

DSP56602

Advance Information 16-BIT DIGITAL SIGNAL PROCESSOR

The DSP56602 is a ROM-based 16-bit fixed-point CMOS Digital Signal Processor (DSP) designed for low-power digital cellular subscriber applications. This 60 MHz chip is optimized for processing-intensive, yet cost-effective, low power consumption digital mobile communications applications. The DSP56602 is a member of the DSP56600 core family of DSPs, and is capable of executing one instruction per clock cycle. The DSP56602 provides for customer-specifiable, factory-programmed ROM. Application development can be performed using the DSP56603EVM Evaluation Module or the DSP56603ADS Application Development System. **Figure 1** provides a block diagram of the DSP56602, showing the core structures and the expansion areas. The DSP56600 core includes the Data Arithmetic Logic Unit (Data ALU), Address Generation Unit (AGU), Program Controller, Program Patch Detector, Bus Interface Unit, On-Chip Emulation (OnCE™) module, JTAG port, and a Phase Lock Loop (PLL)-based clock generator. The expansion areas provide the program and data memories, as well as a versatile set of on-chip peripherals and external ports.

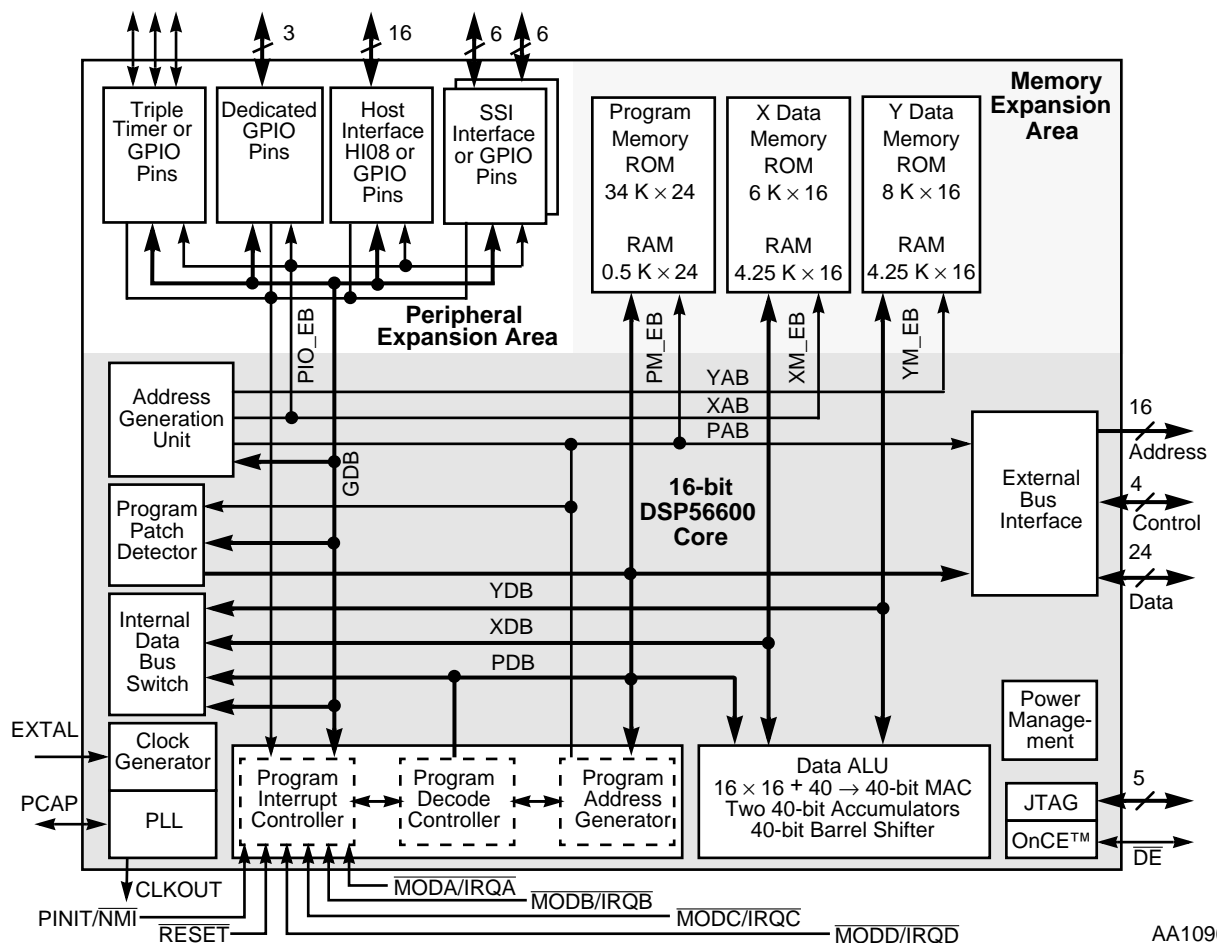


Figure 1 DSP56602 Block Diagram

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

Preliminary

DSP56602 FEATURES

Digital Signal Processing Core

- High-performance DSP56600 core
- Up to 60 Million Instructions Per Second (MIPS) at 2.7–3.3 V
- Fully pipelined 16×16 -bit parallel Multiplier-Accumulator (MAC)
- Two 40-bit accumulators including extension bits
- 40-bit parallel barrel shifter
- Highly parallel instruction set with unique DSP addressing modes
- Code-compatible with the DSP56300 core
- Position-independent code support
- User-selectable stack extension
- Nested hardware DO loops
- Fast auto-return interrupts
- On-chip support for software patching and enhancements
- On-chip Phase Lock Loop (PLL) circuit
- Real-time trace capability via external address bus
- On-Chip Emulation (OnCE) module and JTAG port

Memory

- $34\text{ K} \times 24$ of customer-specifiable factory-programmed Program ROM
- $0.5\text{ K} \times 24$ of Program RAM
- $10.25\text{ K} \times 16$ of X data memory, organized as follows:
 - $6\text{ K} \times 16$ of X data ROM
 - $4.25\text{ K} \times 16$ of X data RAM
- $12.25\text{ K} \times 16$ of Y data memory, organized as follows:
 - $8\text{ K} \times 16$ of Y data ROM
 - $4.25\text{ K} \times 16$ of Y data RAM
- Off-chip expansion for both program fetch and program data transfers
- No additional logic needed for interface to external SRAM memories

Preliminary

Peripheral Circuits

- Three dedicated General Purpose Input/Output (GPIO) pins and as many as thirty-one additional GPIO pins (user-selectable as peripherals or GPIO pins)
