



S3 Incorporated

High-Performance Integrated Graphics/Video Accelerators with Synchronous DRAM Support

- High-performance 64-bit graphics engine
- CPU writes to video memory using one memory clock cycle
- Integrated 24-bit RAMDAC with 170 MHz pixel rate and programmable dual-clock synthesizer
- Trio64V2/DX is a DRAM-based pin compatible upgrade to the Trio64V+ that can be dropped into a Trio64V+ design without change
- Trio64V2/GX is a higher performance SGRAM/SDRAM/DRAM-based chip with a pinout optimized for synchronous operation

S3 Enhanced Streams Processor Features

- On-the-fly stretching and blending of primary RGB stream and RGB or YUV (video) secondary stream
- Horizontal and vertical interpolation for smooth upscaling
- Improved secondary stream decimation
- Each stream can have different color depths
- YUV data is color space converted
- Contrast, saturation and brightness controls

Advanced Playback Capabilities

- High-quality hardware-assisted video playback (up to 1024x768x16 bits/pixel)
- Support for Indeo, Cinepak, and software-accelerated MPEG-1 video playback

Game and Presentation Effects.

- Hardware double-buffering support for high-quality tear-free playback
- 2-D scrolling and sprite plane support
- Color and chroma keying for overlaying of graphics onto video and video onto graphics
- Arithmetic blending of two pixel streams for fade-in/fade-out transition effects

S3 Scenic Highway Interface

- Industry standard video digitizers
- S3 Scenic/MX2 MPEG-1 audio/video decoder

S3 Trio64V+ Compatibility

- Pin compatible with fast page/EDO DRAMs
- BIOS and driver backwards compatibility

High Non-Interlaced Screen Resolution Support

- 1280x1024x256 colors at 85 Hz refresh
- 1024x768x64K colors at 85 Hz refresh
- 800x600x16.7M colors at 85 Hz refresh
- 1600x1200x256 colors at 60 Hz refresh

High-Performance Memory Interface

- 64-bit interface
- Supports 1-, 2-, or 4-MByte frame buffer (4 MByte only with fast page/EDO DRAMs)
- Supports fast page mode DRAM (66 MHz), 1-cycle EDO DRAM (60 MHz), 256Kx16 SDRAM and 256Kx32 SGRAM (66 MHz)

Supports Big or Little Endian Byte Ordering

Glueless PCI 2.1 Local Bus Support

Multimedia Support Hooks

- 8-bit bidirectional feature connector
- S3 Scenic Highway
- I²C serial communications bus

Full Software Support

- Drivers for Windows[®] 3.11, Windows[®] NT, Windows[®] 95, OS/2[®] 2.1 and 3.0 (Warp[™]), SCO[®] UNIX[®]

Green PC/Monitor Plug and Play Support

- Full hardware and BIOS support for VESA Display Power Management Signaling (DPMS)
- DDC monitor communications support

Extensive Static/Dynamic Power Management

© Copyright 1996 S3 Incorporated. All rights reserved. If you have received this document from S3 Incorporated in electronic form, you are permitted to make the following copies for business use related to products of S3 Incorporated: one copy onto your computer for the purpose of on-line viewing, and one printed copy. With respect to all documents, whether received in hard copy or electronic form, other use, copying or storage, in whole or in part, by any means electronic, mechanical, photocopying or otherwise, is not permitted without the prior written consent of S3 Incorporated, P.O. Box 58058., Santa Clara CA 95052-8058. S3 and True Acceleration are registered trademarks of S3 Incorporated. The S3 Corporate Logo, S3 on Board, S3 on Board design, S3d design, Vision968, Trio, Trio64, Trio64V+, Trio64UV+, VIRGE, VIRGE/VX, S3d, Scenic, Scenic/MX2, Scenic Highway, Sonic, Sonic/AD, DuoView, Cooperative Accelerator Architecture, Streams Processor, MIC, Galileo, Native-MPEG, No Compromise Integration, No Compromise Acceleration and Innovations in Acceleration are trademarks of S3 Incorporated. Other trademarks referenced in this document are owned by their respective companies. The material in this document is for information only and is subject to change without notice. S3 Incorporated reserves the right to make changes in the product design without reservation and without notice to its users.



