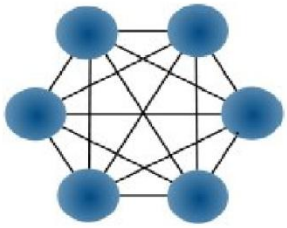
TENET TECHNETRONICS

2014

ZigBee Mesh Networking Using AT Command Set



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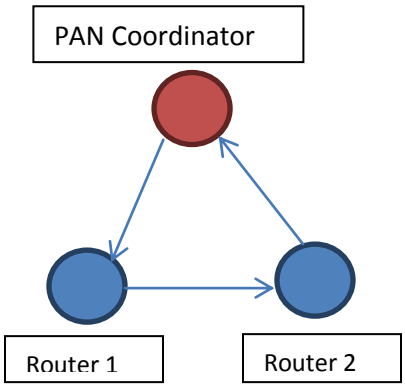
Introduction

Here is the quick tutorial that shows how to communicate threeZigbee radios, and form a mesh network using Xbee series 2 module.



Here in the above figure there is one PAN coordinator (Red circle) and two Routers (Blue circle). To form a mesh network it is required to have exactly one coordinator and N numbers of Router, in this example we have taken 2 Routers.

Coordinator is a device used for initiating a network by establishing the PAN ID; PAN ID is nothing butthe unique Personal Area Network identification number which can bedefined by user.

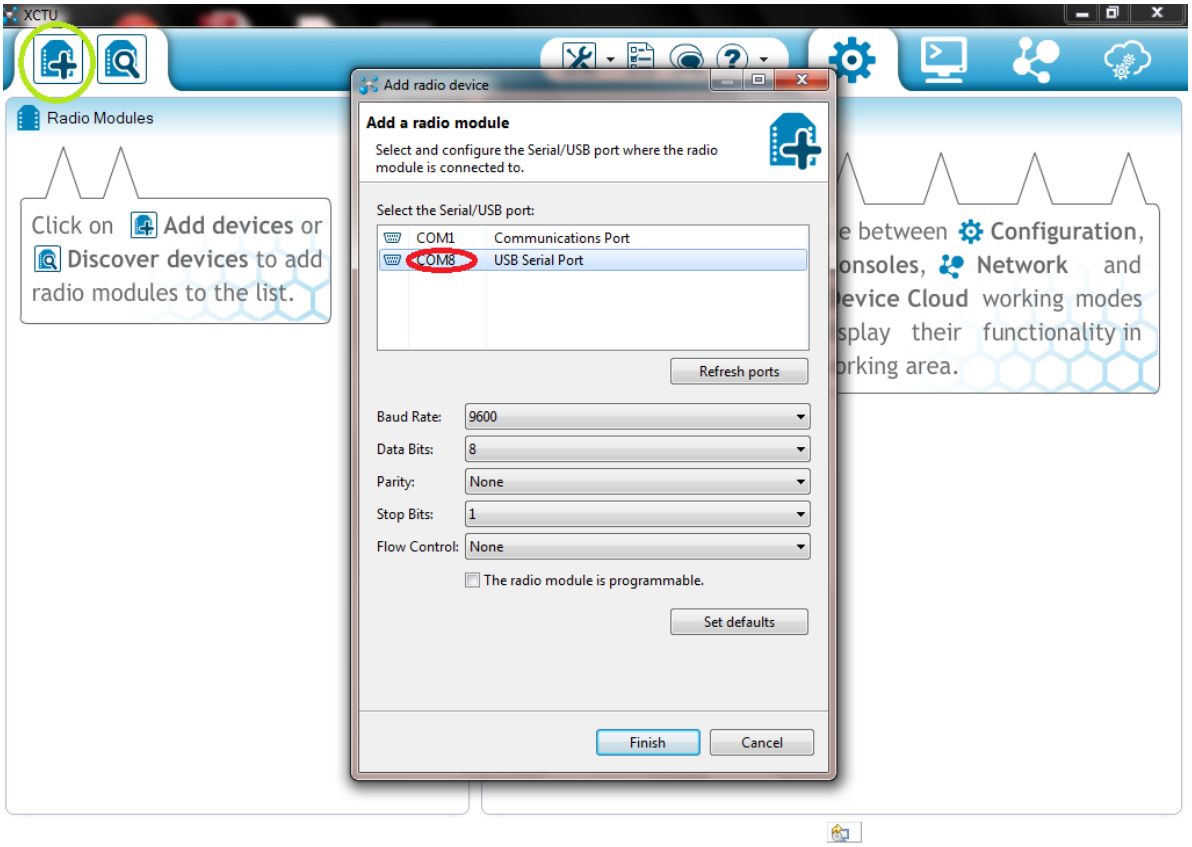
Routers are Full Functional Device (FFD) used to extend the range of network.

