

TRANSDUCERS & INSTRUMENTATION TRAINERS

D1750

EDU-LABS



The Transducer & Instrumentation Trainer providing a comprehensive modular training resource covering the Principles of Transducer and Instrumentation technology.

The experiments module features system layout screen-printed PCB circuits. A comprehensive series of transducer input and an output device together with signal conditioning and instrumentation circuit is provided.

The transducer and signal conditioning elements of this trainer are typical of those used throughout industry. These elements include:

- **Transducer input devices**
- **Transducer output devices.**
- **Instrumentation circuitry.**

Input devices: For the detection of rotary and linear position, light, pressure, strain, humidity and audible and ultrasonic sound.

Output devices: For the generation of heat, light, rotary and linear actions, audible and ultrasonic sound and visual indication of voltage.

Instrumentation circuitry: For the investigation of Wheatstone Bridges and current measurement techniques, linear and non-linear signal amplification, DC restoration of AC signals, signal transmission techniques.

The **comprehensive competency-based curriculum manual** provided with the trainer covers the following topic areas:

- An introduction to sensors & transducers systems.
- Input transducers - an evaluation of the various devices provided.
- Output transducers - practical investigation of the various devices provided.
- Display devices - practical investigation of the devices provided, applications in practical systems, evaluation of input requirements.
- Signal conditioning circuitry - in depth investigation/analysis of the numerous signal conditioning circuits provided, including properties of amplifiers, buffers and inverters, input/output requirements of the circuits provided, proper use of comparators, oscillators and filters and matching instrumentation circuits to the input and output transducers.
- Practical control systems - design and implementation of speed control systems, positional control systems, temperature control systems and light level control systems

The trainer is supplied with a detailed curriculum manual that provides background theory, practical activities and student assessment questions.

A student workbook is also provided, allowing students to create a personalised record of their work together with practical results as they work through the curriculum materials. Finally, an instructor's guide is provided offering solutions to all of the questions and practical activities contained in the curriculum manual and student workbook.

8 UNITS EXPERIMENTS MODULES FEATURES THE FOLLOWING DEVICES AND CIRCUITS: D1750-01 TO D1750-08

INPUT TRANSDUCERS:

- **Position sensors:**
Includes various types of Potentiometers: Carbon Track, Wire Wound, Slide Precision Servo Potentiometer.
- **Temperature / Heat Sensors:**
Includes Type 'K' Thermocouple, NTC thermistor, Platinum RTD, IC temp Sensor.
- **Light Sensors:**
Includes Photoconductive Cell, Photovoltaic Cell, P.I.N. Photodiode & Phototransistor.

- **Displacement Sensors:**
Includes Linear Variable Displacement Transformer (LVDT) and Linear Variable Capacitor (LVC).
- **Speed / Counting Sensors :**
Includes DC motor with Tachogenerator, Slotted Opto Sensors, Reflective Opto Sensors, Inductive Sensor & Hall Effect Sensor.
- **Strain Gauge Sensor**
Includes Strain Gauge.
- **Environmental Sensors:**
Includes Air Pressure sensor, Air Flow Sensor, Humidity Sensor and Force Sensor (Upgraded).
- **Sound Sensors:**
Includes Ultrasonic Receiver and Dynamic Microphone
- **Accelerometer:** (Upgraded)
To measures the vibration, or acceleration of motion of a structure

OUTPUT TRANSDUCERS:

- Heater
- Filament Lamp
- DC Motor
- Solenoid Air Valve
- Ultrasonic transmitter
- Buzzer
- Loudspeaker
- Relay
- Solenoid
- Digital Counter with LED display
- Bargraph voltage indicator

SIGNAL CONDITIONING:

Provide conditioning circuits having interface between the input sensors and output devices.

- Buffers
- Inverters
- Comparator with switchable hysteresis
- Amplifiers with gain and offset control
- Current amplifier
- Summing amplifier
- Differential amplifier
- Instrumentation amplifiers
- AC amplifier
- Oscillator 40kHz
- Filter 40kHz
- Low-pass filter with switchable time constant
- Precision full-wave rectifier
- Sample and hold circuit
- Integrator with switchable time-constant
- Differentiator with switchable time constant
- V/F Voltage to Frequency converters
- F/V Frequency to Voltage converters
- V/I Voltage to Current converters
- I/V Current to Voltage converters
- Alarm oscillator with switchable latching
- Power amplifier
- Electronic switch

UNIVERSAL LAB STATION ULS-2000:



- **DC Power Supplies Module**
Fixed Output: +5V/1A, -5V/0.5A, +12V/0.5A, -12V/0.5A
Variable Output: +0V ~ +23V/0.5A, -0V ~ -23V/0.5A
- **AC Power Supplies Module**
19V-15V-9V-0V-9V-15V-19V
- **Data Switches Module**
5 units slide switches and corresponding output terminals. When switch is set at "down" position, the output is LO level; contrarily, it is to be HI level when setting at "up" position.
- **Function Generator Modules**
Sine, Triangle and Square waveform output Frequency range: 1Hz to 1MHz in 6 decades With fine adjust, Amplitude and DC offset control
 - TTL Mode: 1Hz to 1MHz in 6 decades
 - Six frequency ranges:
 - 1Hz to 10Hz
 - 10Hz to 100Hz
 - 100Hz to 1KHz
 - 1KHz to 10KHz
 - 10KHz to 100KHz
 - 100KHz to 500KHz
 - Sine wave output: 0 to 12Vpp variable
 - Triangle wave output: 0 to 8Vpp variable
 - Square wave output: 0 to 22Vpp variable

ACCESSORIES PACK D1750-AC:

- 2mm Stackable Test Lead Sets
- Carbon Core Module
- Neodymium Magnet Bar
- Black Box Module
- 3 ½ Digits Digital Multimeter
- Syringe Tube & 6mm Tubing
- Pressure Gauge
- Mini Air Pump - Double Channel Output
- Instruction Manual & Experiments Manual.
- Power Cord

The unit operates on 240 VAC, 50Hz. Each unit is supplied with complete set of manuals. The manuals provide comprehensive hands on course of study that guides the user through the technology of transducers and instrumentation

STORAGE RACK D1750-SR:

- Slot In Type
- 11 Modules Storage Space



TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULES:

1) TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE (1) D1750-01



MODULE D1750-01 CONSISTS OF:

- Tachometer (RPM) specially design for application of Modules D1750-03
- Galvanometer ($-35\mu\text{V} \sim 0\text{V} \sim +35\mu\text{V}$) specially design for application of Modules D1750-08

3) [TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE \(3\) D1750-03](#)



[MODULE D1750-03 CONSISTS OF:](#)

[INPUT TRANSDUCERS:](#)

- **Speed / Counting Sensors :**
Includes DC motor with Tachogenerator, Slotted Opto Sensors, Reflective Opto Sensors & Hall Effect Sensor.
- **Environmental Sensors:**
Includes Air Pressure sensor, Air Flow Sensor, Humidity Sensor, Inductive Sensor and Hall Effect Sensor.

4) [TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE \(4\) D1750-04](#)



MODULE D1750-04 CONSISTS OF:

INPUT TRANSDUCERS:

- **Temperature / Heat Sensors:**
Includes Type 'K' Thermocouple, NTC thermistor, Platinum RTD, IC temp Sensor.
- **Light Sensors:**
Includes Photoconductive Cell, Photovoltaic Cell, P.I.N. Photodiode & Phototransistor.
- **Sound Sensors:**
Includes Ultrasonic Receiver and Dynamic Microphone
- **Environmental Sensors:**
Includes Air Solenoid Valve

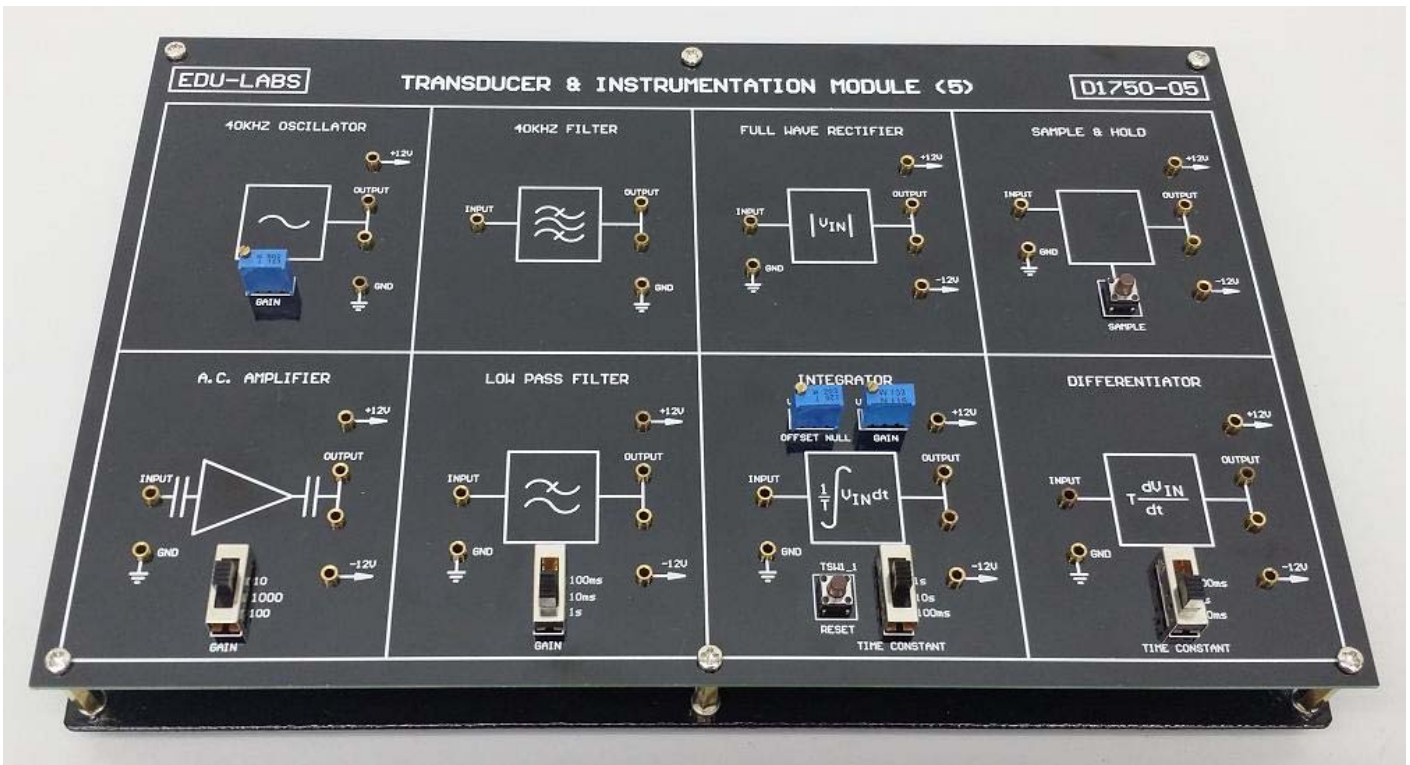
OUTPUT TRANSDUCERS:

- Heater
- Filament Lamp
- Ultrasonic transmitter
- Relay
- Solenoid
- Buzzer
- Loudspeaker
- Bargraph voltage indicator

SIGNAL CONDITIONING:

- Audio Amplifier

5) TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE (5) D1750-05



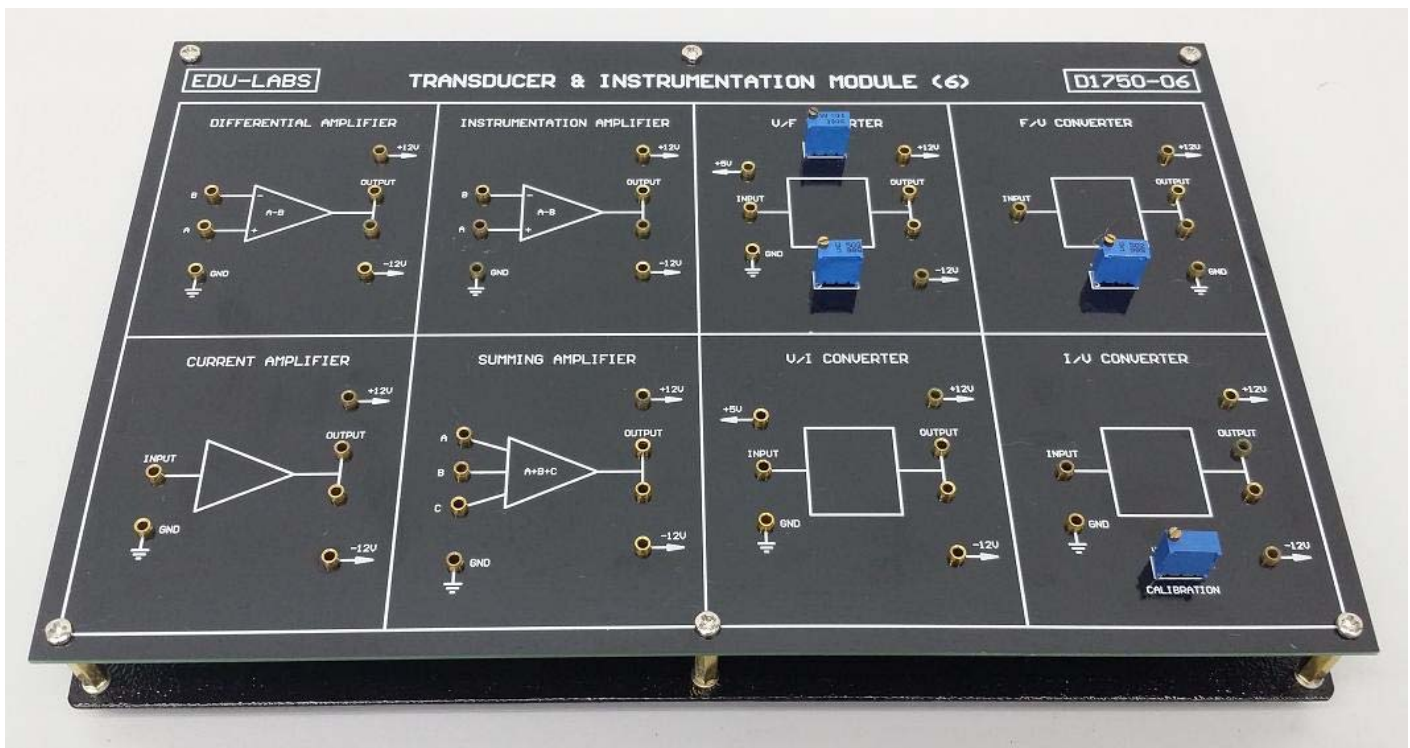
MODULE D1750-05 CONSISTS OF:

SIGNAL CONDITIONING:

Provide conditioning circuits having interface between the input sensors and output devices.

- AC amplifier
- Oscillator 40kHz
- Filter 40kHz
- Low-pass filter with switchable time constant
- Precision full-wave rectifier
- Sample and hold circuit
- Integrator with switchable time-constant
- Differentiator with switchable time constant

6) TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE (6) D1750-06



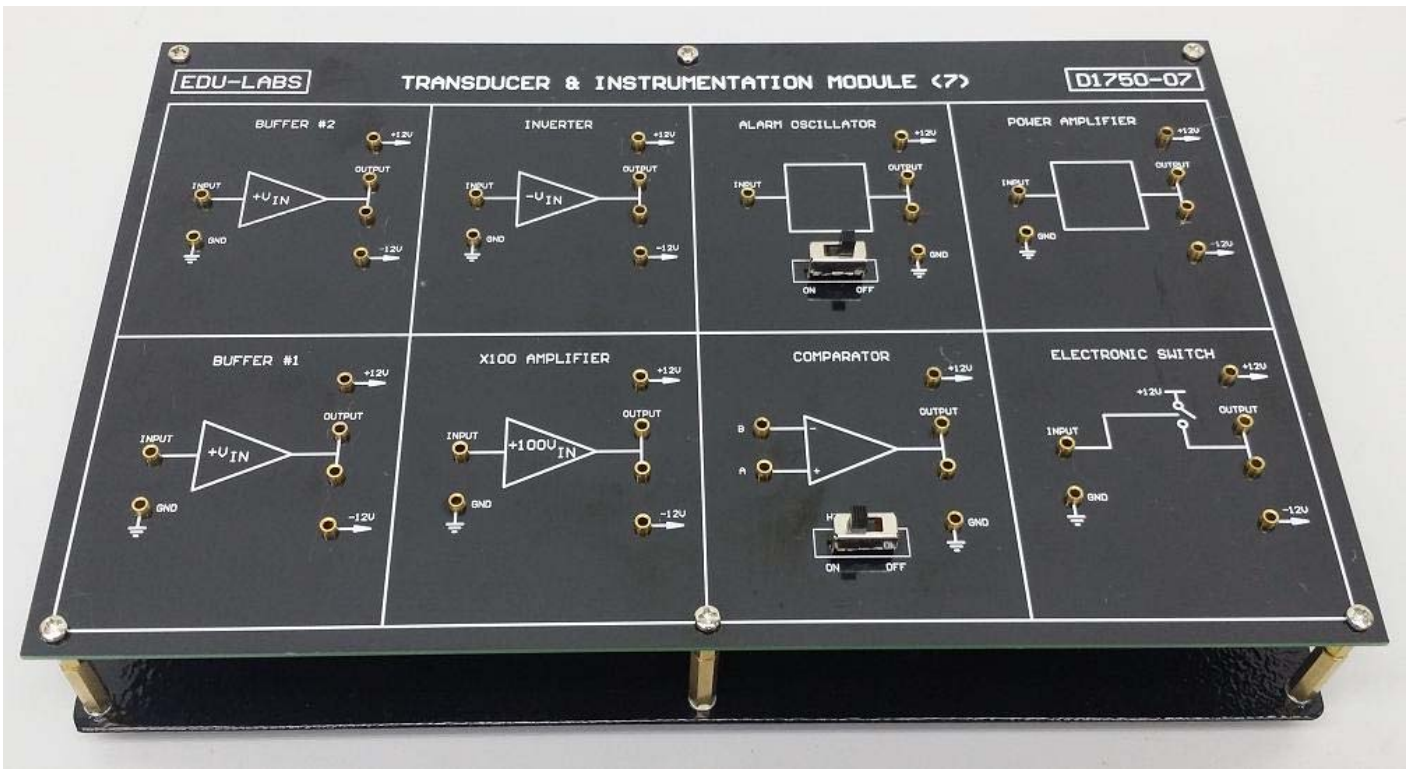
MODULE D1750-06 CONSISTS OF:

SIGNAL CONDITIONING:

Provide conditioning circuits having interface between the input sensors and output devices.

- Current amplifier
- Summing amplifier
- Differential amplifier
- Instrumentation amplifiers
- V/F Voltage to Frequency converters
- F/V Frequency to Voltage converters
- V/I Voltage to Current converters
- I/V Current to Voltage converters

7) TRANSDUCER & INSTRUMENTATION EXPERIMENTS MODULE (7) D1750-07



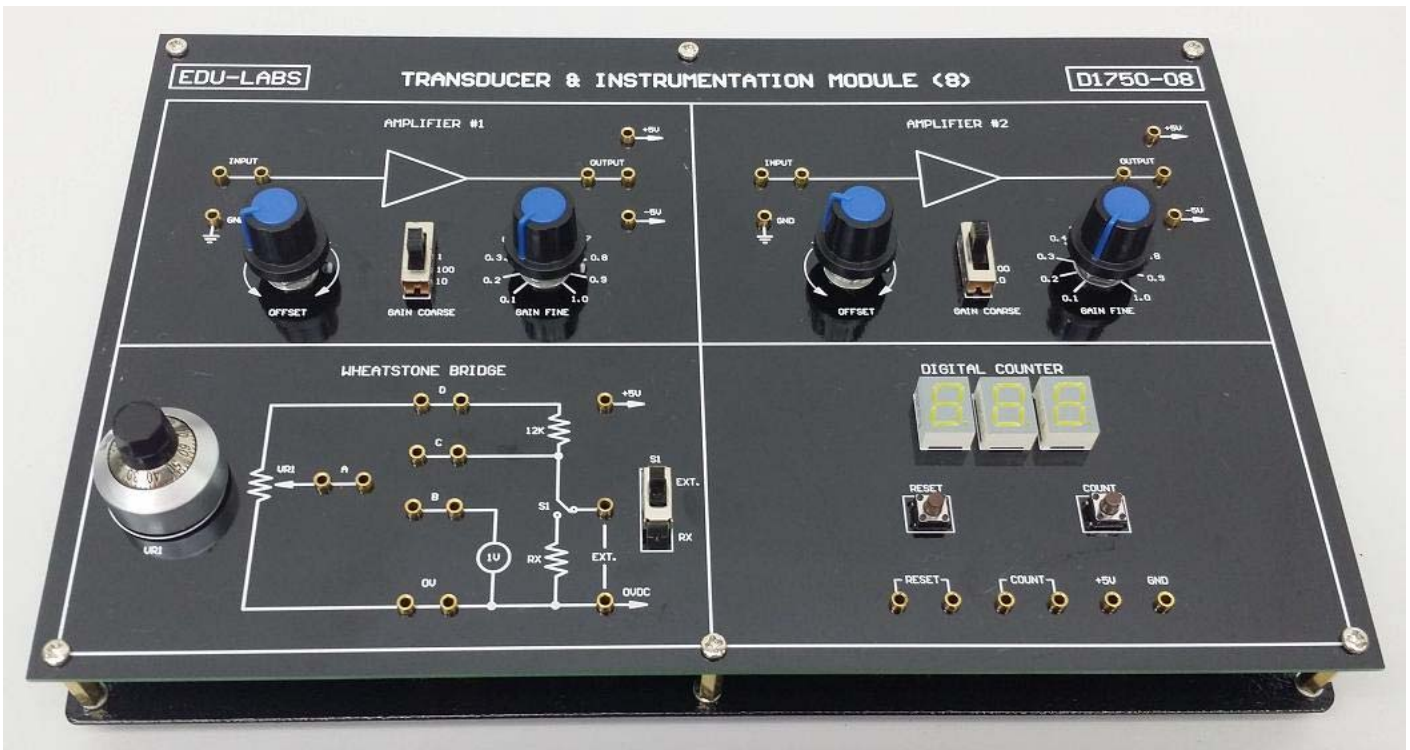
MODULE D1750-07 CONSISTS OF:

SIGNAL CONDITIONING:

Provide conditioning circuits having interface between the input sensors and output devices.

- Buffers
- Inverters
- Comparator with switchable hysteresis
- X100 Amplifier
- Alarm oscillator with switchable latching
- Power amplifier
- Electronic switch

8) TRANSDUCER & INSTRUMENTATION MODULE (8) D1750-08



MODULE D1750-08 CONSISTS OF:

SIGNAL CONDITIONING:

Provide conditioning circuits having interface between the input sensors and output devices.

- Amplifiers with gain and offset control X 2 Units
- Wheatstone Bridge
- Digital Counter with LED display

Note: Specification, Layout, Design Etc. May Change Without Prior Notice For Products Continuous Development Process.