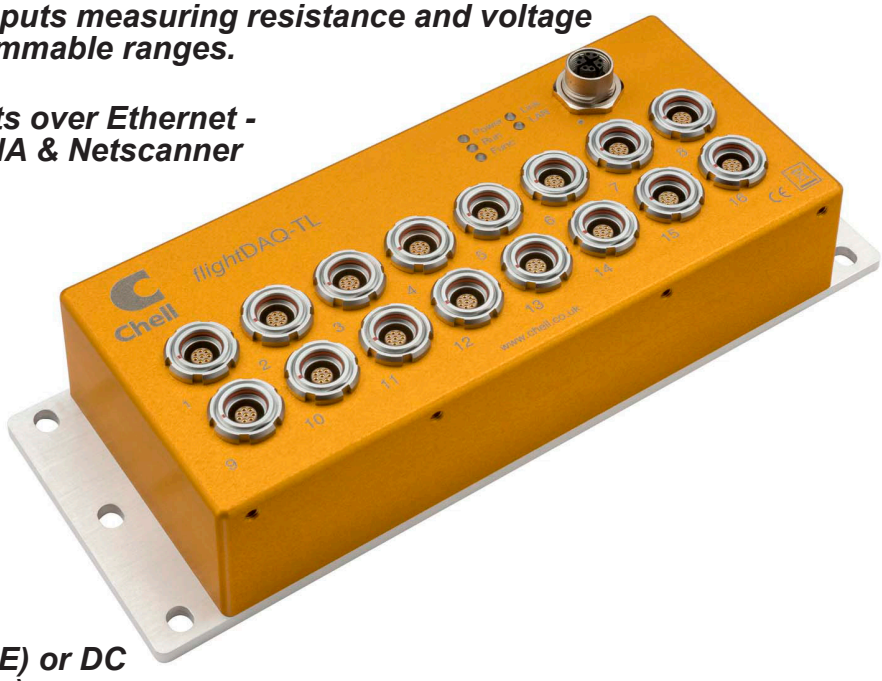
FlightDaq-TL

Voltage, Resistance and Temperature Acquisition System

- ***Configurable acquisition system for PRT's, thermocouples and external pressure transducers (amplified or ratiometric).***
- ***16 highly configurable inputs measuring resistance and voltage over a number of programmable ranges.***
- ***User configurable outputs over Ethernet - iDDS, Chell Protocol, IENA & Netscanner compatibility.***
- ***Configurable 5, 10 and 24V excitation.***
- ***With IEEE 1588 PTP V2.***
- ***250Hz per channel measurement frequency.***
- ***Compatible with Chell Smart Lemo's.***
- ***Power-over-Ethernet (PoE) or DC supply (user configurable).***
- ***Fully configurable over Ethernet with embedded web server.***



The Chell FlightDaq-TL is a complimentary product to our existing line of FlightDaq and Q-Daq pressure measuring equipment.

Using the powerful architecture and interfaces enables the FlightDaq-TL to accurately measure a large variety of input types, convert the measurement to engineering units and then output the data over a number of configurable Ethernet interfaces. These interfaces can be the Chell protocol (TCP/IP or UDP), IENA, iDDS or Netscanner® simulation mode.

The FlightDaq-TL consists of 16 x 8-pin Lemo 1B series inputs each of which contain two inputs (one primary and one secondary), switchable excitation and a digital interface for the optional Smart Lemo plugs.

The two inputs can be individually configured to provide measurements for the following:

- Voltage
- Resistance
- Thermistor
- Thermocouple inputs (using external cold junction such as a Smart Lemo).
- RTD385
- Amplified pressure transducer
- Ratiometric pressure transducer

The FlightDaq-TL can be configured for any combination of channels without comprising speed or performance (with the exception of the 24V excitation which must be applied to all channels).

Configuration of the inputs and the output stream is carried out via an embedded web server, using commands over the selected protocol or via an iDDS configuration server or by XML file download.

The user can choose between a number of standard look-up-tables (RTD385, N-Type etc) or enter their own for conversion to engineering units of their choice (maximum size 448 lines - downloadable from a CSV file).

Alternative, if used with the compatible Smart Lemo's, this look-up-table can be stored in the connector and therefore remains physically tied with the transducer.

The FlightDaq-TL has a programmable excitation source available to all channels. This can be configured to be +5, +10 or +24VDC.

The FlightDaq-TL features PoE as standard but can be user configured (via internal switches) for conventional DC supply.

