ZigBee/802.15.4 2.4G Wireless Radio Module Kit Users Manual

Revision 1.0

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1. General Information ZigBee/802.15.4 2.4G Wireless Radio Module

1.1. Scope

This document describes the basic functionalities and the electrical specifications of Univelop Tech. LLC's ZigBee/802.15.4 2.4G Wireless Radio kit that includes Wireless Radio Module and BDM programmer.

1.2. General Description

The kit consists of all necessary software and hardware for testing/prototype.

Kit includes:

2 x USB Debugger for CC2431/CC2430/CC2511
2 x 2.4Ghz ZigBee/ IEEE 802.15.4 CC2431 Module
1 x CDROM includes all software and manual

Include Software:

1. TI's IAR IDE programming environment for CC2430/2431 (evaluation version),
2. TI/ChipCon's SmartRF Studio, you can use our module without programming.
3. TI/ChipCon's SmartRF04 Flash Programmer
4. TI/ChipCon's Pocket Sniffer,
5. TI/ChipCon's IEEE Address Programmer
6. Elec. documents for the development.

1.3. Features for Zigbee CC2431/CC2430 Module

- Dimentions: 29mm X 30mm (cc2431) , 33mm X 30mm (cc2431+cc2591) (optional)
- Antenna: High performance chip antenna, We use large chip antenna for better performance.
- 2.4 GHz IEEE 802.15.4 / ZigBee(TM)
- Location Engine (CC2431) calculates the location of a node in a network
- High performance and low power 8051 microcontroller core
- Low current consumption (RX: 27mA, TX: 27mA, microcontroller running at 32 MHz)
- 128-bit AES security coprocessor
- ADC with up to eight inputs and configurable resolution
- Only 0.5µA current consumption in power-down mode, where external interrupts or the RTC can wake up the system
- Flash/RAM: 128kb/8kb
- Operating Voltage(Min)(V): 2 (Max)(V): 3.6
- TX Power(dBm): 0 (cc2431 only), 22 dbm (cc2431 + cc2591)
- Sensitivity (Best)(dBm): -92 (cc2431 only), -98 (cc2431 + cc2591)
- Data Rate(Max)(kbps): 250
- Transmission range: 50 meters / 300 feet (without CC2591) 200m/1200 feet (with CC2591)(optional), but that can vary greatly depending on temperature, humidity and air.

1.4. Features for BDM Programmer for CC2431/CC2430/CC2511

- USB Interface
- work with CC2430, CC2431, CC2511
- work with IAR ew8051 software as well as all the above software.
- Provide 2 LEDs and 1 button for Zigbee Module usage
- dimensions: 52mm X 36mm

1.5. Photo of BDM Programmer and ZigBee 2.4G Wireless Radio Module

1.5.1 BDM Programmer for CC2431/CC2430
1.5.2 ZigBee 2.4G Wireless Radio Module (Z31)
1.5.3 ZigBee 2.4G Wireless Radio Module with CC2591 (Z31E)

