



**High-Performance 8-Bit Microcontrollers**

# Z8 Encore! XP™ 4K Series with eXtended Peripherals

**Product Brief**

PB013603-0604

PRELIMINARY



## Product Block Diagram

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

## 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  $-40^{\circ}$  to  $+105^{\circ}\text{C}$

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 Non Volatile Data Storage (NVDS)
- 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
- Two 16-bit timers with capture, compare, and PWM capability
- Watch-Dog Timer (WDT) with internal RC oscillator
- 6–25 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
- 8-, 20- and 28-pin packages
- 0° to +70°C standard temperature and –40° to +105°C 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
  - ZDSII 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.

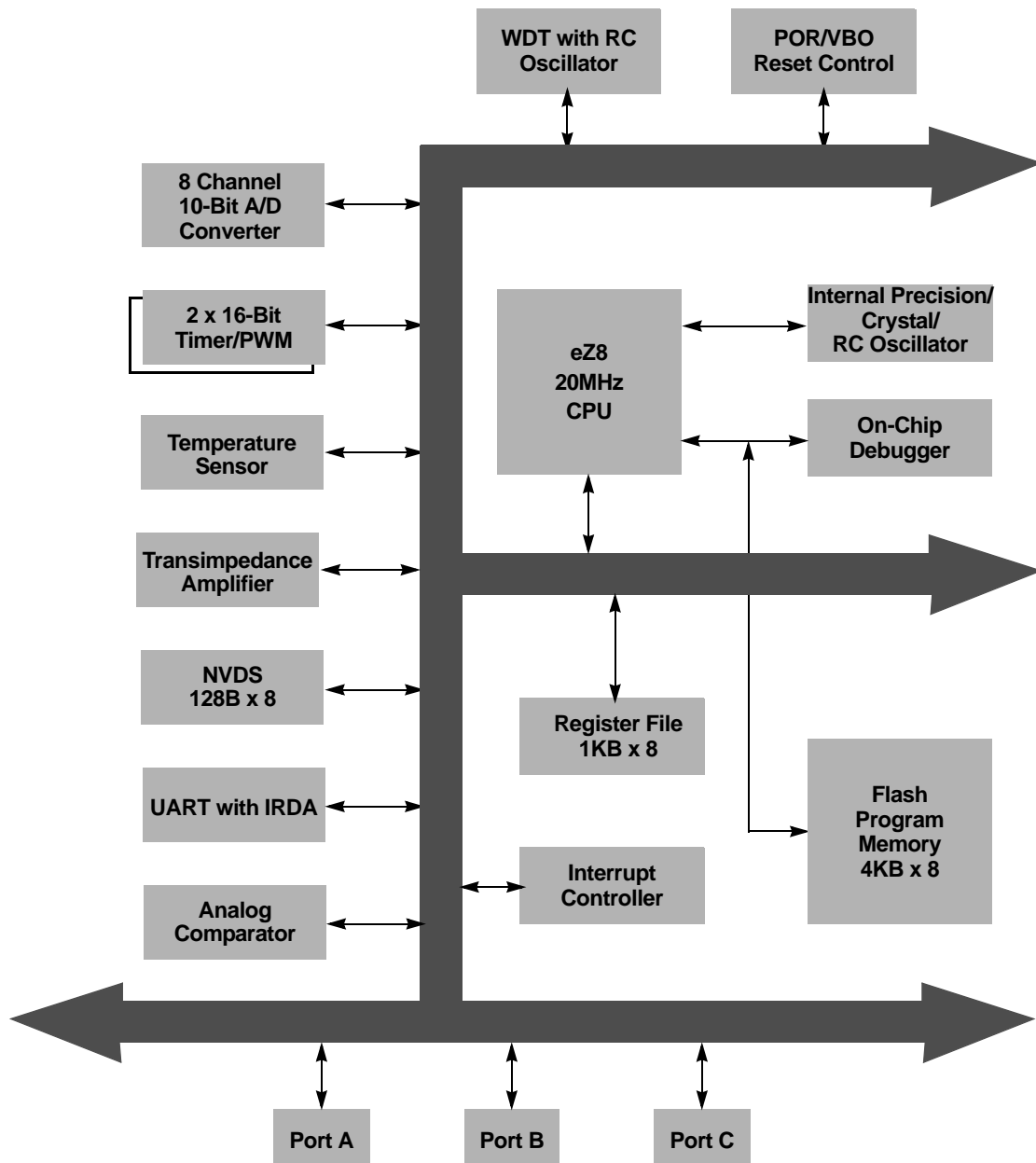


Figure 1. Z8 Encore! XP™ 4K Series Block Diagram



## 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](http://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
<b>Z8 Encore! XP™ with 4KB Flash, 10-Bit Analog-to-Digital Converter</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F042ASB020SC	4KB	1KB	128B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F042APB020SC	4KB	1KB	128B	6	12	2	4	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F042ASB020EC	4KB	1KB	128B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F042APB020EC	4KB	1KB	128B	6	12	2	4	1	1	1	PDIP 8-pin package
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
<b>Z8 Encore! XP™ with 4KB Flash</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F041ASB020SC	4KB	1KB	128B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F041APB020SC	4KB	1KB	128B	6	12	2	0	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F041ASB020EC	4KB	1KB	128B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F041APB020EC	4KB	1KB	128B	6	12	2	0	1	1	1	PDIP 8-pin package
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
