



# Z8 Encore! MC™ 16100 Series

Award-Winning Motor Control Flash MCU Family



## OVERVIEW

Electric motors provide a convenient way of turning electrical energy into motion. Since their invention in the 1800's, motors have become so integrated into our lives that it's hard to even notice how much we rely on them every day. Electric motors today keep our hair dryers blowing, our appliances working, our air conditioning humming, our power tools spinning, our pumps pumping, and our car windows rolling up and down. They are everywhere!

ZiLOG provides the brains of the motor control operation. Our award-winning FMC16100 microcontrollers not only provide safety features and control the speed and torque of the motors, but they also improve the motor's energy efficiency, reduce cost by removing components, and provide many advanced and customized features.

According to a study done by the US Department of Energy, electric motors consume about 70% of energy generated in the US. By providing a means to control the motor more accurately, the microcontroller provides a way to save energy.

ZiLOG's microcontrollers are easy-to-use and are competitively priced for motor control applications to compete – especially in the appliance market, where price is everything. With over 30 years of innovation, ZiLOG remains committed to improving the way we control the electric devices to provide a better, safer, and more convenient way to live.

## Z8FMC16100 SERIES FEATURES

- 20 MHz CPU core
- Up to 16 KB of Flash memory
- Up to 512 B of RAM
- 6-channels of 12-bit PWM with fast shutdown
- 8-channel 2.5 $\mu$ s, 10-bit ADC with internal reference
- Operational amplifier with external gain
- Analog comparator tied to the PWM
- 5.53 MHz Internal precision oscillator w/  $\pm$ 4% accuracy over the full voltage and temperature ranges
- Communication Protocols: UART with LIN, SPI and I<sup>2</sup>C
- One 16-bit timer
- Single-pin debug
- Watch-Dog Timer (WDT)
- Voltage Brown-Out (VBO)
- Power-On Reset (POR)
- 32-pin QFN or LQFP packages
- 2.7-3.6V operation
- Available in standard (0° to 70°C), extended (-40° to 105°C), and automotive (-40° to 125°C) temperature ranges

## DEVELOPMENT TOOLS INFORMATION

### Z8FMC16100 Development Kit

- Low-cost development tool
- Brushless DC (BLDC) Motor
- Brushless DC (BLDC) application board
- Z8FMC16100 series development board
- Opto-isolated USB debugging and programming cable
- ZDS II IDE with a full ANSI C-Compiler

### Z8FMC16100 In-Circuit Emulator

- High-end development tool with trace and event system
- In-circuit emulator
- 32-pin adapters and target pods
- ZDS II IDE with a full ANSI C-Compiler



# Z8 Encore! MC™ 16100 Series Motor Control MCU

## OUR SOLUTIONS TO YOUR DESIGN CHALLENGES

### Energy Efficiency

Ability to run the motor at slower speeds reduces power consumption. Our 2.5µs ADC with time stamp is tied to the PWM module and allows you more accurate control of the motor at lower or variable speeds.

### Quiet Operation

Keep your system's audible noise low by using the soft start feature and ability to adjust the speed of the motor by using our advanced analog motor control features.

### Safe Operation

With the Z8 Encore! MC microcontroller's over-current sense feature and fault input, you can incorporate fast shutdown of the motor for anti-kick back or stall detection.

### Design Flexibility

Microcontroller-based designs allow for the ability to add more complex and differentiating features. With 16 KB of Flash, and up to 17 GPIO, you are able to add many bells and whistles to differentiate your application.

### System Cost

Highly integrated microcontroller features such as the IPO, NVDS and comparator, give you the ability to reduce your overall system cost.

### Communication

Use the advantage of multiple integrated communication peripherals (I<sup>2</sup>C, SPI, UART and LIN) for complete system communication.

### Compact Size

Our MCUs feature-rich performance is compacted into a 32-pin QFN package requiring only 5x5 mm<sup>2</sup> of your PCB space. We also integrated several external components, such as a comparator and operational amplifier, that will save valuable real estate on your PCB board.

### Lower Noise

In many applications, noise can interfere with the MCUs operation. With our IPO and noise filters, our MCU will operate in even the worst conditions.

### Fast Time-to-Market

With reference designs, software libraries, and application notes at your fingertips, ZiLOG provides a complete solution to get your product to market faster.

12-bit PWM Module for Motor Control	16-bit Timer Capture Capture/Compare/PWM	Operational Amplifier
SPI, I <sup>2</sup> C and UART with LIN	<b>20MHz eZ8™ CPU</b>	8-Channel 10-bit ADC
512B RAM	Up to 16 KB Flash	POR/VBO and Reset Control
Watch-Dog Timer	Debugger	Internal Precision Oscillator
Comparator		Interrupt Controller
Up to 17 General-Purpose I/O Pins		

Z8 Encore! MC 16100 Series Simplified Block Diagram

## Silicon Ordering Information

Device	Flash	Package Types Supported
Z8FMC16100AKSG	16 KB	32-Pin LQFP MCU
Z8FMC16100QKSG	16 KB	32-Pin QFN MCU
Z8FMC08100AKSG	8 KB	32-Pin LQFP MCU
Z8FMC08100QKSG	8 KB	32-Pin QFN MCU
Z8FMC04100AKSG	4 KB	32-Pin LQFP MCU
Z8FMC04100QKSG	4 KB	32-Pin QFN MCU

Note: All parts are available in Lead Free only; parts are also available in extended temperature ranges

## Development Tool Ordering Information

Z8FMC160100KITG	Development Kit
Z8FMC161000ZEM	In-Circuit Emulator
ZUSBSC00100ZACG	USB Smart Cable Accessory Kit
ZUSBOPTSC01ZACG	Opto-Isolated USB Smart Cable Accessory Kit

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