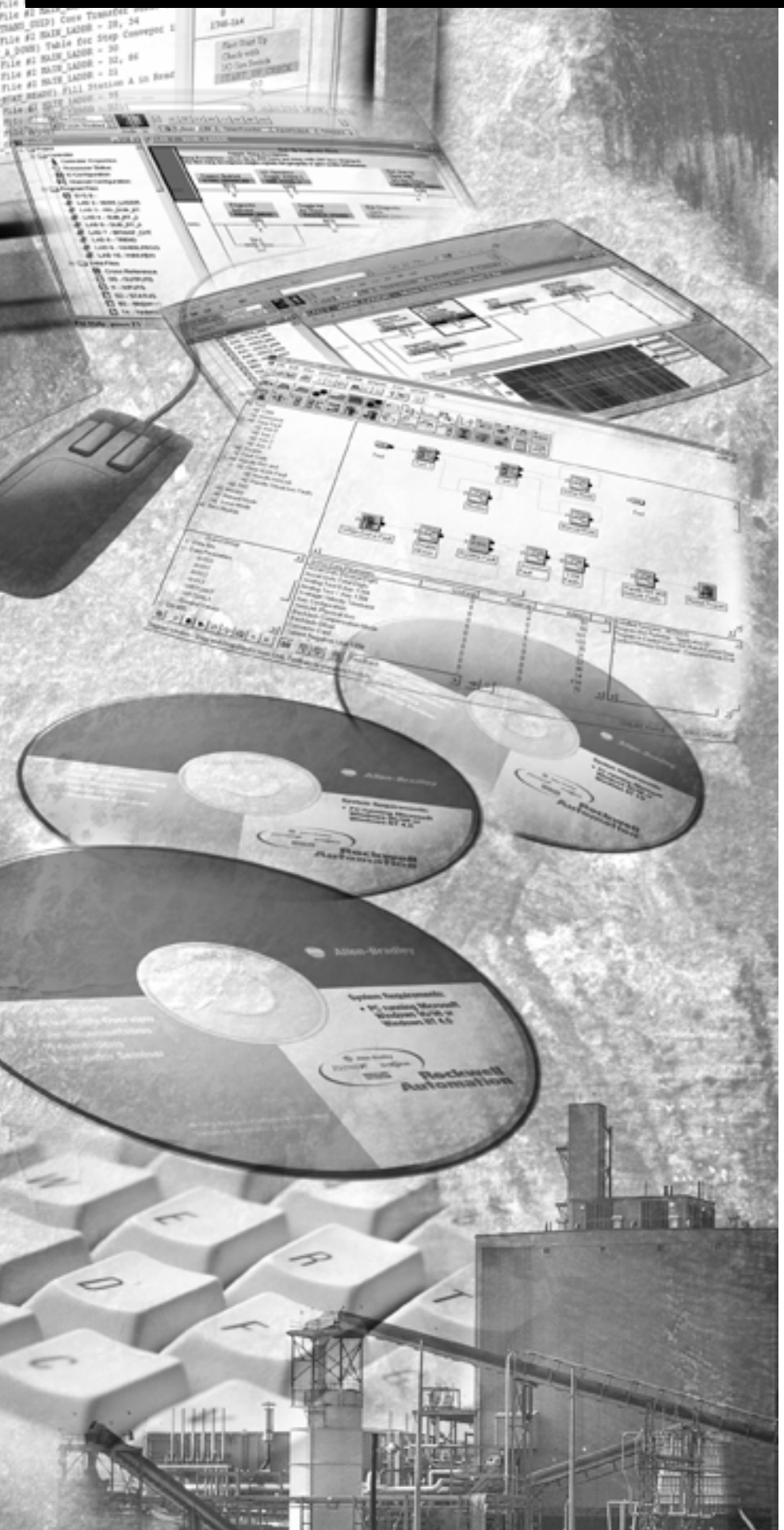


Allen-Bradley

# Modbus Applications

## For PanelView Plus and PanelView Plus CE Terminals

**2711P**

**User Manual**

Rockwell Automation

## Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

| | |
|---|---|
| **WARNING**  | Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss. |
| **IMPORTANT** | Identifies information that is critical for successful application and understanding of the product. |
| **ATTENTION**  | Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence |
| **SHOCK HAZARD**  | Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present. |
| **BURN HAZARD**  | Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures. |

# Table of Contents


**Preface**

Topics Covered . . . 7
Software Requirements . . . 8
Additional Resources . . . 8

**Chapter 1**

**Installing Software**

Objectives . . . 9
Install RSView Studio . . . 9
Install KEPServer Enterprise . . . 10
Firmware Upgrade Wizard . . . 10

**Chapter 2**

**Modbus KEPServer Drivers**

Objectives . . . 11
Modbus Master/Slave . . . 11
- Modbus (RTU) Serial . . . 11
- Modbus Unsolicited Serial . . . 11

Modbus ASCII . . . 13
Modbus/TCP . . . 13
- Modbus Device Model . . . 13
- MailBox . . . 13

Guidelines for Developing Modbus Applications . . . 14
- Create a Modbus Application . . . 14
- Compile, Download and Run a Modbus application . . . 14

**Chapter 3**

**Configuring KEPServer Drivers for Modbus**

Objectives . . . 15
Create a Project File . . . 15
Select the Default Project File (.pfe) . . . 16
Configure Drivers for Modbus Protocols . . . 17
- Add a Channel . . . 17
- Add A Device . . . 24

Create Tags . . . 32

**Chapter 4**

**Testing KEPServer Communications**

Objectives . . . 35
Use the OPC Quick Client . . . 35

**Chapter 5**

**Making KEPServer Drivers and Tags Available in RSView Studio**

Objectives . . . 37
Create an OPC Data Server . . . 37
Browse KEPServer Tags . . . 39

**Chapter 6**

**Installing KEPServer Drivers on Terminal**

Objectives . . . 41
Firmware Upgrade Wizard . . . 41
Preparing Terminal for Firmware Upgrade . . . 41
Copy FUP Files to Development Computer . . . 42
Upgrade Firmware using a Compact Flash Card . . . 42
Upgrade Firmware using a Network (Ethernet) Connection . . . 46

**Chapter 7**

**Compiling, Downloading, and Running Application**

Objectives . . . 53
Compile a Runtime Application File . . . 53
Download Application to Terminal . . . 54
Connect Terminal to Modbus Network . . . 56
Modbus Serial Cables . . . 56
Modbus Ethernet Cables . . . 57
Run Application . . . 58

**Chapter 8**

**Troubleshooting**

Objectives . . . 59
Common Errors . . . 59
Runtime Errors . . . 59

**Appendix A**

**Data Types**

**Appendix B**

**Modbus/TCP Address Definitions**

Output Coils . . . 63
Input Coils . . . 63
Internal Registers . . . 64
Holding Registers . . . 65
Mailbox Addressing . . . 67
Instromet Addressing . . . 68

**Appendix C**

**Modbus ASCII Address Definitions**

Output Coils . . . 69
Input Coils . . . 69
Internal Registers . . . 70
Holding Registers . . . 71

**Appendix D**

**Modbus Unsolicited Serial Address Definitions**

Output Coils . . . 73
Input Coils . . . 73
Internal Registers . . . 74
Holding Registers . . . 75

## Appendix E

**Modbus (RTU) Serial Address Definitions**

Output Coils . . . . . 77
Input Coils . . . . . 77
Internal Registers . . . . . 78
Holding Registers . . . . . 79
Magnetek Address Descriptions . . . . . 81
Elliott Flow Computer Address Descriptions . . . . . 82
Omni Address Descriptions . . . . . 83
Daniel S500 Address Descriptions . . . . . 88

**Index**

Rockwell Automation Support . . . . . 93
Installation Assistance . . . . . 93
New Product Satisfaction Return . . . . . 93

For communication with controllers, RSView Machine Edition products are configured with:

- RSLinx Enterprise for most Rockwell Automation networks or
- KEPServer Enterprise for RSView OPC servers.

The KEPServer OPC server expands PLC and device connectivity options by incorporating 26 communication drivers for the PanelView Plus and PanelView Plus CE platforms, and over 31 communication drivers for RSView Machine Edition running on a desktop.

This guide will show you how to configure KEPServer drivers, specifically Modbus drivers, for RSView ME applications that run on:

- PanelView Plus CE terminals,
- PanelView Plus terminals,
- or the Windows 2000/XP environment.

Using configured KEPServer drivers in your RSView ME application, the terminals will be able to communicate with devices on a Modbus network.

## Topics Covered

- *Chapter 1 Installing Software* - Covers software installation for RSView Studio, RSView Enterprise, KEPServer Enterprise and the Firmware Upgrade Wizard.
- *Chapter 2 Overview of Modbus Protocols* - Gives an overview of Modbus Master/Slave Protocol and each of the KEPServer drivers for Modbus communication protocols.
- *Chapter 3 Configuring KEPServer Drivers for Modbus* - Shows how to use KEPServer Enterprise software to configure KEPServer drivers for Modbus protocols. For each driver, you will create a channel, add a device, and create tags. The driver is saved to a .pfe project file that you will set as the default project.
- *Chapter 4 Testing KEPServer Communications* - Shows how to use the OPC Quick Client to test KEPServer communications for the driver and tags created in Chapter 3.
- *Chapter 5 Making KEPServer Driver and Tags Available in RSView Studio* - Shows how to create an OPC data server in RSView Enterprise or RSView Studio. This server will allow you to access the KEPServer driver and tags from your RSView ME application.
- *Chapter 6 Installing KEPServer Drivers on Terminal* - Shows how to use the Firmware Upgrade Wizard to install KEPServer drivers on PanelView Plus/PanelView Plus CE terminals.

- *Chapter 7 Compiling, Downloading, and Running Application* - Shows how to compile a runtime .mer file, connect your PanelView Plus/PanelView Plus CE terminal to a Modbus network, download the .mer file to the terminal, and run the application.
- *Chapter 8 Troubleshooting* - Covers common error types that occur during runtime and how you can correct these errors.

## Software Requirements

The following software must be installed on the development desktop:

- RSView Studio 3.0, or later
- KEPServer Enterprise software
- Firmware Upgrade Wizard

## Additional Resources

You might want to consult the following sources for additional information:

- KEPServer Enterprise Software online help
- RSView Enterprise or RSView Studio online help
- PanelView Plus User Manual, publication no. 2711P-UM001

An electronic version of the PanelView Plus user manual is available at:

http://literature.rockwellautomation.com

# Installing Software

## Objectives

To develop RSView ME applications, configure KEPServer drivers, and use these drivers with applications that run on PanelView Plus/PanelView Plus CE terminals, the following software must be loaded on your development computer:

- RSView Studio for ME or RSView Enterprise
- KEPServer Enterprise
- Firmware Upgrade Wizard

Refer to the installation information provided with RSView Studio and KEPServer Enterprise for the latest details on installation requirements.

## Install RSView Studio

RSView Studio Enterprise or RSView Studio for Machine Edition software is installed from:

- a CD or
- downloaded from the Rockwell Software website at www.software.rockwell.com.

**IMPORTANT** A current registered serial number is required to download software from the Rockwell Software website.

The installation menu with instructions will appear when inserting the CD into a computer or you can run setup.exe from the root directory.

## Install KEPServer Enterprise

KEPServer Enterprise is used to:

- configure the KEPServer driver
- create tags
- test communications on the desktop.

KEPServer Enterprise is included with RSView Studio and can be installed from:

- a CD or
- downloaded from the Rockwell Software web site at www.software.rockwell.com.

KEPServer runs as a service and an icon will display in the toolbar.

**IMPORTANT** A current registered serial number is required to download software from the Rockwell Software website.

The software can be installed by running the setup.exe file from the CD or downloaded version.

**IMPORTANT** When installing KEPServer Enterprise, be sure to select the Modbus drivers if you are not doing a full install.

## Firmware Upgrade Wizard

The Firmware Upgrade Wizard is used to install KEPServer drivers and upgrade firmware in the following devices:

- PanelView Plus
- PanelView Plus CE

The Firmware Upgrade Wizard is installed automatically with RSView Studio.

The Firmware Upgrade (FUP) files with the KEPServer drivers is available at http://support.rockwellautomation.com under Downloads.

# Modbus KEPServer Drivers

## Objectives

This chapter provides an overview of MODBUS KEPServer drivers available in the RSView Enterprise software.

- Modbus Master/Slave
  - Modbus (RTU) Serial
  - Modbus Unsolicited Serial
- Modbus ASCII
- Modbus/TCP

## Modbus Master/Slave

A Modbus master/slave network provides a protocol for data transfer and programming with a single RTU master and up to 247 slave devices. A Modbus network links distributed devices with a central computer terminal or controller for supervisory control and data acquisition. Up to 247 nodes can be connected at data rates of up to 19,200 baud using media such as twisted pair cable, common carrier phone lines, or microwave transmission. This network is commonly used in SCADA application over large areas such as the water/waste water and oil & gas industries.

### Modbus (RTU) Serial

Modbus (RTU) Serial is the protocol for a master and includes RTS support for radio modems. Supported devices include:

- Modbus compatible devices
- Elliott Flow Computer
- Magnetek GPD 515 Drive
- Omni Flow Computer
- Daniel S500 Flow Computer
- Dynamic Fluid Meter (DFM) SFC3
- Instromet

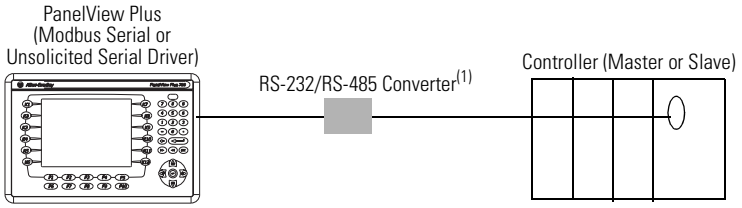
### Modbus Unsolicited Serial

Modbus Unsolicited Serial simulates up to 247 Modbus slave devices. Supported devices include Modbus compatible devices.

## *Modbus Master/Slave Networks*

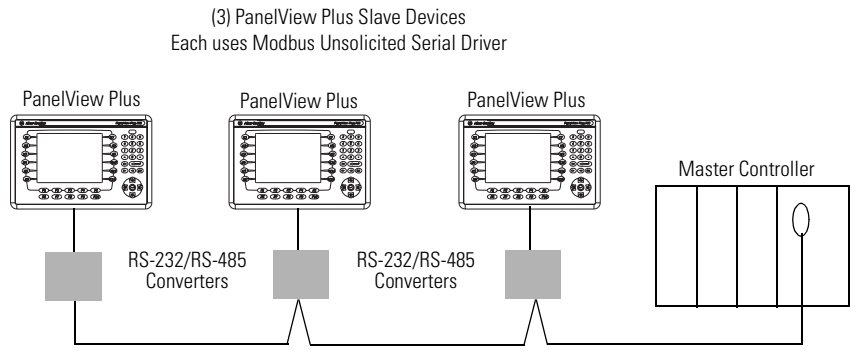
See Chapter 7 for cable information.

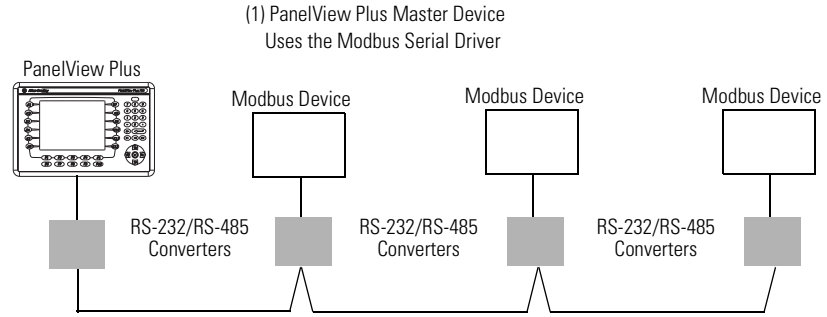
**Direct Connection**



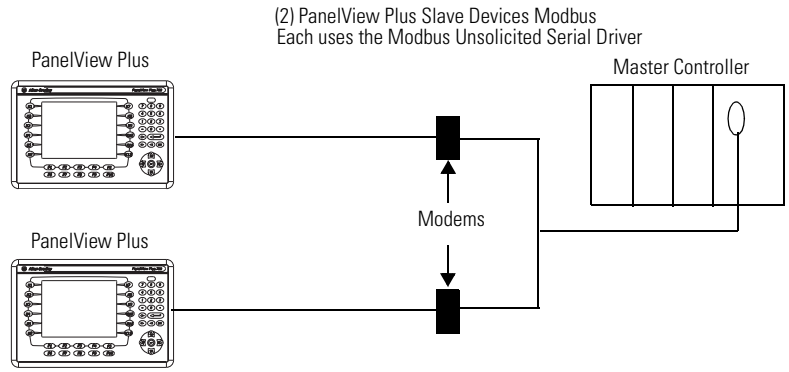

(1) 1761-NET-AIC or Comparable Device

**Master/Slave Network (Multiple Slave Terminals Connect to one Master Controller)**




**Modem Connection**



## Modbus ASCII

Modbus ASCII protocol is typically used to connect to other ASCII devices that support the Modbus ASCII protocol. KEPServer support includes:

- Modbus ASCII compatible devices
- Flow Computers using Daniels/Omni/Elliott register addressing

## Modbus/TCP

Modbus/TCP is a Modbus messaging protocol over Ethernet TCP/IP and is intended for supervision and control of automation equipment. The most common use of this protocol is for Ethernet attachment of PLCs, I/O modules, and gateways to other simple field buses or I/O networks.

The Modbus/TCP KEPServer driver supports Modbus and Mailbox device models.

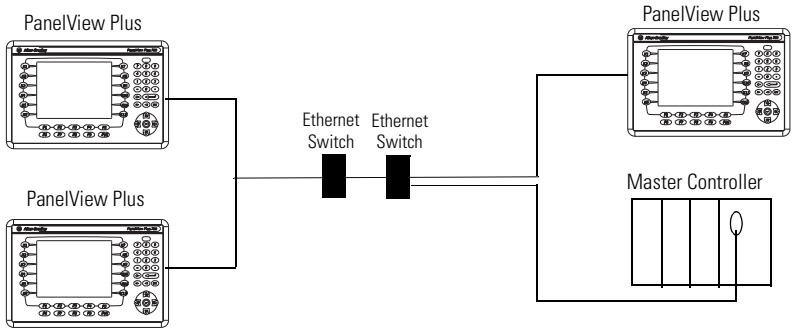
### Modbus Device Model

The most common Modbus device model is where the driver connects to physical devices (e.g. Modicon TSX Quantum, other Modbus Open Ethernet compatible devices) and acts as a device on the network with a device ID equivalent to the machine's IP address. The driver accepts any unsolicited commands it receives and attempts to process them as if it were another PLC.

