RFx: A low-SWaP multichannel RF tuner and digitizer

a HEICO company

The RFx is a multichannel RF tuner and digitizer on a low-profile, low-SWaP PCIe 3.0 board. It has two RF analog tuners with multiple digital tuners per RF input. Each RF tuner provides a 125 MHz complex baseband signal, downconverted from a 0.4–6.0 GHz signal. The baseband signal is digitized by a 14- or 16-bit ADC and processed by a Xilinx Kintex 7 FPGA (options available) which implements automatic gain control (AGC), DC removal, adaptive I/Q balancing, and a bank of digital tuners. Complex data from the digital tuners can be streamed directly or packetized in VITA-49 Radio Transport (VRT) format for downstream processing. Local oscillators and sample clocks are locked to a 10 MHz reference (internal or external).

Features

- 2 RF inputs
- Complex signal bandwidths up to 125 MHz
- Wideband frequency range, 0.4—6.0 GHz
- 14- or 16-bit ADC (one per RF input)
- Xilinx Kintex 7 FPGA with digital tuners
- Automatic gain control (AGC)
- DC removal
- Adaptive I/Q balance processing
- I/Q and VITA-49 Radio Transport (VRT) output formats
- Reference I/O (10 MHz, 1 pps)

Pictured without actual heatsink

Applications

- Signal surveillance
- Wideband signal acquisition and analysis
- Software-defined radio

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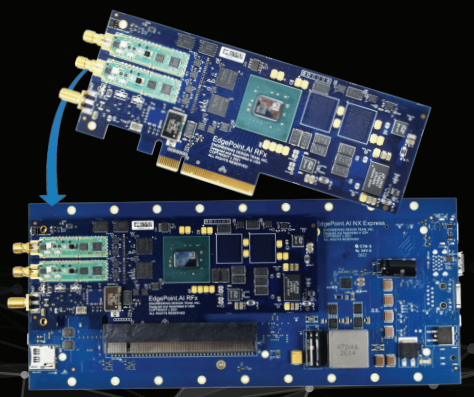
Specifications		
Data Formats	RF input with I/Q and VITA-49 Radio Transport (VRT) output	
RF Tuner Options	ADC	14 or optional 16 bits
	FPGA	Xilinx Kintex 7 XC7K160T or optional 410T
RF Tuner Parameters	Maximum input power without damage	13 dBm
	Input frequency range	0.4—6.0 GHz
	Input impedance	50 Ω
	NF	< 6.0 dB (typical)
	VSWR	< 1.7:1 (typical)
	IIP3	≥ 6.0 dBm*† with 10 MHz tone spacing
	P1dB	> -9.0 dBm† (typical)
	IMD2 / IMD3	≥ 50.0 / 40.0 dBc*
	Image rejection ratio	> 50.0 dB (typical)*
	SFDR	≥ 50.0 dBc* (AGC on)
	* Over input frequency range; for frequency- dependent details, see the typical performance characteristics on the following pages. † AGC off; AGC on enables higher values.	
Radio Interfaces	2 RF Inputs	SMA
Other Interfaces	10 MHz reference I/O	SMA or U.FL
	1 pps I/O	U.FL
Environmental	Temperature (operating / non-operating)	0° to 55° C / -40° to 70° C (ambient)
	Humidity (operating / non-operating)	1% to 90%, non- condensing at 40° C
Software	Linux SoapySDR plugin and example GNURadio Companion flowgraphs	

Interested in AI/ML and RF?

The RFx pairs seamlessly with the Edgepoint AI, EDT's highly configurable NVIDIA Jetson Orin™ or Xavier™ NX carrier built to develop and deploy your RF models at the edge.



*Enclosure available

edgepoint.ai
an EDT edge platform

Contact

sales@edt.com

800.690.1234

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www.edt.com