



Digital Signal Controllers

DSP56858

General-purpose solution with a rich feature set for audio and video applications

The 56800E 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 microcontroller (MCU) applications. The instruction set is also highly efficient for C compilers, enabling rapid development of optimized control applications.

Target Applications

- Full duplex feature phones
- IP phones
- Client-side IP applications
- Intelligent access devices
- Voice and audio processing
- Voice recognition and command
- General-purpose devices
- Hands-free automotive devices

Overview

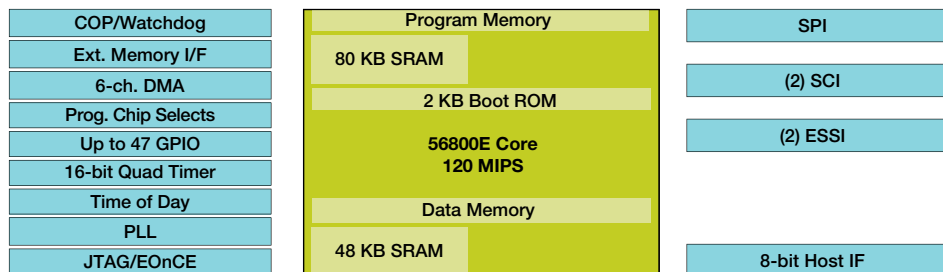
The 56858 core offers a rich feature set and on-chip memory interface. It includes external memory expansion with up to 4 MB program or up to 16 MB data addressing space, and is available in both 144-pin LQFP and 144-pin MAPBGA packages. The 56858 core includes 80 KB of on-chip program SRAM and 48 KB of on-chip data SRAM. With two enhanced synchronous serial interfaces (ESSI) this device can provide outputs for 5.1-channel surround sound. The 56858 core is ideal for client-side telecom/datacom applications requiring up to four channels, including IP phones. This device can be designed into multiprocessor systems to provide speech processing, stand-alone Internet audio and hands-free automotive device functionality.

56800E Core Features

- Efficient 16-bit digital signal controller engine with dual Harvard architecture
- 120 MIPS at 120 MHz core frequency

- Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)
- Four 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
- Four hardware interrupt levels
- Five software interrupt levels
- 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/enhanced on-chip emulation (EOnCE) debug programming interface

DSP56858



Freescale Technology



Benefits

- Easy to program with flexible application development tools
- Supports multiple processor connections
- 16-bit quad timer module (with four external pins) that allows capture/compare functionality and can be cascaded
- Quad timer module can also be used for simple digital-to-analog conversion functionality
- ESSI with enhanced network and audio modes
- Time of day (TOD) modules for applications requiring clock display
- Flexible 6-channel direct memory access (DMA) allows both internal and external memory transfers with almost no CPU interruption
- Serial peripheral interface (SPI) with master and slave mode supporting connection to other processors or serial memory devices
- Two ESSIs with three transmitters per module provide support for 5.1-channel surround sound

Energy Information

- Fabricated in high-density CMOS with 3.3V, TTL-compatible digital inputs
- Wait and stop modes available

56858 16-bit Digital Signal Processors

- 120 MIPS at 120 MHz
- 80 KB program SRAM
- 48 KB data SRAM
- 2 KB boot ROM
- Access up to 4 MB words of program memory or up to 16 MB data memory
- Chip select logic for glueless interface to ROM and SRAM
- Six independent channels of DMA
- Two ESSIs
- Two serial communications interfaces (SCIs)
- SPI
- 8-bit parallel host interface
- General-purpose 16-bit quad timer
- JTAG/EOnCE for unobtrusive, real-time debugging

- Computer operating properly (COP)/ watchdog timer
- TOD
- 144-pin LQFP and 144-pin MAPBGA packages
- Up to 47 general-purpose input/output (GPIO) pins

56858 Memory Features

- Harvard architecture permits up to three simultaneous accesses to program and data memory
- On-chip memory
 - 80 KB program RAM
 - 48 KB data RAM
 - 2 KB boot ROM
 - Chip select logic used as GPIO

56858 Peripheral Circuit Features

- General-purpose 16-bit quad timer
- Two SCIs*
- SPI*
- Two ESSI modules*
- Computer operating properly (COP)/ watchdog timer
- JTAG/EOnCE for unobtrusive, real-time debugging

- Six independent channels of DMA
- 8-bit parallel host interface*
- TOD
- 144-pin LQFP and 144-pin MAPBGA packages
- Up to 47 GPIO pins

*Each peripheral I/O can be used alternately as a GPIO..

Award-Winning Development Environment

- Processor Expert 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 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, Processor Expert technology, the CodeWarrior tool suite and EVMs create a comprehensive, scalable tools solution for easy, fast and efficient development.

Product Documentation

Product	Order Number	Description
DSP56800E Reference Manual	DSP56800ERM	Detailed description of the 56800E architecture, 16-bit DSP core processor and the instruction set
DSP5685x User's Manual	DSP5685xUM	Detailed description of memory, peripherals and interfaces of the 56853, 56854, 56855, 56857 and 56858
DSP56858 Technical Data Sheet	DSP56858	Electrical and timing specifications, pin descriptions and package descriptions
DSP56858 Product Brief	DSP56858PB	Summary description and block diagram of the core, memory, peripherals and interfaces

Ordering Information

.035	DSP56858
Supply Voltage	1.8V, 3.3V
Package Type	Low-Profile Quad Flat Pack (LQFP)
Pin Count	144
Frequency (MHz)	120
Order Number	DSP56858FV120
Part	DSP56858
Supply Voltage	1.8V, 3.3V
Package Type	Mold Array Plastic Ball Grid Array (MAPBGA)
Pin Count	144
Frequency (MHz)	120
Order Number	DSP56858VF120

For more information, visit freescale.com