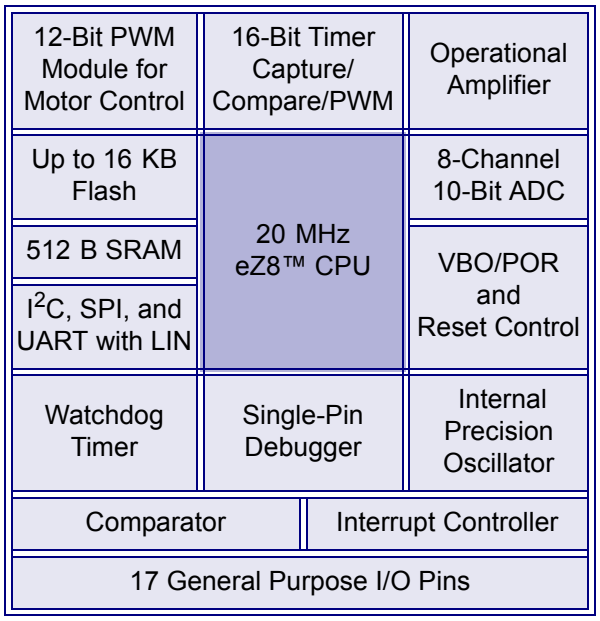
Z8 Encore! MC™ Flash Microcontrollers

Z8FMC16100 Series

Product Brief

PB016607-0308

Product Block Diagram



Overview

Zilog's Z8FMC16100 Series Flash microcontrollers, a part of the Z8 Encore! MC™ family of motor control devices, are based on Zilog's advanced eZ8™ 8-bit CPU core. Optimized for motor control applications, these devices support the control of Single and Multiphase variable-speed motors. Target applications are large appliances, small appliances, HVAC, automotive, power tools, and personal care devices.

Z8FMC16100 Series Flash MCUs feature a flexible pulse width modulator (PWM) module with three complementary pairs or six independent PWM outputs supporting dead-band operation and fault protection trip input. These features provide multiphase control capability for a variety of motor types and ensure safe operation of the motor by providing Pulse-by-Pulse or latched fast shutdown of the PWM pins during fault condition.

Z8FMC16100 Series MCU features up to eight single-ended channels of 10-bit analog-to-digital conversion, with a sample and hold circuit. It also features one operational amplifier for current sampling and one comparator for over-current limiting or shutdown.

A high-speed analog-to-digital converter (ADC) enables voltage, current, and back-EMF sensing, while dual-edge interrupts and a 16-bit timer provide a Hall-effect sensor interface.

A full-duplex 9-bit UART provides serial, asynchronous communication and supports the local interconnect network (LIN) serial communications protocol. The LIN bus is a cost-efficient Single Master, Multiple Slave organization that supports speed up to 20 kbps.

Included in its rich-set of peripherals are other features such as: one additional 16-bit timer with Capture/Compare/PWM capability, SPI or I^2C Master/Slave for serial communication, and an internal precision oscillator (IPO).

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

Z8FMC16100 Series MCU Features

The features of Z8FMC16100 Series MCU include:

- 20 MHz eZ8 CPU core
- Up to 16 KB Flash program memory
- 512 B register SRAM

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- Fast 8-channel 10-bit ADC for current sampling and back-EMF detection
- 12-bit PWM module with three complementary pairs or six independent PWM outputs with dead-band generation and fault trip input
- One 16-bit timer with Capture/Compare/PWM capability
- One analog comparator for current limiting or over current shutdown
- One operational amplifier provides current level-shifting and amplification for ADC current sampling
- I^2C in MASTER, SLAVE, and MULTIMASTER modes
- SPI controller
- UART with LIN interface
- Internal Precision Oscillator (IPO)
- Oscillator supports either internal IPO or external crystals and ceramic resonators
- 17 General-Purpose I/O pins (GPIO)
- Voltage Brownout/Power-On Reset (VBO/POR)
- Watchdog Timer (WDT) with internal RC oscillator
- Single-Pin On-Chip Debugger
- In-circuit serial programming
- Operating at 2.7 V to 3.6 V
- 32-pin QFN and LQFP packages
- Lead-free packaging option
- Standard and extended temperature ranges: 0 ºC to 70 ºC (standard) and –40 ºC to +105 ºC (extended)
- Up to 20 interrupts with configurable priority

eZ8™ CPU Features

The features of eZ8 CPU include:

- New instructions for improved performance including BIT, BSWAP, BTJ, CPC, LDC, LDCI, LEA, MULT, and SRL
- Compatible with existing Z8® code
- Up to 10 MIPS operation
- C-Compiler friendly
- 2 to 9 clock cycles per instruction

Architecture

Figure 1 displays the Z8FMC16100 Series MCU block diagram.

