High-Performance 8-Bit Microcontrollers

Z8 Encore! XP™ 4K Series

with eXtended Peripherals

Product Brief

PB013602-0304 PRELIMINARY

Product Block Diagram

<table>
<tr><td>1–4KB Flash</td><td>256B–1KB RAM</td><td>16B–128B NVDS</td><td>Up to 8 Channels 10-Bit ADC</td></tr>
<tr><td>Two 16-Bit Timers/PWM</td><td colspan="2" rowspan="2">20MHz eZ8 CPU</td><td>Trans-Impedance Amplifier</td></tr>
<tr><td>Watch-Dog Timer with RC Oscillator</td><td>POR/VBO & Reset Control</td></tr>
<tr><td>UART with IrDA</td><td>On-Chip Debugger</td><td>Crystal/RC Oscillator</td></tr>
<tr><td>Temperature Sensor</td><td>Analog Comparator</td><td>Internal Precision Oscillator</td></tr>
<tr><td colspan="4">Up to 25 General-Purpose I/O Pins</td></tr>
</table>

Overview

The Z8 Encore! XP™ 4K Series devices are Flash microcontrollers based on the ZiLOG eZ8 CPU. The Z8 Encore! XP™ 4K Series MCU family of devices sets a new standard for performance and on-chip peripherals.

The Z8 Encore! XP™ 4K Series devices support up to 4KB of Flash program memory and 1KB register RAM

The Z8 Encore! XP™ 4K Series devices feature up to eight 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 –40º to +105ºC

These devices include two enhanced 16-bit timer blocks featuring PWMs and Capture and Compare.

Up to 18 vectored interrupts with programmable priorities provide increased application flexibility.

The Z8 Encore! XP™ 4K Series features an on-chip Internal Precision Oscillator (5MHz/32KHz) as a trimmable clock source that requires no external components.

The new single-pin 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.

Features

- 20MHz eZ8 CPU core
- Up to 4KB Flash memory with in-circuit programming capability
- Up to 1KB register RAM
- Up to 128B nonvolatile data storage
- 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
- Infrared Data Association (IrDA)-compliant infrared encoder/decoders

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- Two 16-bit timers with capture, compare, and PWM capability
- Watch-Dog Timer (WDT) with internal RC oscillator
- 17–25 I/O pins depending upon package
- Up to 18 interrupts with configurable priority
- On-Chip Debugger
- Voltage Brown-Out Protection (VBO)
- Power-On Reset (POR)
- Internal Precision Oscillator (5MHz/32KHz)
- Crystal oscillator with three power settings and external RC network option
- 2.7–3.6V operating voltage with 5V-tolerant inputs
- 20- and 28-pin packages
- 0º to +70ºC standard temperature and –40º to +105ºC extended temperature operating ranges

eZ8 CPU Features

- 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® code
- Up to 10 MIPS operation
- C-Compiler friendly
- 2–9 clock cycles per instruction

Z8 Encore! XP™ 4K Series Development Kit

The Z8 Encore! XP™ 4K Series Development Kit includes the following:

Hardware

- Z8 Encore! XP™ 4K Series Development board
- Smart Cable for PC to Z8 Encore! XP™ 4K Series Development board (DB9 to 6-pin male)
- 5VDC power supply

Software on CD-ROM

- ZDS II–Z8 Encore!® IDE with ANSI C-Compiler
- Sample code
- Document browser
- Acrobat Reader® install program

Documentation

- Quick Start Guide
- Registration card
- Z8 Encore! XP™ 4K Series technical documentation (on CD-ROM)
  - Development Kit User Manual
  - ZDS II IDE User Manual
  - eZ8 CPU User Manual
  - Product specification
  - Product brief
  - Application notes

Architecture

Figure 1 illustrates the Z8 Encore! XP™ 4K Series block diagram.

