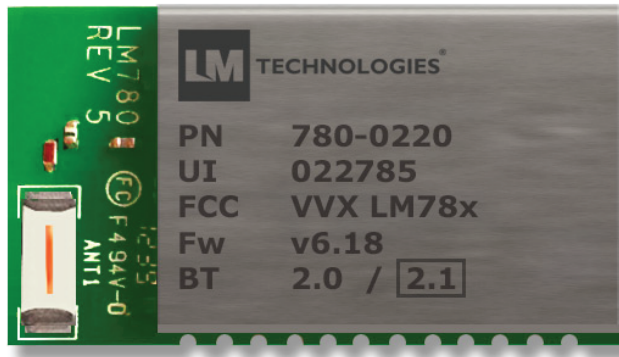


## LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

Product  
Part No  
Revised

LM780  
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24/JAN/2017



### 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 (Full Speed) 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
- FCC and CE / RED Directive
- RoHS, REACH and WEEE Compliant Solution

### 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.

## LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna

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

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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 (Full Speed) 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
Development Kit	LM555

#### 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	1.98 g
Certifications	FCC, and CE / RED Directive
Compliance	RoHS, REACH and WEEE

# LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna

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

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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

## LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna

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

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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.

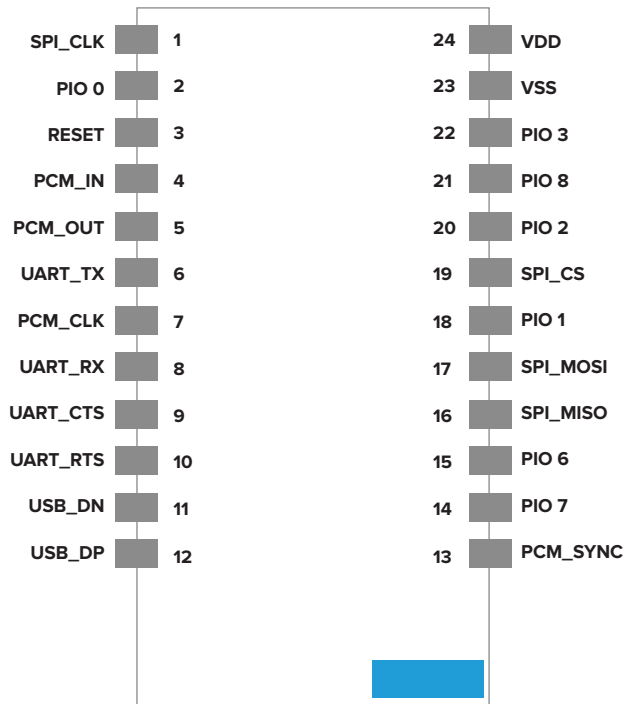
# LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna

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

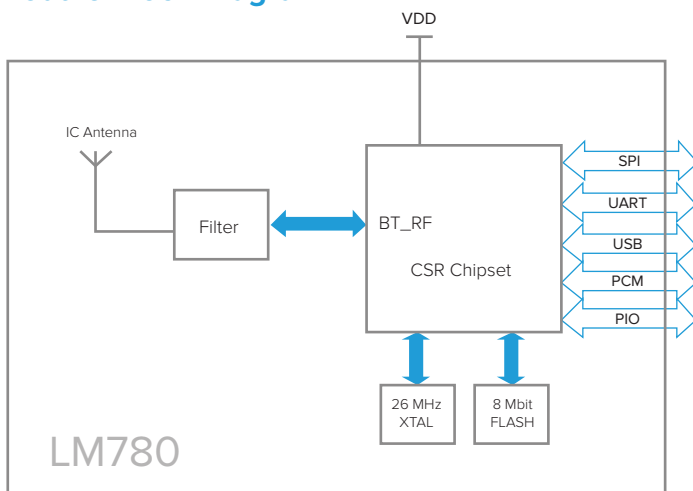
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## Pin Outs



