CIRRUS LOGIC ®

FEATURES

■ **64-bit graphics engine with integrated 3D game acceleration (CL-GD5464)**
- — Perspective textures mapping
- — Bilinear/trilinear filtering
- — Mip mapping
- — Lit, copy, decal, and blend textures
- — Texture decompression
- — Mono rasterization (single-pass lighting)
- — Stippling
- — Polygon, line, and point drawing
- — 16-bit Z-buffer
- — Gouraud shading
- — Alpha blending, fog, and transparency
- — Display list processing for maximum performance
- — Hardware page flipping
- — Sub-pixel accuracy

■ **High-performance 64-bit GUI accelerator**
- — Three-operand BitBLT (bit block transfer)
- — Color expansion for 8-, 16-, 24-, and 32-bpp modes
- — Stretch BLT

■ **PCI 2.1-compliant bus master (CL-GD5464)**
- — DMA maximizes system performance
- — Host-rendered/cached texture maps

■ **AGP (accelerated graphics port) support (CL-GD5465)**

(cont.)

**High-Performance
VisualMedia™ Accelerators**
CL-GD5462 (2D)
CL-GD5464 (3D)
CL-GD5465 (AGP)

OVERVIEW

The CL-GD546X is the Laguna™ family of pin-compatible, Rambus®-based 2D/3D graphics accelerators. The CL-GD5462, the first family member, provides multi-window video and graphics acceleration with greater-than-VRAM performance at lower-than-VRAM cost. The follow-on product, the CL-GD5464, offers 3D graphics capability in addition to maintaining the same high level of 2D performance offered by the CL-GD5462.

The 64-bit graphics engine of the CL-GD546X features standard GUI acceleration hardware as well as advanced features such as stretch BLT and video playback scaling. Color-key and chroma-key operations are supported to enable graphics and video to be combined in an efficient manner. The CL-GD546X integrates a 24-bpp palette DAC, clock generators, a full-feature VGA controller, and V-Port™ bus for easy expandability.

(cont.)

**System
Block Diagram**
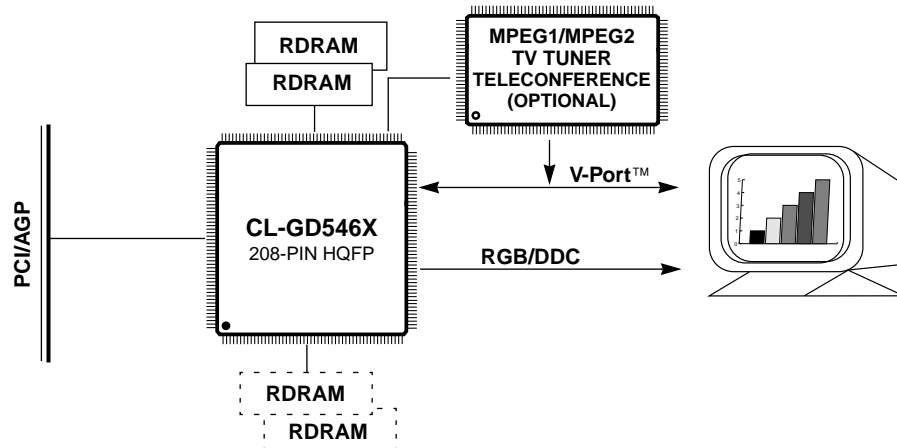
FEATURES (cont.)

- ■ **Video playback acceleration**
  - — Single-pass X, Y interpolated scaling
  - — Hardware occlusion for three video windows
  - — YUV-to-RGB conversion
  - — Color and chroma key
- ■ **Rambus® memory architecture**
  - — Low-latency devices supported
  - — Single memory for color-buffer, Z-buffer, and texture store
- ■ **V-Port™ for peripheral expansion**
  - — MPEG decoder
  - — TV tuner
  - — Teleconferencing
- ■ **Integrated VGA controller**
- ■ **Integrated 230-MHz palette DAC and clock synthesizer (CL-GD5462 is 170 MHz)**
  - — Supports resolutions up to 1600×1200 at 85 Hz
  - — True-color operation up to 1024×768
  - — Hardware cursor
- ■ **DDC (display data channel) level 2B-compliant monitor signaling**
- ■ **'Green PC' power-saving features support**
  - — DPMS (display power management signaling)
  - — System power-down

OVERVIEW (cont.)

