# Power Xpert inControl

# User Manual

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Cover Photo: Power Xpert inControl.

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# Chapter 1—Safety

#### **Definitions and Symbols**

# WARNING

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.

# Â

This symbol is the "Safety Alert Symbol." It occurs with either of two signal words: CAUTION or WARNING, as described below.

**Note:** Indicates a functionality or usability detail which, if not avoided, can result in software or hardware malfunctions or the inability to properly use the PC tool.

# **WARNING**

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

#### 

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING).

#### **Hazardous High Voltage**

## WARNING

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic controllers or rotating machinery.

#### **Power Xpert Safety**

The following section of this manual outlines the safety precautions that must be observed to insure safe and proper usage of the Power Xpert *in*Control remote configuration and control PC Tool.

## Before Using the Software Tool

Prior to installation and usage of the Power Xpert *in*Control remote configuration and control PC Tool, users must contact local safety management and network administrators to insure proper procedures and protocols are followed in accordance with the end users standards in safety, network security, or any other related fields. Any violation of these policies is strictly on the user and in no way voices the procedures laid out herein as these are guidelines of how to use the tool itself.

## Warnings and Cautions

This manual contains clearly marked cautions and warnings which are intended for your personal safety and to avoid any unintentional damage to the product or connected appliances.

# Please read the information included in cautions and warnings carefully.

Throughout this manual specific symbols have been added to cue the reader that important safety or functionality information is being covered. Please refer to "Definitions and Symbols" on this page.

#### **Personnel Safety**

With the use of any remote configuration and control software, users must take appropriate caution as unintentional device activation can occur which increases the risk of personnel and equipment safety issues. All systems should be tested in a controlled environment prior to usage in an active production or service environment as to make the user aware of the tools functionality and control abilities. User roles have been defined within this tool and can be activated to restrict certain user's configuration and control abilities, reducing the risk of those users unintentionally activating devices through the PC Tool.

# Chapter 2-Introduction

## **Using This Manual**

The purpose of this manual is to provide users with information regarding installation, configuration, and execution of Eaton's Power Xpert *in*Control network configuration software. To assure correct usage of the software tool, follow the instructions, guidelines, warnings, and caution presented in this manual.

The Eaton Power Xpert *in*Control manual is specific for Eaton PowerXL devices, it does not reflect the general FDT framework abilities. Please refer to the FDT Help menu for framework explanations.

## Power Xpert inControl System Overview

Power Xpert *in*Control device configuration and control software is a FDT/DTM based software tool used for configuration of networked systems. This tool has been developed to provide a processor-generic, simple interface for configuration, monitoring, troubleshooting, firmware gradation, and logic editing functionality using communication protocols. The software consists of two major parts—the exterior Field Device Tool (FDT) software, which is also known as the "frame application," and the interior Device-Type Managers (DTM). The interior DTM portion is further classified into two categories: Device DTMs which connect to the field devices configuration components, and Communications DTMs (gateway DTMs included for simplicity), which connect to the communications components of the device.

#### Figure 1. Information Flow Diagram and FDT/DTM Layout

Information Flow diagram and FDT/DTM Layout



## **FDT/DTM Explanations**

**The Frame Device Tool (FDT)** contains the run-time environment for field devices to be manipulated by a central open framework independent of host systems. The main function of this frame is to provide a common software environment for accessing device features through independent communications bus in the form of DTMs and. It allows connecting to any device through any host with any protocol.

**Device-Type Managers (DTM)** contains the application software and a GUI for the associated field device for a manufacturer of devices, similar to printer drivers. All device-specific information is accessed and configured through its associated DTM in an online, offline, data monitor, and diagnostic function. Each Eaton DTM is unique to the device type which it is associated to but general device DTMs could be used for some devices. Similar devices will share the same DTM file, but must be individually added to the network topology and individually configured with its only addressing through the tool.

**Communication DTMs** contains the application software for the specific communications hardware being used through a communication channel. It contains the language needed to communicate to the active communications protocol in the device and works as a translator between the frame application (which includes the device DTM) and the devices communication related components.

**Gateway DTMs** are specific to particular devices within a network, and serve as an additional protocol language translator both up and down stream of the nodes location within the network topology. These function similar to communication DTMs but have unique functions specific to a gateway such as translating multiple protocols from multiple devices.

## **Benefits of FDT/DTM Systems**

One unique feature of FDT/DTM based configuration tools is the ability to use DTMs across any common FDT framework. This provides network administrators and system integrators flexibility to use a variety of manufacturer's products within their system while using a common configuration tool. A non-Eaton device DTM, for example, can be integrated into a new or existing Power Xpert *in*Control project file. Conversely, an Eaton PowerXL DG1 drive DTM, can be integrated into CoDeSys 3 rather than Power Xpert *in*Control or another users FDT framework. This provides the user with a new level of flexibility in regards to using new DTMs in their existing FDT systems, or incorporating previously used DTMs into the Power Xpert *in*Control FDT system. Additional benefits of using FDT/DTM based configuration software include:

- Standardized configuration interface for streamlined network commissioning or services
- Parameter download and upload abilities allow greater remote control of devices
- Network configuration centralized to single computer or database, allowing quick access to device parameters
- Ability to create customized software for specific application which can interface with the FDT/DTM system
- Remote storage of device configurations serve as backups in case of emergency
- Standard industry technology allows end users to build off of familiar concepts form previous FDT/DTM software

For more information on integration of DTMs into other FDT frameworks, please see the "Device-Specific Application" section of this manual.

# Chapter 3–Installation Instructions

Please follow the instructions and requirements provided within this section to properly install the Power Xpert *in*Control remote configuration and control tool and parent FDT framework application.

## **System Requirements**

The following items are the minimum system requirements for installing Power Xpert *in*Control:

- 500 MB minimum hard drive space (for 32 bit and 64 bit)
- Operating System Requirements: Must operate on one of the following:
  - Windows 7 (x32/x64)
  - Windows 8 (x32/x64)
- Recommended 512 MB RAM memory or greater
- 1024 x 786 pixel resolution display or greater
- Open PC interface for communication with the device (e.g. USB, Ethernet, RS-485)

#### **Installation Procedure**

The Power Xpert *in*Control framework along with Device and Communication DTMs are available via a CD-ROM shipped with the product or on our website www.eaton.com/ software. To install the Power Xpert *in*Control configuration program and associated Device-Type Managers, double-click the setup file for the software and DTMs. A simple installation walkthrough will appear on screen. Follow the prompted directions to complete installation of the programs.

- 1. Open the setup file provided on the CD or from the www.eaton.com/software website.
- 2. Once the tool opens it will give you a welcome screen to install the Power Xpert *In*Control PC Tool along with the communication and device DTMs. Click "Next" button to advance.

One Installer Wizar	d		23
	Welcome to Eaton's One Installer The InstallShield(R) Wizard will guide you to install Eaton Power 2 inControl Suite on your computer. To continue, click Next. WARNING: This program is protected by copyright law and internation	Kpert onal treaties.	
InstallShield	Next >	Canc	el

3. Read through License agreement and upon completion, accept the terms and click "Next". "Back" will bring you back to the previous window. "Cancel" will close the installation.

F	Powering Busines	s Worldwide
ent ("Agreement") i a Ohio corporation, t identified above.	s a binding legal c , and its successon	ontract s and
Ling, Copying, ( e terms of thi t install or u:	OR OTHERWISE I S AGREEMENT. SE THE SOFTWA	USING IF YOU RE
Software Product t n unopened, unus	by so requesting ar ed condition within	nd, n thirty (30)
t" refers to the con ntation, including w s, images, photogr ompany the Softwa and not limited to c eans accessing, st	nputer software an /ithout limitation an aphs, animations, v are Product; "Infor digital, analog, com oring, loading (whe	d y and all video, mation" ponents, ether into <del>-</del>
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4. Next screen will give the option to do a "Complete" installation or a "Custom" installation. If this is the first time install, it is suggested to perform the complete installation.



5. Once the "Complete" installation is pressed, the tool will go through and install the PC Tool and DTMs available. Accept the window popup to advance through installation. If "Custom" installation was selected, it gives the ability to select which files to install.

#### Complete



#### Custom

Custom Setup		Fate Powering B	Nusiness Worldwide
Select the features you want to install. Deselect	features you want to u	ninstall	
Power Xpert inControl			
Eaton DG1 Device DTM			
Eaton C445 Device DTM			
Eaton Modbus Serial			
Eaton Modbus TCP			
ZEaton PXI Firmware Upgrade Tool			
Eaton DG1 PC Cable Drivers			
Important			
Please close all open Frame Applications befor any of the above applications.	e proceeding with insta	llation or uninsta	allation of

6. After the installation is complete, select the "Finish" button to complete the setup.



## **Uninstall Procedure**

The Power Xpert *in*Control framework and DTMs can be uninstalled through the Windows Control Panel or by using the installation setup file.

Select **Settings**  $\rightarrow$  **Control Panel** from the **Start** menu.

#### Double-click Add or Remove Programs.

Select **Power Xpert** *in***Control** and Eaton Device or Comm DTMs.

Click Uninstall and follow the prompts.

When using the setup tool to modify installations, it will provide a list of installed tools and give the ability to deselect the tools to uninstall.

One Installer Wizard	X
Custom Setup	Fatten Fowering Business Worldwide
Select the features you want to install. Deselect feature	res you want to uninstall
<ul> <li>Power Xpert inControl</li> <li>Eaton DG1 Device DTM</li> </ul>	
✓ Eaton C445 Device DTM	
Eaton Modbus Serial Eaton Modbus TCP	
Eaton PXI Firmware Upgrade Tool	
Eaton DG1 PC Cable Drivers	
Important Please close all open Frame Applications before proc	eeding with installation or uninstallation of
any of the above applications.	
InstallShield	< <u>B</u> ack Install Cancel

## **Software Update Procedure**

The current software updating procedure for Eaton-provided DTMs requires the user to uninstall the previous software files as to avoid potential coding conflicts. Please note that you do NOT need to uninstall all DTMs or the FDT program. Only the files which require a software update need to be uninstalled for the update to take effect. For uninstalling the software the user should use the Control panels add/remove program option. Once uninstalled, users must reboot their computer to insure all associated files are cleared before re-installing the new software version. The below general procedure can be used as a guideline for the software update procedure:

- 1. (If applicable) Save the currently opened project file and close the Power Xpert *in*Control software.
- 2. Navigate to the Add/Remove programs section of the control panel (note: will dependent on windows version)

Start  $\rightarrow$  Control Panel  $\rightarrow$  Programs and features  $\rightarrow$  Click desired DTM to uninstall and click "uninstall" button

- 3. Follow procedures outline in the uninstallation
- 4. Restart the computer once uninstallation of all desired DTMs is complete
- 5. Activated the executable file provided with the Power Xpert *in*Control DTM update file and follow the procedures outlined in the installation.

Updates will be available via our website www.eaton.com/ software. The Power Xpert *in*Control tool will provide you with information regarding any updates that have been posted to the site.

## **Eaton Communication DTMs**

Eaton has created two Modbus<sup>®</sup> communication DTM protocols for use in the Power Xpert *in*Control system: Modbus Serial and Modbus TCP. These DTMs are used to connect to the Eaton devices through the FDT container, other communication DTMs will be added as device scopes change.

#### **Configuration: Modbus TCP**

The Modbus TCP configuration screen can be accessed through the context menu of the device. Double click the node under "Network View" which needs to be configured, or right-click the Modbus TCP DTM node and select the "Configure" option. This will open the configuration window for the Modbus node. Change the default values as needed. Checking the "Advanced Settings" checkbox will unlock the Scan Time, Retry Count, Auto Recover Time, and Time out options, allowing users to set the values as needed. To make changes to the settings it is required to be in an offline mode with the communication DTMs.

Device Catalogue	General Node Info	Modbus TCP - Configuration ×					
<del>-</del>	Modbus TCP Eaton Corporation					/ <b>-</b> (•)	N
MODBUS TOP Sati							- ( <u>m</u>
Port	502		Advanced	Settings			
			Scan Time	50	ms		
			Retry Count	3			
			Auto Recover Time	0	minutes		
			Time Out	500	ms		
Restore to De	efaults						
					Ok I	Cancel Ap	iply
KD Stand by	Data set						

#### **Configuration: Modbus Serial**

The Modbus Serial configuration screen can be accessed through the context menu of the device. Double click the node under "Network View" which needs to be configured, or right-click the Modbus Serial DTM node and select the "Configure" option. This will open the configuration window for the Modbus node. Change the default values as needed. Checking the "Advanced Settings" checkbox will unlock the Scan Time, Retry Count, Auto Recover Time, and Time out input fields, allowing users to set the values as needed. Press "OK" or "Apply" to save the new values for the DMT, to make changes DTMs have to be in the offline mode.

Device Catalogue	General Node Info	Modbus Serial - Configuration ×					
10101	Modbus Serial Eaton Corporation					7A	(•N
ODBUS BTU Setting							
Port	COM3	•	Advanced	d Settings			
Baud Rate	19200	-	Scan Time	50	ms		
Parity	Even	•	Retry Count	3			
Stop Bits	1		Auto Recover Time	0	minutes		
Data Bits	8	•	Time Out	500	ms		
Transmission Mode	RTU	•					
Restore to Defa	ults						
					2.16	1000000AV	

The following sections will cover basic startup and configuration setups for use with the Power Xpert *in*Control configuration and control tool.

## **Program Start**

There are multiple ways to open the software, either by clicking the desktop icon or going through the start menu, Programs, under the Eaton folder.



When you run the program for the first time it will ask to upgrade the device Catalog with any updated DTMs that was installed.

estion -	Power Apert Inc	ontrol from Eaton	e
?	The Device Cat Would you like	alogue seems to be to update it now?	out of date.

Click Yes to update the list of DTMs.

Updating Device	Catalogue	x
Updating info:	DG1.Dtm.dtm.manifest	
	20%	
	Cancel	

PROJECT DEVICE TOPOLOGY VIEW	GROUP AND FILTER			SAdministrator)& a
Stress         B Add         C(0)         C(0)           Fig Cupy         N Remote         Fig Remote         C(0)         C(0)           Fig Rest         Hill Resume         Commot         Discorrect           Ede         Ede         Commot         Discorrect	Open set in the set of the set o	Fill Update Catalogue Proteiron Allowed Functions =  0 01M Infit Device Catalogue		
Network View 🚽 🤋 🗙	General Node Info			
Device Summary	Category .			
(Unnamed)	Add * Name	Vendor	FDT Version	Protocol()
Network				
-	A Category: Communication			
	effs Modeus TCP	Exten Corporation	2000	Modbus over TCP
	The second server	and an barrents	( THE PARTY	mouse and acted the
0 00	📝 [Add] in (Allowed)			00
Error Log PDT Monitor				

Once the updating is completed the framework will be open showing all the added devices in the Device Catalog.

# Chapter 4—Framework

## **Framework Description**

The framework help can be found by selecting the Help option in the main window. This will provide a detailed instruction on functions inside the Framework. Some of the Framework functions are not available due to the individual Device DTMs handling these functions.



# Chapter 5-PowerXL DG1

## Section 1–PowerXL DG1 Connection Process

To set up a network it will require a communication DTM supported by the device DTM being connected to. Determine the communication network being used in your system; Eaton currently supports Modbus Serial and Modbus TCP communication protocols for connecting to its devices.

## **Creating a Network**

The framework will show the installed communication modules that are installed along with the saved Network name.

Netw	ork View + 🛡 🗙							
D	exice Summary	12	winiter	-				
*			Arc-301					
	T_ [Unnamed]*	1.12	-1 bb	Name	Vendor	PDT Version	Protocol(s)	
	Network	۳.						
1.1			+ Categ	pory: Communication				
			0	00 Modbut Serial	Eaton Corporation	2800	Modbus over Serial Line	
			0	dis Modbus TCP	Laton Corporation	2000	Modbus over TCP	

Determine what network is being used to connect to the device. To add that network DTM shown in the device catalog there are a few options

Drag the communication DTM from the Device Catalog to the Network name.

