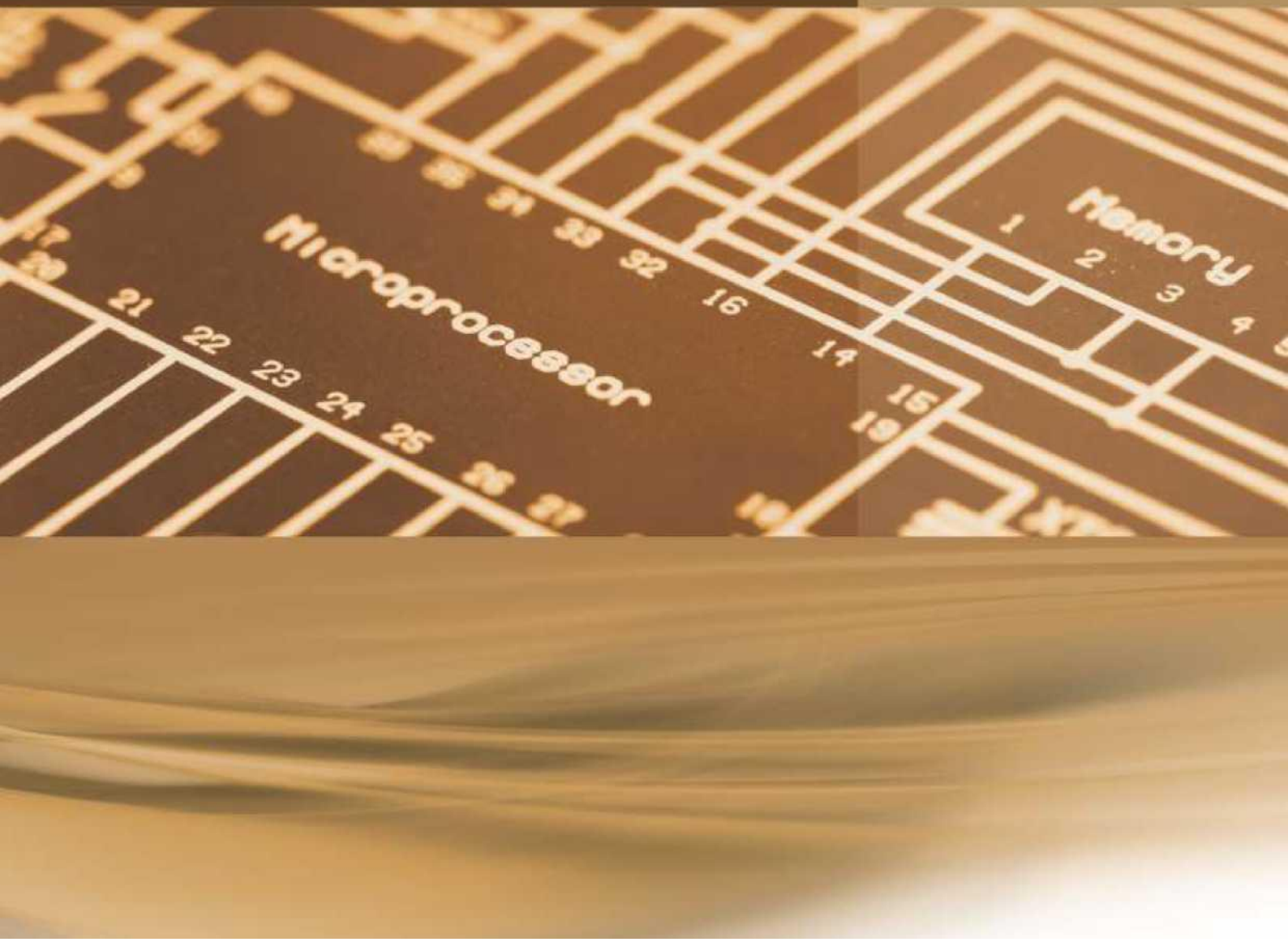
ÇOKESEN ELEKTRONİK



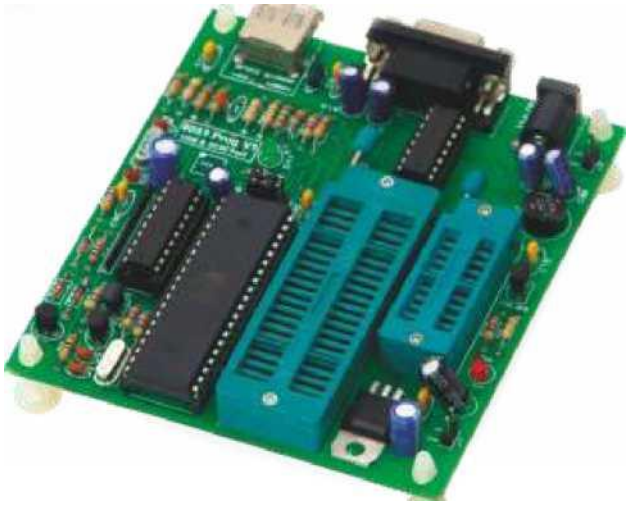
Microcontroller , Programmers and Trainer Kits

Microcontroller Programming Devices

PROG 8051 V1
AVR USB PROG
PIC USB PROG
PICKit2

8051 Programmer
ATMEL AVR Programmer
PIC Programmer
PIC Programmers

8051 VI PROG Programming Card
8051 VI PROG Programming card with 8051 microcontroller family are widely distributed in the market very easily and quickly from your PC's USB or serial port (COM port) will be able to program it with electrical data you send. 8051 V PROG is built with special double-sided printed circuit technique, then mounted carefully tested. PROG 8051 VI card of a PC and has been tested on different laptops, you can safely use it to cause any malfunction under normal use

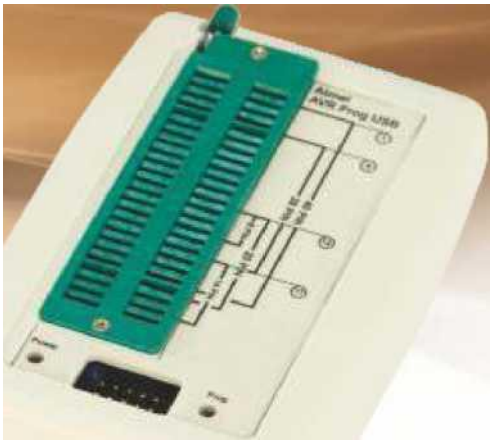


ATMEL 8051 V1 are given, together with the programming card: PROG 8051 V1

All programs are required to use your programming card in place of the CD-ROM Software CD-ROM gets. In addition, the software required for our other products, examples of program code , book reviews included in the set

		EEPROM	RAM (Bytes)	I/O Pins
AT89C51	4		128	32
AT89LV51	4		128	32
AT89C52	8		256	32
AT89LV52	8		256	32
AT8C55	20		256	32
AT89LV55	20		256	32
AT89S51	4		128	32
AT89LS51	4		128	32
AT89S52	8		256	32
AT89LS52	8		256	32
AT89S53	12		256	32
AT89LS53	12		256	32
AT89S8252	8	2 Kb	256	32
AT89LS8252	8	2 Kb	256	32
AT89C1051	1		128	15
AT89C2051	2		128	15
AT89C4051	4		128	15

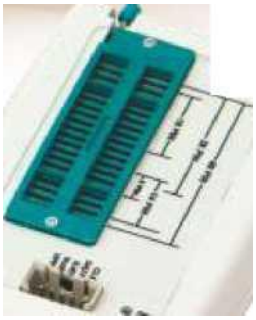
AVR PROG USB



Features of the programs:
• AVR USB PROG, ATMEL AVR microcontrollers are widely distributed in the market, it is a card that you can very easily and quickly programmed from the USB port.
• installing or uninstalling your integrated into a private ZIF socket is very comfortable. The damage to the integrated pin ZIF socket through programs you are preventable.
• AVR USB PROG is built with single-sided custom printed

circuit technique.
Mounting made of each circuit being tested is stored after arriving in operation.
• Enable UN used FT232 (USB-serial converter) is mounted on the back side of the card.
• AVR PROG USB card has been tested several times on different computers. Therefore, it works fine on all computers.
• There is no need for an external power supply. Needed to do programming + 5V is supplied from the USB port.
• On-board ISP (in-circuit programming) is output socket. This move by the help of output pins of the socket
any circuit can program AVR
• Learned and is very easy to use with AVR AVR-OSP II program called PROG is done installing the USB card.
Integrated programs you how to place the ZIF socket, it is stated in the manual. Also on the card is available in the drawing. This in will make your programming provides great convenience.
When you purchase the card, you are given a CD. Plenty of sample programs on this CD (Turkish and English optional) and is located software to use.
• The compiler has been developed for almost all AVR is free. Therefore CD in assembly for AVR C compilers are also available as Basic. AVR Studio 4, BASCOM-AVR (2KB with limited demo) program of the "file download" category is also available as a download from the CD.

AT90Sxxxx	ATtinyXX	ATmegaXXXX	
AT90S1200	ATtiny11	ATmega103	ATmega325
AT90S2313	ATtiny12	ATmega103 comp	ATmega3250
AT90S2323	ATtiny13	ATmega128	ATmega329
AT90S2343	ATtiny15	ATmega1280	ATmega3290
AT90S4414	ATtiny22	ATmega1281	ATmega406
AT90S4433	ATtiny2313	ATmega16	ATmega48
AT90S4434	ATtiny24	ATmega161	ATmega64
AT90S8515	ATtiny25	ATmega161comp	ATmega640
AT90S8515 comp	ATtiny26	ATmega162	ATmega644
AT90S8535	ATtiny261	ATmega163	ATmega645
AT90S8535 comp	ATtiny28	ATmega165	ATmega6450
AT90CAN128	ATtiny44	ATmega168	ATmega649
AT90CAN32	ATtiny45	ATmega169	ATmega6490
AT90CAN64	ATtiny461	ATmega2560	ATmega8
AT90PWM2	ATtiny84	ATmega2561	ATmega8515
AT90PWM3	ATtiny85	ATmega32	ATmega8535
	ATtiny861	ATmega323	ATmega88



(PIC Programming Card / Box) PROG USB PIC is capable of programming a PIC programming card using the computer's USB port.

