IEEE 802.11 b/g/n WiFi Module

Product Specifications

Model: GWF-3M08
Version: 1.3
Date: 2012/5/21

1. Introduction

GWF-3M08 is a WLAN module supporting IEEE 802.11 b/g/n standards with 6-pin connector supporting USB 2.0 / 1.1 interface. This is a small form factor and low cost compact WLAN module designed for the wireless connectivity of products with embedded system.

This module operates in 2.4GHz ISM frequency band. it applies a highly integrated MAC/BBP and RF single chip RT5370 with 150Mbps PHY rate supporting. This module can be built-in other embedded applications such as IP Camera, IP set top box, GPS, Internet radio apparatus. it can be directly soldered on a main PCB.

1.1 Features

- 802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 24, 36, 48, 54Mbps
- 802.11n: (20MHz) MCS3-7, Support up to 72Mbps
  (40MHz) MCS0-7, Support up to 160Mbps
- OFDM, Peak rate 150M/bps, Peak throughput 96M/bps.
- Security support for 64/128 WEP, WPA, WPA2, THIP, AES
- Operates in 2.4GHz frequency bands. Power Management
- WPS and TX external control, WiFi direct supported.

2. Product Information

2.1 Typical Specification Overview

<table>
<thead>
<tr>
<th>Standards</th>
<th>IEEE802.11b/g/n (1T1R mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency</td>
<td>2.412GHz + 2.4375GHz - the CH14 can be made upon request</td>
</tr>
<tr>
<td>Protocols</td>
<td>802.11b: CCK, QPSK, BPSK, 802.11g: OFDM</td>
</tr>
<tr>
<td>Antenna</td>
<td>External antenna via IPEX u-HF receptacle or Built-In On Board</td>
</tr>
<tr>
<td>Security</td>
<td>WPA/WPA2, WPAI, 64/128/152-bit WEP, WPS</td>
</tr>
<tr>
<td>Transmit Output Power</td>
<td>(Typical value to antenna)</td>
</tr>
<tr>
<td>11b: 17±1.0dBm @ 11Mbps; 11g: 14±1.0dBm @ 54Mbps</td>
<td></td>
</tr>
<tr>
<td>802.11n: (HT20), 12±1.0dBm; 802.11n: (HT40), 12±1.0dBm</td>
<td></td>
</tr>
<tr>
<td>Receive Sensitivity</td>
<td>(Typical value without antenna)</td>
</tr>
<tr>
<td>11b: -85dBm @ 11Mbps; 11g: -72dBm @ 54Mbps</td>
<td></td>
</tr>
<tr>
<td>802.11n: (HT20), -68dBm@M007, (HT40), -70dBm@M007</td>
<td></td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>5.0V of 3.3V±5%</td>
</tr>
<tr>
<td>Operating Current</td>
<td>(OFDM, 54Mbps)</td>
</tr>
<tr>
<td>5.0V power input&lt;150mA; 3.3V power input&lt;250mA</td>
<td></td>
</tr>
<tr>
<td>Bus Interface</td>
<td>USB 2.0/1.1</td>
</tr>
<tr>
<td>USB Interface</td>
<td>Max. 7 pins, 2.0 mm pitch pin header, Or Max. 7 pins semi-hole</td>
</tr>
</tbody>
</table>

Information in this document is subject to change without prior notice.
2.2 Hardware Information

2.2.1 General view

![Fig 1](image1)

2.2.2 Block Diagram

![Fig 2. With external antenna used](image2)

![Fig 3. With onboard PCB antenna used](image3)
2.2.3 Mechanical Information

A. Physical Dimensions:

a. Semi-holes with 2.0mm pitch (external RF antenna via I-PEX MHF receptacle).

b. Semi-holes with 2.0mm pitch (onboard PCB antenna).
c. Top side 7-pin pin header with 2.0mm pitch

Unit: mm

Fig 6.

d. Bottom side 7-pin pin header with 2.0mm pitch

Unit: mm

Fig 7.
B. Pin Descriptions:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX</td>
<td>RF ON/OFF control; low level activated to OFF</td>
</tr>
<tr>
<td>2</td>
<td>VCC</td>
<td>5.0VDC or 3.3VDC, +/-5%</td>
</tr>
<tr>
<td>3</td>
<td>UD-</td>
<td>USB data-</td>
</tr>
<tr>
<td>4</td>
<td>UD+</td>
<td>USB data+</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>LED</td>
<td>Indicate module working status</td>
</tr>
<tr>
<td>7</td>
<td>WPS</td>
<td>External to activate WPS function. Low level activated.</td>
</tr>
</tbody>
</table>

