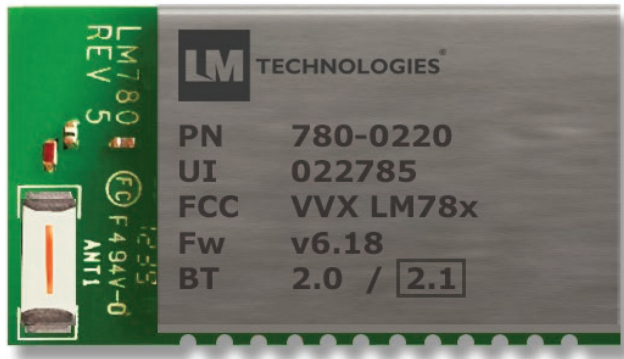


LM780 Bluetooth® Module with IC Antenna

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

Product	LM780
Part No	See Last Page
Revised	13/MAR/2018
Datasheet Version	1.1



Features

- Bluetooth® v2.0 / v2.1 specification
- 4 dBm Tx Output Power (Class 2)
- Low Power Consumption
- SPP firmware available
- Configurable with AT Command Set
- Up to 25m range (in open space)
- 3V - 5.5V Operation
- Extensive Technical Support Available
- Onboard Chip Antenna
- SPI, UART, USB 2.0 and PIO
- RTS / CTS Flow control UART lines
- PCM Audio Interfaces
- Configurations pre-installed on production
- 26.92mm x 15.20mm x 2.0mm
- SMT Side and Bottom Pads for easy production
- See our website for this products certifications.
- RoHS, REACH and WEEE

Typical Applications

- Serial Communications
- Medical Devices
- Domestic and Industrial Applications
- Embedded Devices
- Remote Monitoring and Control
- GPS, POS, Barcode Readers
- Payment Terminals

Overview

The LM780 Bluetooth® v2.0, v2.1 data module with onboard chip antenna provides a secure and reliable Bluetooth® v2.0, v2.1 connection that enables you to communicate with other nearby Bluetooth® v2.0, v2.1 devices.

This standalone module consist of a MCU with 8Mbit flash for running Bluetooth® v2.0, v2.1 profiles such as SPP. It operates within a wide voltage range of 3V to 5.5V and gives excellent RF performance over a distance of up to 25m.

The AT Command set makes configuration of the firmware simple. The developed module and settings can be preloaded to the module, simplifying the manufacturing and testing process. It's SMT side and bottom pads allows for easy integrations into your product.

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General Specification

Wireless

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

Hardware

Chipset	CSR
Antenna	IC Antenna
Flash Memory	8 Mbit
RAM	48 KB
Interfaces	SPI, UART, USB 2.0 and PIO
UART lines	RX, TX, RTS, CTS and GND
Full Duplex (UART)	Yes
Baud Rate (UART)	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 115.2, 230.4, 460.8 and 921.6 Kbps
Audio Interfaces	PCM
Power Supply	3V - 5.5V
Crystal Oscillator	26 MHz

RF Characteristics

Tx Output Power	4 dBm (Typical)
Rx Sensitivity	TBA
Current Consumption (Idle Mode)	19mA (Typical)
Current Consumption (Deep Sleep Mode)	0.9mA (Typical)
Range (in open space)	25m
Data Rate	Up to 3Mbps
Frequency	2.4GHz 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)	26.92mm x 15.20mm x 2.0mm
Weight	1.97g +/- 0.25g tolerance
Certifications	See our website for this products certifications.
Compliance	RoHS, REACH and WEEE

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Electrical Characteristics

Recommended Operating Conditions

Parameter	Min	Max	Unit
Operating Temperature	-10	+70	°C
Supply Voltage (VDD)	+3	+5.5	V
UART pins : Tx, Rx, RTS and CTS	-0.5	+5.5	V
All other pins	VSS - 0.4	+3.3	V

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Storage Temperature	-40	+150	°C
Supply Voltage (VDD)	-0.3	+6.5	V
UART pins : Tx, Rx, RTS and CTS	-0.5	+7.0	V
All other pins	VSS - 0.4	+3.3	V

General Electrical Specification

Parameter	Description	Min	Max	Unit
Input Low Voltage	RESET, PIO, PCM	-0.3	+0.8	V
Input Low Voltage	UART		0.3x VDD	V
Input High Voltage	RESET, PIO, PCM	0.7 x VDD	VDD + 0.3	V
Input High Voltage	UART	0.7 x VDD		V

