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"[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	6
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 4x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Through Hole
Package / Case	8-DIP (0.300", 7.62mm)
Supplier Device Package	-
Purchase URL	https://www.e-xfl.com/product-detail/zilog/z8f012apb020ec

Table 1. Z8 Encore! XP[®] F082A Series Family Part Selection Guide

Part Number	Flash (KB)	RAM (B)	NVDS ¹ (B)	I/O	Comparator	Advanced Analog ²	ADC Inputs	Packages
Z8F082A	8	1024	0	6–23	Yes	Yes	4–8	8-, 20- and 28-pin
Z8F081A	8	1024	0	6–25	Yes	No	0	8-, 20- and 28-pin
Z8F042A	4	1024	128	6–23	Yes	Yes	4–8	8-, 20- and 28-pin
Z8F041A	4	1024	128	6–25	Yes	No	0	8-, 20- and 28-pin
Z8F022A	2	512	64	6–23	Yes	Yes	4–8	8-, 20- and 28-pin
Z8F021A	2	512	64	6–25	Yes	No	0	8-, 20- and 28-pin
Z8F012A	1	256	16	6–23	Yes	Yes	4–8	8-, 20- and 28-pin
Z8F011A	1	256	16	6–25	Yes	No	0	8-, 20- and 28-pin

¹Non-volatile data storage.

²Advanced Analog includes ADC, temperature sensor, and low-power operational amplifier.

Table 2. Signal Descriptions (Continued)

Signal Mnemonic	I/O	Description
Power Supply		
V _{DD}	I	Digital Power Supply.
AV _{DD}	I	Analog Power Supply.
V _{SS}	I	Digital Ground.
AV _{SS}	I	Analog Ground.
Note: 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.

Table 3. Pin Characteristics (20- and 28-pin Devices)

Symbol Mnemonic	Direction	Reset Direction	Active Low or Active High	Tristate Output	Internal Pull-up or Pull-down	Schmitt-Trigger Input	Open Drain Output	5 V Tolerance
AVDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AVSS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA
DBG	I/O	I	N/A	Yes	Yes	Yes	Yes	No
PA[7:0]	I/O	I	N/A	Yes	Programmable Pull-up	Yes	Yes, Programmable	PA[7:2] unless pullups enabled
PB[7:0]	I/O	I	N/A	Yes	Programmable Pull-up	Yes	Yes, Programmable	PB[7:6] unless pullups enabled

