

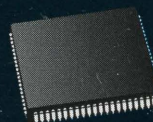
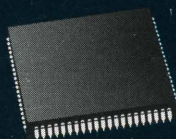
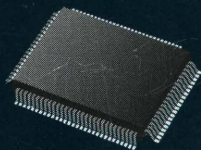
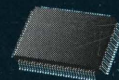


CIRRUS LOGIC

3100 W. Warren Avenue
Fremont, CA 94538
Tel. (415) 623-8300
Fax. (415) 226-2160



CIRRUS LOGIC



**High Performance
Products**

March 1991

CirrusLogic® Inc., produces high-integration peripheral controller circuits for mass storage, graphics, and data communications. Our products are used in leading-edge personal computers, engineering workstations, and office automation equipment.

The Cirrus Logic formula combines proprietary S/LA™[†] IC design automation with system design expertise. The S/LA design system is a proven tool for developing high-performance logic circuits in half the time of most semiconductor companies. The results are better VLSI products, on-time, that help you win in the marketplace.

Cirrus Logic's fabless manufacturing strategy, unique in the semiconductor industry, employs a full manufacturing infrastructure to ensure maximum product quality, availability and value for our customers.

Talk to our systems and applications specialists; see how you can benefit from a new kind of semiconductor company.



[†]Patent pending.

- **Mass Storage** 1

- **Graphics** 8
 - Display/Desktop 8
 - Display/Flat Panel 9

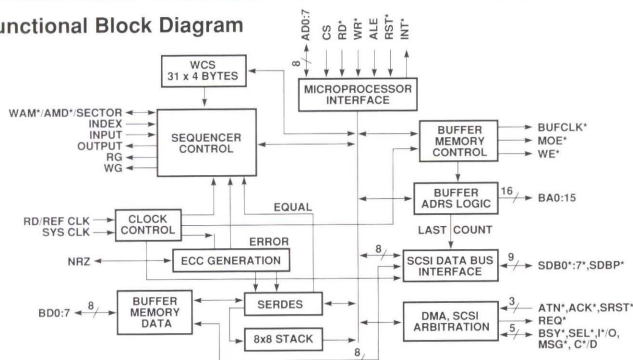
- **Data Communications** 11

- **Product Support** 14

- **Sales Offices** 16

CL-SH250 — Integrated SCSI Disk Controller

Functional Block Diagram



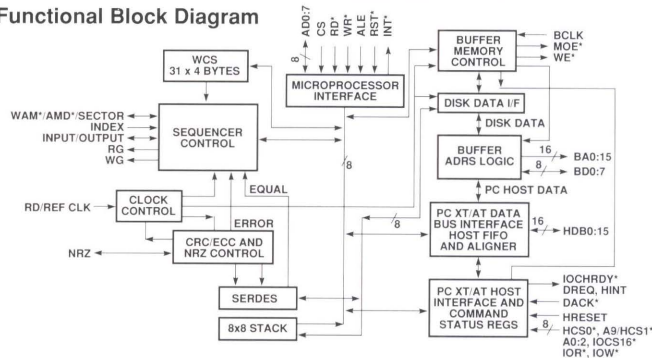
- Asynchronous SCSI transfer rates up to 3 Mbytes
- Buffer memory throughput up to 6 Mbytes
- NRZ data rates up to 24 Mbits
- Selectable 16-bit CRC/56- and 32-bit ECC polynomials with fast hardware correction circuitry
- Direct buffer memory addressing up to 64K bytes of static RAM
- Selectable open-drain or push-pull SCSI drivers
- Fast microcontroller interface
- Low-power CMOS technology in a 100-pin QFP package

The highly integrated CL-SH250 asynchronous SCSI controller is especially well-suited for use in hard disk drives intended for cost-sensitive computer systems and non-personal computer applications. It includes an advanced Winchester disk formatter, a dual-port buffer manager, and extensive hardware support (including 48 mA SCSI drivers). Disk data rates up to 24 Mbits/second are supported.

