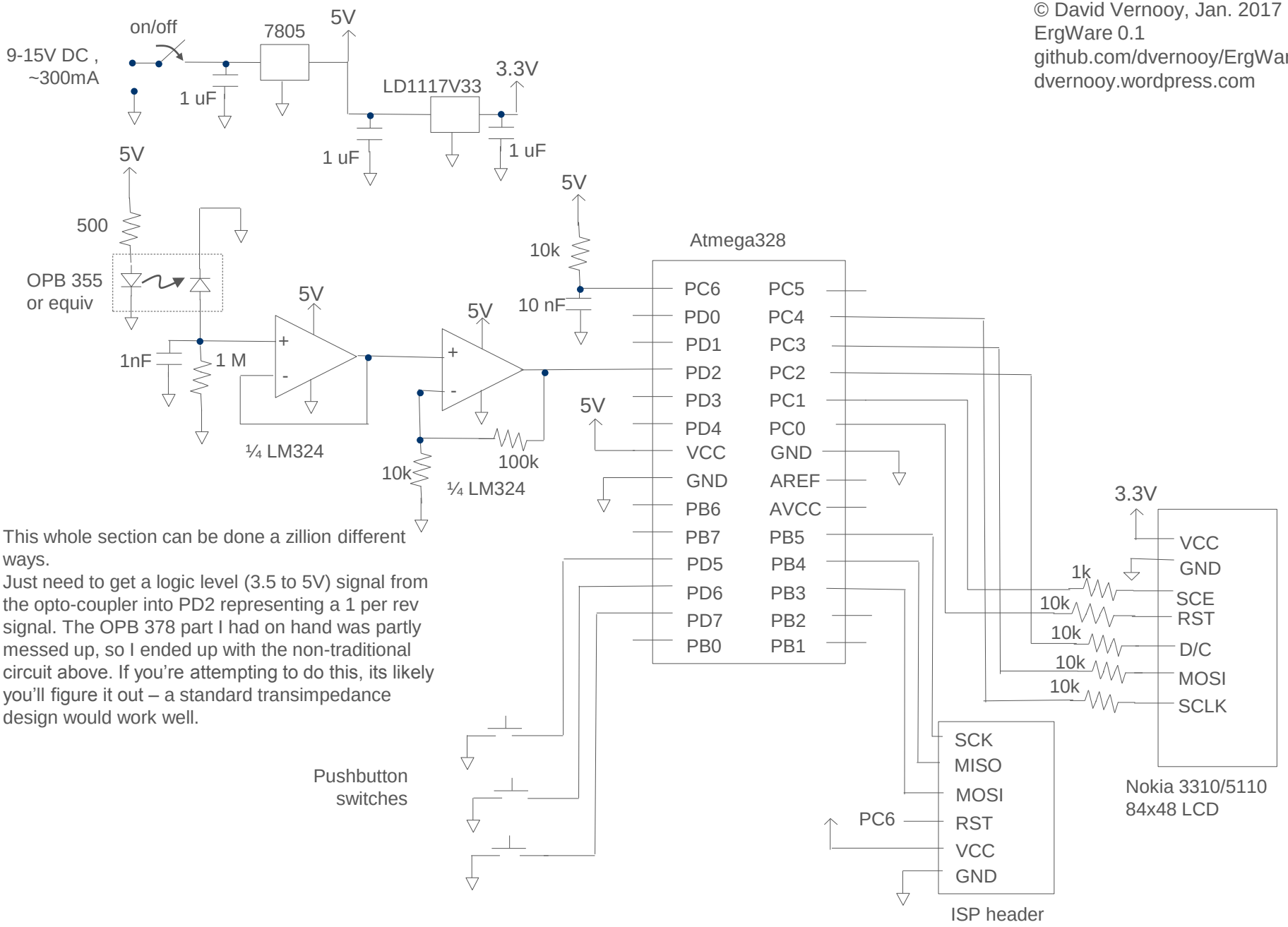
ErgWare 0.1
github.com/dvernooy/ErgWare
dvernooy.wordpress.com



This whole section can be done a zillion different ways.
Just need to get a logic level (3.5 to 5V) signal from the opto-coupler into PD2 representing a 1 per rev signal. The OPB 378 part I had on hand was partly messed up, so I ended up with the non-traditional circuit above. If you're attempting to do this, its likely you'll figure it out – a standard transimpedance design would work well.