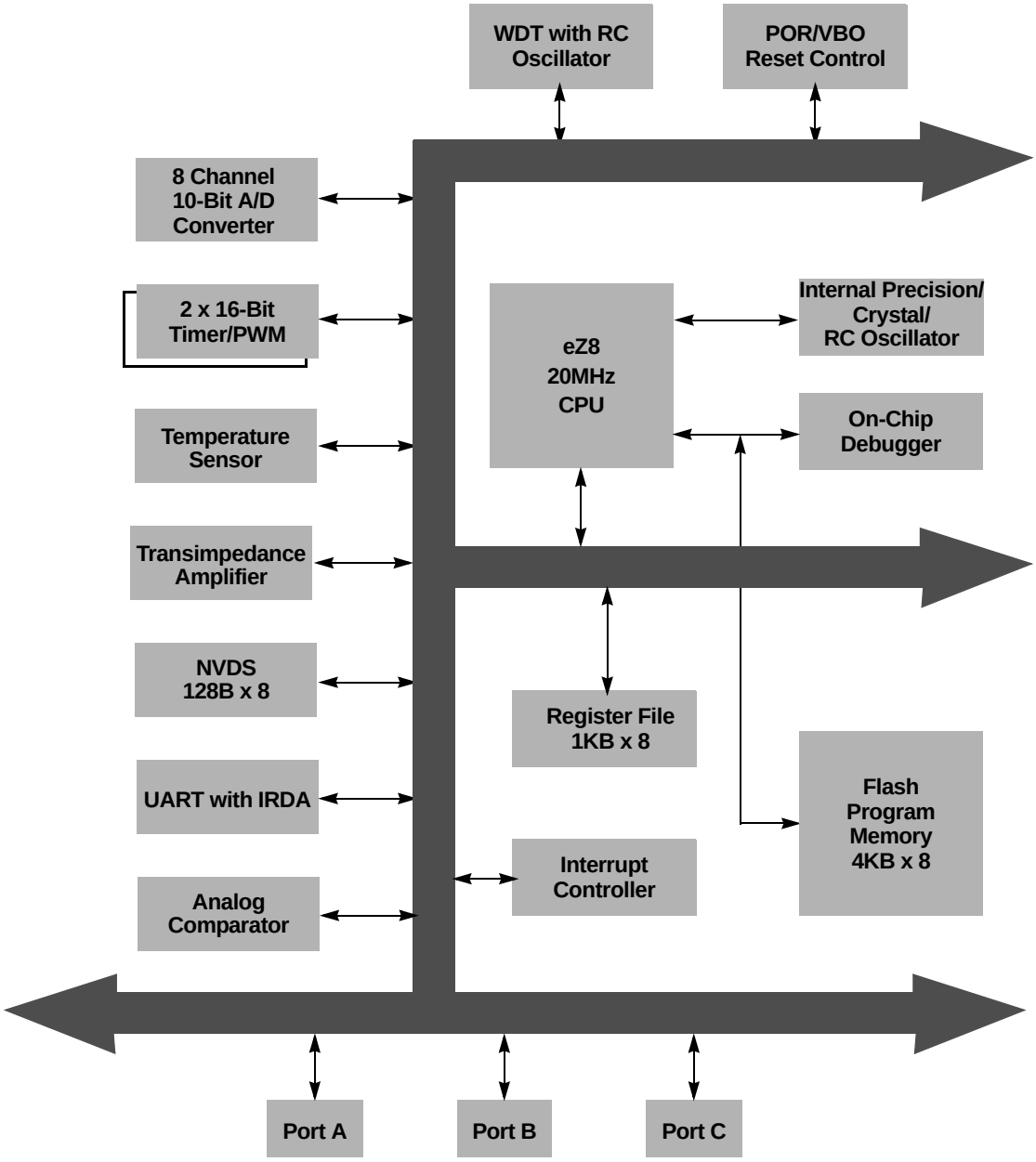


Figure 1. Z8 Encore! XP™ 4K Series Block Diagram

Ordering Information

Order the Z8 Encore! XP™ 4K Series from ZiLOG®, referencing the following part numbers. For more information regarding ordering, please consult your local ZiLOG® sales office. The ZiLOG® website at www.zilog.com lists all regional offices and provides additional Z8 Encore!® 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™ with 4KB Flash, 10-Bit Analog-to-Digital Converter											
Standard Temperature: 0° to 70°C											
Z8F042ASH020SC	4KB	1KB	128B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F042AHH020SC	4KB	1KB	128B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F042APH020SC	4KB	1KB	128B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F042ASJ020SC	4KB	1KB	128B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F042AHJ020SC	4KB	1KB	128B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F042APJ020SC	4KB	1KB	128B	23	18	2	8	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F042ASH020EC	4KB	1KB	128B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F042AHH020EC	4KB	1KB	128B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F042APH020EC	4KB	1KB	128B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F042ASJ020EC	4KB	1KB	128B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F042AHJ020EC	4KB	1KB	128B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F042APJ020EC	4KB	1KB	128B	23	18	2	8	1	1	1	PDIP 28-pin package

