



BL-M8761BU2

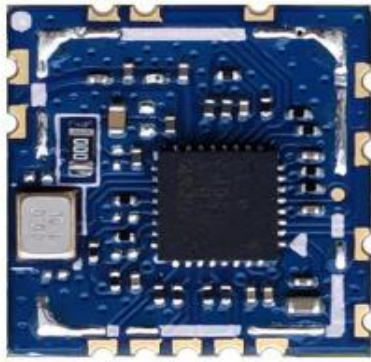
Bluetooth v5.0

USB Module Specification

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(Top View)



(Bottom View)

Module Name: BL-M8761BU2	
Module Type: Bluetooth v5.0 USB Module	
Revision: V1.1	
Customer Approval:	
Company:	
Title:	
Signature:	Date:
LB-link Approval:	
Title:	
Signature:	Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Final release	2020-01-10	
1.1	Update the specification version	2023-04-08	Ch

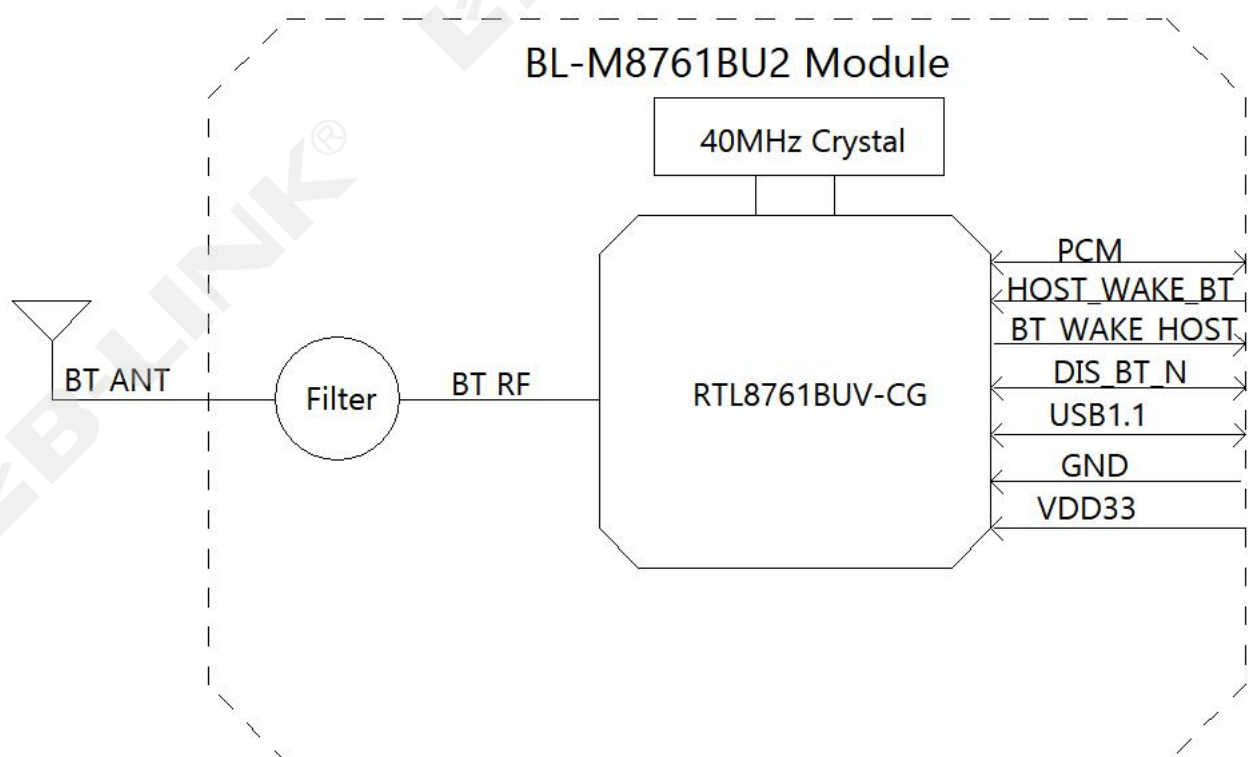
1. Introduction

BL-M8761BU2 BT5 USB module is designed base on RTL8761BUV, It combines a BT Protocol Stack (LM, LL, L2CAP, GATT, RFCOMM, SPP, and LE), BT Baseband, modem and BT RF in a single chip. The BL-M8761BU2 BT5 USB module complies with Bluetooth core specification v5 and supports dual mode (BR/EDR + Low Energy Controllers). It is compatible with previous versions, including v2.1 + LE. For BR/EDR, it allows multiple active links in either slave mode or master mode. For Low Energy, it supports multiple states and allows multiple active links in slave mode. A BR/EDR link and an LE link can be active at the same time.

1.1 Features

- Bluetooth 5.0 Dual Mode support: Simultaneous LE and BR/EDR
- USB1.1 full speed for Bluetooth controller
- Supports Bluetooth Low Energy(BLE)
- Supports Bluetooth classic(BDR/EDR)
- Supports Bluetooth PCM
- Connect to external antenna through half hole

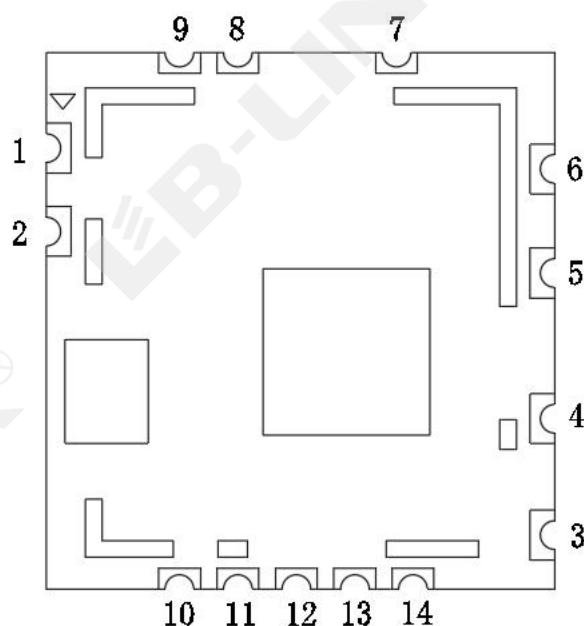
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M8761BU2
Chipset	RTL8761BUV-CG
Bluetooth Standards	Bluetooth Core Specification v5.0
