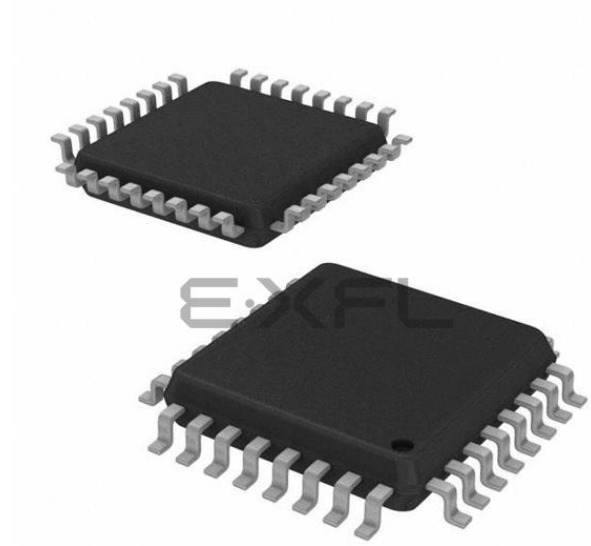

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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	8051
Core Size	8-Bit
Speed	25MHz
Connectivity	SMBus (2-Wire/I²C), SPI, UART/USART
Peripherals	Brown-out Detect/Reset, POR, PWM, Temp Sensor, WDT
Number of I/O	24
Program Memory Size	64KB (64K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	4.25K x 8
Voltage - Supply (Vcc/Vdd)	0.9V ~ 3.6V
Data Converters	A/D 23x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	32-LQFP
Supplier Device Package	32-LQFP (7x7)
Purchase URL	https://www.e-xfl.com/product-detail/silicon-labs/c8051f930-gq

1.1. CIP-51™ Microcontroller Core

1.1.1. Fully 8051 Compatible

The C8051F93x-C8051F92x family utilizes Silicon Labs' proprietary CIP-51 microcontroller core. The CIP-51 is fully compatible with the MCS-51™ instruction set; standard 803x/805x assemblers and compilers can be used to develop software. The CIP-51 core offers all the peripherals included with a standard 8052.

1.1.2. Improved Throughput

The CIP-51 employs a pipelined architecture that greatly increases its instruction throughput over the standard 8051 architecture. In a standard 8051, all instructions except for MUL and DIV take 12 or 24 system clock cycles to execute with a maximum system clock of 12-to-24 MHz. By contrast, the CIP-51 core executes 70% of its instructions in one or two system clock cycles, with only four instructions taking more than four system clock cycles.

The CIP-51 has a total of 109 instructions. The table below shows the total number of instructions that require each execution time.

With the CIP-51's maximum system clock at 25 MHz, it has a peak throughput of 25 MIPS.

1.1.3. Additional Features

The C8051F93x-C8051F92x SoC family includes several key enhancements to the CIP-51 core and peripherals to improve performance and

Figure 1.8. ADC0 Multip lexer Block Diagram

1.6. Programmable Current Reference (IREF0)

C8051F93x-C8051F92x devices include an on-chip programmable current reference (source or sink) with two output current settings: low power mode and high current mode. The maximum current output in low power mode is 63 µA (1 µA steps) and the maximum current output in high current mode is 504 µA (8 µA steps).

1.7. Comparators

C8051F93x-C8051F92x devices include two on-chip programmable voltage comparators: Comparator 0 (CPT0) which is shown in Figure 1.9; Comparator 1 (CPT1) which is shown in Figure 1.10. The two comparators operate identically but may differ in their ability to be used as reset or wake-up sources. See Section “18. Reset Sources” on page 180 and the Section “14. Power Management” on page 156 for details on reset sources and low power mode wake-up sources, respectively.

The Comparator offers programmable response time and hysteresis, an analog input multiplexer, and two outputs that are optionally available at the Port pins: a synchronous “latched” output (CP0, CP1), or an