### MailBox

The Mailbox model determines the manner unsolicited requests are handled. By defining a mailbox device, the driver does not act like a PLC on the network (as described above). Instead, it acts as a storage area for each and every mailbox device defined. When the driver receives an unsolicited command, the driver detects the IP address the message came from and places the data in the storage area allocated for the device. If the message comes from a device with an IP address that has not been defined as a mailbox device, the message is not processed. Any client application that reads/writes to this type of device, reads/writes to the storage area contained in the driver, not the physical device.

Refer to the MSTR instruction in your Modicon documentation for details on sending unsolicited requests to the Modbus Ethernet driver.




# Guidelines for Developing Modbus Applications

The section provides general guidelines for creating and running Modbus applications on PanelView Plus/PanelView Plus CE terminals.

## Create a Modbus Application

| General Steps | Description | Reference |
|---|---|---|
| Step 1 | Create a .pfe project file in KEPServer Enterprise. | Chapter 3 |
| Step 2 | Configure a KEPServer Modbus Driver. Add a channel and device to the project file. | Chapter 3 |
| Step 3 | Enter application tags. | Chapter 3 |
| Step 4 | Set your .pfe file as the default project file. | Chapter 3 |
| Step 5 | Test KEPServer communications to verify your project file and tags. | Chapter 4 |
| Step 6 | Create an OPC Data Server to make your tags available in RSView Studio. | Chapter 5 |

## Compile, Download and Run a Modbus application

| General Steps | Description | Reference |
|---|---|---|
| Step 1 | Create a firmware upgrade card that contains the KEPWare driver and upgrade the terminal. | Chapter 6 |
| Step 2 | Compile the RSView .mer application. | Chapter 7 |
| Step 3 | Download the .mer runtime file to terminal. | Chapter 7 |
| Step 4 | Connect the terminal to the Modbus network. | Chapter 7 |
| Step 5 | Run the application. | Chapter 7 |

# Configuring KEPServer Drivers for Modbus

## Objectives

This chapter shows how to use KEPServer Enterprise software to configure KEPServer drivers for Modbus protocols including Ethernet TCP/IP, RTU Serial, Unsolicited Serial, and ASCII Serial. You will:

- create a project (.pfe) for the drivers
- set the project file as the default project

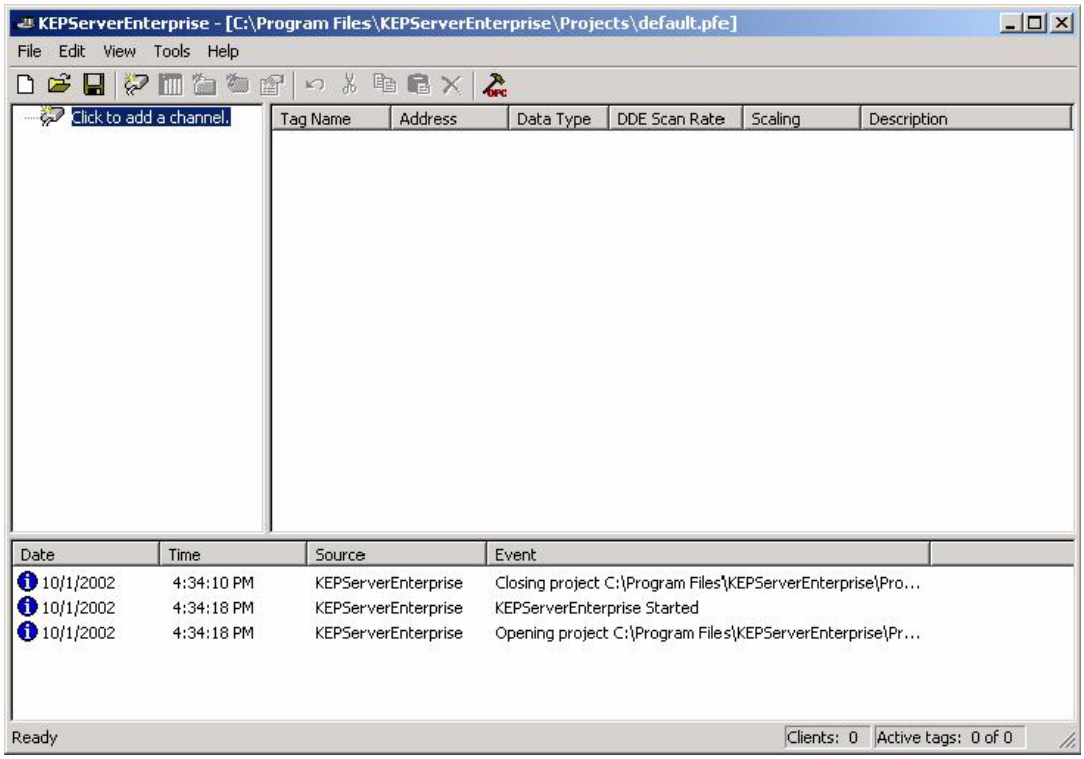
For each Modbus driver in your project file, you will:

- add a channel
- add a device (or controller)
- create tags

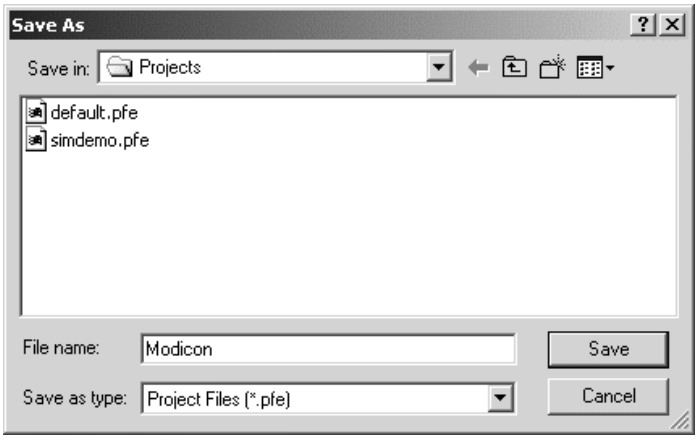
## Create a Project File

The first thing you need to do is create a project file.


1. Double-click the KEPServer Enterprise icon in the Systray to open the default project window below.



2. Create a new KEPServer project (.pfe) file. From the menu, select File>Save As and save the project as a .pfe file.



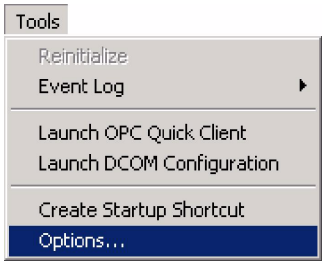

## Select the Default Project File (.pfe)

The steps in this section ensure that the correct project file is used in your RSView Studio application.

When RSView Studio creates a runtime application and the application contains the KEPware OPC server, RSView Studio will merge the KEPware project file (.pfe) into the runtime file (.mer). The project file that RSView Studio uses is defined by the Default project field in the General tab of the Tools>Options menu in KEPware Server Enterprise.

**TIP** This may not be the current configuration running in KEPware Server Enterprise. If you are testing the application on a PC, make sure the project name in the title bar of KEPware Server Enterprise matches the Project default field.

1. From the Menu bar, select Tools>Options…




2. On the General tab, click the … button next to the Default project textbox.

3. Select the desired .pfe file and click the Open button.

You should now see the following:


4. Click the Apply button and **OK** to accept the new project as the default.

**TIP** The KEPServer configuration is not archived with the RSView Studio application backup (.apa) file. If you need to reuse the project configuration file on another computer, copy the .pfe file.

## Configure Drivers for Modbus Protocols

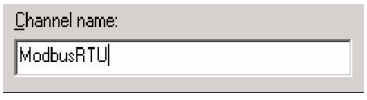
This section shows how to configure KEPServer drivers that will allow a PanelView Plus/PanelView Plus CE terminal to communicate on a Modbus network.

### Add a Channel

The first step in communicating to any device using the KEPServer software is to create a channel. A channel describes the protocol and driver properties used for communication. While a single channel can be used to communicate to multiple devices, separate channels must be defined for each unique driver to be used. Only one project configuration file can run at a time, but it may contain multiple channels and devices.

#### *Step 1 - Add a New Channel*

Click on the New Channel icon or right-click anywhere in the left pane. This will bring up the new channel wizard.



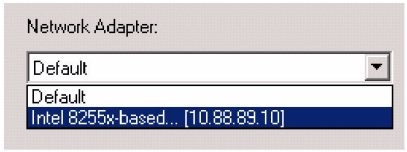

#### *Step 2 - Enter a Channel Name*

Enter a unique name for the channel.


### *Step 3 -Select a Device Driver*

Select a driver from the drop down list. The table below lists the correct driver for each Modbus protocol.

| For this Protocol: | Select this Driver: |
|---|---|
| Modbus/TCP | Modbus Ethernet |
| Modbus RTU Serial (Master) | Modbus Serial |
| Modbus Unsolicited Serial (Slave) | Modbus Unsolicited Serial |
| Modbus ASCII | Modbus ASCII Serial |




### *Step 4 - Select a Network Adapter (for Modbus/TCP only)*

The Network Adapter selection left allows you to select a specific NIC card based on either the NIC name or its currently assigned IP address. The list of available NICs will include either unique NIC cards or NICs that have multiple IP addresses assigned to them. Additionally, the selection will display any WAN connections you may have active such as a dialup connection.

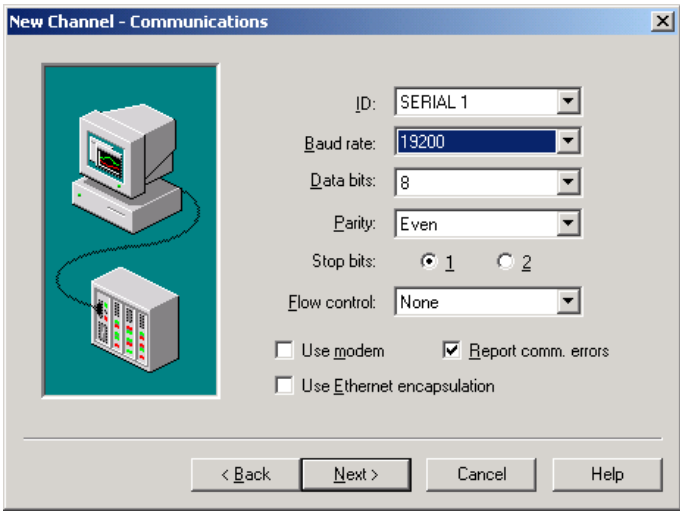
For PanelView Plus/PanelView Plus CE, select Default and click **Next**.

### *Step 5 - Enter Communication Settings (doesn't apply to Modbus/TCP)*

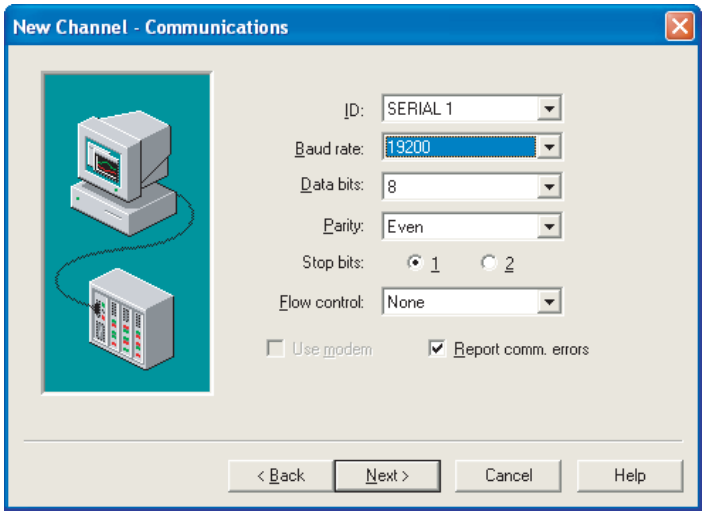
In the New Channel - Communications dialog, make sure the Modicon controller configuration settings match those in slave controllers or devices.

| Parameter | Selections | Recommended |
|---|---|---|
| Data Bits | 5, 6, 7, 8 | 8 |
| Stop Bits | 1, 2 | 1 |
| Parity | None, Even, Odd | Even |
| Baud | 300 to 256000 | 9600 or 19200 |

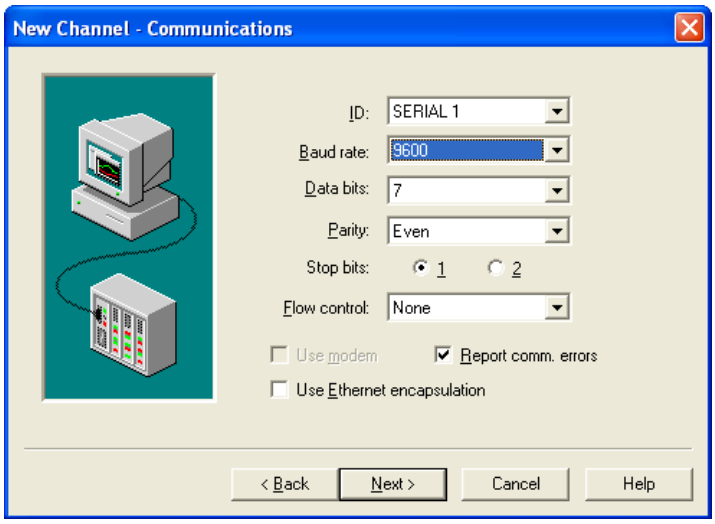
**Modbus RTU Serial**




**Modbus Unsolicited Serial**



**Modbus ASCII**

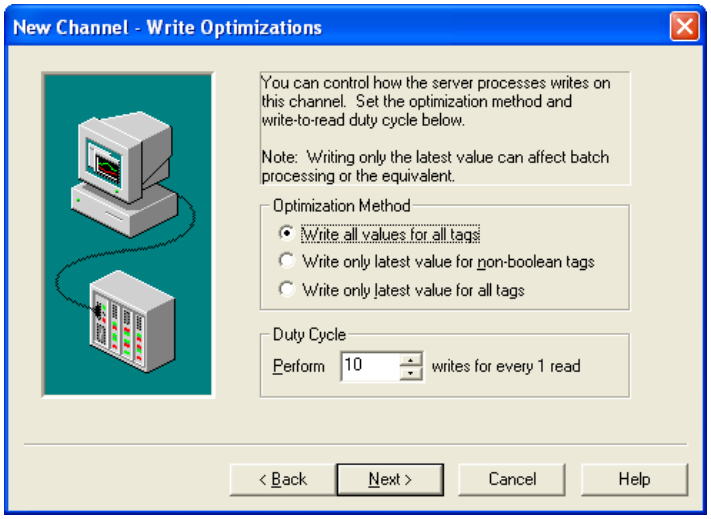



### *Step 6 - Set the Optimization Method for Data Requests*

The New Channel - Write Optimization dialog sets the optimization method for data requests. Select the best optimization for your application and click **Next**.

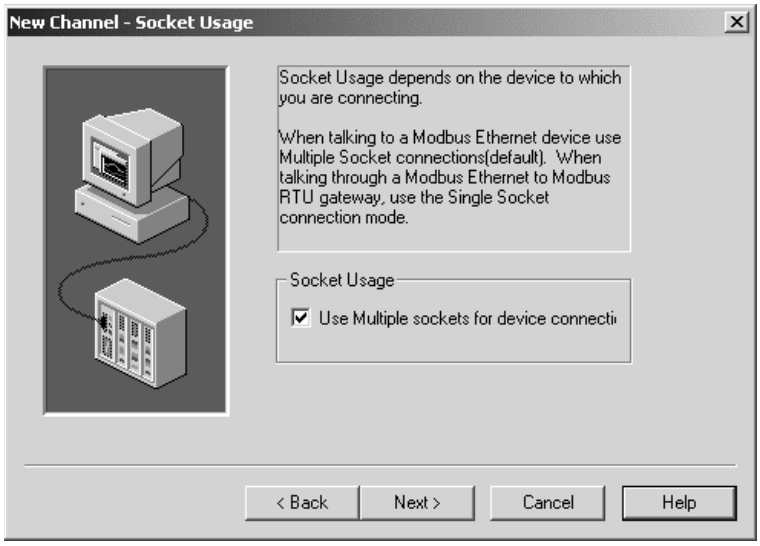
For more information on KEPServer read and write optimization options refer to the online Driver help.

**Applies to all Modbus protocols**



### ***Step 7 -Select Socket Usage*** *(Applies to Modbus/TCP only)*

The New Channel - Socket Usage dialog controls how the Modbus Ethernet driver will utilize Windows sockets when establishing a connection to the target device. For a normal Modbus Ethernet enabled device, the default Use Multiple Sockets for device connection (checked) mode of operation is designed to give the best performance from the driver.




Normally, the Modbus Ethernet driver will use a Windows socket for each device on the network. When using a new socket connection for each device, the Modbus Ethernet driver maintains that socket as an active connection. Normally this provides a very high level of performance since the driver does not need to reestablish a connection each time it needs to read or write data to a given device.

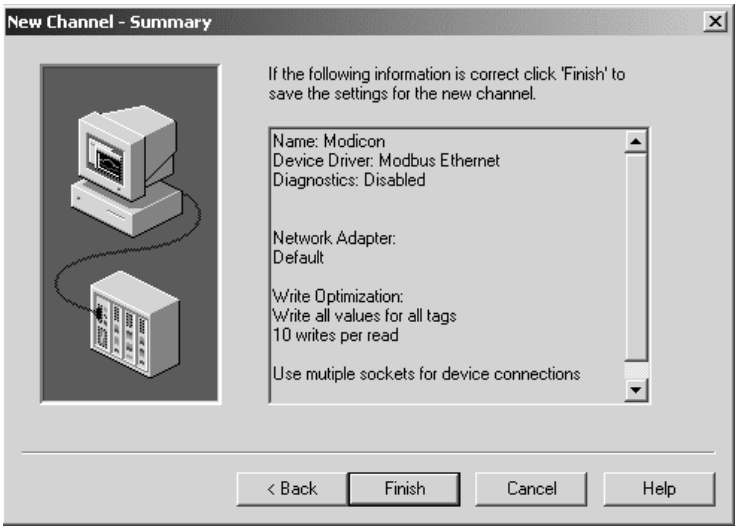
For more information on using Sockets in a Modbus RTU bridge application, refer to the online help.

