by Matt Maziarz Photos Walter Sidas

TWISTED HOBBIES

Viper V-Tail

240MM QUAD

Snake charmer or not, this Viper is hot!

Author's Opinion

Within the last year or so, the FPV sector of UAVs has grown exponentially, leading to a boom in RC FPV racing events all across the USA and the world. The Viper is the perfect platform for just such an event and when set up properly, it can also offer quite a nimble little sport performer for the backyard or jaunts out to the park. The wood construction allows for a modest price point and even fully outfitted, the Viper can easily be built for well under 400 dollars. I do believe I've found my new FPV race-copter as well as my new "go to" sport flyer all in the same, sweet little package.

SPECS

FLYING WEIGHT: 10.9 oz. (310g)

LENGTH: 10 in. (255mm)

HEIGHT: 3.5 in. (89mm)

WIDTH: 8.1 in. (206mm)

ROTOR SPAN: 9.45 in. (240mm)

DURATION: 6-8 minutes

MINIMAL FLYING AREA: Backyard or gymnasium

WE USED

RADIO: Spektrum DX9, SPMR9900

RECEIVER: Spektrum AR6210, SPMAR6210

ESC: (4) Twisted Hobbys 6 amp

MOTOR: (4) DYS 2300Kv 18g brushless outrunner

BATTERY: Twisted Hobbys Crack Series 850mAh 3S 30C LiPo

PROPS: (2) Gemfan 5 x 3 CW, (2) Gemfan 5 x 3R CCW

FLIGHT CONTROLLER: MultiWii Flip 1.5

NEED TO KNOW

MANUFACTURER: Twisted Hobbys

DISTRIBUTOR: Twisted Hobbys

TYPE: 240mm V-tail configuration quadcopter kit

FOR: Intermediate Pilots/Builders

PRICE: $39.99 (basic airframe only)

NEEDED TO COMPLETE/ INCLUDES:

Minimum six channel transmitter, receiver, four motors (23mm diameter 1400-2300Kv), four 6-12 amp ESCs, flight control board, four 5-6 inch props (two CW and two CCW), 3S 600-1300mAh LiPo, compatible charger, soldering iron and building tools.

The industry trends these days have things in the multirotor realm moving towards more exotic designs and materials with the release of each new machine. While carbon fiber is nice, it's also expensive. Alloy is strong, but it's heavy and can be expensive depending on how it is finished. Composite parts are a welcome option, especially given the recent explosion in affordable 3D printers, but don't carry the same finish as the aforementioned materials. Twisted Hobbys has taken the path less traveled when designing their newest release for the multirotor market, the Viper V-tail Quad. The frame is made entirely out of aircraft grade plywood that is laser cut for a perfect fit when assembling. While the idea of multirotor made out of wood might seem like a novelty to some, the interlocking design of the plates results in a rigid airframe that is extremely economical, very easy to build and just as easy to repair. Not only that, but rather than using a traditional "I" or "X" design for the Viper, Twisted Hobbys chose to go with the sweet looking V-tail, complete with downward facing props in the rear. This frugally priced little beast looks great on paper and should prove to be more than a little fun in the air.

Twisted Hobbys is already well known for their economical, yet insanely fun to fly Crack series of airplanes and now they're looking to carry that tradition over to the world of multirotors with the Viper V-tail. Custom tailored for the open source control boards, this little machine is intended to excel at mid-air aerobatics while remaining tough to absorb those unexpected landings. Our test machine was provided with DYS motors, a MultiWii control board, Twisted Hobbys ESCs and an 850mAh Crack Series LiPo so we knew the performance was going to be out of sight. Given the light weight of the airframe itself and the power of the 2300Kv motors, two words that come to mind are "buzz saw".

IN THE AIR

Firing up a 240mm, relatively lightweight machine doesn't usually tend to draw too much attention on a busy club day. The Viper V-tail, however, isn't exactly your average "mini copter". The 2300Kv DYS motors generate a sound that is far and beyond the angry bee moniker that is tossed around all too generously these days. The little V-tail beast literally sounds like a pneumatic buzz saw. At first I was a little worried when the quad wasn't lifting off even though I was only at one quarter throttle. The sound coming from it was telling me it should have been in the clouds already. Slowly advancing the power, the Viper gently lifted off the ground and assumed a level hover just a few feet in front of us.

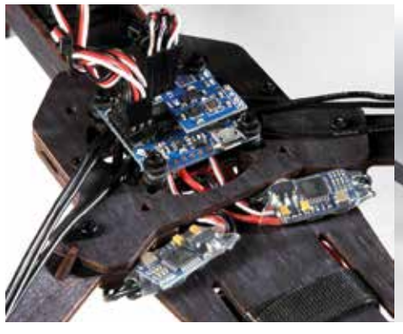
The gains in the GUI had been set fairly conservatively, so while the Viper was very easy and forgiving to fly, there was a bit of lag on the cyclic controls. Bringing the Viper back down for a quick tune, we popped open the net book, fired up the GUI and increased the gains across the board. Originally starting at 20 for each option, we increased both to 40 and saw a marked improvement. This time, the Viper was locked in at a hover, but the control response was much more crisp, while still not being too much to handle. The most pleasant surprise with the Viper was how stable it felt. We almost expected such a small and light machine to suffer a little at the hands of variable winds and/or nervous thumbs, but it felt much larger in the air. Cruising around in high banked figure eights had us wishing we had brought our FPV gear. The large nose of the little V-tail would serve as the perfect mount for an FPV camera and small transmitter.

