

Product Specification

Bluetooth LE 5 Module
Model Name: AP-12SC

VERSION: 0.1

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1. INTRODUCTIONS AND SCOPE

AP-12SC is a Bluetooth low energy(BLE) module. It uses Realtek Semiconductor BLE controller RTL8762CMF, which is an ultra-low-power chipset. AP-12SC is designed for high performance wearable, medical, industrial and consumer applications. The module integrates antenna and completed controller circuit, customer can easily apply it in product.

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2. FEATURES

2.1 General

Bluetooth 5.2 Certified with LE 2Mbps Support
Build in Arm Cortex-M4F Processor
Build in 40MHz system clock crystal
Bluetooth Transceiver
Transmitting Power: -20 to +7.5 dBm
Transmitting Distance: 100m (no disturbance)
RX Sensitivity -97dBm (BLE min)
Support Lower Voltage to 1.8V
160kByte RAM and 8Mbyte Flash Address Space
512kB Internal Flash Memory
Channel Selection #2
Support GAP, ATT/GATT, SMP, LCAP
Support AES128/192/256 Encrypt/ Decrypt Engine
Real Time Counter
Support LE Long Range
Build in PCB Antenna
Support AT Command
Supports OTA
Support MESH
Max TX Power 8dBm

2.2 Peripheral Interface

Hardware Key Scan
Real Time Counters
4 wire SPI Master/ Slave
I2C x2
PWM x8
Timers x8
400Ksps, 12bits, 4channel AUXDAC
Embedded IR Transceiver

3. MECHANICAL CHARACTERISTICS

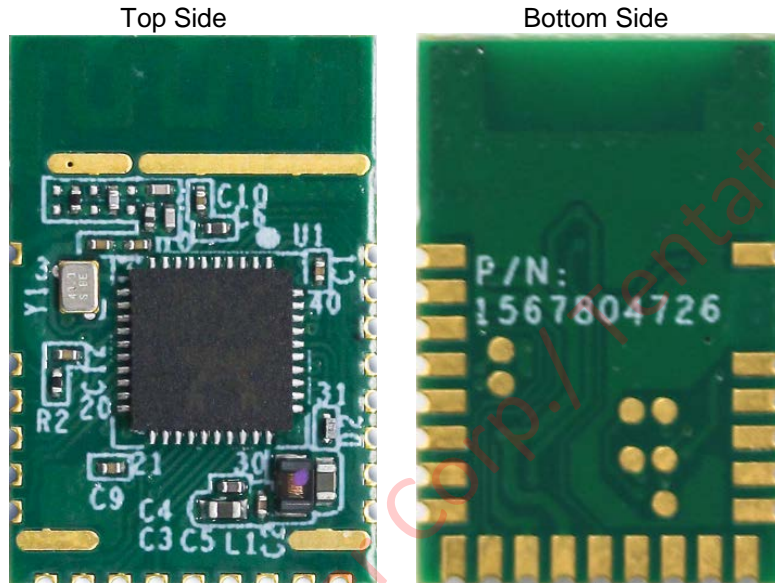
3.1 Weight and Dimension

Weight: 0.8g

Dimension: 17.1mm x 11.15mm x 2.7(L x W x H, with metal cover)

