FireFly Case Assembly Instructions

Contents

Hardware List

HARDWARE FOR CASE	
Item	**Link**
Case -2800 Weatherproof Protective Case, Medium, Black	https://www.harborfreight.com/2800-weatherproof-protective-case-medium-black-63926.html
12V Charging Port - 10 Pack 5.5mm x 2.1mm 3 Pin Female DC Power Jack Panel Mount	https://www.amazon.com/gp/product/B077YB75N3/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1
Cable for charging Power Plate - 5.5mm x 2.1mm 90 Degree Right Angle DC Power Male Plug Jack to Bare Wire	https://www.amazon.com/dp/B081TV7SQ7?psc=1&ref=ppx_yo2_dt_b_product_details
Cue Port Jacks -12 Pack 3.5mm x 1.3mm 2 Pin Female DC Power Jack Panel Mount Screw Nut Kit DC Socket Electrical Plug	https://www.amazon.com/gp/product/B077YHN1WQ/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1
Cue Connection Cables -(10 Pack) Replacement 3.5mm x 1.35mm 90 Degree Right Angle DC Power Male Plug Jack to Bare Wire	https://www.amazon.com/gp/product/B0851CQBWX/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1
WiFi Antenna Extension Cable - (2-Pack) RP-SMA Male Right Angle to RP-SMA Female Bulkhead Mount	https://www.amazon.com/gp/product/B081BGQQXC/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1
Switch -6pcs 12V Red LED Light Illuminated Snap-in Boat Rocker Switch Toggle Power SPST ON-Off 3 Pin	https://www.amazon.com/dp/B081CTDM9X?psc=1&ref=ppx_yo2_dt_b_product_details
Antenna (Optional) -WiFi Antenna 9dbi 2.4ghz 5ghz 5.8ghz Dual Band rp SMA	https://www.amazon.com/dp/B07VGM2GVB?psc=1&ref=ppx_yo2_dt_b_product_details
16 AWG strand Red and Black wire	
Spade connectors for 16 awg wire to switch	
DECALS	
Item	**Link**
Clear Self-Adhesive Lamination Vinyl Roll for Die-Cutters and Vinyl Plotters (12" x 6ft)	https://www.amazon.com/dp/B07FDL8R1R?psc=1&ref=ppx_yo2_dt_b_product_details
Printable Vinyl for Inkjet & Laser Printer - 30 Pack Printable Vinyl Sticker Paper Glossy White - Standard Letter Size 8.5"x11"	https://www.amazon.com/dp/B07ZV63Z7V?psc=1&ref=ppx_yo2_dt_b_product_details

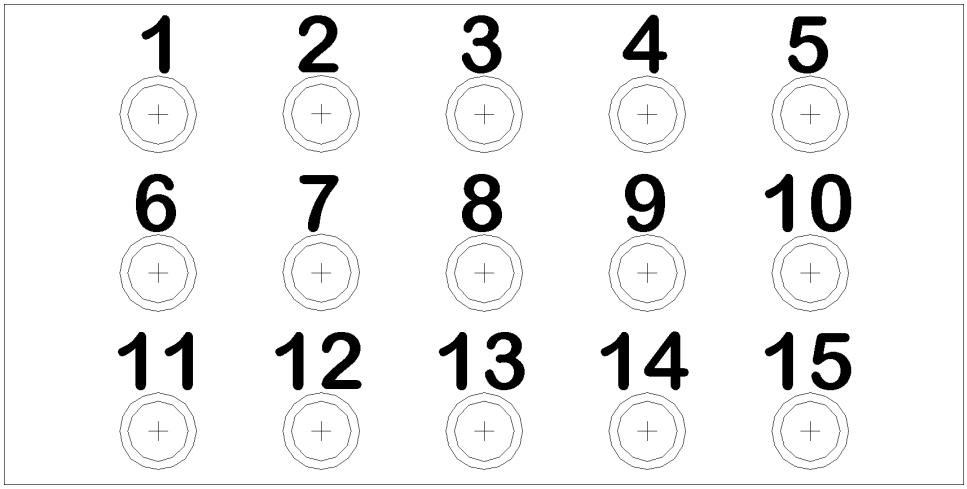
Tools Required

- Drill
- 1/8” Drill bit
- 1/4" Drill Bit
- 5/16” Drill bit
- 7/16” Drill Bit
- Awl or Nail
- 11mm wrench (or pliers)
- Utility Knife
- Tape
- Wire Strippers
- Match / Lighter or Heat Gun
- Solder
- Soldering Iron

