# VP430

## *3U VPX Direct RF Processing System  Xilinx Zynq Ultrascale+ RFSOC*

The VP430 is 3U VPX RF processing system featuring the transformational Xilinx® Zynq® Ultrascale+™ RF system-on-chip technology (RFSoC). The ZU27DR device used on the VP430 includes eight integrated analog-to-digital converters at 4GSPS, eight digital-to-analog converters at 6.4 GSPS, a user-programmable FPGA fabric, and multi-core Zynq ARM® processing subsystem.

### Reduce RF Signal Chain Complexity

RF systems with multiple channels suffer from a cost- and complexity challenge. More channels means more expensive and large RF signal up/down conversion and signal conditioning. As a solution, the VP430 enables direct RF sampling which can be implemented in the digital domain, bringing greater flexibility to the signal processing chain. Additionally, simplified integration with RF sampling devices removes the complexity of JESD204B high speed serial interfaces.

### Maximize Input/Output Channel Density

The VP430 is one of the densest 3U VPX analog FPGA carrier boards available with the ability to synchronize all 16 channels as well as multiple boards for even larger system applications. In previous generations of technology, this combination would have taken four times as many boards.

### Heterogeneous processing capability

Many RF and signal processing systems require both a streaming DSP with an FPGA and a general purpose processor for decisions and control. In the past, these

processing requirements were handled by separate modules. Now, with the VP430, it is possible to get both functions in a single module by leveraging the RFSoC technology.

### Offload Data More Efficiently

The VP430 has a traditional VPX data plane interface, allowing a x8 PCIe™ Gen3 connection to a host computer. With eight ADCs sampling at rates over 4GSPS with two bytes per sample, even the modern PCIe Gen 3 high speed data connection is too slow for a direct transfer. To overcome this challenge, the VP430 includes – in addition to the PCIe Gen3 data plane - the option to be built with an 8-channel VITA 66.4 fiber optic interface for transfers up to 12 GB/s.

The VP430 is designed to be both air- and conduction cooled, making it an ideal COTS product for early designs and capable of being deployed into operational assets. When paired with Abaco's extensive portfolio of multi- architecture processing boards including SBCs and GPGPUs, the state-of-the-art VP430 enables systems to be built from leading edge, interoperable components.

## FEATURES:

- Zynq UltraScale+ RFSoC
  - Integrated ADC, DAC, programmable logic and processing subsystems.
- ADC 8-channel 4GSPS 12-Bit
- DAC 8-channel 6.4GSPS 14-Bit
- Application Processing Unit - Quad-core ARM Cortex-A53
- Real-time Processing Unit
  - Dual-core ARM Cortex-R5
- Up to 8 GBytes DDR4
- Single serial BLAST site
  - Configurable memory options.
  - Firefly Optical backplane option.
- I/O
  - PCIe Gen3 x8
  - DisplayPort™ with RTM311
  - SATA 3.1 M.2 2280 SSD with RTM311
  - VITA 66.4 8x FireFly™ Optical Interface for transfers up to 12 GB/s.

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## Specifications

### Build options
- 1.0″ pitch

### Zynq Ultrascale+ RFSOC
- ZU27DR.

### Memory
- Two 64-bit 4GBytes DDR4 (8GB total) memory blocks. Up to 2400 Mb/s.
- RFSOC - 256KB on-chip with ECC.

### ADC and DAC
- ADC: 8-channels, 12-bit, 4GSPS with DDC
- DAC: 8-channels, 14-bit, 6.4GSPS with DUC

### Programmable FPGA Logic
- 930k System Logic Cells
- 425k CLB LUTs
- 4,272 DSP Slices

### Application Processing Unit
- Quad-core ARM Cortex-A53 MPCore
- Up to 1.5GHz

### Real-time Processing Unit
- Dual-core ARM Cortex-R5 MPCore
- Up to 533MHz

### Flexible VPX backplane options
- NanoRF 10 port connector option in conduction cooled
- VITA 66.4 optical interface via FireFly BLAST site (optional). 8 channels up to 12 GB/s.

