

# ZigBee Module

## Description:

ZigBee Module is a low-cost, low-power, wireless mesh networking standard. The low cost allows the technology to be widely deployed in wireless control and monitoring applications, the low power-usage allows longer life with smaller batteries, and the mesh networking provides high reliability and larger range.

Temco has developed a embedded antenna of wireless data communication module, which adopts standard ZigBee wireless technology. This module is in line with the Industry Standard applications of wireless data communication module.



This module can achieve transparent data transmission between many devices, and it can form a MESH network. This device has the characteristics of small volume, ultra-low power consumption and low-cost. It can be either as an independent data transmission termination or be easily embedded into a variety of products to form a short-range wireless data transmission solution.

This device network has the characteristics of electric power-saving, reliability, low cost, large capacity and security, and it can be widely used in various fields of automatic control. The target application domains are aimed at industry, home automation, telemetry and remote control, vehicle automation, agriculture automation, medical care and so on, such as lighting control automation, wireless data acquisition and monitoring sensor, oil field, electric power, mining and logistics management etc.

## Technical Data:

Environment of Use Industry Standard

### Maximum Transmission Distance:

Internodes Barrier Free: 200 meters( 658feet)

### Wireless Frequency:

2.4G ISM License-free Frequency Band

### Channel Mode:

16 Channels Can Be Specified or the Best Channel Can Be Automatically Selected

### Antenna Configuration:

Built-in 2.4G Ceramics Antenna

### Network Structure:

Star Topology Network, Cluster Tree Network, Chain Network , Mesh Network

### Network ID:

255 Network ID Can Be Specified

### Node Type:

Center Node, Routing Node, Terminal Node, or Software Set

### Serial Rate:

1200-115200

### Send Mode:

Broadcast Send or Destination Address Send

### Working Voltage

DC-3.3V

### Peak Current

40mA

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## Advantages :

- Low power consumption. At the low power consumption standby mode, two No.5 dry-charged batteries can support one node to work 6 ~ 24 months, or even longer.
- Low cost. Because of dramatically simplifying the protocol, Zigbee reduces the requirements for the communications controller. It is protocol patent fee free.
- Low rate. Zigbee can work at the low rate of 20 ~ 250 kbps.
- Short range. Transmission range is generally between 10 ~ 200 m ( 32.8feet~ 656feet) .
- Short time delay. The response speed of Zigbee is very fast, in general, it merely need 10ms from the into work state and it merely need 20 ms from nodes connect into the network state.
- High capacity. Zigbee can adopt star topology, tree topology and mesh network structure, composing of up to 65, 000 network node.
- High security. Zigbee provides a three-tier security model, including the use of Worry-Free Security settings, the access control list ( ACL) to prevent illegally accessing the data and Advanced Encryption Standard ( AES 128) symmetry password.
- License-free frequency band. Zigbee adopts direct sequence spread spectrum of the industrial scientific medical ( ISM) band. 2. 4 GHz ( global) .

## Applications:

- Sensor Network( WSN)
- Automatic meter reading system of water, gas, heat, electricity meters
- Intellectual traffic control, signal lights control and street lights control
- Fire safety alarm, building monitoring
- Catering order, canteen' s sale of food system
- Access control, time and attendance system
- PTZ monitoring, engine room equipment monitoring
- Store & Logistics, laser guns, bar code reader
- RFID remote data transmission
- Meeting ballot system

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## FAQ :

Q: How to join a network?