The most commonly used F-series PICs on the market offers the possibility of programming problem. 8.14 With this card, 18, 28, 40-pin PIC microcontrollers with flash memory can be programmed directly into the ZIF socket is placed on the card. PIC programs you should be in PDIP package type. PIN number and structure of the circuit for ICSP PIC is different (programming on the circuit) can use the feature

PIC PROG USB features:
When you purchase the PIC PROG USB card 8, 14, 18, 28 and 40-pin PIC placed into the socket on the card can program smoothly and reliably.
Allows you to program requiring no external power supply.
Programming without removing the circuit is working PIC (ICSP feature) can be done. You will have the opportunity to devote more time to develop the program with this feature.
Fast and safe programming with UN FT232 USB-serial converters used in this circuit is provided.
ICSP (programming on the circuit) connector and offers the possibility of removing the PIC programming on the circuit.
Through the use of our products with DEKA 16F87X card PROG PIC PIC programming can be done via the USB port on this card.
A circuit will make their move through the ICSP output offers programming possibilities.
Learn and use is made very easy to install with the program called micropro26. Installation and use of this program is described in detail in the instruction manual.

Supplied with

• PIC PROG USB programming card.
• USB port connection cable.
• Where the user may be required for all software CD.
• User guide that explains step by step of the programming process in detail.

Microcontroller training Sets

Order No: ES110

Order No: ES120

Order No: ES130

Order No: PIC PROG/DEKA PRO-1 M-

Order No: PIC / M-AVR

Order No: PIC PROG/DEKA V5 ES120.01

ES110 PIC Microcontrol Trainer:

ES110 Microchip PIC16 microcontroller is the most advanced model of the first series, including other family PIC16F877A 8, 18, 28, 40-pin PICs are the goal is to learn to use all the features produced. ES110 Experiment Set up experienced users, also offers advantages for beginners.
Set has a modular structure, which consists of one main and auxiliary modules 12. PICS on the main modules are programmed from the computer's USB port. Your program does not ends-bit PIC program that will automatically start to run. MAIN PIC module to a part of the module will connect the appropriate cable through the PIC or the entries of the input data are seeing the auxiliary module that allows a portion of the output data. This module provides the necessary environment for the testing of electronic circuits work when the PIC. Will be able to easily see what you have done with the PIC's work on process module will connect to the appropriate port according to the project's features.
PIC Main Module (PAM) that you place it on the programming of PIC is done via the USB port. Whether your desktop, and you have to want a laptop, both of which found that the USB port can be used on any PC.

This kit has been tested on different PCs and notebooks can be safely used is not causing any failure under normal use

One of the most important features of the set; supplied with this kit specifically designed for and set "ASSEMBLY with PIC 16F877 PROGRAMMING INFORMATION AND TESTS" book on programming the PIC 16F877 to integrate all of those who want to begin by recognizing the hardware specifications have been targeted. With the book PIC assembly language programming technique is discussed in detail.

These modules are located on the Set :

1-PIC Main Module (PAM)
2-PORT CROSSINGS and MEASUREMENT module
3-CONTACT module CAPITAL
4-KEYPAD Module
5-Coupled to the analogue input module
6-ADC Module
7-DAC Module
7-INPUT-button module
8-Relay Module
9-Spare Wheel engine module
10-Software CD
11-LCD Module
12-4x7 SEGMENT module
13-LED Module

1. PIC Main Module (PAM)

• attaching the PIC is programmed on the project which will be developed and run this module.
• 8, 14, 18, 28 and 40-pin PDIP type of socket can be placed in the PIC is located.
• There is a built-in programmer circuit on the main module. Programming PIC installed on a PC PAM is done with the data sent from the USB port.
• Located on a main module 6 2x5 pin header connector is made by means of links to other application modules.
• To provide power to the other modules 2 pin connector on each remaining data in an 8-pin ports are also pins.
• The power input to the system is done via this module. 2-10s or moved to other modules with data cables.

2. PORT CROSSINGS and MEASUREMENT module

There are two DIP switches and connecting pins on the module.
With the DIP switch on the left side is used to cut the connection between the PAM modules used as input.
The pins used as input or output modules in the pin on the PIC may not correspond with the PAM entry. In this case the cross is made with

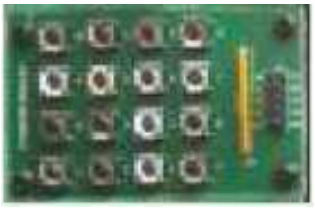
jumper wires to connect to the pin cut precision necessary links with the left DIP switch. If necessary, based on the output of the measuring multimeter or oscilloscope to pin connection is made.
Permanent digital input to any port on the PAM DIP switch on the right side (0V or 5V), the output voltage to a desired port can be used to implement the measure or measuring pins

3. CONTACT module CAPITAL

ES110 Trainer is a module designed to be able to develop serial communication applications with. The connection between the PC with a

DB9 serial port is done by RS232 cable.
Are integrated on the RS-232 module.

4. KEYPAD Module



The module can be optionally made of 4x4 or 4x3 keypad test.
16 Enable button is located. Matrix array of PIC of these buttons 8 pins to be entered data from 16 separate buttons provided.

5. Coupled to the analogue input module

Analog Input Module
PIC on PAM is designed to provide an analog input module.
PIC 8 allows to separate the analog input channel. Enable 3 potentiometers, LM35 (temperature sensor) and
LDR (light sensor) is located. He wanted the analog input to the other two entries in the user's needs
pins are located to place the sensor.

6. ADC Module

ADC0804 is the module that contains the integrated.
AG 0-5 V analog voltage from the entered the pin 8-bit converted digital data. Digital data like 2x5 pin header through the cable can be connected to any port on the PAM.

7. DAC Module

• The module on which the DAC0808 integrated and LM741 opamp.
• 2x5 connector header like PAM digital data from any port on is designed to convert the analog voltage.
• DIP switch on the module was placed in order to provide the independent DAC0808 digital integrated from PAM

8. Button input module

• Digital input (5V, 0V) is a module placed on the 8 button to make.
• Inputs are made with 10K ness pull-up resistor connected to the button (normally connected to the data when the 5V logic 1) button is pressed, the logic -0 (0V) to the module output.

9. Relay Module

• There are 4 pcs one contact relays. Relay voltages are 5V.
• According to the logic-1 or logic-0 data from the PIC output is used to drive higher current and voltage loads to be connected externally.
• Relay contact voltage of 220V is available in 10A.
• Relay coils are driven by the BC3337 transistors. When each role working across the LED lights.

10. Stepper Motor Module

• ULN2003 is integrated and can be operated with 5V stepper motor is located on the module.
• Stepper motors are designed for experiments. Because the stepper motor driver module on the circuit placing any port can be used as a direct output module MAIN PIC unit

11. LCD Module

PIC sent with ten 4-bit data is used to print text alphanumeric LCD. LCD 2 x 8 is mounted on the module status.
4.7K potentiometer is used for the LCD brightness setting.

12. 7 Segment display Module

4 pieces and cathode display driver integrated module where the 74LS47.
74LS47 integrated and the data sent to drive common anode terminals are connected to a single port.
This is a common anode 7-segment display and is driven each BC327 PNP transistors. 4 PIC programming the screening method used to display more digits in the display.

13. LED Indicators Module

• Used to monitor binary numbers sent from the port side by side with 8 LED.
• Simple training can be done in the early stages of learning PIC programming can be done using this module.
• LEDs are connected to GND ends after 220 ohm resistors connected in series (suitable for driving high active).

14. Power Supply

• ES110 Experiment Kit is a switch mode power supply that provides 12V DC power.
• plug the end of the power supply cord set must be installed to provide power to the jack on the PAM

15. Set includes other materials:

- 1's and 2-Data Transmission Cables
- Very popular with the 40-pin PIC16F877 on the set can be used in all applications that can be done to integrate.
- ES110 trainer which will be needed when using the set and does not require any software licenses that are installed CD-ROM. In the CD-ROM "Microcontroller”
- Serial Port Cables The DB9 serial cable supplied with the kit for use in computer applications.
- The trial will be held from the USB connector on the PAM USB cable required to send the program to the PIC computer.

ES120
PIC Microcontroller Trainer

Microchip PIC micro-controller of the company product without the need for another device, you can smoothly and reliably programming.
A PIC microcontroller to be programmed without removing the site provides an examination of the function and the program will automatically run in application mode.
Outside the scope of the experiment set, allows to be used by adding a module to be developed on the Test Set's and will produce.
General Characteristics of the Test Set
1. Test Set, inside lined with anti-static material, non-impact resistant, has a special aluminum-clad cabinet. Set all units are housed within the same cabinet. If the cabinet is removable cover the desired feature.
2- as user level, from beginners up to professional design that makes programming a microcontroller was chosen at a level that can cater to all sections.

Immediately after 3- PIC Mikrodenetleyc programmable switches automatically to test mode. Test Set is to allow nature to run instantly without removing the programming and commissioning of the PIC microcontroller.
4- Experimental Set of supply is a power switch characteristics can be controlled, the state can be monitored by an LED indicator. Also Test Set, is protected by a fuse on the nature easily accessible.
5- Test Set can be monitored by an LED indicator that the programming or application mode.
6. Test Kit has a modular structure and the cabin door is mounted in one board. Test Set, a single board inside the cabin
If mounted.
7. Ensure that all ports are not connected to any fixed input or output modules, the desired input or output ports can be connected to any desired module.
8. Ports selecting the port pins as being constant can be used with any module.
9. Test Set affected due to a failure of other units that may occur in one of the modules. Is replaced by a new module
or repair is very easy. Modular screwed after having replaced or repaired, you can regain the integrity of the kit as soon as possible.
10. any of the modules over the easily removable. Developed a new module can be replaced when removed. This feature is very important for the education of the students. Student's possible to add a module to the Test Set your own design. This is also an important factor that increases the student's confidence.
Using the module allocated for 11 development can be done on a new design and added a new module to the test set.
During the 12- 10-pin IDC flat-ribbon cable connection is used. Therefore, there is no cable clutter on the set.
13. Test Kit to be used in MICROCHIP PIC 16Fxx, 12Cxx includes all the features of 18Fxx microcontroller instruction set.
14. Test Set, MICROCHIP MPLAB, PIC BASIC PRO, JAL, CCSC, HITECH, IIR, C, C compiler for PIC C and completely similar compatible.
Microcontrollers on 15 Test Kit USB and serial port (RS232) is programmed by means of.
16. Test Set has a ZIF socket for quick and ergonomic programming for series production as well as programming and test socket on.
17 of the crystal oscillator can be selected on the Test Set 4 MHz and 20MHz. All socket + 5V, GND is available as standard.
18. Test Set RESET circuit, which is connected to the socket on all PIC is available. It does not matter what is written PIC socket. Once is

enough to press the RESET button to restart.
19. Test Set can be programmed another circuit without dismantling using PIC ICSP socket on the.
20. Test Set on PS2 keyboard connector to allow for wider communication, IDC2 connector and USB communication connectors are ready.
21 on Test Set, a way to allow the project to create a new circuit board.
22 supplied with the Test Set "User's Guide and Experiments" in the booklet, there is an example of the module-Test Kit on the. The specifications of the test in the book, electronic circuit diagrams, Test Set link pictures, other elements outside the PIC features used in the experiment, statements and other information is covered.