### BSP
- Open Source access to Firmware
- Open source Windows and Linux API
- For VxWorks, please contact Abaco.

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## Block diagram
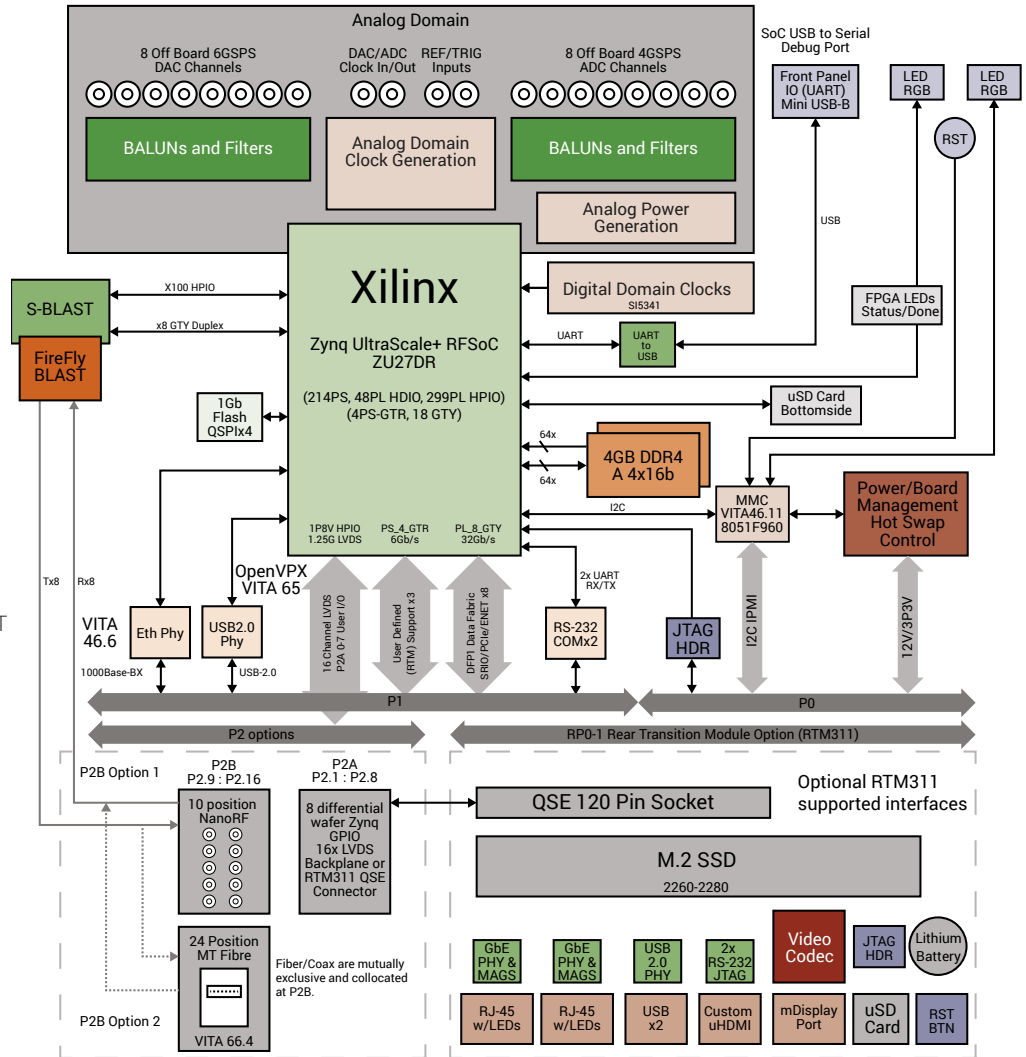


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