



HY-254104 V8DC Bluetooth BLE v4.0 UART Module Specifications

(7 pin)

16.Oct. 2019

Version : V8DC

Copyright © 2010-2019 SHENGRUN Technology Co., Ltd.

All rights reserved.

SHENGRUN Technologies assumes no responsibility for any errors which may appear in this manual, Furthermore, SHENGRUN Technologies reserves the right to alter the hardware, software, and/or specifications detailed here at any time without notice and does not make any commitment to update the information contained here. SHENGRUN's products are not authorized for use as critical components in life support devices or systems.

SHENGRUN Technologies assumes no responsibility for any patents or authorized the use of intellectual property rights.

The *Bluetooth* trademark is owned by the Bluetooth SIG Inc., USA

1.Description

HY-254104 Bluetooth low energy UART protocol module is a single mode device targeted for low power sensors and accessories.

HY-254104 offers all Bluetooth low energy features: radio, stack, profiles and application space for customer applications. The module also provides flexible hardware interfaces to connect sensors.

HY-254104 can be powered directly with a standard 3V coin cell batteries or pair of AAA batteries. in lowest power shutdown mode it consumes only 0.5 uA and will wake up in few microseconds.

Bluetooth IC : TTC2541 6*6*0.9mm 40pin IC / use TI CC2541 IC dice

HY-254104 V8DC with shield case and Pre-certified RF regulations for blue tooth BQB, And can Compliance for worldwide RF Regulations, ex: Japan, Korea, CE ETSI RED, FCC etc....

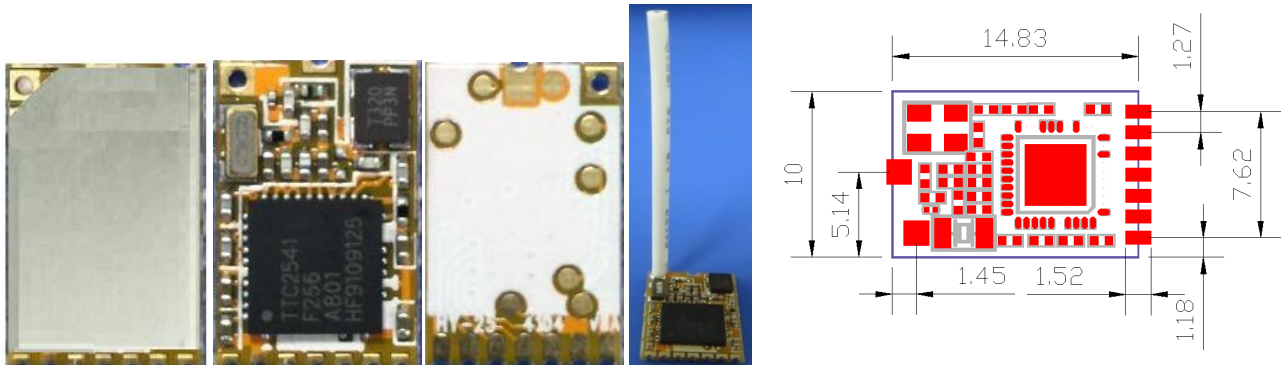
1-1.APPLICATIONS:

- Heart rate sensors
- Pedometers
- Watches
- Blood pressure and glucose meters
- Weight scales
- Key fobs
- Households sensors and collector devices
- Security tags
- Wireless keys (keyless go)
- Proximity sensors
- Indoor GPS broadcasting devices

1-2.KEY FEATURES:

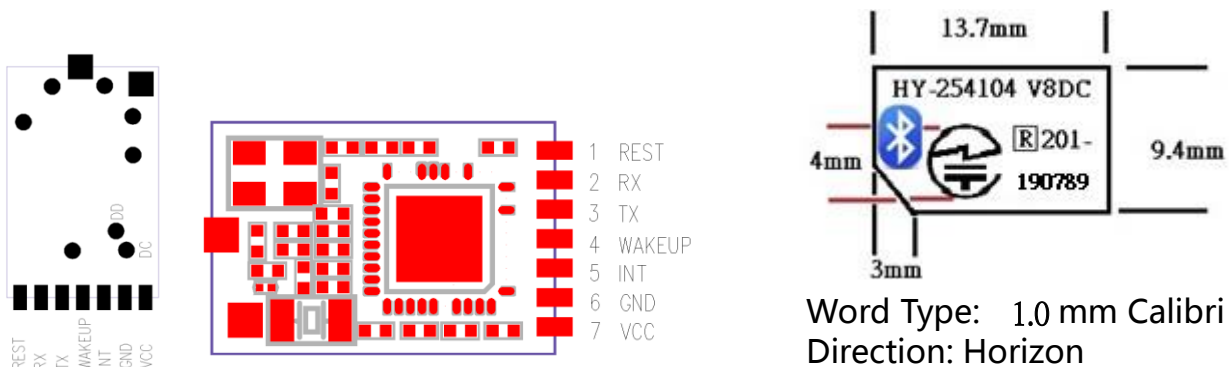
- Bluetooth BLE v.4.0 single mode compliant
- Supports master,slave and master/slave modes
- Integrated Bluetooth low energy stack
- GAP, GATT, L2CAP, SMP Bluetooth low energy profiles
- Compliance: BQB BLE4.0, FCC, IC(Canada), CE ETSI RED...etc. worldwide RF Regulations.
- In-System-Programmable Flash 256KB SRAM 8KB
- Low current consumption :Shutdown. No clocks running, no retention: 0.5uA(Typical)

2. HY-254104 V8DC Metal wire Antenna PCBA with shield case dimension size and picture
(PCBA dimension size : 10.0*14.83*2.8 mm).



3. Module pin definition and description of input and output ports

(3-1) HY-254104 (Metal wire Antenna) PCBA pin map and MIC ID & Lable mark



Word Type: 1.0 mm Calibri
Direction: Horizon

(3-2) Pin function table

pin No.	Function Descrip.	Function corresponds
1	REST	BLE hardware reset pin (Low: reset)
2	RX	UART Serial data bus input
3	TX	UART Serial data bus output
4	WAKEUP	BLE wake up pin: Low/ wake up, High / BLE module automatically sleep
5	INT	Interrupt output pin
6	GND	BLE module grounding pin
7	VCC	BLE module power supply pin, voltage range of 2.0 ~ 3.6V

A: UART: serial bus, the default baud rate 115200bps, a single packet transmission is less than 17 bytes, package transmission intervals greater than 20ms.

b:WAKEUP: BLE wake up pin, Low _wake up, High/ BLE module automatically sleep.

C: RESET: BLE hardware reset pin, Low level reset.

d: VCC: BLE module power supply pin voltage range DC 2.0~3.6V.

e: GND: BLE module ground pin.

4. Electrical Characteristics

4-1: General Characteristics

(With $T_a = 25\text{ }^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$, standard measure: 1Mbps, 250KHz GFSK modulation Bluetooth Low energy mode.)

1. Modulation Mode: GFSK;
2. Frequency range: 2402~2480MHz (2.4G ISM band);
3. RF transmit power setting Range: -20 ~ +0 dBm (programmable by software)
4. The antenna feed point RF transmit power : -3dBm typical. (TX set Max.output characteristics)
6. The antenna feed point RF receiver sensitivity : -84dBm typical. (PER <30.8%)
7. Operating ambient temperature range: $-40\text{ }^{\circ}\text{C} \sim +85\text{ }^{\circ}\text{C}$;
8. The storage temperature range: $-40\text{ }^{\circ}\text{C} \sim +125\text{ }^{\circ}\text{C}$;
9. The power supply voltage: 2.2 ~ 3.6VDC;
10. Receiving mode current (high gain setting): 20.02 mA (typical);
11. Transmit mode current (at 0dBm output setting): 18.2 mA (typical);
12. MCU low active current (only 32MHz operation of X-tal OSC): 6.7 mA (typ);
13. Power mode 1: The current consumption: (under MCU standby mode, the wake-up time = 4 μ S); $I = 270\mu\text{A}$ (Typical);
14. Power mode 2: THE current consumption in sleep mode.
timer activate / enable, wake-up time can be by the programming software setting): $I = 1\mu\text{A}$ (typ);
15. Power mode 3: The current consumption : (Low power deep sleep mode, via the hardware initiative wake): $I = 0.5\mu\text{A}$ (Typical);

4-2. 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 4-4.