The CL-SH250 works with a local microcontroller; it has a multiplexed address and data bus similar to that provided by the Intel® 8051 family of microcontrollers and the Motorola® 68HC11. It is easily adaptable to other microcontroller I/O techniques and supports both interrupt and polled processor interfaces. Maskable interrupts include many disk and host interface events.

CL-SH260 — Integrated PC XT/AT Disk Controller

Functional Block Diagram



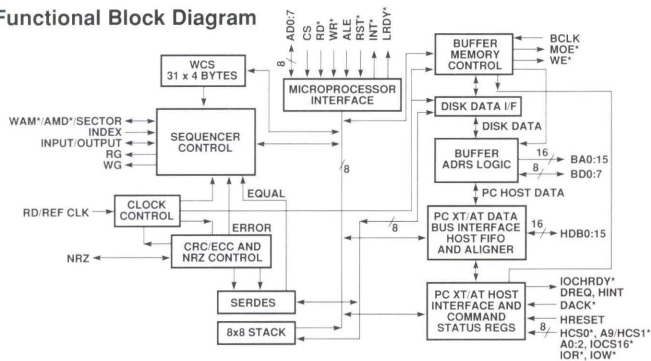
- Hardware- and software-compatible with PC XT/AT computers
- Direct bus interface logic with on-chip 24 mA drivers
- Direct buffer memory addressing up to 64K bytes of static RAM
- Any XT/AT interface speed with programmable and auto-inserted wait states
- NRZ data rates up to 20 Mbits
- Daisy chaining logic for two embedded disk controller drives on a PC AT
- Logic to speed up PC AT command response
- On-chip registers emulate the IBM® Task File for PC AT, IBM Command Descriptor Block for PC XT
- Low-power CMOS technology in a 84-pin PLCC or 100-pin QFP package

Due to its popularity, the CL-SH260 has become the *de facto* industry-standard PC XT/AT-compatible controller for embedded-intelligence hard disk drives. It includes an advanced Winchester disk formatter, a dual-port buffer manager, and host bus interface logic. The disk controller supports disk data rates up to 20 Mbits/second, a requirement in high-performance disk drives.

Mass Storage — HARD DRIVE

CL-SH265 — Enhanced PC XT/AT Disk Controller

Functional Block Diagram

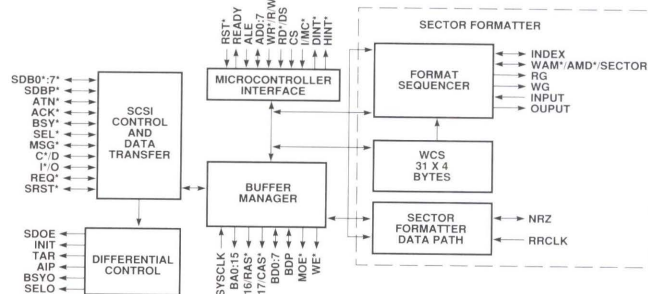


- Hardware- and software-compatible with PC XT/AT computers
- Pin- and plug-compatible with the CL-SH260
- Proprietary split data field support for zone recording formats
- Direct buffer memory addressing up to 64K bytes of static RAM
- Any XT/AT interface speed with programmable and auto-inserted wait states
- NRZ data rates up to 25 Mbits
- Direct bus interface logic with on-chip 24 mA drivers
- Low-power or 'sleep' mode
- Daisy chaining logic for two embedded disk controller drives on a PC XT or AT
- Logic to speed up PC AT command response
- On-chip registers to emulate the IBM Task File for PC AT, IBM Command Descriptor Block for PC XT
- Low-power CMOS technology in an 84-pin PLCC or 100-pin QFP package

Pin- and plug-compatible with the CL-SH260, the enhanced CL-SH265 supports disk data rates up to 25 Mbits/second, a requirement in high-performance disk drives. It allows the designer to optimize disk capacity without increasing the number of platters in the drive. A proprietary split data field technique optimizes disk capacity, enables faster access times, and increases data rates. A power-down mode makes the CL-SH265 ideal for laptop and power-sensitive applications.

