

# Intel<sup>®</sup> Desktop Board DG45ID Specification Update

July 2010

Order Number: E49129-007US

The Intel<sup>®</sup> Desktop Board DG45ID may contain design defects or errors known as errata, which may cause the product to deviate from published specifications. Current characterized errata are documented in this Specification Update.

# Revision History

---

Revision	Revision History	Date
-001	This document is the first Specification Update for the Intel® Desktop Board DG45ID	July 2008
-002	Updated the General Information and Specification Changes Sections	August 2008
-003	Updated the General Information Section	September 2008
-004	Updated the General Information Section	March 2009
-005	Updated the Specification Changes Section	July 2009
-006	Updated the General Information Section	May 2010
-007	Updated the General Information Section	July 2010

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL® PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. INTEL PRODUCTS ARE NOT INTENDED FOR USE IN MEDICAL, LIFE SAVING, LIFE SUSTAINING APPLICATIONS.

Intel may make changes to specifications and product descriptions at any time, without notice.

Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them.

The Intel® Desktop Board DG45ID may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Contact your local Intel sales office or your distributor to obtain the latest specifications before placing your product order.

Copies of documents which have an ordering number and are referenced in this document, or other Intel literature, may be obtained from:

Intel Corporation  
P.O. Box 5937  
Denver, CO 80217-9808

or call in North America 1-800-548-4725, Europe 44-0-1793-431-155, France 44-0-1793-421-777, Germany 44-0-1793-421-333, other Countries 708-296-9333

Intel, the Intel logo, and Intel Core are trademarks of Intel Corporation in the U.S. and other countries.

\* Other names and brands may be claimed as the property of others.

Copyright © 2008-2010 Intel Corporation.

# Contents

---

- Specification Update for the Intel® Desktop Board DG45ID ..... 4**
- Terminology ..... 5
- General Information ..... 5
- Summary Table of Changes ..... 6
  - Codes Used in Summary Table ..... 6
- Specification Changes ..... 7

# Specification Update for the Intel<sup>®</sup> Desktop Board DG45ID

---

This document is an update to the specifications contained in the *Intel<sup>®</sup> Desktop Board DG45ID Technical Product Specification* (Order Number E35960). It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools. It will contain Specification Changes, Errata, Specification Clarifications, and Documentation Changes.

For specification updates concerning the Intel processor that may apply to this desktop board, refer to the following:

- *Intel<sup>®</sup> Core<sup>™</sup>2 Duo Processor E8000Δ and E7000Δ Series Specification Update* (Order Number 318733)
- *Intel<sup>®</sup> Core<sup>™</sup>2 Extreme Processor X6800Δ and Intel<sup>®</sup> Core<sup>™</sup>2 Duo Desktop Processor E6000Δ and E4000Δ Sequence Series Specification Update* (Order Number 310307)
- *Intel<sup>®</sup> Pentium<sup>®</sup> Dual-Core Desktop Processor E2000Δ Series Specification Update* (Order Number 316982)
- *Intel<sup>®</sup> Celeron<sup>®</sup> Dual-Core Processor E1000Δ Series Specification Update* (Order Number 318925)
- *Intel<sup>®</sup> Celeron<sup>®</sup> Processor 400Δ Series Specification Update* (Order Number 316964)
- *Dual-Core Intel<sup>®</sup> Xeon<sup>®</sup> Desktop Processor E3110Δ Series Specification Update* (Order Number 319006)
- *Dual-Core Intel<sup>®</sup> Xeon<sup>®</sup> Desktop Processor E3000Δ Series Specification Update* (Order Number 314916)

Unless otherwise noted in this document, it should be assumed that any processor errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

Refer to the *Intel<sup>®</sup> 4 Series Chipset Family Specification Update* (Order Number 319971) for specification updates concerning the 82G45 GMCH Controller and that may apply to the desktop board DG45ID. Unless otherwise noted in this document, it should be assumed that any MCH errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

Refer to the *Intel<sup>®</sup> I/O Controller Hub (ICH10R) Family Specification Update* (Order Number 319974) for specification updates concerning the 82801JIR I/O Controller Hub and that may apply to the desktop board DG45ID. Unless otherwise noted in this document, it should be assumed that any ICH10R errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

# Terminology

**Specification Changes** are modifications to the current published specifications. These changes will be incorporated in the next release of the specifications.

