# Scorpio Technology NEWSLETTER

## INSIDE THIS ISSUE



### TEACHER CONFERENCES & WORKSHOPS

Scorpio is attending or supporting these Design & Technology teacher activities:

**DATTA QLD** - 27-28 June, 2019
**DATTA WA** – 5th July, 2019
**STEAM FUTURES CONFERENCE (VIC)**- 23 August 2019
**DATTA ACT** – 21st September, 2019: TECHnow Conference
**DATTA AUST** - 14-20 October 2019: Design & Technologies Week 2019
**ITE (was IIATE)**- 27–29 November 2019


### K'NEX CLEARANCE ITEMS

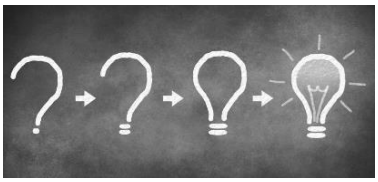
*__Additional 10% off__ clearance catalogue prices if any clearance stock is purchased in conjunction with our regular catalogues' items.

**Offer valid till 30th December 2019**. (Both clearance items and regular catalogue items must be placed on the same purchase order for the offer to be valid. Discount does not include postage charges).*

## WELCOME

We have found an interesting example showing how a basic platform design can be used in many ways.

**Model Solar Competition Challenge** season is almost here. So we have provided some reference resources.



## TECHNOLOGY AT PRIMARY & SECONDARY – K'NEX

**K'NEX** has a great range of **STEM** products suitable for **junior primary** to **senior secondary**. We have a great range of educational kits to challenge and excite your students.

- ☆ Each kit includes teaching guides and ideas to inspire your students.
- ☆ Promotes and provides: hands on learning, problem solving, creativity, collaboration, critical thinking, communication, challenging and imagination building activities.
- ☆ **K'NEX** is an innovative construction system which snaps together for a simple and tool free assembly. Each set includes colour coded instructions.

Unfortunately, we are no longer stocking these items. We encourage you to stock up either for your school or for gifts.

### K'NEX CLEARANCE ITEMS

| Code | Item Name | Specifications/ Description | $ |
|---|---|---|---|
| | Amusement Experience | *(Container has no lid. Some parts may be missing)* | 80.00 |
| KX78600 | Exploring Machines | | 268.00 |
| KX77051 | Exploring Wind & Water Energy | | 110.00 |
| KX78790 | Forces, Motion & Energy | | 230.00 |
| KX79028 | Intermediate Maths & Geometry | *(Containers have some damage)* | 190.00 |
| KX77075 | Investigating Solar Energy | | 110.00 |
| KX78976 | Renewable Energy | | 270.00 |
| KX78620 | Wheels/Axles & Inclined Planes | | 50.00 |
| KX78780 | DNA Replication & Transcription Activity Model Set | | 70.00 |

❖ ALL PRICES INCLUDE GST


**SCORPIO TECHNOLOGY** Vic Pty Ltd
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www.scorpiotechnology.com.au



June 2019

# This Month's Q&A Technology Tips: Solar

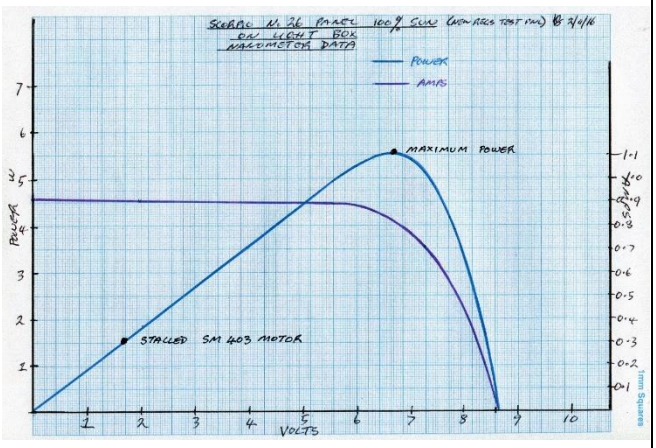
## Q: What is the effect of tilt angle on Solar Panels?

**A:** Maximum power is produced when the Sun impinges on the active surface of the Solar Panel at right angles. As this angle changes towards parallel to the active surface of the Solar panel the power drops off to near zero.

## Q: Finding the Solar Panel's Maximum Power Point requires variable resistor module. Is this true?

**A:** Not exactly the complete story. A Variable Resistor will allow the maximum power point of a Solar Panel to be determined but there are other ways to load the Solar panel in order to determine the maximum power point of a Solar Panel.

Consider the graph below: it is for a real Solar Panel used in the Victorian Model Solar Victoria Car competition.




**Scorpio No. 26 Solar Panel masked down to 5.5 watts to meet the 2018 car regulations requirements.**

The above graph was obtained by illuminating the Solar Panel with 100% Sun equivalent light with the panel at 25º C. Voltage and current data collected during charging a small capacitor connected directly to the Solar Panel was used to calculate the power curve.

Simultaneous voltage and current readings were taken as the capacitor charged and recorded by a high speed data logger. The complete data set was collected in about 1 second which limits the panel heating thus increasing accuracy. (See above for heating effect on power.)

The power curve above was calculated using the voltage and current data collected.

