Technical
Training & Education Equipment
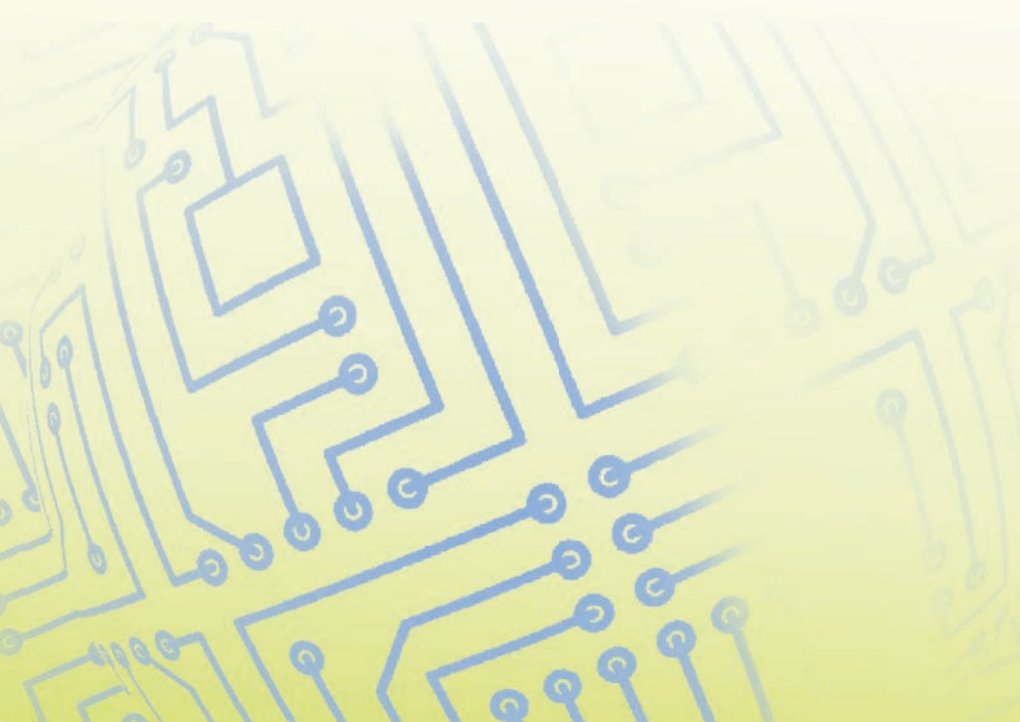
General Catalog 2016 V.1

About K&H

With superior design and good quality control K&H MFG. CO., LTD. has offered high-grade educational products to the market since its foundation in 1979 in Taipei, Taiwan. Due to unbeaten track record, K&H has enjoyed a widespread reputation as a manufacturing leader in the educational field in Taiwan. Our product lines have covered widely ranging from breadboard, its accessories, and testing instruments to versatile electronic, electrical, and mechanical training equipment as well as several products with relevant fields, including information technology, telecommunication, network technology, physics, chemistry, and biomedical science.

So far, we have grown into a company of close to 200 employees in Taiwan. We have dedicated ourself to developing educational products, for example using multimedia to create an easy-to-learn, easy-to-understand, and high quality educational environment.

K&H MFG. CO., LTD. has become one of the leading professional manufacturers of educational training equipment in the world. We are making every effort to provide customers the best products with outstanding service continuously.
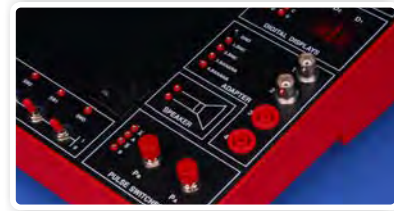
Scope of Business

- Project Planning
- Project Organization
- Project Implementation
- Training & Maintenance
- School System, Course and Curriculum Development
- Lab Equipment Purchasing, Installation and Testing
- Train the Instructors & Trainers

Knowledge & Hope

Contents

DGS-200 GSM / GPS Experimental Set

Satellite

GPS/GPRS

BTS

Internet

GPS

GPRS

TCP/IP

RS232

MCU

Experiment Board

USER

▶ Features

It's a powerful platform for experimenting wireless communication when training and integrating GSM/GPRS with GPS modules, FAX Class1, TCP/IP, NMEA0183, 3GPP TS 27.005 and 3GPP TS 27.007 protocols to be one set.
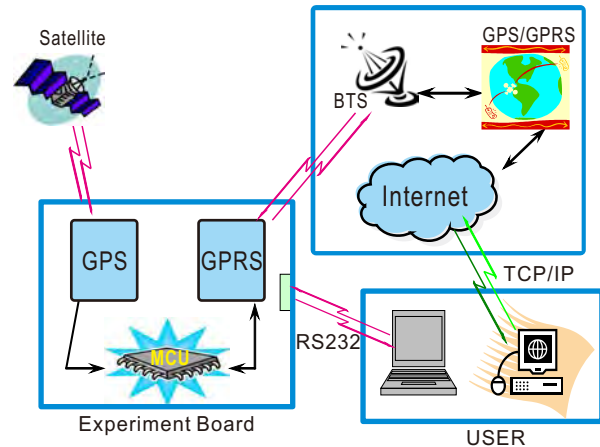
COS-100 Android APP Experiment Module

Android system, mainly used on mobile devices, is an open source operation system based on Linux kernel. Android APPs, the applications mounted on the Android system, are widely developed and used. COS-100 adopts free and open source Android SDK (Android Software Development Kit), JDK (Java Development Kit) and Eclipse (Integrated Development Environment).

COS-100 offers easy-to-follow courses available for users to learn Android APP development environment setup and Android APP programming. In addition to the introduction for basic principles of the Android development environment, experiments of some of APPs are also designed. Topics included in the course: understanding the Eclipse operating environment, capture of images from a USB UVC camera, discussion of the Android APP version compatibility issues, introduction and application of e-books, application of accelerometer, application of touch panel control. Moreover, ZigBee Transceiver Module and ZigBee Sensor Module are also provided for making experiments.

CIC-700 Lonworks Control Network System

Echelon's LonWorks control network technology creates a new generation of control network. CIC-700 LonWorks control network training system tries to help students accelerating their steps to catch up this popular trend. It not only helps students to understand the new control network theory but also provides lots of hands on experiments to learn the implementations of the new technology.

▶ Features

- Implement the real LonWorks control network system on a single table
- Provide complete system tools for users to develop and integrate Lonworks control network
- Explain profound control network theories in an easy-to understand way, fitting for one semester
- Provide more than 7 real daily use devices, such as fire alarm, temperature sensor, and fan for control of network exercises
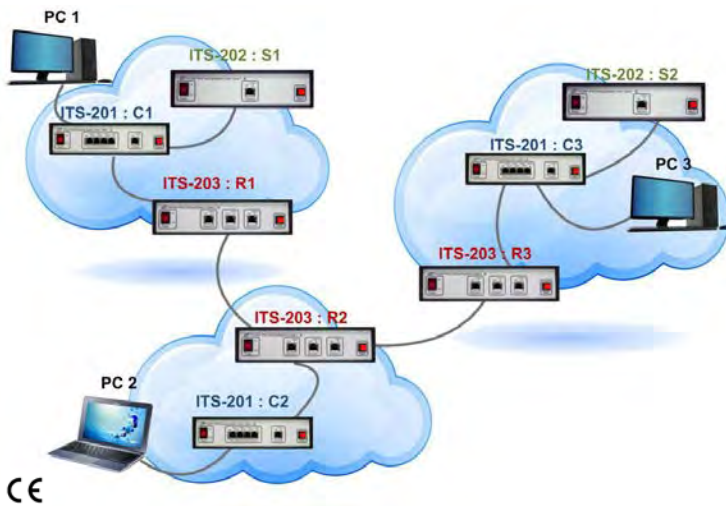- Detailed step-by-step experiment manual

