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# Product Specification

<b>Revision</b>	V1.0		
<b>Date</b>	2019-06-11		
<b>Model Name</b>	BL-M7668BU2		
<b>ProductName</b>	IEEE 802.11a/b/g/n/ac/(2T2R) WLAN + BT5.0 USBModule		
<b>Bilian Approve Field</b>			
<b>Engineer</b>	<b>QC</b>	<b>Sales</b>	
<b>Customer Approve Field</b>			
<b>Engineer</b>	<b>QC</b>	<b>Manufactory</b>	<b>Purchasing</b>

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## Revision History

Date	Document Revision	Product Revision	Description
2019/06/11	1.0	V1.0	Preliminary release

## 1. Introduction

### 1.1 General Description

The BL-M7668BU2 is a highly integrated 2\*2 802.11a/b/g/n/ac Wireless LAN (WLAN) network and bluetooth combo module. USB 1.0/1.1/2.0 interface. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and bluetooth support 5.0 performance. The BL-M7668BU2 module provides a complete solution for a high throughput performance integrated wireless LAN and BT device.



Figure 1 Top View



Figure 2 Bottom View

(7638&7668 use same pcb board)

### 1.2 Features

- | Operating Frequencies : 2.4~2.4835&5.15~5.835GHz
- | Host Interface is USB2.0
- | IEEE Standards : IEEE 802.11a/b/g/n/ac
- | Wireless data rate can reach up to 867Mbps
- | Bluetooth support 5.0/4.2 LE/4.1/3.0/2.1
- | Antenna connected though IPEX connector
- | Power Supply:3.3V±0.3V

### 1.3 Applications

- | IP Camera
- | STB
- | Smart TV
- | E-book
- | Other devices which need to be supported by wireless network

