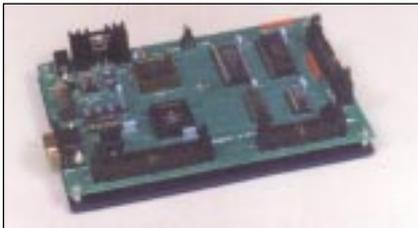




Microprocessor Trainers & Applications, PICs & PLDs

This range includes microprocessors, microcontrollers & programmable logic modules with a common digital I/O bus, compatible with a range of hardware applications. The hardware is complemented by a range of cross-development, assembly language, software packages working from a host PC. All communication software operates with Windows 95, 98 & NT.

68HC11 Microcontroller Trainer 24-102



The 24-102 is a comprehensive single board computer, based on the Motorola MC68HC11 micro-controller unit (MCU). The unit may be used as a development system or trainer. A comprehensive user manual is supplied. Cross-assembler (24-904) & applications boards are also available. A cable adaptor connects the Trainer to Application Board 24-200.

Programming

A ROM-resident monitor allows user programs to be assembled quickly on a line-by-line basis, then run and debugged. More advanced programs may be assembled on the host PC using the cross-development software. The assembled code may then be downloaded, run and debugged. A serial cable is supplied with the Trainer.

80C51 Development & Training System 24-104

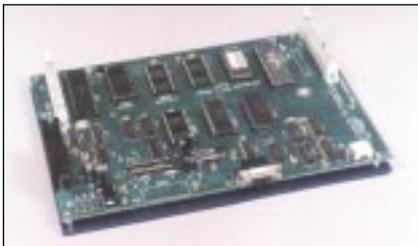


The highly flexible 80C51 single board computer, based on the Atmel T89C51RD2 "In System Programmable" member of the MCS51 family of micro-controllers, can be used as an educational trainer or target board. User and experiment manuals are supplied. This product is compatible with the 8051 Cross-assembler (24-946) and the Applications Board (24-200).

Programming

Using the PC serial port, Intel Hex format programs are entered directly into the Windows based Cross-assembler, Disassembled & debugged with the powerful Monitor facilities. Register contents can be displayed on the screen. The monitor software may be integrated into user code for flexible code development. Programs can be developed in high level languages, compiled and then assembled into Intel Hex format.

Z80 Microprocessor Trainer 24-121



The 8-bit Z80 microprocessor is a comprehensive computer which may be used as a development system for Assembler and Machine Code programs. The EPROM-based monitor provides a user interface to any standard PC via a serial port. A comprehensive user & experiment manual is supplied. Cross-assembler 24-922 and applications boards are also available.

Programming

Programs are entered directly into memory in Hexadecimal format or downloaded from the host in Intel Hex format. A clear graphical display enables line-by line assembler programs to be entered & disassembled. Powerful monitor facilities enable programs to be debugged easily, display register contents on screen & give direct access to cross-development software. On-board static ROM & EPROM are provided.

8086 Development & Training System 24-131

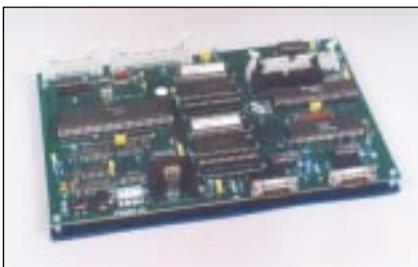


The 8086 16-bit microprocessor and a set of associated peripheral devices are fitted to this computer board and it is supplied complete with an "on board" EPROM-based monitor. Driven from a PC serial port, this product is compatible with the 8086 assembler (24-945) and the Applications board (24-200). User and experiments manuals are supplied.

Programming

Assembler code programs can be entered into the integral LINE-by-LINE assembler, Disassembled and debugged with the powerful MONITOR facilities. LINE-assembled programs can also be saved and re-loaded, when required. Both Register & Memory contents can be displayed on the screen in their own windows and a Watch Window enables specific selected memory locations to be monitored.

68000 Microprocessor Trainer 24-141



Based on the MC68000 16-bit microprocessor, this is a complete computer suitable for many stand-alone applications, especially for real-time control, where power and speed are important. It is supplied with comprehensive EPROM based monitor, line-by-line assembler programs and PC compatible communications software. User & experiment manuals are supplied. Cross-assembler 24-944 & applications boards are also available.

Features

This trainer is a versatile design & evaluation tool for Education & Training purposes, with full access given to Data & Address buses, enabling logic analysers and other diagnostic equipment to be connected for demonstration and debugging. On-board 16-bit wide static RAM & EPROM are provided with expansion facilities and extensive serial & parallel I/O hardware. A serial cable is supplied with the Trainer.