**Errata** are design defects or errors. Characterized errata may cause the desktop board behavior to deviate from published specifications. Hardware and software designed to be used with any given Altered Assembly (AA) and BIOS revision level must assume that all errata documented for that AA and BIOS revision level are present on all desktop boards.

**Specification Clarifications** describe a specification in greater detail or further highlight a specification's impact to a complex design situation. These clarifications will be incorporated in the next release of the specifications.

**Documentation Changes** include typos, errors, or omissions from the current published specifications. These changes will be incorporated in the next release of the specifications.

# General Information

## Basic Desktop Board DG45ID Identification Information

AA Revision	BIOS Revision	Notes
E27729-305	IDG4510H.86A.0071	1-2
E27729-306	IDG4510H.86A.0077	1-2
E27729-307	IDG4510H.86A.0077	1-2
E27729-308	IDG4510H.86A.0077	1-2
E27729-310	IDG4510H.86A.0097	1-2
E27729-311	IDG4510H.86A.0127	1-2
E27729-312	IDG4510H.86A.0127	1-2

Notes:

1. The AA number is found on a small label on the component side of the board.
2. The G45 Chipset kit used on this AA revision consists of two components as follows:

Device	Stepping	S-Spec Numbers
82G45	A3	LB85
82801JIR	A0	LB8S

## Summary Table of Changes

The following table indicates the Specification Changes, Errata, Specification Clarifications, or Documentation Changes that apply to the Intel® Desktop Board DG45ID. Intel intends to fix some of the errata in a future revision of the desktop board, and to account for the other outstanding issues through documentation or specification changes as noted. This table uses the following notations:

### Codes Used in Summary Table

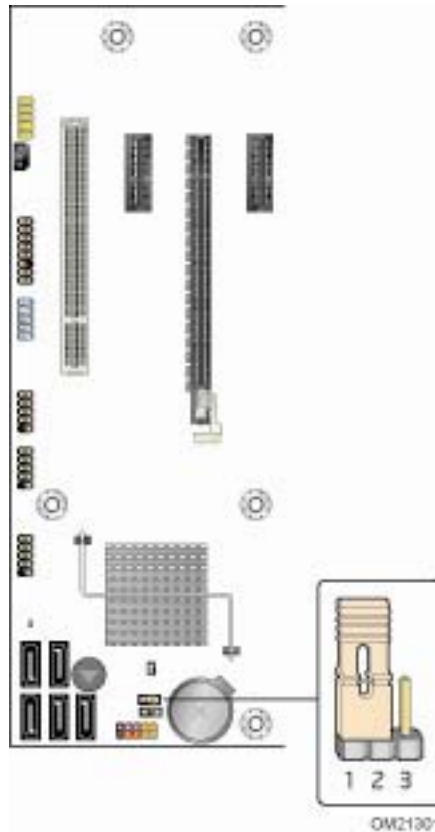
Doc:	Document change or update that will be implemented.
PlanFix:	This erratum may be fixed in a future revision of the desktop board, driver, or BIOS.
Fixed:	This erratum has been previously fixed.
NoFix:	There are no plans to fix this erratum.
Shaded:	This erratum is either new or modified from the previous version of the document.

No.	Plans	Specification Changes
1	Doc	Corrected the Jumper numbering in Figure 14 of Section 2.3 Jumper Block
2	Doc	Added a <i>Caution</i> statement to Section 2.6 Thermal Considerations
3	Doc	Added changes to the <i>Thermal Considerations for Components</i> table and added text and a new table, <i>Tcontrol Values for Components</i> in Section 2.6 Thermal Considerations.
4	Doc	Support for up to 8 GB system memory has been changed to support for up to 16 GB system memory.
No.	Plans	Errata
		There are no characterized erratum for this product

## Specification Changes

The Specification Changes listed in this section apply to the *Intel® Desktop Board DG45ID Technical Product Specification* (Order Number E35960).

