ZigBee CC2530

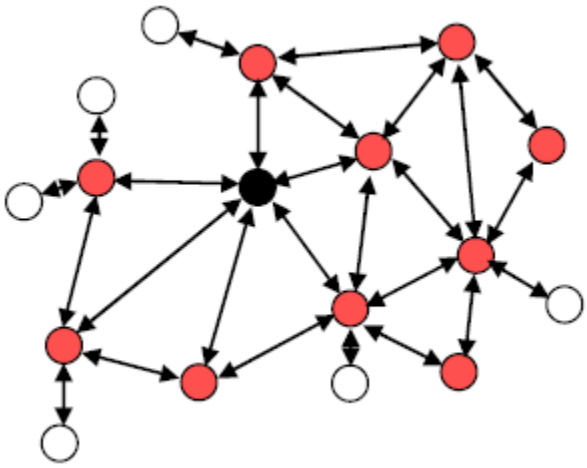
Version: 1.01

Table of contents

1. Reference

TI ZStack-2.3.0

2. Network topologic



Coordinator (in black), the routers (in red) and the end devices (white).

3. Interface Mechanism

3.1 Default network setting:

Channel: 25
PAN ID: FFFF (random)

3.2 UART setting:

P0_2: RX, P0_3: TX, P0_4: CTS, P0_5: RTS
Default baud rate: 9600 bps, 8N1, no flow control

3.3 Message Format

SOP	CMD	LEN	DATA	FCS

SOP (Start of Packet): This is a one byte field with value equal to 0x02 that defines the start of each link level packet.
CMD (Command ID): This is a two byte field (MSByte transmitted first) with a value denoting the Command Identification (ID) for this message. This field is described in detail below.
LEN (Length): This one byte field is the number of bytes in the Data field. If the Data field contains no information this LEN field has a value of 0 and the total length of the command is 5 bytes (0 data message).
Data: This field contains the actual data to be transmitted. This is a field which varies in size according to the command.
FCS (Frame check sequence): This is a one byte field that is used to ensure packet integrity. This field is computed as an XOR of all the bytes in the message starting with CMD and through the last byte of data. The receiver XORs all the received data bytes as indicated above and then XORs the received FCS field. If the sum is not equal to zero, the received packet is in error.

4. Command instructions

4.1 CMD_SET_PAN_ID

4.1.1 Description

Coordinator will create a ZigBee network name of PAN ID.
Router and End Device will try to join a network name of PAN ID.

4.1.2 Usage

CMD 0x00F2	Len	Data(0x0000~0xFFFF)

The default value is 0xFFFF. The device will create or join a random nework.

4.1.3 CMD_Set_Destination output format

CMD 0x10F2	Len 0x02	"OK"

4.2 CMD_SET_Channel

4.2.1 Description

Coordinator will create a ZigBee network in this channel.
Router and End Device will try to join a network in this channel.

4.2.2 Usage

CMD 0x00F3	Len(0x04)	Channel List

Channel List:

11-0x00000800,	12-0x00001000,	13-0x00002000,	14-0x00004000
15-0x00008000,	16-0x00010000,	17-0x00020000,	18-0x00040000
19-0x00080000,	20-0x00100000,	21-0x00200000,	22-0x00400000

23-0x00800000, 24-0x01000000, 25-0x02000000, 26-0x04000000

4.2.3 CMD_Set_Destination output format

CMD 0x10F2	Len 0x02	"OK"

4.3 MSG_Send

4.3.1 Description

Coordinator and End device can transmit message by this command. If End device want send back command to Coordinator, please set short address to 0x0000. When End device or Coordinator receives this command, it will output by UART interface.

4.3.2 Usage

CMD 0x0043(P2P), 0x0042(Broadcast)	Len	Data

Data

Destination Short address	Len	User data(Max: 72bytes)

4.3.3 MSG_Send output format

CMD 0x1043,0x1042	Len	Short address	Data Len	User data

4.4 Assoc_List

4.4.1 Description

Get short address list association with Coordinator

4.4.2 Usage

CMD 0x0013	Len 0x00

4.4.3 Assoc_List output format

CMD 0x1013	Len	Number of devices	(SA SA) (SA SA)…

4.5 Device_Type

4.5.1 Description

Ask device type

4.5.2 Usage

CMD 0x0015	Len 0x02	Short address

4.5.3 Device_Type output format

CMD 0x1015	Len 0x03	Short address	Device Type

Device Type:

0x01	Router
0x02	End Device

4.6 IEEE_Addr

4.6.1 Description

Ask device IEEE address and association list

4.6.2 Usage

CMD 0x0011	Len 0x02	Short address

4.6.3 IEEE_Addr output format

CMD 0x1011	Len	Short address	IEEE address	Count of association device	Short address list

4.7 Get_RSSI

4.7.1 Description

End device will send back RSSI list. (Maxima is 3)

4.7.2 Usage

CMD 0x0021	Len 0x02	Short address

4.7.3 Get_RSSI output format

CMD 0x1021	Len	Short address	RSSI

4.8 PIN_State_Change

4.8.1 Description

Change the state of PIN P1_1.

