Rayson

Bluetooth® Module

Class2 BC04-ext Module

Features
- The module is a Max-4dBm (Class2) module.
- Bluetooth standard Ver. 2.0 + EDR conformity.
- Internal 1.8V regulator.
- Low current consumption: Hold, Sniff, Park, Deep sleep Mode.
- 3.0V to 3.6V operation.
- Support for up to seven slaves: SCO links, ACL links, Piconet<7>
- Interface: USB, UART & PCM (for voice CODEC).
- SPP firmware with AT command sets.
- Small outline: 25 x 14.5 x 2.2 mm

Applications
- Notebook PC
- PDA
- Digital camera & printer
- GPS, POS, Barcode Reader
- Domestic and industrial applications

General Electrical Specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrier Frequency</td>
<td></td>
<td>2.402</td>
<td>2.480</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>Operating Voltage (VDD)</td>
<td></td>
<td>3.00</td>
<td>3.30</td>
<td>3.60</td>
<td>V</td>
</tr>
<tr>
<td>RF Output Power</td>
<td>Measured in 50 ohm</td>
<td>-6</td>
<td>0</td>
<td>4</td>
<td>dBm</td>
</tr>
<tr>
<td>RX Sensitivity</td>
<td></td>
<td>-83</td>
<td>-70</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Load Impedance</td>
<td>No abnormal Oscillation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Low Voltage</td>
<td>RESET, UART, GPIO, PCM</td>
<td>-0.30</td>
<td>-</td>
<td>0.80</td>
<td>V</td>
</tr>
<tr>
<td>Input High Voltage</td>
<td>RESET, UART, GPIO, PCM</td>
<td>0.70VDD</td>
<td>-</td>
<td>VDD+0.30</td>
<td>V</td>
</tr>
<tr>
<td>Output Low Voltage</td>
<td>UART, GPIO, PCM</td>
<td>-</td>
<td>-</td>
<td>0.40</td>
<td>V</td>
</tr>
<tr>
<td>Output High Voltage</td>
<td>UART, GPIO, PCM</td>
<td>VDD-0.40</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Average Current Consumption</td>
<td>SCO connection HV1</td>
<td>46</td>
<td>-</td>
<td>80</td>
<td>mA</td>
</tr>
<tr>
<td>Peak Current</td>
<td>Tx burst +4dBm</td>
<td>-</td>
<td>-</td>
<td>80</td>
<td>mA</td>
</tr>
</tbody>
</table>

Block Diagram
<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Bluetooth Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.402</td>
<td>-</td>
<td>-63</td>
<td>-82</td>
<td>≤ -70</td>
<td>dBm</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>-63</td>
<td>-82</td>
<td>≥ -20</td>
<td>dBm</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>-63</td>
<td>-82</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>-6</td>
<td>0</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>-6</td>
<td>0</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>-6</td>
<td>0</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>+2</td>
<td>-</td>
<td>-6 to +4(2)</td>
<td>dBm</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>+2</td>
<td>-</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>+2</td>
<td>-</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>12</td>
<td>20</td>
<td>±75</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>9</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>879</td>
<td>1000</td>
<td>≤ 1000</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>816</td>
<td>1000</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>819</td>
<td>1000</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>≤25</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>≤40</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.402</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>20</td>
<td>kHz/50µs</td>
</tr>
<tr>
<td>2.441</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>20</td>
<td>kHz/50µs</td>
</tr>
<tr>
<td>2.480</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td></td>
<td>kHz/50µs</td>
</tr>
<tr>
<td>2.402</td>
<td>145</td>
<td>165</td>
<td>175</td>
<td>140&lt;△f1avg&lt;175</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>145</td>
<td>165</td>
<td>175</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>145</td>
<td>165</td>
<td>175</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.402</td>
<td>115</td>
<td>150</td>
<td>-</td>
<td>115</td>
<td>kHz</td>
</tr>
<tr>
<td>2.441</td>
<td>115</td>
<td>150</td>
<td>-</td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>2.480</td>
<td>115</td>
<td>150</td>
<td>-</td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>

Notes:

(1) BlueCore-External firmware maintains the transmit power to be within the Bluetooth specification v2.0 limits.
(2) Class 2 RF transmit power range, Bluetooth specification v2.0
(3) Up to five exceptions are allowed in v2.0 of the Bluetooth specification
### Radio Characteristics – Enhanced Data Rate

