GWK5A3T/R 2.4GHz Wireless Audio Transmitter / Receiver

1. General Description

GWK5A3T/R is the analog audio interface version of Gigawit GWK5 family wireless digital audio products. It can connect to the analog input and output the analog audio directly, and act as a plug and play wireless audio solution.

Inheriting from its GWK5 family, GWK5A3T/R features both good wireless performance and audio performance. GWK5A3T/R has good RF co-existence and robust link quality, can combat the most interference from the crowded 2.4G ISM band. GWK5A3T/R uses non-compression PCM signal thus delivering very low THD audio. By adopting advance forward error correction and error concealment algorithm, GWK5A3T/R can reach <15ms latency, this makes it ideal for the Video synchronization, Home Theater applications.

GWK5A3T/R's built-in high-speed 32bit processor also offers some added value functions such as Volume, Treble/Bass, Balance, 2-way Remote control and etc. It will help customers to reduce the total system cost.

2. Applications

- 5.1 Speakers
- Headphones
- Surround Speakers
- Microphones
- CD Player, DVD Player
- Stereo Audio Dongles

3. Features

- Small RF foot-print (2MHz bandwidth) and frequency agility scheme enables better 2.4GHz co-existence
- Antenna diversity, forward error correction and error concealment for robust audio link
- None-compression wireless audio transmission with very low THD
- <15ms low latency, ideal for video synchronization applications
- Low Power Consumption: 50mA @3.3V for ATX and ARX
- 10+m RF indoor range
- 1 audio transmitter supports 4 receivers
- Dedicated 2-way logical data channel for remote control
- Power management functions for battery powered applications
- Auto muting function when suffering interference or at poor receiving conditions
- Built-in Treble/Bass, Volume, Balance Control
- Flexible design, custom functions supported

