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Digit Datasheet

Digit
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The Digit is a battery powered temperature, light, and humidity logging device, which collects data in a remote location, and stores it to internal memory. When finished, the data can be downloaded via the convenient USB connector. Each data point is associated with a time stamp, so you know when it was collected.

Using the provided Otero software, starting, stopping, and downloading from the Digit is simple and easy. Data is summarized in the program view screens, or can be exported to .csv for further analysis. Temperature can be viewed in °C or °F, and real-time data is visible when connected over USB.

The Digit also supports field programmed firmware upgrades, just download the latest firmware file from the firmware page,

and upgrade using the software package provided.

Specifications

General

Memory	260,000 Readings
Logging rate	10s, 30s, 1m, 10m, 30m, 1h, 6h
LED Alarms	2x user-defined thresholds
LED indicators	Green, Red
Battery life	3.3 Years @ 25°C, 1m interval
Battery type	3V CR1632 coin cell, replaceable
Software	Free, Windows only
Communication	USB
Real-time clock	±2 seconds per day @ 25°C
Memory-Wrap	No
Single/Multi-Use	Multi-use
Conformal Coating	Yes
Operating Temperature	-35°C to +85°C (-31°F to +185°F)
Waterproof Enclosure (TL)	Yes, IP68
Vented Enclosure (H)	IP53

Unlike many battery powered loggers in its class, the Digit does not require a special base to download stored data. Simply connect the Digit to an available USB port, and download stored information using the Otero software. The circuit board is protected by a thin film of conformal coating, which makes the Digit resistant to moisture, static discharges, and fingerprint oils. Still, it is recommended to take ESD precautions when handling the circuit board directly.

Note: Foreign objects inside the enclosure present a risk of damaging the board when the base is twisted off because they can catch and bind.

Temperature

Specification	Min	Typ.	Max.	Unit
Temperature range*	-35(-31)		+85(185)	°C(°F)
Temperature resolution		0.067(0.12)		°C(°F)

Temperature accuracy at +25°C		0.1(0.2)	0.3(0.5)	°C(°F)
Temperature accuracy from 0°C to +65°C			0.5(0.9)	°C(°F)
Temperature accuracy from -35°C to +85°C			1(1.8)	°C(°F)

*Temperature readings are not restricted to the operating range, however continuous operation beyond the limits specified is not guaranteed.

The Digit uses a Texas Instruments TMP112 to record temperature. The TMP112 chip returns calibrated 12-bit readings which are saved to memory within the Digit-TL/TLH. For more information about this temperature sensor, see the TMP112 datasheet.

Light

Specification	Min	Typ.	Max.	Unit
Light range	10		12,000	

Light readings are determined based on reverse leakage through the green LED, and thus have the strongest response to the green component of light. The readings are returned in a Lux range, but should not be considered accurate Lux values, and the values can vary greatly from device to device.

Although not intended for calibrated light measurements, the light readings are useful to monitor changes in light levels. The most common application is simply monitoring whether some light source is on or off.

Because the light readings can vary greatly from device to device, the recommended usage is to take a particular device, see what it reports at different light levels in an environment of interest, and then use that information to interpret future readings.

Humidity (TLH only)

Specification	Min	Typ.	Max.	Unit
Humidity range	5		95	%RH
Humidity resolution		0.75		%RH
Humidity accuracy* 15 to 60%RH & 25°C		±3.5		%RH
Humidity accuracy* 10 to 90%RH & 25°C		±5		%RH
Response time τ (63%)		30		sec
Response time τ (63%) (inside enclosure)		240		sec

*Humidity accuracy can be improved to ±2% with high accuracy calibration chamber. See Offset and Slope discussion below.

The Digit-TLH uses a Honeywell HCH-1000 to record humidity. The 10-bit ADC and current source work together on the Digit to record the capacitance value of the HCH-1000, which is then adjusted in software to produce a calibrated humidity reading. Due to the limited resolution of the on-board ADC, the humidity resolution is limited to about 0.75% humidity per step.

The humidity version of the Digit is called the Digit-TLH, meaning that it is capable of logging all 3 types of data: Temperature, Light, and Humidity. Touching the wires of the HCH-1000 sensor during a reading will cause the reading to be wrong, but this is only an issue when holding the unit in your fingers to plug it in.

