40 EDUCATIONAL ELECTRONIC PROJECTS, BOOK & PARTS KIT
An immersive, hands-on curriculum of fun and illustrative electronics projects that teaches the fundamentals of electronics. Designed to be STEM (Science, Technology, Engineering, Math) Education Compliant for use in school curriculum. Projects are designed to be breadboarded, taken apart and reused.
Complete Lab includes The Basics v2.0 manual (112 pages), and all the parts necessary for the 40 projects in this book, the basics parts kit, solderless circuit board and 9-Volt battery.
CAT# KT-40 $28.95 each
If you only wish to purchase the book, use
CAT# BK-52 $16.95 each

2-DIGIT COUNTER WITH POWER SUPPLY
Large, two digit counter assembly. Advances one digit at a time, from 0 to 99 each time button is pushed. Each digit is 2.75" high and consists of 21 red 5mm LEDs. 5" x 4.18" black display board connected to 4.25" x 2" controller board. Five 4" pigtail wires. Included is a 9 Vdc power supply and a momentary, normally-open pushbutton switch.
CAT# CTR-92 $6.00 each
10 for $5.65 each

ELECTRONIC PARTS KIT
A large assortment of electronic parts in a clear plastic box with lid. Includes: solderless breadboard with 400 contacts, electrolytic capacitors, red, green, blue and yellow LEDs, precision adjustable pot, resistors, resistance card, disc capacitors, jumper wires, tactile pushbuttons with red, yellow, blue and white caps, buzzers and a 40-pin header (see online for full list and quantity of parts).
CAT# EPKIT-1 $15.95 each

SOLAR POWERED RACING CAR
Owkit# OWI-MSK681 Great little solar powered racing car kit for kids ages 8+.
Easy and fast to assemble, no batteries required.
Assembled size: 2.62” x 2.17” x 2.40” high. 20 pieces.
CAT# MSK-681 $11.95 each

ARDUINO COMPATIBLE PRODUCTS
Arduino is an open-source physical computing platform based on a simple i/o board and a development environment that implements the Processing/ Wiring language. Arduino can be used to develop stand-alone interactive objects or can be connected to software on your computer (e.g. Flash, Processing, MaxMSP). The open-source IDE can be downloaded for free (currently for Mac OS X, Windows, and Linux).
We carry Arduino microprocessors and related products. See our online store for full descriptions.

UNO R3
Everything needed to support the onboard ATmega328 microcontroller; connect to a computer with a USB cable or power it with a AC-to-DC adapter or battery. It has 14 digital input/output pins (6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. This version of the board has a socketed / replaceable ATmega328 chip (see CAT# ARD-24).
Recommended operating voltage, 7-12 Vdc.
CAT# ARD-21 $14.00 each
Snap-together cases for the UNO R3 above
Clear CAT# CSE-3C $4.95 each
Black CAT# CSE-3B $4.95 each

ATMEGA328 W/ ARDUINO OPTIBOOT (UNO), DIP
Pre-loaded with the Arduino Optiboot (Uno 16MHz) Bootloader, to use Arduino code in a custom embedded project without using an actual Arduino board.
CAT# ARD-24 $5.50 each
10 for $4.95 each

MICRO SD CARD READER / WRITER MODULE
Read and write Micro SD cards with your Arduino or favorite microcontroller. Great for adding storage space to any Arduino project.
Features on board level shifting IC to go from 5v to 3.3v and uses standard SPI interface.
CAT# SDR-7 $2.85 each

PRO MINI 328
For users that understand the limitations of system voltage (3.3 or 5v), lack of connectors, and USB off board. Not populated with connectors so you can solder any connector or wire with any orientation you need. We recommend first time users start with the Uno R3 (CAT# ARD-21).
3.3V / 8MHZ Pro Mini 328 CAT# ARD-14 $4.90 each • 10 for $4.75 each
5V / 16MHZ Pro Mini 328 CAT# ARD-18 $4.90 each • 10 for $4.75 each
CLOCK MODULE
The DS1302 trickle-charge time-keeping chip contains a Real-Time Clock/calendar. It communicates with a microprocessor via a simple serial interface. On-board CR2032 backup battery. Operates on 2-5.5VDC @ 300mA. 44mm x 23mm x 11mm.
CAT # ME-48 $3.00 each

