

ShockLog Technical Information

How the ShockLog Works

The ShockLog has been designed to monitor shock and vibration based on acceleration or velocity measurements. It has several unique features, which make it especially suitable for applications where the cost of exposure to out-of-specification environmental influences is very high. The instrument is equally convenient for protecting high-value fixed or mobile installations or investigating shock and vibration during transportation.

In normal operation, the device checks the output of the sensors (the three built in accelerometers, the built-in temperature sensor, and any external sensors) once every 10 seconds. The information from the sensors is merged into a record for each recording period and is recorded in non-volatile memory. The length of the recording period can be set between 10 minutes and 24 hours, and there is sufficient memory for 512 periods.

If any of the accelerometer signals or the first external input exceeds the "wake-up" threshold, the processor will be turned on and will check the sensor outputs at a much faster rate (up to 4,000 samples per second). If the output of any sensor exceeds the warning or trip thresholds, the ShockLog will flash its status lamps accordingly. The ShockLog will adjust the sample rate during the event recording (within parameters set up by the user) to make the most efficient use of memory and capture the full extent of any events.

The external inputs are intended for use with low bandwidth devices, such as pressure or humidity sensors, and, in addition, the first external input can be used to trigger the ShockLog.

The ShockLog also supports peak recording in fixed time slots. In this mode the highest and lowest signal level present on each input is recorded for each time slot. The time slot length may be set between 10 seconds and one hour, and as many as 262,144 slots may be recorded.

Security

The ShockLog 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.

The instrument can be configured by connecting it to a PC running the data analysis and set-up software supplied free with each ShockLog. During the configuration process, the operator can set the levels for warnings and alarms, determine the sensor types to be used and set up user passwords for subsequent access to data.

Before the software will communicate with the ShockLog, the user must supply the factory password for the individual instrument and any user passwords that may have been set to restrict access to data, resetting, calibration, or other functions.

The complete electronic and transducer package is enclosed in a robust extruded aluminum case and encapsulated in polyurethane compound. It is completely impossible to tamper with the hardware without leaving clear evidence of such action.

Packaging and Environment

The ShockLog 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 enclosed in the metal case and encapsulated in polyurethane. The securing bolts pass right through the body of the instrument to guarantee a reliable mechanical installation.

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

The ShockLog is sealed to IP67 (including connectors) and is capable of operating at temperatures between -4°F / -20°C to 158°F / 70°C (-40°F / -40°C to 185°F / 85°C to special order).

Micro ShockLog Technical Information

How the Micro ShockLog Works

The ShockWatch Micro ShockLog combines advanced triaxial piezoelectric accelerometer technology with state-of-the-art electronics and field-proven software. The end result is a remarkably affordable advanced shock and vibration monitoring instrument.

The Micro ShockLog can record impact and temperature events over time frames up to 17 months or more. In addition, the Micro ShockLog is the first full-function shock recorder to allow set-up and data extraction in the field without a PC or other handheld computer.

During operation, low power analog 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. The detailed event recording system will be triggered if the level of acceleration from any sensor exceeds a preset threshold. This function will record the event at a rate of up to 1,024 measurements per second on each accelerometer. Sampling rates and event duration can be set by the user. Since only a finite amount of memory is available, the detailed recordings for the first and the most significant events are recorded. In addition, the maximum values for X, Y, Z, and the modulus for the most recent 128 events are recorded along with the event time stamp.

Security

The Micro ShockLog 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 Micro ShockLog, 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, resetting the clock, or clearing out data — and cannot 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 Micro ShockLog is recalibrated by ShockWatch.

Packaging and Environment

The Micro ShockLog has been designed to function reliably in difficult environments. The electronic components use surface mount technology. The complete electronic and transducer package is coated with acrylic resin and enclosed in a metal case. The construction of the Micro ShockLog, along with the absence of cables for power or sensors, results in a very high immunity to electrical interference as well as very low levels of RF emission. The unit may be safely used in close proximity to sensitive instruments or in complex electrical environments. The Micro ShockLog has been designed to meet IP67 (including connector with cap fitted) and is capable of operating at temperatures between - 40°F / -40°C to 185°F / 85°C.