edibon

Engineering and Technical
Teaching Equipment

EANC

EDIBON **SCADA** System

Teaching
Technique
used

② Control Interface Box

③ Software for:
- Computer Control
- Data Acquisition
- Data Management

Computer
(not included in the supply)

④ Cables and Accessories

⑤ Manuals

① Unit: EANC. Computer Controlled Antenna Unit

* Minimum supply always includes: 1 + 2 + 3 + 4 + 5
(Computer not included in the supply)

Key features:

➤ **Advanced Real-Time SCADA and PID Control.**

➤ **Open Control + Multicontrol + Real-Time Control.**

➤ **Specialized EDIBON Control Software based on LabVIEW.**

➤ **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.**

➤ **This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.**

**OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL**

POWERED BY

LabVIEW

www.edibon.com
↳PRODUCTS
↳3.- COMMUNICATIONS

For more information about Key Features, click here

INTRODUCTION

Antennas are the main element of aerial communications. They are the transition between a transmission line (normally a coaxial cable) and the free space, in others words, antennas convert voltages and currents of a transmission line into electromagnetic waves as efficiently as possible.

To characterize an antenna it is necessary to understand the basics of antennas and the most important parameters of antennas measurement.

The Computer Controlled Antenna Unit, "EANC", has been designed for full-automatic control of the antenna measurement through the computer PC, which allows students familiarize with automatic antenna analysis.

The "EANC" allows to learn how to perform the most common antenna measurements (radiation pattern, SWR, etc.). It also allows students to understand when it is necessary to add matching components to reach the correct matching between the antenna, the transmission line and the generator in order to improve the performance of the system.

The unit is provided with a set of practical exercises, through which the student will understand how to work with the different elements of the unit in order to obtain a complete knowledge of the concepts behind antennas.

GENERAL DESCRIPTION

The Computer Controlled Antenna Unit, "EANC", is an advanced system that operates in conjunction with a computer (PC), which allows the control and data acquisition of the antenna measurement by means the SCADA System (control interface box + control software).
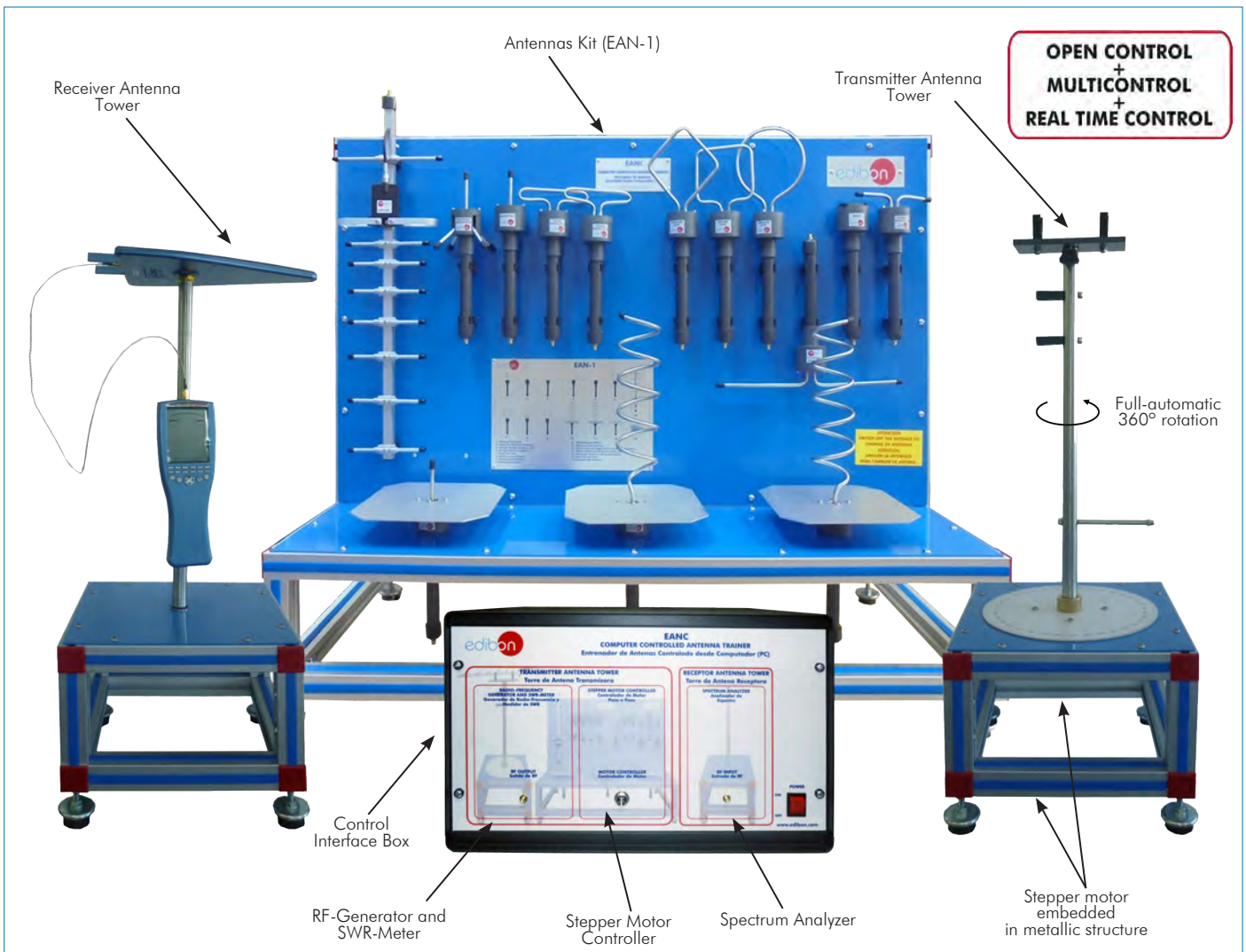
The "EANC" performs the full-automatic 360° rotation of the transmitter antenna tower, controlled by the software, for draw the antenna radiation pattern and display it in the computer (PC) window.

