Arazim Building, 20a Eliau Eithan St.,
New Industrial Area, Rishon-Lezion
P.O.Box 5340, Rishon-Lezion 75151
Tel: 972-3-9412457/9, Fax: 972-3-9412425
E-mail: sesltd@netvision.net.il

Scientific
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Systems

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Mobile Robots with DSM-2095

SES (Scientific Educational Systems) creates means for studying robotic systems that combine machines and electronics - mechatronics.

Today we see more and more robotic systems around us. Systems that perform activities independently, such as: searching, identifying, operating, protecting etc. The leaders in this field are actually the computerized toys. Many systems combine a certain type of artificial intelligence in their operations and in communication between machines.

Constructing a robotic system requires knowledge in various electronics subjects (drivers, amplifiers, sensors, converters, micro-computers, programming and embedded microcontroller or microprocessor systems, computer communication), and in mechanics (motors, transmissions, mechanisms). These subjects are covered by a variety of trainers, also fit for colleges and academic schools.

Because every robotic system has a micro-computer, the developer needs a developing system. SES offers very popular, inexpensive developing systems that achieved great success at a great number of schools. SES also offers development cards for this kind of projects. These systems can be used to exercise, develop and burn the program.

The DSM-2095 card was developed for the "Robotics and Computerized Systems" curriculum, which is based on the 8051 microcontroller (appears in the technicians and practical engineers' curriculum and is used in the various robotics and machines departments, and also by whomever wants to develop an embedded microcontroller system).

The 8051 is especially suitable for this subject. It is a microprocessor and a microcontroller. It has a better working ability with sensors and communication and the created system is much simpler. Motors control is accomplished easily. It is also a popular component in the industry for these uses. Learning about the 8051 is simple and easy.

The card includes a micro-computer systems, lights, switches, drivers, amplifiers, conversion components (ADC and DAC), communication interface and connectors for connection to the motors, lights and the external sensors.
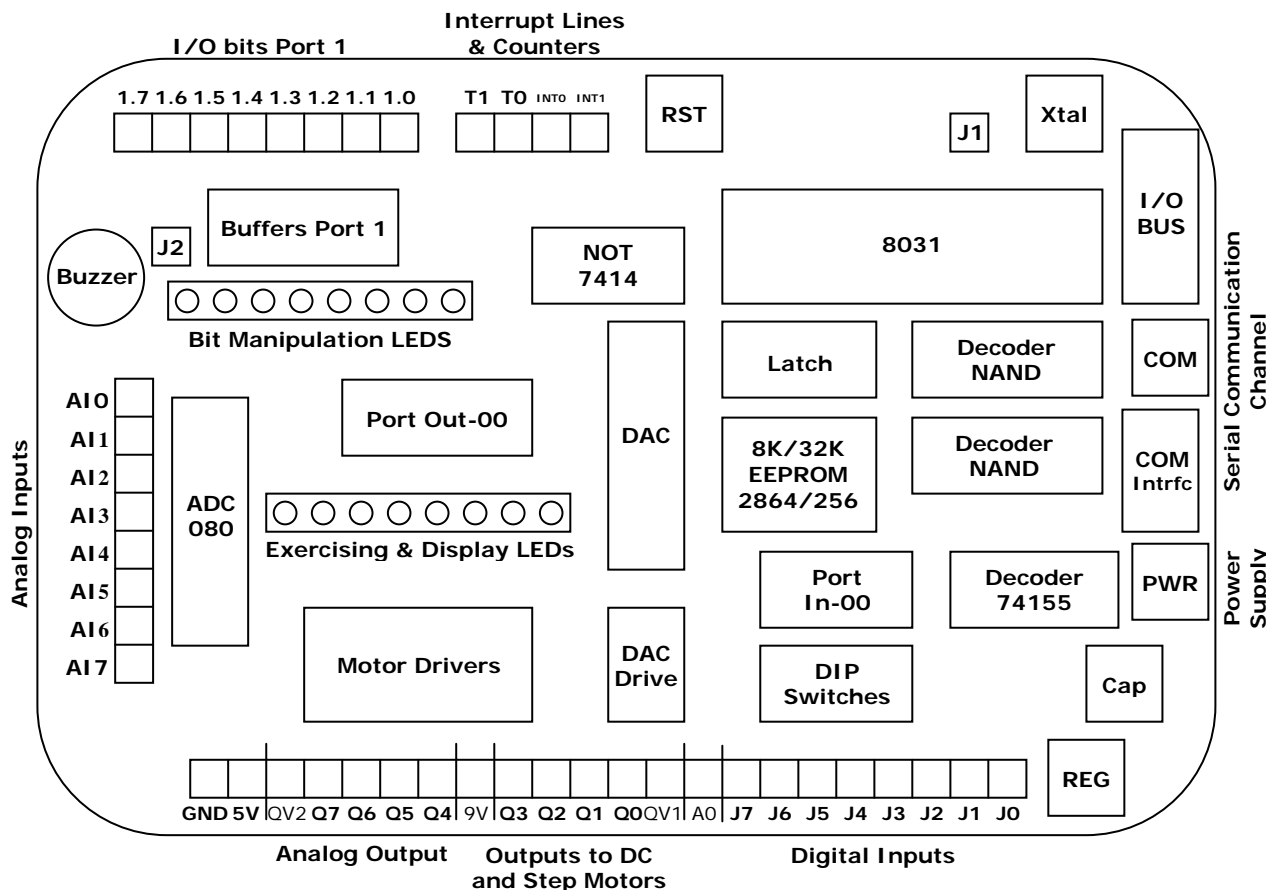
This card has a double function. It is used as a study and exercise trainer for micro-computer, hardware, peripheral components, conversion circuits, driver circuits, and sensors. Afterward, the student uses the card to implement the personal or team project.
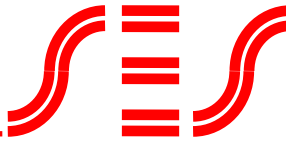
The card is accompanied by a rich organized book named "Robotics and Computerized Systems". It includes an explanation on C language operating and real time systems, which eventually operate independently.

