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 *smart*BASIC 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 (-40º to +85º 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 *smart*BASIC or simple AT Command Set (source available)

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

FEATURES AT A GLANCE

TRULY HOSTLESS OPERATION FOR AUTOMATED USE CASES
Combination of on-module MCU and preloading a *smart*BASIC 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 *smart*BASIC.

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 I Mbps), 111 db (@ BLE 125Kbps)	
	Antenna Options	PCB Trace antenna	
	Raw Data Rates (Air)	1 Mbps, 2 Mbps, 125Kbps	
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	▪ GATT Client & GATT Server – Any Adopted/ Custom Services ▪ Central / Peripheral Roles ▪ Up to 16 BLE connections using FW v29.3.3.0 ▪ BLE Mesh ▪ CODED PHY ▪ 2M PHY	▪ LE Advertising Extensions ▪ LE Secure Connections ▪ Data Packet Length Extensions ▪ LE Privacy v1.2 ▪ LE Ping ▪ vSP – Virtual Serial Port
Programmability Options	*smart*BASIC	On-board BASIC programming language	
	AT Command Set	Simple AT 'Hayes style' command protocol **Note:** AT Command Protocol enabled via a *smart*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 (@ +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) **Note:** 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 – *smart*BASIC