ES120 Microcontroller Trainer Equipment:

• Depending on the choice Test Set has a USB or serial port programming feature.
• 40-pin ZIF socket for rapid programming and application programming outside sockets.
• RESET button for PIC circuit and in all PIC socket.
• Power switch and LED indicator
• LED indicators showing the programming and test mode status
• The key to select USB or RS232 serial port for programming
• Keypad 4x4 keypad circuit
• 2 x 16 character alphanumeric LCD circuit
• 64x128 pixel graphical LCD module circuit
• separate circuit for LCD brightness settings
• Serial EEPROM (24C32 I2C) circuit
• RTC (Real Time Clock) real-time clock circuit
• 32.768 kHz crystal for RTC circuit tests
• Positive temperature coefficient (PTC) circuit elements
• A negative temperature coefficient (NTC) circuit elements
• Hall effect sensor circuit
• LM35 temperature sensor circuit
• Photo resistor (LDR) circuit
• Analog input 0 to +5 volts for multi-turn circuit timpot
• For analog input 2 0 to + 5Volt the potentiometer circuit
• Buzzer circuit
• 4 x 7 segment display (common cathode) circuit
• 8-Piece LED indicator circuit

• 8-Piece mini buttons and 8-DIP swich circuit
• stepper motor (1.8 deg / step) and stepper motor drive circuit
• DC motors and DC motors MOSFET circuit
• DC motor and DC motor speed optocoupler with the counting circuit elements
• RS232 and RS485 communication interface circuit
• USB communication connector
• PS2 PC keyboard input connector
• ICSP output connector (circuit programming capability via)
• Microchip is IDC2 Dubugg (in-circuit debugger) socket
• TTL communication sockets for each port
• 8 channel 10-bit ADC circuit
• 8-Bit DAC circuit
• Marquee circuit (8 character 5x7 LED dot matrix display)
• USB port (USB to RS232 converter) and the serial programming circuit
• put 3 circuit with triac opto diac (external loads can be controlled.) The zero crossing detector.
• 433 MHz ASK modulated RF series for data communication receiver / transmitter circuit
• Infrared receiver and transmitter circuit for FSK modulated serial data communication
• Rotary encoder circuit (A-B encoder)
• Square wave oscillator circuit (0-250 kHz)
• Potentiometer (2 set 1 multi-turn from 0-5 volts DC) circuit
• Test Set project was mounted on boom
• Program Testing and Power LED indicators circuit
• Selectable for programming and testing 4MHz, 20Mhz oscillator circuit
• Special expansion sockets prepared for each port.
• to be heard by the user's requirements for the preparation of its empty module module

Supply unit:
Power input: 220V AC / 50Hz (± 10%)
Mains input cable: IEC / 1.5 meter grounded
On-off switch: push-button. Light display
Test Set feed unit: SMPS (Swich mode power supply).....

+ 5V, +12 volts 2 amps short-circuit protection insurance: Easily accessible. Demountable. Screw type.

Cable Connections:

Unit from the port: 10-pin IDC flat cable, 1mm cable jack Integrated: Each of integrated integrated socket

Trainer bag: interior coated anti-static material, aluminum construction and ABS , shock resistant Installation

Standard accessories included in the Test Set:

1- 1 Piece PIC16F877A integrated
2- 1 Piece 16F628 to integrate
3- 1 Piece USB programmer cable
4- 1 Piece serial communication and serial programming cable
5- 4 Piece IDC 10-pin flat cable
6- 6 Piece pin connection cable
7- 1 Piece user manual and experiment book
8- 1 Piece CD

CD contents

• necessary regarding PIC (do not require license) software.
• PIC programming software.
• Service programs.
• Example programs.
• Data catalogs.
• PIC Projects.

ES120 trainer modules:

- Programming Module (PAM)

Projects to be developed and programmed by inserting the module is operated in PICM.
8, 20, 28 and 40-pin DIP socket type can be placed in the pic is located.
There are built-in circuit programmer on the programming module.
A bastard PAM installed on the PC Programming is done with the data sent from the USB port.
Located on the main module 5 pieces made links to other application modules by means of 2x5 pin header connector. All of 2x5 pin header connector with the connections made in the port pins are connected to the application module with 2x5 ICD via flat cable. Program in order to provide flexibility in developing There is also a 1x10 pin connector sockets header row. The 2 and 4-way connection cable supplied with the kit on any of PAM through a port pin on the application modules can be connected to a desired Each port connector 10 pin to 2 to provide voltage to other modules on the remaining data in an 8-pin ports are also pins.
Power input to the system is done via the PAM module. Moved with 10s or 2-data cables to other modules

- **Text Module**

Fixed or floating text of the application where the application modules.
8 is composed of 5x8 LED matrix blocks. 8 letters can be displayed simultaneously on the display.
Columns are driven by the 4094 integrated.
If the lines are the two ports of the bastard (8 data control pin 4) can be driven by an 8-bit data

- **RS232 & RS485 Serial Communications Module**

ES120 training device is designed to be able to develop serial communication applications with.
The connection between the PC with a DB9 serial port is done by RS232 cable.
Integrated RS485 MAX232 voltage compatibilizer on the module and are integrated.
Extracted on pin connectors connector is required to communicate with other devices with serial RS485 integrated

- **Alphanumeric and Graphic LCD Module**

Different types (for example GDM12864 to, as GDM12864B) graphic LCD that you can place is where the socket module.
Also experiments to make the 8-bit data format Print article alphanumeric LCD, 44780 compatible chip is located socket also can place the LCD (1x14 and 2x8) are sequential header pins

- **4x7 segment display module**

4-way is the module where the common cathode display driver integrated and 74LS47.
74LS47 integrated and the data sent to drive common anode terminals are connected to a single port.
This is a common anode 7-segment display and is driven each BC327 PNP transistors.
4 PIC programming the screening method used to display the numbers in the display.

- **Stepper Motor Module**

ULN2003 is integrated and can be operated with 5V stepper motor is located on the module.
Stepper motors are designed for experiments. Module for

stepper motor driver on the circuit that can be used as an output unit connecting directly to any port on the PIC main module.

- **LED Module**

8 LEDs arrayed side by side used to monitor binary numbers sent from a port.
There is also a buzzer on the module. When the buzzer will be asked to use the J10 jumper BUZZER side.
Simple tests that can be done in the early stages of learning PIC programming can be done using this module. Ends are connected to GND after the 330 ohm resistors connected in series with the LEDs (suitable for driving high active

- **PS2 / USB Module**

Computer to send data with pic synchronous serial communication protocol used to make the computer keyboard or PIC serial communication applications from a USB port.
1 PS2 keyboard connector on the module, there are B-type USB port connector 1.

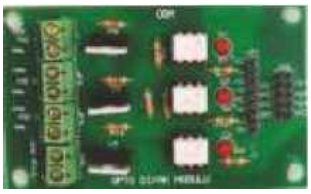
- **Analog Modules**

PIC on PAM is designed to provide an analog input module.

PIC to 8 discrete channels of analog input allows you to do. Normal potentiometer circuit 2, multi-turn potentiometer, LM35 (temperature sensor), LDR (light sensor), PTC and NTC temperature sensors, Hall effect sensor is located.

A4 is the input analog input sensor which depends on the user's needs, for use pin’s are located.

- **Opto Diac Module**



This module has 3 opto-isolator with over 3 triac driven through.
To be checked three separate channels connected to the receiver works with AC voltage. Receiver three entries can be made of the ends of the connection / output terminals to be done and there are a number of common neutral connection.

- **DC Motor and Cycle Counting Module**

L293D driver module is used to integrate with 5 volt DC motor control experiments.
PWM motor speed control method and change the direction of rotation is

the ideal module for making applications.
There are sensors to measure the IR transceiver module also with the engine speed and speed.
To raise the voltage reading from the IR sensor is also located the LM741 opamp circuit.

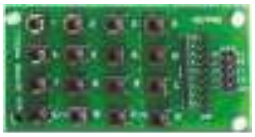
- **ADC Module**

This module has an integrated ADC0804
0-5 V analog voltage between the AG entered the pin, 8-bit is converted to digital data.
Analog input modules can be connected to a desired analog component output of the ANLG with 2 cable.
Digital data like 2x5 pin header through the cable can be connected to any port on the PAM.

- **DAC Module**

DAC0808 and OPAMP LM741 available in this module.
2x5 connector header like PAM digital data from any port on is designed to convert the analog voltage.
LM741 is integrated in the DAC output voltage is used to raise the voltage ranging from 0 ~ 5V.
DIP switches on the module, the PAM independently DAC0808 has been put in order to provide an integrated digital data.
Digital data to be sent from the PIC on PAM request received this DIP switch to OFF.
DAC0808 requires integration of the supply voltage +12 V positive power supply. This is the PAM to provide voltage + 12V, GND pins are.
2-connector cable with this portable on voltage module.

- **4x4 Keypad Module**



The module can be optionally made of 4x4 or 4x3 keypad experiments.
16 Enable button is located. Matrix array of PIC of these buttons 8 pins to be entered data from 16 separate buttons provided.
Rows and columns are made in 10K pull-up resistor.

- **Development Module - 1**

This one is smaller than the current two development module.
ES120 sees the hole PCB mounted function can be improved in order to ensure the training set.
2x5 and 1x10 for connection to the port on the PAM is located header connectors.
Designed to enable users to easily use on the set developed by establishing an input or output module is a module itself.

- **Extra PIC Module**

Microchip products is 18-pin PIC microcontroller module can be used.
B port on the left side of the pot on the right side of the 2x5 pin header connector is Extracted

Often used in the communication between two PIC application.
Series of data sent using the PIC on PAM another set of communication and remote control (IR or RF) is a module that will be used frequently in experiments.
For example, the data read by the PIC modules used in the practice of sending 4x4keypad in series PICs on the PAM.

- **Development Module - 2**

Development module on the set of 2 is the large size.
ES120 placed to ensure that the training set is more advanced and is used as the PCB.
2x5 and 1x10 for connection to the port on the PAM is located header connectors.
Designed to enable users to easily use on the set developed by establishing an input or output module is a module itself.

- **Buttons and Dip Switch Module**

Digital input (5V, 0V) is a module placed on the 8 button to make.

