LM074 Bluetooth® Dual Mode Module
Standalone (With Embedded Bluetooth® v4.1 Stack)

Features
- Bluetooth® v4.1 specification (Dual Mode)
- Class 1 Tx Out Power
- Low Power Consumption
- Applications available including SPP with GAP Central, SPP or GAP Peripheral and SPP to Serial Bridge
- Over-the-Air Upgrade (OTAU) available
- Application firmware support
- Configurable with AT Command Set
- Configurations pre-installed on production

Overview
The LM074 Bluetooth® Dual Mode module is a powerful, flexible and versatile solution, allowing your embedded system to wirelessly communicate with other nearby Bluetooth® enabled devices (e.g. iOS and Android).

Its RF antenna interface provides the option to add an antenna that suits your requirements e.g. a dipole and PCB antenna. The selected antenna could provide a longer range, omnidirectional or unidirectional connection.

This single core standalone module combines a Bluetooth® low energy and v2.0, v2.1 radio using a dual mode Bluetooth® v4.1 stack, plus a microcontroller unit with an 8 Mbit flash memory for running the application. It also incorporates 38 pin outs, including I2C, UART and USB for interfacing with peripheral devices. It’s SMT side and bottom pads allow for easy manufacture and placement within your product.

LM offer bespoke integration into your product by supporting your developer, including development of new applications for the module. We also offer Bluetooth® Dual Mode demo applications, which can be customised to your specification. The AT Command set makes configuration of the firmware simple. The developed firmware and settings can be preloaded to the module, simplifying the manufacturing and testing process.
**General Specification**

**Wireless**
- **Bluetooth® Standard**: v4.1 (Dual Mode)
- **Module Type**: Standalone (Configurable with AT Commands)
- **Profiles**: SPP and GATT-Based

**Hardware**
- **Chipset**: Qualcomm
- **Antenna**: RF Antenna Interface (Pin 37)
- **Microcontroller (MCU)**: 16-bit RISC 80 MHz MCU
- **Flash Memory**: 8 Mbit
- **RAM**: 56 KB (12K x 24-bit)
- **Program Interface**: SPI
- **Interfaces**: I2C, UART, USB 2.0 (Full Speed), AIO, PIO and LED
- **Power Supply**: 5V (VCHG/ VBUS) or 2V8 (VBAT)
- **Crystal Oscillators**: 26 MHz

**RF Characteristics**
- **Tx Output Power**: 9.1 dBm
- **Rx Sensitivity**: -80 dBm
- **Data Rate**: Up to 3Mbps
- **Frequency**: 2.4 GHz to 2.485 GHz

**Physical Characteristics**
- **Operating Temperature**: -40°C to +85°C (TBC)
- **Dimensions (L x W x H)**: 16.7mm x 12.7mm x 2.55mm
- **Weight**: 0.81g +/- 0.25g tolerance
- **Certifications**: See our website for this product’s certifications.
- **Compliance**: RoHS, REACH and WEEE
Firmware

The LM074 Bluetooth® Dual Mode module is configured by using AT commands in configuration mode. The AT command set controls the primary operations such as information enquiry, connection/disconnection set up and settings. The LM074 module can be configured via its UART interface from a microcontroller or computer, using MCU software or a serial terminal (e.g. Hercules SETUP utility) respectively. At the start of every power up cycle the LM074 enters the configuration mode.

When the LM074 is connected to another Bluetooth device it enters into data mode. In data mode, users can send/receive data between the module and the remote device via UART. To exit data mode, the user can use the escape sequence. If the LM074 responds with “OK” to the escape sequence it enters into the online_command_mode (i.e. the connection is still active, AT commands can be entered via UART or the connection can be dropped). The LM074 can re-enter into data mode by using AT commands.

Default Factory Settings

**Device Settings**
- Discoverable: ON
- Device Name: LM074_2_Default
- Echo of command: ON
- Response to commands: ON
- Pairable State: ON

**Bluetooth® (v1.0 - v3.0) Profile Settings**
- SPP Role: Dual
- Escape sequence check enabled: YES

**UART Settings**
- Baud rate: 115200
- Stop bit: ONE
- Parity bits: NONE
- Flow Control: OFF

**Security Settings**
- Pin: 1234
- DPIN: OFF
- MITM: OFF
- IOTYPE: No Input Output

**Bluetooth® low energy Settings**
- GAP Role: Central or Peripheral (dependent on the application)
**Bluetooth® Applications**

The LM074 module can run full application code for a wide range of industries. This includes the M2M (industrial cable replacement), EPOS, health & fitness and consumer electronics industries.

The LM074 modules can run all Bluetooth® applications. Depending on whether the embedded developer requires a Bluetooth® low energy connection, a high-quality data stream Bluetooth® connection or both simultaneously.

LM Technologies offer application support, including designing new applications such as:

- Alert Tag
- Beacon
- Blood Pressure Sensor
- Cycling Speed and Cadence Sensor
- Environment Sensor
- Health Thermometer
- Heart Rate Sensor
- Keyboard & Mouse
- Multifunction Steering Wheel
- Printer
- Security Tag
- Serial Communication
- Time Client
- Temperature and Pressure
- Weight Scale

**Firmware Available**

- SPP with GAP Central
- SPP or GAP Peripheral
- SPP to Serial Bridge
Powering

- The LM074 can be powered in one of 2 ways:

1) Powered through the VCHG/VBUS (Pin 19)
2) Powered from a Lithium ion / Lithium polymer battery through VBAT (Pin 18)
## Pin Assignments

