

zilog® High Performance 8-Bit Microcontrollers

Z8 Encore! XP® F64XX Series

Product Brief

PB012407-0308



Product Block Diagram

| | | |
|--|------------------------|---------------------------------|
| 16–64 KB Flash | 2–4 KB RAM | Up to 12 Channels 10-Bit ADC |
| Four 16-Bit Timers/PWM | 20 MHz eZ8™ CPU | 3-Channel DMA |
| Watchdog Timer with RC Oscillator | | POR/VBO and Reset Control |
| SPI, I ² C, and 2 UARTs with IrDA | On-Chip Debugger | Crystal/RC Oscillator |
| Up to 60 General-Purpose I/O Pins | | |

Overview

Zilog's Z8 Encore! XP® F64XX Series Flash microcontrollers are based on Zilog's eZ8 CPU. The Z8 Encore! XP F64XX Series set a new standard for performance and on-chip peripherals.

The Z8 Encore! XP F64XX Series support up to 64 KB of Flash program memory and 4 KB register RAM.

The Z8 Encore! XP F64XX Series feature up to twelve channels of 10-bit A/D conversion for measuring analog signals.

These devices include up to four enhanced 16-bit timer blocks featuring PWMs and Capture and Compare.

Up to 24 vectored interrupts with programmable priorities provide increased application flexibility.

The new single-pin debugger and programming interface simplifies code development and allows for easy in-circuit programming.

Two full-duplex UARTs provides serial communications and IrDA encoding and decoding capability. SPI and I²C ports allow easy incorporation into any system.

Features

Key features of Z8 Encore! XP F64XX Series include:

- 20 MHz eZ8 CPU core
- Up to 64 KB Flash memory with in-circuit programming capability (Flash only)
- Up to 4 KB register RAM
- Up to twelve channels 10-bit Analog-to-Digital Converter (ADC)
- Two full-duplex 9-bit UARTs with bus transceiver Driver Enable Control
- Inter-Integrated Circuit (I²C)
- Serial Peripheral Interface (SPI)
- Infrared Data Association (IrDA)-compliant infrared encoder/decoders
- Up to four 16-bit timers with capture, compare, and PWM capability
- Watchdog Timer (WDT) with internal RC oscillator
- 3-channel DMA
- Up to 60 I/O pins depending on package
- Up to 24 interrupts with configurable priority
- On-Chip Debugger (OCD)
- Voltage Brownout Protection (VBO)
- Power-On Reset (POR)

- Crystal oscillator with three power settings and external RC network option
- 3.0 V to 3.6 V operating voltage with 5 V-tolerant inputs
- 40-, 44-, 64-, 68- and 80-pin packages
- 0 °C to +70 °C standard temperature, –40 °C to +105 °C extended temperature, and +125 °C automotive/industrial temperature operating ranges

eZ8™ CPU Features

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

Development Kit

The Z8 Encore! XP F64XX Series Development Kit includes the following:

Hardware

- Z8 Encore! XP F64XX Series Development Board
- Smart Cable
- 5 V DC power supply

Software (on CD-ROM)

- ZDS II–Z8 Encore!® IDE with ANSI C-Compiler
- Sample Code
- Document Browser
- Acrobat Reader

Documentation

- Quick Start Guide
- Z8 Encore! XP F64XX Series technical documentation (on CD-ROM)

Architecture

Figure 1 displays the Z8 Encore! XP F64XX Series block diagram.

