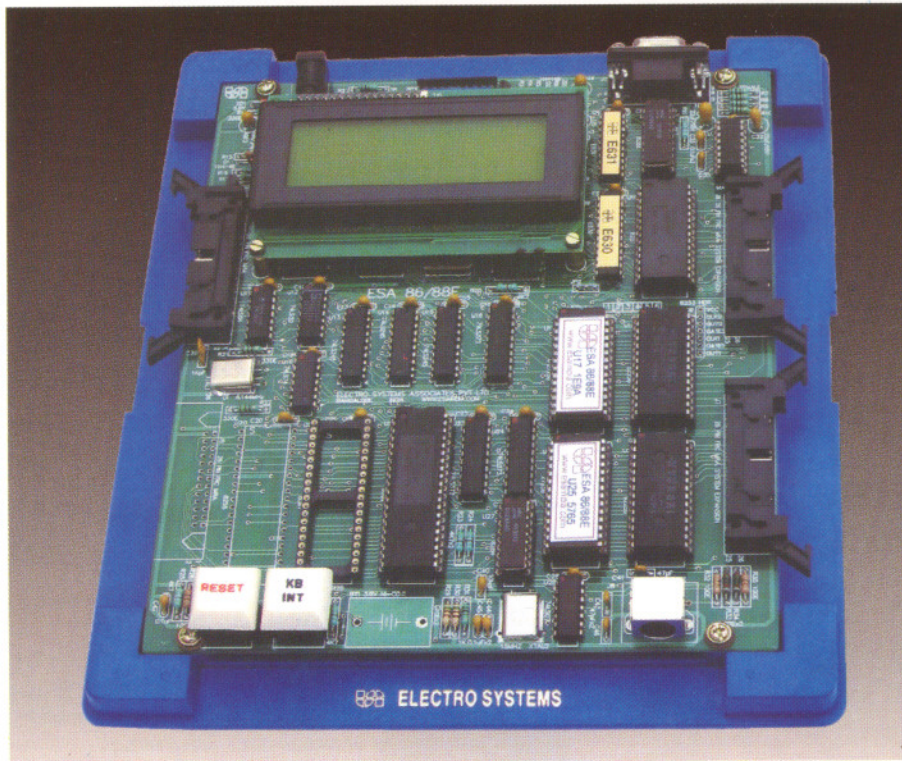# ESA 86/88E
ECONOMICAL
16-bit MICROPROCESSOR TRAINER

ESA 86/88E is an economical version of our advanced microprocessor trainer ESA 86/88-3. It is a powerful, general purpose microprocessor trainer which can be operated either with 8086 CPU or 8088 CPU at a clock frequency of 5MHz in maximum mode of operation. It has provision for on-board NDP (Numeric Data Processor) 8087. It can be configured for different modes of operation using DIP switch settings. The basic system can be expanded through the system bus connector.

The powerful firmware provides keyboard monitor, serial monitor, one-line assembler, disassembler and driver programs for parallel printer interface and PROM programmer interface. ESA 86/88E is supported with comprehensive and user-friendly documentation.

ESA 86/88E can communicate with a PC compatible host system using the DOS/Windows based Driver Software supplied along with the trainer. All the standard commands of the serial monitor of ESA 86/88E are fully supported by this package with online help. In addition, object code files (HEX files generated using PC native tools like MASM, TASM) can be downloaded to ESA 86/88E from the host computer system, permitting the development of powerful application software. All these features make ESA 86/88E a complete single board microcomputer for development in R&D labs and industries or for training in research and educational institutions.

MAIN FEATURES

★ ESA 86/88E operates on single +5V power supply either in stand-alone mode using PC keyboard and LCD or with host PC through its RS-232-C interface in serial mode.

★ Works with either 8086 or 8088 CPU at 5MHz.

★ Provision for on-board 8087 NDP.

★ Keyboard and serial monitor programs support the entry of user program, editing and debugging facilities like breakpoint, single-step and full speed execution of user program.

★ Built-in One Line Assembler, Disassembler in both serial and stand-alone modes of operation.

★ ESA 86/88E has provision for on-board memory of 192K Bytes inclusive of 64K bytes of RAM with optional battery backup.

★ Monitor resident parallel printer driver.

★ 48 I/O lines and three 16-bit programmable interval timers.

★ Provision for system bus expansion through 50 pin ribbon cable connector.

★ User friendly menu driven windows driver software for file upload/download to/from host PC.

★ 64K Bytes of software breakpoints implemented through Windows driver.

