GREEN STUFF WORLD

TUTORIAL ARTIST: CHRIS BUXEY DIFFICULTY ADVANCED

ASSEMBLY

LED HOLOLITH

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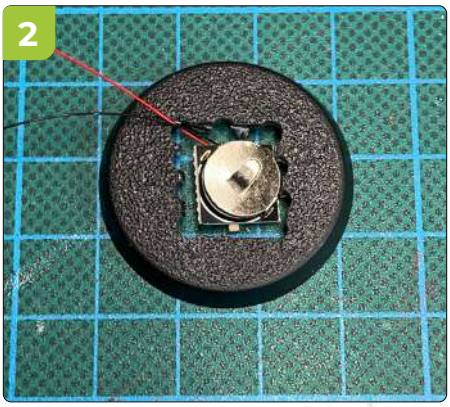
THIS TUTORIAL FOR LED HOLOLITH EFFECTS USES A WARHAMMER GENESTEALER CULTS CLAMAVUS MINIATURE, BUT IT WILL WORK EQUALLY WELL FOR ANY MODEL WITH A WRIST-MOUNTED OR EQUIPMENT MOUNTED HOLOLITH OR PROJECTOR. THE TUTORIAL USERS THE FOLLOWING PRODUCTS AVAILABLE FROM GSW:

- Mini Lighting Set (including 3V CR927 button battery)
- 3D printed set - Hacker Screens
- 1 x 1mm Green LED
- Conductive Paint
- 1 x N52 3x2mm magnet
- Milliput modeling putty

1. Select a base for your miniature that is large enough to fit the Lighting Set. In this tutorial I have used a 32mm diameter base.

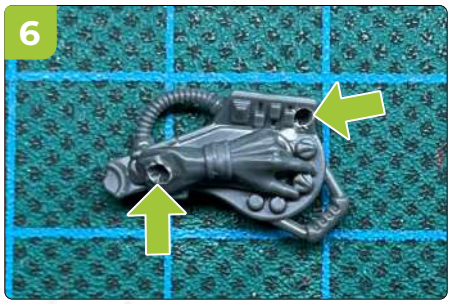


2. Cut a hole in the base large enough for the Mini Lighting Set to sit inside. An easy way to do this is to drill small holes around the Lighting Set and then cut between them with a craft knife.

3. Place the Mini Lighting Set in the hole with the battery facing upwards and the side with the switch facing down. Cover the Mini Lighting Set with Milliput, smoothing it down to be as flat as possible, and allow it to harden. Make sure the side of the Mini Lighting Kit with the switch is flat on your work surface as you do this, otherwise your finished miniature will not sit level. Do not cover the red and black wires, leave them free for the moment.

4. Drill a hole through the leg of the miniature. This will allow the wires to pass into the miniature without being seen. A hole with a 2mm diameter is ideal. It's easiest to drill through a straight leg, or a leg that is provided in two separate parts, rather than drilling through a bent leg.

5. Drill a hole in the side of the torso and upper arm where the lower arm that is holding the hololith will eventually attach. Most modern plastic miniatures have a hollow torso to allow the wires to pass through.



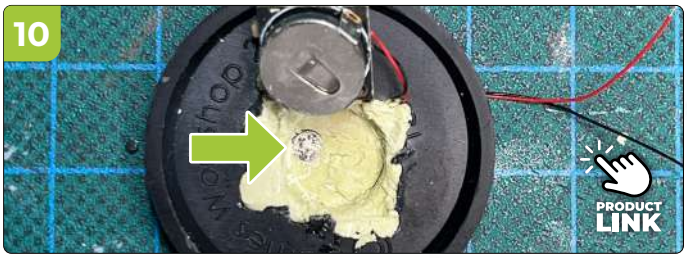
6. Drill a hole for the wires through the centre of the lower arms to the point where the hololith projection will join the miniature. If you are using the Clamavus miniature, there is a hole underneath this component which will make drilling easier.

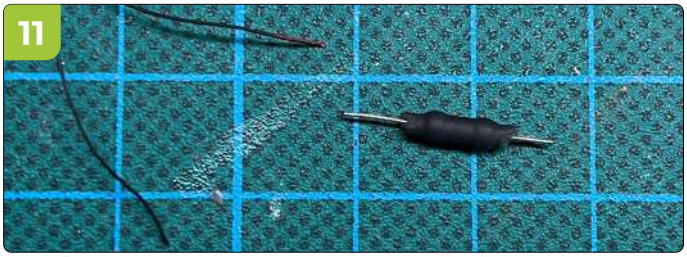
7. Feed the LED wires through the holes drilled in the miniature, starting at the point where the hololith will join the miniature, and running them through the upper arm, torso, and leg in that order. I used a 1mm green LED for this miniature.

   Before you feed the wire through, you will need to cut off the resistor (the cylindrical component at one end of the LED wires). Cut it off neatly with a sharp hobby knife or clippers just above the point where the wire connects with the resistor. Put the resistor safely to one side, as you will need it later. The LED wire that you remove the resistor from is the 'positive' connection of the LED. This will later connect to the red wire from the Mini Lighting Kit. Mark this wire so you can remember which was the positive wire. A dot of red paint can be useful for this.