LOGIC LEVEL CONVERTER, Bi-DIRECTIONAL
Bi-directional logic level converter safely steps down 5V signals to 3.3V and steps up 3.3V to 5V at the same time. This level converter also works with 2.8V and 1.8V devices. 0.63 x 0.52" (16.05 x 13.33mm).
CAT# LLC-46 $2.95 each

ARDUINO STACKABLE HEADER KIT
Works with Arduino Main Board, Pro & Mega. They clear the USB-B connector and enable stacking of multiple shields. This kit includes four headers (2 8-pin and 2 6-pin).
CAT# HDR-07 $1.50 each

SENSORS KIT FOR ARDUINO
A very handy kit containing 37 different devices with the standard 3-pin interface for Arduino. We sell many of these modules and sensors separately, but this kit would be a bargain for a classroom or experimental setting. In addition to a useful assortment of sensors, the kit includes a joystick, relay module, sound and light emitting modules and a pushbutton. Packaged in individual compartments in a sturdy clear plastic case with an easy-to-use display map on the cover showing the location of each item.
CAT # SKA-36 $36.00 each

RFID READ AND WRITE KIT
Allows you to both read and write MiFare-type cards. Includes one credit-card style tag and one key-fob style tag.
CAT # ME-138 $5.75 each

ARDUINO MODULE - ESP8266
Self contained WiFi module capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Pre-programmed with an AT command set firmware. Operating voltage 3.3V.
CAT# ESP-8266 $5.00 each

JOYSTICK SHIELD
Turn your Arduino into a gamepad. Features the Nokia 5110 LCD / nRF24L01 interface. 7 pushbuttons (four big, two small, joystick select button) and a two-axis thumb joystick. Operates on 3.3-5Vdc.
CAT# ST-1124 $4.00 each

ORDER TOLL FREE 1-800-826-5432

UNO R3 STARTER KIT
A very useful, not to mention economical, kit including an Arduino Uno R3 equivalent microcontroller and a large selection of devices you will want for a number of projects using the Arduino micro controller. Includes an expansion board, extra breadboards, motors, motor drivers, a relay board, a remote control keypad, joystick, LCD, LED displays, LEDs, jumpers, headers, sensors, switches, pots, battery holder and more.
All of this packaged in a well organized, divided plastic case. You can't go wrong with this. These items purchased separately would be considerably more.
CAT # SKA-47 $45.00 each

3V 40MA
Output: approximately 3 Volts @ 40 mA. 60mm square x 2.5mm thick epoxy-encapsulated silicon photovoltaic cell. Solid, almost-unbreakable module with solderable foil strips on backside. Ideal for solar-powered battery chargers and other projects.
CAT # SPL-30 $1.15 each 10 for $1.00 each

5V 800MA
Ideal for hobby and educational projects. 82 x 46 x 2mm high. 7" pigtail leads.
CAT # SOL-2N $1.10 each 10 for $1.00 each

3V 40MA
Output: approximately 3 Volts @ 40 mA. 60mm square x 2.5mm thick epoxy-encapsulated silicon photovoltaic cell. Solid, almost-unbreakable module with solderable foil strips on backside. Ideal for solar-powered battery chargers and other projects.
CAT # SPL-30 $1.15 each 10 for $1.00 each

5V 800MA
Ideal for hobby and educational projects. 82 x 46 x 2mm high. 7" pigtail leads.
CAT # SOL-2N $1.10 each 10 for $1.00 each

16 X 2 LCD W/ KEYPAD
For Arduino compatible boards for user input & menu selection in custom applications. Features a 1602 white character LCD with blue LED backlight and 4-bit Arduino LCD library. Character size: 2.95 x 4.35mm. Keypad consists of 6 keys: select, left, up, down, right & reset. Potentiometer for dimmable backlighting. LED indicator. Operates on 5Vdc: 80mm x 58mm x 13mm.
CAT# ST-1113 $5.95 each
LIGHT SENSORS

CdS PHOTOCELLS – PHOTO RESISTORS

Light dependent Cadmium sulfide resistors. Plastic coated resistors on ceramic, 0.2-0.25” dia. Light & dark resistances are approximate.

