

# Chrysalises Manual #3

## Machining Buttons and Color-coding

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### Button Dimensions

Button Height: 0.222 in.

Button Diameter: 0.605 in.

### Button material for Chrysalis I and II

Aluminum Rod: 6061-T6,  $\frac{5}{8}$  in. diameter.

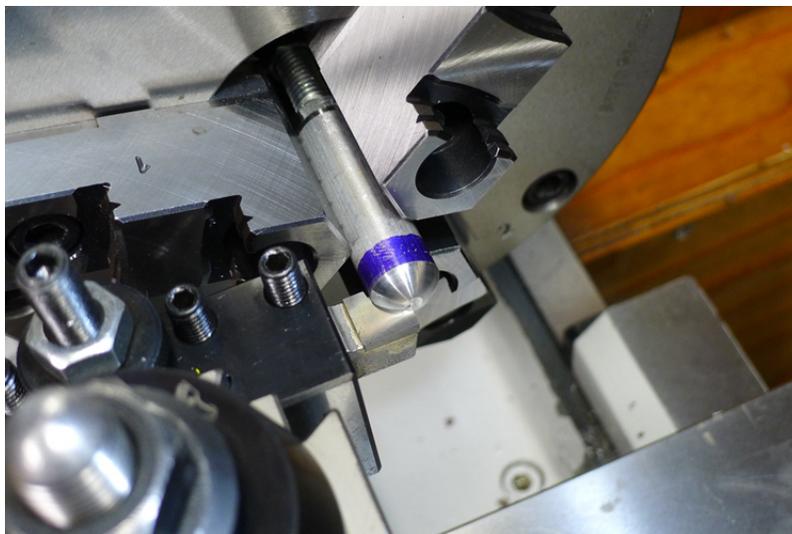
1. Machine all rod blanks to the exact same length of 2.0 in. Apply layout dye and score lines at 0.200 in. from the top.



2. Set up a  $\frac{5}{16}$  in. concave radius tool bit parallel to the lathe chuck and just below the center line. Then, secure a blank so it seats tightly against a spindle work stop inside the lathe chuck.



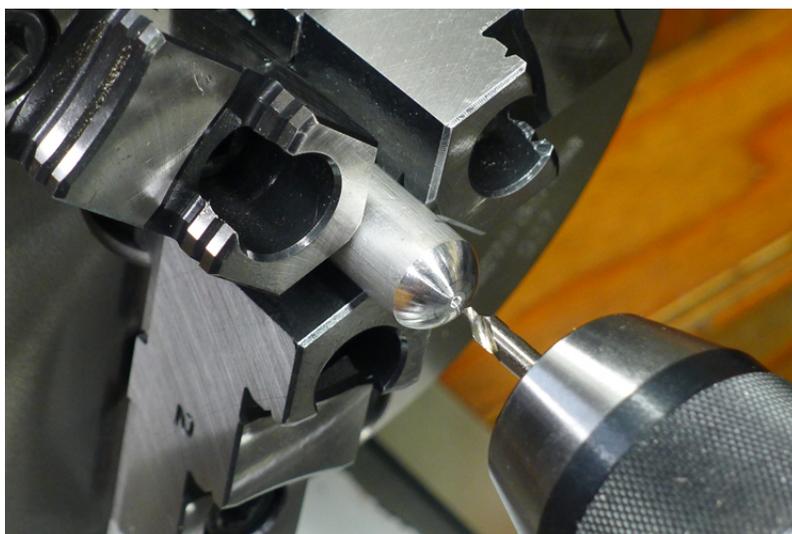
3. Lock the carriage and advance the radius cutter until it reaches the previously scored lines.