Entry is made with 10K pull-up resistor is connected to a button (normally when connected to 5V logic-1 data). By pressing the button logic-0 (0V) to the module output.
Continuous data entered into a port pin logic "1" or "0", there is also a 8-DIP switches can be used in applications that need to remain.
DIP switch in the ON position while the output connector on the logic "0" is sent

- **IR and RF Transmitter Module**

IR and RF is the module where the transmitters element to remote experiments.
IR (Infra Red) for communication, transmitting IR LED on the module and modulation frequency generating circuit LM555 There is.
RF (Radio Frequency) 433 MHz ASK transmitter circuit for communication takes place.

- **Rotary Pulse Encoder Module**

On Rotary Pulse Encoder and two LED modules in order to see the encoded digital output produced by the RPE.
RPE is often used to make the volume settings on the device that produces sound digitally.
Also referred to as digital potentiometer. To learn the operation of these elements and to develop applications
is a very useful module for.

- **1-25 kHz square wave oscillator module**

The module produces between 1-25 kHz square wave. To adjust the oscillator frequency from the LM555 integrated on the module in a different capacity with 4 x 2 jumper capacitor can be selected. The selected frequency range can be changed in the linear potentiometer has one frequency in order to obtain

- **I2C Communication Module**

Applications with components that can be communicated with I2C serial communication mode is prepared to make a module.
24C xx series of EEPROM can be connected and data exchange

applications external to the PIC.
24C32 and PCF8583 on the circuit are integrated as ready.
In addition to the socket on the circuit can be installed with PCF8583 DS1307 digital temperature sensor inserting experiments.
32 kHz is necessary to provide the required accuracy in the Clock app crystal oscillator circuit module is on

- **IR and RF Receiver Module**

IR and RF is a module that includes the receiving member for remote control experiments.
IR (Infra Red) 38 kHz IR receiver on the circuit for communication, RF (radio frequency) are 433 MHz RF receiver circuit elements for communication

ES130
PIC Microcontroller Application Kit

ES130 Trainer kit with PIC 8, 14, 18, 28 and 40-pin PDIP package with the type of PIC or choose from depending on your PC's USB port and to send electrical signals from the RS232 COM port
programs will be able to.
Your program does not ends-bit PIC program that will automatically start to run. MAIN PIC module DB37 connector on the ends of the module depends on the application you are connecting via cable, you will see the function of the program that you install on the PIC.
Application modules are intended for specific purposes and established the PIC circuit work and provides the necessary electronic environment for the testing of the written program

An Overview of the Experiment Set

Power input: 220V AC / 50Hz
Mains input cable: IEC / 1.5 m grounding-type
On-off switch: Two-position ON / OFF switch
Application kit supply unit: SMPS (switch mode power supply) DC +12 volts 2 amps short-circuit protected. main+ 5V and + 12V DC voltage on the card. Fuse: Easily accessible. Demountable. Plug-in type.
Connection type: The connection between the main module and the application modules are:
The two sides are being made by DSUB-37 connectors connected to the ribbon cables.
Applications cabinet set:
The interior of the application set-coated anti-static material, non-aluminum frame, durable, removable lid. The cable used with the set of the user guide and other materials
There is a hinged top tray can be opened in order to preserve the bag.
The bottom of this table can be used as material storage section.
The main modules and application modules collectively has already been mounted on the main console. Thus, to maintain the bag outside of the module need not be further allocation.
Cabin in the main programming module 1 and 7
There are a total of 8 modules including application module. Optionally, to be used for the requested module in the form of floating text which may also be mounted in the cabinet are designed.
Other units of the application set that may occur due to a failure in one of the modules is not affected. Is replaced by a new module or repair is easy. Module is installed in place after being moved or repaired with a new one, you can regain the integrity of the sets in a short time.

Application Specifications:

Applications for the following purposes as set ES130
is designed to:
Microchip PIC microcontrollers product, without the need for another device, seamlessly and reliably make the programming.
A PIC microcontroller is programmed to dislodge automatically run in application mode and provide an examination of the program functions.
For a specific purpose (elevator simulation, simulation of air conditioners, etc.) to try different programs on the prepared application modules.

Units included in the application kit:

1 Piece PIC16F877A integrated (on the main module
attached) 1 Piece USB programmer cable (cabin
in, storage section)
1 Piece serial communication and serial programming cable (cabin
in, storage section)
2 Piece DSUB-37 connector ribbon cable 37'l (cabin
in, storage section)
1 x power cable (in the cabin, storage
section)
1 Piece manuals and books of experiments (cabin
in, storage section)
1 CD (in the cabin, storage section)

Features of the main Programming Module:

On the programmer circuit is different pin number where the module connector and socket that can be connected with other modules can be placed in PICs. As a user level, from beginners to professional design that is suitable for microcontroller programming and training at all levels. Microcontrollers on the main programming module as optional USB or serial port (RS232) is programmed by means of.
Immediately after the test mode switches automatically to PIC programming. Application set, PIC microcontroller programming and operation without removing the circuit is such as to allow immediate

The main programming module socket on the programming and testing as well as for series production speed and ergonomic
There is a ZIF socket for programming.
PAM Microchip microcontroller family when designing the most advanced model of the PIC16 series mainly including the PIC16F877 the other 8, 18, 28, 40-pin PICs are intended to learn to use all its features. Which pins of the PIC port mounted on card

general purpose of the due diligence has been shown and port pins on the need to be exported via connectors are considered

Current features:

In the main programming module 8, 14, 18, 28 and 40-pin

sockets on the product MICROCHIP PIC microcontrollers (12Cxx,12Fxxx, 16Fxx, 16F8xx, 18Fxxxx) can be programmed and operated.
Feed is the main program module can be controlled by a power switch characteristics can be monitored by an LED status indicator.
The main programming module can be monitored by an LED indicator that the programming or test mode.
RESET button for PIC circuit and in all PIC socket. Type B type USB and DB9 RS232 connector for programming cable entry.
Programs from a USB or serial port selector switch.
Except programming connector for RS232 serial port application is a second connector.
Hardware With USB communication unit PIC18F2550, PIC18F4550 USB communication for experiments with microcontrollers like connector.
PS2 PC keyboard input connector for data input to the PIC try the computer keyboard.
Another circuit PIC programming without dismantling using ICSP socket to ensure that structures, ICSP
output connector (via circuit programming capability).
IDC2 socket using the Microchip debugger to debug procedures.
The main programming module socket on the programming and testing as well as for series production speed and ergonomic
There is a ZIF socket for programming.
4 MHz and 20MHz crystal and selector switch to run with different crystal oscillator.
PIC application kit supplied with "User's Guide and Experiments" in the booklet about the module on a sample set
There is. Each sample test The purpose of the electronic circuit diagrams, application set circuit diagrams used in the experiment PIC
There is information like features than other elements. Visual results on the application module after the step by step test procedure is given in the picture.

Features of Application Modules:

Button and LED Display Application Module

Digital inputs / outputs as in the first experiment programming beginners to programming
There are buttons and LEDs can be used. Scanning method with matrix keypad reading, driven 4x7 segment display module is available with transistors for use in multi-display 7-segment display on the number of experiments.
6 buttons designed to be used in a simple digital input test.
8 Each LED is designed to be used in a simple digital output test.
4x4 keypad keypad circuit is designed to be used in the screening method using 4x4 16 buttons arranged in a matrix layout try to read the entries.
4 x 7 segment displays, using the screening method (common cathode)
4 is designed to be used in experiments by placing 4x7 segment display transistor circuit

Stepper Motor Application Module

The stepper motor control experiment
PIC also sent via TTL signals and drive the direction of the rotation of the stepper motor using integrated on the module, changing the rate, different designs, such as displaying the number of steps in the 2x7 segment display can be improved according to the changing speed.
1.8 deg / step unipolar stepper motor.
ULN2003 integrated to make the current upgrade.

There are 4 buttons for digital input.
Step number or speed is displayed on the 7 segment display.

Stepper Motor Application Module

The stepper motor modules with TTL signals have been prepared for use in control experiments. The rotation of the stepper motor on the module direction, change of speed, different designs, such as displaying the number of steps in the 2x7 segment display can be improved according to the changing speed.
1.8 deg / step unipolar stepper motor.
ULN2003 integrated to make the current upgrade.
4 buttons for digital input.
Step number or speed 2x7 segment display to display.

Temperature Control Application Module

Cooling module is designed as a simulation of the air conditioner on 1 fans, 1 heat-generating incandescent lamp, temperature measurement that LM35 temperature sensor, temperature data
displayed as 2x7 segment display, 4 button to make the digital input, analog / digital
1 ADC0804 integrated to make the conversion. Via these elements on the module medium
holding the desired temperature range, experiments can be performed.

For example, the input temperature value with the buttons
After recording the display is viewed and compared with the ambient temperature. Measured from the temperature sensor
The fan runs and more than temperature recorded media is cooled, the measured temperature is less than incandescent lamp
running environment is heated.
2x7 segment display to display the temperature data
5 buttons for digital input
Analog / digital conversion ADC0804 integrated
The LM385 reference diode is used to perform more precise analog conversion
DC 5V fan to cool the environment.
To heat the environment 5V, 2W incandescent lamp.
LM35 temperature sensor to measure temperature
The green LED indicates the cooling case, the red LED indicates the heating condition

DIP DAC Analog Input Module

Potentiometers, LD and optionally hardware with different analog sensor inputs to be connected to circuit analog / digital converter with analog input to the PIC to do the training, from the PIC
transmitted digital data DAC080 digital / using analog converter integrated to achieve the sound from the speaker converts the analog signal or do try to change the LED brightness, turning analog data entered from the analog input elements on the module, send the relay on the module to make the control of the high voltage-operated receiver to TTL voltage, by the digital input module with DIP switch is designed to make converting analog data experiments.
Digital / LM741 integrated for the DAC0808 and the current upgrade for integrated analog conversion.
2 potentiometers for analog input.
LDR light sensor for analog input.
The precision 3x 2 female connector to use different analog sensor inputs. DIP switch for the hold-digital data input.

4 relay to control the receiver from working with higher voltage TTL voltage.
Speaker for voice-prompted experiments.
1 LED to indicate the analog data output.

PWM DC Motor, LCD, Ultrasonic Module

Alphanumeric LCD used in the experiments with the expulsion of the PIC.
Changing the speed of a DC motor with PWM signal generated from the PIC.
Replacing the DC motor rotation. LCD display showing the measured speed of a DC motor.
Is displayed on the LCD of the distance measurement with ultrasonic sensors,
Writing data to the EEPROM using I2C communication protocols integrated and reading can be made.
Make the I2C protocol in real-time clock RTC integrated with
Application module is designed to conduct experiments like.
Speed, direction of rotation used in the replacement drive is integrated 5V DC motor and L293.
TCST1300 infrared transceiver sensor used in measuring the number of revolutions.
4 buttons for input is the digital data.
To be used in experiments measuring the distance the sound waves of 40 kHz ultrasonic sensor 2.
24LCXX type of EEPROM writing / reading test socket and integrated EEPROM 24LC32.
93C46 EEPROM integrated into the socket for data reading and writing tests.
3V battery and the socket to hold the write data EEPROM memory.

