



# **Remote Monitoring and Control**

---

## **DNP-RTM™**

# **Kyle Form 6 Recloser Control Integration Guide**

9941 W Emerald Street  
Boise, ID 83704  
208-658-1292 FAX 208-323-5575  
support@telemetric.net

v. 1.1

## Revision Log

Date	Revision	Changes
10/2/02	1.0	Initial version
8/28/03	1.1	Added plate installation description in Appendix A for new RTM w/power supply plate. Added a verification to make sure the Form 6 is the DNP3.0 version, not 2179.

# Table of Contents

<i>Revision Log</i>	2
<i>Introduction</i>	5
Overview	5
Features	6
<i>Safety Information</i>	9
<i>Installation</i>	11
<i>DNP-RTM Programming</i>	13
<i>Form 6 Programming</i>	13
<i>Additional Information</i>	13
<i>Appendix A – Installing Plate With Power Supply Accessory</i>	14



# 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 (IEDs) such as the Kyle Form 6 Recloser Control. 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 DNP-RTM can be gained from the utility's SCADA system by using the Telemetric SCADA-Xchange™.

Integrating the Telemetric DNP-RTM with the Kyle Form 6 Recloser Control provides immediate control and status indication of operating conditions to improve system operation and protect investments.

Make sure the Form 6 has DNP3.0 communication protocol installed from the factory before attempting this integration. Some Form 6 recloser controls have the 2179 protocol installed. If this is the case, contact your Cooper representative to arrange the conversion to DNP3.0.

If the Form 6 already has the factory DC/DC power supply installed, the standard integration kit can be used to successfully integrate to the Form 6 control. If the factory DC/DC power supply is not included in the Form 6 control, the power supply accessory kit will need to be ordered. Reference Appendix A for installation instructions for this power supply accessory kit.

This integration provides monitoring and control capability over many of the Kyle Form 6 parameters. 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 Kyle Form 6 Recloser Control provides remote notification of recloser events and internal parameter status, as well as the ability to open or close the recloser 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	Recloser Close	X	X	24	0
1	Recloser Open	X	X	24	0
2	Control Lockout	X	X	24	0
3	Control/System Alarm	X	X	24	0
4	Above Min Trip	X	X	24	0
5	Supervisory Off	X	X	24	0
6	Non Reclosing	X	X	24	0
7	Ground Trip Blocked	X	X	24	0
8	SGF	X	X	24	0
9	Cold Load Pickup	X	X	24	0
10	Fast Trips	X	X	24	0
12	Alternate Profile 1	X	X	24	0
13	Alternate Profile 2	X	X	24	0
14	Alternate Profile 3	X	X	24	0
15	Hot Line Tag	X	X	24	0
16	Phase A Voltage	X	X	24	0
17	Phase B Voltage	X	X	24	0
18	Phase C Voltage	X	X	24	0
19	Reverse Power Flow	X	X	24	0
21	AC Power	X	X	24	0
22	Battery Alarm	X	X	24	0
28	CO2 Control OK Status	X	X	24	0
38	CO11 Frequency Alarm	X	X	24	0
39	CO12 Voltage Alarm	X	X	24	0
40	Reclose Retry Active	X	X	24	0
41	Phase A Fault Target	X	X	24	0
42	Phase B Fault Target	X	X	24	0
43	Phase C Fault Target	X	X	24	0
44	Ground Fault Target	X	X	24	0
45	SGF Target	X	X	24	0
53	Ground Overcurrent Alarm	X	X	24	0
54	Phase Overcurrent Alarm	X	X	24	0
55	Negative Sequence Overcurrent Alarm	X	X	24	0

