Order Code : 25268948.1
Universal Embedded/VLSI Trainer

General Features

- Compatibility with daughter boards such as 8051, PIC, AVR, ARM, Microchip PIC16F877/16F876/16F84, Motorola 68HC11, Spartan II, Spartan III, Spartan VI, CPLD etc.
- Microcontroller 8051 family processor to enable upload and download of programs to various other 8, 16, 32-bit microcontrollers.
- Serial/Parallel/USB (JTAG) link for communication with PC.
- Supports development using different software and any development tool for design available globally.
- I/O counter interface to connect various demo modules for man-to-machine interface.
- Two 50-pin headers provided for interfacing daughter boards.
- General-purpose area on board for incorporating additional circuits.

Peripheral Features for 8051

- On-chip Flash Program Memory with In-System Programming (ISP) and In-Application Programming (IAP) capability.
- End-user programmable application (IAP).
- 6-clock/12-clock mode Flash bit erasable and programmable via ISP.
- 6-clock/12-clock mode programmable "on-the-fly" by SFR bit.
- Peripherals (PCA, timers, UART) usable in either 6-clock or 12-clock mode while CPU is in 6-clock mode.
- Speed:

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

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  - Up to 20 MHz with 6-clock cycles per machine cycle (40 MHz equivalent performance).
  - Up to 33 MHz with 12 clocks per machine cycle.
- Fully static operation.
- Four interrupt priority levels.
- Seven interrupt sources.
- Four 8-bit I/O ports.
- Full-duplex enhanced UART.
- Framing error detection.
- Automatic address recognition.
- Power control modes:
  - Clock stoppage and resumption.
  - Idle mode.
  - Power down mode.
- Programmable clock-out pin.
- Second DPTR register.
- Asynchronous port reset.
- Low EMI (inhibit ALE).
- Programmable Counter Array (PCA).
- PWM.
- Capture/Compare.

On-Board Interfaces

- 16x2 LCD module.
- Six Seven-Segment Displays.
- Stepper Motor Controller Interface.
- 8x8 LED Matrix Display.
- EWSN Status LEDs – 12 Nos.
- ADC/DAC Interface.
- RS-232 interface.
- USB interface.
- Four Data Switches.
- Switch Array.
- AT24C16 Serial EEPROM.
- 4x4 Keyboard.
- Power Indicator LED.
- Bluetooth Interface.
- GSM Interface.

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- Zigbee Interface.

Daughter Boards

1. Board for Atmel 8051

- Supports 8051 family (AT89S51, AT89S52, P89V51RD2, AT89Cxx) 40-pin microcontrollers.
- Features:
  - DIP40 microcontroller socket.
  - Quartz crystal 11.05892 MHz.
  - USB interface for communication with PC.
  - Reset button.
  - ON/OFF switch.
  - Power plug-in jack.
  - Extension slot on every µC pin.
  - GND bus.
  - Vcc bus (5V and 12V).
  - On-board power indication.
  - Two 50-pin headers for main board interfacing.
- Includes USB port for flashing P89V51RD2 (NXP).
- 1.5 Amp bridge rectifier allows powering with AC/DC supply.
- Power bus (5V, 12V, GND) for external peripherals.

2. Board for Microchip PIC16F84

- Supports Microchip PIC16F84 microcontrollers.
- Features:
  - DIP microcontroller socket.
  - USB interface for communication with PC.
  - Reset button.
  - ON/OFF switch.
  - Power plug-in jack.
  - Extension slot on every µC pin.
  - GND bus.
  - Vcc bus (5V and 12V).
  - On-board power indication.
  - Two 50-pin headers for main board interfacing.
- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND) for external peripherals.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

High Performance RISC CPU

- 35 single-word instructions.
- All single-cycle instructions except branches (two-cycle).
- Operating speed:
  - DC–20 MHz clock input.
  - DC–200 ns instruction cycle.
- Program memory: 1024 words.
- Data RAM: 68 bytes.
- Data EEPROM: 64 bytes.
- 8-bit wide data bytes.
- 14-bit wide instruction words.
- 15 special function hardware registers.
- Eight-level deep hardware stack.
- Addressing modes: direct, indirect, relative.
- Four interrupt sources:
  - External RB0/INT pin.
  - TMR0 timer overflow.
  - PORTB<7:4> interrupt on change.
  - Data EEPROM write complete.

