QUCM Meter Polling With SNMP Support

Installation and Programming Manual

This Manual describes the QUCM application for polling networked POWERLOGIC meters and displaying the data as web pages. An SNMP Agent is included to allow access of the POWERLOGIC data from an SNMP Network Management System.

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NR&D

Niobrara Research & Development Corporation
P.O. Box 3418 Joplin, MO 64803 USA

Telephone: (800) 235-6723 or (417) 624-8918
Facsimile: (417) 624-8920
www.niobrara.com

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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 and Ethernet protocols. This document covers an set of applications that communicates with Square D POWERLOGIC® meters to gather information to be presented as web pages for direct access via a standard browser. Additionally, the data may be accessed through Modbus RTU serial connections to the QUCM or via Modbus/TCP Ethernet. A Simple Network Management Protocol (SNMP) Agent is included in the application to allow data access via Ethernet from an SNMP Network Management System (NMS).

Two applications are required to be loaded into the QUCM: app1.qcm is the POWERLOGIC serial driver and Modbus/TCP client/server, app2.qcm is the web server used for configuration and data display. Both of these applications must be running for the system to properly perform.

Ports 1 and 2 of the QUCM may be independently configured for a variety of modes: PNIM, PLOGIC, Modbus RTU Master, Modbus RTU Slave, and a combination of PNIM and Modbus RTU. Slave devices connected to the QUCM's serial ports may be directly accessed via Ethernet using Modbus/TCP. Up to 60 meter devices may be configured within the QUCM for access through the serial ports or through Ethernet devices such as the Niobrara PEN-TCP, EPE5-TCP, MEB-TCP, QUCM-TCP, or POWERLOGIC ECM or CM4000 using Modbus/TCP. The QUCM supports most POWERLOGIC meters including ENERCEPT series, CM100 series, POWERMETER series, CM2000 series, and CM4000 series.

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

This set of applications will only run in a QUCM-LE module. The applications require the extra memory in the QUCM-LE module and will not function in a QUCM-SE version.

2
Installation

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 SNMP.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 SNMP.ZIP file is located at

http://www.niobrara.com/ftp/qucm/snmp/snmp.zip

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

http://www.niobrara.com/ftp/qucm/snmp/snmp.pdf

Serial Connections to the QUCM-LE

RS-232 QUCM Port 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-LE. The Niobrara MM1 cable may be used for this connection. This cable is shown in Figure 2-1.

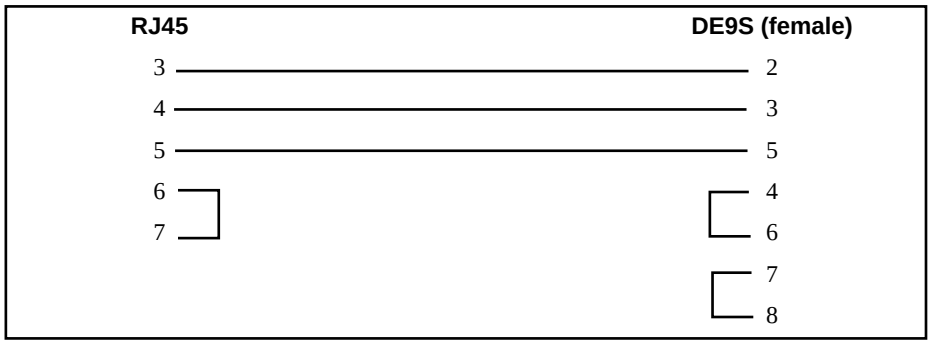

Figure 2-1 QUCM-LE to RS-232 PC DCE Port (9-pin) (MM1 Cable)

RS-485 QUCM Port to the POWERLOGIC Meters

The Niobrara BB85 cable is the most convenient method for connecting may be used for this connection. This cable is shown in Figure 2-1.

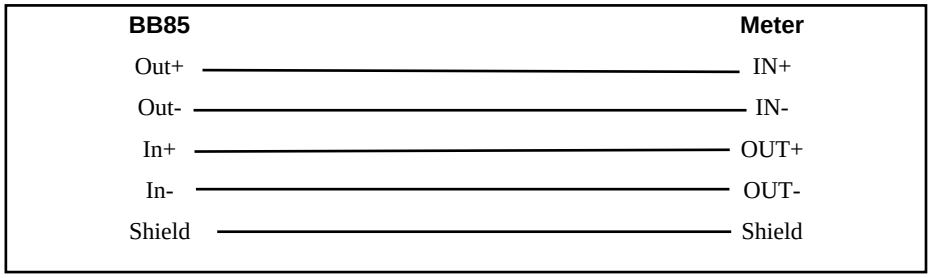

Figure 2-2 QUCM-LE to RS-485 to POWERLOGIC Meter

Downloading the Applications into the QUCM

The QUCM is rapidly evolving so be sure to upgrade the firmware in the module before loading the latest versions of APP1.QCC and APP2.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 form 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 qucmtcpl.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 to use the Ethernet capabilities of QLOAD to load APP1.QCC and APP2.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, De-

fault 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 Load the APP2 file with qload.

```
> qload 2 app2 206.223.51.150:503 -a
```

Will load the file into application 2's flash and set the program to automatically start on power-up.

8 Place Switch 1 in RUN. The RN1 light should come on and light 1 will probably blink rapidly.

9 Place Switch 2 in RUN. The RN2 light should come on.

Configure the application by connecting a web browser to the IP address of the QUCM.

Meter Data

The following POWERLOGIC devices are supported by this QUCM application: CM-100 series, CM-2000 series, CM-4000 Series, Power Meter, and Enercept. The data from each meter is stored in Modbus Holding Registers (4x). Most of the data is stored in 32-bit Integers and some 16-bit Integers. The first 280 Modbus registers contain the sum data for the 20 buildings. After register 40280, the individual meter data is stored in blocks of 164 words.

Table 2-1 Modbus Slave Building Energy Totals Register List

Modbus Register	Building Number	Description
4x0001,2	1	Sum of Real Energy In (KWH)
3,4	1	Sum of Reactive Energy In (KVARH)
5,6	1	Sum of Real Energy Out (KWH)
7,8	1	Sum of Reactive Energy Out (KVARH)
9,10	1	Sum of Apparent Energy Signed (KVAH)
11,12	1	Sum of Real Energy Signed (KWH)
13,14	1	Sum of Reactive Energy Signed (KVARH)
15,16	2	Sum of Real Energy In (KWH)
17,18	2	Sum of Reactive Energy In (KVARH)
19,20	2	Sum of Real Energy Out (KWH)
21,22	2	Sum of Reactive Energy Out (KVARH)
23,24	2	Sum of Apparent Energy Signed (KVAH)
25,26	2	Sum of Real Energy Signed (KWH)
27,28	2	Sum of Reactive Energy Signed (KVARH)
...	...	...
267,268	20	Sum of Real Energy In (KWH)
269,270	20	Sum of Reactive Energy In (KVARH)
271,272	20	Sum of Real Energy Out (KWH)
273,274	20	Sum of Reactive Energy Out (KVARH)
275,276	20	Sum of Apparent Energy Signed (KVAH)
277,278	20	Sum of Real Energy Signed (KWH)
279,280	20	Sum of Reactive Energy Signed (KVARH)

Table 2-2 Modbus Slave Device Data Register List

Modbus Register	Description	CM 100	CM 2000	CM 4000	Power Meter	Enercept
(164*(Slave-1))+281	Device Status					
(164*(Slave-1))+282	ECM Number					
(164*(Slave-1))+283	Building Number					
(164*(Slave-1))+284	Meter Slave Address					
(164*(Slave-1))+285	Device Type	450-455	460-470	15101 - 15102	480-490	8075 - 8076
(164*(Slave-1))+286	Frequency (Hz/100)	Read	Read	Read	Read	N/A
(164*(Slave-1))+287	True Power Factor	Read	Read	Read	Read	Read
(164*(Slave-1))+288	Displacement Power Factor	N/A	Read	Read	Read	N/A
(164*(Slave-1))+289, (164*(Slave-1))+290	Current A (A)	Read	Read	Read	Read	Read
(164*(Slave-1))+291, (164*(Slave-1))+292	Current B (A)	Read	Read	Read	Read	Read
(164*(Slave-1))+293, (164*(Slave-1))+294	Current C (A)	Read	Read	Read	Read	Read
(164*(Slave-1))+295, (164*(Slave-1))+296	Current N (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+297, (164*(Slave-1))+298	Current G (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+299, (164*(Slave-1))+300	Current Avg. (A)	Calculated	Read	Read	Calculated	Read
(164*(Slave-1))+301, (164*(Slave-1))+302	Current Apparent RMS (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+303, (164*(Slave-1))+304	Voltage AN (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+305, (164*(Slave-1))+306	Voltage BN (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+307, (164*(Slave-1))+308	Voltage CN (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+309, (164*(Slave-1))+310	Voltage LN Avg (V)	Calculated	Read	Read	Calculated	Read
(164*(Slave-1))+311, (164*(Slave-1))+312	Voltage AB (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+313, (164*(Slave-1))+314	Voltage BC (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+315, (164*(Slave-1))+316	Voltage CA (V)	Read	Read	Read	Read	Read
(164*(Slave-1))+317, (164*(Slave-1))+318	Voltage LL Avg (V)	Calculated	Read	Read	Calculated	Read
(164*(Slave-1))+319, (164*(Slave-1))+320	Real Power A (KW)	N/A	Read	Read	Read	Read
(164*(Slave-1))+321, (164*(Slave-1))+322	Real Power B (KW)	N/A	Read	Read	Read	Read
(164*(Slave-1))+323, (164*(Slave-1))+324	Real Power C (KW)	N/A	Read	Read	Read	Read
(164*(Slave-1))+325, (164*(Slave-1))+326	Real Power Total (KW)	Read	Read	Read	Read	Read

Modbus Slave Device Data Register List Cont.

