Product Type: ASC/2

Reference: AN2119
Date: 11 September 2009

ASC/2M-1000 Ethernet Feature to Connect to ASC/2S Locals

Purpose

This application note gives the necessary hardware components and a procedure to use Ethernet-type communications to connect an *ASC/2M-1000* Master Controller to four *ASC/2S* Local Controllers.

Introduction

There are many factors involved in a successful implementation of an Ethernet-type Communications Network. Most of these factors are beyond the scope of this application note and are not included here. We assume that you are knowledgeable with the various Microsoft Windows® operating systems, administrative functions, and general LAN/WAN terminology and topologies.

Figure 1 shows the basic design discussed in this document. For more information, contact Econolite Technical Support.

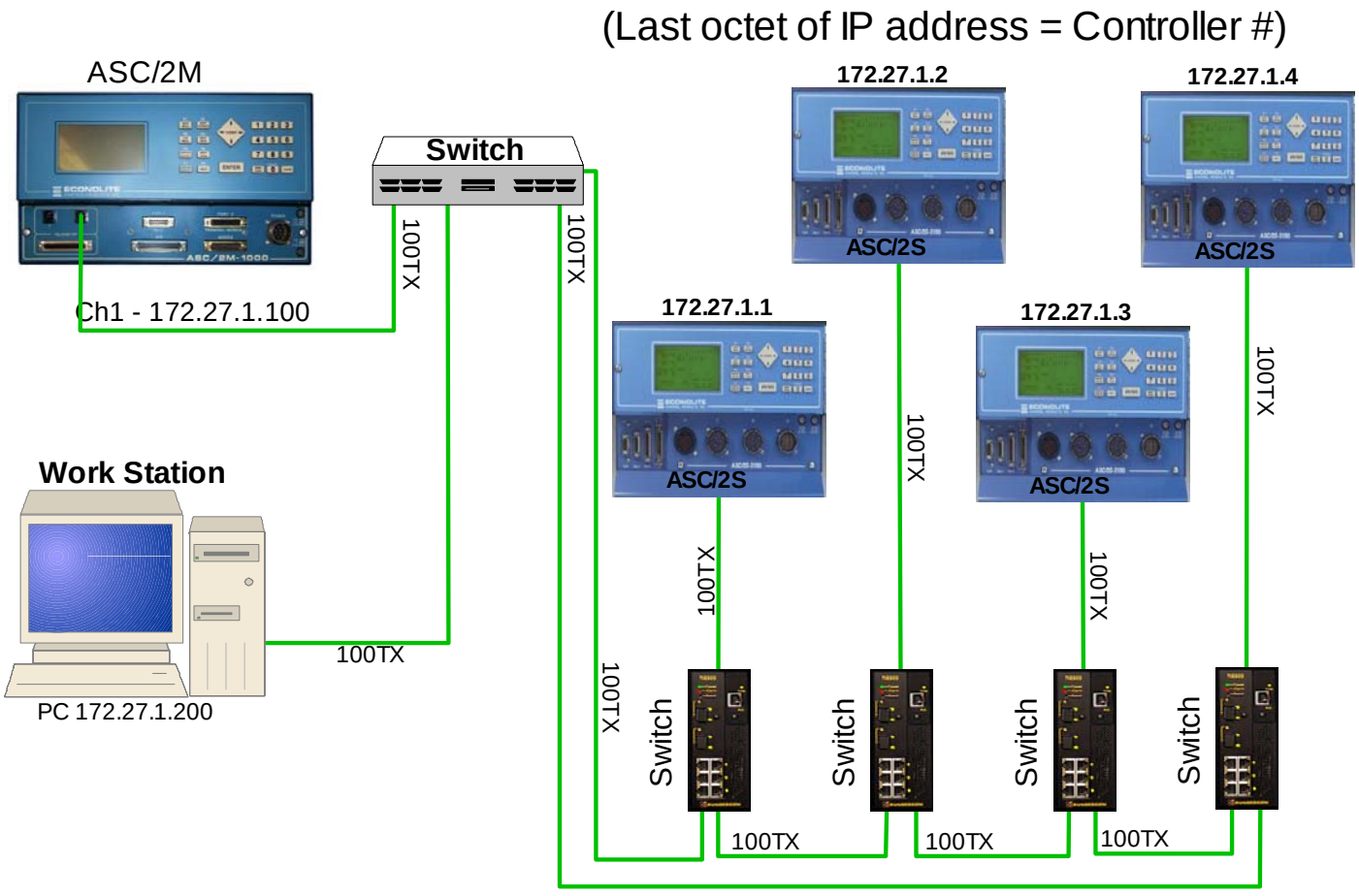

Figure 1. *ASC/2M-1000* to *ASC/2S* Ethernet Connection

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Hardware

Most of the hardware listed here is shown in Figure 1. However, some of the hardware is internal to the devices shown and thus is not in view.

- ***ASC/2M-1000* Ethernet Communications Modules** These modules are installed inside the *ASC/2M-1000* master controller (one or two per *ASC/2M-1000*) and meet all its environmental specifications.
- **Switch** The usual name for this is a "Layer 2 Switch" or a "Bridge." Units are available from many different manufactures such as Ruggedcom, etc. and come in many different port configurations (4, 8, 10 port units are most common). It is necessary for switches installed in the traffic cabinet to be environmentally hardened to at least the NEMA specification of -35ºC to +74ºC.
- **ACS/2S Ethernet Communications Modules** These modules are installed inside the *ASC/2S* and are available as a field-installable upgrade. They meet all environmental specifications of our *ASC/2S* controller.

  Note: This module is designed for the *ASC/2S* controller. It cannot be used with the older *ASC/2*.

- **Workstation** Any common Desktop or Laptop running any of the latest versions of the Microsoft Windows OS and an Ethernet port. Computer setup:
  - Set the IP address to agree with your LAN.
  - If you use XP or Vista, make sure that your windows firewall is turned OFF.

When you install the Ethernet modules in the *ASC/2S* controllers, record the MAC Address listed on each module. You will need this information when you configure the hardware. Here is a sample table, which includes some other necessary information that you will use later:

Controller #	MAC Address	IP Address*	UDP Port
1	00:40:9D:2A:C7:D4	172.27.1.1	5001
2	00:40:9D:2A:E2:4F	172.27.1.2	5002
3	00:40:9D:2A:54:A8	172.27.1.3	5003
4	00:40:9D:24:39:B8	172.27.1.4	5004
Master Ch1	00:40:9D:2A:5E:A8	172.27.1.100	5100

* The IP addresses in this table are the same as the example in this document. They will probably be different in your particular deployment, because they will need to be same as your current LAN/WAN infrastructure. Notice that the IP address and UDP port number assigned to each controller are unique.

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Design Considerations

Network This application note is not intended to describe all of the variables that go into network design.

If you need design assistance in this area, please call your Econolite sales representative, and he/she will make arrangements.

Specifically, this application note is intended to describe cabled infrastructure (Ethernet over fiber/copper) only. We have not yet tested this on different wireless technologies.

Note: All devices on an Ethernet network must contain a unique IP address. But the Subnet mask must be identical on each device.

Controllers There are several ways to implement a closed loop system over IP (CL/IP). Three of these are listed below, each with its application note(s):

- This application note, AN2119, describes an *ASC/2M-1000* Master that uses an internal Ethernet module to talk to *ASC/2S* locals with *ASC/2S* internal Ethernet modules.
- If you have older *ASC/2* controllers and/or a mixture of *ASC/2* and *ASC/2S* controllers, refer to AN2107, *ASC/2M to ASC/2 Ethernet Connection Using Ruggedcom Terminal Servers*.
- For an *ASC/2M-1000* Master with *ASC/3* locals:
  - If the *ASC/2M-1000* has the Ethernet feature (two Ethernet connectors on the front panel), refer to AN2120, *ASC/2M Ethernet Feature to Connect to ASC/3 Locals*.
  - If the *ASC/2M-1000* does NOT have the Ethernet feature (no front-panel Ethernet connectors), refer to AN2116, *ASC/2M to ASC/3 Ethernet Connection Using Digi Portserver TS2 H MEI*.

Aries You can also use a Digi Portserver to connect an *ASC/2M-1000* Master to *Aries*. Refer to the illustration below & application note, AN1063, *ASC/2M Ethernet Connection Using Digi PortServer TS1 H MEI*.

Telemetry Connectors
- Only connect to local controllers.
- Connect to an *internal* card cage to one or two optional modules.
- The top two connectors go to optional Ethernet modules that are installed in the *internal* card cage.

Terminal/Modem Connectors
- Use Port 2 to connect to *Aries* with Ethernet.
- To connect with Ethernet, you must route through an *external* Digi PortServer TS1 H MEI, as given in AN1063.

