



# PIC24™ Industrial Host StackableUSB™ Microcontroller USB1024

## Features



- ✓ 32MHz system clock
- ✓ 16 MIPS performance
- ✓ 256KB Flash, 16KB SRAM memory
- ✓ Single-cycle multiply and high-performance divide unit
- ✓ On-board RS232 transceiver
- ✓ Easy development with Microchip's MPLAB IDE
- ✓ Small 1.85" x 1.78" board
- ✓ -40° to +85°C operation



The USB1024 is a moderate-performance USB Host microcontroller board designed for low-power projects. Well-suited for applications confined to small, tight spaces, the 16MIPS performance typically requires only 40mA power - figure small enough for battery-powered applications.

The USB1024 is powered by the PIC24 microcontroller whose USB 2.0 On-The-Go (OTG) functionality allows the microcontroller to be used as a Host. Operating as a Host device, design engineers can easily and cost-effectively stack StackableUSB client I/O devices onto the controller making a small, embedded controller ideally suited to harsh environments.

Available onboard is a host of control features including 16-channel, 500kps 10-bit ADC, RS232, 8 programmable LEDs, and abundant digital I/Os. Developers will appreciate the PIC24's easy-to-use and solidly-supported software tools as they program and debug.

The 1.85" x 1.78" module is USB 2.0 compliant providing users the advantages of plug-and-play interfacing. The module stacks onto the top or bottom of any StackableUSB client single board computer or microcontroller forming a small, rugged, embeddable system, ideal for harsh environments. The USB1024 can be connected to desktop PCs and laptops via ICSP connector for development.

### Software/Driver Support

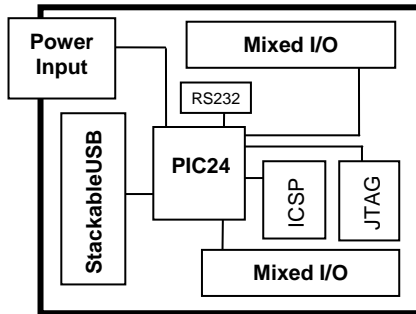
Windows XP, Vista  
MPLAB IDE  
MPLAB C30 C Compiler  
USB Host stack  
Graphics & audio library  
16- and 32-bit File System  
Sample software

### Compatible Hardware

StackableUSB Client devices  
ICE  
ICD2, ICD3

### Mounting/Packaging

1/4-Size 104™ Form Factor  
Standoffs, STDOFFUSB



## Specifications:

### Mechanical:

- 1.85" x 1.78" StackableUSB
- ¼-Size 104™ Form Factor

### Power Requirements:

- +5v ±5% at 40mA typical

### Environmental:

- 40 to +85°C operating
- 40° to +85°C storage
- 5%-95% relative humidity, non-condensing

### Processor:

- Modified Harvard architecture
- Up to 16MIPS operation at 32MHz
- 8MHz internal oscillator
- 17-bit by 17-bit single-cycle hardware multiplier
- 32-bit by 16-bit hardware divider
- 16-bit by 16-bit working register array
- C compiler optimized instruction set architecture with flexible addressing modes
- Linear program memory addressing, up to 12Mbytes
- Linear data memory addressing, up to 64Kbytes
- Two (2) address generation units for separate read and write addressing of data memory

### Serial Ports:

- RS232 available from 20-pin header

### LEDs/Switches:

- Eight (8) programmable user LEDs
- One (1) PB reset switch

### Peripheral Features:

- Peripheral pin select:
  - Allows independent I/O mapping of many peripherals at run time
  - Continuous hardware integrity checking and safety interlocks prevent unintentional configuration changes
  - Up to 44 available pins (100-pin devices)
- Three (3) 3-Wire/4-Wire SPI modules (supports 4 Frame modes) with 8-level FIFO buffer
- Three (3) I2C modules support multi-master/slave modes and 7-bit/10-bit addressing
- Four (4) UART modules with:
  - RS485, RS232, LIN/J6202 protocols, and IrDA®
  - IrDA with on-chip hardware encoder and decoder
  - Auto-wake-up and auto-baud detect (ABD)
  - 4-level deep FIFO buffer
- Five (5) 16-bit timers/counters with programmable prescaler
- Nine (9) 16-bit capture inputs, each with a dedicated time base

- ❑ Nine (9) 16-bit compare/PWM outputs, each with a dedicated time base
- ❑ 8-bit parallel master port (PMP/PSP):
  - Up to 16 address pins
  - Programmable polarity on control lines
- ❑ Hardware real-time clock/calendar (RTCC):
  - Provides clock, calendar and alarm functions
- ❑ Programmable cyclic redundancy check (CRC) generator
- ❑ Up to 5 external interrupt sources

#### **Special Microcontroller Features:**

- ❑ Self-reprogrammable under software control
- ❑ 5.5V tolerant Input (digital pins only)
- ❑ Configurable open-drain outputs on digital I/O
- ❑ High-current sink/source (18 mA/18 mA) on all I/O
- ❑ Selectable power management modes:
  - Sleep, idle, and doze modes with fast wake-up
- ❑ Fail-safe clock monitor operation:
  - Detects clock failure and switches to on-chip, low-power RC oscillator
- ❑ Power-on reset (POR), power-up timer (PWRT), low-voltage detect (LVD) and oscillator start-up timer (OST)
- ❑ Flexible watchdog timer (WDT) with on-chip, low-power RC oscillator for reliable operation
- ❑ Brown-out reset (BOR)
- ❑ Flash program memory:
  - 10,000 erase/write cycle endurance (minimum)
  - 20-year data retention minimum
  - Selectable write protection boundary
  - Write protection option for Flash configuration words

#### **Analog Features:**

- ❑ 16-channel 10-bit analog-to-digital converter
- ❑ 500 KSPS conversion rate
- ❑ Conversion available during sleep, idle
- ❑ Three (3) analog comparators with programmable input/output configuration
- ❑ Charge Time Measurement Unit (CTMU)

#### **Debug Features:**

- ❑ 2-wire ICSP interface with unintrusive access and real-time data exchange with application
- ❑ 4-wire MIPS standard enhanced JTAG interface
- ❑ Unintrusive hardware-based instruction trace
- ❑ IEEE Std 1149.2 compatible (JTAG) boundary scan

#### **External Connections:**

- ❑ 2-pin power terminal
- ❑ StackableUSB
- ❑ 20-pin header for RS232
- ❑ 6-pin ICSP debug port
- ❑ 6-pin JTAG debug port
- ❑ 2x50-pin headers for I/O and peripherals

#### **Internal Electrical Interface:**

- ❑ StackableUSB
- ❑ USB 1.1 & 2.0 compatible, full-speed

#### **Development Kit:**

- ❑ Module with all options installed
- ❑ Complete cable set
- ❑ Documentation, schematics, sample software

## Ordering Information:

### OEM Single Board Computers:

USB1024	PIC24 Industrial Host Microcontroller
CS1024	Complete cable set

### Related Products:

STDOFFUSB	StackableUSB standoff kit
BA4052	50-pin mixed I/O header breakout cable
BA2017	20-pin RS232 header to DB9 breakout cable
CA4142	ICSP programming/ debugging cable
TB50550	50-pin screw terminal breakout board

### Development Board Kits\*

DK1024	PIC24 Industrial Host Microcontroller; Windows- ready development kit
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*\*See Development Kit Specifications*