



KA-HY-254104 V8DC Bluetooth BLE V4.0 UART Module Specifications

(7 pin)

16.Oct. 2019

Version : V8DC

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1.Description

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

KA-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.

KA-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

KA-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:

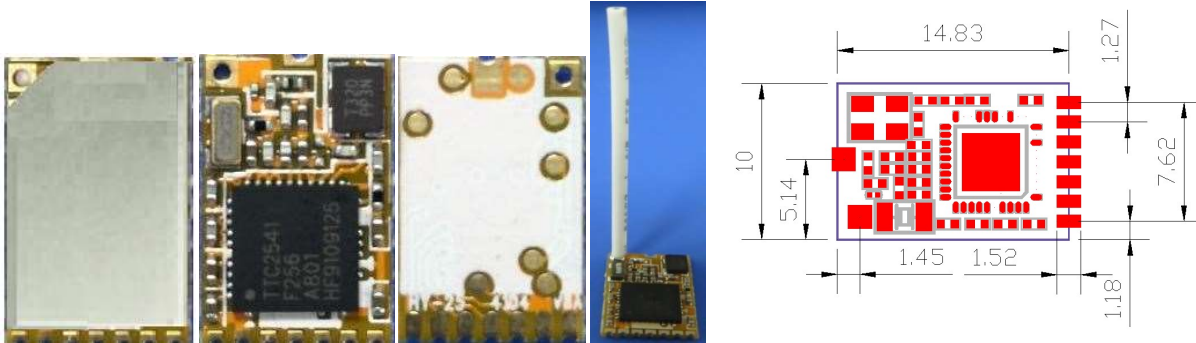
- Bluetooth BLE v.4.0 single mode compliant
- Supports master,slave and master/slave modes
- Integrated Bluetooth low energy stack
- GAP, GATT, L2CAP, SMP Bluetooth low energy profiles
- Compliance: BQB BLE4.0, FCC, IC(Canada), CE ETSI RED...etc. worldwide RF Regulations.
- In-System-Programmable Flash 256KB SRAM 8KB



- Low current consumption :Shutdown. No clocks running, no retention: 0.5uA(Typical)

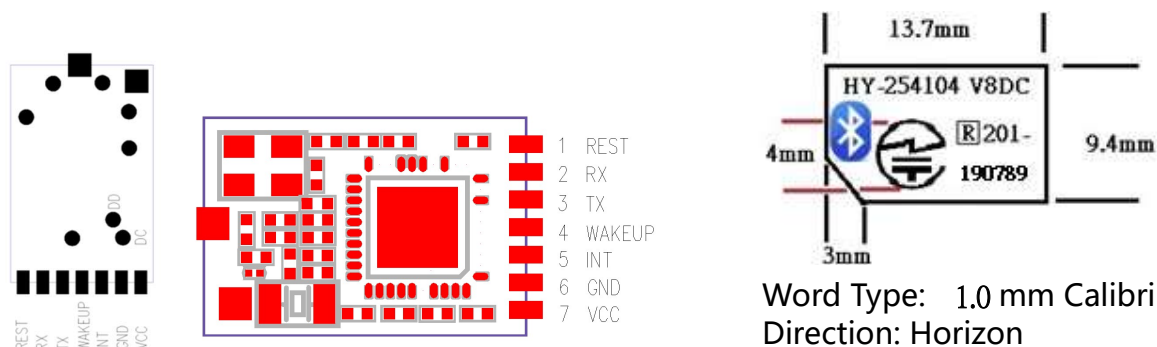
2. KA-HY-254104 V8DC Metal wire Antenna PCBA with shield case dimension size and picture

(PCBA dimension size : 10.0*14.83*2.8 mm).



