

LM540 – Long Range Bluetooth® v2.1 + EDR Adapter

Host Controller Interface (HCI) via USB Interface

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 Revised 11/JAN/2018
 Datasheet Version 1.0



Features

- World's Smallest Bluetooth® USB Adapter with SMA Connector
- Bluetooth® v2.0 / v2.1 wireless technology
- 17.9dBm Output + 2dBi Gain Antenna 19.9dBm
- USB 2.0 for data and power source
- 787m Connection & Pass Data tested between 2 x LM540 each with 2dBi Antenna (tested at Eaton Dorney Olympic Rowing Park Surrey England.)
- Compatible with GAP, SPP, HSP, HFP, DUN, FTP, FAX, PAN, LAN, HID, SYNC, HCRP, A2DP, AVRCP, BIP, GOEP, SDAP and OPP profiles
- Plug and Play (OSX, Linux and Windows XP – 10 compatible)
- IVT Bluesoleil 8.0 License Available. LM tested a range of Bluetooth® stacks and found LM540 with IVT recorded the lowest latency
- RoHS, REACH and WEEE compliant
- See our website for this products certifications.

Overview

The LM540 USB adapter has many uses due to the huge range of Bluetooth® Classic profiles it is compatible with.

Its exceptional range enables wireless communication with other long range Bluetooth® v2.1+EDR devices (or another LM540) up to 787m away.

Similar products on the market are twice the size and require an external power supply.

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General Specification

Wireless

Bluetooth® Standard	v2.1 + EDR
Adapter Type	Host Controller Interface (HCI)
OS Compatibility	OSX, Linux, Windows XP – 10 and Windows IoT Core 10
Software / Drivers	IVT Bluesoleil 8.0 (for Windows), Standard Windows Driver, BlueZ (for Linux) and Standard OSX Driver
LED Indicator	Power / Active

Hardware

Chipset	CSR
Antenna	SMA Connector
Antenna Feature	90° Pivoting Angle Antenna
Interfaces	USB 2.0
Power Supply	5V DC (USB powered)

RF Characteristics

Tx Output Power	17.6 dBm (Class 1)
Rx Sensitivity	-86 dBm (Typical)
Antenna Gain	Max 2.3 dBi
Range	Up to 787 m with 2 dBi Antenna
Data Rate	Up to 3Mbps
Frequency	2.4GHz to 2.485 GHz
Modulation Scheme	GFSK for 1 Mbps, $\pi/4$ -DQPSK for 2 Mbps, 8-DPSK for 3 Mbps
Spread Spectrum	FHSS (Frequency Hopping Spread Spectrum)

Physical Characteristics

Operating Temperature	-20°C to +75°C
Storage Temperature	-40°C to +85°C
Dimensions (L x W x H)	53mm x 28mm x 14mm (Without SMA Connector)
Weight	11.05g +/- 0.25g tolerance
Certifications	See our website for this products certifications.
Compliance	RoHS, REACH and WEEE

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HCI Architecture

Within the Host Controller Interface (HCI) Architecture, the LM540 runs the HCI Firmware, Link Manager Firmware and baseband controller.

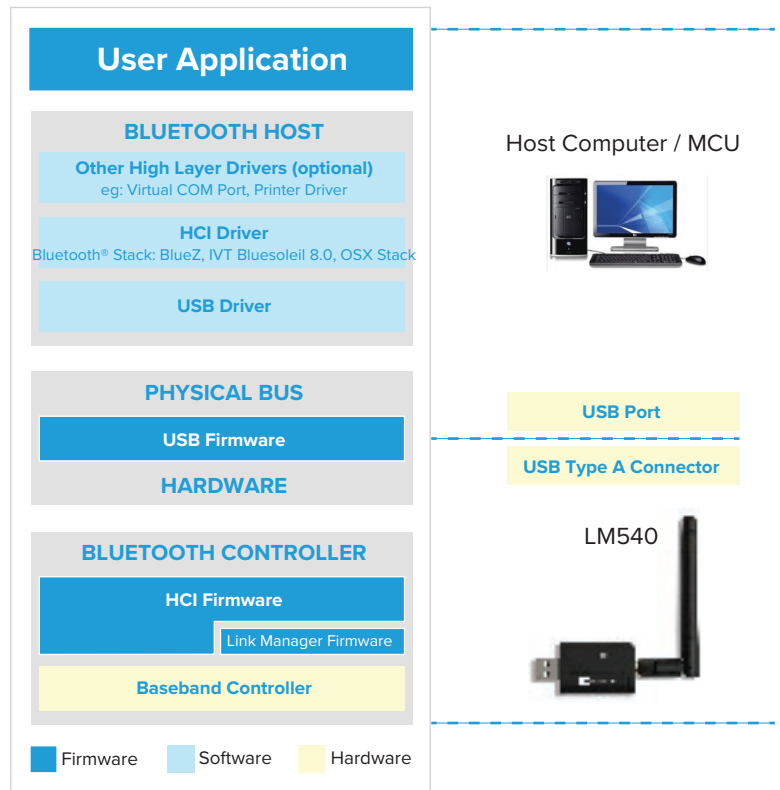
The host operating system runs the Bluetooth® v2.0, v2.1 user application. It also runs the Bluetooth® Stack (HCI Driver), USB Driver and other necessary drivers.

