

HOBO® U12 4-External Channel Data Logger  
(Part # U12-006)

Inside this package:

- HOBO U12 4-External Channel Data Logger
- Mounting kit with magnet, hook and loop tape, tie-wrap mount, tie wrap, and two screws.

Doc # 13125-A, MAN-U12006

Onset Computer Corporation




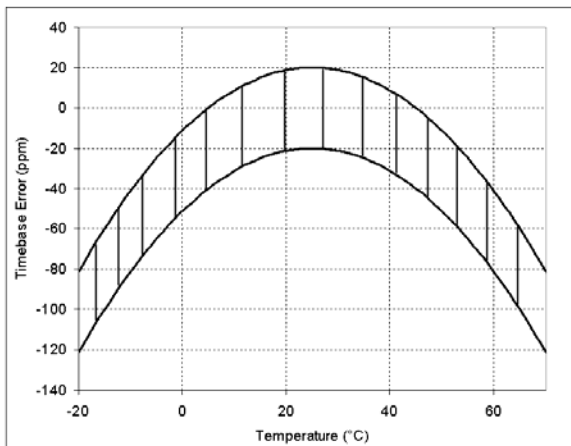
Thank you for purchasing a HOBO data logger. With proper care, it will give you years of accurate and reliable measurements.

The HOBO U12 4-External Channel data logger has a 12-bit resolution and can record up to 43,000 measurements or events. The four external channels accept a variety of sensors, including temperature and split-core AC current sensors as well as 4-20 mA and voltage input cables (sold separately). The logger uses a direct USB interface for launching and data readout by a computer.

An Onset software starter kit is required for logger operation. Visit [www.onsetcomp.com](http://www.onsetcomp.com) for compatible software.

**Specifications**

Measurement range	External input channels (see sensor manual): 0 to 2.5 DC Volts
Accuracy (logger only)	$\pm 2 \text{ mV} \pm 2.5\%$ of absolute reading $\pm 2 \text{ mV} \pm 1\%$ of reading for logger-powered sensors
Resolution	0.6 mV
Time accuracy	$\pm 1$ minute per month at 25°C (77°F), see Plot A
Operating range	-20 to 70°C (-4° to 158°F)
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 (see “Battery” details on next page)
Memory	64K bytes (43,000 12-bit measurements)
Weight	46 g (1.6 oz)
Dimensions	58 x 74 x 22 mm (2.3 x 2.9 x 0.9 inches)
	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).



Plot A

**4-20mA input cable**

This cable (part number CABLE-4-20mA) measures current from 0 to 20.1 mA. Do not expose to current above 20 mA or to negative current. Do not cut off the end of the gray cable where it connects to the blue and yellow wires, as it contains the precision resistor required for current measurement.

**Voltage input cable**

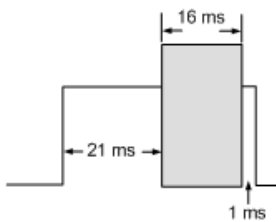
The logger's external inputs can accept the voltage input cable (Onset part number CABLE-2.5-STEREO), which allows a voltage to be recorded. The input line must not be exposed to signals below 0 V or above 2.5 V.

<b>Voltage Input Cable Connections</b>	
Wire	Connection
Red	Switched 2.5 V output
White	Voltage input
Black	Ground

**Switched 2.5 V output**

The external input channels have a switched 2.5 V output. This signal can be used to power a sensor directly, or it can be used to trigger an external circuit. External sensors should draw no more than 4 mA total when powered.

The switched 2.5 V output turns on about 21 ms before the external channels are measured and stays powered for 1 ms after the external channels are measured, as shown in the diagram below. The striped area shows the 16 ms period during which the logger samples the input signals.



When using multiple voltage and/or current inputs, the (-) from your current source(s) and the 0 V line of your voltage source(s) are tied together at the logger. If these lines are at different voltage potentials, this may cause inaccurate readings or even damage your logger. Keep in mind that these lines may also be tied to earth ground through your PC interface cable when connected to your computer. Special precautions may be necessary if any of your voltage or current source common lines are not tied to earth ground. Input isolators may be needed in industrial environments to prevent errors caused by ground loops.

