

Light_Meter_Construction_2001.txt

Subject:[tt-forum] LM-6) Light meter construction and use:

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To:tt-Forum <tt-forum@yahoogroups.com>

If after the PS you are curious about how fast the darkness is clearing up. Then take your light meter out side near noontime once a week or month and plot a graph of light intensity versus Time. This way you can predict when you will have enough light for efficient outdoors growing.

A useful light meter can be made really cheaply for under \$20 from a harbor freight tools using a low cost digital multi-meter (part number 30756) \$6.50 to about \$13 depending on sale price at the time. See: <http://www.harborfreight.com/>. And enter the part number under "find item number:" then click "GO". A silicon solar cell can be purchased from radio shack for about \$5 and hooked directly using any 2 wires with 2 Radio Shack Banana Plugs (cat no. 274-721c) for \$1.59.

The solar cell comes with a nice little plastic box. Solder the leads on. One trick with this -- solder it without flux on the solder. Melt a big drop of solder on the wire on a piece of paper to take off the rosin, let cool, transfer to the back of the solar cell. Holding the wire heat enough to get it to stick. This worked best for me. Other wise once the flux gets on the back of the solar cell it becomes hard or nearly imposable to get solder to stick. One can add a small amount of foam rubber to hold the solar cell to the front face. Close the box and use five-minute epoxy over the crack to seal it up and keep it from opening.

Readings are taking using the DC milliamp and microampere current scales. The unit can be calibrated before the PS if needed. Compare with a know light meter, the sun for high end, and light bulbs or a candle for the low end. For measuring Latitude no celebration is needed. I plotted the following as a typical calibration curve.

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<http://home1.gte.net/ob/LuxMeter-A1.gif>. Note the different curves that resulted because of the different light spectrum for each type of light. Bright sun has more infrared, florescent and cloudy skies have much less. To use this curve one would take a reading in milliamps and follow over to the curve that is appropriate and then over to the LUX axis to see what the light intensity is. I used a LX-101 LUX meter as a standard. This can be purchased at Electronix Express 1-800-972-2225 for \$65.95 and has a part No. 01LX101.

Typical maximum measurements of 150,000 LUX are found on a bright sunny day. With cloudy conditions it can get down to approximately 10,000 LUX. For a typical clear day the sun goes down with the most rapid light change (steepest slop) between 100 LUX and 5 LUX. See <http://home1.gte.net/ob/SUNLUX1.gif>. At the intensity of where photocells typically switch we get about 10 LUX change/min. Thus it becomes possible to measure the length of the day fairly precisely using these devices.