4. All pieces should have identical dimensions.



5. Spot drill the center of the pieces.



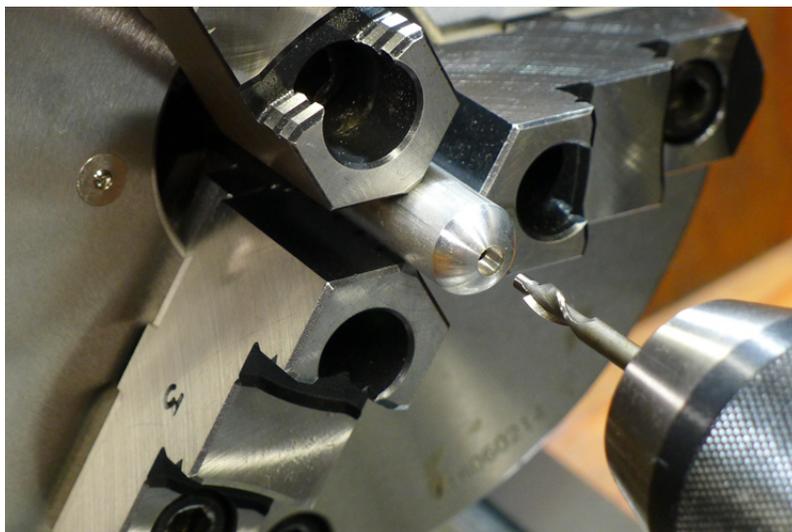
6. With a #35 drill bit, 0.110 in., drill holes into the centers of the pieces 0.375 in. deep.



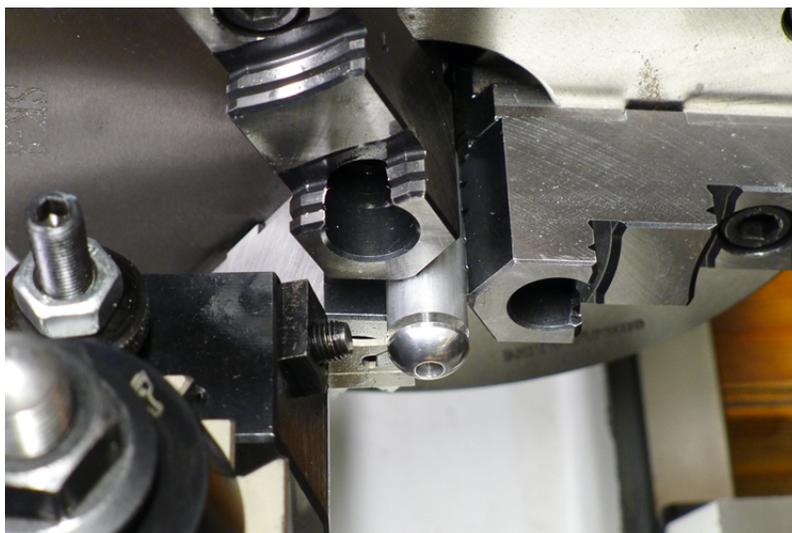
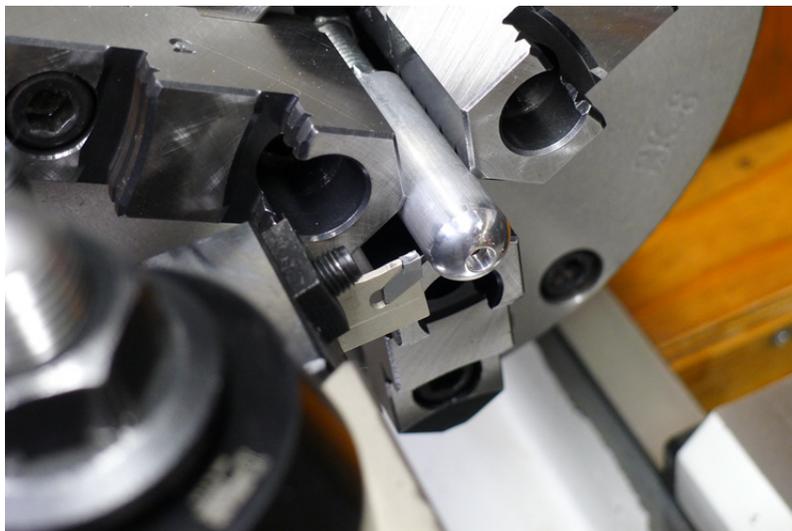
7. Set up a carriage stop to ensure that all holes have the same depth.



