

## Queries On Anti-Fouling For Boats

I am building the Ultrasonic Anti-Fouling Unit For Boats from the September & November 2010 issues of SILICON CHIP and I have two queries about it. First, it has tended to blow the fuse at start-up on several occasions and I was advised by the staff at Jaycar to fit a 5A slow-blow fuse. Is that OK?

Second, my boat only has one battery and I am concerned about the low-voltage cut-out setting of 11.5V. If the unit discharges my battery down to that point, there is a good chance that it might be so discharged that it will not start the motor. Can I increase the cut-out setting to 12V and how do I do that?

By the way, I do have a solar panel and charger on the boat to keep the battery topped up. (G. E., via email).

● There are two ways to increase the cut-out voltage to 12V. First, simply set trimpot VR1 to provide a voltage of 5.2V at TP1. Alternatively, you could change the resistive divider whereby the microcontroller senses the battery voltage. To do this, connect a 150k $\Omega$  resistor across the 10k $\Omega$  resistor from pin 5 of IC2 to ground. This changes the resistance of the lower voltage divider from 10k $\Omega$  to 9.375k $\Omega$ . The 10k $\Omega$  resistor to be shunted is located to the right of the two 22pF capacitors and just below the 10 $\mu$ F capacitor.

When the battery voltage is 12V,

the divider provides 3.83V to pin 5 and this is the switch-off threshold. However, the microcontroller's program does incorporate hysteresis whereby the battery voltage will need to rise to 12.53V (that's 4V at pin 5) for the anti-fouling circuit to start up again.

Since your boat has a solar panel and charger, we would be inclined to leave the cut-out voltage as originally set, since your battery is only likely to be discharged to 11.5V during a long period where there is little output from the solar panel. This might be a week or more so if you live in sunny climes, it is not likely to be a problem.

On the other hand, if your boat did not have a solar power charger and was on a swing mooring whereby you needed to start the motor every fortnight or so to ensure that the battery was reasonably charged, increasing the cut-out voltage is possibly a good strategy.

Over the years since this project was described we have had times where there has been a spate of readers complaining about the initial fuse blowing. We cannot identify the particular reason for this. The initial surge current is largely due to the low ESR of the specified 2200 $\mu$ F 25V capacitor. The solution suggested by Jaycar is valid: fit a 5A slow-blow fuse.