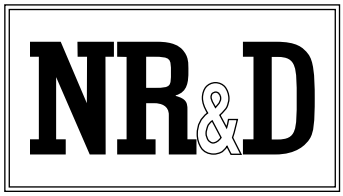
QUCM MICRO-DCI™

Installation and Programming Manual

This Manual describes the QUCM application for interfacing Fischer&Porter MICRO-DCI Controllers to a Modbus/TCP Ethernet system.

Effective: 02 June, 2003



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 protocols. This document covers an application that allows translation of Modbus/TCP messages to be translated into serial networks of Fischer & Porter 53MC5000 MICRO-DCI controllers. The QUCM can support up to 32 controllers on each of two serial ports. The QUCM polls the controllers continuously for up to 12 "C" floating point registers. The QUCM scales these floating point variables to integers based on user settings or the span values within the controller. This scaled data may be "pushed" via Modbus/TCP to a target PLC for completely automatic operation. Additionally, the QUCM can support Modbus/TCP queries to read the polled data or pass-through messages to access any data value in the controller. The QUCM configuration is accomplished by built-in web pages.

The application, "app1.qcm" is compiled and loaded into Application 1 of the QUCM-LE with the Auto-Start feature enabled for stand-alone operation. The application includes multiple threads for simultaneously servicing both serial ports and the Ethernet port. The application, "app2.qcm" is compiled and loaded into Application 2 of the QUCM. This application contains the web server.

The Niobrara QXBP-001 single slot rack with built-in power supply is used for mounting the QUCM-LE. A two (or more) slot Quantum rack and appropriate Quantum power supply may also be used for mounting the QUCM-LE.

Both serial ports of the QUCM may be used to connect to MICRO-DCI networks. The Niobrara DDC2I isolated RS-232<>RS-485 converter may be used to connect the QUCM to the 4-wire RS-485 network. The Niobrara BB85 may also be used to provide a convenient screw terminal for using the QUCM-LE’s built-in RS-485 driver. A Niobrara MM1 cable is needed to load the IP Address into the QUCM.

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Installation

QUCM 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 MICRODCI.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 MICRODCI.ZIP file is located at

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

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

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

Serial Connections to the QUCM-LE

Port 1 (and Port 2) to DDC2I to MICRO-DCI

The serial ports of the QUCM-LE must be switched to RS-232. The Niobrara cable MM0 is used to connect to the DDC2I. This cable is included with the DDC2I

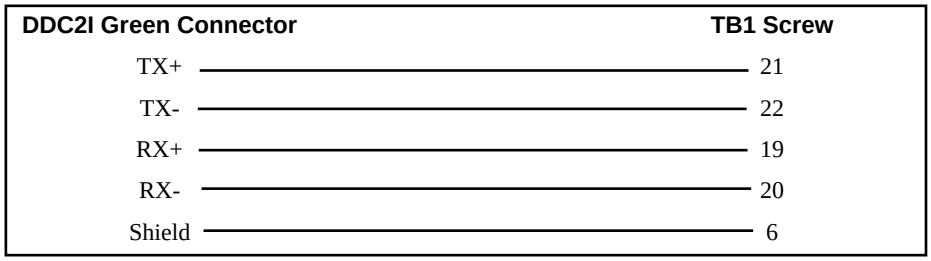


Figure 2-1 DDC2I to MICRO-DCI RS-485 4-wire cable

The DDC2I DIP switches must be configured for 4-wire Master with Termination and Bias.

Table 2-1 DDC2I DIP Switch Settings

Switch	Description	Position
1	4/2 wire	OFF
2	4/2 wire	OFF
3	4/2 wire	OFF
4	Master/Slave	OFF
5	Termination	ON
6	Bias	ON

Port 1 (and Port 2) to BB85 to MICRO-DCI

The serial ports of the QUCM-LE must be switched to RS-485. The Niobrara cable MM0 is used to connect to the BB85. This cable is included with the BB85

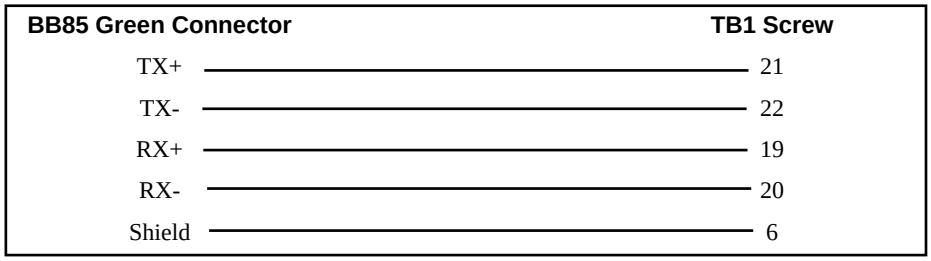


Figure 2-2 BB85 to MICRO-DCI RS-485 4-wire cable

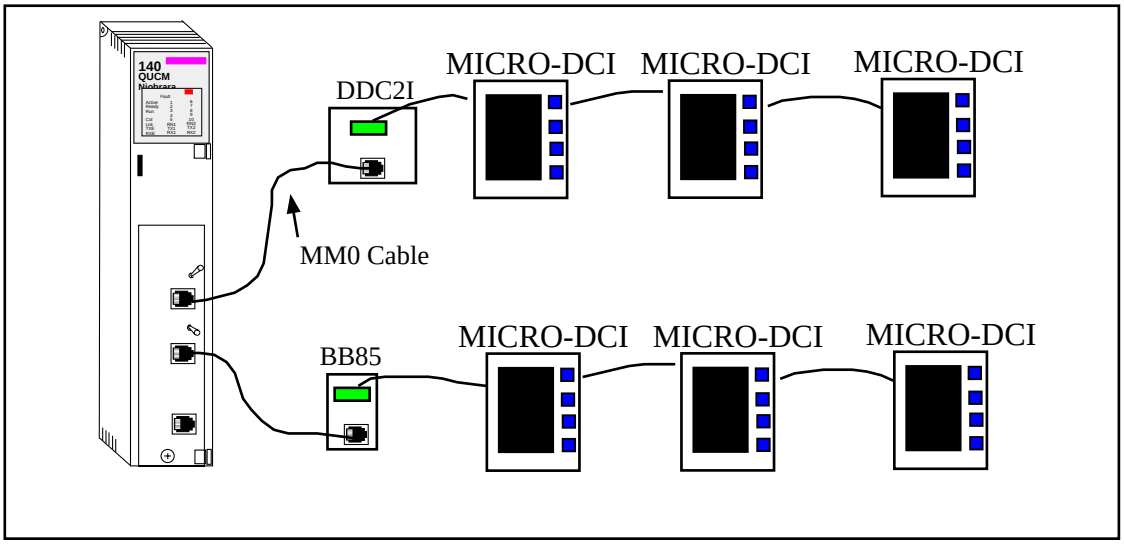


Figure 2-3 Typical system setup

Port 1 (and Port 2) direct to MICRO-DCI

The serial ports of the QUCM-LE must be switched to RS-485. A customer supplied cable may be used to connect the QUCM-LE directly to the Micro-DCI.

NOTE: Pin 1 on the RJ45 connector is the bottom pin.

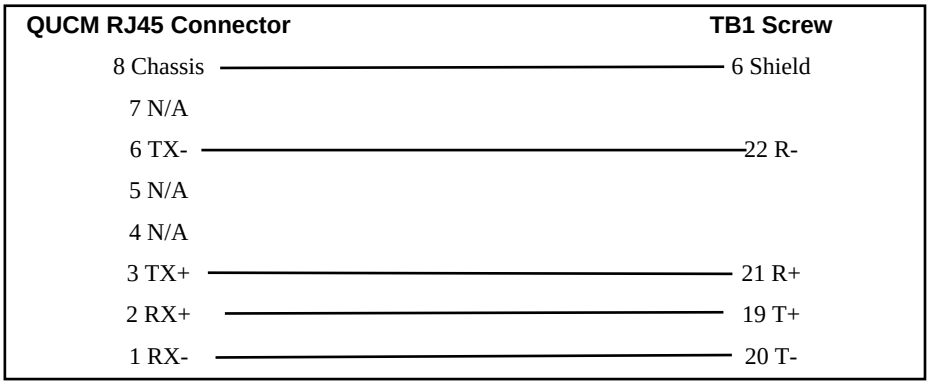


Figure 2-4 Direct RJ45 to MICRO-DCI RS-485 4-wire cable

Port 1 to the Personal Computer

A physical connection must be made from the personal computer to the QUCM in order to configure the Ethernet parameters of the QUCM-LE. 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 pinout is shown in Figure 2-6.

