



Remote Monitoring and Control

DNP-RTM™

Siemens MJ-X^L™ Voltage Regulator Integration Guide

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Revision Log

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1/24/03	1.0	Initial version
9/19/03	1.1	Added MOV to integration parts list and added instructions for installing.

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Introduction

Overview

The Telemetric DNP-Remote Telemetry Module (DNP-RTM™) is a cost-effective communications solution for remote monitoring and control of Intelligent Electronic Devices (IED's) such as Siemens MJ-X^L Voltage Regulator. The DNP-RTM continuously polls the IED through a local serial connection. When a reportable change is detected, the DNP-RTM transmits an event report. This minimizes the cost of communication, yet provides near real-time information. Access to the IED with the DNP-RTM can be gained from the utility's SCADA system by using the Telemetric SCADA-Xchange™.

Integrating the Telemetric DNP-RTM with the Siemens MJ-X^L Voltage Regulator provides immediate control and status indication of operating conditions to improve system operation and protect investments. The instructions and installation kit referenced in this manual were created to integrate a Telemetric DNP-RTM to a Siemens MJ-X^L Voltage Regulator installed in a 20" or 26" Siemens enclosure. If the enclosure is not large enough to accommodate an internal DNP-RTM installation, please contact your Telemetric sales representative and ask about the external DNP-RTM.

If the installation is to be a retrofitted to a previously installed device in the Siemens 20" or 26" enclosure, order the Telemetric Siemens MJ-X^L Integration Kit. This kit will include the mounting plate, wiring harness, and power supply necessary for installing the DNP-RTM. If the MJ-X^L is ordered new from the factory, make sure the radio accessory kit is ordered along with the voltage regulator.

The Siemens DNP configuration software Mjxcommfig.exe, version 2.2 or later, will be needed to program the required DNP point list for this integration. The Siemens MJ-X^L Main Processor will need to be version 3.06 or later.

The MJ-X^L will need the communications module version 3.01 or later. Contact your Siemens representative to obtain the communications module, DNP configuration software or proper firmware versions that will enable DNP communication.

This integration provides monitor and control capability over many of the Siemens MJ-X^L Voltage Regulator points. See Table 1, Table 2, and Table 3 for the monitor and control points provided in this integration.

Features

Integrating the Telemetric DNP-RTM with the Siemens MJ-X^L Voltage Regulator provides remote notification of Siemens MJ-X^L Voltage Regulator events and internal parameter status, as well as the ability to adjust the voltage remotely. The following monitor and control points are provided in this integration:

Table 1 – Digital Input Points

Point Number	Point Name	Enabled on RTM	Report on Change	Report Interval	Trigger Time
0	Tap Position Known	X	X	24 hours	0
1	Control Power Direction	X	X	24 hours	0
2	Auto Inhibit Status	X	X	24 hours	0
3	U2/P2 Voltage Test Switch	X	X	24 hours	0
4	Neutral Signal	X	X	24 hours	0
5	Remote (Switch Setting)	X	X	24 hours	0
6	Manual (Switch Setting)	X	X	24 hours	0

Table 2 – Digital Output Points

Point Number	Point Name	Enabled on RTM	Report on Change	Report Interval	Trigger Time
0	Tap Raise	X	X	0	0
1	Tap Lower	X	X	0	0
2	Auto Inhibit	X	X	0	0

Table 3 – Analog Input Points

Point Number	Point Name	Enabled on RTM	Report Interval	Low Limit	Low-Mid Limit	High-Mid Limit	High Limit
0	Inst Vld	X	0	Low	Normal	High	Very High
1	Inst Vs	X	0	Low	Normal	High	Very High
2	Inst Vcomp	X	0	Low	Normal	High	Very High
3	Inst Ild	X	0	Low	Normal	High	Very High
4	Inst PF	X	0	Low	Normal	High	Very High
5	Inst KVA	X	0	Low	Normal	High	Very High
6	Inst KW	X	0	Low	Normal	High	Very High
7	Inst KVAR	X	0	Low	Normal	High	Very High
8	Inst Vld Primary	X	0	Low	Normal	High	Very High
9	Inst Vs Primary	X	0	Low	Normal	High	Very High
10	Inst Vcomp Primary	X	0	Low	Normal	High	Very High
11	% Regulation	X	0	Low	Normal	High	Very High
12	Inst Vld F min	X	0	Low	Normal	High	Very High
13	Inst Vs F min	X	0	Low	Normal	High	Very High
14	Inst Vld F max	X	0	Low	Normal	High	Very High
15	Inst Vs F max	X	0	Low	Normal	High	Very High
16	Inst Vld R min	X	0	Low	Normal	High	Very High
17	Inst Vs R min	X	0	Low	Normal	High	Very High