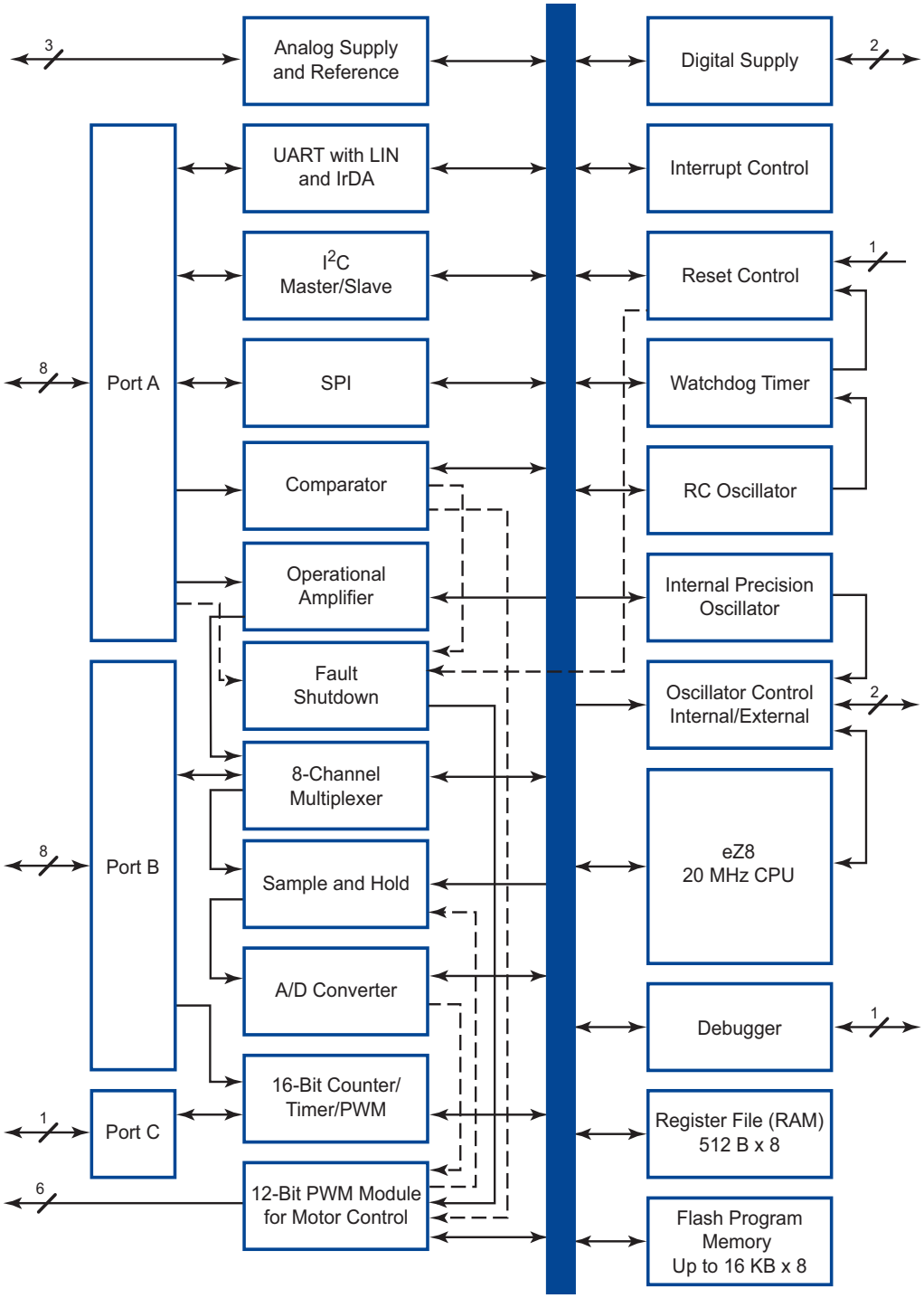


Figure 1. Z8FMC16100 Series MCU Block Diagram

Ordering Information

Table 1 provides the basic features available for each device within the Z8FMC16100 Series product line. Table 2 provides ordering information for the Z8FMC16100 Series products, by part number. See Part Number Suffix Designations on page 6 for product numbering details.

Table 1. Z8FMC16100 Series Part Selection Guide

Product Feature	Z8FMC16100	Z8FMC08100	Z8FMC04100
Flash (KB)	16	8	4
SRAM (B)	512	512	512
General-Purpose I/O	17	17	17
Motor Control PWM Channels	6	6	6
ADC Inputs	8	8	8
Operational Amplifier	Yes	Yes	Yes
Comparator	Yes	Yes	Yes
16-bit Standard Timers with Capture, Compare, PWM	Yes	Yes	Yes
UART with support for LIN and IrDA	Yes	Yes	Yes
I^2C	Yes	Yes	Yes
SPI Controller	Yes	Yes	Yes
Watchdog Timer	Yes	Yes	Yes
5.5296 MHz Internal Precision Oscillator	Yes	Yes	Yes

Each of the parts listed in Table 2 is available in a lead-free package that conforms to responsible environmental standards. For more information regarding ordering, contact your local Zilog® sales office. Zilog web site, www.zilog.com, lists all regional offices and provides additional Z8FMC16100 Series product information.

