



2003 Microprocessor directory

8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
Analog Devices www.analog.com	ADuC812	8051	16	external: 16/8 code, 24/8 data	8	3/5	48 mW (3V)	15 mW			
	ADuC814	8051	131 kHz to 16.78	external: 16/8 code, 24/8 data	8	3/5	36 mW (3V)	33 to 45 mW			
	ADuC816 ADuC824	8051	98.3 kHz to 12.58	external: 16/8 code, 24/8 data	8	3/5	25 mW (3V)	18 to 60 mW			
	ADuC831 ADuC832	8051	131 kHz to 16.78	external: 24/8 data	8	3/5	25 to 50 mW (3V)	33 to 39 mW			
	ADuC836 ADuC834	8051	98.3 kHz to 12.58	external: 16/8 code, 24/8 data	8	3/5	25 mW (3V)	18 to 60 mW			
	ADuC841 ADuC842 ADuC843	8051	Up to 16.78	external: 24/8 data	8	3/5	25 to 50 mW (3V)	33 to 39 mW			
	ADuC844 ADuC846	8051	98 kHz to 12.58	external: 24/8 data	8	3/5	2.3 mA (3.6V)	33 to 39 mW			
	ADuC845 ADuC847	8051	98 kHz to 12.58	external: 24/8 data	8	3/5	2.3 mA (3.6V)	33 to 39 mW			
Atmel www.atmel.com	CAN Multiplexing	8051	40			2.7 to 5.5					
	MP3 Decoder	8051	20			2.7 to 3.6					
	Smart Card	8051	16, 32			3.6 to 5.5					
	MCS 51 AT 89 family	8051	12 to 40	8	16	2.7 to 6	80 mW	Idle: 2 mA, powerdown: 12 mA	8x8		

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Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
8-kbyte Flash/EE, 640-byte Flash/EE, 256-byte SRAM	DMA to external data memory		52 PQFP, 56 CSP	Three 16-bit	UART, I2C, SPI, four 8-bit digital I/O ports	Nine	Eight-channel, 12-bit, 200k-sample/sec ADC; two 12-bit voltage-output DAC	-40 to +125	On-chip voltage reference and temperature sensor	\$6.85
8-kbyte Flash/EE, 640-byte Flash/EE, 256-byte SRAM			28 TSSOP	Three 16-bit, wake up, real-time	UART, I2C, SPI, 11 PIO	11	Six-channel, 12-bit, 5-usec ADC; two 12-bit DAC	-40 to +125	On-chip voltage reference and temperature sensor	\$3.73
8-kbyte Flash/EE, 640-byte Flash/EE, 256-byte SRAM			52 PQFP, 56 CSP	Three 16-bit, wake up, real-time	UART, I2C, SPI, 26 PIO	11	Dual 24/16-bit ADC with program-mable gain; 12-bit DAC	-40 to +85	On-chip excitation and transducer burn-out current sources	\$7.51 to \$8.86
62-kbyte Flash/EE, 4-kbyte Flash/EE, 2-kbyte + 256-byte SRAM			52 PQFP, 56 CSP	Three 16-bit, wake up, real-time, dual 16-bit PWM	UART, I2C, SPI, four 8-bit digital I/O ports	12	Eight-channel, 12-bit, 200k-sample/sec ADC; two 12-bit voltage-output DAC	-40 to +125	Dual data pointer, 11-bit stack pointer, on-chip PLL, upgrade for ADuC812	\$7.62
62-kbyte Flash/EE, 4-kbyte Flash/EE, 2-kbyte + 256-byte SRAM			52 PQFP, 56 CSP	Three 16-bit, wake up, real-time, dual 16-bit PWM	UART, I2C, SPI, 26 PIO	11	Dual 24/16-bit ADC with programmable gain; 12-bit DAC	-40 to +125	Dual data pointer, 11-bit stack pointer, upgrade for ADuC824/816	\$8.70 to \$10.16
62-kbyte Flash/EE, 4-kbyte Flash/EE, 2-kbyte + 256-byte SRAM			8x8-mm CSP, 52 PQFP	Three 16-bit, wake up, real-time, dual 16-bit PWM	UART, I2C, SPI, four 8-bit digital I/O ports	12	Eight-channel, 12-bit, 400k-sample/sec ADC; two 12-bit, voltage-output DAC; 20-ppm reference	-40 to +125	Single-cycle 8052 core, PLL, fast core version of ADuC831/832	\$4.45 to \$7.95
62-kbyte Flash/EE, 4-kbyte Flash/EE, 2-kbyte + 256-byte SRAM			8x8-mm CSP, 52 MQFP	Three 16-bit, wake up, real-time	UART, SPI, I2C	11	Dual 24/16-bit sigma-delta ADC with programmable gain; 12-bit DAC	-40 to +125	Single-cycle 8052 core, on-chip PLL	\$8.20 to \$12.27
62-kbyte Flash/EE, 4-kbyte Flash/EE, 2-kbyte + 256-byte SRAM			8x8-mm CSP, 52 MQFP	Three 16-bit, wake up, real-time, single and dual PWM	UART, SPI, I2C	11	10-channel, 24-bit, sigma-delta ADC with PGA; 12-bit DAC	-40 to +125	Single-cycle 8052 core, on-chip PLL	\$7.77 to \$13.76
16- to 64-kbyte			44 CABGA, 24/28 SOIC, 28/44 PLCC, 32/44 VQFP	Three, PCA, watchdog	Four-channel CAN, UART	20 or 34	10-bit	0 to +70 -40 to +85	In-system programming	
64			80 TQFP, 81 BGA	Two	UART, TWI, USB, SPI, I ² S	44	10-bit	0 to +70 -40 to +85	MP3 Decoder, MMC, IDE, In-system programming	
16/32			24 SSOP, 20 TSSOP, 28/52 PLCC, 32/64 VQFP		UART, USB, SPI, PCMCIA			0 to +70 -40 to +85	ISO7816, DC/DC converter, EMV pre-certified software	
1- to 64-kbyte Flash, 2-kbyte EEPROM, 128 to 2048-bytes SRAM			20 SOIC, 44 TQFP, 64/80 VQFP, 44/52 PLCC, 20/28 SOIC, 24/16 SSOP, 20/24/40 PDIP	One to three 16-bit	SPI, full-duplex UART, CAN, USB	Nine, four levels	Eight channel, 10 bit	0 to +70 -40 to +85 -40 to +125	MP3, In-system-programmable Flash, three-level lock bit security, smart-card reader interface	50 cents to \$4

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Cybernetic Micro Systems www.controlchips.com	P-51	8051	51	16/8 (8051) 20/8 (EISA)	8, 16	3.3/ 5 tolerant	150 mW		8x8	Single-cycle square root: 8-bit root of 16 bit number	
Cygna Integrated Products www.cygna.com	C8051F02X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	27 mW	0.2 mA	8x8		
	C8051F04X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	27 mW	0.2 mA	8x8		
	C8051F06X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	34 mW	0.2 mA	8x8		
	C8051F0XX	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	34 mW	5 mA	8x8		
	C8051F12X	8051	100	16/8	8	2.7 to 3.6/ 5 tolerant	135 mW	0.2 mA	8x8, 16x16 two-cycle MAC		63-entry branch target buffer
	C8051F2XX	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	35 mW	0.1 mA	8x8		
	C8051F30X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	16 mW	Less than 0.1 mA	8x8		
	C8051F31X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	17 mW	Less than 0.1 mA	8x8		
	C8051F32X	8051	24	16/8	8	2.7 to 5.5	33 mW	Less than 0.1 mA	8x8		
	C8051F33X	8051	25	16/8	8	2.7 to 3.6/ 5 tolerant	17 mW	Less than 0.1 mA	8x8		
Dallas Semiconductor/Maxim www.maxim-ic.com	DS500x DS5240 DS225x	8051	16, 25	16/8 or 24/8	8	4.5 to 5.5	30 to 100 mA	Stop, idle			
	DS80C320 DS87C520 DS87C530 DS89C420	8051	18, 25, 33	16/8	8	2.7 to 5.5	10 to 100 mA	Stop, idle			
	DS80C390 DS80C400	8051	40, 75	22/8 or 24/8	8	4.5 to 5.5	35 to 75 mA	Yes	16x16 MAC		
	DS87C550 MAX765x	8051	12, 33	16/8	8	2.7 to 5.5	10 to 30 mA	Yes			
Philips Semiconductors www.philips.semiconductors.com/microcontrollers	P89C51Rx2	8051	33	16/8	8	3 to 6		Idle, powerdown			