## 2. Functional Block Diagram

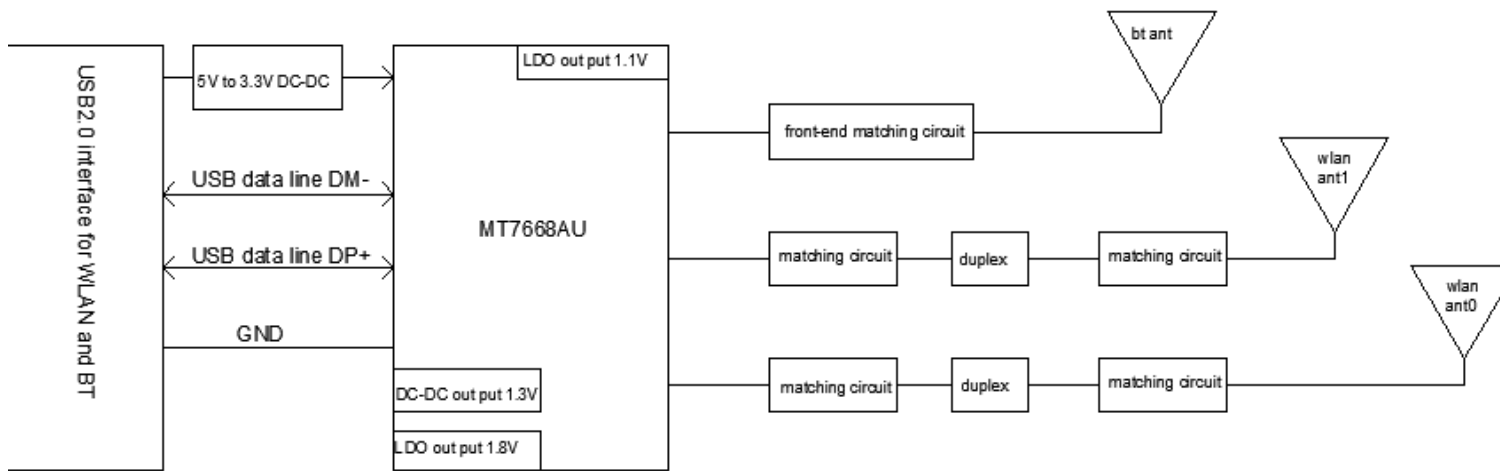


Figure 3 BL-M7668BU2 block diagram

## 3 . Product Technical Specifications

### 3.1 General Specifications

Item	Description
Product Name	BL-M7668BU2
Main Chip	MT7668AU
Host Interface	USB 2.0
IEEE Standards	IEEE 802.11a/b/g/n/ac
Operating Frequencies	2.4~2.4835&5.15~5.835GHz
Modulation	WIFI: 802.11b: CCK, DQPSK, DBPSK 802.11g: 64-QAM,16-QAM, QPSK, BPSK 802.11n: 64-QAM,16-QAM, QPSK, BPSK 802.11ac: 256-QAM,64-QAM,16-QAM, QPSK, BPSK BT: 8DPSK, $\pi/4$ DQPSK, GFSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	WIFI: 802.11b: 1, 2 ,5.5,11Mbps, 802.11g: 6,9,12,18,24,36,48,54Mbps, 802.11a: 6,9,12,18,24,36,48,54Mbps, 802.11n-2.4&5G HT20: MCS0~15, 6.5~144Mbps, 802.11n-2.4&5G HT40: MCS0~15, 13.5~300Mbps, 802.11ac-VHT20/40:MCS0~8 ,VHT80:MCS0~9reach up to 867Mbps, BT: 1Mbps for Basic Rate 2,3Mbps for Enhanced Date Rate
Rx Sensitivity	-95dBm (Min)
TX Power	17.77dBm (Max)
Antenna Type	Connect though IPEX connector
Dimension(L*W*H)	27*17.7*3.1mm (L*W*H) , Tolerance: $\pm 0.15$ mm
Power Supply	3.3V $\pm$ 0.3V /900mA max
Clock Source	40MHz
Working Temperature	-10° C to +70° C
Storage Temperature	-40° C to +85° C

**ESD CAUTION:** Although this module is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this module. It must be protected from ESD at all times and handled under the protection of ESD.

### 3.2 DC Power Consumption

VDD=3.3V, Ta= 25 °C, unit: mA				
Supply current	Typ		Max	
RX sense mode(No Link)	65		100	
<b>802.11b</b>				
	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	551	660	546	580
RX mode	52	108	56	105
<b>802.11g</b>				
	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	417	440	335	420
RX mode	56	98	57	100
<b>802.11n HT20</b>				
	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	408	430	380	412
RX mode	65	100	70	95
<b>802.11n HT20</b>				
	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	420	450	390	435
RX mode	82	105	90	110
<b>802.11n HT40</b>				
	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	425	449	400	426
RX mode	75	102	80	95
<b>802.11n HT40</b>				
	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	430	462	413	425
RX mode	95	108	86	103

<b>802.11a</b>	<b>6Mbps</b>		<b>54Mbps</b>	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	702	862	765	868
RX mode	68	94	72	100
<b>802.11n HT20(5G)</b>	<b>MCS0</b>		<b>MCS7</b>	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	721	836	700	736
RX mode	75	106	80	105
<b>802.11n HT40(5G)</b>	<b>MCS0</b>		<b>MCS15</b>	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	723	831	686	721
RX mode	80	105	90	113
<b>802.11nAC80(5G)</b>	<b>MCS0</b>		<b>MCS9</b>	
Supply current	Typ.	Max.	Typ.	Max.
Continuous TX mode	712	880	692	732
RX mode	80	95	92	116

### 3.3 RF Specifications

TX Power&EVM	WiFi-2.4G: EVM<-15dB@11b 11Mbps EVM<-25dB@11g 54Mbps EVM<-28dB@11n-HT20-2.4G-MCS7 EVM<-28dB@11n-HT40-2.4G-MCS7 WiFi-5G: EVM<-25dB@11a 54Mbps EVM<-28dB@11n-HT20-MCS7 EVM<-28dB@11n-HT40-MCS7 EVM<-32dB@11acMCS9
Receiver Minimum Input Sensitivity@PER	WiFi-2.4G: 11b 1Mbps: -95dBm@PER<8%; 11b 11Mbps:-85dBm@PER<8%; 11g 54Mbps:-73dBm@PER<10%; 11n-HT20-MCS7:-70dBm@PER<10%; 11n-HT40-MCS7:-67dBm@PER<10%; WiFi-5G: 11a6Mbps: -91dBm@PER<10%; 11a54Mbps:-73dBm@PER<10%;