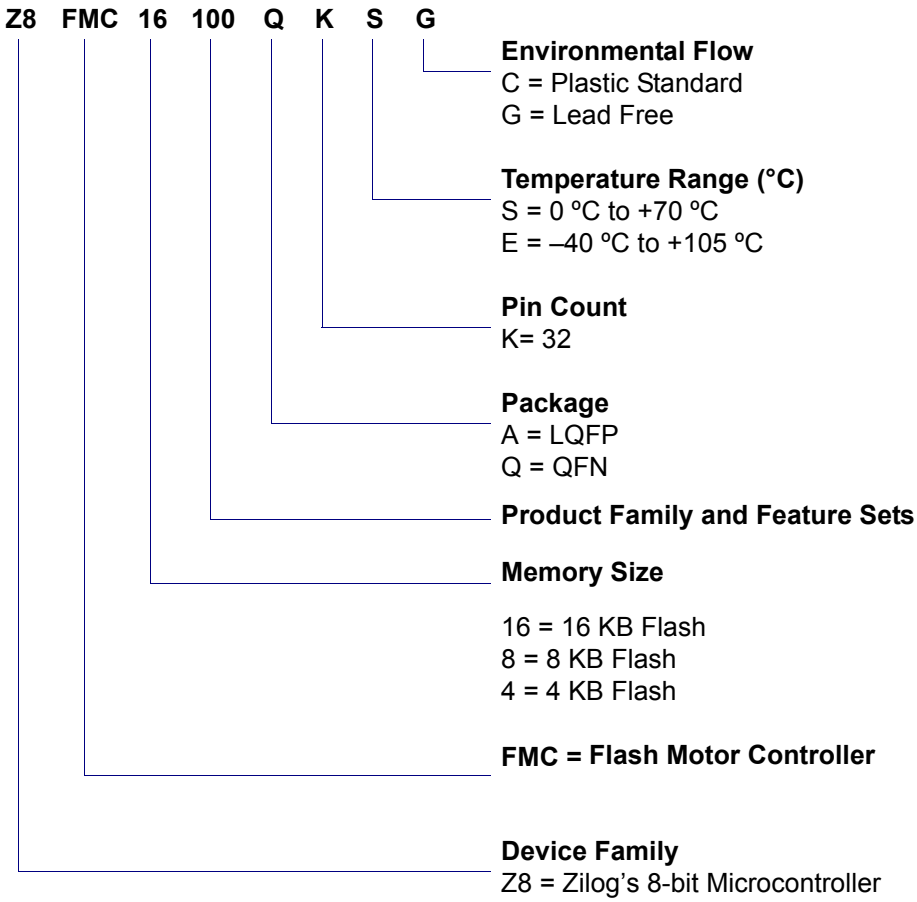
Table 2. Ordering Information for the Z8FMC16100 Series Products*

Part Number	Flash KB (Bytes)	SRAM Bytes	GPIO	Max. Speed (MHz)	I²C/SPI	Trimmed IPO	Package	Temp (°C)
Z8FMC16100 with 16 KB Flash and 512 B SRAM								
Z8FMC16100QKSG	16 (16,384)	512	17	20	I²C/SPI	Y	QFN-32	0 to +70
Z8FMC16100QKEG								–40 to +105
Z8FMC16100AKSG	16 (16,384)	512	17	20	I²C/SPI	Y	LQFP-32	0 to +70
Z8FMC16100AKEG								–40 to +105
Z8FMC08100 with 8 KB Flash and 512B SRAM								
Z8FMC08100QKSG	8 (8,192)	512	17	20	I²C/SPI	Y	QFN-32	0 to +70
Z8FMC08100QKEG								–40 to +105
Z8FMC08100AKSG	8 (8,192)	512	17	20	I²C/SPI	Y	LQFP-32	0 to +70
Z8FMC08100AKEG								–40 to +105
Z8FMC04100 with 4 KB Flash and 512B SRAM								
Z8FMC04100QKSG	4 (4,096)	512	17	20	I²C/SPI	Y	QFN-32	0 to +70
Z8FMC04100QKEG								–40 to +105
Z8FMC04100AKSG	4 (4,096)	512	17	20	I²C/SPI	Y	LQFP-32	0 to +70
Z8FMC04100AKEG								–40 to +105
Z8FMC16100 Series Development Tools								
Z8FMC160100KITG	Z8FMC16100 Series Development Kit							
Z8FMC161000ZEM	Z8 Encore! Z8FMC16100 Series In-Circuit Emulator Development Tool							
ZUSBOPTSC01ZACG	USB Opto-isolated Smart Cable Accessory Kit							
Z8FMC16100 Series Development Tools								

*Factory programming of the devices in this table are available upon request from Zilog®.

Part Number Suffix Designations

Zilog part numbers consist of a number of components. This section describes an example part number, Z8FMC16100QKSG, to indicate each components' description.



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