

# BL3390-I

Wi-Fi Module

Product

Version: 1.1

Release date: September 04, 2019

## Features

- 600MHz MIPS 24Kc MCU
- 64K I-Cache, 32K D-Cache
- 64MB DDR2
- 32MB FLASH
- Working voltage: DC 3.3V
- Wi-Fi related features
  - Support 802.11 b/g/n with 20M and 40M bandwidth
  - Support WEP/WPA2
  - Integrated balun/PA/LNA
- Peripheral:
  - 3x UART
  - 1x I2C
  - 1x SPI
  - 4x PWM
  - 1x USB
  - 3x Ethernet
  - Up to 19GPIOs
- Working temperature: 0°C to +70°C
- Stamp style SMD for surface mounting production

## Applications

- Intelligent Gateway

## Model

Model	Antenna type	Note
BL3390-I	External antenna	Default

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## 1. Overview

BL3390-I is a cost-effective gateway WiFi module launched by hangzhou Broadlink. It is highly integrated with MIPS 24Kc MCU, with the highest main frequency up to 600MHz, built-in with 64MB DDR2, configured with 32MB Flash and 3.3v single power supply.

The module integrates radio transceiver, MAC, baseband, all Wi-Fi protocols, configurations and network stack. It can be widely used in applications like smart home devices, remote monitoring devices and medical care instruments.

## 2. Basic Specifications

### 2.1 Power Consumption

Please refer to Table 1 for power consumption data.

Table 1 BL3390-I Power Consumption Data

Specifications	Min.	Typ.	Max.	Units
VDD	3.0	3.3	3.6	V
VIL(input low voltage)			0.8	V
VIH(input high voltage)	2			V
VOL(output low voltage)			0.4	V
VOH(output high voltage)	2.4			V
Working (avg)		340	360	mA
Working (beacon)			820	mA

## 2.2 Working Environment

Please refer to Table 2 for working environment data.

Table 2 BL3390-I Working Environment Data

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	°C
TA	Ambient operating temperature	0	70	°C
Vdd	Supply voltage	3.0	3.6	V

## 3. Radio Specifications

### 3.1 Basic Radio Specification

Please refer to Table 3 for radio specification.

Table 3 BL3390-I Radio Specification

Radio range	2.412 GHz - 2.472 GHz
Wireless standards	IEEE 802.11 b/g/n
Radio output (conductive)	802.11b: $17.5 \pm 1.5$ dBm@11Mbps
	802.11g: $14 \pm 1.5$ dBm@54Mbps
	802.11n: $12.5 \pm 1.5$ dBm@MCS7/HT20
	802.11n: $12.5 \pm 1.5$ dBm@MCS7/HT40
Antenna type	Internal: Not supported
	External: supported
Receiving sensitivity	802.11b $\leq -86$ dBm@11Mbps
	802.11g $\leq -73$ dBm@54Mbps
	802.11n/HT20 $\leq -69$ dBm@MCS7
	802.11n/HT40 $\leq -67$ dBm@MCS7
Stack	IPv4, TCP/UDP/FTP/HTTP/HTTPS/TLS/mDNS
Data rate (max)	11M@802.11b, 54M@802.11g, MCS7@802.11n
Security	Encryption standard: Open/WEP-Open/WPA/WPA2
	Encryption algorithm: WEP64/WEP128/TKIP/AES
Network types	STA/AP/STA+AP/WIFI Direct

## 3.2 Radio Performance

### 3.2.1 IEEE802.11b

Table 4 Basic specifications under IEEE802.11b

ITEM	Specification
Modulation Type	DSSS / CCK
Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	1, 2, 5.5, 11Mbps

Table 5 Transmitting performance under IEEE802.11b

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@11Mbps</b>	<b>16</b>		<b>19</b>	dBm
<b>Frequency Error</b>	<b>-15</b>		<b>+15</b>	ppm
<b>EVM@11Mbps</b>			<b>-20</b>	dB
<b>Transmit spectrum mask</b>				
<b>Pass</b>				

Table 6 Receiving performance under IEEE802.11b

RX Characteristics	Min	Typical	Max.	Unit
<b>11Mbps Input Level Sensitivity</b>				
Minimum Input Level (FER ≤ 8%)		<b>-87</b>		dBm

### 3.2.2 IEEE802.11g

Table 7 Basic specifications under IEEE802.11g

ITEM	Specification
Modulation Type	OFDM

Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps

Table 8 Receiving performance under IEEE802.11g

TX Characteristics	Min	Typical	Max.	Unit
Power@54Mbps	12.5		15.5	dBm
Frequency Error	-15		+15	ppm
EVM@54Mbps			-27	dB
Transmit spectrum mask				
Pass				

