

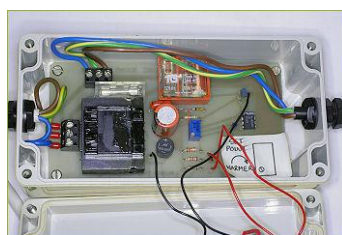
Pond Heater Thermostat

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I had a small fishpond containing a wide range of ornamental goldfish and some cute Shubunkins, and I used a floating mains electric heater to keep a small area clear of ice during the wintertime freeze-over. This allowed noxious gasses from decomposing materials to escape and allowed oxygen in as well. Rather than keep the thing permanently powered on, I hit upon the idea of using thermostatic control and I chose another favourite National Semiconductor chip, the LM3911 for

this. It would provide solid-state control of a heater with no moving parts except a relay.



I ran a number of tests during cold conditions, to measure the output in response to a change of temperature. I simulated deep wintertime using a cool-box full of ice packs, with a digital thermometer showing the temperature drop before the unit switched on. Happily the

weather turned wintry anyway, so late one night found myself doing some final tests when the ambient air temperature had fallen to -7°C or lower (very rare for my region). Gradually I sorted out the calibration and everything fell into place. A cermet trimmer was used to tweak the setpoint.

I wanted to construct a sealed unit that could be kicked around outdoors, so I manually designed a PCB to carry everything including the mains transformer and low profile relay. It was fitted into a robust weatherproof plastic box. Some weatherproof cable glands were used for the cable entries, as I had started to use these for cable entries generally instead of grommets and 'P' clips.

I used smart cylindrical LEDs for power and heating indicators, making them a very tight interference fit through the thick plastic box lid. An alternative idea I thought of might have been to have a clear lid and mount the LEDs on-board. Some rub-down letraset finished off the project nicely.

Generally I adopted this style in my later constructional projects, with a board carrying as much as possible (especially on the mains side – the transformer, fuseholder and relay all being connected through the copper foil), with screw terminals for flying leads. I liked to fit small LEDs using invisible fixings.

I was very happy with the design of the Pond Heater Thermostat. It was a reliable, robust circuit and I used it successfully for quite a few seasons. I found the prototype in the attic in 2013.

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