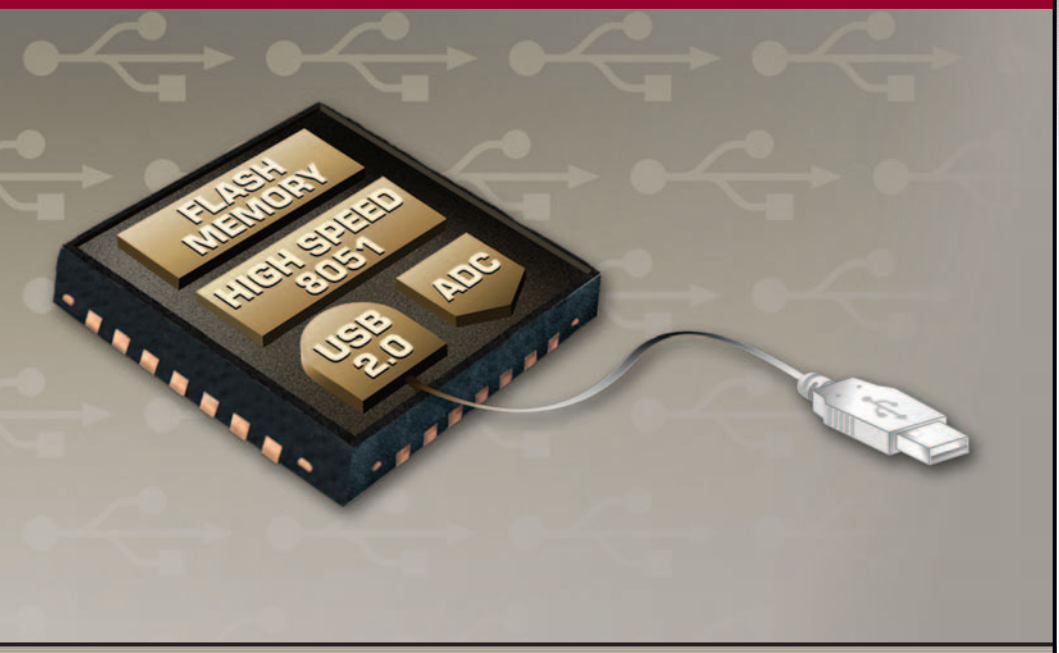
USB Microcontrollers

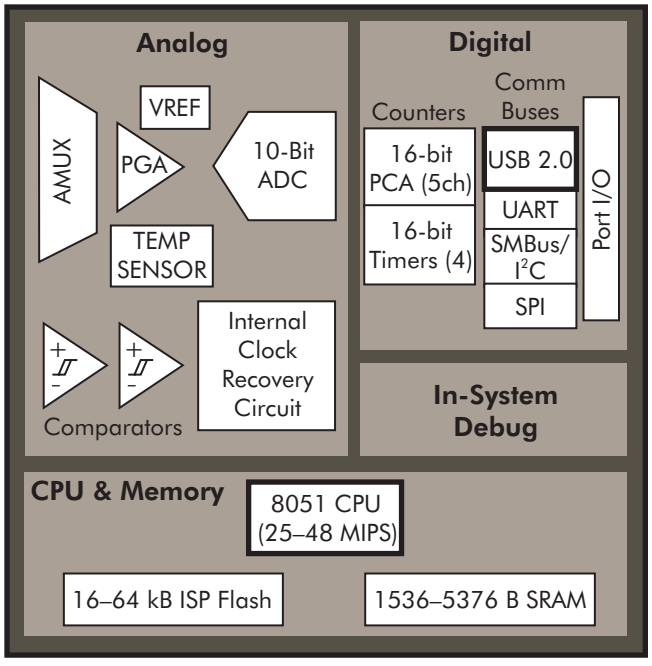
INTEGRATED USB 2.0 FUNCTION CONTROLLER



DESCRIPTION

The USB microcontroller family features an on-board universal serial bus (USB) 2.0 function controller with an integrated transceiver and on-chip clock recovery. No external resistors, crystal, voltage regulator, EEPROM or other components are required. On-chip resources include a high-speed 8051 CPU with up to 64 kB Flash, UARTs, SMBus, SPI, timers, counters and PWM generators. On-chip analog features include a multi-channel 10-bit ADC, voltage reference, internal oscillator, comparators and a temperature sensor. Available in 28-pin QFN, 32-pin LQFP or 48-pin TQFP packages, these devices provide a single-chip solution for embedded USB applications.

USB BLOCK DIAGRAM



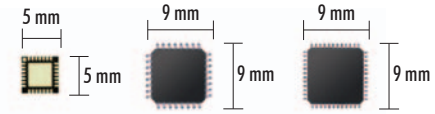
FEATURES

- 25–48 MIPS 8051 CPU
- 16–64 kB Flash Memory
- 1536–5376 B RAM
- USB 2.0
  - Integrated transceiver
  - Integrated clock recovery
  - 1 kB buffer RAM
  - Full (12 Mbps) or low-speed operation
  - Control endpoint plus six bi-directional endpoint pipes
- 10-bit, 200 ksps ADC
- Two asyncronous comparators
- Voltage reference
- Temperature sensor
- 15-40 digital I/O
- Packages (Pb-free, RoHS compliant)
  - QFN28
  - LQFP32
  - TQFP48

APPLICATIONS

- PC peripherals
- Point-of-sale terminals
- Consumer medical devices
- PC-based lab instrumentation
- USB modems
- Game controllers
- IP telephones
- Upgrade legacy RS-232 to USB

ACTUAL SIZE



QFN28 LQFP32 TQFP48

PRODUCT BRIEF

SINGLE-CHIP SOLUTION FOR EMBEDDED USB APPLICATIONS

SILICON LABORATORIES

INTEGRATED. SMALL SIZE. WORLD-CLASS TOOLS.

