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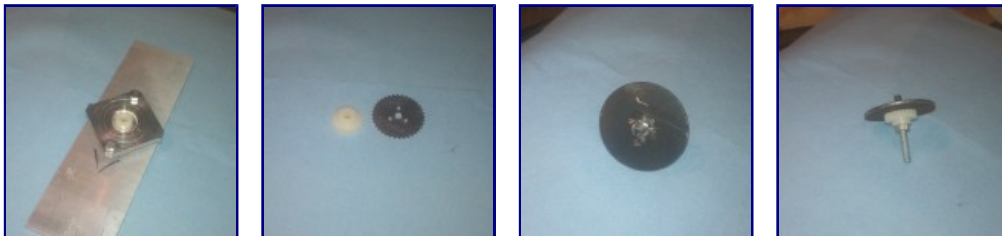
SBE FF Feeder assembly instructions

Posted by rlsPELL in Uncategorized

on Sep 1st, 2012 | 0 comments

Order is important, do in following order:

assemble boards: Note: sensor needs a bit more solder than the paste mask allows. Carefully enlarge the holes in your stencil if you are using one. I used a drill bit just slightly larger than the hole and simply reamed it out. don't install c4



Trim gears. Left picture is a jig I built to hold the gear securely so I could CNC it down to a very precise width. Second picture is the trimmed gear next to the cog wheel. Right two pictures another jig I built to precisely drill the three holes in the nylon gear. Note the holes in the steel jig on the right were started by using a cog blank as a guide and drilling a slight depression in the steel with a drill that fit the cog blank 1/8" hole exactly. Then pulling the cog blank off and finishing the hole with a 4-40 thread tap size drill bit. The holes you drill in the nylon gear are 4-40 thread tap size, and the bolts make their own threads.



Build cog wheel assemblies. Note that the bolt heads visible in left picture ride against the side of the feeder and provide positioning for the teeth on the cog wheel. Also note that getting the nylon gear and the cog wheel on the same axis is important. There should be no visible wobbling when you spin the assembly on it's axis.



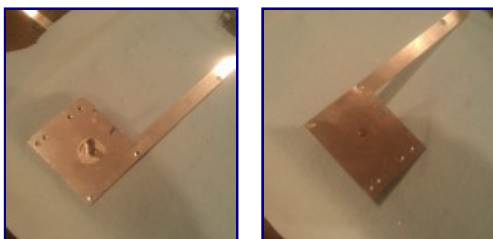
Turn the worm on a lathe. This is a short (3/4" to 7/8", not critical) section of 1/2" acme threaded rod, "McMaster: 98935A820 Plain Steel General Purpose Acme Threaded Rod, Right Hand, 1/2"-8 Thread, 3' Length". Drill one end for the motor shaft, 3mm, drill the other end for the spring wire that is coming out of the worm support, 2.5mm for the spring wire I used. Knock the acme threads off a short section ~1/4" on motor end, cross drill and tap for M3 set screw.



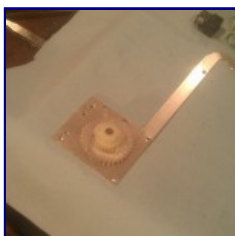
Cut out the sides. counter sink for the screw heads in the aluminium sides, just enough to recess the screw heads a bit. if any metal gets pushed through, grind it off the inside, at least where the axle goes. Note that clearance for sensor on AI sides is set for a 1/8" end mill. if you are using a smaller bit, you will need adjust the size of the slots in the sides to maintain the same centring when you mount the boards. note the screw hole on the the end of the side is back ~1" from

the hook. this is intentional and causes the sides to spring outward, so you get a nice secure fit when you stack the feeders together.

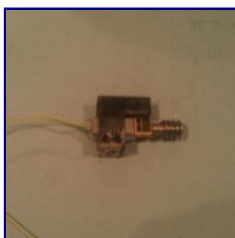
print the parts. leave raft on tape guide and worm support unless you have modified the code. clean out the tape path in the tape guide. tape shouldn't be loose, but should slide easily along the path. be sure to trim the raft from over the wire path on the tape guide.



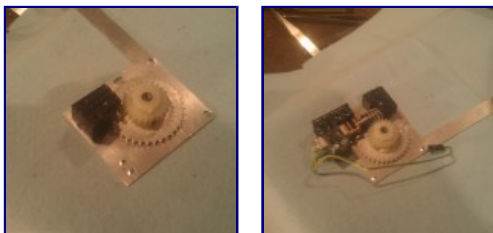
Install the axle shaft. This is a good time to test fit the circuit board. Make sure the wheel sensor photo-interrupter does not touch the actual side. The board needs to be supported only by the fibreglass on the PCB.



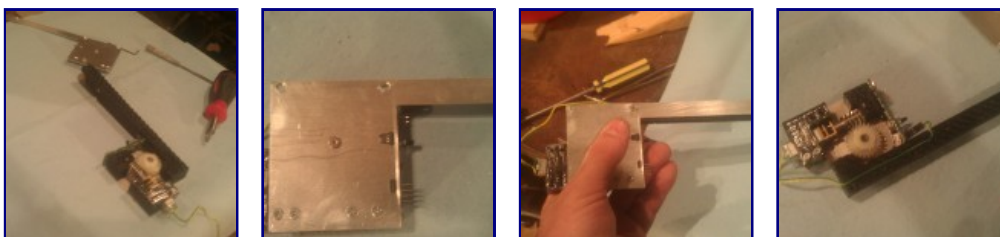
Install the cog wheel assembly. note there is a bit of lithium grease that goes on the side where the bolt heads will rub.



