

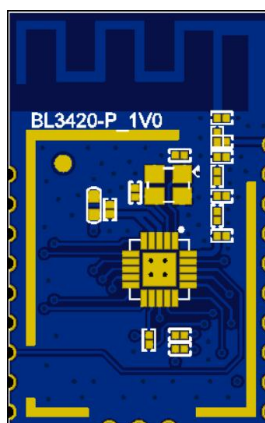
BL3420-P BT Module Datasheet

Module Features

- **MCU:** 32-bit, OTP: 16KB
- **GPIO:** 15 pins, PWM: 8 channels
- **Operating Voltage:** 1.8V ~ 3.6V
- **RF Features:**
 - Frequency Range: 2.400GHz ~ 2.480GHz
 - Data Rate: 1Mbps
 - Modulation: GFSK
 - Output Power: 8dBm $\pm$ 2dBm
 - Receiver Sensitivity: -95 $\pm$ 2dBm @ 1M
 - On-board PCB Antenna
- **Peripherals:**
 - 15x GPIO
 - 8x PWM
 - 4x ADC
 - 1x UART
- **Operating Temperature:** -10°C to +105°C
- **Package:** Half-hole surface mount, supports SMT placement
- **Module Dimensions:** (13.3 $\pm$ 0.2) mm * (21 $\pm$ 0.2) mm * (3.4 $\pm$ 10%) mm (with shield)

Applications

- Intelligent Transportation
- Smart Home/Appliances
- Instrumentation
- Healthcare
- Industrial Automation
- Smart Security
- Smart Energy



Module Model: BL3420-P

Model	Antenna	Note
BL3420-P	Built-in	

Table of Contents

1. Product Overview	3
2. Electrical Parameters	3
2.1 Power Consumption Parameters	3
2.2 Operating Environment	3
3. RF Parameters	4
3.1 Basic RF Parameters	4
4. Basic Information of BL3420-P	5
4.1 Pin Layout	5
4.2 Pin Definitions	5
4.3 Mechanical Dimensions	7
4.5 Usage Instructions	7
Version History	8
Copyright Notice	8
Contact Us 	9

1. Product Overview

The BL3420-P is a BLE module launched by BroadLink, featuring a 32-bit MCU with 15 GPIOs, 8 PWM channels, and 4 ADC interface, utilizing a stamp hole interface, and powered by a 3.3V single power supply. The module integrates an RF transceiver, MAC, and baseband processing, supporting data pass-through and can form self-organizing networks based on BLE. It is widely applicable in smart home devices, medical instruments, and more.

2. Electrical Parameters

2.1 Power Consumption Parameters

Power consumption parameters are detailed in Table 1.

Table 1: BL3420-P Power Consumption Parameters

Specifications	Min.	Typ.	Max.	Units
VDD	1.8	3.3	3.6	V
VIL (input low voltage)	VSS	-	0.3VDD	V
VIH (input high voltage)	0.7VDD	-		V
VOL (output low voltage)	-	-	0.5	V
VOH (output high voltage)	2.5	-	-	V
RPU (pull-up resistor)	-	69	-	KΩ
RPD (pull-down resistor)	-	-	-	KΩ
Io (output current)	-	10	-	mA
Receiving mode @ 1M	-	12	-	mA
Sleep current	-	2	-	uA

*Note: Actual firmware testing results may vary.

2.2 Operating Environment

Operating environment parameters are detailed in Table 2.

Table 2: BL3420-P Operating Environment

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	°C

Symbol	Description	Min.	Max.	Units
TA	Ambient operating temperature	-10	105	°C
Vdd	Supply voltage	1.8	3.6	V
Vio	Voltage on IO pin	0	3.3	V

3. RF Parameters

3.1 Basic RF Parameters

RF parameters are detailed in Table 3.

Table 3: BL3420-P RF Parameters

Normal RF Condition						
Normal RF Condition	Parameter	Min.	Default	Max.	Units	Reference Value
FOP	Frequency range	2400	-	2480	MHz	2400~2480
Specification		BLE 5.2				
TX Characteristics						
PRF	RF output power	-	8	-	dBm	Note (1)
RX Characteristics						
SEN	RX Sensitivity @PER 30.8% 1Mbps	-	-95	-	dBm	≤-70
FET	Frequency offset range	-250	-	250	KHz	-
Carrier Frequency Offset						
FOF	Center frequency offset	-150	-	150	KHz	
FD	Frequency drift	-50	-	50	KHz	
FDR	Maximum drift rate	-20	-	20	KHz	20KHz/50us
Modulation Characteristics						
Delta F1 Avg		225	-	275	KHz	225~275KHz
Delta F2 Max @99.9%		≥185	-	-	KHz	≥185
Delta F2 Avg/Delta F1 Avg		≥0.8	-	-	-	≥0.8

Note: The output power level is determined by the relevant register configuration in the software.

4. Basic Information of BL3420-P

4.1 Pin Layout

Refer to Figure 1 for pin layout.

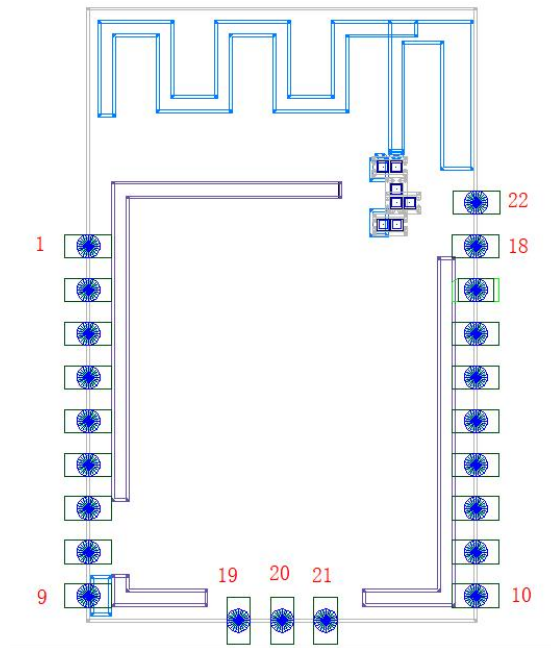


Figure 1: BL3420-P Pin Layout

4.2 Pin Definitions

Refer to Table 4 for pin definitions.

Table 4: BL3420-P Pin Definition Notes

PIN	Function 1	Function 2	Function 3*
1	P9	UART_TX	TX_LOG
2	P8	UART_RX	RELAY4
3	P1	PWM1	KEY3
4	P0	PWM0	KEY4
5	P7	PWM7	KEY1
6	P6	PWM6	DD(backlight)

7	P21	ADC7/PWM5	ZERO
8	VDD		
9	GND		
10	NC		
11	P20	PWM4	RELAY1
12	P18	PWM2	RELAY2
13	P19	ADC6/PWM3	RELAY3
14	P15	ADC4	RELAY4
15	P8		KEY8
16	NC	---	---
17	P23	PWM7	KEY2
18	GND		
19	P2	PWM2	KEY5
20	P4	PWM4	KEY6
21	P5_1	PWM5	KEY7
22	NC		

Note:

1. (Panel) Function 3 is mainly applicable to the pin definition of Broadlink own single-zero-fire panel;
2. The default is to use P5_1 (i.e. P5), located at the PIN21 position;
3. The pins at PIN2 (UART_RX/P8) and PIN15 (P8) are the same pin and can be used interchangeably. Only one function definition can be selected at both ends.
4. RF_OUT indicates that the external antenna of the module is in use. When the PCB antenna is currently in use, this port becomes invalid.

4.3 Mechanical Dimensions

Refer to Figure 2 for module dimensions. Unit: mm.

