

## SECURE, POWERFUL WIRELESS ENGINE FOR YOUR IOT DESIGN



Building on Laird Connectivity's expertise with Nordic from the BL600 and BL652 series comes the most powerful yet - the BL654 series. It provides OEMs with the maximum design flexibility and performance. A complete multi-protocol embedded wireless offering with exceptional processing capability, all at a micro power budget.

Powered by **Nordic's nRF52840** silicon, the small form factor BL654 module with integrated antenna (part # 451-00001) is embedded inside the robust, **packaged USB Adapter**. The BL654 USB Adapter uses a simple, intuitive **AT Command Set**, as well as Laird Connectivity's own **smartBASIC** environment.

Leverage the BL654 USB Adapter to enable any Bluetooth Low Energy (LE) device or sensor to communicate to any PC, laptop, or mobile computer without any complicated installation or software support requirements.

- **Bluetooth v5** Bluetooth Low Energy
- Industrial Temp Rating (-40° to +85° C)
- **Robust footprint** (18.39 mm x 50.74 mm x 11 mm)
- Bluetooth LE Peripheral/Central roles with DTM embedded
- **2 Mbps & LE Long Range**: Support for 2 Mbps, 1 Mbps, & 125 Kbps coded
- **Capable of Hostless operation** – Internal MCU reduces BOM
- **Powerful Core** Cortex-M4F (1 MB Flash, 256 KB RAM)
- Built on years of experience with Nordic (BL600 & BL652 Series)
- **Application Design Choice**: Leverage Laird Connectivity's *smartBASIC* or simple AT Command Set (source available)

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**Note:** Nordic SDK is not supported on this version - part #4 51-00003.  
For Nordic SDK/Zephyr options – use part # 451-00004.

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## FEATURES AT A GLANCE



### TRULY HOSTLESS OPERATION FOR AUTOMATED USE CASES

Combination of on-module MCU and preloading a *smartBASIC* application enables simultaneous central/peripheral role support for powerful hostless sensor applications.



### SPEED TO MARKET

Easily write event-driven, automated applications, no toolchain required with *smartBASIC*.



### EXTREMELY EFFICIENT POWER MANAGEMENT

Customize to balance throughput with power usage, enabled by ultra-low power sleep mode.



### GLOBAL APPROVALS – MAKE YOURSELF AT HOME

Carries several modular FCC, ISED, EU, UKCA, RCM, AS/NZS, and Bluetooth SIG approvals.



### PERSONAL SUPPORT FROM DESIGN TO MANUFACTURE

Laird Connectivity's industry-renowned support is passionate about helping you speed your design to market.

## APPLICATION AREAS



IoT Devices and Sensors



Beacons and Proximity Applications



Secure Medical Peripherals



Industrial Monitoring

## KEY SPECIFICATIONS

CATEGORY	FEATURE	SPECIFICATION
Wireless Specification	Bluetooth®	v5 – Single-Mode (Peripheral and Central Roles)
	Frequency	2.402 - 2.480 GHz
	Transmit Power	+ 8 dBm (maximum). Configurable down to -40 dBm
	Receive Sensitivity	-95 dBm (typical @ Bluetooth LE 1 Mbps) -92 dBm (typical @ Bluetooth LE 2 Mbps) -103 dBm (typical @ Bluetooth LE 125 Kbps)
	Link Budget	103 dB (@ Bluetooth LE 1 Mbps), 111 db (@ Bluetooth LE 125 Kbps)
	Antenna Options	PCB trace antenna
	Raw Data Rates (Air)	1 Mbps, 2 Mbps, 125 Kbps
Host Interface and Peripherals	USB - UART Interface	TX, RX, CTS, RTS. Default: 115200, N, 8, 1. Configurable from 1200 bps to 1 Mbps
	USB Connector	FTDI based – Virtual COM port
	Other	Configurable LED
Key Bluetooth LE Features	Bluetooth Low Energy	<ul style="list-style-type: none"> <li>▪ GATT Client &amp; GATT Server – Any Adopted/ Custom Services</li> <li>▪ Central / Peripheral Roles</li> <li>▪ Up to 16 Bluetooth LE connections using FW v29.3.3.0</li> <li>▪ Bluetooth LE Mesh</li> <li>▪ CODED PHY</li> <li>▪ 2M PHY</li> </ul> <ul style="list-style-type: none"> <li>▪ LE Advertising Extensions</li> <li>▪ LE Secure Connections</li> <li>▪ Data Packet Length Extensions</li> <li>▪ LE Privacy v1.2</li> <li>▪ LE Ping</li> <li>▪ vSP – Virtual Serial Port</li> </ul>
Programmability Options	<i>smart</i> BASIC	On-board BASIC programming language
	AT Command Set	Simple AT Hayes style command protocol <b>Note:</b> AT Command Protocol enabled via a <i>smart</i> BASIC application (available for modification)
	Firmware Upgrade	Via UART
Support (as Virtual COM port)	Operating Systems	Windows 7 - 10 and server editions 2008 - 2019 Windows Embedded Mac OSX Linux & Android
Power	Consumption - Current	Max Peak Radio Current (@ +8 dBm TX) – 14.1 mA (DCDC at 3V) Max Peak Radio Current (@ 0 dBm TX) – 4.9 mA (DCDC at 3V) Standby Doze – ~3.1 µA Deep Sleep – ~0.4 µA (external signal wake up) <b>Note:</b> In USB suspend mode, power consumption is slightly increased, due to FTDI chip
	Supply Voltage	5.0V +/- 10% Powered by standard USB port
Physical	Dimensions	18.39 mm x 50.74 mm x 11 mm
Environmental	Temp Range	-40°C to +85°C
Miscellaneous	Lead Free	Lead-free and RoHS compliant
Development Tools	Utilities	UwTerminalX (Multi-platform) Android and iOS applications UART firmware upgrade
Qualifications	Bluetooth®	Complete Declaration ID
Regulatory	Approvals	FCC, ISED, EU, UKCA, AS/NZS, RCM

**For full specifications on BL654 module on which the BL654 USB Adapter is based, please see the BL654 datasheet.**

PART #	DESCRIPTION
451-00003	Intelligent USB Bluetooth v5 Adapter – <i>smart</i> BASIC