Notes:
- This application note assumes that you know how to set up a master-local communications channel, and so portions of that procedure are not given here.
- If you have not connected your hardware yet, please do that now per Figure 1 on Page 1.

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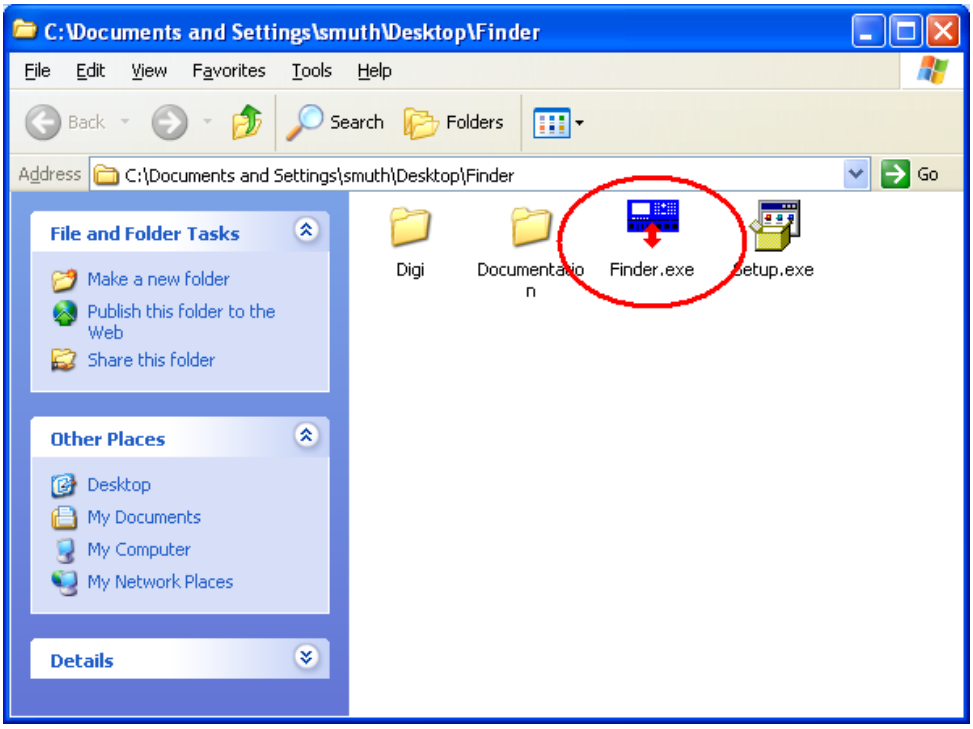
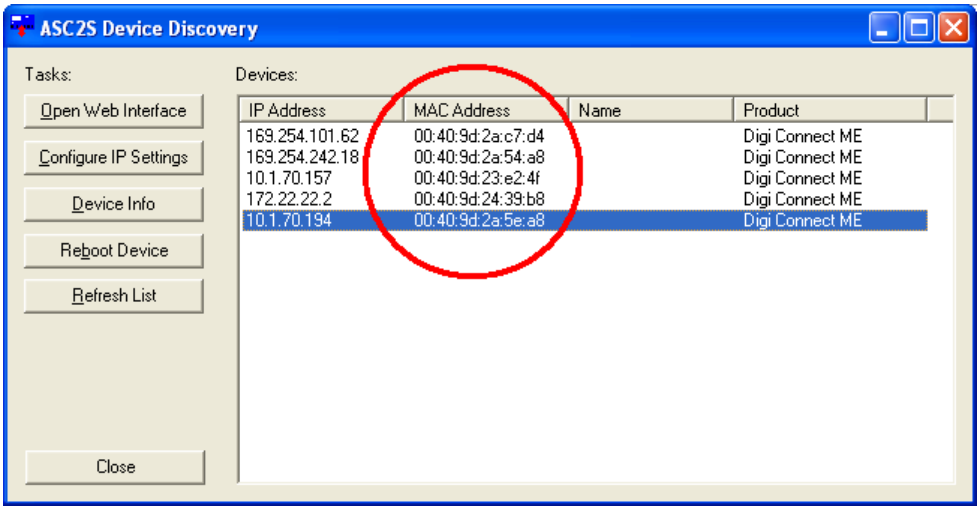
Device Configuration: *ASC/2M-1000* Ethernet module

Part I: Setup of the Ethernet Adaptor in Channel 1 of the *ASC/2M-1000* Master Controller

1. Insert the CD that comes with the *ASC/2M-1000*.
2. Run the **Finder.exe** application.



3. You should see something similar to this screen. (*You should see the MAC addresses that you recorded when you assembled the hardware; refer to Page 2.*)
4. Highlight the Ethernet device that is in the Masters Telemetry channel 1, (*our example is 00:40:9d:2a:5e:a8*) and click Configure IP Settings.



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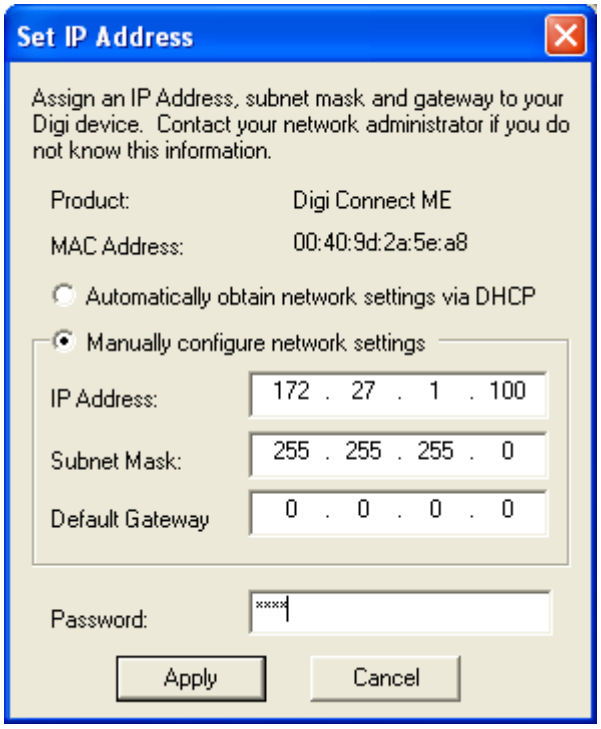
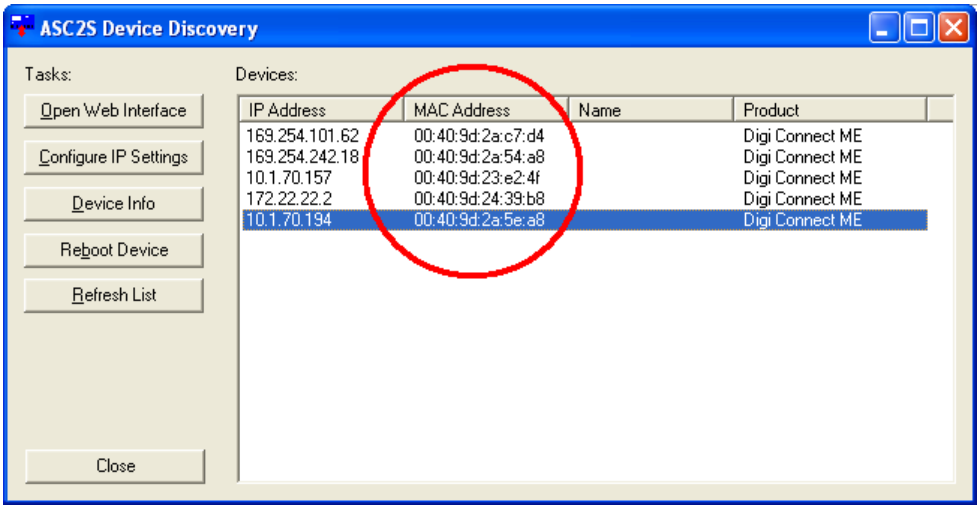
5. Enter the IP settings recorded in your table. Enter the password for the Ethernet module (factory default password is “dbps”.).
6. Click Apply.