Click **Next.**

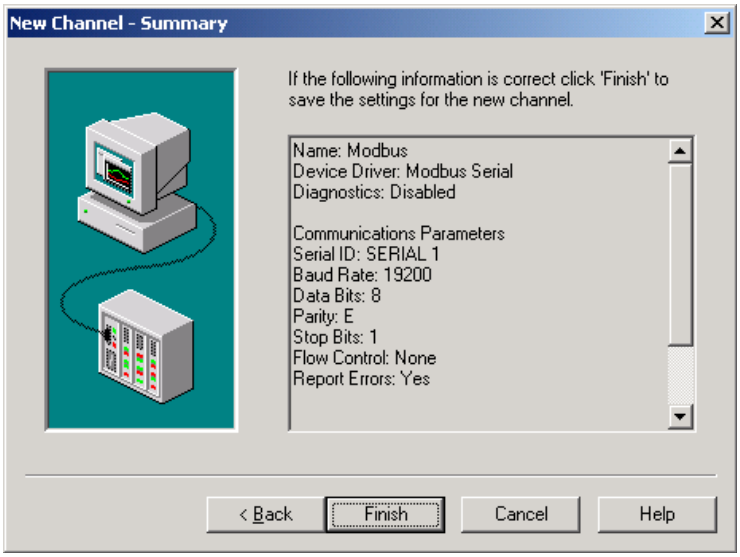
### *Step 8 - View and Verify Channel Summary*

The New Channel - Summary dialog provides a summary of the new channel settings. Verify the settings below and click **Finish**.

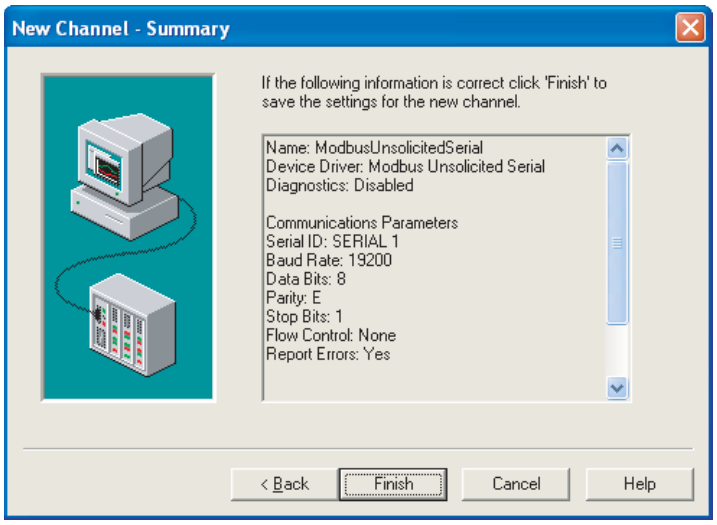
**Modbus/TCP**



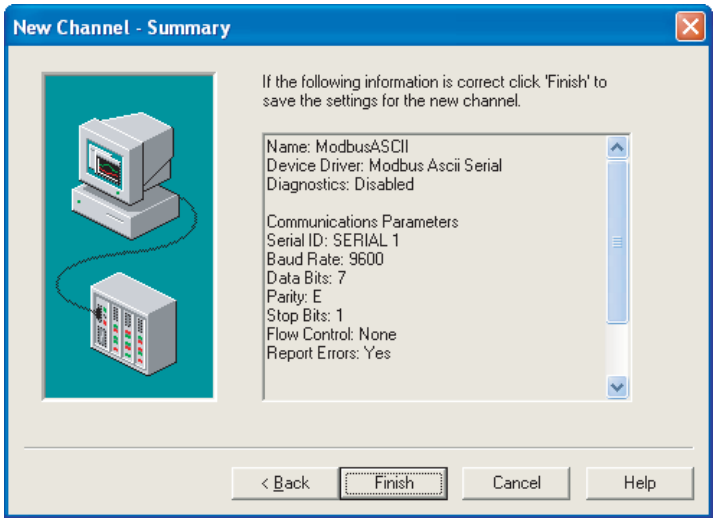

**Modbus RTU Serial**

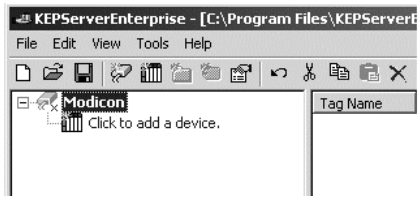


**Modbus Unsolicited Serial**




**Modbus ASCII Serial**



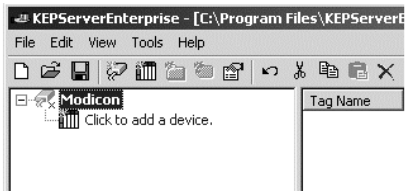

**TIP** The red X next to the channel name will disappear when a destination device is added under this driver.

### *Step 9 - Save Project File*

From the Menu bar, select File>Save or click the Save  button.

## Add A Device

Now that a new channel is defined, you need to add a new device to the channel. In most cases, selecting the default settings will allow you to quickly configure and connect to a device.

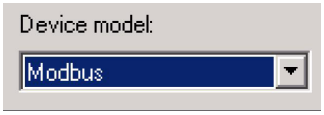



### *Step 1 - Add a Device*

Add a device by clicking on the Click to add a device hypertext or the New Device icon. This will bring up the new device wizard. Here you'll add the information pertinent to the controller that you are going to communicate with.


### *Step 2 - Enter a Device Name*

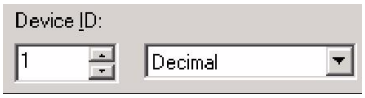
In the New Device - Name dialog, enter a device name that will help you identify the device later and click **Next**. In most cases, the device will be a logic controller.




### *Step 3 - Select a Device Model*

If the device you are defining supports more than one model, select a model that best describes the device.

| For this Protocol: | Most Common Model: |
|---|---|
| MODBIS/TCP | Modbus |
| Modbus RTU Serial | Modbus |
| Modbus Unsolicited Serial | N/A |
| Modbus ASCII | Modbus ASCII |




### *Step 4 - Select a Device ID*

The device you are defining may be multidropped as part of a network of devices. To communicate with the device, it must be assigned a unique ID.

In the New Device - ID dialog, enter a unique Device ID (decimal address) to identify the controller on the network. Enter the Device ID and click **Next**.

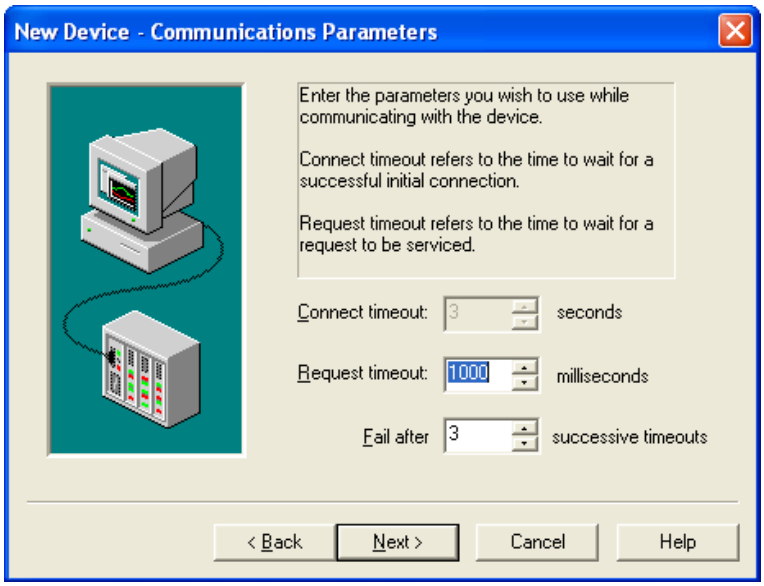
| For this Protocol: | Device ID Range | Data Format |
|---|---|---|
| Modbus/TCP (1) | xxx.xxx.xxx.xxx | IP Address |
| ModbusModbus RTU Serial | 0 - 255 | Decimal |
| Modbus Unsolicited Serial | 1 - 247 | Decimal |
| Modbus ASCII | 1 - 247 | Decimal |

(1) For master/slave communications, add a fifth octet to the IP address. Refer to your KEPWare documentation for more details on Modbus/TCP master/slave communications.

### *Step 5 - Enter Device Communication Parameters*

*(Doesn't apply to Modbus Unsolicited Serial Protocol)*

In the New Device - Communication Parameters dialog, accept the default communication parameters by clicking **Next.**

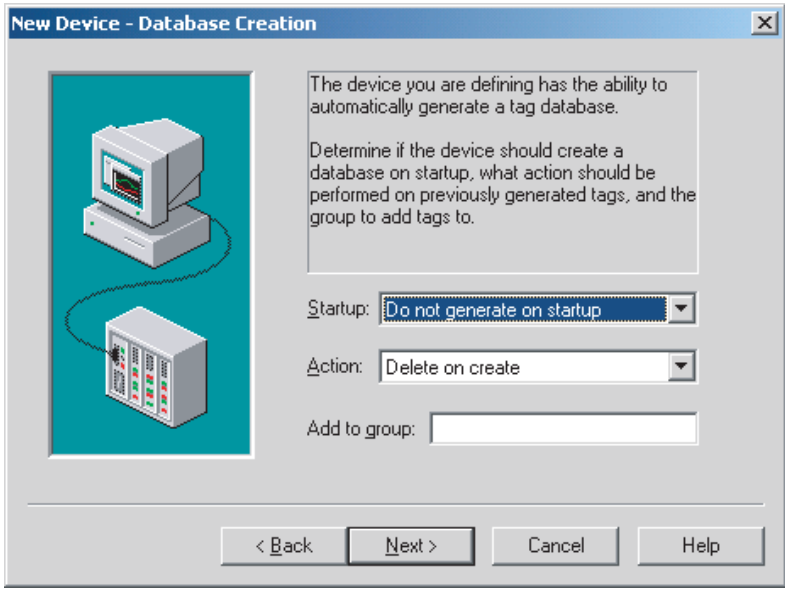


### *Step 6 - Configure Tag Database Options*

*(Doesn't apply to Unsolicited Serial or ASCII Protocols)*

In the New Device - Database Creation dialog, click **Next** to accept the default tag database configuration options.

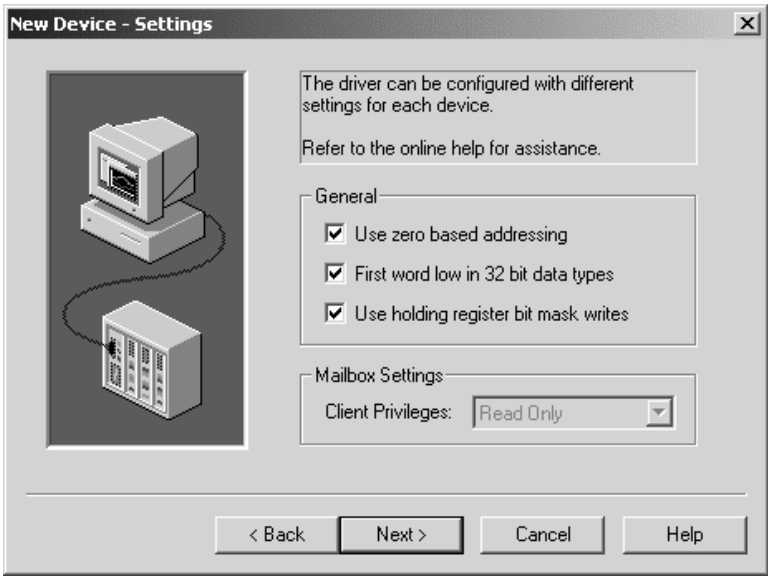
The automatic OPC tag database generation features of the server have been designed to make the setup of your OPC application a Plug and Play operation. For communication drivers that support this feature, you can configure them to automatically build a list of OPC tags within the server that correspond to device specific data. The automatically generated OPC tags can then be browsed from your OPC client.



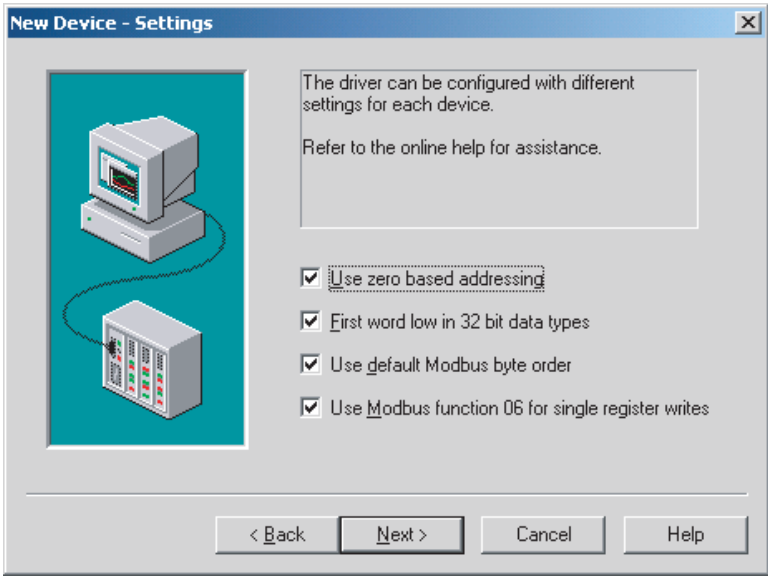
### *Step 7 - Enter Device Settings*

In the New Device - Settings dialog, accept the default settings by clicking **Next**

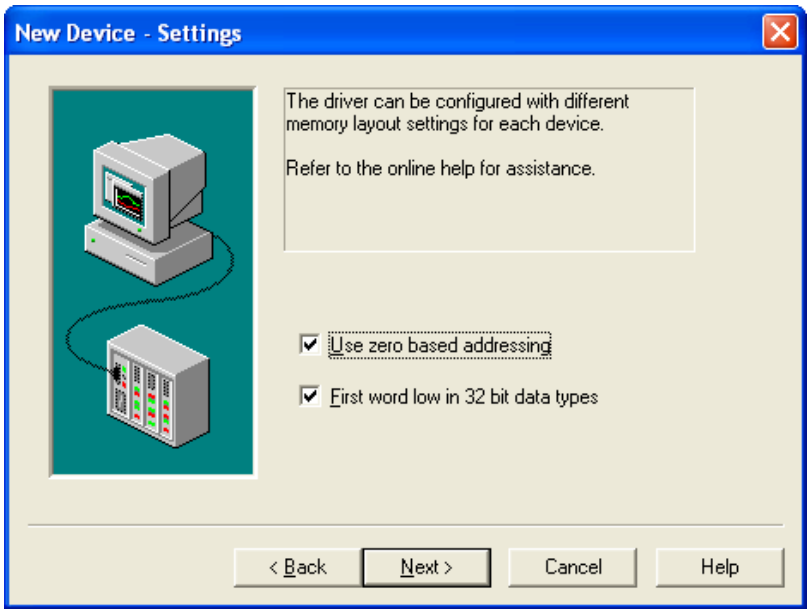
**Modbus/TCP**




**Modbus RTU Serial**



**Modbus Unsolicited Serial and Modbus ASCII**

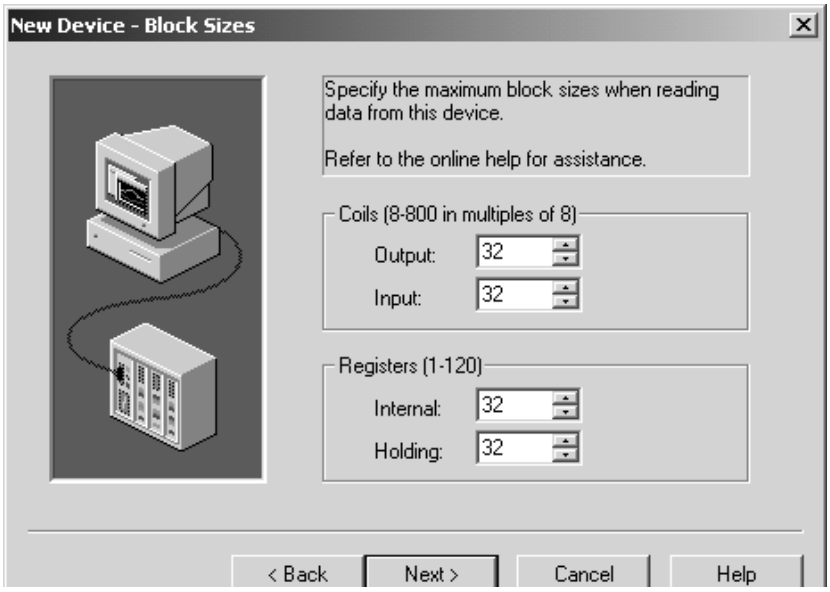



### *Step 8 - Set the Block Size for Reading Data from Device*

*(Doesn't apply to Unsolicited Serial Protocol)*

The New Device - Block Sizes dialog sets the largest block size for reading I/O (coils) and data tables (Registers). Click **Next**.

**Modbus/TCP, Modbus RTU Serial, Modbus ASCII**

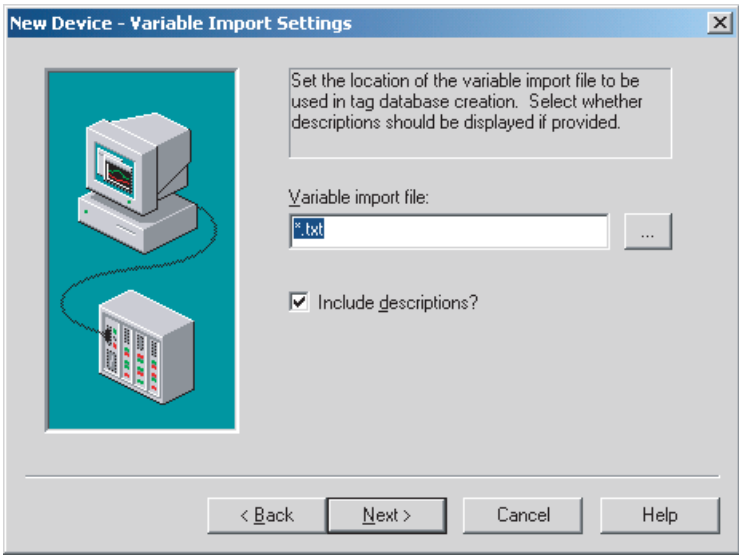


Reasons to Change the Default Block Sizes include:

- The device may not support block read/write operations of the default size. Smaller Modicon PLCs and non-Modicon devices may not support the maximum data transfer lengths supported by the Modbus Ethernet network.
- The device may contain non-contiguous addresses. If this is the case and the driver attempts to read a block of data that encompasses undefined memory, the device will probably reject the request.