In this example we show how to communicate coordinator with Routers, that is coordinator sends information to Router 1 and receives data from router 2. At the same time router 1 can send data to router 2.

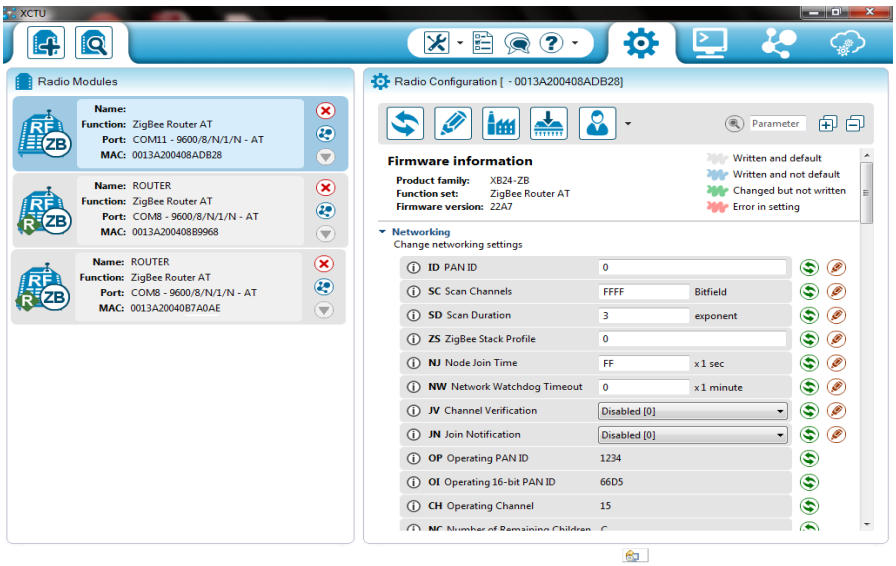
Components required to form a mesh network

1. Xbee S2 module ----3 nos.
2. Xbee USB Explore.
3. USB to mini USB cable
4. Computers.
5. X-CTU software.

Step One:



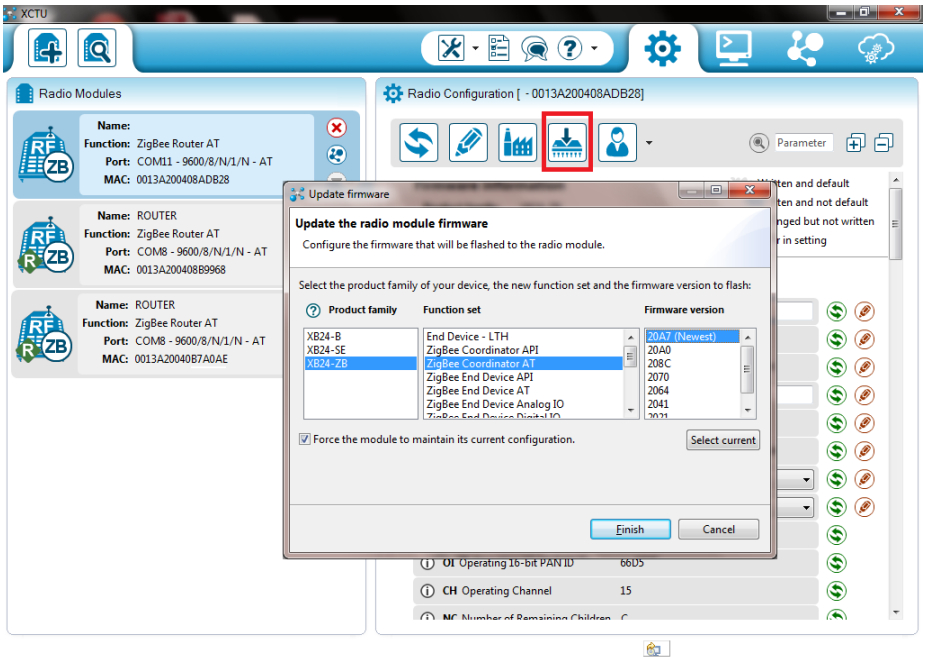
Open X-CTU software click Add device (green circle) a new dialog box appears, select the appropriate COMPORT (Red circle) then click Finish. Do this for all 3 Xbee S2 modules and you can find as below.



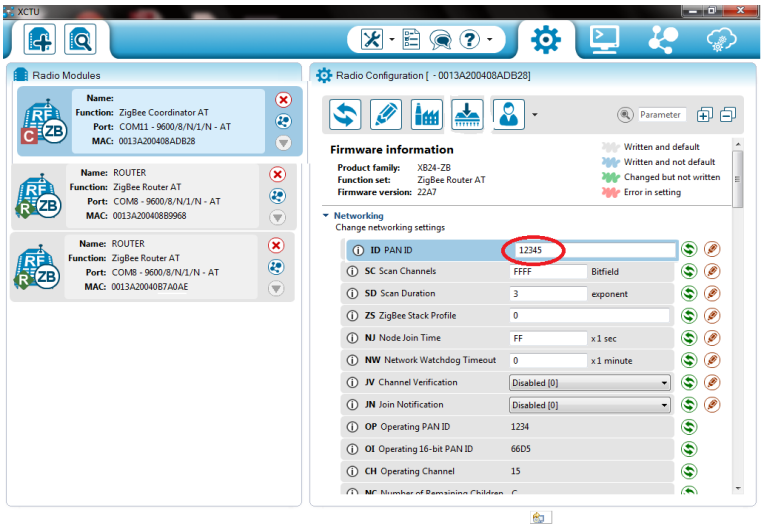
Step Two:

Update the latest firmware for each Xbee modules. Initially all Xbee modules comes with Router firmware.