Network View • # >	Device Catalogue 🗶			
Device Summary	Category A			
T [Unnamed]*	Add <sup>9</sup> Name	Vendor	FDT Version	Protocol(s)
Network	Ŧ			
Dragging acoust	✓ Category: Communication			
Row Modbus KP	C Modbus Serial	Eaton Corporation	2.0.0.0	Modbus over Serial Line
Maus to children collection:	St Modbus TCP	Eaton Corporation	2.0.0.0	Modbus over TCP
Row [Unnamed]				

Press the sign in the device catalog

## **Connection Options**

#### **Table 1. Connection Options**

Connection Method	Port	Upgrade Firmware	Connects to PC Tool	Communication Settings
RS-485	Modbus Serial Terminals	0	$\bigcirc$	+10V         1         DO1         14           Al1+         2         24Vo         15           Al1-         3         GND         16           Al1-         3         GND         16           Al2-         4         AO1+         17           Al2-         4         AO1+         17           Al2-         4         AO1+         17           Al2-         5         24Vi         19           DIN5         7         DIN1         20           DIN6         7         DIN2         22           DIN6         10         DIN2         22           CMB         11         CMA         24           GN0         12         A         25           Z4V0         13         B         26           R1NO         20         R20A         31           R1NO         20         R20A         32           R1NO         30         R20A         32
				RS-485 Comm Set: Settable in RS-485 Communication parameter group (P20.2.1) (Default Modbus RTU) <b>Note:</b> If set to BACnet MS/TP. PC Tool will not communicate.
				Slave Address: Settable in RS-485 Communication parameter group (P20.2.2) (Default 1)
				Baud Rate: Settable in RS-485 Communication parameter group (P20.2.3) (Default 19200)
				Parity: Settable in RS-485 Communication parameter group (P20.2.4) (Default Even)
				Data Bits: Not settable, 8 Data Bit
				Stop Bits: Not settable, 1 Stop Bit
	Keypad Port	0	0	PIN8 - GND PIN7 - +24V out PIN7 - +24V out PIN3 - Not used PIN3 - Not used PIN4 - Not used PIN4 - Not used
				Slave Address: Not settable, set to Modbus ID 18.
				Baud Rate: Not settable, set to 38400 Kbaud
				Parity: Not settable, set to Even
				Data Bits: Not settable, 8 Data Bit
				Stop Bits: Not settable, 1 Stop Bit
Ethernet	Ethernet Port	_	0	PIN4 - GND PIN3 - RXP PIN2 - TXN PIN2 - TXN PIN1 - TXP PIN8 - GND
				IP Address Mode: Settable in Ethernet Communication parameter group (P20.3.1) (Default DHCP with AutoIP) Note: Most facilities require a Static IP. Change the Static IP address before changing.
				After changing this parameter, a reset or power cycle is required.
				Active IP Address: Set depending on IP address assigned Static or DHCP
				Active Subnet Mask: Set depending on IP address assigned Static or DHCP
				Active Default Gateway: Set depending on IP address assigned Static or DHCP
				(Default 192.168.1.254)
				Static Subnet Mask: Settable in Ethernet Communication parameters group (P20.3.7) (Default 255.255.255.0)
				Static Default Gateway: Settable in Ethernet Communication parameters group (P20.3.8) (Default 192.168.1.1)

Click on the green "+" next to the communication protocol or right click on the Network Name and select Add. Follow the steps to add the desired Network.

Pevice Summary       Category         Image: Contraction of the second secon	Netwo	ork View		→ ¤ ×	D		slogue ×
Y       Add <sup>Q</sup> Name         Network       Image: Add       Add <sup>Q</sup> Name         Vetwork       Image: Add       Category: Communication         Image: Add       Image: Add       Image: Add         Image: Add </th <th>De</th> <th>vice Summary</th> <th></th> <th></th> <th>С</th> <th>ategory</th> <th>A</th>	De	vice Summary			С	ategory	A
<ul> <li>Networl: 社 Add</li> <li>오 Load from Device</li> <li>오 Load from Device</li> <li>오 Load from Device</li> <li>오 Kore to Device</li> <li>Import / Export</li> <li>Import / Export<th>T</th><th>IUnnam</th><th>ed]*</th><th></th><th>A</th><th>dd <sup>9</sup></th><th>Name</th></li></ul>	T	IUnnam	ed]*		A	dd <sup>9</sup>	Name
Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the provided interview       ✓ Category: Communication         Image: Contract of the pr	*:	E Network	B <sup>*</sup>	Add		-	
Store to Device     Import / Export       Import / Export     Import / Export		L	OD also	Load from Device		▲ Categ	gory: Communication
Import / Export       ►       ►       Modbus TCP         Import / Export       ►       ►       Modbus TCP         Import / Export       ►       Expand All         Import / Export       ►       Collapse All         Import / Export       ►       Expand All         Import / Export       Expand All       Expand All         Import / Expand All       Expand All       Expand All         Imp			op	Store to Device		0	10101 Modbus Serial
Sort Expand All Collapse All General Node Info				Import / Export		G	윰 Modbus TCP
Expand All Collapse All General Node Info			ΨŤ	Sort			
Collapse All General Node Info				Expand All			
General Node Info				Collapse All			
			0	General Node Info	<u> </u>		
			-				

**Note:** If the Modbus Serial DTM is added an additional window will pop up to set communication protocol settings for the communication adapter.

#### **Connecting to the Drive**

The PowerXL Series DG1 drive can be connected to the Power Xpert *in*Control configuration tool through either the RS-485 communication terminals A(25) and B(26) or through the keypad port with Eaton's designed USB to RJ45 cable or with the Ethernet port located next to the real-time clock battery. Once the drive has physically been connected to the network, both the drives communication parameter and the PC Tool parameters must be configured. Please refer to the PowerXL DG1 communication manual for configuring the Modbus MS/TP or Modbus TCP communication parameters.

# A WARNING

Please note that not all communication information for the PowerXL series DG1 drive will be covered in this manual. For additional information regarding the PowerXL DG1 communication abilities please reference the Communications Manual (MN040010EN).

## 🔒 WARNING

DO NOT attempt to connect through the keypad port with Ethernet Communication; it is not for Ethernet use. It can be used to connect up via RS-485 with Eaton's communication cable.

#### **Quick Connection**

#### Modbus TCP On-Board Communication Details

To connect the PowerXL DG1 drive to the Power Xpert *in*Control PC Tool using an Ethernet connection, please follow the below procedure:

- The DG1 drive's default IP address mode is set to "DHCP with AutoIP" addressing. Change the IP address mode by changing Parameter P20.3.1 to "Static IP". For users using DHCP auto addressing, please skip to step 3.
- The static IP address for the DG1 drive defaults to 192.168.001.254. Change the static IP address as needed to follow the site network topology. Example address: 192.168.001.050.

- 3. Power cycle the drive to activate the new IP address on the drive. If the drive is not power cycled it will remain on the previous IP address mode settings.
- 4. The Ethernet port on the host computer must also be changed as to match the Subnet mask IP requirements of the drive (default set to 255.255.255.000). Find the Ethernet port which is connected to the network through the computers Network control panel menu (administrative rights to computer are required). Change the IP address as the match first (3) octets of the drives IP address, with a unique address in the last IP octet. Example: 192.168.001.001.
  - **Note:** Network administrators at the user's location may have different subnet mask requirements or restrictions. Contact local IT for support for IP addressing if needed.
- 5. Open the Power Xpert *in*Control configuration tool and begin a new project.
- Begin creating the network topology by adding "Modbus TCP" DTM located on the device catalog. (Please see the "Creating Network Topology" section for a more detailed walkthrough).
- 7. Configure the Modbus TCP settings to match that of the drive. The default values loaded into the Modbus TCP DTM matches the DG1 default IP address.
- Add a DG1 device DTM to the network by following the same procedure outlined in step 6. Once added to the network, a prompt will appear requesting an IP address for the device. Enter the same IP address which was set on the device through the keypad in step 2 (Ex: 192.168.001.050), then click "Set".
- 9. Bring the device online by right-clicking the device node, then select "Go Online", or click the "Go Online" button on the top toolbar.
- Double-click the DG1 device node to open the drives Online Configuration Screen. The user should now be connected to the drive and have the ability to monitor, configure, and control the device.

#### Modbus RTU On-Board Communication Details

To connect the drive to the Power Xpert *in*Control remote configuration and control PC Tool, please follow the below procedure:

- 1. The DG1 drives default slave address for the Modbus RTU communication option is "18". It is recommended that the user defines the slave address as to insure a unique address is being assigned to the drive. Change the address as desired by changing parameter P20.2.2 (range available is 1–247 per Modbus node).
- 2. Open the Power Xpert *in*Control configuration tool and begin a new project.
- Begin creating the network topology by adding "Modbus Serial" DTM located on the device catalog. (Please see the "Creating Network Topology" section for a more detailed walkthrough).
- 4. Adjust the port setting values for the connected USB-to-serial adaptor by using the Device Manager Option through the control panel to match the default values of the drive or to the user's preference. Take note of the COM number assigned to the device as it needs to be assigned in the Power Xpert *in*Control Software.
  - **Note:** If the USB-to-serial adaptor port, Modbus Serial DTM, and DG1 drive are not all configured to the same communication settings the devices will not communicate.
- Assign the Modbus Serial communications DTM port setting to match the communication port number found in the device manager in step 4. Adjust all other values to match the drives default values or to the users preference.
  - a. Baud Rate Default: 38400.
  - b. Data Bits Default: 8 (for Modbus TCP specifically).
  - c. Parity Default: Even.
  - d. Stop Bits Default: 1.
- 6. Add a DG1 device DTM.
- 7. Assign the same slave address as in step 1 to the drives DTM.
- 8. This will bring up the Multiframe Setting screen that allows for sizing the drive. This is typically used in creating an offline parameter file. Bring the device online by right-clicking the device node, and then select "Connect" or click the "Connect" button on the top toolbar. The online parameter window will open when once connected.
- 9. The user should now be connected to the drive and have the ability to monitor, configure, and control the device.

#### **Device**

After inserting the communication DTM, the tool will switch to show device DTMs. Select the device you want to connect to and perform the same sets as used to add comm DTM to add the device. Once the device is added, depending on the communication device selected a window will pop up to set slave address or IP address of the device, refer to the device specific DTM for an example of setting the device addresses. Once the correct address is set hit the set button.

## **Offline/Online**

With the devices added to the Network View, it gives the ability to view an Offline parameter set of the device. By stepping through the multi-frame selection screen, it will size the offline file for the correct drive size or you can connect to the device via the selected communication protocol.

#### Offline

The offline mode only allows for viewing and setting the parameter without being connect to the device. Once you have the parameters set you can save this configuration and load it to the drive when you are connected to it. To open an offline file after adding the device to the network, it will open the Multiframe Settings Window, set the drop-downs for the required drive information, and hit set. This will then ask to go through the Quick Start Wizard or open parameters. If you click "Yes" for the Start Up Wizard, it will set through parameter settings; once complete, it will open parameter files. If "No" is selected for the Start Up Wizard, it will close the Multiframe and then double clicking on the device will open parameter screen.



Network View + # ×	Device Catalogue Provenance - Management online - A	
Device Summary T T T T T T T T T T T T T T T T T T T	Ener Cayonian Dire Sola	F:T·N
A IOO Modbus Serial* Modbus S.,	Drive Setup	<u></u>
PeerIX DG1 Midded. PoerIX DG1 1	Drive Irput Voltage  Trive Irput Voltage  Metter / Line Franzansy  Non Application Stort A Optional Based No: Based (0)  Stort B Optional Based No: Based (0)  Stort B Optional Based No: Based (0)  Stort B Optional Based	
		Oi: Caniel Apply

Multi-Frame Setting Window.

<address: 192.168.1<="" th=""><th>1.254&gt; PowerXL DG1 - Multiframe Setting</th></address:>	1.254> PowerXL DG1 - Multiframe Setting
	PowerXL DG1 Eaton Corporation Drive Setup
Drive Setup	
Drive Input Voltage	480 *
Drive Current Rating	230 450 A *
Motor / Line Frequency	575 50Hz •
Drive Application	Multi-Pump (1)
Slot A Optional Board	102 (2)
Slot B Optional Board	IOS (5) •
	Set

- Drive Voltage would correspond to the voltage rating of the drive it is going to be installed in
- Drive Current Rating would correspond to the current rating of the drive it is going to be installed in
- Motor/Line Frequency will correspond to the line frequency of the facility it is being put into
- Drive Application will select the desired application to be used on the drive depending on the intended use
- If option cards will be used, select the desired option cards and slots they will be inserted in

When Set becomes active, it may be pressed to advance to the Startup Wizard screen or can press "No" to close the Multiframe window.

#### Start-Up Wizard

The application selected will depend on how many screens will be available in the Start-Up Wizard. The Start-Up Wizard will walk through the most used parameter required to get the drive programmed and running. As the screens come up, by selecting "Next" it will advance you to the next screen, "Back" will take you back to the previous screen, and "Finish" will open up the parameter screen.

Network View - 9 ×	Device Catalogue	General Node Info	PowerXL DG1 - Offlin Startup Wizard ×			
Device Summary T (Unnamed)* Network		PowerXL DG1 Eaton Corporation Startup Wizard				7:T•N
Hordbus Serial* Modbus S	Part a bland B	nais Deira Patriana				Support
PowerXLDG1 Modbut PowerXLDG1 18	Solid Present         0           P11         0           P13         0           P14         0           P15         0           P16         0           P17         0           P18         0           P19         0           P10         0           P110         0           P111         0           P112         0           P114         0	Mar Cuffre Settings Mar Frequency Max Frequency Acad Time 1 Decel Tene 1 Decel Tene 1 Motor Nom Speed Motor Nom Speed Motor Nom Frequency Power Up Local Remote Sete Remotin I Control Place Local Control Place Local Control Place Local Reference	0 60 3 3 3 1750 0.85 460 60 Hold Last (0) • Krypad (0) • Krypad (0) • Al2 (1) •	Hz Ha s A rpm V Hz	[P	revious Nex Finish
v <b>D</b> G	4P Stand by	🛈 Data set			Ok	Cancel Apply

#### Start-Up Wizard screens

Network View - 🕈 🗙	Device Catalogue	General Node Info PewerXI, DG1 - Offline Parameters X			
Device Summary		PowerXL Series DG1 - Central Purpose Drive Office Parameters	5	47.0	N
Madhar Carial Madaar C	印《子生		Search Enter at least 3 characters	P Support	
PowerXL DG1* Modbus PowerXL DG1 18	Parameter Search M: Monitor P: Parameters				
			Ok Cr	icel Ap	pply

#### **Offline Parameter Window**

The Offline Parameter window gives the ability to compare parameter files, perform a parameter distribution, and Export/ Import parameter files that we will discuss in a later section. To find a desired parameter or word in a parameter, the Search box allows for a quick way to look for letter order used in a parameter name or by checking the Long description box, it will also look in the parameter descriptions. If further support is needed, the Support button will provide technical support contacts for the Region required. More details on these buttons are described below.

#### Online

The Online mode is when the tool is connected to the device via the communication protocol. When online, you are able to make changes to the drive and see them change in real time with the drive. It also gives the ability to see fault conditions, monitor device parameters, trend data, and sync real-time clock, compare parameter, device service info, and control the device. To go online with the device, there are a few options.

Right click on the device in the Network View and select Connect.

Network View		- ņ ×	ш	Device Cat	alogue 3
Device Summary				Category	
T	s./		H	Add 9	Name
A Te [Unnamed]	E.		Ŧ		TUT
A B Modbu	s TCP	ň.			
Powe	rXL D	G1* Modbus	1.		
Powe Powe	臣	Add		1	
	×	Remove			
	₩	Rename			
	40	Connect			
L. L	0.0	Disconnect			
	Op.	Load from Devic	e		
	00	Store to Device			
	周	Set Offline Parar	nete	er	
	0	Set Online Paran	nete	5	
	(1)[] (1)	Compare			
	間	Configuration			
	1.50	Observe			
	°°	Diagnosis			
	fx.	Additional Funct	ions	<ul> <li>•</li> </ul>	
		Import / Export			
	0	General Node In	fo		

With a device selected in the Network View, click on the Connect button in the ribbon.



Once connected the Network tree will show a color bar indicating if the devices connection status.

#### Green-Online

Yellow—Communication set issue, check communication settings

#### Grey-Offline



Once connected to the device, you can open the application window by double clicking on the device you would like to view and edit. The tab indicator will show that you are in an online window.

To disconnect from a device, there are the same options as there was to connect to the device with either right clicking on the device and selecting Disconnect or through the ribbon when the device is selected.

