



DL2 Data Logger

What is the DL2?

Building on the technology from our incredibly popular DL1, the DL2 is a highly configurable, upgradeable data logging system that is designed to operate in harsh high temperature, high vibration racing and testing environments. What sets the DL2 apart from other data logging systems is its durability, accuracy and flexibility. In particular the DL2 uses an all-new 20Hz very high accuracy GPS system that has been designed in-house by Race Technology Ltd specifically for this application.



Figure 1:DL2 general arrangement

Who is the DL2 designed for?

The DL2 is available in a number of configurations and is suitable for use in applications requiring very high levels of accuracy in a highly robust format. The DL2 can be configured for use in the most demanding racing or testing environments, for example saloon cars, single seater racing cars, drag racing, race scrutineering, boats, motorbikes and karts.

What does the DL2 do?

The DL2 can store data from over 30 channels, 100 times every second. Data channels include speeds, accelerations, wheel speeds, shaft speeds, engine speeds, temperatures, pressures, lap times, sector times etc. All the data is stored on a removable compact flash card, which can then be downloaded to a PC for analysis. Our own software is used to analyse the data in great detail to monitor or improve driver and vehicle performance.

What are the key competitive advantages of the DL2?

The DL2 refines our GPS based data logging technology to a level no other manufacturer can match. Our standard 5Hz receiver already offers excellent performance, out performing even "survey grade" receivers. The only way to progress was to design our own system, which is exactly what you will find in the DL2 – and there is nothing to beat it for this application, almost irrespective of cost. Add to this the specially designed IP65 enclosure and the high quality components used throughout. For cost to performance ratio the DL2 cannot be matched.

Standard Features

- 2 RPM inputs. The DL2 has 2 RPM inputs, only one of which can be used at any one time. One input is designed to be connected to "high level" sources, such as the HT leads or the ignition coil. The other input is designed for low-level signals such as a tacho feed from the ECU.
- 16 analogue inputs – 12v FSD, 3mV resolution (12 bit).
- 4 wheel/shaft speed inputs. The DL2 features 4 totally independent wheel/shaft

speed inputs. These can be used to measure the speed of all four wheels, or slip ratios across a torque converter for example. Also capable of recording pulsewidths and duty cycles.

- Serial data (RS232) input. The serial port can be configured to accept data from an external source – possible examples are data from the engine management unit, OBDii or CAN data (with a suitable external adapter)
- Serial data (RS232) output. This port can be connected to any of our dashboard of video overlay products to provide a real time data output.
- Lap beacon input. For some applications it is desirable to use a lap beacon, so we have included a dedicated input for it. This channel can also be used as a general-purpose digital input if required.
- Three axis 2g accelerometer (6g option available). Fully damped GPS and accelerometer sub assembly. The accuracy of both GPS and the accelerometer sensors are degraded with high level of vibrations. To overcome this, the GPS system and accelerometer are mounted on a fully floating, damped platform within the logger.
- Waterproof case and front cover (gives protection to IP65) Totally protected from dust. Protected from low pressure jets of water from all directions.

Optional Features

- 20Hz GPS. A high performance GPS engine with full 20Hz (no interpolation) and advanced processing for very high accuracy position, distance and speed measurement.
- Three axis 6g accelerometer. normally required for very high performance motorsport applications, accident reconstruction, marine applications, etc

Optional Features (requiring additional hardware)

- Internal Battery pack. Power for up to 8 hours continuous logging, charges whilst

connected to a 12v source. This can only be fitted at the factory.

Frequently asked questions

What is the difference between the DL1 and the DL2?

The DL1 and DL2 share several features and technologies, but the DL2 take these to a higher level of optimisation and robustness. The features unique to the DL2 include: more inputs, faster processor, higher accuracy GPS, upgradeable GPS engine, higher vibration resistance, sealed for wet environments, robust custom enclosure

How often does the DL2 get speed/position updates?

Either 5 times per second or 20 times per second, depending on model. In either case the samples are real samples based on independent measurements taken from the GPS satellites. No interpolation is used.

Is the 20Hz GPS receiver the same system I will find on other, more expensive, systems?

No, the GPS system used in the DL2 is not a generic “survey grade system” that we simply buy in. The firmware and software that does all the GPS processing has been designed in-house by Race Technology Ltd and technology partners and is optimised from the ground up for this particular application. It is not available in any other product.

What are the relative accuracies/benefits of the different GPS options?

It is impossible to quote absolute accuracies of GPS systems simply because accuracy depends on time of day, satellite coverage, weather, antenna mounting, tree and building coverage etc. However typical real world positional errors are 3m for the 5Hz system and 2m for the 20Hz system. The 20Hz system also has other performance benefits, for example almost instant regain of GPS lock after short dropouts (eg: when passing under a bridge).