The Bluetooth® Stack (HCI Driver) exchanges data and commands with the HCI firmware via the USB interface.

The LM540 is “plug and play” and compatible with the OSX, Linux and Windows XP – 10 platforms.

The Bluetooth® Stack is in-built into the operating system.

The table below shows the tested OS version numbers:



Host Operating System	Bluetooth® Stack *	LM Tested OS Version Number
MAC OSX	OSX Bluetooth® Stack	OSX 10.11 (El Capitan)
Linux	BlueZ	Ubuntu 15.10 (Kernel 4.2.0-16-generic) and Ubuntu 14.04.03 (Kernel 3.13.0-77-generic)
Windows	Widcomm	Windows 10 IoT Core (Tested on Raspberry Pi), Win 10 (64-bit), Win 10 (32-Bit), Win 8/8.1 (64-bit), Win 8/8.1 (32-Bit), Win 7 (64-bit) and Win XP (32-bit)

*NOTE: Third-party Bluetooth® Stack Software can be used as an alternative to the in-built Bluetooth® Stack for more supported profiles.

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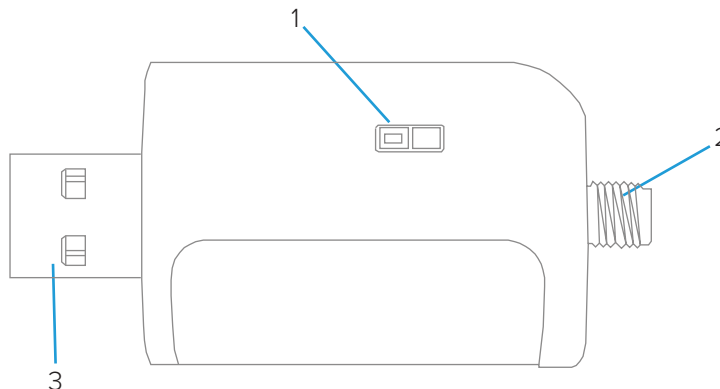
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Hardware Structure

- 1 LED Indicator.
- 2 Antenna RP-SMA Connector.
- 3 USB Connector.



LED Functions

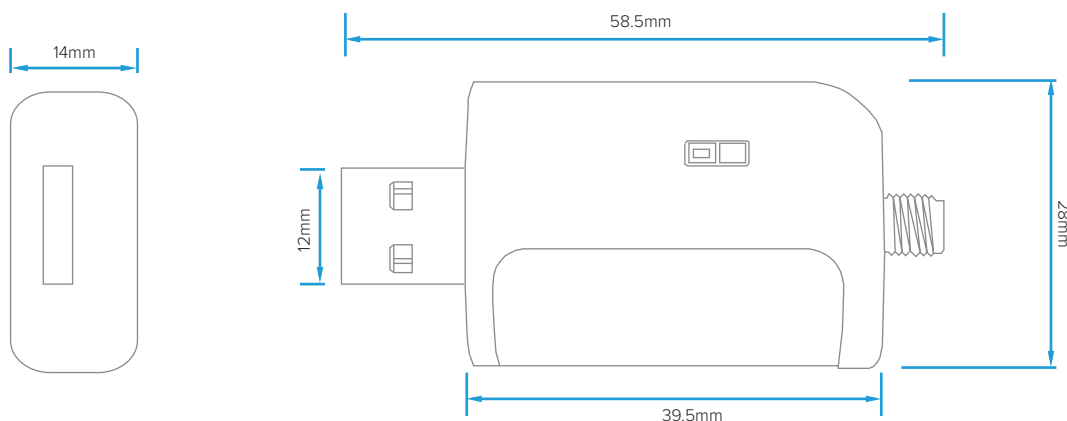
LED Red

- LED is permanently on - Power on
- LED is off - Power off

LED Blue

- ☀ LED is flashing slow = Bluetooth® is searching
- LED is permanently on = Bluetooth® is connected
- Green LED will be added in a future update.

Physical Dimensions





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FCC Warning Statement

This device complies with Part 15 and 15C of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 and 15C of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Installation and use of this device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution of the connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



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Datasheet Version Notes

v1.0 11 JAN 2018 Added version notes to datasheet.

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LM540 Packaging Options

	540-0540	<p>AO - Adapter Only ADT, BT2.1, USB, 5v, rP-SMA JACK, AO</p>
	540-0542	<p>AO - Adapter Only (Branded) ADPT HCI BT2.1 USB IVT NO-ANT rP-SMA LM Brand AO</p>
	540-0543	<p>Adapter with Antenna (Bulk) ADT, BT2.1, USB , 5v, +LM251, rP-SMA JACK, BULK</p>
	540-0545	<p>RP - Retail Pack ADT, BT2.1, USB , 5v, IVT Key + LM255, rP-SMA JACK RP</p>
	540-0546	<p>RP - Retail Pack ADT, BT2.1, USB , 5v, IVT Key + LM251, rP-SMA JACK RP</p>

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