MOTOROLA
SEMICONDUCTOR PRODUCT BRIEF

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DSP56303EVMP/D
Rev 1.0, 10/98

DSP56303EVM

Advance Information

DSP56303EVM Evaluation Module

The DSP56303 Evaluation Module (DSP56303EVM) is a low-cost platform for developing real-time software and hardware products to support a new generation of wireless, telecommunications, and multimedia applications. The DSP56303EVM targets applications requiring a large amount of on-chip memory such as wireless infrastructure applications. The user can download software to on-chip or on-board RAM, then run and debug it. The user can also connect hardware, such as external memories and analog-to-digital (A/D) or digital-to-analog (D/A) converters, for product development. The 24-bit precision of the DSP56303 Digital Signal Processor (DSP) combined with the on-board 64K of external SRAM and Crystal Semiconductor's CS4218 stereo, CD-quality, audio codec ideally suits the DSP56303EVM for implementing and demonstrating many communications and audio processing algorithms. It is also an effective tool for learning the architecture and instruction set of the DSP56303 processor. **Figure 1** shows the functional block diagram for the DSP56303EVM.

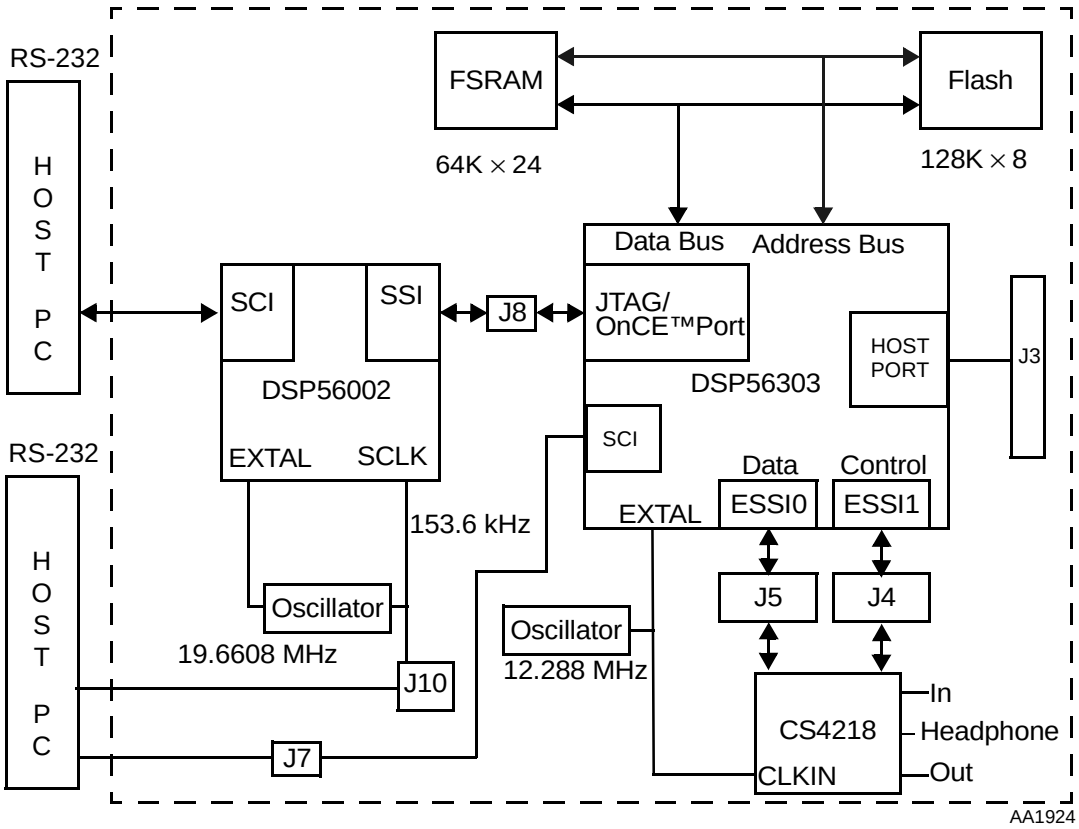


Figure 1 DSP56303EVM Functional Block Diagram

This document contains information on a new product. Specifications and information herein are subject to change without notice.

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FEATURES

High Performance DSP56300 Core

- 66/80/100 Million Instructions Per Second (MIPS) with a 66/80/100 MHz clock at 3.0–3.6 V
- Object code compatible with the DSP56000 core
- Highly parallel instruction set
- Data Arithmetic Logic Unit (Data ALU)
  - Fully pipelined 24 x 24-bit parallel Multiplier-Accumulator (MAC)
  - 56-bit parallel barrel shifter (fast shift and normalization; bit stream generation and parsing)
  - Conditional ALU instructions
  - 24-bit or 16-bit arithmetic support under software control
- Program Control Unit (PCU)
  - Position Independent Code (PIC) support
  - Addressing modes optimized for DSP applications (including immediate offsets)
  - On-chip instruction cache controller
  - On-chip memory-expandable hardware stack
  - Nested hardware DO loops
  - Fast auto-return interrupts
- Direct Memory Access (DMA)
  - Six DMA channels supporting internal and external accesses
  - One-, two-, and three- dimensional transfers (including circular buffering)
  - End-of-block-transfer interrupts
  - Triggering from interrupt lines and all peripherals
- Phase Lock Loop (PLL)
  - Allows change of low power Divide Factor (DF) without loss of lock
  - Output clock with skew elimination
  - Hardware debugging support
  - On-Chip Emulation (OnCE™) module
  - Joint Action Test Group (JTAG) Test Access Port (TAP)
  - Address Trace mode reflects internal Program RAM accesses at the external port