Point Number	Point Name	Enabled on RTM	Report Interval	Low Limit	Low-Mid Limit	High-Mid Limit	High Limit
18	Inst Vld R max	X	0	Low	Normal	High	Very High
19	Inst Vs R max	X	0	Low	Normal	High	Very High
20	Demand Present KW F	X	0	Low	Normal	High	Very High
21	Demand Present KW R	X	0	Low	Normal	High	Very High
22	Demand Vld F min	X	0	Low	Normal	High	Very High
23	Demand Vs F min	X	0	Low	Normal	High	Very High
24	Demand Vld F max	X	0	Low	Normal	High	Very High
25	Demand Vs F max	X	0	Low	Normal	High	Very High
26	Demand Ild F max	X	0	Low	Normal	High	Very High
27	Demand KW F max	X	0	Low	Normal	High	Very High
28	Demand KVAR F max	X	0	Low	Normal	High	Very High
29	Demand KVA F max	X	0	Low	Normal	High	Very High
30	Demand Vld R min	X	0	Low	Normal	High	Very High
31	Demand Vld R max	X	0	Low	Normal	High	Very High
32	Demand Ild R max	X	0	Low	Normal	High	Very High
33	Demand KW R max	X	0	Low	Normal	High	Very High
34	Demand KVAR R max	X	0	Low	Normal	High	Very High
35	Demand KVA R max	X	0	Low	Normal	High	Very High
36	THD-Load Volts	X	0	Low	Normal	High	Very High
37	Harmonics-Load Volts Total		0	Low	Normal	High	Very High
38	THD-Source Volts	X	0	Low	Normal	High	Very High
39	THD-Load Current	X	0	Low	Normal	High	Very High
40	Harmonics-Load Current Total		0	Low	Normal	High	Very High
41	Harmonics-Vld %F-3rd		0	Low	Normal	High	Very High
42	Harmonics-Vld %F-5th		0	Low	Normal	High	Very High
43	Harmonics-Vld %F-7th		0	Low	Normal	High	Very High
44	Harmonics-Vld %F-9th		0	Low	Normal	High	Very High
45	Harmonics-Ild %F-3rd		0	Low	Normal	High	Very High
46	Harmonics-Ild %F-5th		0	Low	Normal	High	Very High
47	Harmonics-Ild %F-7th		0	Low	Normal	High	Very High
48	Harmonics-Ild %F-9th		0	Low	Normal	High	Very High
49	Tap Maximum	X	0	Low	Normal	High	Very High
50	Tap Minimum	X	0	Low	Normal	High	Very High
51	24 Hour		0	Low	Normal	High	Very High
52	30 Day		0	Low	Normal	High	Very High
53	Month-To-Date		0	Low	Normal	High	Very High
54	Last Month		0	Low	Normal	High	Very High
55	Tap Position	X	0	Low	Normal	High	Very High
56	VRC Status	X	0	Low	Normal	High	Very High
57	Voltage Reduction Control %	X	0	Low	Normal	High	Very High
58	VLC Status	X	0	Low	Normal	High	Very High
59	Band (Voltage)	X	0	Low	Normal	High	Very High

Point Number	Point Name	Enabled on RTM	Report Interval	Low Limit	Low-Mid Limit	High-Mid Limit	High Limit
60	Tap Control Mode	X	0	Low	Normal	High	Very High
61	Alert Status	X	0	Low	Normal	High	Very High
62	State Panel Indicators	X	0	Low	Normal	High	Very High
63	Max % Buck or Min % Boost	X	0	Low	Normal	High	Very High
64	Raise Limit Reached status	X	0	Low	Normal	High	Very High
65	Lower Limit Reached status	X	0	Low	Normal	High	Very High
66	CM Software Revision		0	Low	Normal	High	Very High
67	CM I/O Board Type		0	Low	Normal	High	Very High
68	CM Options		0	Low	Normal	High	Very High
69	Serial Number - 1st word		0	Low	Normal	High	Very High
70	Serial Number - 2nd word		0	Low	Normal	High	Very High
71	Product Revision		0	Low	Normal	High	Very High
72	Battery Voltage (on board)	X	0	Low	Normal	High	Very High
73	Main Processor Self Test Result		0	Low	Normal	High	Very High
74	MJX SW Version		0	Low	Normal	High	Very High
75	Number of MJX Resets		0	Low	Normal	High	Very High
76	Hardware Status		0	Low	Normal	High	Very High
77	Vref A/D		0	Low	Normal	High	Very High

Points can be enabled or disabled using the Telemetric web site interface or the Telemetric local configuration program provided with the DNP-RTM. The other settings for the DNP points, such as report interval or trigger time, can be changed only by using the local configuration program.

