

# **Digi Connect Integration Kit Configuration Guide Series**

## **Part I: Wireless Ad-Hoc Serial Bridging between two Connect wireless devices**

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Date: 06/06/2005

Revision: 1.1

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## Purpose

It is the intent of the document to provide a step-by-step procedure for the configuration of two Connect Wireless (Wi-EM or Wi-ME) devices to form an Ad-hoc Serial Bridge. This document may also prove useful to those who wish to create a Serial Bridge, but will be using Infrastructure mode.

For the purpose of this document the term *Connect* is used interchangeably to refer to the Wi-EM and the Wi-ME, unless specifically indicated.

By the following this document the wireless Connect devices will be properly configured for use in a scenario where the remote device (modem, sensor, etc.) is a simple slave device, meaning that it does not initiate communication to a host, it only response to requests.

There are four methods with which to configure the Connects for ad-hoc serial bridging

1. The web (HTML) user interface.
2. CLI (telnet).
3. Remote Configuration Interface (RCI) over Serial
4. Remote Configuration Interface (RCI) over HTTP (TCP sockets)

This document will focus on the web user interface method.

It is not the intent of this document to describe all of the possible variations when configuring an ad-hoc serial bridging, but rather provide one solid working model from which to better understand the basic procedure

If questions persist after completely reviewing this document, please contact Digi's technical support department via our online service request page, <http://www.digi.com/support/eservice/eservicelogin.jsp>.

## Configuration

In order to initially access the Connect devices an Open (no WEP or WPA encryption) Access Point is required.

## Hardware

The configuration described below was documented and verified with the use of:

- One personal computer, with two serial ports
  - o Running one HyperTerminal session on each port
  - o Alternately, it is also possible to make use one serial port from two PCs.
  - o It would also be possible to connect a modem or dumb terminal to HOST B.
- One Wi-ME w/ development board

- One Wi-EM w/ development board
- Two serial null-modem (cross-over) cables
- Linksys Wireless-B Broadband Router, model BEFW11S4 (use for initial access to web interface).

The target configuration described below is as such:

- PC com1 connected to serial port 1 of Wi-ME development board.
- PC com2 connected to serial port 1 of Wi-EM development board.
- HyperTerminal session running on com1 and com2.

### ***Pre-setup***

1. With an Open Access Point, up and operational, power up the Connect devices.
2. Once the devices have established an association with the A Access Point (e.g. the amber LED will be on solid), device discovery should be possible, using the supplied Digi Device Discovery tool (dgdscvr.exe).
3. Launch a web browser window for the Connect devices.
4. Select one of the two Connect devices, from henceforth referred to as Host A, and begin the configuration.

## Host A

Host A will be the initiator of the serial bridge connection. What this means is that once both sides are properly configured it is the serial interface on this host which will be able to initiate the TCP connection to Host B.

As you will be required to supply a static address and this address may or may not be applicable to your particular network topology, it is important to **not** reboot the device until the configuration has been completed, or unless the following instruction sequence prompts you to do so.

These instructions assume that the Connect device begins in a factory default state.

1. In the web interface go to the Serial Port configuration page.

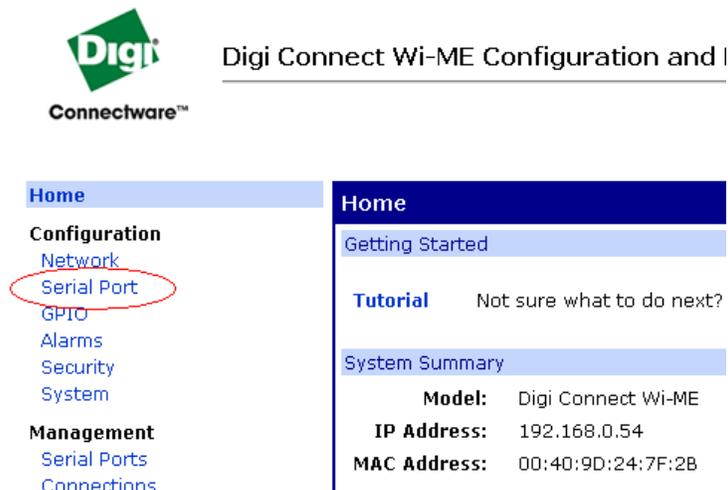


Figure 1 – Host A: Serial Port

2. For the Port Profile, select Serial Bridge, and select Apply.



Figure 2 - Host A: Serial Bridge

3. Select the check box for “Initiate serial bridge to the following Digi device”. If it is desired to have only one side of this connection to be capable of initiating the bridge, do not enable this option on one of the two hosts and set the following information:
  - a. IP Address: 192.168.5.2
  - b. TCP Port: 2101 (this is the default raw TCP port number for serial port 1)

**Serial Port Configuration**

▼ **Port Profile Settings**  
 Current Port Profile: **Serial Bridge** [Change Profile...](#)  
 The Serial Bridge Profile configures one side of a serial bridge the network as if they were connected with a serial cable.

**Serial Bridge Settings**

Initiate serial bridge to the following Digi device:  
 IP Address:   
 TCP Port:

Allow other Digi devices to initiate serial bridge  
 TCP Port:

Enable Secure Socket serial bridge

**Figure 3 – Host A: Outgoing Serial Bridge Configuration**

4. The option for “Allow other Digi devices to initiate serial bridge” must be enabled on, at minimum, the host who will **not** be initiating the bridge. For the sake for this example leave it enabled, and using 2101 for the TCP port.

**Serial Port Configuration**

▼ **Port Profile Settings**  
 Current Port Profile: **Serial Bridge** [Change Profile...](#)  
 The Serial Bridge Profile configures one side of a serial bridge the network as if they were connected with a serial cable.

**Serial Bridge Settings**

Initiate serial bridge to the following Digi device:  
 IP Address:   
 TCP Port:

Allow other Digi devices to initiate serial bridge  
 TCP Port:

Enable Secure Socket serial bridge

**Figure 4 - Host A: Incoming Serial Bridge Configuration**

5. Click Apply when completed.

6. Still within the Serial Port configuration select the “Basic Serial Settings” and set the following:
  - a. Description: *Leave this blank or optionally type in something*
  - b. Baud Rate: 9600
  - c. Data Bits: 8
  - d. Parity: None
  - e. Stop Bits: 1
  - f. Flow Control: None

The image shows a screenshot of the 'Serial Port Configuration' dialog box. The 'Basic Serial Settings' section is expanded and highlighted with a red oval. The settings are: Description (empty text box), Baud Rate (9600), Data Bits (8), Parity (None), Stop Bits (1), and Flow Control (None). An 'Apply' button is visible below the settings.

**Figure 5 - Host A: Serial Port Configuration**

7. Click Apply.

8. Go to the Network configuration page.

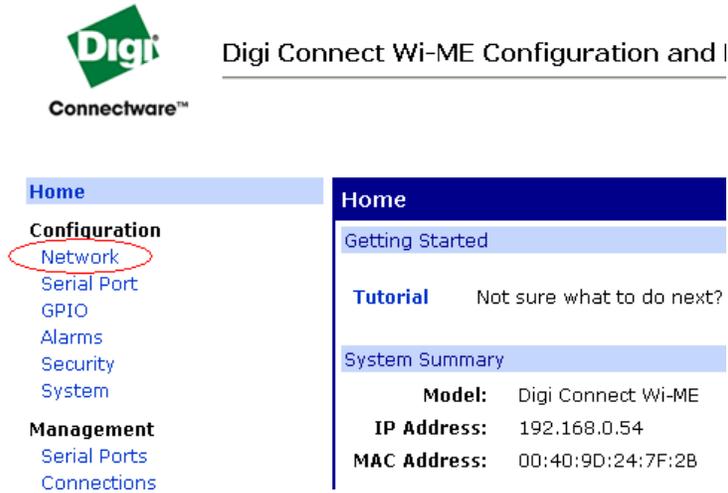


Figure 6 - Host A: Network Settings

9. Select "Wireless LAN Settings".

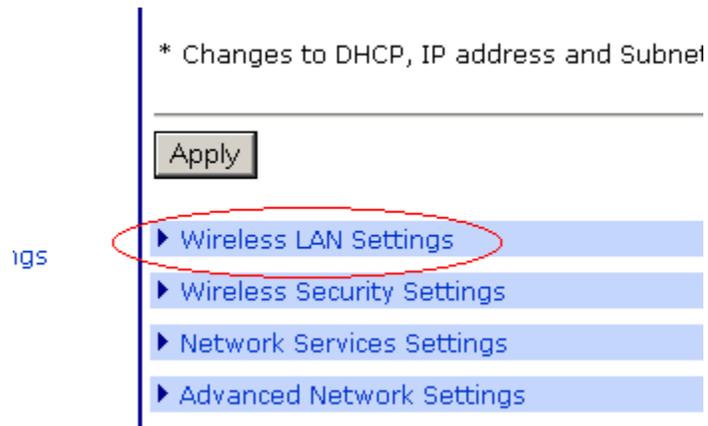


Figure 7 - Host A: Accessing the Wireless LAN Settings

10. Select the option for “Connect to other wireless systems using peer-to-peer (ad-hoc)”.

IP Settings

Wireless LAN Settings

Connect to wireless access points (infrastructure)

Connect to other wireless systems using peer-to-peer (ad-hoc)

Connect to any available wireless network

Connect to the following wireless network

Network name:  (SSID)

Country:

Channel:

Apply

Figure 8 - Host A: Wireless Network Settings

11. Select the option for “Connect to the following wireless network” and enter in the following data:
- Network name: SB1
  - Country: United States (or appropriate supported country)
  - Channel: 1 (or any channel other than Auto-Scan). **Note:** one of the two hosts must be forced to a particular channel, while the other can be set to the same channel or set to Auto-Scan.

IP Settings

Wireless LAN Settings

Connect to wireless access points (infrastructure)

Connect to other wireless systems using peer-to-peer (ad-hoc)

Connect to any available wireless network

Connect to the following wireless network

Network name:  (SSID)

Country:

Channel:

Apply

Figure 9 - Host A: Setting the SSID

12. Click Apply.
13. The Wireless Security Settings should remain disabled (e.g. unchecked).

**Network Configuration**

- ▶ IP Settings
- ▶ Wireless LAN Settings
- ▼ **Wireless Security Settings**

Enable WEP security

Transmit key:  1  2  3  4

Encryption Keys:

1:

2:

3:

4:

Enable WPA authentication

Username:

Password:

Confirm:

**Figure 10 - Host A: Wireless security**

14. Select "IP Settings".

15. Select “Use the following IP address:” and use the following data:
  - a. IP Address: 192.168.5.1
  - b. Subnet Mask: 255.255.255.0
  - c. Default Gateway: 192.168.5.2

**Network Configuration**

▼ **IP Settings**

Obtain an IP address automatically using DHCP \*

Use the following IP address:

\* IP Address:

\* Subnet Mask:

Default Gateway:

\* Changes to DHCP, IP address and Subnet Mask require a reboot to take effect.

**Figure 11 - Host A: IP Address Settings**

16. Click Apply.
17. Reboot the Connect device.

- System
- Management**
  - Serial Ports
  - Connections
- Administration**
  - File Management
  - Backup/Restore
  - Update Firmware
  - Factory Default Settings
  - System Information
  - Reboot**

**Figure 12 - Host A: Reboot**

## Host B

1. In the web interface go to the Serial Port configuration page.

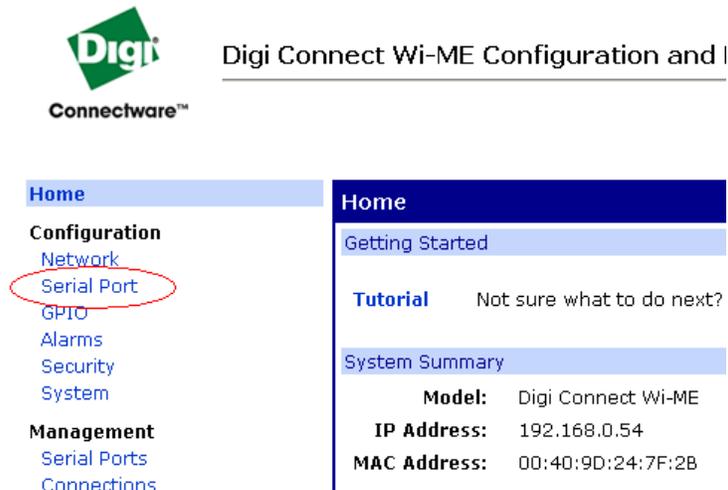


Figure 13 - Host B: Serial Port

2. For the Port Profile, select Serial Bridge, and select Apply.



Figure 14 - Host B: Serial Bridge

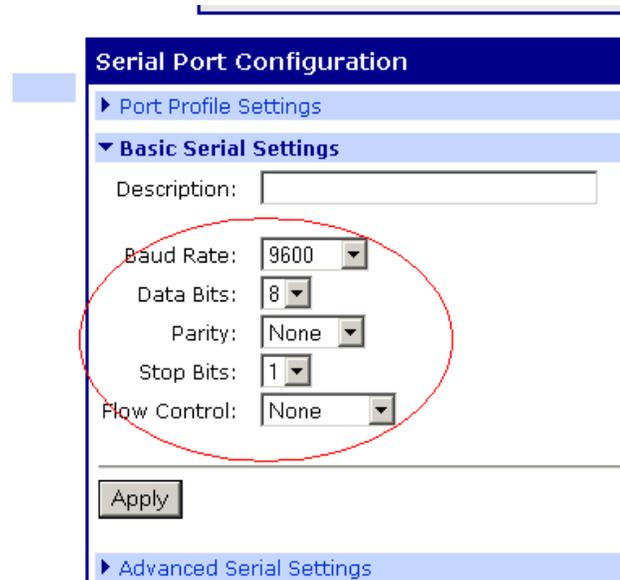
3. Select the check box for “Initiate serial bridge to the following Digi device”. If it desired to have only one side of this connection to be capable of initiating the bridge, do not enable this option on one of the two hosts and set the following information:
  - a. IP Address: 192.168.5.1
  - b. TCP Port: 2101 (this is the default raw TCP port number for serial port 1)

The screenshot shows a 'Serial Port Configuration' dialog box. Under the 'Serial Bridge Settings' section, the checkbox 'Initiate serial bridge to the following Digi device:' is checked. Below it, the 'IP Address' field contains '192.168.5.1' and the 'TCP Port' field contains '2101'. The checkbox 'Allow other Digi devices to initiate serial bridge' is also checked, with its 'TCP Port' field set to '2101'. The 'Enable Secure Socket serial bridge' checkbox is unchecked. An 'Apply' button is at the bottom. A red circle highlights the 'Initiate serial bridge...' checkbox and its associated IP and port fields. The word 'things' is written in blue on the left side of the dialog box.

**Figure 15 - Host B: Serial Bridge**

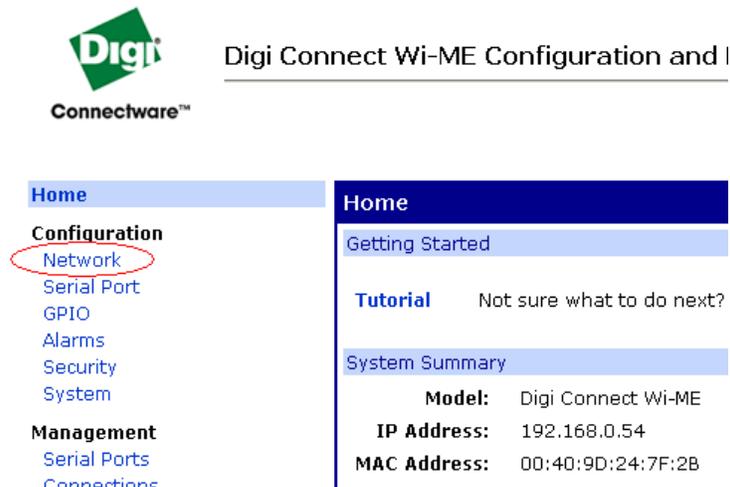
4. The option for “Allow other Digi devices to initiate serial bridge” must be enabled on, at minimum, the host who will **not** be initiating the bridge. For the sake for this example leave it enabled, and using 2101 for the TCP port.
5. Click Apply when completed.

6. Still within the Serial Port configuration select the “Basic Serial Settings” and set the following:
  - a. Description: *Leave this blank or optionally type in something*
  - b. Baud Rate: 9600
  - c. Data Bits: 8
  - d. Parity: None
  - e. Stop Bits: 1
  - f. Flow Control: None



**Figure 16 - Host B: Setting the serial port configuration**

7. Click Apply.
8. Go to the Network configuration page.



**Figure 17 - Host B: Accessing the Network configuration**

9. Select “Wireless LAN Settings”.

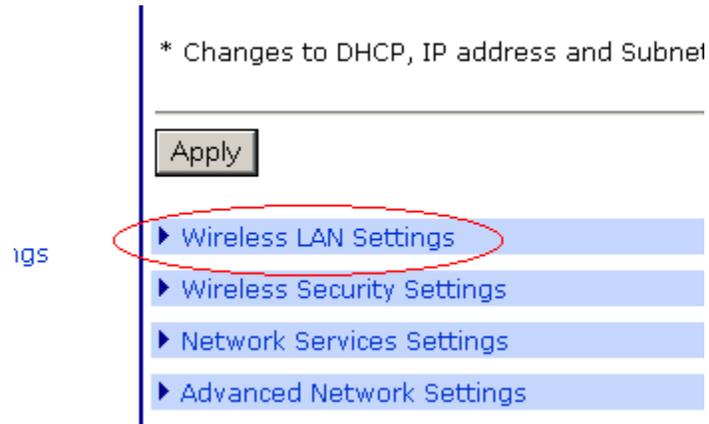


Figure 18 - Host B Accessing the Wireless LAN Settings

10. Select the option for “Connect to other wireless systems using peer-to-peer (ad-hoc)”.

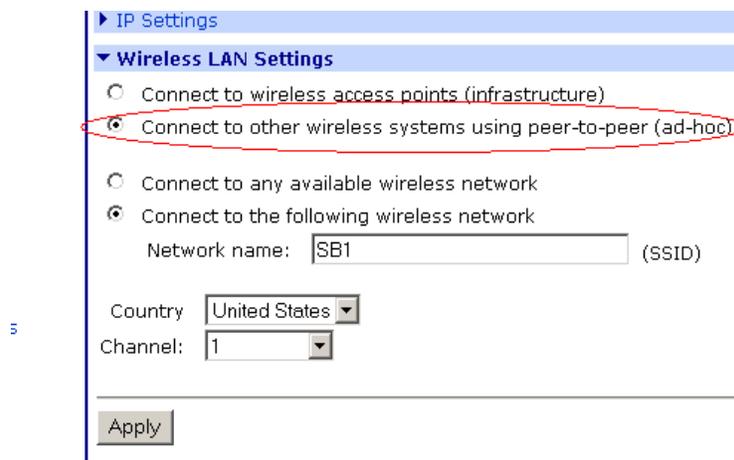


Figure 19 - Host B: Enable ad-hoc

11. Select the option for “Connect to the following wireless network” and enter in the following data:

- a. Network name: SB1
- b. Country: United States (or appropriate, supported country)
- c. Channel: 1 (or any channel other than Auto-Scan). **Note:** one of the two hosts must be forced to a particular channel, while the other can be set to the same channel or set to Auto-Scan.

5

IP Settings

Wireless LAN Settings

Connect to wireless access points (infrastructure)  
 Connect to other wireless systems using peer-to-peer (ad-hoc)  
 Connect to any available wireless network  
 Connect to the following wireless network

Network name:  (SSID)

Country:

Channel:

Apply

Figure 20 - Host B: Setting the SSID

12. Click Apply.
13. The Wireless Security Settings should remain disabled (e.g. unchecked).

Network Configuration

IP Settings

Wireless LAN Settings

Wireless Security Settings

Enable WEP security  
 Transmit key:  1  2  3  4

Encryption Keys:

1:

2:

3:

4:

Enable WPA authentication  
 Username:   
 Password:   
 Confirm:

Figure 21 - Host B Wireless security

14. Select "IP Settings".
15. Select "Use the following IP address:" and use the following data:
  - a. IP Address: 192.168.5.2
  - b. Subnet Mask: 255.255.255.0
  - c. Default Gateway: 192.168.5.1

**Network Configuration**

▼ **IP Settings**

Obtain an IP address automatically using DHCP \*

Use the following IP address:

\* IP Address:

\* Subnet Mask:

Default Gateway:

\* Changes to DHCP, IP address and Subnet Mask require a reboot to take effect.

**Figure 22 - Host B: IP Address Configuration**

16. Click Apply, when ready (**remember:** do not reboot, yet).
17. There is one configuration step to be taken that **cannot** be accomplished via the web interface. There are two operational modes for Ad-hoc, they are *ibss\_join* and *ibss\_create*. The default is *ibss\_create*, when using the web USER INTERFACE. We must connect to the Connect via the CLI (i.e. telnet to the Connect). The follow steps need only be applied to one of the two devices to be bridged.
18. Once connected to the type the following command, “set wlan”.
19. To change the protocol mode to *ibss\_join* with the following command: “set wlan protmode=*ibss\_join*”.
20. It is now safe to reboot this device, by either power cycling it, using the Reboot function from the web USER INTERFACE or typing the following command from the CLI, “boot action=reset”.

## Further Assistance

If you find problems with this documentation, have suggestions to improve it, or have general questions/comments please contact Digi Technical Support via our Online Support Request page at <http://www.digi.com/support/eservice/eservicelogin.jsp>.