4. GWK5A3T Form Factor
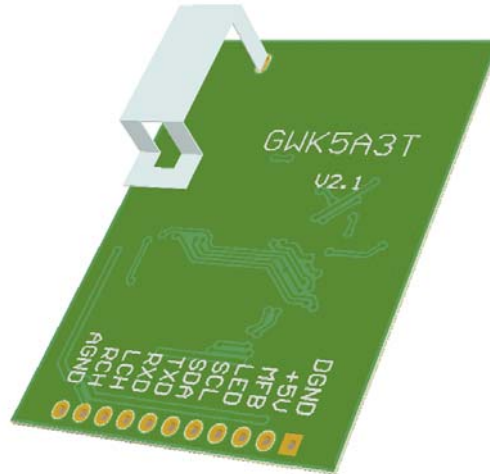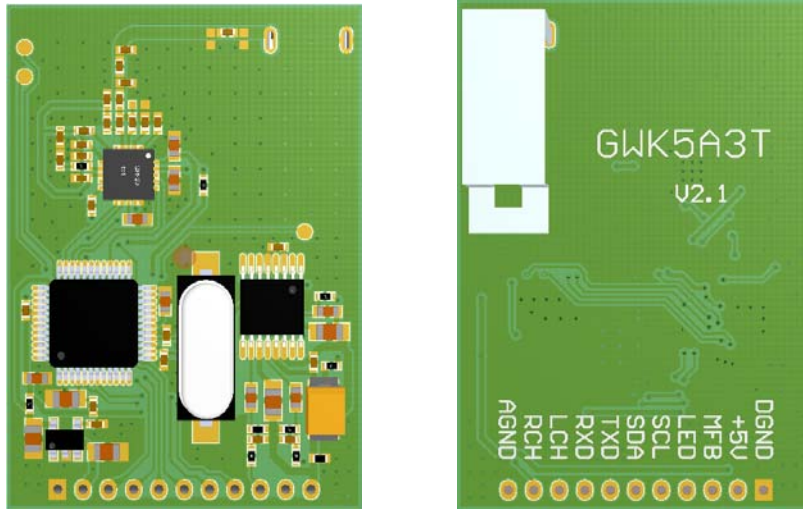
5. GWK5A3R   Form Factor
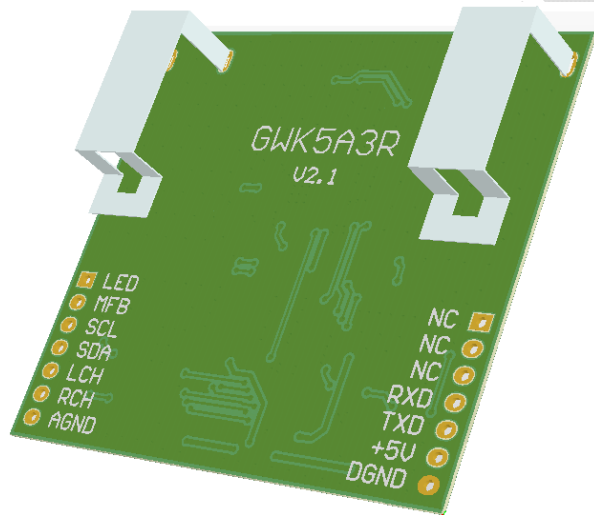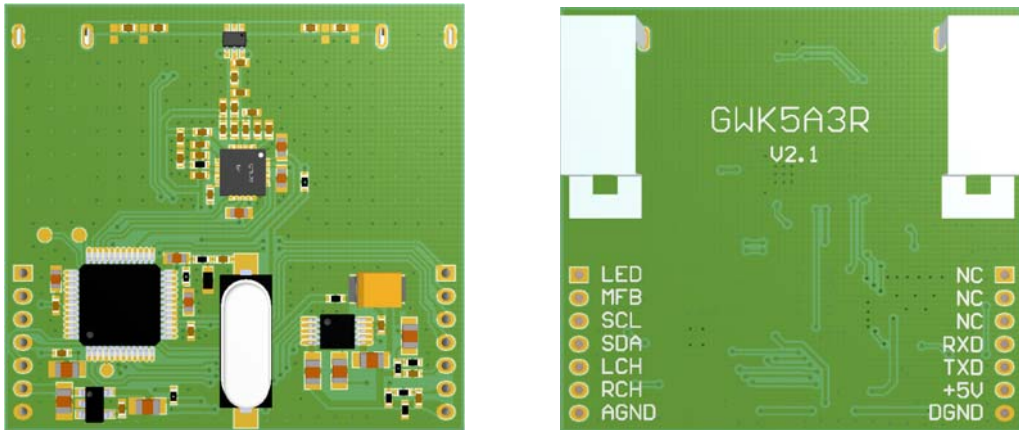
6. Electrical Specification

	Description	Typical
General	Operation voltage	+5V DC
	Supply current	TX: 50mA RX: 55mA
	Operation temperature	-10 ~ +60℃
RF	RF Frequency	2400 ~ 2483MHZ
	Modulation	GFSK
	Data rate	2M bps
	TX Power	+3dBm
	RX Sensitivity	-90dBm
	RF Range (indoor)	10+m
Audio	Frequency Response	20~20KHz
	S/N	>85dB @ 20~20KHz
	THD+N	< 0.01% @ 20~20KHz
	Dynamic range	80dB
	Input level	1.0Vrms
	Input impedance	10K
	Output level	1.0Vrms
	Output impedance	<1K Ohm
	Output/input gain	1:1

Table [1]: Electrical Specification

7. GWK5A3T Pin Assignments

Pin #	Pin name	Type	Description
1	DGND	P	Digital ground
2	VCC	P	+5V DC input
3	MFB	I/O	Power or pairing Key input, press long than 3s to turn on or off the module, press long than 10s to enter pairing mode.
4	LED	I/O	Status LED output
5	SCL	I/O	I2C Clock or GPIO, External 4.7K pull-up resister required
6	SDA	I/O	I2C Data or GPIO, External 4.7K pull-up resister required
7	TXD	O	UART TX
8	RXD	I	UART RX
9	LCH	A	Left Channel Input
10	RCH	A	Right Channel Input
11	AGND	P	Analog ground