CL-SH350 — Integrated Asynchronous/ Synchronous SCSI Disk Controller

Functional Block Diagram

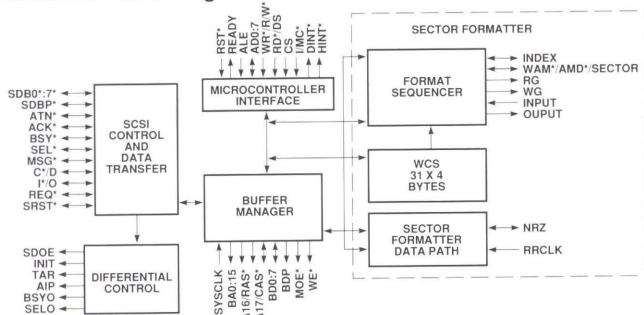


- High-speed microcontroller interfaces (e.g., 16 MHz 8051, 12 MHz 68HC11, 30 MHz HPC460X3)
- Up to 15-byte synchronous transfer offsets and 12 programmable transfer periods
- Asynchronous and synchronous DMA/PIO up to 3 Mbytes/second and 5 Mbytes/second, respectively
- NRZ data rates up to 32 MHz
- Direct buffer addressing up to 256K bytes of SRAM and 1 Mbyte of DRAM
- Concurrent buffer memory throughput up to 10 Mbytes/second in DRAM page mode and 12 Mbytes/second for SRAM
- Automatically controls arbitration, selection, reselection
- Automatically detects selected and reselected conditions
- Low-power CMOS technology in a 100-pin QFP package

The CL-SH350 is a fast, single-chip SCSI controller. Ideal for workstation and mini-computer applications requiring maximum disk performance, the CL-SH350 combines a high-speed local microcontroller port, extensive hardware support for the SCSI interface, a two-channel buffer manager, and an advanced sector formatter. The SCSI host interface is designed for compliance with the SCSI-2 specification and has a synchronous transfer capability of up to 5 Mbytes/second.

CL-SH351 — High-Performance Asynchronous/ Synchronous SCSI-2 Disk Controller

Functional Block Diagram

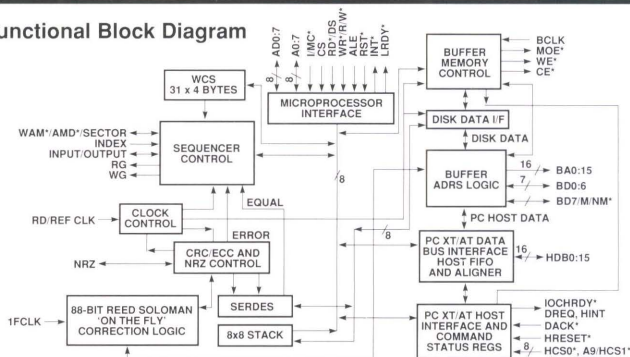


- Direct buffer addressing up to 256K bytes of SRAM and 1 Mbyte of DRAM
- High-speed microcontroller interfaces (e.g., 16 MHz 8051, 12 MHz 68HC11, 30 MHz HPC460X3)
- Up to 15-byte synchronous transfer offsets and 13 programmable transfer periods
- Asynchronous and synchronous DMA/PIO up to 3 Mbytes/second and 10 Mbytes/second, respectively
- NRZ data rates up to 32 MHz
- Concurrent buffer memory throughput up to 14 Mbytes/second in DRAM page mode and 15 Mbytes/second for SRAM
- Automatically controls arbitration, selection, reselection
- Automatically detects selected and reselected conditions
- Low-power CMOS technology in a 100-pin QFP package

The CL-SH351 is a high-performance synchronous/asynchronous SCSI disk controller that supports the full 10 Mbyte "Fast" transfer rate specified by the SCSI-2 standard. It combines a high-speed local microcontroller port, extensive hardware support for the SCSI-2 interface, a two-channel buffer manager, and an advanced sector formatter.