11n-HT20-MCS7:-70dBm@PER<10%;  
 11n-HT40-MCS7:-68dBm@PER<10%;  
 11acVHT80-MCS9:-59dBm@PER<10%;

### 3.4 Bluetooth RF Specification

RF Characteristics for BT				
Items	Contents			
Host Interface	USB			
Specification	5.0/4.2 LE/4.1/3.0/2.1			
Modulation	FHSS:GFSK, $\pi/4$ -DQPSK, 8DPSK			
Channel frequency	2.402~2.480 GHz			
Data rate	1Mbps,2Mbps,3Mbps			
TX Characteristics	min.	typ.	max.	Unit
Power level(BR/EDR)	0	2	5	dBm
Power level(BLE)	0	2	5	dBm
RX Characteristics	min.	typ.	max.	Unit
Minimum input level(Muti-slot packages sensitivity mode<0.1%)	-90	-83	-80	dBm



## 4. Pin Assignments

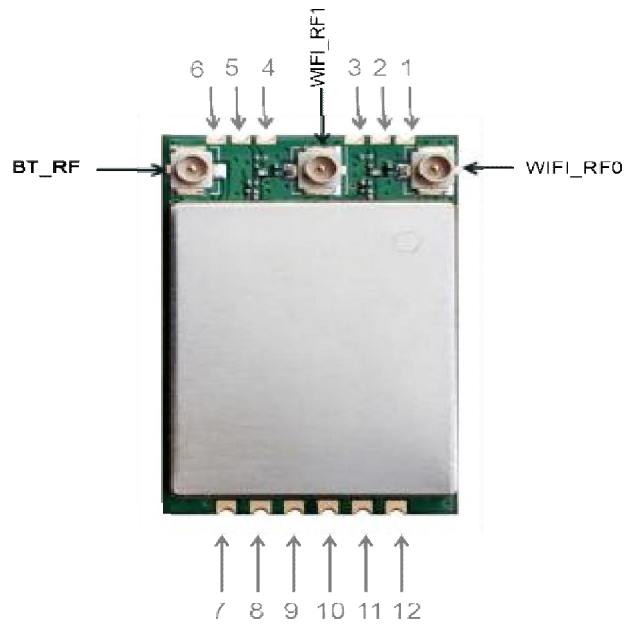


Figure 4 Pin Assignments (Top view)

Pin No:	Pin Name	Type	Description
1	GND	P	GND
2	RF0	I/O	WIFI RF port0 (NC)
3	GND	P	GND
4	GND	P	GND
5	RF1	I/O	WIFI RF port1 (NC)
6	GND	P	GND
7	LED	I/O	LED signal pin(not use)
8	GND	P	GND
9	DP+	I/O	USB differential data line
10	DM-	I/O	USB differential data line
11	3.3V	P	Power supply
12	PDN	I/O	Reset signal pin (active low )

