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

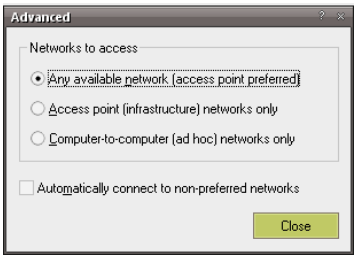
Setup Scenario

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.

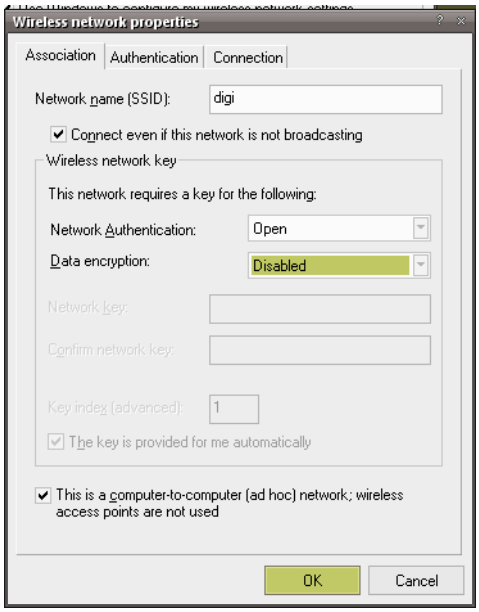
2. 2. Step by Step instructions

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".**

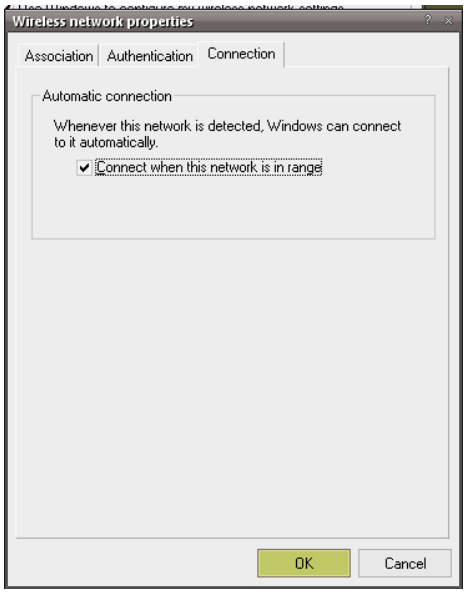


e) In the "Preferred networks" section, click on "**Add…**"
f) Enther a Network name (SSID) : digi , check the " Connect even if this network is not broadcasting" box.



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**"

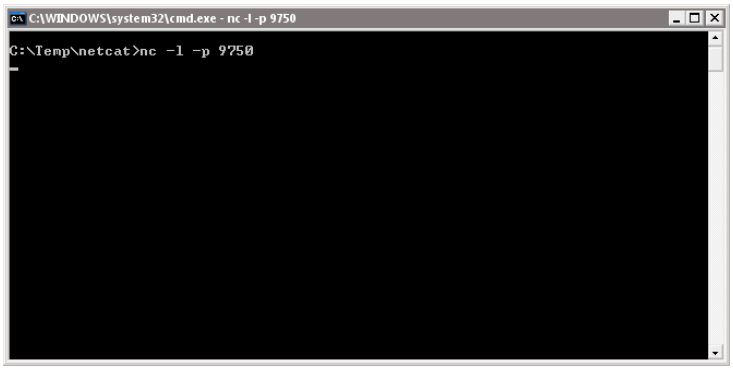
i) Go to the Connection tab and check the "**Connect when this network is in range**"



j) Click **OK**
k) Extract the netcat application to a folder on your computer such as c:\netcat
l) 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

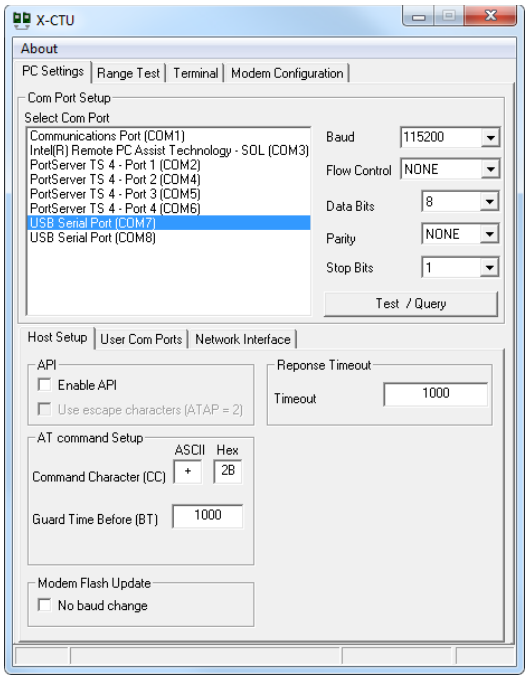
nc.exe is the netcat application
-l is for listening connections
-p 9750 is to specify the TCP port we will be using.

