Modbus Plus Driver Notes

KepserverEX 4.62.188-U

01/11/2002

Modbus Plus Notes

Introduction

The Modbus protocol was invented by Modicon in 1978 as a simple way to transfer control data between controllers and sensors using an RS-232 port. Today, it's the single most supported protocol among automation devices. The Modbus protocol includes Modbus serial, Modbus Plus, Modbus Ethernet and others. This appnote will cover the Modbus Plus protocol, and Kepware's Modbus Plus driver.

Modbus Plus

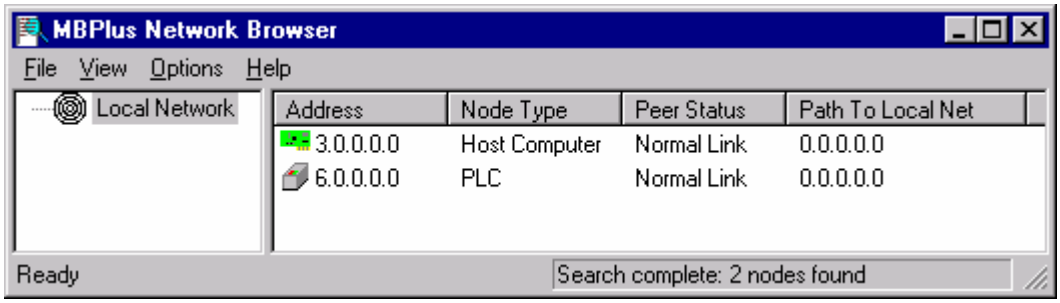
The Modbus Plus driver is different than most drivers in the Kepware product line. It requires an SA-85 (ISA) or a PCI-85 (PCI) adapter card and MBX low level drivers to operate correctly. Both the card and the drivers are provided by Modicon. The driver can poll multiple devices (PLC's) on an MBPlus network and also act as a single slave device on the MBPlus network for other devices to poll. Currently the driver is limited to eight channels and 8192 devices.

Basic Modbus Plus Troubleshooting

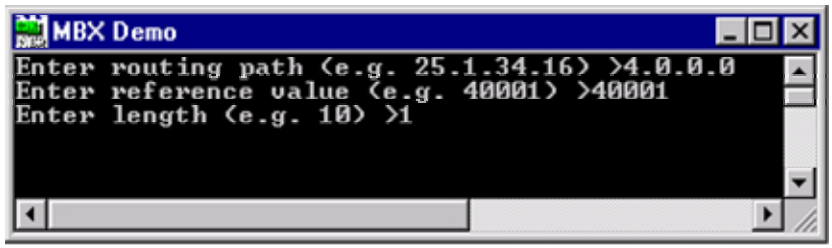
As with any tech support call, the first thing to check is basic server/client connectivity. Check the connection status bar and event window for any relevant messages.

If there is an active client and no relevant Event messages, fire up the Modbus Plus Net Browser Utility from the Start|Programs|KEPServerEx folder. If the utility will not load that means the low-level drivers for the SA85 card are not installed properly. If the utility opens but does not show any PLCs on the network there may be a wiring problem, but you should at least see the SA85 card installed on the Host computer. If nothing is seen or all devices are not seen, try refreshing the utility from the View menu.

If the SA85 card and low-level drivers are installed correctly, and the card's node id does not conflict with the PLC's node id, and the wiring is good between card and PLC you should see a screen showing the entries "Host Computer" and "PLC" in the "Node type" section of the Net Browser window, as seen below.



Another way to prove that the card, wiring, and PLC are setup correctly is to use the MBX Demo program from the Start|Programs|WinConX folder (if using MBX V4.2. or newer this can be launched from the MBX Driver Configuration window). This folder contains the low-level driver software installed from the CD included with the SA85 card as supplied by Modicon. Select option 2, follow the prompts and enter in the node id, as seen below.



This should yield a valid value, if not there is most likely a wiring problem, incorrect node setting, node conflict, or problem with low-level driver installation.