CL-SH360 — Integrated PC XT/AT Disk Controller

Functional Block Diagram

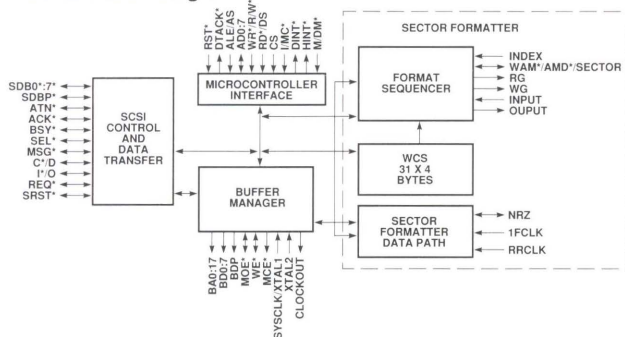


- Reed-Solomon error correction code (ECC) with automatic, 'on-the-fly' hardware correction
- NRZ data rates up to 32 MHz
- Low-power or 'sleep' mode for laptop computers
- Direct buffer memory addressing up to 64K bytes of static RAM
- Any XT/AT interface speed with programmable and auto-inserted wait states
- Proprietary split data field support for zone recording formats
- Multi-sector data transfers
- Direct bus interface logic with on-chip 24 mA drivers
- Daisy chaining logic for two embedded disk controller drives on a PC XT or AT
- Low-power CMOS technology in a 100-pin QFP package

The highly integrated CL-SH360 provides the enabling feature set and technology for smaller, faster, higher capacity and lower cost drives. It is the first intelligent PC AT-compatible disk controller to implement 'on-the-fly' Reed-Solomon error correction while transferring data at a continuous 24 Mbit/second rate. A proprietary split data field technique optimizes disk capacity, enables faster access times, and increases data rates. A power-down mode reduces power consumption by up to 75 percent, making the CL-SH360 ideal for laptop and power-sensitive applications. The disk controller supports multisector data transfer, thus reducing real-time processing demand on local microcontrollers, and enabling the creation of lower cost, single-processor disk drive designs.

CL-SH370 — Integrated Asynchronous/ Synchronous SCSI Disk Controller

Functional Block Diagram

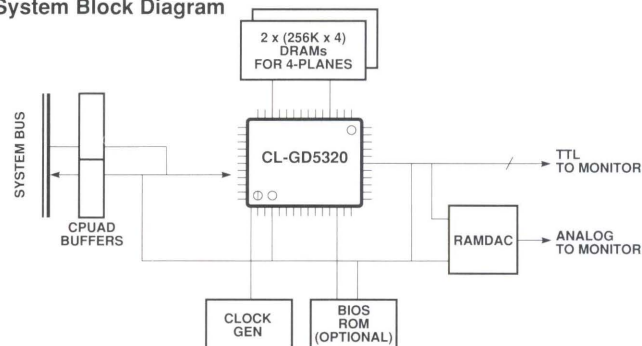


- Automatically controls arbitration, selection, reselection
- Automatically controls synchronous transfer overrun/underrun
- High-speed multiplexed/non-multiplexed microcontroller interfaces (e.g., 16 MHz 8051, 12 MHz 68HC11, 30 MHz HPC460X3, HPL460X3, Intel 80188 and Motorola 68H000)
- Up to 15-byte synchronous transfer offsets and 12 programmable transfer periods
- Asynchronous and synchronous DMA/PIO up to 3 Mbytes/second or 5 Mbytes/second, respectively
- NRZ data rates up to 32 MHz
- Full-track multi-sector transfer capability
- Selectable 16-bit CRC/88-bit Reed-Solomon ECC with 'on-the-fly' hardware correction
- Direct buffer addressing up to 256K bytes of SRAM
- Permits concurrent buffer memory throughput up to 12 Mbytes/second
- Automatic disconnect/reconnect with local interrupt for programmable buffer threshold and buffer empty/full conditions
- Low-power CMOS technology in a 100-pin QFP package

The CL-SH370 is a high-performance SCSI controller with the enabling feature set and technology for smaller, faster, higher capacity and lower cost disk drives. It uses 'on-the-fly' Reed-Solomon error correction while transferring data at a continuous 32 MHz rate. A proprietary split data field technique optimizes disk capacity, enables faster access times, and increases data rates.

