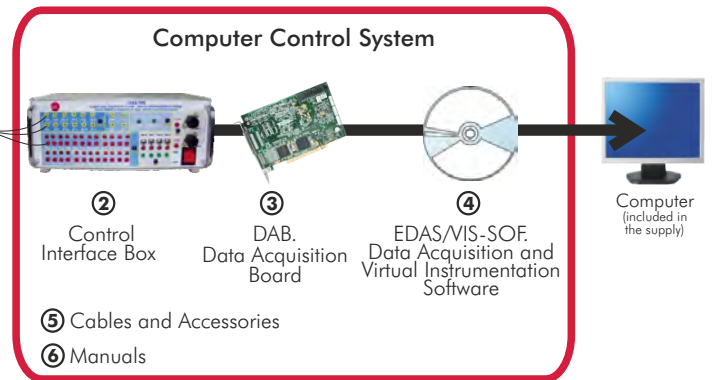




① Unit: LICOMBA. Communications Laboratory



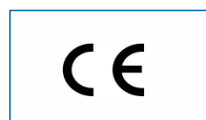
\* Minimum supply always includes: 1 + 2 + 3 + 4 + 5 + 6  
(Computer included in the supply)

Key features:

- ▶ **Specialized EDIBON Control Software based on Labview.**
- ▶ **National Instruments Data Acquisition board (250 KS/s , kilo samples per second).**
- ▶ **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- ▶ **Capable of doing applied research, real industrial simulation, training courses, etc.**
- ▶ **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**
- ▶ **Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).**
- ▶ **Designed and manufactured under several quality standards.**
- ▶ **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc.**  
**Apart from monitoring user's knowledge and progress reached.**



**ISO 9000: Quality Management**  
(for Design, Manufacturing,  
Commercialization and After-sales service)



**European Union Certificate**  
(total safety)



**Certificates ISO 14000 and**  
**ECO-Management and Audit Scheme**  
(environmental management)



**Worlddidac Quality Charter**  
**Certificate and**  
**Worlddidac Member**

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## INTRODUCTION

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EDIBON, a company with more than 35 years of experience designing and implementing training systems, has a wide variety of applications adapted to XXI century new technologies.

Apart from providing a solid theoretical basis, EDIBON units and trainers are aimed at technical professional training, vocational training, for higher education and even applied research, as well as at the improvement in all fields through advanced systems.

Communications Integrated Laboratory "LICOMBA" is a modular-based system for learning the main concepts about analog and digital communications. The unit offers a solid training about the communication technology without any previous knowledge.

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## GENERAL DESCRIPTION

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The LICOMBA provides the students a complete equipment to study the basic and advanced concepts about analog and digital communication. With this unit the students can learn the main communication concepts; analog and digital modulations and demodulation, aerial link, signal analysis in time and frequency domain, etc. The LICOMBA is designed to work with a computer through the Control Interface Box, to study and analyze all the signals from the computer.

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## AVAILABLE MODULES AND TRAINERS LIST

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### Analog Communications Modules

- ED-CAM. AM Communications.
- ED-CFM. FM Communications.

### Analog Communications Trainer

- EMDA/A. Analog Modulations Trainer.

### Digital Communications Modules

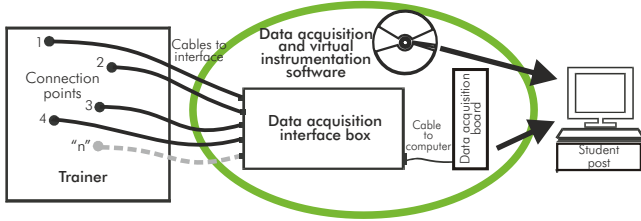
- EDICOM 1. Signals Sampling and Reconstruction.
- EDICOM 2. Time Division Multiplex (TDM). PAM Transmitter and Receiver.
- EDICOM 3. MIC-TDM Transmission/Reception.
- EDICOM 4. Delta Modulation and Demodulation.
- EDICOM 5. Line codes. Signal Modulation and Demodulation.
- EDICOM 6. Optical Fibre Transmission and Reception.

### Digital Communications Trainers

- EMDA/D. Digital Modulations Trainer.
- EMDA/P. Pulse Modulations Trainer.

