

XBee Radio -- quick set up.

[http://www.moltosenso.com/client/fe/browser.php?pc=/  
client/fe/download.php](http://www.moltosenso.com/client/fe/browser.php?pc=/client/fe/download.php)

We will use *xBee's* as USB cable replacements.

- *xBee's* are small, serial radios that can be configured in pairs or small broadcast nets.

We will configure using a piece of software called IRON.

and a piece of hardware called an xBee explorer (in cabinet).

There are lots of ways to do this -- and lots of resources online.

The way that works for you is the right way

Other resources:

<http://www.ladyada.net/make/xbee/ref.html>

<http://hex705.wordpress.com/2008/11/07/xbee-configuring-the-radios/>

# We need to configure 4 settings on the radios:

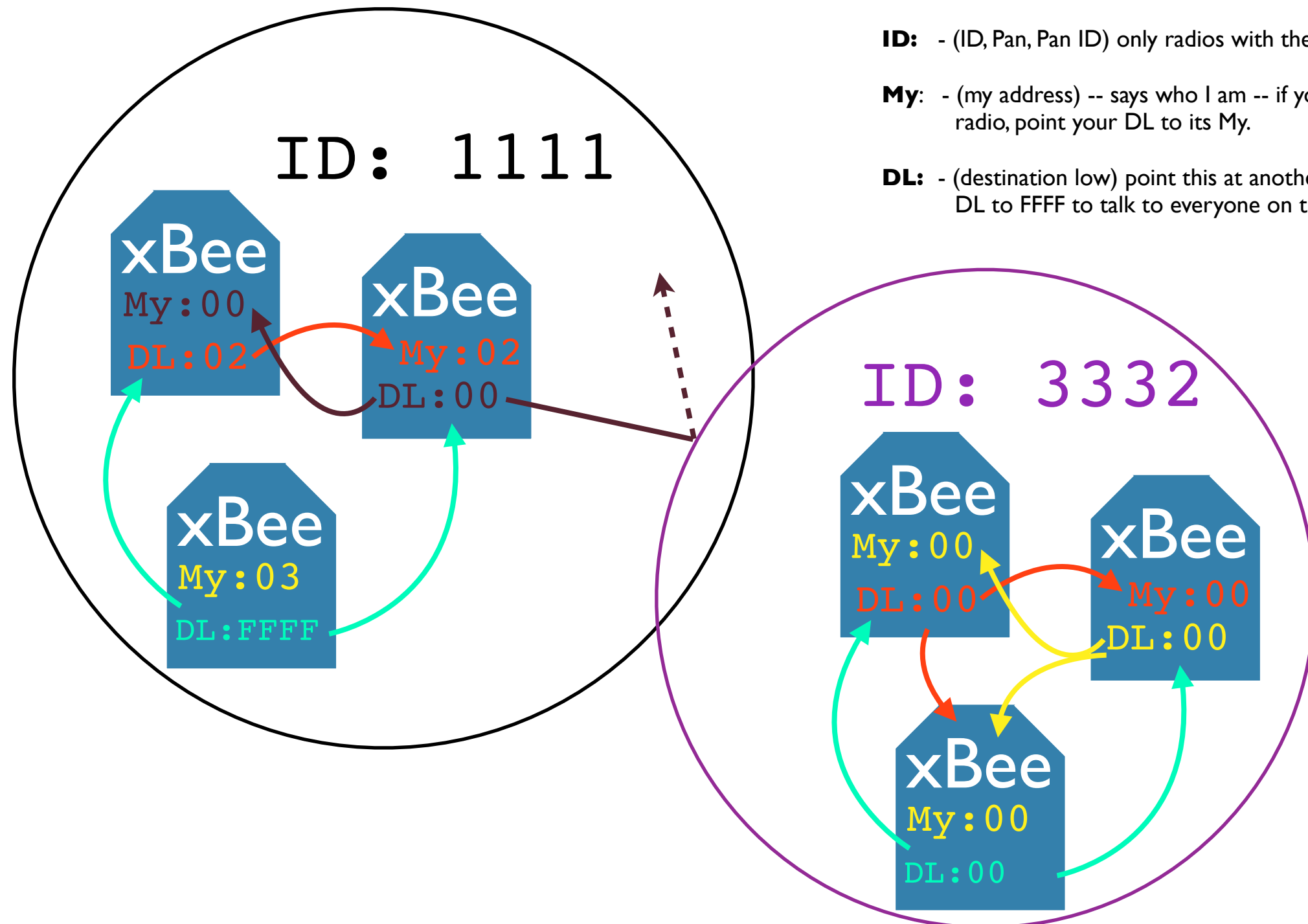
## They are: BAUD, ID, MY and DL.

