PC Card and OHCI Controller

FEATURES

- ***1997 PC Standard*** **compliant**
- ***PCI Bus Power Management Interface Specification 1.1*** **compliant**
- **ACPI 1.0 compliant**
- ***PCI Local Bus Specification Revision 2.1/2.2*** **compliant**
- ***PC 98/99*** **compliant**
- **Compliant with the *PCI Bus Interface Specification for PCI-to-CardBus Bridges***
- **Ultra zoomed Video**
- **Zoomed video auto-detect**
- **Advanced filtering on card detect lines provides 90 microseconds of noise immunity.**
- **Programmable D3 status terminal**
- **Internal ring oscillator**
- **3.3-V core logic with universal PCI interfaces compatible with 3.3-V and 5-V PCI signaling environments**
- **Mix-and-match 5-V/3.3-V PC Card16 cards and 3.3-V CardBus cards**
- **Supports two PC Card or CardBus slots with hot insertion and removal**
- **Uses serial interface to TI™ TPS2216 dual power switch**
- **Supports 132 Mbyte/second burst transfers to maximize data throughput on both the PCI bus and the CardBus bus**
- **Supports serialized IRQ with PCI interrupts**
- **8 programmable multifunction terminals**
- **Interrupt modes supported: serial ISA/serial PCI, serial ISA/parallel PCI, parallel PCI only.**
- **Serial EEPROM interface for loading subsystem ID and subsystem vendor ID**
- **Supports zoomed video with internal buffering**
- **Dedicated terminal for PCI $\overline{\text{CLKRUN}}$**
- **Four general-purpose event registers**
- **Multifunction PCI device with separate configuration space for each socket**
- **Five PCI memory windows and two I/O windows available to each PC Card16 socket**
- **Two I/O windows and two memory windows available to each CardBus socket**
- **ExCA™-compatible registers are mapped in memory or I/O space**
- **Supports distributed DMA and PC/PCI DMA**
- **Intel™ 82365SL-DF register compatible**
- **Supports 16-bit DMA on both PC Card sockets**
- **Supports ring indicate, $\overline{\text{SUSPEND}}$, and PCI $\overline{\text{CLKRUN}}$**
- **Advanced submicron, low-power CMOS technology**
- **Provides VGA/palette memory and I/O, and subtractive decoding options**
- **LED activity terminals**
- **Supports PCI bus lock ($\overline{\text{LOCK}}$)**
- **Packaged in a 256-terminal BGA or 257-terminal MicroStar BGA™**
- **OHCI link function designed to IEEE *1394 Open Host Controller Interface (OHCI) Specification***
- **Implements PCI burst transfers and deep FIFOs to tolerate large host latency**
- **Supports physical write posting of up to three outstanding transactions**
- **OHCI link function is IEEE 1394-1995 compliant and compatible with Proposal 1394a**
- **Supports serial bus data rates of 100, 200, and 400 Mbits/second**
- **Provides bus-hold buffers on the PHY-Link I/F for low-cost single capacitor isolation**

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DESCRIPTION

The Texas Instruments PCI4451 is an integrated dual-socket PC Card controller and IEEE 1394 Open HCI host controller. This high-performance integrated solution provides the latest in both PC Card and IEEE 1394 technology.

The PCI4451 is a three-function PCI device compliant with *PCI Local Bus Specification 2.2*. Functions 0 and 1 provide the independent PC Card socket controllers compliant with the *1997 PC Card Standard*. The PCI4451 provides features that make it the best choice for bridging between the PCI bus and PC Cards, and supports any combination of 16-bit and CardBus PC Cards in the two sockets, powered at 5 V or 3.3 V, as required.

All card signals are internally buffered to allow hot insertion and removal without external buffering. The PCI4451 is register compatible with the Intel™ 82365SL–DF ExCA controller. The PCI4451 internal data path logic allows the host to access 8-, 16-, and 32-bit cards using full 32-bit PCI cycles for maximum performance. Independent buffering and a pipeline architecture provide an unsurpassed performance level with sustained bursting. The PCI4451 can be programmed to accept posted writes to improve bus utilization.

Function 2 of the PCI4451 is compatible with IEEE 1394A and the latest 1394 open host controller interface (OHCI) specifications. The chip provides the IEEE 1394 link function and is compatible with data rates of 100, 200, and 400 Mbits per second. Deep FIFOs are provided to buffer 1394 data and accommodate large host bus latencies. The PCI4451 provides physical write posting and a highly tuned physical data path for SBP-2 performance. Multiple cache line burst transfers, advanced internal arbitration, and bus holding buffers on the PHY/Link interface are other features that make the PCI4451 an excellent 1394 open HCI solution.

The PCI4451 provides an internally buffered zoomed video (ZV) path. This reduces the design effort of PC board manufacturers to add a ZV-compatible solution and ensures compliance with the CardBus loading specifications.

