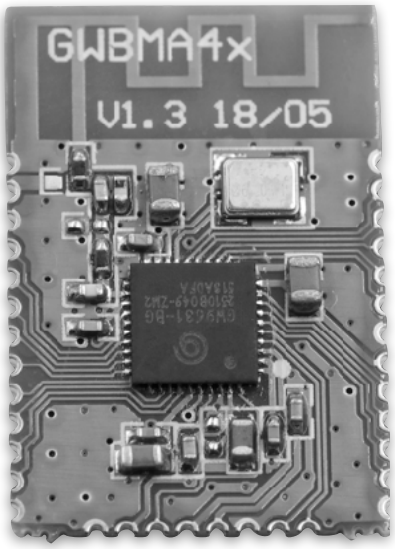
GWBMA3x,GWBMA4x Bluetooth Audio module

Data sheet version 1.2



Introduction

GWBMA3X and GWBMA4x are next generation Bluetooth audio module, providing higher performance for Bluetooth audio. They accept various audio source beside Bluetooth, such as USB, FM radio, allowing them to be adopted into different audio applications, such as sound bar, Bluetooth speaker.

GWBMA3x and GWBMA4x embed with comprehensive firmware, user needs not to spend any engineering effort on audio encode/decoding and RF connection. Firmware customisation is also possible for building application specific feature.

GWBMA4x use same core as GWBMA3x, but providing smaller form factor and higher cost effective, helping customer achieve mission of cost control for mass production.

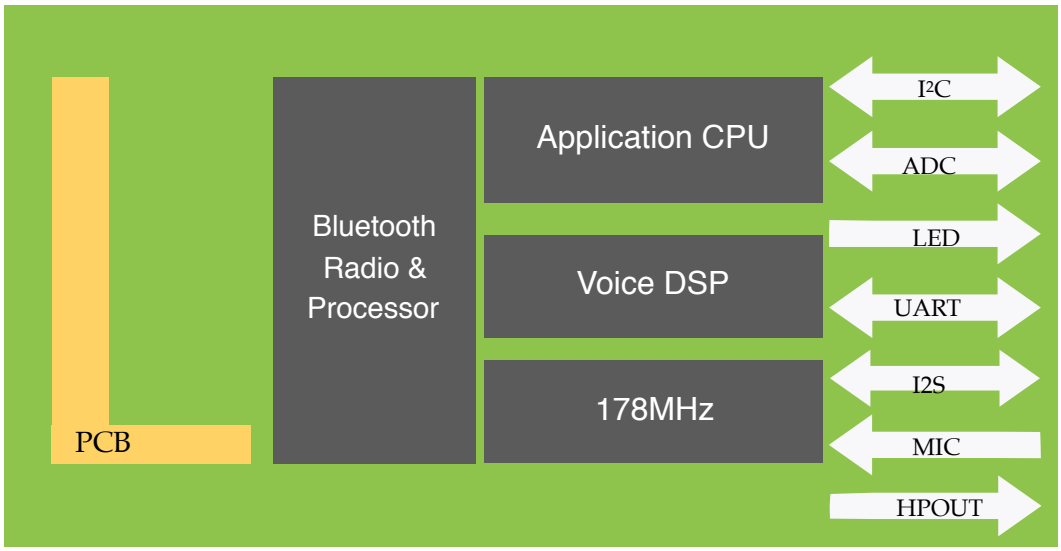
Applications

- Bluetooth speaker
- Bluetooth Sound-bar with wireless subwoofer
- True wireless stereo Bluetooth speaker
- Bluetooth Audio dongle
- Wireless TV headphone
- Wireless gaming headphone

Features

- 178MHz (max) RISC and Voice Co-Processor DSP core chip
- Bluetooth v4.2 specification compliant and support BR/EDR
- -93dBm RF sensitivity
- Support A2DP 1.2, HFP 1.5 and AVRCP 1.6.1
- Dual microphone input
- Multiple interfaces: UART, I2C, USB
- Dual microphone input (multiplex)
- Output: I2S, differential analog output
- On board 24 bit stereo DAC and 24 bit dual channel ADC
- Max sampling rate 96KHz
- Support MP3, SBC, WMA, ACC decoding
- Optional apex socket for external antenna (GWBMA30 only)
- Li-ion battery charging
- FM radio (GWBMA40 only)
- FCC, CE, BQB certification (GWBMA30 only)

Block Diagram



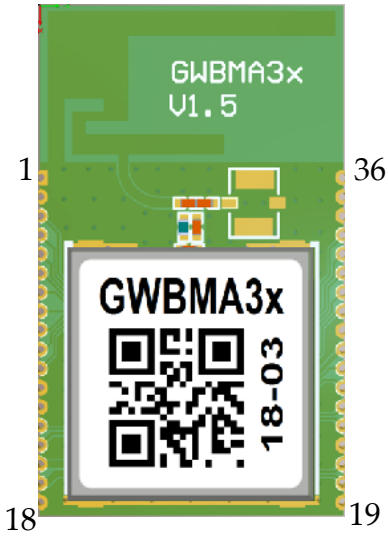
GWBMA3x/4x Block Diagram

Electrical Specification

	Description	Typical
General	Operation voltage	2.4V to 4.35V DC
	Supply current	12mA @play
	Antenna	PCB, (optional Ipex connector)
	Internal DAC	Stereo 16bit/48KHzwith 94dB S/N
	I2S interface	48KHz, 16bit Stereo
	Digital I/O	UART, USB, SPI, I2C, GPIO, PWM
	Dimension	19 x 32 x 1 mm
	Operation temperature	-20 ~ +65°C
Bluetooth RF	Bluetooth version	Bluetooth v4.2 BR/EDR
	Frequency band	2.4GHz ISM (2.402 - 2.480GHz)
	Modulation Method	GFSK PI/4-DQPSK, 8 DPSK
	Max. Data Rate	3Mbps
	TX Power	4dBm max
	Rx Sensitivity	-93dBm
	RF Range (indoor)	10m
Audio	Dual Mic input	Multiplex with other interfaces
	Internal DAC output	Differential signal output, 24bit, 8, 11.025, 12, 16, 22.05, 32, 44.1 48 and 96KHz
	I2S interface	Digital output
	Source	Bluetooth, USB,
	FM radio	only on GWBMA40

