QUCM INCOM

Installation and Programming Manual

This Manual describes the QUCM application for interfacing Cutler-Hammer INCOM devices to a POWERLOGIC or Modbus/TCP system.

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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 places Cutler-Hammer® (Westinghouse®) IMPACC® devices on a Square D POWERLOGIC® network as POWERLOGIC compatible devices. This setup allows existing C-H equipment to be integrated into the POWERLOGIC System Manager Software system via Modbus/TCP Ethernet.

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

Port 1 of the QUCM is to be connected to a C-H MINT II to provide the interface to the INCOM network. Port 2 may also be configured as an INCOM Master and connected to a MINT II to provide a connection to a second INCOM network. INCOM devices may also be connected over Ethernet through the C-H EPONI or EMINT. Up to 150 INCOM devices may be configured within the QUCM for access through port 1, port 2, or Ethernet. The QUCM supports most C-H INCOM devices including IQ meters and Digitrip units. Support for direct and subnet access of INCOM devices is provided. These devices are accessed via Modbus/TCP by selecting the Destination Index assigned to each slave (1-100 and 133-182).

Port 2 may be configured as a combination PNIM/Modbus RTU master to support a string of PowerLogic and/or Modbus RTU slaves. Up to 32 slaves may attached to the QUCM. They must be assigned unique drop numbers between 1 and 32. These devices are accessed by Modbus/TCP Destination Indices 101 through 132. In addition to the combination PNIM/RTU mode, Port 2 may be configured for PNIM only, Modbus RTU only, PLOGIC only, and Modbus RTU Slave. PLOGIC mode uses the SY/MAX version of the POWERLOGIC protocol and should be used with POWERLINK, CM100 CM200, and 810D units which experience a large number of dropouts when using PNIM. The RTU Slave mode may be used for allowing a serial Modbus RTU master to access the INCOM data.

Port 2 may also be configured to act as an INCOM slave from another INCOM network. In this configuration, the QUCM acts as an INCOM router allowing the transfer of commands from the network on Port 2 to the network on Port 1. Thus the QUCM may be inserted into an existing INCOM system and still keep the IMPACC server. Port 2 must be connected directly to the RS-232 port of the IMPACC server. The IMPACC server must be configured for MINT operation on the RS-232 port. The

timeout value on the IMPACC serial port should be increased to a minimum of 5000mS.

The QUCM can also redirect EPONI communication from a PowerNet device server to allow both PowerNet and SMS access to the EPONI device data. The EPONI units only allow a single INCOM/TCP master which must be configured as the IP Address of the QUCM. Additionally, the QUCM may be used to redirect INCOM/TCP messages from a PowerNet Server to the EPONIs. Add the QUCM to the PowerNet system as an EMINT, then add the EPONI devices to the virtual EMINT by using the QUCM destination index as the device address of the slaves. The timeout value must be increased to at least 5000mS.

A Niobrara single slot rack with power supply (part number QXBP-001) is needed for mounting the QUCM for stand-alone applications.

The SMS server is connected to the QUCM via Modbus/TCP Ethernet. The QUCM-SE will support up to 6 simultaneous Modbus/TCP clients for access to the INCOM data and PowerLogic/Modbus data.

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 INCOM.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 INCOM.ZIP file is located at

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

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

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

The IMPACC communications protocol is available from Cutler-Hammer at:

www.ch.cutler-hammer.com:2084/docs/fred/apscpgh/html/COMMUNIC/IL17384.HTM

Serial Connections to the QUCM-LE

QUCM to MINT II

Port 1 of the QUCM-LE must be set to RS-232. The Niobrara cable MM4 is ideal for this connection since it includes an RJ45 RS-232 connection for the QUCM-LE and a 25-pin male RS-232 modem pinout for the MINT II. This cable pinout is described in Figure 2-1

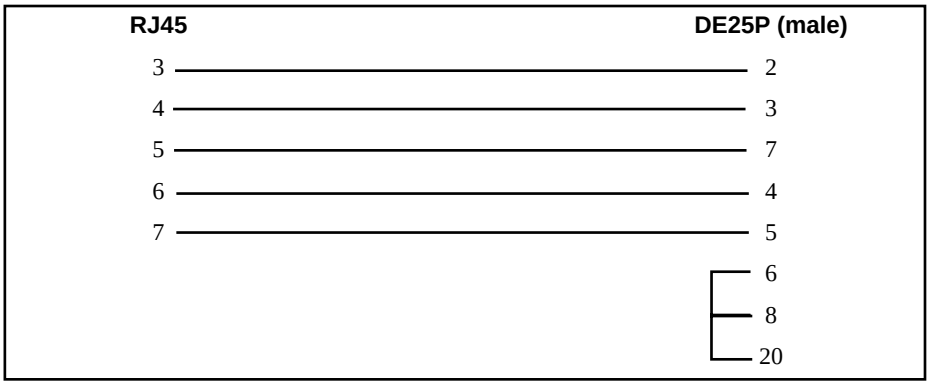

Figure 2-1 QUCM-LE to RS-232 DTE Port (25-pin) (MM4 Cable)

The MINT II 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. 19200 baud is recommended. The DIP switches on the front of the MINT II must be set for the following:

- RS-232 Baud: 19200 (OFF, OFF)
- INCOM Baud: set to match the INCOM network, typically 9600 baud (OFF)
- STOP BITS: 1 (OFF)
- MODEM CONTROL: NO RTS/CTS (ON)
- ACK/NAK BYTE: SENT (OFF)
- HANDSHAKE BYTE: NOT SENT (OFF)
- SWITCH 8 (not used) (OFF)

The switches for the above configuration will be:

OFF, OFF, OFF, OFF, ON, OFF, OFF, OFF.

NOTE: The setting for the ACK/NAK byte is different than the UCM applications.

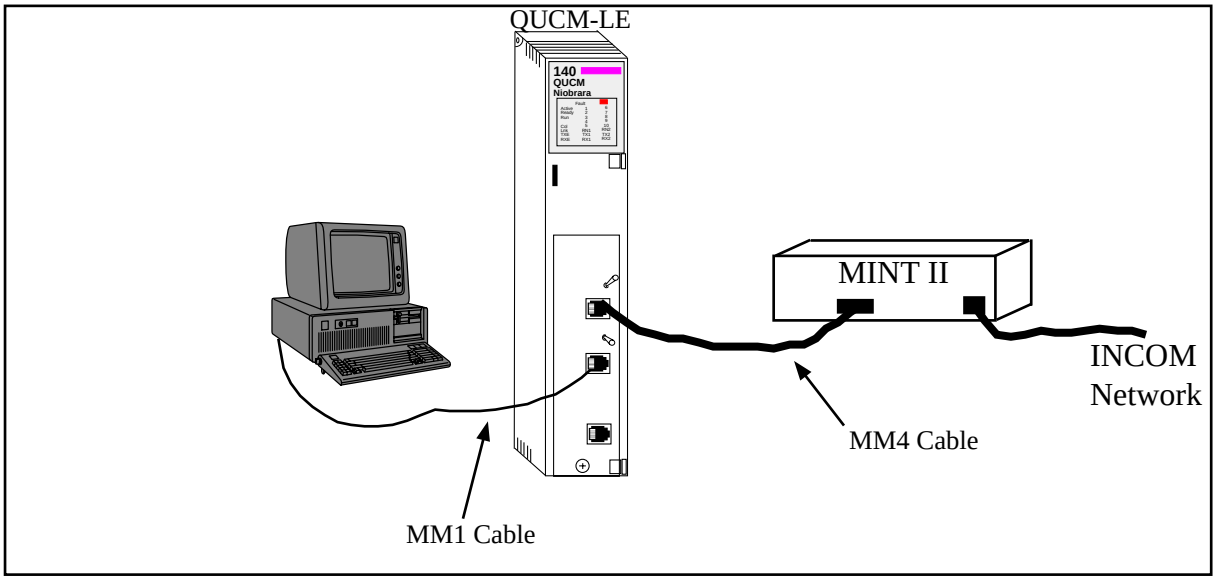

Figure 2-2 QUCM-LE Layout

Port 2 to the Personal Computer

A physical connection must be made from the personal computer to the QUCM in order to set the IP Address of the QUCM. 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 2-3.

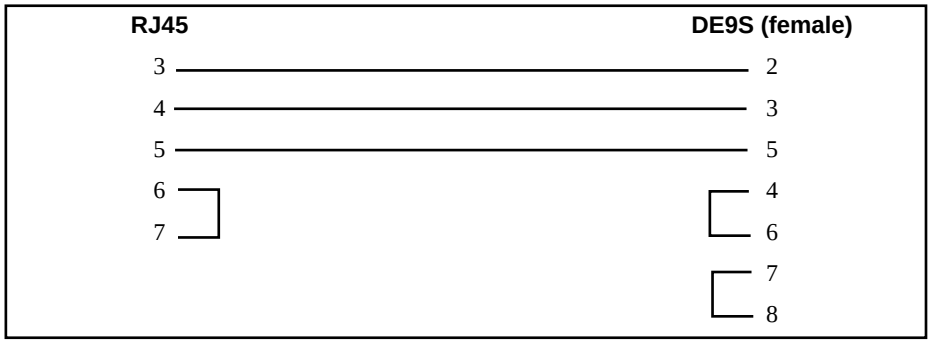

Figure 2-3 QUCM-LE to RS-232 PC DCE Port (9-pin) (MM1 Cable)

Loading the Applications into the QUCM

The QUCM-LE or QUCM-OE must use the qucmtcpl.fwl or qucmtcpl.qcc firmware included in the incom.zip file. This firmware is dated 15SEP2003 or later. There are two ways to upgrade the firmware of the QUCM-OE: QLOAD and FWLOAD.

Using ZAPREG32.EXE to set the IP Address

It is recommended to use the Ethernet capabilities of QLOAD to load the firmware, APP1.QCC and APP2.QCC into the QUCM. Set up the IP parameters of the module by the following method:

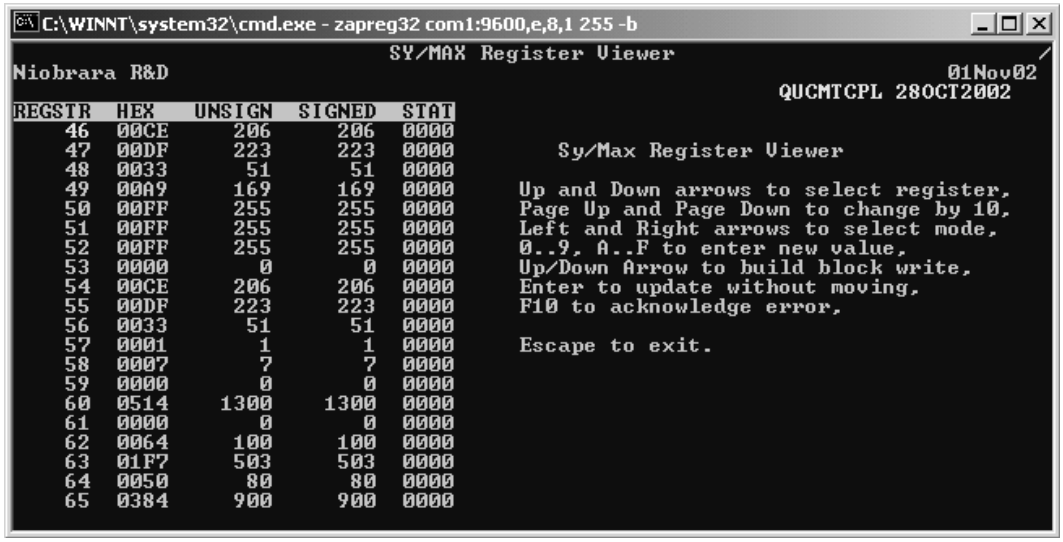

Figure 2-4 ZAPREG32 COM1:9600,E,8,1 255 -B

1 Move Switch 1 and Switch 2 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 = 206.223.51.161 subnet Mask = 255.255.255.0, De-

fault Gate = 206.223.51.1, Modbus/TCP port number = 503:

Register	Description	Example (decimal)
46	IP MSByte	206
47	IP	223
48	IP	51
49	IP LSByte	164
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	(leave this alone)	
59	(leave this alone)	
60	(leave this alone)	
61	(leave this alone)	
62	(leave this alone)	
63	Modbus Port	503 (this defaults to 502)

4 After entering the IP parameters, attempt to ping the module to verify the settings.
> ping 206.223.51.164

5 Verify a connection to the internal Modbus/TCP server with zapreg32.
> zapreg32 206.223.51.164:503 255
Should connect to the QUCM on port 503 with Destination index 255.

