

The Repackaged Starting System

Serena Steuart

Our very successful starting and timing system was produced originally by Fin Cornell and John Birrell, and was mounted in a carrying box made by Gerard Burke. The only deficiency was that the system weighed 31Kg (including the 16Kg car battery) and wasn't weather proof.

I suggested we should do something about making it more portable and the committee agreed that I should do that. And so it has been done.

The brief was to make a box which would be weather proof and much lighter so one person could carry it and still have energy remaining for the race. Initially we thought 5Kg would be an ideal weight, but finding that the individual components without battery totalled 5.4Kg, clearly 10Kg was a more realistic goal.

Calculations of power requirements showed that our large capacity car battery was overkill (in more ways than one) and that an 8AH 2.9Kg Sports Power jet-ski battery would be adequate; added advantages zero maintenance and spill resistant. Its disadvantage was a cost of \$135 (\$150 with delivery), but that was something the club would have to bear.

The parts of the system that have to be protected from the weather are the electronics while the lights and horn are self-protected and can be in the



figure 1: the starting and timing system in its new case.

open. The electronics are contained in two boxes. The control box (with setting knobs and horn button) is the brains of the system, while the large grey box just houses the relays and drivers for the lights and horn.

So my design features two compartments (or bays), one weather proof for the battery, horn pump and relay box, and the other housing the control box.

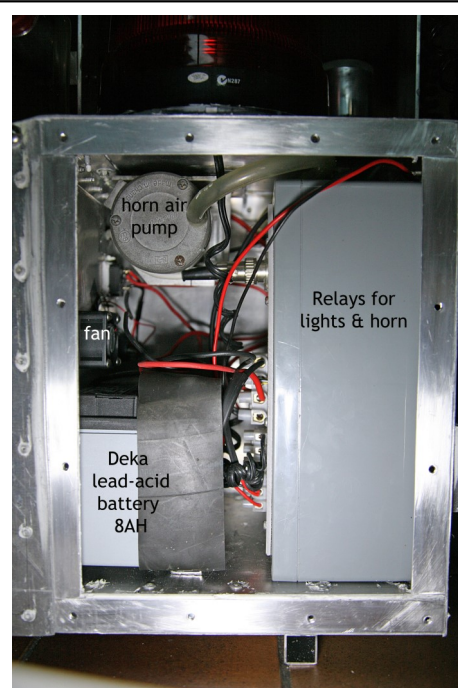


Figure 3: sealed electronics bay

Users must access the control bay so that cannot be made completely proof against rain, but with the door closed it is weather resistant. One light is mounted permanently on top of the case, with the others clipped to its sides for storage and portage (figure 2). Of course in operation you have unclip the two lights and spread them to the left and right of the unit.

The weights of the system components and battery total 8.3Kg, so my initial estimate was for an all-up weight of 11 Kg.

Figure 3 shows the weather-proof bay which, as you can see, is closely packed. The Deka battery is held in place by a Velcro strap and its terminals are protected by a rubber band. During battery charging (especially over-charging) oxygen and hydrogen can be given off, so it isn't wise to completely seal the battery compartment. A 40mm diameter computer cooling fan pumps air through the bay when the charging plug is inserted (figure 4) whether or not the charger is switched on. This fan changes the compartment air about 20 times per minute so, as long as the breather tube (figure 5) is clear and the user access door is open a bit; this will en-

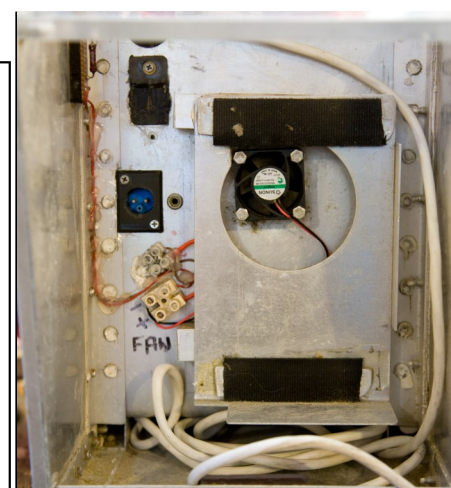


Figure 4: behind the access door

sure safe operations.

The breather tube is designed to ensure free airflow whilst keeping water out. It is also important to keep spiders etc out, so a coarse

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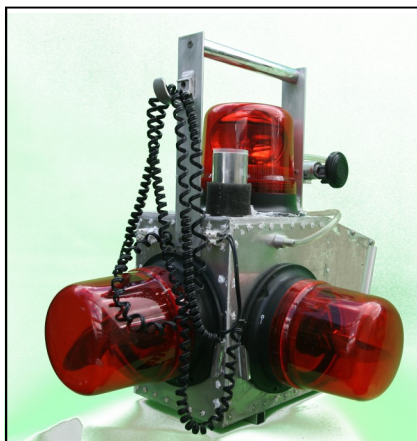


Figure 2: the left and right lights are clipped to the sides of the case for carrying and storage. Note the hook for suspending the lighting cables.

