



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, AMERGINT's wave:IQ Wideband Digitizer 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 RF SoC 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

The AMERGINT 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.

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.

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 and 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 - 6000 MHz |
| Power Range | -100 to -10 dBm |
| Damage Level | -7 dBm |
| AGC Range | 59 dB |
| Alias Rejection | > 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) |

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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THE LINK BETWEEN INGENUITY AND SUCCESS

| 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 addressable 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.



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