Integrated USB 2.0 Interface

These compact MCUs uniquely combine a USB 2.0 function controller with on-board clock extraction eliminating resistors, crystal, voltage regulator, EEPROM and other external components required in competing solutions. This high level of integration results in small package sizes saving board space and reducing overall system cost.

Analog Peripherals

The USB MCUs include 10-bit ADCs with programmable throughput up to 200 ksps, ±1 LSB INL with no missing codes. These ADCs also feature up to 17 external inputs that can be programmed to operate in single-ended or differential mode. Other analog peripherals include two comparators, built-in temperature sensor and internal voltage reference.

Development Tools

Silicon Laboratories' low-cost development kits provide all the hardware and software needed to design almost any circuit application. Standard contents include a USB to serial debugging adapter, Integrated Development Environment (IDE) CD, prototyping target PCB, USB cable and a universal power supply.

In-System Debug

All USB MCUs include on-chip 2-wire debug circuitry that provides non-intrusive, full-speed, in-circuit debugging of the production part installed in the user's end application. Emulators are never required.

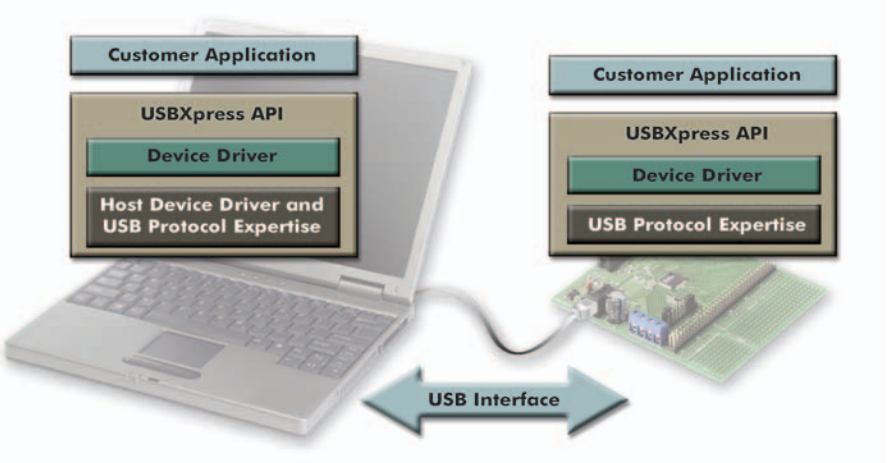
USB Microcontroller Product Matrix

Part Number	MIPS (peak)	Flash Memory	RAM (bytes)	Ext Mem I/F	Digital Port I/O Pins	Serial Buses	Timers (16-bit)	PCA Chnls	Internal Osc	ADC	Temp Sensor	VREF	Comparators	Other	Package	Eval Kit
C8051F340	48	64 kB	5376	Y	40	USB 2.0, 2 x UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	TQFP48	C8051F340DK
C8051F342	48	64 kB	5376	–	25	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	LQFP32	C8051F340DK
C8051F341	48	32 kB	3328	Y	40	USB 2.0, 2 x UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	TQFP48	C8051F340DK
C8051F343	48	32 kB	3328	–	25	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	LQFP32	C8051F340DK
C8051F344	25	64 kB	5376	Y	40	USB 2.0, 2 x UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	TQFP48	C8051F340DK
C8051F346	25	64 kB	5376	–	25	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	LQFP32	C8051F340DK
C8051F345	25	32 kB	3328	Y	40	USB 2.0, 2 x UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	TQFP48	C8051F340DK
C8051F347	25	32 kB	3328	–	25	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	LQFP32	C8051F340DK
C8051F320	25	16 kB	2304	–	25	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 17-ch., 200 ksps	Y	Y	2	–	LQFP32	C8051F320DK
C8051F321	25	16 kB	2304	–	21	USB 2.0, UART, SMBus, SPI	4	5	±1.5%	10-bit, 13-ch., 200 ksps	Y	Y	2	–	QFN28	C8051F320DK
C8051F326	25	16 kB	1536	–	15	USB 2.0, UART,	2	–	±1.5%	–	–	–	–	Separate I/O Supply Pin	QFN28	C8051F326DK
C8051F327	25	16 kB	1536	–	15	USB 2.0, UART,	2	–	±1.5%	–	–	–	–	Fixed I/O Supply Pin	QFN28	C8051F326DK
CP2102	–	1 kB	1024	–	–	USB to UART Bridge	–	–	Y	–	–	–	–	Volt Reg	QFN28	CP2102EK
CP2103	–	1 kB	1024	–	4	USB to UART Bridge	–	–	Y	–	–	–	–	RS485	QFN28	CP2103EK
CP2101	–	0.5 kB	1024	–	–	USB to UART Bridge	–	–	Y	–	–	–	–	Volt Reg	QFN28	CP2101EK

USBXpress® Development Software

With Silicon Laboratories' USBXpress Development Software, interfacing your design to the USB has never been easier. The comprehensive kit provides a complete host and device software solution, including Microsoft Windows device drivers. No USB protocol or hardware expertise is required. Instead, a simple, high-level application program interface (API) is used on both the host and USB MCU to achieve high-performance USB connectivity.

The USBXpress Development Software includes royalty-free, Microsoft-certified device drivers, INF driver installation files, host API library and MCU API library. Microsoft Windows 98SE, Windows 2000 and Windows XP are supported The host-side API is compatible with Microsoft Visual C++, Microsoft Visual Basic and Borland Delphi.



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