



Connect | Condition | Acquire

Key Features

- Rugged and Lightweight (3.0kg)
- 16/24 bit ADC, >111dB SNR, 5-256kHz Sample Rates
- Low power (6-36V d.c. 9W)
- Multi-unit Synchronisation (GPS, IRIG, LVDS, IEEE-1588)
- Modular Architecture, scalable to >1000 channels
- Voltage, IEPE and Charge Conditioning
- Environmentally rated to IP65



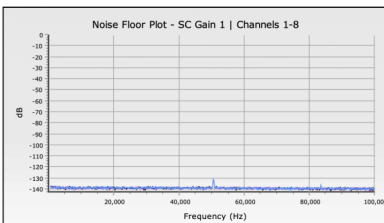
Data Acquisition Module (DF8-1429-DFY)

Overview

The Dragonfly DF8-1429 is a 5th generation 8-channel Data Acquisition Module from HGL Dynamics which fits into its existing Dragonfly family and is compatible with all previous generations (V2—V4 inclusive).

The DF8-1429 model replaces previous DF8-1409/1419 models but provides the same conditioning capabilities and expands the external connectivity using a new (standard) 75mm wide module size to allow the addition of the Calibration Bus, IRIG A/B and Buffered Output connectors not provided on the earlier generation units.

The internal electronics have been redesigned to include HGL's own conditioning circuitry which improves on previous generations in both accuracy and noise performance, and now features a new Instrumentation grade 24-bit ADC which includes a flat noise floor from DC to 100+kHz, improved stability and higher oversampling (512/1024x) for improved anti-aliasing performance.



The dynamic range at 1x Gain is now 139dB with SFDR at 130dB, this drops to 120dB for DR and SFDR at 200x gain (8192-bin FFT at 250kHz sample rate).

Signal Conditioning

The DF8-1429 includes Voltage and IEPE conditioning as standard with TEDS support provided directly from the onboard firmware (previous version required software query support).

Charge conditioning (Single-ended and Differential) is optionally supported (DF8-1429-CHG model) and if enabled provides up to 100,000pC range for standard charge sensors. A further option is available to additionally support high temperature charge devices (DF8-1429-HTC) which provides up to 10,000pC ranges for high temperature sensors.

Calibration Bus Support

The DF8-1429 units now support the HGL Cal Bus system natively and provide an external Cal Bus BNC connector on the rear panel. This means that the Dragonfly range now has the same support as the Hummingbird and Eagle Front-End units.

Synchronisation

The DF8-1429 units now support the HGL LVDS, IRIG A/B, and IEEE-1588 v2 directly on all units; GPS remains an optional add-on. An IRIG A/B connector is provided on the rear panel.

Buffered Outputs

The DF8-1429 units now support the HGL standard 10-pin Buffered Output Connector on the rear panel, allowing ancillary equipment to receive the same conditioned analogue signals as the onboard ADC (albeit without the digital offset, gain and frequency corrections).

Improved Chassis Design

The 5th generation Dragonfly internal structure and chassis has been redesigned to remove (any) internal cables, and improve the environmental capabilities of the units for fluid and particle ingress, temperature handling (and unit cooling), and vibration.

The chassis re-design has provided 60% greater surface area than previous models, which now allows the units to operate approximately 8°C lower in any conditions (Ambient +18°C in still air), ultimately improving operating range to -55°C to 90°C

Dragonfly⁸

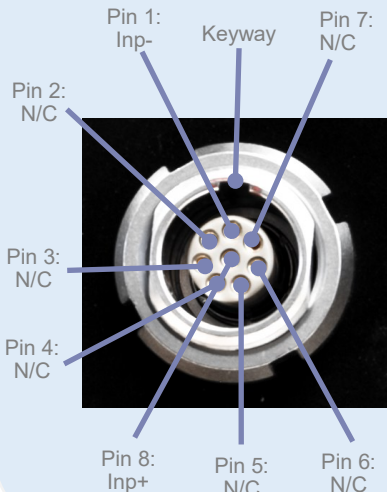


Data Acquisition Module (DF8-1429-DFY)

HGL
Dynamics

Connect

LEMO⁸ Connector Option



Multiple Module Connection

T Slots on each side of the module.
Two modules can be connected using simple H Bar and four screws.