#### Edit DTMs

To edit any of the communication or device DTM information, there is a few options, either right click on the device and select configuration or in the Device ribbon select Configuration. Communication DTMs will show communication port settings while Device DTMs will show address settings.

## Section 2—PowerXL DG1 Software Features

The following sections of this manual will cover all Eaton DTM files available for use.

## **Common Features**

Several features are common within Eaton DTMs that will be covered within the next section. Please note that these are specific to Eaton-provided DTMs and may not apply to DTMs provided by other manufacturers. All of the below noted common features can be found within the "DTM Interface" window of the tool.

## **Device Heading**

All Eaton DTMs will indicate the Device series, Device type, and what mode of parameter you are in. Similar to the image below.



# F-T•N

#### Language Selection

All Eaton-provided DTMs have a language selection drop-down menu located on any of the DTM interfaces in the upper-right corner of the tab or window. Selecting the symbol for the desired language will change all of the text language within the DTM on the selected tab or window only. The default language for the entire program can be set through the Tools menu option, under "Options," "General Options." The language symbols can be seen in the image below.



#### Support Tool

All Eaton-provided DTMs will have a support option drop-down that will provide customer support for the desired region. The drop-down will have pullouts for different regions, which will provide a phone number or an email for technical support. By clicking on the email, it will open the installed email client program and allow for sending an email. This is available on the tool bar in the online and offline Parameter windows.



## Search Tool

All Eaton-provided DTMs will have a Search feature that allows for typing in at least 3 characters to search for in either the Parameter name or the Parameter Long Description if the check box gets checked. It is defaulted that only parameter name will be searched in every group. This is available on the tool bar in the online and offline Parameter windows. When in the online mode, the Auto Refresh check box may be used to view parameters in real time with a maximum of 8 parameters selected at one time. Also by going to the parameter value, the user can right click and select "View Group Parameters."

206	23	frequ			×
Auto Refresh	Panel Code	Paramet	er Data		Min Value
0	P9.2	4mA Fault Frequency	0	Hz	0
۵	P8.17	Frequency Ramp Out FilterTime Constant	0	ms	0
	P1.2	Max Frequency     View Gro	up Parameters	Hz Hz	0
1271	D1.1		ap raioneers	J	0

#### **Status Indicators**

On the bottom portion of each DTM window is a status bar for communication status, network activity, current parameter data, and device status. Each device status is specific to the device rather than the entire system, meaning one device can be disconnected from the network while the remaining devices are active. Please refer to the image below for symbol definitions.



Status Symbol	Indication
있다 Connecting	Attempting to connect to the device (going online)
Connected	Actively connected to the device (online)
↓ ↓ Disconnecting	Attempting to disconnect from the device (going offline)
<b>ØD</b> isconnected	Disconnected from the device (offline)
OD Disturbed	Communication to the device has timed out due to one of several possible errors (detected comm.interruption)
<℃ Stand by	Waiting for connection command (idle)
27	Sending data to or refreshing data from device
🚺 Data set	Displayed parameter values are loaded from the instance data set and can be changed and saved
Data set FPO .	Displayed values are loaded from the instance data set and cannot be $$ changed (locked)

#### **Status Bar**

Above the Status Indicators there is a Status bar which appears in every window. This will give you information in regards to the device status.



Control Place—Device control location.

**Device Run Direction**—Indicates if the device is running in the forward or reverse direction.

**Device Status**—Indicates if device is ready without faults. (Green = Ready, White = Not Ready)

**Device Run Status**—Indicates if device is in a run or stop state.

(Green = Run, White = Stop)

**Fault/Warning Status**—Indicates if device is in a fault or warning.

(Green = No Fault/Warning, Red = Fault/Warning)

**Device Event Log Trigger**—Indicates the status of the Event Analyzer trigger.

#### **Quick Launch Toolbar**

The Device button bar will have device specified buttons to open other features consistent with the devices along with search for device parameters.



## **Online Parameter Set**

The online parameter set is the currently active parameter set on the drive, meaning if a user were to physically travel to the drive they would see the exact same parameter values displayed through the drives keypad as are displayed in the Power Xpert *in*Control interface.

There are several functions that are available within the Online Parameter set which include the Data Analyzer/Graph, Fault History, and Real-time Clock settings interface. These will be covered in detail over the next 4 sections. Access to these interfaces is available through the quick-launch toolbar within the Online Parameters interface, or through the device node context menu under "Additional Features."

## **Offline Parameter Set**

The offline parameter set is isolated to the host computer which houses the DTM file for the device. The configuration interface is identical to the Online Parameterization interface, except that the quick-launch bar and associated functions are not available because the parameter set is not associated to a live device in the field. See the previous offline section for explanation of features.

## **Parameter Configuration**

The parameter configuration screen can be accessed through the device menu within the Network View window either by right-clicking or double-clicking the desired node. All available parameter menus are displayed within this window, and can be seen on the left-hand side of the DTM interface window. Each menu tree can be expanded to view the individual parameter menus by clicking the (+) symbol next to the menu name. Selecting the desired menu will display the associated parameter values in the center portion of the screen.

## 🚹 IMPORTANT

For a detailed breakdown of the PowerXL series DG1 drive parameters, please see the product application manual (MN040004EN).

The Power Xpert *in*Control configuration tool has two different parameter datasets, an Online and Offline set. The "Online" parameter set is the currently loaded and active parameter set on the drive itself. The "Offline" parameter set is isolated to the host computer and cannot become active on the drive until it is downloaded using the "Store to Device" function. These two parameter sets can be entirely separate in terms of parameter values, meaning if a user adjusts the offline parameter set it will not change any values within the online parameter set. Certain features are only available within the Online Parameterization interface specifically for displaying real-time data from the drive, although these can be viewed while the drive is offline. These features will be further explained within the next section.

Device satisfies	Proved 23, 55 DG1 - Gener Otiose Paran Otiose Paran Otiose Paran M. Monitor P. Paraneters P1. Daske Paraneters	naa al Parpene Door orden ∓±0						- TAN
Modeus TCP Modeus TCP Modeus TCP Modeus TCP PowerXL DG1 Modeus PowerXL DG1 192188.12	M Monday P Parlameters P1 Basic Parameters	₹±0						
PowerXL DG1 19218812	M. Montor P. Parameters P1. Basic Parameters	Bernetty P.O.I.I		Search., Enter al least 3 characters	P Support 🛄			
PowerXL DG1 Modbus. PowerXL DG1 192188.12.	P. Parameters P1. Basic Parameters	Lowerve prove	Parameters					
040 PowerXL DG1 192188.LZ.	T TO BOARD I BELEFETATA	M1 (	Output Frequency	0	Hz			
	P2: Analog Input	MZ (	) Freq Reference	0	Hz			
	P3. Digital Input	M3 (	Motor Speed	0	rpm			
	P4: Analog Output P5: Dentul Output	M4 (	Motor Current	6.8	A			
	P6: Logic Function	M5 ①	Motor Torque	0				
	P7: Drive Control	M5 ()	Mator Power	0	56			
	PE: Motor Control PD: Protections	M7 (	Motor Voltage		v			
	P10: PID Controller 1	MS (	DC-link Voltage	699	v			
	P11: PID Controller 2	M9 ()	) Unit Temperature	0				
	P12: Preset Speed P13: Torona Control	M10 (	Motor Temperature	56.3	N			
	P14: Brake	M11 (	) Torque Reference	0	- N			
	P15: Fire Mode P16: Second Motor Parar P17: Bypass I P18: Muth-Pump Control P19: Real Time Clock	M12 (	Analog Input 1	1.92	Varies			
		M13 (	Analog input 2	7.76	Varies			
		M14 (	Analog Output 1	4	Varies			
		M15 (	Analog Output 2	19.98	Varies			
	P20: Communication	M16 (	) DI1, DI2, DI3	OR OF OF				
	ezh. system	M17 (	Di4, DI5, DI6	Off, Off, Off				
		M11 (	) DI7, DI8	08,08				
		M19 (	) D01	On				
		M20 G	) R01, R02, R03	Off.Off.Off				
		M21 0	) TC1, TC2, TC3	05,05,05				
		M22 0	) interval 1	Inactive (0)				
		M23 G	) Interval 2	inactive (0)				
		M24 (	) Interval 3	inactive (0)				
<b>R</b> a	Remote		Forward		· Ready	(3 Run	No Fault/Warring	Waiting Trippe
								Close
	Provented (3) Browner							
	a contractor C2   O contractor							
And Log FDT Monitol								

Parameter value information can be displayed when hovering over the "i" indication next to the parameter name. This information will include the parameter code, Modbus ID, Parameter name, Applications it is in, Read/Write ability, a long definition of the parameter, and then its default, min and max values. This is available for all the parameters and monitoring values.

2. Preset Speeu	M10	Motor Temperature	56.2	%						
14: Brake	M11	Motor Temperature	lo.	1.00						
15: Fire Mode	M12	(	10	10/2/						
<ol> <li>Second Motor Parar</li> <li>Bypass</li> </ol>	M13	Code Modbus ID Paramet M10 9 Motor 1	ter Application Temperature 1,2,3,4	RO/RM RO						
8: Multi-Pump Control	M14 Calculated motor temperature value in Percentage. Value is based off motor name plate									
9: Real Time Clock	M15 data and the motor status information take when power up.									
20: Communication 21: System	M16 M17	Default: 0								
	M18	(i) DI7, DI8	011,011							

If a parameter requires a change, it can be changed through the setting box to the right of the parameter name. Once a change is made, it sends it down to the drive.

If option boards are installed in the drive, the option card parameters will appear as an additional menu item in the parameter tree on the left of the screen. With no option cards installed this menu does not appear.

## **Quick Tool Bar Buttons**

The quick tool bar buttons in the PowerXL DG1 DTM consist of a Data Analyzer Graph, Motor Control, View Faults, Real Time Clock, Event Analyzer, Parameter Compare, Parameter Distribution, Parameter Import/Export, and a Parameter Service File. Each of these buttons will open up a new tab window with features used for monitoring, depending on which window.



Net	twork View 🗸 🖡 🗙	Device Catalogue General Node Info PowerXL DG1 - Online Parameter PowerXL DG1 - Data Analyzer Graph ×	
Ŧ	Device Summary	PowerXL Series DG1 - General Purpose Drive Data Analyzer / Graph	T•N
-	Network     IOIOI Modbus Serial* Modbus S     Modbus Serial	≝▶▲⊙⋭₽	Support •
	PowerXL DG1* Modbus PowerXL DG1 1	Graph	

#### Data Analyzer/Graph

The Data Analyzer provides a live feed of user-selectable data to be monitored and analyzed. Up to 8 channels or axes can be selected to be displayed within the data graph. Each parameter can be selected and assigned channels within the graph through the Parameter Selection drop-down menu. Users can change the sample rates, take snapshots of the graph, or clear the graph data to begin a new set. Users can also import/export graph data to an .xml format which can be used in programs such as Microsoft Excel<sup>®</sup>.



**Sample Rate**—Adjust the sample rate of the graphing tool, 2 to 10 second scale.
**Channel Selection**—Allows selecting which parameter values you would like to assign to one of the 8 channels. When you click on the tab, it will slide out a window of the parameter assignment along with the 8 channels in a table. There are 8 basic values selected for monitoring but they can be adjusted by using the drop-down box. The table will indicate the parameter name, live value, min value, max value, and units of that value. Once the values are set, the window can slide back as a tab by clicking on the Graphing window above.



To assign a monitoring value to a channel, it requires clicking and highlighting the desired channel and then using the drop-down menu. On the parameter monitoring value selection, you can scroll through and select the desired value. Once the value is selected, click the Assign button to put it to that channel. To remove a channel, it requires the same process of highlighting the channel desired and clicking on Remove. Each channel will have its own y axis scale. **Motor Control**—This button allows the PC to take over control of the drive by starting/stopping, changing speed and direction.

**Note:** Remote control place and reference need to be in fieldbus mode for the control menu to function along with the drive being in that control mode. The PC Control Off/On switch will do these transitions. If PC Control is not on, the buttons will be greyed out.



# A WARNING

Take all safety procedures required by local management to insure personnel safety. Accidental user activation of the device is possible which increases the potential for safety risks. Please use caution when remotely controlling devices. **Graph Snapshot**—This button takes a picture snapshot of the graph at that moment in time. The snapshot saves the graph as a jpeg image without any numbers tied to it.

**Clear Data**—This button clears the graphed data along with the channel assignments. The default channel parameters are cleared as well. To get these back, close the Graphing window and reopen. **Import/Export .xml**—These 2 buttons allow for importing and export .xml graphing files for viewing and further analysis. Upon clicking on the button, it will open an Open window to save or select the desired .xml file. Export becomes valid when data is recorded and it is graphing is in the stop state.

**Start/Stop**—This button starts the process of logging data into the graph. Once starting the graph will auto scale the Y axis based off the values shown.

**Graph View Manipulating**—These 3 buttons allow for changing the view of the graph, allowing to zoom in or out on certain areas of the graph window as well as set it back to default view.

**Load History**—This allows for loading up to 15 hours of stored data, then by using the Advance Forward and Backward buttons to change the 4 hours displayed in the graph window at a time.

**Clear Markers**—Will clear the markers that can slide out to view values at a specific point in the graph window. The markers are applied by clicking on a desired point on the graph. Two graph points can be pulled up to get comparisons.

**Time Stamp/Slider**—This area shows the real-time stamp on recorded data from the device. The time is based off the computers real time stamp. The slider allows for going to previous times to view results.

# A WARNING

Take all safety procedures required by local management to insure personnel safety. Accidental user activation of the device is possible, which increases the potential for safety risks. Please use caution when remotely controlling devices.

### **Fault History**

The Power Xpert *in*Control tool displays any faults or warnings/alarms which have occurred on the drive, currently active faults as well as previously cleared faults are viewable within this interface. There are two tabs within the Fault view screen.

Fault Code Fault Type F11 Fault	Fault Code Fault 8 51 External Fault	Detailt	Fault Attribute: Data		
• ] Dear Active Faults		0			
	Ferrard	C Ready	1. Ren	@ Fault	Treper Deal

Active Faults—Any currently active faults or alarms will be displayed within the "Active Faults" tab. Users can clear any active faults once the fault condition has been resolved to restore the drives functionality. Faults must be cleared through this screen by clicking the "Clear Faults" button on the "Active Faults" window, the rest button available on the drive control panel, or through local I/O or keypad options (Back/Reset button, fault clear DI, etc.) to restore use of the configuration tools ability to adjust and control the drives parameters and functionality.

**Faults**—When looking at faults, they will provide the fault code number and fault description. When hovering over that fault, it will give a pop-out window to provide fault cause and possible remedies for that fault. If additional info is needed, the Details button can be pressed to get 16 parameter values that were stored when the fault occurred.

**History Faults**—Any previous faults that occurred to the device are logged within this tab. Up to 10 faults can be stored within the DG1 drive, all of which will be shown on this screen if saved. With each fault, there will be a group of parameters that get stored and can be viewed to provide analysis along with a description of what the fault is and how to rectify it.

#### **Real-Time Clock Settings**

The DG1 drives real-time clock (RTC) settings can be monitored or adjusted through the Power Xpert *in*Control configuration tool. The date and time values can be edited individually or synced with the host computers. The below functions can be performed with their associated button.

Device Catalogue	General Node Info PowerXL DG	12 - Online Parameter	PowerXLDG12 - Real Time clock X			27
1	PowerXL Senes 0G1 - General Purpose Drive Real Time Clock Setting			<b>7</b> A1	•	
E A OL	269				Support	
Device Date & Time		01/01/2013	04 : 10 : 04     Sync System Time			

Button Symbol	Function
3	Refresh the values displayed on the screen with the active values in the drive
Sync System Time	Sync the date and time values on the RTC Settings tab with that of the host computer (which PowerXpert <i>in</i> Control is installed)
15	Calendar function for date value selection
Ok	Saves the modified RTC date and time values to the drive and closes the RTC Settings interface
Cancel	Cancles any unsaved modifications and closes the interface
Apply	Saves the modified RTC date and time values to the drive

### **Event Analyzer**

The event analyzer is very similar to the graphing tool but it actually uses the drives control board to record different trigger points in the control board that can then be pulled out via the PC Tool to look at the desired channel info. This is looking at data at the 10 msec refresh rate in the control board.

