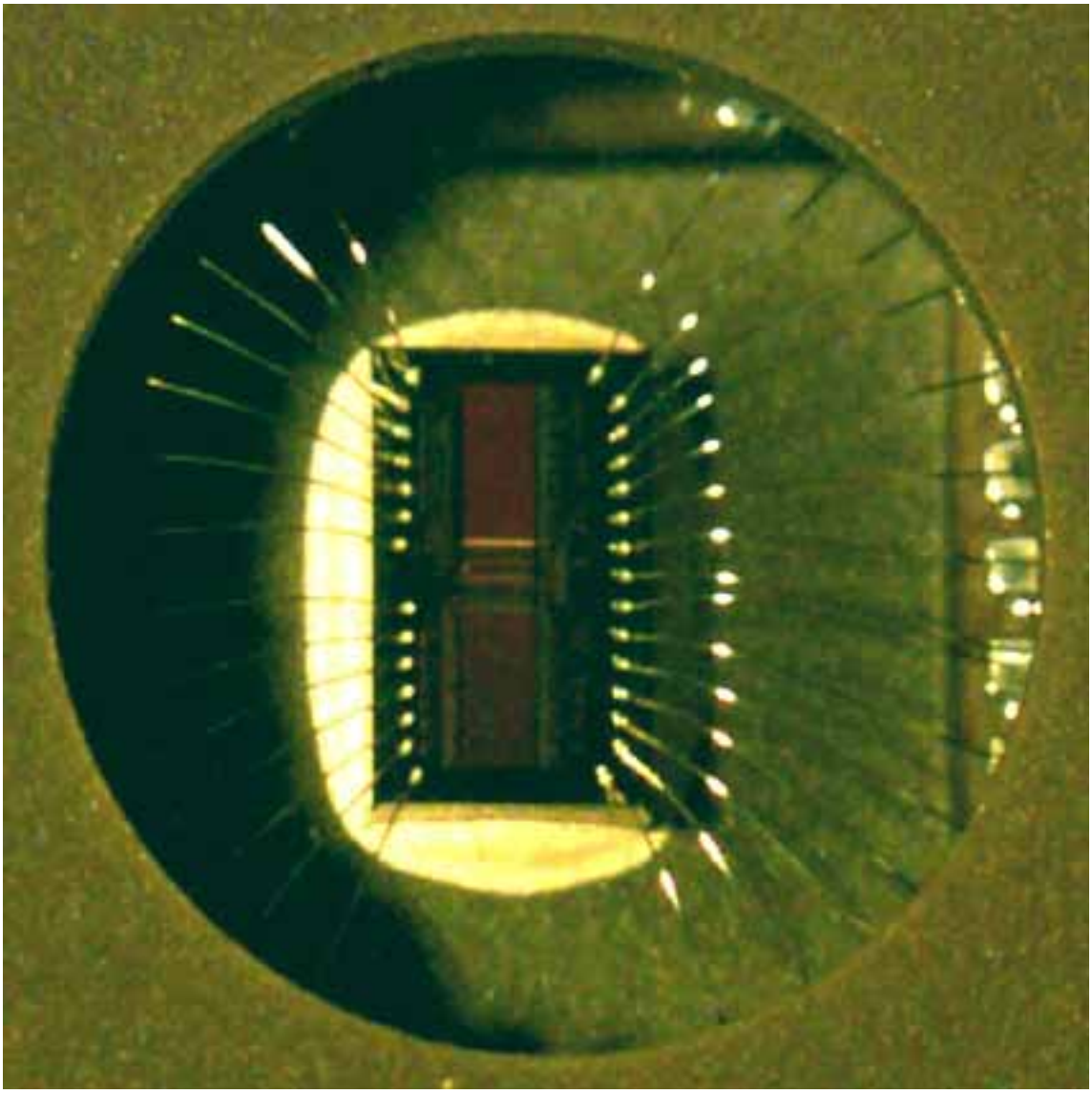
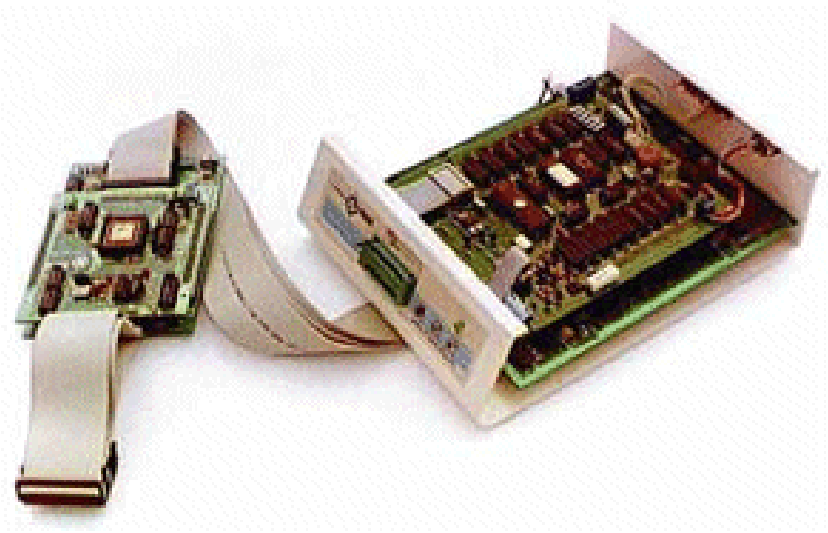
Electron S.R.L.