**Baud:** - Match the baud rate to your Arduino or Processing sketch.

**ID:** - (ID, Pan, Pan ID) only radios with the same ID can talk to each other

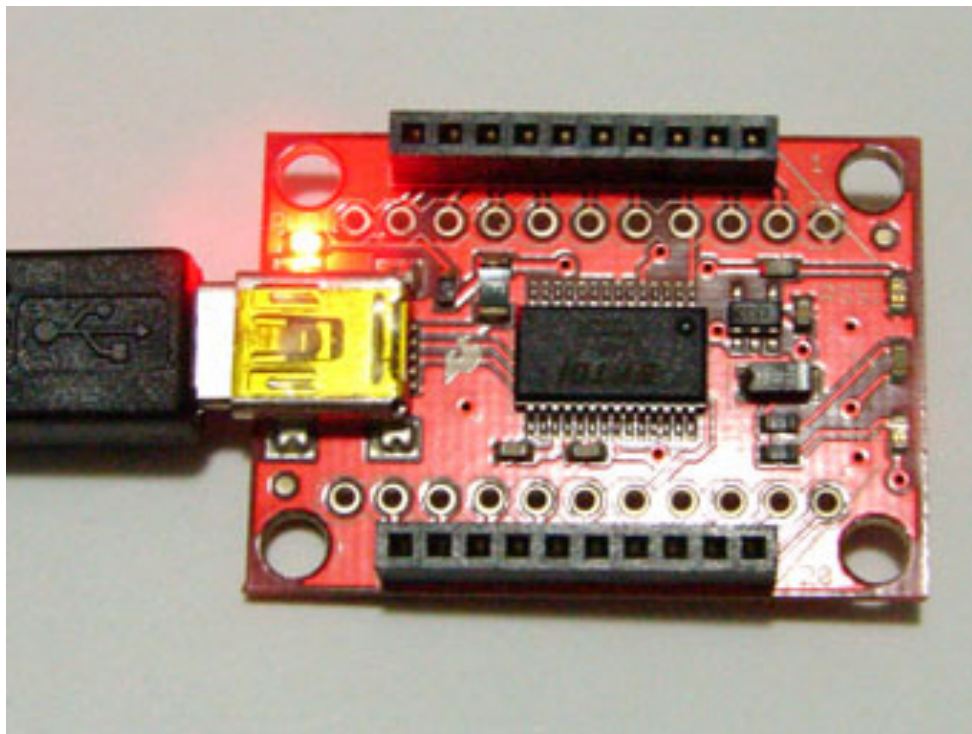
**My:** - (my address) -- says who I am -- if you want to talk to another radio, point your DL to its My.

**DL:** - (destination low) point this at another My to talk between them. Set DL to FFFF to talk to everyone on the same ID



# Quick Configure

1) Place your first XBee into the explorer as shown below (watch the outline).



