

**Note**: Actual programming screens may vary depending on the options ordered with your meter.

Note: The settings shown are for the Nexus 1250 and 1252. The "Enhanced" Nexus 1252 supports DNP Level 2. For details on DNP Level 2, see Chapter 17 of this manual or refer to DNP V3.00 Protocol Assignents for Nexus 1252 & 1272, Rev 1.8. The External Devices section of the Device Profile is covered in Chapter 11.

# 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:

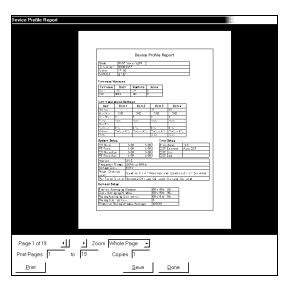
Retrieving Programmable	Settings from Device	
Reading Programmable Settir	ngs	
Time Remaining	2 seconds	
Reading Block	34 of 69	<u>Cancel</u>

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

ce Profile									
	ElectroLogic Relay Contr	rol						_	
Þ., N.	Trending Setup								
•-N	Trending Log Time Interv	Trending Log Time Intervals							
	PQ Thresholds (Wavefor	PQ Thresholds (Waveform Recording)							
N	Pulse Accumulations								
•-N	Digital Inputs	Digital Inputs							
-0	External Devices								
	External Display Options								
te N	Labels								
¢-N	DNP Custom Classes Map								
-N	Internal KYZ Settings								
- N	Accumulations Rollover								
- N	Custom Modbus Map								
L N.	Flicker Settings								
								Ţ	
	Update Device	<u>C</u> ancel	<u>S</u> ave	Load	<u>R</u> eport	<u>H</u> elp			

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 3.3–3.24 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.

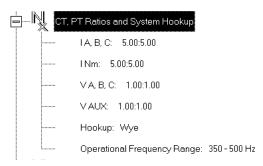
Save: Save these selections for future use.

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.

# 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:



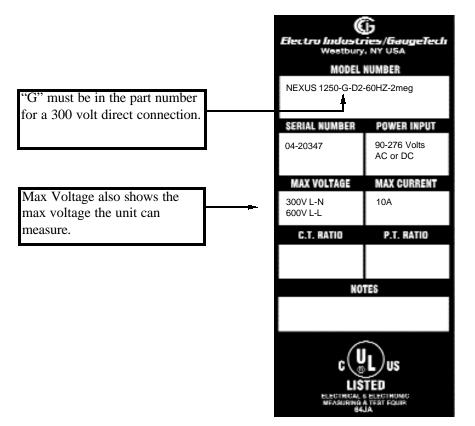
- This screen displays the current Device Profile's settings for CT, PT ratios and connection type. The values shown are for example only.
- 2. Double-click on any of the settings; the CT and PT Ratios screen appears:

Device Profile: CT a	nd PT Ratios					
<sub>C</sub> CT Ratio —		<sub>  Г</sub> РТ F	Ratio ———			
I A, B, C 5.0	0 5.00		B, C 1.00	: 1.00		
IN 5.0	0 : 5.00		1.00	: 1.00		
_ Hookup ——		Volt	age (300 V	olt Option On	ıly)——	
Wye			300 Volt Sec	ondary		
	<sub>[</sub> Operation	al Frequenc	y Range – <sub> </sub>			
	350Hz to 500Hz 🗾					
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp			

- 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: 4-Wire 3-Element Direct Voltage (4 CTs), 4-Wire 2.5 or 3 Element Wye (3 or 4 CTs), 3-Wire Delta (2 or 3 CTs), 3-Wire Delta Direct Voltage (3 CTs) or 4-Wire Grounded Delta (4 CTs). See the *Nexus 1250/1252 Installation and Operation Manual* for diagrams.
  - Click OK. The following screen asks you to verify the Kh/Ke Ratio for the Test Pulse Setting.
     Kh/Ke Ratio is Secondary watthour constant over kWh (the energy).
     NOTE: If the Ke screen does not appear, go to View>Options>Misc. Enable the Ke screen.

Ke setting for K	YZ test pul	se					
Do you want to use the following Kh / Ke for the test pulse setting?							
		1000					
Kh/Ke =	PT Ratio X CT Ratio						
Kh/Ke =	5.000000						
Y	'es	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!



- 4. To select the 300 Volt Option, check the "300 Volt Secondary" box. Are you **sure** you want to select this box?
- 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.

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

e Nexus can be ordered to
it transformers. This will
a range of 0 - 1 amps with
mp. The following lists the
T Ratios in the Nexus to
one wind
toroid)
ive winds
toroid)
accuracy with one (1) amp
nd around the internal toroids
sual one time. This effectively

■ 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

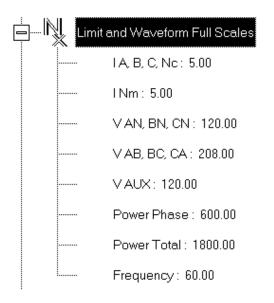
The CT Ratio screen below shows the correct input for the typical one amp user:

Device Profile: C	T and PT Rati	0\$						
CT Ratio-					Ratio			
IA, B, C	1000.00	5.00		VA,	B, C	1.00	1.00	
IN E	5.00	5.00			JX	1.00	1.00	
Hookup — Wye			•	_Volt	2	300 ∨ ⁄olt Sei	otion O y	nly) ——
		Operation 350Hz		-	y Ra	nge — I		
		<u>0</u> K	<u>C</u> an	cel	H	elp		

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 3.10 and 3.14, 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.

Device Profile:	Device Profile: Limit and Waveform Full Scales				
I A, B, C,	I A, B, C, Nc		5.00		
l Nm			5.00		
V AN, BN	, CN		120.00		
V AB, BC	, CA	208.00			
V Aux		120.00			
Power Ph	lase	600.00			
Power To	otal		1800.00		
Frequency			60.00		
ОК	<u>C</u> ano	cel	Help		

- 3. Enter the Full Scale for each parameter:
  - The Limits and Waveform settings (section 3.10 and 3.14, 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 3.25.

# 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:

Comr	nunications Po	orts		
 S	Serial Port 1	1	115200,N,1	Modbus RTU
 S	Serial Port 2	1	115200,N,1	Modbus RTU
 S	Serial Port 3	38	115200,N,1	Modbus RTU
S	Serial Port 4	48	115200,N,1	Modbus RTU

- 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 1250/1252 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.

2. Double-click on any of the settings ("Serial Port 1"); the Communications Settings screen appears:

Device Profile: Communicatio	ns Settings						
_ Port 1	[ Port 2]	Port 3	Port 4(Ext Devices) —				
Address 1	Address 1	Address 2	Address 2				
Baud Rate 9600 🗾	Baud Rate 115200 🚽	Baud Rate 57600 🗾	Baud Rate 38400 🛨				
Data Bits 8 🗾	Data Bits 🛛 🛛 🗾	Data Bits 🛛 🛛 🗾	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 🛛 💆 🗾	Tx Delay 🛛 Oms 💽	Tx Delay 🛛 🔤	Tx Delay 🛛 🗹				
Protocol	Protocol	Protocol	Protocol				
Modbus RTU 🔄	Modbus RTU 🔄	Modbus ASCII 🗾 🗾	Modbus ASCII 🔄 🗾				
	If the Modem or Network option is installed, Port 2 settings here will not be used. See below	Mode Slave 🗾	Mode Slave 🗾				
_ ┌Network Settings (If Ne	etwork Option was purcha						
IP Address 1	35 15 173 96	Advanced Settings					
Subnet Mask 2	55 255 255 0	Ethernet Gateway Bau	d Rate 57600 🗾				
Default Gateway	35 15 173 250	Ethernet Gate <del>way</del> Dela	ay <mark>5</mark> x 15 ms				
	_ _ Internal Modem Settings (If Internal Modem Option was purchased) —						
Answer Phone on	Bings	Modem Gateway Baud	Rate 57600 🗾				
		Dial Out Profile					
	<u>O</u> K <u>C</u> ar	icel <u>H</u> elp					

- 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**: <u>Direct Connections</u> made through Nexus Communicator must use either Modbus RTU or Modbus ASCII protocol (Modbus RTU is recommended). <u>Modem Connections</u> 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.

If your meter has the **INP100 Option (10/100BaseT)** and you click on the Advanced Settings button, the following set of screens will appear. The meter is shipped with initial settings, or you can fully configure the settings using these screens and FTP Client. The process is detailed in Chapter 6. **NOTE:** This screen is **not** supported by meters with the INP10 Option.

Advanced Network Card S			
Services		GE Protocol (EGD)	
Computer Name / DNS	Auto TFTP Download	Alarm / Email	FTP Client
Alarm / Email Email Server IP Address Email Server Port Email Monitor Email Add Return / Reply Address Email Subject Text	25	-	
Email Server requires	authentication		
User name		_	
Password		_	
	ОК	Cancel	

- **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 9 of this manual.
- 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.

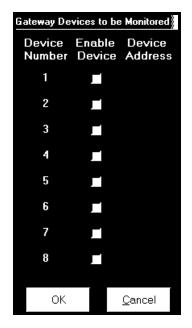
Modem Programming			
<sub>C</sub> Primary phone number settings —		<sub>C</sub> Secondary phone r	number settings
Number 104		Number	101
Retry delay 1 🗾	Minutes	Retry delay	1 Minutes
Retry limit 3 🗾	Attempts	Retry limit	1 Attempts
Connection type Computer		Connection type	Computer
 _Communications settings		<sub>C</sub> Modem settings —	
Activity timeout limit 1	Minutes	Rings to answer	3 <b>T</b> Rings
Call delay timer limit 10 🗾	Seconds	Identification	Host2
Callback type Playback 🗾		Password	123
	Hours	Enable password	×
Share the phone line		Violation limit	3 Attempts
		Violation lockout time	1 Hours
 _ Dial out on the following condition	ıs		
📕 Limits status change	📕 CBEMA Power q	uality event 📕 Cycli	ing of control power
📕 High speed input change	Control output ch	nange 🗾 Mod	em password failure
Waveform record captured	Filling of meter n	nemory 🗹 Failu	re of communication with Nexus
Log full limit threshold (All Logs) 100	%	Edit	gateway port devices
	0K <u>C</u> a	ncel Help	

The Edit Gateway Port Devices button at the bottom of the screen is used to Enable up to 8 devices that are connected the gateway and are to be monitored. When the user clicks the Edit Gateway Port Devices button, the following screen is displayed:

Click on the Box next to the Device to be monitored. A Device Address will appear next to the Enabled Device.

Change the Device Address, if needed, to any address except 1. The Number 1 is always reserved for the Primary Device.

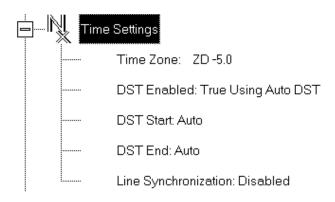
Click OK to return to the Modem Programming screen.



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.

Device Profile: Time Settings				
Zone Desc	criptor -	5.0		
<sub>[</sub> Daylight S	Savings Inf	ormation —		
Auto I	DST	-		
Line Sync	hronizatio	n		
Enable	No _	·		
Frequency	50Hz <u>-</u>	·		
<u>0</u> K	<u>C</u> ancel	<u>H</u> elp		

- 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.

**Start:** 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.

• Line Synchronization: Set Enable or Disable and Frequency.

The basic function of Line Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage ONLY is used. Line Sync is disabled if a GPS signal is present.

#### How Time is Adjusted:

After the clock is synced to the line, the Nexus periodically checks the cumulative difference between the real time clock in cycles and the line cycle count. If the absolute difference is greater that 50 (60) cycles, the clock is adjusted + / - 1 second accordingly.

- 4. To set the Nexus on-board clock, use Set Nexus Time from the Tools Menu. (See section 3.25).
- 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* 1250/1252 *Installation and Operation Manual* for details.
- 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:

Demand Integration Intervals, Thresholds						
	Thermal Averaging Time Interval Window: 0h, 0m, 10s					
	Block Averaging Time Interval Window: 0h, 0m, 0s					
	Rolling Averaging Sub-Interval Window: 0h, 3m, 1s					
	Rolling Sub-Intervals: 5					
	Predictive Rolling Window Average: 100.00					
	I Squared T Threshold: 0.000					
	V Squared T Threshold: 0.000					

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

evice Profile: De	mand Inte	gration				
	Thermal Averaging Time Interval Window					
þ Hou		Minutes	0	Seconds		
_ ⊢Block Avei	raging	Time Inter	val V	vindow—		
0 Hou	<b>rs</b> 30	Minutes	0	Seconds		
<sub>E</sub> Rolling Ave	eraging	Sub-Inte	rval \	∦indow —		
0 Hou	r <b>s</b> 15	Minutes	0	Seconds		
<sub>r</sub> Rolling Su	b-Inter	vals —				
5		Rolling . Interval			5.00 Minutes	
Predictive	Rolling	Window /	Avera	ige ———		
100.00	6					
<sub>F</sub> Block Wind	dow Sy	nc				
📕 Use Syr	ic Pulse	HS In	put 🖡	1 🗾		
Primary Current and Voltage Thresholds						
I Squared T 5.000 V Squared T 1440.000						
Energy, Pulses and Accumulations in the Interval —						
Interval	15	m	ninute	S		
	<u>0</u> K	<u>C</u> ance	1	<u>H</u> elp		

- 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 Averaging Time Interval Window:** Allows you to set hours, minutes and seconds for a precise thermal window of demand data.
- Block Averaging Time Interval Window: Allows you to set hours, minutes and seconds for a precise 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).
- **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.
- Energy Pulses & Accumulations in the Interval: Select an interval, such as 60 min.
- 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 Cold Load Pickup and Cumulative Demand

1. From the Device Profile screen (see section 3.2), click on the (+/-) button beside "Cold Load Pickup and Cumulative Demand" or double-click on the "Cold Load Pickup and Cumulative Demand" line. The following screen appears:

D	emand				
	Cold Load Pickup ——				
	Time after control power is restored to start demand	2 minutes			
	Minimum time control power must be off before using Cold Load Pickup	60 seconds			
	-Cumulative Demand Typ	e			
	<ul> <li>Rolling Window</li> <li>Block Window</li> </ul>				
	ОК	<u>C</u> ancel			

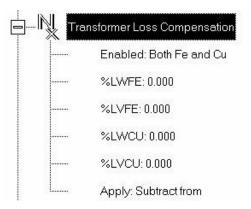
e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

On this screen the user sets the Cold Load Pickup Delay in minutes. This value is the delay from the time control power is restored to the time when the user wants to resume demand accumulation.

- Cold Load Pickup: Delay can be 1 to 60 minutes or Disabled.
- Minimum time control power must be off before using Cold Load Pickup: Value is set from 0 to 255 seconds.
- 2. 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.

# 3.9: 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. If you have a **Standard Unit**, double-click on any loss value, "%LWFE" etc; this screen appears.

- 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.
- Enter the percent Loss of Watts and Vars for copper and iron in the appropriate fields. Enable or Disable Transformer Loss Compensation with the top pull-down menu.
- 7. Click Disable. Or, to Enable, click one of the following: Fe only, Cu only or Both Fe and Cu.
- 8. With the second pull-down menu select from the following:
  - Add to Watts and Subtract from VAR.
  - Subtract from Watts and Add to VAR.
  - Add to Watts and VAR.
  - Subtract from Watts and VAR.

**NOTE: Enhanced "E" 1252 Units have additional choices and firmware to support the additional features. A warning may appear if you DO NOT have an Enhanced Unit.** (Warning: The last Watt-VAR Combinations are only available if you have an Enhanced Unit or the DSP Firmware Version is great or than 212.) Check with Technical Support if you have a question.

9. 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.

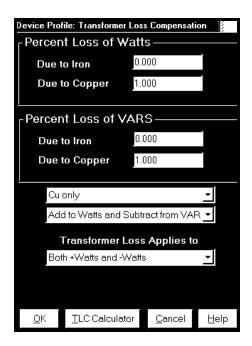
Device Profile: Transformer Loss Compensation							
Percent Loss of Watts							
Due t	o Iron	0.000					
Duet	to Copper	1.000					
<sup></sup> Percer	nt Loss of V	/ARS—					
Due	Due to Iron						
Due	to Copper	1.000					
Cu only							
Add to Watts and Subtract from VAR 🗾							
<u>0</u> K	TLC Calcula	tor <u>C</u> an	cel	<u>H</u> elp			

# 3.9.1: Transformer Loss Compensation for Enhanced Units

- 1. If you have an **Enhanced "E" 1252 Unit**, double-click on any loss value, "%LWFE" etc; a similar Transformer Loss Compensation screen appears but with **additonal calculation choices**.
- 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.

 Enter the percent Loss of Watts and Vars for copper and iron in the appropriate fields. Enable or Disable Transformer Loss Compensation with the top pull-down menu. Click Disable. Or, to Enable, click one of the following: Fe only, Cu only or Both Fe and Cu.



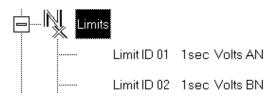
- 4. With the second pull-down menu select from the following:
  - Add to Watts and Subtract from VAR.
  - Subtract from Watts and Add to VAR.
  - Add to Watts and VAR.
  - Subtract from Watts and VAR.
- 5. The "Enhanced" 1252 has a third pull-down menu to apply the loss based on the power flow direction. From the menu select one of the following:
  - Both +Watts and -Watts.
  - -Watts only.
  - +Watts only.

#### **WARNING!** Do NOT use the last settings if you do not have the appropriate firmware. Check with Technical Support if you have a question.

6. 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.

# 3.10: 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									
1			Limit 1			Limit 2			- · · · ·	
Limit	Limit Type	Channel	Settina	Setpoint		Settina	Setpoint		Combination Limit 3	
10			Setting	% of FS	Primary		% of FS	Primary	Linit 5	
1	1sec	Volts AUX	Above	90.00	12.96K	Below	95.00	13.68K	OR	
2	Not Assigned		Above	105.00		Below	95.00		OR	
3	1sec	Volts CN	Above	105.00	15.12K	Below	95.00	13.68K		
4	Not Assigned		Above	25.00		Below	15.00		OR	
5	1sec	Frequency	Above	101.80	61.08	Below	98.40	59.04	OR	⊢
6	1sec	IC	Above	25.00		Below	15.00	3.75	OR	
7	THD	Volts AN/AB	Above	15.00	15.00	Below	0.00	0.00		
8	THD	Volts BN/BC	Above	15.00	15.00	Below	0.00	0.00	OR	
9	THD	Volts CN/CA	Above	15.00	15.00	Below	0.00	0.00	AND	
10	THD	IA	Above	15.00	15.00	Below	0.00	0.00	AND	
11	THD	IB	Above	15.00	15.00	Below	0.00	0.00	AND	
12	THD	IC	Above	15.00	15.00	Below	0.00	0.00	AND	
13	Not Assigned		Above	110.00		Below	90.00		AND	
14	Not Assigned		Above	110.00		Below	90.00		AND	-
Channe	els	Primary Value:	s at 100%	1						
IA, B, C				25.00						
l Nm	,	_	2	25.00						
V Phase	e to Neutral	_	1440	00.00						
V Aux		14400.00								
V Phase	e to Phase	24960.00								
Power P	hase		360000.00							
Power T	otal	1080000.00								
Frequen	юу	7	6	60.00	OK		<u>C</u> ancel	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.
  - The Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

#### Example 1:

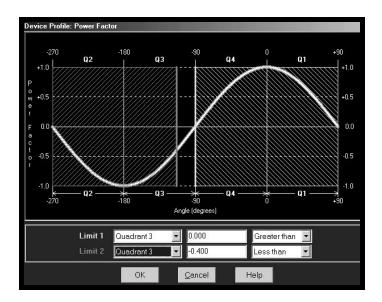
Limit ID 1: Type: 1 Second Readings Channel: Volts AN Limit 1 Setting: Limit exceeded if Volts AN is below 12V. Limit 2 Setting: Limit exceeded if Volts AN is above 132V. Combination Limit 3 Setting: AND If Limit 1 AND Limit 2 are exceeded then Limit 3 is exceeded.

#### Example 2:

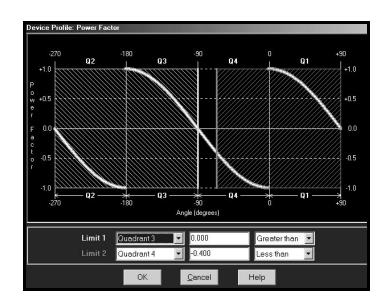
Limit ID 1: Type: 1 Second Readings Channel: Volts AN Limit 1 Setting: Limit exceeded if Volts AN is below 12V. Limit 2 Setting: Limit exceeded if Volts AN is above 132V. Combination Limit 3 Setting: OR If Limit 1 **OR** Limit 2 are exceeded then Limit 3 is exceeded.

To combine Limits of different Limit IDs, use the Relay Logic Diagrams.

- 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 quardrants. **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.



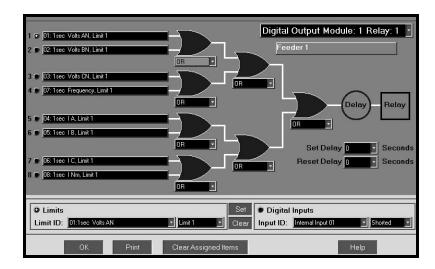
- Note: This meter is a real four quadrant meter. Therefore, limits can be set for capacitive and inductive PF when generating or consuming power.
- 6. When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update 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 3.25.

# 3.11: ElectroLogic Relay Control

- To edit a Device Profile's ElectroLogic Relay settings:
- 1. 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:



2. 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 11 of this manual.

# 3.12: 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 8 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:
- 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 3.25).

Туре	Chai	nnel
1sec	Volts AN	<u> </u>
Add		<u>R</u> emove
Туре	Channel	<u> </u>
1sec	Volts AN	
1sec	Volts BN	
1sec	Volts CN	
1sec	IA	
1sec	IB	_
1sec	IC	
1sec	Volts AB	
1sec	Volts BC	
1sec	Volts CA	
1sec	VA Total	
1sec	VAR Total	
1sec	Watt Total	
1sec	Frequency	<u>.</u> .
<u> </u>		<u> </u>
Total bytes used	174	
Bytes remaining	82	
<u>0</u> K	<u>C</u> ancel	<u>H</u> elp

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.

# 3.13: 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 3.12.
- See Chapter 8 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:

Device Profile: Interval Log Setting							
_ <sup>∟Log</sup>	_Log 1 Interval						
0	Hours 5 Minutes 0 Seconds						
_ Log	 _ Log 2 Interval						
0	Hours 18	5 Minutes	0 Secor	nds			
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp				

- 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 3.25.
- 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 3.25).

# 3.14: 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 3-27.
- 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 Profi	ile: Waveform - C	BEMA Profile				
	Waveform Above Setpoint		Waveform Below Setpoint			
Channel	Value(%)	Enable	Value(%)	Enable	PQ Enable	
Volts AN	105.00	V	95.00	◄		
Volts BN	105.00		95.00		$\checkmark$	
Volts CN	105.00		95.00			
IA	25.00	$\checkmark$	15.00	$\checkmark$		
IB	25.00		15.00		$\checkmark$	
IC	25.00		15.00			
1Nm	10.00 🗆		0.00			
Volts AB	120.00		20.00			
Volts BC	120.00		20.00			
Volts CA	120.00		20.00			
Input	Waveform Enal	ole PQ Ena	ble Samplin	g Rate 128	8 🔻 Samples / Cycle 🤅	_ ⊉ 60Hz
2						
				_		
4			Total Ca	ptures 1	<u> </u>	
5 6						
<u>б</u> 7			[ A limit ∨	$^{-}$ A limit value of 100 % equals the following primary value –		
7 8			I A,B,C	25.00 V I	P-N 14400.00 VP-P 2	4960.00
				<u>0</u> K	<u>Cancel</u> <u>H</u> elp	

#### ■ 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 1250/1252 5 Amp Standard Hardware 61.9437A Peak before clipping.
- Nexus 1250/1252 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 Samples	3	х	64 =	192 cycles of recorded waveforms
128 Samples	3	х	8 =	24 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.

- 5. 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".
- 6. 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 3.25).

#### 3:15: 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 Profi	le: Nexus Internal li	nput Pulse Accumul	lators Setup
Source	Units/Pulse	Aggregator	User Assigned Label
1	25	Add to 1	<b>⊥</b>
2	10	Add to 2	
3	10	Add to 3	
4	10	Add to 4	
5	10	Add to 1	
6	10	Add to 2	
7	10	Add to 3	
8	10	Add to 4	<b>1</b>
Source	Hour R	leading	Aggregator
Source Nexus	Hour R Quadrant(1 + 4) W		Aggregator
	Quadrant(1 + 4) W		► Add to 1
Nexus	Quadrant(1 + 4) W	/att Hour	► Add to 1
Nexus	Quadrant(1 + 4) W	/att Hour	► Add to 1
Nexus Aggreg 1	Quadrant(1 + 4) W	/att Hour	► Add to 1
Nexus Aggreg 1 2	Quadrant(1 + 4) W	/att Hour	► Add to 1

- **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.

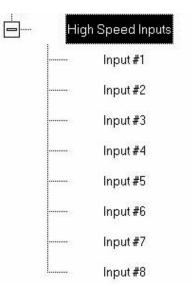
- 3. To add or subtract data, use pull down menu in each window of Accumulator column(s).
- 4. When all data has been entered, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the Update Device button. This sends the new profile to the Nexus Monitor.

#### 3.16: 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.

Input ID	Name	Open Label	Shorted Labe	l Normal Condition
. 1	Input 1	Open	Shorted	Shorted
2	Input 2	Open	Shorted	Open
3	Input 3	Open	Shorted	Shorted
4	Input 4	Open	Shorted	Open
5	Input 5	Open	Shorted	Open
6	Input 6	Open	Shorted	Shorted
7	Input 7	Open	Shorted	Open
8	Input 8	Open	Shorted	Shorted
		<u>0</u> K	<u>C</u> ancel	<u>H</u> elp

4. 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.

#### 3.17: External Devices

- This setting of the Device Profile configures the Nexus External Devices, a variety of I/O Modules configurable using the screen below.
- 1. From the Device Profile screen (see section 3.2), double-click on the "External Devices" line.



2. The following screen appears:

Device Profile: 1/0 Modules								
Module Number	Туре	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	Digital Input	1	Edit	Edit	4	DI Module 1		
6	Digital Output	1	Edit	Edit	4 DO Module 1			
7	KYZ Output	1	Edit	Edit	4 KYZ Module 1			
8	Analog In 0 - 1 mA 8 ch	1	Edit	Edit	4	Al Module 1		
9	Analog In 0 - 20mA 8 ch	1	Edit	Edit	4	Al Module 2		
10	Analog In 0 - 5∨ 8 ch	1	Edit	Edit	4	Al Module 3		
11	Analog In 0 - 10V 8 ch	1	Edit	Edit	4	Al 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		<u>C</u> ancel		Н	elp		

3. 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.

# 3.18: 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.



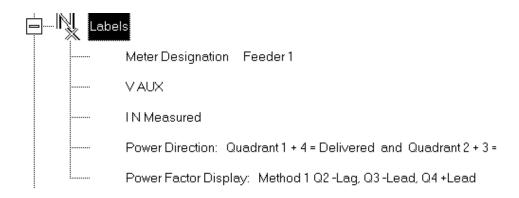
- Many utility companies want to read secondary volts and primary power readings. This feature enables this to be accomplished.
- 1. From the Device Profile screen (see section 3.2), double-click on the "External Display Options" line.

Device Profile: External Display Settings							
Voltage Readings Primary							
ОК	<u>C</u> a	ancel	Help				

- 2. 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 1262/1272. External displays can be used with the meter but not set through the Device Profile.

#### 3.19: 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. 8 for details on logs.
- 1. From the Device Profile screen (section 3.2), click on the (+/-) button beside "Labels" or doubleclick on the "Labels" line. The following submenu appears:



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

Ŀ
_

- 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.

#### 3.20: DNP Custom Class Map

- The DNP Custom Class 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. For a list of available readings, see Appendix E.
- 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. If your meter supports DNP Level 1 (1250), this screen appears:

	Port 1		Port 2		Port 3		Port 4	
Items	Class	Point(s):Obj		Point(s):Obj		Point(s):Obj	Class	Point(s):Obj
Volts AN, BN, CN	None	30-32:30	None	30-32:30	None	30-32:30	None	30-32:30
Volts Aux	None	33:30	None	33:30	None	33:30	None	33:30
I A, B, C	None	34-36:30	None	34-36:30	None	34-36:30	None	34-36:30
l Nm	None	37:30			None		None	37:30
l Nc	None	38:30			None		None	38:3
Volts AB, BC, CA	None	39-41:30		39-41:30		39-41:30		39-41:3
VA A, B, C	None	42-44:30		42-44:30		42-44:30		42-44:3
VA Total	None		None		None	10.00	None	45:3
VAR A, B, C	None	46-48:30		46-48:30		46-48:30		46-48:3
VAR Total	None		None		None		None	49:3
Watt A, B, C	None	50-52:30		50-52:30		50-52:30		50-52:30
Watt Total	None	53:30			None		None	53:3
Frequency	None	54:30			None		None	54:3
Power Factor A, B, C	None	55-57:30		55-57:30		55-57:30		55-57:3
Power Factor Total	None	58:30			None		None	58:30
Volt & Current Imbalance	None	59-60:30	None	59-60:30	None	59-60:30	None	59-60:30
					VE	nahle DNP	Time Sv	/nchronization
Mapping Not Compressed	1 <u>-</u>	OK I	<u> </u>					_1
Mapping Not Compressed	1 <u> </u>	ОК	Cancel	Help	Syn	c Interval 1	Day	

# Note: If your meter is the "Enhanced" 1252, your meter supports DNP Level 2 and a set of screens will appear. For details on DNP Level 2, see Chapter 17 of this manual.

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. A Compressed Map like the example above creates a number sequence (starting with 0) for only those Points selected for a Class. A Not Compressed Map follows exactly the original DNP Mapping. The Compressed Map is a more efficient way to search for assigned values. Refer to Nexus DNP Manual Revision 1.4.

Click Enable DNP Time Synchronization, if you would like to set the time through DNP. When Time Synchronization is Enabled, a Sync Interval pull-down menu appears. The Sync Interval can be set from 1 Minute up to 1 Day in 1-minute intervals. The factory Initial Setting is 1 Day. The Nexus meter initiates the Time Sychronization sequence by sending the appropriate response to the Master connected to the Nexus. The Nexus continues to synchronize time by sending the appropriate response to the Master every time the selected Interval is reached.

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.

**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.

# 3.21: Internal KYZ Outputs

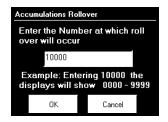
- The Nexus 1250/1252 has no Internal KYZ Outputs. The Internal KYZ Outputs settings allow you to assign a channel and determine other settings for the Heartbeat LED. (The Nexus 1262/1272 is available with the KYZ Output Option.)
- 1. From the Device Profile screen (section 3.2), click on the (+/-) button beside "Internal KYZ Settings" or double- click on the "Internal KYZ Settings" line. The screen appears:

Nexus Interna	al KYZ Outputs					
KYZ Output	Assigned Channel Watt Hour Per Pulse V		Pulse Width(ms)	Form		
HB LED	Quad (1 + 4) Watthour	1.00000	5 📩	Enable _		
	ОК	<u>C</u> ancel	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 1250/1252 Meter.
- Note: For Nexus 1250/1252 Only: To make the Nexus 1250/1252 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 3.26).

#### 3.22: 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.



#### 3.23: Custom Modbus Map

- The Custom Modbus Map for Nexus 1250 can position up to 256 Registers (or the equivalent of 2K, whichever is lower) to readily provide the functionality you want from your Nexus.
- 1. From the Device Profile screen (section 3.2), click on the (+/-) button beside "Custom Modbus Map" or double-click on the "Custom Modbus Map" line. The screen appears:

Nexus U	ustom M	odbus Ma	ар			
ltem <sup>.</sup>	Modbu Line	Modbus Map Line Point Registers Register Description		Channel		
1	0	0	8	412289	Device Name	-
2	9	0	4	412297	1 Cycle Block Time Stamp	Time Stamp
3	12	0	2	412301	1 Cycle Current(A, B, C)	IA
4	12	1	2	412303	1 Cycle Current(A, B, C)	IB
5	12	2	2	412305	1 Cycle Current(A, B, C)	IC
6	13	0	2	412307	1 Cycle Measured N Current	l Nm
7	14	0	2	412309	1 Cycle Calculated N Current	l Nc
8	20	0	2	412311	Tenth Second Current(A, B, C)	IA
9	20	1	2	412313	Tenth Second Current(A, B, C)	IB
10	20	2	2	412315	Tenth Second Current(A, B, C)	IC
11	22	0	2	412317	Tenth Second Phase to Phase Volts	Volts AB
12	22	1	2	412319	Tenth Second Phase to Phase Volts	Volts BC
13	22	2	2	412321	Tenth Second Phase to Phase Volts	Volts CA
14	25	0	2	412323	Tenth Second VAR (A, B, C)	VARIA
15	25	1	2	412325	Tenth Second VAR (A, B, C)	VAR B
16	25	2	2	412327	Tenth Second VAR (A, B, C)	VARC
17	27	0	2	412329	Tenth Second Watts (A, B, C)	Watts A
18	27	[1]	2	412331	Tenth Second Watts (A, B, C)	Watts B
OK		Clear all	Clear	Cancel	Print Help <b>Registe</b>	rs 44 of 256

2. This 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.

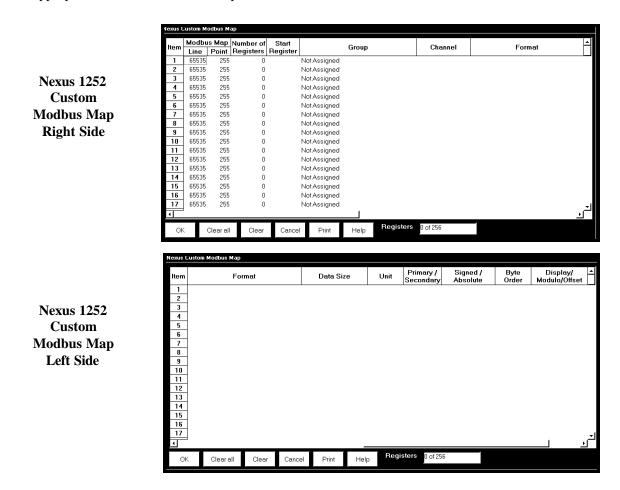
				_			ł				
1	Π	Address	Line	Pt	Description	Rango	U	itr	Type	R/W	Hatap
2					Deviceildensifa	dtion Block					
3	00	0001-00008	0	0	Bovico Namo				F1	К	
4	00	0009-00016	1	0	Firmware Variation String 1				F1	в	
5	00	0017-00024	1	1	Firmware Variation String 2				F1	в	
6	00	0025-00032	1	2	Firmware Variation String 3				F1	В	
7	00	0033-00040	1	3	Firmware Variation String 4				F1	R	
										-	

3. 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 downloaded from our website electroind.com in the Free Downloads section).

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

With the Custom Modbus Map for Nexus 1252 you can select up to 256 Registers (or the equivalent of 2K, whichever is lower) to provide the functionality you want from your Nexus. In addition, you can customize selected values for Format Type, Scaling, Byte Order, Data Size, etc.

Data entry is straightforward. Each type of data is described below. Note that not all selections will appear on the screen at the same time. You have to scroll the screen from right to left to reach some of the functions. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu will automatically adjust to provide the appropriate selections for that data point.



#### NOTE: Table of Modbus Map Readings on page 3-39.

- **Data Point Selection** (There are two different ways to select a Data Point.)
  - 1. Refer to the Modbus Map and find the associated Line and Point for the value you want. When you enter those values into the table, the software will complete the associated Group and Channel.
  - 2. Double-click the Group field. From the pull-down menus, select a Group and Associated Channel value. The software will complete the Map and Line values.

#### ■ Number of Registers

The number of registers polled for this Data Point is automatically computed. The number is dependent on the Data Size selected in the Data Size column.

#### ■ Start Register

Start Register numbers are automatically assigned. The registers are assigned and adjusted automatically to take into account previous entries and data sizes. This is the Start Number for the first register to use in polling.

#### Format

From the pull-down menu, select a type of Format for a value such as Floating, Integer, etc.

#### Data Size

From the pull-down menu, select the Number of Bytes you want to represent the Data Point.

#### Unit

If the polled value is viewed as an integer, the Unit field tells you where to place the decimal point. Example: If you select .01, a polling value 1234 would be interpreted as 12.34. Example: If you select 100, a polling value 1234 would be interpreted as 123400.

#### Pri/Sec

The meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.

#### ■ Sign/Abs

Where appropriate, you may have the option of having the data point computed as a signed or absolute value.

#### **Byte Order**

For most of the Data Points, the user can select the polling order of the number of bytes selected by the Data Size field.

Example: For a four-byte Data Point, the bytes can be arranged in any order for polling purposes.

#### ■ Display/Modulo/Offset

Depending on the Data Point selected, you may select one or more additional options with the appropriate subselections.

**Display:** For certain Data Points, interpretation and display options are offered. Example: For An Angle values, you can represent and display as 0 to 360 degrees or -180 to +180 degrees, etc. Selections will appear in a pull-down menu for the associated point.

**Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.

**Offset:** Where allowed, you can enter a value (offset) which will be added to the data point when it is computed.

Line	Point	Description			
34	0	One Second Phase to Neutral Volts: Volts AN			
34	1	One Second Phase to Neutral Volts: Volts BN			
34	2	One Second Phase to Neutral Volts: Volts CN			
35	0	One Second Auxiliary Volts: V Aux			
36	0	One Second Current (A, B, C): IA			
36	1	One Second Current (A, B, C): IB			
36	2	One Second Current (A, B, C): IC			
37	0	One Second Measured N Current: I Nm			
38	0	One Second Calculated N Current: I Nc			
39	0	One Second Phase to Phase Volts: Volts AB			
39	1	One Second Phase to Phase Volts: Volts BC			
39	2	One Second Phase to Phase Volts: Volts CA			
40	0	One Second VA (A, B, C): VA A			
40	1	One Second VA (A, B, C): VA B			
40	2	One Second VA (A, B, C): VA C			
41	0	One Second VA Total: VA Total			
42	0	One Second VAR (A, B, C): VAR A			
42	1	One Second VAR (A, B, C): VAR B			
42	2	One Second VAR (A, B, C): VAR C			
43	0	One Second VAR Total: VAR Total			
44	0	One Second Watts (A, B, C): Watts A			
44	1	One Second Watts (A, B, C): Watts B			
44	2	One Second Watts (A, B, C): Watts C			
45	0	One Second Watts Total: Watts Total			
46	0	One Second Frequency: Frequency			
47	0	One Second Power Factor (A, B, C): PF A			
47	1	One Second Power Factor (A, B, C): PF B			
47	2	One Second Power Factor (A, B, C): PF C			
48	0	One Second Power Factor Total: PF Total			
49	0	One Second Imbalance: Voltage			
49	1	One Second Imbalance: Current			
216	2	Block Window Average Watt			
217	3	Maximum Block Window Positive Watt			
217	4	Maximum Block Window Negative Watt			
218	3	Minimum Block Window Positive Watt			
218	4	Minimum Block Window Negative Watt			
194	0	Phase A-N/Phase A-B Voltage THD			
195	0	Phase B-N/Phase B-C Voltage THD			
196	0	Phase C-N/Phase C-A Voltage THD			
197	0	Phase A Current THD			
198	0	Phase B Current THD			
199	0	Phase C Current THD			

# 3.24: Flicker Settings

- With the Flicker Settings screen, the user can set the test times for the Flicker function.
- 1. From the Device Profile screen (section 3.2), click on the (+/-) button beside "Flicker Settings" or double-click on the "Flicker Settings" line. The screen appears:

Short term test time (PST) 10 - Mi	
	nutes
Long term test time (PLT) 240 🗾 Min	nutes
Frequency 60 - Hz	
OK <u>C</u> ancel Help	

- 2. From the pull down menus, select a Short term test time and a Long term test time.
- 3. From the Frequency pull-down menu, select 50 or 60 Hz.
- 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: Flicker is discussed in detail in Chapter 16 of this manual.

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

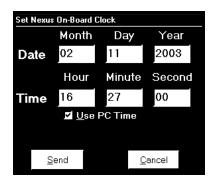
1. From the menu bar select Tools, Reset Nexus Information. The following screen appears.



- 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. You can password protect this feature by enabling the Password feature of the Nexus. (See Chapter 12 for details).

#### 3.26: 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:



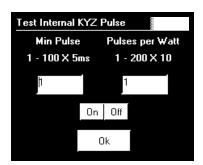
- To synchronize the Nexus Monitor and your computer, leave the Use PC Time box checked.
- To set the date and time independent from the PC, deselect the Use PC Time box and enter the time and date settings.
- 2. Click the Send button to update the Nexus Monitor's time settings.
- To **retrieve** the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

Current Nexus Device Time						
Date	06/20/2003	Friday				
Time	12:49:50.02	IRIG-B				
Polling INP100 Unit 1 96						
	<u>0</u> K	<u>H</u> elp				

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

#### 3.27: 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:



- 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. Click OK to return to the main Nexus Communicator screen.
- Note: For Nexus 1250/1252 Only: If settings from section 3.21 are being used, ignore the settings displayed on this screen.

#### 3.28: Low Level Access

■ Select Low Level Access from the Tools menu.

Low Level Access is not required for normal operation. Low Level Access is a diagnostic tool for third party software and devices. It is designed to be used ONLY by appropriate level Programming Personnel in conjunction with the Modbus Map.

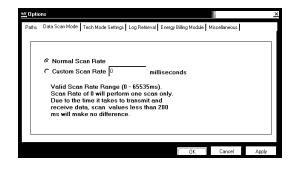
The latest version of the Nexus Modbus Map can be downloaded from the **Free Downloads** section of our website: **www.electroind.com**.

#### 3.29: Options

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



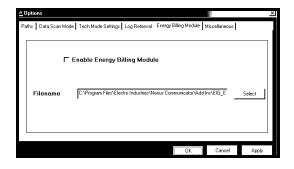
**Paths:** View or change the paths Nexus Communicator uses to store any copied, exported or retrieved data.



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







Just Uptions		
Paths   Data Scan Mode   Tech Mode Settings   Log Retrieval   Energy Billing Module	Miscellaneous	
☐ Enable Kh/Ke Test Pulse Calculation screen		
Ethernet Packet Delay 🕕 milliseconds		
OK.	Cancel	Apply

**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.

**Energy Billing Module:** Click the box on this screen to Enable the Energy Billing Module. The Energy Billing Module can help you manage your Load Profile (see Chapter 14).

**Miscellaneous:** Click the box on this screen to Enable the Kh/Ke Test Pulse Calculation screen. Set the Ethernet Packet Delay in milliseconds. Some systems may require a longer delay if they are slow.

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

#### 3.30: Network Option Update

- Connect your computer to the Nexus 1250/1252 INP100 Port 1. Move the switch beneath Port 1 to select RS-232. Make sure that the meter is connected to your network and is operating properly. NOTE: This screen is not supported by meters with the INP10 Option.
- 2. Connect using Communicator to the Nexus over the serial port and close the Device Status window.
- 3. Select from the menu bar "Tools/Network Card Settings". The following screen appears:

Network Card Run Time Update									
Connect	🔽 Communicate through Nexus								
Boot Version	Copyright 2002 Electro Industries/GaugeTech (EIG). All Rights Reserved. INP-100 (EIG) 10/100 Base-T Network Option Runtime Firmware: v0.1 (Build 26) Checksum = 0x8E48, Length = 0xCF93C Boot Firmware: v1.0 (Build 40) Checksum = 0x923D, Length = 0x2B424 Flash Memory Size: 2MB SDRAM Size : 32MB								
_ Flash File	Update Settings	] [ <sup>F</sup>	Run Time	File U	pdate Settin	gs (Fixed) ——			
Server	10.0.0.99		Base	16					
Client	10.0.0.1		Baud Rate	11520	0				
Gateway	0.0.0.0		File type	S-Rec	ord				
Net Mask	255.255.255.0		Mac Address	00:01:	58:FF:FF:E3				
Runtime File			· 11	1.1.12	- 11 - 317 - 11	I D I			
Boot File		│	rirmware up		a (ne web Use urrent	rname and Password New			
		י	Isername		[				
Retrieve	Settings Write Settings	F	assword		[				
Update F	Run time Update Boot				Change Pa	assword			
Read command	completed								
L	<u></u> K		нн	elp					

- 4. Make sure there is a check mark in the checkbox at the top of the window for "Communicate through Nexus". If there is not a check, click on the box.
- 5. Click "Connect" at the top left of the window. (Progress is shown in a sub-window at the bottom of the screen.) When connected the "Boot Version" window lists data about the Network board.

**NOTE:** A blinking red bar at the bottom of the window (and a pinging sound) will remind the user that the meter is now in Boot Mode and the meter is not available to other users via the Internet.

- 6. Click on "Retrieve Settings" to retrieve the network settings used to download Flash Files for updating the network option board via TFTP. (The Initial Settings appear in the settings windows.)
- 7. In the text boxes provided enter the name of the Runtime Update File and/or Boot Update File. Check with your Network Administrator and make any changes necessary to the network settings.

**NOTE:** These changes facilitate file transfers while in Boot Mode; there is **no permanent change**. Click on "Write Settings" to send the updated settings to the Nexus. A screen will ask, "Are you sure you want to Update the Flash File Settings?" Click Yes to update. The sub-window will display "Write Completed".

- 8. Start up a TFTP server on your computer. Set the default file path for the TFTP server to the location of the Runtime/Boot Flash file location (TFTP server software is available from EIG).
- 9. To update Runtime/Boot, click on "Update Runtime" or "Update Boot". Click "Yes" to verify that you would like to update the Runtime/Boot firmware. After the update is completed, the message "Update Completed" will appear in the sub-window.
- 10. To Change the Username and Password, type in the Current Username and Password, then the New Username and Password. The Initial Username and Password are **eignet** and **inp100**. You will not be able to change the Username and Password unless you know the Current Username and Password. (A screen will ask, "Are you sure you want to change the Username and Password?"). If you click Change Password, a note in the sub-window will confirm the Password changes.
- 11. To close the "Network Card Runtime Update" window, click OK. Nexus Communicator will update the Nexus. After approximately one minute the network will resume its normal functions.

**NOTE:** It is VERY IMPORTANT to store the passwords in a safe place and to change them frequently.

# 3.31: Update TFTP Settings in Nexus Communicator

- From Nexus Communicator click Device Profile > Comm Ports > Advanced Settings. A series of Advanced Settings screens will appear. Click on the Auto TFTP Download tab. The following screen appears:
- Changes can be made to the following settings: TFTP Server IP Address Client IP Address Subnet Mask Gateway

Firmware Filename

**NOTE:** This information will be used in the Network Card Runtime Update process, which is detailed in section 3.30 above.

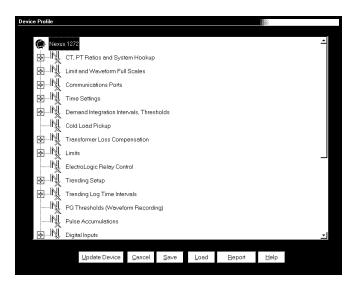
ices I me/DNS IAu	DHCP Ito TFTP Downloa	d GE Protocol (EGD)	FTP Client
t	Don'n Doning		
> Download –	<b>Г</b> Enable	TFTP Port 69	
	Server IP Address		
	Client IP Address		
	Subnet Mask	255.255.255.0	
	Default Gateway	135.15.173.250	
	Downloa	d Filename	
	-	135.15.173.250	

**NOTE:** Check with your Network Administrator before making any changes.

# Chapter 4 Configuring the Nexus 1262/1272 Meter

# 4.1: Overview

■ Nexus Communicator enables you to configure a Nexus 1262/1272 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 1250/1252, see Chapter 3. See Chapter 5 for Futura+.



- The following is an outline of the procedure for configuring a Nexus 1262/1272 Meter:
  - 1. **Retrieve** the Nexus Meter's Device Profile (section 4.2);
  - 2. **Configure** the programmable settings stored in the Device Profile (sections 4.3–4.25);
  - 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 4.26)
  - Setting and Retrieving Nexus Time (section 4.27)
  - Test Pulse (section 4.28) and Options (section 4.30)
- **Note**: Actual programming screens may vary depending on the options ordered with your meter.
- Note: The settings shown are for the Nexus 1262/1272, which have replaced the Nexus 1260/1270 and support DNP Level 2. For a Feature Comparison of Nexus models, refer to section 1.5. For details on DNP Level 2, see Chapter 17 of this manual or refer to DNP V3.00 Protocol Assignents for Nexus 1252, 1262 & 1272, Rev 1.8. The External Devices section of the Device Profile is covered in Chapter 11.

# 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:

Retrieving Programmable	Settings from Device	
Reading Programmable Settin	gs	(16
Time Remaining	3 seconds	
Reading Block	25 of 69	<u>C</u> ancel

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

vice Profile							
N	ElectroLogic Relay Cont	trol					<u> </u>
¢-N	Trending Setup						
¢.N	Trending Log Time Inter	vals					
	PQ Thresholds (Wavefo	rm Recordi	ing)				
N	Pulse Accumulations						
¢-N	Digital Inputs						
	External Devices						
	Display Programmable	Settings					
ē-Ņ	Labels						
ē-Ņ	DNP Custom Classes M	ap					
	Internal KYZ Settings						
N	Accumulations Rollover						
N	Custom Modbus Map						
- N	Flicker Settings						
							J
	Update Device	<u>C</u> ancel	<u>S</u> ave	Load	<u>R</u> eport	Help	

- 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 4.3–4.25 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:

vice Profile Report	
	. 15. [20 col 27
	All and All an
	1 TRANE WINE TR
	TIMUM Bass Variani
	Communications Saturge New Ren 1 Canada Ren 3 Ren 4
	x <sub>111</sub> i         1         1         1         1           i         1         1         1         1
	dynamicau di Tina duru d
	THE BALL OF
	A CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR
	Senure des s
	1         1
	A DATE OF A DATE
- · · · · · · · · · · · · · · · · · · ·	
Page 1 of 18	▶ Zoom Whole Page ▼
Print Pages 1 to	18
	l, ,
<u>P</u> rint	<u>S</u> ave <u>D</u> one
<u> </u>	

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.

