Hi-Techniques

FREEStyle

Data Acquisition System

Flexibility by Design

Introducing Freestyle

The versatile, capable solution for mobile and rugged data acquisition applications.

Key Features:

Supports virtually every signal type on a per channel basis including strain gages, thermocouples, load cells, DC accels, IEPE devices, RTDs as well as voltage and digital I/O.

8 high performance analog input channels per Freestyle. Ultra-stable amplifiers with 20 kS/s, 24-bit SAR digitizers ensure the highest available performance.

8 Digital / Frequency channels for switch closure, RPM, Frequency, or Flow.

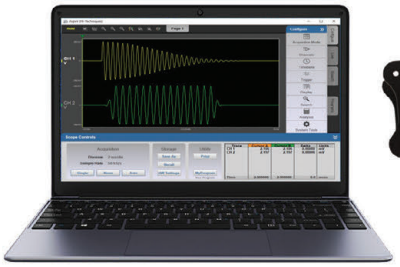
Distributed operation. Up to 4 Freestyle modules can be synchronized together using a single interconnect cable at distances up to 100m.

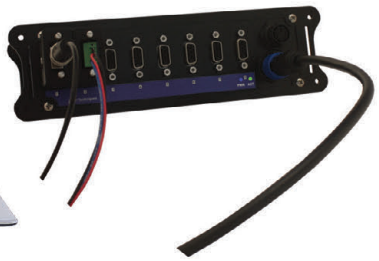
Rugged IP67 Enclosure and wide operating temperature range allows quality data even in the harshest environments

Simple operation for unskilled operators but packs advanced capabilities for even the most sophisticated user

Small Size, Big Performance

Don't let Freestyle's diminutive size fool you. This Data Acquisition System is full featured and ready for even the most complex tasks. Simply connect your Freestyle to any Windows PC and you're ready to go!





Data can be viewed in realtime and is streamed directly to your hard drive even from distances as large as 100 meters away and instantly read for analysis.

The economical Freestyle offers performance typically only found in high end DAQ systems including 24-bit SAR digitizers, ultra-stable circuitry, and high accuracy input amplifiers.

Purpose Built Hardware

Freestyle was designed from the ground up to operate in harsh environmental conditions. Utilizing low power / low heat industrial rated components, Freestyle specifications are guaranteed across the wide -40°C to +85°C operating range. Many lower capability competitive systems can vary dramatically in results across this wide temperature range.

In addition, the IP67 resistant packaging ensures reliable operation even in wet or dusty situations. Sealed connectors ensure water resistance all the way back to the host PC.

Small footprint components and board mounted interconnects provide 100g shock and 20g vibration withstand.

Supports a wide range of sensors and signal types

The Freestyle supports virtually every signal type on a per channel basis to meet ever changing test requirements. Channels can be software configured in any configuration.

Supported sensors include:

Strain Gages and other Bridge type devices including load cells, force, pressure, torque, and piezo-resistive devices.

Temperature Sensors including thermocouples and RTDs

IEPE Type including Accelerometers, Load Cells, and Microphones

Voltage Inputs from ±20mV to ±5V direct. Up to ±100V with adaptors.

Other powered devices including MEMs sensors, 5B/7B signal conditioners, and process transmitters

Digital and Frequency inputs including RPM, Frequency, Pulse Width, and Duty Cycle

Included software allows for channel by channel sensor configuration. Alternatively, use the integrated spreadsheet setup to configure multiple channels simultaneously. A little unsure about how to configure for a particular sensor? The integrated sensor wizard walks you through the setup process to get results quickly and easily.

Get closer to your measurements for better results

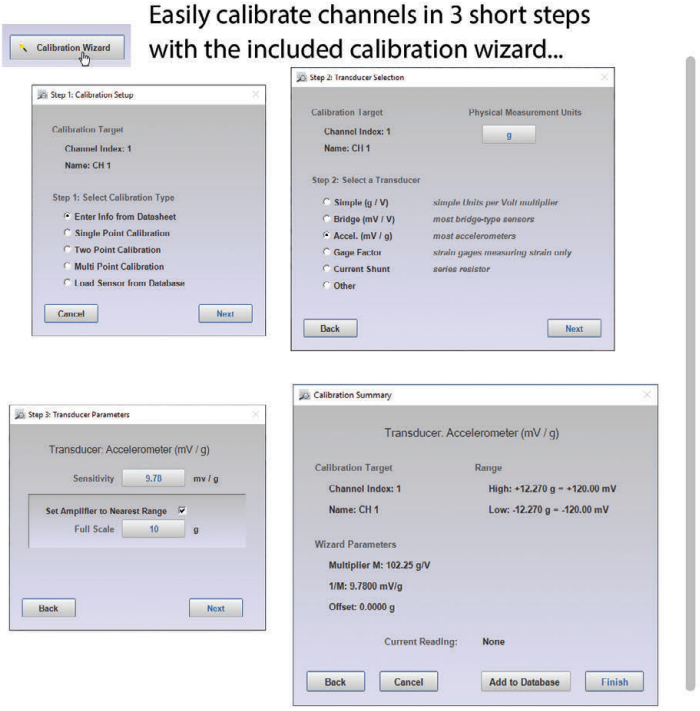
Freestyle's rugged enclosure allows it to be placed closer to the measurement source, reducing analog issues caused by lengthy sensor cables near noisy measurement sources. Simply connect a single, integrated power / communications cable (PCom) from your PC and power source to a single Freestyle and you're ready to go.