CL-GD5320 — Enhanced VGA-Compatible Graphics Chip

System Block Diagram



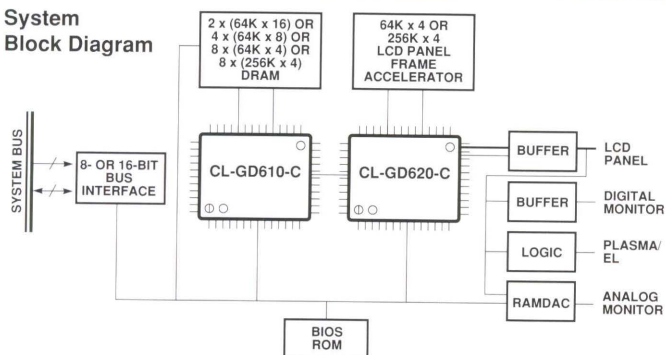
- Single-chip VGA
- Two 256K x 4 DRAM interface
- 100% hardware register- and BIOS-compatible with VGA, EGA, CGA, MDA and Hercules® HGC
- Motherboard VGA solution with only seven ICs
- 800 x 600 x 16 resolution — VESA-compatible
- 132-column support for PS/2 and multi-frequency monitors
- 36 or 40 MHz dot clock
- Low-power CMOS technology in a 100-pin QFP package

The CL-GD5320 VGA graphics controller is a single-chip implementation of the VGA standard that allows designers of IBM-compatible desktop computers to incorporate full VGA capability into the motherboard of highly integrated, low-cost personal computers. It is hardware-compatible with the IBM VGA, EGA, CGA, and MDA standards, as well as Hercules HGC, and provides improved performance and additional functionality.

Operating at dot clock rates up to 40 MHz, the CL-GD5320 chip supports high-resolution graphics and alphanumeric display modes for both monochrome and color, and for high-resolution variable frequency and PS/2 monitors. The CL-GD5320 is designed for minimum external circuitry support, including timing sources, memory, and RAMDAC. A motherboard implementation of only seven ICs can be achieved with the CL-GD5320.

CL-GD610/620-C — CRT/Flat Panel Enhanced VGA Controller

System Block Diagram



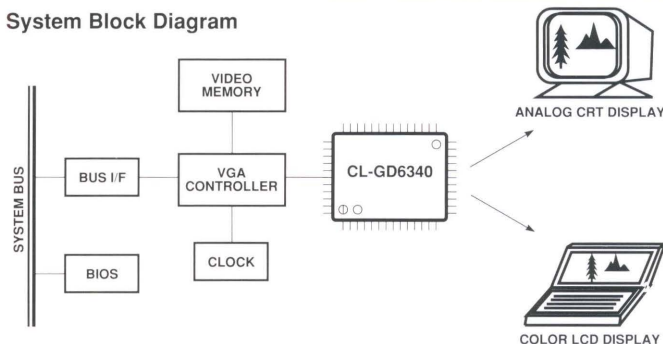
- Supports dual-scan and single-scan LCD panels, and gas plasma and EL panels
- Hardware-compatible with VGA, EGA, CGA, MDA, and Hercules HGC standards
- Automatic hardware mapping of 256 colors into 64 grayshades (AutoMap™)
- Intelligent power management for low power consumption
- Horizontal compression and vertical expansion in hardware
- Requires only two 64K x 16 DRAMs for video memory
- Low-power CMOS technology in two 100-pin QFP packages

The high-integration, low-power CL-GD610/620-C CRT/flat panel display controller chipset brings VGA-quality images to monochrome LCD panels by mapping 256 colors into 64 high-quality, flicker-free grayshades for CRT-quality grayscale emulation. It is fully hardware compatible with the IBM VGA, EGA, CGA, MDA, and HGC video standards. The controller is ideal for notebook and laptop applications, and can also be used in overhead projection displays, desktop LCD systems, point-of-sale (POS) displays, and industrial controls.