## Optional

### EDAS/VIS. EDIBON Data Acquisition System/Virtual Instrumentation System:



EDAS/VIS is the perfect link between the trainer and the PC. With the EDAS/VIS system, information from the trainer is sent to the computer. There, it can be analyzed and represented.

We easily connect the Data Acquisition Interface Box (DAIB) to trainer with the supplied cables (connection points are placed in the trainer). Like any other hardware, the DAIB is connected to the PC through the Data Acquisition Board (DAB), and by using the Data acquisition and Virtual Instrumentation Software, the student can get the results from the undertaken experiment/practice, see them on the screen and work with them.

This EDAS/VIS System includes DAIB + DAB + EDAS/VIS-SOF:

#### 1) Hardware:

##### 1.1) DAIB. Data Acquisition Interface Box:

Metallic box. Dimensions: 310 x 220 x 145 mm. approx.

Front panel:

**16 Analog inputs** (1 block with **12 voltage channels** and 1 block with **2 current channels** (4 connections)).

Sampling velocity **1,250,000 samples per second** for EDAS/VIS 1.25 Version.

Sampling velocity **250,000 samples per second** for EDAS/VIS 0.25 Version.

**2 Analog outputs.**

**24 Digital inputs/outputs, configurable as inputs or outputs**, with 24 state led indicators. These digital inputs/outputs are grouped in three ports of eight channels (P0, P1 and P3).

**4 Digital signal switches 0-5V. 2 Analog signal potentiometers ±12V.**

Main ON/OFF switch.

Inside: Internal power supply of 12 and 5 V. Potentiometer.

Back panel: Power supply connector. SCSI connector (for data acquisition board).

Connecting cables.



DAIB



##### 1.2) DAB. Data Acquisition Board:

###### For EDAS/VIS 1.25 Version:

PCI Data acquisition board (National Instruments) to be placed in a computer slot. Bus PCI.

**Analog input:** Number of channels = **16** single-ended or **8** differential. **Resolution = 16 bits**, 1 in 65536. **Sampling rate up to: 1,250,000 S/s (samples per second)**. Input range (V)  $\pm 10V$ . Data transfers = DMA, interrupts, programmed I/O. DMA channels = 6.

**Analog output:** Number channels = **2**. **Resolution = 16 bits**, 1 in 65536. **Max. output rate up to: 833KS/s**. Output range (V)  $\pm 10V$ . Data transfers = DMA, interrupts, programmed I/O.

**Digital Input/Output:** Numbers of channels = **24 inputs/outputs**. Port 0 up to **8 Mhz**.

Timing: **Counter/timers = 2**. Resolution: Counter/timers: 32 bits.

###### For EDAS/VIS 0.25 Version:

**Sampling rate up to: 250,000 S/s** (samples per second).

**Analog output: Max. output rate up to: 10 KS/s**.

**Digital Input/Output: Number of channels = 24 inputs/outputs. Port 0 up to 1 Mhz.**



DAB



#### 2) EDAS/VIS-SOF. Data Acquisition and Virtual Instrumentation Software:

Compatible with actual Windows operating systems. Amicable graphical frame.

**Configurable software allowing the temporal/frequency representation of the different inputs and outputs. Visualization of a voltage of the circuits on the computer screen.**

**It allows data store in a file, print screens and reports of the signals at any time.**

**Measurement, analysis, visualization, representation and report of results.**

**Set of Virtual Instruments:**

##### - Oscilloscope:

**Channels: 12 simultaneous.** Maximum input voltage:  $\pm 10V$ .

**All 12 input channels could be scaled** to compare signal with different voltage levels.

**"Math Menu"** with operations as Addition, Subtraction, Multiplication and Division, between any of the 12 oscilloscope channels.

##### - Function Generator:

**Two independent signal generators**, for sinusoidal, triangular, saw tooth and square.

**Channels: 2** (allowing working simultaneously). Maximum output voltage:  $\pm 10V$ .

**It includes a graph where an output signal for each channel is shown.**

##### - Spectrum Analyzer:

**Channels: 12** (simultaneous). Max. voltage:  $\pm 10V$ . Spectrum analyzer: based on the FFT.

##### - Multimeter:

**Voltmeter (Channels: 12** (simultaneous). Max. voltage:  $\pm 10V$  RMS).

**Ammeter (Channels: 2** (simultaneous). Max. Ampere: 500 mA rms per channel).

##### - Transient Analyzer.

##### - Logic Analyzer:

**Number of Input channels: 8.** TTL Voltage Level. **Clock Source: 3 different sources.**

This instrument allows receiving as far as 8 digital signal simultaneously at 1 or 8 Mbps (depending the version).