Need more channels? Up to 4 Freestyles can be operated using a single PC connection and power source. The convenient sealed connectors allow power and communications to be daisy chained between Freestyle units. Power and communications pass through subsequent Freestyles.

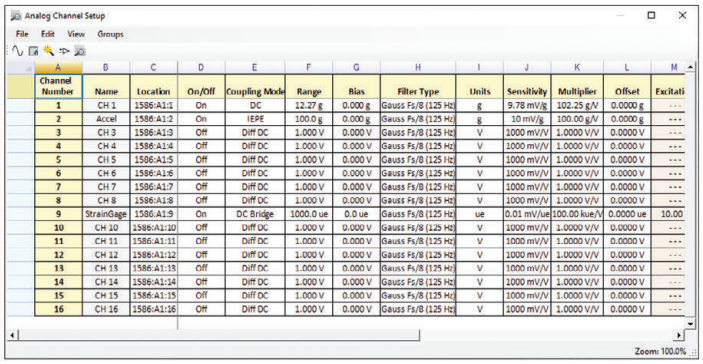
Newly added Freestyle units are automatically recognized by the software and configured in the channel list for immediate use.

The PCom connection utilizes IEEE 1588 Precision Time Protocol to synchronize systems ensuring less than 1 microsecond time skew between units, even at different sample rates. Data is transmitted through connected Freestyle units and stored in realtime to your host PC even at the fastest sample rates.

Easily calibrate channels in 3 short steps with the included calibration wizard...



Or drag and drop calibration information into channels directly with Spreadsheet Setup and the Sensor Database.



Channel Number	Name	Location	On/Off	Coupling Mode	Range	Bias	Filter Type	Units	Sensitivity	Multiplier	Offset	Excitati
1	CH 1	1586:A1:1	On	DC	12.27 g	0.000 g	Gauss Fs/8 (125 Hz	g	9.78 mV/g	102.25 g/V	0.0000 g	---
2	Accel	1586:A1:2	On	IEPE	100.0 g	0.000 g	Gauss Fs/8 (125 Hz	g	10 mV/g	100.00 g/V	0.0000 g	---
3	CH 3	1586:A1:3	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
4	CH 4	1586:A1:4	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
5	CH 5	1586:A1:5	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
6	CH 6	1586:A1:6	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
7	CH 7	1586:A1:7	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
8	CH 8	1586:A1:8	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
9	StrainGage	1586:A1:9	On	DC Bridge	1000.0 ue	0.0 ue	Gauss Fs/8 (125 Hz	ue	0.01 mV/ue	100.00 kue/V	0.0000 ue	10.00
10	CH 10	1586:A1:10	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
11	CH 11	1586:A1:11	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
12	CH 12	1586:A1:12	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
13	CH 13	1586:A1:13	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
14	CH 14	1586:A1:14	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
15	CH 15	1586:A1:15	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---
16	CH 16	1586:A1:16	Off	Diff DC	1.000 V	0.000 V	Gauss Fs/8 (125 Hz	V	1000 mV/V	1.0000 V/V	0.0000 V	---

15-pin D connectors provide sensor connection and sensor excitation for most common sensor types on a per channel basis. Single channel breakout adaptors provide screw terminals for bridge sensors or convenient BNC connections.

