Introduction of Wireless module products

July 2012
Power Module FAE
Rohm group develops LSI of short-distance wireless communication to wide range wireless standards.

Adopting internal LSI into modules!
Easy to use because of completed RF design including periphery of antenna!
## Line Up Wireless Module

<table>
<thead>
<tr>
<th>Wireless LAN</th>
<th>Item Name</th>
<th>Correspondence Standard</th>
<th>Schedule</th>
</tr>
</thead>
</table>
| BP3580       | •IEEE802.11b/g/n, IEEE802.11i (Standard for security)  
•Antenna diversity OK (SW signal output)  
•Built-in WPS, TCP/IP stack | MP |
| BP3591       | •IEEE802.11b/g/n, IEEE802.11i (Standard for security)  
•Built-in chip-antenna  
•Built-in WPS, TCP/IP stack | MP |
| BP3599       | •IEEE802.11b/g/n, IEEE802.11i (Standard for security)  
•Built-in chip-antenna  
•Built-in WPS, TCP/IP stack  
•Built-in FLASH ROM | Under development |

| IEEE802.15.4 | MK72750A-01 (Made in LAPIS Semiconductor) | •IEEE802.15.4, ZigBee (RF4CE)  
•4GHz  
•Built-in pattern antenna (Planned) | 2012/Aug MP planned  
※Enable to customize by ROHM |

| Bluetooth | BP3597 | •Bluetooth Low Energy  
•Built in pattern antenna | Under development |

| Specified Low Power | BP3571-1 | •429MHz or 426MHz  
•ARIB STD-T67  
•2 value FSK | Under development  
※Development only transmission |
| BP3575 | •ARIB STD-T108 (920MHz)  
•IEEE802.15.4g packet  
•GFSK  
•SMD type | Under development |
| BP3596-1 | •ARIB STD-T108 (920MHz)  
•IEEE802.15.4g packet  
•GFSK  
•Build-in chip-antenna | Under development  
2012/Oct MP planned  
※Possible to customize |
Introduction of Wireless LAN module
BP3580/BP3591 Specification

BP3580/BP3591 is based on IEEE802.11b/g/n.

<table>
<thead>
<tr>
<th>Wireless LAN standard above</th>
<th>IEEE802.11b , IEEE802.11g , IEEE802.11n , IEEE802.11i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Interface</td>
<td>SDIO(High-Speed) / USB(High-Speed) / UART (~921.6kbps)</td>
</tr>
<tr>
<td>Frequency width</td>
<td>2,400MHz ~ 2,497MHz (ch1 ~ ch13)</td>
</tr>
<tr>
<td>RF output 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>Supported data rate</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 (Infrastructure mode / Ad hoc communications mode), Access point</td>
</tr>
<tr>
<td>Security function</td>
<td>64Bit / 128Bit WEP , TKIP , AES</td>
</tr>
<tr>
<td>その他の機能</td>
<td>WPS Registrar / Enrollee , ESS , Antenna diversity , 802.11 compliance power management function , ROHM original power save function</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>3.3V (Single)</td>
</tr>
<tr>
<td>Consumption current</td>
<td>Sending 300mA (TYP) / 340mA (with USB)</td>
</tr>
<tr>
<td></td>
<td>Receiving 200mA (TYP) / 240mA (with USB)</td>
</tr>
<tr>
<td></td>
<td>Sleep mode 500uA (TYP)</td>
</tr>
<tr>
<td>Operating conditions</td>
<td>Temperature range : -40 ~ +85°C , Humidity : 85% or less (none condensation)</td>
</tr>
<tr>
<td>OS</td>
<td>μITRON4.0 , Linux2.6 , WinXP SP3 , WinCE6.0</td>
</tr>
</tbody>
</table>
BP3580/BP3591 Feature

【The Feature】 Adopting internal base band LSI. → Full Development support and Long-term stable supply !!

- **Satisfied Development Support**
  Base band LSI and Firmware are made in ROHM. Possible to support from software to hardware.

- **Long Term Stable-Supply**
  Integrated from base band LSI design to modularization by ROHM. None pending by external factor.

- **Satisfied Connection Test**
  Implemented connect test to access point (Commercially Available Wi-Fi Router). Realized highest level connectivity.

- **Acquired Radio Law Certification**
  [BP3580] Possible to acquire Japanese radio law certification.

- **Single Power Supply 3.3V**
  Only single power supply 3.3V because of built-in power supply circuit.

- **Broad operating temperature**
  -40 ~ +85°C
  Ideal for industrial equipment market that Required high reliability

- **Built-in antenna type**

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ROHM Co., Ltd.
BP3580 = SMD type, BP3591 = Built-in antenna.
Firmware download host selectable from HOST CPU or FLASH MEMORY.

MAC address, RF adjustment parameter etc., document solid information.
Flip-chip EEPROM 4Kbit.

※BP3591 MAC Address is written by ROHM.
BP3580 MAC Address is need to write by oneself.

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## BP3580/BP3591 Firmware Line-up

Firmwares are assorted at six types to Meet the variety of needs.

<table>
<thead>
<tr>
<th>Wi-Fi direct</th>
<th>STA (Station)</th>
<th>AP (Access point)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard type (I/F=USB,SDIO)</td>
<td>①</td>
<td>③</td>
</tr>
<tr>
<td>Built-in TCP/IP Stack type (I/F=UART)</td>
<td>②</td>
<td>④</td>
</tr>
<tr>
<td>Wi-Fi direct</td>
<td>⑤</td>
<td>⑥</td>
</tr>
<tr>
<td>Standard (I/F=USB,SDIO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in TCP/IP Stack (I/F=UART)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

※①～④ is released. ⑤⑥ is undecided.
Standard firm is built-in supplicant, built-in TCP/IP firm is all-in-one.

Software structure at standard-firmware

- **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

Enable to control module easy with WID command (ROHM original) Driver is needless! Powerless HOST too enable to mount wireless LAN.

Software structure at built-in TCP/IP firmware

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

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

- **Supplicant and TCP/IP protocol Stack も内蔵。**
  - Built-in Supplicant in module

※Supplicant is software that is based on wireless LAN standard, and is processed certification and encryption.
Preparing interface evaluation board of UART, USB, and SDIO. BP3591+Board is possible to start on developing application at once!!

<table>
<thead>
<tr>
<th></th>
<th>UART</th>
<th>USB</th>
<th>SDIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>front</td>
<td><img src="image" alt="UART" /></td>
<td><img src="image" alt="USB" /></td>
<td><img src="image" alt="SDIO" /></td>
</tr>
<tr>
<td>back</td>
<td><img src="image" alt="UART" /></td>
<td><img src="image" alt="USB" /></td>
<td><img src="image" alt="SDIO" /></td>
</tr>
</tbody>
</table>

Install BP3591 in connector