ITS-101A Internet TCP / IP Protocol Training System

UTP Cable
UTP Cable
UTP Cable
UTP Cable
UTP Cable
UTP Cable

ITS-101A	HUBOX

▶ Features

- Real-time packet monitor
  - Observe TCP segments, IP datagrams, ICMP datagrams, UDP datagrams and ethernet frames
- Packet generator
  - Generate actual TCP segments, IP datagrams, ICMP datagrams, UDP datagrams and ethernet frames
  - Manual or programmable packet generation (packet size up to 1500 bytes)
- Congestion generator
  - User programmable packet generation speed up to 1.2 Mbps
  - User programmable packet delay, error and lost
- Programmable router
  - Configurable as a router or host
  - Can emulate as a firewall or NAT
  - Provide a platform to install user-defined network message procedures for experiment

ITS-200 series IPv6 Training System

PC 1
ITS-202 : S1
ITS-201 : C1
ITS-203 : R1
ITS-202 : S2
ITS-201 : C3
PC 3
ITS-203 : R3
ITS-203 : R2
PC 2
ITS-201 : C2

Explosive growth in network device diversity and mobile communications, along with global adoption of networking technologies, have overwhelmed IPv4 and have driven the development of a next-generation Internet Protocol (IPv6).

In addition to providing more address space, IPv6 not only increases routing efficiency and network-layer security (built-in the IPSec encryption mechanism) but also creates new ways of addressing and more advanced QoS mechanisms, as the protocol develops.

The design purpose of ITS-200 series is to provide learners with a clear and comprehensive understanding of the protocol and operating behavior of the IPv6 specification. The complete system includes ITS-201(host:client) , ITS-202(host:server) and ITS-203(router). The interaction of these three devices can perform experiment as a group or stand alone.

	Application Layer	HTTP	FTP	SMTP	DNS	RIP	SNMP
Transport Layer		TCP			UDP		
Network Layer	Internet Layer	IGMP	ICMP			ND	MLD
		ARP	IP (IPv4)		IPv6		ICMPv6

ITS-201	Cisco 1905

ITS-202	ITS-203
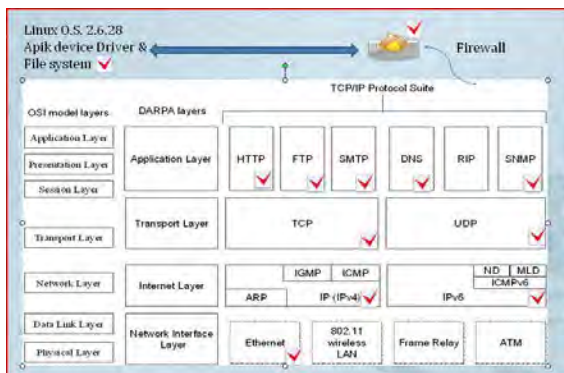
KL-900A Basic Communication System
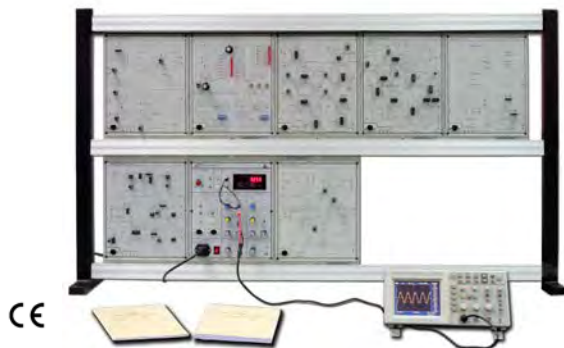
▶ Features
- The trainer includes modules with experimental circuits. It offers the beginner complete courses of basic analog and digital communication.
- KL-900A is equipped with power supply and signal unit. Students only have to adopt the oscilloscope to complete various experiments independently.
- System modularity maximizes flexibility and variety for experimentation, and allows possibility for expansion and customization.

KL-900B
Analog Communication System

144 MHz VHF FM Transceiver Trainer

144MHz VHF FM Transceiver Trainer

KL-900B Analog Communication System discloses the details of the walky-talky based on the 144MHz VHF band. It breaks the circuit of walky-talky into 4 blocks : receiver block, transmitter block, audio amplifier block and microphone amplifier block.
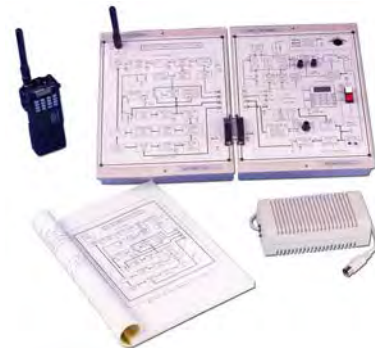
Block diagrams are printed clearly on the panel of the module, giving students a comprehensive view of how walky-talky works.

KL-900C
AM/FM/ASK/FSK Transmitter & Receiver System

The KL-900C AM/FM/ASK/FSK Transmitter and Receiver System is a comprehensive and self-contained system suitable for carrying out AM/ASK and FM/FSK transmission experiments.

The complete system contains KL-900C1 and KL-900C2, eight separate modules being included:
- · AM transmitter & receiver modules
- · FM transmitter & receiver modules
- · ASK/AM transmitter & receiver modules
- · FSK/FM transmitter & receiver modules

KL-900D
Fiber-Optic Transmission Training System

Fiber-Optic communication is one of the most popular technologies in the modern times due to its high transfer speed and large capacity. KL-900D uses fiber optic as a transmission media for the whole experiment.

▶ Features
- With four different data transmission ways (self module transmission, module-to-module transmission, PC-to-module transmission, and module-to-PC transmissions).
- The experiment of KL-900D shows you how easy it is to make productive use of fiber optic materials.
- The equipment that you assemble will transmit voice from one point to another, using light traveling through an optical fiber.

KL-900E
Near Field Communication (NFC) Trainer

▶ **Features**

- 8 antenna modules
- Adjustable antenna module holder
- LED/LCD/BUTTON user interface
- Standard NFC SOC Module
- Mifare S50 card and Ultralight card
- NDEF, NDEF vCard and P2P data transmission,…etc
  Complete learning experiment instrument that cover NFC physical to application layer

KL-910 Advanced Communication System

CE

▶ **Features**

- Various essential theories and techniques in modern communication system includes digital encoding/decoding techniques, various digital serial ports, DTMF signal system, ASK/FSK/QPSK/ TDM/PAM/FDM modulation / demodulation and filters…etc.
- KL-910 offers users not only the comprehensive experiments of advanced communication system but also various peripherals including analog/digital function generator, frequency meter, and V-F converter…etc. All of the experiments are carried out appropriately with the help of oscilloscope, spectrum analyzer and logic analyzer.

KL-920
Advanced Digital Communication System

CE

▶ **Features**

- Complete digital transmitting data format including start bit, preamble, identifier, data with FEC coding, CRC coding, and stop bit.
- All digital transmitting data are encoded with Manchester code before transmitting via ASK or FSK modulator.
- Programmable data, data rate, preamble, identifier, and noise from DIP switches
- FEC encoding, CRC mechanism, and Manchester coding can be included or ignored before wireless ISM transmission.
- Transmit and receive 3 sets of audio signals in TDMA channel via STS-1 and STM-1 frame
- Dual channelTDM transmission with audio signal modulated by PCM or A-Law/ μ -Law compander

EMC-100 EMI Training System

The features of EMC-100 contain two parts: one is the measurement instrument which is equipped with function of measuring electromagnetic interference (EMI), including conductivity of electromagnetic interference and radiated electromagnetic interference. It can provide products electromagnetic interference verification before an inspection. The other part is the training modules which allow students to implement the experiments easily and learn the basic concepts of electromagnetic interference and suppression countermeasure. Beginners are able to learn electromagnetic interference theories, measurement and suppression techniques as being an EMC engineer.