Various implementation specific functions and general-purpose inputs and outputs are provided through eight multifunction terminals. These terminals present a system with options in PC/PCI DMA, PCI $\overline{\text{LOCK}}$ and parallel interrupts, PC Card activity indicator LEDs, and other platform specific signals. ACPI-compliant general-purpose events may be programmed and controlled through the multifunction terminals, and an ACPI-compliant programming interface is included for the general-purpose inputs and outputs.

The PCI4451 is compliant with *PCI Bus Power Management Specification 1.1*, and provides several low-power modes which enable the host power system to further reduce power consumption. The *PC Card (CardBus) Controller* and *IEEE 1394 Host Controller Device Class Specifications* required for Microsoft™ OnNow Power Management are supported. Furthermore, an advanced complementary metal-oxide semiconductor (CMOS) process achieves low system power consumption.

NOTE:

This product is for high-volume PC applications only. For a complete datasheet or more information contact support@ti.com.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
PCI4451GFN	OBSOLETE	BGA	GFN	256		TBD	Call TI	Call TI
PCI4451GJG	OBSOLETE	BGA MI CROSTA R	GJG	257		TBD	Call TI	Call TI

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
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(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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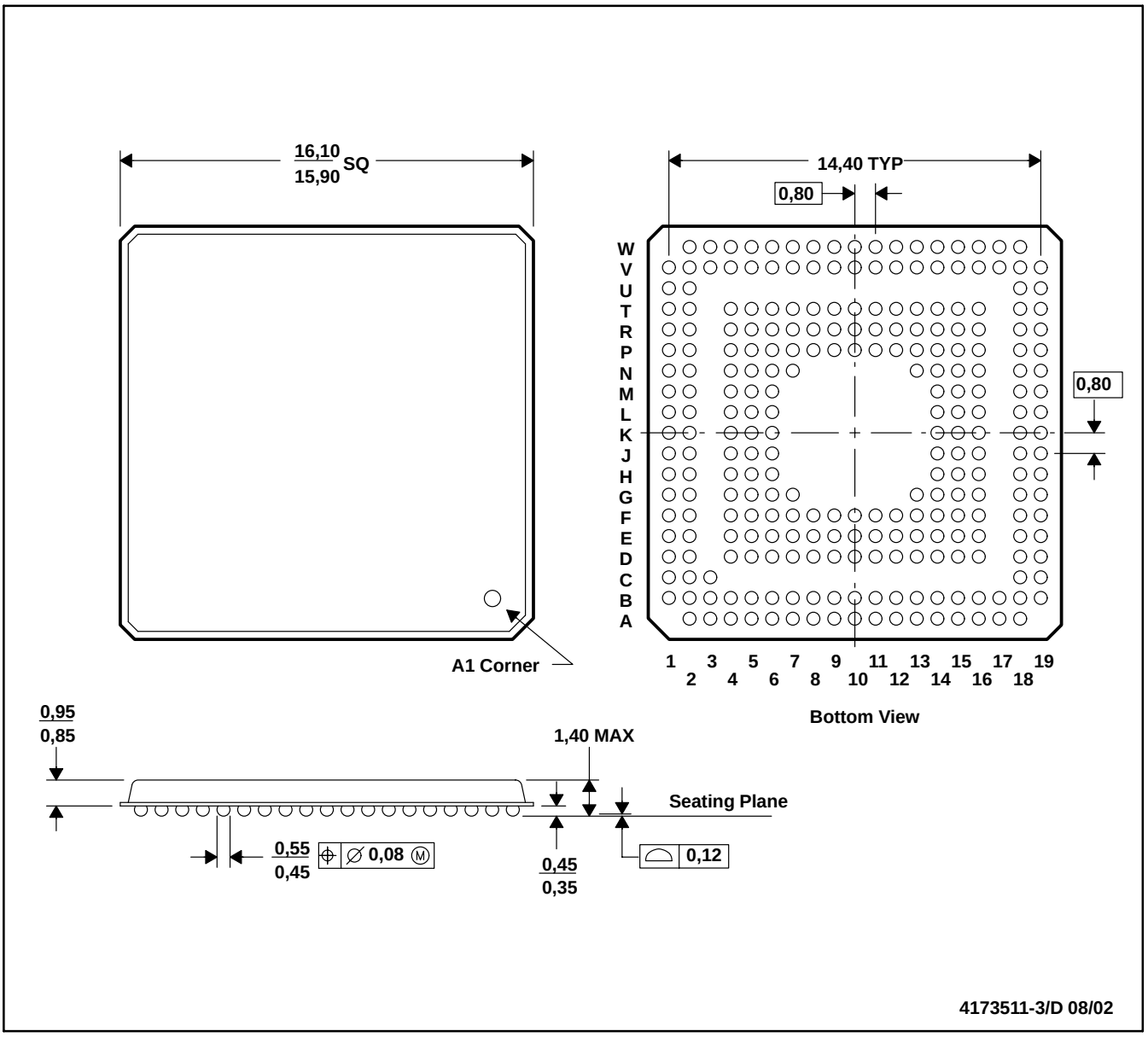
MPBG091B – DECEMBER 1998 – REVISED AUGUST 2002