Operating Frequencies	2.402~2.480GHz
Host Interface	USB1.1 full speed for Bluetooth
Antenna	Connect to the external antenna through half hole pad
Dimension	12.9*12.2*1.7mm
Power Supply	DC 3.3V±0.2V @ 300 mA (Max)
Operation Temperature	-20°C to +70°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



2.1 Pin Definition

No	Pin Name	Type	I/O Level	Module Pin Description
1	GND	RF		RF Ground
2	BT_ANT	RF		RF PAD for BT_ANT

3	VDD33	P		Power supply 3.3V
4	USB1.1-DM	AI/O		USB1.1 data-
5	USB1.1-DP	AI/O		USB1.1 data+
6	GND	P		Ground Connection
7	DIS_BT_N	I	VDD33	1.Shared with GPIOA(11),This pin could externally shutdown the RTL8761BUV BT function when DIS_BT_N is pulled low 2.This pin could be connected to the host to implement reset function 3.Internal pull high by 10K resistor and 0.1uF capacitance to ground
8	HOST WAKE BT	I		1.General Purpose Input / Output GPIOA(13) 2.Host to wake-up this Bluetooth device input 3.Internal pull low by 10K resistor
9	BT_WAKE_HOST	O		1.General Purpose Input / Output GPIOA(14) 2.Bluetooth device to wake-up Host output 3.Internal pull low by 10K resistor(Note:This pin is" EEPROM_SEL" power on latch pin.Must be placed the pull low 10K resistor to GND.
10	BT_PCM_IN	I/O		1. Shared with GPIOA(0), 2. PCM data input, 3. Internal pull low by 10K resistor
11	BT_PCM_OUT	I/O		1. Shared with GPIOA(1), 2. PCM data output, 3. Internal pull low by 10K resistor
12	BT_PCM_SYNC	I/O		1. Shared with GPIOA(2), 2. PCM sync signal, 3. Internal pull low by 10K resistor
13	BT_PCM_CLK	I/O		1. Shared with GPIOA(3), 2. PCM clock, 3. Internal pull low by 10K resistor
14	GND	P		Ground Connection