Pin Assignment

GWBMA30

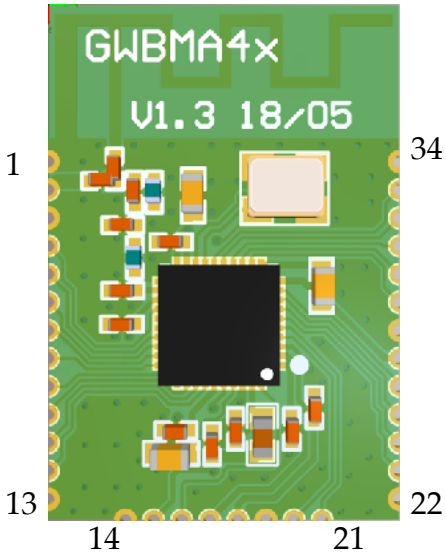


Pin	name	Type	Description
1	GND	GND	Ground
2	GND	GND	Ground
3	ADCKEY	I/O	Push buttons input
4	SCLK	I/O	I2S Bit Clock
5	MCLK	I/O	I2S Master Clock, typ 12.288MHz
6	I2SDO	I/O	I2S data output
7	LRCK	I/O	I2S Left/Right clock
8	I2SDI	I/O	I2S Data Input
9	BLED	GND	Blue LED output
10	VMEM	I/O	VDD for Flash memory, suggest to connect a 4.7u to GND if not use
11	RLED	I/O	Red LED output
12	GND	GND	Ground
13	GND	GND	Ground
14	CHG_LED	I/O	Battery charging LED output
15	VDDIO	Power	Power for digital I/O
16	VIN	Power	Input power
17	VCHG	O	Output voltage for battery charging
18	GND	GND	Ground

Pin	name	Type	Description
19	GND	GND	Ground
20	USBD-	I/O	USB Data - or UART_Rx
21	USBD+	I/O	USB Data + or UART+Tx
22	GND	GND	Ground
23	ROUT+	O	Audio codec output, right, positive
24	ROUT-	O	Audio codec output, right, negative
25	LOUT-	O	Audio codec output, left, negative
26	LOUT+	O	Audio codec output, left, positive
27	AGND	GND	Analog Ground
28	GND	GND	Ground
29	MICB+/SCL	I/O	Microphone B input +/I2C clock
30	MICB-/SDA	I/O	Microphone B input -/I2C data
31	MIC BIAS	I	Microphone bias
32	MICA-/HTX	I/O	Microphone A input - or UART Tx (for firmware programming only)
33	MICA+/HRX	I/O	Microphone A input + or UART Rx (for firmware programming only)
34	GND	GND	Ground
35	GND	I/O	Ground
36	GND	GND	Ground

GWBMA30 pin assignment table

GWBMA40



Pin	name	Type	Description
1	GND	GND	Ground
2	ADCKEY	I/O	Push buttons input
3	FMRF+	I	FM radio input +
4	FMRF-	I	FM radio input -
5	SCLK	I/O	I2S Bit Clock
6	MCLK	I/O	I2S Master Clock, typ 12.288MHz
7	I2SDO	I/O	I2S data output
8	LRCK	I/O	I2S Left/Right clock
9	I2SDI	I/O	I2S Data Input
10	BLED	GND	Blue LED output
11	VMEM	I/O	VDD for Flash memory, suggest to connect a 4.7u to GND if not use
12	RLED	I/O	Red LED output
13	GND	GND	Ground
14	GND	GND	Ground
15	VDDIO	Power	VDD for digital IO. Suggest
16	CHG_LED	I/O	Battery charging LED output
17	VIN	Power	Input power
18	VCHG	O	Output voltage for battery charging
19	GND	GND	Ground

Pin	name	Type	Description
20	USBD-	I/O	USB Data - or UART_Rx
21	USBD+	I/O	USB Data + or UART_Tx
22	GND	GND	Ground
23	ROUT+	O	Audio codec output, right, positive
24	ROUT-	O	Audio codec output, right, negative
25	LOUT-	O	Audio codec output, left, negative
26	LOUT+	O	Audio codec output, left, positive
27	AGND	GND	Analog Ground
28	GND	GND	Ground
29	MICB+/SCL	I/O	Microphone B input +/I2C clock
30	MICB-/SDA	I/O	Microphone B input -/I2C data
31	MIC BIAS	I	Microphone bias
32	MICA-/HTX	I/O	Microphone A input -/UART Tx (for firmware programming only)
33	MICA+/HRX	I/O	Microphone A input +/UART Rx (for firmware programming only)
34	GND	GND	Ground

