Product Information Sheet

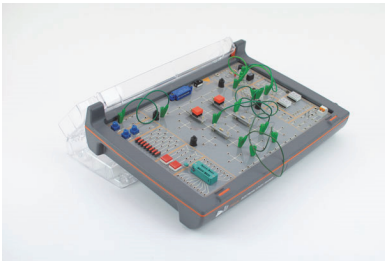
Electronics Study Trainer Complete Electronics Series



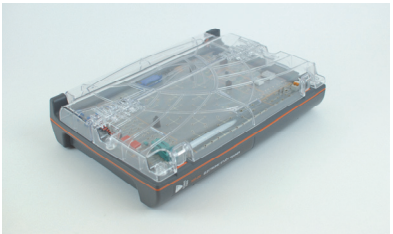
The Complete Electronics series allows the practical study of a wide range of electronics subjects, including DC and AC circuits, semiconductors, analog and digital systems, microcontrollers and telecommunications.

The series comprises an electronics study trainer and component set, and a range of plug-in experiment cards.

The unique design of the trainer includes a heavy duty casing with transparent protective cover.



When in use, the cover folds back to provide an angled support for the unit. With the cover closed, trainers become stackable for easy storage.



320-00 Electronics Study Trainer:

- All on-board power supplies are short circuit/overload protected
- Connection system for plug-in experiment cards
- Patching area for use with component set
- Experiment cards and patching area may be used together
- Easy-to-use switched fault facility for fault-finding activities on the trainer and experiment cards
- On-board signal generator providing square wave and sine wave signal sources
- 8 logic switches and 2 pushbutton switches for use as control inputs.
- Zero insertion force socket to accommodate dual-in-line integrated circuits
- Buzzer, white and red LEDs, and headphone
- OR (x2), AND and inverter gates
- Transistor switch and relay
- 8 logic monitor LEDs for displaying logic outputs
- 2 red and 2 green LED monitors for traffic light simulation activities
- 2 seven-segment displays with decoder/drivers
- Connection panel provides 2mm and 4mm sockets, test pins for oscilloscope probes and connector for powering prototyping boards
- Includes leads, shorting links and power supply adapter

Component Set (supplied with Electronics Study Trainer):

- A total of 28 components mounted on robust carriers and 2 ICs
- Switches (toggle, microswitch, pushbuttons)
- Lamp
- Resistors (47R, 100R, 1K, 4.7K, 10K, 47K, 100K, 220K, 470K)
- Capacitors (470 nF, 1 µF, 10 µF, 100 µF)
- Inductor (100 mH)
- Sensors (thermistor, phototransistor, microphone)
- Diodes (1N4001, 1N4148)
- Potentiometer (10K)
- Integrated circuits (555 timer, PIC microcontroller)

Experiment Cards:

The following cards are included:

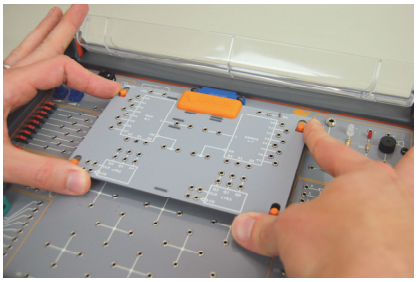
- Electronic Systems
- Diodes and Transistors
- Transistor Amplifiers
- Operational Amplifiers
- Analog Integrated Circuits
- Combinational Logic
- Sequential Logic
- A/D-D/A Systems
- Encoder/Decoder Systems
- Multiplexer/Demultiplexer Systems
- Electronic Communications
- PIC Programmer and Applications

Some experiments may require Digital Multimeter/s, a Function Generator and Oscilloscope or Virtual Instrumentation.

Product Information Sheet (Continued)

Complete Electronics Series

Experiment Cards (continued):



Electronics Study Trainer with experiment card fitted

320-01 Electronic Systems:
Investigate and interconnect the following sub-systems:
- Two comparators with adjustable reference voltages
- Voltage amplifier with adjustable gain
- Logic inverter
- Darlington transistor
- Thyristor
- Field effect transistor (FET)
- Adjustable time delay
- Audio amplifier

Each of these is treated as a simple functional block. No additional components need to be connected for correct operation.

320-14 Electromagnetism:
Investigate the devices:
- Reed switch
- Hall effect sensor
- Electromagnet
- Solenoid
- Transformers
- DC motor and generator

320-21 Diodes and Transistors:
Investigate the following aspects of semiconductors:
- Zener diode characteristics
- Voltage stabilization circuit
- Light emitting diode characteristics
- NPN and PNP transistor characteristics
- Darlington transistor characteristics
- Field effect transistor (FET) characteristics
- Transistor applications including switches, voltage amplifiers and current amplifiers

320-22 Transistor Amplifiers:
Investigate the following transistor applications:
- Class A transistor amplifier
- Class B transistor amplifier
- Class C transistor amplifier
- Effects of feedback in transistor amplifier circuits

320-31 Operational Amplifiers:
Investigate the following:
- Basic operational amplifier
- Effect of negative feedback
- Inverting amplifier
- Non-inverting amplifier
- Voltage follower
- Summing amplifier
- Differentiator

320-32 Analog Integrated Circuits:
Investigate the following devices:
- Thermal sensor IC
- Optical sensor IC
- Linear voltage regulator
- Switch mode voltage regulator
- Switched capacitor filter
- Phase locked loop (PLL)
- Analog switches

320-41 Combinational Logic:
Build combinational logic circuits using the following gates:
- 2-input AND gate
- 2-input NAND gate (x5)
- 2-input OR gate
- 2-input NOR gate
- 3-input NAND gate
- 3-input NOR gate
- Inverter (x3)

320-42 Sequential Logic:
Configure the following sequential logic circuits:
- D-type flip-flop
- J-K flip-flop
- T-type flip-flop
- Asynchronous counter
- Synchronous counter
- Ring counter

320-43 A/D-D/A Systems:
Investigate the following digital systems:
- Digital to analog (D/A) converter
- Analog to digital (A/D) converter
- Tri-state buffer
- Bi-directional transceiver

320-44 Encoder/Decoder Systems:
Interconnect the following digital devices and investigate their operation:
- 8:3 encoder
- 3:8 decoder
- 3-bit binary counter (allows 'scanning' of decoder outputs)

320-45 Multiplexer/Demultiplexer Systems:
Interconnect the following digital devices and investigate their operation:
- 8:1 multiplexer
- 1:8 demultiplexer
- Two 3-bit binary counters (these allow 'scanning' of multiplexer inputs and demultiplexer outputs)

320-51 Electronic Communications:
Investigate the following communication technologies:
- AM modulation and demodulation
- Optical transmission using LED and photodetector
- Coaxial, UTP and fiber optic cable
- Simplex, half-duplex and full duplex communication
- Parallel-to-serial and serial-to-parallel conversion
- Handshaking and flow control

320-61 PIC Programmer and Applications:
Program a PIC microcontroller to simulate the control of a washing machine.
- Control outputs: drum motor, water heater, valve, pump
- Control inputs: temperature sensor, motor speed sensor, door lock sensor
- Zero insertion force socket for PIC microcontroller
- Includes PIC programmer and development software

Items Included:
- Study Trainer
- Experiment Cards (x13)
- Digital Curriculum DVD
- Component Set
- Connection Lead Set
- Storage Case

General Information:
- Power Requirements: 110–240V, 50-60Hz
- Total Shipping Volume: 0.04 m^3
- Total Shipping Weight: 5 kg

Order Code: 320-10

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