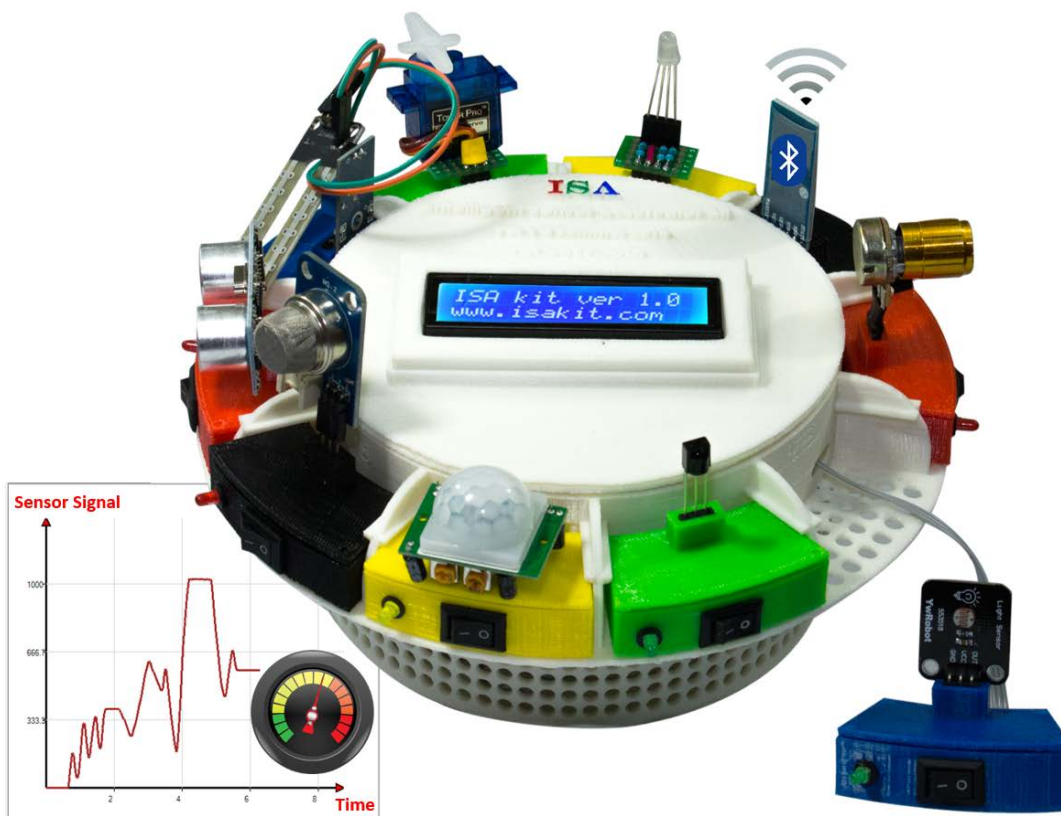


## ISA: Intelligent Sensor and Actuator Kit



*A smart and easy way to learn about sensors and actuators and their real world applications using interactive hands-on projects*

August 2015

## Introduction

Intelligent Sensor and Actuator (ISA) is an all-in-one educational kit for students and instructors in STEM (Science, Technology, Engineering and Mathematics) programs to learn and teach about sensors (inputs) and actuators (outputs) through interactive hands-on projects. Watch the video on [YouTube](#).

## Key Features of the ISA Kit

- Easy to learn and use
- No soldering or wiring is required
- No pre-knowledge of coding is required (automatically generates C/C++ codes for Arduino-based microcontrollers)
- Compact design to save space
- No requirements for any additional tools or parts
- Cost effective
- Interactive tutorial
- Integrates basic, intermediate, and advanced level projects
- Appropriate for middle school, high school, and college students
- Interactive communication with Windows OS and Android Apps.



## Communication Methods

- Though an LCD screen mounted on the kit.
- Through ISA dashboard which provides an interactive graphical user interface for the user. It functions like an oscilloscope to display signals from the sensors and save the log.
- Via smartphone or tablet.