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

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



(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 law 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 = 4uS); $I = 270\text{uA}$ (Typical);

14. Power mode 2: THE current consumption in sleep mode.

timer activate / enable, wake-up time can by the programming software setting): $I = 1\text{uA}$ (typ);

15. Power mode 3: The current consumption :(Low power deep sleep mode, via the hardware initiative wake): $I = 0.5\text{uA}$ (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
VDDS	-0.3	3.9	V
Other Terminal Voltages	VSS-0.3	VDDS+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

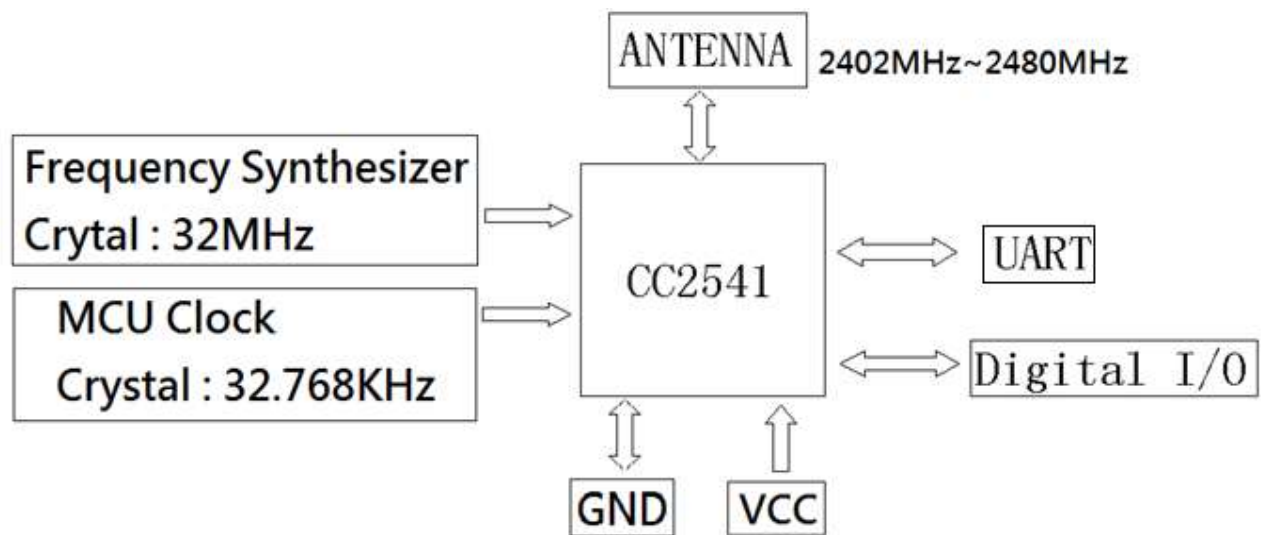
(2).When programming firm ware , the VDD supply voltage must in DC 2.4~3.3V,