Rating	Min	Max	Unit
V _{DD} S	-0.3	3.9	V
Other Terminal Voltages	V _{SS} -0.3	V _{DD} S+0.3	V
Storage Temperature	-40	+125	$^{\circ}\text{C}$

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

4-3. ESD Ratings

			Value	Unit
V _{ESD} Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDECJS001	All pins	±2000	V
	Charged device model (CDM), per JESD22-C101	RF pins	±750	
		Non-RFpins	±750	

(2) CAUTION: ESD sensitive device. Precautions should be used when handling the device in order to prevent permanent damage.

4-4. Recommended Operating Conditions

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

Rating	Min	Max	Unit
VDD (when BlueTooth Active)	2.2	3.6	V
VDD(when flash programming)	2.4	3.3	V
Operating Temperature Range	-40	+85	°C

Note:

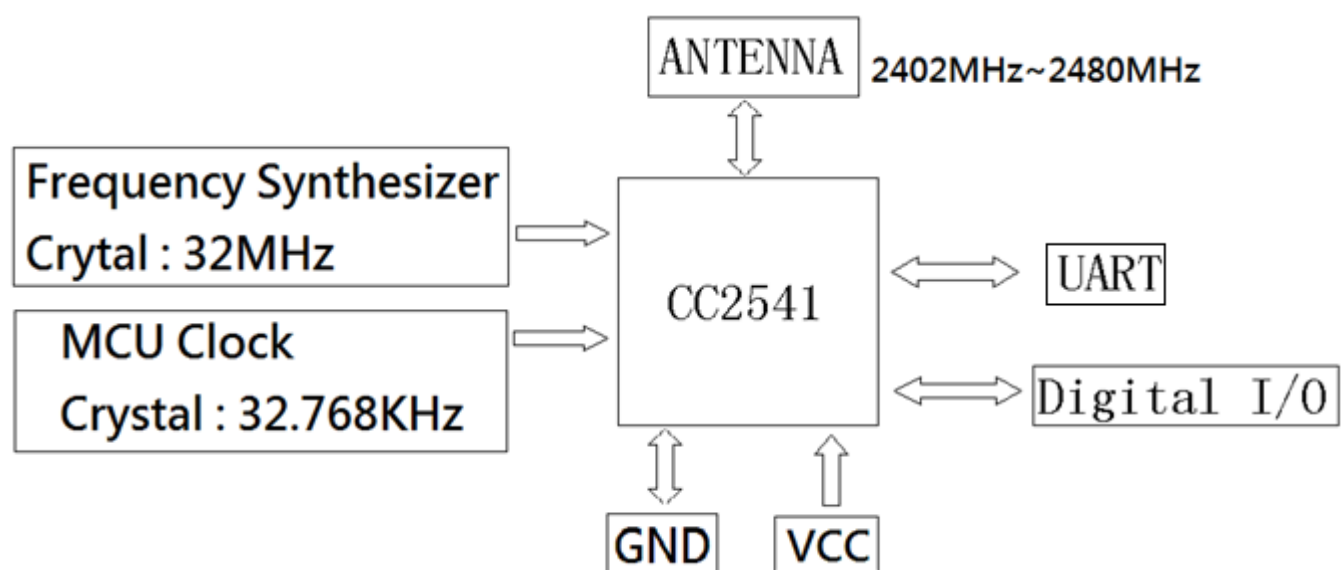
(1).VDD power supply recommended voltage : 2.7~3.3V