**Table 2 – Analog Input Points**

<b>Point Number</b>	<b>Point Name</b>	<b>Enabled On RTM</b>	<b>Report Interval</b>	<b>Low Limit</b>	<b>Mid Limit</b>	<b>High Limit</b>
0	Current Phase A	X	0	N	N	N
1	Current Phase B	X	0	N	N	N
2	Current Phase C	X	0	N	N	N
3	Ground Current	X	0	N	N	N
4	Voltage Phase A	X	0	N	N	N
5	Voltage Phase B	X	0	N	N	N
6	Voltage Phase C	X	0	N	N	N
7	PF Phase A	X	0	N	N	N
8	PF Phase B	X	0	N	N	N
9	PF Phase C	X	0	N	N	N
10	KVA for Phase A	X	0	N	N	N
11	KVA for Phase B	X	0	N	N	N
12	KVA for Phase C	X	0	N	N	N
13	KW for Phase A	X	0	N	N	N
14	KW for Phase B	X	0	N	N	N
15	KW for Phase C	X	0	N	N	N
16	KVAR for Phase A	X	0	N	N	N
17	KVAR for Phase B	X	0	N	N	N
18	KVAR for Phase C	X	0	N	N	N
19	Frequency	X	0	59.4	60.4	N
20	Demand current Phase A	X	0	N	N	N
21	Demand current Phase B	X	0	N	N	N
22	Demand current Phase C	X	0	N	N	N
23	Unloaded battery voltage	X	0	20.8	25	31
24	Unloaded battery current	X	0	N	N	N

**Table 3 – Digital Output Points**

<b>Point Number</b>	<b>Point Name</b>	<b>Enabled on RTM</b>
0	Close	X
1	Lockout	X
2	Non reclosing	X
3	Ground Trip Blocked	X
4	SGF	X
5	Cold load pickup	X
6	Fast trip	X
7	Normal Profile	X
8	Alternate profile 1	X
9	Alternate profile 2	X
10	Alternate profile 3	X
11	Reset targets	X
12	Reset demands	X
13	Reset alarms	X
14	Battery test	X
15	Hot Line Tag On	X
16	Hot Line Tag Off	X
17	Reclose retry	X

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.*

## Integration Parts List

Please verify that all the parts pictured in Figure 1 and listed in Table 4 are provided in the Integration Kit.

**Table 4 - Integration kit parts list. Telemetric part number DNP/FORM6INTGKIT.**

<i>Description</i>	<i>Quantity</i>
PlateDNP/Form 6, mounting plate	1
O4NK, 4-40 "K" Locknut	4
O8NK, Size 8-32 "K" Locknut	2
CableSerial, 6' Serial Cable	1
TRA821, Antenex Antenna	1
NRG-58-2, 24" Antenna Cable	1
DNP/Form 6 Man, Form 6 Integration Guide	1



**Figure 1 – Integration Kit Contents**

## Installation

---

**Required tools: Phillips screwdriver, 1/4" nut driver, and a 3/8" wrench or 3/8" nutdriver. Also required: Radio accessory kit from Cooper/Kyle (includes mounting bracket, DC/DC board and power cable. See Figure 2).**

The DNP-RTM comes with a mounting plate, ready for installation within the Kyle Form 6. Follow the instructions below to install the DNP-RTM. The mounting bracket and DC/DC board pictured in Figure 2 is provided in the Cooper/Kyle radio accessory kit.

1. Make sure the Kyle Form 6 does not have AC power connected and disconnect any batteries.
2. Plug the input power cable into P1 on the DC Converter board. Screw the Telemetric RTM power cable into the DC Converter board P2 screw terminals. Make sure the red wire is attached to pin 1 of P2 and the black wire is attached to pin 2 of P2. Verify all connectors and wires are secure before proceeding. Reference Figure 2 for DC Converter board with attached cabling.
3. Place DNP-RTM mounting plate on the tray. Align threaded mounting posts on the bottom of the RTM plate to the bracket mounting holes and secure the plate by installing size 8 locknuts and tightening with the 3/8" nut driver.
4. Place the DNP-RTM on the threaded studs of the RTM mounting plate. Install size 4 locknuts and tighten with the 1/4" nut driver. Plug the RTM power connector into the RTM "Power" receptacle.
5. Remove the large lock-washer and nut from the antenna that came with the integration kit. Insert the antenna into the leftmost knockout hole in the Form 6 enclosure, keeping the rubber seal on the outside of the enclosure. See Figure 3 for the completed antenna installation.
6. Secure the antenna by screwing the lock-washer and nut onto the antenna from the inside of the enclosure. Attach the antenna cable onto the antenna connector inside the enclosure.

