Flash Microcontrollers with Integrated USB Controller

READY TO GO IN NO TIME

Atmel's family of 8-bit microcontrollers supports a wide range of USB applications: high-end keyboards, mice, phone accessories, toys, serial adapters and industrial equipment.

An on-chip bootloader permits very quick firmware download from a PC, without using a parallel programmer or dedicated hardware.

Nonvolatile memory stores configuration parameters enabling the system to be instantly operational, even without connection to a PC.

C51 solutions offer 16KB to 64KB of Flash with up to 4 MIPS and USB function.

AVR® solutions offer 64KB to 128KB of Flash with up to 16 MIPS, USB function and On-The-Go for dual role host or function.

USB EVERYWHERE

After conquering computers and peripherals, USB is gaining momentum in consumer products and industrial equipment. Data storage, data transfer and product configuration are key applications driving this move.

On-The-Go (OTG) now allows devices to communicate without PC intervention. With the suitable device class libraries OTG can:

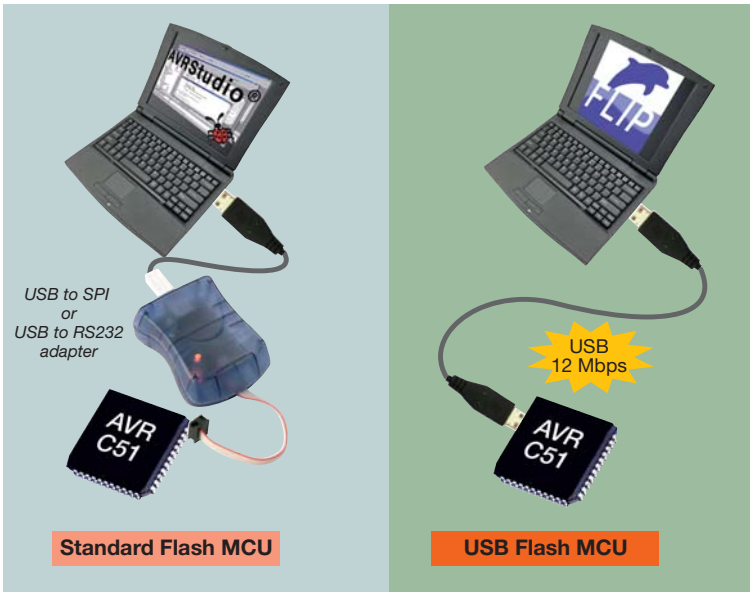
- support various targeted products
- negotiate host or device role with another OTG device
- connect to any PC as a USB device

Human Interface Devices form by far the most popular class of USB peripherals. New pointing and input devices gain in accuracy with full-speed (12 Mbit/s), which is provided by all Atmel® USB microcontrollers. Atmel USB microcontrollers also support isochronous transfers and double buffering for audio streaming. Last but not least, Atmel controllers with seven endpoints can merge several USB functions in one composite device, thus saving space and components.

USB SELF-PROGRAMMING

Atmel USB Flash microcontrollers' on-chip bootloader can be used for self-programming at any step of the product life cycle: development, production, after sales support and in day to day use by the end user.

Dedicated on-chip hardware secures the user firmware but can also force the application to reprogram when it has lost control.



Instant connection: programming on demand

SOFTWARE LIBRARY FOR USB

A library of reference firmware demonstrates the most popular USB device classes and helps proliferate applications without the need for custom driver development: Human Interface Device class for mice, keyboards and industrial equipment I/Os; Mass storage device class to share files with PCs; Communication Device Class for data transfer and UART emulation.