(2).When programming firm ware , the VDD supply voltage must in DC 2.4~3.3V,

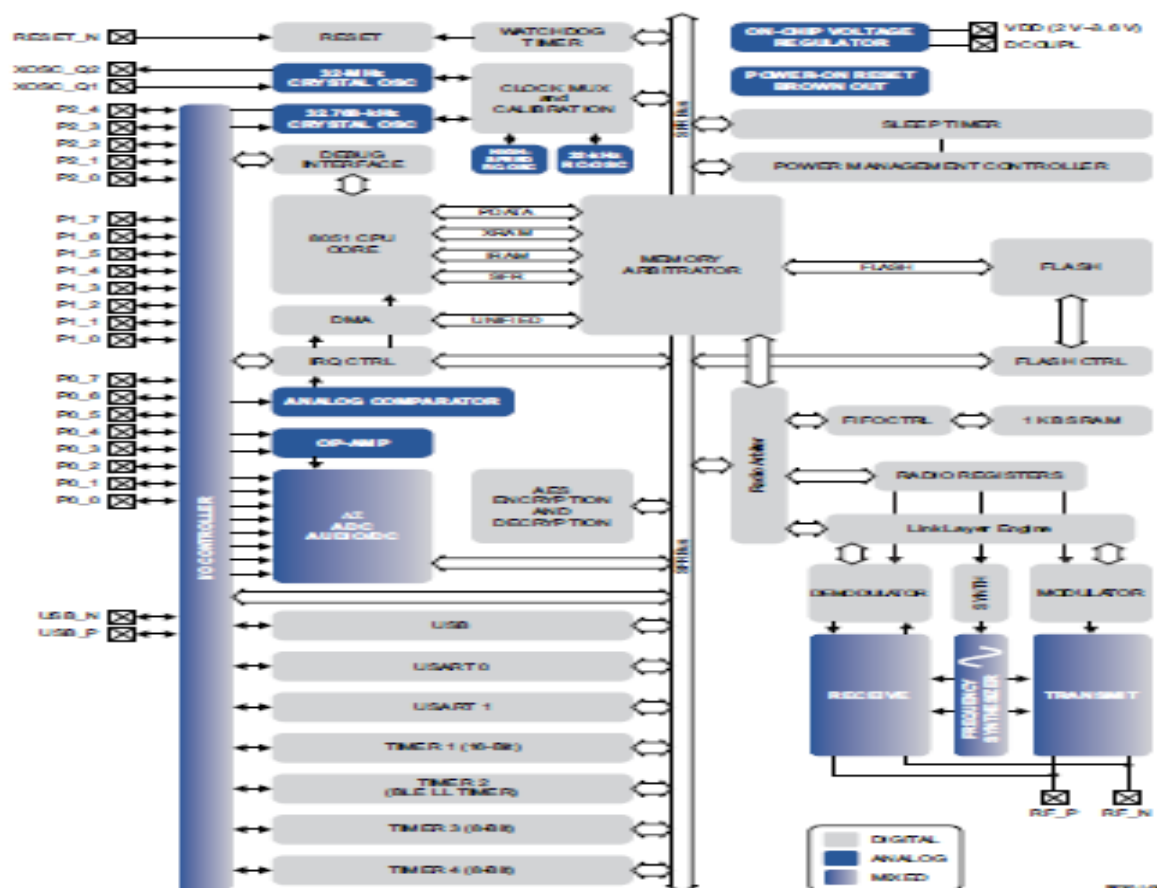
To avoid programming has not completely, or abnormal status occur..

(3).For smaller coin cell batteries, with high worst-case end-of-life equivalent source resistance, a 22-μF VDDS input capacitor must be used to ensure compliance with this slew rate(6-6 timing req.).

