Dragonfly^8

Data Acquisition Module

HGL Dynamics

Connect | Condition | Acquire

Key Features

- Rugged and Lightweight (< 1kg)
- 16/24 bit ADC, >114dB SNR, 5-256kHz Sample Rates
- Low power (6-36V d.c. 4-10W depending on conditioning)
- Multi-unit Synchronisation (GPS, IRIG, LVDS, IEEE-1588)
- Modular Architecture, scalable to >1000 channels
- Multiple Signal Conditioning Options
- Environmentally rated to IP54 (with IP68 option)

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Introduction

The Dragonfly^8 is a high quality modular data acquisition system for dynamic signal measurement requirements. Applications range from ultra portable small channel count mobile field based units, to large scale fixed installations of hundreds of synchronous channels for development testing.

The Dragonfly^8 is small and lightweight; it is an ideal measurement tool for field work, fitting comfortably into a laptop bag. Multiple units may be linked together to form larger systems. The modules are also compatible for integration with any of HGL's Data Acquisition, Monitoring, Analysis and Data Management Hardware and Software products, as well as third party or customer bespoke systems .

Dragonfly Family

The Dragonfly^8 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.

The Dragonfly family provides the ultimate in flexible Data Acquisition, Monitoring and Analysis systems, for both portable and fixed installation applications.

Analogue Input Modules

Dragonfly^8 - 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} - 10 x GigE Ports
- 8 x POE capable Ports (with Dragonfly^{POE} module)

Battery / UPS

Dragonfly^{BAT} - 99WHr Li-Ion Capacity
- Uninterruptible Power Supply (UPS)
- Charge During Operation

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

Power Over Ethernet (POE)

Dragonfly^{POE} - POE Power Supply Module

Miscellaneous

Dragonfly^{DISP} - 7" Display / Control Unit

Dragonfly^{SSD} - 128-1TByte USB SSD Storage

Dragonfly^{ISO} - 4 Channel 1000V Isolation Conditioning

Compatibility

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

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Connect

Connector Compatibility

Standard - BNC, Fischer / LEMO, or 15-way D-Type.

HGL can also provide customer specific connectors on request.

Independent Inputs

One ΣΔ ADC per Channel.
Simultaneous Sampling.
>120dB SNR.
Multiple Conditioning Options.

Rugged Chassis

Extruded Aluminium shell.
Milled Aluminium end plates.

Multiple Module Connection

T Slots on each side of the module.

Two modules can be connected using simple H Bar and four screws.

Scalable Channel Count

8-1024+ Channels.

8 ••• 32 ••• 256 •••

IEEE1588 Synchronisation

Both ports and internal switch are IEEE1588 compatible.

Adaptable Network Topologies

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

Power over Ethernet (PoE)

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

Custom Area

Options include:

- GPS (Location, Position & Sync)
- GPRS / 3G (Data Output)
- 1-8 Digital Inputs
- SD Card (Storage)

Supplementary Channels

2 Analogue Output Channels
2 Digital Input / Output Channels

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

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

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Software Overview

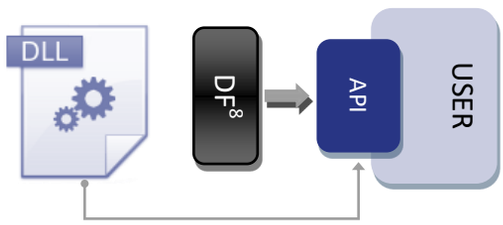
HGL Dynamics provides multiple software platforms for Dragonfly Acquisition modules; these range from low level Network APIs, Windows DLL, LabVIEW™ Drivers, Single Instrument Applications (Apps), and full Measurement System software. This flexibility allows users to choose the best platform for their 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 provides (as standard) a Windows DLL with every Dragonfly Acquisition Module; for Microsoft Windows users this provides a simpler method to access all the functions of the hardware.



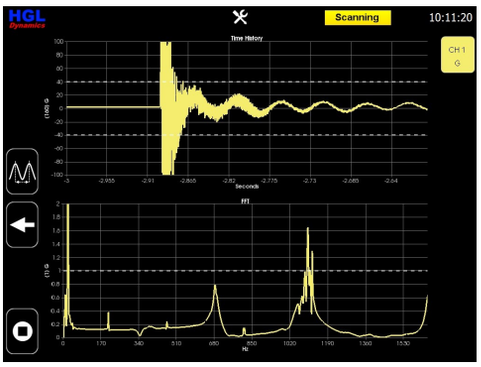
LabVIEW™ Driver

HGL can provide a LabVIEW™ driver for the Dragonfly Acquisition Module; this driver allows full access to the functionality of the hardware, and is available for the Microsoft Windows Operating System.

