



Product Type: ASC/2

Reference: AN2106
Date: 26 January 2009

ASC/2M to ASC/2S Ethernet Connection
Using Digi PortServer TS2 H MEI

Purpose

This application note gives the necessary hardware components and a procedure to use Ethernet-type communications to connect an ASC/2M 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.

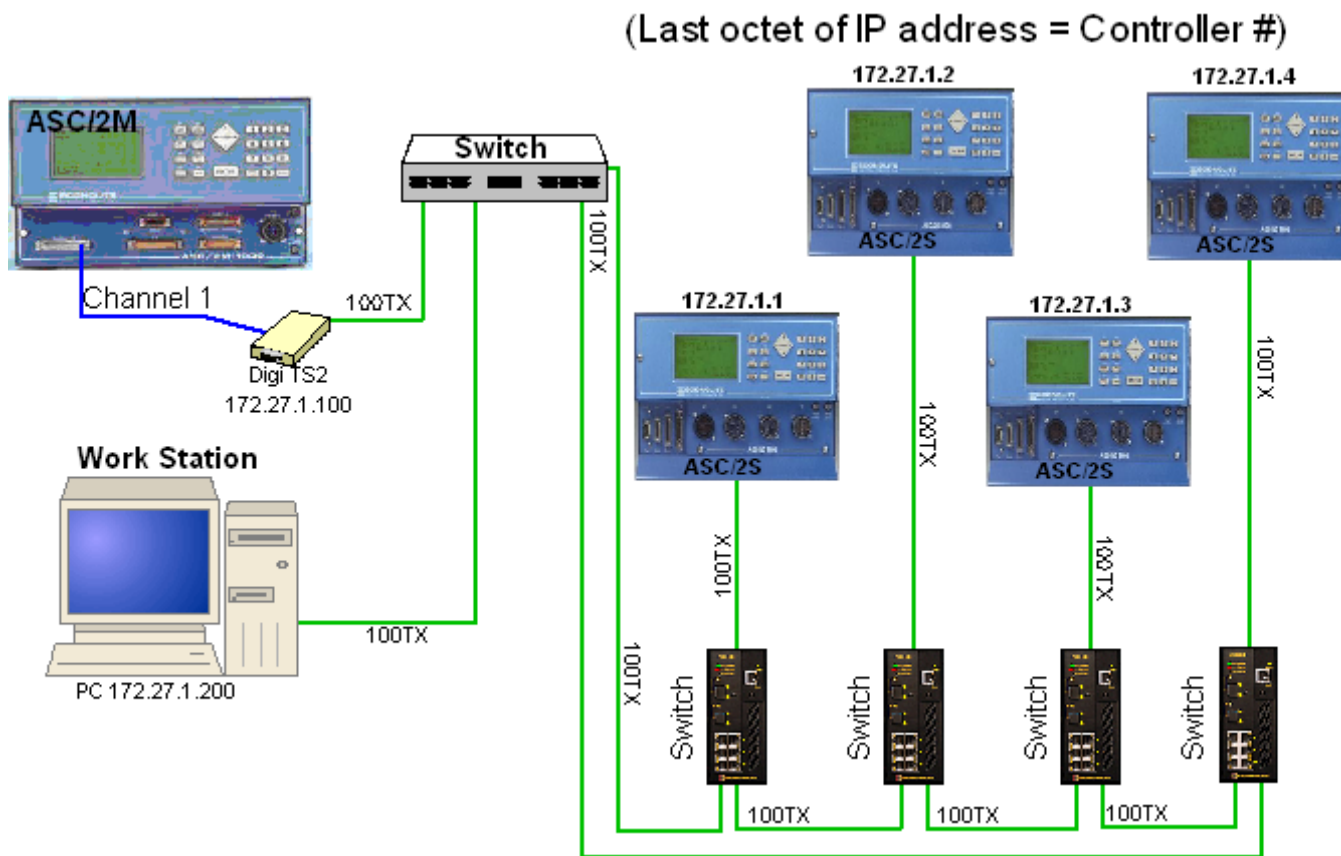


Figure 1. ASC/2M to ASC/2S Ethernet Connection through Digi Portserver TS2 H MEI



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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.

- **Digi PortServer TS 2 H MEI.** Each unit has a separate plug-in power supply. The Digi PortServer TS 2 H MEI unit meets the NEMA temperature range specification. It is temperature-hardened to operate from -35C to +70C. The unit supports both 10base-t and 100base-tx Ethernet speeds and auto negotiates the correct duplex operation. EIA-232 (RS-232) connections to the Master are thru an RJ45 to DB-9, male connector.

NOTE: This application note only applies to Digi brand Terminal servers and does NOT apply to other manufacturers or brands.

- **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 -35C to +70C.
- **ACS/2S Ethernet Communications Module.** 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 local controllers, record the MAC Address listed on each module. You will need this information later when you configure the hardware. Here is an example list:

Controller #	MAC Address	IP Address*	UDP Port
1	00:40:9D:2A:54:A8	172.27.1.1	5001
2	00:40:9D:2A:5E:A8	172.27.1.2	5002
3	00:40:9D:2A:54:25	172.27.1.3	5003
4	00:40:9D:2A:C7:D4	172.27.1.4	5004

* 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 the 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:

- This application note describes an *ASC/2M* Master used with an external Digi Terminal server 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 *2S* controllers, refer to AN2107, *ASC/2M to ASC/2 Ethernet Connection Using Ruggedcom Terminal Servers*.
- For an *ASC/2M* Master with *ASC/3* locals, refer the application note, *ASC/2M to ASC/3 Ethernet Connection using a Digi Portserver TS2 H MEI*, planned for release in early 2009.

Aries. You can also use the Digi Portserver to make a connection from Aries to an *ASC/2M* Master. Refer to application note, AN1063, *ASC/2M Ethernet Connection Using Digi PortServer TS1 H MEI*.

NOTE: This application note assumes that you know how to set up a master-local communications channel, and so that procedure is not given here.



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Device Configuration: Digi PortServer TS 2 H MEI - ASC/2M Telemetry Port

Part I: Configuration of the Serial Server that is connected to the ASC/2M Master Controller

1. On the back of the unit, set DIP switches for EIA-232 (RS232) operation.

NOTE: There are several different models of the Digi Portserver that will work with this application (TS1, TS2, and the TS4). Depending on which model you choose, these DIP switch settings may be different. For clarity, refer to specific product instructions.

Function	Switch Settings			
	1	2	3	4
EIA-232	Up	Down	Down	Down
EIA-422/485 Full-duplex	Down	Up	Down	If up, termination. If down, no termination
EIA-485 half-duplex	Down	Down	Up	

Up/On
Down/Off

EIA-232 EIA-422/485 Full-Duplex EIA-485 Half Duplex

2. Insert the CD that comes with the TS2.
3. Run the **setup**.

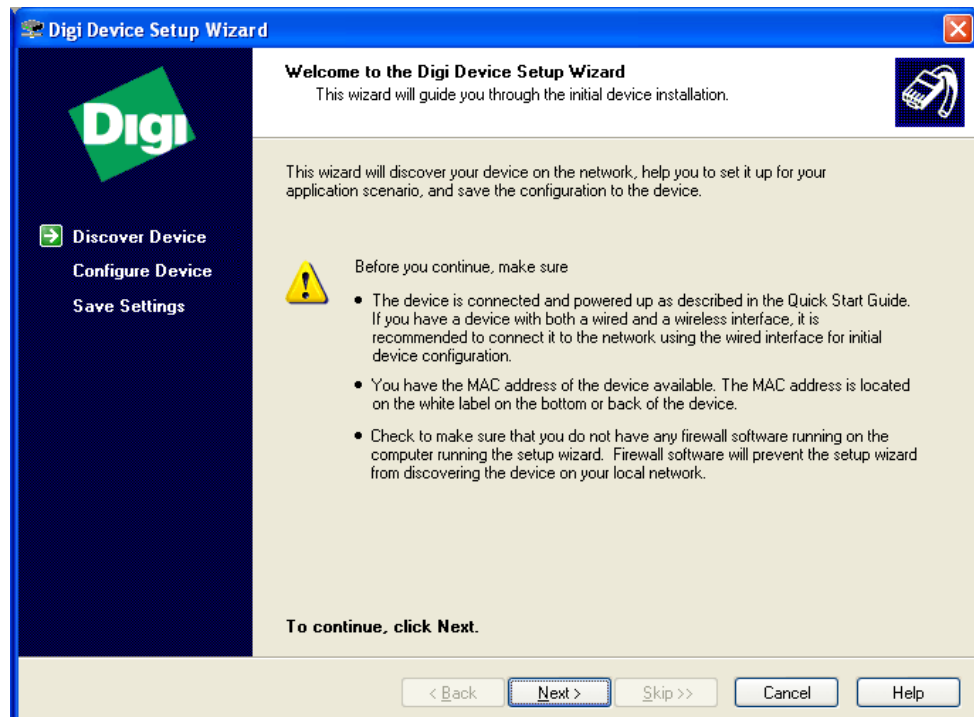




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4. Click [Next].