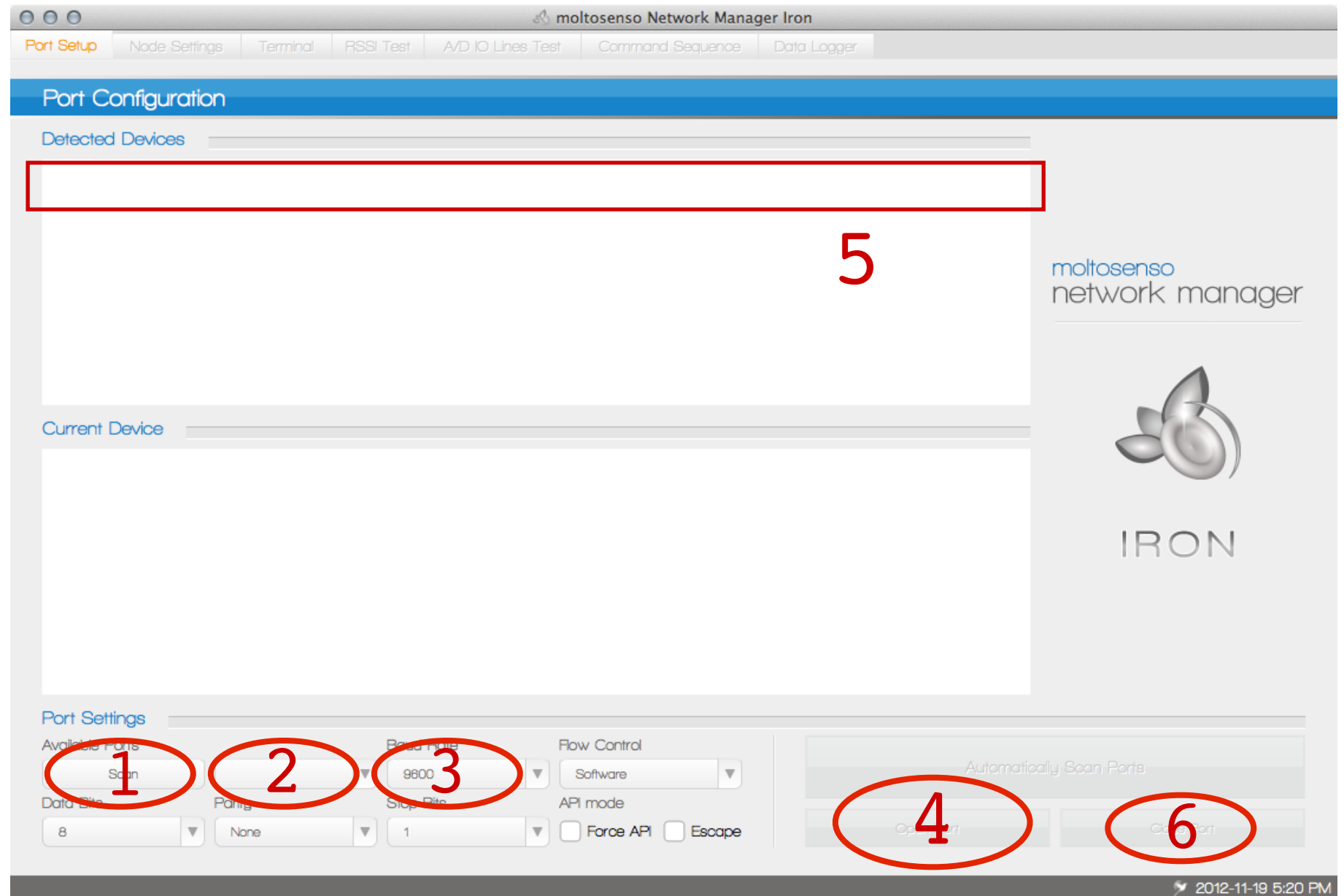
**NOTE: xBees are 3.3V devices!**  
(explorer takes care of this)