**Other external sensors**

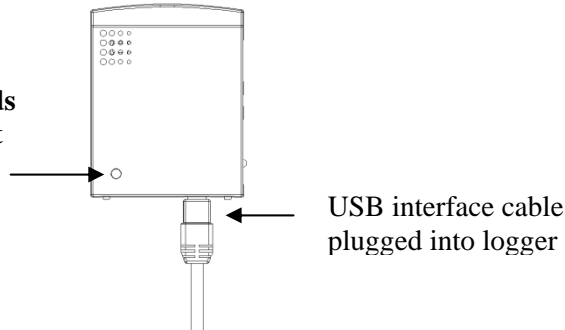
Onset has a range of external temperature sensors, AC current sensors, and cables for incorporating other sensors that are compatible with the U12 4-External Channel Data Logger. Measurement specifications for using Onset temperature and AC current sensors with this logger are provided in the sensor manuals. For compatible sensors, refer to the HOBO catalog, contact Onset Computer Corporation, or contact an Onset Authorized Dealer.

### Connecting the logger

The U-Family 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 bottom of the logger, as shown in the following diagram.

**Important:** Press this button for **3 seconds** when logger is launched with Button Start or press for **1 second** to record an event while logging.



If the logger has never been connected to the computer before, it may take a few seconds for the new hardware to be detected. Use the logger software to launch and read out the logger.

**Important: If you configure the logger to start with a button 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.**

Be sure to plug the external sensors into the side of the logger before logging begins. Also select the correct sensors and activate the external channels in the logger software when configuring the launch.

**Important: If you select an external channel, but do not plug the probe in, false data will be recorded for that channel.**

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.

### 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>.

### Sample and event logging

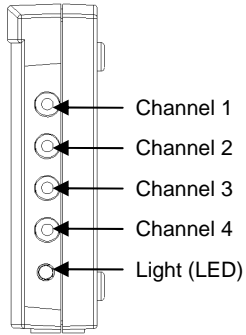
The logger can record two types of data: samples and events. Samples are the sensor measurements recorded at each logging interval (for example, the temperature every minute). Events are independent occurrences triggered by a logger activity. Examples of events recorded asynchronously during deployment include when the logger is connected to the host, when the battery is low, the end of a data file once the logger is stopped, and button pushes.

Press and hold down the button on the front of the logger for at least one second to record an event. Both a button up and down event will be recorded. This is useful if you want to mark the datafile at a particular point. For example, if the logger is located in an incubator, you might press the button each time the door is opened.

The logger stores 64K of data, and can record up to 43,000 samples and events combined.

**Operation**

A light (LED) on the side of the logger confirms logger operation.



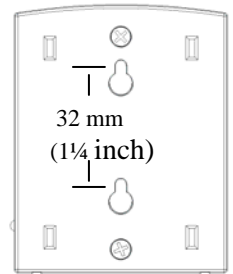
The following table explains when the logger blinks during logger operation:

<b>When:</b>	<b>The light:</b>
The logger is logging ...	Blinks once every one to four seconds (the shorter the logging interval, the faster the light blinks); blinks when logging a sample
The logger is awaiting a start because it was launched in Start At Interval, Delayed Start, or Button Start mode ...	Blinks once every eight seconds until launch begins
The button on the logger is being pushed for a Button Start launch ...	Blinks once every second while pressing the button and then flashes rapidly once you release the button. The light then reverts to a blinking pattern based on the logging interval.

**Mounting**

There are four 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 magnetic surface.
- Use the tie wrap and tie wrap mount to tie the logger to an object.
- Fasten the logger to a surface with the two Phillips-head screws. The back of the logger has two inserts for the screws, 32 mm (1¼ inches) apart.



## 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). A new battery will typically last one year with logging intervals greater than one minute. Deployments in extremely cold or hot temperatures or logging intervals faster than one minute may significantly reduce battery life. Onset recommends that you install a fresh battery before every deployment if temperatures below 0°C (32°F) are expected.

To replace the battery:

1. Disconnect the logger from the computer.
2. Unscrew the logger case.
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 case and re-fasten the screws.

**⚠ 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.

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