P: Power; I: Input; O: Output; I/O: In/Output; A I/O: Analog; In/Output; RF: Analog RF Port

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-20	25	70	°C
External Antenna VSWR		-	1.7	2.0	/
Supply Voltage	VDD33	3.1	3.3	3.5	V

3.2 Digital I/O DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	2.0	3.3	3.6	V
VIL	Input Low Voltage	--	0	0.9	V
VOH	Output High Voltage	2.97	--	3.3	V
VOL	Output Low Voltage	0	--	0.33	V

3.3 Current Consumption

Conditions : VDD33=3.3V ; Ta:25°C ;			
Use Case	VDD33 Current (average)		
	Typ	Max	Units
RX sense mode(No Link)	25	32	mA
BT BR_DH1 TX RF@4dBm	57	66	mA
BT BR_DH3 TX RF@4dBm	55	65	mA
BT EDR_2DH1 TX RF@4dBm	57	66	mA
BT EDR_2DH3 TX RF@4dBm	62	71	mA
BT EDR_3DH1 TX RF@4dBm	57	67	mA
BT EDR_3DH3 TX RF@4dBm	57	66	mA

BT EDR_3DH3 RX RF	45	55	mA
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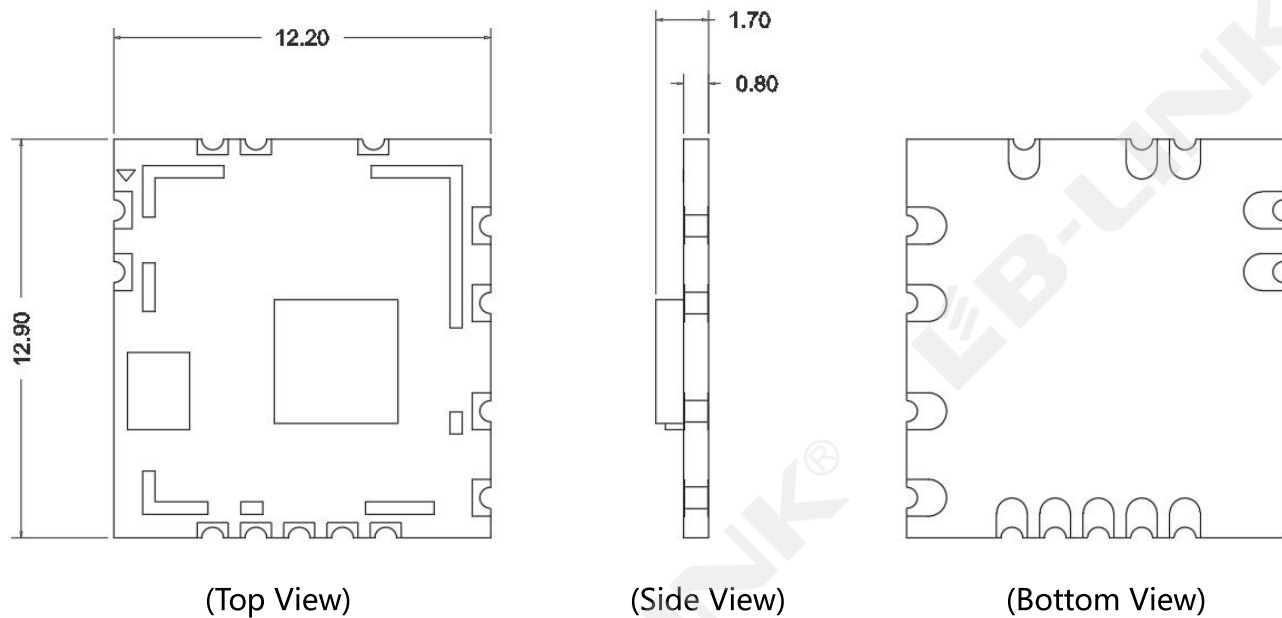
3.4 Bluetooth RF Specification