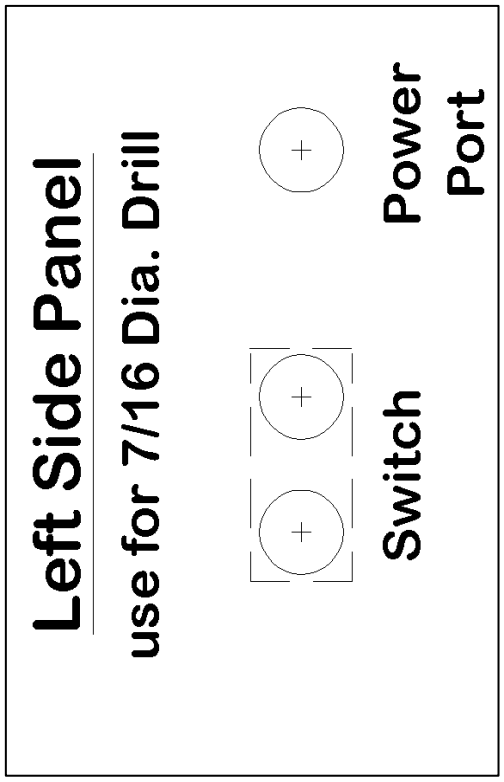
Layout Templates

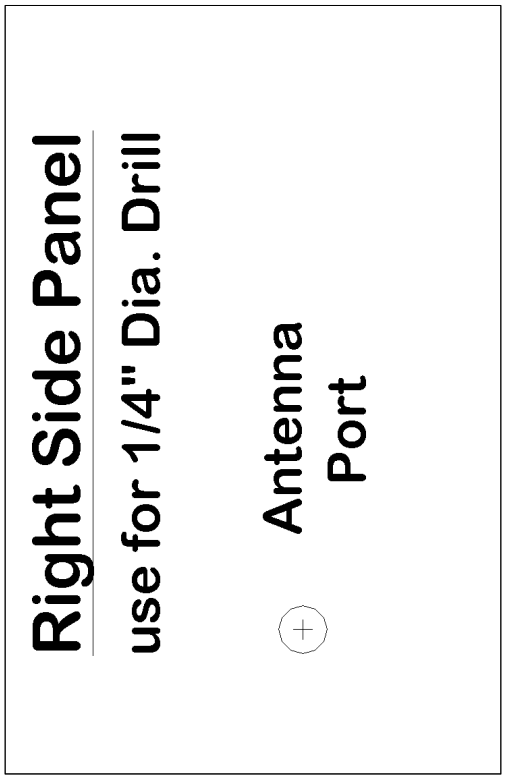
These templates are provided to simplify the process of laying out your case and locating each hole. Print this page at 100% and cut out the templates provided.

Cue Port Template



Side Templates





Soldering Tips

For this project, there are several components that some soldering is required. To help builders with soldering.

Video Instructions
Click Here

Use Flux Core Solder: For electronics, you should use a lead free flux core / rosin core solder. The flux core will assist in the solder flowing into the joint. DO NOT USE acid core solder as this will damage your circuits and electrical components. Acid core solder is sold at home improvement stores and is mainly used for plumbing and metal working.

Make sure the soldering Tip is "Tinned": When starting to solder the tip needs to be "Tinned". If the soldering tip is black / dark, it has oxidation or carbon buildup on the tip, and soldering will not flow onto the tip and make soldering very difficult. If your soldering iron has the dark oxidation on it, it needs to be removed and reconditioned. This may require a Tip Tinner or Tip Cleaning paste. For heavy oxidation, some fine sandpaper can be used on a cold tip to remove the dark oxidation, be careful not to wear down the metal tip. Once the oxidation is removed, plug in the soldering iron and melt some flux core solder onto the tip as it starts to heat up.

Storing the soldering iron: When finished soldering, melt additional solder onto the tip to get a good coat. Lightly clean the soldering tip and turn off the iron. The next time the soldering iron is used, the coating should be cleaned off once the iron is heated up and re tinned with fresh solder.

Locating and Drilling Holes for Cue Ports

This process should be used for locating and drill the hole for the cue ports. For this procedure, you will need a Drill, 1/8” and 5/16” diameter drill bit, the Cue Port Template, tape, and an awl or nail.

Video Instructions
Click Here

1. Start by removing all Foam parts from inside of the case. Place these in a safe space for later use. Be careful when removing these so you do not accidently begin to tear apart the individual squares.
2. Print the Cue Port Template and cut it out. Place the template on the back of the Apache 2800 case lining it up in the center. The bottom edge of the template should be placed at the top of the radius bottom edge of the case. (back of case, lined up on the bottom, not on the roundy part).
3. Use an awl, or nail to press an indention mark in the center of the crosshair of each circle location. This will be location to drill the holes. The indention will help locate the drill.
4. Remove the template.
5. Use a 1/8” diameter drill and drill out each marked location. Use light pressure when drilling the hole. Let the drill do the work. The drill will try to pull through the plastic case.
6. Switch the drill size to 5/16” and drill out each hole to the larger size. The process of stepping the drill up will improve your accuracy. If you attempt to use the larger drill directly from the indentation / drill mark, there is a good chance the drill will “walk” on you.

Place Vinyl Numbers on Cue Port Locations

If you purchased the hardware kit, the vinyl numbers, and a transfer sheet should have been included. The vinyl numbers may or may not have had the excess vinyl peeled away. If not carefully remove the excess vinyl. Using a pair of tweezers or sharp point instrument will make this easier. You will need to remove the center of some numbers as well e.g. 6, 8, 9, and 0.

Video Instructions
Click Here

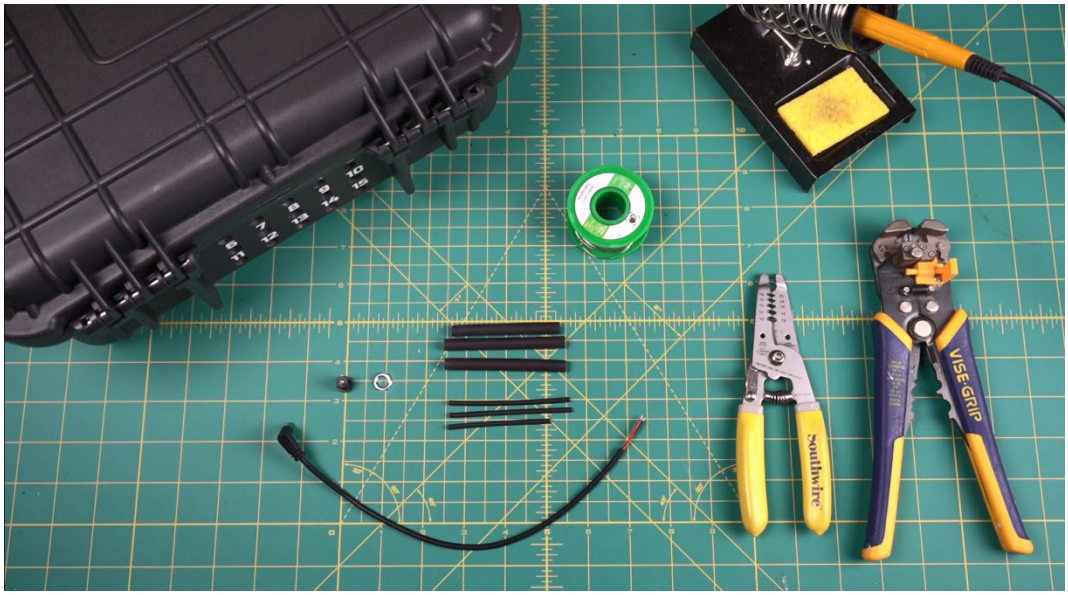
If using the vinyl numbers that come with the hardware kit, the numbers will already have the proper spacing between the holes previously drilled.

1. Ensure all debris has been removed from the hole locations. If there are some flashing or fragments of the drilled holes remaining, try to remove them with a sharp knife.
2. If you are not using the purchased hardware kit, skip to step 6.
3. Peel the backing from the provided transfer paper (clear sheet with alignment grid printed on it) and align evenly with the vinyl numbers.
4. Press the transfer paper firmly on top of each number to ensure good adhesion.
5. Gently peel the transfer paper from the vinyl sheet. The numbers should come off with the transfer paper.
6. Align the numbers so they are above the associated hole. The numbers 6-10 and 11-15 should be aligned roughly in the middle of the first row and second row or second row and third row respectively.
7. Press the transfer sheet onto the case. Firmly rub on each number to transfer it to the case.
8. Gently peel the transfer sheet away. The vinyl numbers should remain.

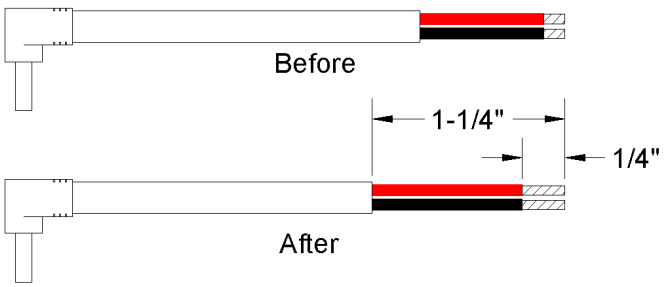
Installing Cue Ports and Connection Wires

For this step you will need the “Cue Port Jacks” and the “Cue Connection Cables”. The “Cue Port Jacks” should come with the jack and a retaining nut. If using the purchased hardware kit, there should also be 15 pcs of 3/32” heat shrink tubing and 15 pcs if 1/4” heat shrink tubing.

Video Instructions
Click Here

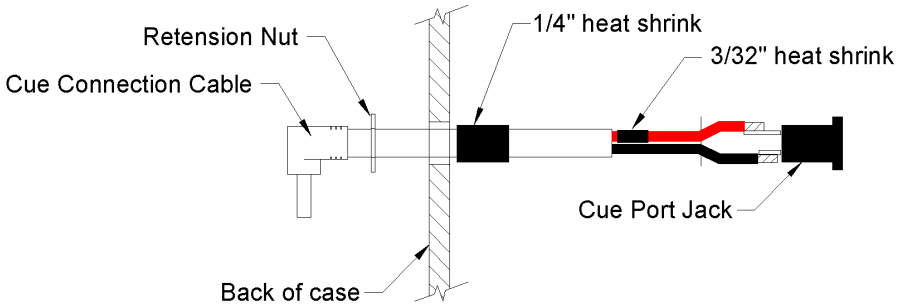


1. Check the holes on the inside of the case and ensure all flashing from the drilling process has been removed. Use a sharp knife to assist in removing any excess plastic parts.
2. Start with Cue 15 and work backwards. This will make it easier to tighten the retainer nut on the cue jack as you work.
3. Strip away the wires and outer sheathing of the Cue Connection Cable to allow room for the heat shrink tubing and easier soldering of the wires. This step can be skipped, but you may run a risk of exposing the heat shrink to unwanted heat during the solder process. Lengthing the amount of exposed wires will allow you to pass the wire through the holes on the Cue jack terminals to make soldering easy.

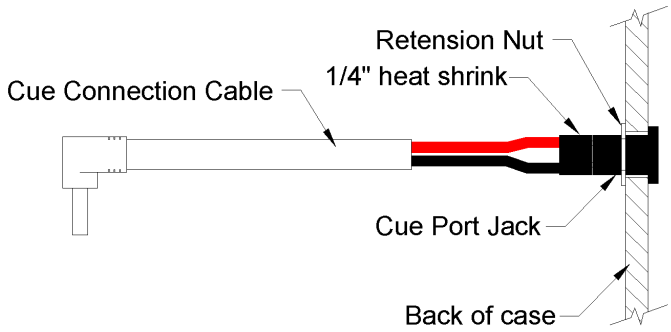


4. Place a retainer nut onto the exposed wire end of the Cue Connection Cable.
5. Stick the exposed wire end of the “Cue Connection Cable“ through the port hole drilled in the back of the case. (starting at hole 15 and working backwards)

6. Place the 1/4" heat shrink tubing on the Cue Connection Cable.
7. Place the 3/32” heat shrink tubing onto the red wire. (at this point the assembly should look like this)



8. Place the tip of the black wire through the hole on the short terminal on the Cue Jack and fold it back on itself.
9. Solder the black wire in place.
10. Place the tip of the red wire through the hole on the long terminal on the Cue Jack and fold it back on itself.
11. Solder the red wire in place
12. Slide the 3/32” heat shrink tubing over the long terminal covering the exposed wire. Activate the heat shrink using a match, lighter, or heat gun. This should only take 2 to three seconds.
13. Slide the 1/4" heat shrink tubing around both the positive and negative terminals on the Cue jack and activate the heat shrink using a match, lighter, or heat gun. This should only take 2 to three seconds.
14. Slide the assembly into the case and secure with the retaining nut.



15. Repeat steps 3 – 14 for each remaining cue.

Locating and Drilling Holes for the Switch and Power Port

This process should be used for locating and drill the hole for the antenna extension cable port. For this procedure, you will need a Drill, 1/8” and 7/16” diameter drill bit, left side drill template, tape, awl or nail, and a utility knife.

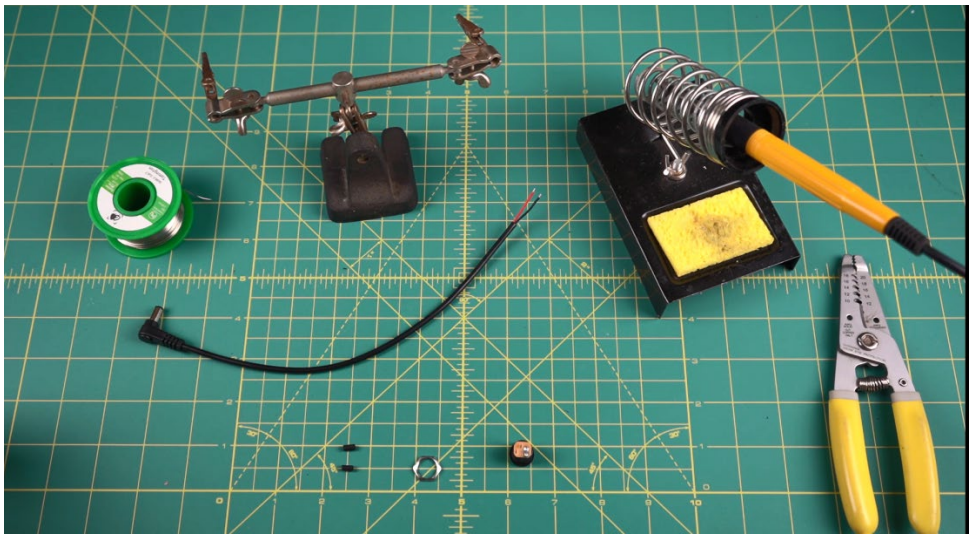
Video Instructions
Click Here:

1. Print and tape the “Left Side Panel” template to the left side of the apache 2800 case. The bottom and right side of the template should be aligned so no part of the template is on the curved part of the corners of the case.
2. Use an awl, or nail to press an indention mark in the center of the crosshair of each circle location. This will be location to drill the holes. The indention will help locate the drill.
3. Remove the template.
4. Use a 1/8” diameter drill and drill out each marked location. Use light pressure when drilling the hole. Let the drill do the work. The drill will try to pull through the plastic case.
5. Switch the drill size to 7/16” and drill out each hole to the larger size. The process of stepping the drill up will improve your accuracy. If you attempt to use the larger drill directly from the indentation / drill mark, there is a good chance the drill will “walk” on you.
6. Use a utility knife to cut out the remaining plastic of the switch location. Use caution when performing this action so as not to cut yourself. I use two techniques for this
    a. Make multiple passes with your knife to cut through the plastic. or
    b. Holding the utility knife roughly at a 45degree angle, press downward into the case to puncture through the case.

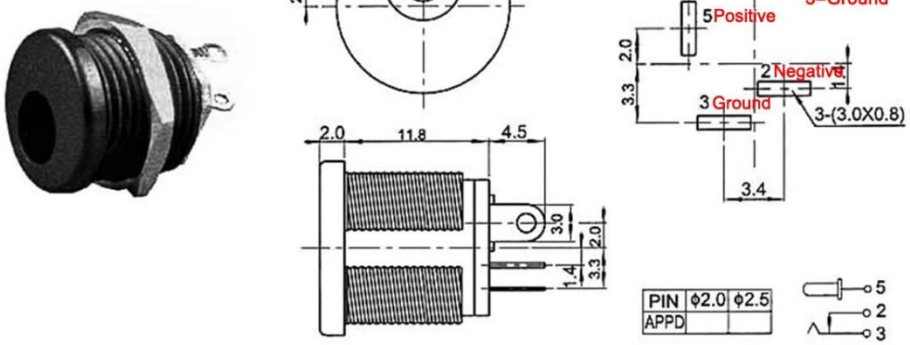
Placing 12V DC Power Port

The Components needed for this step include the 5.5mm x 2.1mm 3 Pin Female 12v DC charge port, 5.5mm x 2.1mm 90 Degree Right Angle DC Charge cable, soldering iron, solder, and 2 pcs 1/8” heat shrink tubing.

Video Instructions
Click Here:



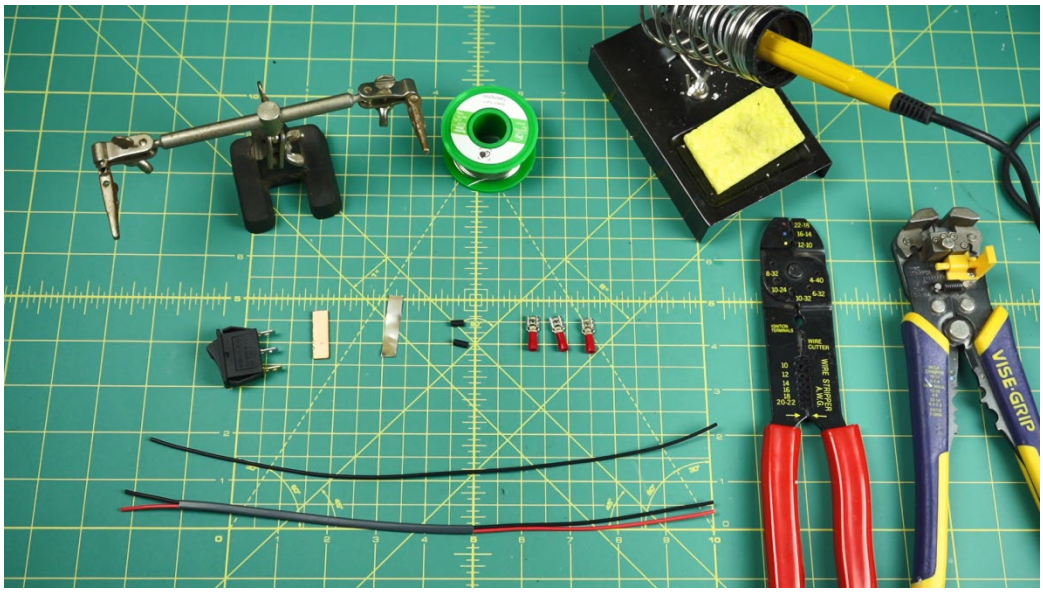
1. With the hole drilled in the previous process, begin this process by placing the retainer nut onto the 5.5mm x 2.1mm 90 Degree Right Angle DC charge cable.
2. Place the charge cable with the retainer nut through the hole drilled in the previous process.
3. Slide one piece of heat shrink tubing on both the red and black wires of the DC charge cable.
4. Place the tip of the red wire through the hole on the terminal for the positive (+) pin and solder in place
5. Place the tip of the black wire through the hole on the terminal for the negative (-) pin and solder in place
6. Slide the heat shrink tubing over both the positive and negative terminal.
7. Use a match / lighter or heat gun to activate the heat shrink tubing on the terminals
8. Press the 12v jack into the hole and secure in place with the retainer nut.



Power Switch Soldering and Assembly

The Components needed for this step include the single pole single through rocker switch, 3 12” 16 gauge wires, 3/8” x 1” double sided copper clad PCB wafer, 3/8”x 1-1/4” nickel plate, 3 spade connectors, solder, soldering iron, wire strippers and tape.

Video Instructions
Click Here:



1. If using 16-2 wire, also remove 1” of the main sheathing from one end of the wire bundle, and 5” of sheathing from the other end of the wire bundle.
2. Strip away 1/4" wire sheathing from both ends of all 3 pieces of wire.
3. Crimp one spade connector to one end of each wire. If using a 16-2 wire bundle, place the spade connector onto the end where you removed 1” of the main sheathing.
4. Solder the red / positive wire to the front bottom of the 3/8” x 1” copper clad PCB wafer.
5. Solder the black / negative wire to the back bottom of the 3/8” x 1” copper clad PCB wafer.
6. Solder the ground wire (separate wire) to the bottom on the 3/8” x 1-1/4” nickel strip.

If Using Batteries

7. Remove the cover.
8. If using batteries connect the nickel strip between the negative post and the battery.
9. Place the PCB wafer between the positive post and the battery. Continue to step 10.

If Using Power Plate

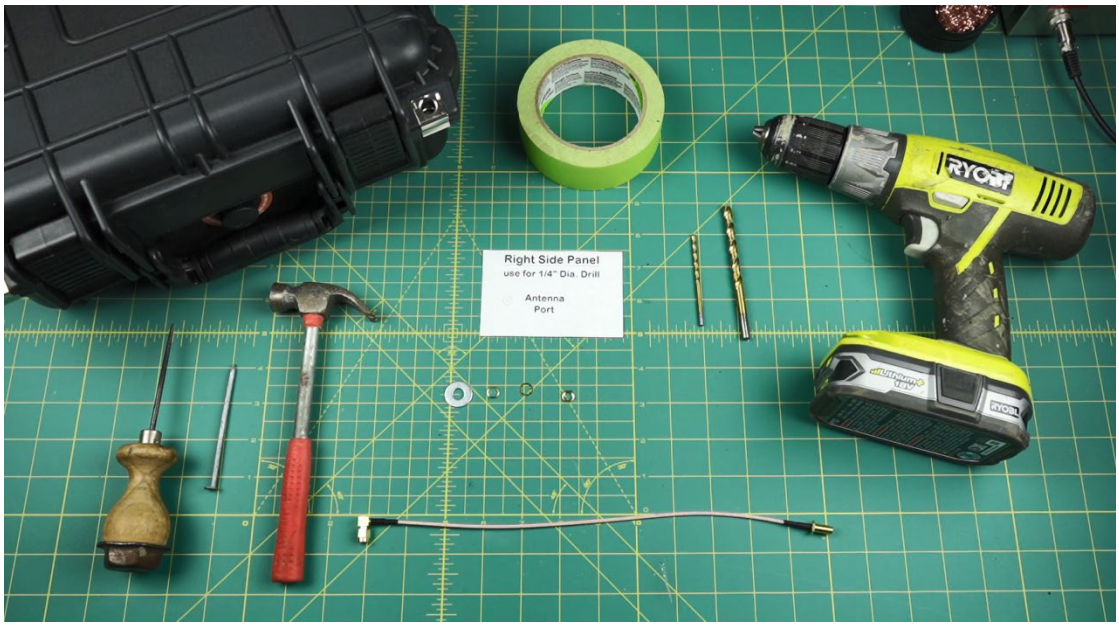
7. Turn the Power Plate switch to the Off position, Remove the Power Plate from the FireFly unit.
8. Power Connect the nickel strip to the terminal on the power plate switch. It should slide in place with s slight bend. Tale the wire lead to the Power Plate roughly 1 inch away from the switch terminal.
9. Place the PCB wafer against the positive terminal. The wires should be aligned to the bottom of the FireFly unit. Tape the wire leads in place so the PCB wafer is secure against the positive terminal without interfering with the flow of electricity.
10. Route the wires to the center of the FireFly case just above the main power button of the unit.

11. Replace the cover of the unit or Power Plate. Tighten the outer screws completely. Tighten the center screw so they are snug, but do not over tighten to prevent the cover from cutting into the wires.
12. Turn the Power Plate switch back to the On position.

Locating and Drill Antenna Extension Cable Port Hole

This process should be used for locating and drilling the holes for the antenna extension cable port. For this procedure, you will need a Drill, 1/8” and 1/4” diameter drill bit, Right Side Panel template, tape, and an awl or nail.

Video Instructions
Click Here:

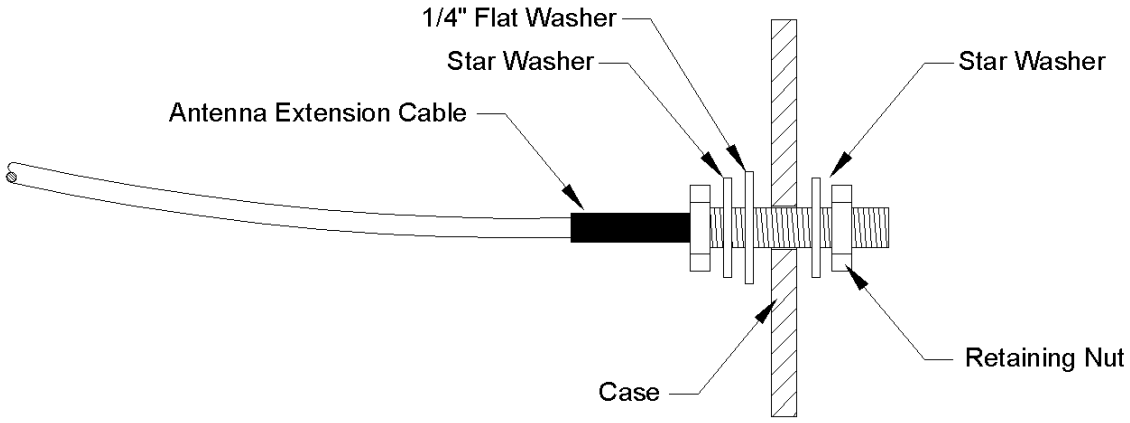


1. Print and tape the “Right Side Panel” template to the Right side of the apache 2800 case. The bottom and left side of the template should be aligned so no part of the template is on the curved part of the edges of the case.
2. Use an awl, or nail to press an indention mark in the center of the crosshair of the hole location. The indention will help locate the drill.
3. Remove the template.
4. Use a 1/8” diameter drill and drill the marked location. Use light pressure when drilling the hole. Let the drill do the work. The drill will try to pull through the plastic case.
5. Switch the drill size to 1/4” and drill the hole to the larger size. The process of stepping the drill up will improve your accuracy. If you attempt to use the larger drill directly from the indentation / drill mark, there is a good chance the drill will “walk” on you.

Installing Antenna Extension Cable

The antenna extension cable should have come with 1 or 2 star washers and a retaining nut. I added an additional 1/4” washer to add additional stability. Alone, the star washer can dig into the softer plastic case allowing the retainer nut to loosen up over time.

1. Place the first star nut onto the extension cable terminal jack.
2. Place the extra 1/4” washer on the top of the star washer on the extension cable terminal jack.
3. From inside of the case, place the extension cable terminal through the 1/4" port hole.
4. Secure the extension cable terminal with the remaining star washer and retainer nut.



Foam Cutouts

Inside the Apache 2800 case, there are 4 pieces of foam. One that is in the lid, and 3 that make up the case body. In this project we will leave the price of foam in the lid alone. The three pieces of foam that make up the main body of the case, we will remove the thin non perforated bottom layer of foam. This will leave 2 identical layers of foam that are perforated for easy removal of the individual blocks of foam.

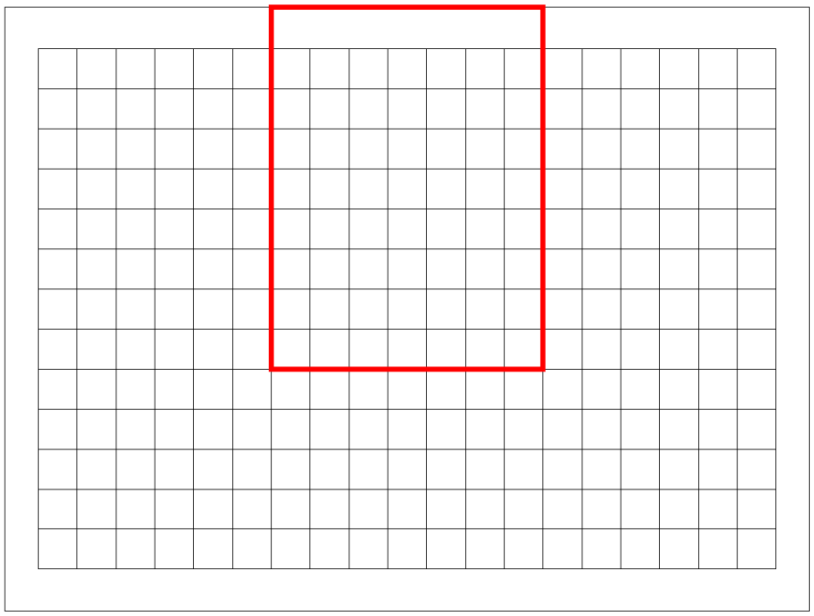
Video Instructions
Click Here:

Follow the drawing provided to form each layer of the case foam.

Bottom layer

This layer will support the Firefly case, but provide a hidden space for cur wires and power / switch lines.

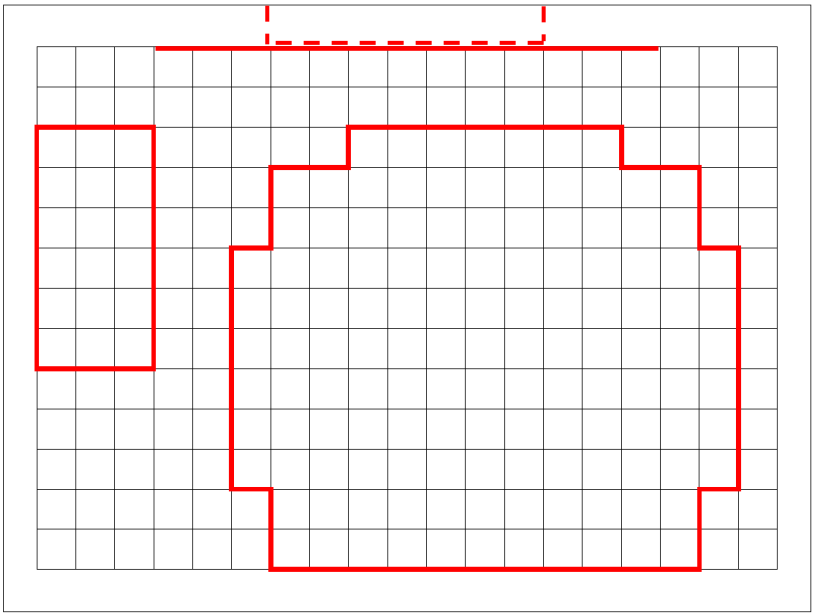
Remove the squares inside of the area outlined in red.



Top layer

This layer will provide the side support for the Firefly case and charger. A slit is formed in one row to hold the antenna.

Remove the squares inside of the areas outlined in red. Make a small shallow slit between the foam where the line is located. From the underside, remove half of the depth of blocks inside the dashed lines.



Final Assembly

1. Start by opening the case and turn it so the back of the lid is flat on the table.
2. Organize the firing cue wires to detangle them
3. Begin Cue 15 working backwards, begin plug in each cue to the associated port on the FireFly
4. Remove the cap covering the Power Plate charging port
5. Insert the lower foam with the cut out facing the rear of the case.
6. Turn the case right side up and organized the cue extension wires into the cut out area of the lower foam.
7. Plug in the 12v DC charging cable into the Power Plate charging port
8. Connect the switch wires from the FireFly to the Master Power switch.
    a. The Wire connecting to the negative terminal goes to the brass lug
    b. The wire closest to the positive terminal on the FireFly unit goes to the center lug
    c. The wire closest to the positive battery / Power Plate terminal goes to the remaining outside lug on the switch
9. Connect the extension cable from the external antenna, You may loop the wire then slide any excess under the Firefly unit.
10. Gently place the top layer of foam into place starting with the side closest to the power switch. Take care not to tear the foam
11. Insert the foam into the lid of the case.
12. Apply the FireFly stickers onto the lid and the label insert on the front of the case.