

LM509 Bluetooth® 5.4 Dual Mode USB Adapter

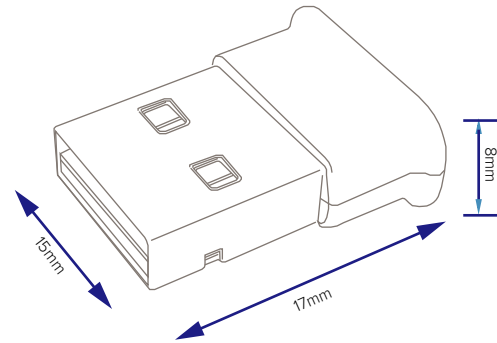
Host Controller Interface (HCI) via USB Interface

Revised

20/FEB/2025

Datasheet Version

1.0



Features

- Bluetooth 5.4 (Backwards compatible with Bluetooth 2.0, 2.1 and 4.x)
- 7 dBm (Class 1) Tx output power
- USB 2.0 for data and power source
- Plug and play (Windows 10- 11 native support)
- Host controller interface (HCI)
- Auracast™ ready (Broadcast audio / Connected audio)
- Supports simultaneous Bluetooth LE and BR/EDR connections
- Enhanced Bluetooth and Wi-Fi coexistence
- 17mm x 15mm x 8mm
- See the website for this products certifications
- RoHS, REACH and WEEE

Overview

The LM509 Bluetooth 5.4 dual mode adapter is an ultra small, simple and highly compatible solution. The adapter can be deployed in a wide range of applications including embedded systems, industrial machines, consumer products and IoT applications; giving users access to all of the latest and legacy Bluetooth audio functionality.

The LM509 is a plug and play USB adapter, compatible with Linux as well as Windows platforms from Windows 10 to Windows 11. The adapter allows your host computer to wirelessly communicate with other nearby Bluetooth 2.x, 4.x and Bluetooth 5.x enabled devices (such as iOS and Android devices, printers, keyboards, speakers, and headphones), providing a low energy connection and high quality data stream.

Using Bluetooth BR/EDR, the LM509 allows multiple active links in either central or peripheral device. Using LE, it supports multiple states and allows multiple active links as either the central/client or peripheral/server device.

LE Audio is a new framework for sharing and receiving audio between Bluetooth enabled devices. With Auracast, Bluetooth devices can broadcast audio to an unlimited number of receivers including headsets, earbuds and hearing aids. This opens the possibility of providing audio to users in the most crowded of settings such as bars, airports and gyms

Typically used in industries such as EPOS, industrial and scientific, the LM509 is ideal for developing voice and data applications. The adapter has a Host Controller Interface (HCI) for a simple connection via USB to a host computer or MCU.

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General Specification

Wireless

Bluetooth® Core Specification	Bluetooth 5.4 Dual Mode (Bluetooth BR/EDR and Low Energy)
Adapter Type	Host Controller Interface (HCI)
OS Compatibility	Linux (BlueZ) and Windows 10 – 11
Profiles	LM, LL, L2CAP, GATT, RFCOMM, SPP, LE, BIG, CIG

Hardware

Chipset	Realtek
Antenna	PCB Trace Antenna
Interfaces	USB 2.0
Power Supply	5V DC (USB powered)
Crystal Oscillator	40 MHz
LED Indicator	Power/ Active (Blue)

RF Characteristics

Tx Output Power	+7 dBm (Class 1)
Rx Sensitivity	-95 dBm (Bluetooth Low Energy) and -92 dBm (Bluetooth EDR)
Current Consumption	TBA
Continuous RX	TBA
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 +70°C
Dimensions (L x W x H)	17mm x 15mm x 8mm
Weight	TBA +/- 0.25g tolerance (TBA in retail pack)
Certifications	See website
Compliance	RoHS, REACH and WEEE

