



## Introducing Intel® Desktop Boards Executive Series based on the Intel® 945G Express Chipset.

### Selecting an Intel® Desktop Board designed for the digital office experience has just been made easier.

The new Intel® Desktop Board Executive Series was created specifically for use in the digital office, with products designed to maximize efficiency and provide extra security, privacy, integrated protections, interoperability, and collaboration services. When configuring a PC for the digital office, the Intel Desktop Board Executive Series is the place to start.

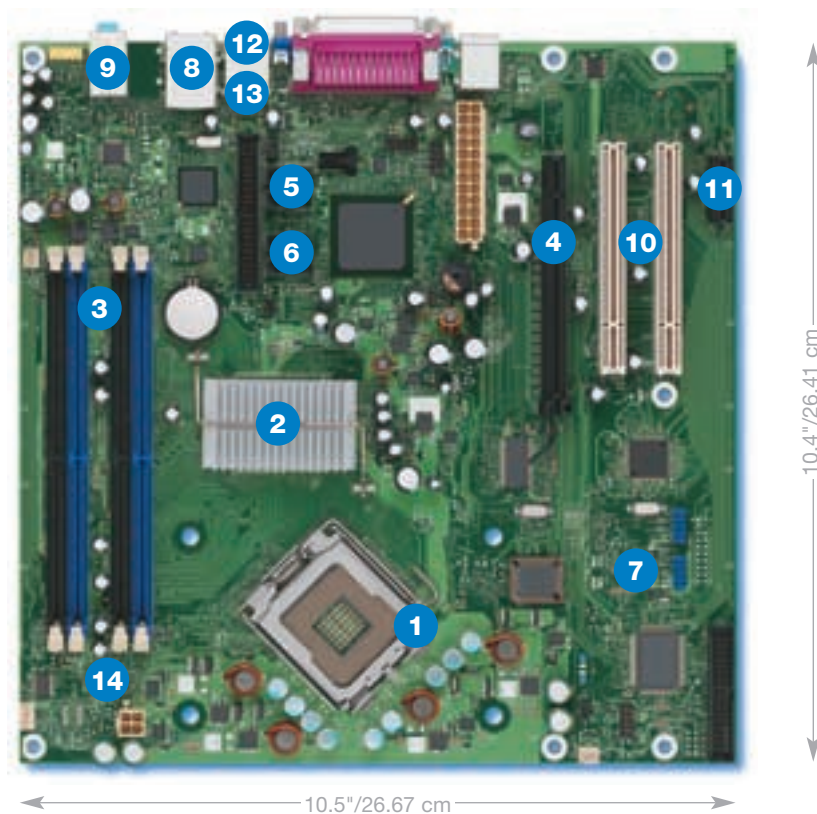
#### **Choose from a variety of desktop boards.**

The Intel Desktop Board Executive Series offers MicroATX or ATX form factors, in addition to a Micro Balanced Technology Extended (MicroBTX) form factor. Whether building a PC for a small business or large enterprise, the Intel Desktop Board Executive Series has the right desktop board for every application.



With support for the new Intel® Pentium® D processors, the Intel Desktop Board Executive Series is designed to optimize a broad range of usage models in the office. These desktop boards feature Intel® High Definition Audio, Intel® PRO 10/100/1000 Network Connection with Intel® Active Management Technology (optional), Trusted Platform Module version 1.2, and PCI Express\* expansion slots. In addition, these desktop boards deliver exceptional platform flexibility with both PCI Express\* x16 graphics and Intel® Graphics Media Accelerator 950 (Intel® GMA 950), as well as support for dual-channel DDR2 667 / 533 / 400<sup>1</sup> memory.

An extensive list of software is included with Intel Desktop Boards Executive Series. Wave Systems\* EMBASSY\* Trust Suite, Norton\* Internet Security 2005, Yahoo!\* Toolbar with Anti-Spy, LANDesk\* System Manager<sup>2</sup>, Intel® Desktop Utilities<sup>3</sup>, and Farstone RestoreIT!\* Gold are just a few examples of the software that come with an Intel Desktop Board Executive Series.