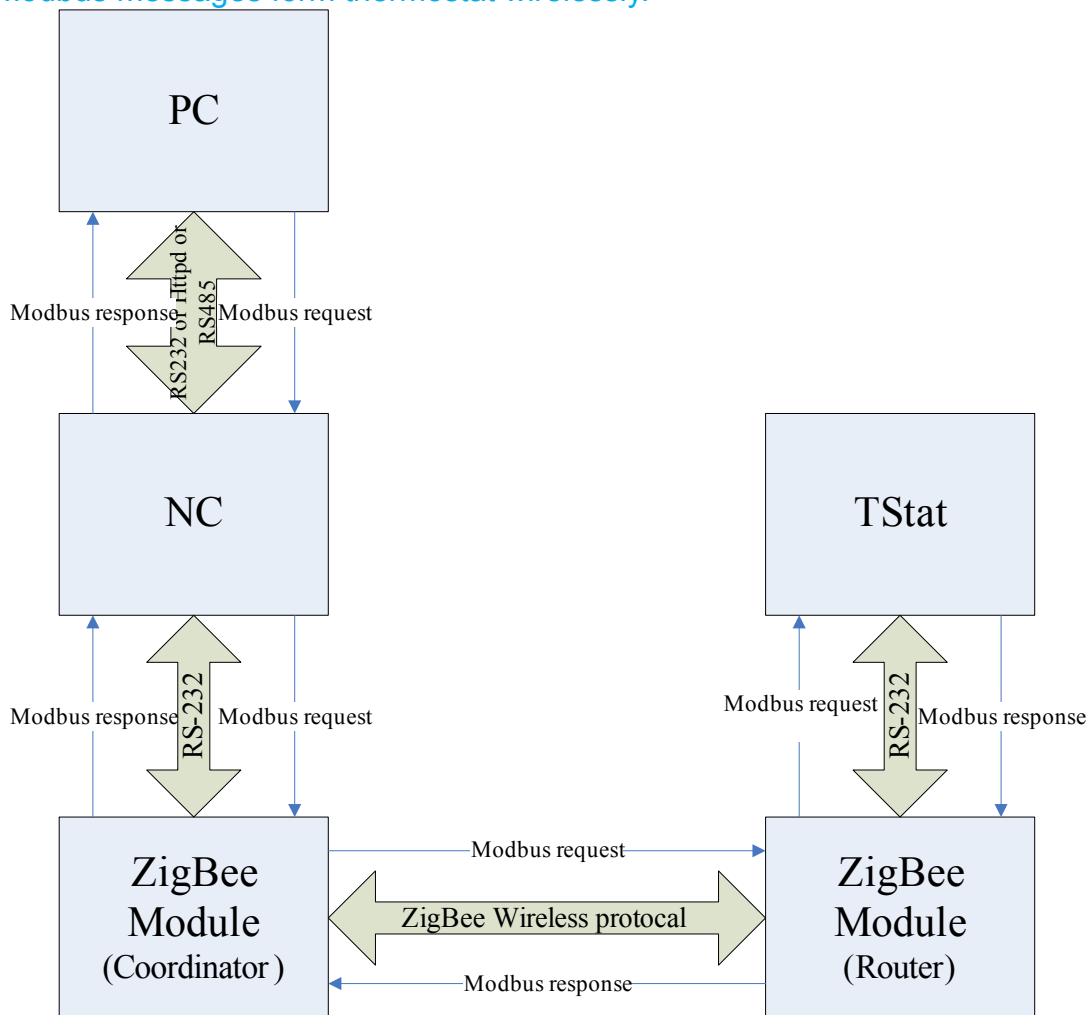
A: Power up TSTAT6-ZIG, and make sure there is a coordinator( e.g. a NC-ZIG) in the same channel. TSTAT6-ZIG's zigbee module will blink led, scan and join the existent network, while it has joined, led stop blink.

Q: What is the profile used?

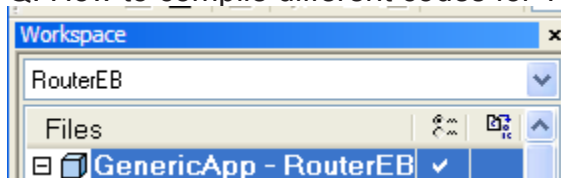
A:It's using generic app profile, profile ID is 0x0F10, cluster ID is 0x0002.

Q: What do the Zigbee module do?

A: The module deliver the wireless ModBus messages it received to thermostat, and transmit the Modbus messages form thermostat wirelessly.