QLOAD QUCM Firmware Update

QLOAD is a convenient method for upgrading the firmware of a QUCM, especially if the QUCM already has an IP Address. A direct serial connection to the module is not required, the module does not need to be powered down, and the entire process may be done remotely across the Ethernet.

1 Application 1 Switch must be in RUN.

2 Start QLOAD.EXE

3 Click on the Browse button and select the file qucmtcpl.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/TCP tab is selected.

(1) The IP Address of the QUCM is entered correctly.

(2) The TCP Port number is set to 503.

(3) The Modbus Drop is set to 255.

6 Press the Start Download button. QLOAD will open a progress window to show the status of the download. Wait approximately 20 seconds for the upgrade to finish after the download is complete. The unit should be ready to received the new versions of app1.qcc and app2.qcc.

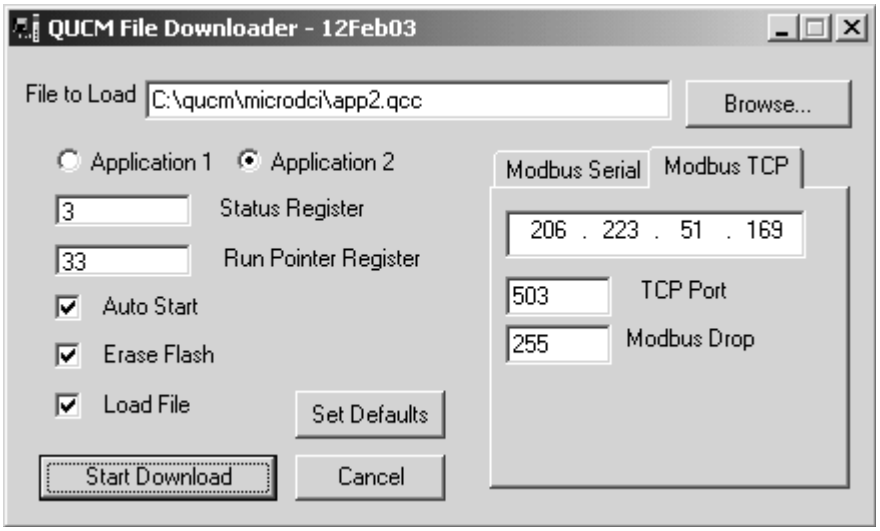

Figure 2-5 QLOAD the QUCM Firmware

FWLOAD QUCM 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 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.. Make sure that Port 1 is set to RS232 mode with the slide switch below the port.

6 Start the program FWLOAD.EXE

7 Select the Browse button and select the file QUCMTCPL.FWL.

8 Select the comm port of the PC.

9 Press "Start Download".

10 When the download is completed, remove the module from the rack and change the switch back to RUN.

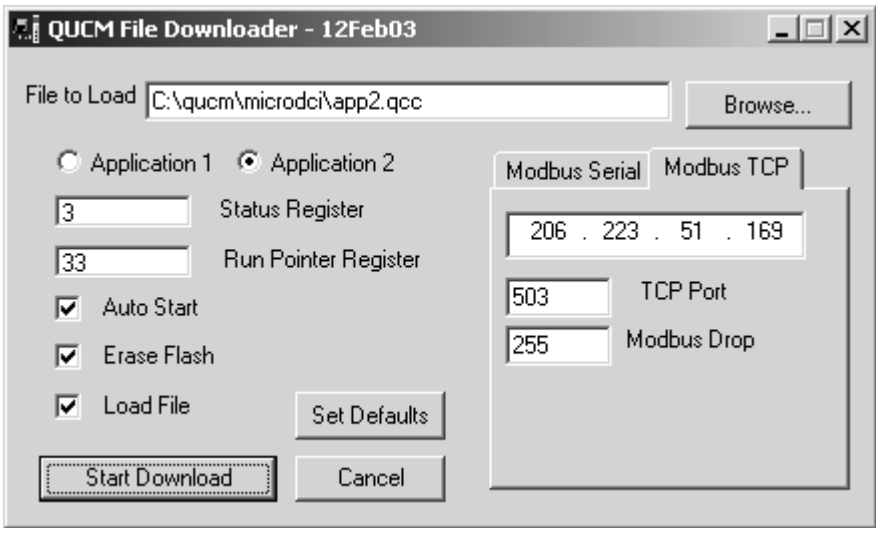

Figure 2-6 FWLOAD the QUCM Firmware

QLOAD APP1 and APP2

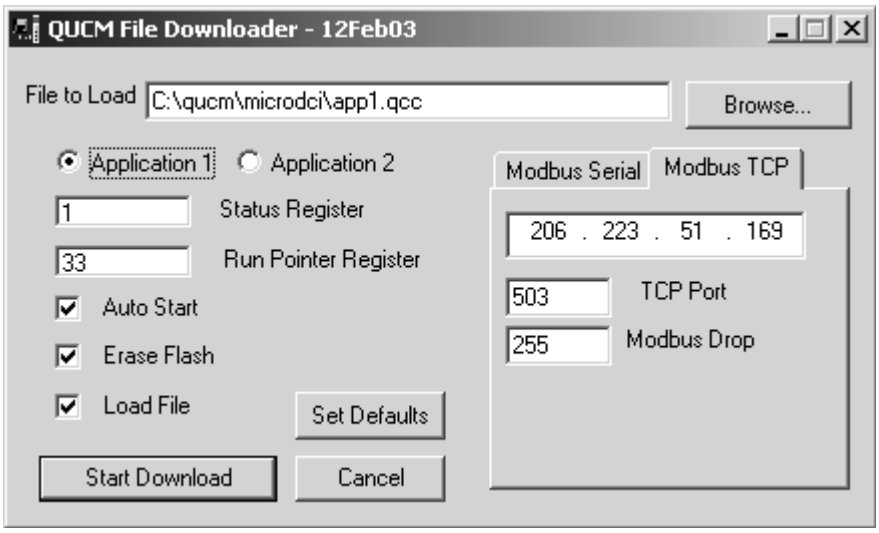

Figure 2-7 QLOAD of APP1

1 Application 1 and 2 Switches must be in RUN.

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/TCP tab is selected.

(1) The IP Address of the QUCM is entered correctly.

(2) The TCP Port number is set to 503.

(3) The Modbus Drop is set to 255.

6 Press the Start Download button. QLOAD will open a progress window to show the status of the download.

7 Click on the Browse button and select the file app2.qcc.

8 Select the Application 2 Radio Button.

9 Verify the following:

a. Status Register = 3.

b. Run Pointer Register = 33.

c. Auto Start is checked.

d. Erase Flash is checked.

e. Load File is checked.

f. The Modbus/TCP tab is selected.

(1) The IP Address of the QUCM is entered correctly.

(2) The TCP Port number is set to 503.

(3) The Modbus Drop is set to 255.

10 Press the Start Download button. QLOAD will open a progress window to show the status of the download.

After downloading both applications, the RN1 and RN2 lights should be on. Open a web browser and point it to the IP Address of the QUCM for configuration.

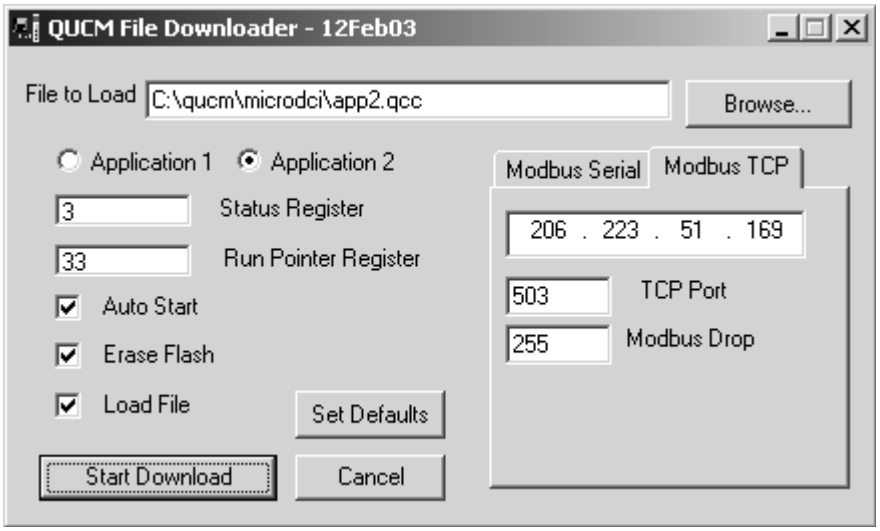

Figure 2-8 QLOAD of APP2

INCOM Installation

The following INCOM devices with their commands are supported by this QUCM application:

INCOM Device	PLOGIC Device	INCOM Commands
ABB MPS/NIM	CM 2050	300, 353, 354
Addressable Relay	Powerlogic Compatible	
Advantage	CM2050	300, 305
AEM II	not mapped, must be set for AEM II mode.	300, 351
Digitrip RMS T700, T800	810D, Must be on AEM subnet.	300, 305, 308, 3CA, 3CB, 3C8
Digitrip T810	810D	300, 305, 308, 309, 30A, 3CA, 3CB, 3C8
Digitrip T910	810D	300, 305, 306, 308, 309, 30A, 3CA, 3CB, 3C8
Digitrip 3000	810D	300, 305, 30F-N=2, 3CB
Digitrip MV	810D	300, 305
Digitrip Optim 550	810D	300, 305, 3C8, 3C9, 3CB
Digitrip Optim 750	810D	300, 305, 3C8, 3C9, 3CB
Digitrip Optim 1050	810D	300, 305, 308, 309, 3CA, 3C8, 3C9, 3CB
Energy Sentinel	CM2050	300, 308, 30A, 3C9
IQ Analyzer	CM 2050	300, 305, 306, 307, 30F-N=6, 30F-N=7, 30F-N=8, 30F-N=10, 30F-N=11, 30F-N=12, 3C8, 3CD
IQ Data/Generator	CM 2050	300, 305, 306, 307, 309, 3C9
IQ Data Plus	CM2050	301, 35x
IQ Data Plus II/HV	CM2050	300, 305, 306, 307, 308, 309, 30A, 3C9
IQ Data Plus 4000	CM2050	300, 305, 306, 307, 308, 309, 30F-N=8, 3C9
IQ 200	CM2050	300, 305, 306, 307, 308, 309, 30A, 3C9
IQ 500	810D	300, 305, 3C8
IQ 1000	810D	301, 38X
IQ 1000 II	810D	300, 305, 30F-N=1, 3C8
MPCV Relay	CM2050	300, 305, 308, 309
Power Manager	CM2050	300, 307, 308
Power Sentinel	CM2050	300, 305, 306, 307, 308, 309, 30A, 3C9
Universal RTD	POWERLOGIC Compatible	300, 30F-N=1

300 = Read Fast Status

301 = Read Fast Status for IQ Data Plus only

305 = Read Currents (A,B,C,G)

306 = Read L-L Voltages

307 = Read L-N Voltages

308 = Read Real, Demand Power

309 = Read Frequency, Reactive Power, Power Factor

30A = Read Energy

351 = Read IQDP Currents, L-L and L-N Voltages, Frequency, Real and Reactive Power, Power Factor, Energy

353 = Read ABB Status Data

354 = Read ABB Currents, L-L and L-N Voltages, Frequency, Real and Reactive Power,

Power Factor, Energy, Reactive Energy

3CA = Read Digitrip Total Real Energy, Forward Energy and Reverse Energy

3CB = Read Digitrip Trip Currents and Trip Energy

3C8 = Read Trip Status

3D1 = Process Subnet Command

Digitrip T700 and T800 units must be on an AEM II subnet. The AEM II must be set for AEM II mode. IQ Data Plus II units are supported on AEM II subnets.