Conditions: VDD33=3.3V; Ta:25℃			
Features	Description		
Bluetooth Specification	Bluetooth Core Specification v5.0		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Bluetooth Classic: Ch0~Ch78 (For 1MHz Channels); Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);		
Power Classes	Bluetooth Classic: Class1; Bluetooth Low Energy: Class1.5;		
Data Rate & Modulation	BR_1Mbps: GFSK; EDR_2Mbps: π/4-DQPSK; EDR_3Mbps: 8DPSK; LE_125Kbps: GFSK (Coded_S=8); LE_500Kbps: GFSK (Coded_S=2); LE_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded);		
Bluetooth Transmitter Specifications			
Items	Min (dBm)	Typ (dBm)	Max (dBm)
TX Power			
BR_1M	1	5	9
EDR_2/3M	1	5	9
LE_125K/500K/1M/2M	1	5	9
Items	Min	Typ	Max
BR_1M (DH1) Modulation Characteristics			
Δf1avg	140KHz	165.2KHz	175KHz
Δf2avg	115KHz	155KHz	/
Δf2max	115KHz	168.2KHz	/
Δf2avg/Δf1avg	0.8	0.94	/
Items	Min	Typ	Max

EDR_3M(3DH5) EDR Carrier Frequency Stability and Modulation Accuracy				
ω_i	-75KHz	-11.6KHz	+75KHz	
$\omega_i+\omega_o$	-75KHz	-11.5KHz	+75KHz	
ω_o	-10KHz	0.53KHz	+10KHz	
8DPSK RMS DEVM	/	0.033	0.13	
8DPSK Peak DEVM	/	0.085	0.25	
Items	Min	Typ	Max	
LE_1M Modulation Characteristics				
Δf_{1avg}	225KHz	252.6KHz	275KHz	
Δf_{2avg}	185KHz	234KHz	/	
Δf_{2max}	185KHz	225.2KHz	/	
$\Delta f_{2avg}/\Delta f_{1avg}$	0.8	0.93	/	
Items	Min	Typ	Max	
LE_2M Modulation Characteristics				
Δf_{1avg}	450KHz	500.31KHz	550KHz	
Δf_{2avg}	370KHz	510.14KHz	/	
Δf_{2max}	370KHz	486.73KHz	/	
$\Delta f_{2avg}/\Delta f_{1avg}$	0.8	1.02	/	
Bluetooth Receiver Specifications				
Items	Sensitivity		Maximum Input Level	
	Input Level(Typ)	BER	Input Level(Typ)	BER
BR_1M (DH1)	-90 dBm	$\leq 0.1\%$	-5 dBm	$\leq 0.1\%$
EDR_3M (3DH5)	-85 dBm	$\leq 0.01\%$	-5 dBm	$\leq 0.1\%$
	Input Level (Typ)	PER	Input Level (Typ)	PER
LE_125K	-92 dBm	$\leq 5\%$	-5 dBm	$\leq 5\%$
LE_1M	-88 dBm	$\leq 5\%$	-5 dBm	$\leq 5\%$
LE_2M	-84 dBm	$\leq 5\%$	-5 dBm	$\leq 5\%$