## Features and Benefits

### Intel® Desktop Board D945GCZ

- |   |   |
|---|---|
| <p><b>1 Support for the Intel® Pentium® D processor:</b> Features dual-core processing and 1066 / 800 / 533 MHz system bus in the LGA775 package with Intel EM64T<sup>+</sup> support.</p> <p><b>2 Intel® 945G Express Chipset:</b> Offers a new level of visual quality with integrated Intel® Graphics Media Accelerator 950 (Intel® GMA 950.)</p> <p><b>3 Dual-Channel DDR2 667 / 533 / 400<sup>1</sup> memory support:</b> Four DIMM sockets designed to support up to 4 GB<sup>5</sup> of DDR2 667 / 533 / 400<sup>1</sup> memory delivers greater platform performance and flexible memory support.</p> <p><b>4 PCI Express* x16 graphics connector:</b> Increased graphics bandwidth provides up to 4 GB/s per direction, and is up to 3.5 times faster than previous high-performance discrete graphics interfaces.</p> <p><b>5 Four Serial ATA ports (3.0 Gb/s):</b> Facilitates high-speed storage and data transfers at up to 3 Gb/s for each of four ports.</p> <p><b>6 Intel® Matrix Storage Technology:</b> Boosts storage performance with RAID 0 while protecting data with RAID 1 on the same two disks. RAID 5 and RAID 10 provide additional options for data increased protection and performance.</p> <p><b>7 Trusted Platform Module (TPM) Version 1.2:</b> The latest version of the Trusted Platform Module helps protect and strengthen digital office platforms against software-based attacks.</p> | <p><b>8 Integrated Intel® PRO 10/100/1000 Network Connection with Intel® Active Management Technology:</b> Features on-board 10/100/1000-Mbps Ethernet LAN connectivity with Intel® Active Management Technology</p> <p><b>9 Intel® High Definition Audio with 5.1 surround sound:</b> Flexible 6-channel audio with jack sensing.</p> <p><b>10 Two PCI connectors:</b> Provides expansion slots for custom system configurations and future add-in card upgrades.</p> <p><b>11 One PCI Express* x1 connector:</b> Designed for bandwidth-intensive applications, PCI Express* x1 I/O offers 3.5 times the bandwidth over traditional PCI architecture.</p> <p><b>12 Eight Hi-Speed USB 2.0 ports:</b> Provides four back panel ports and an additional four USB ports via two internal headers.</p> <p><b>13 1394a ports:</b> One back panel port and two internal headers for an additional two ports enable data transfer.</p> <p><b>14 Intel® Precision Cooling Technology:</b> Enables advanced fan speed control to help keep system cool and improve noise levels.</p> |
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Intel® Desktop Board D945GCZ pairs the innovative technologies and high-bandwidth interfaces of the Intel® 945G Express Chipset with the thermal and acoustic benefits of the new Micro Balanced Technology Extended (MicroBTX) form factor. This new board form factor enables smaller PC designs while minimizing the cost and noise that can be an issue with ATX form factors.

**The Boxed Intel® Desktop Board D945GCZ Solution Includes:**

- BTX 1.0a-Compliant I/O Shield
- Floppy, SATA, and ATA 100 / 66 Cables
- Board and Back Panel I/O Layout Stickers
- Intel® Desktop Board D945GCZ Quick Reference
- Trusted Platform Module Quick Start Guide
- Floppy for Intel® Matrix Storage Technology RAID driver
- Intel® Express Installer Driver and Software CD

**Software Included:**

- Intel® Express Installer
- Intel® Audio Studio
- Intel® Desktop Utilities<sup>3</sup>
- Wave Systems\* EMBASSY\* Trust Suite
- Jasc\* Paint Shop Photo Album 5: Starter Edition
- Norton\* Internet Security 2005
- Farstone RestoreIT!\* Gold
- Farstone VirtualDrive\*
- LANDesk\* System Manager<sup>2</sup>
- Kaspersky\* AntiVirus Business Optimal (Russian only)
- Kingsoft\* WPS Office Storm (Chinese only)
- Kingsoft\* AntiVirus 2005 (Chinese only)
- Yahoo!\* Toolbar with Anti-spy

