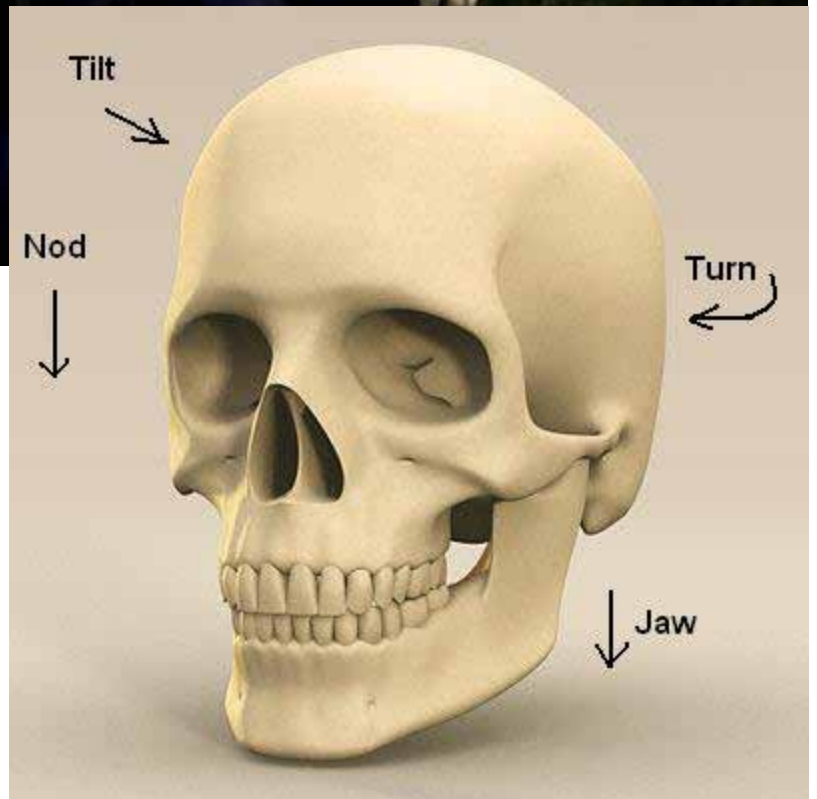


DAVIS GRAVEYARD

Hauntcon 2009

Creating a 3-Axis Bucky Skull





How to Make 3-Axis Bucky Skull

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Why make a talking skull?

They are a lot easier than you think. With a few simple tools and some creativity you can create an effect that will out perform any "crank ghost".

Parts List

You are going to need:

- 1- male-female adapter, 10-32 male end, 5/16"-18 female end \$5.20
- 1-Steel ball bearing, for 5/16" shaft dia, 7/8" od \$6.05
- 1- Delrin ball, 1-1/2" diameter \$14.79 pk of 5
- 4 – Hitech HS-425BB Servos \$14.99ea
- 4 – 2-56 Threaded Ball Link \$1.85ea
- 2 – 2-56 Swivel Ball Link \$1.85ea
- 1 – 12 inch 2-56 threaded rod \$1.40
- 12- 1/2" 2-56 or 4-40 bolts and nuts
- 1 – Aluminum Multi-Purpose Servo Bracket \$11.95 pk 2
- 6" x 8" 1/8" Plexiglas
- 1 – 10-32 flat nut
- 1 – 5/16" lock washer
- 1 – 5/16" half nut
- 1 – Nylon washer
- 1 – 6 inch spring
- 1 – 1/4" eye hook
- Small scrap of aluminum sheet

- 3 - Rare Earth Magnet - Cube - 0.500 x 0.500 x 0.500 \$9.99 pk 4
- 3 - Rare Earth Magnet - Block - 0.500 x 0.500 x 0.125 \$8.99 pk 10

Tool List

For assistance

- Rotary tool with sanding and cutting bits
- Jig saw, band saw or scroll saw
- Electric Drill with assorted drill bits
- 5/16" Die for threading 5/16" rod
- Screw driver
- Needle nose and standard pliers



Modify the Skull

Remove all hardware.

Using a sanding drum on the Rotary Tool sand out a 1/8" ridge all the way around the inside of the top of the skull.



Sand out the base hole to fit the Delrin ball.