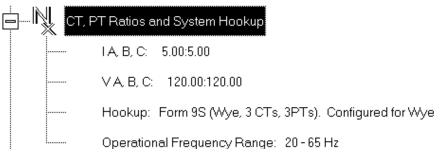
Save: Save these selections for future use.

**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:

Device Profile: CT and PT I	latios				
<sub>C</sub> CT Ratio ———		PT	Ratio ———		
I A, B, C 5.00	5.00		B, C 120.00	120.00	1
 Form 9S					
Wye		<u> </u>			
1	_ Operation	al Frequen	cy Range –		
	20Hz to	o 65Hz	<u> </u>		
	L				
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp		

- 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 1262/1272. Selections may include: 9S 4-Wire Wye or Delta, 36S 4-Wire Wye, 39S 4-Wire Wye and 45S 3-Wire Delta or 4-Wire Wye. The Device Profile screen, including the Form above the connection window, will reflect your selection. See the *Nexus* 1262/1272 *Installation and Operation Manual* for diagrams of these forms.
  - Click OK. The following screen asks you to verify the K<sub>b</sub>/K<sub>e</sub> Ratio for the Test Pulse Setting. K<sub>b</sub>/K<sub>e</sub> Ratio is Secondary Watthour Constant over kWh (the energy).

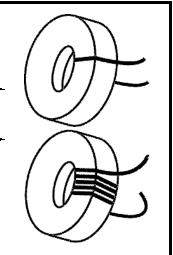
			D			
Ke setting for K	YZ test pu	lse				
Do you want to use the following Kh / Ke for the test pulse setting?						
Kh/Ke =		1000				
KII)Ke -	PT Ratio X CT Ratio					
Kh/Ke = 1000.000000						
<u> </u>	'es	No				

- 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.

# 4.3(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

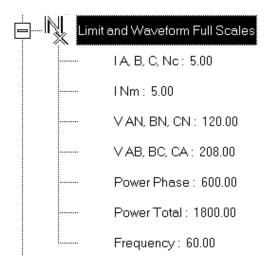
The CT Ratio screen below shows the correct input for the typical one amp user:

Device Profile: C1 and P1 Hatios	
CT Ratio	<sub>F</sub> PT Ratio ———
TA, B, C 1000.00 : 5.00	V A, B, C 1.00 : 1.00
└ ┌Form 9S	-
Wye 📩	
└ Operational Fr	」 equency Range— <sub> </sub>
350Hz to 50	00Hz
<u></u> K	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.

# 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:



- The Nexus 1262/1272 screen displays the Device Profile's settings for the Limit and Waveform Full Scales.
- 2. Double-click on any of the settings; The Limit and Waveform Full Scales screen appears.

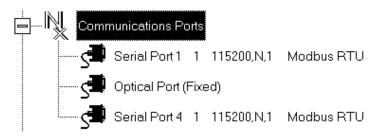
Device Profile: Limit and Waveform Full Scales						
I A, B, C, N	C	5.00				
l Nm		5.00				
V AN, BN, (	CN	120.00				
V AB, BC, 0	ж 🚽	208.00				
Power Pha	se	600.00				
Power Tota	ul 🖉	1800.00				
Frequency		60.00				
ОК	<u>C</u> ancel	Help				

3. Enter the Full Scale for each parameter:

- The Limit and Waveform settings (section 4.10 and 4.14, 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 4.26.

# 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 two 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 an Internal Modem or Ethernet. Ports 1 and 4 are factory set at 115200 and 9600 baud rates, Modem Gateway is 38,400 maximum. See the Nexus 1262/1272 Manual for hardware details.

Device Profile: Comm	unications Settin	ngs				
_ Port 1			Port 4(Ext	Devices)		
Address 1			Address	1		
Baud Rate 11520	)0 <b>-</b>		Baud Rate	115200 _	-	
Data Bits 8	-		Data Bits	8 _	-	
Parity None	<b>-</b>		Parity	None _	-	
Stop Bits 1	•		Stop Bits	1 _	-	
Tx Delay Oms	<b>_</b>		Tx Delay	Oms _	-	
Protocol			Prot	ocol	-	
Modbus RTU	<u>•</u>		Modbus R1	U _	-	
			Mode	Slave _	-	
⊥ ⊢Network Settings	s (If Network	Option	was purcha	ised) ——		
IP Address	10 0	0	1			
Subnet Mask	255 25	5 25	5 0			
Default Gatewa	y 135 15	17	3 250			
[Internal Modem]	Settings (If In	ternal	Modem Opt	ion was p	urchased) —	
Answer Phone on 📴 Rings						
Modem Gatewa	y Baud Rate	38	400 🗾	Dial Ou	t Profile	
	<u>0</u> K	<u>C</u> an	cel	<u>H</u> elp		

- 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**: <u>Direct Connections</u> made through Nexus Communicator must use either Modbus RTU or Modbus ASCII protocol (Modbus RTU is recommended). <u>Modem Connections</u> made through Nexus Communicator **must use Modbus ASCII only**. Use the pull-down menu to select from:

e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

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.

If your meter has the **INP100 Option (10/100BaseT)** and you click on the Advanced Settings button, the following set of screens will appear. The meter is shipped with initial settings, or you can fully configure the settings using these screens and FTP Client. The process is detailed in **Chapter 6. NOTE:** This screen is **not** supported by meters with the INP10 Option.

Autalica network card settings				<u> </u>
Services	DHCP	GE Protocol (EGD)		
Computer Name / DNS Y Auto TF	TP Download	Alarm / Email	T FTP CI	ient
Alarm / Email Email Server IP Address / Name Email Server Port Email Monitor Email Address Return / Reply Address Email Subject Text	65535	-		
F Email Server requires authentic	ation	_		-
Username				
Password		-		
	ок	Cancel		

- **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 9** of this manual. This feature is ordered as INP 2.
- 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.

Modem Programming			
<sub>C</sub> Primary phone number settings -		— <sub>  「</sub> Secondary phone number setting	s
Number 104		Number 101	
Retry delay 1	Minutes	Retry delay 1	Minutes
Retry limit 3 🔹	Attempts	Retry limit 1 🗾	Attempts
Connection type Computer 💌	ſ	Connection type Computer	
 _ Communications settings		Modem settings	
Activity timeout limit 1	Minutes	Rings to answer 3 🗾 F	Rings
Call delay timer limit 10 🗾 💌	Seconds	Identification Host2	
Callback type Playback 💌		Password 123	
Call failure reset limit 2	Hours	Enable password 🔽	
Share the phone line		Violation limit 3 🗾 🖉	Attempts
		Violation lockout time 1	Hours
L Dial out on the following condition	ns		
Limits status change		er quality event 📕 Cycling of control p	oower
📕 High speed input change	📕 Control outpu	t change 🗾 Modem password t	failure
Waveform record captured Filling of meter		er memory 🛛 🗹 Failure of communi	ication with Nexus
Log full limit threshold (All Logs) 100	%	Edit gateway port de	vvices
	ОК	<u>C</u> ancel Help	

The Edit Gateway Port Devices button at the bottom of the screen is used to Enable up to 8 devices that are connected the gateway and are to be monitored. When the user clicks the Edit Gateway Port Devices button, the following screen is displayed:

Click on the Box next to the Device to be monitored. A Device Address will appear next to the Enabled Device.

Change the Device Address, if needed, to any address except 1. The Number 1 is always reserved for the Primary Device.

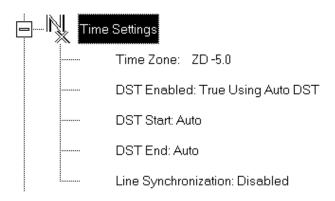
Click OK to return to the Modem Programming screen.

Gateway Devices to be Mon							
		Device Address					
1	M	2					
2	N	3					
3	Y	4					
4	>	5					
5	Y	6					
6	>	7					
7	Y	8					
8	>	9					
ОК		<u>C</u> ancel					

 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 1262/1272 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 a programmable settings ("Time Zone", etc.); the Time Settings screen appears.

Device Profile: Time Settings								
Zone Des	5.0							
<sub>∫</sub> Daylight S	Daylight Savings Information—							
Auto	DST	<u> </u>						
Line Synchronization								
Enable	Yes _	-						
Frequency	60Hz _	-						
<u>о</u> к	<u>C</u> ancel	<u>H</u> elp						

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 & 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:

**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.

**Start:** 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.

• Line Synchronization: Set Enable or Disable and Frequency.

The basic function of Line Synchronization is to adjust the real time clock to track the time based on the power line frequency. For this purpose, Phase A voltage ONLY is used. Line Sync is disabled if a GPS signal is present.

#### How Time is Adjusted:

After the clock is synced to the line, the Nexus periodically checks the cumulative difference between the real time clock in cycles and the line cycle count. If the absolute difference is greater that 50 (60) cycles, the clock is adjusted + / - 1 second accordingly.

- 4. To set the Nexus on-board clock, use Set Nexus Time from the Tools menu. (see section 4.26).
- 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 4.26.

# 4.7: Programming Demand Integration Intervals

- See *Nexus* 1262/1272 *Installation and Operation Manual* for details on Demand Integration.
- 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:

Demand Integration Intervals, Thresholds
 Thermal Averaging Time Interval Window: 0h, 5m, 0s
 Block Averaging Time Interval Window: 18h, 12m, 15s
 Rolling Averaging Sub-Interval Window: 0h, 15m, 0s
 Rolling Sub-Intervals: 5
 Predictive Rolling Window Average: 100.00
 I Squared T Threshold: 0.000
 V Squared T Threshold: 0.000

2. Double-click on any of the settings and the Demand Programming Screen appears:

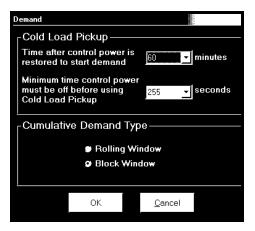
evice Profile: Demand Integration							
Thermal Averaging Time Interval Window							
0 Hours 5	Minutes 0	Seconds					
<sub>F</sub> Block Averaging Ti	ime Interval	Window —					
18 Hours 12	Minutes 15	Seconds					
Rolling Averaging	Sub-Interval	Window					
0 Hours 15	Minutes 0	Seconds					
Rolling Sub-Interv	als ——						
5	Rolling Aver Interval Win		.00 Minutes				
Predictive Rolling Window Average							
<sub>F</sub> Block Window Syn	c						
I Use Sync Pulse HS Input ₽ 1							
☐ Generate End of Interval Pulse Relay & _ Pulse Width 635 _ ms							
$_{ m \Gamma}$ Primary Current and Voltage Thresholds —							
I Squared T 0.000 V Squared T 0.000							
$_{\Gamma}$ Energy, Pulses and Accumulations in the Interval							
Interval 60	minut	BS					
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp				

- 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 Averaging Time Interval Window: allows you to set hours, minutes and seconds for a precise thermal window of demand data.
  - **Block Averaging Time Interval Window:** allows you to set hours, minutes and seconds for a precise 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 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.
  - Energy, Pulses and Accumulation in the Interval: Select an interval, such as 60 minutes.
- 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 Cold Load Pickup and Cumulative Demand

1. From the Device Profile screen (see section 4.2), click on the (+/-) button beside "Cold Load Pickup and Cumulative Demand" or double-click on the "Cold Load Pickup and Cumulative Demand" line. The following screen appears:

On this screen the user sets the Cold Load Pickup Delay in minutes. This value is the delay from the time control power is restored to the time when the user wants to resume demand accumulation.

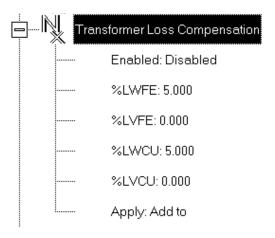


e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

- Cold Load Pickup: Delay can be 1 to 60 minutes or Disabled.
- Minimum time control power must be off before using Cold Load Pickup: Value is set from 0 to 255 seconds.
- 2. 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.

# 4.9: 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:

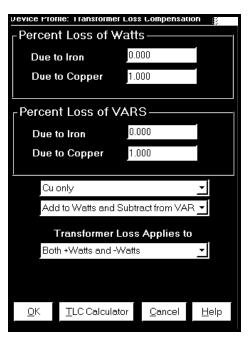


- 2. This screen displays the current values for the Nexus Monitor's Transformer Loss Compensation.
  - %LWFE = Percent Loss of Watts due to Iron
  - %LVFE = Percent Loss of Vars due to Iron
  - %LWCU = Percent Loss of Watts due to Copper
  - %LVCU = Percent Loss of Vars due to Copper
- 3. Consult Appendix 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.
- 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.



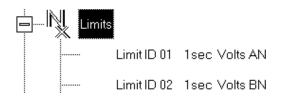
- 7. With the second pull-down menu select from the following:
  - Add to Watts and Subtract from VAR.
  - Subtract from Watts and Add to VAR.
  - Add to Watts and VAR.
  - Subtract from Watts and VAR.
- 8. The "Enhanced" Nexus 1262 and 1272 have a third pull-down menu to apply the loss based on the power flow direction. From the menu select one of the following:
  - Both +Watts and -Watts.
  - -Watts only.
  - +Watts only.

**WARNING!** Do NOT use the last settings if you do not have the appropriate firmware. Check with Technical Support if you have a question.

9. 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 1262/1272 Meter.

#### 4.10: 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 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			Limit 1			Limit 2			a	1	
ID	Туре	Channel	Setting		Setpoint		Settina	Setpoint		Combination Limit 3	
				% of F	S Prim	ary	setting	% of FS	Primary		
1	1sec	Volts AN	Above	-0.	01	-0.01	Above	-0.01	-0.01	AND	
2	1sec	Volts BN	Above	-0.	01	-0.01	Above	-0.01	-0.01	OR	
3	1sec	Volts CN	Above	-0.	01	-0.01	Above	-0.01	-0.01	OR	
4	1sec	Volts AUX	Above	-0.	01	-0.05	Above	-0.01	-0.05	AND	
5	Block Win Avg	Status	Above	-0.	01		Above	-0.01		AND	Р
6	Rolling Win Av	Status	Above	-0.	01		Above	-0.01		AND	
7	THD	Volts AN/AB	Above	-0.	01	-0.01	Above	-0.01	-0.01	AND	
8	THD	Volts BN/BC	Above	-0.	01	-0.01	Above	-0.01	-0.01	OR	
9	THD	Volts CN/CA	Above	-0.	01	-0.01	Above	-0.01	-0.01	OR	
10	1sec	Pwr Factor A	Above	-0.	01		Above	-0.01		AND	
11	1sec	Pwr Factor B	Above	-0.	01		Above	-0.01		AND	
12	1sec	Pwr Factor C	Above	-0.	01		Above	-0.01		AND	
13	Thermal	VA Total	Above	-0.	01	-0.18	Above	-0.01	-0.18	AND	
14	Phase Angles	Volts BN	Above	-0.	01	-0.02	Above	-0.01	-0.02	AND	-
Chann	els	Primary Values	at 100%								
1 A, B, C	, No			5.00							
1 Nm				5.00							
V Phase	to Neutral		12	20.00							
V Phase	to Phase	-	20	00.80							
Power F	hase	7	60	00.00							
Power T	otal	7	180	00.00							
Frequen	су	7	E	50.00							
	-					ОK		<u>C</u> ancel	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.
  - The Combination Limit 3 is the logical combination of Limit 1's state and Limit 2's state.

#### Example 1:

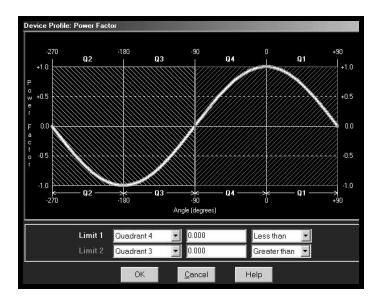
Limit I D: Type: 1 Second Readings Channel: Volts AN Limit 1 Setting: Limit exceeded if Volts AN is below 12V. Limit 2 Setting: Limit exceeded if Volts AN is above 132V. Combination Limit 3 Setting: AND If Limit 1 AND Limit 2 are exceeded then Limit 3 is exceeded.

#### Example 2:

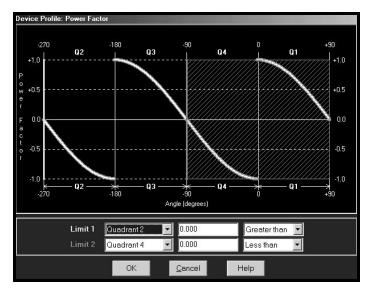
Limit I D: Type: 1 Second Readings Channel: Volts AN Limit 1 Setting: Limit exceeded if Volts AN is below 12V. Limit 2 Setting: Limit exceeded if Volts AN is above 132V. Combination Limit 3 Setting: **OR** If Limit 1 **OR** Limit 2 are exceeded then Limit 3 is exceeded.

To combine Limits of different Limit IDs, use the Relay Logice Diagrams.

- 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 quardrants. **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 4.19) 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.

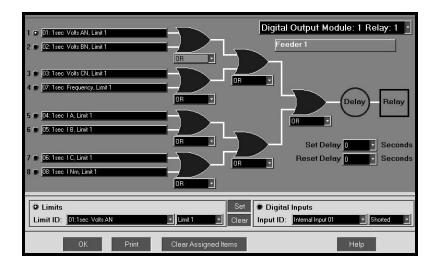
5. When all settings are complete, click OK to return to the main Device Profile screen. For these changes to take effect, you must click on the **Update Device** button. This sends the new profile to the Nexus Monitor. You may **Reset Logs** after updating the device. See section 4.26.

# 4.11: 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 11 of this manual.

# 4.12: 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 4.13. See Chapter 8 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.
- 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 4.26).

evice Profile: Trending Channe	el Assignment Log
Туре	Channel
Cumulative Demand	▼ Q1+4 Watts _
Add	Remove
Туре	Channel
1sec 1sec 1sec Block Win Avg Rolling Win Avg Harmonic Mag Volts Harmonic Mag Current Flicker Readings Interval Energy (Pri) Interval Energy (Pri) Interval Squared Readings Cumulative Demand	Volts AN Volts BN Volts CN Volts AUX Status Status VA: #0 I A: #0 Status VAhour (Q 1+2+3+4) +Wathour (Q 1+4) I Squared T A Q1+4 Watts
Total bytes used	18
Bytes remaining	208
<u>O</u> K <u>C</u> ai	ncel <u>H</u> elp

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.

# 4.13: 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 4.12.
- See Chapter 8 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:

Device Pr	ofile: Interva	l Log	Setting	
Log_	1 Interva	I ——		
0	Hours	5	Minutes	0 Seconds
Log	2 Interva			
0	Hours	15	Minutes	0 Seconds
	<u>0</u> K		<u>C</u> ancel	<u>H</u> elp

- 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 4.27.
- 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 4.26) when changing settings that effect the logs.

# 4.14: Programming the Power Quality and Waveform Recording Thresholds

- The Power Quality (PQ) and Waveform Thresholds setting determines at what point the Nexus 1272 Monitor will execute a waveform capture and/or record a power quality event. See Chapter 8 for how to view logs. (Nexus 1262 does not support Waveform Thresholds.)
- 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:

)evice Pro	file: Waveform - C	BEMA Profile					
	Waveform Ab		Waveform Be	now Setpoint	#880		1
Channe		Enable	Value(%)	Enable		Enable	_
Volts AN	105.00	✓	95.00	✓	1		
Volts BN	105.00		95.00			✓	
Volts CN	105.00	✓	95.00	$\checkmark$			
IA	25.00		15.00	✓			
IВ	25.00		15.00			✓	
I C	25.00		15.00				
l Nm	10.00		0.00				
Volts AB	120.00		20.00			✓	
Volts BC	120.00		20.00				
Volts CA	120.00		20.00				
Input	Waveform Enab	le PQEna	ble .		1		<b>.</b>
1			Sampling	g Rate 12	8 🗾 Sampl	es / Cycle (	@ 60Hz
2							
3							
4			Total Ca	ptures 1	<b>_</b>		
5							
6			_ A limit ∨	alue of 100 %	equals the fo	llowing prime	ry value — <sub>I</sub>
7							
8	⊻	$\checkmark$	IA,B,C	5.00 V	P - N 120.00	VP-P	208.00
				<u>0</u> K	<u>C</u> ancel	<u>H</u> elp	

#### ■ 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 1272 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 Samplin	g Rate	
Samples per Cycle	Cha	nnels	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 Samples	3	х	64=	192 cycles of recorded waveforms
128 Samples	3	х	8=	24 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.

- 5. 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".
- 6. 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 1272 Meter.

# 4:15: Pulse Accumulations

- This section of the Device Profile displays a series of eight running totals available on Nexus 1272. (Nexus 1262 does not support Pulse Accumulations.) 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 Profi	ie: Nexus Internal I	nput Puise Accumulato	s Setup
Source	Units/Pulse	Aggregator	User Assigned Label
1	25	Add to 1 🔄	
2	10	Add to 2 🔄	
3	10	Add to 3 🔄	
4	10	Add to 4 🚬	
5	10	Add to 1 🔄	
6	10	Add to 2 🔄	
7	10	Add to 3 🔄	
8	10	Add to 4 🗾	
Source	Hour F	Reading	Aggregator
Nexus	Quadrant(1 + 4) V	/att Hour 🗾	Add to 1
Aggreg	jator Us	er Assigned Labe	əl
1			
2			
3			
· ·	·		
4			
	ОК	Cancel	Help

- **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.

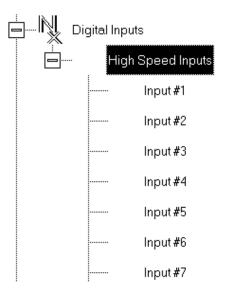
Accumulator: This allows you to place the pulse register into a separate accumulation register, which can aggregate or net values.

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 1272 Meter.

# 4.16: 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 and double-click on "High Speed Inputs". The following submenu appears:



2. Double-click on any of the "Input #" lines; the High Speed Digital Input Assignments screen appears.

Input ID	Name	Open Label	Shorted Label	Normal Condition
1	Input 1	Open	Shorted	Shorted
2	Input 2	Open	Shorted	Open
3	Input 3	Open	Shorted	Shorted
4	Input 4	Open	Shorted	Open
5	Input 5	Open	Shorted	Open
6	Input 6	Open	Shorted	Shorted
7	Input 7	Open	Shorted	Open
8	Input 8	Open	Shorted	Shorted
		<u>о</u> к	<u>C</u> ancel	<u>H</u> elp

4. 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 1262/1272 Meter.

# 4.17: External Devices

- This setting of the Device Profile configures the Nexus External Devices, a variety of I/O Modules configurable using the screen below.
- 1. From the Device Profile screen (see section 4.2), double-click on the "External Devices" line.



2. The following screen appears.

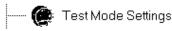
2 4	Analog Out 0 - 1 mA 4 ch		Settings	Settings	Port	Log / Limit ID
		1	Edit	Edit	4 4	AO Module 1
	Analog Out 0 - 1mA 8 ch	1	Edit	Edit	4 A	AO Module 2
3 A	Analog Out 4 - 20mA 4 ch	1	Edit	Edit	4 A	AO Module 3
4 4	Analog Out 4 - 20mA 8 ch	1	Edit	Edit	4 4	AO Module 4
5 [	Digital Input	1	Edit	Edit	4 E	DI Module 1
6 [	Digital Output	1	Edit	Edit	4 E	OO Module 1
7 1	<yz output<="" td=""><td>1</td><td>Edit</td><td>Edit</td><td>4 k</td><td>YZ Module 1</td></yz>	1	Edit	Edit	4 k	YZ Module 1
8 4	Analog In 0 - 1 mA 8 ch	1	Edit	Edit	4 A	Al Module 1
9 4	Analog In 0 - 20mA 8 ch	1	Edit	Edit	4 A	Al Module 2
10 A	Analog In 0 - 5∨ 8 ch	1	Edit	Edit	4 A	Al Module 3
11 4	Analog In 0 - 10∨ 8 ch	1	Edit	Edit	4 A	Al Module 4
12 1	No Device Assigned				4	
13 1	No Device Assigned				4	
14 1	No Device Assigned				4	
15 1	No Device Assigned				4	
16 1	No Device Assigned				4	

3. 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 1262/1272 Meter. For more details on I/O Modules, refer to Chapter 11.

# 4.18: Test Mode

#### Set Exit Delay Time

1. From the Device Profile screen (section 4.2), click on the "Test Mode" icon or double-click on the "Test Mode Settings" line. The Test Mode Settings screen appears:



2. Use the pull down menu to select the delay time in minutes (from 1 to 255 minutes). This is the time in which Nexus Communicator will exit Test Mode if there is no activity. 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 1262/1272 Meter.

Test Mode Settings	
Exit delay time	60 🚽 minutes
ОК	<u>C</u> ancel

#### ■ Test Mode Preset Accumulators

There are two reasons why a user might want to use the Preset Accumulators screens:

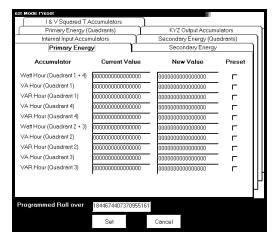
- 1. A monitor in Test Mode is out of service and is therefore not monitoring accumulations. The New Value can be used to adjust for the values not monitored while in Test Mode.
- 2. When replacing an old meter that has accumulations with a new meter that has no accumulations, the New Value can be set with the value of the accumulations of the old meter.

#### ■ Setting Test Mode Preset Accumulators

From the menu bar select Tools > Test Mode > Preset Accumulators. The set of screens shown here (Test Mode Preset Screens) appears.

Each screen has a Current Value, New Value and Preset Box for each accumulator. A new meter will have zeros for Current Values.

Click Tabs at the top of the screens to access the individual screens.



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Settings can be preset for the following sets of values: Primary Energy, Secondary Energy, Primary Energy (Quadrants), Secondary Energy (Quadrants), Internal Input Accumulators, KYZ Output Accumulators, I & V Squared T Accumulators. Examples of some screens are shown here. Click the Preset Boxes for the values you want to set. Click Set or Cancel.

**NOTE:** Programmed (Accumulations) Rollover is set in the Device Profile (see section 4.22). If you try to enter a New Value greater than the Rollover value, the software will not let you.

	AY	Record and Francisco	(O
	Accumulators	Secondary Energy	
Primary I		Secondary Ene	ərgy
I & V Squared T A			
Primary Energy (C	luadrants)	KYZ Output Accumul	ators
Accumulator	Current Value	New Value	Preset
Relay 1	000000000000000000	00000000000000000	- r
Relay 2	000000000000000000	000000000000000000	- r
Relay 3	000000000000000000	0000000000000000000	- r
Relay 4	000000000000000000000000000000000000000	00000000000000000	
Test Pulse (IR)	000000000000000000	000000000000000000	- r
Programmed Roll ove	184467440737095516	1	
	Set	Cancel	

Wett Hour (Quadrant 1)         D0000000000000         0000000000000           Wett Hour (Quadrant 4)         D0000000000000         0000000000000           Wett Hour (Quadrant 2)         D0000000000000         0000000000000           Wett Hour (Quadrant 3)         D00000000000000         0000000000000           Wett Hour (Quadrant 1) 2,3-9         D00000000000000000         D00000000000           VAR Hour (Quadrants 1:2,3-9         D000000000000000000000000000000000000	/ Energy (Quadrar	Secondary E	cumulators	Internal Input Acc
Primary Energy (Quadrants))         KYZ Output Accumulators           Accumulator         Current Value         New Value         Pr           Watt Hou (Quadrant 1)         00000000000000         0000000000000         0000000000000         0000000000000         Watt Hour (Quadrant 2)         00000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         VAR Hour (Quadrant 3) 2.9.9         00000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         0000000000000         00000000000000         00000000000000         0000000000000         00000000000000000         000000000000000         00000000000000         00000000000000         00000000000000         000000000000000000000000000000000000	dary Energy	Seconda	rgy	Primary Ene
Accumulator         Current Value         New Value         Pr           Weit Hour (Quadrant 1)         000000000000000         0000000000000         0000000000000         0000000000000         Weit Hour (Quadrant 2)         000000000000000         00000000000000         00000000000000         00000000000000         Weit Hour (Quadrant 1)         0000000000000000         00000000000000         00000000000000         Weit Hour (Quadrant 1)         000000000000000         00000000000000         0000000000000         Weit Hour (Quadrant 1:2.3.9)         000000000000000         0000000000000         0000000000000         VAR Hour (Quadrant 1:2.3.9)         000000000000000000000000000000000000			mulators	1 & V Squared T Accu
Wet Hour (Quadrant 1)         00000000000000         000000000000           Wet Hour (Quadrant 4)         00000000000000         0000000000000           Wet Hour (Quadrant 3)         00000000000000         0000000000000           Wet Hour (Quadrant 3)         00000000000000         0000000000000           Wet Hour (Quadrant 1: 2.9)         000000000000000000000000000000000000	ccumulators	KYZ Output Acc	drants)	Primary Energy (Qua
Watt Hour (Ousdrant 4)         000000000000000000000000000000000000	alue Pres	New Valu	Current Value	Accumulator
Wett Hour (Quedrant 2)         00000000000000         0000000000000           Wott Hour (Quedrant 3)         00000000000000         00000000000000           VAt Hour (Quedrant 12.34)         00000000000000         000000000000           VAR Hour (Quedrant 12.34)         0000000000000         000000000000           VAR Hour (Quedrant 12.34)         0000000000000         000000000000           VAR Hour (Quedrant 12.34)         000000000000         00000000000		000000000000000000000000000000000000000	0000000000000000	Watt Hour (Quadrant 1)
Wett Hour (Quedrent 3)         000000000000000000000000000000000000		000000000000000000000000000000000000000	000000000000000000	Watt Hour (Quadrant 4)
VA Hour (Quadrants 1.2.3.4) 000000000000000000000000000000000000		000000000000000000000000000000000000000	00000000000000000000	Watt Hour (Quadrant 2)
VAR Hour (Quadrants 1 + 2) 0000000000000000000000000000000000		000000000000000000000000000000000000000	0000000000000000000	Watt Hour (Quadrant 3)
	00000 <b>Г</b>	000000000000000000000000000000000000000	00000000000000000	VA Hour (Quadrants 1,2,3,4)
VAR Hour (Quedrents 3 + 4) p00000000000000000000000000000000000	00000 F	000000000000000000000000000000000000000	00000000000000000	VAR Hour (Quadrants 1 + 2)
		000000000000000000000000000000000000000	000000000000000000	VAR Hour (Quadrants 3 + 4)
	10000	100000000000000000000000000000000000000	p	,
Programmed Roll over 1844674407370955161			1944674407270055161	Programmed Boll over
10grammed 101 0ver 18448/440/3/8555181			1044074407370355161	rogrammed rion over
Set Cancel		Cancel	Set	

Primary I	Energy	Secondary	Energy
I & V Squared T A	.ccumulators	1	
Primary Energy (C		KYZ Output Accun	nulators
Internal Input Accum	nulators	Secondary Energy (Q	uadrants)
Accumulator	Current Value	New Value	Preset
Watt Hour (Quadrant 1)	000000000000000000000000000000000000000	000000000000000000000000000000000000000	- r
Watt Hour (Quadrant 4)	000000000000000000	000000000000000000	— г
Watt Hour (Quadrant 2)	000000000000000000	000000000000000000	— г
Watt Hour (Quadrant 3)	0000000000000000000	0000000000000000000	— г
VA Hour (Quadrant 1)	000000000000000000	000000000000000000000000000000000000000	- r
VAR Hour (Quadrant 1)	00000000000000000	000000000000000000000000000000000000000	— г
VA Hour (Quadrant 4)	00000000000000000	000000000000000000000000000000000000000	— г
VAR Hour (Quadrant 4)	00000000000000000	00000000000000000	— г
VA Hour (Quadrant 2)	00000000000000000	000000000000000000000000000000000000000	— г
VAR Hour (Quadrant 2)	000000000000000000	000000000000000000	— г
VA Hour (Quadrant 3)	000000000000000000	000000000000000000000000000000000000000	— г
VAR Hour (Quadrant 3)	000000000000000000	000000000000000000000000000000000000000	— г
rogrammed Roll over	18446744073709551	61	
	Set	Cancel	

### 4.19: 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 8 for details on viewing stored logs.
- 1. From the Device Profile screen (section 4.2), click on the (+/-) button beside "Labels" or doubleclick on the "Labels" line. The following submenu appears:

els
 Meter Designation METER6
 IN Measured IN Measured
 Power Direction: Quadrant 1 + 4 = Delivered and Quadrant 2 + 3 = Received
Power Factor Display: Method 1 Q1 +Lag, Q2 -Lag, Q3 -Lead, Q4 +Lead

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

User Defined Label					
INP100 Unit 1 96	_				
V Aux					
I N Measured					
Quadrant1+4=Delivered and Quadrant2+3=Received	-				
Power Factor Display Method 2 Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead					
<u>C</u> ancel Help					
	INP100 Unit 1 96 V Aux I N Measured Quadrant1 + 4 = Delivered and Quadrant 2 + 3 = Received play Method 2 Q1 +Lag, Q2 -Lead, Q3 +Lag, Q4 -Lead				

- 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. 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.

#### 4.20: DNP Custom Mapping

- The DNP Custom Class Map is a useful tool for prioritizing the readings in your system and the frequency of the readings. The DNP Custom Class Map also keeps your system free from thousands of unwanted readings.
- From the Device Profile screen (section 4.2), click on the (+/-) button beside "DNP Custom Class Map" or double- click on the "DNP Custom Class Map" line. Nexus 1262/1272 meters support DNP V3.00 Level 2. The following set of screens appears. See Chapter 17 for details.

Object 10 - Binary Output Object 1 - Binary I			nput	Object 20 - Binary Cou	nter		
Object 30 - Analog Input Global Values			Ϋ́	DNP Settings			
DNP	Ma	ър		i-ti	Deadband	Class Assignments	<b>_</b>
Points	Line	Point	ı	Description	(%)	Object 32	
0	8	0		Current Day of the Week:	5.00	No Class	
1	18	0	Tenth Sec	ond Phase to Neutral Volts: Volts AN	5.00	Class 1	
2	18	1	Tenth Sec	ond Phase to Neutral Volts: Volts BN	5.00	Class 2	
3	18	2	Tenth Sec	ond Phase to Neutral Volts: Volts CN	5.00	Class 3	
4	19	0		Tenth Second Auxiliary Volts: V Aux	5.00	No Class	
5	20	0		Tenth Second Current(A, B, C): I A	5.00	Class 1	
6	20	1		Tenth Second Current(A, B, C): I B	5.00	Class 2	
7	20	2		Tenth Second Current(A, B, C): I C	5.00	Class 3	
8	21	0	Tent	h Second Measured N Current: I Nm	5.00	No Class	-
Enter EIG Line and Point assignments directly from the DNP Table or double click the Description Field for a list of Selections. Enter a dead band percentage to be used in causing an associated Object 32 value. (See Manual for Description of base values used by the dead band percentage) For the associated Object 32 assign a class.							
			a oc asongn a ora	1 1		1 1	1

# 4.21: 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:

Nexus Internal	Nexus Internal KYZ Outputs								
KYZ Output	Assigned Channel		Watt Hour Per Pulse	Pulse Width(ms)	Mode	Form			
1	Quad (1 + 4) Watthour	Ŀ	0.60001	20 🗾	Enable 🗾	c 🗾			
2	Quad (1 + 4) Watthour	Ŀ	1.80000	20 📩	Enable 🗾	C 于			
3	Quad (1 + 4) Watthour	Ŀ	1.80000	20 📩	Enable 🗾	c 🗾			
4	Quad (1 + 4) Watthour	Ŀ	1.80000	20 🛨	Enable 🗾	c 🗾			
Test LED	Quad (1 + 4) Watthour	Ŀ	0.60001	100 🗾	Enable 🗾	C -			
	OK		<u>C</u> ancel	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 1262/1272 Meter.
- Note: If your Nexus 1262/1272 meter is equipped with the KYZ Output Option, the KYZ Output Settings will appear. Otherwise, just the Test LED will appear on the screen.

# 4.22: Accumulations Rollover

■ The Accumulations Rollover screen in the Device Profile (section 4.2) allows you to enter a value at which the accumulations will rollover.

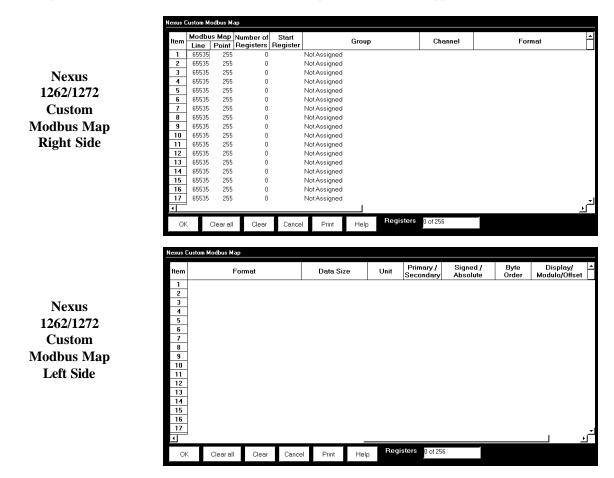
(If the number that appears on this screen is too large, a warning screen will ask for a smaller number.) Click OK.

Accumulations Rollover						
Enter the Number at which roll over will occur						
10000						
Example: En displays <del>w</del> ill						
ОК		Cancel				

# 4.23: Custom Modbus Map

■ With the Custom Modbus Map for Nexus 1262/1272 you can select up to 256 Registers (or the equivalent of 2K, whichever is lower) to provide the functionality you want from your Nexus. In addition, you can customize selected values for Format Type, Scaling, Byte Order, Data Size, etc.

From the Device Profile screen (section 4.2), click on the (+/-) button beside "Custom Modbus Map" or double- click on the "Custom Modbus Map" line. The screen appears:



Data entry is straightforward. Each type of data is described below. Note that not all selections will appear on the screen at the same time. You have to scroll the screen from right to left to reach some of the functions. Certain entries (such as Format, Data Size, etc.) have different allowable selections depending on the data point used. The pull-down menu will automatically adjust to provide the appropriate selections for that data point.he Custom Modbus Map allows you to up to 256 Registers (or the equivalent of 2K, whichever is lower) to readily provide the functionality you want from your Nexus.

#### NOTE: Table of Modbus Map Readings on page 4-36.

**Data Point Selection** (There are two different ways to select a Data Point.)

- 1. Refer to the Modbus Map and find the associated Line and Point for the value you want. When you enter those values into the table, the software will complete the associated Group and Channel.
- 2. Double-click the Group field. From the pull-down menus, select a Group and Associated Channel value. The software will complete the Map and Line values.

#### ■ Number of Registers

The number of registers polled for this Data Point is automatically computed. The number is dependent on the Data Size selected in the Data Size column.

#### ■ Start Register

Start Register numbers are automatically assigned. The registers are assigned and adjusted automatically to take into account previous entries and data sizes. This is the Start Number for the first register to use in polling.

#### Format

From the pull-down menu, select a type of Format for a value such as Floating, Integer, etc.

#### Data Size

From the pull-down menu, select the Number of Bytes you want to represent the Data Point.

#### Unit

If the polled value is viewed as an integer, the Unit field tells you where to place the decimal point. Example: If you select .01, a polling value 1234 would be interpreted as 12.34. Example: If you select 100, a polling value 1234 would be interpreted as 123400.

#### Pri/Sec

The meter normally computes values in secondary units. Where applicable, you may select primary or secondary. If Primary is selected, the value is multiplied by the appropriate CT and/or PT values.

#### ■ Sign/Abs

Where appropriate, you may have the option of having the data point computed as a signed or absolute value.

#### ■ Byte Order

For most of the Data Points, the user can select the polling order of the number of bytes selected by the Data Size field.

Example: For a four-byte Data Point, the bytes can be arranged in any order for polling purposes.

#### ■ Display/Modulo/Offset

Depending on the Data Point selected, you may select one or more additional options with the appropriate subselections. Descriptions continued on page 4-37.

Line	Point	Description
34	0	One Second Phase to Neutral Volts: Volts AN
34	1	One Second Phase to Neutral Volts: Volts BN
34	2	One Second Phase to Neutral Volts: Volts CN
35	0	One Second Auxiliary Volts: V Aux
36	0	One Second Current (A, B, C): IA
36	1	One Second Current (A, B, C): IB
36	2	One Second Current (A, B, C): IC
37	0	One Second Measured N Current: Nm
38	0	One Second Calculated N Current: I Nc
39	0	One Second Phase to Phase Volts: Volts AB
39	1	One Second Phase to Phase Volts: Volts BC
39	2	One Second Phase to Phase Volts: Volts CA
40	0	One Second VA (A, B, C): VA A
40	1	One Second VA (A, B, C): VA B
10	2	One Second VA (A, B, C): VA C
41	0	One Second VA Total: VA Total
12	0	One Second VAR (A, B, C): VAR A
12	1	One Second VAR (A, B, C): VAR B
12	2	One Second VAR (A, B, C): VAR C
13	0	One Second VAR Total: VAR Total
4	0	One Second Watts (A, B, C): Watts A
14	1	One Second Watts (A, B, C): Watts B
14	2	One Second Watts (A, B, C): Watts C
15	0	One Second Watts Total: Watts Total
16	0	One Second Frequency: Frequency
47	0	One Second Power Factor (A, B, C): PF A
47	1	One Second Power Factor (A, B, C): PF B
47	2	One Second Power Factor (A, B, C): PF C
48	0	One Second Power Factor Total: PF Total
19	0	One Second Imbalance: Voltage
19	1	One Second Imbalance: Current
216	2	Block Window Average Watt
217	3	Maximum Block Window Positive Watt
217	4	Maximum Block Window Negative Watt
218	3	Minimum Block Window Positive Watt
218	4	Minimum Block Window Negative Watt
94	0	Phase A-N/Phase A-B Voltage THD
195	0	Phase B-N/Phase B-C Voltage THD
196	0	Phase C-N/Phase C-A Voltage THD
197	0	Phase A Current THD
198	0	Phase B Current THD
199	0	Phase C Current THD

**Display:** For certain Data Points, interpretation and display options are offered. Example: For An Angle values, you can represent and display as 0 to 360 degrees or -180 to +180 degrees, etc. Selections will appear in a pull-down menu for the associated point.

**Modulo:** Certain values are cumulative and can roll over and start recounting from zero. For those values, where required, you can enter a point at which the rollover will occur.

**Offset:** Where allowed, you can enter a value (offset) which will be added to the data point when it is computed.

# 4.24: Flicker Settings

- With the Flicker Settings screen, the user can set the test times for the Flicker function.
- 1. From the Device Profile screen (section 4.2), click on the (+/-) button beside "Flicker Settings" or double- click on the "Flicker Settings" line. The screen appears:

Flicke	er Settings			
Sho	rt term test	time (PST)	10 🗾	dinute
Lon	g term test	time (PLT)	240 🛨	dinute
Fred	quency	60	<b>▼</b> Hz	
	ОК	<u>C</u> ancel	Help	

- 2. From the pull-down menus, select a Short Term test time and a Long Term test time.
- 3. From the Frequency pull-down menu, select 50 or 60 Hz.
- 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 1262/1272 Meter.

#### NOTE: Flicker is discussed in detail in Chapter 16 of this manual.

## 4.25: Programmable Display

1. From the menu bar select Tools, Edit LCD Programmable Settings.

The following set of screens (Nexus Display Programmable Settings) appears:

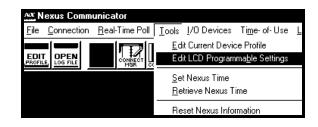
Click tabs at the top of the screens to access the Programmable settings.

■ **Display Modes:** Enter a three-letter Label for each of the three View Modes.

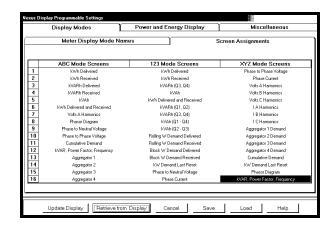
Enter a Description for each View Mode using the Line 1 and 2 Description windows.

■ Screen Assignments: Enter up to 16 screens for each View Mode.

Your Label for each View Mode appears at the top of each column.



Display M	odes	Power and Energy [	Display 🍸	Miscellaneou	s
Meter I	Display Mod	e Names	Screer	Assignments	
Enter Mode La	abel and Des	cription for each mode			
	Label	Line 1 Description	Line 2 D	escription	
Vie <del>w</del> Mode 1	TTT	П	Office		
Vie <del>w</del> Mode 2	123	Whats up	Doc		
View Mode 3	XYZ	is	TOU		



Power and Energy Display: Set Scale, Digits and Decimal Point. Previews appear at the bottom of the screen.

Settings on this screen control the display of energy related numbers. Care should be given to match the values on the display with those in historical logs. These settings apply to VA-hours, watt-hours (+/-), VARhours (+/-) and VAR-hours (quadrants) in the meter.

Primary Energy Primary Power Scale Scale 9 2 Junits 9 2 Number of Digits to Display Decimal Point Location	
Scale         Number of Digits to Display           Junits         9           Number of Digits to Display         Decimal Point Location	
units         9           Number of Digits to Display         Decimal Point Location	
Number of Digits to Display Decimal Point Location	ıy I
	-
8 1 3 2	J
Decimal Point Location	
I <sup>∠</sup> IF Display Leading Zeroes	
	_
Preview 999999.99 Preview 999999.99	9

Scale factor is the user-programmable setting that determines what quantity is used in the energytype registers. Scale Factor applies to primary Values ONLY. (Secondary values are always in units.) **Scale Factor takes precedence over all other settings**, i.e., all other settings are based on this setting.

Miscellaneous: Set Screen Settings, Optical Port and User Inactivity Time Outs. The Screen Settings replace Adjustments Mode in the default profile.

Screen Settings: Back Light Level (brightness), Back Light Time (when Back Light shuts off), Contrast, Scroll Stop, Phasor Rotation and Cumulative Demand. Cumulative Demand Settings: Regular: Running Total Continuous: Running Total + Current Max/Min.

**Optical Port:** Set Baud Rate and Optical Receive (Normal or Inverted).

Screen Back Light Level 5 _ Back Light Time 02 min, 00 sec _ Contrast 5 _ Scroll Stop Enabled _ Phasor Diagram Rotation Counter Clackwise 1	play Programmable Settings		
Back Light Level     5     -     Baud Rate     57600       Back Light Time     02 min.00 sec     -     Optical Receive Mode     Inverted       Contrast     5     -     User Inactivity Time Outs     -       Scroll Stop     Enabled     -     -     -       Phasor Diagram Rotation [Counter Clockwise]     Leave Test Mode After     5     -       Camulative Demand     Require     -     -     -			Miscellaneous
Scroll Stop Enabled Phasor Diagram Rotation Counter Clockwise Camulative Demand Require	Back Light Level 5 Back Light Time 02 min, 0	Baud Rate     Baud Rate     Optical Receiv	re Mode Inverted 📩
	Scroll Stop Enabled Phasor Diagram Rotation Counter	Clockwise	ode After 5 <u>v</u> minutes ode 2 After 5 <u>v</u> minutes

### User Inactivity Time Outs: (number of

minutes since last user action when Mode reverts to View Mode 1). Settings are 5 - 60 minutes. Leave Test Mode After \_ Minutes: Reverts with or without energy accumulation. Leave View Mode 2 or 3 After \_ Minutes: Reverts Automatically.

■ Use Buttons for Functions below:

Update Display: Must click to update the display. After settings update, View Mode 1 is displayed. Retrieve from Display: Click to Retrieve existing settings.

Cancel: Cancel any new settings and return to main Nexus Communicator screen.

Save: Save new settings to a file.

Load: Load saved settings from a file.

Click Update Display to send new settings to the display, return to the main Communicator screen.

♦ <u>Note:</u> See the *Nexus 1262/1272 Manual* (sections 4.15 - 4.18) for further details.

# 4.26: 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.

eset Nexus Parameters										
📕 Reset Max / Min an	Reset Max / Min and Demand									
📕 Reset Hour, I Squa	red T, and V	Squared T (	Counters							
📕 Reset All Logs (Re	venue, Powe	r Quality, Etc	c.)							
Reset Time of Use for current season and month										
Reset Internal Input Accumulations and Aggregations										
Reset Internal KYZ Out Accumulations										
ОК	Cancel	Help								

- 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).

# 4.27: Setting and Retrieving Nexus Time

- The Nexus 1262/1272 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:
  - 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.

Set Nexus On-Board Clock								
Month	Day	Year						
06	23	2003						
Hour	Minut	e Second						
12	47	56						
<mark>.</mark> ⊻ <u>U</u> se	PC Time							
<u>S</u> end		<u>C</u> ancel						
	Month 06 Hour 12	Month Day 06 23 Hour Minut 12 47 ⊻ Use PC Time						

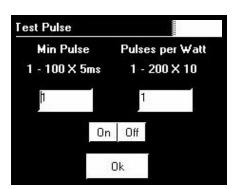
- To **retrieve** the Nexus Monitor device's current time and date settings:
- 1. Select Tools, Retrieve Nexus Time. The following screen appears. Date and running time are displayed in LEDs.

Current Ne	exus Device Time								
Date	06/20/2003	Friday							
Time	12:49:50.02	2 IRIG-B							
– Polling	Polling INP100 Unit 1 96								
	<u>K</u>	<u>H</u> elp							

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

### 4.28: 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:



- 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.

#### 4.29: Low Level Access

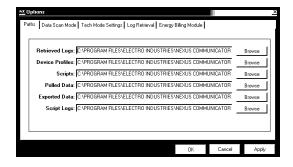
■ Select Low Level Access from the Tools menu.

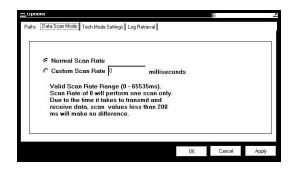
Low Level Access is not required for normal operation. Low Level Access is a diagnostic tool for third party software and devices. It is designed to be used ONLY by appropriate level Programming Personnel in conjunction with the Modbus Map.

The latest version of the Nexus Modbus Map can be downloaded from the **Free Downloads** section of our website: **www.electroind.com**.

# 4.30: Options

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





Patrix Data Scan Mode Tech Mode Settings: Log Retrieval ]

Tech Mode Disabled
Enter Password to Enable Tech Mode
OK Cancel Apply

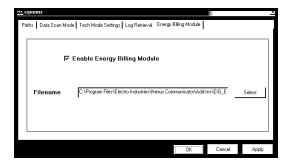
**Paths:** View or change the paths Nexus Communicator uses to store any copied, exported or retrieved data.