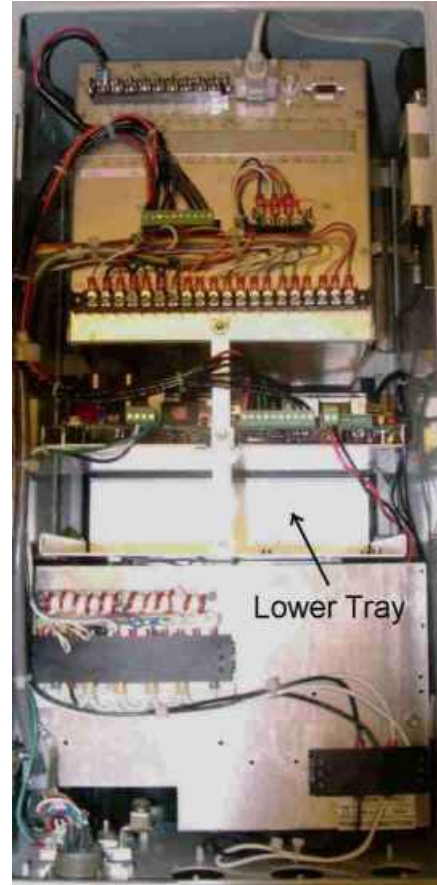


**Figure 2 - DC Converter Board on bracket**



**Figure 3 – Antenna installation**

7. Install the tray into the Form 6 enclosure. Place nuts on tray mounting bolts to secure the tray.
8. Screw the antenna cable onto the DNP-RTM antenna connector where it protrudes through the RTM enclosure.
9. Insert the communication serial cable into the J1 RS-232 serial port on the back of the Form 6. Connect the other end to the bottom "IED" RS-232 port on the DNP-RTM.
10. Plug the DC/DC power board P1 cable into the Power supply board on the upper tray in the Form 6 enclosure.



## DNP-RTM Programming

---

The DNP-RTM should already be factory programmed with the default configuration necessary for the Kyle Form 6. If changes from the factory default configuration are necessary, consult the DNP-RTM Users' Guide for directions on customizing the configuration.

Connect to the Form 6 using the Cooper Form 6 interface software, record the DNP communication settings by clicking on the **Workbench** menu item, then **Workbench Structures**. Click on the **Communications** window, then the **DNP Workbench** button and lastly the **DNP Basic Settings** button. The current DNP parameters will be displayed. Record the BAUD rate and the SlvAddr values. Also, make sure the Comm Port setting uses the rear RS-232 port, and that CTS support is turned off.

You will need to use the Telemetric local programming utility to properly set the device baud rate and the master/slave addresses.

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 RTM device locally.

Using the Telemetric RTM configuration software, make the following changes:

- Change the baud rate to the value recorded from the Form 6 interface software.
- Change the slave address to the SlvAddr value recorded from the Form 6 interface software.
- Change the master address to 1.

## Form 6 Programming

---

Ensure the DNP points on the Form 6 have not been remapped. The factory default point list must be used.

## 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/info/documentation.htm>

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

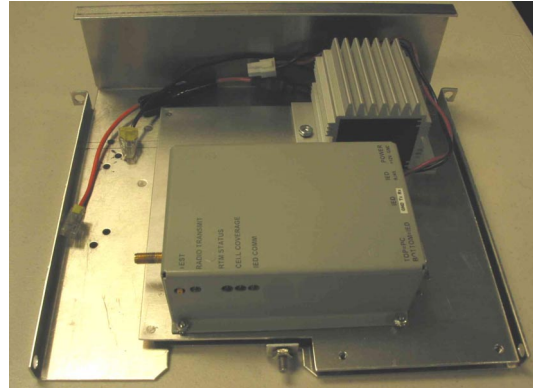
**Telemetric**  
**9941 W. Emerald Street**  
**Boise, ID 83704**  
**208-658-1292 x21 FAX 208-323-5575**  
**support@telemetric.net**