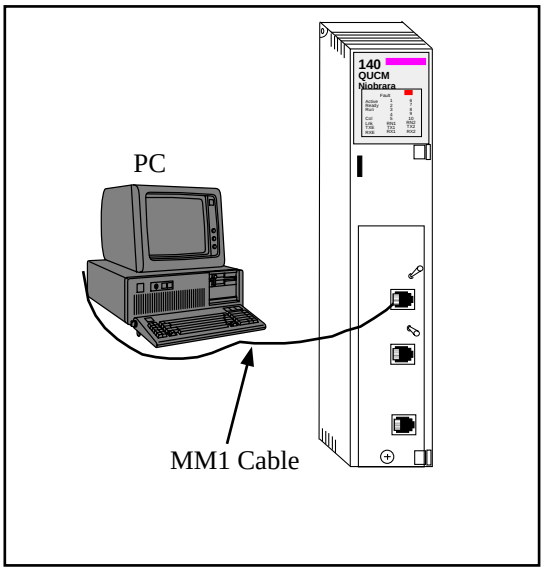


Figure 2-5 PC Connection to QUCM-LE serial port

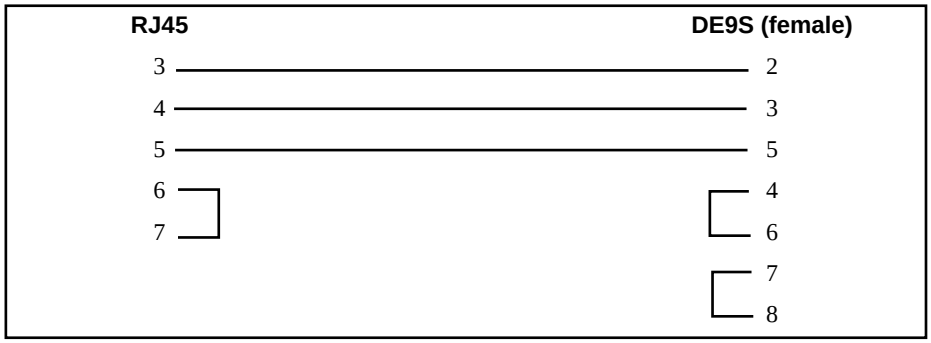


Figure 2-6 QUCM-SE to RS-232 PC Port (9-pin) (MM1 Cable)

Loading the Applications into the QUCM

The QUCM-LE must use the qucmtcpl.fwl or qucmtcpl.qcc firmware included in the microdci.zip file. This firmware is dated 28Oct2002 or later. There are two ways to upgrade the firmware of the QUCM-LE: 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, APP!.QCC and APP2.QCC into the QUCM. Set up the IP parameters of the module by the following method:

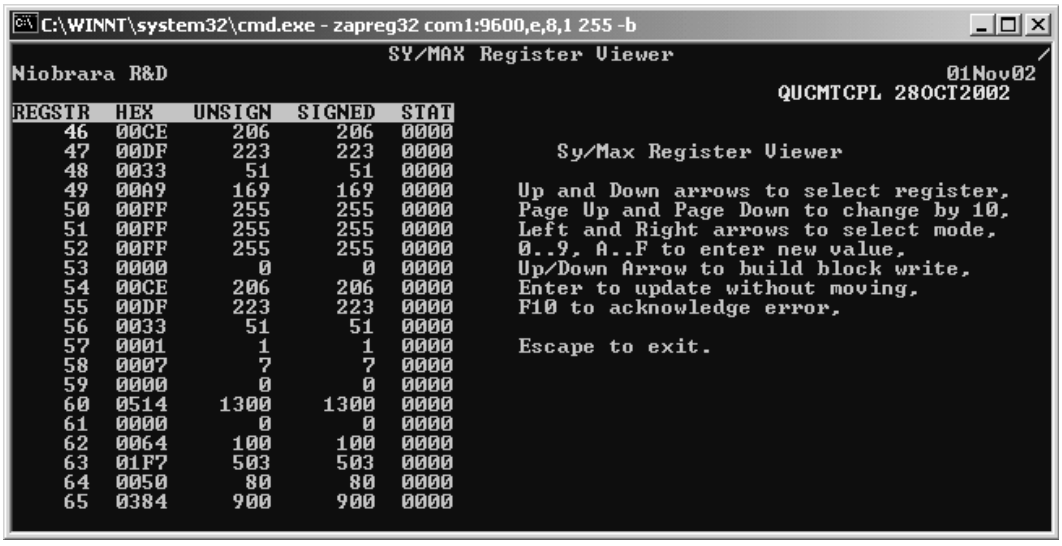


Figure 2-7 ZAPREG32 COM1:9600,E,8,1 255 -B

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 ar-

row 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, Default 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	169
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 206.223.51.161

5 Verify a connection to the internal Modbus/TCP server with zapreg32.
> zapreg32 206.223.51.161:503 255
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.

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 From the command line enter

> fwload qucmtcp.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.

QLOAD APP1 and APP2

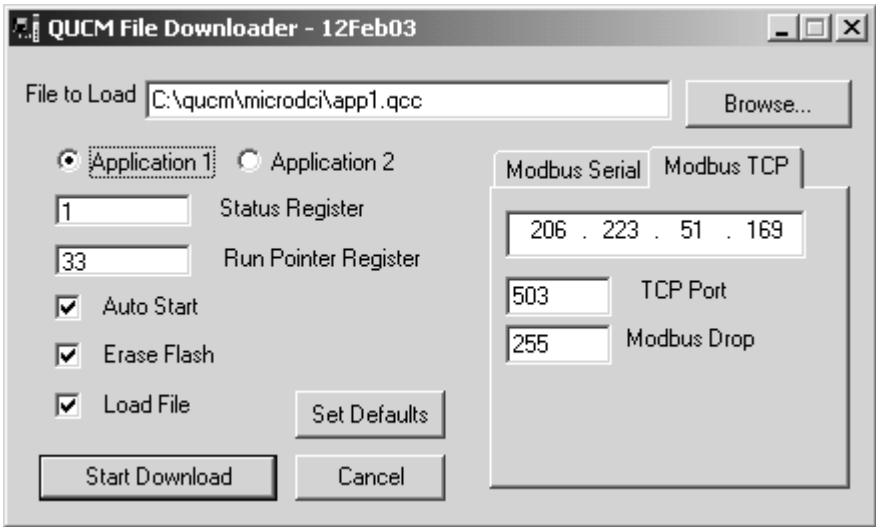


Figure 2-8 QLOAD of APP1

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.

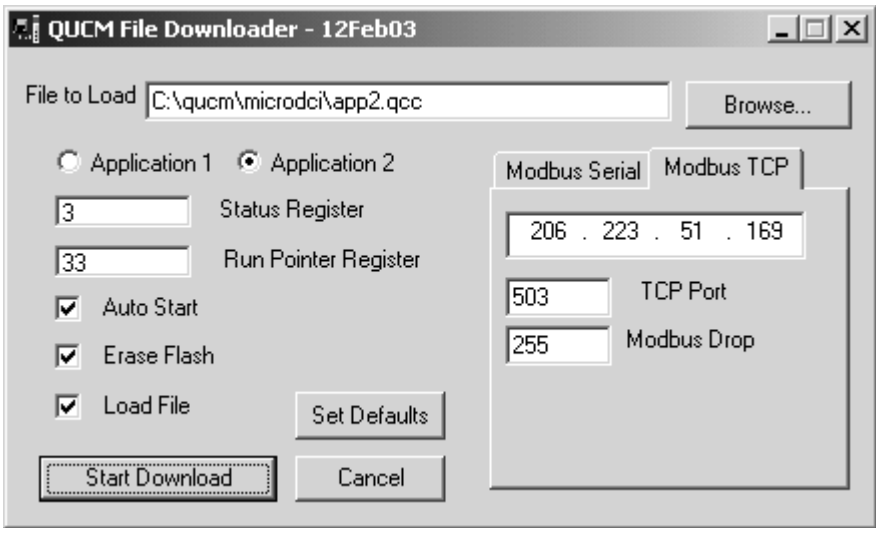


Figure 2-9 QLOAD of APP2

3

Operation

A web browser is used to configure the QUCM. Each MICRO-DCI must be entered into the QUCM to allow it to poll the devices. The target of the Modbus/TCP "push" data must be entered so the QUCM will know where to send the polled data.