Removeable rubber corner bumpers provide additional protection and shock resistance

Sealed IP67 Enclo

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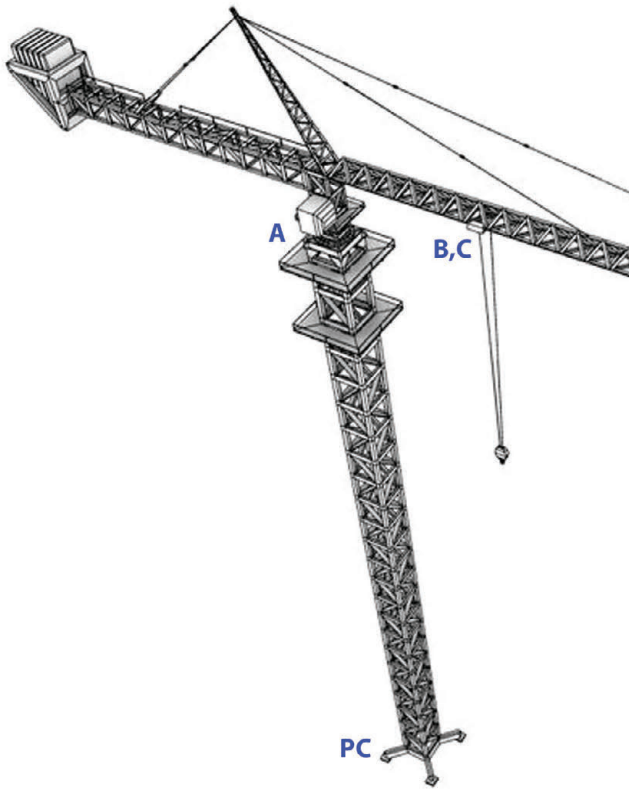
In its most simple configuration one Freestyle is connected to a PC using a single interconnect cable.

(A) Freestyle can be separated by up to 100m from the host PC and power source. The available 8 input channels can be configured on a channel by channel basis for practically any signal type.

Add another Freestyle unit for even more channels. Units can be physically mounted together (B, C) or separated by a PCom interconnect cable for distances up to 100 meters (D).

Up to 4 Freestyle units can be serial daisy chained together and synchronized automatically using the IEEE1588 precision time protocol.



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Water resistant connectors

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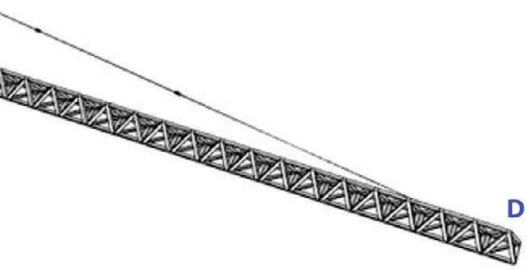
Dual PCom connectors allow power and communications to be daisy chained between up to 4 Freestyle units. Data is synchronized and streamed in realtime to your host PC.

PCom cables come standard in a 3 meter length and offer a Y-connector on the PC side to separate power and GigE communications to the PC. Longer PCom extention cables support distances up to 100 meters.

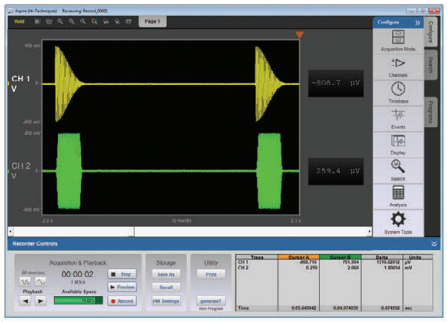
Freestyle supports a wide 9-36 Vdc input range for most field and mobile applications. Never worry about power sags or surges again. A 120V-240V AC adaptor is also included with all Freestyle Units.



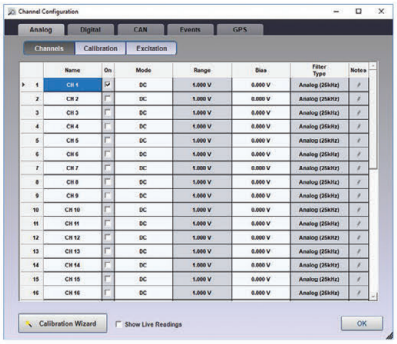
Powerful Aspire™ Software Gets Results Fast

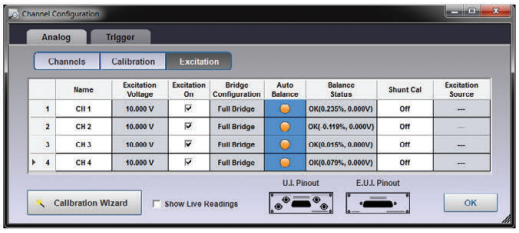
Every Freestyle comes bunded with Hi-Techniques' Aspire software, a sophisticated software especially designed for Hi-Techniques Data Acquisition products.

View data in realtime and manage storage directly to PC. Data is stored in a compact binary format along with all settings and calibration info enabling instant review of even the longest records.

