



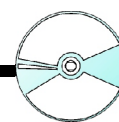
① Unit: TDS. Teaching Unit for the Study of Digital Signal Processing, including Control Interface

Always included in the supply:

RTC. EDIBON Real Time Control System



② Data Acquisition Board



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



Computer (not included in the supply)

④ Cables and Accessories

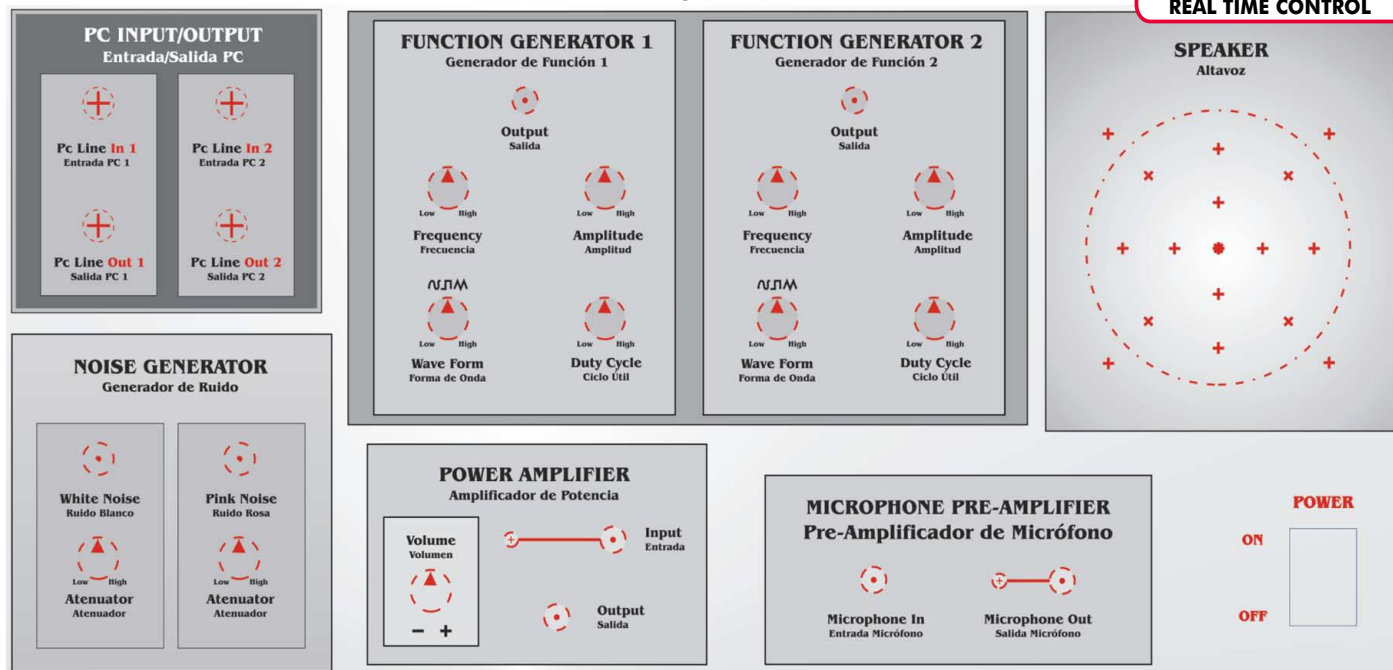
⑤ Manuals

www.edibon.com

Products
Products range
Units
2.-Electronics

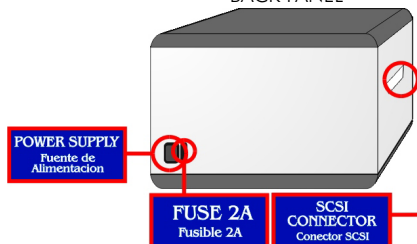
PROCESS DIAGRAM AND ELEMENTS ALLOCATION

FRONT PANEL



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

BACK PANEL



ISO 9001:2000 Certificate of Approval



European Union Certificate



Certificates ISO 14001: 2004 and ECO-Management and Audit Scheme (environmental management)



Worlddidac Quality Charter Certificate Worlddidac Member

Items supplied as standard

① **TDS. Unit:**

Metallic box.

Diagram in the front panel with similar distribution to the elements in the real unit.

