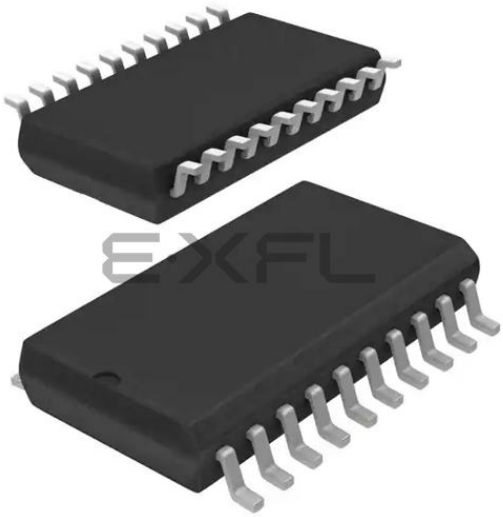

Welcome to E-XFL.COM

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	eZ8
Core Size	8-Bit
Speed	20MHz
Connectivity	IrDA, UART/USART
Peripherals	Brown-out Detect/Reset, LED, LVD, POR, PWM, Temp Sensor, WDT
Number of I/O	17
Program Memory Size	1KB (1K x 8)
Program Memory Type	FLASH
EEPROM Size	16 x 8
RAM Size	256 x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 3.6V
Data Converters	A/D 7x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	20-SOIC (0.295", 7.50mm Width)
Supplier Device Package	-
Purchase URL	https://www.e-xfl.com/product-detail/zilog/z8f012ash020eg

•

Internal Precision Oscillator

The internal precision oscillator (IPO) is a trimmable clock source that requires no external components.

Temperature Sensor

The optional temperature sensor produces an analog output proportional to the device temperature. This signal can be sent to either the ADC or the analog comparator.

Analog Comparator

The analog comparator compares the signal at an input pin with either an internal programmable voltage reference or a second input pin. The comparator output can be used to drive either an output pin or to generate an interrupt.

External Crystal Oscillator

The crystal oscillator circuit provides highly accurate clock frequencies with the use of an external crystal, ceramic resonator or RC network.

Low Voltage Detector

The low voltage detector (LVD) is able to generate an interrupt when the supply voltage drops below a user-programmable level. The LVD is available on 8-pin devices only.

On-Chip Debugger

The Z8 Encore! XP F082A Series products feature an integrated on-chip debugger (OCD) accessed via a single-pin interface. The OCD provides a rich-set of debugging capabilities, such as reading and writing registers, programming Flash memory, setting breakpoints and executing code.

Universal Asynchronous Receiver/Transmitter

The full-duplex universal asynchronous receiver/transmitter (UART) is included in all Z8 Encore! XP package types. The UART supports 8- and 9-bit data modes and selectable parity. The UART also supports multi-drop address processing in hardware. The UART baud rate generator (BRG) can be configured and used as a basic 16-bit timer.

Timers

Two enhanced 16-bit reloadable timers can be used for timing/counting events or for motor control operations. These timers provide a 16-bit programmable reload counter and

Table 2. Signal Descriptions (Continued)

Signal Mnemonic	I/O	Description
Reset		
$\overline{\text{RESET}}$	I/O	RESET. Generates a Reset when asserted (driven Low). Also serves as a reset indicator; the Z8 Encore! XP forces this pin low when in reset. This pin is open-drain and features an enabled internal pull-up resistor.
Power Supply		
V_{DD}	I	Digital Power Supply.
AV_{DD}	I	Analog Power Supply.
V_{SS}	I	Digital Ground.
AV_{SS}	I	Analog Ground.

Notes:
1. PB6 and PB7 are only available in 28-pin packages without ADC. In 28-pin packages with ADC, they are replaced by AV_{DD} and AV_{SS}.
2. The AV_{DD} and AV_{SS} signals are available only in 28-pin packages with ADC. They are replaced by PB6 and PB7 on 28-pin packages without ADC.

Pin Characteristics

Table 3 describes the characteristics for each pin available on the Z8 Encore! XP F082A Series 20- and 28-pin devices. Data in Table 3 is sorted alphabetically by the pin symbol mnemonic.

Table 4 on page 14 provides detailed information about the characteristics for each pin available on the Z8 Encore! XP F082A Series 8-pin devices.

Note: All six I/O pins on the 8-pin packages are 5 V-tolerant (unless the pull-up devices are enabled). The column in Table 3 below describes 5 V-tolerance for the 20- and 28-pin packages only.

tor address. Following Stop

– Set the Capture edge (rising or falling) for the Timer Input

2. Write to the Timer High and Low Byte registers to set the starting count value (typically 0001H).
3. Write to the Timer Reload High and Low Byte registers to set the Compare value.
4. Enable the timer interrupt, if appropriate and set the timer interrupt priority by writing to the relevant interrupt registers.By default, the timer interrupt are generated for both input capture and reload events. If appropriate, configure the timer interrupt to be generated only at the input capture event or the reload event by setting TICONFIG field of the TxCTL0 Register.
5. Configure the associated GPIO port pin for the Timer Input alternate function.
6. Write to the Timer Control Register to enable the timer.
7. Counting begins on the first appropriate transition of the Timer Input signal. No interrupt is generated by this first edge.