1. Corrected the Jumper numbering in Figure 14 of Section 2.3 Jumper Block.



**Figure 14. Location of the Jumper Block**

2. The following Caution statement was modified in the Technical Product Specification in Section 2.6 Thermal Considerations.

## 2.6 Thermal Considerations



### CAUTION

A chassis with a maximum internal ambient temperature of 38 °C at the processor fan inlet is a requirement. Intel recommends the use of a Thermally Advantaged Chassis (TAC) for this desktop board. Use a processor heat sink that provides omni-directional airflow to maintain required airflow across the processor voltage regulator area. For a list of Thermally Advantaged Chassis (TAC) please refer to the following website:

<http://www.intel.com/go/chassis>

3. Changes were made to the *Thermal Considerations for Components* table, as well as lead-in text and a new table, *Tcontrol Values for Components* in Section 2.6 Thermal Considerations.

Table 33 provides maximum case temperatures for the board components that are sensitive to thermal changes. The operating temperature, current load, or operating frequency could affect case temperatures. Maximum case temperatures are important when considering proper airflow to cool the board.

**Table 33. Thermal Considerations for Components**

Component	Maximum Case Temperature
Processor	For processor case temperature, see processor datasheets and processor specification updates
Intel G45 Express Chipset	103 °C
Intel 82801JIR (ICH10R)	107 °C

To ensure functionality and reliability, the component is specified for proper operation when Case Temperature is maintained at or below the maximum temperature listed in Table 33. This is a requirement for sustained power dissipation equal to Thermal Design Power (TDP is specified as the maximum sustainable power to be dissipated by the components). When the component is dissipating less than TDP, the case temperature should be below the Maximum Case Temperature. The surface temperature at the geometric center of the component corresponds to Case Temperature.

It is important to note that the temperature measurement in the system BIOS is a value reported by embedded thermal sensors in the components and does not directly correspond to the Maximum Case Temperature. Intel® Quiet System Technology (Intel® QST) monitors the embedded thermal sensor for system fan speed control. The upper operating limit when monitoring this thermal sensor is Tcontrol.



**Table 34. Tcontrol Values for Components**

Component	Tcontrol
Processor	For processor Tcontrol, see processor datasheets and processor specification updates
Intel G45 Express Chipset	99 °C
Intel 82801JIR (ICH10R)	101 °C

For more information regarding Thermal Design Guidelines please refer to:  
<http://developer.intel.com/Products/Desktop/Chipsets/G45/G45-technicaldocuments.htm>

4. Support for up to 8 GB system memory has been changed to support for up to 16 GB system memory. Partial section of Table 1 shown below.

**Table 1. Feature Summary**

<b>Form Factor</b>	Micro-ATX (9.60 inches by 9.60 inches [243.84 millimeters by 243.84 millimeters])
<b>Processor</b>	Support for the following: <ul style="list-style-type: none"> <li>• Intel® Core™2 Quad processor in an LGA775 socket</li> <li>• Intel® Core™2 Duo processor in an LGA775 socket</li> <li>• Intel® Pentium® Dual-Core processor in an LGA775 socket</li> <li>• Intel® Celeron® Dual-Core processor in an LGA775 socket</li> <li>• Intel® Celeron® processor 400 Sequence in an LGA775 socket</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>• Four 240-pin DDR2 SDRAM Dual Inline Memory Module (DIMM) sockets</li> <li>• Support for DDR2 800 MHz or DDR2 667 MHz DIMMs</li> <li>• Support for up to 16 GB of system memory using DDR2 800 MHz or DDR2 667 MHz DIMMs</li> </ul>

## 1.5 System Memory

The board has four DIMM sockets and support the following memory features:

- 1.8 V DDR2 SDRAM DIMMs with gold plated contacts, with the option to raise the voltage to support higher performance DDR2 SDRAM DIMMs
- Dual channel interleaved mode support
- Unbuffered, single-sided or double-sided DIMMs with the following restriction:  
Double-sided DIMMs with x16 organization are not supported.
- 16 GB maximum total system memory using DDR2 800 MHz or DDR2 667 MHz DIMMs; refer to Section 2.1.1 on page 45 for information on the total amount of addressable memory.
- Minimum recommended total system memory: 512 MB
- Non-ECC DIMMs
- Serial Presence Detect
- DDR2 800 MHz or DDR2 667 MHz SDRAM DIMMs
- DDR2 667 MHz DIMMs with SPD timings of only 5-5-5 (tCL-tRCD-tRP)
- DDR2 800 MHz DIMMs with SPD timings of only 5-5-5 or 6-6-6 (tCL-tRCD-tRP)



### NOTE

*To be fully compliant with all applicable DDR SDRAM memory specifications, the board should be populated with DIMMs that support the Serial Presence Detect (SPD) data structure. This allows the BIOS to read the SPD data and program the chipset to accurately configure memory settings for optimum performance. If non-SPD memory is installed, the BIOS will attempt to correctly configure the memory settings, but performance and reliability may be impacted or the DIMMs may not function under the determined frequency.*

**Table 3. Supported Memory Configurations**

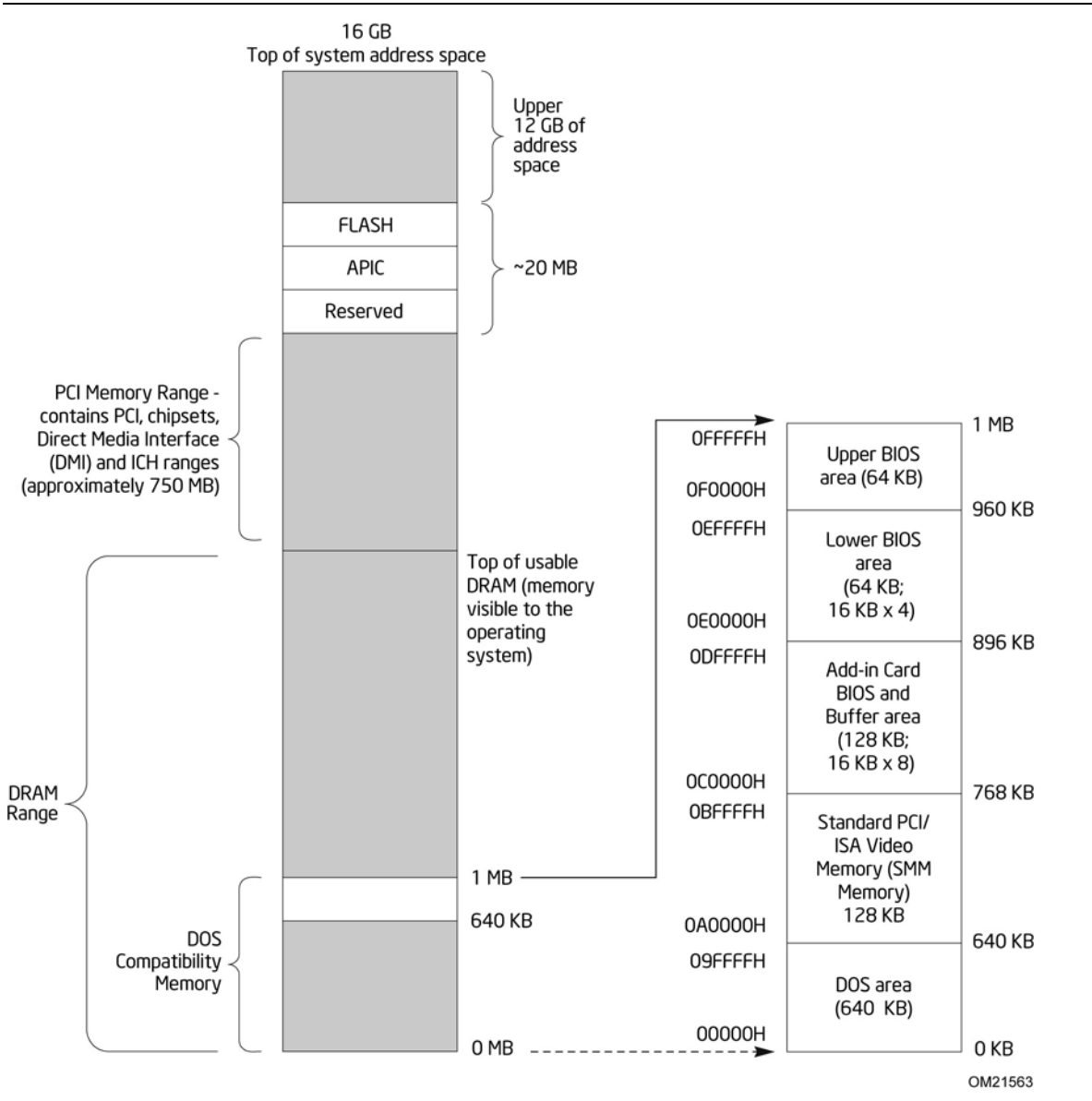
<b>DIMM Type</b>	<b>SDRAM Technology</b>	<b>Smallest usable DIMM (one x16 Single-sided DIMM)</b>	<b>Largest usable DIMM (one x8 Double-sided DIMM)</b>	<b>Maximum capacity with four identical x8 Double-sided DIMMs</b>
DDR2 667	512 Mbit	256 MB	1 GB	4 GB
DDR2 667	1 Gbit	512 MB	2 GB	8 GB
DDR2 667	2 Gbit	1 GB	4 GB	16 GB
DDR2 800	512 Mbit	256 MB	1 GB	4 GB
DDR2 800	1 Gbit	512 MB	2 GB	8 GB
DDR2 800	2 Gbit	1 GB	4 GB	16 GB