# Desktop Board Executive Series Feature Comparison Product Matrix for Desktop Boards D945GNT/D945GTP/D945GCZ

| Product Family                             | Intel® Desktop Board D945GNT  | Intel® Desktop Board D945GTP  | Intel® Desktop Board D945GCZ  |
|--|---|---|---|
| <b>Form Factor</b>                         | ATX   | MicroATX  | Micro Balanced Technology Extended (MicroBTX)   |
| <b>Product Code Code/UPC</b>               | <b>BOXD945GNTLKR (Intel® PRO 10/100/1000, ICH7R) / 00735858174671</b>   | <b>BOXD945GTP LKR (Intel® PRO 10/100/1000, ICH7R) / 00735858174732</b>  | <b>BOXD945GCZ LKR (Intel® PRO 10/100/1000, ICH7R) / 00735858174794</b>  |
| <b>10-pack Product Code/UPC</b>            | BLKD945GNTLKR (Intel PRO 10/100/1000, ICH7R) / 00735858174688<br>KD945GNTKRPAPAK10 (Intel PRO 10/100/1000, ICH7R)   | BLKD945GTP LKR (Intel PRO 10/100/1000, ICH7R) / 00735858174749<br>KD945GTPKRPAPAK10 (Intel PRO 10/100/1000, ICH7R)  | BLKD945GCZ LKR (Intel PRO 10/100/1000, ICH7R) / 00735858174800<br>KD945GCZKRPAPAK10 (Intel PRO 10/100/1000, ICH7R)  |
| <b>Processor Support</b>                   | <b>Intel® Pentium® D processor, Pentium® 4 processor, and Celeron® D processor in the LGA775 package</b>  | <b>Intel® Pentium® D processor, Pentium® 4 processor, and Celeron® D processor in the LGA775 package</b>  | <b>Intel® Pentium® D processor, Pentium® 4 processor, and Celeron® D processor in the LGA775 package</b>  |
| <b>Platform Compatibility Guide</b>        | 05A, 05B, 04A, 04B  | 05A, 05B, 04A, 04B  | 05A, 05B, 04A, 04B  |
| <b>Supported FSB</b>                       | 1066 MHz / 800 MHz / 533 MHz  | 1066 MHz / 800 MHz / 533 MHz  | 1066 MHz / 800 MHz / 533 MHz  |
| <b>Chipset</b>                             | Intel® 945G Express Chipset   | Intel® 945G Express Chipset   | Intel® 945G Express Chipset   |
| <b>Supports Hyper-Threading Technology</b> | Yes   | Yes   | Yes   |
| <b>Graphics</b>                            | Intel® Graphics Media Accelerator 950   | Intel® Graphics Media Accelerator 950   | Intel® Graphics Media Accelerator 950   |
| <b>Graphics Connector</b>                  | PCI Express* x16  | PCI Express* x16  | PCI Express* x16  |
| <b>Memory Support</b>                      | DDR2 667 / 533 / 400' SDRAM 4 slots, Dual-channel (4GB <sup>5</sup> Max)  | DDR2 667 / 533 / 400' SDRAM 4 slots, Dual-channel (4GB <sup>5</sup> Max)  | DDR2 667 / 533 / 400' SDRAM 4 slots, Dual-channel (4GB <sup>5</sup> Max)  |
| <b>Expansion Slots</b>                     | 2 PCI Express* x1, 4 PCI  | 1 PCI Express* x1, 2 PCI  | 1 PCI Express* x1, 2 PCI  |
| <b>Audio</b>                               | Intel® High Definition Audio: Flexible 6-channel audio with jack sensing (back ports: 3 analog, 1 optical)  | Intel® High Definition Audio: Flexible 6-channel audio with jack sensing (back ports: 3 analog, 1 optical)  | Intel® High Definition Audio: Flexible 6-channel audio with jack sensing (back ports: 3 analog, 1 optical)  |
| <b>USB Ports</b>                           | Hi-Speed USB 2.0, 4 Back Ports / 4 Ports via 2 internal headers   | Hi-Speed USB 2.0, 4 Back Ports / 4 Ports via 2 internal headers   | Hi-Speed USB 2.0, 4 Back Ports / 4 Ports via 2 internal headers   |
| <b>1394</b>                                | Up to 3 IEEE-1394a ports (1 back port)  | Up to 3 IEEE-1394a ports (1 back port)  | Up to 3 IEEE-1394a ports (1 back port)  |
