Bluetooth® 4.0 Dual Mode Low Energy Class 1 SoC XB Foot Print
BlueBridge™ BR-XB-LE4.0-D2A

OUTLINE

- *AT HOME. AT WORK. ON THE ROAD. USING BLUETOOTH LOW ENERGY WIRELESS TECHNOLOGY MEANS TOTAL FREEDOM FROM THE CONSTRAINTS AND CLUTTER OF WIRES IN YOUR LIFE.*

- **Wireless data communications 20 pin DIP device**
  24.38(W) X 27.62(L) X 3.89(H) mm

Contains BR-LE4.0-D2A module

- **Includes integrated ceramic antenna and Vcc filter caps**

- **Utilizes the TI MSP430F5438A with 256K Flash, 16K RAM and the TI CC2564 baseband.**

- **Includes integrated software stack, profiles, and AT modem like commands.**

- **Code space in Texas Instruments MSP430F5438A for client applications (100Kb Flash, 4Kb RAM) Baseband is TI dual mode CC2564**

- **Supports both Low Energy and Classic 2.1 BR/EDR Bluetooth.**

- **The BR-LE4.0-D2 dual mode module has the same footprint as the nBlue single mode modules and is pin for pin compatible with the exception of a few extra PIOs.**

- **Embedded *Bluetooth* stack protocols and profiles (Master/Slave) included *(requires no host MCU stack)*: SPP, GAP, GATT, SMP, ATT, L2CAP, BAS, BLP, BLS, DIS, FMP, ANP, HIDS, HOGP, HID, HTP, HTS, HRP, HRS, IOP, IAS, LLS, PASP, PXP, SCPP, SCPS, TIP, TPS, and BRSP.**

FEATURES

- ***nBlue* serial radio modems can be configured, commanded, and controlled via simple ASCII strings on generic profiles or using "C" library calls with custom applications embedded onto the unit.**
- **UART hand shaking speeds: 9600bps up to 460.8Kbps. Default is 115200bps**
- **+300 meters over SPP estimated distance (LOS)**
- **Software adjustable transmitter power from short to long range applications**
- **Programmable Input Output (PIO's)**
- **Operating temperature range: -40°C to ~+85⁰C**
- **Secure and robust communication link**
  - ✓ **FHSS (Frequency Hopping Spread Spectrum)**
  - ✓ **128 bit encryption, and 16 alphanumeric Personal Identification Number (PIN)**
  - ✓ **Error correction schemes for guaranteed packet delivery**
- **Free iOS & Android libraries and applications. Supports iBeacons**

FIRMWARE OPTIONS

1. AT.s Command Set for external control via UART or RF.
2. Stonestreet One Bluetopia stack for custom embedded applications, which requires either the MSP430 IAR Systems Compiler or TI Code Composer Studio.
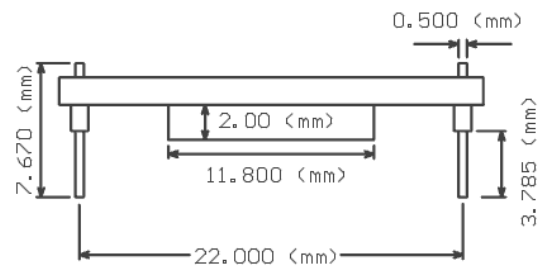
DIMENSIONS

