

# Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads

[www.film-tech.com](http://www.film-tech.com)

# Component Engineering

4237 24th Ave. West  
Seattle, WA 98199-1214

Phone:  
(206) 284-9171

FAX:  
(206) 286-4462

## Upgrading from infrared to red LEDs (analog)

Remove the entire arm assembly which supports the old infrared LED, and ease out so that you can cut the power supply leads as close to the LED as possible. This will allow you to use the wiring for the new LED. In Simplex sound heads the standoff which supported this assembly must also be replaced with the new one supplied.

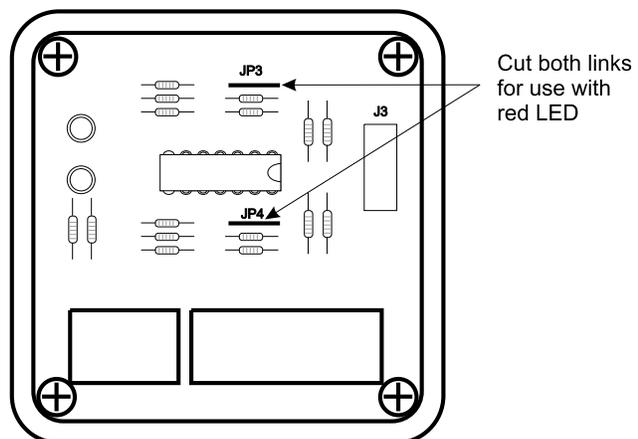
Attach the LED wires to the terminals on the right end of the new assembly (the terminal strip can be unplugged) and mount to the standoff. **Do not turn the power supply on until you have modified it as described below!**

Cut the two links (labeled “JP3” and “JP4”) on the back of the lens assembly. If you have a pair of cutters with 45 degree blades you can probably do this without removing the unit. This will increase the pre-amp gain so that you can run the LED at a lower current.

The EL-2A power supply that was supplied with the infrared LED **must be modified for safe operation** of a red LED. The instructions for that modification follow this section. **Reverse polarity wiring of an unmodified EL-2A will destroy the LED.** Warranty will **not** cover this condition.

LED adjustment is made by loosening the socket head cap screw that clamps the copper mount to the arm. Move the LED in or out and rotate for best alignment with ST-20 reader using test films and audio test equipment. Do not over-tighten the clamp screw when alignment is completed.

Connect the LED power output of the LS-30 or **MODIFIED** EL-2A power supply to the black power terminal. The terminal can be unplugged to facilitate wiring. If the LED does not light, reverse the polarity of the power supply.



Back side of ST-20 Analog reader

# Modification of EL-2A power supplies for use with 660 nM visible red LEDs

## Objective

This power supply is an excellent source for powering the 660 nM visible red LEDs now being used for reading analog and Dolby Digital sound tracks. Modifying the supply is needed for two reasons. One is to change the adjustment range to better suit the new current requirements, and the other is to clamp the output voltage when no load is connected. With the advent of faster lenses in the readers and higher gain in the preamplifiers, we are able to operate the LEDs at a lower current and thereby extend their life. The output no-load voltage clamp is needed because the visible red LEDs are not always the same polarity. Therefore, the installer must try one connection to the supply, and if this doesn't work, reverse the leads. If the output voltage was not clamped, the LED could be ruined if reversed connected.

## Identification

This power supply has been built in two versions, the EL-2 and the EL-2A. The earlier version (EL-2) can be used as is with the visible LED except that the output current needs to be reset to the lowest value possible. The output voltage is already clamped at a reasonable level. If you have one of these units and it is performing properly with the infrared LED, just open it up and reset the output (the only variable resistor on the board) and go with it.

The later version (EL-2A) needs the full treatment as outlined below. The problem is that the first batch of the EL-2A's were mounted in chassis labeled "EL-2". If the chassis does not include the "A", look at the bottom of the unit and if there is one flat head screw showing, it is the "A" version.

## Procedure

Remove the power supply from its mounting and take the cover off. It will not be necessary to remove the circuit board. All of the changes can be made from the top of the board. With the connector end toward you, the lower right hand corner should look like the drawing below. Locate resistors R2, R3, R6, and R12. All of these are to be replaced. The best way is to snip the leads close to the body at each end of the resistor. You will now have two stubs of wire which you can grab with needle-nose pliers while you gently heat the pads and pull out the stubs. Clean out the holes with a solder sucker or wick, but be careful not to over heat. The new value for R2 is 3.6k $\Omega$  5%, R3 is 432 $\Omega$  5%, R6 is 15.8 $\Omega$  5%, and R12 is now 0.15 $\Omega$  1%. When soldering these new values into the circuit board, be careful that the leads do not go through the board far enough to touch the metal chassis below.

