Terminator Eyeball Upgrade
Created by John Park

https://learn.adafruit.com/terminator-eyeball-upgrade

Last updated on 2023-08-29 03:52:55 PM EDT
Table of Contents

Overview 3
- I'm a friend of Sarah Conner. I was told that she's here. Can I see her please?
- Parts
- Materials
- Skull Stand

Prepare the HalloWing Eyeball 5
- Attach the Lens -- Frame Method
- Zip Tie Method
- Eyeball Firmware

Upgrade the Terminator 9
- Skull Stand
- Attach the Eye
- Open the Eye Socket
- Pull on the Mask
- Shades
- Recharge
- Hasta lavista!
I'm a friend of Sarah Conner. I was told that she's here. Can I see her please?

The Cyberdyne Systems T-800 Series Model 101 Terminator is one of the all time classic cyborg characters from science fiction. You can get a terrific Halloween mask of the T-800 and even display it as a piece of artwork, but it's just missing a little something. I know, a terrifying cyborg eyeball to look around, assessing it's environment for potential targets!

You can use the HalloWing M0 Express board with it's TFT display and a convex lens, along with the excellent Terminator eye animation firmware add this key element!

We'll use a plastic under-skull to attach the eye and mask onto a stand for display.

Parts

<table>
<thead>
<tr>
<th>1 x HalloWing M0 Express</th>
<th><a href="https://www.adafruit.com/product/3900">https://www.adafruit.com/product/3900</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Skull-shaped Microcontroller with TFT display</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 x USB cable - USB A to Micro-B</th>
<th><a href="https://www.adafruit.com/product/592">https://www.adafruit.com/product/592</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>A standard A to micro-B USB cable, perfect for connecting a PC to your HalloWing</td>
<td></td>
</tr>
</tbody>
</table>

| 1 x Lithium Ion Polymer Battery |                                      |
|---------------------------------|                                      |
3.7V 350mAh

<table>
<thead>
<tr>
<th>1 x Convex Plastic Lens with edge</th>
<th><a href="https://www.adafruit.com/product/2750">https://www.adafruit.com/product/2750</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Convex Plastic Lens with edge</td>
<td><a href="https://www.adafruit.com/product/3917">https://www.adafruit.com/product/3917</a></td>
</tr>
<tr>
<td>40mm Diameter</td>
<td></td>
</tr>
</tbody>
</table>

or

<table>
<thead>
<tr>
<th>1 x Convex Glass Lens with edge</th>
<th><a href="https://www.adafruit.com/product/3853">https://www.adafruit.com/product/3853</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Convex Glass Lens with edge</td>
<td></td>
</tr>
<tr>
<td>40mm Diameter</td>
<td></td>
</tr>
</tbody>
</table>

You'll also need the acrylic mounting kit. It comes in AdaBox 009, is also sold below. You can alternatively use thin zip ties to hold the lens in place.

<table>
<thead>
<tr>
<th>1 x Clear Acrylic Lens Holder + Hardware Kit for HalloWing</th>
</tr>
</thead>
<tbody>
<tr>
<td>The perfect kit for mounting a convex lens (glass or plastic) to your HalloWing!</td>
</tr>
</tbody>
</table>

You'll also need the acrylic mounting kit. It comes in AdaBox 009, is also sold below.

Materials

In addition to the parts above you'll need:

- Terminator mask from a Halloween or costume shop
- Plastic scull
- Metal or Plastic pipe, pipe flange, and wooden base to form a stand for the bust
- Gaffer's tape
- Scissors
- Black permanent marker

Skull Stand

You can build a skull stand to display the bust. For this you'll want:

- 12" diameter, 3/4" thick plywood round for the base
- 3/4" O.D. black pipe, 12" long, threaded on both ends
- Black pipe flange for 3/4" pipe, threaded
- Black pipe cap for 3/4" pipe
- Wood screws

A wig stand / foam head may also work well.
Prepare the HalloWing Eyeball
Attach the Lens -- Frame Method

Use four nylon M2.5 standoffs and eight screws to connect the lens to the HalloWing as shown, using an acrylic laser cut holder. You can use this file to laser cut your own (\(\)) from 2mm thick acrylic.

The lens will magnify the animation on the TFT as well as give the eye dimension when viewed at oblique angles.
Zip Tie Method

Feed thin zip ties through the holes at the bottom of the board, and then over the lens edges and back through the holes at the top.

Secure each end on the back side with a second zip tie like a fastener.

Trim the excess.
Eyeball Firmware

Follow the [HalloWing Spooky Eyes guide](#) for info on loading the Terminator eye animation onto your HalloWing, or for customization information.

Here’s the tl;dr version:

[Enter bootloader mode by double-clicking the Reset button](#) and then drag this UF2 file over onto your computer. Then using your computers file explorer or finder, copy the file over to the HalloWing. When the HalloWing is plugged in, it should look to the operating system like a flash drive named HALLOWBOOT. Copy the UF2 file to the HALLOWBOOT drive and your software should be set.

**Spooky_Eye_Terminator.UF2**
Upgrade the Terminator

Now that we have the terrific eye animation running on the HalloWing, let's prep the T-800 for the upgrade!

Skull Stand

You can use a plastic skull to attach the eye and support the mask, since it doesn't have much structure on its own.

Following the pictures as a suggestion, you can use pipe, pipe flange, a wooden base and some screws to build the stand, then mount the skull onto the top of the pipe by cutting a small hole and using glue or epoxy.
Attach the Eye

Attach the HalloWing to the skull’s right eye socket with some gaffer’s tape.

There should be enough space to still reach under the HalloWing and turn the switch on and off.
Open the Eye Socket

Using scissors, cut out the old eye -- try to keep the hole a bit smaller than the base of the lens so it doesn't show through.

If there is any unsightly white rubber showing through where you cut it, use a black permanent marker to cover over the rubber.
Pull on the Mask

Slide the mask down over the skull and eye as shown.
Turn on the HalloWing and let the T-800 have a look around!
Shades

The Terminator is looking awesome at this point, but there's something a bit off --- He needs some cool wrap around shades! You can break out one lens if you like, or simply paint the inside of one lens on some cheap safety glasses.

This will cover the non-moving rubber "human" eye, and allow the cybernetic eye to shine through!
Recharge

When you need to recharge the battery, simply remove the shades and mask and plug in USB power to the HalloWing, it's internal charging circuit will take care of the rest.
Hasta lavista!