The "EANC" also allows the full automatic frequency sweep in order to perform the bandwidth analysis of an antenna.

The "EANC" allows students to learn how to perform the essential antenna measurements: radiation pattern with the measure of the azimuth and elevation plots (electrical and magnetic planes), real time signal level, standing wave ratio (SWR), study the effectiveness of antenna through a wide range of frequencies (bandwidth), directivity and antenna's power gain. All of these measures are displayed in the computer (PC), and the student can save the results for subsequent analysis.

This Computer Controlled Unit is supplied with the EDIBON Computer Control System (SCADA), and includes: The unit itself + a Control Interface Box + a Data Acquisition Board + Computer Control, Data Acquisition and Data Management Software Packages, for controlling the process and all parameters involved in the process.

UNIT ELEMENTS ALLOCATION

Receiver Antenna Tower

Antennas Kit (EAN-1)

Transmitter Antenna Tower

OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL

Full-automatic 360° rotation

Control Interface Box

RF-Generator and SWR-Meter

Stepper Motor Controller

Spectrum Analyzer

Stepper motor embedded in metallic structure

With this unit there are several options and possibilities:

- Main items: 1, 2, 3, 4, and 5.
- Optional items: 6, 7 and 8.

Let us describe first the main items (1 to 5):

① EANC. Unit:

RF-Generator and SWR-Meter: (included in the Control Interface Box):

RF-Generator:

Based on voltage controlled oscillator (VCO).

Wide range of generated frequencies: from 600 MHz to 1700 MHz.

Frequency tuning through the computer.

Frequency displayed on the computer.

50 Ω of nominal impedance.

SWR-Meter:

Frequency range: 600 MHz to 2.5GHz.

Insertion loss ≥ 0.1dB.

SWR measurement displayed on the computer.

50 Ω of nominal impedance.

SMA connector to transmitter antenna.

Stepper Motor Controller: (included in the Control Interface Box):

This controller allows the full-automatic 360° rotation of the transmitter antenna.

Spectrum Analyzer: (included in the Control Interface Box):

Frequency range: 50 MHz to 6 GHz.

Typically level range: -40 dBm to +23 dBm.

Accuracy of +/- 0.18 dB at measurement lower than +18 dBm.

Standing wave ratio lower than 1.2:1.

Gain and offset self-calibration.

50 Ω of nominal impedance.

SMA connector to receiver antenna.

Frequency and power signal measurement from the computer (PC).

Two Towers of Antennas:

Receiver Antenna Tower.

Transmitter Antenna Tower. The base of this tower has a computer controlled stepper motor. The base of this tower also has a degree wheel.

EAN-1. Antennas Kit: (included in the supply):

All antennas connect to RF-Generator through a SMA connector.

Monopole antenna:

Designed for 1200 MHz transmission. λ/2 of wavelength. 50 Ω of nominal impedance.

Monopole antenna with ground plane:

Designed for 1200 MHz transmission.λ/2 of wavelength. 50 Ω of nominal impedance.

Drooping monopole antenna:

Designed for 1200 MHz transmission.λ/4 of wavelength. 50 Ω of nominal impedance.

Straight dipole antenna (Short λ/2):

Designed for 1300 MHz transmission. λ/2 of wavelength. 50 Ω of nominal impedance.

Straight dipole antenna (Large λ):

Designed for 1300 MHz transmission. λ of wavelength. 50 Ω of nominal impedance.

Folded dipole antenna (300 Ω):

Designed for 1400 MHz transmission. λ/2 of wavelength. 300 Ω of nominal impedance.

Folded dipole antenna (adapted 50 Ω):

Designed for 1400 MHz transmission .λ/2 of wavelength. 6:1 Balun (length: λ/ 2of wavelength) inside the fixing system of the antenna. 50 Ω of nominal impedance.

Helical antenna (Right-hand circular polarization):

Designed for 1600 MHz transmission. 50 Ω of nominal impedance.

Helical antenna (Left-hand circular polarization):

Designed for 1600 MHz transmission transmission. of nominal impedance.

Unit: EANC

Circular loop antenna:

    Designed for 850 MHz transmission. 50 Ω of nominal impedance.

Square loop antenna:

    Designed for 850 MHz transmission. 50 Ω of nominal impedance.

Diamond loop antenna:

    Designed for 850 MHz transmission. 50 Ω of nominal impedance.

Microstrip patch antenna:

    Designed for 5 band of frequency transmission. λ/2 of wavelength. 50 Ω of nominal impedance.

Yagi-Uda antenna:

    Designed for 900 MHz transmission. 9 elements Yagi-Uda antenna. 50 Ω of nominal impedance.

Log-periodic antenna:

    Designed for the range between 680-2900 MHz transmission. Directional antenna.

    Max. transmission power: 10 W. 50 Ω of nominal impedance. VSWR (typ.): < 2:1. Gain (typ.): 7dBi.

    Antennas expositor which allows the access of different antennas easily.

Space required between antennas: 2 – 3 m.

Recommended Element: (Not included)

    EAN-2. Antennas Kit:

    Microstrip patch array antenna.

    Horn antenna.

    Parabolic reflector.

    Log-periodic antenna.

    Discone antenna.

    Antennas expositor which allows the access of different antennas easily.

The complete unit includes as well:

    Advanced Real-Time SCADA and PID Control.

    Open Control + Multicontrol + Real-Time Control.