7. With the Masters Ethernet adapter still highlighted, click Reboot Device.



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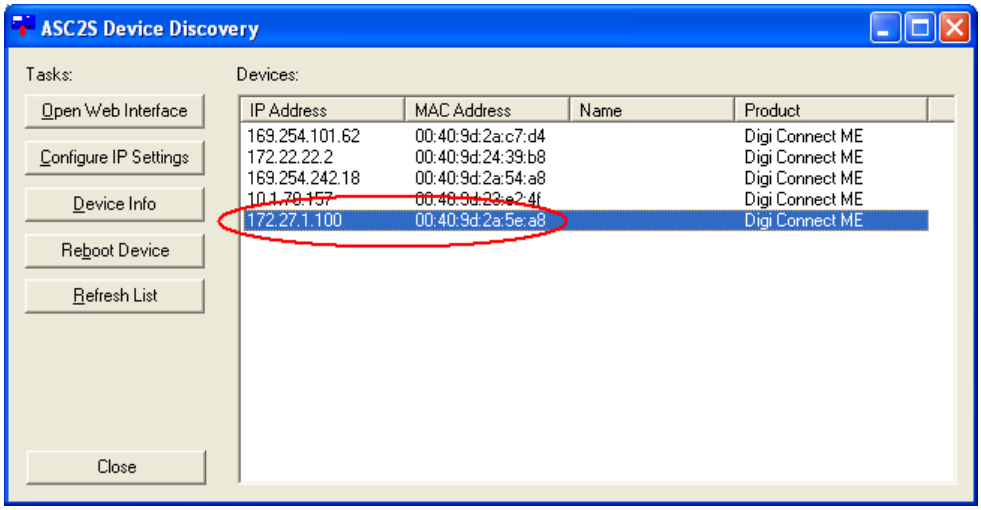
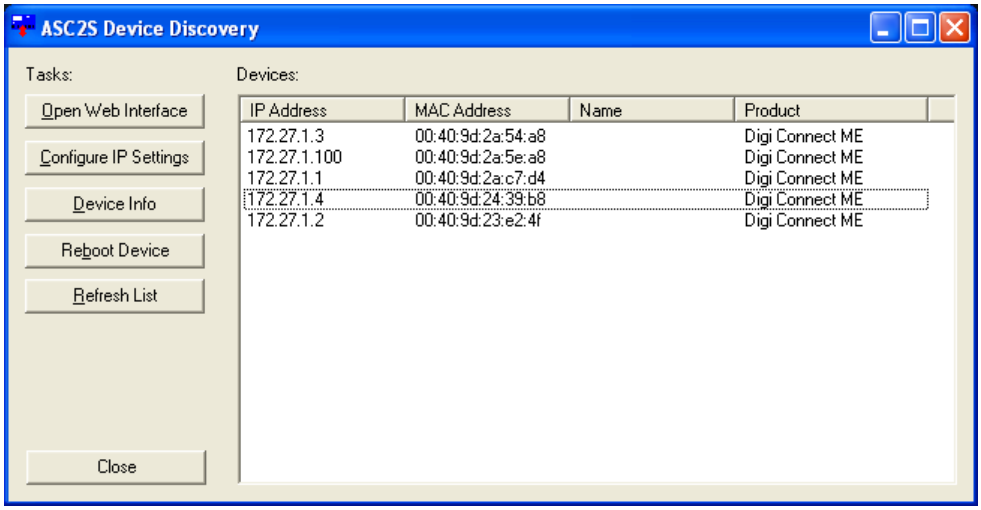
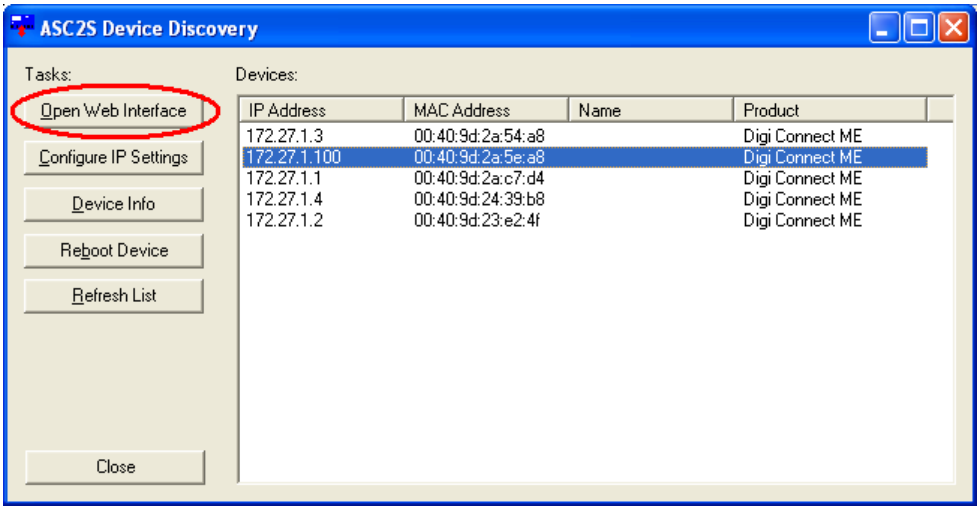
8. After you click Reboot Device, wait about one minute for the reboot, then click Refresh List. You should see the Masters Ethernet adapter with the correct IP address assigned.



9. Repeat Steps 4 thru 8 for the other controllers until they are all correctly configured.



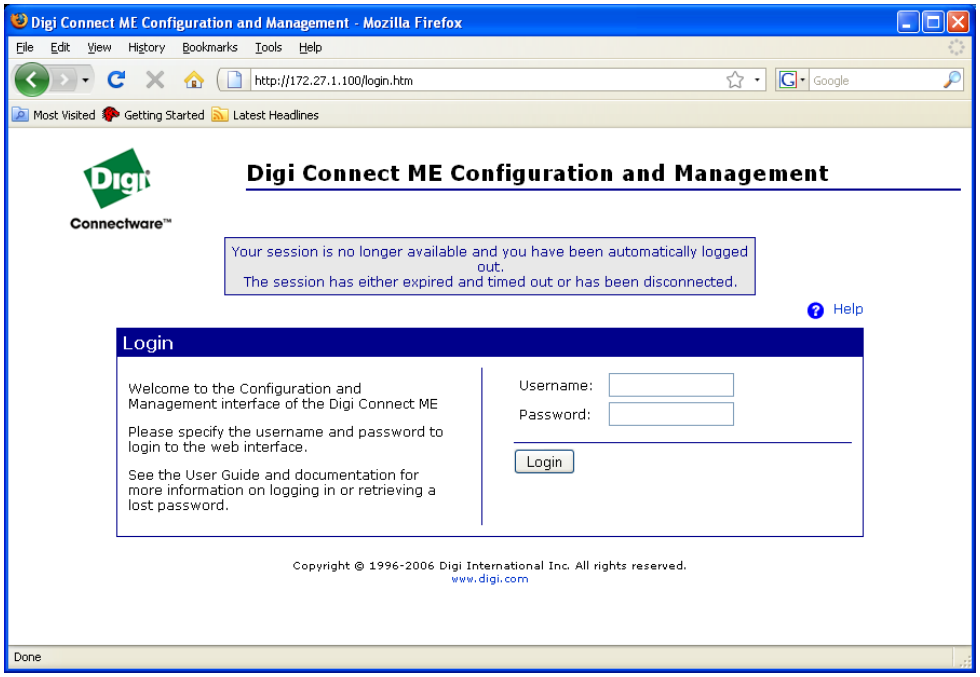
10. When you have configured all of the IP settings with the Discovery utility, highlight the *ASC/2M-1000* Ch1 Ethernet interface and click Open Web Interface.



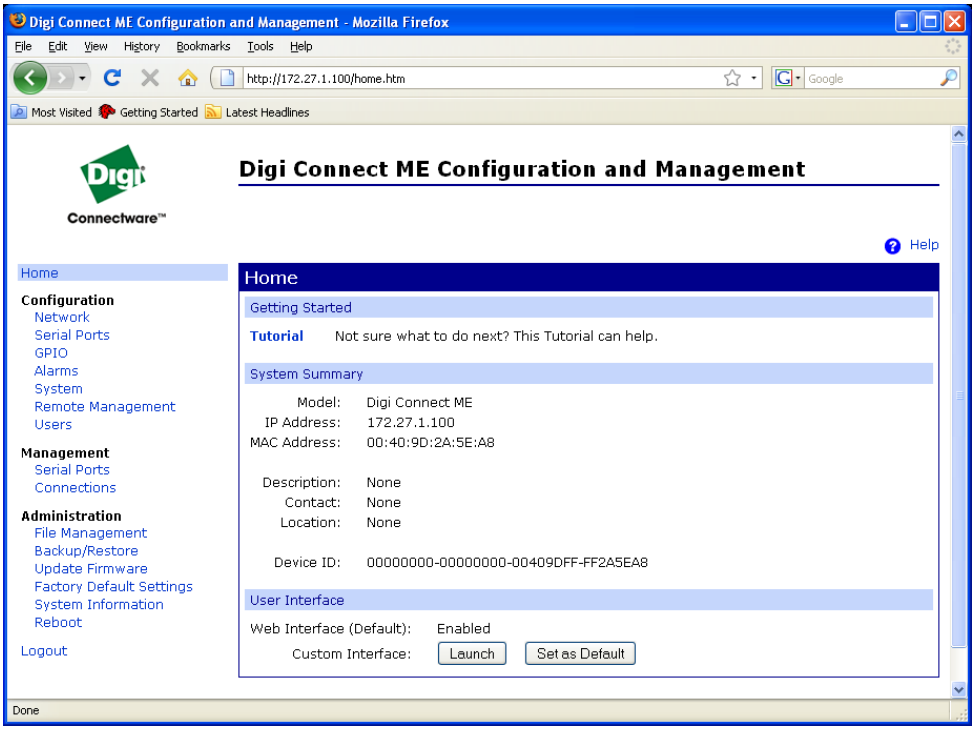
11. This action should open a web browser and go to the Login screen of this Ethernet adapter. This example uses the web browser Mozilla Firefox. What you actually see depends on the software installed on your computer.

