bladeRF

USB 3.0 Software Defined Radio

The bladeRF is an affordable USB 3.0 Software Defined Radio (SDR) designed to allow students and RF enthusiasts to explore wireless communication, and to provide professionals with a versatile COTS waveform development platform.

Support is available for Linux, OSX, and Windows. The bladeRF libraries, utilities, firmware, and platform HDL are released under open source licenses, and schematics are available online. The FPGA and USB 3.0 peripheral controller are programmable with vendor-supplied tools and SDKs that are available online, free of charge.

Features

Frequency range of 300 MHz to 3.8 GHz
- Extendable down to HF/VHF bands with the XB-200 Transverter Module

Independent RX and TX signal paths
- Half or full duplex operation
- Per-module frequency, sample rate, bandwidth, and gain settings
- Direct access to analog ADC/DAC pins

USB 3.0 Support
- Cypress FX3 SuperSpeed peripheral controller with integrated ARM926EJ-S
- Fully bus-powered over USB 3.0
- External power option via 5V DC barrel jack
- Backwards compatible with USB 2.0 (with sample rate limitations)

Supported by popular third-party software[1]
- GNU Radio via gr-osmosdr
- Pothos via SoapySDR
- SDRangel
- SDR Console
- SDR# via sdrsharp-bladeRF
- MathWorks MATLAB® & Simulink® via libbladeRF bindings

Up to 28 MHz of instantaneous bandwidth
- Software-selectable filter options from 1.5 MHz to 28 MHz

Arbitrary sample rates up to 40 MSPS
- 12-bit IQ samples

Factory-calibrated 1 PPM VCTCXO
- Calibrated within 1 Hz of 38.4 MHz reference
- Taming supported via 1.8 V GPSDO reference (1 PPS or 10 MHz)

Altera Cyclone IV FPGA
- 40 kLE or 115 kLE options available for custom signal processing and hardware accelerators

Fully Customizable
- Expansion port with 32 I/O pins
- JTAG connectors
- SMB connector for MIMO configurations
- Triggered multi-device sampling synchronization

Applications
- Custom modem and waveform development
- Wireless video (e.g., ATSC, DVB-T, DVB-S)
- GPS reception and simulation
- Whitespace exploration
- ADSB reception and simulation

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[1] Third-party software is copyrighted by the respective owners and/or contributors.

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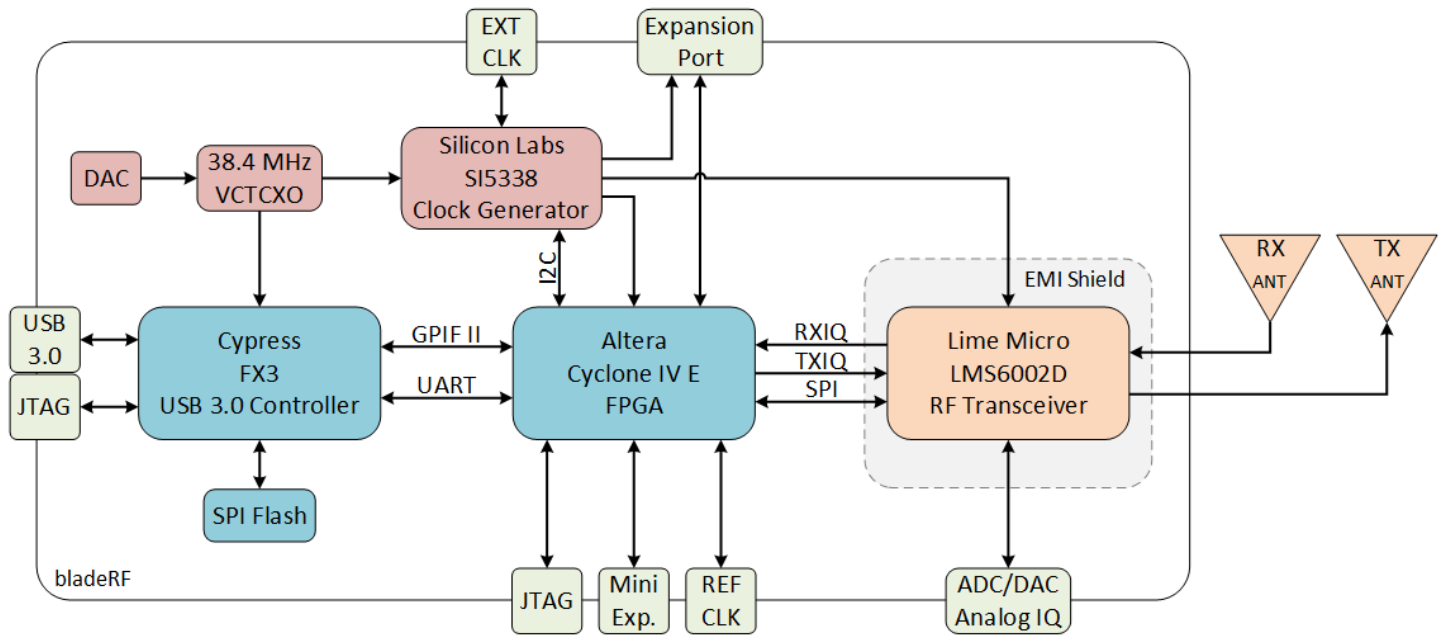
Parameter	Min	Typ	Max	Unit
RF Specifications				
ADC/DAC Sample Rate	0.160		40	MHz
ADC/DAC Resolution		12		bits
VCTCXO Accuracy		1		ppm
RF Tuning Range	300		3800	MHz
RF Bandwidth Filter	1.5		28	MHz
CW Output Power		+6		dBm
FPGA Specifications				
Logic Elements	39,600		114,480	LE
Embedded 18x18 Multipliers	116		266	
BRAM	1,134		3,888	kbits
Physical Specifications				
Dimensions		8.7 x 13.1 x 1.8		cm
Weight		80		g
Operating Temp: x40/x115	0		70	°C
Operating Temp: x115 Thermal	-40		85	°C

Add-on Options	
XB-100 GPIO Board	GPIO breakout with LEDs and DIP switches
XB-200 Transverter	600 kHz to 300 MHz transverter with VHF filterbank, custom filter path, and bypass mode
Case	Clear polycarbonate case for the bladeRF x40 or bladeRF x115

Specifications are subject to change without notice.

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