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Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
4-kbyte dual-port RAM, 8-kbyte program RAM, direct host read, write access	Register to select code RAM or data RAM for direct host access	Pins/registers determine address mapping into host address space	100 SQFP	Three 16-bit	Four 8-bit parallel ports, full-duplex UART, PC-104- or 8051-compatible 8-bit host interface	Seven, via writing or reading to specific memory location		0 to +70 -55 to +125 (storage)	Breakpoint/single-step debugging, selectable IRQ and memory addressing, looks like a memory device to host	\$12
64-kbyte Flash, 4352-byte SRAM			64/100 TQFP	Four 16-bit, five-channel PCA, watchdog	SMBus, SPI, two UART, 64 PIO	22, two levels	Eight-channel, 12-bit ADC; two 12-bit DAC	-40 to +85	V _{ref} , temperature sensor, JTAG Debug	\$6.45 to \$8.29
64-kbyte Flash, 4352-byte SRAM			64/100 TQFP	Five 16-bit, six-channel PCA, watchdog	CAN 2.0B, SMBus, SPI, two UART, 64 PIO	20, two levels	Eight-channel, 12-bit ADC; two 12-bit DAC	-40 to +85	V _{ref} , temperature sensor, 32 CAN message objects, JTAG debug, 60 V PGAMP	\$7.74 to \$9.17
64-kbyte Flash, 4352-byte SRAM			64/100 TQFP	Five 16-bit, six-channel PCA, watchdog	CAN 2.0B, SMBus, SPI, two UART, 59 PIO	22, two levels	Two 16-bit 1M-sample/sec ADC; two 12-bit DAC	-40 to +85	V _{ref} , temperature sensor, 32 CAN message objects, JTAG debug	\$16.84 to \$18.76
32-kbyte Flash, 2304-byte SRAM			32 LQFP, 48/64 TQFP	Four 16-bit, five-channel PCA, watchdog	SMBus, SPI, UART, 32 PIO	21, two levels	Eight-channel 12-bit ADC; two 12-bit DAC	-40 to +85	V _{ref} , temperature sensor, JTAG Debug	\$4.32 to \$5.87
128-kbyte Flash, 8448-byte SRAM			64/100 TQFP	Five 16-bit, six-channel PCA, watchdog	SMBus, SPI, two UART, 64 PIO	20, two levels	Eight-channel 12-bit ADC; two 12-bit DAC	-40 to +85	V _{ref} , temperature sensor, JTAG debug, 2% internal oscillator with PLL	\$10.33 to \$14.48
8-kbyte Flash, 1280-byte SRAM			48 TQFP, 32 LQFP	Three 16-bit, watchdog	SPI, UART, 32 PIO	21, two levels	32 channel, 12-bit	-40 to +85	In-system JTAG debug	\$2.39 to \$3.67
8-kbyte Flash, 256-byte SRAM			11 MLP	Three 16-bit, three channel PCA, watchdog	SMBus, UART, 8 PIO	12, two levels	Eight channel, 8-bit	-40 to +85	Temp Sensor, 2% internal oscillator, in-system debug	\$0.99 to \$1.96
16-kbyte Flash, 1280-byte SRAM			32 LQFP, 28 MLP	Four 16-bit, five-channel PCA, watchdog	SMBus, SPI, UART, 29 PIO	14, two levels	21 channel, 10-bit	-40 to +85	Temp Sensor, 2% internal oscillator, in-system debug	\$3.24 to \$3.58
16-kbyte Flash, 2304-byte SRAM			32 LQFP, 28 MLP	Four 16-bit, five-channel PCA, watchdog	USB, SMBus, SPI, UART, 25 PIO	16, two levels	17 channel, 10-bit	-40 to +85	V _{ref} , Temp Sensor, USB Function Controller, in-system debug	\$3.24 to \$3.58
8-kbyte Flash, 768-byte SRAM			20 MLP	Four 16-bit, three-channel PCA, watchdog	SMBus, SPI, UART, 17 PIO	13, two levels	13-channel, 10-bit ADC, 10-bit DAC	-40 to +85	V _{ref} , Temp Sensor, 2% internal oscillator, in-system debug	\$2.23 to \$2.48
ROMless versions, up to 5-kbyte nonvolatile SRAM, 32-, 64-, or 128-kbyte SRAM		MMU (DS5240only)	80/100 QFP, 40/72 SIMM	Two or three 16-bit, watchdog	One or two full-duplex UART	Six or 15		0 to +70 -40 to +85	In-system-programmable, nonvolatile memory-control circuitry	\$7 to \$50
8- or 16-kbyte EPROM, 16-, 32-, or 64-kbyte Flash, 256-byte, 1-, or 4-kbyte RAM			PDIP, PLCC, TQFP	Three 16-bit, real-time, watchdog	Two full-duplex UART	10 to 14		0 to +70 -40 to +85	In-system-programmable, EMI reduction, dual DPTR, nonvolatile SRAM	\$4 to \$25
256-bytes RAM, 4-kbyte SRAM, 512-bytes RAM for CAN		MMU	64 QFP, 68 PLCC, 100 LQFP	Three or four 16-bit, watchdog	Two full-duplex UART, CAN, 10/100 Ethernet MAC	16		0 to +70 -40 to +85	One-wire	\$8 to \$10
256-byte RAM, 1-kbyte SRAM, 8-kbyte EPROM, 16-kbyte Flash			64 TQFP, 68 PLCC, 80 PQFP, 68 Windowed CLCC	Three 16-bit, four-channel 8-bit PWM, watchdog	Two full-duplex UART	11 or 16	Eight-channel, 10-bit or 12-bit ADC; PWM DAC	0 to +70 -40 to +85	Dual DPTR, EMI reduction	\$7.60 to \$12
RAM: 512- to 1024-byteRAM, 65- to 8192- byte EPROM, 65- to 8192-byte Flash/EEPROM			TSSOP, LQFP, PLCC	Four, watchdog	UART, 32 GPIO	Two external, four levels		0 to +70	40- and 44-pin, 12-clock default, six-clock option, IAP/ISP	\$1.50 to \$3.95

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Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
	P89LPC90x	8051	12	0/8	8	2 to 4		Idle, powerdown			
	P89LPC91x	8051	12	0/8	8	2 to 4		Idle, powerdown			
	P89LPC92x	8051	12	0/8	8	2 to 4		Idle, powerdown			
	P89LPC93x	8051	12	0/8	8	2 to 4		Idle, powerdown			
	P8xLPC76x	8051	20	0/8	8	3 to 6		Idle, powerdown			
Triscend www.triscend.com	E5 Customizable	8051	Up to 40	32/8	8	3.3/5 tolerant	1.8 W	Powerdown: less than 50 mA, function disable	8x8		
Renesas Technology www.renesas.com	740 Series M37542	Accumulator	32 kHz to 8	16/8	8	2.2 to 5.5	40 mW	Standby: 20 mW sleep: 0.1 mW	Software multiply/divide		
	740 Series M37544	Accumulator	32 kHz to 8	16/8	8	4.0 to 5.5	40 mW	Standby: 20 mW sleep: 0.1 mW	Software multiply/divide		
Atmel www.atmel.com	AVR	AVR	1 to 24	16/8	16	1.8 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	DVD AVR	AVR	1 to 40	16/8	16	3.0 to 3.6	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	LCD AVR	AVR	1 to 24	16/8	16	1.8 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	MEGA AVR	AVR	1 to 24	16/8	16	1.8 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	RF AVR	AVR	1 to 19	16/8	16	2.0 to 5.0	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	SECURE AVR	AVR		16/8	16	2.7 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	

