



**Z i L O G**

**High-Performance 8-Bit Microcontrollers**

## **Z8 Encore! XP<sup>®</sup> F08xA Series with eXtended Peripherals**

### **Product Brief**

PB015905-0106

**Z8**  **Encore!XP<sup>®</sup>**  
Flash Microcontrollers

### **Product Block Diagram**

|                                          |                           |                                     |
|------------------------------------------|---------------------------|-------------------------------------|
| 8 KB Flash                               | 1 KB RAM                  | Up to 8 Channels<br>10-Bit ADC      |
| Two 16-Bit<br>Timers/PWM                 | <b>20 MHz<br/>eZ8 CPU</b> | Trans-<br>Impedance<br>Amplifier    |
| Watch-Dog<br>Timer with RC<br>Oscillator |                           | POR/VBO<br>& Reset<br>Control       |
| UART<br>with IrDA                        | On-Chip<br>Debugger       | Crystal/RC<br>Oscillator            |
| Temperature<br>Sensor                    | Analog<br>Comparator      | Internal<br>Precision<br>Oscillator |
| Up to 25 General-Purpose I/O Pins        |                           |                                     |

### **Overview**

The Z8 Encore! XP<sup>®</sup> F08xA Series Flash microcontrollers are based on the ZiLOG's eZ8 CPU. The Z8 Encore! XP<sup>®</sup> F08xA Series MCU family of devices sets a new standard of performance and on-chip peripherals. The Z8 Encore! XP<sup>®</sup> F08xA Series devices support 8 KB of Flash program memory and 1 KB register RAM.

The Z8 Encore! XP<sup>®</sup> F08xA Series features 10-bit sigma-delta analog-to-digital converter (ADC). The ADC facilitates up to 8 single-ended/differential channels of 10-bit A/D conversion with 1x or 20x differential input gain and a transimpedance amplifier for current measurement.

An on-chip temperature sensor allows die temperature measurement over a range of  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ . These devices include two enhanced 16-bit reloadable timers. These timers featuring PWMs and Capture and Compare. Up to 18 vectored interrupts with programmable priorities provide increased application flexibility.

The Z8 Encore! XP<sup>®</sup> F08xA Series features an on-chip Internal Precision Oscillator (5 MHz/32 KHz) as a trimmable clock source that requires no external components. The new single-pin on-chip debugger and programming interface simplifies code development and allows for easy in-circuit programming.

The full-duplex UART provides serial communications and IrDA encoding and decoding capability. The UART baud rate generator (BRG) can be configured and used as a basic 16-bit timer.

### **Z8 Encore! XP<sup>®</sup> F08xA Series MCU Features**

Key features of Z8 Encore! XP<sup>®</sup> F08xA Series MCU include:

- 20 MHz eZ8 CPU core
- 8 KB Flash memory with in-circuit programming capability
- 1 KB register RAM
- Up to 8 channels 10-bit analog-to-digital converter (ADC)
- On-chip temperature sensor
- On-chip analog comparator
- On-chip transimpedance (current sense) amplifier



- Full-duplex 9-bit UART with bus transceiver Driver Enable Control
- The UART baud rate generator (BRG) can be configured and used as a basic 16-bit timer
- Infrared Data Association (IrDA)-compliant infrared encoder/decoders
- Two 16-bit timers with capture, compare, and PWM capability
- Watch-Dog Timer (WDT) with internal RC oscillator
- 6 to 25 I/O pins depending upon package
- Up to 18 interrupts with configurable priority
- On-Chip Debugger
- Voltage Brown-Out Protection (VBO)
- Programmable Low Voltage Detection (LVD), 8-pin only
- Power-On Reset (POR)
- Internal Precision Oscillator (5 MHz/32 KHz)
- Crystal oscillator with three power settings and external RC network option
- 2.7 to 3.6 V operating voltage with 5 V-tolerant inputs
- 8-pin, 20-pin, and 28-pin packages
- 0°C to +70°C standard temperature and –40°C to +105°C extended temperature operating ranges

## **eZ8 CPU Features**

The ZiLOGs latest 8-bit eZ8 CPU features include:

- New instructions for improved performance including BIT, BSWAP, BTJ, CPC, LDC, LDCI, LEA, MULT, and SRL
- New instructions support 12-bit linear addressing of the Register File
- Compatible with existing Z8<sup>®</sup> code
- Up to 10 MIPS operation
- C-Compiler friendly
- 2 to 9 clock cycles per instruction

