



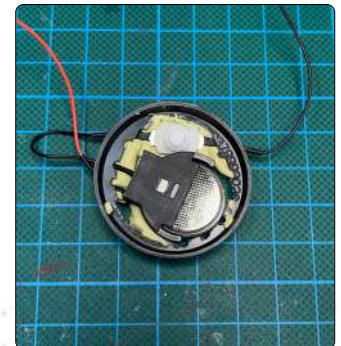
LED SHIELD

ASSEMBLY:

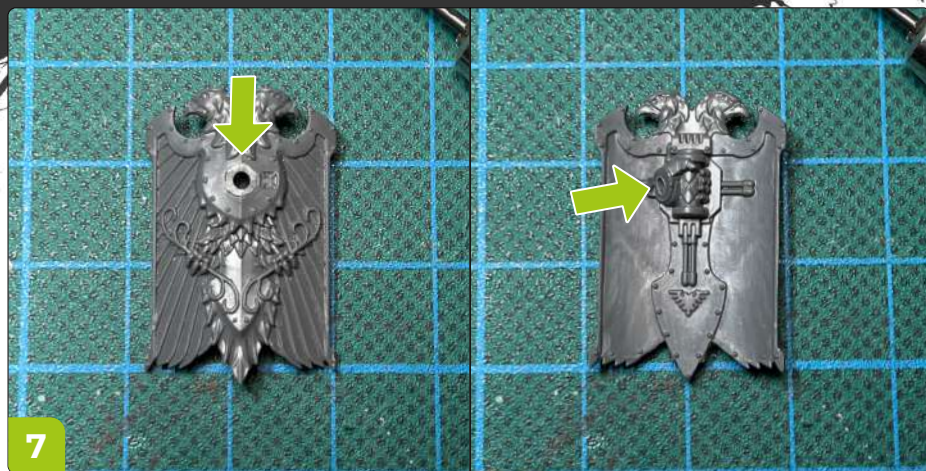
THIS TUTORIAL FOR LED SHIELD EFFECTS USES THE FOLLOWING PRODUCTS AVAILABLE FROM GSW:

- Lighting Set (for CR2023 batteries)
- Special Effects Energy Shields
- 2 x 1mm Warm White LEDs
- Conductive Paint
- Splash Gel Water Effect
- 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 50mm diameter base.
2. Cut a hole in the base large enough for the 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. Insert a CR2032 battery into the Lighting Set, and then place the Lighting Set into the hole with the positive side of the battery (marked with a '+') facing upwards. Make sure that the white switch is in the hole too, with the button facing down. Cover the Lighting Set with Milliput, smoothing it down to be as flat as possible, and allow it to harden. Make sure the bottom of the Lighting Kit 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 or the battery itself, 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 where the arm that is holding the shield 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 arms. If the arm is bent, you may find it easiest to drill two holes from opposite ends so they meet inside the elbow joint.



7. Drill a hole through the shield from the centre of the wrist joint to the front of the shield.



8. Remove the Shield Effect from the sprue, clean up any sprue stubs, and drill holes through the centre of the 'impact' effects.



9



10

9. Insert LEDs through the holes in the shield to check that they fit. I used two 1mm 'warm white' LEDs for this miniature. Before you feed the wire through, you will need to cut off the resistors (the cylindrical components at one end of the LED wires). Cut them off neatly with a sharp hobby knife or clippers just above the point where the wire connects with the resistor. Put the resistors safely to one side, as you will need them 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 Lighting Kit. Mark these wires so you can remember which was the positive wire. A dot of red paint can be useful for this.

10. Feed the LED wires through the holes drilled in the miniature, starting at the front of the shield, and running them through the arm, torso, and leg in that order.



11

11. Assemble the rest of the miniature. You should have a lot of spare wire emerging from the foot of the miniature at this point. Make sure you also have about 1cm slack on each LED wire at the point they emerge from the centre of the shield.

12. You will now need to trim the wires emerging from the feet so you have approximately 2cm of each wire still exposed, as shown in the image. Remember to keep the marks showing which are the two positive wires.

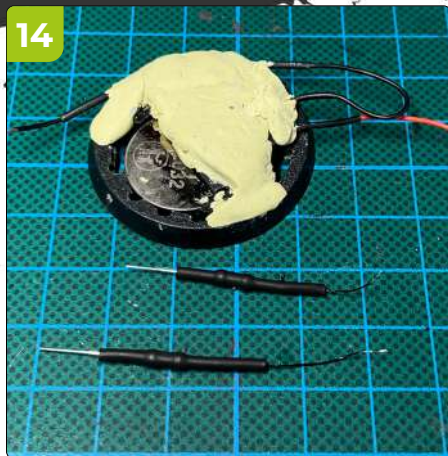


12

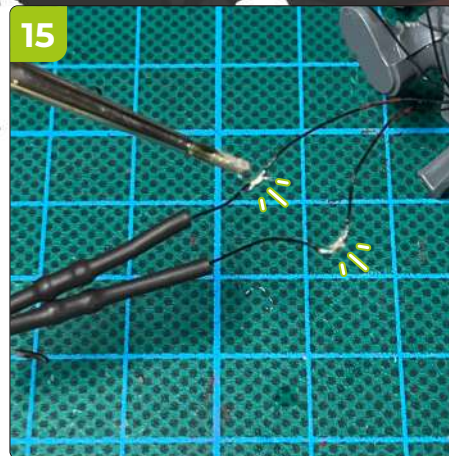
Strip the plastic insulation from the end of each wire so you have a few millimeters of exposed metal at the end. If you don't have a wire stripping tool you can strip the wires by running a sharp craft knife along the plastic insulation at an angle almost parallel with the wire. Be careful not to apply too much pressure, otherwise you may cut the metal.