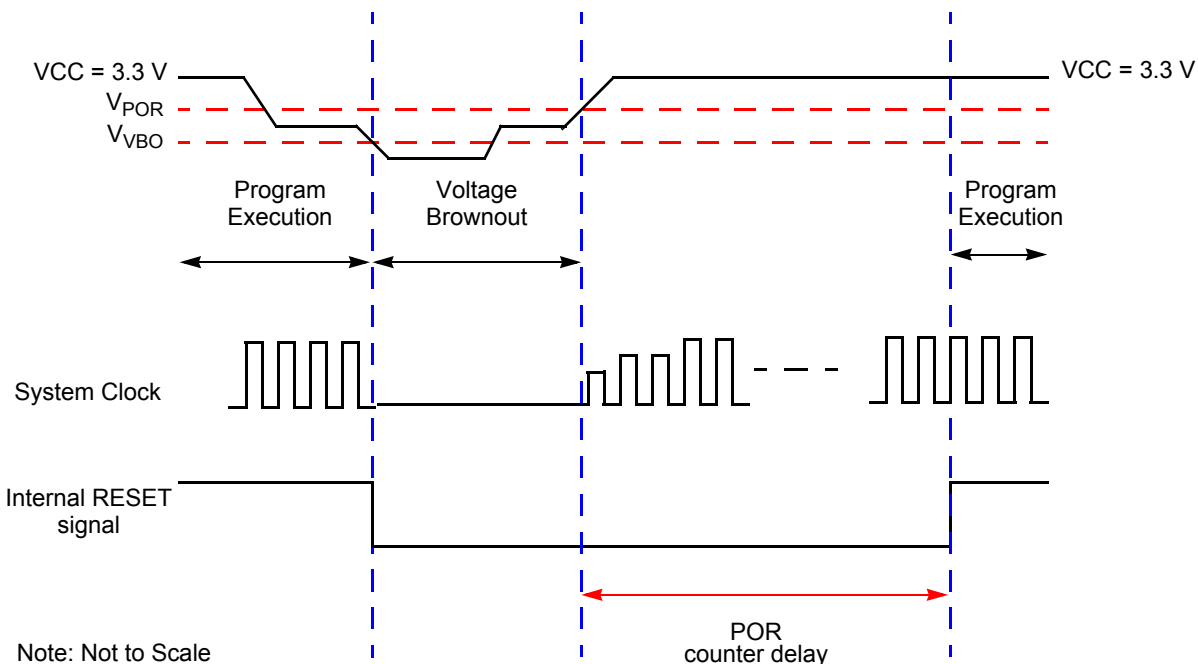


Figure 6. Voltage Brownout Reset Operation

The POR level is greater than the VBO level by the specified hysteresis value. This ensures that the device undergoes a Power-On Reset after recovering from a VBO condition.

Watchdog Timer Reset

If the device is in NORMAL or HALT mode, the Watchdog Timer can initiate a System Reset at time-out if the WDT_RES Flash Option Bit is programmed to 1. This is the unprogrammed state of the WDT_RES Flash Option Bit. If the bit is programmed to 0, it configures the Watchdog Timer to cause an interrupt, not a System Reset, at time-out.

The WDT bit in the Reset Status (RSTSTAT) register is set to signify that the reset was initiated by the Watchdog Timer.

External Reset Input

The RESET pin has a Schmitt-Triggered input and an internal pull-up resistor. Once the RESET pin is asserted for a minimum of four system clock cycles, the device progresses through the System Reset sequence. Because of the possible asynchronicity of the system clock and reset signals, the required reset duration may be as short as three clock periods

Table 14. Port Alternate Function Mapping (Non 8-Pin Parts)

Port	Pin	Mnemonic	Alternate Function Description	Alternate Function Set Register AFS1
Port A	PA0	T0IN/T0OUT*	Timer 0 Input/Timer 0 Output Complement	N/A
		Reserved		
	PA1	T0OUT	Timer 0 Output	
		Reserved		
	PA2	DE0	UART 0 Driver Enable	
		Reserved		
	PA3	CTS0	UART 0 Clear to Send	
		Reserved		
	PA4	RXD0/IRRX0	UART 0/IrDA 0 Receive Data	
		Reserved		
	PA5	TXD0/IRTX0	UART 0/IrDA 0 Transmit Data	
		Reserved		
	PA6	T1IN/T1OUT*	Timer 1 Input/Timer 1 Output Complement	
		Reserved		
	PA7	T1OUT	Timer 1 Output	
		Reserved		

Note: Because there is only a single alternate function for each Port A pin, the Alternate Function Set registers are not implemented for Port A. Enabling alternate function selections as described in [Port A–D Alternate Function Sub-Registers](#) on page 47 automatically enables the associated alternate function.

* Whether PA0/PA6 take on the timer input or timer output complement function depends on the timer configuration as described in [Timer Pin Signal Operation](#) on page 82.

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.

