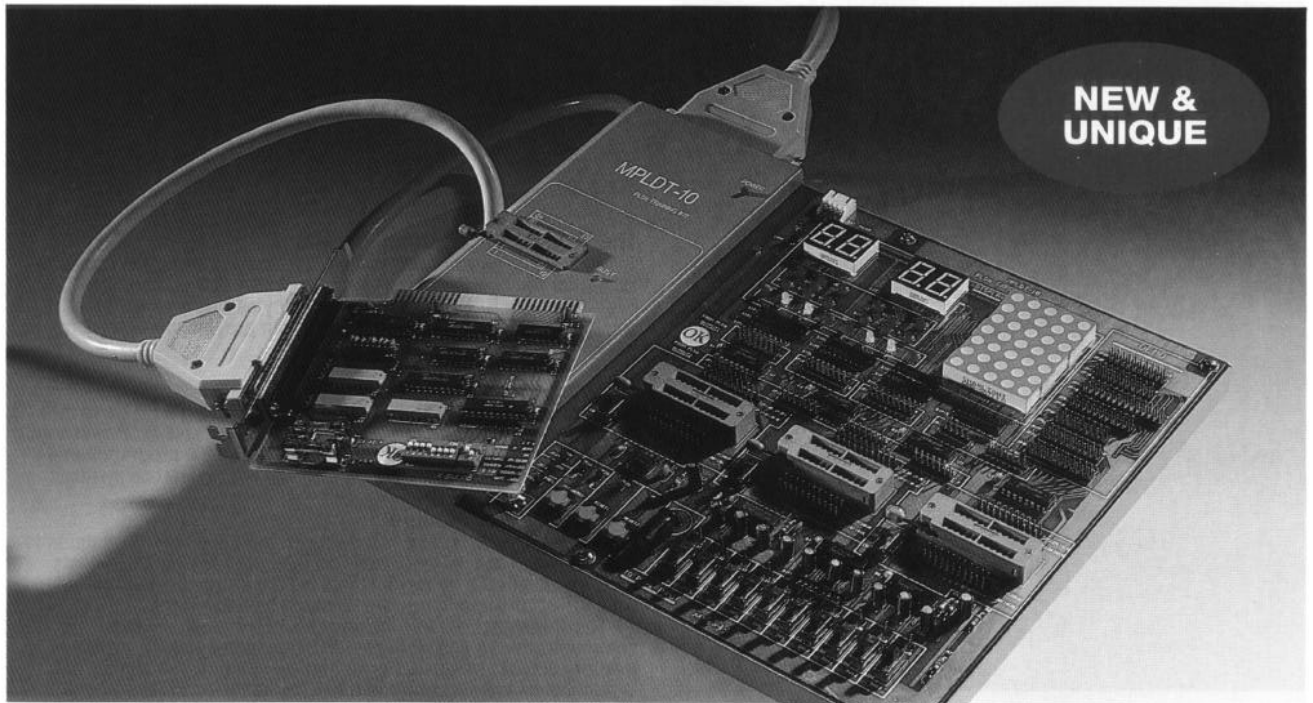NEW & UNIQUE

The Complete, PC-based PLD Training System

Until now, introducing students to the world of Programmable Logic Devices has been fraught with problems.

Not only has the necessary hardware to be laboriously assembled in bits and pieces, but suitable software and – equally important – supporting documentation has been, if anything, harder to source.

With the launch of **THE PAL TRAINER** system from Flight Electronics International, the entire problem has been neatly solved in one comprehensive hardware/software/documentation package...

...providing everything that the instructor and student needs for a thorough introduction to PLD's at a very realistic price.

Simple, Fast, Friendly

The design parameters of **THE PAL TRAINER** were that it should:
 run on IBM XT, AT, or compatibles – with no need for ANY other hardware.
 provide a complete training course, from initial logic design, to PC simulation, device programming and testing.
 be enjoyable, readily-understandable, but fully applicable to 'real-world' situations.
 include a top programming language – in this case AMD's PALASM Version 4, widely regarded as the PLD standard.

The PLD (Programmable Logic Device) or PAL Trainer offers a complete introduction to programmable logic devices. It takes the student from an initial logic design, to simulation on a PC, programming the device and testing the final product on the accessory section in hardware.

Software

We have included the industry standard PLD programming language, **PALASM®4** version 1.1 from renowned chip manufacturer AMD. This will enable a student to become familiar with a language that is actually used in industry and is widely regarded as the standard language in the world of PLD's. The software comes with extensive documentation and to save the user time, these documents include example programs.