13. Add a magnet to the base. This will help hold the 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.

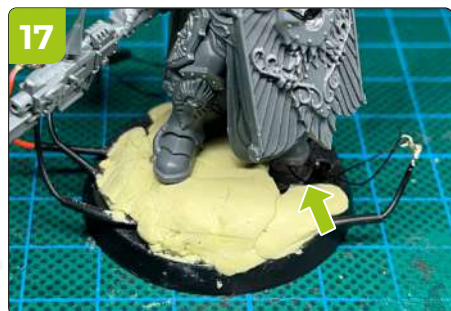


14. Strip the plastic insulation from the wires attached to one end of the two resistors, just as you stripped the wires in step 12. The other end of the resistors should already be bare metal, which does not require stripping. Trim the unconnected red and black wires emerging from the Lighting Kit so that you have approximately 2cm of each wire still exposed, as shown in the image. Strip the plastic insulation from the wires. Do not cut or trim the black wire that is already connected at both ends, as this connects the battery holder to the switch.



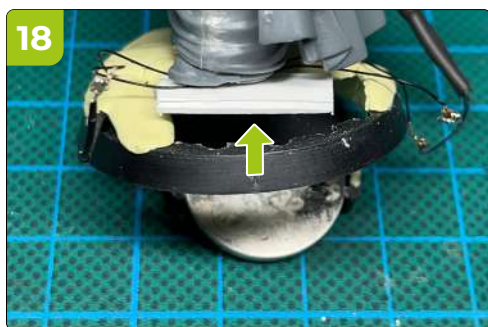
15. Tie the wires together to connect the various components. Wires can be connected by wrapping the exposed metal ends around each other. You may find a pair of fine tweezers useful for this step! You need to make the following connections, as show in the image:

- One end of each resistor needs to be connected to the red wire from the Lighting Kit (it does not matter which way around the resistors are connected).



16. Connect the remaining two LED wires to the black wire from the Lighting kit. To make a secure electrical connection, paint the metal of the connected wires with Conductive Paint, as in step 15.

17. Glue the miniature to the base using the foot without wires as a point of contact. This will leave the other foot "floating" over the exposed battery. You will still have slack wire and resistors exposed at this point.



18. Glue a piece of plastic card or cardboard to the bottom of the foot with the wires emerging from it. This card should be approximately the size of the exposed area of the base that is not yet covered in Milliput. This will help provide support for the Milliput applied in the next step. You may find it useful to move the battery out of the base when you do this, but the card used should not be thick enough to prevent the battery being put back in place.

19. Conceal the slack wire, resistors and card under a thin layer of Milliput. It is important that the exposed metal of the wires that you painted in step 15 and 16 do not end up touching each other at this step, otherwise you may create a short circuit and the LEDs will not work. Once you have finished this step, switch on the LEDs to check that they still work. If they don't, you still have time to troubleshoot before the Milliput hardens. Make sure the Milliput has hardened before proceeding to the next step.

- Connect the positive LED wires to the resistors (one positive wire from one LED to one resistor, and the other positive LED wire to the other resistor).

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).





20. Prepare the miniature for undercoating. You will need to protect the LEDs from the undercoat spray. The best way to do this is to wrap some aluminum foil around them, held in place with blu tack. Do not apply blu tack directly to the LEDs, as it may damage their connections when you remove it.



21. Undercoat and paint the miniature. You may remove the blu tack and foil once the undercoat has dried.



22. Paint the Shield Effect with a thin red glaze. I used a 2:1 mix of Citadel Contrast Medium and Citadel Flesh Tearers Red. This will help to give the Shield Effect definition.



23. Reinsert the LEDs into the Shield Effect, making sure the front of the LEDs are pointed forward, away from the model. Glue the Shield Effect into place using a very small dab of super glue (cyanoacrylate) at the top and bottom.



24. Sculpt the shape of the 'impact explosions' using Splash Gel Water Effect. This can be applied directly to the LEDs using a metal sculpting tool, thin plastic rod or stiff length of wire. When you apply it, the gel will initially appear milky white, but once it is fully dry it will be transparent. This initial application will build the basic shape of the explosion, additional detail will be added in later steps. Wait for the initial application of gel to dry (this can take several hours) before proceeding to the next step.



25. Apply successive layers of Splash Gel Water Effect, allowing each layer to dry before continuing, until you are satisfied with the shape of the explosion. Make sure the gel has fully dried before proceeding to the next step.



26

26. Paint the explosions. You only need to apply a light glaze of paint – this will not inhibit the light of the LED and will also enhance the look of the miniature when the LED is switched off. First apply an orange shade to the base of the explosion, closest to the Shield Effect. Once this has dried apply a yellow glaze to the whole of the explosion. I used Citadel Fuegan Orange for the shade and a 2:1 mix of Citadel Contrast Medium and Citadel Imperial Fist thinned down with water to a glaze consistency. Some small spots of dark brown can be painted on the upper areas of the explosion to give the impression of a shattered projectile. I used a thinned Citadel Rhinox Hide for these areas. Finally, apply a thin glaze highlight to the edge of the Shield Effect hexagons and the circular explosion 'ripples' to give them further definition. I used a 3:1:1 mix of Citadel Lahmian Medium, Citadel Evil Sunz Scarlet and Citadel Ushabti Bone for this highlight.



That's the end of the tutorial.

ENJOY YOUR FINISHED MINIATURE!



CHRIS BUXEY