The -TLH version of the Digit is factory calibrated to meet the above specifications. If higher accuracy is necessary, it may be possible to improve calibration by adjusting the parameters listed below. There is typically no need to adjust the factory offset, or slope, they are provided for advanced users to improve accuracy.

There are two main parameters to adjust the calibration of Digit humidity. Use the calibrate humidity section in software.

1. **Offset Adjustment:** The offset adjustment can be used to change the factory calibration, or even improve on factory

calibration for a specific %RH environment. Saturated (or unsaturated) salt solutions, and certain other chemicals, can be used to generate an environment of a particular relative humidity in an enclosed space. Create one of these enclosed spaces, and place the Digit-TLH inside until the chamber reaches equilibrium. It can take many hours for equilibrium to occur, depending on the amount of air, and the effectiveness of the salt solution. Download the data set from the Digit and compare the %RH result to the %RH of the chamber. Then simply adjust the offset using the CalOffsetH calculator in software.

2. **Slope Adjustment:** The factory slope can also be changed to increase accuracy. To effectively alter the slope, 2 different fixed humidity chambers must be available. After analyzing the raw data, it is possible to determine what the %RH per capacitance slope should be. Use the Hslope calculator in software to adjust the slope.

To verify correct calibration, simply download the data after new settings are stored, and software will use the new calibration adjustments. The calibration images below illustrate humidity data collected by nine different Digit-TLH devices in two fixed-humidity reference chambers. The single-point calibration shows the factory calibration quality.
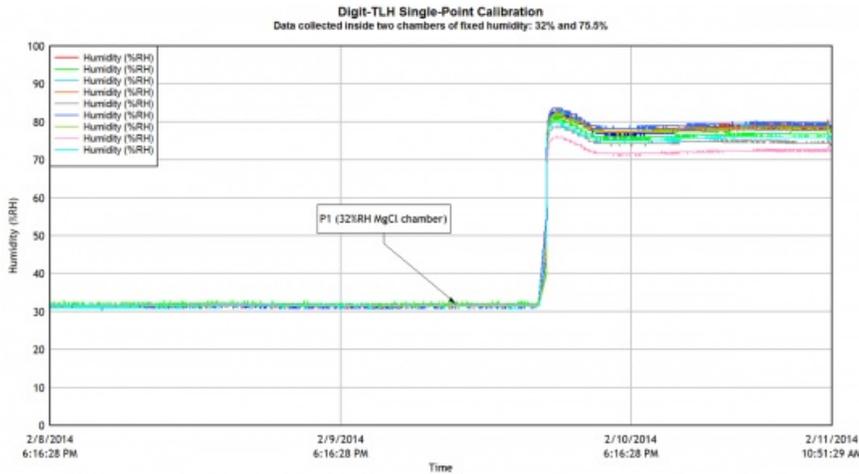
The factory calibration is a single-point calibration adjustment, but higher accuracy can be achieved with a two-point calibration as demonstrated in the image below.
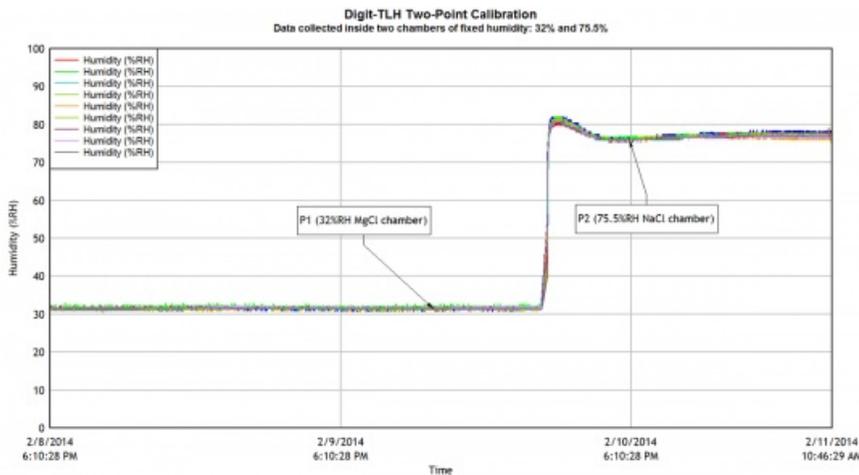
Dew Point (TLH only)

