

# BW682TY

iBeeLink Everywhere

## IoT-WiFi Module Spec Sheet

FCC ID: 2ATCG-BW682TY



Version	Time	Author
V1.0	2018-12-12	Bruce.lee
V1.1	2018-12-17	Bruce.lee
V1.2	2019-01-30	Bruce.lee
V1.3	2019-3-27	Bruce.lee

## 1.1 Product Introduction

BW682TY is iBeeLink Company's introduction of a highly integrated ARM Cortex-M4F Processor, 384KB SRAM, 1MB Flash Module. It can be widely used in the fields of intelligent household equipment, remote monitoring equipment, medical equipment and the like.

## 1.2 Main Features

- Support 192MHz ARM Cortex M4 MCU with FPU.
- Built-in 384KB SRAM/1MB (8Mbit) FLASH
- Support AES, DES, MD5, SHA1
- Support RTC Mode and XIP Mode
- Working Voltage: DC 3.3V
- Wi-Fi Features:
  1. Support 802.11b/g/n (2.4Ghz, 1X1) standard, 20M、40M Bandwidth
  2. Support Station and Soft AP Mode
  3. Support APK, Wechat Official Account, Web browser and so on Configure Network
  4. Support WEP/WPA2/WPS Security
  5. Support Dynamic Switch STA to Soft AP Mode
  6. Integration Balun/PA/LNA
  7. Support Multi Cloud Connect
- Peripheral Interface:
  1. UARTX3(3Mbps)
  2. PWMX5
  3. SDIO 2.0 Masterx1, 2.0 SlaveX1
  4. I2S X 2(Master or Slave) TX/RX with 16/24/48/96/192 kHz, 11.025kHz, 22.05kHz, 44.1kHz frequencies
  5. I2C X 1
  6. SPI X2(MasterX1, Slave X1)
  7. 1 Channel 12bit ADC
  8. Up to 12 GPIOs
- Support FreeRtos OS
- Support Secure Boot
- Comply with FCC rules part 15 subpart C

### 1.3 Electrical Parameters

#### 1.3.1 Power Performance

Operation Mode		Test Conditions	Current Consumptions <sup>(1)</sup>	Unit
Power Mode	Scenario			
OFF	OFF	<ul style="list-style-type: none"> <li>CHIP_EN keeps low</li> </ul>	< 0.5	μA
RETENTION	RETENTION	<ul style="list-style-type: none"> <li>RTC timer</li> <li>0KB SRAM data retention</li> </ul>	2.7	μA
		<ul style="list-style-type: none"> <li>RTC timer</li> <li>8KB SRAM data retention</li> </ul>	4.7	μA
SLEEP	SLEEP_ext_32Khz	<ul style="list-style-type: none"> <li>Cortex-M4 in sleep state</li> <li>TCM 96KB SRAM is retained</li> <li>SYSRAM 384KB SRAM is retained</li> <li>XTAL 32kHz</li> </ul>	110	μA
	SLEEP_int_32Khz	<ul style="list-style-type: none"> <li>Cortex-M4 in sleep state</li> <li>TCM 96KB SRAM is retained</li> <li>SYSRAM 384KB SRAM is retained</li> <li>Internal 32kHz</li> </ul>	380	μA
ACTIVE	Wi-Fi TX	<ul style="list-style-type: none"> <li>CCK 19dBm</li> <li>N9 in idle state</li> <li>Cortex-M4 in active state</li> <li>TCM 96KB SRAM is retained</li> <li>XTAL 32kHz</li> </ul>	248	mA
		<ul style="list-style-type: none"> <li>OFDM 16.5dBm</li> <li>N9 in idle state</li> <li>Cortex-M4 in active state</li> <li>TCM 96KB SRAM is retained</li> <li>XTAL 32kHz</li> </ul>	220	mA
	Wi-Fi RX	<ul style="list-style-type: none"> <li>HT20_MCS7</li> <li>N9 in active state</li> <li>Cortex-M4 in active state</li> <li>XTAL 32kHz</li> </ul>	42	mA
		<ul style="list-style-type: none"> <li>HT20_MCS7</li> <li>N9 in idle state</li> <li>Cortex-M4 in sleep state</li> <li>XTAL 32kHz</li> </ul>	30	mA
ACTIVE & SLEEP	DTIM = 1	<ul style="list-style-type: none"> <li>Cortex-M4 in sleep state</li> <li>TCM 96KB SRAM is retained</li> </ul>	620	μA