Automatic Polling

Two parallel threads within the app1 program simultaneously scan the list of slaves and send queries out the appropriate serial port. The replies are processed with the data converted to standard Modbus compatible IEE 32bit floating point data and 16bit scaled integers. This data is available for Modbus/TCP polling, viewing from the web pages, or may be pushed to a remote Modbus/TCP slave.

This data is stored in Holding Registers 1 through 399 and is read only. See Tables 3-1 through 3-3.

Table 3-1 Modbus Holding Registers for Polled Data

Modbus Register	Description	Read/ Write	Notes
1	Device Type	R	0=MICRO-DCI
2	QUCM Port	R	1 or 2
3	DCI IA	R	Slave Address
4	Good Reply Count	R	Rolls over at 65535
5	Timeout Count	R	Rolls over at 65535
6	System Update Time	R	Seconds
7	Last Time	R	Upper Word
8	Last Time	R	Lower Word
9	Device Update Time	R	Seconds
10	Value 0 ’C’ Reg.	R	Integer value for the ’C’ register to read
11	Value 1 ’C’ Reg.	R	Integer value for the ’C’ register to read
12	Value 2 ’C’ Reg.	R	Integer value for the ’C’ register to read
13	Value 3 ’C’ Reg.	R	Integer value for the ’C’ register to read
14	Value 4 ’C’ Reg.	R	Integer value for the ’C’ register to read
15	Value 5 ’C’ Reg.	R	Integer value for the ’C’ register to read
16	Value 6 ’C’ Reg.	R	Integer value for the ’C’ register to read
17	Value 7 ’C’ Reg.	R	Integer value for the ’C’ register to read
18	Value 8 ’C’ Reg.	R	Integer value for the ’C’ register to read
19	Value 9 ’C’ Reg.	R	Integer value for the ’C’ register to read
20	Value 10 ’C’ Reg.	R	Integer value for the ’C’ register to read
21	Value 11 ’C’ Reg.	R	Integer value for the ’C’ register to read
22 - 39	Reserved	R	
40	V0 Span Min.	R	’C’ reg to read for Span Min. or Constant value
41	V1 Span Min.	R	’C’ reg to read for Span Min. or Constant value
42	V2 Span Min.	R	’C’ reg to read for Span Min. or Constant value
43	V3 Span Min.	R	’C’ reg to read for Span Min. or Constant value
44	V4 Span Min.	R	’C’ reg to read for Span Min. or Constant value
45	V5 Span Min.	R	’C’ reg to read for Span Min. or Constant value
46	V6 Span Min.	R	’C’ reg to read for Span Min. or Constant value
47	V7 Span Min.	R	’C’ reg to read for Span Min. or Constant value
48	V8 Span Min.	R	’C’ reg to read for Span Min. or Constant value
49	V9 Span Min.	R	’C’ reg to read for Span Min. or Constant value
50	V10 Span Min.	R	’C’ reg to read for Span Min. or Constant value
51	V11 Span Min.	R	’C’ reg to read for Span Min. or Constant value
52 - 69	Reserved	R	

Table 3-2 Modbus Holding Registers for Polled Data Cont.

Modbus Register	Description	Read/ Write	Notes
70	V0 Span Max.	R	'C' reg to read for Span Max or Constant value
71	V1 Span Max.	R	'C' reg to read for Span Max or Constant value
72	V2 Span Max.	R	'C' reg to read for Span Max or Constant value
73	V3 Span Max.	R	'C' reg to read for Span Max or Constant value
74	V4 Span Max.	R	'C' reg to read for Span Max or Constant value
75	V5 Span Max.	R	'C' reg to read for Span Max or Constant value
76	V6 Span Max.	R	'C' reg to read for Span Max or Constant value
77	V7 Span Max.	R	'C' reg to read for Span Max or Constant value
78	V8 Span Max.	R	'C' reg to read for Span Max or Constant value
79	V9 Span Max.	R	'C' reg to read for Span Max or Constant value
80	V10 Span Max.	R	'C' reg to read for Span Max or Constant value
81	V11 Span Max.	R	'C' reg to read for Span Max or Constant value
82 - 99	Reserved	R	
100,101	V0 Raw Float Value	R	IEE 32-bit Float
102,103	V1 Raw Float Value	R	IEE 32-bit Float
104,105	V2 Raw Float Value	R	IEE 32-bit Float
106,107	V3 Raw Float Value	R	IEE 32-bit Float
108,109	V4 Raw Float Value	R	IEE 32-bit Float
110,111	V5 Raw Float Value	R	IEE 32-bit Float
112,113	V6 Raw Float Value	R	IEE 32-bit Float
114,115	V7 Raw Float Value	R	IEE 32-bit Float
116,117	V8 Raw Float Value	R	IEE 32-bit Float
118,119	V9 Raw Float Value	R	IEE 32-bit Float
120,121	V10 Raw Float Value	R	IEE 32-bit Float
122,123	V11 Raw Float Value	R	IEE 32-bit Float
124-199	Reserved	R	
200	V0 Scaled Integer Value	R	16-bit Integer scaled to 4095
201	V1 Scaled Integer Value	R	16-bit Integer scaled to 4095
202	V2 Scaled Integer Value	R	16-bit Integer scaled to 4095
203	V3 Scaled Integer Value	R	16-bit Integer scaled to 4095
204	V4 Scaled Integer Value	R	16-bit Integer scaled to 4095
205	V5 Scaled Integer Value	R	16-bit Integer scaled to 4095
206	V6 Scaled Integer Value	R	16-bit Integer scaled to 4095
207	V7 Scaled Integer Value	R	16-bit Integer scaled to 4095
208	V8 Scaled Integer Value	R	16-bit Integer scaled to 4095
209	V9 Scaled Integer Value	R	16-bit Integer scaled to 4095
210	V10 Scaled Integer Value	R	16-bit Integer scaled to 4095
211	V11 Scaled Integer Value	R	16-bit Integer scaled to 4095
301-399	Reserved	R	

Table 3-3 Modbus Holding Registers for Polled Data Cont.

Modbus Register	Description	Read/ Write	Notes
250	V0 Bitmask	R	bit 0 - 1=Enabled, 0=Disabled bit 1 - 1=Read 'C' for Span Min, 0=Constant bit 2 - 1=Read 'C' for Span Max, 0=Constant
251	V1 Bitmask	R	
252	V2 Bitmask	R	
253	V3 Bitmask	R	
254	V4 Bitmask	R	
255	V5 Bitmask	R	
256	V6 Bitmask	R	
257	V7 Bitmask	R	
258	V8 Bitmask	R	
259	V9 Bitmask	R	
260	V10 Bitmask	R	
261	V11 Bitmask	R	
262 - 299	Reserved	R	
300	V0 Actual Span Min.	R	Either Read from 'C' register or constant
301	V1 Actual Span Min.	R	Either Read from 'C' register or constant
302	V2 Actual Span Min.	R	Either Read from 'C' register or constant
303	V3 Actual Span Min.	R	Either Read from 'C' register or constant
304	V4 Actual Span Min.	R	Either Read from 'C' register or constant
305	V5 Actual Span Min.	R	Either Read from 'C' register or constant
306	V6 Actual Span Min.	R	Either Read from 'C' register or constant
307	V7 Actual Span Min.	R	Either Read from 'C' register or constant
308	V8 Actual Span Min.	R	Either Read from 'C' register or constant
309	V9 Actual Span Min.	R	Either Read from 'C' register or constant
310	V10 Actual Span Min.	R	Either Read from 'C' register or constant
311	V11 Actual Span Min.	R	Either Read from 'C' register or constant
312-349	Reserved	R	
350	V0 Actual Span Max.	R	Either Read from 'C' register or constant
351	V1 Actual Span Max.	R	Either Read from 'C' register or constant
352	V2 Actual Span Max.	R	Either Read from 'C' register or constant
353	V3 Actual Span Max.	R	Either Read from 'C' register or constant
354	V4 Actual Span Max.	R	Either Read from 'C' register or constant
355	V5 Actual Span Max.	R	Either Read from 'C' register or constant
356	V6 Actual Span Max.	R	Either Read from 'C' register or constant
357	V7 Actual Span Max.	R	Either Read from 'C' register or constant
358	V8 Actual Span Max.	R	Either Read from 'C' register or constant
359	V9 Actual Span Max.	R	Either Read from 'C' register or constant
360	V10 Actual Span Max.	R	Either Read from 'C' register or constant
361	V11 Actual Span Max.	R	Either Read from 'C' register or constant
362-399	Reserved	R	

Scaling of the Integer Value

The Integer value pushed to the PLC is scaled based on the SPAN values.