Modbus Register	Description	CM 100	CM 2000	CM 4000	Power Meter	Enercept
(164*(Slave-1))+327, (164*(Slave-1))+328	Reactive Power A (KVAR)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+329, (164*(Slave-1))+330	Reactive Power B (KVAR)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+331, (164*(Slave-1))+332	Reactive Power C (KVAR)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+333, (164*(Slave-1))+334	Reactive Power Total (KVAR)	Read	Read	Read	Read	Read
(164*(Slave-1))+335, (164*(Slave-1))+336	Apparent Power A (KVA)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+337, (164*(Slave-1))+338	Apparent Power B (KVA)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+339, (164*(Slave-1))+340	Apparent Power C (KVA)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+341, (164*(Slave-1))+342	Apparent Power Total (KVA)	Read	Read	Read	Read	Read
(164*(Slave-1))+343, (164*(Slave-1))+344	Real Energy In (KWH)	Read	Read	Read	Read	Read
(164*(Slave-1))+345, (164*(Slave-1))+346	Reactive Energy In (KVARH)	Read	Read	Read	Read	N/A
(164*(Slave-1))+347. (164*(Slave-1))+348	Real Energy Out (KWH)	Read	Read	Read	Read	Read
(164*(Slave-1))+349, (164*(Slave-1))+350	Reactive Energy Out (KVARH)	Read	Read	Read	Read	N/A
(164*(Slave-1))+351, (164*(Slave-1))+352	Apparent Energy (KVAH)	Read	Read	Read	Read	N/A

Modbus Register	Description	CM 100	CM 2000	CM 4000	Power Meter	Enercept
(164*(Slave-1))+353, (164*(Slave-1))+354	Real Energy Signed (KWH)	Read	Read	Read	Read	Read
(164*(Slave-1))+355, (164*(Slave-1))+356	Reactive Energy Signed (KVARH)	Read	Read	Read	Read	N/A
(164*(Slave-1))+357, (164*(Slave-1))+368	Incremental Real Energy In (KWH)	Calculated	Calculated	Calculated	Calculated	Read
(164*(Slave-1))+359, (164*(Slave-1))+360	Incremental Reactive Energy In (KVAR)	N/A	Calculated	Calculated	Calculated	N/A
(164*(Slave-1))+361, (164*(Slave-1))+362	Incremental Real Energy Out (KWH)	Calculated	Calculated	Calculated	Calculated	Read
(164*(Slave-1))+363, (164*(Slave-1))+364	Incremental Reactive Energy Out (KVARH)	Calculated	Calculated	Calculated	Calculated	Read
(164*(Slave-1))+365, (164*(Slave-1))+366	Incremental Apparent Energy (KVAH)	N/A	Calculated	Calculated	Calculated	Read
(164*(Slave-1))+367, (164*(Slave-1))+368	Present Current Demand 3-Phase Avg. (A)	Calculated	Calculated	Calculated	Calculated	N/A
(164*(Slave-1))+369. (164*(Slave-1))+370	Present Current Demand A (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+371. (164*(Slave-1))+372	Present Current Demand B (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+373, (164*(Slave-1))+374	Present Current Demand C (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+375, (164*(Slave-1))+376	Present Current Demand N (A)	Read	Read	Read	Read	N/A
(164*(Slave-1))+377, (164*(Slave-1))+378	Peak Current Demand 3-Phase Avg. (A)	N/A	Read	Read	Calculated	N/A
(164*(Slave-1))+379, (164*(Slave-1))+380	Peak Current Demand A (A)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+381, (164*(Slave-1))+382	Peak Current Demand B (A)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+383, (164*(Slave-1))+384	Peak Current Demand C (A)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+385, (164*(Slave-1))+386	Peak Current Demand N (A)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+387, (164*(Slave-1))+388	Present Real Power Demand 3-Phase Total (KW)	N/A	Read	Read	Read	Read
(164*(Slave-1))+389, (164*(Slave-1))+390	Present Reactive Power Demand 3-Phase Total (KVAR)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+391, (164*(Slave-1))+392	Present Apparent Power Demand 3-Phase Total (KVA)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+393, (164*(Slave-1))+394	Peak Real Power Demand 3-Phase Total (KW)	N/A	Read	Read	Read	Read

Modbus Register	Description	CM 100	CM 2000	CM 4000	Power Meter	Enercept
(164*(Slave-1))+395, (164*(Slave-1))+396	Peak Reactive Power Demand 3-Phase Total (KVAR)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+397, (164*(Slave-1))+398	Peak Apparent Power Demand 3-Phase Total (KVA)	N/A	Read	Read	Read	N/A
(164*(Slave-1))+399, (164*(Slave-1))+400, (164*(Slave-1))+401	Start of Day for Incremental Energy	QUCM	QUCM	QUCM	QUCM	QUCM
(164*(Slave-1))+402,... (164*(Slave-1))+410	Reserved					
(164*(Slave-1))+411, (164*(Slave-1))+412	CM Label	Read	Read	Read	Read	N/A
(164*(Slave-1))+413,... (164*(Slave-1))+420	CM Nameplate	Read	Read	Read	Read	N/A
(164*(Slave-1))+421	QUCM Meter Name Length	QUCM	QUCM	QUCM	QUCM	QUCM
(164*(Slave-1))+422,... (164*(Slave-1))+444	QUCM Meter Name	QUCM	QUCM	QUCM	QUCM	QUCM

Brief Summary Data

The QUCM stores a brief summary of seven values for all the possible meters. This data is accessed by way of the special Modbus Index of 201. The register mapping is described in Table 2-3.

This table may also be pushed to a Modbus/TCP server by the QUCM. See page 29 for details.

Table 2-3 Brief Summary Table

Holding Register	Description	Meter Number
1	Meter Status	1
2	Power Factor	1
3,4	Avg. Current	1
5,6	Avg. Voltage L-L	1
7,8	Real Power	1
9,10	Reactive Power	1
11,12	Apparent Power	1
13,14	Present Real Demand Power	1
15	Meter Status	2
16	Power Factor	2
17,18	Avg. Current	2
19,20	Avg. Voltage L-L	2
21,22	Real Power	2
23,24	Reactive Power	2
25,26	Apparent Power	2
27,28	Present Real Demand Power	2
...	...	...
827	Meter Status	60
828	Power Factor	60
829,830	Avg. Current	60
831,832	Avg. Voltage L-L	60
833,834	Real Power	60
835,836	Reactive Power	60
837,838	Apparent Power	60
839,840	Present Real Demand Power	60

3

WEB Server

Main Page

The Main page displays a summary of the configured POWERLOGIC devices. The table will display the Device Number, Building Name, Network Device's IP Address, Network Device's Name, Meter's Slave Address, Meter's Name, and Device Status. If a device is not responding to queries from the QUCM then the Status table entry will have a gray background and display the text "Offline, Meter did not Respond". If the Modbus/TCP connection cannot be established with the remote network device then the Status entry will be "Offline, TCP connection failed". If the device is responding to queries then the cell will display "Online". The Online message is a hypertext link that will display the "Actual" data for that device.

Figure 3-1 shows an example page with 6 meters in two buildings.

At the bottom of the Main page are links to Summary Data Pages, Statistics on this QUCM, and a page for configuring this QUCM.

