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Flight Test

Twin-Sync Engine Syncronizer from R/C Showcase

by George Lumpkins (aka "Twin Man")

It is sometimes written, "He who dies with the most toys-Wins!!" Twin-sanity hit me many years ago and I still am in the terminal stages... Can't get enough! I often get on my soapbox to warn others not to do twins as they're four times the problems. No one listens and the manufacturers are coming out with more each week. Obviously you, dear modeler, are not going to listen either, so let's see what we can do to protect your latest multi-engine creation.

Reliability has always been the danger with multi-engine planes. I have long been an advocate of gyros for rudders and ailerons to delay the unexpected snap roll that an engine out can cause, particularly in planes such as the P-38. Along comes a new product by Bill Wike called the Twin-Sync. Now, I am game to try this new gadget out, but not really too interested in trying on a scale P-38 and deliberately killing an engine in flight..... Even with two gyros!! (I will answer to Wuss, thank you very much!)

One of my "Creations" was taking two Long John's and making a quasi P-82 twin fuse (200' stand off scale.) Lots of fun, easy to fly, and VERY STABLE in engine out. In fact it will take off and loop on one engine. (Don't try this at home kids!!)

The purpose of the Twin Sync is to drop the throttles to idle if one engine fails automatically, to save an expensive model. The remaining engine can then be brought back up to speed, but the modeler must bring his radio throttle control to idle, and then bring the remaining engine back up in power. This allows MUCH more control and confidence during an other wise tense and potentially disastrous engine failure. It also forces the engines to synchronize their RPM by sensing both engines and adjusting the individual throttle servos. Now, perhaps this would be useful with 3D type twins and open a whole new world of excitement and complexity in the 3d Pro Bro World, while saving the scale models from the "Spiral of Death!!

After unpacking the kit and READING THE INSTRUCTION manual, you first need to be find North and South on the Rare Earth Magnets. Yes, you have to read the manual. Nothing is really scary about this installation, but... don't tell anyone, but you do need to read the installation manual.

Take a look at the sensors. Of course I do not need a magnifying glass for this, but some of you others, (and you know who you are), might. One side has no writing on it. This is NOT the side to go toward the magnet DO NOT INSTALL THE MAGNETS AT THIS TIME. Run the throttle servo wire from the receiver, to the Twin Sync to power it up, after first turning on the transmitter... or course. Lay the rare earth magnet down on a flat piece of paper or some surface that you are SURE it will not roll off of and down into the shag carpet!!

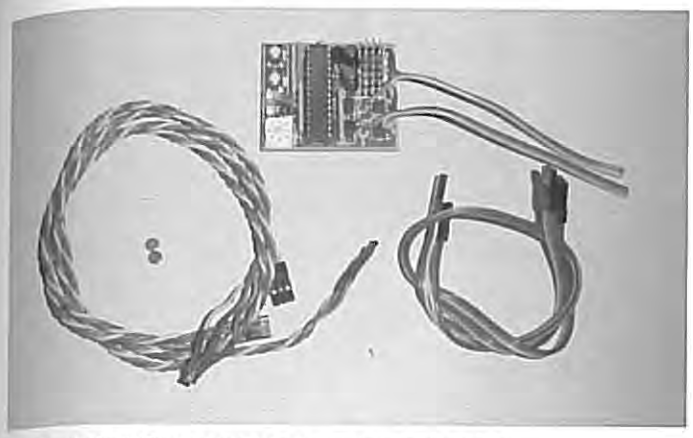
Pass the sensor for servo or engine #1 over the magnet and look for the green light on the circuit board to light. If it does not light, turn the magnet over and try again. It will now light as you pass the sensor over it. Now, Mark the correct pole or side of the magnet to identify which side MUST face the sensor. Use #1 or similar to not mix up the magnet for each engine and mark the sensor wires to make sure you do not cross them.

