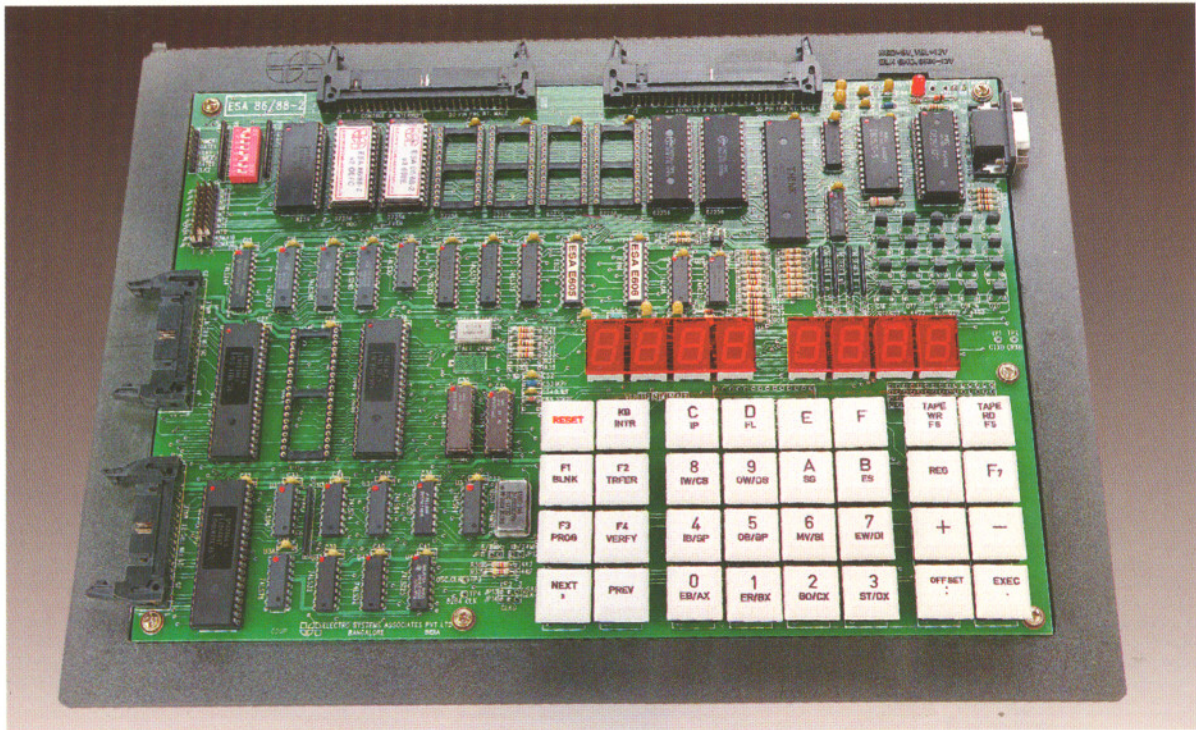# ESA 86/88-2
A VERSATILE
MICROPROCESSOR TRAINER

ESA 86/88-2 is a powerful, general purpose microcomputer trainer that can be operated either with 8086 CPU or 8088 CPU. In either case, the CPU is configured in the Max. mode of operation and has provision for on-board NDP (Numeric Data Processor) 8087. The system is versatile and can be configured in a variety of ways via jumper options, to suit specific user requirements. The basic system can be easily expanded through the system bus connectors.

The powerful firmware provides keyboard monitor, serial monitor, single-line assembler, disassembler and driver programs for parallel printer interface, PROM programmer interface and audio cassette interface. ESA 86/88-2 is supported with comprehensive and user-friendly documentation.

The windows based communication software supplied allows the user to connect the trainer to a host PC. All the standard commands of the serial monitor of ESA 86/88-2 are fully supported by this package with on-line help. In addition, object code files (HEX files generated using PC native tools like MASM, TASM) can be downloaded to ESA 86/88-2 from the host PC facilitating development of powerful application software. All these features allow the use of ESA 86/88-2 as a convenient instructional and teaching aid as well as powerful development tool in R&D labs and industries.

MAIN FEATURES

★ Works with either 8086 or 8088 CPU

★ Operates on a **single +5V power supply,** in stand-alone mode using on-board keypad or with a PC compatible system through its RS-232-C interface.

★ Provision for on-board NDP 8087.

★ Powerful system monitor permits entry of programs, debugging through breakpoint and instruction step facilities.

★ Built-in one line Assembler / Disassembler.

★ Printer Driver included in the firmware.

★ Provision for easy system expansion through system bus connectors.

★ Provision for battery backup to RAM.

★ Windows driver with user friendly debugging environment.

ACCESSORIES (OPTIONAL)

★ Power Supply (+5V @ 3.0A, ± 12V @ 250mA, 30V @ 100 mA).

★ EPROM Programmer Interface (2716 through 27512)

★ 8087-2 Numeric Data Processor.

★ Interface modules for training purpose: Keyboard, 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 Card Modules for 8255, 8251 / 8253, 8279 and 8259.

★ Printer Interface cable.

★ Battery backup for RAM.

CPU

8086-2/8088-2 CPU operating at 8 MHz in Max. mode. (Supplied with 8086-2 CPU)

CO-PROCESSOR :
On-board 8087-2 Numeric Data Processor

MEMORY

EPROM : 4 JEDEC sockets provide

128K bytes using 27256s (32K x 4) or, 256K bytes using 27512s (64K x 4) (System firmware is supplied in 2 x 27256s. The other two sockets are for user expansion).

RAM : 4 JEDEC sockets provide 128K bytes using 62256s (32K x 4) (64K Bytes supplied using 2 x 62256s. The other two sockets are for user expansion).

PERIPHERALS

8279 : To control 32 keys keypad and 8-digit, half-inch size, seven segment LED display.

8288 : Bus Controller used for generating control signals

8284 : Clock-generator used to generate clock for processor and associated peripherals.

8251A : Programmable Communication Interface for serial communication supporting standard bauds from 110 to 19,200.

8259A : Programmable Interrupt Controller provides interrupt vectors for 8 sources.

8253-2 : 3 Programmable Interval Timers; Timer 0 is used for generating baud clock and the rest available for user.

8255A : (2 Nos.) Programmable Peripheral Interface devices provide 48 Programmable I/O lines.

INTERRUPTS

External : NMI through keyboard.
INTR controlled through 8259A, On-board Interrupt Controller provides interrupt Vectors for eight Interrupt sources ; off-board or on-board.

Internal : Interrupt Vectors 1 (single step) and 3 (breakpoint) reserved for monitor.

INTERFACE SIGNALS

CPU Bus : Demultiplexed and fully buffered, TTL compatible, Address, Data & Control signals are available on two 50 pin ribbon cable connectors.

Parallel I/O : 48 programmable parallel I/O lines (TTL Compatible) 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 and Timer 2 signals are brought out to Header Pins.

GENERAL

Power Supply Requirement: +5V DC @ 1300 mA (Approx.)

Dimensions : (L) 365mm x (B) 275 mm x (H) 55mm (Approx.)

Weight : 1300gms (Approx.)

Housed in an ABS Plastic moulded cabinet

SCOPE OF SUPPLY

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

<u>OUR PRODUCT RANGE :</u> 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.,

Dealer / Distributor

NOTE : Specifications are subject to change without prior notice