2MO Dark – 60KΩ Light
CAT# PRE-24 1.25 each
10 for $1.10 each

30K Dark – 1.5K Light
CAT# PRE-25 95¢ each
10 for 85¢ each • 100 for 70¢ each

3MO Dark – 1000 Light
CAT# PRE-26 95¢ each
10 for 85¢ each • 100 for 70¢ each

1MO Dark – 1800 Light
CAT# PRE-27 95¢ each
10 for 85¢ each • 100 for 70¢ each

Arduino-style module. Approximately 1000Ω light, 10KΩ dark resistance. 0.60” x 0.75” pc board with 3-pin output, 0.10” spacing.
CAT# SE-12 $2.40 each

INFRARED SENSORS

INFRARED MOTION DETECTOR MODULE

Mini-passive infrared motion detection module (PIR). Senses changes in infrared heat patterns. 3-pin configuration ideal for use with Arduino / Raspberry Pi / Adafruit microcontrollers. Lens diameter, 14mm. Overall length, excluding pins, 19mm.
CAT# PIR-12 $3.75 each

IR RECEIVER MODULE

Simple IR receiver module used to read infrared light value. Can be used to communicate with our IR transmitter module (CAT# SE-28). Detection angle 60°. Can receive transmissions from a distance of 8 meters. Operating voltage 5 Vdc. 25mm x 15mm.
CAT# ST-1089 $2.40 each

INFRARED SENSOR

RE 200B passive infrared sensor. Two active elements helping compensate for differences in environmental temperature. Used in alarm systems and automatic switches that respond to human body motion. Hermetically sealed TO5 metal case with 3 leads.
CAT# PIR-200B $1.00 ea. • 10 for 90¢ ea.

PIR SENSOR HC-SR501

Can be used alone or with Arduino or other microcontroller. Adjustable sensitivity and timing. 33 x 24mm pc board. 25mm overall depth.
CAT# PIR-7 $3.25 each

IR OBSTACLE AVOIDANCE SENSOR

Uses IR beam to detect proximity of obstacles. Great for sounding an alarm or changing direction of a robot or self-propelled vehicle. Potentiometer to adjust detection distance (2-40cm). Supply voltage 5 Vdc. 45mm x 16 mm x 9mm.
CAT# ST-1081 $2.75 each

LINE FOLLOWING / REFLECTIVITY SENSOR

Measures the reflectivity of a surface using infrared emitter/detector pair. Built around the LM393 comparator, it requires only 3 connections, V+, 5VDC, and GND. LED indicator. Can make a robot follow a painted line or count rotations of a motor shaft. 1.64” x 0.42” x 0.40”. Three pin header, 0.1” centers. Operates on 3.3-5Vdc. 20mA @ 5Vdc.
CAT# ST-1140 $2.75 each

IR TRANSMITTER MODULE

IR transmitter module designed for IR communication when paired with IR receiver (CAT# ST-1089). Indicator LED lights when signal voltage change is detected. Operating voltage 5Vdc. Includes 3-pin female jumpers for attachment to header pins. 34mm x 20mm.
CAT# SE-28 $3.40 each

TEMPERATURE SENSORS

TEMPERATURE SENSOR

National Semi # LM34DZ
Precision Fahrenheit sensor. Voltage is linearly proportional to the temperature. Operates on 5-30Vdc. TO-92 package.
CAT# LM34DZ $3.30 each

TMP36 TEMPERATURE SENSOR

Precision centigrade temperature sensor. It provides a voltage output that is linearly proportional to the Celsius temperature. +125°C temperature range. TO-92 case.
CAT# TMP-36 $2.00 each

DIGITAL TEMPERATURE SENSOR

DS18B20 1-Wire digital temperature sensor. Reports degrees C with 9 to 12-bit precision, -55°C to 125°C (+/-0.5°C). Sensor has a unique 64-Bit Serial number etched into it. TO-92 case.
CAT# DS18B20 $1.50 each

TEMPERATURE / HUMIDITY SENSOR

Digital temperature and humidity measurement device with a high-performance 8-bit microcontroller connected. Standard single-bus interface.
CAT# SEN-4 $3.50 each
**THERMOSTATIC CONTROL MODULE**
Digital module can be programmed to turn equipment on or off at specific, pre-set temperatures. Also has hysteresis setting, delay setting, upper-limit setting and upper limit alarm setting. Displays temperature in Celsius on 3-digit LED display. On-board 20A relay. Waterproof temperature sensor. Three buttons for navigating temperature parameters and other functions. Operating voltage 12 Vdc. Overall dimensions 48mm x 40mm x 14mm.

