

DSP56F826

Product Brief

DSP56F826 16-bit Digital Signal Processor

- Up to 40 MIPS at 80 MHz core frequency
- DSP and MCU functionality in a unified, C-efficient architecture
- Hardware DO and REP loops
- MCU-friendly instruction set supports both DSP and controller functions: MAC, bit manipulation unit, 14 addressing modes
- 31.5K × 16-bit words Program Flash
- 512 × 16-bit words Program RAM
- 2K × 16-bit words Data Flash
- 4K × 16-bit words Data RAM
- 2K × 16-bit words BootFLASH
- Up to 64K × 16-bit words each of external memory expansion for Program and Data memory
- One Serial Port Interface (SPI)
- One additional SPI or two optional Serial Communication Interfaces (SCI)
- One Synchronous Serial Interface (SSI)
- One General Purpose Quad Timer
- JTAG/OnCE™ for debugging
- 100-pin LQFP Package
- 16 dedicated and 30 shared GPIO
- One Time-of-Day module

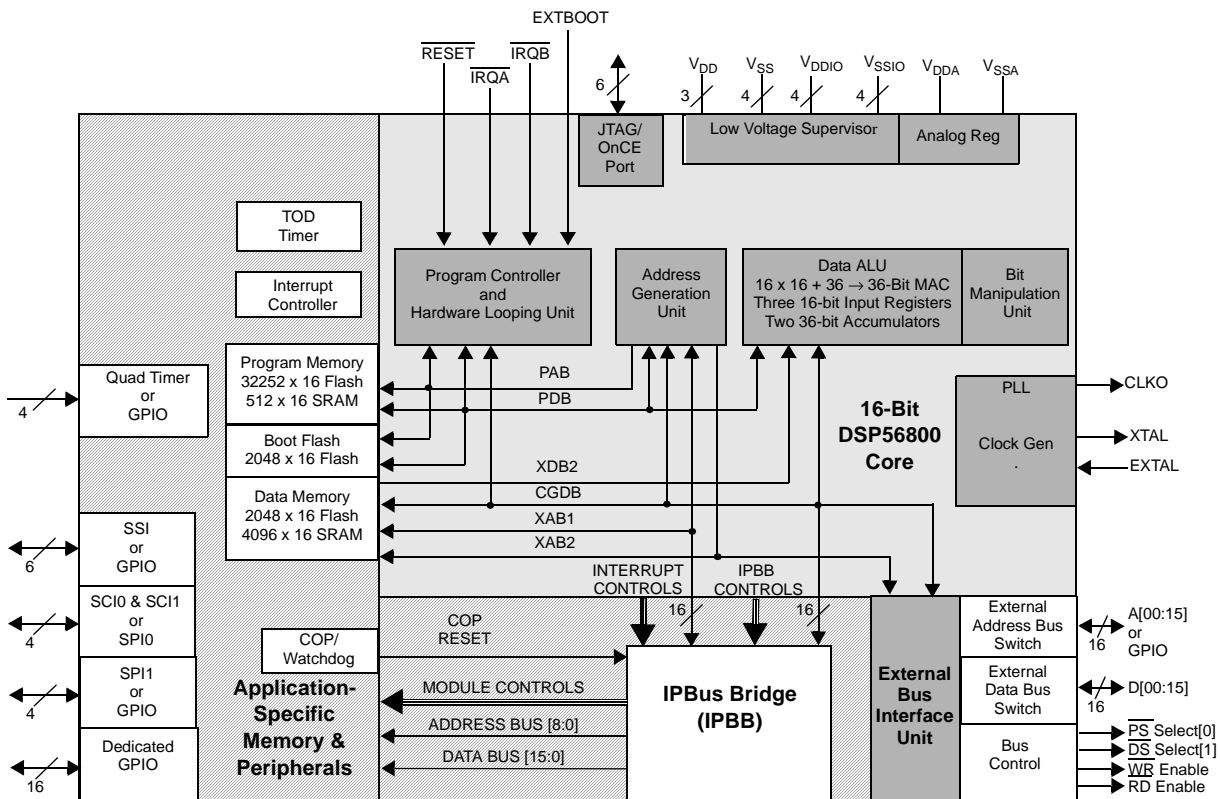


Figure 1. DSP56F826 Block Diagram

DSP56800 Digital Signal Processing Core Features

- Efficient 16-bit DSP56800 family DSP engine with dual Harvard architecture
- As many as 40 Million Instructions Per Second (MIPS) at 80 MHz core frequency
- Single-cycle 16 × 16-bit parallel Multiplier-Accumulator (MAC)
- Two 36-bit accumulators including extension bits
- 16-bit bidirectional shifter
- Parallel instruction set with unique DSP 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/OnCE Debug Programming Interface