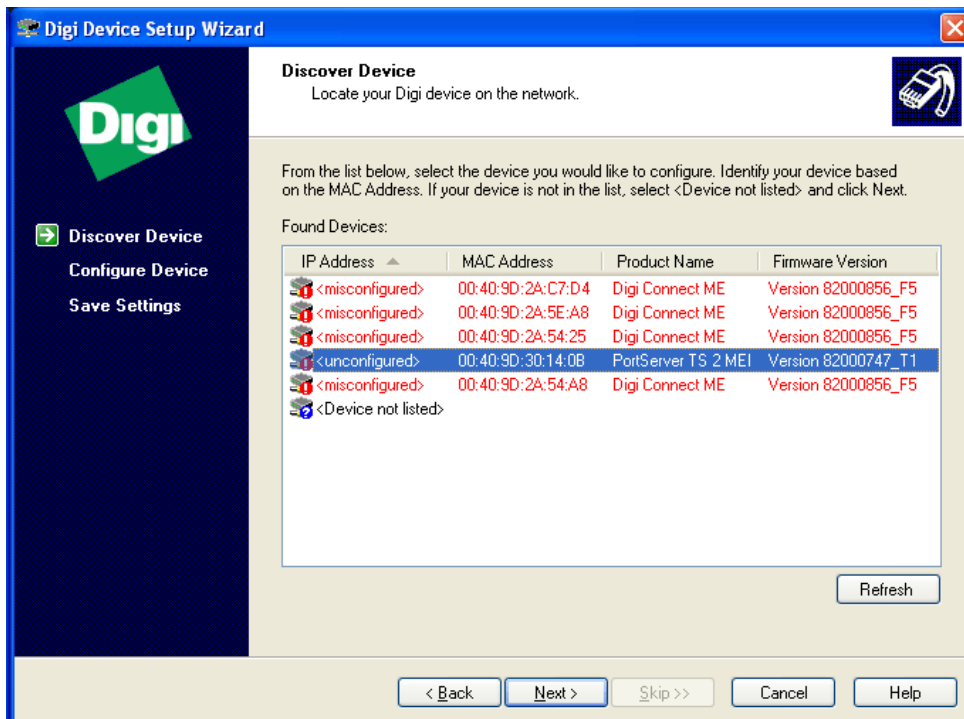




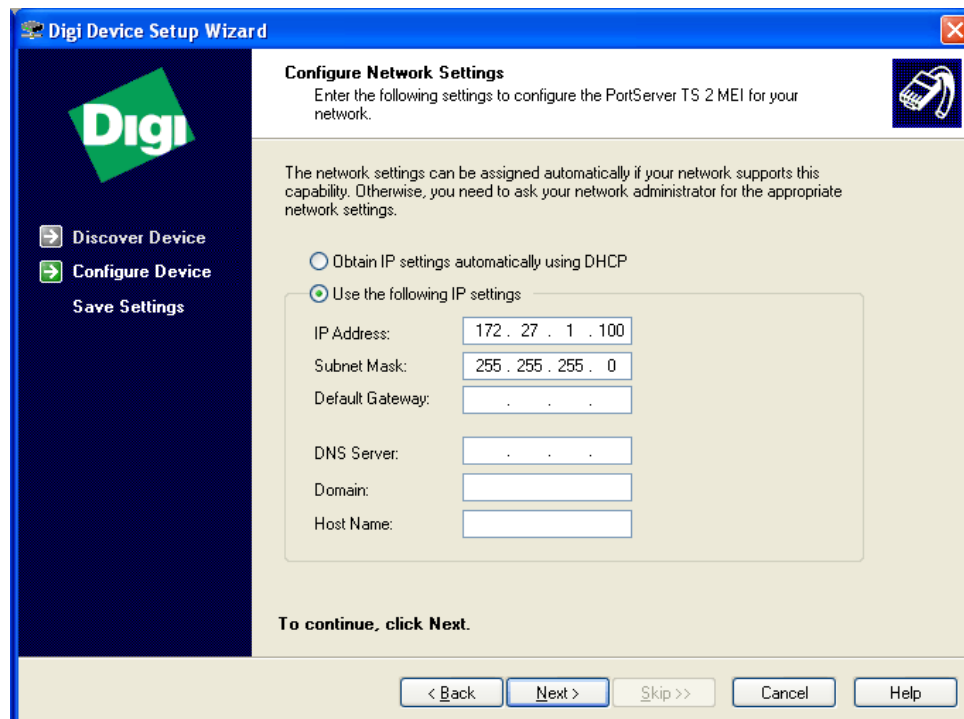
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- Highlight the Portserver TS2 MEI
- Click [Next].



- Click the radio button “Use the following IP settings”
- Enter the correct IP address.
- Click [Next].

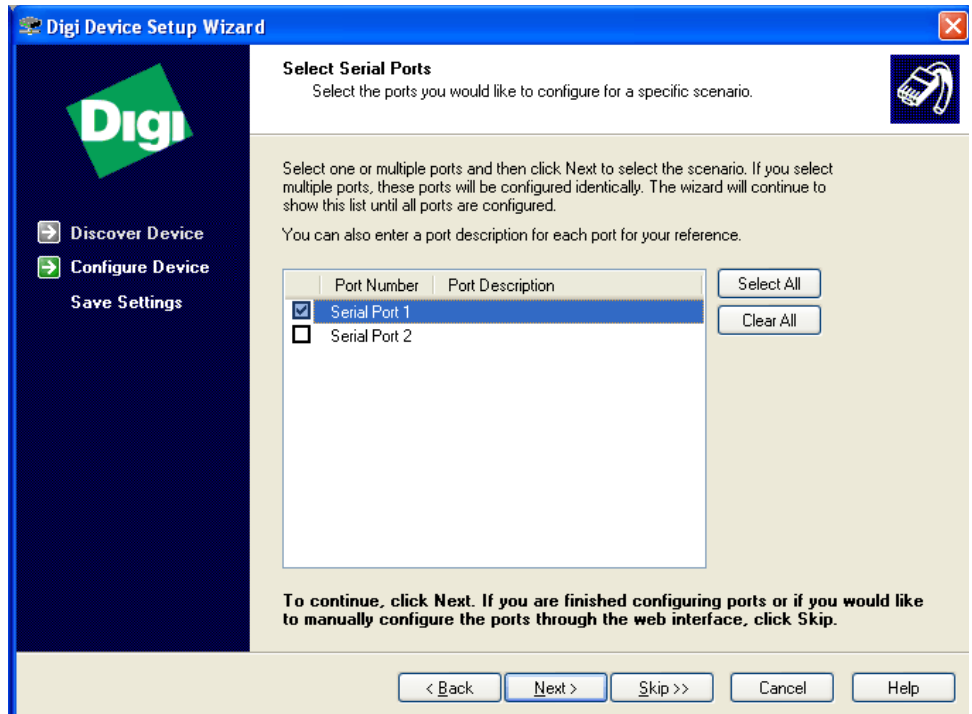




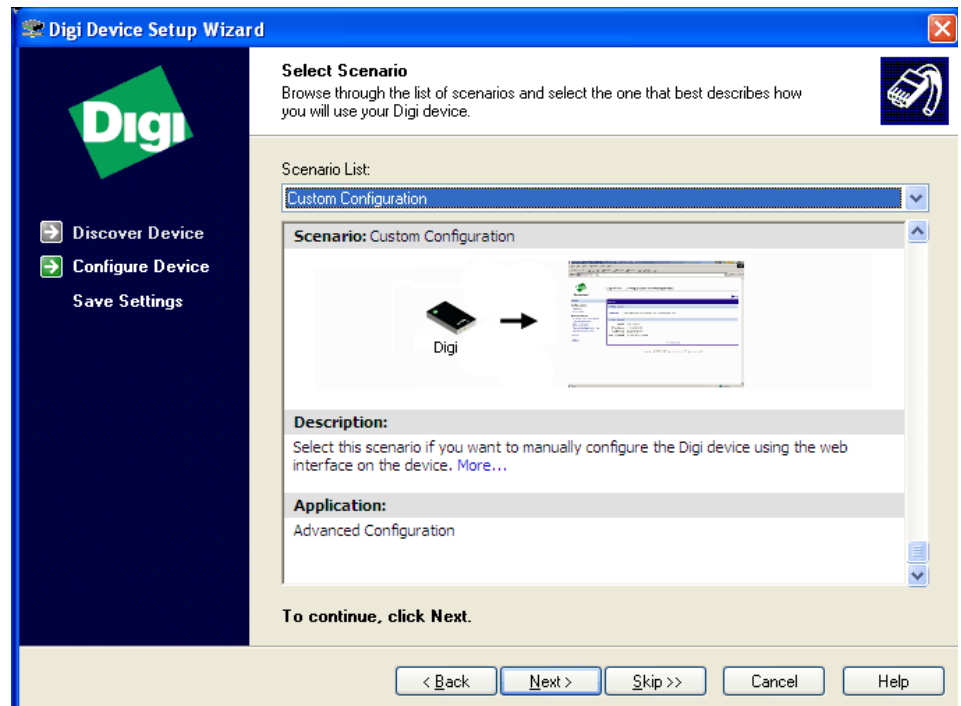
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10. Check the box "Serial Port 1"
11. Click [Next].



