Welcome to E-XFL.COM

Understanding Embedded - DSP (Digital Signal Processors)

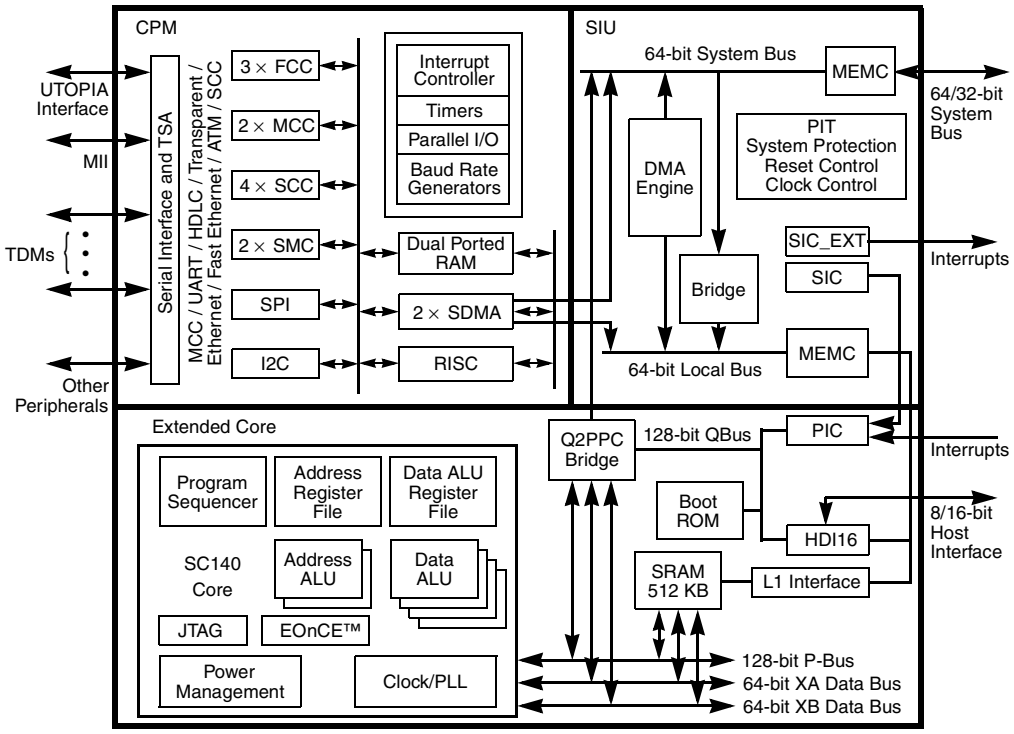
Embedded - DSP (Digital Signal Processors) are specialized microprocessors designed to perform complex mathematical computations on digital signals in real-time. Unlike general-purpose processors, DSPs are optimized for high-speed numeric processing tasks, making them ideal for applications that require efficient and precise manipulation of digital data. These processors are fundamental in converting and processing signals in various forms, including audio, video, and communication signals, ensuring that data is accurately interpreted and utilized in embedded systems.

Applications of Embedded - DSP (Digital Signal Processors)

Details	
Product Status	Active
Type	SC140 Core
Interface	Communications Processor Module (CPM)
Clock Rate	275MHz
Non-Volatile Memory	External
On-Chip RAM	512kB
Voltage - I/O	3.30V
Voltage - Core	1.60V
Operating Temperature	-40°C ~ 105°C (TJ)
Mounting Type	Surface Mount
Package / Case	332-BFBGA, FCBGA
Supplier Device Package	332-FCBGA (17x17)
Purchase URL	https://www.e-xfl.com/pro/item?MUrl=&PartUrl=msc8103m1100f

MSC8103

Networking Digital Signal Processor



The Freescale MSC8103 *16-bit Digital Signal Processor (DSP) is a member of the family of DSPs based on the StarCore™ SC140 DSP core. The* MSC8103 *is offered in two core speed levels: 275 and 300 MHz.*

Figure 1. MSC8103 Block Diagram

The Freescale MSC8103 DSP is a very versatile device that integrates the high-performance SC140 four-ALU (arithmetic logic unit) DSP core along with 512 KB of on-chip memory, a communications processor module (CPM), a 64-bit bus, a very flexible system integration unit (SIU), and a 16-channel DMA controller on a single device. With its four-ALU core, the MSC8103 can execute up to four multiply-accumulate (MAC) operations in a single clock cycle. The MSC8103 CPM is a 32-bit RISC-based communications protocol engine that can network to time-division multiplexed (TDM) highways, Ethernet, and asynchronous transfer mode (ATM) backbones. The MSC8103 60x-compatible bus interface connects to multi-master system architectures. The large on-chip unified program and data SRAM, 512 KB, reduces the need for off-chip memories. The MSC8103 offers 1200 DSP MMACS performance using an internal 300 MHz clock with a 1.6 V core and independent 3.3 V input/output (I/O).

