CL-GD6245

Advance Product Bulletin

FEATURES

- **176-pin (EIAJ standard) VQFP package**
  - — Small form factor
  - — Thin (1.4 mm) package
- **Direct connection to host bus**
  - — 32-bit '486 local bus
  - — VESA® VL-Bus™
  - — 16-bit '386 local bus
  - — ISA bus (PC AT)
- **Integrated dual-scan color STN LCD support**
  - — Requires only ½ Mbyte of video memory
  - — SimulSCAN™ available with no feature compromise
  - — Integrated Frame-Accelerator for less power consumption
- **Integrated support for other LCD panels**
  - — Single-scan color STN
  - — Single- and dual-scan monochrome STN
  - — 9-, 12-, 15-, and 18-bit color TFT
  - — Multi-shade monochrome TFT
- **Up to 256 colors (at 640 x 480) with color STN and TFT panels**
- **Up to 64 shades (at 640 x 480) with monochrome STN and TFT panels**
- **Simultaneous CRT and LCD operation (SimulSCAN™) in all configurations**
- **CRT resolution up to 1024 x 768 with 16 colors; 800 x 600 with 256 colors**
  - — Maximum 65-MHz video clock at 5.0V
  - — Maximum 40-MHz video clock at 3.3V
  - — 132-column text modes
- **Supports 3.3V and 5.0V mixed-voltage operation**

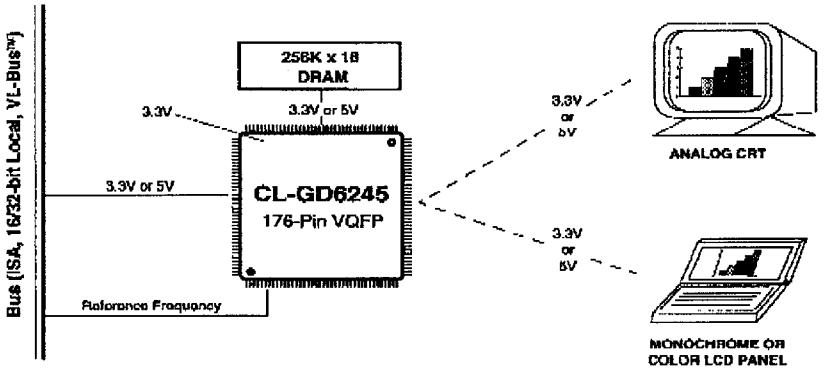
Single-DRAM LCD/VGA Controller for Monochrome/ Color Notebook Computers

OVERVIEW

The CL-GD6245 is an advanced, single-chip, flat panel VGA controller designed for notebook and subnotebook systems with stringent form-factor and power-consumption requirements.

The CL-GD6245 combines the RAMDAC, frequency synthesizer, monochrome/color STN/TFT panel interface, panel power-sequencing logic, host bus interface, and all other functional logic necessary to operate a VGA-compatible video subsystem. This video subsystem is completed with the addition of a single 256K x 16 DRAM. To further minimize board space, the CL-GD6245 controller is packaged in a 176-pin VQFP package, which also features a minimized height for use on boards with two-sided component assembly.

The panel and video-memory interfaces are optimized to allow SimulSCAN™ operation in a single-DRAM configuration with dual-scan panels. This function is implemented without compromising any features of the controller (for specifics of operation, refer to the *CL-GD6245 Data Book*). *(cont.)*



March 1994

FEATURES (cont.)

- **Windows™ performance-improvement features**
  - — True packed-pixel addressing
  - — Color expansion for 8-bit-per-pixel graphics
  - — 32 x 32 hardware graphics cursor (2 bits per pixel)
  - — Improved data latches for block moves
- **Supports single 256K x 16 DRAM configuration**
  - — Symmetric or asymmetric DRAMs
  - — Dual-WE* or dual-CAS* DRAMs
  - — Self-refresh DRAMs
  - — Maximum 50-MHz memory clock at 5.0V
  - — Maximum 45-MHz memory clock at 3.3V
- **Standby and Suspend modes for reduced power consumption**
- **Integrated programmable frequency synthesizer**
- **Integrated RAMDAC**
- **IBM® VGA hardware compatible**

OVERVIEW (cont.)

The host interface of the CL-GD6245 is designed for use with various CPUs, including direct connection to 32-bit '486 local bus, VESA® VL-Bus™, and ISA bus. Moreover, most popular core-logic chip sets can be directly connected to the CL-GD6245, without additional components. The '486 Burst mode is also supported for multiple cycle accesses to further enhance graphics performance.

With integrated Frame-Accelerator technology, the CL-GD6245 controller features low-power LCD operation, yet it supports high LCD-panel vertical-refresh rates. No additional DRAMs are required for frame acceleration because the CL-GD6245 efficiently uses the unused portions of video memory for that purpose.

