BRAVO

TECHNOLOGY OVERVIEW

AST's newest generation of Bravo systems are setting the industry standard by introducing the latest in computing technology advancements. In fact, these technologies are at the heart of our ability to increase efficiency and lower the cost of ownership so effectively over time.

Today's applications, and the future migration to 32-bit computing, are placing extraordinary demands on PC hardware platforms. And Bravo systems are ready. From the accelerated ATI VT graphics engine, to the Intel® 430HX PCIset, to the innovative AST-SmartShare™ memory architecture, Bravo systems are the first with an array of incredible technologies.

The Bravo family of computers represent the absolute in leading edge design to benefit the customer's bottom line. This attention to customer requirements and industry trends can only heighten the popularity of Bravo.

AST® COMPUTER

BRAVO MS GRAPHICS

ATI *mach*64™ VT Graphics Engine

The Bravo MS features ATI's most powerful 64-bit graphics and multimedia accelerator -- the ATI 264VT chip. The ATI VT integrates hardware features, such as smooth video scaling and enhanced color space conversion for breakthrough full-screen, full-motion multimedia playback with only 1 MB graphic RAM. Superior video scalar results from unique line buffer architecture and filtered vertical scaling eliminates jagged blocks created by line replication. Achieve 2D hardware acceleration with BitBLT, Line Draw, Polygon/Rectangle Fill, Bit Masking, Monochrome Expansion, Panning/Scrolling, Scissoring, and Hardware Cursor (up to 64x64x2) capability.

You can experience the incredible speed possible with 2 MB SGRAM and photo realistic full-color graphics (16.7 million colors) and resolution up to 1280 x 1024. And with full-motion MPEG-1 and AVI video playback support you achieve TV quality full-screen, full-motion video (up to 30 frames per second) and flicker free refresh rates up to 120 Hz.

SGRAM

The Bravo MS integrates the first graphics subsystem using Synchronous Graphics RAM (SGRAM) as the memory for its frame buffer. Achieving memory bandwidths of 600 MB/second and beyond, SGRAM is faster than DRAM and EDO and rivals the performance of more expensive dual ported memories like VRAM and WRAM. SGRAM's overlapping data retrieval capability doubles graphics RAM performance.

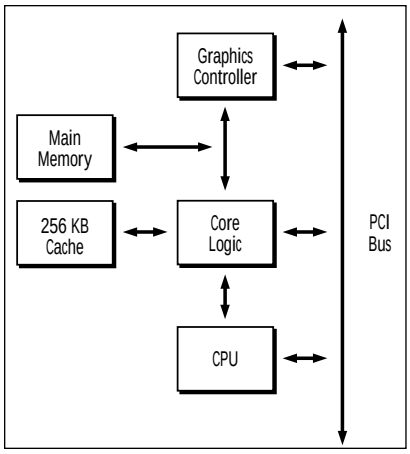
Ease-Of-Use

AST's powerful graphics also includes ease-of-use computing features like "virtual desktop" which allows you to conveniently access a larger desktop workspace, up to 1600x1200. You can change your screen size, center the screen image, and tune monitor refresh rates from within Microsoft® Windows® 95. You can also adjust your screen color to match your printer output and an "intelligent" On-Screen Guide makes it easy to optimize your graphics accelerator and display. Windows 95 plug and play compliance supports automatic configuration and VESA and DDC1/2b compliant monitors.

When compared to the previous generation of Bravo MS systems based on the ATI CT chip with 1 MB of graphics DRAM, the new Bravo MS with an ATI VT chip and 1 MB of SGRAM measures over a 100% performance increase. WinMark scores leap from 13 million to 34 million!

BRAVO LC GRAPHICS

The Bravo LC includes AST-SmartShare, AST's new, integrated PCI-based 64-bit memory architecture. Standard business computing tasks are streamlined with this innovative feature which uses main system RAM rather than dedicated graphics memory. For instance, in a Bravo LC with 16 MB RAM, the CPU dynamically reallocates RAM as data transfers occur and will dedicate 1-2 MB to the AST-SmartShare graphics subsystem. The memory sharing is achieved by physically connecting the core logic chipset and graphics controller to the same physical system memory DRAM pins. Since the graphics controller uses part of the system as its frame buffer, increased efficiency results.



