

## INTRODUCTION

Analog electronics is the field of electronics that studies systems whose variables (voltage, current, etc.) change continuously over time and can take infinite values.

The Analog Circuits Unit, "M99", designed by EDIBON, allows the student to learn the most important concepts of different electronic circuits: analog multiplexer, analog multiplier, function generator, AM modulator and AM demodulator.



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

## GENERAL DESCRIPTION

The Analog Circuits Unit, "M99", designed by EDIBON, allows to do different practices related to basic electronics. The unit has different parts: analog multiplexer, analog multiplier, function generator, AM modulator and AM demodulator.

The "M99" unit mainly consists of:

**Analog Multiplexer.** It allows the user to select between two analog signals IN1 and IN2. There is a digital control signal S for selecting the input signal.

**Analog Multiplier.** Includes a potentiometer to control the gain of the multiplier.

**Function Generator.** It allows the user to generate three different types: sinusoidal, square and sawtooth. The frequency and amplitude of the signals can be adjusted using the potentiometers.

**AM Modulator.** It allows the user to generate an AM signal. The frequency of the carrier signal can be selected by using the potentiometer. The carrier signal can be observed using the blue terminal.

**AM Demodulator.** It allows the user to demodulate an AM signal. The demodulator is divided into different blocks: mixer, IF amplifier, envelope detector and audio filter. The frequency of the local oscillator generated for the tuning can be selected by using the potentiometer. All outputs of these blocks can be observed using the blue terminals.

The unit is provided with a set of practices through which the user will understand how to work with different electronics circuits.

## SPECIFICATIONS

The "M99" unit mainly consists of:

Analog Multiplexer. It allows the user to select between two analog signals. There is a digital control signal for selecting the input signal.

- Two input signals.
- Input Voltage:  $\pm 10$  V max.
- TTL compatible control signal.

Analog Multiplier. Includes a potentiometer to control the gain of the multiplier.

- Two input signals.
- Input Voltage:  $\pm 10$  V max.

Function Generator. It allows the user to generate three different signals types: sinusoidal, square and sawtooth. The frequency and amplitude of the signals can be adjusted using the potentiometers.

- Sine, square and sawtooth signals.
- Amplitude:  $\pm 10$  V.
- Frequency: 0 Hz – 100 Hz.

AM Modulator. It allows the user to generate an AM signal. The frequency of the carrier signal can be selected by using a potentiometer.

- AM-DSB modulator.
- Carrier frequency: 1000 Hz max.

AM Demodulator. It allows the user to demodulate an AM signal. The demodulator is divided in different blocks: mixer, IF amplifier, envelope detector and audio filter. The frequency of the local oscillator generated for the tuning can be selected by using a potentiometer. All outputs of these blocks can be observed using the output terminals.

- Tuning circuit.
- IF amplifier (455 Hz).
- Envelope detector.
- Audio signal filter.

DC source module:

- $\pm 12$  VDC.
- $\pm 5$  VDC.

Cables and accessories, for normal operation.

Manuals: This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

## EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Time division multiplexing (TDM).
- 2.- Analog signals multiplying.

- 3.- Amplitude modulation.
- 4.- Amplitude demodulation.

## REQUIRED SERVICES

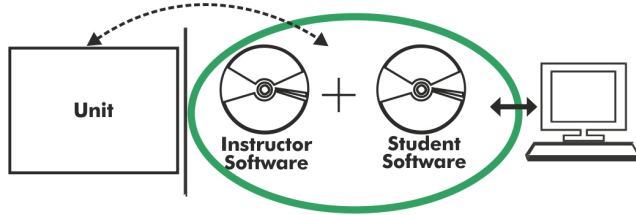
- Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.

## DIMENSIONS AND WEIGHTS

M99:

Dimensions: 490 x 330 x 310 mm approx.  
(19.29 x 12.99 x 12.20 inches approx).

Weight: 6 Kg approx.  
(13 pounds approx).

**M99/ICAI. Interactive Computer Aided Instruction Software:**

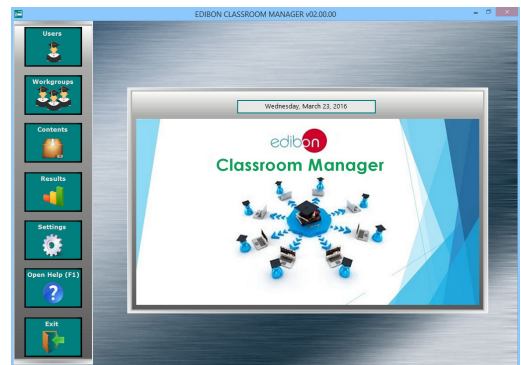
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

Instructor Software**- ECM-SOF. EDIBON Classroom Manager (Instructor Software).**