    A. Enter the Username and Password. Factory defaults are:
    Username: **root**
    Password: **dbps**

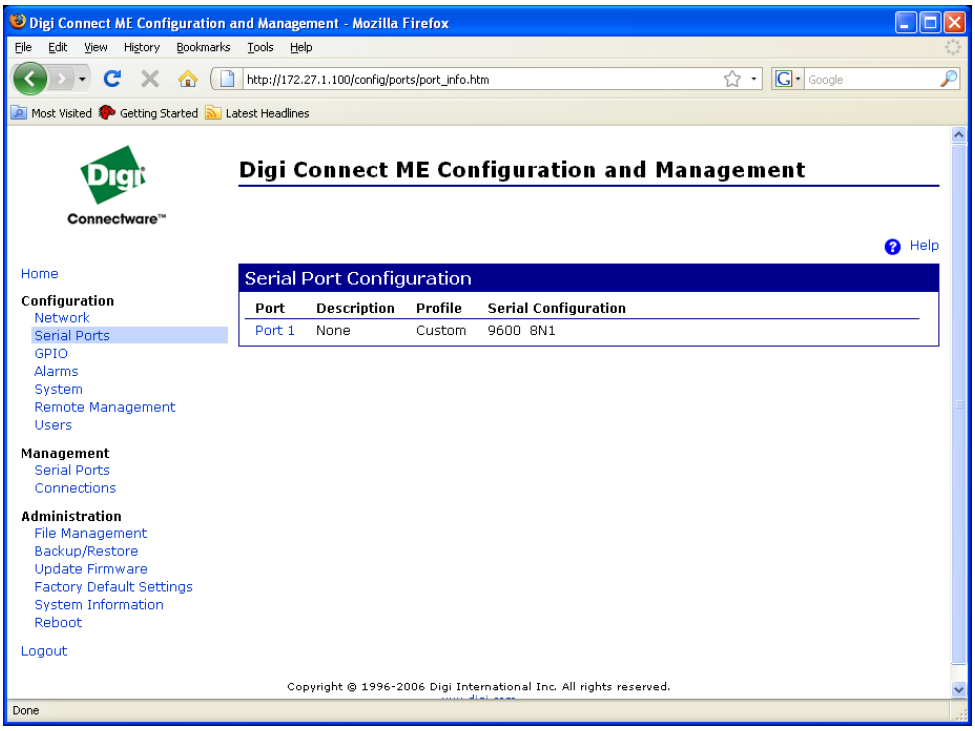
    B. Click Login.



12. Under “Configuration,” select “Serial Ports.”



13. Under “Serial Port Configuration,” select “Port 1."



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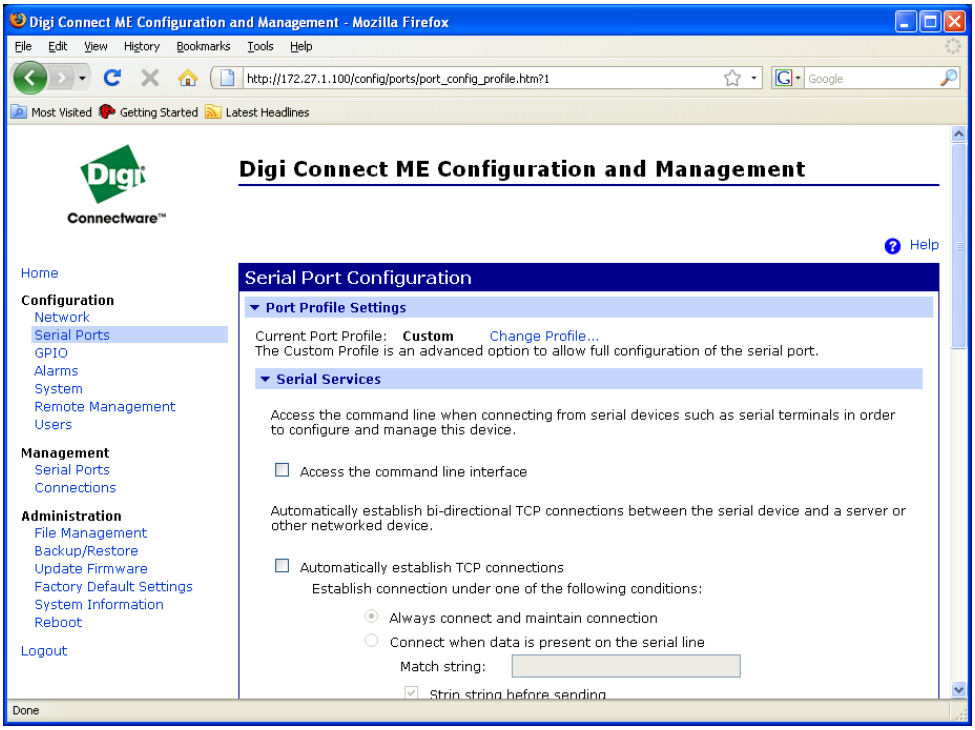
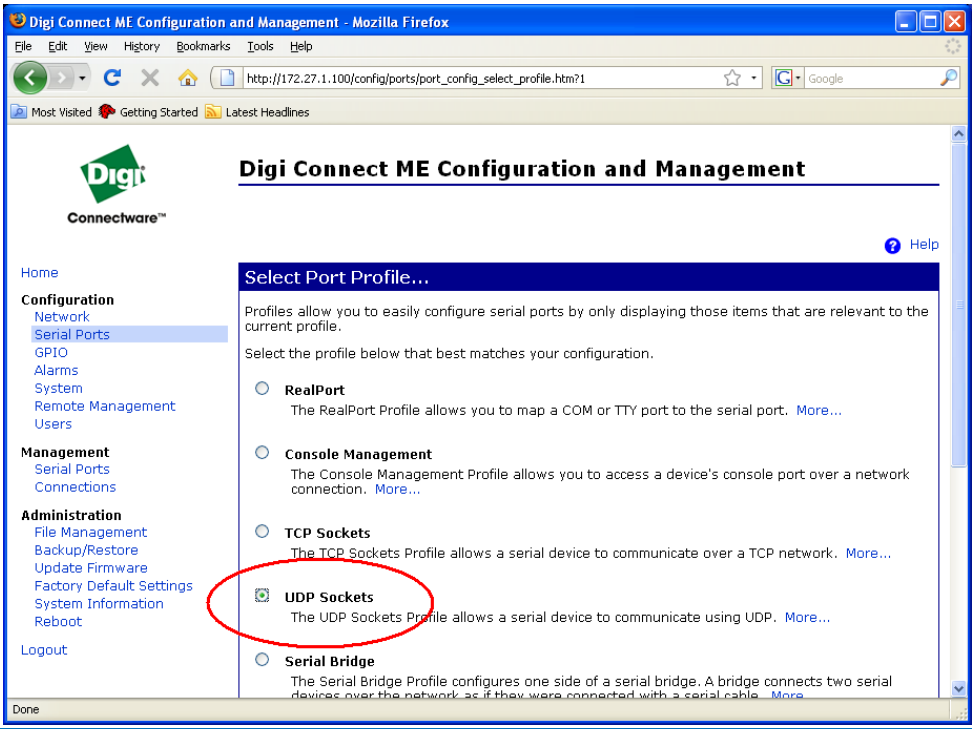
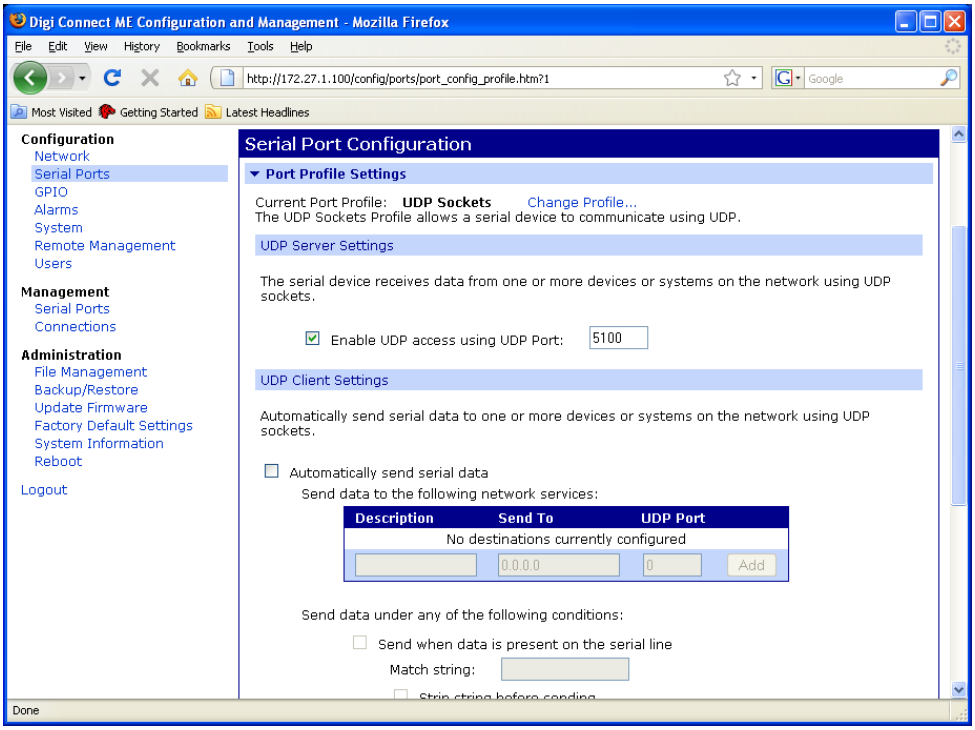
14. Under "Port Profile Settings," select "Change Profile…"