Device Catalogue	General Node Info	PowerXL DG12 - Online Parameter	PowerXL DG12 - Event Analyzer X	
	PowerXL Series DG1 - General Purpose Event Analyzer	Drive		
				Support -
Event Analyzer	Snaps	not Clear Graph		
Setting Trigger	Info			
Remote	Forward	Ready	tun 🕴 No Fault Warnin	g Trigger Disabled
<b>*</b> -	0			Close
Setting Trigge Tab Info	er Trigge Info	r Clear Expo Graph xml	v v v prt/Import Graph data Magnification	

**Setting Tab**—The setting tab is used to set the control board up with channels and trigger point value. This will also allow for pulling the events out of the drive.

**Trigger Info**—This tab provides the info on the event log being displayed in the graph window.

**Snapshot**—This will allow for taking a snapshot of the graph window to allow for sending the picture.

**Clear Graph**—This button will clear the viewed graph screen.

**Export/Import Data**—Will allow for saving the data to an xml file, which will allow sending it or putting it into a spread sheet.

**Graph Magnification**—These buttons allow for zooming in and out in the graph along with resetting back to defaults window.

To Set up a Trigger.

1. Click on the Setting Tab

Device Catalogue	General Node Info Power/0	0012 - Online Parameter Crowthiel	DG12 : Event Analyzet X		
	PowerXL Server DO1 - Ceneral Pagame Drive Event Analyzer				
· · A Ol	<u>*</u> 69				Support (1)
Event Analyzer					
Setting					
Enable Trigg	e RMS + Asogr	Note-For Configuring Trend B	uffer chock 'Enable Trigger' a	nd Reset' the device from 'P21.1.3' gurater	
Channe Part	ameter Min Value Max Value	Unit III Draw	( ] Other	Force Trigger	
CHI		Trigger Bource	AC input votinge Rt	45 +	_
642		C BEMER	D Leve	C Rising C Yating	
00				<u>ن</u>	1
CH4		Pre Tripperty	Sample Period (mil)		
00		0	0	Single Continuous	
07					
		81 C	2 03 04	Upload Set Cancel	
Setting   Trigge	r lanto				
ule :	Farward	· Reaty	Rat	tin Fault/Warning	Trigger Disat

2. Check the Enable Trigger box. You will then see the note that asks to set P21.1.3 to Reset to power cycle the control board or you can perform a manual power cycle.

levite Cetalogie Ge	renal Node Info Power(C	DG12 · Online Recempter Rowers	L DCI3 - Event Analyzer X		
₽≠ 00 €~	eer XI, Dereo 1 - Gerenel Puspone Dave et Analyzee				
	9				Support B
Event Analyzer					
hiting					
AC input vottage FSI/S	* Ange	Note-For Configuring Trend.	Buffer sheck Enable Trigger	r' and 'Reset' the device from 'P21.1.3' onligaration	_
Charte Farmere	Min Value Man Value	Units	Citrae .	Force Tripper	
The Content		Troppe Source	# AC insul vehape	a AlME (*	
out		Q BI Mare	CLANE		
100				C Roing C Falling	
and a					
CHA		Pre Tripper's	Sample Paried Inst		
- 5,00		3	10	C Serge C Cardhund	
Cho.					
1 March 1		History	ar an 1922	Upload Set Camil	7
111				2	
Setting   Trigger Info					
WD	Forward	@ Ready	- Bur	No Feat/Viaming	Tripper Die
SHE .					

3. Close the Event Analyzer window and reopen after the Reset. From there check the Edit Configuration tab to set up the channels and trigger.

evice Catalogue	General	Node Info	PowerXL	DG12 - On	line Paramet	er PowerXL DG1	2 - Event Analyzer 🗙				
	PowerX DQ1 - G Event Ar	(L Senes leneral Purpose nalyzee	Drive								
	<u>*</u> 69									Support	198
Event Analyzer											
tetting											
C input voltag	gør e RMS	- 1	Assign	No	te-For Conf	igunng Trend Buffer Trigger	check 'Enable Trigge	r' and 'Reset' the c configuration	tevice from 'P21.1.3'		
Channe Par	rameter.	Min Value	Max Value	Units		🖂 Fault	Cther		Force Trigger		
CH0 Outp	ut Freque			Hz		Trioner Source	FB Status Wood	)			
CH1 Moto	r Speed			1997		T Pathod	Citized	- 71			
CH2 Moto	r Vollage :			V		#/ Bit Mask	0	a Distin	C Estina		
CH3 DC-1	inii: Voltagi			v		1991 CA	212	- rupui	2 Paleng		
CH4 Unit	Temperati			*C :					۲		
CH5 Moto	r Tempera			÷.		Pre Trigger%	Sample Period (ms	1.			
CH5 FB S	tatus Wor					50	10	Single 6	<ul> <li>Continuous</li> </ul>		
CH7 Moto	e Current			A		History			1		
						@1 02	03 04	Upload	Set Cancel		
0											E
	er Info										
Setting   Trigge											
Setting   Trigge		Forward			Ready		O Run	No	Faut/Warning	Trigg	er Disab

- 4. There are a set of default values listed in the table but these can be selected by the drop-down window and then assigned to a channel.
- 5. With the channels selected, select the trigger method as a Fault or Other. Other would correspond to a parameter that can be bit masked to trigger off a level.
- 6. Select the Pre Trigger %. This is the amount of time before the trigger event that will be stored. Set the Sampling period and if it is a signal shot or continuous. Signal is a single trigger and it is done, Continuous would allow for multiple storage points up to 4, as new ones come in, the oldest is removed.

	) 22년 1 - 10 - 10 - 10 - 10 - 10							Ed	it Configuration		
AC input	voltage RMS	÷	Assign	Remove	Trigger			a Hartisa da	A DES UN # 18570 1		
Channel	Parameter	Min Value	Max Value	Units	Fa	ult	0	ther			Force Trigger
CH0	Control board I				Trigge	r Source	K	eypad Torg	ue Ref	-	17
CH1	DI4, DI5, DI6				0.04	maskil avai	15	E tourst	881988/1	25	
CH2	Motor Voltage			v	U BIL	TRIBSIVE BYER		30		Risinn	C Falling
СНЗ	Analog Output			Varies			. 1			- Turning	to ready
CH4	Unit Temperati			°C		۲					
CH5	Keypad Refere	0	50	Hz	Pre Tr	igger%:	Sam	ple Period (	ms);		
CH6	AC input voltas			v	14		14		Single	00	Continuous
CH7	Analog Input 2			Varies	Histo	ry .			0.000		
					· @ 1	◎ 2	© 3	@4	Uplo	ba	Set

7. Click the Set button to send settings down to the drive.

From there you can disconnect and let the drive perform. Then when reconnecting, the 4 history boxes can be checked to pull the last 4 items out.

#### **To View Plot**

When the trigger condition occurs, the trigger status is changed to '**Triggered**.' User can then upload the trend plot for the set parameters. The latest plot is always available in **History** slot#1. When next 'Triggered' condition occurs, the data from Slot#1 is shifted to Slot#2 and latest data is stored again in Slot#1.

User can take **snapshots** of the trend plot or export the trend file (.xml) that can be imported for viewing in the future.

The Trigger Information of the displayed plot is available in '**Trigger Info**' tab of Event Analyzer.

User can also do a 'Force Trigger' that will trigger immediately.

### **Parameter Compare**

Parameter Compare enables the user to:

• Compare the parameter values between 2 exported configuration files (.exml)

OR

 Compare the parameter values between a configuration file stored in the computer and the device (when the DG1 DTM is Online)

The user can also compare the parameter values between a configuration file and offline parameters (when the DG1 DTM is offline).

This option is available as a shortcut on the toolbar of Online & Offline Parameters window.

Also, 'Parameter Compare' can be launched by right clicking on **DG1 DTM > Additional Functions > Parameter Compare**.

The option to compare 2 files or a file and device is available on the Compare window.

PowerXL Series DG1 - General Purpose Drive Parameters Compare       Eff         PowerXL DG1 Parameters       First File       C:Userale0072155:Documents\Software Application Eng\Galaxy\Customers\UCIDG1 YPALL Browse       Browse       Image: Compare Compare         Device       Compare       Compare       Image: Clear       Image: Clear         Panel Code       Parameter Name       First File       Second File/Device       Image: Clear         Device       Compare       Clear       Image: Clear       Image: Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       Image: Clear         P1.2       Max Frequency       60       60       No Change       Image: Clear       Image: Clear         P1.4       Decol Time 1       30       3       Modified       Image: Clear       Image: Clear         P1.5       Motor Nom Speed       1150       1750       Modified       Image: Clear       Image: Clear	Support
PowerXL DG1 Parameters         First File       C\Users\e0072155\Documents\Software Application Eng\Galaxx\Customers\UCI\DG1 YPALL       Browse         Device       Second File       Browse       Compare         Device       Compare       Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       Planel         P1.2       Max Frequency       60       60       No Change       Planel         P1.3       Accel Time 1       30       3       Modified       Planel         P1.5       Motor Nom Current       23       2.3       Modified       Planel       Planel         P1.5       Motor Nom Speed       1150       1750       Modified       Planel	Support
PowerXL DG1 Parameters          First File       C\Users\e0072155\Documents\Software Application Eng\Galaxy\Customers\UCRDG1 YPALL       Browse       Image: Compare Clear         Device       Second File       Compare Clear       Compare Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       Image: Change         P1.2       Max Frequency       60       60       No Change       Image: Change       Image: Change         P1.3       Accel Time 1       30       3       Modified       Image: Change       Image: Change         P1.5       Motor Nom Current       23       2.3       Modified       Image: Change       Image: Change       Image: Change       Image: Change       Image: Change       Image: Change       Image: Change: Change       Image: Change       Image: Change: Change       Image: Change: Change       Image: Change: Change: Change       Image: Change: Change: Change       Image: Change: C	
First File       C·UUsera/e0072155/Documenta/Software Application Eng/Galaxy/Customers/JC/IDG1 YPALL       Browse         Device       Second File       Compare       Compare       Clear         Device       Compare       Clear       Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       *         P1.2       Max Frequency       60       60       No Change       *         P1.3       Accel Time 1       30       3       Modified       *         P1.5       Motor Nom Current       23       2.3       Modified       *         P1.5       Motor Nom Speed       1150       1750       Modified       *         P1.7       Motor PF       0.85       0.85       No Change       *	
Prist File       Outset sector 2 rostituciation englicitation englicitatio englicitatio englicitation englicitatio englicitation e	
Compare         Device       Compare         Device       Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       Planel Code         P1.2       Max Frequency       60       60       No Change       Planel Code       Planel Code         P1.3       Accel Time 1       30       3       Modified       Planel Code       Planel Code         P1.4       Decel Time 1       30       3       Modified       Planel Code       Planel Code         P1.5       Motor Nom Current       23       2.3       Modified       Planel Code       Pla	
Second File       Compare         Device       Clear         Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       Pl.2         P1.2       Max Frequency       60       60       No Change       Pl.2         P1.3       Accel Time 1       30       3       Modified         P1.4       Decel Time 1       30       3       Modified         P1.5       Motor Nom Current       23       2.3       Modified         P1.7       Motor FF       0.85       0.85       No Change	
Device       Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change	
Panel Code       Parameter Name       First File       Second File/Device       Status         P1.1       Min Frequency       0       0       No Change       *         P1.2       Max Frequency       60       60       No Change       *         P1.3       Accel Time 1       30       3       Modified       *         P1.4       Decel Time 1       30       3       Modified       *         P1.5       Motor Nom Current       23       2.3       Modified       *         P1.6       Motor Nom Speed       1150       1750       Modified       *         P1.7       Motor PF       0.85       0.85       No Change       *	
Panel Code         Parameter Name         First File         Second File/Device         Status           P1.1         Min Frequency         0         0         No Change         a           P1.2         Max Frequency         60         60         No Change         a           P1.3         Accel Time 1         30         3         Modified         a           P1.4         Decel Time 1         30         3         Modified         a           P1.5         Motor Nom Current         23         2.3         Modified         a           P1.6         Motor Nom Speed         1150         1750         Modified         a           P1.7         Motor PF         0.85         0.85         No Change         a	
P1.1         Min Frequency         0         0         No Change           P1.2         Max Frequency         60         60         No Change           P1.3         Accel Time 1         30         3         Modified           P1.4         Decel Time 1         30         3         Modified           P1.5         Motor Nom Current         23         2.3         Modified           P1.7         Motor PF         0.85         0.85         No Change	
P1.1         Min Prequency         0         0         No Change         -           P1.2         Max Frequency         60         00         No Change         -           P1.3         Accel Time 1         30         3         Modified           P1.4         Decel Time 1         30         3         Modified           P1.5         Motor Nom Current         23         2.3         Modified           P1.6         Motor Nom Speed         1150         1750         Modified           P1.7         Motor PF         0.85         0.85         No Change	
P1.2         Max Prequency         60         60         60         No Charge           P1.3         Accel Time 1         30         3         Modified           P1.4         Decel Time 1         30         3         Modified           P1.5         Motor Nom Current         23         2.3         Modified           P1.6         Motor Nom Speed         1150         1750         Modified           P1.7         Motor PF         0.85         0.85         No Charge	
P1.4         Decentime 1         30         3         Modified           P1.5         Motor Nom Current         23         2.3         Modified           P1.6         Motor Nom Speed         1150         1750         Modified           P1.7         Motor PF         0.85         0.85         No Change	
P1.5         Motor Nom Current         23         2.3         Modified           P1.6         Motor Nom Speed         1150         1750         Modified           P1.7         Motor PF         0.85         0.85         No Change	
P1.6         Motor Nom Speed         1150         1750         Modified           P1.7         Motor PF         0.85         0.85         No Change	
P1.7 Motor PF 0.85 0.85 No Change	
P1.8 Motor Nom Voltage 460 230 Modified	
P1.9 Motor Nom Frequency 60 60 No Change	
P1.10 Power Up Local Remote Select 0 0 No Change	
P1.11 Remote 1 Control Place 0 0 No Change	
P1.12 Local Control Place 0 0 No Change	
P1.13 Local Reference 6 6 No Change	
P1.14 Remote 1 Reference 0 1 Modified	
P1.15 Reverse Enable 1 1 No Change	
P2.1 Al1 Mode 1 1 No Change	
LP22 IAI1Signal Bange 1.2 0 Modified	

#### **Parameter Distribution**

Parameter Distribution feature allows the user to copy selected parameters from one DG1 DTM to multiple DG1 DTMs. This is an offline operation and is applicable to Offline parameters. Both the source and the destination DTMs need to have the same DG1 setup configuration (i.e., Input Voltage rating and Drive current ratings) to perform Parameter Distribution.

Parameter Distribution can be launched from the toolbar icon in Online Parameters page.

Alternatively, Parameter Distribution can be launched by right clicking on **DG1 DTM > Additional Functions > Parameter Distribution**.

The 'DG1 Parameter Selection' table will display all the offline parameters of Source DG1.

DG1 D	r Distribution Device Selection			
elect A	Select None R	everse Selections Refresh		
Select	Device	Device Address Status		
	PowerXL DG1	166.99.170.133		
1	PowerXL DG13	192.168.1.254 Success		
DG1 P	arameter Selecti	on		Send Data
DG1 P elect A Salact	arameter Selecti II Select None R	on everse Selections Refresh	Value	Send Data
DG1 P elect A Select	arameter Selecti I Select None R Panel Code	on everse Selections Refresh Parameter Min Frequency	Value	Send Data
DG1 F elect A Select	arameter Selecti Select None R Panel Code P111 P1-2	on everse Selections Refresh Parameter Min Frequency Max Frequency	Value 0	Send Data
DG1 P elect A Select	arameter Selecti Select None R Panel Code P111 P12 P13	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1	Value 0 60 3	Send Data
DG1 P elect A Select	arameter Selecti Select None R Panel Code P11 P12 P13 P14	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1	Value 0 60 3 3	Send Data
DG1 F elect A Select	arameter Selecti Select None R Panel Code P11 P12 P13 P14 P15	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1 Motor Nom Current	Value 0 60 3 4.8	Send Data
DG1 P elect A Select	arameter Selecti Select None R Panel Code P11 P12 P13 P14 P15 P16	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1 Decel Time 1 Motor Nom Current Motor Nom Speed	Value 0 60 3 4.8 1750	Send Data
DG1 P elect A Select	arameter Selecti Select None R Panel Code P11 P12 P13 P14 P15 P16 P17	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1 Decel Time 1 Motor Nom Current Motor Nom Speed Motor PF	Value 0 60 3 3 4.8 1750 0.85	Send Data
DG1 P elect A Select	arameter Selecti Select None R Panel Code P12 P13 P14 P15 P16 P17 P18	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1 Decel Time 1 Motor Nom Current Motor Nom Speed Motor PF Motor Nom Voltage	Value 0 3 3 4.8 1750 0.85 230	Send Data
DG1 9 elect A Select	arameter Selecti Select None R Panel Code P12 P13 P14 P15 P16 P17 P18 P19	on everse Selections Refresh Parameter Min Frequency Max Frequency Accel Time 1 Decel Time 1 Decel Time 1 Motor Nom Current Motor Nom Speed Motor PF Motor Nom Voltage Motor Nom Frequency	Value 60 3 4.8 1750 0.85 230 60	Send Data

**Note:** Source DG1 is the DTM from which the Parameter Distribution is launched.

Under '**DG1 Parameter Selection**', when 'Send Data' button is enabled, clicking it shall copy the selected parameter values to respective Offline parameters of all DTMs selected in '**DG1 Device Selection**' section.