Notes:

1. TX terminal must be pulled up with an external resistor (4.7K ohm) to high level.
2. LED terminal output 3.3V LED blink signal. To limit LED current, a series 330 ohm or other value resistor should be connected.
3. WPS terminal is internally pulled up with an onboard 4.7K ohm resistor to 3.3VDC.
C. RF signal input and output:

a. A 50 ohm external antenna via an I-PEX receptacle. (Part No: 20279-001E-01)

![I-PEX MHF receptacle](image)

![The profile of the I-PEX connector](image)

Notes: When an external antenna is required via the I-PEX MHF RF connector, the on board PCB antenna will be disconnected.

b. On-board PCB antenna.

![Fig 10.](image)

Notes: The onboard antenna is designed with tiny space which affects the signal performance. If the onboard antenna does not satisfy user's application, please use another external antenna.
c. External antenna via soldered RF cable.

2.3 Software and system Information

<table>
<thead>
<tr>
<th>Operation System</th>
<th>CPU Supplier</th>
<th>Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux 2.4/2.6</td>
<td>ARM, MIPSII</td>
<td>Available</td>
</tr>
<tr>
<td>Windows 2000/XP/Vista/7</td>
<td>X86 Platform</td>
<td>Available</td>
</tr>
<tr>
<td>Windows CE 5.0/6.0</td>
<td>ARM, MIPSII</td>
<td>Available</td>
</tr>
<tr>
<td>Mac OS X 10.3/10.4/10.5/10.6</td>
<td>N/A</td>
<td>Available</td>
</tr>
</tbody>
</table>

2.4. Design Concerns:

2.4.1 Power supply:

1) The input power can be 5.0VDC or 3.3VDC, please mentioned it when place an order.

2) The operation current of 5.0VDC power input will be different with that of 3.3V power input. The external power shall be well designed with enough capacity.

3) Should 3.3VDC power be selected, please be sure it’s clean with low ripple; otherwise, the EMI or RF performance might be deteriorated.

2.4.12 Using pin headers:

1) The pins can be less than 7 pins, but the VCC, UD-, UD+, GND must be applied for USB interface communication.

2) Should the pin header connection be applied, please still keep enough metallic clear space around the antenna end of the module, this gives better antenna performance.

2.4.2 Using semi-holes:

1) When the module is designed to be soldered on a main PCB board directly, the area under the antenna end of the module should be keep clear of metallic components, connectors, vias, traces and other materials that can interfere with the radio signal. The recommended clear space requirements are refer to Fig 12 and Fig 13.
2) The module is not recommended using reflow oven process, hand soldering is suggested.

2.4.2 Clear place to use the module:

The following drawing shows a recommended footprint which can be a reference for a main PCB design.

The clear space requirement for onboard antenna is suit for either pin header or semi-holes connection application.

Fig 13.
2.5 Order information:

GWF-3M08-50-T-7-1

RF output mode:
1: On-board antenna
2: I-Pex MHF receptacle
3: Soldered with cable

Number of pins used

USB interface connection
T: Top side pin header
B: Bottom side pin header
F: 90 degree pin header
H: Semi-holes

Power voltage
50: 5.0VDC +/- 5% power in
33: 3.3VDC +/- 5% power in

Due to the pin header can be different type and be upside down soldered, please specially mention the pin header type and its direction when ordering.

Should an external antenna connection is required; please mention the details while ordering.

3. Certificates and Approval

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCC Part15</td>
<td>undergoing</td>
</tr>
<tr>
<td>CE</td>
<td>undergoing ✓</td>
</tr>
<tr>
<td>RoHS</td>
<td>RoHS process.</td>
</tr>
</tbody>
</table>
4. Environment

4.1 Temperature

4.1.1 Operating Temperature
Continuous reliable operation in ambient temperature -10°C to +50°C.

4.1.2 Storage Temperature
The product is not damaged or degraded when keeping in -20°C to +50°C.

4.2 Humidity

4.2.1 Operating humidity conditions
The product should be capable of continuous reliable operation when subjected to relative humidity in the range of 20% to 80% (non-condensing).

4.2.2 non-operating humidity conditions (receiving warehouse)
The product should not be damaged or degraded when kept in the place (where relative humidity range is in the range of 20% to 80%) for 48 hours.

5. Disclaimer

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