1.6. Diagram of ZigBee Module

Diagram in BDM programmer

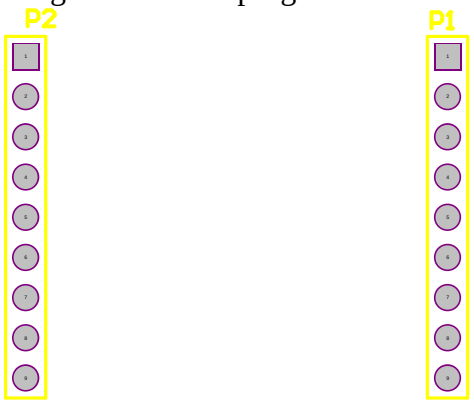
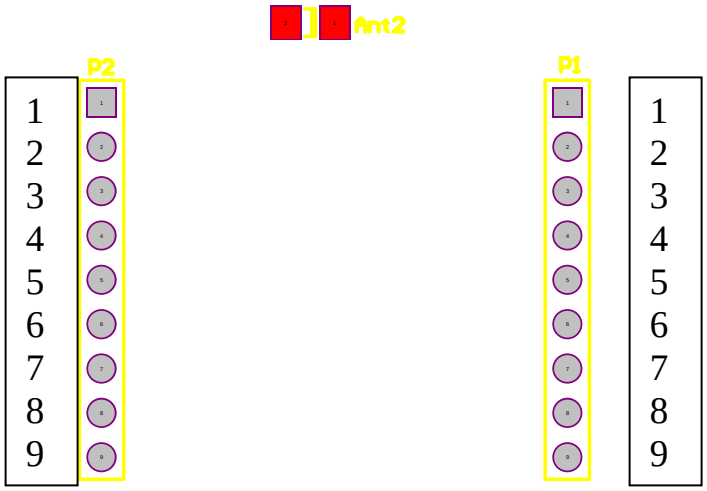
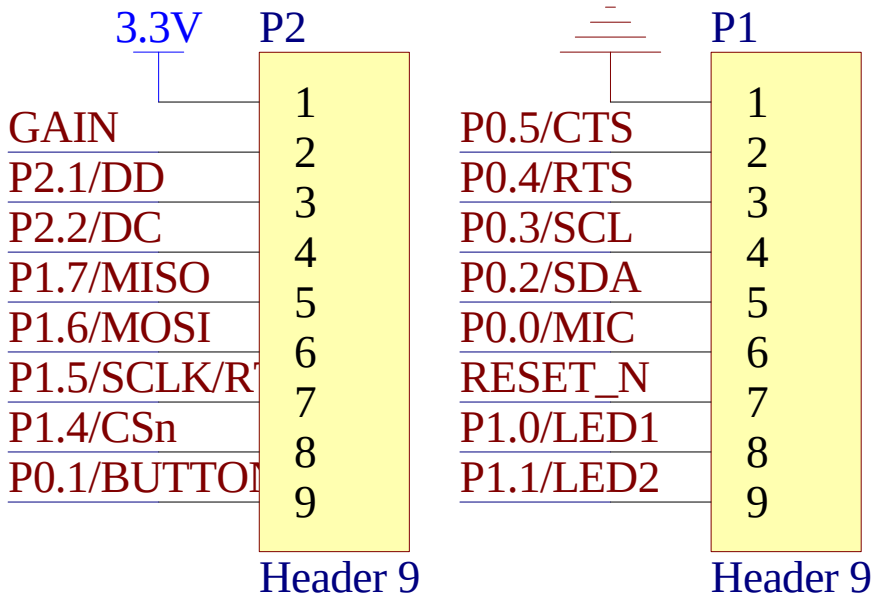


Diagram in ZigBee Module:



Pin Definition for ZigBee Module:



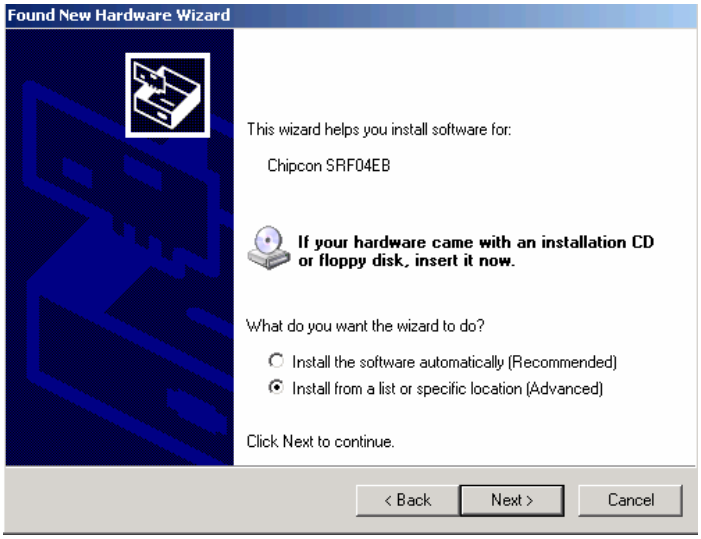
Pins (P2)	Function
3.3V	+3.3V input to the module
Gain	Used to control CC2591 (to enable or disable cc2591)
P2.1/DD	Connects with CC2430 P2.1
P2.2/DC	Connects with CC2430 P2.2
P1.7/MISO	Connects with CC2430 P1.7
P1.6/MOSI	Connects with CC2430 P1.6
P1.5/SCLK/RTS	Connects with CC2430 P1.5
P1.4/CSn	Connects with CC2430 P1.4
P0.1/BUTTON	Connects CC2430 P0.1 and BDM's button

