**GAL v.2 mod D Build Guide Supplement**

11/17/23

**\*\*Read through Knack's original build guide for instruction on basic assembly concepts and best print orientations.**

**- Unique Part Print Orientations:**

-Backplate printed flat with letters facing up.

-Switch Knob printed with bottom down.

-TPU Laser Cover printed front face down

**-Main Body Variations:**

There are two options with the main body. Either you print the complete one piece body and deal with potential poor resolution in the mode selector markings on the back, or you print the two-part body with the separate backplate. If you do the two-part one, you'll want to install the crane connector parts with wires attached first before you attach the back plate or else there won't be clearance to install them later. To attach the plate, run a bead of super glue around all edges to bond the parts. Use the selector rotary switch axel to aid alignment.

For either version, print the body with the front side facing up, and use generous tree-supports to make sure all the internal overhangs are supported.

There is no 18650 battery option, due to the placement of the PCB in the body. You can use either a 3V CR123a primary cell or 3.7V rechargeable RCR123a/16350 cell.

**-Lid Variations:**

There are 2 lid options, one that uses the fire button included in Knack’s kit, and another that uses the 18mm **Schurter 1241.1104.7097** button. The Schurter is black and has a rubbery over mold design that I think is more fitting to the design, but it is a bit more expensive. If you use that button, also make sure you purchase the separate part number **Schurter 0098.9201** which includes a sealing o-ring and bolt-down bracket to secure the button on the back face of the lid. Without this kit, the button is a simple snap-in and could pop out potentially.

**-Battery Cap Variations:**

There are two battery cap options. One is the original Knack design that uses a US nickel installed inside. The other I modified to use a thin metal disk instead. For that disc, I bought a small sheet of copper from a hobby store, traced out a nickel sized disc and cut it out.

**-PCB Options:**

You may either use the PCB supplied in Knack's kit or have the modified version I designed made using the included PCB design zip file. JLCPCB is a good option for quick and cheap custom PCBs if you go that route. Also, with the custom board, you will have to buy and solder down all the small components as well, so keep that in mind. There is a reference image to help there, as well as an explanation of the switch-to-board wiring.

**-New Rotary Switch:**

The smaller 9-position **Grayhill 56P36-01-1-09N** switch is installed in the rear of the body. It can only go in one of two orientations thanks to the flats on the threaded barrel, so confirm you have it pointing the right way so that with the knob installed, it points at the positions on the body and isn't upside-down. You may have to remove the sticker on the side with the pin ID numbers to install it, it's a tight fit. I would recommend soldering all the wire leads to the switch before installation for that reason.

Here is the pin-out for the new switch:

**Pin 1** - IR Dual High (DH)

**Pin 2** - IR Illum Only High (IH)

**Pin 3** - IR Aim High (AH)

**Pin 4** - IR Dual Low (DL)

**Pin 5** - PROGRAM (P)

**Pin 6** - IR Aim Low (AL)

**Pin 7** - OFF (O)

**Pin 8** - Vis Aim Low (AL)

**Pin 9** - Vis Aim High (AH)

**Pin 10** - UNUSED

**Center Pin** - COMMON

*\*Note: I swapped the positions of the "Program" and "IR Aim Low" modes vs. Knack's design, so pins 4 and 5 are swapped if using his PCB. The correct positions are marked on the image titled "Knack PCB retrofit wiring diagram".*

Once the new switch is installed with its retaining nut inside the body, the printed selector knob can be slid on. Install the M2 heat set in the hole on the side of the knob and use the M2 grub screw to secure the knob in place on the switch.