Table [2]: GWK5A3T Pin Assignment

8. GWK5A3R Pin Assignments
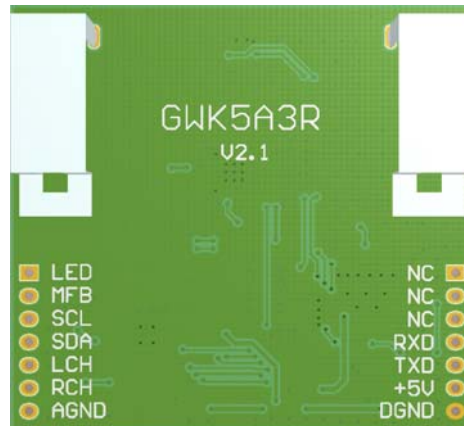
Pin #	Pin name	Type	Description
1	LED	I/O	Status LED output
2	MFB	I/O	Power or pairing Key input, press long than 3s to turn on or off the module, press long than 10s to enter pairing mode.
3	SCL /MUTE	I/O	I2C Clock or MUTE Control, firmware configurable. When used as I2C, External 4.7K pull-up resister required.
4	SDA /STANDBY	I/O	I2C Data or Standby Control, firmware configurable. For Standby mode, A high level will be asserted when no TX signal >5s. When used as I2C, External 4.7K pull-up resister required.
5	LCH	A	Left Channel Output
6	RCH	A	Right Channel Output
7	AGND	P	Analog ground
8	DGND	P	Digital ground
9	VCC	P	+5V DC input
10	TXD	O	UART TX
11	RXD	I	UART RX
12	NC		No connection
13	NC		No connection
14	NC		No connection

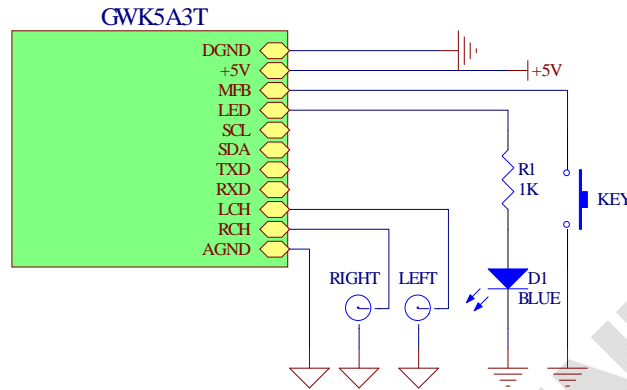Table [3]: GWK5A3R Pin Assignment

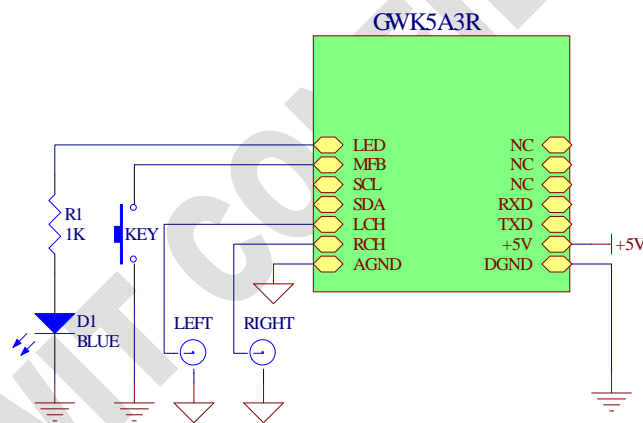## 9. Application Schematic

Figure [1]: GWK5A3T Application

Figure [2]: GWK5A3R Application

10. I2C Control Interface

GWK5A3T/R features a standard I2C Control interface. The I2C can work as a master or a slave,

It can be used to control the peripheral devices or be controlled by the external MCU / DSP.

GWK5A3T/R features a two way wireless logical data channel; The I2C can also be used to exchange the control information between the TX and RX side.

