CIRRUS LOGIC®

CL-GD5452/GD5453

Preliminary Product Bulletin

FEATURES

- Two-chip multiplexer-less, VRAM-based graphics accelerator
- Resolutions supported:
  - 1280 x 1024 x 24 bits per pixel (non-interlaced)
  - 1024 x 768 x 32 bits per pixel (non-interlaced)
  - 1600 x 1200 x 8 bits per pixel (interlaced)
- 64-bit graphics acceleration
  - Bit Block Transfer (BitBLT) engine
  - Color expansion for 8-, 16-, 32-bit-per-pixel modes
  - Line-draw engine with styling capability
  - 64 x 64 x 2 hardware cursor compatible with 8- to 32-bit-per-pixel modes
  - BitBLT registers backward-compatible with Cirrus Logic Alpine™ and True Color (CL-GD543X and CL-GD542X) Families
- 32-bit direct-connect host interfaces
  - PCI™ bus with burst-cycle support (up to 33 MHz)
  - VESA® VL-Bus™ (up to 50 MHz)
  - ISA bus (up to 12.5 MHz)
  - Zero-wait-state, 4-level write buffer (ZWS up to 33 MHz)
  - Direct linear addressing of frame buffer memory
  - Memory-mapped I/O for fast register access
- 64-bit VRAM display memory interface
  - 1 to 4 Mbyte display memory support
  - x4-, x8-, x16-wide VRAM support
- 135-MHz, 24-bit dedicated palette DAC (CL-GD5453)
  - Up to 128-bit-wide direct interface to VRAM serial ports
  - Up to 32-bit-wide Video Overlay port with 'Color Key' support
  - Alpha channel support (32 bits per pixel)
- Integrated dual-clock synthesizer
  - Pixel clock programmable up to 135 MHz
  - Memory clock programmable up to 68 MHz   *(cont.)*

## High-Resolution True Color Graphics Accelerator

OVERVIEW

The CL-GD5452/GD5453 VRAM-based graphics accelerator is a two-chip solution that includes a high-performance VGA controller (CL-GD5452) and palette DAC (CL-GD5453). The CL-GD5452 has an integrated clock synthesizer and a configurable direct-connect 32-bit PCI™ local bus, 32-bit VESA® VL-Bus™, or ISA bus interface. Coupled with the CL-GD5453, which features a 128-bit-wide direct VRAM interface, a truly glueless high-performance graphics subsystem can be implemented.

To provide outstanding graphics acceleration, the CL-GD5452/GD5453 includes features such as a BitBLT engine, X/Y line-draw engine, hardware cursor, color expansion, linear addressing, and memory-mapped I/O. With a programmable pixel clock up to 135 MHz, non-interlaced resolutions of 1280 x 1024 x 24 and 1024 x 768 x 32 bits per pixel (true-color with alpha overlay channel) are achievable.

(cont.)

System Block Diagram

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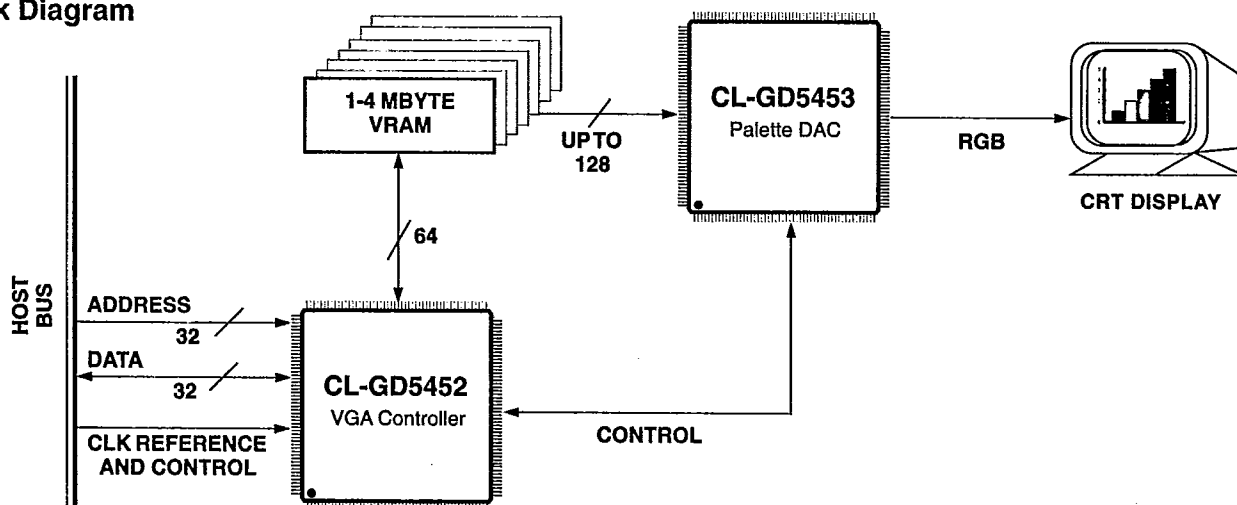
CL-GD5452/GD5453

NorthStar™ Family

FEATURES (cont.)

- ■ 'Green PC' power-saving features
  - — VESA® Display Power Management Signaling (DPMS) support
  - — Programmable DAC sleep mode
  - — Low-frequency VRAM refresh
- ■ Integrated VGA for 100% software compatibility
- ■ Both chips offered with 0.8-micron CMOS technology in 208-pin PQFP packages

OVERVIEW (cont.)

