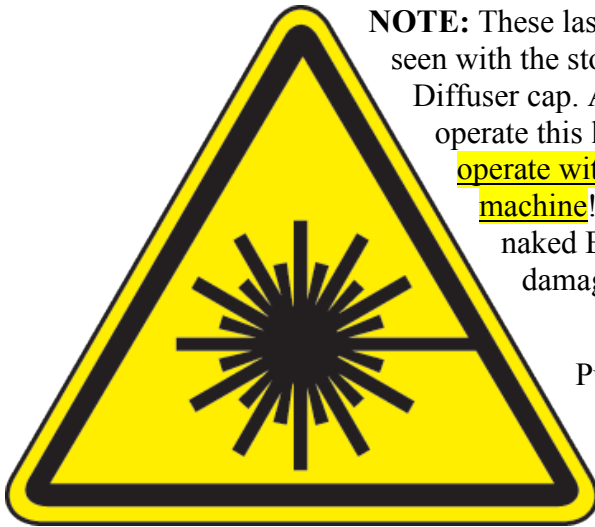


Stern Star Trek Laser Module Upgrade

The following document walk you through the installation of Pinball-Mods.com's Laser upgrade for the Stern Star Trek Premium and Limited Edition Pinball Machines. This upgrade is a bolt-on modification which requires no irreversible changes to your pinball machine. It uses a custom Cable, Voltage Regulator Module (VRM), and an Application-Specific Laser module. The Laser module **cannot** be installed without the VRM and custom cable as they are keyed differently to prevent end-users from attempting to plug this higher power laser into the stock harness – it simply won't work.

Please note: the Author of this document is not responsible for any damage you do to yourself or your property.



NOTE: These lasers output a large amount of power in order to be seen with the stock Stern General Illumination and the stock Diffuser cap. As a Result; the purchaser of this product ***MUST*** operate this laser with basic laser safety rules and ***NEVER*** operate without the stock stern star cap that came with the machine! Viewing these lasers without the cap and with the naked Eye may lead to temporary or even permanent eye damage.

Purchase of this kit is your understanding *and agreement* to not hold the seller or distributor liable for misuse of this laser product. It is your consent that you will hold Pinball-Mods.com and its owners/agents harmless for any damages.

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Tools/Materials Needed:

- 11/32" Nut driver
- ¼" Nut Driver or Flat head Screw Driver
- Philips Screw driver
- Wire Cutters (for cable/zip ties)

- 1) Begin by removing the metal apron on the machine; to do this – locate the two 11/32” nuts on the bottom side of the playfield holding the front the apron down. These nuts are are indicated in Figure 1 below:

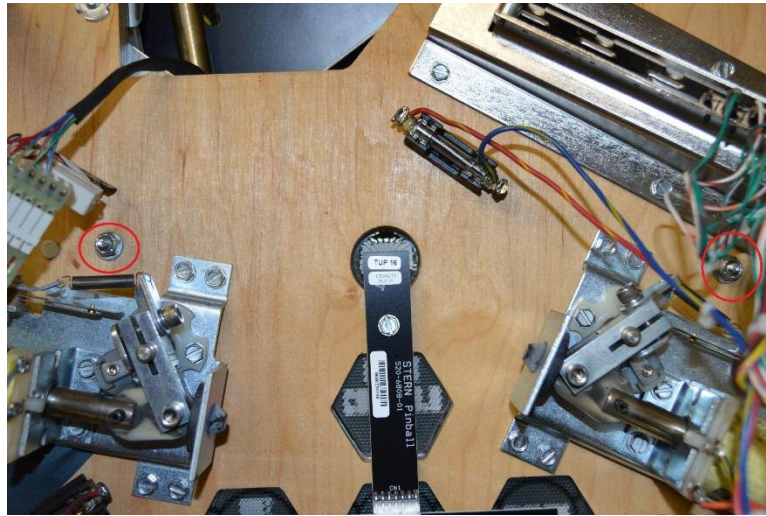


Figure 1. Remove Apron Nuts

- 2) Next; locate the Philips counter sunk machine screws under the playfield hangers. Remove them and the apron will be free to remove from the PF.