CAT # THM-4 $6.00 each

**DIGITAL THERMOMETER W/ PROBE SENSOR**
-50 to 110° Celsius thermometer with digital LCD readout. Moisture resistant, waterproof probe on 38” lead. Snap-mounts in 1.75” x 1” panel cut-out.

CAT # THM-5 $3.75 each

**TEMPERATURE SENSOR MODULE**
NTC thermistor sensor. LM393 voltage comparator for clean output waveform. Working voltage 3.3V-5V. Digital switching outputs (0 and 1). PC board, 32 x 14mm.

CAT # SEN-19 $1.50 each

**KNOCK SENSOR MODULE**
3-pin knock sensor attached to PC board with 10K resistor. Designed for use with Arduino and similar microcontroller systems. 18.5mm x 19.0mm x 8mm thick.

CAT # SE-29 $1.85 each

**THERMISTORS**
NTC – Negative Temperature Coefficient. Resistance drops as temperature increases.

**10K OHM NTC THERMISTOR**
5mm epoxy coated disc. 500mW max power rating. -20 to 125K operating temperature.

CAT# TNR-103 65¢ each

10 for 55¢ each • 100 for 40¢ each

**10K NTC TEMPERATURE SENSOR**
Gold-plated 3mm dia. x 14.5mm long probe compresses, with spring-return, into a 4.2mm dia. x 9mm long collar. Removed from new equipment in excellent condition.

CAT# THM-43 $1.00• 75¢ each

10 for 60¢ each

**INRUSH CURRENT SUPPRESSOR, 3.9 OHM**
Murata # NTPAD393RLDNB0. 3.9 Ohm NTC thermistor. Current rating: 3.3A. Voltage: 264V.

CAT# TNR-3.9 65¢ ea. • 150 for 40¢ ea.

**HALL EFFECT SENSORS**

**HALL EFFECT SENSOR BOARD**
44E938 and related components on a pc board designed for use with Arduino boards. 30 x 15mm overall dimensions. Operates on 5V.

CAT# SE-54 $2.25 each

**HALL EFFECT SENSOR**
Allegro MicroSystems # UGN3503U Ratio metric, linear hall-effect sensor in a miniature three-lead plastic SIP package. Flat Response to 23 kHz. 4.5V to 6V Operation.

CAT# HES-2 $1.50 each

**LINEAR MAGNETIC HALL SENSOR**
Simple analog hall sensor module used for proximity switching, positioning, speed detection, and current sensing applications. Signal output is low when magnetic field is present, signal output is high when magnetic field is absent. LED indicator. Potentiometer for adjustable sensitivity. Operating voltage 5Vdc. 44mm x 15mm x 13mm.

CAT# SE-14 $2.50 each

**ROTARY MAGNETIC MODULE**
RLS # RM221Q3 / SKM 3208. Encoder module with a magnetic actuator. 20mm dia. x 4mm thick. Includes small neodymium magnet.

CAT # HES-3 $1.75 each

**BI-POLAR HALL EFFECT SENSOR**
MICRONAS HAL115UA-C Detects the presence or the absence of a magnetic field. TO-92UA. VDD = 4.5V to 24V. Typical VDD = 12V.

CAT# HES-1 75¢ each

10 for 65¢ each • 100 for 55¢ each

**ULTRASONIC SENSORS**

**ULTRASONIC DISTANCE SENSOR**
The HC-SR04 is an affordable proximity/distance sensor that can be used for object avoidance in various applications from robotics to car parking. The module has integral ultrasonic transmitters, receiver and control circuit and is for use in conjunction with Arduino boards. 45 x 27 x 17mm.