#### Transmitter, VDD = 3.3V Temperature =+20°C

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Bluetooth Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum RF transmit power</td>
<td>2.402</td>
<td>-6</td>
<td>0</td>
<td>+2</td>
<td>-6 to +20</td>
</tr>
<tr>
<td></td>
<td>2.441</td>
<td>-6</td>
<td>0</td>
<td>+2</td>
<td>dBm</td>
</tr>
<tr>
<td></td>
<td>2.480</td>
<td>-6</td>
<td>0</td>
<td>+2</td>
<td>dBm</td>
</tr>
<tr>
<td>Relative transmit power</td>
<td>-</td>
<td>-1.5</td>
<td>-</td>
<td>-4 to +1</td>
<td>dB</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK Maximum carrier frequency stability $w_0$</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>$\leq 10$ for all blocks</td>
<td>kHz</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK Maximum carrier frequency stability $w_i$</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>$\leq 75$ for all packets</td>
<td>kHz</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK Maximum carrier frequency stability $</td>
<td>w_0 + w_i</td>
<td>$</td>
<td>-</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>8 DPSK Maximum carrier frequency stability $w_0$</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>$\leq 75$ for all packets</td>
<td>kHz</td>
</tr>
<tr>
<td>8 DPSK Maximum carrier frequency stability $w_i$</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>$\leq 75$ for all packets</td>
<td>kHz</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK Modulation Accuracy RMS DVEM</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>$\leq 20$</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>99% DEVM</td>
<td>-</td>
<td>13</td>
<td>-</td>
<td>$\leq 30$</td>
</tr>
<tr>
<td></td>
<td>Peak DEVM</td>
<td>-</td>
<td>19</td>
<td>-</td>
<td>$\leq 35$</td>
</tr>
<tr>
<td>8 DPSK Modulation Accuracy RMS DVEM</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>$\leq 13$</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>99% DEVM</td>
<td>-</td>
<td>13</td>
<td>-</td>
<td>$\leq 20$</td>
</tr>
<tr>
<td></td>
<td>Peak DEVM</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>$\leq 25$</td>
</tr>
<tr>
<td>In-band spurious emissions $F=F_0 + 3$ MHz</td>
<td>-</td>
<td>-50</td>
<td>-</td>
<td>$\leq 40$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F&lt;F_0 - 3$ MHz</td>
<td>-</td>
<td>-50</td>
<td>-</td>
<td>$\leq 40$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 - 3$ MHz</td>
<td>-</td>
<td>-46</td>
<td>-</td>
<td>$\leq 40$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 - 2$ MHz</td>
<td>-</td>
<td>-34</td>
<td>-</td>
<td>$\leq 20$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 - 1$ MHz</td>
<td>-</td>
<td>-35</td>
<td>-</td>
<td>$\leq 26$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 + 1$ MHz</td>
<td>-</td>
<td>-35</td>
<td>-</td>
<td>$\leq 26$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 + 2$ MHz</td>
<td>-</td>
<td>-31</td>
<td>-</td>
<td>$\leq 20$</td>
<td>dBm</td>
</tr>
<tr>
<td>$F=F_0 + 3$ MHz</td>
<td>-</td>
<td>-33</td>
<td>-</td>
<td>$\leq 40$</td>
<td>dBm</td>
</tr>
<tr>
<td>EDR Differential Phase Encoding No Errors</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$\geq 99$</td>
<td>%</td>
</tr>
</tbody>
</table>