**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.



**Energy Billing Module:** Click the box on this screen to Enable the Energy Billing Module. The Energy Billing Module can help you manage your Load Profile (see Chapter 14).

<u>Ax</u> Options		X
Paths Data Scan Mode Tech Mode Settings Log Retrieval Energy Billing Module	Miscellaneous	
F Enable Kh/Ke Test Pulse Calculation screen		
Ethernet Packet Delay 0 milliseconds		
OK	Cancel	Apply

**Miscellaneous:** Click the box on this screen to Enable the Kh/Ke Test Pulse Calculation screen. Set the Ethernet Packet Delay in milliseconds. ASome systems may require a longer delay if they are slow.

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

# 4.31: INP100 Network Option Update

Using an RS-232/RS-485 converter, connect your computer to the Nexus 1262/1272 Port 1. Port 1 is RS-485, so an RS-232/RS-485 Converter is required to create an RS-232 serial connection. Make sure that the meter is connected to your network and is operating properly.

NOTE: This screen is not supported by meters with the INP10 Option.

- 2. Connect using Communicator to the Nexus over the serial port and close the Device Status window.
- 3. Select from the menu bar "Tools/Network Card Settings". The following screen appears:

Connect	RunTimeUpdate IV Communicate through N								
Boot Version	Copyright 2002 Electro Industries/GaugeTech (EIG). All Rights Reserved. INP-100 (EIG) 10/100 Base-T Network Option Runtime Firmware: v0.1 (Build 26) Checksum = 0x8E48, Length = 0xCF93C Boot Firmware : v1.0 (Build 40) Checksum = 0x923D, Length = 0x2B424 Flash Memory Size: 2MB SDRAM Size : 32MB								
Flash File	Update Settings ———	Run Time File Update Settings (Fixed) ———							
Server	10.0.0.99	Base 16							
Client	10.0.0.1	Baud Rate 115200							
Gateway	0.0.0.0	File type S-Record							
Net Mask	255.255.255.0	Mac Address 00:01:58:FF:FF:E3							
Runtime File									
Boot File		Firmware Update Via the Web Username and Password Current New							
		Username							
Retrieve	Settings Write Settings	Password							
Update F	lun time Update Boot	Change Password							
Read command	completed								
ł									
<b>—</b>	Oł								

- 4. Make sure there is a check mark in the checkbox at the top of the window for "Communicate through Nexus". If there is not a check, click on the box.
- 5. Click "Connect" at the top left of the window. (Progress is shown in a sub-window at the bottom of the screen.) When connected the "Boot Version" window lists data about the Network board.

**NOTE:** A blinking red bar at the bottom of the window (and a pinging sound) will remind the user that the meter is now in Boot Mode and the meter is not available to other users via the Internet.

- 5. Click on "Retrieve Settings" to retrieve the network settings used to download Flash Files for updating the network option board via TFTP. (The Initial Settings appear in the settings windows.)
- 6. In the text boxes provided enter the name of the Runtime Update File and/or Boot Update File. Check with your Network Administrator and make any changes necessary to the network settings.

**NOTE:** These changes facilitate file transfers while in Boot Mode; there is **no permanent change**. Click on "Write Settings" to send the updated settings to the Nexus. A screen will ask, "Are you sure you want to Update the Flash File Settings?" Click Yes to update. The sub-window will display "Write Completed".

- 7. Start up a TFTP server on your computer. Set the default file path for the TFTP server to the location of the Runtime/Boot Flash file location (TFTP server software is available from EIG).
- 8. To update Runtime/Boot, click on "Update Runtime" or "Update Boot". Click "Yes" to verify that you would like to update the Runtime/Boot firmware. After the update is completed, the message "Update Completed" will appear in the sub-window.
- 9. To Change the Username and Password, type in the Current Username and Password, then the New Username and Password. The Initial Username and Password are eignet and inp100. You will not be able to change the Username and Password unless you know the Current Username and Password. (A screen will ask, "Are you sure you want to change the Username and Password?") If you click Change Password, a note in the sub-window will confirm the Password changes.
- 10. To close the "Network Card Runtime Update" window, click OK. Nexus Communicator will update the Nexus. After approximately one minute the network will resume its normal functions.

**NOTE:** It is VERY IMPORTANT to store the passwords in a safe place and to change them frequently.

# 4.32: Update TFTP Settings in Nexus Communicator

- From Nexus Communicator click Device Profile > Comm Ports > Advanced Settings. A series of Advanced Settings screens will appear. Click on the Auto TFTP Download tab. The following screen appears:
- Changes can be made to the following settings: TFTP Server IP Address
   Client IP Address (Nexus Meter)
   Subnet Mask
   Gateway
   Firmware Filename

**NOTE:** This information will be used in the Network Card Runtime Update process, which is detailed in section 4.31 above.

**NOTE:** Check with your Network Administrator before making any changes.

omputer Name / DNS	Auto TFTP Download	d Alarm / Ema	11	FTP Client
Auto TFTP Downloa	1			
		TFTP Port 69		
	Server IP Address			
	Client IP Address			
	Subnet Mask	255.255.255.0		
	Default Gateway	135.15.173.250		
	Download	d Filename		

# Chapter 5 Configuring the Futura + & DM Series Meters

# 5.1: Overview

■ Communicator Software enables you to configure the Futura+ and DM Series Meters' 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 1250/1252, see Chapter 3. To configure the Nexus 1262/1272, see Chapter 4. Note: If you cannot make a connection, make sure your communication settings match those below.

Address 0001   Baud Rate 38400 ▼     System Yes   No   Iank Display Leading Zero   Iank Display Protection   C   Power   XXXX ▼   Kwatts   Kwatts   Communication Protocol   Main Port [Side Port] [J2:1 or J2:2]   Electro Industries (EI) Protocol   Top Pott (SF485DB or SF232)   Pott Control   Point Control   Printing and Communication	Random Access	.ogic/Con	trol 🖡 Hi	Waveform	Log Profi			
Communication         Address       0001         Saud Rate       38400 *         System       Yes         System       Yes         Valtage       120.0         Power       X.XXX         Communication Protocol         Main Port (Side Port) (J2-1 or J2-2)         [Electro Industries [E1] Protocol         Top Pott (SF485DB or SF232)         Modbus ASCII         Povice Firmware         Communication         CPU100 V5.2 250         OSP         CPU196 V3.0	Alarm Limits % THD	nst. or A	vg. Limit	s K'	Z Pulse Ou	utput	Respons	e Delay
Address 0001   Baud Rate 38400 v   System Yes   System Yes   Iank Display Leading Zero C   Iank Display Protection C   Communication Protocol   Main Port [Side Port] [J2:1 or J2:2]   Electro Industries (EI) Protocol   Top Pott Control   Powice Firmware   Communication   CPU100 V5:2 250   OSP   CPU196 V3.0   Voltage 120.0 C Volts C kVolts   Current   Solution   Valtage   120.0   Voltage   Voltage   Voltage   Voltage   Valtage   Voltage   Communication   CPU196 V3.0	General Alar	General Alarm Limits (Volta					Alarm Limits	(Power)
System       Yes       No         Iank Display Leading Zero       C       C         Main Port (Side Port) [J2-1 or J2-2]       Electro Industries (EI) Protocol         Ipen Deta       C       C         Input Flip       C       Modbus ASCII         Device Firmware       Power       Yes         Communication       CPU100 V5.2 250         DSP       CPU196 V3.0	Communication Address 0001				-	💿 Volt	s 🤿 kVol	ts
Yes       No         Ilank Display Leading Zero       C         Reset From Display Protection       C         Ipen Delta       C         Retect Phase Reversal       C         Operice Firmware       C         Communication       CPU100 V5.2 250         OSP       CPU196 V3.0	Baud Rate 38400 💌				-			
Ipen Delta     C     C       Ipen Delta     C     C       Input Flip     C     C       Device Firmware     C     C       Communication     CPU100 V5.2 250       DSP     CPU196 V3.0	System Hank Display Leading Zero	1000				Constant Interes	.2)	
nput Flip C C Port Control Printing and Communication SP CPU196 V3.0 Printing and Communication Averaging Window	Reset From Display Protection Ipen Delta				and a state of the	Contract of the local of the		
Device Firmware     Printing and Communication       Communication     CPU100 V5.2 250       DSP     CPU196 V3.0   Averaging Window				1				•
OSP CPU196 V3.0 Averaging Window		50			8.020/4	nication		•
	10100 43.2 2					15	]	

■ 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 1250/1252 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 15 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:

Retrieving Programmable	Settings from Device	
Reading Programmable Settin	gs	-
Time Remaining	3 seconds	
Reading Block	25 of 69	<u>C</u> ancel
10 mil		

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

lla Futura+ Device Setup								
Random Access	Relay L	ogic/Con	ntrol 📕 Historical Log Profile 🗍 Waveform Log					
Alarm Limits % THD	vg. Limits	s KYZ Pulse Output Response Dela						
General Ala	rm Limits	: (Voltage	e) Ala	rm Limits ((	Current)	Alarm Limits (Power)		
Communication Address 00001 Baud Rate 38400 T			– Full S Volta <u>c</u> Currer	je 120.0	⊂ Vol			
System			Powe	×.xxx	▼ ⊙ kW	atts C MWatts		
Blank Display Leading Zero	Yes C	No ©		unication Pro Port (Side Po		2-2]		
Reset From Display Protection Open Delta	C C	•		tro Industries Port (SF485D				
Detect Phase Reversal	C	•		bus ASCII	0 01 01 2025	<b>_</b>		
Input Flip	0	۰	Port C	ontrol				
Device Firmware			Prin	ting and Comm	nunication	•		
Communication CPU100 V5.2 DSP CPU196 V3.0		Averaging Window Interval (Seconds) 15						
<u>H</u> elp E <u>x</u> it	<u>O</u> per	n	<u>S</u> ave	Upda	ate <u>R</u>	letrieve <u>P</u> rint Report		

■ 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 mesurements 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 soft ware, 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 or 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)

IG Futu	ra+ Device Setu	P							
Random Access			Relay Logic/Control			Historia	al Log Pro	file   Wav	reform Log Prof
Alar	rm Limits % T	HD Ĭ	Inst. or Av	/g. Limi	ts Ĭ	KYZ Pu	Ise Output	Re:	sponse Delay
	General	AI	arm Limits	(Voltag	e) A	larm Limi	its (Current)	Alarm	Limits (Power)
Volts	Limit 1		Tri	gger Re	elay	Limit 2		т	rigger Relay
	Value %	of FS		1 2	3	Value	% of FS		1 2 3
A-N	15.0 12	.50	○ Above ● Below			30.0	25.00	<ul> <li>Above</li> <li>Below</li> </ul>	
B-N	15.0 12	.50	○ Above ● Below			30.0	25.00	<ul> <li>Above</li> <li>C Below</li> </ul>	
C-N	15.0 12	.50	○ Above ● Below			30.0	25.00	<ul><li>Above</li><li>Below</li></ul>	
A-B	0.0	00	Above Below			0.0	0.00	<ul><li>○ Above</li><li>○ Below</li></ul>	
B-C	0.0	JO 0L	Above Below			0.0	0.00	<ul><li>○ Above</li><li>○ Below</li></ul>	
C-A	0.0		○ Above ● Below			0.0	0.00	<ul><li>○ Above</li><li>○ Below</li></ul>	
н	lelp	E <u>x</u> it	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)

Rai	ndom Access	Relay Logi	c/Control	Historic	al Log Profile	e Wavef	orm Log Profil
Alarm	Limits % THD	Inst. or Avg	. Limits	KYZ Pu	lse Output	Resp	onse Delay
G	eneral	Alarm Limits (V	/oltage)	Alarm Limit	s (Current)	Alarm Li	nits (Power)
Amps Lii	mit 1	Trigg	jer Relay	Limit 2		Trig	ger Relay
	Value % of FS	; · ·	123	Value	% of FS		1 2 3
A [	0.00	C Above		10.00	200.0 °	Above Below	
в	0.00	O Above O Below		10.00	200.0	Above Below	
	0.00	C Above C Below		10.00	200.0		
N F	0.00	C Above C Below		0.00	0.00 C	Above Below	
Phase mb	999.9						
Phase Rev		Г					

- 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)

EIG Futu	ra+ Device Sel	tup								
F	Random Access F			jic/Cor	trol	Historica	Wave	Waveform Log Profil		
Alar	rm Limits % <sup>-</sup>	THD Inst	or Avg	g. Limit	s⊥ľ	KYZ Puls	se Output	│ Resp	oonse	e Delay
	General	Alarm	_imits (	Voltag	e)   ́ 4	Narm Limits	(Current)	Alarm Li	mits	(Power)
	Limit 1 Setti	ings	Trig	ger Re	lay	Limit 2 Se	ttings	Triç	ger	Relay
			1	2	3			1	2	3
Watt	0	<ul> <li>○ Above</li> <li>● Below</li> </ul>				0	C Above © Below			
VAR	0	<ul> <li>Above</li> <li>Below</li> </ul>				0	C Above Below			
VA	0	C Above C Below				0	C Above C Below			
P.F.	0.000	<ul> <li>○ Above</li> <li>○ Below</li> </ul>				0.000	C Above C Below			
Freq.	59.00	C Above C Below				61.00	<ul> <li>Above</li> <li>Below</li> </ul>			
	6					4				
H	elp	E <u>x</u> it	<u>O</u> pen	T	<u>S</u> av	e <u>U</u>	pdate	<u>R</u> etrieve	P	int 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

	Gene	ral	Alarr	n Limi	ts (V	oltage)	Alarm	Limits (Cu	urrent)	Alarn	n Lim	its (Power
Ra	andom Ad	cess	Relay	/ Logi	c/Co	ntrol	Histori	cal Log Pr	ofile	Wavefo	orm L	og Profile
Alarn	n Limits %		Inst. o	r Avg	Limi	its	KYZ P	ulse Outpu	it )	Respo	onse	Delay
THD	Limit 1 S	ettings		Trig	ger	Relay	Limit 2	Settings		Trig	gger	Relay
				1	2	3				1	2	3
VA	0	CAL ⊛Be	oove elow				0	15765	Above Below			
∀В	0	⊂ Ab ⊛ Be	oove elow				0		Above Below		Γ	
vc	0	⊂ At ⊛ Be	oove elow				0	1000	Above Below	Γ	Г	
A	0	− CAb ⊙Be	oove elow	Г			0		Above Below	Γ		
в	0		oove elow				0		Above Below		Г	
с	0	⊖ Ab ⊛ Be	oove elow		Г		0		Above Below	Г		

- 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

General	Alarm Limits (Voltage)	Alarm Limits (Current)	Alarm Limits (Powe
Random Access	Relay Logic/Control	Historical Log Profile	Waveform Log Profile
Narm Limits % THD	Inst. or Avg. Limits	KYZ Pulse Output	Response Delay
Limits Triggered On- Instantaneo C Average Re			

• 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

IG Futura+ Device	e Setup						
Gene	eral	Alarm Limits (Vo	oltage)	Alarm Limits	(Current)	Alarm	Limits (Power)
Random A	ccess I	Relay Logic/Con	itrol	Historical Log	g Profile	Wavefor	m Log Profile
Alarm Limits 9	% THD II	nst. or Avg. Limit	s	KYZ Pulse O	utput	Respor	ise Delay
One KYZ pu 0 Mappings KYZ Output Not Assign	і 1 к	Watt Hour VAR Hour VA Hour YZ Output 2 Iot Assigned	KY KY	ay Output Mo Z Disabled Z Output 3 ot Assigned	de y	×	
Help	E <u>x</u> it	<u>O</u> pen	<u>S</u> ave	Upda	ite <u>R</u>	etrieve	Print Report

• 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

EIG Futura+ Devic	e Setup						
Gen	eral	Alarm Limits (	/oltage)	Alarm Li	mits (Current	) Alarm	Limits (Power)
Random A	Access	Relay Logic/Co	ontrol	Historical	Log Profile	- 14	rm Log Profile
Alarm Limits	% THD	Inst. or Avg. Lin	nits	KYZ Puls	e Output	Respo	nse Delay
(Main F	ad Port Port, Side Po lay	(Top P ort) (DMMS No De	: 300) lay 💌				
<u>H</u> elp	E <u>x</u> it	<u>O</u> pen	<u>S</u> ave	1	lpdate	<u>R</u> etrieve	Print Report

• 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 Futura+ Device Setup					
Alarm Limits % THD	Inst. or Avg. Lir	nits	KYZ Pulse Ou	tput I	Response Delay
General	Alarm Limits (Volte	age) 🛛 Ala	rm Limits (Cur	rent) Alar	m Limits (Power)
Random Access	Relay Logic/Contro	ol   Histo	rical Log Prot	ile   Wave	form Log Profile
Programming Block  Byte Number  Byte Description  For advanced setup or	MS 7 Current Setting 0 New Setting 0 Hex Value # Decimal Value #		• 0 • 0 •		LSB 0 0 Change
<u>H</u> elp E <u>x</u> it	<u>O</u> pen	<u>S</u> ave	<u>U</u> pdate	<u>R</u> etrieve	Print Report

• 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

Alar	m Limits General	% THD	Inst. or Avg			YZ Pulse Outp n Limits (Currei		Response Delay
Rand	lom Acce	ss	Relay Logic/C			ical Log Profile	<u> </u>	form Log Profile
Relay	Dela Set	y (Sec) Reset	Computer Control	Logic Contro	ol	Hysteresis	Logic T	уре
1	0	0	Yes	0R		Disabled	Positi	ve
2	0	0	Yes	OR	1	Disabled	Positi	ve
3	0	0	Yes	OR		Disabled	Positi	ve

- 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):

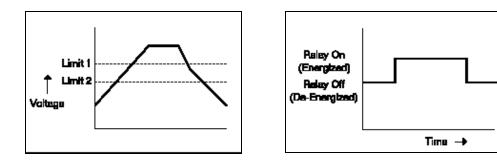
**Set:** Delay before setting (energizing) the relay when the linked limit is exceeded.

**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

Random Access     Relay Logic/Control     Histor       Instantaneous     Average     Exceeded       ✓ Van     ✓ la     ✓ Van     ✓ la       ✓ Vbn     ✓ lb     ✓ Vbn     ✓ lb       ✓ Vbn     ✓ lb     ✓ Vbn     ✓ lb       ✓ Vbn     ✓ lc     ✓ Vcn     ✓ lc       ✓ Vbc     ✓ lc     ✓ Vcn     ✓ lc       ✓ Vbc     ✓ Vbc     ✓ Vbc     ✓ Vca       ✓ Vat     ✓ Vab     ✓ ln     ✓ Vab       ✓ Vat     ✓ Vab     ✓ ln     ✓ Vab       ✓ Vat     ✓ Vab     ✓ ln     ✓ Vab       ✓ Watt     ✓ VAR     ✓ Watt     ✓ VAR       ✓ Watt     ✓ VAR     ✓ VAR     ✓ Watt       ✓ Watt     ✓ VAR     ✓ VAR     ✓ Watt       ✓ Watt     ✓ VAR     ✓ VAR     ✓ Watt       ✓ Watt     ✓ VAR     ✓ VA     ✓ PF       ✓ Watt     ✓ VA     ✓ PF     ✓ VA       ✓ VA     ✓ PF     ✓ VA     ✓ PF       ✓ VA     ✓ PF2	V la 31 V lb V lc V V ln V V Freq V	ie Wavefo nterval (Seco 800 7 <u>Synchroniz</u> Watt Hours 7 Watt 17	· ·
Instantaneous     Average     Exceeded       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van     Image: Van     Image: Van       Image: Van     Image: Van     Image: Van </th <th>imit Int I⊽ Ia 31 I⊽ Ib I⊽ Ic I⊽ I⊽ In I I⊽ Freq I⊽</th> <th>nterval (Seco 200 Synchroniz Watt Hours Watt IV Vatt IV VAR IV</th> <th>onds) <u>:e Time</u> -Watt</th>	imit Int I⊽ Ia 31 I⊽ Ib I⊽ Ic I⊽ I⊽ In I I⊽ Freq I⊽	nterval (Seco 200 Synchroniz Watt Hours Watt IV Vatt IV VAR IV	onds) <u>:e Time</u> -Watt
	V la 31 V lb V lc V V ln V Freq N	800 7 <u>Synchroniz</u> Watt Hours 7 Watt 7 VAR 7	<u>e Time</u>
\[         \[         Vbn         \[         \[         Vbn         \[         \[         Vbn         \[         \[         Vbn         \[         Vbc         \[         Vbc         \[         Vca         \[         Vatt         \[         Vat         \[         Va         \[         Va         \[         Va         \[         Va         \[         Va	V la 31 V lb V V lc V V ln V V Freq N	800 7 <u>Synchroniz</u> Watt Hours 7 Watt 7 VAR 7	<u>e Time</u>
V Von       V In       V Von       V In       V Von       V Von         V Vab       V In       V Vab       V In       V Vab       V Vab         V Vab       V In       V Vab       V In       V Vab       V Vab         V Vac       V Freq       V Vab       V Vab       V Vab       V Vab         V Vac       V Freq       V Vac       V Vac       V Vac       V Vac         V Watt       V VAR       V Watt       V VAR       V Watt       V Vac       V Vatt         V Watt       V VAR       V Watt       V WAR       V Watt       V WAR       W Watt       V Wat	V Ib V Ic V In V Freq	「 <u>Synchroniz</u> Watt Hours マWatt マ マVAR マ	-Watt
V Vab       V Vab       V Vab       V Vab       V Vab         V Vbc       V Vbc       V Vbc       V Vab         V Vbc       V Vbc       V Vbc       V Vab         V Vbc       V Vbc       V Vbc       V Vbc         V Vat       V Vat       V Vat       V Vat         V Watt       V VAR       V Watt       V Watt       V Watt         V Watt       V VAR       V Watt       V Watt       V Watt       V Watt         V Watt       V VAR       V Watt       V Watt       V Watt       W Watt       V Watt         V Watt       V VAR       V Watt       V Watt       V WAR       W Watt       V Watt       V Watt       V Watt         V Watt       V WAT       V Watt       V Watt       V WAR       W Watt       V	IN I	Watt Hours ▼ Watt ▼ VAR ▼	-Watt
V Vbc     V Vbc     V Vbc     V Vbc       V Vbc     V Vbc     V Vbc     V Vbc       V Vat     V Vat     V Vat     V Vat       V Watt     V VAR     V Watt     V VAR       V Watt     V VAR     V Watt     V VAR       V Watt     V VAR     V Watt     V VAR       V Watt     V VAR     V Watt     V WAR       V Watt     V VAR     V Watt     V WAR       V Watt     V VAR     V Watt     V WAR       V Watt     V VAR     V Watt     V VAR       V Watt     V VAR     V Watt     V VAR       V Watt     V VA     V PF     V VA       V VA     V PF     V VA     V PF       V VA     V PF     V VA     V PF       V VA     V PF     V VA     V A	Freq [	マ Watt マママン VAR マ	
V         Va         V         Va         Va         Va         Va         Va           V         Vatt         V         Va         Va         Va         Va         Va         Vatt         Va           V         Vatt         Va         Vatt         Va         Vatt	🗹 Freq	🔽 VAR 🛛 🖾	
V         V	100 State 100 St	1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 - 1977 -	-VAR
V       Walt 1       V       V       Value 1       V<	🔽 VAR 🛛 🔽	VA VA	
V         Watt 2         V         VAR 2         V         Vatt 2         V         VAR 2         III         Watt 2           V         Watt 3         V         VAR 3         V         VAR 3         III         Watt 3           V         VA         V         VP         V         VA         V         PF         V         VA           V         VA         V         PF         IV         VA         V         VA         VA <td></td> <td></td> <td></td>			
V         Watt 3         V         VAR 3         V         Watt 3         V         V         Watt 3         V         <	🗖 VAB 1 🛛 🛏		
VA         V         PF         V         VA         V         PF         VA           VA1         V         PF1         VA1         V         PF1         VA1	🗆 VAB 2 🛛 🖓	Instantaneous	THD
VA1         VPF1         VA1         VPF1         VA1           VA2         VPF2         VA2         VPF2         VA2	🗖 VAR 3 🛛 🖡	🗸 Va 📝	la
▼ VA 2 ▼ PF 2 ▼ VA 2 ▼ PF 2 ▼ VA 2	🔽 PF 🛛 🗖	Vb 🔽	2077 C
	🗖 PF 1 🛛 🖡	Vc 🔽	lc
🗹 VA 3 🔽 PF 3 🖾 VA 3 🖾 PF 3 🖂 VA 3	🗖 PF 2		
	PF3	Limit THD	
Check All Check All Check			la 
		Vb 🔽	ІЬ
Uncheck All Uncheck All Unche		Vc V	lc

- 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

Alarm Lim	its % THD	Inst. or Avg	J. Limits	KYZ	Pulse Output	Res	ponse Delay
Gene	ral	Alarm Limits (	√oltage)	Alarm	imits (Current)	Alarm L	imits (Power
Random Ac	cess [	Relay Logic/C	ontrol	Historic	al Log Profile	Waveform	n Log Profile
Voltage Hi	gh-Speed						
	Value	% of FS					
Limit 1	110.4	92	C Ab	ove 📀	Below		
Limit 2	129.6	108	• Ab	ove C	Below		
Current Hig					ds		
	Value 0.00		~ ···	~			
Limit 1	0.00	0	( Ab	ove •	Below		
Limit 2	0.00	0	⊂ Ab	ove 📀	Below		
Vaveform Ca	apture Nur	nber 3 🔹			);		
Vaveform M	ode 🕢	Normal C	Extended				
	'8 1	ionnai io	LAGINGU				

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 1250/1252 and 1262/1272 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

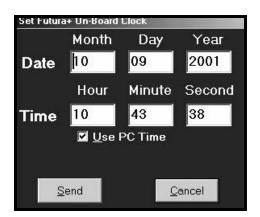
• After connecting to the Futura+ device, on the menu bar, select Tools. A menu of the following tools will appear:

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 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.

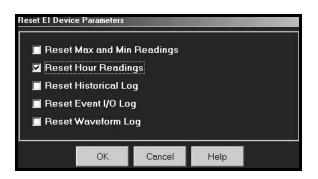
# 5.19: Retrieve Futura+ Time

• 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 El 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.

List of Currently Connected Devices							
Device Type	Run-time	DSP Run-time	NVRAM				
Futura+ CPU 1000	CPU100 V5.2 250	CPU196 V3.0	1024kB				
	Device Type	Device Type Run-time	Device Type Run-time DSP Run-time				

# 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. Low Level Access is a diagnostic tool for third party software and devices. It is designed to be used ONLY by appropriate level Programming Personnel in conjunction with the Modbus Map.

The latest version of the Modbus Map can be downloaded from the **Free Downloads** section of our website: **www.electroind.com**.

# 5.23: Futura+ Analog Output Programmer

Ports	Functions		
P0: Watts Bi-Directional	Volts AN		<b>•</b>
P1: VAR Bi-Directional	Change F	Port Function	
P2: Frequency 60Hz			_
P3: Volts AN	Adjustments	Low End	d
P4: Volts BN			•
P5: Volts CN	<b>.</b>	•	•
P6: Amps A	Coarse Fine	Coarse	Fine
P7: Amps B	r Message		
P8: AmpsC	2001-10-08 17:11:16 Com		
P9: Amps N		rse increase at High Imand sent successf	End ully.
Show Log Clear Message	2001-10-08 17:11:22 Coa 2001-10-08 17:11:22 Cor		
Auto Programming Test Mode	Volt Setting	<u>U</u> ndo All	<u>S</u> ave
	▼ 120V ▼	Close	Help

**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 messge 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) Bidirectional, -1mA (Ports 0 through 2) Unidirectional, omA (Ports 3 through 9)

Midpoint Output (0 or 12mA) Bidirectional, 0mA (Ports 0 through 2) Bidirectional, .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 though P9).
  - Select a function (Volts AN, BN, CN, AB, BC, or CA; Amps A, B, C or N, Watts Unidirectional or Bidirectional, VAR Unidirectional or Bidirectional; VA; Power Factor or Frequency 60 Hz or 50 Hz).
  - 3. Click a 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 Bidirectional 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 (Bidirectional) or 4mA. • Each set of Adjustment buttons has Coarse and Fine Adjustments.

Click Up to increase the adjustment or Down to decrease it. Alternatively, us 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 sdjustments. 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 Total Web Solutions<sup>a</sup>

### 6.1: Overview

The 10/100BaseT Ethernet Option (INP100) for Electro Industries/GaugeTech's Nexus 1250/1252, 1262 and 1272 Monitors, a fully customizable web server, provides access to real-time data via Internet Explorer. EIG's name for this dynamic system is **Total Web Solutionsã.** This is an open design that enables you to communicate with any device via a variety of open protocols. The system incorporates a highly programmable network card with built-in memory that is installed in 10/100BaseT Option meters. Each card can be programmed to perform an extensive array of monitoring functions. **NOTE:** A Nexus meter with the **INP10** Option does **not** support Total Web Solutions<sup>®</sup>.

# 6.2: System Components

The components of the **Total Web Solutions**<sup>a</sup> system are detailed below. Each component adds special features to this fully configurable system. For **Flow Charts** of the components see 6.10-6.12.

**WebExplorer a:** This component utilizes your Web Browser to provide you with direct access to all power data. Using your browser, you can access any data file. And, because it looks like a standard HTML web page to an IT department, the data transmits through corporate firewalls.

This fully configurable component allows you to customize your own SCADA quality web pages, graphics and configurations via FTP Server and/or FTP Client. The Main Default Page is shown below. This is just an example because, the web pages for your data may be changed or created to your specifications and needs.

🕑 http://64.131.106					
	5.45				ểGo
		ies/GaugeTea			
The Le	ader in web Acces	sed Power Monitor			
			=//Web	Explorer	
1				(1922) -	
olts/Amps	Voltage/Freque	ency			
wer/Energy		Instantaneous	Maximum	Minimum	
wer Quality	Volts AN	+122.59	+123.72	+119.77	
	Volts BN	+122.58	+123.71	+119.75	
lse cumulation	Volts CN	+122.57	+123.71	+119.78	
	Volts A-B	+0.00	+0.21	+0.00	
puts	Volts B-C	+0.00	+0.19	+0.00	
ter	Volts C-A	+0.00	+0.00	+0.00	
ormation	Frequency	+60.01	+60.18	+59.89	
nails	0				
	Current				
		Instantaneous	Maximum	Minimum	
	Amps A	+0.48	+0.52	+0.43	
	Amps B	+0.48	+0.52	+0.43	
	Amps C	+0.48	+0.52	+0.43	
	Amps N	+1.44	+1.57	+1.29	

**WebXML<sup>a</sup>:** A very versatile component for configuring data to your specifications. The data is polled, then stored in an XML file for later access by any client on the network. The data can be viewed via a host of applications including Internet Explorer, Excel, Power Point and Word.

WebReacher<sup>a</sup>: With this component, you can access meters anywhere in the world. WebReacher<sup>©</sup> has a built-in Modbus data concentrator that allows you to poll up to 8 devices or 512 unique polling items from any device that can speak Modbus RTU and/or Modbus TCP protocols. WebReacher<sup>©</sup> can retrieve the data and consolidate it into web pages without separate software.

WebMod<sup>a</sup>: The 10/100BaseT design allows the unit to speak Modbus TCP. Once the programmable network card is placed inside the Nexus, Port 2 becomes a gateway. The gateway enables a highspeed interface between the Network LAN and other Modbus-based IED (Intelligent Electronic Device) equipment. Modbus TCP is an industry-proven open protocol that can be easily integrated with any other software or hardware.

WebAlarm<sup>a</sup>: Real-Time Email alerts are sent via the Internet to up to 9 recipients simultaneously for any combination of event notifications. You decide what message is sent and to whom. Email format can be Short Format or Long Format. Short Format is for cellphones with text messaging service. Long Format provides detailed alarm conditions for any devices with full email support (computers, PDAs, cellphones).

# 6.3: Hardware Connection

The Nexus 1250/1252, 1262 and 1272 Monitors with the 10/100BaseT Ethernet Option (INP100) have all the components of the standard Nexus Monitors PLUS the capability of connection to a network through an Ethernet LAN or the Internet via Modbus TCP, HTTP, SMTP, FTP and/or DHCP. Monitors with the 10BaseT Option (INP10) connect via Modbus TCP ONLY.

INP100 can auto detect the cable type and works with either straight or crossover cable. INP10 does not have that capability.

**Example:** A direct connection between a PC and INP100 can use a straight or a crossover cable. But, for an INP10 connection, you must use a crossover cable.

# 

# Nexus 1250/1252: RJ-45 Connection - Nexus with 10/100BaseT Option to Multiple PCs

The 10/100BaseT Option conforms to the IEEE 802.3 specification using unshielded twisted pair (UTP) wiring. So, inexpensive RJ-45 connectors and CAT5 or better cabling can be used.

Using this LAN connection allows multiple PCs to be connected concurrently. The RJ-45 line is inserted into the RJ-45 Port on the face of the Nexus 1250/1252 with 10/100BaseT Option. The connection using RJ-45 into the Nexus 1250/1252 can connect the Nexus to a network using Modbus TCP protocol over the Ethernet. To connect with other Nexus Monitors with Modbus RTU in either remote or local locations, you MUST use **Port 2** (which is labeled Ethernet Gateway) as a Master and an **RS-485** connection. The link using RS-485 is viable for up to 4000 feet (1219 meters).

**RS-232:** Insert RS-232 cable from a PC into **Port 1** and set the Selector Switch to RS-232. This connection is necessary to set the initial software configuration. For details on Nexus 1250/1252 connections and wiring, see *Nexus 1250/1252 User's Manual*.

### Nexus 1262 and 1272: RJ-45 Connection

The 10/100BaseT Option conforms to the IEEE 802.3 specification using unshielded twisted pair (UTP) wiring. This allows the use of inexpensive RJ-45 connectors and CAT5 or better cabling. The RJ-45 connector is supplied with the meter.

Using this LAN connection allows multiple PCs to be connected concurrently. The RJ-45 line is inserted into the RJ-45 Port (or Jack) on the Port 3 cable coming from the back of the Nexus 1262 and 1272 with 10/100BaseT Option.

The connection using RJ-45 into the Nexus 1262 and 1272 connects the Meter to a network using Modbus TCP protocol over the Ethernet. You can access the Meter with a SCADA system, MV90 and PCs all at the same time.

**RS-232:** Use the Optical Port on the face of the meter to make the RS-232 connection. The magnetic coupler snaps into place; the other end of the cable connects to your PC. This connection is necessary to set the initial software configuration. For additional details on Nexus 1262 and 1272 connections and wiring, refer to the *Nexus 1262/1272 User's Manual*.

### 6.4: Software Connection

#### Nexus 1250/1252, 1262 and 1272:

Connect a Nexus to a computer using Port 1 (1250/1252) or Port 3 (1262, 1272) 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 Gateway operates as a Modbus RTU Master with programmable Baud Rate up to 115200.

#### **Direct Connection:**

- Click the Connect button on the Tool Bar or select Connect, Quick Connect.
   Click the Network radio button. The Connect screen will change from the Serial Port version to this example.
- 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 fixed.

Connect				
Serial Po	ort 🙂 Network			
Device Ad	dress	1		
Host		10.0.0.	1	
Network Port 502				
Protocol		Modb	us TCP	·
C <u>o</u> nnect	<u>C</u> ar	ncel	<u>H</u> elp	

e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

- 3. Click Connect. Nexus Communicator locates the Nexus Monitor and the Device Status screen appears, confirming the connection.
- 4. Click OK. The computer is now connected to the Nexus Monitor.
- 5. The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters. Status Bars vary, depending on the connection parameters.
- **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.



#### **Connection Manager:**

Connect a Nexus to a computer using Port 1 (1250/1252) or Port 3 (1262, 1272) 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 Gateway operates as a Modbus RTU Master with programmable Baud Rate up to 115200.

1. Click the Connection Manager icon, or select Connection, Connection Manager.

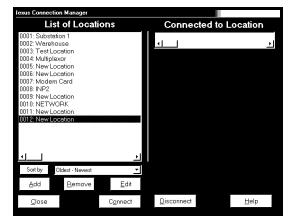
The example screen appears:

- 2. Select the "New Location" listing in the Locations Field. Your selection will be highlighted.
- 3. Click the Edit button.

The Location Editor screen appears, displaying the computer's communication settings:

4. 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:





5. Enter a Computer's IP Address in the Host field.

In the Network Port field, enter 502 (assigned port for Modbus TCP).

To add or remove devices from the network, click Add or Remove. If you are adding a device, click Edit to change the device Name, Address and/or Description.

The following screen will appear:

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.

**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.

Connection Manager Location Editor		
Location Name NETWORK		
• <u>S</u> erial Port • <u>N</u> etwork	■ <u>U</u> se Data Switch String(s)	
Host 10.0.0.1	Connect	<u> </u>
Network Port 502		
		Ŀ
	Disconnect	<u>_</u>
		Ľ
Devices A	t Location	
Add Bern	ove <u>E</u> dit	
Device Address Device Name	Description	1
1 Device 1	Device 1	
2 Device 2	Device 2	
3 Device 3	Device 3	
4 Device 4	Device 4	
		_
Close	Help	

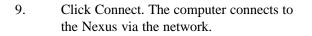
Connection Manager L	ocation Devic	e Editor:	
Device Properties			
Address	2		
Name	Device 2		
Description	Device 2		
Protocol	Modbus TCP		
Device Type	NEXUS 🗾		
<u>C</u> lose		<u>H</u> elp	

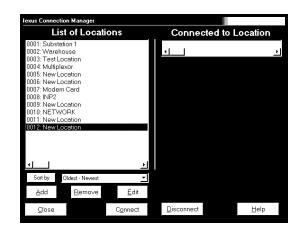
6. If additional devices are required, in the Device Address field enter the address assigned to the additional Nexus unit. Again, each unit MUST have a unique address other than 1. "1" is reserved as the address of the Nexus connected to the network.

In the Name field, enter a name for the device that is different 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.
- 7. 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.

8. 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.





10. When Nexus Communicator has located the Nexus device(s) at that location, the Device Status screen appears, confirming the connection. The Computer Status Bar at the bottom of the screen confirms the computer's connection parameters.

**NOTE: 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.
  - 3. Check that the Address is 1.
  - 4. Check that Modbus TCP was selected in Device Properties.

### • 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.
- 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 10.0.0.1".

# 6.5: Setting Up the 10/100BaseT Connection

Setting up the 10/100BaseT Option consists of configuring the **web connection** and the **Advanced Network Card Screens** so that you can access the data you need from the Web. Once the initial configuration is set, you will not need software, unless you want to make changes to the configuration. With the Basic Setup, you will be able to access the Default Screens (page 6-1) that display a variety of Real Time Readings. You may wish to **customize your screens.** (See details in section 6.6.)

**In order for the Web to access the data from a meter, the meter must have an IP Address.** An IP Address is a number (typically written as four numbers separated by periods, i.e. 107.3.2.54) which uniquely identifies a computer that uses the Internet. An IP Address can be assigned by using a **DHCP Server** or it can be **entered manually**. For your information, here is a brief explanation of DHCP:

**DHCP** (Dynamic Host Configuration Protocol) was created by IETF (Internet Engineering Task Force) to enable individual computers on an IP network to extract their configurations from a server (the "DHCP Server"), or servers, that have no exact information about the individual computers until they request the information. The DHCP Server "leases" the IP Address to the DHCP Client for a period of time from 15 minutes to a year. More information can be found in the Internet RFCs (Request for Comments) regarding available servers and technical details.

**NOTE:** In DHCP Mode, if a NACK message is received from the DHCP server, INP100 will stop all Ethernet activities immediately and start a new DHCP process.

# 6.5.1: DHCP Setup

1. Enable the DHCP Mode in the meter. From Device Profile in Nexus Communicator, open the Communication Ports screen, click on Advanced Settings, click DHCP Tab, click Enable DHCP.

Access a working DHCP Server. DHCP Servers automatically assign an IP Address and Subnet Mask. Some DHCP Servers such as the one in Windows 2000® allows you to assign a Default Gateway IP (DHCP Option #3), DNS IP (DHCP Option #6) and SMTP Server IP (DHCP Option #69) to the meter. If your DHCP Server does not let you assign parameters other than the IP Address, enter those values manually.

2. Enter a unique computer name (Optional). This allows the user to access the meter by name if there is a DNS Server working in conjunction with the DHCP Server. Please see your network administrator and the servers' user manuals for further details.Default Computer Name is EIGNET\_XXXXX where the X's are the last 3 octets of the MAC Address.



# Manual Set Up

1. Manually enter an IP Address, if DHCP Mode is OFF.

For reference:IP Addresses reserved<br/>for Internal NetworksClass A10.0.0.0Class B172.16.0.0 to 172.31.0.0Class C192.168.0.0 to<br/>192.168.255.0

Co	mputer Name / DNS	Auto TFTP Download	Alarm / Email		
	Services	DHCP	GE Protocol (EGD)		
гD	HCP				
	_				
	Enable DHCP (Obtain IP Address from DHCP Server)				

#### **Basic Items:**

IP Address Subnet Mask Default Gateway

### **Advanced Items:**

Gateway Port (RS-485) Baud RateGateway Port Delay.DNS IP (will be needed for WebAlarm email and FTP Client if the Server Address is entered as a name string, not an IP Address).

# 6.5.2: Services

Click the Services tab.

Check the boxes in front of the listed Services to Enable the features desired. **Unless these Services are Enabled, they will not work.** 

Click OK to save settings.

# 6.5.3: Computer Name / DNS

Click the Computer Name / DNS tab.

Enter the Computer Name.

Enter the IP Addresses for Domain Name Servers 1 and 2.

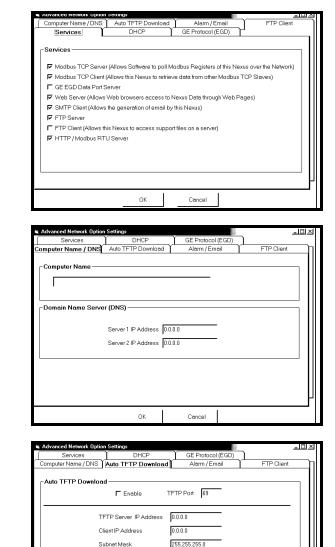
Click OK to save settings.

# 6.5.4: Auto TFTP Download

Click the Auto TFTP Download tab.

Enable Auto TFTP Download; the port is 69. Enter the TFTP Server IP Address, Client IP Address, Subnet Mask, Default Gateway and the Download Filename. Click OK to Save.

Once that data is saved, it is downloaded automatically until you change it.



Default Gateway

0.0.0.0

Cancel

Download Filename

ОК

# 6.5.5: WebAlarm/Email

This feature sends out email when an alarm condition occurs. The settings are configured in the Advanced Network Card Settings.

- 1. Access those settings from Device Profile, Communication Ports, Advanced Settings.
- 2. Click the **Services** tab. The Services screen appears. Enable/Disable the sending of Email by clicking SMTP Client. The Initial Setting if OFF.
- 3. Click on the **Alarm**/ **Email** tab. The screen appears as it is shown here.

Enter the following settings to configure Alarm/Email service:

#### Alarm/Email Settings:

- SMTP Server IP or Name (Requires DNS Setup).
- Email Server Port Number, Initial Setting as xx.
- Administrator Email Address: user preferred address or any monitoring software receive address such as EIG's Dial-In Server.
- Return/Reply/From Address.
- Subject Text: any

# 6.5.6: FTP Client

This feature allows the user to substitute his own (user defined) polling profile, web pages or graphics for the web server. User should set up an FTP Server nearby with a user account and read-only access for this purpose.

- 1. Access the Advanced Network Card Settings (see above).
- 2. Click the **Services** tab. The Services screen appears. Enable/Disable the sending of Email by clicking FTP Client. The Initial Setting if OFF.
- 3. Click on the **FTP Client** tab. The screen appears as it is shown here.

Advanced Network Card Settings		_
Computer Name / DNS	Auto TFTP Download	Alarm / Email
FTP Client	Services	DHCP
FTP Client		
FTP Server IP Address/ Name FTP Port	21	
	Startup Remote Directory	
Username		
Password		

Auto TFTP Download	DHCP
25	
tication	
	Services Auto TFTP Download

4. Enter the following settings to load user defined files.

### **FTP Client Settings:**

- FTP Server IP or Name (requires DNS setup).
- FTP Server Port, Initial Setting is xx.
- Startup Directory: (where files are located)(subdirectory is not supported). If the file has the same name as the one in the Initial Files within the meter, the new file will replace the Initial one.
- User Name
- Password

### **FTP Client Settings Example:**

By default, Microsoft's FTP Server will use **"C:\Inetpub\ftproot\"** as the root directory. When a user logs onto the FTP Server, this is the initial directory the user will see.

1. If the files for INP100 are stored in the root directory ("C:\Inetpub\ftproot\"), leave the "Startup Remote Directory" text box empty.

### **Example Files in FTP Server's Root Directory:**

- "C:\Inetpub\ftproot\index.htm"
- "C:\Inetpub\ftproot\poll\_profile.xml"
- "C:\Inetpub\ftproot\logo.gif"

When INP100 starts up, it will check to see what files are in the server's directory and will download them all.

2. If the files for INP100 are stored in a **subdirectory** in the root directory, such as

"C:\Inetpub\ftproot\nexus\_meters\feeder\_12345\", put "nexus\_meters/feeder\_12345" in the "Startup Remote Directory" text box. Note the different "/" between directory names.

When INP100 starts up, it will check to see what files are in the server's directory and will download them all, including "nexus\_meters/feeder\_12345".

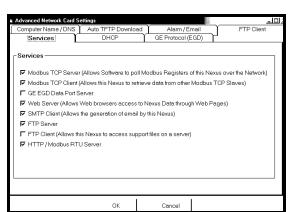
If there is another subdirectory inside this directory that is not listed in the server's directory as above, such as "C:\Inetpub\ftproot\nexus\_meters\feeder\_12345\info\", INP100 will not locate that file and no files will be downloaded from that directory to INP100.

# 6.6: Customizing Screens

# 6.6.1: Configuring WebExplorer©

All polled data is stored in an XML file, poll\_data.xml. Each polled item is located in its DEVICE\_x section as it is programmed in the poll\_profile.xml file. The standard data format for each device is:

<DEV\_NAME> <DEV\_TYPE> up to 64 <items>, each with its D\_UID, D\_LABEL and D\_VALUE.



This XML file can be viewed directly in your browser. To display it on a customized web page,

you must set up your browser to run Java Script. (Configuring XML is detailed in section 6.6.2.) **NOTE:** Auto Refresh Rate is set in the SetTimeout ()Function (see Java Script example below).

# Example of the data file: <?xml version="1.0" encoding="UTF-8"?>

# 

### Displaying a value in an HTM file: (Use Java Script in the web browser.)

- Define a unique name for a value to be displayed, such as data\_name. Insert <span id="data\_name"></span> in the HTM file where it will be displayed.
- 2. Create a Java Script code inside the HTM file (Auto Screen Refresh is set at 5000ms in the Set Timeout ()Function; see Example below) :

```
xmlDoc.load("poll_data.xml");
      function do get data()
{
      if (xmlDoc.readyState == 4)
      {
            if (xmlDoc.documentElement == null)
            {
                  timerID = setTimeout("do_get_xml();",5000);
            }
            else
            {
                  disp value =
            xmlDoc.documentElement.selectSingleNode
                  ("//item[@D_UID='1_1']").
            getAttribute("D_VALUE");
                  data_name.innerHTML = disp_value;
                  timerID = setTimeout("do_get_xml();",5000);
            }
      }
}
//--></SCRIPT>
```

```
NOTE: Inside the <body> of the HTML file, add on the following: Load="do_get_xml()"
```

#### Server Side Include Functions

These functions will send data directly to the browser as part of a requested document.



#### **Example of using Server Side Include Functions:**

```
1. In HTM file, add to the first line of that file
```

<!-- \*\* THIS FILE DOES CONTAIN REALTIME DATA \*\* --> Without that line, any server side include functions will not be processed by the web server.

2. Inside the HTM file where you want the info displayed, add

<!--#exec cgi="/[server\_side\_include\_function\_name]"--> where [server\_side\_function\_name] can be one of the function names.

3. To display stored email #1's date/time, add the following to your HTML file at the location where you want the data displayed:

<!--#exec cgi="/ssi\_show\_email\_date\_time 1"-->

GENERAL FUNCTIONS			
Server Side Include Function Name Parameter Description			
get_ip.fn Show local IP address			

DIAGNOSTIC FUNCTIONS			
Server Side Include Function Name	Parameter	Description	
ssi_diag_cpu		Show CPU info	
ssi_diag_ethernet_hardware		Show ethernet hardware info	
ssi_diag_firmware		Show firmware info	
ssi_diag_ftp_server		Show FTP Server info	
ssi_diag_memory		Show memory info	
ssi_diag_modbus_com		Show all Modbus communication info	
ssi_diag_modbus_tcp_server		Show Modbus TCP Server info	
ssi_diag_system		Show system info, such as start time	
ssi_diag_web_server		Show Web server info	
stats.fn		Show ethernet communication status	

STORED EMAIL FUNCTIONS			
Server Side Include Function Name	Parameter	Description	
ssi_show_email_date_time	1 to 10	Show stored email's date/time	
ssi_show_email_subject	1 to 10	Show stored email's subject text	
ssi_show_email_from	1 to 10	Show stored email's from text	
ssi_show_email_to	1 to 10	Show stored email's to text	
ssi_show_email_cc	1 to 10	Show stored email's cc text	
ssi_show_email_device_name	1 to 10	Show stored email's device name text	
ssi_show_email_contact_person	1 to 10	Show stored email's contact person name	
ssi_show_email_contact_phone	1 to 10	Show stored email's contact phone number	
ssi_show_email_alarm_ids	1 to 10	Show stored email's alarm IDs	
ssi_show_email_alarm_names	1 to 10	Show stored email's alarm names	
ssi_show_email_alarm_details	1 to 10	Show stored email's alarm details	
ssi_show_email_send_status	1 to 10	Show stored email's send status	
NOTE: 1 = Newest, 10 = Oldest			

SPECIAL FUNCTIONS FOR MODBUS DEVICE 1			
Server Side Include Function Name	Parameter	Description	
ssi_show_pt		Show PT ratio	
ssi_show_ct		Show CT ratio	
ssi_show_system		Show hookup info	
ssi_show_dev_type		Show device type/model	
ssi_show_dev_name		Show device name	
ssi_show_boot		Show boot firmware version	
ssi_show_run_time		Show runtime firmware version	
ssi_show_dsp_boot		Show DSP firmware boot version	
ssi_show_dsp_runtime		Show DSP runtime firmware version	
ssi_show_sn		Show device serial number	
ssi_show_com_state		Show COM firmware runtime state	
ssi_show_dsp_state		Show DSP firmware runtime state	
ssi_show_pw_state		Show password protection state	
ssi_show_mac		Show ethernet MAC address	
ssi_show_ip		Show IP address	
ssi_show_mask		Show subnet mask	
ssi_show_gateway		Show default gateway IP address	

# 6.6.2: Configuring WebXML©

The term XML stands for EXtensible Markup Language. XML is a markup language similar to HTML which is used to describe data. HTML displays the data. XML does not replace HTML; it compliments HTML. An XML document is information wrapped in XML tags. A piece of software has to be written to send, receive or display the document.



