

# **Intel® Server Board SE8501HW4 Memory List Test Report Summary**



**Revision 1.3  
March 2006**

## Revision History

Date	Rev	Modifications
Apr/05	1.0	Initial Release for Intel® Server Board Set SE8500HW4
Jun/05	1.1	Added Samsung* parts. (In shaded area)
Oct/05	1.2	Revised for Intel® Server Board Set SE8501HW4
Mar/06	1.3	Updated to new document format. Added Infineon* 256MB part. Added Hynix* 512MB part. Added two Hynix and one Infineon* 1GB parts. Added Samsung 2GB part. Added Infineon 4GB part.

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The Intel® Server Board SE8501HW4 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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**Please 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

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The following test processes are used to qualify Dual In-Line Memory Modules (DIMMs) for use with the Intel® Server Board SE8501HW4. 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 List. 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).

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 is 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 Subsystem SE8501HW4

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The Intel® Server Board SE8501HW4 main memory subsystem was designed to support Double Data Rate2 (DDR2) 400-MHz Registered ECC Synchronous Dynamic Random Access Memory (SDRAM). Other industry naming conventions for DDR2-400 include PC2-3200.

The maximum main memory capacity supported is based on the number of DIMM slots provided and maximum supported memory loads by the chipset. On the Intel® Server Board SE8501HW4 the maximum supported capacity is 64GB. The minimum supported capacity is 512MB with two 256MB DIMMs.

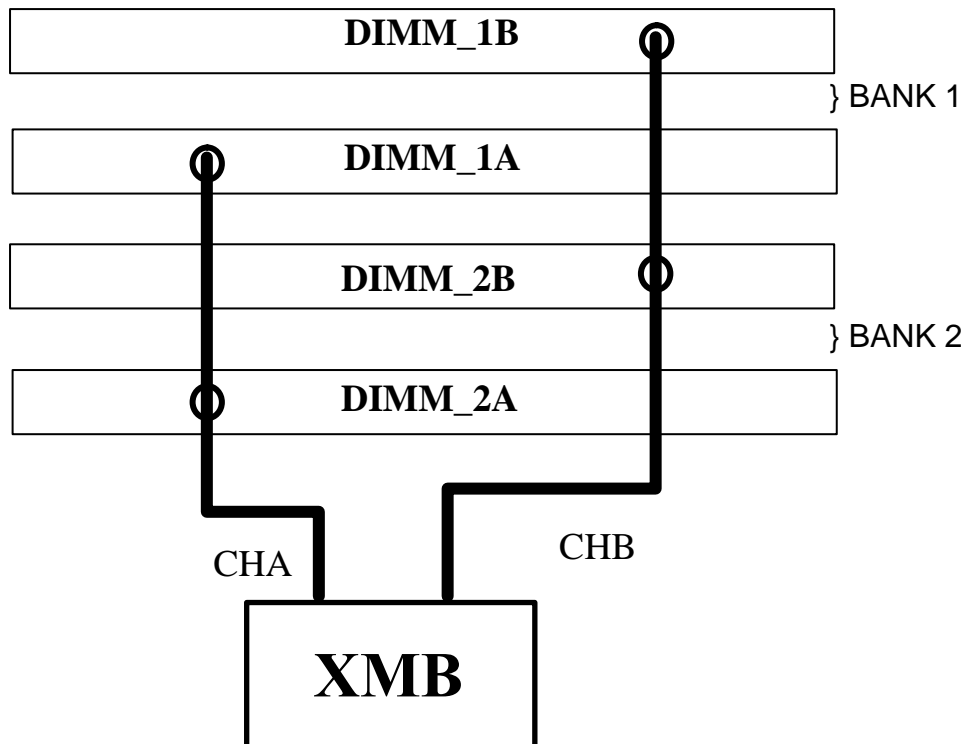
Supported DDR2-400 DIMM capacities for main memory include: 256MB, 512MB, 1GB, 2GB, and 4GB.

The Intel® Server Board SE8501HW4 RAID memory subsystem was designed to support Double Data Rate2 (DDR2) 400-MHz Registered ECC Synchronous Dynamic Random Access Memory (SDRAM). The Intel Server Board SE8501HW4 maximum supported RAID memory capacity is 1GB, the minimum supported capacity is 256MB.

Supported DDR2-400 DIMM capacities for RAID memory include: 256MB, 512MB, and 1GB.

### 2.1 Main Memory Population

The Intel® Server Board Set SE8501HW4 Memory Board has four DIMM slots grouped into two DIMM banks for main memory. DIMMs within a bank should be identical (same manufacturer, CAS latency, number of rows, columns and devices, timing parameters etc.). Although DIMMs within a bank must be identical, the BIOS supports various DIMM sizes and configurations allowing memory between banks to be different. Memory sizing and configuration is guaranteed only for qualified DIMMs approved by Intel.



**Figure 1. Identifying Banks of Memory**

The memory controller is capable of supporting up to 4 loads per channel for DDR2-400. Memory technologies are classified as being either single rank or dual rank depending on the number of DRAM devices that are used on any one DIMM. A single rank DIMM is a single load device, ie) Single Rank = 1 Load. Dual rank DIMMs are dual load devices, ie) Dual Rank = 2 loads. Refer to the memory module manufacturer specifications to determine if a DIMM is single or dual rank.

**DDR2-400 DIMM population rules are as follows:**

- (1) DIMM banks must be populated in order, starting with the bank furthest from the XMB (Bank 1).
- (2) Dual rank DIMMs must be populated before single rank DIMMs.
- (3) All DIMMs can be dual rank.

The following tables show the supported memory configurations:

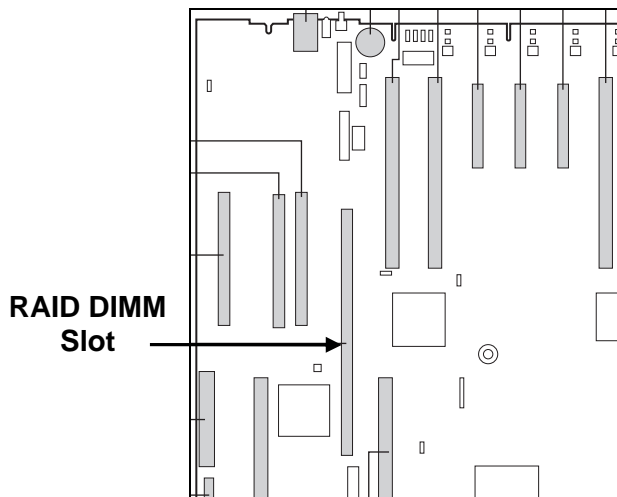
**Table 1: Supported DDR2-400 DIMM Populations**

	Config 1	Config 2	Config 3	Config 4	Config 5
<b>DIMM 1B</b>	DR	DR	DR	SR	SR
<b>DIMM 1A</b>	DR	DR	DR	SR	SR
<b>DIMM 2B</b>	E	SR	DR	E	SR
<b>DIMM 2A</b>	E	SR	DR	E	SR

*Note: SR = single rank, DR = dual rank, E = Empty*

**2.2 RAID Memory Population**

The Intel® Server Board SE8501HW4 includes one DDR2-400 DIMM slot, next to the PCI Slots, not shared with main memory and for exclusive use as RAID cache of the RAID subsystem. Memory sizing and configuration is guaranteed only for qualified DIMMs approved by Intel. The ROMB subsystem supports RAID memory for higher performance operation (write back cache). In addition, for enhanced data protection, the ROMB functionality in the Intel® Server Board SE8501HW4 server board supports the Intel® RAID Smart Battery accessory which provides battery back-up.



*Figure 2. Identifying RAID Memory Slot*

### **3. Intel® Server Board SE8501HW4 Main Memory Tested**

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The following tables list DIMM devices tested to be compatible with the Intel® Server Board SE8501HW4. 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 Server Board SE8501HW4 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.

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**Server Board SE8501HW4**

**Registered, ECC, DDR2-400 DIMM Modules  
256MB Sizes (32Mx72)**

<b>Manufacturer</b>	<b>Part Number</b>	<b>DRAM Part Number</b>	<b>DRAM Vendor</b>	<b>PCB Part Number</b>	<b>Date Code</b>	<b>Date</b>	<b>DRAM Organization</b>	<b>Rank</b>	<b>EOL</b>
Micron*	MT9HTF3272Y-40EB2	MT47H32M8BT	Micron		0428 (Module)	6/8/05	(32Mbx8)*9	SR	
Infineon*	HYS72T32000HR-5-A		Infineon		0431 (Module)	12/31/05	(32Mbx8)*9	SR	
Samsung*	M393T3253FZ3-CCC		Samsung		0524 (Module)	8/5/05	(32Mbx8)*9	SR	

*Modules shaded in blue are low profile.*

**Modules in bold text do not contain Lead**

(+) 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/>

**Registered, ECC, DDR2-400 DIMM Modules  
512MB Sizes (64Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date Code	Date	DRAM Organization	Rank	EOL
Hynix*	HYMP564R72P8-E3		Hynix		0444 (Module) 0437A (Component)	6/8/05	(64Mbx8)*9	SR	
Hynix	HYMP564R72BP8-E3 AB		Hynix		0532 (Module)	12/31/05	(64Mbx8)*9	SR	
Micron	MT9HTF6472Y-40EB2	MT47H64M8BT	Micron		0509 (Module)	6/8/05	(64Mbx8)*9	SR	
Infineon	HYS72T64000HR-5-A	HYB18T512800AF	Infineon		0502 (Module)	6/8/05	(64Mbx8)*9	SR	
Samsung	M393T6553CZ3-CCC		Samsung		0523 (Module)	7/11/05	(64Mbx8)*9	SR	
Samsung	M393T6453FZ3-CCC		Samsung		0524 (Module)	8/5/05	(32Mbx8)*18	DR	
Samsung	M393T6450FZ3-CCC		Samsung		0524 (Module)	8/5/05	(64Mbx4)*18	SR	

*Modules shaded in blue are low profile.*

**Modules in bold text do not contain Lead**

(+) 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/>

<b>Registered, ECC, DDR2-400 DIMM Modules 1 GB Sizes (128Mx72)</b>									
<b>Manufacturer</b>	<b>Part Number</b>	<b>DRAM Part Number</b>	<b>DRAM Vendor</b>	<b>PCB Part Number</b>	<b>Date Code</b>	<b>Date</b>	<b>DRAM Organization</b>	<b>Rank</b>	<b>EOL</b>
Hynix	HYMP512R72P4-E3-AA		Hynix		0425A (Module)	6/8/05	(128Mbx4)*18	SR	
Hynix	HYMP512R72BP8-E3		Hynix		0531 (Module)	12/31/05	(64Mbx8)*18	DR	
Hynix	HYMP512R72BP4-E3 AB		Hynix		0532 (Module)	12/31/05	(128Mbx4)*18	SR	
Infineon	HYS72T128020HR-5-A		Infineon		0534 (Device)	12/31/05	(64Mbx8)*18	DR	
Samsung	M393T2950CZ0-CCC		Samsung		0523 (Module) 0522 (Comp.)	10/9/05	(128Mbx4)*18	SR	
Samsung	M393T2953CZ0-CCC		Samsung		0523 (Module)	7/11/05	(64Mbx8)*18	DR	
Micron	MT18HTF12872Y-40EB3		Micron		0522 (Module)	8/5/05	(128Mbx4)*18	SR	

*Modules shaded in blue are low profile.*

**Modules in bold text do not contain Lead**

(+) 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/>

**Registered, ECC, DDR2-400 DIMM Modules  
2 GB Sizes (256Mx72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date Code	Date	DRAM Organization	Rank	EOL
Hynix	HYMP125R72MP4-E3-AA		Hynix		0444 (Module)	6/8/05	(128Mbx4)* 36	DR	
Infineon	HYS72T256000HR-5-A	HYB18T1G400AF-5	Infineon		0452 (Module)	6/8/05	(256Mbx4)* 18	SR	
Micron	MT18HTF25672Y-40EA2	MT47H128M8BT	Micron		0431 (Module)	6/8/05	(256Mbx4)* 18	SR	
Samsung	M393T5660MZ3-CCC		Samsung		0523 (Module)	7/11/05	(256Mbx4)* 18	SR	
Hynix	HYMP125R72P4-E3-AA		Hynix		0521 (Module)	8/5/05	(256Mbx4)* 18	SR	
Micron	MT36HTF25672Y-40EB1		Micron		0523 (Module)	8/5/05	(128Mbx4)* 36	DR	
Samsung	M393T5750CZ3-CCC		Samsung		0523 (Module)	10/9/05	(128Mbx4)* 36	DR	
Samsung	M393T5660AZ3-CCC		Samsung		0534 (Module)	12/31/05	(256Mbx4)* 18	SR	

*Modules shaded in blue are low profile.*

**Modules in bold text do not contain Lead**

(+) 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/>

**Registered, ECC, DDR2-400 DIMM Modules  
4 GB Sizes (256Mx72)**

<b>Manufacturer</b>	<b>Part Number</b>	<b>DRAM Part Number</b>	<b>DRAM Vendor</b>	<b>PCB Part Number</b>	<b>Date Code</b>	<b>Date</b>	<b>DRAM Organization</b>	<b>Rank</b>	<b>EOL</b>
<b>Hynix</b>	<b>HYMP351R72MP4 -E3 AA</b>		<b>Hynix</b>		<b>0524 (Module)</b>	<b>10/9/05</b>	<b>(256Mbx4)* 36</b>	<b>DR</b>	
<b>Infineon</b>	<b>HYS72T512022HR -5-A</b>		<b>Infineon</b>		<b>0528 (Device)</b>	<b>12/31/05</b>	<b>(256Mbx4)* 36</b>	<b>DR</b>	
<b>Micron</b>	<b>MT36HTJ51272Y- 40EA2</b>		<b>Micron</b>		<b>0517 (Module)</b>	<b>10/9/05</b>	<b>(256Mbx4)* 36</b>	<b>DR</b>	

*Modules shaded in blue are low profile.*

**Modules in bold text do not contain Lead**

(+) 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/>

## 4. RAID On MotherBoard (ROMB) Memory Tested

The following tables list DIMM devices tested to be compatible with the RAID subsystem of the Intel® Server Board SE8501HW4. 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 RAID subsystem of the Intel® Server Board SE8501HW4 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.

<i>Server Board SE8501HW4 RAID On MotherBoard (ROMB)</i>				
<b>Manufacturer</b>	<b>Manufacturer Part Number</b>	<b>Size</b>	<b>Device Organization *(#devices)</b>	<b>Date Codes</b>
<b>Micron</b>	<b>MT9HTF3272Y-40EB2</b>	<b>256MB</b>	<b>(32Mbx8)*9</b>	<b>0431 (Module)</b>
<b>Samsung</b>	<b>M393T3253FZ3-CCC</b>	<b>256MB</b>	<b>(32Mbx8)*9</b>	<b>0524 (Module)</b>
<b>Hynix</b>	<b>HYMP564R72P8-E3</b>	<b>512MB</b>	<b>(64Mbx8)*9</b>	<b>0444 (Module) 0437A (Component)</b>
<b>Infineon</b>	<b>HYS72T64000HR-5-A</b>	<b>512MB</b>	<b>(64Mbx8)*9</b>	<b>0502 (Module)</b>
<b>Samsung</b>	<b>M393T6553CZ3-CCC</b>	<b>512MB</b>	<b>(64Mbx8)*9</b>	<b>0523 (Module)</b>
<b>Micron</b>	<b>MT9HTF6472Y-40EB2</b>	<b>512MB</b>	<b>(64Mbx8)*9</b>	<b>0509 (Module)</b>

*Modules shaded in blue are low profile.*

*Modules in bold text do not contain Lead*

The Intel® RAID On MotherBoard (ROMB) DIMM should be either a 256MB or 512MB single rank device (with at maximum nine x8 devices) due to the Intel® RAID Smart Battery (RSB) retention time requirements.

## 5. Sales Information

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Vendor Name	Web URL	Vendor Direct Sales Info
Hyundai/Hynix Semiconductor	<a href="http://www.hea.com/">http://www.hea.com/</a>	<a href="http://www.hynix.com/datasheet/eng/module/module_sub.jsp?RK=08&amp;SK=RD&amp;RAM_NAME=DDR2%20SDRAM&amp;SUB_RAM=512MB&amp;SUB_RAM1=1GB&amp;SUB_RAM2=2GB&amp;SUB_RAM3=4GB">http://www.hynix.com/datasheet/eng/module/module_sub.jsp?RK=08&amp;SK=RD&amp;RAM_NAME=DDR2%20SDRAM&amp;SUB_RAM=512MB&amp;SUB_RAM1=1GB&amp;SUB_RAM2=2GB&amp;SUB_RAM3=4GB</a>
Infineon	<a href="http://www.infineon.com/business/distribut/index.htm">http://www.infineon.com/business/distribut/index.htm</a>	<a href="http://www.infineon.com/cgi-bin/ifx/portal/ep/programView.do?channelId=-64258&amp;programId=32841&amp;programPage=%2Fep%2Fprogram%2Ftypelist.jsp&amp;pageTypeld=17099&amp;BV_SessionID=@ @ @ 0484552071.1127159115 @ @ @ &amp;BV_EngineID=ccceaddfjliiklgcflqcegndfifdfoh.0">http://www.infineon.com/cgi-bin/ifx/portal/ep/programView.do?channelId=-64258&amp;programId=32841&amp;programPage=%2Fep%2Fprogram%2Ftypelist.jsp&amp;pageTypeld=17099&amp;BV_SessionID=@ @ @ 0484552071.1127159115 @ @ @ &amp;BV_EngineID=ccceaddfjliiklgcflqcegndfifdfoh.0</a>
Micron	<a href="http://silicon.micron.com/mktg/">http://silicon.micron.com/mktg/</a> <a href="http://silicon.micron.com/mktg/mbqual/qual_data.cfm">http://silicon.micron.com/mktg/mbqual/qual_data.cfm</a>	<a href="http://www.micron.com/products/modules/dr2sdram/partlist.aspx?pincount=240-pin&amp;version=Registered&amp;package=DIMM">http://www.micron.com/products/modules/dr2sdram/partlist.aspx?pincount=240-pin&amp;version=Registered&amp;package=DIMM</a>
Samsung	<a href="http://www.korea.samsungsemi.com/locate/buy/list_na.html">http://www.korea.samsungsemi.com/locate/buy/list_na.html</a>	For US customers go to: <a href="http://www.mymemorystore.com/">http://www.mymemorystore.com/</a> Or <a href="http://www.samsung.com/Products/Semiconductor/common/product_list.aspx?family_cd=DRM070201">http://www.samsung.com/Products/Semiconductor/common/product_list.aspx?family_cd=DRM070201</a>

## 6. CMTL\* (Computer Memory Test Labs)

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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 RAID Controller. 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 on the Intel® Server RAID Controller. 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 RAID Controller 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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