



# Grogu Ultimate Installation Guide

Rev. B



## Table of Contents

Product overview .....	2
What's included .....	3
Tools required .....	3
Installation instructions .....	4



## Product overview

The Stern Mandalorian factory Grogu figure lacks the motion and integration with game play that we were hoping to see from the start. This **Grogu Ultimate** pinball modification kit offers what we wanted all along in a fully integrated, plug and play kit. This professionally designed and built kit uses a Hasbro Mandalorian “The Child” toy, modified to enable automated, external control through game play.

Unlike other offerings, the **Grogu Ultimate** stays powered on with the machine and performs its original effects in a controlled manner using the factory-control PCB inside the toy. It uses a proprietary microcontroller PCB controller to drive responses based on events during game play to simulate the factory toy switch positions and sensors. Another key feature not found in any other offering is the ability for the toy to raise its right arm instead of the factory left arm allowing for seamless integration in the same space as the factory toy without interference from the ramp.

The microcontroller PCB controller senses when the left or right “Child” insert LEDs on the playfield are lit, signaling the toy to perform its normal, random animations built in to the toy when touched. It uses an interrupt that senses when the magnet on the playfield activates, switching Grogu to the Force animation mode by lifting his right arm followed by closing his eyes for a brief rest. When the game is over or there is no activity over one minute, Grogu closes his eyes, not waking up until new game activity is present. As an added feature, Grogu wakes up during sleep mode to perform a random effect followed by falling back to sleep again if idle long enough.

*Important note: Premium and LE models are required for the Force effect. Pro models do not have the magnet necessary to detect when Force mode is activated. All other effects will work with the Pro.*

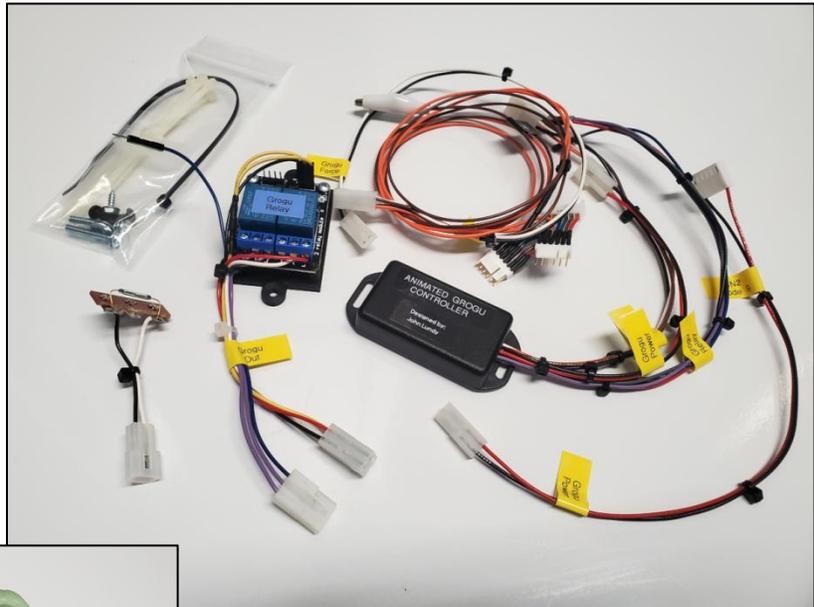
This kit is plug and play and requires no solder or modifications.

## What's included

- Instruction sheet
- Modified Grogu toy
- Mounting hardware and tie wraps
- Main input wiring harness
- Power wiring harness
- Microcontroller PCB controller box with built-in harness
- Reed switch sensor with harness (used with Premium and LE machines only)
- Dual relay board with harness

## Tools required

- Philips screwdriver
- 1/4" Hex driver



# Installation instructions

Please read all instructions before installing this mod.

**Step One:** Remove the factory toy and black #38 back panel plastic piece.

With the machine open, balls removed, and playfield pulled out as far as possible on the slide rails, extract the original Grogu toy by removing the two mounting screws from the back of the rear panel behind the toy and #38 black plastic. The toy will lift straight out, and the toy and mounting hardware can now be safely stored away as they are no longer needed. Retain the #38 black plastic and mounting screws for later. See Figure 1.



