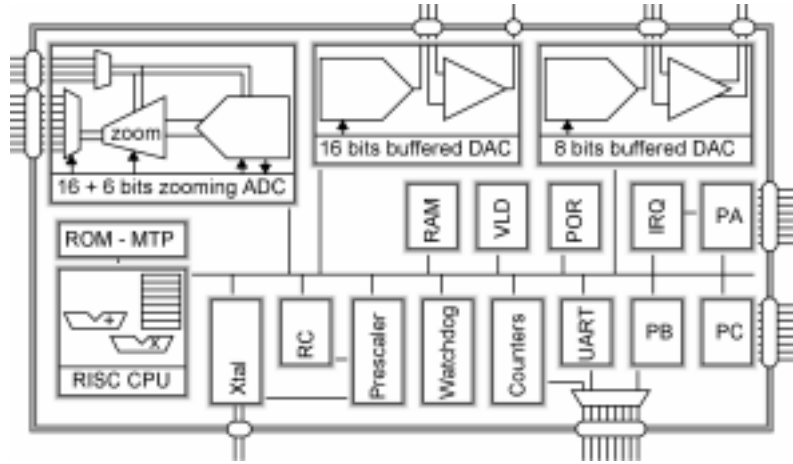


**1.2V-5.5V**  
**1 MIPS @ 300 uA**  
**16 bits + 6 bits**



# XE8000 series

## Ultra Low-Power, Low-Voltage Mixed-Signal Microcontrollers

### General Description

XE8000 is a series of high performance, ultra low-power, low-voltage 8-bit MTP/ROM-based CMOS microcontrollers, some with advanced analog features. It is built around a high efficiency 8-bit RISC architecture. All instructions, including 8 \* 8 bit multiplications, are executed in exactly 1 clock cycle (4 MHz clock → 4 MIPS). In comparison with other market competitors of the XE8000 series, it is more energy efficient by orders of magnitude.

### Applications

- Portable, battery operated instruments
- RF powered instruments
- Battery capacity monitoring
- Motor control
- Low-power data loggers
- Bar code readers
- Home automation
- 4-20 mA loop
- Sensor interfacing

### Key product Features


- Low-voltage, down to 1.2 V
- Low-power operation:  
 < 300 uA @ 1 MHz (MTP memory)  
 < 10 uA @ 32 kHz  
 < 1 uA, standby mode (Xtal clock on)
- 16 + 6 bits zooming ADC, 16 bits DAC
- < 100 nA, sleep mode
- 8-bit RISC architecture
- 8 kWords ROM or MTP (= 22 kBytes)
- 512 bytes RAM

### Ordering Information

**Samples available:** Q1 2000  
 (XE88LC05 samples available now)

Nomenclature:

XE88LCxxMEyyy

program		device and package code:
memory		000: bare die
R: ROM		012: SO20
M: MTP	temperature code	015: SO28
	I: -40 to 85 °C	026: TQFP3:
	E: -40 to 125 °C	027: TQFP4:
		028: TQFP6:

Cool Solutions

# XE8000 series

## Ultra Low-Power, Mixed-Signal Microcontrollers

### Functional description

The different functional blocks are connected to a common databus. The heart of the controller is a high efficiency RISC 8-bit core. The reset and oscillators control a system block that contains the watchdog and the prescaler that sets the operating frequency. Three programmable I/O ports are available for external communication, interrupt and event catching or supplying the internal clock. Four 8-bit cascadable counters can be operated in PWM, capture or compare mode.

### Other Peripherals:

- Multiple Time Programmable (MTP) memory
- UART (300 – 38400 bauds)
- 32 KHz Xtal oscillator
- RC oscillator:  
100 kHz - 4 MHz; 2% software trimming
- Prescaler of 20 bits
- 19 interrupt sources (8 external)
- Up to 24 I/O pins individually controllable
- Analog switches matrix on 8 I/O pins
- Reset with input combination on I/O pins
- 4 cascadable 8 bit up-down counters with PWM, capture and compare
- Voltage Level Detection with programmable detection level
- 16 + 6 bits ADC
- 8 bits and 16 bits DACs

### Electrical Characteristics

- Temperature -40 °C - 85 °C
- Voltage 2.4 V – 5.5 V

### CPU:

The XE8000 series uses the CoolRISC® processor core with separate 22-bit instruction bus and 8-bit data bus. Its 3-stage pipeline allows execution of all instructions (including branches) in one clock cycle. The rich instruction set (35 generic instructions) includes powerful multiplication instructions (8x8 bits in one cycle). Data can be accessed through 8 different addressing modes.

### Complete development environment

A complete development environment based on the standard GNU tools is provided. It includes an assembler, a C-compiler (ANSI compatible), a source level debugger, a simulator and a hardware emulator, as well as a graphical interface and project management tools.

### Sleep modes:

Each block can be individually stopped.

Xtal oscillator and prescaler can work with 1 uA and generate 1 Hz interrupts while the CPU is stopped for ultra low-power operation.

Model	Supply voltage	Memory			Peripherals									Package		
		Program (kB)	Program (kW)	Data (B)	RC	Xtal	UART	PIO	Voltage level	Watchdog	Counters	PWM	Buffered DAC		Zooming ADC	LCD drivers
XE88LC01	2.4 5.5	22	8	512	√	√	√	24	√	√	4	2		16+6b		TQFP44
XE88LC02	2.4 5.5	22	8	512	√	√	√	24	√	√	4	2		16+6b	√	
XE88LC03	2.4 5.5	22	8	512	√	√	√	12 - 24	√	√	4	2				SO28 TQFP32
XE88LC04	1.2 5.5	22	8	512	√	√	√	12 - 24	√	√	4	2			√	
XE88LC05	2.4 5.5	22	8	512	√	√	√	24	√	√	4	2	16b, 8b	16+6b		TQFP64

### Preliminary

SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有 10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌 IC 芯片和电子元器件的连锁经营综合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

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