ISA Card Considerations

The SA 85 card supplied by Modicon comes in both a PCI and ISA variety. They each have their own idiosyncrasies. This section applies to the ISA variety

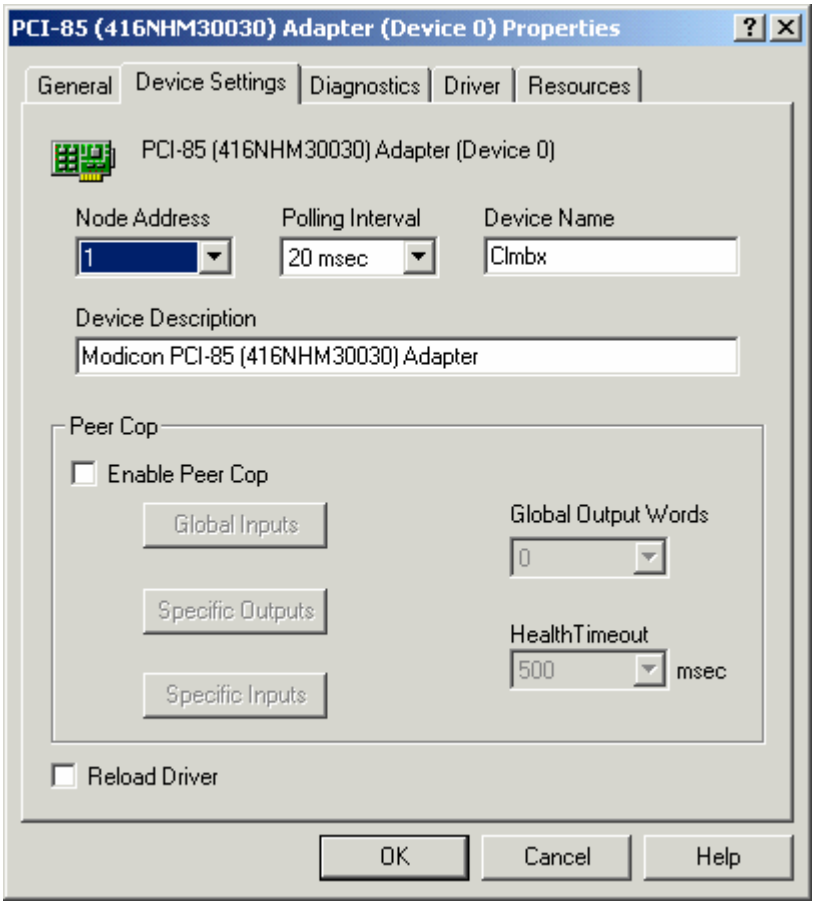
Modbus Plus Node id:
Set the node id via the dipswitches on the card. Refer to the "*Modicon IBM Host Based Devices User's Guide*" for help (page 43). You will need to shut down the PC and then power up after changing the dip-witches.

Base Memory Address:
Set the base memory address via the dipswitches on the card. Refer to the "*Modicon IBM Host Based Devices User's Guide*" for help (page 45). You will need to shut down the PC and then power up after changing the dip-switches. When using a single card, the address most commonly used is *D0000.*

MBX Driver Configuration:
The MBX driver configuration must match the settings chosen on the card itself. The ISA card comes with a mode jumper that is set to *Polled* mode as the default. This is the recommended setting. Make certain that the user has chosen polled mode in the configuration settings (MBX Driver Configuration). Also make certain that the user has matched the driver configuration settings for base memory address with the address chosen via dipswitches.

