Graphics and Video Accelerator

64-bit Architecture

€64-bit graphics engine

€64-bit video memory interface

Powerful Software

€Drivers for all major operating systems

€Video BIOS supports major RAMDACs

€Fully compatible with VGA and VESA® SVGA

€Direct Microsoft® Video for Windows™, Indeo™, and CinePak™ support

Flexible System Design

€32/64/128-bit SID RAMDACs

€1 to 8 MBytes of VRAM

€Pin compatible with S3 Vision964™

Industry-standard Local Bus Support

€32-bit glueless PCI local bus interface

€32-bit VESA local bus interface

High Resolution/75 Hz (NI) Refresh Rate Support

€1024x768 resolution with 16.7M colors

€1280x1024 resolution with 16.7M colors

€1600x1200 resolution with 16.7M colors

Integrated Multimedia Support

€ Color space conversion

€ Bilinear scaling

€ Dithering

€ Image compression

Green PC/Monitor Plug and Play Support

208-pin PQFP Package

The S3™ Vision968™ 64-bit VRAM-based multimedia accelerator (hereinafter referred to as the Vision968) provides accelerated graphics and video, high resolutions, true color and multimedia capabilities to Intel®, PowerPC™, Alpha™ and MIPS™ hardware platforms. Operating environments supported include Microsoft Windows™, Windows NT™, OS/2®, Video for Windows, Indeo and CinePak. Applications supported include AutoCAD® and MicroStation PC®.

The 64-bit graphics engine accelerates common graphics operations such as bit block transfers and rectangle fills. The Vision968 processes two 32 bits/pixel (bpp) (true color) operations, four 16 bpp operations or eight 8 bpp operations per clock cycle. Other performance enhancing features include linear addressing of video memory and write posting of CPU memory writes.

The pixel data bus to the frame buffer is 64 bits wide. When combined with support for the fast page and extended data out (EDO) modes of the latest VRAMs, this provides a pixel data bandwidth between the CPU and video memory of up to 400 MBytes/second. Maximum screen refresh band-width using a 128-bit SID bus and a 64-bit RAMDAC is 720 MBytes/second.

The Vision968 is register-level compatible with standard VGA and provides fast operation in these text and graphics modes. It supports the VESA extended VGA modes. It also provides a set of enhanced modes

for accelerated operation with higher resolutions and pixel depths (bits/pixel).

High performance Vision968-based systems can be designed with 1 MByte of VRAM and a 32-bit SID RAMDAC. Very high performance systems can be configured with up to 8 MBytes of faster VRAM and a 64- or 128-bit SID RAMDAC. This provides a wide range of price/performance points. VRAM sizes supported are 256Kx4, 256Kx8 and 256Kx16.

The Vision968 provides interfaces to both the PCI bus and VL-Bus. The PCI bus interface (Figure 1) is fully compliant with revision 2.0 of the PCI specification and requires no external glue logic. The VL-Bus interface requires external buffers to allow multiplexing of the system address and data lines. The Vision968 provides all required control signals for these buffers.

The high memory bandwidth and support for high-speed SID RAMDACs allows the Vision968 to support very high resolutions and screen refresh rates. The accompanying table shows the resolutions supported for various memory sizes.

Resolution	VRAM SIZE			
	1 MB	2 MB	4 MB	8 MB
640X480X4	✔	✔	✔	✔
640X480X8	✔	✔	✔	✔
640X480X16	✔	✔	✔	✔
640X480X24	✔	✔	✔	✔
640X480X32		✔	✔	✔

800X600X4	✔	✔	✔	✔
800X600X8	✔	✔	✔	✔
800X600X16	✔	✔	✔	✔
800X600X24/32		✔	✔	✔
1024X768X4	✔	✔	✔	✔
1024X768X8	✔	✔	✔	✔
1024X768X16		✔	✔	✔
1024X768X24/32			✔	✔
1280X1024X4	✔	✔	✔	✔
1280X1024X8		✔	✔	✔
1280X1024X16			✔	✔
1280X1024X24			✔	✔
1280X1024X32				✔
1600X1200X4	✔	✔	✔	✔
1600X1200X8		✔	✔	✔
1600X1200X16			✔	✔
1600X1200X24/32				✔

The Vision968 supports several types of multimedia operations. It provides a request/grant protocol and associated signals to allow a video coprocessor to share the video frame buffer. In addition, the Vision968 contains built-in genlock circuitry to synchronize the RAMDAC output with an external NTSC/PAL video signal. This feature provides support for multimedia-type applications such as video super-position and chroma key control.

The Vision968 accelerates most standard video playback decompression algorithms. Integrated color space conversion, scaling and dithering further enhance the user interface and increase video performance.

The Vision968 can convert a YUV data stream to a 24 bpp RGB data stream. The output of the color space converter is then sent through the Vision968's scaling engine to provide up to 4 times the size of the original video image. Additionally, a dithering engine supports 24 bpp images in a 16- or 8- bit format with little quality impact.

To support image compression, the Vision968 can scale images down to the size required to meet disk drive bandwidth requirements.

For low power consumption designs (Green PC), the Vision968 allows software manipulation of its horizontal and vertical sync signals to control the power state of monitors. The Vision968 also supports the VESA Display Data Channel (DDC1 and DDC2) standard that permits transfer of monitor identification and resolution support data.
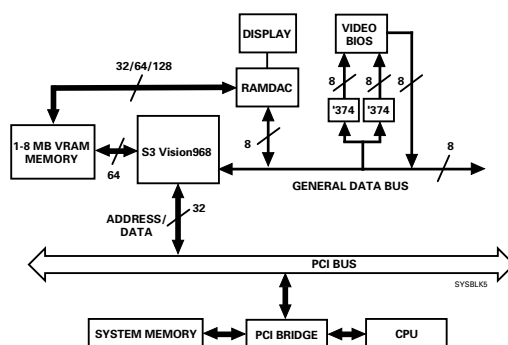

Figure 1. Vision968 System Block Diagram