### *Step 9 - Set Location of the Variable Import File*

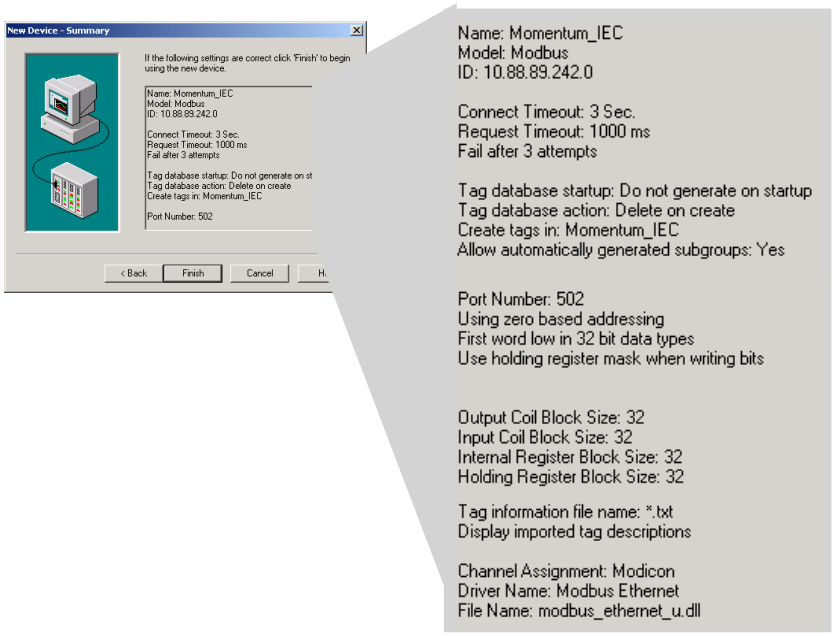
The New Device - Variable Import Settings dialog sets the location of the Concept or ProWORX variable import file the driver will use when the automatic tag database generation feature is enabled for this device. Refer to the KEPServer Enterprise online help for details on how to use this feature.



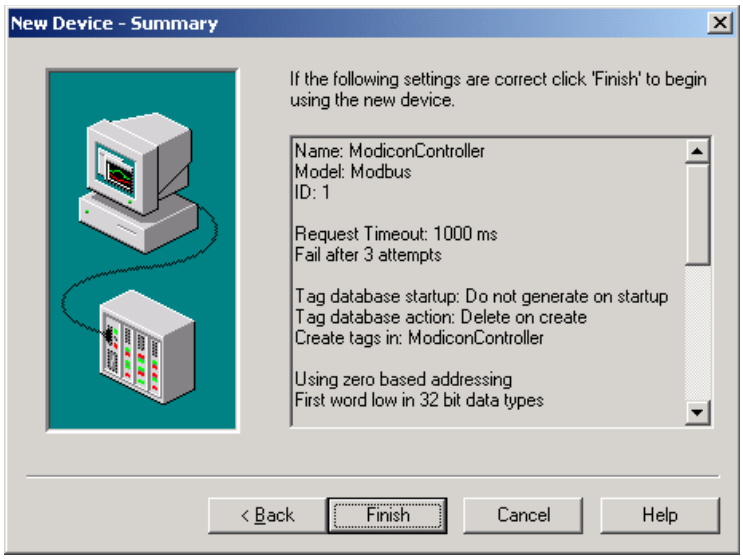
### *Step 10 - View and Verify the Device Summary Information*

The New Device - Summary dialog provides a summary of the new device settings. Verify the information and click **Finish**.

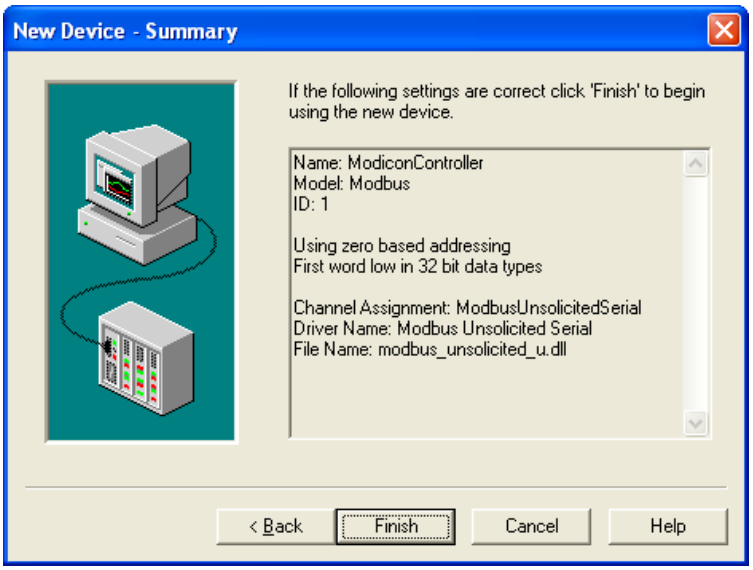
**Modbus/TCP**



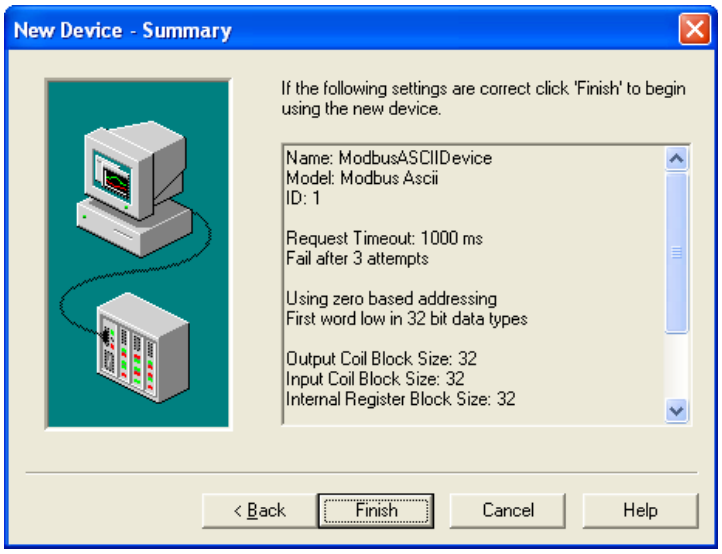

**Modbus RTU Serial**



**Modbus Unsolicited Serial**




**Modbus ASCII**




### *Step 11 - Save Project File*

From the Menu bar, select File>Save or click the Save  button.

## Create Tags

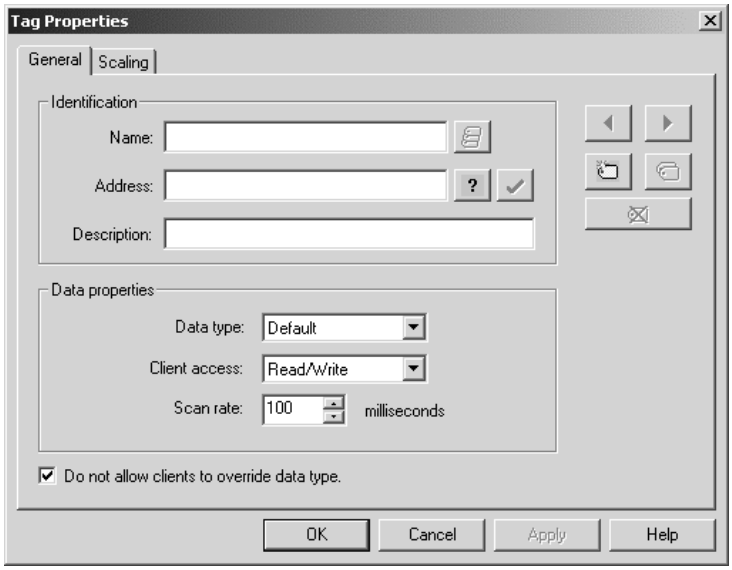
With a channel and device defined, you are ready to create tags within the KEPServer software. These tags are used to link to the controller addresses. The procedure is similar to creating an HMI tag database. For details on valid data types and addressing, see Appendices A - E.

1. In the right hand pane, click on the Click to add a static tag text.

   Or right-click on a device (such as the Momentum_IEC) in the left hand pane and select New Tag…



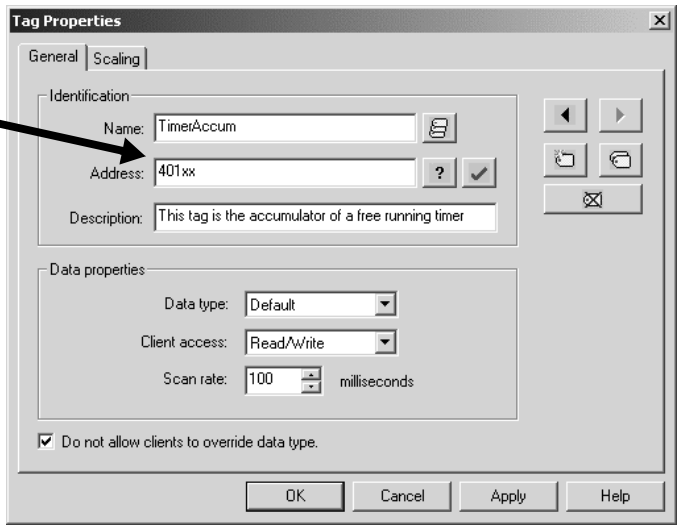
   The Tag Properties dialog opens.

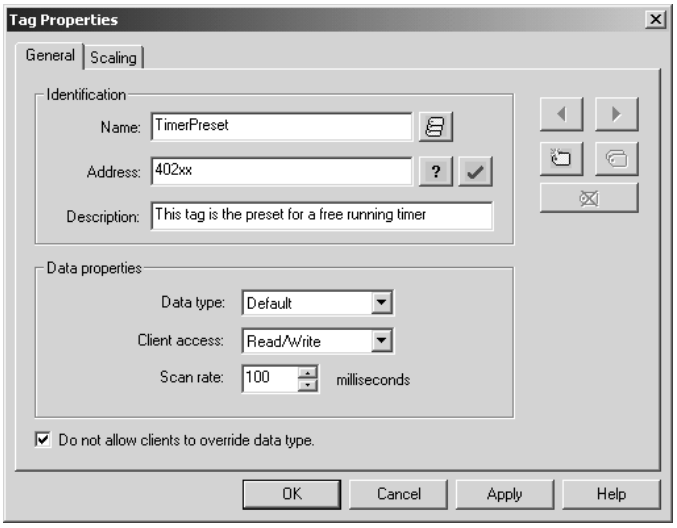



2. Enter the tag name and address along with a description as shown in the following dialogs.

   **TIP** Clickon ? next to the Address field for a list of valid addresses.

Replace the 'xx with your table number. For example, the Address for table #1 would be 401**01.**




KEPServer allows you to validate the address based on the device you will be talking to. Your project configuration should now list the tags in the right pane.

| Tag Name | Address | Data Type | Scan Rate | Scaling | Description |
|---|---|---|---|---|---|
| TimerAccum | 400101 | Word | 100 | None | This tag is the accumulator of a free running timer |
| TimerPreset | 400201 | Word | 100 | None | This tag is the preset for a free running timer |

3. From the Menu bar, select File>Save or click the Save button.

# Testing KEPServer Communications

## Objectives

This chapter shows how to test KEPServer communications on a development computer to verify your project configuration and tags.

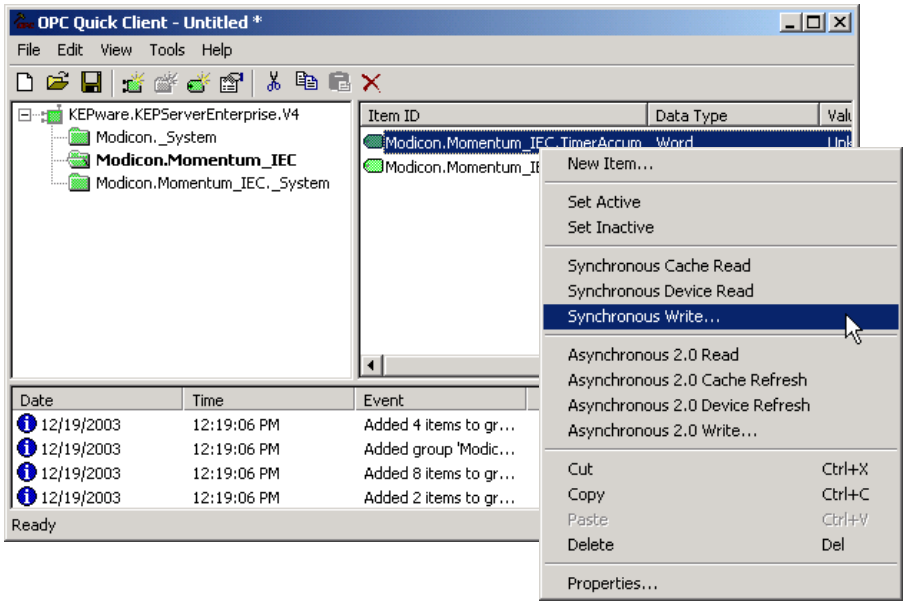
## Use the OPC Quick Client

Included with the KEPServer server installation is a simple tool for testing OPC tags called the OPC Quick Client. When you create a new KEPServer configuration, there are several system and communications tags that are also created. In this section, you'll verify communication with the tags you've created before incorporating them into an HMI project.

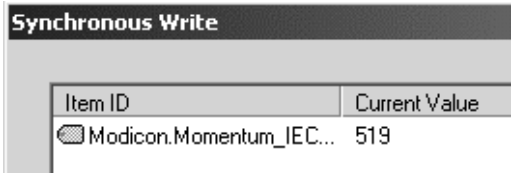
1. Select Tools>Launch OPC Quick Client from the main menu. Or click on the OPC Quick Client  icon.

2. Highlight the name of the device that you plan to test in the left pane. This will display the tags that you have created in the right pane.

3. Right-click the tag in the right pane that you plan to test, and select Synchronous Write.



The resulting window not only allows you to write new data to the controller, but it also displays the current value of the tag.



# Making KEPServer Drivers and Tags Available in RSView Studio

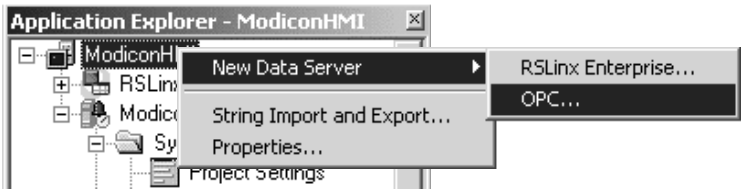
## Objectives

Now that you've configured and tested KEPServer communications, you are ready to make the KEPServer driver and tags available in RSView Studio. This chapter will show you how to add an OPC data server to the RSView Studio project.

## Create an OPC Data Server

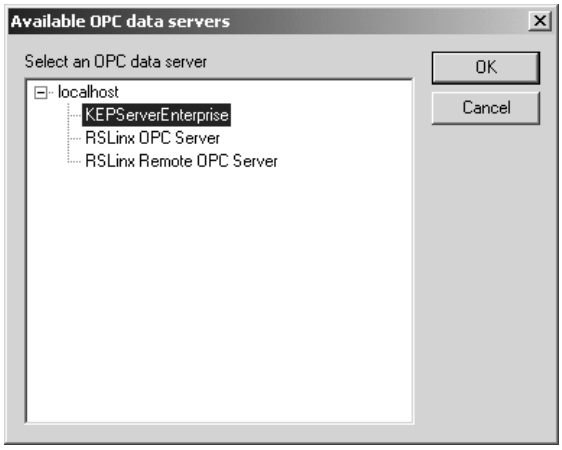
KEPServer is an OPC data server. You need to add this server to the RSView Studio project.

1. Open RSView Enterprise or RSView Studio for Machine Edition from the development computer.
2. Open your application.
3. In the Application Explorer pane (left), right-click on the application name at the root of the tree view and select New Data Server>OPC…

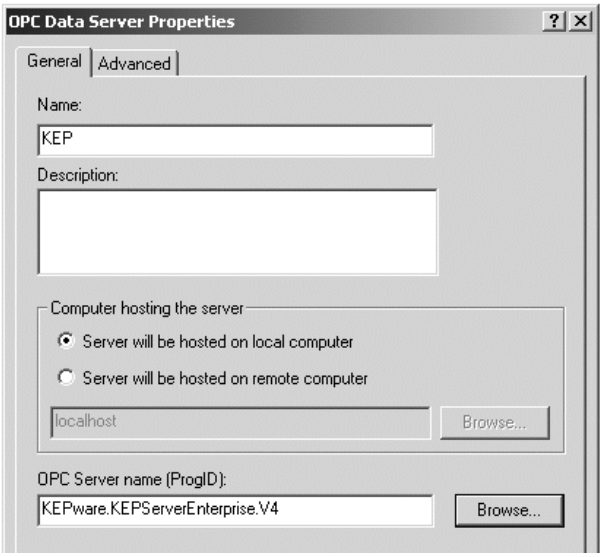



4. Click the Browse... button next to the OPC Server Name textbox.

5. Select KEPServerEnterprise and click **OK**.




6. Enter a name for the KEPServer driver and click **OK**.




Informational messages appear at the bottom of your RSView Studio window indicating that the Server has started and is available on the computer.


Any tags created earlier in the KEPServer software are now available for the HMI using the standard RSView Studio tag browser.

**TIP** Remove all serial drivers from the RSLinx Enterprise Communication Setup that would conflict with the port configured for Modbus.

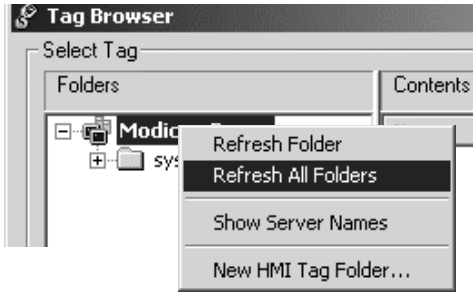
## Browse KEPServer Tags

**TIP** For additional information on working with tags, see Chapter 6 of the RSView Machine Edition User's Guide (ViewME-UM003) available under the RSView Studio help menu.

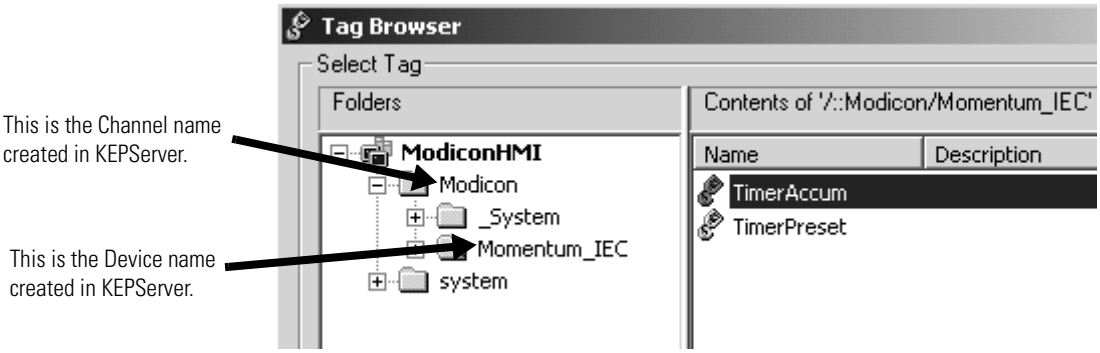
1. Double click or right-click on an object to open its Properties dialog.