Independent Inputs

One Σ ADC per Channel.
Simultaneous Sampling.
>111dB SNR.
Voltage, IEPE, SE and DIFF
Charge Conditioning

Rugged Chassis

Extruded Aluminium shell.
Milled Aluminium end plates.

Scalable Channel Count

8-1024+ Channels.



Indicators

Heartbeat
Power Network Activity
Network Link

Adaptable Network Topologies

Internal Gigabit switch allows Daisy-Chain, Star or mixed topologies.

IEEE1588 Synchronisation

Both ports and internal switch are IEEE1588 compatible.

Power over Ethernet (PoE)

Marked port is 802.3at Type 1 (<12.95W) compliant.

Flexible Power

- 6-36 V DC (fully automotive compatible)
- Two ports allow Daisy-Chain, Star or mixed power topologies
- Full range power adapter (100 - 240V AC 50/60Hz) supplied with each module
- Dragonfly^{BAT} 99 Whr rechargeable battery module available for UPS/ untethered operation



Buffered Output

HGL Standard LEMO¹⁰ Connector
8x Single Ended Outputs
2x Ground pins

LVDS Synchronisation

- LVDS (Low Voltage Differential Signalling) Synchronisation Interface
- <10nS Unit to Unit
- 0-200m Unit to Unit cable lengths
- Daisy-Chain, Star or mixed topologies

IRIG A/B Synchronisation

AM 1/10kHz carrier support

HGL Cal Bus Support

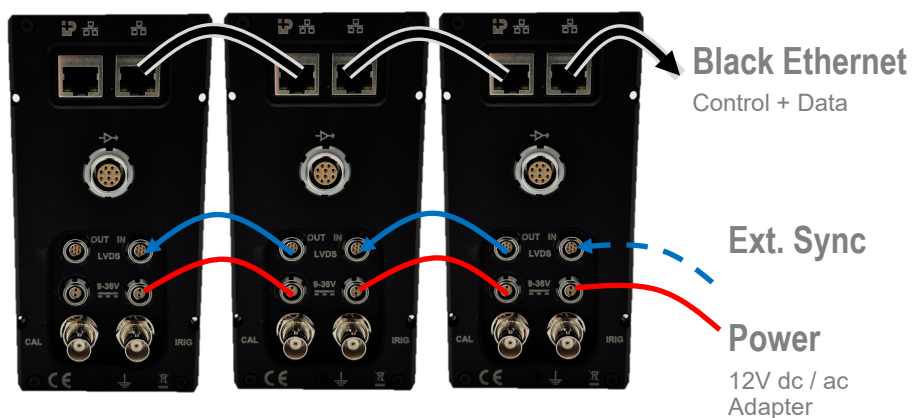
External Cal Bus BNC Connector

Multi-Connect

Multiple Dragonfly Systems

The Dragonfly system is designed to allow easy connection of multiple modules to form larger channel count systems. Three connection configurations are supported, Daisy-chain and Star, and Mixed.