    Specialized EDIBON Control Software based on LabVIEW.

    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.

    This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

② **EANC/CIB. Control Interface Box:**

The Control Interface Box is part of the SCADA system.

The control interface box includes: the Spectrum Analyzer, the RF-Generator, the SWR-Meter and the Stepper Motor Controller. All of them connected to computer (PC) for recording, display and evaluation of data.

USB cable between the control interface box and computer.

The unit control elements are permanently computer controlled, without necessity of changes or connections during the whole test procedure.

Simultaneous visualization in the computer of all parameters involved in the process and analysis: Received signal power value, SWR value, frequency of signal, etc.

All the parameters values are displayed on only one screen in the computer.

Real time radiation pattern representation. Storage of all the analysis data and results in a file.

Graphic representation in real time of the system responses.

Shield and filtered signals to avoid external interferences.

Real time computer control.

Open control, allowing modification of frequency of signal for the analysis of radiation patterns, etc.

Safety levels, one mechanical in the unit, another electronic in the control interface and the third one in the control software.

EANC/CIB

③ **EANC/CCSOF. Computer Control + Data Acquisition + Data Management Software:**

    The three softwares are part of the SCADA system.

    Compatible with actual Windows operating systems.

    Compatible with the industry standards.

    Registration and visualization of all values and analysis measurements in an automatic and simultaneous way.

    Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all antenna parameters.

    Management, processing, comparison and storage of data.

    Sampling velocity up to 10 KS/s (kilo samples per second).

    Three selectable antenna tests: Antenna radiation pattern, Antenna bandwidth test and Power signal measurement.

   Graphic representation in real time.

    The configuration of each antenna has been memorized in the software for a quick and easy antenna study.

    Comparative analysis of the obtained data, after the process with differents frequencies and antennas.

    Open software, allowing the teacher to modify texts, instructions.

    Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

    This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.
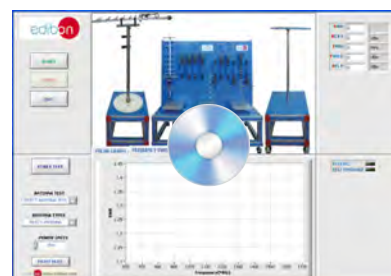
EANC/CCSOF

④ **Cables and Accessories**, for normal operation.

⑤ **Manuals:**

    This unit is **supplied with 8 manuals**: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

✳ References 1 to 5 are the main items: EANC + EANC/CIB + EANC/CCSOF + Cables and Accessories + Manuals are included in the minimum supply for enabling normal and full operation.

EXERCISES AND PRACTICAL POSSIBILITIES TO BE DONE WITH THE MAIN ITEMS

1.- Familiarization with the unit.
2.- Installation, connection and familiarization with the computer control software.
3.- Basic principles of radiation pattern parameters measurement.
4.- Study of the surrounding signals.
5.- Distance effect over radiation power.
6.- Direction of maximum radiation and gain of an antenna.
7.- Analysis of the antenna bandwidth.
8.- Study of monopole antennas.
9.- Study of antennas with ground planes.
10.-Study of dipole antennas.
11.-Study of loop antennas (circular, square and diamond loop antennas).
12.-Study of circular polarization helical antennas.
13.-Study of Yagi-Uda antennas.
14.-Study of microstrip patch antennas.
15.-SWR measurement and conversion in Return loss and Reflected Power.
16.-Improvement of the performance of a system.

Additional practical possibilities to be done with the optional Antennas Kit (EAN-2):

17.-Study of horn antenna.
18.-Study of parabolic reflector.

19.-Basic principles of wide bandwidth antennas: log-periodic antenna.
20.-Basic principles of wide bandwidth antennas: discone antenna.
21.-Basic principles of microstrip patch array antenna.

Other possibilities to be done with this Unit:

22.-Many students view results simultaneously.
   To view all results in real time in the classroom by means of a projector or an electronic whiteboard.
23.-Open Control, Multicontrol and Real Time Control.
   This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
24.-The Computer Control System with SCADA allows a real industrial simulation.
25.-This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
26.-This unit can be used for doing applied research.
27.-This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
28.-Control of the EANC unit process through the control interface box without the computer.
29.-Visualization of all the sensors values used in the EANC unit process.
- Several other exercises can be done and designed by the user.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

EANC:
   Transmitter Antenna Tower:
      -Dimensions:310 x 310 x 700 mm approx.
         (12.20 x 12.20 x 27.56 inches approx.)
   Receiver Antenna Tower:
      -Dimensions:310 x 310 x 700 mm approx.
         (12.20 x 12.20 x 27.56 inches approx.)
   Antennas Kit (EAN-1) in expositor:
      -Dimensions:1000 x 500 x 600 mm approx.
         (39.37 x 19.69 x 23.62 inches approx.)
   Control Interface Box (including RF-Generator, SWR-Meter, Stepper Motor Controller and Spectrum Analyzer):
      -Dimensions:490 x 330 x 310 mm approx.
         (19.29 x 12.99 x 12.20 inches approx.)
   Total weight: 50 kg approx. (110 pounds approx.)

