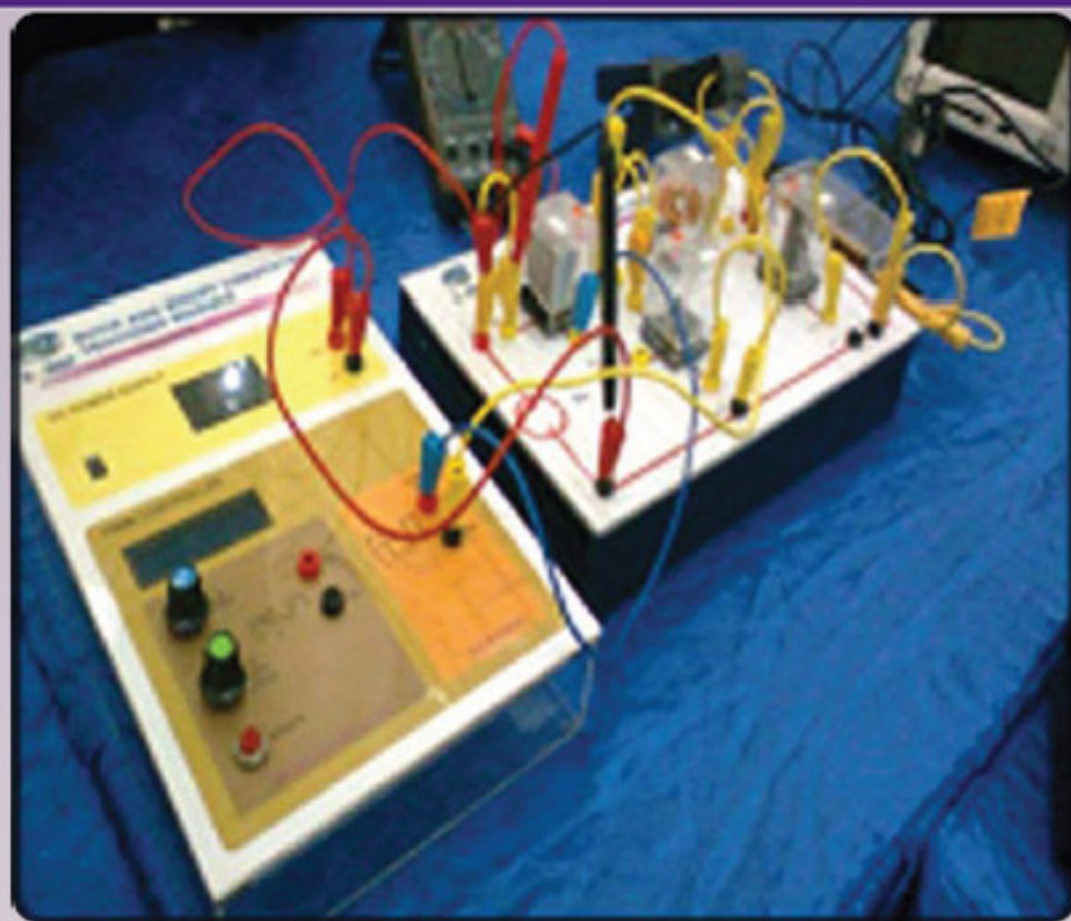


# SELLING TECHNOLOGY

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UniMAP's Small and Medium Enterprise Unit (SME Unit) was established in 2008. It is placed under the jurisdiction of the Office of the Deputy Vice Chancellor (Research & Innovation). The unit's sole objective is to commercialise UniMAP's research products, services and technologies incepted from the University's research activities. For starters, the SME Unit seeks to foster linkages between organisations and individuals with new technological innovations with a view towards commercialisation. The Unit aims to generate income for UniMAP through the commercialisation of research products. Hence, building linkages and establishing collaboration between UniMAP and the industries are given due attention.

A milestone in the Units' achievement is when it struck gold with Maxlane Sdn. Bhd. UniMAP and Maxlane Sdn. Bhd. have recently signed a collaborative commercialisation agreement. The Memorandum of Agreement (MoA) Signing Ceremony between the two was held on January 7 2010 at Dewan Warisan Kangar, Perlis during the 'Ekspo Rekacipta 2009'. The collaboration is a pioneering commercialisation activity for UniMAP. The MoA entails the development, manufacture, and marketing of two of UniMAP's research products - namely the 'Buck and Boost Converter Teaching Module' and the 'Single Phase Inverter Training Kit'. Both products are invented and developed by UniMAP's PE2R research team, whose members comprise of Mr. Zainuddin Md Isa (featured in this issue's Personality),

Mr. Baharudin Ismail, Mr. Mohd Faridun Naim Tajuddin and Mr. Mohd Fayzul Mohamad from the School of Electrical Systems Engineering. The product has been classified a 'novelty' based on a novelty search by UniMAP's Research and Development (R&D Unit). Their commercial potential is based on their user friendliness, low cost, reduced dependence on external products and their well developed teaching equipment.

The interactive '2-in-1' Buck and Boost Converter Teaching Module has been developed to demonstrate the two basic topologies of switch-mode power conversion in order to help students understand and visualise circuit elements clearly. In this teaching module, the two fundamental topologies of non-isolated dc-dc switching converters, which are the buck and the boost converters, are developed in a single platform.

The plug and play concept enables students to play around with placement of energy storage elements and switching devices to construct either buck or boost converters. Students can also vary the output voltage for both converters by adjusting the pulse width modulation (PWM) duty cycle which is microcontroller based. Module-based laboratory experiments for undergraduate, diploma and certificate courses are often used to assist and complement classroom lectures. These are important tools for improving students' skills in measuring, corroborating practical results, comparing theory and practice, modeling, as well as boosting confidence in handling power devices.

The Single Phase Inverter Training Kit is developed to assist student learning of the basic principles of single phase inverter operation. This training kit allows students to translate the theory learned

in class into practical knowledge. The kit is divided into four independent modules, namely switching module, gate driver module, circuit topology module and filter module.

Applying the plug and play concept, all the modules can be integrated together to create a simple single phase inverter or can be studied independently for better understanding of the contribution of each module in order to create an improved single phase inverter. This allows students develop their own modules and combine these together with available modules to create their own inverters. The concept not only helps students learn the basic principles of single phase inverter, but also allows them to enhance their knowledge by designing some parts of the inverter.

The complexity of power electronics systems complicates laboratory experiment implementation. The Power Electronics field is highly multidisciplinary, which is compounded by lecture / class temporal restrictions in virtually all courses, and one of the lecturer's main challenges is to adjust the depth and breadth of the approach. In this context, a well-planned teaching equipment can help save class time and spur students' imagination and motivation.

## Buck And Boost Characteristics:

1. Three modules; the power converter module comprises switching devices and energy storage elements, the PWM controller module and finally the gate driver module.
2. The switching devices and the storage elements positions in the power converter module are allowed to change.
3. Same power module can be used to implement either buck or boost converter.
4. Switching devices and the energy storage elements are placed in a visible enclosure.
5. Novel Pulse Width Modulation (PWM) microcontroller

## Single Phase Inverter Characteristics:

1. Four different modules which can be integrated together to create a single phase inverter or studied independently.
2. Provide two different switching techniques with adjustable switching frequency and duty circle.
3. Provide two different inverter circuit topologies.
4. Applying 'plug and play' concept.