Front Panel:

2 Function generators modules, that can generate 3 different signals: sinusoidal, square and triangular.

Each function generator includes:

Wave forms selector (sinusoidal, square and triangular).

Frequency selector.

Amplitude selector.

Duty cycle selector.

Signal output (BNC connector).

Noise generator module, that can generate two noises type. Including:

2 noise outputs: one for white noise and other for pink noise.

Attenuator selector per each noise type.

Microphone pre-amplifier module, including:

Input (microphone)(jack connector 1/4").

Outputs (2 connectors, one jack connector 1/8" and the other BNC connector).

Power amplifier module, including:

Inputs (2 connectors, one jack connector 1/8" and the other RCA connector).

Output (BNC connector).

Volume selector.

Speaker module.

PC input/output module, including:

2 inputs (BNC connectors).

2 outputs (BNC connectors).

Power On/Off switch.

Lateral panel:

SCSI connector for connecting with the data acquisition board (DAB) to be placed in the computer PC.

Back panel:

Power supply connector. Safety fuse.

Inside:

Power supply.

2 Signal generation boards (PBC).

White and pink noise generation board (PBC).

Power amplifier board (PBC).

Pre-amplifier board (PBC).

Control interface.

Possibility of working simultaneously with two external signals, thanks to its inputs, facilitating operations that required more than one signal.

Moreover it is possible to generate signals directly by the software and send them to the unit outputs and then visualizing by an external oscilloscope or listening by the speaker.

② **DAB. Data Acquisition Board:**

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

Analog input: Channels= 16 single-ended or 8 differential. Resolution= 16 bits, 1 in 65536.

Sampling rate up to: 250 KS/s (Kilo samples per second). Input range (V) $\pm 10V$.

Data transfers=DMA, interrupts, programmed I/O. Number of DMA channels=6.

Analog output: Channels=2. Resolution=16 bits, 1 in 65536. Maximum output rate up to: 833 KS/s.

Output range(V) $\pm 10V$. Data transfers=DMA, interrupts, programmed I/O.

Digital Input/Output: Channels=24 inputs/outputs. D0 or D1 Sample Clock frequency: 0 to 1 MHz.

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

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

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.

Registration and visualization of signals in an automatic and simultaneously way. 2 signals can be visualized simultaneously.

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

Management, processing and comparison of data.

Sampling velocity up to 250,000 data per second.

Comparative analysis of the obtained data, after to the process and modification of the conditions during the process.

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: TDS + DAB + TDS/CCSOF + Cables and Accessories + Manuals are included in the minimum supply, enabling a normal operation.**

Complementary items to the standard supply

Simulation Software:

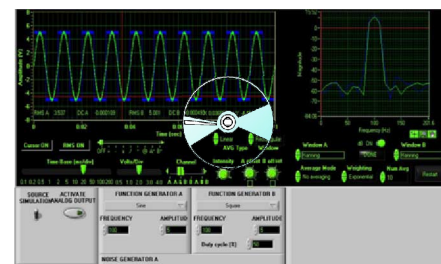
⑥ **TDS/SOF. Digital Signal Processing Simulation Software Package.** (See TDS/SOF Catalogue).