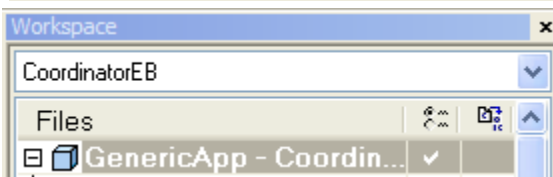
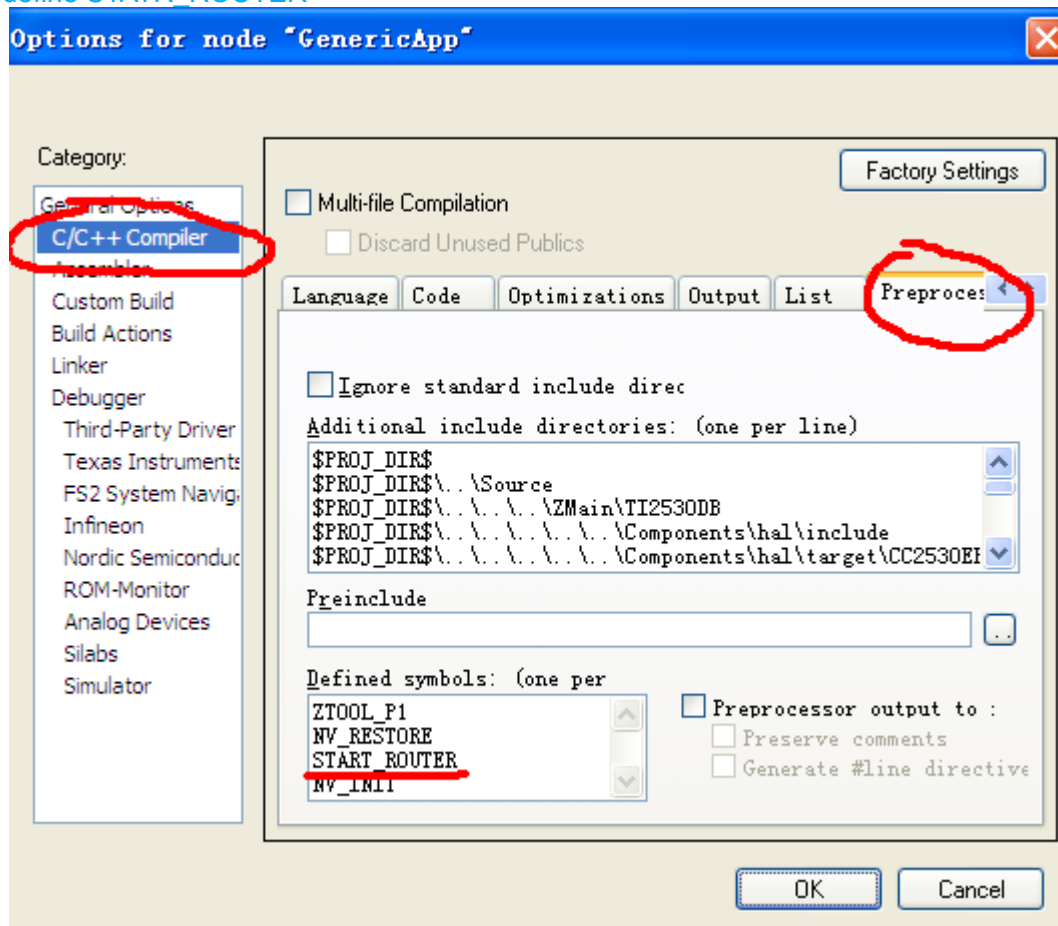


Q: How to compile different codes for TSTAT6-ZIG or NC-ZIG in GenericApp project?



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A: RouterEB is compiled for TSTAT6-ZIG module In the code, `#if defined ( START_ROUTER)`  
`define STATR_ROUTER`



CoordinatorEB is for NC-ZIG module. don't define START\_ROUTER.

Q: how is pan id assignment done? or if it default zigbee (random)?

A: In the project, PAN id is randomly generated.

Q: where in the t3 nc code can I see examples of modbus packets ?