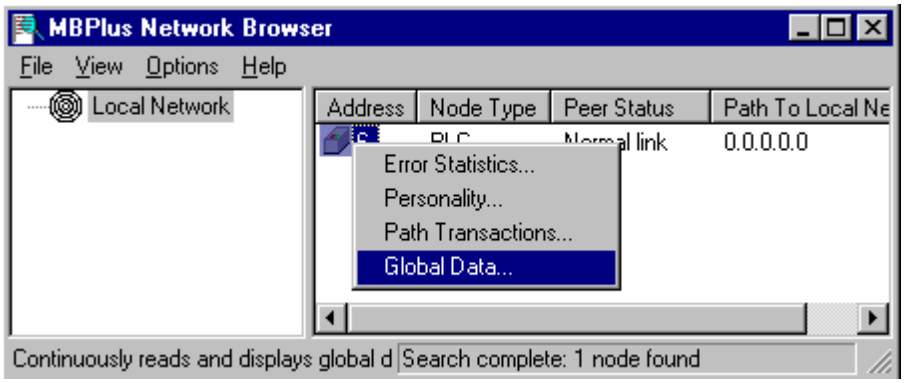
PCI Card Considerations

With the PCI card all settings for Node id, memory address, and mode are set through the MBX Driver Configuration software. Highlight the device in the configuration software and click Edit. This will prompt you to enter the Device Manager and make the changes there, as seen below.



Global Data

To take advantage of Global data the customer must configure MSTR instructions in the PLC ladder logic to pass global data to another Modbus Plus Node (your PC). Global data is only available at the local Modbus Plus layer (6.0.0.0.0). If the DM device address has a non-zero value in the 2nd digit (left to right) then global data will not be available. If the customer cannot read global data from the local layer, try reading Global data from the Modbus Plus Network Browser.



Placeholders in the Kepserver/EX folder

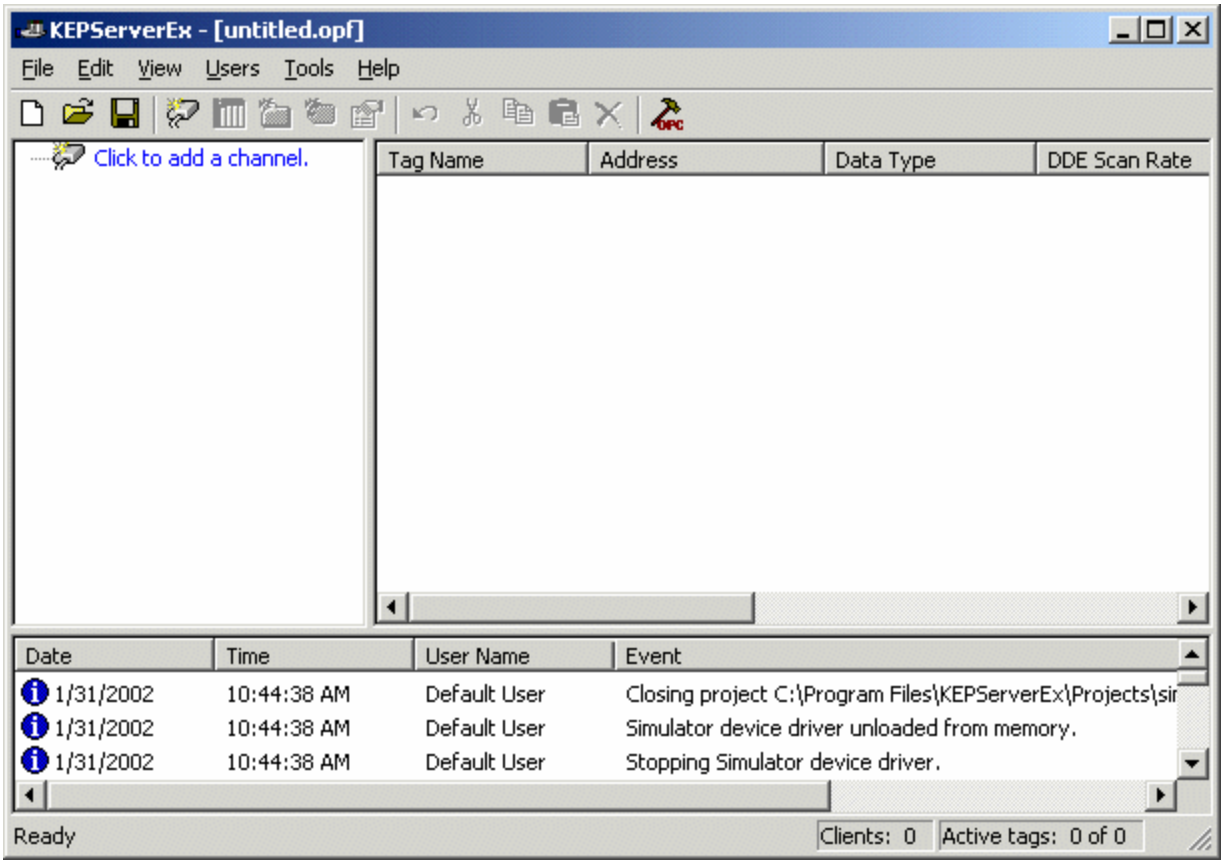
During the Kepserver installation routine, two files are installed that allow users to configure a Modbus Plus project without having an SA85 card and MBX drivers installed. One is for the server, the other is for the net browser utility (Modbus_plus_mbx_u.dll and Modbus_plus_net_u.dll note: _a for win95/98). This will allow project configuration but the channel and device will be grayed out and simulation mode is not possible unless the card and mbx drivers are installed.

