

# CBX

## Contents

- 1 Device Overview
- 2 Key Features
- 3 Daughterboard Specifications
  - ◆ 3.1 Features
  - ◆ 3.2 Antennas
  - ◆ 3.3 Gains
  - ◆ 3.4 Bandwidths
  - ◆ 3.5 Sensors
  - ◆ 3.6 LEDs
- 4 RF Specifications
  - ◆ 4.1 Freq Range
  - ◆ 4.2 Noise Figure
  - ◆ 4.3 RX IIP3 (Max)
  - ◆ 4.4 RX IQ Imbalance
  - ◆ 4.5 TX Power (Max)
  - ◆ 4.6 TX OIP3
  - ◆ 4.7 TX IQ Imbalance
  - ◆ 4.8 Input/Output Impedance
  - ◆ 4.9 Input Power Levels
- 5 RF Performance Data
- 6 Hardware Specifications
  - ◆ 6.1 CBX
- 7 Environmental Specifications
  - ◆ 7.1 Operating Temperature Range
  - ◆ 7.2 Operating Humidity Range
- 8 USRP Compatibility
  - ◆ 8.1 CBX-40
  - ◆ 8.2 CBX-120
- 9 Phase Synchronization
- 10 Schematics
  - ◆ 10.1 CBX
- 11 Key Component Datasheets
- 12 Drawings
- 13 RF Connectors
- 14 Certifications
  - ◆ 14.1 RoHS
  - ◆ 14.2 China RoHS
- 15 Certificate of Volatility
  - ◆ 15.1 CBX-40/CBX-120
- 16 Downloads

The CBX is a full-duplex, wideband transceiver that covers a frequency band from 1.2 GHz to 6 GHz with a instantaneous bandwidth of 40 MHz or 120 MHz. The CBX can serve a wide variety of application areas, including WiFi research, cellular base stations, cognitive radio research, and RADAR. The CBX daughterboard is supported by the USRP Hardware Driver? (UHD) software API for seamless integration into existing applications.

The CBX does not provided phase coherent operation, and therefore is not recommended for MIMO and Phased Array applications.

- Frequency Range:  
1.2GHz - 6GHz
- Versions: 40MHz /  
120MHz



- 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 CBX 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
- CBX: 40 MHz, RX & TX
- CBX-120: 120 MHz, RX & TX
- **lo\_locked:** boolean for LO lock state
- All LEDs flash when daughterboard control is initialized
- **TX LD:** Transmit Synthesizer Lock Detect
- **TX/RX:** Receiver on TX/RX antenna port (No TX)
- **RX LD:** Receive Synthesizer Lock Detect
- **RX1/RX2:** Receiver on RX2 antenna port
- 1.2GHz - 6GHz
- 5 - 7.5 dB @ (1.2GHz ~ 5GHz)
- 7.5dB - 10 dB (5GHz ~ 6GHz)
- 8 - 10 dBm
- -20 dBc
- 22 dBm @ (1.2GHz ~ 3GHz)
- 12 ~ 22 dBm @ (3GHz ~ 6GHz)
- 30 - 32 dBm @ (1.2GHz ~ 5GHz)
- 26 ~ 30 dBm @ (5GHz ~ 6GHz)
- -20 dBc
- 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 CBX is -15 dBm.
- **CBX 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
- 0-40 °C
- 10% to 90% non-condensing
- N or X Series
- X Series only

The CBX daughterboard is not capable of phase-synchronous operation. The SBX, UBX, TwinRX daughterboards are recommended for phase-coherent applications.

Part Number	Description	Schematic ID (Page)
VMMK-3603	Low Noise Amplifier	U1, U5 (1)
AS225-313LF	SPDT Switch	U3, U6 (1)
HMC624LP4E	ATTENUATOR	U7, U2 (1)
MGA82563	Amplifier	U4 (1)
GVA-84+	Amplifier	U9 (1)
PHA-1+	Amplifier	U8 (1)
ADL5380ACPZ	Quadrature Demodulator	U11 (2)
ADA4927-2YCPZ	Differential ADC Driver	U10 (2)
AD8591ARTZ-REEL	Amplifiers	U31 (2)
NC7WZ04P6X	Dual Inverter	U26 (3); U15, U16 (4); U21 (5); U27 (6)
MAX2870ETJ+	Fractional/Integer-N Synthesizer	U23 (3); U24 (6)
SKY13267-321	Diversity Switch	U12 (3); U25 (6)
LFCN-2000+	Low Pass Filter	FL13 (3); FL12 (6)
LP3878MR-ADJ	Voltage Regulator	U13, U14 (4); U19, U20 (5)
24LC024	EEPROM	U17 (4); U22 (5)
ADL5375-05	Quadrature Modulator	U18 (5)

- [File:cu ettus-cca-cbx.pdf](#)

- The CBX daughterboard features female SMA 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](#)