The present release of this application does not support writes from the POWERLOGIC system.

Table 2-1 Universal RTD Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6 - 29	Reserved	
69	RTD Valid Bitmap	Bits 0 through 9 are on when RTD valid.
70	Winding Temperature 1	
71	Winding Temperature 2	
72	Winding Temperature 3	
73	Winding Temperature 4	
74	Winding Temperature 5	
75	Winding Temperature 6	
76	Motor Bearing 1 Temperature	
77	Motor Bearing 2 Temperature	
78	Load Bearing 1 Temperature	
79	Load Bearing 2 Temperature	
80	Aux. Temperature	

Table 2-2 IQ 1000 II Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6	Reserved	
7, 1003	Current A	
8, 1004	Current B	
9, 1005	Current C	
10, 1006	Current N	
11, 1007	Current G	
52	Trip Flags 1,2	b0 = Instantaneous Over Current Trip b1 = I-Squared T Trip b2 = Phase Unbalance Trip b3 = Ground Fault Trip b4 = Jam Trip b5 = Under Load Trip b6 = Trip Bypass b7 = Remote Hardware Input Trip b8 = Motor Bearing Temperature Trip b9 = Load Bearing Temperature Trip b10 = Winding Temperature Trip b11 = Reverse Sequence Trip b12 = Incomplete Sequence Trip b13 = A/D Converter Error b14 = RAM Error b15 = ROM Error
53	Trip Flags 3,4	b0 = Opto-coupler Failure b1 = Transition Not Completed b2 = Full Load Amps/CT Value Error b3 = Battery Low b4 = External Trip (Via INCOM) b5-b7 = Reserved b8 = Phase Unbalance Alarm b9 = Winding Temperature Alarm b10 = Motor Bearing Temperature Alarm b11 = Load Bearing Temperature Alarm b12-b15 = Reserved
54	Trip Flags 5,6	b0 = I-Squared T Alarm/Trip b1 = Starts per Hour Alarm/Trip b2-b15 = Reserved
55	Operations Count	
56	Run Time	
57	Remaining Starts	
58	Oldest Start Time	
59	Percent I2T	
60	Highest Phase Current	
61	Highest RTD Temperature	
62	Number of I2T Trips	

Table 2-3 IQ 1000 II Register List (Continued)

Modbus/TCP Register	Description	Notes
63	Number of Instantaneous Over Current Trips	
64	Number of Under Load Trips	
65	Number of Jam Trips	
66	Number of Ground Fault Trips	
67	Number of RTD Trips	
68	Reserved	
69	RTD Valid Bitmap	Bits 0 through 9 are on when RTD valid.
70	Winding Temperature 1	
71	Winding Temperature 2	
72	Winding Temperature 3	
73	Winding Temperature 4	
74	Winding Temperature 5	
75	Winding Temperature 6	
76	Motor Bearing 1 Temperature	
77	Motor Bearing 2 Temperature	
78	Load Bearing 1 Temperature	
79	Load Bearing 2 Temperature	
80	Aux. Temperature	

Table 2-4 IQ 1000 Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6	Reserved	
7, 1003	Current A	
8, 1004	Current B	
9, 1005	Current C	
10, 11	Reserved	
52	Trip Flags 1,2	b0 = Instantaneous Over Current Trip b1 = I-Squared T Trip b2 = Phase Unbalance Trip b3 = Ground Fault Trip b4 = Jam Trip b5 = Under Load Trip b6 = Trip Bypass b7 = Remote Hardware Input Trip b8 = Motor Bearing Temperature Trip b9 = Load Bearing Temperature Trip b10 = Winding Temperature Trip b11 = Reverse Sequence Trip b12 = Incomplete Sequence Trip b13 = A/D Converter Error b14 = RAM Error b15 = ROM Error
53	Trip Flags 3,4	b0 = Opto-coupler Failure b1 = Transition Not Completed b2 = Full Load Amps/CT Value Error b3 = Battery Low b4 = External Trip (Via INCOM) b5 = Differential Trip on AC Input b6 = Ambient Temerature Trip b7 = Reserved b8 = Phase Unbalance Alarm b9 = Winding Temperature Alarm b10 = Motor Bearing Temperature Alarm b11 = Load Bearing Temperature Alarm b12 = Jam Alarm b13 = Under Load Alarm b14 = Ambient Temerature Alarm b15 = Reserved
54	Trip Flags 5,6	b0 = I-Squared T Alarm/Trip b1 = Starts per Hour Alarm/Trip b2-b15 = Reserved

Table 2-5 IQ 1000 Register List (Continued)

Modbus/TCP Register	Description	Notes
55	Operations Count	
56	Run Time	
57	Remaining Starts	
58	Oldest Start Time	
59	% of Full Scale Phase A Current	
60	% of Full Scale Phase B Current	
61	% of Full Scale Phase C Current	
62-68	Reserved	
69	RTD Valid Bitmap	Bits 0 through 9 are on when RTD valid.
70	Winding Temperature 1	
71	Winding Temperature 2	
72	Winding Temperature 3	
73	Winding Temperature 4	
74	Winding Temperature 5	
75	Winding Temperature 6	
76	Motor Bearing 1 Temperature	
77	Motor Bearing 2 Temperature	
78	Load Bearing 1 Temperature	
79	Load Bearing 2 Temperature	

Table 2-6 Addressable Relay Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6	Input Status	b0 = Input 1 0=off, 1=on b1 = Input 2 0=off, 1=on
7	Output Command	Set b0 to turn on relay, clear b0 to trun off relay
8	Command Status	b0 is on while the write is pending, clears after the write was sent to the AR.

The Addressable Relay supports Modbus writes to register 7 only. Writing register 7 will cause the QUCM to queue the double writes to the AR. After the QUCM accepts the Modbus write command, bit 0 of register 8 will come on to indicate that the write is queued. After the QUCM sends the redundant writes to the AR, bit 0 of register 8 will be cleared. The AR does not provide for a way of reading the relay to determine the present state of the output relay so the value in register 7 is not guaranteed to reflect the actual state of the relay. Common practice is to wire one of the AR's inputs to the output to be able to read the state of the relay.

Table 2-7 Advantage Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6	Reserved	
7	Current A	
8	Current B	
9	Current C	
10	Flags 1	b3 = Run/Closed b4 = Ready/Open b5 = Trip Indication b7 = Overload
11	Flags 2	b1 = Run Permit Signal Present b2 = Start Signal Present b3 = Remote Reset Present b7 = Local Reset Present
12	Flags 3	x01 = Overload x02 = Ground Current Trip x03 = Phase Loss Trip x04 = Phase Unbalance Trip x10 = Ground Current Exceeds Interrupt Capactiy x20 = Control Voltage too low > Unit will open x30 = Control Voltage too low to pick up x40 = Control Voltage too high to pick up x50 = Current too low to close x70 = External Trip (via INCOM)
13	Coil Voltage	
14	Maximum Coil Current on Closing	
15	CHOLD	Time equivalent fo the delay from the middle of each half cycle to the beginning of holding pulse.
16	Coil_I	
17	Dipheatre Setpoint	b4-b0 = Heater number (0-31) b6. b5 00 = Class 10 Overload 01 = Class 20 Overlaod 10 = Class 30 Overload 11 = No protection b7 = Automatic Reset
18	Econfig	b0 = Ground Fault Enabled b1 = Phase Protection Enabled b2 = Thermal Overload Enabled b3 = 1=50Hz, 0=60Hz b4 = 1=overload, 0-contactor/starter b5 = Ultrasonic holding is enabled b6 = Local reset is disabled b7 = Unit will not reset thermal trip on power up even if reset conditions met

Table 2-8 Advantage Register List (continued)

Modbus/TCP Register	Description	Notes
19	Trip Time Offset	
20	Current A at trip	
21	Current B at trip	
22	Current C at trip	
54	Flags 1 at trip	
55	Flags 2 at trip	
56	Flags 3 at trip	

Table 2-9 Analog Input Module Register List

Modbus/TCP Register	Description	Notes
1	Device Status	
2	Main Network Address	
3	Subnet Address	
4	Division Code	
5	Comm Revision	
6	General Status	b0 = Reserved b1 = Sensor Profile Error b2 = N/A b3 = Clock Error b4 = Internal Communication Link Error b5 = Memory Error b6 = Checksum Error b7-b15 = Reserved
7	Number of Sensors Configured	0-32
8	Sensor Hardware Error	b0 = sensor 1, b15=sensor 16
9	Sensor Hardware Error	b0 = sensor 17, b15=sensor 32
10	Sensor 1 Configuration	b0-b3 = type 0 = no sensor 1 = General Purpose 2 = Pulse Contact 3 = Runtime 4, 5, 6, 7, 8 = N/A 9 = BTU
11	Sensor 2 Configuration	
12	Sensor 3 Configuration	
13	Sensor 4 Configuration	
14	Sensor 5 Configuration	
15	Sensor 6 Configuration	
16	Sensor 7 Configuration	
17	Sensor 8 Configuration	
18	Sensor 9 Configuration	
19	Sensor 10 Configuration	

Table 2-10 Analog Input Module Register List (Continued)

Modbus/TCP Register	Description	Notes
20	Sensor 11 Configuration	
21	Sensor 12 Configuration	
22	Sensor 13 Configuration	
23	Sensor 14 Configuration	
24	Sensor 15 Configuration	
25	Sensor 16 Configuration	
26	Sensor 17 Configuration	
27	Sensor 18 Configuration	
28	Sensor 19 Configuration	
29	Sensor 20 Configuration	
30	Sensor 21 Configuration	
31	Sensor 22 Configuration	
32	Sensor 23 Configuration	
33	Sensor 24 Configuration	
34	Sensor 25 Configuration	
35	Sensor 26 Configuration	
36	Sensor 27 Configuration	
37	Sensor 28 Configuration	
38	Sensor 29 Configuration	
39	Sensor 30 Configuration	
40	Sensor 31 Configuration	
41	Sensor 32 Configuration	
42	Reserved	
43, 44	Sensor 01 Average Value (1 sec)	or Running Total
45, 46	Sensor 02 Average Value (1 sec)	or Running Total
47, 48	Sensor 03 Average Value (1 sec)	or Running Total
49, 50	Sensor 04 Average Value (1 sec)	or Running Total
51, 52	Sensor 05 Average Value (1 sec)	or Running Total
53, 54	Sensor 06 Average Value (1 sec)	or Running Total
55, 56	Sensor 07 Average Value (1 sec)	or Running Total
57, 58	Sensor 08 Average Value (1 sec)	or Running Total
59, 60	Sensor 09 Average Value (1 sec)	or Running Total
61, 62	Sensor 10 Average Value (1 sec)	or Running Total
63, 64	Sensor 11 Average Value (1 sec)	or Running Total
65, 66	Sensor 12 Average Value (1 sec)	or Running Total
67, 68	Sensor 13 Average Value (1 sec)	or Running Total
69, 70	Sensor 14 Average Value (1 sec)	or Running Total
71, 72	Sensor 15 Average Value (1 sec)	or Running Total
73, 74	Sensor 16 Average Value (1 sec)	or Running Total
75, 76	Sensor 17 Average Value (1 sec)	or Running Total
77, 78	Sensor 18 Average Value (1 sec)	or Running Total

Table 2-11 Analog Input Module Register List (Continued)

Modbus/TCP Register	Description	Notes
79, 80	Sensor 19 Average Value (1 sec)	or Running Total
81, 82	Sensor 20 Average Value (1 sec)	or Running Total
83, 84	Sensor 21 Average Value (1 sec)	or Running Total
85, 86	Sensor 22 Average Value (1 sec)	or Running Total
87, 88	Sensor 23 Average Value (1 sec)	or Running Total
89, 90	Sensor 24 Average Value (1 sec)	or Running Total
91, 92	Sensor 25 Average Value (1 sec)	or Running Total
93, 94	Sensor 26 Average Value (1 sec)	or Running Total
95, 96	Sensor 27 Average Value (1 sec)	or Running Total
97, 98	Sensor 28 Average Value (1 sec)	or Running Total
99, 100	Sensor 29 Average Value (1 sec)	or Running Total
101, 102	Sensor 30 Average Value (1 sec)	or Running Total
103 104	Sensor 31 Average Value (1 sec)	or Running Total
105 106	Sensor 32 Average Value (1 sec)	or Running Total