Install the worm onto the motor shaft, then install the motor into the motor holder.



Install the worm support, don't tighten the screws all the way. put a dab of lithium grease on the worm support shaft and bearing surface. then install the motor mount and motor onto the worm support and worm gear. push the motor and worm all the way forward, tighten all screws and put in the motor mount screws.



Install the tape guide but only with the screw in the back. Then install the circuit board. Hold the circuit board in place with your hand as you put the rest of the screws into the tape guide. Route the wires through the slot we left for them.



Install the other axle screw bolt, then the rest of the screws for the other side. Make sure the circuit board goes into the

- [Carlson Design](#)
- [Frank Ellinghaus' Information and links](#)

DONATE

Many people have written me to thank me for putting these pages up. The truth is that I have many more projects, some very interesting, that I don't put up on this website because there is no incentive to do so. Without an incentive I would rather just work on the projects instead of the webpage.

Some examples are the Linux based security camera system I built, the circuit boards I print and etch myself for various projects, the tooth setter for the bandsaw blade sharpener, the computer controlled wood stove, etc.

Here is your chance to see these projects, and various others. I could even be encouraged to put plans, drawings, and circuit diagrams online with enough donations... Below is the link for donations. Feel free to give as little or as much as you wish.



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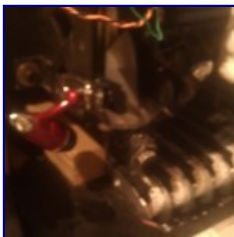


All done!



To thread tapes, insert into the tape guide slot and hold down the continuous feed button till the end of the tape comes out. attach a piece of scrap/used paper 8mm tape to the carrier tape on the bottom. if it's paper to paper, a couple of staples work pretty good. if it's plastic to paper, 3M VHB adhesive tape (McMaster 75935A18 3m Vhb Foam Tape – Adhesive On Both Sides, #4949, 3/4" Width X 5 Yards Length, .045" Thick) and gently squeezing with pliers works pretty good. It is possible I think to use 8mm film splicing tape, or even the specially designed SMT splicing tapes. however, I haven't had the opportunity to play with that yet.

Route the cover tape through the hole left in the tape guide designed for that purpose. For the wider tapes, route though the slot next to the circuit board, then to the *opposite* side when you come out the back. Attach to the cover tape with polyester string or unwaxed dental floss and a an anglers hitch, fish it through and attach the weight. Weights should be at least 8oz. Flimsy plastic tapes need less on the main supply tape, about 1oz. Some of the large plastic tapes need more pull, so I use two 8oz weights on them. 8oz seems to work pretty good for all the cover tapes. To change parts out, leave existing parts in feeder, pull feeder off, and install new feeder with the the other parts already threaded



Install an adjustable focus IR laser on the head. (don't forget the shark!) De-focus it till it comes out as a cone. If the cone is unsymmetrical, make the long part go up and down. I use the camera on my phone to be able to see the laser, but most web-cams will work too.

Numbers method for lining up laser: visually line up with sensor on X axis, move closer or further till it's lined up. move to one side, then jog across the feeders, writing down the coordinates where it trips. do the same thing moving in the other direction, then plug the numbers into a spread sheet. optimal position will be 1/2 way between.

Note I toggle the power to the laser power regulator sub-board to turn the laser on and off. I have to pause after shutting the laser off as I used a 100uF cap and it takes about .6 second for the laser to fully discharge the cap. If I move the head before then I occasionally trip the feeders by accident.

When testing the feeders, the most common problem I ran into was it not stopping. This was due to not getting enough solder under the photo interrupter that detects the cog wheel teeth. You can resolder that part if you have a reflow station. I had one failure during use where it did the same thing, the side was physically touching the sensor and movement had broken the solder joint.

Also, be sure your ambient lights don't put out a bunch of IR, and be sure to ground the feeders. Both of these will cause random feeding's. If it doesn't advance at all, make sure you didn't install c4.

I cover the hole in the top of the feeders with a single piece of clear packing tape that spans all the feeders. this is easily removable, and keeps stuff from falling into the mechanism, yet will still allow a view of what is going on.

I purchased a couple of power supplies that provide both 12V and 5V and connected the feeders up in a "daisy chain", so each feeder is providing power to the one next to it. this makes it easy to remove one feeder from the stack to work on it, or to replace it with a feeder and reel assembly that is already threaded with the correct parts. I just used a different power supply for each row of feeders, power strips are cheap.

I still, on rare occasions get a part that jumps out of the hole. I'm hoping as the rough printed plastic wears smooth that his will go away. Other options, if it doesn't, is to go with slower motors, or to PWM the entire stack of feeders. The motor power is independent to the logic power, so sending a PWM signal to the motor power line isn't a problem. One thought was to run the motors at less than the rated 12V, but you would loose torque doing that, while you wouldn't loose torque with PMW.

Feedback is welcomed.

Enjoy.

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