Pins (P2)	Function
GND	Ground input to the module
P0.5/CTS	Connects with CC2430 P0.5
P0.4/RTS	Connects with CC2430 P0.4
P0.3/SCL	Connects with CC2430 P0.3
P0.2/SDA	Connects with CC2430 P0.2
P0.0/MIC	Connects with CC2430 P0.0
RESET_N	CC2430 Reset
P1.0/LED1	Connects CC2430 P1.0 and LED1 on BDM
P1.1/LED2	Connects CC2430 P1.1 and LED2 on BDM

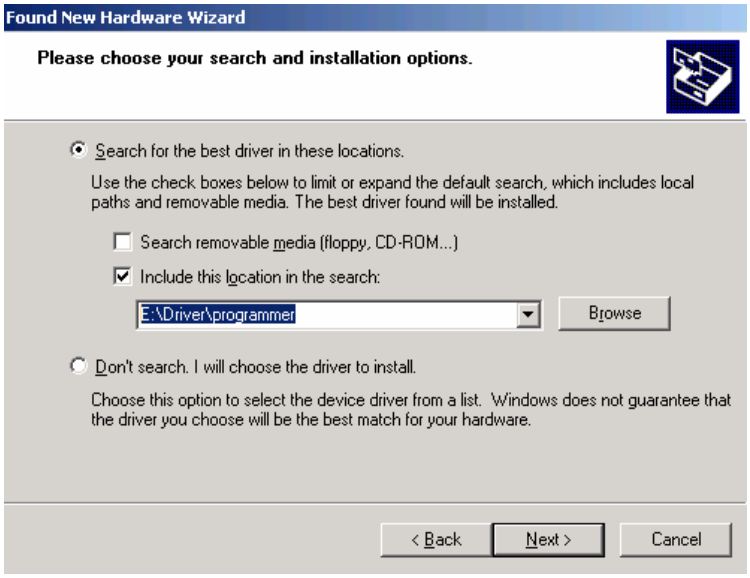
2. Install Driver for BDM Programmer in WinXP

1. Mount the ZigBee Module onto the top of BDM programmer (on double 9 pins with the antenna outside of the BDM programmer).
2. Plug the USB cable into a USB port in PC:

Then, select “No, not this time”, click “Next”,

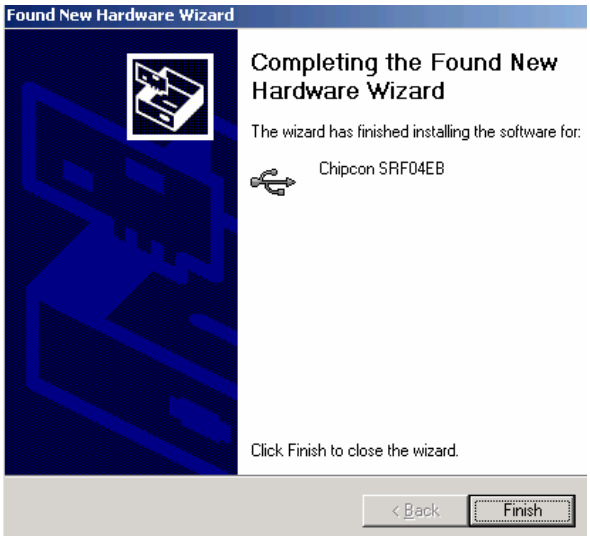


then select “install from a list or specific location”,

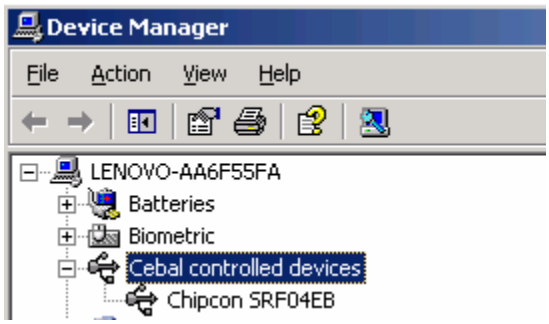


input the location of driver "cd-rom"\driver\programmer .

Finish installation.



