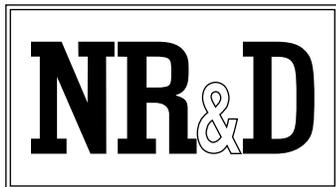


MUCM CMLW

Installation and Programming Manual

This Manual describes the MUCM application for interfacing a PowerLogic CM2000 to LONWORKS®.

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Contents

1 Introduction	5
2 Installation	7
Module Installation	7
Software Installation	7
Serial Connections to the MUCM	7
Port 1 to the Personal Computer	7
Port 2 to CM2000	8
Loading the Application into the MUCM	8
QLOAD MUCM Firmware Update	8
FWLOAD MUCM Firmware Update	9
QLOAD APP1	10
3 LONWORKS to CM2000	13
Configure the MLWF	13
Add the MLWF to the Network	13
Browse the MLWF	13
CM2000 Configuration	14
4 Troubleshooting	15
MUCM Module Lights	15
MUCM User Lights	15
MLWF Lights	15
Figures	
Figure 2-1 MUCM to RS-232 PC DCE Port (9-pin) (MU1 Cable)	7
Figure 2-2 RS-485 Connection	8
Figure 2-3 MUCM Layout	8
Figure 2-4 QLOAD of APP1	10

Tables

Table 3-1 CM2000 Network Variables	14
Table 4-1 Module Lights	15
Table 4-2 User Light Definitions	15
Table 4-3 MLWF Light Definitions	16

Introduction

The Niobrara MUCM is a TSX Momentum[®] compatible module that is capable of running multiple applications for performing communication translations between serial protocols. It can also perform automatic polling and data concentration for access by a tophat. This document covers an application that allows a single PowerLogic[®] CM2000 series meter to be placed on a LONWORKS network via the Niobrara MLWF.

One application is required to be loaded into the MUCM: app1.qcm contains the serial driver, and the routine to make the data available to the MLWF. This application must be running for the system to properly perform.

Port 2 is to be connected point to point with a single CM2000. The Circuit Monitor must be set to 9600 baud, address 1.

A Niobrara MLWF must be connected to the MUCM. The MLWF will be connected to the LONWORKS network.

The MUCM may be mounted on a DIN rail, or directly to a wall via mounting holes.

Installation

Module Installation

- 1 Snap the MLWF onto an MUCM-002.
- 2 Mount the MUCM in an appropriate location on a DIN rail or in a cabinet.

Software Installation

The application files for the MUCM are included in the CMLW.ZIP file. This file must be unzipped using an application like 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 CMLW.ZIP file is located at www.niobrara.com/ftp/mucm/CMLW/CMLW.zip

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

www.niobrara.com/ftp/mucm/CMLW/CMWL.pdf

When all of the files are unzipped, move the .nc, .xif, .apb, and .nxe files to a folder easily accessible to the LONWORKS® software.

Serial Connections to the MUCM

Port 1 to the Personal Computer

A serial connection must be made from a COM: port on the personal computer to the MUCM in order to download the application. The Niobrara MU1 cable may be used for this connection. This cable is shown in Figure 2-1.

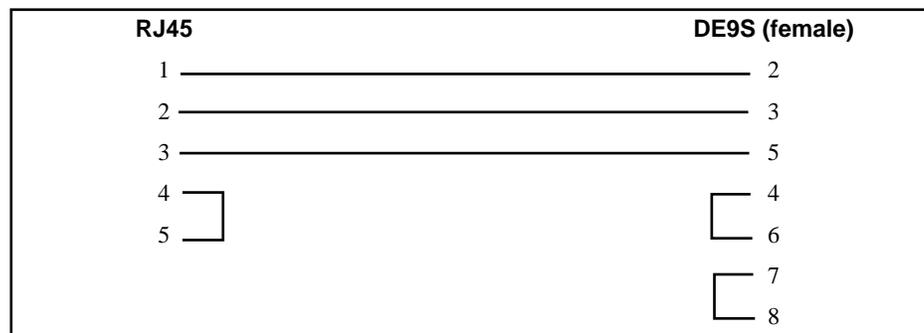


Figure 2-1 MUCM to RS-232 PC DCE Port (9-pin) (MU1 Cable)

Port 2 to CM2000

Since both the MUCM and the CM2000 have screw terminal serial ports, the user may simply use a four- or five-conductor twisted pair cable. This cable pinout is described in Figure 2-2.

MUCM Screw Terminal	CM2000 Screw Terminal
1	20
2	21
3	22
4	23
5	Cable Shield
	24

Figure 2-2 RS-485 Connection

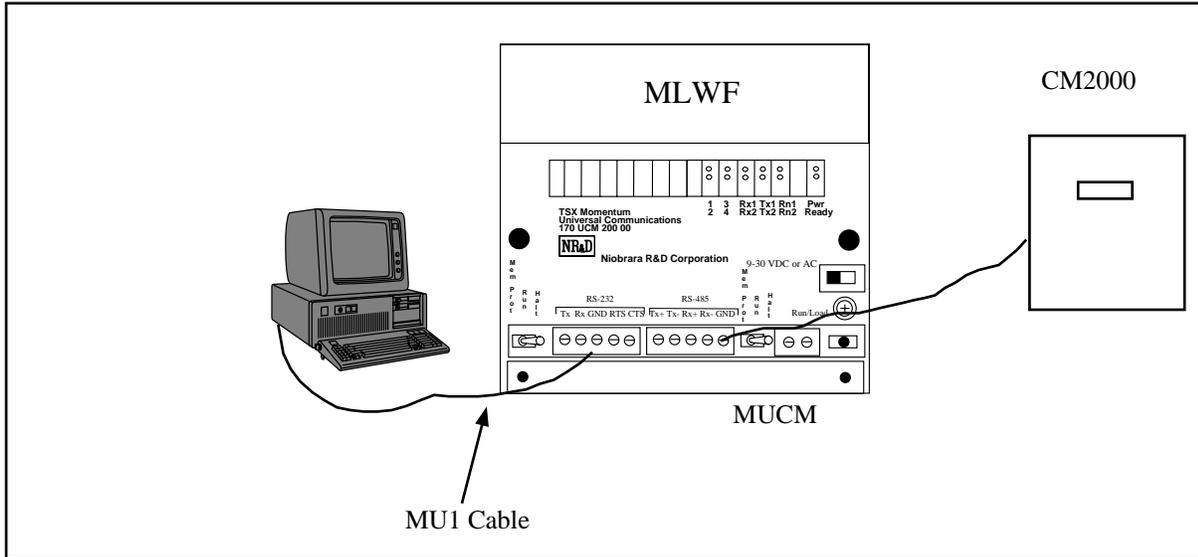


Figure 2-3 MUCM Layout

Loading the Application into the MUCM

The MUCM-002 must use the mucm.fwl or mucm.qcc firmware included in the cmlw.zip file. This firmware is dated 28Oct2002 or later. There are two ways to upgrade the firmware of the MUCM-002: QLOAD and FWLOAD.

QLOAD MUCM Firmware Update

QLOAD is a convenient method for upgrading the firmware of a MUCM. A direct serial connection to either port1 or port 2 on the MUCM is required.

- 1 Application 1 and 2 Switches must be in HALT
- 2 Start QLOAD.EXE
- 3 Click on the Browse button and select the file mucm.qcc.

- 4 Select the Application 1 Radio Button.
- 5 Verify the following:
 - a. Status Register = 1.
 - b. Run Pointer Register = 33.
 - c. Auto Start is checked.
 - d. Erase Flash is checked.
 - e. Load File is checked.
 - f. The Modbus Serial tab is selected.
 - (1) The COM port of the PC is selected in the pull-down.
 - (2) The baud rate is set to 9600.
 - (3) The Modbus Drop is set to 255
 - (4) The ASCII box is not checked.
 - (5) The 8 Bits button is checked.
 - (6) The Parity is set to EVEN.
- 6 Connect the PC to MUCM Port 1 with a MU1 cable..
- 7 Press the Start Download button. QLOAD will open a progress window to show the status of the download.
- 8 Move switch 1 to RUN. Wait approximately 20 seconds for the upgrade to finish after the download is complete. The unit should be ready to receive the new version of app1.qcc.

FWLOAD MUCM Firmware Update.

If the QUCM has corrupt firmware or completely non-responsive then the old method of using FWLOAD may be required.

Firmware upload is as follows:

- 1 Move the RUN/LOAD switch to LOAD.
- 2 Connect the PC to QUCM Port 1 with a MU1 cable..
- 3 From the command line enter
 - > fwload mucm.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.
- 4 Remove the module from the rack and change the switch back to RUN.

QLOAD APP1

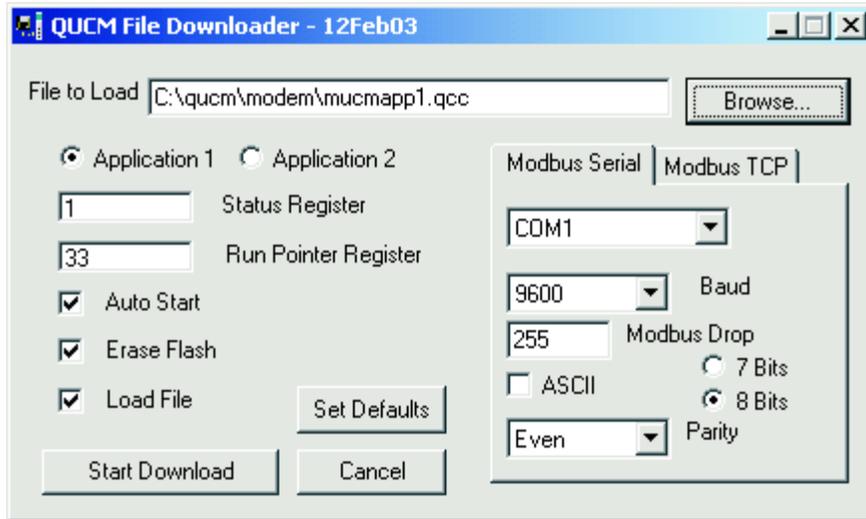


Figure 2-4 QLOAD of APP1

- 1 Application 1 and 2 Switches must be in HALT.
- 2 Start QLOAD.EXE
- 3 Click on the Browse button and select the file app1.qcc.
- 4 Select the Application 1 Radio Button.
- 5 Verify the following:
 - a. Status Register = 1.
 - b. Run Pointer Register = 33.
 - c. Auto Start is checked.
 - d. Erase Flash is checked.
 - e. Load File is checked.
 - f. The Modbus Serial tab is selected.
 - (1) The COM port of the PC is selected in the pull-down.
 - (2) The baud rate is set to 9600.
 - (3) The Modbus Drop is set to 255
 - (4) The ASCII box is not checked.
 - (5) The 8 Bits button is checked.
 - (6) The Parity is set to EVEN.
- 6 Connect the PC to MUCM Port 1 with a MU1 cable..
- 7 Press the Start Download button. QLOAD will open a progress window to show the status of the download.
- 8 Select the Application 2 Radio Button.

- 9 Verify the following:
 - a. Status Register = 3.
 - b. Run Pointer Register = 33.
 - c. Auto Start is NOT checked.
 - d. Erase Flash is checked.
 - e. Load File is NOT checked.
 - f. The Modbus Serial tab is selected.
 - (1) The COM port of the PC is selected in the pull-down.
 - (2) The baud rate is set to 9600.
 - (3) The Modbus Drop is set to 255
 - (4) The ASCII box is not checked.
 - (5) The 8 Bits button is checked.
 - (6) The Parity is set to EVEN.
- 10 Press the Start Download button. QLOAD will open a progress window to show the status of the download. This step is to simply erase the FLASH for application 2 to make sure that a previous program is not accidentally running.

After downloading both applications, move the Application Switch 1 to RUN. The RN1 light should be on.

LONWORKS to CM2000

After the software has been loaded, flip the Application 1 switch to RUN, and the RN1 LED will light. The MUCM will then begin polling a CM2000 with an address of 1 via the RS-485 port. The rest of the configuration must be done in the MLWF.

Configure the MLWF

The MLWF must be loaded with the proper program for the data to be read properly. For this example, we will configure the MLWF using Echelon's® LonMaker™ software.

Add the MLWF to the Network

With the desired network open, add the MLWF to the network by dragging the device icon into the layout drawing. The "New Device Wizard" will open, allowing the user to add the MLWF to the network. In the first window, choose a name for the new device, such as MLWF or CM2000. Click the "Commission Device" checkbox. Then click Next. The second window allows the user to pick the Device Template for the MUCM. The user should choose "Load XIF," and browse to the folder where the .xif file was unzipped and moved. Then click Next. The third page lets the user select the transceiver type for the device being added. Scroll down, and pick "TP/FT-10." Then click Next. The fourth page can be left at the default settings. Then click finish. LonMaker will then ask the user to press the service pin on the device. Press the service pin on the MLWF. The MLWF will then be added to the network.

NOTE: The "Load XIF" command will only be used for the first CMLW system placed on the network. Any subsequent Circuit Monitors added to the network must use the existing template, which will be listed in the pull-down menu.

Browse the MLWF

Once the MLWF has been added to the network, right-click on it, and choose "Browse." This will open the LonMaker Browser. The Browser will display all of the network variables reported by the MLWF. Most, if not all, of the network variables should be displayed in Integer format. The network variables and their descriptions are listed in Table 3-1.

NOTE: The Browser may, by default, list the variables in alphabetical order. This may not be desirable. To display the variables in the order they are declared, go to the Browse menu, and choose Options. In the General tab, uncheck the "Sort NVs by Name" box. Then click OK. The Browser must then be closed and reopened for the changes to take effect.

Table 3-1 CM2000 Network Variables

Name	Description
Device_Type	Device type reported by all PowerLogic Devices. For CM2000, range is 460-465.
Frequency	Frequency of line voltage displayed with two decimal places. (6000 = 60.00 Hz)
True_Pwr_Fac	True Power Factor, as reported by the CM2000
Disp_Pwr_Fac	Displacement Power Factor, as reported by the CM2000
Current_A	Current of Phase A, already scaled
Current_B	Current of Phase B, already scaled
Current_C	Current of Phase C, already scaled
Current_N	Current of Neutral, already scaled
Current_G	Current of Ground, already scaled
Current_Avg	Average Current of 3-Phase total, already scaled
Current_App	Apparent rms Current, already scaled
Volt_AN	Voltage, Phase A to Neutral, already scaled
Volt_BN	Voltage, Phase B to Neutral, already scaled
Volt_CN	Voltage, Phase C to Neutral, already scaled
Volt_LN_Avg	Voltage, L to N, 3-Phase Average, already scaled
Volt_AB	Voltage, Phase A to B, already scaled
Volt_BC	Voltage, Phase B to C, already scaled
Volt_CA	Voltage, Phase C to A, already scaled
Volt_LL_Avg	Voltage, L to L, 3-Phase Average, already scaled
Real_Pwr_Tot	Real Power, 3-Phase Total, already scaled
React_Pwr_Tot	Reactive Power, 3-Phase Total, already scaled
App_Pwr_Tot	Apparent Power, 3-Phase Total, already scaled
Real_E_In_Lo	Low word of Real Energy In 3-Phase Total
Real_E_In_Hi	High word of Real Energy In 3-Phase Total
Real_E_Out_Lo	Low word of Real Energy Out 3-Phase Total
Real_E_Out_Hi	High word of Real Energy Out 3-Phase Total
React_E_Out_Lo	Low word of Reactive Energy Out 3-Phase Total
React_E_Out_Hi	High word of Reactive Energy Out 3-Phase Total
App_E_Lo	Low word of Apparent Energy 3-Phase Total
App_E_Hi	High word of Reactive Energy 3-Phase Total
Address	Device address of the CM2000. Should always be 1
Status	Error reporting register. Will be 0 when comms are OK to the CM2000.

CM2000 Configuration

The Circuit Monitor must be set to 9600 baud and address 1. Only one Circuit Monitor may be attached to the MUCM. For any changes to this configuration, contact the factory.

Troubleshooting

MUCM Module Lights

The MUCM has several lights that indicate the status of the module. Table 4-1 shows the meanings of these lights.

Table 4-1 Module Lights

Light	Meaning
Pwr	This light will be on while there is power to the module.
Ready	This light will be on while the MLWF is communicating to the MUCM.
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.

MUCM User Lights

The MUCM has 4 application driven lights numbered 1-4. The meaning of these lights while the APP1 program is running is shown in Table 4-2.

Table 4-2 User Light Definitions

Light	Meaning
1	Toggles when a read is sent
2	Toggles when a good reply is received.
3	Lights when an error or timeout has occurred.
4	Not Used

MLWF Lights

The MLWF has 3 lights that indicate the status of the module. The meaning of these lights is shown in Table 4-3.

Table 4-3 MLWF Light Definitions

Light	Meaning
N	Lights when the MLWF transmits on the network.
A	Lights while communicating to the MUCM.
S	Blinks when no program is loaded. Lights while service pin is pressed, and while a program is being loaded into it.