MOTOROLA'S MPC823 AND MPC823E INTEGRATED COMMUNICATION PROCESSORS

Freescale Semiconductor, Inc.

The MPC823 extends the versatility of the PowerPC family portfolio by offering an integrated communication solution that can be used in a variety of electronic products. It particularly excels in low-power, portable, image capture, and personal communication products. The MPC823 microprocessor integrates a high-performance embedded PowerPC core with a communications processor module (CPM) and system interface support, simplifying developing effort and reducing time-to-market. The CPM performs embedded signal processing functions for image compression and decompression. It also supports seven serial channels: two serial communication controllers (SCC), two serial management controllers (SMC), one I2C port, one USB channel, and one serial peripheral interface (SPI). This two-processor architecture consumes power more efficiently than traditional architectures because the CPM frees the core from peripheral tasks such as imaging and communication. Additionally, the MPC823 integrates a video and LCD controller for image processing applications.

The 823E offers enhanced on-board caches, 16KB instruction cache and 8KB data cache, and is suited for applications requiring higher performance than the 823.

Product Highlights

- Embedded PowerPC core (99 MIPS at 75MHz using Dhrystone 2.1)
- On-board cache
  - 823: 2KB instruction cache and 1KB data cache
  - 823e: 16KB instruction cache and 8KB data cache
- Communications Processor Module (CPM) manages communication and image processing
- LCD and video controller
- Dynamic Bus Sizing for 8-, 16-, and 32-bit data buses
- Two SCCs, one USB, two SMCs, one I2C, and one SPI
- Support for Ethernet, HDLC, IrDA, UART, and USART
- 3.3V core and system bus operation with 5.0V TTL compatibility on the General Purpose I/O pins
- 0.32u TLM available in 66, 75, and 81 MHz (823) and 66 and 75 MHz (823e) in a 256-pin PBGA package
- Strong 3rd party tools support

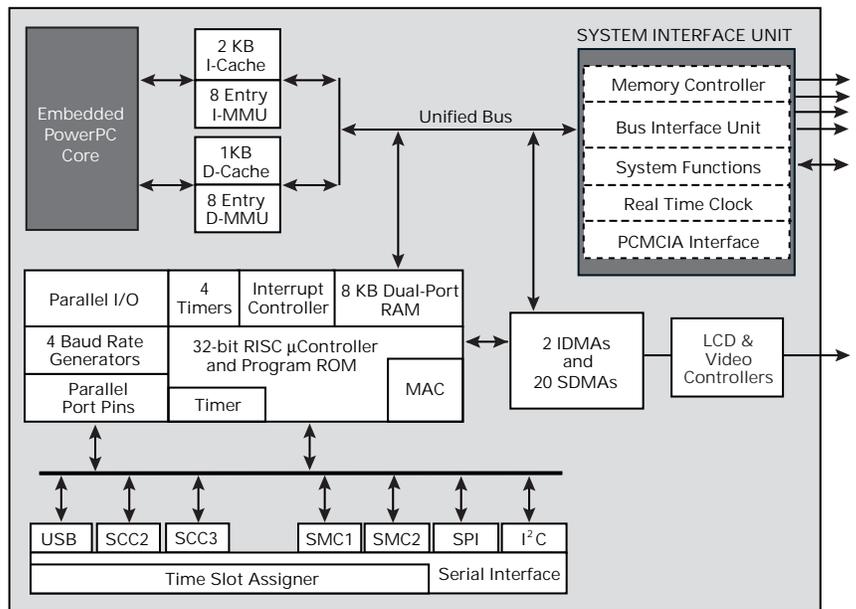### MPC823 INTEGRATED POWERPC PROCESSOR

Typical Applications

- Internet access products
- Image capture devices, including digital cameras
- Web screenphones
- Photo printers
- Low power portable products

PowerPC™

Digital DNA
from Motorola

Freescale Semiconductor, Inc.

Technical Specifications

- Embedded PowerPC core providing 99 MIPS at 75MHz (using Dhrystone 2.1)
  - Single-issue, 32-bit version of the PowerPC core with 32x32-bit fixed point registers
  - 2KB instruction cache and 1KB data cache (823) or 16KB instruction cache and 8KB data cache (823e)
  - Memory management units with 8-entry TLBs and fully associative instruction and data TLBs
- Advanced on-chip emulation debug mode
- Data bus dynamic bus sizing for 8-, 16-, and 32-bit buses
- Completely static low-power design
- Communication Processor Module (CPM)
  - 32-bit, Harvard architecture, scalar RISC microprocessor
  - 75+ MIPS at 75MHz in parallel with PowerPC core
  - 8KB dual port RAM
  - Twelve serial DMA (SDMA) channels
  - Two Serial Communication Controllers (SCCs)
  - One dedicated high-speed serial channel for the Universal Serial Bus (USB)
  - Two Serial Management Controllers (SMCs)
  - One I2C port
  - One Serial Peripheral Interface (SPI)
  - Four baud rate generators
  - One time slot assigner (2 for the 823e)

  - Protocols supported
    - Ethernet/IEEE 802.3 (CS/CDMA)
    - HDLC/SDLC and HDLC bus
    - Asynchronous HDLC
    - Universal Asynchronous Receiver Transmitter (UART)
    - Synchronous UART (USART)
    - IrDA Version 1.1 Serial Infrared (SCC2 only)
    - Basic Rate ISDN (BRI) in conjunction with serial management controllers
    - Primary Rate ISDN
    - Totally Transparent Mode with/without CRC
    - AppleTalk

- Video controller
  - Supports Digital NTSC/PAL video encoders and Digital TFT
  - Sequential RGB, 4:4:4, and 4:2:2 Ycr Cb (CCIR 601) digital component video formats
  - CCIR-656 compatible 8-bit interface port

- System Integration Unit
  - Memory controller
  - Bus interface unit
  - System functions
  - Real time clock
  - PCMCIA interface

- LCD controller
  - Supports Digital TFT and passive LCD panels

Contact Information

- Motorola offers user's manuals, application notes and sample code for all of its communications processors. In addition, local support for these products is also provided. This information can be found at:

  http://motorola.com/MPC823/

- For all other inquiries about Motorola products, please contact the Motorola Customer Response Center at:

  Phone: 800-521-6274
  or http://motorola.com/SPS

MPC823 Processor Block Diagram

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