Figure 1

**Step Two:** Install the **Grogu Ultimate** toy and black #38 plastic piece (upper playfield portion).

Remove the **Grogu Ultimate** toy from the sealed bag and fish the three wiring harnesses through the location where the black #38 plastic was mounted originally. Slide them towards where the original factory toy was located and loosely place the **Grogu Ultimate** toy in the same factory location. Maneuver the toy and left arm for proper fit to the space. Note that it may be necessary to shift the back side of the #16 plastic 1/16 of an inch to the left for extra room for the mounting bracket. It is only mounted with a single nut and can be shifted carefully by hand without loosening. See Figure 2.

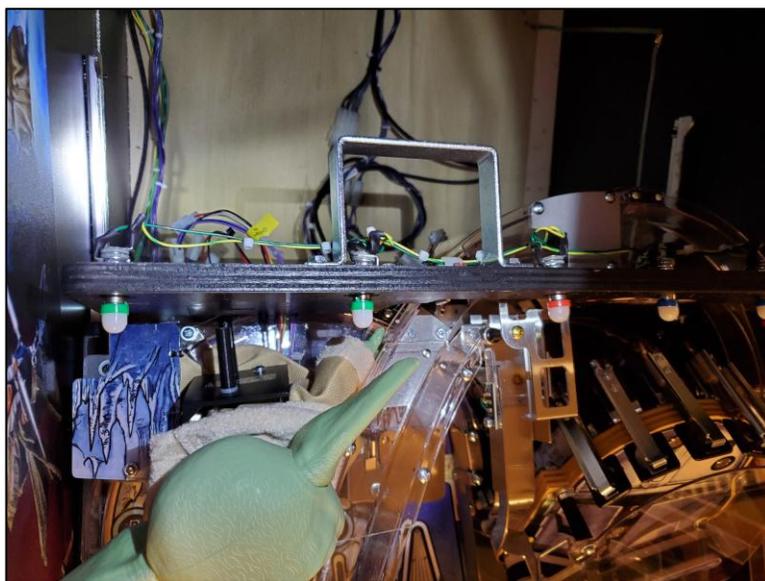


Figure 2

Using the two supplied 6-32 x 7/8" Phillips screws with internal tooth washers and the two #6

flat washers, mount the toy to the back panel using the same factory back panel screw holes. It is best to only slightly tighten the lower mounting standoff first to leave plenty of wiggle room to install the top standoff screw more easily. Note that the standoffs are threaded plastic, so make sure the screws are carefully started by hand to ensure they are properly threaded before using a screwdriver to finish them. Now fully tighten both screws while using your other hand to ensure the toy is mounted as far left as possible as it's tightened down. Reinstall the black #38 panel plastic to the original location. See Figure 3.

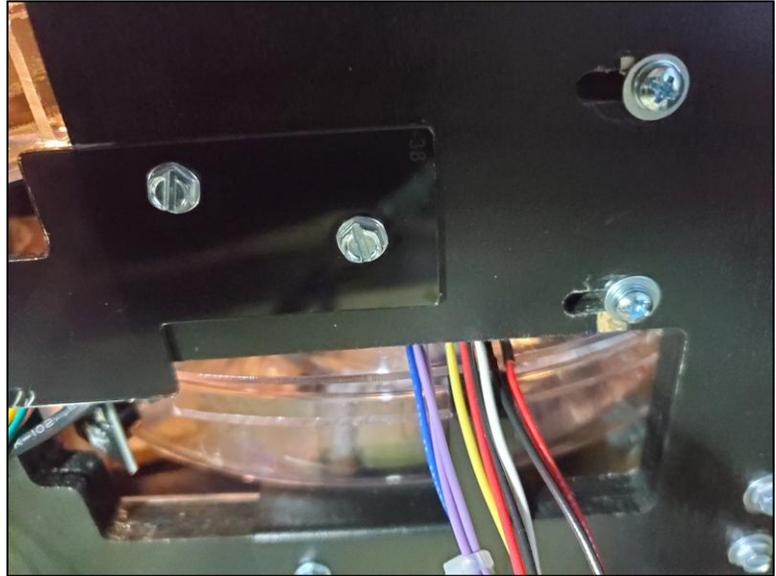


Figure 3

Rearrange the toy's clothes to insure the collar is BELOW the ramp and placed as loosely as possible around the neck for maximum range on motion of the head without any restrictions. It might be necessary to loosen the back collar velcro slightly to allow for the extra collar room. Now arrange the bottom of the clothes for the best desired look. See Figure 4.