<b>Z8 Encore! XP™ with 2KB Flash, 10-Bit analog-to-Digital Converter</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F022ASB020SC	2KB	512B	64B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F022APB020SC	2KB	512B	64B	6	12	2	4	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F022ASB020EC	2KB	512B	64B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F022APB020EC	2KB	512B	64B	6	12	2	4	1	1	1	PDIP 8-pin package
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
<b>Z8 Encore! XP™ with 2KB Flash</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F021ASB020SC	2KB	512B	64B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F021APB020SC	2KB	512B	64B	6	12	2	0	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F021ASB020EC	2KB	512B	64B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F021APB020EC	2KB	512B	64B	6	12	2	0	1	1	1	PDIP 8-pin package
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
<b>Z8 Encore! XP™ with 1KB Flash, 10-Bit Analog-to-Digital Converter</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F012ASB020SC	1KB	256B	16B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F012APB020SC	1KB	256B	16B	6	12	2	4	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F012ASB020EC	1KB	256B	16B	6	12	2	4	1	1	1	SOIC 8-pin package
Z8F012APB020EC	1KB	256B	16B	6	12	2	4	1	1	1	PDIP 8-pin package
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

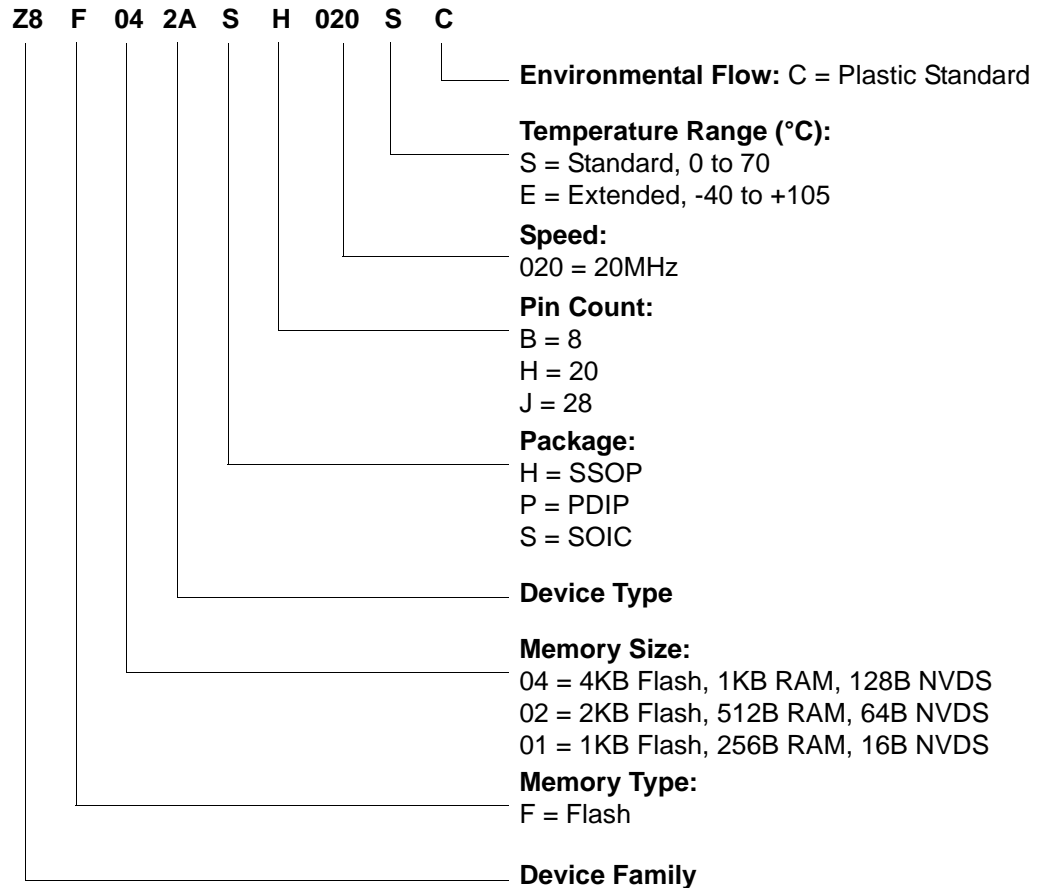




Part Number	Flash	RAM	NVDS	I/O Lines	Interrupts	16-Bit Timers w/PWM	10-Bit A/D Channels	UART with IrDA	Comparator	Temperature Sensor	Description
<b>Z8 Encore! XP™ with 1KB Flash</b>											
<b>Standard Temperature: 0° to 70°C</b>											
Z8F011ASB020SC	1KB	256B	16B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F011APB020SC	1KB	256B	16B	6	12	2	0	1	1	1	PDIP 8-pin package
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
<b>Extended Temperature: -40° to 105°C</b>											
Z8F011ASB020EC	1KB	256B	16B	6	12	2	0	1	1	1	SOIC 8-pin package
Z8F011APB020EC	1KB	256B	16B	6	12	2	0	1	1	1	PDIP 8-pin package
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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