CC2541-HY1

DATA SHEET

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HY1 Bluetooth® low energy single mode module

1，DESCRIPTION

HY1, *Bluetooth* low energy single mode module is a single mode device targeted for low power sensors and accessories.

HY1 offers all *Bluetooth* low energy features: radio, stack, profiles and application space for customer applications, so no external processor is needed. The module also provides flexible hardware interfaces to connect sensors, simple user interfaces or even displays directly to the module.

HY1 can be powered directly with a standard 3V coin cell batteries or pair of AAA batteries. In lowest power sleep mode it consumes only 400nA and will wake up in few hundred microseconds.

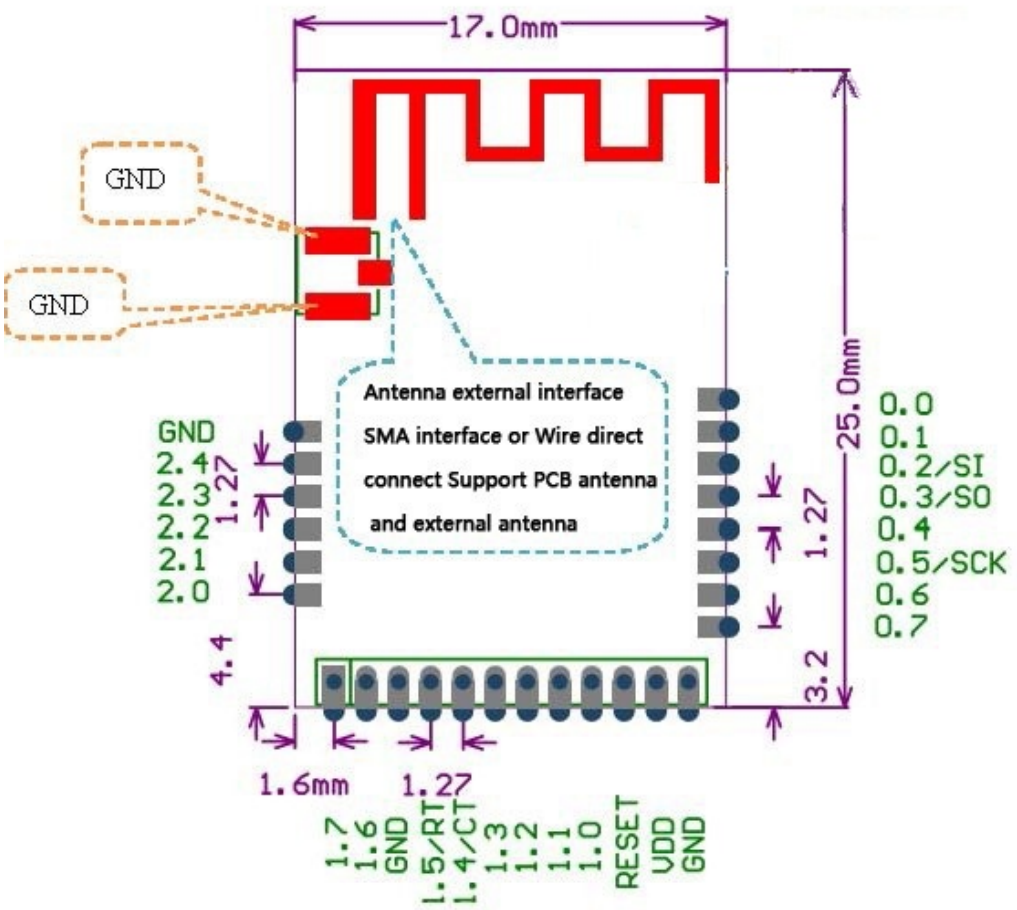
2，APPLICATIONS:

- Bluetooth UART Module implementation of the connection with the tablet, IPHONE and android mobile phone with Bluetooth 4.0, As far as the communication distance is in 20 m(linear) without sunscreen.
- UART baudrate optional: (115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200)
- Work style: transparent way
  Maximum send packet length: 128 BYTES
  Maximum receive packet length: 128 BYTES
- Application scope: equipment needs with the tablet, IPHONE, other android phones with 4.0 equipment to transport small data volume and low power consumption

3，KEY FEATURES:

- *Bluetooth v.4.0*, single mode compliant
  - Supports master and slave modes
- Integrated *Bluetooth* low energy stack
  - GAP, GATT, L2CAP, SMP
- *Bluetooth* low energy profiles
- Radio performance
  - TX power: +3dBm to -23dBm
  - RX sensitivity: -87dBm to 93dBm
- Ultra low current consumption
  - Transmit: 27mA (0dBm)
- Sleep mode 3: 0.4uA
- Programmable 8051 processor for embedding full applications

4，Pinout and Terminal



5，Feedback IO output of the command：

RT (P1.7) can be used for receiving interrupt instructions, When there are the serial data output or the output data in the buffer, to be low; or the serial buffer is empty, the output is high.