## **Appendix A – Installing Plate With Power Supply Accessory**

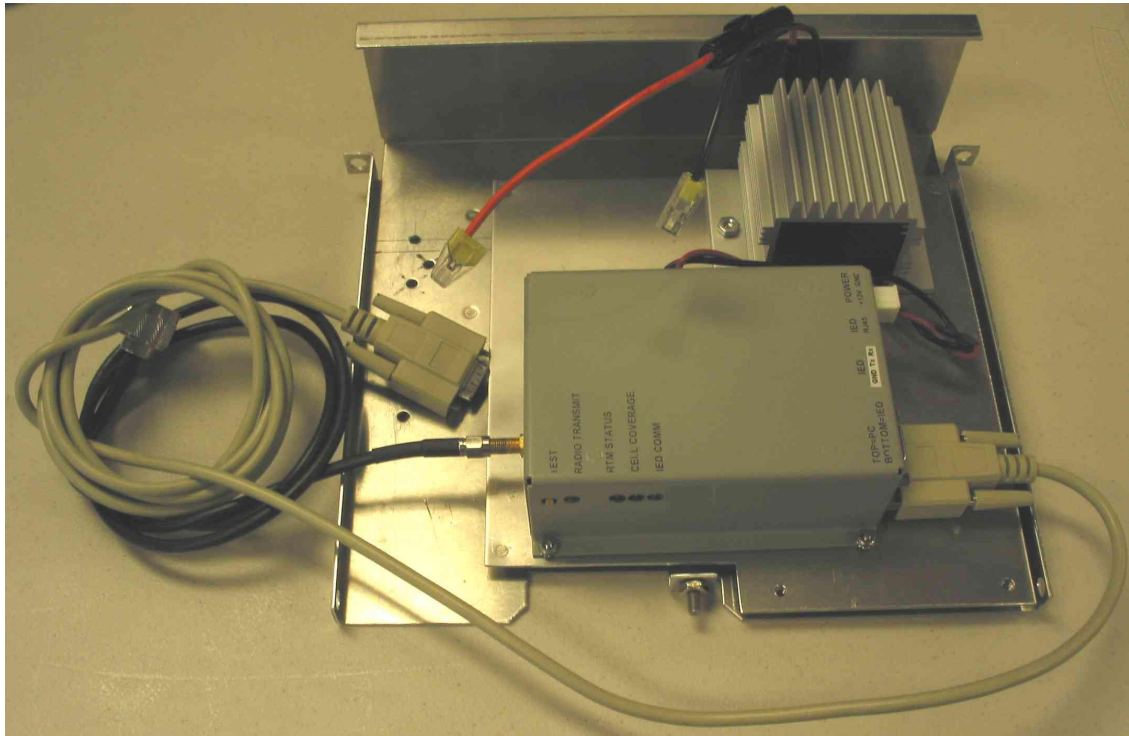
---

The DNP-RTM Power Supply Accessory Kit comes with an optional mounting plate that includes a mounting location for the power supply accessory. This mounting plate only fits on the Cooper Form 6 bracket if there is no Cooper DC/DC power supply. The following directions provide additional detail for the installation of this plate:

1. Remove the Form 6 bracket from the enclosure. If the Form 6 bracket is secured inside the Form 6 enclosure, it may not be easy to remove. In this case, assemble the RTM and DC/DC converter onto the DNP-RTM mounting plate first, then slide whole assembly into the Form 6 enclosure over the bracket before securing to the two bracket mounting bosses.
2. Install the RTM and the power supply onto the mounting plate provided in the integration kit as shown in Figure 4. Apply four size 4 kepnuts onto the RTM studs and tighten. Apply the two size 8 kepnuts to the power supply studs and tighten.
3. Plug in the power connector into the RTM. Insert the DB-9 cable into the RTM and secure by tightening the thumb-screws.
4. Attach the 3' antenna cable onto RTM antenna snout and tighten secure.
5. Insert the orange and black DC/DC power supply wires into separate Wal-Nuts. Insert the Cooper power supply pigtails into the Wal-Nuts, ensuring that the positive voltage mates with the orange wire, and the ground mates with the black wire.
6. Insert the size 6 bolts into the Form 6 bracket mounting bosses and tighten to secure. Reference Figure 5 for the proper orientation for the plate on the bracket.
7. Follow the directions in the Installation section of this document to complete the installation of the antenna, communication cable and the DC power connector.



**Figure 4 - RTM and power supply on plate**



**Figure 5 - Power, antenna and serial cables installed**