The CL-GD610/620-C frame accelerator technology, combined with on-chip intelligent power management, brings maximum contrast, reduced flicker, and lower power consumption to LCD panels.

CL-GD6340 — Color LCD Interface Controller

System Block Diagram



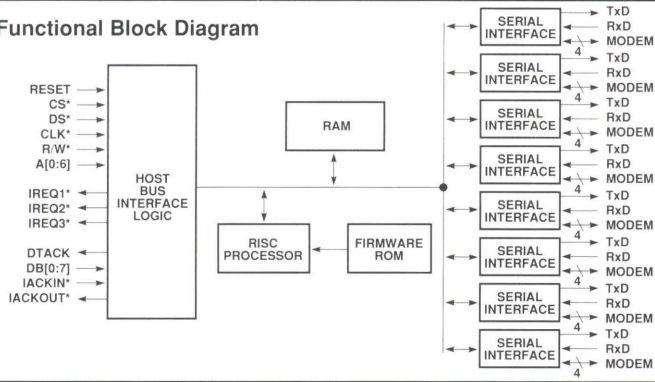
- On-chip support for 8-, 512-, or 4K-color active-matrix LCD panels
- On-chip support for monochrome and passive color LCD panels (single- and dual-panel displays)
- Palette of thousands of colors provides full-color VGA
- Supports all VGA modes on monochrome LCD panels
 - 64-shade grayscale on passive monochrome panels
 - 16-shade grayscale on active-matrix panels with no internal grayscale capability
- Simultaneous displays on analog CRT and LCD
- On-chip RAMDAC and RAMDAC extension registers
- 40 MHz operation
- Low-power CMOS technology in a 100-pin QFP package

The CL-GD6340 color LCD interface controller makes life-like 3-D images possible on TFT and STN flat panel displays, providing a level of image quality approaching that of an analog CRT. It is used with other Cirrus Logic VGA graphics chips to provide full-color displays on limited-color LCD panels. Using multiple techniques for color shading, the CL-GD6340 is able to increase the number of colors an LCD panel can display.

The chip features a highly programmable panel interface that has timing- and power-sequencing logic. The chip can also provide simultaneous analog and digital output, driving an analog CRT and digital LCD in parallel. The CL-GD6340 integrated RAMDAC will enable the design of a minimum-size VGA controller, providing unequalled color capability for the portable and flat panel displays markets.

CL-CD180 — Intelligent 8-Channel Asynchronous Communications Controller

Functional Block Diagram



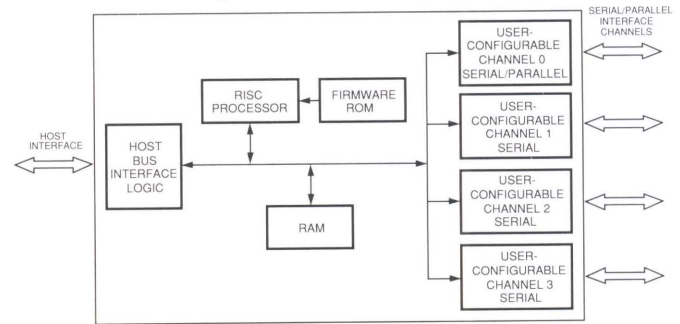
- Eight-byte FIFOs for transmit and receive, per channel
- Vectored interrupts for direct jump into service routines eliminate the need for status checks
- Good Data™ Interrupts simplify software
- User-programmable and automatic flow control modes
- Send Special Character, Line Break and Transmit Delay supported
- Four modem control signals per channel
- Low-power CMOS technology packaged in an 84-pin PLCC

The CL-CD180 is a CMOS universal asynchronous receiver/transmitter with eight full-duplex serial channels, each having separate 8-byte transmit and receive FIFOs. Because it moves data efficiently from the serial channels to the host system, the CL-CD180 can reduce overhead and yield an eight-fold improvement in system throughput.

