



USRP™ E320

Performance on Embedded

USRP E320

Product Overview

The USRP E320 brings performance to embedded software defined radios by offering four times more FPGA resources compared to the USRP E31x devices. The USRP E320 also introduces improvements in streaming, synchronization, integration, fault-recovery, and remote management capability. This field deployable SDR continues to use the flexible 2x2 MIMO AD9361 transceiver from Analog Devices, which covers frequencies from 70 MHz – 6 GHz and provides up to 56 MHz of instantaneous bandwidth. The baseband processor uses the Xilinx Zynq 7045 SoC to deliver FPGA accelerated computations combined with stand-alone operation enabled by a dual-core ARM CPU. Users can deploy applications directly on to the preinstalled embedded Linux operating system or stream samples to a host computer using high-speed interfaces such as 1 Gigabit Ethernet, 10 Gigabit Ethernet, and Aurora over an SFP+ port. The USRP E320 has a flexible synchronization architecture with support for independent clock and PPS time references, as well as a built-in GPSDO module, to enable implementation of high channel count MIMO systems. The USRP E320 is available in both 3U board-only and fully enclosed form factor variants. Users can rapidly prototype and reliably deploy designs for embedded SDR applications with demanding performance requirements on the portable USRP E320 device.

Applications

Spectrum Monitoring and Analysis

The large FPGA accelerates a variety of computationally heavy IP for real-time spectrum processing.

eNB/UE

High throughput streaming and support of open source and commercial protocol stacks enable base station/UE emulation.

Mobile Radio and Unmanned Vehicle

The compact size is highly suitable for deployment in manpacks or on UAVs.



Features

RF Capabilities

- 2 RX, 2 TX
- Filter banks
- 70 MHz to 6 GHz frequency range
- Up to 56 MHz of bandwidth

Baseband Processing

- Xilinx Zynq 7045
 - Dual-core ARM Cortex A9 800 MHz with 1 GB DDR3 RAM
 - 7 Series FPGA with 2 GB DDR3 RAM

Software

- UHD version 3.14.0 or later
- RFNoC
- GNU Radio
- C/C++
- Python

Synchronization

- Clock reference
- PPS time reference
- GPSDO included

Peripherals

- SFP+ (1/10 GbE, Aurora)
- RJ45 (1 GbE)
- Type A USB Host
- Micro-USB (serial console, JTAG)
- GPIO

Power

- DC power supply (not included with board only)

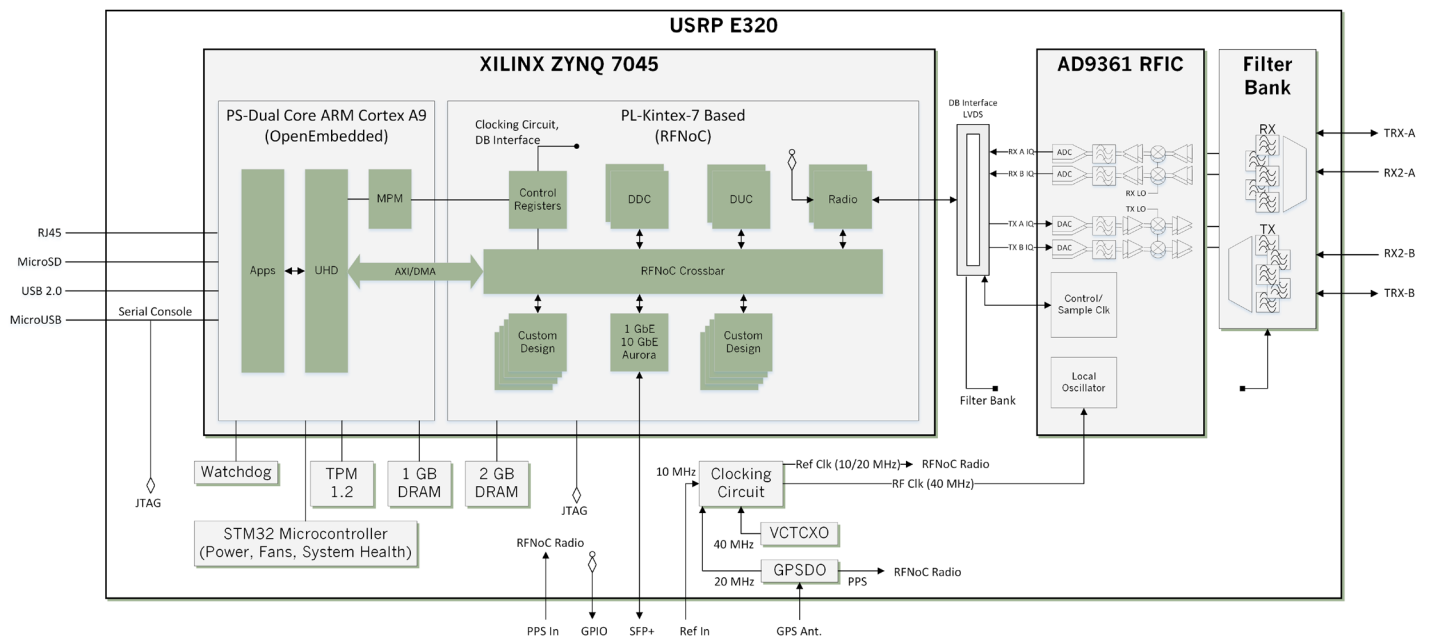
Form Factors

- 3U board-only (w/ heatsink): 173 x 100 x 36 mm, 0.16 kg
- Full enclosure: 175 x 106 x 38 mm, 0.86 kg

Specifications¹

Specification	Typical	Unit
RF Performance²		
IIP3 (at typical NF)	-20	dBm
Power Output	> 10	dBm
Receive Noise Figure	< 8	dB
Conversion Performance and Clocks²		
ADC Sample Rate (Max.)	61.44	MS/s
ADC Resolution	12	bits
DAC Sample Rate (Max.)	61.44	MS/s
DAC Resolution	12	bits
Host Sample Rate (16b)	61.44	MS/s
GPSDO Frequency Stability Unlocked ³	0.1	ppm
GPSDO PPS Accuracy to UTC ³	< 8	ns
GPSDO Holdover Stability ³	< +/-50 3 25	μ s hours $^{\circ}$ C
Power		
DC Input	10 – 14, 3	V, A
Power Consumption (Max.)	30	W

Specification	Typical	Unit
Temperature		
Operating	0 – 45	$^{\circ}$ C
Non-Operating	-40 – 85	$^{\circ}$ C
Humidity (Non-Condensing)		
Operating	10 – 90	%
Non-Operating	5 – 95	%
Shock and Vibration		
Operating Mechanical Shock (Tested in accordance with IEC 60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)	30 half-sine 11	g peak ms pulse
Operating Random Vibration (Tested in accordance with IEC 60068-2-64.)	5 – 500 0.3	Hz g rms
Non-Operating Random Vibration (Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)	5 – 500 2.4	Hz g rms
Altitude		
Operating	2000	m



¹ All specifications are subject to change without notice. This equipment information is only for product description and is not covered by warranty. Characteristic specifications are unwarranted values that are representative of an average unit operating at room temperature.

² Additional RF and digitizer specifications can be found on the ADI 9361 data sheet. <http://www.analog.com/media/en/technical-documentation/data-sheets/AD9361.pdf>

³ Clock and timing specifications are based on information from component vendors and are not measured. Visit the [USRP E320 hardware resources](#) page.