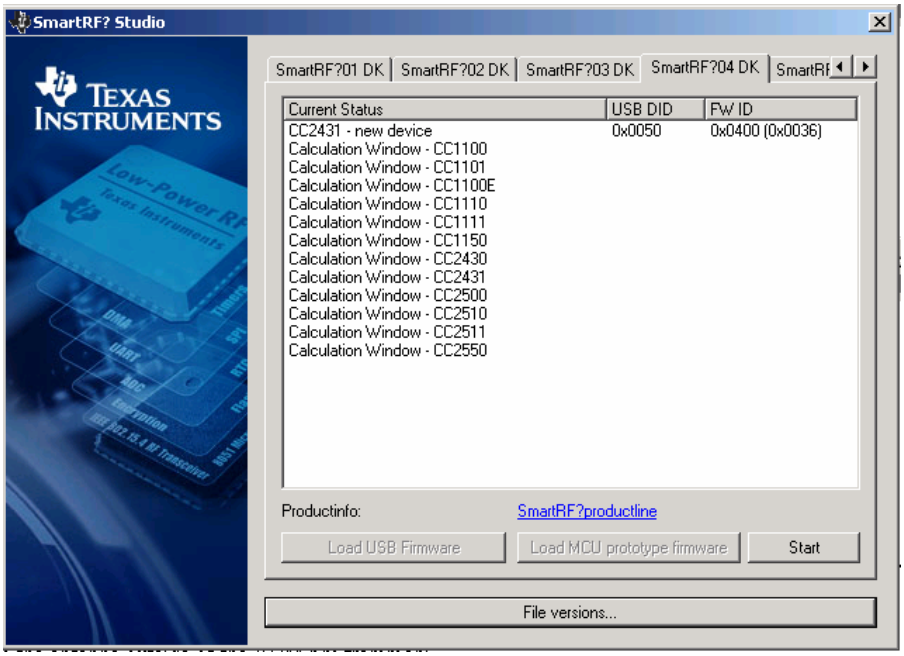
You can check from hardware list to make that the driver is installed properly.



The BDM programmer is installed as "Chipcon SRF04EB" under Cebal controlled devices.

3. Using SmartRF Studio to control our model Via BDM programmer

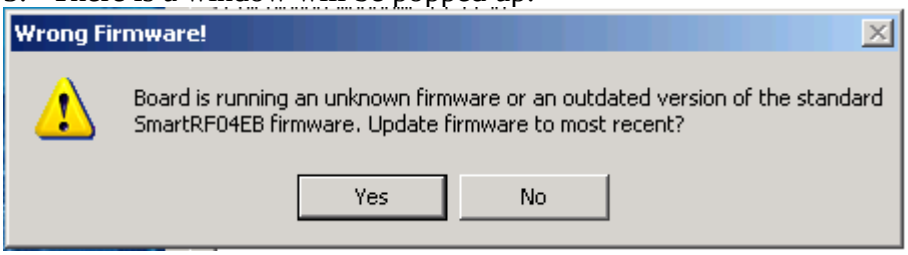
1. Mount the ZigBee Module onto the top of BDM programmer (on double 9 pins with the antenna outside of the BDM programmer).
2. Plug the USB cable into a USB port in PC.
3. Start to run StartRF Studio



You will find in the first line "CC2431 – new device …" which means that the software already identifies our hardware.