– **PALASM®** and PAL are registered trademarks of Advanced Micro Devices, INC.

PLD Programmer/Application Board

This device enables fast programming and testing of PLDs. It comes complete with 4 GAL chips. These chips, once programmed, can be used over and over again, simulating different PAL devices. The programmer and applications section are all part of one board and are connected to the PC by an 8-bit interface' card. This enables rapid programming of the PLD and greater flexibility than a serial link can deliver.

PLD Programmer

This is part of the main training board and is complemented by software which will run on the PC. The GAL device is placed in a ZIF IZero Insertion Force) socket and oroarammed from the PC. The software will let you choose a particular PAL to emulate; Load a JEDEC file into memory; Download a JEDEC file to the GAL and it will even let you 'view' the GAL.

The GAL's included in the package are 3 x GAL16V8 and 1 x GAL20V8. The nature of GAL devices means that they do not need to be erased so a separate UV eraser is unnecessary.

Application Section

This section of the board provides facilities for testing the programmed devices. It can accommodate up to three PLDs simultaneously; it has a variable square wave frequency generator; a matrix display; dice simulator display; LED 'traffic light' display and four seven segment displays. The board also has a demonstration section to rapidly show how each of these devices can be used. JEDEC files for the demonstration programs are included. These include the following:

24 Hour Clock	Neon Lighting
Simulated Dice	Dot Matrix Display

For your own programs, pins are provided around the ZIF socket to connect. via the jumoer leads supplied. to the various sections of the board. Using this system, we believe that your introduction to PLD's will be quick, your frustration low, and your enjoyment of this field of electronics greatly enhanced.

Documentation

In 'Vintage' Flight Electronics International style there is a superb operation and experimental manual, written by our resident Applications Engineer - Andrew Padley B.Eng (Hons) and edited by our Technical Director, Eur. Ing. John H. R. Selby C.Eng. MIEE. This manual takes you from unpacking the system and ensuring you have everything available, via a 'step-bt-step' system from setting-up through to the 23 experiments. It is written in precise, easy to understand English. The manual alone is worth including in your library!

Computer Specification

sm 4 version 1.1
IBM PC XT, PC AT, PS/2 or 100%
compatible computer
A minimum of 512Kb of free system RAM and 10Mb of Hard Disk Space Available
One Floppy Disk Drive
1 Mb Extended Memory for large designs/designs with a large number of test vectors.
Optional Printer: IBM Proprinter, Epson FX80 series, HP Laserjet with line cartridge.
MS-DOS 3.1 or later.

Training Board Specification

This is a basic PLD (GAL/PAL) Training Kit for teaching the fundamentals of PLDs.

Uses PALASM 4 to edit compile and simulate.

Programming:

Powerful software - you need to see it!
GAL writer: To program GAL 16v8 and 20v8
User friendly operation (pop up menu)
More than 40 different PAL chips can be emulated via the supplied GAL 16V8 and GAL 20V8 I.C's
Power supply (+5v) or use directly from your PC

Signal Generation:
2 independent 1Hz and 10KHz outputs
1 independent adjustable clock pulse generator (1Hz – 1KHz)

Display Devices:
Logic indicator
8 independent LED's to indicate High/Low
LED's arranged as a dice face
One 5 x 7 dot matrix display
4 seven segment LED s

Level Switch:
10 independent input switches- Latch switch which includes debounce circuit
Fan out up to 10 TTL Loads

Edge Switch:
Includes debounce circuit
0v to 5v output, pulse width is controlled manually
Fan out up to 10 TTL loads

Text Tools:
3 x ZIF sockets for experiments
Items for experimentation include, 23 on board combinational logic and sequential circuits.

Experiments:

Combinational Logic (10 experiments)
Full adder
Full subtracter
3 bit look ahead adder
Comparator
Seven segment decoder
5 x 7 dot matrix
3 x 8 decoder
4 x 2 encoder
Multiplier
basic logic gates experiment

Sequential Logic (13 experiments)
counter
light circuit
electronic dice
traffic light simulator
general circuit
seven segment LED
dot matrix
Up/down counter
Sequential detector
24 hr clock
3 bit neon light
Alarm circuit
Moore circuit

System Contents:

PC interface card
API-37, interface cable
Operation Manual
Experiment handbook
Lattice 3x16v8 & 1x20v8
Berg line x1, x2, x4
MPLDT-10 Kit

Conclusion:

When you have finished all of this, you will be a competent PLD user!
Then you can use it as a professional PAL programmer!

Flight Electronics International Limited

Ordering Information

Description	Part No.
MPLDT-10 PAL Trainer	800-001