Creating a Modbus Plus Project

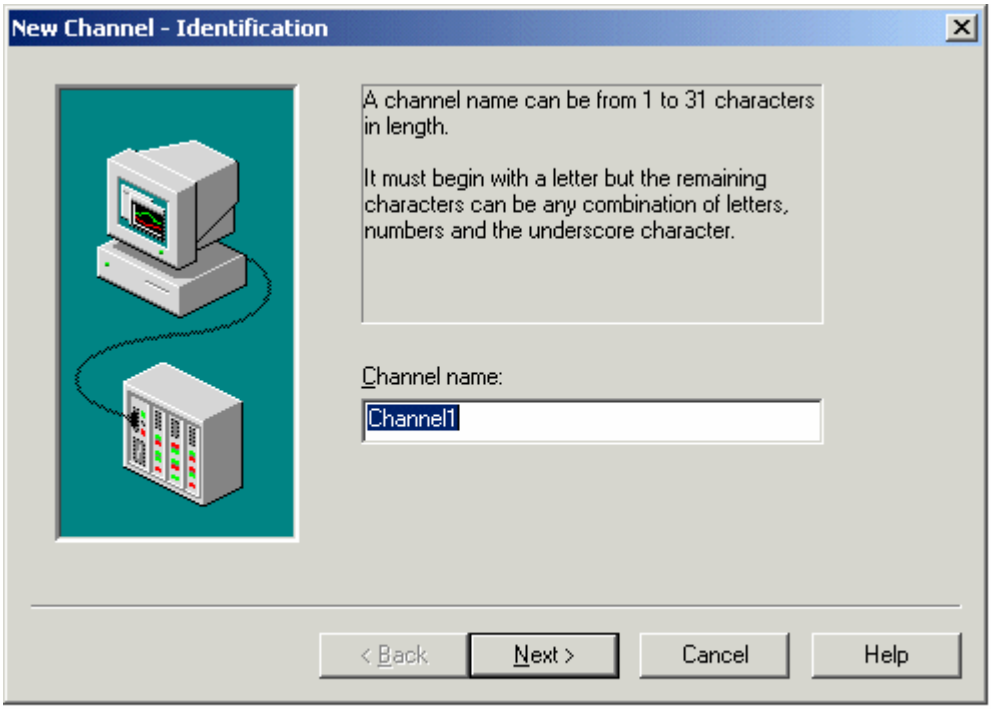
The following is a simplified version of the steps used to create a Modbus Plus project in KepServerEX. For more detailed information on addressing, data types, etc. please consult the Modbus Plus help file provided with the server.