Table 2-12 Digitrip Register List

Modbus/TCP Register	Description	700, 800 on AEM	810 on AEM	910 on AEM	810 Direct	910 Direct	MV or 3000	Optim 550, 750	Optim 1050
1	Device Status	X	X	X	X	X	X	X	X
2	Main Network Address	X	X	X	X	X	X	X	X
3	Subnet Address	X	X	X					
4	Division Code	X	X	X	X	X	X	X	X
5	Comm Revision	X	X	X	X	X	X	X	X
6	Reserved								
7, 1003	Current A	X	X	X	X	X	X	X	X
8, 1004	Current B	X	X	X	X	X	X	X	X
9, 1005	Current C	X	X	X	X	X	X	X	X
10, 1006	Current N								
11, 1007	Current G	X	X	X	X	X	X	X	X
12, 1008	Current Avg	C	C	C	C	C	C	C	C
14, 1014	Voltage A-B			X		X			
15, 1015	Voltage B-C			X		X			
16, 1016	Voltage C-A			X		X			
16, 1017	Voltage L-L Avg			C		C			
21, 1034	True Power Factor Total			X	X	X	X	X	X
40, 2020	Scale A	X	X	X	X	X	X	X	X
41, 2021	Scale B	X	X	X	X	X	X	X	X
42, 2022	Scale C	X	X	X	X	X	X	X	X
43, 2023	Scale D	X	X	X	X	X	X	X	X
44, 2024	Scale E	X	X	X	X	X	X	X	X
45, 2025	Scale F	X	X	X	X	X	X	X	X

Table 2-13 Digitrip Register List (Continued)t

Modbus/TCP Register	Description	700, 800 on AEM	810 on AEM	910 on AEM	810 Direct	910 Direct	MV or 3000	Optim 550, 750	Optim 1050
50, 1601	Real Energy In (1)				X	X			X
51, 1602	Real Energy In (2)				X	X			X
52, 1603	Real Energy In (3)				X	X			X
53, 1604	Real Energy In (4)				X	X			X
54, 1609	Real Energy Out (1)				X	X			X
55, 1610	Real Energy Out (2)				X	X			X
56, 1611	Real Energy Out (3)				X	X			X
57, 1612	Real Energy Out (4)				X	X			X
26, 1621	Real Energy Total (1)	X	X	X	X	X			X
27, 1622	Real Energy Total (2)	X	X	X	X	X			X
28, 1623	Real Energy Total (3)	X	X	X	X	X			X
29, 1624	Real Energy Total (4)	X	X	X	X	X			X
25, 1734	Peak Demand Power			X	X	X	X		X
80, 1827	Date/Time Energy Reset (1)								
81, 1828	Date/Time Energy Reset (2)								
82, 1829	Date/Time Energy Reset (3)								
36, 2085	Sqare D ID	X	X	X	X	X	X	X	X
37, 8188	Square D ID	X	X	X	X	X	X	X	X
38, 3002	General Status	X	X	X	X	X	X	X	X
39, 3101	Cause of Trip	X	X	X	X	X	X	X	X
60, 3103	Date/Time of Trip (1)	X	X	X					
61, 3104	Date/Time of Trip (2)	X	X	X					
62, 3105	Date/Time of Trip (3)	X	X	X					
63, 3106	Current A at trip	X	X	X	X	X	X	X	X
64, 3107	Current B at trip	X	X	X	X	X	X	X	X
65, 3108	Current C at trip	X	X	X	X	X	X	X	X
66, 3109	Current N at trip								
67, 3110	Current G at trip	X	X	X	X	X	X	X	X
68, 3111	Current Avg at trip	C	C	C	C	C	C	C	C
69, 3112	Real Power at trip			X	X	X			
70, 3129	Peak Demand Power at trip			X	X	X			X
71, 3113	Real Energy In at trip (1)								
72, 3114	Real Energy In at trip (2)								
73, 3115	Real Energy In at trip (3)								
74, 3116	Real Energy In at trip (4)								
75, 3117	Real Energy Out at trip (1)								
76, 3118	Real Energy Out at trip (2)								
77, 3119	Real Energy Out at trip (3)								
78, 3120	Real Energy Out at trip (4)								

Table 2-14 Digitrip Register List (Continued)

Modbus/TCP Register	Description	700, 800 on AEM	810 on AEM	910 on AEM	810 Direct	910 Direct	MV or 3000	Optim 550, 750	Optim 1050
79, 3121	Real Energy Signed at trip (1)				X	X			X
80, 3122	Real Energy Signed at trip (2)				X	X			X
81, 3123	Real Energy Signed at trip (3)				X	X			X
82, 3124	Real Energy Signed at trip (4)				X	X			X
85, 3201	Frame Type	X	X	X	X	X	X	X	X
86, 3203	Plug	X	X	X	X	X	X	X	X
87, 3204	Plug Rating	X	X	X	X	X	X	X	X
88	Event Count						X		
89	5 minute average of power						X		
90	Peak Demand Current A						X		
91	Peak Demand Current B						X		
92	Peak Demand Current C						X		
93	Peak Demand Current D						X		
200, 201	Real Energy (32-bit Integer)	X	X	X	X	X			X
202, 203	Real Energy IN(32-bit Integer)				X	X			X
204, 205	Real Energy OUT (32-bit Integer)				X	X			X

Table 2-15 IQ Meter Register List

Modbus/TCP Register	Description	IQ 200	IQ Data Plus	IQ Data Plus II	IQ DP4000	IQ Analy-zer	IQ Data Gen.	IQ Energy Sent.	IQ Power Sent.	Power Manager
1	Device Status	X	X	X	X	X	X	X	X	X
2	Main Network Address	X	X	X	X	X	X	X	X	X
3	Subnet Address	X	X	X	X	X	X	X	X	X
4	Division Code	X	X	X	X	X	X	X	X	X
5	Comm Revision	X	X	X	X	X	X	X	X	X
6, 1001	Frequency	X	X	X	X	X	X		X	
7, 1003	Current A	X	X	X	X	X	X		X	
8, 1004	Current B	X	X	X	X	X	X		X	
9, 1005	Current C	X	X	X	X	X	X		X	
10, 1006	Current N									
11, 1007	Current G					X				
12, 1008	Current Avg	C	C	C	C	C	C		C	
14, 1014	Voltage A-B	X	X	X	X	X	X		X	
15, 1015	Voltage B-C	X	X	X	X	X	X		X	
16, 1016	Voltage C-A	X	X	X	X	X	X		X	
17, 1017	Voltage L-L Avg	C	C	C	C	C	C		C	
18, 1018	Voltage A-N	X	X	X	X	X	X		X	X
19, 1019	Voltage B-N	X	X	X	X	X	X		X	X
20, 1020	Voltage C-N	X	X	X	X	X	X		X	X
83, 1011	Voltage L-N Avg	C	C	C	C	C	C		C	C
21, 1034	True Power Factor Total	X		X	X	X			X	
22, 1042	Real Power	X	X	X	X	X		X	X	X
23, 1046	Reactive Power	X	X	X	X	X			X	
24, 1050	Apparent Power									
25, 1731	Demand Power	X	X	X	X	X				
40, 2020	Scale A	X	X	X	X	X	X	X	X	X
41, 2021	Scale B	X	X	X	X	X	X	X	X	X
42, 2022	Scale C	X	X	X	X	X	X	X	X	X
43, 2023	Scale D	X	X	X	X	X	X	X	X	X
44, 2024	Scale E	X	X	X	X	X	X	X	X	X
45, 2025	Scale F	X	X	X	X	X	X	X	X	X

Table 2-16 IQ Meter Register List (Continued)t

Modbus/TCP Register	Description	IQ 200	IQ Data Plus	IQ Data Plus II	IQ DP4000	IQ Analy-zer	IQ Data Gen.	IQ Energy Sent.	IQ Power Sent.	Power Manager
50, 1601	Real Energy In (1)	X			X	X				
51, 1602	Real Energy In (2)	X			X	X				
52, 1603	Real Energy In (3)	X			X	X				
53, 1604	Real Energy In (4)	X			X	X				
54, 1609	Real Energy Out (1)	X			X	X				
55, 1610	Real Energy Out (2)	X			X	X				
56, 1611	Real Energy Out (3)	X			X	X				
57, 1612	Real Energy Out (4)	X			X	X				
26, 1621	Real Energy Total (1)	X	X	X	X	X		X	X	X
27, 1622	Real Energy Total (2)	X	X	X	X	X		X	X	X
28, 1623	Real Energy Total (3)	X	X	X	X	X		X	X	X
29, 1624	Real Energy Total (4)	X	X	X	X	X		X	X	X
62, 1605	Reactive Energy In (1)	X			X	X				
63 1606	Reactive Energy In (2)	X			X	X				
64, 1607	Reactive Energy In (3)	X			X	X				
65, 1608	Reactive Energy In (4)	X			X	X				
66, 1613	Reactive Energy Out (1)	X			X	X				
67, 1614	Reactive Energy Out (2)	X			X	X				
68, 1615	Reactive Energy Out (3)	X			X	X				
69, 1616	Reactive Energy Out (4)	X			X	X				
46, 1625	Reactive Energy Total (1)	X			X	X				
47, 1626	Reactive Energy Total (2)	X			X	X				
48, 1627	Reactive Energy Total (3)	X			X	X				
49, 1628	Reactive Energy Total (4)	X			X	X				
26, 1617	Apparent Energy (1)	X			X	X				
27, 1618	Apparent Energy (2)	X			X	X				
28, 1619	Apparent Energy (3)	X			X	X				
29, 1620	Apparent Energy (4)	X			X	X				
80, 1827	Date/Time Energy Reset (1)				X	X				
81, 1828	Date/Time Energy Reset (2)				X	X				
82, 1829	Date/Time Energy Reset (3)				X	X				
74, 2001	Mode	X	X	X	X	X	X	X	X	X
70, 2002	CT Primary Ratio	X	X	X	X	X	X	X	X	X
71, 2003	CT Secondary Ratio	X	X	X	X	X	X	X	X	X
70, 2004	NCT Primary Ratio	X	X	X	X	X	X	X	X	X
71, 2005	NCT Secondary Ratio	X	X	X	X	X	X	X	X	X
72, 2006	PT Primary Ratio	X	X	X	X	X	X	X	X	X
87, 2007	PT Scale Factor	X	X	X	X	X	X	X	X	X
73, 2008	PT Secondary Ratio	X	X	X	X	X	X	X	X	X

Table 0-1 IQ Meter Register List (Continued)