2. On the Connections tab, click the Value's ... button to open the FactoryTalk Tag Browser.

3. Right-click on the heading in the left pane and select Refresh All Folders to obtain the list of tags in the KEPServer data server.




4. Drill down and select the tags from the folder you created.




5. Click **OK** to close the window.

# Installing KEPServer Drivers on Terminal

## Objectives

If you plan to run the Machine Edition project on a PanelView Plus or PanelView Plus CE terminal, the corresponding CE-based KEPServer components must be installed. This chapter will show you how to use the Firmware Upgrade Wizard (FUW) utility to install the KEPServer drivers on the terminals.

## Firmware Upgrade Wizard

The Firmware Upgrade Wizard (FUW) will add the necessary KEPServer components to the terminal firmware. You can:

- create a firmware upgrade card (compact flash card) which you then load in the card slot of terminal to upgrade firmware.
- upgrade firmware in a terminal that is connected to your desktop computer using a Serial, Ethernet, or Network connection via RSLinx Enterprise (for supported protocols).

The Firmware Upgrade Wizard is available in RSView Studio. Refer to the FUW Help for additional information.

### Preparing Terminal for Firmware Upgrade

Before starting the Firmware Upgrade Wizard, follow the steps below to prepare the terminal for a successful upgrade.

1. Backup all .MER files on the terminal to an external storage card or network.
2. Delete all applications on the terminal.
3. Record any Ethernet communication settings, such as IP address, subnet masks, and gateways by selecting Terminal Settings>Network and Communications>Network Connections>Network Adapters>IP Address.
4. Disable the Auto-start feature on the terminal by selecting Startup Options>RSView ME Station Startup and select Go to Configuration Mode.
5. Reset the terminal.

## Copy FUP Files to Development Computer

Download the Firmware Upgrade (FUP) files with the KEPServer drivers to your development computer before using the FUW.

The FUP files are available on the Firmware Upgrade Media Kit (Cat. No. 2711P-RU31O) which you can order through your local Allen-Bradley distributor. Run the *.exe file to unzip the files. Unzip the files to this directory:

Documents and Settings\All User Documents\RSView Enterprise\ME\Firmware Upgrade

**TIP** The Firmware Upgrade Wizard is available at http://.support.rockwellautomation.com under Downloads.

## Upgrade Firmware using a Compact Flash Card

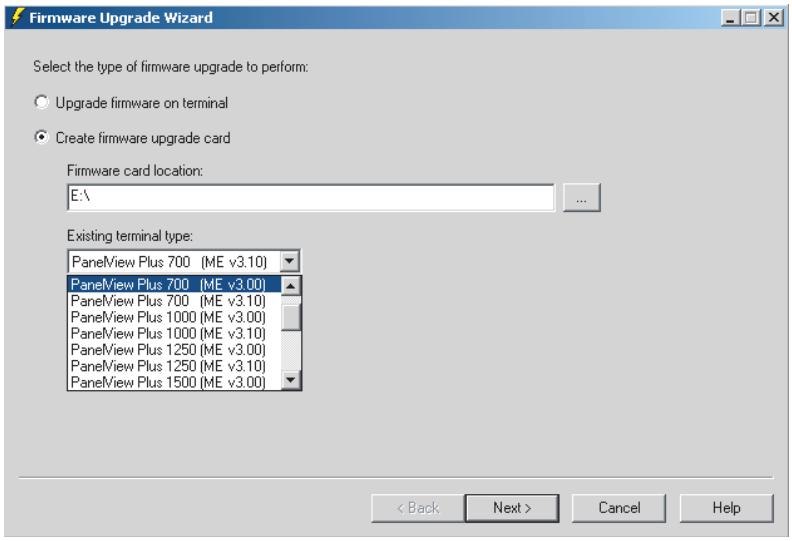
This section shows how to upgrade firmware in a PanelView Plus terminal using a Compact Flash Card. This is a two step-process. First, you create a firmware upgrade card with the necessary firmware files. Second, you load this card in the terminal to upgrade the firmware.

1. *Creating Firmware Upgrade Card*

**1.** Start the Firmware Upgrade Wizard. Select Start>Rockwell Software>RSView Enterprise>Firmware Upgrade Wizard.

**2.** Select Create firmware upgrade card.

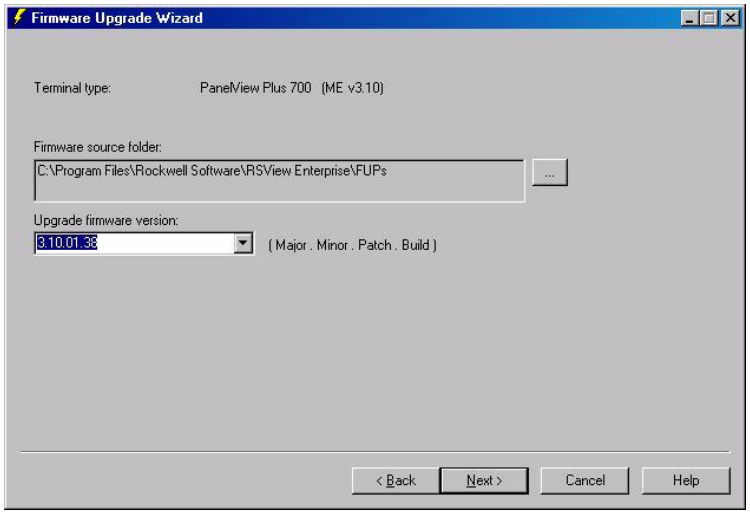
- In the Firmware card location text box, select the destination for the compact flash files (folder on the hard drive or physical location of the compact flash card, e.g., E:\).
- From the Existing terminal list, select the type of PanelView Plus terminal you are upgrading, then press **Next**.



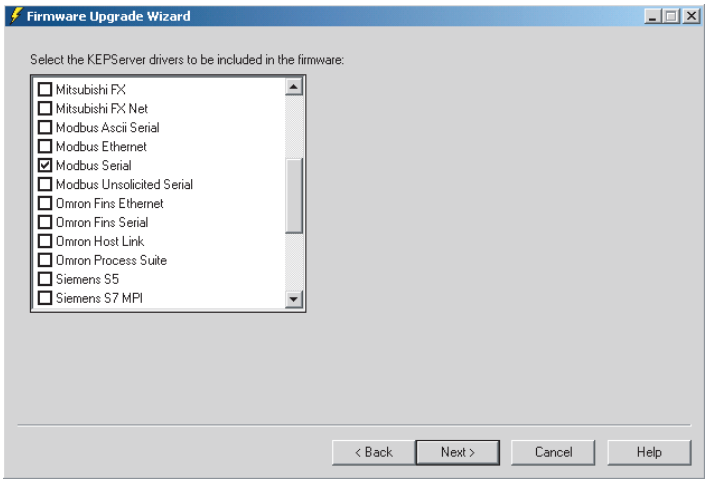

**TIP** To add a KEPWare driver to a PanelView Plus 400/600 terminal, use a compact flash card.

3. From the Firmware source folder list, select the location of the firmware files. The default location is C:\Program Files\Rockwell Software\RSView Enterprise\FUPs.

   From the Upgrade firmware version list, select the version of the firmware you want to upgrade to, then press **Next**.



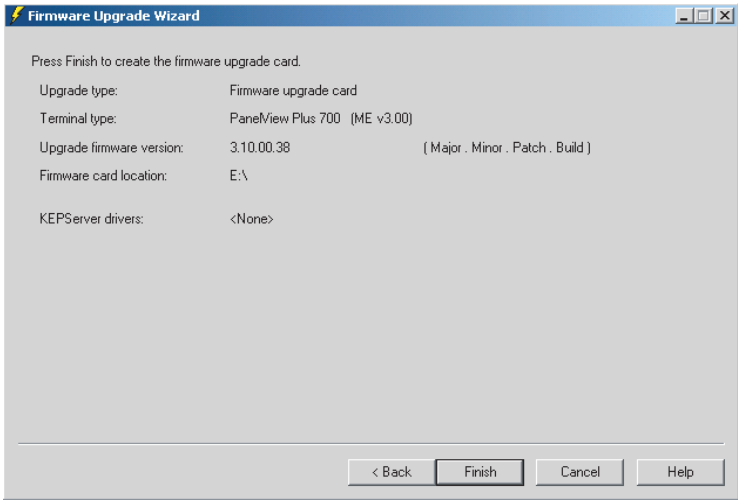

4. Select the appropriate KEPServer drivers and press **Next**. If the selected FUP file does not support the KEPServer drivers, this dialog will not appear.




**IMPORTANT** Each driver consumes 150Kbytes to 250Kbytes of disk-on-chip memory space. Only install drivers to be used on the Windows CE terminals. You can always add others drivers later if needed.

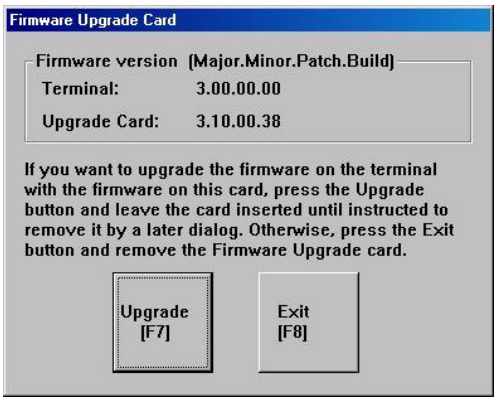
5. Select Finish to copy the firmware source files to the location specified in step 2.

**TIP** If the files were created in a separate folder on a local hard drive, copy the files to the root directory of the compact flash card.




## 2. Upgrade Firmware in Terminal using Firmware Upgrade Card

1. Insert the compact flash card into the card slot of a powered PanelView Plus terminal. A dialog appears indicating the firmware upgrade is about to occur.




2. Press **Upgrade** to begin the firmware upgrade.

**IMPORTANT** Do NOT remove the compact flash card while the upgrade is in process.

3. If other PanelView Plus terminals exist on the same Ethernet network, the following error may display:

   Error registering name on network (may be duplicate). Change in system Control Panel and try again.

   Ignore this error. It will be corrected during the upgrade. Press **OK** to acknowledge error and wait for terminal to reset.

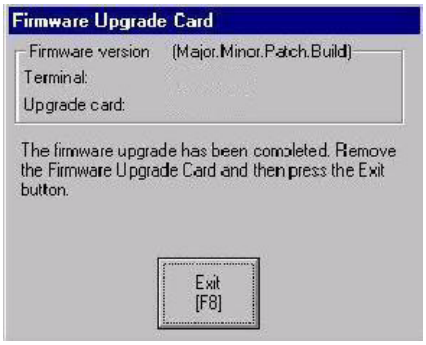
   **TIP** If a USB mouse is available you can acknowledge this error by selecting **OK**.

4. On touch or touch/screen terminals, you must calibrate the touch screen by selecting pointers in all four corners of the screen and pressing the middle of the screen when prompted.

5. Ignore the following message if it appears. It means RSView ME is being installed. Do not touch the two buttons that appear with this message.

   Machine edition may be corrupted. Do you want to download firmware?

6. When the upgrade is complete, a dialog appears requesting you to remove the compact flash card from the card slot. Remove the card and press **F8** or **Exit** to reset the terminal.




7. Communication settings are cleared when the terminal is upgraded. If Ethernet communications is used, reconfigure the Ethernet communication settings using the values recorded when preparing the terminal.

   **TIP** Kepware drivers were installed on terminal. On PanelView Plus CE terminals, you can go to the Storage Card/KEPServer/Drivers folder to verify that the driver dll exists.

8. Replace the .MER files that you backed up before starting the upgrade or download a new .MER file to the terminal.

9. Load the .MER file and run the project.

   **TIP** You can configure your application to start automatically on power cycle under Startup Options.

## Upgrade Firmware using a Network (Ethernet) Connection

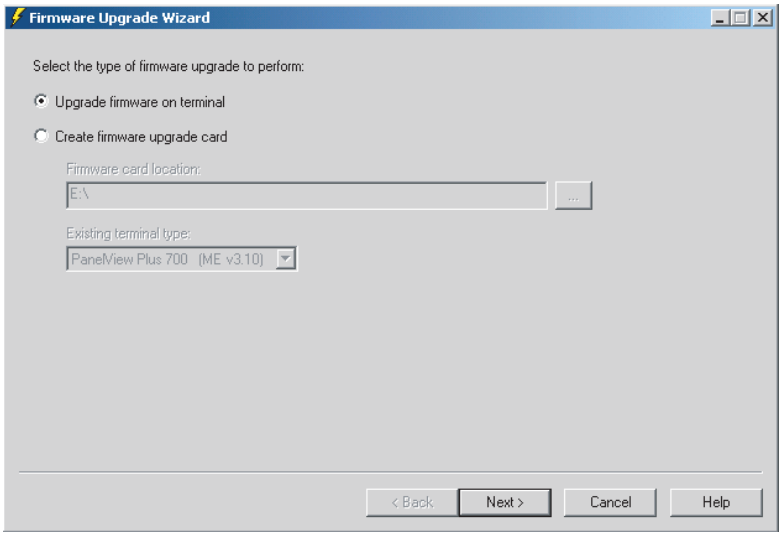
You can upgrade the firmware in a terminal that is connected to a desktop computer using a Serial, Ethernet or Network (using RSLinx Enterprise) connection.

- **Network connection** requires RSLinx Enterprise where you select the terminal on an existing network.
- **Serial connection** requires a RAS connection to be set up on computer. During the RAS setup, you select the COM port.
- **Ethernet connection** requires that you enter the terminal's IP Address.

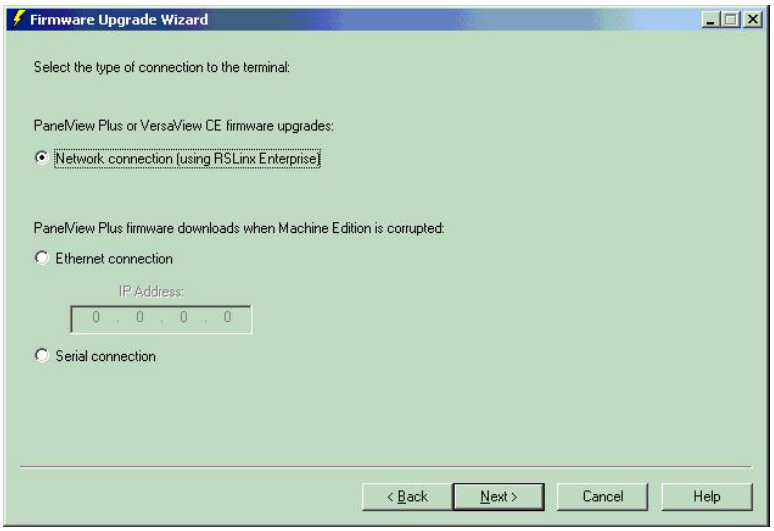
Both the Serial and Ethernet connection requires the PanelView Plus File Transfer Utility running on the terminal and should only be used when other methods fail.

This section shows how to upgrade firmware in a PanelView Plus terminal using a Network connection via Ethernet communications.

1. Start the Firmware Upgrade Wizard. Select Start>Rockwell Software>RSView Enterprise>Firmware Upgrade Wizard.



2. Select Upgrade firmware on terminal and press **OK.**

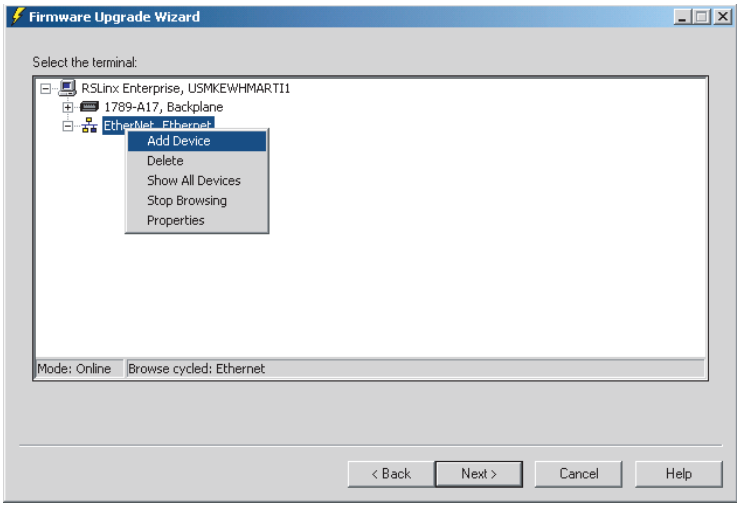



3. Select Network connection and press **Next**.

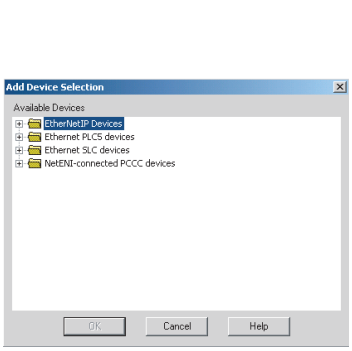
   Use the Ethernet and Serial connections only if the firmware upgrade is unsuccessful.

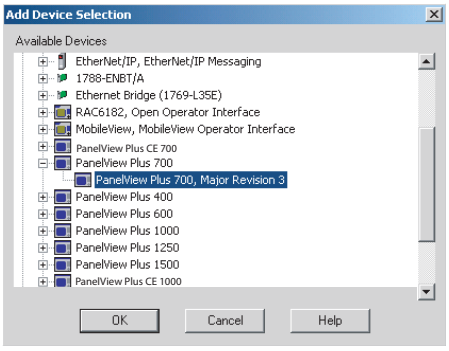
4. Locate the PanelView Plus terminal on your Ethernet network via its IP address.

   Skip to Step 6 if you found the terminal. If you do not see the terminal, right click on the Ethernet driver and add the device to the browse tree.