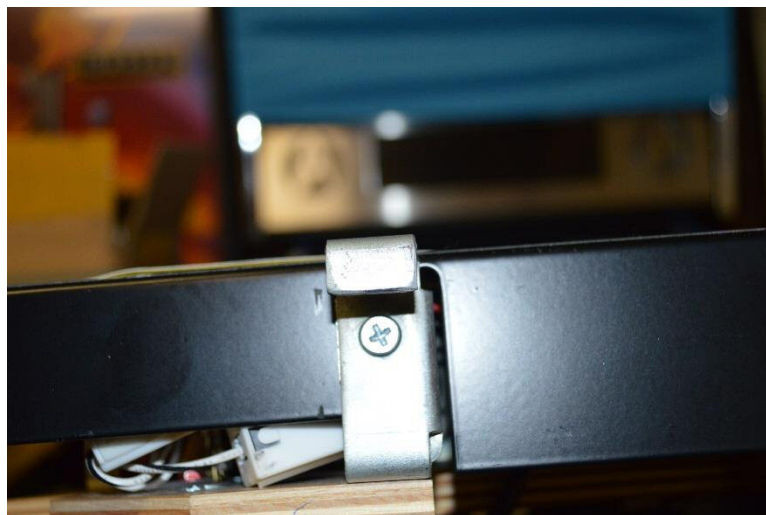


Figure 2 Remove 2X Apron Hanger screws

- 3) With the apron; removed loosen the ¼” screw holding the existing red laser pointer to the laser bracket. You do not need to remove this set-screw completely; just loosen it enough to remove the module. Keep the white plastic spacer/insulator; you are going to need it for the new module. Also; keep in mind the silver Stern Star Cap should not be attached to the module - is should still be press/friction fitted to the white pulley at the front of the laser motor assembly:

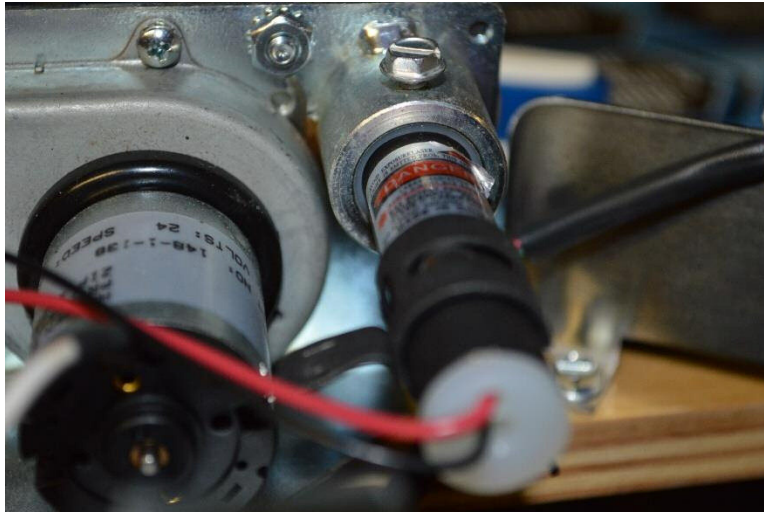


Figure 3 Loose Laser's Set-screw

You do not need to remove the clamp holding the laser pointer's switch "on"; it is not needed for our module – so keep it with the module in case you want to restore your machine to factory configuration later.

- 4) Install the new brass laser module. Make sure you install the white plastic insulator to keep the module's body electrically insulated from laser bracket's ground. Snug up the set screw. Don't over tighten – just enough that the module is secure and it won't rattle out.



Figure 4 New Laser Module installed with insulator

Run the power leads over to the hole the original module used. You'll connect to the supplied wire harness below.

- 5) Now, lift the playfield and look for the laser wiring harness. On the Author's machine; this connection was identified with two yellow dotted connectors. On one side; there is brown and purple-violet conductors. On the other; there is a couple of white/black stripped wires crimped to the "purple side" and white/brown stripped wires crimped to the "brown side". For your reference; the Laser connections are listed on Page Y42 in the LE manual. Disconnect these connectors and connect the supplied cable harness between these two connectors.