## What is Included in the ISA Kit?











- One Arduino-based microcontroller
- One ISA Shield (version 3)
- 10 modules: 7 sensors, 2 actuators, and one Bluetooth
- 10 extension cables
- One infrared (IR) remote control
- LCD display
- Housing and sensor/actuator mounts
- 2GB flash drive which includes the user manual
- ISA dashboard (windows-based software)
- ISA kit App for Android smartphone and tablets
- USB cable (to connect ISA kit to your PC)
- 9V to Barrel Jack Adapter + 9V battery (in case you are not using the USB cable)








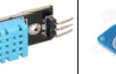
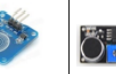


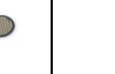
Watch the video on [YouTube](#)

# ISA Kit Sensors and Actuators











ISA Kit Basic comes with 10 modules: 7 sensors, 2 actuators, and one Bluetooth.

Actuators		Sensors							
1	2	3	4	5	6	7	8	9	10
RGB LED	Servo	Soil Moisture	Ultrasonic Rangefinder	Gas & Alcohol	Motion	Infra Red (IR)	Light	Potentiometer	Bluetooth
									

ISA Kit Pro comes with 20 sensors and actuators. This Kit has everything included in ISA Kit Basic plus 10 additional sensors and actuators.

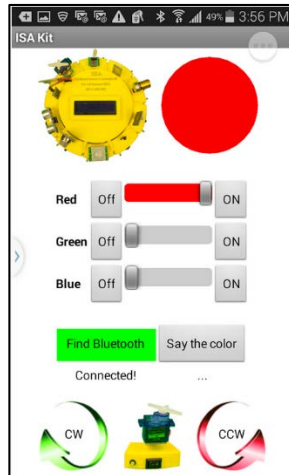
Actuators		Sensors							
11	12	13	14	15	16	17	18	19	20
2-Channel Relay	Buzzer	3-axis Accelerometer	2D Joystick	Line Track	Temperature and Humidity	Touch	Sound	Soft Pot	Pressure
									

ISA Kit Premium comes with 30 sensors and actuators. This Kit has everything included in ISA Kit Pro plus 10 additional sensors and actuators and their accessories.

Actuators					Sensors				
21	22	23	24	25	26	27	28	29	30
Fan motor	DC Motor	Pump	Valve	Laser	Flame	Pulse	hall effect	Tilt	vibration
									

# ISA Kit Application

ISA Kit Application (App) is developed for Android smart phones and tablets and is available on Google Play. You can connect to the ISA Kit via Bluetooth to control the color of the RGB LED and rotate the servo motor.



## Who Can Use the ISA Kit?

- Students and teachers who have no knowledge on sensors and actuators
- Students and teachers who have basic knowledge about sensors and actuators but do not know how to develop codes or do wiring
- Students and teachers who have decent knowledge about sensors and actuators and know how to develop codes in C++ and do soldering and wiring but would like to save more time.

## Made in the USA

- The technology has been developed at the University of California, Irvine and Intelligent Design Technology LLC (Patent pending). It has been designed, developed, and manufactured by Intelligent Design Technology, LLC. Our goal is to support design and manufacturing in the USA.
- Intelligent Design Technology LLC was founded in 2012 and is based in Torrance, California. The company has a successful team of licensed professional engineers in different engineering disciplines: mechanical engineering, electrical engineering, structural engineering, and computer science. The company develops engineering-based software packages and related high-end technologies (<http://www.idesignt.com>).