MTS-Z80A Z-80 Microcomputer Trainer
MTS-86C 8086 Microcomputer Trainer

MTS-Z80A (86C) helps students to understand the architecture and programming of Z-80 (8086) computer. The system contains five main parts: (1) a Z-80 CPU (8086 CPU) (2) system and user memory (3) world standard chip sets (4) input and output devices, and (5) external interface.

Students edit and assemble program codes from PC and observe instant results after they download and execute programs from system memory. Debug functions are also available via PC or system keypad interface.

MTS-100 Tutor For Arduino

MTS-100 is the most powerful training system of Arduino. This system contains most popular sensors and input/output modules. Such as wifi/Bluetooth/Temperature sensor/Servo motor/Stepper motor/LCDs…etc

Students can program the Arduino code form PC and observe instant result after they upload code to Arduino main board. More than thirty example code and teaching materials are available.

MTS-51 8051 Microcomputer Trainer

8051 is the original chip of MTS-51 family devices which is originated from Intel. This chip is a stand-alone, powerful 8-bit single-chip microcomputer and is commonly used for real-time control applications. MTS-51 microcomputer trainer is designed for learning 8051 core architecture and instructions.

MTS-52 ICE (Option)

1. 32K byte In-Circuit-Emulator
2. Toggle break point
3. Step into / step over
4. Full run
5. Register & memory editor

MTS-33T Intelligent Micromouse Trainer

MTS-33T allows students to carry out 3 types of micromouse experiments on a lab table individually- they are wall maze solver, line maze solver, and line follower. With provided maze wall, post, and line track pad, students can setup corresponding experiment environments efficiently and flexibly.

Learning MCU programming for three types of micromouse is an important course topic in MTS-33T. Students can see the behavior of micromouse instantly after MCU code is programmed, downloaded and executed.

The provided simulation software allows students to create the map of line maze and wall maze so as to observe how micromouse solves the maze.

LV-200 LabVIEW™ I/O Interface Lab

LV-200 LabVIEW™ I /O Interface Lab is a platform of hardware/ software development. It offers a variety of I /O and peripheral devices used in real world and adopts National Instruments LabVIEW™ (G programming language) as development software. Data transfer between LV-200 Lab and computer is performed via USB interface. LV-200 also provides a comprehensive Experiment Manual which describes the operation of I /O circuits and peripheral devices as well as the programming of control programs (Virtual Instruments) using G programming language.

MTS-54 MSP430 Training Lab

▶ **Features**

- The system adopts classic MSP430F5438A from MSP430 family, very suitable for beginners to learn the control of TI MSP430 microcontrollers.
- Using DIP switch to control the power of each I/O sets, further reduce mass I/O connecting wires.
- Measurable system clocks, such as SMCLK, MCLK, ACLK.
- An acrylic cover is placed on the top of MCU area to protect the MCU being damaged from shorting pins or external force.
- Reserve three sets of expansion sockets to connect to external circuits or modules.

MTS-887 PIC16F Training Lab

▶ **Features**

- The trainer uses PIC16F887 microcontroller chip which is ideal for beginners of learning programming language.
- Each experimental block uses individual control switch to avoid interference if sharing pin.
- Pins of the microcontroller have been connected to the peripherals inside the trainer. There is no need to connect it manually.
- "Reset" button: to reset the chip if errors occur.
- Development interface is reserved for advanced learners, which can connect the external modules to the chip pins.
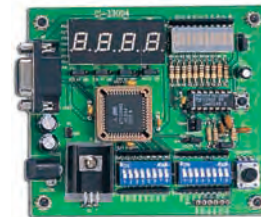
CI-33001C CPLD/FPGA Prototyping Board
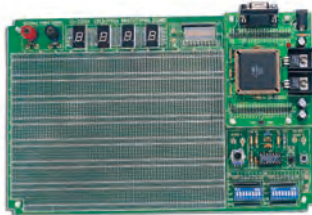
▶ **Features**

- Atmel ATF1508-15 CPLD chip is compatible with Altera MAX 7128, containing 128 microcells over 2500 usable gates, which is able to reprogram over 10k times.
- Using Altera MAX+PLUS® II for chip development, users can use graphic or text editor (HDL syntax) to design, simulate and implement digital circuit easily.
- The program is downloaded from PC to CPLD chip via series port with JTAG technology.
- Provide some simple I/Os for design efficiency
- Reserve large hardware design area best for circuit prototyping and student project implementation
- Best solution for the shortage of budget

CI-33004 CPLD/FPGA Experiment Board

▶ **Features**

- Atmel ATF1504-15 CPLD chip is compatible with Altera MAX 7064, containing 64 microcells over 1000 usable gates, which is able to reprogram about 10k times.
- Using Altera MAX+PLUS® II for chip development, users can use graphic or text editor (HDL syntax) to design, simulate and implement digital circuit easily.
- The program is downloaded from PC to CPLD chip via series port with JTAG technology.
- Provide some simple I/Os for design efficiency
- Suitable for new FPGA designers
- Best solution for the shortage of budget

CIC-500 DSP Development and Experiment System

▶ **Features**

- FPGA (FLEX 8000) download board (84pin)
- Program manager software for program download and In-System-Programming
- Additional training content : DC motor, stepper motor, temperature and PLC I/O controls
- I/O expanded socket is included

CIC-800A Interface Lab

USB 2.0, RS-232C and Centronics Interface

An interface is a hardware and software data transmission regulator that controls data exchange between the PC and other peripheral devices, including RS-232C, AT-BUS, IDE, SCSI, ISA, PCI, AGP, IrDA, GPIB, USB, IEEE-1394, Wireless etc...

Each interface device inherits different specifications such as transmission rate, data format, protocol and applications. Accordingly, learners can familiarize themselves with each kind of interface devices.

CIC-800A contains multi-purpose interfaces modules, inclusive of serial port (RS-232C), parallel port (Centronics) and universal serial bus (USB2.0) that can be used for various peripheral devices. Add-on modules are available for experiment purpose. The RS-232C and centronics interface firmware adopt Atmel's chipset modules, and use Microsoft visual C++ 6.0 as developing tools.

The USB 2.0 interface firmware adopts cypress's chipset modules, and uses Microsoft visual C++ 6.0 as developing tools. By learning traditional and popular interfaces, users can reap the benefits. Additionally, we also provide source codes and execution files for further studying.

CIC-310
CPLD/FPGA Development System

CIC-310 CPLD/FPGA Development System is self-contained system, which contains stabilized DC power supplies, Development Board , and Experiment Board. CIC-310 also provides digital system designers for hardware verification which enables students to learn digital system design efficiently.

▶ Features
- FPGA (FLEX 8000) download board (84pin)
- I/O experiments board
- MAX+PLUS® II development software (student version)
- Program manager software for program download and In-System-Programming
- Experiment manual

CIC-560
Advanced FPGA Development System

▶ Features
- CIC-560 is well equipped for complex digital circuit design.
- It provides AD/DA converter, keypad, LCD display, PS/2, VGA, UART, SCI interface, LEDS, 8-digit 7-segment LED display, step motor and DC motor driver circuits.
- Suitable for the curriculum training in electronics, electrical engineering, information, communication and automation field.
- Ideal for professional IC designers, R&D engineers, undergraduate and graduate students to learn IC design and software development.
- Develop and verify basic and advanced digital circuit, digital signal processing and CPU / MCU with large-element and multi-pin FPGA chip.

CIC-910A PSoC Training Lab

▶ Features
- CIC-910A adopts cypress chip Cy8c27443 (28 pins) powerful harvard architecture processor with following specialized features:
  (1) M8C processor speed up to 24 MHz
  (2) Providing 12 analog and 8 digital PSoC blocks
  (3) 16K bytes flash program storage with 50,000 erase/ write cycles
  (4) 256 bytes SRAM data storage
  (5) Making good trade-offs between price and performance

KL-100 Electric Circuit Lab

The KL-100 Linear Circuits Lab (1) Electric Circuits Lab is a comprehensive and self-contained system suitable for tuition and experimentation with electric circuits.

