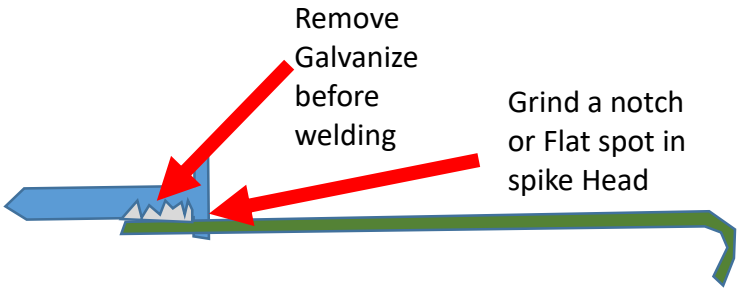
Leaping Arches

These Shapes you see going across my yard are most frequently referred to as leaping arches. I insert LED strip lights into tubing to form the Arch.

I used polyproylene tubing in Natural color which is basically clear. The tubing is fine in the cold, but it might sag a bit in warmer weather. This tubing is commonly used for Hula Hoops. I found it on Ebay at https://www.ebay.com/usr/dreadfuldesigns No Longer Available

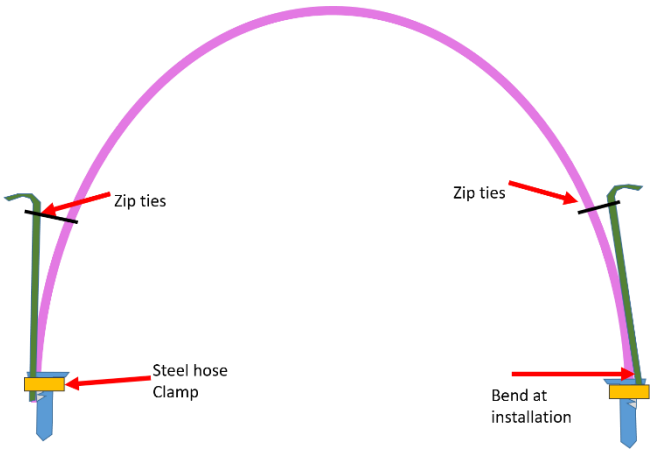
Coil of natural colored 3/4" OD PolyPro tubing, with a 5/8" inner diameter.

Search for polypropylene and PolyPro



I made stakes to hold each end of the Arch that I drive into the ground with a hammer. The stakes are composed of galvanized spikes from Lowes and I weld a 3/16 steel rod onto the spike. I used an angle grinder to remove the galvanization from the spike before welding the rod. Welding on Galvanization is reported to generate poisonous gases. I used a plumber's torch to heat the non-welded end of the steel Rod to bend it round for safety. I use a steel hose clamp and Zip ties to secure the Polypro tube to the stakes. I use a lot of zip ties and I usually buy them at Harbor Freight on Sale.

Disclaimer: I would like to find a better and cheaper way to provide stakes for the Leaping Arches. The spikes at Lowes are $0.90 and the steel Rod is about $0.30 for 2ft. (my local Steel supply is IMS).
Welding: very easy welding, just need to make it stick. I use a wire welder.



I run/fish the WS2811 strip lights (12v) through the tubing. I make all the strip LEDs face the same direction. I use the standard JST connector on the WS2811 strips which *fit through the tube*. The WS2811 strip lights come with extra power and ground wires that I use to inject power. You must inject power, the WS2811 strips will not provide sufficient power to strips in series more than three. The WS2811 strips are not extension cords. Which is unfortunate because the Data Line (middle connector) must propagate through all the strips.

Installation:

With the stakes I use you can drive the end of the Arch into the ground with a hammer. You can add zip ties to try and adjust the Arch so that it looks pleasing to the eye. The stake I've made is easy to bend at the bottom and midway to adjust in making the Arch pleasing to the eye (consistent round Arch). Adjust the connections to the next Arch so that water will run away from the connector. Try to make a sort of Drip Loop to use the cable company language.

