

Scientific Educational Systems



Electronics, Communication, Control, and Autotronics

SES offers new trainers of the TPS series, which preset a new strategy and unique attitude for electronics teaching. This series covers the electronic, communication and control fields. The trainers are large at size, very beautiful, and each covers a complete learning field. The trainers' components are organized as modules at the experience area, and they connect via banana wires (accept for the TPS-3371).

- **TPS-3321:** A trainer for studying electricity and semi conductors. The trainer's components are organized in groups (resistors, capacitors, coils, silicon and geranium diodes, Zener diodes, stabilizer, LEDs, transistors; NPN, PNP, JFET, MOSFET, sensors; NTC, PTC, LDR, phototransistors, control components; SCR, TRIAC, DIAC, UJT, two motors, lights and transformer). The trainer is designated to perform measurements at the component level. The trainer's supply creates alternate voltage for voltage conversion, straightening, filtering, and stabilization practice.
- **TPS-3331:** A trainer for studying analog electronics (diodes circuits, power supplies, linear and switch stabilizers, bipolar and FET transistors, server amplifiers and their applications). Measurements can also be performed at the component level.
- **TPS-3351:** A trainer for studying digital systems and switching (logic gates, simplification and implementation of logic functions, decoders, multiplexers, binary addition and subtraction, Flip-Flops and their applications, registers and their applications, counters and their applications). Measurements can also be performed at the component level.
- **TPS-3371:** A trainer for studying analog and digital electronics with discreet components and integrated circuits, which are inserted to the system's matrixes. It also includes peripheral components, such as: switches, pushbuttons, LEDs, buzzer, audio amplifier, logic probe, consecutive examiner, two 7-Segment displays, alternate oscillators, and potentiometer. This trainer is also suitable for microprocessor's hardware and ports exercises.
- **TPS-3421:** A trainer for studying AM/FM analog communication (modulation and detection of AM and FM, transmission, reception, tuner, oscillators, mixer, frequency converter, filters, directed amplifiers, PLL, VCO, preamplifier and microphone, power amplifier and speaker).
- **TPS-3431:** A trainer for studying digital communication (digital data modulation methods, ASK, BPSK, DPSK, QPSK detection methods, filter, tracing a carrier wave using PLL, transmission and reception of binary data).
- TPS-3481: A trainer for studying optic communication and optic fiber (RC oscillator, preamplifier and microphone, audio amplifier and speaker, digital, analog and optic transmitter, transmission LED, optic receiver, IR transmitter with modulation, optic fiber, IR receiver, Schmitt amplifier, digital counter and display, transmission and reception of binary data using RZ and NRZ methods).
- **TPS-3491:** A trainer for studying digital and analog signals (conversion of analog signal to digital signal using ADC, conversion of digital data to analog data using DAC, compression and expansion to improve the relation

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between signal and noise, conversion by delta modulation, encoding methods (PAM, PCM, DPCM), serial transmission and reception, two channel TDM, storing in RAM, signals reconstruction, changing the sample frequency and the reconstruction, preamplifier and microphone, audio amplifier and speaker).

- TPS-3011: A trainer for studying process control (motor and dynamo for speed control, lights and temperature sensor for temperature control, lights and light sensor for light control, level control module, load components to interrupt the controlled variable, analog voltmeter, control and regulation amplifier module in open loop, feedback amplifiers, Schmitt amplifier for two-level control, adder for close loop control, PD control module, PI control module). The system's scope enables to present transfer phenomenon and control system's reactions.
- TPS-3071: A trainer for studying systems control (step motor with a dial, optic pair, Hole effect sensor, limit switch, motor and dynamo for speed control, lights and temperature sensor for temperature control, lights and light sensor for light control, elevator module, traffic light module, connection points to any programmed controller, analog and digital I/O unit operated by the SES ladder diagram software, a connection to SES microprocessors modules operated with Assembly and C language).
- **TPS-352X:** A 6 trainers series for studying and exercising autotronic subjects: communication inside a vehicle, sensors in a car and their influence on fuel injection, car operators and electric windows control, sensors and their influence on the ignition advancement, alternator and diesel sparks, signaling and electric mirrors. It is possible to connect the trainers via communication to the computer to display the system's signals.

Each trainer is an independent trainer that includes all the components required for the experiments. The trainer is built in equipped metal, includes a wide printed circuit (22x35 cm) for experiments that enables clear view and easy access to the components.

The components are located on the board along with a clear, well organized silk print. The main part of the card is the experiments area, divided to various modules; each covers a certain control function. This part includes banana plugs for connection and checking points.

The upper part of the board includes the circuit's components. These components must not be touched. They are placed under a strong and transparent polycarbonate cover.

Each trainer is fed by a single supply. The trainer includes a power supply unit, which supply stabilized voltages and an alternate voltage source.

Each trainer includes an internal controller, which activates a signal generator and samples two channels as a scope. This controller is controlled by a computer in serial communication. The operating program that accompanies the trainer is a friendly "floating equipment" program, simple to operate and enables graphic signals display with spectral analysis. The program fits itself to the automatically connected trainer.

Each trainer is accompanied with theoretical and experimental literature, which covers all the curriculum tasks and more.

All the trainers are designated to be operated by standard measurement equipment as by a computer. The literature relates to this two possibilities. The computer gives the trainer a remarkable dimension, and enables to present reports with the signals description as received and measured.



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In addition, SES offers 3 **student cards** for exercise and development for Altera and 8051 applications (8051 includes writing and running program in C language).

DSM-3098: A unique and inexpensive card based on the 7128 Altera and is designated for the following usages: study and exercise station for programmable components in general and Altera in particular, includes using and operating various development tools; Altera embedded project card; logic components and digital systems exercising card.

The card includes one of the Altera's popular components. The card connects directly to the computer's printer output and is activated by the software provided by Altera.

DSM-3090: A revolutionary and inexpensive card, based on the 8051, designated for the following usages: exercise station for C language and micro-computer embedded systems; microcontroller embedded projects card; study and exercise station for the 8051 microcontroller; development station for project based on the very small microcontroller 89C2051 and serial support components; computer serial communication I/O card for exercising 8086 Assembly; computer serial communication I/O card for exercising software in high level language such as C, VISUAL, BASIC, DELFI, PASCAL.

The card includes the 89S52 controller and a strong operational system, thus it is used as a multi-purpose development card, including development in C language.

- **DSM-3092:** 8051 controllers burning card from the most popular (89C2051 and 8952). The card is also used as a ROM emulator for the 8952.
- DSM-2095: A robotic card based on 8051 that includes exercise units and project support components in the robotic and computerized systems field: digital output channels with motors drivers, digital input channels, analog input channels for sensors and an analog output channel with drivers. The company also supply control components (motors, sensors etc.) for a variety of robots.

The card also includes the 89S52 controller and a strong operating program, so it can be used as a multi-possibilities development card, in C language.