

### SECURE, POWERFUL WIRELESS ENGINE FOR YOUR IOT DESIGN



Building on Laird'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's own **smartBASIC** environment.

Leverage the BL654 USB Adapter to enable any BLE 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 (BLE)
- Industrial Temp Rating (-40° to +85° C)
- **Robust footprint** (18.39 mm x 50.74 mm x 11mm)
- BLE Peripheral/Central roles with DTM embedded
- **2Mbps & LE Long Range**: Support for 2Mbps, 1Mbps, & 125Kbps coded
- **Capable of Hostless operation** – Internal MCU reduces BOM
- **Powerful Core** Cortex-M4F (1MB Flash, 256KB RAM)
- Built on years of experience with Nordic (BL600 & BL652 Series)
- **Application Design Choice**: Leverage Laird's *smartBASIC* or simple AT Command Set (source available)

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**Note:** Nordic SDK is not supported on the BL654 USB dongle, part #451-00003. For Nordic SDK / Zephyr options, contact Laird Connectivity sales.

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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, IC, CE, RCM, MIC and Bluetooth SIG approvals.



#### PERSONAL SUPPORT FROM DESIGN TO MANUFACTURE

Laird'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 @ BLE 1 Mbps)
			-92 dBm (typical @ BLE 2 Mbps)
			-103 dBm (typical @ BLE 125 Kbps)
	Link Budget	103 dB (@ BLE 1 Mbps), 111 db (@ BLE 125Kbps)	
Antenna Options	PCB Trace antenna		
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 BLE 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 8 BLE connections</li> <li>▪ BLE 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	smartBASIC	On-board BASIC programming language	
	AT Command Set	Simple AT 'Hayes style' command protocol <b>Note:</b> AT Command Protocol enabled via a smartBASIC 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 (@ +8dBm TX) – 14.1mA (DCDC at 3V)	
		Max Peak Radio Current (@ 0dBm TX) – 4.9mA (DCDC at 3V)	
		Standby Doze – ~3.1µA Deep Sleep – ~0.4µA (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 11mm	
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 / IC / CE / MIC / 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