Creating a New Channel

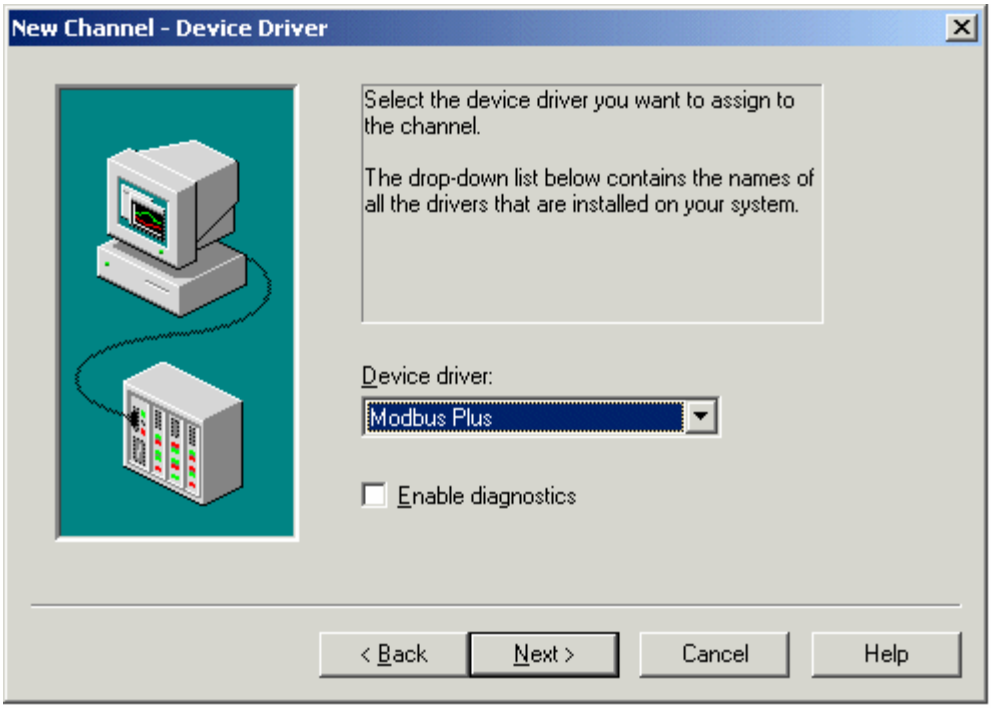
Start by opening Kepserver, and clicking on File, New. The below window will open.



Double click on “Click to add a channel”, in the upper left hand pane.



Choose a name for your channel, or accept the default and press next.



The Device Driver window will appear. In the demo, all drivers will appear in this drop down list. If you have purchased the product, only the drivers that have been purchased and unlocked will appear. Choose Modbus Plus, and press next.

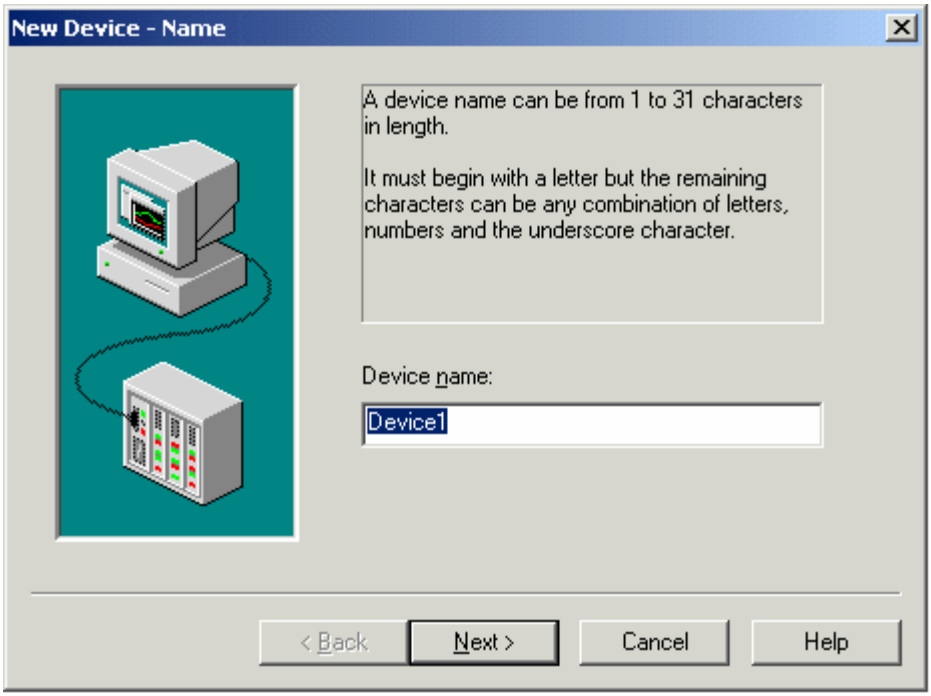
The next window allows you to configure how the server handles writes on this channel. In most cases, you can accept the defaults and press next.