All the necessary equipment for electric circuit experiments such as power supply, function generator, analog and digital meters are installed on the main unit.

The 11 modules cover a wide variety of essential topics for electric circuit. It is indeed a time and cost saver for both students and engineers interested in training, developing and testing prototype circuits.

▶ Features
- Ideal for electric circuit experiments and design practice
- Integrated trainer with complete curriculum
- Fully equipped with power supplies and test systems for easy and efficient implementation
- Universal breadboard(1680 tie points)for circuit design and Prototyping
- All modules are equipped with 8-bit DIP switch for circuits fault simulations.

KL-200 Electronic Circuit Lab

▶ Features
- Ideal for electronic circuit experiments and design exercises
- Integrated experimental circuit and trainer with comprehensive experiment curriculum
- Supply complete training device with easy and effective for experiments
- With universal breadboard for circuit designing and prototypes
- All modules equipped with an 8-bit DIP switch for fault simulations
- Individual keeping case of all modules for easy carrying and storage facilities

KL-210 Basic Electrical / Electronic Circuit Lab

KL-210 Basic Electrical / Electronic Circuit Lab is ideal for electrical,mechanical, automative, automotive, science, civil & electronics engineering learning.

All the necessary equipment for electric circuit experiments such as power supply, function generator, analog and digital meters are installed on the main unit for the requirement of experiment.

The whole essential topics of electrical circuit learning are studied by different modules.

▶ Features
- Ideal for students to learn the design of electrical, electronics and digital logic circuits.
- To learn efficiently, power supply, function generator and measurement unit are all included.
- All supply units are secured with overload protection.
- With one main unit, user can choose the needed modules for different learning topics.

KL-300 Digital Logic Lab

Features

- Suitable for combination logic, sequential logic and microprocessor circuits design and experiments
- Ideal tool for learning the basics of digital logic circuits
- Comprehensive power, signal supply and testing devices for convenient experiments
- Experiments are expandable and flexible with universal breadboard
- Capable of processing TTL, CMOS, NMOS, PMOS and ECL circuits
- All supply units are equipped with overload protection for safety purpose
- All modules equipped with 8-bit DIP switch for fault simulations
- Individual keeping cases for all modules for easy storage and carrying
- All signal generators have independent and simultaneous TTL and CMOS level output terminal.

ETS-8000A
General Digitized Training System

Features

- Suitable for combination logic, sequential logic experiments and design
- Ideal tool for learning the basic digital logic circuits
- Comprehensive power, signal supply and measurement devices for making experiments easily
- Expandable and flexible experiments with the combination of the universal breadboard
- All supply units are equipped with overload protection for safety
- Human-computer interaction includes simulation software & emulation hardware.

KL-310 Advanced Digital Logic Lab

Features

- A trainer with a design of full CPLD logic circuit
- Suitable for combination logic, sequential logic and microprocessor circuits design and experiment
- Ideal tool for learning the basics of digital logic circuits
- A variety of power, signal source and testing devices for making experiments easily
- The universal expanding module for CPLD download experiments
- All modules equipped with power & signal connection socket for linking with main unit to avoid any connection mistake

i de@Lab-200
Intelligent Digitize Emulated Achievement Lab

   i de@Lab-200 is a digitized based training system, which utilizes integrated Hardware Platform, Experimental Modules and Software Platform to help students to learn various electronic based subjects. Hardware Platform is composed of multiple measuring instruments such as digital storage oscilloscope, logic analyzer, frequency synthesizer, digital multi-meters and programmable power supply as well as output display unit. Experimental Modules contain versatile electronic based topics for students to carry out, including basic electricity, electronic circuits and digital logic circuits.

KL-710 Biomedical Measurement Data Acquisition System
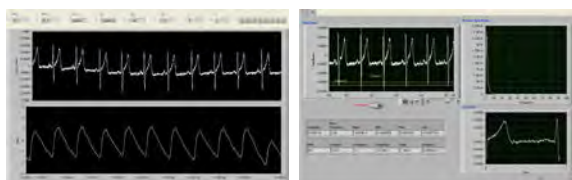

ECG_PPG

ECG_PPG

▶ Features

The major software allows you to edit data and control the experiment process appearing on the screen. It performs four general functions:

- Control the data acquisition process including the analog input, analog output, digital input, digital output and trigger start.
- Perform real-time calculation including the math functions, digital filter, wave analysis, rate detection and power spectrum.
- Perform off-line analysis including the statistics, math functions, wave analysis, rate detection and power spectrum.
- There are various types for saving data.

KL-730   Biomedical Measurement Training System

▶ Features

- KL-730 contains twelve modules, including Electrocardiogram Measurement, Electromyogram Measurement, Electrooculogram Measurement, Electroencephalogram Measurement, Blood Pressure Measurement, Photoplethysmogram Measurement, Respiratory Ventilation Detection, Pulse Meter, Body Impedance Detection, Doppler Ultrasound Blood Velocity, TENS and Respiration Flow / Vital Capacity Meter.
- The sensors and transducers used in this equipment include pressure transducer, infrared photocoupler, strain gauge, temperature sensor, surface electrode, dual element transducer and pneumotach transducer.
- Each module has many test points for changing the frequency bandwidth and amplifier gain. Thus students can understand the correlation between physiological signal and each circuit stage.
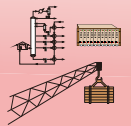
KL-500 Industrial Electronic Trainer

The KL-500 Industrial Electronic Trainer is a self-contained training equipment allowing students to learn more than 70 experiments through a power supply unit and 16 replaceable modules.

Various types of industrial electronic devices, such as UJT, PUT, SCR, SCS, DIAC, TRIAC, JFET, MOSFET, IGBT are introduced in this system. For each device, students are able to learn its characteristic, trigger circuit, and practical application circuit those providing students a comprehensive understanding of related knowledge in this technology field.

KL-600 Microcomputer Sensing Control System

The KL-600 Microcomputer Sensing Control System is a comprehensive sensor / transducer control training system that incorporates industrial-grade components with various control circuits and load units. Its modular and closed-loop control circuits allow implementation of open-ended, individual control loops used in industrial applications.

The KL-600 uses only industrial-standard sensors / transducers (0~10V, 4~20mA) with USB interface.

KL-620 Microcomputer Sensing Control Equipment

The KL-620 Microcomputer Sensing Control equipment is a comprehensive sensor / transducer control training system. Its modular and closed-loop control circuits allow implementation of open-ended, individual control loops used in industrial applications.

The KL-620 uses only industrial-standard sensors / transducers (0~10V, 4~20mA) with USB interface.

KL-630 MEMS Training System

MEMS (Micro-electromechanical Systems) based sensors such as accelerometer, gyroscope and magnetometer, are crucial components used in smart portable devices, such as smart phone and tablet PC. The demand of MEMS sensors has been increased dramatically and identified as one of the most promising technologies nowadays.

K&H develop world's first series of MEMS-based training system to facilitate students learning various MEMS functions and applications more systemically. 4 different types of MEMS based sensors are introduced in this training system, including 3-axis accelerometer, 3-axis gyroscope, barometer and magnetometer. To gain better experimental quality, module with XYZ-Axis Rotation Stand is specially designed to carry out three - dimensional motion experiments with operation of accelerometer and gyroscope module.

ACS-1000 Analog Control System

ACS-1000, covered with many technical disciplines, explicates the central significance of Analog Control System. This applies particularly in mechanical and electrical engineering, and as well in production and process technology . It is indispensable to plant and system technology.

