AE9000FW-500
Wideband SIGINT Recorder

Rugged 1-channel 500 MHz IF Disk Recorder

Figure 1: Avalon AE9000FW Disk Recorder (front view).

- **Single-channel, multi-mode analogue IF recorder (2- and 4-channel interface options available)**
- **IFs: 1 GHz, 160, 140, 70, 60 and 21.4 MHz**
- **BWs: 500 MHz (1 GHz IF), 100, 50, 25 and 12 MHz**
- **8- and 16-bit recording modes (menu-selectable)**
- **Optimised input/output filtering**
- **Built-in down- and up-conversion**
- **Real-time FFT Display**
- **Disk Pack: 16 TB SSD (high capacities available)**
- **Data extraction direct to workstation/network, or portable media (Audavi disk pack, LTO-5 tape, etc.)**

Introduction

The compact, self-contained **Avalon AE9000FW-500 SIGINT Disk Recorder** is designed to record, reproduce and export a single channel of wideband analogue IF data at centre frequencies of 1 GHz IF, 160, 140, 70, 60 and 21.4 MHz at pre-defined bandwidths. Depending on the selected IF, recording bandwidths of up to 500 MHz are supported. Two- and four-channel data interfaces are also available.

Two user-selectable recording resolutions are offered: 8-bits for routine data collection tasks and 16-bits for high-resolution applications (see Specification section for details). The unit's baseline hot-swappable 16 TB Disk Crate is able to store up to 2 hours of mission data at the full 1 GHz IF / 500 MHz BW (16-bit) recording mode. Record times are proportionately longer at lower channel counts, 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. The unit also supports snapshot recording.

As with all Avalon SIGINT recorders, AE9000FW-500 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.

In addition to normal analog replay, recorded data can be exported in digital form. For example, it is possible to BACKUP selected passages of data to a 1 TB (or larger) 2.5 inch SSD, an optional attached Audavi media pack or attached Ultrium LTO-5 tape drive using software utilities running on the recorder itself. Data stored on external media can be RESTORED to the same or another AE9000FW-500 for analog replay or transcribed to conventional storage media at a remote digital analysis facility.

Technical Specifications (AE9000FW-500)

Number of Channels:	1.				
Supported IFs:	1 GHz, 160, 140, 70, 60 and 21.4 MHz (user-selectable).				
Maximum Bandwidths:	**IF**	**Bandwidth**	**8-bit**	**16-bit**	**Lower Bandwidths (user-selectable)**
	1 GHz	500 MHz	YES	YES	250, 125 and 62.5 MHz
	160 MHz	100 MHz	YES	YES	50, 25 and 12.5 MHz
	140 MHz	100 MHz	YES	YES	50, 25 and 12.5 MHz
	70 MHz	50 MHz	YES	YES	25 and 12.5 MHz
	60 MHz	50 MHz	YES	YES	25 and 12.5 MHz
	21.4 MHz	12.5 MHz	YES	YES	N/A
Frequency Response:	IF paths:	+/-1 dB (typical) with optimised (internal) anti-alias filters.			
Recording Duration (16 TB):	500 MHz (8-bit) mode:	2 hours.			
	100 MHz (8 bit) mode:	10 hours.			
Recording Format:	IF sources:	IQ pairs, 2s complement.			
Backup / Transfer / Archive:	To/from attached 2.5" SSD, Audavi disk pack, Ultrium LTO-5 tape drive and/or DVD.				
Replay (analogue):	Same format and bandwidth as recording (with automatic detection of recording mode).				
Replay (digital):	Binary files for computer analysis.				
Input Levels for FS rec.:	-15 to +10 dBm from 50 Ω source (AC coupled).				
ADC Specification:	SNR 54dB. SFDR 60dB, IMD3 63dB (Texas Instruments ADC12D1800).				
Output Level from FS rec.:	0 dBm into 50 Ω load (AC coupled).				
Spur Free Dynamic Range:	>45 dB (8-bits), >55 dB (16-bits). Typical figures.				
Group Delay Variation:	2 nanoseconds pk-pk.				
Reference Frequency:	Stable internal 10 MHz clock, or external 10 MHz source.				
Local Control:	Attached monitor/mouse/keyboard.				
Remote Control:	Via Ethernet using stand-alone executable (Windows/Linux) or Remote Desktop application. APIs also available from Avalon.				
LOOP recording:	The recording media can be configured as a simulated 'endless loop' for record and play.				
SKIP mode:	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.				
Real-time FFT:	Real–time calculation of FFT (waterfall/spectrogram) display of input signal.				
Data Extraction Ports:	LAN, USB, USB-2 and eSATA.				
Power:	85 –240 VAC, 50- 60 Hz (auto-ranging). 200 VA nominal. 270 VA peak demand.				
Physical:	½ rack x 4u x 530 mm.				
Environmental:	Designed and tested to the applicable sections of MIL-STD-461E (EMC) and MIL-STD-810E (Shock and Vibration).				

These specifications are provisional and subject to change without notice. Please contact Avalon for full technical details.

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