CAT# UST-4 $3.25 each

**3-AXIS ACCELEROMETER**
3-axis accelerometer with signal conditioned voltage outputs. Measures acceleration with a minimum full-scale range of ±3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration from motion, shock, or vibration.

CAT # ACX-61 $8.95 each
LIQUID SENSORS

FLUID PRESSURE SENSOR
Using a 5 Vdc input, the fluid pressure sensor provides a 0.25 - 4 Vdc output proportional to pressure from 0-5” H2O max. Typical applications include duct air flow, filter pressure monitoring, combustion air flow and gaseous leak detection. Measures 1-5/16” x 17/32” on a pair of 7/8” long slotted mounting wings. Two 3/16” O.D. barbs. 3-pin connector with 3” wire leads for power and output.
CAT # FLS-4 $3.15 each

LIQUID LEVEL SENSOR
Float switch closes circuit when float rises to top of switch (end opposite leads). Can be used in opposite direction as well to close circuit when water level drops. 0.96” diameter plastic float and 0.35” threaded bushing with plastic nuts and rubber O-ring. 2.64” overall length. 14” pigtail leads.
CAT # FLW-2 $3.35 each

FLOAT SWITCH WITH INTEGRATED THERMISTOR
Gems Sensors. Horizontal liquid level float switch. For sensing rising or falling liquid levels (normally open or normally closed). Hermetically sealed magnet and reed switch for accurate, reliable long-life operation. Polypropylene float, 2.4” long from hinge to end. Four 10” leads, two for switch (red) and two for thermistor (green).
CAT# FLW-1 $3.50 ea. • 10 for $3.00 ea.

LIQUID FLOW SENSOR
Measures the rate of liquid flowing through it. Consists of a plastic valve body, flow rotor and hall effect sensor. Can be used with a microcontroller such as Arduino to monitor devices. Operates on 5vdc @ 15mA. Water flow range 0.3-6 L/min. Water pressure <0.8MPa. 4mm I.D. x 6mm O.D. inlets. Overall dimensions 35mm x 35mm x 26mm. 6” 3-wire leads with 3-pin connector.
CAT # FLW-3 $5.00 each

PROXIMITY SENSOR
P/N: LJ12A3-4-Z/BX. Inductive-type proximity sensor with NPN, Normally open transistor switch. Output upon detection. Power: 6-36 VDC. Output Current: 300mA. Detection Range: 4mm. Detected material: Iron/Steel alloys. 64mm long x 12mm dia. threaded bushing. Includes hardware. 3-wire, 43” cable.
CAT # PSW-21 $3.75 each

THROUGH-BEAM PHOTO-ELECTRIC SENSOR PAIR
SICK Optics WS15-D1130 / WE15-A1130. Photo-electric sender and receiver pair detects the presence of an object when the beam between the two is interrupted. When the beam is broken, the receiver produces a current that can be used to trigger an audio-visual signal or relay-operated device. 5 Meter range. Built-in LED alignment and power indicators. Modules are 38 x 21 x 16.2mm and can be front or side-mounted. Front-mount hardware is included. Operate on 10-30Vdc. Power supply not included. cULus.
CAT # OSU-1130 $11.35 pair

RED LASER MODULES

LASER DIODE
LiteOn # LTLD505T. 6mm diameter. Gold-plated heat-sink base and leads.
CAT# DLM-6 85¢ each
100 for 40¢ each

LASER ASSEMBLY W/ PINS
Mounted on pc board with header pins for use with Arduino and other projects. Can be used as a trip wire for theft detection or for optical effects. 26 x 16 x10mm.
CAT# ST-1172 $2.80 each

MODULE WITH ADJUSTABLE LENS
Metal enclosed module. 12mm diameter x 35mm long 5” pigtail leads.
CAT# DLM-8 $4.55 ea. • 10 for $4.00 ea.

RED X MODULE
Projects a red X. Visible approximately 10’ in daylight. Metal enclosed module, 12mm diameter x 35mm long. 5” pigtail leads.
CAT# LL-6 $5.00 each

CD LASER OPTICS AND MECHANISM
Sony# KSM213CLCM / KSS213CL. Optical pickup mechanism with CD laser lens assembly. 3.93” x 3.15” metal bracket. New, original condition.
CAT # LA-10 $7.50 each
10 for $6.70 each