#### The "Rules" of XML:

- 1. The first line of the document, the XML declaration, defines the XML version and the characters used in the document.
- 2. All XML elements MUST have a closing tag. It is illegal to omit the closing tag.
- 3. XML tags are case sensitive.
- 4. All XML elements must be properly nested.
- 5. All XML documents must have a root tag (first tag in an XML document).
- 6. Attribute values must always be quoted. It is illegal to omit quotation marks around attribute values.
- 7. White space in XML documents is Preserved, not truncated.
- 8. Comment syntax is similar to HTML. <!-- This is a comment -->

#### **Example of Root Tag and Elements:**

The first tag in an XML document is the root tag. All XML documents must contain a single tag pair to define the root element. All other elements must be nested within the root element.

All elements can have subelements (children). Subelements must be correctly nested within their parent elements as shown below:

```
<root>
        <child>
        <subchild>....</subchild>
        </child>
</root>
```

```
Example of Attributes:
<data id="1" value="123"></data>
```

SYSTEM ATTRIBUTES				
Attribute	Description	Settings		
DATA_POLL_DELAY	Poll delay between each Modbus poll, in milliseconds	Min=500 Max=65536 Default=500		
SYSTEM_COMM_TIMEOUT	System communication timeout, in miliseconds	Min=500 Max=32000 Default=500		
ALARM_POLL_DELAY	Poll delay between each Modbus poll for each device's alarm polling, in milliseconds	Min= 1000 Max=65535 Default=1000		
ALARM_CONTACT_PHONE	Alarm contact phone number	Max size=10 digits		
ALARM_CONTACT_PERSON	Alarm contact person name	Max size=64 characters		



#### **Email Attributes:**

```
<item EMAIL_1=""FORMAT_1="long"
   EMAIL_2=""FORMAT_2="long"
   EMAIL_3=""FORMAT_3="long"
   EMAIL_4=""FORMAT_4="short"
   EMAIL_5=""FORMAT_5="short"
   EMAIL 6=""FORMAT 6="short"
   EMAIL_7=""FORMAT_7="short"
   EMAIL_8=""FORMAT_8="short"
```

</item>

EMAIL ATTRIBUTES			
EMAIL_X	Email address, X is from 1 to 8	Max size = 64 characters	
FORMAT_Y	Email format, Y is from 1 to 8	Strings 'long' or 'short'	

Device Elements: <DEVICE\_X> and </DEVICE\_X>, where X is from 1 to 8. Contain parameters for each device.

**General attributes:** 

```
<item DEV_TYPE="Nexus 1250"
   DEV PROTOCOL="Modbus RTU"
   DEV_NAME="Nexus Demo 1"
   DEV_ADDRESS="1"
   DEV IP=""
   DEV_MAX_PACKET_LEN="127"
   DEV_POLL_ALARM="yes"
   DEV_ALARM_OPTIONS="1+2+3+4+5+6+7+8+9"
   DEV_ALARM_DELAY="2000"
   DEV_COMM_TIMEOUT="750"
   DEV_PARENT="1"
</item>
```

SYSTEM ELEMENTS		
Device Element	Description	Settings
DEV_TYPE	Supported device name	Generic Modbus Nexus 1250 Nexus 1252 Nexus 1260 Nexus 1262 Nexus 1270 Nexus 1272 Futura+ DMMS 300 DMMS 350 DMMS 425 [~DEVICE_TYPE_LABEL] = Auto detect device's type
DEV_PROTOCOL	Protocol name	Modbus RTU Modbus TCP
DEV_NAME	User assigned device name	Max = 32 characters [~DEVICE_LABEL]=Use the name stored inside the device (Only supported in Nexus devices)
DEV_ADDRESS	Device address	Modbus protocol = 1 to 247
DEV_IP	IP address for Modbus TCP devices	XXX.XXX.XXX.XXX
DEV_MAX_PACKET_LEN	Max modbus registers for a device's response buffer	Nexus = 127 Futura & DMMS = 50
DEV_POLL_ALARM	Enable or disable device alarm poll function	Yes = Enable No = Disable
DEV_ALARM_OPTIONS	Alarm poll options	<ul> <li>1 = Limits exceeded</li> <li>2 = Inputs abnormal condition</li> <li>3 = Waveform captured</li> <li>4 = PQ (CBEMA) event captured</li> <li>5 = Control output changed</li> <li>7 = Control power/system start</li> <li>9 = Communication failure</li> </ul>
DEV_ALARM_DELAY	Delay time for reporting alarm condition (in milliseconds) for limit and input type alarms	Min = 0 Max = 300000 Default = 0
DEV_COMM_TIMEOUT	Device communication timeout (in milliseconds)	Min = 500 Max = 32000 Default = 500
DEV_DATA_FORMAT	Data format	0 to 0.000000
DEV_PARENT	Parent device ID	Value from 1 to 8

### Polling Data Elements: <DEV\_DATA> and </DEV\_DATA>

Polling data attributes, up to 64 in each <DEV\_DATA> element:

<item D\_UID="1\_1" D\_LABEL="Inst Van" D\_ADDR="180" D\_LENGTH="2" D\_TYPE="7" D\_USE\_SPECIAL="3" D\_VALUMODE="Primary" ></item>

DATA ELEMENT ATTRIBUTES Attribute Description Settings User assigned device polling data D UID Max = 16 characters unique ID D LABEL User assigned data label Max = 32 characters D ADDR Decimal, 1 based Modbus register address D LENGTH Modbus register length For Nexus Devices, use Fx Communication Data Formats D TYPE Data type For Generic Modbus Device Type, see NOTE below for values D CHANNEL Channel ID for I/O type values Auto = auto show k or M Format value with k or M D\_SHOW\_KM k = fixed to kM = fixed to MD\_USE\_SPECIAL Special functions See note\* If a numerical value is set here and a real polled value matched with D\_NA\_VAL Numerical Value for '\*\*\*' this number, a '\*\*\*' string will be stored in the xml data file. Raw Primary D\_VALUEMODE Value mode Secondary Value (for Generic Modbus Device Type)

**NOTE:** Values for Generic Modbus D\_TYPE:

- 1 = ASCII string
- 2 = 1 byte, signed high byte of the Modbus Register
- 3 = 1 byte, signed low byte of the Modbus Register
- 4 = 1 byte, unsigned high byte of the Modbus Register

- 5 = 1 byte, unsigned low byte of the Modbus Register
- 6 = 2 bytes, signed integer
- 7 = 2 bytes, unsigned integer
- 8 = 4 bytes, signed long integer
- 9 = 4 bytes, unsigned long integer
- 10 = 8 bytes, signed long long integer
- 11 = 8 bytes, unsigned long long integer
- 12 = 4 bytes, IEEE float
- 13 = 1 digit, 8 bits representation
- 14 = 1 digit, 4 bits representation (aka Packed BCD)

### **NOTE:** Parameters for D\_USE\_SPECIAL:

- 0 = do not multiply any number
- 1 = multiply by CT ratio (mainly used for current values)
- 2 = multiply by CT Aux ratio
- 3 = multiply by PT ratio (mainly used for voltage values)
- 4 = multiply by PT Aux ratio
- 5 = multiply by CT and PT ratio (mainly used for power, energy values)

# 

### Poll\_data.xml

Root tag: <EIG\_DATA> and </EIG\_DATA> One (1) system element: <EIG\_SYSTEM> and </EIG\_SYSTEM> Eight (8) device elements: <DEVICE\_X> and </DEVICE\_X>, where X is from 1 to 8. In each of the 8 device elements: Device info elements: card copies data from poll\_profile.xml <DEV\_NAME> and </DEV\_NAME> <DEV\_TYPE> and </DEV\_TYPE> Up to 64 polling data attributes: card copies data from poll\_profile.xml <item D\_UID="1\_1" D\_LABEL="Inst\_Van"

```
D_LABEL="Inst Van"
D_VALUE="+126.06" (Data value).
></item>
```

# 6.6.3: Configuring WebReacher©

Through the configuration of poll\_profile.xml, you can poll up to 8 individual devices or up to 512 unique items via Modbus RTU protocol or Modbus TCP protocol.

Devices supported: any device that supports Modbus RTU or Modbus TCP protocol (with at least one available socket).

Devices supported for Advanced Features: Nexus 1250/1252, 1262, 1272, CPU 1000, DMMS300/350/425.

```
System set up:
```

Set DATA\_POLL\_DELAY in milliseconds; the system will pause between each Modbus poll. Set SYSTEM\_COMM\_TIMEOUT in milliseconds.

#### **Example:**

### Device Set up: within the boundary of <DEVICE\_X> and </DEVICE\_X>

- 1. Assign a device type, DEV\_TYPE.
- 2. Assign a protocol, DEV\_PROTOCOL
- 3. Assign user defined device name, DEV\_NAME (should be unique in a system).
- 4. Assign Modbus device address, DEV\_ADDRESS.
- 5. If protocol is Modbus TCP, assign the remote device's IP address and the TCP port number, DEV\_IP and DEV\_TCP\_PORT.
- 6. Set max Modbus packet length in number of registers, DEV\_MAX\_PACKET\_LEN.
- 7. Set device's communication timeout in milliseconds, DEV\_COMM\_TIMEOUT. The timeout value should be longer for devices that speak Modbus TCP than for devices that speak Modbus RTU, depending on network traffic.
- 8. Set device's data display format, DEV\_DATA\_FORMAT, from 0 to 0.000000.
- 9. You can expand the polling item limitation of 64 items per device by setting a device as a child device of a parent device.

For Example, in <DEVICE\_X> section, if you set it to be the parent device, DEV\_PARENT must be X or 0. Then for <DEVICE\_Y> section, if you set the device to be a child device of X, set DEV\_PARENT to X. Other parameters can be omitted.

```
Example:
<EIG_POLL_DATA>
     <DEVICE 1>
            <item DEV_TYPE="Nexus 1250"
                  DEV_PROTOCOL="ModbusRTU"
                  DEV_NAME="Nexus Demo 1"
                  DEV ADDRESS="1"
                  DEV_IP=""
                  DEV_TCP_PORT=""
                  DEV_MAX_PACKET_LEN="127"
                  DEV COMM TIMEOUT="750"
                  DEV DATA FORMAT="0.00"
                  DEV PARENT="1"
            </item>
      </DEVICE 1>
</EIG_POLL_DATA>
```

#### Polling Item Set up:

In each DEVICE\_X, DEV\_DATA section, you can have up to 64 items. Any extra items will be ignored.

- 1. Set a unique ID, D\_UID, so any program can easily access this item.
- 2. Set a data label, D\_LABEL, optional.
- 3. Set Modbus register in decimal, 1 based, D\_ADDR.
- 4. Set how many Modbus registers, D\_LENGTH. Note: Each register is 2 bytes long.
- 5. Set data type, D\_TYPE. (See Modbus Protocol Mapping Manual.)
- 6. Set special operations, such as multiplying PT or CT ratio, D\_USE\_SPECIAL.
- 7. Set value mode, D\_VALUEMODE as primary, secondary or raw value.
- 8. Set display units, D\_SHOW\_KM, optional.
- 9. Set a N/A value, D\_NA\_VAL, optional.

#### **Example:**

### 6.6.4: Configuring WebMod©

WebMOD© allows the network to interface with Modbus-based EIDs. WebMOD© supports 12 Modbus TCP sockets (12 simultaneous connections). The Modbus Port Number is 502. The Modbus Port Number is set on the Location Editor screen and Devices are added to the Network on this screen. **NOTE:** If you have a firewall in your system, you must ask your network administrator to grant communication access on TCP/IP Port 502.



**Modbus TCP Format:** [6-byte Header] [Modbus RTU message without checksum] Header detail:

[2 Bytes - Sequences/Transactions ID] [2 Bytes - 0s] [2 Bytes - Length, Number of Bytes following]

### Example:

Request: 01 03 00 00 06 01 03 00 00 00 02 Transaction #259, 6 Bytes long, Modbus RTU Request for Address 01, Function Code 03 (read holding registers), Start at Register 0 for 2 registers. Response: 01 03 00 00 00 7 01 03 04 xx xx xx xx Transaction #259, 7 Bytes long, Modbus RTU Response for Address 01, Function Code 03, 4 Bytes long data.

It will not support multiple Modbus requests and responses in a single Modbus TCP packet. For INP10 and INP100 Options, all requests with Modbus Address 01 will transmit to the meter itself. All other requests with Modbus Addresses other than 01 will transmit to the RS-485 Gateway Port.

### 6.6.5: Configuring WebAlarm©

1. The user must Enable this feature.

From the Device Profile, click Communication Ports, then click the Advanced Settings button. The following tabbed screens will appear:

Click the **Services** tab. On that screen click the SMTP Client box.

Click the Alarm/Email tab.
The screen (shown here) allows you
to configure one Email Address,
which will be stored in the meter
for single user or administrative use.
Eight additional addresses can be
programmed into the Polling Profile
XML File (see WebXML).
The alarm format for the
Administrative Address is always
Long Format to insure that the alarm detail will be transmitted.

🛎 Advanced Network Card Settings		_D×
FTP Client	Services	DHCP
Computer Name / DNS	Auto TFTP Download	Alarm / Email
- Alarm / Email Email Server IP Address / Name Email Server Port Email Monitor Email Address Return / Reply Address Email Subject Text	25	
F Email Server requires authen User name Password	tication	
	OK Cancel	P

e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

 Enter the following values on this screen to configure the Administrative Address: Email Server IP Address/Name: IP Address, Name, 10.0.0.250, or mail@abccorp.com. Email Server Port: Port 25 is the Default. Email Monitor Email Address: the Primary Email Address to be notified of an event. Return/Reply Address: Administrative Email Address. Email Subject Text: Typical Message might be "Limits Exceeded".

If your email server (SMTP server) requires authentication before sending out the email, you must enable the checkbox and supply the correct user name and password in the configuration screen or the device will not be able to send out emails. This feature is implemented according to ESMTP Specification and supports 64-bit encryption for the user name and password.

- 3. Click OK or Cancel.
- 4. Configure more Email Recipients:

Edit the poll\_profile.xml file saved in FTP Server (see FTP Server).

From EMAIL\_1 to EMAIL\_8, enter the email address within the double quotes From FORMAT\_1 to FORMAT\_8, enter the format name as either "short" or "long" within the double quotes. A section of a poll\_profile.xml file is shown below without values entered.

```
<EIG_POLL_DATA>
```

#### Short Format:

For all handheld mobile devices with text messaging service capable of receiving up to 160 characters. Character number includes sender address, subject and body plus additional separator characters. This format is defined by EIG and the user cannot modify it.

Example of the Short Format: [64 characters of sender's email address]##[32 characters of Meter ID] #Alarm[10digit operator's phone number] IDs1+2+3+4+5+6+7+8+9+10+11+12+13+14+15+16

#### Long Format:

For all handheld mobile devices and PC users who can receive regular email. This includes detailed alarm information.

#### **Example of Long Format:**

Device Name: Nexus Demo 1 Contact Person: Administrator Contact Phone: 1234567890 Alarm IDs: 1+2+3+4 Alarm Names:

- (1) Limits exceeded
- (2) Inputs abnormal condition
- (3) Waveform captured
- (4) PQ (CBEMA) event captured

Alarm Details:

Limits:

- (4) 1s IA, Below Limit 2, Combination=OR, value = +0.38
- (5) 1s IB, Below Limit 2, Combination=OR, value = +0.38
- (6) 1s IC, Below Limit 2, Combination=OR, value = +0.38

Inputs:

(1) HSI Input 1 BK101 Off

- (3) HSI Input 3 Closed
- (4) HSI Input 4 Closed
- 5. **Configure Alarm Polling Options:** Enter values within the double quotes. To enable the polling for a device, set DEV\_POLL\_ALARM to "Yes"; to disable it, set "No".

Alarm polling options: 1 to 9 (See table below).

The default is sending alarm emails for all options, 1 to 9.

You can configure the polling profile to have any combination of options.

Edit the poll\_profile.xml. Set up the alarm polling options by concatenating the options IDs, such as: "1+2+3+4+5+7+9".

Set the alarm delay for limits in Milliseconds (a value of 1000 = 1 second). If a limit condition occurs for 1 second or more, an alarm email will be sent.

**NOTE:** Most of the **Alarm Triggering Conditions** for Nexus devices rely on the device's configuration in the Device Profile. Make sure that the settings are correct for Limits, Inputs, Waveforms, etc.

	ALARM POLLING OPTIONS							
Option ID	Option Name	Description						
1	Limits exceeded	Any limit condition exceeded for the 32 Nexus limit channels						
2	Inputs abnormal condition	Any internal digital input abnormal condition						
3	Waveform captured	When Nexus captures a waveform						
4	PQ (CBEMA) event captured	When Nexus captures a PQ event						
5	Control Output changed	When any relay modules connected to Nexus changes state						
7	Control power/System start	Device restart due to cycle power						
9	Communication Failure	Network card has difficulty talking to Nexus meter						

#### 6. **Configure Alarm Polling for more individual devices.**

Edit the poll\_profile.xml file for each device's section. Configure the parameters. <EIG\_POLL\_DATA>

#### 7. Common Problem

If you entered a name for the SMTP Server instead of an IP Address, make sure your DNS Server is working and you have either set a DSP IP inside the meter or your DNS can supply a DNS IP. Otherwise, if it cannot resolve the name to an IP translation, no email will be sent.

#### 8. Stored Emails:

User can access the stored\_emails.htm page from any internet browser. The last 10 emails sent will be stored in the RAM on a FIFO basis (First In, First Out) and will be displayed in descending order. The page will be cleared after a complete system restart.

### 6.7: FTP Server

A built-in FTP Server is available for INP100. It has a 3-user Limit; three users can connect to the FTP Server simultaneously. The FTP Server logon User Name and Password are stored in the INP100 card, not in the meter's programmable settings. The Initial FTP Server User Name and Password are: **eignet** and **inp100**. The FTP Server's quota is 4Meg RAM.

To change the Initial User Name and Password, switch to INP100's boot mode and change the Initial Settings. (See section 6.9.)

To copy a file into the FTP Server, simply copy the file and paste it into the Server. If there is a file with the same file name in the Server, you must delete the existing file first, then copy and paste the new file.

If the memory quota is filled before a new file is completely copied into the FTP Server, that file will be deleted and an error will be sent to the FTP Client.

Since poll\_profile.xml and poll\_data.xml file sizes can be dynamic, it's preferable to have some reserved space in the FTP Server for those files.

**Example:** After a test run, if poll\_data.xml is approximately 1k bytes, you should reserve at least 4k bytes for those files. The ratio is about 1 to 4.

### 6.8: Update Network Card Firmware from a Browser (in Runtime Mode ONLY)

Network Card Firmware can be easily updated via the Web. Follow these steps:

 Start your browser. If you know the meter's IP Address, type it in the browser's URL Address Bar.

The Main WebExplorer screen appears.

 Click Tools. Then, click on Firmware Upgrade. Or, add /update1.htm to the end of the URL.

		<b>ies/GaugeTec</b> ssed Power Monitorin	ıg	Explorer
duction	Date/Time	2003-01-17 09:31	:50.640	
l Web tions	Voltage/Frequ	ency		
s/Amps		Instantaneous	Maximum	Minimum
	Volts AN	+59.75	+66.13	+0.00
r/Energy	Volts BN	+59.81	+67.65	+0.00
r Quality	Volts CN	+59.77	+66.13	+0.00
	Volts A-B	+0.00	+4.59	+0.00
nulation	Volts B-C	+0.00	+9.55	+0.00
5	Volts C-A	+0.00	+10.60	+0.00
	Frequency	+440.01	+440.01	+0.00
nation s	Current			
-		Instantaneous	Maximum	Minimum
ostic	Amps A	+0.44	+0.74	+0.00
	Amps B	+0.44	+0.74	+0.00
	Amps C	+0.44	+0.74	+0.00
	Amps N (calculated)	+1.32	+2.21	+0.00

The Enter Network Password screen will appear and ask for a User Name and Password.

3. Type User Name and Password into windows.

Initial User Name = eignet Initial Password = inp100

**NOTE:** See section 6.9 to change User Name and Password.

Click OK.

Enter Net	work Passwo	rd	<u> ? ×</u>
<b>?</b>	Please type yo	our user name and password.	
٤J	Site:	10.0.0.10	
	Realm	Administrator	
	<u>U</u> ser Name	eignet	
	<u>P</u> assword	*****	
	$\square$ Save this p	password in your password list	
		OK Ca	ncel

The Update Run-Time Firmware screen appears:

- 4. Click the Browse button to select the correct runtime firmware file.
- 5. Click on Update Run-Time Firmware button to continue. The whole process can take several minutes. Make sure that during the process you do not close the Update Run-Time Firmware screen (or update1.htm browser window).

Update INP-100 Run-time	Firmware		
1. Click on the Browse butt	on to select the firmware file.		
2. Click on the Update Run-	time Firmware button to continue	э.	
Please note: the update p	process could take several minute	95.	
[			 Brov

During the update process, the INP100 Update Run-Time Firmware Status screen appears. It displays the current status of the update.

- 6. If the update is successful, restart the connected meter. Restart one of two ways:
  - 1. Go to reset\_ethernet.htm. (Click on Restart.)
  - 2. Power down/up the connected meter.

### 6.9: Update Network Card Firmware from Nexus Communicator

Using this screen is the **ONLY** way to change the **Boot Firmware** and **Username and Password**.

**NOTE:** While you are on this screen, the Network Card is in BOOT MODE.

Changes can easily be made by using the Network Card Run Time Update screen. Details for using this screen for Nexus 1250/1252 are offered in section 3.28 and for Nexus 1260/1262, 1270/1272 in section 4.29 of this manual. The use of this screen is the same for all meters. The connections are slightly different.

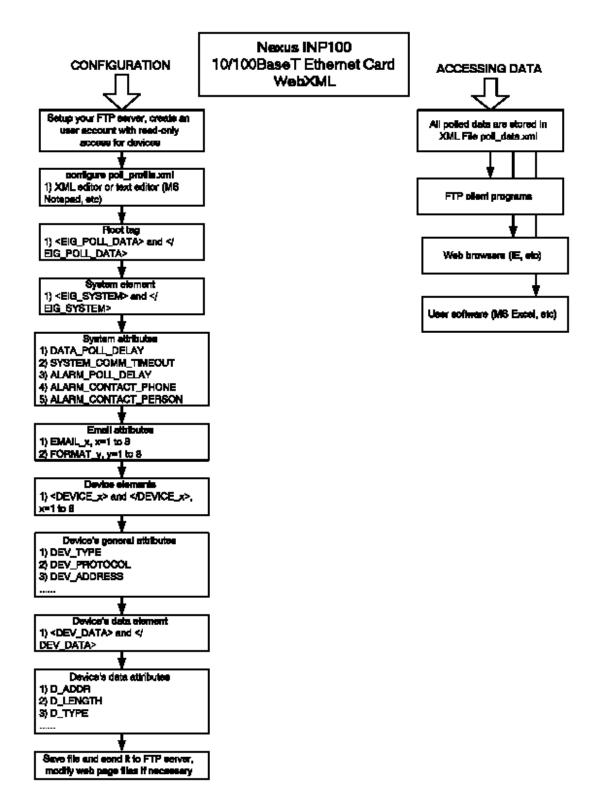
Network Card F	Run Time Undate	
Connect	Communicate through Nex	2U
Boot Version	INP-100 (EIG) 10/100 Base-T Nets Runtime Firmware: v0.1 (Build 26.) Cl Boot Firmware: v1.0 (Build 40.) Che Flash Memory Size: 2MB SDRAM Size : 32MB	hecksuim = 0x8E48, Length = 0xCF93C ccksuim = 0x923D, Length = 0x28424
_ Flash File	Update Settings	Run Time File Update Settings (Fixed)
Server	10.0.099	Base 16
Client	10.0.0.1	Baud Rate 115200
Gateway	0.0.0.0	File type S-Record
Net Mask	255.255.255.0	Mac Address 00:01:58:FF:FF:E3
Runtime File		E 11 1 2 4 2 1 1 1 1 1
Boot File		Firmware Update Via the Web Username and Password - Current New
		Username
Retrieve	Settings Write Settings	Password
Update R	un time Update Boot	Change Password
Read command	completed	
ļ	·	
-	<u>0</u> K	Help

NOTE: Changes made here **DO NOT** modify the meter's Device Profile.

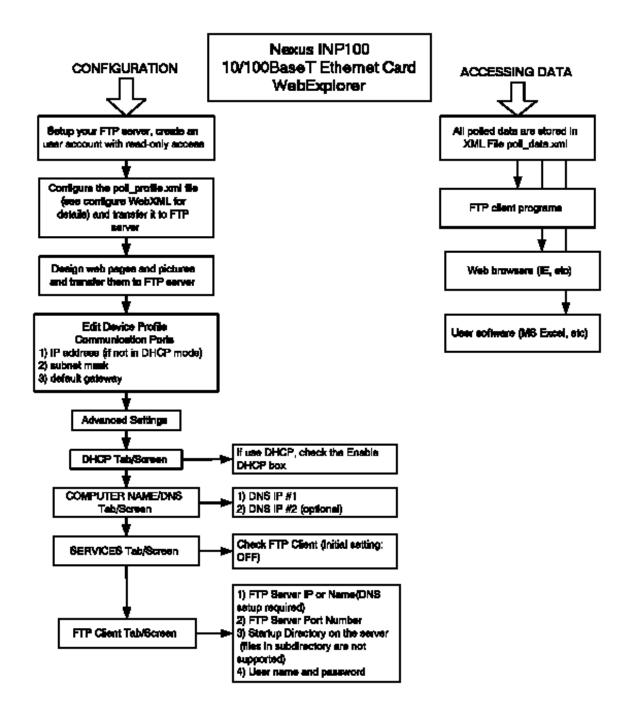
#### **TFTP Settings Update:**

From Nexus Communicator click Device Profile > Comm Ports > Advanced Settings Click on the Auto TFTP Download tab to change TFTP settings.

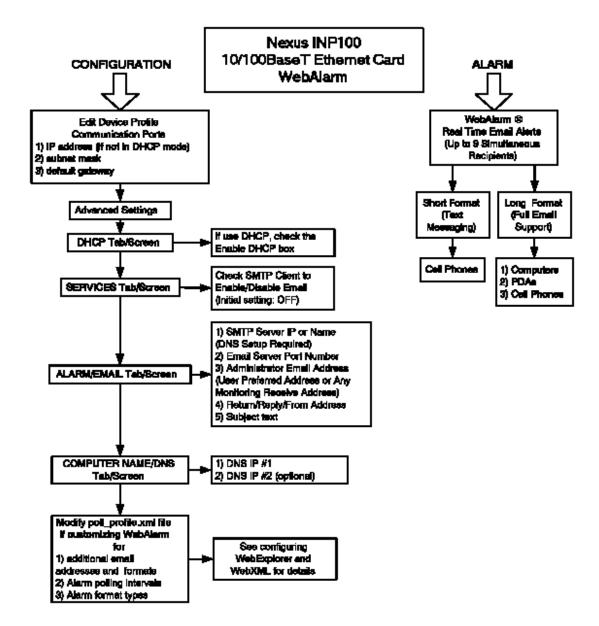
#### 6.10: WebXML Flow Chart



### 6.11: WebExplorer Flow Chart



### 6.12: WebAlarm Flow Chart



# Chapter 7 Real-Time Polling

# 7.1: Overview

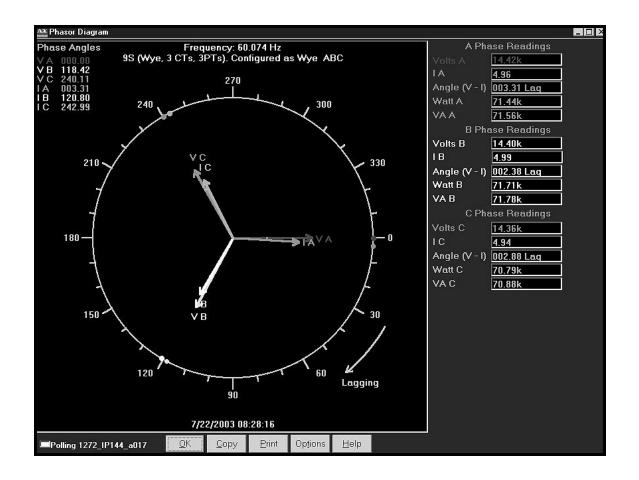
■ The Real-Time Polling features of Nexus Communicator consist of fifteen data arrangements. Thirteen screens appear under the Real-Time Polling menu:

Aux Nexus Communicator	
File Connection Real-Time Poll Iools 1/0 Devices Time-of-Us	e <u>L</u> ogs <u>V</u> iew <u>H</u> elp
Phasors         Instantaneous Polling         Poll All         Poll Max and Min Readings         Poll Power Readings         Poll Harmonics         Poll Multiple Devices         Poll Pulse Accumulations         Poll Limit Status         Poll Internal KYZ Output Accumulators         Poll Energy, Pulses and Accumulations in the Intt         Poll Energy, Pulses and Accumulations	SORS LOG STATUS, DEVI

- Two additional polling screens can be accessed from the I/O Devices menu: Poll External Digital Inputs (Section 7.15) and Poll External Analog Inputs (Section 7.16).
- 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 7.9) 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.

### 7.2: Phasors

- The Phasors screen displays the phase relationships of the currently connected Nexus Monitor device.
- Note: The Nexus 1262/1272 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 phaser 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.

Nexus Phas	or Diagra	m I	Uptions	
			Phase To Phase In Wye Configuration	
_ │ <sup>Display</sup>	Angles	no	creasing —	-1
Cloc	kwise	Ç	Counter Clockwise	
Display	Vectors		<b>_</b>	
	OK			

- 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.

# 7.3: 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.

Nexus Polling								
Volts	Curren	t (I)						
Instar	Itaneous	Instantaneous	Maxim	ium	Va	olts A W	/aveforr	n
A-N	119.99 A	261.17	31	17.34	<u> 2007</u>			
B-N	119.99 B	260.97	31	17.09	1			
C-N	119.98 C	261.34	31	16.99	1			
A-B	0.00 Nc	782.81	95	51.16			$\cap$	
B-C	0.00 Nm	0.26		0.32			/	
C-A	0.00				7	\	/	
AUX	120.00 Freque	ncy 60.01	2		ļ.	<b>1</b>		7
	Real	Power (W)			t	$\langle \rangle$	١	
	Total	А	В	C		( )		
Inst.	51.06k	17.02k	17.02k	17.02k				$\cup$
Average	51.47k	17.15k	17.16k	17.16k	Ŧ			
+Maximum [	56.46k	18.83k	18.81k	18.81k				
-Maximum [	****	*****	****	*****	<del>, 11</del> 7			
	Reactive	Power (vars)				Apparent Po	ower (VAs)	
	Total	Α	в	C	Total	A	В	С
Inst.	-78.94k	-26.32k	-26.29k	-26.33k	94.01k	31.34k	31.32k	31.36k
Average	-80.82k	-26.92k	-26.98k	-26.92k	95.75k	31.92k	31.90k	31.93k
+Maximum [	*****	*****	*****	*****	116.42k	38.83k	38.80k	38.79k
-Maximum	-102.91k	-34.33k	-34.29k	-34.28k				
							8	1 <u>S</u> econd
🔲 Polling Dev	vice 1	<u>0</u> K	<u>P</u> rint	<u>H</u> elp	Volts A	Sp	octrum	0.1 S <u>e</u> cond

- 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.

# 7.4: 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.

Polling Device 1 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
√olts BN	119.96	119.96	119.96	123.35	116.56			119.67
√olts 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
A	266.05	264.16	263.81	317.34	215.74			259.29
В	266.05	264.04	263.70	317.09	215.61			263.09
C	266.05	264.08	263.75	316.99	215.82			260.75
Nm	0.27	0.26	0.26	0.32	0.22			0.26
Nc	N/A	791.95	790.86	951.16	646.51			0.00
volts AB	0.00	0.00	0.00	0.00	0.00			0.00
√olts BC	0.00	0.00	0.00	0.00	0.00			O.DD
volts CA	0.00	0.00	0.00	0.00	0.00			0.00
VA A	31.91k	31.69k	31.65k	38.83k	26.06k			-
VA B	31.92k	31.67k	31.64k	38.80k	26.05k			
VA C	31.91k	31.68k	31.64k	3B.79k	26.07k			
VA Total	95.75k	95.04k	94.92k	116.42k	78.18k			
VAR A	-26.70k	-26.61k	-26.56k	*****	*****	-34.33k	-21.37k	
/AR B	-26.69k	-26.56k	-26.52k	*****	*****	-34.29k	-21.34k	
VAR C	-26.66k	-26.56k	-26.51k	*****	*****	-34.28k	-21.38k	
VAR Total	-80.06k	-79.73k	-79.59k	*****	****	-102.91k	-64.09k	
₩att A	17.47k	17.21k	17.21k	18.83k	14.91k	*****	****	
Watt B	17.50k	17.26k	17.25k	18.81k	14.82k	*****	*****	
₩att C	17.54k	17.26k	17.26k	18.81k	14.91k	*****	*****	
₩att Total	52.51k	51.73k	51.72k	56.46k	44.64k	*****	*****	
Frequency	59.996	59.996	59.996	6D.039	59.957			
Power Factor A	0.547 LEAD	0.542 LEAD	0.543 LEAD					
Power Factor B	0.548 LEAD	0.544 LEAD	0.545 LEAD					
Power Factor C	0 549 I FAD	0.5451EAD	0 546 I FAD					
Coincident Channel	PN	lax Watt N	Max Watt P	Min Watt	N Min Watt			
Thermal Average VAR		-86,49k	0.00k	-65.77k	D OOk			
		-82.40k	0.00k	-65.77k	0.00k			
Fixed Window Average			0.00k	-76.52k	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.

### 7.5: 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.

Polling Device 1	Pes	tive Maximum	Pos	itive Minimum	Neg	ative Maximum	tive Min
Channel		Time					Value
/olts AN	123.35	4/24/2000 16:41:31.06	116,55	4/26/2000 10:56:25.09			
√olts BN	123.35	4/24/2000 16:41:31.06	116.56	4/26/2000 10:56:25.09			
√olts CN	123.34	4/24/2000 16:41:31.06	116.55	4/26/2000 10:56:25.09			
olts AUX	123.36	4/24/2000 16:41:31.06	116.57	4/26/2000 10:56:25.09			
A	317.34	4/24/2000 16:09:37.07	215.74	4/28/2000 08:54:03.10			
B	317.09	4/24/2000 16:09:37.07	215.61	4/28/2000 08:54:03.10			
C	316.99	4/24/2000 16:09:37.07	215.82	4/28/2000 08:54:03.10			
Nm	0.32	4/24/2000 16:09:37.07	0.22	4/28/2000 08:54:03.10			
Nc	951,16	4/24/2000 16:09:37.07	646.51	4/28/2000 08:54:03.10			
√olts AB	0.00	4/20/2000 13:49:12.06	0.00	4/20/2000 13:49:12.09	2		
/olts BC	0.00	4/20/2000 13:49:12.06	0.00	4/20/2000 13:49:12.09			
olts CA	0.00	4/20/2000 13:49:12.06	0.00	4/20/2000 13:49:12.09			
/A A	38.83k	4/24/2000 16:09:37.07	26.06k	4/28/2000 08:54:03.10			
/A B	38.80k	4/24/2000 16:09:37.07	26.05k	4/28/2000 08:54:03.10			
/A C	38.79k	4/24/2000 16:09:37.07	26.07k	4/28/2000 08:54:03.10			
/A Total	116.42k	4/24/2000 16:09:37.07	78.18k	4/28/2000 08:54:03.10			
AR A	*****	0/0/0 00:00:00.00	*****	0/0/0 00:00:00.00	-34.33k	4/24/2000 16:09:37.07	-21
AR B	*****	0/0/0 00:00:00.00	****	0/0/0 00:00:00.00	-34.29k	4/24/2000 16:09:37.07	-21
/AR C	*****	0/0/0 00:00:00.00		0/0/0 00:00:00.00	-34.28k	4/24/2000 16:09:37.07	-21
/AR Total	at the state of th	0/0/0 0D:00:DD.00	****	D/0/0 00:DD:00.0D	-102.91k	4/24/2000 16:09:37.07	-6-
Vatt A	18.83k	4/21/2000 09:05:40.08	14.91k	4/28/2000 08:54:03.10	*****	0/0/0 00:00:00.00	
Vatt B	18.81k	4/21/2000 09:05:40.08	14.82k	4/21/2000 07:43:20.10	*****	0/0/0 00:00:00.00	
Vatt C	18.81k	4/21/2000 09:05:40.08	14.91k	4/21/2000 07:43:20.10		0/0/0 00:00:00.00	
Vatt Total	56.46k	4/21/2000 09:05:40.09	44.64k	4/21/2000 07:43:20.10	*****	D/0/D 00:00:0D.00	
requency	60.039	4/21/2000 14:55:33.04	59.957	4/21/2000 09:05:51.10			
mbalance V	100.00	4/21/2000 07:43:20.07	99.98	4/25/2000 13:02:18.06	1		
mbalance I	100.00	4/21/2000 07:43:20.08	99.57	4/26/2000 13:18:37.08			
HD Volts AN	0.00	4/20/2000 13:49:19.05	0.00	4/20/2000 13:49:19.08			
HD Volts BN	0.00	4/20/2000 13:49:19.05	0.00	4/20/2000 13:49:19.08			
HD Volts CN	0.00	4/20/2000 13:49:19.05	0.00	4/20/2000 13:49:19.08			
THDIA	0.00	4/20/2000 13:49:19.05	0.00	4/20/2000 13:49:19.08			

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

- 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 Chapters 3, 4, 5.

### 7.6: 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.

Power and Energ	ע						
Real Time	Ins	tant	Therr	nal	Block	Rolling	Predicted
W	atts	214.69k	21	4.59k	214.82k	214.8	l0k 214.75k
VA	RS	9560.74	91	50.47	9090.84	9161.	.58 9150.47
	VA 🔄 🗄	214.90k	21	4.78k	215.01k	214.9	19k 214.95k
	PF 0.9	199 LAG	0.99	8 LAG			
Peak Dema	nd		Therr	nal	Block	Rolling	1
	Del	Watts	21	5.13k	214.96k	214.9	19k
	Rec	Watts		*****	****		***
Del Watts C	oincident	VARS	93	05.94	9197.31	9199.	.78
Rec Watts C	oincident	VARS		0.00	0.00	0.	.00
	+	VARS	95	48.25	18.54M	9442.	.84
	-	VARS		*****	*****		***
Energy	(Secondary	/) [	Unco	ompensa	ted Energy	Ĭ	Q Hours
	quared T	<u> </u>	Cun	nulative D	emand	Quadran	t Energy(Primary)
Wh <sup>1</sup> (	000000000	000000	VARh	0000000	003848798	Wh <sup>`</sup>	0000000091816626
VARh	0000000000	000000					000000003848792
VAh 0	0000000000	00000		Q2	Q1	VAh	0000000091898064
-Rec Wh0	00000000000	000024	- VAh-	0000000	091901276	Del Wh-	0000000091818920
VAh 🔤	0000000000	000024		Q3	Q4	VAh	0000000000003067
-VARh	0000000000	000000				-VARh	0000000000000773
	000000000	000023	VARh	0000000	000000774	Wh _	0000000000002413
Delling 1272	P144_a017						
			(	ЭК	Print		

■ The Nexus is a true four-quadrant power meter. On the Quadrant Energy (Primary) section of this screen, readings are displayed for the Vars and VA for each quadrant:

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

- Click on the tabs at the top of each screen in the lower part of the screen to access other readings. Examples of the additional screens follow:
  - Click Print to send a copy of the screen to a printer.
  - Click OK to return to the main Nexus Communicator screen.

■ Cumulative Demand:	Energy (Secondary) Uncompensated Energy Q Hours I & V Squared T (Cumulative Demand) Quadrant Energy(Primary)
Readings in Secondary	
and Primary.	Secondary
	Continuous Delivered Watts 3869463038 3869463396
	Received Watts 2424070915 000000000
	Primary Continuous
	Received Watts 2321677822800 2321678037600
	Delivered Watts 1454442549000 000000000
	L2
■ I & V Squared T	Energy (Secondary) Uncompensated Energy Q Hours
	<b>a v Squarea I</b> Cumulative Demand Guadulatik Energy(Primary)
	I Squared T V Squared T
	A 000000000001300 000000634805695
	B 00000000008275 000000081930794
	C 00000000001098 000000331862947
■ Q Hours:	I & V Squared T Cumulative Demand Quadrant Energy(Primary)
Plus and minus readings in	Energy (Secondary) Uncompensated Energy Q Hours
Secondary and Primary.	Secondary Primary
5 5	+Qh 00000000017027 000000010216497
	-Qh000000000000000000000000000
■ Uncompensated Energy:	
Plus and minus Watt and	I & V Squared T [ Cumulative Demand ] Quadrant Energy(Primary)
VAR and VA readings in	Energy (Secondary) <b>Uncompensated Energy</b> Q Hours
Secondary and Primary.	Secondary Primary
Secondary and Tinnary.	+Watt000000000316320000000018979698
	-Watt 00000000000000 00000000000000000000
	+VAR 00000000001411 00000000847171
	-VAR000000000000000000000000000
	VA 7068782691908528 000000018998656
	1 & V Squared T Cumulative Demand Quadrant Energy(Primary)
■ Energy (Secondary):	Energy (Secondary) Uncompensated Energy Q Hours
Plus and minus Watt and	
VAR and VA readings.	
	+Watt000000000198097
	-Watt0000000000024
	+VAR
	VA000000000198305

# 7.7: 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.

	exus Harmonics S THD KFa		Volts	A Ener							_	
		1000 I			uency		1070 10111	017				
	3.12		14.4	IK	74 Hz P	olling	1272_IP144_a	3UT7				
#	Magnitude	Angle	ŧ	Magnitude	Angle	ŧ	Magnitude	Angle	ŧ	Magnitude	Angle	<b>^</b>
0	0.02	0.00	32	0.00	0.00	64	0.00	0.00	96	0.00	0.00	
1	100.00	0.00	33	0.00	0.00	65	0.00	0.00	97	0.00	0.00	
2	2.70	143.24	34	0.00	0.00	66	0.00	0.00	98	0.00	0.00	
3	0.91	98.67	35	0.00	0.00	67	0.00	0.00	99	0.00	0.00	
4	1.05	156.14	36	0.00	0.00	68	0.00	0.00	100	0.00	0.00	
5	0.23	-73.70	37	0.00	0.00	69	0.00	0.00	101	0.00	0.00	
6	0.44	-146.09	38	0.00	0.00	70	0.00	0.00	102	0.00	0.00	
- 7	0.32	-96.35	39	0.00	0.00	71	0.00	0.00	103	0.00	0.00	
8	0.00	0.00	40	0.00	0.00	72	0.00	0.00	104	0.00	0.00	
9	0.00	0.00	41	0.00	0.00	73	0.00	0.00	105	0.00	0.00	
10	0.29	57.46	42	0.00	0.00	74	0.00	0.00	106	0.00	0.00	
11	0.00	0.00	43	0.00	0.00	75	0.00	0.00	107	0.00	0.00	
12	0.00	0.00	44	0.00	0.00	76	0.00	0.00	108	0.00	0.00	
13	0.00	0.00	45	0.00	0.00	77	0.00	0.00	109	0.00	0.00	
14	0.00	0.00	46	0.00	0.00	78	0.00	0.00	110	0.00	0.00	
15	0.00	0.00	47	0.00	0.00	79	0.00	0.00	111	0.00	0.00	
16	0.00	0.00	48	0.00	0.00	80	0.00	0.00	112	0.00	0.00	
17	0.00	0.00	49	0.00	0.00	81	0.00	0.00	113	0.00	0.00	
18	0.00	0.00	50	0.00	0.00	82	0.00	0.00	114	0.00	0.00	
19	0.00	0.00	51	0.00	0.00	83	0.00	0.00	115	0.00	0.00	
20	0.00	0.00	52	0.00	0.00	84	0.00	0.00	116	0.00	0.00	
21	0.00	0.00	53	0.00	0.00	85	0.00	0.00	117	0.00	0.00	
22	0.00	0.00	54	0.00	0.00	86	0.00	0.00	118	0.00	0.00	
23	0.00	0.00	55	0.00	0.00	87	0.00	0.00	119	0.00	0.00	
24	0.00	0.00	56	0.00	0.00	88	0.00	0.00	120	0.00	0.00	
25	0 N N	N NN	57	N NN	N NN	89	N NN	0 00	121	0 00	N NN	<b>.</b>
			G	<u>V</u> alues	6	) <u>S</u> ре	ectrum	۵ ۲	<u>/</u> ave	form		
	<u>O</u> K <u>P</u> rir	nt <u>C</u> op	oy		Volt	s A	<u>•</u>				<u>H</u> elp	

- 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.

# 7.8: 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.

12345	678
Input	Status
1:HSI Input 1	Open
2:HSI Input 2	Open
3:HSI Input 3	Open
EHSI Input 4	Open
5:HSI Input 5	Open
6:HSI Input 6	Open
7:HSI Input 7	Open
3:HSI Input 8	Open

- To change the screen in any way, click OK to return to the Nexus Communicator screen and click on Edit Profile. See section 3.16 and 4.16 for details.
  - Click OK to return to the main Nexus Communicator screen.

### 7.9: 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.

🚉 Nexus Poll Mu	ltiple Devic	es						-	
0.1 Second 1 Sec	cond Averag	e Maximum	Minimum H	lour Readings	Device	Time	Accumulatio	ons	
Device	Volts AN	Volts BN	Volts CN	Volts AUX				IC	
1272_IP144_a017	14.42k	14.40k	14.36k	0.00k	4	.98	5.00		4.95
▲									+
- Polling		ОК		He	elp				
				110	- Yr				

■ 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.
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.

# 7.10: 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
Input Acc 1	000000000423125	6000	6050	7/22/2003 05:00:00.10	+1
Input Acc 2	0000000000000000	0	0	0/0/0 00:00:00.00	+2
Input Acc 3	0000000000000000	O	0	0/0/0 00:00:00.00	+3
Input Acc 4	0000000000000000	O	0	0/0/0 00:00:00.00	+4
Input Acc 5	0000000000000000	O	0	0/0/0 00:00:00.00	+1
Input Acc 6	0000000000000000	o	0	0/0/0 00:00:00.00	+2
Input Acc 7	0000000000000000	0	0	0/0/0 00:00:00.00	+3
Input Acc 8	0000000000000000000	0	0	0/0/0 00:00:00.00	+4
Nexus Watt Hour	Energy				Acc To
1272_IP144_a017	000000095038692				+1
Aggregator	Totals	Average	Maximum	Time Stamp	
Input Total 1	000000095461996	220.742 k	599.400 k	0/0/2000 04:30:00.10	
Input Total 2	0000000000000000	0	0	0/0/0 00:00:00.00	
Input Total 3	0000000000000000	0	0	0/0/0 00:00:00.00	
Input Total 4	00000000000000000	0	0	0/0/0 00:00:00.00	
Polling 1272_IP144	_а017	Print	Export		

- 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 3:15 and 4.15 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.

# 7.11: Poll Limit Status

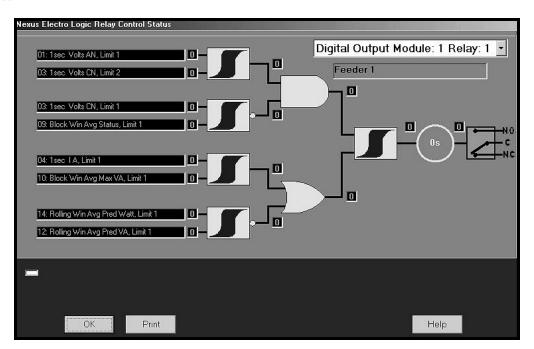
■ To view the Limit Status of the currently connected Nexus Monitor device, select Poll Limit Status from the Real-Time Polling menu. The Nexus Limit Status screen appears:

Nexus	s Limit Status									
Limit	<b>b</b>		Sta	atus	Li	mit 1	Li	mit 2	Combir	nation
ID	ltem	Value	Limit 1	Limit 2	Setting	Setpoint	Setting	Setpoint	Туре	Status
1			ിന	60						lo
2			ിന	ിര						ിര
3	1sec Volts CN	14.36k	ിത	60	Above	15.12k	Below	13.68k	AND	ിര
4	THD Volts AN/AB	3.90	ിര	նօ	Above	15.00	Below	0.00	AND	ിര
5	THD Volts BN/BC	1.95	ിര	ിര	Above	15.00	Below	0.00	AND	ിര
6	THD Volts CN/CA	3.90	նօ	ിര	Above	15.00	Below	0.00	AND	ിര
7	THDIA	4.29	ിത	60	Above	15.00	Below	0.00	AND	ിര
8	THDIB	1.95	ിര	նօ	Above	15.00	Below	0.00	AND	ിര
9	THDIC	4.29	ിര	ിര	Above	15.00	Below	0.00	AND	ിര
10	1sec Frequency	60.07	ിന	ിര	Above	61.08	Below	59.04	AND	ിര
11			ിന	00						ിര
12	1sec IC	4.94	ിര	ിര	Above	6.25	Below	3.75	AND	ിര
13			ിര	ിര						ിര
14			ിന	ിര						ിര
15			ിന	00						ിര
16			ിന	00						ിര
17			ിര	ിര						ിര
18			ിന	lo						00
19			ിന	00						ിര
20			ിന	00						ിന
21			ിന	lo						ിര
22			ിന	ിര						ിര
23			ിന	00						ിര
24			ിന	60						ിത
25			ിന	lo						ിര
26			ിന	ിര						ിര
27			ിന	00						ിര
28			ിന	00						ിന
29			la	00						ിന
- 30			ിന	la						lo
- 31			ിര	ിര						ിന
32			ിര	ിന						ിന
	Polling 1272 IP144 a017			Duint		le lu				
	Polling 1272_IP144_aU17	OK		Print		Help				

- This screen displays the Status of the Limits set in the Programming Limits section of the Device Profile (sections 3.10 and 4.10). 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.