## 2.1.1 Addressable Memory

The board utilizes 16 GB of addressable system memory. Typically the address space that is allocated for PCI Conventional bus add-in cards, PCI Express configuration space, BIOS (SPI Flash), and chipset overhead resides above the top of DRAM (total system memory). On a system that has 16 GB of system memory installed, it is not possible to use all of the installed memory due to system address space being allocated for other system critical functions. These functions include the following:

- BIOS/ SPI Flash (32 Mbits)
- Local APIC (19 MB)
- Direct Media Interface (40 MB)
- Front side bus interrupts (17 MB)
- PCI Express configuration space (256 MB)
- GMCH base address registers, internal graphics ranges, PCI Express ports (up to 512 MB)
- Memory-mapped I/O that is dynamically allocated for PCI Conventional and PCI Express add-in cards
- Base graphics memory support (1 MB or 8 MB)
- Intel® Management Engine Interface (Intel® MEI) single channel (8 MB) or dual channel (16 MB)

The amount of installed memory that can be used will vary based on add-in cards, BIOS settings, and operating system installed. Figure 8 shows a schematic of the system memory map. All installed system memory can be used when there is no overlap of system addresses.



**Figure 8. Detailed System Memory Address Map**

Table 10 lists the system memory map.

**Table 10. System Memory Map**

<b>Address Range (decimal)</b>	<b>Address Range (hex)</b>	<b>Size</b>	<b>Description</b>
1024 K - 16777216 K	100000 - 3FFFFFFF	16382 MB	Extended memory
960 K - 1024 K	F0000 - FFFFF	64 KB	Runtime BIOS
896 K - 960 K	E0000 - EFFFF	64 KB	Reserved
800 K - 896 K	C8000 - DFFFF	96 KB	Potential available high DOS memory (open to the PCI Conventional bus). Dependent on video adapter used.
640 K - 800 K	A0000 - C7FFF	160 KB	Video memory and BIOS
639 K - 640 K	9FC00 - 9FFFF	1 KB	Extended BIOS data (movable by memory manager software)
512 K - 639 K	80000 - 9FBFF	127 KB	Extended conventional memory
0 K - 512 K	00000 - 7FFFF	512 KB	Conventional memory