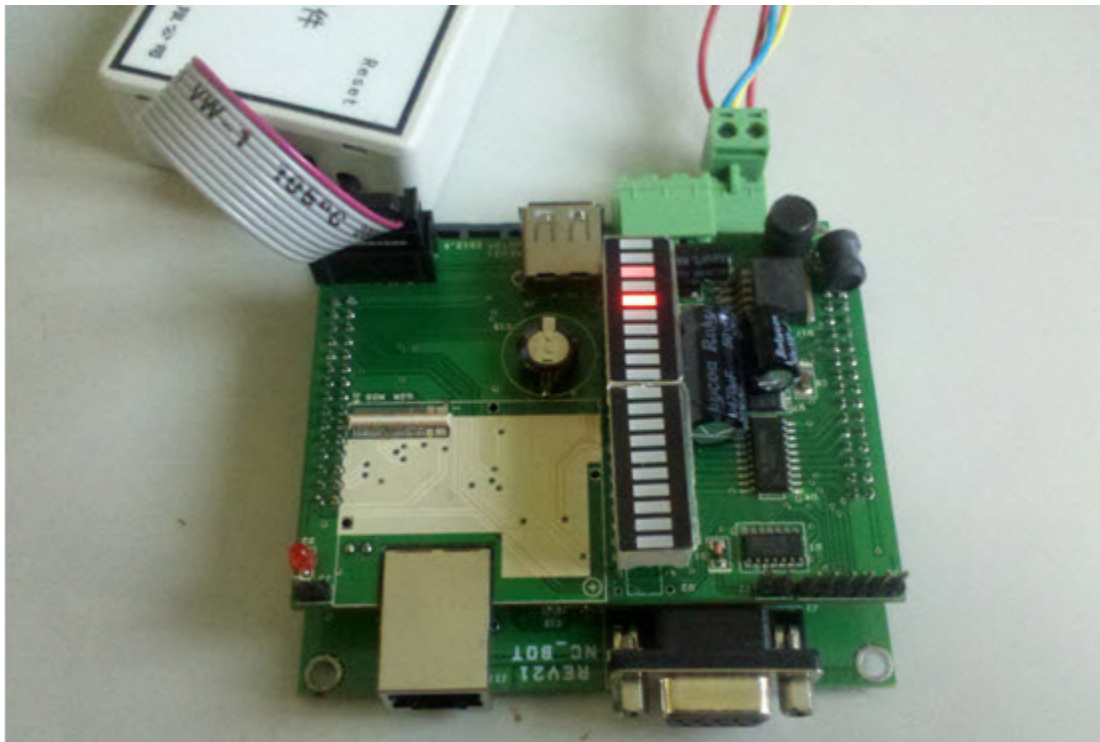
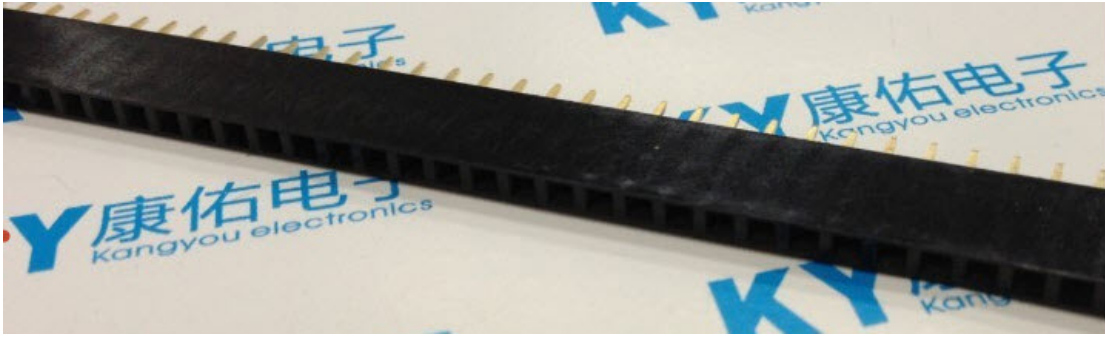
A: Uart0\_Receive in main.c and HTTP\_Receive in httpd.c are the functions that to process modbus packets.

Q: how can i reprogram the cc2530 ... where is the programming header to plug in the programmer on your thermostat?

A: Open the shell, you will see a cc2530 module under the LCD, plug the programmer to the ten-pin header, red wire on the left side.

Once you can't find the chip, attach power to TStat or NC please.