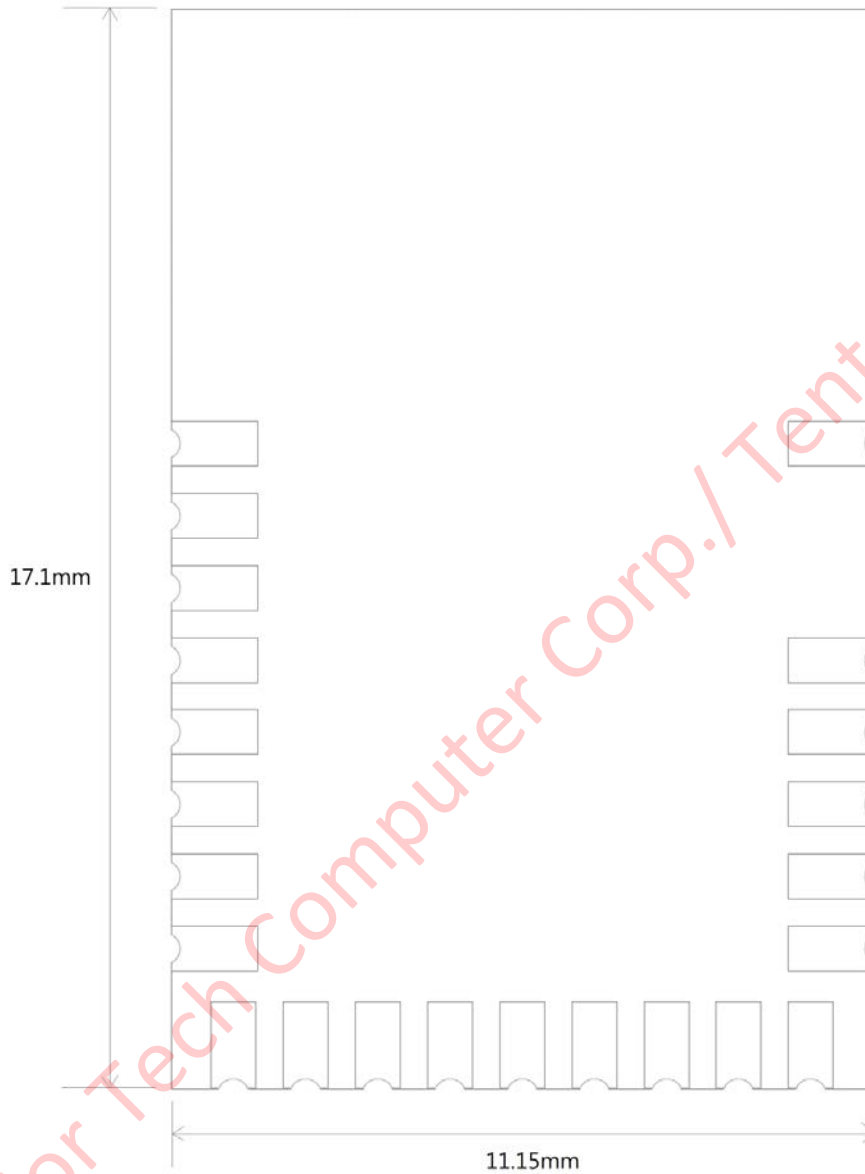
3.2 Module Picture

Reference picture below(without shielding cover):



