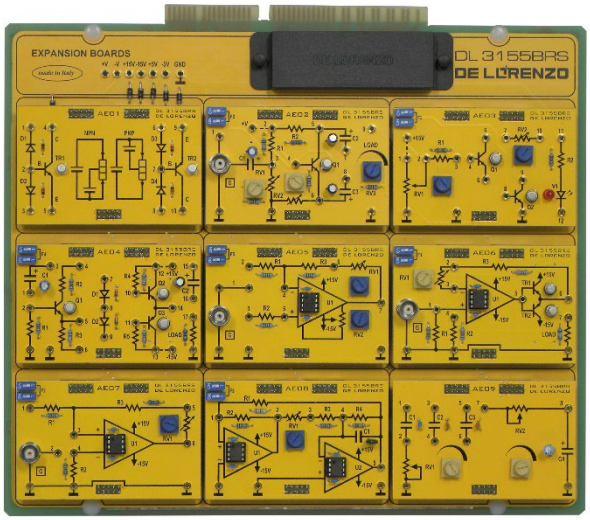
# ELECTRONICS

## KIT FOR THE STUDY OF ANALOGUE ELECTRONICS




## DL 3155BRS-BAE

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

With this board the students can study the most important circuit and components with operational amplifiers and transistors used in the electronics applications.

***NOTE WELL! The board comes with a case complete with all accessories.***

### LEARNING EXPERIENCES

- Basic concepts of Bipolar Junction Transistors
- BJT transistors characteristic
- BJT – Darlington Configuration
- Push-pull output stage
- Operational Amplifier Circuits
- Operational Amplifiers coupled to power stages
- Schmitt triggers
- Square and triangular wave generators
- Passive Filters
- First order active filters
- Second order active filters
- JFET Amplifier

### CIRCUIT BLOCKS

- Base board
- Bipolar junction transistors mini board
- BJT common emitter amplifier mini board
- BJT-Darlington pair mini board
- A and AB push pull mini board
- Operation amplifiers mini board
- Power operation amplifiers mini board
- Schmitt trigger mini board
- Waveform generator mini board
- First order passive filter mini board
- First order active filter mini board
- Second order active filter mini board
- JFET amplifier mini board

Complete with theoretical and practical manual.
Dimensions of the board: 297x260mm

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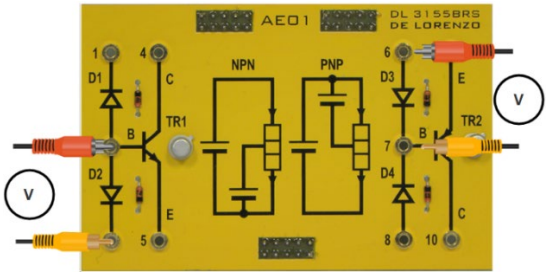
**ACCESSORY INCLUDED:**
**DL 2555ALG - DC POWER SUPPLY**

- ± 5 Vdc, 1 A
- ±15 Vdc, 1 A

## EXPERIMENTS DESCRIPTION:

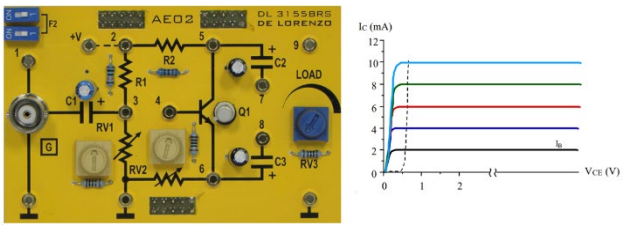


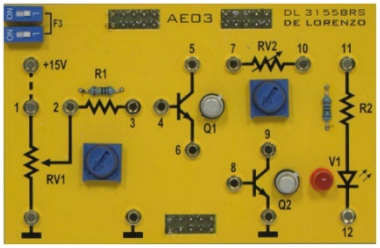

**Basic concepts of Bipolar Junction Transistors**

In circuit design the identification of pin connections of transistors is very important. Imagine that you have to pick a Bipolar Junction Transistor (BJT) and you don't know whether is an NPN or PNP type transistor. Experimenting with this simple sub-module will give you the answer.

**BJT transistors characteristic**

After you are able to identify the proper transistor type, you need to understand what transistor biasing and transistor DC and AC operation is. You will also learn how to make the correct choice of the passive components in order to operate the transistor.



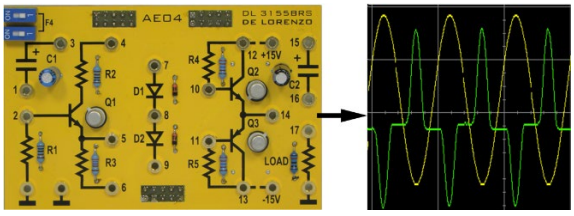




**BJT – Darlington Configuration**

The transistor Darlington pair have to a variety of applications and circuits where high current gain transistors are required. The students will see the difference between driving a LED load with a single bipolar junction transistor or using Darlington transistor pair.

**Push-pull output stage**

The mail objective of this module is to check the characteristics of a class A emitter follower and of a class B/AB push-pull amplifier stage. Because the circuit is really only a couple of emitter followers driving the same load, the operation is simple and easy to understand.

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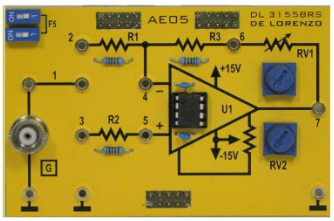
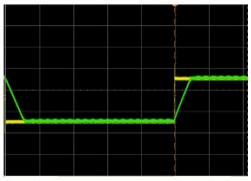


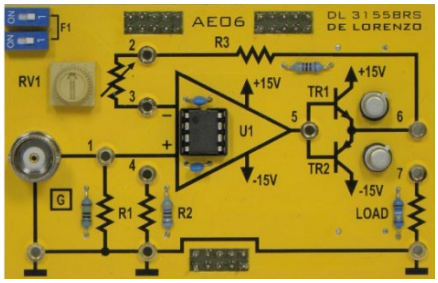



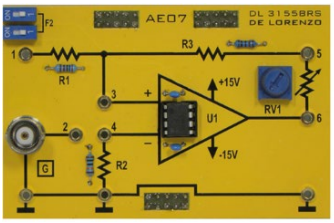
## Operational Amplifier Circuits

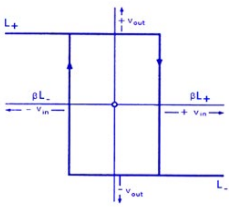
The O.A. (operational amplifier) analysis in its configurations is very simple, because it needs only to determine input and feedback impedance. Using this sub-module, it's easy to study the inverting and non-inverting configuration and also O.A. voltage follower.

## Operational Amplifiers coupled to power stages

Many applications require substantially greater output voltage swing or current (or both) than IC amplifiers can deliver. In these situations, an output "booster", or post amplifier, is required to achieve the needed voltage or current gain. With the knowledge gathered up to this point you will be capable of studying the voltage and current AO output



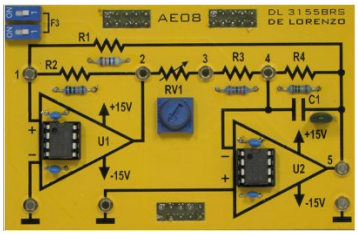



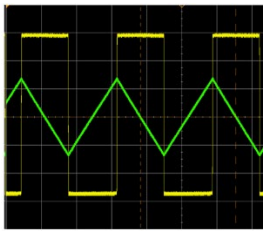
## Schmitt triggers

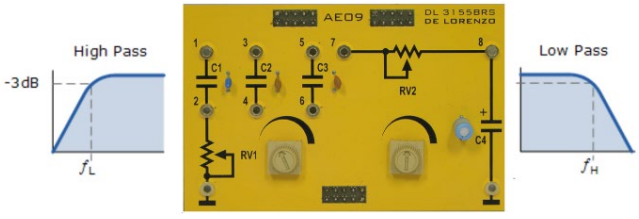
This sub-module studies the performance of a non-inverting/inverting Schmitt trigger. Schmitt trigger inputs are useful where the input signal is noisy. This type of input circuit implements hysteresis which can effectively filter many types of noise.

## Square and triangular wave generators

You are now ready to work with circuits which can continuously oscillate from one state to the other and because of this they do not require any triggering signal. The waveform generators function can be tested using a generic oscilloscope.






## Passive Filters

Working with this module gives the basic know-how regarding the characteristics of first order (single pole) passive low-pass and high-pass filters and to determine their frequency response.

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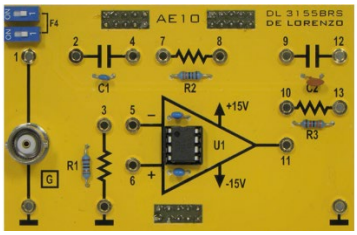
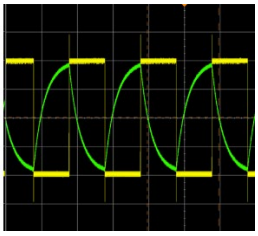
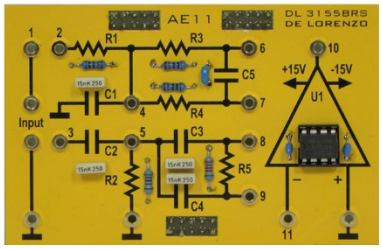
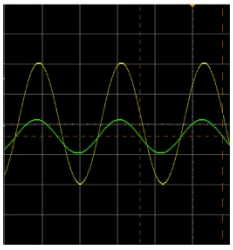
**First order active filters**

You are no familiar with the concept of filters and will be easy to study the active filters characteristics. Students will perform practical study of active first order low-pass filter and high-pass filter. More detail approach is permitted regarding the active first order low-pass filter (operation as an integrator) and active first order high-pass filter (operation as a differentiator)





**Second order active filters**

You understand now very well the first order active filters. The second order filters use gain devices to operate but different combinations of passive elements need to be implemented to obtain the required –40dB/dec signal attenuation at the undesired frequencies.

**JFET Amplifier**

The purpose of this section is to study and check the operating modes and characteristics of an n-channel JFET amplifier. The study will focus on AC gain and AC Bandwidth