ELECTRONICS KIT – with 'Photonics'

Cat: EM1765-001 Electronics & 'Photonics'

DESCRIPTION:

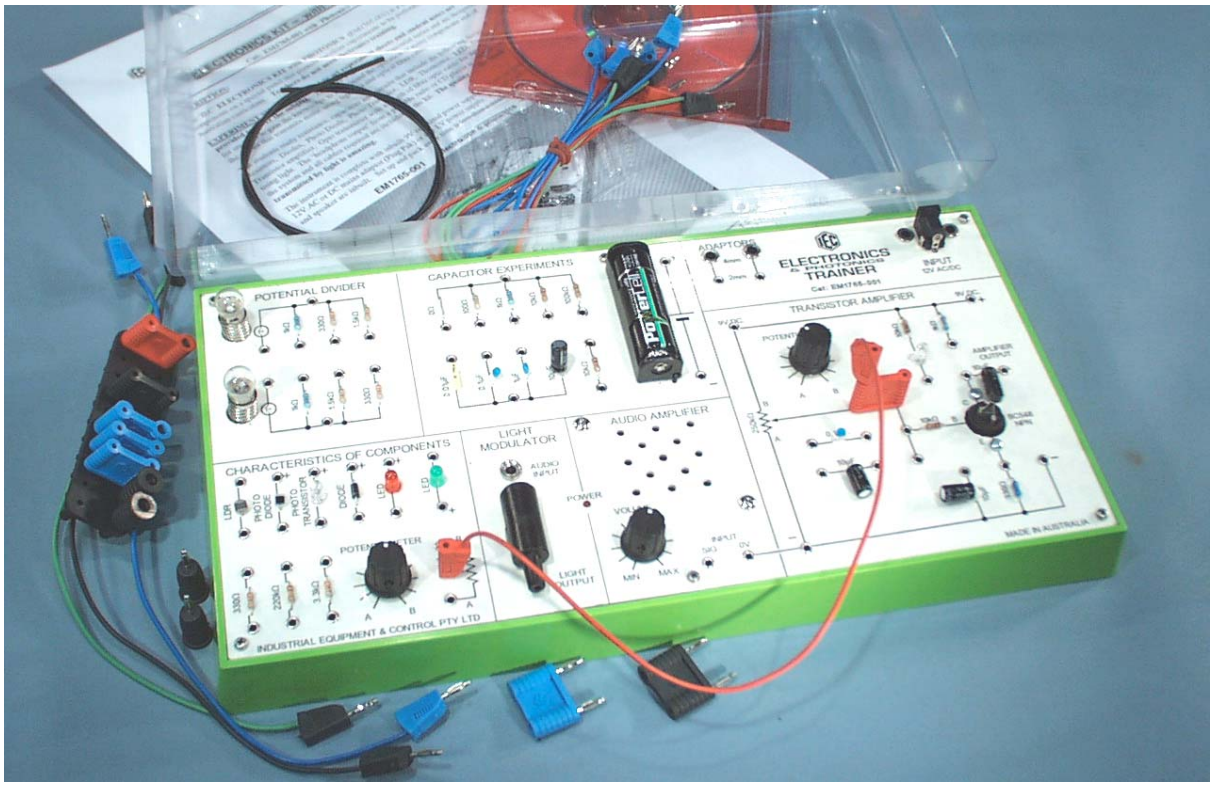
The 'IEC' **ELECTRONICS KIT with PHOTONICS** (EM1765-001) is a set of electronic components on a special panel that permits excellent experiments to be performed to fit the Australian HSC curriculum. **Teachers do not need electronics training.**

EXPERIMENT SHEETS: Complete set experiment sheets and student notes are available on a CD (PA1765-004) to cover the subject. Nine sheets in correct sequence are designed for students to gain the knowledge to understand the operation of many electronic components and the circuits that transmits music using light via and optical fibre cable.

The students study resistance, capacitors and circuits that include the following devices: Resistors, Diodes, Photo Diode, Photo Transistor, LDR, Thermistor, LED, Capacitors, Transistor amplifier, Opto transmitter with a length of fibre optic cable for data transmission using light. The 'headphone output' from a portable radio or CD player is ideal for driving the system and all cables required are included in the kit. **The quality of the music transmitted by light is amazing.**

The instrument is complete with inbuilt 9V regulated power supply that can be powered by 12V.AC or DC mains adaptor (Plug Pak) or any LV power supply. A small audio amplifier with speaker is inbuilt. Set up and pack away time is less than a minute.

EM1765-001 electronics & photonics



Physical size: 320x170x65 LxWxH **Weight: 0.6 kg**

Features:

- **ELECTRONICS EXPERIENCE NOT REQUIRED: The Electronics/Photonics trainer removes the concern and worry from instructors regarding electronic theory and provides a fast path to teaching the subject effectively. The equipment design and the student and teacher notes allows the student to work with minimal supervision but to achieve a good result.**
- **COVERS THE WHOLE 'PHOTONICS' OPTION FULLY: The system covers all experiments to be performed and provides excellent student notes with questions and teacher notes with answers. To avoid conflicts, the approach taken to the electronic theory is similar to the approach taken in the text books.**
- **CONVENIENT: To make operation easy and to avoid the need to purchase or find and connect more apparatus, the trainer has its regulated power supply, an audio amplifier and loud speaker all inbuilt. Depending on the experiment being performed, student meters, an IEC Signal Generator and/or a simple single beam Oscilloscope may be required.**
- **POWER: The system powers by any 12V Power Supply or by a 12V.AC/DC plug Pak. The creation of the correct and regulated 9V.DC power is performed inside the Trainer Kit.**
- **SECURITY: The electronic components cannot be removed or lost by the students. Cables and Links and several portable components are provided in a zip bag which is stored with the kit inside the main cover. The underside of the board is covered to prevent tampering with the tracks or components.**
- **EASE OF USE: The system takes only moments to set up and a minute to store away. The kits are stackable on the storage shelf and use minimal space.**

Using the Trainer Board:

The trainer board is designed for a long and useful life. It is fitted with many 2mm sockets for interconnecting the components. There are two places where a 2mm socket links directly to a 4mm socket so that large cumbersome 4mm banana plugs in the classroom can be joined to the neat 2mm banana plug system.

