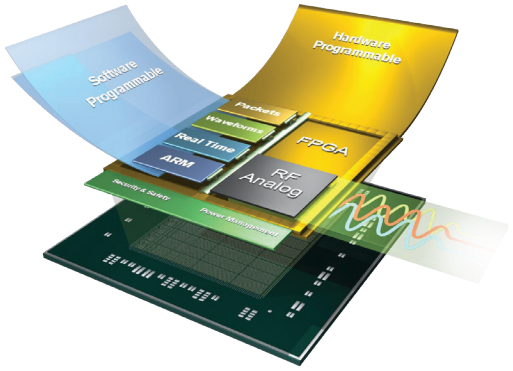
BittWare a molex company

RFX-8440A

PCIe RFSoC Card

RFSoC Data Acquisition Card

Seamlessly cross between analog and digital at up to S-Band rates



The BittWare RFX-8440A data acquisition card features the third generation AMD Zynq® UltraScale+™ RFSoC. This data acquisition solution is capable of addressing a wide frequency spectrum – a critical need for applications such as 5G, LTE wireless, phased array RADAR and satellite communications. The RFX-8440A transfers digital data over OCuLink or QSFP at twice the rate of RFSoC cards that move data only over PCIe.

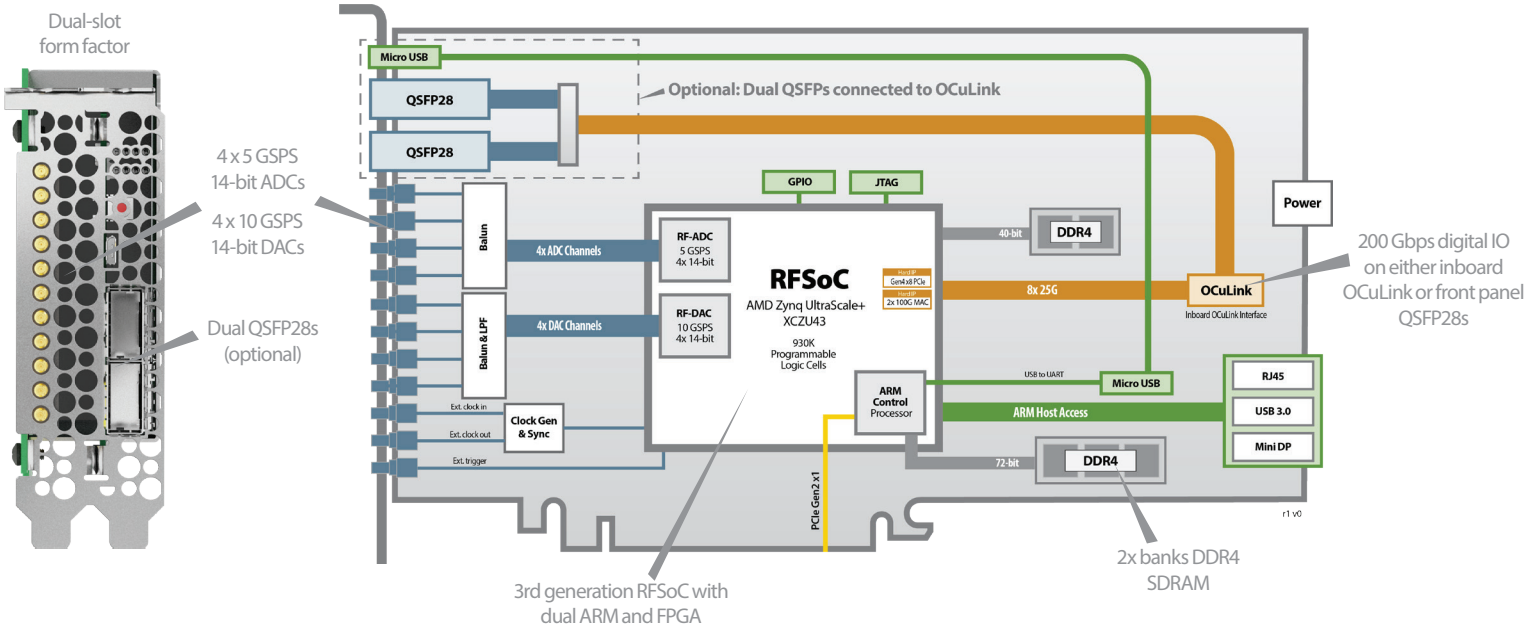
The RFX-8440A does not require any power or signals from a PCIe slot. However, unlike our L-Band variant, the RFX-8440A is usually deployed inside a server. In this configuration it is wired to a dual 100 GbE NIC or to a separate FPGA card like our IA-440i. BittWare can deliver the RFX-8440A in a standard server or a chassis enclosure which provides power, cooling and interface to the RFX-8440A via RJ45.

The AMD Zynq® UltraScale+™ RFSoC integrates RF-class A/D and D/A converters into the Zynq® FPGA fabric and multi-core ARM processor subsystem, creating a multi-channel data conversion and processing solution on a single chip.