Power Consumption Characteristics

Current Consumption

Operation Mode	Average	Unit
Slave mode, Unconnected Idle	19	mA
Master mode, Unconnected Idle State	5.3**	mA
Connected State, no data transfer (master and slave mode)	19	mA
Unidirectional data traffic	27	mA
Bidirectional data traffic	29	mA
Deep Sleep Mode	0.9	mA

Input Voltage: 3.3V*

* : Increasing power supply voltage to 5V has negligible effect on power consumption figure

** : When switching role from Master to Slave, the current consumption goes up to 37mA and then falls to 5.3mA after about 15 seconds

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Pin Assignments

Pin	Name	Type	Description
1	SPI_CLK	I	SPI Clock
2	PIO 0	I/O	Programmable Input Output
3	RESET	I	Active Low Reset
4	PCM_IN	I	Synchronous Data Input
5	PCM_OUT	O	Synchronous Data Output
6	UART_TX	O	UART Data Output
7	PCM_CLK	I/O	Synchronous Data Clock
8	UART_RX	I	UART Data Input
9	UART_CTS	I	UART Clear to Send (Active Low)
10	UART_RTS	O	UART Request to Send (Active Low)
11	USB_DN	I/O	USB Data Negative
12	USB_DP	I/O	USB Data Positive
13	PCM_SYNC	I/O	Synchronous Data Sync
14	PIO 7	I/O	Programmable Input Output
15	PIO 6	I/O	Programmable Input Output
16	SPI_MISO	O	SPI Data Output
17	SPI_MOSI	I	SPI Data Input
18	PIO 1	I/O	Programmable Input Output
19	SPI_CS	I	Chip Select for SPI Interface
20	PIO 2	I/O	Programmable Input Output
21	PIO 8	I/O	Programmable Input Output
22	PIO 3	I/O	Programmable Input Output
23	VSS	N/A	Ground
24	VDD	I	Power Supply

Factory Settings

Default COM Port Settings:

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, Baud Rates, Data Bits, Parity and Flow Control Settings.

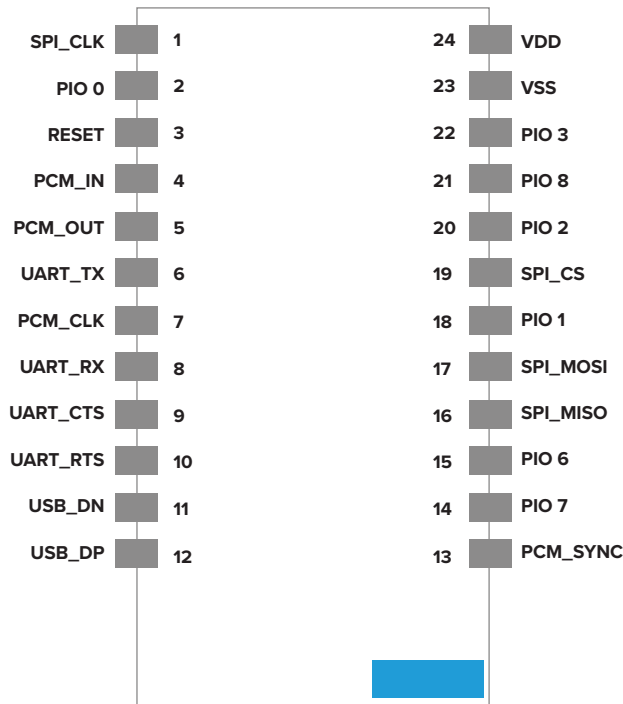
LM780 Bluetooth® Module with IC Antenna

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

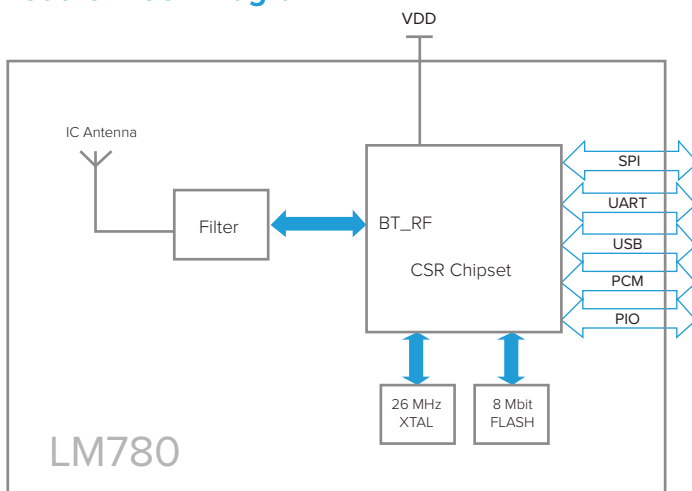
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Pin Outs