## 5. Typical Application Circuit

RF reference circuit

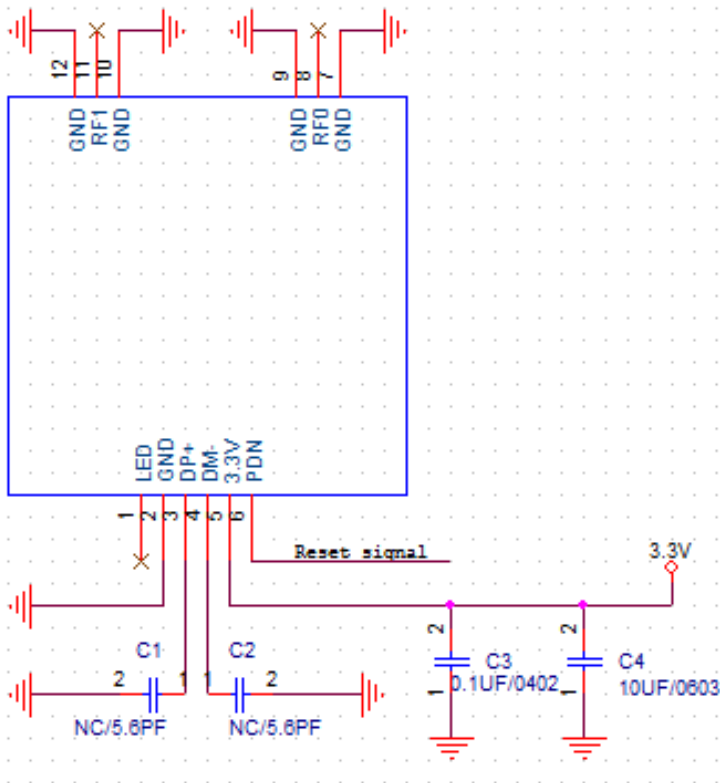


Figure 5 Typical application circuit

NOTE: RF port connect to antenna though IPEX connector.

## 6. Mechanical Specifications

Module dimension: Typical (L\*W \* H): 27\*17.7\*3.1mm (L\*W\*H) , Tolerance:  $\pm 0.15\text{mm}$

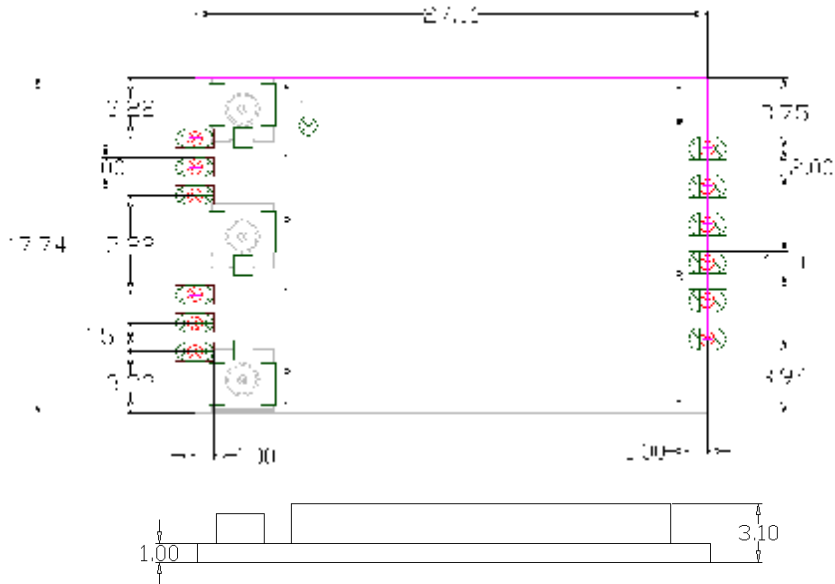


Figure 6 Module dimension

## 7. Others

### 7.1 Package Information



Figure 7 Package Information

### 7.2 Storage Temperature and Humidity

1. Storage Condition: Moisture barrier bag must be stored under 30°C, humidity under 85% RH.

The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.

Humidity indicator cards must be blue, <30%.

2. Products require baking before mounting if humidity indicator cards reads > 30% temp < 30°C, humidity < 70% RH, over 96 hours.

Baking condition: 125°C, 12 hours.

Baking times: 1 time.

### 7.3 Recommended Reflow Profile

Reflow soldering shall be done according to the solder reflow profile, Typical Solder Reflow Profile is illustrated in Figures 8. The peak temperature is 245°C.



Figure 8 Typical Solder Reflow Profile

### **FCC 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.

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

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 important announcement

Important Note:

### **Radiation Exposure Statement**

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

### **Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### **End Product Labeling**

The final end product must be labeled in a visible area with the following" Contains FCC ID: **2AVEDBL-M7668BU2** ".

### **Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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

2.7 Antennas

This radio transmitter 2AVEDBL-M7668BU2 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Connector	Peak gain ( dBi )				
			2400-2483.5 MHz	5150-5250 MHz	5250-5350 MHz	5470-5725 MHz	5725-5850 MHz
BAT-POLK-BT	Dipole	RF-SMA	5.0dBi	/	/	/	/
BAT-POLK-WIFI	Dipole	RF-SMA	5.0dBi	5.0dBi	/	/	5.0dBi
BAT-POLK-WIFI	Dipole	RF-SMA	5.0dBi	5.0dBi	/	/	5.0dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2AVEDBL-M7668BU2".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.