

RD317 Micro ShockLog ™ Recorder

Tri-axial Shock, Vibration and Environmental Monitor

The RD317 combines the latest developments in Lamerholm Electronics advanced tri-axial piezo electric accelerometer technology with state of the art electronics and field proven software to offer an advanced shock and vibration-monitoring instrument at an amazingly low price.

This instrument has been designed to offer new levels of user friendliness and is the first full function shock recorder to allow setup and data extraction in the field without a PC or other hand held computer.



RD317 and iButtons

- 9 month life from single AA battery
- Humidity sensor option
- iButton interface – no PC required in the field
- Three built in accelerometers
- Non volatile memory records 500 day history
- Records first and up to nine most significant events in detail
- Records time and amplitude of 128 most recent events
- Time slot recording for complete shock and vibration history



RD317 Starter Kit



9-month life from single AA battery

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Features

The RD317 has been designed to offer a cost effective solution to the increasing need to monitor environmental influences, especially shock and vibration, on high value goods in transit. This new instrument offers several novel features which significantly reduce the cost of deployment in the field and permit the effective use of shock monitoring equipment by unskilled personnel after minimal training. In normal circumstances it is not necessary for field staff to use a PC or similar hand held computer to fully utilise the RD317.

Recording
During operation low power analogue circuits continuously monitor the signals from the three built in accelerometers. The peak value of acceleration in each timeslot period is recorded in the timeslot memory. The timeslot period can be set to as little as 10 seconds or as long as one hour.

If the level of acceleration from any sensor exceeds a preset threshold then the detailed event recording system will be triggered. This will make a detailed recording of the event at a rate of up to 1024 measurements per second on each accelerometer. The user can set the event duration. Since only a finite amount of memory is available the detailed recordings for the first and the nine most significant events are recorded. In addition the maximum values for X, Y, Z and the modulus for the 128 most recent events are recorded along with the event time stamp.

The RD317 is fitted with an internal temperature sensor as standard and a humidity sensor is available as a factory fitted option. Temperature and humidity data can be recorded in the timeslot memory.

User Interface
The RD317 can be configured by attaching it to a PC using a serial cable and running the standard ShockLog software. All the data stored in the ShockLog can be downloaded to the PC and analysed off line. It is recognised that the cost of deploying PCs in the field is very considerable so the RD317 offers an iButton interface. This is a simple socket on the front panel, which is activated by touching a button-sized device to it. The iButton is a standard product of Dallas Semiconductor. You can set up iButtons yourself on a PC or buy them pre-initialised from Lamerholm to configure the RD317 and set its clock. In addition you can extract a summary of the RD317 recorded data into a memory iButton and read this on a remote PC.

The RD317 uses two LEDs to guide the operator in the use of the iButton and to confirm successful data transfer.

Security
The RD317 stores all data and status information in high performance sector erase FLASH memory. This memory requires no power to retain data and offers special hardware protection against accidental erasure.

Before the software will communicate with the RD317 the user must supply any user passwords which may have been set to restrict access to data, resetting, calibration or other functions. If the iButton interface is used passwords may still be configured if required.

A special section of the flash memory is reserved for the security log – this records the timing of such actions as removal of the battery, re-setting the clock or clearing out data and can not be easily modified by the operator. It is intended that the security log last the operating life of the instrument and should only be cleared when the ShockLog is re-calibrated by Lamerholm Fleming.

Software

The RD317 is supplied with software, which runs on a desktop or portable PC using either the Windows 95, 98, 2000, NT4 (SP3), XP operating systems. Additional operating systems may be supported at a later date.

The software allows the operator to configure the RD317, either directly or via iButtons and to extract and examine data records from the instrument.

Reports may be viewed on screen and selected data exported to other applications. Six different reports are available: summary data, events summary, event details, time slot data, mission report and security log data.

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Summary report: The mission is split into as many as 512 summary periods which may be from 10 minutes to twenty four hours long and for each period the following parameters are reported in spreadsheet form: date, time, number of alarms, max x|y|z, (humidity), rms x|y|z, max/min temperature, range

Events summary report: The first and 128 most recent events are presented in a graphical or spreadsheet form. For each event the following parameters are available**:** date, time, range, temperature, max/min x/y/z, modulus. In addition the maximum modulus of all the events may be displayed graphically.

Event Details report: For the first and the (nine) most significant events the detailed information is available in spreadsheet or graphical form. When the graphical form is used pan and zoom controls are available.

