

# WBX

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The WBX is a wide bandwidth transceiver that provides up to 100 mW of output power and a noise figure of 5 dB. The LO's for the receive and transmit chains operate independently. The WBX daughterboard is supported by the USRP Hardware Driver? (UHD) software API for seamless integration into existing applications.

The WBX provides phase coherent operation, although with a 180-degree ambiguity, which must be calibrated out in the application. For phase-coherent applications, Ettus Research recommends the SBX with the N200/N210 or the SBX or UBX with the X300/X310.

- Frequency Range: 50MHz - 2.2GHz
- Versions: 40MHz / 120MHz
- Power Output: 100mW
- Noise Figure: 5dB



- 2 quadrature frontends (1 transmit, 1 receive)
  - ◆ Defaults to direct conversion
  - ◆ Can be used in low IF mode through `lo_offset` with `uhd::tune_request_t`
- Independent receive and transmit LO's and synthesizers
  - ◆ Allows for full-duplex operation on different transmit and receive frequencies
  - ◆ Can be set to use Integer-N tuning for better spur performance with `uhd::tune_request_t`

Transmit: **TX/RX**

Receive: **TX/RX** or **RX2**

- **Frontend 0:** Complex baseband signal for selected antenna
- **Note:** The user may set the receive antenna to be TX/RX or RX2. However, when using a WBX board in full-duplex mode, the receive antenna will always be set to RX2, regardless of the settings.
  
- Transmit Gains: **PGA0**, Range: 0-31.5dB
- Receive Gains: **PGA0**, Range: 0-31.5dB
  
- WBX: 40 MHz, RX & TX
- WBX-120: 120 MHz, RX & TX
  
- **lo\_locked:** boolean for LO lock state
  
- 50MHz - 2.2GHz
  
- 2 - 4 dB @ (50MHz ~ 1.2GHz)
- 4 - 8 dB @ (1.2GHz ~ 2.2GHz)
  
- 10 - 18 dBm
  
- -30 dBc
  
- 18 - 20 dBm @ (50MHz ~ 1.4 GHz)
- 12 - 18dBm @ (1.4GHz ~ 2.2 GHz)
  
- 30 - 32 dBm @ (50MHz ~ 800MHz)
- 25 - 30 dBm @ (800MHz ~ 2.2GHz)
  
- -30 dBc @ (50MHz ~ 1.9GHz)
- - 24 dBc @ (1.9GHz ~ 2.2GHz)
  
- All RF Ports are matched to 50 Ohm with -10dB or better return loss generally. Detailed test is pending.
  
- The maximum input power for the WBX is -15 dBm.
  
- **WBX without UHD Corrections**
  
- Ettus Research recommends to always use the latest stable version of UHD
  
- Current Hardware Revision: 1
- Minimum version of UHD required: 3.8.0
  
- Current Hardware Revision: 1
- Minimum version of UHD required: 3.8.0
  
- 0-40 °C
  
- 10% to 90% non-condensing
  
- N or X Series
  
- X Series only

The WBX daughterboard is capable of phase-synchronous operation, but with a with a 180-degree ambiguity, which must be calibrated out in the user application. The SBX, UBX, TwinRX daughterboards are recommended for phase-coherent applications.

[WBX Schematics](#)

[WBX FE Schematics](#)

Part Number	Description	Schematic ID (Page)
ADA4937	Ultralow Distortion Differential ADC Driver	U304 (2)
ADP3336	High Accuracy Ultralow IQ, 500 mA anyCAP® Adjustable Low Dropout Regulator	U306, U308 (2); U503, U505 (4)
ADL5387	50 MHz to 2 GHz Quadrature Demodulator	U307 (2)
ADL5385	50 MHz to 2200 MHz Quadrature Modulator	U501 (4,5)
ADF4350 / ADF4351	Wideband Synthesizer with Integrated VCO	U201 (3); U401 (5)
HMC472LP4	Attenuator	U302 (2); U504 (4,5)
MGA82563	Amplifier	U313 (2)
24LC024	EEPROM	U202 (3); U403 (5)
GVA784+	Amplifier	U502 (4)

- [Media:cu ettus-wbx-cca.pdf](#)

- The WBX daughterboard features female MCX connectors for both the TX/RX and RX2 connectors.

As of December 1st, 2010 all Ettus Research products are RoHS compliant unless otherwise noted. More information can be found at <http://ettus.com/legal/rohs-information>

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- [Media:volatility UBX CBX WBX SBX r1 1.pdf](#)

[FPGA Resources](#)

[UHD Stable Binaries](#)

[UHD Source Code on Github](#)