15. Select the radio button "UDP Sockets."
16. At the bottom of the page, click Apply.



17. Under "UDP Server Settings" change the UDP port number to match your table on Page 2.



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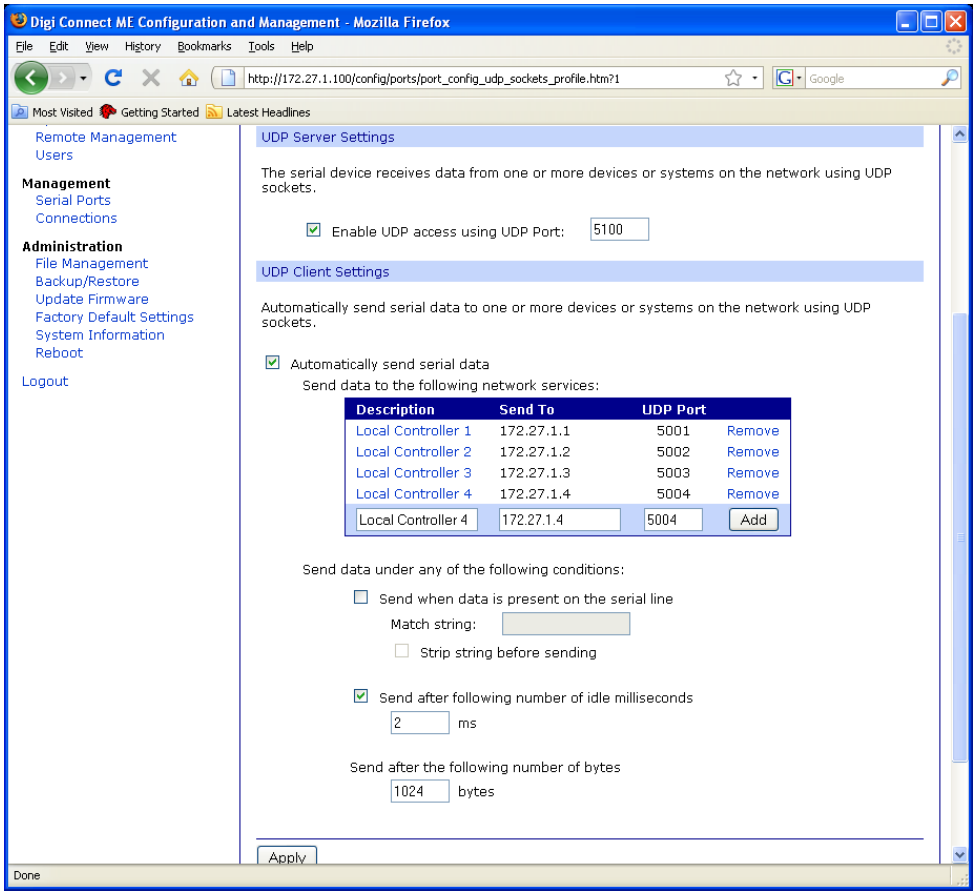
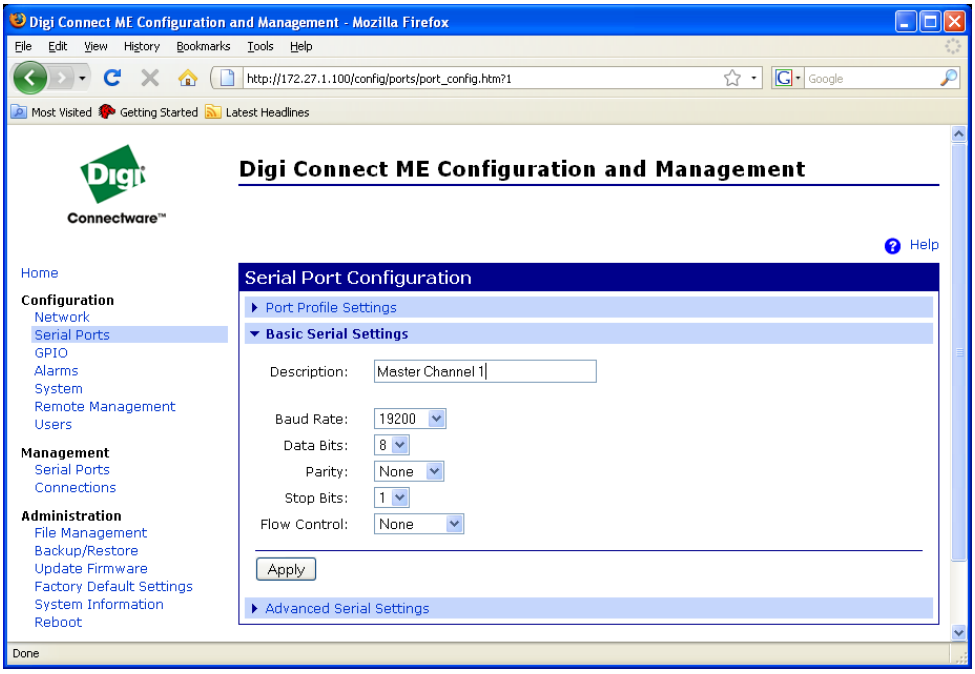
18. Under "UDP Client Settings," check the box "Automatically send serial data" and then, for each controller on the channel:
    A. Enter the Controller name, IP address and UDP Port number.
    B. Click Add.
19. Change the "Send data after the following number of idle milliseconds" field to 2 ms.
20. At the bottom of the page, click Apply.



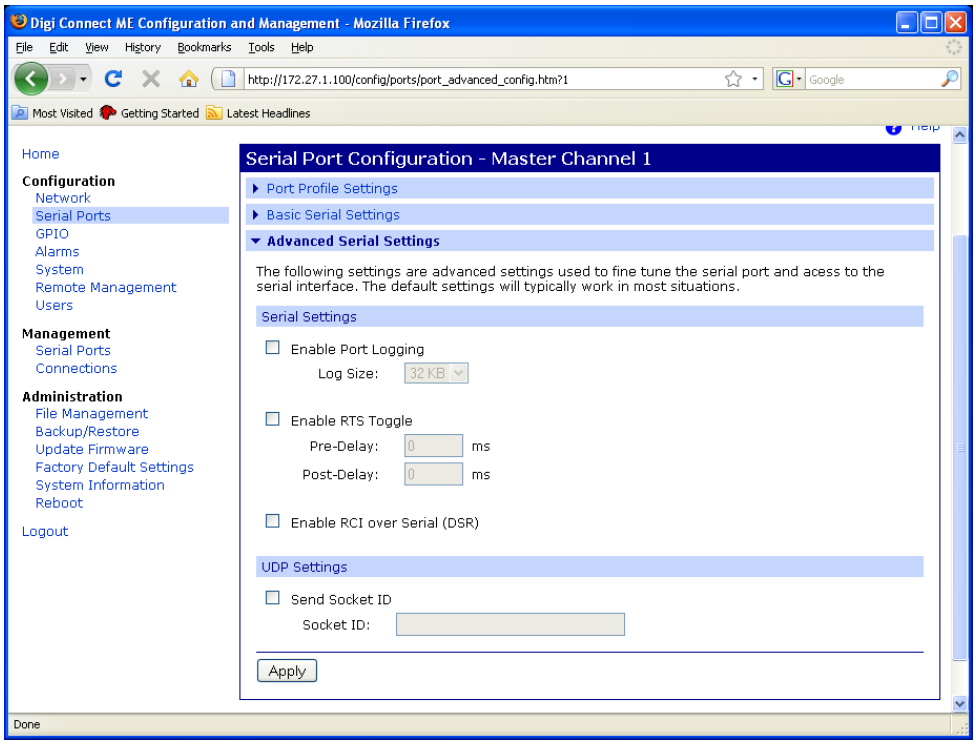
21. At the bottom of the page, click “Basic Serial Settings.”
22. Make these settings the same as the telemetry port settings on the *ASC/2M-1000* Master (MM-1-0-9). We recommend the settings shown.
23. Set “Flow Control” to “None.”
24. Click Apply.