The next window will allow you to set the adapter number that your Modbus Plus card is using. Valid adapter numbers are 0 through 3.

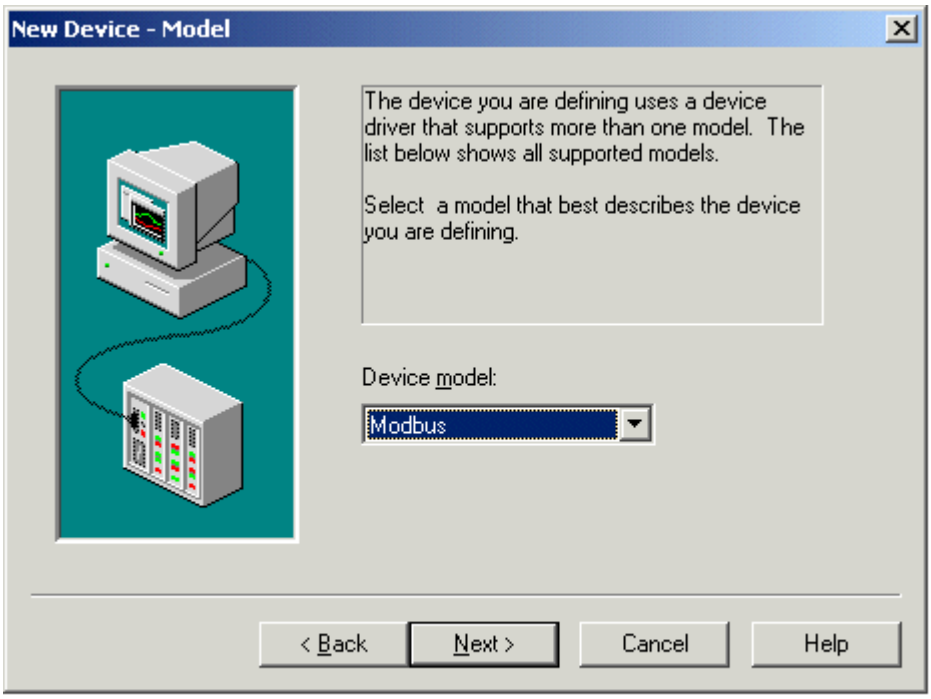
The last window in the channel setup process lists all the information that was entered during the setup process. If the information is correct, press Finish and continue to the device setup stage.

Adding a Device

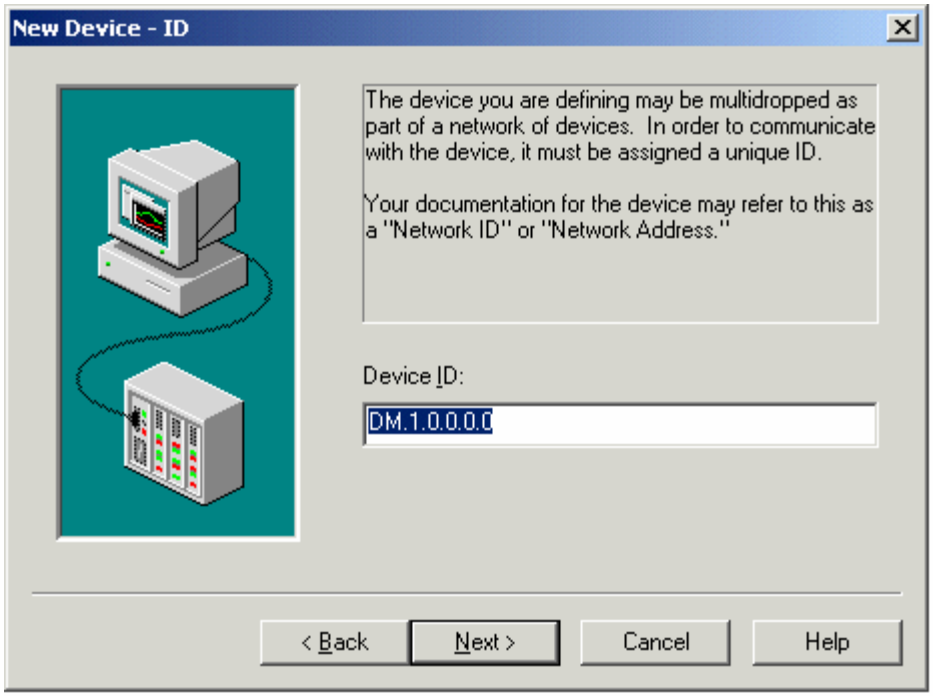
After your channel is configured, the next step is adding a device. Double click on “Click to add a device” under your channel name and this window will come up.



Choose your device name, and click next.



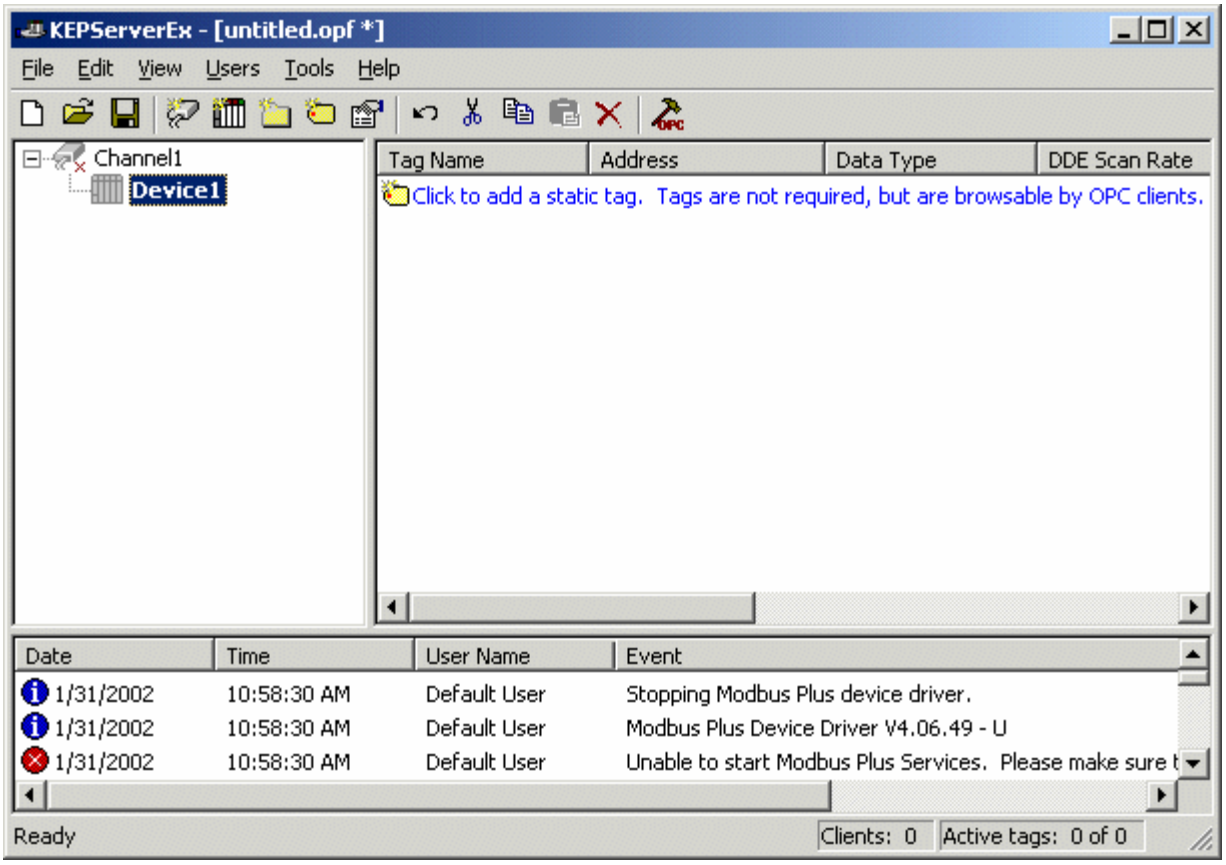
Choose your device model, and click next.