Based on the CL-GD5462, the CL-GD5464 incorporates a 3D module, PCI bus mastering, and a newer, 230-MHz DAC. The CL-GD5464 offers very cost-effective hardware acceleration for the latest generation of 3D games that rely heavily on texture mapping to achieve a dramatic experience for the end user. The rendering performance is tuned to Microsoft's Direct3D game API. The CL-GD5464 is also compatible with many other 3D game APIs on the market.

The CL-GD5464 operates as a PCI bus master for maximum system throughput. Use of the PCI bus master reduces the system cost by optionally storing texture maps, Z-buffer, and display list instructions for 3D operation in system memory.

The CL-GD5465 also supports Intel's AGP (accelerated graphics port) for higher bandwidth between the system memory and the graphics subsystem.

Both the CL-GD5462 and CL-GD5464 are one-channel devices with bandwidth up to 600 Mbytes per second. While maintaining the same pin layout, future Laguna family members will use two Rambus channels to increase the bandwidth to 1.2 Gbytes per second.

3D GRAPHICS AND VIDEO MODES (CL-GD5464)

The following table shows some of the video data formats associated with each of the graphics display modes for the CL-GD5464.

RDRAM Memory Size	Screen Resolution (Double-Buffered)	Color Depth (Double-Buffered)	Z-Buffer	Off-Screen Texture Memory[a]
1 Mbyte	640×480	8 bpp	Host based	> 350 Kbytes
1 Mbyte	320×240	16 bpp	16 bit	> 450 Kbytes
2 Mbyte	640×480	16 bpp	16 bit	> 150 Kbytes
2 Mbyte	640×480	16 bpp	Host based	> 600 Kbytes
2 Mbyte	485×380	16 bpp	16 bit	> 800 Kbytes

a Additional texture maps can be stored in system memory and accessed by the CL-GD5464 bus master capability.

SOFTWARE DRIVERS SUPPORT

Cirrus Logic provides an extensive and expanding range of software drivers to enhance the resolution and performance of many software packages. The following table lists the Cirrus Logic software drivers for the CL-GD546X. The CL-GD5464 is a software superset of the CL-GD5462.

Software Drivers	Resolution Supported	No. of Colors
Microsoft® Windows® Microsoft® DCI Provider (display control interface) Microsoft® Windows® 95 Microsoft® DirectDraw™	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 Million (24 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 Million (32 bit) CL-GD5464 only
Microsoft® Windows NT™	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 Million (24 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 Million (32 bit)
AutoCAD® AutoShade® with Renderman™ 3D Studio™ MicroStation®	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024, 1600 × 1200	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	65,536 (16 bit)
	640 × 480, 800 × 600, 1024 × 768	16.8 Million (24 bit)
OS/2® v3.×, Warp	640 × 480, 800 × 600, 1024 × 768, 1280 × 1024	256 (8 bit)
	640 × 480, 800 × 600, 1024 × 768	65,536 (16 bit)
VPM (video port manager)	Resolution-independent	–

BIOS SUPPORT

- **Fully IBM® VGA-compatible BIOS**
- **VBE (VESA® BIOS Extension) v2.0 support**
- **PCI support**
- **DPMS and DDC2B support in ROM**
- **Plug-and-play support**

UTILITIES

- **Manufacturing test**
- **Video-mode configuration utility: CLMODE**
- **Configured OEM system integration: OEMSI**
- **Resolution switching utility: WINMODE**
- **RAMBIOS utility**
- **Screen centering utility**
- **Register editor and viewer**