25. Click “Advanced Serial Settings.”
26. Make sure that all boxes are unchecked on this page.
27. At the bottom of the page, click Apply.

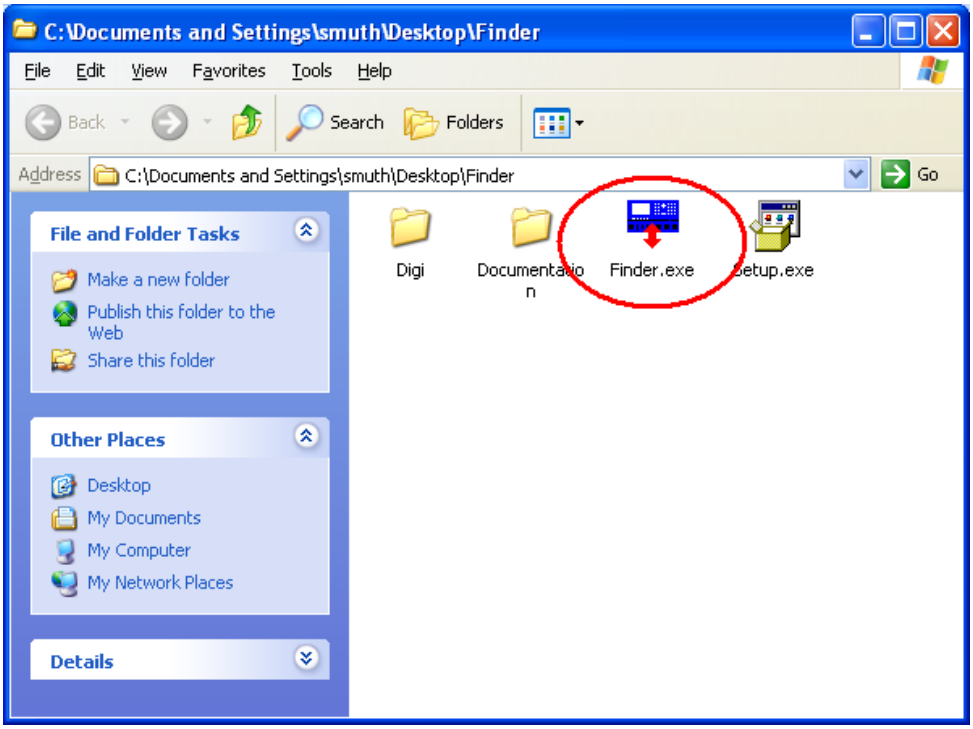
This is the end of the configuration for the Ethernet adapter in Channel 1 of the *ASC/2M-1000* Master Controller.

You can now Logout and close this window.