The dew-point temperature can be calculated from the relative humidity and temperature. The dew-point temperature is the temperature to which the air must be cooled to reach saturation. Basically when the temperature cools to the dew point, fog or dew can occur, because ambient water vapor will condense. A well-known approximation used to calculate the dew point, given just the air temperature, T and relative humidity (in percent), RH, is the Magnus formula:

Dew Point = (243.12*[ln(RH/100)+((17.62*T) / (243.12+T))]) / (17.62 - [ln(RH/100)+((17.62*T) / (243.12+T))])

$$DewPoint = \frac{243.12 * \left[ln\left(\frac{RH}{100}\right) + \frac{17.62(T)}{243.12+(T)}\right]}{17.62 - \left[ln\left(\frac{RH}{100}\right) + \frac{17.62(T)}{243.12+(T)}\right]}$$
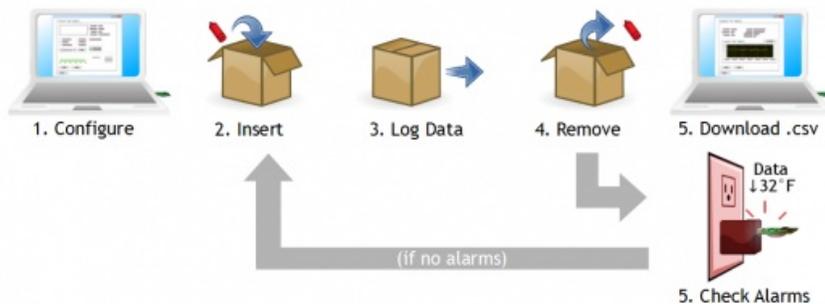
RH = Relative Humidity (in percent)

T = Temperature (in Celsius)

Spreadsheet program users can copy and paste the above formula into their spreadsheet software to generate a column for dew point (substituting RH and T with corresponding cell contents). Alternatively, use an online calculator. There are some other more complex ways to calculate dew point, see the Wikipedia Dew Point topic if interested.

Operating Sequence

The example below demonstrates a possible operating sequence for the Digit.

1. Configure   2. Insert   3. Log Data   4. Remove   5. Download .csv

(if no alarms)

Data
↓ 32°F

5. Check Alarms

1. Configure the Digit on the computer: setting up the log interval, log items, alarm thresholds, etc.
2. Place the Digit into the measurement environment.
3. Data is logged for some period of time.
4. Remove the Digit from the measurement environment.
5. Either check the alarms using a 5V USB adapter, or connect it to a computer and view the whole data set.

Our customers have logged data in their pool, attic, garden, luggage, packages, the ocean, and many more. Most people will download the data once logging is finished, but if the data history needs to be analyzed quickly, the alarm thresholds can save a lot of time. Simply configure the alarms to trigger above/below some threshold condition, and the Digit will illuminate its Red LED (on USB connection) if the threshold has been exceeded.

LED Indicators

The moment the Digit is connected to a USB port, it will signal if a user threshold alarm has been triggered. If any alarms have been triggered the red LED will illuminate for 5 seconds. If the alarms are configured, but no alarms have been triggered, the Green LED will illuminate for 5 seconds. If user-alarms are disabled (set to None in software), the LEDs will not turn on. Additionally, while connected to USB, and for 6 log events after disconnect from USB, each read of temperature will cause the green LED to blink once.*

LEDs OFF: Alarm(s) are disabled.*

Green LED: Alarm(s) configured, but not yet triggered.

Red LED: Alarm(s) triggered.

Green and Red LEDs Blink: Two rapid blinks of both LEDs indicates that the device has recovered from a system error, such as a power failure from changing the battery.

There are no buttons on the device (to save on space, and make the enclosure more simplistic) so instead the LEDs are activated with USB power.

*LED behavior changed slightly starting with firmware v1.21, see <u>firmware revision history</u> for details.

Logging Information

Battery life

Logging at a rate faster than one reading per minute doesn't decrease battery life dramatically, but it does have a small impact. Take note of the table below if you are using the Digit in hot temperatures.

Log (1m) \ Temperature	-35°C	23°C	85°C
Temperature	3.4µA	3.9µA	11.4µA
Temperature, Light	3.8µA	4.4µA	11.8µA
Temp, Light, Humidity	4.2µA	4.8µA*	12.5µA

*3 year lifespan calculated: 140mAh / 0.0048mA = 31818hr = **3.33yr**

Notice that at cold temperatures the power consumption is actually lower than at room temp, but some batteries have reduced overall capacity at low temperatures, which can offset the reduction in power usage. High temperatures have the most dramatic impact on battery life, as the processor and peripherals simply consume more power when hot.