Design
Production &
Trading of
Educational
Equipment

B51 SERIES – MICROPROCESSORS, MICROCONTROLLERS, PERSONAL COMPUTER



B5100 - UNIVERSAL MICROPROCESSOR TRAINER



The trainer B5100 is a UNIVERSAL EMULATOR suitable for both 8 and 16 bit microprocessors.
The basic version includes the Z80, 8031-2 and 68000 microprocessors.

The unit is a stand-alone serial emulator and consists of a set of equipment conceived to design a microprocessor board, performing real-time emulation.

The system is based on a PC (not included), where Software is developed, and on the xxPx Emulator to emulate Hardware.
While we suggest to develop Software with "C", any cross-assembler available on the market can be used and a symbol converter can be provided on request when necessary.

Common Technical Characteristics

- Equipped with a 128K x 16 RAM of internal emulation mappable with 8K block resolution for all microprocessors that address more than 64K. When it is used with an 8 bit microprocessor, the RAM is mapped accordingly. Complete with 8 hardware breakpoints for real-time emulation with the clock settable to internal or external.
- Trace (Optional unit **B5100T**):
  32 x 64 bit trace buffer with
  internal/external clock,
  internal/external trigger,
  pre/center/post trigger with 8K counter, 8 clips
  supplementary external breakpoint, "trigger" and "level" outputs.
- The emulation is completely symbolic.
- Banking:
  16 Banks of 64K for 8 bit processors.
  256 Banks of 64K for 16 bit processors.

User Interface

One of the most important aspects of the Emulator Software is the C Debugger which allows debugging of any C source developed by the user.

Management of the breakpoints can be performed directly on the lines of the C program and by means of the special "Watch" it is possible to monitor any symbol in "real time".

This Software is customized for each family of microprocessors according to the different technical characteristics, and it enables the serial dialogue between the Emulator and the computer.

B5110 – MICROPROCESSOR TRAINING SYSTEM

Photo of the trainer complete with optional modules and optional PC

General:

The B5110 system consists of a set of modules providing a means of studying microprocessor technology from the basic programming to the most complex applications, such as industrial automation control, robotics, etc.. The system can be used as a general-purpose development tool for microprocessor-based applications.

The trainer is based on a microprocessor family of widespread use, the 80C51 (which includes the 80C31, 80C51, 80C71) presently manufactured by INTEL, PHILIPS, OKI etc. The system is also compatible with single-chip microprocessors such as the 80C552, 87C751 and others.

System Characteristics:

The system consists of the following items:

B5110-A – PERSONAL COMPUTER.
IBM compatible, of the PENTIUM class, with a minimum configuration of 64 Mb RAM, Keyboard, Mouse, SVGA monitor, 4 GB HD, 3.5" FD, CD ROM, Printer.
The above is a standard PC and can be supplied by ELECTRON or alternatively use may be made of a PC machine already in possession of the educational institution.

B5110-B – UNIVERSAL MICROCOMPUTER BOARD AND DEVELOPMENT SYSTEM SOFTWARE PACKAGE.
This allows the writing of applications in Assembly Symbolic Language and the easy testing and debugging of the programs created.

This software package allows the downloading of object files in HEX format to the System under development or to the EPROM programmer.

These files can also be uploaded from the System under development in the same format for disassembly and the reconstruction of the Source Listing file.
The software package can optionally be provided with the facilities to write programs in the "C" language and convert them into Assembly Source Listings.
The Microcomputer board contains the CPU, memory, I/O interface, RS 232 serial link with the support PC (B5110-A)
This board provides ready-to-use universal hardware allowing the implementation an immediately working system. The user can therefore focus on program development.
Additional boards of this type can be provided with the trainer as separate items.