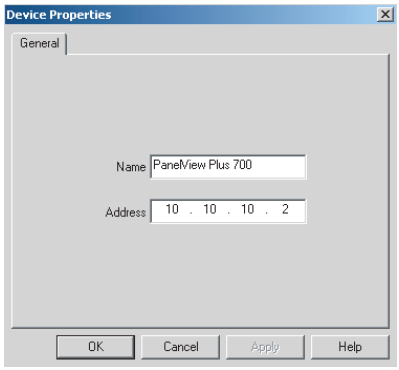


5. Double-click on EthernetIP Devices. Select the appropriate terminal and press **OK**.

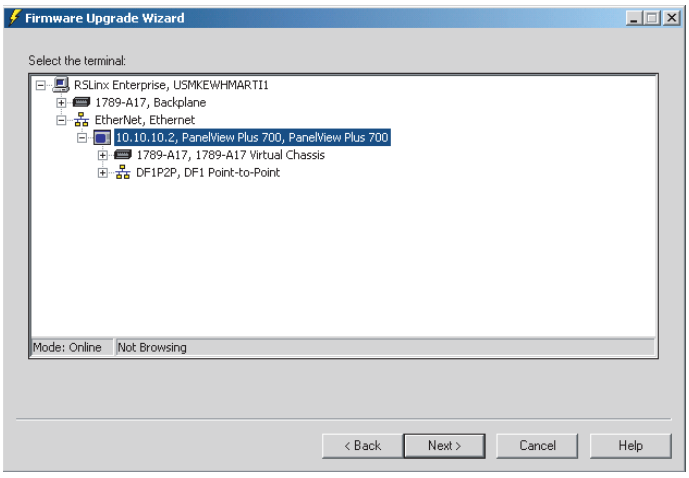



6. Enter the IP address for the terminal and press **OK**.

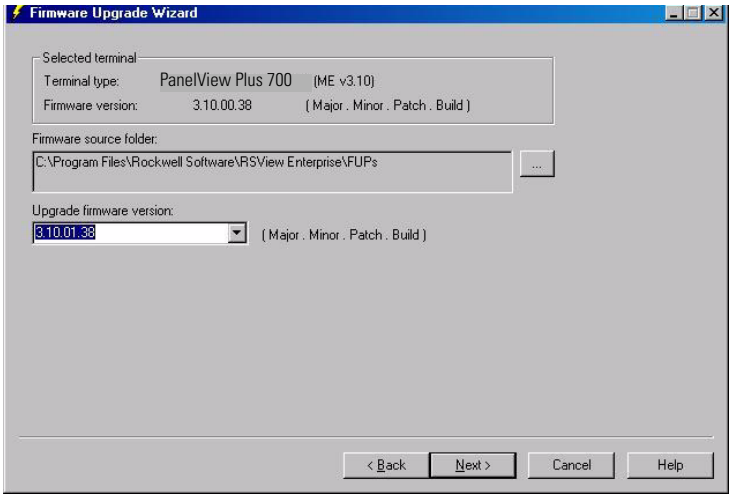



7. Select the terminal to be upgraded and press O**K**.

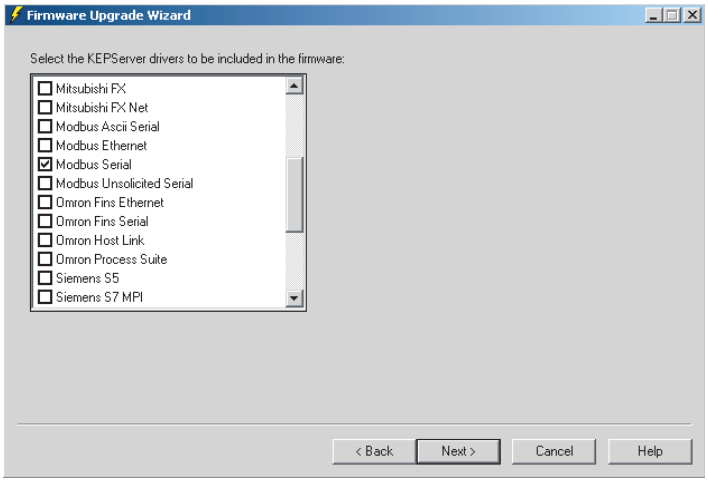


**8.** From the Firmware source folder text box, select the location of the firmware files. The default location is C:\Program Files\Rockwell Software\RSView Enterprise\FUPs.

From the Upgrade firmware version list, select the version of the firmware you want to upgrade to, then select **Next**.

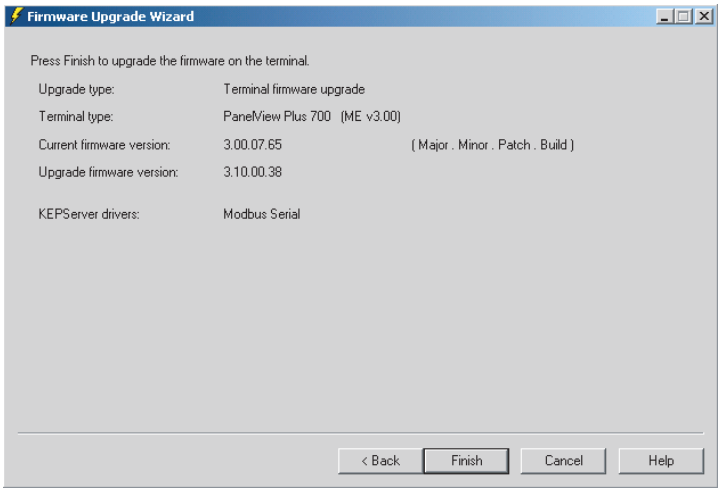



**9.** Select the appropriate KEPServer drivers and select **Next**. If the selected FUP file does not support the KEPServer drivers, this dialog will not appear.

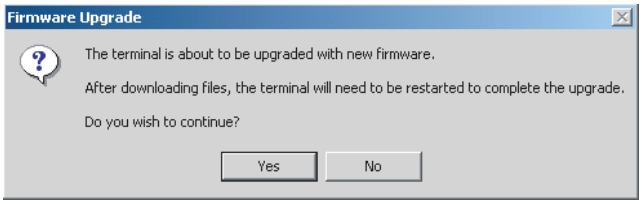



**IMPORTANT** Each driver consumes 150Kbytes to 250Kbytes of disk-on-chip memory space. Only install drivers to be used on the Windows CE terminals. You can always add others drivers later if needed.

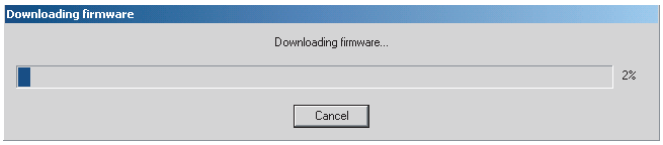
10. Press **Finish** to start the upgrade.

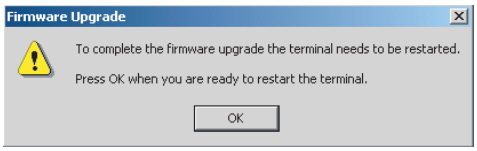



11. Press **Yes** to continue the upgrade process. If the terminal was properly prepared for the upgrade, no applications should be running.




12. Firmware files are downloaded to the terminal. This may take several minutes to 15 minutes. When the download is complete, press **OK** to reset the terminal.




If other PanelView Plus terminals exist on the same Ethernet network, the following error may display:

Error registering name on network (may be duplicate). Change in system Control Panel and try again.

Ignore this error. It will be corrected during the upgrade. Press **OK** to acknowledge error and wait for terminal to reset.

**TIP** If a USB mouse is available you can acknowledge the error by selecting **OK**.

13. On touch or touch/screen terminals, you must calibrate the touch screen by selecting pointers in all four corners of the screen and pressing the middle of the screen when prompted.
14. Ignore the following message if it appears. It means RSView ME is being installed. Do not touch the two buttons that appear with the message.

    Machine edition may be corrupted. Do you want to download firmware?
15. Communication settings are cleared when the terminal is upgraded. If Ethernet communications is used, reconfigure the Ethernet communication settings using the values recorded when preparing the terminal.
16. Replace the .MER files that you backed up before starting the upgrade or download the new .MER files to the terminal.
17. Load the .MER file and run the project.

**TIP** You can configure your application to start automatically on power cycle under Startup Options.

# Compiling, Downloading, and Running Application

## Objectives

This chapter shows how to:

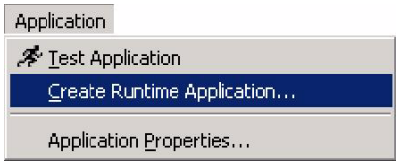
- compile a runtime RSView ME application file
- download and load application on terminal.
- connect terminal to a Modbus network
- run application.

## Compile a Runtime Application File

You are now ready to build the Machine Edition runtime (.mer) file to be downloaded to a PanelView Plus/PanelView Plus CE terminal.

**TIP** Before compiling the .mer file, verify that the correct .pfe project file is selected. See page 16.

1. From the menu bar, select Application>Create Runtime Application…



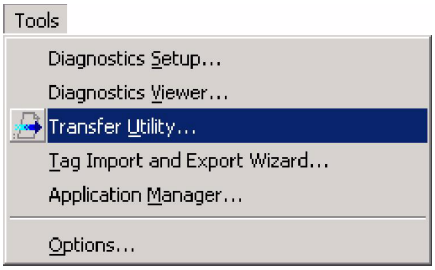

2. Save the project to the default Runtime folder location on the hard drive. Enter the filename and click Save

   After a few minutes, you should have an .mer project ready to download to the terminal. The KEPServer .pfe project file created in Chapter 3 is merged into the .mer file.

## Download Application to Terminal

Typically, downloading an application to a terminal is accomplished using the RSLinx Enterprise File Transfer Utility. You can download an application using a Compact Flash card, a serial connection, or an Ethernet connection. Refer to the RSView Machine Edition User Manual (ViewME-UM003).

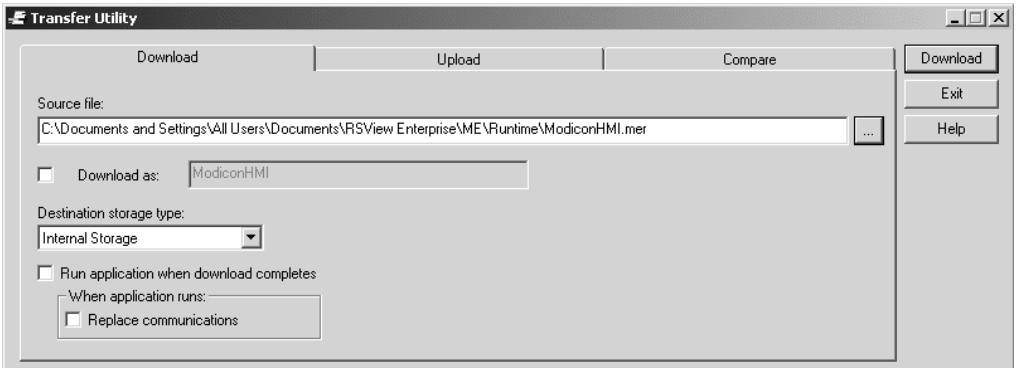
1. From the menu bar, select Tools>Transfer Utility…



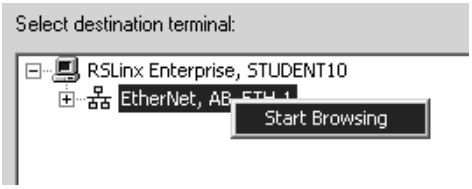

2. On the Download tab, click the [...] button.

3. Select the .mer file and click [Open]

   You should see the following dialog.

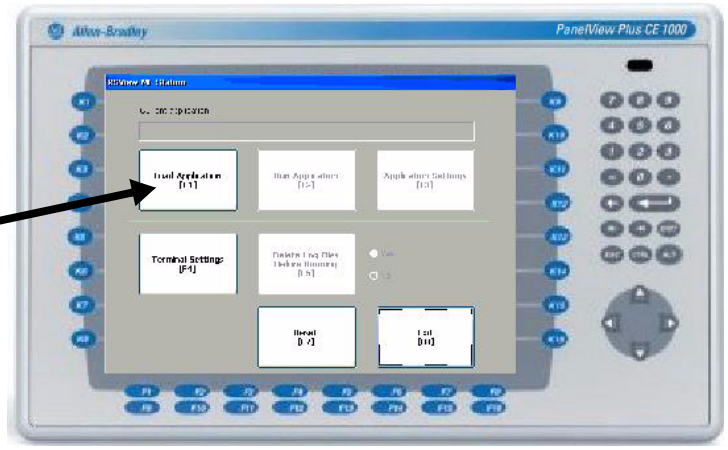



4. Select the target PanelView Plus using the Ethernet browsing capability of RSLinx Enterprise. Right-click on the Ethernet, AB_ETH-1 driver and select Start Browsing.



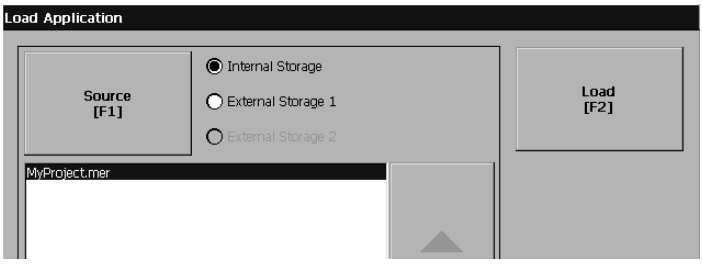

5. Highlight your PanelView Plus or PanelView Plus CE terminal and click [Download]

6. When the download is complete, click Exit and turn your attention to the terminal.




7. Click the **Load Application [F1]** Button.

8. Select the .mer file and click the **Load [F2]** button.




9. Click **Yes [F7]** to replace the terminal's current RSLinx Enterprise communication configuration with the one stored in the application file.

## Connect Terminal to Modbus Network

Before running your application, you need to connect the PanelView Plus/PanelView Plus CE terminal to a Modbus network using either:

- Modbus serial cables or
- Modbus Ethernet cables

### Modbus Serial Cables

The serial port on a PanelView Plus/PanelView Plus CE terminal is different than a desktop computer. Typically, you just need to add a null modem adapter to a cable that works with a desktop computer. To create a cable specifically for the PanelView Plus/PanelView Plus CE, use the cable descriptions in this section for Modbus Serial KEPServer drivers (RTU Serial, Unsolicited Serial, ASCII Serial).

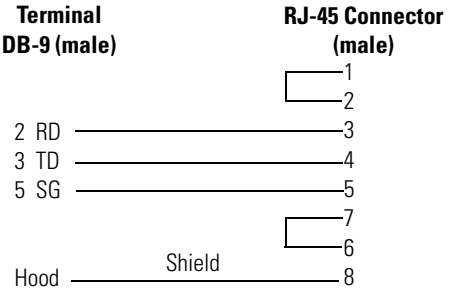
#### *Terminal to Controller 9-pin/25-pin/8-pin Port*

| PanelView Plus RS-232 Port | | Modbus Controller or Desktop PC | | MicroLogix/ DNI |
|---|---|---|---|---|
| 9-pin DCE | | 9-pin(1) | 25-pin | 8-pin DIN(2) |
| 1 | | | | |
| 2 | RXD → | 2 | 3 | 4 |
| 3 | TXD ← | 3 | 2 | 7 |
| 4 | DTR ← | 4 | 20 | |
| 5 | COM ↔ | 5 | 7 | 2 |
| 6 | DSR → | 6 | 6 | |
| 7 | RTS ← | 7 | 4 | |
| 8 | CTS → | 8 | 5 | |
| 9 | | | | |
| Connector Shell | Chassis Gnd | | | |

(1) The 2711-NC13, 2711-NC14, or 2706-NC13 cables have a 9-pin D-Shell connector.

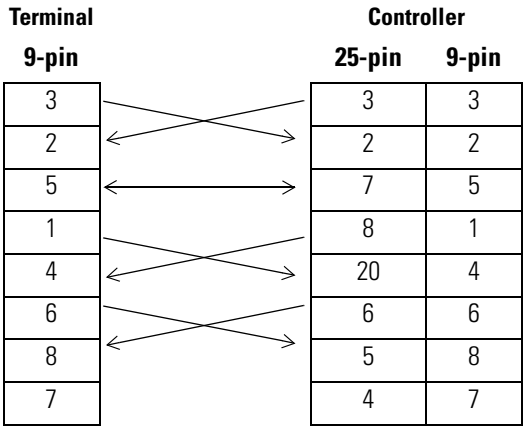
(2) The 2711-NC21 or 2711-NC22 have an 8-pin Mini DIN connector.

#### *Terminal to Controller with an RJ45 Port*



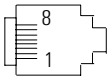
### *Null Modem Cable*

To construct a null modem cable, refer to the following pinout:




## Modbus Ethernet Cables

The RJ45 connector pinout for the PanelView Plus or VersaView Terminal is shown below.

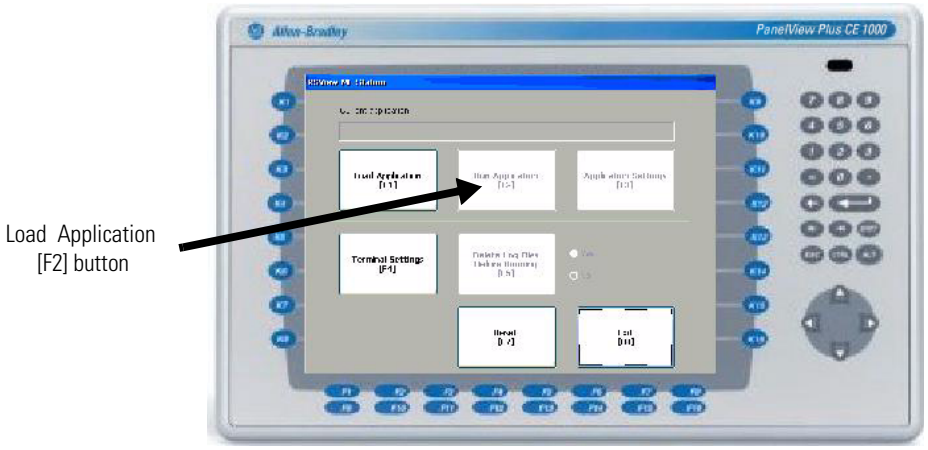
| Connector | Pin | Pin Name |
|---|---|---|
| RJ45 Connector   | 1 | TD+ |
| | 2 | TD- |
| | 3 | RD+ |
| | 4 | NC |
| | 5 | NC |
| | 6 | RD- |
| | 7 | NC |
| | 8 | NC |
| | Shield Connection | Chassis Gnd |

Use point-to-point, 10/100Base-T cables with cross over pin-outs (such as 2711P-CBL-EX04) when connecting the Ethernet port on the PanelView Plus directly to a logic controller's Ethernet port or a computer 10/100Base-T port. Use standard Ethernet cables when connecting to a switch or hub.

## Run Application

Now that your PanelView Plus/PanelView Plus CE terminal contains the loaded application and is connected to a Modbus network, you can run the application.

1. Click the **Run Application [F2]** button to launch application.



# Troubleshooting

## Objectives

This chapter lists common errors that occur during application development as well as errors that occur during runtime.