# 7.12: 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 (sections 3.11 and 4.11). 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.

## 7.13: Poll Internal KYZ Output Accumulators

To view the Internal KYZ Output Accumulators of the currently connected Nexus Monitor device, select Poll Internal KYZ Output Accumulators from the Real-Time Polling menu. The following screen appears:

	Accumulator	Channel	Hour Reading	WH per pulse
Relay 1	0752269922	Quad (1 + 4) Watthour	0000000095084044	0.00000
Relay 2	0752269922	Quad (1 + 4) Watthour	0000000095084044	0.00000
Relay 3	0752269921	Quad (1 + 4) Watthour	0000000095084044	0.00000
Relay 4	0752269922	Quad (1 + 4) Watthour	0000000095084044	0.00000
LED	0000022195	Quad (1 + 4) Watthour	0000000095084044	1.00000
Polli	ng 1272_IP144_a017			
		ОК		

- This screen displays the Positive and Negative Energy Readings from the Internal KYZ Outputs. The screen for the Nexus 1250/1252 only displays the HeartBeat LED Pulse for the Channel selected. This screen is set in the Internal KYZ Settings section of the Device Profile.
- 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 Internal KYZ Settings to access the programming screen. (See section 3.21 for Nexus 1250/1252; section 4.21 for Nexus 1262/1272).
- To return to the main Nexus Communicator screen, click OK.

### 7.14: Poll Flicker

To view the Flicker readings of the currently connected Nexus Monitor, select Poll Flicker from the Real-Time Polling menu.

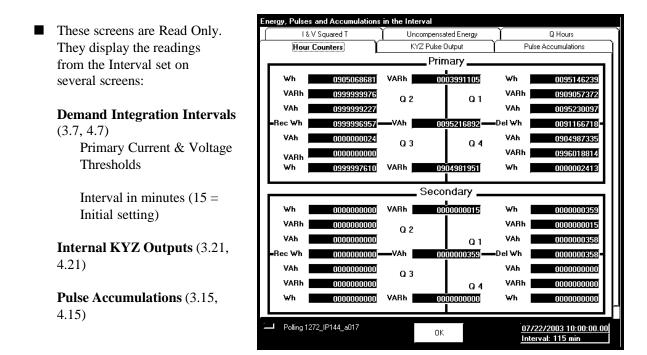
(See Chapter 16 for a complete discussion on Flicker.)

This screen appears:

Time	Instantaneous Short Term Long Ter	m
Start/Reset 00/02/2000 01:27:52	PINST Voltage Reading	
Stop 00/00/0000 00:00:00	Volts A 0.098 14416.550V	
Current 07/22/2003 09:43:58	Volts B 0.118 14396.360V	
Next PST 0 min, 2 sec Next PLT 0 min, 2 sec	Volts C 0.119 14359.710V	
Status		
Active		
Frequency Base 60 Hz Current 60.074 Hz		
Base Voltage120Volts		
Flicker Monitoring		
Start Stop Reset	OK Help Print	

# 7.15: Poll Energy, Pulse & Accumulations in the Interval

■ To view the Energy, Pulse & Accumulations in the Interval of the currently connected Nexus Monitor device, select Poll Energy, Pulse & Accumulations in the Interval from the Real-Time Polling menu. The following set of screens appears:



To change any of the settings that effect the readings, click OK. You will return to the main Nexus Communicator screen. Click Edit Profile. Double click on the appropriate screen to access settings and make adjustments. Click Update Profile to send the new settings to the Nexus.

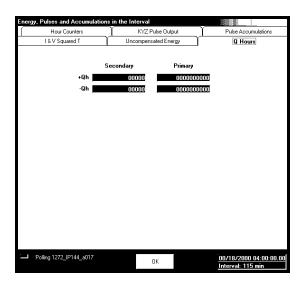
nergy, Pulses and Accumulation	is in the Interval		Energy, Pulses and Accumulations	in the Interval	
I & V Squared T	Uncompensated Energy	Q Hours	I & V Squared T	Uncompensated Energy	Q Hours
Hour Counters	KYZ Pulse Output	Pulse Accumulations	Hour Counters	KYZ Pulse Output	Pulse Accumulations
Internal KYZ Relay 1	0000029458		Internal Input 1	000000000	
Internal KYZ Relay 2	0000029458		Internal Input 2	000000000	
Internal KYZ Relay 3	0000029458		Internal Input 3	000000000	
Internal KYZ Relay 4	0000029458		Internal Input 4	000000000	
Internal KYZ IR LED	0000022195		Internal Input 5	000000000	
			Internal Input 6	000000000	
			Internal Input 7	000000000	
			Internal Input 8	000000000	
			Aggregation 1	0000214721	
			Aggregation 2	000000000	
			Aggregation 3	000000000	
			Aggregation 4	000000000	
Polling 1272_IP144_a017		00/18/2000 04:00:00.00		24	00/18/2000 04:00:0
	OK.	Interval: 115 min		OK	Interval: 115 min

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Energy, Pulses and Accumulations in the Interval								
Hour Counters	KYZ Pulse Output	Pulse Accumulations						
I & V Squared T	Uncompensated Energy	Q Hours						
I Squared T Phase A	0000001300							
I Squared T Phase B	0000008265							
I Squared T Phase C	0999999798							
V Squared T Phase A	0911747662							
V Squared T Phase B	0198028345							
V Squared T Phase C	0627822233							
Polling 1272_IP144_a017	ОК	07/22/2003 10:00:00.00 Interval: 115 min						

Energy, Pulses and Accumulations in the Interval						
Hour Counters	KYZ Pulse Outp		ions			
I & V Squared T	Uncompensated En	ergy Q Hours				
S	econdary	Primary				
+Watt	00000	000000000				
-₩att	00000	000000000				
+VAR	00000	000000000				
-VAR	00000	000000000				
VA	00000	000000000				
Polling 1272_IP144_a017	OK	00/18/2000 04:0 Interval: 115 min				

- Uncompensated Energy: Readings that are NOT adjusted by Transformer Loss Compensation.
- **Q Hours:** Q is the quantity obtained by lagging the applied voltage to a wattmeter by 60 degrees.



# 7.16: Poll Uncompensated Power & Q Readings

To view the Uncompensated Power and Q Readings of the currently connected Nexus Monitor device, select Poll Uncompensated Power and Q Readings from the Real-Time Polling menu. The following screen appears:

#### ■ Uncompensated Power

Transformer Loss Compensation adjusts the measured VA, Watts and VARs in accordance with transformer parameters programmed by the user.

Uncompensated Power Readings are the per phase and total VA, Watts and VARs readings unadjusted by Transformer Loss Compensation.

### Q Readings

Another quantity of measure used in the power sector is Q. By definition, Q is the quantity obtained by lagging the applied voltage to a wattmeter by 60 degrees.

Uncompensated Power and Q Readings							
Uncompens	ated Power						
	Total	А	В	С			
Watt	. 0.00	0.00	0.00	. 0.00			
VAR	0.00	. 0.00	0.00	0.00			
VA	. 0.00	0.00	. 0.00	. 0.00			
Q Readings	Total	•	в	c			
Inst	0.00	0.00	0.00	0.00			
Thermal Ave	erage 📔 Blo	ock Window Avera	age ( Rolling∖	Vindow Average			
Ave	rage	0.00					
		Т	ïme Stamp				
+Maxii	mum	0.00 00	/00/0000 00:00:0	00.00			
-Maxir	mum	0.00 00	/00/0000 00:00:0	00.00			
+Minii	mum	0.00 00	/00/0000 00:00:0	00.00			
-Minir	mum	0.00 00	/00/0000 00:00:0	00.00			
		ОК					

#### ■ Instantaneous Q

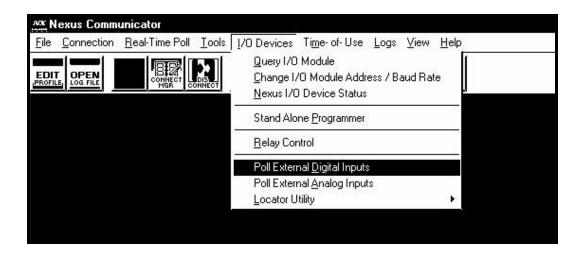
This reading is computed on a Per Phase and Total basis.

### Average Screens

The bottom half of the Uncompensated Power and Q Readings screen displays Thermal Average, Block Window Average and Rolling Window Average readings. Average Total Q and corresponding +/- Max and Mins are computed on those screens. Click on tabs at the top of each screen to move from screen to screen. The screens are the same; the readings will differ.

# 7.17: 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:

nput	Name	State	Transistions Reset Co	ounters -
1	M 1:M1:1	Open	00000000002 Module 1	✓ Res
2	M 1:M1:2	Open	00000000028	100
3	M 1:M1:3	Open	00000000002	
4	M 1:M1:4	Open	00000000010	
5	M 1:M1:5	Open	00000000006	
6	M 1:M1:6	Open	00000000018	
7	M 1:M1:7	Open	0000000008	
8	M 1:M1:8	Open	00000000004	
9	M 2:M2:1	Open	00000000000	
10	M 2:M2:2	Open	00000000000	
11	M 2:M2:3	Open	00000000000	
12	M 2:M2:4	Open	00000000000	
13	M 2:M2:5	Open	00000000000	
14	M 2:M2:6	Open	00000000000	
15	M 2:M2:7	Onen	0000000006	
16	M 2:M2:8	Open	0000000004	ок
17	M 3:M3:1	Open	0000000004	
18	M 3:M3:2	Open	00000000014	
19	M 3:M3:3	Open	00000000050	elp
20	M 3:M3:4	Open	00000000002	
21	M 3:M3:5	Open	00000000002 Cd	ру
22	M 3:M3:6	Open	00000000002	
23	M 3:M3:7	Open	00000000002	
24	M 3:M3:8	Open	00000000002	
25	M 4:M4:1	Closed	0000000031	
26	M 4:M4:2	Onen	00000000000	
27	M 4:M4:3	Open	00000000000	
28	M 4:M4:4	Open	00000000000	
29	M 4:M4:5	Closed	00000000019	
30	M 4:M4:6	Closed	00000000011	
31	M 4:M4:7	Open	0000000003	
32	M 4:M4:8	Onen	00000000001	

- 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.

### 7.18: 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:

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	ок
9	M 2:	0.000 V	0.000	OK
10	M 2:	0.000 V	0.000	
11	M 2:	0.000 V	0.000	Help
12	M 2:	0.000 V	0.000	
13	M 2:	0.000 V	0.000	Сору
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 8 Viewing Logs

### 8.1: Overview

■ The Nexus 1250/1252, 1262 and 1272 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 8.2). Logs run automatically.
  - 2. **Retrieve** the logs manually from the Nexus Monitor (section 8.3); or retrieve logs automatically using the **Nexus Script & Scheduler Program**. See Chapter 15 for further details.
  - 3. View and analyze log data with Nexus Communicator's Log Viewer (sections 8.5–8.18).
  - 4. **Diagnose PQ Events** from Nexus logs, **create comprehensive report**, transmit, modify, print or export file with **optional AiReports software** (section 8.15).
- 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

### 8.2: 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 (1250/1252) or Chapter 4 (1262/1272) 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, 4.4)
- Limits (section 3.10, 4.10)
- Trending Setup (section 3.12, 4.12)
- Trending Log Time Intervals (section 3.13, 4.13)
- Power Quality and Waveform Thresholds (section 3.14, 4.14)
- Labels (section 3.19, 4.19)—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.

lexus Log Statistics							
Logging Statistics							
Log	Records	Memory Used	Newest Record Time	Oldest Record Time	Record Size	Max Records	Memory
Historical Log 1	1152	100%	06/25/2003 01:45:00.00	06/21/2003 02:10:00.00	256	1152	288K
Historical Log 2	3200	100%	06/25/2003 01:45:00.00	05/22/2003 18:30:00.00	128	3200	400K
Limit Triggers	252	25%	06/25/2003 01:34:05.73	05/23/2003 19:51:55.06	32	1024	32K
Limit Snapshots	252	25%	06/25/2003 01:34:05.73	05/23/2003 19:51:55.06	64	1024	64K
Digital Input	128	100%	06/10/2003 22:00:06.96	06/07/2003 21:12:32.35	16	128	16K
Digital Input Snapshots	128	100%	06/10/2003 22:00:06.96	06/07/2003 21:12:32.35	256	128	32K
Digital Output	0	0%			64	256	16K
Digital Output Snapshots	0	0%			64	256	32K
Flicker	0	0%			32	1536	48K
Waveform Triggers	63	100%	06/25/2003 01:37:31.79	06/24/2003 02:42:06.85	256	63	16K
Waveform Samples	63	100%	06/25/2003 01:37:31.79	06/24/2003 02:42:06.85	16384	63	1024K
PQ(CBEMA)	45	9%	06/24/2003 03:26:41.35	05/23/2003 19:51:55.43	128	512	64K
Polling INP100 Unit 1 96							
			<u>0</u> K	Help			

# 8.3: 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 Designati	on: INP100 Unit 1 96				
· -	<b>-</b> · ·				
Log Type	Status	Retrieve			
Historical Log 1	Available	Yes			
Historical Log 2	Available	No			
Limits	Available	No			
Digital Inputs	Available	Yes			
Digital Outputs	Available	No			
Flicker	Available	No			
Waveform / PQ	Available	No			
	Double clic	k on Retrieve field to toggle Yes/No			
<u>S</u> tart	Cancel	<u>H</u> elp			
<u> </u>					

- 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 (Chapters 3, 4), 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 section 3.19 (1250/1252) or 4.19 (1262/1272) for how to give the Nexus Monitor a label.
- 4. Click Start. Nexus Communicator begins to retrieve the log. The following screen appears:

<b>Retrieving Historical Log</b>	1	
1 of 1		
Time Remaining	4 minutes, 4 seconds	
Reading Block	344 of 2304	<u>Cancel</u>

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

EIG Lo	g Converter			×
Mode:	Stopped	Start:	6/24/2003 11:10:39 /	١M
Status: Conversion successful. Delete source file successful.				
Version: 1.0.40, 03/20/2003, T-0.				

- 6. Nexus Communicator then runs Log Viewer: See sections 8.5–8.17 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 8.14). Snapshots, or partial downloads, must be a time frame within the database dates. Otherwise, there is no data from which to retrieve the snapshot.

# 8.4: 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.

# 8.5: 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 8.3.
  - 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 ("Meter6");
- Or click on either Meter button (1 or 2) that displays a meter name. Log Viewer will ask you to select a log database file:

.ook jn:	C Retrieved Log	gs	•	← ⊡ ☆	•
History Desktop My Documents	CO005555.DB Feeder 1.DB METERSIOS Test Unit 7.DB				
My Computer	File <u>n</u> ame:	METER6		-	<u>O</u> pen

- 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:

Select Data Points		
Available Data Points 18		Selected Data Points 12
Data Name		Data Name
Inst. Ia		0.1s VAa
Inst. Ib		0.1s VARa
Inst. Ic	Add >>	0.1s Wa
Inst. VAa	2	Inst. Van
Inst. VARa	<< <u>R</u> emove	Inst. Vbn
Inst. Wa	3	Inst. Vcn
Inst. FQ		Inst. PFa
Inst. PFc (Raw)	Add All	Inst. PFb
Inst. PF (Raw)		Inst. PFc
Rolling Avg. VA	Re <u>m</u> ove All	Inst. PF
Rolling Avg. VAR		Inst. PFa (Raw)
Rolling Avg. W		Inst. PFb (Raw)
Rolling Avg. Pred.VA	Res <u>t</u> ore	
Rolling Avg. Pred.VAR		
Rolling Avg. Pred.W	<u>S</u> et Default	
Block Window Avg. VA		
Block Window Avg. VAR		
Block Window Avg. W		
<u>О</u> К	<u>C</u> ancel	<u>H</u> elp

- 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<sup>®</sup> Control Panel). Click on the Time Range button in the Select Time section. The following screen appears:

Select a Time Range						<u>&gt;</u>
	Time F	Range Se	elect	ion O	ptions	
© <u>B</u> etween	6/24/200	3 12:00 AM		and	6/24/2003 11:	59 PM
During the provide the provided the provi	previous <u>h</u> o	ur(s)	1		*	
During the	previous <u>d</u> a	y(s)	1		* *	
During the	previous <u>w</u> e	ek(s)	1		*	
During the	previous <u>m</u> o	onth(s)	3		*	
During the	previous <u>y</u> e	ar(s)	1		*	
	<u>0</u> K	<u>C</u> a	ncel		<u>H</u> elp	

• **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.

Please	select a sta	rt date/time.						×
			6/24/	2003 12:	00 AM			
		JL	ine 200	3	Jur	ne 🗾	2003 💌	
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
	25	26	27	28	29	30	31	
	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	1	2	3	4	5	
12:00	AM			12:00 PI	A		11:	59 PM
			<u>0</u> K		<u>C</u> ancel			

- 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.

# 8.6: 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 8.5).

<b>셸EIG Log Viewer</b> <u>F</u> ile <u>E</u> dit <u>S</u> elect Data	<u>V</u> iew Dat	a <u>H</u> elp					_0×
Snapshot Type	All Sn	apshots	Time Range 6/	24/2003 11:59	5:00.010	PM to 6/24/2003 3:	00:00.000
Sort Criteria	Desc	ending				<u>U</u> р	<u>D</u> own
Date/Time		Record Type	10 Unit 196 - Inst. Van	10 Unit 1 96 - Ins	st. Vbn /10	0 Unit 1 96 - Inst. Vcn	INP100 Un
6/24/2003 3:24:18.3	20 AM	Limits	1			14,364.25	
6/24/2003 3:24:16.0	20 AM	Limits				14,365.11	
6/24/2003 3:24:15.0	80 AM	📕 Limits				14,367.39	
6/24/2003 3:23:42.8	90 AM	Limits				14,364.53	
6/24/2003 3:23:41.9	90 AM	Limits				14,363.04	
6/24/2003 3:23:35.0	40 AM	Limits				14,366.68	
6/24/2003 3:23:20.3	50 AM	Limits				14,368.92	
6/24/2003 3:22:25.7	30 AM	Limits				14,362.45	
6/24/2003 3:22:09.0	20 AM	Limits				14,366.93	
6/24/2003 3:22:03.0	60 AM	Limits				14,362.45	
6/24/2003 3:22:02.5	70 AM	Limits				14,361.56	
6/24/2003 3:20:28.4	90 AM	Limits				14,366.02	
6/24/2003 3:20:27.6	20 AM	Limits				14,365.26	
6/24/2003 3:20:22.0	40 AM	Limits				14,361.18	
6/24/2003 3:20:00.0	10 AM	Log 1	14,347.06	14,3	366.97	14,366.51	
6/24/2003 3:15:00.0	10 AM	Log 1	14,339.25	14,3	370.74	14,370.86	
6/24/2003 3:10:00.0	00 AM	Log 1	14,348.54	14,3	370.10	14,368.16	
6/24/2003 3:05:00.0	00 AM	Log 1	14,342.31	14,3	370.92	14,373.43	
6/24/2003 3:00:00.0	00 AM	Log 1	14,344.24	14,3	373.33	14,368.60	
							<u>→</u>
		Back	<u>S</u> ort	<u>G</u> raph		<u>H</u> elp	

- 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 8.8 for details about viewing Snapshot Graphs.

# 8.7: 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.

Sort Data Uptions			X
Sort Item	Date/Time		•
Sort Order	Descending		•
<u>O</u> K	<u>C</u> ancel	<u>H</u> elp	]

• 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 D	ata Options			x					
Red	cord Type	All Snapshots	•						
Sor	t Item	Date/Time	Date/Time						
Sor	t Order	Descending	•						
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp						

- 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.

# 8.8: Viewing Trending and Demand Graphs (XY and Circular)

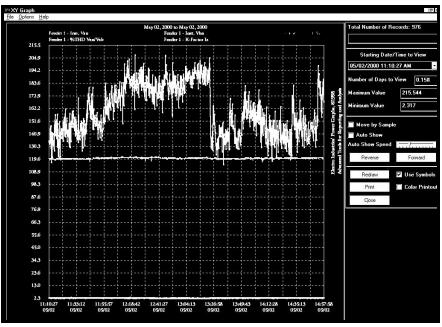
1. To display Trending or Demand data as either an XY or Circular graph, click on the Graph button in the main Trending or Demand screen. The following screen appears:

Select Data Points		
Available Data Points 18		Selected Data Points 12
Data Name		Data Name
Inst. Ia		0.1s VAa
Inst. lb		0.1s VARa
Inst. Ic	Add >>	0.1s Wa
Inst. VAa		Inst. Van
Inst. VARa	<< <u>R</u> emove	Inst. Vbn
Inst. Wa	,3	Inst. Von
Inst. FQ		Inst. PFa.
Inst. PFc (Raw)	Add All	Inst. PFb
Inst. PF (Raw)		Inst. PFc
Rolling Avg. VA	Re <u>m</u> ove All	Inst. PF
Rolling Avg. VAR		Inst. PFa (Raw)
Rolling Avg. W		Inst. PFb (Raw)
Rolling Avg. Pred.VA	Res <u>t</u> ore	
Rolling Avg. Pred.VAR		
Rolling Avg. Pred.W	<u>S</u> et Default	
Block Window Avg. VA		
Block Window Avg. VAR		
Block Window Avg. W		
OK	Canaal	Help
<u>O</u> K	<u>C</u> ancel	<u>H</u> elp

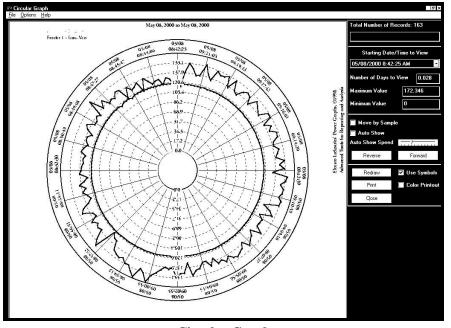
- The Available Items column lists the data points that have been selected for the log file. To add a new data point, return to Log Viewer's main screen and click on the Data Points button (see section 8.5).
- From the Available Data Points column, click on the data points you want to graph. Then, click 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:



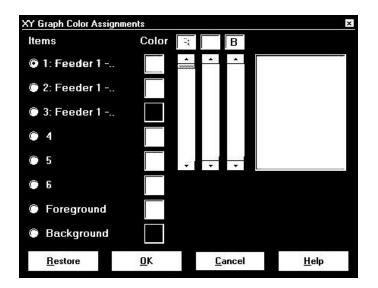
XY Graph



**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:

raph Labels			×
	Li	ne 1	
Electro Industries	Power Graphs,	©1998	
1			
	Li	ne 2	
		1.4 1 2	
Advanced Tools	for Reporting an	d Analysis	
<u>R</u> estore	<u>o</u> k	<u>C</u> ancel	Help
<u>R</u> estore	<u>o</u> k	<u>C</u> ancel	Help

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 curser on the graph and hold down the mouse button.

# **8.9: 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 8.5).

<b>씰 EIG Log Viewer</b> <u>F</u> ile <u>E</u> dit <u>S</u> elect Data <u>V</u> iew	EIG Log Viewer    X       ile     Edit       Select Data     View Data									
Data Type Lim	its Log	Time	Range 6/2	4/2003 11:59:59	PM to 6/2	4/2003 2	2:41:21	710 AM		
Sort Criteria De	scending					<u>U</u> р		<u>D</u> own		
Show Snapshots										
Start Date/Time	End Date/Time		Duration (S)	Device	Set Index	Limit ID	State	Data 🔺		
6/24/2003 3:26:43.670 AM	1		0	INP100 Unit 1 96	12	Limit 2	Below	%THD lo		
6/24/2003 3:26:43.520 AM	1		0	INP100 Unit 1 96	11	Limit 2	Below	%THD It		
6/24/2003 3:26:43.400 AN	1 6/25/2003 12:16:33.2	280 AM	74989.88	INP100 Unit 1 96	10	Limit 2	Below	%THD Ιε		
6/24/2003 3:26:43.210 AM	1		0	INP100 Unit 1 96	9	Limit 2	Below	%THD V		
6/24/2003 3:26:43.020 AN	1		0	INP100 Unit 1 96	6	Limit 3	True	Inst. Ic		
6/24/2003 3:26:43.020 AM	1		0	INP100 Unit 1 96	6	Limit 2	Below	Inst. Ic		
6/24/2003 3:26:42.880 AM	1		0	INP100 Unit 1 96	8	Limit 2	Below	%THD V		
6/24/2003 3:26:42.880 AM	1		0	INP100 Unit 1 96	8	Limit 3	True	%THDV		
6/24/2003 3:26:42.660 AM	1 6/25/2003 1:19:59.60	00 AM	78796.94	INP100 Unit 1 96	7	Limit 2	Below	%THD V		
6/24/2003 3:26:42.660 AM	1 6/25/2003 1:19:59.60	00 AM	78796.94	INP100 Unit 1 96	7	Limit 3	True	%THD V_		
6/24/2003 3:26:42.030 AN	1 6/25/2003 1:19:57.09	30 AM	78795.06	INP100 Unit 1 96	5	Limit 3	True	Inst. FQ		
6/24/2003 3:26:42.030 AN	1 6/25/2003 1:19:57.09	30 AM	78795.06	INP100 Unit 1 96	5	Limit 2	Below	Inst. FQ		
6/24/2003 3:26:41.060 AM	1		0	INP100 Unit 1 96	3	Limit 3	True	Inst. Vcn		
6/24/2003 3:26:41.060 AM	1		0	INP100 Unit 1 96	3	Limit 2	Below	Inst. Vcn		
6/24/2003 3:26:40.070 AN	1		0	INP100 Unit 1 96	1	Limit 2	Below	Inst. Vau:		
6/24/2003 3:24:18.320 AN	1 6/24/2003 3:26:43.40	00 AM	145.08	INP100 Unit 1 96	10	Limit 1	Above	%THD Ιε		
6/24/2003 3:24:15.080 AN	1 6/24/2003 3:26:40.07	70 AM	144.99	INP100 Unit 1 96	1	Limit 1	Above	Inst. Vau:		
6/24/2003 3:23:42.890 AM	1 6/24/2003 3:24:18.32	20 AM	35.43	INP100 Unit 1 96	10	Limit 2	Below	%THD le <b>⊸</b>		
<u> </u>								→		
	<u>B</u> ack	<u>S</u> ort		<u>G</u> raph	<u>H</u> elp	)				

- 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.

## 8.10: Viewing the Waveform Log

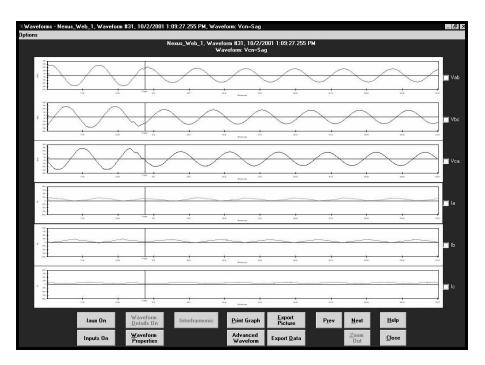
■ From Log Viewer's main screen (section 8.5), click on the Waveform button or View Data, Waveform. Log Viewer will display waveform information for the selected log file(s) based on the **time range** specified in the Select Time Range section of its main screen. Futura+ Waveform Time Precision is 1 second.

<b>≝ EIG Log V</b> <u>F</u> ile <u>E</u> dit <u>S</u> e		w Data <u>H</u> elp							<u>-0×</u>
Data Type	∍ <u>`</u> ₩	aveform Log	Time R	ange <u>2/27/</u> 2	2002 11:00	:36.944 AM to	0 12/7/2001	111:45:5	59.735
Sort Criter	ia D	escending					<u>U</u> р		Down
🗹 Show W	aveform Setti	ings							
Start Date/	Time	End Date/Ti	ime	Duration ms 1	Frigger Date	e/Time	Device	Waveforr	m Trig 🔺
2/27/2002	11:00:37.078	AM 2/27/2002 11	:00:37.212 AM	133 2	2/27/2002 11	:00:37.095 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	11:00:36.944	AM 2/27/2002 11	:00:37.078 AM	133 2	2/27/2002 11	:00:36.961 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	11:00:36.812	AM 2/27/2002 11	:00:36.945 AM	133 2	2/27/2002 11	:00:36.845 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	10:54:19.496	AM 2/27/2002 10	):54:19.630 AM	133 2	2/27/2002 10	:54:19.511 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	10:54:19.362	AM 2/27/2002 10	):54:19.496 AM	133 2	2/27/2002 10	:54:19.378 AM	Feeder 1	la=Sag, II	b=Sag
2/27/2002	10:54:19.230	AM 2/27/2002 10	):54:19.363 AM	133 2	2/27/2002 10	:54:19.263 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	10:52:31.581	AM 2/27/200210	):52:31.715 AM	133 2	2/27/2002 10	:52:31.598 AM	Feeder1 I	la=Sag, II	b=Sac
2/27/2002	10:52:31.449	AM 2/27/2002 10	):52:31.583 AM	133 2	2/27/2002 10	:52:31.466 AM	Feeder1 I	la=Saq, II	b=Sac <u></u>
<u> </u>									<u> </u>
	Decise		O Ka D t	Or antime Million					<u> </u>
	Device Feeder 1	HookUp Y Wye	Sampling Rate	1 1	'  3	I	I	11	
	reederi	T wye	120	) .	2				
		Waveform Setpo	pint 1	Wa	aveform Set	point 2	PQ		rvefc
Channel	States	% of Full Scale	Enabled	States	% of Full	Scale Enable	d Enabled	Inputs	Enε
Van	Above	110	Yes	Below	90	Yes	Yes	1	Ý
Vbn	Above	110	Yes	Below	90	Yes	Yes	2	Y
Vcn	Above	110	Yes	Below	90	Yes	Yes	3	. Y <b>≁I</b>
4									∸
		<u>B</u> ack	<u>S</u> ort	<u>(</u>	<u>G</u> raph	<u>H</u> el	р		

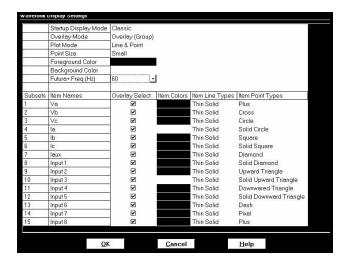
- To save the data to your clipboard, right-click anywhere in table.
- **To view the Waveform Settings**, click on a waveform record and then click the Show Waveform Settings box on the left side of the screen.
- **To adjust the column widths**, position the cursor between columns at the top of the screen. 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.

# 8.11: Viewing Waveform Graphs

■ To view any waveform in the main Waveform Log screen (section 8.10), click on the desired record and then click the Graph button (or double-click on the desired record).



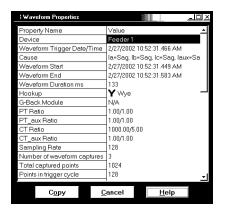
• **To change the Waveform Display Settings,** click the Options button in the upper left corner of the screen. The Waveform Options screen will appear:



**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:

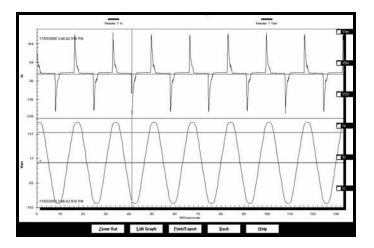
- 1. Start Up Mode: Classic, Overlay or Overlay (group)
- 2. Overlay Mode: Overlay or Group
- 3. Plotting Method: Line, Point or Line and Point (Line and Point is slower than the other two options.)
- 4. Colors: Background, Foreground, Subsets (User can reverse the colors.)
- 5. Point Sizes for Each Subset: Small, Medium, Large or Micro
- 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, Dosh 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:

: Adva	nced Wave	eform Analy:	sis Setu	р				3			x
🕲 Use	Entire Cap	ture	Feeder	r 1, Wavefo	rm #8, 2/2	7/2002	10:52:31.4	49 AM	l, 133 ms		
دەل	🕒 Usa Salasiai Window 🛛 🗛										
Current Waveform Items Selected Waveform Items											
Index	ltem			Date/Time	9		Device	ltem	Туре	Dur.(ms)	
1	Van			2/27/2002	10:52:31.4	49 AM	Feeder1	Van	Complete		133
2	Vbn			2/27/2002	10:52:31.4	49 AM	Feeder 1	Vbn	Complete		133
3	Vcn	Add >	·>	2/27/2002	10:52:31.4	49 AM	Feeder 1	Vcn	Complete		133
4	la	<< Rem		2/27/2002	10:52:31.4	49 AM	Feeder 1	la	Complete		133
5	lb	<< Rem	iove	2/27/2002	10:52:31.4	49 AM	Feeder 1	lb	Complete		133
6	lc			2/27/2002	10:52:31.4	49 AM	Feeder 1	lc	Complete		133
7	laux										
8	Input 1										
9	Input 2			<u>Original Wa</u>	weform Pro	perty					
10	Input 3										
11	Input 4										
12	Input 5										
13	Input 6										
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15	Input 8										<b>~</b> (
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- 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:



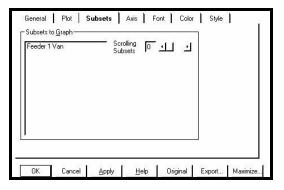
• To edit the Advanced Waveform Graph, click on Edit Graph. The first of a series of screens appears. These screens assist the user in Customization of Advanced Waveform Graphs.

dvanced Waveform Analysis ub Title:	
Viewing Style Color Monochrome Monochrome + Symbols	Grid Lines 「Both CYCX のNone 「Grid in front of data
Font Size CArge 🤇 Med 🧿 Small	

- 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.

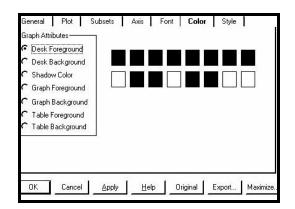
T Mark Data Points	C Axis 4 C Axis 5 C Axis 6 Off C Shadov C 31 C <u>M</u> ark Data Points	Points+BestFitCurve Points+BestFitLine Points+Spline Points+Spline Spline Spline	
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- To Add Subsets to the Graph, use the Subsets screen.
  - 1. From Available 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 andpoints)
  - 4. Graph Background
  - 5. Table Foreground and Background

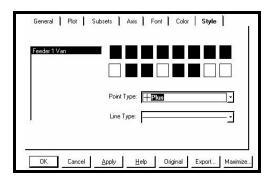


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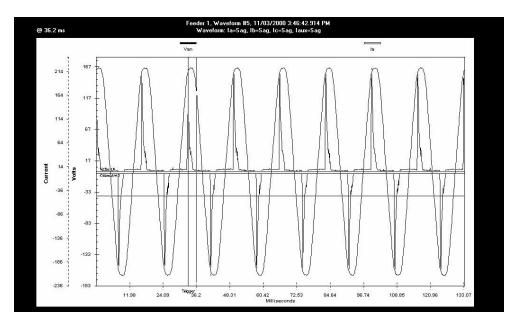
Times New Roman		bold	Г	italic	Г	underline	
<u>S</u> ub-Title:							
Times New Roman	ЧГ	bold	Г	italic	Г	underline	
Subset / Point / Axis L							
Arial	<b>⊸</b>	bold	Г	italic	Г	underline	
sample:							



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

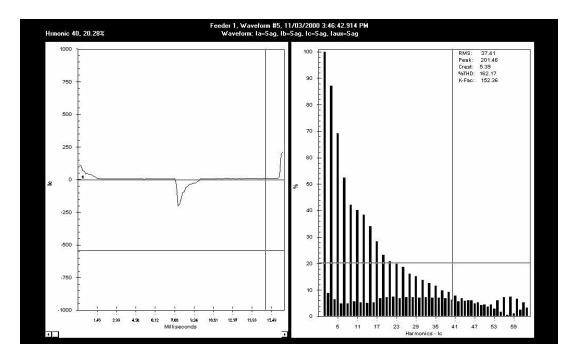


■ **To combine multiple waveforms into one graph**, click the check boxes on the right side of the screen for each waveform you wish to include. Then double-click on one of the selected graphs. The following example screen shows the Van and Ic channels:



- **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.

## 8.11.1: 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<sub>A</sub>, V<sub>B</sub>, V<sub>C</sub>) and Current channels (I<sub>A</sub>, I<sub>B</sub>, I<sub>C</sub>, I<sub>AUX</sub>). 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.

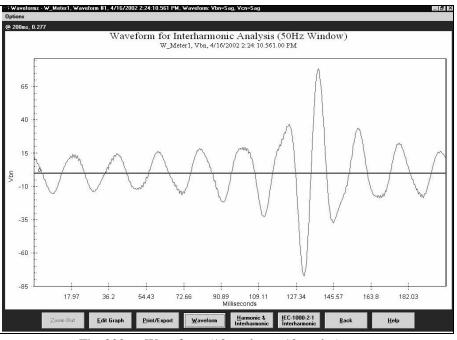
■ From Log Viewer's main screen, click the Interharmonic Analysis button. The following screen will appear.

quency Grou	p 1500 to 1550, 0		usure - economi		ALC: NO.		-		
		IEC-10	00-2-1[1]	Interharmon eter1, Vbn, 4/16/2	ic Spectru	n (50Hz Win	dow)		
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10 -									
E									
5 -									
E			1000	14	2 F			95	-
0	150 to 200	300 to 350	450 to 500	600 to 650 750	1 to 000 900 to 1	350 1050101100	1200 to 1250	1350 to 1400	1500 to 155
		\$2000100001	000000000		ncy(Hz) Group		10000000000		
	Zoom (Jut	Edit Graph	Print/Export	Waveform	Harmonic & Interharmonic	IEC-1000-2-1 Interharmonic	Back	Help	

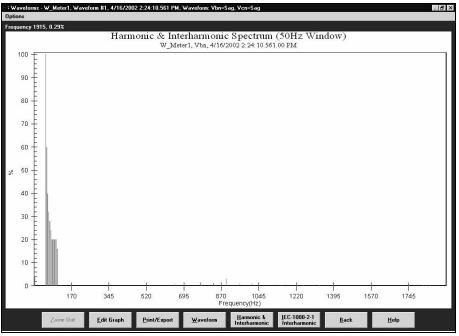
### To view a graph:

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.)

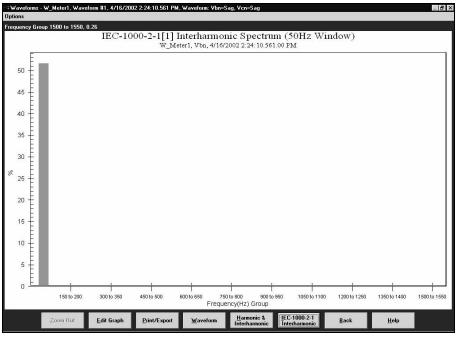
Three graphs will be displayed:



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:

$$\chi_{IH}^{2} = \sum_{i=2}^{8} \chi_{10n+i}^{2}$$
(50Hz s

(50Hz systems)

$$\chi^2_{IH} = \sum_{i=2}^{10} \chi^2_{12n+i}$$

(60Hz systems)

# 8.12: Viewing the Power Quality Log

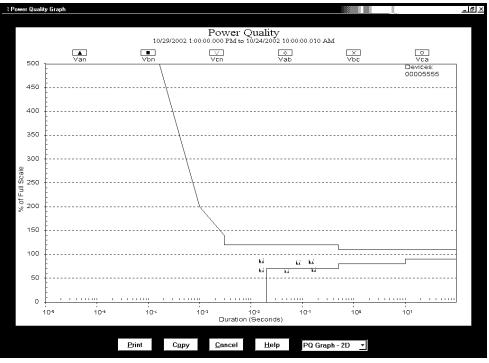
■ From Log Viewer's main screen, click on the PQ button or View Data, Power Quality. Log Viewer will display power quality information for the selected log file(s) based on the **time range** specified in the Select Time Range section of its main screen (see section 8.5).

<u>⊒a Eto Log viewer</u> Eile <u>E</u> dit <u>S</u> electData									<u>-14</u>
Data Type	Powe	r Quality Log	Time P	ange 6/24	/2003 11:59:59	PM to 5/23	/2003 7:5	1:55.43	0 PM
Sort Criteria	Desc	ending					<u>U</u> p		<u>D</u> own
📕 Show Waveform	15	Show PQ/	Waveform S	ettings					
Start Date/Time		End Date/Time		Duration ms	Device	Condition	Channel	Value	% of F_
6/5/2003 10:18:51.	142 PM	6/10/2003 10:48:	11.110 PM	433759968	INP100 Unit 1 96	Sag	Vbn	0.00	
6/2/2003 7:47:48.4	27 PM	6/2/2003 8:20:04.	910 PM	1936483	INP100 Unit 1 96	Sag	lb	0.47	
6/2/2003 7:47:45.8	80 PM	6/2/2003 8:20:00.	247 PM	1934367	INP100 Unit 1 96	Sag	Vbn	0.00	
5/24/2003 2:28:35.	234 AM	5/24/2003 2:28:5	4.244 AM	19010	INP100 Unit 1 96	Sag	Vbn	0.00	
5/24/2003 2:28:35.	234 AM	5/24/2003 2:28:5	4.227 AM	18993	INP100 Unit 1 96	Sag	lb	0.30	
5/24/2003 2:27:24.	370 AM	5/24/2003 2:28:11	0.194 AM	45824	INP100 Unit 1 96	Sag	lb	0.00	
5/24/2003 2:27:24.	354 AM	5/24/2003 2:27:2	4.370 AM	16	INP100 Unit 1 96	Surge	lb	28.24	
5/24/2003 2:21:26.	854 AM	5/24/2003 2:27:0	5.304 AM	338450	INP100 Unit 1 96	Surge	lb	24.91	
5/24/2003 1:41:44.	397 AM	5/24/2003 2:21:0	3.270 AM	2364873	INP100 Unit 1 96	Sag	lb	0.45	
5/24/2003 1:41:37.	662 AM	5/24/2003 1:41:4	4.397 AM	6735	INP100 Unit 1 96	Surge	lb	10.69	
5/24/2003 1:41:29.	447 AM	5/24/2003 1:41:3	7.512 AM	8065	INP100 Unit 1 96	Sag	lb	0.62	
5/24/2003 1:41:22.	997 AM	5/24/2003 1:41:2	3.447 AM	6450	INP100 Unit 1 96	Surge	lb	10.74	
5/24/2003 1:41:20.	547 AM	5/24/2003 1:41:2:	2.780 AM	2233	INP100 Unit 1 96	Sag	lb	0.51	
5/24/2003 1:41:20.	112 AM	5/24/2003 1:41:2	0.380 AM	268	INP100 Unit 1 96	Surge	lb	6.42	
5/24/2003 1:33:35.	230 AM	5/24/2003 1:41:1-	4.112 AM	458882	INP100 Unit 1 96	Sag	lb	0.31	
5/24/2003 1:33:35.	212 AM	5/24/2003 2:28:1	0.194 AM	3274982	INP100 Unit 1 96	Sag	Vbn	0.00	-
5/24/2003 1:26:48.	840 AM	5/24/2003 1:26:4	9.104 AM	264	INP100 Unit 1 96	Sag	lb	3.71	
5/24/2003 1:13:39.	117 AM	5/24/2003 1:26:4	8.822 AM	789705	INP100 Unit 1 96	Sag	lb	0.76	
1									کد
		<u>B</u> ack	<u>S</u> ort		<u>G</u> raph	<u>H</u> elp			

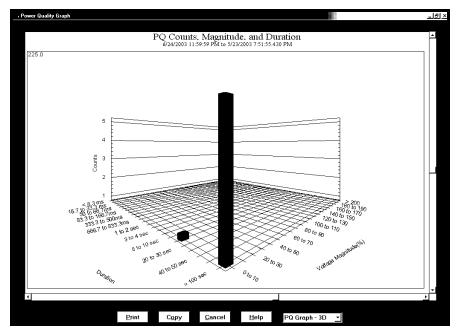
- To save the data to your clipboard, right-click with the cursor positioned anywhere in table.
- **To view waveform information associated with a record or a range of records**, click on the record(s) and then click the Show Waveform Settings box on the left side of the screen.
- To view the PQ/Waveform 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 8.10 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.

# 8.13: Viewing the Power Quality Graph

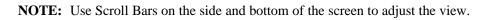
■ To view a graph of any PQ record, click on the desired record and then click the Graph button. The following screen appears. Use the pull-down menu on the lower right of the screen to access a 3D graph and a Histogram of the record.



**Power Quality Graph** 



Power Quality Graph in 3D



e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

# 8.14: Database Status

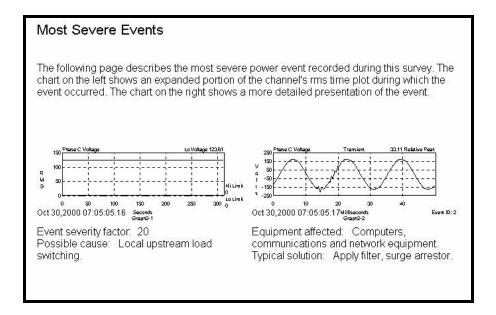
- The Database Status screen provides statistical information about the selected log(s).
- Click on the Database button or View Data, Database Status. The following screen appears:

<mark>꼴 EIG Log Viewer</mark> File <u>E</u> dit <u>S</u> elect Data <u>V</u> iew Da	ata Help			<u>_   </u> >
	base Status			
				<u> </u>
	Device #1			
Device Type	Nexus			
Device Name	INP100 Unit 1 96			
Device ID	00000015			
File Name	MMUNICATOR\Retrieved Logs\INP100 Unit 1 96.DB			
Data file size	18,499,584 Bytes			
Number of downloads	3			
First download	6/24/2003 11:10:40 AM			
Last download	6/24/2003 4:16:11 PM			
Number of data points	63			
Database file version	8.2			
Database file description	01/03/2003			
Data Log	First Date	Last Date	Number of Days	Number of P
Snapshots	5/22/2003	6/25/2003	35	
Limits	5/23/2003	6/25/2003	9	
Status Change (Inputs)	6/7/2003	6/10/2003	2	
Control Output (Relays)	N/A	N/A		
Flicker Max/Min	N/A	N/A		
Waveforms ▲	6/25/2003	6/25/2003	1	ك ك
	Back Sort Graph		<u>H</u> elp	

- 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.

### 8.15: 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.

# 8.16: 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.

# 8.17: Status Change Log (Inputs)

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

≝ <b>ElG Log Viewer</b> Eile <u>E</u> dit <u>S</u> electData	<u>V</u> iew Dat	a <u>H</u> elp						
Data Type	Input	Log	Time	Range				
Sort Criteria	Desc	ending					<u>U</u> р	<u>D</u> own
📕 Show Snapshots		Show	Input Settings					
Start Date/Time		End Date/Tir	ne	ration ms	Device Nam	e Module Nar	Input Na	State State Narr_
6/10/2003 10:00:06	.960 PM			0	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 10:00:06	.890 PM	6/10/2003 10	00:06.960 PM	70	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:59:41.3	310 PM	6/10/2003 10	00:06.890 PM	25580	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open 🗕
6/10/2003 9:59:41.1	70 PM	6/10/2003 9:5	9:41.310 PM	140	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:59:29.1	50 PM	6/10/2003 9:5	9:41.170 PM	12020	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:59:28.4	120 PM	6/10/2003 9:5	9:29.150 PM	730	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:57.8	320 PM	6/10/2003 9:5	9:28.420 PM	30600	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:57.7	770 PM	6/10/2003 9:5	8:57.820 PM	50	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:57.4	140 PM	6/10/2003 9:5	8:57.770 PM	330	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:55.5	510 PM	6/10/2003 9:5	8:57.440 PM	1930	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:54.6	650 PM	6/10/2003 9:5	8:55.510 PM	860	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:54.9	50 PM	6/10/2003 9:5	8:54.650 PM	100	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:53.6	680 PM	6/10/2003 9:5	8:54.550 PM	870	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:53.6	620 PM	6/10/2003 9:5	8:53.680 PM	60	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:53.5	590 PM	6/10/2003 9:5	8:53.620 PM	30	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:53.5	560 PM	6/10/2003 9:5	8:53.590 PM	30	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted
6/10/2003 9:58:52.6	630 PM	6/10/2003 9:5	8:53.560 PM	930	INP100 Unit 1 9	6 HS Int. Input	Input 1	1 Open
6/10/2003 9:58:52.3	390 PM	6/10/2003 9:5	8:52.630 PM	240	INP100 Unit 1 9	6 HS Int. Input	Input 2	0 Shorted 🚽
1								ك
		Back	Sort		<u>G</u> raph	He	lp	

- 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.

# 8.18: Control Output Log (Relays)

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

Data Type Sort Criteria	Relay Desce			Time Range	11/0	3/2000 8:22:	46.850 AM to 11/03/200	0 8:22:33.720 A	M	<u>U</u> p	<u>D</u> own
Show Snapshots		📕 Show F	Relay	Settings							
Trigger Time		Duration ms					Acknowledge Time	Device Name			End State
11/03/2000 8:22:46.				13/2000 8:22:46.80			11/03/2000 8:22:46.850 AM			NO, Active	NC, Inactive
11/03/2000 8:22:42.				3/2000 8:22:42.12			11/03/2000 8:22:42.170 AM			NC, Inactive	NO, Active
1/03/2000 8:22:36. 1/03/2000 8:22:33.				13/2000 8:22:37.01 13/2000 8:22:33.91			11/03/2000-8:22:37.060 AM 11/03/2000 8:22:33:970 AM			NO, Active NC, Inactive	NC, Inactive
				Back	8	<u>S</u> ort	<u>G</u> raph	<u>H</u> elp			

- 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.