RECOMMENDED ELEMENTS (Not included)

EAN-2. Antennas Kit:
   All antennas connect to RF-Generator through a SMA connector.
   Microstrip patch array antenna:
      Designed for 1450 MHz. 50 Ω of nominal impedance.
   Horn antenna:
      Designed for 1500 MHz. 50 Ω of nominal impedance.
   Parabolic reflector: mounted in its own tower antenna.
   Log-periodic antenna:
      Designed for the range between 680 – 2900 MHz transmission. Directional antenna.
      Max. transmission power: 10 W. 50 Ω of nominal impedance. VSWR typ.): < 2:1. Gain (typ.): 7 dBi.
   Discone antenna:
      Designed for the range between 300 - 3000 MHz transmission. Omnidirectional antenna.
      Max. transmission power: 200 W. 50 Ω of nominal impedance. VSWR (typ.): < 2:1. Gain (typ.): 2.15 dBi.
   Antennas expositor which allows the access of different antennas easily.
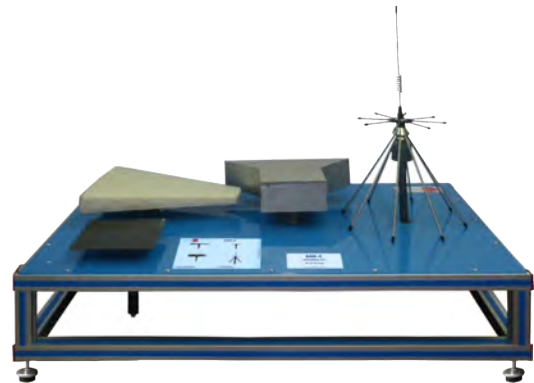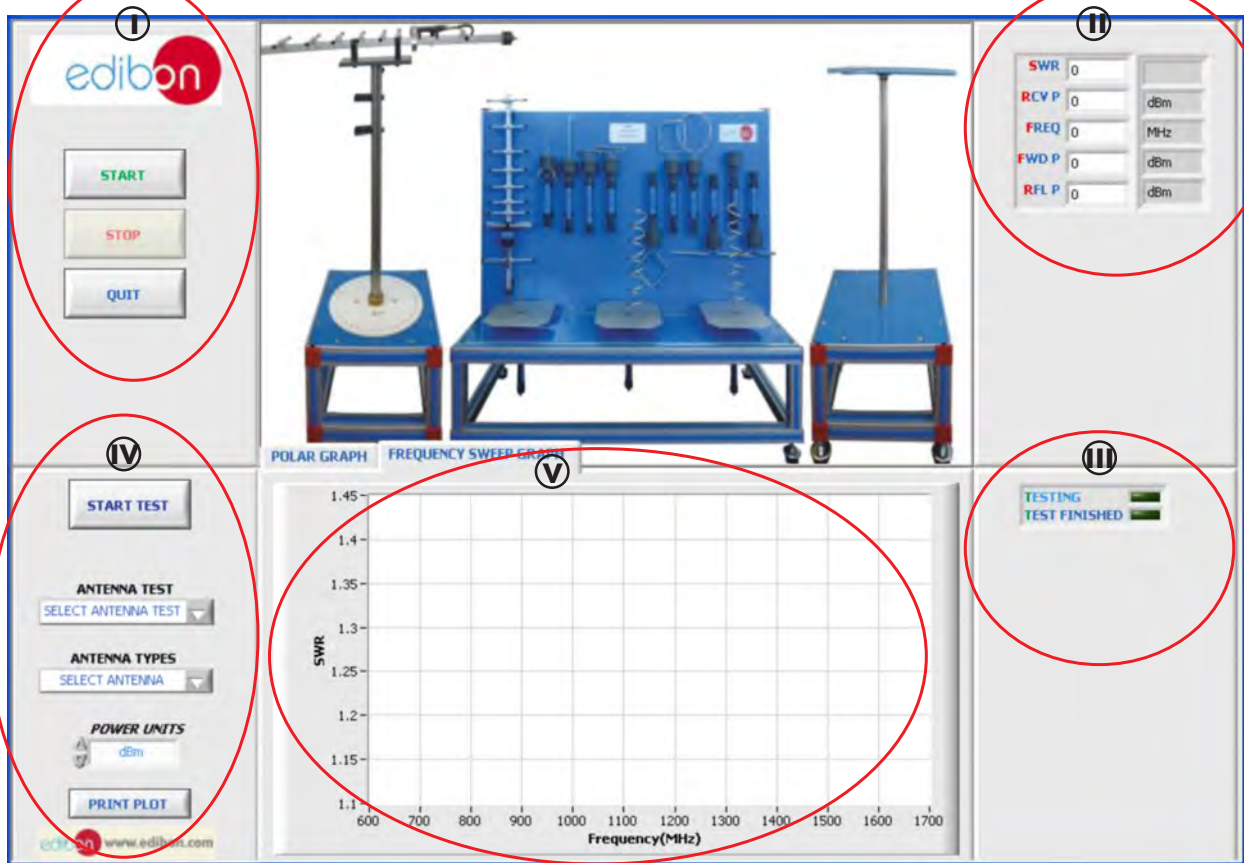
AVAILABLE VERSIONS

-EANC. Computer Controlled Antenna Unit.

-EAN. Antenna Unit.