# Import/Export Parameter (Configuration Replicator)

PC Tool enables the user to export PowerXL DG1 device configurations to a file (.exml) that can be later imported to DG1 devices or Offline parameters.

The Export / Import shortcuts are available on the toolbar of Online and Offline Parameters window.

#### **Exporting Offline Configuration**

For creating an offline parameter set, user first needs to set up the drive from the Multi-Frame window and then export it using the **Export** icon from the toolbar of Offline Parameters window.

#### **Exporting Online Configuration**

Online / Device configuration file can be created by using the **Export** icon from the toolbar of Online Parameters window. It will export all the parameters from the device to the exported file.

#### Import

Using the Import option will import the previously exported configuration file to the DG1 Offline / Online Parameters.

If a configuration file is imported in Online Parameters, all the parameters from the file are written to device.

#### **Service File**

User can print some useful information of DG1 parameters using **Service File Information**. This feature will read the parameter values from the DG1 with **Drive Information** and **History Fault Information**, and show them in a HTML file. User can then print the contents of this window, or save it to a file. This feature is available only in Online mode.

Service File Information can be launched from the toolbar icon in Online Parameters page. After saving the file as an HTML, it will open up an Internet browser and display the parameter file page.

## **Device Monitoring**

Device monitoring is available through two mediums of the Power Xpert *in*Control tool. The Data Analyzer/Graph is available for user-defined parameter monitoring (please see "Data Analyzer/Graph" section for more detail). The Monitoring menu is also available which displays all available monitoring parameters and their current value on the drive.

Device Catalogue Gene	eral Node	Info	PowerXi	. DG12 - Online Parameter	×		_		_		3
Powr DG1 Ontin	erXL Seri - General le Parame	es Purpose Di fers	iNe						741	(•N	
	1 < 7	F ± C	3			Sear	ch., Enler al	least 3 characters	p	Support	•
M. Monitor		PowerXL I	DG1 Pa	rameters							E
P. Parameters Pt. Paris Parameter		M1	0	Output Frequency	0	1	Hz				
P2: Analog Input		M2	0	Freq Reference	0		Hz				
P3: Digital Input	3	M3	Ō	Motor Speed	0		rpm				
P4: Analog Output	. 8	M4	0	Motor Current	6.8	1	A				
P6: Logic Function		M5	Õ	Motor Torque	0		%				
P7: Drive Control		M6	õ	Motor Power	0	1	96				
P8: Motor Control		M7	õ	Motor Voltage	0		v				
P10: PID Controller	4	M8	õ	DC-link Voltage	699		v				
P11: PID Controller	2	M9	õ	Unit Temperature	0	1	*C				
P12: Preset Speed	2. 3	M10	õ	Motor Temperature	56:2	1	.%				
P13: Torque Conaro P14: Brake	•	MIT	õ	Torque Reference	0		96				
P15. Fire Mode		M12	õ	Analog Input 1	1.89		Varies				
P16: Second Motor	Parar	M13	õ	Analog Input 2	7.6	1	Varies				
P17: Bypass P18: Multi-Pump Co	ontrol	M14	õ	Analog Output 1	4		Varies				
P19: Real Time Clo	dk	M15	õ	Analog Output 2	19.98		Varies				
P20: Communicatio	n	M16	õ	DI1, DI2, DI3	Off,Off,Off	1					
P21: System     B: Optional Boards		M17	õ	DI4, DI5, DI6	Off,Off,Off						
		M18	õ	DI7, DI8	017,011	1					
		M19	õ	DO1	On	i i					
		M20	õ	R01, R02, R03	Off,Off,Off						
		M21	õ	TC1, TC2, TC3	Off,Off,Off						
	8	M22	õ	Interval 1	Inactive (0)	*					
		M23	õ	Interval 2	Inactive (0)						
		M24	õ	Interval 3	Inactive (0)						
41 1		M25	0	Interval 4	Inactive (0)						F
Remote	Forw	and		Ready	Chaire Journ 1111	Run		No Fault/Warning		Trigger Disat	oled
										Close	T
Connected 0	Data set	T	71	1						1	

## **Upload Parameters (Load from Device to PC)**

The software tool can upload parameters that are currently active on the drive to the Offline parameter set within the device DTM. Uploading parameters will overwrite all values within the Offline Parameter set and replace them with those from the drive. The device must be online in order to upload parameters.



# Download Parameters (Load from PC to Device)

The software tool can download parameter values to the drive from the Offline Parameter set loaded into the device DTM. The drive must not be receiving a "RUN" signal in order to download parameters. Downloading parameters will overwrite all currently loaded parameter values within the drive. The device must be online in order to download parameters to the drive. It is recommended that users save a copy of the parameters they wish to replace by uploading the parameters on the drive to a back-up DTM file. This will help in future trouble-shooting and record keeping if needed.

# A WARNING

Currently, the PowerXL DG1 series offline parameter set has not been configured to load base parameters based on the frame size of the drive. This means that the <u>default values loaded in the offline parameter set are</u> <u>incorrect and must be uploaded from the drive to reflect</u> <u>the specific frame size installed the field</u>. Before downloading parameters to the drive users need to upload parameters from the drive as to ensure that the current values are entered for the particular frame size in use.

## Section 3-Firmware Upgrade Process

#### **Application Summary**

The PowerXL Series DG1 adjustable frequency drive has the ability to upgrade firmware through a PC Firmware Upgrade Tool. It can be used to load a single packaged firmware file to the MCU, DSP, Keypad and Option boards.

#### How to Load Firmware

 Download and open the firmware upgrade tool by clicking on the Firmware Upgrade Tool Icon seen in Figure 2.

#### Figure 2. Eaton Power Xpert inControl-Firmware Upgrade Tool



- 2. Ensure that the correct communication port is selected, loading firmware requires a USB to RS-485 converter that can be connected to either terminals A and B on the drive terminals or to the Key-pad RJ45 port (this is not an Ethernet port).
  - a. Using Windows 7/XP, go to Start Menu.
  - b. Select "Control Panel".
  - c. Select the "System and Security" Icon.
  - d. Under the "System", select the link for "Device Manager".
  - e. In the Device Manger window scroll down to Ports, expand the Ports tree, and check the com port setting of your communication device.

Figure	3. D	evice	Prop	erties
--------	------	-------	------	--------

	🚍 Device Manager		×
	File Action View Help		
l	▲ 🛁 MKEWIWHP1001426	 	
1	🕟 🗐 A-B Virtual Backplane		
	> 🙀 Batteries		
	🖟 🛞 Bluetooth Radios		
J	⊳ ₁Щ Computer		
I	🖒 🧫 Disk drives		
	🔈 🖳 Display adapters		
	DVD/CD-ROM drives		
	🔈 🕼 Human Interface Devices		
I	IDE ATA/ATAPI controllers		
1	🔉 🖷 IEEE 1394 Bus host controllers		
	⊳ · ─── Keyboards		
l	Mice and other pointing devices		
l	Modems		
	⊳ • Monitors		
	Multi-port serial adapters		
	Wetwork adapters		
	PCMCIA adapters		
	Ports (COM & LPT)		
	Communications Port (COMI)		
	MOYA LISE Serial Port (COM7)		
	SD host adapters		
	Security Devices		
	Smart card readers		
	Sound, video and game controllers		
	⊳ 🚛 System devices		
	🕟 🕛 Universal Serial Bus controllers		
	•		
I			

3. Click the **Browse** button, select the configuration file that your Eaton Representative sent you, and click the **Connect** button.

#### Figure 4. Tool Buttons

oningi Care					~ · ·	و الحر الدر الدر		10.0	
Jonne	guration F	lie C:\Us	ers\e00/215	5\Documents\So	oftware A	pplication Eng	(Galaxy\Softwar	e\Software Kelease	e\DG_V0L Browse
Slave	Address	0x01	COM Port	COM5 (In Use)		•	Conr	nect	
rodu	ct Name	Eaton VF	D P	roduct Code	0x3000	Serie	al Number	- [	Program
rogra		Processor		Memory		Device Rev	File Rev	Program S	itatus
	DG1 Mai	n Processor	r Bl	ock 0 Chinese La	nguage		1.02.0026	Device not p	present
	DG1 Maii	n Processor	r Bl	Pack ock 1 Chinese La Pack	nguage		1.02.0026	Device not p	present
	DG1 Mai	n Processor	r i	DG1 Main Proce	ssor		1.02.0026	Device not p	present
	DG1 Maii	n Processor	r Bl	ock 0 Chinese La Pack	nguage		1.01.0026	Device not p	present
	DG1 Mai	n Processor	r Bl	ock 1 Chinese La	nguage		1.01.0026	Device not p	present
16	DG1 Man	Slave Devi	ce Address	Pact DG1 Main Proce	COM Se	ection	1.01.00	Connect	Browse for Configuration F
	CANopen	Processor		CANopen Proce	ssor		1.02.0001	Device not p	resent
	DeviceNe	t Processor	-	, DeviceNet Proce	essor		1.02.0001	Device not p	resent
	DG1 Con	trol Proces	sor l	DG1 Control Pro	essor		1.01.0024	Device not p	vresent
	Option Co	ard 1 Proce	essor C	ption Card 1 Pro	cessor		1.01.0007	Device not p	present
	Option Co	ard 2 Proce	essor C	ption Card 2 Pro	cessor		1.01.0007	Device not p	oresent
	Ontion C	ard 3 Proce	essor C	ntion Card 3 Pro	cessor		1.01.0007	Device not r	present
a									

4. The drive initially will go into a bootloader mode and next the software will go out to scan the drive for the processors that are available for upgrade. It will then compare the processor firmware versions on the drive to the firmware update package file.

#### Figure 5. Firmware Files

👫 Eaton Power Xp	pert inControl - Firm	nware Upgrade Tool					x
Options Help							
Configuration							
Configuration F	ile	2155\D		(Calau) (Calaura)		Deserves	
Configuration File C:\Users\e0072155\Documents\Software App				\Galaxy\Software	Software Release DG_VUL	browse	
Slave Address	0x01 COM Po	COM5 (In Use)	Ŧ	Discon	nect		
Product Name	Eaton VFD	Product Code 0x3000	Serie	al Number 1	Program		
Progra	Processor	Memory	Device Rev	File Rev	Program Status		*
DG1 Mai	n Processor	Block 0 Chinese Lang ~	1.01.0026	1.01.0026	Code is same		
DG1 Mai	n Processor	Block 1 Chinese Lang 🗸	1.01.0026	1.01.0026	Code is same		
DG1 Mai	n Processor	DG1 Main Processor	1.01.0026	1.01.0026	Code is same		-
DG1 Con	trol Processor	DG1 Control Processor	1.01.0024	1.01.0024	Code is same		-
DG1 Key	pad Processor	DG1 Keypad Processor	1.01.0021	1.01.0021	Code is same		
DG1 Key	oad Processor	MCF51AC256B EEPROM	1.01.0021	1.01.0021	Code not present		
Profibus (	Card Processor	Profibus Card Processor		1.02.0001	Device not present		
Option C	ard 1 Processor	Option Card 1 Processor		1.01.0007	Device not present		
Option C	ard 2 Processor	Option Card 2 Processor		1.01.0007	Device not present		
Option C	ard 3 Processor	<b>Option Card 3 Processor</b>		1.01.0007	Device not present		
Option C	ard 4 Processor	<b>Option Card 4 Processor</b>		1.01.0007	Device not present		
Option C	ard 5 Processor	<b>Option Card 5 Processor</b>		1.01.0007	Device not present		
CANoper	Processor	CANopen Processor		1.02.0001	Device not present		*
Log							*
Idle							

**Language Blocks**—will pop up with drop-downs to select the desired language in addition to English.

If option cards are installed, they will show up allowing for upgrading. The Program Status will indicate if the code in the drive vs. the file are the same. 5. The **Program Status** row will show you the status of the firmware on the drive and the revisions available in the firmware update package file. If you would like to load software to the drive, select the **Program** check box. With that box selected, the Program button will become active; pressing it will start the download process.

onfig	uration					
oning o c	indion					
Conti	guration File C:\Users\e00	72155\Documents\Software A	pplication Eng	\Galaxy\Software\	Software Release\DG_V00	Browse
Slave	Address 0x01 COM F	Port COM5 (In Use)	*	Disconr	iect	
rodu	ct Name Eaton VFD	Product Code 0x3000	Seri	al Number 1	Cancel	
rogra	Processor	Memory	Device Rev	File Rev	Program Status	_
	DG1 Main Processor	Block 0 Chinese Lang	1.01.0026	1.01.0026	Code is same	
	DG1 Main Processor	Block 1 Chinese Lang ~	1.01.0026	1.01.0026	Code is same	
	DG1 Main Processor	DG1 Main Processor	1.01.0026	1.01.0026	Code is same	
	DG1 Control Processor	DG1 Control Processor	1.01.0024	1.01.0024	Code is same	
1	DG1 Keypad Processor	DG1 Keypad Processor	1.01.0021	1.01.0021	2%	
	DG1 Keypad Processor	MCF51AC256B EEPROM	1.01.0021	1.01.0021	Code not present	
	Profibus Card Processor	Profibus Card Processor		1.02.0001	Device not present	
	Option Card 1 Processor	Option Card 1 Processor		1.01.0007	Device not present	
	Option Card 2 Processor	Option Card 2 Processor		1.01.0007	Device not present	
	Option Card 3 Processor	Option Card 3 Processor		1.01.0007	Device not present	
	<b>Option Card 4 Processor</b>	Option Card 4 Processor		1.01.0007	Device not present	
	Option Card 5 Processor	Option Card 5 Processor		1.01.0007	Device not present	
	CANopen Processor	CANopen Processor		1.02.0001	Device not present	
oa						

#### Figure 6. Firmware Upgrade Status

- 6. Upon completion of the firmware download, the drive will come out of bootloader mode by either disconnecting or closing the Firmware Upgrade Tool. After the reset occurs, the drive keypad will then go through the process of uploading the new firmware automatically (while this is occurring there will be a status indication on the keypad).
- 7. The drive should then be powered down and back on, completing the firmware upgrade process. If the drive firmware update fails, please contact your local Eaton Technical Resource Center.

# Chapter 6-C445

## Section 1—Starting a Project

Start the *in*Control software and the following screen will be displayed.



Select "Empty project" to create a new project or "Import from XML" to import a project previously exported. Exporting/Importing a project is discussed later in this chapter.

Select Empty project and a screen displaying the communication DTMs that have been installed will be displayed as shown below.

	NETWORK VIEW [Unnamed]	- Power Xpert inControl		? _ @ ×
PROJECT DEVICE TOPOLOGY VIEW	GROUP AND FILTER			Administrator 🚨 a
% Cut 📑 Add	Set Offline Parameter	Configuration 🎯 Diagnosis	📳 Update Catalogue	
E Copy Remove	Load from Store to	🕞 Observe 🙎 Channel Functions	$\mathbf{\mathbf{\widehat{Y}}}$ Filter on Allowed	
Paste B Rename	Device Device	$\stackrel{\texttt{B.E.}}{\Leftrightarrow}$ Compare * $f_{X}$ Additional Functions *	DTM Info	
Edit	Device Operations	Device Functions	Device Catalogue	
Network View 🗸 म 🗙	Device Catalogue × General Node Info			
Device Summary	Category A			
Т				
[Unnamed]	Add <sup>9</sup> Name	Vendor	FDT Version	Protocol(s)
Network	T			
	▲ Category: Communication			
	B Modbus TCP	Eaton Corporation	2.0.0.0	Modbus over TCP
	How Modbus Serial	Eaton Corporation	2.0.0.0	Modbus over Serial Line

In this case, the Modbus TCP Ethernet DTM and the Modbus serial DTM are shown.