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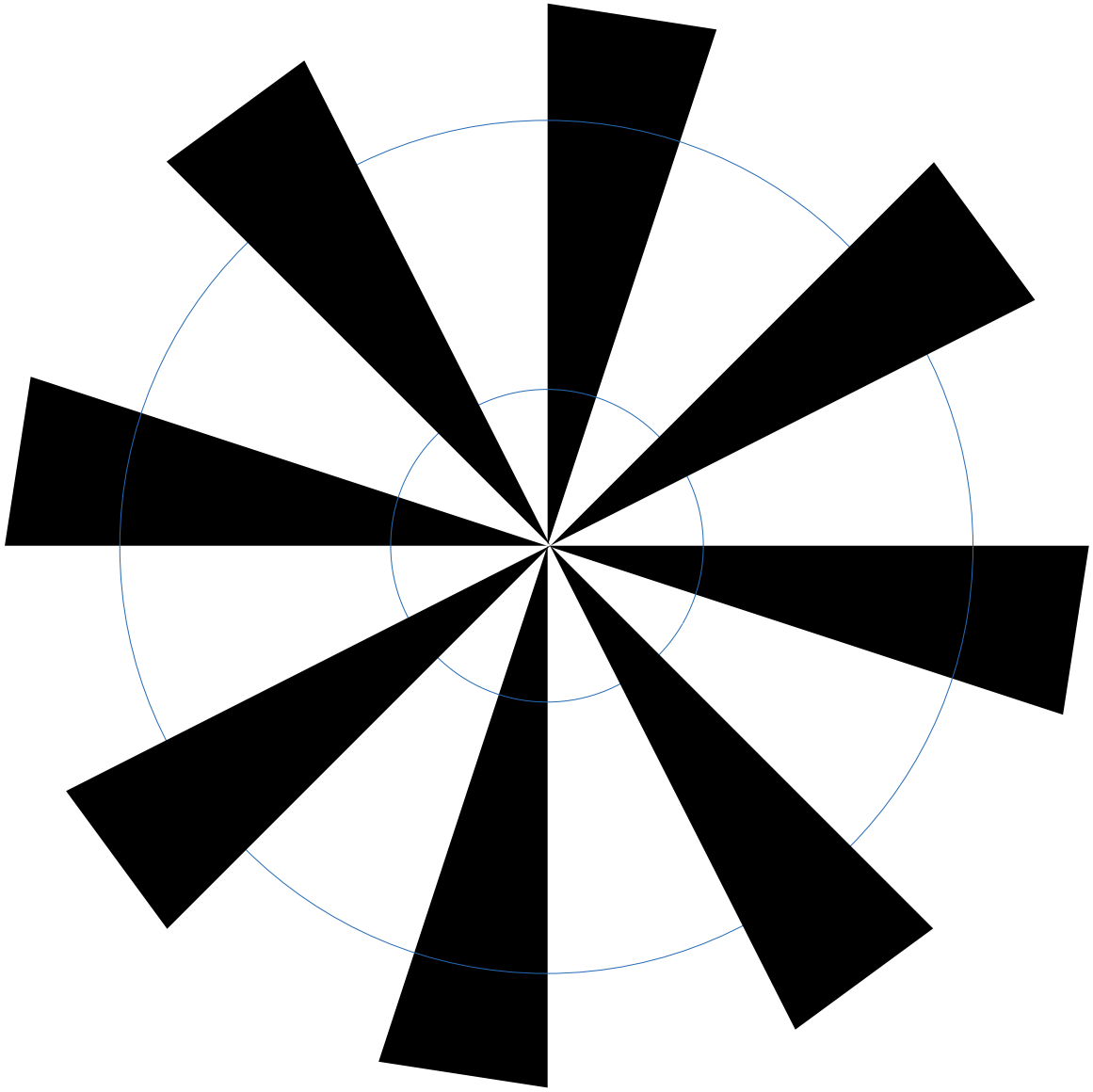

You could also buy a chopper wheel, use one out of an old optical mouse, or forget this method altogether and just use a reed switch like they typically do in bike computers. In those cases, you'll probably need to modify the circuit and software.

Cut out this pattern, Glue or tape to a CD & attach concentric with wheel & slot into slot of optocoupler. Software currently assumes an 8-wedge pattern, but really a single spoke will work with a very minor change to code. I used an old mountain bike wheel and just attached this to where the disk brake would mount on the non-drive/non-cog side.

The OD of this template should fit a standard CD.