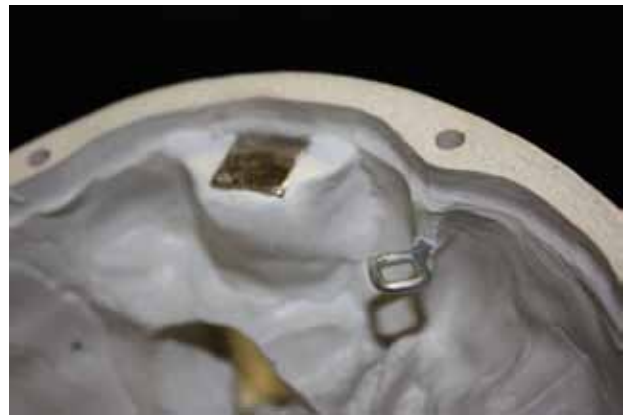


Drill holes for jaw

Drill holes and mount wire for jaw. Attach the jaw with small tie wraps.



Drill hole and install eye hook in the front of the skull below the sanded ridge

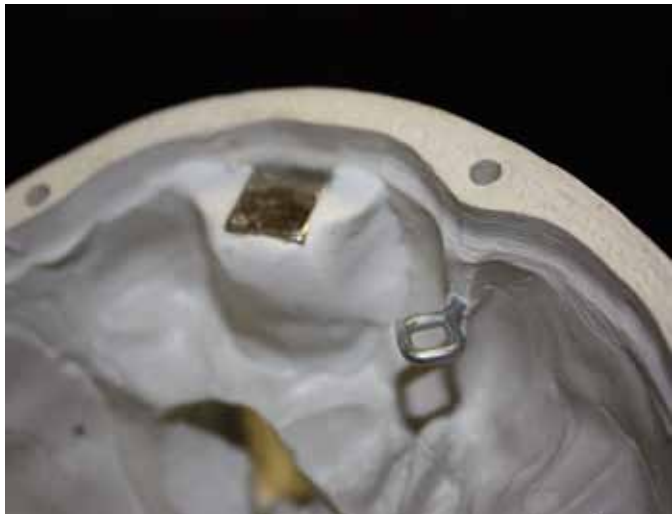


Cut 2 square holes on each side of the base hole for RJ-45 jacks.



Modify the Skull *continued*

Mount rare earth magnets along the side with epoxy and then strengthen with Fixit.



Drill a $\frac{3}{4}$ " centered hole through both eyes and grind away the opening on the inside for the LED eyes.

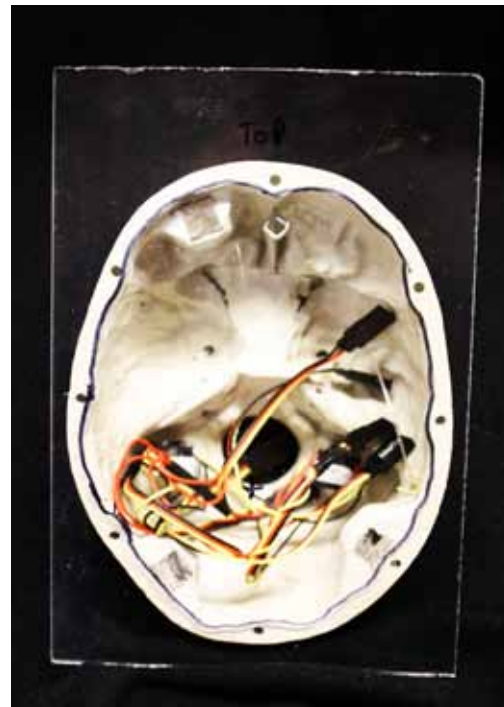


Making the plate

Trace the inside of the skull onto the Plexiglas using a sharpie. Then cut out the pattern using a scroll saw or jig saw. Sand the edges with the rotary tool until it fits into the top of the skull.

Trace the servos

Drill the holes (4 for each servo and one 1" hole for access)



Epoxy flat square magnets to plate.



Building the Stand

Thread 2" of a 7" piece of 5/16" rod

Drill a hole in 6"x8" 3/4" plywood and mount the rod

Drill a hole in the center of the Delrin ball

Cut a scrap piece of 1/2" PVC 3 3/4" long and slide over rod.