# Quick Configure

## OPEN IRON - find your xBee

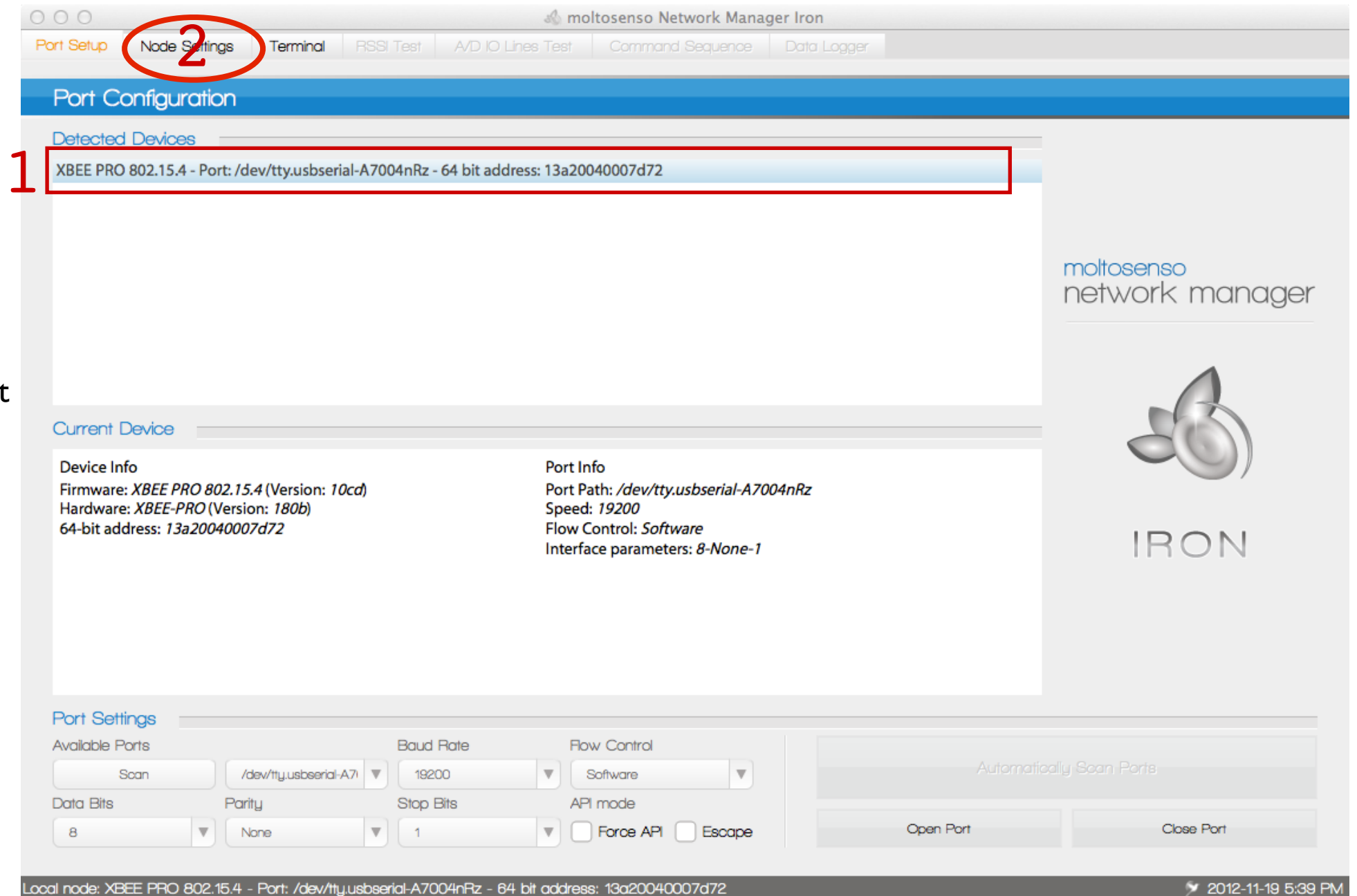
Click the following in order:

- 1) scan ports
  - 2) select port ( something like: /dev/tty.usb-A34532)
  - 3) select baud (this is the radio serial baud) (try 9600 first).
  - 4) open port (click yes)
  - 5) You should get a message in top area -- listing your radio.
  - 6) If you don't get a message -- click close port
- AND  
go back to 3 and repeat with a different baud until you connect (sorry tedious but thats how this one works).