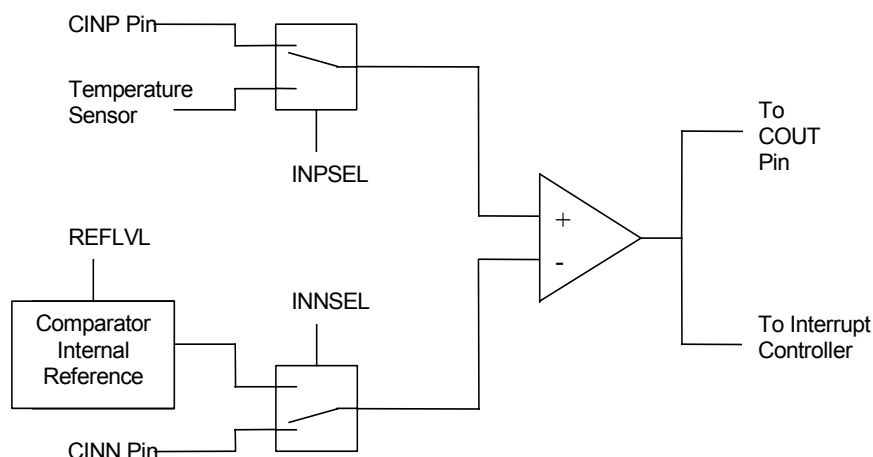


Figure 20. Comparator Block Diagram

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 137](#) on page 233 for details.

The comparator may be powered down to reduce supply current. See [Power Control Register 0](#) on page 34 for details.



Caution: *Because of the propagation delay of the comparator, it is not recommended to enable or reconfigure the comparator without first disabling interrupts and waiting for the comparator output to settle. Doing so can result in spurious interrupts. The following example describes how to safely enable the comparator:*

```
di
ld cmp0, r0 ; load some new configuration
nop
```


Flash Option Bits

Programmable Flash option bits allow user configuration of certain aspects of Z8 Encore! XP[®] F082A Series operation. The feature configuration data is stored in the Flash program memory and loaded into holding registers during Reset. The features available for control through the Flash Option Bits include:

- Watchdog Timer time-out response selection—interrupt or system reset
- Watchdog Timer always on (enabled at Reset)
- The ability to prevent unwanted read access to user code in Program Memory
- The ability to prevent accidental programming and erasure of all or a portion of the user code in Program Memory
- Voltage Brownout configuration—always enabled or disabled during STOP mode to reduce STOP mode power consumption
- Oscillator mode selection—for high, medium, and low power crystal oscillators, or external RC oscillator
- Factory trimming information for the internal precision oscillator and low voltage detection
- Factory calibration values for ADC, temperature sensor, and Watchdog Timer compensation
- Factory serialization and randomized lot identifier (optional)

Operation

Option Bit Configuration By Reset

Each time the Flash Option Bits are programmed or erased, the device must be Reset for the change to take effect. During any reset operation (System Reset, Power-On Reset, or Stop Mode Recovery), the Flash Option Bits are automatically read from the Flash Program Memory and written to Option Configuration registers. The Option Configuration registers control operation of the devices within the Z8 Encore! XP F082A Series. Option Bit control is established before the device exits Reset and the eZ8 CPU begins code execution. The Option Configuration registers are not part of the Register File and are not accessible for read or write access.

Table 114. Notational Shorthand

Notation	Description	Operand	Range
b	Bit	b	b represents a value from 0 to 7 (000B to 111B).
cc	Condition Code	—	Refer to Condition Codes section in the eZ8 CPU Core User Manual (UM0128).
DA	Direct Address	AddrS	AddrS. represents a number in the range of 0000H to FFFFH
ER	Extended Addressing Register	Reg	Reg. represents a number in the range of 000H to FFFH
IM	Immediate Data	#Data	Data is a number between 00H to FFH
Ir	Indirect Working Register	@Rn	n = 0–15
IR	Indirect Register	@Reg	Reg. represents a number in the range of 00H to FFH
Irr	Indirect Working Register Pair	@RRp	p = 0, 2, 4, 6, 8, 10, 12, or 14
IRR	Indirect Register Pair	@Reg	Reg. represents an even number in the range 00H to FEH
p	Polarity	p	Polarity is a single bit binary value of either 0B or 1B.
r	Working Register	Rn	n = 0 – 15
R	Register	Reg	Reg. represents a number in the range of 00H to FFH
RA	Relative Address	X	X represents an index in the range of +127 to –128 which is an offset relative to the address of the next instruction
rr	Working Register Pair	RRp	p = 0, 2, 4, 6, 8, 10, 12, or 14
RR	Register Pair	Reg	Reg. represents an even number in the range of 00H to FEH
Vector	Vector Address	Vector	Vector represents a number in the range of 00H to FFH
X	Indexed	#Index	The register or register pair to be indexed is offset by the signed Index value (#Index) in a +127 to -128 range.