Remark: If Set Then DTIM=10, Low Power may be less than 500uA.

#### 1.3.2 Work Environment

1. Suggest Operating Conditions: -20 to 80° C,
2. WiFi During Normal Work Peak Current Dot less than 400mA.

## 1.4 RF Performance

### 1.4.1 Transmitter and Receiver Performance

Modulation	RATED MIN. POWER(dBm)	RATED MAX. POWER (dBm)
802.11 B	15	18
802.11 G	13	16
802.11 N/HT20	12	15
802.11 N/HT40	11	14

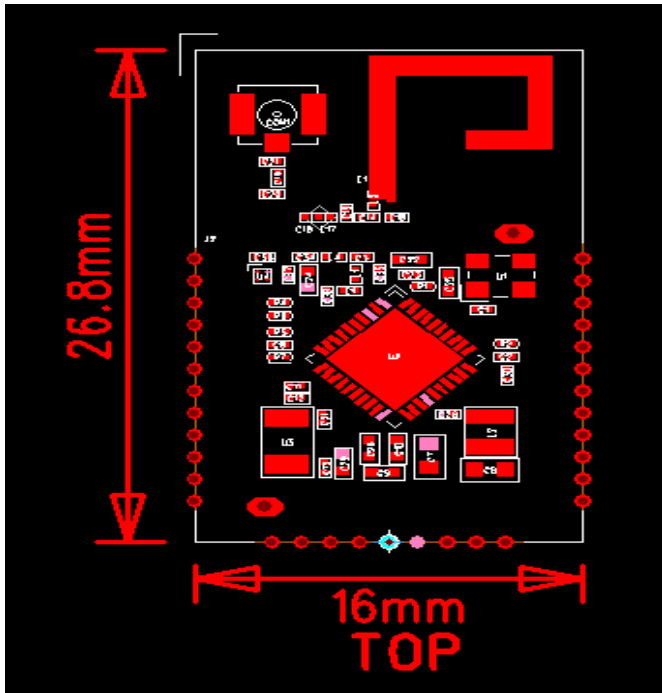
Receiver sensitivity:

802.11b 2.4GHz Band		Criterion Limit Unit: dBm		Receiver Sensitivity Test Channel		
Mode / Rate	Min.	Max.	CH10		P / F	
CCK 1M		-80	-97.5		Pass	
CCK 2M		-80	-94.5		Pass	
CCK 5.5M		-76	-92.5		Pass	
CCK 11M		-76	-89.5		Pass	
802.11g 2.4GHz Band		Criterion Limit Unit: dBm		Receiver Sensitivity Test Channel		
Mode / Rate	Min.	Max.	CH10		P / F	
OFDM-6M		-82	-94.5		Pass	
OFDM-9M		-81	-92.5		Pass	
OFDM-12M		-79	-91.5		Pass	
OFDM-18M		-77	-89		Pass	
OFDM-24M		-74	-86		Pass	
OFDM-36M		-70	-82.5		Pass	
OFDM-48M		-66	-78.5		Pass	
OFDM-54M		-65	-77		Pass	

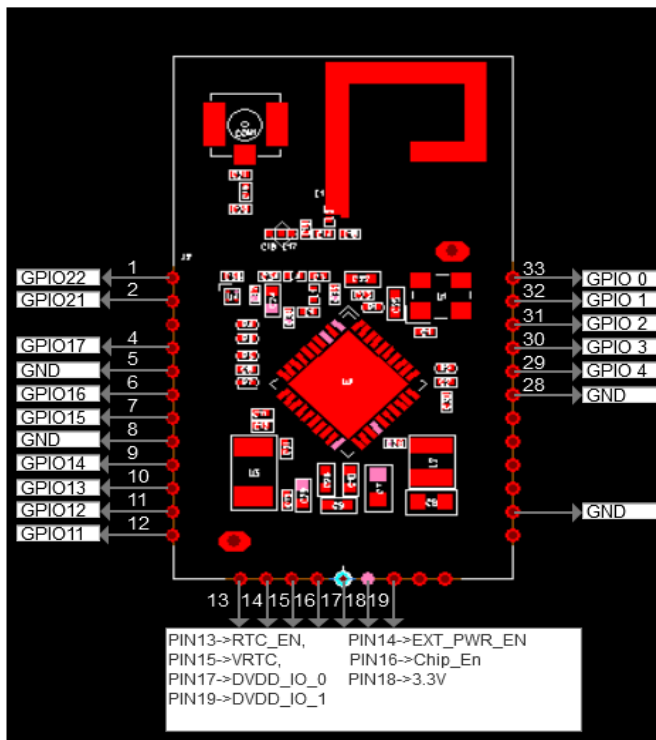
802.11n 2.4GHz Band	Criterion Limit Unit: dBm		Receiver Sensitivity Test Channel	
	Min.	Max.		
Mode / Rate			CH10	P / F
HT20-MCS0		-82	-94	Pass
HT20-MCS1		-79	-90.5	Pass
HT20-MCS2		-77	-88	Pass
HT20-MCS3		-74	-85.5	Pass
HT20-MCS4		-70	-81.5	Pass
HT20-MCS5		-66	-77.5	Pass
HT20-MCS6		-65	-76	Pass
HT20-MCS7		-64	-74.5	Pass
802.11n 2.4GHz Band	Criterion Limit Unit: dBm		Receiver Sensitivity Test Channel	
Mode / Rate	Min.	Max.	CH10	P / F
HT40-MCS0		-79	-90.5	Pass
HT40-MCS1		-76	-87.5	Pass
HT40-MCS2		-74	-85	Pass
HT40-MCS3		-71	-82	Pass
HT40-MCS4		-67	-78.5	Pass
HT40-MCS5		-63	-74.5	Pass
HT40-MCS6		-62	-73	Pass
HT40-MCS7		-61	-71.5	Pass

1.5 Physical Properties Description

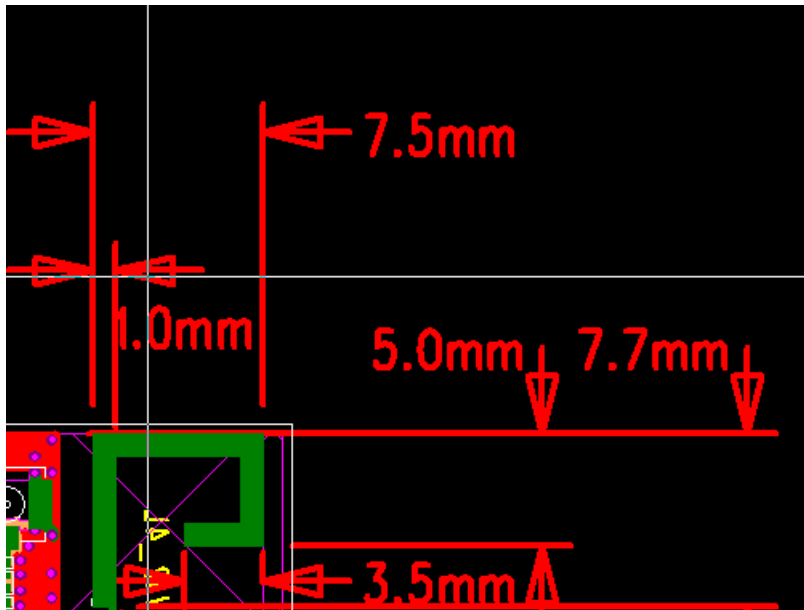
1.5.1 Module Appearance



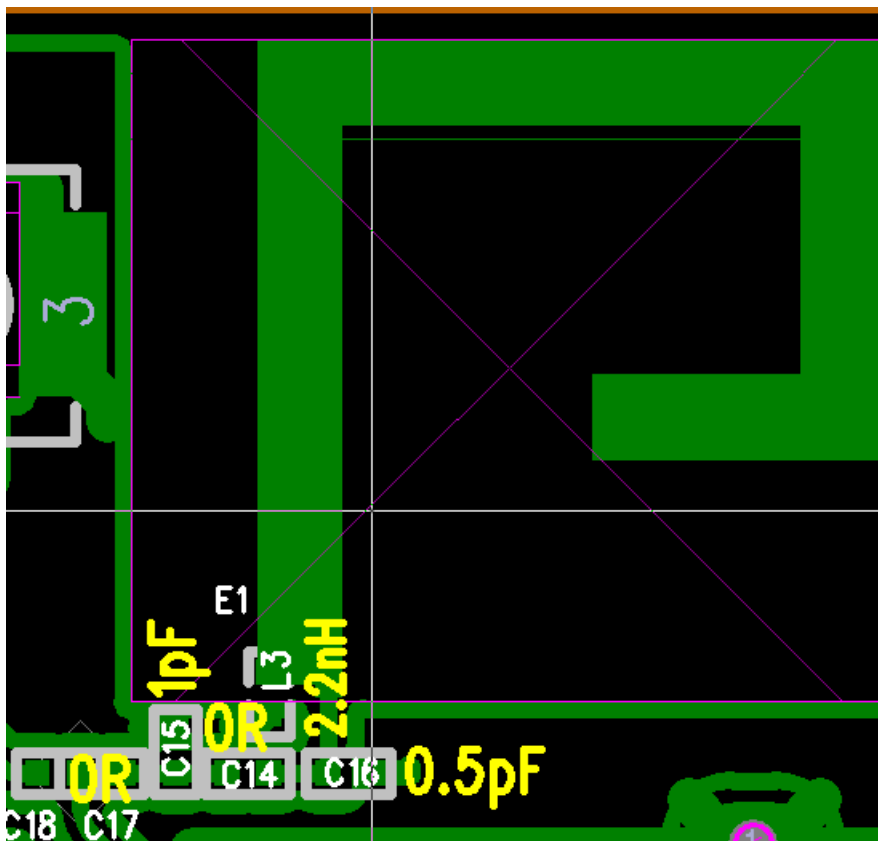
PIN Name Define :



PCB Antenna



Antenna matching parameters see bellow device C17, C15, C14, L3, C16

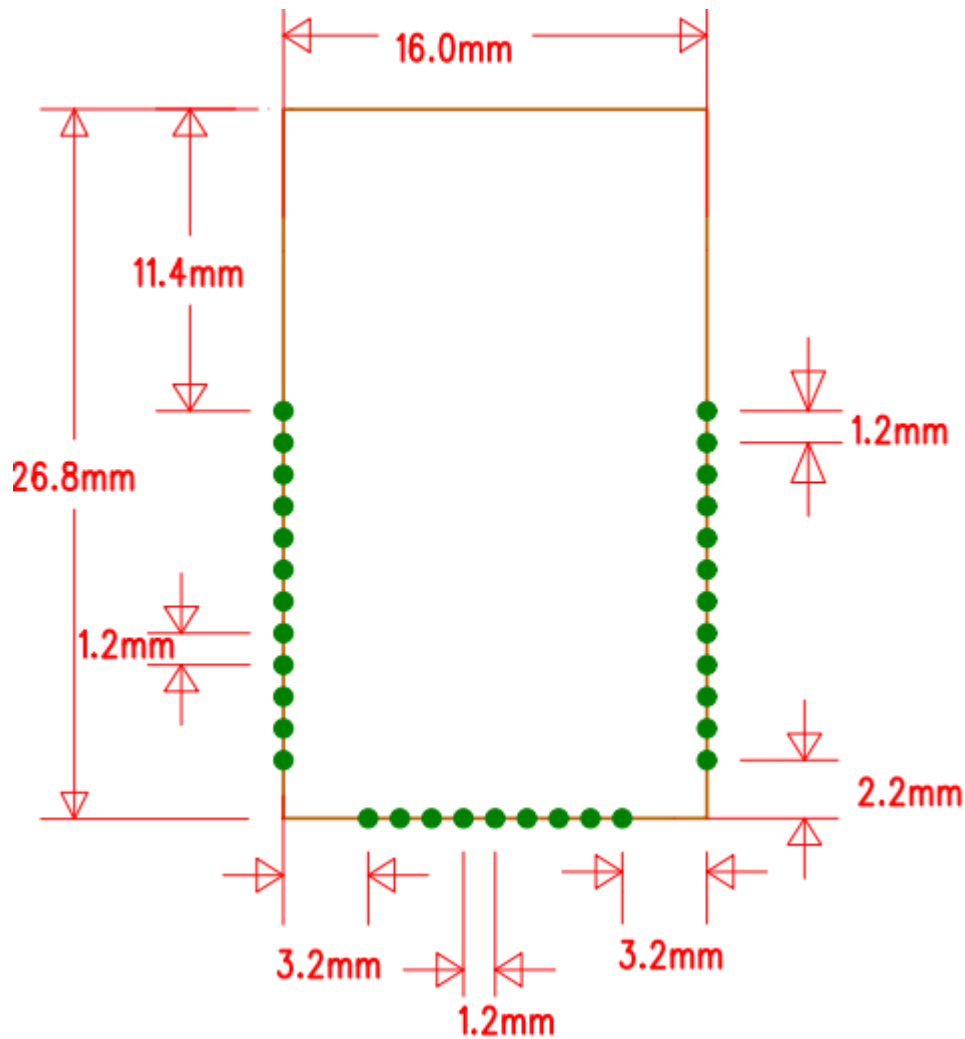


Note 1: This module contains only the PCB antenna described above, max. gain is 1dBi.

Note 2: Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.



### 1.5.2 Module Size Specifications



### PIN Function Description

Ball Name	Aux Func.0	Aux Func.1	Aux Func.2	Aux Func.3	Aux Func.4	Aux Func.5	Aux Func.6	Aux Func.7	Aux Func.8	Aux Func.9	Aux Func.10
GPIO_0	GPIO0	EINT0		U1RT5	SCL1	I2S_RX	JTDI		WIFI_ANT_5 ELO	BT_PRI1	PWM0
GPIO_1	GPIO1	EINT1		U1CT5	SDA1	I2S_TX	JTMS		WIFI_ANT_5 EL1	BT_PRI3	PWM1
GPIO_2	GPIO2	EINT2		URXD1	PWM0	I2S_W5	JTCK	CLK00		BT_PRI0	WIFI_ANT_5 EL4
GPIO_3	GPIO3	EINT3		UTXD1	PWM1	I2S_CK	JTRST_B			WIFI_ANT_5 EL2	I2S_CK
GPIO_4	GPIO4	SPISLV_A_S1 O2	SPIMST_A_S1 O2	EINT4		I2S_MCLK	JTDO			WIFI_ANT_5 EL3	I2S_MCLK
GPIO_11	GPIO11	EINT11	PWM3	URXD2	MA_MCO_CK	SLV_MCO_CK	CLK02			WIFI_ANT_5 ELO	I2S_RX
GPIO_12	GPIO12	SPISLV_B_S1 O3	SPIMST_B_S1 O3	UTXD2	MA_MCO_C MD	SLV_MCO_C MD	EINT12			WIFI_ANT_5 EL1	I2S_TX
GPIO_13	GPIO13	SPISLV_B_S1 O2	SPIMST_B_S1 O2	U2RT5	MA_MCO_D A0	SLV_MCO_D A0	CLK04		EINT13		I2S_W5
GPIO_14	GPIO14	SPISLV_B_S1 O1	SPIMST_B_S1 O1	TDM_RX	MA_MCO_D A1	SLV_MCO_D A1	PWM4		EINT14		CLK04
GPIO_15	GPIO15	SPISLV_B_S1 O0	SPIMST_B_S1 O0	TDM_TX	MA_MCO_D A2	SLV_MCO_D A2	SCL1		EINT15		PWM3
GPIO_16	GPIO16	SPISLV_B_SC K	SPIMST_B_SC K	TDM_W5	MA_MCO_D A3	SLV_MCO_D A3	SDA1		EINT16		
GPIO_17	GPIO17	SPISLV_B_CS	SPIMST_B_CS	TDM_CK		PWM5	CLK03	AUXADC0	EINT17		BT_PRI0
GPIO_21	GPIO21	URXD0	EINT19	SCL1		PWM5					
GPIO_22	GPIO22	UTXD0	EINT20								