12. From "Scenario List," select "Custom Configuration."
13. Click [Next].

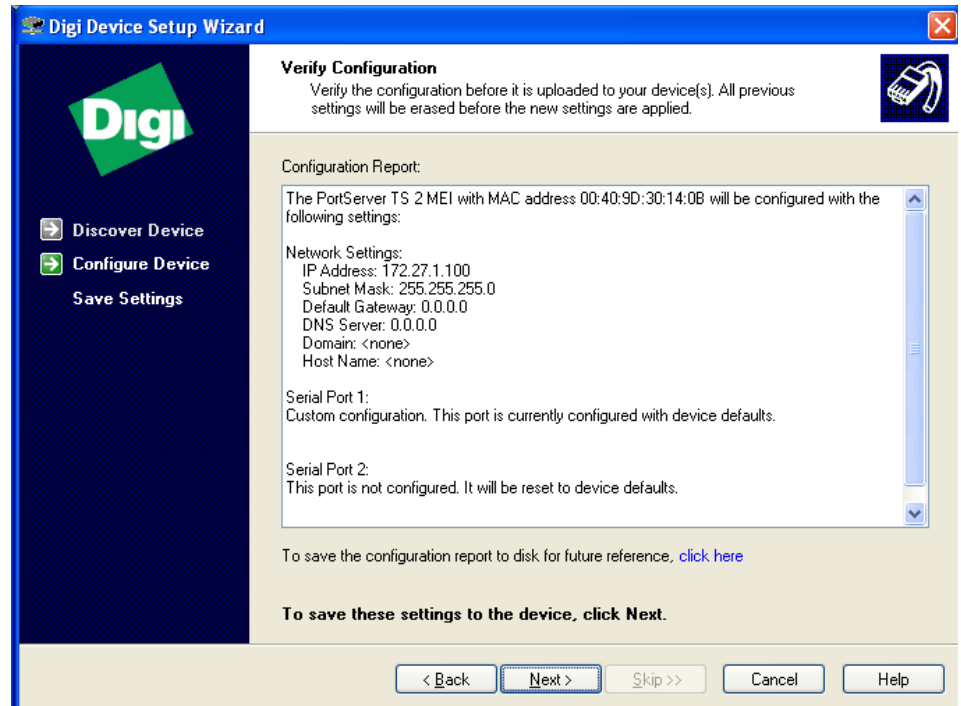




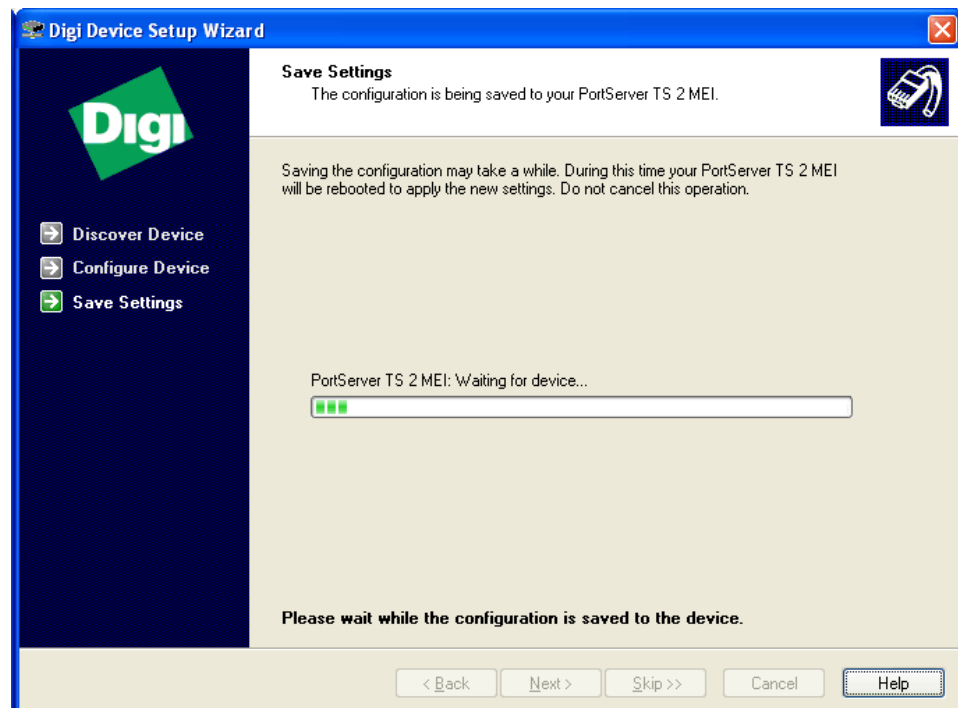
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14. If you are using the Digi TS2 (as we are in this example):
 - a. Skip Serial Port 2.
 - b. On the “Verify Configuration Page,” click [Next].
 - c. Do the same with Port 3 and Port 4 on TS4.



15. Wait for the setting to be saved.
16. The unit will reboot.



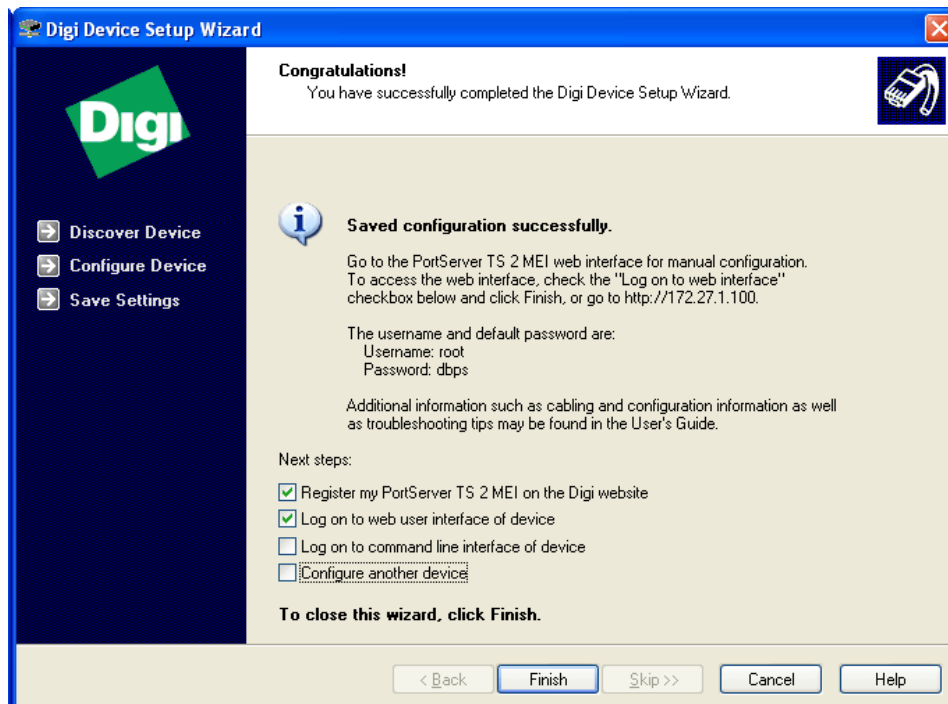


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17. Click [Finish].

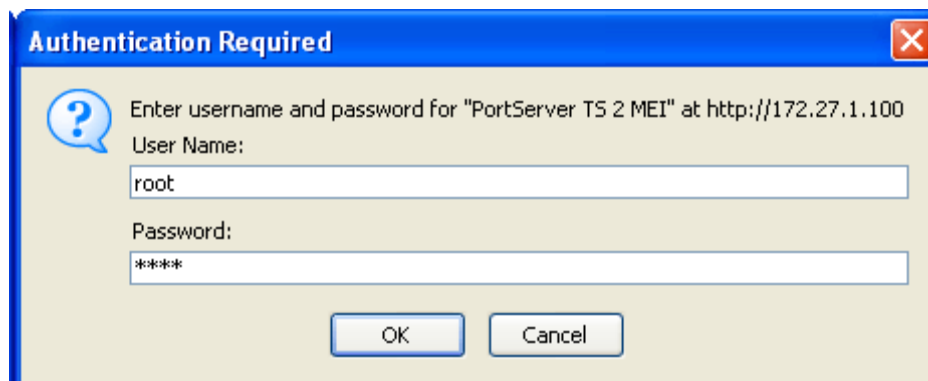
NOTE: If you are NOT connected to the internet, uncheck the box “Register my PortServer TS 2 MEI on the Digi website.”



