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Alpha 21164PC

Digital Semiconductor Alpha 21164PC Microprocessor Product Brief

ALPHA GENERATION

The Digital Semiconductor Alpha 21164PC microprocessor (referred to as the 21164PC) is designed for Windows NT desktop applications and offers an alternative for high-performance PCs. The 21164PC is the first microprocessor to include motion video instructions (MVI), the new standard for 21st century visual computing.

Description

The 21164PC is a superscalar microprocessor, based on Digital Semiconductor's award-winning Alpha 21164 microprocessor. It provides unparalleled price performance for multimedia authoring, high-quality video conferencing, and 3D graphics. Unlike its competition, the 21164PC includes Digital Semiconductor's MVI, enabling real-time video conferencing and MPEG 2 decode without additional hardware assistance.

Benefits

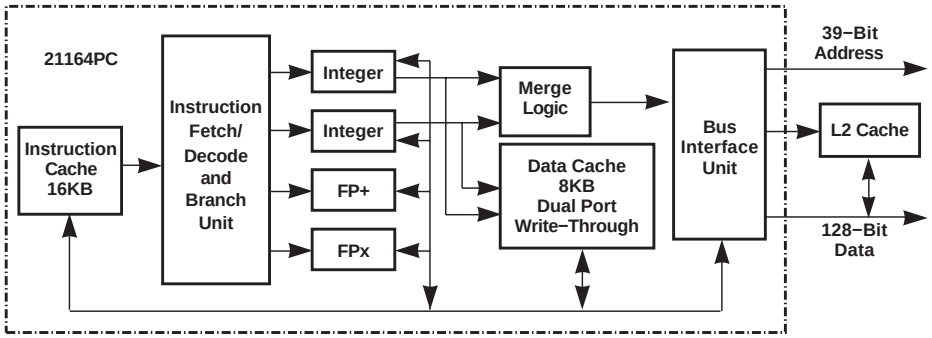
- Windows compatible
  - Thousands of native applications
  - High-performance translation technology for x86 applications
- Higher performance Windows NT desktop alternative for increased productivity
- Host-based DVD/MPEG 2 playback
- MPEG 1 real-time authoring
- H.323 LAN/H.320 ISDN video authoring with full screen, 30 frames per second (fps)
- Industry-standard SSRAM support
  - Flow through SyncBurst
  - Pipelined
- Designed for the future using Alpha's 21st century, 64-bit architecture

Features

- Fully pipelined 64-bit advanced RISC (reduced instruction set computing) architecture
- Superscalar (4-way instruction issue)
- 0.35 µm CMOS technology
- Onchip, 16KB, instruction cache
- Onchip, 8KB, dual-ported data cache
- Memory-management unit
- Serial ROM interface for initialization
- Support for byte and word data types
- JTAG (IEEE 1149.1) support for module-level tests
- Flexible high-performance interface
  - 128-bit memory data path
  - 3.3-V I/O
  - Selectable parity protection on data
  - Programmable system interface; one-fourth to one-fifteenth of clock speed
  - Control for offchip L2 cache (512KB through 4MB), with multiple timing options for industry-standard synchronous SRAMs
- 413-pin ceramic interstitial pin grid array (IPGA) package
- 2.5-V core for reduced power consumption

21164PC Functional Block Diagram

The 21164PC consists of five independent functional units: the instruction fetch/decode and branch unit; the integer execution unit; the memory-management unit; the cache control and bus interface unit; and the floating-point unit. There are two onchip caches: the instruction cache and the data cache.



Thermal Management

The 21164PC dissipates approximately 23 W (internal power) at 400 MHz. Conventional forced air cooling methods are sufficient to remove heat and maintain the highest levels of reliability. The user may also define an application-specific heat sink.

Estimated Performance

Speed	SPECint95	SPECfp95	BYTE
533 MHz	12	17	N/A
466 MHz	11	15	N/A
400 MHz	10	13	N/A

Characteristics	
Electrical	
Power supply	**Vss** = 0.0 V, **Vdd** = 3.3 V ±5%, **Vddi** = 2.5 V ±0.1 V
Environmental	
Operating temperature	**Ta** = 50°C maximum (122°F) **Tj** = 85°C maximum (185°F)
Storage temperature range	–55°C to +125°C (–67°F to +257°F)
Internal power dissipation @ **Vddi** = 2.5 V Frequency = 400 MHz	23 W maximum
For frequencies greater than 400 MHz, add 4 W for every 66 MHz.	
External power dissipation @ **Vdd** = 3.3 V Frequency = 400 MHz to 533 MHz	3 W maximum
Physical	
Package	413-pin IPGA

For More Information

To learn more about the availability of the 21164PC, contact your local semiconductor distributor or visit the Alpha World Wide Web Internet site:

http://www.alpha.digital.com

To learn more about Digital Semiconductor's product portfolio, visit the Digital Semiconductor World Wide Web Internet site:

http://www.digital.com/semiconductor

or you can contact the Digital Semiconductor Information Line:

United States and Canada
1–800–332–2717
Outside North America
1–510–490–4753
Electronic mail address
semiconductor@digital.com

For technical support, contact the Digital Semiconductor Customer Technology Center:

Phone (U.S. and international)
1–508–568–7474
Fax
1–508–568–6698
Electronic mail address
ctc@hlo.mts.dec.com