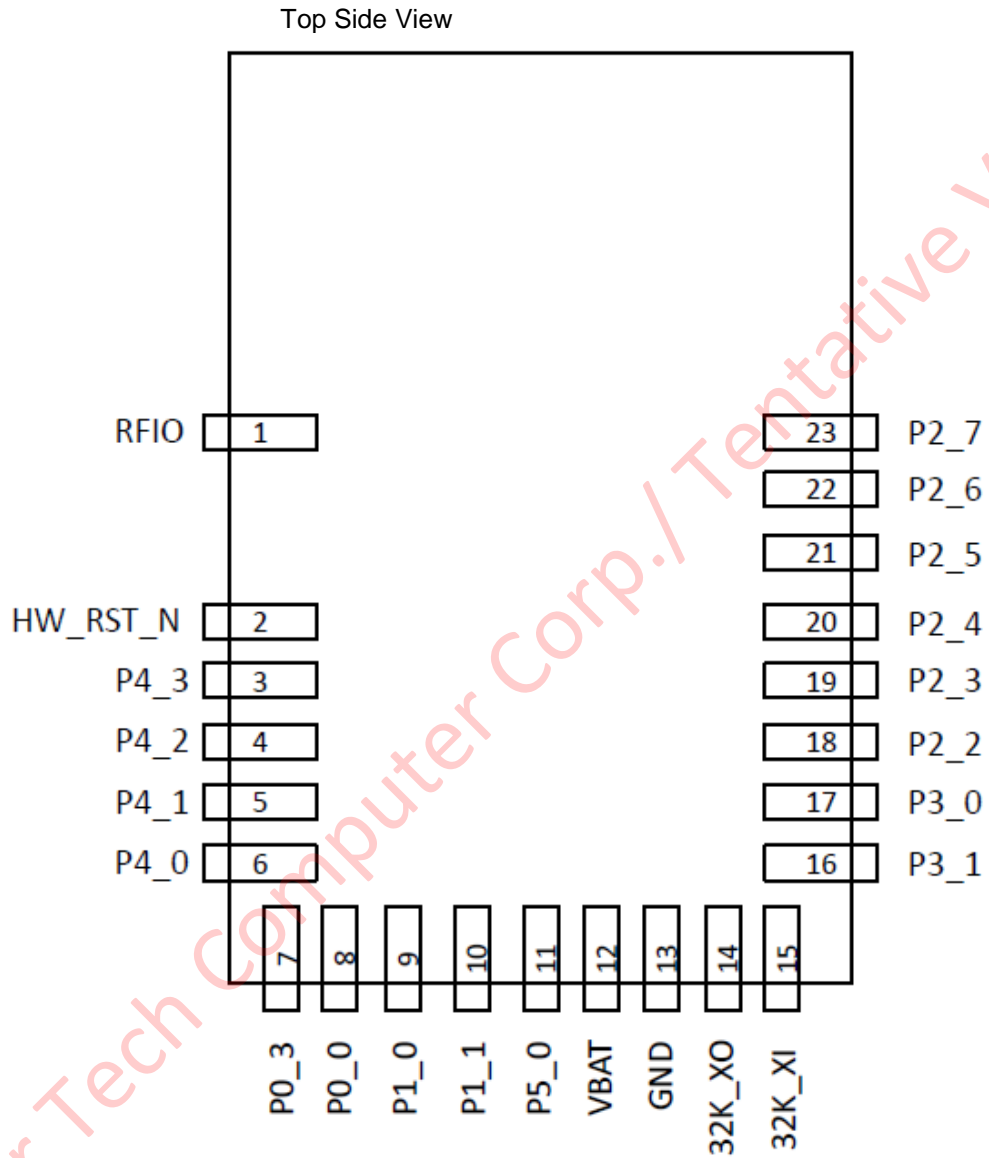
4. EXTERNAL DIMENSION

4.1 Outline Dimension of PCBA (unit: mm)



5. PIN ASSIGNMENT AND DESCRIPTION

5.1 Pin Assignment



5.2 Pin Descriptions

Pin	Symbol	I/O	ADC	Pull	Description
1	RFIO	--	--	--	BT RX/BT TX interface
2	HW_RST_N	I	--	--	Hardware reset pin; low active
3	P4_3	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
4	P4_2	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
5	P4_1	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
6	P4_0	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
7	P0_3	IO	--	--	LOG_UART TX Power on trap: Pull-up for normal operation Pull-down to bypass executing program code in flash (PAD internal pull-up by default)
8	P0_0	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
9	P1_0	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
10	P1_1	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
11	P5_0	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down
12	VBAT	P	--	--	Battery voltage input DC1.8V~3.6V
13	GND				Ground
14	32K_XO	A/IO	--	--	32k crystal output or external 32k clock output(optional)

15	32K_XI	A/IO	--	--	32k crystal input or external 32k clock input(optional)
16	P3_1	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down HCI_UART_RX
17	P3_0	IO	--	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down HCI_UART_TX
18	P2_2	IO	ADC2	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 2
19	P2_3	IO	ADC3	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 3
20	P2_4	IO	ADC4	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 4
21	P2_5	IO	ADC5	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 5
22	P2_6	IO	ADC6	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 6
23	P2_7	IO	ADC7	U/D	General purpose IO 8mA driving capacity with wakeup function with internal strong/ weak pull-up and pull-down AUXADC input 7

Legend:

Type: A = analog; D = digital; I = input; O = output; P = power

Pull(U/D) : U = pull up; D = pull down

6. ELECTRICAL CHARACTERISTICS

6.1 Voltage Specification

Symbol: VBAT

Power supply voltage range: 1.8~3.6V

6.2 Temperature Specification

Functional temperature range: -40°C ~ 105°C

Storage temperature range: -55°C~125°C

6.3 AUXDAC Characteristics

Resolution 12bits

DNL (Single-ended mode) +/-1.5 LSB

DNL (Differential mode) +/-3 LSB

INL (Single-ended mode) +/-1 LSB

INL (Differential mode) +/-2 LSB

Maximum input voltage: VBAT

Input Impedance (bypass mode): 1Mohm

Input Impedance (resister divider mode 1/4): 500kohm

6.4 Radio Characteristics

Frequency range 2402MHz~2480MHz

RX sensitivity -97dBm (PER <= 30.8%)

RX maximum input level -1dBm (PER <= 30.8%)

TX maximum output power 8dBm

6.5 GPIO Characteristics

Input/ Output functions

Independent interrupts

3 interrupt trigger conditions (level/ edge/ dual-edge)