18. Login with the default

User Name: **root**

Password: **dbps**





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

PortServer TS 2 MEI Configuration and Management - Mozilla Firefox

File Edit View History Bookmarks Yahoo! Tools Help

http://172.27.1.100/

Digi Connectware™

PortServer TS 2 MEI Configuration and Management

Home

Getting Started

Tutorial Not sure what to do next? This Tutorial can help.

System Summary

Model: PortServer TS 2 MEI

IP Address: 172.27.1.100

MAC Address: 00:40:9D:30:14:0B

Description:

Contact:

Location:

www.digi.com

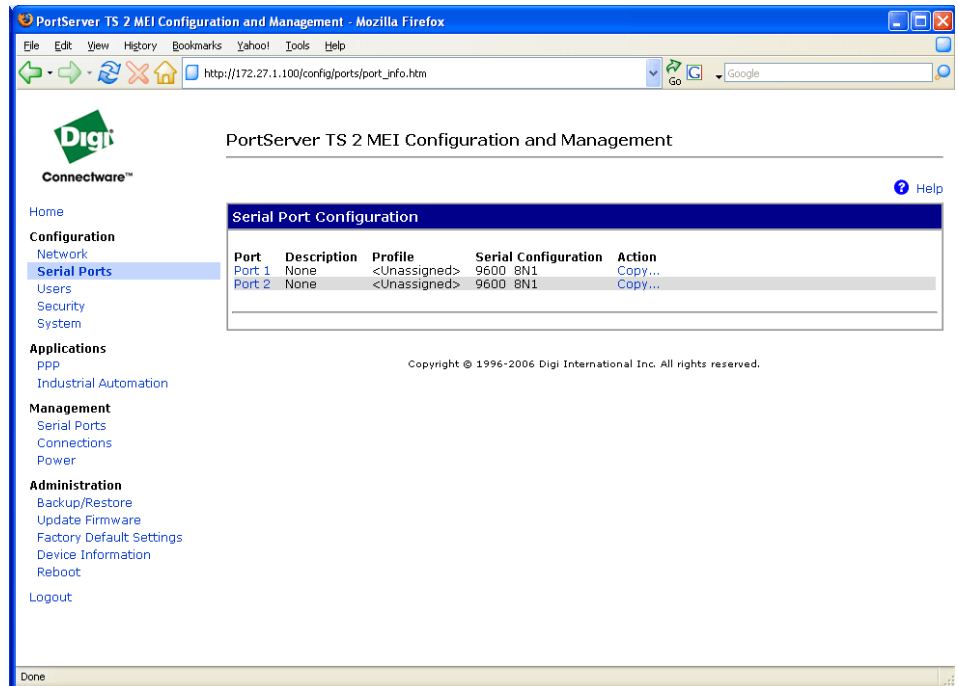
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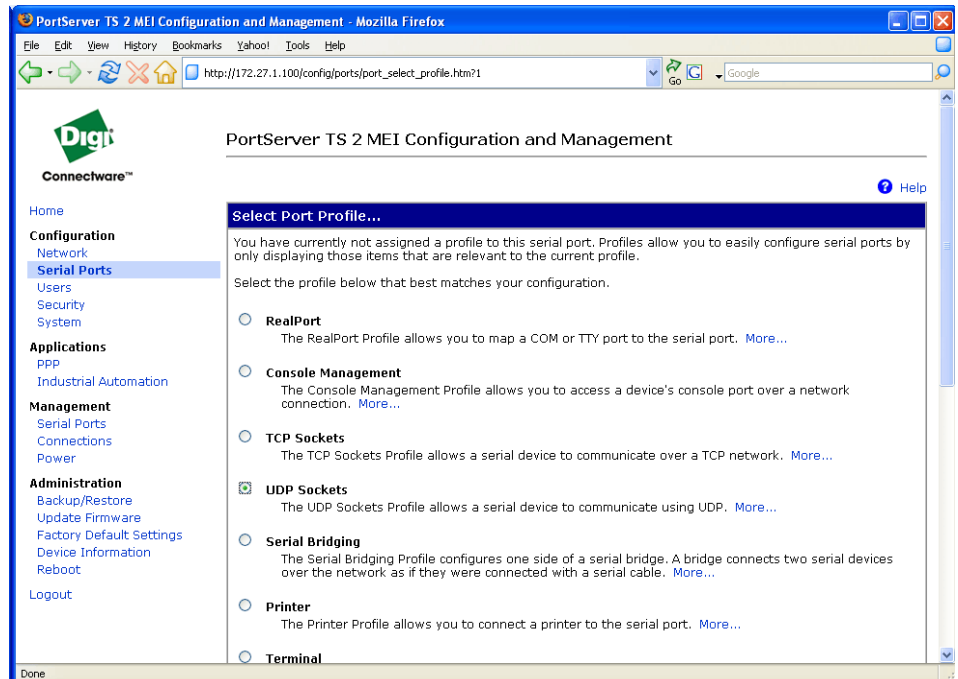
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- 20. Under “Serial Port Configuration,” select “Port 1.”



- 21. Select the radio button “UDP Sockets.”
- 22. At the bottom of the page, click [Apply].

