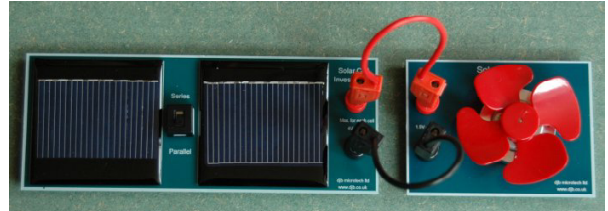
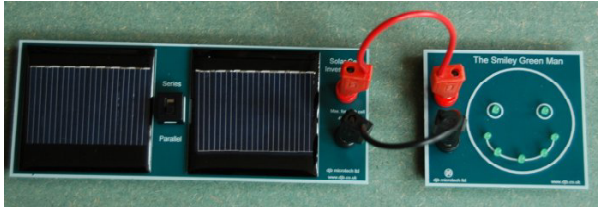


Technical Notes

Solar Cell Investigation Board



Associated Equipment

The following equipment from djb microtech can be used with the Solar Cell Investigation Board:

- Solar Motor L1-1020.00
- Smiley Green Man LED Board L1-1030.00
- Light Meter D3-1010.00
- Decade Resistance Unit A1-1010.00

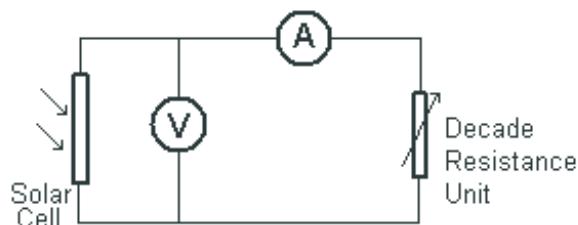
Each mono-crystalline solar panel has a maximum rating of 4.4V, 90mA. They can be easily energised by a bright lamp or sunlight and can be operated in conjunction with our Solar Motor and Smiley Green Man LED Board.

Investigations

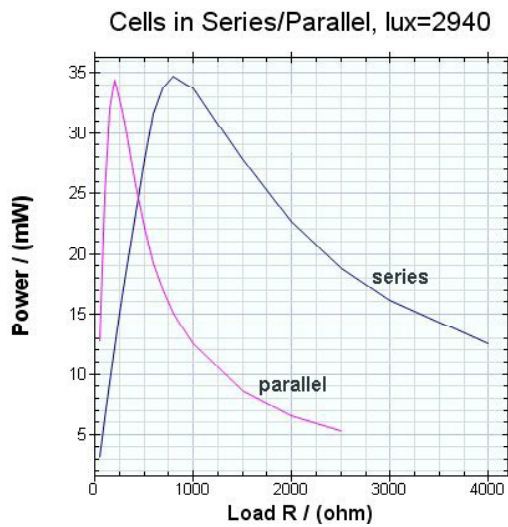
Listed below are suggestions for some possible investigations to try with your Solar Cell Investigation Board.

- With no load, measure the output with the cells in series and then in parallel. Replace the voltmeter with a Solar Motor. Does it go faster with the cells in series or in parallel? Perhaps surprisingly it goes faster when the cells are in parallel - under no load conditions the parallel combination gives the smallest output voltage. Now connect a voltmeter across the motor and note the series and parallel voltages. The parallel combination now gives the larger voltage. This should enable your students to appreciate that the electrical load affects the output voltage of the solar cell.
- For a fixed light intensity, determine the optimum electrical load for maximum power transfer when the cells are in series and then in parallel.
- Investigate how the optimum maximum load changes as the light intensity changes.
- Investigate how the output voltage varies with the area of cell exposed to the light.
- Use filters to investigate how the output voltage varies with colour/wavelength of light.
- Use a light meter and investigate how the output voltage varies with light intensity.

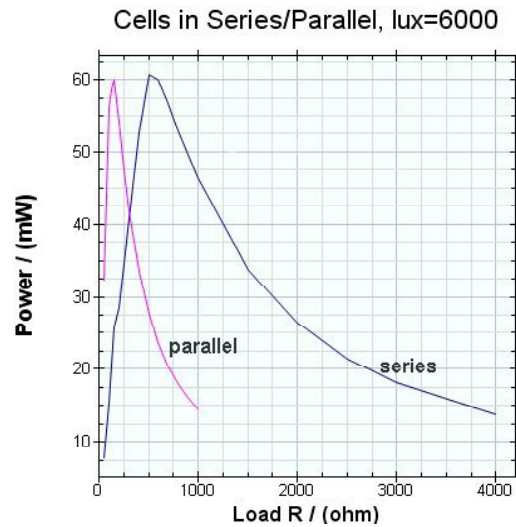
Circuit for Power Investigations



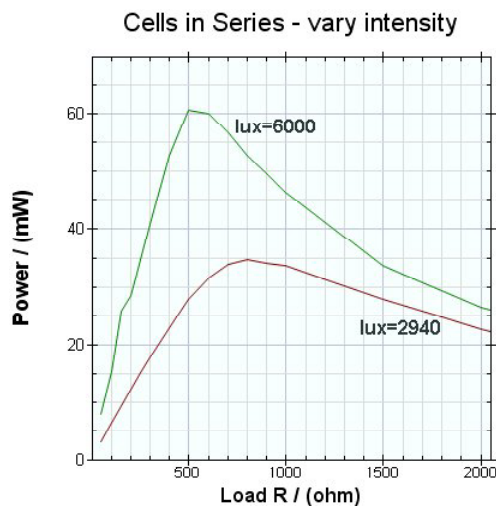
Typical Graphs for Maximum Power Transfer



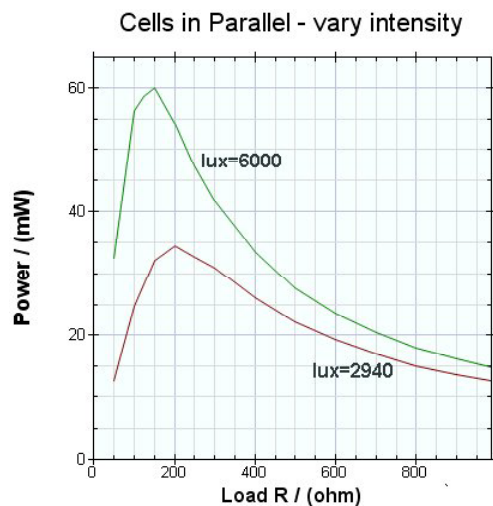
These plots show how the optimum load for maximum power transfer for cells in series and parallel. The light level is fixed at 2940 lux.



These plots show how the optimum load for maximum power transfer for cells in series and parallel. The light level is fixed at 6000 lux.



These plots show that for cells in series the optimum load for maximum power transfer changes as the light intensity changes.



These plots show that for cells in parallel the optimum load for maximum power transfer changes as the light intensity changes.

Graphs drawn using the ALBA Data Logging software - demo version available free from www.djb.co.uk

This Technical Note is available as a coloured pdf in the Teachers section of our website.