APPLICATION NOTE

STATE, EVENT & PULSE DATA LOGGERS

Choosing Between a State, Event, or Pulse Data Logger

The State101A, Event101A, and Pulse101A data loggers, although related, each serve very different purposes in meeting the needs of a specific application.

A state data logger indicates how long an event lasts.

An event data logger indicates when an event occurs.

A pulse data logger indicates the number of times an event occurred in a given time interval.

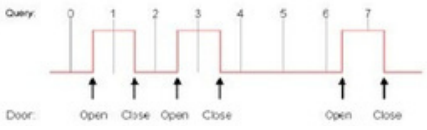
This application note will discuss the differences between these three types of units and provide some insight into practical applications to help the user choose the correct product for their application.

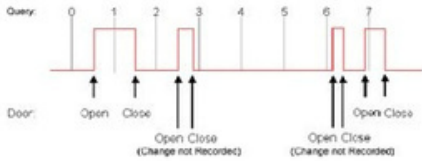
State101A Data LoggerThe State101A samples the state of the input at fixed intervals.

In order for a state change to be recorded, the change must be present at the time it is sampled. If more than one transition occurs between position 0 and position 1, only the state of the input at the time of the sample will be recorded. Therefore, the sample period must be set to less than the minimum time required for the input signal to rise and fall. If the change in state does not persist long enough to be active at the time of sampling, it will be missed.

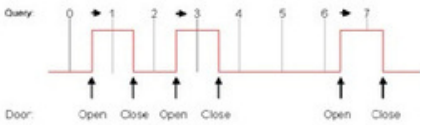
EXAMPLE:

If it takes 30 seconds for a garage door to open and close, the time period should be set to less than 30 seconds to ensure the state change is not missed.





Another example of an application for the State101A is the monitoring of a furnace or pump turning on and off, both of which have a long enough state change to be captured by the State101A.



Another common application for an Event101A is monitoring tipping-bucket rain gauges. The Event101A will record data when the bucket tips and the contact is closed. It is unlikely that the bucket on the rain gauge will tip more than once per second, therefore the Event101A will not miss recording any data points.

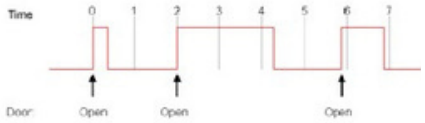
Event101A Data Logger

The Event101A Data Logger records a single direction time-stamped data point when an event takes place within a fixed reading interval. This is useful when the user needs to be able to collect data on when an event occurred, but does not need to know the duration of the event.

EXAMPLE:

If the user is monitoring the traffic flow through a door, the Event101A will take a data point recording:

1. That the door opened, and
2. That the door opened again, and
3. That the door opened again.



Unlike the State101A, the Event101A does not provide the data points that would indicate how long the door was open. The Event101A can track the number of times the door was opened, but not how long it was open for.

EXAMPLE:

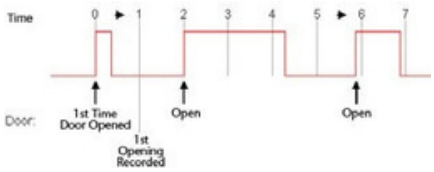
Data from the Event101A tells the user that events occurred:

1. When the door opened at 9:30:00 am, and
2. When the door opened at 9:37:04 am, and
3. When the door opened again at 12:22:13 pm

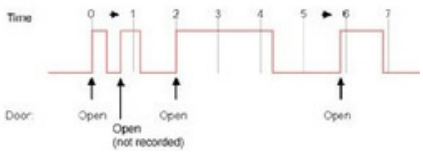
Thus, the user can track the number of times the door was opened, but not how long the door was open each time.

The Event101A has a resolution of 1 second. This means that the device has the ability to record an event every second. Unlike the State101A, the Event101A does not require a persistent signal. The Event101A will trigger on the leading edge of the signal transition. However, it should be noted that:

If a data point occurs between position 0 and position 1, it will be recorded as having taken place at position 1.



If more than one data point occurs between position 0 and position 1, only a single data point will be recorded.



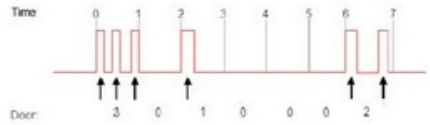
Pulse101A Data Logger

The Pulse101A Data Logger records the number of pulses that happen over a period of time. Unlike the State101A or Event101A, the device does not time-stamp each pulse, but rather groups together
or "bins" the number of pulses according to the time period they occurred in.

EXAMPLE:

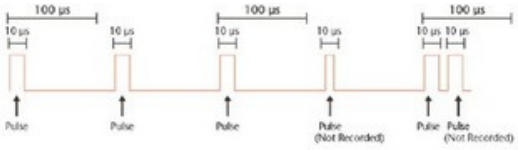
If the user is monitoring traffic through a door, the Pulse101A will log the number of times the door was opened during each interval:

1. The door was opened 3 times between 9:30 and 9:31 am
2. The door was opened once between 9:32 and 9:33 am
3. The door opened twice between 9:36 and 9:37 pm



The Pulse101A requires a signal of at least a 10 microsecond duration and at least 100 microseconds between the leading edge of each pulse to be counted. If these conditions are met, then every pulse will be logged, up to 4.3 billion pulses per time interval.

Conversely, a pulse may not be recorded if it is less than 10 microseconds or if more than one pulse occurs within a 100 microsecond period. If the latter happens, further data points may not be recorded until 100 microseconds after the first pulse.



A common application for the Pulse101A is to measure the flow rate or total volume of a pipeline. The Pulse101A collects pulses generated by a flow meter and uses that information to calculate the number of gallons per minute. The flow meter produces a pulse that is too rapid to be collected by the Event101A or State101A, yet can easily be binned by the Pulse101A. The important data here is not the exact time when the pulse took place, but rather the number or pulses in a time interval.

If you have any further questions about your application, please contact MadgeTech Customer Support at (603) 456-2011 or **support@madgetech.com**.

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