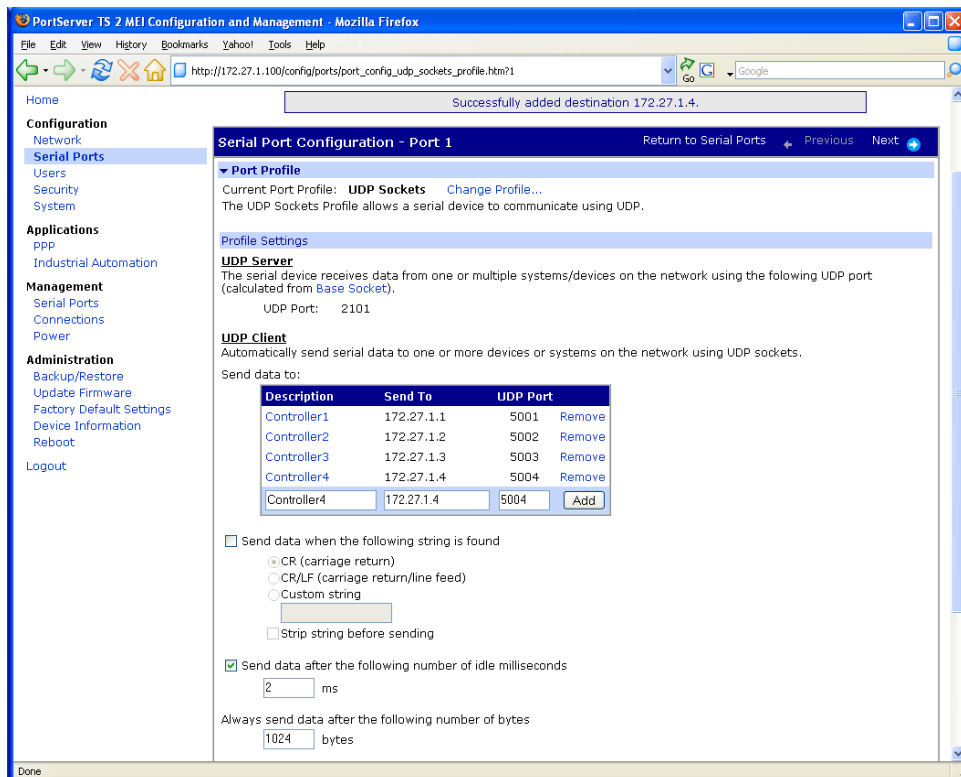




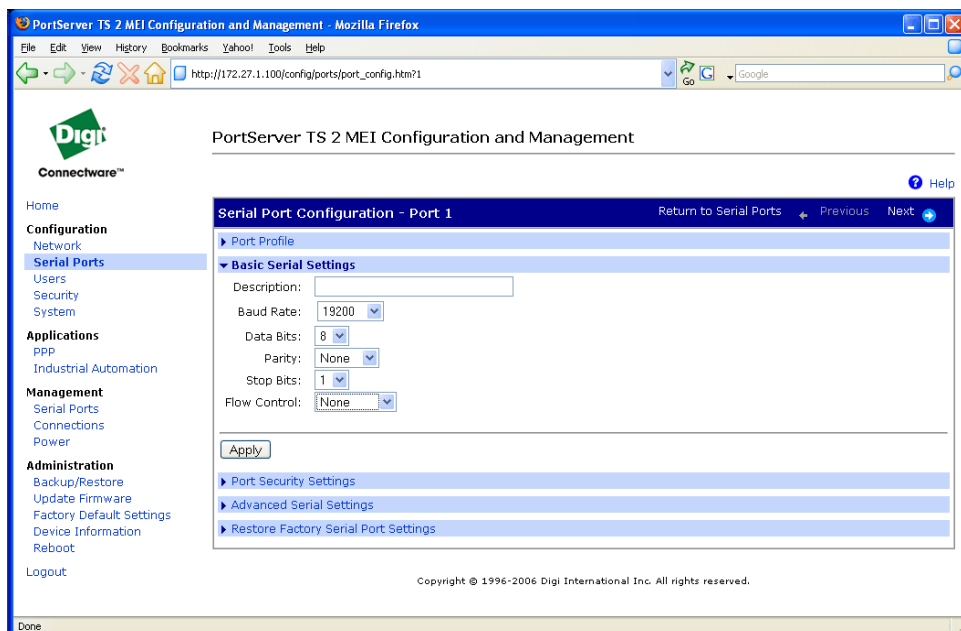
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23. Enter the Controller name, IP address and UDP Port number of each controller on the Channel.
24. Record the information in Step 23 for later use.
25. Change the “Send data after the following number of idle milliseconds” field to 2 ms.
26. At the bottom of the page, click [Apply].
27. Record the “UDP Port: 2101” number under “UDP Server”. You will need this number later when you configure the locals. It is the path back to the Master.



28. At the bottom of the page, click “Basic Serial Settings.”
29. Make these settings the same as the telemetry port settings on the ASC/2M Master (MM-1-0-9). We recommend the settings shown.
30. Set “Flow Control” to “None.”
31. Click [Apply].





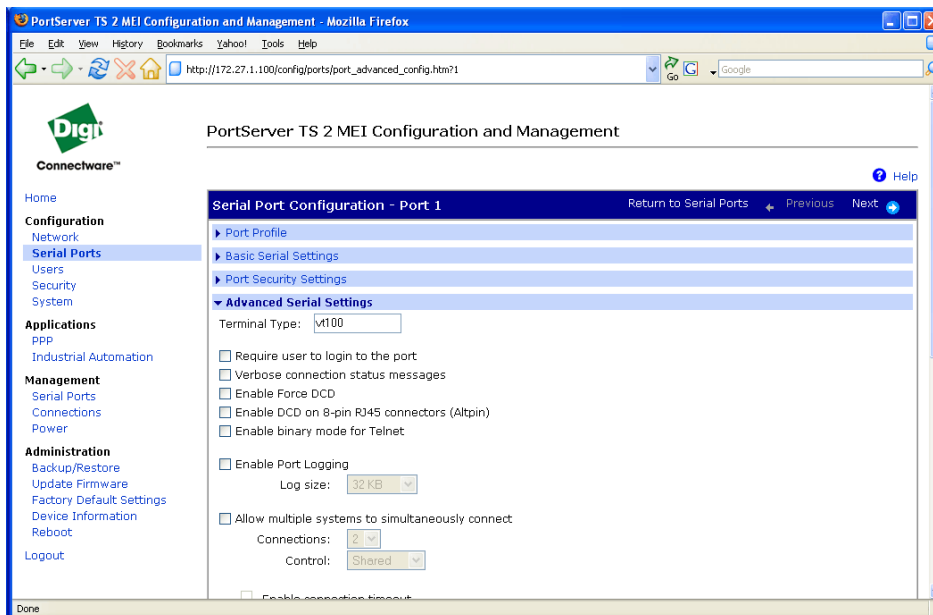
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32. Click “Advanced Serial Settings.”
33. Make sure that all boxes are unchecked on this page.
34. At the bottom of the page, click [Apply].

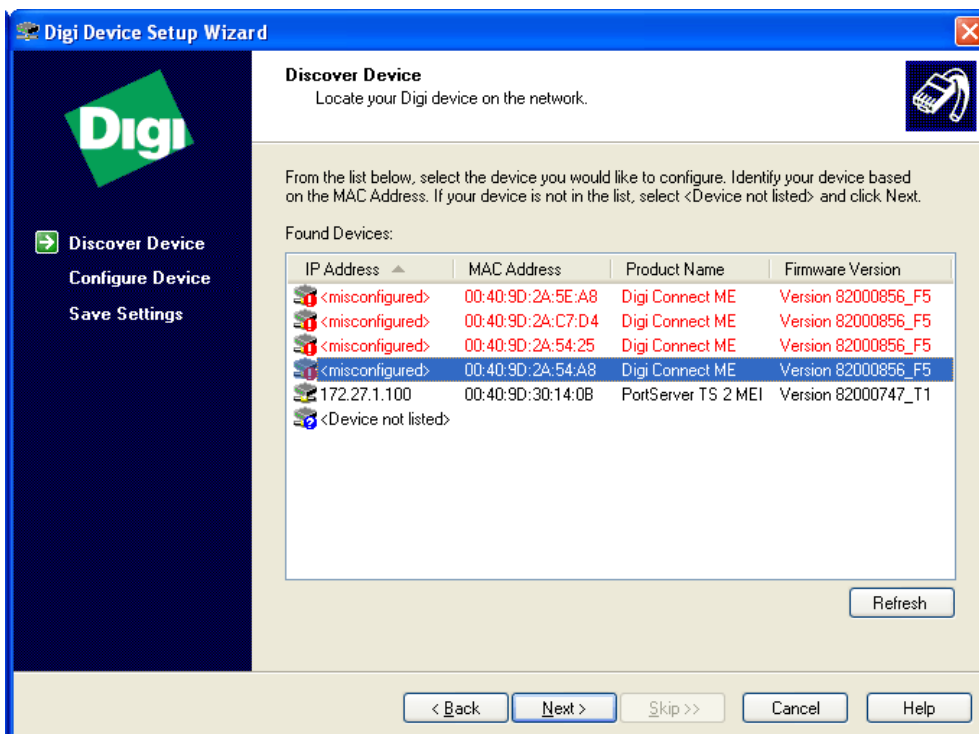
This is the end of the configuration for the Serial Server attached to the ASC/2M Master Controller.

You can now close this window.



Part II: Setup of ASC/2S Controllers

1. Restart the Digi device discover software application.
2. The “Discover Device” screen comes into view.
3. Reference the notes you took when you installed the Ethernet modules in the ASC/2S controllers, and highlight the card in your first ASC/2S controller.
4. Click [Next].