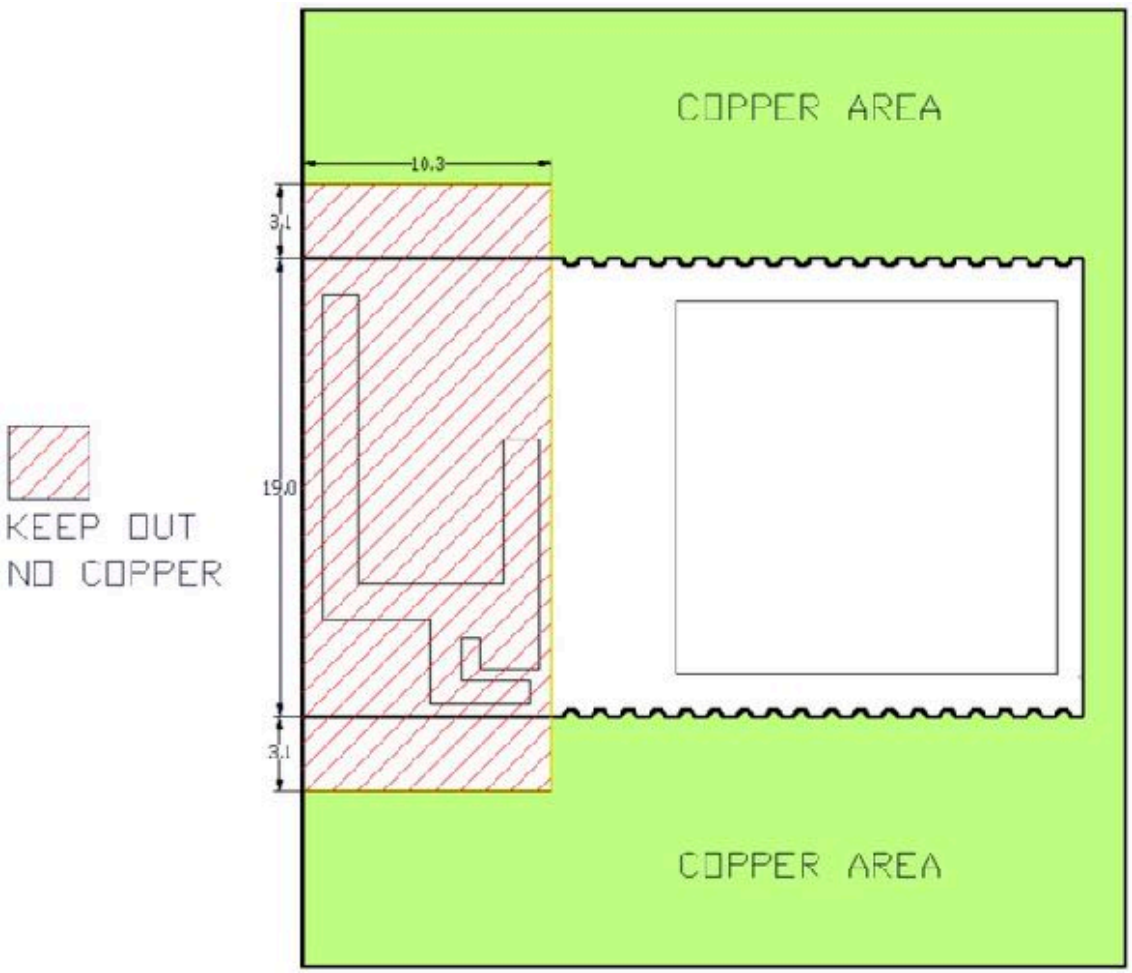
GWBMA40 pin assignment table

Mounting GWBMA3x and GWBMA4x

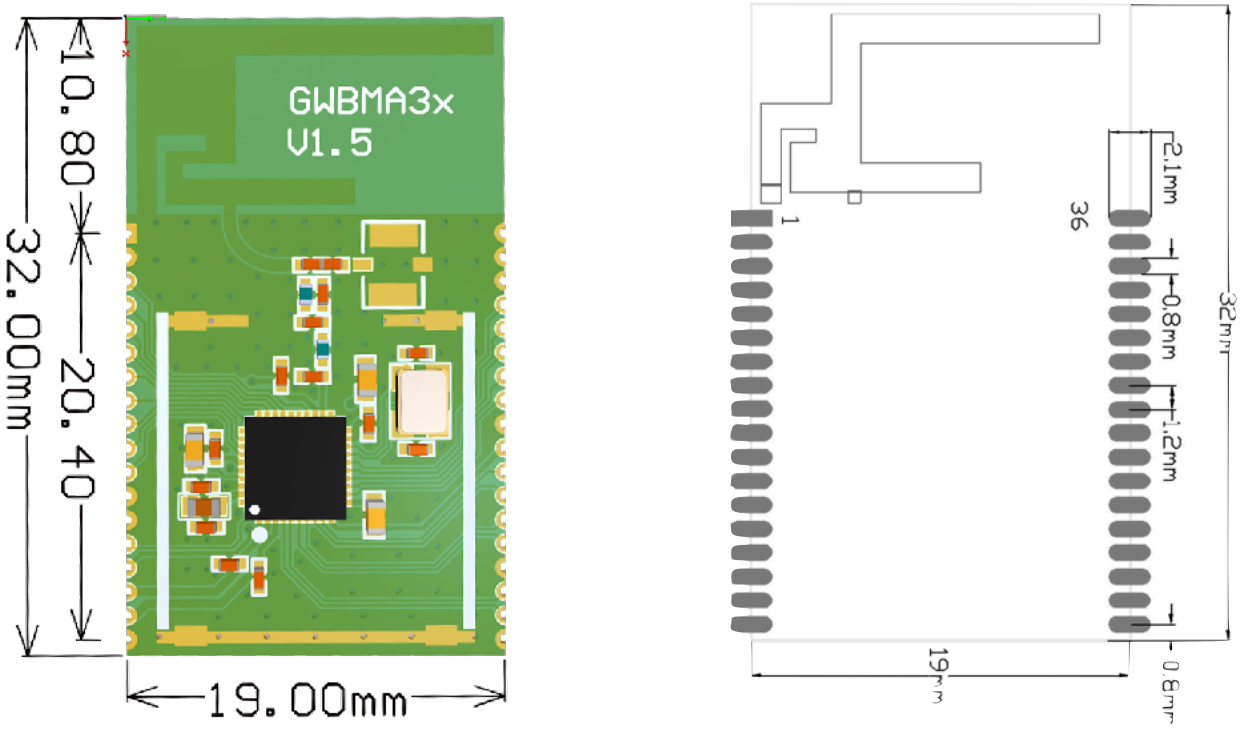
GWBMA3x/4x are RF sensitive; in order to obtain the best performance, it is recommended to mount the module(s) at corner of mother board, and with some marginal space.

Also, keep it away from metal components, such like speakers, transformers, batteries, big aluminium capacitors, heat sinks and Metal Panels.

