GPR-WIFI-001 Manual

Ver 0.1

GUNPOWER

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Revision	Date	Descreption	Director
Ver 0.1	2016-06-09	Draft	Sung-June Yoo

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1. General

1.1 Overview

GPR-WIFI-001 has a built-in wireless LAN ↔ serial converter. When you connect the GPR-WIFI-001 to an existing serial devices easily without any software changes
You can connect to the network.
With the complete and self-contained Wi-Fi networking capabilities, GPR-WIFI-001 can perform either as a standalone application or as the slave to a host MCU. When GPR-WIFI-001 hosts the application, it promptly boots up from the flash. The integrated highspeed
cache helps to increase the system performance and optimize the system memory.
Also, GPR-WIFI-001 can be applied to any micro-controller design as a Wi-Fi adaptor through SPI / SDIO or I2C / UART interfaces.

1.2 Feature

- 802.11 b support.
- Wi-Fi Direct (P2P) support.
- P2P Discovery, P2P Group Owner mode, P2P Power Management.
- Infrastructure BSS Station mode / P2P mode / softAP mode support.
- Hardware accelerators for CCMP (CBC-MAC, counter mode), TKIP (MIC, RC4), WAPI (SMS4), WEP (RC4), CRC.
- WPA/WPA2 PSK, and WPS driver
- Seamless roaming support.

1.3 Main Technical Specifications.

Categories	Items	Parameters
Wi-Fi	Standards	FCC
	Protocols	802.11 b
	Frequency Range	2.4 G ~ 2.5 G (2400M ~ 2483.5M)
	Tx Power	802.11 b: +20 dBm
	Rx Sensitivity	802.11 b: -91 dbm (11 Mbps)
	Antenna	External
Hardware	CPU	Tensilica L106 32-bit micro controller
	Peripheral Interface	UART/SDIO/SPI/I2C/I2S/IR Remote Control
	Operating Voltage	3.0 V ~ 3.6 V
	Operating Current	Average value: 80 mA
	Operating Temperature Range	-40°C ~ 125°C
	Storage Temperature Range	-40°C ~ 125°C
	Package Size	QFN32-pin (5 mm x 5 mm)
	External Interface	
Software	Wi-Fi Mode	station/softAP/SoftAP+station
	Security	WPA/WPA2
	Encryption	WEP/TKIP/AES
	Firmware Upgrade	UART Download / OTA (via network)
	Software Development	Supports Cloud Server Development / Firmware and SDK for fast on-chip programming
	Network Protocols	IPv4, TCP/UDP/HTTP/FTP
	User Configuration	AT Instruction Set, Cloud Server, Android/iOS App