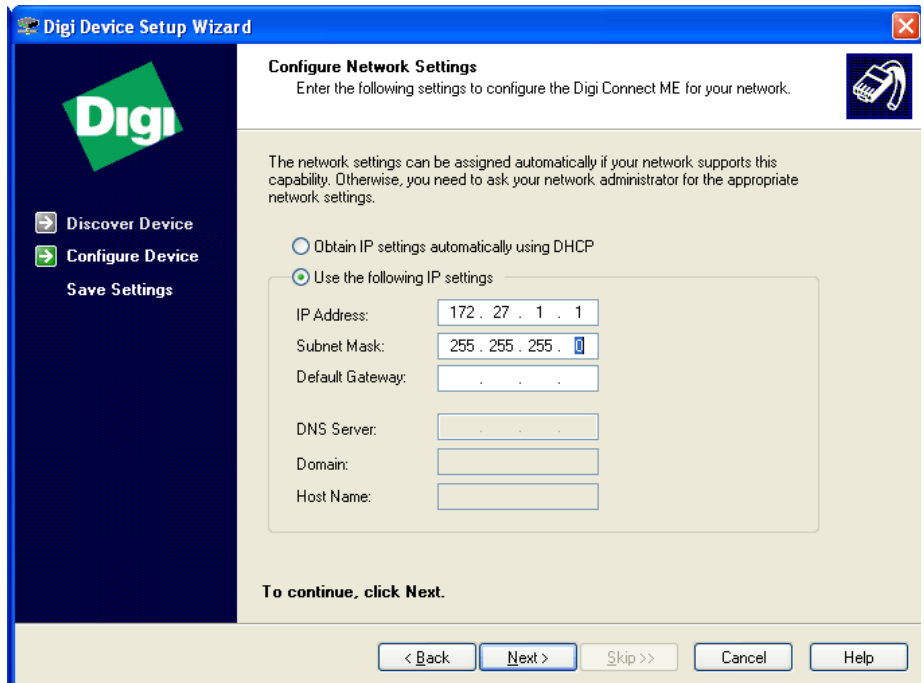




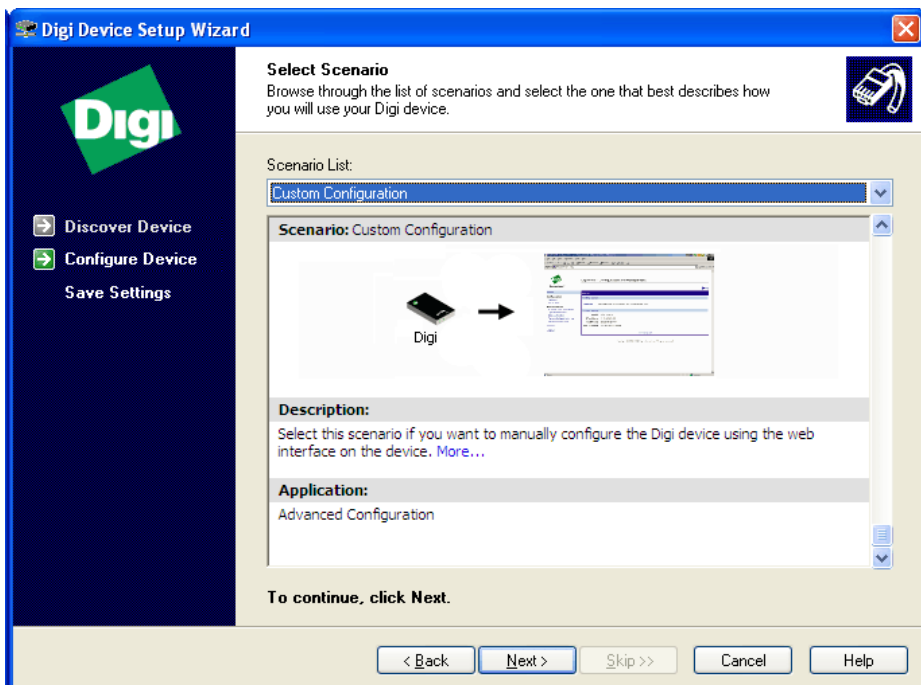
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5. The “Configure Network Settings” screen comes into view.
6. Click the radio button “Use the following IP settings.”
7. Enter the correct IP Address and subnet Mask.
8. Click [Next].



9. The “Select Scenario” screen comes into view.
10. From the “Scenario List,” select “Custom Configuration.”
11. Click [Next].

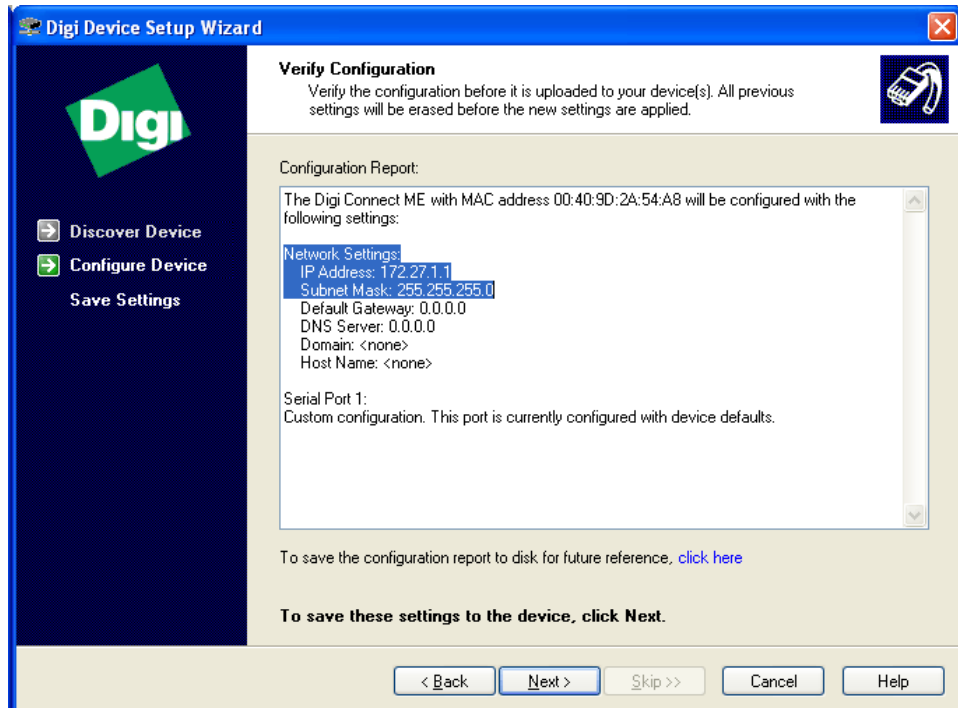




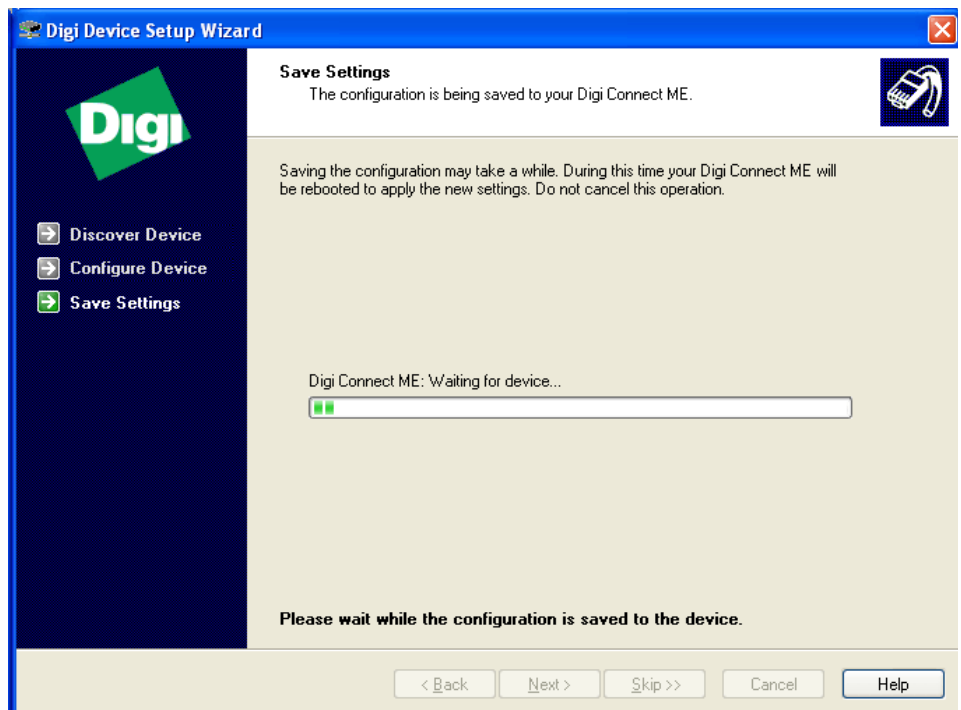
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12. Make sure your setting is correct.
13. Click [Next].



14. Wait for the settings to save and the device to reboot.

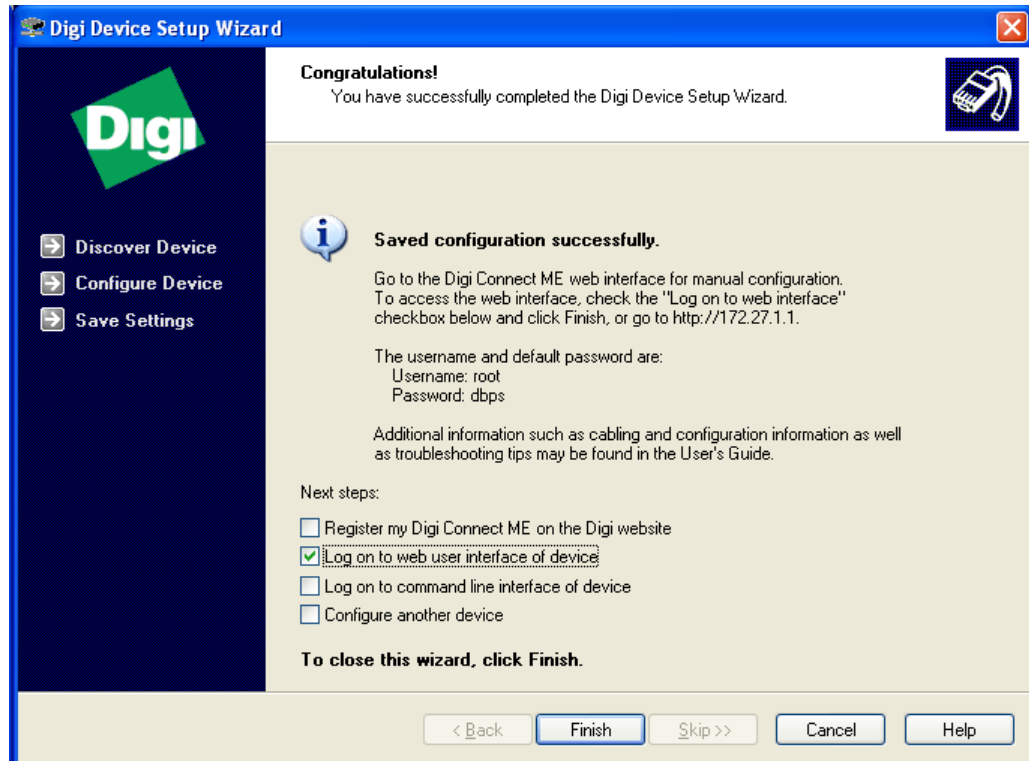




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- 15. Make sure that the box “Log on to web user interface of device” is checked.
- 16. Click [Finish].

