

An Addendum to my Article “Building the Hacker new Micro Magic Kit”

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by Greg Norris

Note: all photos by me



The new boat with one of my old rigs on it.

Introduction:

My original article in October, 2021 on building a Hacker new Micro Magic kit needs to be updated a little. Hacker is a company that believes in continuous quality improvement, and the current kits, while of identical high quality, have some significant differences from the original ones. The hull material is now thinner and the keel fin and rudder are of better material and shape, and I need to show more exactly how to set up the boat for old rigs and interchangeable rigs.

The background for the move to lighter material is interesting. As you all know, Micro Magics are an international class. The largest fleets are in Belgium, Germany, Holland, Hungary, Russia, Switzerland, and here in the US. The German fleet is big, and they race to a different ruleset. While they have interchangeable rigs, just like the rest of us, they also allow interchangeable keels (of different weights), and cutting holes in the deck and covering them with plastic film to save weight. While there is a lot that can be said about the pros and cons of this more open ruleset, the most important thing is that Dutch sailors have sailed in any number of German regattas with their international rules boats and typically finish at or near the top. The current German National Champion is Micro Magic International's own Geert Middel, a Dutch sailor, who sailed with a boat using the international ruleset just like ours.

Enough of that, just recall that the original new Hacker MM that I built for the October, 2021 article was of heavier material, but still came in at the international minimum weight of 860 grams. The Germans lobbied for lighter hull material, and got it. The current Hacker kit are made of the same thickness ABS as the original German Graupners. The Dutch like the new, lighter hulls, so I wanted to check out for myself how the new, lighter Hacker boats are.

So, I bought a new Hacker nMM kit from Twisted Hobbys. They included some of their servos for me to test. More about those below.

As before, the kit came beautifully packaged, far better than Graupner used to do. In particular, there will be no loose keel bulbs bouncing around destroying stuff in these packages. Both the deck and hull are beautifully molded and cut. They are made of 1.0 mm ABS, not the 1.2 mm stock my previous Hacker kit. The rudder and keel fin are made of stiffer material than the previous Hacker ones. The rudder shape is markedly improved, the keel fin shape is somewhat improved, but still required some shaping with 200 grit sandpaper. The rudder shaft and the fastener bolt on the keel fin are plated as before, so you will want to coat them with lithium grease every few months if you sail in salt or brackish water. There are new servo plates, which are really nice. All the small parts come in nice thermo-sealed plastic bags.

For the techies among you, the hull weighs 84 gm, the deck 55 gm, the keelbox 15 gm, the keel fin 41 gm, the (beautifully finished) keel bulb 371 gm and the rudder 19 gm. The finished keel weighed 416gm finished and painted. All up the boat weighed 840 gm, 20 gm lighter than the first Hacker I built.

I used carpenter's wood glue for the stand, JB Weld Plastic Bonder for most structural stuff, including for the hull/deck junction, the bow reinforcement and jib hold-down loop, the keelbox, and the rudder post, and Loctite Gel CA for anything else. I'm sure that Gorilla CA Gel would have worked fine instead. JB Weld Plastic Bonder is an absolutely fabulous epoxy. It sets up in about 20 minutes, which is near perfect for many/most RC boat builds.

The stand is bigger, sturdier, but not really any better than the old Graupner ones. It was easy to assemble.



You will recall that the original Hacker keelboxes were made of 3D printed nylon. Very sturdy and precise, but unhappily porous to water. We fixed this by spray painting enamel from the inside and outside prior to gluing it into the hull. I leak-tested the new keel box and mast tube (as before very sturdy 3D printed nylon). Both were water tight. I thought that it would be a good idea to still spray paint them. This turned out to be more prophetic than I ever am: the spray paint immediately bled through the keelbox from the inside and colored my fingertips

with yellow enamel. SO, by all means do spray paint the keelbox inside and out after masking off the bottom and top gluing surfaces. I used Testors model enamel, but any thin spray enamel would work fine.

