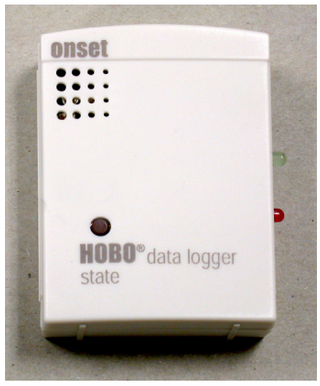
HOBO® U9 State Data Logger
(Part # U9-001)

Inside this package:

- HOBO U9 State Data Logger
- One input cable
- Magnet
- Mounting kit with magnet, hook and loop tape, 3/8" double-sided tape.



Doc # 8951-A, MAN-U9-001
Onset Computer Corporation

Thank you for purchasing a HOBO data logger. With proper care, it will give you years of accurate and reliable measurements.

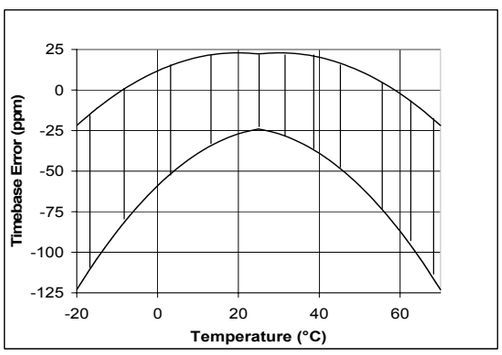
The HOBO U9 State Data Logger has 64K of memory and can record up to 43,000 state changes. The state channel can monitor conditional changes when the input cable conductors are "opened" or "closed." External contact closer devices "open" and "close" the logger's conductors and are controlled by external sensing devices, which are commonly used in monitoring equipment and machines such as motors, doors and other cycling equipment. The state channel also incorporates a reed switch which alternatively can be used to internally "open" and "close" the logger's input channel with the use of a magnet.

The logger uses a direct USB interface for launching and data readout by a computer.

A HOBOware™ software starter kit is required for logger operation. Visit www.onsetcomp.com for details.

Specifications

State Channel	External contact input: Passive relay switch or contact closure - minimum duration 1 second (open > 300 KΩ or closed < 15 KΩ)
Max total cable run	38 m (125 ft)
Time accuracy	Approximately ± 1 minute per month at 25°C (77°F); see Plot A
Operating temperature	Logging: -20° to 70°C (-4° to 158°F) Launch/readout: 0° to 50°C (32° to 122°F), per USB specification
Humidity range	0 to 95% RH, non-condensing
Battery life	1 year typical use
Memory	64K bytes (up to 43,000 state changes); see "Storage capacity" on the next page
Weight	25 g (0.8 oz)
Dimensions	45 x 60 x 20 mm (1.8 x 2.38 x 0.77 inches)
CE	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).



Plot A

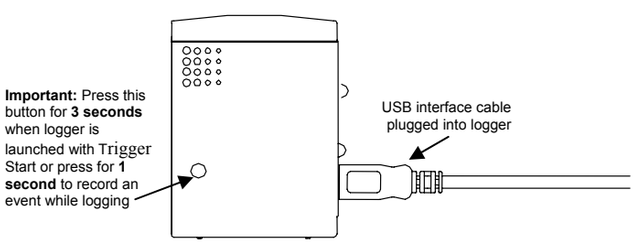
Accessories available

- AC Current Switch (Part # CSV-A8)

Connecting the logger

The U-Series logger requires an Onset-supplied USB interface cable to connect to the computer. If possible, avoid connecting at temperatures below 0°C (32°F) or above 50°C (122°F).

1. Plug the large end of the USB interface cable into a USB port on the computer.
2. Plug the small end of the USB interface cable into the side of the logger, as shown in the following diagram.
3. Load and use logger software to operate the logger (see software manual).



If the logger has never been connected to the computer before, it may take a few seconds for the new hardware to be detected

You can read out the logger while it continues to log, stop it manually with the software, or let it record data until the memory is full.

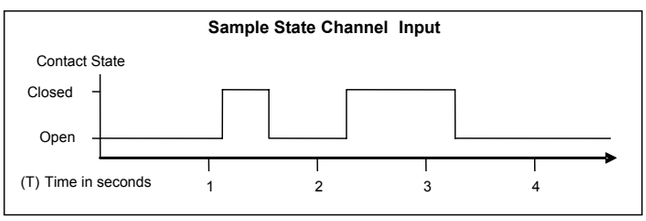
Refer to the software user's guide for complete details on launching, reading out, and viewing data from the logger.

Important notes:

- If you configure the logger to start with a trigger start, be sure to press and hold down the button on the front of the logger for at least three seconds when you want to begin logging data. When you release the button, the light on the side of the logger will flash rapidly to indicate that logging has begun.
- Plug the state input cable into the side of the logger before logging begins. Plugging in the input cable or removing it while logging may produce false state changes.
- Connecting an input cable to the logger while the battery is low can reset the logger and stop it from operating.

