# TRAINERS / CONTROLLERS / SOFTWARE

## RSR—∿∿— DIGITAL I/O MODULE

### KIT / ASSEMBLED

This trainer comes in kit form. It provides all necessary features for experimentation and prototyping of digital circuits. This trainer includes 8-SPDT toggle DIP switches, 8-LED indicators, clock conditioning circuit, two pulse switches, and 26 screwless terminal blocks for easy circuit connection. The kit comes with easy to follow instructions.
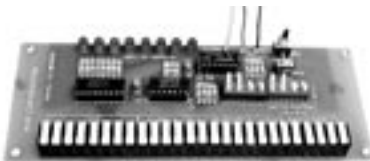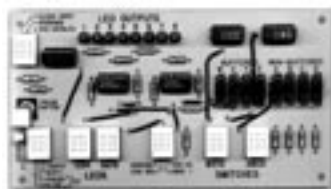
| Part No. | Price |
|---|---|
| 3200DIGKIT | $27.95 |
| 3200DIGASSMB | 38.95 |

## RSR—∿∿— DIGITAL TRAINER

### MODEL NO. DT3

### KIT VERSION ONLY

This Digital Trainer comes in kit form and provides all the functions necessary for digital experimentation and prototyping. The DT3's features include 8 binary switches (4 buffered), 8 LED indicators, a clock conditioning circuit, pulse switch with 0 to + 5V or + 5V to 0V output and 7 board mounted tie blocks for easy circuit connections. The kit comes with easy to follow assembly instructions.

| Part No. | Price |
|---|---|
| 3200DT-3 | $24.95 |

## velleman USB EXPERIMENT INTERFACE BOARD

The K8055 interface board features 5 digital input and 8 digital output channels. There are also 2 analog inputs and outputs with 8 bit resolution. Number of inputs/ outputs can be expanded by connecting up to a maximum of four cards the PC's USB connectors. All communication routines are contained in a Dynamic Link Library (DLL). Write custom Windows (98SE, 2000, Me, XP0 applications in Delphi, Visual Basic, C++ Builder or any other 32-bit Windows application development tool that supports calls to a DLL.

**DIAGNOSTIC/TEST SOFTWARE:**
— Separate output / input test
— Clear all / set all function
— Counter function on inputs 1 and 2
— Analog output set sliders
— Analog input bar-graph indicator
— Conversion time 20ms per command

**SPECIFICATIONS:**
5 digital inputs, 8 outputs
2 analog inputs and outputs
Power supply through USB
Diagnostic software with DLL included
**Requirements** – Pent. CPU, SB1.0, Windows 98SE, CD ROM player & mouse

| Part No. | Description | 1-4 | 5+ |
|---|---|---|---|
| 32VK8055 | Kit Version | $44.95 | $39.95 |
| 32VKMV110 | Assembled Version | 72.00 | 65.00 |

## ANALOG-DIGITAL TRAINER

### SINGLE BOARD

Compact, affordable and practical. Offers all the necessary features for any curriculum requiring electronic lab training and experimentation. Includes a multiple output power supply, signal generator, independent clocks, logic switches, tri-state LED indicators, frequency function and more. This is a powerful training and prototyping tool. Comes complete with 12vdc adapter with din connector to mate directly to board, plus operation manual.

- **Portable:** Easily transported. Large solderless breadboard area (1,640 tie points)
- **Power Supply:** ±9V and +5V @ 500ma
- **Digital:** 16 tri-state multi-color **LED indications** which remain in a normally lit pattern which alerts user that the LED is functioning (color then changes when in operation). Two **independent clocks**, 16 **logic switches**, 2 **momentary switches**.
- **Analog**: Sine and Square wave generator. Variable amplitude, variable offset, variable frequency to 20K
- Operation manual and power adapter (±12V) included
- Optional – 240 page circuit experiment and training book used by leading technical colleges. Emphasizes the relationship between design, analysis and testing. To fully utilize optional Experiment Book including circuit analysis, some additional hardware items (available from ELECTRONIX EXPRESS) and software may be needed.

| Part No. | Description | Price |
|---|---|---|
| 01ADASM | Single Board Analog-Digital Trainer | $74.95 |
| 2700MJW70 | 140 Piece Jumper Wire Kit | 4.50 |
| 31WI470144879 | 240 Page Experiment/Training Book | 32.95 |

## USB INTERFACE BOARD

USB Experimenter's Board is designed to introduce you to using a USB interface in your hardware designs. The Board is built around a Cypress Cy7C63001A Universal Serial Bus Microcontroller chip which has been pre-programmed to accept a variety of commands in a relatively simple format. A Windows-based test program is supplied, as well as full documentation of the USB chip. This board has 12 I/O lines: 4 output bits and 8 input bits. You connect to the I/O bits using jumper wires *(not included)*. In addition, the board has 4 LEDs which can be jumpered to the outputs and an 8-bit DIP switch that can be jumpered to the inputs. The board is available as a kit or pre-assembled.

| Part No. | Description | Price |
|---|---|---|
| 3200USBKIT | USB Kit | $28.95 |
| 3200USBASM | USB Assembled | 33.95 |

# TRAINERS

## GLOBAL SPECIALTIES®
## PROTO-BOARD® DESIGN WORKSTATION SERIES

*MODEL PB503 – Bench-Top Workstation*
*MODEL PB503C – Portable Unit*
   *(Includes Rugged Carrying Case)*
*MODEL PB505 – Advanced Design;*
   *Enhanced Features*

• Multiple test equipment features in one complete instrument.

• 100KHz function generator with sine, square, triangle and TTL.

• Triple output power supply offers 5VDC fixed plus two variable outputs: ±1.3 to ±15VDC.

• Removable breadboard sections.

• 8 channel logic monitor.

• 8 selectable logic switches.

• Two digital pulsers, audio experimentation speaker.

• High and low buffered logic indicators.