PC Applications and Interface Trainer 25-151-1

This trainer comprises an open-board format applications unit & a PC interface. It provides a wide range of programmable devices, either directly addressable from the PC, or indirectly via an interface, external sensors and associated components. A comprehensive manual is supplied including background theory assignments and software listings. A power supply, interface cable, manual and driver CD for the PC card is included.



Applications Board

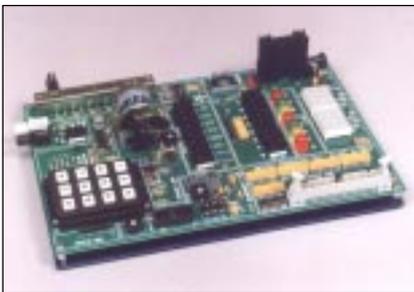
- LED bar voltmeter
- Dual-slope integrating A/D converter
- Fast comparator
- Variable 0-5V dc output
- Light sensor
- Heater and temperature sensor
- dc motor with fan and opto-sensor
- Switched clock
- Timed pulse output
- Adjustable frequency multivibrator
- Piezoelectric buzzer
- Logic sources

- 4-phase stepper motor
- LED logic indicator
- Push-button logic output
- Variable pulse output

Interface Board

- Programmable peripheral interface
- Programmable interval timer
- 8-bit D/A converter
- 12-bit D/A converter
- 12-bit fast A/D converter
- Single-bit input port and output Port

Microprocessor Applications Board 24-200



This is a highly versatile board, compatible with all our micro trainer hardware or a PC. It is ideal for teaching the basics of micro-processor programming and applications such as decision making, D/A and A/D conversion, open and closed-loop control, delay loops, sub-routines & event counting. It covers the techniques of micro control of Fibre optics, keyboard entry, digital sound production, dc motors control, infra-red sensing, heating & cooling & visual displays. Optional applications are available - Stepper Motor 24-201 & Liquid Crystal Display 24-202.

Inputs

- Optical fibre receiver
- 8-bit digital switch bank
- Numerical keypad
- Optical speed and position sensor
- Temperature sensor
- Slide potentiometer
- External analogue input

Outputs

- Optical fibre transmitter
- dc motor
- 8 LEDs
- Heater
- 2 dual segment displays
- Analogue output
- Speaker

Programmable Logic Development & Training System 28-107

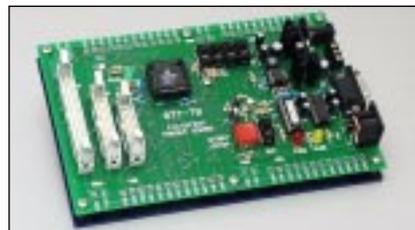


A low cost introduction to 'in system' PLD programming and application. This board comes with design software and is fitted with the powerful Lattice ispLSI2032E PLD. Comprehensive user & experiment/tutorial manuals are also supplied. Connects to a PC via a parallel port. Applications boards are also available.

Programming

Programs are developed on a PC and downloaded into an 'In system programmable' (ISP) device. Devices may be repeatedly programmed without removal from the hardware. LATTICE ISP Synario Starter Software is supplied, including ISP Encyclopaedia, applications notes, Design techniques, lattice data book and ISP development and download software. The hardware is also compatible with the LATTICE ISP Synario System Software.

PIC Development & Training System 28-122



The 28-122, is based on the versatile micro-chip PIC16F877 CMOS FLASH device in a 44 pin PLCC and has in-circuit debugging. It can be used for various applications; as a target board, or for educational purposes. It can also be used as a stand-alone controller, via a serial port to a PC, allowing easy downloads of control code, developed using Microchips MPLAB software or high level language development software.

Application Adaptor ADP-2 98-300

The 98-300 Application Adaptor enables the 28-107, 28-122 & 24 series Micro Trainer to be connected to the 34-401 Automatic Washing Machine & 34-402 Traffic Signal Control modules. The 34-401 cannot be controlled by the 24-121 (Z80) or the 24-102 (68HC11).

Cross-development Software for WIN95, 98 & NT4.0

The NT series of PC-compatible **Cross-assemblers** for Windows are available for **68HC11, Z80, 68000, 8051** and **8086** each consisting of:

- A relocating macro cross-assembler (except A8086NT)
- A relocating linker (except A8086NT which is absolute)
- A library manager
- A make utility
- Printed and on-line manuals
- The Embedded Development Studio (unless purchased as an add-on module)

NT ANSI C Compilers are also available for 8051 & 68000

Applications Board Interface DIO-PK-PCI 24-204

The board interface consists of a PC-installed Digital I/O card, a DIO adaptor and connection cable. It enables the Application Board 24-200 to be interfaced to, and driven directly from, a PC based parallel I/O port.

For further information on these items and other equipment in the Feedback range please contact:

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