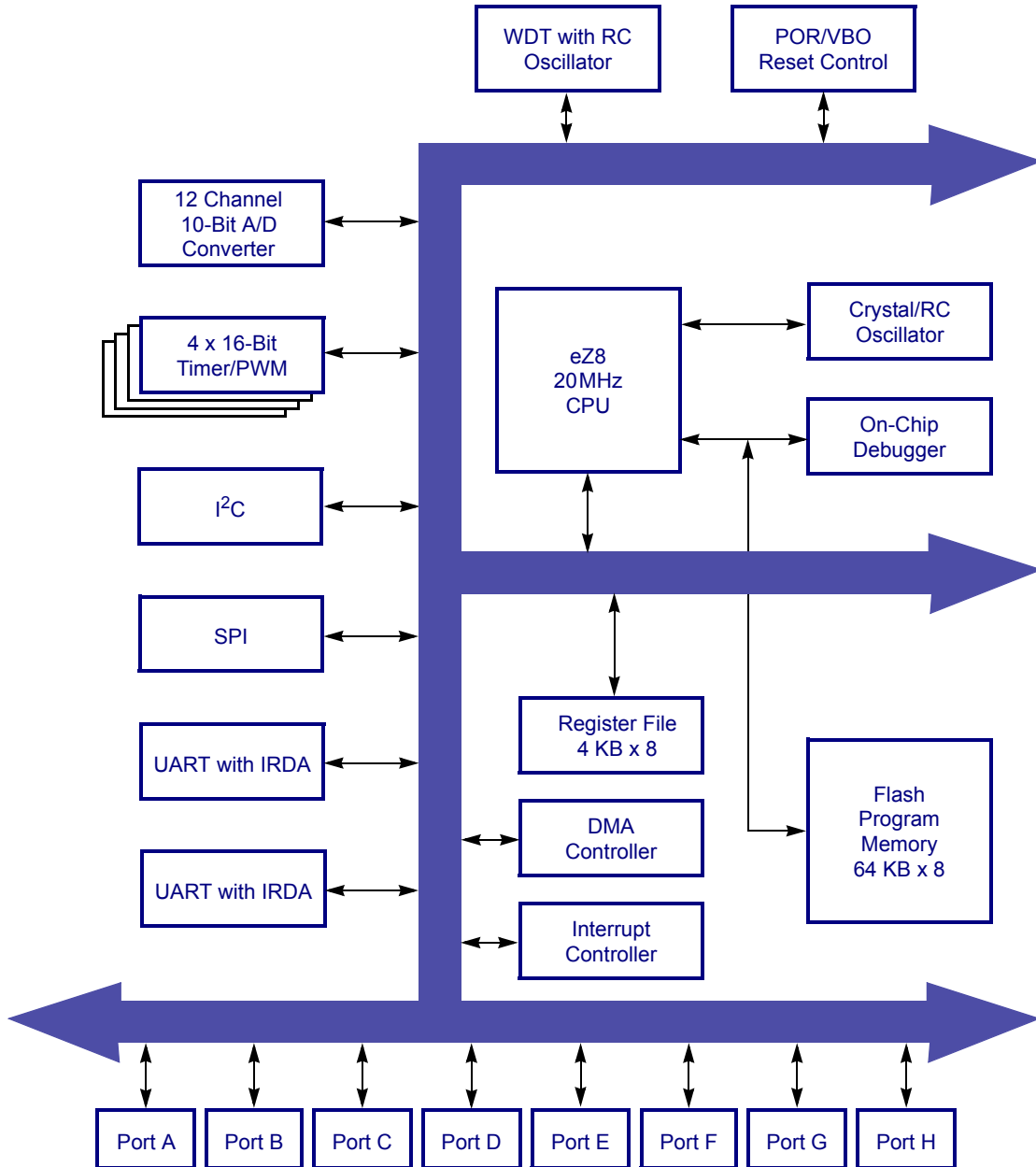


Figure 1. Z8 Encore! XP F64XX Series Block Diagram



Ordering Information

Order the Z8 Encore! XP F64XX Series from Zilog®, using the following part numbers. For more information regarding ordering, contact 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 | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | I ² C | SPI | UARTs with IrDA | Description |
|---|-------|------|-----------|------------|---------------------|---------------------|------------------|-----|-----------------|---------------------|
| Z8F642x with 64 KB Flash, 10-Bit Analog-to-Digital Converter | | | | | | | | | | |
| Standard Temperature: 0 °C to 70 °C | | | | | | | | | | |
| Z8F6421PM020SC | 64 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F6421AN020SC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F6421VN020SC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F6422AR020SC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F6422VS020SC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F6423FT020SC | 64 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Extended Temperature: -40 °C to +105 °C | | | | | | | | | | |
| Z8F6421PM020EC | 64 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F6421AN020EC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F6421VN020EC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F6422AR020EC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F6422VS020EC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F6423FT020EC | 64 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Automotive/Industrial Temperature: -40 °C to +125 °C | | | | | | | | | | |
| Z8F6421PM020AC | 64 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F6421AN020AC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F6421VN020AC | 64 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F6422AR020AC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F6422VS020AC | 64 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F6423FT020AC | 64 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Note: Replace C with G for lead-free packaging. | | | | | | | | | | |