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Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
128-byte RAM, 1-kbyte Flash/EEPROM			SO, DIP	Three, watchdog	UART, six GPIO	Three external, four levels		-40 to +85	8-pin, byte erasable Flash	63 cents to 80 cents
128-byte RAM, 1-kbyte Flash/EEPROM			TSSOP	Three, watchdog	UART, 12 GPIO	Three external, four levels		-40 to +85	14-pin, byte erasable Flash	79 cents to 85 cents
256-byte RAM, 2 to 8-kbyte Flash/EEPROM			TSSOP, DIP	Three, watchdog	UART, 18 GPIO	Three external, four levels		-40 to +85	76x pin-compatible, 20-pin, byte erasable Flash	\$1.05 to \$1.26
256- to 768-byte RAM, 2- to 8-kbyte Flash/EEPROM			HVQFN, TSSOP, PLCC	Three, watchdog	I ² C, UART, 26 GPIO	Three external, four levels	8-bit	-40 to +85	28-pin, byte erasable Flash	\$1.21 to \$1.79
128-byte RAM, 1- to 4-kbyte Flash/EEPROM			SO, TSSOP, DIP	Two, watchdog	I ² C, UART, 18 GPIO	Three external, four levels	8-bit	0 to +70	14, 16, and 20 pins, two analog comparators	79 cents to \$1.86
Up to 64-kbyte of RAM+O2	External 8-bit such as Flash and SRAM, serial Flash, two DMA		128 LQFP, 208 PQFP	Three 16-bit, 32-bit watchdog, can add timers	UART, can add (UART, SPI, I ² C, HDLC), 56 to 228 PIO	12, can add more			Up to 30,000 on-chip programmable logic gates, up to 120 user-definable I/O pins	\$4.80 to \$18.75
36-kbyte Flash, 1-kbyte SRAM			36 SSOP, 32 LQFP, 32 SDIP	Two 8-bit, two 16-bit	Two UART or SIO, 29 GPIO	18 sources, six external	Eight channel, 10-bit	-40 to +125		\$1.25 to \$3.50
8-kbyte OTP, mask, 256-byte SRAM			32 LQFP, 32 SDIP	Two 8-bit, 16-bit	UART or SIO, 25 GPIO	12 sources, five external	Six channel, 8-bit	-20 to +85		\$1.15 to \$1.75
1- to 128-kbyte Flash, 64- to 4-kbyte EEPROM, 128-byte to 4-kbyte SRAM			20 SSOP, 8/20 SOIC, 32/44/64 TQFP, 8/20/28/40 DIP	Two 8-bit, two 16-bit	SPI, UART, I ² C, 8-bit parallel (64-kbyte addressing)	27, eight external	Eight channel, 10-bit		JTAG debug	50 cents to \$4
12-kbyte SRAM			128/208 LQFP		UART	27, eight external	10-bit	-40 to +85	DVD/CD ATAPI interface and servo controller	From \$1
16- to 32-kbyte Flash, 512-byte to 1-kbyte EEPROM, 1- to 2-kbyte SRAM			64 TQFP, 64 MLF, Die	Two 8-bit, 16-bit	SPI, UART, TWI, 8-bit parallel (64-kbyte addressing)	27, eight external	Eight channel, 10-bit	-40 to 85	Self-programming memory, LCD, JTAG debug	\$2.5 to \$4
4- to 256-kbyte Flash, 256-byte to 4-kbyte EEPROM, 128-byte to 8-kbyte SRAM			44 PLCC, 28/40 DIP, 32/44/64 TQFP, 32/44/64 MLF, Die	Two 8-bit, two 16-bit	SPI, UART, TWI, 8-bit parallel (64-kbyte addressing)	27, eight external	Eight channel, 10-bit	-40 to 85	Self-programming memory, JTAG debug	\$1 to \$6
2-kbyte Flash, 128-byte EEPROM, 128-byte SRAM			20 TSSOP	8-bit		27, eight external		-40 to 85	PLL-based RF transmitter, 250 to 450 MHz	\$1.20
8- to 64-kbyte Flash, 32- to 256-kbyte MaskROM, 4- to 72-kbyte EEPROM, 1.5- to 6-kbyte SRAM			44 LQFP, Die, Module	Two 16-bit	TWI	27, eight external		-40 to 85	16-bit coprocessor, ISO 7816 external interface, common criteria EAL4+	From \$2

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	TCP Trusted Computing	AVR	1 to 33	16/8	16	3.0 to 3.6	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	TINY AVR	AVR	1 to 16	16/8	16	1.8 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	USB AVR	AVR	1 to 24	16/8	16	4.5 to 5.5	1 to 3 mA	Less than 1 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
Infineon Technologies www.infineon.com/microcontrollers	C504	C500, 8051	40	16/8	8	5	154 mW	Slow down, idle, powerdown	8x8		
	C505CA	C500, 8051	40	16/8	8	5	143 mW	Slow down, idle, powerdown	8x8		
	C505L	C500, 8051	20	16/8	8	5	143 mW	Slow down, idle, powerdown	8x8		
	C508	C500, 8051	40	16/8	8	5	113 mW	Slow down, idle, powerdown	8x8		
	C515C	C500, 8051	20	16/8	8	5	94 mW	Slow down, idle, powerdown	8x8		
	C868	C500, 8051	40	16/8	8	3.3	52mW	Slow down, idle, powerdown	8x8		
Atmel www.atmel.com	In-System Programming Flash	CISC	40			2.7 to 5.5					
	Mask ROM	CISC	66			2.7 to 5.5					
	One Time Programmable	CISC	66			2.7 to 5.5					
	Programmable Flash	CISC	2			2.7 to 6.0					

