This guide covers the assembly and installation of the Scale Sound Systems LED Conversion Kits. An Athearn Genesis GP38-2 was used for this guide. The same assembly principles will apply to using the LED Conversion Kits with any locomotive.

I initially used Micro Scale Kristal Kleer for all of the assembly. This is strong adhesive and permits the parts to be cut apart if required. However, I have since switched to using medium/gel CA for the assembly. This is faster and provides an equally strong bond. However, in the event that an LED fails (or blows from a result of not using a resistor), the whole assembly will need to be thrown out. There is no cutting the Conversion Lens from the blown LED using CA. If you're confident in your assembly and decoder installation work, CA will provide the fastest assembly time and you should be able to complete this job in less than 30 minutes. If you do not want to risk discarding the whole assembly in the event of LED failure, I suggest you use Micro Scale Kristal Kleer. This is not as fast since the KK needs time to dry and fully cure, but you will be able to replace the LED and save the lens in the event of LED failure.

DO NOT use any Tacky Glue or similar for assembly. It is NOT strong enough. Kristal Kleer or medium/gel CA provides the required strength. We will use Tacky Glue for the complete assembly installation.

Lets begin with a look at the stock locomotive as it comes out of the box.
Most Genesis hood units will require removing the cab to gain access to the high-mounted headlights. If your loco has nose-mounted headlights, you won't need to do this. Likewise, high-hood units shouldn't require cab removal either.

After releasing the handrails attached to the cab, I use the butt-end of tweezers to push in the clips and release the cab.

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For soldering surface-mount LEDs, I use double-sided tape to hold them. Stick your LEDs to the tape and test them before doing any soldering. I use a dual-double-A battery holder to provide the required 3 volts. The short solder pad is the positive-anode, while the longer pad is the negative-cathode.

Here we see the cab free from the shell and the stock headlight bulbs removed.

1206 LEDs stuck to double-sided tape.
In some cases, you will leave the LED and wires straight as shown above. This is useful where space is tight, such as the rear headlight where a speaker box may interfere. For most front headlights, I bend the LED 90° perpendicular. I do this by grasping the LED with tweezers so that the solder pads are not stressed, then fold the wires over 90° with my finger. Do not attempt to bend or manipulate the wires without supporting them to the pads.

Tin the LED solder pads by melting a small dab of solder to your clean iron tip, then quickly touch the molten solder blob to each pad. Strip and tin the wires about 1mm or so. Hold the wires over the tinned solder pads with tweezers, then quickly touch your clean iron to the tinned wire, which will immediately solder itself to the LED’s pad. Blue goes to the small anode pad, function wires to the long cathode pad. TEST with your battery at this time.

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Place a small dab of adhesive on the front of each LED, then set the lenses on the LED, being sure they're centered. Let this cure. With CA, this takes only a minute. With Kristal Kleer, give them about 20-30 minutes to setup before the next step.

Here we see the LEDs wired up, with the front LED bent 90° and the rear LED left strait.

Test both assemblies again with your battery.
Here are the finished assemblies. On top we see the rear headlight assembly; bottom is the front headlight assembly with the included heat-shrink tubing used to block light from flooding the cab interior. Shrink the tubing with a clean soldering iron tip. Do not use a heat-gun; it will damage the lens and possibly the LED.

Once the lenses have setup on the LEDs, use more CA or Kristal Kleer and spread the adhesive around the lens/LED edges. Spread the adhesive down all around the solder joints and pull the adhesive down onto the wires. What this does is provide a very strong wire strain relief and strengthens the delicate LED solder pads. Once cured, this assembly is very strong and the risk of damaging the solder pads/joints is eliminated.

Completely coat the solder joints and wire ends with adhesive.
Most Athearn shells have three little “nubs” in the cab roof. I am not sure what these are for, but they are not needed. I trim off the center nub as it will interfere with sliding the headlight assembly in.

I use Aleene’s Fast-Grab Tacky Glue to install the assemblies in the shell. This grabs quickly and dries quickly. It permits repositioning or total removal if required in the future. Use a tooth-pick and spread a little tacky glue around the base of the lenses.

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Here we see the rear headlight assembly installed. I positioned the assembly so that the wires pointed toward the roof. This compact installation will not interfere at all with the speaker box.

Slide the front LED assembly into the headlight holes. Use your battery and test the LED. Check the shell and number boards to see if there is any “glowing”. If the shell glows, skip to the bottom of this guide to see how to fix this. If the shell does not glow, apply the tacky glue and let the assembly dry. As shown here, I used a little black dimensional paint to seal the crack to prevent all light leakage into the cab interior.
Feed the front headlight wires through the hole and lower the cab into place, snapping onto the shell. We are now ready to wire the lights to the decoder.

Once again, I used black dimensional paint to cover the LED and prevent light from showing through the fans. A small piece of black tape can also be used here instead of paint.

The dimensional paint I use is called "Writer’s Paint" and is made by the craft paint brands sold in most craft stores. It is very thick and opaque and is the most effective light-blocking paint I’ve tried. It’s better than normal paint, Liquid E-tape, etc.
Next, trim the tape width to 3/16” or 4.7mm. This is the perfect width to make one full wrap around the lens without overlapping or leaving a large gap.

Shell “glowing” is an issue I’ve found with about 2 out of 10 installations I perform.

If you find that your shell “glows” from the lenses, use some of the included aluminum tape. Trim a piece that is just a bit shorter than the lens length. You want to keep the tape well short of the lens end so that it does not show when installed in the shell.
This assembly is for the *Genesis SD70ACE* front headlight. The magnetic removable roof makes access a breeze, but leaves little room for the high-mount LED headlight.

When assembling this, keep everything very trim and clean. You won't have room for the heat shrink light-block. Install the assembly with the wires down so they won't interfere with the roof. Use black paint to block cab interior light bleed.

Use tweezers and wrap each lens with the aluminum tape you just trimmed. The tape should be snug to the base and leave about 1mm of the end clear. This will prevent shell “glow”. The assembly may be a bit more snug in the shell, but should otherwise slide in.

This may seem “fiddly” and to be sure, it is, but it's not difficult. Painting the lens tubes black also works, but it reduces light output and colors the light a bit.

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