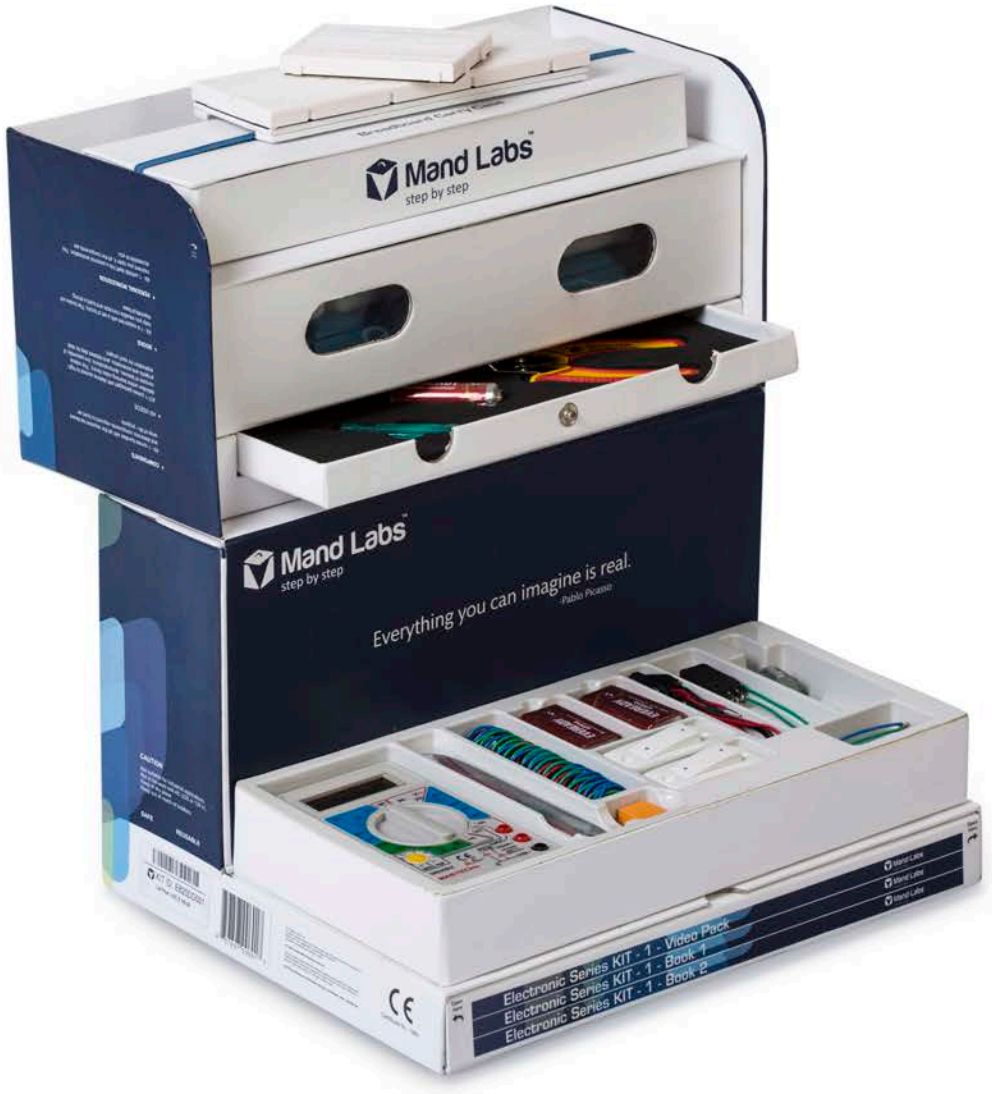
Mand Labs
step by step electronics

KIT-1:

THE COMPLETE ELECTRONICS LAB



INTRODUCTION

Mand Labs KIT-1 is a DIY (do-it-yourself) experiential learning kit for electricity, electronics and semiconductors. Using the kit, learners can build a range of hands-on projects, gain technical skills to prototype circuits, and learn concepts of physics and electronics through experimentation and vivid observation.

RECOMMENDED FOR STUDENTS (GRADE 6-12), SCIENCE EDUCATORS AND MAKERS

- Build an exciting array of projects
- Work with real world electronic components and understand how they work
- Learn and test the concepts of physics
- Gain circuit prototyping skills
- Learn electronics with fun

i-Design Award 2015, Portable Electronic Workstation

60	25	165	2
PROJECTS	HANDS-ON HOURS	COMPONENTS	BOOKS

LIST OF EXPERIMENTS

Level-1 Projects

- Measuring voltage using a multimeter
- Measuring resistance using a multimeter
- Continuity Test of an LED
- Glowing an LED and verifying Kirchhoff's Voltage Law (KVL)
- Measuring current in a circuit using a multimeter and verifying Ohm's law
- Varying intensity of LED using a preset
- Alternate glowing of LEDs using a preset
- Glowing an LED using an LDR
- Beeping a buzzer
- Series combination of LEDs and verifying Kirchhoff's Voltage Law and Ohm's Law
- Parallel combination of LEDs-Type 1
- Parallel combination of LEDs-Type 2 and verifying Kirchhoff's Current Law (KCL)
- Continuity test of an SPDT switch
- Controlling an LED using an SPDT switch
- Alternate switching of LEDs using an SPDT switch
- Staircase lighting
- Charging and discharging of a capacitor
- Charging different capacitors with resistors and Time constant calculation during charging (3 Cases)
- Discharging different capacitors with resistors and Time constant calculation during discharging (3 Cases)
- Sequential Glowing of LEDs

