Firework Instructions

Ok the general gist is that there will be 3 channels of "shoots" - the inner, the middle and the outer. Then there are the "embers" which are the part that fades out. Each row of shoots is sort of random, sort of not... quick diagram below. The colors are not there to represent color, they represent channel. Notice I use roughly 3 different lengths of strips a 4" section, a 6" section and a 10" section. Randomize them in their placement. Use different lengths to make it look like the shoots are random. I made one too uniform and it looked bad. Also, on the top left and right, start to bend the outermost branches down a little to mimic an actual firework.

Material info and instructions on next page.
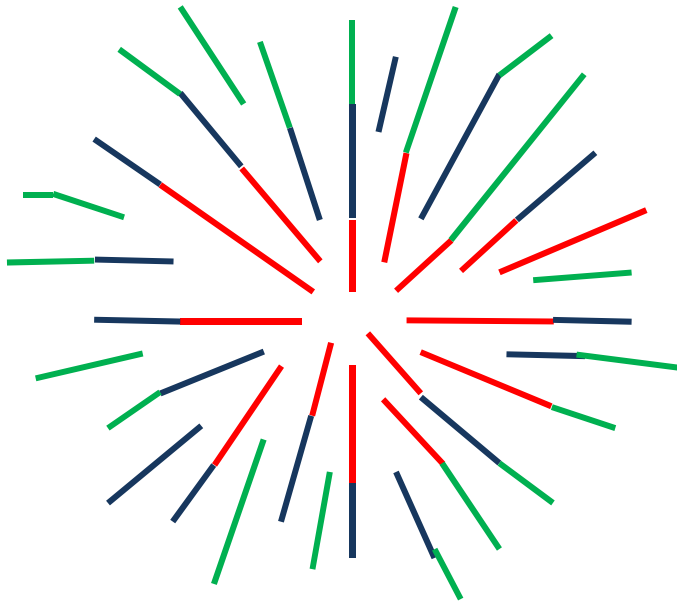
Let's talk about the LED strips first. I used the LED strips because they were the brightest and the LIGHTEST. Easiest to work with, lowest power. I tried with convention LED minis or incandescent minis and they looked terrible and weighed too much to suspend over my house. So I used the strips. Several options with the strips:

They come on 16' 4" rolls. In each 16'4" strip, there are actually (98) 2" sections. The strip can be cut at any of those 2 inch sections. So you can make a 4" strip, 6" strip, etc. Each section has solder points so you can connect it.

The rolls (about $60 per roll) come in either solid colors (red, blue, green, yellow, pure white, warm white) here:

http://www.ledlightsworld.com/smd-3528-flexible-led-strips-300-leds-p-90.html

Or the better model (about $80 per roll) has an RGB option which has 3 leds so you can make any color you want, they are here:

http://www.ledlightsworld.com/smd-5050-trichip-flexible-led-strip-with-150-leds-p-91.html

The firework in my video is just using a solid color led strip, but you could in theory make an RGB one too.

Two other options you need to know about. Normally the rolls are not water proof. They are just strips of flexiboard with the components on them. You want the Waterproof Surface Injection option. This coats them in silicone. The top of the strip is round, the bottom is flat with an adhesive surface. There are other waterproofing options, but I like this the best. The other option is not important – it's whether you want the flexiboard to be white or yellow background. Who cares, when it's dark, no one can see it.
For a 4'x4' firework, you will need 2 rolls.

(Note – this website was AWESOME to deal with. Very prompt. Comes from China, but I never had any issues. Fast as hell. 4 – 5 days max.)
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OK NEXT – you will need a way to power these. Best bet, spend the $100 on the CMB-16D – QC from LOR. Each firework will need 3 DC channels and 1 regular AC channel off a regular LOR controller.
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So you will also need:

- 4'x4' piece of regular fiberglass Screen
- Some hookup wire
- Soldering Iron, solder
- Hot Glue
- One set of regular mini lights in whatever color you want the "embers" to be. (in my video, they were white)
- Lots of patience

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Here we go:

1. Cut your LED strips in to the desired lengths to create the "shoots" of the firework. **NOTE: You have to cut on the line between the 2 sets of solder points. Each led segment is 2" long, so in the diagram above when I said a 4", 6", and 10" strip, that equates to a 2 led, 3 led, and 5 led segment. Make sense?** For my 4x4 firework, I used (8) 10" sections, (22) 6", and (30) 4".
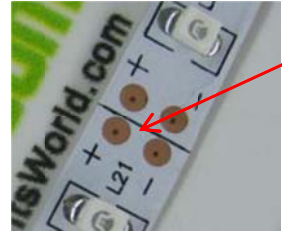
2. This part sucks a little. The solder points are buried under the silicone water proofing. I found the easiest thing to do is get a dremel…. Put the sander wheel on it, put the dremel in a vice and just run the end of the strip against the sander wheel until the silicone is ground away and you can see the metal contacts. This takes practice, but gets pretty easy after a while.
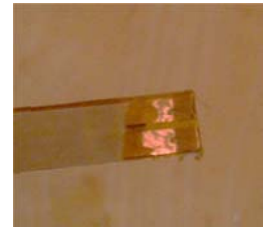
3. Next you need to cut yourself some wire. For however many strips you have, you need a segment of 8" of wire. Thin guage (I even got away with cat 5 cable, not much power). (Thin because you are going to need to push the wire through the solder point and if it's too thick it rips the strip.) Twisted pair worked great for me. Strip both ends. **Be forewarned…..these are DC led strips, they are polarity sensitive. Make sure you stay standardized in which color you use for positive and negative, or else your firework will only half light up…. This SUCKS (trust me).**

4. Ok, so strips ready, wires ready – warm up your soldering iron. Grab a strip and a wire. Push the wire through the strip on both the pos and neg (careful again to maintain polarity) and then solder down. Save yourself some time, have a 12v DC power source nearby… (plug it in and tape the leads to the table or something) When you finish soldering, run the newly soldered leads by the test leads to make sure your connections are good. Better now then when on the screen. Repeat!

5. Once the strips are all prepared, get your screen. Assemble on a surface like a garage floor. (You are going to hot glue these strips down eventually, so glue will leak through. You do NOT want to glue to your dining room table.) Anyway, before you glue though, lay your firework out. Start with the inner channel. (use the adhesive back of the strips to temporarily hold them in place). Wire up and use a test 12vdc block to make sure it works. Move on to channel 2, etc.

6. Once everything is tested and done, connect a main power lead to each of the 3 channels (just leave it dangling for now) and solder over all connections. I also found liquid electrical tape to be a god send here. Do the same for the middle and outer rings.
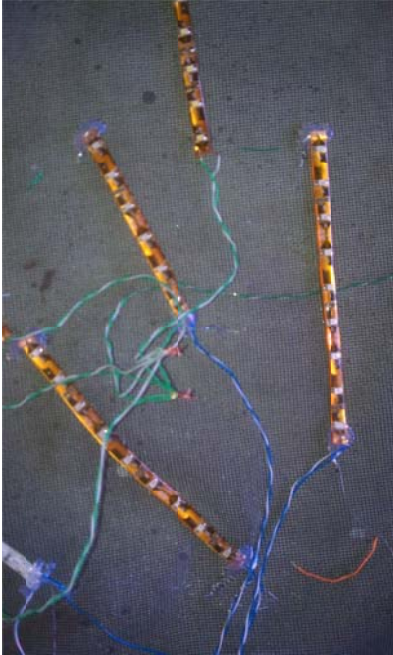
7. Once you have the 3 rings done and everything is tested, hot glue down all the strips. Both ends. Use the hot glue as an insulator to the solder points on the strips.

8. Ok so that's the "shoots". The embers are easy too. Take a regular set of mini lights. Cut the bulbs out, leave an inch or so of wire on both sides and strip both ends. Lay them out around your firework and hot glue them down. (I found with these its easier to glue them down first, then wire them up.

9. I wired them in series. Take the plug from your light set. Solder one wire of it to one lead of the first bulb. Then connect the other lead of the first bulb to the next bulb and so on. The 2nd lead of your last bulb will be connected to the other side of the plug. **BE CAREFUL, if you screw up this wiring, or double back on yourself, when you plug it in, you will blow every bulb in the lot. Be careful of accidental shorts. Before you plug it in, liquid electrical tape or hot glue over your connections.**

a. You may be asking why I cut up the mini lights… the spacing on my lights wasn't right… they were too close and it looked funny. I found cutting the minis gave me more control over the placement of the embers. Do as you please.
b. Also, I chose mini incandescent lights because they dim more naturally than the led strips.

10. That's it – solder over all your connections, tape or liquid tape every connection. Cleanup your wiring by bunching and gluing it down. Don't worry what it looks like, you can't see it at night!
11. Just play with the sequencing in the software and you'll be good to go.

My 4x4 fireworks weigh about 2.6 lbs (so they are easy to suspend over my house) Each one cost me about $150 (I made 4) ..and took about 2 days to make. (In fairness, the first one took me almost 2 weeks ☺)

Good Luck!
Email me with questions – andrewszito@gmail.com