Mount Bearing and Delrin ball



Cut and drill aluminum bracket (5/16" at base and 2/56 at end) in shape as shown



Install bracket, lock washer and reducer into place

Servos

Mount the servos on the plate using 4-40 bolts and nuts using 2 per servo.

Mount the servo bracket to the top of the plate using 4 bolts. Mount the servo in the bracket.



Linkages

Pop out the swivel from the 2-56 swivel ball linkages and drill out to fit over 10-32 rod



Cut 2-56 threaded rod for tilt, nod and turn rods and attach ball sockets

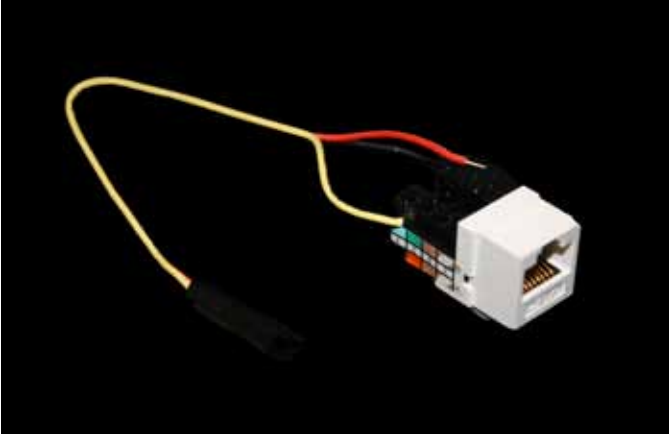
Attach balls to adjustable servo arms.



Wiring

Wire 4 female servo connectors to a RJ-45 Jack. Leave the power (red) wire unwired.

Wire 2 female servo connectors to another RJ-45 jack. These are for future eye servos make sure to leave the power (red) wire unwired

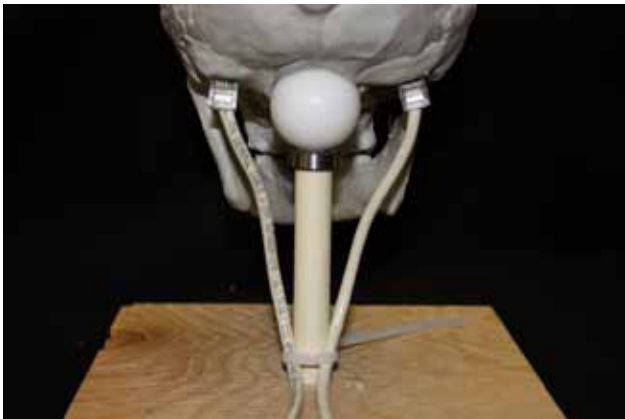


Wire 5 of the 6 power wires (red) to one wire on the RJ-45 Jack

Wire the last one of the 6 power wires to another wire on the RJ-45 jack. This servo connector is dedicated for the jaw.

Wire one last female servo connector to the RJ-45 Jack using just red and black wires. This is a plug for LED's for the eyes.

Using Fixit putty the jacks into place. **MAKE SURE ALL WIRE CONNECTIONS ARE SECURE FIRST.**



Final Assembly

Tie a knot in a 10" piece of 60lb fishing line. Insert it into the jaw hole and epoxy. Then drill a hole through the base of the skull near the jaw and insert the fishing line.



Form a small hook with wire and tie another knot on the wire hook at the right height when the jaw is closed.



When ready to attach to the Bucky skeleton cut the rod down to the same height from the bottom of the bearing to the top of the rod. Then using a 5/16" die, thread the first 1" of the rod. Insert the bearing and the Delrin ball onto the rod then add the 5/16" half nut, bracket, lock washer and reducer.



Install the head, attach the spring, snap the turn linkage to the ball socket, and attach the tilt and nod linkages. Using a needle nose pliers install the 10/32 nut.



References

Aves Fixit www.avesstudio.com

Servo City www.servocity.com

Part Numbers: 31425S, FSL2406S, MS-L2406J

McMaster-Carr www.mcmaster.com

Part Numbers: 92499A118, 6384K53, 9614K39

Rare Earth Magnets www.rare-earth-magnets.com

Part Numbers: NSN0607, NSN0911

Lynxmotion www.lynxmotion.com

Part Number: ASB-04

