Instructions for Table Top Christmas Ornament Software Version 1.8:

The table top ornament has been designed with a DFRobot Beetle Controller Board (https://www.dfrobot.com/product-1075.html) as the control element. The Beetle Board is compatible with the Arduino Leonardo - ATmega32U4 design. The ornament includes three 12mm CZ gemstones, backed by three 5mm white display LEDS.

If the ornament USB Type-A connector is attached to a personal computer USB port, the Arduino development tools can be used to modify and update the software installed in the ornament Beetle board. Otherwise, the ornament can be powered up with a standard USB Type-A power adapter.

Ornament LED Operation:

1. When the ornament USB connector is powered up, the LEDS will blink the Version and Revision of the software installed in the Beetle. The initial version and revision is 1.8, so one long blink, a pause, and eight short blinks.

2. The bottom section of the ornament is attached to an internal potentiometer, with a #6-32 set screw, that allows turning the bottom a total of 300 degrees. So slightly less than one full turn. The position of the bottom section determines how the LEDS operate. Please don't attempt to turn the bottom past the pot limits.

3. The ornament is originally set up to operate in five different LED modes.

   1. When the bottom is turned fully counter clockwise, the LEDS are OFF and the ornament is set to simultaneous fade mode. The operating fade mode is only changed when the LEDS turn off. If the bottom is turned to the LED dim steady light mode, the LED fade mode doesn't change.

   2. Turning slightly clockwise from the full counter clockwise position, will light the LEDS in there dimmest steady light mode.

   3. Turning further clockwise will cause the LEDS to fade in and out at the same time. Continuing to turn clockwise will shift from fastest fade time, about 6 seconds per cycle, to the slowest fade time, about 12 seconds per cycle.

   4. At the upper clockwise range, just before the LEDS turn off again, the LEDS will light at their brightest steady light mode.

   5. At the extreme clockwise point, when the LEDS turn off, the ornament is set to fade the LEDS at different rates.

   6. As the bottom section is turned counter clockwise, the LEDS will first light at their brightest in a steady light mode. As the bottom is rotated further in the counter clockwise direction, the LEDS will again shift from the 12 second per cycle slowest mode, to the 6 second per cycle fastest mode.

   7. The LED steady dim mode and the LED steady bright mode, can be used to determine where the LEDS will turn off, and switch from one fade mode to the other.

Table Top Ornament Stand and Cable Replacement:

The ornament stand is in three parts, the base and two riser halves. The risers are connected together with three pairs of 1/4" magnets. If the four #8 screws are removed from the base, the risers can be separated. This allows the USB-Micro cable to be replaced with a longer cable if preferred.

To change the cable will require the the front of the ornament top be separated to allow the USB-Micro cable to be disconnected from the Beetle controller. The easiest way to "split" the top is to use a plastic shim, like a guitar pick. Insert the shim at the very top of the ornament where the USB cable is located. As the shim is inserted, the front will separate to allow the cable to be, carefully disconnected, and a new cable installed.

The images below the disassembled stand, and the ornament with the top face removed, showing the USB-Micro cable and it's connection to the DFRobot Beetle.

Ornament Assembly:

A. The upper section and center top are coupled together with three sets of 3/16" magnet pairs.

B. The lower section and center bottom are also coupled together with three sets of 3/16" magnet pairs.

C. The lower section and the rotating bottom are held in place by the #6-32 set screw that connects to the internal pot, read by the DFRobot Bettle board.
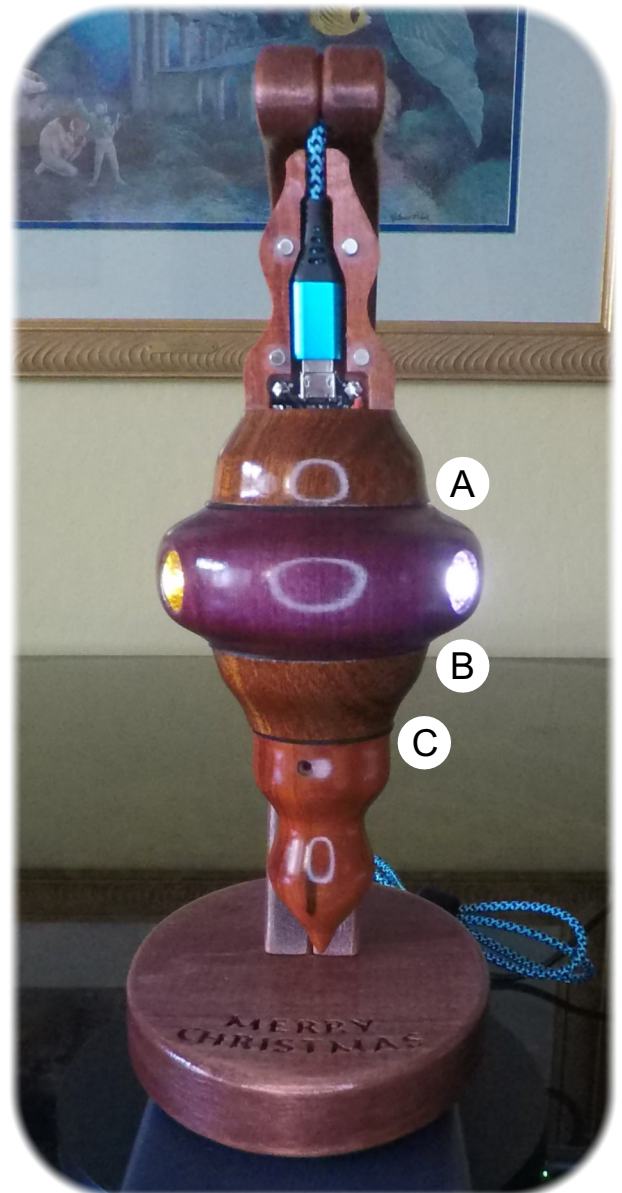
Instructions for Table Top Christmas Ornament Software Version 2.1:

The table top ornament has been designed with a DFRobot Beetle Controller Board (https://www.dfrobot.com/product-1075.html) as the control element. The Beetle Board is compatible with the Arduino Leonardo - ATmega32U4 design. The ornament includes four 12mm CZ gemstones, backed by 5mm white display LEDS.

If the ornament USB Type-A connector is attached to a personal computer USB port, the Arduino development tools can be used to modify and update the software installed in the ornament Beetle board. Otherwise, the ornament can be powered up with a standard USB Type-A power adapter.

Ornament LED Operation:

When the ornament USB connector is powered up, the LEDS will blink the Version and Revision of the software installed in the Beetle. The initial version and revision is 2.1, so two long blinks, a pause, and one short blink.

The bottom section of the ornament is attached to an internal potentiometer, with a 1/16" hex head #6-32 set screw. This allows turning the bottom a total of 300 degrees, so slightly less than one full turn. The position of the bottom section determines how the LEDS operate. Please don't attempt to turn the bottom past the pot limits.

The ornament is originally set up to operate in five different LED modes. When the bottom is turned fully counter clockwise, the LEDS are turned OFF.

Turning the bottom slightly clockwise from the full counter clockwise position, will allow the LEDS to start displaying a "Blink Code". The code currently supports five blink codes, from one to five blinks, with a one second pause between blink code sets. Once the desired blink mode is displayed, the user has one second to advance the bottom slightly more to have the ornament run in that mode.

Blink Codes for LED Modes:

1. Steady Light : The LEDS will light without fading. As the bottom is turned further clockwise, the brightness of the LEDS will increase.

2. Simultaneous Fade Slow : All LEDS will fade at the same time, with a 7 second minimum cycle, to a 24 second maximum cycle. Turning the bottom fully clockwise will set the fade mode to the maximum cycle time.

3. Simultaneous Fade Fast : The same function as Mode 2, but in this mode the minimum cycle time is 4 seconds, and the maximum cycle time is 12 seconds.

4. Different Rate Fade Slow : The LEDS are set to fade at different speeds, with the Lavender LED fading the slowest. The cycle time for the Lavender LED is set to a 7 second minimum cycle time, to a 24 second maximum cycle time. Turning the bottom fully clockwise will set the fade mode to the maximum cycle time.:

5. Different Rate Fade Fast : 4 to 12 : The same function as Mode 4, but in this mode the minimum cycle time is set to 4 seconds, and the maximum cycle time is set to 12 seconds.

Table Top Ornament Stand and Cable Replacement:

The ornament stand is in three parts, the base and two riser halves. The risers are connected together with three pairs of 1/4" magnets. If the four #8 screws are removed from the base, the risers can be separated. This allows the USB-Micro cable to be replaced with a different cable if preferred. Or this allows the ornament to be placed in a different stand, or hung from a sturdy tree branch.

To change the cable will require the the front of the ornament top be separated to allow the USB-Micro cable to be disconnected from the Beetle controller. The ornament front and back are connected together with four small magnets. The easiest way to "split" the top is to use a plastic shim, like a guitar pick. Insert the shim at the very top of the ornament where the USB cable is located. As the shim is inserted, the front will separate to allow the cable to be, carefully disconnected, and a new cable installed.

Ornament Assembly:

A. The bottom of the upper section, and top of the center section, are coupled together with three sets of 3/16" magnets.

B. The top of the lower section, and the bottom of the center section, are also coupled together with three sets of 3/16" magnets.

C. The bottom of the lower section, and the top of the rotating bottom, are held in place by a #6-32 set screw that connects to the stem of an internal potentiometer, that is read by the DFRobot Bettle board.

Ornament Materials:

The ornament is approximately 6-1/2" in height, and the center is just under 3" in diameter. The base is 3-1/2" wide, and 4-1/2" in length.

Top and Bottom : Both pieces are turned from a 1-1/2" x 1-1/2" Redheart spindle blank.

Upper and Lower : Both pieces are turned from a 2" x 2" Bloodwood spindle blank.

Center Section : The center section is turned from a 3" x 3" Purpleheart spindle blank.

Gemstones : The four gemstones are 12mm round faceted Cubic Zirconia. In Lavender, Pink, Yellow, and White (Clear).