| <b>Storage</b>                             | 4 SATA ports (3.0 Gb/s) and ATA 100/66 up to two devices  | 4 SATA ports (3.0 Gb/s) and ATA 100/66 up to two devices  | 4 SATA ports (3.0 Gb/s) and ATA 100/66 up to two devices  |
| <b>RAID</b>                                | Intel® Matrix Storage Technology (NCQ, Hot Plug, RAID 0, 1, 10, 5, and Matrix RAID)   | Intel® Matrix Storage Technology (NCQ, Hot Plug, RAID 0, 1, 10, 5, and Matrix RAID)   | Intel® Matrix Storage Technology (NCQ, Hot Plug, RAID 0, 1, 10, 5, and Matrix RAID)   |
| <b>On-Board LAN</b>                        | Intel PRO 10/100/1000 Network Connection  | Intel PRO 10/100/1000 Network Connection with Intel® Active Management Technology   | Intel PRO 10/100/1000 Network Connection with Intel® Active Management Technology   |
| <b>TPM</b>                                 | Yes   | Yes   | Yes   |
| <b>Lead Free</b>                           | Yes   | Yes   | Yes   |
| <b>Software</b>                            | Intel® Express Installer<br>Intel® Audio Studio<br>Intel® Desktop Utilities <sup>3</sup><br>Wave Systems* EMBASSY* Trust Suite<br>Jasc* Paint Shop Photo Album 5: Starter Edition<br>Norton* Internet Security 2005<br>Farstone RestoreIT!* Gold<br>Farstone VirtualDrive*<br>LANDesk* System Manager <sup>2</sup><br>Kaspersky* AntiVirus Business Optimal (Russian only)<br>Kingsoft* WPS Office Storm (Chinese only)<br>Kingsoft* AntiVirus 2005 (Chinese only)<br>Yahoo!* Toolbar with Anti-spy | Intel® Express Installer<br>Intel® Audio Studio<br>Intel® Desktop Utilities <sup>3</sup><br>Wave Systems* EMBASSY* Trust Suite<br>Jasc* Paint Shop Photo Album 5: Starter Edition<br>Norton* Internet Security 2005<br>Farstone RestoreIT!* Gold<br>Farstone VirtualDrive*<br>LANDesk* System Manager <sup>2</sup><br>Kaspersky* AntiVirus Business Optimal (Russian only)<br>Kingsoft* WPS Office Storm (Chinese only)<br>Kingsoft* AntiVirus 2005 (Chinese only)<br>Yahoo!* Toolbar with Anti-spy | Intel® Express Installer<br>Intel® Audio Studio<br>Intel® Desktop Utilities <sup>3</sup><br>Wave Systems* EMBASSY* Trust Suite<br>Jasc* Paint Shop Photo Album 5: Starter Edition<br>Norton* Internet Security 2005<br>Farstone RestoreIT!* Gold<br>Farstone VirtualDrive*<br>LANDesk* System Manager <sup>2</sup><br>Kaspersky* AntiVirus Business Optimal (Russian only)<br>Kingsoft* WPS Office Storm (Chinese only)<br>Kingsoft* AntiVirus 2005 (Chinese only)<br>Yahoo!* Toolbar with Anti-spy |
| <b>Intel Advanced BIOS</b>                 | Intel® Platform Innovation Framework for the Extensible Firmware Interface (EFI)<br>Intel® Rapid BIOS Boot<br>Intel® Precision Cooling Technology<br>Intel® Express BIOS Update<br>Fault Tolerant Flashing<br>Multiple Language Support<br>Digital Signature Technology   | Intel® Platform Innovation Framework for the Extensible Firmware Interface (EFI)<br>Intel® Rapid BIOS Boot<br>Intel® Precision Cooling Technology<br>Intel® Express BIOS Update<br>Fault Tolerant Flashing<br>Multiple Language Support<br>Digital Signature Technology   | Intel® Platform Innovation Framework for the Extensible Firmware Interface (EFI)<br>Intel® Rapid BIOS Boot<br>Intel® Precision Cooling Technology<br>Intel® Express BIOS Update<br>Fault Tolerant Flashing<br>Multiple Language Support<br>Digital Signature Technology   |
| <b>Warranty</b>                            | 3 year limited warranty   | 3 year limited warranty   | 3 year limited warranty   |