AST-SmartShare features 135 MHz pixel clock for faster draws, 24-bit true color RAMDAC, and resolutions up to 1280 x1024 with 256 colors.

CPU And Memory Subsystem

Intel® 430HX PCIset

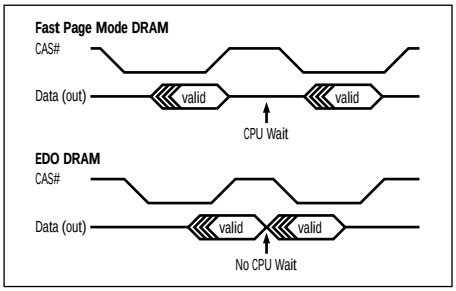
AST is first to feature the Intel® 430HX PCIset with the Bravo MS. This core logic chip speeds up the data flow over the PCI bus, memory and CPU subsystems for overall system performance gains of up to 10% from previous generations of core logic chipsets.

Gains in performance are achieved by employing a technology called Concurrent PCI. Concurrent PCI conducts transactions simultaneously on the CPU, PCI and ISA buses for increased bandwidth, improved video and audio performance, and faster processing of host-based applications.

EDO DRAM

Replacing FPM (Fast Page Mode) DRAM, Bravo desktops now feature the more powerful EDO (Extended Data Out) DRAM.

EDO DRAM is a high-density, high-performance memory technology that maximizes the performance of faster Intel® Pentium® processors and boosts throughput by reducing the number of back-to-back read cycle times. CPU bus wait cycles for a page hit are reduced from 5-3-3-3 with FPM DRAM to 5-2-2-2 using EDO DRAM. This translates into higher overall system performance of 3% - 4% over FPM DRAM!



Column Address Strobes (CAS) are the signals used to latch the column address on the memory address lines into the DRAMS. EDO separates the two functions of the CAS pin. In FPM DRAM, the CAS HIGH-to-LOW transition latches the column address and the LOW-to-HIGH transition turns off the output buffer. With EDO, the LOW-to-HIGH transition of CAS no longer turns off the output buffer. This allows the CPU to sample the output data even while the address is setup in advance for the next cycle.

256 KB Level-2 Cache Standard

The entry-level Bravo LC includes 256 KB asynchronous cache with the option of upgrading to 256 KB pipeline burst synchronous cache. The more powerful Bravo MS features 256 KB pipeline burst synchronous cache upgradable to 512 KB.

	Bravo LC	Bravo MS
Standard Cache	256 KB asynchronous	256 KB pipeline burst synchronous
Optional Upgrade	256 KB pipeline burst synchronous	512 KB pipeline burst synchronous

Bravo LC and Bravo MS cache

Cache memory provides the CPU with the most frequently accessed instructions and data. Faster performance is achieved when accessing this data from cache memory rather than main system memory. AST offers a substantial 256 KB cache standard on all Bravo desktops with pipeline burst synchronous cache offered on Bravo MS systems.

Pipeline burst synchronous cache improves performance by synchronizing data operations with the speed of the CPU, eliminating address propagation delays from the processor, and offering an extra data output register which allows the next access cycle to begin while the CPU is still reading data from the previous cycle. By overlapping data retrieval, cache performance is improved by as much as 25%.

I/O Subsystem

AST's Bravo desktops feature the highest performing I/O technology available today - PCI local bus, and Enhanced IDE (EIDE) interfaces with EIDE Mode 4 support.