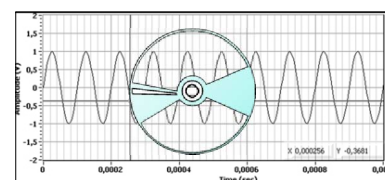
TDS Unit



DAB



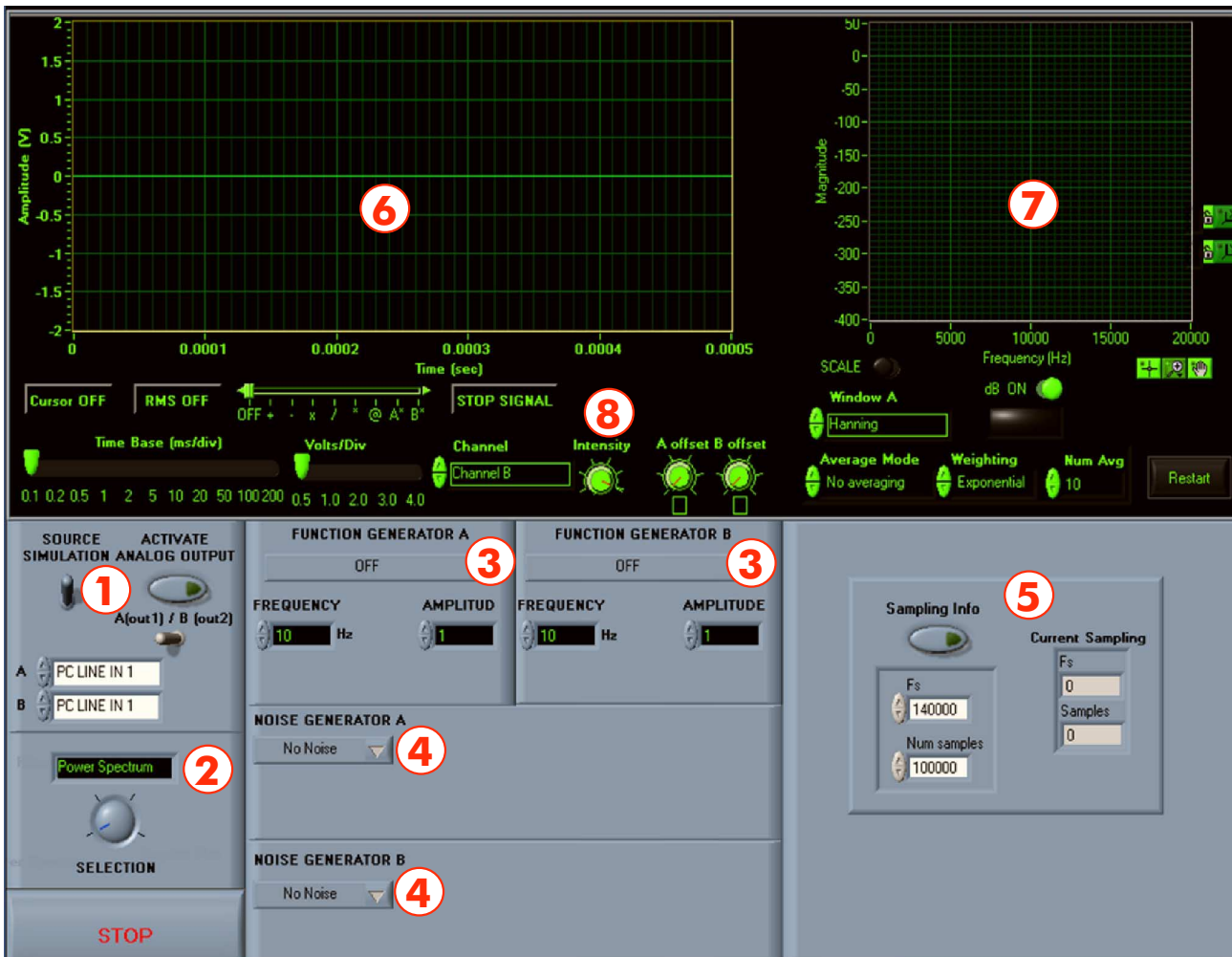
TDS/CCSOF



TDS/SOF

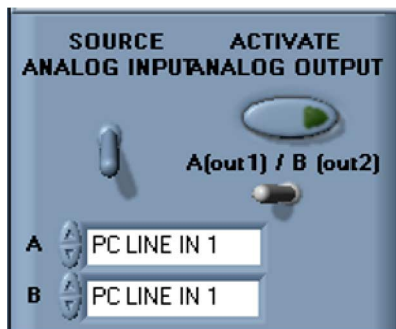
Software Main Screens

Main screen

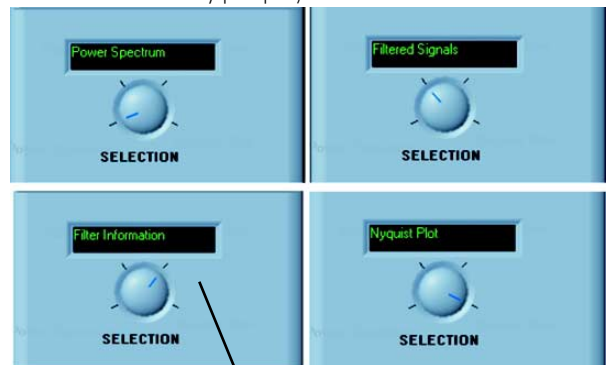


This main screen is divided in different sections:

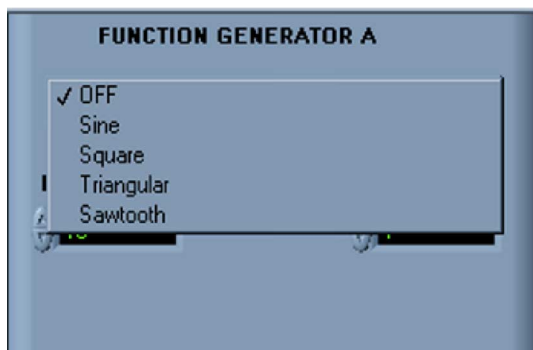
1.- Control of inputs and outputs, and source type (acquisition from the interface or simulation):



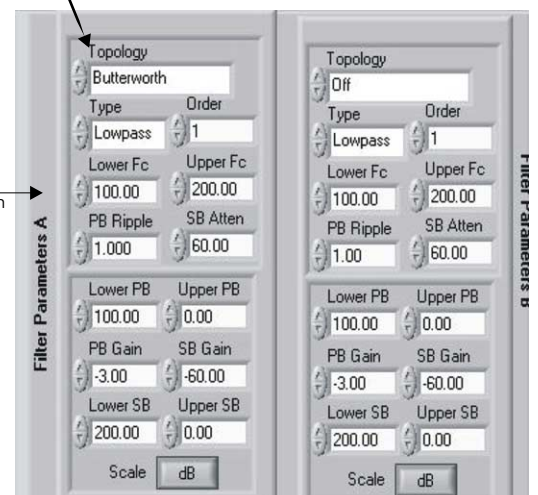
2.- Mode selection. There are 4 modes (power spectrum, filtered signals, filter information and Nyquist plot):



3.- Two Function Generators. Possibility of generating 4 different signals:



Example of Filter parameters screen

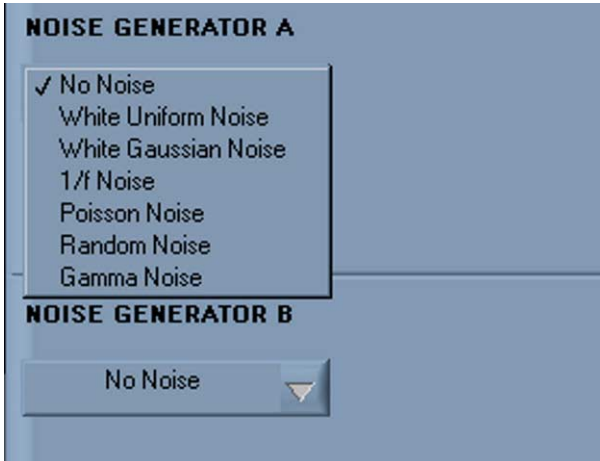


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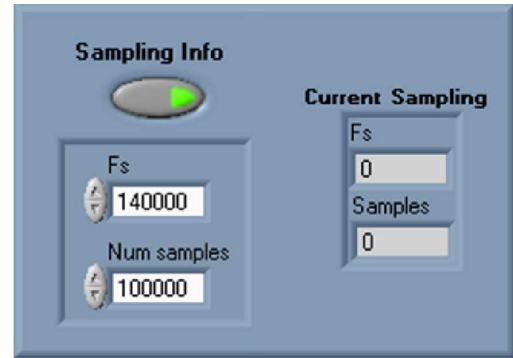
Software Main Screens (continuation)

This main screen is divided in different sections:(continuation)