www.edibon.com

SCADA
Main screen

Ⓘ **Main software operation buttons.**

Ⓘ **Start test, setting and print plot buttons.**

Ⓘ **Antenna measurement indicators:** Stationary Waves Ratio (SWR), Received Power (RCV P), Working Frequency (FREQ), Forward Power (FWD P) and Reflected Power (RFL P).
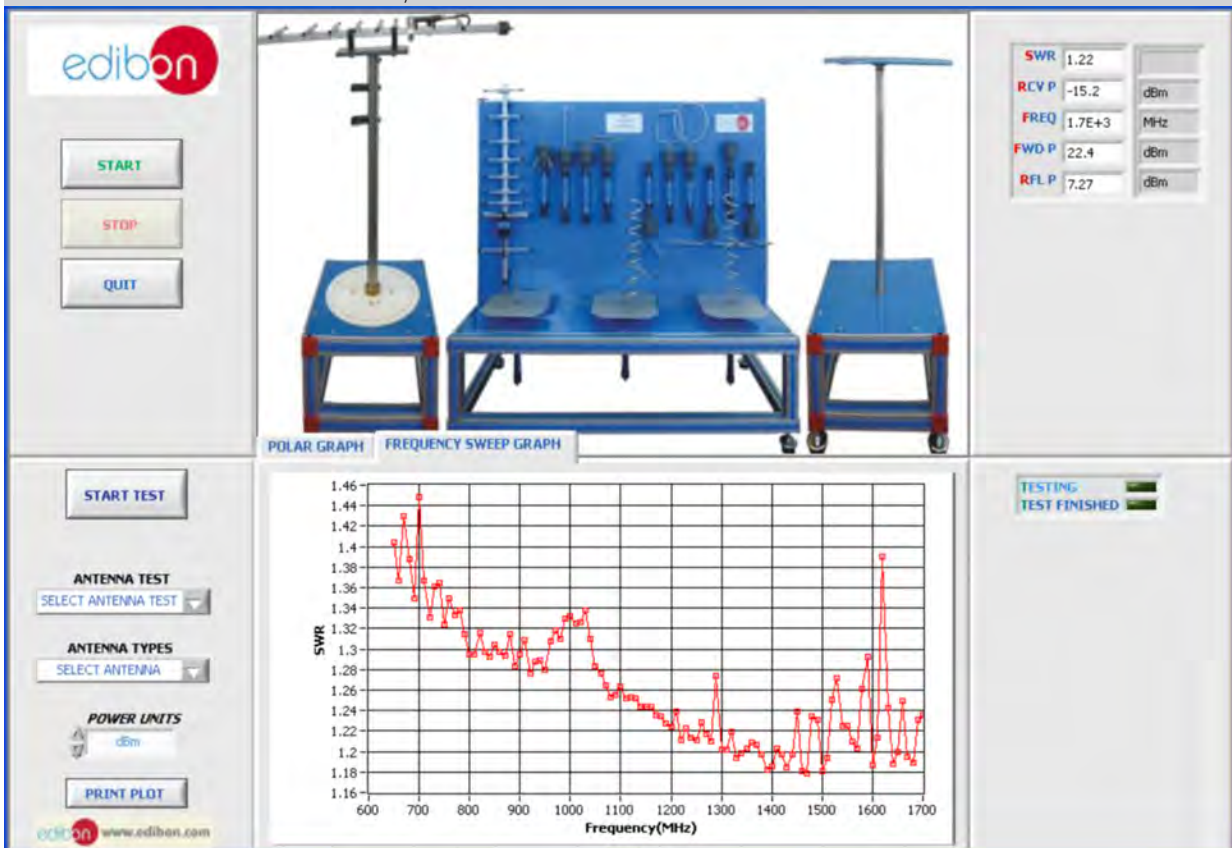
Ⓘ **Test status indicators.**

Ⓥ **Real time graphics. Allows to show the radiation pattern and the frequency sweep graph.**

SOME **REAL** RESULTS OBTAINED FROM THIS UNIT

The screen below shows the azimuthal radiation pattern of a loop antenna.
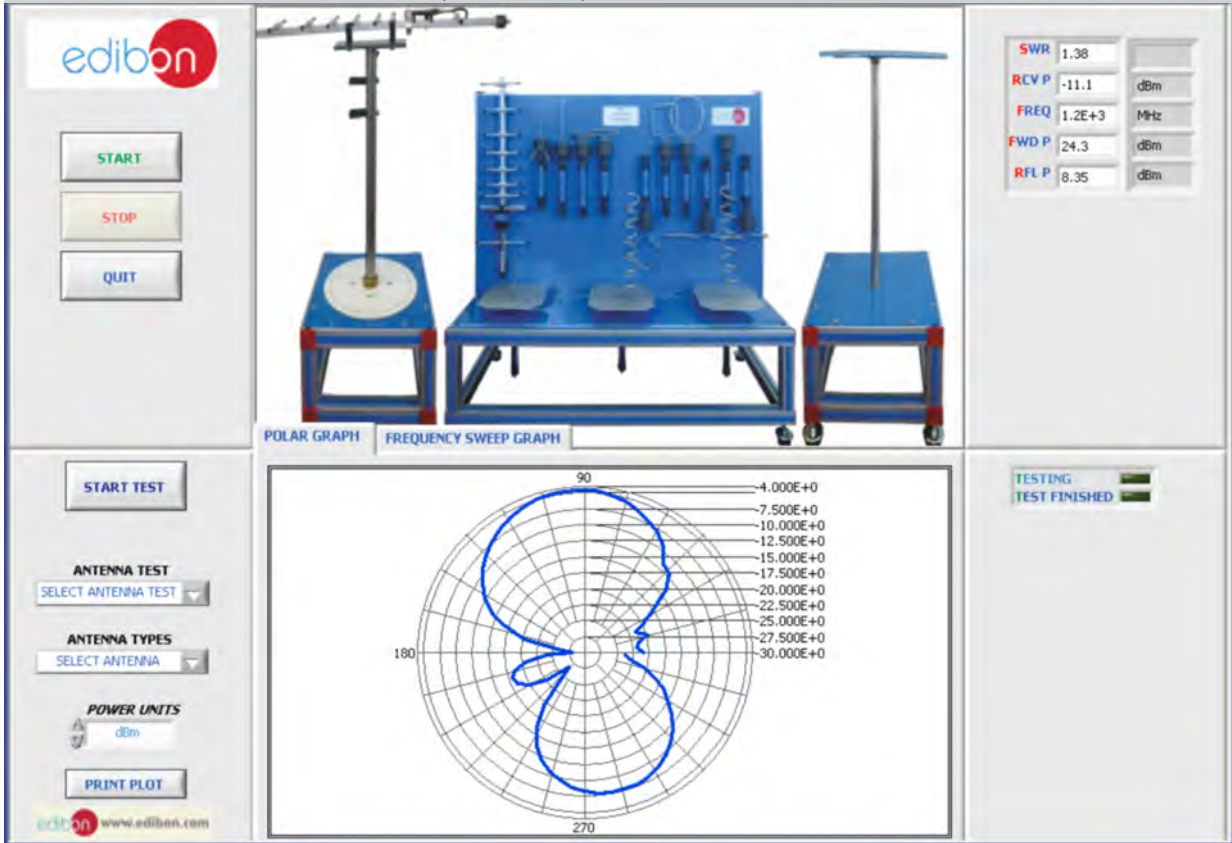
The screen below shows the bandwidth analysis of a wideband antenna.