The CL-GD5452/GD5453 are offered in highly integrated 208-pin PQFP packages that are ideal for both motherboard systems and add-in cards. The CL-GD5452/GD5453 graphics accelerator requires no external support other than VRAM memory and a 14.31818-MHz frequency reference. This two-chip solution lowers system component count and saves board space, thus lowering system costs.

ADVANTAGES

Unique Features

Cost Effectiveness —

- ■ Interface to as few as two VRAMs, integrated dual-frequency synthesizers, and a companion true color palette DAC chip (CL-GD5453)
- ■ Interface to x4, x8, x16 VRAMs

  - — Integrated VGA core
  - — Integrated data multiplexers in DAC chip
  - — Integrated flexible host interface

High Performance —

- ■ 64-bit BitBLT engine

- ■ Hardware line-draw engine
- ■ 32-bit PCI bus, VESA® VL-Bus™, and local bus interface
- ■ 64-bit-wide VRAM interface
- ■ Independent video and VRAM timing
- ■ Host access to VRAMs through advanced write buffers
- ■ 32-bit memory-mapped BitBLT control registers
- ■ 135-MHz, 24-bit, true-color palette DAC

Multimedia —

- ■ Color keying, GENLOCK, and 8-, 16-, or 32-bit video overlay input port

Compatibility —

- ■ Compatible with VGA and VESA® standards
- ■ Drivers supplied at various resolutions for Windows 3.1, Windows NT, AutoCAD®, OS/2 ™, and other key applications
- ■ Connects directly to IBM® PS/2™ and multi-frequency analog monitors
- ■ VESA® DPMS support

Benefits

- ❐ Minimizes chip count, system cost, and board space for a cost-effective solution.

- ❐ Flexible design for use of appropriate type and amount for a cost-effective solution.
  - — Eliminates external VGA chip and glue logic
  - — Eliminates need for high-speed external multiplexers
  - — Allows direct-connect interfaces to VESA® VL-Bus™, PCI™, and ISA buses

- ❐ Accelerates graphics, such as Microsoft® Windows and similar applications.
- ❐ Accelerates CAD applications.
- ❐ Increases system throughput.
- ❐ Eliminates display memory bottleneck.
- ❐ Optimizes timing for increased performance.
- ❐ Provides faster host access for writes to display memory.
- ❐ Improves graphics application performance.
- ❐ 16.8 million colors at high resolutions for life-like images. Provides high-color and true-color display for photo-realistic images.

- ❐ Allows high-bandwidth video interfacing through the VESA® connector for multimedia applications.

- ❐ Compatibility with installed base of systems and software.
- ❐ Provides a 'ready-to-go' solution that minimizes the need for additional driver development.

- ❐ Drives all PC-industry-standard, high-resolution monitors to ensure compatibility.
- ❐ Complies with VESA® monitor signalling standard for 'Green PC' applications.

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SOFTWARE SUPPORT

CL-GD5452/GD5453 VGA Software Drivers

Cirrus Logic provides an extensive — and expanding — range of software drivers to enhance the resolution and performance of many software packages. Note, however, the CL-GD5452/GD5453 VGA graphics portion of a system does not require software drivers to run applications in standard-resolution mode.

Cirrus Logic software drivers for the CL-GD5452/GD5453 include the following:

Software Drivers	Resolution Supported*	No. of Colors
Microsoft® Windows v3.X	640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024	16 and 256 colors 65,536 colors 16.8 million colors
Microsoft® Windows NT v1.X	640 x 480, 800 x 600, 1024 x 768, 1280 x 1024	16 and 256 colors
AutoCAD® v11, v12 Autoshade® v2.0 with Renderman, 3D Studio v1, v2 MicroStation®	640 x 480, 800 x 600, 1024 x 768, 1280 x 1024 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024 640 x 480, 800 x 600, 1024 x 768	16 colors 256 colors 65,536 colors 16.8 million colors
GEM™ v3.X	800 x 600, 1024 x 768	16 colors
Ventura Publisher® v2.0, v3.X	800 x 600, 1024 x 768	16 colors
OS/2™ v2.0, v2.1	800 x 600, 1024 x 768 640 x 480, 800 x 600, 1024 x 768 Up to 1024	16 colors 256 colors 65,536 colors
Lotus® 1-2-3® v2.X,	132 x 25, 132 x 43 (text) 800 x 600	16 colors 16 colors
Lotus® 1-2-3® v3.X	800 x 600, 1024 x 768	16 colors
Microsoft® Word v5.X	132 x 25, 132 x 43 (text) 800 x 600, 1024 x 768	16 colors 16 colors
WordPerfect® v5.0	800 x 600	16 colors
WordPerfect® v5.1	132 x 25, 132 x 43 (text) 800 x 600, 1024 x 768	16 colors 16 colors
WordStar® v5.5-7.0	800 x 600, 1024 x 768	16 colors
SCO UNIX™	640 x 480, 800 x 600, 1024 x 768	16 and 256 colors

NOTE: *All resolutions may not run on all monitor types; 640 x 480 drivers will run on PS/2-type monitors. Extended resolutions are dependent upon monitor type and VGA system implementation.

BIOS SUPPORT

- **Fully IBM® VGA-compatible BIOS**
- **Relocatable, 32K bytes with VESA® VL-Bus™ and PCI™ local bus support**
- **VESA® BIOS Extensions (VBE) support in ROM**
- **Display power-management signaling (DPMS) support in ROM**
- **VESA®-monitor-timing-compliant**

UTILITIES

- ■ **Manufacturing test**
- **Windows DOS/NT utilities**
- **Video-mode configuration utility — CLMODE**
- **RAMBIOS utility**
- **Set resolution in Windows — SETRES**
- **Configured OEM system integration — OEMSI**