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PEAK OF FLIGHT

NEWSLETTER

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Build a Super Simple, Safe, Cheap Igniter Tester

Cover Photor: Mad Cow Rocketry's Honest John rocket.
Get your own kit at: www.ApogeeRockets.com/Madcow_Honest_John.asp

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Build a Super Simple Safe Cheap Igniter Tester

By Annette Sostarich

After a disastrous ignition failure on my Strap-on booster rocket (Peak-of-Flight Newsetter #260 at www.ApogeeRockets.com/education/downloads/Newsletter260.pdf), I decided that pre-testing cluster igniters would be a good idea. Since igniters on clusters are wired in parallel, it's impossible to tell once they're all hooked up, whether any one of them is good or bad. The only thing you know for sure is at least ONE of them is good.

If you really want to get fussy, you could put an ohmmeter in your range box, and if you are clustering huge expensive rockets that might be a good idea. However, if a simple go/no go test will do, read on.

Testing igniter continuity can be done using a battery and a light bulb, BUT you must be absolutely sure the current through the is igniter is limited to a safe level, or you may accidentally fire the igniter. This is why we use an LED – They need much less current.

Here's a guaranteed safe design. Why? It is safe because the battery chosen for this project can only produce about 25 milliamps. The lowest current igniters I know about, the Q2G2 from Quest (www.apogeerockets.com/igniters.asp#Q2G2_igniter), need over 100 milliamps, so you have a wide safety margin.

Even if you've never built anything electronic before, this project is a great intro to rocket electronics. It can be built for less than $10, much less if you can scrounge parts.

Parts list, with Radio Shack part numbers:

1- Super Bright LED. Buy the biggest, brightest LED you can find. You want to be able to see it in daylight. Only use red LEDs – They need less power. Radio Shack P/N 276-086 (~$2.99) will do, although you can get much better deals on eBay. Search for "Super Bright red LED." Don't buy "Surface Mount" LEDs.

1- Lithium coin cell holder, Radio Shack P/N 270-009, ~$.99

1- CR2032 Lithium battery. Do NOT use a larger battery. The 2032 is very common, and can be found at Radio Shack (P/N 23-802), Walgreens, etc. You'll pay a premium price at local retailers. eBay has 10 of these for the same price you'd pay for one locally.

1- Small box to put it in, with a nonmetallic panel to mount the parts. Whatever you have that the components will fit in and is sturdy enough will do. Radio Shack's P/N 270-1801 (~$2.49) will do nicely (Mount the parts in the plastic box, not on the aluminum panel). I used a dummy pager that I already had.

2- Screws with nuts and washers. I used 4-40 X 1/2". Use whatever is handy.

A bit of wire, glue, and solder. You can assemble this without soldering, but soldering all connections is preferable for reliability. There's nothing worse than unreliable test equipment. If you don't know how to solder, here's a good chance to learn. Radio Shack has soldering kits for under $10.

Photo 1: All the components you'll need for building an igniter tester, with 2 different boxes.

Construction

Lay out the parts where you want them to go in the box. Photo 2 shows my layout. The LED is below the screws in the photo. The screws are the testing contacts. Place them about 1/2" - 3/4" apart. If you place the LED close to one of

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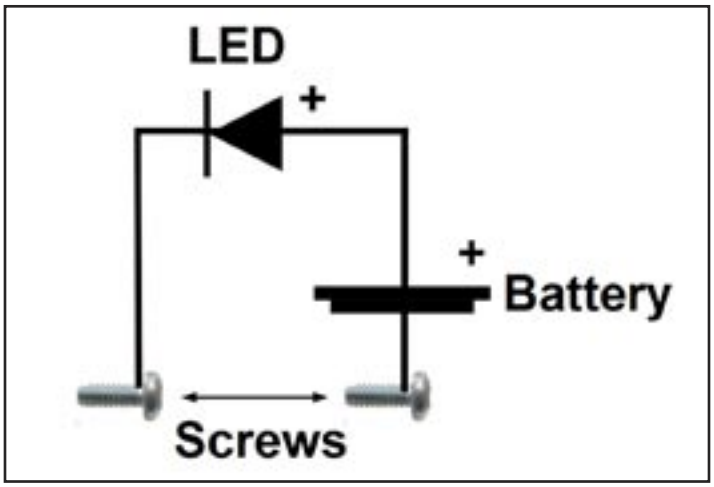
Photo 2: Layout of the parts in the plastic box.

the screws, you can connect one of the LED leads (wires) directly to one of the screws. Drill holes for the screws and the LED.