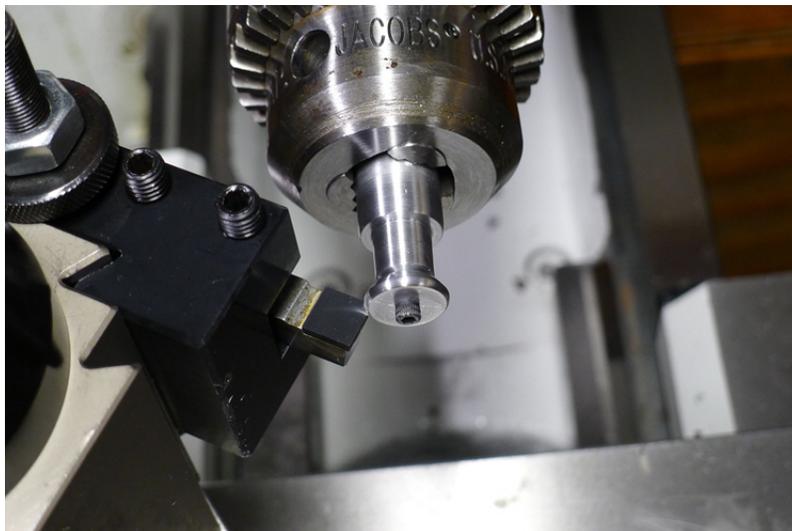
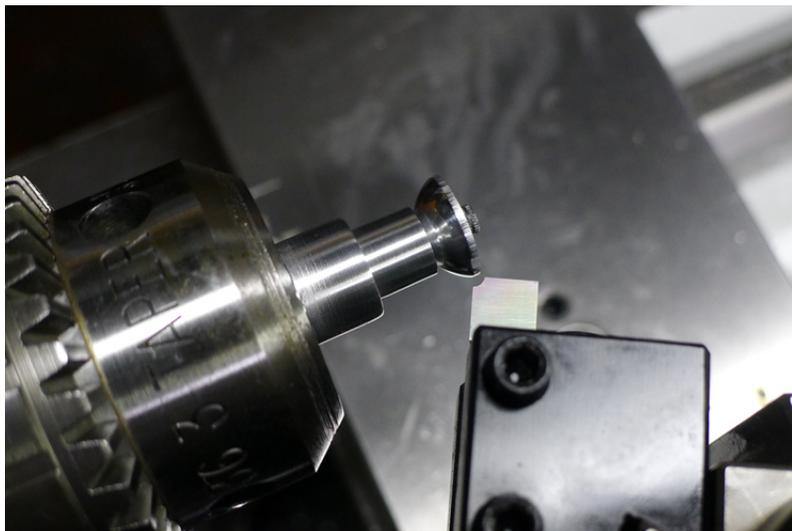
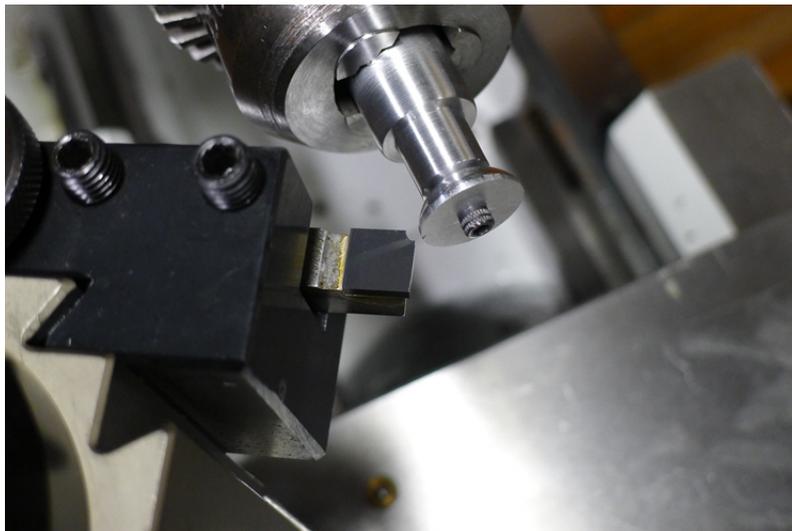
8. With a #4 counterbore — Weldon LGN4-1 — drill holes 0.130 in. deep.

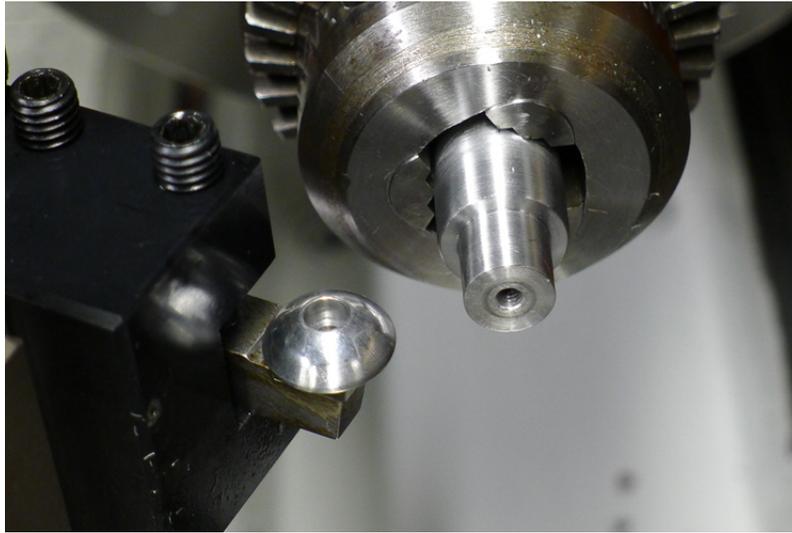


9. Set up a cutoff tool parallel to the lathe chuck and at the exact height of the center line. Cut off the buttons at a height of 0.222 in.

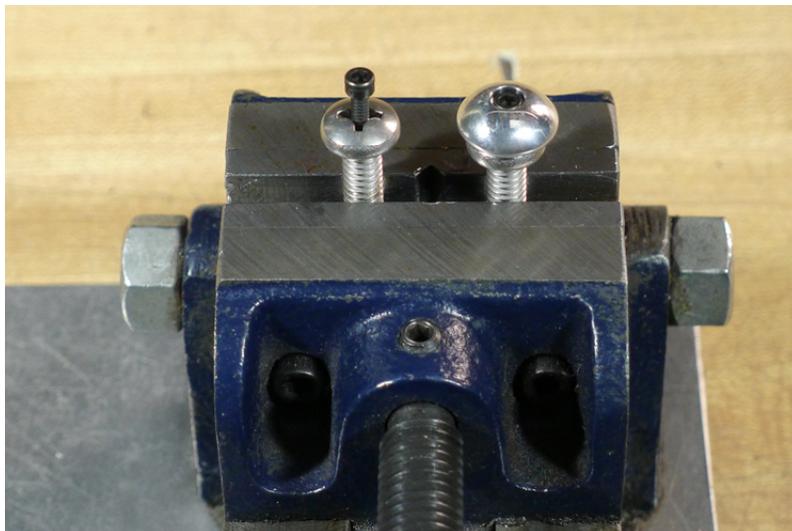


10. Mount the buttons on a custom-made mandrel with a 4-40 tapped hole in the center. Fasten the mandrel in a drill chuck secured in the lathe chuck. Set up a  $\frac{1}{16}$  in. concave radius tool bit at approximately  $45^\circ$  to the bottom edges of the buttons. Lock the carriage and round over the edges. Finished button diameter: 0.605 in.





11. Drill out the centers of all  $\frac{1}{4}$ -20 soundboard machine screws and thread them with a 4-40 tap. Fasten the buttons to the machine screws with 4-40 socket head cap screws. Chrysalis I screw length:  $\frac{3}{8}$  in. Chrysalis II screw length:  $\frac{1}{2}$  in.



12. Polish the buttons.



13. To promote primer adhesion, bead blast the buttons.



14. I used Montana-Cans spray products to prime and color-code the buttons.

Montana Aluminum Primer: T2450. One coat; three passes per coat.

*Montana Black* line of paints. Two coats; three passes per coat.

<b>black</b>	BLK 9001
<b>white</b>	BLK 9105
<b>bloody mary</b>	BLK 3330
<b>pure orange</b>	BLK 2075
<b>blue lagoon</b>	BLK 5230
<b>boston</b>	BLK 6055
<b>yellow</b>	BLK 1030
<b>pecan nut</b>	BLK 1070

Warning! Do not use the following primers on aluminum.

Montana All Metal Primer: T2400.

Montana Universal Primer: T2300.

15. The cans of the *Montana Black* line of paints do not spray very well at an angle. *They only work well when held in a vertical position.* Consequently, I mounted the buttons on spraying sticks. I cut narrow pieces of wood and applied double-sided tape. To raise the buttons above the sticks, I also applied double-sided tape to #6 hex nuts and attached them to the bottom of the buttons.