##### - Logic Generator:

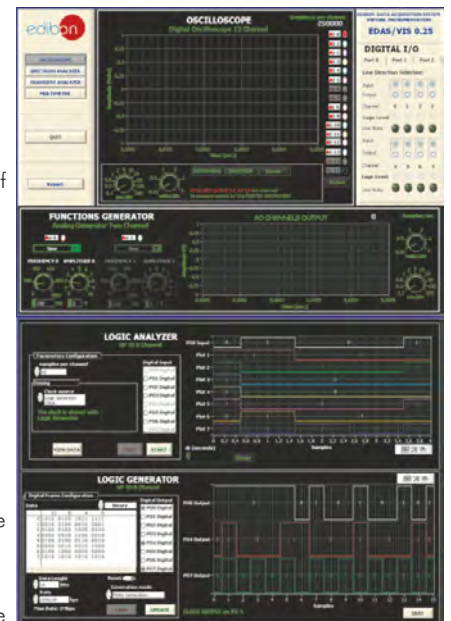
**Number of transmission channels: 8.** TTL voltage level.

This instrument allows generating up to 8 digital simultaneous signals of 1 or 8 Mbps (depending of the version).

**Sampling velocity 1,250,000 samples per second for EDAS/VIS 1.25 Version.**

**Sampling velocity 250,000 samples per second for EDAS/VIS 0.25 Version.**

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

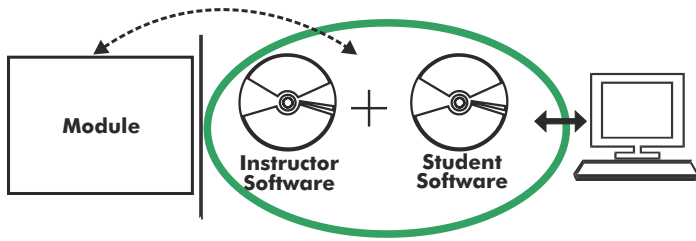


EDAS/VIS-SOF

For more information see EDAS/VIS catalogue. Click on the following link:

[www.edibon.com/products/catalogues/en/units/communications/digital/EDAS-VIS.pdf](http://www.edibon.com/products/catalogues/en/units/communications/digital/EDAS-VIS.pdf)

**LICOMBA/ICAI. Interactive Computer Aided Instruction Software System:**



With no physical connection between trainer and computer, **this complete package consists on an Instructor Software (INS/SOF) totally integrated with the Student Software (EMDA/SOF)**. Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students. These, on the other hand, get a virtual instructor who helps them to deal with all the information on the subject of study.

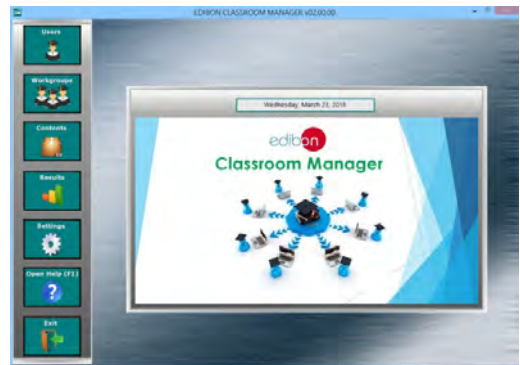
Instructor Software

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

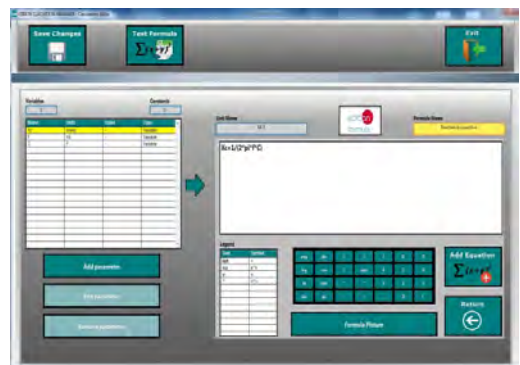
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