SV = ((FV - Smin) / (Smax - Smin)) * 4095

Where SV = Scaled Value
FV = Actual Float Value
Smin = Span Min.
Smax = Span Max.

Modbus Pass-through

Registers 1000 through 1999 are the pass through L Base data directly from the MICRO-DCI. These registers have a quick turn around because the data is read in 8-bit bytes. These registers are read-only and may be accessed on any boundary and any normal Modbus register count. The L Base data is packed 16 bits per register. Bits 15 through 0 are in register 1000 with bit 0 at the LSB. For write operations on the L Base data use register 5000 and up.

The L Base register operations are limited to a maximum of 16 Modbus registers per operation. The QUCM handles Modbus requests larger than 15 registers but the turn-around time becomes much longer because the QUCM must break the large Modbus request into multiple DCI requests.

Table 3-4 Pass Through L Base Data

Modbus Register	Description	Read/ Write	Notes
1000	L15-L0	R	bits 15-0
1001	L31-L16	R	bits 15-0
1002	L47-L32	R	bits 15-0
1003	L63-L48	R	bits 15-0
1004	L79-L64	R	bits 15-0
1005	L95-L80	R	bits 15-0
1006	L111-L96	R	bits 15-0
1007	L127-L112	R	bits 15-0
1008	L143-L128	R	bits 15-0
1009	L159-L144	R	bits 15-0
1010	L175-L160	R	bits 15-0
...	...	R	...

Registers 2000 through 2999 are the pass through B Base data directly from the MICRO-DCI. These registers have a quick turn around because the data is read in 8-bit bytes. These registers are read-only and may be accessed on any boundary and any normal Modbus register count. The B Base data is in the lower 8 bits of the Modbus register. The upper 8 bits are zero.

The B Base register operations are limited to a maximum of 32 Modbus registers per operation. The QUCM handles Modbus requests larger than 32 registers but the turn-around time becomes much longer because the QUCM must break the large Modbus request into multiple DCI requests.

Table 3-5 Pass Through B Base Data

Modbus Register	Description	Read/ Write	Notes
2000	B0	R/W	lower 8 bits
2001	B1	R/W	lower 8 bits
2002	B2	R/W	lower 8 bits
2003	B3	R/W	lower 8 bits
2004	B4	R/W	lower 8 bits
2005	B5	R/W	lower 8 bits
2006	B6	R/W	lower 8 bits
2007	B7	R/W	lower 8 bits
2008	B8	R/W	lower 8 bits
2009	B9	R/W	lower 8 bits
2010	B10	R/W	lower 8 bits
...	...	R/W	...

Registers 3000 through 3999 are the pass through C Base data directly from the MICRO-DCI. These registers have a slow turn around because the data must be converted from the 3 byte floating point used by the DCI to the normal 32bit IEE format used by Modbus. These registers are read/write and must be accessed in multiples of 2 starting on an even number. Sending a read or write on an odd numbered register will return an "illegal address" exception response. Sending a read or write with an odd numbered count will also return an "illegal address" exception response.

The C Base register operations are limited to a maximum of 20 Modbus registers per operation. The QUCM handles Modbus requests larger than 20 registers but the turnaround time becomes much longer because the QUCM must break the large Modbus request into multiple DCI requests.

Table 3-6 Pass Through C Base Data

Modbus Register	Description	Read/ Write	Notes
3000,3001	C0	R/W	IEE 32bit float
3002,3003	C1	R/W	IEE 32bit float
3004,3005	C2	R/W	IEE 32bit float
3006,3007	C3	R/W	IEE 32bit float
3008,3009	C4	R/W	IEE 32bit float
3010,3011	C5	R/W	IEE 32bit float
3012,3013	C6	R/W	IEE 32bit float
3014,3015	C7	R/W	IEE 32bit float
3016,3017	C8	R/W	IEE 32bit float
3018,3019	C9	R/W	IEE 32bit float
3020,3021	C10	R/W	IEE 32bit float
...	...	R/W	...

Registers 4000 through 4999 are the pass through H Base data directly from the MICRO-DCI. These registers have a slow turn around because the data must be con-

verted from the 5 byte floating point used by the DCI to the normal 32bit IEE format used by Modbus. These registers are read/write and must be accessed in multiples of 2 starting on an even number. Sending a read or write on an odd numbered register will return an "illegal address" exception response. Sending a read or write with an odd numbered count will also return an "illegal address" exception response.

The H Base register operations are limited to a maximum of 12 Modbus registers per operation. The QUCM handles Modbus requests larger than 12 registers but the turn-around time becomes much longer because the QUCM must break the large Modbus request into multiple DCI requests.

Table 3-7 Pass Through H Base Data

Modbus Register	Description	Read/ Write	Notes
4000,4001	H0	R/W	IEE 32bit float
4002,4003	H1	R/W	IEE 32bit float
4004,4005	H2	R/W	IEE 32bit float
4006,4007	H3	R/W	IEE 32bit float
4008,4009	H4	R/W	IEE 32bit float
4010,4011	H5	R/W	IEE 32bit float
4012,4013	H6	R/W	IEE 32bit float
4014,4015	H7	R/W	IEE 32bit float
4016,4017	H8	R/W	IEE 32bit float
4018,4019	H9	R/W	IEE 32bit float
4020,4021	H10	R/W	IEE 32bit float
...	...	R/W	...

Registers 5000 through 5999 are the pass through L Base data directly from the MICRO-DCI. These registers have a quick turn around because the data is read in 8-bit bytes. These registers are read/write and may be accessed on any boundary and any normal Modbus register count. The L Base data is packed 1 bit per register. Bit 0 of the Modbus register contains the data and all other bits are forced to zero.

The L Base register operations are limited to the normal Modbus maximum count.

Table 3-8 Pass Through L Base Data

Modbus Register	Description	Read/ Write	Notes
5000	L0	R/W	bit 0 only
5001	L1	R/W	bit 0 only
5002	L2	R/W	bit 0 only
5003	L3	R/W	bit 0 only
5004	L4	R/W	bit 0 only
5005	L5	R/W	bit 0 only
5006	L6	R/W	bit 0 only
5007	L7	R/W	bit 0 only
5008	L8	R/W	bit 0 only
5009	L9	R/W	bit 0 only
5010	L10	R/W	bit 0 only
...	...	R/W	...

Modbus PUSH Operation

The QUCM may be configured to push the scaled integer data to a Modbus/TCP client continuously. The PUSH operation configuration includes the target IP Address, the target destination index, the starting register in the target for the data and a status register in the target that gets incremented with each update.

For example, the status register is 1 and the starting register in the PLC is 10. There are two MICRO-DCI units configured. Table shows the register list for the PLC.

Table 3-9 Sample PUSH PLC Registers

Modbus Register	Sample Data	Description
1	9932	Incrementing Status
10	2047	Index 1 - V0
11	982	Index 1 - V1
12	2048	Index 1 - V2
13	0	Index 1 - V3
14	0	Index 1 - V4
15	0	Index 1 - V5
16	0	Index 1 - V6
17	0	Index 1 - V7
18	0	Index 1 - V8
19	0	Index 1 - V9
20	0	Index 1 - V10
21	0	Index 1 - V11
10	512	Index 1 - V0
11	3049	Index 1 - V1
12	0	Index 1 - V2
13	0	Index 1 - V3
14	0	Index 1 - V4
15	0	Index 1 - V5
16	0	Index 1 - V6
17	0	Index 1 - V7
18	0	Index 1 - V8
19	0	Index 1 - V9
20	0	Index 1 - V10
21	0	Index 1 - V11

4

Web Server

Navigation Bar

The left side of each page includes a set of navigation links. This list changes dynamically based on the current page displayed. The root links are Home, Configuration, Statistics, and Help.

Home

The Home link displays a page similar to figure 4-1. It gives a brief summary of the number of devices configured, the settings on the two QUCM serial ports, and the status of the modem connections. The table of devices shows the Modbus/TCP destination Index, QUCM port number, remote Slave Address, text Name, and a link for the online status.

Clicking on the online link in the Status will show a page for the current readings from the MICRO-DCI. See figure 4-2. This page gives the raw floating point and scaled integer values for the configured variables in the MICRO-DCI. Listings for the span, min. and max. values are also shown is integers. Links are provided at the bottom of the page for Next Device, Previous Device, and Home.