In the automation field, important optimization tasks would be quite impossible to be accomplished without closed-loop control technology. In line with its increasing importance, closed-loop control has become an essential subject in professional training and further education for many professions.

In the newly formulated training curriculum, this technology plays an important role covering a number of subjects in syllabuses for training in industry and the crafts.

CE

EM-3000 Electrical Machine System
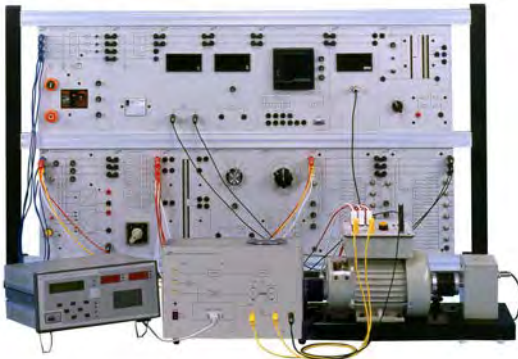
The electrical machines system leads students to distinguish the mechaniclal similarities and differences among all electrical machinaries.

Students study and turn all kind of electrical machinaries into circuit models for the foundation. Moreover, it enhances students ability for further employing and controlling. Besides facilitating teaching, it makes students be familar with every kind of electrical mechanical test.

PE-5000 Power Electronics Training System
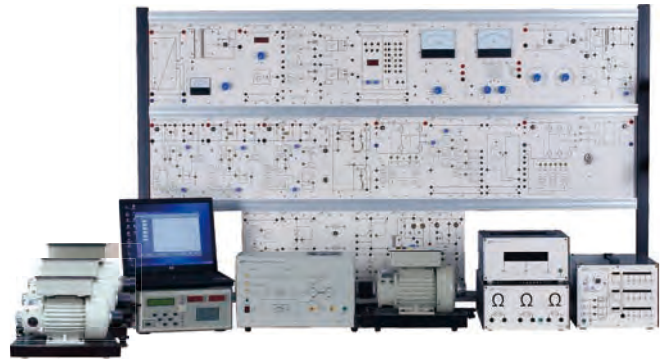
▶ **Features**

The PE-5000 is the combination of power, electronics, and control. It has a wide applications of solid-state electronics for the control and conversion of electric power. Popular circuits of power electronics contain rectifiers, choppers and inverter.

The experimental for PE-5000 modules includes converter, power supply, load, control and testing modules. These experimental modules and instruments will be introduced and demonstrated in the subsequent experiments.

EM-3350
## Cutaway Model of Electrical Machine
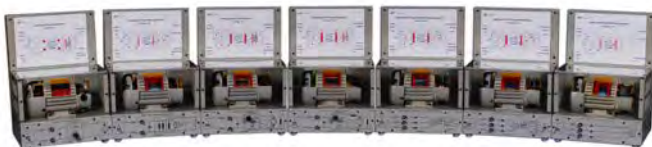
Cutaway models are made from normal electrical machines.

The stator is cut away by 1/4 over the entire length to enable an optimum view of the internal construction of the machine and it is still operating. The cutaway surfaces are protected against corrosion.

> DC Permanent-magnet Motor (EM-3350-1A)
> Single-phase Induction Motor (EM-3350-1C)
> DC Shunt Wound Motor (EM-3350-1D)
> DC Compound Wound Motor (EM-3350-1F)
> Three-phase Salient Pole Synchronous Motor (EM-3350-3A)
> Three-phase Rotor Winding Motor (EM-3350-3B)
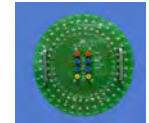> Three-phase Squirrel Cage Motor (EM-3350-3C)

EM-3360
AC Induction Motor Winding Training System
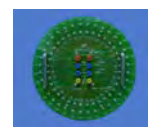

EM-3360-3A 1Ø-2P-A
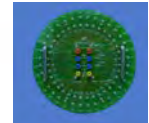
EM-3360-3A 1Ø-4P-A

EM-3360-3A 1Ø-6P-A

▶ **Features**

- Use 4mm safety socket terminal
- The clearly- printed winding set codes and colorful wire on top allow user to do winding and operation easily
- The power input with the motor circuit breaker
- Easy linking to brake controller unit for measuring and drawing the characteristics of each winding motor through PC
- Plug-in panel helps teachers complete the experiments easily and quickly*(Optonal)*
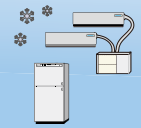
KR-101 Refrigerator Model Training System


Teacher Board
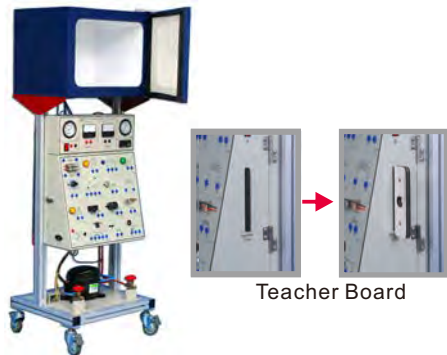
▶ *Features*

- The major elements of the refrigeration system are open for the purpose of best observation, including condenser, compressor, evaporator, capillary tube, filter and drier .
- The system contains various electronic components and their symbols located at the front panel allowing students to use 4mm safety plug cables to construct the control circuit of the refrigeration system.
- The control circuit of the refrigeration system are made of following electronic devices: system fuse, fan indicator, evaporator door switch...etc.
- The system includes high pressure gauge, low pressure gauge, AC Voltmeter, AC Ammeter and temperature meter which are located at the front panel allowing students to record the status of the components during its operation.
- The refrigerant path for high pressure tube is painted in red and low pressure tube in blue.
- Teacher board allows teacher to quick demonstrate the operation of the refrigeration system needless constructing the control circuits.

KR-102 Refrigerator Training System

The design principle of KR-102 is to train students the refrigerator circuit, system processing, welding copper tube, and other related skills. This device uses the actual fridgemodification, and with installation by safety plug terminals. There are three low pressure and one high pressure manual valves from the system for convenience welding and refrigeration process exercises.

KR-105 Compressor Training System
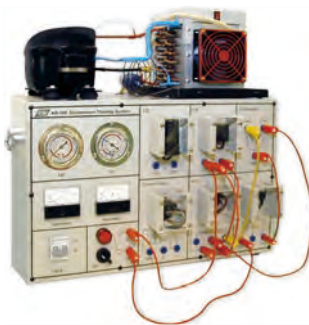
By using this trainer, trainees can wire the circuit of compressor . Two start-up methods (current-mode and PTC) are provided in this training system. Trainees can measure and observe the signals on terminals in the start-up circuit to comprehend its operating principle.In addition, the trainer includes a real refrigeration system. Hence, the start-up circuit can drive a real compressor when the wiring is completed. High/Low pressure gauges and voltage/current meters are embedded in front panel. The copper tubes in the system have reserved apertures for users to measure the temperature. Each component in the system is fixed individually. A transparent acrylic cover is assembled which can protect the components and make trainees observe he component's structure clearly. Two fans are installed on the evaporator and the condenser respectively for adjusting evaporation and condensing conditions, which makes experiments diversified.

KR-115 Refrigeration Cycle and Heat Pump System

KR-115 is designed to learn the theory of Heat Transfer in refrigeration engineering. With proper setup, KR-115 can be emulated as a Refrigeration or Heat Pump system. All system components are mounted on the front panel so students can directly observe, touch the components, and hear the noise produced by the components while it is running under either Refrigeration or Heat Pump cycle.

KR-115 offers three expansion devices available for the refrigerant to pass through; they are pressure expansion valve, capillary tube, and thermal expansion valve. Students can use the control panel to switch the preferred expanding path from three expansion devices and compare the corresponding performance under Refrigeration or Heat Pump cycle.