Each interface on the CL-GD6245 can operate from either a 3.3V or 5.0V power supply. Mixed-voltage operation is optimized for quick implementation of a notebook computer with reduced power consumption. The video memory, host bus interface, panel interface, and CRT interface can be independently implemented with either 3.3V or 5.0V, in any combination.

The CL-GD6245 offers true packed-pixel addressing, color expansion for 8-bit-per-pixel graphics, and a hardware graphics cursor, thus improving Windows™ performance. Other incorporated features that boost performance include memory-write buffers and internal asynchronous display-data FIFOs.

Standby and Suspend power-management modes reduce power consumption when the system is not active. The internal Standby Counter can initiate Standby mode without software intervention. During this reduced-power mode, the LCD panel is turned off while the video memory can be accessed and modified. In Suspend mode, all I/O pins, except a dedicated Suspend-mode pin, are deactivated to further reduce power consumption. In this mode, the video-memory data is preserved, but cannot be accessed — this feature is useful when a system remains inactive for a relatively long time.

The CL-GD6245 also features SimulSCAN, a technique introduced by Cirrus Logic to achieve simultaneous CRT and LCD operation. SimulSCAN allows portable computers to become a key part of presentation environments for sales-force automation, field service, and educational organizations. SimulSCAN is supported in single- and dual-scan, color and monochrome LCD panels, as well as fixed- and multi-frequency analog CRTs.

Proprietary algorithms in the CL-GD6245 expand the available palette depth for color flat panels to 256K colors: 256 simultaneous colors for color panels and 64 shades of gray for monochrome panels.

High clock rates provide extended-resolution capability in CRT mode. At 1024 x 768 resolution, 16 simultaneous colors can be displayed; at 640 x 480 and 800 x 600 resolutions, up to 256 simultaneous colors can be displayed.

The CL-GD6245 provides unmatched performance while featuring design flexibility in CPU, video-memory interface, and power management. The CL-GD6245 also drives a large variety of color and monochrome LCD flat-panel displays.

VIDEO MODES

CRT Mode	Monochrome STN LCD	Color STN LCD	512-Color TFT LCD
640 x 480, 16/256K IBM® VGA mode	640 x 480 x 16/16 (gray)	640 x 480, 16/256K	640 x 480, 16/256K
640 x 480, 256/256K Extended mode	640 x 480, 64/64 (gray)	640 x 480, 256/256K	640 x 480, 256/256K
800 x 600, 256/256K Extended mode	N/A	N/A	N/A
1024 x 768, 16/256K Interlaced/Non-interlaced	N/A	N/A	N/A

SUPPORT FOR QUICK IMPLEMENTATION

The CL-GD6245 LCD VGA controller is supported by a complete documentation package, Cirrus Logic BIOS kit, software drivers kit, and evaluation board kit. These kits include all necessary documentation and schematics to facilitate system evaluation and design.

Literature

- CL-GD6245 Product Bulletin
- CL-GD6245 Data Book
- CL-GD6245 Application Book
  - — Application notes
  - — Schematics
  - — Technical updates
  - — Panel interface guide
  - — External functions specification (software)

Evaluation Kit

The Evaluation Kit includes the following items:

- VL/ISA Bus Evaluation Board
- CL-GD6245 Data Book
- CL-GD6245 Application Book
- Drivers and utilities diskettes for evaluation
- Demonstration diskette

Software Kits

The CL-GD6245 is supported by a full set of Cirrus Logic BIOS, software drivers, and utilities. Cirrus Logic BIOS and software drivers take full advantage of the hardware to optimize performance and compatibility.