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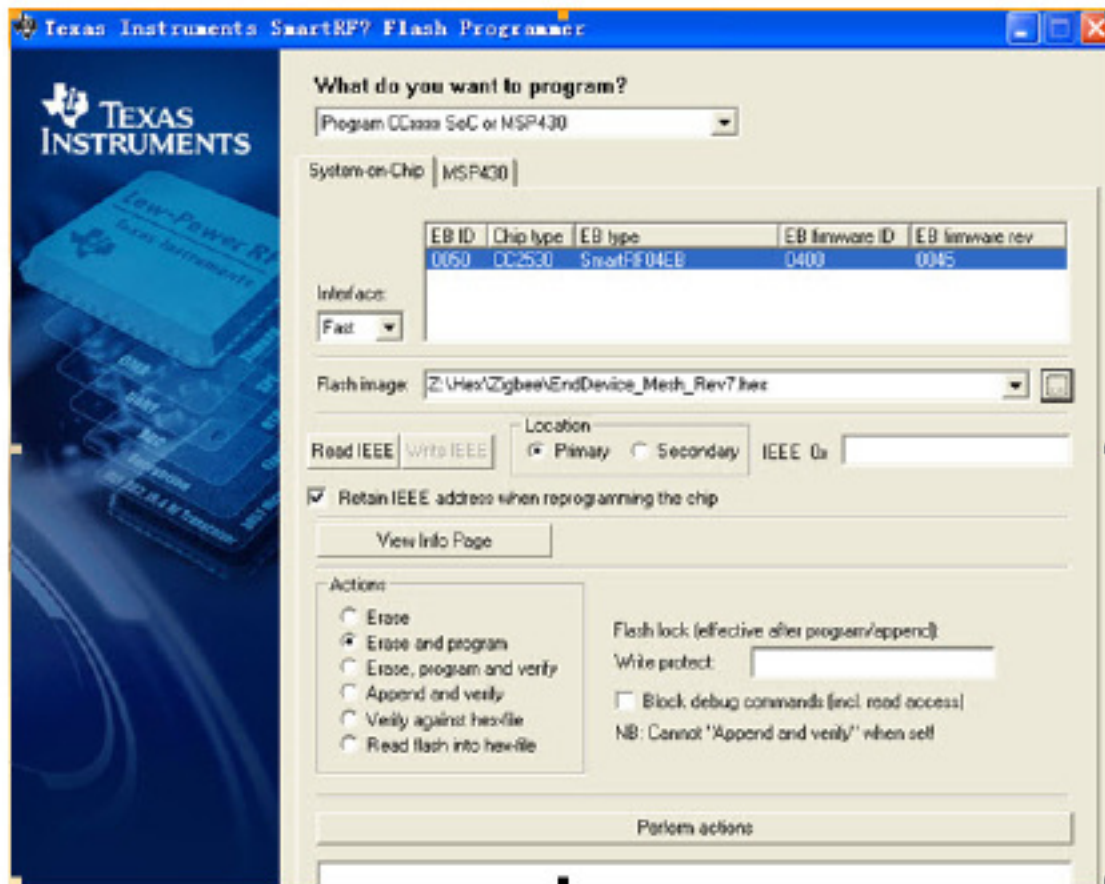
Use the Flash Programmer to install the hex image into the Soc.



( EndDevice\_Mesh\_Revxx.hex for TStat6 and Coord\_Revxx.hex for NC)

If the device list show the connected device, select the .hex file which wanted to been programmed, select the actions" Erase and program" or "Erase, program and verify", Click the "Perform actions" button to start programming.

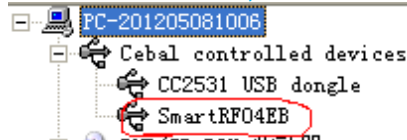
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Q: I loaded the CONTROLLER on a module ... windows makes a sound like a new device is found, but no new COMM port shows up ..

A: This step, did you want to connect the module to computer.

If this is the case, It could be found here.



Q: when using this controller code, should I see the Controller appear on a comm port so I can see data?

A: See data? you meant the modbus message?

It cannot be seen with the programmer.

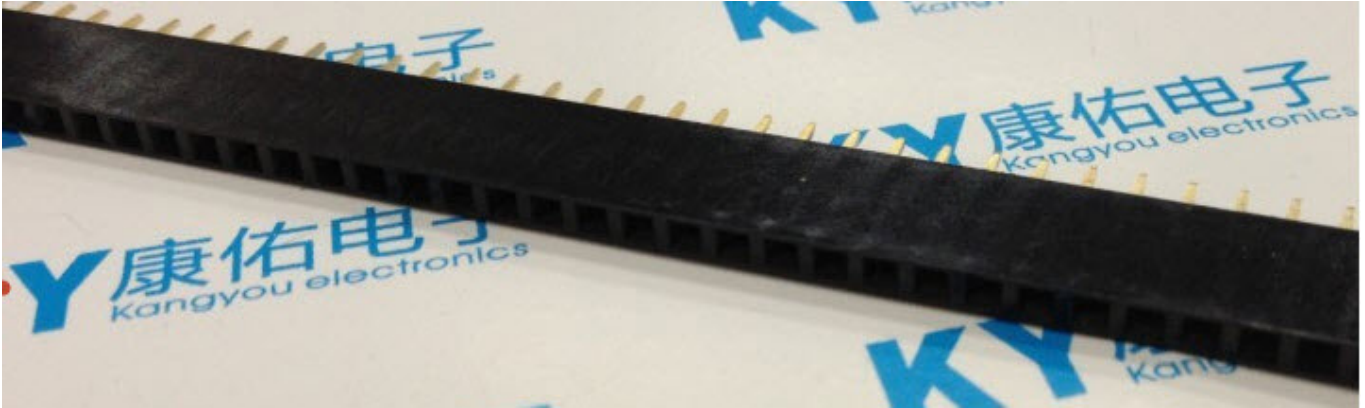
If you want to see data, you can connect PC to NC(by RS232/485 or httpd) . use modbuspoll to send a modbus request

Q: once the controller and thermostat is powered.. is any data exchanged that will dump to serial terminal (comm port) .. or does it wait for commands ?