### Step Three: Install the **Grogu Ultimate** lower playfield electronics.

Hold off installing any tie wraps until instructed. Reference Figure 5 as you go for overall finished install for each individual installation box reference.



Figure 4

With balls removed, lift the playfield to full upright vertical position resting on the backbox while using your preferred method of protecting inner cabinet side art, apron, and backbox.

Install the main input wiring harness. Start by organizing and straightening out the harness and routing and installing the orange wire Child LED taps to connector CN1 on both the left and right LED boards. The order doesn't matter. See Figures 5A and 5B.



Route and connect the brown EOS wire alligator clip to the left flipper EOS switch (non-grounded side) gray/yellow wire. It's best to clip the wire as pictured so it securely rests against the bracket. See Figure 5C.

Install the power harness to the unpopulated CN-2 connector of the Node 9 board. See Figure 5D.

Connect the controller box assembly harness to the main input and power harnesses. This is the 4-pin orange, black, brown, and white connector mating pair and red and black power connector mating pair. See Figure 5E.

*The following paragraph is for Premium and LE machines only.* Prepare to mount the reed switch assembly close to the magnet with the supplied #6 3/8" hex head screw. **Warning: The reed switch itself is very fragile. Be careful not to break it.** Wiggle the magnet to make sure it can't inadvertently hit the reed switch where you plan to mount it when energized. A recommended gap of 1/8" from the magnet to the glass reed switch is shown in the picture. Later during final testing, this gap can be tweaked by bending just the single bracket tab for best operation using the service mode magnet test to trigger Force mode. **Temporarily place the reed switch bracket where you want it located, use a pencil to mark where the mounting hole needs to be located, and set it aside for now.** Use an electric screwdriver or drill with 1/4" hex bit and use the supplied screw to pre-drill the hole needed. Remove the screw and safely hand-screw the reed assembly carefully into place. Connect the two-pin black and white connector from the assembly to the same color mating end of the main input wiring harness. See Figure 5F.

Prepare to mount the dual relay board with harness in place. Test fit the required mounting location referencing Figure 5. It might be necessary to relocate the loom holder slightly to the right if more room is needed. Mount the dual relay bracket into place with the two supplied black #6 1/2" Phillips screws. Connect the four-pin header connector of the control box harness to the four-pin header of the dual relay board. **Note: The connector must be inserted with the red wire towards the left (VCC on silkscreen of the PCB) of the connector.** Now connect the remaining single blue wire connector pair. See Figure 5G.

Connect the four-pin red, black, yellow, and white connector and three-pin blue, violet, and violet connector from the dual relay board to the mating connectors of the **Grogu Ultimate** toy. See Figure 5H.

Connect the remaining Grogu necklace red and black LED power alligator clips to one of the four lane GI socket connectors above the magnet. The positive GI connection is yellow/black, and the negative is white/black. The necklace circuitry is designed to not get damaged if the positive and negative connections are reversed and will simply not light up in case of error. See Figure 5I.

Tidy up all wiring harnesses using the supplied tie wrap as you go. The single, longer black tie wrap is for mounting the controller box in place.



**Step Four:** Verify and test.

Look closely at all alligator clips for shorts, verify red wire to the dual relay board is to the left (VCC), and make sure the reed switch glass didn't break.

**Caution: Power is applied at this point. Follow all precautions going forward.**

With the power off, the playfield still in the upright position, and the coin door open with door switch pulled out to enable 48 volts, power on the machine. As the machine boots, Grogu should become active confirming it is getting power and the machine boots as normal. You are now able to move forward with testing. Make sure the necklace alligator clips are properly supplying power and the necklace is lit.