B5110-C – EPROM/EEPROM PROGRAMMING MODULE.

B5110-D – ULTRA-VIOLET EPROM ERASER.

B5110-E – DIGITAL APPLICATIONS MODULES KIT
This consists of a set of boards containing specific hardware (digital) to be interfaced to the microcomputer board B5110-B to perform the experiments. These include:

- 8-input board with optoisolators and simulating switches
- 8-output board with microrelays and LEDs
- 2-digit 7-segment display
- keyboard and buzzer
- DC motor control
- Optional Adapter board to connect all simulators of the B3729 series (PLC trainer). This greatly extends the range of use of the B5110 trainer.

Note that the B3729 simulators include items ranging from a Traffic Lights, an Elevator, a Conveyor Belt, etc. Please see the description of the B3729 series for full details.
The list of Applicable Modules provided with the trainer can be expanded/modified to fulfill the customer's requirements.

B5110-F – ANALOG APPLICATIONS MODULE KIT
This consists of a set of boards containing analog hardware to be interfaced to the microcomputer board B5110B to perform analog experiments.
A/D and D/A converters are included

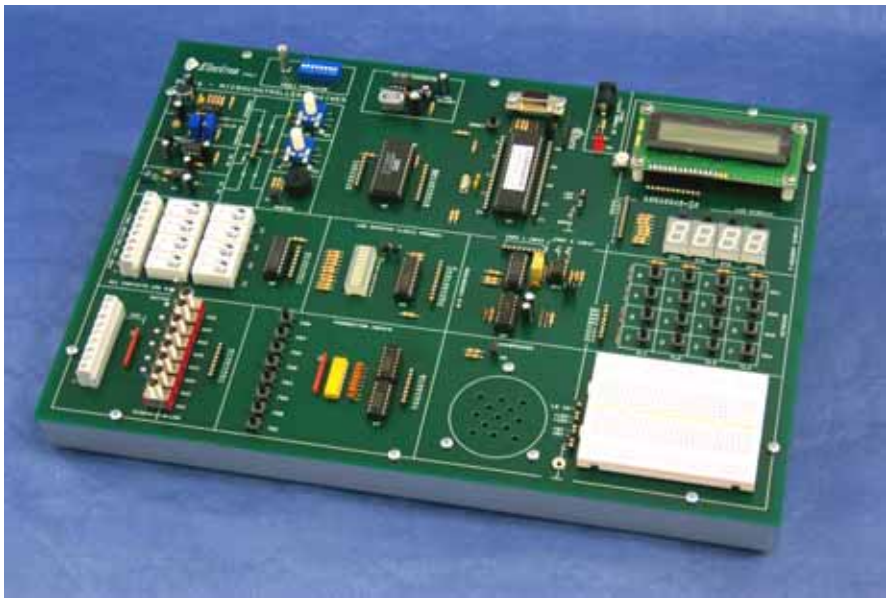
B5110-G – POWER SUPPLY MODULE, delivering the voltages required to operate the system.

The B5110 trainer is delivered with accessory kit (connection cables) and extensive instructions manual. This covers both the introductory subjects on microprocessors as well as guided experiments and programming examples.

Ordering code:

B5110

B5116 – MICROCONTROLLER TRAINER



This trainer is to build expertise on PIC microcontrollers, leading the student from the basics of microcontroller understanding and programming up to the design and development of complex applications.
In addition to being an efficient means of learning, the B5116 can be used as a feature-rich complete system, including In-Circuit Emulation (ICE) capability and PIC device programming.

The B5116 consists in a large-sized development board for PIC Flash Microcontrollers PIC16F87X and specifically for the PIC 16F877A device, in the 40-pin DIP package.
The 40-pin PIC microcontroller contains a superset of peripherals of lower-pin count PIC devices, and experience gained on this trainer can easily be transferred to practically all other PIC microcontroller types.

The B5116 board includes:

- 2 potentiometers, connectable to the A/D converter inputs
- Microphone and relevant amplifier
- Photoresistor and conditioning circuit
- Infrared transmitter
- Infrared receiver
- Buzzer
- 16-key keyboard in 4 rows and 4 columns
- 8 toggle switches to provide digital inputs
- 8 pushbuttons with debouncing circuitry
- 1 reset pushbutton
- Bargraph display with 10 LED positions, used to display digital outputs
- 8 micro-relays with relevant drive circuitry
- 1 loudspeaker and drive circuit
- 1 8-bit D/A converter
- 1 PWM to analog converter/filter
- 4-digit, 7-segment LED displays
- Intelligent LCD display, 2-lines x 16-characters each
- 1 28-pin socket for RAM/EPROM expansion
- Clock circuit at 20MHz, quartz controlled, with the capability of building an on-board RC clock oscillator
- Expansion connectors replicating the PIC pinouts
- 9-pin serial connector (RS232) to link to the host PC
- Stabilized on-board +5V power supply
- Fault simulator consisting of micro-switches concealed under a removable cover. This is to train students in troubleshooting
- Solderless breadboard to set-up additional interface circuits