## Module Block Diagram



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

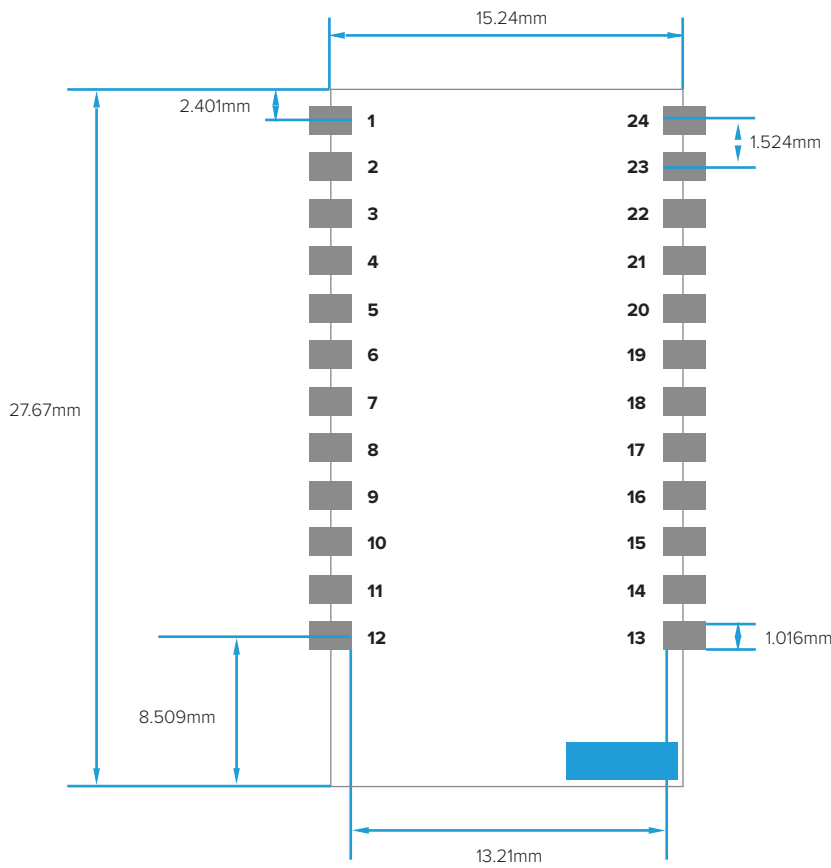
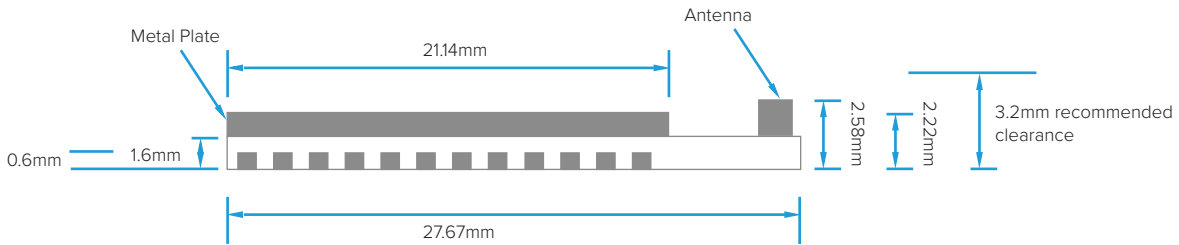


# LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

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## Physical Dimensions



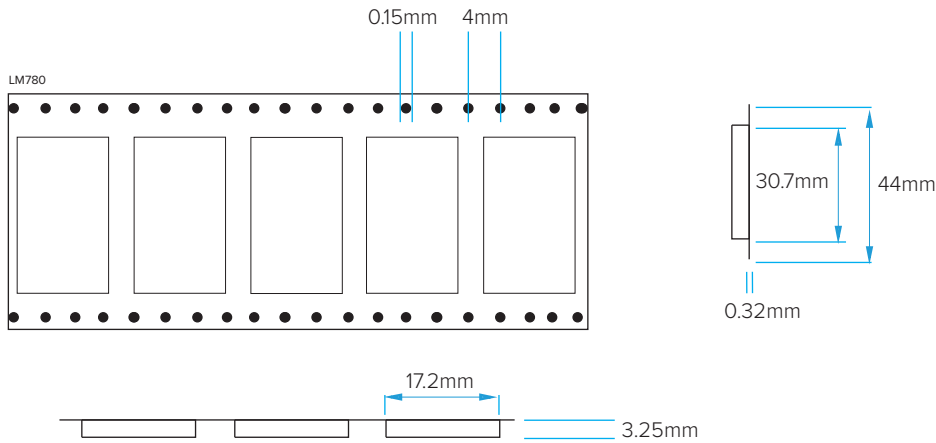
**LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna**  
 Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

