

wave:IQ WIDEBAND DIGITIZER

High-speed Analog to Digital Converter (ADC) moves analog RF data to the digital domain

Software programmable signal filtering and bandwidth selection

RFSoc (System on a Chip) technology for improved signal access

System simplification via software applications / services and edge devices

OVERVIEW

Part of our satTRAC® suite of modem solutions, wave:IQ Wideband Digitizer developed by ARKA is the industry's most flexible and configurable solution to support the expanding landscape of high-bandwidth signals, networks, and satellite links. It is a direct RF-to-digital and digital-to-RF signal converter that captures and processes high bandwidth data through modular software applications hosted on a Commercial Off-the-Shelf (COTS) server or through services / microservices hosted in a Cloud architecture for greater scalability and resiliency.

While typical RF interfaces require hardware down conversion, our wave:IQ leverages proven RFSoc technology developed for LTE / 5G, DOCSIS, and RADAR applications, and it uses only a small PCIe Digital IO card form-factor installed on a server that is conveniently co-located with the digitizer at the edge for a complete wideband modem solution. The RFSoc technology is beyond evolutionary—it is a revolutionary digitizer chip that provides significantly greater access to RF signals over conventional Application Specific Integrated Circuits (ASICs) that are used in commodity digitizers today. It provides eight (8) individual input / output channels and offers the advantages of gain, filtering, and step attenuation.

When integrated with our WAN-EX RF over IP technology, the wave:IQ provides reliable data transport of critical and continuous multi-Gbps data streams via any IP network, over any distance, and without the need for costly hardware. The result is reliable, real-time digitization of 1250 MHz of RF signal data that is processed into VITA-49 IP packets and transported over public or private IP networks.

THE wave:IQ IS THE SOLUTION OF CHOICE WHEN:

- the mission link's bandwidth requirement is greater than 100 MHz;
- multiple channels are required;
- space and power savings are needed when compared to discrete hardware digitizers.

SPECIFICATIONS

PHYSICAL INFORMATION	SPECIFICATION
RF Connectors	<i>Recommend IO panel; loose cables can be provided if IO panel is not an option</i>
Server Dimensions	<i>Typical Dell R740 Server: 2U, 3.4 H x 17.08 W x 29.03 D (in)</i>

TIMING & REFERENCE SIGNALS	SPECIFICATION
Frequency Reference	10 MHz
Internal Reference Accuracy	< 0.1 ppm
Time Reference Supported	IRIG-B, 1 PPS
Time Reference Voltage levels (for IRIG and 1PPS)	0.1 to 5 v peak-to-peak
Timing Reference Impedance	50 Ohms
Timing Reference Switching Threshold	-10 dBm
Timing Reference Max Input Level	+ 10 dBm

RF INPUT	SPECIFICATION
Architecture	14 bit RFSoc ADC
Number of Input Channels	8
Frequency Range	50 - 600 MHz
Power Range	-100 to -10 dBm
Damage Level	-7 dBm
AGC Range	59 dB
Alias Range	> 75 dB
Input Impedance (nominal)	50 Ohms
Input P1dB	> -4 dBm
Instantaneous Bandwidth	600 MHz single channel 1.25 GHz aggregate across all channels
Instantaneous Dynamic Range	> 74 dB
Noise Figure	< 9 dB
RF Gain	20 dB (typical)
Sample Rate	5000 MS/s
Sample Width	14 bits / sample
Tuning Step Size	< 1 MHz
VSWR	2:1 (typical)

DIGITAL IO CARD	SPECIFICATION
Timing Signal / Reference	1 PPS, IRIG, SMA (2)
Memory	2 KB EEPROM
Digital Interfaces:	Two (2) 42 pin connectors
Single-Ended GPIO	12 bidirectional 3.3V LVCMOS (6 per connector) 10 MHz max data rate
LVDS GPIO	8 Rx pairs (4 per connector) 8 Tx pairs (4 per connector) 100 MHz max data rate
12C Bus	One (1) individual address bus per connector 100 Kbps max data rate

RF OUTPUT	SPECIFICATION
Architecture	14 bit RFSoc DAC
Number of Output Channels	8
Frequency Range	50 - 6000 MHz
Power Range	-40 to +10 dBm
Dynamic Range	> 74 dB
Instantaneous Bandwidth	1250 MHz max
Instantaneous Dynamic Range	> 65 dB
Impedance (nominal)	50 Ohms
Phase Noise	TBD
Power Accuracy	+/- 0.5 dB
Sample Rate	6800 MS/s
Spurious	< -65 dBc
Sweep Modes	Triangle, Return to 0
Sweep Rates	10 kHz/s max
Sweep Limits	center-500 to center+500 kHz
Tuning Step Size	< 1 MHz
VSWR	< 1.8:1

Note: Specification values listed here are preliminary and subject to change. All measurements are taken between 50 - 2150 MHz and 0 dB attenuation level.

Environmental specifications of the wave:IQ, including operating / storage temperature and relative humidity, are derived from the server that is selected for the wave:IQ system. Consult the server manufacturer specifications for this information.



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