The software package provided with the trainer includes the following:

- Assembler program to translate the program listings in ASCII format (prepared with Windows Notepad or any other text editor) into *.HEX, *.LST and *.COD files to be used by or downloaded to the on-board resident PIC microcontroller.
- ICE software, PC resident, to set-up via the serial link to the PIC on-board the B5116 trainer, an In-Circuit Emulator/Debugger/Programmer system.
- ICE Monitor software, stored in the on-board PIC 16F877A chip.

  The monitor allows the B5116 hardware board to communicate with the host PC, thus implementing the ICE functions.

The B5116 trainer is supplied complete with all required accessories, which are as follows:

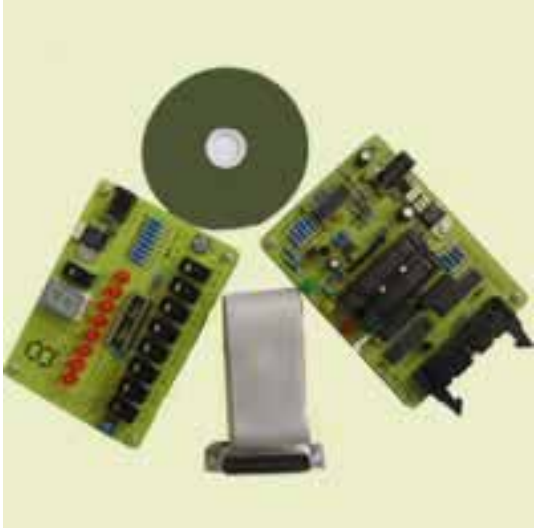
- Power supply from the AC mains, 220-240V AC, 50/60Hz
- RS232 serial cable
- Set of pre-stripped breadboard cables, various colors and lengths
- 1 RAM chip type 61C64 and 1 EPROM chip type 27C64, for experiments of the external memory provisions of the PIC of the trainer.
- Instruction manual
- CD with Assembler software, ICE package, sample and Tutorial application programs. Datasheet for the PIC microcontroller in electronic format is also included

Ordering code:

B5116

B5120 – PLD STARTER KIT

Factory code ATM014



B5120 is a complete training and development system for Programmable Logic Devices - PLD. This unique starter kit allows you to learn the principles, try out the code and program devices. As well as a programmer for Atmel 16V8, 20V8 and 22V10 flash PLD, the starter kit includes a training board, CUPL compiler and a Get Going with PLD book on CD.
This package is used by universities and companies worldwide for training on basic logic and PLDs and configuration languages. It can also be used as a low cost programming unit.

PLD Starter Kit

- Software Development Environment
- Atmel CUPL
- Programmer with ZIF socket
- Evaluation, training board
- Get going with PLD book on CD

Device Support

- Atmel ATF16V8B, AT16V8BQL, ATF16V8C
- Atmel ATF20V8B
- Atmel ATF22V10C
- This programmer does not support AT22V10B devices as these are officially obsolete

Operating Systems

- Win95,Win98
- Win2000, ME, XP

Hardware Description

- PC Interface Cable (Printer Port)
- Training Board with LEDs, 7-segment display and switches including Clock and Output Enable.
- Programmer board with ZIF socket for device programming
- Atmel ATF16V8 device, re-programmable thousands of times
- Includes 9 VDC Power supply, code PSU9V-UNI.

Software Description

- Kanda Template software, for Pin Assignment, I/O configuration etc. including editor and Programmer Interface.
- Atmel CUPL software for design compilation
- Training book on CD - a complete logic and CUPL tutorial with worked examples

Ordering code:

B5120

B5140 – PC MAINTENANCE TRAINER
B5142 – ADVANCED PC MAINTENANCE AND TROUBLESHOOTING TRAINER

The trainers consist of updated Personal Computers of the Pentium class, transformed in trainers suitable for use in hands-on laboratory courses for computer maintenance.

The two trainer models share the same design principles and organization. The B5142 offers over the B5140 the provision of an additional hardware/software trouble-shooting package which ranks to the current top industry level.

Both trainer models fully display the electronics of the system, made accessible for the execution of the experiments, and include plastic transparent covers to protect the equipment when the trainer is not in use.