• **Additional Features (*Model PB505*)** – Larger breadboard area, low voltage (12.5VAC), AC supply, built in logic probe, BCD to 7 segment decoder/display, compatible with optional trainer boards.
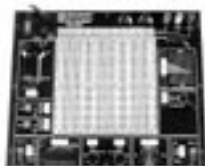
*MODEL PB-503*

*MODEL PB-503C*

*MODEL PB-505*

| Part No. | Description | Price |
|---|---|---|
| 01PB503 | Design Workstation – Bench Style | $290.00 |
| 01PB503C | Design Workstation – With Case | 333.00 |
| 01PB505 | Advanced Circuit Design Trainer | 437.00 |

## MICROWAVE TRAINING SYSTEM
### SOLID STATE / KLYSTRON TRAINER
*MODEL LRL 550B-SS*

Best value for hands-on microwave training. 22 microwave components per trainer. Features dual power source facilitating both Klystron and solid state microwave instruction within a single system. Includes both a Klystron "Tube-to-Waveguide" mount for use with the 2K25 Klystron, and a Solid State Oscillator, enabling selection of either a Klystron or Solid State Signal source for experiments.

• 22 rugged microwave components
• 24 snap-fast waveguide clips for fast assembly time
• RG-52/U brass and copper waveguide construction with UG-39/U cover flanges
• Nickel plated components for durability
• Includes complete course in microwave theory supported by training manual with fifteen experiments
• Instructor can utilize standard lesson plan or create many other demonstrations with components provided
• Solid State Oscillator for simple one-step conversion between Klystron and Solid State modes with no additional wiring, power sources or adjustments
• 220V 50Hz version available for export for an additional charge

| Part No. | Description | Price |
|---|---|---|
| 01LRL550BSS | Microwave Training System | $4,200.00 |
| 01LRL575SC | Storage Case for Microwave Training System Components | 185.00 |

## MATRIX EDUCATION SERIES
### "C" FOR PICmicro® MICROCONTROLLERS CD ROM

The C for PICmicro microcontrollers CD ROM is designed for students and professionals who need to learn how to use C to program embedded microcontrollers. It also provides all the software tools needed to actually program a PIC16F84 – including a full C compiler and device programmer that is compatible with the Matrix PICmicro development board. Although the course focuses on the use of the PIC series of microcontrollers, this CD ROM will provide a relevant background in C programming for any microcontroller. The CD ROM assumes no previous experience of C programming – the only assumed knowledge is an ability to use a web browser and an understanding of basic digital electronics. In addition to the required underpinning knowledge PIC-C includes 9 complete projects, each of which has up to 5 subsections, that take users through the material in a relevant context.

| Part No. | Description | Price |
|---|---|---|
| 01ELPCCST3 | "C" PICmicro® Student Vers. | $68.00 |
| 01ELPCCSI3 | "C" PICmicro® Single User Vers. | 115.00 |
| 01ELPCC103 | "C" PICmicro® 10 User Vers. | 345.00 |

# RSR-⟍⟍⟋⟍— TELECOMMUNICATIONS TRAINER
## HANDS-ON TELEPHONY, LAN, CATV, FIBER OPTIC EXPERIENCE

*MODEL TCM-200*

**TELECOMMUNICATIONS** skills are necessary to succeed today. "TCM-200" introduces you to telephony, cabling, LAN and CATV with one self-contained unit. A comprehensive workbook walks you through the world of telecommunications from the very basic fundamentals of electronics to networks. Priced under $225.00, the TCM-200's innovative design covers more material in less time than units costing *thousands of dollars more.* The TCM-200 delivers the platform to teach the skills your students need **FOR TODAY AND TOMORROW.**



**$220⁹⁵**

*\* Tools, workbook, supplies and meter available at additional cost*



*Component and Supplies Kit*



*Tool Kit*

**Tool Kit Includes:**

• **Punch-Down Tool** – Impact type w/blades for 66 & 110 punch down blocks
• **Crimping Tool** – Deluxe ratchet type with four different dies
• **Wire Strippers** – (3) for coax cable, data / phone cable and hook-up wire
• **Long nose plier**
• **Diagonal cutter**
• **Screwdrivers** (2)
• **Magnifier** – lighted
• **Telephone Set**
• **Tool Box**



| Part No. | Description | Price |
|---|---|---|
| 01TCM200 | T-Comm Trainer (TCM-200) | $220.95 |
| 3300TCOM200 | Lab Manual / Work Book | 34.95 |
| 3200TCOMCSK200 | Component and Supplies Kit | 39.95 |
| 3200TCOMTK | Tool Kit | 119.95 |

**66 PUNCH DOWN BLOCK** ......................... 25x4 Split Punch Down Block for hands-on training with telephone cabling.

**TYPE 110 PUNCH DOWN BLOCK** ............. For hands-on training with telephone cabling. These are configured for use in conjunction with and separately from the 66 Block

**DIAL TONE**.................................................. "TONE ON-OFF" switch to supply tone selected by "TONE SELECT" switch to RJ11 type J1, J2, J3 and 110 block type PB5, PB6 and PB7.

**RING SIGNAL**.............................................. Push-button switch to supply 80VAC, 20Hz ring signal to J5, PB5, PB6 and PB7.

**RJ-11 CONNECTORS** .................................. Use 2 or more telephones for full-duplex communication to simulate a local loop and CO. Use connected Type 110 connectors to test ring, dial, ringback and busy tone signals.

**RJ-45 CONNECTOR**S .................................. Use for testing various LAN cables.

**CABLE TEST**................................................ Use with interchangeable PC Boards to test data cables with various pin-out standards. The test results are indicated by 4 LED's.

**PROTOTYPING AREA**................................. 480 tie-point breadboard.

**5V & 12V DC POWER SUPPLY** ................... For prototype circuits built on breadboard.

**BNC CONNECTOR & F CONNECTOR** ....... 50 Ohm / 75 Ohm Terminated for cable assembly instruction and prototyping use with RG58 and RG59 and RG6 cable.

**1KHZ TONE** ......................................... Fixed frequency 1KHz TTL clock signal.

## TRAINERS

## RSR-ᴡᴡ— PLDT-2 PROGRAMMABLE LOGIC DEVICE PROTOTYPING BOARDS

### WHY USE OLD, OBSOLETE TTL GATES TO IMPLEMENT COMPLEX LOGIC & STATE MACHINE DESIGNS?

*with the ALTERA® EPM7128SLC™ CPLD*

**ONLY $79⁰⁰**

User design software available from the chip manufacturer.* Then download your design from the PC with the parallel port cable (included). each comes with a user's manual containing a complete description of the board together with Lab experiments, power supply and cable.