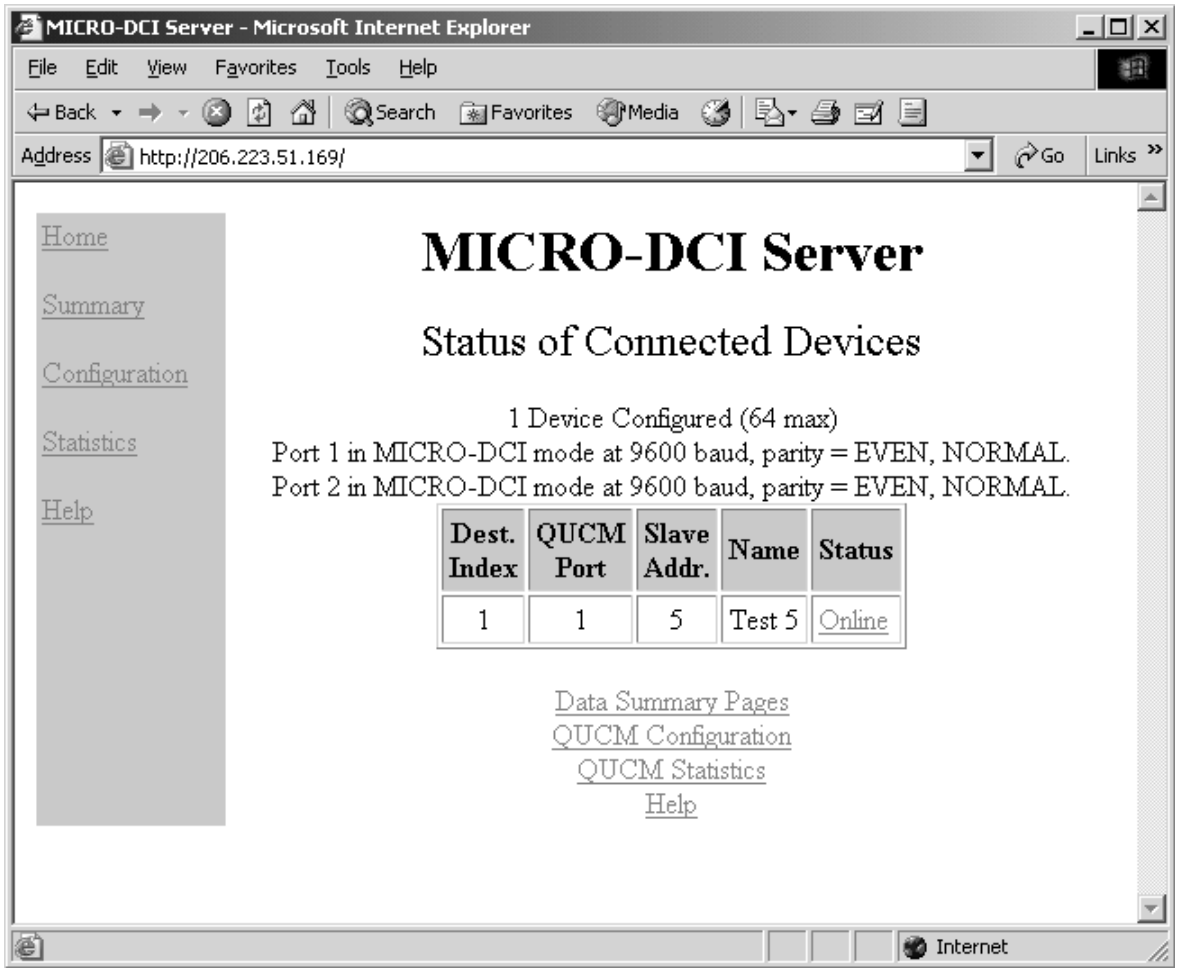


Figure 4-1 Main Page with three devices configured

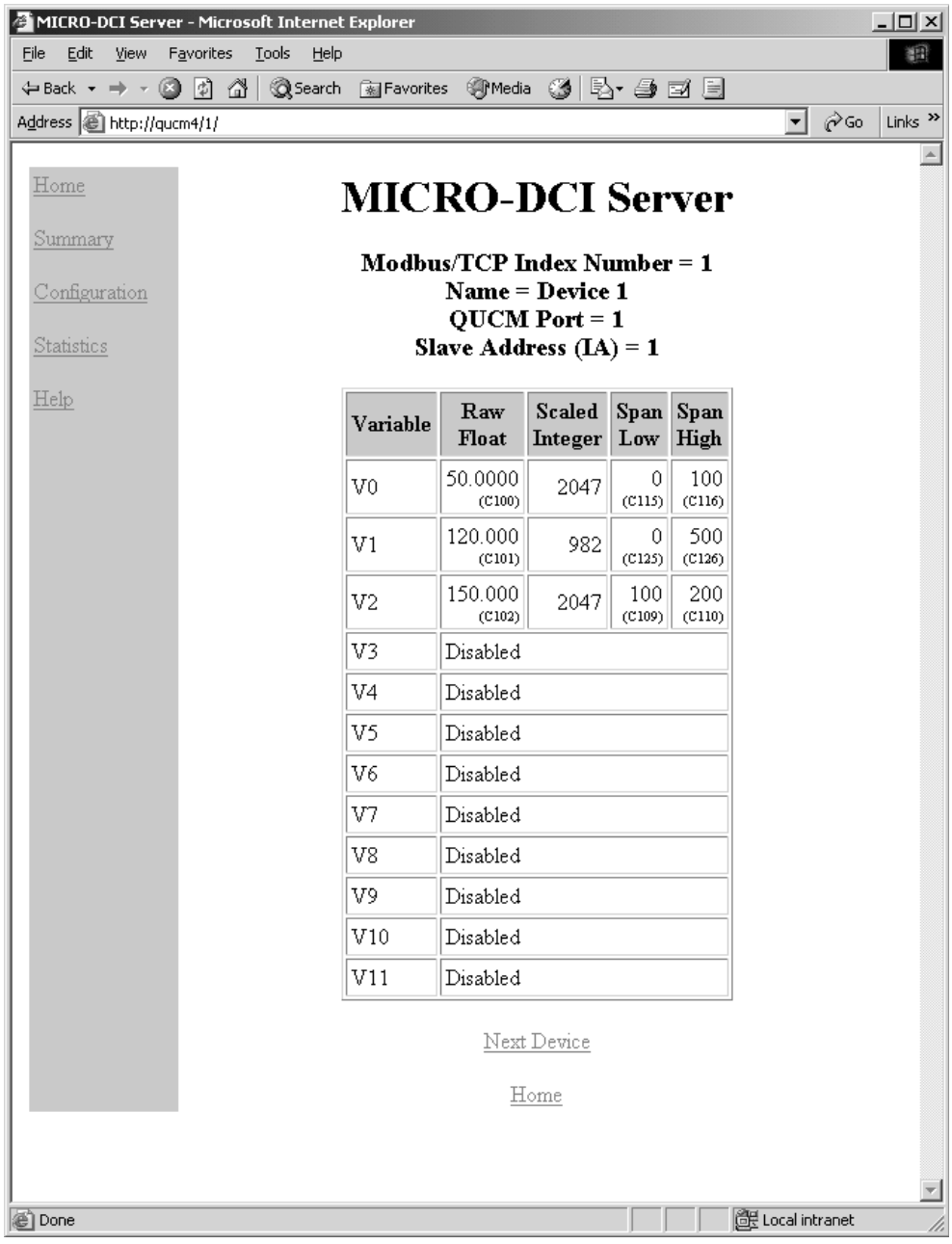
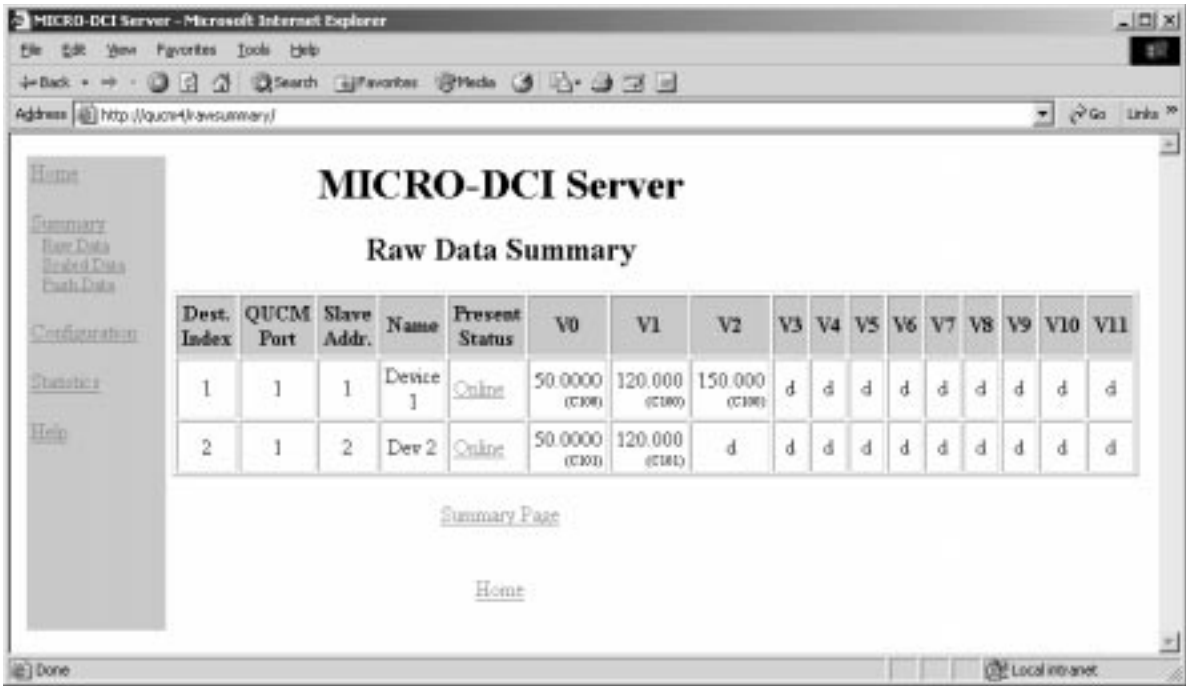