## Power in watts = volts multiplied by current

*Note: the voltage and current used in the power calculation must have been recorded at the same time, otherwise the power calculated will be in error.*

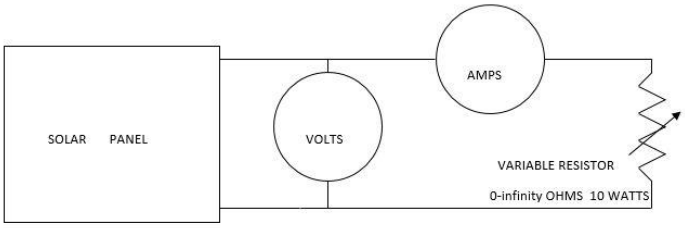
Using a variable resistor load also works. A variable resistor connected across the panel terminals set to infinite resistance will see the power from the panel at zero, the point where the power curve and current curve intersect the X axis. This is the open circuit voltage point of the panel. (8.5 volts)

As the value of the resistance is lowered the current will start to flow through the resistor and panel voltage will drop (Ohm's Law applies). By sweeping the variable resistor over the whole range from infinite resistance to zero resistance and taking simultaneous readings of voltage and current the power curve for the panel can be calculated. When a resistor value of zero Ohms is reached we will be at zero volts and reading maximum current the panel can provide, this is panel short circuit current.

Panel power is calculated as described above. Accuracy depends on how quickly the data is collected and recorded as panel heating quickly lowers the power.

Any method of providing a variable load on the Solar Panel can be used to gather the voltage and current data required to calculate the panel power curve. There are several others, including but not limited to a motor or a transistor.

Typical circuit for panel testing using a variable resistor as a load is shown below.



# OPEN SOURCE ELECTRIC VEHICLE PLATFORM "WOODPECKER"

***"Design is an Action. Goal-oriented process of creation, resolution and improvement."***

So many great ideas never get beyond the concept stage. Some make it to the next stage and may be entered into national design competitions. One such design is the "**Woodpecker**". It was designed in Latvia and was a finalist in the Latvian National Design Award 2019. One of the judges was **Despina Macris**, Director of the Design Studio DotDash, Brisbane.

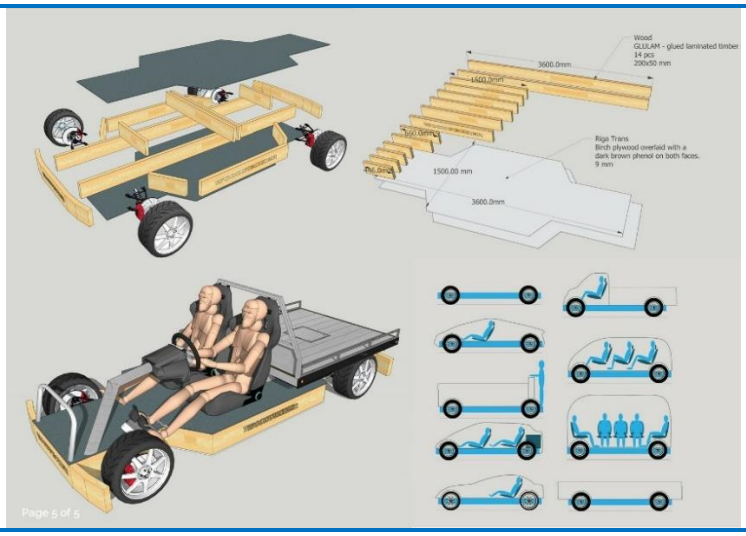
Many Scorpio projects have the same design flexibility and opportunity for innovation as this full size model electric vehicle. It's great to see that our ideas have applications in real life!

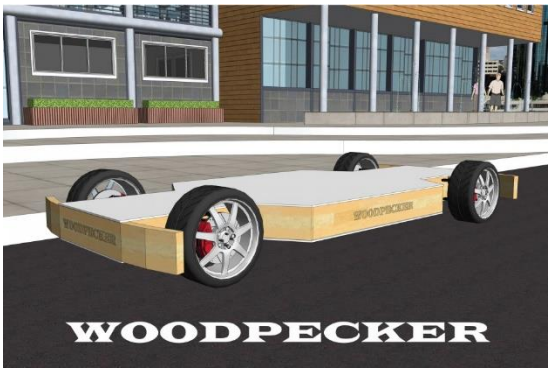
Latvian National Design Award 2019

## WOODPECKER

"*Woodpecker is full size vehicle platform from wood for robotics and automotive hobbyists. An open sourced concept of a modular, inexpensive platform was created to foster tinkering, in-home garage development of autonomous technologies for enthusiasts and research organisations. A wooden frame could be made and assembled by everyone using simple woodworking tools and downloadable free drawings, while those looking for professionally made kit of pre-produced parts (like IKEA) furniture), it will be delivered through local IKEA or Home Depot. Woodpecker's compact and modular "skateboard" frame combined with an ecological wooden frame creates an innovative concept for the future development of transportation*."

**Client:** – PILOT Automotive Labs **Author:** Rihards Gailums
https://www.artstation.com/artwork/k4ZD8z






**Design your own car on this battery base. Your own Tesla.**

Comment by Dr Christopher Turner (Architecture and Design Department at Victoria and Albert Museum, London)