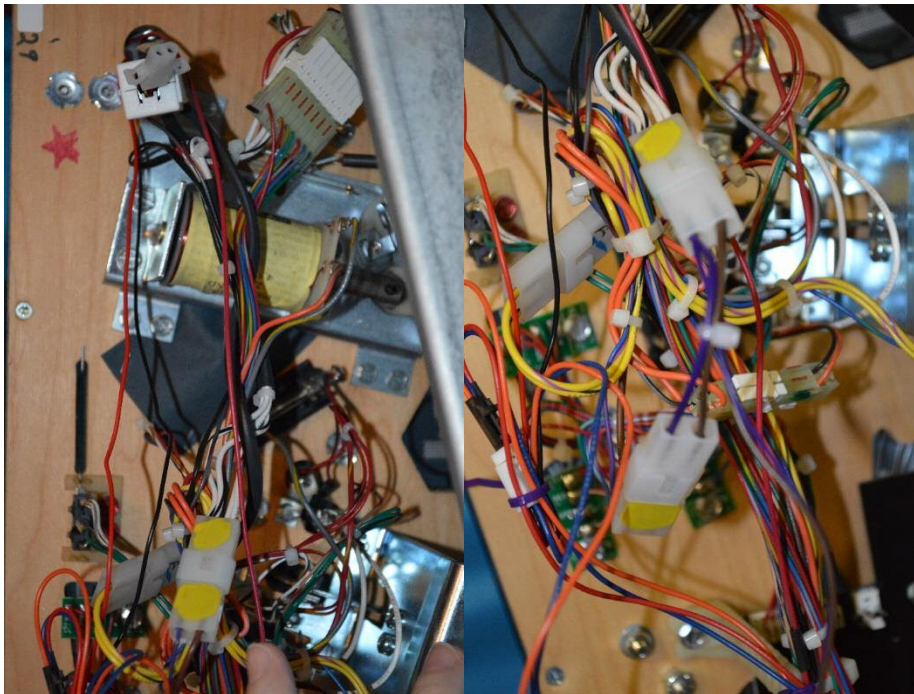


Figure 5. Splice in New Cable Harness

- 6) The new cable harness has a VRM to regulate the power needed for the upgraded laser module. Ensure it is properly installed by verifying the “dot” indicator is above the brown conductor of the connector:

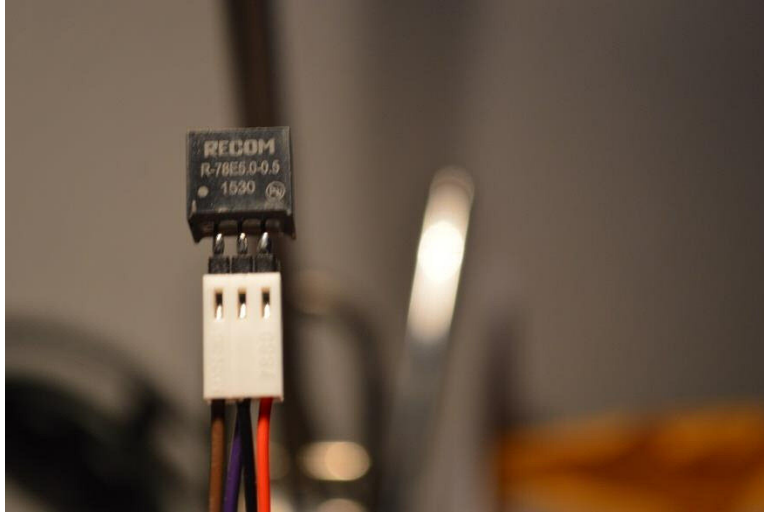


Figure 6. Verify Laser VRM polarity

- 7) At this point; there should be only one connection left; which is for the laser diode module. Run it up thru hole and connect it to the brass laser module. The connector is shape keyed; so it should be impossible to connect improperly – just in case; red goes to red – black to black.

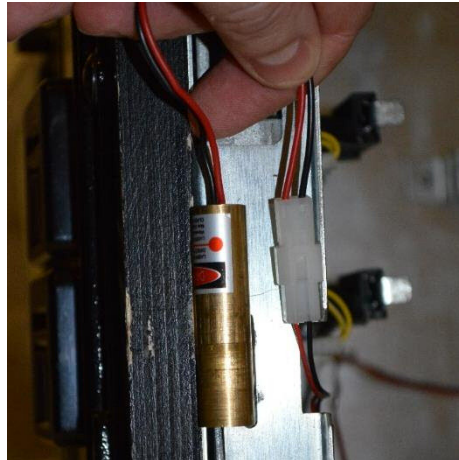


Figure 7. Connect laser module to new harness

- 8) You can now power up your machine and run the laser test to verify all is working properly before you re-install the metal apron.
- 9) Assuming everything checks out with the laser test; simply re-install the apron and tidy up the new harness by using cable ties to secure it to the harness under the Playfield. Put the old diode module in the coinbox if you aren't collecting cash from your machine; or put it in some other safe place so you can find it. Finally; please note you should leave the original laser harness as-is; in the machine. You should have anything connected to it; but it is still needed because that harness supplies power to the laser motor.