Now that Grogu was active and the machine has booted to attract mode as normal, wait for approximately one minute and verify Grogu falls asleep. After he falls asleep for a few seconds, manually lift the left flipper from the top side of the playfield and verify Grogu becomes active again. This step verifies the EOS brown wire alligator clip is properly connected and working and the dual relay board input harness is installed correctly.

*The following paragraph is for Premium and LE machines only.* Enter the service menu, go to coil test, and stop at magnet test without selecting it yet. Focus on the dual relay board and enable the magnet test. You should hear a relay click and then see Grogu use the Force. If this didn't happen, verify the two-pin white and black cable connection. If it looks good, carefully adjust the reed switch assembly by bending the single mounting tab a little closer to the magnet. In some cases, it helps to loosen the screw and have the assembly at a slight angle with one side closer to the magnet than the other for best results. Be sure to never put force on the actual glass read switch itself. Do these small adjustments and repeat the magnet test each time until you get proper operation.

Testing and adjusting are now complete, and you're ready to close up the machine and play.

We hope you enjoy what is unmistakably the best animated Grogu integrated mod to date. If you find yourself needing installation help or have questions about this mod, please contact "Tekman" on Pinside (<https://pinside.com>) or send an email to [john@lundyelectronics.com](mailto:john@lundyelectronics.com).

**Enjoy your Grogu Ultimate mod!**

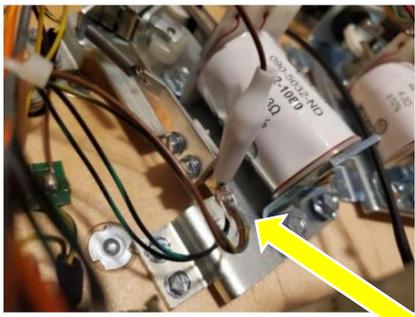


Figure 5C

Figure 5A



Figure 5B

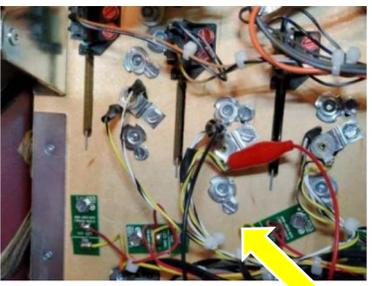


Figure 5I

Figure 5G

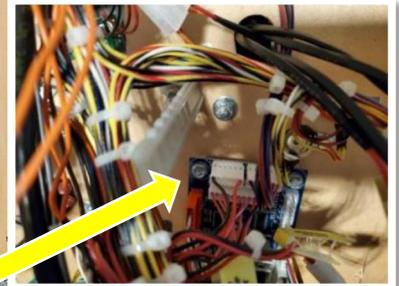


Figure 5D

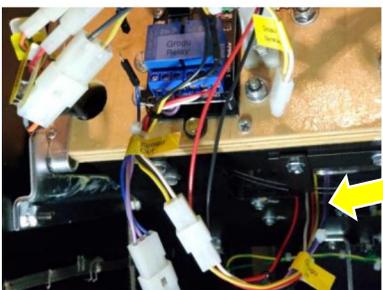
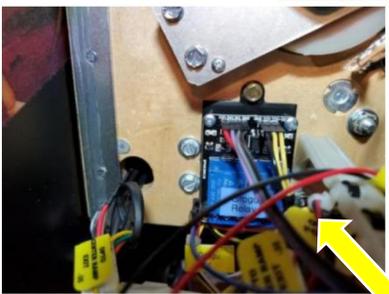