4.8.2 Usage

CMD 0x009C	Len 0x02	Short address

4.8.3 PIN_State_Change output format

No feedback

4.9 Device_NWK_Change_Info

4.9.1 Description

When the network state of End device or Router has change. They will send the message back to the coordinator.

4.9.2 Usage

4.9.3 Device_NWK_Change_ Info output format

CMD 0x10F9	Len 0x0B	Short address	IEEE address	Device type

Device Type:

0x01	Router
0x02	End Device

4.10 ADC_Read_Value

4.10.1 Description

End device and Router will cover P0_0 value in 12bit resolution and send back to coordinator. (Resolution: 12bits)

4.10.2 Usage

CMD 0x004D	Len 0x02	Short address

4.10.3 ADC_Read_Value output format

CMD 0x104D	Len 0x04	Short address	P0_0 ADC Value

4.11 CMD_BAUD_Change

4.11.1 Description

Change local UART baud rate.

4.11.2 Usage

CMD 0x004A	Len 0x05	Short address	Baud rate	Flow control	Mode

Short address: When set the local baud rate, the value of short address 0x00, 0x00
Flow control: 0x00(Off), 0x01(On)

Baud rate table:

UART_BR_4800	0x00
UART_BR_9600	0x01
UART_BR_19200	0x02
UART_BR_38400	0x03
UART_BR_57600	0x04
UART_BR_115200	0x05

Mode table:

Bits,parity,stop-bit	Value
8, None ,1	0x01
8 ,None ,2	0x02
8 ,Even ,1	0x03
8 ,Even ,2	0x04
8 ,Odd ,1	0x05
8 ,Odd ,2	0x06

4.11.3 CMD_BAUD_Chang output format

CMD 0x104A	Len 0x02	OK

4.12 CMD_PING_Node

4.12.1 Description

Get basic information about node connect in COM port.

4.12.2 Usage

CMD 0x0001	Len 0x00

4.12.3 CMD_PING_Node output format

CMD 0x1001	Len 0x0E	IEEE address	PAN ID	Channel	type

4.13 CMD_Set_Destination

4.13.1 Description

In the Coordinator after set this command, user can issues message to the coordinator through UART port. The Coordinator will send message to the destination set by this command.
Note:
This function not supports multipoint transfer. When use it, please make sure only one device in transfer. Please keep 700 million second delay between two message. The maximum length of message is 50 bytes.

4.13.2 Usage

CMD 0x0056	Len 0x02	SA address

4.13.3 CMD_Set_Destination output format

CMD 0x1056	Len 0x02	"OK"

4.14 PIN_State_Set

4.14.1 Description

It will change device's PIN state to High (0x01) or Low (0x00) set by user.

4.14.2 Usage

CMD 0x009D	Len 0x04	Short address	PIN	State

PIN:

0x00	P0_1	0x01	P0_6	0x02	P1_0	0x03	P1_2	0x04	P1_3
0x05	P1_5	0x06	P2_0						

State: 0x00 Logic Low; 0x01 Logic High.

4.15 PIN_State_Get

4.15.1 Description

The assign device will return the PIN state High (0x01) or Low (0x00)

4.15.2 Usage

CMD 0x008D	Len 0x03	Short address	PIN

PIN:

0x00	P0_1	0x01	P0_6	0x02	P1_0	0x03	P1_2	0x04	P1_3
0x05	P1_5	0x06	P2_0						

State: 0x00 Logic Low; 0x01 Logic High.

4.15.3 PIN_State_Get output format

CMD 0x108D	Len 0x04	Short address	PIN	State

4.16 SA_State_Set

4.16.1 Description

Change this value in the Coordinator will affect the message receive.

4.16.2 Usage

CMD 0x005E	Len 0x01	Value

Value: 0x00 Message will not take the short address;
0x01 Message will take the short address;

4.16.3 SA_State_Set output format

CMD 0x105E	Len 0x02	“OK”