Figure 4-2 Device Page

Summary

The Summary link has three sub-links that show summary pages for the raw data, scaled integer data, and Modbus/TCP PUSH data.



Dest. Index	QUCM Port	Slave Addr.	Name	Present Status	V0	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
1	1	1	Device 1	Online	50.0000 (C100)	120.000 (C100)	150.000 (C100)	d	d	d	d	d	d	d	d	d
2	1	2	Dev 2	Online	50.0000 (C101)	120.000 (C101)	d	d	d	d	d	d	d	d	d	d

Figure 4-3 Raw Data Summary

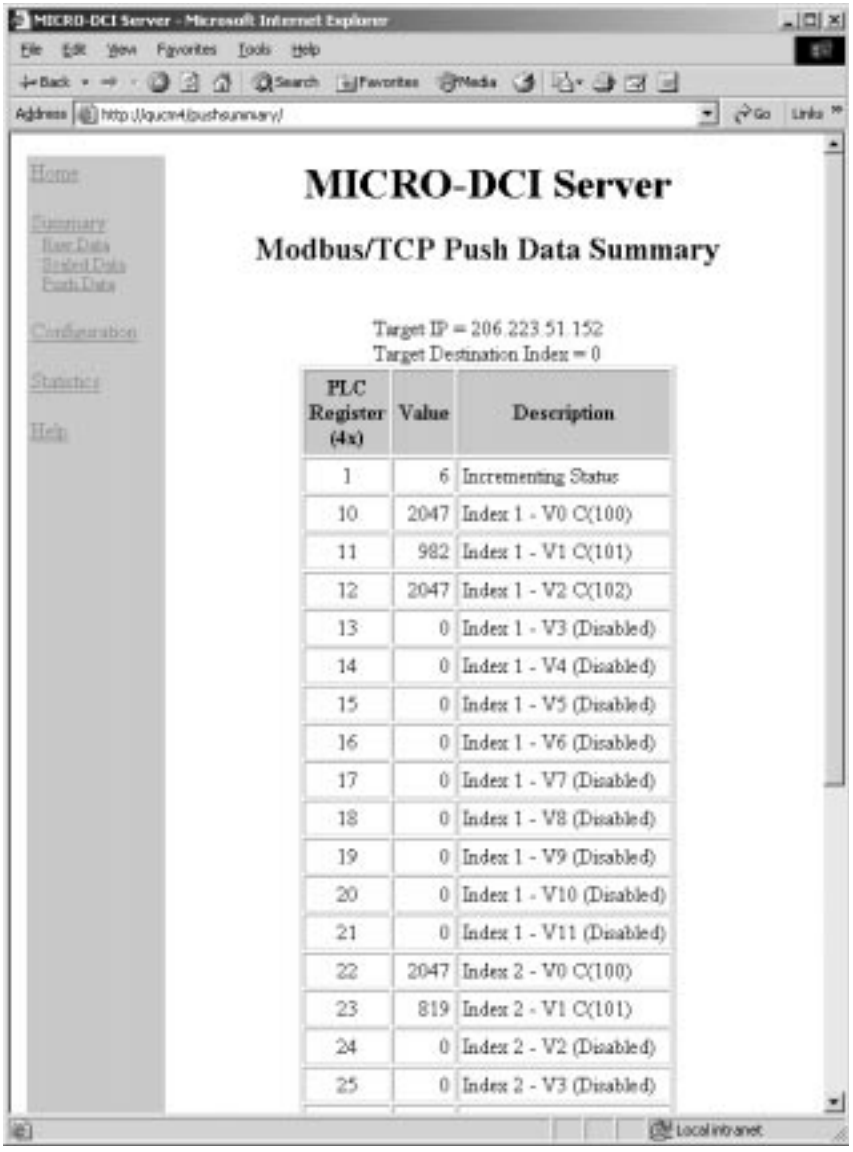


Figure 4-4 PUSH Summary

Configuration Page

The Configuration Page link will enter a set of pages for configuring the QUCM. A table is shown with the currently configured devices with links to Edit or Remove each device. Additional links are provided to Add Device, Serial Port Configuration, Change QUCM Titles, configure Modbus/TCP PUSH, Change QUCM TCP/IP Address, Change Password, Store Configuration in Flash, and Home. See figure 4-5.

Password

These pages are password protected based on a 3 minute activity timer. If the password timer has expired the user will be prompted to enter the password. Some configuration parameters require the password to be entered before the action is taken.

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

Add Device

The Add Device link is used to add new remote devices. Each device allows the selection of the Modbus/TCP Destination Index, Slave Address, QUCM Port number, text Name, Scaling for each of the possible Control Modules, and In Service check box.

The Destination Index is the Modbus/TCP slave address used by the Client software to decide which remote device to dial. Valid entries are 1 to 64.

The DC IA is the slave address of the MICRO-DCI

The QUCM port is the port that the message will be transmitted from. Possible values depend on the settings of the serial ports.

The Name is a text description for the remote slave. This description is shown in most QUCM tables. The maximum length is 20 characters.

The In Service check box is used to temporally disable a device.

Serial Port Configuration

The Serial Port Configuration page is used to set up the parameters for the local modems.

The Port Mode allows the setting of Port 1 or Port 2 operation. The only mode at the present time is MICRO-DCI Master.

The Baud Rate settings allow the chosen serial port to be set at 1200, 2400, 9600, and 19200 baud. The default values are 9600.

The Parity setting allow the port to be set to NONE or EVEN. The default value is EVEN.

The Encoding determines the "byte stuffing" feature of the protocol. NORMAL mode inserts an extra 00 byte after each 7E byte other than SOH. MODIFIED mode does not stuff this byte. NORMAL mode is the default.

Edit Title Page

The Edit Title page allows the setting of the HTML Title and Head values. The Title is displayed at the top of most browsers and it also the text displayed when bookmarked. The Head is the text displayed in bold at the top of every QUCM web page.

QUCM TCP/IP Configuration

The QUCM TCP/IP page allows the changing of the IP Address, Subnet Mask, and Default Get of the QUCM. The new settings are not automatically stored to flash so they must be stored after the change.

Change Password

This page allows the user to change the default password for the configuration of the QUCM.

Store Configuration to FLASH

The Store Configuration to FLASH link must be used to save the current settings to non-volatile memory. All changes will be lost on power cycle if the store to flash is not used.