The ID should fit the bolt pattern of disk brake. You'll have to drill a few holes on that radius to mount it & also cut out the center. I used a soldering iron to melt the cd plastic instead of trying to cut it.

You might have to take off the film on the CD to make it transparent, & of course cut away the white paper on this pattern where it goes through the optocoupler

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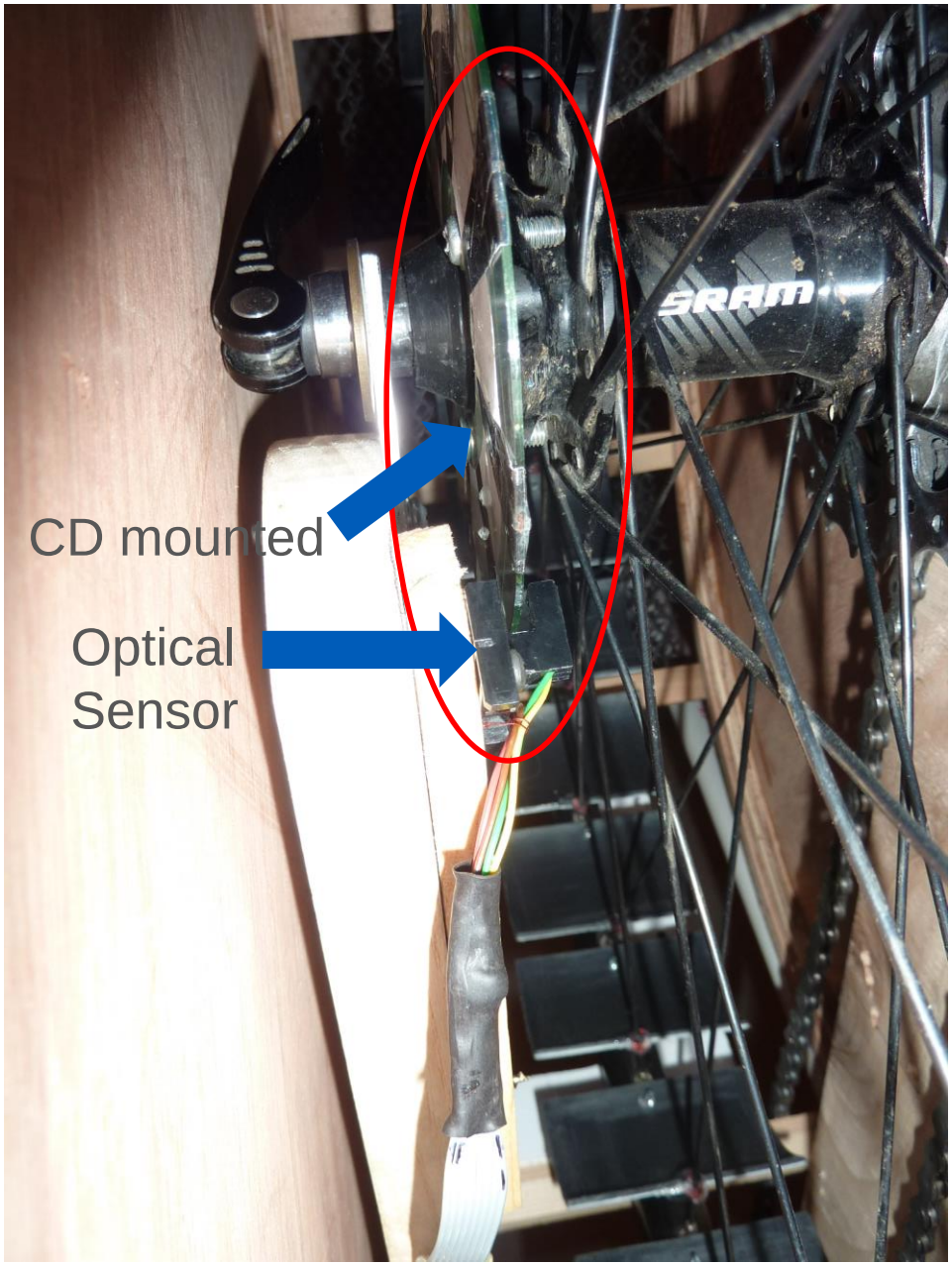
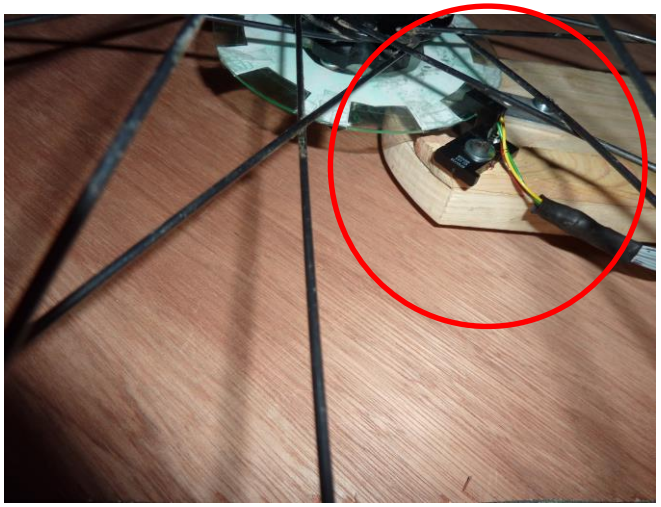