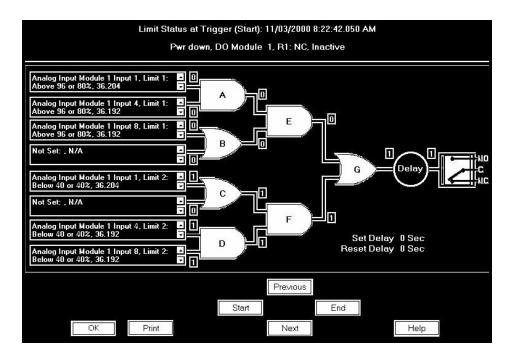
Stage 2: a meter responds to the change relay request and sends out the change relay command to the relay device.

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 9 Modem Dial-In / Dial-Out Function

### 9.1: 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 (9.4) Dial-In Programming (9.5) Disable Email / Page Generation (9.6) Modem Monitor (9.7) Alarm Server (9.8)

# 9.2: Setting the Dial-In Connection

Install the modem connected to the computer (the "originate modem"). See the Nexus 1250/1252 and 1262/1272 *Installation and Operation Manuals* for details on hardware requirements.

1. From the Nexus Communicator Icon To	ol Bar, click on the Connection Manager icon, or select
Connection, Connection Manager.	The Connection Manager screen appears.

Nexus Conne	ction Manager				
L	ist of Locat	ions	Conne	cted to Locatio	n
0001: Subs 0002: Wars 0003: Test 0004: Multi 0005: New 0006: New 0006: INP2 0008: INP2 0003: New 0010: NET	phouse Location Slexor Location Location em Card Location		<u>.</u>		<u> </u>
<u> </u>		<u>ب</u>			
Sort by	Oldest - Newest	-			
<u>A</u> dd	<u>R</u> emove	<u>E</u> dit			
<u>C</u> lose		C <u>o</u> nnect	<u>D</u> isconnect	<u>H</u> elp	1

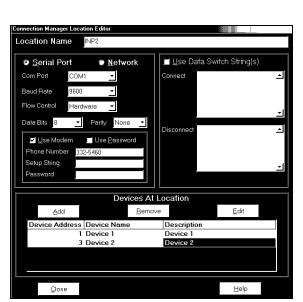
2. Click the Add button to add a "New Location" and click the Edit button. The Location Editor screen appears. 3. Configure the Location Editor screen. Type in new Location Name. Select a Com Port Number. Set Baud Rate to 38400. Enable Hardware Flow Control. Data Bits: 8. Parity: None Click Use Modem. Enter Phone Number or Setup String.

> From Devices at Location section, select a Device, click Edit button. The Device Editor screen appears.

4. Configure Location Device Editor screen: Address will be 1 for the Primary Device. Address will something other than 1 if it is not the Primary Device. Type in Name. Type in Description. Select Modbus ASCII from pull-down menu. Device Type is Nexus. Click Close.

You return to Location Editor screen.

5. Click once on the Device to which you want to connect your computer. Click Connect. The computer begins dialing.



Connection Manager Location Device Editor						
Device Properties						
Address	3					
Name	Device 2					
Description	Device 2					
Protocol	Modbus AS	scii 🗾				
Device Type	NEXUS	<b>_</b>				
<u>C</u> lose		<u>H</u> elp				

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: Troubleshooting the connection - 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. That the Gateway and Slave Port have the same Baud Rate and are set to Modbus ASCII.

Nexus Communicator will search for a Modem. If you do not get a "Modem Found" message, check your computer configuration or External Modem setup.

# 9.3: Setting the Dial-Out Connection

- 1. To set the Dial-Out Connection, from the Nexus Communicator Icon Menu, click on Edit Profile. Nexus Communicator retrieves the programmable settings for the currently selected, connected Nexus Monitor. Two screens will confirm that the settings have been retrieved successfully.
- 2. Click OK. The Device Profile screen appears.
- 3. Click on the (+/-) icon next to Communication Ports, then double-click on one of the parameters. The following screen appears if the connection is to a Nexus 1250/1252:
   NOTE: the screen for the Nexus 1262/1272 shows only Port 1 and Port 4 (see Chapter 4 for an example).
- 4. Configure the Internal Modem Device Profile: Communicati ns Settinas Port 1 Port 2 Settings for the Internal Address Address Modem Option. Baud Rate Baud Rate 115200 9600 Data Bits Data Bits Settings: Parity Parity None Stop Bits Stop Bits Answer the Phone on Tx Delay Tx Delay Oms Oms 2 Rings. Protocol Modbus RTU Modbus RTU If the Modem or Netwo is installed, Port 2 setti will not be used. See b Baud Rate = 38400.

Click the **Dial-Out Profile** button to configure the Dial-Out feature of the Internal Modem.

Settings are detailed below.

- Port 4(Ext Devices) Port 3-Address Address Baud Rate Baud Rate 57600 38400 Data Bits Data Bits Parity Parity None None Stop Bits Stop Bits Tx Delay Oms Tx Delay Oms Protocol Protocol Modbus ASCII Modbus ASCII Mode Slave Mode Slave Network Settings (If Network Option was purchased) IP Address 135 15 173 96 Advanced Settings Ethernet Gateway Baud Rate 57600 🔻 Subnet Mask 255 255 255 Default Gateway 250 Ethernet Gateway Delay 5 x 15 m s 135 173 15 Internal Modem Settings (If Internal Modem Option was purchased) Answer Phone on 📑 🗾 Rings Modem Gateway Baud Rate 57600 💌 Dial Out Profile <u>0</u>K <u>C</u>ancel <u>H</u>elp
- 5. If you do not click Dial-Out Profile or when you have completed the configuration, click OK. You will return to the main Device Profile screen.
- 6. Click Cancel to cancel any changes and return to the main Device Profile screen.
- 7. Click Update Device to update the Device Profile. Save the settings you wish to save. Click OK. The Device Profile will now update the settings.

Modem Programming				
<sub>C</sub> Primary phone number settings		Secondary phone number settings		
Number 104		Number 101		
Retry delay 1	<ul> <li>Minutes</li> </ul>	Retry delay 1 Minutes		
Retry limit 3	<ul> <li>Attempts</li> </ul>	Retry limit 1 Attempts		
Connection type Computer	-	Connection type Computer		
_ Communications settings——		Modem settings		
Activity timeout limit 1	<ul> <li>Minutes</li> </ul>	Rings to answer 3 🗾 Rings		
Call delay timer limit 10	<ul> <li>Seconds</li> </ul>	Identification Host2		
Callback type Playback	-	Password 123		
Call failure reset limit 2	- Hours	Enable password 💆		
Share the phone line 📕		Violation limit 3 🗾 Attempts		
		Violation lockout time 1 Hours		
📕 Limits status change	CBEMA Power	quality event 📕 Cycling of control power		
📕 High speed input change	📕 Control output o	hange 🗾 Modem password failure		
Waveform record captured	Filling of meter	memory 🗾 Failure of communication with Nexus		
Log full limit threshold (All Logs) 100	%	Edit gateway port devices		
	ΟΚ <u>Ο</u>	ancel Help		

### 9.4: Modem Dial-Out Programming

The Modem Programming screen helps you configure the Dial-Out Profile. It has five sections and each is detailed below.

### 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.

The modem will retry the Primary Number according to the Retry Limit set. The modem will then dial the Secondary Number for the programmed number of retries set in the Retry Limit.

### **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.

### **Edit Gateway Port Devices**

The Edit Gateway Port Devices button at the bottom of the screen is used to Enable up to 8 devices that are connected the gateway and are to be monitored. When the user clicks the Edit Gateway Port Devices button, the following screen is displayed:

Click on the Box next to the Device to be monitored. A Device Address will appear next to the Enabled Device.

Change the Device Address, if needed, to any address except 1. The Number 1 is always reserved for the Primary Device.

Click OK to return to the Modem Programming screen.

Click Cancel on either screen to cancel changes and return to the previous screen.

Gateway Devices to be Mon				
	Enable Device	Device Address		
1	$\checkmark$	2		
2	$\mathbf{N}$	3		
3	M	4		
4	V	5		
5	M	6		
6	M	7		
7	V	8		
8	M	9		
ОК		<u>C</u> ancel		

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.

## 9.5: 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—		⊢High speed input cha	nge ———	-  – Control output change	
Retrieve Limit log	Ŧĺ	Retrieve Digital inp	ut log 🔻	Retrieve PQ(CBEM/	Nlog ▼ĺ
		j= ·3····	· 1		
📕 Reset all logs after i	retrieval	📕 Reset all logs after	retrieval	📕 📕 Reset all logs after	retrieval
🔽 Generate email	Call pager	🔽 Generate email	📕 Call pager	🔽 Generate email	📕 Call pager
⊥ ⊤Waveform record captu	ıre ——	L CBEMA Power quality	event	」 - <sub>  `</sub> Filling of log memory –	
Retrieve Waveform I	og 🔽	Retrieve PQ(CBEM	A) log 🗾	Retrieve Filled log	<b>_</b>
Reset all logs after	retrieval	Reset all logs after	retrieval	Reset all logs after	retrieval
Generate email	Call pager	Generate email	Call pager	Generate email	Call pager
Cycling of control powe	er	Hodem password failu	re ———	Failure of communicat	ion with Nexus —
🔽 Generate email	📕 Call pager	🔽 Generate email	📕 Call pager	🗹 Generate email	📕 Call pager
- ⊢Email and pager setting	18				
	mail@erols.com	Sender	Nexus Communic	ator Pager ID #	234-4301
Reply address		Port numbe	а <b>т</b> 25 Те	est email	Test pager
Recipients					
Name	Mail address	Pager number	Filter(Double	e Click to Edit)	
John Smith	jsmith@electricity.cor	n <u>1-732-323-3444</u>	0		Add
Jim Jones	jjones@aol.com		0		
					Remove
User defined	Please contact the m	nain office.			
message				-	
	OK		D.L.		
	OK	Cancel	Print	Help	

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.

### 9.6: Filter Screen

The Filter Screen allows you to exclude a highlighted recipient from receiving one or more messages.

Disable Email / Page Generation when					
🗹 Limits status change					
📕 High speed input change					
Waveform record captured					
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					
ΟΚ					

#### View

From the View menu on the Toolbar, click Dial-In Settings. The Dial-In Settings screen will appear. Double-click **Filter** (in the **Recipients** section) 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

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## 9.7: 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.

M Modem	M Modem Monitor for Nexus Communicator							
Status Mo	onitoring Available	Modems						
Port	Modem		Status					
COM 3	LT V.90 Dat	a+Fax+Voice+Dsvd Modem Version 5.31	Listening					
Start	Stop	Version 1.0.4 March 22, 2002 09:00		Exit				

#### 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.



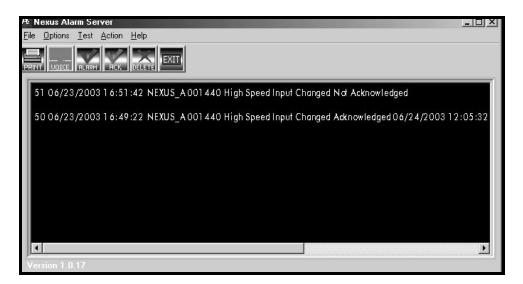
#### Buttons

Click Stop to disconnect the Modem Monitor. Click Start to connect the Modem Monitor.

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## 9.8: 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

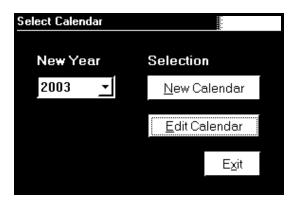
# Chapter 10 Nexus Time-of-Use

## **10.1: General Procedure**

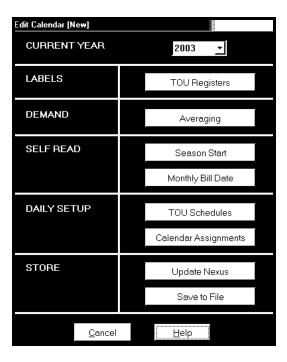
- See the *Nexus Installation and Operation Manuals* for a detailed discussion of the Nexus Time-of-Use (TOU) function.
- The following is a general outline for programming Nexus TOU. Each step is described in detail in subsequent sections.
- From the Tool Bar, select Time-of-Use, Calendar Settings.
- 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 Nexus 1250/1252 (Chapter 4 for 1262/1272) 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 is taken from the new calendar.
- To use Daylight Savings Time, you must enable it in the Nexus Monitor's Device Profile (see Chapter 3 (1250/1252) or 4 (1262/1272)) 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.

## **10.2: Creating a TOU Calendar Profile**

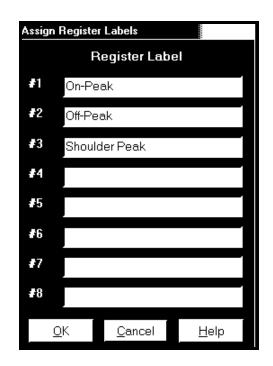
- The TOU calendar profile sets the parameters for TOU data accumulation. You may store up to twenty calendars in the Nexus Monitor and an unlimited amount on your computer. To create a new calendar, follow the steps below. To edit an existing calendar, see section 10.3.
- 1. From the Time-of-Use menu, select Calendar Settings. The following screen appears:



- 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:



4. Click on TOU Registers. The following screen appears:

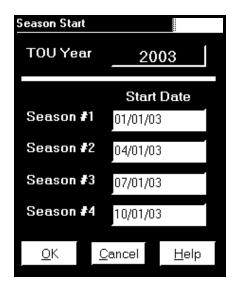


- 5. A **register** is a type of rate structure, for example "Peak", "Off-Peak" or "Shoulder Peak." You will assign one register to each fifteen-minute interval of the day when you set up the TOU **schedule** (see below).
  - Enter a name for each different register (up to eight).
  - Click OK to return to the main Edit Calendar screen.
- 6. Click Averaging. The following screen appears:

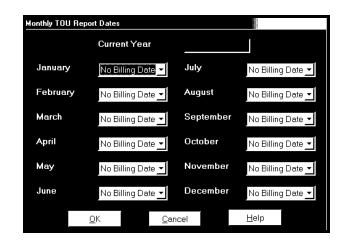


7. Select the type of Demand Averaging to be applied to the TOU accumulations. For a discussion on Demand, see the *Nexus Installation and Operation Manuals*.

- 8. Click OK to return to the main Edit Calendar screen.
- 9. Click Season Start. The following screen appears:



- 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<sup>®</sup> 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:



- 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:

Schedule_1         Schedule_2         Schedule_3         Schedule_4         Schedul           05:00:00 - 05:14:59         Off-Peak         Off-Peak </th <th><u>×</u> 8_5_1</th>	<u>×</u> 8_5_1
05:00:00 - 05:14:59         Off-Peak         Off-Peak </th <th><u>₽_5</u>_</th>	<u>₽_5</u> _
05:15:00 - 05:29:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           05:30:00 - 05:44:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           05:45:00 - 05:59:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:00:00 - 06:14:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:15:00 - 06:29:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak	1
05:30:00 - 05:44:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak           05:45:00 - 05:59:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:00:00 - 06:14:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:15:00 - 06:29:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak	1
05:45:00 - 05:59:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:00:00 - 06:14:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak           06:15:00 - 06:29:59         Off-Peak         Off-Peak         Off-Peak         Off-Peak         Off-Peak	1
06:00:00 - 06:14:59 Off-Peak Off-Peak Off-Peak Off-Peak 06:15:00 - 06:29:59 Off-Peak Off-Peak Off-Peak Off-Peak	1
06:15:00 - 06:29:59 Off-Peak Off-Peak Off-Peak Off-Peak	1
06-30-00 - 06-44-59 Off-Peak Off-Peak Off-Peak Off-Peak	
Solo of the Onleak Onleak Onleak Onleak	
06:45:00 - 06:59:59 Off-Peak Off-Peak Off-Peak Off-Peak	
07:00:00 - 07:14:59 On-Peak Off-Peak Off-Peak Off-Peak	
07:15:00 - 07:29:59 On-Peak Off-Peak Off-Peak Off-Peak	
07:30:00 - 07:44:59 On-Peak Off-Peak Off-Peak Off-Peak	
07:45:00 - 07:59:59 On-Peak Off-Peak Off-Peak Off-Peak	
08:00:00 - 08:14:59 On-Peak Off-Peak Off-Peak Off-Peak	
08:15:00 - 08:29:59 On-Peak Off-Peak Off-Peak Off-Peak	
08:30:00 - 08:44:59 On-Peak Off-Peak Off-Peak Off-Peak	
08:45:00 - 08:59:59 On-Peak Off-Peak Off-Peak Off-Peak	
09:00:00 - 09:14:59 On-Peak Off-Peak Off-Peak Off-Peak	
09:15:00 - 09:29:59 On-Peak Off-Peak Off-Peak Off-Peak	
09:30:00 - 09:44:59 On-Peak Off-Peak Off-Peak Off-Peak	
09:45:00 - 09:59:59 On-Peak Off-Peak Off-Peak Off-Peak {	لے ،
	_
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:

Edit s	chedule name			
		Schedule #4		
Sch	edule Name	Vacation		
	OK	Orment		
	<u>0</u> K	<u>C</u> ancel	<u>H</u> elp	

- 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:

Set schedule's registers						
Schedule #4: Vacation						
Register Name	R2: Off-Peak	<b>_</b>				
<u>о</u> к	<u>C</u> ancel	<u>H</u> elp				

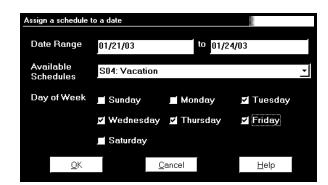
- 19. From the pull-down menu, select the Register Name you would like to apply to this fifteen-minute block. Click OK.
- 20. Repeat the above procedure until all fifteen-minute blocks in the schedule(s) are assigned registers.
- 21. When all schedules are formatted, click OK to return to the main Edit Calendar screen.
- 22. Click on Calendar Assignments. The following screen appears:

Time-of-L	Jse Profile								
				Jan	uary 2	2003			
					ĺ			ĺ	
				ĺ	1	2	3	4	
		5	6	7	8	9	10	11	
	Prev << Month	12	13	14	15	16	17	18	<u>N</u> ext Month >>
		19	20	21	22	23	24	25	
		26	27	28	29	30	31		
S1 V	¥eekday	S2	√eekend		53	3 Holida	y		S4 Vacation
S5		S6			S7	7			
		S10			S1	1			
S13									<u> </u>
	<u> </u>	К	<u>C</u>	ancel		<u>M</u> ulti D	ate		<u>H</u> elp

- 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					
Curr	ent Date					
	ilable edules	S04: Vacat	ion			<b>_</b>
	<u>0</u> K		<u>C</u> ancel		<u>H</u> elp	

- 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 the Multi Date button, you can quickly program a whole year (For Example, 2003) by selecting, for instance, all the weekdays (Mon Fri) and in the Date Range type 01/02/03 to 12/31/03. Do the same for the weekend days. Fill in holidays and vacations for each month.



- 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 10.3 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:

Aux Checking Nexus TOU	Setup					-D×
	Curr	ent Nexus T	ου	Setup Sta	atus	
Item Name	Status	Value(s)				
Year	Passed	2003				
Seasons	Passed	1/1/2003, 4/1	/200	13, 7/1/2003	, 10/1/2003	
Bill Days	Passed	No billing de	ites	set.		
Daily Setup	Passed	Daily profile	set	after 9/16/2	002	
Register Names	Warning	Register nar	ne n	ot set for P	4, R5, R6, R7, R8	
Schedule Names	Warning	Schedule na	me	not set for \$	S5, S6, S7, S8, S9,	S10, S11,
Schedule Setup	Passed					
•						•
		<u>C</u> ontinue		<u>H</u> elp		

• 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:

N T: (1)	.0
Nexus Time of Use	
Please Select a l	Nexus Calendar Slot to Send to
Calendar 1 2000	Calendar 11 0000
Calendar 2 2001	Calendar 12 0000
Calendar 3 2002	Calendar 13 0000
Calendar 4 2003	Calendar 14 0000
Calendar 5 0000	Calendar 15 0000
Calendar 6 0000	Calendar 16 2004
Calendar 7 0000	Calendar 17 0000
Calendar 8 0000	Calendar 18 0000
Calendar 9 0000	Calendar 19 0000
Calendar 10 000	0 Calendar 20 0000
Se	end Cancel

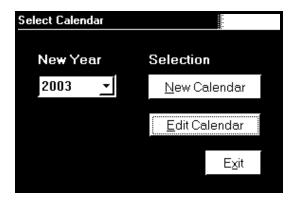
31. Select the slot you would like to use. Click Send.

Nexus Communicator	×
Writing the calendar to the Nexus was success	sful
OK	

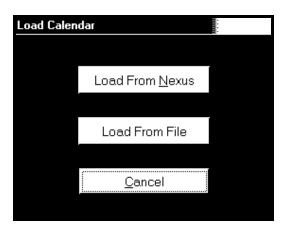
- 32. Communicator will send the calendar to the Nexus Monitor. The above pop-up window will tell you that the calendar was received. Click OK. The Nexus Monitor will use the calendar for the designated year, based on the date settings of your computer.
- Note: Do not enter more than one calendar for the same year (ie, do not store two calendars for 2004). If this occurs, Nexus will use the first calendar entered.

## 10.3: 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:



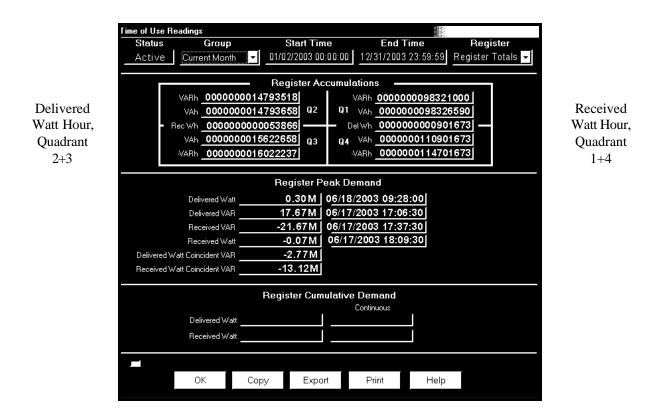
- To edit a calendar saved on the computer's hard drive, click Load From File. Nexus Communicator will ask you to locate the calendar. After the calendar has loaded, see section 10.2 for details on programming the calendar.
- To edit one of the calendars stored in the Nexus Monitor, click Load from Nexus. The following screen appears:

Nexus Time of Use	
Please Select a Calend	dar to Retrieve from Nexus
Calendar 1 2000	Calendar 11 0000
Calendar 2 2001	Calendar 12 0000
Calendar 3 2002	Calendar 13 0000
Calendar 4 2003	Calendar 14 0000
Calendar 5 0000	Calendar 15 0000
Calendar 6 0000	Calendar 16 2004
Calendar 7 0000	Calendar 17 0000
Calendar 8 0000	Calendar 18 0000
Calendar 9 0000	Calendar 19 0000
Calendar 10 0000	Calendar 20 0000
Retrie∨e	Cancel
1.301676	

3. Select the calendar year you would like to edit and click Retrieve. After the calendar year has been retrieved, see section 10.2 for details on editing.

## **10.4: Viewing TOU Accumulated Data**

1. From the Time-of-Use menu select Poll Time of Use Registers. The following screen appears:



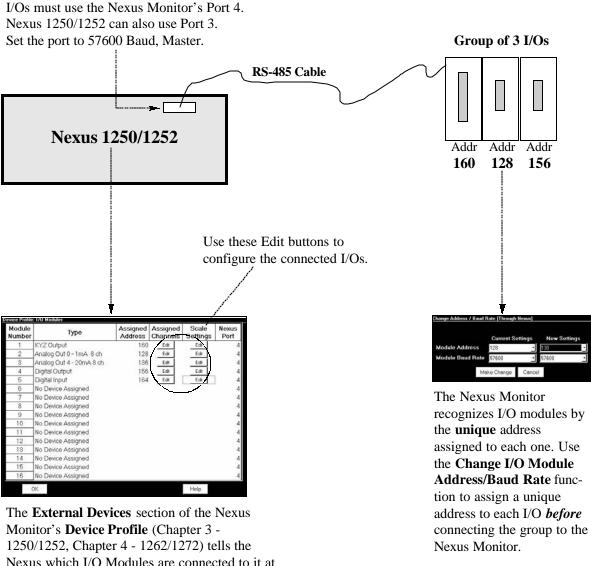
- 2. From the Group pull-down menu, select the month or season accumulations you would like to view.
- 3. From the Register pull-down menu, select the individual register accumulation (or the total of all registers) you would like to view for the selected month or season.
  - The Nexus Meters are true four-quadrant power meters. They display the VARs and VA for each quadrant, as illustrated below:

<u>Quadrant</u>	<b>Power Factor</b>	<b>Watts</b>	VARs
1	Lag	+	+
2	Lead	_	+
3	Lag	_	_
4	Lead	+	_

4. Print or Export the data by clicking the appropriate button at the bottom of the screen.

# Chapter 11 Nexus External I/O Modules

## 11.1: Overview



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.

e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

## 11.2: 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 11.5 for a list of factory-set addresses and baud rates. To assign or change I/O addresses, see section 11.6.
- 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 1250/1252 Monitor's Port 3 or 4 or Nexus 1262/1272 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 1250/1252) and 4 (Nexus 1262/1272) for how to configure the communication ports.
- 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 11.7.

**NOTE:** Updating the Device Profile will reset all logs.

- This chapter also covers the following I/O utilities:
  - Nexus I/O Device Status (section 11.13): lists all registered I/Os currently in use.
  - Query I/O Module (section 11.14): locates an I/O's address and baud rate.
  - Locator Utility (section 11.15–16): locates an I/O's address and baud rate without using the reset button.
  - **Stand Alone Programmer** (section 11.17): allows you to configure all I/O parameters directly from a computer, not through a Nexus Monitor.

## 11.3: Using Multiple I/O Modules

- Each type of I/O module is shipped with a factory-set address (see section 11.5). 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 11.6 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 1250/1252 Monitor's Port 3 or Port 4 (Port 4 **ONLY** for Nexus 1262/1272) (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 11.14. 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 11.4) 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 1250/1252 Monitor's **Port 3 or 4** (**Port 4 ONLY for Nexus 1262/1272**).
- 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 11.7.

## **11.4: Steps to Determine Power Needed**

- Available power for All Ports of the Nexus 1250/1252 is 12 VA. Nexus 1262/1272 does NOT support I/O Modules; an additonal power supply is required.
- Refer to the table in the next section (Section 11.5) 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.

## 11.5: 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 11.4) for the steps to determine if you must use an additional power source with the Nexus 1250/1252. Nexus 1262/1272 does NOT support I/O Modules; an additonal power supply, such as the PSIO, is required. See section 11.5.1.
- 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						

## 11.5.1: Additonal Power Source for I/O Modules

Available power for All Ports of the Nexus 1250/1252 is 12 VA. The Nexus 1262/1272 Power Supply will NOT SUPPLY POWER TO THE I/O MODULES. You must use a power source, such as the EIG PSIO (12V), for additonal I/Os connected to the Nexus 1250/1252 and for ANY I/Os connected to the Nexus 1262/1272. RS-485 communication is viable for up to 4000 feet (1219 meters). Below are the dimensions and the labels for the PSIO.

#### **Connection Steps:**

- 1. Connect the A(+) and B(-) terminals on the Nexus to the A(+) and B(-) terminals of the male RS-485 port. Connect the shield to the shield (S) terminal. The (S) terminal on the Nexus is used to reference the Nexus port to the same potential as the source. It is not an earth ground connection. You must also connect the shield to earth-ground at one point.
- 2. Put termination resistors at each end, connected to the A(+) and B(-) lines. RT is ~120 Ohms.

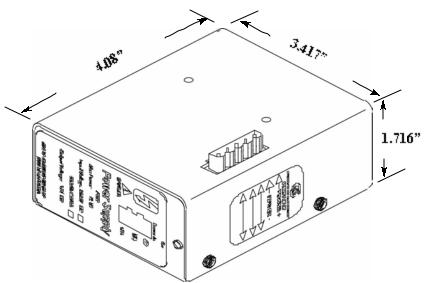
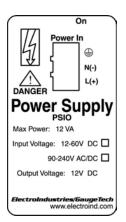


Figure 11.1: The PSIO Power Source (Male RS-485 Side Port)

Dimensions for the PSIO are: Height: 3.41" Width: 1.71" Depth: 4.08"



#### **TOP LABEL**

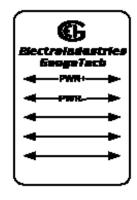


Figure 11.2: Labels for the **PSIO** Power Source (Labels are Red & White)

SIDE LABEL

## 11.6: 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 1250/1252 Monitor at Port 3 or 4 (Nexus 1262/1272 at Port 4 ONLY). To configure an I/O module by connecting it directly to your computer, use the Stand Alone Programmer utility, section 11.17.
- You must know the current address and baud rate of the I/O you want to change. See section 11.5 for a list of factory-settings, if the I/O is new, or use the Query I/O function (section 11.14) (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). Set the Port to Master mode. See Chapter 3 (1250/1252) or Chapter 4 (1262/1272) for details on configuring the Nexus Monitor's communication ports.
- 2. Connect the I/O to the Nexus 1250/1252 Monitor's Port 3 or 4 or Nexus 1262/1272 Port 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 11.3 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:

Change Address / Baud Rate [Stand Alone]									
PC Serial Port	Com 1 🔄	ſ							
	Current Se	ettings	New Se	ettings					
Module Address	128	<u> </u>	1	<u> </u>					
Module Baud Rate	57600	<u> </u>	57600	<u> </u>					
М	ake 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 11.7 to enter the I/O in the Nexus Monitor's Device Profile and configure all other I/O parameters.

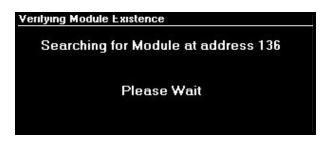
## 11.7: Entering I/O Modules in the Nexus Monitor's Device Profile

- 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 1250/1252 Monitor's Port 3 or 4 (1262/1272 Port 4) (57600 is recommended). Be sure all addresses are unique. See section 11.6 for how to assign addresses and baud rates.
- 2. Connect the I/O module(s) to the Nexus 1250/1252 Monitor's Port 3 or 4 (1262/1272 Port 4); see the *Nexus Installation and Operation Manuals* for hardware/installation details. Be sure Port 3 or 4 is operating at 57600 baud and is in Master mode (see Chapter 3 (1250/1252), Chapter 4 (1262/1272)).
- 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 (1250/1252), Chapter 4 (1262/1272)).
- 4. When Nexus Communicator has retrieved the Device Profile from the Nexus Monitor, double click on "External Devices". The following screen appears.

Device Profi	le: 1/0 Modules					
Module Number	Туре	Assigned Address	Nexus Settings	Module Settings	Nexus Port	Log / Limit ID
1	Analog Out 0 - 1mA 4 ch	128	Edit	Edit	4	AO Module 3
2	Analog Out 0 - 1mA 8 ch	128	Edit	Edit	4	AO Module 1
3	Analog Out 4 - 20mA 4 ch	132	Edit	Edit	4	AO Module 2
4	Analog Out 4 - 20mA 8 ch	132	Edit	Edit	4	AO Module 4
Б	Analog In 0 - 1 mA 8 ch	136	Edit	Edit	4	Al Module 1
6	Analog In 0 - 20mA 8 ch	140	Edit	Edit	4	Al Module 2
7	Analog In 0 - 5V 8 ch	144	Edit	Edit	4	Al Module 3
8	Analog In 0 - 10∨ 8 ch	148	Edit	Edit	4	Al Module 4
9	Digital Output	156	Edit	Edit	4	DO Module 1
10	KYZ Output	160	Edit	Edit	4	KYZ Module 1
11	Digital Input	164	Edit	Edit	4	DI 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		<u>C</u> ancel		н	elp

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 11.6. 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 (11.8–11.12) 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 11.14) (Port 4 Only) or the Locator Utility (section 11.15 11.16) 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.

## **11.8: Configuring the Analog Output Module**

- 1. Be sure each module has a unique address and is connected to the Nexus 1250/1252 Monitor's port 3 or 4 or the Nexus 1262/1272 Monitor's Port 4 at the same baud rate as the port (57600 recommended); see section 11.6.
- 2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (see Chapter 3 (1250/1252) or Chapter 4 (1262/1272) for more detail on the Device Profile and section 11.7).
- 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:

Device Prof	ile: Analog Output								
Output	Туре			Chann	el				
1	1sec	<u> </u>	Volts AN	l		<b>_</b>			
2	Uncompensated Por	▼ 19W	VAA			_			
3	Q Readings	<u> </u>	QA			_			
4	0.1sec	<u> </u>	Volts AN	1		_			
5	Flicker	-	PINST V	/olts A		_			
6	K-Factor	<u> </u>	IA			_			
7	Ext Analog In	<u> </u>	Mod 1:1	nput 1		_			
8	Harmonic Mag: Volts	. <u>.</u>	V AN/AE	3: Mag #	0	_			
	Channel Upda	te	1	<b>_</b>					
For 8 Byte data only, please choose 4 of the 8 bytes you <del>w</del> ant to map to the Analog outputs									
	Bytes 7, 6, 5, 4								
	ок <u>с</u>	ancel	Н	elp					

- 4. From the pull down menus, select the type of reading and the channel to which it will be applied.
- 5. The module reads a 4-byte value per channel. So, you must select 4 of the 8 bytes to be read by the module. Use the pull-down menu to choose 4 of the 8 bytes.
- 6. Click OK when all channels are set. The Device Profile: I/O Modules screen appears.
- 7. 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 4 Channel						
Version	0019, Build 112						
Address	28						
Baud Rate	57600 🗾	Scale Settings should be entered in secondary for Volts, Current and Power. All other readings should					
Transmit Delay	).0 ms 🗾	be entered in	primary				
Channe	el#	Scale High	Value(1mA)	Scale Low '	Value(-1mA)		
1:Uncompensated VA	۱A		900.000		-900.000		
2:Uncompensated VA	۱۸		0.010		533.330		
3:Uncompensated VA	<b>A</b> A		0.000 -1800.				
4:Uncompensated VA		0.000		-1800.000			
Update	Cancel	Print	Save	Load	Help		

- 8. 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 11.17.
- 9. When you have entered the scale settings, click Update. Nexus Communicator will send the new scale settings to the module and then reset it.
- 10. 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.

## **11.9: Configuring the Analog Input Module**

CONVERSION TO VALUE								
READING	READING SIGNAL							
100 <sup>0</sup>	1mA	100%						
50 <sup>0</sup>	0.5mA	50%						
0	0.0mA	0%						
50 <sup>0</sup>	-0.5mA	-50%						
110 <sup>0</sup>	-1mA	-100%						

The Anaolog 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:

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 11.6).
- 2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (section 11.7).
- 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:

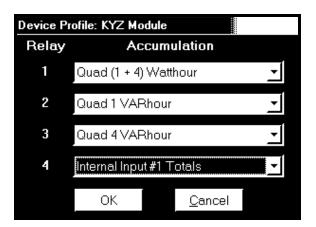
Device F	rofile: Analog Input			
Input	Channel Label	High V	alue (1mA)	Low Value (-1mA)
1	Temp Sensor 1, C	100.0000		-100.0000
2	Temp Sensor 2, K	300.0000		-300.0000
3	Temp Sensor 3, F	500.0000		-500.0000
4	Pres Sensor, Hg	50.0000		-50.0000
5	Light Sensor, Lu	5000.000	0	-5000.0000
6	Humidity Sensor	100.0000		-100.0000
7	Sea Level, Ft	24.0000		-24.0000
8	Sound Level, dB	250.0000		-250.0000
	ОК	<u>C</u> ancel	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 Ext	ternal ModuleProgramme	21			
Module Type	Analog Input Module	8 Channel, 0 to	5∨		
Version	,0013, Build 104				
Address	144				
Baud Rate	57600 🗾				
Transmit Delay	0.0 ms 🔄				
Update	Cancel	Print	Save	Load	Help

## 11.10: 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 11.6.
- 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:



- 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 Pro	ogrammer							
Module Type	KYZ Module							
Version	0017, Build 114							
Address	160							
Baud Rate	57600	·						
Transmit Delay	0.0 ms	· ]						
KYZ Out	put	Wa	tt/Pulse		Roll Over		Min Pulse	e Width (ms)
1:Quad (1 + 4) Watt	hour		2000000	9999	999999999	9999		1000
2:Quad 1 VARhour			2000000	9999	999999999	9999		1000
3:Quad 4 VARhour			2000000	9999	999999999	9999		1000
4:Quad (2 + 3) Watt	hour		2000000	9999	999999999	9999		1000
Update	Can	cel	Print		Save		Load	Help

- 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 11.17.
- 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.

## **11.11: Configuring the Digital 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 11.6.
- 2. Retrieve the External Devices section of the Device Profile from the Nexus Monitor (see Chapter 3).
- 3. After you have entered the Digital 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:

Device P	rofile: Digita	l Output					
Relay		Label	Common Sho	orted to N.C.	Common	Shorted to N.O.	Lock to Manual Control
1	D021		Common Shorter	d to NC			<b>~</b>
2	D022				Common Sho	orted to NO	<b>v</b>
3	D023		Common Shorter	Common Shorted to NC			<u>v</u>
4	D024				Common Sho	orted to NO	
			OK	Cancel	Help		

- 4. Enter label and Common Shorted to N.C. or N.O. for each output. Click Lock to Manual Control, if desired.
- 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.

Digital Output External Module Programmer								
Module Type	Digital Output Module	Digital Output Module						
Version	0020, Build 117							
Address	156							
Baud Rate	57600 🗾							
Transmit Delay	0.0 ms 🗾							
Update	Cancel	Print	Save	Load	Help			

## 11.12: Configuring the Relay Outputs

- 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 11.7.
- 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*	Г
2 M2R2		Common Shorted to N.C.	
3 M2R3		Common Shorted to N.C. *Locked*	
4 M2R4		Common Shorted to N.C.	
5 M1R1		Common Shorted to N.C.	ŗ
6 M1R2		Common Shorted to N.C.	F
7 M1R3		Common Shorted to N.C.	
8 M1R4		Common Shorted to N.C.	
9 M4R1		Common Shorted to N.C.	
10 M4R2		Common Shorted to N.C.	
11 M4R3		Common Shorted to N.C.	
12 M4R4		Common Shorted to N.C.	
13 M3R1		Common Shorted to N.C.	
14 M3R2		Common Shorted to N.C.	L L
15 M3R3		Common Shorted to N.C.	
16 M3R4		Common Shorted to N.C.	L L
Select New	State Unlock	Арр	ly .
Polling 0000144	Ō	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.

## 11.13: Using the Digital 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 11.6.
- 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:

Jeyice Fronie. Digital input									
Input	Channel Label		Open Label	Closed La	abel Normal Ste	Normal State			
1	Input 1	Оре	n	Closed	Open	<u> </u>			
2	Input 2	Оре	in	Closed	Shorted	<u> </u>			
3	Input 3	Оре	in	Closed	Open	<u> </u>			
4	Input 4	Оре	n	Closed	Shorted	<u> </u>			
5	Input 5	Ope	n	Closed	Open	Ŀ			
6	Input 6	Оре	n	Closed	Shorted	Ŀ			
7	Input 7	Ope	n	Closed	Shorted	<u> </u>			
8	Input 8	Оре	n	Closed	Shorted	<b>.</b>			
		ОК	<u>C</u> ancel	Help					

- 4. Enter Channel Label, Open Label, Closed Label and Normal State for each input.
- 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.

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 11.7) and configure the screen above; you do not need to configure the module further 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.

Digital Input External Module Programmer							
Module Type	Digital In	Digital Input Module					
Version	,0014, Bui	0014, Build 106					
Address	164						
Baud Rate	57600	-					
Transmit Delay	0.0 ms	<b>_</b>					
Digital Inp	ut			Roll Over			
1:Input 1						99999999	
2:Input 2		1				999999999	
3:Input 3		1				999999999	
4:Input 4		1				99999999	
5:Input 5		]				999999999	
6:Input 6						99999999	
7:Input 7						99999999	
8:Input 8						99999999	
Update		Cancel	Print	Save	Load	Help	
					_		

- To change the I/O's Transmit Delay, you must use the Stand Alone Programmer, section 11.17.
- 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.

#### 11.14: 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 11.7).
- 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):

exus I/U Module Status		
Device	Status	Port
KYZ Module, @ Address 160	Registered and present	
Analog Out 0-1 ma Module, @ Address 128	Registered and present	
Analog Out 4-20ma Module, @ Address 136	Registered and present	
Digital Output Module, @ Address 156	Registered and present	
OK Refresh	Query Help	

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:

KYZ External Modu	le Programmer						
Module Type	KYZ Ma	dule					
Version	0017, B	uild 114					
Address	160						
Baud Rate	57600	<b>_</b>					
Transmit Dela	ay 0.0 ms	•					
KYZ	2 Output	Wat	tt/Pulse		Roll Over	Min Puls	e Width (ms)
1:Quad (1 + 4)	Watthour		2000000	9999	999999999999	199	1000
2:Quad 1 VARh	nour		2000000	9999	999999999999	99	1000
3:Quad 4 VARh	nour		2000000	9999	99999999999		1000
4:Quad (2 + 3)	Watthour		2000000	9999	99999999999	999	1000
Update		Cancel	Print		Save	Load	Help

- To change the I/O's Transmit Delay, you must use the Stand Alone Programmer, section 11.17.
- 3. Query screens are read-only. To change any parameters you must edit the Nexus Monitor's Device Profile (see section 11.7).
- 4. Click Refresh to initiate a new search and listing of connected I/Os.

## 11.15: 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 11.15–16.
- 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:

old for at least 3 seconds
Cancel

- 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:

Here are the com	munications se	ettings
Address	160	
Baud Rate	57600	
Exit	Cancel	

6. Write down the address and baud rate.

# 11.16: Locator Utility—Through Nexus Method

- Use this utility if you do not have accesses 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 11.16) 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:

rrough Nexus Device Locator							
Start Address	1	End Addres	s 247				
Device Typ	e	Address					
Start	Stop	Exit	Help				

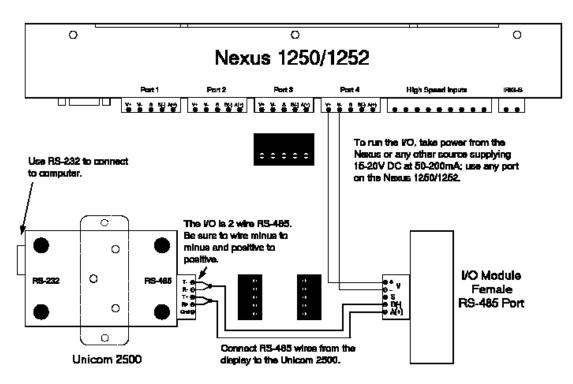
- 4. Set the Address range for the search. Nexus Communicator will begin at the start address, searching every address up to and including the End Address. Set the Address range as small as possible to limit the time of the search.
- 5. Device Locator lists any device it finds:

Through Nexus Device Locator								
Start Address	128	End Address	164					
	5 dev	vices found						
Device Typ	e	Address						
0-1 mA Anal			128					
8AI 0 to 5V	2		144					
Digital Outp	ut Module		156					
KYZ Module	1		160					
Digital Input	Module		164					
Start	Stop	Exit	Help					

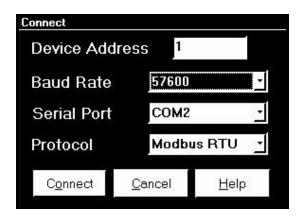
6. Device Locator will continue to search for devices until it reaches the end of the specified criteria or until you click Stop. Click OK to return to the main Nexus Communicator screen.

# 11.17: Locator Utility—Stand Alone Method

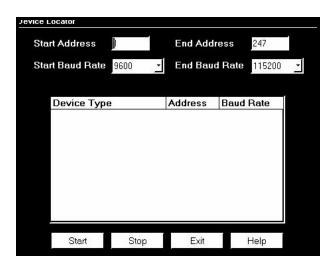
- The Stand Alone Locator utility searches for any I/O device connected directly to your computer (it is not for use with remote connections). The search criteria is a programmable range of baud rates and addresses. When a device is found, Locator displays its name, baud rate and address.
- To make a 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 15–20V DC at 50–200 mA power source for the I/O module, such as EIG model PSIO; you may also use any port on a Nexus 1250/1252 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:



- 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:



7. 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.

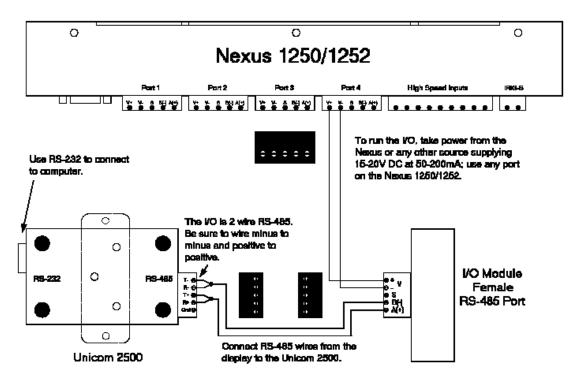
8. Click Start. The Device Locator begins searching for devices within the specified baud rate and address range.

Start Address 1	End Add	ress	247
Start Baud Rate 115200	- End Bau	d Rate	115200
Searching for a dev	vice at Address	11, 115	200
Device Type	Address	Baud	Rate
Nexus 1250	1		115200

9. 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.

#### 11.18: 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 11.7.
- 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 15–20V DC at 50–200 mA power source for the I/O module, such as EIG model PSIO; you may also use any port on a Nexus 1250/1252 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.

3. Click on the Nexus Communicator Connect icon on the tool bar, or select Connect, Quick Connect. The following screen appears.

Connect		
Device Addres	s 1	
Baud Rate	57600	Ţ
Serial Port	COM2	*
Protocol	Modbus	RTU
C <u>o</u> nnect <u>C</u>	ancel	<u>H</u> elp

- 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 11.16).
- 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 11.16).
- 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.
- 4. Click Connect. Nexus Communicator searches for a module at the specified baud rate and address.
- 5. When it has located the I/O(s), the following screen appears (see NOTE below):

List of Currently Connected Devices								
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	2 27	 ب

**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 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 11.8–11.12 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 🗾					
Update	Cancel	Print	Save	Load	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 11.7.

# Chapter 12 Passwords

# 12.1: Overview

✤ <u>Note</u>: 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 12.4) to renew password protection immediately.

# 12.2: Enabling Passwords

1. From the Tools Menu select Passwords, Enable/Disable:

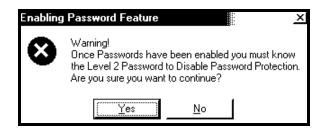


- 2. Passwords may contain up to 10 characters and may include the digits 0–9 and/or the letters A–Z. Passwords are **not** case-sensitive.
  - Enter a password for Level 1 and then retype it. The Level 1 password blocks a user access to the Poll Time-of-Use Registers screen **only** without a password.
- Note: If you enter and retype only a Level 1 Password or Level 2 Password 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 12.1 without a password. Only the Level 2 password 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 12.4 for how to disable passwords.

#### 12.3: Password Status

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).

115200 Addr: 1 Feeder 1 Modbus RTU PW: Disabled, SS: Disabled
---

# 12.4: 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:

Disable Nexus Password Feature						
To Disable The Nexus Password Feature Please						
Enter the I	Enter the Level 2 Password in the field below					
				_		
20	ołoł					
, 						
	ОК		Cancel			

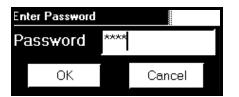
2. Enter the Level 2 password and click OK.

Protection Status				
Full Access - Password Pr	otection	Disable	ed	
ОК				

3. The password function is now disabled. The status bar at the bottom of your screen will now read: PW: Disabled.

# 12.5: 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 12.1 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.

Protection Status				
Full Protection - Password	Protectior	n Enat	oled	
OK				

5. Click OK.

## 12.6: 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.

Change Nexus Password	
To Change a Password	l Fill In The Follo <del>w</del> ing Fields
Current Password	d ****
New Password	*****
Retype New Password	*****
ОК	Cancel

- 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.

Change Nexus Password		x
Are you sure you want to cha	ange the Level	2 Password?
Yes	<u>N</u> o	J

★ <u>Note:</u> 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.

Nexus Communicato	×
The New Password is too s	mall
OK D	

5. Click OK. Type in new password, retype it, click OK, click Yes. You now have a new password.

# Chapter 13 Flash Upgrading

## 13.1: 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 13.5.)
  - 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 13.6.)
- 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 13.2). 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.

# 13.2: Flash Upgrading the Nexus Unit

- 1. Contact EIG to receive the most recent Nexus 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.

★ <u>Note:</u> The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or l, 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 13.3.

Select NEXUS Code To Flash		
• Nexus <u>U</u> nit	Internal Modem	
Nexus Comm Only	<i>,</i>	
Nexus DSP Only		
• <u>L</u> ED Display		

5. Choose the type of upgrade you want to perform: Nexus Unit, Nexus Comm or Nexus DSP. See section 13.3 to Flash Upgrade Nexus Comm Only or Nexus DSP Only. See section 13.4 to Flash Upgrade the Nexus External Display, section 13.5 to Flash Upgrade the Internal Modem Card and section 13.6 to Flash Upgrade the Internal Network Option. Click Next. The screen below 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.

Enter Flash File			
File 1			
C:\WINDOWS\	Desktop\320ru	n_v96\E-107-9-7-	Browse
3			

6. Click the Browse button beside File 1.

elect Flash	info file					3
Look jn: 🧲	320run_v96	- E	1	Ř	8-8- 8-8- 8-8-	
E-107-9-7	-96.ini					
File <u>n</u> ame:	E-107-9-7-96.ini		-		<u>O</u> pen	
						. 1
Files of <u>t</u> ype:	EIG Flash Info File (*.ini)		-	1	Cancel	

- 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.