#### Receiver, VDD = 3.3V Temperature =+20°C

<table>
<thead>
<tr>
<th>Modulation</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Bluetooth Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity at 0.1% BER $\pi/4$ DQPSK</td>
<td>-</td>
<td>-82</td>
<td>-</td>
<td>$\leq -70$</td>
<td>dBm</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK</td>
<td>-</td>
<td>-76</td>
<td>-</td>
<td>$\leq -70$</td>
<td>dBm</td>
</tr>
<tr>
<td>8 DPSK</td>
<td>-</td>
<td>-10</td>
<td>-</td>
<td>$\leq -20$</td>
<td>dBm</td>
</tr>
<tr>
<td>Maximum received signal level at 0.1% BER $\pi/4$ DQPSK</td>
<td>-</td>
<td>-8</td>
<td>-</td>
<td>$\geq -20$</td>
<td>dBm</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK</td>
<td>-</td>
<td>-10</td>
<td>-</td>
<td>$\geq -20$</td>
<td>dBm</td>
</tr>
<tr>
<td>8 DPSK</td>
<td>-</td>
<td>19</td>
<td>-</td>
<td>$\geq +13$</td>
<td>dB</td>
</tr>
<tr>
<td>C/I co-channel at 0.1% BER $\pi/4$ DQPSK</td>
<td>-</td>
<td>-10</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK</td>
<td>-</td>
<td>-5</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>Adjacent channel selectivity C/I F=F_0 + 1 MHz $\pi/4$ DQPSK</td>
<td>-</td>
<td>-11</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK</td>
<td>-</td>
<td>-5</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>Adjacent channel selectivity C/I F=F_0 - 1 MHz 8 DPSK</td>
<td>-</td>
<td>-10</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>$\pi/4$ DQPSK</td>
<td>-</td>
<td>-5</td>
<td>-</td>
<td>$\leq 0$</td>
<td>dB</td>
</tr>
<tr>
<td>Adjacent channel selectivity</td>
<td>π/4 DQPSK</td>
<td>-40</td>
<td>≤-30</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>-----</td>
<td>------</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>F=F₀ +2 MHz</td>
<td>8 DPSK</td>
<td>-40</td>
<td>≤-25</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Adjacent channel selectivity</td>
<td>π/4 DQPSK</td>
<td>-23</td>
<td>≤-20</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>F=F₀ -2 MHz</td>
<td>8 DPSK</td>
<td>-20</td>
<td>≤-13</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Adjacent channel selectivity</td>
<td>π/4 DQPSK</td>
<td>-45</td>
<td>≤-40</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>F=F₀ +3 MHz</td>
<td>8 DPSK</td>
<td>-45</td>
<td>≤-33</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Adjacent channel selectivity</td>
<td>π/4 DQPSK</td>
<td>-45</td>
<td>≤-40</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>F=F₀ -5 MHz</td>
<td>8 DPSK</td>
<td>-45</td>
<td>≤-33</td>
<td>dB</td>
<td></td>
</tr>
</tbody>
</table>

F₀ = 2405, 2441, 2477 MHz

### SPP AT Command sets

**A**

(Establish connection)

When it’s in master mode, this command establishes a connection. When it’s in slave mode, the command will be rejected.

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Connect to a Bluetooth device (It’s only available when “ATD=xxxxxxxxxxxx” assigned)</td>
</tr>
<tr>
<td>A1-A8</td>
<td>Connect to a Bluetooth neighborhood device 1-8 (ATF? Result)</td>
</tr>
</tbody>
</table>

**B**

(Display local BD address)

This command displays the local BD address

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Inquire the Local BD address</td>
</tr>
</tbody>
</table>

**D**

(Set Remote BD address)

For security purposes, we can specify the unique remote device it can be connected. In master role, it automatically inquire and search the slave even if it is undiscoverable. In slave role, the command should be as a filter condition to accept the master’s inquiry.

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D=xxxxxxx</td>
<td>“xxxx-xx-xxxxxx” is 12 digit hex symbol</td>
</tr>
<tr>
<td>D0</td>
<td>Clear Remote BD address setting, inquire any slave in master mode or accept any master in slave mode.</td>
</tr>
<tr>
<td>D?</td>
<td>Inquire the Remote BD address setting</td>
</tr>
</tbody>
</table>

**E**

(Local Echo)

This command specifies whether the device should echo characters received from the UART back to the DTE/DCE.

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0</td>
<td>Command characters received from the UART are not echoed back to the DTE/DCE.</td>
</tr>
<tr>
<td>E1 (Default)</td>
<td>Command characters received from the UART are echoed back to the DTE/DCE.</td>
</tr>
<tr>
<td>E?</td>
<td>Inquire the current setting</td>
</tr>
</tbody>
</table>

**F**

(Find Bluetooth device)

This command is used to find any Bluetooth device in the neighborhood within 60 seconds timeout. If any device is found, its name and address will be listed. The search ends with a message “Inquiry ends, xx device(s) found.”