Product  
 Part No

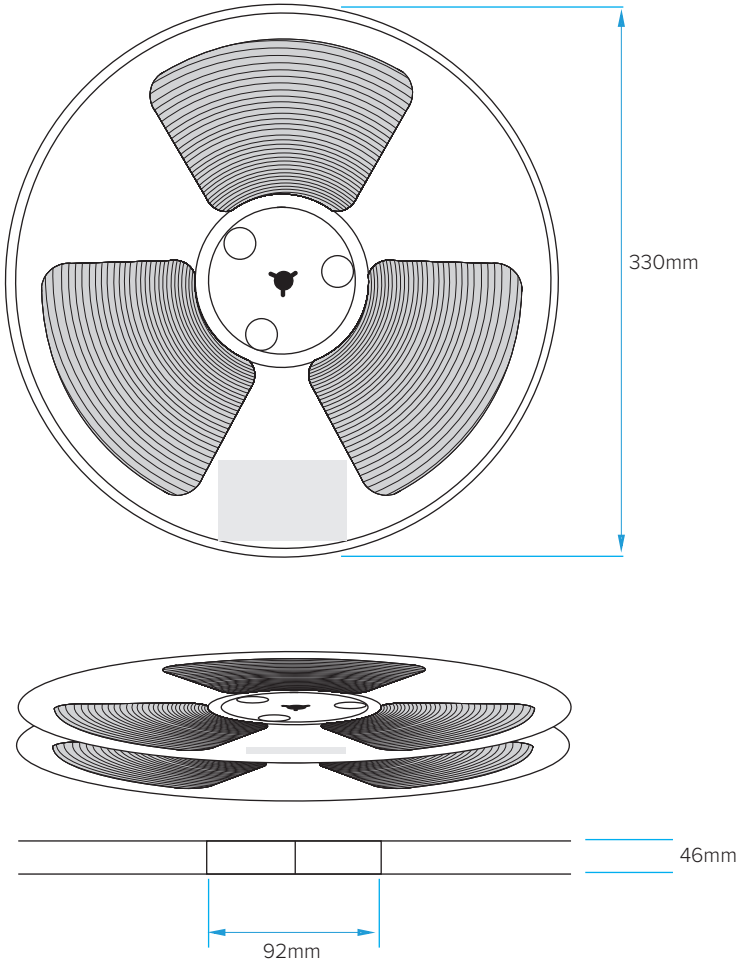
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**Tape and Reel Packaging**

**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

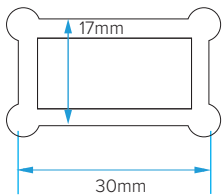
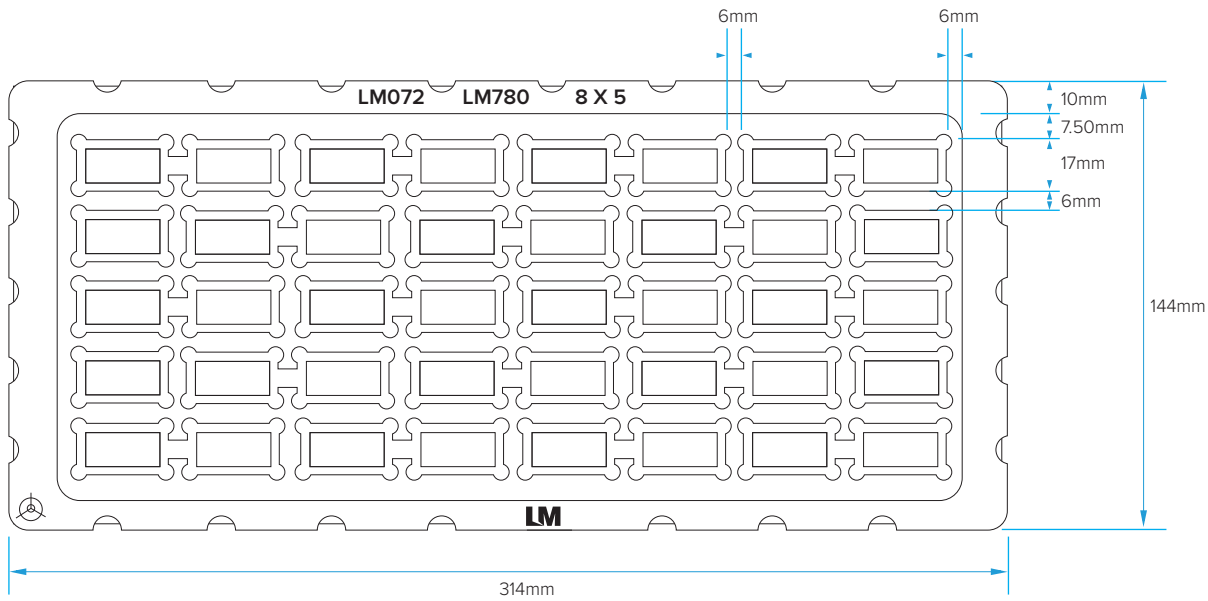
**LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna**  
 Standalone (With Embedded Bluetooth® v2.0 / v2.1 Stack)

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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



# LM780 Bluetooth® v2.0, v2.1 Data Module with IC Antenna

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

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## LM780 Packaging Options



780-0221

### LM780 Module

1 x LM780 SMT Programmable BT 2.0 Firmware IC Ant Module  
Tray



780-0222

### LM780 Module

1 x LM780 SMT Programmable BT 2.0 Firmware IC Ant Module  
Tape and Reel



780-0224

### LM780 Module

1 x LM780 SMT Programmable BT 2.1 Firmware IC Ant Module  
Tray



780-0225

### LM780 Module

1 x LM780 SMT Programmable BT 2.1 Firmware IC Ant Module  
Tape and Reel

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