Memory

Memory will not run out for at least 15 days, at a log interval of 10 seconds, while logging temperature, and light. The memory lasts much longer if you select fewer log items, and change the logging to happen less frequently. For example, if you log temperature and light once per minute, the memory will last for 90 days.

*Ex:* 260,000(readings) / 2(log items) / 1(per minute) / 60(minutes) / 24(hours) = 90.277 days of memory

Reference the table below to find how long it will take to use up memory space.

	10s	30s	1m	10m	30m	1h	6h
Temperature	30d	90d	181d	4.9yr	14.8yr	29.7yr	178yr
Temperature, Light	15d	45d	90d	2.6yr	7.4yr	14.8yr	89yr
Temp, Light, Humidity	10d	30d	60d	1.6yr	4.9yr	9.9yr	59yr

When the Digit runs out of space to store new readings, it will not wrap-around and erase older data, it will simply not store new information. When the Digit reaches 262,144 stored readings, the very last data point is repeatedly overwritten.

Alarm conditions

Threshold alarms are useful for applications where the data set is not important, as long as a specific threshold is not exceeded. There is no button on the Digit to check if an alarm occurred, so alarms can be checked by plugging it into a 5V adapter, or 5V USB battery as shown in the images below. Adapters are in-expensive, and can be purchased through a number of retailers. Shown below is a simple <u>5V adapter</u> and a <u>11200mAh External USB Battery</u> Pack, this <u>smaller one</u> would also work.
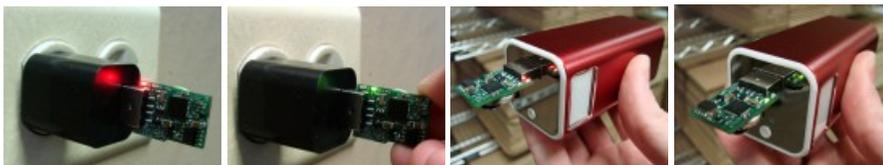
The concept is that the "checking station" will have a 5V USB power supply (battery or adapter). Simply plug the Digit in for a brief moment to check LEDs, and then place it back into the measurement environment. Also, only a single 5V USB supply is required to check as many Digits as desired.

A key in understanding threshold alarms is to realize that the act of checking an alarm would trigger the alarm, if it the alarm always occurred on the first out-of-threshold reading. Alarm arming must also be considered: what if it takes some time before the Digit reaches equilibrium with the measurement environment? The Digit has three ways to customize arming and triggering behavior, which allows for flexible alarm control.

1. **Arm after time delay.** Say it takes ~30 minutes to reach equilibrium with the measurement environment, and after this amount of time, you want to know if a specific threshold in temperature is exceeded. Configure the alarm arming condition for a pure time delay of 30 intervals, at a 1 minute log interval. Once configured, the alarm will not arm until 30 minutes have elapsed, and thus the alarm cannot be triggered until at least 31 minutes have elapsed.

2. **Arm according to thresholds.** If the amount of time to reach equilibrium is unknown, it is possible to delay arming until the Digit reaches a specific threshold condition. Once below/above the defined threshold(s), it will become armed, and thereafter the alarm will trigger if the threshold is exceeded. Threshold arming is particularly useful for refrigeration applications. Accommodate environment noise by setting the arming delay to a few intervals.

3. **Trigger delay.** Just like a security system, the alarm cannot be triggered until it is armed. But then what if you want some time to check the LEDs, without concern for triggering the alarm? Also, what about environment noise? Will a single stray data point cause the alarms to trigger? Set an appropriate trigger delay to resolve these issues. A trigger delay of 1 will trigger the alarm on the first alarm-causing data point. A trigger delay of 5 means that 5 consecutive alarm-causing data points must occur before the alarm is triggered. Use the trigger delay to account for environment noise, and give yourself time to check the LEDs, and return the Digit to the logging environment.