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
<th>Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SPI_CLK</td>
<td>I/O</td>
<td>SPI Clock</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>Ground</td>
<td>Common Ground</td>
<td>0V</td>
</tr>
<tr>
<td>3</td>
<td>SPI_CS</td>
<td>I/O</td>
<td>SPI Chip Select</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>4</td>
<td>SPI_MOSI</td>
<td>I/O</td>
<td>SPI Master Out Slave In</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>5</td>
<td>SPI_MISO</td>
<td>I/O</td>
<td>SPI Master In Slave Out</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>6</td>
<td>SPI_ENABLE</td>
<td>I/O</td>
<td>SPI Enable (CSR)</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>7</td>
<td>RST</td>
<td>Input</td>
<td>Reset</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>Ground</td>
<td>Common Ground</td>
<td>0V</td>
</tr>
<tr>
<td>9</td>
<td>AIO_7</td>
<td>I/O</td>
<td>Analog Input / Output</td>
<td>0V - VDD</td>
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<tr>
<td>10</td>
<td>AIO_9</td>
<td>I/O</td>
<td>Analog Input / Output</td>
<td>0V - VDD</td>
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<tr>
<td>11</td>
<td>AIO_24</td>
<td>I/O</td>
<td>Analog Input / Output</td>
<td>0V - VDD</td>
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<td>12</td>
<td>PIO_16</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<tr>
<td>13</td>
<td>PIO_15</td>
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<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<td>14</td>
<td>PIO_12</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<tr>
<td>15</td>
<td>CHG_EXT</td>
<td>Power</td>
<td>External Battery Charge Control</td>
<td>0V - 6.5V &amp; 0mA - 20mA</td>
</tr>
<tr>
<td>16</td>
<td>GND</td>
<td>Ground</td>
<td>Common Ground</td>
<td>0V</td>
</tr>
<tr>
<td>17</td>
<td>VREGENABLE</td>
<td>Power</td>
<td>Voltage Regulator Enable</td>
<td>1V</td>
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<tr>
<td>18</td>
<td>VBAT</td>
<td>Power</td>
<td>Battery Input</td>
<td>2V8</td>
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<tr>
<td>19</td>
<td>VCHG/VBUS</td>
<td>Power</td>
<td>Battery Charger Input / Positive Power Supply</td>
<td>5V (3V - 6.5V)</td>
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<tr>
<td>20</td>
<td>VBAT_SENSE</td>
<td>Power</td>
<td>Battery Charger Sense Input</td>
<td>200mV (195mV - 205mV)</td>
</tr>
<tr>
<td>21</td>
<td>SCL</td>
<td>I/O</td>
<td>I2C Serial Clock</td>
<td>0V - VDD</td>
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<tr>
<td>22</td>
<td>SDA</td>
<td>I/O</td>
<td>I2C Serial Data</td>
<td>0V - VDD</td>
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<td>23</td>
<td>PIO_18</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<td>24</td>
<td>PIO_13</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<td>25</td>
<td>PIO_30</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
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<tr>
<td>26</td>
<td>PIO_17</td>
<td>I/O</td>
<td>Programmable Input / Output</td>
<td>0V - VDD</td>
</tr>
<tr>
<td>27</td>
<td>USB_N</td>
<td>I/O</td>
<td>USB Negative</td>
<td>0V - VDD</td>
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<tr>
<td>28</td>
<td>USB_P</td>
<td>I/O</td>
<td>USB Positive</td>
<td>0V - VDD</td>
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<tr>
<td>29</td>
<td>LED_2</td>
<td>Output</td>
<td>LED 2</td>
<td>0V - VDD</td>
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<tr>
<td>30</td>
<td>LED_1</td>
<td>Output</td>
<td>LED 1</td>
<td>0V - VDD</td>
</tr>
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</table>
## Pin Assignments (Continued)

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<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
<th>Typical</th>
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</thead>
<tbody>
<tr>
<td>31</td>
<td>LED_0</td>
<td>Output</td>
<td>LED 0</td>
<td>0V - VDD</td>
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<tr>
<td>32</td>
<td>PIO_5 / UART_CTS</td>
<td>I/O</td>
<td>Programmable Input / Output or UART CTS</td>
<td>0V - VDD</td>
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<tr>
<td>33</td>
<td>PIO_3 / UART_TX</td>
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<td>Programmable Input / Output or UART Transmit</td>
<td>0V - VDD</td>
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<td>PIO_4 / UART_RTS</td>
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<td>Programmable Input / Output or UART RTS</td>
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<td>PIO_2 / UART_RX</td>
<td>I/O</td>
<td>Programmable Input / Output or UART Receive</td>
<td>0V - VDD</td>
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<tr>
<td>36</td>
<td>GND</td>
<td>Ground</td>
<td>Common Ground</td>
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<tr>
<td>37</td>
<td>ANTENNA</td>
<td>Analogue</td>
<td>Antenna Interface</td>
<td>0V - VDD</td>
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<tr>
<td>38</td>
<td>GND</td>
<td>Ground</td>
<td>Common Ground</td>
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</table>
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Module Block Diagram

- ANT
- Filter
- CSR Chipset
- BT_RF
- SIO
- LED
- AIO
- SPI (Debug)
- UART
- I2C
- USB
- PIO
- VDD
- 8 Mbit SIO
- FLASH
- XTAL 26 MHz
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Physical Dimensions

Top View

Front View

Side View
Datasheet Version Notes

v1.0 13 MAR 2018 Added version notes to datasheet.
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LM074 Packaging Options

<table>
<thead>
<tr>
<th>Part No</th>
<th>Product</th>
<th>Description</th>
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<tr>
<td>074-0190</td>
<td>LM074 Module</td>
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<td>074-0191</td>
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<td>074-0192</td>
<td>LM074 Module</td>
<td>MOD SMT PROG BT4.1 D/Mode Fw5.x 9dBm NO-ANT T&amp;R</td>
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