

Robotics Sensor & Motor Training Kit for myRIO & LabVIEW

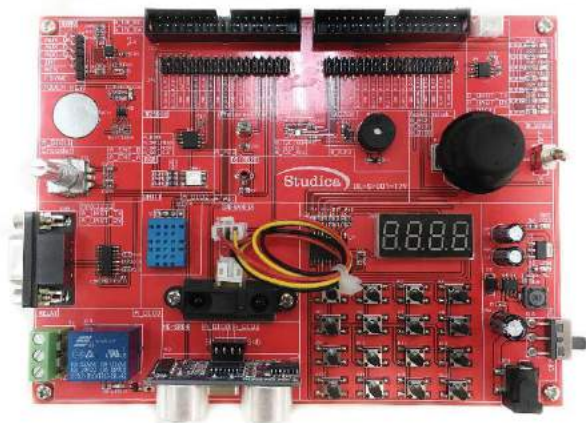
The Robotics Sensor & Motor Training Kit provides a comprehensive solution for the introduction of sensors, actuators and motor control using the NI myRIO and LabVIEW. The kit includes a sensor training board, a motor training board, power adapter, connection cables and courseware. Each board includes the essential hardware needed to complete the courseware. (NI myRIO and computer are not included).

This training kit meets a variety of needs of students at all levels and is suitable as an introduction to sensor and motor control using LabVIEW. By interfacing with the NI myRIO students use individual projects and exercises to concentrate on each component and to develop skills that apply to WorldSkills Mobile Robotics, WRO (World Robotics Olympiad), and FIRST Robotics.

Learning Objectives:

Students learn the concepts and characteristics of common sensors, actuators, and electrical components. Students use LabVIEW software to observe the functionality of sensors, actuators, and other electrical components.

Sensor Training Board



Features:

- 5V Relay
- SMD LED Module
- Capacitive Touch Sensor
- Toggle Switch
- Two-way Rocker with Button Function
- Photoresistor
- Thermistor
- Infrared Ranging Sensor
- Ultrasonic Distance Sensor
- Three-color LED
- Passive Buzzer
- MAX3232 and MAX3485 Serial Chips
- IMU: 3-axis gyro, 3-axis accelerometer, 3-axis magnetometer
- TSL2561 Digital Light Intensity Sensor
- 7 Segment LED display
- DHT11 Temperature and Humidity Sensor
- Memory chip W25Q16
- EC11 Rotary Switch

Motor Training Board



Features:

- Stepper Motor Drive Circuit
- NEMA 17 42 Hybrid Stepper Motor
- DC motor drive circuit
- DC speed reduction motor with orthogonal encoder
- PWM Controlled Analog Servo Motor
- Solenoid valve \ Electromagnet Drive circuit
- 7 Segment LED Display Digital Tube Sensor
- Memory chip W25Q16
- EC11 Rotary Switch

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Sensor Board Exercises:

The Sensor Training Board guide includes the following exercises:

1. Application of common digital I/O port:
 - a. LED control experiment
 - b. Relay control experiment
 - c. TTP23 touch switch experiment
 - d. Toggle switch
 - e. Rocker button experiment
2. The application of AD port:
 - a. Photosensitive resistance experiment
 - b. Thermistor experiment
 - c. 2D rocker experiment
 - d. Infrared distance sensor experiment
3. The use of PWM port:
 - a. Three-color LED experiment
 - b. Passive buzzer experiment
4. The use of serial port:
 - a. RS232 serial communication experiment
 - b. RS485 serial communication experiment
5. The use of I2C bus:
 - a. 9-axis gyroscope using experiments
 - b. Digital light intensity sensor experiments
 - c. Display control button recognition experiment
6. The use of a single bus:
 - a. DHT11 temperature
 - b. Humidity sensor experiment
7. Clock use:
 - a. Ultrasonic sensor experiment
8. SPI bus use:
 - a. Memory chip W25Q16 experiment
9. Orthogonal coding use:
 - a. EC11 rotary encoder using experiments

Sensor Board Exercises:

The Motor Training Board guide includes the following exercises:

1. Stepper motor motion control:
 - a. Stepping motor forward and reverse experiment
 - b. Stepping motor rotation speed control experiment
 - c. Stepping motor rotation angle control experiment
 - d. Stepping motor acceleration and deceleration control experiment
2. Steering gear motion control:
 - a. Steering gear angle control experiment
3. DC motor motion control:
 - a. DC motor forward and reverse experiment
 - b. DC motor speed open loop control experiment
 - c. DC motor speed detection experiment,
 - d. DC motor speed closed loop control experiment,
 - e. DC motor position closed loop control experiment
4. Solenoid valve \ electromagnet control:
 - a. Solenoid valve \ electromagnet on-off I/O control experiment
5. Digital tube display control:
 - a. 7 Segment LED Display experiment