Dimensions

Enclosure: 60mm x 21mm (2.362" x 0.826")

Circuit board: 40mm x 17mm x 9mm (1.57" x 0.67" x 0.35")
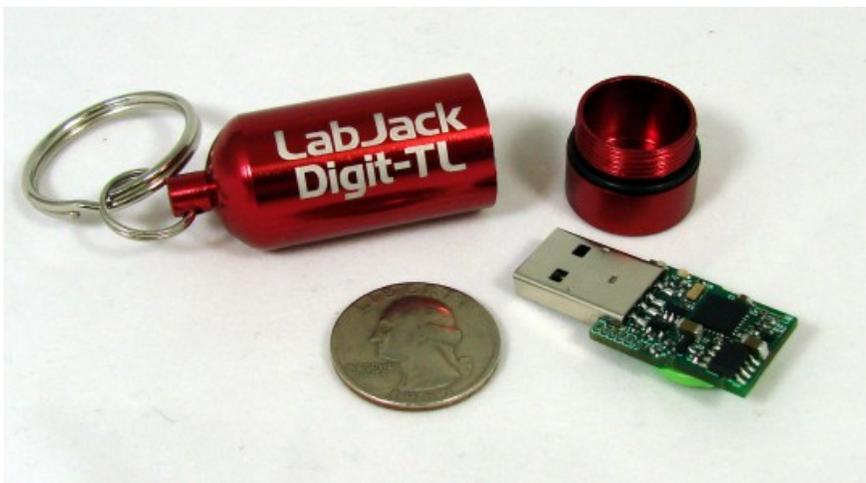
You can see that the circuit board is close to the size of a USD Quarter. Slip it into a jacket pocket, or toss it in the glove box to monitor temperature on the go. The rubber o-ring provides a waterproof seal. Included with the aluminum enclosure are two extra o-rings that can be used as backup or spare seals. Remove the extra O-rings from the enclosure before use.

6 Month Outdoor Reliability Test

Back in January when we first started selling Digit devices, someone decided to stow one outside partially under a rock to see how it'd hold up. Well after about 7 months, the results were collected, and you can see them below. The rock covered about half of it, so the discoloration on the enclosure is from the sun on the exposed half.

Data

Temperature data for Colorado from January to late July.
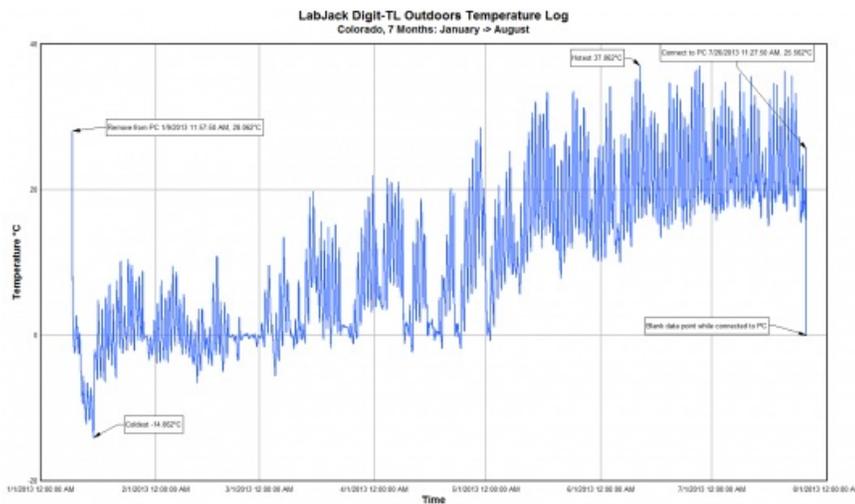
Data was collected at a 10 minute interval, and only temperature was being logged. Each day is a small spike, and then within each day (can't be seen at this zoom level), it is possible to see when the sun passed from direct contact with the Digit, to only hitting the rock above (shaded).

As the season changes from winter to summer, the average temperature increases, nothing too surprising, but it's always good to verify that the hardware is reliable, even in outdoor conditions. Read more on the related blog post.

Appendix A - Hardware Versions

There are two different hardware versions for the Digit-TL/TLH. The primary difference is that the current version has an easily replaceable CR1632 battery, and the old version has a solder mount battery which required a soldering tool for replacement. Hardware version 1.11 is no longer in production, as v1.20 is a fully compatible improvement. They are both compatible with Otero(software), and should be considered interchangeable.

Hardware version 1.20 on the left, and v1.11 on the right, the table below describes the notable differences.