Daisy Chain



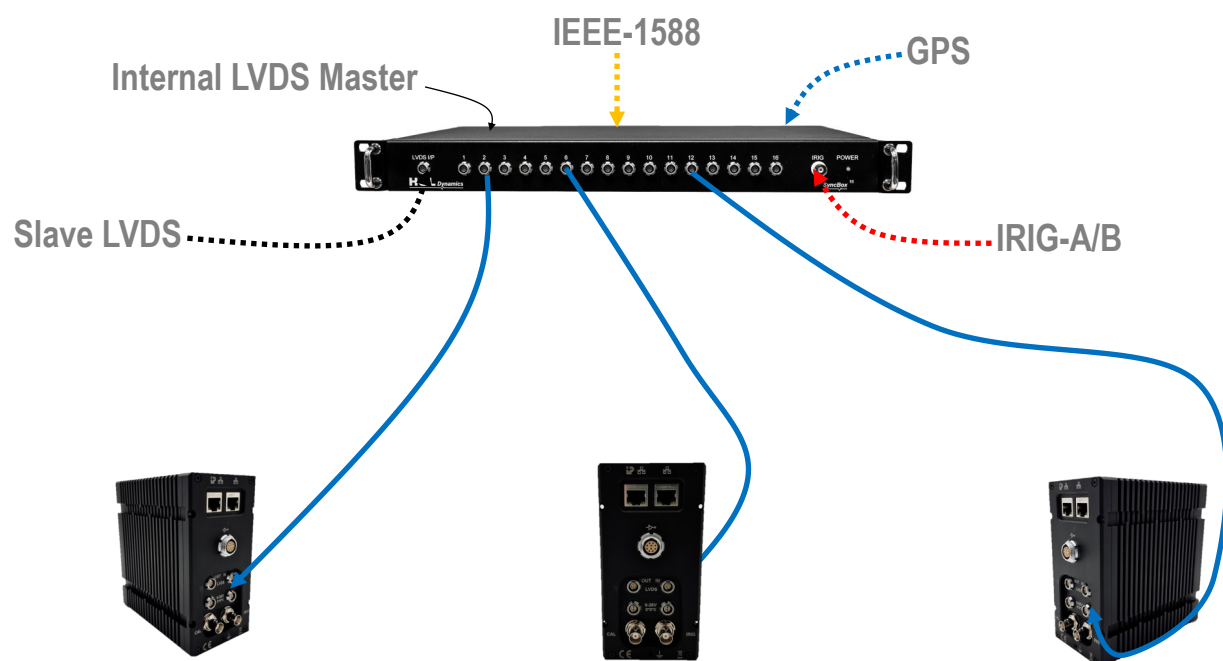
This mode allows Dragonfly Modules to be chained together for all three required connections (Ethernet, Power and Sync)

Inter-node distances can be 100m or greater (using switches), although synchronisation delays can become an issue over long distances (5.6nS per meter).

Star

Star configurations are ideal for situations where Power Over Ethernet (POE) can be used and where close synchronisation over large distances are required.

Networks are simple to configure for Star operation by simply using any (POE capable) Gigabit Network Switch. The LVDS Sync (if IEEE-1588 is not used) requires the use of the HGL Dragonfly Sync Box (pictured below) which can provide up to 16 precisely synchronised LVDS outputs from a single GPS, IRIG, IEEE-1588 or Internal LVDS source.



Condition

Signal Conditioning—HGL-1429

The HGL 1429 Conditioning provides the next generation for the popular Voltage, IEPE and (optionally) SE/DF Charge conditioning used in general purpose and vibration monitoring applications.

The HGL 1429 conditioning is fully supported by 5th Generation Dragonfly modules (and HGL 3.10 software) and provides 15+dB better noise performance over previous generations.

Charge support is improved to provide up to 100,000pC for standard charge devices and up to 10,000pC for the High Temperature Charge (HTC) variant.

TEDS support is built-in as standard and 5th Generation Dragonfly Modules automatically scan for TEDS devices on power up (and under subsequent software control).

Specification

IEPE Supply CHARGE	Up to 8 channels	4mA nom. @20V Compliance TEDS Compatible
	Up to 8 channels	Differential and Single Ended
	Level max	100,000pC pk (Std) 10,000pC pk (HTC variant for high temperature sensors)
Differential Charge	Protection	+/-50V continuous, 100V transient
	Frequency Response	1Hz to >20kHz -3dB
	Sensitivity	0.2mV/pC +/-1% (programmable to 200mV/pC)
Single Ended Charge	Noise	<40uV pk rto
	Sensitivity	0.2mV/pC +/-1% (programmable to 200mV/pC)
	Noise	<20uV pk rto
AMPLIFIER Input	8 identical amplifiers	Low Noise differential AC/DC switchable
	Impedance	10MOhm differential
	Coupling	DC or AC 0.16Hz (-3dB)
Gain	Signal / Protection	+/-10V max / +/-50V max continuous input / ground
	Calibration	Individual inputs selectable onto common Cal Bus
	CMR	>70dB AC Coupled, >100dB DC coupled (@ 1000x gain)
ENVIRONMENT	Noise	<15uV pk-pk DC-100kHz Measurement Bandwidth
	Programmable	x0.1, x0.2, x0.5, x1, x2, x5, x10, x20, x50, x100 & x200
	Accuracy	+/-0.25% T.C. <25ppm/°C, G>100 -50ppm +/-25ppm
	Linearity	Better than 0.01% (to +/-10V / 1kHz)
	Temp. Range	-55°C to 90°C operating



Data Acquisition Module (DF8-1429-DFY)

Software Support

HGL Dynamics provides multiple ways to interact with Dragonfly Acquisition modules; including low level Network APIs, Windows DLL, LabVIEW Drivers, Single Instrument Applications (Apps), and full Measurement System software. This flexibility allows customers to choose the best method for their particular applications and / or increases the utilisation of the hardware for multiple uses.