# Technical Specifications

## Processor

### Processor Support

- Intel® Pentium® D processor in the LGA775 package
- Intel® Pentium® 4 processor in the LGA775 package
- Intel® Celeron® D processor in the LGA775 package
- Supports Intel® EM64T\*
- Platform Compatible Guide: 04A, 04B, 05A, 05B

## Chipset

### Intel® 945G Express Chipset

- Intel® 82945G Memory Controller Hub (MCH)
- Intel® 82801GR I/O Controller Hub (ICH7R)

### Graphics Memory Controller Hub (GMCH)

Designed to support up to 4 GB<sup>s</sup> of system memory using DDR2 667 / 533 / 400<sup>1</sup> SDRAM memory

- Intel® GMA 950

### Intel® ICH7R I/O Controller Hub

Four SATA (3.0 Gb/s) ports

- Up to two ATA 100/66 devices
- Four PCI request-grant pairs for support of four PCI bus masters (Desktop Board D945GNT)
- Two PCI request-grant pairs for support of two PCI bus masters (Desktop Boards D945GTP/CZ)
- Intel® PRO 10/100/1000 Network Connection

## I/O Features

Integrated super I/O LPC bus controller

- Four PCI local bus slots (Desktop Board D945GNT)
- Two PCI Express x1 local bus slots (Desktop Board D945GNT)
- Two PCI local bus slots (Desktop Boards D945GTP/CZ)
- One PCI Express\* x1 local bus slot (Desktop Boards D945GTP/CZ)

## USB 2.0

Integrated Intel® ICH7R controllers:

- Four back-panel ports (two dual stack)
- Four front-panel ports (via 2-headers requiring cabling to front panel)

## Firmware Hub

### System BIOS

- 4 Mb (Desktop Board D945GNT) and 8 Mb (Desktop Boards D945GTP/CZ) Flash SPI with Intel® Platform Innovation framework for extensible firmware interface
- Advanced configuration and power interface V1.0b, DMI 2.0, multi-lingual support

### Intel® Rapid BIOS Boot

- Optimized POST for fast access to PC from power-on

### Intel® Precision Cooling Technology

- Advanced thermal management system dynamically adjusts fan speeds to keep system cool and improve noise levels

## System Memory

### Memory Capacity

- Four 240-pin DIMM connectors supporting up to four double-sided DIMMs

### Memory Types

- DDR2 667 / 533 / 400<sup>1</sup> SDRAM memory support
- Non-ECC Memory

### Memory Modes

- Dual or single-channel operation support

### Memory Voltage

- 1.8V

## Hardware Management

- Processor fan speed control
- System chassis fan speed control
- Voltage and temperature sensing
- Fan sensor inputs used to monitor fan activity
- Power management support for ACPI 1.0b

## Wake-Up From Network

- Wired for Management (WfM) 2.0-compatible
- Support for system wake-up using an add-in network interface card with remote wake-up capability or integrated LAN