The CL-CD180 is based on a high-speed, integrated RISC CPU developed by Cirrus Logic for communication applications. This on-chip processor is transparent to the user, and no programming is required. Because the on-chip processor is handling every character, automatic flow control and special character recognition are easily implemented, further reducing host system load.

CL-CD1400 — Intelligent 4-Channel UXART — The UART for UNIX®

Functional Block Diagram



- Twelve-byte FIFOs for transmit and receive, per channel
- Vectored interrupts for direct jump into service routines eliminate the need for status checks
- Good Data Interrupts simplify software
- User-programmable and automatic flow control modes
- Send Special Character, Line Break and Transmit Delay supported
- Special character processing for UNIX line driver applications, handled automatically:
 - Expansion of NL to CR-NL
 - Supports LNEXT and ISTRIP
 - Five UNIX parity handling options
- Six modem control signals per channel
- Low-power CMOS technology packaged in a 68-pin PLCC

The CL-CD1400 is a CMOS universal asynchronous receiver/transmitter with four full-duplex serial channels, each having separate 12-byte transmit and receive FIFOs. In addition, one channel can be configured as a parallel Centronics®-compatible interface. It operates at 115.2 kbps. Because it moves data efficiently from the serial channels to the host system, the CD1400 can reduce overhead and yield a ten-fold improvement in system throughput.

The CL-CD1400 is based on a high-speed, integrated RISC CPU developed by Cirrus Logic for communication applications. This on-chip processor is transparent to the user, and no programming is required. Because the on-chip processor is handling every character, automatic flow control and special character recognition are easily implemented, further reducing host system load.

Direct Sales Offices

Domestic

Northwest

San Jose, CA
(408) 436-7110
FAX: (408) 437-8960

Southwest

Tustin, CA
(714) 258-8303
FAX: (714) 258-8307

Thousand Oaks, CA
(805) 371-5381
FAX: (805) 371-5382

Central

Boulder, CO
(303) 939-9739
FAX: (303) 440-5712

Southcentral

Austin, TX
(512) 794-8490
FAX: (512) 794-8069

Northcentral

Westchester, IL
(708) 449-7715
FAX: (708) 449-7804

Northeastern

Malvern, PA
(215) 251-6881
FAX: (215) 651-0147

Andover, MA

(508) 474-9300
FAX: (508) 474-9149

Southeastern

Boca Raton, FL
(407) 994-9883
FAX: (407) 994-9887

Norcross, GA

(404) 263-7601
FAX: (404) 729-6942

International

Germany

Herrsching
(49) 8152-2030
FAX: (49) 8152-6211

Japan

Chuurinkan
(81) 462-76-0601
FAX: (81) 462-76-0291

Singapore

Singapore
65-3532122
FAX: 65-3532166

Taiwan

Taipei
(886) 2-718-4533
FAX: (886) 2-718-4526

United Kingdom

Berkshire
(44) 344-780-782
FAX: (44) 344-761-429

Information

Yes, I want more information ✓!

- Please have a Cirrus Logic representative contact me immediately.
- Please send me product information on ✓:

Mass Storage:

- CL-SH250
 CL-SH260
 CL-SH265
 CL-SH350
 CL-SH351
 CL-SH360
 CL-SH370

Graphics:

- CL-GD5320
 CL-GD610/620-C
 CL-GD6340

Data Communications:

- CL-CD180
 CL-CD1400
 CL-CD2400/2401

Name _____

Title _____

Company _____

Address _____

City _____ State ___ Zip _____

Country _____

Phone _____

Comments: _____

Cirrus Logic, Inc., believes the information contained in this document is accurate and reliable. It is subject to change without notice. No responsibility is assumed by Cirrus Logic, Inc., for its use, nor for infringements of patents or other rights of third parties. This document implies no license under patents or copyrights. Cirrus Logic, AutoMap, Good Data, UXART and S/LA are trademarks of Cirrus Logic, Inc. Other trademarks in this document belong to their respective companies. Cirrus Logic, Inc., products are covered under one or more of the following U.S. patents: 4,293,783; Re. 31,287; 4,763,332; 4,777,635; 4,839,896; 4,931,946; 4,979,173.

102001-001