200 Gbps of digital I/O is available on the FPGA side of the RFSoC. That is twice the bandwidth of RFSoC implementations that depend upon PCIe for data transfer. This I/O is available on a single, 8x OCuLink port, a popular connector used inside a chassis. We also offer an add-on that provides the same signals through two QSFP28 cages, the most popular connector between chassis. Customers have implemented transports using Aurora, Ethernet MAC frames, and UDP.

key features

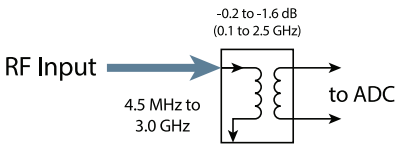
- Third Generation AMD Zynq® Ultra-Scale+™ RFSoC
- **Standalone** Capable
- **200 Gbps** Digital I/O



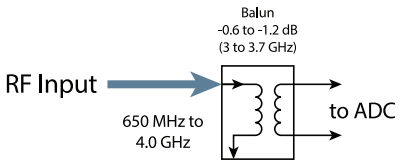
Analog Front End Options

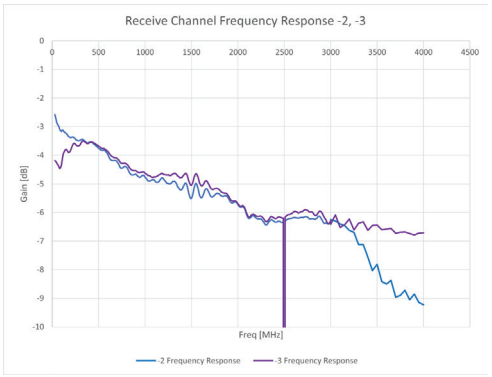
The RFX-8440A provides a direct connection with baluns supporting up to 4 GHz.The difference between the 3 and 4 GHz options is the balun transformer. The 3 GHz transformer offers slightly better, low frequency performance for customers who do not need the full 4 GHz top end.

Direct 3 GHz Balun



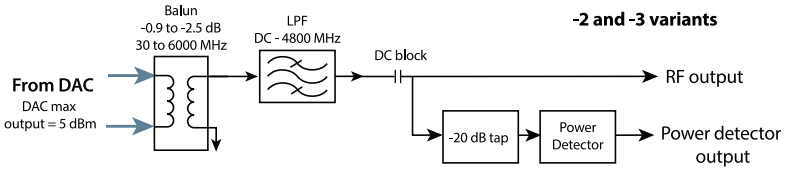
Direct 4 GHz Balun





3 and 4GHz Frequency Responses

Transmit Side Block Diagram



Board Specifications

FPGA	• AMD Zynq UltraScale+ RFSoC
	  • XCZU43 in an E1156 package
	  • Core speed grade -2
	• Contact BittWare for other FPGA options

Analog	• Two analog configurations available:
	  • Direct 3 GHz Balun
	  • Direct 4 GHz Balun
	• 4 x 10 GSPS 14-bit DACs: -40 to 0 dBm (default)
	• Programmable clocks
	• External reference and triggers
	• SSMC style connectors

On-board flash	• Flash memory for booting FPGA • Flash memory for ARM bootloader and OS image
External memory	• 16GB DDR4 processing system (ARM) memory with ECC • 8GB DDR4 programmable logic memory with ECC

External digital interfaces	• Processing system
	  • PCIe Gen2 x1
	  • RJ45 Ethernet
	  • USB UART, USB 3.0
	  • Mini DisplayPort
	• Programmable logic:
	  • Up to 200 Gb/s available via:
	  • Option 1: inboard OCuLink
	  • Option 2: Front panel 2x QSFP28
	  • AMD Hard IP support for dual 100GbE and PCIe Gen4

Cooling	• Standard: double-width passive heatsink • Contact BittWare for other cooling options
Electrical	• On-board power derived from 6-pin AUX connector • Power dissipation is application dependent • Typical max power consumption 50W
Environmental	• Operating temperature: 5°C to 35°C
Quality	• Manufactured to IPC-A-610 Class 2 • RoHS compliant • CE, FCC, UKCA & ICES approvals
Form factor	• ¾-length, standard-height PCIe dual-slot card (x16 mechanical) • Supports standalone operation • RFX-8440 can be ordered as a TeraBox™ integrated server platform

Sales Part Numbers

RFX-8440-0009	RFX-8440A card with 3 GHz balun input with QSFP28 mezzanine for TeraBox 1401B/1402B
RFX-8440-0012	RFX-8440A card with 3 GHz balun input
RFX-8440-0013	RFX-8440A card with 3 GHz balun input with QSFP28 mezzanine
RFX-8440-0014	RFX-8440A card with 4 GHz balun input with QSFP28 mezzanine
RFX-8440-0015	RFX-8440A card with 4 GHz balun input

Development Tools

FPGA development	BittWare provides a basic data capture and replay example utilizing the major interfaces of the product. AMD Vivado development tools are fully supported for development of custom designs.

Deliverables

- RFX-8440 Analog Data Acquisition Card
- Data capture and relay example - Full source code
- 1-year hardware warranty

To learn more, visit **www.BittWare.com**

r1 v0 | last revied 2024.03.20

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