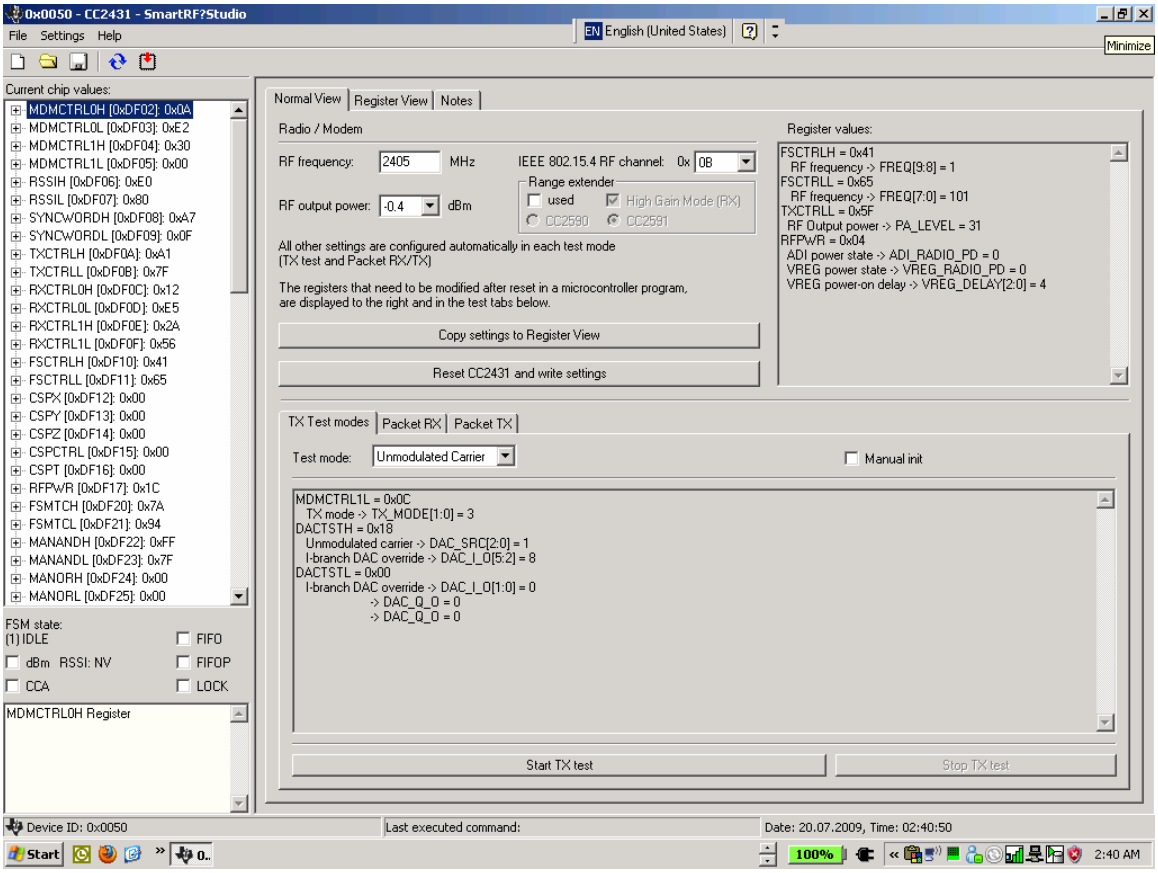
4. Then select the above line, and click "start"

5. There is a window will be popped up:



Please select "NO".

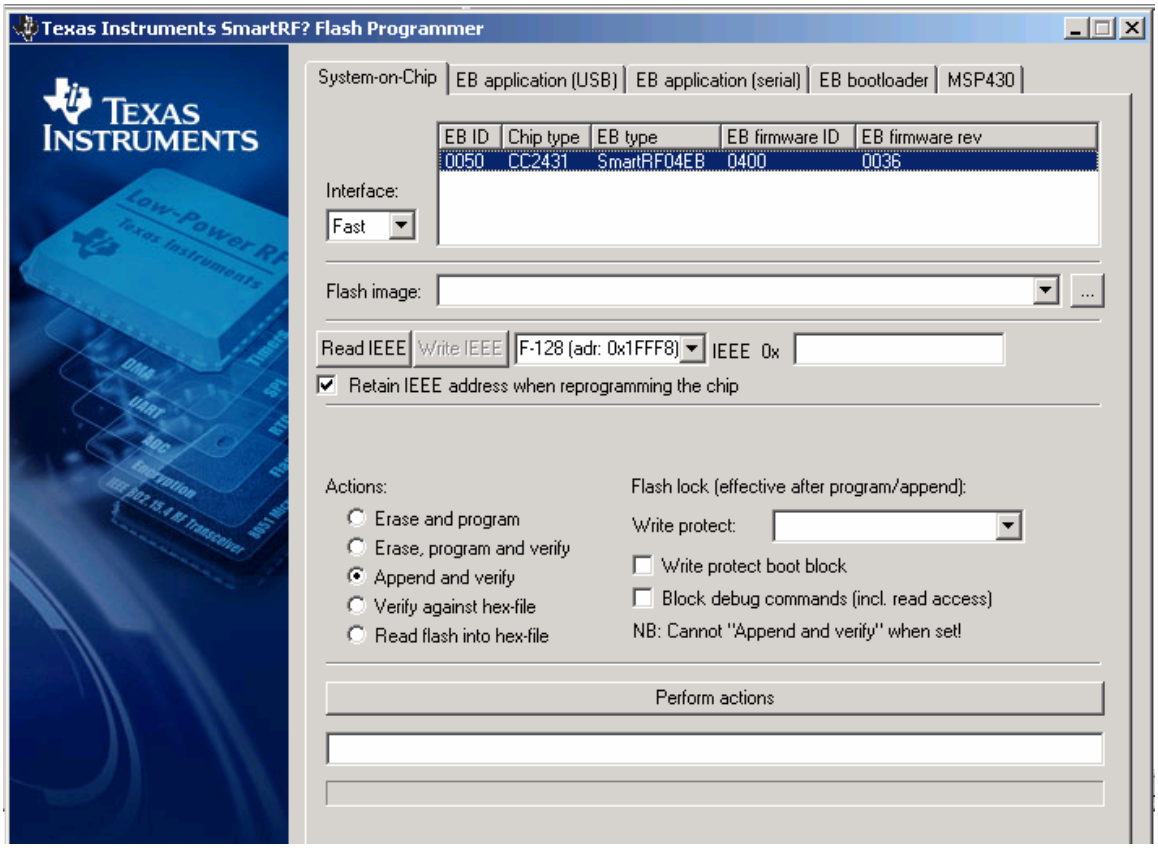
6. Then a window will be shown as the follows:



Then you can use it by following the smartRF studio software.

4. Using SmartRF04 Flash Programmer

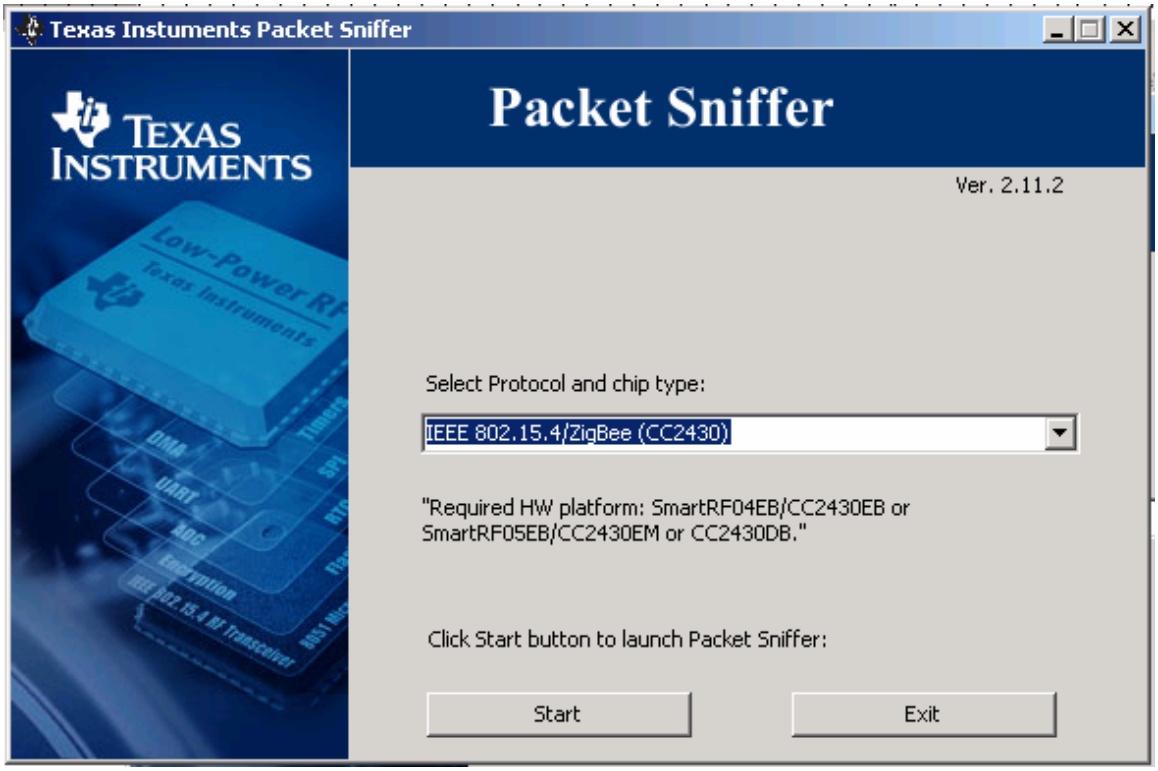
1. Mount the ZigBee Module onto the top of BDM programmer (on double 9 pins with the antenna outside of the BDM programmer).
2. Plug the USB cable into a USB port in PC.
3. Start to run SmartRF04 Flash Programmer,