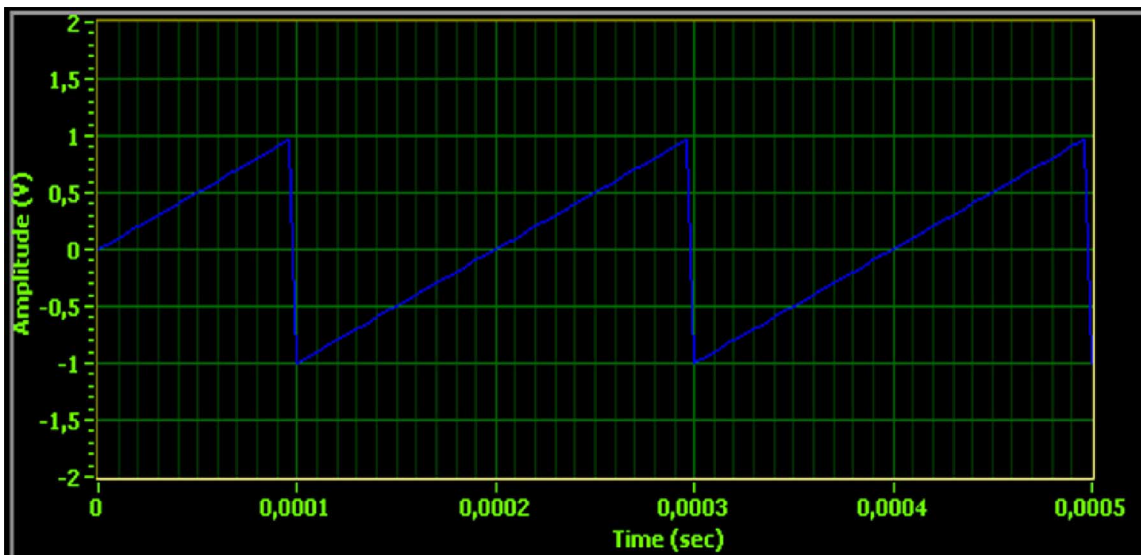
4.- Two Noise Generators. Possibility to select 6 different noises type:



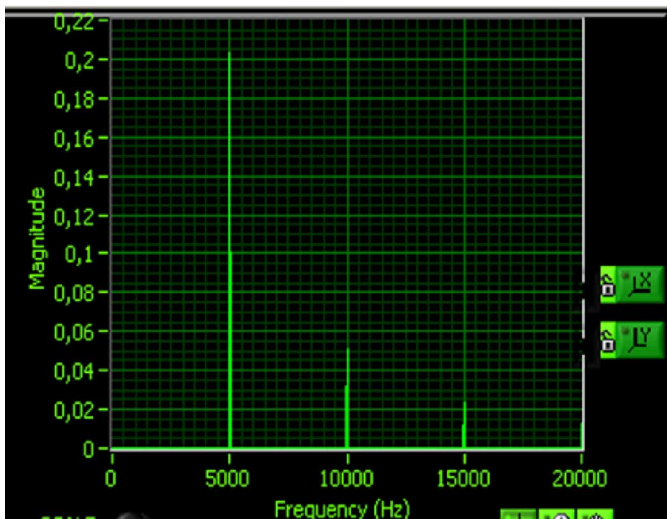
5.- Set sampling frequency:



6.- Signal/s graph visualization (in time):



7.- Signal/s graph visualization (in frequency or time):



8.- Oscilloscope and spectroscope tools:

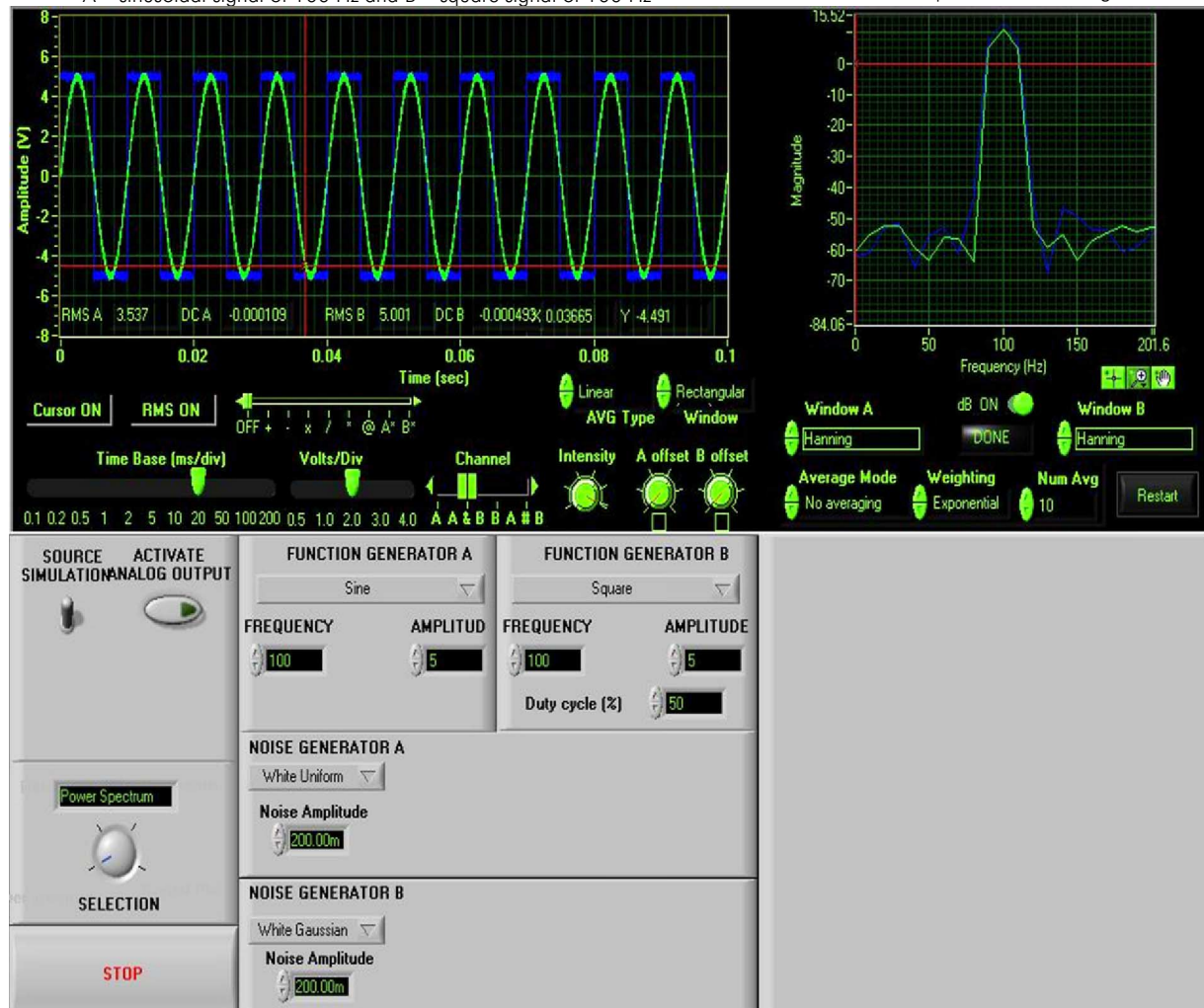


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Some typical exercises results