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For More Information On This Product,
Go to: www.freescale.com

On-Chip Memories

- Program RAM, Instruction Cache, X data RAM, and Y data RAM size is programmable:

Instruction Cache	Switch Mode	Program RAM Size	Instruction Cache Size	X Data RAM Size	Y Data RAM Size
disabled	disabled	4096 × 24-bit	0	2048 × 24-bit	2048 × 24-bit
enabled	disabled	3072 × 24-bit	1024 × 24-bit	2048 × 24-bit	2048 × 24-bit
disabled	enabled	2048 × 24-bit	0	3072 × 24-bit	3072 × 24-bit
enabled	enabled	1024 × 24-bit	1024 × 24-bit	3072 × 24-bit	3072 × 24-bit

- 192 x 24-bit bootstrap ROM

Off-Chip Memory Expansion

- Data memory expansion to two 256 K × 24-bit word memory spaces (or up to two 4 M x 24-bit word memory spaces by using the Address Attribute AA0–AA3 signals)
- Program memory expansion to one 256 K × 24-bit words memory space (or up to one 4 M x 24-bit word memory space by using the Address Attribute AA0–AA3 signals)
- External memory expansion port
- Chip Select Logic for glueless interface to SRAMs
- On-chip DRAM Controller for glueless interface to DRAMs

On-Chip Peripherals

- Enhanced DSP56000-like 8-bit parallel Host Interface (HI08) supports a variety of buses (e.g., ISA) and provides glueless connection to a number of industry standard microcomputers, microprocessors, and DSPs
- Two Enhanced Synchronous Serial Interfaces (ESSI), each with one receiver and three transmitters (allows six-channel home theater)
- Serial Communications Interface (SCI) with baud rate generator
- Triple timer module
- Up to thirty-four programmable General Purpose Input/Output (GPIO) pins, depending on which peripherals are enabled

Reduced Power Dissipation

- Very low power CMOS design
- Wait and Stop low power standby modes
- Fully-static logic, operation frequency down to 0 Hz (DC)
- Optimized power management circuitry (instruction-dependent, peripheral-dependent, and mode-dependent)

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- 64K x 24-bit fast static RAM for expansion memory
- 128K x 8-bit Flash Programmable Erasable Read Only Memory (PEROM) for stand-alone operation
- 16-bit CD-quality audio codec
  - Two channels of 16-bit A/D conversion
  - Two channels of 16-bit D/A conversion
  - Software-selectable 8-bit and 16-bit data formats, including μ-law and A-law companding
  - Stereo jacks for audio input, output, and headphones
- Command converter
  - DSP56002 for high-speed OnCE/JTAG command conversion software
  - JTAG connector for use with the Application Development System (ADS) command converter card
  - RS–232 serial port
- Connectors
  - Host-port connector
  - Host interface RS–232 connector
  - ESSI0 connector
  - ESSI1 connector
  - SCI connector

Software

- Motorola's DSP563xx cross assembler
  - Produces DSP56303 binary code from source code using labels, sections, and macro definitions incorporating the DSP's complete instruction set, all addressing modes, and all memory spaces
  - Offers macros, expression evaluation, and functions for strings, data conversion, and transcendentals
  - Creates reports for cross-references, instruction cycle count, and memory usage
  - Provides extensive error checking and reporting
- Domain Technologies debug software with Windows™-based user interface
  - Symbolic debugging
  - Windows for data, code, DSP registers, commands, peripherals, etc.
  - Data and registers displayed in fractional, decimal, or hexadecimal format
  - Graphical display of memory segments

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- Up to eight simultaneous software breakpoints
- Built–in line assembler and disassembler

User Requirements

The user must provide the following:

- Power supply (7–9 V ac or dc, 500 mA with 2.1 mm coaxial connector)
- RS-232 cable (DB9 plug to DB9 receptacle)
- Audio source and a cable with 1/8-inch stereo plugs
- PC-compatible computer (90MHz or higher) running Windows95 or NT4 with an RS-232 serial port capable of 9,600 to 115,200 bits-per-second operation, 12 Mbytes RAM, 3-1/2 inch diskette drive, CD-ROM drive, hard drive with 20 Mbytes of free disk space, and a mouse

SUPPORTING DOCUMENTATION

The first three documents listed in **Table 1** are required for a complete description of the DSP56303 chip and are necessary to design properly with the part. The fourth and fifth documents describe the DSP56303 Evaluation Module, including installation and use and are provided with the module. Additional copies are available from one of the following locations (see back cover for detailed information):

- A local Motorola distributor
- A Motorola Semiconductor Sales Office
- Motorola Literature Distribution Center
- The World Wide Web (WWW) *http://www.mot.com/SPS/DSP/documentation*.

You can order DSP56303 literature using the document order number provided in the table below.

Table 1 Documentation List

Document Name	Description	Order Number
DSP56300 Family Manual	Detailed description of the DSP56300 family processor core and instruction set	DSP56300FM/AD
DSP56303 User's Manual	Detailed functional description of the DSP56303 memory configuration, operation, and register programming	DSP56303UM/D
DSP56303 Technical Data	DSP56303 features list and physical, electrical, timing, and package specifications	DSP56303/D
DSP56303EVM Product Brief	Overview description of the DSP56303EVM, including block diagram and list of features	DSP56303EVMP/D
DSP56303EVM User's Manual	Detailed functional description of the DSP56303EVM, including requirements, installation, and general operating guidelines	DSP56303EVMUM/D

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