- Host Interface (HI08) support: one 8-bit parallel port (or as many as sixteen additional GPIO pins)
 - Direct interface to Motorola HC11, Hitachi H8, 8051 family, and Thomson P6 family
 - Minimal logic interface to standard ISA bus, Motorola 68K family, and Intel x86 microprocessor family.
- Synchronous Serial Interface (SSI) support: two 6-pin ports (or twelve additional GPIO pins)
 - Supports serial devices with one or more industry-standard codecs, other DSPs, microprocessors, and Motorola SPI-compliant peripherals
 - Independent transmitter and receiver sections and a common SSI clock generator
 - Network mode using frame sync and up to 32 time slots
 - 8-bit, 12-bit, and 16-bit data word lengths
- Three programmable timers (or as many as three additional GPIO pins)
- Three external interrupt/ mode control lines
- One external reset pin for hardware reset

Energy Efficient Design

- Very low power CMOS design
 - Operating voltage range: 1.8 V to 3.3 V
 - < 0.85 mA/MIPS at 2.7 V
 - < 0.55 mA/MIPS at 1.8 V
- Low power Wait for interrupt standby mode, and ultra low power Stop standby mode
- Fully static, HCMOS design for operating frequencies from 60 MHz down to 0 Hz (DC)
- Special power management circuitry

Preliminary

PRODUCT DOCUMENTATION


The three manuals listed in **Table 1** are required for a complete description of the DSP56602 and are necessary to design properly with the part. Documentation is available from a local Motorola distributor, a Motorola semiconductor sales office, a Motorola Literature Distribution Center, or through the Motorola DSP home page on the Internet (the source for the latest information).

Table 1 DSP56602 Chip Documentation

Topic	Description	Order Number
DSP56600 Family Manual	Detailed description of the DSP56600-family architecture, and 16-bit DSP core processor and the instruction set	DSP56600FM/AD
DSP56602 User's Manual	Detailed description of memory, peripherals, and interfaces of the DSP56602	DSP56602UM/AD
DSP56602 Technical Data	Electrical and timing specifications, pin descriptions, and package descriptions	DSP56602/D

OnCE and Mfax are trademarks of Motorola, Inc.



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/Europe/Locations Not Listed:

Motorola Literature Distribution
P.O. Box 5405
Denver, Colorado 80217
1 (800) 441-2447
1 (303) 675-2140

Mfax™:

RMFAX0@email.sps.mot.com
TOUCHTONE (602) 244-6609
USA and Canada ONLY:
1 (800) 774-1848

Asia/Pacific:

Motorola Semiconductors H.K. Ltd.
8B Tai Ping Industrial Park
51 Ting Kok Road
Tai Po, N.T., Hong Kong
852-26629298

Technical Resource Center:

1 (800) 521-6274

DSP Helpline

dsphelp@dsp.sps.mot.com

Japan:

Nippon Motorola Ltd.
Tatsumi-SPD-JLDC
6F Seibu-Butsuryu-Center
3-14-2 Tatsumi Koto-Ku
Tokyo 135, Japan
81-3-3521-8315

Internet:

<http://www.motorola-dsp.com>