The state of the refrigerant can be clearly observed through 6 sight glasses at different phases of the Refrigeration / Heat Pump cycle. 5 hand valves are used to manually control the flowing direction of the refrigerant circulating through the system. Student must use the valves to lead the refrigerant to the appropriate flowing direction so that the system can operate in corresponding cooling / heating condition. If students mislead the refrigerant to wrong flowing direction, the pressure protection switches will detect the conflict and halt the compressor to prevent the system from being damaged.
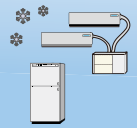
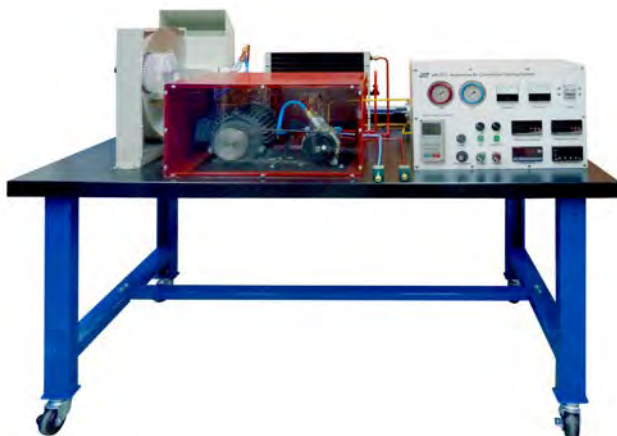## KR-201 Air Conditioner Training System

The main composition of KR-201 is a real window type air conditioner just like in our daily life. What makes it special is that students are able to observe the operation of the internal components and the state of the refrigerant while the air conditioner is running.

From the front panel, there are four refrigerant sight glasses, which provide students an excellent opportunity to observe the state of the refrigerant before and after passing through four major elements Compressor, Condenser, Capillary Tube, and Evaporator.

Students can also use built-in gauges/meters to draw the Mollier diagram and so as to understand the performance of this air conditioner. Combining the observation of refrigerant state during different phase of the refrigeration cycle, KR-201 helps students to understand the operating principle of the window type air conditioner easier and faster.

KR-212
### Single-Split Type Cooling / Heating Air Conditioner Training System

- The operation of the system is based on a real split-type air conditioner including one indoor unit and one outdoor unit installed on a same stand.
- The system can be operated as either cooler or heater modes.
- Provide 4 fixing valves at the front panel to enable students handily install the connection pipes (gas pipe and liquid pipe) between indoor and outdoor units.
- Provide voltmeter and ammeter at the front panel to monitor instant system power.
- Provide high and low pressure gauge at the front panel to monitor instant inlet/outlet pressure of the compressor.
- Both indoor and outdoor units are powered by an isolated power supply with overload protection.
- The circuit diagram of the system and a Mollier Chart are clearly printed on the front panel for quick reference.
- Both indoor unit and outdoor unit are installed on an aluminum stand with wheels for easy movement.

KR-270 Automotive Air Conditioner Training System

▶ **Features**
- Understanding the principle of automotive air condition system
- Understanding the components in an automotive air condition system
- Understanding the difference between automotive air condition system and building air condition system

KR-351 Chilled Water Refrigeration Control System

▶ **Features**
- The commonly-used control components of chilled water unit are mounted on the panel layout for easy learning.
- The input vapor-pressure, which is divided into 3 mimic pressures like low-pressure, high-pressure and oil pressure, can be used and adjusted separately so the learner would have clearer understanding of functionality of each component accordingly.
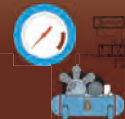
PLC-100
Programmable Logic Controller (FATEK PLC) Trainer

CE

▶ *Features*

- Input-simulation switches function as level and pulse input for different input signal
- Installation of output relay helps to increase load current
- Easy-to-use, windows-based development software
- With various peripheral devices and other devices that support external extensions, particularly suited for laboratory experiment and project implementation
- Equipped with various simulations I/O devices for the convenience of studying and observing the results
- Use 4mm safety sockets input/output terminals to ensure the physical safety of users
- Easy to carry, move and store with a suitcase design

PLC-200
Programmable Logic Controller (SIEMENS PLC) Trainer

CE

▶ *Features*

- Input-simulation switches function as level and pulse Input for different input signal
- Installation of output relay helps to increase load current
- Easy-to-use, windows-based development software
- With various peripheral devices and other devices that support external extensions, particularly suiting laboratory experiment and project implementation
- Equipped with various simulations I/O devices for studying and observing the results
- Use 4mm safety sockets Input/Output terminals to ensure users physical safety
- Easy to carry, move and store with a suitcase design

MS-7200
Portable Mechatronics Training System for PLC

With PLC-200

   MS-7200 contains two independent mechatronics training modules, automatic sorting robot and linear positioner. These two modules can be controlled by PLC-200 directly or controlled by other PLC systems through its digital input and output ports from control panel. Each model provides at least ten training courses, starting from learning the characteristic of every mechatronic component to controlling of whole mechatronic system, providing an efficient way to build solid knowledge and concept of factory automation control.

MS-7400
Portable Mechatronics Training System for MCU

With MS-C100

   MS-7400 provides two independent mechatronics training modules automatic sorting robot and linear positioner. These two modules can be controlled by MS-C100 directly or controlled by other microcontrollers through its digital input and output ports from control panel. Each model provides at least ten training courses, starting from learning the characteristic of every mechatronic components to controlling of whole mechatronic system, providing an efficient way to build solid knowledge and concept of factory automation control.

## PS-1000 Pneumatic Training System

It is well known that "Factory Automation" is an indispensable measure to reduce labor cost, improve production efficiency and achieve higher product quality, which is widely adopted by electronic, semiconductor, LCD and mechanical factories. In factory automation, "air pressuring" plays a very essential and critical role.

The "PS-1000" is launched to enrich education from basic air pressure components, advanced air-pressure loop design to PLC-based electrical control system. The trainee can be upgraded to high-level automation engineer with the help of the "PS-1000" trainer system.

HS-2000 Hydraulic Training System

It is well known that "Factory Automation" is an indispensable measure to reduce labor cost, improve production efficiency and achieve higher product quality, which is widely adopted by electronic, semiconductor, LCD and mechanical factories. In factory automation, oil pressuring" plays a very essential and critical role.

The "HS-2000" is launched to enrich education from basic oil pressure components, advanced oil-pressure loop design to PLC-based electrical control system. The trainee can be upgraded to high-level automation engineer with the help of the "HS-2000" trainer system.

MS-6200 Mechatronics Training System (with PLC-200)
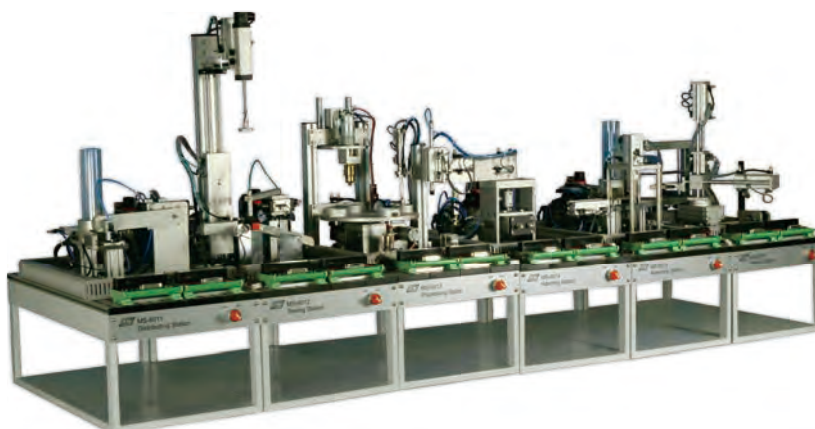
PLC-200

Since PLC (Programmable Logic Controller) was first introduced in 1970, it has been widely applied to various industrial uses such as machine and process controls.