**NOTE: xBees are 3.3V devices!**

# Now that you have found your xBEE



**NOTE: xBees are 3.3V devices!**

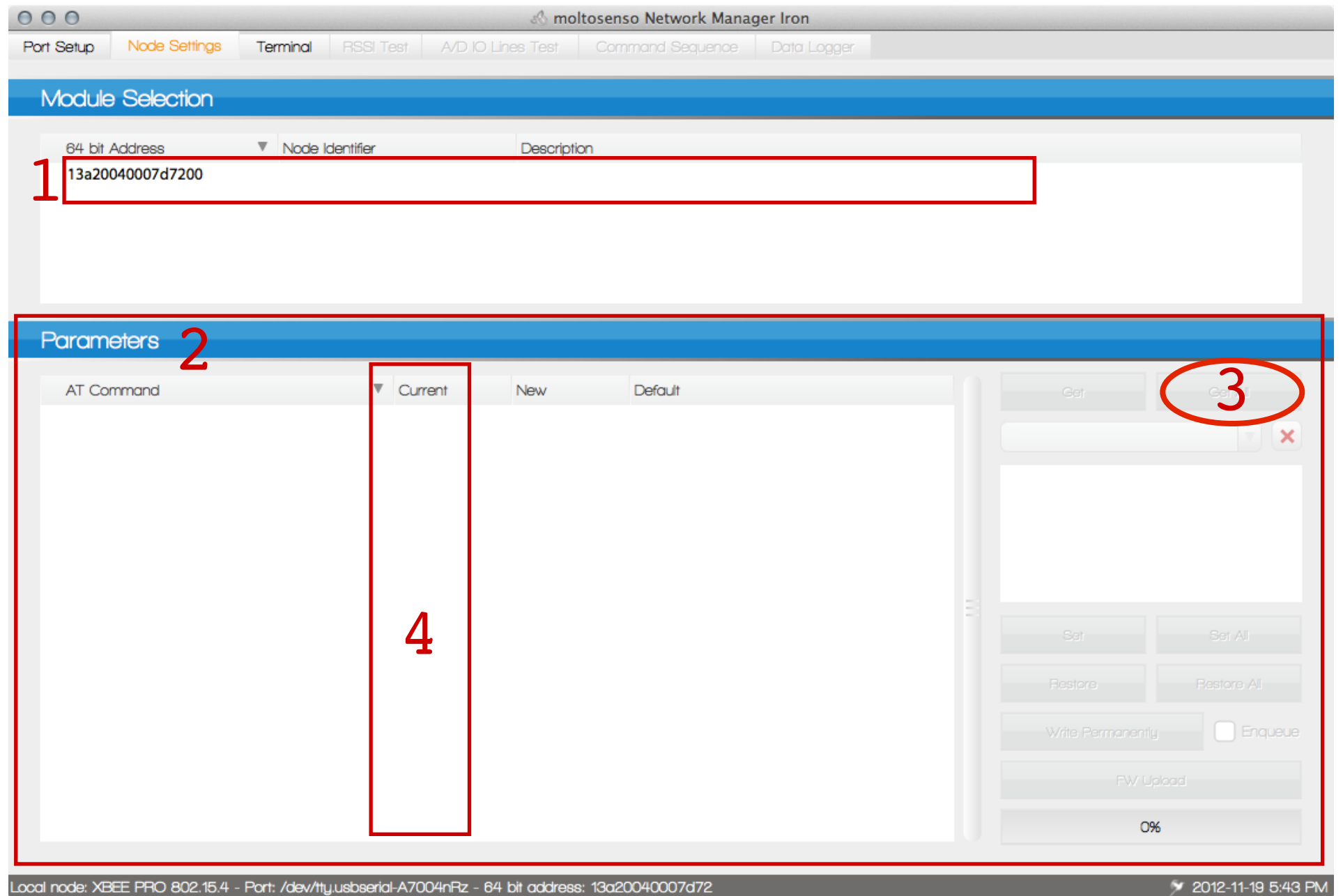


# Now that you have found your xBEE

1) Click on the Serial Number and a whole LOT of info appears in the Parameters section (2)

3) click GET ALL to read the current radio settings.

The radio setting show up in the current column.



**NOTE: xBees are 3.3V devices!**

# Now we can configure the radio (BD,ID,MY,DL)

1) We need to set the baud rate.

Under  
[1] **Serial Interfacing**

find

[2] **BD** (baud) -- they call it **Interface Data Rate** -- they mean BAUD.

Note the current value -- it will be a number from 0 to 7.

3) To change this go to the drop down on the right [3]. Select the baud you intend to use.

**NOTE** - once you write this setting permanently you need to go back to the first configure slide and close / open the port at the new baud rate.

4) Click Set

The screenshot shows the 'moltosenso Network Manager Iron' application. The 'Node Settings' tab is active, displaying a table of parameters for a node with address 13a20040007d7200. The 'Serial Interfacing' section is expanded, and the 'BD' (Interface Data Rate) parameter is highlighted. The current value is 04, and the default is 3. To the right, a dropdown menu is open, showing a list of baud rates, with '4 - 19200' selected. Below the dropdown, a 'Set' button is circled. The status bar at the bottom indicates the local node is an XBEE PRO 802.15.4 with a specific port and address.

AT Command	Current	New	Default
<b>Serial Interfacing</b>			
RO	Packetization Timeout	03	3
PR	Pull-up Resistor Enable	ff	FF
BD	Interface Data Rate	04	3
AP	API Enable	00	0
<b>RF Interfacing</b>			
PL	Power Level	04	4
CA	CCA Threshold	2c	2C
<b>Networking &amp; Security</b>			
SL	Serial Number Low	40007d72	
SH	Serial Number High	13a200	
SD	Scan Duration	04	4
SC	Scan Channels	1ffe	1FFE
RR	XBee Retries	00	0
RN	Random Delay Slots	00	0
NT	Node Discover Time	19	19
NO	Node Discover Options	00	0
NI	Node Identifier		

**NOTE: xBees are 3.3V devices!**

# Repeat that pattern to set ID,MY,DL.

We need to set remaining parameters...

