Features

- World’s smallest Bluetooth® Serial Adapter (RS232)
- Bluetooth® v2.0, v2.1 wireless technology
- dBm Outputs TBA (expecting as previous version (18 dBm Tx Output Power and -86 dBm Rx Sensitivity)
- Serial (RS232) interface
- Serial Port Profile (SPP) available
- Programmable Standalone Module (With Embedded Bluetooth® v2.0 / v2.1 Stack)
- Unique patented firmware enabling serial printer functionality
- Up to 100m range (in open space)
- 46.3mm x 34mm x 16mm
- Powered by USB - Mini USB, DB9 or AC adaptor
- DTE / DCE (Master / Slave) mode switch
- DTR / DSR Handshaking and RTS / CTS Flow control lines
- Full Duplex for simultaneous communication between sender and receiver
- Ease of configuration and setup using the LM149 software
- Configurations pre-installed on production
- Fully Certified Solution
  See our website for this products certifications. RoHS, REACH and WEEE

Typical Industries

- EPOS
- Aviation
- M2M
- Automotive
- LNG

Overview

The LM048 is the world’s smallest Bluetooth® serial adapter (RS232), providing a secure and reliable Bluetooth® v2.0, v2.1 connection.

This wireless connection reaches a range of up to 100m in open space, replacing RS232 cables between a master (DTE) device and slave (DCE) devices such as printers, data loggers and digital signalling devices.

The LM048 patented firmware allows the serial configurations to be used. The firmware controls the RS232 signals, including DTR / DSR handshaking and RTS / CTS flow control lines. The LM048 is powered by USB - Mini USB, DB9 or AC adaptor and all settings and configurations are even retained when the adapter is powered down.

Our LM149 software is used to change the settings and configurations; including the auto connect function, discoverable / non-discoverable function, device name, baud rate, data bits and flow control. The AT Command set is used to change the configurations, plus the developer can also configure and modify the settings of a remote LM048 from a local LM048. Customised configurations and settings can be preloaded to the LM048, simplifying the manufacturing and testing process.
## General Specification

### Wireless
- **Bluetooth® Standard**: v2.0 and v2.1 wireless technology
- **Adapter Type**: Standalone (Configurable with AT Commands)
- **Profiles**: SPP

### Hardware
- **Chipset**: CSR
- **Antenna**: IC Antenna Onboard
- **Flash Memory**: 8 Mbit
- **RAM**: 48 KB
- **Interfaces**: Serial (RS232)
- **Power Supply**: 4V to 12V DC
- **Crystal Oscillator**: 16 MHz
- **LED Indicators**: Link (BLUE), Data (ORANGE) and Power (RED)

### RS232 (Serial)
- **RS232 Interface**: D_SUB 9 pin female
- **Signal**: RxD, TxD, DTR, DSR, RTS, CTS and GND
- **Full Duplex**: Yes
- **Baud Rate**: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2, 230.4, 460.8 and 921.6 Kbps

### RF Characteristics
- **Tx Output Power**: 18 dBm (Maximum)
- **Rx Sensitivity**: -86 dBm (Typical)
- **Antenna Gain**: 1 dBi to 2 dBi (Maximum)
- **Current Consumption**: 90 mA (Typical)
- **Range (in open space)**: Up to 100m
- **Data Rate**: Up to 3Mbps
- **Frequency**: 2.4 GHz to 2.485 GHz
- **Hopping**: 1,600/sec, 1MHz channel space
- **Modulation Scheme**: GFSK-Mbps, DQPSK-2 Mbps, and 8-DPSK-3Mbps

### Physical Characteristics
- **Operating Temperature**: -10°C to +70°C
- **Dimensions (L x W x H)**: 46.3mm x 34mm x 16mm
- **Weight**: 20.19g +/- 0.25g tolerance
- **Certifications**: See our website for this products certifications.
- **Compliance**: RoHS, REACH and WEEE
**LM048 Bluetooth® v2.0, v2.1 RS232 Serial Adapter**

Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

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**Signals**

![Female DB9 Connector](image)

**Pin out for LM048 Adapter**

<table>
<thead>
<tr>
<th>Pin</th>
<th>RS232 Signal</th>
<th>DTE to DCE Direction</th>
<th>DCE to DTE Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CD</td>
<td>Input</td>
<td>Output</td>
<td>Not Connected</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
<td>Input</td>
<td>Output</td>
<td>Receive Data</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Output</td>
<td>Input</td>
<td>Transmit Data</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>Output</td>
<td>Input</td>
<td>Data Terminal Ready</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>n/a</td>
<td>n/a</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>Input</td>
<td>Output</td>
<td>Data Set Ready</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Output</td>
<td>Input</td>
<td>Request to Send</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Input</td>
<td>Output</td>
<td>Clear to Send</td>
</tr>
<tr>
<td>9</td>
<td>Vcc</td>
<td>Input</td>
<td>Input</td>
<td>Power Supply</td>
</tr>
</tbody>
</table>

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**Factory Settings**

The factory settings of the COM Port are as follows:

- **Baud Rate**: 19200 bps
- **Data Bits**: 8
- **Parity**: None
- **Stop Bits**: 1
- **Flow Control**: None

Customised settings are available as factory settings upon special request; Bonding, Pre-Pairing, different Baud Rates, Data Bits, Parity and Flow Control Settings.
LM048 Bluetooth® v2.0, v2.1 RS232 Serial Adapter
Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

Hardware Structure

1. Link LED.
2. Data LED.
3. Power LED.
5. RS232 Connector.
6. Slide Switch.
7. Reset Button.

Switch Functions

Reset Button
By pressing the Reset Button you can:

- Disconnect a wireless connection (after a short press).
- Restore the factory settings (after over 3 seconds press).

Slide Switch
The slide switch can swap TxD / RxD, RTS / CTS and DTR / DSR Signals.
By switching, you can set the adapter as a DTE (towards antenna connector) or a DCE (towards RS232 connector).

Physical Dimensions
Datasheet Version Notes

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>v1.0</td>
<td>13 MAR 2018</td>
<td>Added version notes to datasheet.</td>
</tr>
<tr>
<td>v1.1</td>
<td>1 MAY 2018</td>
<td>Existing Part Numbers end of life (due to hardware change).</td>
</tr>
<tr>
<td>v2.0</td>
<td>1 MAY 2018</td>
<td>New LM048 version 3 release (with new power amplifier replacing previous).</td>
</tr>
<tr>
<td>v2.1</td>
<td>16 MAY 2018</td>
<td>New Part Numbers released for LM048 version 3.</td>
</tr>
<tr>
<td>v2.2</td>
<td>10 SEP 2018</td>
<td>Packing Description typo amended (DB9 male to male (not male to female))</td>
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</table>
LM048 Bluetooth® v2.0, v2.1 RS232 Serial Adapter
Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

LM048 Packaging Options

AO - Adapter Only
1 x Bluetooth® Serial Adapter

SRP - Single Retail Pack
1 x Bluetooth® Serial Adapter
1 x DB9 male to male connector
1 x USB - mini USB Cable for power supply
1 x All in one power supply (UK, EU and US)

Optional
LM025 Slim Line 9 pin to 25 pin Convertor

Twin Pack Pre-Paired
2 x Bluetooth® Serial Adapter

TRP - Twin Retail Pack
2 x Bluetooth® Serial Adapters
1 x DB9 male to male connector
1 x USB mini USB Cable for power supply
1 x All in one power supply (UK, EU and US)

Optional
LM025 Slim Line 9 pin to 25 pin Convertor

See our website to download any applicable Product Software, Manuals and Notes - http://www.lm-technologies.com/downloads