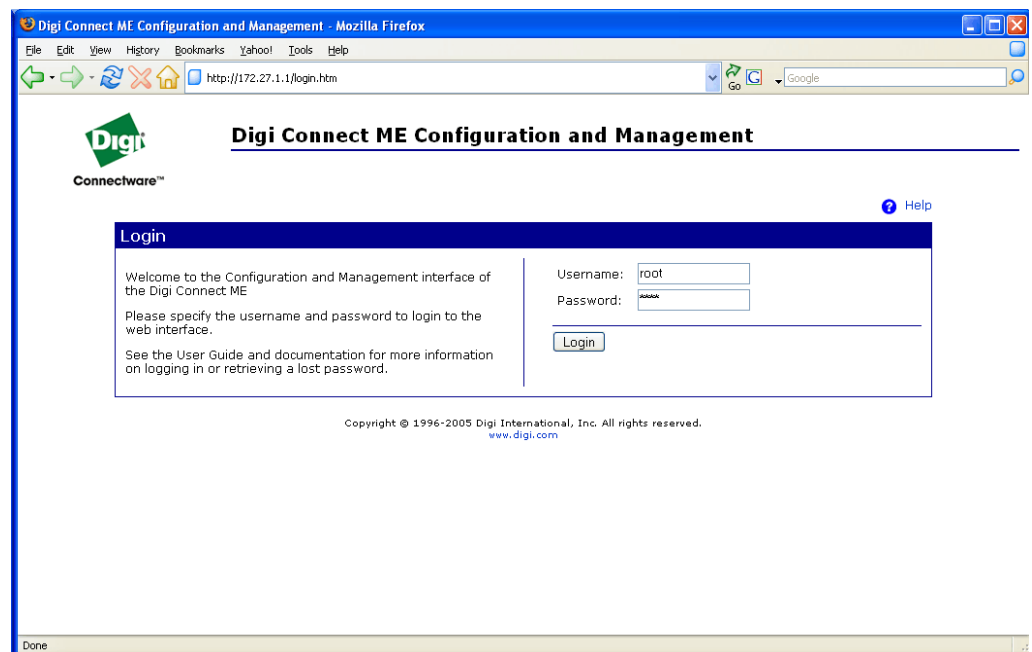


- 17. Enter the username and password:

Username: **root**
 Password: **dbps**

These are the factory settings.

- 18. Click [Login].



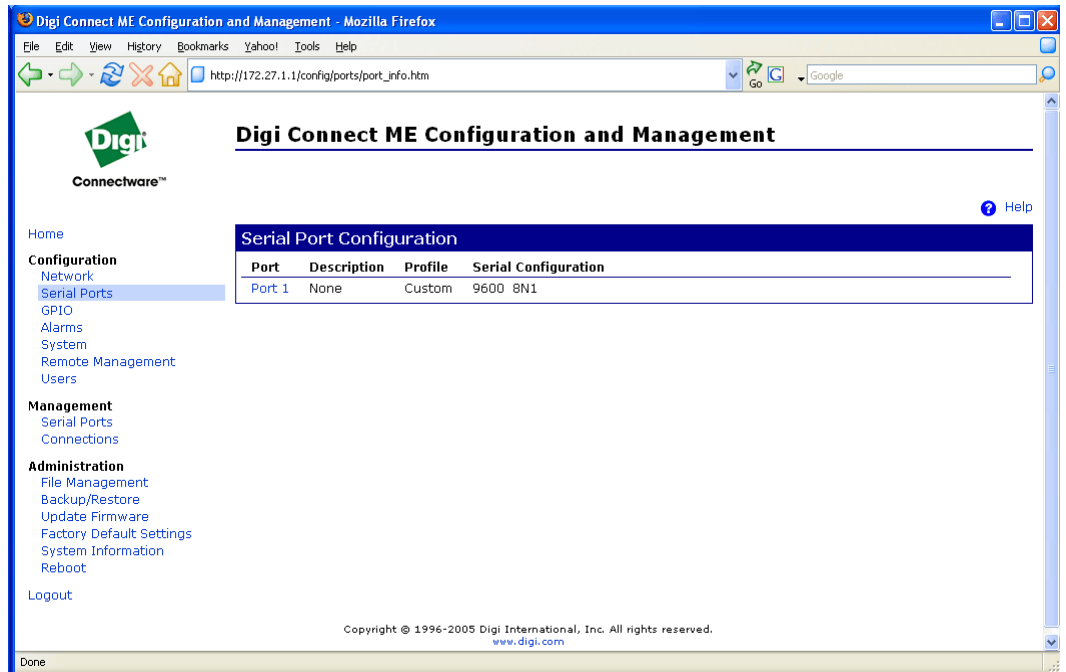


ASC/2

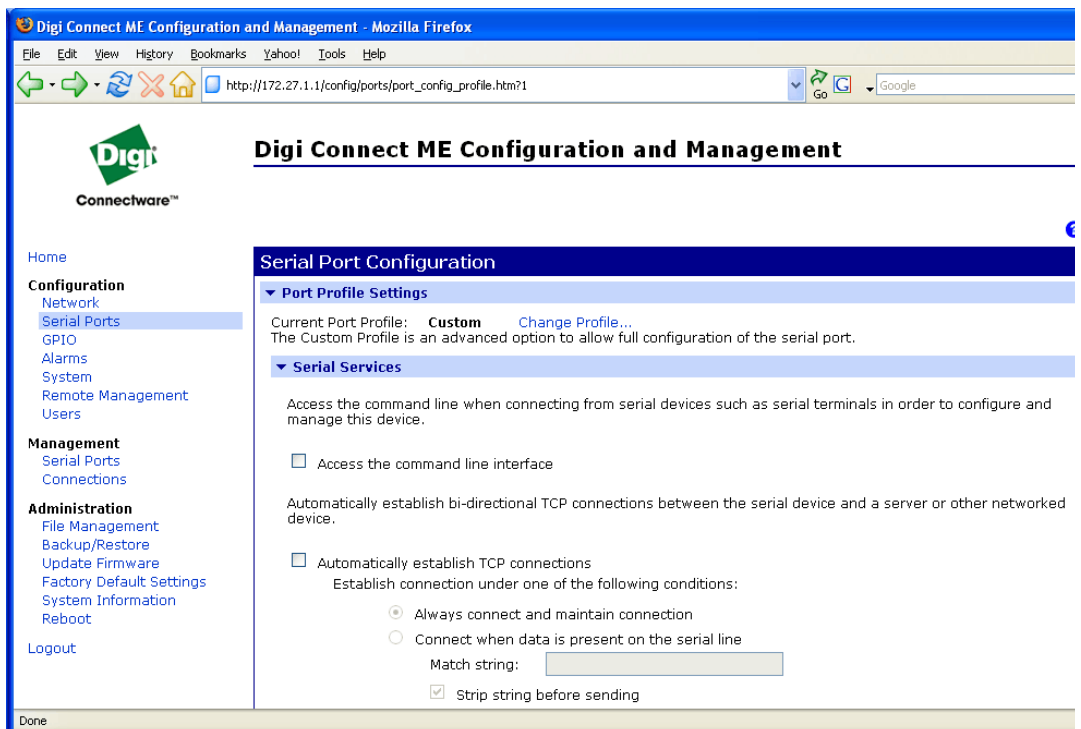
AN2106: ASC/2M to ASC/2S Ethernet Connection Using Digi PortServer TS2 H MEI