Network API

All HGL Dynamics hardware modules are Ethernet connected to each other and their host PC(s); a fully documented Programmer's API is available for integrators / customers who wish to access the modules at this level or need to integrate the modules with a non-Windows® operating system.

Microsoft Windows DLL

HGL can provide a documented Windows DLL compatible with every Dragonfly Acquisition Module. This provides a simpler method to access all the functions of the hardware for Windows users..

LabVIEW™ Driver

HGL can provide a LabVIEW driver compatible with all Dragonfly Acquisition Modules which provides full access to the functionality of the hardware..

Single Instrument Apps

HGL has developed a number of Single Instrument Apps, primarily for its Firefly system. These apps can be operated on a Dragonfly and Laptop / PC system equally well. The Apps are intended to provide a family of simple, easy to use applications which turn the Firefly / Dragonfly into a single instrument, examples include:

- FFT Analyser
- Oscilloscope
- Chart Recorder
- Rotating Machinery Analyser
- Trim Balance
- Power Dip & Rise
(requires isolation amplifier hardware)

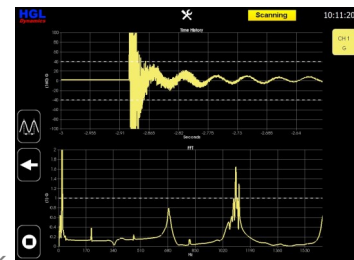
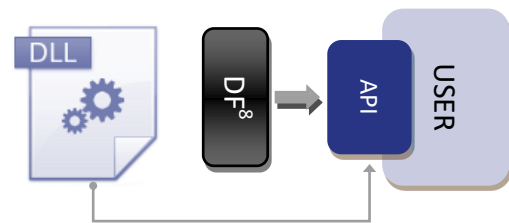
Full Measurement System Software

For over 20 years HGL has provided a fully integrated, modular, network distributed Dynamics Measurement System; this software is intended for wide variety of applications and for systems ranging from small portable units to large multi-site systems with hundreds or thousands of channels. The system is in daily use with multiple Gas Turbine OEMs and test houses across the Globe for development and production engine testing.

The System comprises four main parts,

- Data Acquisition (and Signal Conditioning Control)
- Real-time & Safety Monitoring,
- Post-test Data Analysis and Reporting
- Data Management

The system is focused on providing robust, flexible, fixed or mobile operation with ease of use as a primary consideration.



Data Acquisition Module (DF8-1429-DFY)

Software Overview

Data Acquisition - Hawk

HGL's Hawk acquisition software provides everything a user needs to configure, calibrate and acquire data from the acquisition hardware. Full control and feedback of the system is provided by the Hawk GUI Client application; this provides an intuitive instrument-like interface that allows even novice users to operate large channel count systems, even from remote locations.



Real-Time Monitoring - Hawkeye

Hawkeye allows one or more users to monitor the signals being acquired in real-time (<0.1s latency). Fully customisable displays including FFTs, Waterfalls, Oscilloscopes, Numerical, Speed and Tracked-orders, Phase, Bode, Orbit, nth Octave etc, provide a rich monitoring environment.

Hawkeye also provides Time, Frequency, Order and Phase domain alarming facilities for all channels simultaneously, with support for many different alarms types per channel.



Analysis - Aurora

Aurora provides an in-depth analysis tool for acquired data which can pinpoint areas of interest / problems to be investigated further. Aurora provides a range of client / server based tools to analyse, investigate, mine, summarise and report on acquired data.



Data Storage & Archiving - Hercules

Prolonged or large-scale data acquisition can generate Terabytes of data. This data is expensive to collect and, with care, can provide benefit to a customer for many years. HGL's Hercules software provides an integrated, low-cost, yet highly scalable and safe data management solution for any sized data acquisition operation. The key to the system's success is support for virtually any common media type (SD cards, HDD/SSDs, LTO tapes etc.) combined with a unique database architecture and a client/server architecture which allows data to be managed across multiple remote sites from a single intuitive Graphical User Interface.