Chopper pattern mounted on CD. Yes, it's a hack job, but it works fine.

Slotted Optical Switch

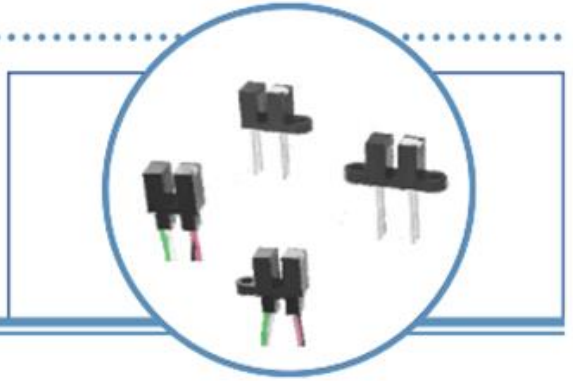
Series: OPB355, OPB360, OPB370, OPB380, OPB390

OPB859, OPB860, OPB870, OPB880, OPB890

TT electronics
OPTEK Technology

Features:

- 0.125" (3.175 mm) slot width
- Choice of aperture (0.050" or 0.010" width)
- Choice of opaque or IR transmissive shell material
- Choice of mounting configurations
- Choice of lead spacing or wires



Description:

The slotted optical sensors in this series provide the flexibility of a custom device from a standard product line.

Building from a standard housing with a 0.125" (3.18mm) wide slot, the user can specify output logic state, output driver circuit, aperture width, aperture surface and mounting tab locations. Furthermore, an option of wire or PCB leads allows electrical interface flexibility.

The device body is an opaque plastic which minimizes sensitivity to both visible and near-infrared external light sources which may impact operation. Aperture width choices provide different optical resolution for motion sensing. A covered aperture provides dust protection, while an open aperture provides maximum protection against external light sources.

Phototransistor sensor devices are: OPB360, OPB370, OPB380, OPB390, OPB859, OPB860, OPB870, OPB880, OPB890. The OPB355 provides a photodiode detector, which has a lower linear output-versus-light.

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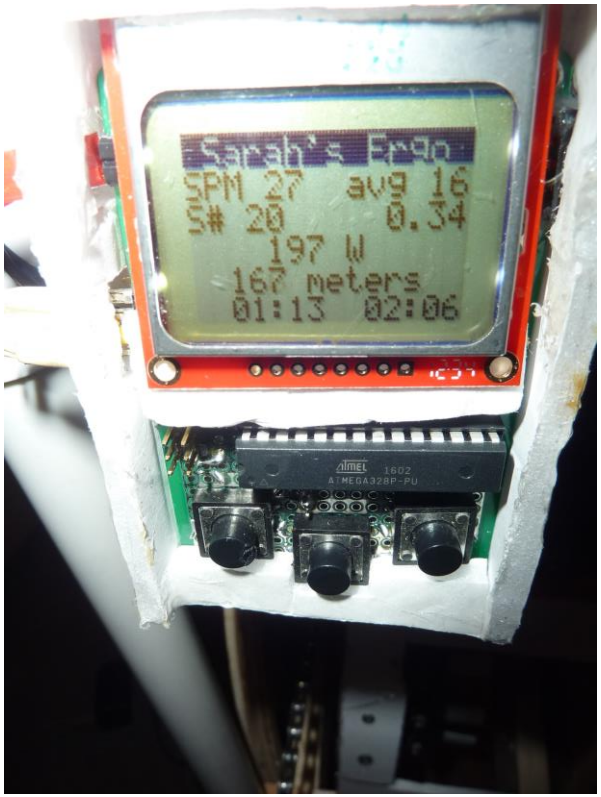

Wiring tucked up inside PVC mount.

