M10/N-M10. Digital Systems & Converters Module

GENERAL DESCRIPTION

Generally, an analog to digital converter is an electronic device that converts an analog voltage input to a digital number. The digital output can use different coding schemes, such as binary, although some non-electrical or partially electrical devices can be considered as analog to digital converters.

The resolution of a converter indicates the number of discrete values it can produce over a range of voltage values (usually expressed in bits). For the implementation of digital circuits, logic gates (AND, OR and NOT) and transistors are used.

With the Digital Systems & Converters Module, "N-M10", designed by EDIBON, the behaviour of BCD/Binary counters, comparators and analog integrators can be studied, as well as analogue/digital conversion and vice versa.

In addition, faults can be simulated in most of the circuits under study. The student must investigate what is happening in the circuit and why it is not working properly. These faults simulations can be of several types from damage components to a hypothetical incorrect circuit assembly.

PRACTICAL POSSIBILITIES

Analog switching. Bistable, astable and monostable family:

1.- Characteristics of an analog switch chip.
2.- Faults study of F1 in the analog multiplexer.
3.- Faults study of F3 in the analog multiplexer.
4.- Characteristics of a Latch integrated circuit type S-R.
5.- Faults study of F2 in the bistable.
6.- Characteristics of an astable integrated circuit.
7.- Faults study of F8 in the astable.
8.- Characteristics of a monostable integrated circuit.
9.- Theoretical/practical exercises.

Binary/BCD counters & 7-segments displays:

10.-Characteristics of a 74ALS193 binary up/down counter and a 7-segment display.
11.-Faults study of F6 in the binary counter.
12.-Characteristics of the BCD up/down counter and 7-segment display.
13.-Faults study in the BCD counter.
14.-Theoretical/practical exercises.

Comparators and analog integrators:

15.-Characteristics of an analog comparator.
16.-Analog integrator.
17.-Faults study of F7 in the analog integrator.
18.-Triangular wave generation.
19.-Theoretical/practical exercises.

A/D and D/A conversion:

20.-D/A converter.
21.-A/D converter.
22.-Theoretical/practical exercises.

Applications:

23.-Random number generator.
24.-Measuring the time between two events.
25.-Theoretical/practical exercises.

Additional practical possibilities:

26.-Synchronous/asynchronous counter.
-Several other exercises can be done and designed by the user.

SPECIFICATIONS

Circuit blocks:
- Potentiometer.
- BCD counter.
- Binary counter.
- Logic monitors.
- Display.
- Shot clocks.
- Logic switches.
- Flip Flop RS.
- Analog multiplexer.
- Analog integrator.
- Monostable.
- Logic gates.
- Astable.
- Analog comparator.
- D/A converter.
- Channels.

DIMENSIONS AND WEIGHTS

Dimensions: 300 x 210 x 45 mm approx.
(11.81 x 8.26 x 1.77 inches approx.)
Weight: 300 g approx.
(0.66 pounds approx.)

REQUIRED ELEMENTS (NOT INCLUDED)

Required (at least one):
- FACO. Power Supply.
- EBC100. Base Unit, with built-in power supply.

ADDITIONAL RECOMMENDED ELEMENTS (NOT INCLUDED)

Recommended (only one):
- EDAS/VIS-0.25. EDIBON Data Acquisition System and Virtual Instrumentation (speed: 250,000 samples/s). *or*
- EDAS/VIS-1.25. EDIBON Data Acquisition System and Virtual Instrumentation (speed: 1,250,000 samples/s).