

# Science Olympiad AC Powered Laser Pointer

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Many Science Olympiad events require the use of laser pointers or photogates. This document shows how to make inexpensive AC powered laser pointers instead of using off the shelf ones. NOTE: Science Olympiad has an official "Use of Laser and High-Brightness LED Devices" policy that must be followed, available at <https://www.soinc.org/lasers>

## Materials / Tools:

- 24 gauge x 5' speaker wire (~\$1 @ Home Depot)
- 3/8" x 5' PEX pipe (~\$2 @ Home Depot)
- Saw
- Electrical tape
- Wire cutters
- Soldering iron and solder
- 3V 1A DC power adapter (~\$5 @ Amazon, ASIN B009SNGQXU)
- SPST rocker switch (~\$5 for 5 @ Amazon, ASIN B008X10YRC)
- 3V 5mW laser diode module (\$8 for 10 @ Amazon, ASIN B00R73MCZE)

1. Cut off a ~4" section of the 3/8" PEX pipe
2. Strip the wire so ~1" is bare for both conductors on both ends
3. Pass the wire through the pipe
4. Solder the ends of the wire to the ends of the laser diode module. Be sure to note which wire connects to the red wire on the laser diode module.
5. Wrap small pieces of electrical tape around each of the soldered joints to ensure they won't accidentally touch and short the circuit
6. Wrap a piece of electrical tape about 12 times around the body of the laser diode module to increase the diameter to match the inside diameter of the pipe.
7. Push it into the pipe and ensure a snug fit.
8. Tape the wires coming out of the other end of the pipe to the pipe to ensure the laser module isn't pulled out.
9. Cut the barrel connector off of the wire from the DC power adapter and strip the wire ends. Be sure to note which wire went to the inside hole of the connector.
10. Solder the wire that went to the inside hole of the connector to the speaker wire that connects to the red wire from the laser diode module.
11. Solder the other speaker wire to one of the lugs of the SPST switch and the other DC power adapter wire to the other lug.
12. Use small pieces of electrical tape around all the soldered connections to ensure they don't touch and short out the circuit.
13. Once the power supply is plugged in, the switch can be used to turn the laser on and off. If it doesn't work, you likely have the wires accidentally reversed or don't have good solder connections.

