



# LM400 Bluetooth® Module with IC Antenna Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

Product LM400  
Part No See Last Page  
Revised 16/MAY/2018



See version notes page for changes



## Features

- Bluetooth® v2.0, v2.1 wireless technology
- 18 dBm Tx Output Power and -88 dBm Rx Sensitivity
- IC Antenna Onboard
- 3.0V to 3.6V Operation
- SPI, UART and USB 2.0
- Serial Port Profile (SPP) available
- Programmable Standalone Module (With Embedded Bluetooth® v2.0 / v2.1 Stack)
- Up to 100m range (in open space)
- 30mm x 27mm x 14mm
- DTR / DSR Handshaking and RTS / CTS Flow control lines
- Full Duplex for simultaneous communication between sender and receiver

- Configurations pre-installed on production
- SMT Side and Bottom Pads for easy production
- See our website for this products certifications.
- RoHS, REACH and WEEE

## Typical Industries

- EPOS
- Aviation
- M2M
- Automotive
- LNG

## Overview

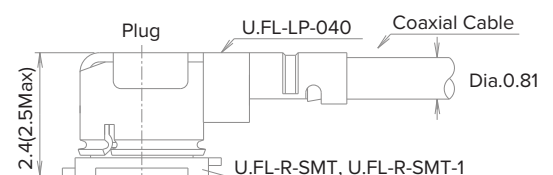
The LM400 Bluetooth® v2.0, 2.1 module provides a secure and reliable wireless connection to other Bluetooth® devices within a range of up to 100m. This is the ideal serial cable replacement between devices such as printers, vehicle monitoring systems, car diagnostics and EPOS systems.

This module uses our LM072 that combines a Bluetooth® Classic Radio using a v2.0 / v2.1 stack, plus a microcontroller with 8 Mbit Flash for running the applications. The LM400 has a small form factor of 30mm x 27mm x 14mm incorporating UART, SPI and USB for interfacing with a wide range of peripheral devices. Application firmware and configuration settings can be preloaded to the module before supply. The firmware controls the serial signals including DTR / DSR handshaking and RTS / CTS flow control lines.

## See LM411 for U.FL and IPEX

Although many users request a U.FL receptacle for compatibility reasons, U.FL is in fact a trade name of a series of connectors manufactured and owned by HIROSE. IPEX connectors are identical in every dimension and is an international standard that will connect seamlessly with branded U.FL Connectors.

Our IPEX receptacles are manufactured to the highest standard using high grade materials for insulating and plating, a full breakdown of the materials used including Phosphor, Bronze, Gold and Brass can be supplied by request.



# LM400 Bluetooth® Module with IC Antenna

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

Product LM400  
Part No See Last Page

### General Specification

#### Wireless

Bluetooth® Standard	v2.0 and v2.1
Module Type	Standalone (Configurable with AT Commands)
Profiles	SPP

#### Hardware

Chipset	CSR
Antenna	IC Antenna Onboard
Flash Memory	8 Mbit
RAM	48 KB
Interfaces	AIO, PCM, PIO, SPI, UART and USB 2.0
Power Supply	3V – 3.6V

#### Serial Interface

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	-88 dBm (Typical)
Antenna Gain	1 dBi to 2 dBi (Maximum)
Current Consumption	114 mA (Maximum)
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)	30mm x 27mm x 14mm
Weight	4.91g +/- 0.25g tolerance
Certifications	See our website for this products certifications.
Compliance	RoHS, REACH and WEEE

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Product LM400  
Part No See Last Page

### Electrical Specification

Parameter	Description	Min	Typ.	Max	Unit
Carrier Frequency	-	2.402	-	2.480	GHz
RF Output Power	Measured in 50ohm	15	16.5	18	dBm
Rx Sensitivity	-	-	-88	-86	dBm
Load Impedance	No abnormal Oscillation	-	-	5:1	-
Input Low Voltage	RESET, UART, GPIO, PCM	-0.30	-	0.80	DCV
Input High Voltage	RESET, UART, GPIO, PCM	0.7VDD	-	VDD+0.3	DCV
Output Low Voltage	UART, GPIO, PCM	-	-	0.40	DCV
Output High Voltage	UART, GPIO, PCM	VDD-0.4	-	-	DCV
Average Current Consumption	Receive DM1	-	114	-	mA

Absolute Maximum Ratings	Min	Max	Units
Storage Temperature	-40	+85	°C
Supply Voltage (VDD)	2.7	3.6	DCV
Supply Voltage (PVCC)	3.0	3.3	DCV
Other Pin Voltage	VSS - 0.4	VDD + 0.4	DCV

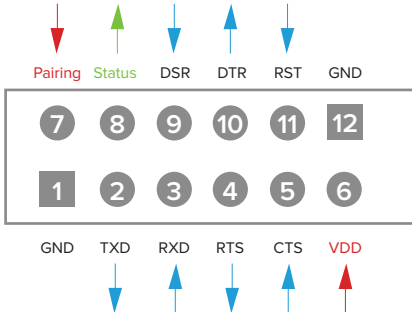
Recommended Operating Conditions	Min	Max	Units
Temperature	-10	+70	°C
Supply Voltage for UART	3.0	3.6	DCV
Supply Voltage for USB	3.0	3.6	DCV