## **Z8 Encore! XP<sup>®</sup> F08xA Series Development Kit**

The Z8 Encore! XP<sup>®</sup> F08xA Series Development Kit includes the following:

### **Hardware**

- Z8 Encore! XP<sup>®</sup> F08xA Series Development Board
- Smart Cable for PC to Z8 Encore! XP<sup>®</sup> F08xA Series Development Board (DB9 to 6-pin male, only 20-pin and 28-pin kits)
- USB Smart Cable (included in 8-pin kit only)
- USB Smart Cable available for 20-pin and 28-pin kits as an accessory kit ZUSBSC0100ZAC
- 5 V DC power supply

### **Software on CD-ROM**

- ZDS II–Z8 Encore!<sup>®</sup> IDE with ANSI C-Compiler
- Sample code
- Document browser
- Acrobat Reader<sup>®</sup>

### **Documentation**

- Quick Start Guide
- Registration card
- Z8 Encore! XP<sup>®</sup> F08xA Series technical documentation (on CD-ROM)
  - Development Kit User Manual
  - ZDSII IDE User Manual
  - eZ8 CPU User Manual
  - Product Specification
  - Product Brief
  - Application Notes

## Architecture

Figure 1 illustrates the Z8 Encore! XP<sup>®</sup> F08xA Series block diagram.