*Power Supply and Cable Included*

*Breadboard Optional*

* Design software is available at the following chip manufacturer websites: For the **Altera** chip: http://www.altera.com. You can also go to the PLDT page on the Electronix Express website at http://www.elexp.com/tst_pldt.htm which has links directly to the software pages.
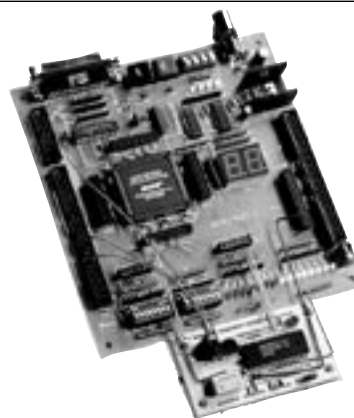
### HAS THE ON-BOARD I/O CAPABILITY YOU NEED:
• DIP Switches
• De-bounced Momentary Switches
• LEDs
• 7-Segment Displays
• Numerous Connectors for Jumper-Wires and Ribbon Cables

### ACCESSORY KIT *(32RSRFPGAACC)*
**INCLUDES:** 1 RSR MB-102 Breadboard with Wire Kit
1 RSR LP-610 Logic Probe
50 Breadboarding Pins

| Part No. | Description | Price |
|---|---|---|
| 01PLDT2 | PLDT-2 Board | $79.00 |
| 31CPLD | CPLD Programming Lab Manual | 58.00 |
| 31P0130453056 | Experiments In Digital Fundamentals With VHDL | 60.75 |
| 311401840302 | Digital Design With CPLD Applications & VHDL, 2Ed. | 140.80 |
| 32RSRFPGAACC | Accessory Kit | 19.95 |

### CPLD PROGRAMMING & DIGITAL LOGIC SIMULATION – *By Steve Waterman*

A lab manual to accompany any digital electronics textbook. This lab manual can help you learn how to use Max⁺plusII software by Altera Corporation. This manual starts with fundamentals of logic gates, then progresses to MSI devices, latches and flip flops. Then it moves on to clock dependent circuits including counters and registers, memory addressing, and converters.

Provides laboratory exercises that support Digital Fundamentals with VHDL by Tom Floyd. The manual supports the PLDT-2 and PLDT-3 boards from RSR Electronics, as well as the DeVry University board, and the Altera University Program board.

### DIGITAL DESIGN WITH CPLD APPLICATIONS & VHDL, 2ED
2nd edition; 896 pages. Updated Altera's Quartus II software and Lab.Source CD included with book. Thorough coverage of basic techniques and fundamentals to advanced principles.

## RSR-ᴡᴡ— PLDT-3 PROGRAMMABLE LOGIC DEVICE PROTOTYPING BOARDS

### WHY USE OLD, OBSOLETE TTL GATES TO IMPLEMENT COMPLEX LOGIC & STATE MACHINE DESIGNS?

*with the XILINX® XC95108™ CPLD*

**ONLY $79⁰⁰**

User design software available from the chip manufacturer.* Then down-load your design from the PC with the parallel port cable *(included)*. EACH comes with a user's manual containing a complete description of the board together with Lab experiments, power supply and cable.

*Power Supply and Cable Included*

### HAS THE ON-BOARD I/O CAPABILITY YOU NEED:
• DIP Switches
• De-bounced Momentary Switches
• LEDs
• 7-Segment Displays
• Numerous Connectors for Jumper-Wires and Ribbon Cables

* Design software is available at the following chip manufacturer website: For the Xilinx chip: http://www.xilinx.com
You can also go to the PLDT page on the Electronix Express website at http://www.elexp.com/tst_pldt3.htm which has links directly to the software pages.
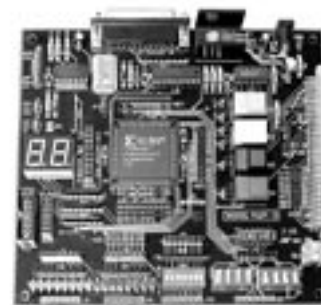
### ACCESSORY KIT *(32RSRFPGAACC)*
**INCLUDES:** 1 RSR MB-102 Breadboard with Wire Kit
1 RSR LP-610 Logic Probe
50 Breadboarding Pins

### DIGITAL ELECTRONICS LABORATORY EXPERIMENTS
**USING THE XILINX® XC95108™ CPLD WITH XILINX® FOUNDATION DESIGN AND SIMULATION SOFTWARE**

This digital laboratory manual by James Stewart and Chao-Ying Wang, published by Prentice Hall, allows introductory digital electronics students to use the Xilinx® software early in the course. Features of this manual include:
• A step-by-step introduction to Xilinx® software.
• Class-tested laboratory experiments guaranteed to work.
• More than one experiment for most typical areas to allow for greater flexibility in the laboratory environment.

| Part No. | Description | Price |
|---|---|---|
| 01PLDT3 | PLDT-3 Board | $79.00 |
| 31DELE | Digital Electronics Laboratory Experiments | 56.50 |
| 32RSRFPGAACC | Accessory Kit | 19.95 |

## TRAINERS / SOFTWARE

# terasIC T-REX C1 DEVELOPMENT KIT
## FPGA DEVELOPMENT BOARD W/BUILT IN USB PORT

This Development Board provides a complete, low cost multimedia platform featuring Altera Cyclone (EP1C6Q248C8) FPGA device. With the built-in USB blaster circuits, this TR1 development board has many multimedia features for users to develop advanced video, audio, memory and storage applications using the most popular components in consumer electronic products such as DVD and VCD players. Also includes a C++ program and controller IPs for peripheral controls to allow users to build up advanced applications in shortest timeframe. Users can use either the USB blaster link or RS-232 link to control the board.