# LM400 Bluetooth® Module with IC Antenna

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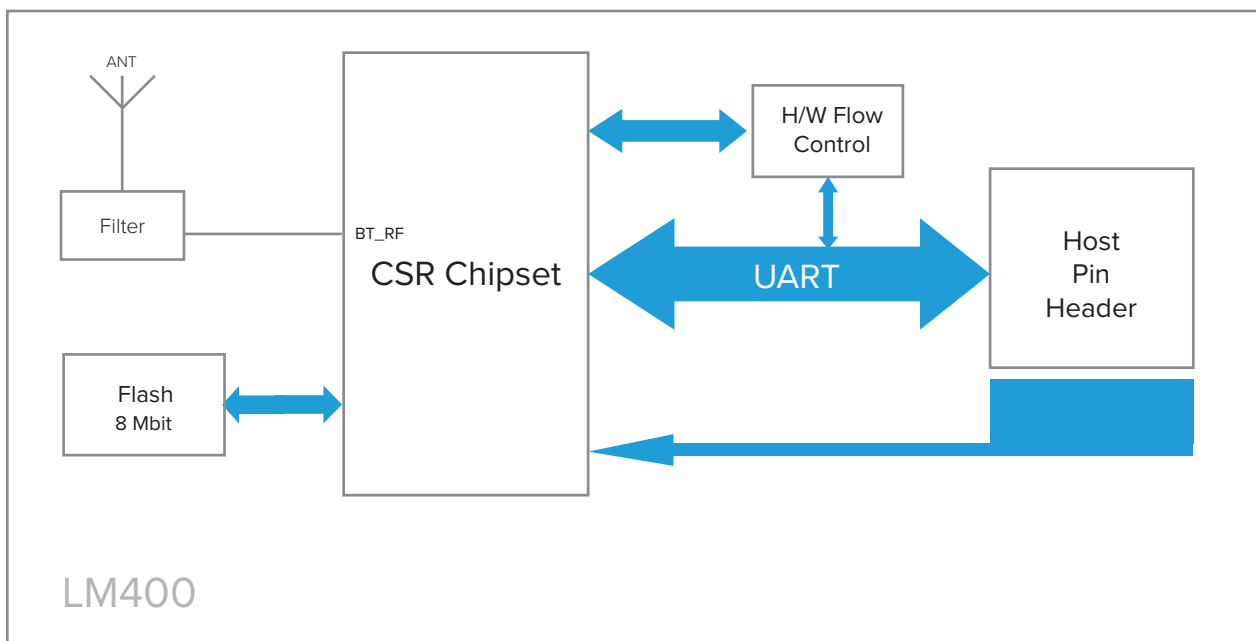
Product LM400  
Part No See Last Page

## Pin out and Definition for Header



Pin	Pin Name	Direction	Description	Signal Level
1	GND	-	Power Ground	Ground
2	TXD	Output	UART data output	TTL
3	RXD	Input	UART data input	TTL
4	RTS	Output	UART request to send	TTL
5	CTS	Input	UART clear to send	TTL
6	VDD	Input	DC input (3.0 ~ 3.3V)	Power
7	Pairing	Input	Pairing input (Active Low)	TTL
8	Status	Output	Bluetooth® Connect Detect (Active Low)	TTL
9	DSR	Input	Data Set Ready	TTL
10	DTR	Output	Data Terminal Ready	TTL
11	RST	Input	Reset (Active Low)	TTL
12	GND	-	Power Ground	Ground

## Module Block Diagram



LM400

# LM400 Bluetooth® Module with IC Antenna

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Product LM400  
Part No See Last Page