Modbus/TCP Register	Description	IQ 200	IQ Data Plus	IQ Data Plus II	IQ DP4000	IQ Analy-zer	IQ Data Gen.	IQ Energy Sent.	IQ Power Sent.	Power Manager
73, 2008	CT Ratio Correction Factor A	X	X	X	X	X	X	X	X	X
84, 2009	CT Ratio Correction Factor B	X	X	X	X	X	X	X	X	X
84, 2010	CT Ratio Correction Factor C	X	X	X	X	X	X	X	X	X
84, 2011	CT Ratio Correction Factor N/G	X	X	X	X	X	X	X	X	X
84, 2012	PT Ratio Correction Factor A	X	X	X	X	X	X	X	X	X
84, 2013	PT Ratio Correction Factor B	X	X	X	X	X	X	X	X	X
84, 2014	PT Ratio Correction Factor C	X	X	X	X	X	X	X	X	X
85, 2015	Nominal System Frequency	X	X	X	X	X	X	X	X	X
4, 2093	PLOS Rev. Sublevel	X	X	X	X	X	X	X	X	X
49, 2400	Status In									
36, 8085	Sqd ID 2085	X	X	X	X	X	X	X	X	X
37, 8188	Sqd ID 8188	X	X	X	X	X	X	X	X	X
38, 3002	General Status									
39, 3101	Cause of Trip									
130, 2094	Firmware	X	X	X	X	X				
130, 3401	Firmware Version	X	X	X	X	X				
117, 2404	Input Counter 1					X				
118, 2405	Input Counter 1					X				
119, 2409	Input Counter 2					X				
120, 2410	Input Counter 2					X				
121, 2414	Input Counter 3					X				
122, 2415	Input Counter 3					X				
141,2070	Demand Power Window					X				
142,1038	Displacement Power Factor					X				
143,1732	Demand Reactive Power					X				
144,1733	Demand Apparent Power					X				
145,1734	Demand Peak Real Power					X				
146,1738	Demand Peak Real Reactive					X				
147,1742	Demand Peak Apparent Power					X				
148,2079	Demand Current Window					X				
149,1700	Demand Current Total					X				
150,1708	Demand Peak Current Total					X				
151,1701	Demand Current A					X				
152,1702	Demand Current B					X				
153,1703	Demand Current C					X				
154,1709	Demand Peak Current A					X				
155,1710	Demand Peak Current B					X				
156,1711	Demand Peak Current C					X				

Table 0-2 IQ Meter Register List (Continued)

Modbus/TCP Register	Description	IQ 200	IQ Data Plus	IQ Data Plus II	IQ DP4000	IQ Analyzer	IQ Data Gen.	IQ Energy Sent.	IQ Power Sent.	Power Manager
157,1039	Real Power A					X				
158,1040	Real Power B					X				
159,1041	Real Power C					X				
160,1043	Reactive Power A					X				
161,1044	Reactive Power B					X				
162,1045	Reactive Power C					X				
163,1047	Apparent Power A					X				
164,1048	Appaernt Power B					X				
165,1049	Apparent Power C					X				
166,1035	Displacement PF A					X				
167,1036	Displacement PF B					X				
168,1037	Displacement PF C					X				
169,1031	True PF A					X				
170,1032	True PF B					X				
171,1033	True PF C					X				
172-174, 1872-1874	Peak Demand Current D/T					X				
175-177, 1803-1805	Peak Demand Current D/T A					X				
178-180, 1806-1808	Peak Demand Current D/T B					X				
181-183, 1809-1811	Peak Demand Current D/T C					X				
184-186, 1815-1817	Peak Demand Current Cleared D/T					X				
187-189, 1812-1814	Peak Demand Real Power D/T					X				
190-192, 1857-1859	Peak Demand Reactive Power					X				
193-195, 1860-1862	Peak Demand App. Power D/T					X				
196-198,1 824-1826	Peak Demand Power Cleared D/T					X				
200-201	KWH (32-bit Integer)	X	X	X	X	X		X	X	X
202-203	KWH IN (32-bit Integer)	X			X	X				
204-205	KWH OUT (32-bit Integer)	X			X	X				
206-207	KVARH (32-bit Integer)	X			X	X				
208-209	KVARH IN (32-bit Integer)	X			X	X				
210-211	KVARH OUT (32-bit Integer)	X			X	X				
212-213	KVAH (32-bit Integer)	X			X	X				

Table 0-3 IQ Meter Register List (Continued)

Modbus/TCP Register	Description	IQ 200	IQ Data Plus	IQ Data Plus II	IQ DP4000	IQ Analy-zer	IQ Data Gen.	IQ Energy Sent.	IQ Power Sent.	Power Manager
220,1051	THD Current A (% in 10ths)					X				
221,1052	THD Current B (% in 10ths)					X				
222,1053	THD Current C (% in 10ths)					X				
223,1054	THD Current N (% in 10ths)					X				
224,1055	THD Voltage A-N (% in 10ths)					X				
225,1056	THD Voltage B-N (% in 10ths)					X				
226,1057	THD Voltage C-N (% in 10ths)					X				
227,1058	THD Voltage A-B (% in 10ths)					X				
228,1059	THD Voltage B-C (% in 10ths)					X				
229,1060	THD Voltage C-A (% in 10ths)					X				

3

WEB Server

Main Page

The Main page displays a summary of the configured INCOM devices. The table will display the Modbus/TCP Destination Index, Device Type (if known), Communication Revision of the slave, Main INCOM network address, Subnet INCOM network address, 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". If the device is responding to queries then the cell will display "Online" along with a short description of the status of the device. The Online message is a hypertext link that will display the "Actual" data for that device.

Figure 3-1 shows an example page with Port 2 set for INCOM Slave mode with an IQ Data Plus II 003 online. Devices 2 and 3 have been configured but they have yet to respond to a query from the QUCM so their device type is unknown. Device 4 is an IQ DP-4000 meter which is presently configured as "Out of Service". At some point in the past, the QUCM has communicated with device 4 because it knows that it was an IQ DP-4000.

At the bottom of the Main page are links to Niobrara's WWW site, Statistics on this QUCM, and a page for configuring this QUCM.

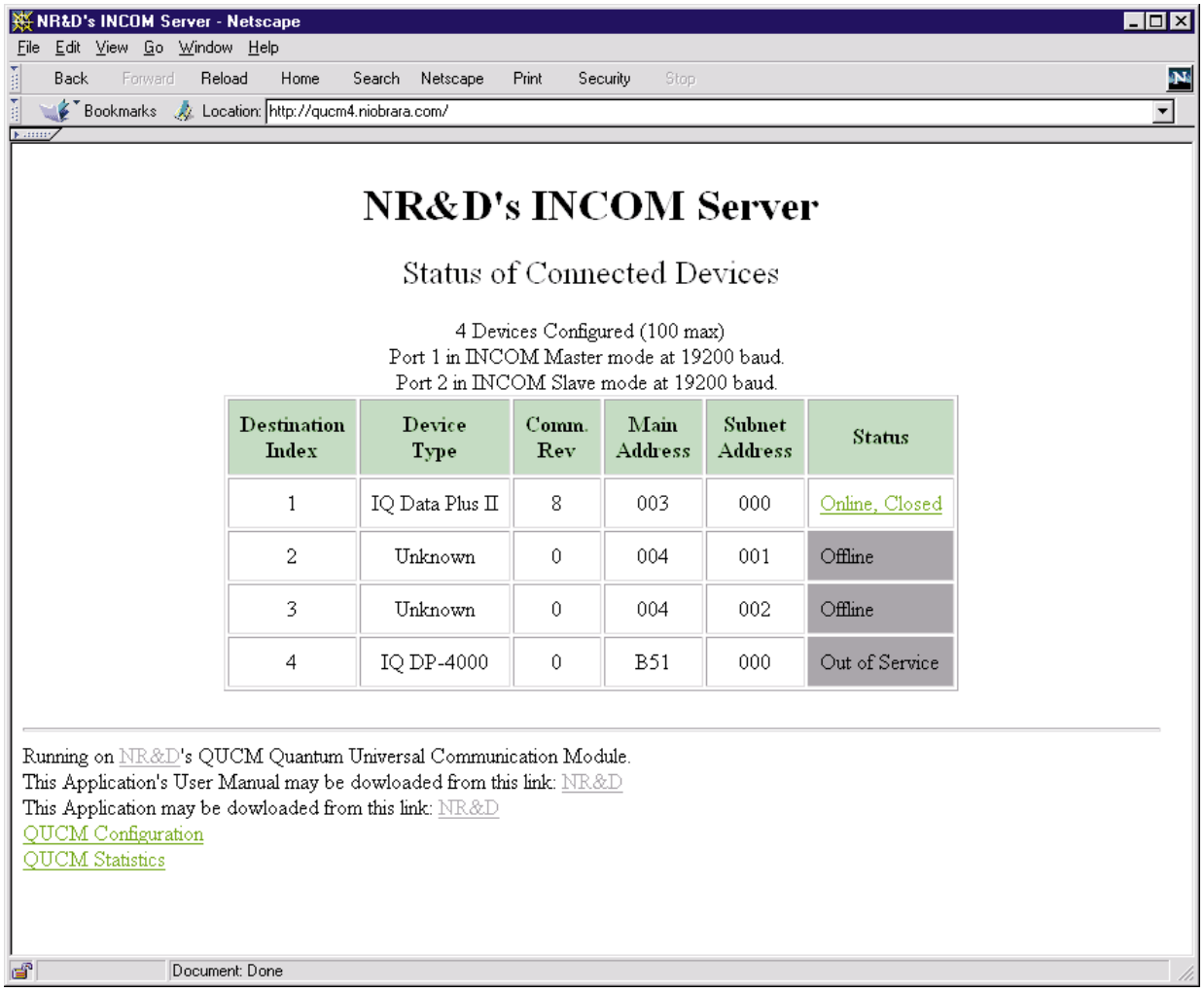

Figure 3-1 Main Web Page

Actual Data Page

Following one of the "Online" links will display a table of the metered data for the particular INCOM device. Figure 3-2 shows a table for an IQ Data Plus II meter with no current flowing.

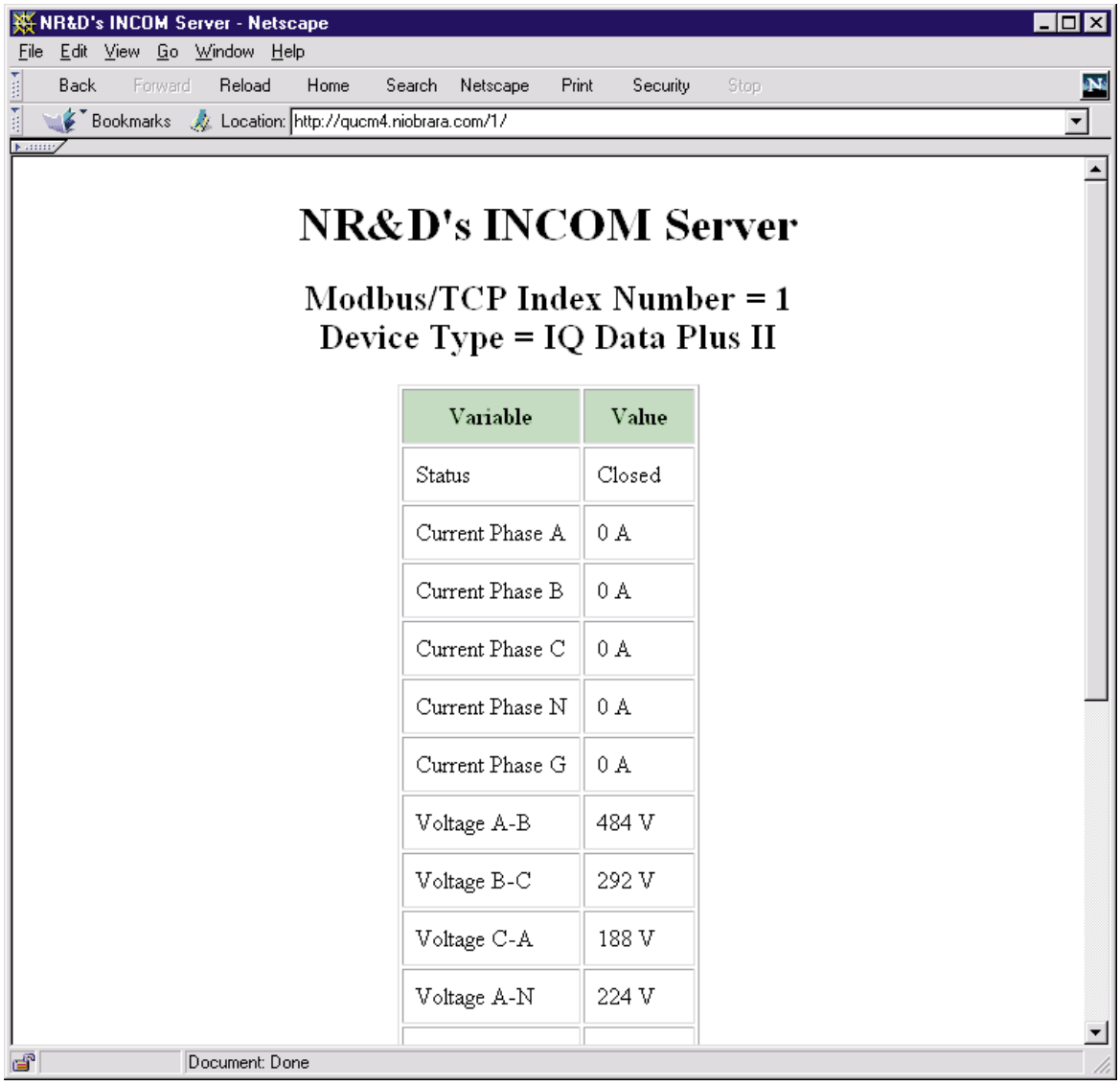

Figure 3-2 Web Server Actual Data Page

Configure QUCM

At the bottom of the Main page is a link to configure the QUCM. (See Figure 3-3). 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 "Configure Serial Port" page. Light 9 will come on while the password timer is active.