Table 9 Receiving performance under IEEE802.11g

RX Characteristics	Min	Typical	Max.	Unit
54Mbps Input Level Sensitivity				
Minimum Input Level (FER $\leq$ 10%)		-74		dBm

### 3.2.3 IEEE802.11n

IEEE802.11n 20MHz bandwidth mode

Table 10 Basic specifications under IEEE802.11n with 20MHz

ITEM	Specification
Modulation Type	OFDM
Frequency range	2412MHz~2462MHz
Channel	CH1 to CH11
Data rate	MCS0/1/2/3/4/5/6/7

Table 11 Transmitting performance under IEEE802.11n with 20MHz

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@HT20, MCS7</b>	<b>11</b>		<b>14</b>	dBm
<b>Frequency Error</b>	<b>-15</b>		<b>+15</b>	ppm
<b>EVM@HT20, MCS7</b>			<b>-28</b>	dB
<b>Transmit spectrum mask</b>				
<b>Pass</b>				

Table 12 Receiving performance under IEEE802.11n with 20MHz

RX Characteristics	Min	Typical	Max.	Unit
<b>MCS7 Input Level Sensitivity</b>				
Minimum Input Level (FER $\leq$ 10%)		-71		dBm

IEEE802.11n 40MHz bandwidth mode

Table 13 Basic specifications under IEEE802.11n with 40MHz

ITEM	Specification
Modulation Type	OFDM
Frequency range	2412MHz~2452MHz
Channel	CH3 to CH9
Data rate	MCS0/1/2/3/4/5/6/7

Table 14 Transmitting performance under IEEE802.11n with 40MHz

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@HT40, MCS7</b>	<b>11</b>		<b>14</b>	dBm
<b>Frequency Error</b>	<b>-15</b>		<b>+15</b>	ppm
<b>EVM@HT40, MCS7</b>			<b>-29</b>	dB

Transmit spectrum mask
Pass

Table 15 Receiving performance under IEEE802.11n with 40MHz

RX Characteristics	Min	Typical	Max.	Unit
<b>MCS7 Input Level Sensitivity</b>				
Minimum Input Level (FER $\leq$ 10%)		-68		dBm

## 4. BL3390-I Hardware Information

### 4.1 PIN Sequence

Please refer to Fig 1 for the pin sequence.

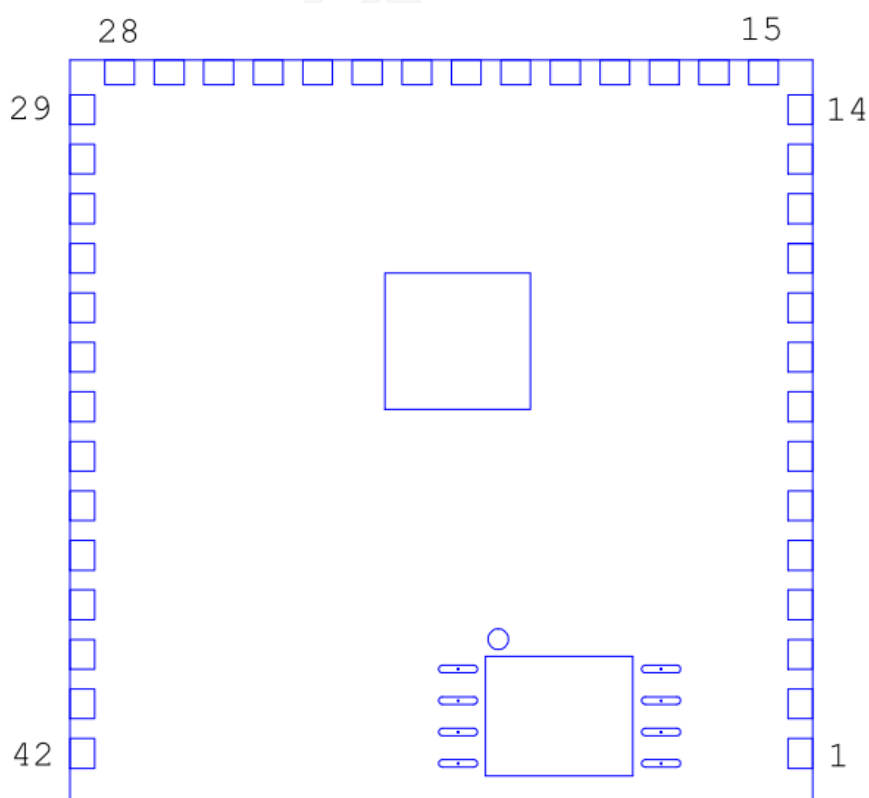


Fig 1 BL3390-I pin sequence

## 4.2 PIN Definitions

Refer to Table 17 for testing data.