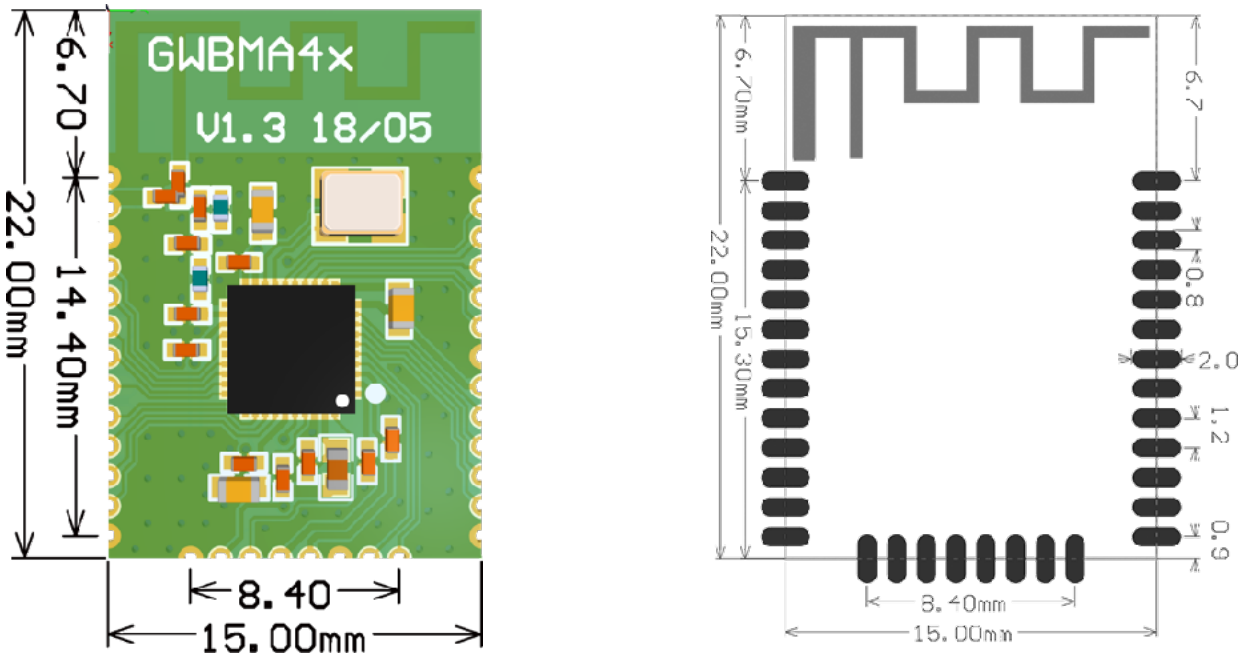
The figure below illustrates how to mount the GWBMA3x/4x module. Improper mounting will decrease the RF performance dramatically.



Dimension and layout

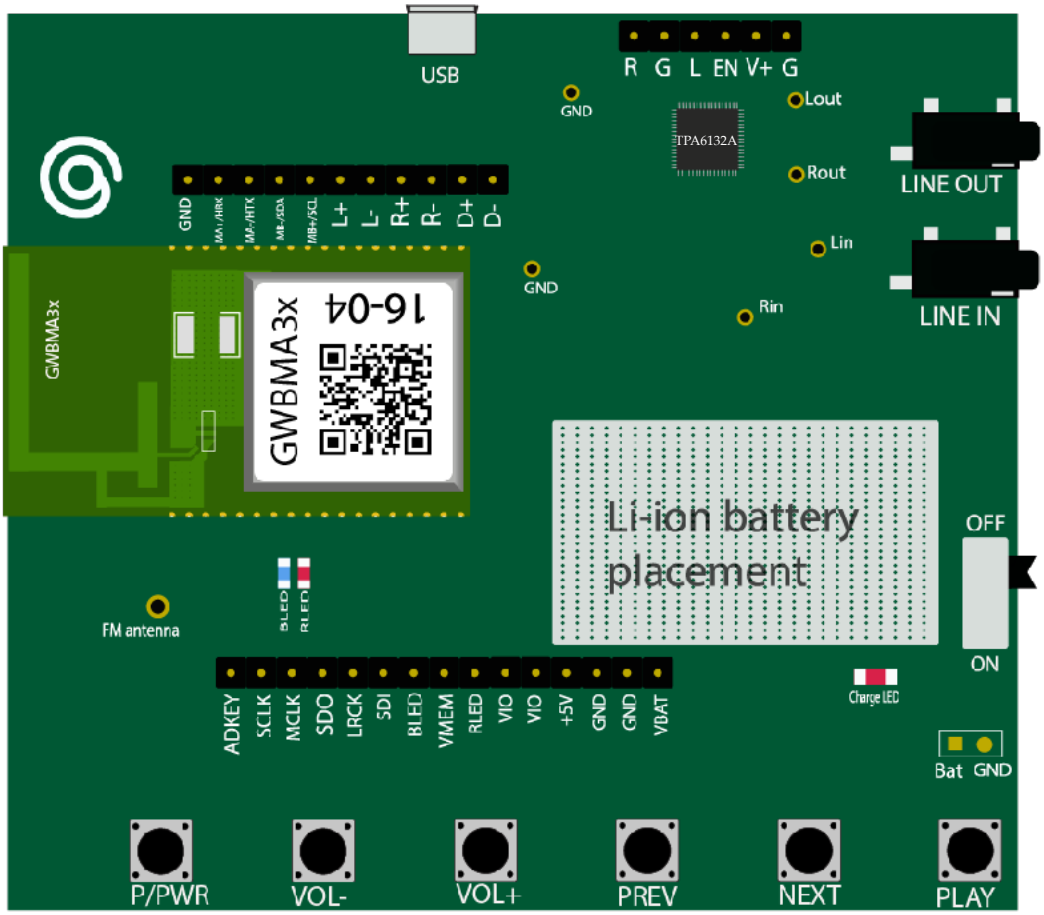


GWBMA30



GWBMA40

Evaluation board



Description

The evaluation board is compatible with both GWBMA30 and GWBMA40. It is a comprehensive board where user can simply connect it to any audio device or headphone for evaluation purpose.