Table 115 lists additional symbols that are used throughout the Instruction Summary and Instruction Set Description sections.

Ordering Information

Order the Z8 Encore! XP[®] F082A Series from Zilog[®], using the following part numbers. For more information on ordering, please consult your local Zilog sales office. The Zilog website (www.zilog.com) lists all regional offices and provides additional Z8 Encore! XP product information.

Part Number	Flash	RAM	NVDS	I/O Lines	Interrupts	16-Bit Timers w/PWM	10-Bit A/D Channels	UART with IrDA	Comparator	Temperature Sensor	Description
Z8 Encore! XP[®] F082A Series with 8 KB Flash, 10-Bit Analog-to-Digital Converter											
Standard Temperature: 0 °C to 70 °C											
Z8F082APB020SC	8 KB	1 KB	0	6	14	2	4	1	1	1	PDIP 8-pin package
Z8F082AQB020SC	8 KB	1 KB	0	6	14	2	4	1	1	1	QFN 8-pin package
Z8F082ASB020SC	8 KB	1 KB	0	6	14	2	4	1	1	1	SOIC 8-pin package
Z8F082ASH020SC	8 KB	1 KB	0	17	20	2	7	1	1	1	SOIC 20-pin package
Z8F082AHH020SC	8 KB	1 KB	0	17	20	2	7	1	1	1	SSOP 20-pin package
Z8F082APH020SC	8 KB	1 KB	0	17	20	2	7	1	1	1	PDIP 20-pin package
Z8F082ASJ020SC	8 KB	1 KB	0	23	20	2	8	1	1	1	SOIC 28-pin package
Z8F082AHJ020SC	8 KB	1 KB	0	23	20	2	8	1	1	1	SSOP 28-pin package
Z8F082APJ020SC	8 KB	1 KB	0	23	20	2	8	1	1	1	PDIP 28-pin package
Extended Temperature: -40 °C to 105 °C											
Z8F082APB020EC	8 KB	1 KB	0	6	14	2	4	1	1	1	PDIP 8-pin package
Z8F082AQB020EC	8 KB	1 KB	0	6	14	2	4	1	1	1	QFN 8-pin package
Z8F082ASB020EC	8 KB	1 KB	0	6	14	2	4	1	1	1	SOIC 8-pin package
Z8F082ASH020EC	8 KB	1 KB	0	17	20	2	7	1	1	1	SOIC 20-pin package
Z8F082AHH020EC	8 KB	1 KB	0	17	20	2	7	1	1	1	SSOP 20-pin package
Z8F082APH020EC	8 KB	1 KB	0	17	20	2	7	1	1	1	PDIP 20-pin package
Z8F082ASJ020EC	8 KB	1 KB	0	23	20	2	8	1	1	1	SOIC 28-pin package
Z8F082AHJ020EC	8 KB	1 KB	0	23	20	2	8	1	1	1	SSOP 28-pin package
Z8F082APJ020EC	8 KB	1 KB	0	23	20	2	8	1	1	1	PDIP 28-pin package
Replace C with G for Lead-Free Packaging											

Customer Support

For answers to technical questions about the product, documentation, or any other issues with Zilog's offerings, please visit Zilog's Knowledge Base at <http://www.zilog.com/kb>.

For any comments, detail technical questions, or reporting problems, please visit Zilog's Technical Support at <http://support.zilog.com>.