The Modular Production System stations allow varying simulation of real production processes that exist in industry field. The system is universal, industry-based, modular and flexible for further expansion. Students can learn the entire process of production such as feeding, processing, etc...

Each station simplifies the training of operation and can be expanded sequentially step by step through building complex automated procedure.

▶ Features

- Input-simulation switches function as level and pulse Input for different input signal.
- Easy-to-use windows-based development software
- With various peripheral devices and devices that support external extensions particularly suits laboratory experiment and project implementation.
- With various simulations I/O devices for studying and observing the results
- Use 4mm safety sockets Input/Output terminals to ensure the physical safety of users.
  The stations are universal, industry-based.

KL-800 Autotronic Training System

Interactive Computerized Automotive System

The modularized system provides electronic and automotive courses with step - by - step experiments on technological educational training.

All theoretical, experimental and practical learning procedures are supported by a personal computer assisted supervision and dedicated software.

The KL-800 can simulate the operation of fuel injection system, ignition system, and the control of exhaust gas, etc. Experiments include the characteristic and operation of various sensors and actuators monitored by microprocessor on the main unit.

▶ Features

- 89S51 computer interface monitor control
- Data of fuel injection, ignition and exhaust gas can be acquired and monitored by computer.
- Can be assembled as the injection system
- With trouble-shooting simulation function
- Switch-off input / output function when trouble-shooting is made

KL-800A CAN BUS Autotronic Training System

The KL-800A CAN BUS Autotronic Training System is a distributed control system supported by advanced serial bus system CAN (Controller Area Network). CAN is a multi-master bus with an open, linear structure with one bus line and equal nodes.The number of nodes is not limited by the protocol.

Each module of KL-800A system is an ECU or the interoperable device (node) on CAN BUS. Data transfer between modules is by the micro-controllers over CAN BUS. When signals and data are sent to personal computer, the computer monitoring system displays the current status and data of module on PC screen and turns on the warning light if something is wrong.

The KL-800A system can simulate the operation of fuel injection system, ignition system and exhaust gas control. Experiments include the characteristic and operation of various sensors and actuators used in automobiles.

Controller Area Network
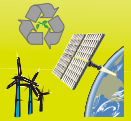
GES-100 Solar Cell Trainer

The GES-100 Solar Cell Trainer is an easy and self-contained trainer designed for learning the basic configuration and characteristics of a solar cell.

Through the use of different irradiations for various load units, students study the photoelectric effect of solar cells and plot the current-voltage curve as well as charging / discharging curves.

GES-200 Wind Energy Trainer

The GES-200 Wind Energy Trainer is an easy and self-contained trainer designed for learning the basics and characteristics of wind energy.

The current-voltage characteristic curves and charging/discharging curves are obtained through the use of different wind speeds, load units and wind generators.

GES-300 H_2/O_2 Fuel Cell Trainer

▶ Features

- GES-300 is a basic trainer of the Proton Exchange Membrane Fuel Cell (PEMFC).
- Open system configuration with modulized-design elements.
- Understand the combination of water by electrolysis.
- The voltage and current can be measured.
- A complete fuel cell database can be constructed for study, research, and development.
- The brightness of the simulated sunlight is adjustable.

GES-33001
the lid can be separated

GFC-6100 Fuel Cell Electric Vehicle Training System

A Fuel Cell Electric Vehicle (FCEV) is a hydrogen vehicle which produces electricity to power its on-board electric motor using hydrogen fuel cell. It provides an effective solution for energy resource and environmental pollution. In the progress of fuel cell technology, the importance of the topics such as how to use fuel cell in an electric vehicle system and how to integrate fuel cell control with other subsystems has been enhanced. To solve these problems, the GFC-6100 Fuel Cell Electric Vehicle Training System is designed to demonstrate the application of fuel cells to electric vehicles, including the FCEV mechanism, fuel cell system, hydrogen supply system, and motor controller.

GES-500 Wind and Solar Hybrid System

GES-500 (Wind and Solar Hybrid system) is composed of Solar panel, Battery bank module, MPPT Solar charging controller module, DC-AC Inverter module, Grid-tie inverter module, Wind generator set, Wind energy monitor module, Three-phase rectifier module, Wind and Solar hybrid controller module, Load module and meters. By means of combining all these control systems to create a teaching platform for implementation of the wind power and solar power experiment together. It can help the students understand the theory of solar on-grid and off-grid, the wind power generation system and further to study the engineering practical application technology.
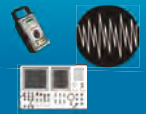
DPS-1000 Series Dual DC Power Supply

1303A

1303AF

1303AP

1303D

1303DF

1303DP

DPS Series
Dual Output

Model	Output Voltage	Out Current
DPS-1303A	0~ ± 30V	3A
DPS-1306A	0~ ± 30V	6A
DPS-1603A	0~ ± 60V	3A
DPS-1303D	0~ ± 30V	3A
DPS-1306D	0~ ± 30V	6A
DPS-1603D	0~ ± 60V	3A

Dual Output with Six Pre-Set Voltage(3,5,6,9,12,24V)

Model	Output Voltage	Out Current
DPS-1303AP	0~ ± 30V	3A
DPS-1306AP	0~ ± 30V	6A
DPS-1603AP	0~ ± 60V	3A
DPS-1303DP	0~ ± 30V	3A
DPS-1306DP	0~ ± 30V	6A
DPS-1603DP	0~ ± 60V	3A

Triple Output With One 5V/3A Fixed Output

Model	Output Voltage	Out Current
DPS-1303AF	0~ ± 30V	3A
DPS-1306AF	0~ ± 30V	6A
DPS-1603AF	0~ ± 60V	3A
DPS-1303DF	0~ ± 30V	3A
DPS-1306DF	0~ ± 30V	6A
DPS-1603DF	0~ ± 60V	3A

Dimension(HxWxL): 133x300x345(m/m)

KI-3020A Semiconductor Curve Tracer

Curve tracing on a scope could be made easily by KI-3020A. However, only a Sync. Oscilloscope is required. Characteristic curves of all types of semiconductor-transistor such as FET, diodes, zener diode, SCR, TRIAC, DIAC, UJT etc. areaccurately displayed. By examining these curves you can determine all of the operating characteristics of the device you are testing including gain (β), cutoff current, leakage current, output admittance and any other measurable specifications. It is far superior to the general transistor tester for checking quality. Uniquely, it is intended for testing semiconductors in production line and lab as well as making trouble shooting by technicians.

▶ *Features*

● A quick checking tool for semiconductor devices
● Display characteristic curves for all semiconductor devices on your scope

MODEL KI-3020A is designed fortesting:
Transistors-NPN, PNP, FET&MOSFET, SCR'S(thyristers), UJT, DIAC & TRIAC'S, Diodes-rectifier, zener, detector & tunnel.
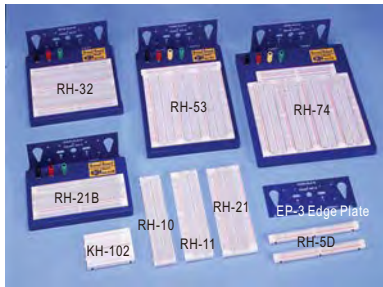
AD Series
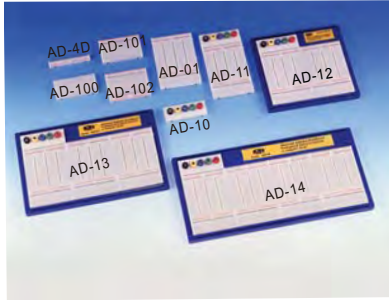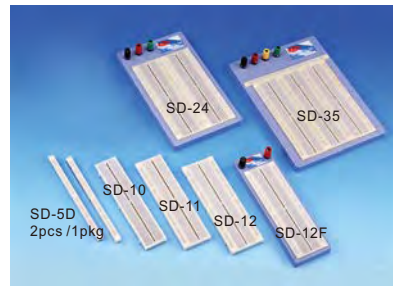

