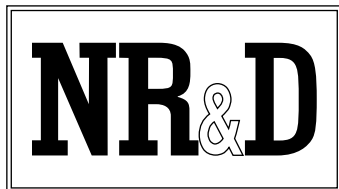


QUCM 3964(R)

Installation and Programming Manual

This Manual describes the QUCM application for interfacing 3964(R) devices to a Modbus master.

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Introduction

The Niobrara QUCM is a TSX Quantum[®] compatible module that is capable of running multiple applications for performing communication translations between serial protocols. This document covers an application that allows a Modbus RTU master to communicate with 3964(R) devices. This setup allows a Modbus master to be placed in a point to point configuration with a single 3964(R) device.

One application is required to be loaded into the QUCM: appl.qcc contains the Modbus and 3964(R) serial drivers, and the configuration software. This application must be running for the system to properly perform.

Port 1 of the QUCM is to be connected to a Modbus RTU master to provide the interface to the 3964(R) device. Port 2 is the 3964(R) port, and must be connected point to point with the 3964(R) device. The QUCM supports many 3964(R) devices including the Euchner Identsystem CIS3. These devices are accessed via Modbus RTU by selecting the slave ID assigned to the QUCM (0-254).

Port 2 is also the configuration port. When Application 2's RUN/HALT switch is switched to the memory protect mode, it interfaces to an ASCII terminal to provide the user with a simple way to reconfigure the two serial ports.

A Modicon two (or more) slot Quantum rack and appropriate Quantum power supply is needed for mounting the QUCM.

Module Installation

- 1 Mount the QUCM in an available slot in the register rack. Secure the screw at the bottom of the module.

Software Installation

The application files for the QUCM are included in the 3964R.ZIP file. This file must be unzipped using PKUNZIP.EXE. A copy of PKUNZIP is included on the standard NR&D software disk and is also available at www.niobrara.com. The latest version of the 3964R.ZIP file is located at

[ftp.niobrara.com/qucm/3964R/3964R.zip](ftp://ftp.niobrara.com/qucm/3964R/3964R.zip)

The latest version of this document in pdf format is located at:

[ftp.niobrara.com/qucm/3964R/3964R.pdf](ftp://ftp.niobrara.com/qucm/3964R/3964R.pdf)

The 3964(R) communications protocol is available from several companies. The information concerning the protocol is usually listed in the specific product's manual.

Serial Connections to the QUCM-L

Port 1 to Modbus Master

If connecting to a Modicon PLC, Port 1 of the QUCM-L will be set to be RS-232. The Niobrara cable MM2 is ideal for this connection since it includes an RJ45 RS-232 connection for the QUCM-L and a 9-pin male RS-232 Modicon-style pinout for the PLC. This cable pinout is described in Figure 2-1

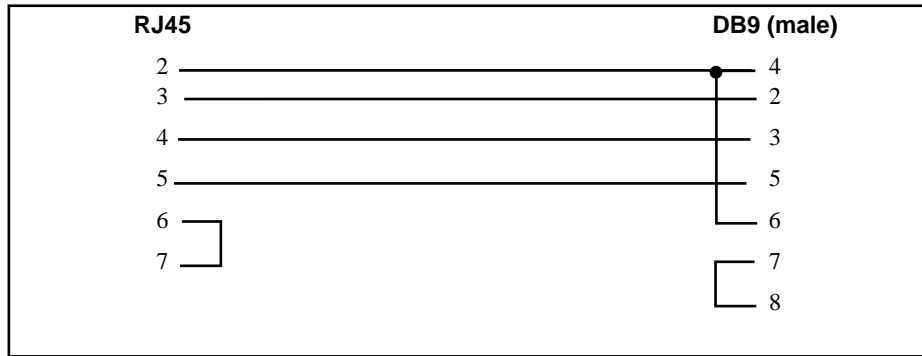


Figure 2-1 QUCM-L to RS-232 DTE Port (9-pin) (MM2 Cable)

The Modbus master must be configured to match the serial settings of the QUCM Port 1. The supported baud rates by both units are 1200, 2400, 9600, and 19200. 9600 baud is the default.