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. If it has been longer than three minutes since a password protected setting has been altered then the user will be prompted to enter the password.

NOTE: This password protection is not very 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.

NOTE: Once a password has been accepted by the QUCM, any connection is allowed to modify settings until the timer expires; not just the user who entered the password.

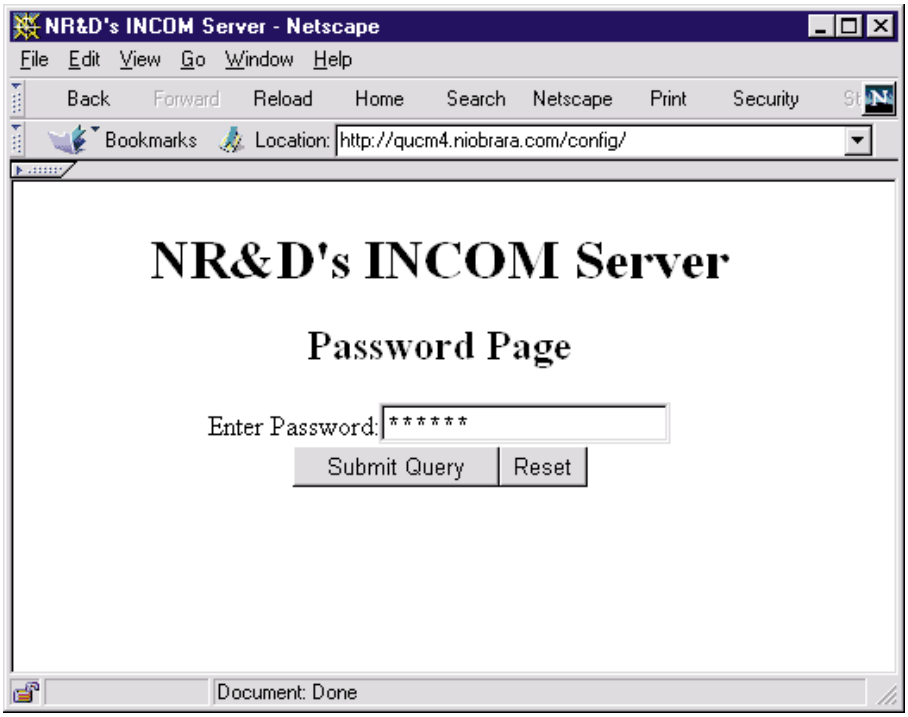

Figure 3-3 Enter Password Page

After entering a successful passoword a screen like Figure 3-4 is displayed. Each INCOM device configured is shown with a link to edit the device paramters or remove the device. Links below are given to add a new device, alter the serial port configuration, change the password, and save the configuration to FLASH.

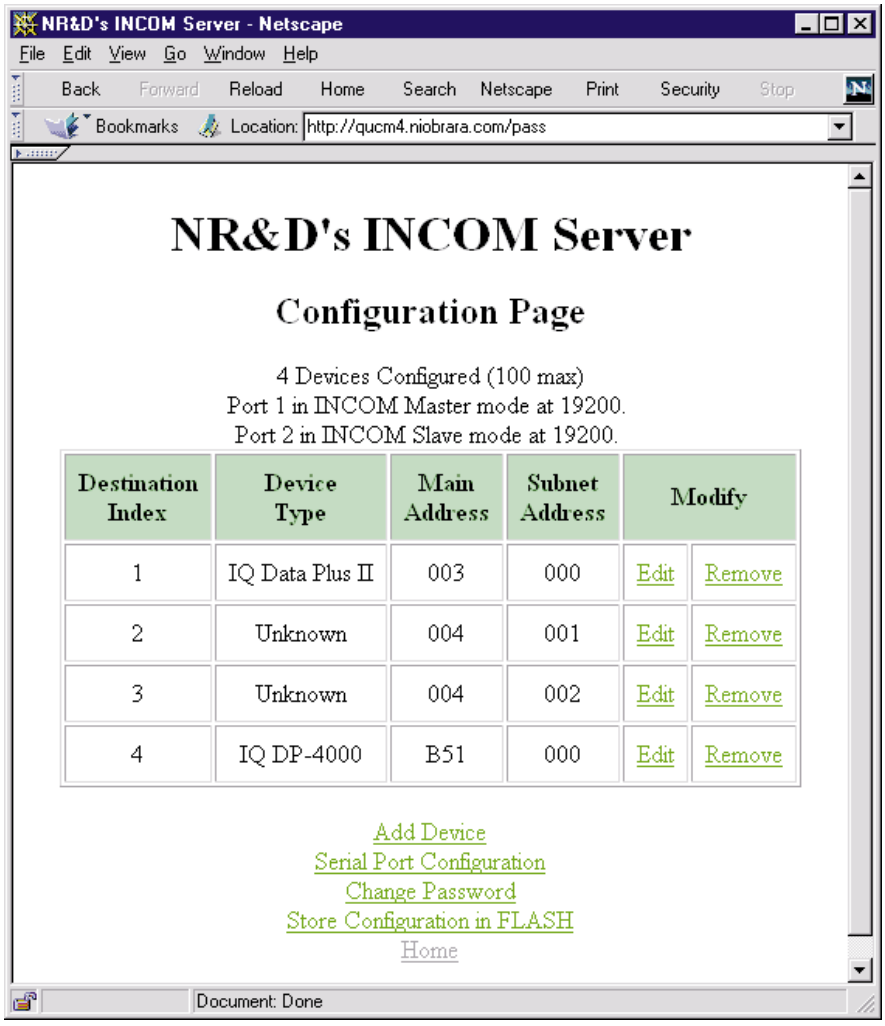

Figure 3-4 Configuration Page

Add Device

The Add Device link is used to add a new INCOM device to the list. A screen like Figure is displayed. There is a pull-down menu item for the Modbus/TCP Destination Index. This menu will only display unused values.

There is a text field for the Main INCOM Network Address. This value is entered in hexadecimal. If the target device is on the main network then simply enter its three digit address. This is usually the rotary switches on the PONI. If the device is on a sub-network (such as off of an AEM) then enter the main network address of the AEM.

There is a pull-down menu for the Subnet address. If the device is on the Main network then set this value to 000. Otherwise enter the address of the device.

There are boxes for the IP Address of an EPONI. Set the IP Address to 0.0.0.0 if the INCOM device is connected to a QUCM serial Port though a MINT II. Otherwise enter the IP Address of the EPONI.

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.

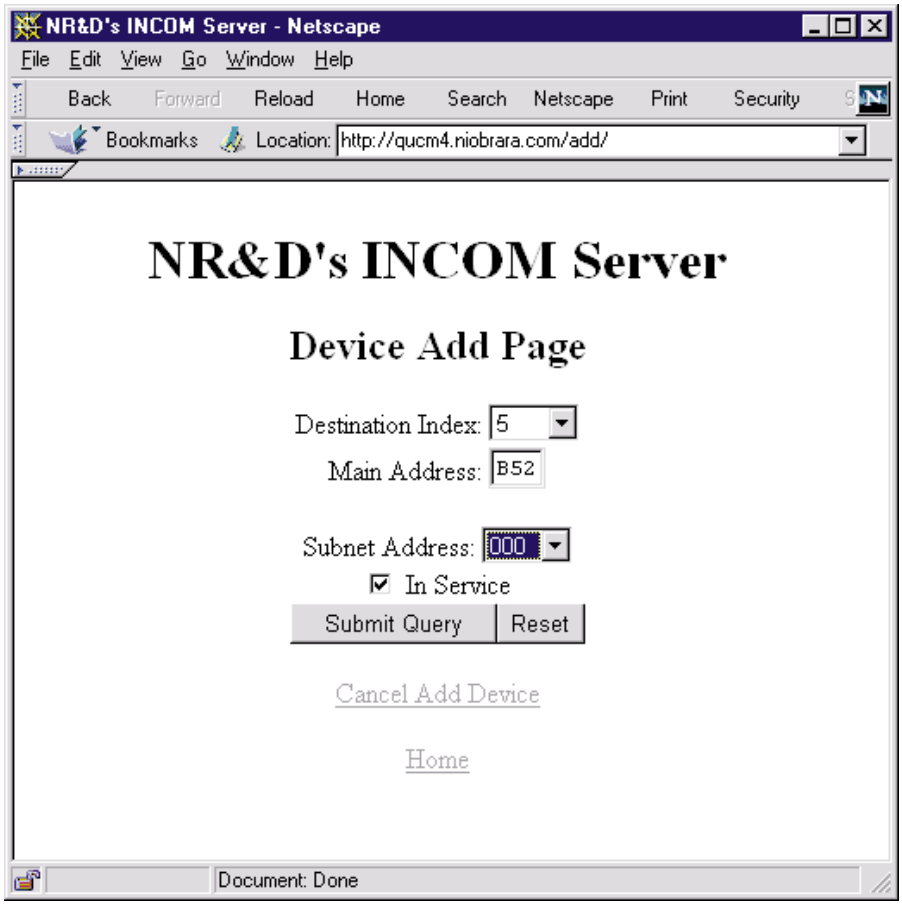

Figure 3-5 Add Device Page

Serial Port Configuration

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

Port 1 is fixed as an INCOM Master. Its parity is fixed at NONE. Its baud rate may be set to 1200, 2400, 9600, or 19200. 19200 is recommended.

Port 2 may be set to INCOM Slave, PNIM/RTU Master, PNIM Master, RTU Master, PLOGIC Master, and RTU Slave. As an INCOM Slave its parity is fixed at NONE and its baud rates may be set to 1200, 2400, 9600, or 19200. As a PNIM/RTU/PLOGIC Master or Slave, its parity may be set to EVEN or NONE and its baud rate may be set to 1200, 2400, 4800, 9600, or 19200

When Port 2 is in PNIM/RTU/PLOGIC, it accepts Modbus/TCP queries to Destination Idices 101 through 132 and passes the messages out to either PNIM, PLOGIC, or Modbus RTU slaves 1 through 32. The QUCM will automatically determine the proper protocol for the each of the possible 32 slaves.

Modbus RTU Slave mode allows a serial Modbus Master to read the data from Incom slaves 1 through 100.