State logging

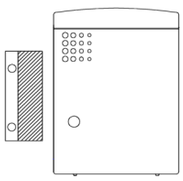
The logger checks the state value every second. It is unaware of any changes that happen between checks. Accordingly, if the contact activity shown in Plot B below is applied to the state channel, the logger does not see the momentary closure that happens between T1 and T2 because the contacts are open at both times. However, the state changes from T2 to T3, and from T3 to T4, are recorded as one closure that begins at T3 and ends at T4.



Plot B

Using the magnet

Your logger contains a reed switch which can be used with the included magnet as the input to your logger. This setup can be used to determine when a door or window is opened and closed. You must orient the magnet as shown. While logging, the logger will blink green while the magnet is near it and red when it isn't.

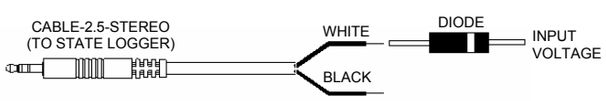


Measuring contact closures

Your logger came with an input cable. This cable can be used to measure contact closures, and allows the logger to be mounted remotely from the contacts. Connect your contacts to the black and white wires, and plug the other end of the cable into the state input connector on the side of the logger. Do not connect the contacts to anything besides the logger input cable.

Measuring positive DC voltages

Your input cable can detect positive DC voltages up to 15V if connected as shown below. This will only work if the input voltage goes to ground when the positive voltage is not applied. To avoid damaging your logger or equipment, the diode must be connected with the polarity as shown, and negative voltages must not be applied to the input.



Logging the battery voltage

In addition to state readings, the logger can record battery readings at regular intervals. If you enable the internal battery channel for logging, battery measurements should be made at long intervals (one hour or greater) to minimize memory usage.

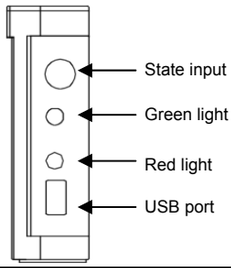
Internal events

Events are independent occurrences triggered by logger activity. Examples of events recorded asynchronously during deployment include: when the logger is connected to the host, when the battery is low, end of a datafile once the logger is stopped, and button pushes.

Press the button on the front of the logger for one second to record an event. Both a "button down" and a "button up" event will be recorded. This is useful if you want to mark the datafile at a particular point.

Logger operation

Lights (LEDs) on the side of the logger confirm logger operation.



The following table explains when the logger blinks during logger operation:

When:	The lights:
The logger is logging battery channel faster than four seconds	Blinks at the battery logging interval • Red LED blinks if the contacts are open • Green LED blinks if the contacts are closed*
The logger is logging battery channel at four seconds or slower, or is logging only state changes	Blinks every four seconds • Red LED blinks if the contacts are open • Green LED blinks if the contacts are closed*
The logger is awaiting a start because it was launched in Start At Interval, Delayed Start, or Trigger Start mode	Red LED blinks once every eight seconds until launch begins
The button on the logger is being pushed for a Trigger Start launch or manual event	Red LED blinks once every second while pressing the button and then (trigger start only) flashes rapidly once you release the button. The light then reverts to a blinking pattern based on the logging interval

*Faint red LED blinks can be seen when the contacts are closed. This is a normal condition; the logger is checking its battery voltage.

Storage Capacity

The logger's storage capacity depends on the interval between state changes. The longer the interval between a state change, the more memory is needed to store the data. The following table shows how memory capacity is affected by various intervals between state changes, assuming the battery channel is disabled.

Average interval between state changes	Approximate total points
1 sec. – 15 sec.	43,439
16 sec. – 4.25 min.	32,512
4.24 min – 68.25 min.	26,009

Protecting the logger

The logger can be permanently damaged by corrosion if it gets wet. Protect it from condensation. If it gets wet, remove the battery immediately and dry the circuit board with a hair dryer before reinstalling the battery. Do not let the board get too hot. You should be able to comfortably hold the board in your hand while drying.

Note! Static electricity may cause the logger to stop logging. To avoid electrostatic discharge, transport the logger in an anti-static bag, and ground yourself by touching an unpainted metal surface before handling the logger. For more information about electrostatic discharge, visit our website at http://www.onsetcomp.com/support/support.html.

Mounting

There are three ways to mount the logger using the materials in the mounting kit included with the logger.

- Use the hook-and-loop tape to affix the logger to a surface.
- Attach the magnet and then place the logger on a flat magnetic surface.
- Use the double-sided tape to affix the logger to a surface.

Battery

The logger requires one 3-Volt CR-2032 lithium battery. Expected battery life varies based on the temperature and the frequency at which the logger is recording data (the logging interval and the rate of state changes). A new battery typically lasts one year. Deployments in extremely cold or hot temperatures or logging intervals faster than one minute may significantly reduce battery life.

