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AE9020 Rugged 2GHz Snapshot Data Recorder

- Single-channel* analogue IF recorder
- 3.0 GHz IF centre frequency
- 2.0 GHz Recording Bandwidth
- 8- and 16-Bit Recording Modes
- Optimised Input Filtering
- 100GbE fibre-optic interface as standard
- Built-in down/up-shifting
- Real-time FFT/waterfall display
- Intuitive Graphical User Interface
- Data extraction direct to workstation/network
- Community-standard headers supported
- External data storage modules available – from 16TB capacity

Avalon AE9020 Snapshot Data Recorder (front view).

TECHNICAL OVERVIEW

The *New* Avalon AE9020 snapshot SIGINT Data Recorder in a rugged, full width, 2U enclosure, is designed to record a 3.0 GHz analogue IF (intermediate frequency) signal at a bandwidth of up to 2.0 GHz for several seconds before transferring the captured data to data storage. The user can define a pre-trigger period which allows the signal of interest to be fully captured.

The recorder is designed to be fitted into our 19" backplane chassis and interface with our range of storage modules but may also be used in stand-alone mode and store to any compatible, remote storage system via a 100GbE fibre-optic link.

The recorder contains the key analogue electronics associated with the processing of 3.0 GHz analogue IF signals with up to 2.0 GHz Bandwidth. contains the digital processing electronics required to store and recover digital data recorded to the external storage. The rear panel allows access to stored data and live data streams via the 100GbE MTP/MPO fibre-optic connectors or the QSFP28 port.

The recorder is also able to reconstruct the recorded digital samples and output these in their original analogue form. With the recorder in *record* or *standby* modes, the output signal is derived from the record input signal. During playback, the output signal is derived from stored data.

Unlike some previous generations of Avalon Disk Recorders, the AE9020 records data in a standard computer file format, thereby dramatically simplifying the selection and copying of critical sections of recorded data.

*Multi-channel interface models with different IF and bandwidth configurations are optionally available.

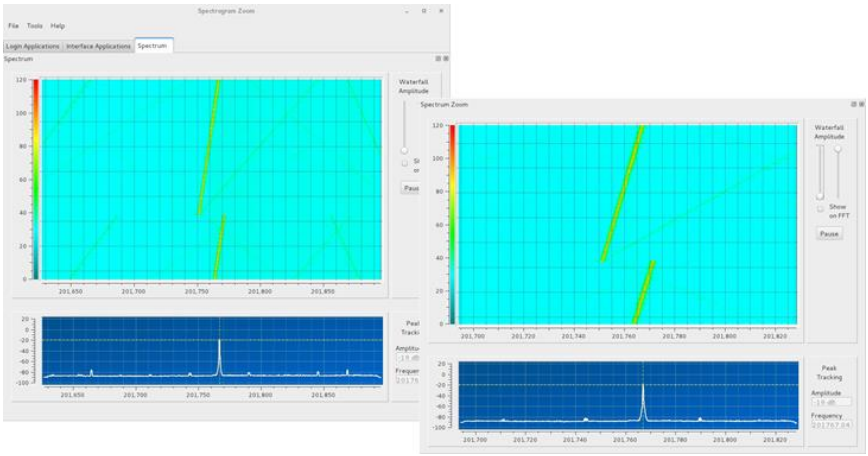
GRAPHICAL USER INTERFACE (GUI)

The recorder is typically controlled from either an external PC/Laptop using an Avalon-developed GUI application or from the pre-loaded version stored on the recorder. The Avalon GUI Application may be compiled to run under a range of Windows and Linux operating systems.
The GUI provides control over all the Recorder functionality, including: RECORD, PLAY, STOP, Data selection (for extraction/forwarding, etc.), data handling, including transcription to networked storage media; and control and monitoring of input signals and levels.