S3 Incorporated

Overview

The S3[®] Trio64V2/DX[™] and Trio64V2/GX[™] graphics/video accelerators (hereinafter referred to as the Trio64V2/DX and Trio64V2/GX respectively), combine high-performance graphics and high-quality video acceleration features with the capability to directly interface to live video and MPEG-1 peripherals. They incorporate an enhanced version of the 64-bit graphics accelerator core used in S3's existing Trio64V+[™] accelerator and a high-performance 170 MHz true-color RAMDAC. Note that the term Trio64V2[™] graphics/video accelerator (or Trio64V2) is used when the discussion applies equally to the Trio64V2/DX and Trio64V2/GX.

All display applications that require high-quality video playback (from a CD-ROM or hard drive), or live video input capability, can take advantage of the new features. The Trio64V2 accelerates/enhances software MPEG-1/Indeo/Cinepak video playback by providing arbitrary scaling with high-quality linear interpolation in both the horizontal and vertical dimensions and color space conversion (RGB to YUV). The Trio64V2 offers high-quality video playback with window sizes of up to 1024x768x16 bits/pixel at high frame rates. The Trio64V2 has an S3 Scenic Highway[™] interface that provides a direct interface to MPEG-1 audio/video decoder devices and live video digitizers to attain full-motion video.

Synchronous Memory Support

The Trio64V2/GX is the first S3 product to support synchronous memory. Low cost 256Kx16 SDRAMs and 256Kx32 SGRAMs are supported at 66 MHz. This provides a peak bandwidth of 528 MB/s.

1-Cycle Operation

S3 was the first graphics accelerator supplier to provide support for 1-cycle EDO operation. With 1-cycle EDO architecture, peak bandwidth increases linearly with memory clock speed, e.g, 320 MB/s at 40 MHz, 400 MB/s at 50 MHz and 480 MB/s at 60 MHz. The Trio64V2 raises the memory speed supported to 60 MHz. In addition, the Trio64V2 is the first graphics accelerator to provide CPU writes to video memory using one memory clock cycle.

S3 Enhanced Streams Processor

The S3 Streams Processor[™] architecture allows the mixing of three separate display streams. The primary stream can be RGB data of any color depth. The secondary stream can be RGB or YUV (video) data of any color depth. YUV data is color space converted to RGB. The third stream, the hardware cursor, overlays the other two streams. Horizontal and vertical interpolation allow smooth upscaling of the secondary stream.

Arithmetic blending of a primary graphics stream and secondary graphics/video enables dramatic transition effects for game applications. Color and chroma keying allow opaque or transparent overlays of one stream on the other. Hardware-assisted double buffering of both primary and secondary data streams is also provided to enable high-quality "tear-free" playback.

The Streams Processor architecture saves memory storage and bandwidth. It also enables simultaneous display of graphics and video of different color depths. For example, it is possible to display 24 bits/pixel-equivalent video on top of an 8-bit graphics background, thus permitting higher frame rates because of reduced bandwidth requirements.

The contrast, saturation and brightness of the video stream can be adjusted. This allows the viewer to adjust for personal preferences.

S3 Scenic Highway

The S3 Scenic Highway interface directly connects to the S3 Scenic/MX2[™] MPEG-1 audio/video decoder as well as standard video digitizers. This provides easy implementation of MPEG-1 or digital video daughtercards that directly plug into the Scenic Highway connector or, alternately, ISA cards, where a ribbon cable is also necessary.

The Streams Processor and Scenic Highway are tightly coupled to provide optimal live video playback. The hardware automatically switches capture and display buffers without software intervention.