PCF8583 for integrated real-time clock applications.
32.768 kHz crystal oscillator for RTC integrated clock input.
2-line alphanumeric LCD 16 column LCD for driving tests.

Breadboard Module

Bread board module is a module used for other experiments and designs.
The main programming module from the DSUB-37 connector pin ribbon cable connection are moved to the PIC module.
2 20-pin connector on the board in the precision of the connection is made on the jumper wire.
There are 2 DSUB-37 output connectors to connect the two application modules on the module.
This module also on 64x128 pixel graphical LCD
is given the opportunity to do the test.
For connection with the main programming module has 1 DSUB-37 connector.
To establish contact with other application modules 2 DSUB-37 connector.
5.5x16.5 in size 63 sequential breadboard.
2 20-pin female to get a connection on a breadboard are precision connectors.
64x128 pixel graphics 20-pin header connector for the LCD connection and has a brightness adjustment potentiometer.

Existing integrated circuits on the module

Programming Main Module 16F628 to 74LS06 MAX232 (2)
Button and LED Display Application Module 74LS47
ULN2003 Stepper Motor Module
Temperature Control Application Module ADC0804
DIP LM741 DAC0800 DAC Analog Input Module
PWM DC Motor, LCD, Ultrasonic Module L293D 24LC32 PCF8583
LM324, Lift Module L293D ULN2003

CD contents:

PIC as appropriate (that do not require license) software.
PIC programming software.
Example programs.
Data catalogs.

PIC PROG/DEKA PRO-1 Trainer

Order No: PIC Prog/Deka PRO-1

PIC PROG / DEKA PRO-1, Microchip PIC16 microcontroller is the most advanced model of the first series, including other family PIC16F877A 8, 18, 28, 40-pin PICs are The goal is to learn to use all the features produced. PIC PROG / DEKA PRO-1 card
also offers advantages for beginners up to advanced users. Beginners biggest factors to make fast learning disabilities or applications when they first started work is the preparation of the equipment must be installed for each software to take a very long time. Our company, product, or similar cards are designed to minimize this time.

PIC PROG / DEKA PRO-1 Test Kit with 8, 14, 18, 28 and 40-pin PDIP package will be able to program the PIC with the type of electrical signals to send to the PC's USB port. Your program does not ends-bit PIC program that will automatically start to run. PIC will place it on the Socket whether you want to program the desktop via the USB port, or you are with laptop, is found in both the USB port can be used on any PC. This kit has been tested on different PCs and laptops can be used safely is not causing any failure under normal use

General Introduction:

1. PIC PROG / DEKA PRO-1 Test Kit is manufactured in two different versions.
a. Placed in the bag and cover version 'which opened the "PIC PROG / Deka Pro-1 Test Kit" is named. The inside of the bag coated with anti-static material, non-impact resistant, aluminum is coated with a special cabinet. All units are the same cabin Set
in is hosted. If the cabinet is removable cover the desired feature.
b. PCB version not found in the bag "PIC PROG / DEKA PRO-1 Educational Card" is named. There is no difference between the outside of the form work of both versions.
2. User level microcontroller programming in every sector, from beginners up to professional design makes
was chosen at a level that can be addressed.
3. Once the PIC microcontroller is programmed automatically switches to test mode. Test Set is to allow nature to run instantly without removing the programming and commissioning of the PIC microcontroller.
4. The test set is the feed can be controlled by a power switch characteristics can be monitored by an LED status indicator.
Also in the bag version, is protected by a fuse on the nature easily

accessible.
5. Test Set can be monitored with a colorful green LED indicator is in the programming mode.
6. Assay Kit board mounted in a single cabinet.
7. Test Kit to be used in MICROCHIP PIC 16Fxx, 12Cxx, all the properties of 18Fxx microcontroller instruction set
covers.
8. Test Set, MICROCHIP, MPLAB, PIC BASIC PRO, JAL, CCSC, HITECH, IIR, C, C, and is fully compatible with similar PIC C compilers.
9. Test Set on microcontrollers are programmed through the USB port.
10. Test Set the desired frequency oscillator connection pins on the (4 MHz, 20MHz, etc.) can be installed crystal oscillator.
11. Test Set RESET circuit, which is connected to the socket on all PIC is available. PIC is not a matter on which the socket. Once is enough to press the RESET button to restart.
12. Test Set can be programmed using another circuit without PIC ICSP socket on the dismantling.
13. Test Kit on the PS2 keyboard connector to allow for wider communication, IDC2 connector and USB serial connectors are ready.
14. On the Test Set, a way to allow the project to create a new circuit board.
15. Test Kit supplied with the "User's Guide and Experiments" in the booklet, one related to hardware on the Test Set
There are examples. The specifications of the test in the book, electronic circuit diagrams, circuit diagrams Test Kit, used in the experiment
Other element, except PIC statements and other information is covered....

Trainer Hardware Features:
As standard when you buy the card; CD, user manual, where the program to use, USB communication cable, serial communication cable, power supply, MAX232, 24C32, 2x8 LCD, 74LS48, 74C595, 74C597, 16F877 to, as well as the 16F628 elements and integrated.
- Programming via the USB port.
- Programmed, will be tried for PICs 8, 14, 18, 28, 40 pin DIP sockets.
- Selectable 4 and 20 MHz RC oscillator circuits.
-All RESET circuit for PIC PIC in the socket and switch.
-16-Key matrix keypad.
- 2x8 pin socket and 2-line LCD display for sequential LCDs 8 columns.
- 1x16 1x16 pin female header connector for sequential LCDs.
- Serial EEPROM (24lcxx) tests and 24LC32 EEPROM integrated circuit.
- RTC (PCF8583 or DS1307) experiments circuit.

- RTC try to 32.768 kHz crystal
- LDR for analog experiments, LM35 and 3 potentiometers
- 4x7 segment display
- 8 LED indicator and buzzer
- Serial input parallel shift recorder for port replication assays with 74LS595.
- Parallel experiments with 74LS597 input multiple-input, serial output shift recorder.
- LED indicators for 8 , 8 serial communication with port replication experiments
- 9 buttons for digital input
- DC motor driver integrated socket L293 and motor output pins for experiments (integrated drive and DC motor Optionally
can be obtained from our company.)
- ULN2003 driver and motor output pin socket for integrated stepper motor tests. (Optionally stepper motor driver integrated and
can be obtained from our company.)
- RC servo motor servo output pins for experiments. (Optionally, RC servo motors can be obtained from our company.)
- 5 or 8 5x7 matrix formed from the display marquee module (available upon request from our company.)
- 12V DC output pins can be used outside of the set.
- Rotary Encoder and circuit.
- Integrated Max232 and RS485 serial communication sockets for experiments and DB9 serial communication connector.
- On the main circuit for serial data communication 433 MHz ASK modulated RF transmitter / receiver circuit.
- On the main circuit infrared transmitters and receivers for FSK modulated serial data communication circuits.
- IR or RF signals to separate the IR & RF transmitter module for sending remote data set from the main circuit PCB board. (On all
elements are mounted.)
- 128x64 pixel graphic LCD connector for experiments (optional KS108 graphics chip compatible gdm128x64 our LCD company
can be provided.)
- LCD and graphics socket and brightness adjustment potentiometer for the LCD.
- PS2 computer keyboard input.
- Microchip IDC2 (in-circuit debugger) socket.
- USB serial communication input socket (socket programming in addition to such other 18F4550 or 18F2550 USB communication module PIC those who try to use the USB communication.)
- Precision contact pins that can be taken out on a breadboard and

jumper wires for each port.
- Bag Breadboard version of the Test Set to establish different circuits.

Included in the Standard Accessories Test Set

1 1 Each test set programming. (Standard circuit elements are mounted on the PCB and tested.)
2. 1pcs IR & RF transmitter circuit. (Standard circuit elements are mounted on the PCB and tested)
3. 1 433 MHz ASK RF transmitter card (as mounted on the IR & RF transmitter circuit.)
4 1 433 MHz ASK RF receiver card (PRO-1 is mounted on the circuit board.)
5. 1 Piece integrated PIC16F877 (provided on an antistatic foam)
6. 1 Piece integrated PIC16F628 (provided on an antistatic foam)
7. 1 Piece MAX232 (installed on the PCB)
8. 1 Piece 24LC32 EEPROM (installed on the PCB)
9. 1 Piece 74LS48, 7-segment display is integrated encoder (installed on the PCB)
10 1 Piece 74HC595 serial port, parallel output shift recorder (provided on an antistatic foam)
11 1 Piece 74HC597 parallel input, serial output shift recorder (provided on an antistatic foam)
12 1 Number 2 line alphanumeric LCD 8 columns. (On antistatic foam)
13 1 12V DC switch mode power supply.
14 1 Piece USB programmer cable
15 1 Piece serial communication and serial programming cable
16 1 Piece user manual and experiment book. (This book in your hands)
17 1 Piece CD-ROM CD includes:
· Necessary regarding PIC (do not require license) software.
· PIC programming software.
· Service programs.
· Example programs.
· Data catalogs.
· PIC Projects.

Equipment that can be used as an optional
PRO-1 listed below and are not supplied with the kit, but can be used as optional equipment by our company
are sold. Can be obtained by contacting by telephone in the user guide if necessary.
1. DC motor driver integrated L293

2. 5V mini DC motors.
3. ULN2003 DC stepper motor driver IC.
4. 5V, 7.5 degrees, 5-pin stepper motor
5. standard RC servo motors
6. PCF8583 real time clock integrated
7. 1x16 row 2 x 16 character alphanumeric LCD
8 128x64 pixel graphic LCD
9. Marquee LED module
10. RS-485 integrated

M-PIC / M-AVR TRAINER

Other advantages are as follows:

1. appeals to users of all levels. The main program of all up to the most advanced project development application
programs can be done on the same set.
2. In the main module (depending on your preferences) PIC or ATMEL AVR core modules, which will be the main module can be used.
3. 8, 14, 18, 28, 40-pin PIC microcontrollers provides all the

programming and testing facilities.
4. PC's USB port is used to program the PIC on the main module. USB port of desktop and laptop computers
It is possible to use it smoothly on all PCs come standard in all.
5. Broadcasting and Electronic company has the ability to run programs in all books published in the.
Program with source code compatibility in the absence of the pins on the set only input / output pin definition of
All programs may be operated by state changed.
6. Located on the main module serial communication (RS232) connector can be made of some high as via serial communication applications
ICD offered by the level language (In Circuit Debugging - Debugging on the circuit) can use the feature (eg, such as ICD feature of Studio software microcode). Using a bootloader program via this serial communication connector PIC programmable hardware without programming applications can be made.
7. The ability to use by adding modules to be developed in the future of our company set because of its modular structure
8. AVR Programmer module (PROM) 8,14,20,40 integrated programming of Atmel AVR pin can be selected .