Remarks:

All GPIO Function Can be Configuration by software in SDK.

### 1.5.4 Application attention

#### 1. Power –On Sequence

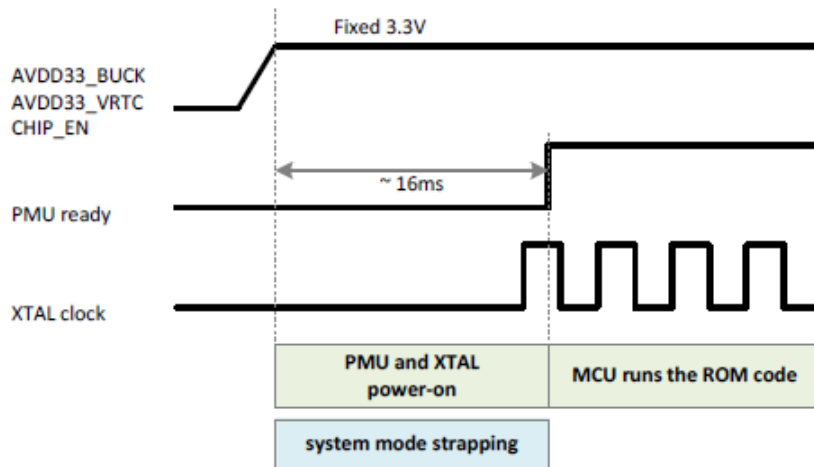


Figure 4.5-1. Power-on sequence

#### 2. Some GPIO Pin During Power-Up By HW to Configuration

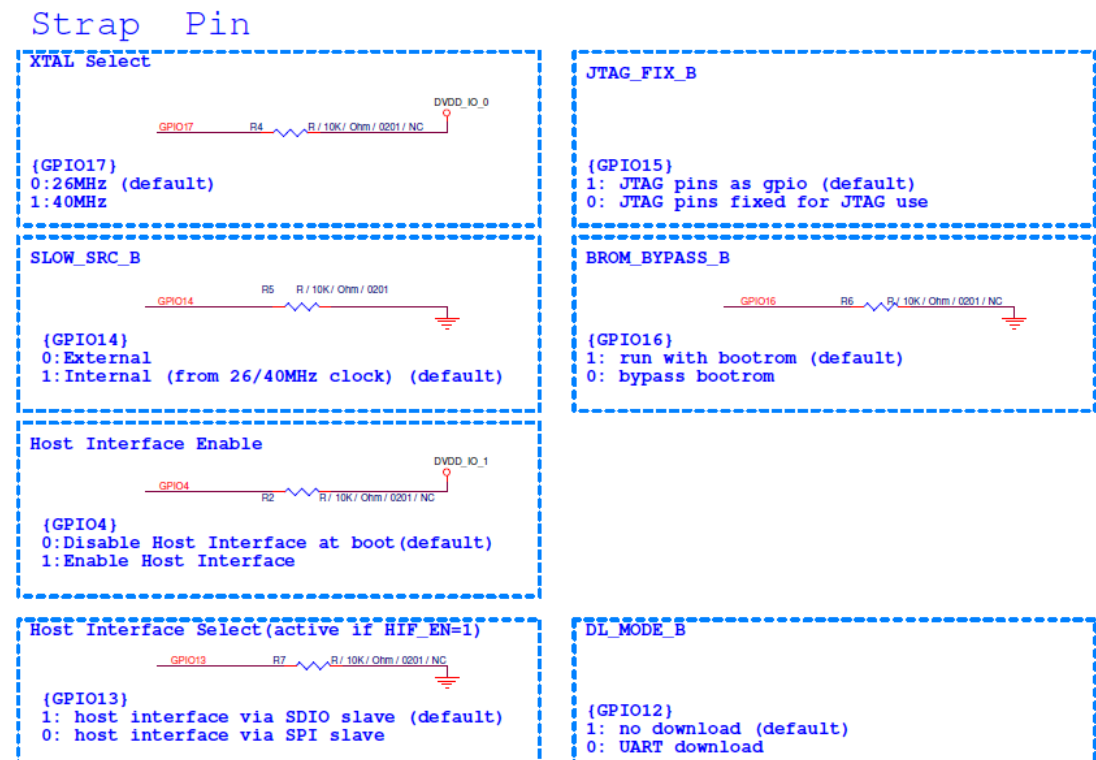
Mode Selection	Pin name	Description	Trapping condition
XO source frequency select	GPIO_17	GND : XO input is 26MHz (default) DVDD_IO_0 : XO input is 40MHz	Core reset
32kHz clock source select	GPIO_14	GND : 32kHz source is from external DVDD_IO_0 : 32kHz source is from internal (divided from 26/40MHz clock) (default)	Core reset
Boot with host interface (HIF_EN)	GPIO_4	GND : Boot with host interface disabled (default) DVDD_IO_1 : Boot with host interface enabled	Core reset
Host interface select (active if HIF_EN is enabled)	GPIO_13	(Active if HIF_EN = 1) GND : Host interface via SPI slave DVDD_IO_0 : Host interface via SDIO slave (default)	Core reset
Boot ROM bypass select	GPIO_16	GND : Boot up bypass boot ROM (directly jump to flash) DVDD_IO_0 : Boot up with boot ROM (default)	Core reset
JTAG pins fixed for use	GPIO_15	GND : JTAG pins fixed for JTAG use DVDD_IO_0 : JTAG pins as GPIO (configurable after boot up) (default)	Core reset
UART download	GPIO_12	GND : Enter UART download mode in Boot ROM DVDD_IO_0 : Skip UART download in Boot ROM (default)	Core reset or watchdog reset

Note 1: Strapping resistors for default option are implemented as internal pull-down or internal pull-up. (Refer to DRPU\* and DRPD\* in Table 6.2-5 for internal pull-up and pull-down resistor value.)

Note 2: If non-default option is used, it is recommended to use pull-down or pull-up 10kΩ as external strapping resistors.

Note 3: SDIO master and slave interfaces are limited to 1-bit mode if the 32kHz source is from external.

The reference circuit is as follows:



## FCC Statements

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.

## FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or

operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

“Contains Transmitter Module FCC ID: 2ATCG-BW682TY Or  
Contains FCC ID: 2ATCG-BW682TY”

When the module is installed inside another device, the user manual of this device must contain below warning statements:

1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The end user manual shall include all required regulatory information/warning as shown in this manual, include:

This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

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