Drawing 1 shows the wiring diagram in schematic form. Note that the battery and LED are both polarized – That is, they have a plus and minus lead, and the plus side of the battery must match the plus lead of the LED. When the battery is in the holder, the plus side is up. Find the terminal on the underside of the battery holder that



Drawing 1: Electrical schematic of the igniter tester.

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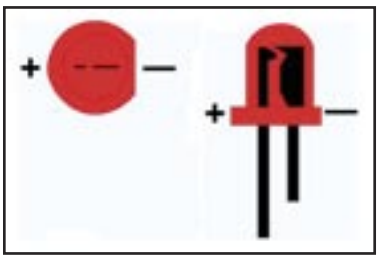
goes to the plus side of the battery. LEDs usually have the plus lead longer than the minus lead, and also a flat spot on the minus side of the component (Drawing 2). Test the LED and battery holder by touching the LED leads to the appropriate terminals on the battery holder. The LED should light up. If it doesn't, reverse the LED. Remember which lead goes to the plus side of the battery holder.



Drawing 2: The wire nearest the flat side of the LED is the negative terminal.

Solder the plus lead of the LED to the plus lead of the battery holder. My tester has the battery holder close enough to bend over the LED lead and connect. Try to solder quickly, the LED is heat sensitive. Solder a piece of wire to the minus side of the battery holder that will be long enough to go to the screws.

Now, glue the LED into the hole from inside the box. Put the screws through the holes from the outside. Connect the minus lead of the LED to the nearest screw by making a hook in the LED lead and putting it around the screw, under the washer and nut.

Connect the wire from the minus lead of the battery holder to the other screw. I just soldered the wire to a washer and placed the washer under the nut (Photo 3). You can also twist the wire into a loop, solder, and put it under the washer (Photo 4). Tighten the screws.

Photo #3 The wires are soldered directly to the washers that go under the nuts.

Test by putting any piece of metal across the screws. The LED should light up brightly. If not, check the polarity.

Glue the battery holder into the box. I used hot melt glue for everything. Assemble the box with screws or tape so you can change the battery.

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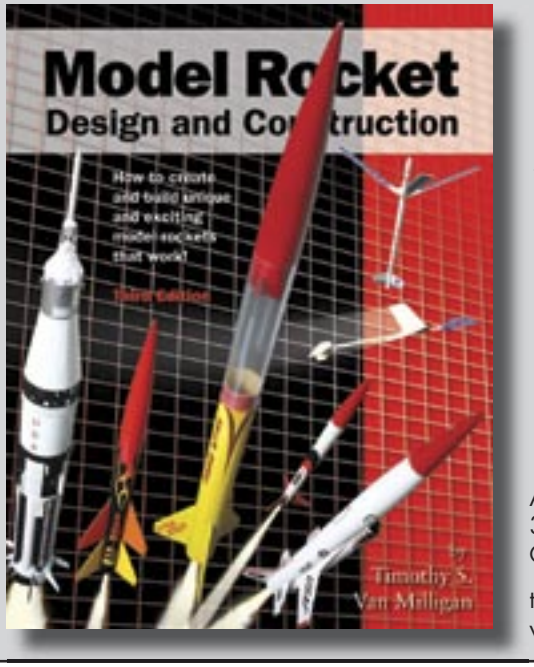

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By Timothy S. Van Milligan

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Photo #4: An alternative to soldering to the washer is to make a loop in the wire, and put it between the washer and the nut.

Photo #5: The completed igniter tester. Touching the igniter to the screws will cause the LED to light up if the igniter is good.

To use, touch the igniter leads to the screws (Photo 5). Store it where the screws cannot touch any metal, or put a piece of tape over the screws when not in use to avoid running down the battery.

Congratulations! you now have a 1-second igniter tester!

About the Author

Ever since she can remember, Annette Sostarich has been fascinated with two subjects - electronics and aviation. From watching planes take off as a kid on Saturday mornings to over 450 parachute jumps, designing and building numerous kites, volunteer work at Tucson, Arizona's Pima Air & Space Museum in their restoration hangar, and now designing unusual rockets, there have been a lot of adventures.

Her electronics background began with picking up a soldering iron by the wrong end at the age of 12, and has since been parlayed into a part-time computer repair business. She is just beginning to apply electronics to rocketry with subcompact video cameras as payloads. She met her husband of 28 years while skydiving, and they jumped into their own wedding. Her husband is an aircraft mechanic who is currently building an airplane in their garage.

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