DC Power supplied by external 9-15V AC-DC adapter (wall wart). Make sure not super el-cheapo or will require heavier filtering, etc… If the stroke count looks/acts wonky, that is likely the problem.

The pushbuttons reset timers/strokes/etc… while rowing. I have plans to implement other functions with those over time.

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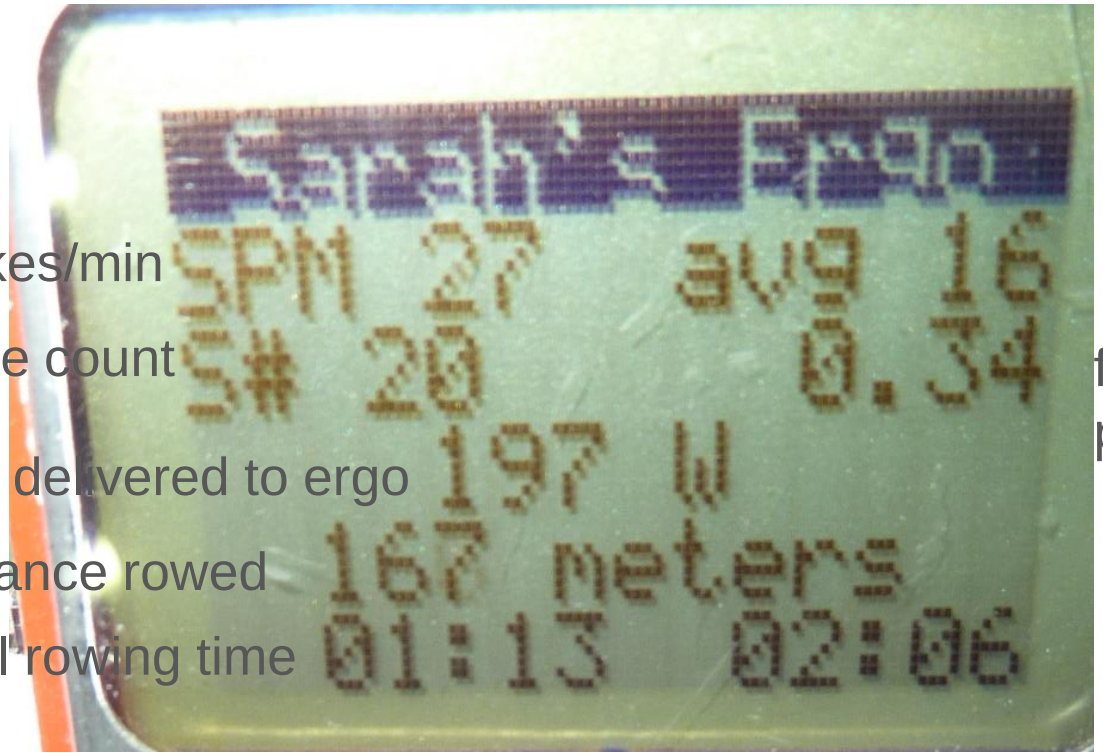