Peripheral Features

- 13 I/O pins with individual direction control.
- High current sink/source for direct LED drive.
- 25 mA sink/source max. per pin.
- TMR0: 8-bit timer/counter with programmable prescale.

3. Board for Microchip PIC16F877

- Supports PIC16F877 microcontrollers.
- Features:
  - DIP40 socket.
  - Quartz crystal 4 MHz.
  - USB interface with PC.
  - Reset button.
  - ON/OFF switch.
  - Power plug-in jack.
  - Extension slot on every µC pin.
  - GND bus.
  - Vcc bus (5V and 12V).

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

  - On-board power indication.
  - Two 50-pin headers.
- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND).

High Performance RISC CPU

- 35 single-word instructions.
- All instructions single cycle except program branches (two-cycle).
- Operating speed: DC–20 MHz input, DC–200 ns cycle.
- Memory:
  - Up to 8K x 14 words FLASH program memory.
  - Up to 368 x 8 bytes RAM.
  - Up to 256 x 8 bytes EEPROM.

Peripheral Features

- Timer0: 8-bit timer/counter with prescaler.
- Timer1: 16-bit timer/counter with prescaler, increment during sleep.
- Timer2: 8-bit timer/counter with register, prescaler and post scaler.
- Capture/Compare/PWM modules (16-bit resolution).
- SSP with SPI (Master) and I2C™ (Master/Slave).
- USART/SCI with 9-bit address detection.
- Parallel Slave Port (8-bit wide, external RD, WR, CS).
- Brown-out detection circuitry.

Analog Features

- 10-bit, up to 8-channel ADC.
- Brown-out Reset (BOR).
- Analog Comparator module:
  - Two comparators.
  - Programmable voltage reference (VREF).
  - Programmable input multiplexing.
  - Externally accessible comparator outputs.

4. Board for Microchip P18F455

- Supports Microchip PIC18F455 microcontrollers.
- Features:
  - DIP40 socket.
  - Quartz crystal 11.05892 MHz.
  - USB interface with PC.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

- Reset button.
- ON/OFF switch.
- Power plug-in jack.
- Extension slot on every µC pin.
- GND bus.
- Vcc bus (5V and 12V).
- On-board power indication.
- Four mounting holes (3.0 mm) for easy mounting.
- Two 50-pin headers for main board interfacing.

- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND) for external peripherals.

Peripheral Features

- High-current sink/source: 25 mA/25 mA.
- Three external interrupts.
- Four timer modules (Timer0 to Timer3).
- Up to 2 Capture/Compare/PWM (CCP) modules:
  - Capture: 16-bit, max resolution 5.2 ns (TCY/16).
  - Compare: 16-bit, max resolution 83.3 ns (TCY).
  - PWM: 1 to 10-bit resolution.
- Enhanced Capture/Compare/PWM (ECCP) module:
  - Multiple output modes.
  - Selectable polarity.
  - Programmable dead time.
  - Auto-shutdown and auto-restart.
- Enhanced USART module with LIN bus support.
- Master Synchronous Serial Port (MSSP) module supporting SPI (all 4 modes) and I2C™ Master/Slave.
- 10-bit, up to 13-channel ADC with programmable acquisition time.
- Dual analog comparators with input multiplexing.

5. Board for PIC J24 Series

- Supports Microchip PIC J24 series microcontrollers.
- Features:
  - USB interface with PC.
  - Reset button.
  - Extension slot on every µC pin.
  - GND bus.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

- Vcc bus (5V and 12V).
- Two 50-pin headers for main board interfacing.

- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND) for external peripherals.

6. Board for Motorola 68HC11

- Supports Motorola 68HC11 microcontrollers.
- Features:
  - Serial port for downloading sample programs.
  - 1.5 Amp bridge rectifier for AC/DC supply.
  - Power bus (5V, 12V, GND) for external peripherals.
  - Status LED.

