

1. Configure a Digi XBee Wifi module as a TCP Client to connect to a TCP Server for sending/receiving data in an Ad Hoc network.

Objective: Configure a TCP Socket connection between a Digi XBee Wifi module and a computer running a TCP Server connected in an Ad hoc network.

- 1.1 Software Requirements
 - XCTU
 - PuTTy or any Terminal application
 - TCP Server such as netcat
- 1.2 Hardware Requirements
 - Digi XBee Wifi module
 - Computer with Wireless card

Setup Scenario

In this scenario we will configure a TCP Socket between a Digi XBee Wifi module and a computer in Adhoc running a TCP server application.





2. 2. Step by Step instructions

2.2.1 Configure Computer for Ad hoc and setup TCP Socket server

- a) Go to the Wireless Network connection settings (Start > Connect To > Show all connections > Right click on Wireless Network Connection)
- b) Scroll to the Internet Protocol (TCP/IP) and click "Properties"
- c) Assign a fixed IP Address to your network card, in this example : **192.168.0.1** and a subnet of **255.255.255.0** and click **OK**
- d) Go to the "Wireless Networks" tab, click on "Advanced" and make sure that Networks to access is set to "Any available network".

Advanced	3	×
Networks to access		
Any available network (access point preferred)		
○ Access point (infrastructure) networks only		
○ <u>C</u> omputer-to-computer (ad hoc) networks only		
Automatically connect to non-preferred networks		
Close		

- e) In the "Preferred networks" section, click on "Add..."
- f) Enther a Network name (SSID) : digi, check the "Connect even if this network is not broadcasting" box.

Wireless network properties	? ×			
Association Authentication Connection				
Network <u>n</u> ame (SSID): digi				
Connect even if this network is not broadcasting Wireless network key				
This network requires a key for the following:				
Network Authentication: Open				
Data encryption:				
Network <u>k</u> ey:				
Confirm network key:				
Key indeg (advanced): 1 The key is provided for me automatically This is a computer-to-computer (ad hoc) network; wireless access points are not used				
access points are not used				
OK Cancel				

- g) Network authentication : **Open**, Data Encryption : **Disabled**
- h) At the bottom of this window, check "This is a computer-to-computer (ad hoc) network; wireless access points are not used"



i) Go to the Connection tab and check the "Connect when this network is in range"

Wireless network properties	? ×
Association Authentication Connection	
Automatic connection	
Whenever this network is detected, Windows can connect to it automatically.	
Connect when this network is in range	
OK Canc	el

- j) Click **OK**
- k) Extract the netcat application to a folder on your computer such as c:\netcat
- 1) Click on **Start>Run** and type "**CMD**" to start a command line window.
- m) Navigate to the netcat directory
- n) Start netcat in listening mode by issuing the following command :

nc.exe -l -p 9750

nc.exe is the netcat application **-l** is for listening connections

-p 9750 is to specify the TCP port we will be using.



Netcat is now "listening" to incoming TCP socket connection



2.2.2 Configure XBee Wifi module

- a) Insert the XBee module on the XBee development board and connect the USB cable to your computer.
- b) Open XCTU, in the PC Settings tab, select the "USB Serial Port" corresponding to your board, set the baud rate to 9600, flow control to none, data bits to 8, parity to none and stop bits to 1 (this should be default settings) and click the "Test/Query" button, which should prompt the modem information like below :

😃 X-CTU		
About		
PC Settings Range Test Terminal Modem Configu	ration	
Com Port Setup		
Select Com Port		
Communications Port (COM1) Intel(B) Remote PC Assist Technology - SOL (COM2)	Baud 115200 👻	
PortServer TS 4 - Port 1 (COM2)	Flow Control NONE	
PortServer TS 4 - Port 2 (COM4) PortServer TS 4 - Port 3 (COM5)		
PortServer TS 4 - Port 4 (COM6)	Data Bits 🛛 📕	
USB Serial Port (CUM7) USB Serial Port (COM8)	Parity NONE 💌	
	Stop Bits 1	
	Test / Query	
Host Setup User Com Ports Network Interface	`	
	se Timeout	1
Enable API	1000	
Use escape characters (ATAP = 2)	t 1000	Com test / Query Modem
AT command Setup		Communication with modern OK
ASCILLER THE T		Modem type = XB24-WF
Command Character (CC)		Modem firmware version = 1015
Guard Time Refore (RT) 1000		
		Serial Number = 23A/1D5383
Modem Flash Update		
No baud change		
		Retry OK
р)	· · · · · ·	

- c) Click on the "Modem Configuration" tab
- d) Under "Active Scan " click the "Scan" button to discover nearby networks, the previously created "digi" network should appear in the list, select it and click the "Select AP" button.

