



## RFSoc Data Acquisition Card

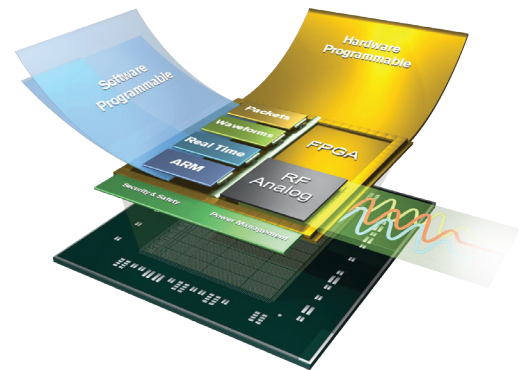
Seamlessly cross between analog and digital at up to S-Band rates

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.

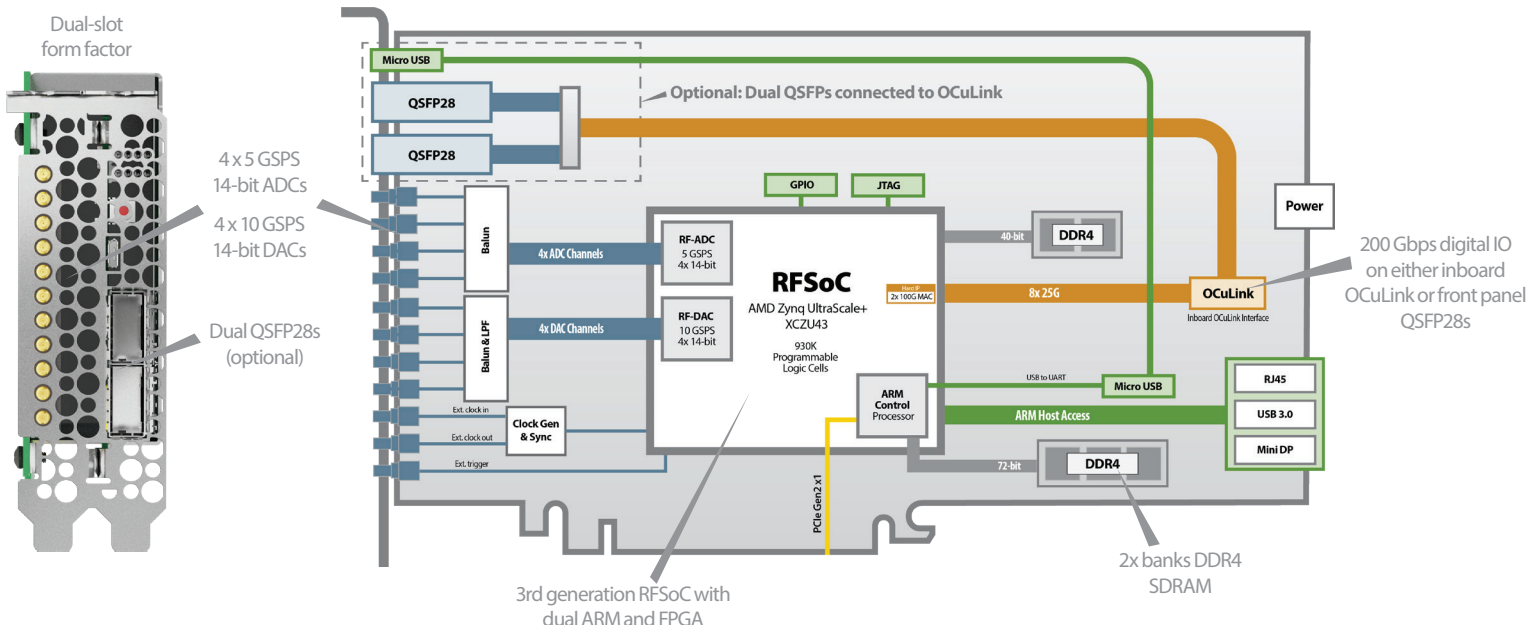


## key features

Third Generation  
AMD Zynq® Ultra-  
Scale+™ RFSoc

Standalone  
Capable

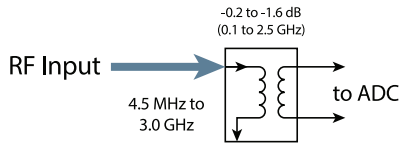
200 Gbps  
Digital I/O



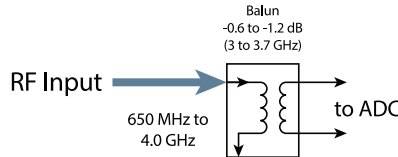
# Analog Front End Options

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.

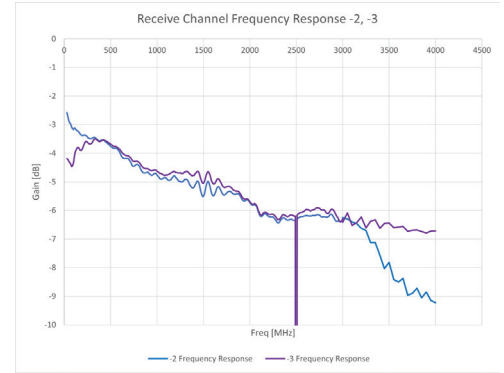
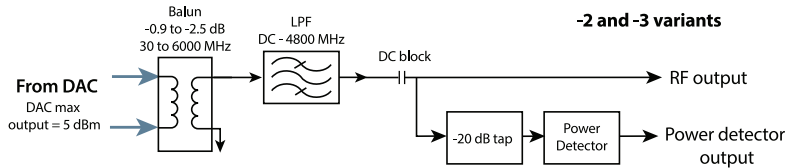
## Direct 3 GHz Balun



## Direct 4 GHz Balun



# Transmit Side Block Diagram



3 and 4GHz Frequency Responses

# Board Specifications

<b>FPGA</b>	<ul style="list-style-type: none"> <li>• AMD Zynq UltraScale+ RFSoc</li> <li>• XCZU43 in an E1156 package</li> <li>• Core speed grade -2</li> <li>• Contact BittWare for other FPGA options</li> </ul>
<b>Analog</b>	<ul style="list-style-type: none"> <li>• Two analog configurations available: <ul style="list-style-type: none"> <li>• Direct 3 GHz Balun</li> <li>• Direct 4 GHz Balun</li> </ul> </li> <li>• 4 x 10 GSPS 14-bit DACs: -40 to 0 dBm (default)</li> <li>• Programmable clocks</li> <li>• External reference and triggers</li> <li>• SSMC style connectors</li> </ul>
<b>On-board flash</b>	<ul style="list-style-type: none"> <li>• Flash memory for booting FPGA</li> <li>• Flash memory for ARM bootloader and OS image</li> </ul>
<b>External memory</b>	<ul style="list-style-type: none"> <li>• 16GB DDR4 processing system (ARM) memory with ECC</li> <li>• 8GB DDR4 programmable logic memory with ECC</li> </ul>

## 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](http://www.BittWare.com)

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