It also provides various jumpers for user to connect with their own circuit for development purpose.

Besides GWBMA30/40 module, the EVK also contains a Texas Instruments TPA6132A headphone amplifier and a Li-ion battery charging circuit, which provide a comprehensive circuit for user as reference, shorten the hardware design cycle on the end product.

Function of the EVK depends on module firmware. The function description below is base on standard firmware for GWBMA30/40.

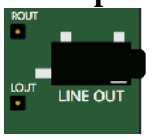
USB port

The USB port provides three major functions: 1. audio source from USB (i.e. audio file in USB memory stick), 2. Power charging source for Li-ion battery. (note: the USB port does not able to power the module and the EVK circuit alone without battery)

Control keys

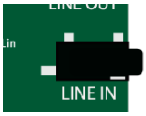
The board contains basic control keys and the functions is as following:
P/PWR : Play/Pause an audio
VOL-, VOL+ : Increase or decrease audio volume
PREV: Jump to previous track (in Bluetooth and USB mode); Search down in FM radio mode (only on GWBMA40)
NEXT: Jump to next track (in Bluetooth and USB mode); Search up in FM radio mode (only on GWBMA40)
PLAY: Switch different audio source (Bluetooth, AUX and FM radio)
note: The buttons' function are base on the current

Audio output



A 3.5mm jack audio output from TPA6132A.

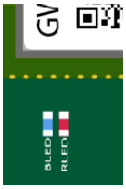
Mic input



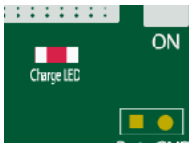
A 3.5mm jack audio input to GWBMA30/40

LED indication

There are three LEDs on the EVK to indicate different status:

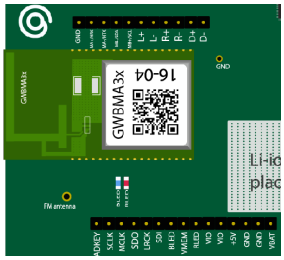


Two LEDs beside GWBMA30/40 module indicate the module status:
- Blue LED indicates Bluetooth connection status
  Blink when advertising; Solid when connected; Breathing when
- Red LED indicates power status

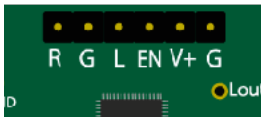


The Red LED on the right side of EVK will turn on while battery charging.

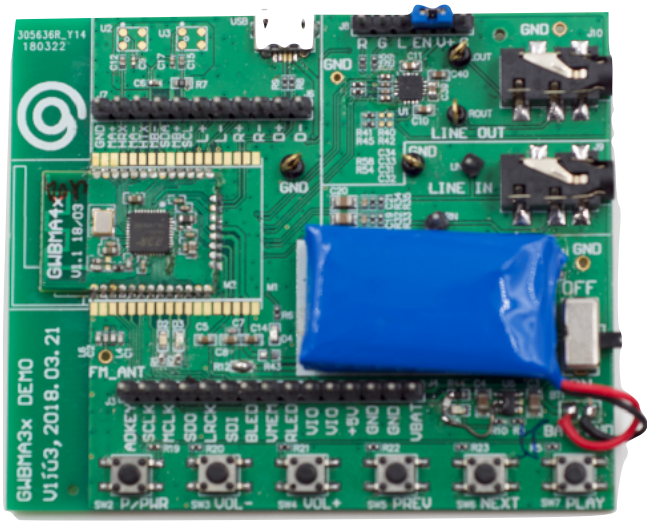
Headers



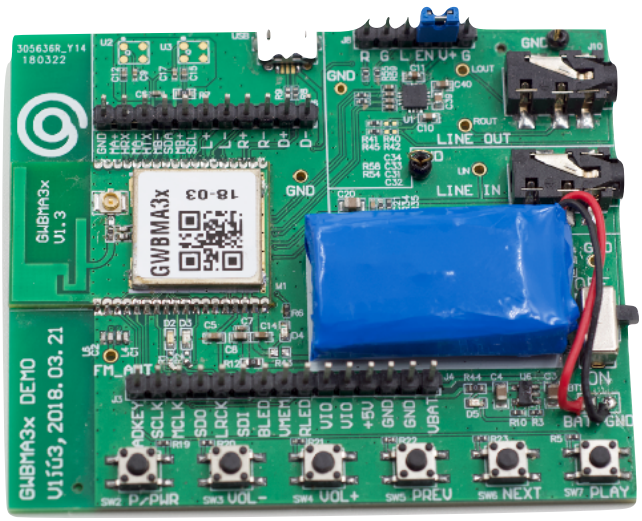
There are three rows of headers on the EVK, the headers beside the module is simply a direction connection to the module, user can connect them to external circuit for project development.



The header on near TPA6132A is reserved for future use.

