

## Aircraft Jumper Cable Project EAA 79

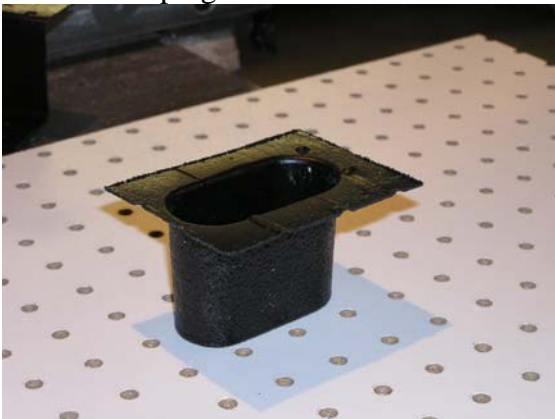
March 2006

--Dave Barker 587700



Sooner or latter everyone is plagued weak or Dead battery. With aircraft jumper cables and plug costing, as much as \$200 at Sporty's Pilot shop, most of us tend to do without the appropriate jumper cable.

This months project will allow fabrication of the standard 3 terminal aux aircraft battery connector and cables. The plug body can be fabricated out of a variety of materials from Delrin to wood. I used vacuum formed ABS to make the plug shell.



The Shell is filled with Polyester body resin (Bondo) and allowed to cure. Dimples molded into the shell provide drill index locations for the terminal contact holes. Trim off and sand flush the flange after the cure.



Trimmed shell shown w/o bondo filler

. Drill 2 ea.  $\frac{1}{2}$ " diameter holes and one  $5/16$ " hole thru the length of the plug body. These holes are on 1.000" centers.



Use a drill press vise. Drill all three holes before removal from vise to assure parallelism of holes.

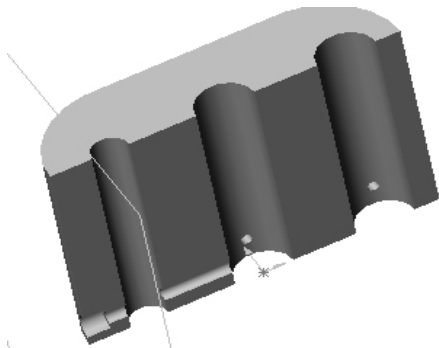
To secure the terminal contacts, drill 2 ea. #43 holes (.089" dia. and one #35 hole approximately  $\frac{1}{4}$ " from the back edge of the connector shell,)



across each diameter of the power terminal holes (Flat side of the connector) and drill the relay pin hole #35 hole transversely through the rounded end of the connector shell through the 11/32" dia. relay power enable terminal hole and then on thru the center Positive battery terminal hole. Counter bore each hole with a 1/4" drill 3/16" deep to recess the heads of the mounting screws.

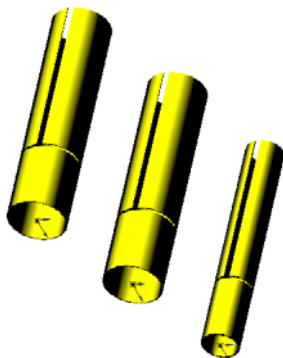


Finished Plug Shell Rear view



Drilled Plug Shell "Section" View

**Terminal contacts** are fabricated from K&S Brass tubing stock. Cut two lengths of 15/32" OD tubing x 2" long and one piece of 11/32" OD x 2.0" long. (0.016" wall)



Use a band saw to cut approximately half way thru the tube diameter at a distance of 1/2" from the end of each tube, Use a Dremel tool rotary slitting saw to make a single slit in the tube lengthwise from the far end to the midpoint of half-diameter cut done previously. Make these cuts for all the brass pieces.

### Heat Treating

Put the brass tubing in a 500°F oven for two hours, and then slow air cool. This simple heat treatment precipitation hardens the brass and makes it springier. Clean off the tube interior oxide formed by heating with a wad of Scotch Brite or fine sandpaper.

### Cables

Remove the battery clamps from one end of a Set of automotive jumper cables. ( Harbor Freight p/n 4120-2VG ) Strip the Insulation back 1/2". Insert each cable thru back shell strain reliefs. (RED lead + goes to center terminal. Solder to the uncut ends of each of 1/2" brass terminals. I recommend a small pencil torch. Tin the cables and the terminals and then reflow solder cable to terminal. Do not over heat the terminals or it will destroy spring temper. Insert the terminals into the plug shell. (The Red Positive lead/ terminal goes to the center hole.)



Hold the end of the terminal flush with the back end of the plug shell and then transfer

drill a #43 hole through the brass terminal. Use a # 4 sheet metal screw to secure the terminal to the plug body. Each terminal is ideally secured at only one point to allow it to float within the plug shell for self-alignment with the mating connector. Insert the 5/16" dia. relay power enable terminal, hold it flush with the back of the plug body and transfer drill laterally from the rounded end of the shell all the way to the center Positive battery terminal. Install a long # 6 sheet metal screw to electrically connect the relay enable contact to the Positive center terminal contact. Make sure all screw heads of all are well recessed in the plug body. (The back shell/strain relief

cover must slide over the counter bored screw heads in the plug body.

**Connector mechanics** / logic is designed such that the Power and ground terminals are in good contact on the aircraft connector pins before the shorter length relay power pin makes contact. This prevents contact arcing. Likewise the relay disables current flow from the power contact pins before disconnect.

Test fit the connector to the aircraft plug and then back fill each cable /terminal strain relief interface/ sleeve with hot glue, and quickly slide close the back cover on to the plug body.

### Bill of materials

<u>Item</u>	<u>Source</u>
ABS plastic shell	B.A.R.C.
& Back Strain relief	
3oz. Bondo	NAPA auto parts (polyester resin)
15/32" OD x 2"	Brass Tubing K&S (2ea)
11/32" OD x 2"	Brass Tubing K&S (1.ea)
Jumper cables	Harbor Freight* p/n 4120-2VGA
Misc. screws	
* Sheet metal screws	
2 ea. #4 x 3/4" long Sheet Metal screws*	
1 ea. #6 x 1 1/2" long Sheet Metal screw*	
Hot glue	

### PARTS KIT

A kit of materials consisting of:  
Vacuum formed ABS plastic plug shell  
Back cable strain relief cover,  
two pieces of 15/32", brass tubing cut and slotted.  
one piece of 5/16" brass tubing cut and slotted.  
12 foot automotive style jumper cable set  
and the Required screws  
are available from:

B.A.R.C. for \$26 plus \$8 S& H (USA)

Go to [www.barkeraircraft.com](http://www.barkeraircraft.com)

Contact

B.A.R.C.

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