Main Module PIC / ATMEL AVR Main Module

- PIC on the project which will be developed / AVR attaching modules that are programmed and executed.
- 8, 14, 18, 28 and 40-pin PDIP type of socket can be placed in the PIC is located.
- For AVR (PROM module) is the purchase of 8, 20, 28, 40-pin main module is programmed with the Atmel AVR microcontrollers.
- Programming is done using the PC's USB port.
- Located on a main module 4 10-pin socket is made through links to other application modules.
- To provide power to the other modules 2 pin socket on each remaining data in an 8-pin ports are also pins.
- 9-pin DB9 connector on the module, serial bootloader is used in

communication applications, or applications.
- Power input is done via this module to the system.

Scrolling Text Module

- Fixed application modules or applications where the marquee.
- 7 lines were created with LEDs placed on the 24 columns is a LED matrix circuit.
- Columns are driven by the 4094 integrated.
- Lines can be driven by the 8-bit data sent using different modules.

Series - Parallel Converter

- 4094 will be made of the application modules with integrated shift register implementation.
- Can be used in the most simple application that can be made to learn the concept of serial communications.
- PIC port number used in multiplexing applications. (Eg PIC / ATMEL avr only 3-pin using 8 output pins, such as to obtain.)

Parallel - Serial Converter

- 4014 with integrated 8-bit parallel input data is used to read the pıc series.
- Can be used in the most simple application that can be made to learn the concept of serial communications.
- PIC / AVR 8-bit is used to read the data using the 3 pins. This module PIC / ATMEL AVR for data entry
is intended to save pins are used.

Port Crossover Module

- Input or output is used to cut the connection between the modules used by PAM.
- Input or output pin is used as the input module on the PAM PIC / ATMEL avr the appropriate pins
may fall, in this case to be connected to the pins cut precissio necessary links with DIP switch jumper
made with cross wires.

Hold up Login

- PIC / ATMEL avr the pins to permanent data (1 or 0) is used to apply.
- Pull-up resistor and the ON / OFF switch is composed of. DIP switches on when the logic related to location pins 0
(0V) volts is applied. About logic to pin 1 is in the OFF position (5 volts) is applied.

7 Segment Display Inverter from binary

- This module on the 4-bit binary data as entered in the 7-segment display can burn the required segments
There are 7448 integrates the code for encoding.
- 7-segment display is designed to make applications. Both single display to drive the display as well as 4-way may be used.

PS2- Keyboard Input

- The computer keyboard PIC / ATMEL AVR is used to send data with synchronous serial communication protocol.
- On the PAM modules on the module PIC / avr required for entry into the appropriate port pins
used with the cross module.

USB Serial Communications Module (USB)

- Hardware PIC18F2550 with USB communication features, such as USB communication with PIC 18F4550 microcontroller
module is developed in order to make applications.
- There is a type of USB connector on the module. This connector is the same as the PAM.
- After the programming operation, the USB cable is removed from the PAM and attached to the connector on the port.

Mono-speaker, buzzer, Servo Motor Drive (S1)

- PIC / AVR output and produce sound from the RC module is used to drive the servo motor.
- A buzzer on the module has a separate terminal and 4 standard RC servo motor RC servo motor connector to the appropriate pin header for connection to the capacitor to drive to the speaker.

Graphic LCD Module

- Different types (eg GDM12864 to, as GDM12864B) you can insert graphics LCDs is the module where the socket.
- In addition to the 8-bit data format Print article alphanumeric LCD experiments, you can place the LCD connector compatible with the 44780 chip is well located (there are 1x14 and 2x8 row header pins.)

4x7 Segment Display

- 4-way is the module where the common cathode display and driver circuit. PIC / avr of the two separate ports
is driven by the data sent.
- 7-segment data sent from one port to another port with 4 bits at the ends to drive common cathode
is checked.
- With this module PIC / AVR is possible to make different applications with additional modules placed between the main module. 7 segment displays are common cathode and is placed on each NPN transistor. 4 screening method is used to display more digits in the display

Extra Modules

- 18-pin or 20-pin module is PICs can be used.

- On PAM PIC / AVR with serial communication and remote control (IR or RF) is a module that will be used frequently in experiments.

- For example, the data read from the 4x4keypad sending application module can be used in series with the PIC on the PAM.
- There are 5 pin connector for programming with PIC ICSP technique mounted on the module.

LED Module

- 8 This module was created LED binary sequential sequencing.
- Simple experiments may be made in the initial stages of learning PIC programming done using this module.
- Terminals are connected to GND after the 220 ohm resistors connected in series with the LEDs (according to the riding high active).

DC Motor Module

- To make experiments with 5-volt DC motor control module integrated L293D drivers.
- PWM motor speed control method and is an ideal module to change the direction of rotation practices.

IR RF Receiver

- Is the module where the receiver element to experiment with IR and RF remote control.
- IR (Infra Red) 38 kHz IR receiver on the circuit for communication,
- RF (radio frequency) are 433 MHz RF receiver circuit elements for communication. 16IR_RF

Keypad Module

- The module can be made of 4x4 or 4x3 keypads optional tests.
- Enable 16 button is located. Matrix sequence of these buttons PIC / ATMEL AVR 8 pins on the receipt of the data entered from 16 separate buttons provided.

Power Supply Module

- With a 9 V battery and LM7805 regulator is used to obtain 5 V constant voltage.
- Remote control experiment (IR and RF) to be separate from each other in two different systems portable second
voltage source is needed.
- Work independently from the mains voltage circuit can also be used if desired. 19LCD MODULE

LCD Module

- Sent from the PIC with 4-bit data is used to print text alphanumeric LCD. LCD 2 x 8 is mounted on the module status.
- 8 or who you will sell to print on the LCD with your hand-bit data can practice inserting the appropriate socket in another LCD GLCD module.

Button Module

- Digital input (5V, 0V) is located 8 button on the module in order to login.
- Inputs are made with 10K pull-up resistor connected to the button (normally connected to the data when the 5V logic 1). Button is pressed, will be sent to 0V output module.

Stepper Motor Module

- ULN2003 is integrated and can be operated with 5V stepper motor is located on the module.
- Designed for stepper motor tests. Module for stepper motor driver on the circuit PIC is placing any port module can be used directly as the MAIN output unit.

Analog Input Module

- A PIC on PAM is designed to provide an analog input module.
- PIC allows to 8 discrete channels of analog input. 2 potentiometer circuit, a multi-turn potentiometer, LM35 (temperature sensor) and LDR (light sensor) is located. In the other three input pins in order to place the analog input sensor that is located in the user's needs according to their wish.

Rotary Encoder

- On the Pulse Rotary Encoder and two LED modules in order to see the encoded digital output produced by the RPE.

- RPA is usually used to make the volume settings on the device that produces sound digitally. Also referred to as digital potentiometer. To learn the operation of these elements is a very useful module designed to develop applications.

I2C Module

- Applications with components that can be communicated with I2C serial communication mode is prepared to make a module.
- 24Cxx only series connection and data exchange applications can be external to the PIC of the EEPROM. 24C32 on integrated circuits are readily available.
- In addition, digital temperature sensors and DS1307 such as digital clock integrated circuit PCF8583 is also included with this empty socket to try it.
- 32 kHz is necessary to provide the required accuracy in the Clock application is on the crystal oscillator circuit module.

Singles 7 Segment Display

- Designed for beginners to work with 7-segment displays.
- 1 consists of the display and drive common cathode resistor. Directly connected to one of the output ports of the main module.

USART Module

- M-PIC is a set of modules designed with the aim to develop advanced communication applications.
- PAM needs to be heard in the USART communication mode can be

used if desired to PC data entry.
- Remote data communication between PC and PAM (using the IR_RF module) used in making the application.

Power Supply (1 Amp)

- M-PIC / M-AVR is set module provides the energy needed to help.
- The power supply is plugged into the socket on the end of the PAM private tunic connector cable.
- Setting the switch on the power supply voltage must be kept at 12V range.

PIC16F877A / Integrated in / ATmega 32 Built-in

- Do not need another member of staff that he is very popular with modular sets that can be added to the set and the set can be used in all applications on 40-pin PIC16F877 to integrate.
- The purchase of M-AVR ATmega32 integrated in

PIC 16F628 / A / ATtiny2313 IC

- In some applications, when working with modular kit (remote control, keyboard reading ..) may require a second PIC. Still very popular with 18-pin PIC16F628 are included in the set.
- The purchase of M-AVR ATtiny2313 IC

Serial Port Cable

- Is supplied with a set of applications for use in serial communication with the computer.
- Also from the serial port using a bootloader program PIC / AVR program installation and ICD (via circuit debugging) is used in the process.

USB Cable

- Which will be held from the USB connector on the PACE trial PIC / AVR USB cable from the computer programs required to send.

Storage box for Modules

- Plastic bags are used to maintain the modules. There is the appropriate section for the mixing of the module.
- Module with transparent cover and there needs on both sides of the bag can be easily seen.

CD-ROM

- M-PIC / M-AVR needs of all the installed programs that are using the CD-ROM.
- Assembly in this CD, Pic basic Pro, written in languages such as JAL numerous sample programs and source code are translated into machine language extension .hex files available. This program is arranged so that it can work on your set. Programs running your equipment will be tested again and you will see both the M-PIC / what can be done with M-AVR.

M-PIC / M-AVR User Guide

- M-PIC / M-AVR given detailed information on how to use the booklet Modular PIC program.
- After each module separately described M-PIC / M-AVR also use the program to use when you use is detailed.

- M-PIC / M-AVR sample programs in this manual to set an example for the application can be made by and information on the operation are also included.

PIC PROG / DEKA V5

PIC PROG DEKA V5 sets of experiments with 18, 28 and 40-pin PDIP package type with your PC's USB PIC with electrical signals to send to the port programs will be able to. Your program is finished bits PIC programs that automatically run will begin.

1. PIC PROG DEKA V5 Test Set is manufactured in two different versions.
a. The version that has been placed in the bag "PIC PROG DEKA V5 Test Set" is named. Anti-static bag inside covered by the material, non-impact resistant, has a special aluminum-clad cabinet. Set all units in the same housing is hosted. If the cabinet is removable cover the desired feature.
b. PCB version not found in the bag "PIC PROG DEKA V5 Card" is named. There is no difference between the outside of the form work of both versions.