19. Under “Configuration,” click “Serial Ports.”

20. Click “Port 1”.



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

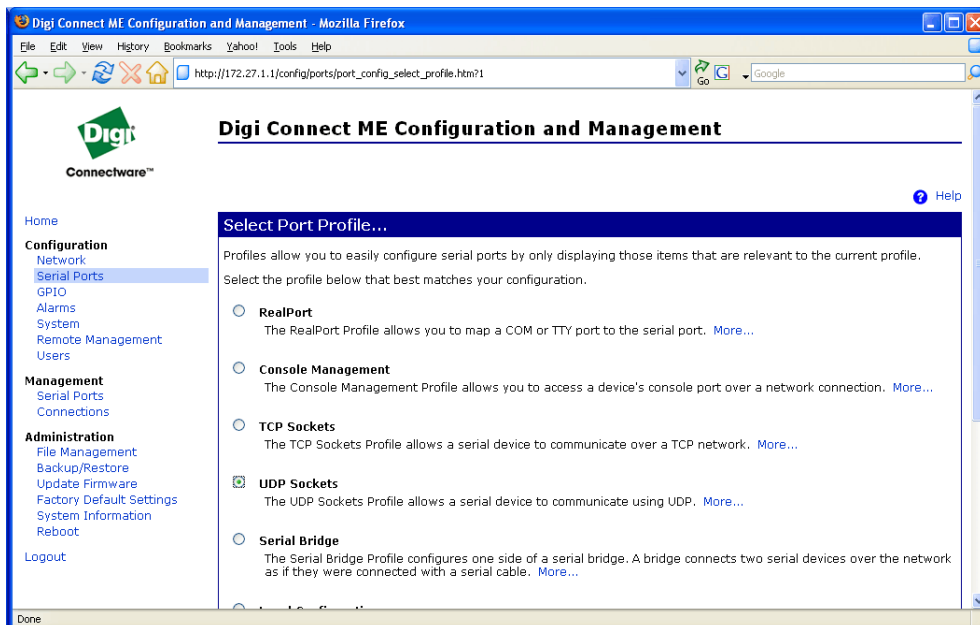




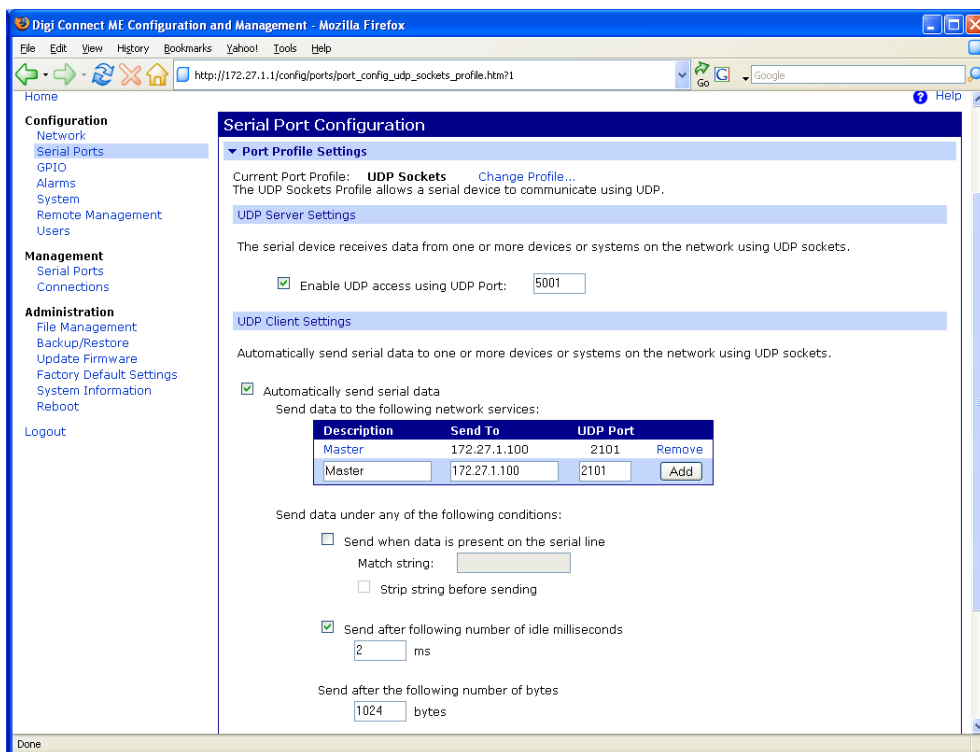
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- 22. Click the radio button “UDP Sockets.”
- 23. At the bottom of the page, click [Apply].



- 24. Make the UDP access port the same as what you entered into the Digi TS2 that is connected to the ASC/2M telemetry port. (You can also refer to the table you made when you installed the Ethernet modules in the ASC/2S.)
- 25. Check the box “Automatically send serial data.”
- 26. Enter the IP address and UDP port number of the Digi TS2 (as shown).
- 27. Change the “Send after following number of idle milliseconds” to 2 ms.
- 28. At the bottom of the page, click [Apply].





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

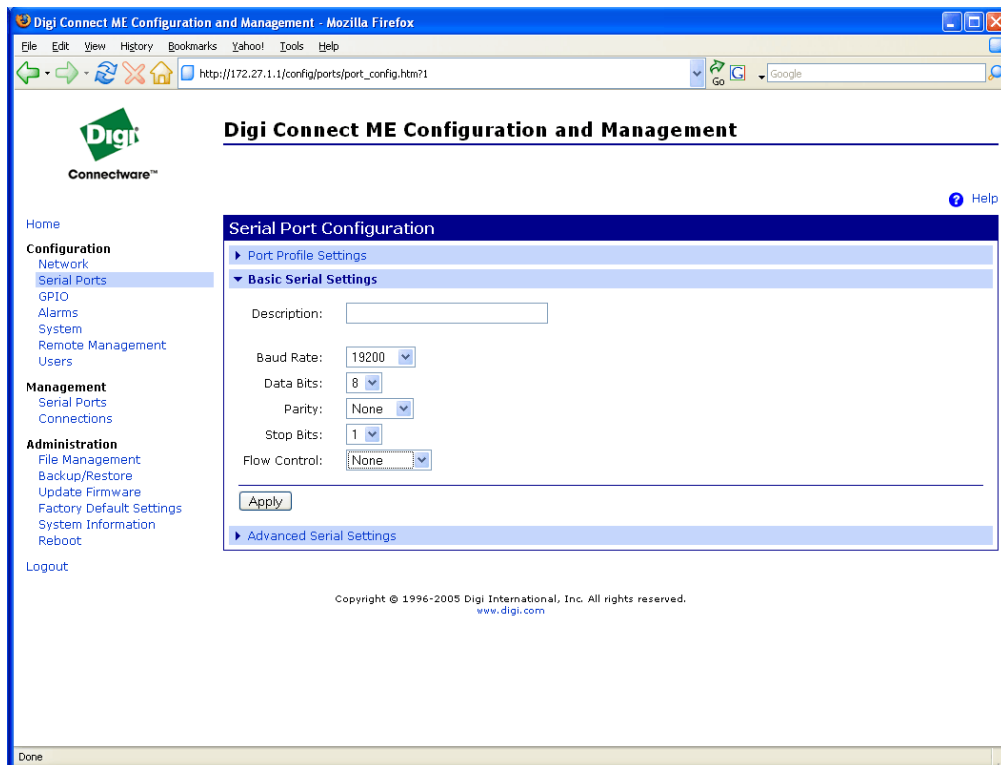
30. Adjust the serial settings to the same as the controller.

We recommend the settings shown.

31. Change “Flow Control” to None.

32. Click [Apply].

33. Repeat Steps 1 thru 32 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* 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*, 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, 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	CTR	AUX	SDA1	SDA2	SDB1	SDB2
TELEM	1-24	1-24	1-32	1-32	1-32	1-32
ADDRESS						
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 MILLISEC 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)	



ASC/2

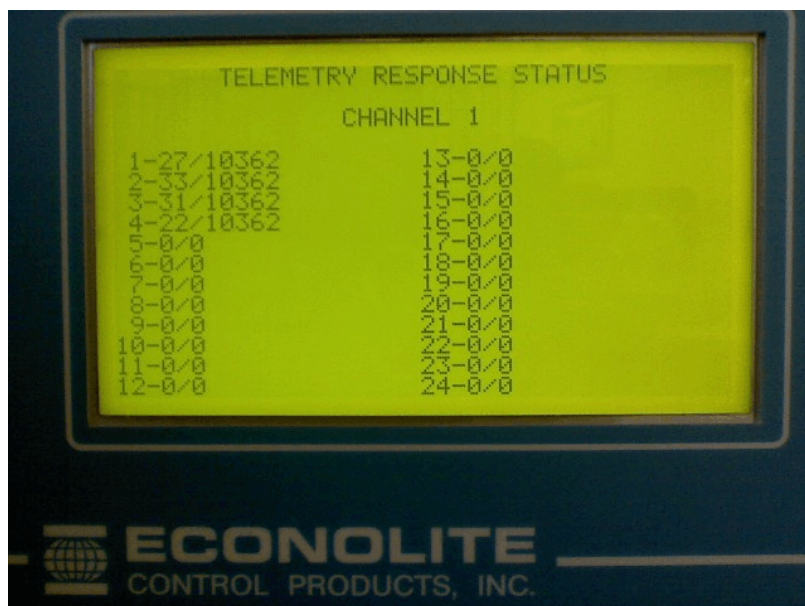
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Make sure of Master to Local Communications

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.





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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