SES also provides various end components such as: different types of motors and sensors up to a **Robot Kit** level and sensors.

The **DSM-2095 card** comes with operating software, thus it can be programmed directly in serial communication using the computer in Assembler or C language.

The SES trainers are accompanied by exercise and practice literature aimed for self-study. Also suitable for students with no electronic background or for electronics students who are not familiar with the 8051.

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Robots based on this card won first places at the "Roboner" competitions.

In 2003, the three robots (from 3 different schools) that won the first three places in the international competition in the U.S.A. were based on this card.
The three winning teams traveled with no accompanying technological teacher.

DSM-2095
Controller Card for Robotic Systems

The DSM-2095 characteristics:

1) Designated for studying the 8051 principles, control, microcontroller embedded systems and peripherals components (such as: ports, ADC, and DAC) and also as an independent system, which operates and controls a robot.

2) Based on the 89S52 (from the 8051 family and the most popular in the industry for these applications). Used as a CPU as well as a microcontroller.

3) Includes internal timers for implementing motors control (PWM and Encoder's call), watch dog and real time systems.

4) Includes interrupt lines (level triggering and edge triggering), internal ports and UART for serial communication.

5) The controller includes operational software and strong development software for **C and Assembly languages development**.

6) The card enables burning the user's program in the EEPROM, which turns the system to an independent one. There is no need to connect it again to the computer to load the program, unless a change in the program is required.

7) The card comes with a 9V/880mA power supply. Batteries or a battery can be used.

8) A separate supply, the card's voltage input, or the DAC output can be connected to the motors drivers. Connecting the DAC output to the motors' driver enables control on the motors speed.

9) The motors speed can also be controlled by the PWM routines, which are included in the example programs provided with the card.

10) The motors outputs enable operation of up to 4 DC motors or 2 DC motors and one or two step motors up to 2A per coil.

11) The motors driver operates a DC motor in both rotation directions.

12) The DAC output includes a driver and is able to provide a 1A current.

13) The buffers of port 1 only indicate the line's state and do not affect it.

14) The channels of port 1 enable addressing the I/O units, the sensors and the consumers in bit manipulation, simply and conveniently.

15) The digital inputs also enable connecting a keyboard without any other means.

16) The BUS connector enables expanding the system by connecting additional modules such as: LCD, speech, additional peripherals components etc.

17) The card includes a serial communication interface and can be used for computer communication or communication between systems.

18) Comes with complete literature, including basic exercises in robotics and applications.