A: There are some ZigBee messages when they are powered up. The thermostat will try to join a network which the controller created.

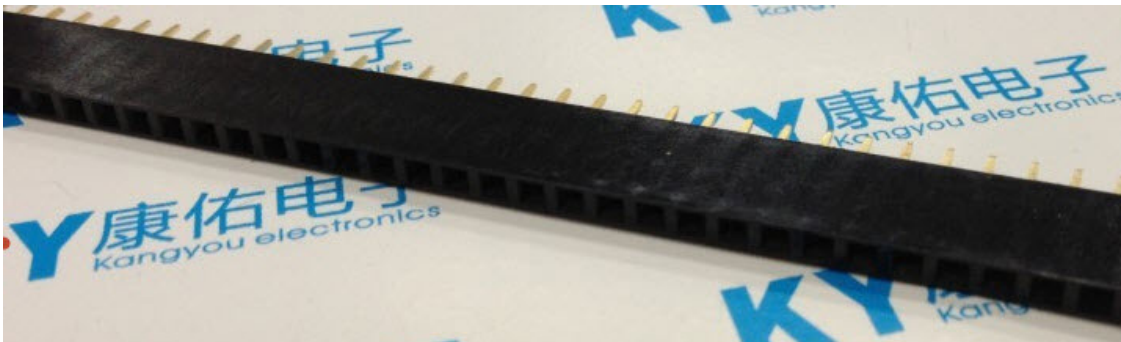
Then the controller are waiting the command from PC.

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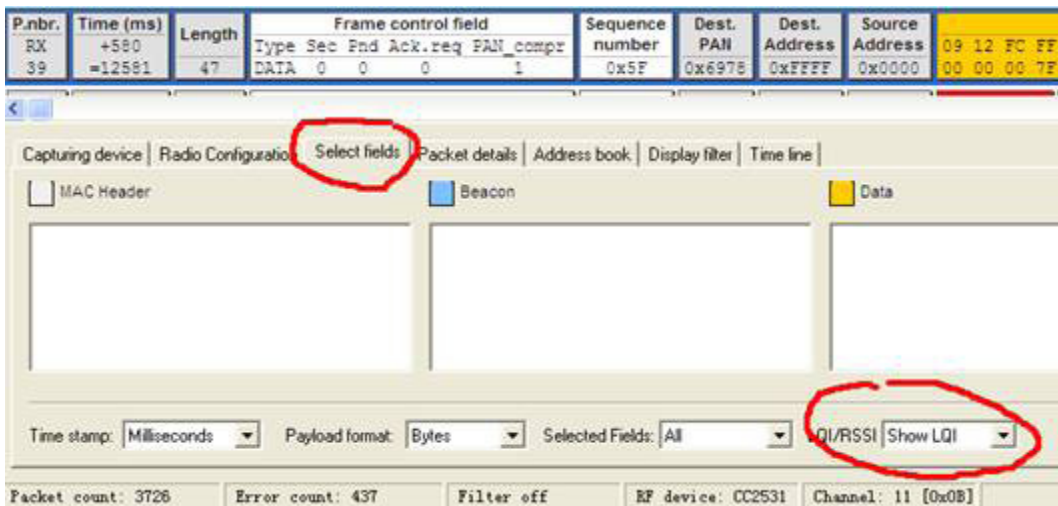
Q: I loaded the Controller code on my module and the thermostat can't associate with it. When I try with the NC it works fine (I've attached both packet sniffs)

Can you think of any reason why the code on my module doesn't associate with the thermostat, but works fine with the NC? what could the difference be? can you tell anything from the packets?



A: Perhaps reason is LQI too low. In your sniffs, LQI of thermostat around 10. It can be displayed in the form of the RSSI in packet sniffer.

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When the zigbee device want to associate, RSSI need to be -85dBm at least.



Our zigbee module added a power ampliari chip (cc2591)on board. So in the Controller code, cc2591 support HAL\_PA\_LNA is defined.  
so do your module have cc2591? if not, don't define HAL\_PA\_LNA in hal\_board\_cfg.h.  
and how far between the two device,your module and the thermostat?  
you can make them closer to test again.