Module Block Diagram



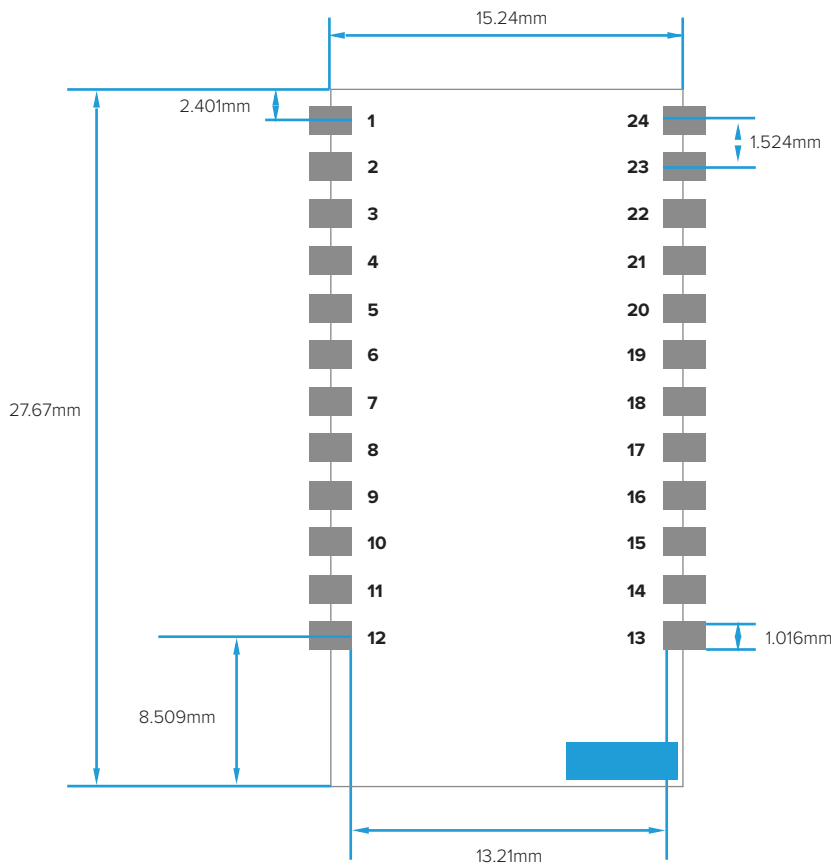
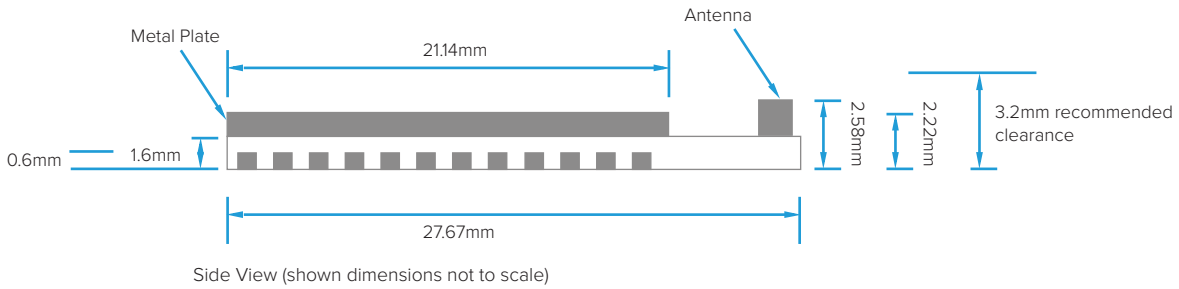
Note: USB and PCM interface are not handled by LM780 firmware at present

LM780 Bluetooth® Module with IC Antenna
 Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