Additionally to the main items (1 to 5) described, we can offer, as optional, other items from 6 to 8.

All these items try to give more possibilities for:

a) Technical and Vocational Education configuration. (ICAI)

b) Multipost Expansions options. (MINI ESN and ESN)

<u>a) Technical and Vocational Education configuration</u>

⑥ **EANC/ICAI. Interactive Computer Aided Instruction Software.**
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.

This software is optional and can be used additionally to items (1 to 6).

- 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.**

- 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/en/files/expansion/ICAI/catalog

<u>Instructor Software</u>
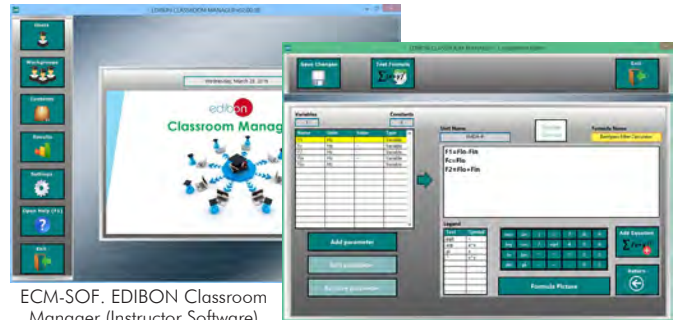
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
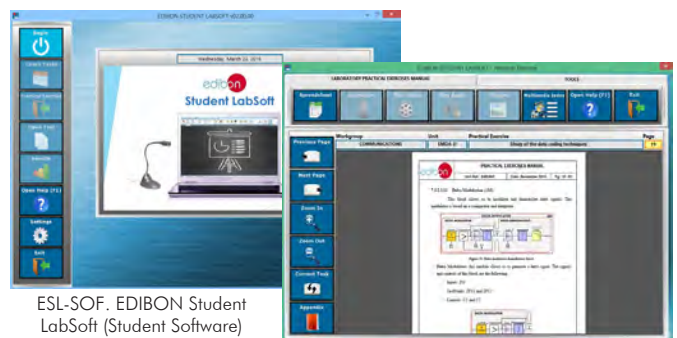
ECAL. EDIBON Calculations Program Package - Formula Editor Screen

ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram
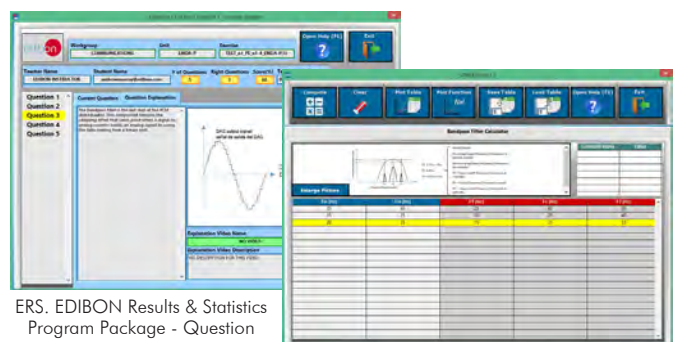
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

<u>Student Software</u>

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

b) Multipost Expansions options

⑦ **MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.**

MINI ESN. EDIBON Mini Scada-Net System allows up to 30 students to work with a Teaching Unit in any laboratory, simultaneously. It is useful for both, Higher Education and/or Technical and Vocational Education.

The MINI ESN system consists of the adaptation of any EDIBON Computer Controlled Unit with SCADA integrated in a local network.

This system allows to view/control the unit remotely, from any computer integrated in the local net (in the classroom), through the main computer connected to the unit. Then, the number of possible users who can work with the same unit is higher than in an usual way of working (usually only one).

Main characteristics:

- It allows up to 30 students to work simultaneously with the EDIBON Computer Controlled Unit with SCADA, connected in a local net.
- Open Control + Multicontrol + Real Time Control + Multi Student Post.
- Instructor controls and explains to all students at the same time.
- Any user/student can work doing "real time" control/multicontrol and visualisation.
- Instructor can see in the computer what any user/student is doing in the unit.
- Continuous communication between the instructor and all the users/students connected.

Main advantages:

- It allows an easier and quicker understanding.
- This system allows you can save time and cost.
- Future expansions with more EDIBON Units.

For more information see **MINI ESN** catalogue. Click on the following link:

www.edibon.com/en/files/expansion/MINI-ESN/catalog

MINI ESN.
EDIBON Mini Scada-Net System

1 UNIT= up to 30 STUDENTS can work simultaneously

Computer Controlled Antenna Unit (EANC)

Control Interface Box

Software for:
- Computer Control
- Data Acquisition
- Data Management

Instructors' Central Computer

Mini Scada-Net Software

LOCAL NET FOR 30 STUDENTS

OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL
+
MULTI STUDENT POST

Note: The MINI ESN system can be used with any EDIBON computer controlled unit

⑧ **ESN. EDIBON Scada-Net Systems.**

This unit can be integrated, in the future, into a Complete Laboratory with many Units and many Students.