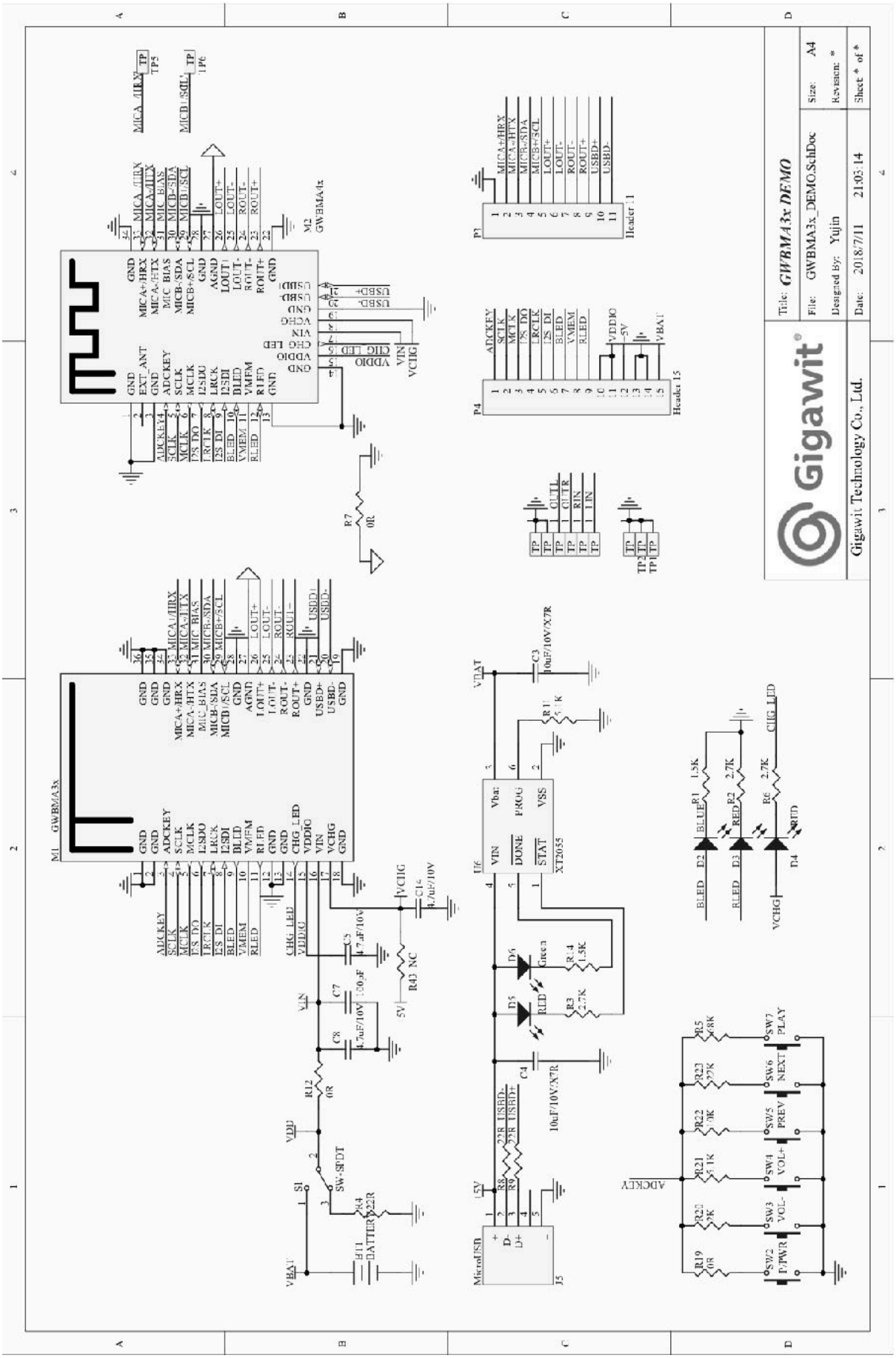


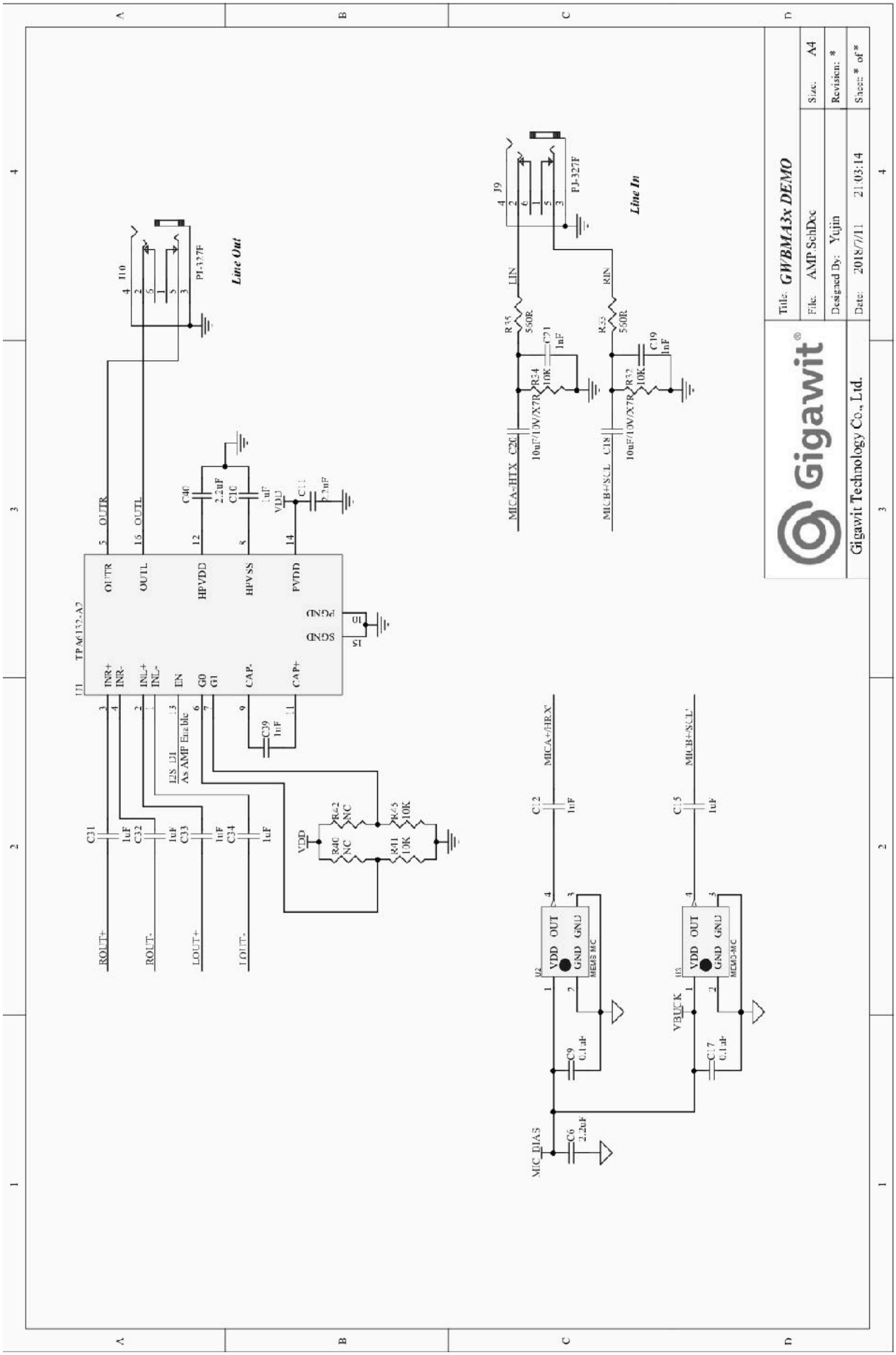
EVK with GWBMA40



EVK with GWBMA30

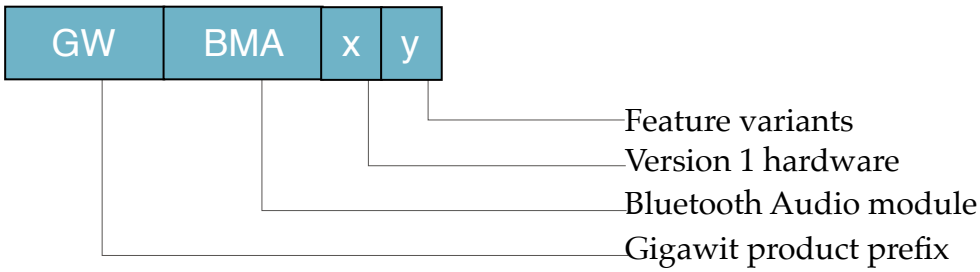
Evaluation board circuit




Line Out
Line In
TPA6132-A2
Gigawit
Gigawit Technology Co., Ltd.
Title: GWBMA3x DEMO
File: AMP.SchDoc
Designed By: Yujin
Date: 2018/7/11
Size: A4
Revision: *
Sheet * of *
ROUT+
ROUT-
LOUT+
LOUT-
MIC_BIAS
VBUCK
MICA+/HTX
MICB+/SCL
VDD
GND
OUT
MEMS MIC

Part number

GWBMA1x naming rule is as following:



All part numbers are base on same hardware with different firmware loaded. Therefore, same PCB can fit with all the part number above.

Customisation