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™ with 4KB Flash											
Standard Temperature: 0° to 70°C											
Z8F041ASH020SC	4KB	1KB	128B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F041AHH020SC	4KB	1KB	128B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F041APH020SC	4KB	1KB	128B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F041ASJ020SC	4KB	1KB	128B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F041AHJ020SC	4KB	1KB	128B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F041APJ020SC	4KB	1KB	128B	25	17	2	0	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F041ASH020EC	4KB	1KB	128B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F041AHH020EC	4KB	1KB	128B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F041APH020EC	4KB	1KB	128B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F041ASJ020EC	4KB	1KB	128B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F041AHJ020EC	4KB	1KB	128B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F041APJ020EC	4KB	1KB	128B	25	17	2	0	1	1	1	PDIP 28-pin package

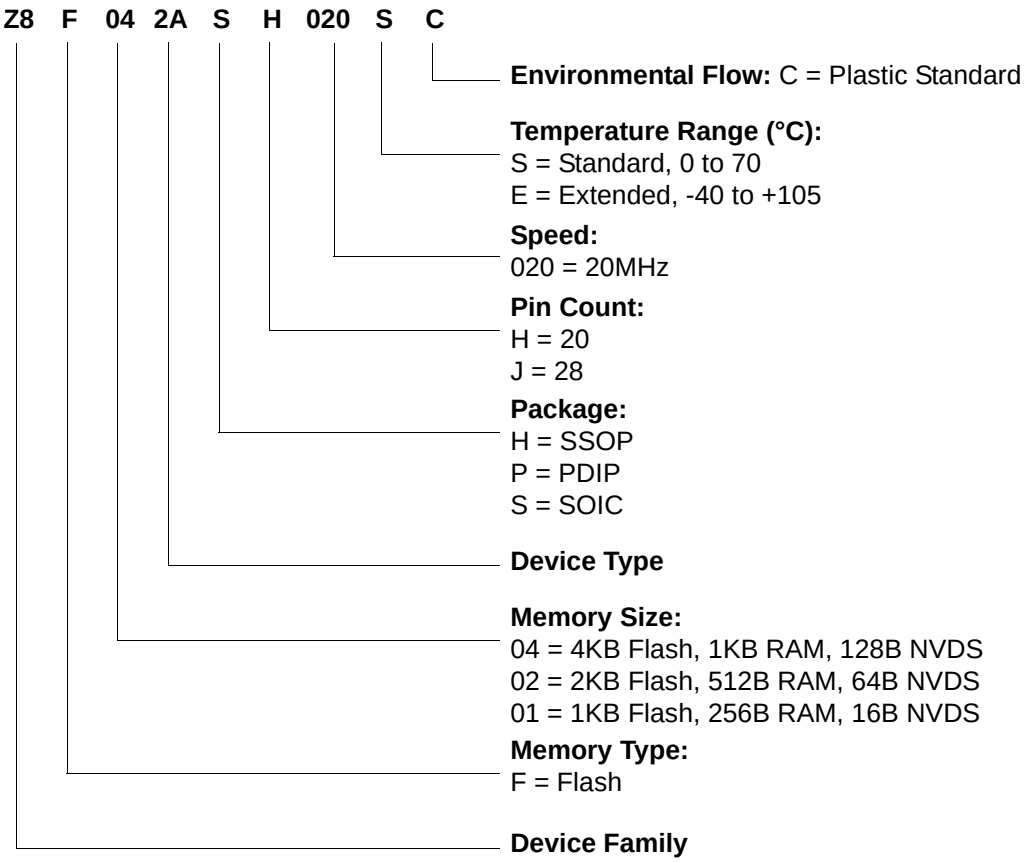
Part Number	Flash	RAM	NVDS	I/O Lines	Interrupts	16-Bit Timers w/PWM	10-Bit A/D Channels	UART with IrDA	Comparator	Temperature Sensor	Description
Z8 Encore! XP™ with 2KB Flash, 10-Bit analog-to-Digital Converter											
Standard Temperature: 0° to 70°C											
Z8F022ASH020SC	2KB	512B	64B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F022AHH020SC	2KB	512B	64B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F022APH020SC	2KB	512B	64B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F022ASJ020SC	2KB	512B	64B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F022AHJ020SC	2KB	512B	64B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F022APJ020SC	2KB	512B	64B	23	18	2	8	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F022ASH020EC	2KB	512B	64B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F022AHH020EC	2KB	512B	64B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F022APH020EC	2KB	512B	64B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F022ASJ020EC	2KB	512B	64B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F022AHJ020EC	2KB	512B	64B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F022APJ020EC	2KB	512B	64B	23	18	2	8	1	1	1	PDIP 28-pin package