SL0099-1.6 October 2019

Chell Instruments

FlightDaq-TL Input Types		
Input Type	**Channels**	**Notes**
Voltage	32	Ranges of ±78mV, ±300mV, ±5V and ±10V, primary and secondary inputs[1].
Resistance	16	Ranges of 250Ω, 500Ω, 1kΩ and 20kΩ
Thermistor	16	Tyoe 10kΩ -40 to 90°C
Thermocouple	16	Type B, E, J, K, N, R, S, T
RTD-385	16	PT100 - 4 wire -200 to 850°C
Pressure transducer - amplified	16	±78mV, ±300mV, ±5V and ±10V input ranges, 10V or 24V excitation[2]
Pressure transducer - ratiometric	16	±78mV, ±300mV, ±5V and ±10V input ranges, 10V excitation
Common mode Voltage	±78mV range : 14V, ±300mV range : 14V, ±5V range : 9V and ±10V range : 4V	

NOTES:
1. Primary input is differential, secondary is single-ended. Both inputs are bi-directional.
2. All channels can be individually configured with the exception of the 24V excitation which must be applied to all inputs when selected.

FlightDaq-TL Input Specifications		
Measurement type		
RTD (4-wire, -60 to 400°C)	Resolution	±0.0005 Ω or 0.001°C
	Accuracy[3]	< ±0.05 Ω or 0.1°C
	Noise[1]	< 0.02°C
10 k Thermistor	Resolution	±0.1 Ω or 0.003°C
	Accuracy[3]	< ±0.04 Ω or 0.1°C
Voltage (±78mV FS)	Resolution	±0.02 µV or 0.001°C (K type)
	Accuracy[3]	< ±10 µV or 0.26°C (K type) or 0.27°C (N type)[2]
	Noise[1]	< 3 µV
Voltage (±300mV FS)	Resolution	±0.3 µV
	Accuracy[3]	< ±15 µV (0.005%FS)
	Noise[1]	< 5.5 µV primary input, 8 µV secondary input
Voltage (±5V FS)	Resolution	±0.076 mV
	Accuracy[3]	< ±1 mV (0.02%FS)
	Noise[1]	< 70 µV primary input, 90 µV secondary input
Voltage (±10V FS)	Resolution	±0.15 mV
	Accuracy[3]	< ±2.5 mV (0.025%FS)
	Noise[1]	< 130 µV primary input, 170 µV secondary input

NOTES:
1. Noise figures based on an acquisition frequency of 250Hz and a running average setting of 8
2. Thermocouple temperature errors are for hot junction measurement only. This does not include cold junction thermal, transducer or measurement errors which will need to be considered.
3. All accuracy figures include ***all*** thermal errors between -40 and 90°C

Excitation Supplies	
5V	3% tolerance[1], 30mA per channel maximum
10V	1% tolerance[1], 7mA per channel maximum
24V	5% tolerance[1], 12mA per channel maximum

1. All tolerance figures include ***all*** thermal errors between -40 and 90°C

FlightDaq-TL Interface Types	
Interface types	
Chell protocol	32-bit floating-point output (IEEE 754) via TCP or UDP max 250Hz (see manual 900204-X.X for details)
IENA	UDP max 250Hz (see manual 900204-X.X for details)
iDDS	Conforms to EIM 03869
Netscanner emulation	TCP / UDP max 250Hz, limited command set (please contact Chell for details)
NOTES : 1. The interface type is user selectable via the embedded web server. 2. Configuration can be via embedded web server, using commands via one of the above protocols or, for iDDS applications via an appropriate iDDS configuration server or by XML file download.	

FlightDaq-TL System Specifications		
System resolution	24 bit	
Dimensions	241.2 x 89 x 68mm (please contact us for a solid model)	
Weight (with DTC scanner)	1.53Kg	
Environmental sealing	IP67	
Measurement connector	Lemo 1B series	
Input supply	PoE	IEEE 802.3at
	DC	24 to 50VDC (1.5A maximum at 24V)
Excitation Output	10V on Pin 1, 5V (digital grade) on Pin 7, +24 VDC (digital grade) Pin 2. Pin 1 is configurable (OFF/RTD/10V)	
Electrical connector	M12 X-Coded TE2232331-1	
System timing	IEEE1588-2008 PTP V2 accurate to 1% of the acquisition frequency (±40 µS at 250Hz)	
Operating temperature range.	-20 to+90°C (lower range can be extended if unit is powered first)	
Maximum relative humidity	95% at 50°C (non-condensing)	
Ethernet specification	Auto-negotiating 100Mbit TCP or UDP (fixed or DHCP)	

FlightDaq-TL Environmental Specifications	
Ambient altitude	100 mbar abs or nominally 52000 ft
Vibration	Engine standard vibration test to DO160E category S, curve W with duration of 1 hr/axis. Fan blade out case to DO160E category S, curve P.
	Fan blade out to DO160F section 7 (40g 11m/s)
	Engine load to +/- 40g per axis
Temperature	Engine temperature to DO160F section 4 cat D2 and section 5 cat A requirements
	General temperature -20 to+90°C
	Thermal transient : ±10°C/min
Radiated emissions	MIL standard 461-E: RE102
Conducted emissions	MIL standard 461-E/MIL standard 461-C
NOTES: To monitor the health of the FlightDaq-TL, the excitation supplies, internal temperature and internal absolute pressure are available over the embedded web server	

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