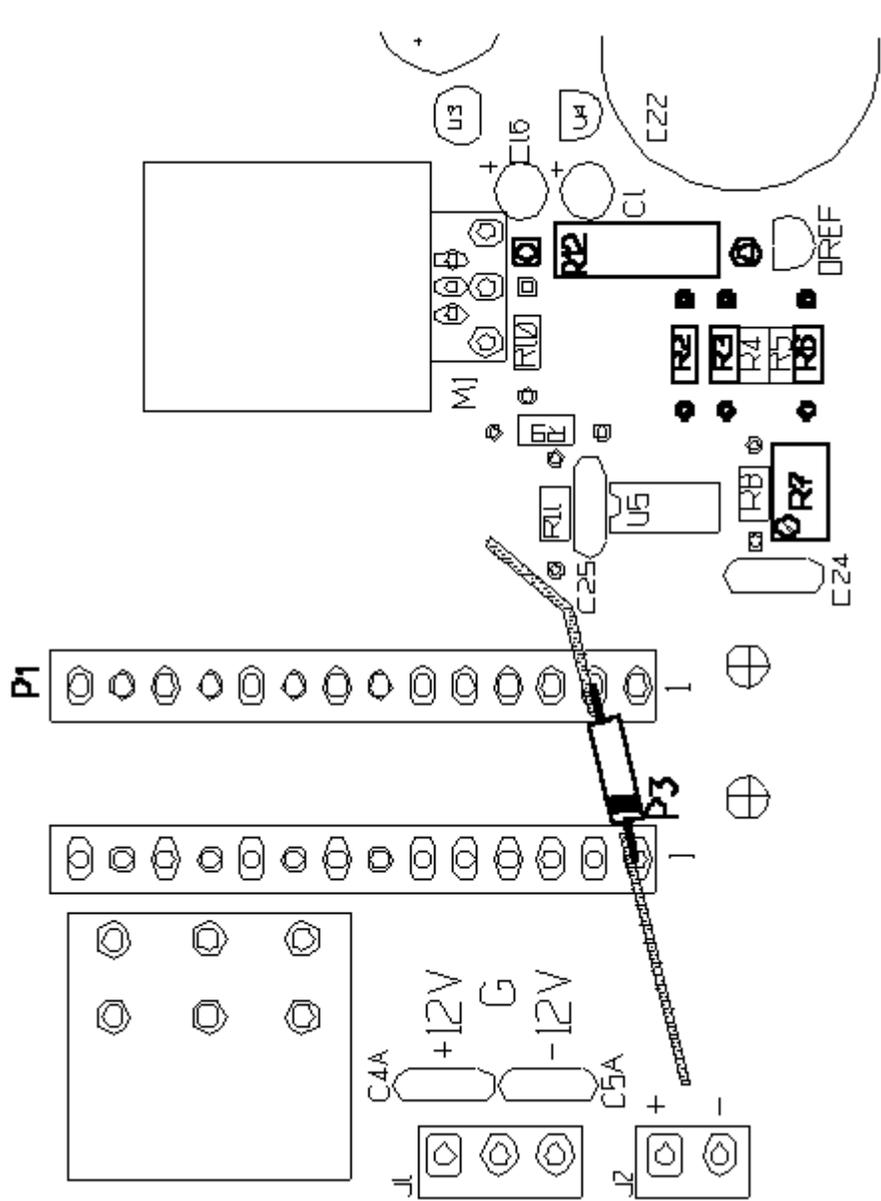
The last change is the addition of a Zener diode. This is the part to which have been soldered large copper heat sinks. Look carefully at the illustration to see where the diode is to be soldered. Note that the banded end of the diode goes into pin one of the strip of holes labeled

“P3”. The other end of the diode goes into pin 2 of the strip labeled “P1”. When soldering the diode into place, slip a piece of paper or thin card (a piece of business card is perfect) under the two heat sinks so that the copper will not touch the board after it is soldered in place and the card shim removed. The inboard heat sink will have to be gently bent to the left such that it doesn’t touch the leads of any of the other components. Run a straight edge (or sight) across the top edges of the chassis to assure that the copper pieces will not touch the cover when it is re-installed.

Turn the adjusting screw on “R7” full minimum and turn on the power. Without any load the Zener diode will begin to get hot. As soon as the LED is connected there will no longer be any current through the Zener and it will go back to its cool state.

Adjust R7 to minimum (aprox 270 mA). This is a beginning point for analog systems and should give you enough level from the sound track to begin alignment. After peaking the LED alignment, set the processor pre-amp gain at 80% or so. Bring up the current until you reach Dolby level. If the supply is going to be used with a Dolby Digital reader you will begin at minimum, peak the alignment, and adjust until you have at least 3 volts of video as measured on your oscilloscope.

As a final added touch you can drill a hole through the top cover of the supply so that you can get your screw driver into the output adjusting screw. The enclosed drawing will give you the dimensions from that same lower left corner, or, you can use the drawing as a template and center-punch the location right through the paper. The hole can be whatever feels right, but 3/16” or 1/4” works well.



## What to change with the EL-2A conversion kit

Change R2 to 3.6 K (orange blue, red, gold)  
Change R3 to 432 ohm (yellow, orange, red, black, brown)  
Change R6 to 10 ohm (brown, black, black, gold, brown)  
Change R12 to .15 ohm (brown, green, silver, gold)

Add large diode per drawing (\*watch polarity).

\*Output pot should be turned down all the way before firing up (clockwise is down) Then bring it up to the needed output (counter clockwise).