4. Mechanical Specifications

4.1 Module Outline Drawing

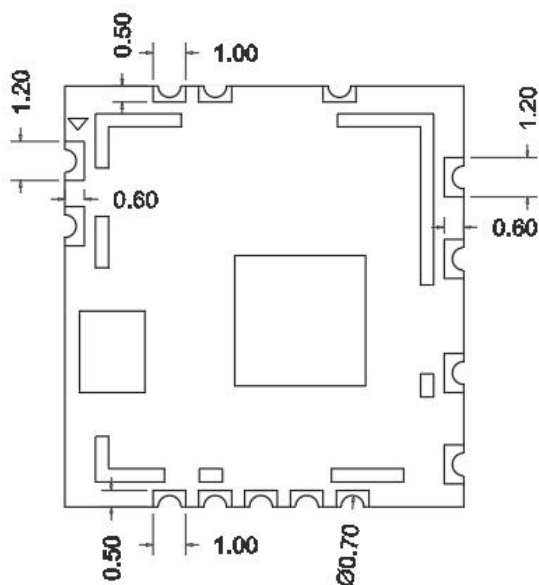


Module dimension: 12.9*12.2*1.7mm (L*W*H; Tolerance: $\pm 0.15\text{mm}$)

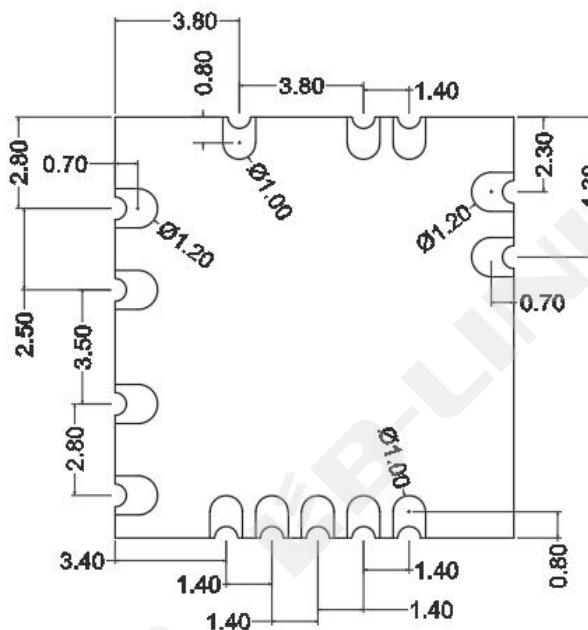


Module Bow and Twist: $\leq 0.1\text{mm}$

4.2 Mechanical Dimensions



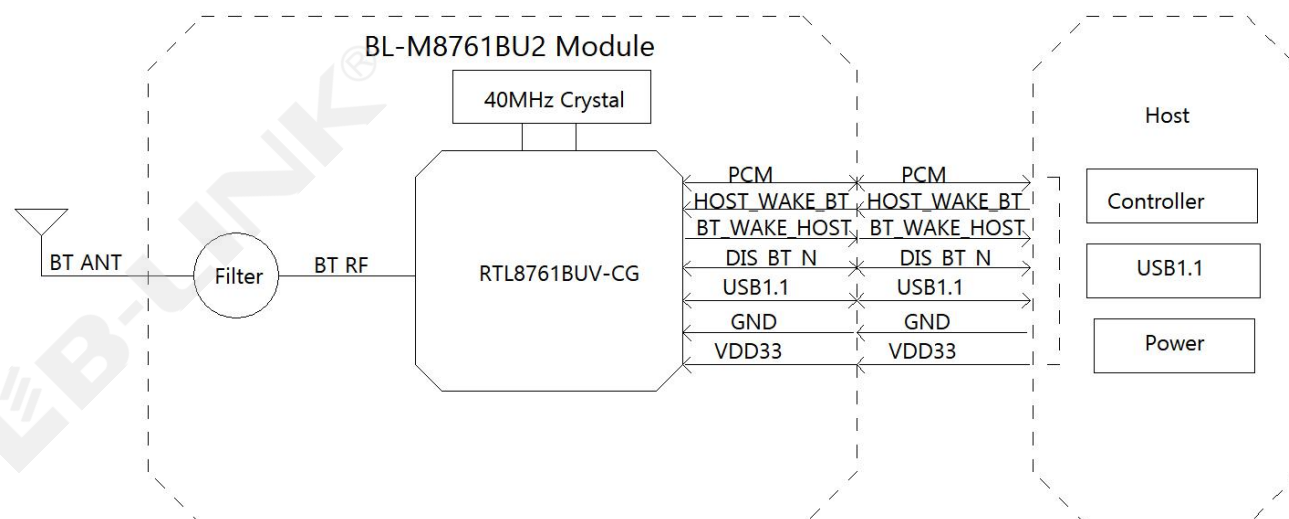
(Top View)