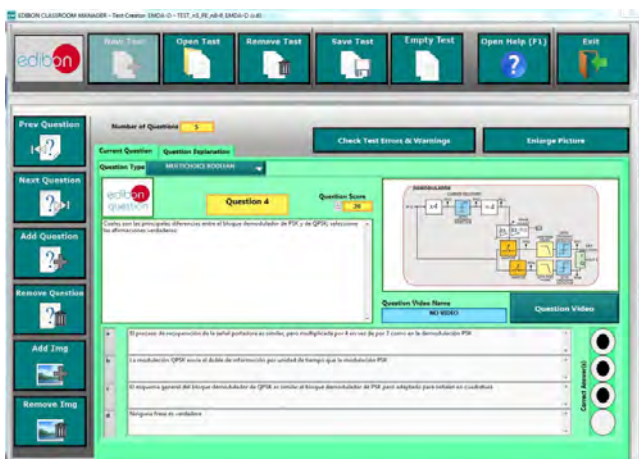
- User Data Base Management.**
- Administration and assignment of Workgroups, Tasks and Training sessions.**
- Creation and Integration of Practical Exercises and Multimedia Resources.**
- Custom Design of Evaluation Methods.**
- Creation and assignment of Formulas & Equations.**
- Equation System Solver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



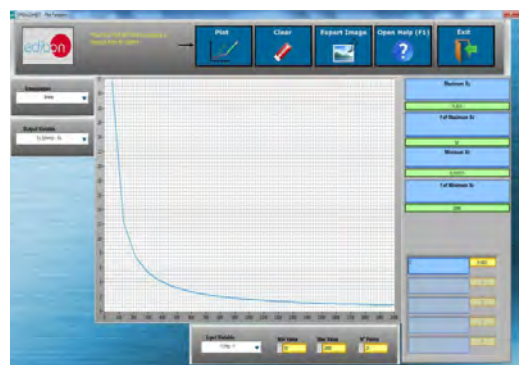
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

Optional  
**Student Software**

**-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.

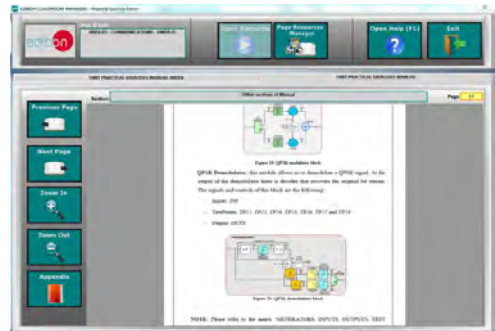
Innovative features:

- 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.**

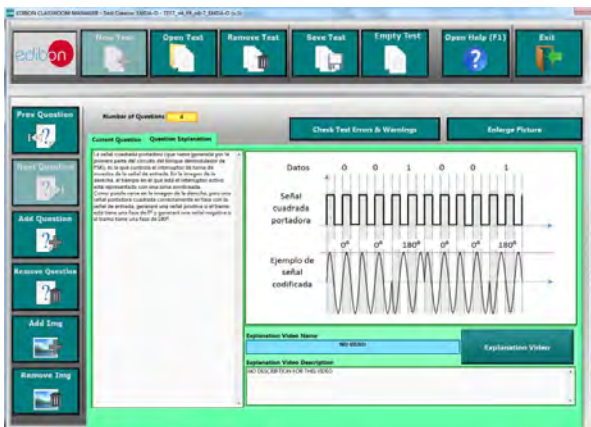
For more information see ICAI catalogue. Click on the following link:  
[www.edibon.com/products/catalogues/en/ICAI.pdf](http://www.edibon.com/products/catalogues/en/ICAI.pdf)



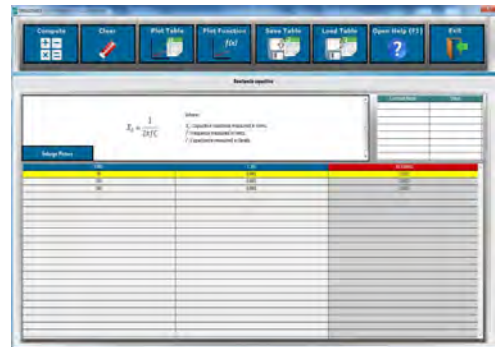
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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 improvements of the product.



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REPRESENTATIVE:

