



SS01 Temperature Sensors



SS02 Light Sensors



SS03 Infrared Sensors



Sciencetech TechBooks are compact and user friendly learning platforms to provide a modern, portable, comprehensive and practical way to learn Technology. Each TechBook is provided with detailed Multimedia learning material which covers basic theory, step by step procedure to conduct the experiment and other useful information.

Sciencetech 2311 SensorLab comprises of Sensors and Transducers which provide the fundamental knowledge of sensing Light, Pressure, Temperature, IR and many more non electrical entities.

Since, most of the sensors give signal which show small variation and are of low level output, these signals need to be converted into a form that is measurable and could be used efficiently. The lab consists of various signal conditioning blocks which perform amplification, filtration, signal conditioning and all the required operations which are acceptable to the input devices.

7" capacitive touch screen LCD is inbuilt for output device with easy to use instructions and graphical user interface, to display waveforms, to plot characteristics with the help of graphs, for reading operating manual and watching tutorials. SensorLab is a stand alone TechBook. It does not require external Oscilloscope for measuring, or observing the output and characteristics of the Sensors interfaced.

Features

- IoT enabled Android based 7" Graphical touch LCD with inbuilt cortex processor & DAQ for acquiring analog data and software for viewing the output waveforms, reading the operating manual, tutorial, video etc, with USB storage and HDMI output. Ethernet port to connect real world.
- Inverting, Non-Inverting, Power, Current, Instrumentation and Differential Amplifier, Buffer, Frequency to Voltage, Voltage to Frequency, Current to Voltage, Voltage to current Converter, High Pass and Low Pass Filter, Buffer, LED , Buzzer, Relay, Square Wave generator.
- Inbuilt DAQ
- User can design any circuit on bread board and test
- Stand alone TechBook
- USB Port for Keyboard and Pendrive interface
- Ethernet Port to connect with real world
- HDMI Port
- PC Interface
- Data Login in .csv format
- Ethernet connectivity for remote view application (supported operating system : windows/Linux)
- Online update / USB update
- On board Graph capture and store
- Office tools are inbuilt to view PDF and doc files
- Scientific calculator
- On Board Circuit Simulation

Scope of Learning

- Learn the detailed fundamentals of signal conditioning.
- Learn in-depth study of sensors and it's circuit diagram.
- Learn how automation can implement using sensors and actuators.
- Testing and understanding graph various Sensors for Light Intensity like Photo Diode, Photo Transistor, Photo Voltaic Cell and LDR.
- Testing and understanding graph of various Sensors for Temperature like NTC Thermistor, Platinum RTD, K and J type Thermocouple , AD590 and Lm35.
- See the sensor real timer graph using PC based software
- Sensors data logging using PC based software
- Fault finding to Types of signal conditioning and Sensors.
- Testing, Fault finding of Sensor and understanding graph of IR Sensor like L14G1 and TSOP1738. Characteristics of other Sensor modules.
- Testing and understanding the working of Amplifiers like Inverting amplifier, Non inverting amplifier, Differential amplifier, Instrumentation Amplifier , Current Amplifier
- Testing and understanding the working of Filters like High Pass filter and Low Pass Filter
- Testing and understanding the working of Types of and Converters like Frequency to Voltage and Voltage to Frequency convertor, Current to Voltage and Voltage to current convertor.
- Study of output blocks like LED, Buzzer , Relay.

Technical Specifications

On board display	: 7" capacitive touchscreen
Connectivity	: USB, Ethernet & HDMI
Square Wave Generator	: up to 40KHz
Low Pass Filter	: up to 30KHz
High Pass Filter	: After 40KHz
Inverting Amplifier	: Variable Gain 1-10
Non Inverting Amplifier	: Variable Gain 2-10
Differential Amplifier	: Variable Gain 1-10
Instrumentation Amplifier	: Variable Gain 10-20
Frequency to Voltage Converter range	: Input : 1-10KHz Output : 1-10Volt
Voltage to Frequency Converter range	: Input : 1-10Volt Output : 1-10KHz
Current to Voltage Converter range	: Input : 4-20mA Output : 0-5Volt
Voltage to Current Converter range	: Input : 0-5Volt Output : 4-20mA
Analog/Digital Converter	: 4 Channel (0-5V)
Digital/Analog Converter	: 1 Channel (0-3.3V)
Input/Output Ports	: 4-IP / 4-OP
Operating Voltage Range	: 0 – 3.3V
LM35	: 10mV/ °C
Platinum RTD	: 100Ω at 0°C (Temp. coefficient 0.385 Ω /°C)
K Type Thermocouple	: -200°C to 1250°C
J Type Thermocouple	: - 200°C to +1200°C
AD590	: - 55°C to +150°C
NTC Thermistor	: 4.7KΩ
BPX65 Photo Diode	: 500nm – 1100nm
L14G1 Photo Transistor	: 500nm – 1100nm
Photovoltaic Cell	: 500mV – 580mV
Dimensions (mm)	: W 326 x D 252 x H 52
Power Supply	: 100V - 240V AC, 50/60Hz
Weight	: 1.5Kg (approximately)
Operating Conditions	: 0-40°C, 85% RH
Package contains	: Patch cords 16" -30nos A to B USB cable -1no TechBook Power Supply-1no 5V 3Amp adaptor-1no SS01, SS02, SS03-1no each +12V Power Supply-1no

Included Sensors

Temperature Sensors (SS01)