**FPGA development board**
- Altera EP1C6Q240C8
- Altera EP1S Serial Configuration Device
- Built-in USB Blaster programming circuitry.
- Support both JTAG and AS mode programming
- Option to power via universal serial bus (USB)
- Eight LEDs
- Eight Schmitt-trigger debounced push buttons
- 1MByte Flash Memory
- 8MByte SDRAM (1M x 4 x 16)
- CF Card Socket (True IDE mode)
- 16-bit CD-quality Audio DAC with line-out connector
- TV Encoder with TV Out jack
- RS-232 Transceiver with 9-pin connector

- VGA DAC (4-bit resistor network) with VGA-out connector
- PS2 Keyboard/mouse connector
- 4-bit DIP switches
- 4-bit 7-SEG display module
- Two-40 pin expansion slots.

**Cables and accessories**
- USB A->B cable (for both USB-blaster programming and the TREX C1 API controll)
- 7.5V DC Power Supply
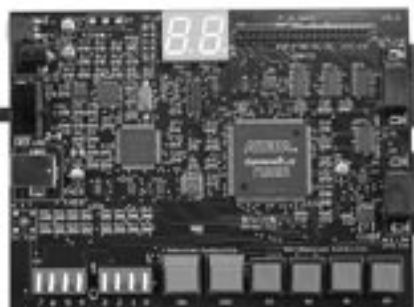- Quartus® II Web Edition design software

**Reference designs and C++ applications**
- Lab manual for using the C++
- Lab Manuals for using the reference designs
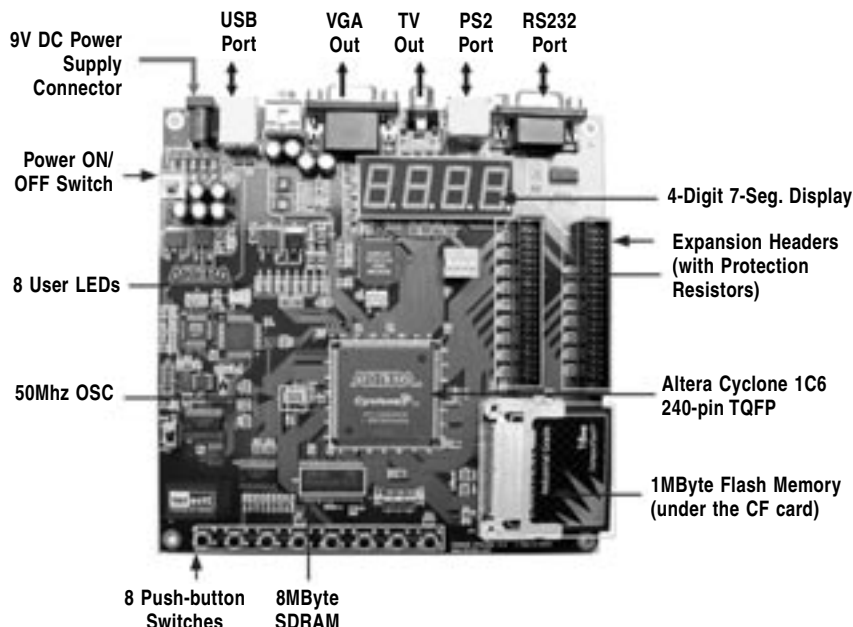
**Part No. 01FPGA1 • Price: $159.00**

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# FPGA BOARD WITH USB PORT

- Provides means of learning and prototyping digital logic, computer systems and FPGA code. This board provides a complete low cost platform using Altera Cyclone II (EP2C8) chip connected to various LEDs, switches and 7-segment displays. One can use web edition of Altera Quartus II to design FPGA code using Verilog HDL, VHDL as well as other design methods
- USB port for transferring FPGA to chip configurations
- 8 red LEDs, 8 green LEDs
- 2 sets of 4 SPDT switches
- 2 debounced, 4 non-debounced switches
- 40 pin and 2 DB-9 I/O connectors for interfacing
- 24MHz clock; can be multiplied or divided using interal PLL

**Part No. 01FPGA4 • Price: $149.00**

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# terasIC FPGA ALTERA BOARD WITH USB [NEW]

Provides ideal vehicle for advanced design prototyping in the multimedia, storage, and networking. The board offers a rich set of features that make it suitable for use in a laboratory environment for university and college courses, for a variety of design projects, as well as for the development of sophisticated digital systems. Altera provides a suite of supporting materials for the DE1 board, including tutorials, "ready-to-teach" laboratory exercises, and illustrative demonstrations.
**Altera DE1:** Available on the Altera website (http://university.altera.com/materials/unv-dev-edu-boards.html)

**FEATURES**
DE1 board provides users many features to enable various multimedia project development. Component selection was made according to the most popular design in volume production multimedia products. The DE1 platform allows users to quickly understand all the insight tricks to design projects for industry.

- Altera Cyclone II 2C20 FPGA with 20000 LEs
- Altera Serial Configuration deivices (EPCS4) for Cyclone II 2C20
- USB Blaster built in on board for programming and user API controlling
- JTAG Mode and AS Mode are supported
- 8Mbyte (1M x 4 x 16) SDRAM
- 4Mbyte Flash Memory
- 512Kbyte(256Kx16) SRAM
- SD Card Socket
- 4 Push-button switches
- 10 DPDT switches
- 8 Green User LEDs

- 10 Red User LEDs
- 4 Seven-segment LED displays
- 50MHz oscillator ,24MHz oscillator ,27MHz oscillator and external clock sources
- 24-bit CD-Quality Audio CODEC with line-in, line-out, and microphone-in jacks
- VGA DAC (4-bit R-2R per channel) with VGA out connector
- RS-232 Transceiver and 9-pin connector
- PS/2 mouse/keyboard connector
- Two 40-pin Expansion Headers
- DE1 Lab CD-ROM which contains many examples with source code

**Part No. 01FPGA2 • Price: $170.00**

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# SOFTWARE AND PROGRAMMERS

## matrixmultimedia ELECTRONIC PROJECTS

### PLATFORM: WINDOWS 3.1/95/98/NT; FORMAT: CD ROM

- 10 projects to build
- Component lists – also included as separate files for easy access
- Fully functional schematic design and PCB layout software included on the CD (CAD Pack)
- Component and general construction guides
- Project specific construction and testing

The projects on this CD are as follows:

- Light, Heat and Moisture Sensor
- Logic Probe
- NE555 Timer
- Egg Timer
- Dice Machine
- Bike Alarm
- Stereo Mixer
- Power Amplifier
- Sound Activated Switch
- Reaction Tester

| Part No. | Description | Price |
|---|---|---|
| 01ELEPSST | Electronic Projects – Student Ver. | $59.00 |
| 01ELEPSSI | Electronic Projects – Single User | 93.00 |
| 01ELEPS10 | Electronic Projects – 10 User | 192.00 |

## matrixmultimedia ELECTRONIC CIRCUITS AND COMPONENTS  – VER. 2

### PLATFORM: WINDOWS 95/98/NT/2000/ME; FORMAT: CD ROM

- Highly interactive virtual labs. Clear circuit simulation.
- Spoken text caters to students with low reading ability.
- Thorough assessment – multiple choice, worksheets, fault finding circuits, written exam questions and assignments.
- Flexible resources – stand alone, in front of class, class activity on a network, revision/remediation.
- Browser based – Intranet ready.
- Teachers' notes and editable worksheets included on CD.
- Multi Sim® / Electronics Workbench® circuits provided.

| Part No. | Description | Price |
|---|---|---|
| 01ELECCST2 | Electronic Circ. & Comp – Student / Home User | $59.00 |
| 01ELECCSI2 | Electronic Circ. & Comp – Single User | 93.00 |
| 01ELECC102 | Electronic Circ. & Comp – 10 User Ver. | 192.00 |

## matrixmultimedia ANALOG ELECTRONICS

### PLATFORM: WINDOWS 3.1/95/98/NT; FORMAT: CD ROM

- Virtual labs
- SPICE® simulation of over 50 editable circuits
- Design parameters for
- circuits included
- Complete hi-fi amplifier case study
- Editable worksheets

| Part No. | Description | Price |
|---|---|---|
| 01ELANAST2 | Analog Electronics – Student Ver. | $59.00 |
| 01ELANASIN2 | Analog Electronics – Single User | 93.00 |
| 01ELANA102 | Analog Electronics – 10 User Ver. | 192.00 |

## matrixmultimedia DIGITAL ELECTRONICS

### PLATFORM: WINDOWS 3.1/95/98/NT; FORMAT: CD ROM

- Virtual labs
- Full audio commentary
- Over 20 links to pre-designed Electronics Work-
- bench® circuits and crocodile clips
- Teachers' notes
- Editable worksheets

Digital Electronics provides a broad introduction to the principles and practice of digital electronics, including logic gates, combinational and sequential logic circuits, clocks, counters, shift registers, and displays. The CD ROM also provides an introduction to microprocessor based systems.

| Part No. | Description | Price |
|---|---|---|
| 01ELDIGST2 | Digital Electronics – Student User | $59.00 |
| 01ELDIGSI2 | Digital Electronics – Single User | 93.00 |
| 01ELDIG102 | Digital Electronics – 10 User License | 192.00 |

## GLOBAL SPECIALTIES®

## PROTOLAB™ CIRCUIT SIMULATION SOFTWARE

### CREATE AND ANALYZE CIRCUITS INSTANTLY ON YOUR PC!

### Release 4.0

Protolab™, a total computer-simulated, electronics laboratory including free built-in test instruments and tools to build and test actual circuits.

- Easy-to-use interface: Create AC&DC circuits moments after installation with ProtoLab's easy "click & drag" component placement and on-line help
- Choose from a complete list of active and passive components
- Five virtual instruments allow for instant, accurate circuit analysis: Voltmeter, Ammeter, Wattmeter, Oscilloscope, Ohmmeter
- Pre-designed circuit library included

**SYSTEM REQUIREMENTS:**
- IBM/PC 386 or compatible with 4MB RAM
- SVGA video
- Windows 3.1 or Windows 95
- Mouse
- 3 1/2 floppy drive

### Part No. 01PL300-0007 • Price: $49.95

## RSR PIC WRITER – HANDHELD

### SERIAL PROGRAMMER COMPATIBLE WITH MICROCHIP® MPLAB DEVELOPMENT SOFTWARE

Low cost programmer supports many devices from PIC family. Operates with PC-compatible host system running Windows 3.X/ME/NT/2000/XP. Reads, programs, verifies EPROM and EEPROM program and data memory. MPLAB Project support to automatically download object file to PSTART. Complete with RS-232 cable, 9V universal power adapter. Includes MPLAB Development Software (CDROM).

*LP-PICD is manufactured under license from* **MICROCHIP®**

### Part No. 01LPPSTART • Price $205.00

## matrixmultimedia ASSEMBLY FOR PICmicro® MICROCONTROLLERS CD ROM

- Virtual PIC allows full on-screen simulation programs
- Over 80 exercises
- Over 30 full working programs
- On-screen challenges
- Includes shareware assembler and send programs

The PICtutor is designed to teach users of all levels how to write assembler programs for the PIC series of microcontrollers. The CD ROM's 39 tutorial sections guide the complete beginner through PIC architecture, commands and programming techniques up to advanced programming techniques including discussion and examples of watchdog timers, interrupts and sleep modes. Over 80 exercises and challenges are provided.

| Part No. | Description | Price |
|---|---|---|
| 01PICST2 | Assembly for PICmicro / Student Ver. | $59.00 |
| 01PICSI2 | Assembly for PICmicro / Single User | 125.00 |
| 01PIC102 | Assembly for PICmicro / 10 User | 375.00 |

## matrixmultimedia PICMICRO MCU DEVELOPMENT SOLUTION

- Low cost solution with USB interface • Fully compatible with E-Blocks™ • No power supply required
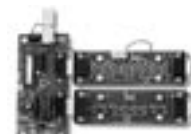
This consists of a USB Lite PICMicro MCU programmer, an LED block (8 LEDs), and a switch block (8 switches), a USB cable and CD ROM. It is supplied with PIC16F88 device which provides 15 I/O lines. Lite programmer is compatible with several 18 pin PICMicro devices. A simple patch wire *(not included)* or external supply is required for switch board.