To diagnose error messages that are generated while developing the KEPServer driver, refer to the KEPServer online help for the appropriate driver and refer to the error description.

## Common Errors

Some of the most common errors made during application development are listed below:

- The .mer file was compiled with the wrong .pfe file. See page 16 for details on setting the default project file.
- The KEPServer driver was not downloaded to the terminal. On PanelView Plus CE terminals, you can verify that the driver is in the Storage card/KEPServer/drivers folder.
- The wrong serial cable is connected to the PanelView Plus or PanelView Plus CE terminal. Refer to Chapter 7.

## Runtime Errors

The table below lists errors that may occur during runtime. Possible causes and solutions are provided for each error.

| Error | Error Type | Possible Cause | Solution |
|---|---|---|---|
| Device '<device name> is not responding | Serious | 1. The connection between the device and the terminal is broken.<br>2. The communication parameters for the connection are incorrect.<br>3. The named device may have been assigned an incorrect network ID. | 1. Verify the cabling between the terminal and the device. The serial pinout for the PanelView Plus/PanelView Plus CE terminal is different than a computer.<br>2. Verify that the specified communi- cation parameters match those of the device.<br>3. Verify that the network ID given to the named device matches that of the actual device. |
| Unable to write to '<address>' on device '<device name>' | Serious | 1. The named device may not be connected to the network.<br>2. The named device may have been assigned an incorrect Network ID.<br>3. The named device is not responding to write requests.<br>4. The address does not exist in the PLC. | 1. Check the PLC network connections.<br>2. Verify that the network ID given to the named device matches that of the actual device. |

| Error | Error Type | Possible Cause | Solution |
|---|---|---|---|
| Bad address in block [x to y] on device '<device name>' | Fatal addresses failing in this block | This error is reported when the driver attempts to read a location in a PLC that does not exist. For example, in a PLC that only has holding registers 40001 to 41400, requesting address 41405 would generate this error. Once this error is generated, the driver will not request the specified block of data from the PLC again. Any other addresses being requested that are in the same block will also be invalid. | Modify the client application to request addresses within the range of the device. |
| Bad received length [x to y] on '<device name>' | Fatal addresses failing in this block | The driver attempted to read a block of memory in the PLC. The PLC responded with no error, but did not provide the driver with the requested block size of data. | Ensure that the range of memory exists for the PLC. |

# Data Types

This appendix describes valid data types for creating tags. This information is also available in the Modbus driver online help in KEPServer Enterprise.

| Data Types | Description[2] |
|---|---|
| Boolean | Single bit |
| Word | Unsigned16 bit value<br>bit 0 is the low bit<br>bit 15 is the high bit |
| Short | Signed16 bit value<br>bit 0 is the low bit<br>bit 14 is the high bit<br>bit 15 is the sign bit |
| Dword | Unsigned 32 bit value<br>bit 0 is the low bit<br>bit 31 is the high bit |
| Long | Signed 32 bit value<br>bit 0 is the low bit<br>bit 30 is the high bit<br>bit 31 is the sign bit |
| BCD | Two byte packed BCD<br>Value range is 0 - 9999.<br>Behavior is undefined for values beyond this range. |
| LBCD | Four byte packed BCD<br>Value range is 0 - 99999999.<br>Behavior is undefined for values beyond this range. |
| Float | 32-bit floating point value.<br>The driver interprets two consecutive registers as a floating-point value by making the second register the high word and the first register the low word.<br>**Float Example:** If register 40001 is specified as float, bit 0 of register 40001 would be bit 0 of the 32-bit word, and bit 15 of register 40002 would be bit 31 of the 32-bit word. |
| String[1] | Null terminated ASCII string<br>Supported on Modbus Model, includes HILo LoHi byte order selection. |
| | Modbus Serial<br>8 byte and 16 byte Omni Flow Computer string data |

(1) The descriptions assume first word low data handling of 32-bit data types.

(2) Not available for Modbus ASCII protocol.

# Modbus/TCP Address Definitions

This appendix describes valid tag addressing for Modbus/TCP communications. This information is also available in the Modbus/TCP driver online help in KEPServer Enterprise. KEPServer drivers use decimal addressing.

## Output Coils

| Output Coils | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Boolean | |
| Format | 0xxxxx | H0yyyyy |
| Security | Read/Write | |
| Range | 000001 - 065536 | H000001 - H01000 |

**Example:**
The 255th output coil would be addressed as '0255' using decimal addressing or 'H0FF' using hexadecimal addressing.

## Input Coils

| Input Coils | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Boolean | |
| Format | 1xxxxx | H1yyyyy |
| Security | Read(1) | |
| Range | 100001 - 165536 | H100001 - H11000 |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

**Example:**
The 127th input coil would be addressed as '1127' using decimal addressing or 'H17F' using hexadecimal addressing.

## Internal Registers

Defaults are shown in **bold**.

| **Internal Registers** | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Word, Short, BCD | |
| Format | 3xxxxx | H3yyyyy |
| Security | Read only (1) | |
| Range | 300001 - 365536 | H300001 - H31000 |

| | | |
|---|---|---|
| Type | **Boolean** | |
| Format | 3xxxxx.bb | H3yyyyy.c |
| Security | Read only (1) | |
| Range | 3xxxxx.0 - 3xxxxx.15 | 3yyyyy.0 - 3yyyyy.F |

| | | |
|---|---|---|
| Type | Float, DWord, Long, LBCD | |
| Format | 3xxxxx | H3yyyyy |
| Security | Read only (1) | |
| Range | 300001 - 365535 | H3000D1 - H3FFFF |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

### *Arrays*

Arrays are also supported for the internal register addresses. The syntax for declaring an array (using decimal addressing) is 3xxxx[cols] with assumed row count of 1 and 3xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the internal register block size that was specified for this device.

## Holding Registers

Default types are shown in **bold**.

| **Holding Registers** | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Word, Short, BCD | |
| Format | 4xxxxx | H4yyyyy |
| Security | Read/Write | |
| Range | 400001 - 465536 | H400001 - H410000 |

| Type | **Boolean** | |
|---|---|---|
| Format | 4xxxxx.bb | H4yyyyy.c |
| Security | Read/Write | |
| Range | 4xxxxx.0 - 4xxxxx.15 | 4yyyyy.0 - 4yyyyy.F |

| Type | Float, DWord, Long, LBCD | |
|---|---|---|
| Format | 4xxxxx | H4yyyyy |
| Security | Read/Write | |
| Range | 400001 - 465535 | H400001 - H4FFFF |

| Type | String HiLo Byte Order | |
|---|---|---|
| Format | 400001.2H - 465536.240H<br>.Bit is string length,<br>Range 2 - 240 bytes | H400001.2H - H4FFFF.240H<br>.Bit is string length,<br>Range 2 - 240 bytes |
| Security | Read/Write | |
| Range | 400001 - 465536<br>Length 2-240 Bytes | H400001 - H4FFFF<br>Length 2 - 240 Bytes |

| Type | String LoHi Byte Order | |
|---|---|---|
| Format | 400001.2L - 465536.240L<br>.Bit is string length,<br>Range 2 - 240 bytes | H400001.2L - H4FFFF.240L<br>.Bit is string length,<br>Range 2 - 240 bytes |
| Security | Read/Write | |
| Range | 400001 - 465536,<br>Length 2-240 Bytes | H400001 - H4FFFF,<br>Length 2 - 240 Bytes |

### *String Support*

The Modbus model supports reading and writing holding register memory as an ASCII string. When using holding registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either an H or L to the address.

**String Example:**
To address a string starting at 40200 with a length of 100 bytes and HiLo byte order enter:

40200.100H

### *Arrays*

Arrays are also supported for the holding register addresses. The syntax for declaring an array (using decimal addressing) is 4xxxx[cols] with assumed row count of 1 and 4xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the holding register block size that was specified for this device.

## Mailbox Addressing

Default types are shown in **bold**.

| **Mailbox Addressing** | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Word, Short, BCD | |
| Format | 4xxxxx | H4yyyyy |
| Security | Read/Write | |
| Range | 1 - 65536 | 1 - 10000 |

| | | |
|---|---|---|
| Type | **Boolean** | |
| Format | 4xxxxx.bb | H4yyyyy.c |
| Security | Read/Write | |
| Range | xxxxx.0 - xxxxx.15 | yyyyy.0 - yyyyy.F |

| | | |
|---|---|---|
| Type | Float, DWord, Long, LBCD | |
| Format | 4xxxxx | H4yyyy |
| Security | Read/Write | |
| Range | 1 - 65535 | 1 - FFFF |

*Arrays*

Arrays are also supported for the holding register addresses. The syntax for declaring an array (using decimal addressing) is 4xxxx[cols] with assumed row count of 1 and 4xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the holding register block size that was specified for this device.

# Instromet Addressing

| | Decimal Addressing |
|---|---|
| Area | **Short Word Registers (16 Bit)** |
| Type | **Word**, Short |
| Range | 400000 - 400199 |
| Security | Read only |

| | |
|---|---|
| Area | **Short Word Registers (32 Bit)** |
| Type | **DWord**, Long |
| Range | 400200 - 400399 |
| Security | Read only |

| | |
|---|---|
| Area | **Floating Point Registers (32 Bit)** |
| Type | **Float** |
| Range | 400400 - 400599 |
| Security | Read only |

**TIP** The normal Instromet addressing does not include the 40xxx. It is included here to keep the addresses in a normal Modbus compatible mode.

# Modbus ASCII Address Definitions

This appendix describes valid tag addressing for Modbus ASCII communications. This information is also available in the Modbus driver online help in KEPServer Enterprise. KEPServer drivers use decimal addressing.

## Output Coils

| Output Coils | |
|---|---|
| | Decimal Addressing |
| Type | Boolean |
| Format | 0xxxxx |
| Security | Read/Write |
| Range | 000001 - 065535 |

**Example:**
The 255th output coil would be addressed as '0255' using decimal addressing or 'H0FF' using hexadecimal addressing.

## Input Coils

| Input Coils | |
|---|---|
| | Decimal Addressing |
| Type | Boolean |
| Format | 1xxxxx |
| Security | Read(1) |
| Range | 100001 - 165535 |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

**Example:**
The 127th input coil would be addressed as '1127' using decimal addressing or 'H17F' using hexadecimal addressing.

## Internal Registers

Defaults are shown in **bold**.

| **Internal Registers** | |
|---|---|
| | Decimal Addressing |
| Type | **Word,** Short, BCD |
| Format | 3xxxxx |
| Security | Read only (1) |
| Range | 300001 - 365535 |

| | |
|---|---|
| Type | Boolean |
| Format | 3xxxxx.bb |
| Security | Read only (1) |
| Range | 3xxxxx.0 - 3xxxxx.15 |

| | |
|---|---|
| Type | Float, DWord, Long, LBCD |
| Format | 3xxxxx |
| Security | Read only |
| Range | 300001 - 365534 |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

*Arrays*

Arrays are also supported for the internal and holding register addresses. The syntax for declaring an array (using decimal addressing) is 3xxxx[cols] with assumed row count of 1 and 3xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the internal register block size that was specified for this device.

## Holding Registers

Default types are shown in **bold**.

| **Holding Registers** | |
|---|---|
| | Decimal Addressing |
| Type | **Word**, Short, BCD |
| Format | 4xxxxx |
| Security | Read/Write |
| Range | 400001 - 465535 |

| | |
|---|---|
| Type | Boolean |
| Format | 4xxxxx.bb |
| Security | Read/Write |
| Range | 4xxxxx.0 - 4xxxxx.15 |

| | |
|---|---|
| Type | Float, DWord, Long, LBCD |
| Format | 4xxxxx |
| Security | Read/Write |
| Range | 400001 - 465534 |

# Modbus Unsolicited Serial Address Definitions

This appendix describes valid tag addressing for Modbus Unsolicited ASCII communications. This information is also available in the Modbus driver online help in KEPServer Enterprise. KEPServer drivers use decimal addressing.

## Output Coils

| Output Coils | |
|---|---|
| | Decimal Addressing |
| Type | Boolean |
| Format | 0xxxxx |
| Security | Read/Write |
| Range | 000001 - 009999 |

## Input Coils

| Input Coils | |
|---|---|
| | Decimal Addressing |
| Type | Boolean |
| Format | 1xxxxx |
| Security | Read |
| Range | 100001 - 109999 |

## Internal Registers

Defaults are shown in **bold**.

| **Internal Registers** | |
|---|---|
| | Decimal Addressing |
| Type | **Word,** Short, BCD |
| Format | 3xxxxx |
| Security | Read only (1) |
| Range | 300000 - 309999 |

| | |
|---|---|
| Type | Boolean |
| Format | 3xxxxx.bb |
| Security | Read only (1) |
| Range | 3xxxxx.0 - 3xxxxx.15 |

| | |
|---|---|
| Type | Float, DWord, Long, LBCD |
| Format | 3xxxxx |
| Security | Read only (1) |
| Range | 300001 - 309998 |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

*Arrays*

Arrays are also supported for the internal and holding register addresses. The syntax for declaring an array (using decimal addressing) is 3xxxx[cols] with assumed row count of 1 and 3xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the internal register block size that was specified for this device.

## Holding Registers

Default types are shown in **bold**.

| **Holding Registers** | |
|---|---|
| | **Decimal Addressing** |
| Type | **Word**, Short, BCD |
| Format | 4xxxxx |
| Security | Read/Write |
| Range | 400001 - 409999 |

| | |
|---|---|
| Type | Boolean |
| Format | 4xxxxx.bb |
| Security | Read/Write |
| Range | 4xxxxx.0 - xxxxx.15 |

| | |
|---|---|
| Type | Float, DWord, Long, LBCD |
| Format | 4xxxxx |
| Security | Read/Write |
| Range | 400001 - 409998 |

| | |
|---|---|
| Type | String HiLo or LoHiByte Order |
| Format | 400001.2H - 409999.240H<br>.Bit is string length,<br>Range 2 - 240 bytes |
| Security | Read/Write |
| Range | 400001 - 409999<br>Length 2 - 240 bytes |

### *String Support*

The Modbus model supports reading and writing holding register memory as an ASCII string. When using holding registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either an H or L to the address.

**String Example:**
To address a string starting at 40200 with a length of 100 bytes and HiLo byte order enter:

40200.100H

# Modbus (RTU) Serial Address Definitions

This appendix describes valid tag addressing for Modbus (RTU) Serial communications. This information is also available in the Modbus driver online help in KEPServer Enterprise. KEPServer drivers use decimal addressing.

## Output Coils

| Output Coils (Function Codes: 01, 05, 15) | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Boolean | |
| Format | 0xxxxx | H0yyyyy |
| Security | Read/Write | |
| Range | 000001 - 065536 | H000001 - H0FFFF |

**Example:**
The 255th output coil would be addressed as '0255' using decimal addressing or 'H0FF' using hexadecimal addressing.

## Input Coils

| Input Coils (Function Code 02) | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | Boolean | |
| Format | 1xxxxx | H1yyyyy |
| Security | Read(1) | |
| Range | 100001 - 165536 | H100001 - H1FFFF |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

**Example:**
The 127th input coil would be addressed as '1127' using decimal addressing or 'H17F' using hexadecimal addressing.

## Internal Registers

Defaults are shown in **bold**.

| Internal Registers (Function Code 04) | | |
|---|---|---|
| | Decimal Addressing | Hexadecimal Addressing |
| Type | **Word**, Short, BCD | |
| Format | 3xxxxx | H3yyyyy |
| Security | Read only (1) | |
| Range | 300001 - 365536 | H300001 - H310000 |

| | | |
|---|---|---|
| Type | Boolean | |
| Format | 3xxxxx.bb | H3yyyyy.c |
| Security | Read only (1) | |
| Range | 3xxxxx.0 - 3xxxxx.15 | H3yyyyy.0 - H3yyyyy.F |

| | | |
|---|---|---|
| Type | Float, DWord, Long, LBCD | |
| Format | 3xxxxx | H3yyyy |
| Security | Read only (1) | |
| Range | 300001 - 365535 | H300001 - H3FFFF |

(1) For unsolicited device 127.0.0.1.0, these locations are Read/Write.

### *Arrays*

Arrays are also supported for the internal register addresses. The syntax for declaring an array (using decimal addressing) is 3xxxx[cols] with assumed row count of 1 and 3xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the internal register block size that was specified for this device.

## Holding Registers

Default types are shown in **bold**.

| Holding Registers (Function Codes: 03, 06[1], 16) | | |
|---|---|---|
| | **Decimal Addressing** | **Hexadecimal Addressing** |
| Type | **Word**, Short, BCD | |
| Format | 4xxxxx | H4yyyyy |
| Security | Read/Write | |
| Range | 400001 - 465536 | H400001 - H41000 |
| | | |
| Type | Boolean | |
| Format | 4xxxxx.bb | H4yyyyy.c |
| Security | Read/Write | |
| Range | 4xxxxx.0 - 4xxxxx.15 | H4yyyyy.0 - H4yyyyy.F |
| | | |
| Type | Float, DWord, Long, LBCD | |
| Format | 4xxxxx | H4yyyyy |
| Security | Read/Write | |
| Range | 400001 - 465535 | H400001 - H4FFFF |
| | | |
| Type | String HiLo Byte Order | |
| Format | 400001.2H - 465536.240H<br>.Bit is string length,<br>Range 2 - 240 bytes | H400001.2H - H4FFFF.240H<br>.Bit is string length,<br>Range 2 - 240 bytes |
| Security | Read/Write | |
| Range | 400001 - 465536<br>Length 2-240 Bytes | H400001 - H4FFFF<br>Length 2 - 240 Bytes |
| | | |
| Type | String LoHi Byte Order | |
| Format | 400001.2L - 465536.240L<br>.Bit is string length,<br>Range 2 - 240 bytes | H400001.2L - H4FFFF.240L<br>.Bit is string length,<br>Range 2 - 240 bytes |
| Security | Read/Write | |
| Range | 400001 - 465536,<br>Length 2-240 Bytes | H400001 - H4FFFF,<br>Length 2 - 240 Bytes |

(1) Function Code 06 cannot be used with string types.

### *String Support*

The Modbus model supports reading and writing holding register memory as an ASCII string. When using holding registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be 2 to 240 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either an H or L to the address.

**String Example 1:**
To address a string starting at 40200 with a length of 100 bytes and HiLo byte order, enter:

40200.100H

**String Example 2:**
To address a string starting at 40500 with a length of 78 bytes and LoHi byte order, enter:

40500.78L

### *Arrays*

Arrays are also supported for the holding register addresses. The syntax for declaring an array (using decimal addressing) is 4xxxx[cols] with assumed row count of 1 and 4xxxx[rows][cols].

For Word, Short and BCD arrays, the base address + (rows * cols) cannot exceed 65536.