< Table 1.   Main Technical Specifications >

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2. Configuration

2.1 Component

Product name	Figure	Quantity (EA)
GPR-WIFI-001 (ON-board Chip Antenna)		1 EA

< Figure 1. Component >

2.2 Dimension
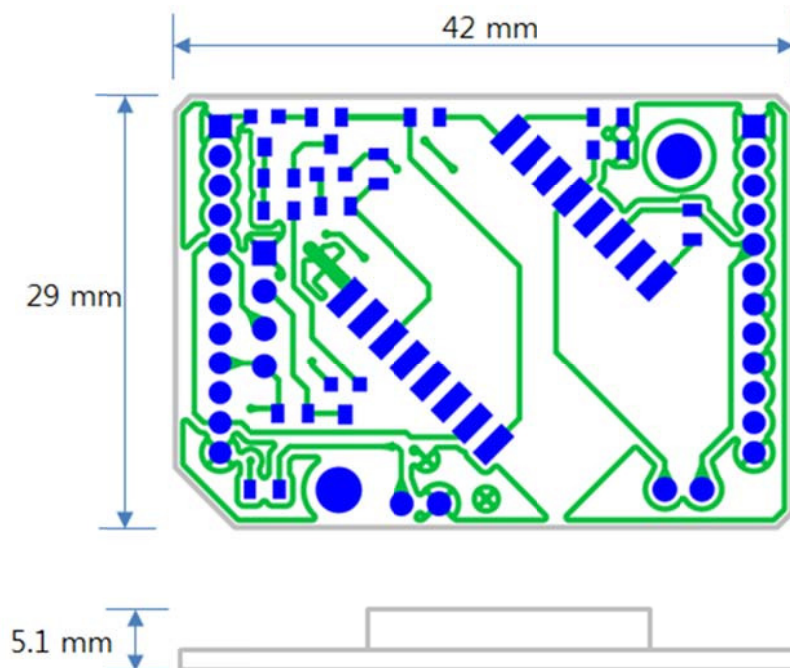
TOP
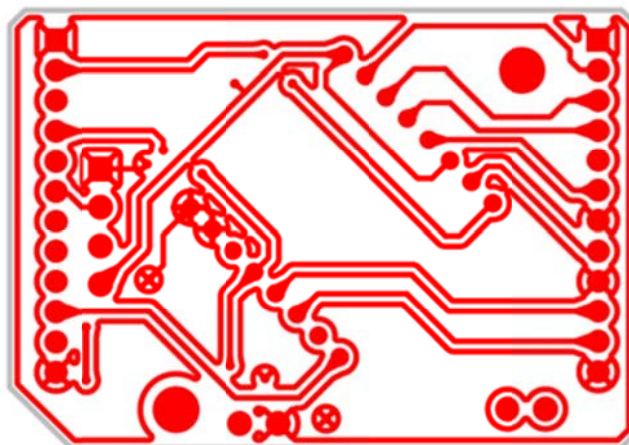
BOTTOM

< Figure 2. Dimension>

2.3 Pin Assign

< Figure 3. PIN Assign>

NO.	Pin name	Type	Function
1	GND	P	Ground
2	RESET	I/O	External reset signal (Low voltage level: Active)
3	X	-	-
4	MODE	I/O	High : On, chip works properly Low : Off, small current consumed
5	RXD	I/O	UART Rx during flash programming
6	TXD	I/O	UART Tx during flash progamming;
7	X	-	-
8	X	-	-
9	VCC_3	P	Amplifier Power 3.0 V ~ 3.6 V
10	DEBUG_TXD	I/O	UART Tx DEBUG flash programming
11	DEBUG RXD	I/O	UART Rx DEBUG flash programming
12	GND	P	Ground
13	GND	P	Ground
14	IO_13	I/O	HSPI_MOSI; UART0_CTS
15	IO_12	I/O	HSPI_MISO
16	IO_14	I/O	HSPI_CLK
17	VCC_3	P	Amplifier Power 3.0 V ~ 3.6 V
18	IO_16	I/O	Deep-sleep wakeup
19	GND	P	Ground
20	ADC	I/O	ADC pin
21	GND	P	Ground
22	IO_5	I/O	GPIO5
23	IO_4	I/O	GPIO4
24	GND	P	Ground

< Table 2. I/O Rediretion & Function >

3. Functional Description
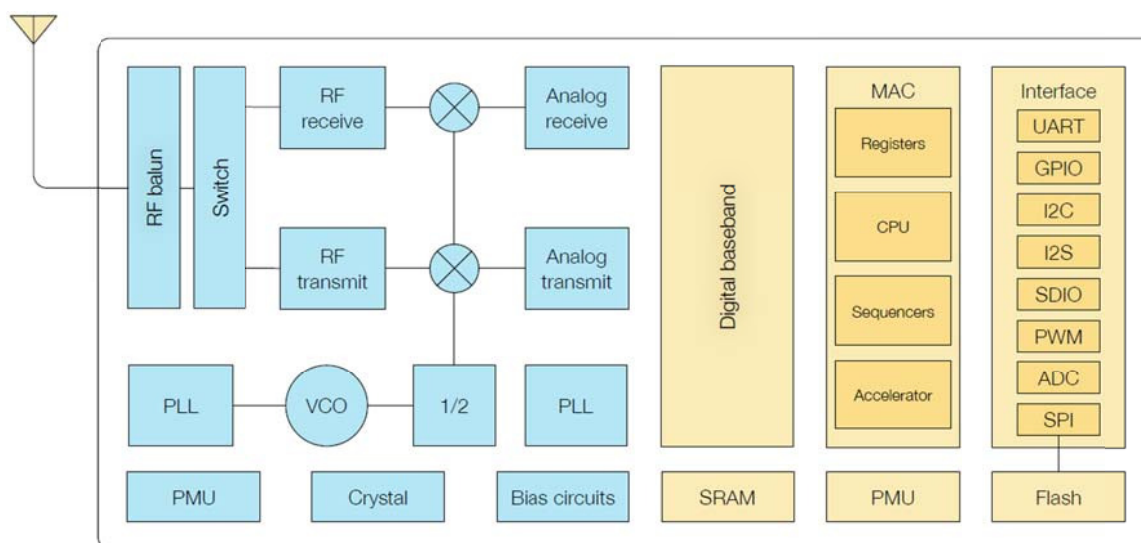
< **Figure 4.** Functional Block Diagram>

 2.4 GHz receiver
• 2.4 GHz transmitter
• High speed clock generators and crystal oscillator
• Real time clock
• Bias and regulators
• Power management

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442	14	2484

< **Table 3.** Frequency Channel Do not use (12, 13,14) >

4. Power Management

GPR-WIFI-001 is dedicated designed for mobile devices, wearable electronics and the Internet of Things applications with advanced power management technologies.

