

# DAQStreaming

## 40 MB/s Data Recorder for Analog and Digital Signals

### Features

- Windows-based turnkey system for recording analog and digital signals
- Up to 40 MB/s real-time data recording throughput
- Up to 1.5 hours recording duration at maximum data rate
- Diversified models for
  - High-speed analog signals
  - Multiple-channel simultaneous analog signals
  - High-speed digital patterns
- Digital pattern playback
- C-like file API to manage recorded data
- Complete software architecture for customized data processing
- PXI platform DAQStreaming is also available



### Introduction

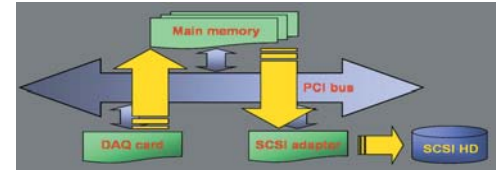
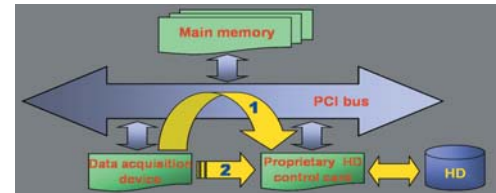
DAQStreaming is a revolutionary high-speed data recorder that takes advantage of advanced software technologies and the high data throughput of SCSI devices to meet the needs of high-speed, real-time, and sustained data recording with up to 40 MB/s data throughput.

### Background & Technologies

Some data acquisition applications need to continuously acquire and store high volumes of data for the off-line processing. However, due to disk speed limitations and file system overhead, it's virtually impossible to provide real-time data recording capabilities with data rates over 10 MB/s. Traditionally, a proprietary hard disk control card is used to transfer the acquired data from the DAQ device to the hard drive via a DMA (path #1) or a front panel connection (path #2). Using current technologies, data throughput from 60 MB/s to 200 MB/s is achievable using proprietary data acquisition and hard disk control cards.

Introducing proprietary devices increases costs, making it priced out of reach to many users requiring high-speed data recorders. ADLINK proposes a revolutionary concept to utilize commercial SCSI devices and data acquisition cards to make high-speed data recording affordable.

In existing computers, the PCI bus provides 132 MB/s bandwidth. Meanwhile, a SCSI adapter allows up to 320 MB/s data transfer rate (Ultra-320) and the burst data transfer of a SCSI hard disk is up to 70 MB/s data throughput. Combined with a precise DMA control and raw disk access capabilities, 40 MB/s data throughput is available in the current computer architecture. ADLINK's DAQStreaming is a turnkey system integrated with commercial data acquisition devices, SCSI devices and complete software architecture to provide a cost-effective solution for high-speed data recording.



### Hardware Architecture

#### Storage Device

DAQStreaming is equipped with state-of-the-art SCSI storage devices, including a Ultra-160 SCSI adapter and high-capacity SCSI hard disk(s). The SCSI drive is assembled in a swappable mobile rack for flexible capacity expansion. The DAQStreaming default configuration includes one mobile rack with a 36.7 GB SCSI drive which allows 15 minutes recording duration at maximum data rate. A fully configured system contains 3 SCSI mobile racks, each with a 73 GB drive to extended the capacity to 220 GB for 1.5 hours recording time.

#### Data Acquisition Device

DAQStreaming is designed to record both analog and digital data. Integrated with ADLINK's most advanced data acquisition devices, DAQStreaming high-speed data recorder offers diversified models for different signal types.

##### ■ DAQStreaming-A1 for burst analog signals

Designed to record burst analog signals, such as explosion and radar echo. This model is equipped with a high-speed data acquisition card which provides 4-CH analog input channel with a 20 MS/s sampling rate. Users can obtain sustained analog signal recording with the following settings:

- 1-CH @ 20 MS/s
- 2-CH @ 10 MS/s for each channel
- 4-CH @ 5 MS/s for each channel

##### ■ DAQStreaming-D1 for high-speed digital patterns

Designed to record and playback digital patterns such as GPS and satellite signals. This model is equipped with a high-speed digital input/output which provides a variety of configurations and a maximum 20 MHz update rate. Users can obtain sustained digital pattern recording with the following settings:

- 16-CH record @ 20 MHz
- 32-CH record @ 10 MHz

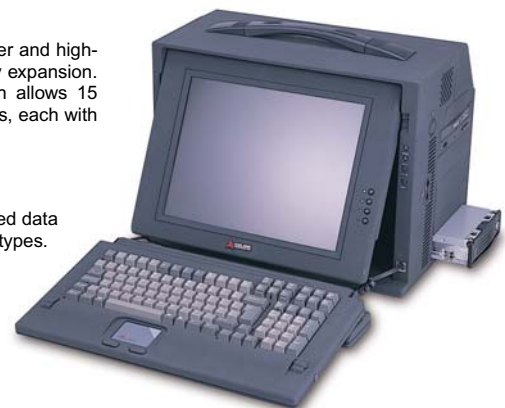
Or reproduce the recorded digital patterns with the following settings:

- 16-CH playback @ 20 MHz
- 32-CH playback @ 10 MHz

##### ■ DAQStreaming-S1 for simultaneous analog inputs

Designed to record multi-channel, phase-related analog signals, such as vibration and sound. This model is equipped with state-of-art simultaneous data acquisition cards which provide 8-CH simultaneous analog inputs and a maximum 2 MHz sampling rate for each channel. Users can obtain sustained analog signal recording with the following setting:

- 8-CH simultaneously @ 2 Msps for each channel



## System Configuration

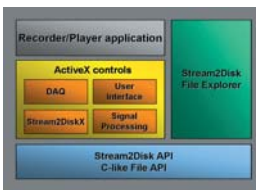
The DAQStreaming high-speed data recorder delivers a highly integrated system in a durable lunchbox-style portable case. It comes with a 14.1" TFT LCD panel and built-in keyboard/touchpad as well as an advanced single board computer providing Pentium 4 1.6 GHz computing power. In addition, a variety of peripherals are integrated into this system, including system drive, CD-ROM, 10/100 Mbps Ethernet, USB ports, etc. This makes DAQStreaming an ideal data recording system for both laboratory and field-use.



DAQStreaming for the PXI platform is also available.

## Software Architecture

Software is the core of DAQStreaming since the 40 MB/s data throughput is achieved by programming precise DMA operations and direct access to sectors of SCSI drives. In the DAQStreaming, we define a proprietary file system to avoid the overhead brought by Windows file system and to efficiently handle acquired data. We designed a complete software architecture to allow users to easily record/review data using the recorder/player application, or write a customized application using the provided API and ActiveX controls.



## Stream2Disk API

The Stream2Disk is a set of C-like file APIs to handle files in the DAQStreaming file system. Names and parameters of functions in the Stream2Disk API are similar to standard ANSI C file I/O functions. With this, users may use functions like fopen, fclose, fread and fwrite to access all the files stored in DAQStreaming file system.

## Associated ActiveX Controls

DAQStreaming also provides a variety of ActiveX controls to help users build customized applications, including:

- Stream2DiskX - To access files and manage the file system.
- DAQ - To control DAQ devices and perform data acquisition and recording.
- Signal Processing - To provide essential DSP for off-line data processing, such as FFT, windowing, correlation and so on.
- User Interface - To visually present the acquired data.

## Stream2Disk File Explorer

The Stream2Disk file explorer is useful tool for users to manage the file system. It has a similar user interface with Windows to allow users delete/rename files, check available space, and perform formatting and defragmenting.

## Recorder/Player Application

The easy-to-use recorder/player application let users record/review the acquired within just few mouse clicks. Even without any programming knowledge, users can record analog or digital data at 40 MB/s, as well as review the acquired data and perform essential analysis.

## Applications

- High-energy physics
- Radar and sonar systems
- Missile tracking
- GPS signal recording
- Satellite communication recording/testing
- High duration vibration/sound monitoring

## Ordering Information

### Turnkey System

- **DAQStreaming-A1**
  - •40 MB/s Data recorder for high-speed analog signals
  - •Portable/IPC platform
- **DAQStreaming-D1**
  - •40 MB/s Data recorder for high-speed digital patterns with playback capability
  - •PXI/Portable/IPC platform
- **DAQStreaming-S1**
  - •40 MB/s Data recorder for 8-CH simultaneous analog inputs
  - •PXI/Portable/IPC platform
- **Optional storage space extension**

### Development Toolkit Package (No platform included)

**Package includes:** Data acquisition card, DAQStreaming software, and SCSI devices

- DAQStreaming-A1-TK  
40 MB/s data throughput for high-speed analog signals
- DAQStreaming-D1-TK  
40 MB/s data throughput for high-speed digital patterns with playback capability
- DAQStreaming-S1-TK  
40 MB/s data throughput for 8-CH simultaneous analog inputs

## Specifications

Model Number	DAQStreaming-A1	DAQStreaming-D1	DAQStreaming-S1
<b>Data Storage</b>			
Data Throughput	40 MB/s	40 MB/s	32 MB/s
Capacity (Default/Max)	36.7 GB/220 GB	36.7 GB/220 GB	36.7 GB/220 GB
Recording Duration (Default/Max)	15 Min /1.5 Hrs	15 Mins/1.5 Hrs	19 Mins/1.9 Hrs
<b>Data Acquisition</b>			
Input Channels	4-CH analog signals	32-CH digital signals	8-CH simultaneous analog signals
Maximum Sampling Rate	1-CH @ 20 MHz 2-CH @ 10 MHz 4-CH @ 5 MHz	16-CH @ 20 MHz 32-CH @ 10 MHz	8-CH simultaneously @ 2 MHz
Input Range	±1 V or ±5 V	TTL level	±1.25 V to ±10 V
Signal Playback	No	16-CH DO @ 20 MHz 32-CH DO @ 10 MHz	No
<b>System Configuration</b>			
Chassis	Lunchbox-style portable chassis with built-in keyboard/mouse		
CPU	P4 1.6 GHz		
Memory	512 MB DDR		
Display	14.1" TFT 1024x768		
System Drive	20 GB		
CD Drive	Built-in 52x CD-ROM		
Network	10/100 Ethernet		
Power Supply	ATX 400 W		
OS	Windows 2000		
<b>Others</b>			
PXI Platform Available	No	Yes	Yes



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