The markings on the front face of the board show which components are connected together to provide the circuits. In many cases the user must decide which sockets to link together to create the desired circuit. The components themselves are not handled by the user but the value and the name of each component is marked on the board. Each logical section of the Trainer Board is clearly marked and matches the experiment notes.

The IEC compact 2mm banana plug system is used throughout. Because masses of connection cables are often a nuisance, IEC provides special 2mm links to minimise the use of cables. Both 2mm and 4mm banana plugs can connect to the top of these links for the convenient use of 4mm cables, bench meters, Signal Generators, Oscilloscopes, Multimeters and Power Supplies. The kit includes small cables fitted with 2mm stackable banana plugs for connections that links cannot reach. IEC supplies also several 4mm to 2mm adaptors that convert a 4mm banana plug into a 2mm banana plug.

The various sections of study include:

- **Resistors and Potential Dividers**
- **Capacitors and their uses.**
- **Characteristics of different Components**
- **Transistor Theory and Amplification of audio signals**
- **More advanced Transistor theory (with removable transistor on a plug)**
- **Light Modulator. Transmission of intelligence using light.**

The 'Electronic / Photonic Trainer' (EM1765-001) provides:

- 1x Main panel with all components fixed in place. Including audio amplifier, speaker and volume control
- 5x 2mm banana plug links stackable for 2mm plugs
- 2x 2mm banana plug links stackable to 4mm plugs.
- 6x 2mm to 4mm banana plug adaptors.
- 7x Cables, 300mm long, with 2mm stackable banana plugs each end.
- 1x Length of optic fibre cable
- 1x Cable for connecting a radio or CD player to the panel
- 1x Temperature sensor on probe.
- 1x LED on a probe.. .
- 1x CD is available separately and, although class quantities of the trainers would be required, only one CD is required for the whole school. It contains a set of comprehensive student notes and experiments covering the whole option, together with teacher notes with answers.

The Compact Disc for the Electronics and Photonics Trainer Board is to be purchased separately. It has been written and prepared specially for IEC and it contains 'Word' files for all the experiments. The experiments are written clearly and explain the theory as the experiments are performed. The 'teacher files' are the same as the 'student files' but they have answers and results included.

NOTE:: Only one CD is required for each school because teachers may print and photocopy an unlimited number of copies for students or themselves.

If any errors, omissions or difficulties are discovered in performing any experiments, IEC would appreciate immediate feedback.

The CD of experiments and theory is cat: PA1765-004

Read these notes on using the Trainer Board:

- Remove the transparent cover and use it as a holder for the various links, cables and other components.
- The 4mm banana plug INPUT sockets are for the connection of 12V AC or DC from a classroom power supply or from a standard 240V/12V.AC/DC plug pak. This input voltage is regulated by the Trainer Board to be smooth 9V.DC. and this voltage is internally connected to sockets marked 9V.DC.+ and -.
- To apply 9V.DC. to any other socket on the board, use 2mm banana plug cables to connect to any sockets marked 9V.DC.+ and -.
- The ADAPTORS are simply connections between 4mm and 2mm sockets for use whenever a 4mm banana plug must be joined to a 2mm banana plug. Also, small adaptors are supplied in the kit to convert 4mm banana plugs to 2mm plugs.
- The POTENTIAL DIVIDER section permits the use of the 2mm links to join pairs of resistors together and a cable can be plugged into the top of the link to connect meters as required by the experiment. Note that, to reduce wiring and complexity, one end of a group of resistors are all joined to one 2mm socket. **CAUTION:** It is very important that both lamps are the same voltage and wattage so that the experiment runs correctly.
- The CAPACITOR section permits the use of the 2mm links to join resistors and capacitors in series as required by the various experiments. For further experiments, capacitors can be connected in other ways by using separate cables. Note that, to reduce wiring and complexity, one end of a group of capacitors are all joined to one 2mm socket.
- The single 'AA' battery is used in one experiment to 'bias' a circuit by 1.5V relative to the power supply. This means to add or subtract an extra 1.5 volts to one end of the power supply.
- The CHARACTERISTICS OF COMPONENTS section of the Trainer Board provides a set of various devices to be interconnected during experiments. They can be connected into circuits by using links and cables.
- The LIGHT MODULATOR is where a signal, fed into the audio input socket from the headphone output from a CD player or similar, can be changed into a modulated light beam. The black socket contains the modulated light source and an Opto Cable can be inserted to transport the modulated light to another place on the board.
- The AUDIO AMPLIFIER is a separate electronic circuit built into the Trainer Board that allows a small signal to be amplified and heard from an inbuilt speaker. It is complete with 2mm input sockets and a volume control. This amplifier is convenient because it removes the need to use an external amplifier for some experiments.
- The TRANSISTOR AMPLIFIER section permits many experiments to be performed while studying the behaviour of a transistor. Components from other parts of the board are connected into the transistor circuit with 2mm banana plug cables. The transistor itself can be unplugged for heating for an experiment in 'Thermal Runaway', but normally the transistor remains plugged into its socket.
- Two devices are supplied on slim circuit boards for the connection by 2mm banana plug cables to the board. These devices can be hand held and moved from place to place for some experiments.

Designed and manufactured in Australia