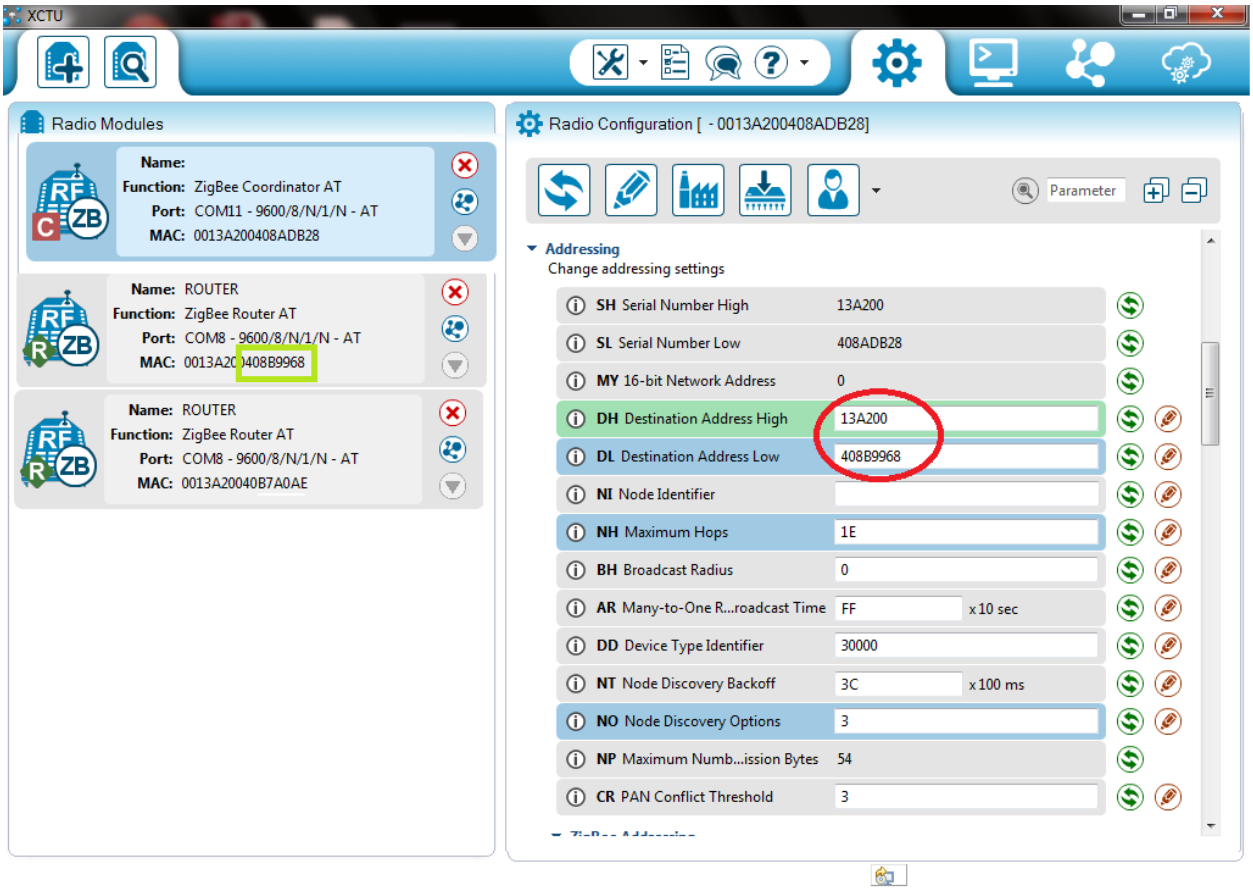
For Coordinator:



To work as a coordinator, click one of the device in 'Radio Modules' then click on Update firmware (Red Box), a new window appear, there select "XB24-ZB" in Product family, "Zigbee Coordinator AT" in function set & "20A7"in firmware version, then click Finish. After few sec you see a dialog window tell that firmware updated successfully then click OK.



Now in networking section enter the **ID** PAN ID (Red circle), you can enter your own unique id, but it should be within 0-0Xfffffffff. In this example you can see it as 12345. Once after you enter the id please click on write .



Now scroll down the scroll bar, in Addressing section enter **DH** Destination Address High&**DL** Destination Address Low (Red circle).