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32-kbyte MaskROM, 32-kbyte EEPROM, 2-kbyte SRAM			28 TSSOP			27, eight external		-40 to 85	Fully TCG/TCPA-compliant security processor, TSS drivers	\$3
1- to 2-kbyte Flash, 64- to 128-byte EEPROM, 64-byte to 128-byte SRAM			32 TQFP, 32 MLF, 8/20 SOIC, 8/20/28 DIP, Die	Two 8-bit	8-bit parallel (64-kbyte addressing)	27, eight external	Four or 11 channel, 10-bit	-40 to 85	In-system programming	39 cents to \$1
16- to 24-kbyte MaskROM, 16- to 24-kbyte EEPROM, 512-byte to 1-kbyte SRAM			48/64/100 LQFP	8-bit, 16-bit	SPI, full-speed USB	27, eight external	12 channel, 10-bit	-40 to 85	Two- to four-hub port, three to six function endpoints	\$1.50 to \$4
16- to 32-kbyte ROM/OTP or ROMless, 512 bytes RAM			44 PMQFP	Five 16-bit, seven-channel (maximum) PWM	UART, 32 PIO	Six, six external	Eight channel, 10-bit	0 to +70 -40 to +85 -40 to +125	Motor-control peripheral	\$3.50 (ROMless)
16- to 32-kbyte ROM/OTP or ROMless, 1.2-kbyte RAM			44 PMQFP	Three 16-bit, four-channel PWM	CAN 2.0B, UART, 34 PIO	Six, six external	Eight channel, 10-bit	0 to +70 -40 to +85 -40 to +125		\$4.50 (ROMless)
16- to 32-kbyte ROM/OTP or ROMless, 512-byte RAM			80 PMQFP	Three 16-bit	UART, 46 PIO	Six, six external	Eight channel, 10-bit	0 to +70 -40 to +85	128-segment LCD controller	\$5 (OTP)
16- to 32-kbyte ROM/OTP or ROMless, 1.2-kbyte RAM			64 PMQFP	Five 16-bit, 11-channel (maximum) PWM	UART, 40 PIO (eight-input only)	Nine, 10 external	Eight channel, 10-bit	0 to +70 -40 to +85	Motor-control peripheral, PLL	\$3.50 (ROMless)
64-kbyte ROM/OTP or ROMless, 3.2-kbyte RAM			80 PMQFP	Three 16-bit, four-channel PWM	CAN 2.0B, UART, SPI, 49 PIO, eight-input only	Seven, 10 external	Eight channel, 10-bit	0 to +70 -40 to +85		\$5 (ROMless)
8-kbyte ROM/SRAM, 512 byte RAM			38 PTSSOP, 28 PDSO	Five 16-bit, seven-channel (maximum) PWM	UART, SPI/I ² C (for booting), 13 PIO (five-input only)	Nine, four external	Four channel, 8-bit	-40 to +85 -40 to +125	Brownout, motor-control peripheral, PLL	Up to \$2
1- to 64-kbyte			20 SOIC, 44 TQFP, 48 MLF, 64/80 VQFP, 44/52 PLCC, 20/28 SOIC, 24/16 SSOP, 20/24/40 PDIP	Three, watchdog	UART, USB 2.0, SPI	32 or 48	10-bit	0 to +70 -40 to +85	Baud-rate generator, keyboard interface	
4- to 64-kbyte			20 SOIC, 44 TQFP, 64/80 VQFP, 44/52 PLCC, 20/28 SOIC, 24/16 SSOP, 20/24/40 PDIP	Three, PCA, watchdog	UART, SPI, USB, I ² S	32 or 48	10-bit	0 to +70 -40 to +85	IDE, MMC, baud-rate generator, keyboard interface	
4- to 64-kbyte			20 SOIC, 44 TQFP, 64/80 VQFP, 44/52 PLCC, 20/28SOIC, 24/16 SSOP, 20/24/40 PDIP	Three, PCA, watchdog	UART, SPI	32 or 48	10-bit	0 to +70 -40 to +85	RC oscillator, programmable I/O	
2- to 32-kbyte			20 SOIC, 44 PLCC/TQFP, 20/44 PDIP	Two or three, watchdog	UART	15 or 32		0 to +70 -40 to +85	Analog comparator	

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8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
	ROMless	CISC	60			2.7 to 5.5					
XEMICS SA www.xemics.com	XE88LC01A Sensing Machine	CoolRISC	2	16/8	22	2.4 to 5.5	0.3 mA/MHz, power supply independent	Sleep, hibernate function disable	8x8 single-cycle multiplication		Three-instruction pipeline
	XE88LC02 Sensing Machine	CoolRISC	2.5 MTP 7 ROM	16/8	22	2.4 to 5.5 (MTP), 1.2 to 5.5 (ROM)	0.3 mA/MHz, power supply independent	Sleep, hibernate function disable	8x8 single-cycle multiplication		Three-instruction pipeline
	XE88LC05A Sensing Machine	CoolRISC	2	16/8	22	2.4 to 5.5	0.3 mA/MHz, power supply independent	Sleep, hibernate function disable	8x8 single-cycle multiplication		Three-instruction pipeline
	XE88LC06A Radio Machine	CoolRISC	2.5 MTP 7 ROM	16/8	22	2.4 to 5.5 (MTP), 1.2 to 5.5 (ROM)	0.3 mA/MHz, power supply independent	Sleep, hibernate function disable	8x8 single-cycle multiplication		Three-instruction pipeline
Fujitsu Micro-electronics America www.fma.fujitsu.com	F2MC - 8L	F2MC-8L	1 to 12.5	16/8	16	1.8 to 6.0	50 mW	Sleep, stop, subclock, watch, timer			
Renesas Technology www.renesas.com	H8/38004	H8	5	16/8	16, 32	1.8 to 3.6	35 mW	Eight	8x8		
	H8/38024	H8	8	16/8	16, 32	1.8 to 5.5	35 mW	Eight	8x8		
Motorola www.motorola.com/semiconductors	68HC08 family (HCS08) series GT, GB	HC08	20	8	8	1.8 to 3.6	9.6 mW	Powerdown: 20 nA, wait, stop, zero-component auto wake-up			
	68HC08 family EY series	HC08	8	8	8	3.0 to 5.0	99 mW	Wait, stop, low-voltage inhibit, auto-wakeup			
	68HC08 family JB, JG, JT	HC08	3.0 to 5.5	8	8	2.0 to 5.0	36.75 mW	Wait, stop, low-voltage inhibit, auto-wakeup			
	68HC08 family JK, JL series	HC08	8	8	8	3.0 to 5.0	50 mW	Wait, stop, low-voltage inhibit, auto-wakeup			
	68HC08 family QT/QY series	HC08	8	8	8	3.0 to 5.0	22.5 mW	Wait, stop, low-voltage inhibit, auto-wakeup			
Cypress MicroSystems www.cypressmicro.com	CY8C22113 CY8C24213	M8C	24	16/8	8, 16, 24	3.0 to 5.5	20 mA	Analog, digital, both	8x8 multiply 32-bit accumulate		

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(by instruction set) 8-BIT MICROPROCESSORS

Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
			40 PDIL, 44/64 VQFP, 44/68/52 PLCC	Three, PCA, watchdog	UART, SPI, TWI	32 or 48		0 to +70 -40 to +85		
22-kbyte MTP, 512-byte SRAM			44 LQFP, 48 VQFN	Four 8-bit, up-down, PWM, real-time, Xtal, 22-bit prescaler	115-kbps UART, 24 GPIO	Up to 24, 16 events	13-channel, 16+10-bit zooming ADC	-40 to +85 MTP -40 to +125 ROM	Prescaler with 1- and 128-Hz interrupt	\$4.69
22-kbyte MTP, 1024-byte SRAM			80/100 LQFP	Four 8-bit, up-down, PWM, real-time, Xtal, 22-bit prescaler	115-kbps UART, SPI, 60 GPIO	Up to 24, 16 events	13-channel, 16+10-bit zooming ADC, four low-power comparators	-40 to +85 MTP -40 to +125 ROM	120-segment LCD driver, prescaler with 1- and 128-Hz interrupt	
22-kbyte MTP, 512-byte SRAM			64 LQFP	Four 8-bit, up-down, PWM, real-time, Xtal, 22-bit prescaler	115-kbps UART, 24 GPIO	Up to 24, 16 events	13-channel, 16+10-bit zooming ADC, 8- and 16-bit DAC	-40 to +85 MTP -40 to +125 ROM	Prescaler with 1- and 128-Hz interrupt	\$ 5.63
22-kbyte MTP, 512-byte SRAM			32 TQFP	Four 8-bit, up-down, PWM, real-time, Xtal, 22-bit prescaler	115-kbps UART, 24 GPIO, 156-kbps Bitjockey (Radio UART)	Up to 24, 16 events	Four low-power comparators	-40 to +85 MTP -40 to +125 ROM	Prescaler with 1- and 128-Hz interrupt	\$2.94
128-byte to 18-kbyte RAM, 4- to 60-kbyte ROM, 16- to 60-kbyte Flash			28/48/64/80/100 QFP/QFP/SOP/SDIP/DIP (plastic)	8/16-bit, 21-bit time-base, 8 bit PWM, PPG, PWC, watchdog	SIO, I2C, USB, SMBus, UART, up to 85 PIO	Up to 16 external	Eight-channel (maximum), 8/10-bit ADC; DAC	-40 to +85	Buzzer output, remote-control carrier generator, DTMF generator, LCD driver, VFD, stepper-motor control	From \$1.20
32-kbyte Flash, 16- to 32-kbyte mask ROM			64 QFP/TQFP	Two 16-bit, 8-bit, two PWM, watchdog	(A)synchronous	11 external	Four channel, 10 bit	-40 to +85	25x4 LCD controller, on chip debug, 32-kHz subclock	\$1.50 to \$4
32-kbyte Flash, 8 to 32-kbyte mask ROM			80 QFP/TQFP	Three 8-bit, two 16-bit, two PWM, watchdog	(A)synchronous	13, nine external	Eight channel, 10 bit	-40 to +85	25x4 LCD controller, on chip debug, 32-kHz subclock	\$1.70 to \$4.65
32- to 60-kbyte Flash, 2- to 4-kbyte RAM			44/64 QFP, 42 SDIP	Eight 16-bit, PWM	Two SCI, SPI, I2C, up to 56 GPIO	IRQ, KBI (up to eight pins)	Eight channel, 10 bit	-40 to +85	debug module with two comparators and nine trigger modes, single-pin interface, background debug, hardware breakpoint	\$3.85 to \$5.25
16-kbyte Flash, 512-byte RAM			32 LQFP	Two 16-bit, PWM	24 GPIO, ESCI, SPI	IRQ, KBI (five pins)	Eight channel, 10 bit	-40 to +85 -40 to +105 -40 to +125	Higher current source capability on nine-port lines for LED drive, low-voltage inhibit with software-selectable trip points for 5V operation	\$3.57 to \$3.95
5.5- to 8-kbyte ROM, 8- to 16-kbyte Flash, 128- to 384-byte RAM			20 (P)DIP, 44 QFP, 32 LQFP, 20 to 28 SOIC	Single or dual 16-bit	13 to 37 GPIO, USB, USB 2.0, PS/2, SCI	IRQ, KBI (up to eight pins)	Eight channel, 10 bit	0 to +70	Low-voltage inhibit, up to six LED pins	\$1.89 to \$4.25
4-kbyte ROM, 1.5- to 8-kbyte Flash, 128- to 256-byte RAM			20 to 28 SOIC, 20 to 28 DIP, 20 to 28 PDIP, 32 to 48 LQFP	Single or dual 16-bit, PWM	14 to 26 GPIO, SCI	IRQ, KBI (up to eight pins)	12 to 14 channel, 8-bit	-40 to +85 -40 to +125	RC oscillator option, addressable external memory, low voltage inhibit, up to 10 LED pins, LVR with selectable trip points	\$1.20 to \$2.95
1.5- to 4-kbyte Flash, 128-byte RAM			8 DIP/DFN, 16 PDIP, 16 TSSOP, 8 to 16 SOIC	Two 16-bit, PWM	Five to 13 GPIO	IRQ, KBI (up to six pins)	Four channel, 8-bit	-40 to +85	Trimmable internal oscillator; selectable trip point LVI (low-voltage inhibit)	From 70 cents
2-kbyte program Flash, 256-byte SRAM			28 MLF, 8 PDIP/SOIC, 20 PDIP/SSOP	Up to four user-definable 8/16/24/32-bit, PWM	Up to two user-definable SPI/asynchronous, six to 16 PIO	11	Up to one 13-bit ADC; up to one 6/8-bit DAC	-40 to +85 -40 to +125	User definable filters, amplifier/scalers, comparators, pseudorandom sequence generator,	69 cents

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8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
	CY8C24123 CY8C24223 CY8C24423	M8C	24	16/8	8, 16, 24	3.0 to 5.5	20 mA	Analog, digital, both	8x8 multiply 32-bit accumulate		
	CY8C25122 CY8C26233 CY8C26443 CY8C26643	M8C	24	16/8	8, 16, 24	3.0 to 5.25	20 mA	Analog, digital, both	8x8 multiply 32-bit accumulate		
	CY8C25122A CY8C26233A CY8C26443A CY8C26643A	M8C	24	16/8	8, 16, 24	3.3/5.0	20 mA	Analog, digital, both	MAC		
	CY8C27143 CY8C27243 CY8C27443 CY8C27543 CY8C27643	M8C	24	16/8	8, 16, 24	3.0 to 5.5	20 mA	Analog, digital, both	8x8 multiply 32-bit accumulate		
Uvicom www.ubicom.com	IP2012	MASI	120	Software I/O	16	2.5/2.5 or 3.3, 5 tolerant	175 mW	Sleep: 500 mW, runtime clock control, function disable	One-cycle 8x8 signed/unsigned		None, single-cycle program/data memory on-chip
	IP2022	MASI	120 to 160	Software I/O	16	2.5/2.5 or 3.3, 5 tolerant	175 mW	Sleep: 500 mW, runtime clock control, function disable	One-cycle 8x8 signed/unsigned		None, single-cycle program/data memory on-chip
Silicon Storage Technology www.sst.com	FlashFlex51	MCS 51	12, 33, 40	16/8	8	2.7 to 5.5	15 mA	Idle, standby, powerdown	8x8		
Intel www.intel.com	MCS251 8XC251Sx 8XC251Tx	MCS51	16, 24	24/8	8, 16	4.5 to 5.5 +/- 10%	85 mA	Idle, powerdown	16x8		
	MCS51 8XCxx 8XC51Fx 8XC51Rx 83C51KB	MCS51	12, 16, 24, 33	8	8	4.5 to 5.5 +/- 10%	24 mA	Idle, powerdown	8x8		
Texas Instruments www.ti.com/msc	MSC120x	MSC	Up to 33	16/8	8	2.7 to 5.25	40 mW	Stop: less than 1 mA, idle, slow	8x8 32-bit accumulator		
	MSC121x	MSC	Up to 33	16/8	8	2.7 to 5.25	48 mW	Stop less than 1 mA, idle	8x8 32-bit accumulator		
NEC Electronics America www.necelam.com	K0	NEC K	1 to 12	8/16	8	1.8 to 5.5	5 to 10 mA (5V)	Halt, stop	8x8 multiply, 16x8 divide		
	K0S	NEC K	1 to 10	None	8	1.8 to 5.5	0.25 to 2.5 mA (5V)	Halt, stop	8x8		
	Kx1	NEC K	2 to 10	8/16	8	2.7 to 5.5	5 to 10 mA (5V)	Halt, stop	16x16 multiply, 32x16 divide		

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(by instruction set) 8-BIT MICROPROCESSORS

Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
4-kbyte program Flash, 256-byte SRAM			28 MLF, 8 PDIP/SOIC, 20/28 PDIP/SSOP	Up to four user-definable 8/16/24/32-bit, PWM	Up to two user-definable SPI/asynchronous, six to 24 PIO	12	Up to two 13-bit ADC; up to two 6/8-bit DAC	-40 to +85 -40 to +125	User definable filters, amplifier/scalers, comparators, pseudorandom sequence generator,	99 cents
4- to 16-kbyte program Flash, 256-byte SRAM			8 PDIP, 44 TQFP, 48 SSOP, 20/28 PDIP/SSOP/SOIC	Up to eight user-definable 8/16/24/32-bit, PWM	Up to four user-definable SPI/asynchronous, six to 44 PIO	16	Up to two 13-bit ADC; up to four 6/8-bit DAC	-40 to +85	User definable filters, amplifier/scalers, comparators, pseudorandom sequence generator,	\$1.69
4-, 8- or 16-kbyte program Flash, 256-byte SRAM			8 PDIP, 48 QFP, 20/28/48 PDIP/SSOP/SOIC	Up to eight user-definable 8/16/24/32-bit, PWM	Up to four user-definable SPI/asynchronous, six to 44 PIO	16	Up to two eight-channel DAC		User definable filters, amplifier/scalers, comparators	\$1.60 to \$4.50
16-kbyte program Flash, 256-byte SRAM			8 PDIP, 20 SSOP, 44 TQFP, 48 SSOP, 48 MLF, 28 PDIP/SSOP	Up to eight user-definable 8/16/24/32-bit, PWM	Up to four user-definable SPI/asynchronous, six to 44 PIO	18	Up to two 13-bit ADC; up to four 6/8-bit DAC	-40 to +85 -40 to +105	User definable filters, amplifier/scalers, comparators, pseudorandom sequence generator,	\$1.99
64-kbyte Flash (program or data), 16-kbyte + 4-kbyte SRAM	Implement via GPIO only (part of software I/O)		80 PQFP	Two 16-bit, 8-bit pre-scale, real-time, watchdog	Serdes unit for Ethernet, USB, GPSI, SPI, UART, 48 GPIO	15	Eight channel, 10 bit	-40 to +85	Software I/O	\$7.75
64-kbyte Flash (program or data), 16-kbyte + 4-kbyte SRAM	SRAM		80 PQFP, 80 uBGA	Two 16-bit, 8-bit pre-scale, real-time, watchdog	Two Serdes units for Ethernet, USB, GPSI, SPI, UART, 52 GPIO	15	Eight channel, 10 bit	-40 to +85 (120 MHz) 0 to +55 (160 MHz)	Software I/O	\$8.50 to \$9.90
20-, 36-, 40-, 72-kbyte Flash, 256-byte to 1-kbyte RAM			40 PDIP, 44 PLCC, 44 TQFP	Three 16-bit, PCA, watchdog	Full duplex UART, enhanced version, SPI	Six to eight, two to four levels		0 to +70 -40 to +85	In-application programming, BOD, second DPTR	\$1.30 to \$3
8- or 16-kbyte OTP, ROM, 512- or 1024-byte RAM			44 PLCC, 40 PDIP	Three 16-bit, PCA, watchdog	One or two UART	Eight, four levels			40-byte register file	\$4.84 to \$6.87
8-, 16-, or 32-kbyte EPROM, OTP, ROM, 256- or 512-byte RAM			44 PLCC, 44 PDIP, 44 MQFP	Three 16-bit, PCA, watchdog	Full-duplex UART	Eight, two levels				\$1.61 to \$5.48
4- to 8-kbyte code/data Flash, 128-byte SRAM			48TQFP	Two 16-bit, four system	Basic SPI, I ² C, UART, 16 PIO	20 sources	24-bit ADC, 8-bit DAC	-40 to 85	Internal Oscillator, PLL, precision V _{ref} and temperature sensor, PGA=128	\$5
4- to 32-kbyte code/data Flash, 1.2-kbyte SRAM			64TQFP	Two 16-bit, four system	Multimaster SPI and I ² C, dual QUART, 34 PIO	21 sources	24-bit ADC, Quad 16-bit DAC	-40 to 85	Precision V _{ref} and temperature sensor, PGA=128	\$8 to \$14
8- to 60-kbyte, ROM, Flash, OTP			QFP, SSOP, SDIP	8-bit, 16-bit, watchdog, real-time, PWM	UART, I2C, three-wire, two-wire	NMI, 20 maskable	Eight channel, 8/10-bit	-40 to +85	Four LCD configurations	\$2.50 to \$7
2- to 48-kbyte ROM, Flash			SSOP, LQFP	8-bit, 16-bit, watchdog, real-time, PWM	UART, I2C, three-wire	NMI, 15 maskable	Four to eight 8/10-bit	-40 to +85	Eight LCD configurations	\$1.50 to \$5
8- to 60-kbyte, ROM, Flash			SSOP, QFP	8-bit, 16-bit, watchdog, real-time, PWM	UART, LIN	NMI, 28 maskable	Eight channel, 10 bit	-40 to +85	Failsafe clock, external device reset, POC, LVI	\$2.50 to \$5.50

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8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
Microchip Technology www.microchip.com	PIC12	PICmicro	20	14/8	12, 14	2 to 5.5	10 mW	low power sleep, individual peripheral on/off control			
	PIC16	PICmicro	20	14/8	12, 14	2 to 6	50 mW	low power sleep, individual peripheral on/off control			
	PIC18	PICmicro	40	16/8	16	2 to 5.5	50 mW	low power sleep, individual peripheral on/off control	8x8		
	rPIC	PICmicro	20	14/8	12, 14	2.5 to 5.5	10 mW	low power sleep, individual peripheral on/off control			
STMicroelectronics www.st.com	ST62xx family	ST6	Up to 8		8	3.0 to 6.0	3.3 mA (5V)	Wait: 350 mA stop: 0.1 mA			
	ST72(F)260 ST72(F)262 ST72(F)264	ST7	Up to 8		8	2.4 to 5.5	7.2 mA (5V)	Halt, active-halt, wait, slow	Hardware multiply		
	ST72(F)321	ST7	Up to 8		8	3.8 to 5.5	6.5 mA (5V)	Halt: 10 mA (less than 85°C), halt: 50 mA (less than 125°C)	Hardware multiply		
	ST72(F)324	ST7	Up to 8		8	3.8 to 5.5	7.4 mA (5V)	Halt, active-halt, wait, slow	Hardware multiply		
	ST72(F)521	ST7	Up to 8		8	3.8 to 5.5	6.2 mA (5V)		Hardware multiply		
	ST72(F)65	ST7	3, 6, 8		8	2.4 to 5.5	14 mA (5V)	Wait, halt	Hardware multiply		
	ST7261 ST72(F)62 ST72(F)63B	ST7	1, 2, 4, 8		8	3.0 to 5.5	12 mA (5V)	Slow, wait, halt	Hardware multiply		
	ST7FLiteSx ST7FLite0x ST7FLite1x ST7FLite2x	ST7	Up to 8		8	2.4 to 5.5	4 mA (5V)	Halt: 10 mA, autowake-up, active-halt, wait, slow	Hardware multiply		

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(by instruction set) 8-BIT MICROPROCESSORS

Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
768- to 3584-byte ROM/OTP/Flash 25- to 128-byte SRAM, 16- to 128-byte EEPROM			8 PDIP, 8 SOIC, 8 CERDIP, 8 DFN	8/16-bit real-time/counter (8-bit programmable prescaler)	UART, I ² C	Four to 12	Up to four channel, 8/10-bit	-40 to +125	In-circuit serial programming, low-voltage detect, brownout reset, internal oscillator, analog comparator	80 cents to \$2
768-byte to 14-kbyte ROM/OTP/Flash 68- to 368-byte SRAM, 64- to 256-byte EEPROM			14/44 DIP/SOIC/ SSOP/PLCC/ TQFP/MQFP/ CERDIP/QFN	Multiple 8-/16-bit, PWM, capture/compare	USART, I ² C, SPI, LIN, MI2C, USB, 13 to 33 GPIO,	Four to 12	Four- to eight-channel 8/12-bit ADC; 8-bit DAC	-40 to +125	Op amp, in-circuit serial programming, low-voltage detect, brownout reset, internal oscillator, analog comparator, voltage reference	\$1.10 to \$5.50
4- to 128-kbyte OTP/Flash, 256-byte to 4-kbyte SRAM, 128 byte to 1-kbyte EEPROM			18/84 DIP/SOIC/ PLCC/TQFP/ SDIP/QFN	Two 10-bit PWM, three 8-/16-bit watchdog, start-up, power-up	Up to two UART, three-wire SPI, I2C, MI2C, CAN 2.0B, 23 to 68 GPIO	Up to 22 external, two UART on address bit	10-bit, support during sleep	-40 to +125	In-circuit serial programming, low-voltage detect, brownout reset	\$1.60 to \$6.50
768- to 3584-byte OTP/Flash, 25- to 128-byte SRAM, 16- to 128-byte EEPROM			18/20 CERDIP/ SSOP/SOIC	8-bit, 16-bit, watchdog		Four to 12	Four 10-bit ADC	-40 to +125	RF transmitter, 310 to 440 MHz, 85 to 930 MHz, in-circuit serial programming, low-voltage detect, brownout reset, 25-mA source/sink per I/O	\$1.94 to \$2.09
1- to 8-kbyte OTP, ROM, up to 128 bytes of EEPROM, up to 320 bytes of SRAM	Internal memory only		DIP, SDIP, SO, SSOP, QFP (16 to 100)	8-bit, 16-bit, 8-bit autoreload, watchdog	UART, SPI	Six levels	21 channel (maximum), 8-bit	0 to +70 -40 to +85 -40 to +105 -40 to +125	Low-voltage detector	80 cents to \$3
4- or 8-kbyte ROM or Flash, 256-byte RAM	Internal memory only		28 SO, 32 SDIP, 36 BGA (6x6 mm)	Two 16-bit, PWM, watchdog	SPI, I ² C, SCI	10, 22 external (nested support)	Six channel, 10-bit	0 to +70 -10 to +85 -40 to +85	PLL, in-application Flash programming	\$1.13 to \$174
32- to 60-kbyte ROM or high density Flash, 1- to 2-kbyte RAM	Internal memory only		44/64 TQFP, 42/56 SDIP	Two 16-bit, PWM, 8-bit auto-reload, watchdog	SPI, I ² C, SCI	10, 15 external (nested support)	16 channel, 10-bit	0 to +70 -40 to +85 -40 to +105 -40 to +125	In-application Flash programming	\$2.18 to \$3.84
8- to 32-kbyte ROM or Flash, 384- byte to 1-kbyte RAM	Internal memory only		32/44 TQFP, 32/42 SDIP	Two 16-bit, PWM, watchdog	SPI, SCI	10, nine external (nested support)	12 channel, 10-bit	0 to +70 -40 to +85 -40 to +105 -40 to +125	Enhanced reset, in-application Flash programming	\$1.60 to \$2.39
32- to 60-kbyte Flash or ROM, 1- to 2-kbyte RAM	Internal memory only		64/80 TQFP	Two 16-bit, PWM, 8-bit auto-reload, watchdog	SPI, SCI, I ² C, CAN	14, 15 external, TLI (nested support)	16 channel, 10-bit	0 to +70 -40 to +85 -40 to +105 -40 to +125	In-application Flash programming	\$3.48 to \$4.21
16- or 32-kbyte, 1- to 5-kbyte SRAM	Internal memory only		64 TQFP	16-bit with compare, 6-bit PWM, 4-bit rate multiplier, watchdog	I ² C, USB full speed, 47 PIO	16 external	Two channel, 8-bit	0 to +70	In-application programming	\$4.05 to \$5.22
4- to 16-kbyte Flash, EEPROM, OTP and ROM, 256- to 768-byte SRAM	Internal memory only		PDIP, SO, TQFP, CSDIP	16-bit, 8-bit auto reload, 8-bit timebase unit, PWM, watchdog	SCI, SPI, I ² C, USB low speed, 11 to 31 PIO	12 external	Eight channel, 8/10-bit	0 to +70	In-application programming	\$1.38 to \$2.97
1k- to 8-kbyte Flash, up to 256-byte EEPROM, 128- to 384-byte SRAM	Internal memory only		16/20 SO, 16/20 DIP	8-bit, 12-bit auto-reload, up to four PWM, real-time, watchdog	SPI	10, four external	Five or seven channel, 8/10-bit with op-amp	0 to +70 -10 to +85 -40 to +85	1% RC internal oscillator, PLL, DALI communication interface, in-application programming	70 cents to \$1.45

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8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
Toshiba America Electronic Components www.toshiba.com	870 family	TLCS	32 kHz to 8	16/8	8 to 32	1.8 to 6.0	8 mA	Idle: 4 mA slow: 30 mA sleep: 15 mA stop: 0.5 mA	Yes		
	870/C family	TLCS	32 kHz to 16	16/8	8 to 40	1.8 to 5.5	7.5 mA	Idle: 5.5 mA slow: 14 mA sleep: 6 mA stop: 0.5 mA	Yes		
	870/X family	TLCS	32 kHz to 16	20/8	8 to 48	2.7 to 5.5	20 mA	Idle: 10 mA stop: 0.5 mA	Yes		
Rabbit Semiconductor www.rabbitsemi-conductor.com	Rabbit 2000	Z80/Z180	30	20/8	8, 16	2.5 to 5.5	120 mA (5V)	Sleepy: 60 mA (2.5V)	16x16		
	Rabbit 3000	Z80/Z180	54	20/8	8, 16	1.8 to 3.6	108 mA (3.3V)	Sleepy: 23 mA, ultra sleepy: 2 mA (1.8V)	16x16		
ZiLOG www.zilog.com	eZ80190	Z80/Z180	50	24/8	24	3.3/ 5 tolerant	50 mA		16x16+40 MAC		
	eZ80F91	Z80/Z180	50	24/8	8	3.0 to 3.6/ 5 tolerant	50 mA	Sleep, halt			
	eZ80F92	Z80/Z180	20	24/8	8	3.0 to 3.6/ 5 tolerant	30 mA	Sleep, halt			
	eZ80F93	Z80/Z180	20	24/8	8	3.0 to 3.6/ 5 tolerant	30 mA	Sleep, halt			
	eZ80L92	Z80/Z180	20, 50	24/8	24	3.3/ 5 tolerant	40 mA	Sleep, halt			
	eZ80L92 Ethernet Module	Z80/Z180	48	24/8	24	3.3/ 5 tolerant	125 mA	Sleep, halt			
	Z8	Z80/Z180	16	16/8	16	2.0 to 5.5	20 mA	Stop: 10 mA	16x16 multiply 32x16 divide		
	Z8F042x Z8 Encore!	Z80/Z180	20	16/8	16	2.7 to 3.6/ 5 tolerant	10 mA	Sleep, halt	16x16 multiply 32x16 divide		
	Z8F082x Z8 Encore!	Z80/Z180	20	16/8	16	2.7 to 3.6/ 5 tolerant	10 mA	Sleep, halt	16x16 multiply 32x16 divide		
	Z8F160x Z8 Encore!	Z80/Z180	20	16/8	16	3.0 to 3.6/ 5 tolerant	15 mA	Sleep, halt	16x16 multiply 32x16 divide		