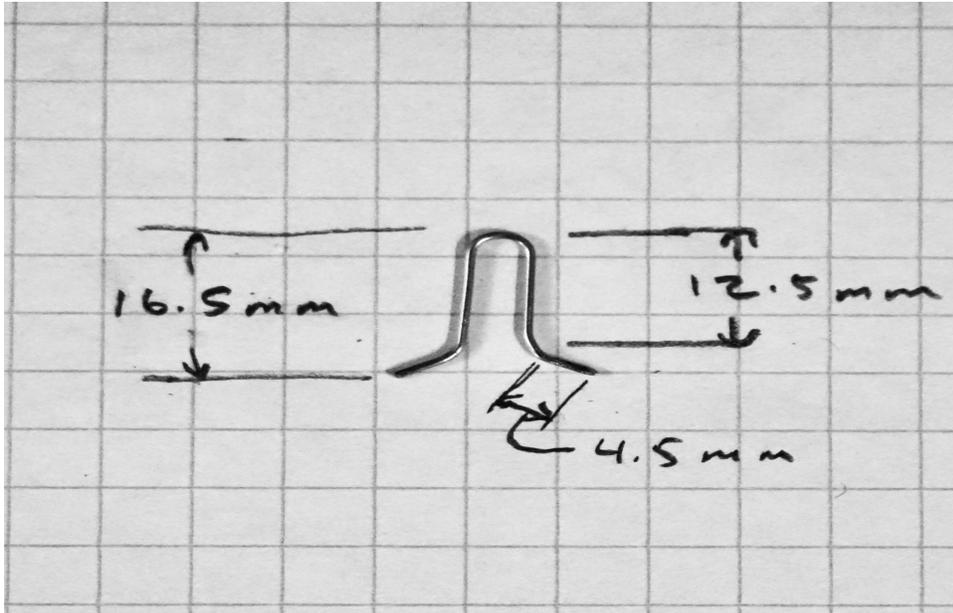
I used a simple velcro strip on the floor of the hull starting at aft end of the sail servo and ending about 1" behind the aft edge of the hatch in order to be able to move the battery back in heavier wind.



Keel and Rudder:

The keel fin needed a bunch of shaping with 200 grit sandpaper. The cross-sectional shape should mirror that of the current rudder or one of the Graupner fins, if you have one around. The rudder only needs a little bit of shaping. I continue to use 3-4 degrees of keel fin to bulb cant, and did this exactly as I described in the big article. Note the 4 degree keel cant in the photo.

Deck and Hull Fittings:



I lowered the jib boom tie down loop $3/32''$ (2.5mm) exactly as I did in the 10/21 big article.



Instead of using the Hacker hull backstay fitting, I simply used a cotter pin backed with a small piece of this carbon fiber plate. (Some ABS or other thin plastic would work fine as well.) Hold the cotter pin in place with some small clamps while it is drying.

I decided to again copy one of Rolf Bohnenberger's ideas. As I've written before, Rolf is a German MM skipper who builds really interesting boats. This time, I've led the endpoints of the main and jib sheets into the cockpit where they can be adjusted easily with bowsies and are fastened with little screws to the port side of the cockpit. (See photo and text below.) If you decide to do this, again, back up the small screws with some thin plastic or carbon plate.



I moved the little screw that is used for the jib boom hold down bowsie back to 4 1/2" (11.5cm) from the jib hold-down loop to allow for more adjustment. Again, back up with a small piece of thin plastic or carbon fiber plate.

Assure that the servo holders and the screw holes fit the servos that you've selected. They are much easier to modify before screwing or gluing in place.

Ream out the main and jib sheet guides with a drill before gluing in place to assure that they are smooth.

Deck/Hull and Rudder Post:

Just like in the big article, except that I used JB Weld Plastic Bonder instead of Testors model cement this time.

Rigging:

I need to write more here, as there's been a good bit of confusion in this area.

The most important piece is to disregard the Hacker instructions on rigging completely.

Mast:

The stock Hacker mast is fine.



Use one of Geert Middel's mast cranes (link below) or alternatively make one like this as I described in the big article. I will copy that to here to save you time:

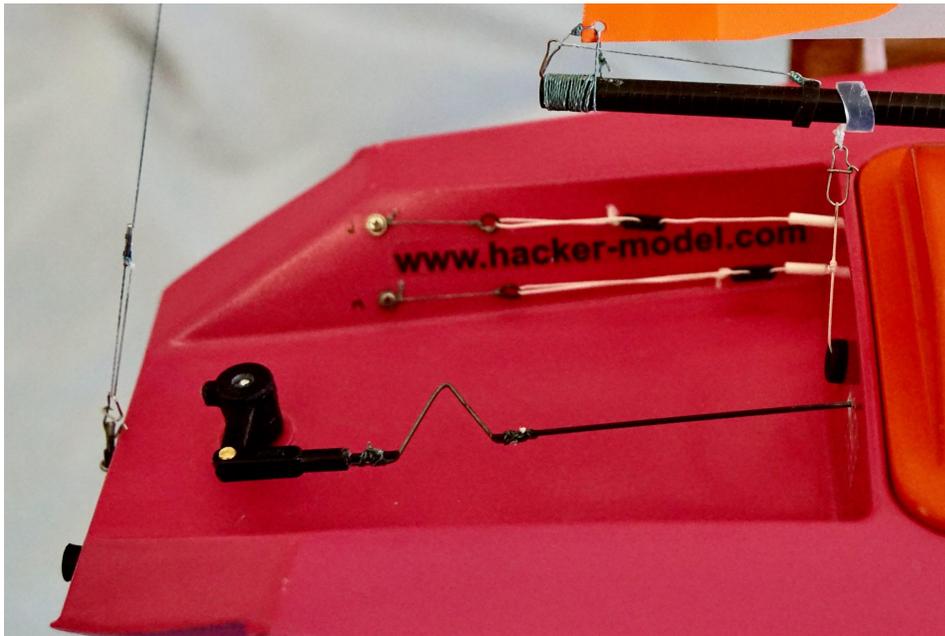
"The backstay crane is an interesting piece. It is nice, trick looking, but I think a little heavy. On mine, the vertical end of the metal piece was 8 mm too long, so I cut it off with a Dremel cutting disk. Modified like this, the piece weighs 3 grams if you don't use the flexible rubber tubing (which is not necessary). My usual home-made ones (see Figure 12) are hard to weigh, but I think weigh about 1 gram. They are made out of 1 mm carbon fiber rod and Spiderwire. They are very strong, and they also look trick. If you want to save a couple of grams where it matters a lot, you can substitute one of these." I use CA gel to glue these.

If you use the Hacker mast jib fitting, wrap it with 20 lb test spiderwire fishing line and impregnate with CA gel. Otherwise, make your own with a 1mm cotter pin wrapped with spiderwire as in the photo above.



This is how I configure my jib boom tie down apparatus. In order to decrease breakage due to chafing, I use 50 lb test spiderwire for this and for the loop from the boom that the snap connects to. Note also the silicone tube adjusters on the jib boom. From L to R: 1) jib downhaul, 2) topping lift, 3 & 4) jib sheet fastener, and 5) jib outhaul. The silicone tube here is the aquarium tubing. I used to wrap the jib and main booms with packing tape to make the sliders work better. I now use Du-bro nitro fuel line for the sliders. It is no longer necessary for me to wrap with packing tape. Also note the Geert Middel mast ram.

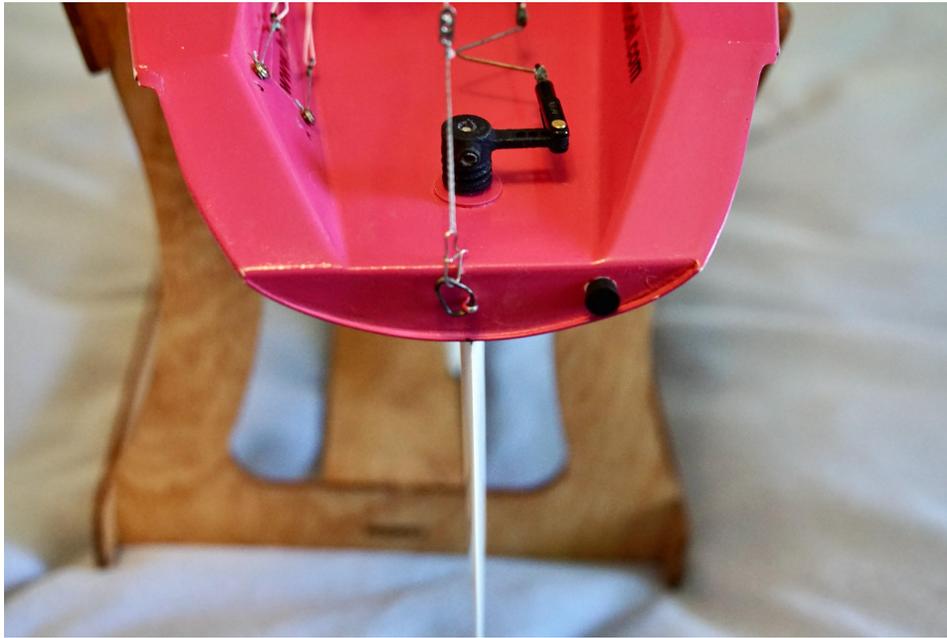
I try very hard to keep windage down. I use a micro-bowsie on the jib halyard at the top. I only use a jib downhaul, no bowsie for this at the top. I use a bowsie on the deck for the jib boom hold down apparatus, and now two more for the new jib and main sheet adjusters in the cockpit. All the rest I do with sliders on the main and jib booms. If they fit your boom diameter, use the DF65 sliders that come with the goosenecks. They are nice. I no longer use aquarium silicone tubing for the sliders. Jack Chambers from my own club found that hobby shop gas motor tubing works better. I like it a lot. Available at hobby shops: Du-bro nitro line fuel line silicone tubing. It lasts longer than the aquarium tubing.