Cable Lengths:

Length to First Arch can be critical. The controller board may have trouble driving the signal to the First Arch. The end of the first Arch drives the second; normally this would be much shorter (easier). I contacted the controller board manufacturer and I decided to use Cat5 network cable with a cable to pin adapter. I have two continuous sections of Arches, both are driven by the controller in my garage. The Drive lengths of the two sections is 75ft and 100ft and they seem to work consistently. I also have a section with 100ft cable that I place a buffer amplifier as the distant end of the cable.

Monoprice Monoprice Cat5 100ft cable

Cat5 Network to pin RJ45 to Screw Terminal Adapter

Link to F-Amp PixelController.com F-Amp 5 pack

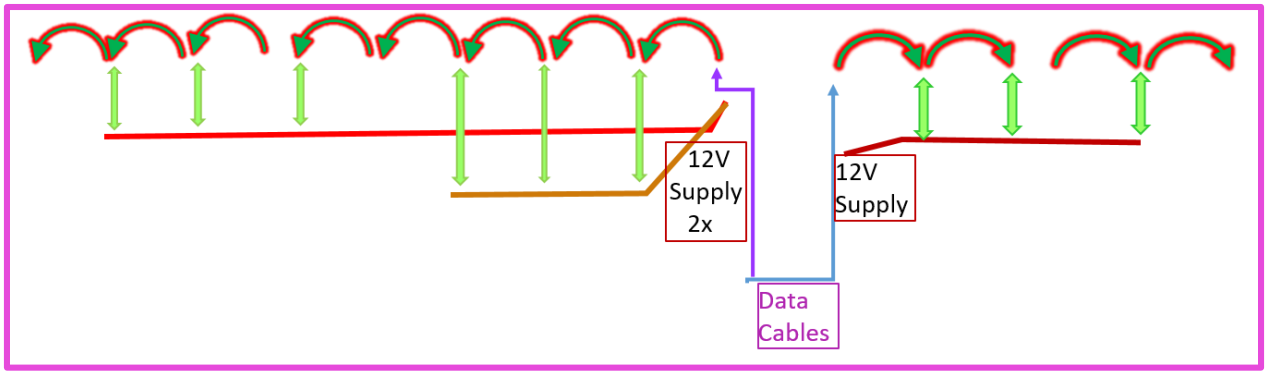


Figure 1 Power Lines shown with Power injection into Arches and Data Cables

Power Injection

I use all 12v WS2811 strip lights. The 12V version allow for less frequent power injection. The 5V version require power injection for Each strip to maintain good color match. The Ground returns are all connected together. The 12V I can inject power every OTHER strip and that works so well I plan to Inject every Third strip

for the next project. Size your power supplies carefully. I normally derated my supplies by close to 50%. For example a 360 watt supply should be loaded at about 200 watts not 360 watts.

Here is an article about power for LED strip lights
https://www.thesmarthomehookup.com/the-complete-guide-to-selecting-individually-addressable-led-strips/

Basically 0.184 watts per RGB. WS2811 strips 300 LEDs per strip or 55 watts per strip. So 4 strips = 55 x 4 =220 watts. I use 300 LEDs per strip, many options are available such as 150 per strip.

Now the less than perfect measured data. With my strips and My sequence I measured a peak of about 9.9 Amps per four Arches. I used a "Clip On" current meter so accuracy is suspect. This would seem to indicate that I am under utilizing my 360 Watt 12v supply and only drawing 125 Watts of power (9.9amps and I adjust the voltage to 12.6VDC). Many are available on Amazon, They all seem to be Chinese made so I don't want to over stress them.

Link to Amazon 12V Power supply or Similar

Congratulations

If you read through all this and you are still interested, there is still much to learn.

Controllers I use the falcon F16V3. Read about it here.
E131 Artnet Pixel Controller - F16V3 - PixelController.com

Players. I use the Falcon Pi Player running on a raspberry pi. You can read about them here.
FalconChristmas/fpp: Falcon Player – GitHub
Buy a Raspberry Pi 4 Model B – Raspberry Pi
I actually ran the display from software (below) the first year. I now use the FPP and I like it much better.

Software. I use Xlights. You can read about it here.
xLights – Light sequencer and Show scheduler