The low-power architecture operates in 3 modes: active mode, sleep mode and deep sleep mode. GPR-WIFI-001 consumes about than 20μA in deep sleep mode (with RTC clock still running) and less than 1.0mA (DTIM=3) or less than 0.6mA (DTIM=10) to stay connected to the access point.
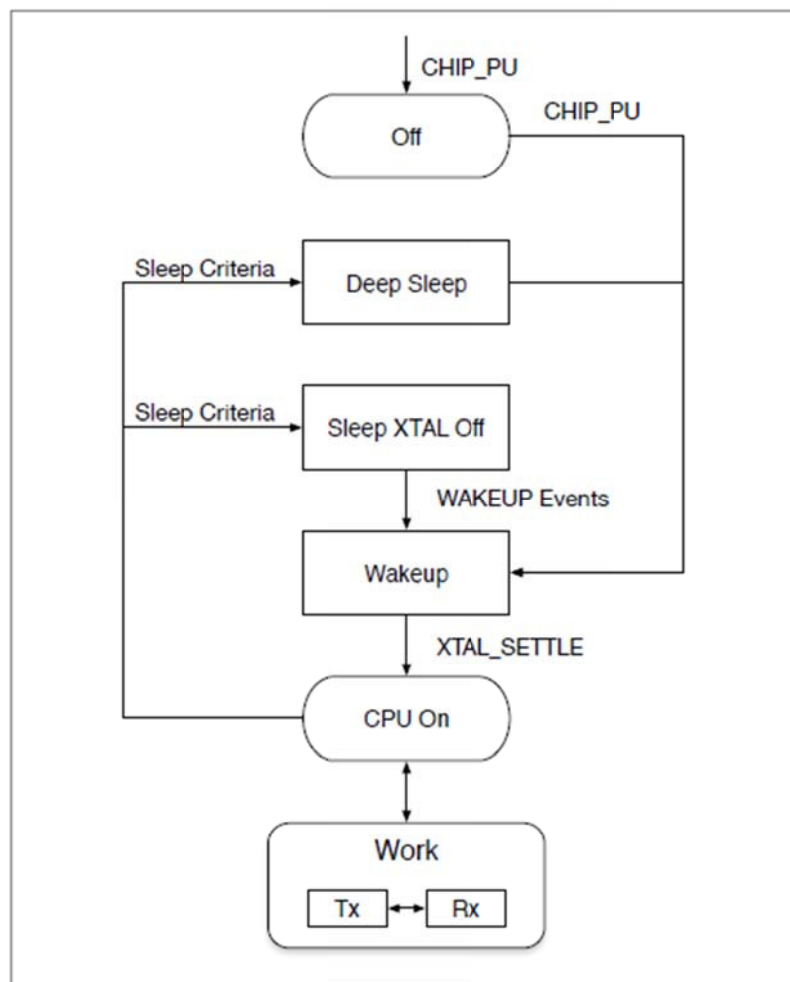
< Figure 5. Power Management >

5. Electrical Specification

5.1 Electrical Specification

Parameters		Conditions	Min	Typical	Max	Unit
Storage Temperature Range		-	-40	Normal	125	°C
Maximum Soldering Temperature		IPC/JEDEC J-STD-020	-	-	260	°C
Working Voltage Value		—	3.0	3.3	3.6	V
I/O	V_{IL}/V_{IH}	-	$-0.3/0.75V_{IO}$	-	$0.25V_{IO}/3.6$	V
	V_{OL}/V_{OH}	-	$N/0.8V_{IO}$	-	$0.1V_{IO}/N$	
	I_{MAX}	-	-	-	12	mA
Electrostatic Discharge (HBM)		$T_{AMB}=25°C$	-	-	2	KV
Electrostatic Discharge (CDM)		$T_{AMB}=25°C$	-	-	0.5	KV

< Table 4. Electrical Specification >

5.2 Power Consumption

Parameters	Min	Typical	Max	Unit
Tx802.11b, CCK 11Mbps, P OUT=+17dBm		170		mA
Rx 802.11b, 1024 bytes packet length , -80dBm		50		mA
Modem-Sleep		15		mA
Light-Sleep		0.9		mA
Deep-Sleep		10		µA
Power Off		0.5		µA

< Table 5. Current Consumption >

FCC Information to User

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 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.

*The provisions of paragraphs (a) and (b) of this section do not apply to digital devices exempted from the technical standards under the provisions of § 15.103.

*For systems incorporating several digital devices, the statement shown in paragraph (a) or (b) of this section needs to be contained only in the instruction manual for the main control unit.

*In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information : 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

Including interference that may cause undesired operation. Modifications not expressly approved by the manufacturer could void the user's authority To operated the equipment under FCC rules. To satisfy FCC exterior labeling requirements, the following text must be placed on the exterior of the end product.

Contains Transmitter Module FCC ID : 2AIHIGPR-WIFI-001

CAUTION : This device and its antenna(s) must not be co-located or operated in conjunction with any other antenna or transmitter. End users cannot modify this transmitter device. Any unauthorized modification could void the user's authority to operate this device.

This module is limited to installation in mobile or fixed applications.

The OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.

In the event that the Host Manufacturer requires assistance in ensuring compliance with Part 15 subpart B, the Grantee will offer assistance

IMPORTANT NOTE:

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

This device is intended only for OEM integrators under the following conditions:

1)The transmitter module may not be co-located with any other transmitter or antenna,

2)OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

The OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.

separate section should clearly state "FCC RF Exposure requirements: "

Required operating conditions for end users

Antenna/or transmitter installation requirements, where relevant

(For example: whether the antenna used with this module must be installed to provide a separation distance of at least 20 cm from all persons, and must not transmit simultaneously with any other antenna or transmitter.)

User manual must contain the information for the antenna proposed for use with this module device: type, gain, and manufacturer or model number.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Manual Information To the End User The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Manual Information To the End User
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.