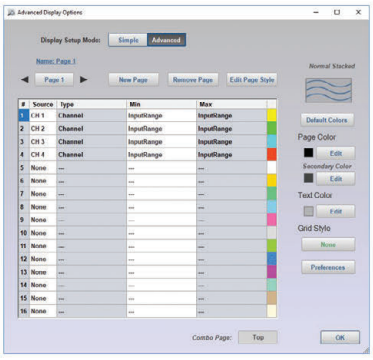


Set up channels including ranges, filtering, calibration, balance and sensor excitation.

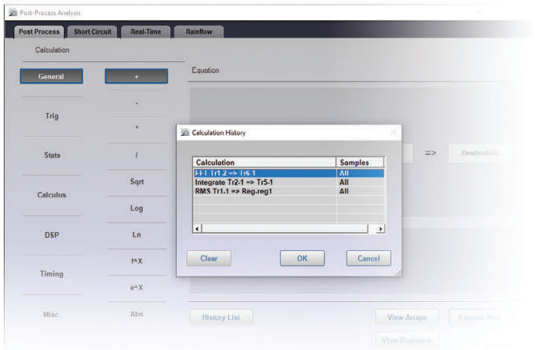




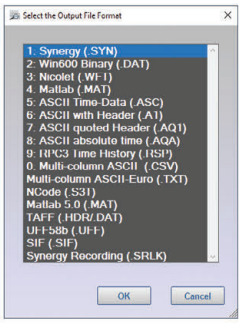
Configure displays and meter selections using fixed size or floating windows.



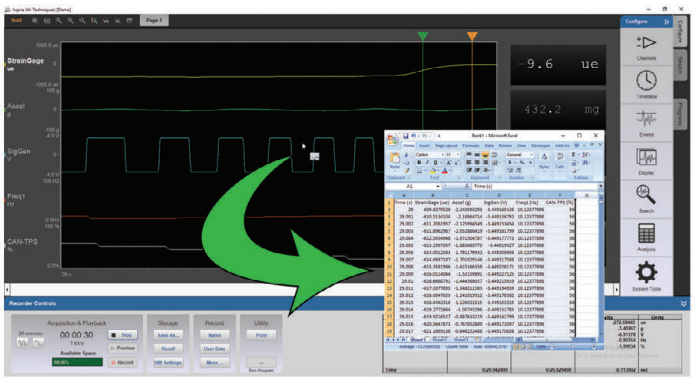
Analyze data using over 100 integrated analysis functions or use the convenient waveform calculator to instantly provide the most basic common measurements.



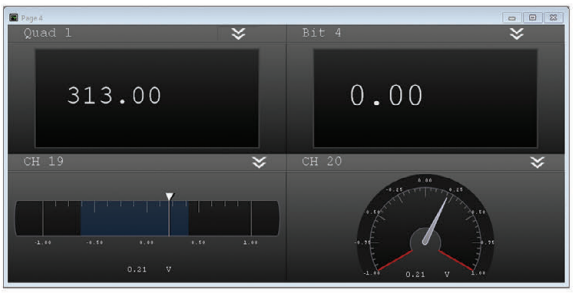
Need more analysis capability? Aspire provides export to 17 different formats, including MATLAB, SIF, S3T, RPC3 as well as standard ASCII and binary formats.



Drag results directly into Excel for analysis or Word for sophisticated report generation.



Realtime error monitoring lets you know if a sensor is off scale or not responding correctly.



And as always, software and updates are free of charge forever... no cumbersome dongles or annual fees to pay.

Ordering Information

Freestyle Data Acquisition System includes:

One 8-channel system
3 meter PCom connection cable with Y-connector to RJ45 Ethernet and DC power connection
120V / 240V AC/DC adaptor
Aspire Data Acquisition software

Options:

Larger output power supply to power 3 or 4 FreeStyle units

Miniature PCom interconnect cable for use between attached systems

5 meter extension PCom cable

BNC Breakout Connector with selectable IEPE constant current and signal attenuation

Screw terminal breakout allows for strain gage, thermocouple, and other sensors that terminate in flying leads

3 meter flying lead breakout cable

Freestyle...a modern way to get data fast and easy from sensor to result. Contact your Hi-Techniques sales professional to schedule a demonstration.