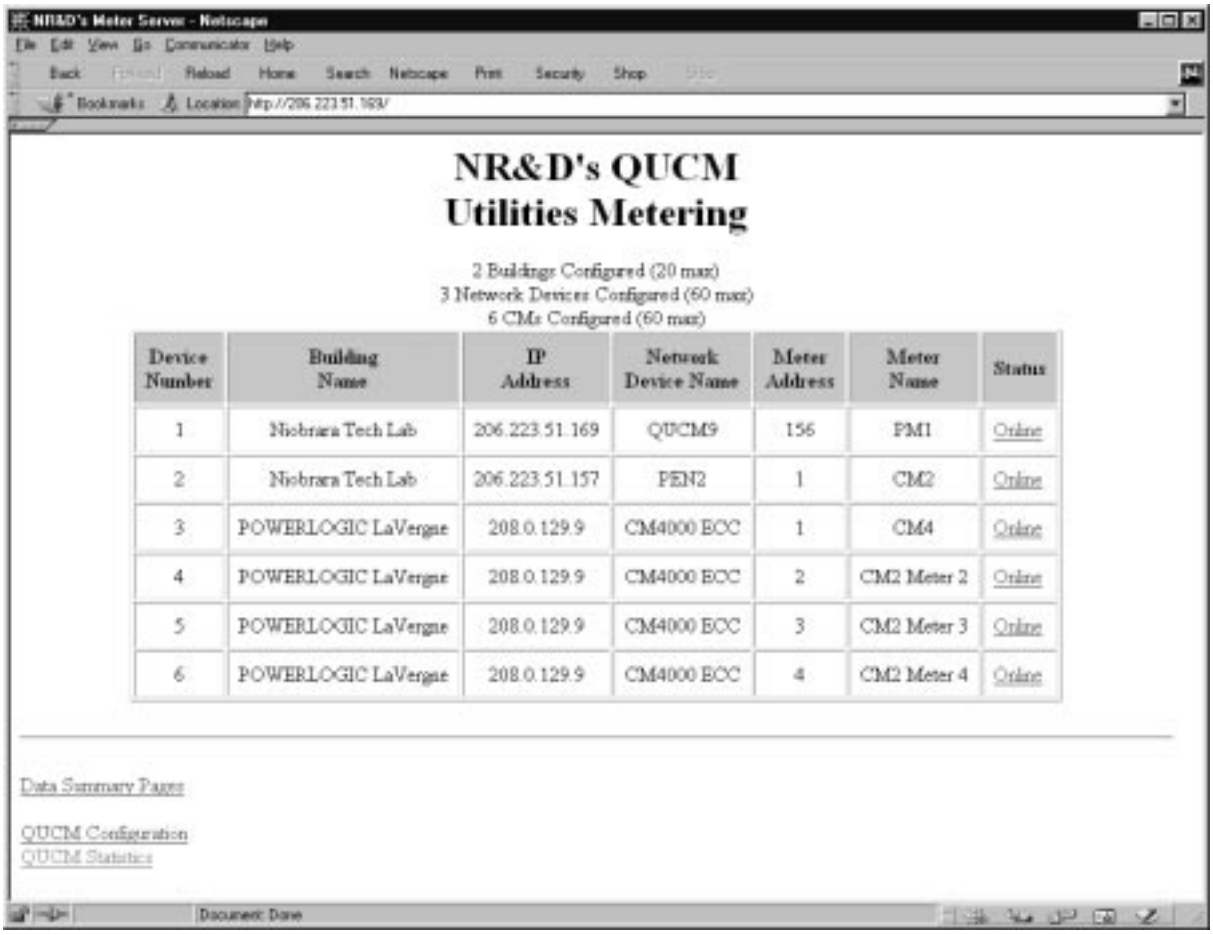

Figure 3-1 Main Web Page

Actual Data Page

Following one of the "Online" links will display a table of the metered data for the particular POWERLOGIC device. Figure 3-2 shows a portion of the table for a CM2450 meter in LaVergne.

At the bottom of each Device page are links to the previous device, next device, the last 30 days of incremental energy for this meter, shortcut to the data summary page list, and a link back to the home page.

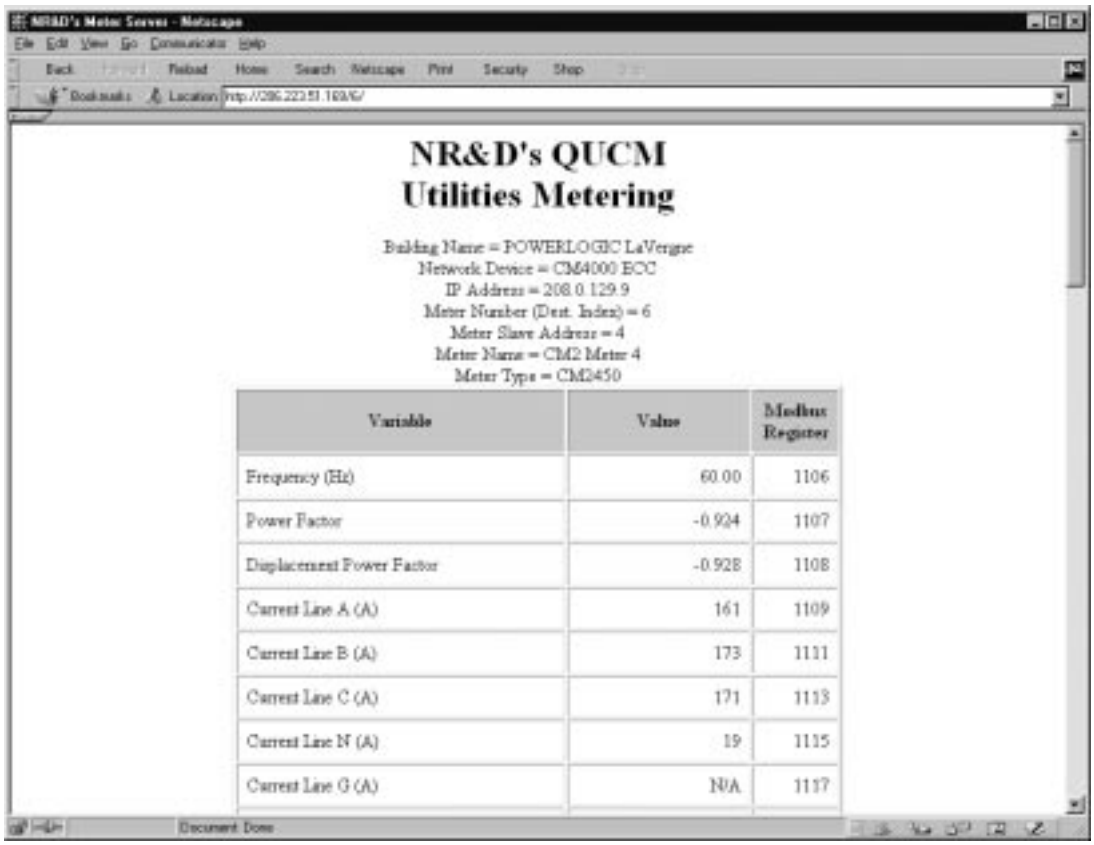

Figure 3-2 Web Server Actual Data Page

Data Summary Pages

The link to the Data Summary Pages jumps to a page of links for individual summary pages. Summary pages are provided for Currents, Demand Currents, Voltages, Power, Demand Power, Energy, Incremental Energy, and Active Alarms. The data for each summary page is grouped in tables for each building. The Energy pages include energy totals for each building. Figure 3-3 shows a partial page for the Current Summary page.

The "Destination Index" and "Meter Name" are links back to the actual data table for the individual meter.

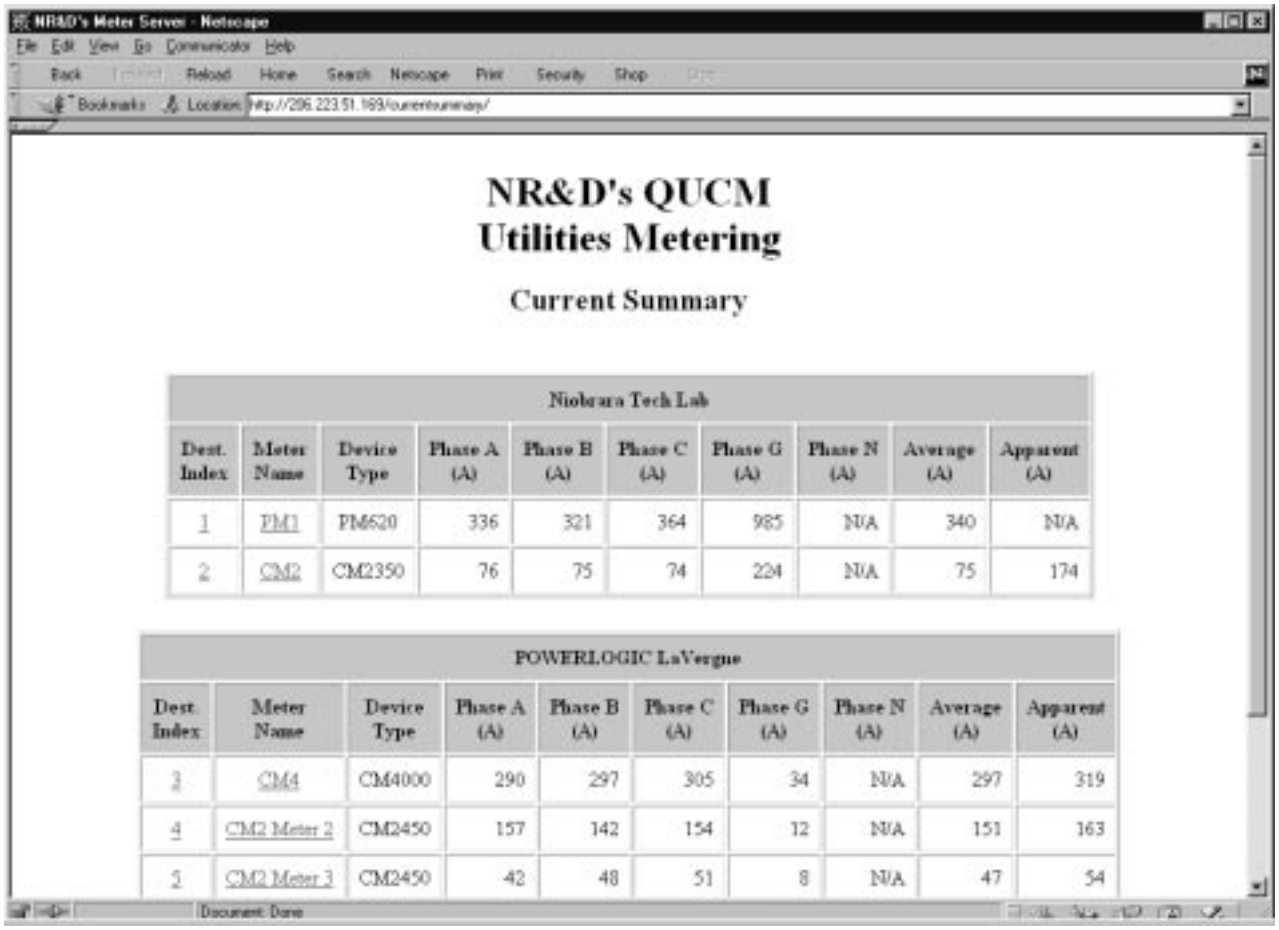

Figure 3-3 Current Summary Page

Configure QUCM

At the bottom of the Main page is a link to configure the QUCM. (See Figure 3-4). The password may need to be entered before access to this page is granted. The default password is "master" and is case sensitive. The password may be altered from the "Change Password" page. Light 9 will come on while the password timer is active.

A three minute timer is set when the proper password is entered. This timer is reset whenever there is activity on any page that requires a password. When the timer has expired, the next access to a password protected page will require the entering of the password again.

The QUCM checks the IP address of the web client and compares it to the IP Address of the client that entered the password. If the client address does not match the password address then the password will be required, even if the timer has not yet expired. If a second client attempts to connect to a password protected page then a notice will be displayed indicating the IP address of the current logged in client. The new client will be allowed to enter the password and continue.