Device Class	Endpoint / Pipe*	Code size		
		AVR		C51
		Host	Function	Function
Device Firmware Update	1	6KB	4KB	3KB
Human Interface Device	2— 3	3KB	3KB	3KB
Mass Storage	3	6KB	5KB	6KB
Communication Device Class	4	7KB	7KB	5KB

** Including one IN/OUT control endpoint/pipe*

TOOLS FOR AVR

Demo Kit	Atmel: AT90USBKEY
Starter Kit	Atmel: STK525
Emulator Platform	Atmel: JTAGICE mkII
In-System Programming	Atmel: FLIP software, AVRISP mkII, JTAGICE mkII
Flash Device Programmers	Atmel: STK500 + STK501 Elnec, Hi-Lo Systems, etc
Compilers	CodeVision™, GCC-AVR, IAR®, ImageCraft®

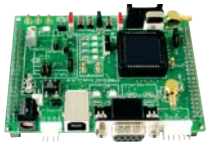
AT90USB Demo Kit
P/N: AT90USBKEY

AT90USB Starter Kit
P/N: ATSTK525

TOOLS FOR C51

Starter & Development Kits	Atmel: AT89STK-05, AT89STK-10, AT89DVK-04
Emulators	Ceibo, Hitex, Nohau, Phytec, Signum
In-System programming	Atmel: FLIP software
Flash Device Programmers	Advantech®, Hi-Lo Systems, Elnec, BP microsystems Data I/O®, etc
Compilers	Crossware®, Hi-Tech, IAR®, Keil™, Raisonance® SDCC, Tasking®

AT89C5132 Development Kit
P/N: AT89DKV-04



AT89C5130A/31A Starter Kit
P/N: AT89STK-05

Mass Storage Starter Kit
P/N: AT89STK-10

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Literature Requests
www.atmel.com/literature

Ref.: 4036E-8051-01/06/5M

AVR Architecture
1 clock / cycle - 2 clocks multiplier

C51 Architecture
6 clocks / cycle

		AT90USB646	AT90USB647	AT90USB1286	AT90USB1287	AT89C5130A	AT89C5131A	AT89C5132
On-Chip Memory	Flash Program Boot	64KBytes / up to 8 KB	64KBytes / up to 8 KB	128KBytes / up to 8 KB	128KBytes / up to 8 KB	16KBytes + 3KBytes	32KBytes + 3KBytes	64KBytes 4KBytes
	RAM	4KBytes	4KBytes	8KBytes	8KBytes	1280Bytes	1280Bytes	2304Bytes
	EEPROM	2KBytes	2KBytes	4KBytes	4KBytes	1KBytes	1KBytes	–
ISP	In System Programming*	USB / SPI	USB / SPI	USB / SPI	USB / SPI	USB	USB	USB
USB	USB 2.0 Host/OTG	No	Yes	No	Yes	No	No	No
	USB 2.0	Full speed Low speed	Full speed Low speed	Full speed Low speed	Full speed Low speed	Full speed	Full speed	Full speed
	USB DPRAM	832 Bytes	832 Bytes	832 Bytes	832 Bytes	1280 Bytes	1280 Bytes	168 Bytes
	USB Endpoints	7	7	7	7	7	7	4
On-chip Peripherals	UART	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SPI	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	TWI	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	10 bit ADC	8 channels	8 channels	8 channels	8 channels	No	No	2 channels
	PWM	6+2 channels	6+2 channels	6+2 channels	6+2 channels	5 channels PCA	5 channels PCA	–
	Timers	2x8b 2x16b RTC	2x8b 2x16b RTC	2x8b 2x16b RTC	2x8b 2x16b RTC	4x16b	4x16b	2x16b
	Watchdog	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	POR/PFD	Yes	Yes	Yes	Yes	Yes	Yes	No
Others	Other features	JTAG OCD	JTAG OCD	JTAG OCD	JTAG OCD	Keyboard LED	Keyboard LED	I2S, IDE, MMC keyboard
	I/Os	48	48	48	48	18-34	18-34	44
Available Versions	Supply (V)	2.7-5.5V	2.7-5.5V	2.7-5.5V	2.7-5.5V	2.7-5.5V	2.7-5.5V	2.7-3.6V
	Max Speed (MHz)	8–16	8–16	8–16	8–16	24	24	20
	Packages	TQFP64 QFN64	TQFP64 QFN64	TQFP64 QFN64	TQFP64 QFN64	QFN32 PLCC52 VQFP64	QFN32 PLCC52 VQFP64	TQFP80
	Availability	Q3 2006	Q3 2006	Now	Now	Now	Now	Now

* Factory programmed boot loader with API for in Application Programming and complying to USB DFU class.
SPI for ISP with standard AVR tools.

Hotline USB@atmel.com