ELECTRONICS

OPEN MICROCONTROLLER TRAINER

DL OMCT with a set of sub-boards (option)

Flexible and modular system, that uses the Arduino technology as a base. The system can interface to a tablet (included) or to a PC through USB ports.

The use of sub-boards from our BRS system allows performing simple, but detailed practical experiments in the field of basic electronics.

With this solution students can program their own micro controller and connect it to the system through a suitable interface.

TRAINING OBJECTIVES

The trainer represents a comprehensive tool for developing personal applications on electronic circuits and Arduino programming.

The training objectives for this trainer depend on the type/s of application/s that are developed by the student. However, the trainer can be provided as an option with a set of sub-boards of the De Lorenzo BRS system to allow for the performance of simple applications.

They include:

- analogue electronics,
- digital electronics,
- photovoltaic solar energy.

TECHNICAL FEATURES

- Power supply
  To provide the necessary voltages for performing the experiments: ± 5 Vdc, ± 15 Vdc, 1 A
- Function generator
  For generating sine, square and triangular waves. It will provide the necessary signals to be used as inputs for the electronic boards. Max. 125 kHz.
- Single channel oscilloscope
  1MHz, it will allow monitoring in a simple way small analogue signals.
- Arduino 328 microcontroller card with interface.
- Digital and analogue I/O with NI interface.

Complete with tablet (Windows) and Arduino programming software.
Dimensions: 0.50 x 0.4 x 0.20 (h, closed) m.
Weight: 10 kg.

OPTIONS:

DL 3155BRS-BAE-OT: set of modules for the study of analogue electronics
DL 3155BRS-BDE-OT: set of modules for the study of digital electronics
DL 3155BRS-PSE-OT: set of modules for the study of photovoltaic solar energy
DL MINI-TRACKER: solar position tracking panel

OPTIONS

DL 3155BRS-BAE-OT
Set of modules for the study of analogue electronics.
They include: BJT amplifier, BJT-Darlington, class A and class AB push-pull circuits, operational amplifier, power operational amplifier, Schmitt trigger, square/triangular waveforms generator, 1st order high-pass/ low-pass passive filters, 1st order high-pass/ low-pass active filers (operational amplifier differentiator and integrator), 2nd order high-pass/low-pass active filters, JFET.

TRAINING OBJECTIVES
BJT – verification of the integrity of e-b and c-b junctions.
Common emitter circuit – DC operation: Bias Point, DC gain, AC operation.
Driving a led load with a single bipolar junction transistor and with a Darlington transistor pair.
Class a output stage - emitter follower circuit.
Push-pull output stage – crossover distortion.
Operational amplifier: reduction of the offset voltage, inverting/ non-inverting, slew rate, voltage follower, voltage and current output, coupled to pushpull booster – voltage and current output.
Inverting/ non-inverting Schmitt trigger.
Square and triangular waveforms generation.
Active 1st order low-pass filter, operation as an integrator, active 1st order high-pass filter, operation as a differentiator.
Active second order low-pass and high-pass filters.
JFET-VGS off, JFET-AC Gain, JFET – AC Bandwidth.
Faults simulation.

DL 3155BRS-BDE-OT
Set of modules for the study of digital electronics.
They include: AND, OR, NAND, NOR, EXOR and NOT gates, latch & buffer circuit, Flip-Flop JK and D Master Slave, up/down counter, shift register, 7 segment display, multiplexer and demultiplexer, oscillators, 555 timer circuit.

AND/OR, NAND/NOR, XOR/NOT logic gates.
De Morgan's first and second theorem.
Latch – DC operation.
Buffer – DC operation.
J-K and D flip-flop – Truth table.
Master-slaved flip-flop.
Basic binary UP counter.
UP/DOWN counter.
Serial input-parallel output shift register – 1 bit shifting.
BCD to 7-segment led display decoder truth table.
MUX – Multiplexing and DMUX – Demultiplexing.
Oscillators - TTL configuration.
Oscillators - TTL configuration with quartz.
NE555 - astable configuration, inverting buffer and bistable Flip Flop.
Faults simulation.

ELECTRONICS

DL 3155BRS-PSE-OT
Set of modules for the study of photovoltaic solar energy.
They include: photovoltaic solar cell, multifunction display, charge regulator, breadboard, battery controller with battery, light sensor, incandescent lamps and LED, voltage regulator, current regulator and relay circuit, solar panel.

Electrical characteristics of a single solar cell.
Electrical characteristics of two solar cells connected in parallel and series.
Electrical characteristics of a solar panel.
Monitoring of the charge level and analysis of the discharging process in a gel battery.
Charging a battery by using a current regulator.
Charging a battery by using a charge regulator.
Analysis and comparison of two light sources.
Smart system for energy management.
Study of energy efficiency by means of a breadboard.

DL MINI-TRACKER
Solar position tracking panel.

General View