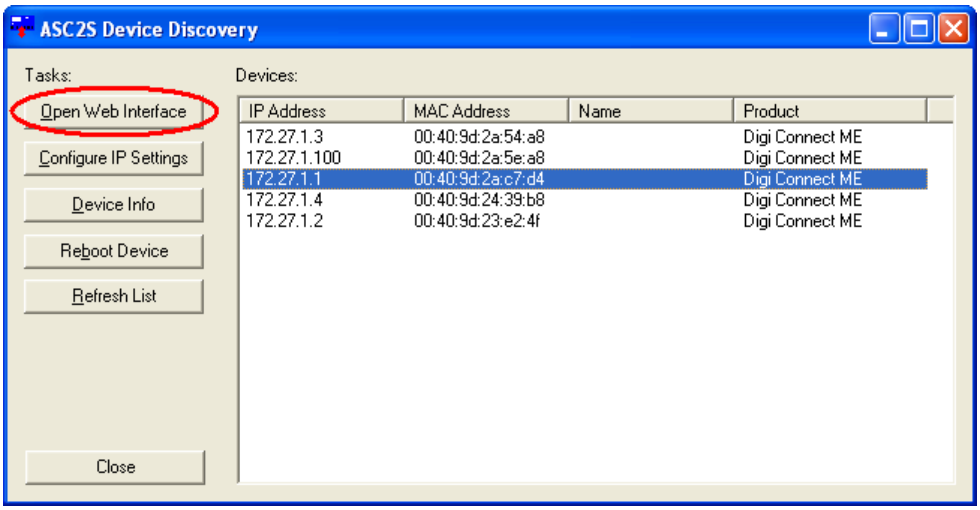


Part II: Setup of *ASC/2S* Controllers

1. Restart the Finder application.



2. Highlight the first Local Controller and click Open Web Interface.



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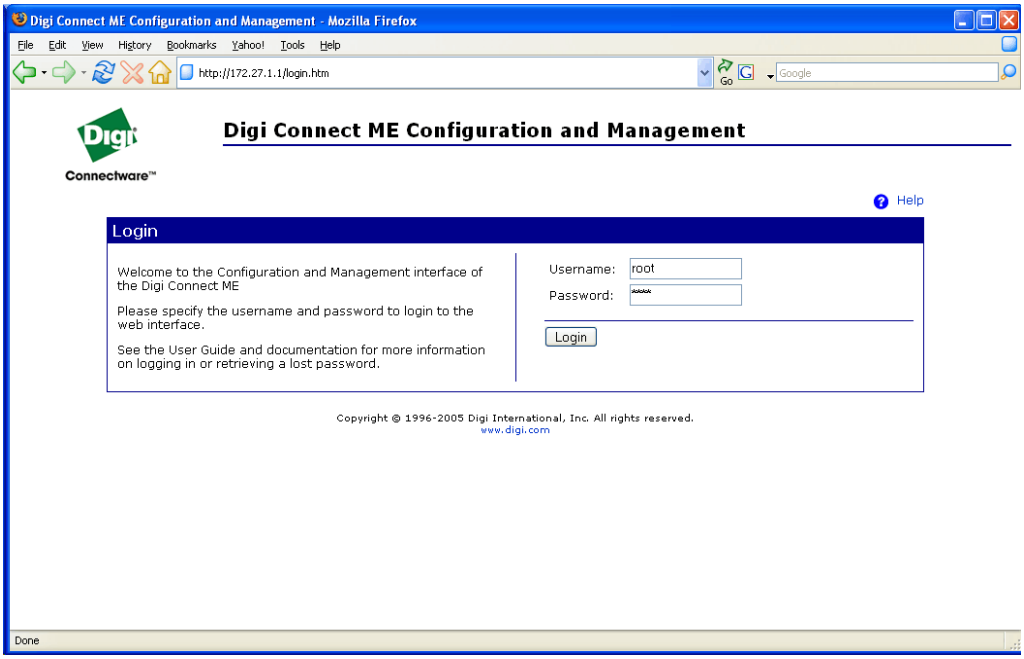
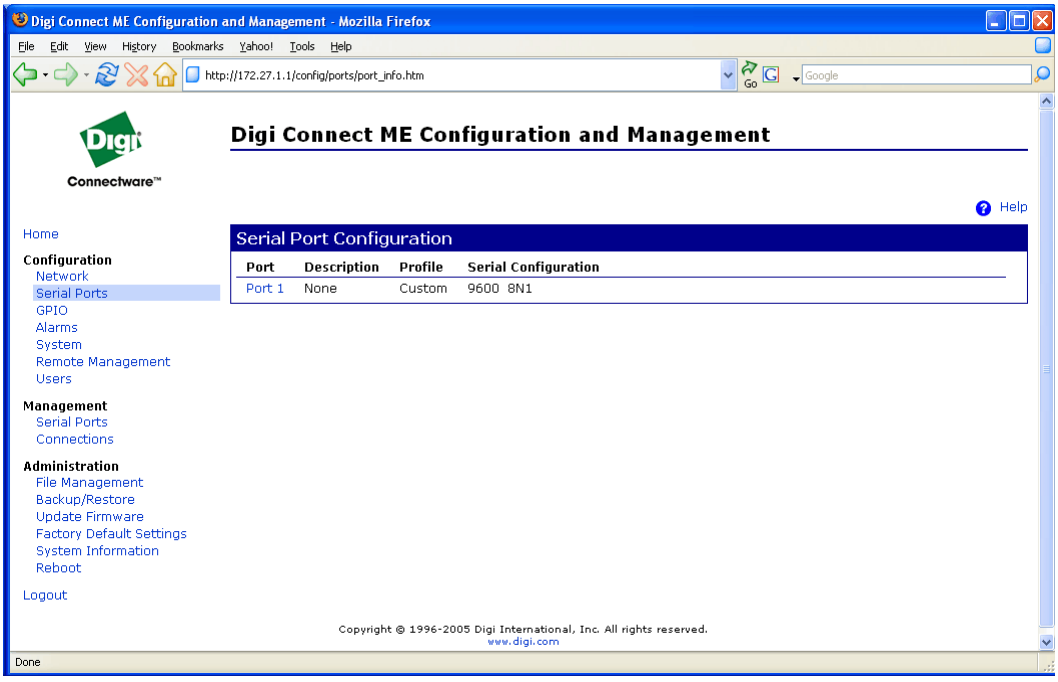
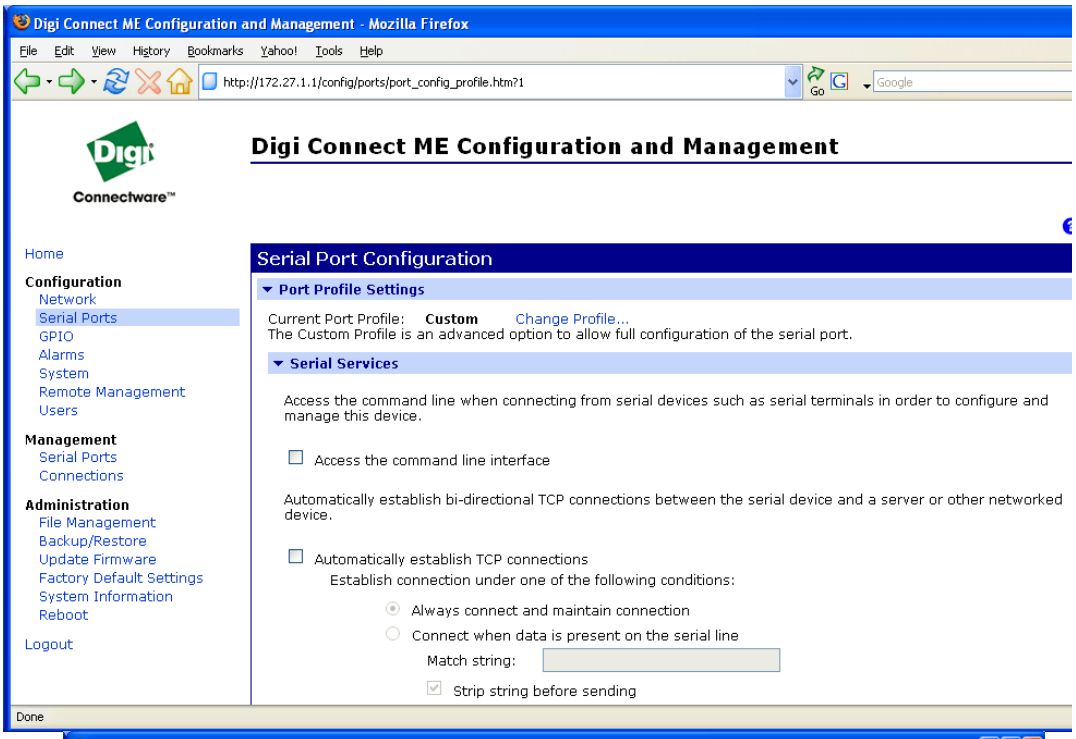
3. Enter the Username and Password. The factory defaults are: Username: **root** Password: **dbps**
4. Click Login.



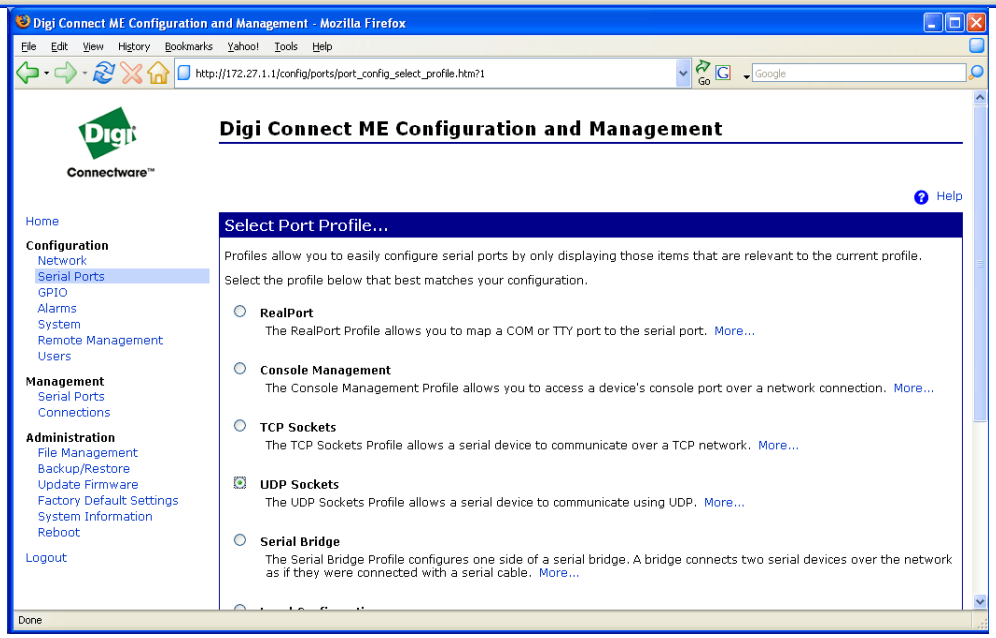
5. Under "Configuration," click "Serial Ports."
6. Click **"**Port 1."



7. Under “Port Profile Settings,” click “Change Profile...”



8. Click the radio button “UDP Sockets.”
9. At the bottom of the page, click Apply.



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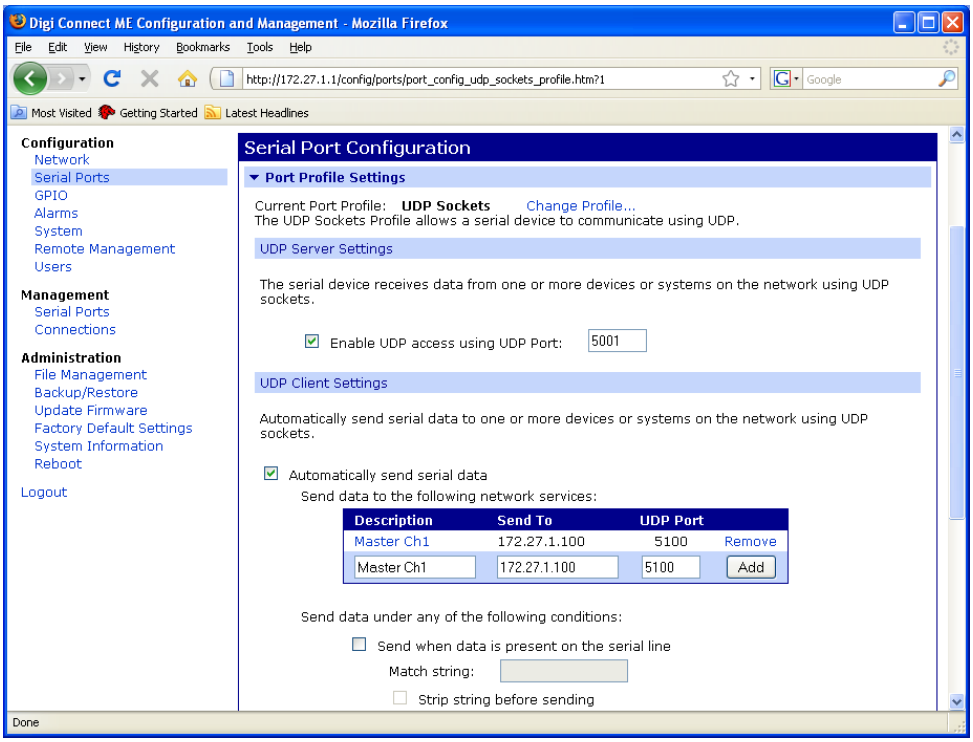
10. Make the UDP access port the same as that entered into the Digi TS2 that is connected to the *ASC/2M-1000* telemetry port. (You can also refer to the table you made when you installed the Ethernet modules in the *ASC/2S*.)
11. Check the box "Automatically send serial data."
12. Enter the IP address and UDP port number of the *ASC/2M-1000* Ch1 (as shown) and click Add.
13. Change the "Send after following number of idle milliseconds" to 2 ms.
14. At the bottom of the page, click Apply.



