Introduction of Wireless module products (Wi-Fi)

Jun 2015
Discrete & Module Production Headquarters
Power module Division
R&D of ROHM Wireless modules

Short-distance wireless communication

Data rate (Mbps)

Near 
Communication distance
Far

Bluetooth

IEEE 802.15.4

Sub-GHz RF

Wireless LAN IEEE802.11

Rohm group develops LSIs and modules which covers all of the wireless standard above.

- Enhance support system by adopting internal ICs into modules.
- Long term stable-supply
### Wireless module line up

<table>
<thead>
<tr>
<th>Wireless Std.</th>
<th>Frequency</th>
<th>Appearance</th>
<th>Part No</th>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi</td>
<td>2.4 GHz</td>
<td>![image]</td>
<td>BP3580</td>
<td>• IEEE802.11b/g/n&lt;br&gt;• Surface mount type</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>![image]</td>
<td>BP3591</td>
<td>• IEEE802.11b/g/n&lt;br&gt;• Built-in antenna, Connector mount type</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>![image]</td>
<td>BP3599</td>
<td>• IEEE802.11b/g/n&lt;br&gt;• Built-in antenna, Connector mount type, Built-in flash memory</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>![image]</td>
<td>BP3595</td>
<td>• IEEE802.11b/g/n&lt;br&gt;• Built-in antenna, Connector mount type, Small type</td>
<td>MP</td>
</tr>
<tr>
<td>Sub-GHz RF</td>
<td>920 MHz</td>
<td>![image]</td>
<td>BP3596A</td>
<td>• IEEE802.15.4g&lt;br&gt;• Built-in antenna, Connector mount type</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>![image]</td>
<td>BP35A0</td>
<td>• IEEE802.15.4g (original network)&lt;br&gt;• Built-in antenna, Surface mount type</td>
<td>MP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>![image]</td>
<td>BP35A1</td>
<td>• IEEE802.15.4g/e (Wi-SUN)&lt;br&gt;• Built-in antenna, Connector mount type</td>
<td>MP</td>
</tr>
<tr>
<td>EnOcean</td>
<td>928 MHz</td>
<td>![image]</td>
<td>BP35A3</td>
<td>• TCM 410J compatible&lt;br&gt;• Built-in antenna, Connector mount type</td>
<td>DS</td>
</tr>
</tbody>
</table>
ROHM Wi-Fi series
### ROHM Wi-Fi series based on IEEE802.11b/g/n

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>IEEE802.11b, IEEE802.11g, IEEE802.11n</td>
</tr>
<tr>
<td>HOST I/F</td>
<td>SDIO (High-Speed) / USB (High-Speed) / UART (~921.6kbps)</td>
</tr>
<tr>
<td>Frequency</td>
<td>2,400MHz<del>2,497MHz (ch1</del>ch13)</td>
</tr>
<tr>
<td>Transmit power</td>
<td>IEEE802.11b: 15dBm ± 2dB</td>
</tr>
<tr>
<td></td>
<td>IEEE802.11g: 13dBm ± 2dB</td>
</tr>
<tr>
<td></td>
<td>IEEE802.11n: 12dBm ± 2dB</td>
</tr>
<tr>
<td>Communication speed</td>
<td>IEEE802.11b: 1~11Mbps</td>
</tr>
<tr>
<td></td>
<td>IEEE802.11g: 6~54Mbps</td>
</tr>
<tr>
<td></td>
<td>IEEE802.11n: 6.5~72.2Mbps</td>
</tr>
<tr>
<td>Access mode</td>
<td>Station (infra / ad-hoc), Access point</td>
</tr>
<tr>
<td>Security</td>
<td>64bit / 128bit WEP, TKIP, AES</td>
</tr>
<tr>
<td>Other function</td>
<td>WPS Registrar / Enrollee, Site survey, Antenna diversity,</td>
</tr>
<tr>
<td></td>
<td>Power management (Based on 802.11), Power save (ROHM original)</td>
</tr>
<tr>
<td>Voltage</td>
<td>3.3V (Single power supply)</td>
</tr>
<tr>
<td>Current</td>
<td>Transmission: 300mA (typ.) / 340mA (Used USB)</td>
</tr>
<tr>
<td></td>
<td>Reception: 200mA (typ.) / 240mA (Used USB)</td>
</tr>
<tr>
<td></td>
<td>Sleep: 1mA (typ.)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>−40 ~ +85°C</td>
</tr>
<tr>
<td>Result OS</td>
<td>μ ITRON4.0, Linux2.6, WinCE6.0</td>
</tr>
</tbody>
</table>

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【ROHM Advantage】Integrate manufacture (IC and module) → Good support & Long period supply!