### Part No. 01EB263 • Price: $152.95

# SOFTWARE AND PROGRAMMERS

## matrixmultimedia E-BLOCK™ SYSTEM

The E-Block™ System consists of small circuit boards each of which contains electronics that you would typically find in an Electronic System. The E-Blocks™ range consists of around 150 separate items which can be combined to make a variety of systems offering a wide range of learning opportunities. **Select a Programmer Board, add a number of peripheral boards, combine with a range of software utilities including "Flow Code" to develop a fully functional electronic system**.

# PROGRAMMING BOARDS

## PICMICRO DEVELOPMENT BOARD VER. 3

This is an ideal platform for learning how PICmicros are programmed and also for project work. This board programs a range of 8, 14, 18, 28 and 40 pin devices from the 12, 16 and 18 series PIC micro ranges. The on-board LED's, switches and displays can be used in CD ROM based courses or with Microchip's MPLAB software. The board also has two E-Blocks parts (on ports C and D) which makes it compatible with a large range of E-blocks add-ons and sensors.
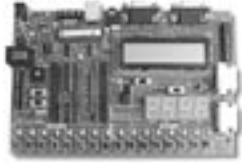
**Features:**
- USB Connector
- Single bit audio output
- 2 line LCD display
- Onboard sensors
- Quad 7 segment displays

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**Part No. 01HP488 • Price: $285.00**

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## PICMICRO MULTIPROGRAMMER

This programmer connects to your PC via USB to provide you with a low cost and flexible PIC microcontroller programmer. This board can be used with Assembly, C or Flowcode programming utilities provided by Matrix Multimedia. This board will programm most 8, 14, 18, 28 and 40 pin flash PIC micro devices using the flexible programming software provided and provided "clean" access to all I/O lines. The board has 5 E-blocks parts to which you can connect a variety of peripheral boards.
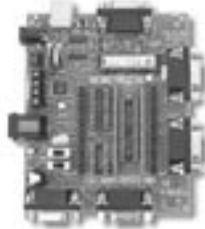
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**Part No. 01EB006  • Price: $115.00**

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## matrixmultimedia

# FLOWCODE / PICMICRO

## PLATFORM WIN95/98/ME/NT/2000/XP

Flowcode is a very high level language programming system for PICmicro® micro-controllers **based on flowcharts.** Flowcode allows students to design complex robotics and control systems in a matter of minutes. Flowcode is a powerful language that uses macros to facilitate the control of complex devices like 7-segment displays, motor controllers, and LCD displays. The use of macros allows students to control highly complex electronic devices without getting bogged down in understanding the programming involved.

| Part No. | Description | Price |
|---|---|---|
| 01TEFLCST2 | Flowcode Student Ver. | $79.00 |
| 01TEFLCSI2 | Flowcode Single User | 182.00 |
| 01TEFLC102 | Flowcode 10 Users | 550.00 |

# PERIPHERAL BOARDS

## LED BOARD
It has 8 LEDs which shows the status of each bit on the port

## LCD BOARD
This E-block contains a 16 character 2 line alphanumeric LCD display on a 5 wire serial bus.

## SWITCH BOARD
This E-block contains 8 push-to-make switches. Connectors allow this board to be used in bus configuration.

## PROTOTYPE BOARD
It contains a small breadboard for developing circuits and projects. Connectors for two E-block ports allow prototype wires and leads to be connected to the rows and columns on the prototype board.

## SENSOR BOARD
This board contains a variable resistor and a simple light sensor which can be used for simple analog experiments. It also contains sockets which allow users to interface with many other sensors.

## BLUETOOTH BOARD
This board allows you to add Bluetooth capability to any microcontroller with UART functionality.

## INTERNET BOARD
This board adds Ethernet functionality to a microprocessor with the need for developing a TCP-IP software stack.

## VOICE CODEC BOARD
This audio coder-decoder board allows students to investigate Bluetooth systems that use audio. It is based on MC145483 linear 13 bit CODEC which allows voice digitization and reconstruction as well as pre and post filtering.

## MOTORS BOARD
This board is based on L298 device which can drive two motors operating up to 46 V @ 4A each. It can be used in a variety of motor control configurations including PID control.
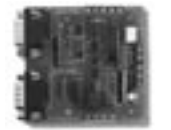
## OPTO-ISOLATOR BOARD
This Opto-Isolator Board allows you to add 4 separate optically isolated inputs to your E-blocks system. This is ideal for developing industrial control systems like PLCs (programmable Logic Controllers) where electrical systems need to be isolated from one another.

## KEYPAD BOARD
A simple 4 x 3 keyboard that allows data entry into bus based systems.

| Part No. | Description | Price |
|---|---|---|
| 01EB004 | LED Board | $22.00 |
| 01EB005 | LCD Board | 32.00 |
| 01EB007 | Switch Board | 22.00 |
| 01EB016 | Prototype Board | 32.00 |
| 01EB003 | Sensor Board | 26.00 |
| 01EB024 | Bluetooth Board | 210.00 |

| Part No. | Description | Price |
|---|---|---|
| 01EB023 | Internet Board | $120.00 |
| 01EB032 | Voice CODEC Board | 210.00 |
| 01EB022 | Motor Board | 95.00 |
| 01EB035 | Opto-Isolator Board | 54.00 |
| 01EB014 | Keypad Board | 26.00 |

**Call Toll Free: 1 (800) 972-2225** • In NJ:  (732) 381-8020 • Fax: (732) 381-1006 (732) 381-1572

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# PROGRAMMERS / TRAINERS

## RSR-ᴧᴧᴧ—
# HANDY UNIVERSAL WRITER

### MODEL LP-48

This advanced, portable unit is competitively priced and supports: EPROMs, EEPROMs, FLASH EPROMs, Serial E/EPROMs, NV RAMs, Micro-Controllers, DSP, PLDs...

- Comes complete with USB cable, CD-ROM software and power adapter
- 48 Pin ZIF socket accepts DIP devices up to 48 pins, and both 200-600 mil width
- Fast programming – takes only 30 seconds for 16M bit FLASH memory device
- Easy to operate software with automatic processing function
- Supports low voltage components
- System Requirements: Windows (9X/ME/2000/NT/XP. Pentium II, min. 32 MB RAM but 64 MB recommended, 30MB free drive hard drive space.
- **Optional Accessories:**
  IC Adaptors: SOP, TSOP, SSOP, VSOP, SDIP, PLCC, QFP, µBGA.

