

## AE9000-100 Rugged 2-Channel Disk Recorder

- Two wideband channels (IF and/or baseband)
- IFs: 160, 140, 70 and 21.4 MHz centre frequencies (menu-selectable)
- Menu-selectable recording bandwidths (100, 50, 25 and 12.5 MHz)
- 8 and 16-Bit Recording Modes (menu-selectable)
- Optimised Input / Output Filtering
- 8 TB removable Disk Crate as standard (16TB optional)
- Built-in down/up-shifting (IF paths)
- Intuitive Graphical User Interface
- Data extraction direct to workstation/network
- Community-standard headers supported
- Longer record durations optional



**Avalon AE9000-100 Two-Channel SIGINT Disk Recorder (front view).**

### TECHNICAL OVERVIEW

The compact, self-contained **Avalon AE9000-100 SIGINT Disk Recorder** is designed to record, reproduce and export up to, two channels of wideband signals at a total bandwidth of up to 100 MHz. The recording channel can be configured to record either an IF or a baseband (video) signal. Two user-selectable recording resolutions are offered: 8-bits for routine data collection tasks and 16-bits for high-resolution applications. User-selectable IFs include 160, 140, 70 and 21.4 MHz. Four user-selectable recording bandwidths are supported: 100, 50, 25 and 12.5 MHz. The unit's hot-swappable Disk Crate (SSD standard) can store up to 40 hours of mission data in 1 Ch x 25 MHz (8-bit) recording rates. Record times are proportionally longer or shorter at different resolutions or bandwidths. The primary means of local control is by means of a monitor, mouse and keyboard attached to the recorder's rear panel. The unit can also be controlled remotely.

As with all Avalon SIGINT recorders, the AE9000-100 incorporates high-precision anti-alias input filtering and advanced, custom-designed analog-to-digital conversion techniques in order to provide the signal quality required by critical applications such as LPI (low probability of intercept) and SEI (specific emitter identification). IF signals are down-converted to the selected recording bandwidth using fast digital signal processing (DSP) techniques and recorded as IQ (complex) pairs of samples for easy up-conversion during replay. Baseband signals are recorded as 'real' samples.

In addition to normal analog replay, recorded data can be exported in digital form directly to an analysis computer via a 10 Gbit LAN.

## 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

## TECHNICAL SPECIFICATIONS

<b>Number of Channels:</b>	1 or 2 channel operation (user-selectable).																				
<b>Recording Modes:</b>	2 channels of IF data, or ) 2 channels of baseband (video) data, or ) user-selectable. 1 channel of IF plus one channel of baseband (video) )  IF Modes: 160, 140, 70 and 21.4MHz (user-selectable).																				
<b>Bandwidths/Resolution:</b>	<table border="1"> <thead> <tr> <th>Bandwidth</th> <th>8-bit</th> <th>16-bit</th> <th>All Bandwidths are user-selectable</th> </tr> </thead> <tbody> <tr> <td>100 MHz</td> <td>YES</td> <td>No*</td> <td>16-bit available on request</td> </tr> <tr> <td>50 MHz</td> <td>YES</td> <td>No*</td> <td>16-bit available on request</td> </tr> <tr> <td>25 MHz</td> <td>YES</td> <td>YES</td> <td></td> </tr> <tr> <td>12.5 MHz</td> <td>YES</td> <td>YES</td> <td></td> </tr> </tbody> </table>	Bandwidth	8-bit	16-bit	All Bandwidths are user-selectable	100 MHz	YES	No*	16-bit available on request	50 MHz	YES	No*	16-bit available on request	25 MHz	YES	YES		12.5 MHz	YES	YES	
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25 MHz	YES	YES																			
12.5 MHz	YES	YES																			
<b>Frequency Response:</b>	IF paths: +/-2 dB (typical) with optimised (internal) anti-alias filters. Baseband path: DC to band-edge +/-2dB.																				
<b>Recording Duration:</b>	100 MHz (8-bit) mode: 80 minutes (8TB Disk Crate). 25 MHz (8-bit) mode: 40 hours (16TB Disk Crate).																				
<b>Recording Format:</b>	IF sources: IQ pairs (centred on 0 Hz), 2s-complement. Baseband: Real samples, 2s-complement.																				
<b>Data Transfer/Archive:</b>	To a remote server via 10 Gbit Ethernet port.																				
<b>Replay (analogue):</b>	Same format and bandwidth as recording (with automatic detection of recording mode).																				
<b>Replay (digital):</b>	Binary files for computer analysis, c/w Midas Blue headers.																				
<b>Input Levels for Full Scale record:</b>	IF source: -20 to +10 dBm from 50 Ω source (AC coupled). Baseband sources: -20 to +10 dBm from 50 Ω source (DC coupled).																				
<b>Output Levels from Full Scale record:</b>	Normal IF: 0 dBm into 50 Ω load (AC coupled). Baseband: 1V pk/pk into 50 Ω load (DC coupled).																				
<b>Spur Free Dynamic Range:</b>	Typical figures: ~50 dB (8-bits), ~70 dB (16-bits).																				
<b>Group Delay Variation:</b>	2 nanoseconds pk/pk.																				
<b>Reference Frequency:</b>	Stable internal 10 MHz clock, or external 10 MHz source.																				
<b>Local Control:</b>	Avalon GUI running on recorder, with attached monitor/mouse/keyboard.																				
<b>Remote Control:</b>	Via 10/100/1000BASE-T Ethernet), using Avalon GUI (or user-furnished equivalent) running on remote laptop/PC. Most popular OS's (including Windows) supported. APIs also available from Avalon.																				

<b>LOOP recording:</b>	The recording media can be configured as a simulated 'endless loop' for record and play.
<b>SKIP mode:</b>	Permits the user to tag selected passages of data with SKIP flags to avoid accidental overwriting. SKIP flags can be set either while recording or when the recorder is stopped.
<b>Media Life:</b>	2,500 hours warranted minimum life at maximum bandwidth. Typical media life more than 10,000 hours.
<b>Data Extraction Ports:</b>	LAN 10Gbit Ethernet.
<b>Dimensions:</b>	217mm (19" Half-width) x 4u x 545 mm deep.
<b>Weight:</b>	~ 15 Kg.
<b>Power:</b>	90 to 264 Volts, 47 to 63 Hz, 360 Watts.
<b>Temperature:</b>	0 to +55 °C (operating), -20 to +70 °C (storage). Values established with SSD drives.
<b>Environmental:</b>	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.
<b>System Control:</b>	Stand-alone, fully-featured Avalon-designed GUI (graphical user interface) running on an external laptop/PC (via Ethernet port).
<b>File Format:</b>	Midas Blue (Platinum 2.0).

## OPTIONS

- 16TB (total capacity) removable Disk Crate.
- Extra-long-life SSDs – refer to Avalon Electronics Ltd. for details.