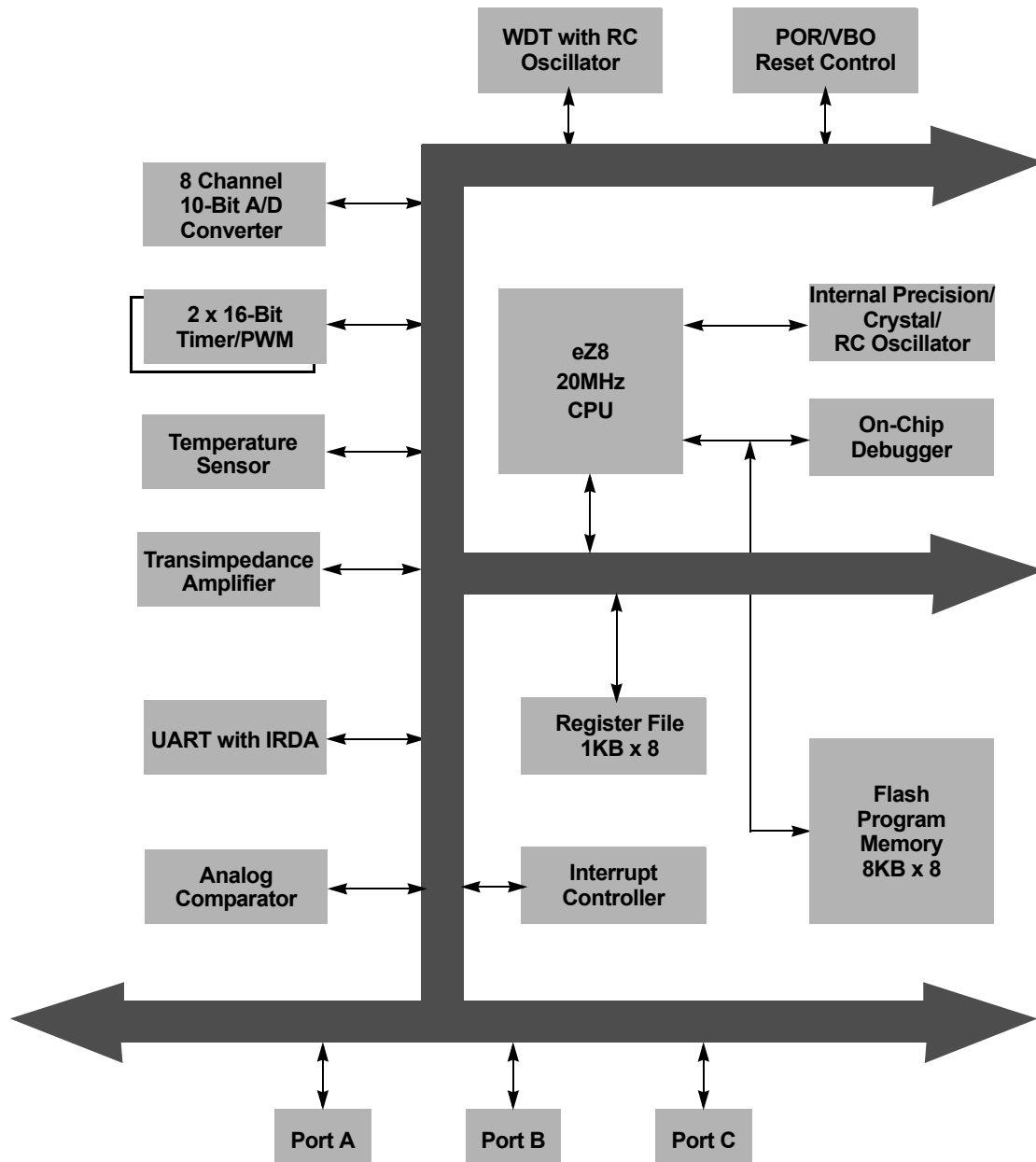


Figure 1. Z8 Encore! XP<sup>®</sup> F08xA Series Block Diagram



## Ordering Information

You can order the Z8 Encore! XP<sup>®</sup> F08xA Series from ZiLOG<sup>®</sup>, referencing the following part numbers. For more information regarding ordering, please consult your local ZiLOG<sup>®</sup> sales office. The ZiLOG<sup>®</sup> website [www.zilog.com](http://www.zilog.com) lists all regional offices and provides additional Z8 Encore!<sup>®</sup> product information.

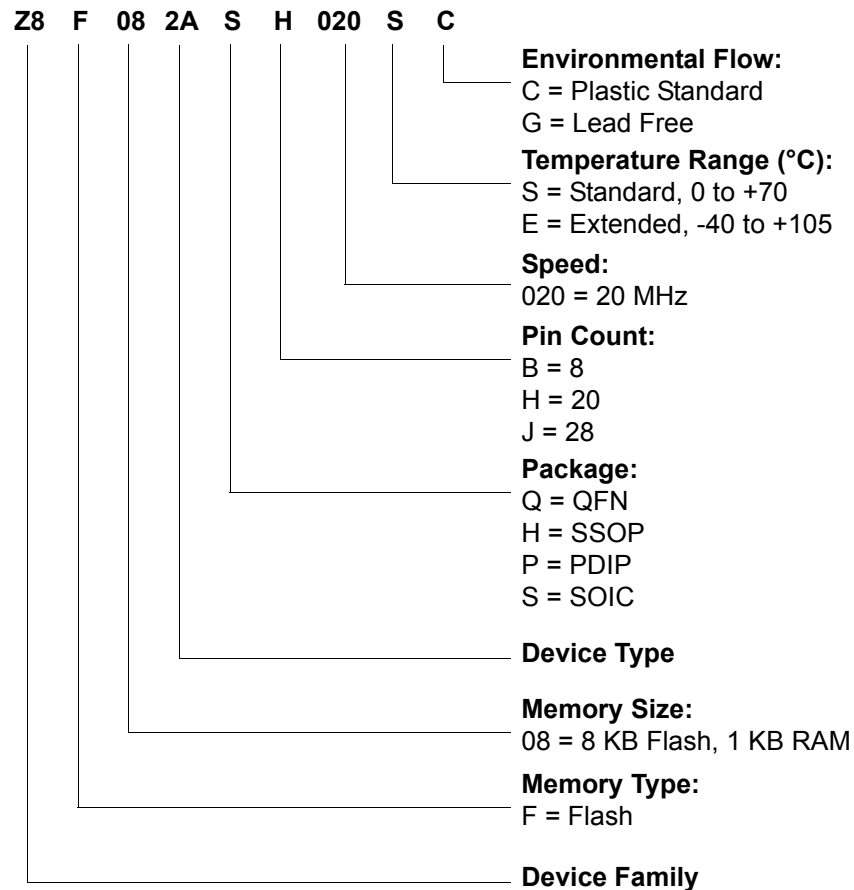
| Part Number                                                                                      | Flash | RAM  | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | UART with IrDA | Comparator | Temperature Sensor | Description         |
|--------------------------------------------------------------------------------------------------|-------|------|-----------|------------|---------------------|---------------------|----------------|------------|--------------------|---------------------|
| <b>Z8 Encore! XP<sup>®</sup> F08xA Series with 8KB Flash, 10-Bit Analog-to-Digital Converter</b> |       |      |           |            |                     |                     |                |            |                    |                     |
| <b>Standard Temperature: 0° to +70°C</b>                                                         |       |      |           |            |                     |                     |                |            |                    |                     |
| Z8F082APB020SC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 4                   | 1              | 1          | 1                  | PDIP 8-pin package  |
| Z8F082AQB020SC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 4                   | 1              | 1          | 1                  | QFN 8-pin package   |
| Z8F082ASB020SC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 4                   | 1              | 1          | 1                  | SOIC 8-pin package  |
| Z8F082ASH020SC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | SOIC 20-pin package |
| Z8F082AHH020SC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | SSOP 20-pin package |
| Z8F082APH020SC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | PDIP 20-pin package |
| Z8F082ASJ020SC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | SOIC 28-pin package |
| Z8F082AHJ020SC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | SSOP 28-pin package |
| Z8F082APJ020SC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | PDIP 28-pin package |
| <b>Extended Temperature: -40° to +105°C</b>                                                      |       |      |           |            |                     |                     |                |            |                    |                     |
| Z8F082APB020EC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | PDIP 8-pin package  |
| Z8F082AQB020EC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | QFN 8-pin package   |
| Z8F082ASB020EC                                                                                   | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | SOIC 8-pin package  |
| Z8F082ASH020EC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | SOIC 20-pin package |
| Z8F082AHH020EC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | SSOP 20-pin package |
| Z8F082APH020EC                                                                                   | 8 KB  | 1 KB | 17        | 18         | 2                   | 7                   | 1              | 1          | 1                  | PDIP 20-pin package |
| Z8F082ASJ020EC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | SOIC 28-pin package |
| Z8F082AHJ020EC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | SSOP 28-pin package |
| Z8F082APJ020EC                                                                                   | 8 KB  | 1 KB | 23        | 18         | 2                   | 8                   | 1              | 1          | 1                  | PDIP 28-pin package |