To replace the battery:

1. Disconnect the logger from the computer.
2. Open the case by unsnapping the side cover.
3. Lift the circuit board and carefully push the battery out with a small blunt instrument, or pull it out with your fingernail.
4. Insert a new battery, positive side facing up.
5. Carefully realign the logger in the case and re-close it.

WARNING: Do not cut open, incinerate, heat above 85°C (185°F), or recharge the lithium battery. The battery may explode if the logger is exposed to extreme heat or conditions that could damage or destroy the battery case. Do not dispose of the logger or battery in fire. Do not expose the contents of the battery to water. Dispose of the battery according to local regulations for lithium batteries.

Service and Support

HOBO products are easy to use and reliable. In the unlikely event that you have a problem with this instrument, contact the company where you bought the logger: Onset or an Onset Authorized Dealer. Before calling, you can evaluate and often solve the problem if you write down the events that led to the problem (are you doing anything differently?) and if you visit the Technical Support section of the Onset web site at www.onsetcomp.com/support.html. When contacting Onset, ask for technical support and be prepared to provide the product number and serial number for the logger and software version in question. Also completely describe the problem or question. The more information you provide, the faster and more accurately we will be able to respond.

Onset Computer Corporation
470 MacArthur Blvd., Bourne, MA 02532
Mailing: PO Box 3450, Pocasset, MA 02559-3450
Phone: 1-800-LOGGERS (1-800-564-4377) or 508-759-9500
Fax: 508-759-9100
E-mail: loggerhelp@onsetcomp.com
Internet: www.onsetcomp.com

Warranty

Onset Computer Corporation (Onset) warrants to the original end-user purchaser for a period of **one year** from the date of original purchase that the HOBO® product(s) purchased will be free from defect in material and workmanship. During the warranty period Onset will, at its option, either repair or replace products that prove to be defective in material or workmanship. This warranty shall terminate and be of no further effect at the time the product is (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained in accordance with the accompanying documentation; (2) modified; (3) improperly installed; (4) repaired by someone other than Onset; or (5) used in a manner or purpose for which the product was not intended.

THERE ARE NO WARRANTIES BEYOND THE EXPRESSED WARRANTY ABOVE. IN NO EVENT SHALL ONSET BE LIABLE FOR LOSS OF PROFITS OR INDIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL OR OTHER SIMILAR DAMAGES ARISING OUT OF ANY BREACH OF THIS CONTRACT OR OBLIGATIONS UNDER THIS CONTRACT, INCLUDING BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY.

Limitation of Liability. The Purchaser's sole remedy and the limit of Onset's liability for any loss whatsoever shall not exceed the Purchaser's price of the product(s). The determination of suitability of products to the specific needs of the Purchaser is solely the Purchaser's responsibility. **THERE ARE NO WARRANTIES BEYOND THE EXPRESSED WARRANTY OFFERED WITH THIS PRODUCT. EXCEPT AS SPECIFICALLY PROVIDED IN THIS DOCUMENT, THERE ARE NO OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTIBILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO INFORMATION OR ADVICE GIVEN BY ONSET, ITS AGENTS OR EMPLOYEES SHALL CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THE EXPRESSED WARRANTY OFFERED WITH THIS PRODUCT.**

Indemnification. Products supplied by Onset are not designed, intended, or authorized for use as components intended for surgical implant or ingestion into the body or other applications involving life-support, or for any application in which the failure of the Onset-supplied product could create or contribute to a situation where personal injury or death may occur. Products supplied by Onset are not designed, intended, or authorized for use in or with any nuclear installation or activity. Products supplied by Onset are not designed, intended, or authorized for use in any aeronautical or related application. Should any Onset-supplied product or equipment be used in any application involving surgical implant or ingestion, life-support, or where failure of the product could lead to personal injury or death, or should any Onset-supplied product or equipment be used in or with any nuclear installation or activity, or in or with any aeronautical or related application or activity, Purchaser will indemnify Onset and hold Onset harmless from any liability or damage whatsoever arising out of the use of the product and/or equipment in such manner.

Returns

Please direct all warranty claims and repair requests to place of purchase.

Before returning a failed unit directly to Onset, you must obtain a Return Merchandise Authorization (RMA) number from Onset. You must provide proof that you purchased the Onset product(s) directly from Onset (purchase order number or Onset invoice number). Onset will issue an RMA number that is valid for 30 days. You must ship the product(s), properly packaged against further damage, to Onset (at your expense) with the RMA number marked clearly on the outside of the package. Onset is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company. Loggers must be clean before they are sent back to Onset or they may be returned to you.

Repair Policy

Products that are returned after the warranty period or are damaged by the customer as specified in the warranty provisions can be returned to Onset with a valid RMA number for evaluation.

ASAP Repair Policy. For an additional charge, Onset will expedite the repair of a returned product.

Data-back™ Service. HOBO data loggers store data in nonvolatile EEPROM memory. Onset will, if possible, recover your data.

Tune Up Service. Onset will examine and retest any HOBO data logger.

Part #: MAN-U9-001, Doc #: 8951-A, Patent # 6,826,664