I2C Address is 0x0e, it is configurable by firmware.

Register	Bit	R/W	Reset	Description
0x00: Control	0: Mute	R/W	0	0: Mute off 1: Mute on
	1: Power	R/W	1	0: Power Off 1: Power On
	2; Link Status	R	0	0: Not Linked 1: Linked
	3: Standby	R/W		0: Standby off 1: Standby on
	4-5: Pairing	R/W	0	Write 1 to Enter pairing mode Read back: 0: Normal Mode 1: Pairing in progress, pairing will be timeout in 30 seconds. 2: Paired with success 3: Pairing failed, time is out
	6-7: Reserved	R/W	0	
0x01: Volume	0-7	R/W	0	Volume 0dB to -48dB 0x00: 0dB 0xd0: -48dB
0x02: Treble	0-7	R/W	0	Treble -14dB to + 14dB 0xf2: -14dB 0x00: 0dB 0x0e: +14dB
0x03: Bass	0-7	R/W	0	Bass -14dB to + 14dB 0xf2: -14dB 0x00: 0dB 0x0e: +14dB
0x04: Balance	0-7	R/W	0	Balance -12dB to + 12dB 0xf4: -12dB 0x00: 0dB 0x0c: +12dB

Table[4] I2C Registers

11. ISP Firmware Updating

GWK5A3T/R support ISP firmware updating through UART, When TXD pin connected with a 4.7K resistor to the GND, GWK5A3T/R will enter the ISP mode.
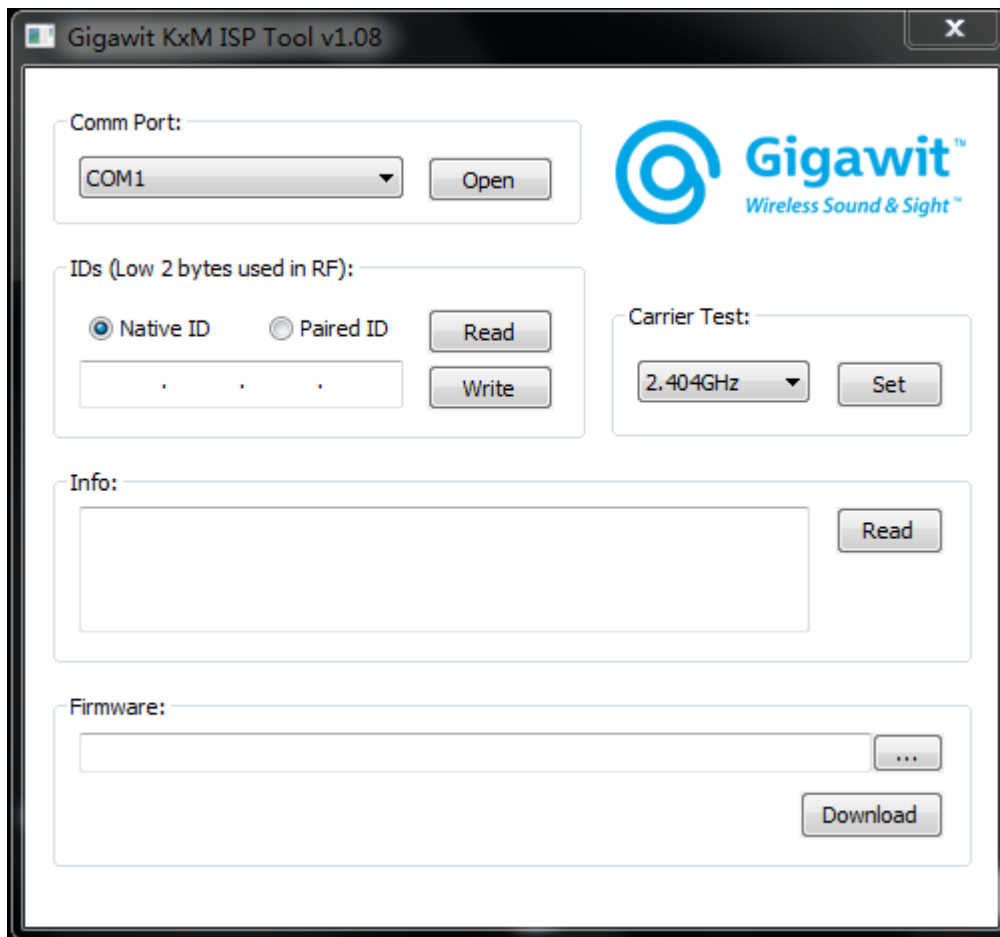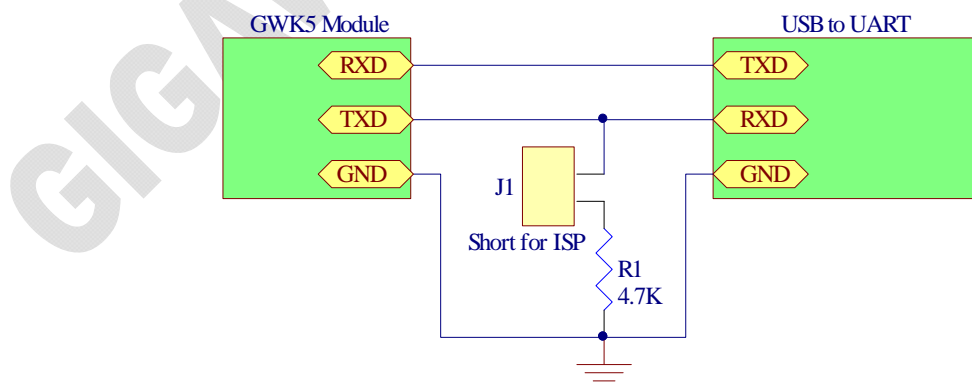