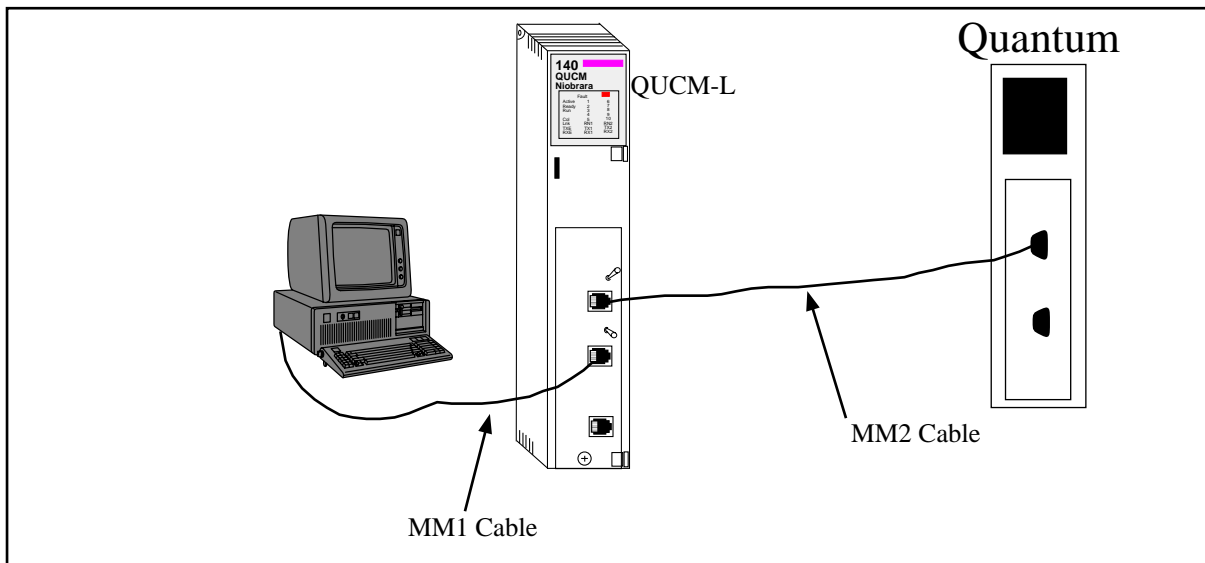


Figure 2-2 QUCM-L Layout

Port 2 to the Personal Computer

A physical connection must be made from the personal computer to the QUCM in order to download the applications. This link may be a serial connection from a COM port on the personal computer to the RS-232 port on the QUCM-S. The Niobrara MM1 cable may be used for this connection. This cable is shown in Figure 2-3.

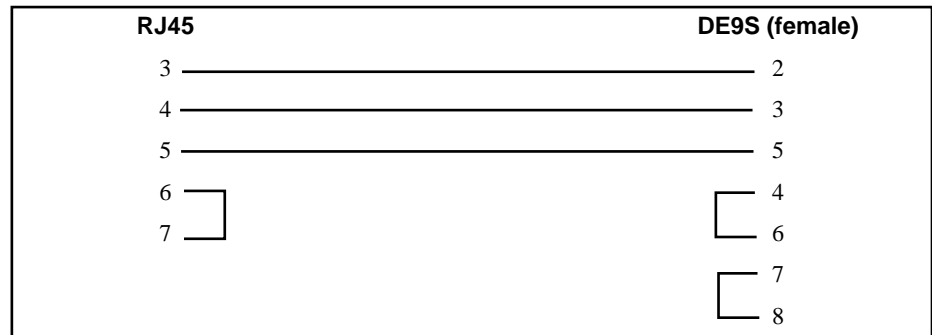


Figure 2-3 QUCM-L to RS-232 PC DCE Port (9-pin) (MM1 Cable)

Loading the Applications into the QUCM

The QUCM is rapidly evolving so be sure to upgrade the firmware in the module before loading the latest version of APP1.QCC. Most likely the QCOMPILE.EXE has been updated so be sure to use the newest version. Firmware upload is as follows:

- 1 Remove the module from the rack.
- 2 Move the RUN/LOAD switch on the back of the module to LOAD.
- 3 Replace the module in the rack and apply power.
- 4 Only the 3 light should be on. (The Link and RX E-net lights may be on if the E-net port is connected and there is traffic.)
- 5 Connect the PC to QUCM Port 1 with a MM1 cable.
- 6 From the command line enter
 > fwload qucmtepl.fwl com1:
Be sure to have the colon after the PC's com port name. The download will only take a few minutes and will inform when finished.
- 7 Remove the module from the rack and change the switch back to RUN.
- 8 It is a good idea to press the RESET button after a firmware change.

It is recommended, though not necessary, to use the Ethernet capabilities of QLOAD to load APP1.QCC into the QUCM. Set up the IP parameters of the module by the following method:

- 1 Move Switch 1 to Halt.
- 2 Connect the PC to QUCM Port 1 with a MM1 cable.
- 3 From the command line enter
 >zapreg32 com1:9600,e,8,1 255 -b
This will start zapreg32 in Modbus RTU mode to slave address 255. Use the arrow and Page Up/Down keys to move to register 46. The IP parameters are shown

below for a unit with the IP = 206.223.51.150 subnet Mask = 255.255.255.0, Default Gate = 206.223.51.1, Modbus/TCP port number = 503, Telnet Port number = 24:

Register	Description	Example (decimal)
46	IP MSByte	206
47	IP	223
48	IP	51
49	IP LSByte	150
50	SN Mask	255
51	SN Mask	255
52	SN Mask	255
53	SN Mask	0
54	Def. Gate	206
55	Def. Gate	223
56	Def. Gate	51
57	Def. Gate	1
58	TCP Control	7 (leave this at 7)
59	Reserved	0
60	Reserved	0
61	Reserved	0
62	TCP backstep	100 (leave this at 100)
63	Modbus Port	503 (this defaults to 502)
64	Telnet Port	24 (this defaults to 23)
65	Quiet Timer	900 (leave this at 900)
66	Clients	-1 (leave this at -1)

- 4 After entering the IP parameters, attempt to ping the module to verify the settings.
> ping 206.223.51.150
- 5 Verify a connection to the internal Modbus/TCP server with zapreg32.
> zapreg32 206.223.51.150:503 255
Should connect to the QUCM on port 503 with Destination index 255.
- 6 Load the APP1 file with qload.
> qload 1 app1 206.223.51.150:503 -a
Will load the file into application 1's flash and set the program to automatically start on power-up.
- 7 Place Switch 1 in RUN. The RN1 light should come on.
- 8 Place Switch 2 in HALT.

Connect the Modbus master to QUCM port 1 with an MM2 cable.

If Ethernet is not desired, a QUCM-L will be sufficient for this application. In this case, to load the application:

- 1 Move switch 1 to Halt.
- 2 Connect the PC to QUCM Port 1 with an MM1 cable.
- 3 Load the APP1 file with qload.
 > qload 1 app1 com1:9600,e,8,1 -a
- 4 Place Switch 1 in RUN. The RN1 light should come on.
- 5 Make sure Switch 2 is in HALT, unless configuring the serial ports.

3964(R) to QUCM Port 2

After the software has been installed into the QUCM, Port 2 becomes the 3964(R) port. The connection for the QUCM to the Euchner read/write head CIT3SX is an RJ-45 connector on the QUCM side, and terminal screws at the Euchner device(Refer to Figure 2-4).

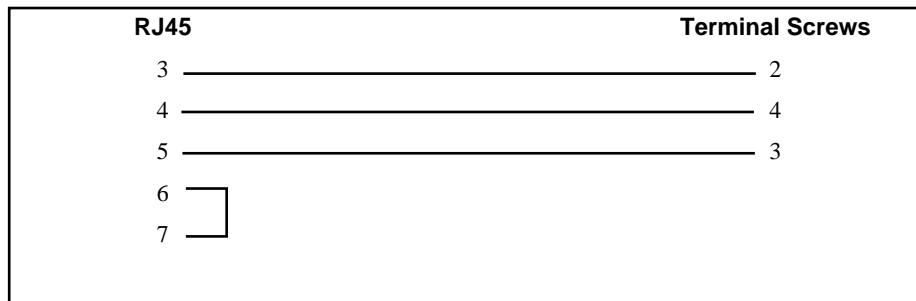


Figure 2-4 QUCM-L RS-232 to Euchner read/write head CIT3SX

Modbus to 3964(R) Bridge

After the software has been loaded, and the RN1 light is lit, the QUCM is ready to be used as a bridge between Modbus RTU and 3964(R). The master should use opcode x03 for a read, and opcode x06 or x16 for writes. Any other opcode will not be translated. The master will transmit a normal modbus query, and the QUCM will translate the query, providing the configured slave ID is used.

Configure QUCM

The QUCM is configured by a hyperterminal session. The PC is connected to the QUCM's Port 2 with an MM1 cable. Configure the hyperterminal session for 9600 baud, no parity, 8 data bits, 1 stop bit, no handshaking. The QUCM will set itself to these settings, and transmit the configuration page when the Application 2 Run/Halt switch is placed in the Memory Protect position.

When the Application 2 switch has been set to Memory Protect, it will transmit the configuration page to the hyperterminal. If at any time the information is not displayed, or is displayed incorrectly, pressing the Enter key will cause the QUCM to retransmit the same page. From this main page, the user can configure the Modbus port and the 3964(R) port. The user can also select an option that will display all current settings. To select an option, simply press the corresponding number for the option desired. There is no need to press the Enter key.

Modbus Configuration

The Modbus configuration page allows the user to select the baud rate, parity, data bits, stop bits, and slave ID that will be used to communicate with the Modbus master. The defaults are 9600, Even, 8, 1, and 1, respectively. Be sure that these settings match the settings for the master. Again, simply press the corresponding number for the desired option.

When an option is selected, the QUCM will display the current setting, as well as all available options for that particular setting. To accept the current setting, press the Enter key. To change the setting, press the number of the desired option. The QUCM will save that setting, and return to the previous configuration page. To exit the Modbus configuration page, press the X key. This will return the user to the main configuration page.

3964(R) Configuration

The 3964(R) configuration page allows the user to change the settings for the 3964(R) port. Possible settings are baud rate, parity, data bits, stop bits, and message timeout. The first four are set in the same manner as for the Modbus port. Their default settings are 9600, Even, 8, and 1, respectively.

The message timeout feature allows the user to select how long the QUCM will wait for a reply to a query. The default timeout is 400ms. The timeout is fully programmable by typing the desired time in milliseconds. Valid times are 0 to 30000ms.

Example 1

Figure 4-1 displays an example Modbus to 3964(R) bridge using a Modicon Bridge/Multiplexer to bridge between Modbus Plus and Modbus RTU. A Quantum PLC polls the 3964(R) device across Modbus Plus, and the QUCM converts the message to 3964(R).

The Quantum sends a query using the MSTR block out the Modbus Plus port with a route of 35, 2, 1. Port 2 of the Bridge/MUX has been configured as a network port to which multiple devices may be connected. The message is therefore received by the Bridge/MUX(drop 35), translated to Modbus RTU, and routed out port 2 to slave device 1.

The QUCM will receive the Modbus RTU message at port 1 for device 1, translate the message to 3964(R), and route it out port 2 to the 3964(R) device. When the 3964(R) device responds to the query, the QUCM will receive the response at port 2, convert the message to Modbus RTU, and route back out port 1. The Bridge/MUX will receive the reply, and route the appropriate Modbus Plus message back to the PLC.

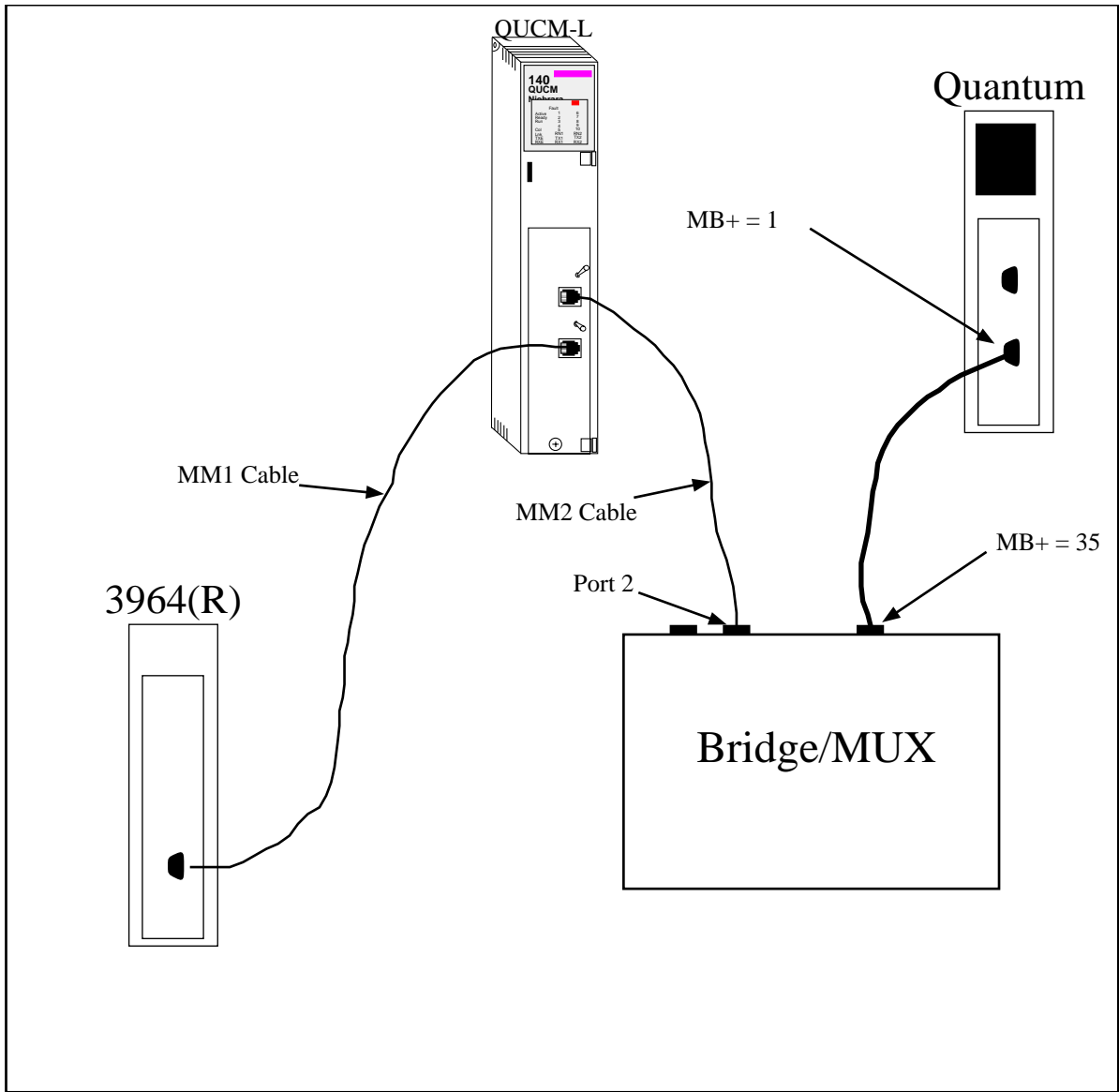


Figure 4-1 Modbus Plus Example

Example 2

Figure 4-2 displays an example of how the QUCM could be used to put data from a 3964(R) device onto Modbus TCP.

This example allows the SMS computer to see the data in the 3964(R) device connected to port 2 of the QUCM. The EPE5's Port 1 must be set to Modbus Gate protocol, and an MM7 cable should be used between the EPE5 and the QUCM. The QUCM's port 1 must be set to RS-422 communications.

Table 4-1 shows the entry that must be in the Modbus Server table for the PC to be able to communicate with the 3964(R) device. SMS will connect to the EPE5-TCP using index 1. Index 1 points to the entry in the server table, and routes the message out Port 1 to the QUCM, which sends the message to the 3964(R) device.