DSP56F826 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
 - 31.5K words of Program Flash
 - 512 words of Program RAM
 - 2K words of Data Flash
 - 4K words of Data RAM
 - 2K words of BootFLASH
- Off-chip memory expansion capabilities programmable (4, 8, or 12 wait states)
 - As much as 64 K words of data memory
 - As much as 64 K words of program memory

DSP56F826 Peripheral Circuit Features

- One General Purpose Quad Timer totalling 7pins
- One Serial Peripheral Interface with 4 pins (or four additional GPIO lines)
- One Serial Peripheral Interface, or multiplexed with two Serial Communications Interfaces totalling 4 pins
- Synchronous Serial Interface (SSI) with configurable six-pin port (or six additional GPIO lines)
- Sixteen (16) dedicated general purpose I/O (GPIO) pins
- Thirty (30) shared general purpose I/O (GPIO) pins
- Computer-Operating Properly (COP) Watchdog timer

- Two external interrupt pins
- External reset pin for hardware reset
- JTAG/On-Chip Emulation (OnCE™) for unobtrusive, processor speed-independent debugging
- Software-programmable, Phase Lock Loop-based frequency synthesizer for the DSP core clock
- Fabricated in high-density EMOS with 5V tolerant, TTL-compatible digital inputs
- One Time of Day module

Energy Information

- Dual power supply, 3.3V and 2.5V
- Wait and Multiple Stop modes available

DSP56F826 Description

The DSP56F826 is a member of the DSP56800 core-based family of Digital Signal Processors (DSPs). It combines, on a single chip, the processing power of a DSP and the functionality of a microcontroller with a flexible set of peripherals to create an extremely cost-effective solution for general purpose applications. Because of its low cost, configuration flexibility, and compact program code, the DSP56F826 is well-suited for many applications. The DSP56F826 includes many peripherals that are especially useful for applications such as: noise suppression, ID tag readers, sonic/subsonic detectors, security access devices, remote metering, sonic alarms, POS terminals, feature phones.

The DSP56800 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/C++ Compilers to enable rapid development of optimized control applications.

“Best in Class” Development Environment

The SDK (Software Development Kit) provides fully debugged peripheral drivers, libraries and interfaces that allow programmers to create their unique C application code independent of component architecture. The CodeWarrior Integrated Development Environment 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, the SDK, CodeWarrior, and EVMs create a complete, scalable tools solution for easy, fast, and efficient development.

Product Documentation

The four documents listed in Table 1 are required for a complete description and proper design with the DSP56F826. Documentation is available from local Motorola distributors, Motorola semiconductor sales offices, Motorola Literature Distribution Centers, or online at www.motorola.com/SPS/DSP.

Table 1. DSP56F826 Chip Documentation

Topic	Description	Order Number
DSP56800 Family Manual	Detailed description of the DSP56800 family architecture, and 16-bit DSP core processor and the instruction set	DSP56800FM/D
DSP56F826/827 User's Manual	Detailed description of memory, peripherals, and interfaces of the DSP56F826/827	DSP56F826-827UM/D
DSP56F826 Technical Data Sheet	Electrical and timing specifications, pin descriptions, and package descriptions	DSP56F826/D
DSP56F826 Product Brief	Summary description and block diagram of the DSP56F826 core, memory, peripherals and interfaces (this document)	DSP56F826PB

Ordering Information

Consult a Motorola Semiconductor sales office or authorized distributor to order parts.

Table 2. DSP56F826 Ordering Information

Part	Supply Voltage	Package Type	Pin Count	Frequency (MHz)	Order Number
DSP56F826	3.0–3.6 V 2.25–2.75 V	Plastic Low Profile Quad Flat (LQFP)	100	80	DSP56F826BU80

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