	Hardware v1.20	Hardware v1.11
Battery style	Replaceable CR1632	Solder mount BR1632
Battery life	140mAh (3.3yr)	120mAh (3.0yr)
Operating temp (T, L)	-35 to 85°C	-35 to 85°C
Operating temp (H)	-35 to 85°C	10 to 85°C
Humidity slope stability	±0.01%RH/°C	±0.04%RH/°C
Default enclosure	Clear plastic*	Aluminum
Al Enclosure Orientation**	USB opposite to keyring	Either orientation OK

* The clear plastic enclosure includes both a vented and watertight base option. Unlike the aluminum enclosure, the clear plastic enclosure allows the device to collect light readings. The rugged aluminum enclosure can be purchased as an add-on item.

** Both hardware versions fit inside the aluminum and clear plastic enclosure variants, but the battery holder makes HW 1.2 a bit too large to fit both directions in the aluminum case. The aluminum enclosure is watertight and airtight, so response time of the Digit temperature readings is not impacted by orientation within the case.

Some comments about old hardware (v1.11)...

The battery in HWv1.11 was a 120mAh Panasonic BR-1632A, and can be found on DigiKey, part number P022. With a soldering tool it is possible to both replace the battery, or install a different battery.

Note: If extreme harsh temperatures are expected to last for a long time, a custom battery can be installed to handle the conditions. Acceptable battery voltage range is 3.0V to 3.6V. Our top pick is a Tadiran TL-5101/P, which will work continuously for more than 3 years at even the most harsh of conditions (-55C to +85C). The Digit shown below is stored inside our office refrigerator.

On old Digit-TLH devices, the humidity accuracy below 10°C was subject to battery voltage. Often times the battery voltage would drop at cold temperatures, and the humidity readings were low if the battery voltage was less than 2.73V. Humidity readings on new hardware (v1.2+) operate normally over the full temperature and battery voltage range.

When the Digit is connected to a powered USB port, battery usage is suspended. Therefore, it is possible to prolong battery life by connecting the Digit to a 5V USB adapter, or USB hub when it's not being used. Another good method to prolong battery life is to disable all log items when the Digit is not in-use. When nothing is being logged, it stays in a low-power sleeping state.

Appendix B - Low-Level Docs

Use the instantaneous readings to grab a reading from each of the sensors while the Digit is connected via USB. The conversion equations used to convert each of these from a raw representation are described below. Alternatively, download the C++, or LabVIEW example code attached at the bottom of this page.

Converting raw temperature data

Temperature on the Digit is stored as an unsigned 12 bit value, this value needs to be converted into a signed number, and multiplied by a conversion factor before it will look like degrees C. The raw value is a 16-bit number, the 4 lowermost bits being system flags.

Raw Temperature 16-bits:
Xxxx xxxx xxxx rrrr

r's are reserved for flags.
x's are the temperature information.
X is the most significant temperature bit, discussed in step 2.

To convert raw temperature into °C:

1. Remove/Process the lowermost 4 bits (if non-zero). See flag descriptions below.
2. **Decide if positive or negative** by looking at the most significant bit.
   If the MSB is 1, temperature is negative,
   If the MSB is 0, temperature is positive.
3. (For negative temperature, MSB == 1)
   Subtract 1 from the value.
   Invert every bit of the value (change 0s to 1s, and 1s to 0s).
   Perform a logical right hand shift of the value by 4 bits.
   Multiply the value by -1, to get the sign right.
4. (For positive temperature, MSB == 0)
   Perform a logical right hand shift of the value by 4 bits.
5. Multiply the value from step 3 or 4 by the conversion factor: (0.0625 °C/count)

The TMP112 datasheet also explains this process. See page 8: http://www.ti.com/lit/ds/sbos473b/sbos473b.pdf

Invalid Measurement = 32768
If the battery is dead, the TMP112 has failed, or a communication line between the temperature sensor and the microprocessor is damaged. the Digit will return a value of 32768. A value of 32768 converts into -128C, but normal operation will never return -128C, so it's a unique indication of an invalid reading.

Flags in the temperature

bit0 (0x01) = Warning Detected
bit1 (0x02) = Power Failure Detected
bit2 (0x04) = Reset Detected
bit3 (0x08) = 'On USB' flag, to indicate processor heat influence

Converting raw light data

Raw light readings are saved as a number of timer counts in memory, ranging from 18-65535.

Raw Light 16-bits:
xxxx xxxx xxxx xxxx

In software the calibrated light value is generated through interpolation along a 3D surface (with some simplification). The temperature (to nearest 1°C) at the time of the light reading is used as an index, then the Digit's raw light value (timer counts) points to a region in-between Lux values, so interpolation is performed between the nearest 2 points in Lux.