2. Is the level up to which each professional design, from beginners to microcontroller programming was chosen at a level that appeals to cut.
3. Once the PIC microcontroller is programmed automatically switches to test mode. Test Set, the PIC microcontroller programming, and without removing the circuit is such as to allow the execution immediately.
5. Test Kit board mounted in a single cabinet.
6. Test Kit to be used in MICROCHIP PIC 16Fxx, 12Cxx, all the properties of 18Fxx microcontroller instruction set covers.
7. Test Set, MICROCHIP, MPLAB, PIC BASIC PRO, JAL, CCSC, HITECH, IIR, C, C, and completely similar C compiler for PIC compatible.
8. Test Kit on the microcontroller is programmed via the computer's USB port.
9. Test Set has 4 MHz or 20MHz crystal oscillator like to use the selection jumpers on the.
10. Test Set RESET circuit, which is connected to the socket on all PIC is available. PIC is not a matter on which the socket.
Once is enough to press the RESET button to restart.
11. Test Set another circuit without programming PIC using ICSP connector on dismantling made.
12 on Test Set, a way to allow the project to create a new circuit board.
13. Test Kit supplied with the card "User's Guide and Experiments" booklet, available at hardware on Test Set There are also examples. The specifications of the test in the book, electronic circuit diagrams, circuit diagrams Test Set, the test other elements outside the PIC features used, statements and other information is covered.
As standard when you buy the card; a CD that contains the program you want to use, user manual, USB communication cable, serial communication cable, power supply, PIC16F877 / A as well as to integrate.

Features:
Programming via the USB port.
- 18, 28, 40-pin sockets are normal.
- RESET button for PIC circuit and in all PIC socket.
- 16-key keypad matrix.
- 2-line LCD display connector 8 column (Optionally 2x8 or 2x16 LCD display can be obtained from our company.)
- 128x64 pixel graphic LCD connector for experiments (optional KS108 gdm128x64 graphics chip compatible LCD can be obtained from our company.)
- Serial EEPROM (24lcxx) test circuits and sockets. (Optional 24LC32 EEPROM chip can be obtained from our company.)

- 3 potentiometer and the space of the sensor can be used for the analog input pin experiments.
- 2-digit 7-segment LED display.
- 8 LED indicator and buzzer.
- 6 buttons for the digital inputs.
- 1 5x7 dot matrix LED display.
- Max232 and integrated serial communications connector for serial communication experiments.
- The main circuit on the 433 MHz RF RECEIVER ASK modulated serial data communication to / DELIVERY sockets (433 MHz Optionally TXC1 and RXB1 transmitter and receiver modules can be obtained from our company.)
- Infrared transmitters and receivers for sockets on the main circuit FSK modulated serial data communication. (IR and RF transmitter circuit Optionally can be obtained from our company as a separate card mount-elements.)
- LCD and graphics socket and brightness adjustment potentiometer for the LCD.
- Contact pins that can be taken out on a breadboard and jumper wires for each port.
- Bag type Breadboard version of the Test Set to establish different circuits.

Included units
- 1 Piece of programming test set. (On PCB
standard circuit elements are assembled and tested.)
- 1 Piece integrated PIC16F877 (mounted on PCB
as).
- 1 Piece MAX232 (installed on the PCB).
- 1 piece ULN2003 integrated (installed on the PCB).
- 1 x 5V DC switch mode power supply.
- 1 Piece USB programmer cable.
- 1 Piece of serial communication and serial programming cable.
- 1 Piece of manuals and books of experiments.
- 1 CD-ROM.

CD includes:
- The necessary related to the PIC (do not require license) software.
- PIC programming software.
- Service programs.
- Example programs.
- Data catalogs.
- PIC Projects.

Size : Width: 32 cm, Depth: 20.5 cm, Height: 6 cm

ES120.01
ATMEL AVR Microcontroller Training Kit

Atmel AVR Microcontroller Training Kit (ES120.01) set with 8, 20, 28 and 40-pin PDIP package with the type of AVR programs will be able to integrate with electrical signals to send to the PC's USB port.
Do you as soon Programming program on integrated AVR programs that automatically start working. ES120.01 through the training set of the MAIN module to other modules will connect the appropriate cable are seeing the AVR Introduction to Application module providing data or output data. This module provides the necessary environment for the testing of the circuit works when the AV. When you operate the AVR to the matching port on the module according to the project's property transactions will be able to easily see what you are doing.

Atmel AVR microcontroller training Kit (ES120.01) Advantages:
at all levels in the preparation of this set of experiments aimed to benefit the user. As well as perform simple operations such as quenching of a button will be lit with LED AVR programming beginner's first try, try more complex operations, such as a user's advanced RF communications possible. Also Atmel AVR (ATtiny2313) of samples can be tested on this set of programs in programming books.
Another important feature and advantage of the test set is as follows: Due to the nature of the Atmel AVR microcontrollers, but also in an integrated configuration program does not take place in a row. Therefore, fuse bits are also printed program prepared according to the features such as an integrated program. A fuse bits value unsuitable during this print may not be rewritten integrated state is selected. This is the meaning can not be used again integrated. Such a result was locked in programming AVR integrated, high-voltage programming can be reset to factory settings done. ES120.01 Test Kit has the said high-voltage programming feature. This feature is the biggest advantage of this set of experiments. Do you think you can use broken briefly returning to integrate your factory settings.

ES120.01 An Overview of the Experiment Kit

1. Experimental set, inside coated with anti-static material, impact resistant exterior is coated with aluminum and ABS special case. Set all units are housed within the same cabinet. If the cabinet is removable cover the desired feature.
2- as user level, from beginners up to professional design that makes programming a microcontroller was chosen at a level that can cater to all sections.
3- AVR automatically switches to the test mode microcontroller immediately after programming. Set of experiments, the AVR microcontroller programming and operation without removing the circuit is such as to allow instant.
4- The experiment sets of feed can be controlled is by nature a power switch, follow up with a PLOT indicator
can be. Also experiment set, is protected by a fuse on the nature easily accessible.
5. Experimental set, monitored by an LED indicator that the programming or application mode.
6. Fuse bits are programmed incorrectly locked because an integrated,

HVPP / HVSP re-programming unit
can be programmed again available.
7. Test kit has a modular structure and is mounted into the cabinet as a single board.
8. Ensure that all ports are not connected to any fixed input or output modules, the desired input or output ports can be connected to any desired module.
9. Ports selecting the port pins as outputs to be constant can be used with any module.
10. Experiment Kit affected other units that may occur due to a failure in one of the modules. Is replaced by a new module
or repair is very easy. Modular screwed after having replaced or repaired, the integrity of the set short
also can recycling.
Any of the 11 modules over the easily removable. Developed a new module can be replaced when removed. This feature
It is very important for the education of the students. Student's possible to add a module to set its own design experiments.
This is also an important factor that increases the student's confidence.
12 using the module allocated for development can be done on a new design and added a new module to the test set.
During the 13- 10-pin IDC flat-ribbon cable connection is used.
Therefore, there is no cable clutter on the set.
14 ATMEL AVR to be used in the experiment set 90S, ATTiny includes all the features of ATmega microcontroller instruction set
15. Experimental set, the AVR STUDIO, BASCOM AVR C and is fully compatible with similar C compilers.
Microcontrollers are programmed on 16- experiment set via the USB port.
17. In the crystal oscillator on the experimental set by changing a switch used as a 4 MHz and 16 MHz aid.
All modules + 5V, GND is available as standard.
18. Experimental set RESET circuit, which is connected to all AV socket on are available. Written AVR matter which socket
are not. Once is enough to press the RESET button to restart.
19. Another set of experiments using the ISP connector on the AVR circuit can be programmed without dismantling.
20 on the test set, a way to allow the project to create a new circuit board.
21 supplied with the experiment set "User's Guide and Applications" in the booklet about the module on the test set
There are examples in the quorum. The specifications of the test in the book, electronic circuit diagrams, circuit diagrams set of experiments,

other elements except the AVR features used in the experiment, statements and other information included in Appendix

Purpose of the Atmel AVR instruction set:
1- Atmel AVR microcontrollers of the product, without the need for another device, seamlessly and reliably make the programming.
2- A programmed AVR microcontroller without removing the spot, and the program will automatically run in application mode
provide an examination of the function.
3. Faulty fuse bits to use closed due to programming (locked) to return to integrate the factory settings
reprogrammed to provide.
4- Test Set outside the scope by adding a module to be developed on the Test Set's and will produce
allow to be used.

General Features:
- Depending on the choice experiment set has a programming feature without USB or serial port.
- Fast outside sockets programming and applications
40-pin ZIF socket for programming.
- RESET button for AVR circuits and in all AV connector.
- Power switch and LED indicator
- LED indicators show the status of programming and test mode
- The key to select USB or RS232 serial port for programming
- 4x4 keypad keypad circuit
- 2 x 16 character alphanumeric LCD circuit
- 64x128 pixel graphical LCD module circuit
- Separate circuit for LCD brightness settings
- Serial EEPROM (24C32 I2C) circuit
- RTC (Real Time Clock) real-time clock circuit
- 32.768 kHz crystal for RTC circuit tests
- Positive temperature coefficient (PTC) circuit elements
- Negative temperature coefficient (NTC) circuit elements
- Hall effect sensor circuit
- LM35 temperature sensor circuit
- Photo resistor (LDR) circuit
- Multi-turn from 0 to +5 volts for analog input circuit timpot
- 2 0 + 5Volt the potentiometer circuit for analog input
- Buzz circuit

- 4 7-segment display (common cathode) circuit
- 8 pcs LED indicator circuit
- 8 pcs mini buttons and 8-DIP switch circuit

- Stepper motor (1.8 deg / step) and stepper motor drive circuit
- DC motors and DC motors MOSFET circuit
- DC motors and DC motor speed opto-coupler with the counting circuit elements
- RS232 and RS485 communication interface circuit
- USB communication connector
- PS2 PC keyboard input connector
- ISP output connector (circuit programming capability via)
- TTL communication sockets for each port
- 8 channel 10-bit ADC circuit
- 8-Bit DAC circuit
- Marquee circuit (8 character 5x7 LED dot matrix display)
- USB port (USB to RS232 converter) and serial port programming circuit
- Opto Triac 3 with cardiac driven circuit (external loads can be controlled.) The zero crossing detector.
- 433 MHz for serial data communication ASK modulated RF transmitter / receiver circuit

- Infrared receiver and transmitter circuit for FSK modulated serial data communication
- Rotary encoder circuit (A-B encoder)
- Square wave oscillator circuit (0-250 kHz)
- Potentiometer (2 set 1 multi-turn from 0-5 volts DC) circuit
- Mounted on the experiment set the project was bom
- Program Testing and Power LED indicators circuit
- Can be selected for programming and testing 4MHz, 20Mhz oscillator circuit
- Specially prepared for each port expansion sockets.
- Users will be empty modules needed for the preparation of its own module

Supply unit:
Power input: 220V AC / 50Hz (± 10%)
Mains input cable: IEC / 1.5 meter grounded
On-off switch: push-button. Light display
The experiment set supply unit: SMPS (Switch mode power supply)
+ 5V, +12 volts 2 amps short-circuit protected
Insurance: Easily accessible. Demountable. Screw type.

