Integrating Eaton meters into Schneider/Siemens software

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Abstract
Schneider® Power Monitoring Expert (PME) software and Siemens® WinPM.Net™ software include a utility program called the Modbus Device Importer (MDI) that enables the integration of devices. This paper discusses how the MDI utility can be used to integrate Eaton meters.

Introduction
Schneider Power Monitoring Expert (PME) software (formerly ION Enterprise software) includes a software tool called the Modbus Device Importer (MDI) that enables the integration of devices that communicate using the Modbus protocol. Siemens WinPM.Net software includes the same MDI tool.

The MDI is intended as a tool for advanced users to create the files and software support necessary to display data from any Modbus device. To streamline this process for popular Eaton meters, MDI files have been created and preconfigured for ease of integration. These files are free and available from Eaton PXAEs. (PME licenses per device count still apply.)

Background
Modbus RTU is a fieldbus that is based on RS-485 twisted pair communication. Because modern computers (PCs and servers) don't support twisted pair communications natively, some kind of translation of Modbus RTU communication into a medium that the computer can understand is necessary. Typically, this translation is from Modbus RTU to some form of Ethernet (i.e., TCP/IP) communications using a protocol such as Modbus TCP. For the purposes of this white paper, Modbus TCP can be thought of as encapsulating Modbus RTU communications in TCP/IP packets.

The most common integration scenario is to integrate devices using Modbus TCP. Some Eaton meters support Modbus TCP natively. Some Eaton meters support Modbus RTU natively, and so require a gateway device, such as the PXG900, to translate Modbus RTU to Modbus TCP. The PXG900 gateway can support up to 64 Modbus RTU devices simultaneously. In other words, only one PXG900 gateway is required to support many Modbus RTU devices.
Figure 1 shows Power Xpert® meters and a Power Xpert gateway connected to a network and communicating to a PME server using Modbus TCP. Any number of Power Xpert devices can be supported in this way. For Modbus RTU devices, such as the IQ 1xx and 2xx meters shown in Figure 1, the gateway converts Modbus RTU communication over an RS-485 twisted pair network to Modbus TCP communication over an Ethernet network.

Figure 1: Network diagram

<table>
<thead>
<tr>
<th>Meter</th>
<th>Communication method</th>
<th>PXG900 gateway required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Xpert Meter 4000/6000/8000</td>
<td>Modbus TCP</td>
<td>No</td>
</tr>
<tr>
<td>Power Xpert Meter 2000 series</td>
<td>Modbus TCP</td>
<td>No</td>
</tr>
<tr>
<td>IQ 250 / IQ 260</td>
<td>Modbus RTU</td>
<td>Yes</td>
</tr>
<tr>
<td>IQ 130 / IQ 140 / IQ 150</td>
<td>Modbus RTU</td>
<td>Yes</td>
</tr>
</tbody>
</table>

A protocol conversion device is required for Modbus RTU devices, in order to convert to Modbus TCP Ethernet communications. The PXG900 is recommended for Modbus RTU to Modbus TCP protocol conversion, as the PXG900 has many powerful features, including an embedded web server that allows viewing meter information directly. However, other communications gateways or protocol converters with the capability to support Modbus TCP Ethernet communications to RS-485 Modbus RTU slave devices can be applied.

Installation packages

For each type of meter, the installation package includes the following information:
1. Device installation procedure
2. Device “MDI” driver files
3. Device icons
4. Device diagram backgrounds
5. Device Vista diagrams
6. Eaton logo
7. Eaton web page Vista diagram and background
8. Points list summary for the meter

To use the installation package, all that is required is to point the PME software to the location of the installation package. Users with expertise in PME software can do this themselves. Eaton engineering services or independent systems integrators are also available to assist, if needed.

Figure 2 shows a screen capture in PME software of an Eaton PXM6000 meter. Note that this web page has the standard PME look-and-feel for meters. The tab shown displays real-time information, and two additional tabs display energy and I/O information. In addition to real-time information, this web page also has buttons on the bottom that link to logged data, to min./max. data, and also to the PXM6000 meter’s embedded web server (“Eaton device Web Page”). From the meter’s web server, the user can access the full range of capability of this advanced power quality meter, including ITIC curves, waveforms and meter configuration functions.
Integrating other Eaton devices

In addition to the preconfigured Eaton meters, for which MDI files have already been created, it is also possible to integrate other Eaton devices into PME software by creating the appropriate MDI files and installation package. Eaton engineering services and independent systems integrators are available to aid in the creation of the MDI files. For example, the PXMP and PXBCM multipoint meters can readily be integrated into PME software by creating the appropriate MDI files.

Logging time series data

The local PME server will collect Modbus register data from meters and store the data locally, and then pass the data to the enterprise database server when the network is available.

Waveforms

Third-party software is available to collect and view waveforms from Eaton meters. Alternatively, waveforms can be viewed by using the Power Xpert meters’ embedded web server. Figure 3 shows an example of a waveform captured using a PXM2290 meter, and displayed via the meter’s embedded web server.

Figure 2: Screen capture of PXM6000 in PME software

Figure 3: PXM2K waveform capture
Customer success story

A facility manager for a large automotive manufacturing plant was interested in integrating Eaton Power Xpert meters into the site’s existing Schneider PME software system. The facility manager was already familiar with Modbus Data Importer (MDI) mechanism, and reported that the MDI files for the Power Xpert meters were very easy to install. The software system was successfully gathering information from the meters in no time.

Conclusion

Eaton meters are easily integrated into Schneider and Siemens software using the Modbus Data Importer mechanism. Eaton engineering services and independent systems integrators are available to assist, if needed.

Author

Tim Thompson is chief engineer for communications in power components solutions at Eaton. He has held positions in design engineering and engineering management, and has over 20 years of experience in developing electronic power distribution products, including power quality meters, protective relays, electronic trip units, communications gateways, and enterprise software. He holds five patents, with several pending. Tim received his BSEE from the University of Pittsburgh, and his MSEE from Carnegie-Mellon University.

References