Level-2 Projects

- Continuity Test of a relay using a multimeter
- Alternate glowing of LEDs using a relay
- Burglar Alarm: Type 1 and Type 2
- Continuity test of Bump switch and Momentary push button switch
- Relay as an oscillator
- Diode as a switch: Its functioning in forward bias and reverse bias modes
- Minimum resistance path using a diode
- Protecting a circuit using a diode
- OR Gate using diodes
- AND Gate using diodes
- NOR Gate using diodes
- NAND Gate using diodes
- To learn how a zener diode works
- Zener diode as a voltage regulator

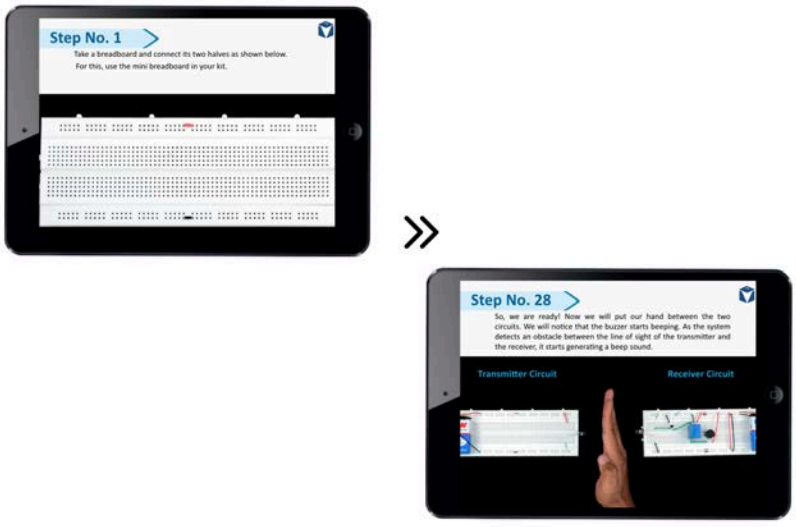
Level-3 Projects

- DC motor as a generator
- Surgery of a DC Motor
- Factors affecting speed of DC Motor
- Identifying the type of BJT transistor using a multimeter
- Measuring the gain of a transistor
- B-E junction as diode in a transistor
- Transistor as an Amplifier and a Switch: Demonstrating cut-off, active and saturation region of a transistor, Identifying the biasing conditions for all the three regions of a transistor, Experimental calculation of beta in active and saturation region
- Touch activated switch using a transistor and verifying the biasing conditions of 'transistor in saturation region'
- Darlington Pair and cascading transistors for multistage amplification
- Automatic night lamp
- Inverted night lamp
- OR Gate using transistors
- AND Gate using transistors
- NOR Gate using transistors
- NAND Gate using transistors
- Transistor as an Inverter (NOT Gate)
- LED Flasher using transistor and concept of Tunneling (Esaki diode)
- Alternating blinking of LEDs using transistors
- H-Bridge (Motor driving circuit used in Robotics)

Additional Projects

- IR (Infrared) Security Alarm System
- Temperature Sensor
- Joule Thief: drawing energy from a dead cell
- Lemon Battery
- Motor control using DPDT switches
- Voltage divider using a potentiometer
- Half-wave and Full-wave Rectifier
- KIT-2, KIT-3 and KIT-4 will cover advanced learning levels covering Integrated Circuits, Sensors and Programming

LEARN AND BUILD **STEP-BY-STEP**



Complete Lab:

+ Hardware Kit
+ Flash Drive (Content)
+ Guide Books + Step-by-Steps
+ Dedicated Technical Support

ACCESS TO TWO GUIDE BOOKS
380 PAGES

ACCESS TO STEPWISE TUTORIALS
DETAILED ASSEMBLY

ACCESS TO FREE LEARNING VIDEOS
FOR REFERENCE

ABOUT MAND LABS, INC. (ARIZONA CORPORATION)

Mand Labs is an educational products and services company based out of Phoenix, Arizona, USA. The mission of the company is to make STEM learning more fun, hands-on and intuitive through DIY experiential learning kits and practical curriculum. After closely working with and teaching 25,000 students and 100s of physics educators in schools globally, the company has developed comprehensive hands-on physics-based curricula on electrical and electronics. Mand Labs brand is known for its quality, innovation and depth.

Have a few queries? Write to us: support@mandlabs.com

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