Connections cable:
Unit from the port: 10-pin IDC flat cable, 1mm cable jack

Integrated with:
Each of on IC socket

Trainer bag type:
Interior coated anti-static material, the outer
made of aluminum, impact resistant

Standard accessories included in the Test Set:
1- 1 Piece ATmega32 integrated
2- 1 Piece integrated Atmega8
3- 1 ATTINY2313 integrated
3- 1 Piece USB programmer cable
4- 1 Number Serial communication cable
5- 4 Piece IDC 10-pin flat cable
6- 6 Piece pin connection cable
7- 1 Piece manual and applications manual
1 Piece Atmel AVR 8- Programming (ATTINY2313) book
9- 1 Piece CD

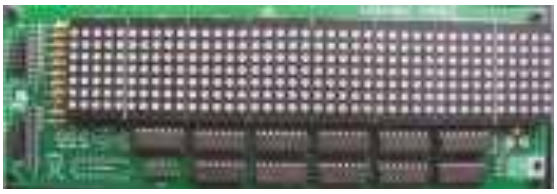
CD includes:
1. ATMEL AVR needed regarding (not requiring license) software.
2. AVR programming software.
3. Service programs.
4. Example programs.
5. Data catalogs.
6. AVR Projects

Units in the training set:

Programming Module (PROM)

- 8, 20, 28 and 40-pin PDIP has type IC sockets. It can be programmed to the desired IC attached.
- Has built-in programmer circuit on the programming module. When installed on a PC AVR programming PROM is done with the data sent from the USB port.
- Located on a main module 5 pieces made links to other application modules by means of 2x5 pin header connector. All of 2x5 pin header connector with the connections made in the port pins are connected to the application module with 2x5 ICD via flat cable. Program in order to provide flexibility in developing There is also a 1x10 pin connector sockets header row. The 2 and 4-way connection cable supplied with the kit on any of the PROM via a port pin on the application modules can be connected to a desired p.
- Each port connector 10 pin to 2 to provide voltage to other modules on the remaining data in an 8-pin ports are also pins.
- Power input to the system is done via the PROM module. 2-10s or moved to other modules with data cables.

Scrolling Text Module



- Fixed application modules or applications where the marquee.
- 8 blocks of 5x8 matrix is formed from the LEDs. 8 letters on display at the same time
be displayed.
- Columns are driven by the 4094 integrated.
- If the lines are from the PIC's two ports (8 data control pin 4) can be driven by the 8-bit data

RS232 & RS485 Serial Communications Module

- ES120.01 Trainer is a module designed to be able to develop serial communication applications with.
- The connection between the PC with a DB9 serial port is done by

RS232 cable.
- Are integrated into the module and RS485 MAX232 voltage integrated compatibilizer.
- Is issued on the necessary connector pin terminals to communicate with other devices with serial RS485 integrated.

Alphanumeric and Graphic LCD Module

- Different types (eg GDM12864 to, as GDM12864B) you can insert graphics LCDs,
It is the module where the socket.
- 8-bit data format also try to make the LCD alphanumeric text printing, 44780 is located socket compatible chip also can place the LCD (there are 1x14 and 2x8 row header pins.

- **4x7 segment display module**

4-way is the module where the common cathode display driver integrated and 74LS47.
74LS47 integrated and the data sent to drive common anode terminals are connected to a single port.
This is a common anode 7-segment display and is driven each BC327 PNP transistors.
4 PIC programming the screening method used to display the numbers in the display.

- **Stepper Motor Module**

ULN2003 is integrated and can be operated with 5V stepper motor is located on the module.
Stepper motors are designed for experiments. Module for stepper motor driver on the circuit that can be used as an output unit connecting directly to any port on the PIC main module.

- **LED Module**

8 LEDs arrayed side by side used to monitor binary numbers sent from a port.
There is also a buzzer on the module. When the buzzer will be asked to use the J10 jumper BUZZER side.
Simple tests that can be done in the early stages of learning PIC programming can be done using this module. Ends are connected to GND after the 330 ohm resistors connected in series with the LEDs (suitable for driving high active

- **PS2 / USB Module**

Computer to send data with pic synchronous serial communication protocol used to make the computer keyboard or PIC serial communication applications from a USB port.
1 PS2 keyboard connector on the module, there are B-type USB port connector 1.

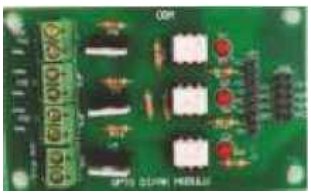
- **Analog Modules**

PIC on PAM is designed to provide an analog input module.

PIC to 8 discrete channels of analog input allows you to do. Normal potentiometer circuit 2, multi-turn potentiometer, LM35 (temperature sensor), LDR (light sensor), PTC and NTC temperature sensors, Hall Effect sensor is located.

A4 is the input analog input sensor which depends on the user's needs, for use pin’s are located.

- **Opto Diac Module**



This module has 3 opto-isolator with over 3 triac driven through.
To be checked three separate channels connected to the receiver works with AC voltage. Receiver three entries can be made of the ends of the connection / output terminals to be done and there are a number of common neutral connections.

- **DC Motor and Cycle Counting Module**

L293D driver module is used to integrate with 5 volt DC motor control experiments.
PWM motor speed control method and change the direction of rotation is the ideal module for making applications.
There are sensors to measure the IR transceiver module also with the engine speed and speed.
To raise the voltage reading from the IR sensor is also located the LM741 opamp circuit.

- **ADC Module**

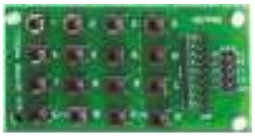
This module has an integrated ADC0804
0-5 V analog voltage between the AG entered the pin, 8-bit is converted to digital data.
Analog input modules can be connected to a desired analog component output of the ANLG with 2 cable.
Digital data like 2x5 pin header through the cable can be connected to any port on the PAM.

- **DAC Module**

DAC0808 and OPAMP LM741 available in this module.
2x5 connector header like PAM digital data from any port on is designed to convert the analog voltage.
LM741 is integrated in the DAC output voltage is used to raise the voltage ranging from 0 ~ 5V.
DIP switches on the module, the PAM independently DAC0808 has been put in order to provide an integrated digital data.
Digital data to be sent from the PIC on PAM request received this DIP switch to OFF.

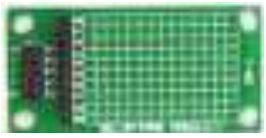
DAC0808 requires integration of the supply voltage +12 V positive power supply. This is the PAM to provide voltage + 12V, GND pins are.
2-connector cable with this portable on voltage module.

- **4x4 Keypad Module**



The module can be optionally made of 4x4 or 4x3 keypad experiments.
16 Enable button is located. Matrix array of PIC of these buttons 8 pins to be entered data from 16 separate buttons provided.
Rows and columns are made in 10K pull-up resistor.

- **Development Module - 1**



This one is smaller than the current two development module.
ES120 sees the hole PCB mounted function can be improved in order to ensure the training set.
2x5 and 1x10 for connection to the port on the PAM is located header connectors.
Designed to enable users to easily use on the set developed by establishing an input or output module is a module itself.

- **Extra PIC Module**

Microchip products is 18-pin PIC microcontroller module can be used.
B port on the left side of the pot on the right side of the 2x5 pin header connector is extracted

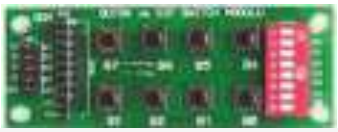
often used in the communication between two PIC application.
Series of data sent using the PIC on PAM another set of communication and remote control (IR or RF) is a module that will be used frequently in experiments.
For example, the data read by the PIC modules used in the practice of sending 4x4keypad in series PICs on the PAM.

- **Development Module - 2**

Development module on the set of 2 is the large size.
ES120 placed to ensure that the training set is more advanced and is used as the PCB.
2x5 and 1x10 for connection to the port on the PAM is located header connectors.
Designed to enable users to easily use on the set developed by establishing an input or output module is a module itself.

- **Buttons and Dip Switch Module**

Digital input (5V, 0V) is a module placed on the 8 button to make.



Entry is made with 10K pull-up resistor is connected to a button (normally when connected to 5V logic-1 data). By pressing the button logic-0 (0V) to the module output.
Continuous data entered into a port pin logic "1" or "0", there is also a 8-DIP switches can be used in applications that need to remain.
DIP switch in the ON position while the output connector on the logic "0" is sent

- **IR and RF Transmitter Module**

IR and RF is the module where the transmitters element to remote experiments.
IR (Infra Red) for communication, transmitting IR LED on the module and modulation frequency generating circuit LM555 There is.
RF (Radio Frequency) 433 MHz ASK transmitter circuit for communication takes place.

- **Rotary Pulse Encoder Module**

On Rotary Pulse Encoder and two LED modules in order to see the encoded digital output produced by the RPE.
RPE is often used to make the volume settings on the device that produces sound digitally.
Also referred to as digital potentiometer. To learn the operation of these elements and to develop applications
is a very useful module for.

- **1-25 kHz square wave oscillator module**

The module produces between 1-25 kHz square wave. To adjust the oscillator frequency from the LM555 integrated on the module in a different capacity with 4 x 2 jumper capacitor can be selected. The selected frequency range can be changed in the linear potentiometer has one frequency in order to obtain

- **I2C Communication Module**

Applications with components that can be communicated with I2C serial communication mode is prepared to make a module.
24C xx series of EEPROM can be connected and data exchange

applications external to the PIC.
24C32 and PCF8583 on the circuit are integrated as ready.
In addition to the socket on the circuit can be installed with PCF8583 DS1307 digital temperature sensor inserting experiments.
32 kHz is necessary to provide the required accuracy in the Clock app crystal oscillator circuit module is on

- **IR and RF Receiver Module**

IR and RF is a module that includes the receiving member for remote control experiments.
IR (Infra Red) 38 kHz IR receiver on the circuit for communication, RF (radio frequency) are 433 MHz RF receiver circuit elements for communication