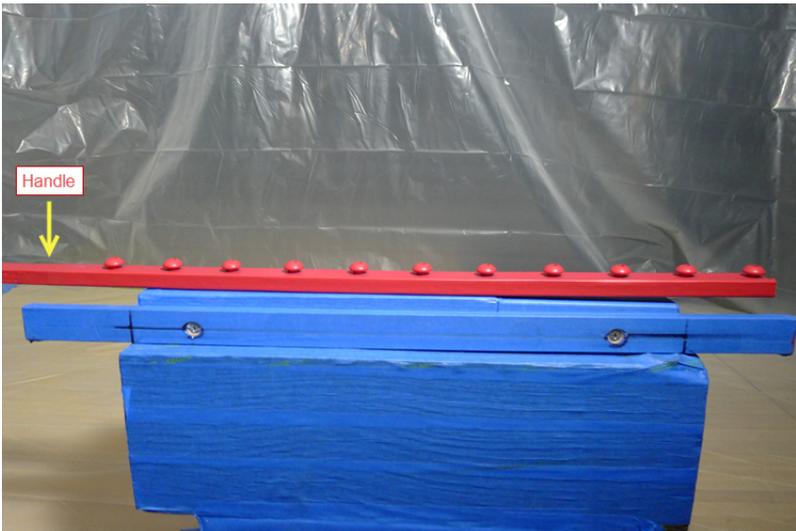
16. Each coat of primer and paint consists of three passes. With the buttons in a vertical position and the stick handle clamped on the right, spray the first pass. *Remember, do not hold the cans at an angle.*



With the buttons in a horizontal position and the stick handle on the right, spray the second pass.

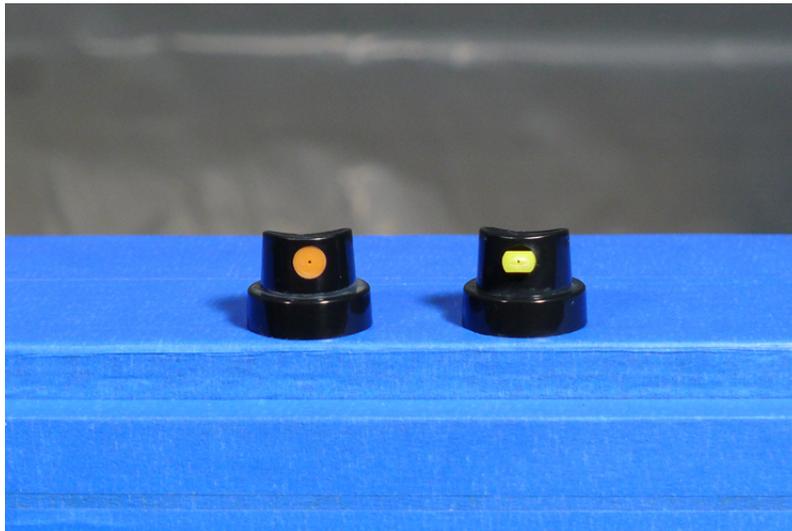


With the buttons in a horizontal position and the stick handle on the left, spray the third pass.





17. The cans of the *Montana Black* line of paints come with orange-tipped nozzles that produce a round-shaped spray pattern. In contrast, all the cans of the three Montana primers mentioned above come with yellow-tipped nozzles that produce either a vertical or horizontal fan-shaped spray pattern.



Unfortunately, the orange nozzles produce a spray where the leading edge of the pattern is very difficult to detect. For intricate work required by the buttons, the orange nozzles do not work very well. So, I simply used the yellow primer nozzles on the *Montana Black* cans and achieved very good results. I later discovered that in the U.S., the yellow nozzles are called StewMac Aerosol Spray Nozzles. The web graphic below shows that one can rotate the tips for either vertical or horizontal fan-shaped spray patterns.



18. I sprayed the final clear coats — Varathane Crystal Clear Matte: 262074 — with a Binks spray gun. Three coats; two passes per coat. With the buttons in a vertical position and the stick handle clamped on the right, spray the first coat at approximately  $45^\circ$ . Then, with the buttons in a vertical position and the stick handle clamped on the left, spray the second coat also at approximately  $45^\circ$ .