Due to the simplification of 1°C resolution, the interpolation is merely done on a 2D surface, the whole 3D surface does not need to be analyzed in software.

To convert raw light into Lux:

If converting raw light readings sounds overwhelming, don't worry too much-just look at the C++ example code attached on this page. The 3D calibration surface is simply a header file[LightCalibration.h] with 3 static arrays. The light conversion code uses temperature as the first lookup index in the header file, which reduces the three large(1792 datapoint) arrays down into two 14 datapoint arrays that represent possible values of *calibrated lux* and *raw light counts* at the given temperature.

Next, the raw light reading (DGT_LIGHT_RAW) is compared to each of the raw readings in the 14 datapoint array that contains raw values. Simple linear interpolation between the two nearest raw values will yield a fractional index of where the raw reading resides relative to the available calibration points. Finally, this fractional index is applied to interpolate between the nearest Lux values which yields the light reading in Lux.

Invalid Measurement = 1
If the Digit is plugged/un-plugged from USB during a light reading in-progress, the reading is interrupted, and a 1 is saved instead of the timer value. A value of 1 converts to roughly 12000 Lux, but normal operation will never return a value of 1, so it's a unique indication of an invalid reading.

Converting raw humidity data

Humidity readings are performed by an HCH-1000, which is a capacitive humidity sensor. A constant current source and a 10-bit ADC on the Digit-TLH work together to read the capacitance value, which is the raw humidity reading.

Raw Humidity 16-bits:
rrrr **xxxx xxxx xxxx**

x - measurement of raw capacitance (humidity)
r - reserved.

Humidity variables

Name	Start Address	Type	Access	Default
DGT_HUMIDITY_RAW	22001	UINT16	R	
DGT_HUMIDITY_CAL_SLOPE	22236	FLOAT32	R/W	
DGT_HUMIDITY_CAL_OFFSET	22232	UINT16	R/W	
DGT_HUMIDITY_CAL_T_SLOPE	22238	FLOAT32	R/W	

DGT_HUMIDITY_RAW
Craw. Get a new humidity reading from HCH-1000. Units are in 100s fF of capacitance.

DGT_HUMIDITY_CAL_SLOPE

The slope of humidity used in the conversion of raw humidity. Units in %Rh per 100s fF.

DGT_HUMIDITY_CAL_OFFSET

A single point offset used in the conversion of raw humidity. Units in 100s fF

DGT_HUMIDITY_CAL_T_SLOPE

The temperature dependent factor used in the conversion of raw humidity. Units in 100s fF per degC

Master Equation

%RH = (DGT_HUMIDITY_RAW - DGT_HUMIDITY_CAL_OFFSET + ((DGT_HUMIDITY_CAL_T_SLOPE)(DGT_TEMPERATURE_LATEST_RAW) - (DGT_HUMIDITY_CAL_T_SLOPE)(-38))(DGT_HUMIDITY_CAL_SLOPE)

To convert raw humidity into %RH:

1. Read the current temperature DGT_TEMPERATURE_LATEST_RAW*.
2. Read the values of the CAL registers listed above.
3. Read DGT_HUMIDITY_RAW.
4. Use the "Master Equation" to calculate the %RH humidity.

*In the case of downloaded data, use whatever temperature reading happened at the same time as the humidity reading (adjacent in memory).

Invalid Measurement = 1
If the Digit does not have a humidity sensor, or the humidity sensor is broken, the raw humidity reading will be a value of 1. Normal operation will never return a value of 1, so it's a unique indication of an invalid reading.

There is also a command (DGT_HUMIDITY_CAL_I_SOURCE) to initiate calibration of the constant current source, which is used during factory calibration, but it is not recommended to write to this register, unless you plan to re-calibrate the other parameters.

Everything Else

Digit Instantaneous Readings

Name	Start Address	Type	Access	Default
DGT_TEMPERATURE_LATEST_RAW	22000	UINT16	R	
DGT_HUMIDITY_RAW	22001	UINT16	R	
DGT_LIGHT_RAW	22002	UINT16	R	

DGT_TEMPERATURE_LATEST_RAW

Get the latest temperature conversion, and begin a new conversion. Starting with FW1.21, temperature conversion is instantaneous. Units are described in TMP112 datasheet.