- RTD
- NTC Thermistor
- LM35
- J and K type Thermocouple
- AD590

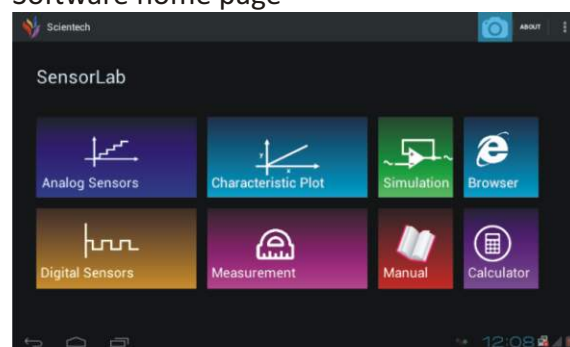
Optical Sensors (SS02)

- Photo Voltaic Cell
- LDR (Light Dependent Resistor)
- Photo Transistor
- PIN Photo Diode

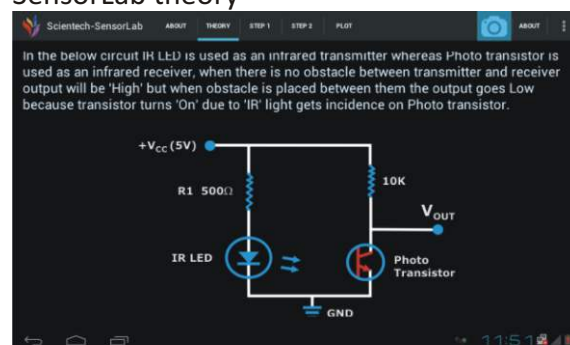
IR Sensors (SS03)

- TSOP 1738
- IR LED

Software home page



SensorLab theory



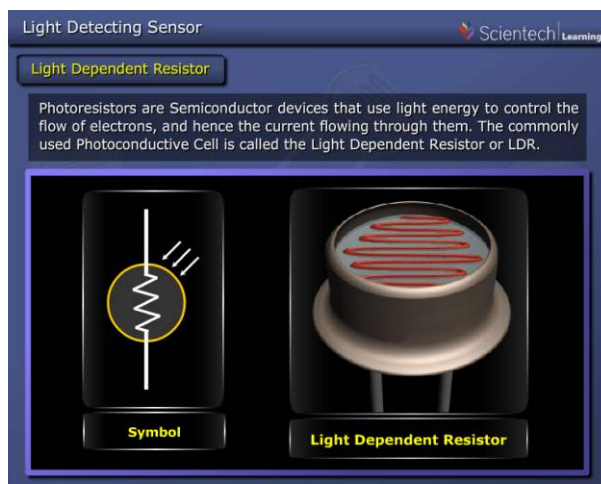
Characteristics plot



Optional Sensors

- SS04 Pressure Sensor
- SS05 LVDT Coil
- SS06 Load Cell
- SS07 Strain Guage
- SS09 Gas Sensor
- SS10 Alcohol Sensor
- SS13 Magnetic Sensors
- SS15 Limit Switch
- SS16 Capacitive Proximity Sensor
- SS17 Inductive Proximity Sensor
- SS24 Level Sensor
- SS32 Fire Sensor
- SS33 Flow Sensor
- SS36 Smoke Sensor
- SS37 Accelerometer Sensor
- SS48 Potentiometric Displacemnet sensor
- SS58 Capacitive Displacement Sensor
- SS150 Humidity Sensor
- SS151 Air Quality Sensor
- SS152 Soil Moisture
- SS153 Ambient Light Sensor
- SS154 Soil/Water temperature
- SS155 PIR Sensor
- SS175 Atmospheric Pressure Sensor

Simtel 25 - SensorLab Software window (optional)



Optional

Technology Learning Software - Simtel 25 - SensorLab

This contain

- Sensor, Transducer and actuator
- Difference between sensor and transducer
- Signal Conditioning; Inverting, Non – Inverting, Power, Current, Instrumentation and Differential Amplifier, Buffer, Frequency to Voltage, Voltage to Frequency, Current to Voltage, Voltage to current Converter, High Pass and Low Pass Filter, Buffer, LED, Buzzer, Relay, Square Wave generator.
- Characteristic of different types of Sensors.
- Working of Types of Temperature Sensor like RTD (PT100), J and K Type Thermocouple, LM35, NTC Thermistor
- Working of Types of Light Sensor like Light Intensity like Photo Diode, Photo Transistor, Photo Voltaic Cell and LDR.
- Working of IR Sensor like L14G1 and TSOP1738
- Working of Pressure Sensor
- Working of Displacement Sensors like LVDT and Capacitive displacement sensor
- Working of Force Sensors like Load Cell, Strain Gauge, Piezoelectric Sensor
- Working of Environment Sensors like Temperature and Humidity Sensor, Air Quality Sensor, Soil Moisture Sensor, Ambient Light Sensor, Soil/Water Temperature Sensor, Leaf Wetness Sensor, Industrial Soil Moisture Sensor, Conductivity Sensor, Alcohol Sensor, Dust Sensor, CO2 Sensor, O2 Sensor, CO2 Sensor, CO Sensor, VOC Sensor, CH4 Sensor, C2H4 Sensor, NH3 Sensor, Atmospheric Sensor, Noise Sensor, Solar Radiation Sensor, Smoke Sensor
- Working of Switches like Magnetic Reed Switch and Limit Switch
- Working of Proximity Sensors like Inductive Proximity Sensor, Capacitive Proximity Sensor, Optical Proximity Sensor, Magnetic Proximity Sensor