Time slot report: Data recorded in the timeslot memory can be displayed in graphical form. The following parameters are available: date, time, max pk x|y|z, internal temperature, humidity.

Mission Report: The mission report can be extracted in the field by means of an iButton. It offers a summary of the complete mission data set including a condensed view of the timeslot data, the Events Summary report for up to 128 events and a condensed plot of the most significant event.

Security Log report: The security log data can be displayed in spreadsheet form. The following parameters are available: date and time of password changes, setup changes, battery changes, data clearing operations or resets.

Packaging and Environment

The RD317 has been designed to function reliably in difficult environments. The electronic components are assembled using surface mount technology and the latest automatic assembly equipment. The complete electronic and transducer package is coated with acrylic resin and enclosed in a metal case.

This construction technique, in combination with the absence of cables for power or sensors results in a very high immunity to electrical interference and very low levels of RF emission. The RD317 may safely be used in close proximity to sensitive instruments or in difficult electrical environments.

The RD317 has been designed to meet IP67 (including connector with cap fitted) and is capable of operating at temperatures between –40 and + 85°C.

Unit Options

Unit Part No.	Range	Maximum frequency	Built in humidity sensor
31700R1F2H0	10g	40Hz	No
31700R1F2H1	10g	40Hz	Yes
31700R2F1H0	100g	250Hz	No
31700R2F1H0	100g	250Hz	Yes

Technical Specification

Complete instrument		**Min**	**Max**	**Units**
Operating temperature range (recording)		-40	+85	°C
Operating temperature range (recording + communications)		-20	+85	°C
Temperature recording accuracy	(-40 to +85 °C)	-3	+3	°C
	(-10 to +65 °C)	-2	+2	°C
Drop test survival		1		m
Size (over connectors)	85 x 85x 50			mm
Case material	aluminium and steel			
Weight			0.445	kg
A-D converter resolution		10		bits
Flash memory	(for code)	128		k bytes
	(for data)	512		k bytes
Battery	1 x 3.6V lithium thionyl chloride	2.2		Ah
	1 x 1.5V Alkaline size AA			
Indicators	3 x Red and 2 x Green LEDs			
Interface	RS232 levels, Rx and Tx Baud rates	19200	57600	
EMC	EN50022, EN50082-1, FCC CFR47(July1998) Part 15 Limit B			

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Technical Specification

Accelerometers	**Min**	**Max**	**Units**
Low frequency cut off (-3dB 10g – 100g)	0.1	0.5	Hz
High frequency cut off (-3dB, option F1)	220	280	Hz
High frequency cut off (-3dB, option F2)	35	45	Hz
Resolution (% of full scale)	0.5		%
Scale factor accuracy at 5/50g (event record)	-5	+5	%
Additional error for peak capture	-5	+5	% (of range)
Change of scale factor over temperature	-4	+4	%
Additional offset error	-1	+1	g
Acceleration ranges (option R1)		±10	g
Acceleration ranges (option R2)		±100	g
Wake up threshold (% of range)	10	95	%
Alarm thresholds (% of range)	10	95	%
Wake up time		1.5	mS

Humidity Sensor	**Min**	**Max**	**Units**
(NB IP67 rating does not apply to humidity sensor)			
Measuring range (non condensing)	5	95	% RH
Accuracy (@25 °C, 25 – 75 %RH)	-3	+3	% RH
Resolution	0.5		% RH

Connector Details	**Min**	**Max**	**Units**
Connector 3 pole 3.5mm min jack DIN with screw on cover			

Data Collection	**Min**	**Max**	**Units**
Timeslot Interval	10	3600	Seconds
Number of timeslots (depends on slot contents)		131072	
Samples per event		2048	
Number of events (detailed)		10	
Number of events (time, date and magnitude)		128	

Battery Endurance	**Min**	**Max**	**Units**
Lithium (operating, -10 to +45 °C)	6		months
Lithium (operating, +5 to +35 °C)	9		months
Lithium (waiting, -10 to +45 °C)	24		months (estimated)
Alkaline (operating, +5 to +45 °C)	1		months

Air Cargo The RD317 is classified as non dangerous, assuming the approved battery type is fitted.

About Lamerholm Electronics Ltd.

Lamerholm Electronics, develops, manufactures and markets a broad range of shock, environmental, temperature monitoring and damage prevention products. The companies' worldwide distribution network is coordinated from the UK base, at:

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