ACCESSORIES (OPTIONAL)

★ Power Adapter : +5V @ 3A (SMPS) .

★ PC keyboard for stand-alone mode of operation.

★ 8087 NDP - Numeric Data Processor.

★ EPROM Programmer Interface to program 2716 through 27512.

★ Interface modules for training purpose: Calculator type keypad, HEX Keypad, Elevator, Display, Dual DAC, 12 bit 8 Channel ADC, Logic Controller, Traffic Lights, Tone Generator, Stepper Motor, Opto Isolated Input, Opto Isolated Output, Relay Output, DC Motor Interface, Temperature Controller Interface etc.

★ Study cards for 8255, 8279, 8251/8253, 8259 etc.

★ Power Supply : +5V @ 3A; ±12V @ 250mA; and +30V @ 100mA (required for some of the above interfaces).

★ 3.6V Ni-Cd battery for power backup to RAM.

★ Parallel Printer Interface Cable.

SPECIFICATIONS

CENTRAL PROCESSOR

8086/8088 @ 5MHz (Supplied with 8086)

CO - PROCESSOR

8087 NDP

MEMORY

4 JEDEC sockets provide the following Memory Configuration

ROM : 128K bytes system firmware using 27C512 (64K X 2)

RAM : 64K bytes using 62256 (32K X 2)

PERIPHERALS

8255 : PPI ; Three nos. of Programmable Peripheral Interface. (72 I/O lines) One 8255 used by system for mode selection and LCD. Remaining two nos. are for user, one supplied; another for user expansion.

8253 : PIT; Programmable interval timer. Three 16 bit programmable timers, timer 0 for baud, timer 1 and 2 available for user.

8251 : USART for serial communication supporting all standard bauds from 110 to 19200.

8042 : Universal Peripheral Interface used to interface with PC keyboard in standalone mode.

8288 : Bus controller used to generate control signals.

8284 : Clock generator used to generate clock & RESET signals.

INTERRUPTS

External : NMI for user through KBINT key
INTR is left unconnected.

Internal : INT1 for single step
INT3 to break user program.

INTERFACING SIGNALS

CPU Bus : Demultiplexed and fully buffered, TTL compatible; Address, Data & Control signals are available on two 26 pin flat ribbon cable connectors.

Parallel I/O : 48 programmable parallel I/O lines through two 26 pin ribbon cable connectors.

Serial I/O : RS-232-C through on-board 9 Pin D-type female connector.

Timer Signals : Timer 1 & 2 signals are brought to a header.

GENERAL

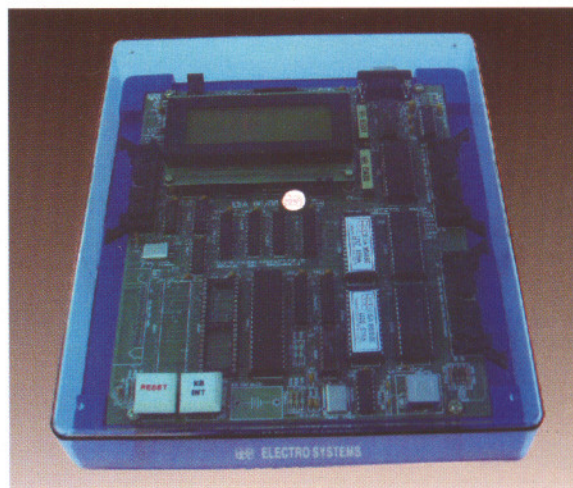Power Supply
Requirement : +5V@ 1.4 A (approx.)

Dimensions : (L)240mm x (B)210mm x (H)50mm (Approx.)

Weight : 700gms. (approx.)

Housed in ABS plastic moulded cabinet

SCOPE OF SUPPLY

1. ESA 86/88E Trainer
2. RS-232-C Cable
3. DOS & Windows Driver Software CD
4. User's Manual with Schematics
5. MCS-86 Assembly Language Reference Card

OUR PRODUCT RANGE : Microprocessor Trainers for 8085, Z80, 6809, 8086/88, 68000; Microcontroller Trainers for 8031/51, 80C196 KB/KC, 68HC11, PIC Trainers and Interface Modules; DSP Trainers; Power PCs; In-Circuit Emulators; ROM Emulators; Microcomputer Development Systems; Universal Device Programmers; UV Erasers; PC compatible systems and Add-on Cards, Logic Analysers, AD/DA cards, DIO cards, etc.; Microprinters; Printer Support Products and Software Development Tools; etc.,

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12-2007

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NOTE : Specifications are subject to change without prior notice