Under  
[1] **Networking and Security**

find

[2] **MY, ID and or DL**

You set these to an integer of your liking between the values of 0 and FFFF (that's hex).

To set them click the row and goto drop down [3] type your value.

4) Click Set

Go back to [1] and repeat for all parameters you need to change.

moltosenso Network Manager Iron

Port Setup Node Settings Terminal RSSI Test A/D IO Lines Test Command Sequence Data Logger

Module Selection

64 bit Address	Node Identifier	Description
13a20040007d7200		

Parameters

AT Command		Current	New	Default
▼ Networking & Security				
SL	Serial Number Low	40007d72		
SH	Serial Number High	13a200		
SD	Scan Duration	04		4
SC	Scan Channels	1ffe		1FFE
RR	XBee Retries	00		0
RN	Random Delay Slots	00		0
NT	Node Discover Time	19		19
NO	Node Discover Options	00		0
NI	Node Identifier			
MY	16-bit Source Address	01		0
MM	MAC Mode	00		0
KY	AES Encryption Key			
ID	PAN ID	2222		3332
EE	AES Encryption Enable	00		0
DL	Destination Address Low	02		0
DH	Destination Address High	00		0
CH	Channel	0c		C
CE	Coordinator Enable	00		0

Get Get All

01 3

Description  
Set/read the 16-bit source address for the modem. Set MY = 0xFFFF to disable reception of packets with 16-bit addresses. 64-bit source address is the serial number and is always enabled.

4 Set All

Restore Restore All

Write Permanently ☐ Enqueue

FW Upload

100%

Local node: XBEE PRO 802.15.4 - Port: /dev/tty.usbserial-A7004nRz - 64 bit address: 13a20040007d72 2012-11-19 8:05 PM

**NOTE: xBees are 3.3V devices!**

# Repeat that pattern to set ID,MY,DL.

Last step -- we need to write these change to the xBee.

1) click set all (just incase you forgot one along the way.

2) click Write permanently

3) return to Port Setup tab and in the bottom right of it click close port.

**NOTE** - if you changed the BAUD and execute a *Write Permanently* you need to go back to the first configure slide and close / open the port at the new baud rate or this interface will not be able to connect to the radio.


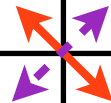

The screenshot shows the 'moltosenso Network Manager Iron' interface. The 'Port Setup' tab is circled with a red '3'. The 'Node Settings' tab is active, showing a table of parameters. The 'MY' parameter (16-bit Source Address) is highlighted. The 'Set All' button is circled with a red '1', and the 'Write Permanently' button is circled with a red '2'.

AT Command		Current	New	Default
▼ Networking & Security				
SL	Serial Number Low	40007d72		
SH	Serial Number High	13a200		
SD	Scan Duration	04		4
SC	Scan Channels	1ffe		1FFE
RR	XBee Retries	00		0
RN	Random Delay Slots	00		0
NT	Node Discover Time	19		19
NO	Node Discover Options	00		0
NI	Node Identifier			
MY	16-bit Source Address	01		0
MM	MAC Mode	00		0
KY	AES Encryption Key			
ID	PAN ID	2222		3332
EE	AES Encryption Enable	00		0
DL	Destination Address Low	02		0
DH	Destination Address High	00		0
CH	Channel	0c		C
CE	Coordinator Enable	00		0

Local node: XBEE PRO 802.15.4 - Port: /dev/tty.usbserial-A7004nRz - 64 bit address: 13a20040007d72 2012-11-19 8:05 PM

**NOTE: xBees are 3.3V devices!**

NOW -- do it all again for the other radio --  
make sure the ID and BD all match (its easier).  
Make sure the DLs point at the MYs.

Parameter	xB1	xB2
ID		
MY		
DL		
BD		

**NOTE: xBees are 3.3V devices!**

Remember there are lots of ways to do this --  
and lots of resources online.

Now we need to set up the circuit to connect  
the radio to an arduino.