15. At the bottom of the page, click “Basic Serial Settings.”

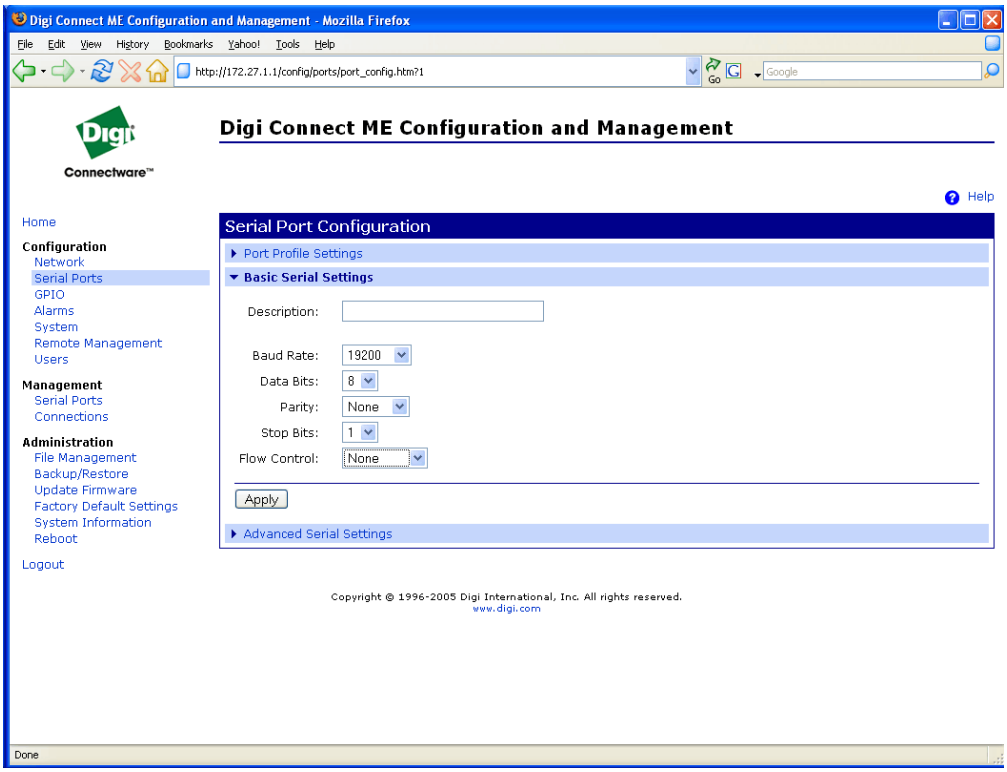
16. Adjust the serial settings to the same as the controller.

    We recommend the settings shown.

17. Change “Flow Control” to “None.”

18. Click Apply.

19. Repeat Steps 1 thru 18 for the other *ASC/2S* local controllers.



This is the end of the Digi configuration.

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Configuration of the Master

1. To configure the *ASC/2M-1000* telemetry settings, go to MM-1-0-9.
2. Enter the settings shown.

TELEMETRY SETUP AND OPTIONS

TELEMETRY SETUP

	CH1	CH2
DATA RATE (bps).....	19.2K	****
DATA FRAMING (parity, stop)	8,N,1	****
COMMANDS / SECOND	25	****
COMMAND TIME	724	****
WINDOW	80	****
BUFFER LEVEL	3	****
RTS TO CTS DELAY	0	****
TRANSMIT TIME	0	****

3. To enable devices in the *ASC/2M-1000*, go to MM-1-0-2.

   You will probably have more settings here because of more locals than this example.

ENABLE DEVICES

DEVICE#	SYSTEM DET.	CONT.	SPEED TRAP	TELEM. CHAN.
1.....	.	x	.	x
2.....	.	x	.	.
3.....	.	x	.	
4.....	.	x	.	
5.....	x	.	.	
6.....	x	.	.	
7.....	x	.	.	
8.....	x	.	.	

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4. To set up the Telemetry Sequence for Channel 1 in the *ASC/2M-1000*, go to MM-1-0-3.

   Again, your settings will probably be different for your application.

TELEMETRY SEQUENCE CHANNEL 1
(See HELP for caution.)

LOCAL TELEM ADDRESS	CTR 1-24	AUX 1-24	SDA1 1-32	SDA2 1-32	SDB1 1-32	SDB2 1-32
1...	1	1	1	0	0	0
2...	2	2	2	0	0	0
3...	3	3	3	0	0	0
4...	4	4	4	0	0	0
5...	0	0	0	0	0	0
6...	0	0	0	0	0	0

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Configuration of the *ASC/2S* Locals

To configure the telemetry port in the *ASC/2S*, go to MM-1-6.

The TELEMETRY ADDRESS is the controller number.

Note: The telemetry response delay metric is 922= 1 millisecond. Thus 19,362 is 21 milliseconds (922 x 21 = 19,362).

For other values, refer to the "*ASC/2* Telemetry Response Delay Table" at the end of this application note.

PORT3 CONFIGURATION

PORT3 PROTOCOL	TELEM
PORT3 ENABLE	YES
PORT3 MILISEC TIMING	NO
PORT3 RTS TO CTS DELAY	0
PORT3 RTS TURN-OFF DELAY	0
DUPLEX — HALF or FULL	FULL
MODEM DATA RATE (bps)	19.2K
DATA, PARITY, STOP	8, N, 1
TELEMETRY ADDRESS	(?)
SYSTEM DETECTOR 9 – 16 ADDRESS	0
TELEMETRY RESPONSE DELAY	19362
ADDITIONAL SCREEN(S)	

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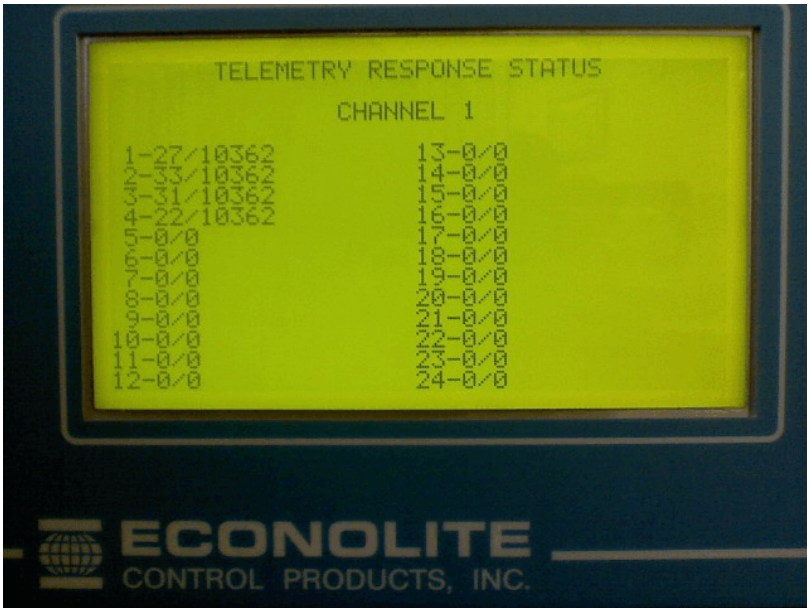
Make sure of Master-to-Local Communications

1. To go to the "TELEMETRY RESPONSE STATUS" screen, in the master, go to MM-3-6.

2. If all has gone well, the screen should be similar to the screen shown here.



Notice that packet loss is <1%.

Depending on your communications architecture, you may want to adjust the telemetry response delay (either up or down) in the locals to get the packet loss as low as possible.

ASC/2 Telemetry Response Delay Table

Delay metric	Amount of Time in msec
0	0
922	1
1844	2
2766	3
3688	4
4610	5
5532	6
6454	7
7376	8
8298	9
9220	10
10142	11
11064	12
11986	13
12908	14
13830	15
14752	16
15674	17
16596	18
17518	19
18440	20
19362	21
20284	22
21206	23
22128	24
23050	25