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Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
4- to 60-kbyte ROM, up to 2-kbyte SRAM, up to 16-kbyte EEPROM program, up to 512 bytes EEPROM data			SDIP, QFP, LQFP, SSOP, SOP	Up to four 8-bit, up to two 16-bit, up to 18-bit timers, watchdog	Up to one UART, up to three synchronous SIO, up to two I2C, up to one high-speed SIO	15	16-channel (maximum) 8/10-bit ADC; up to six AD comparator inputs; up to eight DAC		LED, LCD, VFT drivers, dual clock, clock gear, on-screen-display, remote-control pulse detector	\$1.50 to \$7
4- to 60-kbyte ROM, up to 2-kbyte of SRAM			SDIP, QFP, LQFP, SSOP, SOP	Up to four 8-bit, up to two 16-bit, 18-bit (maximum) timers, watchdog	Up to two UART, synchronous SIO, up to three I2C, up to one CAN, up to eight PWM	15	16-channel (maximum), 10-bit ADC; eight channel (maximum), 8-bit ADC; up to one 8-bit DAC		LED, LCD, VFT drivers, dual clock, clock gear, brushless motor control	\$1.25 to \$7
16- to 96-kbyte ROM, up to 3-kbyte of SRAM	Yes		SDIP, QFP, LQFP, SOP	Up to four 8-bit, up to three 16-bit timers, watchdog	Up to one UART, up to two synchronous SIO, up to two I2C, up to 10 PWM	63	16-channel (maximum), 10-bit ADC; 12-channel (maximum), 8-bit ADC		LED, LCD, VFT drivers, dual clock, clock gear, brushless motor control	\$2.50 to \$8
External Flash, ROM, SRAM	Three chip selects, two out/write enables, up to six devices	Yes	100 PQFP	Five 8-bit, 10-bit with two match registers, real-time, watchdog	Four asynchronous, two synchronous with SPI, 40 PIO	Four external			Slave port, bootstrap mode, spread spectrum circuitry for low-EMI	\$7.50
External Flash, ROM, SRAM	Three chip selects, two out/write enables, up to six devices	Yes	128 LQFP, 128 TFBGA	10 8-bit, 10-bit with two match registers, real-time, PWM, watchdog	Six asynchronous, IrDA, four synchronous or SPI, two with HDLC/SDLC, 56 PIO	Four to eight external			Slave port, bootstrap mode, quadrature decoder, pulse capture, auxiliary I/O bus, spread spectrum circuitry for low-EMI	\$8.75
8-kbyte SRAM	Two DMA, external Flash		100 LQFP	Six PRT, watchdog	Two UART, SPI, 24 PIO, I ² C	44		-40 to +105	SSL, Ethernet/PPP drivers	\$5.99 to \$6.59
256-kbyte Flash, 8-kbyte SRAM, 8-kbyte EMAC Buffer			144 LQFP	Four PRT, PWM, real-time, watchdog	Two 9-bit UART, 32 bit GPIO, I ² C, SPI, Ethernet MAC	46		-40 to +105	IrDA, Ethernet/PPP drivers, TCP/IP stack, RTOS	\$12.78 to \$14.06
128-kbyte Flash, 8-kbyte SRAM			100 LQFP	Six PRT, watchdog	Two 9-bit UART, 24-bit GPIO, I ² C, SPI	36		-40 to +105	IrDA, Ethernet/PPP drivers, TCP/IP stack, RTOS	\$7.54 to \$8.30
64-kbyte Flash, 4 kbyte SRAM			100 LQFP	Six PRT, watchdog	Two 9-bit UART, 24-bit GPIO, I ² C, SPI	36		-40 to +105	IrDA, Ethernet/PPP drivers, TCP/IP stack, RTOS	\$7.01 to \$7.72
	External Flash		100 LQFP	Six PRT, real-time, watchdog	Two UART, SPI, 24 PIO, I ² C	36		-40 to +105	IrDA, TCP/IP stack, RTOS	\$4.39 to \$5.56
1-Mbyte Flash, 512-kbyte RAM	External Flash		Two 50-pin system-expansion interfaces	Six PRT, watchdog	Two UART, SPI, 24 PIO, I ² C	36		0 to +70	IrDA, TCP/IP stack, RTOS, RJ45	\$52.80 (5000)
OTP, EPROM, 236-byte SRAM			18/28/40 DIP, 18/28 SOIC, 20 SSOP, 44 PLCC/QFP	Two or three 8-bit with 6-bit prescaler, watchdog	UART, 32 GPIO	Six	Eight-channel, 8-bit ADC	-40 to +105	In-circuit programming, POR, brownout reset	68 cents to \$8.25
4-kbyte Flash or ROM, 1-kbyte SRAM			20, 28	Two 16-bit, PWM	9-bit UART with RS485, IrDA encoder/decoder	24	Five-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$1.83
8-kbyte Flash or ROM, 1-kbyte SRAM			20, 28	Two 16-bit, PWM	9-bit UART with RS485, IrDA encoder/decoder	24	Five-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$2.26
16-kbyte Flash or ROM, 2-kbyte SRAM	Three-channel DMA		40, 44, 64, and 68	Four 16-bit, PWM	Two 9-bit UART with RS485, IrDA encoder/decoder	24	12-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$2.84

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8-BIT MICROPROCESSORS (by instruction set)

Company name	Device name or family	Instruction set architecture	CPU frequency (MHz)	Bus interface (address/data) (bits)	Instruction width (bits)	Core / I/O operating voltages (V)	Typical power at maximum frequency	Powerdown modes and minimum power	DSP/multiplication hardware support (bits)	FPU	Caching
	Z8F240x Z8 Encore!	Z80/Z180	20	16/8	16	3.0 to 3.6/ 5 tolerant	15 mA	Sleep, halt	16x16 multiply 32x16 divide		
	Z8F320x Z8 Encore!	Z80/Z180	20	16/8	16	3.0 to 3.6/ 5 tolerant	15 mA	Sleep, halt	16x16 multiply 32x16 divide		
	Z8F480x Z8 Encore!	Z80/Z180	20	16/8	16	3.0 to 3.6/ 5 tolerant	15 mA	Sleep, halt	16x16 multiply 32x16 divide		
	Z8F640x Z8 Encore!	Z80/Z180	20	16/8	16	3.0 to 3.6/ 5 tolerant	15 mA	Sleep, halt	16x16 multiply 32x16 divide		
Atmel www.atmel.com	FPSLIC FPSLIC Secure		1 to 25	16/8	16	3.0 to 3.6	2 to 3 mA/MHz	Less than 100 mA	8x8 (un)signed, 16x16 signed	Two-cycle 8x8 fixed-point	
	MARC4		32 kHz to 4		8	1.8 to 6.5	220 μ A (3V)	Sleep: 600 nA deep sleep: 300 nA			
National Semiconductor www.national.com	COP8 family		10 to 20	8/1	8	2.5 to 5.5 (OTP, Flash) 2.5 to 7 (ROM)	75 mW (ROM)	Active idle: 21 mW sleep: 48 mW			

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Memory	Memory controller	MMU	Package selection	Timers	Serial, Parallel I/O	Interrupts	ADC/DAC	Temperature ranges (degrees Celsius)	Additional features	Price (10,000)
24-kbyte Flash or ROM, 2-kbyte SRAM	Three-channel DMA		40, 44, 64, and 68	Four 16-bit, PWM	Two 9-bit UART with RS485, IrDA encoder/decoder	24	12-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$3.28
32-kbyte Flash or ROM, 2-kbyte SRAM	Three-channel DMA		40, 44, 64, and 68	Four 16-bit, PWM	Two 9-bit UART with RS485, IrDA encoder/decoder	24	12-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$3.49
48-kbyte Flash or ROM, 4-kbyte SRAM	Three-channel DMA		40, 44, 64, 68, and 80	Four 16-bit, PWM	Two 9-bit UART with RS485, IrDA encoder/decoder	24	12-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$3.93
64-kbyte Flash or ROM, 4-kbyte SRAM	Three-channel DMA		40, 44, 64, 68, and 80	Four 16-bit, PWM	Two 9-bit UART with RS485, IrDA encoder/decoder	24	12-channel (maximum), 10-bit ADC (sigma/delta)	-40 to +105	One-pin in-circuit programming, on-chip debug, voltage brown out, power-on reset	\$4.37
20- to 32-kbyte program, 4- to 16-kbyte data memory, reconfigurable, EEPROM (Secure)			84 PLCC, 100 TQFP, 144/208 PQFP, 256 caBGA (Secure)	Two 8-bit, 16-bit	UART, I ² C, 8-bit PIO	31, four external			5000- to 40,000-gate FPGA, JTAG debug	\$5 to \$85
2- to 4-kbyte ROM, 256-nibbles RAM, 512-bit EE			20/44 SSO	One or Two		Three or four, four to 10 external		-40 to +85 -40 to +105 -40 to +125	Switchable clock sources, brown out	\$1.25 to \$2.50 (60-kbyte ROM)
1- to 32-kbyte ROM, OTP, Flash			16 to 68	Three 16-bit, PWM, idle	CAN, UART, SPI, I ² C	Up to 15 maskable	16 channel, 10-bit	-40 to +125	Dynamic allocated non-volatile memory on Flash devices	75 cents to \$6.50