GUI examples

REAL-TIME FFT / WATERFALL DISPLAY

The AE9020 features a powerful, real-time FFT function that can be used to visualise the incoming signal. In record and standby modes, the spectrogram display reflects the record input signal, during playback the spectrogram will display the reconstructed signal. Typical examples of real-time FFTs are shown below...



Examples of FFT displays

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TECHNICAL SPECIFICATIONS

Number of Channels:	1 standard. *Note: Multi-channel interfaces also available*.
Input Centre Frequency:	3.0 GHz.
Input Filtering:	High precision anti-aliasing filtering is provided, 2GHz bandwidth as standard.
ADC Sample Rate:	8.8 GHz.
ADC Resolution:	Sampling is at 12-bits.
Recording Depth:	High Resolution Mode: 12-bit samples recorded as 2 Bytes (16-bits) Lower Resolution Mode: 1 Byte (with LSBs discarded by rounding after internal signal processing)
Decimation:	2:1
Record Sample Rate (IQ pairs):	1.1 x Bandwidth. i.e. 2.2GHz for a 2GHz Bandwidth
Recording Data Rate:	4.4 GBytes/sec (2.0 GHz BW, 8-bits) 4.4 GBytes/sec (1.0 GHz BW, 16-bits).
Recording Duration (16 TB, no looping):	30 minutes (2.0 GHz BW, 8-bits), Snapshot recording 30 minutes (1.0 GHz BW, 16-bits), Snapshot recording 1 hour (500 MHz BW, 8-bits), Continuous recording 1 hour (250 MHz BW, 16-bits), Continuous recording 2 hours (250 MHz BW, 8-bits), Continuous recording
Recorded Spur-free dynamic range:	>55 dB (16-bit recording).
Max signal level for FS rec.:	-10 to +10 dBm adjustable for full-scale recording.
Input impedance:	50 Ω (nominal).
Input Coupling:	AC.
Output Level:	0 dBm (typical) from full-scale recording.
Output Impedance:	50 Ohms (nominal)
Output Centre Frequency:	3.0 GHz.
Output Bandwidth:	2.0 GHz (8-bit mode) 1.0 GHz (8-bit and 16-bit modes) 500MHz (8-bit and 16-bit modes) 250MHz (8-bit and 16-bit modes)

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Internal Reference Freq.:	10 MHz +/- 1 ppm after 10-minute warm up. Note: The internal sampling and translation oscillator is locked to this reference. This internal reference is available for use by other equipment.
External Reference Freq.:	10 MHz, +10 to +16 dBm, +/- 1 ppm or better - to lock the internal reference.
Network Comms. Applications:	Interface for networking communications. Support for fibre optic or copper cable. Protocols supported include Ethernet (10Gbits/s, 40GBits/s). *See options below…*
Data/Control Port:	Ethernet, at up to 100Gb
Storage Capacity (baseline):	Dependent on storage module attached. Basic module is 16TB.
Dimensions:	Full-width 19" (426mm) x 2U height (88mm). Rack Depth: 450mm; Total depth, including front handles: 500mm
Weight:	~ 20 Kg.
Power:	100 to 240 Volts, 47 to 63 Hz, 400 Watts maximum.
Environmental:	EMC/RFI: Designed to conform to the applicable sections of MIL-STD-461. Shock/Vibration: Designed to conform to the applicable sections of MIL-STD-810, and US Navy specifications. Similar construction approved for flight in USAF Rivet Joint and other military and civilian turbo-jet and propeller aircraft.
System Control:	Stand-alone, fully featured, Avalon-designed GUI (graphical user interface) running on an external laptop/PC (via Ethernet port).
File Format:	Midas Blue (Platinum 2.0) or MATLAB™ see note 1

Note 1: MATLAB is a trademark of The MathWorks Inc.

OPTIONS

- The AE1003 – a 3U 19" backplane chassis – accommodates this recorder and one AE3000-series storage module.
- Other backplane chassis sizes are available – for accommodating addition storage or accessory units.
- Various AE3000-series storage modules are available.
- Contact us to discuss the availability of multi-channel versions of this recorder.

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