Figure 5H

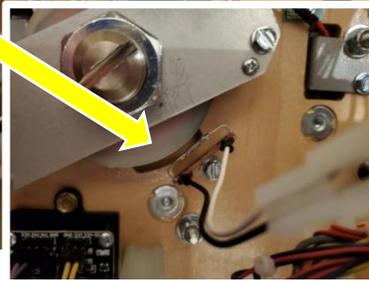


Figure 5F



Figure 5E

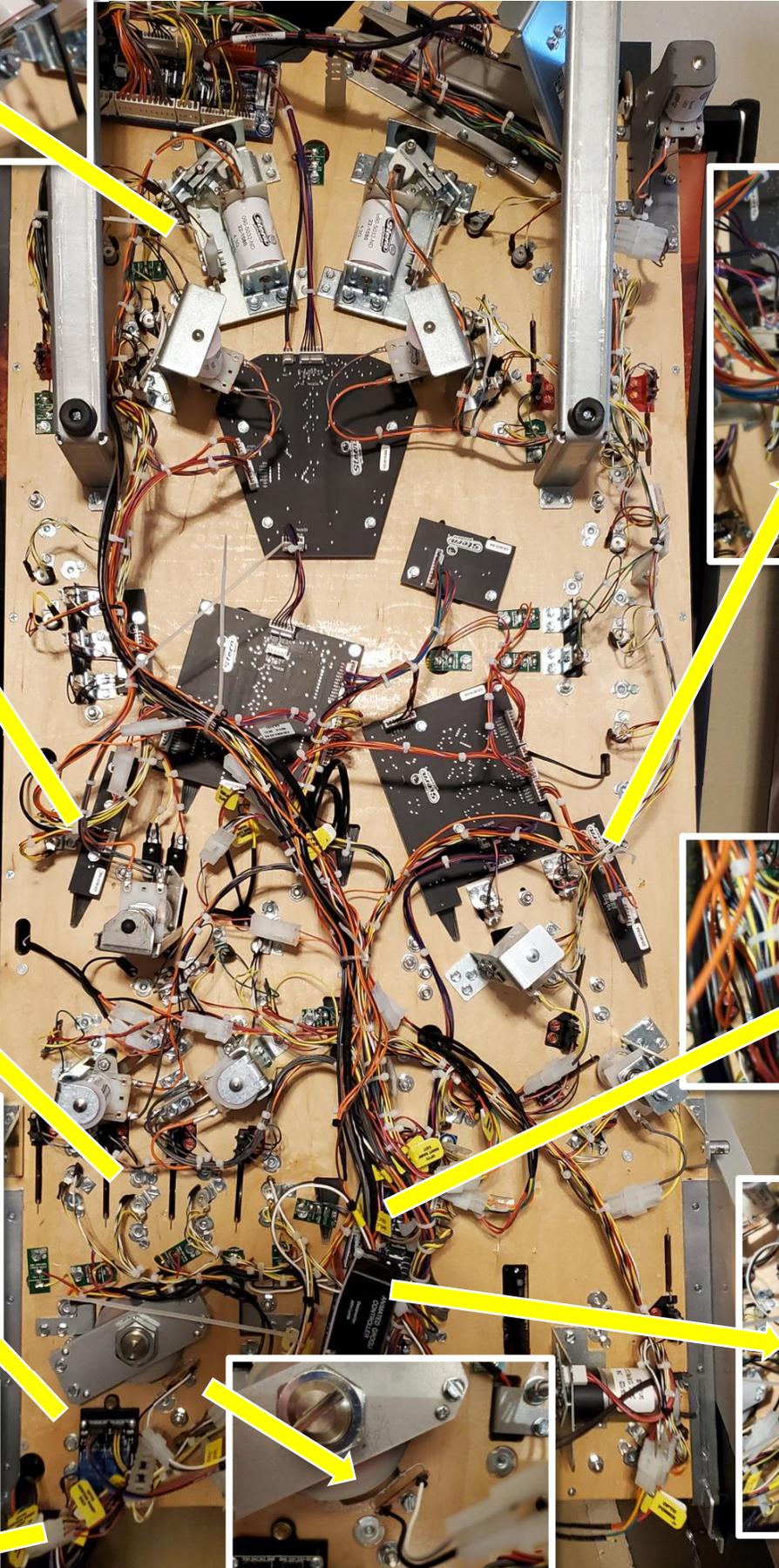


Figure 5