## **Connecting using the Modbus Serial DTM**

The Modbus serial DTM is used for the following connections between the PC running the *in*Control software and the C445:

- USB/Micro USB cable (part number C445XS-USBMICRO) to the Micro USB port on the User Interface
- 2. USB/Micro USB cable (part number C445-USBMICRO) to the Micro USB port on the Base Control Module
- RS-485 connections to the Base Control Module, RS-485 Modbus port. This includes a USB/RS-485 cable (part number C445XS-USBLEADS).

The USB driver for the USB/Micro USB cable when connected to the USB Micro port on either the User Interface or Base Control Module is installed on the computer with the *in*Control software. When this cable is plugged into the PC and either port on the C445 system, a virtual communication port will be assigned and will allow it to immediately connect. It should be noted that if the user does not have administrative rights and is having an IT person install the *in*Control software, the USB/Micro USB cable needs to be connected to a C445 during the installation for the USB driver to be installed. If it is not connected at the time of installation, it must be installed later by a person with administrator rights with the USB cable connected to a C445.

A driver for the USB/RS-485 cable must be installed on the PC running the *in*Control software for that cable to work with the software. The driver for the Eaton cable may be found on the Eaton website.

For this example, the Modbus Serial driver will be used with the USB/Micro USB cable. Select the plus sign to the left of the Modbus Serial DTM and the following window will open:

Modbus Serial - Moda	al Configuration		□ x
10101	Modbus Serial DTM Eaton Corporation Configuration Settings	F:T•N	
			-
Port	COM3 COM3	Baud Rate	19200 🔹
Parity	COM4 Even	▼ Stop Bits	1 •
Data Bits	8	▼ Transmission Mode	RTU •
(i) Quick Help			Ok

The virtual COM4 port was assigned to the USB port for this application. The other parameters are the default parameters for the micro USB ports on the Base Control Module and the User Interface. Select the COM port and then select the OK button.

Do not select ASCII as the Transmission Mode. This is not supported by this version of the *in*Control software.

Select the plus sign to the left of the C445 DTM that appears on the next screen and the following window will open:

Modbus Serial - Set Ad	ldress		x
10101	Modbus Serial DTM Eaton Corporation Set Device Address	FAT•N	
		Select language	•
Set Address Slave Address	1		
(j) Quick Help		Set	

In all cases, the Slave Address will be 1 when using one of the micro USB ports on the C445. If using the RS-485 serial port, the node address of the C445 could be any value from 1 to 253. If that is the case, the actual address of the C445 must be entered here.

One important note concerning the USB/Micro USB connection: Following disconnecting the software from the C445, the only way to connect to the C445 again is to also disconnect the Modbus serial driver, then physically unplug the USB cable from the computer, and then plug it in again. Connect to the C445 DTM again as described above.

## **Connecting Using the Ethernet DTM**

The Modbus TCP Ethernet driver can only be used if an optional Ethernet card is inserted into the Base Control Module of the C445. Refer to the C445 user manual for information on configuring the IP address of the Ethernet card using the DIP switches on the Base Control Module. The IP address on the computer must then be modified to be in the same range based on the subnet mask.

Select the plus sign to the left of the Modbus TCP DTM and the Modbus TCP driver will be added to the tree on the left of the screen as shown below.

Ν	etwork View 👻 🕂 🗙	_	Device Cata	logue × General Node Info			
Ŧ	Device Summary		Category				
	T [Unnamed]*	Г	Add <sup>9</sup>	Name	Vendor	FDT Version	Protocol(s)
	A Network	т					
•	Hodbus TCP* Modbus TCP	Þ	▲ Categ	jory: Device			
_	Modbus TCP	Г	0	PowerXL DG1	Eaton Corporation	2.0.0.0	Modbus over TCP, Modbus over Serial Line
		Г	0	🕼 C445	Eaton Corporation	2.0.0.0	Modbus over TCP, Modbus over Serial Line

Select the plus sign to the left of the C445 DTM and the following window will open:

Modbus TCP - Set A	ddress	•	x
	Modbus TCP DTM Eaton Corporation Set Device Address	F:T•N	
		Select language	•
Set Address IP Address	192.168.1.254		
(i) Quick Help		Set	

The default IP address for the C445 Ethernet option card is shown. If a different IP address is being used, the IP address in this window must be changed to that IP address. Then select the Set button and the C445 will be shown in the tree on the left under the Modbus TCP driver as shown below.

Ν	etwork View 👻 🕂 🗙	_	Device Cata	logue × General Node Info			
Device Summary			Category	<b>A</b>			
	[Unnamed]*		Add 📍	Name	Vendor	FDT Version	Protocol(s)
	Network	٣					
•	Modbus TCP* Modbus TCP		▲ Categ	ory: Device			
	Modbus TCP		0	PowerXL DG1	Eaton Corporation	2.0.0.0	Modbus over TCP, Modbus over Serial Line
	C445* Modbus TCP : Add	Þ	0	🕼 C445	Eaton Corporation	2.0.0.0	Modbus over TCP, Modbus over Serial Line
ŀ	◀ (445 192.168.1.254						

## Section 2-Opening the Offline C445 DTM Mode

For this example, the Modbus Serial driver will be used. From the following screen, double click the C445 DTM in the tree on the left portion of the screen and the C445 Offline Set-up Wizard will open on the right as shown below.



## Section 3-Configuring the Offline C445 DTM

## The Set-up Wizard

The Offline Set-up Wizard Operation

- 1. It will open anytime a new offline DTM is opened.
- 2. If the Set-up Wizard is finished (not closed) for a particular C445 offline DTM and that DTM is saved, whenever that DTM is opened, the Set-up Wizard will no longer open.
- 3. If the Set-up Wizard is used with an offline C445 DTM, the part number of the Measurement Module must be selected if this offline DTM is to be stored to the actual device at a later time. If the part number of the Measurement Module in an offline DTM does not match the actual part number of the C445 when attempting to Store to Device, the operation will not be allowed. A way to ensure this operation is to connect to the actual C445 and do a Load from Device and modify the DTM uploaded from the device. This DTM can then be Stored to Device.
- 4. Selecting the Close button at the bottom right of any of the Set-up Wizard screens will instruct the Wizard to not write any changes to the offline DTM and will immediately close the Wizard. If this operation is selected, the Wizard will re-open if Parameter Distribution is selected from the C445 DTM tool bar.
- 5. When finishing the Wizard operation by selecting the Check mark at the top of any of the Wizard screens, all changes made to that point will be written to the offline DTM and the Wizard will close. If the Save or Save As function under Project menu is used to save the project, any time this file is opened again, the Set-up Wizard will not open.
- 6. The arrows at the top of all Wizard screens are used for Wizard navigation.

## **Parameter Categories**

Following the Wizard, whether it is Closed or used to configure important operational and motor parameters, the following C445 categories and parameters will be displayed. Note that the exact Measurement Module type must be selected or the offline DTM will not be allowed to be Stored To Device (downloaded to a C445). The Measurement Module type is very important in determining the range for the FLA setting for example. So, the software does not allow any offline DTM to be downloaded to a C445 unless the Measurement Module type in the offline matches the Measurement Module actually connected to the C445.

Network View - # X Device Catalogue Ger	eneral Node Info C445 - OfflineParameters X		-
Device Summary C4	145 Iton Corporation		FAT•N
A TE [Unnamed] V Off	fline Parametrization		
A IOIOI Modbus Serial* Modbus S	< 10		P Firmware 1.00.0020 ▼ ■ ▼
Modbus Serial Motor Configuration Wiring Configuration	C445 Parameters		
C445* Modbus Serial : M C445 1 Operation Mode	Basic Settings	E	
Faults and Events  Protections		0	
Real Time Clock	Motor Rated Service Factor	1.15	%
Communications		101	A
Security	(Nominal Current)	101	A
	Motor Rated Voltage	480	v
	Motor Rated Frequency	60	Hz
	(i) Motor Rated Efficiency	85	%
	Motor Rated Watts Motor1	14914	W
	Motor Rated Watts Motor2	14914	W
	Motor Rated HP Motor 1	20.00	HP
	Motor Rated HP Motor 2	20.00	HP
	Motor Rated Power Factor	83.50	%
	<ul> <li>Motor Rated Stator Resistance</li> </ul>	280	Ohms
	Advanced Settings		
	Motor Rated Speed Motor1	1750	RPM
	Motor Rated Speed Motor2	1750	RPM
	<ul> <li>Motor Start Threshold</li> </ul>	30	%
	Motor Stop Threshold	5	%
	Motor Transition Threshold Percent	115	%
			Ok Cancel Apply
✓ Ø Stand by 0 I	Data set		

Only categories containing configuration parameters are displayed for the offline DTM. Other categories containing numerous control and monitor parameters are shown in the C445 online DTM.

The Motor Configuration category is displayed by default when initially opening the offline DTM. The parameters for this category include the motor nameplate data. If the Wizard was used, the parameters entered into the Wizard will be shown. Any parameters in this category can be modified at this time.

The parameters for each category may be accessed by selecting the category. A description for each parameter in each category may be found in the C445 user manual, publication MN042003EN, found on the Eaton website at <u>www.eaton.com</u> or accessed under the user manual icon on the C445 DTM toolbar.

Additional information for each parameter may be viewed by hovering over the (i) to the left of each parameter.

Additional features accessed with the icons shown above the categories as also shown below are described later in this chapter under the "Overview of C445 DTM Features" section.

# **₮ ±** ि छ < ∎ 0

Hovering over each icon will provide additional information about that feature.

Configuring an offline C445 DTM is useful when the devices are not present. Each C445 can be configured and saved as a file to be stored to the appropriate device later.

# Section 4—Opening and Connecting to the Online C445 DTM

Another way to configure a C445 is to do it online, and then save the final configuration to a file as a backup. Parameter Export is used to save an online or offline DTM and will be discussed later in this chapter.

Another way to save a project is to use Save or Save As under Project. This will save an entire project. If the Check mark is selected for the Start-up Wizard prior to doing a Project/Save, the Wizard will never open again for this file. In the first section of this chapter, the serial Modbus and the Modbus TCP Ethernet drivers were discussed. These drivers are used to access the C445 parameters by connecting with the C445. For this example, the serial Modbus driver will be used with the USB/Micro USB cable. This USB cable can be used with all C445 configurations because it can be connected to either the Base Control Module or the User Interface.

Plug the USB/Micro USB cable into a USB port on the computer and into the micro USB port on either the Base Control Module or the User Interface. From the screen shown below, select the C445 in the tree on the left, and then select Connect from the toolbar.

⊕ 4.· =	NETWORK VIEW	[Unnamed] (*) - Power Xp	ert inControl	?	- 8 ×
PROJECT DEVICE TOPOLOGY VIEW	GROUP AND FILTER			Adn	ninistrator 🏜 😞
☆ Cut         ™ Add           ™ Copy         X Remove           ™ Remove         M Connect         Disconnect           Exit         Exit         Connect         Disconnect	t Load from Store to Device Device Device Contine Par	meter Configuration Tragnosis meter Coserve Channel Function Compare Michael Function Desire Functional Function	Update Catalogue     Filter on Allowed     Ord Info		
Connect	Device Operations	device runctions	Device Catalogue		
Vetwork View  Pointe Summary  I Make the device onli  I I I I I I I I I I I I I I I I I I	ns. C445 Eaton Corporation Online Parametrization	A <b>I G</b> U		FAT	N 2 10 •
<ul> <li>ICNCI Modeus Serial Modeus Serial Modeus Serial</li> <li>C445* Modeus Serial 1 M</li> <li>C445* Modeus Serial 1 M</li> </ul>	Conduct Mondor (Dask board) Monstaurment Monstaurment Monstaurment Monstaurment Monstaurment Monstaurment Monstaurment Operation Mode Faults and Events Protections Protections Communications Security O O O O O O O O O O O O O	ameters lettings ol Active Control Source for Motor State (Current Based) Motor Control Status Line Frequency Voltage Phase Order I Average Nof FLA (Nominal Current) I Average Float Thermal Memory Percent Average Line IroLine Voltage Total Watis Power Factor Number Of Operating Seconds Operating Seconds (Resettable) Forward	2: FieldBus is The Active Control Source *         0: Motor Current Indicates A Stop *         68         60:00         1: ABC (L1-2-L3) *         0         0         44         480         00         4294997235         65148         Ready       F	Hz Xi Xi A Xi Xi V V V V V V V V V V V V V V V V V	ware 1.00.0020 Close
9 40	P Disconnected				
w 80					
error Log PD1 Monitor	a 👘		21 23 (*	曹観御井町心が今春なのり屋地をしろ	8.57 AM

When successfully connecting to the C445, the bar on the left side of the Modbus Serial driver and the C445 in the tree will turn from gray to green. The possible states of those bars are shown below:

Grav	Offline
Gruy	Ommo

Green Connected

- Yellow Attempting to Connect
- Red Failed to Connect



If it does not successfully connect the first time, disconnect and then try again. The USB driver for this cable is installed with the software for Windows 7, 8.0, and 8.1 operating systems. It should work provided the correct virtual communication port was selected when the Modbus DTM was added and that the cable is properly connected to the computer and the C445. Once connected, double click the C445 DTM in the tree on the left and a progress bar will appear showing that the parameters are being uploaded from the C445. When finished and if this is the first time connecting to this device, the following Set-up Wizard will open as follows:



## Section 5-Configuring the Online C445 DTM

## Set-up Wizard

The Online Set-up Wizard Operation

- 1. It will open each time the online DTM is accessed for the first time.
- 2. It is recommended to set the parameters in the Wizard the first time and be sure when finished to select the Check mark to save them to the device. Then use the Check mark button immediately to easily close the Wizard when accessing the C445 parameters in the future. Using the Check mark instead of the Close button will prevent the Wizard from opening while accessing other features while online, as described below. After configuring the C445 using the Wizard, if the Check mark is selected to write the parameters to the device and if Save or Save As under Project is used to save the project, the Wizard will not open again when using this file.
- 3. When using the Set-up Wizard online, the parameters in the Wizard contain the actual parameters from the device. That's why the Measurement Module selection is grayed out. It reflects the actual Measurement Module connected to the Base Control Module.

4. Selecting the Close button at the bottom right of any of the Set-up Wizard screens will cancel the Wizard; any changes made will be ignored and the Wizard will close. If this operation is selected, the Wizard will re-open again if the following features are selected when online with the C445:

Motor Control

Parameter Watch List

Real Time Clock

Fault Logs

- 5. Selecting the Check mark at the top of any of the Wizard screens will write all changes made to that point to the online DTM and close the Wizard.
- 6. The arrow at the top of all Wizard screens except the last one will change to the next Wizard screen.

## **Parameter categories**

Following the Wizard, whether it is Closed or used to configure important operational and motor parameters, the following C445 categories and parameters will be displayed.

© El &• ፣				[Unnamed] (*) - Powe	r Xpert inControl			? _ @ ×
PROJECT DEVICE TOP	OLOGY VIEW							Administrator 👜 💩
🔏 Cut 🔋 🗟 Add 🧃	ÞD-		Set Offline Parameter	Configuration % Diagnosis	President Catalogue			
Copy X Remove		Load from Store to	🗐 Set Online Parameter	😥 Observe 🖳 Channel Func	tions 🕈 Filter on Allowed			
n Paste 🗟 Rename		Device Device		Compare • fx Additional Fu	nctions • (1) DTM Info			
Edit		Device Operations		Device Functions	Device Catalogue			
Network View	* # ×	Device Catalogue Gen	neral Node Info C445 -	OnlineParameters ×				
V     V	al* Modbus S	Control/Monitor (Dashi Control/Monitor (Dashi Monitor)	45 Ion Corporation Iirre Parametrization Mooard) C445 Parameters	۵ წ	_	-	<b>F</b> A1	(•N
• C445 Moo	dibus Serial : M., 1	Motor Configuration Wring Configuration Operation Mode Faults and Events Protections Real Time Clock Communications Communications Society Society	Basic Settings Control → Acti Monitor → Mor →	ive Control Source tor State (Current Based) tor Control Status Frequency tage Phase Order verage % of FLA (Nominal Current) verage % of FLA (Nominal Current) verage Line-to-Line Voltage al Watts wer Factor mber Of Operating Seconds	2: FieldBus is The Active Control So 0: Motor Current Indicates A Stop 68 60:00 1: ABC (L1-L2-L3) 0 0 0 480 0 0 0 0 0 0 0 0 0 0 0 0 0	HZC V HZ K K K K V V V V V V V K S S S S S S S S		
		Remote	Forward	d	Ready	O Run	No Fault Or Warning	Firmware 1.00.0020
			Formation	ч 	e may	U TAN	e no radii of maning	Close
2	00	PConnected 😧 0	Data set					
Error Log FDT Monitor	3.0							
e = 0		¢ 🐺 🕫				• N 12 = O = + = -;	< ◇ ◆ ● ぐ ② ○ 圖 閏 � ↓ →	al 🔿 10:12 AM

Note that there are 2 additional categories shown for the online DTM:

- Control/Monitor (Dashboard)
- Measurement

These 2 categories are for monitoring online motor parameters such as currents, voltages, and more.