7. Board for ATMEGA 328

- Supports ATMEGA 328 microcontrollers.
- Features:
  - Microcontroller socket.
  - Quartz crystal 6 MHz.
  - USB interface with PC.
  - Reset button.
  - Extension slot on every µC pin.
  - GND bus.
  - Vcc bus (3.3V, 5V and 12V).
  - On-board power indication.
  - Two 50-pin headers for main board interfacing.
- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND).

8. Board for ATMEGA 16

- Supports ATMEGA 16 microcontrollers.
- Features:
  - Microcontroller socket.
  - Quartz crystal 8 MHz.
  - USB interface with PC.
  - Reset button.
  - Power plug-in jack.
  - Extension slot on every µC pin.
  - GND bus.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

- Vcc bus (5V and 12V).
- On-board power indication.
- Four mounting holes (3.0 mm).
- Two 50-pin headers for main board interfacing.

- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND).

9. Board for ARM 2148

- Supports ARM7 2148 microcontrollers.
- Features:
  - Microcontroller socket.
  - USB interface with PC.
  - Extension slot on every µC pin.
  - GND bus.
  - Vcc bus (5V and 12V).
  - Two 50-pin headers for main board interfacing.
- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND).

10. Board for STM32

- Based on ARM Microcontroller STM32F103C8T6.
- Suitable for learners of STM32 microcontroller with ARM Cortex-M3 32-bit core.

Features

- Based on: STM32.
- Core Architecture: ARM.
- Core Sub-Architecture: Cortex-M0+.
- Silicon Core Number: STM32G070RBT6.
- No. of Bits: 32-bit.
- Two 50-pin headers for main board interfacing.

11. ARM Cortex M3 Daughter Board

- Based on LPC1768.
- All ports available onboard for user access.
- USB Programming.
- On-board USB for downloading.
- Two 50-pin headers for main board interfacing.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

12. Board for FPGA Spartan-3

- Supports FPGA Spartan-3 microcontrollers.
- Features:
  - Core3S250E FPGA board with XC3S250E device.
  - Onboard 1 pcs XCF02S.
  - Integrated FPGA basic circuits (clock circuit, etc.).
  - Onboard CONFIG button and RESET button.
  - All I/O ports accessible via pin headers.
  - Onboard JTAG debugging/programming interface.
  - Two 50-pin headers for main board interfacing.
- 1.5 Amp bridge rectifier for AC/DC supply.
- Power bus (5V, 12V, GND).

13. Board for CPLD

- Uses industry standard CPLD 95C108 or 95C72.
- Communicates with computer via standard Webpack.
- Circuit/schematic development using Xilinx Foundation Series software and VLSI design tools.
- All I/O ports accessible via pin headers.
- Onboard JTAG debugging/programming interface.
- Two 50-pin headers for main board interfacing.

14. Board for FPGA Spartan-6

- FPGA: Spartan-6 XC6SLX9 in TQG144 package.
- Flash memory: 16 Mb SPI flash (M25P16).
- 100 MHz CMOS oscillator.
- USB 2.0 interface for onboard flash programming.
- FPGA configuration via JTAG and USB.
- IOs for user-defined purposes.
- Onboard voltage regulators for single power rail operation.
- Two 50-pin headers for main board interfacing.

15. Board for Raspberry Pi

- Supports Raspberry Pi microcontrollers.
- Features:
  - Raspberry Pi 4 with quad-core ARM Cortex-A72 processor.
  - 2.4 GHz and 5.0 GHz Wi-Fi.
  - Bluetooth 5.0.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

- Gigabit Ethernet.
- Two micro-HDMI ports.
- Two USB 3.0 ports and two USB 2.0 ports.
- All ports available onboard for user.
- Two 50-pin headers for main board interfacing.

16. Board for MSP430F540X

- Includes MSP430F5529 16-bit MCU.
- Features:
  - 128KB Flash, 8KB RAM.
  - Up to 25 MHz CPU speed.
  - Integrated USB 2.0 PHY.
  - 12-bit ADC.
  - Timers and serial communication (UART, I2C, SPI).
  - USB interface with PC.
  - Reset button.
  - Two 50-pin headers for main board interfacing.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.