  *Approximately 2 weeks delivery on adapters*

**Part No. 01LP48 • Price: $650.00**

## BK PRECISION PROGRAMMER
### USB INTERFACE – MODEL 844USB

Great common device programmer. Reads, copies and programs IC's via USB computer interface

- 40 pin dual-in-line zif socket accepts both 300 and 600 mil devices up to 40 pins.
- In circuit serial programming (ISP) capability.
- Easy-to-Use. Windows 95/98/ME/NT/2000/XP compatible.

**Part No. 01BK844USB • Price: $450.00**

## velleman PIC PROGRAMMER BOARD KIT

This board can program a wide range of Microchip® PIC™ microcontrollers Suitable for the programming of the "VM142" mini PLC microcontroller

- Onboard configurable 40 pin. ZIF socket
- Microcontroller selection using patch jumper
- Easy to use programming PICprog2006™ software included
- SUBD connector set included
- Minimum system requirements:

- IBM Compatible PC, Pentium or better
- Windows™ NT/2000/XP
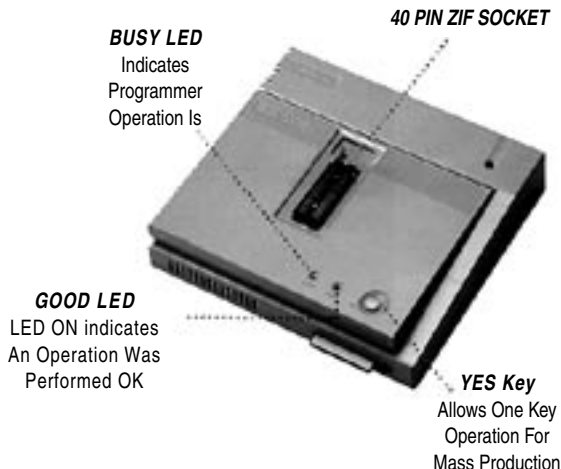- CDROM drive
- Free serial RS232 port required

### SPECIFICATIONS
- Power supply *(required)*: 15V DC, min. 300mA adapter
- Serial port connector: 9 p. SUBD
- Dimensions: 132x65x20mm / 5,23 x 2,57 x 0,79"
- Currently supported controllers:
  — PIC10F200
  — PIC12C508A,PIC12CE518
  — PIC12F629,PIC12F675
  — PIC16F54
  — PIC16F84A
  — PIC16F870,PIC16F871,PIC16F872,PIC16F873,PIC16F874
  — PIC16F876,PIC16F877
  — PIC16F627,PIC16F627A, PIC16F628,PIC16F628A
  — PIC16F648A PIC16F630,PIC16F676
  — PIC18F2550,...

**Part No. 32VK8076 • Price: $41.95**

# PC BASED UNIVERSAL PROGRAMMER AND TESTER
## SUPPORTS OVER 12,000 DEVICES
### WINDOWS VERSION
### MODEL ALL-11C2

**BUSY LED** Indicates Programmer Operation Is

**40 PIN ZIF SOCKET**

**GOOD LED** LED ON indicates An Operation Was Performed OK

**YES Key** Allows One Key Operation For Mass Production

- Supports over 12,000 IC's including expansive array of EPROM, EEPROM, Flash, Serial PROM, BPROM, MPU/MCU/DSP, microcontrollers from Atmel, Dallas, Hitachi, Intel, Microchip, Mitsubishi, Motorola, NEC, Philips, TI, Toshiba, WSI, Zilog and others.
- Supports PAL, GAL, PEEL, EPLD, EPL, FPGA, CPLD from Altera, AMD, Atmel, Lattice, Lucent Technologies, Motorola, TI, Xilinx, etc.
- Nearly all devices with 8-40 pins can be programmed directly by the 40 pin ZIF socket. Adapters and converters are available to support nearly every type of IC package including PLCC, SOP, TSOP, QFP, TQFP, PGA, AOJ and many more.
- Can test logic IC's, SIP/SIMM, performs functional vector tests on programmable logic devices as fast as 4ns.
- Programs single device only.
- Connects to PC via high speed parallel interface.
- Includes a high speed CPU and expandable to 128M memory buffer.
- Compact SMT design weights only 4.4 lb.
- Free online software updates and support.
- **INCLUDES:** Programmer with 40 pin ZIF socket, interface cable, software, user manual and power supply.

### MODEL ALL-11P3
- All features as in **Model ALL-11C2**.
- Consists of universal base and exchangeable pack option:
  — 40 pin ZIF socket *(included)*
  — Optional gang programmer available
- High speed parallel port and USB connects the programmer to any desktop to laptop PC running Windows 95/98/NT/2000/XP.

### SYSTEM REQUIREMENTS (*BOTH ALL-11P3 AND ALL-11C2*):
486/Pentium or compatible with minimum 32MB extended memory. 5 MB minimum free hard disk space. Windows 95/98/NT/2000/XP.

| Part No. | Price |
|---|---|
| 01ALL-11C2 | $875.00 |
| 01ALL-11P3 | 1,075.00 |

## PROGRAMMERS

### XELTEK
# PROGRAMMERS
# SUPERPRO 48 PIN – USB

### MODELS 280U / 580U / 3000U

**580U**

**3000U**

- High speed, low cost
- Supports EPROM, EEPROM, FLASH, FPGA, CPLD, SPLD, µController MCU, Standard Logic
- Overcurrent / overvoltage protection
- Software supports Windows® 98/ME/NT/XP
- Includes power adapter, manual, program CD and USB cable

**MODEL 3000U**
- Reliable programming of low voltage devices down to 1.5V
- 42,000+ devices

| Part No. | Description | Price |
|---|---|---|
| 01XL280U | Model 280U (21,000_ Devices) | $585.00 |
| 01XL580U | Model 580U (31,000+ Devices) | 735.00 |
| 01XL3000U | Model 3000U (42,000_ Devices) | 1,085.00 |