UIB Universal Interface Breadboard

GL Series

RH Series & KH-102

SD Series

PSB-01 AC/DC Power Supply

For Breadboard

With Built-In Short-Proof Regulated Power Supply
- Power switch with lamp
- Just plug in and start to use
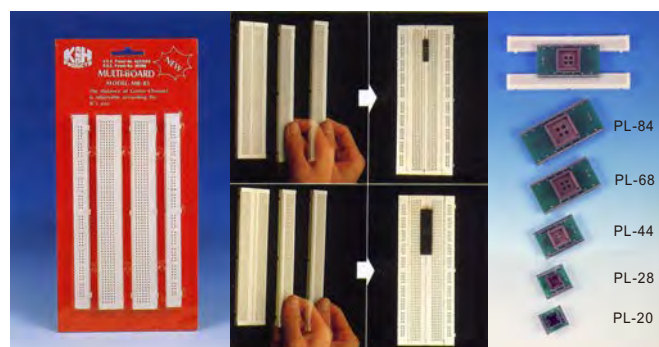- Compact and light-weighted
- For both digital / analog circuits

Test Leads

LA-60 Breadboard for LEGO, ARDUINO

MB-85 with PLCC Test Board

PL-84
PL-68
PL-44
PL-28
PL-20

Logic Probe

Logic Pulser

Logic Probe & Pulser

LP-2001

LP-2800

LP-3500

LP-540H

LP-1001

SY-805
Computer Servicing Tool Kit(1)

SY-703
Computer Servicing Tool Kit(2)

SY-815
Computer Servicing Tool Kit(3)

SY-9457
Computer Servicing Tool Kit(4)

Universal Project & Potting Box

Universal Project Box(PX Series)

Potting Case(AX Series)

Potting Case(BX Series)

Circuit Box(CB-01)

Project Case (DX-01)

Project Case (EX-01)

HX-1

HX-2
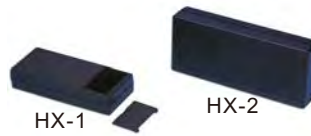
Hand Held Cases

Universal PC Board

IC Test Clips

IC Tools

PB-16 DIP IC Extractor

ICS-01 IC Straightener

ICP-20 IC Puller

GX-8 PLCC Extractor

Breadboarding & Accessories

KS-350
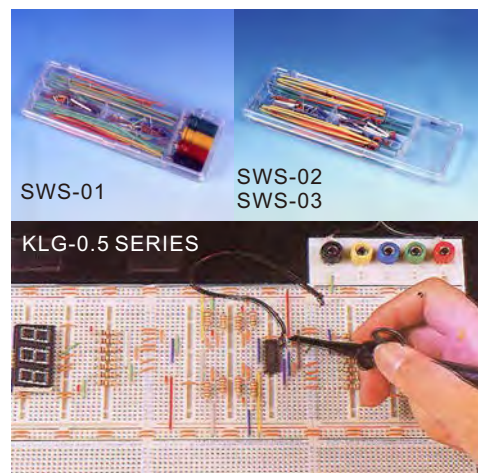
SWS-01

SWS-02
SWS-03

KLG-0.5 SERIES

IDL-400 Logic Trainer

IDL-600A Analog Lab

IDL-800A Digital Lab

ETS-5000
Advanced Digital Training System

ETS-7000A
Digital-Analog Training System

PP-272 / PBU-312
Power project board / Circuit Lab
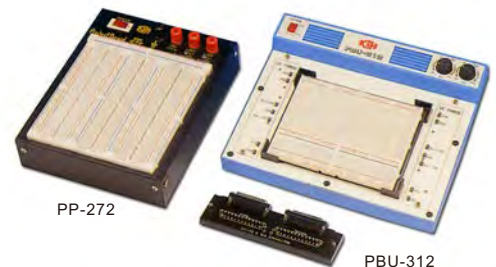
PP-272

PBU-312

DT-01 Digital Trainer

With breadboard, digital circuits, flip-flops and monostable multivibrators, counters, encoders, decoders, multiplexers, demultiplexers and sequencers, resistor, LED and 7 segments LED displays, memory devices, etc..
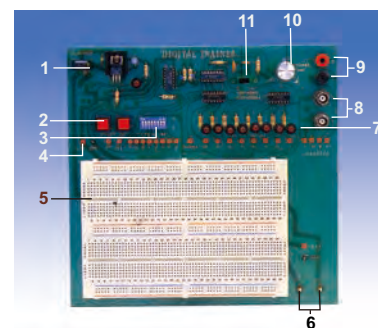
▶ Specifications

1. AC adaptor jack : I/P DC + 8 V, 1.5 A
2. Pulse switch : Two bounce-free push-buttons
3. Logic switch : Eight logic level switches in DIP type
4. DC O/P : DC + 5 V, 750 mA for user
5. B-023 breadboard : Solderless breadboard with 1580 interconnected tie points
6. Clip terminal : Logic probe clip terminal
7. LED display : Eight LED buffered logic level indicators.
8. BNC jacks.
9. Banana jacks.
10. Clock adjustment : Fine adjustment of clock frequency
11. Select switch : Clock range selection
    L : 10-40Hz. H : 1K-20KHz.

OLS-1000
Analog Overlay Learning System

OLS-2000
Digital Overlay Learning System

▶ Features

- The OLS-1000 analog overlay learning system is compatible with K&H IDL-600A analog lab training system and ETS-7000A digital - analog training system.
- The OLS-2000 overlay learning system is compatible with K&H IDL-800A digital lab, DT-01 digital trainer, ETS-5000 advanced digital system and ETS-7000A digital analog training system.

To assemble and examine experiment is laborious. OLS Series will condition the students to visualize the function of experiment circuit.
Electronic theory will be taught straightly out of book accordingly.

The main objective of this trainer is to teach the student of Electronic circuits rather than focusing on the assembly of the components.
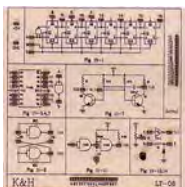
LT-1000 Digital Learner's Teacher
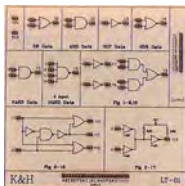
LT-01
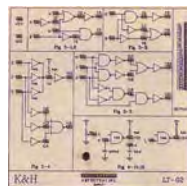
LT-02
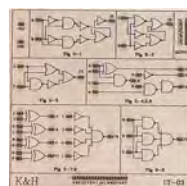
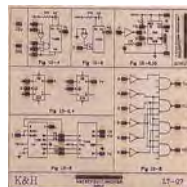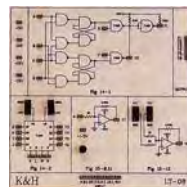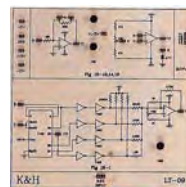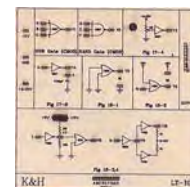LT-03
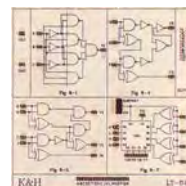
LT-04
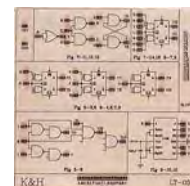
LT-05

LT-06

LT-07

LT-08

LT-09

LT-10

▶ Features

- With 10 modules including 18 experiments
- Step-by-step exercises and application
- Compatible with ETS-7000A digital-analog system and ETS-5000 advanced digital system
- Modular can be changed easily
- With experiment manual

▶ Specifications

1. 10 experiment modules
2. Symbols of element for experimental circuit are printed on the modules.
3. Weight : 4Kg

Technical Training & Education

K&H MFG. CO., LTD.

10503