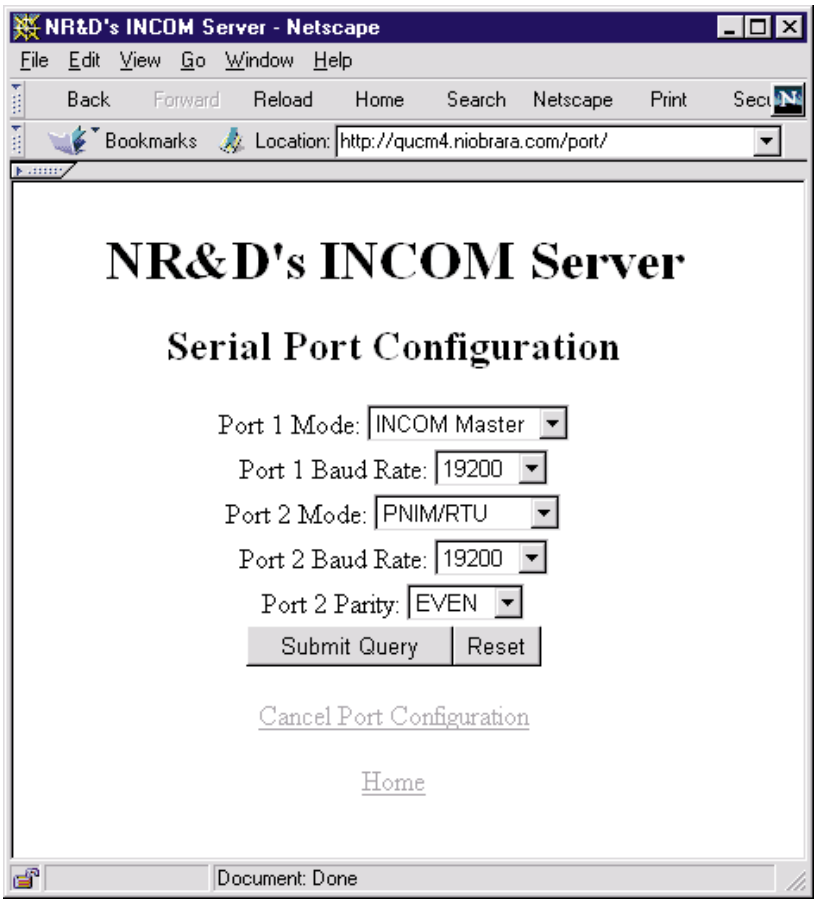

Figure 3-6 Serial Port Page

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 indefinately.

Statistics Page

At the bottom of the Main page is a link to some statistical information about this QUCM. (See Figure 3-7)