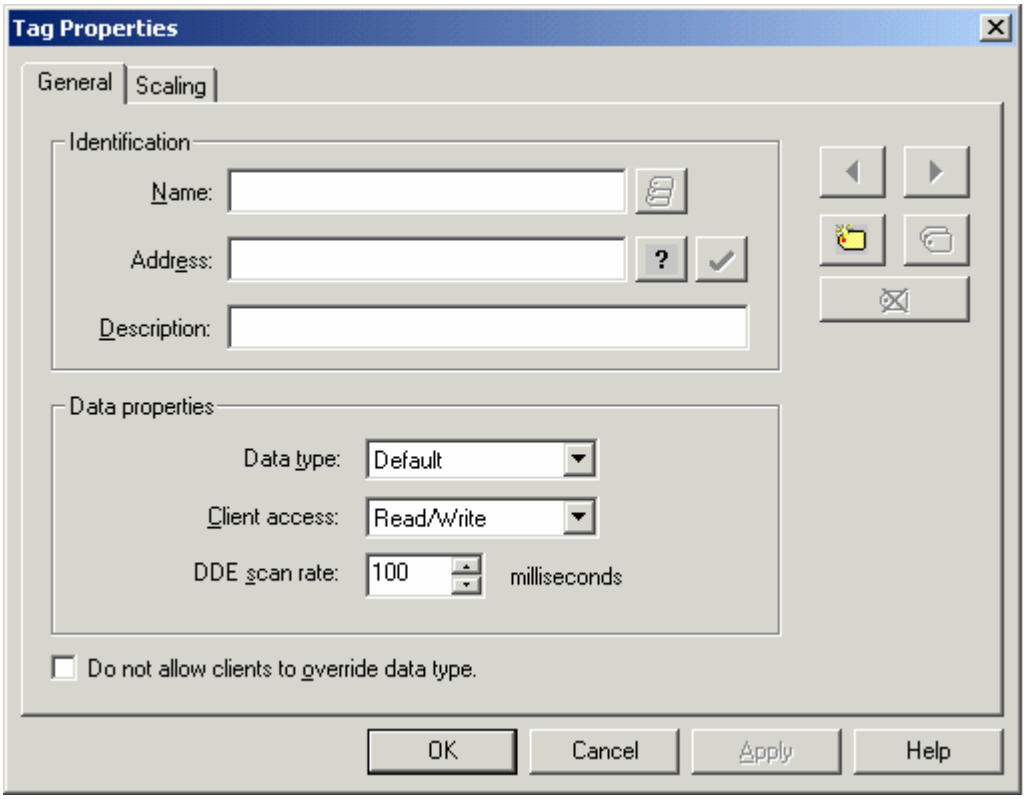
Assign your device id on this screen. For more information on Modbus Plus Device ID naming conventions, please refer to the help file included with the server.

The next three screens are communications parameter setup screens. Configure these screens for your particular parameters. The defaults assume the device is a Modicon PLC.

The last device setup screen, much like the final channel setup screen, lists the configurations for the device, based on the information entered in the previous screens. If this is all correct, press finish. You should then have a window like this.



At this point, you can add whatever tags you wish.



Help in tag addressing is available by clicking the question mark button. You will be prompted by the server if you attempt to configure an unsupported tag address.

More detailed information on general channel/device/tag setup and specific Modbus Plus setup is available in the KepserverEX and Modbus Plus help files provided with the server.