● **BR-XB-LE4.0-D2A (with Ceramic Antenna) 2 dBi TDK ANT8030-2R4-01**

● **BR-XB-LE4.0-D2U (U.FL)**

● **BR-XB-LE4.0-D2W (Whip Antenna)**
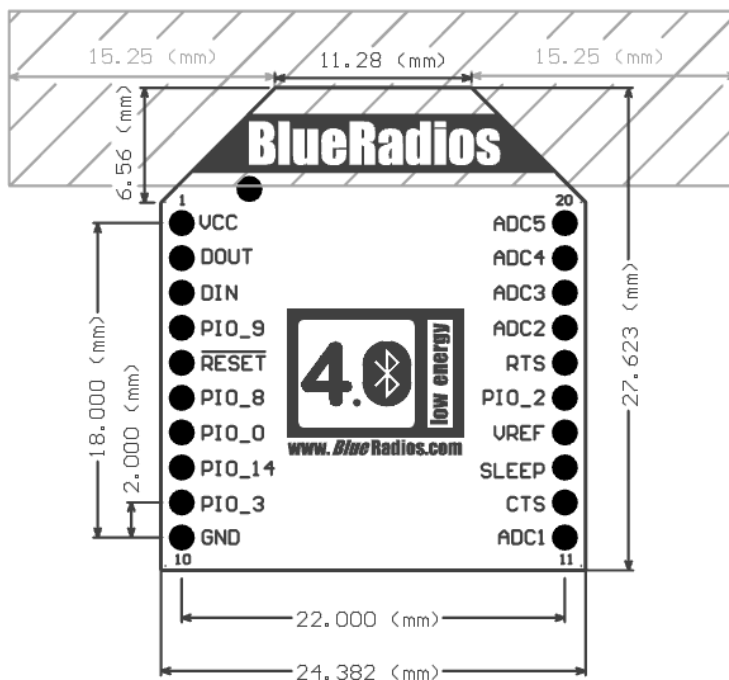
Mating Through Hole Connector:
Digikey P/N: S5751-10-ND
Manufacturer: Sullins Connector Solutions
Man. P/N: NPPN101BFCN-RC

Mating Suface Mount Connector:
Digikey P/N: S5901-10-ND
Manufacturer: Sullins Connector Solutions
Man. P/N: NPPN101BFLC-RC

TERMINALS	
1. VCC (2.4-3.6Vdc)	20. SPI_CLK
2. DOUT	19. SPI_CSB
3. DIN	18. SPI_MOSI
4. PIO_9	17. SPI_MISO
5. RESET	16.. RTS
6. PIO_8	15. PIO_2
7. PIO_0	14. VREF
8. PIO_14	13. SLEEP
9. PIO_3	12. CTS
10. GND	11. ADC1

Part is not 5Vdc tolerant.
Reset is active **low**; pulse 1usec. (min)
INPUTS – Schmitt Trigger
OUTPUTS – Reduced Drive Strength
NOTE: Please refer nBlue User's guide for more information (D2 PIO Specification Summary 3.4.2)

Power-up Sequence

Power management sleep modes:

Refer to BR-LE4.0-D2A module spec.

SMD Module Cross Reference Table

XB Pinout	Pin Name	BR-C40 BT2.0	BR-XX-S1 BLE	BR-C46 BT2.0	BR-XX-S2 BLE	BR-XX-D2 BT/BLE
1.	VCC (3.3V)	3.3V	3.3V	3.3V	3.3V	3.3V
2.	DOUT	UART_TX	UART_TX	UART_TX	UART_TX	UART_TX
3.	DIN	UART_RX	UART_RX	UART_RX	UART_RX	UART_RX
4.	PIO_9	NC	PIO_9	PIO_9	PIO_9	PIO_9
5.	RESET	RESET	RESET	RESET	RESET	RESET
6.	PIO_8	NC	PIO_8	PIO_8	PIO_8	PIO_8
7.	PIO_0	PIO_0	PIO_0/ADC0	PIO_0/ADC0	PIO_0/ADC0	PIO_0/ADC0
8.	PIO_14	NC	NC	NC	PIO_14	PIO_14
9.	PIO_3	PIO_3	PIO_3	PIO_3	PIO_3	PIO_3
10.	GND	GND	GND	GND	GND	GND
11.	ADC1	NC	PIO_1/ADC1	PIO_1/ADC1	PIO_1/ADC1	PIO_1/ADC1
12.	CTS	UART_CTS	UART_CTS	UART_CTS	UART_CTS	UART_CTS
13.	SLEEP	PIO_5	PIO_5	PIO_5	PIO_5	PIO_5
14.	VREF	PIO_6	PIO_6	PIO_6	PIO_6	PIO_6
15.	PIO_2	PIO_2	PIO_2	PIO_2	PIO_2	PIO_2
16.	RTS	UART_RTS	UART_RTS	UART_RTS	UART_RTS	UART_RTS
17.	ADC2	SPI_MISO	SPI_MISO / ADC2	SPI_MISO	SPI_MISO / ADC2	SPI_MISO
18.	ADC3	SPI_MOSI	SPI_MOSI / ADC3	SPI_MOSI	SPI_MOSI / ADC3	SPI_MOSI
19.	ADC4	SPI_CSB	SPI_CSB / ADC4	SPI_CSB	SPI_CSB / ADC4	SPI_CSB
20.	ADC5	SPI_CLK	SPI_CLK / ADC5	SPI_CLK	SPI_CLK / ADC5	SPI_CLK