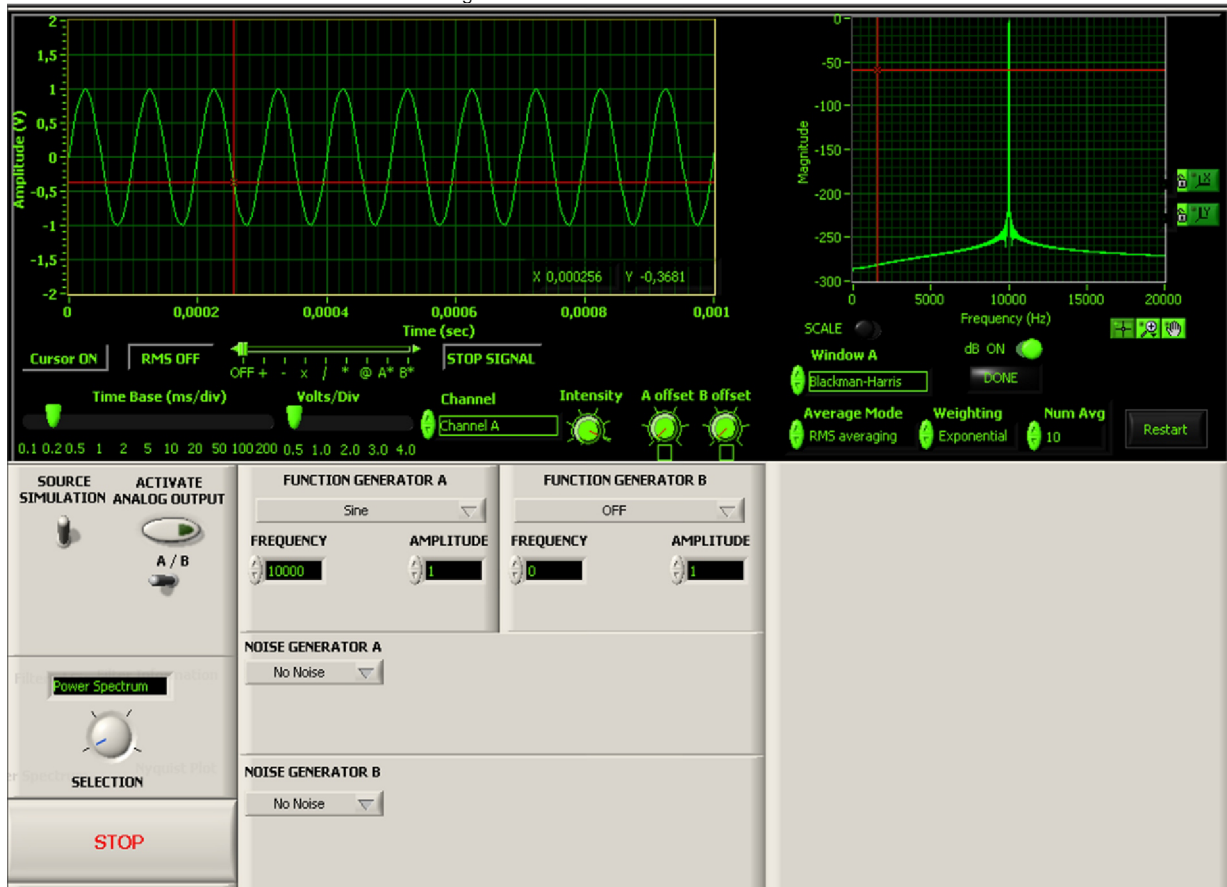
Visualization of 2 channels, A and B, simultaneously.
A= sinusoidal signal of 100 Hz and B= square signal of 100 Hz

Power spectrum of the 2 signals



Visualization of channel A. Sinusoidal signal of 10 KHz

Power spectrum of the signal



Continue...

Some typical exercises results (continuation)

Visualization of channel B, sawtooth signal of 5 KHz.

Power spectrum of the signal



Visualization of channel A, sinusoidal signal with White Uniform Noise

Filtered signal (signal reconstruction) through Chebyshev Low Pass Filters



Some typical exercises results (continuation)

Visualization of 2 channels, A and B, simultaneously.

A= square signal of 1KHz, 1V and duty cycle=50%, and B= sinusoidal signal of 1KHz and 1V.