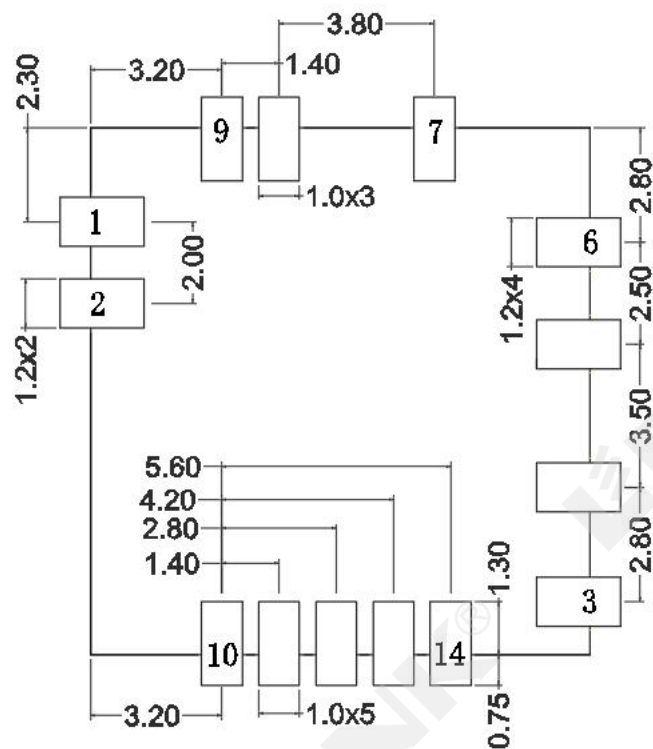
(Bottom View)

5. Application Information

5.1 Typical Application Circuit

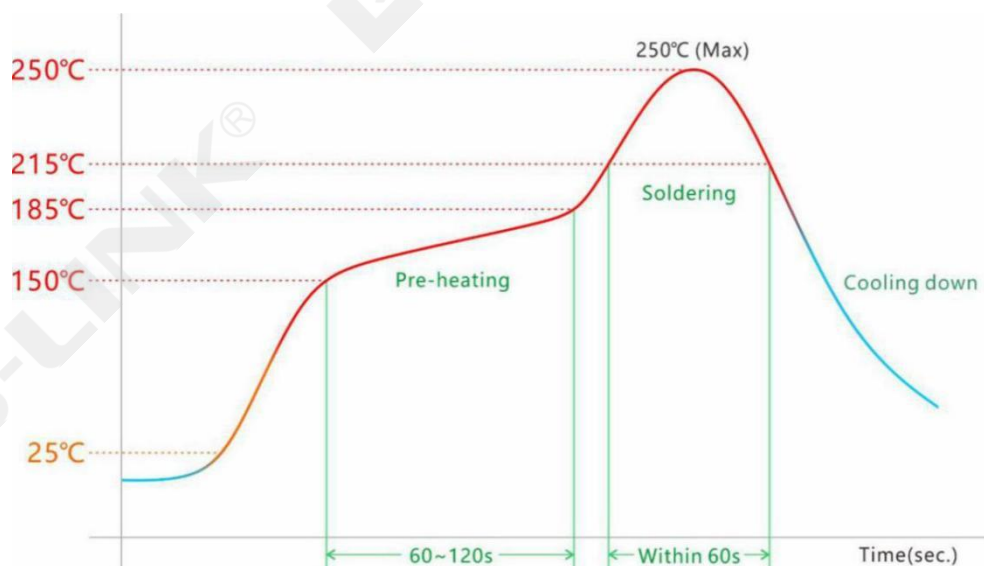


5.2 Recommend PCB Layout Footprint



(Design Unit:mm)

5.3 Reflow Soldering Standard Conditions



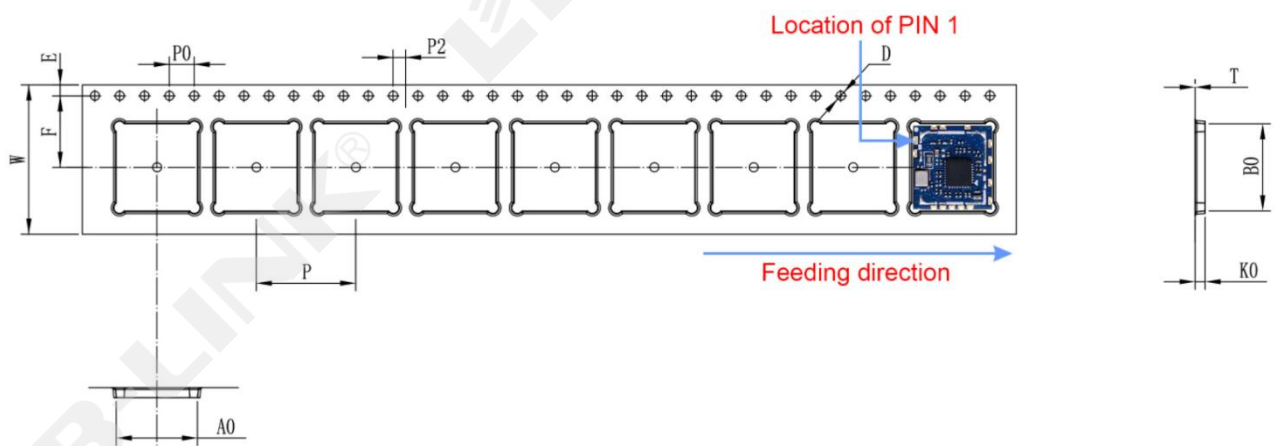
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

6. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	RTL8761BUV-CG	Realtek Semiconductor Corp.	
2	PCB	BL-M8761BU2	ShenZhen Tie Fa Technology Limited	
			Huizhou Dayawan Kexiang Technology Circuit Board Co., Ltd	
			SHEN ZHEN QILI ELECTRON CO.,LTD	
3	Crystal	40MHz-2520	LUCKI CM ELECTRONICS CO.,LTD	
			HUBEI TKD CRYSTAL ELECTRONIC SCIENCE AND TECHNOLOGY CO.,LTD	
			Chengde oscillator Electronic Technology CO.,LTD	

7. Package and Storage Information

7.1 Package Dimensions



ITEM	W	A0	B0	K0	E	F	P	P0	P2	D	T
DIM	24.00±0.3	12.65±0.1	13.60±0.1	1.80±0.1	1.75±0.1	11.5±0.1	16.00±0.1	4.00±0.1	2.00±0.1	Ø1.5±0.1	0.30±0.05

**Package specification:**

1. 2,000 modules per roll and 10,000 modules per box.
2. Outer box size: 37.5*36*29cm.
3. The diameter of the blue environment-friendly rubber plate is 13 inches, with a total thickness of 28mm (with a width of 24mm carrying belt).
4. Put 1 package of dry agent (20g) and 1 humidity card in each anti-static vacuum bag.
5. Each carton is packed with 5 boxes.

7.2 Storage Conditions**Absolute Maximum Ratings:**

Storage temperature: -40°C to +85°C

Storage humidity: 10% to 95% RH (Non-Condensing)

Recommended Storage Conditions:

Storage temperature: 5°C to +40°C

Storage humidity: 20% to 90% RH

Please use this Module within 12month after vacuum-packaged.

The Module shall be stored without opening the packing.

After the packing opened, the Module shall be used within 72hours.

When the color of the humidity indicator in the packing changed,

The Module shall be baked before use.

Baking condition: 60°C, 24hours, 1time.

ESD Sensitivity:

ESD Protection: 2KV(HBM ,Maximum rating)

The Module is a static-sensitive electronic device.

Do not operate or store near strong electrostatic fields.

Take proper ESD precautions!

**ESD CAUTION**