## Expansion Capabilities

- Four PCI bus add-in card connectors (Desktop Boards D945GNT)
- Two PCI Express\* x1 bus add-in card connectors (Desktop Boards D945GNT)
- Two PCI bus add-in card connectors (Desktop Boards D945GTP/D945GCZ)
- One PCI Express\* x1 bus add-in card connectors (Desktop Boards D945GTP/D945GCZ)
- One PCI Express\* x16 graphics connector

## Jumpers and Front-Panel Connectors

### Jumpers

- Single configuration jumper design
- Jumper access for BIOS configuration mode

### Front-Panel Connectors

- Reset, HD LED, Power LEDs, power on/off, standby header
- Two front-panel Hi-Speed USB 2.0 headers
- Front-panel audio header
- Two front-panel 1394a headers

## Mechanical

### Board Style

- Desktop Boards D945GNT—ATX 2.2-compliant
- Desktop Board D945GTP—MicroATX 1.0-compliant
- Desktop Board D945GCZ—Micro Balanced Technology Extended (MicroBTX) 1.0a-compliant

### Board Size

- Desktop Boards D945GNT—12" x 9.6" (30.48 cm x 24.38 cm)
- Desktop Board D945GTP—9.6" x 9.6" (24.38 cm x 24.38 cm)
- Desktop Board D945GCZ—10.5" x 10.4" (26.67 cm x 26.41 cm)

### Baseboard Power Requirements

- Desktop Boards D945GNT—ATX12V
- Desktop Boards D945GTP—ATX12V or SFX12V
- Desktop Board D945GCZ—ATX12V, SFX12V, or CFX12V

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## Environment

### Operating Temperature

- 0° C to +55° C

### Storage Temperature

- -40° C to +70° C

## Regulations

### Safety Regulations

#### U.S. and Canada

UL 1950, Third edition—CAN/CSA C22.2 No. 950-95 with recognized U.S. and Canadian component marks

#### Europe

Nemko certified to EN 60950

#### International

Nemko certified to IEC 60950 (CB report with CB certificate)

### EMC regulations (tested in representative chassis)

**U.S.:** FCC Part 15, Class B

**U.S.:** FCC Part 15, Class B open-chassis (cover off) testing

**Canada:** ICES-003, Class B

**Europe:** EMC directive 89/336/EEC; EN 55022:1998 Class B; EN 55024:1998

**Australia/New Zealand:** AS/NZS 3548, Class B

**Taiwan:** CNS 13438, Class B

**International:** CISPR 22:1997, Class B

Power requirements vary. Complies with US CRF via EN55022 +6 db in system configurations with an open chassis and EU Directive 89/336/EEC and use via EN55022 and EN50082-1 in a representative chassis.



**Lead-Free:** The symbol is used to identify electrical and electronic assemblies and components in which the lead (Pb) concentration level in any of the raw materials and the end product is not greater than 0.1% by weight (1000 ppm). This symbol is also used to indicate conformance to lead-free requirements and definitions adopted under the European Union's Restriction on Hazardous Substances (RoHS) directive, 2002/95/EC.

**Ordering Information: See the Intel Web site at [www.intel.com](http://www.intel.com).**

**For the most current product information, visit [developer.intel.com/design/motherbd/](http://developer.intel.com/design/motherbd/)**

- 1 DDR2 400 memory only supported in combination with Intel® processors in the LGA775 package with 800 MHz and 533 MHz system bus.
- 2 Available by Internet download only. Third party user registration required.
- 3 Intel® Desktop Utilities includes: hardware monitoring, Diskeeper® Lite defragmentation, NTI Backup Now®, Stress Test® OSA AdminWorks®, and Symantec® Security Check.
- 4 Intel® EM64T requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. See [www.intel.com/info/em64t](http://www.intel.com/info/em64t) for more information.
- 5 System resources (such as PCI and PCI Express\*) require physical memory address locations that reduce available memory addresses above 3 GB. This may result in less than 4 GB of memory being available to the operating system and applications.

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