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

www.edibon.com/en/files/expansion/ESN/catalog
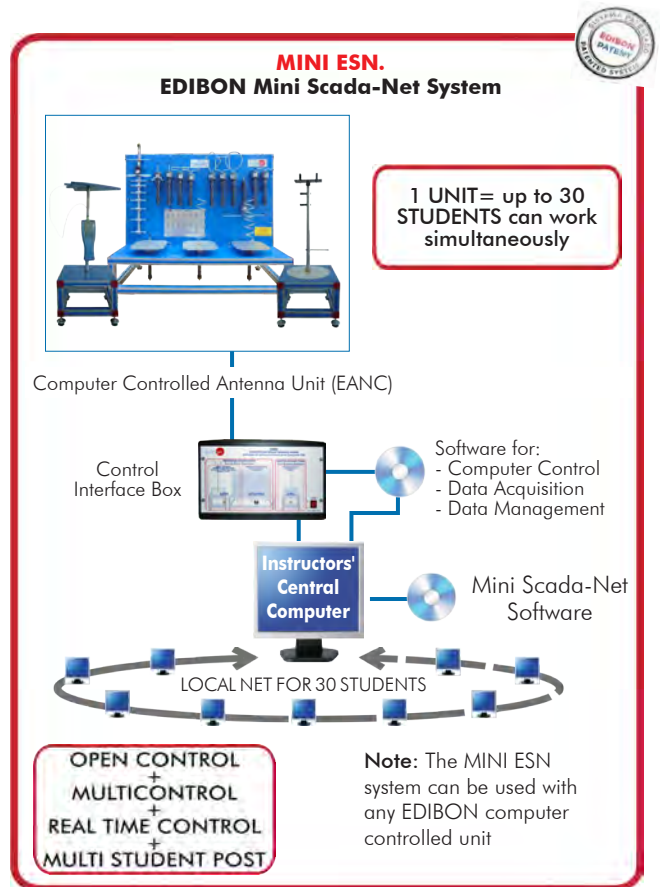
ORDER INFORMATION

Main items (always included in the supply)

Minimum supply always includes:

① Unit: EANC. Computer Controlled Antenna Unit.

② EANC/CIB. Control Interface Box.

③ EANC/CCSOF. Computer Control + Data Acquisition + Data Management Software.

④ **Cables and Accessories**, for normal operation.

⑤ **Manuals**.

*IMPORTANT: Under EANC we always supply all the elements for immediate running as 1, 2, 3, 4, and 5.

Optional items (supplied under specific order)

a) Technical and Vocational Education configuration

⑥ EANC/ICAI. Interactive Computer Aided Instruction Software.

b) Multipost Expansions options

⑦ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

⑧ ESN. EDIBON Scada-Net Systems.

www.edibon.com

①EANC. Unit:
RF-Generator and SWR-Meter: (included in the Control Interface Box):
  RF-Generator:
    Based on voltage controlled oscillator (VCO).
    Wide range of generated frequencies: from 600 MHz to 1700 MHz.
    Frequency tuning through the computer.
    Frequency displayed on the computer.
    50 Ω of nominal impedance.
  SWR-Meter:
    Frequency range: 600 MHz to 2.5GHz.
    Insertion loss $\geq$ 0.1dB.
    SWR measurement displayed on the computer.
    50 Ω of nominal impedance.
    SMA connector to transmitter antenna.
Stepper Motor Controller: (included in the Control Interface Box):
  This controller allows the full-automatic 360° rotation of the transmitter antenna.
Spectrum Analyzer: (included in the Control Interface Box):
  Frequency range: 50 MHz to 6 GHz.
  Typically level range: -40 dBm to +23 dBm.
  Accuracy of +/- 0.18 dB at measurement lower than +18 dBm.
  Standing wave ratio lower than 1.2:1.
  Gain and offset self-calibration.
  50 Ω of nominal impedance.
  SMA connector to receiver antenna.
  Frequency and power signal measurement from the computer (PC).
Two Towers of Antennas:
  Receiver Antenna Tower.
  Transmitter Antenna Tower. The base of this tower has a computer controlled stepper motor. The base of this tower also has a degree wheel.
EAN-1. Antennas Kit: (included in the supply):
  All antennas connect to RF-Generator through a SMA connector.
  Monopole antenna: Designed for 1200 MHz transmission. λ/2 of wavelength. 50 Ω of nominal impedance.
  Monopole antenna with ground plane: Designed for 1200 MHz transmission.λ/2 of wavelength. 50 Ω of nominal impedance.
  Drooping monopole antenna: Designed for 1200 MHz transmission.λ/4 of wavelength. 50 Ω of nominal impedance.
  Straight dipole antenna (Short λ/2): Designed for 1300 MHz transmission. λ/2 of wavelength. 50 Ω of nominal impedance.
  Straight dipole antenna (Large λ): Designed for 1300 MHz transmission. λ of wavelength. 50 Ω of nominal impedance.
  Folded dipole antenna (300 Ω): Designed for 1400 MHz transmission. λ/2 of wavelength. 300 Ω of nominal impedance.
  Folded dipole antenna (adapted 50 Ω): Designed for 1400 MHz transmission. λ/2 of wavelength. 6:1 Balun (length: λ/ 2of wavelength) inside the fixing system of the antenna. 50 Ω of nominal impedance.
  Helical antenna (Right-hand circular polarization): Designed for 1600 MHz transmission. 50 Ω of nominal impedance.
  Helical antenna (Left-hand circular polarization): Designed for 1600 MHz transmission transmission. of nominal impedance.
  Circular loop antenna: Designed for 850 MHz transmission. 50 Ω of nominal impedance.
  Square loop antenna: Designed for 850 MHz transmission. 50 Ω of nominal impedance.
  Diamond loop antenna: Designed for 850 MHz transmission. 50 Ω of nominal impedance.
  Microstrip patch antenna: Designed for 5 band of frequency transmission. λ/2 of wavelength. 50 Ω of nominal impedance.
  Yagi-Uda antenna: Designed for 900 MHz transmission. 9 elements Yagi-Uda antenna. 50 Ω of nominal impedance.
  Log-periodic antenna: Designed for the range between 680-2900 MHz transmission. Directional antenna. Max. transmission power: 10 W. 50 Ω of nominal impedance. VSWR (typ.): < 2:1. Gain (typ.): 7dBi.
  Antennas expositor which allows the access of different antennas easily.
Space required between antennas: 2 – 3 m.