Table17 BL3390-I pin definitions

PIN	Interface1	Interface2	Interface3	Interface4	Interface5	Interface6
1	GND					
2	GPIOH3	UART0_RX				
3	GPIOH4	UART0_TX				
4	GPIOH2					
5	GPIOG7		PWM1			
6	GPIOH1		PWM3			
7	GPIOE2					
8	GPIOE3					
9	GPIOE1					
10	GPIOE4					
11	GPIOC3			SPI_CS		
12	GND					
13	USBDN					
14	USBDP					
15	GND					
16	TXOP0					

17	TXON0					
18	RXIP0					
19	RXIN0					
20	TXOP1					
21	TXON1					
22	RXIP1					
23	RXIN1					
24	TXOP4					
25	TXON4					
26	RXIN4					
27	RXIP4					
28	GND					
29	VD33					
30	VD33					
31	GPIOB6		PWM0	SPI_CLK		
32	GPIOC0	U1_TX	PWM2	SPI_TX		I2C0_SCL
33	GPIOB7	U1_RX	PWM1	SPI_CS		
34	GPIOB1		PWM3	SPI_RX	I2S_SD_I	
35	GPIOC1		PWM3			I2C0_SD

						A
36	GPIOB5				I2S_SD_ O	
37	GPIOB4	U2_RX			I2S_WS	
38	GPIOB3	U2_TX			I2S_SCL K	
39	GPIOB2				I2S_MCL K	
40	GND					
41	RF					
42	GND					

Note:

1. GPIOH4, GPIOC0, GPIOB6 are Strapping Pin, so avoid using them.

GPIOH4	0: DDR2_400MHz	1:DDR2_533MHz
GPIOC0	0:Debug mode enable	1:Debug mode disable
GPIOB6	0:External reset select enable	1:External reset select disable

2. GPIOB6 and GPIOC0 can only be output, not input;

## 4.3 Mechanical Dimensions

Please refer to Fig 6 for the dimensions of module.

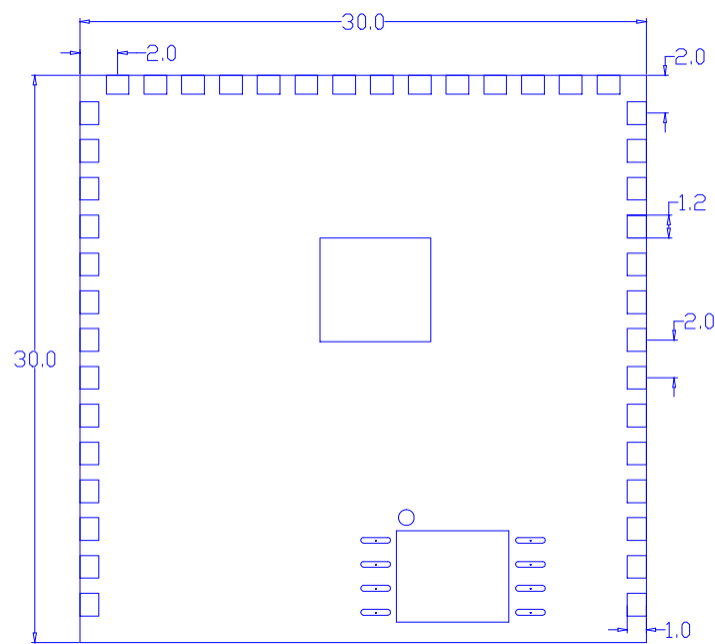


Fig 6 BL3390-I Dimensions

Note: Dimensions  $(30 \pm 0.2)$  mm \*  $(30 \pm 0.2)$  mm

#### 4.4 Recommended Pad Size

Please refer to Fig 7 for the recommended pad size

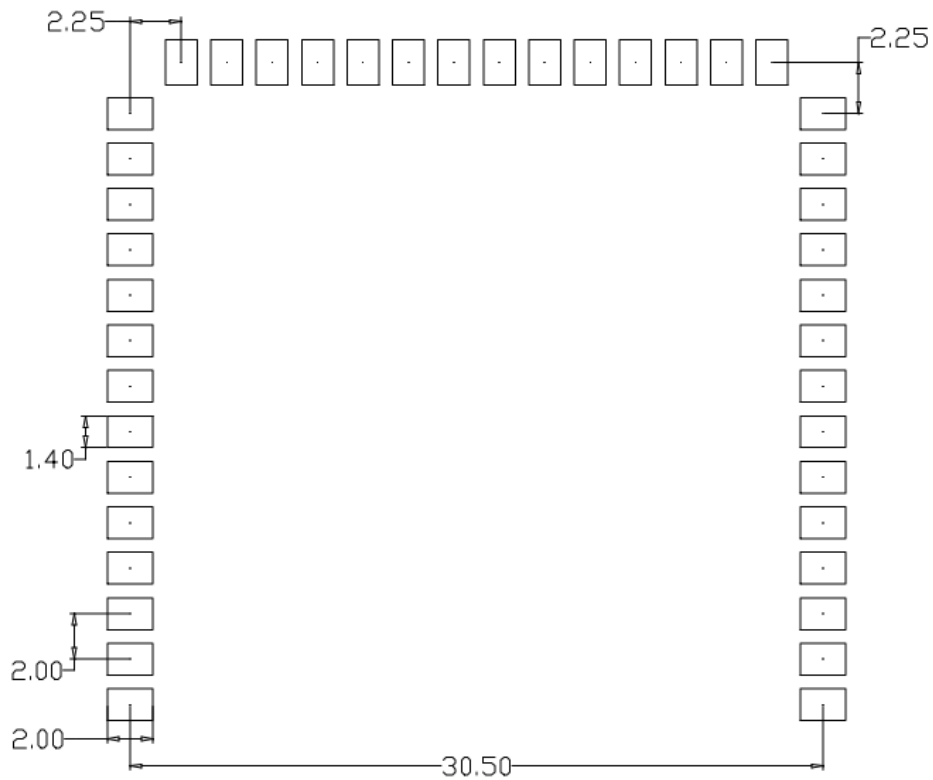


Fig 7 BL3390-I Recommended pad size

## 4.5 Power Supply Requirement

If an DCDC is used to supply the module with 3.3V power, C1 capacitor can be considered to be used with 10u-22u,

Please ensure that the power supply can provide enough current to avoid power loss when sending data to the module. The maximum input current of the module is recommended to be greater than 1A.

## 4.6. Certifications

1. Compliant and certified with SRRC standard (CMIIT ID: xxxxxxxxxx).

2. Compliant with requirement of RoHS 2.0.
3. Compliant with requirement of REACH.
4. Compliant with requirement of FCC/IC.

#### 4.7. Label

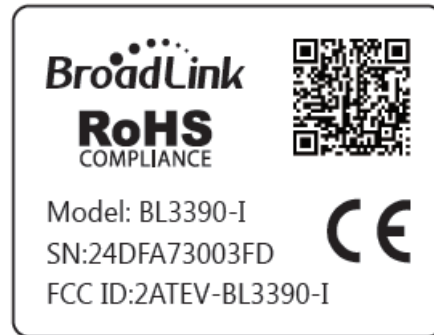


Fig 8 BL3390-I label content

Please refer to Fig 8 for the content description on label.

Model: \*\*\*\*\* : Module model

SN: 24DFA73003FD : Module unique MAC address

The QR code contains information including but not limited to:

CMIIT ID:xxxxxxxxxxxxx

FCC ID: 2ATEV-BL3390-I

IC: 25062-BL3390I

Manufacturer:

Hangzhou BroadLink Technology Co., Ltd.

Building C, 57 Jiang'er Road, Binjiang District, Hangzhou, Zhejiang, P.R.China

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: This product 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 product 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 product 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.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC & 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.

## 2.2 List of applicable FCC rules

FCC Part 15.247

## 2.6 RF exposure considerations

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

## 2.8 Label and compliance information

FCC ID label on the final system must be labeled with "Contains FCC ID: 2ATEV-BL3390-I" or "Contains transmitter module FCC ID: 2ATEV-BL3390-I".

## 2.9 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.

## 2.10 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 1:** This module is certified that it complies with RF exposure requirements under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

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

**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:** Additional testing and certification may be necessary when multiple modules are used.

**Note 4:** 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.

This product must be professionally installed to ensure that no antenna other than that furnished by the responsible party shall be used with the device

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.

The host product shall be properly labelled to identify the modules within the host product. The ISED certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the ISED certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:

Contains IC: 25062-BL3390I

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

*Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

This equipment complies with FCC/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.

ce matériel est conforme aux limites de dose d'exposition aux rayonnements, FCC / CNR-102 énoncée dans un autre environnement. cette équipement devrait être installé et exploité avec distance minimale de 20 entre le radiateur et votre corps.

*This radio transmitter [IC: 25062-BL3390I] has been approved by Innovation, Science and Economic Development Canada 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.*

No.	Antenna Type	Gain	Impedance
1	External uniqueness Antenna	3.0dBi	50ohm

## Revision History

Date	Version	Updated Content
12/10/2018	1.0	Preliminary version
9/4/2019	1.1	Increase current and RF parameters

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For more information of BroadLink Wi-Fi modules, please visit our website:

[www.broadlink.com.cn](http://www.broadlink.com.cn)

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