Firmware customisation service will be provided (requires NRE). Customised firmware will be pre-programmed in the module and delivery to customer.
Almost each pin of GWBMA30/40 can be re-programmed for alternative purpose.

Appendix

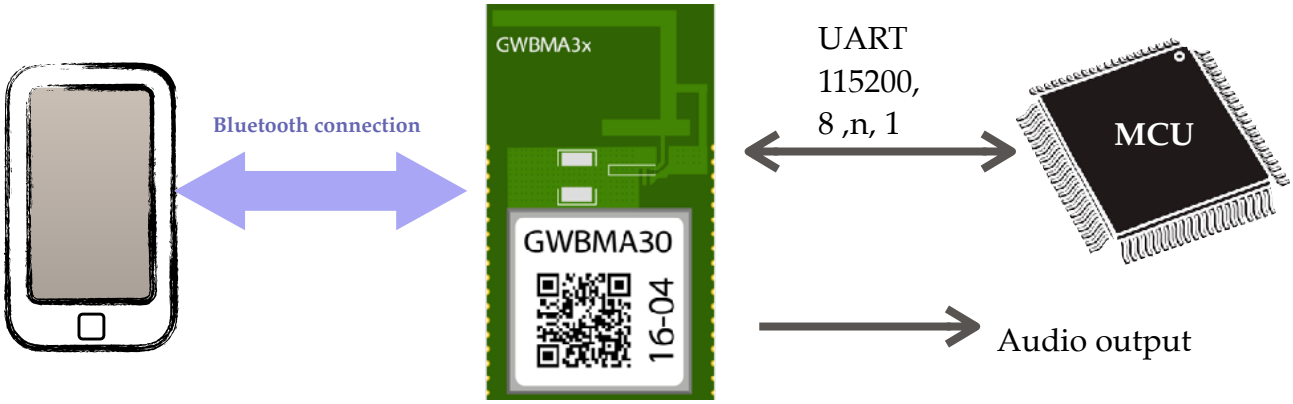
Pin assignment of different GWBMAxx modules

Pin #	GWBMA10	GWBMA30	GWBMA40
1	GND	GND	GND
2	RXD	GND	ADCKEY
3	TXD	ADCKEY	FMRF+
4	I2SDI	SCLK	FMRF-
5	I2SDO	MCLK	SCLK
6	LRCK	I2SDO	MCLK
7	SCLK	LRCK	I2SDO
8	MCLK	I2SDI	LRCK
9	GND	BLED	I2SDI
10	GPIO3.7	VMEM	BLED
11	SDDAT3	RLED	VMEM
12	GPADC	GND	RLED
13	SDDAT2	GND	GND
14	SDDAT1	CHG_LED	GND
15	SDDAT0	VDDIO	VDDIO
16	SDCLK/HRX	VIN	CHG_LED
17	SDCMD/HTX	VCHG	VIN
18	GND	GND	VCHG