Features

- SC140 core
  - Architecture optimized for efficient C/C++ code compilation
  - Four 16-bit ALUs and two 32-bit AGUs
  - 1200 MMACS, 3000 RISC MIPS, running at 300 MHz
  - Very low power dissipation—less than 0.25 W for the core running full speed at 1.6 V
  - Variable-length execution set (VLES) execution model improves code density
  - JTAG/enhanced OnCE debug port
- Communications processor module (CPM)
  - Programmable protocol machine using a 32-bit RISC engine
  - 155 Mbps ATM interface (including AAL 0/1/2/5)
  - 10/100 Mbit Ethernet interface
  - Up to four E1/T1 interfaces or one E3/T3 interface and one E1/T1 interface
  - HDLC support up to T3 rates, or 256 channels
- 100 MHz 64- or 32-bit wide bus interface
  - Bursts for high efficiency
  - Glueless interface to 60x-compatible bus systems
  - Multi-master support
- Programmable memory controller
  - Control for up to eight banks of external memory
  - User-programmable machines (UPM) allowing glueless interface to various memory types (SRAM, DRAM, EPROM, and Flash memory) and other user-definable peripherals
  - Dedicated pipelined SDRAM memory interface
- Large on-chip SRAM
  - 256K 16-bit words (512 KB)
  - Unified program and data space configurable by the application
  - Word and byte addressable
- DMA controller
  - 16 DMA channels, FIFO based, with burst capabilities
  - Sophisticated addressing capabilities
- Small footprint package: 17 mm × 17 mm lidded FC-PBGA package with lead-bearing or lead-free spheres
- Very low power consumption
- Separate power supply for internal logic (1.6 V) and for I/O (3.3 V)
- Enhanced 16-bit parallel host interface (HDI16) supports a variety of microcontroller, microprocessor, and DSP bus interfaces
- Phase-lock loops (PLLs)
  - System PLL
  - CPM DPLLs (SCC and SCM)
- Process technology: 0.13 micron copper interconnect

Target Applications

The MSC8101 targets applications requiring very high performance, very large amounts of on-chip memory, and such networking capabilities as:

- Third-generation wideband wireless infrastructure systems
- Packet telephony systems
- Multi-channel modem banks
- Multi-channel xDSL

Product Documentation

The documents listed in **Table 1** are required for a complete description of the MSC8103 and are necessary to design properly with the part. Documentation is available from the following sources (see back cover for detailed information):

- A local Freescale distributor
- A Freescale Semiconductor sales office
- A Freescale literature distribution center
- The world wide web (WWW)

Table 1. MSC8103 Documentation

Name	Description	Order Number
MSC8103 Technical Data	MSC8103 features list and physical, electrical, timing, and package specifications	MSC8103
MSC8103 User's Guide	Detailed functional description of the MSC8103 memory configuration, operation, and register programming	MSC8103UG
MSC8103 Reference Manual	Detailed description of the MSC8103 processor core and instruction set	MSC8103RM
SC140 DSP Core Reference Manual	Detailed description of the SC140 family processor core and instruction set	MNSC140CORE
Application Notes	Documents describing specific applications or optimized device operation including code examples	See the MSC8103 product website

How to Reach Us:

Home Page:
www.freescale.com

E-mail:
support@freescale.com

USA/Europe or Locations not listed:
Freescale Semiconductor
Technical Information Center, CH370
1300 N. Alma School Road
Chandler, Arizona 85224
+1-800-521-6274 or +1-480-768-2130
support@freescale.com

Europe, Middle East, and Africa:
Freescale Halbleiter Deutschland GMBH
Technical Information Center
Schatzbogen 7
81829 München, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
support@freescale.com

Japan:
Freescale Semiconductor Japan Ltd.
Headquarters
ARCO Tower 15F
1-8-1, Shimo-Meguro, Meguro-ku,
Tokyo 153-0064, Japan
0120 191014 or +81 3 5437 9125
support.japan@freescale.com

Asia/Pacific:
Freescale Semiconductor Hong Kong Ltd.
Technical Information Center
2 Dai King Street
Tai Po Industrial Estate
Tai Po, N.T. Hong Kong
+800 2666 8080
support.asia@freescale.com

For Literature Requests Only:
Freescale Semiconductor Literature Distribution Center
P.O. Box 5405
Denver, Colorado 80217
1-800-441-2447 or 303-675-2140
Fax: 303-675-2150
LDCForFreescaleSemiconductor@hibbertgroup.com

MSC8103PB
Rev. 3
9/2005

freescale™
semiconductor