Power spectrum of the 2 signals

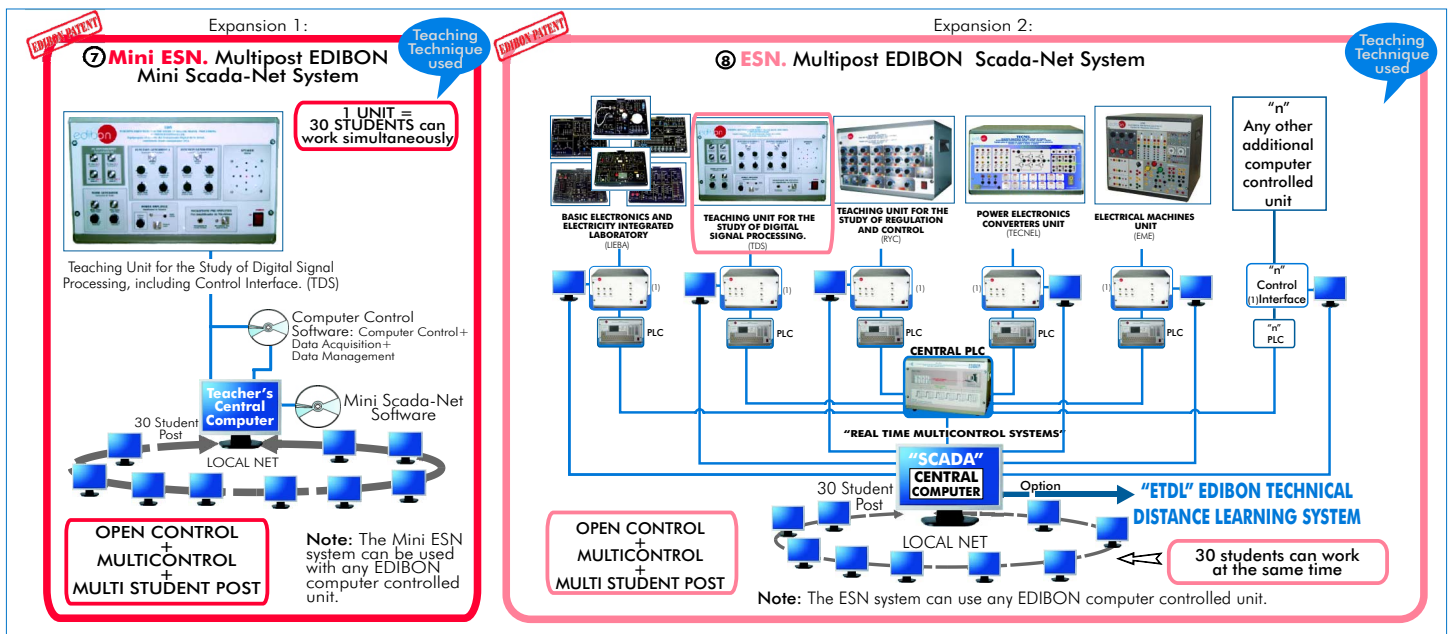


EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

- 1.- Continuous wave form generation, with the possibility of varying the frequency and amplitude of signals, besides of duty cycle.
- 2.- Characterization of signals. To analyze the nature of the signals: sinusoidal, square, triangular and sawtooth.
- 3.- Possibility of working simultaneously with two external signals.
- 4.- Possibility of generating signals directly by the software and send them to the unit outputs and then visualizing or listening by the speaker or an external oscilloscope.
- 5.- Signal digitalization, permitting the most suitable sampling time, avoiding "aliasing".
- 6.- Digitalization of signals with the possibility of adjusting the sampling frequency.
- 7.- Fast Fourier Transforms (Power Spectrum).
- 8.- Addition, subtraction, multiplication, convolution and auto-convolution of signals.
- 9.- Study of "aliasing".
- 10.- Application of the frequency convolution theorem.
- 11.- Study of different noise types:
 - White Uniform noise.
 - White Gaussian noise.
 - 1/f noise.
 - Poisson noise.
 - Random noise.
 - Gamma noise.
- 12.- Representation of the Bode diagram and Nyquist diagram of any transfer function, and phase information.
- 13.- Study and use of filters:
 - Possibility of filtration of any signal.
 - Reconstructions of signals through the application of filters.
 - Finite Impulse Response (FIR) Filters.
 - Infinite Impulse Response (IIR) Filters.
 - Possibility to use Bartlett, Hanning, Hamming, Kaiser, Parzen, etc. windows for applying on the signal.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS



ORDER INFORMATION

Items supplied as standard

Complementary items to the standard supply

Minimum configuration for normal operation includes:

- ① Unit: TDS. Teaching Unit for the Study of Digital Signal Processing, including Control Interface.
- ② DAB. Data Acquisition Board.
- ③ TDS/CCSOF. Computer Control + Data Acquisition + Data Management Software.
- ④ Cables and Accessories, for normal operation.
- ⑤ Manuals.

- ⑥ TDS/SOF. Digital Signal Processing Simulation Software Package.

Expansions

- ⑦ Mini ESN. Multipost EDIBON Mini Scada-Net System.
- ⑧ ESN. Multipost EDIBON Scada-Net System.

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

REQUIRED SERVICES

- Electrical supply: single-phase, 220V. 50Hz or 110V. 60Hz.
- Computer (PC).

DIMENSIONS & WEIGHTS

- Dimensions: 490 x 330 x 310 mm. approx.
- Weight: 30 Kg. approx.

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



C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANES. (Madrid). SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: www.edibon.com

Issue: ED01/09
Date: November/2009

REPRESENTATIVE:

A large, empty rectangular box with a light blue border, intended for a representative's signature or stamp.