

**Intel[®] Server Board S5000PAL
Intel[®] Server Board S5000XAL**

**Intel[®] Server Systems SR1550AL /
SR2500AL – Intel RAID Cache**

Tested Memory Report

Revision 40.0
October 2008

Revision History

Date	Rev	Modifications
Jun/2006	1.0	Release version.
Jun/2006	2.0	Removed Micron* 512MB part. Added Micron 1GB and 4GB part. Added Samsung* 512MB part. Added Hynix* 512MB and 1GB parts. Added Smart* 128MB and Micron 256MB mini-DIMM parts. (In shaded areas)
Jun/2006	3.0	Added Kingston* 512MB part. Added ATP Electronics* 1GB parts. (In shaded areas)
Jul/2006	4.0	Added A-Data Technology*, Apacer*, Crucial Technology*, Hynix, Dataram*, Kingston, and Smart 512MB parts. Added Apacer, ATP Electronics, Crucial Technology, Kingston, Smart, Micron, Hynix, and Samsung 1GB parts. Added Qimonda (Infineon)* and ATP Electronics 2GB parts. (In shaded areas)
Aug/2006	5.0	Added A-Data Technology, Apacer, ATP Electronics, and Dataram 512MB parts. Added Apacer, Kingston, and Smart 1GB parts. Added Mini-DIMMs. (In shaded areas)
Aug/2006	6.0	Added Smart 512MB parts. Added Smart, ATP Electronics, and Dataram 1GB parts. Added Apacer 2GB part. (In shaded area)
Aug/2006	7.0	Added Samsung* and Qimonda 512MB parts. Added Samsung, Nanya*, Qimonda, and Kingston 1GB parts. (In shaded area)
Oct/2006	8.0	Updated vendor sales information and memory details. Added Micron, ATP Electronics, Kingston, Nanya, Legacy, and Smart 512MB parts. Added Kingston, Smart, and ATP Electronics 1GB parts. Added Samsung, Nanya, Apacer, ATP Electronics, and Smart 2GB parts. (In shaded area)
Oct/2006	9.0	Added Samsung 512MB part. Added Samsung, Hynix, and Micron 1GB part. Added Samsung 2GB part. (In shaded area)
Nov/2006	10.0	Added Wintec Industries, Super Talent Electronics, and Apacer 512MB parts. Added Wintec Industries, Kingston, Ventura, and Apacer 1GB parts. Added Netlist, Inc., Kingston, Dataram, Wintec Industries, and Apacer 2GB parts. Added Kingston 4GB part. (In shaded area)
Jan/2007	11.0	Added A-Data Technology and Kingston 512MB parts. Added Actica, Inc, Viking, Kingston, Smart, and Super Talent Electronics 1GB parts. Added Ventura, Viking, Kingston, Smart, and Super Talent Electronics 2GB parts. Added ATP Electronics 4GB part. (In shaded area)
Jan/2007	12.0	Added Qimonda 512MB part. Added Legacy, Micron, Hynix, and Buffalo 1GB parts. Added Kingston, Qimonda, and Wintec 2GB parts. (In shaded area)
Jan/2007	13.0	Added Qimonda and Hynix 512MB parts. Added Qimonda, Micron, and Legacy 1GB parts. Added Qimonda and Micron 2GB parts. Added Samsung 4GB part. (In shaded area)
Jan/2007	14.0	Added Apacer, Legacy, Hynix, Qimonda, Samsung, and Viking 512MB parts. Added Apacer, Micron, and Legacy 1GB parts. Added Buffalo and Qimonda 2GB parts. (In shaded area)
Feb/2007	15.0	Added Micron, Qimonda, ATP Electronics, Dataram, Kingston, Legacy, and Viking 512MB parts. Added Qimonda, Samsung, Dataram, Kingston, S3+, and Wintec 1GB parts. Added Qimonda, Samsung, Hynix, Kingston, and Legacy 2GB parts. Added Qimonda, Micron, Apacer, and Kingston 4GB parts. (In shaded area)

Date	Rev	Modifications
Feb/2007	16.0	Added Qimonda 512MB part. Added Viking and Micron 1GB parts. Added Micron 2GB parts. Added Viking, Qimonda, Samsung, Micron, and Legacy 4GB parts. Updated vendor contact information. (In shaded area)
Mar/2007	17.0	Added AMB Vendor, AMB Rev, and Heat Sink Type information to some of the parts. Added Micron 256MB and Kingston 512MB Mini DIMMs. Added Qimonda 1GB part. Added Qimonda and Hynix 2GB parts. Added Samsung 4GB part. (In shaded area)
Mar/2007	18.0	Updated contact information. Added Netlist, Inc. and Smart 1GB parts. (In shaded area)
Apr/2007	19.0	Added STEC Inc.*, Micron, and ATP Electronics 1GB parts. Added Hynix, Micron, and STEC Inc. 2GB parts. Added Micron 4GB part. (In shaded area)
May/2007	20.0	Added Micron, Smart, and Dataram 1GB parts. Added Micron, Kingston, ATP Electronics, and Dataram 2GB parts. (In shaded area)
May/2007	21.0	Added section 2.2: clarification for acoustics versus performance mode. Added updated memory parts. (In shaded area)
Jun/2007	21.0	Added updated memory parts. (In shaded area)
Jun/2007	22.0	Added updated memory parts. (In shaded area)
Jul/2007	23.0	Added updated memory parts. (In shaded area)
Aug/2007	24.0	Added updated memory parts. (In shaded area)
Oct/2007	25.0	Updated some contact information. Additional memory parts added. (In shaded area)
Oct/2007	26.0	Corrected a 4 GB part number (in shaded area).
Nov/2007	27.0	Added a note on product codes covered by this list. Added AMB revision notes. Added additional memory parts (in shaded area).
Jan/2008	28.0	Removed modules built with Qimonda C1 stepping AMBs. Added additional memory parts (in shaded area).
Mar/2008	29.0	Added additional memory parts (in shaded area).
Apr/2008	30.0	Added additional memory parts (in shaded area).
May/2008	31.0	Added additional memory parts (in shaded area).
May/2008	32.0	Added support for DDR2-533 and 667MHz for ROMB. Added additional memory parts (in shaded area).
June/2008	33.0	Added additional memory parts (in shaded area).
June/2008	34.0	Added additional memory parts (in shaded area).
July/2008	35.0	Added additional memory parts (in shaded area).
July/2008	36.0	Added additional memory parts (in shaded area). Update contact information for MSC Vertriebs GmbH
Aug/2008	37.0	Added additional memory parts (in shaded area).
Aug/2008	38.0	Added additional memory parts (in shaded area).
Sep/2008	39.0	Added additional memory parts (in shaded area).
Oct/2008	40.0	Added additional memory parts (in shaded area).

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The Intel® Server Board S5000PAL 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.

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Note: DIMM devices with gold contacts should NOT be placed into DIMM sockets with tin-lead contacts or vice-versa. Mixing dissimilar metal contact types has been shown to result in unreliable memory operation. Intel recommends similar manufacturer and similar speeds in each Rank on the memory module. Mixing of dissimilar memory is NOT recommended.

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1. Overview of Memory Testing

The following test processes are used to qualify Dual In-Line Memory Modules (DIMMs) for use with the Intel® Server Board S5000PAL/S5000XAL. Memory is a vital subsystem in a server. Intel requires that strict guidelines be met before a DIMM vendor is added to the Tested Memory Report. To be included on the list as a fully supported DIMM, the memory must undergo rigorous tests to ensure that the product will perform the intended server product functions. Memory qualification for Intel server, workstation and RAID controller products is performed both by Intel's Memory Validation Lab (MVL) and by an independent external test lab, Computer Memory Test Lab* (CMTL).

Note: This tested memory list applies to all product codes in the Intel® Server Board S5000PAL/S5000XAL family.

The Tested Memory Lists for Intel's server board, workstation board, and RAID controller products categorize memory modules as Advanced Tested. The Advanced Testing process includes a standard paper qualification and then is followed by two levels of functional testing. DIMMs that have completed and passed Advanced Testing are considered to be compatible with the product on which they were tested, and with the test software and operating systems that was used during the test process.

Note: Memory qualification for main memory is done by testing identical memory modules in all DIMM slots. Memory qualification does not include testing of mixed DIMM type and/or vendors. Mixing of DIMM type and/or vendors is not recommended.

1.1 Paper Qualification

A paper qualification is performed to verify that the specifications of a given DIMM meet Intel's memory specifications for a given product. Specification criteria reviewed include: critical timings, electrical characteristics, timing requirements, environmental requirements, and packaging requirements.

1.2 Functional Testing

After a given DIMM passes the standard paper qualification, functionality of the DIMM is then tested with the intended Intel product. Two levels of functional testing are performed; standard and advanced.

Standard functional testing requires that the given DIMM and Intel product combination operate with no failures for a period of no less than 24 hours for both minimum and maximum DIMM configurations. Testing is performed using a Microsoft Windows* operating system and a custom test package. The test systems operate with standard voltage and at room temperature.

1.3 Advanced functional testing

Advanced functional testing requires that the given DIMM and Intel product combination operate with no failures for a period of no less than 24 hours for both minimum and maximum DIMM configurations. Testing is performed with multiple operating systems and various custom test packages. Each test configuration is tested with various voltage and temperature margin conditions.

1.4 Computer Memory Test Lab*

Computer Memory Test Lab, also known as “CMTL*” is a leading memory test organization responsible for testing a broad range of memory products. A memory product, which receives a “PASS” after being tested by CMTL, means it functions correctly and consumers can use the product to perform the intended server functions. In order to pass these stringent standards, memory products must maintain the highest manufacturing procedures and pass an exacting battery of tests. Testing is performed with Intel supplied equipment and procedures defined by Intel’s various functional testing levels.

CMTL* Contact Information:

Office: (949) 716-8690

Main Fax: (949) 716-8691

Computer Memory Test Lab (CMTL)

24 Hammond Suite F

Irvine, CA 92618

<http://www.cmtlabs.com/>

2. Memory Requirements – Server Board and SAS RAID

2.1 Server Board Memory Sub-system

The Intel® Server Board S5000PAL and Intel® Server Board S5000XAL have memory sub-systems designed to support only Fully Buffered Dual In-line (FBD) Registered DDR2-533 and DDR2-667 FBDIMM memory ECC Synchronous Dynamic Random Access Memory (SDRAM). Other industry naming conventions for DDR2-533 include PC2-4200, and DDR2-667 includes PC2-5300.

Note: Only DDR2 DIMMs that are Fully Buffered is supported on these server boards.

These server boards provide eight DIMMs slots. They are capable of supporting a minimum of 512MBs using a single 512MB FBDIMM, and a maximum of up to 32GBs. Supported FBDIMM capacities for main memory include: 512MB, 1GB, 2GB, and 4GB.

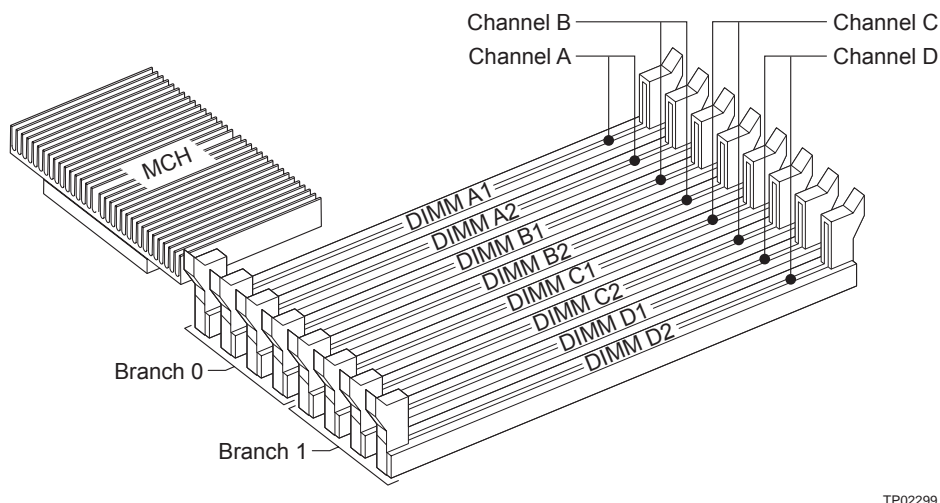
Maximum 8 DIMM System Memory Configuration – x8 Single Rank

DRAM Technology x8 Single Rank	Maximum Capacity Mirrored Mode	Maximum Capacity Non-Mirrored Mode
512 Mb	2 GB	4 GB
1024 Mb	4 GB	8 GB
2048 Mb	8 GB	16 GB

Maximum 8 DIMM System Memory Configuration – x4 Dual Rank

DRAM Technology x4 Dual Rank	Maximum Capacity Mirrored Mode	Maximum Capacity Non-Mirrored Mode
512 Mb	8 GB	16 GB
1024 Mb	16 GB	32 GB
2048 Mb	16 GB	32 GB

The MCH masters four fully buffered DIMM (FBD) memory channels. FBD memory utilizes a narrow high speed frame oriented interface referred to as a channel. The four FBD channels are organized into two branches of two channels each, Branch 0 consists of channels A and B, and Branch 1 consists of channels C and D. Each branch is supported by a separate memory controller. The two channels on each branch operate in lock step to increase FBD bandwidth. On the server board, the four channels are routed to eight DIMM slots and are capable of supporting registered DDR2-533 and DDR2-667 FBDIMM memory (stacked or unstacked). Peak theoretical memory data bandwidth is 6.4GB/s with DDR2-533 and 8.0GB/s with DDR2-667.



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Figure 1. Memory Layout

2.1.1 DIMM Population Rules

DIMM population rules depend on the operating mode of the memory controller, which is determined by the number of DIMMs installed. DIMMs must be populated in pairs. DIMM pairs are populated in the following DIMM slot order: A1 & B1, C1 & D1, A2 & B2, C2 & D2. DIMMs within a given pair must be identical with respect to size, speed, and organization. However, DIMM capacities can be different between different DIMM pairs.

For example, a valid mixed DIMM configuration may have 512MB DIMMs installed in DIMM Slots A1 & B1, and 1GB DIMMs installed in DIMM slots C1 & D1.

Notes:

- Single channel mode is only tested and supported with a 512MB x8 FBDIMM installed in DIMM Slot A1.
- The supported memory configurations must meet population rules defined above.
- **For best performance, the number of DIMMs installed should be balanced across both memory branches. For Example: a four DIMM configuration will perform better than a two DIMM configuration and should be installed in DIMM Slots A1, B1, C1, and D1. An eight DIMM configuration will perform better than a six DIMM configuration.**
- Although mixed DIMM capacities between channels is supported, Intel does not validate DIMMs in mixed DIMM configurations.

See the Intel® Server Board S5000PAL / S5000XAL Technical Product Specification for more information about DIMM population rules as they pertain to Memory Mirroring and DIMM Sparring configurations.

The server board supports up to eight DDR2-533 or DDR2-667 Fully Buffered DIMMs (FBD memory). The following tables show the maximum memory configurations supported using the specified memory technology.

2.2 Acoustic versus Performance Mode for System Fan Control

2.2.1 Memory Sizing and Configuration

The BIOS supports various memory module sizes and configurations. These combinations of sizes and configurations are valid only for FBDIMMs approved by Intel. The BIOS reads the Serial Presence Detect (SPD) EEPROMs on each installed memory module to determine the size and timing characteristics of the installed memory modules (FBDIMMs). The memory-sizing algorithm then determines the cumulative size of each row of FBDIMMs. The BIOS programs the memory controller in the chipset accordingly, such that the range of memory accessible from the processor is mapped into the correct FBDIMM, or set of FBDIMMs.

2.2.2 Performance Configuration in BIOS Setup (Default)

In performance mode, the system will utilize fan control over memory throttling to provide primary system cooling. This mode results in a moderately louder system than acoustic mode due to more aggressive fan speed control settings. Independent of the system's temperature level, the fan speed in performance mode will be slightly higher than the fan speed in acoustic mode. Additionally, at a given temperature, the increased airflow from this cooling option diminishes the occurrence of memory throttling. This enables high-power DIMMs (typically DRx4) to operate at their maximum capacity since these DIMMs produce a higher thermal output from their higher bandwidth.

Note: this is the recommended mode when using DRx4 memory modules.

2.2.3 Acoustic Configuration in BIOS Setup

In acoustic mode, the system temperature is maintained primarily by memory throttling, so the utilization of high fan speeds is reduced. As a result, this mode produces a quieter system because the fans will run at a lower speed if the system does not require additional cooling. However, the memory throttling utilized in this mode could lower memory performance for high-power DIMMs (typically DRx4 or better) because these DIMMs cause a higher thermal output when reaching optimal memory bandwidth.

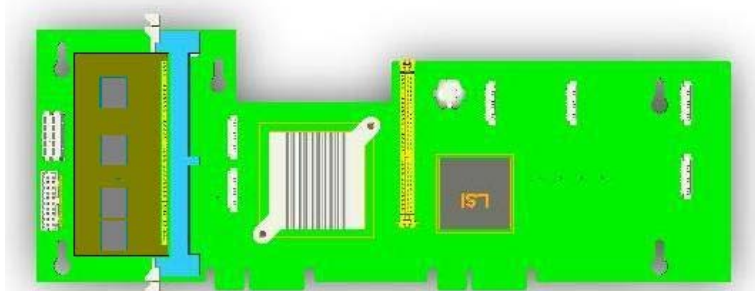
Note: this is the recommended mode when using DRx8 memory modules.

The following table lists the current supported memory types:

FBDIMM-533 CL4 & FBDIMM-667 CL5 Memory Matrix						
DIMM Capacity	DIMM Organization	SDRAM Density	SDRAM Organization	# SDRAM Devices	# Address bits Row/Bank/Column	# of Ranks
512MB	64M x72	512Mbit	64M x 8	9	14/10/2	1
1GB	128M x 72	512Mbit	64M x 8	18	14/10/2	2
1GB	128M x 72	512Mbit	128M x 4	18	14/11/2	1
1GB	128M x 72	512Mbit	128M x 8	9	14/10/3	1
2GB	256M x72	512Mbit	128M x 4	36	14/11/2	2
2GB	256M x72	1Gbit	256M x 4	18	14/11/3	1
2GB	256M x72	1Gbit	128M x 8	18	14/10/3	2
4GB	512M x72	1Gbit	256M x 4	36	14/11/3	2
4GB	512M x 72	2Gbit	512M x 4	18	13/11/2	2

2.3 Intel® Server System SR1550AL / Intel® Server System SR2500AL with Active SAS Mid-plane

The active SAS/SAS RAID mid-plane board is an optional feature of the Intel® Server Systems SR1550AL and SR2500AL. By default, this mid-plane option provides software RAID levels 0, 1, and 10 utilizing Intel® Embedded RAID Technology II. The active mid-plane supports options to provide full hardware RAID support. Options required to enable hardware RAID support include an Intel® RAID Activation Key (Product order code - AXXRAK18E) and installation of a mini-DIMM for Intel RAID Cache support. To protect from data loss during an unexpected power loss event, an Intel® RAID Smart Battery Backup module (AXXRSBBU3) is also supported. Hardware RAID levels supported include 0, 1, 5, 10, and 50.



2.3.1 Intel RAID Cache Support

To enable support for hardware RAID, the active mid-plane provides a 244-pin mini-DIMM connector (J8C1), supporting a single registered ECC non-parity DDR2-400, DDR-533 or DDR667 MHz mini-DIMM to provide Intel RAID cache. mini-DIMM capacities supported range from 128MB to 1GB. However, if the optional battery backup unit is used, battery retention requirements can only support single rank DIMMs, which will limit the number of devices consuming power during self-refresh mode. This limits the supported memory list to only 128 MB, 256 MB, and 512 MB modules.

- DDRII – 400MHz, 533MHz and 667MHz SDRAM
- The SAS mid-plane RAID board will only support DIMMs with 2 banks address select.
- Registered DIMMs only (board not routed nor simulated for unbuffered DIMMs)
- 72-bit ECC DIMMs only. 64-bit data bus width + 8-bit ECC

3. Intel® Server Board S5000PAL / S5000XAL Tested Memory

The following tables list DIMM devices tested to be compatible with the Intel® Server Board S5000PAL and Intel® Server Board S5000XAL. The list of tested memory is periodically updated, as qualified memory is added during the production life of the Intel product.

Intel strongly recommends the use of ECC memory in all server products.

Memory modules not listed in the following tables have not been tested for compatibility and their use with the specified server boards may result in unpredictable operation and data loss.

Caution: Third party memory vendors may use the same module part number with different DRAM vendors and die revisions. To insure proper system operation, verify that each DRAM vendor and die revision has been separately tested and qualified. Please notify CMTL if there is a discrepancy. This list is subject to change without notice.

Note: This list is not intended to be all-inclusive. It is provided as a convenience to Intel's general customer base, but Intel does not make any representations or warranties whatsoever regarding the quality, reliability, functionality, or compatibility of these memory modules.

3.1 Intel® Server System SR1550AL / Intel® Server System SR2500AL SAS Mid-plane RAID Board Memory Population

The SAS mid-plane RAID board is an optional feature of the Intel® Server Systems SR1550AL and SR2500AL which allows for the integration of RAID functionality using the LSISAS1068 controller along with the IOP80333 IO processor and a single DDR2 memory module.

The SAS mid-plane memory subsystem consists of a single 244-pin Registered DDR2 SDRAM DIMM socket connected to the IOP80333 IOP DDR interface. Data is clocked at both the rising and falling edges of the 200MHz bus clock to achieve an effective source synchronous frequency of 400MHz.

- DDRII – 400MHz, 533MHz and 667Mhz SDRAM are supported.
- The SAS mid-plane RAID board will only support DIMMs with 2 banks address select.
- Registered DIMMs only (board not routed nor simulated for unbuffered DIMMs)
- 72-bit ECC DIMMs only. 64-bit data bus width + 8-bit ECC

Note: Due to battery retention requirements for the optional battery backup solution, the SAS mid-plane RAID will only support single rank DIMMs to limit the number of devices consuming power during self-refresh mode. This limits the qualification list to only 128 MB, 256 MB, and 512 MB modules.

4. Intel® Server Board S5000PAL / S5000XAL Main Memory Tested

The following tables list DIMM devices tested to be compatible with the Intel® Server Board S5000PAL / S5000XAL. The list of tested memory is periodically updated as qualified memory is added during the production life of the Intel product.

Intel strongly recommends the use of ECC memory in all server products.

Memory modules not listed in the following tables have not been tested for compatibility and their use with the Intel® Server Board S5000PAL / S5000XAL may result in unpredictable operation and data loss.

Caution: Third party memory vendors may use the same module part number with different DRAM vendors and die revisions. To insure proper system operation, verify that each DRAM vendor and die revision has been separately tested and qualified. Please notify CMTL if there is a discrepancy. This list is subject to change without notice.

Note: This list is not intended to be all-inclusive. It is provided as a convenience to Intel's general customer base, but Intel does not make any representations or warranties whatsoever regarding the quality, reliability, functionality, or compatibility of these memory modules.

Intel® Server Board S5000PAL / S5000XAL
Fully Buffered ECC, DDR2-533 DIMM Modules
512 MB Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Samsung	M395T6553CZ4-CD51	K4T51083QC-ZCD5	Samsung		IDT	AMB0480A5RJ A1.5		1	6/1/06
Hynix	HYMP564F72BP8D2-C4	HY5PS12821BFP-C4	Hynix		IDT	AMB0480A5RJA 1.5		1	6/15/06
Kingston	KVR533D2S8F4/512I	HYB18T512800AF-3.7-A	Qimonda		Intel QG6400	GB C0 ¹		1	6/13/06
A-Data Technology	M2OEL2G3HAC521B5Z	EDE5108AGSE-5C-E rev G	Elpida	B62FRCA na	Intel	C0	Foxconn	1	6/26/06
Apacer	78.97G96.404	K4T51083QC-ZCD5 rev C	Samsung	48.16203.014 rev 4	Intel	D1	Foxconn	1	6/23/06
Crucial Technology	CT9HTF6472FY53EB4E3.01	MT47H64M8CB-37E rev B	Micron	0499 rev B	Intel	D1	Foxconn	1	6/28/06
Dataram	DTM65505B	EDE5108AGSE-5C-E rev G	Elpida	40053A rev B	Intel	D1	Foxconn	1	7/5/06
Smart Modular Technologies	SG647FBD64843-IAI	HYB18T512800AF37 rev A	Qimonda (Infineon)	240-21-4 na	Intel	D1	Logitex	1	7/10/06
ATP Electronics	AP64K72A8BHD5S	K4T51083QC-ZCD5 rev C	Samsung	SP240A08K1 na	IDT	A1.5	Foxconn	1	7/17/06
Smart Modular Technologies	SG647FBD64843-IAI	HYB18T512800AF37 rev A	Qimonda (Infineon)	240-21-4 na	Intel	C0	Foxconn	1	8/8/06
Legacy Electronics Inc.	B557K4C90AE-37R	K4T51083QC-ZCD5 rev C	Samsung	D2F18A na	IDT	A1.5	Foxconn	1	8/18/06
Kingston	KVR533D2S8F4/512I	E5108AGBG-5C-E rev G	Elpida	2025285-002.A00 na	Intel	C0	Foxconn	1	8/21/06
Smart Modular Technologies	TD647FBD64843SCI	K4T51083QC-ZCD5 rev C	Samsung	PG54G240NFBUB3RA rev A	Intel	C0	Foxconn	1	9/7/06
Smart Modular Technologies	TD647FBD64843IAI	HYB18T512800AF37 rev A	Qimonda (Infineon)	PG54G240NFBUB3RA rev A	Intel	C0	Foxconn	1	9/7/06
Samsung	M395T6553CZ4-CD50		Samsung		Intel	GB C0 ¹		1	10/24/06
Qimonda	HYS72T64400HFN-3.7-A	HYB18T512800AF	Qimonda		Intel	GB C0 ¹	FDHS	1	1/16/07
Hynix	HYMP564F72BP8N2-C4	HY5PS12821BFP-C4	Hynix		Intel	GB C0 ¹	FDHS	1	11/10/06
Qimonda	HYS72T64400HFD-3.7-A	HYB18T512800AF-3.7-A	Qimonda		IDT	1.5	FDHS	1	11/14/06
Qimonda	HYS72T64400HFN-3.7-B	HYB18T512800AF	Qimonda		Intel	D1	FDHS	1	12/13/06

¹ The GB C0 AMB revision does not support closed-loop throttling.

**Fully Buffered ECC, DDR2-533 DIMM Modules
512 MB Sizes (64Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Hynix	HYMP564F72BP8D2-C4	HY5PS12821BFP-C4	Hynix		IDT	1.5	FDHS	1	1/24/07
Qimonda	HYS72T64400HF D-3.7-B	HYB18T512800AF	Qimonda		IDT	1.5	FDHS	1	1/29/07
Viking	VR5EF647218EB SL1	HYB18T512800BF37 rev B	Qimonda (Infineon)	D2F18A	IDT	A1.5	Foxconn	1	2/1/07
Kingston	KVR533D2S8F4/512I	E5108AGBG-6E-E rev G	Elpida	2025285-002.A00 na	Intel	D1	Foxconn	1	2/9/07

**Fully Buffered ECC, DDR2-667 DIMM Modules
512 MB Sizes (64Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Hynix	HYMP564F72BP8N2-Y5	HY5PS12821BFP-Y5	Hynix		Intel	GB C0 ¹		1	7/13/06
A-Data Technology	M2OEL5G3HAC7111C5Z	EDE5108AGSE-6E-E rev G	Elpida	B62FRCA na	Intel	D1	Foxconn	1	7/17/06
Apacer	78.97G99.404	K4T51083QC-ZCE6 rev C	Samsung	48.16203.014 rev 4	Intel	C0	Foxconn	1	7/18/06
Dataram	DTM65506A	NT5TU64M8AE-3C rev A	Nanya	40053A rev B	Intel	D1	Foxconn	1	7/21/06
Smart Modular Technologies	SG647FBD648521A D5	HYB18T512800AF3 S rev A	Qimonda (Infineon)	PG54G24 0NFBUB3 RA rev A	IDT	A1.5	Foxconn	1	7/27/06
Qimonda (Infineon)	HYS72T64400HFN-3S-A	HYB18T512800AF-3S	Qimonda (Infineon)		Intel	GB C0 ¹		1	8/2/06
Samsung	M395T6553CZ4-CE61	K4T51083QC-ZCE6	Samsung		IDT	1.5		1	8/2/06
Samsung	M395T6553CZ4-CE60	K4T51083QC-ZCE6	Samsung		Intel	GB C0 ¹		1	8/15/06
Micron	MT9HTF6472FY-667B4E3	MT47H64M8CB-3	Micron		Intel			1	9/13/06
ATP Electronics	AP64K72A8BHE6S	K4T51083QC-ZCE6 rev C	Samsung	SP240A08 K1 na	IDT	A1.5	Foxconn	1	8/16/06
ATP Electronics	AP64K72A8BHE6S	K4T51083QC-ZCE6 rev C	Samsung	SP240A08 K1 na	NEC	B5 ²	Foxconn	1	8/30/06
Kingston	KVR667D2S8F5/512I	E5108AGBG-6E-E rev G	Elpida	2025285-002.A00 na	Intel	D1	Foxconn	1	9/13/06
Nanya Technology Corporation	NT512T72U89A5BD-3C	NT5TU64M8AE-3C rev A	Nanya	NTPCB00 056P na				1	9/20/06
Wintec Industries	39C925284C	K4T51083QC-ZCE6 rev C	Samsung	D2F18A rev A	IDT	A1.5	Foxconn	1	10/6/06
Super Talent Electronics	T667FA512(Channe l/S12TF8CMS(OEM)	K4T51083QC-ZCE6 rev C	Samsung	B62FRCA na	IDT	A1.5	Foxconn	1	10/10/06

¹ The GB C0 AMB revision does not support closed-loop throttling.

² This part may show voltage errors in the System Event Log (SEL) during boot. These errors will not affect system operation and can be ignored.

**Fully Buffered ECC, DDR2-667 DIMM Modules
512 MB Sizes (64Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Apacer	78.9DG99.404	K4T51083QC-ZCE6 rev C	Samsung	48.16203.014 rev 4	Intel	C0	Foxconn	1	11/11/06
A-Data Technology	M2OSS5G3HAB71L1C5Z	K4T51083QE-ZCE6 rev E	Samsung	B62FRCA093 na	NEC	B5 ²	Foxconn	1	12/14/06
Kingston	KVR667D2S8F5/512I	E5108AGBG-6E-E rev G	Elpida	2025285-002.A00 na	Intel	D1	Foxconn	1	12/12/06
Hynix	HYMP564F72BP8D2-Y5	HY5PS12821BFP-Y5	Hynix		IDT	1.5	FDHS	1	11/10/06
Samsung	M395T6553EZ4-CE65	K4T51083QE	Samsung		Intel	GB D1	FDHS	1	1/29/07
Apacer	78.9EG99.334	HYB18T512800BF3S rev B	Qimonda	48.16203.094 rev 4	Intel	D1	AVC	1	1/26/07
Legacy Electronics Inc.	N557K4C90AN-30R	EDE5108AHBG-6E-E rev H	Elpida	D2F18A	NEC	B5	AVC	1	1/13/07
Legacy Electronics Inc.	B557K4C90AN-30R	K4T51083QC-ZCE6 rev C	Samsung	D2F18A rev A	NEC	B5	AVC	1	1/14/07
Viking	VR5EF647218EBWL1	HYB18T512800BF3S rev B	Qimonda	D2F18A	IDT	A1.5	Foxconn	1	1/18/07
Viking	VR5EF647218EBWL2	HYB18T512800BF3S rev B	Qimonda		NEC	B5+	Foxconn	1	1/18/07
Legacy Electronics Inc.	B557K4C90AE-30R	K4T51083QC-ZCE6 rev C	Samsung	D2F18A rev A	IDT	A1.5	AVC	1	1/28/07
Legacy Electronics Inc.	N557K4C90AE-30R	E5108AHBG-6E-E rev H	Elpida	D2F18A rev A	IDT	A1.5	AVC	1	1/29/07
Dataram	DTM65506C	HY5PS12821CFP-Y5 rev C	Hynix	40053A rev B	INTEL	D1	Foxconn	1	1/31/07
ATP Electronics	AP64K72A8BHE6S	K4T51083QE-ZCE6 rev E	Samsung	D2F18A na	NEC	B5	Foxconn	1	2/1/07
Micron	MT9HTF6472FY-667D5E4	MT47H64M8-3	Micron		Intel	GB-D1		1	2/5/07
Qimonda	HYS72T64400HFD-3S-B	HYB18T512800AF-3S-B	Qimonda		IDT	C1		1	2/9/07
Qimonda	HYS72T64400HFN-3S-B	HYB18T512800AF-3S-B	Qimonda		Intel	D1		1	2/9/07
Kingston	KVR667D2S8F5/512I	NT5TU64M8BE-3C rev B	Nanya	2025285-002.A00 na	Intel	D1	Foxconn	1	5/14/07
Apacer	75.963AI.G00	K4T51083QE-ZCE6 rev E	Samsung	48.16203.094 rev 4	Intel	D1	AVC	1	5/15/07
Micron	MT9HTF6472FY-667D5D4	MT47H64M8B6-3:D	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT6472AF667.9FD5D4	MT47H64M8B6-3:D	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT6472AF667.9FD5E4	MT47H64M8B6-3:D	Micron		Intel	GB D1	FDHS	1	6/18/07
Samsung	M395T6553EZ4-CE66	K4T51083QE	Samsung		IDT	C1	FDHS	1	6/18/07

² This part may show voltage errors in the System Event Log (SEL) during boot. These errors will not affect system operation and can be ignored.

**Fully Buffered ECC, DDR2-667 DIMM Modules
512 MB Sizes (64Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Hynix	HYMP564F72CP 8N3-Y5	HY5PS12821CFP- Y5	Hynix		Intel	GB D1	FDHS	1	6/18/07
Hynix	HYMP564F72CP 8D3-Y5	HY5PS12821CFP- Y5	Hynix		IDT	C1	FDHS	1	6/18/07
Qimonda	HYS72T64400HF E-3S-B	HYB18T512800AF	Qimonda		NEC	B5+	FDHS	1	6/18/07
STEC	INT72W8M64M8 M-A03GZU	K4T51083QE-ZCE6 rev E	Samsung	D2F18A na	IDT	C1	AVC	1	7/25/07
Smart Modular Technologies	SG647FBD64852 IBD5	HYB18T512800BF- 3S rev B	Qimonda	PG54G240 NFBUB4R AS rev A	IDT	A1.5	Foxconn	1	8/05/07
Dataram	DTM65506E	HYB18T512800BF3 S rev B	Qimonda	40053A rev B	INTEL	D1	Foxconn	1	9/13/07
Ventura Technology Group	D2-52VD98SIV- 555	K4T51083QE-ZCE6 rev E	Samsung	B62FRCA 0.93 na	IDT	A1.5	AVC	1	10/15/07
Qimonda	HYS72T64520HF D-3S-B	HYB18T512800BF- 3S-B	Qimonda		IDT	C1	FDHS	1	11/19/07
ATP Electronics	AP64K72A8BHE6 S	K4T51083QE-ZCE6 rev E	Samsung	SP240A08 K1 na	NEC	D1	Foxconn	1	2/22/08
Dataram	DTM65506F	HYB18T512800B2F -3S rev B2	Qimonda	40053A rev B	IDT	C1	Foxconn	1	2/28/08

(+) This vendor is part of the CMTL Certification program. This means this part has/will be tested across all compatible Intel Server Boards. For further information contact CMTL @ <http://cmtlabs.com/>

(^) This module is not recommended for use in the following Intel 1U server chassis: Intel® Server Chassis SR1500 and Intel® Server Chassis SR1550.

Note: Some memory modules may have thermal issues when used in a non-Intel 1U rack solution. It is advised that you verify any thermal limitations with your chassis supplier before purchasing a chassis.

Note: The use of x4 FBDIMMs will only be supported with the server system operating in "Performance" mode (default). The use of x4 FBDIMMs while the server system is configured to operate in "Acoustics" mode is not supported.

Intel® Server Board S5000PAL / S5000XAL

Fully Buffered ECC, DDR2-533 DIMM Modules

1 GB Sizes (128Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Samsung*	M395T2953CZ4-CD51	K4T51083QC-ZCD5	Samsung		IDT	AMB0480 A5RJ A1.5		2	5/18/06
Hynix*	HYMP512F72BP8 D2-C4	HY5PS12821BFP -C4	Hynix		IDT	AMB0480 A5RJ A1.5		2	6/1/06
Micron	MT18HTF12872F DY-53EB5E3	MT47H64M8CB-37E	Micron		Intel	QG6400 C0		2	6/1/06
Hynix	HYMP512F72BP8 N2-C4	HY5PS12821BFP -C4	Hynix		Intel	QG6400 C0		2	6/15/06
ATP Electronics	K4T51083QC-ZCD5 rev C	AP28K72S8BHD 5S	Samsung		IDT 0480A5R J	Y0604D	Foxconn	2	6/22/06
Apacer	78.07G96.405	K4T51083QC-ZCD5 rev C	Samsung	48.16203.0 15 rev 5	Intel	C0	Foxconn	2	6/23/06
ATP Electronics	AP28K72S8BHD5 S	K4T51083QC-ZCD5 rev C	Samsung	SP240S08 K1 na	IDT	A1.5	Foxconn	2	6/15/06
Crucial Technology	CT18HTF12872FD Y53EB5E3.01	MT47H64M8CB-37E rev B	Micron	500 rev C	Intel	D1	Foxconn	2	6/30/06
Kingston	KVR533D2D8F4/1 GI	HYB18T512800A F-3.7-A	Qimonda		IDT	AMB0480 A5RJ A1.5		2	6/13/06
Smart Modular Technologies	SG1287FBD64843 NAI	NT5TU64M8AE-3C rev A	Nanya	PG58G240 NFBUB3R B rev C	Intel	D1	Foxconn	2	7/10/06
Smart Modular Technologies	TD1287FBD64843 SCI	K4T51083QC-ZCD5 rev C	Samsung	PG58G240 NFBUB3R BS rev B	Intel	C0	Foxconn	2	7/12/06
Smart Modular Technologies	SG1287FBD64843 -IAI	HYB18T512800A F37 rev A	Qimonda (Infineon)	240-22-5 na	Intel	C0	Logitex	2	8/8/06
Kingston	KVR533D2D8F4/1 GI	HYB18T512800A F-3.7-A	Qimonda (Infineon)		Intel	QG6400C 0		2	8/2/06
Kingston	KVR533D2D8F4/1 GI	E5108AGBG-5C-E rev G	Elpida	2025286-002.A00 na	Intel	C0	Foxconn	2	8/18/06
Samsung	M395T2953CZ4-CD50		Samsung		Intel	GB C0 ¹		2	10/24/06
Kingston	KVR533D2D8F4/1 GI	E5108AGBG-6E-E rev G	Elpida	2025286-002.A00 na	Intel	D1	Foxconn	2	11/6/06
Micron	MT18HTF12872F DY-53EB5D3	MT47H64M8B6-37E	Micron		IDT	1.5	FDHS	2	11/2/06
Qimonda	HYS72T128420HF D-3.7-B	HYB18T512800A F-3.7-B	Qimonda		IDT	1.5	FDHS	2	11/14/06
Qimonda	HYS72T128420HF N-3.7-A	HYB18T512800A F-3.7-A	Qimonda		Intel	GB C0 ¹	FDHS		12/13/06
Apacer	78.0EG96.335	HYB18T512800A F37 rev A	Qimonda (Infineon)	48.16203.0 95 rev 5	Intel	C0	Foxconn	2	1/25/07

¹ The GB C0 AMB revision does not support closed-loop throttling.

**Fully Buffered ECC, DDR2-533 DIMM Modules
1 GB Sizes (128Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Kingston	KVR533D2D8F4/1GI	E5108AGBG-6E-E rev G	Elpida	2025286-002.A00 na	Intel	D1	Foxconn	2	2/8/07
Qimonda	HYS72T128420HF N-3.7-B	HYB18T512800A F-3.7-B	Qimonda		Intel	D1		2	2/13/07

**Fully Buffered ECC, DDR2-667 DIMM Modules
1 GB Sizes (128Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Samsung	M395T2953CZ4-CE60	K4T51083QC-ZCE6	Samsung		Intel	QG6402 C0		2	7/13/06
Hynix	HYMP512F72BP 8N2-Y5	HY5PS12821BFP -Y5	Hynix		Intel	QG6402 C0		2	7/13/06
Apacer	78.07G99.405	K4T51083QC-ZCE6 rev C	Samsung	48.16203.015 rev 5	Intel	D1	Foxconn		7/20/06
ATP Electronics	AP28K72S8BHE6S	K4T51083QC-ZCE6 rev C	Samsung	SP240S0 8K1 na	IDT	A1.5	Foxconn	2	7/28/06
Smart Modular Technologies	SG1287FBD6485 2IAD5	HYB18T512800A F3S rev A	Qimonda (Infineon)	PG58G24 0NFBUB3 RBS rev B	IDT	A1.5	Foxconn	2	7/28/06
Dataram	DTM65507A	NT5TU64M8AE-3C rev A	Nanya	40053A rev B	Intel	D1	Foxconn	2	8/7/06
Smart Modular Technologies	SG1287FBD6485 2SCD5	K4T51083QC-ZCE6 rev C	Samsung	PG58G24 0NFBUB3 RBS rev B	IDT	A1.5	Foxconn	2	8/7/06
Qimonda (Infineon)	HYS72T128420H FN-3S-A	HYB18T512800A F-3S	Qimonda (Infineon)		Intel	QG6402 C0		2	8/14/06
Nanya	NT1GT72U8PA5 BD-3C	NT5U64M8AE-3C	Nanya		IDT	AMB0480 A5RJ A1.5		2	8/14/06
Samsung	M395T2953CZ4-CE61	K4T51083QC-ZCE6	Samsung		IDT	AMB0480 A5RJ A1.5		2	8/15/06
Smart Modular Technologies	SG1287FBD6485 2NAD5	NT5TU64M8AE-3C rev A	Nanya	PG58G24 0NFBUB3 RBS rev B	IDT	A1.5	Foxconn	2	8/12/06
Smart Modular Technologies	SG1287FBD6485 2-IAI	HYB18T512800A F3S rev A	Qimonda (Infineon)	K0545 na	Intel	D1	Logitex	2	8/14/06
Kingston	KVR667D2D8F5/1GI	E5108AG-6E-E rev G	Elpida	2025286-001.F00 na				2	8/24/06
ATP Electronics	AP28K72S8BHE6S	K4T51083QC-ZCE6 rev C	Samsung	SP240S0 8K1 na	NEC	B5 ²	Foxconn	2	8/29/06
Kingston	KVR667D2D8F5/1GI	E5108AGBG-6E-E rev G	Elpida	2025286-002.A00 na	Intel	D1	Foxconn	2	9/17/06
Hynix	HYMP512F72BP 8D2-Y5	HY5PS12821BFP -Y5	Hynix		IDT	1.5		2	10/24/06
Micron	MT18HTF12872F DY-667D5E3	MT47H64M8B6-3	Micron		Intel	GB C0 ¹		2	10/24/06
Wintec Industries	39C935284C	K4T51083QC-ZCE6 rev C	Samsung	D2F28B rev B	IDT	A1.5	Foxconn	2	10/6/06
Ventura Technology Group	D2-54VD80LIV-555	EDE-5108AGBG-6E-E rev G	Elpida	D2F28B na	IDT	A1.5	Foxconn	2	11/8/06

**Fully Buffered ECC, DDR2-667 DIMM Modules
1 GB Sizes (128Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Apacer	78.0DG99.405	K4T51083QC-ZCE6 rev C	Samsung	48.16203.015 rev 5	Intel	D1	Foxconn	2	11/10/06
Smart Modular Technologies	SG1287FBD6485 2-SCI	K4T51083QC-ZCE6 rev C	Samsung	M395T2953CZ0 na	Intel	D1	Samsung	2	11/21/06
Smart Modular Technologies	SG1287FBD6485 2-HBD	HY5PS12821BFP-Y5 rev B	Hynix	KS-11 (0634-5)	Intel	D1	Hynix	2	11/22/06
Super Talent Electronics	T667FB1G(Channel)/S1GTF8AMS (OEM)	K4T51083QC-ZCE6 rev C	Samsung	B62FRCB na	IDT	A1.5	Foxconn	2	11/30/06
Smart Modular Technologies	SG1287FBD6485 2-ECD	E5108AG-6E-E rev G	Elpida	BFA1=AM-1 na	IDT	A1.5	Elpida	2	12/2/06
Kingston	KVR667D2D8F5/1GI	E5108AGBG-6E-E rev G	Elpida	2025286-002.A00 na	Intel	D1	Foxconn	2	12/8/06
Viking	VR5EF287218EB WL1	HYB18T512800B F3S rev B	Qimonda (Infineon)	D2F28B	IDT	A1.5	Foxconn	2	12/21/06
Actica, Inc.	ACT1GFR72K8F667S	K4T51083QE-ZCE6 rev E	Samsung	E186014 na	IDT	A1.5	Foxconn	2	12/29/06
Buffalo	D2F667CW-1GMDJ	E5108AG-6E-E rev G	Elpida	2DFB28F-AC na				2	1/6/07
Legacy Electronics Inc.	B517K4C90BE-30R	K4T51083QC-ZCE6 rev C	Samsung	D2F28B na	NEC	B5 ²	Foxconn	2	1/5/07
Micron	MT18HTF12872FDY-667B5E3	MT47H64M8CB-3	Micron		Intel	GB C0 ¹	FDHS	2	1/16/07
Hynix	HYMP512F72CP8N3-Y5	HY5PS12821CF P-Y5	Hynix		Intel	GB D1	FDHS	2	1/16/07
Legacy	B517K4C90BN-30R	K4T51083QC-ZCE6	Samsung		NEC	B5	FDHS	2	8/24/06
Micron	MT18HTF12872FDY-667D6E4	MT47H64M8-3	Micron		Intel	GB-D1	FDHS	2	1/29/07
Apacer	78.0EG99.335	HYB18T512800B F3S rev B	Qimonda	48.16203.095 rev 5	Intel	D1	AVC	2	1/24/07
Legacy Electronics Inc.	B517K4C90BN-30R	K4T51083QC-ZCE6 rev C	Samsung	D2F28B	IDT	A1.5	Foxconn	2	1/16/07
Legacy Electronics Inc.	B517K4C90BE-30R	K4T51083QC-ZCE6 rev C	Samsung	D2F28B na	NEC	B5 ²	AVC	2	1/19/07
Legacy Electronics Inc.	N517K4C90BE-30R	E5108AE-6E-E rev E	Elpida	D2F28B na	IDT	A1.5	AVC	2	1/22/07
Dataram	DTM65507C	HY5PS12821CF P-Y5 rev C	Hynix	40053A rev B	INTEL	D1	Foxconn	2	1/30/07
Wintec Industries	39C935281B-IL	HYB18T512800B F3S rev B	Qimonda	D2F28B rev B	Intel	D1	Foxconn	2	2/3/07
S3+	SG26671GBEI	K4T51083QC-ZCE6 rev C	Samsung	B62FRCB na	IDT	A1.5	AVC	2	2/5/07

¹ The GB C0 AMB revision does not support closed-loop throttling.

² This part may show voltage errors in the System Event Log (SEL) during boot. These errors will not affect system operation and can be ignored.

**Fully Buffered ECC, DDR2-667 DIMM Modules
1 GB Sizes (128Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Qimonda	HYS72T128420HF N-3S-B	HYB18T512800A F-3S-B	Qimonda		Intel	GB D1		2	2/5/07
Samsung	M395T2953EZ4- CE65	K4T51083QE	Samsung		Intel	GB D1		2	2/5/07
Viking	VR5EF287218EB WL2	HYB18T512800B F3S rev B	Qimonda	D2F28B	NEC	B5+	Foxconn	2	2/23/07
Micron	MT9HTF12872FY- 667E1N6	MT47H129M8HQ -3:E	Micron		NEC	B5+	FDHS	1	2/26/07
Netlist, Inc.	NLC127A26407FD 531SC1	K4T51083QC- ZCE6 rev C	Samsung	0296-10A rev A	IDT	C1	Foxconn	2	3/13/07
Smart Modular Technologies	SG1287FBD64852 -HB	HY5PS12821CF P-Y5 rev C	Hynix	KS-11 (0646-3F)	IDT	A1.5	Hynix	2	3/14/07
STEC Inc	INT72W8M128M8 M-A03GZU	K4T51083QE- ZCE6 rev E	Samsung	D2F28B	Intel	D1	AVC	2	4/3/07
ATP Electronics	AP28K72S8BHE6 S	K4T51083QE- ZCE6 rev E	Samsung	SP240S08 K1 na	NEC	B5 ²	Foxconn	2	4/5/07
Micron	MT9HTF12872FY- 667E1E4	MT47H128M8HQ -3:E	Micron		Intel	GB D1	FDHS	1	4/9/07
Micron	MT9HTF12872FY- 667E1D4	MT47H128M8HQ -3:E	Micron		IDT	C1	FDHS	1	4/9/07
Smart Modular Technologies	SG1287FBD64852 IBD5	HYB18T512800B F3S rev B	Qimonda	PG58G240 NFBUB4R BS rev A	IDT	A1.5	Foxconn	2	4/10/07
Dataram	DTM65507D	HYB18T512800B F3S rev B	Qimonda	40053A rev B	Intel	D1	Foxconn	2	4/12/07
Micron	MT18HTF12872F Y-667D6E4	MT47H128M4	Micron		Intel	GB D1	FDHS		5/1/07
Wintec Industries	39C935284E-IL	K4T51083QE- ZCE6 rev E	Samsung	D2F28B rev B	Intel	D1	Foxconn	2	4/26/07
Apacer	75.063AI.G00	K4T51083QE- ZCE6 rev E	Samsung	48.16203.0 95 rev 5	Intel	D1	AVC	2	5/16/07
Kingston	KVR667D2D8F5/1 GI	NT5TU64M8BE- 3C rev B	Nanya	2025286- 002.A00 na	Intel	D1	Foxconn	2	5/18/07
Micron	MT18HTF12872F DY-667D6D4	MT47H64M8B6- 3:D	Micron		IDT	C1	FDHS	2	6/18/07
Micron	MT18HTF12872F Y-667D6D4	MT47H128M4B6- 3:D	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT12872AF667.18 FD6D4	MT47H64M8B6- 3:D	Micron		IDT	C1	FDHS	2	6/18/07
Crucial Technology	CT12872AF667.18 F4D6D4	MT47H128M4B6- 3:D	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT12872AF667.9F E1E4	MT47H128M8HQ -3:E	Micron		Intel	GB D1	FDHS	1	6/18/07
Crucial Technology	CT12872AF667.18 FD6E4	MT47H64M8B6- 3:D	Micron		Intel	GB D1	FDHS	2	6/18/07
Crucial Technology	CT12872AF667.18 F4D6E4	MT47H128M4B6- 3:D	Micron		Intel	GB D1	FDHS	1	6/18/07
Crucial Technology	CT12872AF667.9F E1D4	MT47H128M8HQ -3:E	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT12872AF667.9F E1N6	MT47H128M8HQ -3:E	Micron		IDT	C1	FDHS	1	6/18/07
Samsung	M395T2953EZ4- CE66	K4T51083QE	Samsung		IDT	C1	FDHS	2	6/18/07

² This part may show voltage errors in the System Event Log (SEL) during boot. These errors will not affect system operation and can be ignored.

**Fully Buffered ECC, DDR2-667 DIMM Modules
1 GB Sizes (128Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Hynix	HYMP512F72CP8 D3-Y5	HY5PS12821CF P-Y5	Hynix		IDT	C1	FDHS	2	6/18/07
Qimonda	HYS72T128420HF E-3S-B	HYB18T512800B F	Qimonda		NEC	B5+	FDHS	2	6/18/07
Qimonda	HYS72T128520HF D-3S-B	HYB18T512800B F	Qimonda		IDT	C1	FDHS	2	6/18/07
Ventura Technology Group	D2-54VD80SIV-555	K4T51083QE-ZCE6 rev E	Samsung	D2F28B na	IDT	A1.5	AVC	2	7/13/07
Smart Modular Technologies	SG1287FBD64852-SEI	K4T510830QE-ZCE6 rev E	Samsung	M395T2953 EZ0 na	IDT	C1	Foxconn	2	9/10/07
Kingston	KVR667D2D8F5/1 GI	HYB18T512800B F-3S rev B	Qimonda	2025286-002.A00 na	Intel	D1	Foxconn	2	10/3/07
Smart Modular Technologies	SG1287FBD64852-SEC1	K4T51083QE-ZCE6 rev E	Samsung	PG58G240 NFBUB4RB S rev A	IDT	C1	Foxconn	2	10/6/07
Smart Modular Technologies	SG1287FBD64852 IBDC	HYB18T512800B F3S rev B	Qimonda	PG58G240 NFBUB4RB S rev A	IDT	C1	Foxconn	2	10/20/07
Apacer	75.073AI.G00	EDE1108ACSE-6E-E rev C	Elpida	48.16203.09 4 rev 4	Intel	D1	AVC	1	10/25/07
Hynix	HYMP112F72CP8 D3-Y5	HY5PS1G831CF P-Y5	Hynix		IDT	C1	FDHS	1	12/28/07
Hynix	HYMP112F72CP8 N3-Y5	HY5PS1G831CF P-Y5	Hynix		Intel	GB D1	FDHS	1	1/15/08
Samsung	M395T2863QZ4-CE66	K4T1G084QQ-HCE66	Samsung		IDT	C1	FDHS	1	2/23/08
ATP Electronics	AP28K72S8BHE6 S	K4T51083QE-ZCE6 rev E	Samsung	D2F28B na	NEC	D1	Foxconn	2	1/16/08
Dataram	DTM65507G	HYB18T512800B 2F3S rev B2	Qimonda	40053A rev B	IDT	C1	Foxconn	2	3/03/08
STEC	INT72W8W128M8 M-A03GZU	MT47H128M8HQ -3 rev E	Micron	D2F18A rev A	IDT	C1	AVC	1	4/5/08
Avant Technology	AVF7228B52E566 7F1NYBP-IS	NT5TU64M8BE-25C rev B	Nanya	D2F28B rev B	IDT	C1	Foxconn	2	5/24/08
Avant Technology	AVF7228B52E566 7F1ELJP-IS	EDE5108AJBG-8E-E rev J	Elpida	D2F28B rev B	IDT	C1	Foxconn	2	5/25/08
Swissbit	MEF12872C1BJ2E P-30RE	EDE5108AJBG-6E-E rev J	Elpida	50-1451-01A rev A	IDT	C1	Foxconn	2	06/04/08
Viking	VR5EF287218FB WL1	HY5PS1G831CF P-Y5 rev C	Hynix	D2F18A rev A	IDT	L4	Foxconn	1	06/21/08
Micron	MT9HTF12872FY-667E2D6	MT47H128M8HQ -3:E	Micron		IDT	L4	FDHS	1	6/13/08
Crucial	CT12872AF667.9E 2D6	MT47H128M8HQ -3:E	Micron		IDT	L4	FDHS	1	6/13/08
Qimonda	HYS72T128420EF D-3S-B2	HYB18T512805B 2F-3S	Qimonda		IDT	C1	FDHS	2	7/13/08
TRS	TRS32400X	HY5PS1G831CF P-Y5 rev C	Hynix	0806-2DC	IDT	C1	Hynix	1	07/25/08
Dataram	DTM65526A	HY5PS1G831CF P-Y5 rev C	Hynix	40053A rev B	IDT	C1	Foxconn	1	8/15/08
ATP Electronics	AP28K72A8BJE 6S1	K4T1G084QQ-HCE6 rev Q	Samsung	SP240A08 K1 na	NEC	D1	Foxconn	1	09/23/08
Qimonda	HYS72T128501EFD-3S-C2	HYB18T1G800C2F-3S-C2	Qimonda		IDT	AMB+	FDHS	1	8/24/08

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(+) This vendor is part of the CMTL Certification program. This means this part has/will be tested across all compatible Intel Server Boards. For further information contact CMTL @ <http://cmtlabs.com/>

(^) This module is not recommended for use in the following Intel 1U server chassis: Intel® Server Chassis SR1500 and Intel® Server Chassis SR1550.

Note: Some memory modules may have thermal issues when used in a non-Intel 1U rack solution. It is advised that you verify any thermal limitations with your chassis supplier before purchasing a chassis.

Note: The use of x4 FBDIMMs will only be supported with the server system operating in "Performance" mode (default). The use of x4 FBDIMMs while the server system is configured to operate in "Acoustics" mode is not supported.

Intel® Server Board S5000PAL / S5000XAL

Fully Buffered ECC, DDR2-533 DIMM Modules

2 GB Sizes (256Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Kingston	KVR533D2D4F4/2GI	HYB18T512400AF-3.7	Qimonda (Infineon)		Intel	QG6400 C0		2	5/18/06
Samsung	M395T5750CZ4-CD51	K4T51043QC-ZCD5	Samsung		IDT	AMB048 0A5RJ A1.5		2	6/1/06
ATP Electronics	K4T51043QC-ZCD5 rev C	AP56K72G4BHD5S	Samsung				Foxconn	4	6/22/06
ATP Electronics	AP56K72G4BH D5S	K4T51043QC-ZCD5 rev C	Samsung	SP240G04K1 na	IDT	A1.5	Foxconn	2	6/20/06
Apacer	78.A7G9G.401	K4T51043QC-ZCD5 rev C	Samsung	48.1A205.011 rev 1	Intel	C0	Foxconn	2	8/10/06
Smart Modular Technologies	SG2567FBD28443IAI	HYB18T512400AF37 rev A	Qimonda (Infineon)	PG54G240 NFSUB1RE S rev B	Intel	C0	Foxconn	2	8/15/06
Smart Modular Technologies	TD2567FBD28443IAI	HYB18T512400AF37 rev A	Qimonda (Infineon)	PG54G240 NFSUB1RE S rev B	Intel	C0	Foxconn	2	8/15/06
Smart Modular Technologies	SG2567FBD28443IAD5	HYB18T512400AF37 rev A	Qimonda (Infineon)	PG54G240 NFSUB1RE S rev B	IDT	A1.5	Foxconn	2	9/14/06
Smart Modular Technologies	SG2567FBD28443SCD5	K4T51043QC-ZCD5 rev C	Samsung	PG54G240 NFSUB1RE S rev B	IDT	A1.5	Foxconn	2	9/15/06
Ventura Technology Group	D2-56TF82SIV-444	K4T51043QC-ZCD5 rev C	Samsung	D2F24E na	IDT	A1.5	AVC	2	12/19/06
Qimonda	HYS72T256420HFN-3.7-B	HYB18T512800BF-3.7-B	Qimonda		Intel	GB D1	FDHS	2	1/16/07
Qimonda	HYS72T256420HFN-3.7-A	HYB18T2G402AF-3.7	Qimonda		Intel	GB C0 ¹	FDHS	2	1/16/07
Qimonda	HYS72T256420HFD-3.7-A	HYB18T512400AF-3.7-A	Qimonda		IDT	1.5	FDHS	2	12/13/06
Qimonda	HYS72T256420HFD-3.7-B	HYB18T512400AF	Qimonda		IDT	1.5	FDHS	2	1/29/07
Hynix	HYMP525F72C P4N3-C4	HY5PS12421CFP-C4	Hynix		Intel	GB D1		2	2/13/07
Kingston	KVR533D2D4F4/2GI (INT/ELP)	EDE5104AESK-5C-E	Elpida		Intel	GB C0 ¹		2	2/13/07
Samsung	M395T5750CZ4-CD50	K4T51043QC-CZD5	Samsung		Intel	GB C0 ¹		2	2/13/07
Kingston	KVR533D2D4F4/2GI	NT5TU128M4BE-3C rev B	Nanya	2025378-001.A00 na	Intel	D1	Foxconn	2	10/21/07
Kingston	KVR533D2D4F4/2GI	E5104AHSE-6E-E rev H	Elpida	2025378-001.A00 na	Intel	D1	Foxconn	2	4/13/07
Kingston	KVR533D2D4F4/2GI	HYB18T512400B2F25F rev B2	Qimonda	2025378-001.A00	Intel	D1	Foxconn	2	06/06/08
Dataram	DTM65522A	HYB18T1G800BF-3.7 rev B	Qimonda	40053A rev B	IDT	C1	Foxconn	2	06/19/08

¹ The GB C0 AMB revision does not support closed-loop throttling.