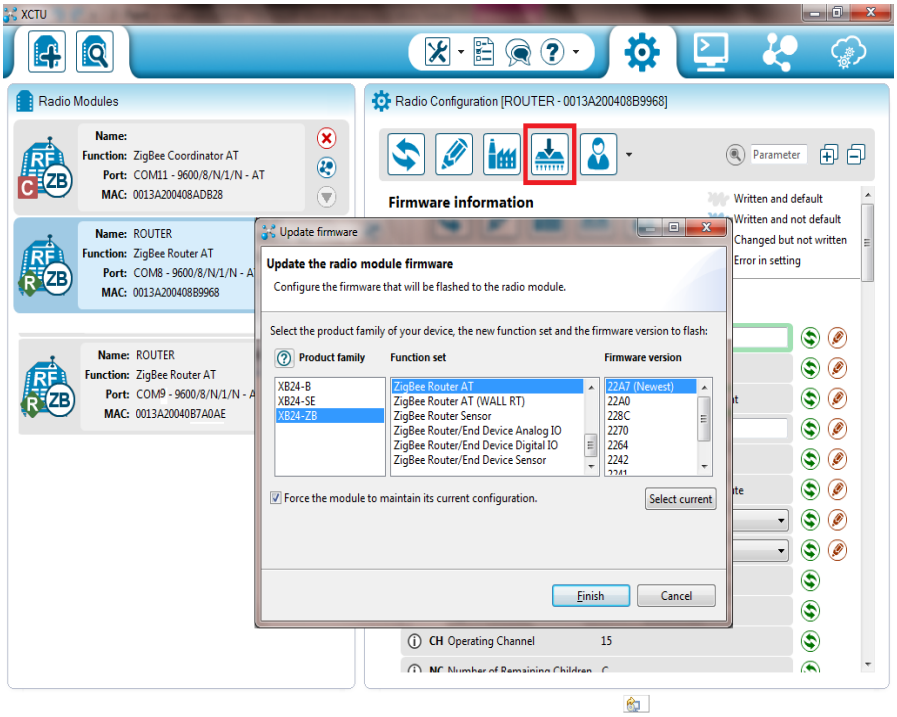
Destination Address High DH as “13A200” this is same for all Xbee modules.

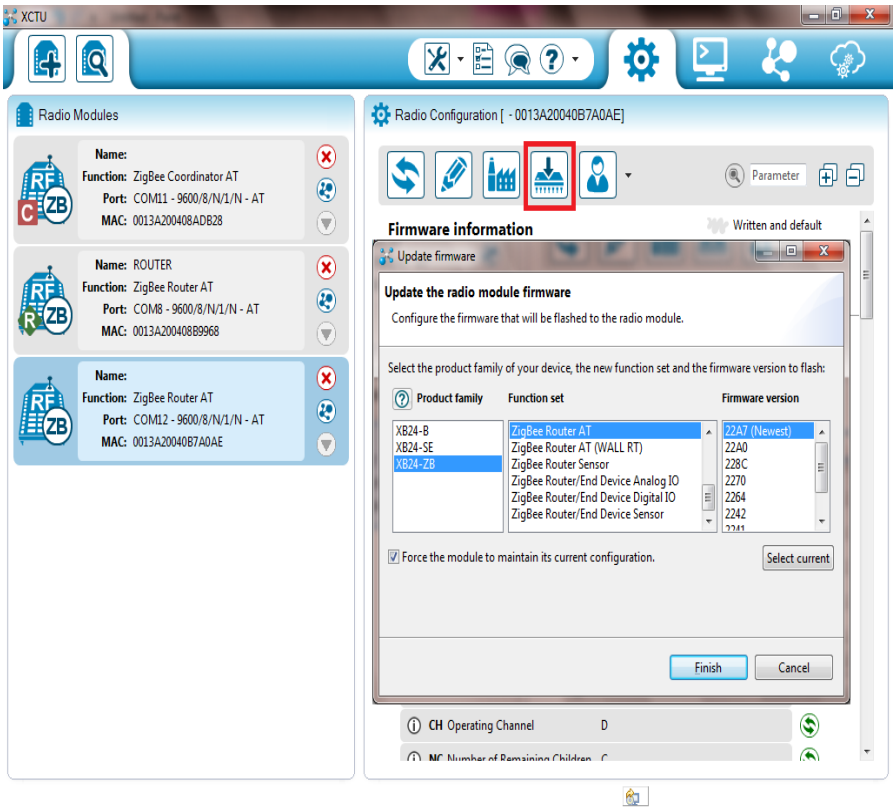
The Destination Address Low DL should be the address of the device to which you are going to send the data. In this example I have taken the address of Router 1 (green box).

Note: please click on write after entering DH & DL.

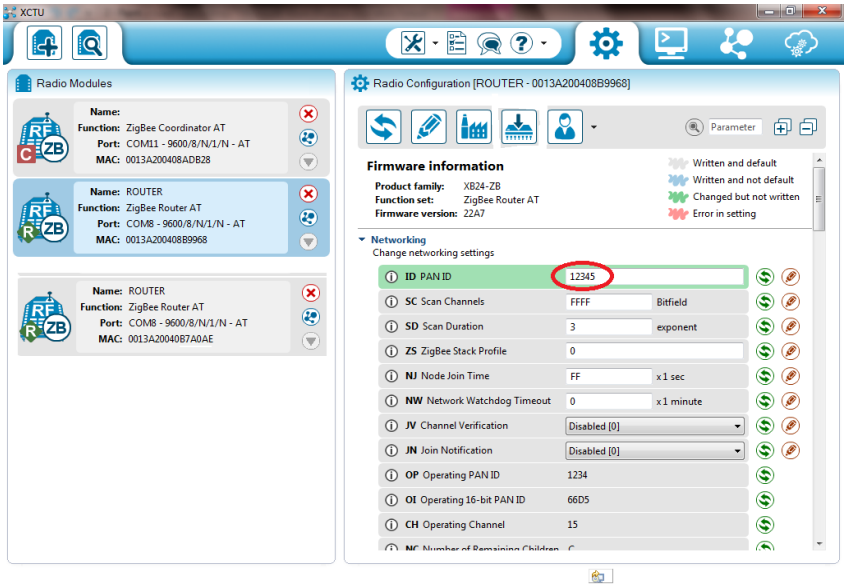
Step Three:

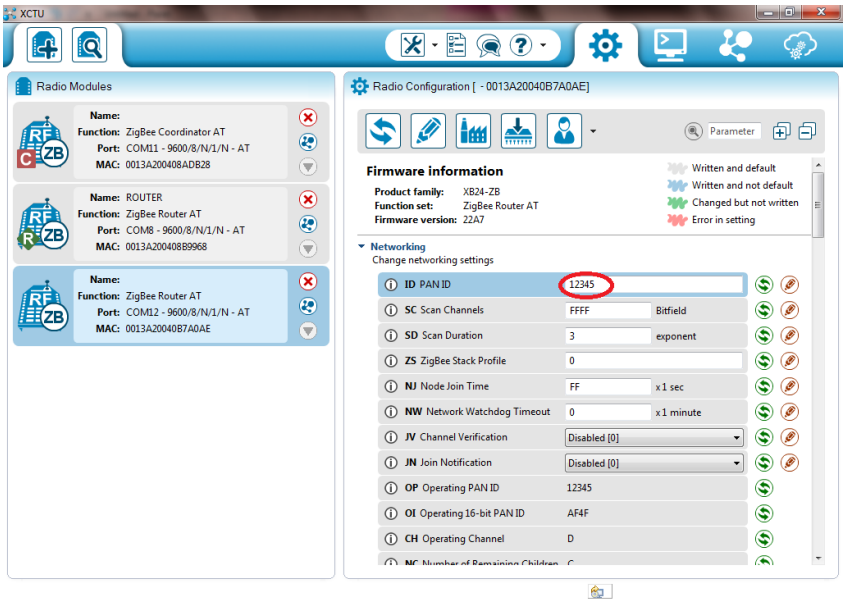
Similarly update the firmware for two devices as Router as shown below



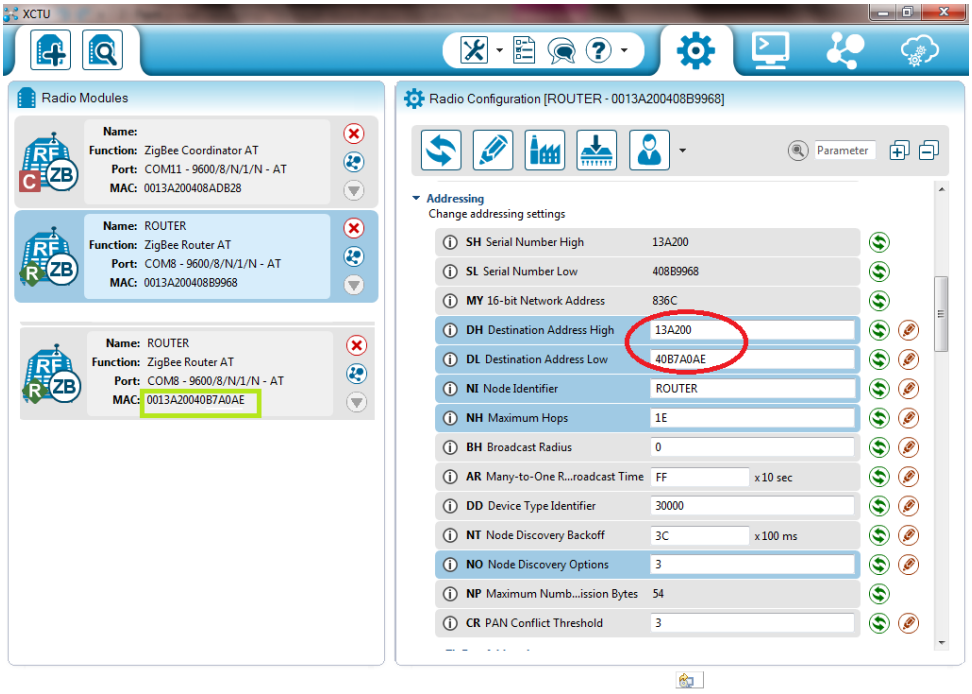


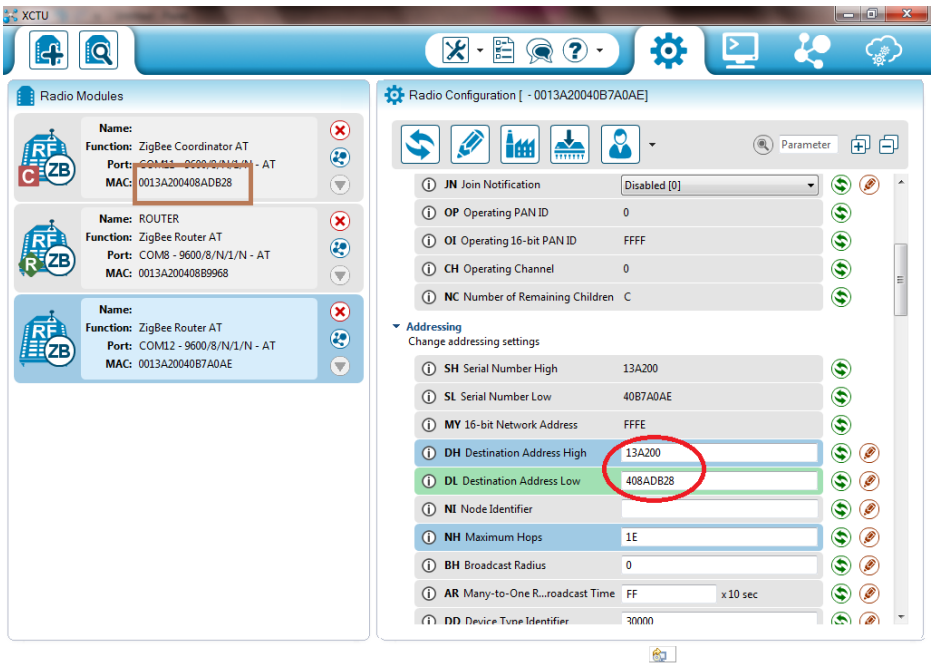
Select the device in Radio module then click on update firmware (Red box), now select “XB24-ZB” in Product family, “ZIgbee Router AT” in function set & “22A7”in firmware version, then click Finish.





Now enter the same PAN ID as coordinator to both the Routers in **ID** PAN ID(Red circle), then click  .

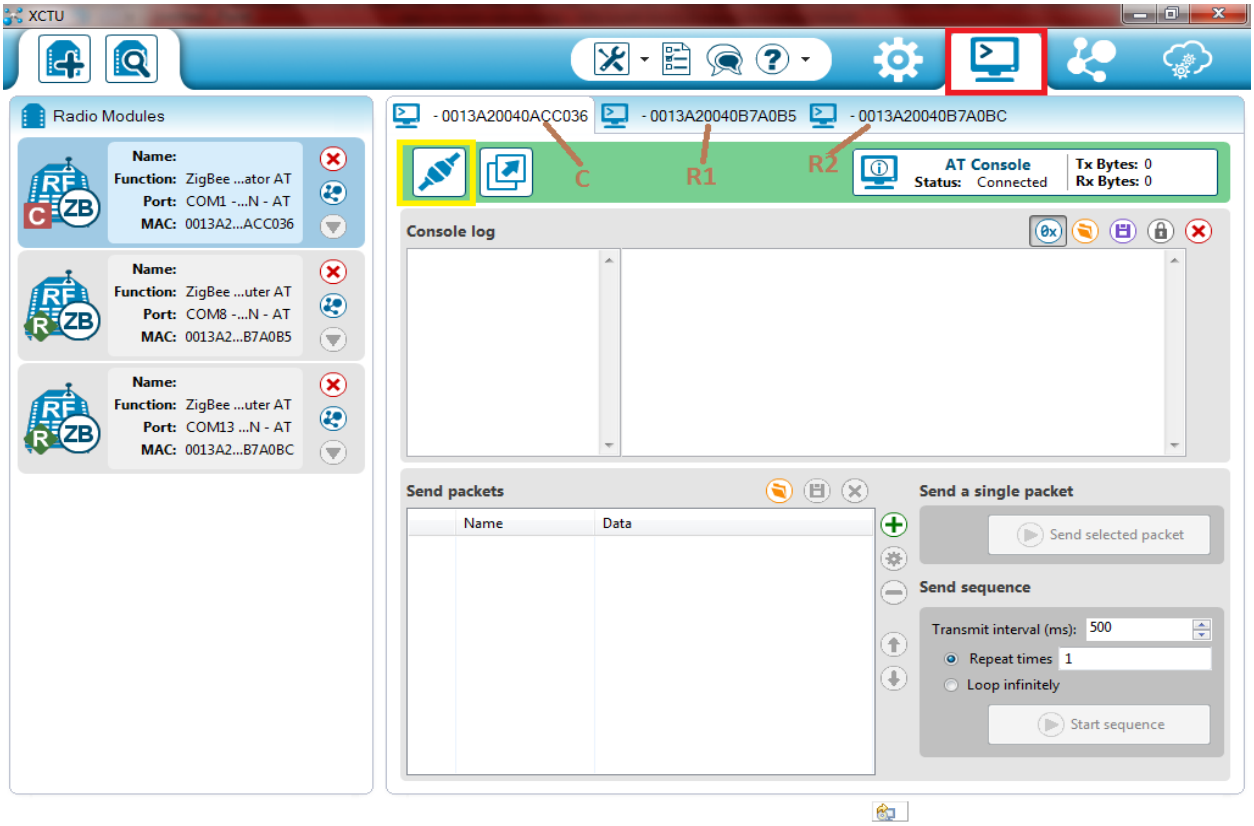




Enter the DL Destination Address Low of the device to which you are going to send the data. In this example, For Router 1, I have entered the address of Router 2 (Green box). For Router2, I have entered the address of coordinator (Brown box).

Note: please click on write  after entering DH & DL.

Step Four:



Once after the XBees are configured you need test for proper working, so click on 'switch to consoles working mode (Red box)'. Now click on each tab of XBee modules (Brown lines) and connect each other by clicking 'open the serial connection with radio module' (yellow box).

Step Five:

For better understanding click on ‘Detach view’(orange box) for Routers, a separate window appears for routers. Now type the data in console log, that is whatever data is entered at coordinator console log, that data is appeared at R1 console log. Similarly the data entered at R1 console log will appear at R2 console log. And the data entered at R2 console log will appear at coordinator console log.