This is how I rigged the jib and main sheet adjusters. The tiny rings are available at fly fishing shops. Note the spring connector on the rudder push rod. It is described in the 2021 article. The trick (springed) rudder lever is available from Geert Middel. (See the links below.) Also, note the main outhaul. I no longer use the cotter pin (see the photo of the ball bearing gooseneck below.) Instead, I just drill a hole through the boom, and then wrap with spiderwire and cover with CA. More importantly, note the clew loop to keep the clew close to the boom. I like this better than the wire hook clews.



The threading of the main sheet adjuster is easy. For the jib sheet adjuster, pass the sheet through the little tube adjacent to the sail servo board and then around the front of the keelbox to the swingarm.



This is how I rig the backstay to the new cotter pin backstay eye. Note also where I place the drain plug. Start with small drill bits as the ABS tends to bind with larger bits.



For A and B rigs, the stock Hacker gooseneck is fine. C, D, and E rigs should best use a ball bearing gooseneck. This photo shows a DF65 gooseneck placed upside down. The DF65 gooseneck is the cheapest and best choice for this. (See link below.) Many skippers will prefer to have ball bearing goosenecks on all of their rigs. I have no preferences here. As noted in the big article, we tested this carefully at our pond. The stock rigs, because they increase main camber when the sails are eased, are very marginally faster (reproducibly about 1 boat length on a standard MM downwind), but if you ever sail with your rig in marginal conditions for your rig, the last thing you need is more camber downwind. The black ball bearing gooseneck in the

photos with the pink boat above are from VAM. I now use only the DF65 ball bearing goosenecks. They are nice, include the vang adjustment screw, and are a great value. L to R the sliders on the main boom are 1) downhaul, 2 & 3) mainsheet, and 4) outhaul.

As noted above, I have stopped using wire hooks for the jib and main outhauls. I took a hint from my own full-sized laser. I use a standard outhaul with a clew ring to hold it down on the boom. This is best seen on the jib boom in the photo above.

The mast ram (the plate on the deck that the mast goes through) is an issue if you intend to use multiple rigs. If you use ball-bearing goosenecks there is no issue, but if you use Hacker or Graupner gooseneck, you need to assure that your mast ram and the goosenecks you are using are compatible. Geert Mittel makes parts that address all of this. (See link below).

Lastly, please note that I no longer use 6mm aluminum or CF tubing to shim the mast inside of the keelbox. Rather, I simply wrap the mast with tape to a diameter of 6mm. Both mylar and fiber reinforced packing tape work fine for this.

Servos:

Twisted Hobbys, our supplier, sent me servos to test. Both are really nice. I've used them for a busy season and they have performed flawlessly. The sail servo is an analog, plastic geared servo, PDI-4806HM (\$20), and the rudder servo is a metal geared digital model, CSP-D14M (\$32). These both seem to be a good alternative to the HiTec HS-485HB that I usually use for my sail servo and the HiTec HS-65HB+ for my rudder servo.

Links:

Geert Middel Shapeways parts:

Geert is one of the MM International leads and current European champion. He likes to design 3D printed parts for MMs, and he uses Shapeways (a European and US 3D printing company) for his part production. The parts are well thought out and beautifully made.

MM boat parts set without servoplate:

www.shapeways.com/product/CNGZ559WC/mm-boat-parts-set-without-servoplate?optionId=83457896&li=marketplace

MM boat parts set with servoplate:

www.shapeways.com/product/MUKYJVAJ5/mm-boat-parts-set-with-servoplate?optionId=148172823&li=marketplace

MM RIG SET, 5 mm mast, alternative:

www.shapeways.com/product/8M9UQFAWA/mm-rig-set-5-mm-mast-alternative?optionId=213466174&li=marketplace

NMM RIG SET, 5 mm mast, alternative:

www.shapeways.com/product/NPG5BLBNJ/nmm-rig-set-5-mm-mast-alternative?optionId=186528423&li=marketplace

MM RIG SET, 5 mm mast:

www.shapeways.com/product/X33SU4UY5/mm-rig-set-5-mm-mast?optionId=84799926&li=marketplace

Ball Bearing Goosenecks:

DF65 boom kits are just great for MMs. And a great value. Typically, they are mounted upside down, so that the boom is parallel to the foot of the sail.

radiosailing.net/collections/dragonforce-65-v6-replacement-parts/products/main-boom-set-suitable-for-a-b-c-rigs