When you pass the sensor for engine two over the correct side of the magnet, this light will flash. The other light is for engine/ sensor two. Once the test is completed do not mix up the magnets or wiring. Due to memory fading with hair, I marked the sensor wires 1 and 2 to avoid mix up. Note, however you mount the magnets, you must make sure that they CANNOT COME OUT during engine running. If a magnet were to fly out during engine run up, the magnet could hit you or bystanders and cause injury.

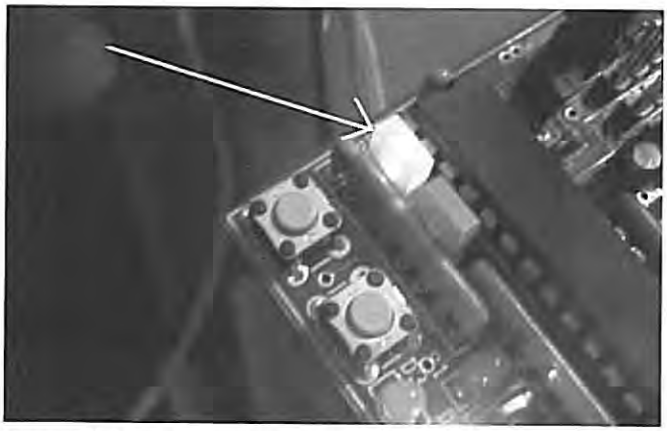
The instructions that come with the kit suggest several possibilities to mount the sensor magnets in the spinner, so naturally I rejected those in favor of my way. No one in this hobby would do that!! Besides, I had plastic spinners which I worried as to how to PERMANENTLY attach the magnets.

I am using Super Tigre .45's, so I removed the bearing cover and prop mount and drilled a pilot hole, that clear the internal webs. Note, if you are concerned about a balance issue, you could mount and second magnet on the other side. At such close proximity to the centerline of the engine, I did not feel this would be a problem. Here is the magnet that is inserted into the pre

Here's TwinSync reviewer George Lumpkins with his fleet. It's easy to see why he's called the Twin Man!



Here's the TwinSync components... right out of the box.



Green LED's on the circuit board are used to test the Hall effect circuit.

drilled hole. Make SURE the previously identified pole of the magnet is facing outward. At this point, I took a punch and slightly staked or crushed the outside of the hole to tighten the fit for the magnet. This was to make sure that the magnet could not slide out. The magnet was inserted into the hole from the inside with 30 minute epoxy or Liquid Steel Epoxy and pushed into place flush with the outside with a small pair of pliers. DO NOT CRUSH the spinner back plate. Add a small additional dab of epoxy on the inside of the back plate and let dry. You must test fit the back plate after drying to make sure it does not rub the crankcase nose when it is reinstalled. After the glue dries for at least 24 hours, push on the magnet firmly to make sure it is tight.

There are more engines and possible mounting conditions and possibilities than can be covered by one set of instructions, so I will only go over my idea. The sensor must be mounted to remain stable at a maximum distance of _" from the magnet. Possible methods are printed circuit boards or plastic boards from the engine mounts are possible ideas. The instructions go over several possibilities rather well,,,,,, but I went a different route.

I picked a spot around 135 degrees away from the carburetor to mount the clamp. If a little 30 minute epoxy or plumber Goop would make you sleep better at night, between the clamp and crankcase, by all means add some. You will find that this clamp really fits and locks tight... especially after the use or my handy channel lock pliers.

The clamp I bought was a little large, but that means that here are two spaces left, (one approximately _" away from the center line and one around 1/8") in the ratchet mechanism that the sensor for the magnet just slips through. Life is good... I planned that!!

Test fit the sensor in the clamp by sliding the sensor in and out until the sensor is positioned centered over the magnet. IMPORTANT NOTE. The back plate with the magnet must be oriented under the sensor in the bottom dead stroke position or approximately so. The idea is so that if one engine were to die and the prop "wind milled" to the compression stroke, you do not want the magnet under the sensor with the engine not running in the air. If it is, the computer might think that the engine is still running due to vibration and not function to bring the remaining engine to idle properly.