Certain pages always require the password for clearance. Clearing the alarm summary log is an example of a page that always requires the password.

A link is provided for altering the password. The current password must be verified before the new password is edited. The new password must be entered twice for verification.

NOTE: This password protection is not extremely secure and is only intended to prevent accidental modification to the QUCM configuration. The user should implement other more stringent protection such as firewalls and isolated networks to ensure the safety of the metered system.

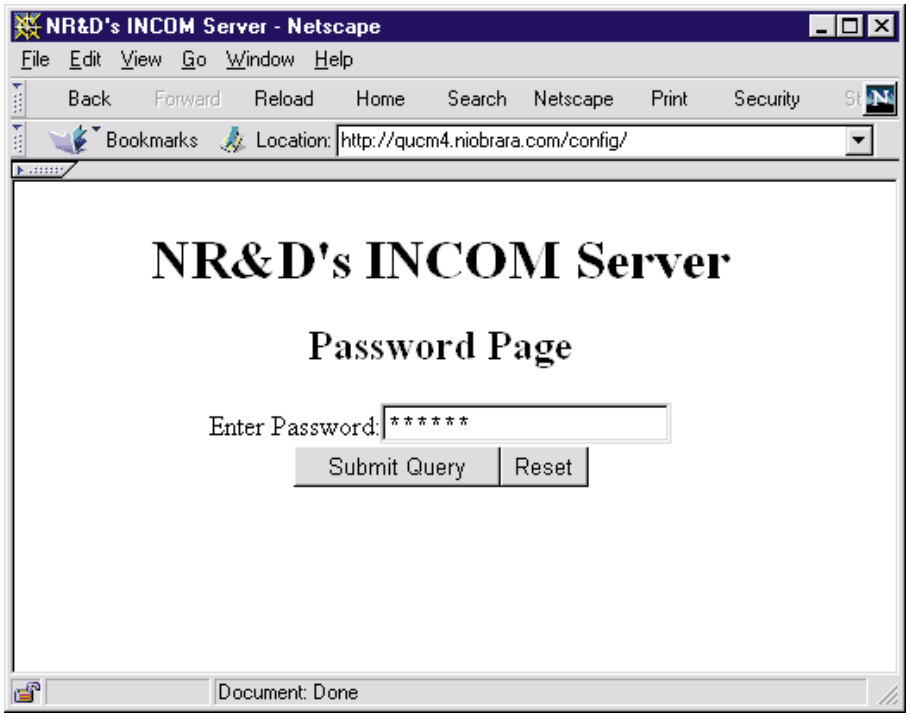

Figure 3-4 Enter Password Page

After entering a successful password a screen like Figure 3-5 is displayed. Each configured building is shown. The building name is a link to edit the name of the building. The Network Device Count is a link to edit the network devices and meters. Links below are given to add a new building, alter the SNMP settings, change the titles, change the password, alter the serial port configurations, alter the Modbus/TCP push settings, and save the configuration to FLASH.

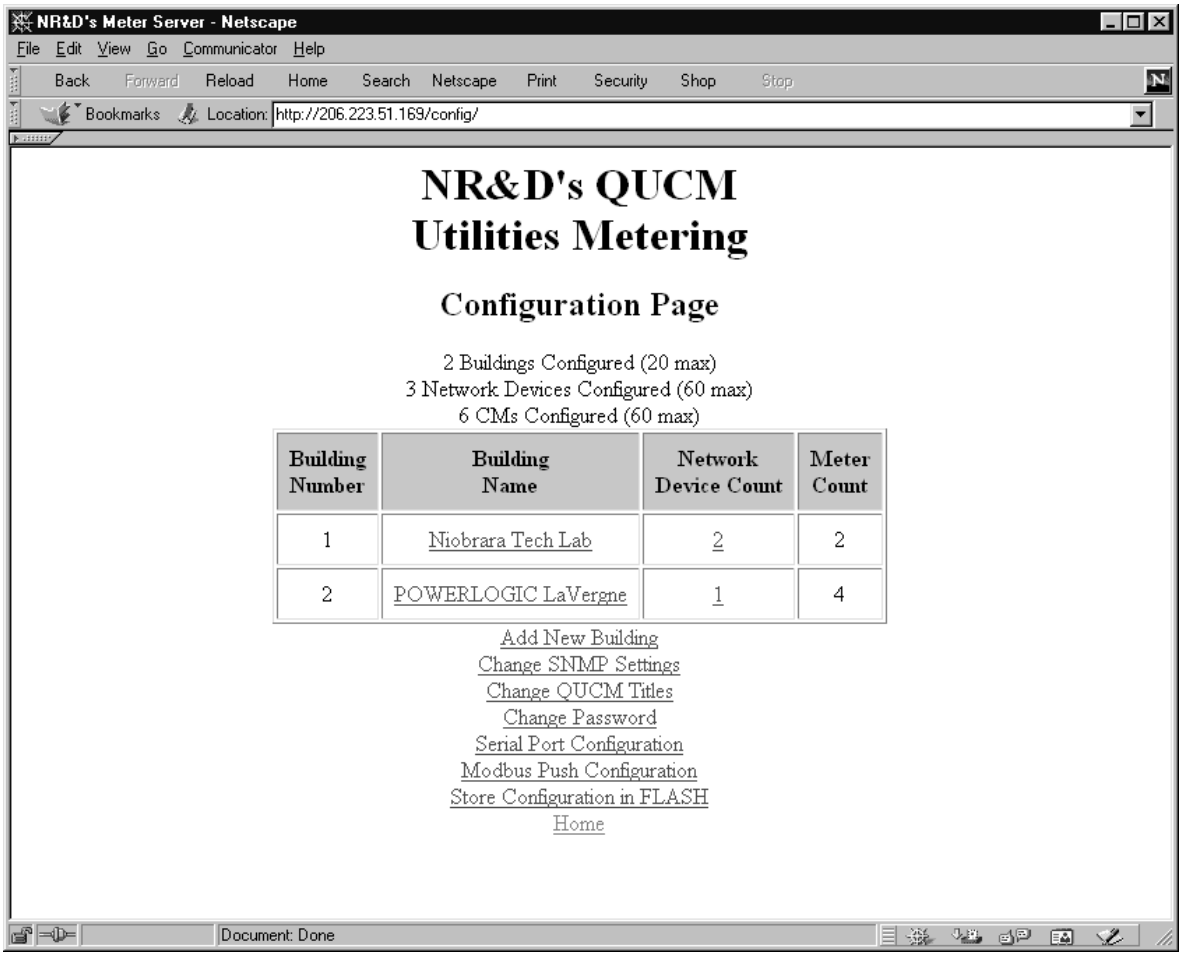

Figure 3-5 Configuration Page

Add New Building

The Add New Building link is used to add a new building to the list.. There is a pull-down menu item for the building number and a text entry box for the building name. The building name may be up to 20 characters long.

Edit or Remove a Building

To change the name of a building, click on the building's name. The name may be modified from this page.

To remove a building, click on the "Remove this Building" link.

Network Device Count

The Network Device Count is a link to the network devices and meters for a given building. Figure 3-6 shows an example page with two network devices.

The Network Device IP Address and Name are links to edit/remove the network device. The Add Network Device link is used to add a new network device.

If there are meters on the serial ports of the QUCM then the QUCM itself must be added as a network device.