Flash	Me			
		Enter Fl	lash File	
22		- 20 Met 20 Web - 1946		
	File 1			
	C:\WINDOWS\	Desktop\320rur	n_∨96\E-107-9-7-	Browse
<u></u>				l.
	a	at A		
	<u>P</u> revious	<u>N</u> ext	<u>C</u> ancel	

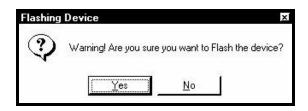
9. When the files have been entered, click Next. The following screen appears:

Comm	unication	is Parameters
Address	1	
Baud Rate	9600	-
Serial Port	COM1	•
revious	<u>N</u> ext	<u>C</u> ancel

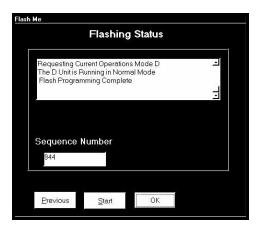
- 10. If you are already connected to the Nexus Monitor you want to upgrade, disregard this screen, click Next and skip to step 11. If you are **not** connected to the Nexus Monitor and/or you have a series of Nexus Monitors to upgrade, this screen avoids the reloading of files.
  - In the Address field,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

ash Me			
	Flashing	Status	
Warning you a Press Start to (		the Flash Process.	4
			ľ
Sequence I	lumber		
<u>P</u> revious	<u>S</u> tart	Cancel	

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



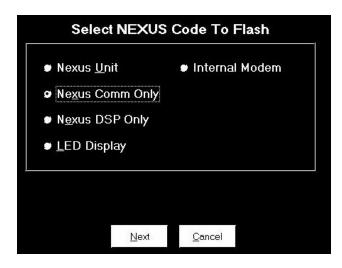
12. Flash upgrading begins. The following screen displays the progress of the upgrade:



- 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.

# 13.3: Flash Upgrading the Nexus Communicator and Nexus DSP Firmware

- 1. Contact EIG to receive the most recent Nexus 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.
- ★ <u>Note:</u> The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or 1, 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 13.2 for how to Flash upgrade the Nexus Unit. See section 13.4 to Flash Upgrade the Nexus External Display, section 13.5 to Flash Upgrade the Internal Modem Card and section 8.6 to Flash Upgrade the Internal Network Option. Click Next. The following screen appears:

n Me			
	Enter F	lash File	
File 1			
	\Desktop\320ru	n_∨96\E-107-9-7-	Browse
File 2			

6. Click the Browse button beside File 1.

Select file to	be flashed				?!	x
Look in: 🕞	320run_v96	<u>-</u> E	1	ď	8-8- 8-8- 8-8-	
	96-2-1a-96.hex 96-2-1b-96.hex					-
<b>j</b> File <u>n</u> ame:			_		<u>O</u> pen	
Files of type:	Intel Hex File (*.hex)		Ŀ	_	Cancel	

- 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.

lash Me			
	Enter F	lash File	
File 1			
C:\WINDOWS\E	Desktop\320ru	n_∨96\E-107-9-7-	<u>B</u> rowse
File 2			
C:\WINDOWS\E	Desktop\320ru	n_∨96\E-107-9-7-	Browse
6			
2		, <u>12 - 3</u> 7	
<u>P</u> revious	<u>N</u> ext	<u>C</u> ancel	

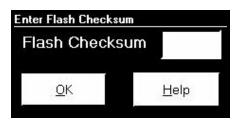
9. When the files have been entered, click Next. The following screen appears:

Address	1	
Baud Rate	9600	-
Serial Port	COM1	-

- 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 what 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.

lash Me			
	Flashing	g Status	
Warning you are Press Start to Co		jin the Flash Process.	4
			1
Sequence N	umber		
		0.825	
<u>P</u> re∨ious	<u>S</u> tart	<u>C</u> ancel	

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



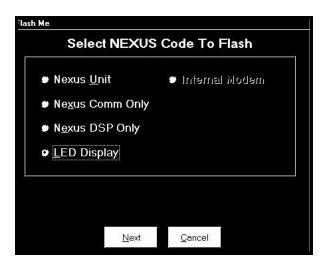
- 12. Enter the checksum code from the text file accompanying the firmware files. **If you do not enter the correct checksum code, the flash upgrade will fail**.
- 13. Click OK. Flash upgrading begins. The following screen displays the progress of the upgrade:

ash Me			
	Flashing	g Status	
The D Unit is F	urrent Operation Running in Norn nming Complet	nal Mode	न नग
Sequence I	Number		
<u>P</u> revious	<u>S</u> tart	OK	

- 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.

# 13.4: 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.
- ★ <u>Note:</u> 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:

h Me	<b>F</b> -4 <b>F</b>		
	Enter F	lash File	
File 1			
C:\WINDOWS\D	esktop\320ru	n_∨96\E-107-9-7-	Browse
File 2			Description
			B <u>r</u> owse
<u>P</u> revious	<u>N</u> ext	<u>C</u> ancel	

6. The Nexus External Display firmware upgrade requires only one File. Click the Browse button beside File 1.

Select file to	be flashed				? ×
Look jn: 🧲	Nexus_Display_v26	- E	Ø	ř	8-8- 8-8- 8-8-
E-125-9-3	-26-2-5-26.hex				
20					
File <u>n</u> ame:	E-125-9-3-26-2-5-26.hex				<u>O</u> pen
Files of type:	Intel Hex File (*.hex)		J		Cancel

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:

ash Me			
	Enter F	lash File	
File 1			
C:\WINDOWS\I	Desktop\Nexu	s_Display_v26\E	<u>B</u> rowse
anticol access			
File 2			
			B <u>r</u> owse
Previous	Next	<u>C</u> ancel	
Lievious	<u>H</u> ext	Saucer	

8. Click Next. The following screen appears:

Comm	unicatior	ns Parameters	
Address	1		
Baud Rate	9600	•	
Serial Port	COM1	-	
Previous	<u>N</u> ext	<u>C</u> ancel	

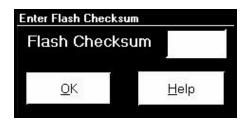
- 9. If you are already connected to the Nexus Monitor, disregard this screen, click Next and skip to step 10. If you are **not** connected to the Nexus Monitor:
  - In the Address field, enter the Address of the Nexus Monitor to which your computer is connected and that you want to flash upgrade.
  - 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.

Flash Me			
	Flashing	g Status	
Warning you a Press Start to		jin the Flash Process.	Ъ
			1
Sequence	Number		
Previous	<u>S</u> tart	<u>C</u> ancel	

10. Click Start to begin the upgrade process. A final warning screen appears; click Yes. The following screen appears:

isplay Location		
Through Nexus		-
Connected to Port	3	Ţ
ОК		

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:

He	Flashing Status	
	urrent Operations Mode D	<u>ا</u>
	Running in Normal Mode mming Complete	÷
ġ.		1
Sequence	Number	

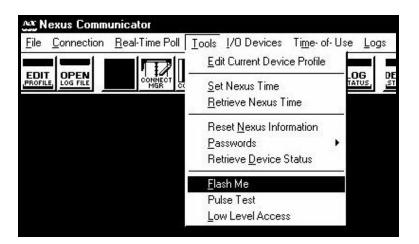
- 13. When the Flash upgrade is complete, the Cancel button changes to OK. Click OK.
- Note: To upgrade additional Nexus External Displays, click Previous and return to Communications Parameters screen. Repeat the steps as needed, entering a unique address for each unit.

# 13.5: Flash Upgrading the Internal Modem Card

 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 13.2, 13.3 and 13.4 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.
- ✤ <u>Note:</u> The checksum code consists only of the digits 0–9 and the letters A–F. The checksum will never contain the letters O or l, 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:

Cancel

5. The Password is the number **2**. Enter **2** and click OK. The Internal Modem Flash Programmer screen appears. Enter Command Mode is highlighted.

<u>nternal M</u> Status:	odem Flash Programmer	
	Enter Command Mode	Program Flash
	Boot Version	Firmware Version
	Exi	t

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.

<u>nternal Ne</u> Status:	etwork Option Flash Programmer	
	Enter Command Mode	Program Flash
	Boot Version	Firmware Version
	Exi	t

7. Click on Program Flash. The following screen appears:

Open			? X
Look in:	Hex Files	· 🗈 🖉	▮ă⊯≣
R102.hex			
, File <u>n</u> ame:	R102.hex		Open
Files of <u>type</u> :	Hex File (*.hex)	<u>.</u>	Cancel

**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.

Status:	Uploading Programming	
	Line 18 Checksum OK	
	Enter Command Mode	Program Flash

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:

∀erify Checksum		x
Checksum = 9D271	s this Corr	ect?
Yes	<u>N</u> o	

- 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.

## 13.6: Flash Upgrading the Internal Network Option

- Flash upgrading the Internal Network (Ethernet) Option takes approximately 30 minutes.
- 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 13.2, 13.3 and 13.4 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:

<sup>Me</sup> Select NEXUS Code To Flash		
Nexus <u>U</u> nit	🛚 Internal Network	
Nexus Comm Only		
Nexus DSP Only		
• <u>L</u> ED Display		
	1210 10	
Next	<u>C</u> ancel	

4. Click Internal Network and the Next button. If the Password Feature is Enabled, the following Password screen appears:

Enter Password		
Password	10	
OK	Cancel	

5. Enter your Level 2 Password. Click OK. The Internal Network Flash Programmer screen appears. Enter Command Mode is highlighted.

nternal N	letwork Option Flash Programmer	
Status:		
	Enter Command Mode	Program Flash
	Boot Version	Firmware Version
	Current Mode	Exit

6. Click on Enter Command Mode. After a moment "In Command Mode" appears on the screen. Click on Program Flash. The following screen appears:

Open				? ×
Look jn: 🔽	] Flash Network	- <u>1</u>	Ø	<u>تة الا</u>
🗒 E126-9-2-	2-2.ini	Marine Des		<u> </u>
File <u>n</u> ame:				pen
Files of type:	Flash File (*.ini)		-	Cancel
	<b>Г</b> Open as <u>r</u> ead-only			

**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.

Flashing	Nexus Option
?	Is this what you want to Flash: Release E126-9-2-2-2.hex
	Yes <u>N</u> o

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.

nternal N	etwork Option Flash Programmer		
Status:	Uploading Programming		
	Writing Line 7678 of 14368		
	Time to completion: 15 min, 06 sec		
	Enter Command Mode	Program Flash	
	Boot Version	Firmware Version	
	Current Mode	Exit	

When the Flash Upgrade is complete, the Status window will say "The Flash has been Programmed" as below.

Status:	The Flash has been programmed	
	Enter Command Mode	Program Flash
	Boot Version	Firmware Version
	Current Mode	Exit

9. Click Exit to exit the program and return to the Main Nexus screen.

# Chapter 14 Energy Billing Module

# 14.1: Overview

## ■ Managing Your Load Profile:

Your monthly electric bill is comprised of your total energy usage (kWh) plus your maximum demand (kW) during the billing period. Maximum demand, a.k.a. peak demand, can represent 30% to 60% of your total energy cost. Managing your load profile is the key to reducing your costs; reducing your peak demand without changing your total usage lowers your costs.

The optimal load profile would be flat, with minimum demand at constant usage. But, a flat load profile is not possible in industrial and commercial environments because of the variation and number of loads in the system. However, there are steps you can take to control those variations and ultimately reduce costs. The steps are listed below:

- Collect historical and real time energy data.
- Use graphical tools to calculate and analyze the data.
- Control loads and shift demands.
- Calculate savings and results.

The Energy Billing Module presented in this chapter gives you a tool to use with the Nexus 1250/1252, 1262 and 1272 Meters to collect the data and analyze it. With a few clicks, you can collect historical and real time power usage data so that you can make changes necessary to reduce costs.

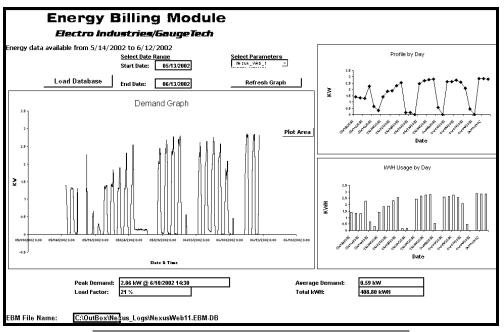


Fig. 14.1: Example Screen for the Energy Billing Module

The Energy Billing Module Graph Screen, as shown in the example screen above, displays a Demand Graph, a Graph Profile by Day and a Graph of kWh Usage by Day for the Date Range selected.

# 14.2: Basic Energy Management

To understand how to manage your power usage, you must understand billing determinants and the terminology of energy management. Below are Basic Energy Terms followed by an Energy Management Example.

Basic Energy Terms Kilowatt hour (kWh)		Measurement for energy equal to the amount of work done by 1,000 watts for one hour.
Kilovolt-ampere-reactiv	ve hour (kVARh)	Measurement similar to kWh that reflects current drawn by a customer that produces no useful work, but takes up space on the electrical distribution system.
Megawatt-hour (MWh)	)	1,000 kWh.
Energy (Active and Re	active)	The total consumption that is measured in Kilowatt hours (kWh) and Kilovolt-ampere-reactive hours (kVARh).
Interval Type		An interval is composed of N subintervals (1<=N<=10). The data collected in the previous N subintervals is used in the demand calculation.
Demand		Rate at which electric energy is delivered to a system, usually expressed in kW or MW. There are two methods for calculating demand: (1) Block window and (2) Rolling (or sliding) window.
Load Factor		An indicator of the quality of the load profile (0 to 1) for a certain period in the electrical system.
Block Demand		Demand calculations performed over a fixed period (interval) of time. When that time period lapses, the next interval starts where the previous interval ended.
Rolling (Sliding) Dema	nd Window	Demand calculations performed over a fixed period (interval) of time that is made up of (n) subintervals $(n=>2)$ . When one subinterval elapses, the demand value is computed by adding the most recently completed subinterval data to the demand interval and subtracting the oldest subinterval data from the demand interval.

Thermal Demand	Emulation of a Thermal Demand Meter that provides an exponentially time-lagged demand where, given a constant load, the indication reads 90% of the actual demand in 15 minutes.
Power Factor	An indicator of the quality of the power $(-1 \text{ to } +1)$ at a certain point in the electrical system.
Time of Day or Time of Use	Rates vary at different times of the day (on-peak and off-peak) for Energy and Demand.
Off-Peak	Designated periods of low system demand (usually non-business hours) when electricity is generally less expensive.
On-Peak	Designated periods of high system demand when electricity is generally more expensive.
Shoulder	Designated periods between off-peak and on-peak.
Real Time Pricing	The instantaneous pricing of electricity based on the cost of the electricity available for use at the time the electricity is demanded by the customer. Rates are downloaded over the phone or Internet. This is a customized plan.
Aggregation	The combined total energy use of customers/ units/ cost centers for billing purposes.

## Energy Management Example

A light manufacturer operates on two shifts. The typical electricity cost is about \$150,000 per year. Before the installation of any energy management equipment and software, the facility was paying, in a typical summer month, \$12,000 for electricity.

56,000 kWh (Off-Peak)	\$2,400
120,000 kWh (On-Peak)	\$5,500
480 kW (Peak Demand)	\$4,100
Total Bill	\$12,000

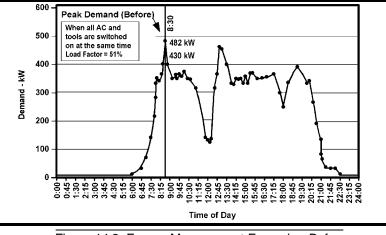


Figure 14.2: Energy Management Example - Before

With the Energy Billing Module, plant management is able to optimize the loads. Essential loads are monitored and turned on or off in sequence. Simple steps are taken without jeopardizing the integrity of the manufacturing process. Savings in energy costs = 4% (see Figure 2).

56,000 kWh (Off-Peak)	\$2,400
120,000 kWh (On-Peak)	\$5,500
480 kW (Peak Demand)	\$3,600
Total Bill	\$11,500

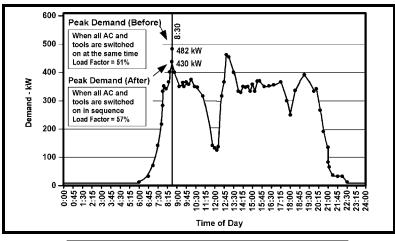


Figure 14.3: Energy Management Example - After

Further savings can be realized by doing the following:

- Shift non-essential loads to off-peak hours.
- Flatten the demand curve wherever possible.
- Identify equipment and process problems.
- Negotiate with your utility based on peak demand.
- Source the best utility for your needs.

# 14.3: Cost Allocation

In addition to the cost savings steps listed above, further steps can be taken using Cost Allocation. By submetering , one of your primary fixed costs, electricity, becomes a variable cost that can be accurately allocated.

#### **Cost Allocation Steps:**

- Determine cost centers.
- Use submeters to monitor usage at each cost center.
- Assign accountability and offer incentives for departments within a facility to reduce their own energy usage.
- Determine equipment and system efficiency within cost centers.
- Make sure Tenant Billing accurately reflects usage.

#### ■ Cost Allocation System:

- One computer at primary facility.
- A number of low cost, high quality meters to monitor usage at each cost center.
- A simple network connecting the meters to the computer.
- Energy Billing Module.

## 14.4: System Configuration

The basic Energy Billing Module System consists of the following components:

#### Hardware

A dedicated Energy Billing Module PC or Laptop A Unicom RS-232/485 Converter At least one Energy Billing Module meter

#### Software

Nexus Communicator Software (meter programming and communication) Energy Billing Module with MS-Excel Macros Note: MS Excel ('97 or later) must be installed in the computer

#### **Setup Requirements for Nexus**

- 1. Nexus Communicator Software
- 2. EIG Log Converter Software
- 3. EIG\_EBM.EBM-DB (template database file)
- 4. Nexus meter Log 2, logging interval greater than 0 seconds, less than and equal to 900 seconds and will have an integer number of records during a 15 minute period.

**Example:** If Log 2 interval is set at x and 900 modulo with interval x is at 0, then setting is OK.

- 5. Nexus Meter Log 2, Log Block Window Avg Watt (Modbus Register 0A35-0A36).
- 6. Nexus Meter Block Window Avg interval set at 15 minutes.
- 7. EIG's EBM Excel worksheet.

#### Setup Requirements for Futura+

- 1. Nexus Communicator Software
- 2. EIG Log Converter Software
- 3. EIG\_EBM.EBM-DB (template database file)
- 4. Futura Historical Logging Interval greater than or equal to 60 seconds, less than and equal to 900 seconds and with an integer number of records during a 15 minute period.

Example: If Log Interval is set at x, if 900 modulo with interval x is at 0, then the setting is OK.

- 5. Futura Historical Log, Log Avg Watt.
- 6. Futura Avg Window Interval set at 900 seconds (15 minutes).
- 7. EIG's EBM Excel worksheet.
- 8. Must set Time Sync for Historical Logging.
- 9. Firmware must support Time-stamped Record.

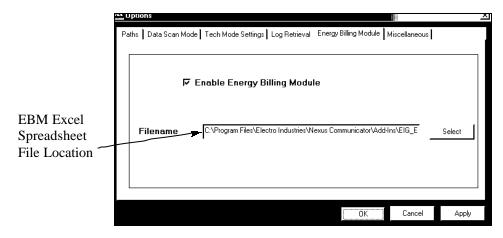
## 14.5: Operation Overview

## **Creating a Demand Database**

Click View > Options > Energy Billing Module and the screen below appears. Click to Enable. (If the Enable Box is not checked, no data will be processed by EBM.) If the option is set, Log Converter will store the Avg Watt values from the log into the new Demand Database. The new database will carry the same file name as the regular meter database, except the file extension is EBM-DB. If the file does not exist, Log Converter will make a duplicate copy of the template database and rename it [Device\_Name].EBM-DB. There should be no more than 96 records per day in the database. EIG's EBM Excel worksheet can be used to load and view the Demand Database.

System Requirement: MS Excel '97 or 2002 installed.

**NOTE:** The EBM Excel Spreadsheet File Location is C:\Program Files\Electro Industries\Nexus Communicator\Add-Ins\ EIG\_EBM.xls (shown below). Click Select for a different location.



## ■ Using the Excel Spreadsheet

- 1. On startup, the user must select a valid EBM database file or click the Load Database button to select a file.
- 2. Under File > Properties > Summary, the EBM Excel Spreadsheet information will be displayed, including version number and release date.

# 14.6: Hardware and Software Installation and Setup

## ■ Hardware Installation:

The typical Hardware Installation for the Energy Billing Module System is an RS-485 loop. However, the network that connects the hardware can be simple or complicated. See Setup Requirements in Section 14.4.

## Software Installation:

The software required for the system, Nexus Communicator, enables the user to program the meter and to communicate to the computer. The Nexus Communicator software is installed in the meter at the factory. The Energy Billing Module is also installed at the factory. The user may only be required to update the software at some time in the future, when new features are added to the software. The initial installation is done for you.

Note: MS Excel '97 or 2002 Software must be installed on your computer for the Energy Billing Module to work.

# 14.7: Using the Energy Billing Module

The Energy Billing Module software is an MS-Excel based graphical user interface for viewing, tracking, comparing and analyzing real time electrical energy data. It is a productivity tool that provides the energy information you need so you can monitor and control your loads to reduce overall energy cost.

The Energy Billing Module is a Visual Basic macro that runs inside MS Excel. The module contains three worksheets:

- **Demand Graphs** Graphical presentations of demand and energy usage information.
- **Demand Statistics** Statistical data and analysis on demand and energy.
- **Bill Verification** Calculate and verify your electrical utility cost based on a utility rate structure.

Start Up

First, make sure that your meter is connected to the PC.

To start the Energy Billing Module, simply go to the bottom left corner of your Windows main screen and click through the following:

- Start > Programs > Electro Industries > Log Viewer the Log Viewer screen appears.
- Click \$Bill button MS Excel will start automatically. A message box will appear to ask if you want to enable the macros.
- Click on Enable Macros. Your screen will display the Demand Graphs screen.

## 14.8: Demand Graphs

First, make sure that the CAM Logger is running at the bottom of your screen.

Available Energy Data will be shown above the Demand Graph, indicating the start and end dates of the data. If you just installed the system, "No Data Available" will appear in this section.

#### ■ Select Date Range

To view the graphs, enter your start and end dates in the Start Date and End Date fields. Ranges are limited to days only. For example, if you want to view data from January 1, 2002 3:00pm to February 23, 2002 6:00am, enter "1/1/2002" in the Start Date field and "2/24,2002" in End Date field.

Note: Make sure the dates are with the range of the Available Energy Data start and end dates. Otherwise, the graphs will not be correct.

#### Select Parameters

A list of Energy Billing Module meters will be displayed in the pull-down menu in this section. Select a meter from which you want to retrieve data.

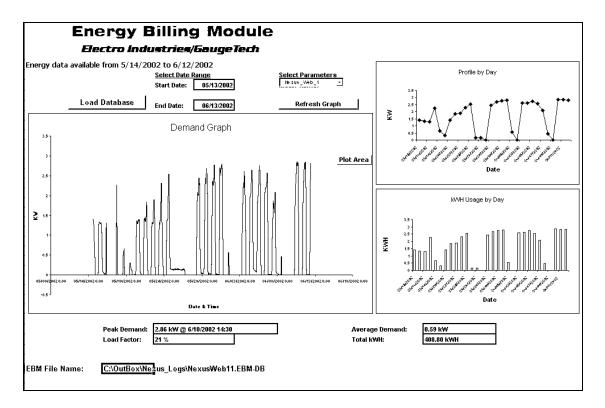
#### Refresh Graph

Click on Refresh graph to start retrieving graphs for the dates and parameters selected.

**Warning!** DO NOT click anywhere on the spreadsheet while the system is in Calculation Mode!

#### Demand Graph

This graph shows the Demand History. Demand data is collected every 15 minutes from the Energy Billing Module meter.



## ■ Profile by Day Graph (upper right)

This graph shows the Daily Peak Demand for the period you selected.

## ■ kWh Usage by Day Graph (lower right)

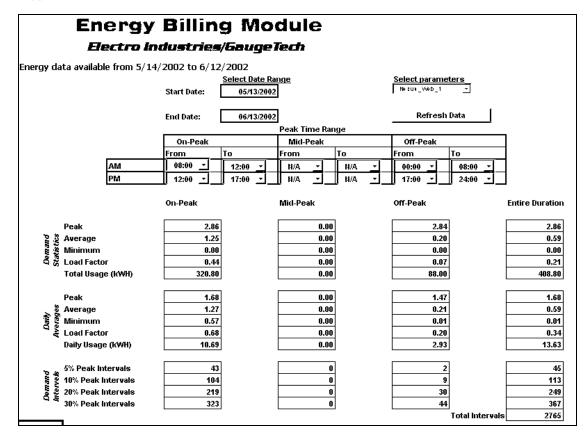
This graph shows the Aggregated Daily Usage (kWh) for the period you selected.

Generic load information is displayed at the bottom of the screen.

# 14.9: Demand Statistics

The Demand Statistics screen displays statistical energy data for the time period you selected.

Click the Demand Statistics tab in the Demand Graph screen. The Demand Statistics screen appears.



## Select Parameters

Enter a Start Date, End Date and Select a meter. Peak Time Range is your Utility Time Structure setup.

## **Example:**

Your utility has the following setup: On-Peak: 7:00am - 6:00pm. Off-Peak: 6:00pm - 7:00am.

To retrieve statistics for that setup:

- 1. Select the following: Select On Peak from 7:00 to 15
  - Select On-Peak from 7:00 to 18:00 in Range 1 and N/A's in Range 2.
    Since no Mid-Peak is given, select Mid-Peak from 6:00 to 6:00 in Range 1 and 18:00 to 18:00 in Range 2.
    Select Off-Peak from 18:00 to 0:00 in Range 1 and from 0:00 to 7:00 in Range 2.

- 2. Click on Refresh Data to get statistical results. Data will appear for each time period and for each day.
- **Warning!** DO NOT click anywhere on the spreadsheet while the system is in Calculation Mode!

## 14.10: Bill Verification

The Bill Verification screen calculates and displays cost analysis results for a billing period you selected.

Click the Bill Verification tab in the Demand Graph screen. The Bill Verification screen appears.

		Ener	gy B	illing	Mod	ule						
				stries/6								
Ene	rov data	a available fro	nn 5/14/200	)2 to 6/12/20	102							
	ng, aut		Select Date Ra			Select parame	eters		On-Peak	Mid-Peak	Off-Peak	Sum
			Start Date:	05/13/2002	1	Ne sue_We b_1	-	Distribution	\$0.00	\$0.00		\$0.00
								Transmission		\$0.00	\$0.00	\$0.00
			End Date:	06/13/2002	1	Calcul	ate	Generation	\$0.00	\$0.00	\$0.00	\$0.00
								Misc	\$0.00	\$0.00	\$0.00	\$0.00
					Peak Time Ra	nge						
			On-Peak		Mid-Peak		Off-Peak				TOTAL	\$0.00
			From	То	From	То	From	То				
		AM	08:00 -	12:00 -	N/A 💌	N/A 📩	00:00 -	08:00 -				
		PM	12:00 -	17:00 -	N/A 🔹	N/A -	17:00 -	24:00 -				
				Rate Struc	ture Table							
	Please ei	nter your rate i	information	On-Peak Char			Mid-Peak Cha	rge		Off-Peak Char	ge	
	on the w	hite area.		Actual kW	Total kWH		Actual kW	Total kWH		Actual kW	Total kWH	
				2.86	320.80		0.00	0.00		2.84	88.00	
	Demand			Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)
ШO			First			0			0			0
u ti			Remaining	2.85852356		0	0		0	2.839678955		0
Distribution	Energy			Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)
õ			First			0			0			0
			Remaining	320.7998981		0	0		0	87.99547191		0
~	Demand			Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)
sion			First			0			0			0
<b>Transmission</b>			Remaining	2.85852356		0			0		1	0
SHE	Energy			Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)
£,			First			0			0			0
_	D		Remaining	320.7998981	D-4-404346	0	0		0		D-4-404346	0
	Demand		First	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$) 0
tion			First Remaining	2.85852356		0			0	2.839678955		U 0
Generation	Energy		remaining		Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	u Amount(\$)	2.039676999 Usage(kWH)	Rate(\$/kWH)	u Amount(\$)
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-			Remaining	320.7998981		0			0	87.99547191		
	Demand			Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)
			First			0			0			0
5			Remaining	2.85852356		0	0		0	2.839678955		0
Ne c	Energy			Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)
1			First	1		0			0			0
			Remaining	320.7998981		0	0		0	87.99547191		0
	Demand			Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)	Usage(kW)	Rate(\$/kW)	Amount(\$)
			First			0			0			0
c 2			Remaining	2.85852356		0	0		0	2.839678955		0
SE .	Energy			Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)	Usage(kWH)	Rate(\$/kWH)	Amount(\$)
			First			0			0			0
			Remaining	320.7998981		0	1 0		0	87.99547191		0

## Select Parameters

In the Select Data Range field, enter a Start Date and an End Date.In the Select Parameters field, select a meter from which to calculate data.In the Peak Time Range fields, enter the peak time structure (or make changes).In the Rate Structure Table, enter your rate structure in the white spaces in the table. Leave a space empty if it does not apply.

#### **Rate Structure Table**

This generic rate structure table is set up based on utility rates for small and medium industrial and commercial facilities. This model has charges for Distribution, Generation, Transmission and some miscellaneous items. It also allows 1 to 2 tiers in rate structure.

#### **Example of tiered rate structures:**

A company used 5,000 kWh with a 400 kW peak demand during a billing period.

**Single Tier Rate Structure:** Utility charges a flat usage rate of 4 cents per kWh and a flat demand rate of 2 cents per kW.

**Double Tier Rate Structure:** Utility charges a usage rate of 4 cents per kWh for the 1st 2000 kWh and a lower usage rate of 3 cents per kWh for the remaining 3000 kWh. Demand rate is 2 cents per kW for the 1st 300kW and 1 cent per kW for the remaining 100kW.

Double check the data entered in the table and click on "Calculate".

**Warning!** DO NOT click anywhere on the spreadsheet while the system is in Calculation Mode!

## 14.11: Notes

## ■ Excel 2002:

The Excel Spreadsheet used in the EBM is designed for use with Excel '97. When using this module with Excel 2002, the first time a file is opened it takes several minutes for the file to be converted into the updated format. Save the file immediately after the load is completed. After the initial conversion, the file will open more quickly.

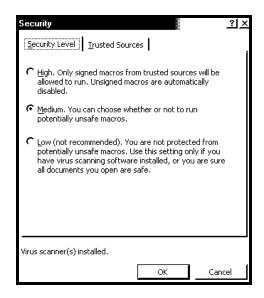
When using Excel 2002, check that a level of security is in place. Click on the following:

Tools > Macro > Security

KI.	licrosoft Ex	cel - Book	1									
9	<u>File E</u> dit <u>V</u>	iew <u>I</u> nsert		<u>T</u> ools <u>D</u> ata ⊻	<u>V</u> indow <u>H</u>	elp_A	cro <u>b</u> at					
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4				×			] ⊻isual E				Alt+F11	
							Microso	oft Scri	pt <u>E</u> dil	tor A	Alt+Shift+F11	
6												
7												
8												
9												
10												

The following screen appears:

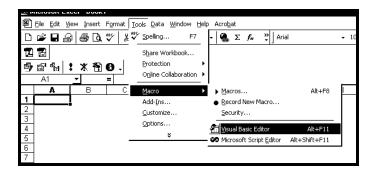
Click Medium > OK.



## ■ Trouble Shooting:

If you are experiencing a problem executing this module, you may be missing the DAO component. To add the DAO component to your system, do the following:

Click Tools > Macro > Visual Basic Editor.



The Visual Basic Editor screen appears.

Click Tools > References > VBA Project. The following screen appears. Select the Microsoft DAO 3.6 Object Library(as highlighted). If 3.6 is not available, select the next highest below 3.6.

Make sure only one DAO Library is selected.

Click File, Save before closing the Macros.

Save the Excel spreadsheet before closing.

References - VBAProject	×
<u>A</u> vailable References:	ОК
♥ Visual Basic For Applications ♥ Microsoft Excel 9.0 Object Library	Cancel
	Browse
□ AcrobatPDFMaker □ AdobePDFMakerX	
Microsoft Forms 2.0 Object Library  Priority  -) VideoSoft VSFlex 6.0 Controls (DAO)  ·) VideoSoft VSView6 Controls	Help
ACMWrapperServer 1.0 Type Library	
Acrobat Distiller	
Microsoft DAO 3.6 Object Library	
Location: C:\PROGRAM FILES\COMMON FILES\MICROSOFT	SHARED\D4
Language: Standard	

Warning! If the user tries to open the EBM file saved in Excel 2002 using Excel '97, a conflict could occur. DO NOT ATTEMPT THIS!

# Chapter 15 EIG Script & Scheduler Program Automated Data Retrieving and Processing

## 15.1: Overview

- EIG Script & Scheduler software program serves as a stand-alone module for the Communicator software package. The EIG Script & Scheduler program is <u>Automated Data Retrieving and</u> <u>Processing</u> 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 Scheo	luler				
Active scr	ipts		Schedul	er is running	<u>R</u> un/Stop
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: 3:15:58 PM	9/5/2001 3:15:58 PM	9/4/2001 3:15:5	9 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 4:23:0	9 PM
6	New script 8	Weekly, Day of week: Sunday, Time: 3:51:53 PM	9/9/2001 3:51:53 PM		
	New script 6	Daily, Time: 4:00:25 PM	9/5/2001 4:00:25 PM	9/4/2001 4:01:1	4 PM
8	New script 7	Daily, Time: 4:15:26 PM	9/5/2001 4:15:26 PM	9/4/2001 4:15:2	9 PM
9	New script 8	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:5	9 PM
10	New script 7	Daily, Time: 4:00:22 PM	9/5/2001 4:00:22 PM	9/4/2001 4:00:2	7 PM
Current sta	atus				
9/4/2001 4:: 9/4/2001 4:: 9/4/2001 4:: 9/4/2001 4: 9/4/2001 4:	23:40 PM Loc 23:53 PM Sc	g Converter Manager started g Converter Manager stopped neduler stopped neduler is running			
S	CRIPT	SCHEDULER	STATUS		
		Add Script	eset Alarm		
		<u>E</u> dit Script	⊻iew Log	He	lp
C I	<u>S</u> cripts	Delete Script C	lea <u>r</u> status	Εž	çit

- 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 15.3 15.5); 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 15.6 15.8);
    - 1.b **Set Up Script Commands:** Add, edit or delete script commands (sections 15.9 15.12);
  - 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 15.13 - 15.15);
  - 3. **Status:** View the Scheduler Log and clear Current status (section 15.16);
  - 4. **Exit:** Exit from the program (section 15.17). 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.

## **15.2: 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.

Log Converter Manager							
Program Status Script Name(s)	Auto Started	I			J		
Entry Date/Time	Script Name					1	
9/4/2001 4:23:14 PM	New script 7					10 10	
Converting Files							
Index File Name S	ource Name	Dest Name	Start	Done			
Message							
No files to convert							
	Manu	ual <u>S</u> tart		<u>C</u> ancel			

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 1250/1252, 1260/1262 and 1270/1272, 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.
- 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.

# 15.3: 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.

Create New / Op	oen / Delete So		<u>&gt;</u>		
Current Scri	pts				
S001 - New	script 1				<u> </u>
New	<u>O</u> pen	<u>D</u> elete	<u>C</u> lose	<u>R</u> eport	<u>H</u> elp

- To create a new script, click New. The Set Up Script screen will appear (see section 15.5). 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 15.5). 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.

## 15.4: Script Report

Gen	eral Setting	ne			EIG Scrip	ot Rep	ort		
Con	ltem	90		F	Property				
Nam	9		New script 1						
Inde>			1						
	ection Type		Direct - Single C	OM Port					
	per of Retries		2						
	Convertion		Starts when script is finished						
	Port		COM1						
	Rate		9600						
	Control		None						
Data			8						
Parit	(	3	None						
ID	ce Setting: Address	Туре	Name	Connection	Protocol	PW-1	PW-2		
1	1	Nexus	Device 1	COM Port	Modbus ASCII	Not set	Not set		
2 3	1	Nexus	Device 2	COM Port	Modbus ASCII	Not set	Not set		
5	11	Nexus	Device 3	COM Port	Modbus ASCII	Not set	Not set		

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%**.

## 15.5: 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 Ty	vpe Plea	se select your conne	ection type	-
Number of Re	tries ()	<u> </u>		
🗹 Siari Log C	onverier ali	er this script is finish	ទប	
L Scribt Couve	ction Propa	rties - Disabled		
Comm Port	COM1	<b>•</b>		
Baud Rate	9600	-		
Flow Control	None	<u>·</u>		
Data Bits	8	-		
Parity	None	-		
<u>D</u> evice	s	C <u>o</u> mmands	<u>C</u> lose	<u>H</u> elp

■ 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.

## 15.6: 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.

1       1 Nexus       Device_1       COM Port       Modbus ASCII         2       1 Nexus       Device_2       COM Port       Modbus ASCII         3       1 Nexus       Device_3       COM Port       Modbus ASCII         4       1 Nexus       Device_4       COM Port       Modbus ASCII         5       1 Nexus       Device_5       COM Port       Modbus ASCII	Device ID	Device Address	Device Type	Device Name	Connection	Protocol
3 1 Nexus Device_3 COM Port Modbus ASCI 4 1 Nexus Device_4 COM Port Modbus ASCI	1	1	Nexus	Device_1	COM Port	Modbus ASCII
4 1 Nexus Device_4 COM Port Modbus ASCII	2	] 1	Nexus	Device_2	COM Port	Modbus ASCII
	3	1	Nexus	Device_3	COM Port	Modbus ASCII
5 1 Nexus Device_5 COM Port Modbus ASCII	4	] 1	Nexus	Device_4	COM Port	Modbus ASCII
	5	1	Nexus	Device_5	COM Port	Modbus ASCII

- 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.

## 15.7: 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 15.8.

Edit Script Device		×
Script Connection type	Direct - Single COM Port	
Connection type for this device	COM Port	×
Device Name	Device_9	
CDevice Information ————		
Address 1		
Protocol Modbus RTU		
Type Nexus 👱		
Password	 <sub>  C</sub> Data Switch Strings	
Level 1	Connect	5
Level 2	Disconnect	
<u>0</u> K	Cancel	Help

■ 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.

## Add a Data Switch (Substation Multiplexor) or Multiple Devices

Note: For Help with hardware connections for the Substation Multiplexor, please refer to EIG's SM1-16 (Substation Multiplexor) User Manual.

Edit Script D	evice				×
Script Cor	nnection type	Direct - Single	COM Port		
Connectio	on type for this device	COM Port		<u> </u>	
Device Na	ame	Device_5			
<sub>C</sub> Device I	nformation ———	13			
Address	1				
Protocol	Modbus ASCII 🗾 🛃				
Туре	Nexus 🗾				
- Passwor	rd	」 <sub>  ┌</sub> Data Switch S	trings ———		
Level 1	Password 1	Connect	"%%%"PT02 "		
Level 2	Password 2	Disconnect	"%%%"		
	<u>0</u> K	<u>C</u> ancel		<u>H</u> elp	

■ 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 "|" for carriage return.
- Sample data switch strings:

a) Connect string to Port 2 of an SM1-16 device (Electro Industries' Data Switch) Format: <CR><CR>,,%%%,,PT02<CR>,, Actual string: ||,,%%%,,PT02|,,

b) Switch a connection from Port 2 to Port 1 of an SM1-16 device 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.

Device ID	Device Address	Device Type	Device Name	Connection	Protocol	<b>_</b>
1	1	Nexus	Device_1	COM Port	Modbus ASCII	
2	1	Nexus	Device_2	COM Port	Modbus ASCII	
3	1	Nexus	Device_3	COM Port	Modbus ASCII	
4	1	Nexus	Device_4	COM Port	Modbus ASCII	
5	1	Nexus	Device_5	COM Port	Modbus ASCII	
6	1	Nexus	Device_6	COM Port	Modbus ASCII	
7	] 1	Nexus	Device_7	COM Port	Modbus ASCII	
8	1	Nexus	Device_8	COM Port	Modbus ASCII	
9	1	Nexus	Device_9	COM Port	Modbus ASCII	
10	1	Nexus	Device_10	COM Port	Modbus ASCII	5.5.0
11	1	Nexus	Device_11	COM Port	Modbus ASCII	
12	1	Nexus	Device_12	COM Port	Modbus ASCII	<u>-</u>

# **15.8: 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."

Edit Script Device			×
Script Connection type	Direct - Single COM Port		
Connection type for this device	COM Port	<u> </u>	
Device Name	Device_5		
<sub>C</sub> Device Information ————			
Address 1			
Protocol Modbus ASCII	-		
Type Nexus	-		
Password	 <sub>       </sub> Data S <del>w</del> itch Strings —		
Level 1 Password 1	Connect	02 ,,	
Level 2 Password 2	Disconnect "%%%"		
<u>O</u> K	<u>C</u> ancel	Help	

- Using the windows available, select or deselect the item(s) you would like to change.
- Edit the items.
- Click OK.

# **15.9: 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.

Comm	ands for	script			
ndex	Device	Device Name	Device Index	Address	Command Description
1	Nexus	Device_1	1	1	Retrieve, Historical Log 1, Historical Log 2, Limit Log, PQ/Wave
2	Nexus	Device_2	2	1	Retrieve, Historical Log 1, Digital Input Log
3	Nexus	Device_3	3	1	Retrieve, Historical Log 1, Historical Log 2, PQ/Waveform Log
4	Nexus	Device_4	4	1	Retrieve, Limit Log, Digital Input Log
1					

■ 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.

## 15.10: Add a Script Command

■ This screen enables you to add or edit a script command. This section will discuss adding a script, Section 15.11 will discuss editing a script command.

Edit Script Command			X
Device D000: Sys	stem Device		<b>•</b>
Number of Retries	2 🗾		
Primary Commands			
Send switch string			<u> </u>
Secondary Commar	nds		
Name	String		Ĩ
1 System data switch	string   .,%%%,,PT0	2	19
	Use & for line feed, use	for carriage return.	
<u>0</u> K	<u>C</u> ancel	Help	

#### ■ 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.

# 15.11: Edit a Script Command

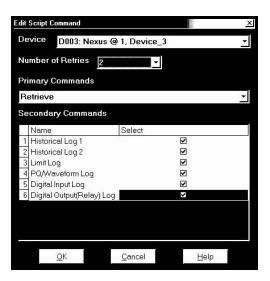
Comman	nds for s	script					2	-101>
Index D	evice)	Device Name	Device Index	Address	Command Description			j.
1 N	lexus	Device_1	1	1	Retrieve, Historical Log 1,	Historical Log 2, Li	mit Log, PQ/V	Vavef
2 N	lexus	Device_2	2	1	Retrieve, Historical Log 1,	Digital Input Log		
3 N	lexus	Device_3	3	1	Retrieve, Historical Log 1,	Historical Log 2, P	Q/Waveform I	Log
4 N	lexus	Device_4	2	1	Retrieve, Limit Log, Digital	Input Log		
4								•
4								<u>+</u>

- 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.

cript & Schedui	×
Please select a com	mand.
(OK)	
	Cript & Schedu Please select a com

#### **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:

dit	Script Command			2
De	D000: System E	)evice		
Nu	mber of Retries 2	•		
Pri	mary Commands			
Se	end switch string			•
Se	condary Commands			
	Name	String		
1	System data switch string	∥%%%,.PT02		
	11 47	P Z 1 1Z		
	Use & h	or line feed, use   for ca	rriage return.	
	OK	Cancel	<u>H</u> elp	2

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.

# 15.12: Delete a Script Command

Comm	ands for	script			
Index	Device	Device Name	Device Index	Address	Command Description
1	Nexus	Device_1	1	1	Retrieve, Historical Log 1, Historical Log 2, Limit Log, PQ/Wavef
2	Nexus	Device_2	2	1	Retrieve, Historical Log 1, Digital Input Log
3	Nexus	Device_3	. 3	1	Retrieve, Historical Log 1, Historical Log 2, PQ/Waveform Log
4	Nexus	Device_4	4	1	Retrieve, Limit Log, Digital Input Log
4					
ė	}dd	<u>E</u> dit	Delete		 Upownloseelp

- 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.



Nexus S	cript & Scheduler		×
$\triangle$	Are you sure you want to termi	nate the scheduler	program?
	<u>Y</u> es	No	

# 15.13: 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.

	duler			
ctive scr	ipts		لــــــــــــــــــــــــــــــــــــ	opped <u>R</u> un/Sto
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: 3:15:58 PM	9/5/2001 3:15:58 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: 4:15:26 PM	9/5/2001 4:15:26 PM	9/4/2001 4:15:29 PM
9	New script 8	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:59 PM
Current st		heduler is running		
/5/2001 12 /5/2001 12	2:22:52 PM Sc 2:22:54 PM Sc	heduler stopped heduler is running heduler stopped		
)/5/2001 12 )/5/2001 12 )/5/2001 12	2:22:52 PM Sc 2:22:54 PM Sc	heduler stopped heduler is running	rus	
)/5/2001 12 )/5/2001 12 )/5/2001 12	2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped		
9/5/2001 12 9/5/2001 12 9/5/2001 12	2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped SCHEDULER STAT	Alarm	Help

On the main Scheduler screen, click the Add Script in the Scheduler section of the screen. The following screen will appear:

cheduler		<u>×</u>
for Scheduler		
ot 1		-
Daily		-
6:00:58 PM		
Cancel	Help	1
	ot 1 Daily	5 for Scheduler ot 1 Daily 6:00:58 PM

- 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:

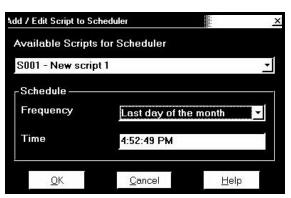
Add / Edit Script to S		Add / Edit Script to So Available Scripts	
S001 - New scri	1	S001 - New scrip	
	_		
-Schedule Frequency	Yearly	Schedule	Monthly by date
Month	January 🗾	Date	1
Day	1 🗾	Time	4:44:16 PM
Time	1000:01 AM	OK	Cancel
<u>O</u> K	<u>C</u> ancel <u>H</u> elp		
		Add / Edit Script to Sc Available Scripts	HX:
		S001 - New scrip	
		_Schedule	
a tha mult day		Frequency	Once
e the pull-dov	vn menus to make	Date	
ctions.		Date	9/4/2001
		Time	4:38:28 PM
pe in desired	ime.		
		Add / Edit Script to Sc	heduler
	to the Scheduler.	Available Scripts	for Scheduler
, click Cancel		S001 - New scrip	t 1
		Frequency	Last day of the mor
		Time	4:52:49 PM
		<u>0</u> K	<u>C</u> ancel

■ 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.

# **15.14: Edit Scheduler Scripts**

	duler			
ctive scr	ripts		 Scheduler st	opped <u>R</u> un/Stop
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: 3:15:58 PM	9/5/2001 3:15:58 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: 4:15:26 PM	9/5/2001 4:15:26 PM	9/4/2001 4:15:29 PM
9	New script 8	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:59 PM
urrent st	atus			
3/5/2001 1: 3/5/2001 1:	2:22:52 PM Sc	heduler is running heduler stopped heduler is running		e e
3/5/2001 1: 3/5/2001 1: 3/5/2001 1:	2:22:52 PM Sc 2:22:54 PM Sc	heduler stopped		
8/5/2001 11 8/5/2001 11 8/5/2001 11 8/5/2001 11	2:22:52 PM Sc 2:22:54 PM Sc	heduler stopped heduler is running	rus	
8/5/2001 11 8/5/2001 11 8/5/2001 11 8/5/2001 11	2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped		
9/5/2001 11 9/5/2001 11 9/5/2001 11 9/5/2001 11	2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped SCHEDULER STA	Alarm	Help

- 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 15.13 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 15.13 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.



# **15.15: Delete Scheduler Scripts**

EIG Scheo	duler						
Active scr	ripts			Scheduler	stopped	<u>R</u> un/Sto	ot
Schedule	Script Name	Frequency		Next Run Time	Last Run 1	Time	
1	New script 1	Weekly, Day of week: Sunday, Tim	ie: 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: 3:15:58 PM		9/5/2001 3:15:58 PM	9/4/2001 3	8:15:59 PM	
4	New script 5	Monthly by date, Date: 1, Time: 3:50	0:53 PM	10/1/2001 3:50:53 PM	М		
5	New script 7	Daily, Time: 4:22:59 PM		9/5/2001 4:22:59 PM	9/4/2001 4	4:23:09 PM	
6	New script 8	Weekly, Day of week: Wednesday	; Time: 9:00:00 AM	9/5/2001 9:00:00 AM			
	New script 6	Daily, Time: 4:00:25 PM		9/5/2001 4:00:25 PM	9/4/2001 4	4:01:14 PM	
	New script 7	Daily, Time: 4:15:26 PM		9/5/2001 4:15:26 PM	20. 20	4:15:29 PM	
9	New script 8	Daily, Time: 4:00:46 PM		9/5/2001 4:00:46 PM		4:01:59 PM	
10	New script 7	Daily, Time: 4:00:22 PM		9/5/2001 4:00:22 PM	9/4/2001 4	4:00:27 PM	
Current sta	atus						
9/5/2001 8: 9/5/2001 8: 9/5/2001 8: 9/5/2001 8: 9/5/2001 8:	24:25 AM Sci 25:51 AM Sci	heduler is running heduler stopped heduler is running heduler stopped					
S	CRIPT	SCHEDULER	STAT	US			
		<u>A</u> dd Script	<u>R</u> eset A	Alarm			
		<u>E</u> dit Script	⊻iew	Log	<u>H</u> e	elp	
S	<u>S</u> cripts	Delete Script	Clears			xit	

- 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.

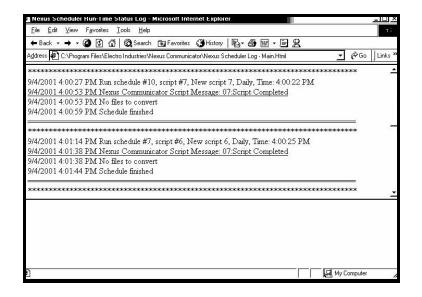


■ The script will be deleted immediately from the Active Scripts window and you will return to the main Scheduler screen.