Remove the sensor and apply Plumbers Goop, or similar, to the wires and sensor base. DO NOT ALLOW THE ADHESIVE TO EVEN APPROACH THE SENSOR END!!! I repositioned the sensor in the bracket to the correct position above the magnet and allowed the Plumbers Goop to dry. It may be necessary to position the wires to maintain the 1/8" gap as the Goop dries.

This is the Hall Effect transistor... and the magnet that needs to be mounted into either the spinner or the thrust washer on each engine.

This view shows the actuator magnet, epoxied into a hole drilled in the engine thrust washer. This needs to be very secure, so the magnet doesn't become an airborne projectile.

George found these ratchet clamps at a local Ace Hardware store... a simple way to secure the sensor transistor onto the engines.

Here's one of the sensors... securely in place, where it will pick up the magnetic field from the magnets rotating in front as the engine runs.

As this is my test bed, I did not cut hole in the firewall or fuse for the wires, but will route them on the fuselage and into the fuel tank hatches. Secure the wires to prevent wind from pulling them out, here Goop will work again. DO NOT clamp them to metal or eventually the insulation will wear through and cause a short circuit. The plan is to move this device to a more valuable plane if the system performs as I hope

After following the instructions for low and high idle set points, off to the field.

Starting the engines is similar to normal start procedures, but once started the engines should be brought to idle momentarily to activate the sync system. From then on, it is completely automatic to hold the engines together on RPM like glue. On the 3D type of sport flying, I found it particularly invaluable.

One of the problems with an aerobatic twin and hovering is that the engines do not spool up together and therefore the hover maneuver is very difficult to maintain. I am here to tell you, that problem is a thing of the past!!!! The engines come up together, even if one is set rich.

I then found my "Bro of Pro Bro", whom previously did not like the plane, but is MUCH better at 3 D than anyone I know, and asked him to retry the plane with this new fangled electronic device. This time the response was "WOW, this is a lot of fun". As we began to explore the new experience, he was more and more impressed and really having fun. I cannot use his name. Pro Bro is single engine only!!! He feels he has a "REP" to protect.

The engines can still be set with dual input for mixing of rudder to engines for much better knife edge and spins so fast that on one model of mine, it could actually cause the engine going in reverse to die due to fuel starvation. This is no longer the problem and white knuckles it once was.

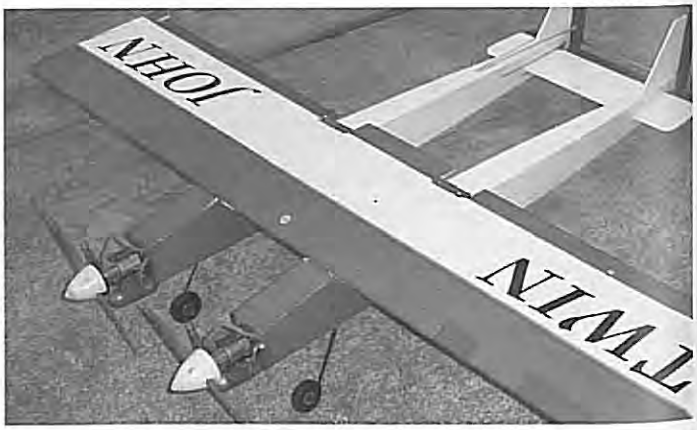
Does the Twin Sync do as promised to bring one engine to idle if the other dies? Yes. The potential for protecting your really expensive aircraft, in terms of time and MONEY for that giant scale model is immediately apparent to prevent the spiral of death. That was and still is the original idea of the design of this unit. I think that I have also found that there are other benefits to it in multi-engine aerobatics.

Currently a four engine version is in final test to control pairs at a time, such as outside to outside and inside to inside.

You can see the manual and purchase the unit from RC Showcase at http://www.rcshowcase.com/html/accessories/twinsync.html.

Best of Luck,
Twinman

A dab of Plumber's Goop can be used for added security on the ratchet clamps holding the sensors in place.



This is George's "hybrid" twin engine Long John. It's proven to be a good test bed for the TwinSync... which is now proven for a "serious" twin.