| Part Number | Flash | RAM | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | I ² C | SPI | UARTs with IrDA | Description |
|---|-------|------|-----------|------------|---------------------|---------------------|------------------|-----|-----------------|---------------------|
| Z8F482x with 48 KB Flash, 10-Bit Analog-to-Digital Converter | | | | | | | | | | |
| Standard Temperature: 0 °C to 70 °C | | | | | | | | | | |
| Z8F4821PM020SC | 48 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F4821AN020SC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F4821VN020SC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F4822AR020SC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F4822VS020SC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F4823FT020SC | 48 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Extended Temperature: -40 °C to +105 °C | | | | | | | | | | |
| Z8F4821PM020EC | 48 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F4821AN020EC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F4821VN020EC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F4822AR020EC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F4822VS020EC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F4823FT020EC | 48 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Automotive/Industrial Temperature: -40 °C to +125 °C | | | | | | | | | | |
| Z8F4821PM020AC | 48 KB | 4 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F4821AN020AC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F4821VN020AC | 48 KB | 4 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F4822AR020AC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F4822VS020AC | 48 KB | 4 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F4823FT020AC | 48 KB | 4 KB | 60 | 24 | 4 | 12 | 1 | 1 | 2 | QFP 80-pin package |
| Note: Replace C with G for lead-free packaging. | | | | | | | | | | |

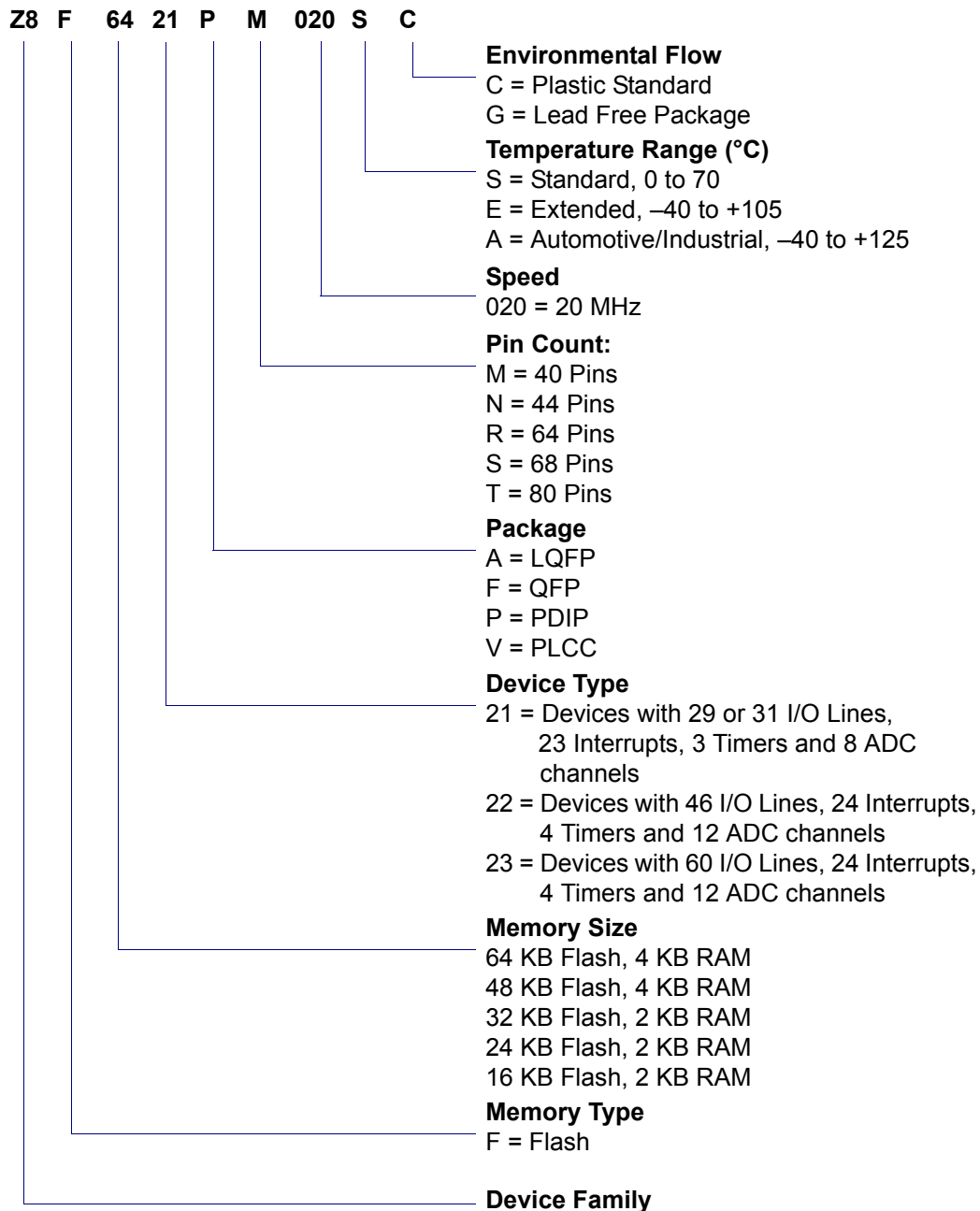
| Part Number | Flash | RAM | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | I ² C | SPI | UARTs with IrDA | Description |
|---|-------|------|-----------|------------|---------------------|---------------------|------------------|-----|-----------------|---------------------|
| Z8F322x with 32 KB Flash, 10-Bit Analog-to-Digital Converter | | | | | | | | | | |
| Standard Temperature: 0 °C to 70 °C | | | | | | | | | | |
| Z8F3221PM020SC | 32 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F3221AN020SC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F3221VN020SC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F3222AR020SC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F3222VS020SC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Extended Temperature: -40 °C to +105 °C | | | | | | | | | | |
| Z8F3221PM020EC | 32 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F3221AN020EC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F3221VN020EC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F3222AR020EC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F3222VS020EC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Automotive/Industrial Temperature: -40 °C to +125 °C | | | | | | | | | | |
| Z8F3221PM020AC | 32 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F3221AN020AC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F3221VN020AC | 32 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F3222AR020AC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F3222VS020AC | 32 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Note: Replace C with G for lead-free packaging. | | | | | | | | | | |

