

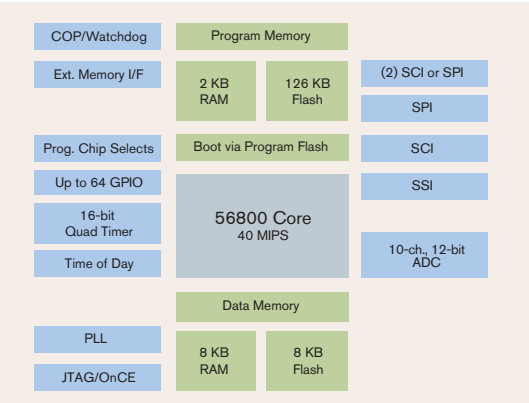
56F827

Target Applications

- > Noise suppression
- > ID tag readers
- > Sonic/subsonic detectors
- > Security access devices
- > Remote metering
- > Sonic alarms
- > General-purpose devices

Overview

The 56F827 is a member of the 56800 core-based family of digital signal controllers. It combines, on a single chip, the processing power of a DSP and the functionality of a microcontroller (MCU) with a flexible set of peripherals to create an extremely cost-effective solution. Because of its low cost, configuration flexibility and compact program code, the 56F802 is well-suited for many applications. The 56800 core is based on a Harvard-style architecture consisting of three execution units operating in parallel, allowing as many as six operations per instruction cycle. The microprocessor-style programming model and optimized instruction set allow straightforward generation of efficient, compact code for both DSP and MCU applications. The instruction set is also highly efficient for C compilers to enable rapid development of optimized control applications.



56800E Core Features

- > Efficient 16-bit 56800 family digital signal controller engine with dual Harvard architecture
- > As many as 40 MIPS at 80 MHz core frequency
- > Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)
- > Two 36-bit accumulators, including extension bits
- > 16-bit bidirectional shifter
- > Parallel instruction set with unique addressing modes
- > Hardware DO and REP loops
- > Three internal address buses and one external address bus
- > Four internal data buses and one external data bus
- > Instruction set supports both DSP and controller functions
- > Controller-style addressing modes and instructions for compact code
- > Efficient C compiler and local variable support
- > Software subroutine and interrupt stack with depth limited only by memory
- > JTAG/on-chip emulation (OnCE™) debug programming interface

Benefits

- > Low-power applications supported by multiple operating modes
- > Flash memory is engineered to provide reliable, nonvolatile memory storage, eliminating the need for external storage devices
- > Easy to program with flexible application development tools
- > Optimized for C compiler efficiency
- > Simple updating of Flash memory through serial peripheral interface (SPI), serial communications interface (SCI) or OnCE, using on-chip boot loader
- > Simple interface with other asynchronous serial communication devices and off-chip EE memory
- > Digital-to-analog converter (DAC) functionality available by using quad timer
- > Sophisticated debugging using OnCE to view core, peripheral and memory contents
- > Analog-to-digital converter (ADC) shut-down mode for power savings
- > Program chip selects allow for enabling/disabling external memory and external peripherals

Energy Information

- > Fabricated in high-density CMOS with 5V-tolerant, TTL-compatible digital inputs
- > Dual power supply, 3.3V and 2.5V
- > Wait and multiple stop modes available

56F827 16-bit Digital Signal Controller

- > Up to 40 MIPS at 80 MHz core frequency
- > DSP and MCU functionality in a unified, C-efficient architecture
- > Hardware DO and REP loops
- > 134 KB On-chip Flash
 - 126 KB Program Flash
 - 8 KB Data Flash
 - Boot via Program Flash
- > 2 KB Program RAM
- > 8 KB Data RAM
- > Up to 128 KB external memory expansion each for program and data memory
- > JTAG/OnCE for debugging
- > General-purpose quad timer
- > MCU-friendly instruction set supports both DSP and controller functions: MAC, bit manipulation unit, 14 addressing modes
- > 10-channel, 12-bit ADC
- > Synchronous serial interface (SSI)
- > Up to two SPIs
- > Up to three SCIs
- > Time-of-day (TOD) timer
- > 128-pin LQFP package
- > 16 dedicated and 48 shared general-purpose input/outputs (GPIOs) pins

56F827 Memory Features

- > Harvard architecture permits as many as three simultaneous accesses to program and data memory
- > On-chip memory including a low-cost, high-volume Flash solution
 - 134 KB On-chip Flash
 - › 126 KB Program Flash
 - › 8 KB Data Flash
 - › Boot via Program Flash
 - 2 KB Program RAM
 - 8 KB Data RAM
- > Off-chip memory expansion capabilities
 - As much as 128 KB data memory
 - As much as 128 KB program memory

56F827 Peripheral Circuit Features

- > One 10-channel, 12-bit ADC
- > General-purpose quad timer
- > Three SCIs
- > Two SPIs
- > SSI
- > Four programmable chip selects
- > 16 dedicated and 48 multiplexed GPIO pins
- > Computer operating properly (COP)/ watchdog timer
- > Two external interrupt pins
- > External reset pin for hardware reset
- > JTAG/OnCE for unobtrusive, processor speed-independent debugging
- > Software-programmable, Phase-Lock Loop (PLL)-based frequency synthesizer
- > One TOD Timer

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 navigating, compiling and debugging. A comprehensive set of evaluation modules (EVMs) and development system cards will support concurrent engineering. Together, PE technology, the CodeWarrior tool suite and EVMs create a comprehensive, scalable tools solution for easy, fast and efficient development.

Learn More: For more information about Freescale products, please visit www.freescale.com.

Product Documentation

DSP56800 Family Manual	Detailed description of the 56800 family architecture and 16-bit DSP core processor and the instruction set Order Number: DSP56800FM
DSP56F826/827 User's Manual	Detailed description of memory, peripherals and interfaces of the 56F826/827 Order Number: DSP56F826-827UM
DSP56F827 Technical Data Sheet	Electrical and timing specifications, pin descriptions and package descriptions Order Number: DSP56F827
DSP56F827 Product Brief	Summary description and block diagram of the core, memory, peripherals and interfaces Order Number: DSP56F827PB

Ordering Information

Part	DSP56F827
Supply Voltage	2.25V–2.75V/3.0V–3.6V
Package Type	Low-Profile Quad Flat Pack (LQFP)
Pin Count	128
Frequency (MHz)	80
Order Number	DSP56F827FG80