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 the past 15 years, HGL has providing 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 comprises four main parts, Acquisition, Monitoring, Analysis and Data Management, and is focused on providing robust, flexible, fixed or mobile operation with ease of use as a primary consideration.

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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 such as FFTs, Waterfalls, Oscilloscopes, Numerical, Speed and Tracked-orders, Phase, Bode, Orbit, n^{th} 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. Hawkeye is also client / server based with the 'thin' Hawkeye Client allowing local or remote monitoring (performance dependent on network infrastructure).

Analysis - Aurora

Aurora provides an in-depth analysis tool for acquired data; this is usually required post-test, but can be operated simultaneously with testing if useful. Post-test analysis can pinpoint areas of interest / problems to be further investigated, and for this purpose Aurora provides a range of client / server based tools to analyse, investigate, mine, summarise and report on acquired data.
Multiple users can use Aurora simultaneously, and in common with HGL software portfolio access is via a network connected thin-client (Aurora Client) application, thus allowing both local and (potentially widely) remote users to access data simply and efficiently.

Data Storage & Archiving - Hercules

Prolonged or large-scale data acquisition generates a lot of data, 10's and 100's of TBytes are not unusual for large enterprises. Data is expensive to collect and the functionality to efficiently store and retrieve legacy data is essential for in-service investigations, product development etc.
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 providing simple, yet highly efficient data storage information, and a client/server architecture which allows data to be managed across multiple remote sites from a single intuitive Graphical User Interface.

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Condition

Signal Conditioning

The Dragonfly[8] module can be fitted with a wide range of internal signal conditioning cards which further extend the Dragonfly's capabilities. Single or multiple conditioning functions are possible depending on card choice.

HGL has designed a set of conditioning cards that fulfil most industry standard requirements. However more cards are developed as clients' requirements change. The signal conditioning options currently available for the Dragonfly[8] module are:

- FE-1404-DFY: Voltage, IEPE, and Proximeter Probe conditioning card
- FE-1407-IA: 4-Channel High voltage isolation amplifier
- FE-1408-APC All-purpose conditioning card including Voltage, IEPE, Bridge, Dynamic Strain, and Charge. On-board sensor health check and buffered dual analogue outputs.
- FE-1409-DFY: Voltage and IEPE (ICP) multi-range conditioning card. On board sensor health check and buffered analogue outputs
- FE-1410-BRG / DYN Voltage & Bridge Only and IEPE & Dynamic Strain only variants of FE-1408-APC card
- FE-1411-MIC Voltage, IEPE & 200V Excited Microphone Conditioning
- HGL-HiZ: AC/DC Voltage only conditioning with gain

	Voltage		IEPE	Bridge	Dynamic	Charge	Temperature	Proximeter Probe	Speed
Cond. Card	AC	DC	Accel / Mic	Strain (¼, ½, full)	Strain (SG, Press)	Accel	Therm. & PT100		
FE-1404-DFY	✓	✓	✓					✓	✓
FE-1407-IA	✓	✓							✓
FE-1408-APC	✓	✓	✓	✓	✓	✓	✓#		✓
FE-1409-DFY	✓	✓	✓						✓
FE-1410-BRG	✓	✓		✓		✓	✓#		✓
FE-1410-DYN	✓		✓		✓	✓			✓
FE-1411-MIC	✓	✓	✓			✓			✓
HGL-HiZ	✓	✓							✓

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Specification

General

Dimensions (W x H x D):	140 x 50 x 150 mm
Weight:	0.8 kg (typical)
Supply Voltage:	6 - 36 V DC
Power:	9.0 W (typical)

Environmental

Operating Temp.:	-25 to 70°C
Storage Temp:	-40 to 85°C
Relative Humidity:	< 90% RH non condensing

Input Configuration (with standard 1409 V+ IEPE signal conditioning card)

Input Channels:	8
ADC Type:	Sigma-Delta
Quantization:	24-bit / 16-bit*
Input Ranges:	±10 V, ±1 V, ±0.1 V *
DC Offset:	±0.15 mV
Input Coupling:	AC, DC *
Input Impedance:	>100 kΩ
SNR:	>120 dB
Anti-aliasing:	<-100 dB
Sample Rate:	5 - 256 kHz *
Frequency Response:	DC to >100 kHz ±0.1 dB
Dynamic Range:	140 dBFS / √Hz, 114 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:	< -80 dB, 0 to 80 kHz
DC Linearity:	< 0.075% (w.r.t full scale)
Drift:	< 125 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)

BNC Cables

Power Supply

Laptop

Flight Case

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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 Dragonfly[8] 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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