For Float, DWord, Long and Long BCD arrays, the base address + (rows * cols * 2) cannot exceed 65535.

For all arrays, the total number of registers being requested cannot exceed the holding register block size that was specified for this device.

## Magnetek Address Descriptions

The following table provides the general ranges of data available for a Magnetek GPD 515 Drive. Consult the Magnetek Modbus RTU Technical Manual, part number TM4025, for information on how specific drive parameters can be accessed using Modbus RTU addressing. In all cases, the letter H (used to signify Hex addressing) should precede the desired address.

Default data types for dynamically defined tags are shown in **bold** where appropriate.

**Magnetek GPD 515 Addressing - Hexadecimal Format**

| Address | Range | Data Type | Access |
|---|---|---|---|
| Command Registers | H40001 - H4000F | **Word**, Short, Boolean | Read-Write |
| Bit Level Access | H4xxxx.0 - H4xxxx.F | | |
| Monitor Registers | H40010 - H4001A | **Word**, Short, Boolean | Read Only |
| Bit Level Access | H4xxxx.0 - H4xxxx.F | | |
| Driver Parameter Registers (Monitor Only) | H40020 - H40097 | **Word**, Short, Boolean | Read Only |
| Bit Level Access | H4xxxx.0 - H4xxxx.F | | |
| Driver Parameter Registers | H401000 - H4050D | **Word**, Short, Boolean | Read/Write |
| Bit Level Access | H4xxxx.0 - H4xxxx.F | | |
| Special Registers | H44FFDD ACCEPT | Word, Short | Write Only |
| | H44FFDD ENTER | | |

### Addressing Example

To access the drive's Operation Status (address 02BH), enter the following address in you client application.

H4002B

### Important Notes

- When adding a Magnetek device to your OPC Server project, make sure the setting Use Zero Based Addressing is not checked (page 27). If this parameter is not set correctly, the Modbus RTU driver will offset all of your Magnetek addresses by 1.
- Arrays are supported for holding register locations for all data types except boolean. There are two methods of addressing an array. Examples are given using holding register locations.

  4xxx [rows] [cols]
  4xxx [cols] - assumes rows is equal to 1
- Rows multiplied by cols cannot exceed the block size that has been assigned to the device for the register type.

## Elliott Flow Computer Address Descriptions

Default data types for dynamically defined tags are shown in **bold** where appropriate.

**Elliott Flow Computer Addressing**

| Address | Range | Data Type | Access |
|---|---|---|---|
| Output Coils | 000001 - 065536 | **Boolean** | Read-Write |
| Input Coils | 100001 - 165536 | **Boolean** | Read Only |
| Internal Registers | 300001 - 365536<br>300001 - 365535<br>3xxxxx.0 - 3xxxxx.15 | **Word**, Short, Boolean<br>Float, DWord, Long, LBCD<br>Boolean | Read Only |
| Holding Registers | 400001 - 465536<br>400001 - 465535<br>4xxxxx.0 - 4xxxxx.15 | **Word**, Short, BCD (1)<br>Float, DWord, Long, LBCD,<br>Boolean | Read-Write |

### Important Notes

- Address ranges 405001 to 405315 and 407001 to 407315 are 32 bit registers. Addresses in the range of 405001 to 405315 use a default data type of Long. Addresses in the range of 407001 to 407315 use a default data type of Float. Since these address registers are 32 bit, only Float, DWord, Long or LBCD data types are allowed. Arrays are not allowed for these special address ranges.
- Arrays are supported for internal and holding register locations (see note 1 above for exceptions) for all data types except Boolean. There are two methods of addressing an array. Examples are given using holding register locations.

  4xxxx [rows] [cols]
  4xxxx [cols] (this method assumes rows is equal to one)

- Rows multiplied by cols cannot exceed the block size that has been assigned to the device for the register type. For arrays of 32 bit data types, rows multiplied by cols multiplied by 2 cannot exceed the block size.

## Omni Address Descriptions

Default data types for dynamically defined tags are shown in **bold** where appropriate.

| **OMNI Addressing** | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Digital I/O Point | 1001 - 1024 | **Boolean** | Read-Write |
| Programmable Boolean Point | 1025 - 1088 | **Boolean** | Read-Write |
| Meter Run Status and Alarm Points | 1**n**01 - 001**n**59<br>1**n**76 - 1**n**99<br>**n** = Number of Meter Run | **Boolean** | Read-Write |
| Micro Motion Alarm Status Points | 1**n**60 - 1**n**75<br>**n**=Number of Meter Run | **Boolean** | Read-Write |
| User Scratch Pad Boolean Points | 1501 - 1599<br>1601 - 1649 | **Boolean** | Read-Write |
| User Scratch Pad One Shot Points | 1650 - 1699 | **Boolean** | Read/Write |
| Command Boolean Points/Variables | 1700 - 1798 | **Boolean** | Read/Write |
| Meter Station Alarm and Status Points | 1801 - 1899 | **Boolean** | Read/Write |
| Prover Alarm and Status Points | 1901 - 1967 | **Boolean** | Read/Write |
| Meter Totalizer Roll-over Flags | 2**n**01 - 2**n**37<br>**n** = Number of Meter Run | **Boolean** | Read/Write |
| Misc. Meter Station Alarm and Status | 2601 - 2623 | **Boolean** | Read/Write |
| Station Totalizer Roll-over Flats | 2801 - 2851 | **Boolean** | Read/Write |
| Station Totalizer Decimal Resolution | 2852 - 2862<br>2865 - 2999 | **Boolean** | Read/Write |

| **OMNI Addressing - 16 Bit Integer Data Addresses** | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Custom Data Packet #1 | 3001 - 3040 | **Short,** Word, BCD | Read-Write |
| Custom Data Packet #2 | 3041 - 3056 | **Short,** Word, BCD | Read-Write |
| Custom Data Packet #3 | 3057 - 3096 | **Short,** Word, BCD | Read/Write |
| Misc. 16-Bit Integer Data | 3097 - 3099<br>3737 - 3799<br>3875 - 3899 | **Short,** Word, BCD | Read/Write |
| Meter Run 16-Bit Integer Data | 3**n**01 - 3**n**52<br>**n**=Number of Meter | **Short,** Word, BCD | Read/Write |
| Scratchpad 16-Bit Integer Data | 3501 - 3599 | **Short,** Word, BCD | Read/Write |
| User Display #1 | 3601 - 3608 | **Short,** Word, BCD | Read/Write |
| User Display #2 | 3609 - 3616 | **Short,** Word, BCD | Read/Write |
| User Display #3 | 3617 - 3624 | **Short,** Word, BCD | Read/Write |
| User Display #4 | 3625 - 3632 | **Short,** Word, BCD | Read/Write |
| User Display #5 | 3633 - 3640 | **Short,** Word, BCD | Read/Write |
| User Display #6 | 3641 - 3648 | **Short,** Word, BCD | Read/Write |
| User Display #7 | 3649 - 3656 | **Short,** Word, BCD | Read/Write |
| User Display #8 | 3657 - 3664 | **Short,** Word, BCD | Read/Write |
| Access Raw Data Archive Records | 3701 - 3736 | **Short,** Word, BCD | Read/Write |
| Meter Station 16-Bit Integer Data | 3800 - 3842 | **Short,** Word, BCD | Read/Write |
| Meter #1 Batch Sequence | 3843 - 3848 | **Short,** Word, BCD | Read/Write |
| Meter #2 Batch Sequence | 3849 - 3854 | **Short,** Word, BCD | Read/Write |
| Meter #3 Batch Sequence | 3855 - 3860 | **Short,** Word, BCD | Read/Write |
| Meter #4 Batch Sequence | 3861 - 3866 | **Short,** Word, BCD | Read/Write |
| Flow Computer Time/Date | 3867 - 3874 | **Short,** Word, BCD | Read/Write |
| Prover 16-Bit Integer Data | 3901 - 3999 | **Short,** Word, BCD | Read/Write |

| **OMNI Addressing - 8 Character ASCII String Data** | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Meter Run ASCII Data | 4**n**01 - 4**n**39<br>**n**=Number of Meter Run | **String** | Read-Write |
| Scratch Pad ASCII Data | 4501 - 4599 | **String** | Read-Write |
| User Display Definition Variables | 4601 - 4640 | **String** | Read/Write |
| Station Auxiliary Input Variables | 4707 - 4710 | **String** | Read/Write |
| Meter Station ASCII Data | 4801 - 4851 | **String** | Read/Write |
| Meter Run 16-Bit Integer Data | 4707 - 4710 | **String** | Read/Write |
| Meter #1 Batch ID | 4852 - 4863 | **String** | Read/Write |
| Meter #2 Batch ID | 4864 - 4875 | **String** | Read/Write |
| Meter #3 Batch ID | 4876 - 4887 | **String** | Read/Write |
| Meter #4 Batch ID | 4888 - 4899 | **String** | Read/Write |
| Prover ASCII String Data | 4901 - 4942 | **String** | Read/Write |

| **OMNI Addressing - 32 Bit Integer Data** | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Meter Run 32-Bit Integer Data | 5**n**01 - 5**n**99<br>**n**=Number of Meter Run | **Long,** DWord, LBCD, Float | Read-Write |
| Scratch Pad 32-Bit Integer Data | 5501 - 5599 | **Long,** DWord, LBCD, Float | Read-Write |
| Station 32-Bit Integer Data | 5801 - 5818 | **Long,** DWord, LBCD, Float | Read-Write |
| Meter #1 Batch Size | 5819 - 5824 | **Long,** DWord, LBCD, Float | Read-Write |
| Meter #2 Batch Size | 5825 - 5830 | **Long,** DWord, LBCD, Float | Read-Write |
| Meter #3 Batch Size | 5831 - 5836 | **Long,** DWord, LBCD, Float | Read-Write |
| Meter #4 Batch Size | 5837 - 5842 | **Long,** DWord, LBCD, Float | Read-Write |
| Additional 32-Bit Meter Run Data | 5843 - 5899 | **Long,** DWord, LBCD, Float | Read-Write |
| Prover 32-Bit Integer Data | 5901 - 5973 | **Long,** DWord, LBCD, Float | Read-Write |
| Compact Prover TDVOL/TDFMP Pulses | 5974 - 5999 | **Long,** DWord, LBCD, Float | Read-Write |

| OMNI Addressing - 32 Bit IEEE Floating Point Data | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Reserved Data | 6001 - 7000 | **Float,** Long, DWord, LBCD | Read-Write |
| Digital to Analog Outputs | 7001 - 7024 | **Float,** Long, DWord, LBCD | Read-Write |
| User Variables | 7025 - 7088 | **Float,** Long, DWord, LBCD | Read-Write |
| Programmable Accumulator | 7089 - 7099 | **Float,** Long, DWord, LBCD | Read-Write |
| Meter Run Data | 7**n**01 - 7**n**99<br>**n**=Number of Meter Run | **Float,** Long, DWord, LBCD | Read-Write |
| Scratch Pad Data | 7501 - 7599 | **Float,** Long, DWord, LBCD | Read-Write |
| PID Control Data | 7601 - 7623 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Meter Run Data | 7624 - 7699 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Variables | 7701 - 7799 | **Float,** Long, DWord, LBCD | Read-Write |
| Meter Station Data | 7801 - 7899 | **Float,** Long, DWord, LBCD | Read-Write |
| Prover Data | 7901 - 7918 | **Float,** Long, DWord, LBCD | Read-Write |
| Configuration Data for Prover | 7919 - 7958 | **Float,** Long, DWord, LBCD | Read-Write |
| Last Prove Data | 7959 - 7966 | **Float,** Long, DWord, LBCD | Read-Write |
| Data Rejected During Prove | 7967 - 7990 | **Float,** Long, DWord, LBCD | Read-Write |
| Prove Run Data | 7991 - 8050 | **Float,** Long, DWord, LBCD | Read-Write |
| Prove Average Data | 8051 - 8079 | **Float,** Long, DWord, LBCD | Read-Write |
| Prove Run - Master Meter Data | 8080 - 8199 | **Float,** Long, DWord, LBCD | Read-Write |
| Proving Series Data | 8200 - 8223 | **Float,** Long, DWord, LBCD | Read-Write |
| Data of Meter Being Proved | 8224 - 8230 | **Float,** Long, DWord, LBCD | Read-Write |
| Mass Prove Data | 8231 - 8500 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Meter Run #1 | 8501 - 8599 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Meter Run #2 | 8601 - 8699 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Meter Run #3 | 8701 - 8799 | **Float,** Long, DWord, LBCD | Read-Write |
| Miscellaneous Meter Run #4 | 8801 - 8899 | **Float,** Long, DWord, LBCD | Read-Write |
| Station Previous Batch Average Data | 8901 - 8999 | **Float,** Long, DWord, LBCD | Read-Write |

| OMNI Addressing - 16 Bit Integer Configuration Data | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Meter Run #1 | 13001 - 13013 | **Short,** Word, BCD | Read-Write |
| Meter Run #2 | 13014 - 13026 | **Short,** Word, BCD | Read-Write |
| Meter Run #3 | 13027 - 13039 | **Short,** Word, BCD | Read-Write |
| Meter Run #4 | 13040 - 13052 | **Short,** Word, BCD | Read-Write |
| Prover Configuration | 13053 - 13073 | **Short,** Word, BCD | Read-Write |
| General Flow Configuration | 13074 - 13084 | **Short,** Word, BCD | Read-Write |
| Serial Port Configuration | 13085 - 13128 | **Short,** Word, BCD | Read-Write |
| PID Configuration | 13129 - 13160 | **Short,** Word, BCD | Read-Write |
| PLC Data | 13161 - 13299 | **Short,** Word, BCD | Read-Write |
| Peer to Peer Setup | 13300 - 13499 | **Short,** Word, BCD | Read-Write |
| Raw Data Archive | 13500 - 13999 | **Short,** Word, BCD | Read-Write |

| OMNI Addressing - 16 Character ASCII String Data | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Flow Computer Configuration | 14001 - 14499 | **String** | Read-Write |

| OMNI Addressing - 32-Bit Integer Data | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Flow Computer Configuration | 15001 - 16999 | **Long,** DWord, LBCD, Float | Read-Write |

| OMNI Addressing - 32-Bit IEEE Floating Point Data | | | |
|---|---|---|---|
| **Address** | **Range** | **Data Type** | **Access** |
| Flow Computer Configuration | 17001 - 18999 | **Float,** Long, DWord, LBCD | Read-Write |

## Daniel S500 Address Descriptions

Default data types are dynamically defined tags are shown in **bold** where appropriate.

**Daniel S500 Addressing**

| Address | Hex Range | Decimal Range | Data Type | Function Codes | Access |
|---|---|---|---|---|---|
| Totals | 000 - 0FF | 4096 - 4351 | **Double** | 03 | Read Only |
| Calculated/Measured Variables | 100 - 24F | 4352 - 4687 | **Float** | 03, 16 | Read/Write |
| Calculation Consultants | 250 - 28F | 4688 - 4751 | **Float** | 03, 16 | Read/Write |
| Keypad Default Values | 290 - 2AF | 4752 - 4783 | **Float** | 03, 16 | Read/Write |
| Alarm and Scaling Constants | 2B0 - 5FF | 4784 - 5631 | **Float** | 03, 16 | Read/Write |
| Status / Control | 700 - 7FF | 5888 - 6143 | **Boolean** | 02, 5 | Read/Write |
| Alarms | 800 - 8FF | 6144 - 8191 | **Boolean** | 02 | Read/Write |

## Symbols

**.mer file** 53
**.pfe file** 15

## A

**address definitions**
MODBUS (RTU) Serial 77
MODBUS ASCII 69
MODBUS Unsolicited ASCII 73
MODBUS/TCP 63
**application**
compiling 53
downloading 54
guidelines for creating 14
loading 55
running 58
**application guidelines** 13

## C

**cables**
Ethernet cables 57
null modem cable 57
serial cables 56
**channel** 17
**compiling application** 53

## D

**Daniles S500 address definitions** 88
**data types** 61
**downloading**
application 54
Firmware Upgrade Wizard 42

## E

**Elliott address definitions** 82
**Ethernet cable** 57

## F

**firmware upgrade**
creating a firmware upgrade card 42
firmware upgrade wizard 41
upgrading via network connection 46
using a firmware upgrade card 44
**Firmware Upgrade Wizard** 10
using a compact flash card 42
using network connection 46

## I

**Instromet addressing** 68

## K

**KEPServer communications, testing** 35
**KEPServer drivers**
Firmware Upgrade Wizard 41
installing on terminal 41
**KEPServer drivers and tags**
making available to RSView Studio 37
**KEPServer Enterprise** 10

## M

**Magnatek address definitions** 81
**MODBUS (RTU) Serial**
address definitions 77
Danieles S500 address definitions 88
holding registers 79
input coils 77
internal registers 78
OMNI address definitions 83
output coils 77
**MODBUS ASCII** 11
address definitions 69
holding registers 71
input coils 69
internal registers 70
output coils 69
**MODBUS drivers**
adding a channel 17
adding a device 24
configuring 17
**MODBUS master/slave protocol**
MODBUS (RTU) Serial 11
MODBUS Unsolicited Serial 11
network illustrations 12
**MODBUS protocols**
master/slave 11
MODBUS (RTU) Serial 11
MODBUS ASCII 13
MODBUS Unsolicited Serial 11
MODBUS/TCP 13
**MODBUS Unsolicited ASCII**
address definitions 73
holding registers 75
input coils 73
internal registers 74
output coils 73

**MODBUS/TCP** 13
address definitions 63
holding registers 65
input coils 63
Instromet addressing 65
internal registers 64
mailbox addressing 65
output coils 63

## N

**network connections** 56

## O

**OMNI address definitions** 83
**OPC Data Server** 37
**OPC Quick Client** 35

## P

**project .pfe file**
creating 15
saving 31, 33
setting default project 16

## R

**RSView Studio** 9
available KEPServer drivers 37
**running application** 58
**runtime errors** 59

## S

**serial cables**
MODBUS cables 56
null modem cable 57
**software, required**
Firmware Upgrade Wizard 10
KEPServer Enterprise 10
RSView Studio 9

## T

**tags**
browsing 37
creating 32
**terminal**
connecting to MODBUS network 56
**troubleshooting**
common operating errors 59
runtime errors 59

## Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

## Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

| | |
|---|---|
| United States | 1.440.646.3223<br>Monday – Friday, 8am – 5pm EST |
| Outside United States | Please contact your local Rockwell Automation representative for any technical support issues. |

## New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

| | |
|---|---|
| United States | Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for return procedure. |



**www.rockwellautomation.com**

**Power, Control and Information Solutions Headquarters**

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication 2711P-UM002B-EN-P - March 2007
Supersedes Publication 2711P-UM002A-EN-P - August 2004