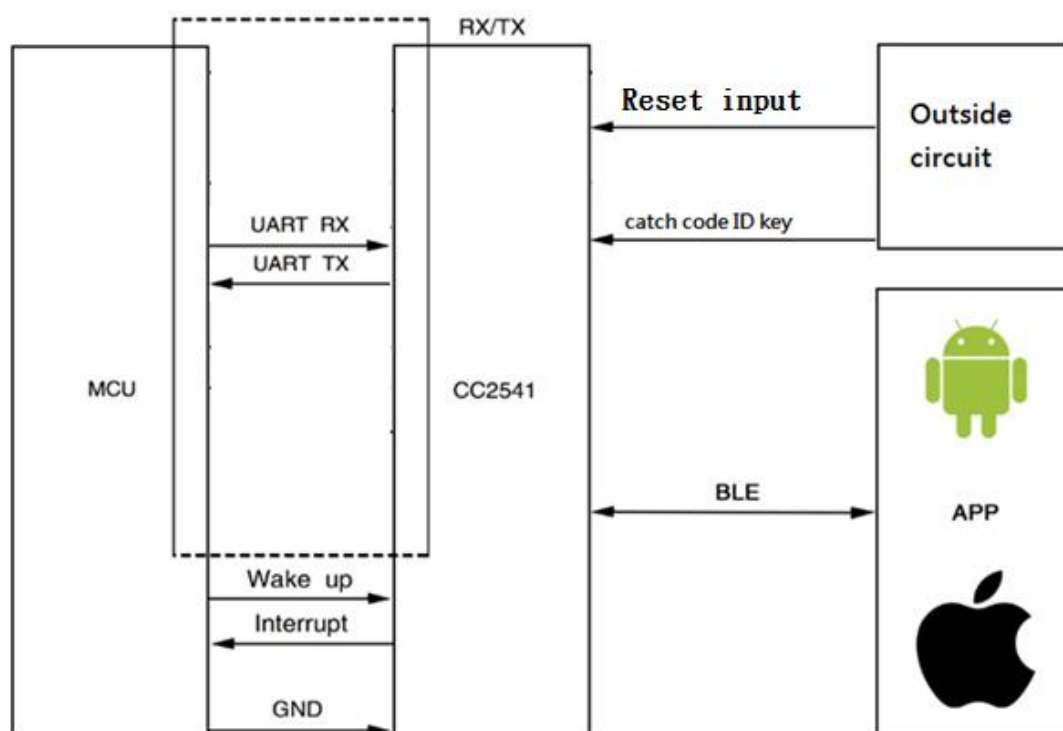
5. Block Diagram



6. Functional Block Diagram



7. Working mode schematic :



8.Metal wire antenna characteristics:

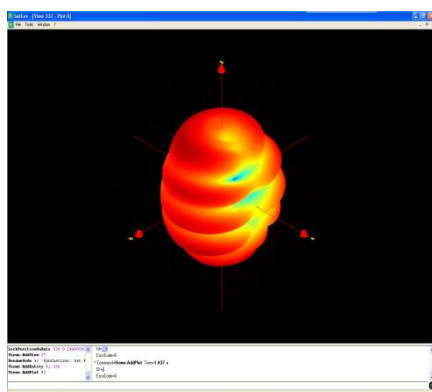
Antenna Gain : 2.657dB at 2440MHz

Synthesizer: Set Frequency	Gain . dBi	Efficiency(%)	Efficiency(dB)
2402	2.44	54.50%	-2.636
2440	2.65	54.38%	-2.646
2480	2.46	49.10%	-3.089

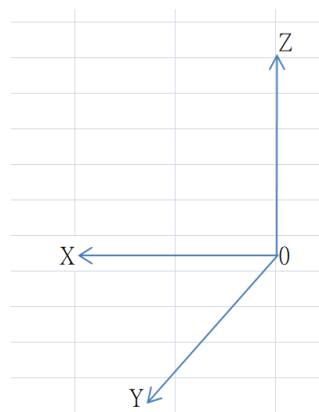
Antenna size



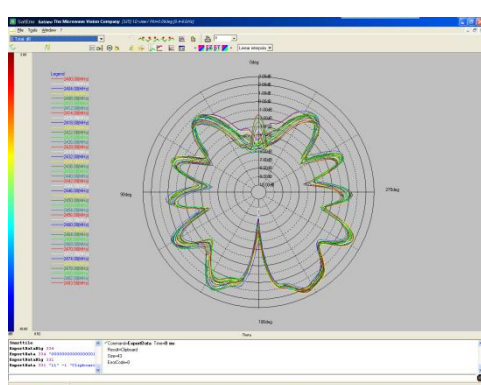
8-2. 3D Radiation Pattern



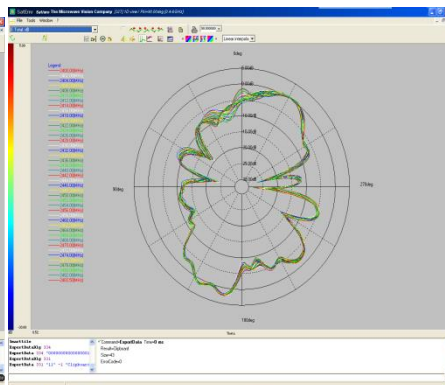
8-3. X / Y / Z coordinate



8-4. Phi = 0 degree pattern



8-5. Phi = 90 degree pattern



8-6. Theda = 90 degree pattern