Climb-out wasn't all that spectacular, but we were only using 5x3 props, so some six inchers or perhaps something a little steeper in the pitch department would greatly aid in the vertical prowess of the Viper. Aside from that, this quad is a pure joy to fly. Properly set up and with the gains and rates nice and low, it handles much like a large coaxial helicopter. Open up the GUI and raise the gains a bit … now you've got a machine that dances around not unlike a fixed pitch helicopter. Go to the extreme with the travel and gains and what you're left with is an acrobatic, tumbling multirotor that's perfectly at home bouncing across the skies, somersaulting like a gymnast to your heart's content.

Upon opening the box from Twisted Hobbys, I was surprised to find that the only instructions pertaining to the airframe was a single sheet of card stock with three simple steps illustrated on it. After examining the parts for the frame, I quickly realized this simple one pager was more than sufficient for assembling the frame. While I am familiar with wood constructed models on the fixed wing side of the hobby, the plywood was a first for me with the multirotors. The build process is about as simple as it gets in any hobby, but I was having a tough time leaving the wood in its natural color. I didn't want to paint the individual pieces as it would add more work at the back end of the assembly. True, a nice lacquer or enamel finish would look sweet, but it'd also add to the dimensions of the wood and require subsequent sanding to get the pieces to fit together properly. Ultimately, I entrusted the "dye job" of the Viper frame to my wife, leaving her alone for an evening with the pile of wood parts and a fat black Sharpie.

The one page manual advises to dry fit every part first to check for a good fit before gluing and to sand as needed for such a fit. Our kit required no such sanding so after the obligatory black paint job, the individual frame pieces went together within minutes. We used BSI Super Thin and Medium CA glues for the bonding and after tinkering with the long plastic screws that hold the frame together for a bit, the entire airframe was together with the control board mounted. For a fleeting second, we toyed with the idea of reversing the screws to leave the plastic nuts on top of the board. This would allow for easy removal of the board if need be. In the end, however, we decided to stick with the factory setup as the nuts would have to be filed to clear the posts near the ends of the board.

Getting all the electronics sorted out in the Viper might prove a bit troublesome for a novice, but anyone with even a little bit of build experience should be fine without a printed manual. It is important to note that there are tutorial videos on the web as well as how-to guides on Twisted Hobbys' website. The only soldering that needed to be done was to solder the 2.5mm connectors to each motor that were included with them and to solder all the power leads for the ESCs into a parallel harness. For the harness, we've found it easiest to bundle all the individual positive and negative wires separately, shrink wrap them, tin them and then butt solder them to the power lead. This technique helps to keep the bundles from wanting to separate themselves when tinning or being mated to the plug. Programming the MultiWii control board is probably the hardest part of getting the Viper into the air, but luckily, we were already well versed in the ways of the Arduino programming and GUI by the time we received this model for testing.



PRO TIPS

Even though all of the parts on our test machine fit together without any need for sanding or filing, it is best to follow the manual and dry fit all parts together before applying any glue. The great part about this build is that aside from the motor mounts, there is almost no hardware to be found. he one drawback to this design, though, is that once the glue is applied, the frame is not coming apart without the use of tools and heavy hand.

Getting all the frame parts and arms held together to drop the four plastic bolts that hold them and the control board together can be a bit tricky if a second person isn't present to lend a hand or two. We found it easiest to invert the machine on a wood block while getting everything lined up. This allowed us to slide the arms into their respective notches while combining the tail, center section and nose all into one piece so that they could be held, sandwiched together as one. Then we were able to carefully guide the four screws down through the plates to get everything locked down. To keep the board from being affected by vibrations, it is sandwiched between two rubber grommets on each corner for dampening and the mounting locations for the board are elongated to allow for the use of many a different open source options.

It's pretty much common sense that one should not have the props on a multirotor when programming it for the first time. This is especially true with the MultiWii boards until one is really familiar with them. They can be a bit confusing at first, but between all the options in the Arduino software as well as the MultiWii GUI (Graphic User Interface), these boards are far more tunable than some other options out on the market today.

THE LAST WORD

The V-tail design of the Viper is a welcome departure from what we have become accustomed to seeing in the multirotor world of late. Add to that the fact that the Viper is constructed entirely out of plywood and what you've got is a unique looking machine that's easy to build and tons of fun in the air. The capabilities of the MultiWii control board only further enhance the already redeeming qualities of this latest offering from the fine folks at Twisted Hobbys. Toss an FPV camera on the nose plate for some organized, competitive racing or crank up the gains for mind blowing aerobatics. Either way, the Viper V-tail is tons of fun and is definitely worth a look if you're into straying from the flock. ✪

CONTACTS
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For more information, please see our source guide on page 89.