PLANNING YOUR SOLAR PROJECT
1997

1. Design rules – Four solar cells must be mounted on foam board.
   The motor in the kit must be used.
   Cars must have some sort of a body.
   Cars may have any number of wheels.
   Cells and motors must be used.
   All other parts are for convenience and may be used as desired.
   You will get wheels, gears, a lamp, battery, etc!

2. It is important to place the solar cells on the foam board immediately to minimize handling and cell breakage. Once the cells are in a firm array the possibilities of breakage is minimized!

3. Four Cells fit on either a 9"x2.5" or a 4.5"x4.5" foam board, so the first thing to do is THINK about design.

4. NOW design your project

   For the car THINK about how the solar array, motor, body, and other parts will fit together. LOW friction and light weight are essential – try for 100 to 140 gms. Light is FAST!

   For the house THINK about how the solar array, light, battery and switches fit your passive solar design – on a pole? on the roof?

   LOOK for common objects that can be used! We have done our THINKING – now LETS GO!

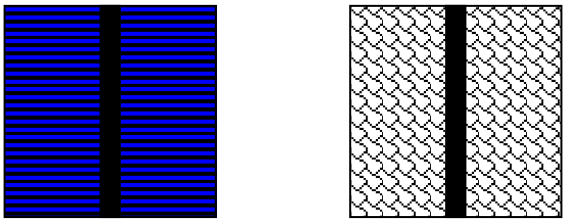
5. NOW build the solar array that you need for your design.

6. NOW you can build your car or house. Experiment – you can modify the design as long as your solar array fits.

7. Test the performance – evaluate the appearance. Improve!

   Some things you might need:
   Magic Tape – ½" to tape the cell connections, wire – soldering for a few connections, hot melt, good glue – small tools – a voltmeter is desirable for testing.

Solar Cells



Sun Side Negative Back Side Positive

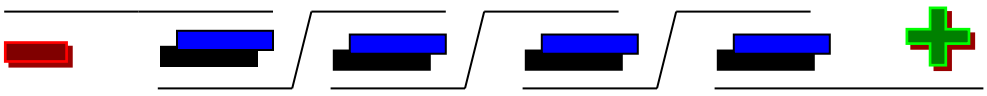
Handle cells with care!
They are thin “glass” and can break.
Place them carefully on the firm foam supprt and they will be well protected.

These silicon solar cells are 5cm x 5cm (2”x2”)
They are polycrystal silicon made as 10cm x 10cm wafers.
We have them cut into quarters to match our requirements.

Silicon solar cell generate about 0.5+ volts in sunlight. This is the same for any size cell. This is open circuit without any load. We connect four cells in series to produce the 2 volts for our motors.

Cells generate current proportional to their area. These 5x5 produce about 0.5 amperes. Our array of 4 cells produces about 1 watt of power (2 volts * 0.5 amps) so our cars must be light and efficient!

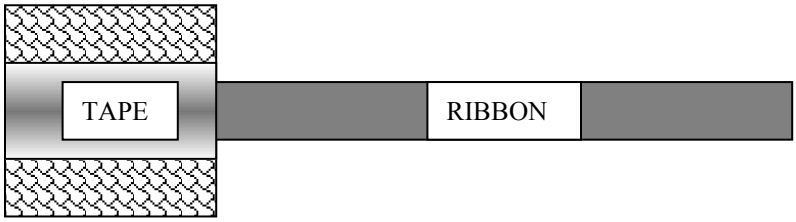
Approximately 2 Volts at 500 milliamperes



BUILDING THE SOLAR ARRAY

1. First have your foam base ready – about 2.5”x9” or 4.5”x4.5” square.

2. Handle cell carefully! Lay the cell on a flat surface back side up. Place an about 8” of ribbon along the connector in the cell center. This will be the negative terminal. Use a short piece of ½” “magic tape” across to hold it on the center line, then put a longer piece to complete the contact.



3. Put the cell Sun Side up on the foam board and tape it in place.

4. For the second cell put a 4” ribbon on the back center line.

5. Tape it in place so that the overhanging end of the ribbon covers the center connector on cell #1 and tape it.

6. Proceed with the third and fourth cells the exact same way as the second.

7. The fourth cell will now need a Sun Side connection. Put about an 8” piece of ribbon on it. This will be the negative connection.

8. Tape array so that the cells will not fall off.

9. The cells must not touch each other and should be far enough apart so that the ribbon cannot kink and short the top to the bottom – there is 0.5 volts there!

10. We suggest “magic tape” as it can be carefully lifted if one makes a mistake!

Final Board