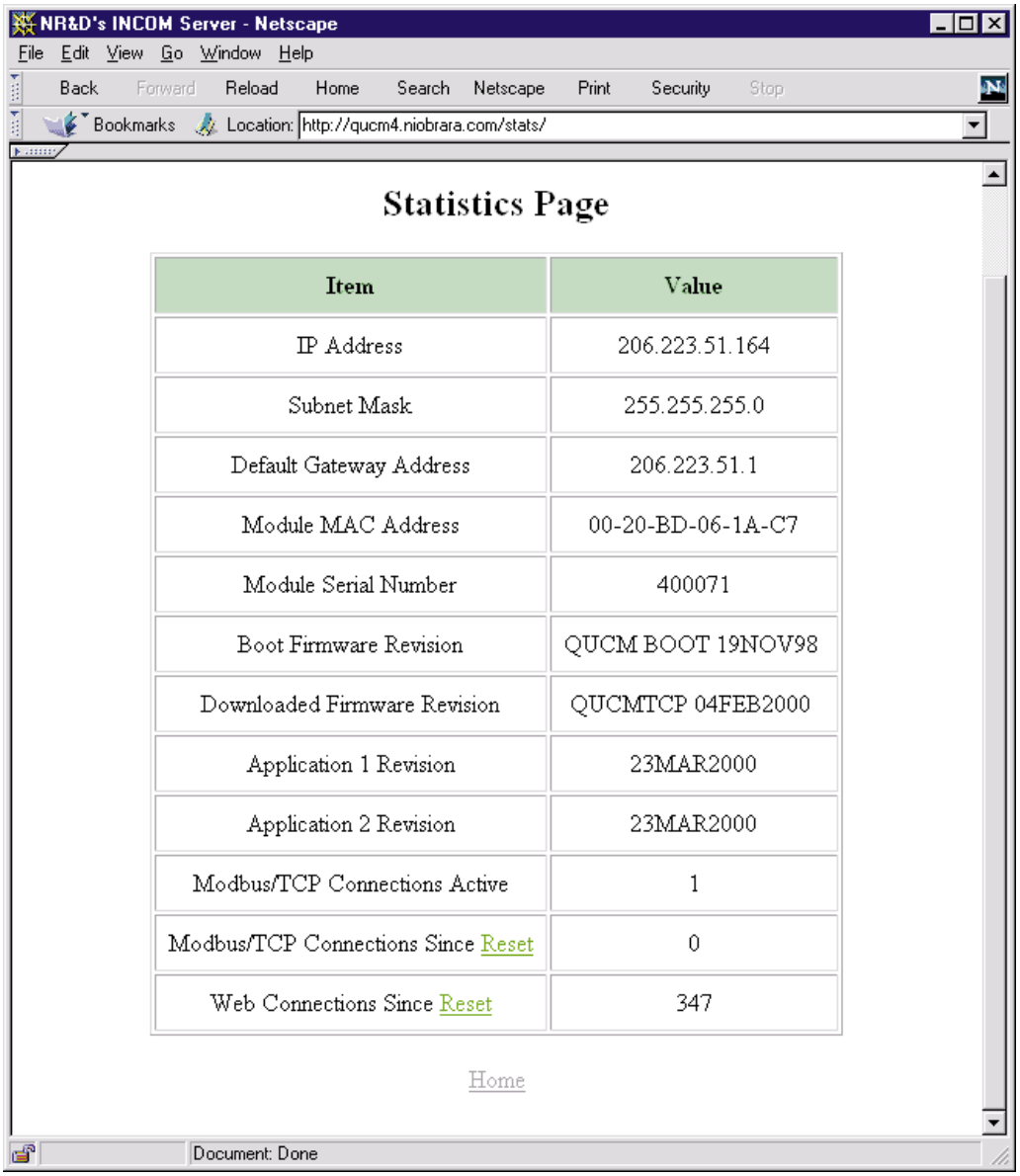

Figure 3-7 Statistics Web Page

4

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.
```

5
Examples

Example 1

Figure 5-1 displays an example INCOM network with a QUCM-SE, MINT II, an AEM II (address = 012) with a sub-network consisting of an IQ Data Plus II (address = 001) and a Digitrip T700 (address = 011). Also on the main network is another IQ Data Plus II (address 004) and an ABB MPS/NIM (address = 01E).

Port 2 of the QUCM is configured for PNIM/RTU mode at 9600 baud, EVEN parit. A Niobrara DDC2I RS-232<>RS-485 converter is connected to the QUCM port through an MM0 cable. The DDC2I's RS-485 port has a network with a CM-2350 and a Modicon Momentum PLC connected. The CM is set to drop 1 in PNIM mode while the PLC speaks Modbus RTU at drop 2. The CM may be reached by Modbus/TCP Index 101 and the PLC by Index 102.

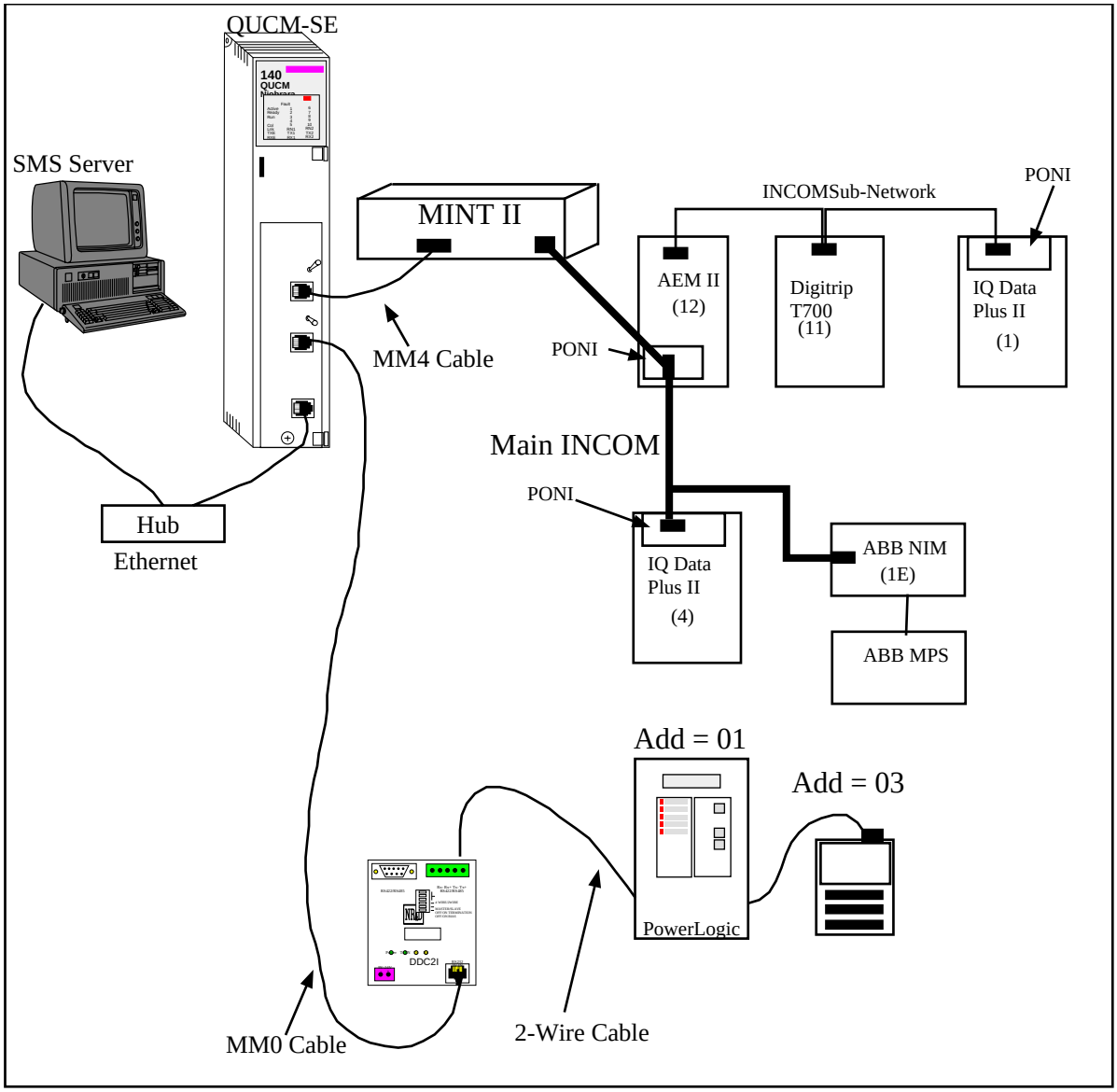

Figure 5-1 Network Example

Figure 5-2 shows the terminal emulator screen from QUCM Port 2 after a "Learn" operation. The QUCM found all five devices and mapped the IQ Data Plus II (address = 004) on the Main network as PLOGIC (Modbus) device 1. The AEM II (address = 12) was found but since it doesn't have pertinent data, it was not assigned a PLOGIC address. The IQ Data Plus II (address = 01) on the AEM subnet as found next and assigned as PLOGIC device 2. The Digitrip (address = 11) was assigned PLOGIC address 3. The ABB MPS/NIM (address = 1E) was the last device found and assigned PLOGIC address 4.

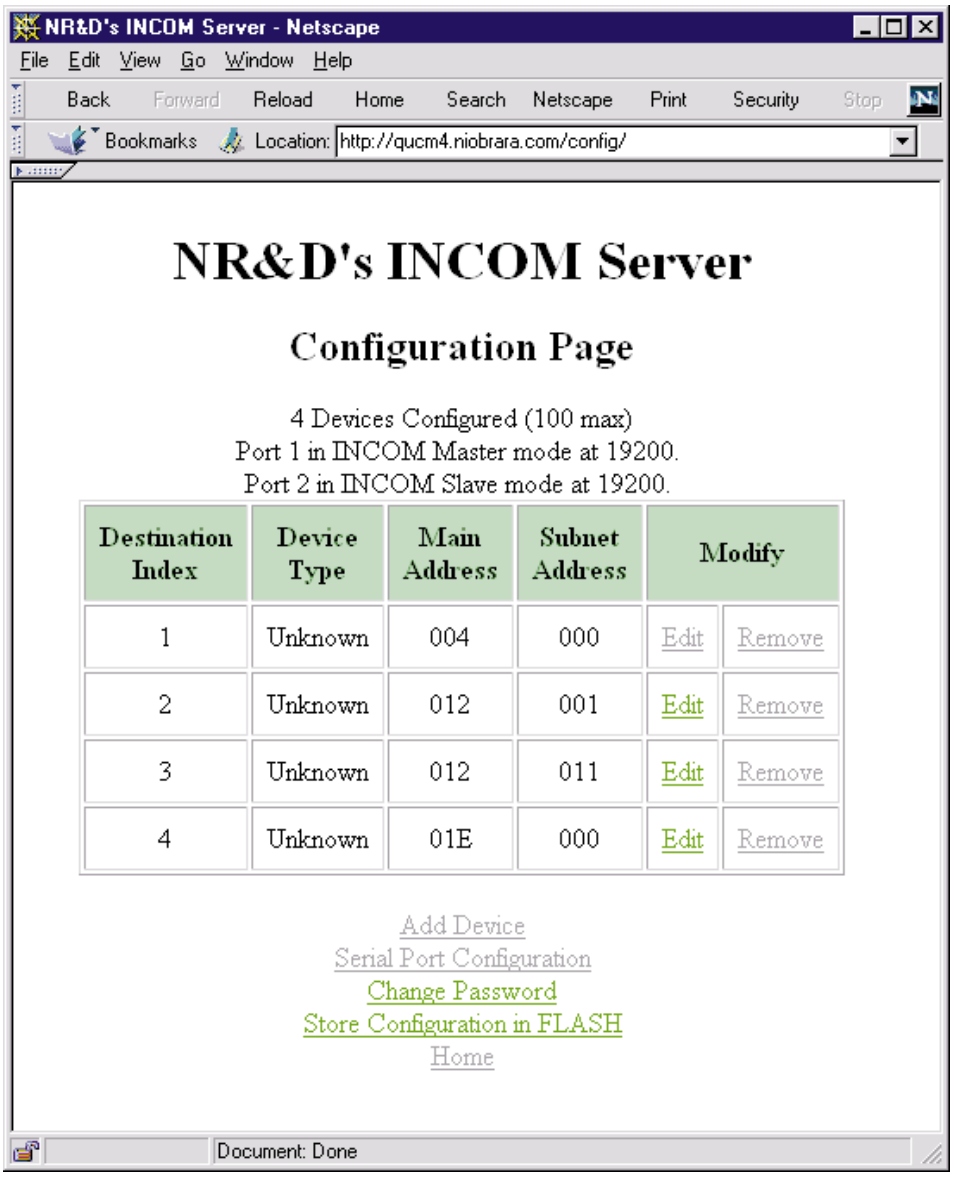

Figure 5-2 Example 1 Configuration Screen

Incoming Modbus/TCP messages with a Destination Index (target drop) of 1 will be sent to the IQ Data Plus II (address = 04), Index 2 will be sent to the IQ Data Plus II (address 01), Index 3 will be sent to the Digitrip, and Index 4 will be sent to the ABB.

Example 2

Figure 5-3 displays an example INCOM network with a QUCM-SE, MINT II, an AEM II (address = 012) with a sub-network consisting of an IQ Data Plus II (address = 001) and a Digitrip T700 (address = 011). Also on the main network is another IQ Data Plus II (address 004) and an ABB MPS/NIM (address = 01E).

Port 2 of the QUCM is connected to a PC running IMPACC III software.

This example allows the SMS computer to see all of the data on the INCOM network attached to QUCM Port 1 but not the devices on the network attached to QUCM Port

2. The IMPACC computer can see the devices on its local network as well as all of the devices on the other network. The QUCM acts as an INCOM routing module allowing access from both SMS and the IMPACC PC to its own network.

The QUCM is configured much like Example 1 with Port 2 set for INCOM Slave mode instead of PNIM/RTU.

Configuation a serial port connection on the IMPACC computer for MINT operation at 19.2K, N, 8, 1 with no ACK. The QUCM bridging is transparent to the PC's application. Increase the timeout value on the INPACC server to 1500.

If the connection to the PC is close then use an MM1 cable from the IMPACC serial port to the QUCM. Otherwise use a pair of DDC2Is and run an RS-422 cable between them.

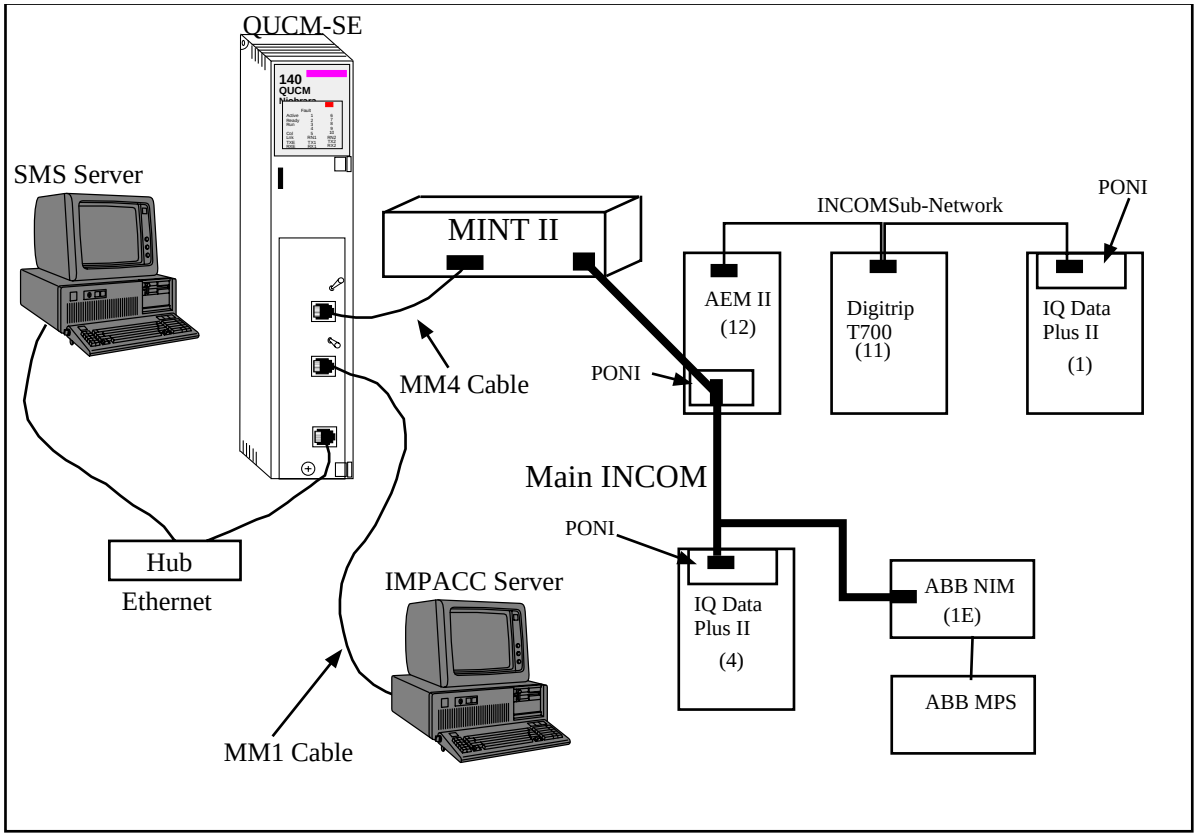

Figure 5-3 Dual IMPACC Network Example

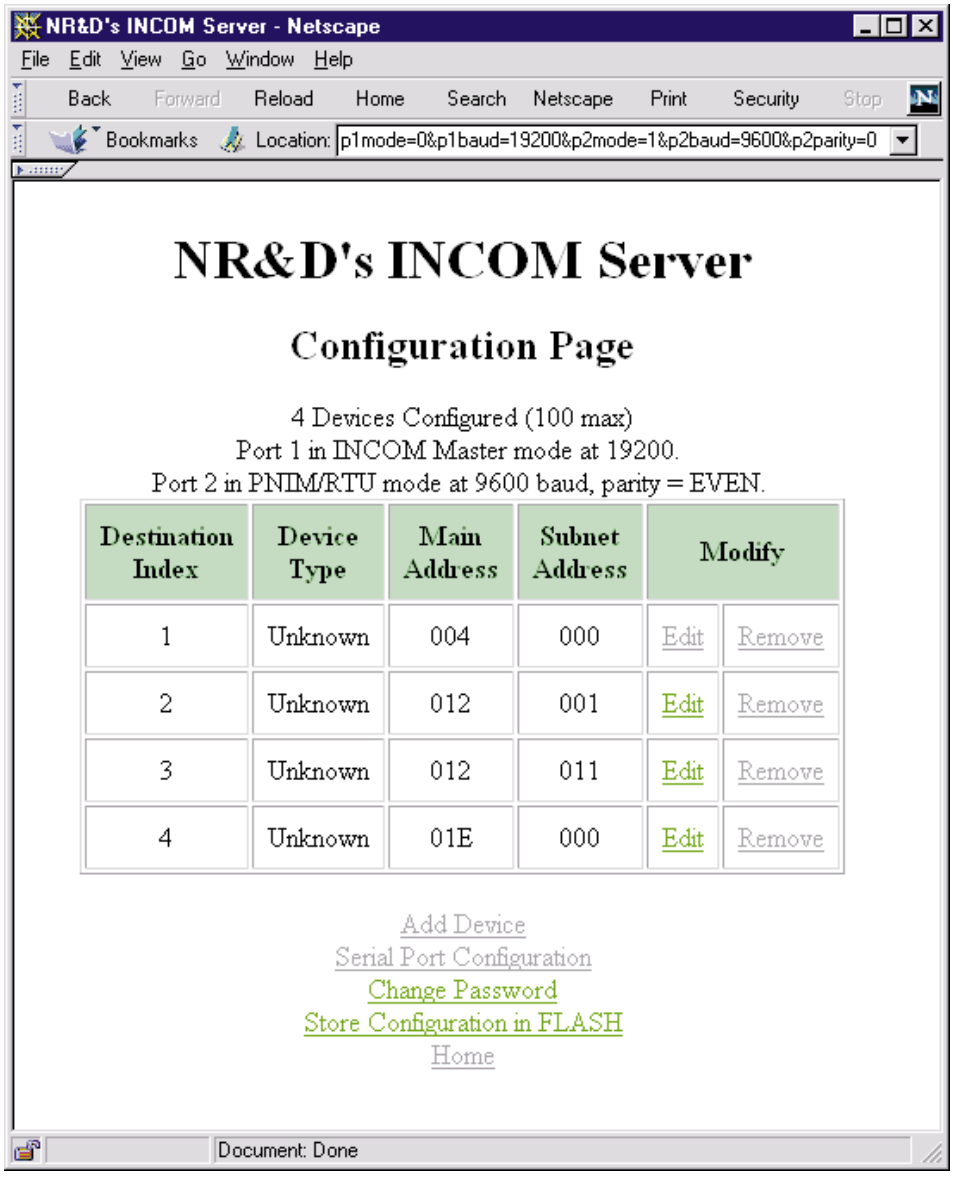

Figure 5-4 Example 2 Configuration Screen

Incoming Modbus/TCP messages with a Destination Index (target drop) of 1 will be sent to the IQ Data Plus II (address = 04), Index 2 will be sent to the IQ Data Plus II (address 01), Index 3 will be sent to the Digitrip, and Index 4 will be sent to the ABB.

6
Troubleshooting

Module Lights

The QUCM-SE has several lights that indicate the status of the module. Table 6-1 shows the meanings of these lights.

Table 6-1 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 6-2.

Table 6-2 User Light Definitions

Light	Meaning
1	INCOM network not configured if rapidly blinking (5/sec). No ACK from MINT if slowly blinking (1/sec).
2	INCOM Reply Timeout (1/sec).
3	INCOM Bad Checksum (1/sec).
4	INCOM BCH Error (1/sec).
5	INCOM Error Bit Set in Reply (1/sec).
6	Port 2 Terminal Server Running when ON.
7	Learn Mode when ON.
8	At Least One Modbus/TCP Server Connection Open when ON.
9	TELNET Server Running when ON.
10	Port 2 in Modbus (and SY/MAX) Slave mode when ON.