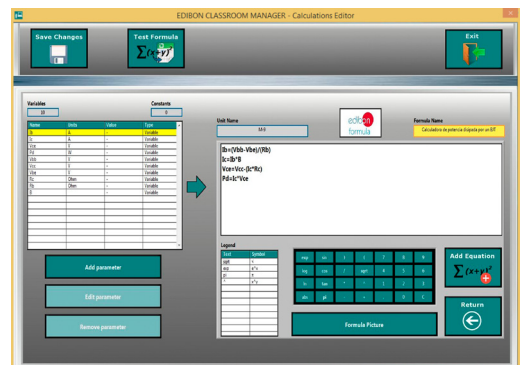
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

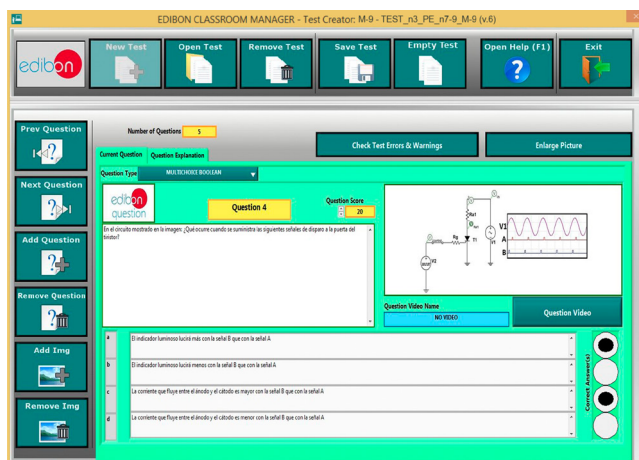
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



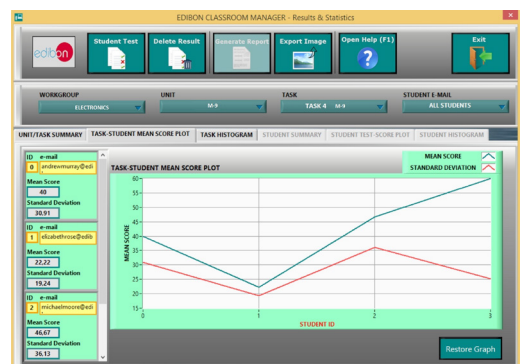
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

# - ESL-SOF. EDIBON Student Labsoft (Student Software).

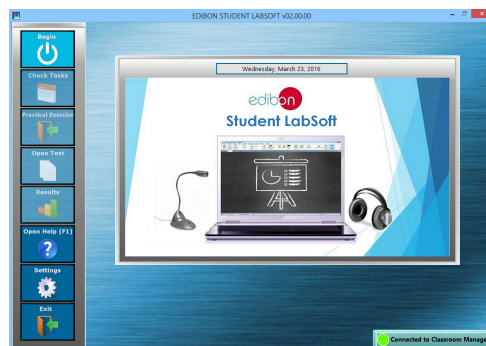
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

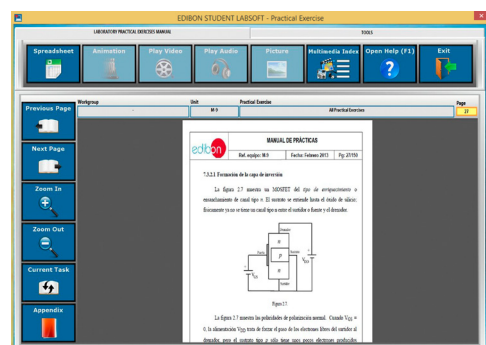
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

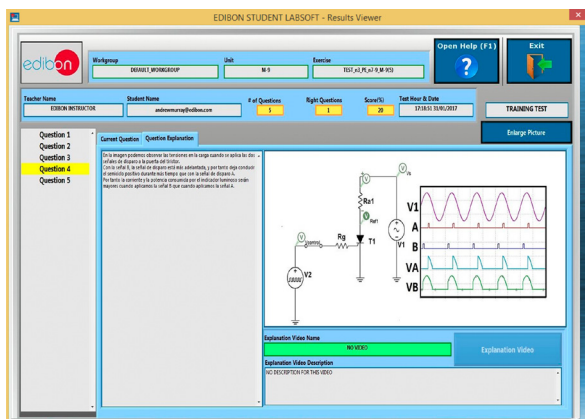
<https://www.edibon.com/en/interactive-computer-aided-instruction-software/catalog>



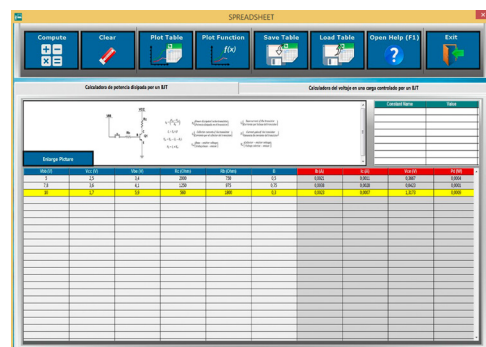
ESL-SOF. EDIBON Student LabSoft (Student Software)  
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

\* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE:

