# TX and RX Daughterboards
For the USRP™ Software Radio System
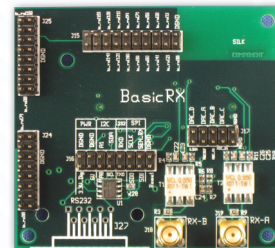
BasicTX and BasicRX

1 to 250 MHz IF Transmitter and Receiver

The BasicTX and BasicRX are designed for use with external RF frontends as an intermediate frequency (IF) interface. The ADC inputs and DAC outputs are directly transformer-coupled to SMA connectors (50Ω impedance) with no mixers, filters, or amplifiers.

The BasicTX and BasicRX give direct access to all of the signals on the daughterboard interface (including 16 bits of high-speed digital I/O, SPI and I²C buses, and the low-speed ADCs and DACs), and as such are useful for developing your own daughterboards or custom FPGA designs.
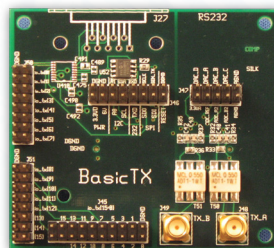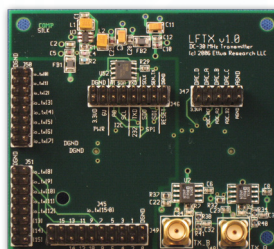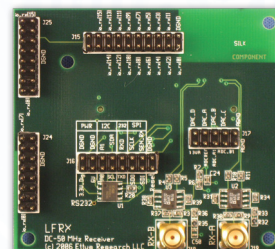

BasicTX   *BasicRX*

LFTX and LFRX

DC to 30 MHz Transmitter and Receiver

The LFTX and LFRX are very similar to the BasicTX and BasicRX, respectively, with 2 main differences. Because the LFTX and LFRX use differential amplifiers instead of transformers, their frequency response extends down to DC. The LFTX and LFRX also have 30 MHz low pass filters for antialiasing.


LFTX   *LFRX*

TVRX2

Dual 50 MHz to 860 MHz Receiver

The TVRX2 offers two independent low-IF receivers in a single daughterboard covering the VHF and UHF bands with 10 MHz baseband bandwidth and typical 5 dB noise figure. The dual receivers provide flexibility to address many applications including white spaces, broadcast television, public safety, land-mobile communications, low-power unlicensed devices, wireless sensor networks, and six amateur radio bands.
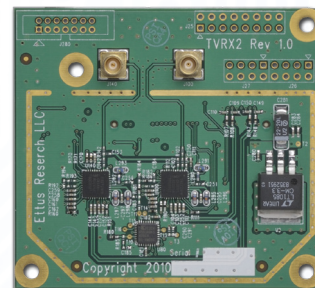

TVRX2

DBSRX2

800 MHz to 2.4 GHz Receiver

The DBSRX2 is a complete receiver system for 800 MHz to 2.4 GHz *(2.4 to 2.48 GHz ISM band not included)* with a 5 dB noise figure. The DBSRX2 features a software controllable channel filter that can be made as narrow as 1 MHz, or as wide as 60 MHz. The DBSRX2 frequency range covers many bands of interest, including all GPS and Galileo bands, the 902 to 928 MHz ISM band, cellular and PCS, the Hydrogen and Hydroxyl radio astronomy bands, DECT, and many more. The DBSRX2 is MIMO capable, and can power an active antenna via the coax.
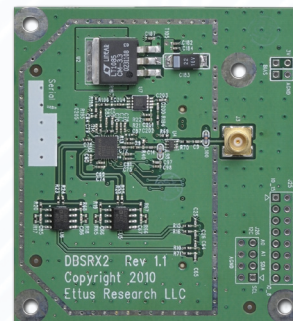

DBSRX2

DESCRIPTION

Daughterboards turn a USRP motherboard into a complete RF transceiver system. Just add an antenna, and you are ready for two-way, high-bandwidth communications in many popular frequency bands. The boards have many features that facilitate their integration into more complex systems, such as digital control lines and the option for split transmit-and-receive ports.

FEATURES

- Fully synchronous design, MIMO capable

- I/Q Architecture

- Full-duplex capable (except XCVR2450)

- Built-in T/R switching

- TX and RX on same connector or use auxiliary RX port

- All functions controllable from software or FPGA

- 16 digital I/O lines to control external devices like antenna switches

- Adjustable transmit power and receiver gain

- Less than 200 µs PLL lock time; can be used for frequency hopping

- 30 MHz transmit and receive bandwidth

WBX
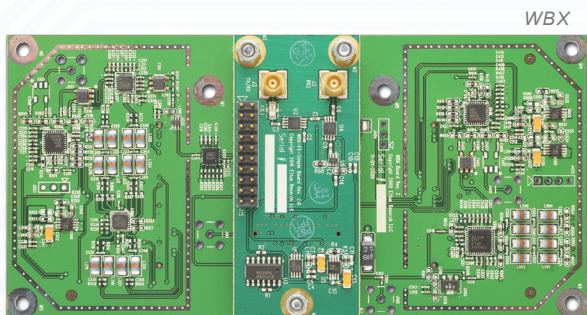
BOARDS

WBX
- Frequency Range: 50 MHz to 2.2 GHz
- Transmit Power: 30 to 100 mW typical
- Dual synthesizers for independent TX and RX frequencies

The frequency range of the WBX covers many bands of interest, including white spaces, broadcast television, public safety, land-mobile communications, low-power unlicensed devices, wireless sensor networks, cell phones, and six amateur radio bands.

SBX
- Frequency Range: 400 MHz to 4.4 GHz
- Transmit Power: 30 to 100 mW typical
- Dual synthesizers for independent TX and RX frequencies

The frequency range of the SBX covers cellular, WiFi, WiMax, microwave S band and the 2.4 GHz ISM band.

XCVR2450
- Frequency Range: 2.4 to 2.5 GHz, and 4.9 to 5.9 GHz
- Transmit Power: 100 mW typical
- Single synthesizer shared between TX and RX

The XCVR2450 covers both the ISM band at 2.4 GHz and the entire 4.9 to 5.9 GHz band, including the public safety, UNII, ISM, and Japanese wireless bands.

RFX900
- Frequency Range: 750 to 1050 MHz
- Transmit Power: 200 mW typical
- Dual synthesizers for independent TX and RX frequencies

Features coverage of cellular, paging, two-way radio, and 902 to 928 MHz ISM band.

RFX1200
- Frequency Range: 1150 to 1450 MHz
- Transmit Power: 200 mW typical
- Dual synthesizers for independent TX and RX frequencies

Features coverage of navigation, satellite, and amateur bands.

RFX1800
- Frequency Range: 1.5 to 2.1 GHz
- Transmit Power: 100 mW typical
- Dual synthesizers for independent TX and RX frequencies

Features coverage of DECT, US-DECT, and PCS (including unlicensed) frequencies.

RFX2400
- Frequency Range: 2.3 to 2.9 GHz
- Transmit Power: 50 mW typical
- Dual synthesizers for independent TX and RX frequencies

The RFX2400 has a band-pass filter around the 2400 to 2483 MHz ISM band on the TXRX port, while the RX2 port is unfiltered allowing for coverage of the entire frequency range without attenuation. Features coverage of the 2.4 GHz ISM band allowing applications using most of the communications standards in this ISM band.