Figure [3]: Gigawit ISP tool

Figure [4]: Gigawit ISP Connection

12. Pairing

GWK5A3T/R support ID matching to enable multi TX/RX operating in a same area. The RX will only receive the paired TX audio signals. To pair the TX and RX module, follow the below steps:

1) Power on the TX and RX Module. The TX/RX LED will keep solid for 5 seconds, and then turn into Idle Mode and flash slowly.

2) Press the TX key long than 10 seconds Until the LED change into flashing fast. Release the key. After this, The TX Module will stay into Pairing Mode for 30 seconds until it find the RX (the RX must be in Pairing Mode in 30 seconds, see Step 3).If the TX found the RX in 30 seconds and paired, the LED will turn to solid and quit the Pairing Mode, or it will be time out after 30 seconds and turn the Pairing Mode into the Idle Mode.

3) Press the RX key long than 10 seconds Until the LED change into flashing fast. Release the key. After this, The RX Module will stay into Pairing Mode for 30 seconds until it find the TX (the TX must be in Pairing Mode, see Step 2) If the RX found the RX in 30 seconds and paired, the LED will turn to solid and quit the Pairing Mode, or it will be time out after 30 seconds and turn the Pairing Mode into the Idle Mode.

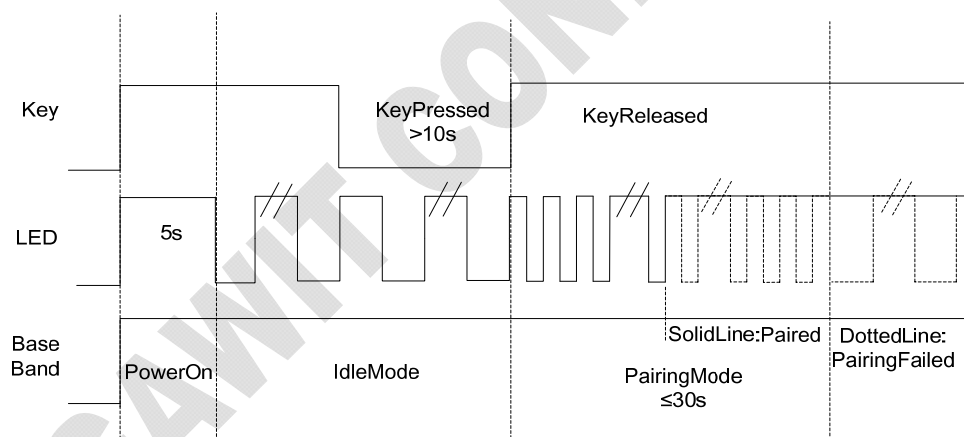4) When the TX and the RX are paired, The TX/RX LED will stay in solid .the RX can receive the TX signal.