**Fully Buffered ECC, DDR2-667 DIMM Modules
2 GB Sizes (256Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Qimonda (Infineon)	HYS72T25642 0HFN-3S-A	HYB18T512400AF-3S	Qimonda (Infineon)		Intel	QG6402 C0		2	7/13/06
Apacer	78.A7G9H.401	K4T51043QC-ZCE6 rev C	Samsung		Intel	D1	Foxconn	2	8/1/06
ATP Electronics	AP56K72G4BH E6S	K4T51043QC-ZCE6 rev C	Samsung	SP240G04 K1 na	IDT	A1.5	Foxconn	2	8/12/06
Smart Modular Technologies	SG2567FBD28 452IAD5	HYB18T512400AF3 S rev A	Qimonda (Infineon)	PG54G240 NFSUB1R ES rev B	IDT	A1.5	Foxconn	2	8/14/06
ATP Electronics	AP56K72G4BH E6S	K4T51043QC-ZCE6 rev C	Samsung	SP240G04 K1 na	NEC	B5 ²	Foxconn	2	8/24/06
Smart Modular Technologies	SG2567FBD28 452IBD5	HYB18T512400BF-3S rev B	Qimonda (Infineon)	PG54G240 NFSUB1R ES rev B	IDT	A1.5	Foxconn	2	9/19/06
Nanya Technology Corporation	NT2GT72U4N A1BD-3C	NT5TU128M4AE-3C rev A	Nanya	NTPCB000 57P na	IDT	A1.5	Foxconn	2	9/20/06
Samsung	M395T5750CZ 4-CE61	K4T51043QC	Samsung		IDT	1.5		2	9/28/06
Netlist, Inc.	NLC257A2120 3F-D53IIB1	HYB18T512400BF3 S rev B	Qimonda	0285-10 rev B	IDT	A1.5	Foxconn	2	10/16/06
Kingston	KVR667D2D4F 5/2GI	HYB18T512400AF3 S rev A	Qimonda (Infineon)	2025372-002.A00 na	Intel	D1	Foxconn	2	10/18/06
Dataram	DTM65508A	NT5TU128M4AE-3C rev A	Nanya	40060A rev A	Intel	D1	Foxconn	2	10/25/06
Wintec Industries	39945344C	K4T51043QC-ZCE6 rev C	Samsung	D2F24E rev E	IDT	A1.5	Foxconn	2	10/27/06
Apacer	78.ADG9H.401	K4T51043QC-ZCE6 rev C	Samsung	48.1A205.0 11 rev 1	Intel	D1	Foxconn	2	11/15/06
Smart Modular Technologies	SG2567FBD28 452-IAI	HYB18T512400AF3 S rev A	Qimonda	240-25-4 na	IDT	A1.5	Logitex	2	11/18/06
Kingston	KVR667D2D4F 5/2GI	E5104AG-6E-E rev G	Elpida	2025378-001.A00 na	IDT	A1.5	Samsung	2	11/28/06
Super Talent Electronics	T667FB2G4(C hannel)/S2GTF 4EMS(OEM)	K4T51043QC-ZCE6 rev C	Samsung	BA2FRCE na	IDT	A1.5	Foxconn	2	11/29/06
Smart Modular Technologies	SG2567FBD28 452-SCD	K4T51043QC-ZCE6 rev C	Samsung	M395T575 0-CZ0 na	IDT	A1.5	Samsung	2	12/7/06
Ventura Technology Group	D2-56VF82SIV-555	K4T51043QC-ZCE6 rev C	Samsung	D2F24E na	IDT	A1.5	AVC	2	12/15/06
Viking	VR5EF567214 EBWL1	HYB18T512400BF3 S rev B	Qimonda	D2F24E	IDT	A1.5	Foxconn	2	12/20/06
Wintec Industries	39C945341B-IL	HYB18T512400BF3 S rev B	Qimonda (Infineon)	D2F24E rev E	Intel	F	Foxconn	2	1/10/07
Kingston	KVR667D2D4F 5/2GI	NT5TU128M4AE-3C rev A	Nanya	2025372-002.A00 na	Intel	D1	Foxconn	2	1/12/07

**Fully Buffered ECC, DDR2-667 DIMM Modules
2 GB Sizes (256Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Kingston	KVR667D2D4F 5/2GI (INT/ELP)	E5104AG-6E-E	Elpida		Intel	D1	FDHS	2	1/16/07
Qimonda	HYS72T25642 0HFN-3S-B	HYB18T512400AF- 3S-B	Qimonda		Intel	GB D1	FDHS	2	1/16/07
Qimonda	HYS72T25642 0HFD-3S-A	HYB18T512400AF- 3S-A	Qimonda		IDT	1.5	HS	2	11/14/06
Micron	MT36HTF2567 2FY-667D1E3	MT47H128M4B6-3	Micron		Intel	GB C0 ¹	FDHS	2	11/14/06
Buffalo	D2F667CW- W2GMBJ	MT47H128M4B6-3 rev D	Micron	2DFE24F- AA na	NEC	B5 ²	Foxconn	2	1/23/07
Qimonda	HYS72T25642 0HFD-3S-B	HYB18T512400AF	Qimonda		IDT	1.5		2	2/5/07
Samsung	M395T5750EZ 4-CE65	K4T51043QE	Samsung		Intel	GB D1		2	2/5/07
Kingston	KVR667D2D4F 5/2GI	HYB18T512400BF3 S rev B	Qimonda	2025372- 002.A00 na	Intel	D1	Foxconn	2	2/6/07
Legacy Electronics Inc.	N527MYG90E N-30R	EDE5104AG-6E-E rev G	Elpida	D2F24E rev E	NEC	B5 ²	AVC	2	2/6/07
Legacy Electronics Inc.	B527M4C90EN -30R	K4T51043QC-ZCE6 rev C	Samsung	D2F24E rev E	NEC	B5 ²	AVC	2	2/7/07
Qimonda	HYS72T25642 0HFE-3S-B	HYB18T512400AF- 3S-A	Qimonda		NEC	B5+		2	2/13/07
Micron	MT18HTF2567 2FDY-667E1D4	MT47H128M8HQ- 3:E	Micron		NEC	B5+	FDHS	2	2/26/07
Micron	MT18HTF2567 2FDY-667E1E4	MT47H128M8HQ- 3:E	Micron		Intel	GB D1	FDHS	2	2/26/07
Hynix	HYMP525F72B P4D2-Y5	HY5PS12421BFP- Y5	Hynix		IDT	1.5	FDHS	2	3/12/07
Hynix	HYMP525F72C P4D3-Y5	HY5PS12421BFP- Y5	Hynix		IDT	C1	FDHS	2	3/28/07
STEC Inc	INT72W4M256 M8M-A03GZU	HYB18T512400BF3 S rev B	Qimonda	D2F24E na	IDT	A1.5	AVC	2	4/5/07
Micron	MT18HTF2567 2FDY-667E1N6	MT47H128M8HQ- 3:E	Micron		NEC	B5+	FDHS	2	4/9/07
Kingston	KVR667D2D8F 5/2GI	MT47H128M8HQ-3 rev E	Micron	2025286- 002.A00 na	Intel	D1	Foxconn	2	4/08/07
ATP Electronics	AP56K72G4BH E6S	K4T51043QE-ZCE6 rev E	Samsung	SP240G04K 1 na	NEC	B5 ²	Foxconn	2	4/10/07
Kingston	KVR667D2D4F 5/2GI	HY5PS12421BFP- Y5 rev B	Hynix	0708-6A	IDT	A1.5	AVC	2	4/14/07
Dataram	DTM65508D	HYB18T512400BF3 S rev B	Qimonda	40060A rev A	Intel	D1	Foxconn	2	4/18/07
Dataram	DTM65508E	HY5PS12421CFP- Y5 rev C	Hynix	40060A rev A	Intel	D1	Foxconn	2	4/18/07
Micron	MT18HTF2567 2FY-667E1E4	MT47H256M4	Micron		Intel	GB D1	FDHS	1	5/1/07
Micron	MT36HTF2567 2FY-667D1E4	MT47H128M4	Micron		Intel	GB D1	FDHS	2	5/1/07
Smart Modular Technologies	SG2567FBD28 452IBD5	HYB18T512400BF3 S rev B	Qimonda	PG54G240 NFSUB1RE S rev C	IDT	A1.5	Foxconn	2	5/14/07
Apacer	75.A72AI.G00	K4T51043QE-ZCE6 rev E	Samsung	48.1A205.0 11 rev 1		D1	AVC	2	5/21/07

**Fully Buffered ECC, DDR2-667 DIMM Modules
2 GB Sizes (256Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Micron	MT18HTF25672FY-667E1E4	MT47H256M4	Micron		Intel	GB D1	FDHS	1	5/1/07
Micron	MT36HTF25672FY-667D1E4	MT47H128M4	Micron		Intel	GB D1	FDHS	2	5/1/07
Smart Modular Technologies	SG2567FBD28452IBD5	HYB18T512400BF3 S rev B	Qimonda	PG54G240NFSUB1RE S rev C	IDT	A1.5	Foxconn	2	5/14/07
Apacer	75.A72AI.G00	K4T51043QE-ZCE6 rev E	Samsung	48.1A205.011 rev 1		D1	AVC	2	5/21/07
Legacy Electronics Inc.	M527NAE90B E-30R	MT47H128M8HQ-3 rev E	Micron	D2F28B rev B		A1.5	AVC	2	06/07/07
Micron	MT18HTF25672FY-667E1D4	MT47H256M4HQ-3:E	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT25672AF667.18F4E1D4	MT47H256M4HQ-3:E	Micron		IDT	C1	FDHS	1	6/18/07
Crucial Technology	CT25672AF667.18FE1E4	MT47H128M8HQ-3:E	Micron		Intel	GB D1	FDHS	2	6/18/07
Crucial Technology	CT25672AF667.18F4E1E4	MT47H256M4HQ-3:E	Micron		Intel	GB D1	FDHS	1	6/18/07
Crucial Technology	CT25672AF667.36FD1E4	MT47H128M4B6-3:D	Micron		Intel	GB D1	FDHS	2	6/18/07
Crucial Technology	CT25672AF667.18FE1D4	MT47H128M8HQ-3:E	Micron		IDT	C1	FDHS	2	6/18/07
Crucial Technology	CT25672AF667.18FE1N6	MT47H128M8HQ-3:E	Micron		NEC	B5+	FDHS	2	6/18/07
Samsung	M395T5750EZ4-CE66	K4T51043QE	Samsung		IDT	C1	FDHS	2	6/18/07
Micron	MT36HTF25672FY-667D1D4	MT47H128M4B6-3	Micron		IDT	C1	FDHS	2	7/16/07
Smart Modular Technologies	SG2567FBD28452IBDC	HYB18T512400BF3 S rev B	Qimonda	PG54G240NFSUB1RE S rev C	IDT	C1	Foxconn	2	09/26/07
Kingston	KVR667D2D4F5/2GI	NT5TU128M4BE-3C rev B	Nanya	2025378-001.A00 na	Intel	D1	Foxconn	2	10/5/07
Apacer	75.A73AI.G00	EDE1108ACSE-6E-E rev C	Elpida	48.16203.095 rev 5	Intel	D1	AVC	2	10/27/07
Qimonda	HYS72T256520HFD-3S-B	HYB18T512400BF-3S-B	Qimonda		IDT	C1	FDHS	2	11/19/07
Hynix	HYMP125F72CP8N3-Y5	HY5PS1G831CFP-Y5	Hynix		Intel	GB D1	FDHS	2	12/28/07
Hynix	HYMP125F72CP8D3-Y5	HY5PS1G831CFP-Y5	Hynix		IDT	C1	FDHS	2	12/28/07
Kingston	KVR667D2D8F5/2GI	E1108ACBG-6E-E rev C	Elpida	2025286-002.A00 na	Intel	D1	Foxconn	2	2/14/08
ATP Electronics	AP56K72S8BJE6S	K4T1G084QQ-HCE6 rev Q	Samsung	D2F28B rev B	NEC	D1	Foxconn	2	04/14/08
Smart Modular Technologies	SG2567FBD12852HCDC	HY5PS1G831CFP-Y5 rev C	Hynix	PG58G240NFBUB4RB S rev A	IDT	C1	Foxconn	2	04/26/08
Transcend Information	TS256MFB72V6U-T	K4T1G084QA-ZCE6 rev A	Samsung	09-2600 rev B	IDT	A1.5	Foxconn	2	04/20/08
Kingston	KVR667D2D8F5/2Gi	HY5PS1G831CFP-Y5 rev C	Hynix	2025286-002.A00 na	Intel	D1	Foxconn	2	05/04/08

**Fully Buffered ECC, DDR2-667 DIMM Modules
2 GB Sizes (256Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Wintec Industries	39C945384Q	K4T1G084QQ-HCE6 rev Q	Samsung	D2F28B rev B	IDT	C1	Foxconn	2	05/03/08
Micron	MT18HTF25672FDY-667E1N8	MT47H128M8HQ-3:E	Micron		NEC	D1	FDHS	2	4/26/08
Micron	MT18HTF25672FDY-667E2D6	MT47H128M8HQ-3:E	Micron		IDT	L4	FDHS	2	4/29/08
Crucial	CT25672AF667.18FE1N8	MT47H128M8HQ-3:E	Micron		NEC	D1	FDHS	2	5/21/08
Crucial	CT25672AF667.18FE2D6	MT47H128M8HQ-3:E	Micron		IDT	L4	FDHS	2	5/21/08
Crucial	CT25672AF667.36FD1D4	MT47H128M4B6-3:D	Micron		IDT	C1	FDHS	2	5/21/08
Avant Technology	AVF7256B61E5667F1ELC P-IS	EDE1108ACBG-8E-E rev C	Elpida	D2F28B rev B	IDT	C1	Foxconn	2	5/29/08
Avant Technology	AVF7256B61E5667F0ELC P-IS	EDE1108ACBG-8E-E rev C	Elpida	50-1451-01A rev A	IDT	C1	Foxconn	2	5/31/08
Kingston	KVR667D2D4F5/2GI	HYB18T512400B2F25F rev B2	Qimonda	2025378-001.A00	INTEL	D1	Foxconn	2	06/08/08
Swissbit	MEF25672C1BC2EP-30RE	EDE1108ACBG-6E-E rev C	Elpida	50-1451-01-A rev A	IDT	C1	Foxconn	2	06/05/08
Centon Electronics	TOP-030	K4T1G084QQ-HCE7 rev Q	Samsung	D2F28B rev B	IDT	A1.5	AVC	2	06/16/08
Viking	VR5EF567218FBWL2	HY5PS1G831CFP-Y5 rev C	Hynix	D2F28B rev B	IDT	L4	Foxconn	2	06/18/08
Micron	MT36HTF25672FY-667F1N6	MT47H128M4CF-3:F	Micron		NEC	B5+	FDHS	2	6/7/08
Crucial	CT25672AF667.36FF1N6	MT47H128M4CF-3:F	Micron		NEC	B5+	FDHS	2	6/7/08
Dataram	DTM65521A	HY5PS1G831CFP-Y5 rev C	Hynix	40053A rev B	IDT	C1	Foxconn	2	08/01/08
TRS	TRS32401X	HY5PS1G831CFP-Y5 rev C	Hynix	0821-1DC	IDT	C1	Hynix	2	07/24/08
Centon Electronics	TOP-035	EDE1108ACBG-6E-E rev C	Elpida	D2F28B rev B	IDT	A1.5	AVC	2	8/10/08
Qimonda	HYS72T256521EFD-3S-C2	HYB18T1G800C2F-3S	Qimonda		IDT	AMB+	FDHS	2	7/18/08

(+) This vendor is part of the CMTL Certification program. This means this part has/will be tested across all compatible Intel Server Boards. For further information contact CMTL @ <http://cmtlabs.com/>

(^) This module is not recommended for use in the following Intel 1U server chassis: Intel® Server Chassis SR1500 and Intel® Server Chassis SR1550.

Note: Some memory modules may have thermal issues when used in a non-Intel 1U rack solution. It is advised that you verify any thermal limitations with your chassis supplier before purchasing a chassis.

Note: The use of x4 FBDIMMs will only be supported with the server system operating in "Performance" mode (default). The use of x4 FBDIMMs while the server system is configured to operate in "Acoustics" mode is not supported.

Intel® Server Board S5000PAL / S5000XAL
Fully Buffered ECC, DDR2-533 DIMM Modules
4 GB Sizes (512Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Micron	MT36HTS51272FY-53EA2D3	MT47H512M4THJ-3E	Micron		IDT 1.5	AMB0480A5RJ A1.5			6/15/06
Qimonda	HYS72T512422HFD-3.7-A	HYB18T2G402AF-3.7	Qimonda		IDT	1.5		2	2/13/07
Viking	VR5EF127214FBSL1	MT47H256M4HQ-37E rev E	Micron	D2F24E rev A (LF-0001145AG-GEN)	IDT	A5	Foxconn	2	2/15/07
Samsung	M395T5166AZ4-CD51	K4T2G264QA-ZCD5	Samsung		IDT	1.5	FDHS	2	3/12/07
^ Samsung	M395T5166AZ4-CD50	K4T2G264QA	Samsung		Intel	GB C0 ¹	FDHS	2	2/26/07

Fully Buffered ECC, DDR2-667 DIMM Modules
4 GB Sizes (512Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Kingston	KVR667D2D4F5/4GI	K4T2G264QA-ZCE6 rev A	Samsung	M395T5166AZ0 na	IDT	A1.5	Samsung	2	11/6/06
ATP Electronics	AP12K72D4BGE6S	K4T2G264QA-ZCE6 rev A	Samsung	M395T5166AZ0 na	IDT	A1.5	Samsung	2	12/5/06
Samsung	M395T5166AZ4-CE61	K4T2G264QA	Samsung		IDT	1.5	FDHS	2	11/14/06
Apacer	75.B92AH.G00	K4T2G264QA-ZCE6 rev A	Samsung	M395T5166AZ0 na	IDT	A1.5	Samsung	2	1/27/07
Kingston	KVR667D2D4F5/4GI	E1108ABSH-E rev B	Elpida	0646 na	IDT	A15	Foxconn	2	2/2/07
Micron	MT36HTF51272FY-667E1N6	MT47H256M4HQ-3:E	Micron		NEC	B5+		2	2/13/07
Legacy Electronics Inc.	M547RAE90EE-30R	MT47H256M4HQ-3 rev E	Micron	D2F24E rev E	IDT	A5	AVC	2	2/15/07
Micron	MT36HTF51272FY-667E1D4	MT47H256M4HQ-3:E	Micron		IDT	C1	FDHS	2	2/26/07
Qimonda	HYS72T512522HFN-3S-A	HYB18T2G402AF-3S-A	Qimonda		Intel	D1	FDHS	2	2/26/07
^ Qimonda	HYS72T512422HFN-3.7-A	HYMB18T2G402AF-3.7	Qimonda		Intel	GB C0 ¹	FDHS	2	2/26/07
Micron	MT36HTF51272FY-667E1E4	MT47H256M4HQ-3:E	Micron		Intel	GB D1	FDHS	2	4/9/07
Smart Modular Technologies	SG5127FBD225652-SA	K4T2G264QA-ZCE6 rev A	Samsung	M395T5166AZ0 na	IDT	A1.5	Samsung	2	4/24/07
ATP Electronics	AP12K72G4BJE6M	MT47H256M4HQ-3 rev E	Micron	SP240G04K1 na	NEC	B5 ²	Foxconn	2	5/15/07
STEC	INT72W4W512M8M-A03GZU	MT47H256M4HQ-3 rev E	Micron	D2F24E		C1	AVC		5/31/07
Crucial Technology	CT51272AF667.36FE1E4	MT47H256M4HQ-3:E	Micron		Intel	GB D1	FDHS	2	6/18/07
Crucial Technology	CT51272AF667.36FE1D4	MT47H256M4HQ-3:E	Micron		IDT	C1	FDHS	2	6/18/07

**Fully Buffered ECC, DDR2-667 DIMM Modules
4 GB Sizes (512Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Crucial Technology	CT51272AF667.36 FE1N6	MT47H256M4H Q-3:E	Micron		NEC	B4+	FDHS	2	6/18/07
Samsung	M395T5160CZ4-CE66	K4T1G044QC-ZCE6	Samsung		IDT	C1	FDHS	2	6/18/07
Smart Modular Technologies	SG5127FBD22565 2MEC	MT47H256M4H Q-3 rev E	Micron	PG54G240 NFSUB2RE S rev A	IDT	C1	Foxconn	2	7/23/07
Apacer	78.BHGA8.421	E1104ACSE-6E-E rev C	Elpida	48.1A205.0 11 rev 1	IDT	C1	AVC	2	7/24/07
Smart Modular Technologies	SG5127FBD22565 2-SC	K4T1G044QC-ZCE6 rev C	Samsung	M395T5750 EZ0 na	IDT	A1.5	Samsung	2	8/23/07
Smart Modular Technologies	SG5127FBD22565 2SCD	K4T1G044QC-ZCE6 rev C	Samsung	M395T5750 EZ0 na	IDT	C1	Samsung	2	8/28/07
ATP Electronics	AP12K72G4BJE6 S	K4T1G044QC-ZCE6 rev C	Samsung	D2F24E na	NEC	D1	Foxconn	2	12/19/07
Dataram	DTM65510C	HY5PS1G431CF P-Y5 rev C	Hynix	40084A rev A	IDT	C1	Foxconn	2	12/21/07
Hynix	HYMP151F72CP4 N3-Y5	HY5PS1G831CF P-Y5	Hynix		Intel	GB D1	FDHS	2	1/7/08
Hynix	HYMP151F72CP4 D3-Y5	HY5PS1G831CF P-Y5	Hynix		IDT	C1	FDHS	2	1/7/08
Viking	VR5EF127214FB WL1	MT47H256M4H Q-3 rev E	Micron	D2F24E na	IDT	A1.5	Foxconn	2	2/25/08
Samsung	M395T5160QZ4-CE66	K4T1G044QQ-HCE66	Samsung		IDT	C1	FDHS	2	2/20/08
Smart Modular Technologies	SG5127FBD22565 2HCD	HY5PS1G431CF P-Y5 rev C	Hynix	0746-4CC rev C	Intel	D1	Hynix	2	1/11/08
Viking	VR5EF127214FB WL1	MT47H256M4H Q-3 rev E	Micron	D2F24E na	IDT	A1.5	Foxconn	2	2/25/08
ATP Electronics	AP12K72G4BJE6 S	K4T1G044QQ-HCE6 rev Q	Samsung	D2F24E rev E	NEC	D1	Foxconn	2	3/14/08
Kingston	KVR667D2D4F5/4 Gi	E1104ACSE-6E-E rev C	Elpida	2025378-001.A00	Intel	D1	Foxconn	2	4/2/08
Wintec Industries	39955444Q	K4T1G044QQ-HCE6 rev Q	Samsung	D2F24E rev E	IDT	C1	Foxconn	2	04/12/08
Micron	MT36HTF51272F Y-667E2D6	MT47H256M4H Q-3:E	Micron		IDT	L4	FDHS	2	4/26/08
Micron	MT36HTF51272F Y-667E1N8	MT47H256M4H Q-3:E	Micron		NEC	D1	FDHS	2	4/30/08
Crucial	CT51272AF667.36 FE2D6	MT47H256M4H Q-3:E	Micron		NEC	B5+	FDHS	2	5/21/08
Crucial	CT51272AF667.36 FE1N8	MT47H256M4H Q-3:E	Micron		NEC	D1	FDHS	2	5/21/08
Avant Technology	AVF7251B62E566 7F4ELCP-IS	EDE1104ACSE-8E-E rev C	Elpida	BA2FRCU 3.10 rev 3.10	IDT	C1	Foxconn	2	5/30/08
Viking	VR5EF127218FB WL1	HY5PS1G831CF P-Y5 rev C	Hynix	D2F48W na	IDT	L4	Foxconn	4	06/25/08
Viking	VR5EF127214FB WL2	HY5PS1G431CF P-Y5 rev C	Hynix	D2F24E rev E	IDT	L4	Foxconn	2	06/27/08
TRS	TRS32404X	HY5PS1G431CF P-Y5 rev C	Hynix	0815-3EC na	IDT	C1	Hynix	2	07/28/08

**Fully Buffered ECC, DDR2-667 DIMM Modules
4 GB Sizes (512Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	AMB Vendor	AMB Revision	Heat-sink Vendor	Rank	Date
Netlist, Inc.	NMD517B2120HF D53N1EC	E1108ACBG-6E- E rev C	Elpida	0430-10 rev A	NEC	D0	Netlist	4	7/29/08
Netlist, Inc.	NMD517B21207F D53I5EC	E1108ACBG-8E- E rev C	Elpida	0430-10 rev A	IDT	L4	Netlist	4	7/30/08
ATP Electronics	AP12K72F8BJE6S 1	K4T1G084QQ- HCE6 rev Q	Samsung	BA2FRCG	NEC	D1	Foxconn	4	8/15/08
Smart Modular Technologies	SG5127FB2128 52HCDM	HY5PS1G831 CFP-Y5 rev C	Hynix	D2F48W	IDT	L4	Foxconn	4	09/23/08
Smart Modular Technologies	SG5127FB2128 52QC2M	HYB18T1G800 C2F-3S rev C2	Qimonda	D2F48W	IDT	L4	Foxconn	4	10/01/08

(+) This vendor is part of the CMTL Certification program. This means this part has/will be tested across all compatible Intel Server Boards. For further information contact CMTL @ <http://cmtlabs.com/>

(^) This module is not recommended for use in the following Intel 1U server chassis: Intel® Server Chassis SR1500 and Intel® Server Chassis SR1550.

Note: Some memory modules may have thermal issues when used in a non-Intel 1U rack solution. It is advised that you verify any thermal limitations with your chassis supplier before purchasing a chassis.

Note: The use of x4 FBDIMMs will only be supported with the server system operating in "Performance" mode (default). The use of x4 FBDIMMs while the server system is configured to operate in "Acoustics" mode is not supported.

5. Intel® Server Systems SR1550AL / SR2500AL - Intel RAID Cache Tested Memory

The following tables list DIMM devices tested to be compatible with the Intel® Server Systems SR1550AL / SR2500AL SAS Mid-plane RAID boards. The list of tested memory is periodically updated as qualified memory is added during the production life of the Intel product.

Intel strongly recommends the use of ECC memory in all server products.

Memory modules not listed in the following tables have not been tested for compatibility and their use with the Intel® SAS Mid-plane RAID board sub-system with the Intel® Server Board S5000PAL / S5000XAL may result in unpredictable operation and data loss.

The Intel® SAS Mid-Plane RAID DIMM should be a single rank device (with at maximum nine x8 devices) due to the Intel® RAID Smart Battery (RSB) retention time requirements.

Caution: Third party memory vendors may use the same module part number with different DRAM vendors and die revisions. To insure proper system operation, verify that each DRAM vendor and die revision has been separately tested and qualified. Please notify CMTL if there is a discrepancy. This list is subject to change without notice.

Note: This list is not intended to be all-inclusive. It is provided as a convenience to Intel's general customer base, but Intel does not make any representations or warranties whatsoever regarding the quality, reliability, functionality, or compatibility of these memory modules.

Active SAS / SAS RAID Mid-plane RAID Board					
Registered ECC DDR Mini-DIMM Modules					
128 MB Sizes (16Mx16)					
Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Speed
Smart*	SG572163FG8RWDC				DDR2-400
Micron*	MT5HTF1672KY-40EB2		Micron		DDR2-400
Registered ECC DDR Mini-DIMM Modules					
256 MB Sizes (32Mx8)					
Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Speed
Micron	MT5HTF3272KY-40EB1		Micron		DDR2-400
Smart	SG572328FG8RWDB				DDR2-400
Micron	MT5HTF3272KY-40ED3		Micron		DDR2-400
Micron	MT5HTF3272KY-40EB2				DDR2-400
Micron	MT5HTF3272PKY-53ED1	6ZD22 D9GKW	Micron		DDR2-533
Registered ECC DDR Mini-DIMM Modules					
512 MB Sizes (64Mx8)					
Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Speed
Micron	MT9HTF6472PKY-40EB1		Micron		DDR2-400
Smart	SG572648FG8RZDB				DDR2-400
Micron	MT9HVF6472PKY-40EB2				DDR2-400
Kingston	KVR400D2M3/512	V59C1512804QBF37			DDR2-400

(+) This vendor is part of the CMTL Certification program. This means this part has/will be tested across all compatible Intel Server Boards. For further information contact CMTL @ <http://cmtlabs.com/>

Sales Information

Vendor Name	Web URL	Vendor Direct Sales Info
ATP Electronics	http://www.atpinc.com/	Tel (1) 408-732-5000, ext 5858 Fax 408-732-5893 sales@atpusa.com
ATP Electronics -- Taiwan Inc.	http://www.atpinc.com/	Tel 011-886-2-2659-6368 Fax 886-2-2659-4982
Avant Technology	http://www.avanttechnology.com	Brad Scoggins Phone: (512)491-7411 Fax: (512)491-7412 brads@avanttechnology.com
Aved Memory Products	http://www.avedmemory.com/	
Buffalo Technology	http://www.buffalotech.com/	(800) 967-0959 memory@buffalotech.com
Centon Electronics	http://www.centon.com	Tel: 949-855-9111 Fax: 949-855-6035
Corsair	http://www.corsairmicro.com/	Tel: 510-657-8747 Fax: 510-657-8748
Crucial	http://www.crucial.com/intel	Toll-free: 888-363-4167 (US & Canada only) Tel: 208-363-5790 Fax: 208-363-5560 crucial.sales@micron.com
Dane-Elec	http://www.dane-memory.com/	Michal Hassan @ (949)450-2941 or email @ Michal@Dane-memory.com
Dataram	http://www.dataram.com/	Paul Henke, 800-328-2726 x2239 in USA 609-799-0071 phenke@dataram.com
GoldenRAM	http://www.goldenram.com	Jason M. Barrette @ 800-222-861 x7546 jasonb@goldenram.com or Michael E. Meyer @800-222-8861 x7512 michaelm@goldenram.com
Hitachi	http://semiconductor.hitachi.com/pointer/	
Hynix Semiconductor	http://www.hynix.com/	
Qimonda (Infineon)	http://Qimonda.com	
ITAUCOM	http://www.itaucom.com.br	
JITCO CO LTD	http://www.jitco.net/	Seong Jeon Tel: 82-32-817-9740 s.jeon@jitco.net
Kingston	http://www.kingston.com	US.- Call (877) 435-8726 Asia – Call 886-3-564-1539 Europe – Call +44-1932-755205
Legacy Electronics Inc.	http://www.legacyelectronics.com	U.S. Contact: Gary Ridenour, 949-498-9600, Ext 350 European Contact: 49 89 370 664 11
Legend	http://www.legend.com.au	
Micron	http://www.micron.com/	
MSC Vertriebs GmbH	http://www.msc-ge.com	Andreas Gruendl Tel: +49-89-945532-34 Fax: +44-89-945532-41 agru@msc-ge.com
Nanya Technology	http://www.ntc.com.tw	Winson Shao 886-3-328-1688, Ext 6018 winsonshao@ntc.com.tw

Vendor Name	Web URL	Vendor Direct Sales Info
Netlist, Inc	http://www.netlistinc.com	Christopher Lopes 949.435.0025 tel 949.435.0031 fax sales@netlistinc.com
Peripheral Enhancements	http://www.peripheral.com/	
Samsung	http://www.samsung.com/Products/Semiconductor/	For US customers go to:
Silicon Tech	http://www.silicontech.com/contact/salescontacts.shtml	
Simple Tech	http://www.simpletech.com	Ron Darwish @ (949) 260-8230 or email @ Rdarwish@Simpletech.com
SMART Modular Technologies	www.smartm.com/channel/hpc/	Gene Patino (949) 439-6167 Gene.Patino@Smartm.com
Super Talent Electronics	http://www.supertalentmemory.com	David Crume (408) 957-8181 support@supertalentmemory.com
Swissbit	http://www.swissbit.com	Tony Cerreta Tel: 914-935-1400 x240 Fax: 914-935-9865 tony.cerreta@swissbitna.com
TechnoLinc Corporation	http://www.technolinc.com	David Curtis 510-445-7400 davidc@technolinc.com
TRS* Tele-Radio-Space GmbH	http://www.certified-memory.com http://www.certified-memory.de	Vender Direct Sales Info: Andreas Gruendl Tel: +49.89.945532-34 Fax: +49.89.945532-41 Andreas.gruendl@trs-eu.com
Unigen	http://www.unigen.com	
Ventura Technology Inc	http://www.venturatech.com	Sam Lewis 760 724-8700 ext. 103
Viking InterWorks	http://www.vikinginterworks.com	Adrian Proctor Tel: 949-643-7255 adrian.proctor@sanmina-sci.com
Virtium Technology Inc	http://www.virtium.com	Tod Skelton @ (949) 460-0020 ext. 146 or email @ tod.skelton@virtium.com
Wintec Industries	http://www.wintecindustries.com	Tel 510-360-6300 Fax 510-770-9338

6. CMTL* (Computer Memory Test Labs)

CMTL is a privately owned and operated memory testing organization responsible for testing a broad range of memory products. Memory devices tested by CMTL must undergo a rigorous battery of tests to ensure that the product will perform the intended server functions. Memory capability is a major factor your customers consider. CMTL has the ability to test and certify memory on Intel-based server platforms. The list of memory modules, which have undergone testing through the CMTL facility, should be referenced when considering modules for integration into this Intel server product. Stringent standards with regard to manufacturing procedures and quality must be met to pass the exacting tests required for qualification through the independent testing facility. Testing is performed by CMTL with Intel server products and test procedures defined by Intel's Memory Qualification Lab. Intel routinely audits the CMTL facility to ensure all procedures, process handling, and testing methodologies are met.

IMPORTANT NOTE

DIMM devices with gold contacts should NOT be placed into DIMM sockets with tin-lead contacts or vice-versa. Mixing dissimilar metal contact types has been shown to result in unreliable memory operation. Intel recommends similar manufacturer and similar speeds in each Rank on the memory module. Mixing of dissimilar memory manufacturer devices or dissimilar memory device speeds is not recommended. This document contains information which is the proprietary property of Intel Corporation. Nothing in this document constitutes a guaranty, warranty, or license, express or implied. Intel has tested the following DIMMs for minimum electrical and functional compatibility with the Intel® Server Board. This listing is not intended to be all inclusive; it only represents the DIMMs Intel or CMTL has tested. Users of this list are reminded to check with the DIMM manufacturer or Distributor to ensure that a particular DIMM model is adequate for the intended purpose of the Intel® Server Board. Intel provides no indemnities for and expressly disclaims all liabilities for any and all such guaranties, representations, and warranties (oral or written) whether express or implied, related to DIMMs in a Intel® Server Board product, including without limitation to: fitness for a particular purpose; merchantability; noninfringement of intellectual property or other rights of any third party or of Intel. The reader is advised that third parties may have intellectual property rights which may be relevant to this document and the technologies discussed herein, and is advised to seek the advice of competent legal counsel, without obligation of Intel. Intel retains the right to make changes to this document at any time, without notice. Intel makes no warranty or representation with respect to the use of this document or reliance by the reader upon its contents, and assumes no responsibility for any errors which may appear in the document nor does it make a commitment to update the information contained herein.

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