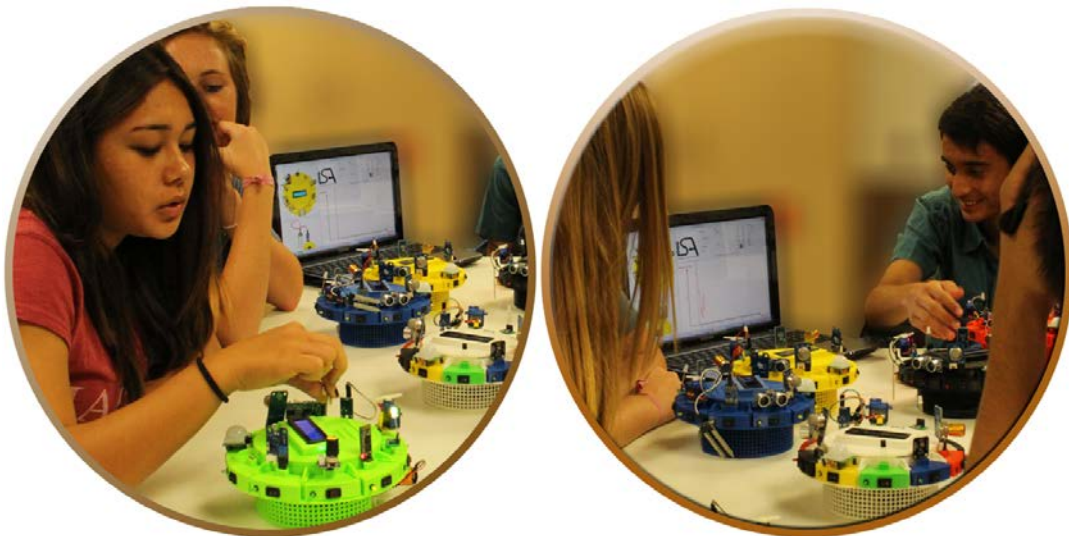
## The Need for Educational Kits

The United States has the best graduate schools in the world and is amongst the top countries when considering undergraduate STEM programs. However, the quality of K-12 education in general is lacking in comparison; the US ranked 52nd in the quality of STEM education based on the World Economic Forum. We can do better and we should!

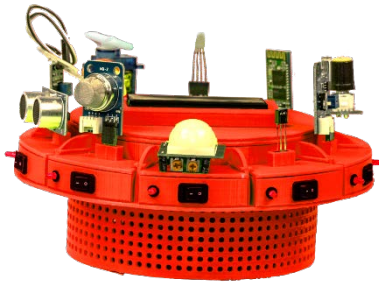
It is essential for our students in STEM programs to have project based classes and hands on experience. Projects that are based on sensors and actuators are very interesting subjects to students in STEM programs. However, sometimes these projects are too challenging for students who are being exposed to electronics and coding for the first time. When students involved in hands-on projects are exposed to too many new subjects they tend to get frustrated and loose interest in the projects and consequently lack the most important tool to come up with innovative ideas.

The ISA Kit provides a smart and easy way to learn about sensors and actuators and their real world applications through interactive hands-on projects. With the ISA Kit and its interactive graphical user interface, students will be more enthusiastic about science, technology, engineering, and mathematics projects. The package includes basic, intermediate, and advanced projects for middle school, high school, and college students respectively.

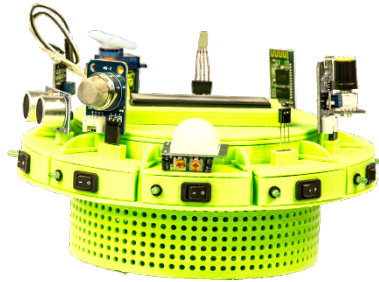
Students who start working with the ISA Kit will outperform other students in hand-on projects and that will help them not only in their school and college courses but also in becoming well-educated engineers and scientists with more innovative ideas in the future



# Available Colors



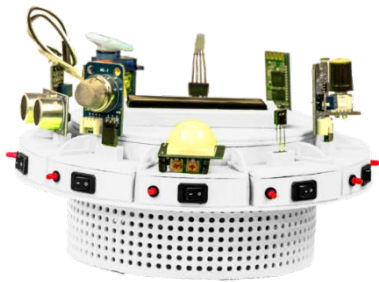
Red



Green



Blue



White



Black



Yellow



Multi-color

## Links

ISA Kit website: <http://www.isakit.com>

Intelligent Design Technology LLC: <http://www.idesignt.com>

Sensors and actuators of the ISA Kit (YouTube): <https://www.youtube.com/watch?v=GMSeic3EwSc>

The Henry Samueli School of Engineering at the University of California, Irvine: <http://www.eng.uci.edu/>

Intelligent Structures and Systems Lab at the University of California, Irvine: <http://issl.eng.uci.edu/>

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