| Part Number | Flash | RAM | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | I ² C | SPI | UARTs with IrDA | Description |
|---|-------|------|-----------|------------|---------------------|---------------------|------------------|-----|-----------------|---------------------|
| Z8F242x with 24 KB Flash, 10-Bit Analog-to-Digital Converter | | | | | | | | | | |
| Standard Temperature: 0 °C to 70 °C | | | | | | | | | | |
| Z8F2421PM020SC | 24 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F2421AN020SC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F2421VN020SC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F2422AR020SC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F2422VS020SC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Extended Temperature: -40 °C to +105 °C | | | | | | | | | | |
| Z8F2421PM020EC | 24 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F2421AN020EC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F2421VN020EC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F2422AR020EC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F2422VS020EC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Automotive/Industrial Temperature: -40 °C to +125 °C | | | | | | | | | | |
| Z8F2421PM020AC | 24 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F2421AN020AC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F2421VN020AC | 24 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F2422AR020AC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F2422VS020AC | 24 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Note: Replace C with G for lead-free packaging. | | | | | | | | | | |

| Part Number | Flash | RAM | I/O Lines | Interrupts | 16-Bit Timers w/PWM | 10-Bit A/D Channels | I ² C | SPI | UARTs with IrDA | Description |
|---|---|------|-----------|------------|---------------------|---------------------|------------------|-----|-----------------|---------------------|
| Z8F162x with 16 KB Flash, 10-Bit Analog-to-Digital Converter | | | | | | | | | | |
| Standard Temperature: 0 °C to 70 °C | | | | | | | | | | |
| Z8F1621PM020SC | 16 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F1621AN020SC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F1621VN020SC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F1622AR020SC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F1622VS020SC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Extended Temperature: -40 °C to +105 °C | | | | | | | | | | |
| Z8F1621PM020EC | 16 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F1621AN020EC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F1621VN020EC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F1622AR020EC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F1622VS020EC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Automotive/Industrial Temperature: -40 °C to +125 °C | | | | | | | | | | |
| Z8F1621PM020AC | 16 KB | 2 KB | 29 | 23 | 3 | 8 | 1 | 1 | 2 | PDIP 40-pin package |
| Z8F1621AN020AC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | LQFP 44-pin package |
| Z8F1621VN020AC | 16 KB | 2 KB | 31 | 23 | 3 | 8 | 1 | 1 | 2 | PLCC 44-pin package |
| Z8F1622AR020AC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | LQFP 64-pin package |
| Z8F1622VS020AC | 16 KB | 2 KB | 46 | 24 | 4 | 12 | 1 | 1 | 2 | PLCC 68-pin package |
| Z8F64200100KITG | Development Kit | | | | | | | | | |
| ZUSBSC00100ZACG | USB Smart Cable Accessory Kit | | | | | | | | | |
| ZUSBOPTSC01ZACG | Opto-Isolated USB Smart Cable Accessory Kit | | | | | | | | | |
| ZENETSC0100ZACG | Ethernet Smart Cable Accessory Kit | | | | | | | | | |
| Note: Replace C with G for lead-free packaging. | | | | | | | | | | |



Part Number Suffix Designations



Note: *Not all packages are available for all memory sizes. See [Ordering Information](#) for the packages available for your requirements.



Warning: DO NOT USE IN LIFE SUPPORT

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As used herein

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