Figure [5]: Key and LED Timing at pairing mode

13. Mounting Requirements

GWK5A3T/R is the sensitive RF part. Need to mount them at the corner of the mother circuit board and reserve some keep out space to the components on the mother board. Try to keep them away with metal components like Speakers, Transformers, Batteries, Big Aluminum Capacitors, Heat Sinks and Metal Panels.

The figure below illustrates how to mount the GWK5 module. **Improper mounting will decrease the RF performance dramatically.**
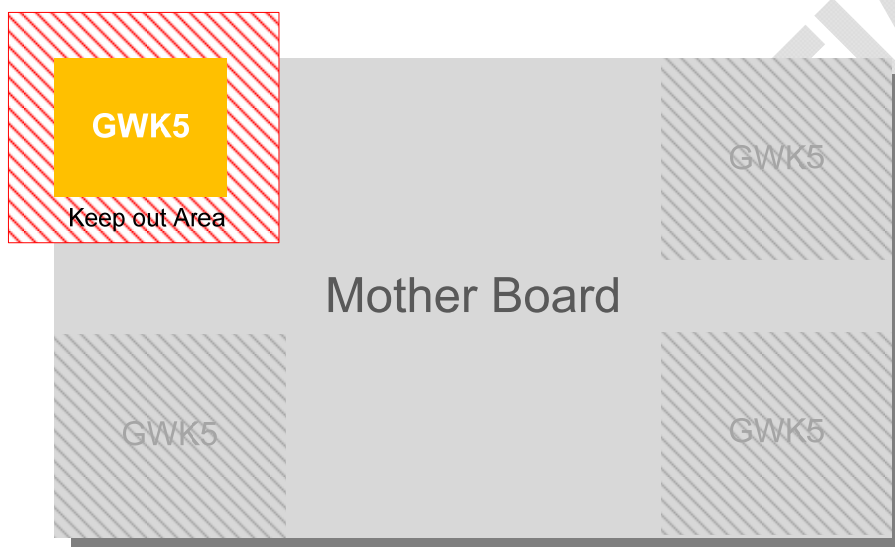

Figure [6]: GWK5A3T/R Mounting Rule
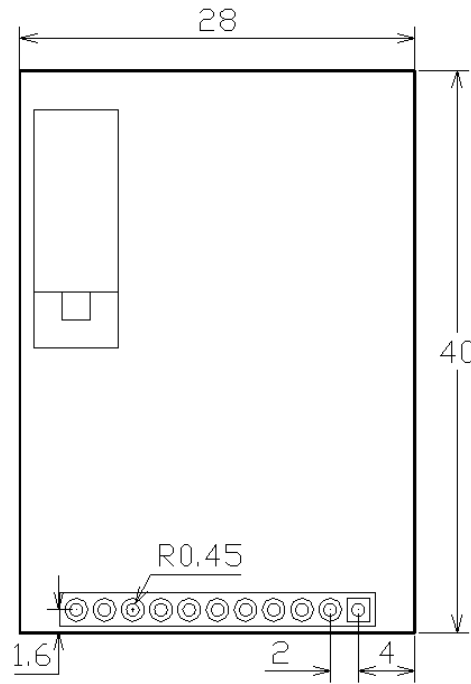
14. GWK5A3T Physical Dimension