| Part Number                                                  | Flash | RAM  | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | UART with IrDA | Comparator | Temperature Sensor | Description                       |
|--------------------------------------------------------------|-------|------|-----------|------------|---------------------|---------------------|----------------|------------|--------------------|-----------------------------------|
| <b>Z8 Encore! XP<sup>®</sup> F08xA Series with 8KB Flash</b> |       |      |           |            |                     |                     |                |            |                    |                                   |
| <b>Standard Temperature: 0° to +70°C</b>                     |       |      |           |            |                     |                     |                |            |                    |                                   |
| Z8F081APB020SC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 1                  | PDIP 8-pin package                |
| Z8F081AQB020SC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 1                  | QFN 8-pin package                 |
| Z8F081ASB020SC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 1                  | SOIC 8-pin package                |
| Z8F081ASH020SC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 1                  | SOIC 20-pin package               |
| Z8F081AHH020SC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 1                  | SSOP 20-pin package               |
| Z8F081APH020SC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 1                  | PDIP 20-pin package               |
| Z8F081ASJ020SC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 1                  | SOIC 28-pin package               |
| Z8F081AHJ020SC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 1                  | SSOP 28-pin package               |
| Z8F081APJ020SC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 1                  | PDIP 28-pin package               |
| <b>Extended Temperature: -40° to +105°C</b>                  |       |      |           |            |                     |                     |                |            |                    |                                   |
| Z8F081APB020EC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | PDIP 8-pin package                |
| Z8F081AQB020EC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | QFN 8-pin package                 |
| Z8F081ASB020EC                                               | 8 KB  | 1 KB | 6         | 18         | 2                   | 0                   | 1              | 1          | 0                  | SOIC 8-pin package                |
| Z8F081ASH020EC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 0                  | SOIC 20-pin package               |
| Z8F081AHH020EC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 0                  | SSOP 20-pin package               |
| Z8F081APH020EC                                               | 8 KB  | 1 KB | 17        | 17         | 2                   | 0                   | 1              | 1          | 0                  | PDIP 20-pin package               |
| Z8F081ASJ020EC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 0                  | SOIC 28-pin package               |
| Z8F081AHJ020EC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 0                  | SSOP 28-pin package               |
| Z8F081APJ020EC                                               | 8 KB  | 1 KB | 25        | 17         | 2                   | 0                   | 1              | 1          | 0                  | PDIP 28-pin package               |
| <b>Replace C with G for Lead-Free Packaging</b>              |       |      |           |            |                     |                     |                |            |                    |                                   |
| Z8F08A28100KIT                                               |       |      |           |            |                     |                     |                |            |                    | 20-pin and 28-pin Development Kit |
| Z8F04A08100KIT                                               |       |      |           |            |                     |                     |                |            |                    | 8-pin Development Kit             |
| ZUSBSC0100ZAC                                                |       |      |           |            |                     |                     |                |            |                    | USB Smart Cable Accessory Kit     |



## Part Number Suffix Designations



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