Both trainers are provided with a fault simulation system usable to train students in trouble-shooting techniques, as well as to enhance their understanding of system operation.

12 different fault situations are provided.
The programmable faults cover all subassemblies/sections of the system and are conceived to train students to locate faults by precisely following a logical guideline from symptom to the possible cause of misoperation.

The B5140 and B5142 provide fault insertion by means of concealed switches or, optionally, by means of the B1176 – Fault Simulator with Keyboard and Display –.

The construction of both trainers is such that the units are suitable for use by a single student as well as for classroom demonstrations.

A summary of the technical characteristics of the systems is as follows:

- CPU PENTIUM class.
- VGA colour monitor, 15" diagonal.
- 256 Mbytes RAM.
- 1 Floppy disk drive
- 1 Hard disk, 40 Gbytes.
- 1 Keyboard.
- 1 Mouse
- 1 Parallel port
- 1 Serial ports RS232C.
- 1 CD (ROM) drive
- 4 USB ports

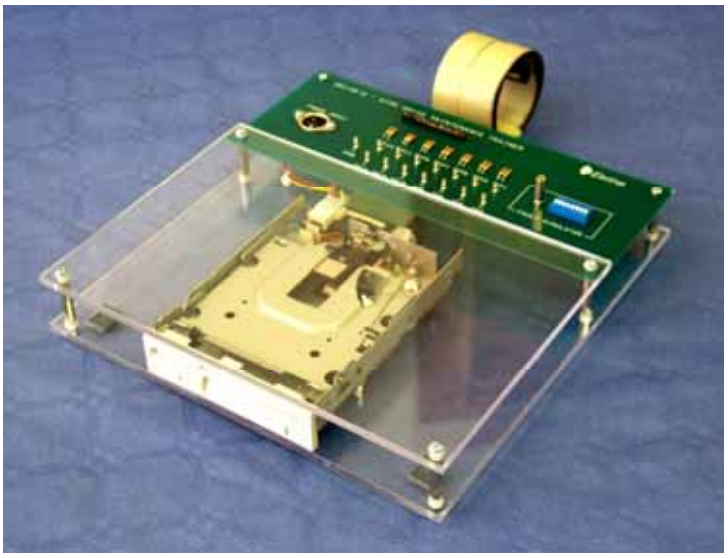
The additional diagnostic package of the B5142 includes:

- Flip POST Card for PCI bus with display for POST codes and solution codes.
- Logic probe with LED indicators.
- Diagnostic software allowing system test and advanced diagnostic tests on:
  - processor
  - memory
  - FDD and HDD
  - CD-ROM, DVD-ROM, ZIP, SCST devices
  - serial/parallel ports
  - modem, printer, mouse, joystick
  - burn-in PC diagnostic.

Ordering codes:

B5140
B5142

B5140-D – DISK DRIVE MAINTENANCE TRAINER



This trainer can be regarded as part of the ancillaries to the B5140 – PC MAINTENANCE TRAINER. It consists of a 3.5-inch Floppy Disk drive, modified so as to display the mechanics as well as the electronics. Both these subassemblies are provided with removable plastic covers to protect the equipment when not in use.

In addition to familiarization and study of disk drives, the study topic allowed by this trainer is troubleshooting. 8 simulated faults are provided, which can be inserted by the instructor through concealed microswitches

Ordering code:

B5140-D

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B5145 – LASER PRINTER MAINTENANCE MODULE

The trainer can be regarded as an appendix to the B5140 – PC MAINTENANCE TRAINER. This item consists in an industrial apparatus transformed for the requirements of training.
The original equipment cabinet is added with a rugged synoptic board with clear silk-screen printing of the system block diagram.

The electronics of the unit is made accessible for test and measurements through 18 test points, selected to provide a clear understanding of the system operation.

Since laser printers internally generate Very High Voltages, special care has been taken to ensure safe use of the trainer: all test points carry low-voltage, hazard-free signals and high-voltage parts are insulated and shielded so as to prevent accidental contact.

A fault simulation system is provided, for 12 different fault situations. The faults are inserted by means of microswitches, concealed from the student but accessible to the instructor.

The trainer is supplied with accessories and instruction manual and with an initial supply of consumable items.

Ordering Code:

B5145

DUE TO CONTINUOUS UPGRADING OF THE ORIGINAL EQUIPMENT, THE PHYSICAL APPEARANCE OF THE FRONT PANEL OF THIS TRAINER MAY CHANGE. THIS MAKES NO DIFFERENCE IN THE EDUCATIONAL QUALITY OF THE TRAINER ITSELF.