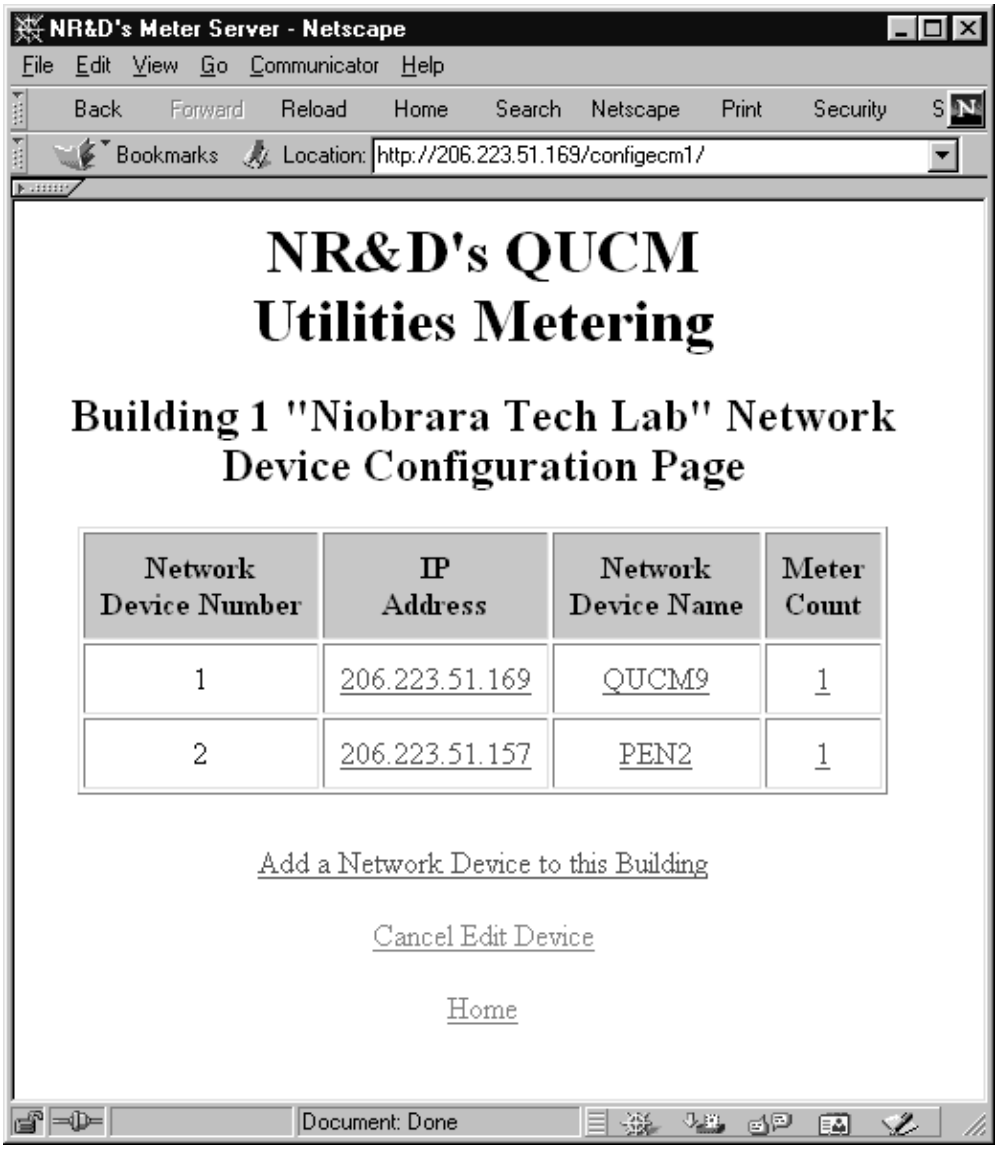

Figure 3-6 Network Configuration Page

Meter Count

The Meter Count is a link used for configuring the number of meters assigned to a given network device. A list of all meters assigned to the network device is given (Figure 3-7). There is a link for adding a new device. Click on the meter name or meter address link to edit or remove the meter (Figure 3-8). The Cancel Edit Device link returns to the edit network device page for the building.

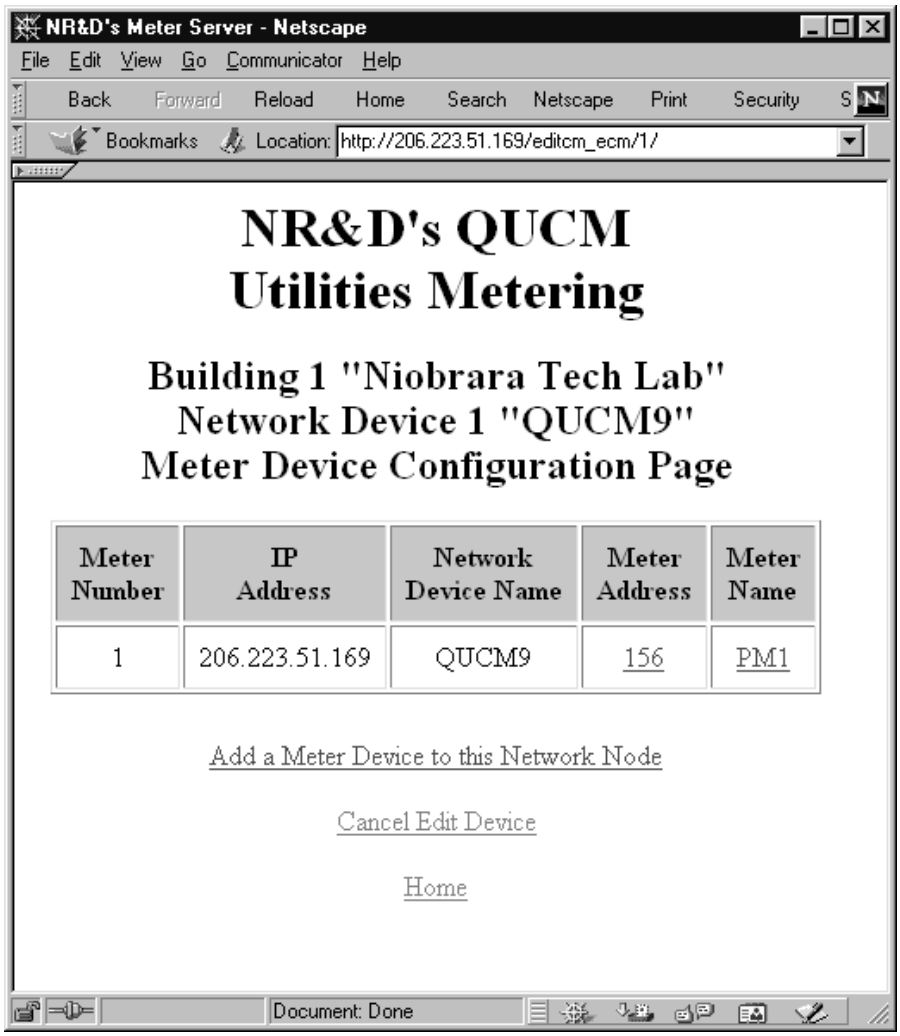

Figure 3-7 Meter Device Configuration Page

The Meter Slave Address (Destination Index) is the index used to reach the target meter through the network device. If the meter is local to the QUCM then the meter address will be the slave address of the meter plus 100 if it is connected to Port 1 of the QUCM and plus 150 if it is connect to port 2 of the QUCM.

There is a check box for "In Service". Clearing this check box keeps the device in the QUCM's configuration but prohibits the QUCM from actually polling it. This may be desirable if a particular device is to be powered off for extended periods of time because the QUCM will not waste bandwidth trying to poll a device that is not present.