DGT_HUMIDITY_RAW

Craw. Get a new humidity reading from HCH-1000. Units are in 100s fF of capacitance.

DGT_LIGHT_RAW

Counts. Get a new light reading from LED. Units are in counts before reverse leakage complete.

Use the _DATASET, and START_TIME parameters to interpret downloaded data. Logged data must always be saved in one of the following sequences: T, TL, TH, THL, so downloading code simply reads the logged items, and interprets data space in segments of unsigned 16s. There are no timestamps saved with the data. Instead, use the DGT_LOG_START_TIME and the DGT_LOG_INTERVAL_INDEX_DATASET to determine when data was collected.

Download Data

Name	Start Address	Type	Access	Default
DGT_LOG_ITEMS_DATASET	22019	UINT16	R	
DGT_LOG_INTERVAL_INDEX_DATASET	22039	UINT16	R	
DGT_LOG_START_TIME	22042	UINT16	R	
DGT_STORED_BYTES	22210	UINT32	R	

Name	Start Address	Type	Access	Default
DGT_pFLASH_READ	22810	UINT32	R/W	
DGT_FLASH_READ	22812	UINT16	R	

DGT_LOG_ITEMS_DATASET

Read what is logged in the dataset. Value is a bitmask. Bit0: 1 = Temperature logged, Bit1: 1 = Light logged, Bit2: 1 = Humidity logged. In memory: T, TL, TH, THL.

DGT_LOG_INTERVAL_INDEX_DATASET

Read time interval between log events in the dataset. Index 0=10s, 1=30s, 2=1m, 3=10m, 4=30m, 5=1h, 6=6h

DGT_LOG_START_TIME

The start time of the logging session: 22042 Year=0 to 99, 22043 Month=1 to 12, 22044 Day=1 to 31, 22045 Weekday=1 to 7, 22046 Hour=0 to 23, 22047 Minutes=0 to 59, 22048 Second=0 to 59

DGT_STORED_BYTES

Number of bytes of data stored on flash.

DGT_pFLASH_READ

The read pointer for flash. Auto-incremented, simply initialize with a start address, then use 22812+

DGT_FLASH_READ

Read data from this address and subsequent addresses after pointer is initialized. Used to download data from the Digit.

Change the configuration of the Digit with the following registers. Changes are applied when data is erased with DGT_FLASH_bkERASE. It is recommended that the Digit RTC is synchronized with the host computer with DGT_RTCC_TIME immediately prior to applying changes to configuration (calling DGT_FLASH_bkERASE).

Digit Configuration

Name	Start Address	Type	Access	Default
DGT_CHANGE_LOG_ITEMS	22018	UINT16	R/W	
DGT_CHANGE_LOG_INTERVAL_INDEX	22038	UINT16	R/W	
DGT_RTCC_TIME	22242	UINT16	R/W	
DGT_FLASH_bkERASE	22822	UINT16	W	
DGT_FLASH_WIP	22804	UINT16	R	

DGT_CHANGE_LOG_ITEMS

Set the items to log. Value is a bitmask. Bit0: 1 = Log Temperature, Bit1: 1 = Log Light, Bit2: 1 = Log Humidity. All other bits reserved. Change implemented on next erase of dataset.

DGT_CHANGE_LOG_INTERVAL_INDEX

Set the time interval between log events. Index 0=10s, 1=30s, 2=1m, 3=10m, 4=30m, 5=1h, 6=6h Change implemented on next erase of dataset.

DGT_RTCC_TIME

The current time of the real-time-clock on the Digit. Synchronized with the computer within software. 22242 Year=0 to 99, 22243 Month=1 to 12, 22244 Day=1 to 31, 22245 Weekday=1 to 7, 22246 Hour=0 to 23, 22247 Minutes=0 to 59, 22248 Second=0 to 59

DGT_FLASH_bkERASE

Erase all data on the flash. KEY=Erase, Other=No effect, KEY=37157 Takes 5 seconds to complete, so poll the WIP status flag until =0. After erase, logging will begin immediately.

DGT_FLASH_WIP

A status flag for the flash(data storage chip) on the Digit. 1=Write in-progress, 0=Idle

Alarm thresholds, changing factory settings, and upgrading firmware are not covered in this doc. If you need information about these topics please contact support@labjack.com for more details.

File Attachment:

Digit C++ example code

3D light calibration surface

Digit LabVIEW example code