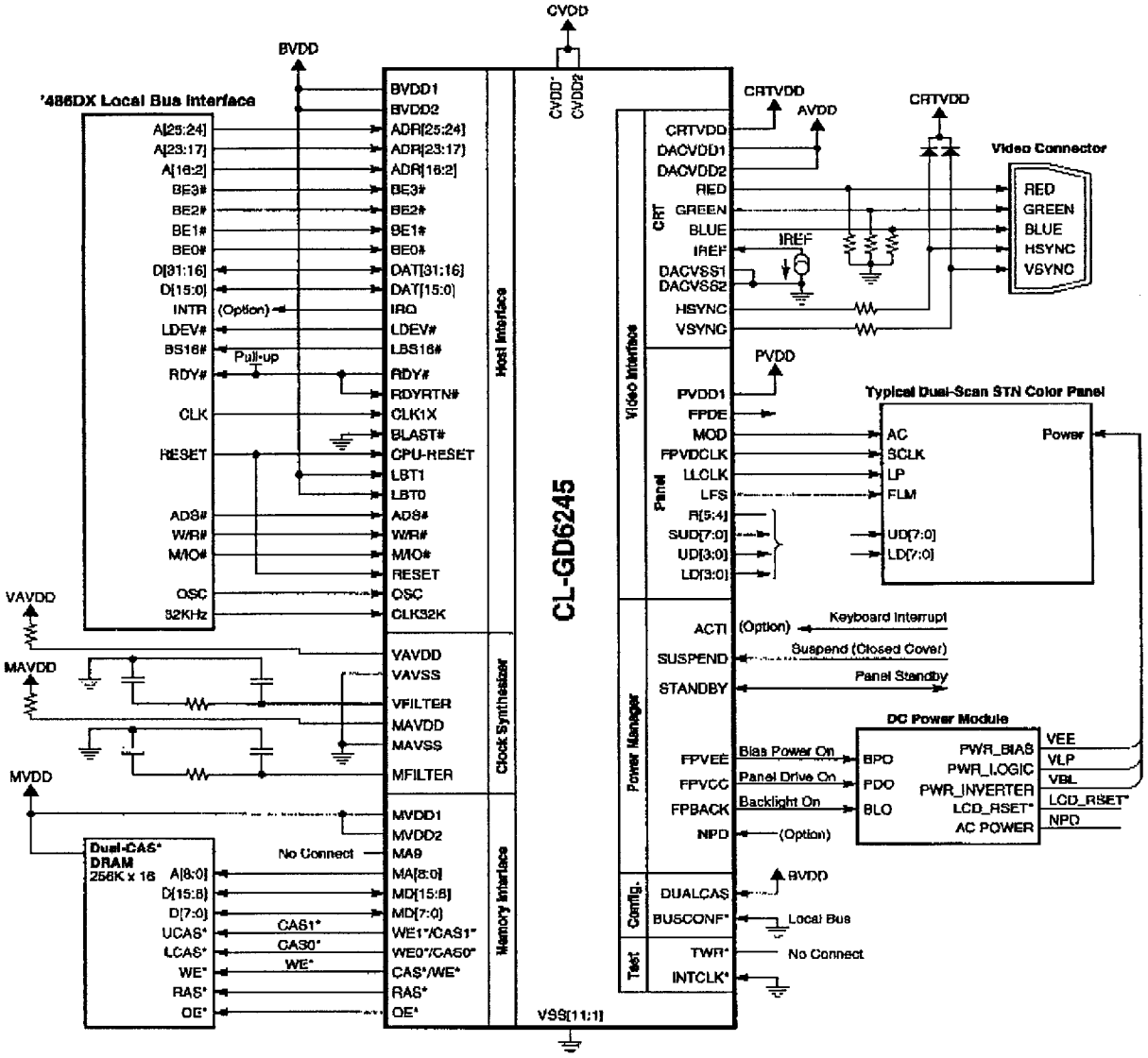
Two software kits are available for the CL-GD6245:

- BIOS and Utilities Kit
- Drivers and Utilities Kit

These kits include a complete set of OEM and end-user utilities. The OEM utilities enable developers to customize the BIOS for specific needs. End-user utilities are provided for system-configuration purposes.

The drivers package includes drivers for Microsoft® Windows™ version 3.1, AutoCAD®, OS/2™, Lotus®, and other application programs.

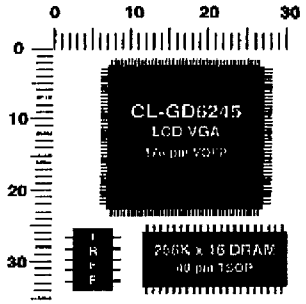
SAMPLE SYSTEM BLOCK DIAGRAM



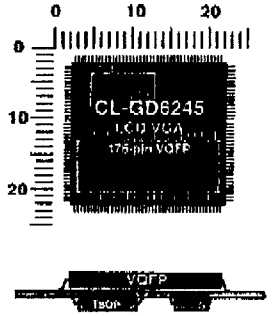
Dual-Scan STN Color Panel Connections
'486DX Local Bus Using 256K x 16 DRAM with Dual CAS*

Subnotebook and Notebook Design Priorities	Supporting Features
Integration	❒ Integrated RAMDAC ❒ Integrated programmable frequency synthesizer ❒ No external components necessary for connecting to 32-bit local bus ❒ One 256K x 16 DRAM configuration ❒ Two-chip solution
Smallest Form-Factor Full-Featured LCD VGA Controller	❒ 176-pin VQFP package — 24 x 24 mm — 1.4 mm height ❒ SimulSCAN™ with dual-scan color STN panels ❒ One 256K x 16 DRAM configuration ❒ Frame acceleration ❒ All features available in ½-Mbyte DRAM configuration
Low Power Consumption	❒ Mixed 3.3/5.0V operation ❒ Frame acceleration for reduced active power consumption ❒ Power-management modes
Performance	❒ 16/32-bit local bus and VESA® VL-Bus™ direct connection ❒ Color expansion ❒ Hardware cursor
CRT	❒ 1024 x 768 x 16 out of 256K colors ❒ 800 x 600 x 256 out of 256K colors
LCD	❒ 640 x 480 x 256 colors (or x 64 grayshades)

MINIMUM REQUIRED FORM FACTOR



Single-Sided < 1000 mm²



Double-Sided < 625 mm²
< 3.3 mm high