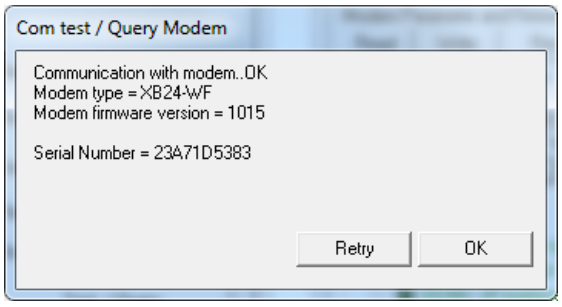


Netcat is now "listening" to incoming TCP socket connection

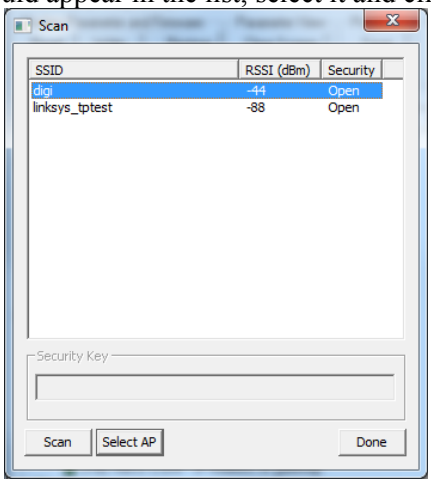
2.2.2 Configure XBee Wifi module

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 :





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.



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**

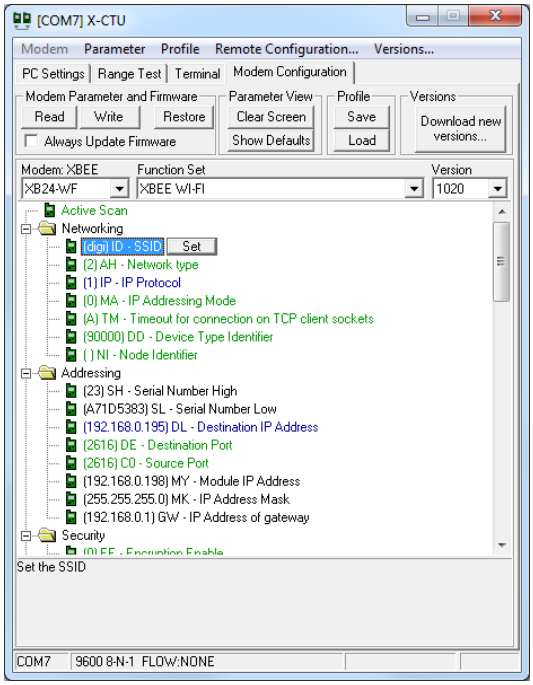
f) In the "**Addressing**" section, set the Destination IP Address to the computer's ip address : **192.168.0.1** and the Destination/ Source Port to **2616 (**this value is in **HEX** format, which makes **9750** in decimal)

g) Click the "**Write**" button at the top Window to write all modified parameters to the module.

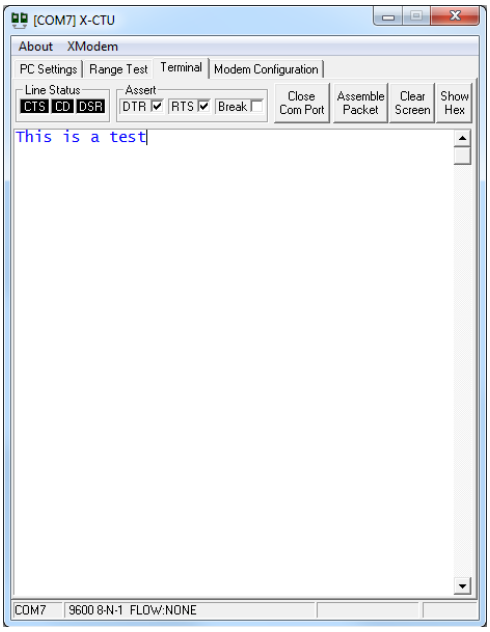
h) To set a static IP Address on the module, go to the "**Terminal**" tab and issue the following commands :