### Pin Outs

Pin	Pin Name	Type	Description
1	GND	GND	Common Ground
2	PVCC	Power	Power Amp. Power Supply (3.3V)
3	AIO 0	Bi-directional	Programmable I/O terminal, 32KHz sleep clock input
4	AIO 1	Bi-directional	Programmable I/O terminal
5	PIO 0	Bi-directional	Programmable I/O terminal, Rx Enable
6	PIO 1	Bi-directional	Programmable I/O terminal, Tx Enable
7	PIO 2	Bi-directional	Programmable I/O terminal, USB_PULL_UP, CLK_REQ_OUT
8	PIO 3	Bi-directional	Programmable I/O terminal, USB_WAKE_UP, CLK_REQ_IN
9	PIO 4	Bi-directional	Programmable I/O terminal, USB_ON, BT_PRIORITY/CH_CLK output for co-existence signalling
10	GND	GND	Common Ground
11	PIO 5	Bi-directional	Programmable I/O terminal, USB_DETACH/, BT_ACTIVE output for co-existence signalling
12	PIO 6	Bi-directional	Programmable I/O terminal, CLK_REQ, WLAN_ACTIVE/CH_DATA input for co-existence signalling
13	PIO 7	Bi-directional	Programmable I/O terminal
14	PIO 8	Bi-directional	Programmable I/O terminal
15	PIO 9	Bi-directional	Programmable I/O terminal
16	RESET	CMOS input	Reset input of module, Active Low Reset
17	VCC	Power	Module Power Supply input
18	GND	GND	Common Ground
19	GND	GND	Common Ground
20	USB_DP	Bi-directional	USB data plus
21	USB_DN	Bi-directional	USB data minus
22	PCM_SYNC	Bi-directional	Synchronous data sync
23	PCM_IN	CMOS input	Synchronous data input
24	PCM_OUT	CMOS output	Synchronous data output
25	PCM_CLK	Bi-directional	Synchronous data clock
26	UART_RX	CMOS input	UART data input
27	UART_TX	CMOS output	UART data output
28	UART_RTS	CMOS output	UART request to send (active low)
29	GND	GND	Common Ground
30	UART_CTS	CMOS input	UART clear to send (active low)
31	SPL_MOSI	CMOS input	Serial Peripheral Interface data input
32	SPL_CSB	CMOS input	Chip select for Synchronous Serial Peripheral Interface (active low)
33	SPL_CLK	CMOS input	Serial Peripheral Interface Clock
34	SPL_MISO	CMOS output	Serial Peripheral Interface data output
35	PIO 11	Bi-directional	Programmable I/O terminal
36	PIO 10	Bi-directional	Programmable I/O terminal
37	RF_IO	Analogue	Antenna interface
38	GND	GND	Common Ground

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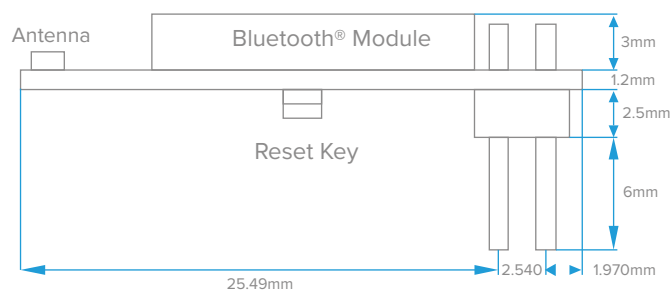
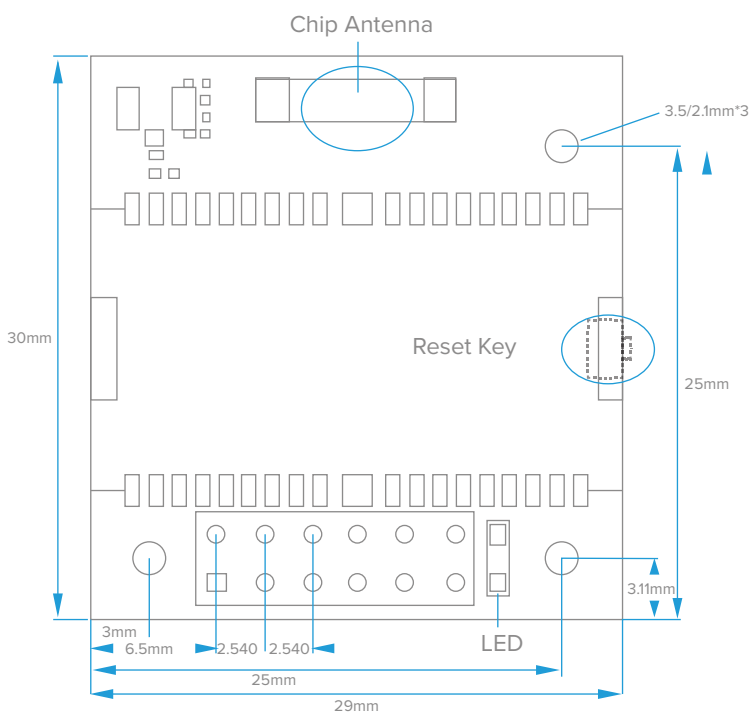
Product  
Part No

LM400  
See Last Page

### Pin Out Notes

1. PIO10 DSR/DTR: Do not use as they do not currently function
2. PIO Pairing: The function has been changed to Data LED Indication
3. PIO6 Status: The function has not been specified.
4. LED: Bluetooth® Link status.
5. RESET E
  - The following occurs when the Reset Button is pressed:
  - Disconnect and reconnect a wireless connection (A short press).
  - Restore the factory COM port 1 200bps settings (Press for over 3 seconds).

### Physical Dimensions



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Product LM400  
Part No See Below

## LM400 Packaging Options



400-3150

Previously 400-0150

### LM400 Module

MOD SMT PROG BT2.0 UART-12Pin Fw4.x 3-3.6v P&P IC-ANT PCS



400-3151

Previously 400-0151

### LM400 Module

MOD SMT PROG BT2.0 UART-12Pin Fw4.x 3-3.6v P&P IC-ANT TRAY



400-3158

Previously 400-0158

### LM400 Module

MOD SMT PROG BT2.1 2Mbps UART 3.0-3.6V 12Pin P&P IPEX TRAY



400-3159

Previously 400-0159

### LM400 Module

MOD SMT PROG BT2.0 2Mbps UART 3.0-3.6V 12Pin P&P IPEX TRAY

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