See Appendix A in the DNP-RTM Users' Guide for complete instructions on using the local configuration program.

Safety Information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it. We strongly urge that you follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment.

A competent technician has these qualifications:

- *Is thoroughly familiar with these instructions.*
- *Is trained in industry-accepted high-voltage and low-voltage safe operating practices and procedures.*
- *Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.*
- *Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.*

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Following are general caution and warning statements that apply to this equipment.

WARNING: *This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage.*

DANGER: *Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high and low voltage lines and equipment.*

WARNING: *Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.*

WARNING: *Power distribution equipment must be selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install, or maintain this equipment can result in death, severe personal injury, and equipment damage.*

Installation

Required tools: *Phillips screwdriver, very small standard screwdriver, 17/64 drill bit, 1-inch diameter hole saw and drill. Optional: Silicone sealant.*

Follow the instructions below to install the DNP-RTM into the Siemens 20" or 26" enclosure with the Siemens radio accessory kit:

- 1) Remove the MJ-X^L PDS strip from the terminal block at the top of the enclosure. Lift the MJ-X^L from the hinge points and remove from the enclosure.
- 2) If the large aluminum mounting plate is already installed in the enclosure, remove it by unbolting the lower mounting bolt on the back of the enclosure. Remove the plate from the enclosure before proceeding.
- 3) Mount the DNP RTM along the L-bend of the aluminum mounting plate provided in the Siemens radio accessory kit. Orient the RTM so that the LEDs face away from the plate back and will be viewable from the front of the enclosure, as shown in Figure 2. Locate the four mounting holes and secure the RTM with size 4 screws.
- 4) Mount the 120VAC/12VDC power supply on the Power Supply mounting plate using the four flathead size 4 screws.
- 5) Mount the power supply mounting plate over the four holes on the lower right side of the larger plate. Attach with size 4 screws and tighten.



Figure 2 - RTM Mounting

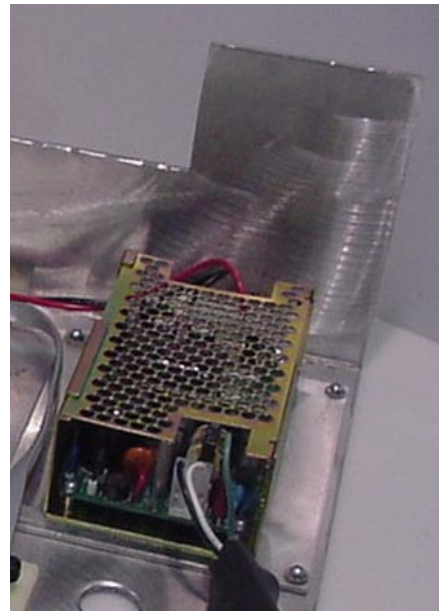


Figure 3 - Power Supply Mounting

- 6) Attach the wiring harness between the power supply and the RTM as shown in Figure 4. The 120VAC input (Black, White, Green) wiring plugs into the 4-pin keyed header and the 12VDC (Black, Red) wiring plugs into the 6-pin keyed header on the power supply.
- 7) Insert the RJ-45 connector into the RTM IED RJ-45 receptacle. Insert the power connector into the RTM POWER +12V receptacle



Figure 4 - Wiring Harness Installation

- 8) Install large aluminum plate into the enclosure and secure using the mounting bolt and washer, as shown in Figure 5. The mounting bolt and washer are to the left of the power supply in the figure.



Figure 5 - Plate Installed in Enclosure

- 9) Attach the wiring harness 120VAC wires to the PDS receptacle terminal block. Attach the black wire to line, and the white and green wires to neutral/ground. The line voltage can be obtained from the P2 terminal of the PDS strip receptacle. Neutral/ground can be obtained from the E terminal of the PDS strip receptacle. For extra surge protection, connect the integration kit MOV between E and P2 on the PDS strip.



Figure 6 - The PDS Strip

- 10) Connect the communication wiring to the Siemens MJ-X^L terminal block on the back of the MJ-X^L as shown in Figure 7. Connect the Brown wire to RTN, the Blue wire to Rx and the White/Green wire to Tx.

- 11) Select a location for the antenna. Make sure the location is within reach of the antenna cable when the cable is attached to the RTM. For maximum weather protection, mount the antenna pointing downwards on the bottom of the enclosure.



Figure 7 - Communication Wiring

- 12) Drill the antenna hole in the enclosure using the 17/64-inch drill bit.