Hardware interrupt de-bounce

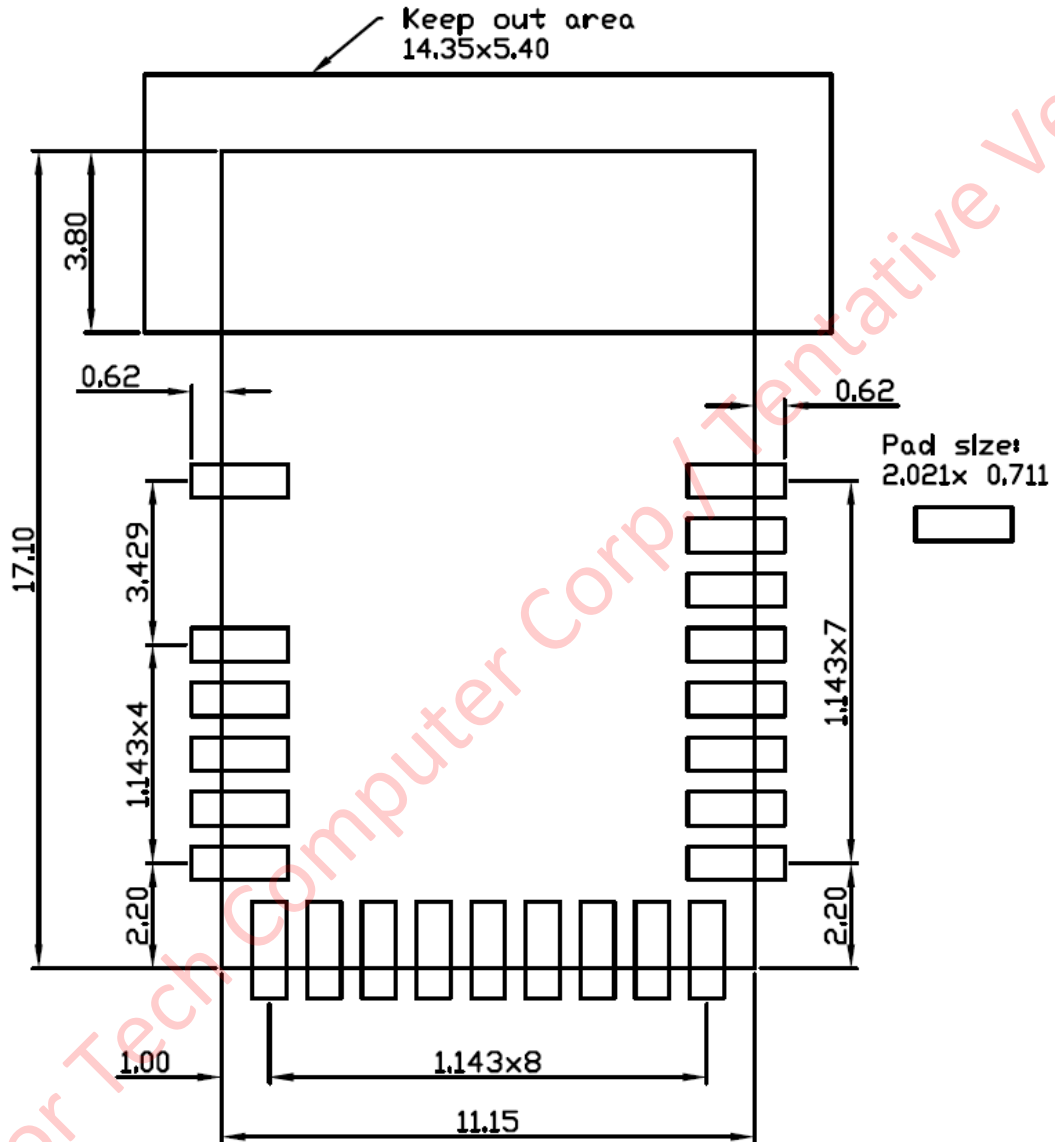
Parameter	Condition	Min	Typical	Max
Input high voltage	Vbat = 3.3V	2	3.3	3.6
Input low voltage	Vbat = 3.3V	--	0	0.9
Output high voltage	Vbat = 3.3V	2.97	--	3.3
Output low voltage	Vbat = 3.3V	0	--	0.33
Input high voltage	Vbat = 2.8V	1.8	2.8	3.1
Input low voltage	Vbat = 2.8V	--	0	0.8
Output high voltage	Vbat = 2.8V	2.5	--	--
Output low voltage	Vbat = 2.8V	0	--	2.8
Pull high and pull low resister(KOhm)	Vbat = 3.3V Strong pull/ weal pull	--	10/100	--

	Vbat = 1.8V Strong pull/ weal pull	--	20/200	--
	Vbat = 3.3 Strong pull/ weal pull V	--	5/50	--
	Vbat = 1.8 Strong pull/ weal pull V	--	2.5/25	--
Input high current(uA)	PAD configured as input mode	--	--	0.1
Input low current(uA)	PAD configured as input mode	--	--	0.1

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6. FOOTPRINT

Make sure no ground pad is in the keep out area. If PCB is multi layer, there should be no ground pad in each layer inside keep out area



unit : mm

7. SHIPPING PACKAGE

Packed by tray, 80pcs modules per tray (T.B.D)

MOQ 1200pcs

MPQ 80pcs

Carton and labels (T.B.D)

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