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™ with 2KB Flash											
Standard Temperature: 0° to 70°C											
Z8F021ASH020SC	2KB	512B	64B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F021AHH020SC	2KB	512B	64B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F021APH020SC	2KB	512B	64B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F021ASJ020SC	2KB	512B	64B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F021AHJ020SC	2KB	512B	64B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F021APJ020SC	2KB	512B	64B	25	17	2	0	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F021ASH020EC	2KB	512B	64B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F021AHH020EC	2KB	512B	64B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F021APH020EC	2KB	512B	64B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F021ASJ020EC	2KB	512B	64B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F021AHJ020EC	2KB	512B	64B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F021APJ020EC	2KB	512B	64B	25	17	2	0	1	1	1	PDIP 28-pin package

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™ with 1KB Flash, 10-Bit Analog-to-Digital Converter											
Standard Temperature: 0° to 70°C											
Z8F012ASH020SC	1KB	256B	16B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F012AHH020SC	1KB	256B	16B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F012APH020SC	1KB	256B	16B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F012ASJ020SC	1KB	256B	16B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F012AHJ020SC	1KB	256B	16B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F012APJ020SC	1KB	256B	16B	23	18	2	8	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F012ASH020EC	1KB	256B	16B	17	18	2	7	1	1	1	SOIC 20-pin package
Z8F012AHH020EC	1KB	256B	16B	17	18	2	7	1	1	1	SSOP 20-pin package
Z8F012APH020EC	1KB	256B	16B	17	18	2	7	1	1	1	PDIP 20-pin package
Z8F012ASJ020EC	1KB	256B	16B	23	18	2	8	1	1	1	SOIC 28-pin package
Z8F012AHJ020EC	1KB	256B	16B	23	18	2	8	1	1	1	SSOP 28-pin package
Z8F012APJ020EC	1KB	256B	16B	23	18	2	8	1	1	1	PDIP 28-pin package

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™ with 1KB Flash											
Standard Temperature: 0° to 70°C											
Z8F011ASH020SC	1KB	256B	16B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F011AHH020SC	1KB	256B	16B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F011APH020SC	1KB	256B	16B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F011ASJ020SC	1KB	256B	16B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F011AHJ020SC	1KB	256B	16B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F011APJ020SC	1KB	256B	16B	25	17	2	0	1	1	1	PDIP 28-pin package
Extended Temperature: -40° to 105°C											
Z8F011ASH020EC	1KB	256B	16B	17	17	2	0	1	1	1	SOIC 20-pin package
Z8F011AHH020EC	1KB	256B	16B	17	17	2	0	1	1	1	SSOP 20-pin package
Z8F011APH020EC	1KB	256B	16B	17	17	2	0	1	1	1	PDIP 20-pin package
Z8F011ASJ020EC	1KB	256B	16B	25	17	2	0	1	1	1	SOIC 28-pin package
Z8F011AHJ020EC	1KB	256B	16B	25	17	2	0	1	1	1	SSOP 28-pin package
Z8F011APJ020EC	1KB	256B	16B	25	17	2	0	1	1	1	PDIP 28-pin package
Z8F04A28100KIT											Development Kit

Part Number Suffix Designations



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