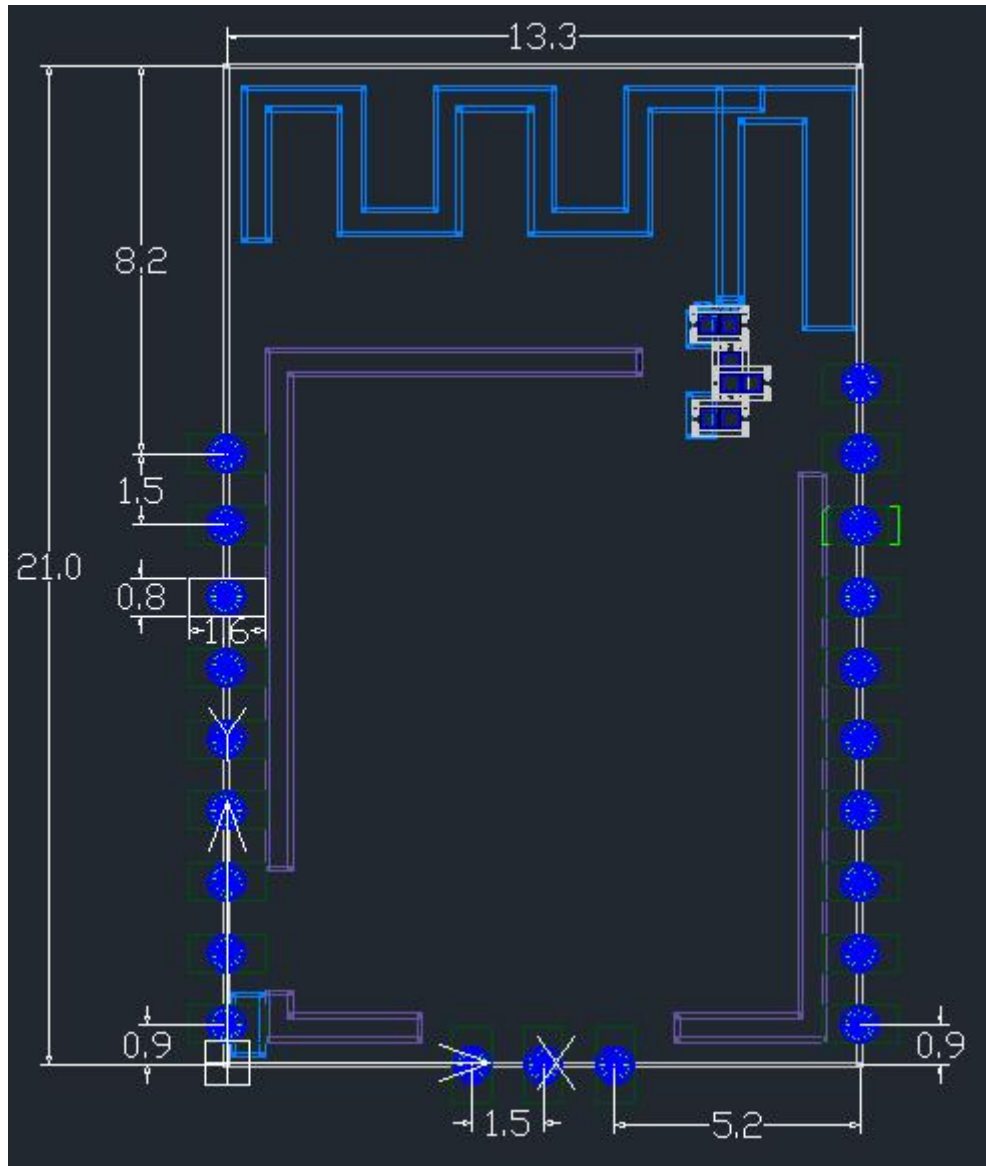


Figure 2: BL3420-P Module Dimensions

Dimensions: (13.3 $\pm$ 0.2) mm x (21 $\pm$ 0.2) mm x (3.4 $\pm$ 10%) mm (with shield)

4.5 Usage Instructions

1. Ensure there are no metals or components within 30mm around the onboard antenna. Keep the bottom area clear, avoiding high-speed clock lines and high-current power lines.
2. For the 3.3VD power supply pin, connect capacitors of 10 μ F-47 μ F in parallel with several 18pF to 100nF capacitors.

3. The preferred location for the module is shown in Figure 8.

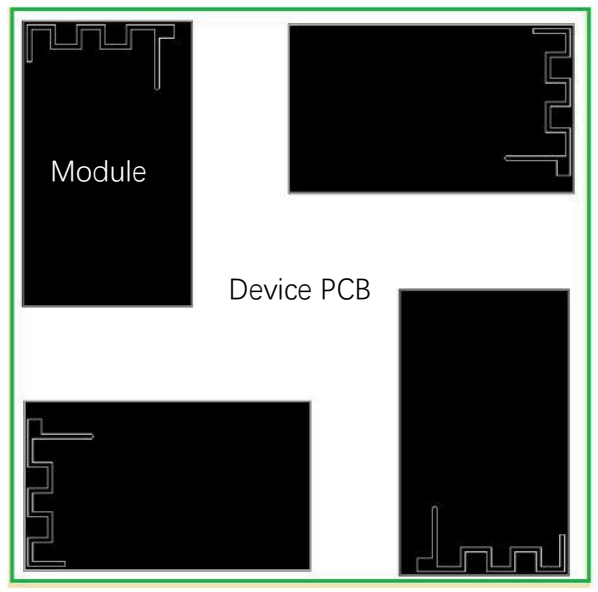


Figure 4: Preferred Location for Module

4. The I2C interface supports both Master and Slave modes, determined by the firmware version. When in Slave mode, an external pull-up to 3.3VD is required.

Version History

Date	Version	Description
2026-6-16	1.0	Initial document
2026-7-9	1.1	Parameter update

Copyright Notice

Without permission, it is forbidden to use or copy any part of this manual, especially trademarks, model names, part numbers, and graphics.

Contact Us

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List of applicable FCC rules

FCC Part 15.247

Label and compliance information

FCC ID label on the final system must be labeled with "Contains FCC ID:

2ATEV-BL3420-P" or "Contains transmitter module FCC ID: 2ATEV-BL3420-P".

Information on test modes and additional testing requirements

Contact Hangzhou BroadLink Technology Co., Ltd. will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

Additional testing, Part 15 Subpart B disclaimer

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, Hangzhou BroadLink Technology Co., Ltd. shall provide guidance to

the host manufacturer for compliance with the Part 15B requirements.

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.

FCC Warning

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.

NOTE 1: 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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an

uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

IC WARNING

This device contains licence-exempt transmitter(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is

subject to the following two conditions:

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

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Radiation Exposure Statement:

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures. Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionnement en association avec une autre antenne ou transmetteur.

This equipment complies with IC RSS-102 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.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre

corps.

This module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products. Additional testing and certification may be necessary when multiple modules are used.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

The final end product must be labeled in a visible area with the following " Contains IC: 25062-BL3420P".