



# 56F8156

### Target Applications

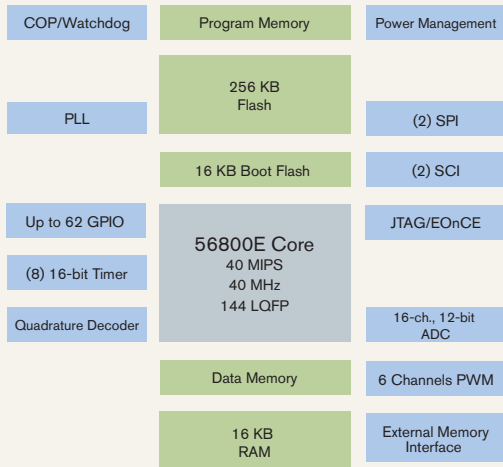
- > Polyphase metering
- > UPS
- > Electric vehicles
- > Currency validation
- > Industrial control/ connectivity
- > Home appliances
- > Smart relays
- > Fire and security systems
- > Medical monitoring

### Overview

Are features being added to your design as you get ready to begin production? Have you ever dreamed of the day you would have an easy solution for this dilemma? Dream no more!

The 56F8156 offers twice as much Program Flash, Data RAM and Boot Flash as the 56F8145, while providing complete pin-for-pin compatibility.

Doubling your application's memory has never been so easy! Continue to enjoy all the benefits of using a hybrid architecture and sophisticated peripherals with the additional memory you require to expand the capabilities of your product.



### 56800E Core Features

- > Up to 40 MIPS at a guaranteed 40 MHz core frequency
- > DSP and microcontroller (MCU) functionality in a unified, C-efficient architecture
- > JTAG/enhanced on-chip emulation (EOnCE™) for unobtrusive, real-time debugging
- > Four 36-bit accumulators
- > 16- and 32-bit bidirectional barrel shifter
- > Parallel instruction set with unique addressing modes
- > Hardware DO and REP loops available
- > Three internal address buses
- > Four internal data buses
- > Architectural support for 8-, 16- and 32-bit single-cycle data fetches
- > MCU-style software stack support
- > Controller-style addressing modes and instructions
- > Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)
- > Proven to deliver more control functionality with a smaller memory footprint than competing architectures

### Benefits

- > Hybrid architecture facilitates implementation of both control and signal processing functions in a single device
- > High-performance, secured Flash memory eliminates the need for external storage devices
- > Extended temperature range up to +105°C allows for operation of nonvolatile memory in industrial applications
- > Flash memory emulation of EEPROM eliminates the need for external nonvolatile memory
- > 32-bit performance with 16-bit code density
- > On-chip voltage regulator and power management reduce overall system cost
- > Off-chip memory expansion capabilities allow for glueless interfacing with the additional memory of external devices without sacrificing performance
- > This device boots directly from Flash, providing additional application flexibility
- > High-performance pulse-width modulation (PWM) with programmable fault capability simplifies design and promotes compliance with safety regulations
- > PWM and analog-to-digital converter (ADC) modules are tightly coupled to reduce processing overhead
- > Low-voltage interrupts (LVIs) protect the system from brownout or power failure
- > Simple in-application Flash memory programming via EOnCE or serial communication

### Memory Features

- > Architecture permits as many as three simultaneous accesses to program and data memory
- > On-chip memory includes high-speed volatile and nonvolatile components
  - 256 KB of Program Flash
  - 16 KB of Data RAM
  - 16 KB of Boot Flash
- > All memories operate at 40 MHz (zero wait states) over temperature range (-40°C to +105°C), with no software tricks or hardware accelerators required
- > Flash security feature prevents unauthorized accesses to its content
- > Off-chip memory expansion capabilities provide a simple method for interfacing additional external memory and/or peripheral devices
  - Access up to 1 MB of external program memory or 1 MB of external data memory
  - External accesses supported at up to 40 MHz (zero wait states)

### 56F8156 Peripheral Circuit Features

- > PWM module with six outputs and four programmable fault inputs
- > Two serial peripheral interfaces (SPIs)
- > Two serial communications interfaces (SCIs)
- > Eight 16-bit timers with input and output compare capability
- > Four-input quadrature decoder
- > On-chip 3.3V to 2.6V voltage regulator
- > Software-programmable Phase-Lock Loop (PLL)
- > 12-bit ADC with 16 inputs, self-calibration and current injection capability
- > Up to 62 general-purpose input/output (GPIO) pins
- > External reset input pin for hardware reset
- > Computer operating properly (COP)
- > Integrated power-on reset and LVI module
- > I<sup>2</sup>C communications master mode (emulated)

### Product Documentation

- 56F8300 Peripherals Manual** Detailed peripheral description of the 56F8300 family of devices  
**Order Number:** MC56F8300UM
- 56F8356/56F8156 Technical Data Sheet** Electrical and timing specifications, device-specific peripheral information and package and pin descriptions  
**Order Number:** MC56F8356
- 56F8156 Product Brief** Summary description and block diagram of the core, memory, peripherals and interfaces  
**Order Number:** MC56F8156PB
- DSP56800E Reference Manual** Detailed description of the DSP56800E architecture, 16-bit core processor and the instruction set  
**Order Number:** DSP56800ERM

### Award-Winning Development Environment

- > Processor Expert™ (PE) technology provides a rapid application design (RAD) tool that combines easy-to-use, component-based software application creation with an expert knowledge system.
- > The CodeWarrior™ Integrated Development Environment (IDE) is a sophisticated tool for code navigation, compiling and debugging. A complete set of evaluation modules (EVMs) and development system cards will support concurrent engineering. Together, PE technology, CodeWarrior tools and EVMs create a complete, scalable tools solution for easy, fast and efficient development.

### Ordering Information

<b>Part</b>	MC56F8156
<b>Package Type</b>	Low-Profile Quad Flat Pack (LQFP)
<b>Pin Count</b>	144
<b>Temperature Range</b>	-40°C to +105°C
<b>Order Number</b>	MC56F8156VFV

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