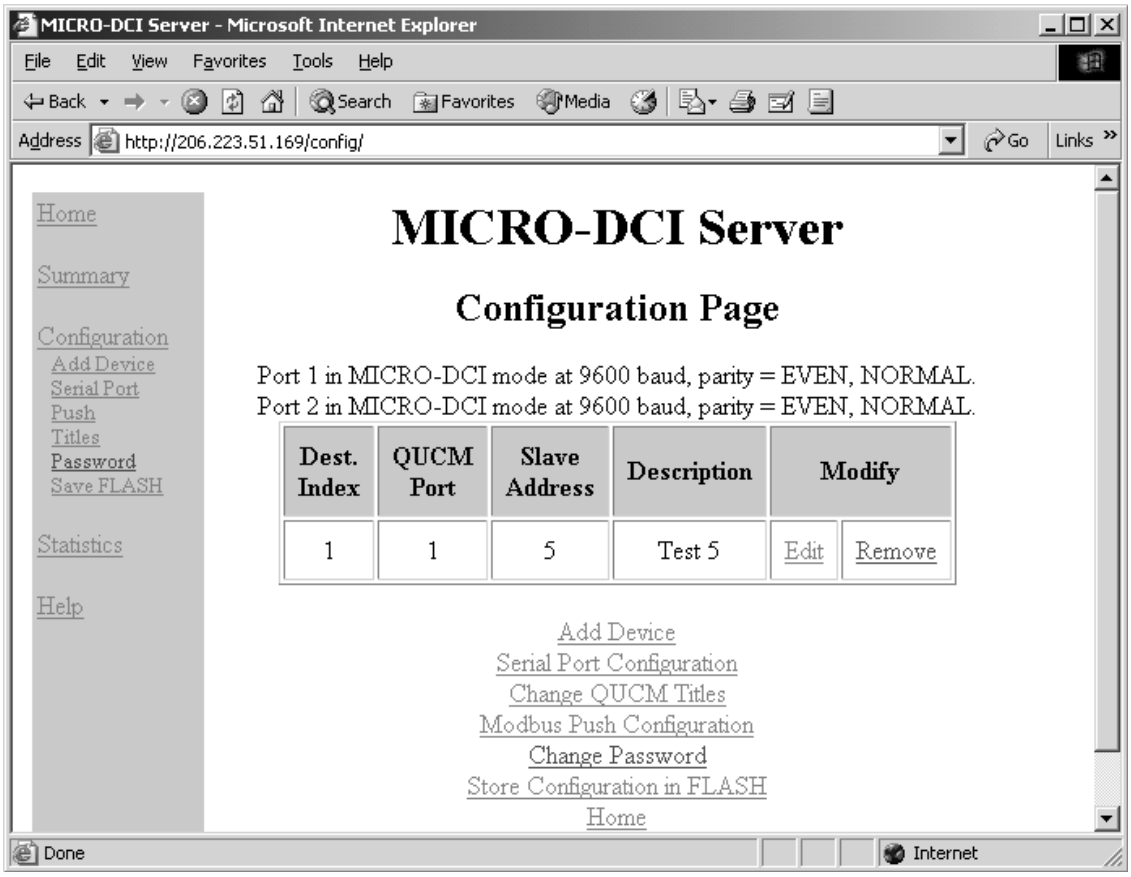


Figure 4-5 Configuration Page

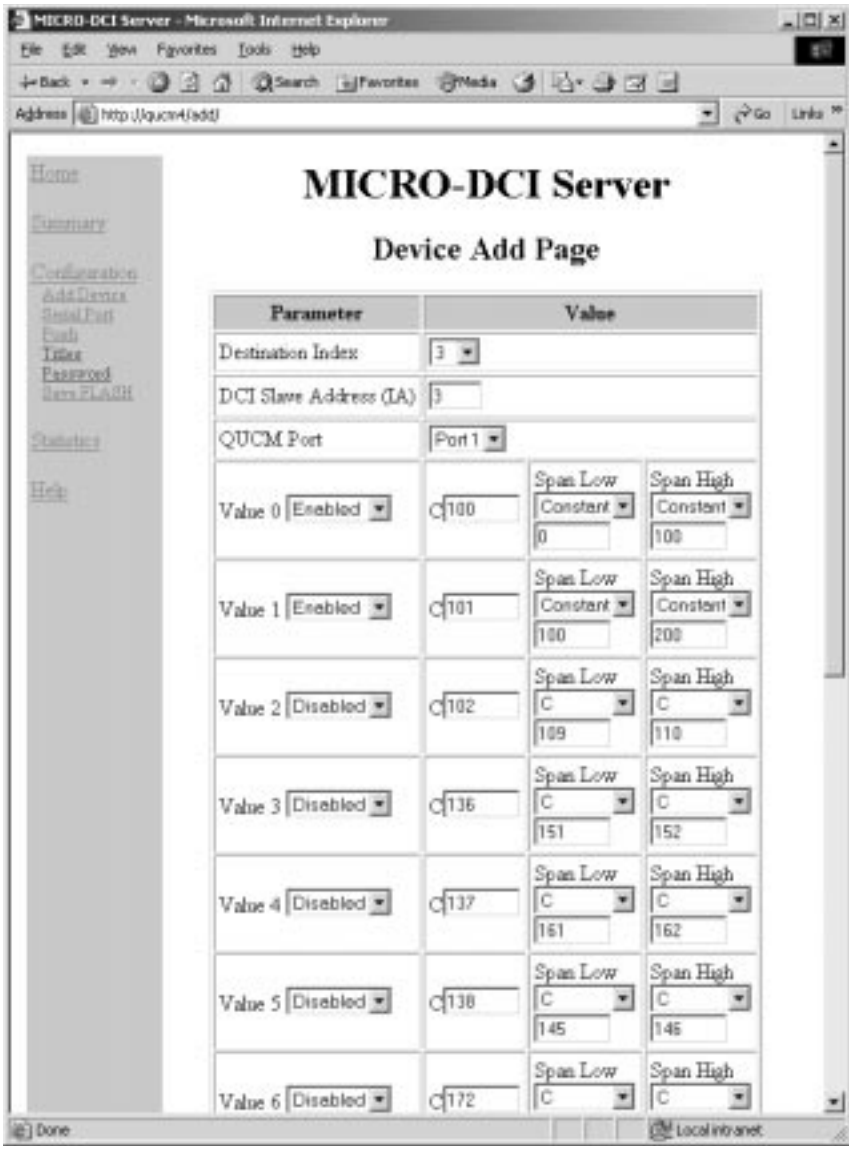


Figure 4-6 Add Device Page

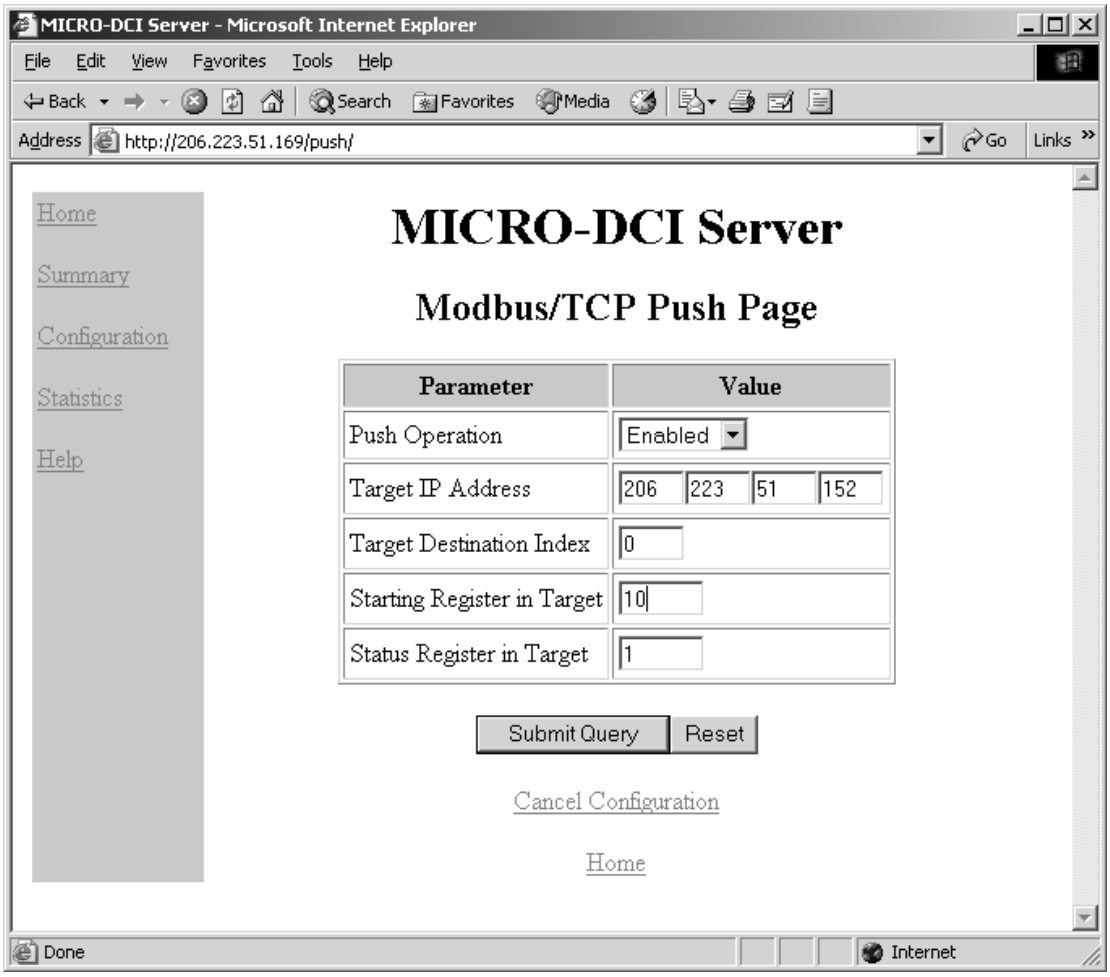


Figure 4-7 PUSH Configuration Page

Statistics Pages

There are two links for statistics: QUCM and Device stats. (See Figure 4-8 for the QUCM stats sample page) The QUCM stats page shows a variety of information about the QUCM itself including the MAC address, IP settings, firmware revisions and