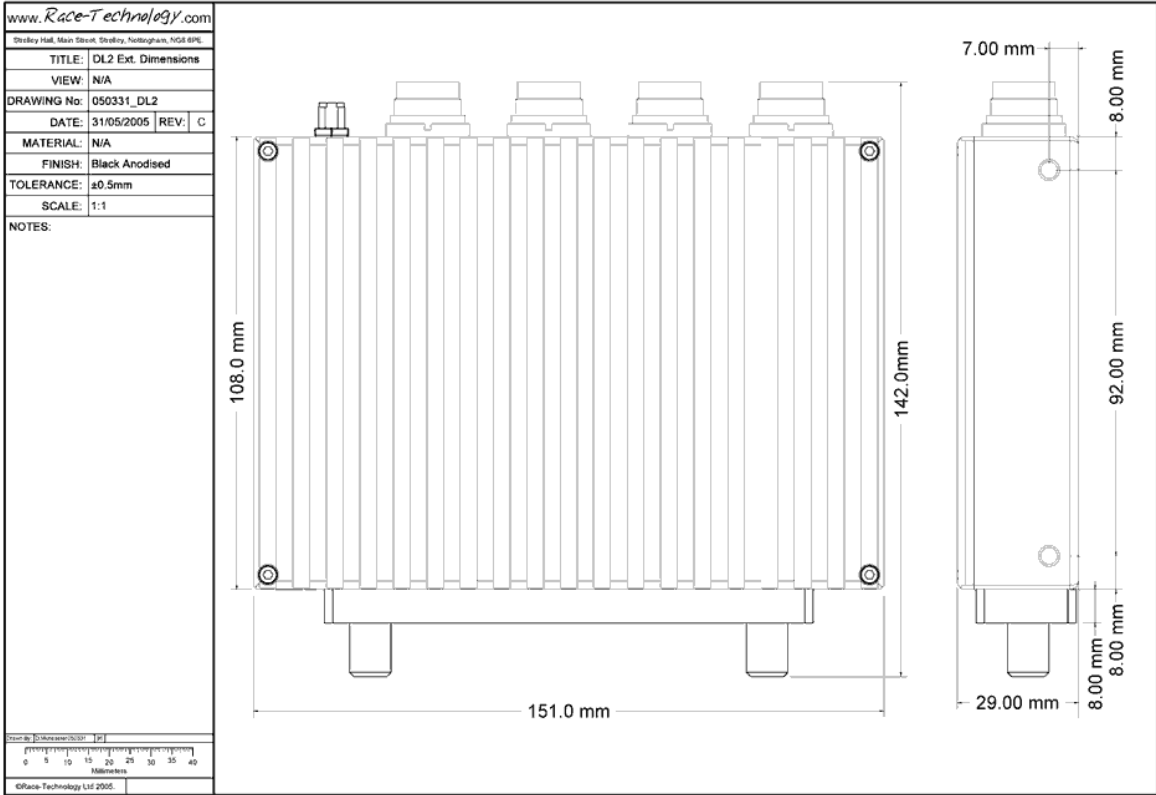
Is the DL2 fully waterproof?

The DL2 is sealed to IP65, this is defined as “Totally protected from dust, protected from low pressure jets of water from all directions”

To what standards is the DL2 constructed?

Design and tested to 25g at 20Hz-200Hz in all 3 axes for 24 hours, this exceeds military specification by approximately a factor of 4. Individual units tested for 5 minutes 25g in the vertical axis to detect manufacturing faults.

Conn	Pin N ^o		Description	Range
Conn-1 Binder 423 Series Male Bulkhead (09-0131-68-12)	1	A	Digital/Frequency I/P #1	0v (low), 5-12v (High)
	2	B	Low V RPM I/P	0v (low), 5-12v (High)
	3	C	Status O/P (Low while Logging)	30mA shared with Conn-2_11
	4	D	RPM Gnd	Gnd
	5	E	High RPM I/P	Special
	6	F	Trigger I/P (Gnd to Toggle Logging)	Active Low
	7	G	Power In	9-15v
	8	H	Digital/Frequency I/P #3	0v (low), 5-12v (High)
	9	J	Digital/Frequency I/P #4	0v (low), 5-12v (High)
	10	K	Digital/Frequency I/P #2	0v (low), 5-12v (High)
	11	L	Lap Beacon I/P (Gnd to indicate beacon)	Gnd to Toggle Logging
	12	M	GND	Gnd
Conn-2 Binder 423 Series Male Bulkhead (09-0131-68-12)	1	A	DL2 Serial Comms receive	RS232 RX
	2	B	Charger Supply (Optional) I/P	12v
	3	C	Trigger I/P (Gnd to Toggle Logging)	Active Low
	4	D	Gnd	Gnd
	5	E	CAN High	Not Implemented
	6	F	CAN Low	Not Implemented
	7	G	Power In	9-15v
	8	H	GPS Serial Comms receive	RS-232 RX
	9	J	GPS Serial Comms transmit	RS-232 TX
	10	K	DL2 Serial Comms transmit	RS-232 TX
	11	L	Status O/P (Low while Logging)	30mA shared with Conn-1_3
	12	M	Lap Beacon I/P (Gnd to indicate beacon)	Gnd to Toggle Logging
Conn-3 Binder 423 Series Male Bulkhead (09-0131-68-12)	1	A	Analogue I/P #14	0-12v
	2	B	GND	Gnd
	3	C	Analogue I/P #12	0-12v
	4	D	Analogue I/P #11	0-12v
	5	E	Analogue I/P #10	0-12v
	6	F	Analogue I/P #9	0-12v
	7	G	Power In	9-15v
	8	H	5v Auxilliary	Max 100mA shared W/Conn4-8
	9	J	Analogue I/P #16	0-12v
	10	K	Analogue I/P #15	0-12v
	11	L	Analogue I/P #13	0-12v
	12	M	Gnd	Gnd
Conn-4 Binder 423 Series Male Bulkhead (09-0131-68-12)	1	A	Analogue I/P #6	0-12v
	2	B	GND	Gnd
	3	C	Analogue I/P #4	0-12v
	4	D	Analogue I/P #2	0-12v
	5	E	Analogue I/P #3	0-12v
	6	F	Analogue I/P #1	0-12v
	7	G	Power In	9-15v
	8	H	5v Auxilliary	Max 100mA shared W/Conn3-8
	9	J	Analogue I/P #8	0-12v
	10	K	Analogue I/P #7	0-12v
	11	L	Analogue I/P #5	0-12v
	12	M	Gnd	Gnd



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