LabJack

Published on *LabJack* (https://labjack.com)

Home > 1 Year in the pond - Digit-TL reliability test

1 Year in the pond - Digit-TL reliability test

Submitted by LabJack Support on Mon, 01/13/2014 - 17:11

When we first started selling Digit-TL devices, we decided to stow one outside under a rock, and another in the pond to see how they'd hold up. After 6 months we downloaded the results to verify operation, and everything looked good, so we threw them back out. Now, after a full year, they're still going strong. See the data and photos below.
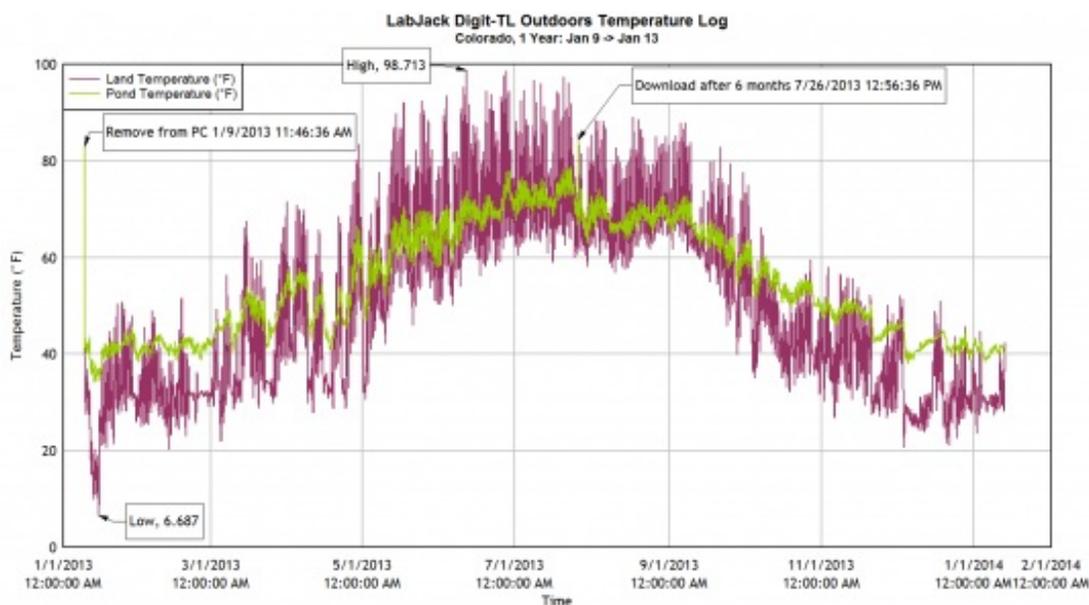
Each day is a small spike, and the yearly trend is shown by the overall shape of the graph. The two curves on the graph demonstrate how the water acts as a thermal buffer by regulating fluctuations in daily temperature. If you look carefully, you can tell when there is snow covering the Digit-TL on land, because the temperature fluctuation is minimal (like the Digit-TL in the water).

The Digit-TLs were configured to log temperature at a 10 minute interval, and each was equipped with a rugged aluminum enclosure.

Land

This one logged continuously except for one afternoon during the summer when someone found it and thought it was a thumb drive. Thankfully they returned it to us and we put it back under its rock.

Carefully hidden under a rock, but mostly exposed to the air.

Move that rock. Some snow remains on the ground from Colorado's last storm.

Bottom center, logging temperature for the last 369 days, and somewhere out in the pond lies its counterpart. Both devices were part of the 1st shipment of units to LabJack (and have some pretty old firmware too). Since then, many firmware improvements have been made.

The case was faded due to exposure to the sun, but nothing too bad. The O-ring had some cracks, but seems to be watertight enough to keep moisture out. This O-ring is probably too cracked for full submersion in water now, which is why we provide extra O-rings with each Digit-TL aluminum enclosure.

Pond

The Digit-TL floats, so we had to tie it to a rock, and since we have an abundance of wire in the office, we used that instead of twine. Also, because the key ring is prone to rust and deterioration, we tied the wire directly to the case. Once it was tied securely, we cast it into the lake, about 15ft out, and 4ft down. Finally, the wire was tied to a reed so it could be found later.

It's apparent why people made treasure maps, can't remember which reed it's on.

Found it.

Towing in the Digit by its wire, which has become noticeably faded by the sun.

There are actually some large catfish in this pond, wonder if they'll eat this thing someday.

Not surprisingly, the Digit and its anchor brought some pond junk with them.

It was slimy and cold, so unscrewing the enclosure was a bit tricky.

The case is totally dry inside, definitely a comforting sign. It's important to fully submerge this case because the O-ring can dry out in the sun and crack - leading to eventual leaks. When pulling these out of the water, make sure your hands are dry before touching the device directly.

Summary

These things work well outdoors. The battery voltage on the 'land' Digit was 2.65V, and the

battery voltage for the 'pond' Digit was 2.74V, which means that large daily temperature fluctuations can reduce overall battery capacity. Nevertheless, we have tested the Digit to be operational down to ~2.2V, so it's possible that these will last for the full 3 years, even outside.

The RTCC were off by a little bit, 587 seconds for the device on land, and 387 seconds for the device in the pond (just about 1s/day), which is pretty good. Only a 6-9 minute error for an entire year of logging is pretty impressive, especially if you consider the temperature fluctuations these things were experiencing.

They were running firmware 0.7403, and the current release is 1.1725, which is more robust and efficient, and fixes a number of interface bugs. Even with the old firmware, the latest version of Otero (v1.40) still opens them and downloads the data without errors. So now that reliability has been more or less verified, they will be updated to the latest firmware, and returned to their posts until next year.

We hope that our customers will find many fun and demanding uses for the Digit series loggers. You can view the data yourself if you download the file attachments at the bottom of this page.

File Attachment:

PondData-2014-01-13.csv
LandData-2014-01-13.csv