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HCI Architecture

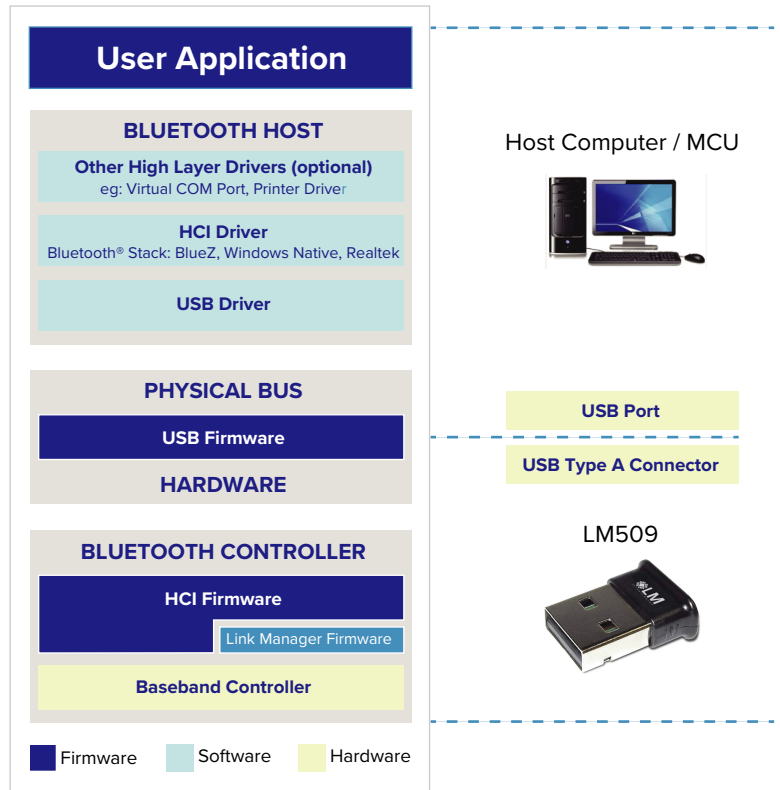
Within the host controller interface (HCI) architecture, the LM509 runs the HCI firmware, link manager firmware and baseband controller.

The host operating system runs the Bluetooth 2.0, 2.1, 4.x, or 5.x 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 LM509 is plug and play compatible for Windows 10 – 11 platforms.

The table below shows the tested OS version numbers:



Host Operating System	Bluetooth Stack*	LM Tested OS Version Number
Linux	BlueZ	Linux Kernel v2.6.32 - 6.5.5
Windows	Native Support Realtek Driver	Win 10 (64-bit), Win 10 (32-Bit), Win 11 (64-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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Datasheet Version Notes

v1.0 20 FEB 2025 Initial datasheet release.



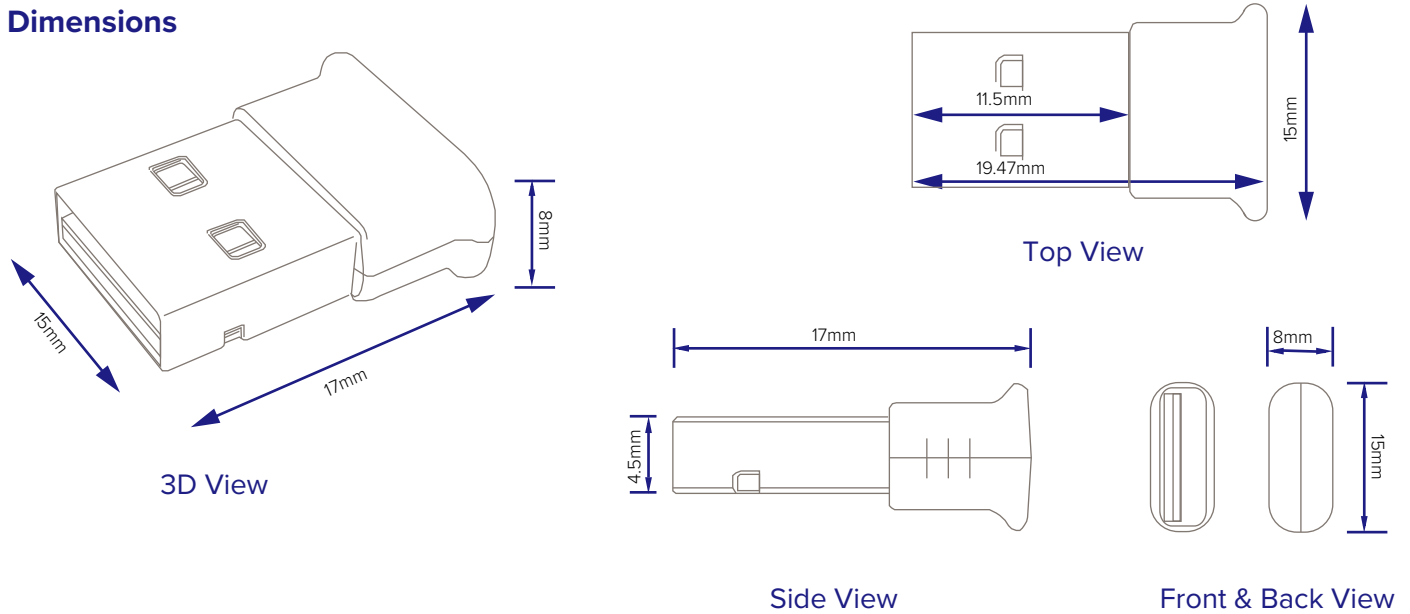
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Dimensions



Ordering Options



509-5090

Adapter Only

ADPT HCI BT5.4 D/Mode USB PCB-ANT AO



509-5091

Retail Pack

ADPT HCI BT5.4 D/Mode USB PCB-ANT RP

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