current strokes/min

average strokes/min

total stroke count

fraction of time in power part of stroke

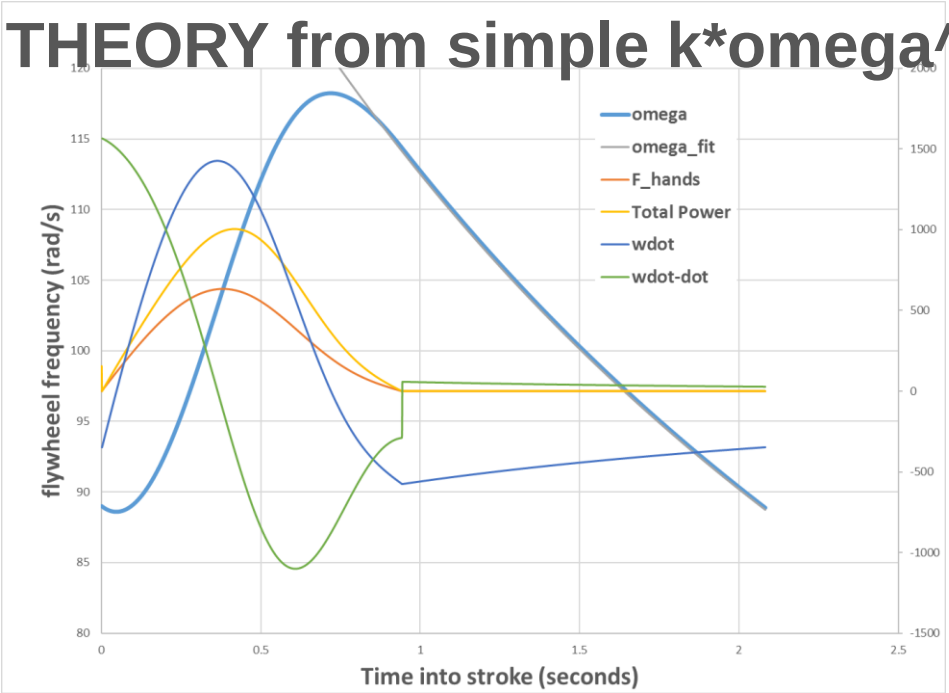
Watts delivered to ergo

distance rowed

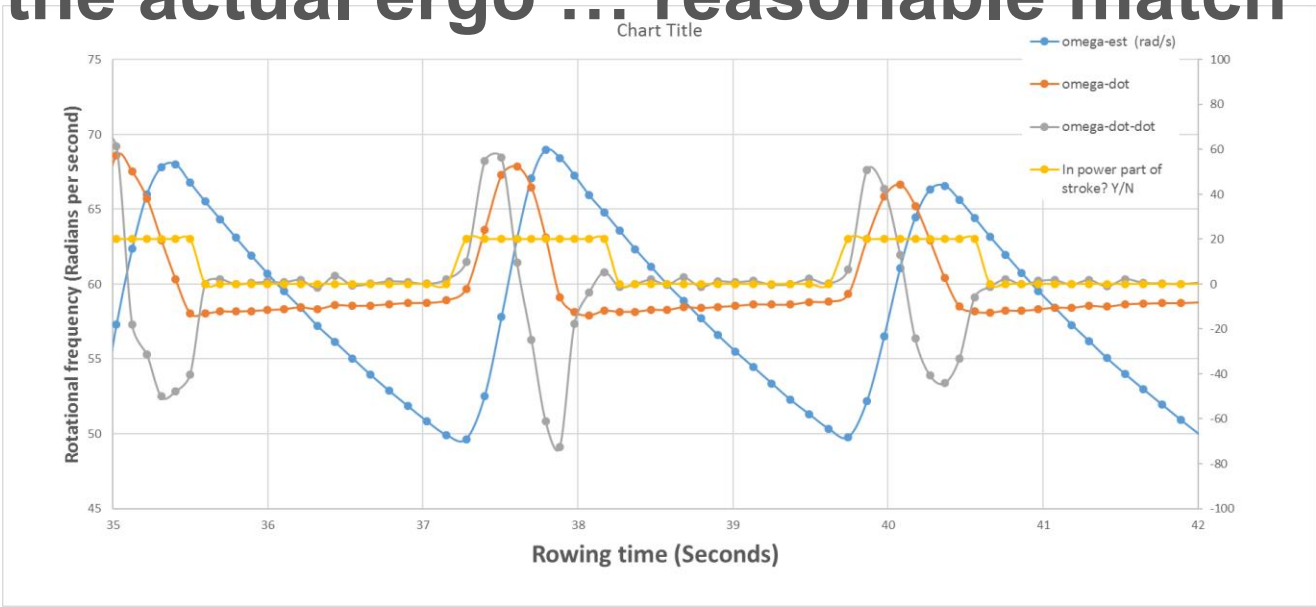
total rowing time

current 500m split time/pace

THEORY from simple k*omega^2 damping model



DATA from the actual ergo … reasonable match



Good references:

http://eodg.atm.ox.ac.uk/user/dudhia/rowing/physics/ergometer.html#section9
… for the origin of the factor 2.8 in the code

http://home.hccnet.nl/m.holst/ErgoDisp.pdf ... Makes me think that at some point displaying energy (calories) burned might be interesting

http://home.hccnet.nl/m.holst/Ergo.pdf ... Easy to follow model that is the basis for my excel spreadsheet … would be easy to augment the current software to show the total power the rower is outputting when using the erg .. Not just the power actually delivered to the flywheel (which is what I currently show). This would allow the rower to optimize their power delivery to the flywheel vs. power lost/wasted.

http://www.analyticcycling.com/WheelsInertia_Page.html … good reference to quickly measure the moment of inertia of your flywheel … required in code