The Control/Monitor category is displayed when initially opening the online DTM. The parameters for this category include the Active Control Source and numerous motor parameters.

If the Wizard was used, the parameters entered into the Wizard will be shown in their appropriate categories. Any configuration parameters in any category can be modified at this time. Once changed, they will be immediately downloaded to the device. By default, if the C445 is in Run mode, configuration parameters are locked out and cannot be changed. Refer to the Security section later in this chapter for more information.

The parameters for each category may be accessed by selecting the category. A description for each parameter in each category may be found in the C445 user manual, publication MN042003EN, found on the Eaton website at www.eaton.com.

## Section 6-Store to Device / Load from Device

Store to Device and Load from Device are icons shown in the upper toolbar in the inControl software as shown below.

Additional information for each parameter may be viewed by hovering over the circled "i" to the left of each parameter.

Additional online features accessed with the icons shown above the categories and also shown below are described later in this chapter under the "Overview of C445 DTM Features" section.



Hovering over each icon will provide additional information about that feature.

Select each category to view the parameters contained in each of them to determine the features and protections for your application.

After configuring the parameters and features for a particular application, they can be saved to a file by using the export feature described later in this chapter.

PROJECT	DEVICE	TOPOLOG	GY VIEW						
🔏 Cut	E Add		-(D>		O	Set Offline Parameter	🔡 Configuration	😵 Diagnosis	🗐 Update Catalogue
E Copy	🗙 Remove	Ň	•			📃 Set Online Parameter	Observe	Channel Functions	♀ Filter on Allowed
i Paste	⊡) Rename	Connect	Disconnect	Load from Device	Device		😑 Compare 🔹	fx Additional Functions *	DTM Info
Edit Device Operations							Dev	ice Functions	Device Catalogue

Store to Device allows for the parameters of an offline DTM to be downloaded to an online DTM that is open. The following rules and procedure should be used for this feature.

- 1. A Load from Device must be performed before a Store to Device can be executed if the Measurement Module type in the offline DTM was not known when the offline Set-up Wizard was executed.
- 2. The Store to Device operation will be allowed only if the selected Measurement Module in the Set-up Wizard is the same as the one that is actually present.

## Section 7—Using the Search Feature

The search feature in the *in*Control software searches any character string entered into it and displays all parameters that apply. It begins searching and displaying matches the moment the third character is entered. The search box is at the upper right of the online and offline parameter window as shown below.



If the search is to include the long descriptions found when hovering over the circled "i" to the left of any parameter, check the Long Description box that appears when clicking in the search window, as shown above.

Once a third character is entered, results begin to appear. Continuing to add characters refines the search. Below is an example of searching for "Current."

	TOPOLOGY	леw				[Un	named] (*) - Power )	Xpert inCon	trol							? _ 리 × Administrator 🏜 a		
Open backstage page	-⊜[> e  } → 4 Connect Disco	inect Load Dev	rom Store to ce Device	Set Offine	Parameter Parameter	Configuration Cobserve Compare * Devi	* Diagnosis Channel Function fx Additional Func- tice Functions	ons f	Update Catalogue Filter on Allowed DTM Info Device Catalogue									
Network View	- 4	× Device	Catalogue	General Node Info	C445 - 0	OnlineParameters ×	3											
Device Summary	* is Serial* Modbus	s		C445 Eaton Corporation Online Parametrizat	ion	<b>0</b> 🖞								Current	741	•N × •••••••••••••••••••••••••••••••••••		
Modbu	s Serial	Co Me	ntrol/Monitor (I asurement	Dashboard) C44	45 Parameters									✓ Long Description	1			
<ul> <li>C445</li> <li>C445</li> </ul>	* Modbus Serial : I	1	Voltage				Parameter D	Data			Min Value	Max Value						
_			Power	0	Active Op	eration Mode	[	Direct Onli	18	•						<u>_</u>		
		Me Wi	System Itor Configurati ring Configurat	on G	D Active Ov Current)	erload Trip FLA (Nor	minal (	1.900		A	1	65535						
		Op Fa	eration Mode ults and Events stections	. 0	Current D	lemand Value	(	0		W								
			Real Time Clock		Average	erage % of FLA (Nominal Current)		0		%								
		⊳ Sy Se	<ul> <li>Communications</li> <li>System View</li> <li>Security</li> </ul>		vstem View 0		Average	l Average Float		A 0		A						
				0	Negative	e Sequence Imaginar	ry [	0										
				G	D   Negative	e Sequence Real	(	0										
				0	Positive	Sequence Imaginary	y [	0										
					<b>`</b>		,	,		-						T		
		Remote	Remote Forward		rd 🛛 Ready			O Run			No Fault	Or Warning	Firmware 1.00.0020					
																Close		
	0	Strain Conn	ected 🕄	🛈 Data set														
Error Log FDT Monitor																		
🛞 e 🗖	0 🛛	61 0	- <b>P</b>								00	0 3 4	8940		19:46 Jal	🗢 2:19 PM		

With Long Descriptions checked, the search results include parameter names and the descriptions found under the information area for all parameters. To limit the search to only the parameter names, do not check the Long Descriptions box when using the search tool.

## Section 8–Overview of C445 DTM Features

#### **DTM Toolbar Features**

Additional powerful features in the C445 DTM can be accessed from the toolbar right above the categories as shown below.



Descriptions of these features are displayed by hovering over the icons. These features are described in order from left to right below.

A. Parameter Export

This feature extracts all parameters for the open online or offline DTM and stores them in a local file. It is supported for both an online and an offline DTM.

B. Parameter Import Copy

This feature opens a previously exported local file and copies all non-critical parameters to the open DTM. Non-critical parameters refers to parameters not specific to a particular device, such as Protection selections including Trip and Warning Enable bits, Current and Voltage Alarm Levels and Debounce times can be applied to multiple different C445 DTMs. Parameters specific to each C445 such as FLA setting, serial Modbus node address and IP address if the optional Ethernet card is used are not copied. It is supported for both an online and an offline DTM. C. Parameter Import Clone

This feature opens a previously exported local file and copies all parameters to the open DTM. This feature is similar to the Import Copy described above, but when this clone feature is executed, all parameter values in the open DTM are overwritten by the imported file. It is supported for both an online and an offline DTM.

D. Local Parameter Compare

This feature compares each parameter of two previously exported local files or the parameters of an open DTM with those of a previously exported local file. The result is a list of all parameters indicating which parameters are different and which contain the same values. The values of each parameter are also displayed. If only parameters that differ are to be displayed, select the Check Box for "Hide Identical Entries." It is supported for both an online and an offline DTM.

E. Parameter Distribution

This feature only applies to an Offline DTM. It allows selected parameters from the open offline DTM to be copied to any existing offline or online DTMs. Below is an example of a few selected parameters for an offline C445 DTM at node 3 ready to be copied to a selected offline C445 DTM at node 2 and another selected online C445 DTM at node 1.

⊕ 4 • =				[Ur	named] (*) - Power Xpert in(	Control		? _ @ ×
PROJECT DEVICE	TOPOLOGY VIEW							Administrator 🎂 🚕
Yes Street				ell conformation	Santonic	65.0.1. A.I.		
and Cut E Add		Q	Set Omine Parameter	Em Configuration	a Diagnosis	Update Catalogue		
🗈 Copy 🗙 Remove	Econect Disconnect	Load from St	Set Online Parameter	🕞 Observe	P Channel Functions	Filter on Allowed		
🖹 Paste 🖼 Rename	Comment Disconnect	Device D	levice	Compare *	fX Additional Functions •	DTM Info		
Edit		Device Opera	ations	Dev	ice Functions	Device Catalogue		
Network View	- 4 ×	Device Catalogue	e General Node Info C4453	- OfflineParameters	C4453 - Parameter Distrib	ution ×		
Device Summary		100	C445					
Ŧ		45	Eaton Corporation					
T [Unnamed]		<b>V</b>	Paramatar Natilation					
A Network		~	Palalifetet casalovatori					
Madh	e Carlal* Madhur S							H .
→ ICIOI Modbu	s Serial	- Parameter Distrib	ation					A
(A. 011)		C445 Device S	Belection					
C445	<ul> <li>Modbus Serial : M</li> </ul>	0110 00100 0						
4 000		Select All Select	None Reverse Selections Refresh					
C445	Z* Modbus Serial :	Selected D	evice Slave Address	System Tag	Status			
4 (H)	4		445 1	50500ee1-2272-4c1d-	8408-8db58c9e9036			
> C445	3* Modbus Serial :	<u> </u>	4432 Z	2200001-2272-4038-	5140-071530324675			
- C445	2						Send Data	
		C445 Paramet	ter Selection					
		Salact All Salact	None Reverse Selections Refresh					
		Octored 0		Mahua				
		Selected P	arameter	value				
		B	ehavior	°				
		V M	lotor Rated Frequency	60				
		2 M	lotor Rated Efficiency lotor Rated RE (Scaled)	85				
			lotor Rated Service Factor	115				
		V M	lotor Start Threshold	30				
		M M	lotor Stop Threshold	5				
		E M	lotor Transition Threshold Percent	115				
		M	lobal Auto Reset Enable	False				
		T	rip Auto Reset Enable Bits	00 00 00 00				
				14				
								Close
2	00	Stand by	Data set					
Error Lon EDT Monitor								
enter tog PDT Monitor								
🛞 é 🔚	0 0 0	ý 🕎	-(D)				• N 12 = Q = 1 = 2 < 4 < 0 < 2 < 0 < 1 < 1 < 0 < 1 < 0 < 1 < 0 < 1 < 0 < 0	1 🖬 🔥 🔊 1.13 PM
F. Motor Control

This feature provides the ability to control the C445 as the fieldbus master as well as monitor very useful information such as:

- 1. Average current as a % of FLA
- 2. Average voltage
- 3. Thermal capacity
- 4. Average current—floating point format
- 5. Status of 4 inputs on the Base Control Module
- 6. Status of 4 inputs on the User Interface
- 7. Status of 3 outputs on the Base Control Module
- 8. C445 status, i.e., Running, Faulted, Warning, Inhibited, Ready, Remote/Local Control mode
- 9. Active Fault, Warning, and Inhibit information

G. Parameter Watch List

This feature provides the ability to plot up to 8 parameters at a time. This is very useful for viewing how different parameters interact with one another as well as how they act relative to time. There are 39 different parameters that can be plotted.

Select the Parameter Watch List icon and the following screen will open:

Device Catalogue	General Node Info	C445 - OnlineParameters	C445 - Parameter Watch Lis	t ×		•
	C445 Eaton Corporation Parameter Watch List				<b>F</b> A	(•N
	A I O 😃					•
Graph						
	<sup>2</sup> 49:30 PM 6/18/2015 Sample Rate (sec) 2	<sup>2,49,30</sup> PM <sup>6/18/2015</sup> <sup>6/1</sup>	50.00 PM 182015 ★ ★ ► ►	2:51:30 PM 6/18/2015 Q. Q. Q. Q	2:52:00 PM 6/18/2015	2.52:30 6/18/2015
Parameter Sele	ection Motor Control					

Select the Parameter Selection tab at the lower left of the screen to access the parameters to plot. Select one of the 8 channel rows starting with CH0, then choose a parameter from the list, and click the Assign button to assign it to the selected channel. The example below shows the startup plot for Average Floating Point Current, Average Voltage, and % Thermal Capacity.



Note that the plot was started prior to running the motor by selecting the Play button shown above. To control the motor from this feature, select the Motor Control tab and select the Play button on that screen to instruct the C445 to close its output that energizes the contactor that runs the motor.

H. Real Time Clock

The Real Time Clock feature uses the optional RTC module that plugs into the Base Control Module behind the communication module slot. The RTC module also contains non-volatile backup of the entire configuration of the C445 it is plugged into. This non-volatile memory is not battery-backed memory, but is non-volatile memory that will retain its contents. Refer the C445 user manual for information on this very useful feature.

The battery on the RTC module is to retain the date/time information. All of the date/time parameters can be found in the Modbus memory map chapter in the C445 user manual. That allows the user to update the date/ time from any Modbus or Modbus TCP master as often as needed.

Another method for setting the date/time is to use the *in*Control software tool. Select the Real Time Clock icon and the following screen will open:

Device Catalog	gue General Node Info	C445 - OnlineParameters	C445 - Real Time Clock ×	
	C445 Eaton Corporation Real Time Clock			FAT•N
	A I O 😃			10
-			Date : Saturday, January 01, 2000 Time : 1:22:00 AM	
Central Standa	rd Time			
Change Tim	iezone			Sync to System Timezone
Set Timezon	•			· ·
(UTC-06:0	)) Central Time (US & Canad	a)		▼
United Stat	es of America			•
Start Month	May • Week	Day of Week Sund	ay Vinute 0	
End				
Month	November 👻 Week 🤅	5 Day of Week Sund	ay Hour 2 Minute 0	

Select the box to the left of "Change Date and Time," and then select the "Sync to System Timezone" button, followed by the Sync to System Time button. The RTC information will be read from the computer and it will be written to the RTC module connected to the C445. This feature is only accessible online.



The *in*Control software tool can also be periodically connected to each C445 to update the date/time to retain accuracy and keep all C445s at the same date/time from the computer.

I. Fault Logs

This feature provides 2 important pieces of fault information:

- 1. A history of the last 10 faults
- 2. A snapshot of numerous critical parameters at the time of the most recent fault.

Both of these pieces of fault information are very important in troubleshooting a problem motor or its motor control system. Below is an example of this Fault Log window:

Device Catalogue	G	eneral Node Info C445 - OnlineParameter	s C445 - Fault L	ogs X	•
	C E F	445 aton Corporation ault Logs			FAT-N
C445 Fault Logs	2				· · · · · · · · · · · · · · · · · · ·
Active Fault			F	ault Snapshot (Trip Cau	ise)
			£3	Time Base	: C445 Accumulated Run Time
Active Fault		No Faults		Fault Code	:1
Active Warnin	ing	No Warnings		Fault Description	: Under Voltage
•	- L			Fault Time	: 00:01:21
Active Inhibit		No Inhibits		Fault Date	: 2000-01-01
Fault Logs				Thermal Memory	:0%
			Î	Current Phase A (L1)	:0A
Entry	ID	Fault Description	<b>A</b>	Current Phase B (L2)	: 0 A
1	1	Under Voltage		Current Phase C (L3)	: 0 A
2	1	Under Voltage		Voltage AB (L1-L2)	: 0 V
3	17	Contactor Failure		Voltage BC (L2-L3)	: 0 V
4	2	Over Voltage		Voltage CA (L3-L1)	: 0 V
5	16	Low Power		Line Frequency	: 0 Hz
6	19	Overload		Ground Current	: 0 A
7	2	Over Voltage		Apparent Power	: 0 VA
8	2	Over Voltage		Real Power	: 0 W
9	16	Low Power		Power Factor	:0
10	2	Over Voltage		TroubleShooting	Trip occurs If mains voltage drops below

This Fault Log also shows the current Fault, Warning, and Inhibit. It also provides troubleshooting information for the latest fault and when hovering over any of the faults in the Fault queue, it provides a detailed description of the fault. J. User manual

This button will allow the C445 user manual or the *in*Control software user manual to be opened. This works offline or online.