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

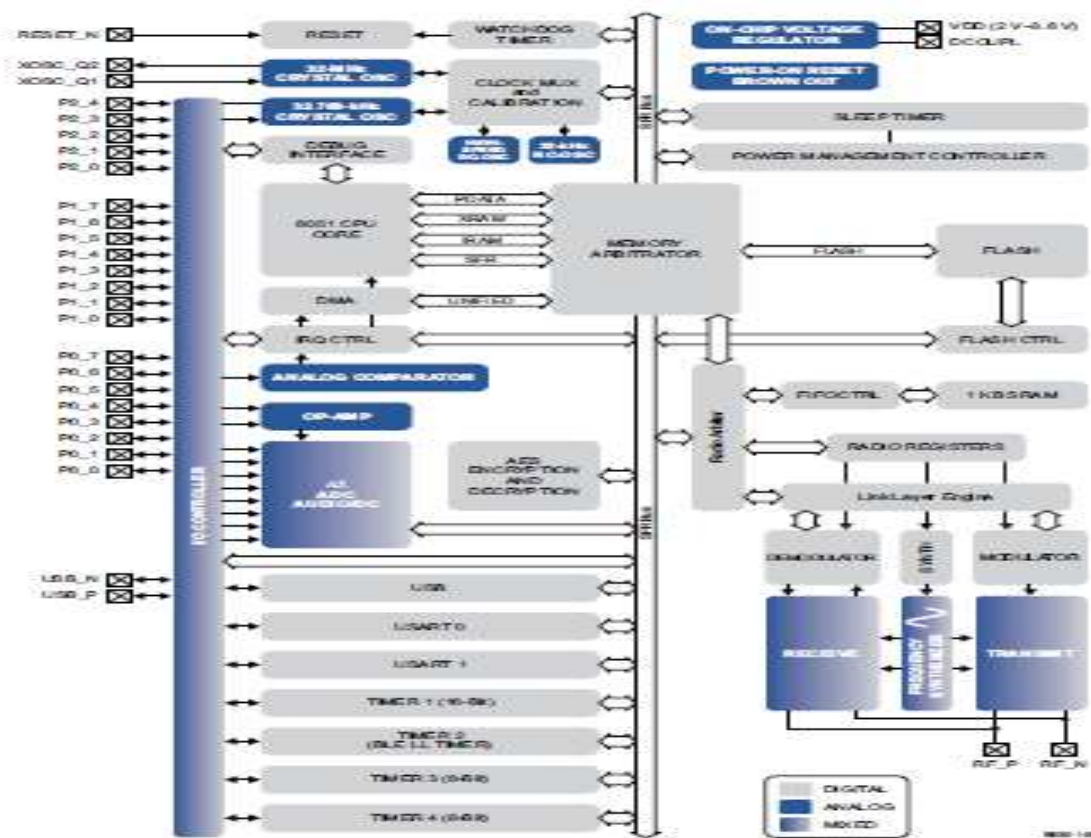
(3).For smaller coin cell batteries, with high worst-case end-of-life equivalent source resistance, a 22-μF VDDS input capacitor must be used to ensure compliance with this slew rate(6-6 timing req.).

5. Block Diagram



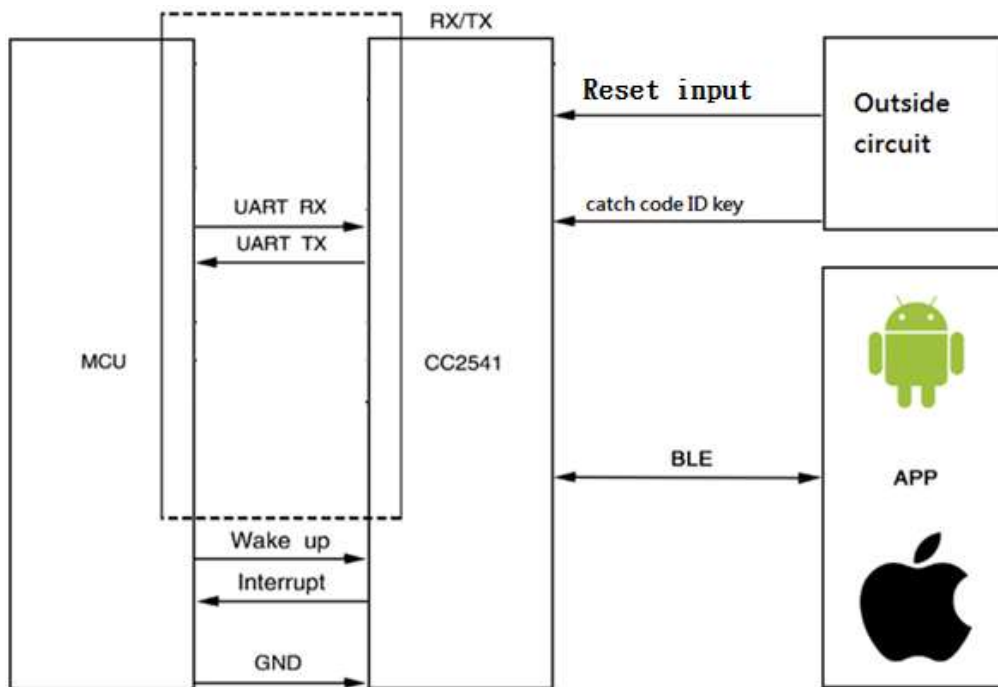


6. Functional Block Diagram



7. Working mode schematic :



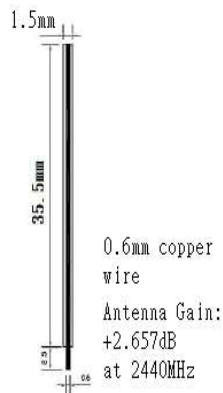


8.Metal wire antenna characteristics:

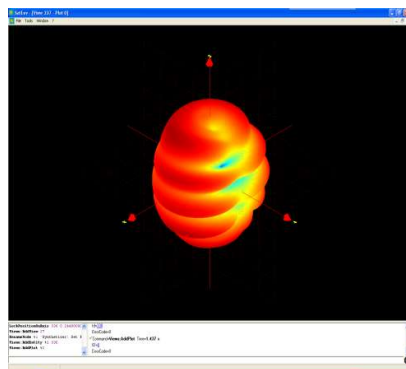
Antenna Gain : 2.657dB at 2440MHz

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

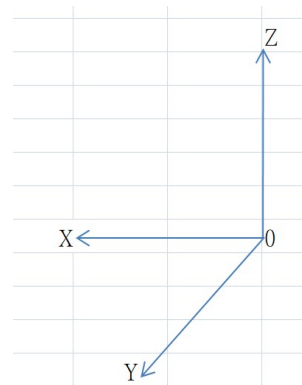
Antenna size



8-2. 3D Radiation Pattern



8-3. X / Y / Z coordinate



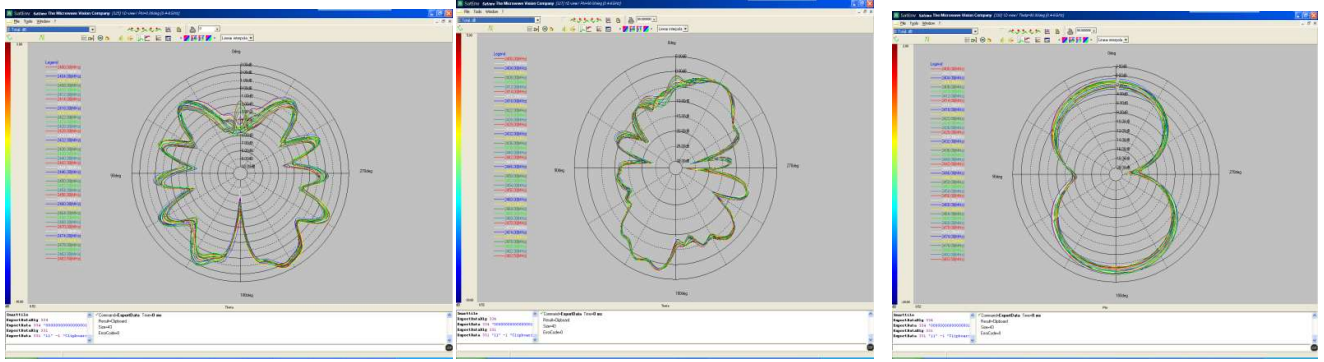
8-4. Phi = 0 degree pattern

8-5. Phi = 90 degree pattern

8-6. Theda = 90 degree



pattern



FCC Statement

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.

To assure continued compliance, any changes or modifications not expressly approved by the party.

Responsible for compliance could void the user's authority to operate this equipment. (Example- use only shielded interface cables when connecting to computer or peripheral devices).

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

The equipment complies with FCC Radiation exposure limits set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.



The following information is shown in the user' s manual.

Compliance Information

Product Name:	Bluetooth module
Model Number:	KA-HY-254104
Trade name:	/
Compliance Statement:	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Correspondence of the responsible party in USA:	
Company:	Kickass Products USA LLC
Address:	9070 IRVINE CTR DR, STE. 135, IRVINE, USA 92618
Tel.:	213 652 6566

The user manual shall include the following or similar statement, placed in a prominent location in the text of the manual:

Warning: Any 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.



Class B 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.

☒ MPE caution (if a FCC certified RF module is inserted in & the separation distance is indicated in the FCC grant of RF module)

To satisfy FCC / IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