## 15.16: Status

	duler			
ctive scr	ripts		لــــ <u>Scheduler st</u>	opped <u>R</u> un/Stop
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: 3:15:58 PM	9/5/2001 3:15:58 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: 4:15:26 PM	9/5/2001 4:15:26 PM	9/4/2001 4:15:29 PM
9	New script 8	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:59 PM
/5/2001 12 /5/2001 12 /5/2001 12	2:22:50 PM Sc 2:22:52 PM Sc 2:22:54 PM Sc	heduler is running heduler stopped heduler is running heduler stopped		- - -
/5/2001 12 /5/2001 12 /5/2001 12 /5/2001 12	2:22:50 PM Sc 2:22:52 PM Sc 2:22:54 PM Sc	heduler stopped heduler is running	rus	<u>.</u>
/5/2001 12 /5/2001 12 /5/2001 12 /5/2001 12	2:22:50 PM Sc 2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped		
/5/2001 1: /5/2001 1: /5/2001 1:	2:22:50 PM Sc 2:22:52 PM Sc 2:22:54 PM Sc 2:22:57 PM Sc	heduler stopped heduler is running heduler stopped SCHEDULER STAT	Alarm	<u>H</u> elp

- 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:

Liu Jule	duler			<u></u> _				
ctive sci	ripts							
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: 3:15:58 PM	9/5/2001 3:15:58 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: 4:15:26 PM	9/5/2001 4:15:26 PM	9/4/2001 4:15:29 PM				
9	New script 8	Daily, Time: 4:00:46 PM	9/5/2001 4:00:46 PM	9/4/2001 4:01:59 PM				
a i i	100 0.000			→[				
urrent st	atus							
	1:18:43 AM CIE	eared current status						
(5/2001 1								
/9/2001 1								
/0/2001 1								
/5/20011								
	SCRIPT	SCHEDULER STAT	us					
	CRIPT	SCHEDULER STAT						
	SCRIPT							
	SCRIPT	SCHEDULER STAT	Alarm	Holp				
	SCRIPT	SCHEDULER STAT	Alarm	Help				

**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.

## 15.17: 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.

Nexus S	cript & Scheduler		×
$\triangle$	Are you sure you want to terminate	the scheduler	program?
	Yes No		

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.

# Chapter 16 Flicker

## 16.1: Overview

Flicker is the sensation that is experienced by the human visual system when it is subjected to changes occurring in the illumination intensity of light sources. The primary effects of flicker are headaches, irritability and sometimes epilepsy.

IEC 61000-4-15 and former IEC 868 describe the methods used to determine flicker severity. This phenomenon is strictly related to the sensitivity and the reaction of individuals. It can only be studied on a statistical basis by setting up suitable experiments among people.

## 16.2: Theory of Operation

Flicker can be caused by voltage variations which are caused by variable loads, such as arc furnaces, laser printers and microwave ovens. In order to model the eye brain change, which is a complex physiological process, the signal from the power network has to be processed while conforming with Figure 16.1 below.

- **Block 1** consists of scaling circuitry and an automatic gain control function that normalizes input voltages to Blocks 2, 3 and 4. For the specified 50 Hz operation, the voltage standard is 230 V RMS.
- Block 2 recovers the voltage fluctuation by squaring the input voltage scaled to the reference level. This simulates the behavior of a lamp.
- **Block 3** is composed of a cascade of two filters and a measuring range selector. In this implementation, a log classifier covers the full scale in use so the gain selection is automatic and not shown here. The first filter eliminates the DC component and the double mains frequency components of the demodulated output.

The configuration consists of a .05 Hz Low High Pass filter and a 6 Pole Butterworth Low Pass filter located at 35 Hz. The second filter is a weighting filter that simulates the response of the human visual system to sinusoidal voltage fluctuations of a coiled filament, gas-filled lamp (60 W - 230 V). The filter implementation of this function is as specified in IEC 61000-4-15.

- **Block 4** is composed of a squaring multiplier and a Low Pass filter. The Human Flicker Sensation via lamp, eye and brain is simulated by the combined non-linear response of Blocks 2, 3 and 4.
- **Block 5** performs an online statistical cumulative probability analysis of the flicker level. Block 5 allows direct calculation of the evaluation parameters Pst and Plt.
- Flicker Evaluation occurs in the following forms: Instantaneous, Short Term or Long Term. Each form is detailed below:

#### • Instantaneous Flicker Evaluation

An output of 1.00 from Block 4 corresponds to the Reference Human Flicker Perceptibility Threshold for 50% of the population. This value is measured in Perceptibility Units (PU) and is labeled Pinst. This ia a real time value and it is continuously updated.

#### • Short Term Flicker Evaluation

An output of 1.00 from Block 5 (corresponding to the Pst value) corresponds to the conventional threshold of irritability per IEC 1000-3-3. In order to evaluate flicker severity, two parameters have been defined: one for the short term called Pst (defined in this section) and one for the long term called Plt (defined in the next section).

The standard measurement time for Pst is 10 minutes. Pst is derived from the time at level statistics obtained from the level classifier in Block 5 of the flicker meter. The following formula is used:

$$P_{st} = \sqrt{0.0314 P_{0.1} + 0.0525 P_{1s} + 0.0657 P_{3s} + 0.28 P_{10s} + 0.08 P_{50s}}$$

Where the percentiles P(0.1), P(1), P(3), P(10), P(50) are the flicker levels exceeded for 0.1, 1, 2, 20 and 50% of the time during the observation period. The suffix S in the formula indicates that the smoothed value should be used. The smoothed values are obtained using the following formulas:

$$\begin{split} P(1s) &= (P(.7) + P(1) + P(1.5))/3\\ P(3s) &= (P(2.2) + P(3) + P(4))/3\\ P(10s) &= (P(6) + P(8) + P(10) + P(13) + P(17))/5\\ P(50s) &= (P(30) + P(50) + P(80))/3 \end{split}$$

The .3-second memory time constant in the flicker meter ensures that P(0.1) cannot change abruptly and no smoothing is needed for this percentile.

#### • Long Term Flicker Evaluation

The 10-minute period on which the short-term flicker severity is based is suitable for short duty cycle disturbances. For flicker sources with long and variable duty cycles (e.g. arc furnaces) it is necessary to provide criteria for long-term assessment. For this purpose, the long-term Plt is derived from the short-term values over an appropriate period. By definition, this is 12 short-term values of 10 minutes each over a period of 2 hours. The following formula is used:

$$P_{lt} = \sqrt[3]{\frac{\sum_{i=1}^{N} P_{sti}^3}{N}}$$

Where  $P_{sti}$  (i = 1, 2, 3, ...) are consecutive readings of the short-term severity  $P_{st}$ .

#### ■ Summary

Flicker = Changes in the illumination of light sources due to cyclical voltage variations. Pinst = Instantaneous flicker values in Perceptibility Units (PU). Pst = Value based on 10-minute analysis. Plt = Value based on 12 Pst values.

#### **Measurement Procedure**

- 1. Original Signal with amplitude variations.
- 2. Square demodulator.
- 3. Weighted filter.
- 4. Low pass filter  $1^{st}$  order.
- 5. Statistical computing.

#### Data available

Pst, Pst Max, Pst Min values for long term recording Plt, Plt Max, Plt Min values for long term recording

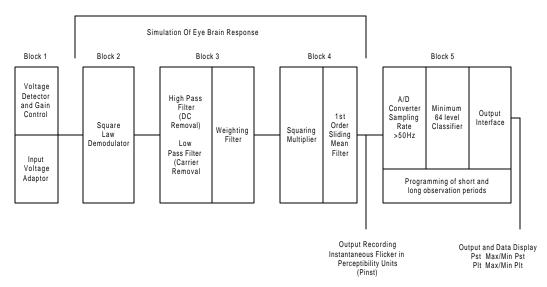


Figure 16.1: Simulation of Eye Brain Response

## 16.3: Setup

Initially the user must set up several parameters to properly configure Flicker. Using Nexus Communicator, from the Icon Menu select Edit Device Profile. From the Device Profile, select Flicker Settings. The following screen will appear:

Flicker Set	tings							
Short term test time (PST) 👖 🗾 Minut								
Long term test time (PLT) 3 🗾 Minut								
Frequen	су	5	0	<u>→</u> Hz				
	ОК		F	lelp				

e Electro Industries/GaugeTech Doc # E107-7-07 V1.24

- Select a Pst time range from 1 to 10 minutes. The standard measurement period is nominally 10 minutes.
- Select a Plt time range from 1 to 240 minutes. The standard measurement is nominally 12 Pst periods (120 minutes). Plt time must always be equal to or great than and a multiple of Pst time. This is reflected in the selections available to the user.
- Select the frequency of operation. 50 Hz is the approved frequency according to Flicker standards. A 60 Hz implementation is available and can be selected. This implementation is the proposed 60 Hz standard that is still in the approval process.

Remember the voltage is normalized. For 50 Hz, the normalized voltage is 230 V and for 60 Hz, the normalized voltage is 120 V.

Press OK when you are finished.

Press Help for more information on this topic.

## 16.4: Software - User Interface

#### Main screen

From the Nexus Communicator Icon Menu select Real Time Poll, Flicker. The following screen appears:

Flicker	( : <b> </b>	-i Y - Chort To	
-Time Start/Reset 00/02/2000 01:27:52	Instantaneou		• • •
Stop <u>00/00/0000 00:00:00</u>	Volts A	PINST 0.098	Voltage Reading 14416.550V
Current         07/22/2003 09:43:58           Next PST         0 min, 2 sec	Volts B	0.118	14396.360V
Next PLT 0 min, 2 sec	Volts C	0.119	14359.710V
-Status			
Active			
-Frequency			
Base <u>60 Hz</u>			
Current 60.074 Hz			
Base Voltage 120 Volts			
-Flicker Monitoring			
StartStopReset	ОК	Help	Print

This section describes the Main Screen functions. The available values (Instantaneous, Short Term, Long Term) will be described below.

#### Time

Start/Reset is the time when Flicker was started or reset. A **Reset** of Flicker causes the Max/Min values to be cleared and restarts the Flicker Pst and Plt timers. A **Start** of Flicker is also equivalent to a Reset in that the PST and PLT are restarted and the Max/Min Values are cleared.

Stop corresponds to the time when Flicker is turned off.

Current is the current clock time.

Next Pst is the countdown time to when the next Pst value is available.

Next Plt is the countdown time to when the next Plt value is available.

#### Status

Indicates the current status. Active = On. Stopped = Off.

#### Frequency

Base is the current operating frequency selected by the user (50 or 60 Hz).

Current is the real time frequency measurement of the applied voltage.

Base Voltage is the normalized voltage for the selected frequency (230 V for 50 Hz or 120 V for 60 Hz).

#### **Flicker Monitoring**

Clicking on Stop causes Flicker to stop being processed and freezes all the current values. Stop Time is recorded and clears the current Max/Min Values

Clicking on Start starts Flicker processing. Start Time is recorded.

Clicking on Reset causes the Max/Min values to be cleared and restarts the Flicker Pst and Plt timers.

Click OK to exit the Flicker screen.

Click Help for more information on this topic.

## ■ Instantaneous Readings

Refer to the Instantaneous section of the Main screen above. If you are on the Short or Long Term screens, click on the Instantaneous tab to display the Instantaneous screen. The PU values, Pinst for Voltage Inputs Va, Vb and Vc are displayed here and are continuously updated. The corresponding Current Voltage values for each channel are displayed for reference.

#### ■ Short Term Readings

Click on the Short Term tab to access the screen containing three groups of Pst readings.

#### **Pst Readings Displayed**

- Current Pst values for Va, Vb and Vc and the time of computation.
- Current Pst Max values for Va, Vb and Vc since the last reset and the time of the last reset.
- Current Pst Min values for Va, Vb and Vc since the last reset and the time of the last reset.

The following screen is displayed:

Flicker			
-Time —	Instantane	ous 🎽 Short Te	erm Long Term
Start/Reset 00/02/2000 01:27:52		PST	Time
Stop 00/00/0000 00:00:00	Volts A	0.355	07/22/2003 09:48:00.23
Current 07/22/2003 09:48:19 Next PST 0 min. 41 sec	Volts B	0.285	07/22/2003 09:48:00.23
Next PST         0 min, 41 sec           Next PLT         0 min, 41 sec	Volts C	0.264	07/22/2003 09:48:00.23
- Status	Max Volts A	13.344	00/02/2000 01:47:00.17
Active	Max Volts B	13.993	00/14/2000 04:33:00.08
- Fraguaday	Max Volts C	15.815	00/14/2000 02:00:00.07
-Frequency Base 60H2	Min Volts A	0.023	00/02/2000 01:42:00.09
Current 60.074 Hz	Min Volts B	0.023	00/02/2000 01:42:00.09
	Min Volts C	0.023	00/02/2000 01:42:00.09
Base Voltage 120 Volts			
-Flicker Monitoring			
StartStopReset		K Help	Print

#### ■ Long Term Readings

Click on the Long Term tab to access the Plt readings. The screen below displays three groups of Plt values.

#### **Plt Readings Displayed**

- Current Plt values for Va, Vb and Vc and the time of computation.
- Current Plt Max values for Va, Vb and Vc since the last reset and the time of the last reset.
- Current Plt Min values for Va, Vb and Vc since the last reset and the time of the last reset.

			~ ~ ~
-Time	Instantaneo	ous 👔 Short Te	erm Long Term
Start/Reset 00/02/2000 01:27:52		PLT	Time
Stop 00/00/0000 00:00:00	Volts A	0.341	07/22/2003 09:58:00.11
Current 07/22/2003 09:58:12 Next PST 0 min, 48 sec	Volts B	0.365	07/22/2003 09:58:00.11
Next PLT Omin, 48 sec	Volts C	0.257	07/22/2003 09:58:00.11
-Status	Max Volts A	13.344	00/02/2000 01:47:00.17
Active	Max Volts B	13.993	00/14/2000 04:33:00.09
- Frequency	Max Volts C	15.815	00/14/2000 02:00:00.07
Base 60 Hz	Min Volts A	0.023	00/02/2000 01:42:00.09
Current 60.074 Hz	Min Volts B	0.023	00/02/2000 01:42:00.09
Base Voltage 120 Volts	Min Volts C	0.023	00/02/2000 01:42:00.09
Base Fonage			
-Flicker Monitoring			
Start Stop Reset	0	K Help	Print

## 16.5: Logging

The Nexus is capable of logging Flicker values in an independent log. When Flicker is on, entries are made into the log in accordance with the times that associated values occur. Pst, Pst Max, Pst Min, Plt, Plt Max, Plt Min, Start/Reset and Stop times are all recorded. All values can be downloaded to the Log Viewer where they are available for graphing or export to another program, such as Excel. All Flicker values are predefined and cannot be changed.

## 16.6: Polling

The Pinst, Pst, Pst Max, Pst Min, Plt, Plt Max, Plt Min values are all capable of being polled through the Communications Port. Refer to the Nexus Modbus and DNP Mappings for register assignments and data definitions.

#### 16.7: Log Viewer

From the Nexus Communicator Log Viewer screen, using the menus at the top of the Log Viewer screen, select a meter, time ranges and values to access. Select Flicker.

The values and the associated time stamps (when the values occurred) are displayed in a grid box. Use the buttons at the bottom of the screen to create a graph or export the data to another program. Max and Min values are only displayed; they cannot be graphed. But, Max and Min values are available for export.

Graphed values include Pst and Plt Va, Vb and Vc. Displayed values include Pst and Plt Max and Min for Va, Vb and Vc.

## 16.8: Performance Notes

Pst and Plt average time are synchronized to the clock (e.g. for a 10 minute average, the times will occur at 0, 10, 20, etc.). The actual time of the first average can be less than the selected period to allow for initial clock synchronization.

If the wrong frequency is chosen (e.g. 50Hz selection for a system operating at 60Hz), Flicker will still operate but the values computed will not be valid. Select carefully.

User settings are stored. If Flicker is on and power is removed from the meter, Flicker will still be on when power returns. This can cause data gaps in the logged data.

The Max and Min values are stored and are not lost if the unit is powered down.

Flicker meets the requirements of IEC 61000-4-15 and former IEC 868. Refer to those specifications for more details, if needed.

Operation is at 230V for 50Hz and 120V for 60Hz as per specification. If the input voltage is different, the system will normalize it to 230V or 120V for computational purposes.

# CHAPTER 17 Customizing DNP V3.0 Configuration Using Nexus Communicator

A Nexus meter can measure more than 3000 DNP Static Points. But not all points can be polled at a time. In order for the meter to have the appropriate data, the user should customize the DNP Point Map. This can be done easily using Nexus Communicator software. Up to 250 points of Event Data can be created in the Nexus meter. Refer to *DNP V3.00 Level 2 Protocol Assignments for Nexus 1252, 1262 & 1272, Rev. 1.8,* for more details.

## **17.1: Connecting to Nexus Communicator**

- 1. Open Nexus Communicator software by double-clicking on the icon.
- 2. Connect to the meter:

Click on Quick Connect, checking the settings and clicking Connect (or) Click on Connection Manager, select a location and click Connect.

See Chapter 2 of this manual for complete connection instructions.

- 3. When a connection is made, a Status Bar will appear showing a Healthy status. Click OK.
- 4. Click the Edit Profile icon. A pop-up window will tell you that data is being retrieved. The Device Profile screen appears. If the meter (Nexus 1252, 1262 or 1272) supports DNP V3.00 Level 2, **DNP Level 2** will appear in the profile. Click on DNP Level 2. A set of programming screens appears, the DNP Custom Mapping screens. Each screen has a tab at the top. Click on any tab to move from screen to screen.

D	NP Custom	Mapping									
ſ	C	bject 30 -	Analog Inp	iut	Global Values	Ť		DNP Settings			
Ĺ	Ob	ject 10 - Bi	inary Outpu	ıt 🔰	Object 1 - Binary Input Object 20 - Binary Counter						
	DNP	M	ap		Description	<b>Class Assignments</b>					
	Points	Line	Point		Description	Object 2					
	0 - 7	233	0		Internal Ing	puts State	s: Inputs 1-8	Class 1			
	8 - 15	16	0		1 Cycle High Speed I	Input: Del	ta Inputs 1-8	No Class			
	16 - 23	232	0		Limit States Value 2	2 Compare	es: Limits 1-8	No Class			
	24 - 31	231	0		Limit States Value 1	1 Compare	es: Limits 1-8	No Class			
	32 - 39	232	0		Limit States Value 2	2 Compare	es: Limits 1-8	No Class			
	40 - 47	238	0		Digital Input	States, M	lodule 3: 1-8	No Class			
	48 - 55	236	0		Digital Input	States, M	lodule 2: 1-8	No Class			
	56 - 63	240	0		Digital Input	States, M	lodule 4: 1-8	No Class			
		s are assi	gned in Gr	oups of 8. E	ctly from the DNP Table or double cl ntering an EIG Point selects that poir						
				-	OK Cancel H	Help	Clear	All Clear			

# 17.2: Binary Input (Object 1)

A Nexus meter can use up to 64 Binary Input Points. Values available for Binary Input use can be found in the DNP Object Mapping. Only Class 0 is used when polling Binary Input (Object 1) Data. Class 1, 2 or 3 is used when polling Binary Input Change (Object 2) Data.

## Line, Point, Description

Double-click on the box under Description to Add, Delete or Modify DNP Points to the screen above. A pull-down window will appear. Choose a Type (of reading) and a Channel and click OK. The corresponding numbers for the selected reading and channel will appear in the Line and Point columns. Line and Point Numbers for a Binary Input value can also be found in the DNP Object Mapping (Ch. 7 of the *DNP V3.00 Level 2 Protocol Assignments for Nexus 1252, 1262 & 1272, Rev.1.8*).

For example, *1 Cycle High Speed Input Delta and Current State* has Line Number 16 and Point Number 0 in the DNP Object Mapping. Write those numbers into the Object 1 – Binary Input window of the Nexus Communicator. When the Line and Point Numbers are written, the software fills in the description on the screen. Repeat for each desired Binary Input Point. Update the device.

The Nexus meter will scan those points every second.

## **Object 2**

Any DNP Static Point can be configured to create a DNP Event Points. Class Assignments on the Object 2 screen are used to configure Binary Input Change Event Points. In order to create Event Data, Object 2 Points must be assigned to Class 1, 2 or 3. Each point can have a different Class Assignment.

The Clear All Button clears all assigned items on all the tabs. The Clear Button clears only the items on the current tab view.

## 17.3: Analog Input (Object 30)

A Nexus meter can use up to 64 Analog Input points. Values available for Analog Input use can be found in the Nexus DNP Object Mapping. Only Class 0 is used when polling Analog Input (Object 30) Data. Class 1, 2 or 3 is used when polling Analog Change Event (Object 32) Data.

	Object	10 - Binə	ry Output	Ob	ject 1 - Binary I	nput	Obje	ct 20 - Binary Co	unter		
Object 30 - Analog Input				, (	Global Values	ľ	[	ONP Settings			
DNP	м	ар	1P Deadband		Deadband	Class A	Class Assignments				
Points	Line	Point		Description		(%)	Ob				
0	8	0		Current D	ay of the Week:	5.00	N	o Class			
1	18	0	Tenth Sec	ond Phase to Neut	ral Volts: Volts AN	5.00	С	lass 1			
2	18	1	Tenth Sec	ond Phase to Neut	ral Volts: Volts BN	5.00	С	lass 2			
3	18	2	Tenth Sec	ond Phase to Neut	ral Volts: Volts CN	5.00	C	lass 3			
4	19	0		Tenth Second Au:	kiliary Volts: V Aux	5.00	No	o Class			
5	20	0		Tenth Second C	urrent(A, B, C): I A	5.00	C	Class 1			
6	20	1		Tenth Second C	urrent(A, B, C): I B	5.00	Class 2				
7	20	2		Tenth Second C	urrent(A, B, C): I C	5.00	C	ass 3			
8	21	0	Ten	th Second Measure	d N Current: I Nm	5.00	No	o Class	-		
Enterac valuesu	lead ba sed by 1	nd perce he dead	assignments dire entage to be used band percentag et 32 assign a cla	d in causing an e							

## Line, Point, Description

Double-click on the box under Description. A pull-down window will appear. Choose a Type (of reading) and a Channel and click OK. The corresponding numbers for the selected reading and channel will appear in the Line and Point columns. Line and Point Numbers can also be found in the DNP Object Mapping (Chapter 7 of the DNP V3.00 Level 2 Protocol Assignments for Nexus 1252, 1262 & 1272, Rev. 1.8).

For example, *One Second Phase A-N Voltage* is EIG Line Number 34 and Point Number 0 in the DNP Object Mapping. Write these numbers into the Object 30 – Analog Input window of the Nexus Communicator. When the Line and Point Numbers are written, the software will fill in the description. Repeat for each desired Analog Input Point. Click OK to return to the main Nexus Communicator screen. Click Update Device to update the meter.

The Nexus meter scans those points every second (except for *Tenth Second Readings*). *Tenth Second Readings* (Line 18 to 32) are scanned as soon as the meter detects a change (as often as every 50 milliseconds).

## Deadband (%), Object 32

Any DNP Static Point can be configured to create DNP Event Points. Deadband and Class Assignments on the Object 32 screen are used to configure Analog Change Event Points. In order to create Event Data, Object 32 Points must be assigned to Class 1, 2 or 3. Each point can have a different Class assignment.

Deadband (%) defines the **boundary value** for that point. For example, suppose *One Second Phase to Neutral Volts AN* is programmed and the *Voltage Full Scale* is 120.00V for the meter. Entering 10% for Deadband will define the boundary value of 12V (10% of 120V). Every second, new Static Data is scanned for *One Second Phase to Neutral Volts AN*. If the new data is different from the previous standard value by the boundary value, an Analog Change Event will be created.

For example, if the previous standard value is 110 and new data is lower than 98V or higher than 122V, a new Analog Change Event Point will be created. The new value then becomes the previous standard value for future scans.

Analog Input Points have various Full Scales values due to different data types (Volts, Amps, Watts, etc.). These Full Scale values are used for Exception Polling in DNP. Some Full Scale values are programmable by users and others have fixed numbers. See the chart of Full Scale Values below.

The Clear All Button clears all assigned items on all the tabs. The Clear Button clears only the items on the current tab view.

Analog Input	Full Scale	Unit			
I A, B, C, Nc	Programmable	1/65536 Amps			
I Nm	Programmable	1/65536 Amps			
V AN, BN, CN	Programmable	1/65536 Volts			
V AB, BC, CA	Programmable	1/65536 Volts			
V Aux	Programmable	1/65536 Volts			
Power Phase	Programmable	1/65536 Watts			
Power Total	Programmable	1/65536 Watts			
Frequency	Programmable	1/65536 Hz			
Power Factor	4000	0.001 PF			
Angles	18000	0.001 PF			
Percent	10000	0.01 %			
K-Factor	500	0.01			
TOU Ratio	N/A	N/A			
Temperature	10000	0.01			
Flicker	65536	0.0001			
In Interval	1000	1000			
Day of Week	6	1			
Sequence	1	1			
Status	100	1			
Avg Select	100	1			
Delay	100	1			
Log Index	100	1			
Countdown	100	1			

Full Scale values are 4-byte integer numbers. The units are as follows:

For example, in order to find out if there is new log data, use a Log Index Number. One of the Log Index Numbers (Last Index) will increase when a new log is created. In Object 30, Program Last Log Record Index: Waveform Log (Line 499, Point 7). Input Deadband 1.00% and assign a Class. The exception data will be created when the Index Number increases by one.

## 17.4: Binary Counter (Object 20)

A Nexus meter can use up to 8 Binary Counter Points. Values available for Binary Counter use can be found in the DNP Object Mapping. Only Class 0 is used when polling Binary Counter (Object 20) Data and Frozen Counter (Object 21) Data. Class 1, 2 or 3 is used when polling Counter Event (Object 22) Data and Frozen Counter Event (Object 23) Data.

	Object	t 30 - Ane	log Input	∫ Global Vi	alues	L	DNP S	ettings		
Object 10 - Binary Output				Object 1 - Bina	ry Input	ĭ	Object 20 - Binary Counter			
DNP	м	ap			Carlin	Ob	ject 22	Object 23		
oints	Line	Point	De	scription	Scaling	Delta	Class	Class		
0	244	0	Primary Hour Rea	adings(Binary): Watthour (Q1+4)	0	2	Class 1	Class 2		
1	246	0	I&V Sc	quared T (Binary): I squared T A	0	2	Class 1	Class 2		
2	246	1	I & V Sc	quared T (Binary): I squared T B	0	2	Class 1	Class 2		
3	246	2	I&V Sc	quared T (Binary): I squared T C	0	2	Class 1	Class 2		
4	246	3	I&V Squ	uared T (Binary): V squared T A	0	2	Class 1	Class 2		
5	246	4	I&V Squ	uared T (Binary): V squared T B	0	2	Class 1	Class 2		
6	246	5	I&V Squ	uared T (Binary): V squared T C	0	2	Class 1	Class 2		
7	244	1	Primary Hour	Readings(Binary): VAhour (Q1)	0	2	Class 1	Class 2		
Enter EIG Line and Point assignments directly from the DNP Table or double click the Description Field for a list of Selections. Enter a Digit Scaling Number(0 to 15) for the point. Each Object 20 assigned has an associated Object 22 and 23. For the associated Object 22, enter a delta value to trigger the DNP event and assign a claass. For the associated Object 23 assign a class.										

## Line, Point, Description

Double-click on the box under Description to Add, Delete or Modify DNP Points. A pull-down window appears. Choose a Type (of reading) and a Channel and click OK. The corresponding numbers for the selected data and channel will appear in the Line and Point columns. Line and Point Numbers can also be found in the DNP Object Mapping (Ch. 7 of *DNP V3.00 Level 2 Protocol Assignments for Nexus 1252, 1262 & 1272, Rev. 1.8*).

For example, *VA hour* has Line Number 133 and Point Number 0 in the DNP Object Mapping. Write those numbers into the Object 20- Binary Counter window of the Nexus Communicator. When the Line and Point Numbers are written, the software fills in the description on the screen. Repeat for each desired Binary Counter Point. Update the device. The Nexus meter scans those points every second.

## Scaling

A Nexus meter can measure its Binary Counter value using up to a 16-digit number (0 to 9,999,999,999,999,999). DNP Binary Counter Points use up to 32 bits. That means that the range is 0 to 4,294,967,295 (0x0FFFFFFF). This maximum number is only a 10-digit number. In order to deal with a 16-digit number, Scaling is necessary.

Scaling is used to select a unit in powers of 10: 1 = x10, 2 = x100 and so on. The Scaling value can be 0 to 15.

For example, if the value inside the meter is 3,000,000 and a Scaling value of 2 (x100) is used, the Binary Counter value will be reported as 30000. The actual value is 30000x100 = 3,000,000.

## Delta, Object 22

Any DNP Static Point can be configured to create DNP Event Points. Delta and Class Assignments on the Object 22 screen are used to configure Counter Change Event Points. In order to create Event Data, Object 22 must be assigned to Class 1, 2 or 3. Each point can have a different Class Assignment.

The Delta value defines the **boundary** value for that point.

For example, suppose *VA hour* is programmed and the Delta is 5. That represents 5 increments from the returned 32-bit Binary Counter value. Every second, new Static Data is scanned for *VA hour*. If new data is different from the previous standard value by the Delta value, the Counter Change Event Data will be created. That means, if the previous standard polled value is *50000 VA hour* and if the VA hour reading increases to 50005, it will create a Counter Change Event Point for *VA hour* and *50005 VA hour* will become the previous standard value for the next Static Data.

The Scaling setting for a point also applies to the Delta value. If Delta is 5 and Scaling is 2, this indicates a 500-count change in the internal representation.

## Object 23

Frozen Analog Event (Object 23) will be created if Object 23 is assigned to Class 1, 2 or 3.

## Line, Point, Description

Double-click on the box under Description. A window will appear. Choose a type of data and a channel and click OK. The corresponding numbers for the selected data and channel will appear in the Line and Point columns. Line and Point Numbers for a Binary Input value can also be found in the DNP Object Mapping (Chapter 7 of this manual).

For example, *1 Cycle High Speed Input Delta and Current State* has Line Number 16 and Point Number 0 in the DNP Object Mapping. Write those numbers into the Object 1 – Binary Input window of the Nexus Communicator. When the Line and Point Numbers are written, the software fills in the description on the screen. Repeat for each desired Binary Input Point. Update the device.

The Nexus meter will scan those points every second.

## **Object 2**

Any DNP Static Point can be configured to create a DNP Event Points. Class Assignments on the Object 2 screen are used to configure Binary Input Change Event Points. In order to create Event Data, Object 2 Points must be assigned to Class 1, 2 or 3. Each point can have a different Class Assignment.

The Clear All Button clears all assigned items on all the tabs. The Clear Button clears only the items on the current tab view.

# 17.5: Binary Output (Object 10)

Class 0 is used when polling Binary Output (Object 10) Data.

External Relay Output Modules can be attached to the Nexus meter. Up to 4 Relay Output Modules can be attached and each Relay Module has 4 Relay Outputs.

Object 30 - Analog Input								bal Va			I				P Setti	
Object 10 - Binary Output						Ob	ject 1 -	Binar	y Input				Obje	ct 20 - I	Binary	Counte
DNP Point	n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Relay #	-				-				-	-						
Enable	V									•	•	V				
DNP Point						P	leset						E	nable		
16						Log	Res	et						>		
17					N	Maxim	um R	eset						$\checkmark$		
18					1	Minim	um R	eset						$\checkmark$		
19						Energ	gy Re	eset						$\checkmark$		
20		Res	set Tir	me Of	Use	Curre	nt Se	ason	and C	urrent	t Mon	th		$\checkmark$		
21				ŀ	Manua	al Wa	vefori	m Cap	oture					$\checkmark$		
22		Re	set In	ternal	Input	t Accu	mula	tions	and A	ggreg	gation	s		$\checkmark$		
23	1	Reset	t Unit	to Bo	ot Mo	de - C	)efau	lt Con	nmuni	cation	ı Setti	ngs		$\checkmark$		
Check the box to enable the function to be able to be controlled by DNP.																

To control a **Relay** by DNP, check its box. If unchecked, the relay will not be controlled by DNP. The Master in DNP protocol can control 16 relays. In order to do that, each relay box should be checked and the Nexus meter should be updated with this profile.

Check the box for the **Reset Enable** you want to control through DNP.

Example 1 - The Master can control Relay 1 by sending this message (Meter Address 1, Master Address 10):

05 64 18 C4 01 00 0A 00 6C 1A C0 C0 05 06 01 17 01 00 03 01 01 00 00 00 00 00 3B EF 00 00 00 FF FF

Example 2 – The Master can control Relay 2 by sending this message:

05 64 18 C4 01 00 0A 00 6C 1A C0 C1 05 0C 01 17 01 01 03 01 01 00 00 00 00 00 E2 5F 00 00 00 FF FF

The Master not only controls relays but also can do various resets. Each box should be checked in order for the Master to do the reset.

## Example 3 – The Master can do a Log Reset by sending this message:

05 04 18 C4 01 00 0A 00 6C 1A C0 C2 05 0C 01 17 01 10 03 01 01 00 00 00 00 00 C5 1B 00 00 00 FF FF Example 4 – The Master can do an Energy Reset by sending this message:

05 04 18 C4 01 00 0A 00 6C 1A C0 C3 05 0C 01 17 01 13 03 01 01 00 00 00 00 00 E7 5B 00 00 00 FF FF

**NOTE:** All above examples are done with Function 5 (Direct Operate Relay) using Qualifier 0x17.

Relay Status and Reset Status can be polled using Object 10. For Controlling Relays and performing Resets, Object 12 is used.

The Point Numbers for Relays and Resets are as follows:

Points	Assignment
0	Relay 1
1	Relay 2
2	Relay 3
3	Relay 4
4	Relay 5
5	Relay 6
6	Relay 7
7	Relay 8
8	Relay 9
9	Relay 10
10	Relay 11
11	Relay 12
12	Relay 13
13	Relay 14
14	Relay 15
15	Relay 16
16	Log Reset
17	Maximum Reset
18	Minimum Reset
19	Energy Reset
20	Reset Time of Use Current Season and Current Month
21	Manual Waveform Capture
22	Reset Internal Input Accumulations and Aggregations
23	Reset Unit to Boot Mode – Default Communication Settings

The Clear All Button clears all assigned items on all the tabs. The Clear Button clears only the items on the current tab view.

## **17.6: Global Values**

Each Object can be polled by Variation 0. In this window, you can assign a default variation to be returned for each Object.

Click on the Object on the left side of the screen; click on a Variation on the right side of the screen.

DNP Custom Mapping					
Object 10 - Binary Output	Object 1 - Binary Input Object 20 - Bir		linary Counter		
Object 30 - Analog Input	GI	obal Valu	es ľ	DNP Se	ttings
Ob	ject		0	bject	í
Name		Number	Va	riation	
Binary Input		1	2, (With Status)		
Binary Input Change		2	2, (With Time)		
Binary Counter		20	6, (16-bit w/o F		
Frozen Counter		21	10, (16-bit w/o l		
Counter Change Eve		22	6, (16-bit With <sup>-</sup>	,	
Frozen Counter Even	t	23	6, (16-bit With <sup>-</sup>	,	
Analog Input		30	4, (16-bit w/o F	27	
Analog Change Even	it	32	4, (16-bit With <sup>-</sup>	Fime)	
Click on the field for a list of the variants allowed for each object					
_	ОК	Cancel	Help	Clear All	Clear

Click OK to save the new settings.

The Clear All Button clears all assigned items on all the tabs.

The Clear Button clears only the items on the current tab view.

## 17.7: DNP Settings

In this window, you can enable DNP Time Synchronization. The Time Interval is the amount of time the device waits before requesting Time Synchronization from the Master (using IINI-4). The Time Interval is configurable from 1 minute to 1 day in 1-minute intervals. The initial factory setting is 1 day.

Select a Class 0 Poll Counter Object using the lower pull-down menu.

<sup>o</sup> Custom Mapping		
Object 10 - Binary Output	Object 1 - Binary Input	Object 20 - Binary Counter
Object 30 - Analog Input	Global Values	DNP Settings
	nization	
Class 0 Poll Counter Object	Frozen Counter (Object 21)	
	OK   0    11-1-	
	OK Cancel Help	Clear All Clear

Click OK to save the new settings.

The Clear All Button clears all assigned items on all the tabs.

The Clear Button clears only the items on the current tab view.

## 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:

À means for correcting the reading of a meter when the metering point and point of service are physically separated, resulting in measurable losses including I R 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.

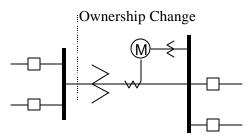


Figure B.1: Low Voltage Metering Installation Requiring Loss Compensation

- 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.

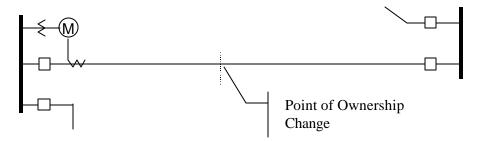


Figure B.2: Joint Ownership Line Metering Requiring Loss Compensation

- 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 =

(((Measured Voltage/Cal point Voltage)<sup>2</sup> x %LWFE) + ((Measured Current/Cal Point Current)<sup>2</sup> x %LWCU)) x Full-scale Secondary VA

Total Secondary VAR Loss =

(((Measured Voltage/Cal point Voltage)<sup>4</sup> x %LVFE) + ((Measured Current/Cal Point Current)<sup>2</sup> x %LVCU)) x 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 tranformer 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 3.9 (Nexus 1250/1252) and 4.9 (Nexus 1260/1270) 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 - Υ
Xv - Low			Δ - Υ
YV - Tertiary			Δ - Υ

Value	Watts Loss		
Value	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-Loa	d Loss =	
No-Load Loss VA (kVA)	= (%Exciting Cur	rent) * (1-Phase kVA Se	elf-Cooled Rating) / 100
	= (	) * (	) / 100
	=	kVA	
No-Load Loss VAR (kVAR)	= SQRT((No-Loa	d Loss kVA) <sup>2</sup> - (No-Loa	d Loss kW) <sup>2</sup> )
	= SQRT((	)^2 - (	)²)
	= SQRT((	) - (	))
	= SQRT (	)	
	=		

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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		Ι		^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.

#### Westbury, NY

#### (877) EIMETER [877-346-3837]

#### Nexus Transformer Loss Compensation Calculation

Three Element Meter with 3 Wye-connected PT's and 3 CT's

Company:	Substation:	
Name:	Stn Trf Bank No.:	
Date:		
Trf Manf:		
Trf S/N:		

Loss Factors		Loss Factors		
for Nx Communicator Softw	are	Calc	Used	
% No-Load Loss Watts	%LWFE	#DIV/0!	#DIV/0!	
% No-Load Loss VARs	%LVFE	#DIV/0!	#DIV/0!	
% Full-Load Loss Watts	%LWCU	#DIV/0!	#DIV/0!	
% Full-Load Loss VARs	%LVCU	#DIV/0!	#DIV/0!	

Winding	Voltage	Connection	MVA Ratings
HV - High			
XV - Low			
YV - Tert.			

#### Transformer Test Data

	Watts	Loss		
Value	3 Phase	1 Phase	Calculated	Calc kVA
No Load Loss Watts			0.00	0.00
Full Load Loss Watts			0.00	0.00
% Exciting Current			3.S. (1)	
% Impedance				

Denominator Multiplier

0

	3 Phase	1 Phase	Calculated
Self-Cooled kVA Rating			0

	Phase-to-Phase	Phase-to-Grd
Test Voltage		0
Full Load Current	#DIV/0!	

Meter / Installation Data		
Instrument Transformers	Numerator	
Potential Trf		

Current In		
Power Multiplier		0
Meter Secondary Voltage	120	120 volts for Nexus
Meter Secondary Current	F	5 amps for Nexus

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This spreadsheet is designed only to be used with EIG Nexus based metering equipment.

#### Westbury, NY

#### (877) EIMETER [877-346-3837]

#### Nexus Transformer Loss Compensation Calculation - Example

Three Element Meter with 3 Wye-connected PT's and 3 CT's

Company:	ABC Power Company	Substation: Big Station
Name:	Joe Engineer	Stn Trf Bank No.: 131
Date:	2/14/2002	
Trf Manf:	ABB	
Trf S/N:	AT4391-01	

Loss Factors		Loss Factors		
for Nx Communicator Softw	are	Calc	Used	
% No-Load Loss Watts	%LWFE	0.04314	0.043	
% No-Load Loss VARs	%LVFE	0.06765	0.068	
% Full-Load Loss Watts	%LWCU	0.87524	0.875	
% Full-Load Loss VARs	%LVCU	20.76262	20.763	

Winding	Voltage	Connection	MVA Ratings
HV - High	138000	delta	16.8/22.4/28.0
XV - Low	13090	wye	
YV - Tert.			

#### Transformer Test Data

	Watts Lo	DSS		
Value	3 Phase	1 Phase	Calculated	Calc kVA
No Load Loss Watts	15400		5133.33	5.13
Full Load Loss Watts	69200		23066.67	23.07
% Exciting Current	0.183			
% Impedance	9.78			

	3 Phase	1 Phase	Calculated
Self-Cooled kVA Rating	1680	0	5600

	Phase-to-Phase	Phase-to-Grd
Test Voltage	13090	7558
Full Load Current	741	

#### Meter / Installation Data

Instrument Transformers	Numerator	Denominator	Multiplier
Potential Trf	7200	120	60
Current Trf	1500	5	300
Power Multiplier	18000		

Meter Secondary Voltage	120	120 volts for Nexus
Meter Secondary Current	5	5 amps for Nexus

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#### Westbury, NY

(877) EIMETER [877-346-3837]

#### Nexus Line Loss Compensation Calculation

Three Element Meter with 3 Wye-connected PT's and 3 CT's

Company:	Substation:
Name:	Stn Trf Bank No.:
Date:	

#### Metering Point Information

Loss Factors for Nx Communicator Software		Loss Factor	
		Calc	Used
% Full-Load Loss Watts	%LWCU	#DIV/0!	#DIV/0!
% Full-Load Loss VARs	%LVCU	#DIV/0!	#DIV/0!

#### Transmission Line Impedance Data

Quantity	PU Value	% Value	Used
R			0
Х			0
MVA Base			0
Nominal Volta	ige		

#### Meter / Installation Data

Instrument Transformers	Numerator	Denominator	Multiplier
Potential Trf			(
Current Trf			(
Power Multiplier	0		

Meter Secondary Voltage	120	120 volts for Nexus
Meter Secondary Current	5	5 amps for Nexus

Value	3 Ph Loss	1 Ph Watt	1 Ph kW
Full Load Loss Watts		0.00	0.00
Full Load Loss VARs	-	0.00	0.00
Watts Loss at CT Full Load	#DIV/0!		

	Phase-to-Phase	Phase-to-Grd
Test Voltage	0	0
Full Load Current	#DIV/0!	

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e Electro Industries/GaugeTech Doc #: E107-7-07-1.24

Westbury, NY

#### (877) EIMETER [877-346-3837]

#### Nexus Line Loss Compensation Calculation - Example

Three Element Meter with 3 Wye-connected PT's and 3 CT's

Company:	ABC Power Co	mpany	Substation: Big Station
Name:	Joe Engineer		Stn Trf Bank No.: Small Station 138
Date:	2/14/2002		

Loss Factors for Nx Communicator Software		Loss Factors	
		Calc	Used
% Full-Load Loss Watts	%LWCU	0.00362	0.004
% Full-Load Loss VARs	%LVCU	0.01872	0.019

#### Transmission Line Impedance Data

Quantity	PU Value	% Value	Used
R	0.0304		0.0304
Х	0.1573		0.1573
MVA Base	100	03/03/02/02/02 4	100
Nominal Volta	ge	138000	

#### Meter / Installation Data

Instrument Transformers	Numerator	Denominator	Multiplier
Potential Trf	138000	115	1200
Current Trf	900	5	180
Power Multiplier	216000		
Meter Secondary Voltage	120	120 volts for	Nexus
Meter Secondary Current	5	5 amps for Nexus	

Value	3 Ph Loss	1 Ph Watt	1 Ph kW
Full Load Loss Watts	3,040	1013.33	1.01
Full Load Loss VARs	15,730	5243.33	5.24
Watts Loss at CT Full Load	14,068	- A.C.	

	Phase-to-Phase	Phase-to-Grd
Test Voltage	138000	79674
Full Load Current	418	

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# Appendix C Nexus Communicator Command Line Arguments Version 1.08

Current 6-26-2003

# C.1: Script Command Line Methods

Tells Communicator to perform a task corresponding to the Script ID Number.

#### /snnnn Script ID Number

#### • Example :

Nexus Communicator /s1234 (/s Script ID Number)

#### uc: Start Log Converter

- 0 Do not start log converter
- 1 Start log converter

If left out of command line, Start Log Converter assumed.

#### • Example :

Nexus Communicator with Script 1234 will Start Log Converter if Log Retrieval is in the script.

Nexus Communicator /s1234 uc:1

# **C.2: Application Command Line Methods**

Tells Communicator to make a connection and display a particular application screen.

#### /c (additional arguments with a space between each argument)

#### • Example 1:

Nexus with address 2 on network with IP address 10.0.0.1 using Modbus TCP Start on device status screen.

Nexus Communicator /c cm:1 ad:2 pr:3 ip:10.0.0.1 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 or 1 - 16 Alphanumeric characters with no spaces.
	If left out, error assumed.
np:	Network Port
-1.	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:	<b>Use Modem</b> 0 No 1 Yes	
	If left out, No modem selected.	
pn:	<b>Phone Number</b> Use No spaces. To be defined.	
ms:	Modem Setup String To be defined.	
dc:	<b>Data Switch Connect string</b> To be defined.	
dd:	<b>Data Switch Disconnect string</b> 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	
	16 Poll Readings with DDE Service (Nexus Only) (Tech Mode ONLY)	
	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
- Hide Main Window and Exit Program upon closing of Start Screen.
   Nexus Communicator acts as a plug-in for integrating with third party software.

If left out, Normal is the View Mode.

# am:Answer Modem0No1Open 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
- After Software successfully answers the call, it looks for a reason of call code (based on the code Perform Automated functions).
   Upon completion of all functions, Communicator places the Remote Modem into command mode, sends an acknowledgment, hangs up, closes the port and exits the program.

## mp: Modem Password

Must use period as place holder for a space.

## dt: User Defined DDE Topic Name for Start Screen 16

Topic Name is a string of characters that must contain no spaces.

If left out, Meter Designation is used as Topic.

# Appendix D TFTP Server Program Setup

A free shareware **TFTP** (**Trivial File Transfer Protocol**) server program known as **tftpd32** is provided to customers to be used to update firmware for the INP-100 Ethernet card. The program files are located on the software installation CD.

**NOTE: tftpd32 must be running** to update the firmware.

Setup requirements:

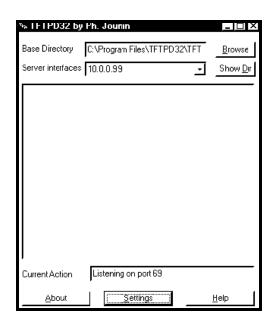
- 1. Windows Operating System
- 2. A working Ethernet card with a valid IP Address
- 3. Winzip software (only if Windows OS does not open the zip file automatically)
- Setup procedures:
  - 1. In your PC's hard disk, create a folder with a name. **Example:** C:\Program Files\TFTPD32.
  - 2. Locate the Zipped **tftpd32** program files on the CD. Then, use the Winzip program to extract all compressed files into the folder you have created in Step 1.
  - 3. In your PC's hard drive, create a folder with a name to be used as the root directory for TFTP Server.

**Example:** C:\Program Files\TFTPD32\TFTP\_files.

4. To start running the program, double click on tftpd32.exe.

Configuring **tftpd32**:

1. Start the TFTPD32 program (Step 4 above). The following screen appears:



2. Click the Settings button. The Tftpd32: Settings screen appears.

- Tftpd32 Settings	x
□ Security	Server configuration
C None	Timeout (seconds) 3
C Standard	Max Retransmit 3
r High	Tftp port 69
Base Directory	PD32\TFTPD32_files
Advanced Options	
🔽 Option negotiation	🔽 Hide Window at startup
🔽 🔽 Show Progress bar	🔽 Create "dir.txt" files
🔽 🔽 Translate Unix file n	names 🛛 🔽 Beep for long transfer
Activate Tftpd32 or	n this interface 🗾 🚽
	indow of 0 Bytes
ок <u>D</u> е	afault <u>H</u> elp Cancel

NOTE: The screen shown here displays EIG's recommended settings.

**NOTE:** All firmware files for INP100 should be placed inside the "C:\Program Files\TFTPD32 \TFTP\_files" folder before updating firmware.

**WARNING:** It is **not** recommended to check the "Activate Tftpd32 on this interface" box. Once that box is checked and your computer's IP is changed, the TFTPD32 program may not work properly. To fix the problem, you may have to disable this feature inside the Windows Registry.

# Appendix E DNP Custom Class Map Readings

# E.1: Available DNP Class Map Readings for Nexus 1250:

1 Second Readings Thermal Readings Accumulations Maximum Readings Minimum Readings Block Window Average Rolling Window Average THD and K-Factor Phase Angles and Voltage Sequence 0.1 Second Readings Harmonic Magnitudes Harmonic Phases External Analog Inputs Time of Use Binary States Action Block Time Stamps Energy and Pulses in the Interval Flicker Miscellaneous

# 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. Nexus 1250 supports Level 1; Nexus 1252 supports Level 2.
EEPROM:	
EEPROM: Energy Register:	Level 2. Nonvolatile memory. Electrically Erasable Programmable Read Only Memory that retains its data during a power outage without need for a battery. Also
	Level 2. 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. Programmable record that monitors any energy quantity. Example: Watthours,

Flicker:	Flicker is the sensation that is experienced by the human visual system when it is subjected to changes occurring in the illumination intensity of light sources. IEC 61000-4-15 and former IEC 868 describe the methods used to determine flicker severity.
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 1250/1252; 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 <sub>e</sub> :	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 reponds 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. (See THD.)
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).
Q Readings:	Q is the quantity obtained by lagging the applied voltage to a wattmeter by 60 degrees. Values are displayed on the Uncompensated Power and Q Readings screen.
Quadrant: (Programmable Values and Factors on the Nexus)	Watt and VAR flow is typically represented usng 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: Reset:	A point at which a Register reaches its maximum value and rolls over to zero. 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 connection can be accomplished using Port 1 of the Nexus 1250/1252 or the Optical Port on the face of the Nexus 1260/1270.
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.
Uncompensated Power	: VA, Watt and VAR readings not adjusted by Transformer Loss Compensation.
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.
Voltage, Vaux	This is the fourth voltage input measured from between the Vaux and Vref inputs. This input can be scaled to any value. However, the actual input voltage to the meter should be of the same magnitude as the voltages applied to the Va, Vb and Vc terminals.