



Sam Fortescue discovers how clever use of LED lighting can transform a boat inside and out

# LED there be light!

Read almost any new boat review these days and the words 'bright and airy' are likely to feature. Modern cruising boats have more hatches, windows and portholes than they did 10 or 20 years ago, all to great effect when you're down below.

They also employ a range of lighting techniques that weren't even on the horizon when my Sadler 34 was built in the late-80s. Like many boats of a certain age, my boat Summer Song was equipped with a few brass reading lamps, and slightly random scattering of those ubiquitous dome lights that you switch on by twisting the lens.

Back when Sadlers were winning races, incandescent bulbs made lighting on boats a power-hungry luxury. Today's LED technology has changed all that for good. With power consumption of around 100mA – 10-15 per cent of their incandescent equivalents, LED lights are a game-changer. Combine that with the advent of LED tape and the development of 'indirect' lighting, different beam widths and tones, and you can achieve really dramatic effects without draining the batteries.

I worked with Hella Marine to transform my navigation lights, and Swedish boat outfitters Batsystem

to tackle my interior lighting. The results were phenomenal.

## *Designing the system*

My boat's original dome lamps were simple – twist the plastic lens to switch them on or off, one by one. They were designed for the ubiquitous Festoon bulbs – incandescent, of course, and drew a greedy 10W or 20W. Over the course of our cruising, I had swapped the old bulbs for warm LED bulbs on a Festoon fitting to reduce power consumption dramatically. But every LED showed clearly and the lenses refracted the light oddly. There were also five nice spun-brass reading lamps – two fitted to the saloon bulkhead, two to the fo'c's'le bulkhead and one in the stern cabin.

The aim of my redesign was to make the saloon brighter and more homely; to introduce indirect lighting that would flatter its size;

install new lighting in dark areas of the boat, such as the chart table shelving and in the galley; and to offer a night-vision alternative with red light in key areas.

## *Overhead lights*

I used Batsystem's popular Nova light for all the overhead lighting. It comes in a range of finishes and allows flush or surface mounting. Variants include touch-sensitive lenses, red-white toggling, dimmers and normal switches. The Sadler's inner and outer skins give plenty of depth for flush mounting. One Nova variant allows you to switch on a string of several lights just by touching one – great for the saloon area. They are dimmable simply by holding your finger to the lens for longer. The give out 64 lumen, consume just 1W and have a milky lens to disguise the source of the light. Beam width was 50 degrees and they have a reasonable CRI of no less than 80 – good enough for general lighting.

Over the saloon table, I installed a Neptune 30. It uses ultra bright Cree LEDs to produce 240 lumen from just 3.3W consumption, and has a more focused 30-degree beam – again diffused to disguise the LEDs. It is also inclinable to 35 degrees inside a flush-mounted gimbal, so I can direct it onto the saloon table.

The spun brass spotlights on →





the bulkhead were good for reading, but looked strange with a tiny LED circuit board screwed into their bulb socket. For that reason, I decided to replace them with Båsystem's compact Tube D2 lamps, finished in chrome.

These lights can be supplied with or without a USB socket in the base for charging a mobile phone or other device. I chose these for the fo'c's'le cabin. Even with the 1A current draw of the phone, they consume less power than the old 15W bulbs.

In key areas – over the chart table, galley and heads, I specced a red-white Nova light. You need an external switch to control them – initially going on in red mode, but changing to white if the switch is flicked a second time within a short timeframe.

## LED lighting strips

This part of the installation required a little more thought. So far, it had just been a case of swapping old lamps for new and drilling a few new holes in the headlining for the



extra spots. The LED strips, however, needed to be mounted out of sight.

My boat was short of fiddles and overhangs that could conceal the LED tape, but Båsystem sells a ready-routed-out mahogany profile that can be mounted to existing surfaces. It is distributed in 1m lengths, but it would be simple to have a chippie knock one up in custom lengths if you wanted longer joint-free strips. The routed groove fits an LED 'mini sleeve' tape which uses 4.8W per metre.

I mounted these mahogany profiles along the top of the saloon seats, just below the cushion and under the shelving above the V-berth in the focsle.

The strips for the kitchen cupboards and the shelving by my chart table use a slightly more powerful 5W/m LED tape. This comes unprotected by any sleeve and can be stuck nearly anywhere with its self-adhesive backing. The safest bet is to mount it inside a profile again. I stuck these plastic profiles up under the shelf overhangs, out of sight, and put them on a switch – one for the galley and another for the chart table.

The final additions to the system were the LED strip lights in the engine compartment, to make it easier to spot problems and carry out routine servicing. And we also have a removable underwater light – also from Båsystem – that comes with a simple mount that clips onto the bathing ladder. As with any installation, the wire runs were one of the toughest elements. Cabling for the existing lights was straightforward to reuse, so that kept new wiring to a minimum. In the end, with everything switched on, I have installed about 160W of lighting – roughly the same as the original incandescent capacity.

## Protecting the system

LEDs are vulnerable to fluctuations in voltage. "They should not be exposed to voltage over 12.5V," said Båsystem's Leon Schultz. "While charging the batteries, however, the voltage is considerably higher it is also a good idea to run the lighting system through a DC-DC converter which ensures that there is never more than 12.5V in the circuit.



## LEDs for navigation

You simply won't find a new boat for sale with old-fashioned incandescent navigation lights. The reason is clear when you look at the advantages of LEDs.

- service lives of 35,000 hours-plus
- 80-90 per cent lower power consumption
- Completely sealed units
- No maintenance – fit and forget

I turned to Hella Marine for my LED nav lights, not least because they are excellent value and have a wide following for reliability in the commercial marine world. Their range covers sailing and power boats up to superyacht size, and includes deck floods and interior lights.

Hella lights use a slightly different fixing system to my existing Aquasignal lights, which meant re-drilling holes in the mast for the steaming light and deck flood. Otherwise, it was easy enough to adapt the existing stainless steel brackets to accept them.

The lights come completely sealed and pre fitted with 2.5m of wire – it would be nice if there had been the option for more cable to avoid junctions up the mast, but in the event, it was easy enough to connect it to the existing mast wire runs using a slimline waterproof plug and socket.

Nav light visibility

LOA	12m	20m	50m
Masthead	2nm	3nm	5nm
Steaming	2nm	3nm	5nm
Bow/stern	1nm	2nm	2nm
Side	2nm	2nm	2nm

The lights include sophisticated voltage stabilising circuits, so they work on 12V and 24V systems and there is no need to worry about damage from voltage spikes. Voltage drop from long wire runs is no threat, either: even the lights with 5NM visibility only consume 4W – just 0.3A on a 12V system.

Hella also offers both black and white casings and brackets for all its lights, which can be handy.