K. System Services

The System Services consist of the following:

- 1. Re-Pair External Modules
- 2. Factory Reset
- 3. Soft Reset
- 4. Fault Reset

The Re-Pair feature will clear a fault generated by changing the ports on the Base Control Module that the Measurement Module and the User Interface are plugged into. It will also clear the fault caused by plugging a different size Measurement Module or a different type of User Interface module. It will then instruct the Base Control Module to accept the changes as a valid new system.

Factory Reset will reset the entire C445 system back to factory default settings. This should be used with care so as not to lose the configuration of a C445 system.

A Soft Reset is required following a change of something like the Operation Mode or the Local or Remote Control Source. It forces the C445 to accept the change that will inhibit the C445 until the Soft Reset is executed.

Fault Reset will reset a fault provided the fault condition is no longer present.

#### Security/Parameter Lock

A. Administrator Password Lock

By default, there is no active Administrator password set.

There are 2 ways to set the Administrator Password.

- 1. Using the inControl software
- 2. Writing directly to Modbus register 5000 with a Modbus master, and then unlocking the parameters with the password by writing to register 5002. Both are 32 bit values, so 5000 and 5002 are starting addresses and a length of 2 is needed if the password exceeds 16 bits.

The range for the password is 1 to 4,294,967,295. Do not use commas when entering the password value.

All pertinent configuration parameters are protected with the Administrator password. These parameters will be grayed out and cannot be changed with the *in*Control software until the correct password is entered. An error exception code 4 will be received if it is attempted to change configuration parameters via Modbus commands until the password is sent to the Administrator Login registers, 5002-5003. The password can be set using the *in*Control software when online with the C445 or in the offline DTM followed by a Store to Device. In either case, once a valid password has been set in a C445, a soft reset or power cycle must be performed before it will take effect.

If a password has been set online and an offline DTM is opened and the correct Measurement Module is selected using the offline Wizard, but the password set online is not entered into the offline DTM, a Store to Device will result in an error. If configuration changes are made to an offline DTM and the user wishes to write them to the online C445, the correct password must also be entered into the Security section for the offline DTM, and then a Store to Device will allow the new configuration data to be written to the C445.

A password of 0 means that the system is unlocked and that the Administrator Lock feature is disabled. The Set Admin Password register (5000-5001) will be a value of 0 when the feature is disabled and a value of 4294967295 if a password has been set.

There is no way to read back the Set Admin Password register (5002-5003). If the password is lost, the only way to recover access to the C445 parameters is to perform a factory test.

Procedure for setting an Administrator password in a C445 using the *in*Control software tool in the online mode:

- 1. Go to the Security page.
- 2. Enter a Password for the "Set Admin Password" parameter, e.g., 123. It will automatically get written to device.
- Perform a Soft Reset to allow the device to save this value. The soft reset can be found in System Services.
- 4. Following the Soft Reset, the C445 will be locked with the Admin Password.
- 5. Logging into the device and entering the password is required to make configuration changes.
- Enter the password into the Administrator Login (e.g., 123) and all configuration parameters will be unlocked.

Procedure for setting an Administrator password in an offline C445 DTM using the *in*Control software tool:

- 1. Use the Set-up Wizard when accessing the offlineC445 DTM and be sure the Measurement Module type is selected to match the actual C445 this file will be downloaded to later.
- 2. Go to the Security page.
- 3. Enter a Password for the "Set Admin Password," e.g., 123. Then enter the same password into the Administrator Login parameter.
- 4. Perform a Store to Device to write this offline DTM to the C445.

- 5. The parameters will now be downloaded to the online DTM.
- 6. Logging into the device and entering the password is required to make additional configuration changes.
- 7. Enter the password into the Administrator Login (e.g., 123) and all configuration parameters will be unlocked.
- B. USB Password Lock

By default, there is no active USB password.

There are 2 ways to set the USB Password.

- 1. Using the *in*Control software.
- 2. Writing directly to Modbus register 5004 (set USB Port Password) with a Modbus master, and then unlocking the parameters with the password by writing to register 5006 (USB Login). Both are 32 bit values, so 5004 and 5006 are starting addresses and a length of 2 is needed if the password exceeds 16 bits.

The range for the password is 1 to 4,294,967,295. Do not use commas when entering the password value.

The USB Password lock prevents changing configuration parameters in a C445 only when being accessed via the Micro USB ports on the User Interface or Base Control Module. If the *in*Control software uses Modbus TCP via an optional Ethernet card or Modbus via the RS-485 port, access to change configuration parameters is unaffected by the USB Password Lock.

The password can be set using the *in*Control software when online with the C445 or in the offline DTM followed by a Store to Device. In either case, once a valid password has been set in a C445, a soft reset or power cycle must be performed before it will take effect.

If a password has been set online and an offline DTM is opened and the correct Measurement Module is selected using the offline Wizard, but the password set online is not entered into the offline DTM, a Store to Device will result in an error. If configuration changes are made to an offline DTM and the user wishes to write them to the online C445, the correct password must also be entered into the Security section for the offline DTM, then a Store to Device will allow the new configuration data to be written to the C445.

A password of 0 means that the system is unlocked and that the USB Port Lock feature is disabled. This Set USB Port Password register (5004-5005) will be a value of 0 when the feature is disabled and a value of 4294967295 if a password has been set.

There is no way to read back the USB Port Password previously set, register (5006-5007). If the password is forgotten, the only way to recover access to the C445 parameters is to perform a factory test.

Procedure for setting a USB password in a C445 using the *in*Control software tool in the online mode:

- 1. Go to the Security page.
- Enter a Password for the "Set USB Password," e.g., 123. It will automatically get written to device.
- 3. Perform a Soft Reset to allow the device to save this value. The Soft Reset can be found in System Services.
- 4. Following the Soft Reset, the C445 will be locked with respect to modifying configuration parameters via a USB Port, unless the correct password is entered.
- 5. Logging into the device and entering the password is required to make configuration changes.
- 6. Enter the password into the USB Login (e.g., 123) and all configuration parameters will be unlocked.

Procedure for setting a USB Port password in an offline C445 DTM using the *in*Control software tool:

- Use the Set-up Wizard when accessing the offline C445 DTM and be sure the Measurement Module type is selected to match the actual C445 this file will be downloaded to later.
- 2. Go to the Security page.
- 3. Enter a Password for the "Set USB Port Password," e.g., 123.
- Perform a Store to Device to write this offline DTM to the C445, which will include the new USB Port password.
- 5. The parameters will now be downloaded to the online DTM.
- 6. Logging into the device and entering the password is required to make additional configuration changes.
- 7. Enter the password into the USB Login (e.g., 123) and all configuration parameters will be unlocked.
- C. Running Parameter Lock

By default, when the C445 is actively running a motor, the configuration parameters are locked. They may not be modified with the *in*Control software or via Modbus Write commands.

To disable this feature, there is a check box in the Operation Mode category of the *in*Control software with the description: Motor Run Parameter Lock Override. Checking this box overrides this Run Lock feature and allows configuration parameters to be changed while the motor is running. Before overriding this safety feature, be sure that allowing configuration parameters to be modifying while the motor is running will not cause harm to personnel or equipment.

### Language Selections

Various language selections can be made from a drop-down menu in the software. Per the following, select the down arrow next to the flag located in the upper right corner of the C445 DTM window.



The country represented by each flag can be viewed by hovering over each flag. Select a flag for the language required and all category names and parameter names will immediately change to the selected language for that country.

#### Section 9–Using the Firmware Upgrade Tool

## Updating the firmware for a C445 using the Firmware Upgrade Tool

The latest firmware for the C445 system is located on the Eaton website www.eaton.com. Download the firmware files and then access the Firmware Upgrade Tool from the Start menu, under Eaton/Power Xpert *in*Control. The Upgrade Tool is installed with the One Installer. Be sure to note where the firmware files are stored. The following firmware files allow for upgrading any and all modules in your C445 system:

- C445\_Package\_xx\_Codepack
- C445\_Package\_xx\_Config

The xx will be the firmware revision number. The file C445\_Package\_xx\_Config is the file that must be selected from the Firmware Upgrade Tool. The process is described below.

The firmware can be upgraded by connecting to either the RS-485 port on the Base Control Module or to one of the RJ12 ports on the Base Control Module.

### Updating the firmware for a C445 using the RS-485 port

The cable for upgrading the firmware for a C445 system using the RS-485 port is the USB/RS-485 cable from Eaton, part number C445XS-USBLEADS. The USB driver for this cable can be found on the Eaton website.

Connect the C445XS-USBLEADS cable between the USB port on the computer and the RS-485 port on the C445 Base Control Module.

Start the Firmware Upgrade Tool software and the following screen will open.

ptions Help							
Configuration							
Configuration File C:\Users\E0057	779\Documents\PCTool\Pa	ckage17\C445_	Package_17_Confi	ig.xml	Browse		
Slave Address 0x01 COM Port COM3  Connect							
Product Name C445	Product Code 0x8300	Serie	al Number	Program			
rogra Processor	Memory	Device Rev	File Rev	Program Status			
Base Control Module (BCM)	Application Flash		1.00.0020	Device not present			
Control User Interface (CUI)	Application Flash		1.00.0016	Device not present			
Ethernet Option Card	Application Flash		1.01.0033	Device not present			
Measurement Module (MM)	Application Flash		1.00.0033	Device not present			
PROFIBUS Option Card	Application Flash		1.00.0021	Device not present			
og					1		

The following are the steps for upgrading the firmware:

- Select the Browse button and browse for the firmware files previously downloaded. Select the file: C445\_Package\_xx\_Config.
- Select the down arrow next to the Com Port and select the virtual Com Port the computer assigned for the USB/ RS-485 cable. Also select the slave address of the C445.
- 3. Click the Connect button to the right of the Com Port selection and the Upgrade Tool will connect to the C445 and display the following.

🖄 Eaton Power	🛵 Eaton Power Xpert inControl - Firmware Upgrade Tool								
Options <u>H</u> elp									
Configuration									
Configuration	Configuration File C:\Users\E0057779\Documents\PCTool\Package18\C445_Package_18_Config.xml Browse								
Slave Addres	Slave Address 0x01 COM Port COM10 Disconnect								
Product Nam	Product Name C445 Product Code 0x8300 Serial Number 0 Program								
Progra	Processor	Memory	Device Rev	File Rev	Program State	JS			
Base C	Control Module (BCM	Application Flash	1.00.0019	1.00.0020					
Contro	ol User Interface (CUI	Application Flash	1.00.0032	1.00.0016					
PROFIL	BUS Option Card	Application Flash	1.00.0019	1.00.0022					
Ethern	et Option Card	Application Flash		1.01.0033	Device not prese	ent			
Log						*			
🕒 Idle									

Note that the C445 system has been placed into boot mode. LEDs on all modules will begin to blink fast, indicating they are all in boot mode. The software will then display all possible C445 system modules. It also shows which modules are present and shows the actual version of the firmware in each module as well as the firmware versions in the file selected for the upgrade. This allows the user to compare the version of firmware in the C445 modules with the firmware in the file.

In the screen shot shown above, the firmware version of the file is a later version than what is in the C445 devices. It also shows that this C445 system includes a PROFIBUS card rather than an Ethernet card. 4. The next step is to select the boxes to the left of each module to be upgraded, and then select the Program button as shown below.

i	🚵 Eaton Power Xpert inControl - Firmware Upgrade Tool								
	<u>Options</u>	; <u>H</u> elp							
	Configuration								
	Configuration File C:\Users\E0057779\Documents\PCTool\Package18\C445_Package_18_Config.xml Browse								
	Slave Address 0x01 COM Port COM10 Disconnect								
	Produ	ict Name C445	Product Code 0x8300	Seri	al Number	0	Program	<i>4</i> 5	
	Progra	Processor	Memory	Device Rev	File Rev	Program Stat	tus		
1	<b>V</b>	Base Control Module (BCM	Application Flash	1.00.0019	1.00.0020				
		Measurement Module (MN	Application Flash	1.00.0032	1.00.0033				
	7	PROFIBLIS Option Card	Application Flash	1.00.0019	1.00.0010				
1		Ethernet Option Card	Application Flash		1.01.0033	Device not pres	sent		
	Log							~	
	O Io	dle							
L									

The firmware will begin upgrading with the first module selected, the Base Control Module.

### Chapter 6—C445

🖧 Eat	on Power Xpert inControl - Firm	nware Upgrade Tool - [52%]				_ 🗆 🗙		
Option	ns <u>H</u> elp							
Conf	iguration							
Cor	Configuration File C:\Users\E0057779\Documents\PCTool\Package18\C445_Package_18_Config.xml Browse							
Slav	Slave Address 0x01 COM Port COM10							
Proc	luct Name C445	Product Code 0x8300	Seri	al Number	0 Cancel	æ		
Prog	ra Processor	Memory	Device Rev	File Rev	Program Status			
1	Base Control Module (BCM	Application Flash	1.00.0019	1.00.0020	52%			
$\checkmark$	Measurement Module (MN	Application Flash	1.00.0032	1.00.0033	Queued			
1	Control User Interface (CUI	Application Flash	1.00.0015	1.00.0016	Queued			
1	PROFIBUS Option Card	Application Flash	1.00.0019	1.00.0022	Queued			
	Ethernet Option Card	Application Flash		1.01.0033	Device not present			
Loa						<b></b>		
θ	Writing 0x0FE8 bytes with Star	ting Address 0x8049840						

Progress will be displayed as well as success or failure information for each device.

il.z	Eator	n Power Xpert inControl - Firm	ware Upgrade Tool - [5%]				<b>– –</b> X	
0	ptions	; <u>H</u> elp						
1	Config	uration						
	Confi	iguration File C:\Users\E0057	779\Documents\PCTool\Pa	ckage18\C445_	Package_18_Co	onfig.xml	Browse	
	Slave	Address 0x01 COM Po	rt COM10	~	Disco	onnect		
	Produ	ct Name C445	Product Code 0x8300	Seri	al Number (	Cancel	æ	
	Progra	Processor	Memory	Device Rev	File Rev	Program Status		
	1	Base Control Module (BCM	Application Flash	1.00.0019	1.00.0020	Programming Success - Verification OK		
	1	Measurement Module (MM	Application Flash	1.00.0032	1.00.0033	5%		
ы.	1	Control User Interface (CUI	Application Flash	1.00.0015	1.00.0016	Queued		
11	1	PROFIBUS Option Card	Application Flash	1.00.0019	1.00.0022	Queued		
		Ethernet Option Card	Application Flash		1.01.0033	Device not present		
Ľ								
	og						*	
	<b>)</b> v	Vriting 0x03E8 bytes with Start	ing Address 0x8006A60					

5. When all selected modules have been upgraded and verified, select the Disconnect button to the right of the Com Port to complete the process and take the C445 out of boot mode. This is indicated by the C445 modules turning their LEDs on then off, and then stop fast flashing them like they were while in boot mode. When the modules turn all LEDs on then off, this indicates the C445 modules are executing a Soft Reset, which takes them out of boot mode. The C445 is now ready to be configured and operated normally.

# Updating the firmware for a C445 using an RJ12 port

The process for updating the firmware using the USB/RJ12 port connected to either RJ12 port on the C445 Base Control Module is similar to the procedure above for the USB/RS-485 cable except it must be accomplished in two firmware downloads and the C445XS-USBRJ12 cable is required.

**Note:** When connecting with this cable, the slave address does not matter and is not used.

The User Interface Module and the Measurement Module are typically connected to the two RJ12 ports on the Base Control Module. Because the upgrade can only be done to the Base Control Module, one of the RJ12 devices connected to it must be disconnected for the firmware download. All connected modules in the C445 system may then have the firmware updated, but a second download will be necessary for the module that was disconnected to accommodate the USB/RJ12 cable for the first firmware download.

For example,

- 1. Disconnect the User Interface from the Base Control Module to free up a port for the USB/RJ12 cable.
- 2. Plug the cable into the free RJ12 port and update the firmware for the Base Control Module, the Measurement Module, and the optional Ethernet or PROFIBUS module if used.
- 3. When finished, select the Disconnect button to complete the process and bring the C445 modules out of boot mode.
- 4. Then power down the C445 system, disconnect the Measurement Module and connect the USB/RJ12 cable to the port vacated by this module. Then connect the User Interface to the other RJ12 port on the Base Control Module.
- 5. Then connect the User Interface to its original RJ12 port and run the Firmware Upgrade Tool again, but this time only select the User Interface. When it finishes, select the Disconnect button to complete the process and bring the C445 modules out of boot mode.

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