Pin #	GWBMA10	GWBMA30	GWBMA40
19	GND	GND	GND
20	AVDD33	USBD-	USBD-
21	nRESET	USBD+	USBD+
22	VIN	GND	GND
23	USBDN	ROUT+	ROUT+
24	USBDP	ROUT-	ROUT-
25	SDA	LOUT-	LOUT-
26	SCL	LOUT+	LOUT+
27	RLED	AGND	AGND
28	BLED	GND	GND
29	LOUT	MICB+/SCL	MICB+/SCL
30	ROUT	MICB-/SDA	MICB-/SDA
31	MICP	MIC BIAS	MIC_BIAS
32	MICN	MICA-/HTX	MICA-/HTX
33	MICBAS	MICA+/HRX	MICA+/HRX
34	AGND	GND	GND
35	GPIO2.0	GND	N/A
36	GND	GND	N/A

AT-command

GWBMA30 accepts AT-command for configuration, allowing the module to be controlled by micro-controller, so that feature of GWBMA30 can be embedded into system's software



The AT-command syntax is as following:

Enquiry:

AT+command?\r\n

Setting:

AT+command= new value\r\n

GWBMA30/40 AT-command are listed as following:

Aspect	Topic	Enquiry	Response	Set	Response	Note
Bluetooth	**Bluetooth name**	AT+BTNAME?	Current Bluetooth name	AT+BTNAME={new name}	OK	
	Bluetooth Address	AT+BTADDR?	Current Bluetooth address	AT+BTADDR={new address}	OK	the address is 6-byte data
	Bluetooth PIN	AT+PINCODE?	Current PIN code	AT+PINCODE={new pin code}	OK	PIN code is 4-byte data
Audio operation	**Playback**	**N/A**	**N/A**	AT+PLAY	OK	
	Previous track	**N/A**	**N/A**	AT+PREV	OK	
	Next track	**N/A**	**N/A**	AT+NEXT	OK	
	Volume up	**N/A**	**N/A**	AT+VOLUP	OK	
	Volume down	**N/A**	**N/A**	AT+VOLDN	OK	

Note: AT-CMD will be enhanced without prior notice

Certifications

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Shenzhen BALUN Technology Co., Ltd.

Block B, Fl. 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, ShenZhen, GuangDong Province, P. R. China 518055.

VERIFICATION OF CONFORMITY

Certificate No.:	BL-HK1890431D01
Applicant:	Gigawit Electronics Limited
Address:	308 Building 25-2, Keyuanxi Industry Park, High-Tech Park, Nanshan District, Shenzhen 518057, China
Manufacture:	Gigawit Electronics Limited
Address:	308 Building 25-2, Keyuanxi Industry Park, High-Tech Park, Nanshan District, Shenzhen 518057, China
Product:	GWBMA3x
Brand name:	Gigawit
Model name:	GWBMA3X

The submitted sample of the above product has been tested according with following standards. Standard(s) used for showing compliance with the essential requirements in the specified directive(s):

Applied Standards:	Report No.:
EN 60950-1: 2006+A11: 2009+A1: 2010+A12: 2011+A2: 2013	BL-HK1890431-101
Draft EN 301 489-1 V2.2.0(2017-03); Draft EN 301 489-17 V3.2.0(2017-03)	BL-HK1890431-401
EN 300 328 V2.1.1(2016-11)	BL-HK1890431-601
EN 62479: 2010	BL-HK1890431-701

CE

Wei Yanqiuxia / Chief Engineer

Date of Issue: Oct. 24, 2018

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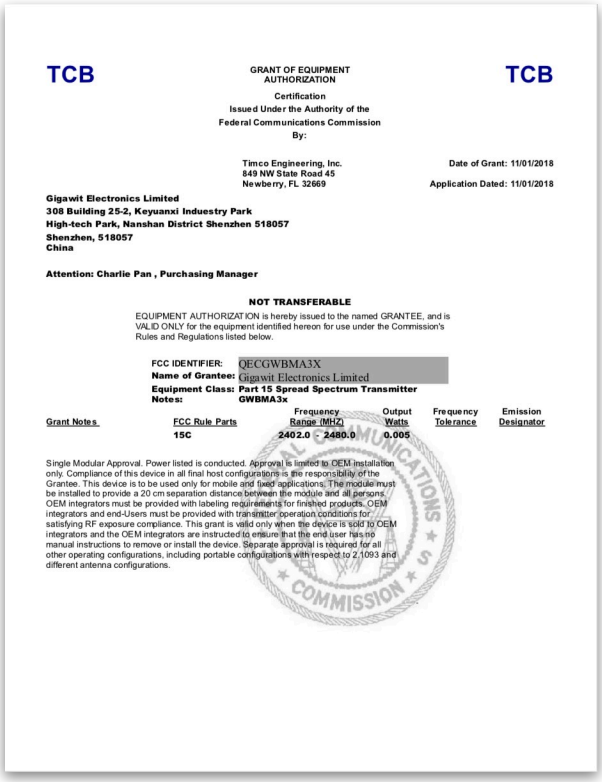
FCC



TCB GRANT OF EQUIPMENT AUTHORIZATION TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

Timco Engineering, Inc.
849 NW State Road 45
Newberry, FL 32669

Date of Grant: 11/01/2018
Application Dated: 11/01/2018

Gigawit Electronics Limited
308 Building 25-2, Keyuanxi Industry Park
High-tech Park, Nanshan District Shenzhen 518057
Shenzhen, 518057
China

Attention: Charlie Pan , Purchasing Manager

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: QECGWBMA3X
Name of Grantee: Gigawit Electronics Limited
Equipment Class: Part 15 Spread Spectrum Transmitter
Notes: GWBMA3x

Grant Notes	FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designator
	15C	2402.0 - 2480.0	0.005		

Single Modular Approval. Power listed is conducted. Approval is limited to OEM installation only. Compliance of this device in all final host configurations is the responsibility of the Grantee. This device is to be used only for mobile and fixed applications. The module must be installed to provide a 20 cm separation distance between the module and all persons. OEM integrators must be provided with labeling requirements for finished products. OEM integrators and end-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance. This grant is valid only when the device is sold to OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

CE-RED

BQB, QDID: 121015

note: the certification applies to GWBMA30 only

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Revision update

Rev. 1.2	Certification information added