Specifications

General Information

Power Input	9-36Vdc input. 100-240V AC adaptor provided
Power Consumption	10W Max
Enclosure	IP67 Sealed Extruded Aluminum
Dimensions	9.3"W × 2.9"T × 3.5"D (23.5cm × 7.5cm × 9cm)
Weight	TBD
Shock	100g, 11ms half-sine, Mil-Std-810F, Procedure 1
Vibration	20g, 25-500 Hz, Mil-Std-810F, Procedure 1
Operating Temperature	-40°C to +85°C
EMI	CE compliant
Communications	(2) GigE Ethernet ports

Channel Information

Number of Inputs	8
Input Connectors	15-pin Female D connector
Input Ranges, Full Scale	±20mV, 50mV, 100mV, 200mV, 500mV, 1V, 2V, 5V
Input Impedance	10MΩ each input to Gnd, 20MΩ differential
Coupling	Gnd, DC, AC, DC Diff, DC Bridge, DC+Pwr, DC Diff+Pwr, Thermocouple, IEPE, RTD
ADC	24 bit Oversampling SAR per channel
Amplifier	Zero-drift, fully differential signal path from input to ADC to minimize thermal drift.
Over-voltage Protection	Indefinite Duration: 50V DC, 100V Diff 1ms Duration: 200V DC, 400V Diff
Pre-ADC Filter Bandwidth	2kHz 2-pole Butterworth analog anti-alias filter, ADC Oversampling Digital Filter at 9.6kHz, over 100dB stop-band rejection
Post-ADC Filters	Off or selectable Gaussian Fs/8, Fs/20, Fs/40, Butterowrth Fs/10, Steep, Fs/2.5. Automatically track sample rate for continuous anti-alias protection at all sample rates.
Sample Rates	Decimal 0.5S/s to 20kS/s
Sample Rate Accuracy	5 ppm
Trigger Events	Any channel(s) Level or Math Channel Level (eg. Slope, Frequency, RMS) in OR logic combination

DC Bridge Modes

Bridge Configuration	Full, Half , Quarter, software selectable by channel, 2 to 4 wire plus shield.
Quarter-Bridge Completion	Built-in 350Ω and 120Ω 0.01%, 0.2 ppm/°C standard.
Half-Bridge Completion	Software selectable by channel, terminates Amplifier In+
Shunt Calibration	100 kΩ 0.05% between Ch- and Ex+ or Ex- bridge legs. Shunt calibration calculator included in Aspire Software.
Excitation Source	Unipolar 5V
Voltage Accuracy	0.1% of Range
Voltage Stability	10 ppm (0.001%)/°C
Excitation Current	170mA total. Short circuit protected
Over-current Protection	Upon over-current condition, excitation remains enabled but current is actively limited
Output Impedance	Less than 1 Ω typical
Balance Range	±100% full scale

IEPE Mode

Excitation	4mA/ch (10mA Optional)
AC Coupling	0.33 Hz

RTD Mode

Types	PT100, 3 or 4 wire, ITS-90, IEC60751
Excitation	100µA

Amplifier Accuracy/Stability

Gain Accuracy	0.02% of Range + 5µV
Gain Stability	20 ppm (0.002%) of Range/°C across entire operating temperature range
Offset Accuracy	10 ppm (0.001%) of Range
Offset Stability	5 ppm (0.0005%) of Range/°C typical
Bias Range	20mV - 1V ranges: ±100% of range 2V, 5V ranges: Bias not available
Linearity	20 ppm (0.002%) of Range
Noise	Inputs terminated 350Ω to Gnd 10kS/s, 1250 Hz BW: 20mV range: 1µV rms, 10µV pp 1V range: 12µV rms, 100µV pp 1kS/s, 125 Hz BW: 20mV range: 0.4µV rms, 3µV pp 1V range: 5µV rms, 35µV pp 100S/s, 12.5Hz BW: 20mV range: 0.12µV rms, 1µV pp 1V range: 5µV rms, 35µV pp Note: 1µV is equivalent to 0.4 µstr in a ¼ bridge at Ve = 5.00V, GF = 2.0
CMRR	> 120 dB at 100 Hz, > 100 dB at 1 kHz, > 80 dB at 10 kHz, all ranges
CMV Range	±6V

Digital Inputs

Number	8, Pin 4 of each input connector
Type	TTL w/ hysteresis
Modes	Boolean, Frequency, RPM, Period, Pulse Width, Duty Cycle
Counter	32 bit 20MHz

For over 35 years, Hi-Techniques has been a leader in high performance Data Acquisition Systems and Digital Oscilloscopes for the automotive, aerospace, power, and industrial markets. Our systems are designed to offer out-of-the-box operation combining flexible hardware with user friendly software. Please visit our website or contact us directly at:

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Specifications subject to change. Please contact Hi-Techniques for more complete specifications.