+++ (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

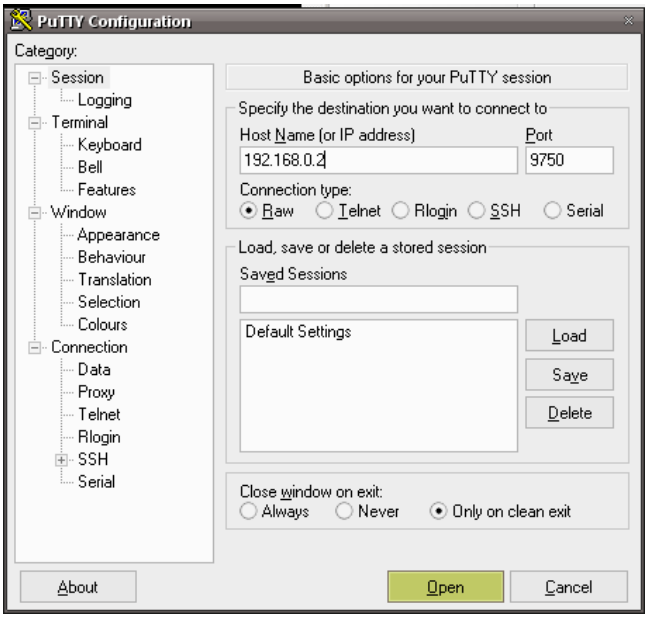
i) Go to the "**Modem Configuration**" tab and verify the settings by click on the "**Read**" button. Module IP Address and IP Address Mask should be filled.



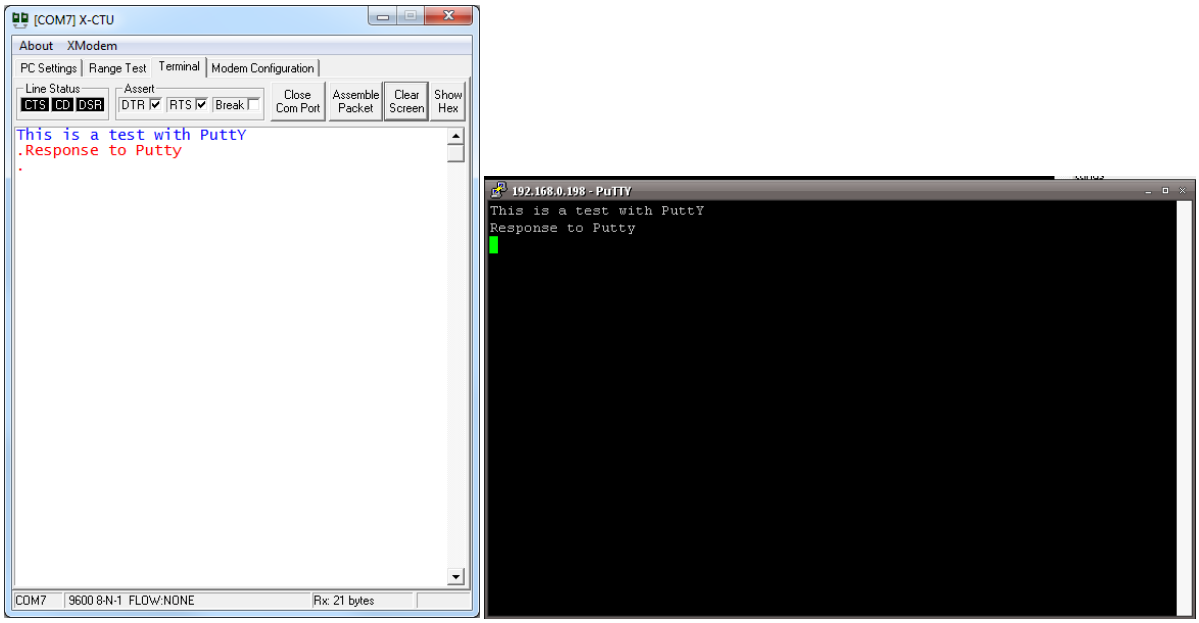
j) Go to the "**Terminal**" Tab, typed text in the Terminal window will appear in the command prompt window on the computer (TCP Server)



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**

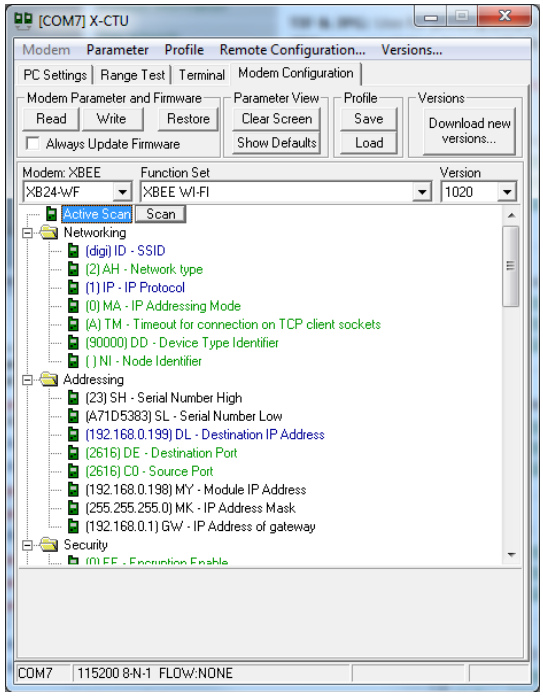


l) Type text in the Terminal or in the Putty Window, it will appear on the opposite side : (Blue text is **sent**, red is **received**)



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 :

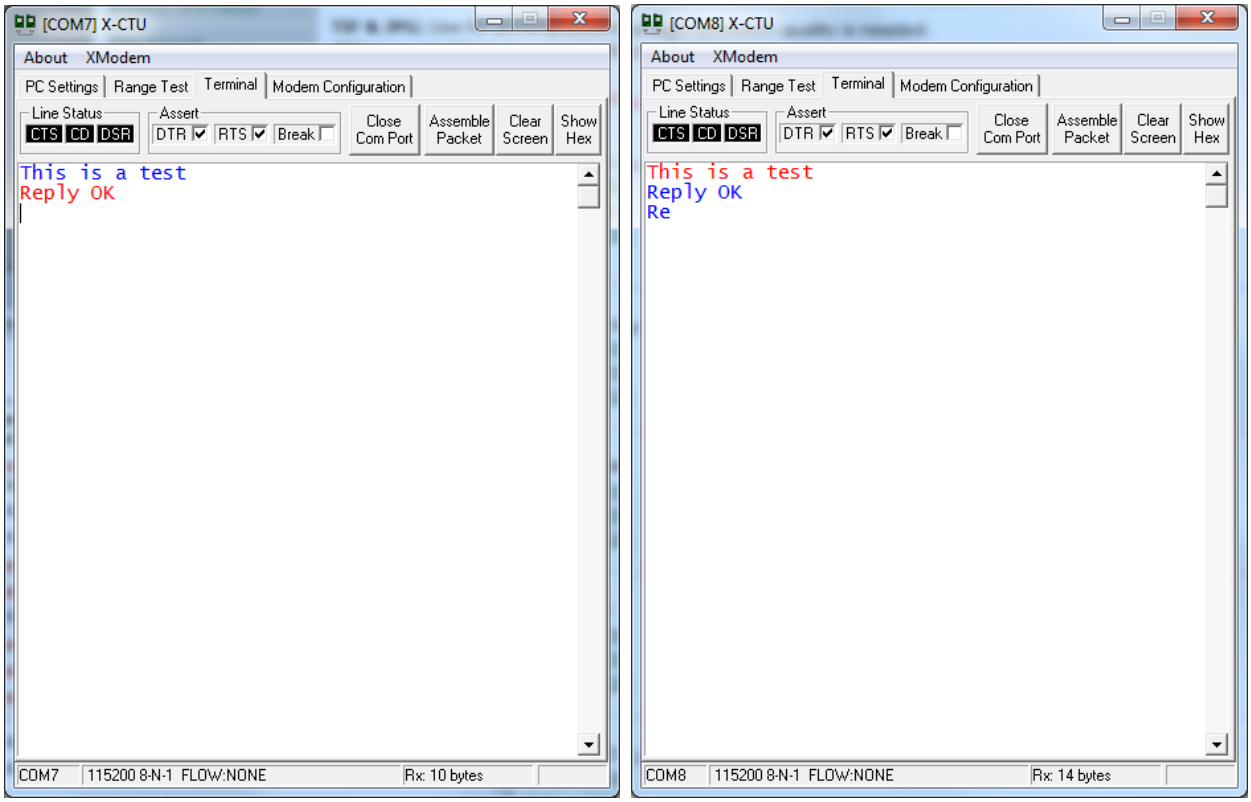


e) Repeat those steps for the second module.
f) In the Addressing section, modify the Destination IP Address to be the other module's IP.

Module IP Address = 192.168.0.19**8**
Destination IP Address = 192.168.0.19**9**

Module IP Address = 192.168.0.19**9**
Destination IP Address = 192.168.0.19**8**

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.


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