<http://hex705.wordpress.com/category/xbee/>

The way that works for you is the right way

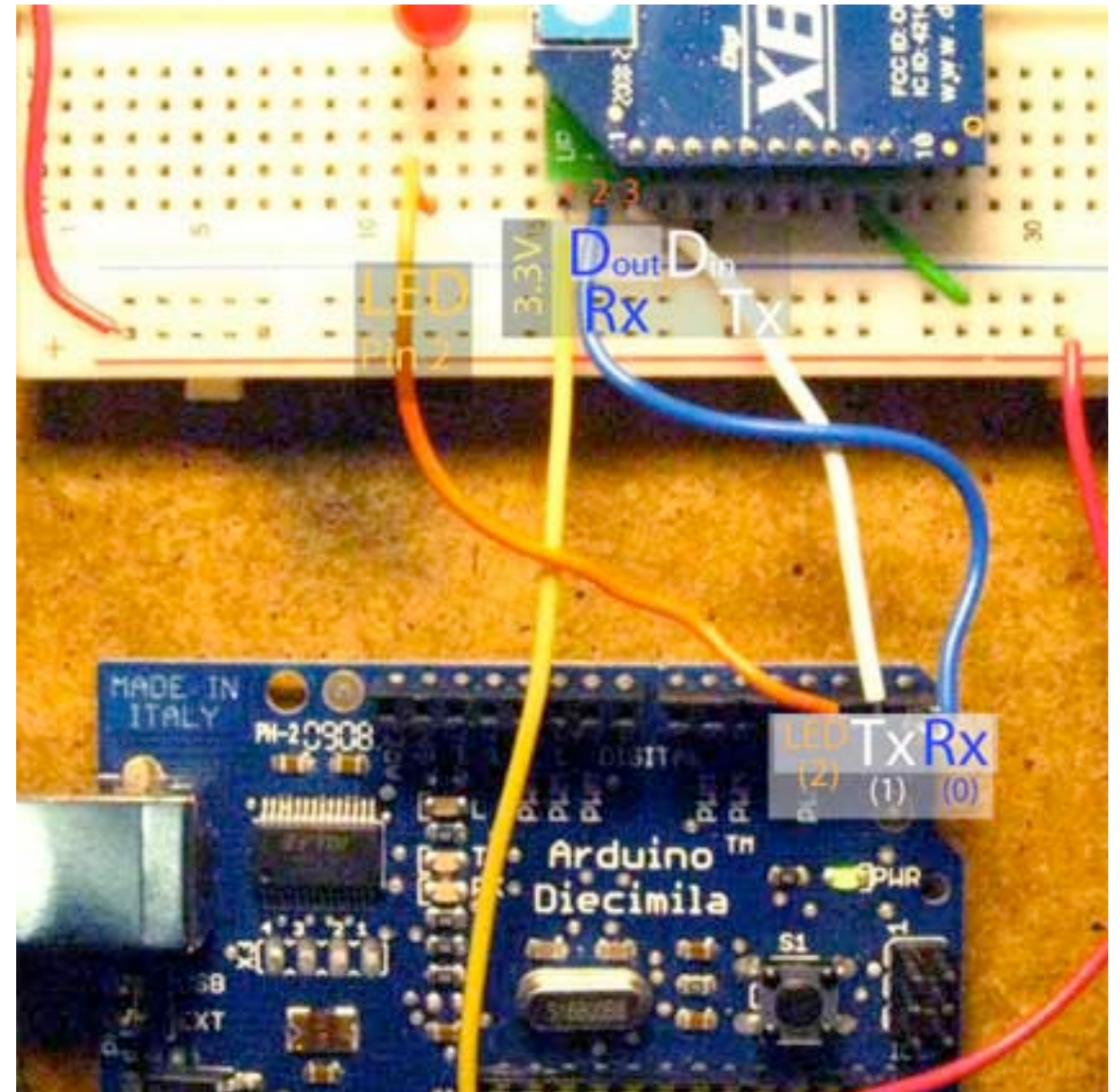


## NOTE: xBees are 3.3V devices!

# Wiring Diagram

xBee pin 1, Vcc --> **3.3V** (from Arduino) [YELLOW]  
 xBee pin 2, Dout --> Rx Arduino [Blue]  
 xBee pin 3, Din --> Tx Arduino [White]  
 xBee pin 10, GND --> GND Arduino [Green]

Remember --  
connect  
GROUNDS!



