



# 8-bit 48-MIPS General Purpose Client Microcontroller for StackableUSB™ USB1108

## Features

- ✓ 48MHz system clock
- ✓ Pipelined 48-MIPS architecture  $\mu$ P
- ✓ UART, SPI, I2C, ADC, temperature sensor, analog comparators, PCA, timers
- ✓ Twenty (20) user configurable I/O pins
- ✓ 64KB Flash, 2k (256x8) EEPROM, 4352 bytes RAM
- ✓ Small 1.85" x 1.78" board
- ✓ -40 to +85C operation



The USB1108 is the ideal low-power microcontroller board for use in embedded systems where space may be limited. OEMs have access to basic microcontroller features such as a 10-bit differential ADC, digital I/O, Timers, PWMs, SPI, I2C, RS232, and more making it ideal for handling a broad collection of basic control tasks.

Powered by the Silicon Labs C8051F340 microcontroller, the USB1108 houses a great set of additional features providing excellent processing power over a pipelined

48-MIPS architecture. This allows 70% of instructions to be executed in 1 or 2 system clocks.

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 host single board computer or microcontroller forming a small, rugged, embeddable system ideal for harsh environments. The USB1108 can be connected to desktop PCs and laptops via a Mini-B USB connector for development or runtime applications.

### Software/Driver Support

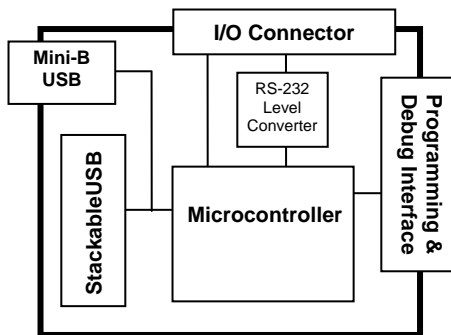
Window XP  
Windows CE  
Linux  
Host MCU firmware  
On-board MCU firmware  
Sample Software

### Compatible Hardware

StackableUSB Host single board computers and microcontrollers  
PC host desktops and laptops  
SPI, I2C, UART  
Analog Devices  
SiLabs DEBUGADPTR-USB

### Mounting/Packaging

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



## Technical Details:

At the core of the USB1108 is the Silicon labs C8051F340 8-bit microcontroller which houses a high-speed 8051, 48-MIPS pipelined architecture CIP-51™ CPU Core. This provides excellent throughput allowing execution of 70% of instructions in 1 or 2 system clocks.

The USB1108 communicates with a host CPU through the StackableUSB connector, the Mini-B USB connector, or can serve as a standalone sensor board. A 10-pin connector provides access to the programming and debugging interface, and a high density 50-pin connector provides access to the microcontroller's multiplexed Differential ADC with a built-in temperature sensor, Comparators, Digital I/O, I2C, SPI, UART ports (one RS232 and one TTL level), Timers, and Counters.

Twenty (20) pins on the microcontroller are provided as user-configurable pins and can be configured for Analog input, Digital I/O, or any of the other features mentioned above.

The USB1108 also includes an EEPROM which resides on the I2C bus. This provides programmers with 2k (256x8) of storage space in addition to the microcontroller's 64KB Flash and 4352 bytes of RAM.

The USB1108 comes with pre-installed software that allows the transfer of data between the USB port and all of the on-board peripherals with no need to write additional code to the device side of the system. To ease installation on the host side, USB drivers and example source codes are supplied, eliminating the need for prior USB experience. Host side operating systems supported are Linux, WinCE, and WinXP.

A command and control protocol implemented over the USB interface allows direct communication with the on-board peripherals via inport and outport driver calls executed on the host computer. A custom interrupt service routine can be called directly by the host side USB driver.

The USB1108 is USB 2.0 compliant and supports both full-speed (12Mbps) and low-speed (1.5Mbps) transfer rates.

The USB1108 draws its power through either the StackableUSB or Mini-B USB port when connected to a PC. An optional power adapter plug may be included for standalone functionality

## Specifications:

### Mechanical:

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

### Power Requirements:

- ❑ +5v ±5% @ 40 mA (max)

### Environmental:

- ❑ -40° to +85°C Operating Temp
- ❑ -40° to +85°C Storage Temp

### Processor:

- ❑ 48MHz Silicon Labs C8051F340
- ❑ 48MHz system clock
- ❑ On-chip debug & development interface
- ❑ Sixteen (16) interrupt sources
- ❑ Nine (9) reset sources
- ❑ Watchdog timer
- ❑ 20 configurable I/O Pins (5V tolerant)
- ❑ Analog Peripherals
  - 10-bit ADC (200ksps)
    - ❑ Single or Differential inputs
    - ❑ Built-in temperature sensor
    - ❑ External VREF
    - ❑ External conversion start trigger
  - Two (2) Comparators
- ❑ Digital Peripherals
  - Hardware enhanced SPI
  - SMBus/I2C (Built in 5V pull-up resistors)
  - One (1) RS232 Level UART Port
  - One (1) TTL Level UART Port
  - Four (4) 16-bit general purpose counters/timers
  - 16-bit Programmable Counter Array with five (5) capture/compare modules
  - USB 2.0 Compliant (full-speed or low-speed)

### Memory:

- ❑ 4352 bytes RAM
- ❑ 64KB Flash
- ❑ 2K (256x8) EEPROM (on I2C bus)

## Debug Interface:

10 Pin I/O Connector			
Pin	Signal	Signal	Pin
1	NC	GND	2
3	GND	C2D	4
5	RST#	NC	6
7	RST#/C2CK	NC	8
9	GND	NC	10

## I/O Interface:

50 Pin I/O Connector			
Pin	Signal	Signal	Pin
1	RS232_RX0	GND	2
3	RS232_TX0	GND	4
5	P00/SCK	GND	6
7	P01/MISO	P02/MOSI	8
9	GND	GND	10
11	P10/SDA	P11/SCL	12
13	P14	GND	14
15	P15	GND	16
17	P16	GND	18
19	P17	GND	20
21	P20	GND	22
23	P21	GND	24
25	P22	GND	26
27	P23	GND	28
29	P24	GND	30
31	P25	GND	32
33	P26	GND	34
35	P27	GND	36
37	P30	GND	38
39	P31	GND	40
41	P32	GND	42
43	P33	GND	44
45	P34	GND	46
47	P35	GND	48
49	P36	P37	50

**External Connectors:**

- StackableUSB
- Mini-B USB
- 10 pin Debug Interface connector
- 50-pin I/O connector

**Development Kit:**

- Base module
- Complete cable set
- Documentation, schematics, sample software

**Ordering Information:****OEM Modules:**

USB1108-ST	8-bit 48-MIPS General Purpose Client Microcontroller with StackableUSB stack-through connector
USB1108-PC	8-bit 48-MIPS General Purpose Client Microcontroller with Mini-B USB connector for PC connection
CS1108	Complete cable set

**Related Products:**

STDOFFUSB	StackableUSB standoff kit
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**Development Board Kits\***

DK1108-ST	8-bit 48-MIPS General Purpose Client Microcontroller with StackableUSB stackthrough connector, Windows-ready development kit
DK1108-PC	8-bit 48-MIPS General Purpose Client Microcontroller with Mini-B USB connector for PC connection, Windows-ready development kit

\*See Development Kit Specifications