GJG (S–PBGA–N257) **PLASTIC BALL GRID ARRAY**



NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. MicroStar BGA™ configuration

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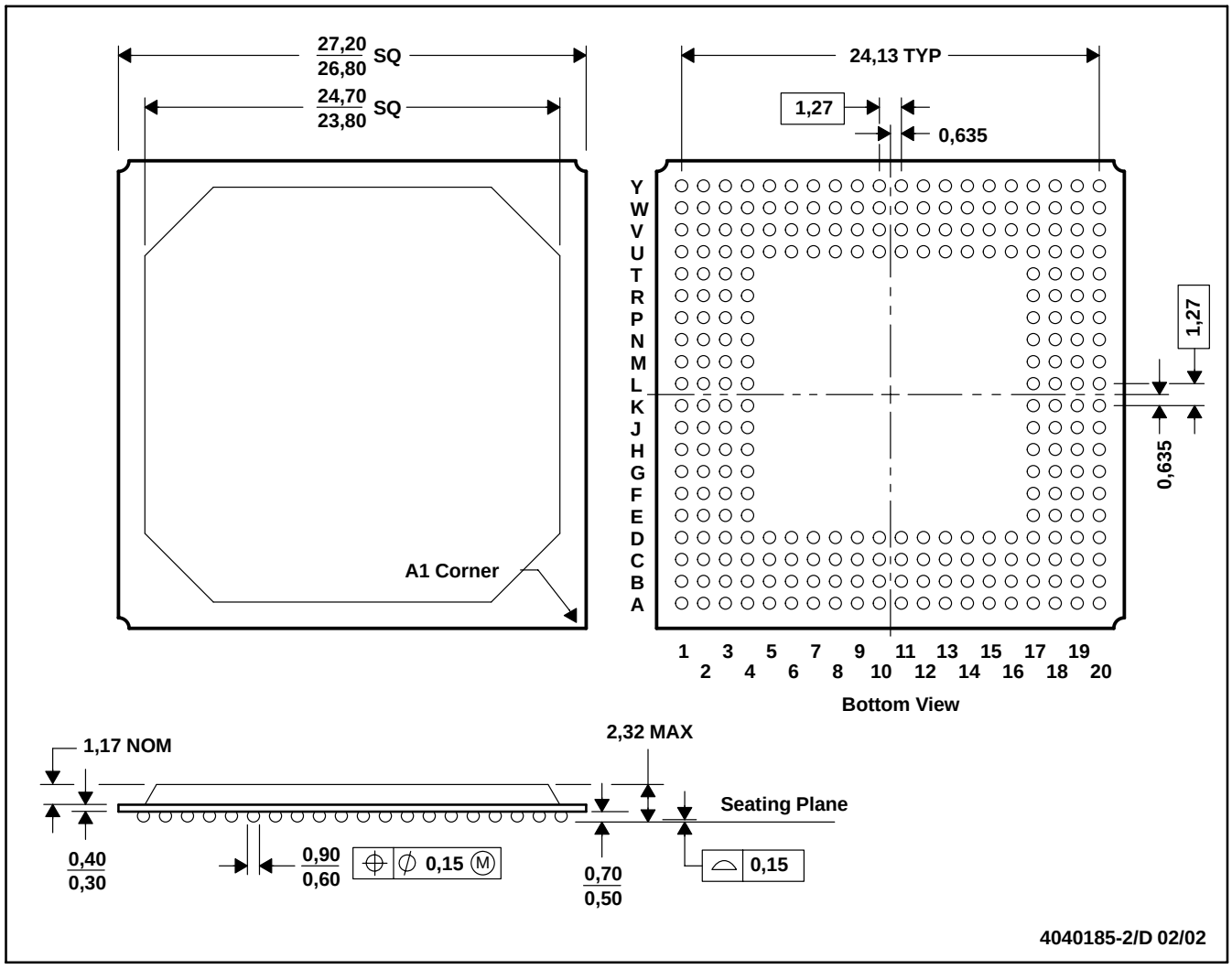
MBGA002C – JANUARY 1995 – REVISED MARCH 2002

GFN (S-PBGA-N256) **PLASTIC BALL GRID ARRAY**



NOTES: A. All linear dimensions are in millimeters.
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C. Falls within JEDEC MO-151

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