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foam sleeve filter covers the exhaust vents and the transparent top allows a visual check. The spider filter also impedes rain hitting the case splash-

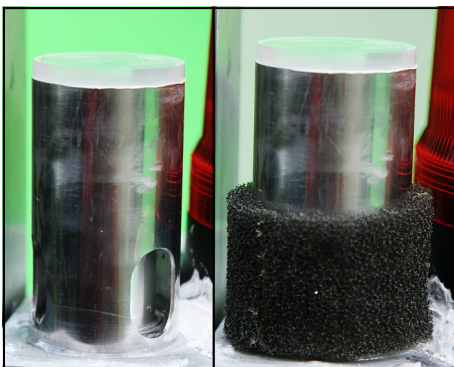


Figure 5: exhaust/breathing snorkel, with (right) spider filter.

ing up into the tube. The other function of the breather is to let the horn pump suck in air.

At the operator end, behind the access door, you'll find the control box (figure 6), and with the door closed (figure 7) you can still operate the horn button and read the display through the window. The door fits quite snugly (unless someone bends things by rough handling) so that should keep out most water. Any leakage will end



Figure 6: the control box in its compartment

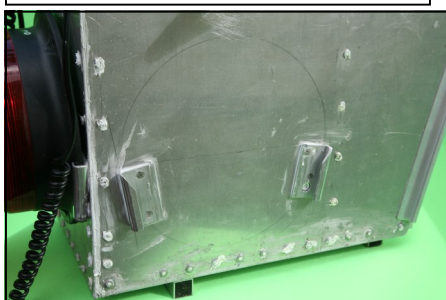


Figure 8: clips that hold removable lights



Figure 7: operator's access door has a magnetic catch (don't turn knob).

up in the sump and can be drained by setting the system down on a small slope.

Figure 8 shows the clips that hold the removable lights, so you take a light off by lifting it a little.

The instructions for the person setting it up are fairly simple.

- 1) Switch off and unplug the charger;
- 2) Remove the charging plug, which has a catch that must be depressed (figure 9) to release the plug (and be aware that it is a firm fit);
- 3) Carry the unit to the seawall and put it down with the horn pointing towards the start line;
- 4) Lift off the light on the rear of the case and place it a metre or so to the right of the unit ;
- 5) Lift off the other light and place that the left of the unit. (the lights should be seen as separate at the distance of the



Figure 9: charging plug

starting line);

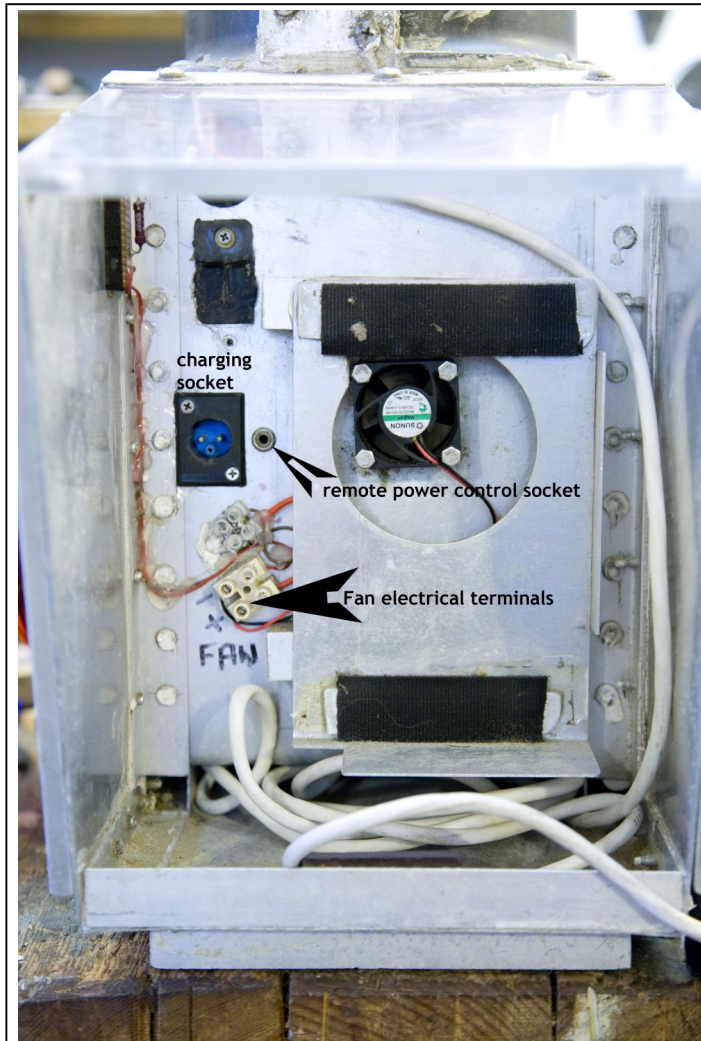
- 6) Set the dials on the control box: delay 0, starts 2 (normally);
- 7) When ready set the switch on the left side of the control box to "on";
- 8) Close the control access door;
- 9) When you finish on the beach (self-timing) you run up and press the external horn button and read the display through the window, and write that on the entry sheet.
- 10) If it is still raining when you pack up (or your hands are soaking wet) you might delay turning off the control box until you have it back in the shed. Just return the lights to their clips and carry the unit back to the club room. Then turn off on the control box, plug in the charger, and plug in and turn that "on";
- 11) If the unit is wet, check inside the control bay for water and if any place the unit so water will drain towards the access door (and out of the drain holes). If necessary towel out wetness. Also remove the spider filter and shake it to remove "solid" water to ensure free flow of air through the system (put it back, of course);
- 12) Treat the unit with care. Any denting or bending of panels will reduce its weather resistance.