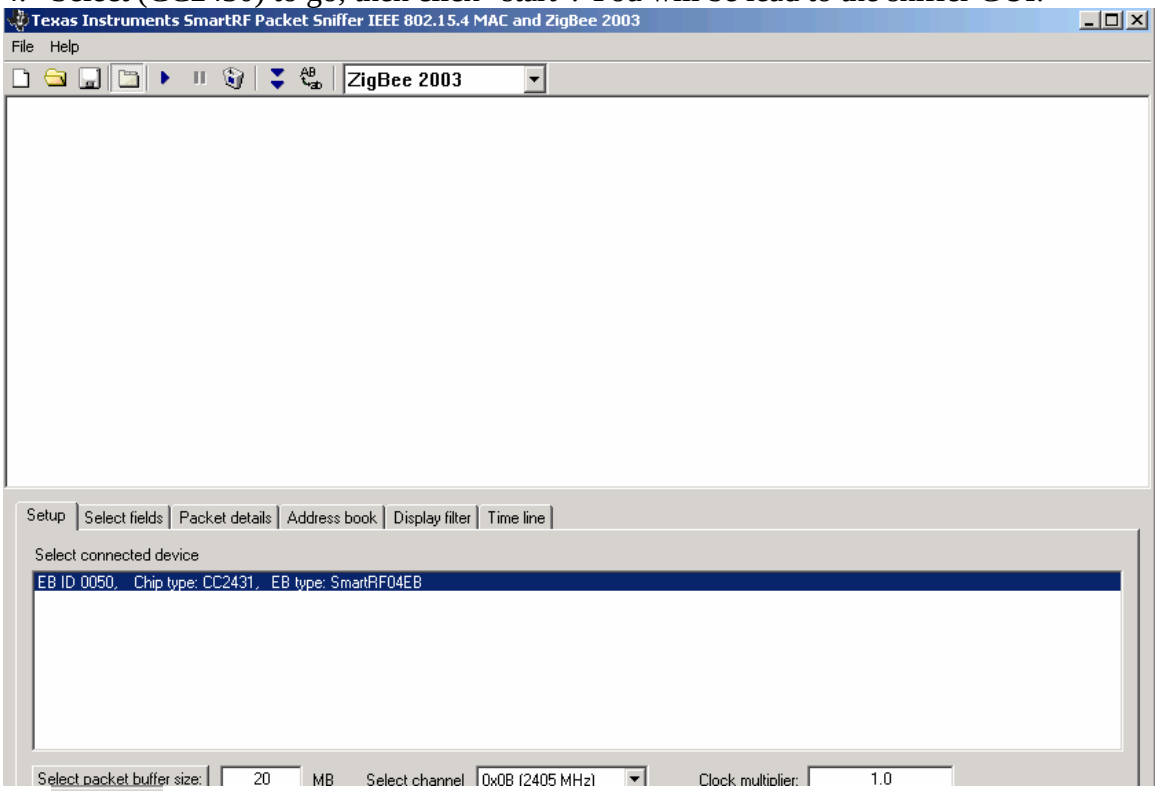
4. Then select “Flash image” to input a Hex file,
5. Then Use “Erase and Program Verify” to write into the flash in CC2430,

5. Using Packet Sniffer

1. Mount the ZigBee Module onto the top of BDM programmer (on double 9 pins with the antenna outside of the BDM programmer).
2. Plug the USB cable into a USB port in PC.
3. Start to run Packet Sniffer,



4. Select (CC2430) to go, then click “start”. You will be lead to the sniffer GUI:



5.  to record and stop the sniffer.