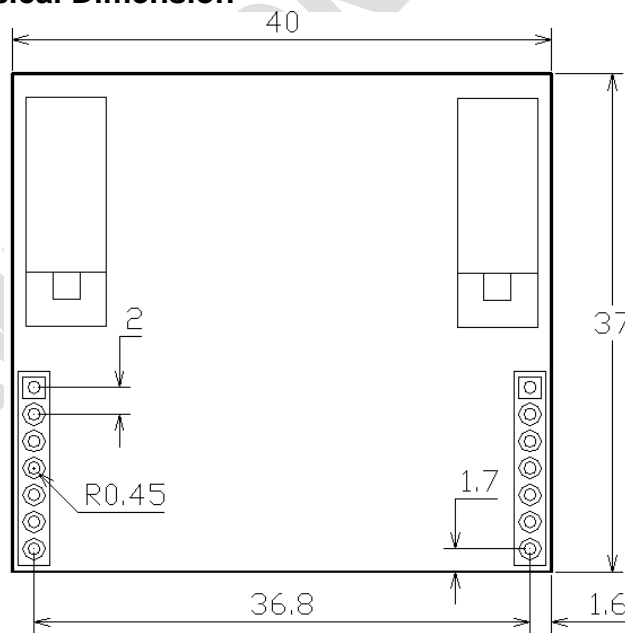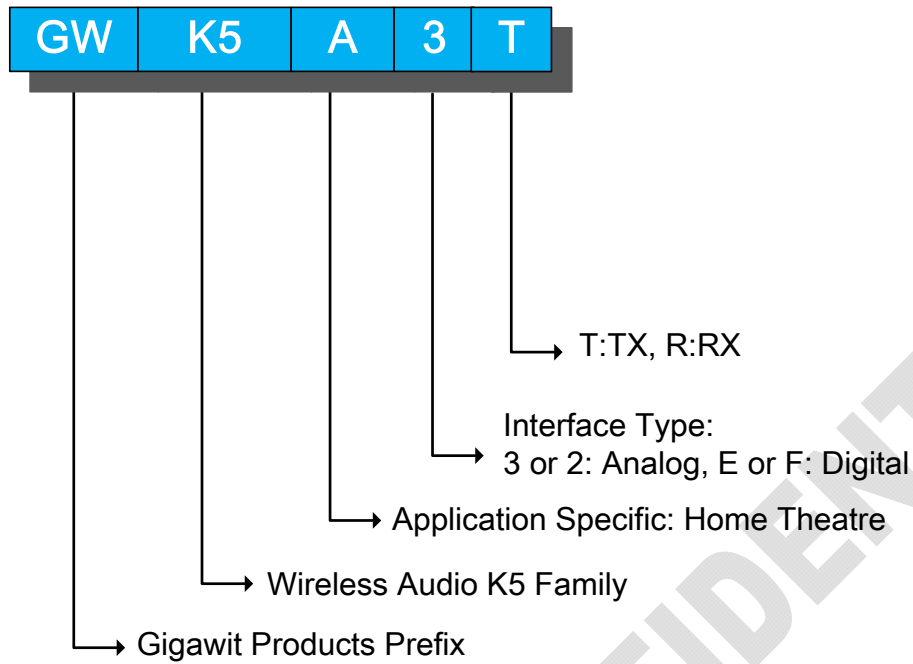Figure [7]: GWK5A3T Dimension

15. GWK5A3R Physical Dimension

Figure [8]: GWK5A3R Dimension

16. Naming Rule

GW	K5	A	3	T

T:TX, R:RX

Interface Type:
3 or 2: Analog, E or F: Digital

Application Specific: Home Theatre

Wireless Audio K5 Family

Gigawit Products Prefix

17. Ordering Information

Gigawit ID.	Description
GWK5A3T	Wireless Audio Transmitter with Analog Interface
GWK5A3R	Wireless Audio Receiver with Analog Interface

18. Contact

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19. Revision History

2011-1-12   Version 1.0, Original version

2011-05-07   Version 1.01, Add I2C Interface and ISP firmware update.