■ Good support
Hardware (IC and Module), Software (Firmware) is made in ROHM!

■ Long period supply
Because it’s internal development IC. ROHM policy makes an effort on industrial and Automotive.

■ Radio low certified
BP3591: Japan, FCC, KC
BP3599: Japan, FCC
BP3595: Japan
BP3580: Non-antenna

■ Single Power Supply 3.3V
Built-in power supply.

■ Substantial connection test
The connection test was made the AP of all over the world. Good connection.

■ Wide temperature range
-40~+85℃
BP3580 = Non-antenna, BP3591 = Built-in antenna, BP3599 = Built-in Flash ROM, BP3595 = Small package.

When firmware boot and Reset, it’s downloaded each time. It’s possible to choose appropriate firmware from the line-up.

※Serial FLASH (4Mbit)
## Firmware Line-up

It's applicable to various needs.

<table>
<thead>
<tr>
<th>Standard type (I/F=USB,SDIO)</th>
<th>STA (Station)</th>
<th>AP (Access point)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Built-in TCP/IP protocol stack (I/F=UART)</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

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Software stack

![Diagram showing software stack components]

**Standard type: Built-in Supplicant, Built-in TCP/IP type: ALL in One**

- **Standard type**
  - HOST side Software
    - User Applications
    - TCP/IP Protocol Stack
    - Wireless LAN Device Driver
    - USB2.0/SDIO Device Driver
  - Wireless LAN Firmware
    - HOST Interface Device Driver (USB2.0/SDIO)
    - WPS Registrar/Enrollee
    - WPA/WPA2-PSK
    - BB/MAC Controller

- **Built-in TCP/IP type**
  - HOST side Software
    - User Applications
  - TCP/IP Protocol Stack
  - Wireless LAN Firmware
    - HOST Interface Device Driver (UART only)
    - TCP/IP Protocol Stack
    - WPS Registrar/Enrollee
    - WPA/WPA2-PSK
    - BB/MAC Controller

**WID command controls our module easily. Driver is unnecessary. It’s possible to control in weak HOST.**

**ROHM original device driver.**

**Built-in TCP/IP protocol stack.**

**Built-in Supplicant.**

※Supplicant = Authentication and Cipher by Wireless LAN standards.

**TCP/IP protocol stack**

- API
- DHCP Server/Client
- DNS Client
- TCP
- UDP
- IP (IPv4)
- ICMP
- ARP

**AP firmware**
- DHCP Server
- WPS Registrar

**STA firmware**
- DHCP Client
- WPS Enrollee

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BP3591 Appearance

Built-in antenna, Board to Board connector type

- Chip antenna
- Available to connect external antenna
- Screw hole (M2)
- Micro QR code (include MAC address)
- Radio low certified (Japan, Korea, USA)
- MAC address
- BP3580

Surface

Bottom

33.1 mm

24 mm

0.5 mm pitch 34pin connector
BP3599 Appearance

**Built-in Chip antenna & Flash ROM, Board to Board connector type**

- **Chip antenna**
- **Flash ROM**
- **Available to connect external antenna**
- **Screw hole (M2)**

**Dimensions:**
- **Surface:**
  - 24mm
- **Bottom:**
  - 33.1mm
  - 0.5mm pitch 34pin connector

**Features:**
- Micro QR code (include MAC address)
- Radio low certified (Japan, Korea, USA)
- MAC address

**Notes:**
- BP3580
- BP3599
BP3595 Appearance

Small package, Built-in antenna, Board to Board connector type

47% size down!

BP3591

BP3595

S = 47% DOWN

33.1mm 24.0mm

27.6mm 15.3mm
Evaluation board

UART

- RS-232C I/O
- USB – UART I/F change
- USB bus power

UART I/F Board
BP359C

Wi-Fi module
BP3591／BP3599／BP3595

Adapter Board
Change to 2.54mm pitch!
BP359D (For BP3591)
BP359E (For BP3599)
BP359F (For BP3595)

USB / SDIO

Surface
Bottom

Surface
Bottom

BP3591 / BP3599 connector
Click the "Wireless module"

Click the "Wi-SUN support page"

Various support documents and the latest F/W are available on the ROHM web site.

(English: http://www.rohm.com/web/global/
Korea: http://www.rohm.co.kr/web/korea/)
How to get samples ……

Via Internet

RS

chip 1 stop®

corestaff Zaikostore.com

KARIBONG

Available from 1 piece at the distributor

Various sales channels are available for customer needs/support.