downloaded application revisions. The Device Stats page shows a summary of the communication counters for each device.

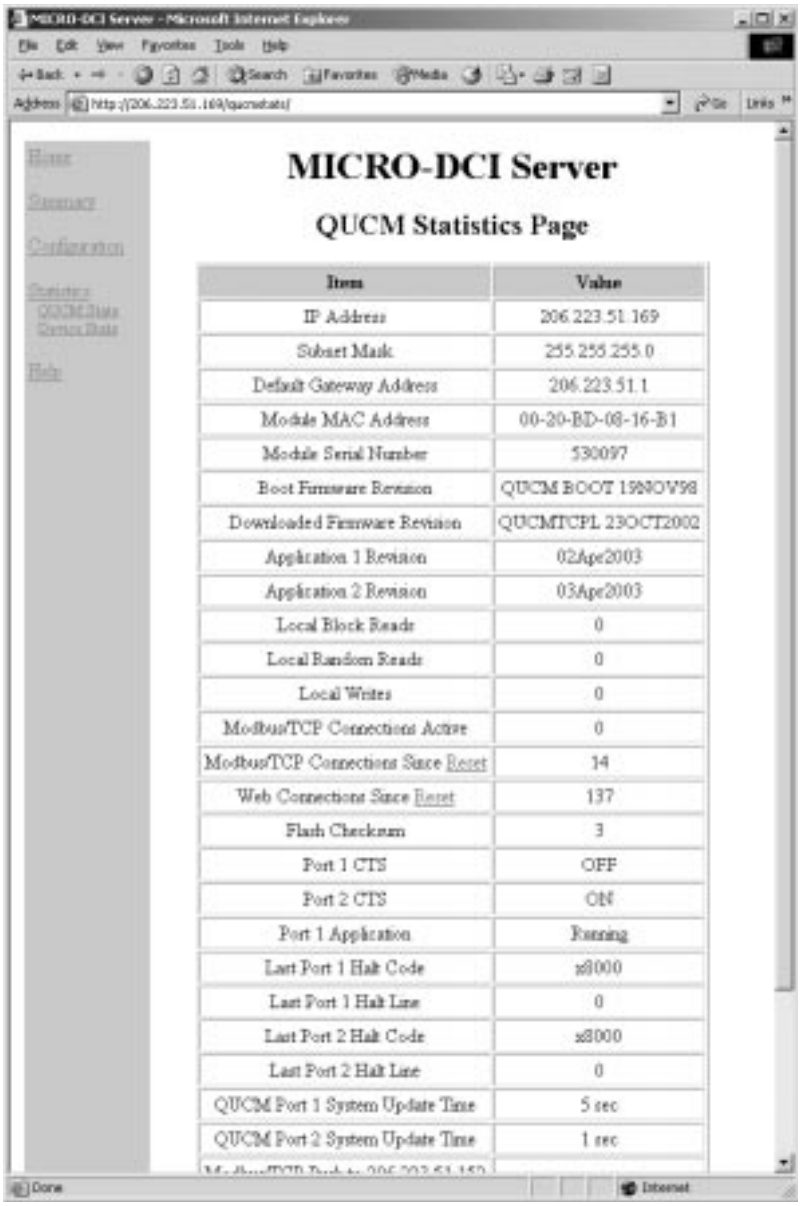


Figure 4-8 Statistics Web Page

Help Pages

There are a number of help pages to assist in understanding how the QUCM and MUCM work together, serial cable pinouts, and links to support from Niobrara's web site. Figure 4-9 shows the help page for the DDC2I.

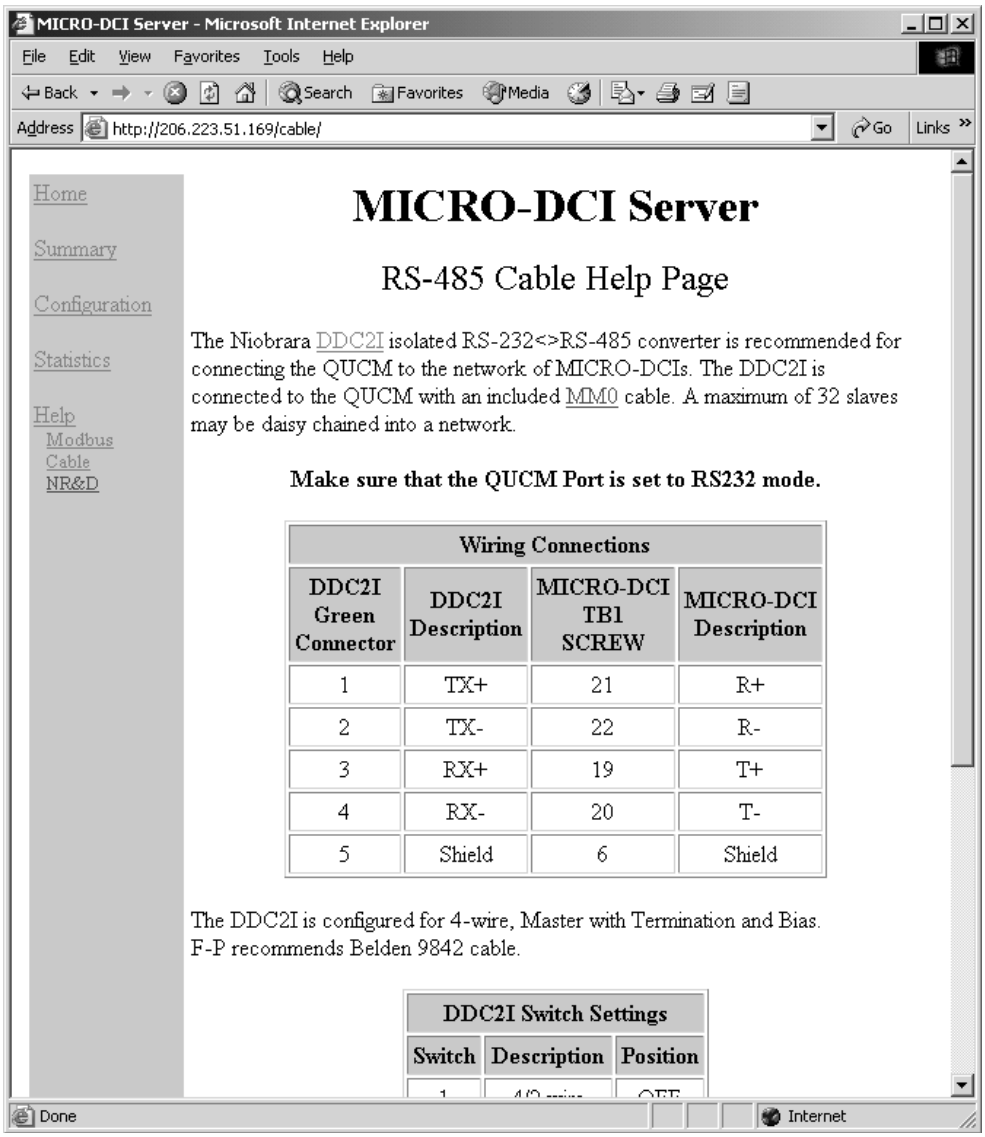


Figure 4-9 Cable Help Page