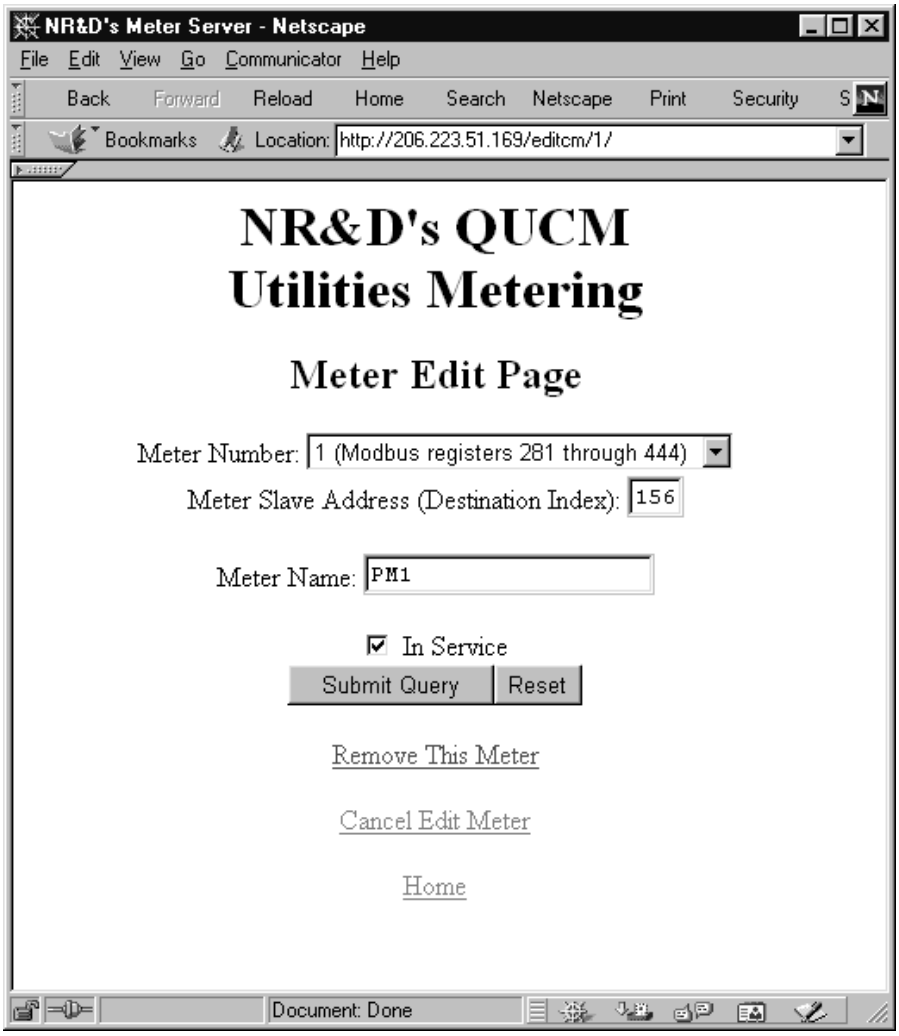

Figure 3-8 Meter Edit Page

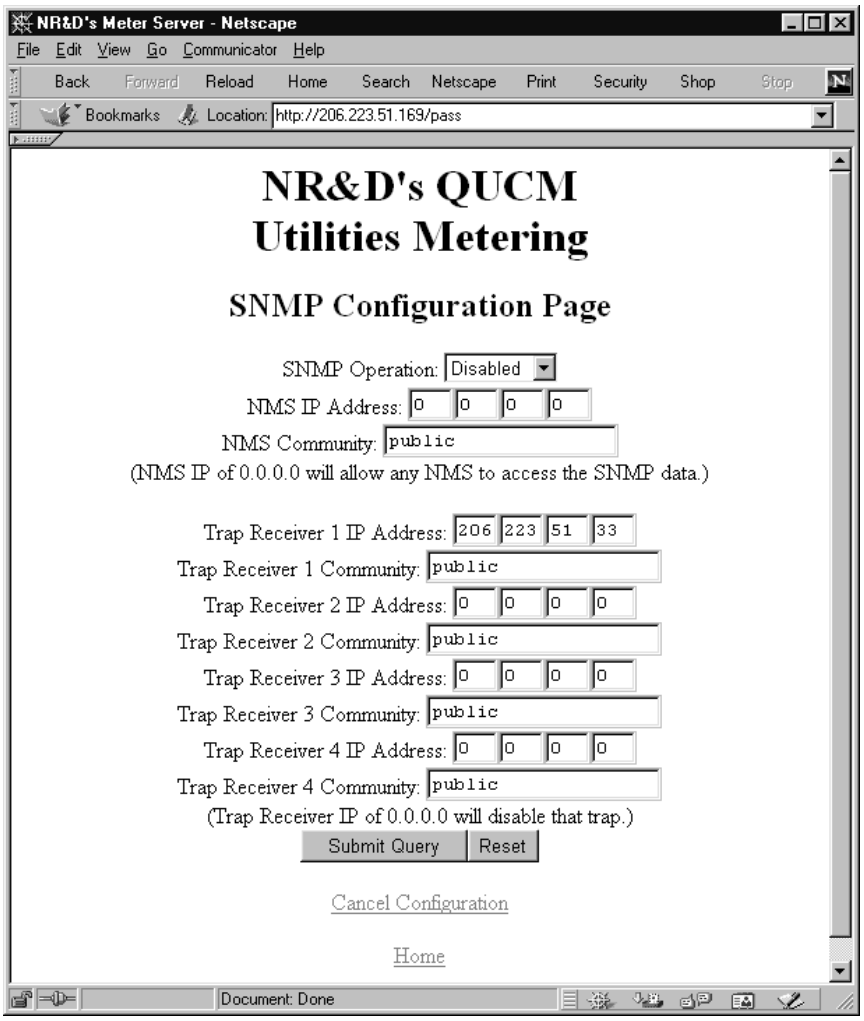

Figure 3-9 SNMP Configuration Page

SNMP Configuration

The link to the SNMP Configuration is from the main Configuration page. A page similar to Figure 3-9 will be displayed. A pull down option for operation of SNMP is offered for Enabled or Disabled. If Disabled is set then the SNMP service will not function and an extra Modbus/TCP server will be enabled.

The Network Management System (NMS) IP Address may be entered. A value of 0.0.00 for the NMS IP Address will allow any client to communicate with the QUCM via SNMP. If a non-zero IP Address is entered, only that client will be able to access the SNMP data.

The NMS community name must also be entered in the next text field.

Up to four Trap Receivers may be configured to which the QUCM will send SNMP traps when error conditions occur. Each Trap Receiver may be configured for a different community. To disable a particular trap receiver, set the IP address to 0.0.0.0.

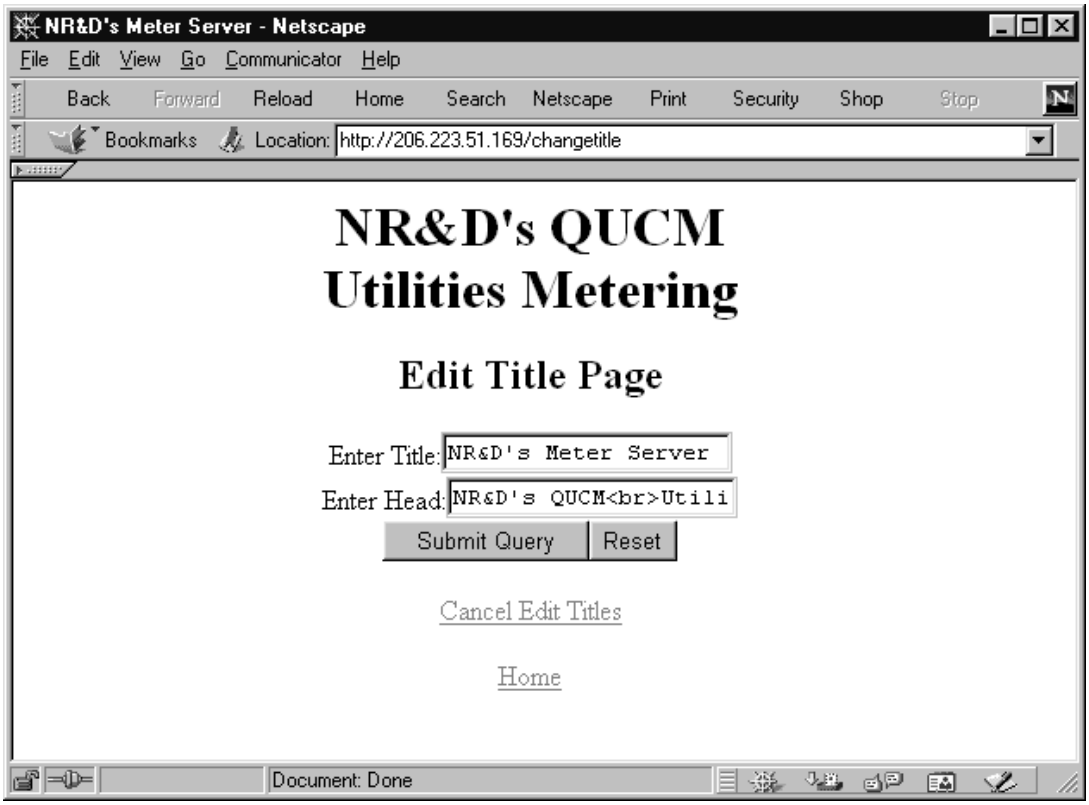

Figure 3-10 QUCM Title Configuration Page

QUCM Titles

The Head and Title for the QUCM web pages may be changed to suit a particular installation. The title is displayed at the top of each window and as the bookmark in most browsers. The head is displayed at the top of each page within the browser window. See Figure 3-10. The defaults are:

Title: NR&D's Meter Server
Head: NR&D's QUCM
Utilities Metering

The "
" in the middle of the head is HTML for break and causes a new line between QUCM and Utilities.

Change Password

The Change Password link allows the password to be modified. The current password must be entered before access to the new password setting is allowed. The new password must be entered twice before it is accepted.

The factory default password is "master" and is case sensitive.

Serial Port Configuration

The Serial Port Configuration page allows the altering of the baud rates of QUCM port 1 and 2, the Protocol of Ports 1 and 2, and the Parity of Ports 1 and 2.

Ports 1 and 2 may be set to PNIM/RTU Master, PNIM Master, RTU Master, and PLOGIC Master, and RTU Slave. The parity may be set to EVEN or NONE. The baud rate may be set to 1200, 2400, 4800, 9600, or 19200.

When Port 1 is in PNIM/RTU/PLOGIC, it accepts Modbus/TCP queries to Destination Index 101 through 150 and passes the messages out to either PNIM, PLOGIC, or Modbus RTU slaves 1 through 50. The QUCM will automatically determine the proper protocol for the each of the possible slaves.

When Port 2 is in PNIM/RTU/PLOGIC, it accepts Modbus/TCP queries to Destination Indices 151 through 200 and passes the messages out to either PNIM, PLOGIC, or Modbus RTU slaves 1 through 50. The QUCM will automatically determine the proper protocol for the each of the possible slaves.

Modbus RTU Slave mode allows a serial Modbus Master to read the compressed data from Powerlogic slaves 1 through 60.

Figure 3-11 Serial Port Page

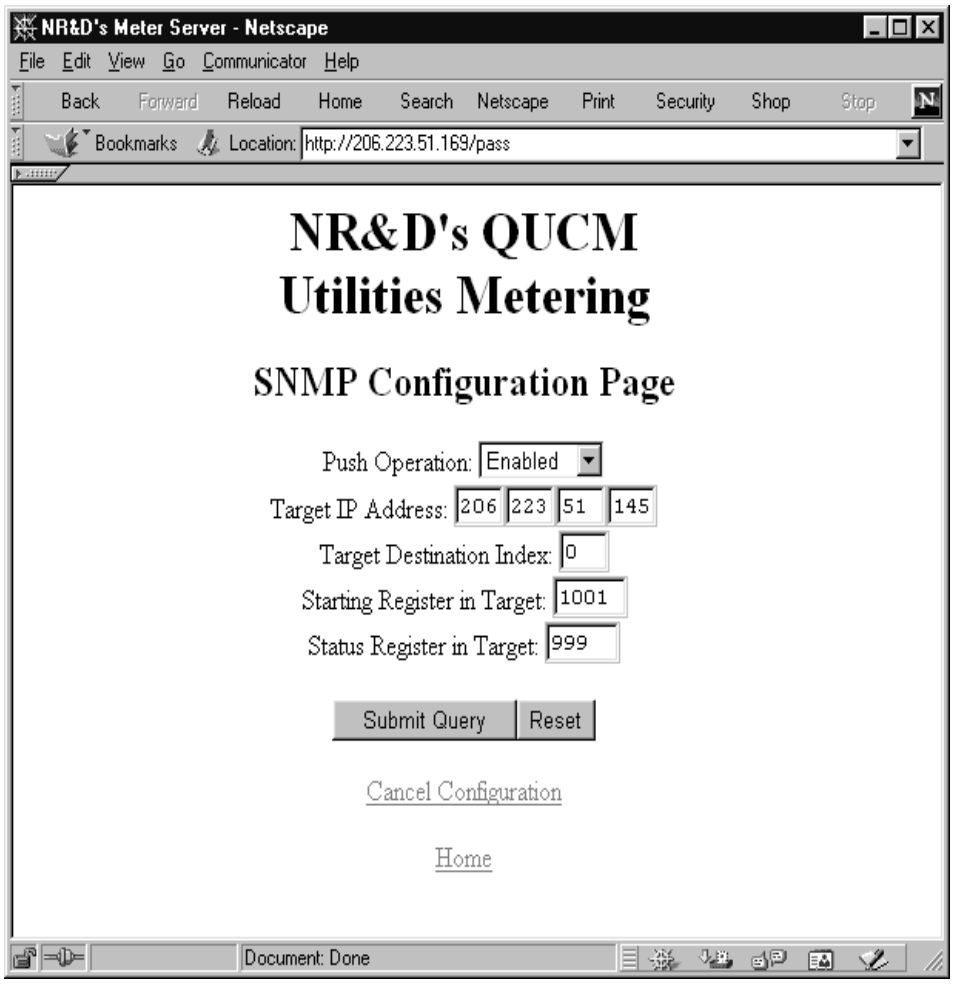

Figure 3-12 Modbus/TCP Push Configuration

Modbus Push Configuration

The QUCM application has the ability to push all the data from the brief summary table (page 15) to a Modbus/TCP server. There is a pull-down option to enable the push operation. The IP Address of the Modbus/TCP server is entered in the next fields. The Destination Index for the target is also entered. The 4x starting register in the target is entered as the Holding Register number for the start of the brief table. The status register number is also entered on this page.