When there is a timelord (not sitting in the rain) take the control box out for comfortable operation. When putting it back, coil up the cord and slide that under the electronics bay (as shown in figure 4). Then place the control box on its platform against the alignment edges (right and bottom) so the external button will line up with the horn button.

Did you ask about the weight? Here, as in the aircraft business, there has to be a compromise between durability and weight. This unit isn't strong enough to withstand careless treatment, but ought to be fine in your hands. The total weight is 12.5Kg.

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(Continued from page 2)



Control Bay Connections

Not light, but certainly portable..

Two developments that need to be known.

1. the sea air is hard on cooling fans and they don't last very long;
2. Power to the horn and lights can be controlled by an external switch connected to the remote socket.

To facilitate changing the fan the electrical connector has been brought out of the internal equipment bay and the fan also mounted externally. Four bolts hold the fan and the positive and negative connections are labelled.

A yellow LED has been added that is lit to indicate that the fan is working when the charging plug is connected. If it doesn't light, then the fan has failed and must be replaced immediately.

The external power switch is provided on the control box adjustable supporting platform. Turning off the power

(using that remote switch) does not affect the timer and the purpose is to allow extra starts to be set in case of a class recall. Turning off power to the lights and horn allows any unrequired "starts" to be silenced. Of course the power must be restored once the unused "starts" have passed.

A further added facility is a magnifying glass hinged inside the access door. This is held against the door by a magnet and can be swung down to make reading the display easier for those needing glasses. This is relevant only when races are "self timed".

Serena

NOTE: three modifications have been made:

1. A switch has been added (visible through top window) to allow the horn and lights to be switched off without disabling timing. It plugs into the socket "remote power control socket";
2. The door now is hinged in to parts, sans the window. This enables the door to stay in its raised position but timings can only be read when the door is raised.
3. The system was modified (August 2023) to enable the horn to be detached and placed on the sand in front of the seawall. Instructions for that are in the next document.

A modification to the BHSA starting system : Setting Up the Remote Horn

The original design of the starting system had the horn mounted on the box, with the air compressor driving the horn mounted internally in the system box. Consequently using the system became difficult (especially in wet weather when the control and timing display unit must be mounted within the weather proof box). In fine weather the control unit can be taken out of the box and placed for convenient reading,

The starting system has now been modified to make the horn (with its air compressor) detachable, allowing the main unit to be conveniently located whilst the horn is placed at the base of the seawall.

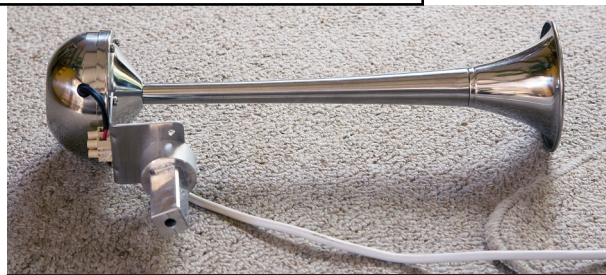
The horn mounting monopod is drilled down into the sand by oscillating it about the vertical axis until the plate is on the sand; orientation to the starting line is engraved on the plate.



Starting System with new detachable horn plus horn mono-



Horn Monopod



Horn



Figure 2: horn mount ready to drill down.



Monopod drilled down to bury resistance plates.



Horn mounted on pod.

NOTE: the horn is orientated to the area immediately upstream of the starting line, assuming downriver starts. When starting under northerly winds, the orientation of the horn needs to be towards south of the starting line.