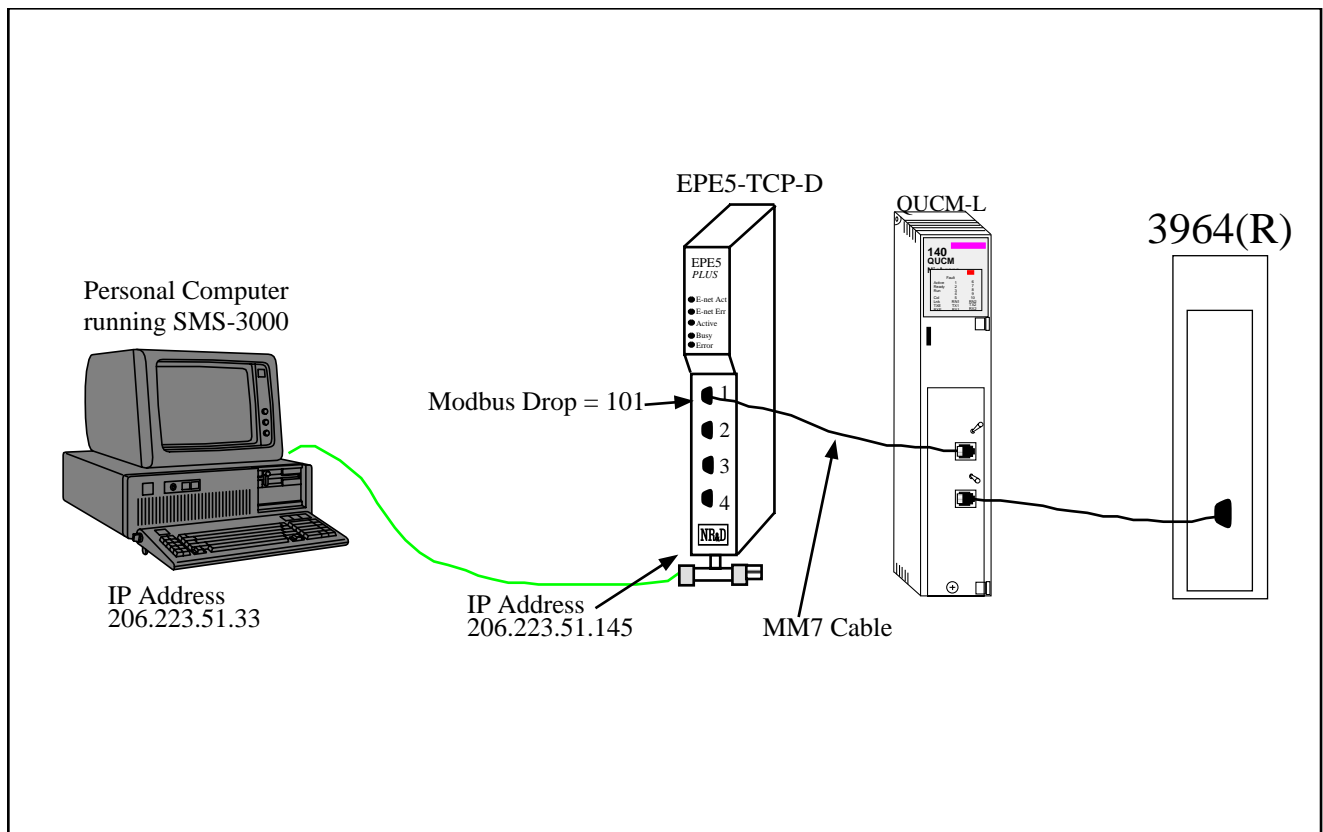


Figure 4-2 Modbus TCP Example

Table 4-1 Server Index Table For EPE5-TCP

Drop	TYPE	Route
1	OTHER	101,1

Troubleshooting

Module Lights

The QUCM-SE has several lights that indicate the status of the module. Table 5-1 shows the meanings of these lights.

Table 5-1 Module Lights

Light	Meaning
Fault	The module has a catastrophic fault.. Call the factory.
Active	This light will be on if the module is in a traffic-copped slot in a Quantum PLC system and the PLC is in RUN.
Ready	This light should always be on (as long as it isn't in firmware load).
Run	This light will be on if the module is in a traffic-copped slot in a Quantum PLC system and the PLC is in RUN.
Col	Comes on when an Ethernet collision occurs.
Lnk	Is on when LINK is established on the 10BaseT port.
TXE	Comes on when the module is transmitting on the Ethernet port.
RXE	Comes on when the module is receiving on the Ethernet port.
RN1	This light should be on to indicate app1 is running.
TX1	Comes on when the module is transmitting on serial port 1.
RX2	Comes on when the module is receiving on serial port 1.
RN2	This light should not come on since there is no app2 loaded.
TX1	Comes on when the module is transmitting on serial port 1.
RX2	Comes on when the module is receiving on serial port 1.

User Lights

The QUCM-SE has 10 application driven lights numbered 1-10. The meaning of these lights while the APP1 program is running is shown in Table 5-2.

Table 5-2 User Light Definitions

Light	Meaning
1	Lights when a Modbus message with opcode 3 is translated
2	Lights when a Modbus message with opcodes 6 or 16(dec) is translated
3	Not used
4	Not used
5	Not used
6	Not used
7	Not used
8	Lights when application is in CONFIG mode
9	Lights when application is in CONFIG mode
10	Lights when application is in CONFIG mode