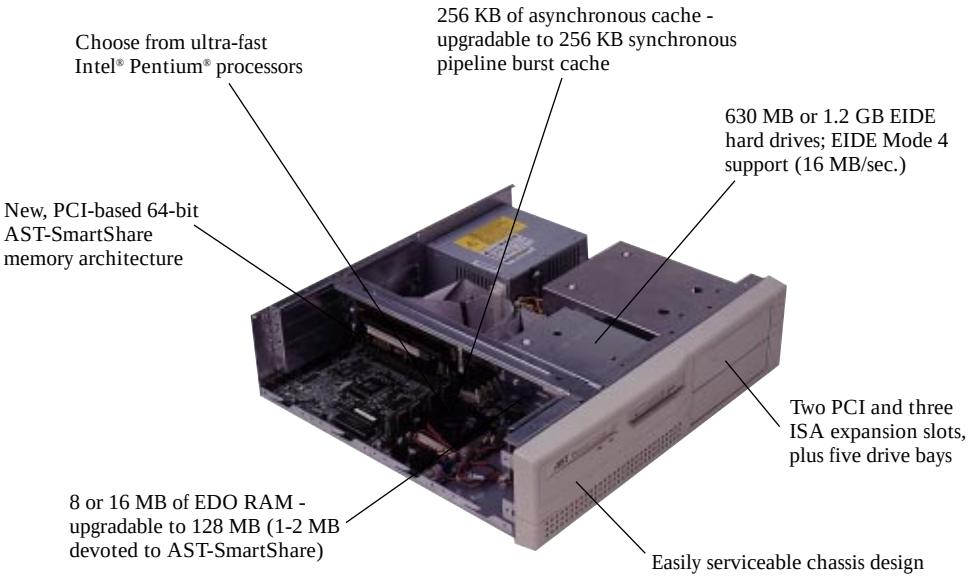
EIDE Mode 4 Support

EIDE Mode 4 provides significant enhancements over standard IDE bus technology - resulting in data transfer rates of up to 16.7 MB per second!

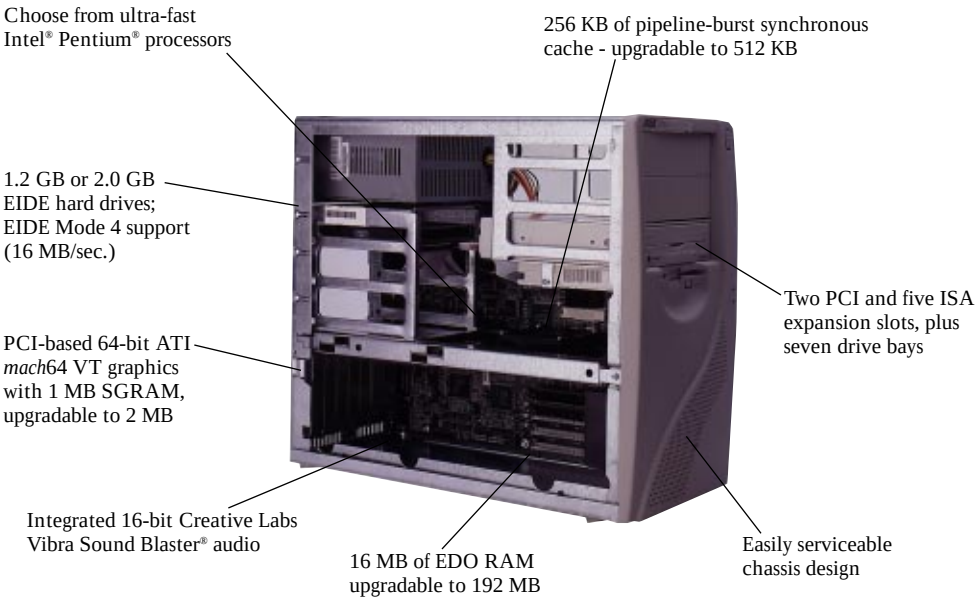
The higher data transfer rate is a critical factor when working with large blocks of data. This is generally associated with graphics intensive and database applications.

Mode	MB/second
PIO Mode 4	16.7
PIO Mode 3	11.1
PIO Mode 2	8.3
PIO Mode 1	5.2
PIO Mode 0	3.3

PIO mode data transfer rate comparison



BRAVO LC



BRAVO MS-T

BRAVO MS AUDIO SUBSYSTEM

Get tomorrow's audio technology today with AST-AudioWorks™. AST's plug-n-play audio subsystem using Creative Labs' Vibra Sound Blaster® 16-bit stereo recording and playback with complete Sound Blaster and Windows® 95 compatibility.

AUDIO™ WORKS

Featuring Creative Labs' Creative Mixer, a powerful Windows-based audio mixer, you can combine, manipulate and control sound while running other Windows applications. And it's MPC level-2 compliant for full compatibility with the latest multimedia hardware and software.

AST has included stereo inputs for CD-audio, plus line-in and music synthesis chips, stereo line output, microphone input and a serial data port to simplify the integration of advanced telephony applications. AST also offers full duplex operation to allow simultaneous two-way communication to save time.

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 Printed in U.S.A. Worldwide English Version 4/96 040006-647

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