- 13) Remove the nut and washer from the antenna snout. Leave the lockwasher on the antenna snout. Insert the antenna into the hole. Silicone can be used to weather seal the antenna snout.

- 14) To apply silicone:
 - a) Before installing the rubber seal and washer on the antenna snout, apply a layer of silicone on the outside of the enclosure.
 - b) Fill the hole in the enclosure around the antenna snout with silicone.
 - c) Insert the rubber seal over the antenna snout. This will press the excess silicone out the sides.

- 15) After inserting the rubber seal over the antenna snout, insert the gold washer and nut on the antenna snout threads and tighten. Do not over-tighten or you will deform the rubber seal and compromise the weatherproof seal.

MJ-X^L Programming

Use Siemens' DNP Configure software utility to load the DNP point list to the MJ-X^L.

1. If the Siemens DNP Configuration software is not already installed, install the software on a PC that can be used to configure the MJ-X^L. This software must be version 2.2 or later.
2. Copy the DNP configuration file MJXL.dnp from the Telemetric CD to the hard drive of the PC that will be used. This file is located in the \Configuration_Files\Siemens_MJXL directory.
3. Connect the PC to the data port on the front of the MJ-X^L.
4. Reference the MJ-X^L front panel LCD to find the current MJ-X^L communications settings (press the right scroll button until you get to the **Communications** menu, then press the down scroll button and record the dataport communication settings). Note the **Dataport BAUD** rate and **Parity** settings.
5. Start the Siemens' DNP Configuration application, click on **Setting** and set the **Comport** to the PC Comport you will be using to communicate with the MJ-X^L. Also, set the **BAUD** and **Parity** settings to the values noted in step 4. Make sure **Addressing** is disabled.
6. Connect a PC to the MJ-X^L through the data port on the front panel using a standard serial cable. Make sure the MJ-X^L is powered up.
7. Click on **File** and **Open** to open the MJXL.dnp from the directory it was copied to on the hard drive. After the file has been opened, click on the **Send** button to configure the DNP points on the MJ-X^L. Click the **Send** button on the confirmation screen.
8. If the DNP file download was successful, a Windows Information pop-up will indicate "**Sending communication status: OK...**".
9. If this acknowledgement is not received, check the communications settings for the Siemens MJ-X^L and the Mjxcommfig program as described in steps 4 and 5. Make sure all communication settings match. Verify proper communication cabling and try again.

Use the MJ-X^L front panel LCD to set the following DNP communication parameters:

1. Press the left arrow navigation button on the MJ-X^L front panel until the LCD displays the **Communications** menu.
2. Press the down arrow navigation button until the **Protocol** parameter is displayed. Make sure the selected protocol is **DNP 3.0**. If not, press the **Change** button and scroll through the protocol options until **DNP 3.0** is selected, then press the **Save** button.
3. Scroll down again and verify the **Comm Baud** parameter is **9600**. If not, again press the **Change** button again to scroll through values to select **9600** and save.
4. Scroll down again and verify **Comm Parity** is set to **NONE**.
5. Scroll down again and set the **Comm Addr** to **00001**.
6. Scroll down continuously until the **CM Unsolicited** parameter is displayed. Make sure this value is set to **N**.
7. Scroll down once more and ensure the **AutoInhEnRemRL** parameter is set to **N** if remote Tap Raise and Lower is needed.

DNP-RTM Programming

The DNP-RTM should already be factory programmed with the default configuration necessary for the Siemens MJ-X^L Voltage Regulator Control. If changes from the factory default configuration are necessary, consult the DNP-RTM Users' Guide for directions on customizing the configuration.

You will need to use the local programming utility to properly set the device baud rate and the slave address. The local programming utility is included on the Telemetric CD provided with the DNP-RTM device. Reference the DNP-RTM Users' Guide for instructions on interfacing to a device locally. Once you are connected to the DNP-RTM using the RTM-Configuration application, set the Baud rate to 9600 and the Master and Slave addresses both to '1'. Click **File** and **Upload the Profile to the RTM** to send these values to the DNP-RTM.

Verify DNP communication by monitoring the IED COMM LED on the DNP-RTM. Proper communication will result in the LED illuminating Green when the DNP-RTM is polling the IED for information. When the IED answers, the LED will illuminate Red. Typically there is no separation between Green illumination and Red illumination. In some cases the DNP response is so short, the red LED does not illuminate long enough to see.

Additional Information

Product manuals, installation manuals, application notes, application guides and technical specifications are available for download at the Telemetric web site.

http://www.telemetric.net/front_end/documentation.htm

For more information, questions or feedback, please feel free to contact Telemetric technical support.

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