No	RT PIN (P1.7)	STATUS
0	1	The serial buffer is empty
1	0	The serial data output or the output data in the buffer

OT (P1.0) can be used for the indication if the data is sent to the BLE host (tablet, IPHONE), OT is the high when executing the transmit data or waiting the data transmission, OT is low when the data has been sent to the BLE host.

No	OT PIN (P1.0)	STATUS
0	1	Executing the transmit data or waiting the data transmission
1	0	The data has been sent to the BLE host.

The input and output data:

No	PINS	Description
1	VDD	2.7-3.6V
2	TX (P1.5)	Connect the RX side of the controller (Output Pin TTL)
3	RX (P1.4)	Connect the TX side of the controller (Input Pin TTL)
4	GND	GND

Power input, please try to reduce the ripple, so that can guarantee the communication distance

The input of data bytes must be continuous, Also the gap between the bytes sent time can't be more than the time interval of corresponding baud rate. When (115200, 57600 and 57600 to 1 ms; 19200 to 2 ms; 9600 for 4 ms; 4800 for 7 ms; 2400 for 10 ms; 1200 to 15 ms) no data input, the system will think that a packet of data reception is complete. Example: if the baud rate for 9600, you need to transport the 16 byte bytes, a serial port serial input 16 bytes , after the 4 ms, the data will begin to transfer to another module. If you want to transfer 1 byte, serial input, after finishing the 1 byte transmission, after 4 ms, the data will begin to transfer to another module. Single biggest bytes what can be sent is 128 BYTE. When transmission of bytes is 128 ,they will be sent immediately.

The interval of time between the package is at least a connection, This time is by the BLE host.

Establish a connection with BLE4.0 host (mobile phone, tablet, computer, etc.), light LED2, otherwise shut off LED2

No	(P0.1) LED2 output	Light LED
0	0	Shut off
1	1	LED

This can be used as a indiction to judge the bluetooth BLE connection or not.

6 Bluetooth 4.0 host programming guide:

- **6.1 instructions**

  The module can transfer 128 byte packets at once, the intervals of the time between each packet are by the package length and the interval time of the bluetooth connection, the interval time of the bluetooth connection is setuped by BLE host (PC, IPHONE, the ANDROID,support maximum time interval is 1000 ms, the minimum time interval for 100 ms).

- **6.2 Sends a packet length calculation**

  Connection interval for T (unit: ms), circulated a packet length Vt (ms), byte length L (byte).

  Vt =(L / 80) * T + T

  Note: (L / 80) add 1 if there is a decimal, such as L is 100 , so (L / 80) is equal to 2.

7 Electrical Characteristics

7.1 Absolute Maximum Ratings Note: These are absolute maximum ratings beyond which the module can be permanently damaged. These are not maximum operating conditions. The maximum recommended operating conditions are in the table 5.

Rating	**Min**	**Max**	**Unit**
Storage Temperature	-40	85	°C
VCC	-0.3	3.9	V
Other Terminal Voltages	VSS-0.4	VDD+0.4	V

Table 4: Absolute Maximum Ratings

7.2 Recommended Operating Conditions

Rating	Min	**Max**	**Unit**
Operating Temperature Range	-40	85	°C
VCC	2.0	3.6	V

***)**Supply voltage noise should be less than 10mVpp. Excessive noise at the supply voltage will reduce the RF performance.

Table 5: Recommended Operating Conditions

For the I/O terminal characteristic refer to the CC2541 datasheet

Integrator is reminded to assure that these installation instructions
will not be made available to the end-user of the final host device.

The final host device, into which this RF Module isintegrated" hasto be labelled
with an auxilliary lable stating the FCC IDofthe RF Module,
such as "Contains FCC ID: 2AKIWCC2541-HY1"

"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1)this devicemay not cause harmful interference, and
(2)this devicemust accept any interference received, including
interference thatmay cause undesired operation."

the Integrator will be responsible to satisfy SAR/ RF Exposure requirements,
when the module integrated into the host device.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection
against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.