** NOTE: Please refer to nBlue Module User's Guide for IO alternative function

Firmware Options

- **AT Command API.**
- **Libraries to compiler in custom "C" Applications**

PIO_4 and PIO_7 have dual modes and when not used for programming inputs.

Note: Keep metallic components, connectors, copper traces, internal layers, and ground planes away from the ceramic chip antenna area in 3D space!

AT-Style Commands Reference (BlueRadios AT.s Command Set)

In LE, GAP defines four specific roles: Broadcaster, Observer, Peripheral, and Central. A device may support multiple LE GAP roles provided that the underlying Controller supports those roles or role combinations. However, only one LE GAP role may be supported at a given time. Each role specifies the requirements for the underlying Controller. This allows for Controllers to be optimized for specific use cases.

The **Broadcaster** role is optimized for transmitter only applications. Devices supporting the broadcaster role use advertising to broadcast data. The broadcaster role does not support connections. The **Observer** role is optimized for receiver only applications. Devices supporting the observer role are the complementary device for a broadcaster and receives broadcast data contained in advertisements. The observer role does not support connections. The **Peripheral** role is optimized for devices that support a single connection and are less complex than central devices. Devices supporting the peripheral role only require Controllers that support the Controller's slave role. The **Central** role supports multiple connections and is the initiator for all connections with devices in the peripheral role. Devices supporting the central role require a Controller that supports the Controller's master role and generally supports more complex functions compared to the other LE GAP roles.

DEBUGGING

SBWTCK (TEST) and SBWTDIO (Reset) allow the module to be connected to a TI MSP-FET430UIF for debugging and programming via SPY-Bi Wire. See the MSP-FET430UIF User's Guide for more information http://www.ti.com/lit/ug/slau278j/slau278j.pdf.

An *nBlue* Interace Board (IB) is also available and allows the user to debug, program, update firmware and have UART communications with any of the *nBlue* modules through a single or double row 10 pin header. See the *nBlue* Module User's Guide for more information.

A MSP-FET430UIF is only needed for writing a custom application for a module and not using the AT.s command set.
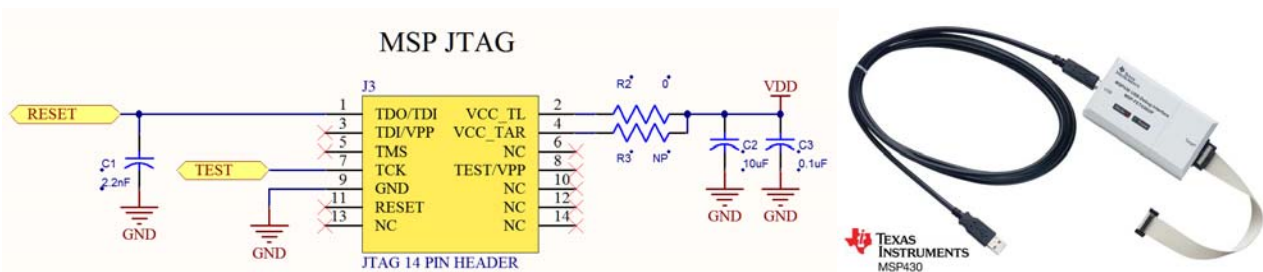
ORDERING INFORMATION