In CAPTURE/COMPARE Mode, the elapsed time from timer start to Capture event can be calculated using the following equation:

$$\text{Capture Elapsed Time (s)} = \frac{(\text{Capture Value} - \text{Start Value}) \times \text{Prescale}}{\text{System Clock Frequency (Hz)}}$$

Reading the Timer Count Values

The current count value in the timers can be read while counting (enabled). This capability has no effect on timer operation. When the timer is enabled and the Timer High Byte Register is read, the contents of the Timer Low Byte Register are placed in a holding register. A subsequent read from the Timer Low Byte Register returns the value in the holding register. This operation allows accurate reads of the full 16-bit timer count value while enabled. When the timers are not enabled, a read from the Timer Low Byte Register returns the actual value in the counter.

Timer Pin Signal Operation

The timer output function is a GPIO port pin alternate function. The Timer Output is toggled every time the counter is reloaded.

Watchdog Timer

The Watchdog Timer (WDT) protects against corrupt or unreliable software, power faults and other system-level problems which may place the Z8 Encore! XP F082A Series devices into unsuitable operating states. The features of Watchdog Timer include:

Table 74. ADC Control/Status Register 1 (ADCCTL1)

Bit	7	6	5	4	3	2	1	0
Field	REFSELH	Reserved				BUFMODE[2:0]		
RESET	1	0	0	0	0	0	0	0
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
Address	F71H							

Bit	Description
[7] REFSELH	**Voltage Reference Level Select High Bit** In conjunction with the Low bit (REFSELL) in ADC Control Register 0, this determines the level of the internal voltage reference; the following details the effects of {REFSELH, REFSELL}; this reference is independent of the Comparator reference. 00= Internal Reference Disabled, reference comes from external pin. 01= Internal Reference set to 1.0V. 10= Internal Reference set to 2.0V (default). 11= Reserved.
[6:3]	**Reserved** These bits are reserved and must be programmed to 0000.
[2:0] BUFMODE[2:0]	**Input Buffer Mode Select** 000 = Single-ended, unbuffered input. 001 = Single-ended, buffered input with unity gain. 010 = Reserved. 011 = Reserved. 100 = Differential, unbuffered input. 101 = Differential, buffered input with unity gain. 110 = Reserved. 111 = Reserved.

ADC Data High Byte Register

The ADC Data High Byte (ADCD_H) Register contains the upper eight bits of the ADC output. The output is an 13-bit two’s complement value. During a single-shot conversion, this value is invalid. Access to the ADC Data High Byte Register is read-only. Reading the ADC Data High Byte Register latches data in the ADC Low Bits Register.

Comparator

The Z8 Encore! XP F082A Series devices feature a general purpose comparator that compares two analog input signals. These analog signals may be external stimulus from a pin (CINP and/or CINN) or internally generated signals. Both a programmable voltage reference and the temperature sensor output voltage are available internally. The output is available as an interrupt source or can be routed to an external pin.

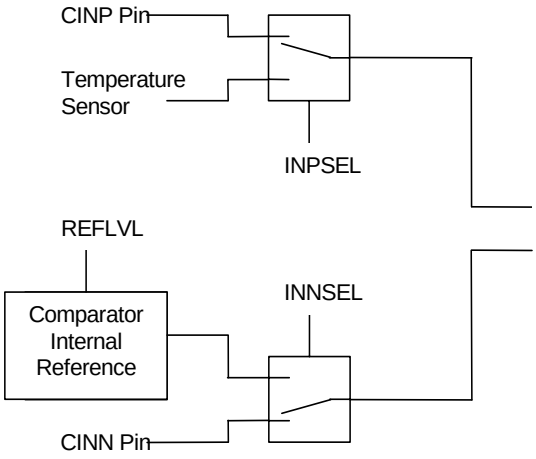

Figure 20. Comparator Block Diagram

Operation

When the positive comparator input exceeds the negative input by more than the specified hysteresis, the output is a logic High. When the negative input exceeds the positive by more than the hysteresis, the output is a logic Low. Otherwise, the comparator output retains its present value. See Table 141 on page 238 for details.

The comparator may be powered down to reduce supply current. See the Power Control Register 0 section on page 33 for details.

Because of the propagation delay of the comparator, Zilog does not recommend enabling or reconfiguring the comparator without first disabling the interrupts and waiting for the comparator output to settle. Doing so can result in spurious interrupts.

M

N

O

S

T