8. Make sure the LED has a few millimeters of slack as it emerges from the miniature, then glue together all the parts of the miniature that the wires are running through. You should have a lot of spare wire emerging from the foot of the miniature at this point.

9. Assemble the rest of the miniature, except for the head. You will now need to trim the two wires emerging from the feet and the two wires emerging from the Mini Lighting Kit so that you have approximately 2cm of each wire still exposed, as shown in the image. Remember to keep the marks showing which is the positive wire (reapplying the mark if necessary). Strip the plastic insulation from the end of each wire so you have a few millimeters of exposed metal at the end. If you don't have a wire stripping tool you can strip the wires by running a sharp craft knife along the plastic insulation at an angle almost parallel with the wire. Be careful not to apply too much pressure, otherwise you may cut the metal.





10. Add a magnet to the base. This will help hold the Mini Lighting Set in place while also allowing you to remove it to change the battery when needed. The Milliput applied in step 3 must be fully hardened before attempting this step. Drill a hole in the Milliput of the same diameter as the magnet you will use. I used a N52 3x2mm magnet. Insert this magnet into the hole and use superglue (cyanoacrylate) to hold it in place.

11. Strip the plastic insulation from the wires attached to one end of the two resistors, just as you stripped the wires in step 10. The other end of the resistors should already be bare metal, which does not require stripping.

12. Tie the wires together to connect the various components. Wires can be connected by wrapping the exposed metal ends around each other. You may find a pair of fine tweezers useful for this step! You need to make the following connections, as show in the image:

- One end of the resistor needs to be connected to the red wire from the Mini Lighting Kit (it does not matter which way around the resistors are connected).
- Connect the positive LED wire to the resistor.
- Connect the remaining LED wire to the black wire from the Mini Lighting kit.

To make a secure electrical connection, paint the metal of the connected wires with Conductive Paint (alternatively, you can join them with solder if you have access to a soldering iron).

13. Glue the miniature to the base, ideally using the foot without wires as a point of contact. You will still have slack wire and resistors exposed at this point, as shown in the image.

14. Conceal the slack wire and resistor under a thin layer of Milliput, as shown in the image. It is important that the exposed metal of the wires that you painted in step 12 do not end up touching each other at this step, otherwise you may create a short circuit and the LED will not work. Once you have finished this step, switch on the LED to check that it still works. If it doesn't, you still have time to troubleshoot before the Milliput hardens.

15. Prepare the miniature for undercoating. You will need to protect the LED from the undercoat spray. The best way to do this is to wrap some aluminum foil around it, held in place with blu tack. Do not apply blu tack directly to the LEDs, as it may damage the connections when you remove it. Make sure the Milliput applied in step 14 has hardened before proceeding to the next step.

16. Undercoat the miniature, including the separate head. Once the undercoat has dried, remove the blu tack and foil covering the LED.

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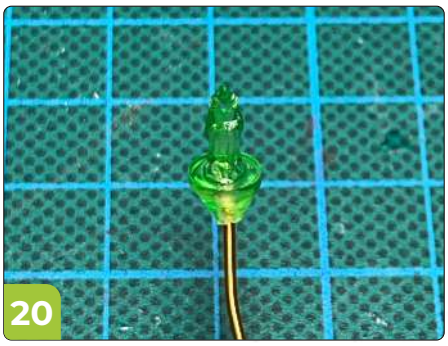
17. Paint the miniature, including the separate head.

18. Prepare the Hololith 3d printed component. Remove it from the sprue and clean up any sprue stubs.

19. Drill a 1mm diameter hole in the base of the Hololith component, starting at the narrow point on the base where the component will be glued to the arm of the miniature. This hole should be diagonal and finish directly under the 'figure' on the Hololith. The LED and the wire should fit neatly inside this hole.



20. Paint the Hololith with a thin green glaze.I used a 1:1 mix of GSW Ork Blood and water, but any thin green glaze will do. This will enhance the appearance of the Hololith component when the LED is switched off.

21. Feed the LED and wires into the hole in the base of the Hololith, then glue the Hololith component into place using a very small dab of super glue (cyanoacrylate).

22. Glue the head into place. This part is left until last so it can be carefully aligned looking directly at the Hololith.

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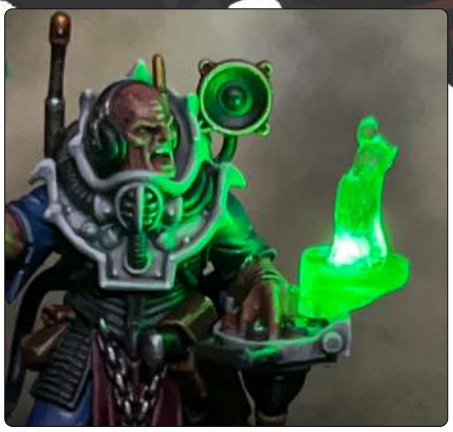

That's the end of the tutorial.

ENJOY YOUR FINISHED MINIATURE!

CHRIS BUXEY