The Status register is simply a 16-bit counter that is incremented each time the entire brief table is written to the target device. This counter may be used for a watchdog by the target device to sound an alarm if it stops receiving data from the QUCM.

Save Settings to FLASH

After completion of the configuration, be sure to save the settings to flash. Otherwise the modifications will be lost on the next power cycle of the QUCM. Once the settings are saved to flash, the QUCM's configuration, including its IP settings, will be safe indefinitely.

Statistics Page

At the bottom of the Main page is a link to some statistical information about this QUCM. (See Figure 3-13)

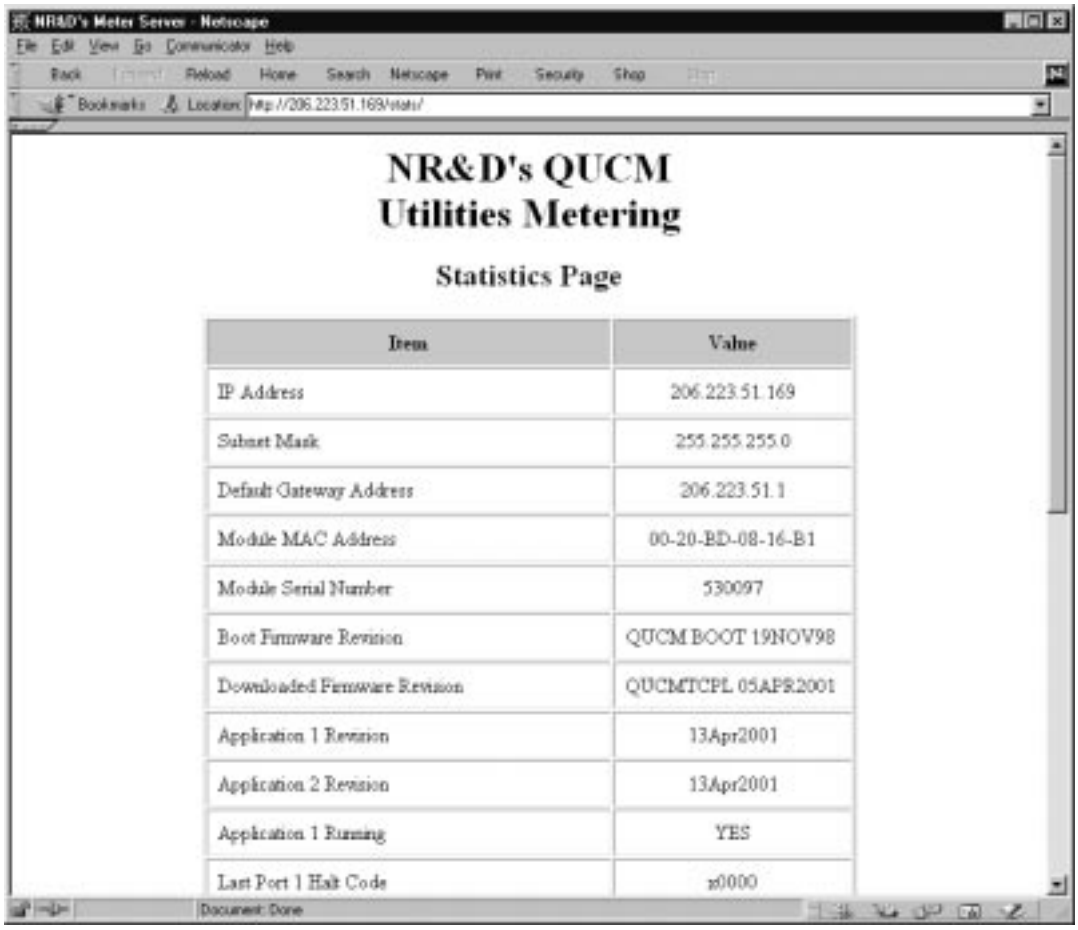

Figure 3-13 Statistics Web Page

Additional information is provided on the statistical page including the IP addresses of clients connected to the Modbus/TCP servers, and status of the Modbus/TCP push connection.

4

SNMP Support

This set of QUCM applications acts as an SNMP Agent for the data from the POWERLOGIC meters. Niobrara has registered its own Enterprise address and provides a specific private MIB for POWERLOGIC equipment. This MIB is included in the SNMP.ZIP file and is called POWERLOGIC.MIB. This MIB file should be incorporated into the SNMP Network Management System. This may involve compiling the MIB for the NMS, refer to the NMS documentation for more information.

The QUCM builds a series of tables for the data from each meter. In this manner, multiple meters may be presented by a single QUCM. The QUCM application supports SNMP version 1. The QUCM serves its data on UDP port 161 and sends traps on UDP port 162.

The QUCM may be configured to allow any number of NMSs or may be limited to a specific NMS by way of IP address and SNMP Community. The QUCM may also be configured to send traps to up to four receivers, each with its own Community.

5

FTP Server

Application 2 contains an FTP server as well as the web server. The FTP server allows the storage and retrieval of the FLASH setup parameters used by Application 1 and 2 from any computer with an FTP client. The user flash areas are presented by the QUCM's FTP server as a single file called "flash.bin". The user may use "get" to retrieve this file from the QUCM and "put" or "send" to copy this file to the QUCM. At this time, the login name is not required and the password is the same as the Web server password (defaults to "master"). When the file is copied to the QUCM (using put or send), the QUCM is rebooted after the FTP session is "quit" to allow the module to restart and load the new settings from FLASH.

Example Login, DIR, and "get"

```
>ftp 206.223.51.163
Connected to 206.223.51.163.
220 QUCM FTP Service (Version 07Jul2000)
User (206.223.51.163):(none)):
331 User okay; need password.
password:
230 User logged in; proceed.
ftp> dir
200 PORT Command Successful.
150 Opening ASCII mode data connection for /bin/ls.
flash.bin
226 PORT Command Successful.
11 bytes received in 0.01 seconds (1.10 Kbytes/sec)
ftp> get flash.bin
200 PORT Command Successful.
150 Opening ASCII mode data connection for flash.bin(16384 bytes).
226 Transfer complete.
16384 bytes received in 2.72 seconds (6.01 Kbytes/sec)
ftp> quit
221 Connection Closing. goodbye.
```

6
Examples

Example 1

Figure 6-1 displays a POWERLOGIC system consisting of two buildings and several devices. The first building is the Niobrara Technical Support Lab in Joplin, MO and the second building is at POWERLOGIC in LaVergne, TN. The two buildings are connected through the public Internet.

The Niobrara building contains a QUCM-LE with a PM-620 Power Meter connected to port 2 through a NR&D BB85 adapter. The Power Meter is configured for slave address 6. Since the PM is connected to port 2 of the QUCM, it will be accessed as Destination Index 156. The QUCM's IP Address is set to 206.223.51.169. A NR&D PEN-T is also in the lab at 206.223.51.157. It has a CM2350 connected as device 1. Also a Quantum PLC with an NOE-211 is on the network at 206.223.51.145. The QUCM will push the summary data to this plc.

The POWERLOGIC building contains a CM4000 with the Ethernet Communication Card option at 208.0.129.9. The CM4000 is Destination Index 1 while three CM2450 meters are at Index values of 2, 3, and 4.