This command is available only when the adapter is in the master role.

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F?</td>
<td>Inquire scan Bluetooth neighborhood devices.</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>This command specifies whether the device could be discovered by remote master device.</td>
</tr>
<tr>
<td>T0</td>
<td>The device enters undiscoverable mode. If a pair have been made, the original connection could be connected again. Other remote master device can not discovery this device.</td>
</tr>
<tr>
<td>T1</td>
<td>The device enters discoverable mode.</td>
</tr>
<tr>
<td>T?</td>
<td>Inquire the current setting</td>
</tr>
</tbody>
</table>

| **I**   | This command is used to inquiry the FW version. |
| ??      | Inquire the version Codes |

| **K**   | This command is used to specify one or two stop bits of COM port. |
| K0      | One Stop bit |
| K1      | Two stop bits |
| K?      | Inquire the current setting |

| **L**   | This command is used to specify the baud rate of COM port. |
| L0      | 4800bps |
| L1      | 9600bps |
| L2      | 19200bps |
| L3      | 38400bps |
| L4      | 57600bps |
| L5      | 115200bps |
| L6      | 230.4Kbps |
| L7      | 460.8Kbps |
| L?      | Inquire the current setting |

| **M**   | This command is used to specify the parity bit setting of COM port. |
| M0      | None Parity bit. |
| M1      | Odd parity setting. |
| M2      | Even parity setting. |
| M?      | Inquire the current setting |

| **N**   | We can specifies the device a friendly name using 0 to 9, A to Z, a to z, space and –, which are all valid characters. Note that "first space or -, last space or – isn’t permitted". The default name is "Serial Adaptor". |
| Nxxxxx   | "xxxxx" is a character string, maxima length is 16 |
| N?       | Inquire the device name |

| **O**   | When it’s in master mode, the command is used to enable/disable auto-connection feature. When it’s in slave mode, the command will be rejected. |
| O0      | Automatically connecting to a device which is assigned in "ATD" or
The factory settings of UART are as follows:

- **Baud rate**: 19200 bps
- **Data bit**: 8
- **Parity**: none
- **Stop bit**: 1
- **Flow control**: H/W or none
- **Others**: Please refer to AT Command Sets.
<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>TYPE</th>
<th>FUNCTION</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PIO(8)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PIO(9)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PIO(10)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AIO0</td>
<td>Bi-directional</td>
<td>Programmable Input/Output Line</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>AIO1</td>
<td>Bi-directional</td>
<td>Programmable Input/Output Line</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>RESET</td>
<td>CMOS input</td>
<td>Reset if high. Input debounced so must be high for &gt;5ms to cause a reset</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>SPI_MISO</td>
<td>CMOS Output</td>
<td>Serial Peripheral Interface Data Output</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SPI_CSB</td>
<td>CMOS Input</td>
<td>Chip Select For Synchronous Serial Interface active low</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>SPI_CLK</td>
<td>CMOS Input</td>
<td>Serial Peripheral Interface Clock</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SPI_MOSI</td>
<td>CMOS Input</td>
<td>Serial Peripheral Interface Data Input</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>UART_CTS</td>
<td>CMOS Input</td>
<td>UART Clear To Send (Active Low)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>UART_TX</td>
<td>CMOS Output</td>
<td>UART Data Output</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>UART_RTS</td>
<td>CMOS Output</td>
<td>UART Request To Send (Active Low)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>UART_RX</td>
<td>CMOS Input</td>
<td>UART Data Input</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>PIO(11)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3V3</td>
<td>Power</td>
<td>3.3V Power Supply Input</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>PCM_OUT</td>
<td>CMOS Output</td>
<td>Synchronous Data Output</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>PCM_SYNC</td>
<td>Bi-directional</td>
<td>Synchronous Data Sync</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>PCM_IN</td>
<td>CMOS Input</td>
<td>Synchronous Data Input</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>PCM_CLK</td>
<td>Bi-directional</td>
<td>Synchronous Data Clock</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>USB_DP</td>
<td>Bi-directional</td>
<td>USB Data Plus</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>USB_DN</td>
<td>Bi-directional</td>
<td>USB Data Minus</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>PIO(7)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line (Drive Link status led, active low)</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>PIO(6)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line (connection status indication, active high)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>PIO(5)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output line</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>PIO(4)</td>
<td>Bi-directional</td>
<td>Programmable Input / Output Line (Button Input, active high)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>PIO(3)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output Line</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>PIO(2)</td>
<td>Bi-directional</td>
<td>Programmable Input / Output Line</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>PIO(1)</td>
<td>Bi-directional</td>
<td>Programmable Input/Output Line</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>PIO(0)</td>
<td>Bi-directional</td>
<td>Programmable Input / Output Line</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>GND</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>RF_IO</td>
<td>Analogue</td>
<td>50 ohm Antenna connection</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>GND</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
</tbody>
</table>
**BTM-11x Pin out Information**

