

SD-2 Source Driver

Recommended first time setup: Safety Limit

This is an example of how to calculate and enter a PWM limit for a particular source and power supply voltage. This is to protect the source from inadvertent commands that might destroy it. You must use the information from the manufacturer for the specific source you are using to set the limit correctly. You must also make sure you take into account the heat sinking of the source at the power level you set

Requirements

- Intelligent Peripheral Solutions SD-2 Source Driver board.
- Source Driver Communications program. This is available directly from the manufacturer or via download from the Internet.
- A host computer running Win 9.x and having an available DB-9, RS-232 connection. For other Operating Systems some informational support is available.
- A standard Male to Female RS-232 cable to connect the host computer to the SD-2 board.
- Installation of the Source Driver Communications program on the computer. Please check with the Software Installation instructions.

Calculating the PWM modulation limit:

*Summary: Limit DC%=Maximum Source Power
Allowed/Source Power Available*

- Determine the Source resistance:

- From the data sheet and curves for the source, calculate the source resistance at the maximum DC operating voltage and current.

EXAMPLE: Cal-Sensors Model SVF350-8M $E/I=R$,
 $1.8V/1.1A=1.64$ OHMS.

- Determine the power supply voltage that will be used:

EXAMPLE: 5.0 volts.

Calculate the modulation limit:

- Using the example of 5 VDC and the above Source we can now calculate the percent modulation required operating the source just below its peak D.C. power of 2.1 watts or 2.0 watts. Lower limits are acceptable and might be required.

The true power limit is dependent upon the physical mounting and ambient temperature. If in any doubt check with the Source data sheet and the Source manufacturer, Cal Sensors!

Supplied power at 100% modulation:

$$P = E^2/R = 25/1.64 = 15.24 \text{ Watts.}$$

Supplied power at M% modulation:

$$W_M = P * M\%$$

Maximum allowed modulation:

$$M\% = W_M/P \text{ or: } M\% = 2/15.24 = 0.13123 \text{ or } 13.23\%$$

Rephrasing:

- W_M is the maximum power to be allowed to the source: 2.0-Watts max.
- P is the power at 100% modulation: $25/1.64 = 15.24$ Watts.
- $M\%$ is the desired limit for power, in percent; in this case 13.12%.

13.12% is the desired modulation in percent, which should be set as the LIMIT for this particular source and power supply.

Connecting the SD-2 for initial operation and limit setting

CAUTION: PLEASE BE VERY CAREFULL WITH THE POLARITY OF THE POWER CONNECTIONS. REVERSAL OF THE POWER WILL SEVERLY DAMAGE THE BOARD AND WILL VOID ALL WARRENTY COVERAGE.

- Make sure your power supply is disconnected or off!
- Connect a dummy load to the two terminals on the driver board terminal block with “S” markings on the PC board. A 5-ohm, 5-watt resistor or a 12 volt, 5 or 10 watt automotive lamp makes a satisfactory dummy load and you will have a visual indication the board is operating. Make certain the connections are tight at each terminal position.
- Connect the power leads from the power source to the (+) and (-) terminals on the driver board terminal block but DO NOT TURN THE POWER ON. Make certain the leads are tight at the terminal positions.

CAUTION: DOUBLE CHECK THE POLARITY OF THE POWER CONNECTIONS. REVERSAL OF THE INPUT POWER WILL SEVERLY DAMAGE THE BOARD AND WILL VOID ALL WARRENTY COVERAGE.

- Connect the available serial port on your computer to the Source Driver Board serial port.
- On your computer, start the SD-2 Source Driver Communications program.
- In the Source Communications Window, select the CommPort/Properties/COMM PORT from the tool bar; then select the Communications port connected to the Driver board.
- Check that the Communications Indicator at the upper right of the Communications window is green. If not, click on it. It should go from red to green.
- Now apply power to the driver board. A “READY>” prompt should appear in the communications window on your computer. Note: This indicates that your computer and the Driver board are communicating and the driver should respond to commands. You may or may not see the green L.E.D. on the Source driver board flashing; this depends on the previous settings of the driver board. You may also see the dummy load illuminate.

Click anywhere inside your Source communications window to make sure it is the active window. Using the example outlined above, the following illustrates how to set limits for the selected source.

- On your keyboard, type “L” and then the hex code for the % modulation you calculated above. (See the tables furnished with the driver board). In this EXAMPLE, your entry would be L0036, which corresponds to 12.98% modulation. (12.98% of 107 μ sec in .25 usec. steps). This is the closest setting on the low side of your calculation for the source in this example. The window will show your entry followed by an echo of the value 0036. The window will then show “>E 232=0036”, this is checking the RAM memory location for the present PWM value stored in RAM (which might have been reduced to your new limit). You now have the PWM limit set, which prevents exceeding the maximum power of the source.