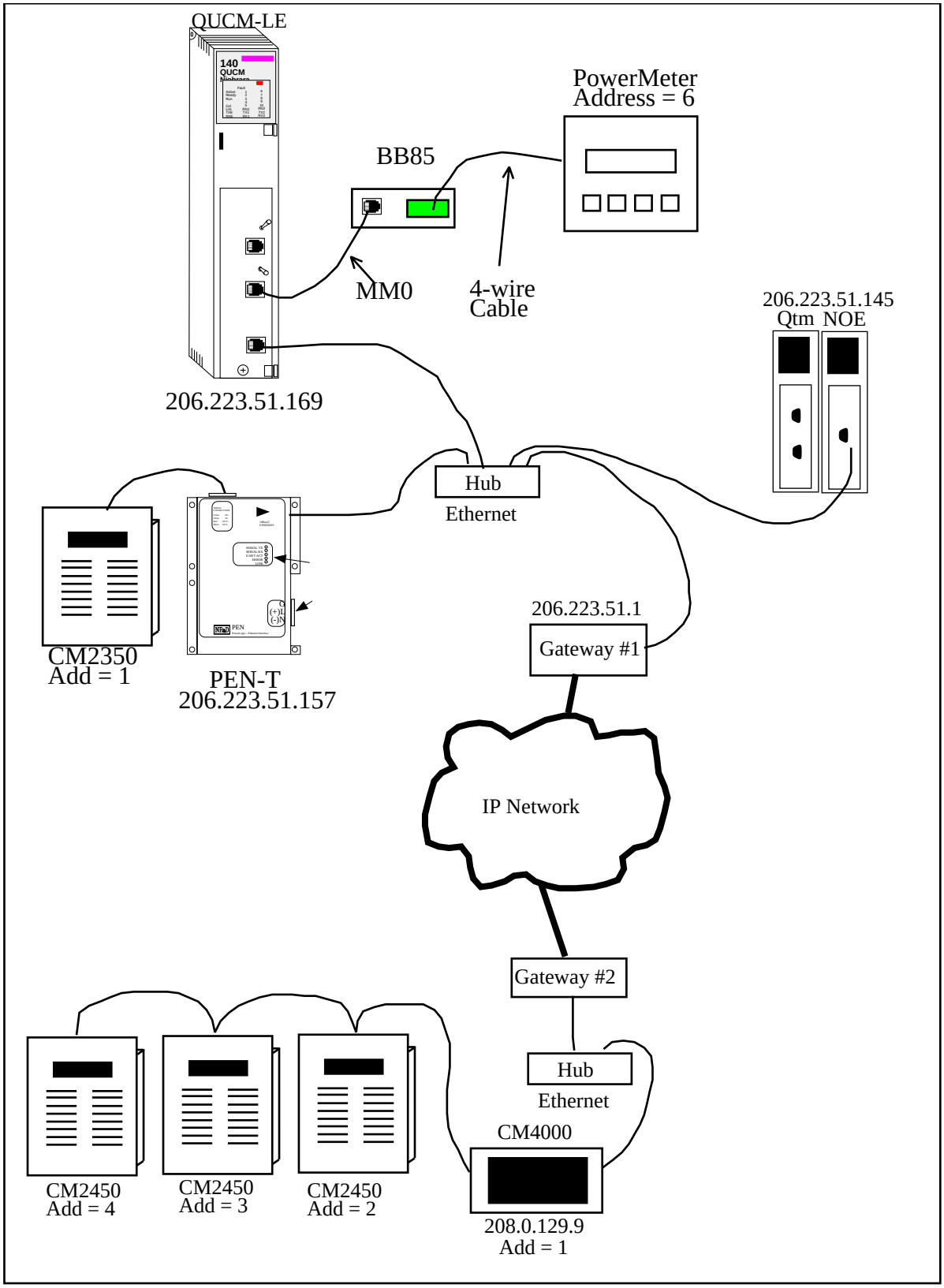

Figure 6-1 Network Example

Figure 6-2 shows the web page after configuration of the system.

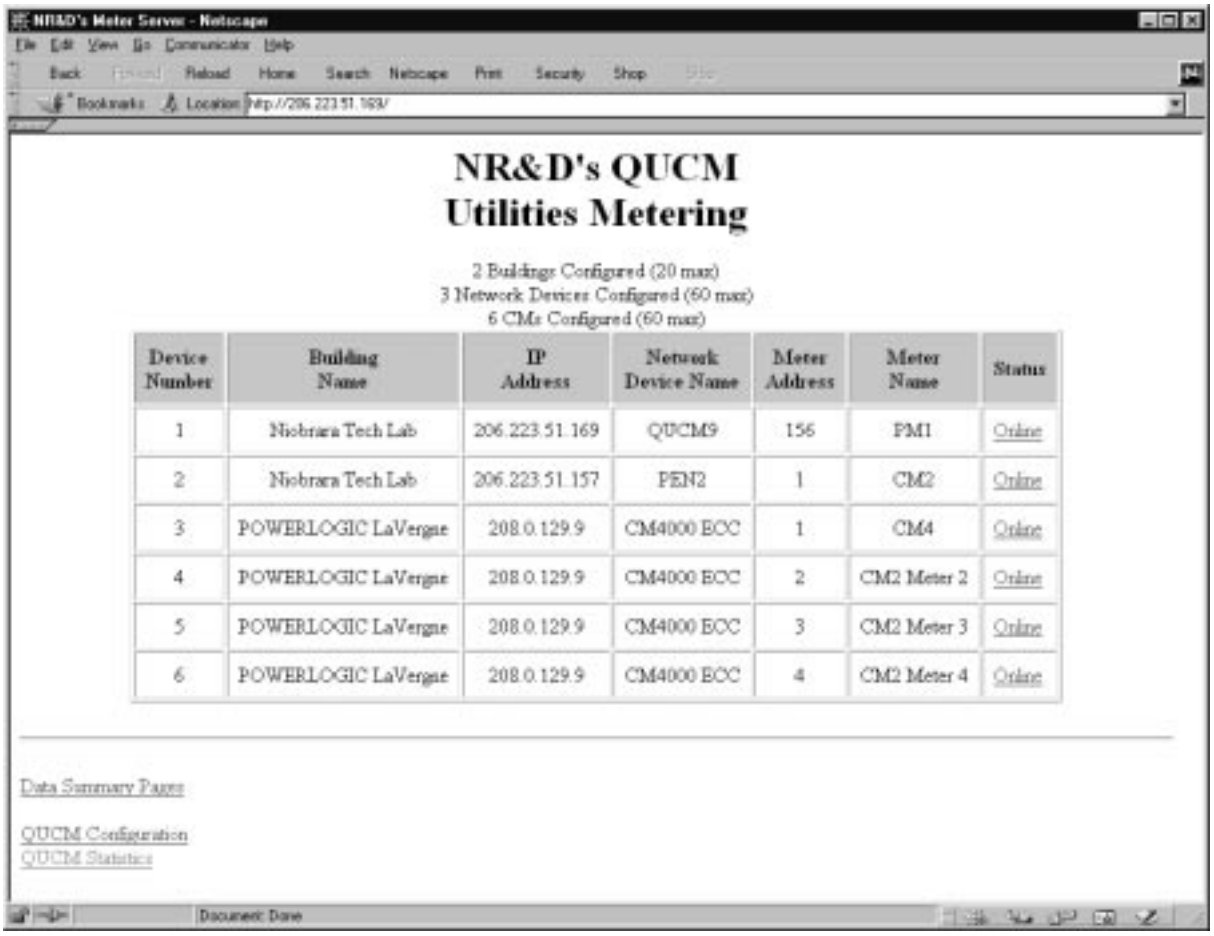

Figure 6-2 Example 1 Main Screen

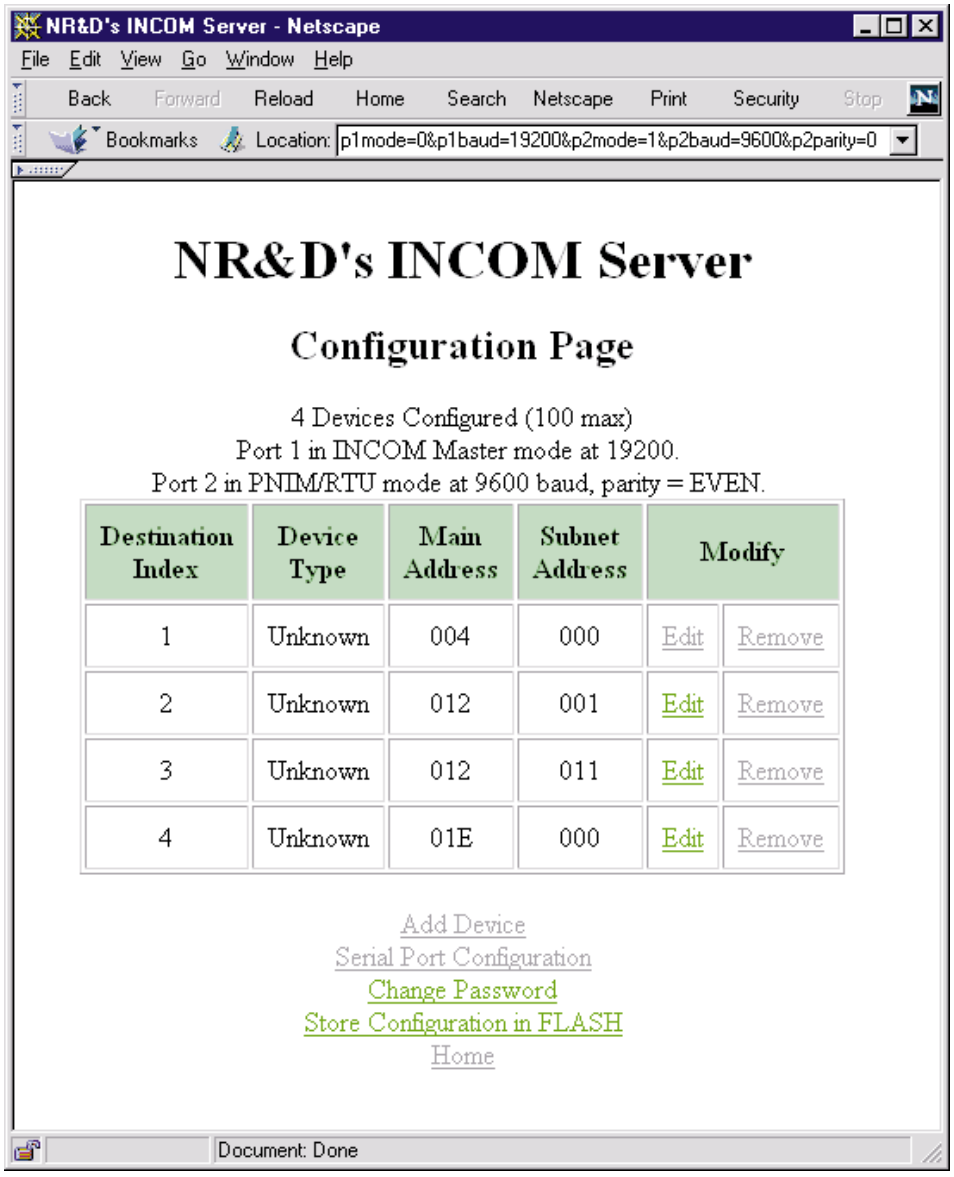

Figure 6-3 Example 2 Configuration Screen

7
Troubleshooting

Module Lights

The QUCM-SE has several lights that indicate the status of the module. Table 7-1 shows the meanings of these lights.

Table 7-1 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 7-2.

Table 7-2 User Light Definitions

Light	Meaning
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	