Dragonfly Family

The Dragonfly⁸ Acquisition Module is part of the Dragonfly family of common form factor modules, any of which can be slotted together securely to form a robust, flexible solution for virtually any measurement requirement.

All Dragonfly modules are compatible with all other HGL Acquisition systems (FireFly, Eagle, Hummingbird).



Analogue Input Modules

- Dragonfly⁸ - 5-256kHz 16/24bit
- Multiple Conditioning Choices
- Dragonfly^{Hi8} - 50kHz-4MHz 18-bit



Analogue Output Modules

- Dragonfly^{8OUT} - 5-256kHz 16/24 bit
- 0 / 50Ohm Output Impedance
- 0.1 to 20V p-p output ranges



Networking

- Dragonfly^{SW} - 12 x GigE PoE Ports



Digital Input Modules

- Dragonfly^{TEL} - 10/15 Mbit/sec Digital Streams



Processing

- Dragonfly^{CPU} - Core Atom / Mobile i7
- 4 GigE Network Ports
- 128-1TByte MSata Storage
- 3 x USB, 1 x Display Port



Battery / UPS

- Dragonfly^{BAT} - 99Whr Li-Ion Capacity
- Uninterruptible Power Supply (UPS)
- Charge During Operation
- Front Panel Level Monitor

Data Acquisition Module (DF8-1429-DFY)

Specification

General

Dimensions (W x H x D):	140 x 75 x 150 mm
Weight:	3.0 kg (typical)
Supply Voltage:	6 - 36 V DC
Power:	9.0 W (typical)

Environmental

Operating Temp.:	-55 to 90°C
Storage Temp.:	-55 to 125°C
Relative Humidity:	0-100%

Input Configuration

Input Channels:	8
ADC Type:	Sigma-Delta
Quantization:	24-bit / 16-bit*
Input Ranges (V):	±100, 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05*
DC Offset:	±0.01 mV
Input Coupling:	AC, DC *
Input Impedance:	>10 MΩ Differential
SNR:	>111 dB
Anti-aliasing:	<-120 dB
Sample Rate:	5 - 256 kHz *
Frequency Response:	DC to >100 kHz ±0.1 dB
Dynamic Range:	140 dBFS / √Hz, 111 dB (broadband)
Inter-Channel Δ Phase:	< 20 nS (< 0.36° @ 10 kHz output signal)
Crosstalk:	< 100 dB @ 5 kHz, < 95 dB @ 10 kHz, < 87 dB @ 20 kHz, < 82 dB @ 40 kHz, < 70 dB @ 100 kHz
Distortion:	< -90 dB, 0 to 80 kHz
DC Linearity:	< 0.075%
Drift:	< 50 ppm/°C (with no correction applied)

*Software configurable parameter



Synchronisation

LVDS:	10 ns per unit
LVDS (max distance):	200 m # (node to node)
IRIG A/B:	±100 ns
GPS:	< 5 ns

#If longer distances are require please contact HGL

Other Inputs (using any standard input)

IRIG-A and IRIG-B
Audio Voice Annotation
Tachometer

Package Details



Portable Acquisition Module
(8, 16, 32, 48+ Channels)



ACE-1 & ACE-3 Cables
(Power & Sync)



Full Range Power Supply



Data Acquisition Module (DF8-1429-DFY)

Training

Training

HGL Dynamics offers a wide variety of training workshops and courses. Workshops are conducted at one of our global offices or at the client's site by our training team, all of whom have many years' of industry experience and knowledge.

Typical training courses include: Vibration Fundamentals, Signal Processing, Rotating Machinery, Advanced use of HGL Software and Analysing Large Datasets.



Information

About HGL Dynamics

HGL Dynamics is a world-leading supplier of services and high specification equipment for the integrated capture, monitoring, analysis, storage and management of high bandwidth data.

Purchasing & Availability

The HGL Dynamics Dragonfly⁸ Data Acquisition Module is now available for purchase or lease. Please contact one of our HGL Dynamics offices below for further information or to request a quote.

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