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Physical Dimensions



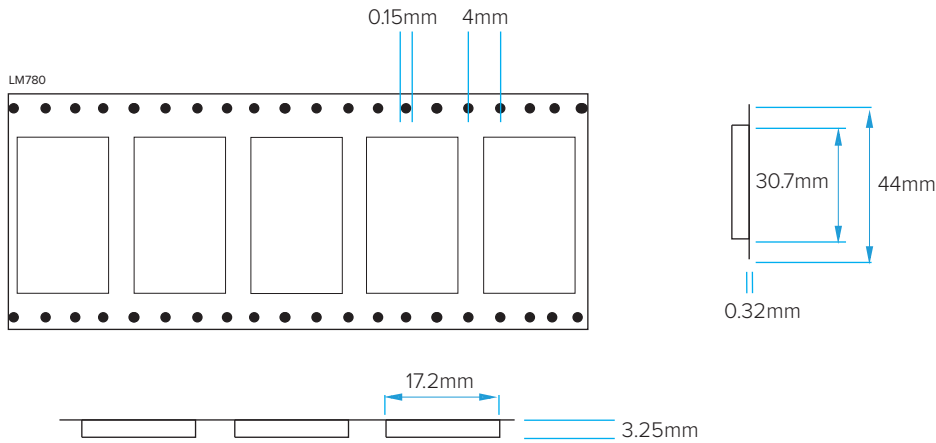
LM780 Bluetooth® Module with IC Antenna
 Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

Product
 Part No

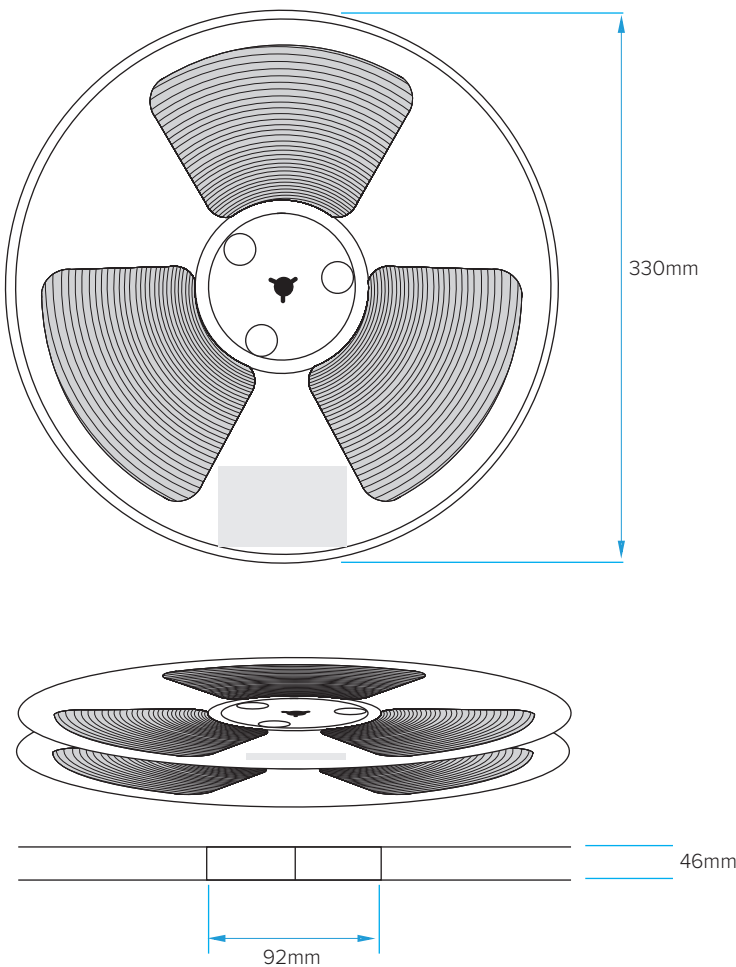
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Tape and Reel Packaging