**PIN DETAILS VIEWED FROM TOP SIDE**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>PIO(8)</td>
<td>GND</td>
</tr>
<tr>
<td>PIO(9)</td>
<td>RF_IO</td>
</tr>
<tr>
<td>PIO(10)</td>
<td>GND</td>
</tr>
<tr>
<td>AIO(0)</td>
<td>PIO(0)</td>
</tr>
<tr>
<td>AIO(1)</td>
<td>PIO(1)</td>
</tr>
<tr>
<td>RESET</td>
<td>PIO(2)</td>
</tr>
<tr>
<td>SPI_MISO</td>
<td>PIO(3)</td>
</tr>
<tr>
<td>SPI_CSBI</td>
<td>PIO(4)</td>
</tr>
<tr>
<td>SPI_CLK</td>
<td>PIO(5)</td>
</tr>
<tr>
<td>SPI_MOSI</td>
<td>PIO(6)</td>
</tr>
<tr>
<td>UART_CTS</td>
<td>PIO(7)</td>
</tr>
<tr>
<td>UART_TX</td>
<td>USB_DN</td>
</tr>
<tr>
<td>UART_RTS</td>
<td>USB_DP</td>
</tr>
<tr>
<td>UART_RX</td>
<td>PCM_CLK</td>
</tr>
<tr>
<td>PIO(11)</td>
<td>PCM_IN</td>
</tr>
<tr>
<td>3V3</td>
<td>PCM_SYNC</td>
</tr>
<tr>
<td>GND</td>
<td>PCM_OUT</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

**MODULE PAD AND SOLDER MASK DETAILS**

- SOLDER MASK WINDOW 1.0mm MAX
- SOLDER PAD 0.8mm

**MECHANICAL DETAILS VIEWED FROM TOP/BOTTOM SIDE**

---

PCB Layout (Top View)

- Design to Micro Strip Line
- PCE Layout (Top View)
# Qualified Product Notice

Jan-Willem Vonk  
Bluetooth Qualification Body (BQB)  
TUV Rheinland Taiwan Ltd.

<table>
<thead>
<tr>
<th>Applicant details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicant</strong></td>
</tr>
<tr>
<td><strong>Address</strong></td>
</tr>
<tr>
<td><strong>Person responsible</strong></td>
</tr>
<tr>
<td><strong>Phone</strong></td>
</tr>
<tr>
<td><strong>Fax</strong></td>
</tr>
<tr>
<td><strong>E-mail</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product name</strong></td>
</tr>
<tr>
<td><strong>Product ID</strong></td>
</tr>
<tr>
<td><strong>Hardware Version</strong></td>
</tr>
<tr>
<td><strong>Software Version</strong></td>
</tr>
<tr>
<td><strong>Product category</strong></td>
</tr>
<tr>
<td><strong>Product Type</strong></td>
</tr>
<tr>
<td><strong>Supported profiles</strong></td>
</tr>
<tr>
<td><strong>Product Description</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference documents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Specification</strong></td>
</tr>
<tr>
<td><strong>Test Case Reference List</strong></td>
</tr>
<tr>
<td><strong>Program Reference Document</strong></td>
</tr>
<tr>
<td><strong>Conformance Test Specification</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Qualified Product Notice identification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QPN Reference No.</strong></td>
</tr>
<tr>
<td><strong>Date of Assessment</strong></td>
</tr>
<tr>
<td><strong>Date of Listing</strong></td>
</tr>
</tbody>
</table>