The way that works for you is the right way.

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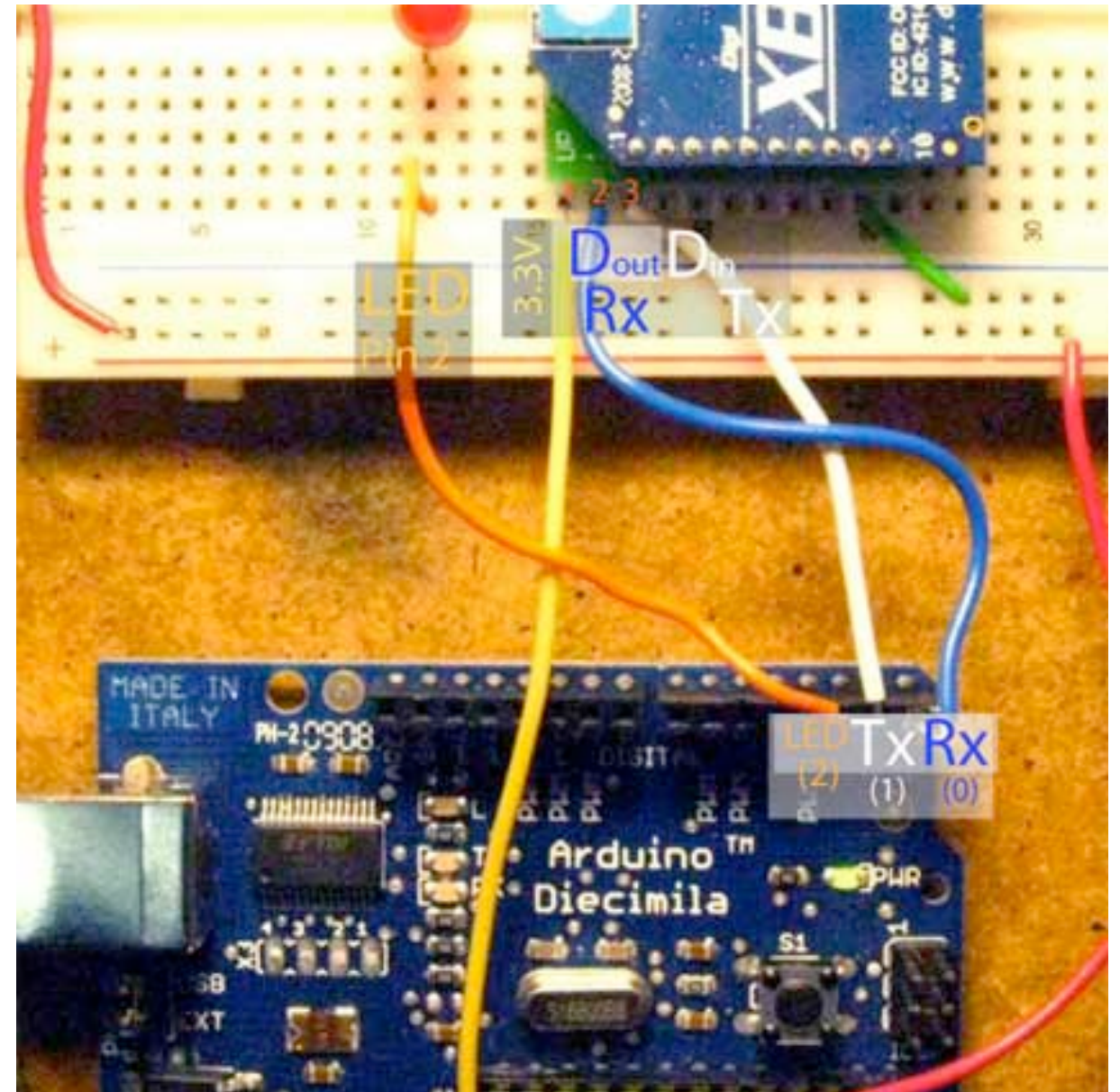
# When you want to upload new Arduino code...

You need to disconnect Rx and TX to reprogram your arduino.

Then reconnect them once code is loaded.

Otherwise you will get programming errors / fail.

This is analogous to port conflict with Processing.



**NOTE: xBees are 3.3V devices!**



Now -- you have 2 radios and they are ready to replace your USB cable.