Tape Dimensions



Reel Dimensions



Notes

- Carton Dimensions (L x W x H):
 360mm x 280mm x 370mm

Quantities

- 900 modules per Tape
- 4 Boxes per Carton
- 3600 modules per Carton

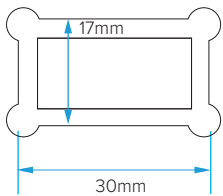
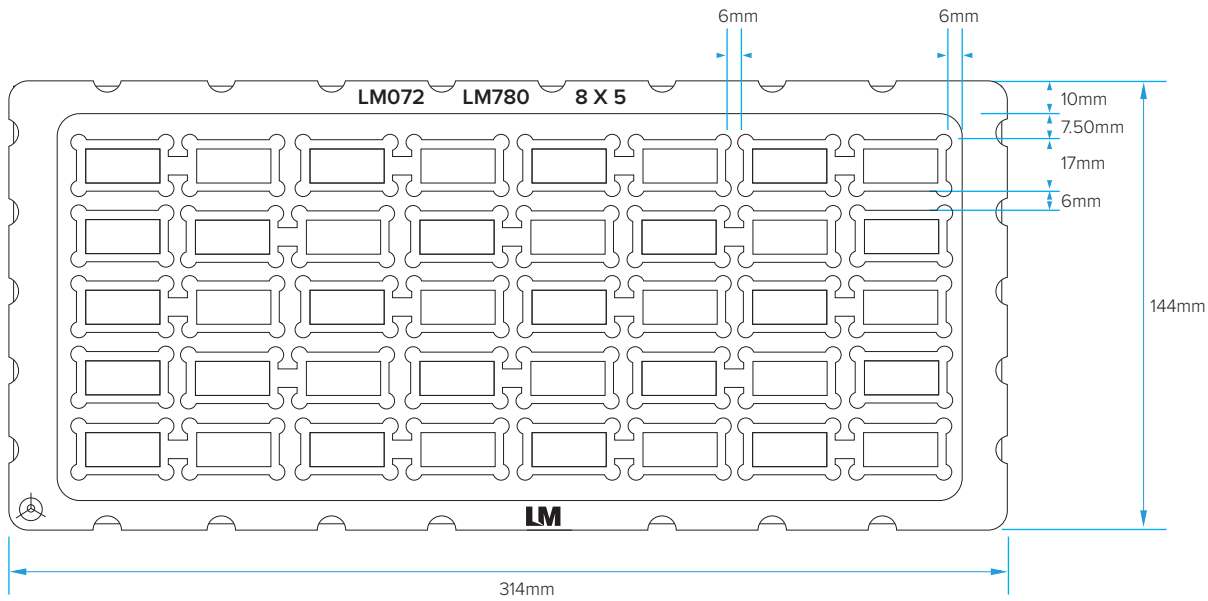
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 Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

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Tray Packaging

Tray Dimensions



Notes

- Anti-Static PS Tray, Black .
- Electrical Resistance: $1\text{ M}\Omega < R < 100\text{ M}\Omega$.
- Thickness: $T = 0.8\text{ mm}$
- Carton Dimensions (L x W x H):
 $312\text{mm} \times 141\text{mm} \times 7.5\text{mm}$

Quantities

- 40 modules per Tray
- 400 modules per Box
- 4 Boxes per Carton
- 1600 modules per Carton

PCB Drying Conditions

This module is a Moisture Sensitivity Level 3 (MSL-3) surface mount device.

Please refer to drying conditions prior to the solder reflow processes.



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Datasheet Version Notes

v1.0	11 JAN 2018	Added version notes to datasheet.
v1.1	13 MAR 2018	MSL Description text improvement in the PCB Drying Conditions section.



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LM780 Packaging Options



780-0220

LM780 Module
MOD CL2 20m CSR IC BC4 SMT OB-ANT



780-0221

LM780 Module
MOD SMT PROG BT2.0 2Mbps UART USB 3.0-3.6V 4dBm IC-ANT TRAY



780-0222

LM780 Module
MOD BT2.0 CL2 CSR BC4 SMT Fw4.xx OB-ANT T&R



780-0223

LM780 Module
MOD BT2.1 CL2 MOD CSR BC4 SMT Fw6.xx OB-ANT



780-0224

LM780 Module
MOD SMT-PROG BT4.0 DUAL USB UART 4.25-5V DTRAY Aptx NO-ANT



780-0225

LM780 Module
MOD BT2.1 CL2 CSR BC4 SMT Fw6.xx OB-ANT T&R



780-0226

LM780 Module
MOD BT2.1 CL2 CSR BC4 SMT Fw5.xx OB-ANT



780-0227

LM780 Module
MOD BT2.1 CL2 CSR BC4 SMT Fw5.xx OB-ANT TRAY



780-0228

LM780 Module
MOD BT2.1 CL2 CSR BC4 SMT Fw5.xx OB-ANT T&R

• Product User Guides, Manuals and Configuration Software is available to download via our website - <http://www.lm-technologies.com/downloads>