Scan		
SSID	RSSI (dBm)	Security
diai	-44	Open
linksys_tptest	-88	Open
-Security Key		
Scan Select AP		Done



- e) In the "Networking" section, set the Network type to 1 IBSS Creator, the IP Protocol to 1 TCP, and IP Addressing Mode to 1 Static
- f) In the "Addressing" section, set the Destination IP Address to the computer's ip address : 192.168.0.1 and the Destination/ Source Port to 2616 (this value is in HEX format, which makes 9750 in decimal)
- g) Click the "Write" button at the top Window to write all modified parameters to the module.
- h) To set a static IP Address on the module, go to the "**Terminal**" tab and issue the following commands :

+++ (wait for the OK to confirm that AT mode is active) AT MY 192.168.0.2 ok AT MK 255.255.255.0 ok

i) Go to the "**Modem Configuration**" tab and verify the settings by click on the "**Read**" button. Module IP Address and IP Address Mask should be filled.





j) Go to the "**Terminal**" Tab, typed text in the Terminal window will appear in the command prompt window on the computer (TCP Server)



k) It is also possible to open the TCP Socket directly to the module by using PuTTY, select "Raw", port 9750, IP Address of the XBee module 192.168.0.2, in the "Serial" section, set Flow Control to "None" and click Open

🔀 PuTTY Configuration		×		
Category:				
E Session	Basic options for your PuTTY session			
Logging	- Specify the destination you want to conne	ct to		
Kevboard	Host <u>N</u> ame (or IP address)	Port		
Bell	192.168.0.2	9750		
- Features	Connection type:			
Window	• <u>Raw</u> • <u>l</u> einet • Riogin • <u>5</u> 5F			
Behaviour	Load, save or delete a stored session			
- Translation	Sav <u>e</u> d Sessions			
Selection				
Connection	Default Settings	Load		
- Data		Sa <u>v</u> e		
Telnet		<u>D</u> elete		
Serial	Close window on exit: Always Never Only on clean exit			
About	<u>O</u> pen	<u>C</u> ancel		



1) Type text in the Terminal or in the Putty Window, it will appear on the opposite side : (Blue text is **sent**, red is **received**)





2.2.3 Configure XBee Wifi module for Infrastructure and Serial bridge

- a) In the "**Networking**" section, set the Network type to **2 Infrastructure** and IP Addressing Mode to **0 DHCP**
- b) Under "Active Scan " click the "**Scan**" button to discover nearby networks, the infrastructure network of your router should appear in the list, select it and click the "**Select AP**" button
- c) Click on the "Write" button to save parameters to the module.
- d) In the Addressing section, check that your module has correct received an IP Address from the DHCP server, MY/MK/GW should be filled in :

PC Settings Bange Test Terminal Modem Configuration Ve	rsions			
- Modem Parameter and Firmware				
Read Write Restore Clear Screen Save				
	Download new			
Always Update Firmware Show Defaults Load	VEISIONS			
Modem: XBEE Function Set	Version			
XB24-WF XBEE WI-FI	▼ 1020 ▼			
🖬 Active Scan				
🖻 🔄 Networking				
📮 (digi) ID - SSID				
📮 (2) AH - Network type	=			
- IP Protocol				
U) MA - IP Addressing Mode				
A) TM - Timeout for connection on TCP client sockets				
I (90000) DD - Device Type Identifier				
Callessing Callessing Callessing Callessing				
A71D5383) SL - Serial Number Low				
- 192.168.0.199) DL - Destination IP Address				
📔 (2616) DE - Destination Port				
🔓 (2616) C0 - Source Port				
🖥 (192.168.0.198) MY - Module IP Address				
🖢 (255.255.255.0) MK - IP Address Mask				
🔤 (192.168.0.1) GW - IP Address of gateway				
E Security	-			
i i 🖬 IIII EE - Encruption Enable				

- e) Repeat those steps for the second module.
- f) In the Addressing section, modify the Destination IP Address to be the other module's IP.

Module IP Address = 192.168.0.198 Destination IP Address = 192.168.0.199

Module IP Address = 192.168.0.199 Destination IP Address = 192.168.0.198

g) Go to the "**Terminal**" tab, typed text will appear on the 2nd's module terminal window. Sent text is Blue, received text is Red.



Digi XBee Application Note Configuring a Digi XBee Wifi module for TCP Socket

📴 [COM7] X-CTU	
About XModem	About XModem
PC Settings Range Test Terminal Modem Configuration	PC Settings Range Test Terminal Modern Configuration
Line Status Assert Close Close Clear Show CTS CO DSR DTR RTS RESAL	Line Status Assert Close Assemble Clear Show CTS CO DSR DTR RTS Break Com Port Packet Screen Hex
This is a test Reply OK	This is a test Reply OK
(
<u>-</u>	
COM7 115200 8-N-1 FLOW:NONE Rx: 10 bytes	COM8 115200 8-N-1 FLOW:NONE Rx: 14 bytes