Pricing and ordering information can be found at:
http://www.blueradios.com/orderinfo_new.htm

BR-XB-LE4.0-D2#

BR = BlueRadios
XB = XB 20 pin foot print
LE = Low Energy
4.0 = *Bluetooth* LE version
  D = Dual Mode BT2.1/BLE
  2 = Version

  # = A (Antenna)
 **# = U (U.FL RF Connector),** built to order, not a stock item
  # = W (Whip Antenna), built to order, not a stock item

	Part Number	Description
1)	BR-XB-LE4.0-D2A	*Bluetooth* Low Energy v4.0 Single Mode with Ceramic Antenna
2)	BR-XB-LE4.0-D2U	*Bluetooth* Low Energy v4.0 Single Mode with U.FL RF Connector
3)	BR-XB-LE4.0-D2W	*Bluetooth* Low Energy v4.0 Single Mode Whip Antenna

Optional Evaluation Test Board
Part number: **BR-XB-TSB**
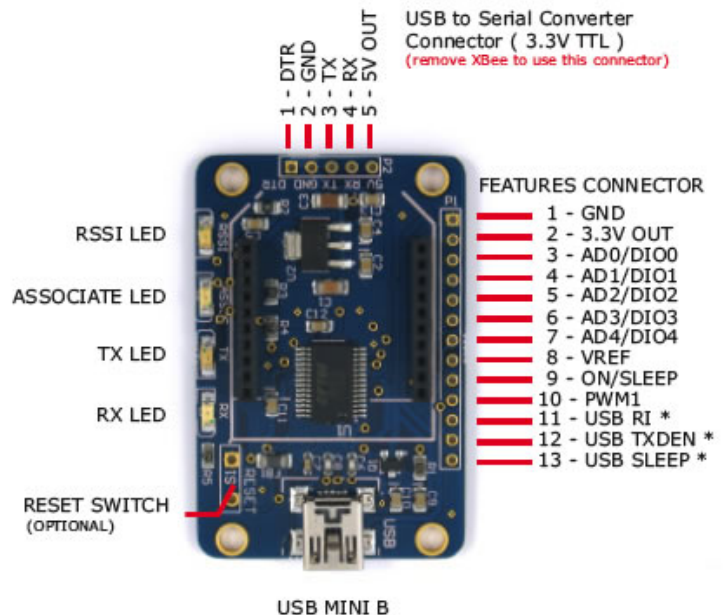
Bluetooth Low Energy, part of *Bluetooth* Ver. 4.0, specifies two types of implementation: **single** mode and **dual** mode. Single mode chips implement the low energy specification and consume just a fraction of the power of classic *Bluetooth,* allowing the short-range wireless standard to extend to coin cell battery applications for the first time. Dual mode chips combine low energy with the power of classic *Bluetooth* and are likely to become a de facto feature in almost all new *Bluetooth* enabled cellular phones and computers.

Note: Single mode *Bluetooth* 4.0 Low Energy is *not* backwards compatible with previous *Bluetooth* standards. Dual mode *Bluetooth* 4.0 Low Energy is backwards compatible but is not practical for low power devices but targeted to gateway products.

DEVELOPMENT KIT (BR-EVAL-LE4.0-D2A)

Development kit available containing everything required to set up a connection quickly and evaluate range and performance of the BR-LE4.0-D2A: http://www.blueradios.com/hardware_EVAL-LE4.0-D2.htm

CUSTOM FIRMWARE

The AT.s command interface can be modified for high volume customers and custom embedded software development is available upon request

ADDITIONAL DOCUMENTATION

Complete OEM documentation can be found at: http://www.blueradios.com/forum. Requires proof of purchase.