### XELTEK
# PROGRAMMERS 40 PIN

- Supports 3400+ devices, including most E(E)PROM, Series E(E)Prom & Flash
- Programs GALs, PEELs, PALCE, Microcontrollers, PIC16Cxx/17CXX, COP87XX, and PSD3XX
- Tests TTLCMOS Test, Memory Test, Vector Test, Test Pattern Edit, Auto Identify TTL/CMOS Device
- Features a universal ZIF socket that accepts up to 40 pins
- Supports Windows® 9x/NT/2000/XP
- Size: 7.8"Lx5.5"Wx0.8"H
- Printer Port Interfact
- Weight: 4.0 lbs.
- Includes Power adapter, parallel cable, manual and CD-ROM software

**Part No. 01XLSP-Z • Price: $248.00**

# PROGRAMMER UNIVERSAL

- Low cost USB 2.0 with Windows support and low voltage capability
- Extremely portable
- Supports devices that include EPROMs, Flash, PIC, AVR GAL, CPLD, PEEL, PALCE, EPLD, Microcontrollers
- 48 pin zif socket with universal pin driver
- Accepts most compiler outputs in JDEC format including ABEL, CUPL, PALASM, TANGO PLD, OrCADPLD, PLD Designer and ISDATA
- Features test vector capability and multiarray fuse map editor
- Test TTL/CMOS logic IC's and DRAM devices
- Supports Windows Vista/XP/2000/NT/9X/ME
- Support Devices: 17,000+ *(Model VP480)*; 7,000+ *(Model VP280)*; 5,000+ *(Model VP190)*
- Go to our website at ***http://www.elexp.com/tst_v190.htm*** for complete device support list
- Power adapter *(optional)*
- Dimensions: 166 x 98 x 23mm; Wt. 10 oz.

| Part No. | Description | Price |
|---|---|---|
| 01VP190 | Model VP190 | $195.00 |
| 01VP280 | Model VP280 | 235.00 |
| 01VP480 | Model VP480 | 445.00 |
| 16DVP | DC Voltage Adapter | 15.00 |

### BK PRECISION
# UNIVERSAL PROGRAMMERS

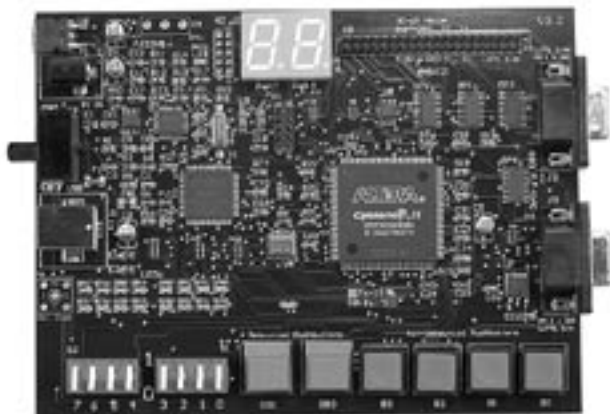### MODELS 848A, 866B

**Model 848A**

**Model 866B**

- Windows 2000/95/98/ME/NT compatible
- Parallel port interface (***Model 866B*** *offers both parallel and USB interface*)
- Includes ZIF socket for DIP IC's. 48 pin ZIF ***(Model 866B)***; 32 pin ZIF ***(Model 848A)***
- Optional adapters available for PLCC, SOIC, TSOP, TQFP, SSOP, PSOP, QFP ***(Model 866B)***
- EPROM, EEPROM, Flash, NVRAM and serial EEPROM capability
- USB interface ***(Model 866B Only)***

| Part No. | Price |
|---|---|
| 01BK848 | $259.00 |
| 01BK866 | 895.00 |

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# TRAINERS

## FPGA BOARD WITH USB PORT

• Provides means of learning and prototyping
digital logic, computer systems and FPGA code. This board provides a complete low cost platform using Altera Cyclone II (EP2C8) chip connected to various LEDs, switches and 7-segment displays. One can use web edition of Altera Quartus II to design FPGA code using Verilog HDL, VHDL as well as other design methods
• USB port for transferring FPGA to chip configurations
• 8 red LEDs, 8 green LEDs
• 2 sets of 4 SPDT switches
• 2 debounced, 4 non-debounced switches
• 40 pin and 2 DB-9 I/O connectors for interfacing
• 24MHz clock; can be multiplied or divided using interal PLL

**Part No. 01FPGA4 • Price: $149.00**

## PORTABLE RADIO TELESCOPE

### MODEL RTL-11

*Tripod Not Included*

Have hours of fun learning about the wonders of Radio Astronomy. Make a study of the principles of microwave radiometry through the use of **RTL-11**. This simple instrument is easy to assemble and operate. It is capable of detecting solar radio noise at approximately 11-12 GHz as determined by satellite receiver LNB (low noise block converter).

**RTL-11** can be used to:
• Demonstrate remote measurement of temperature of various objects
• Demonstrate that the human body or hand generates solar radio noise
• One can use a data logger connected to radio telescope output. The solar noise magnitude can later be plotted vs. time on a PC
• Other than astronomical applications can be found as various objects absorb, radiate, or reflect microwaves in a manner different from that at visible light

**RTL-11 includes:**
• Parabolic dish (32 cm)
• 11 GHz LNB
• F-F coaxial cable (2 ft. long)
• IF in-line amplifier
• F/F male/male adapter
• Indicator box
• AC/DC wall adapter
• Instruction manual

\* ***Tripod Not included***

**Part No. 01RTL-11 • Price: $350.00**

# PC BOARD DESIGN AND FABRICATION KIT

This kit includes PCB layout software plus material and instructions to make your own printed circuit boards. No dark room processing needed.

**Included in Kit:**
• Board Creator Software
• Press-N-Peel image transfer film
• Etching solution
• Copper clad boards
• Software manual
• Complete instructions for making PC boards
• More than 100 hobby circuits on CD

**Features of the Board Creator Software included in this kit**
• Boards up to 10' x 8' up to 6 layers with 8 masks each
• Built-in print queue up to 10 masks
• User selectable cursor layout grid up to 1 mil resolution. Items not limited to grid

• Full surface mount device support
• Multiple line widths, from 0.001 to 0.255 inches wide
• Up to 10 different pad shapes and sizes
• Locates and displays errors on-screen

**Part No. 32AMSPCBDFKIT • Price: $145.00**