Recommended element: (Not included)
  EAN-2. Antennas Kit:
    Microstrip patch array antenna.
    Horn antenna.
    Parabolic reflector.
    Log-periodic antenna.
    Discone antenna.
    Antennas expositor which allows the access of different antennas easily.
The complete unit includes as well:
  Advanced Real-Time SCADA and PID Control.
  Open Control + Multicontrol + Real-Time Control.
  Specialized EDIBON Control Software based on LabVIEW.
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  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.
  This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

②EANC/CIB. Control Interface Box:
The Control Interface Box is part of the SCADA system.
The control interface box includes: the Spectrum Analyzer, the RF-Generator, the SWR-Meter and the Stepper Motor Controller. All of them connected to computer (PC) for recording, display and evaluation of data.
The unit control elements are permanently computer controlled, without necessity of changes or connections during the whole test procedure.
Simultaneous visualization in the computer of all parameters involved in the process and analysis: Received signal power value, SWR value, frequency of signal, etc.
Shield and filtered signals to avoid external interferences. Real time computer control.
Open control, allowing modification of frequency of signal for the analysis of radiation patterns, etc.
Safety levels, one mechanical in the unit, another electronic in the control interface and the third one in the control software.

③EANC/CCSOF. Computer Control +Data Acquisition+Data Management Software:
The three softwares are part of the SCADA system.
Compatible with the industry standards.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all antenna parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 10 KS/s (kilo samples per second).
Three selectable antenna tests: Antenna radiation pattern, Antenna bandwidth test and Power signal measurement.
The configuration of each antenna has been memorized in the software for a quick and easy antenna study.
Open software, allowing the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

④Cables and Accessories, for normal operation.

⑤Manuals:
This unit is supplied with 8 manuals: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

Exercises and Practical Possibilities to be done with the Main Items

1.- Familiarization with the unit.

2.- Installation, connection and familiarization with the computer control software.

3.- Basic principles of radiation pattern parameters measurement.

4.- Study of the surrounding signals.

5.- Distance effect over radiation power.

6.- Direction of maximum radiation and gain of an antenna.

7.- Analysis of the antenna bandwidth.

8.- Study of monopole antennas.

9.- Study of antennas with ground planes.

10.-Study of dipole antennas.

11.-Study of loop antennas (circular, square and diamond loop antennas).

12.-Study of circular polarization helical antennas.

13.-Study of Yagi-Uda antennas.

14.-Study of microstrip patch antennas.

15.-SWR measurement and conversion in Return loss and Reflected Power.

16.-Improvement of the performance of a system.

Additional practical possibilities to be done with the optional Antennas Kit (EAN-2):

17.-Study of horn antenna.

18.-Study of parabolic reflector.

19.-Basic principles of wide bandwidth antennas: log-periodic antenna.

20.-Basic principles of wide bandwidth antennas: discone antenna.

21.-Basic principles of microstrip patch array antenna.

Other possibilities to be done with this Unit:

22.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

23.-Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

24.-The Computer Control System with SCADA allows a real industrial simulation.

25.-This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

26.-This unit can be used for doing applied research.

27.-This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

28.-Control of the EANC unit process through the control interface box without the computer.

29.-Visualization of all the sensors values used in the EANC unit process.

- Several other exercises can be done and designed by the user.

TENDER SPECIFICATIONS (for optional items)

⑥ EANC/ICAI. Interactive Computer Aided Instruction Software.

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.

- 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.

- 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.

⑦ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

MINI ESN. EDIBON Mini Scada-Net System allows up to 30 students to work with a Teaching Unit in any laboratory, simultaneously.

The MINI ESN system consists of the adaptation of any EDIBON Computer Controlled Unit with SCADA integrated in a local network.

This system allows to view/control the unit remotely, from any computer integrated in the local net (in the classroom), through the main computer connected to the unit.

Main characteristics:

- It allows up to 30 students to work simultaneously with the EDIBON Computer Controlled Unit with SCADA, connected in a local net.

- Open Control + Multicontrol + Real Time Control + Multi Student Post.

- Instructor controls and explains to all students at the same time.

- Any user/student can work doing "real time" control/multicontrol and visualisation.

- Instructor can see in the computer what any user/student is doing in the unit.

- Continuous communication between the instructor and all the users/students connected.

Main advantages:

- It allows an easier and quicker understanding.

- This system allows you can save time and cost.

- Future expansions with more EDIBON Units.

The system basically will consist of:

This system is used with a Computer Controlled Unit.

- Instructor's computer.

- Students' computers.

- Local Network.

- Unit-Control Interface adaptation.

- Unit Software adaptation.

- Webcam.

- MINI ESN Software to control the whole system.

- Cables and accessories required for a normal operation.

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

REPRESENTATIVE: