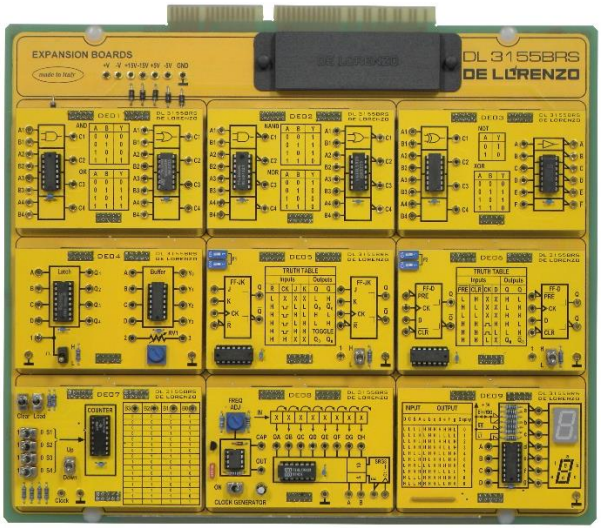
ELECTRONICS

KIT FOR THE STUDY OF DIGITAL ELECTRONICS



DL 3155BRS-BDE

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 fundamentals and specific characteristics of basic combinational logic in digital circuits.

LEARNING EXPERIENCES

- AND/OR logic gate
- NAND/NOR logic gates
- XOR/NOT logic gates. De Morgan's theorems
- Latch and Buffer
- J-K flip-flop
- D flip-flop. 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
- MUX: Multiplexing. DMUX: Demultiplexing
- Oscillators: TTL configuration
- NE555: Astable configuration, Inverting buffer, Bistable Flip-Flop
- TTL IN/OUT

Complete with manual (theoretical and practical) and cable kit.

Dimensions of the board: 297x260mm

CIRCUIT BLOCKS

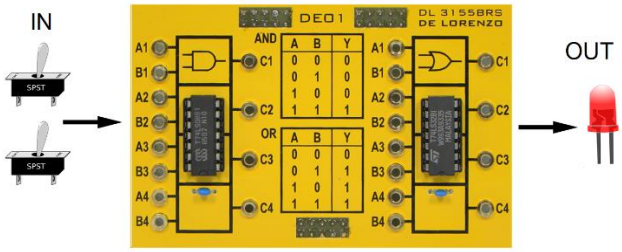
- Base board
- AND/OR logic gate mini board
- NAND/NOR logic gates mini board
- XOR/NOT logic gates mini board
- Latch and Buffer mini board
- J-K flip flops mini board
- D flip flops mini board
- Sequential logic counter mini board
- Shift register
- 7-segment display mini board
- MUX and DMUX mini board
- Oscillator mini board
- NE555 mini board

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

ACCESSORY INCLUDED:
DL 2555ALG - DC POWER SUPPLY

- ± 5 Vdc, 1 A
- ±15 Vdc, 1 A

EXPERIMENTS DESCRIPTION

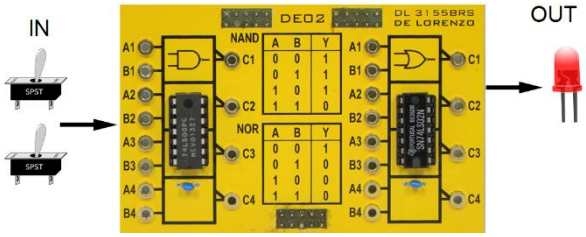


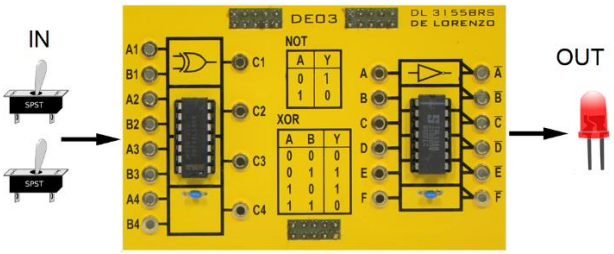
AND/OR logic gate

The input and output information of AND/OR gates can be plotted into a truth table to give a visual representation of the switching function of the system. The gate operation will be demonstrated using toggle switches find on a dedicated sub-board.

NAND /NOR logic gates

After understanding the previous gates functionality, it will be easy to work with the input and output information of NAND/NOR universal gate. This can be easily plotted into a truth table. The gate operation will be demonstrated using toggle switches find on a dedicated sub-board.



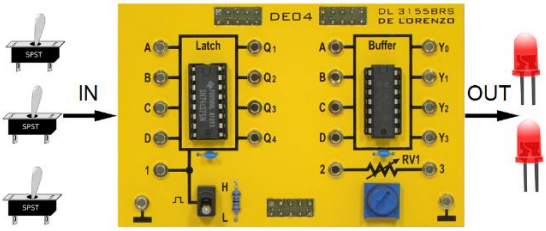


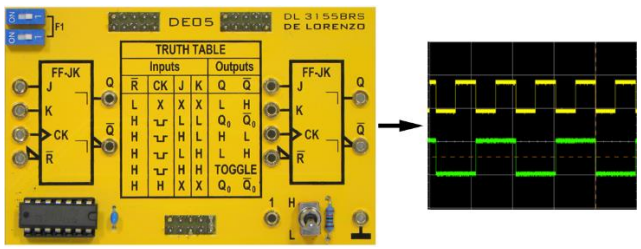
XOR/NOT logic gates. De Morgan's theorems

The Boolean Algebra laws and theorems can be investigated and demonstrated by practicing on this universal gate sub-modules. Understanding these basic gates functionality will be very helpful in digital programming and for making digital circuit diagrams.

Latch and Buffer

Through simple experiments we study the basic concepts of Latch and Buffer components. This will give the student information regarding the method used for changing their logic state. This will be helpful in understanding a microprocessor function.



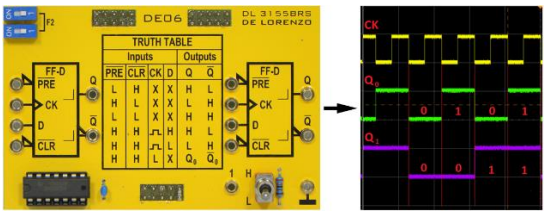


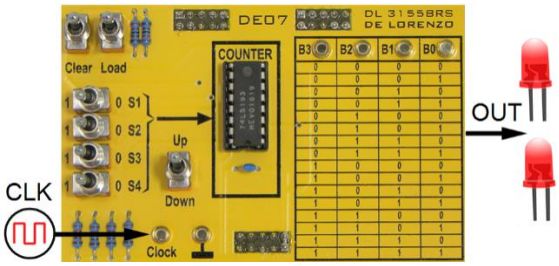
J-K flip-flop

After studying the latch, it is time to understand circuits with memory because one can deduce the last applied command by analyzing the outputs. This circuits are the basis of all sequential circuits and their applications are various: counters, registers or data storing.

D flip-flop. Master-slaved flip-flop. Basic binary up counter

This section will allow to develop a master–slave flip-flop, that can be created by using two single flip-flops. The students will understand why it is called a master–slave flip-flop. One flip-flop acts as the master receiving the external inputs while the other acts as its slave.



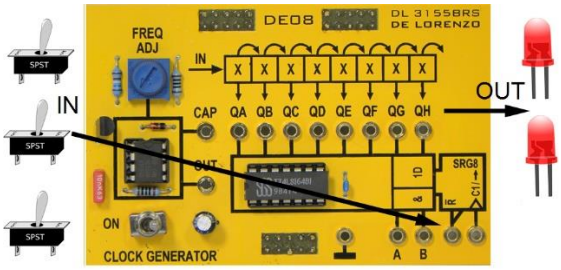


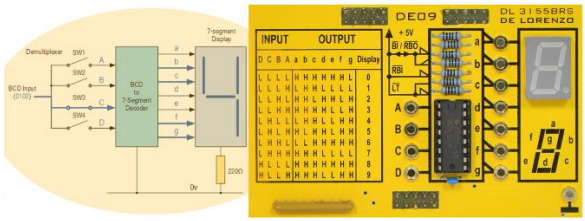
UP/DOWN counter

Sequential Logic counter use flip-flops as memory elements and in which their output is dependent on the input state. The students will easy test and verify this with the TTL-SP01 and the clock generator included in this trainer.

Serial input-parallel output shift register (1 bit shifting)

The know-how from the previous experiments regarding data storage and latches will be very useful. Using the TTL module, the students will understand how registers are devices capable of temporarily storing a given number of bits.





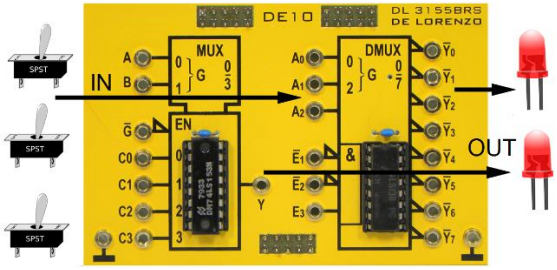
BCD to 7-segment LED display

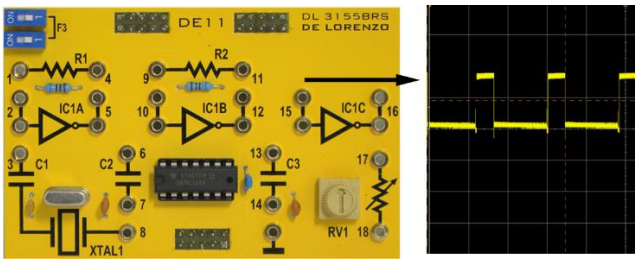
The analysis is directed to the use of the component more than to its theoretical aspects and will give the student some general information and specifications on the characteristics of a BCD to seven segment decoder

MUX: Multiplexing. DMUX: Demultiplexing

The Multiplexer component is used to select 1 of n inputs while the Demultiplexer component is used to route 1 signal to n outputs. It is easy to verify this with the TTL-SP01 board included in this trainer.

Understanding this part, it is important in practical applications that include the following: Arithmetic Logic Unit, Communication System and Serial to Parallel Converter.



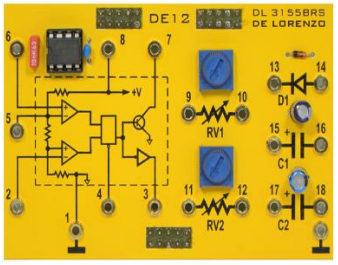


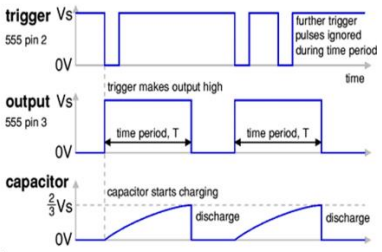
Oscillators: TTL configuration

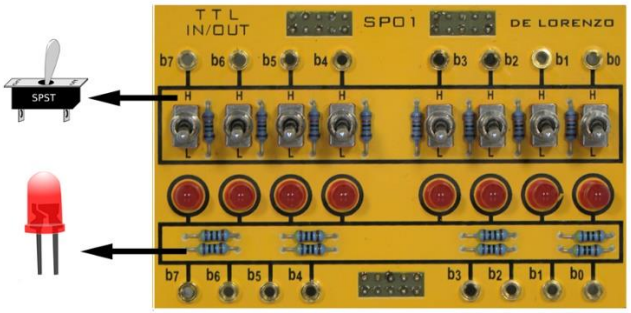
The purpose of this section is to teach the student different oscillators by using integrated digital type TTL-HC/Mos-C/Mos, able to provide an output square wave signal.

NE555: Astable configuration, Inverting buffer, Bistable Flip-Flop

The purpose of this section is to give the student the tools to describe the functionality of a timer 555. The student will become able to design different configurations that use this type of component.







TTL IN/OUT

Transistor-transistor logic (TTL) is the principal type of integrated circuit-based logic gates implemented in digital circuits.

Through simple experiments we get familiar with the way TTL components work. To drive and monitor the sub-module of this trainer the students will use this TTL IN/OUT module.