



Intel® Server Board SE7320SP2 Memory List Test Report Summary

Revision 42.0
November 2007

Revision History		
Date	Rev	Modifications
June/04	1.0	Initial release.
Aug/04	2.0	Added Apacer* 256MB and 1GB parts. Added Infineon* 512MB and 1GB parts. Added Micron* 512MB, 1GB and 2GB parts. (In shaded area)
Sep/04	3.0	Added statement "The E7320 Chipset only supports BGA DRAM module Technology for DDR333". Added TRS*, Legend* and Dataram* 512MB parts. Added Legend, Apacer, Kingston*, Infineon, Smart* and Micron 1GB parts. Added Kingston and Dataram 2GB parts. (In shaded area)
Sep/04	4.0	Added Legend 512MB parts. Added Smart 2GB parts. Added Ventura*, TRS, Smart, and Viking* 1GB parts. (In shaded area)
Oct/04	5.0	Added ATP 256MB, 512MB, and 1GB parts. Added Legend 256MB and 1GB parts. Added TRS 1GB and 2GB parts. Added Hynix* 512MB part. Added Smart 1GB parts. (In shaded area)
Oct/04	6.0	Added Apacer and Smart 512MB parts. Added Dataram 1GB parts. Added Wintec* 2GB parts. (In shaded area)
Oct/04	7.0	Added Micron, Infineon and Samsung* 256MB parts. Added Avant* 512MB parts. Added TRS, Smart and ATP 1GB parts. Added Ventura 2GB parts. (In shaded area)
Nov/04	8.0	Added Swissbit*, Wintec and Hynix 512MB parts. Added Ventura, ATP, Swissbit and Wintec 1GB parts. (In shaded area)
Dec/04	9.0	Added Micron and Hynix 512MB parts. Added Legacy* 1GB parts. (In shaded area)
Dec/04	10.0	Added Legacy and Hynix 512MB parts. Added Viking, Legacy and Apacer 2GB parts. (In shaded area)
Jan/05	11.0	Added Micron 1GB and Smart 2GB parts. (In shaded area)
Feb/05	12.0	Added ATP 2GB parts. (In shaded area)
Feb/05	13.0	Added Samsung 256MB and 512MB parts. Added Swissbit 1GB parts. (In shaded area)
Mar/05	14.0	Added Smart, Legacy, ATP and Swissbit 1GB parts. Added Dataram 2GB parts. Added Dane-elec* 512MB parts. (In shaded area)
Mar/05	15.0	Added note on Lead free modules (these modules are now in bold text). Added Dane-elec and Ventura 512MB and 1GB parts. Added ATP 2GB parts. (In shaded area)
Apr/05	16.0	Added Ventura 512MB parts. (In Shaded area)
Apr/05	17.0	Added Simple* and Kingston 512MB parts. Added Simple and Ventura 1GB parts. Added Kingston 2GB parts. (In shaded area)
May/05	18.0	Added Avant 1GB parts. (In shaded area)
May/05	19.0	Added Apacer and Avant 512MB and 2GB parts. (In shaded area)
Jun/05	20.0	Added Dataram 1GB parts. Added Smart 2GB parts. (In shaded area)
Jun/05	21.0	Added Kingston 1GB parts. (In shaded area)
Aug/05	22.0	Added Kingston and Viking 512MB parts. Added Kingston 1GB parts. Added Infineon and TRS 2GB parts. Added Samsung 512MB, 1GB, 2GB and 4GB parts. Added Micron 4GB part. Added support for 4GB modules. Removed column for "Low Profile" and replaced it with "Lead Free". (In shaded area)

Aug/05	23.0	Added Samsung 2GB part. (In shaded area)
Sept/05	24.0	Added Legacy 512MB parts. Added Micron 2GB part. (In shaded area)
Oct/05	25.0	Added Samsung and Micron 512MB parts. Added Samsung 1GB part. (In shaded area)
Oct/05	26.0	Added Legacy 1GB part. Added Kingston 2GB part. (In shaded area) Updated unleaded parts with correct shading.
Nov/05	27.0	Added Hynix 512MB part. Added Hynix 1GB part. Added Avant 1GB part. (In shaded area)
Nov/05	28.0	Updated two Micron 1GB parts with corrected DRAM part numbers. (in shaded area)
Dec/05	29.0	Added Legend 1GB part. (In shaded area)
Jan/06	30.0	Added Legend 1GB part. Added Samsung 256MB, 512MB, 1G & 2G parts. (In shaded area)
Feb/06	31.0	Added Infineon 512MB, 1G & 2G parts. (In shaded area)
Mar/06	32.0	Added TRS 2GB part. (In shaded area)
Mar/06	33.0	Added TRS 512MB and 1GB parts. (In shaded area)
May/06	34.0	Infineon name change to Qimonda effective May 1 st , 2006. Added TRS 512MB & 1GB modules. Added Kingston 1GB module. (In shaded area)
June/06	35.0	Added Smart 1GB part. (In shaded area)
Aug/06	36.0	Added Kingston 2GB part. (In shaded area)
Oct/06	37.0	Added Kingston 1GB part. (In shaded area)
Nov/06	38.0	Added Kingston 1GB part. (In shaded area)
Mar/07	39.0	Updated contact information. Added Kingston 512MB part. (In shaded area)
May/07	40.0	Added Kingston 2GB part. (In shaded area)
May/07	41.0	Additional memory parts added. (In shaded area)
Nov/07	42.0	Additional memory parts added. (In shaded area)

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The Intel® Server Board SE7320SP2 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 bank on the memory module. Mixing of dissimilar memory manufacturer and similar speeds in each bank on the memory module is NOT recommended.

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Overview of Memory Testing

The following procedure is used to qualify Dual In-Line Memory Modules (DIMMs) for use with the Intel® Server Board SE7320SP2. Memory is a vital subsystem in a server. Intel requires strict guidelines to be met before a DIMM vendor is put onto the qualified memory list. To be acknowledged on the list as a fully functional DIMM, the memory must undergo rigorous tests to ensure that the product will perform the intended Server and Workstation product functions.

Memory qualification for Intel®'s Server and Workstation Board products is performed by Intel's Memory Validation Laboratory (MVL), and by an independent external test laboratory, Computer Memory Test Lab (+CMTL®).

Intel's Server Board, Workstation Board and RAID Controller products qualified memory lists categorize memory modules as Advanced Tested. The Advanced Testing process involves a paper qualification, a standard voltage and room temperature functional test, and a voltage and temperature margin functional test. A paper qualification is a review of critical timings, electrical characteristics, timing requirements, environmental requirements, and packaging requirements in order to see if the DIMM meets Intel's memory specifications. The standard voltage and room temperature test involves testing the memory module on the particular Intel board for which it is being qualified with test software operating under Microsoft* Windows for no less than 24 hours. The voltage and temperature margin testing involves testing the memory module on the particular Intel product for which it is being qualified with various test software and operating systems for 24 hours under various voltage and temperature margin conditions. DIMMs that have completed Advanced Testing are known to be compatible with the product on which they were tested, and with the test software and operating system that was utilized during the test procedure.

+CMTL® is a leading memory testing 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 equipment and a procedure as defined by Intel's various functional testing levels. Testing is performed on a number of Intel® Server RAID Controllers.

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Qualified DDR Memory for the Server Board SE7320SP2

The Intel® Server Board SE7320SP2 has 4 DIMM sockets supporting up to 8 GB of Registered ECC DDR266 or DDR333 memory using four 72-bit DIMM modules. These four DIMM sockets constitute two memory banks; Bank1 with contiguous sockets labeled DIMM1A & DIMM1B, and Bank2 with contiguous sockets labeled DIMM2A & DIMM2B. When memory is installed in pairs, DIMM Bank1 must be populated before DIMM Bank2. Memory within a DIMM bank must be identical. For customers requiring a lower cost configuration, a single DIMM may be populated in the DIMM1A socket. If this is done, the Intel® x4 Single Device Data Correction (Intel x4 SDDC) technology and memory interleaving will not be enabled. DIMM and memory configurations must adhere to the following:

- DDR266 or DDR333 registered ECC 2.5V modules (in compliance with the DDR JEDEC DIMM Specification)
- DIMM organization: x72 ECC
- Pin Count: 184
- Memory capacity: 256MB, 512MB, 1GB and 2GB
- Minimum configuration: 256MB using one single 256MB DIMM in socket DIMM1A.
- One or two memory banks may be populated

Below is a chart that lists the current supported memory types:

DDR266 Registered SDRAM Module Matrix					
DIMM Capacity	DIMM Organization	SDRAM Density	SDRAM Organization	# SDRAM Devices/rows/Banks	# Address bits rows/Banks/column
256MB	32M x 72	128Mbit	32M x 4	18/1/4	12/2/11
256MB	32M x 72	128Mbit	16M x 8	18/2/4	12/2/10
256MB	32M x 72	256Mbit	32M x 8	9/1/4	13/2/10
512MB	64M x 72	256Mbit	64M x 4	18/1/4	13/2/11
512MB	64M x 72	256Mbit	32M x 8	18/2/4	13/2/10
512MB	64M x 72	512Mbit	64M x 8	9/1/4	13/2/11
1GB	128M x 72	256Mbit	64M x 4	36/2/4	13/2/11
1GB	128M x 72	512Mbit	64M x 8	18/2/4	13/2/11
1GB	128M x 72	512Mbit	128M x 4	18/1/4	13/2/12
2GB	256M x 72	512Mbit	128M x 4	36/2/4	13/2/12
4GB	512M x 72	1Gbit	512M x 72	36/2/4	14/2/12
DDR333 Registered SDRAM Module Matrix					
Note: The E7320 Chipset only supports BGA DRAM module Technology for DDR333					
256MB	32M x 72	128Mbit	32M x 4	18/1/4	12/2/11
256MB	32M x 72	128Mbit	16M x 8	18/2/4	12/2/10
256MB	32M x 72	256Mbit	32M x 8	9/1/4	13/2/10
512MB	64M x 72	256Mbit	64M x 4	18/1/4	13/2/11
512MB	64M x 72	256Mbit	32M x 8	18/2/4	13/2/10
512MB	64M x 72	512Mbit	64M x 8	9/1/4	13/2/11
1GB	128M x 72	512Mbit	128M x 4	18/1/4	13/2/12
1GB	128M x 72	512Mbit	64M x 8	18/2/4	13/2/11

DDR333 Registered SDRAM Module Matrix

Note: The E7320 Chipset only supports BGA DRAM module Technology for DDR333

DIMM Capacity	DIMM Organization	SDRAM Density	SDRAM Organization	# SDRAM Devices/rows/Banks	# Address bits rows/Banks/column
1GB	128M x 72	1Gbit	128M x 4	9/1/4	14/2/11
2GB	256M x 72	1Gbit	128M x 4	18/1/4	14/2/12
2GB	256M x 72	1Gbit	128M x 8	18/2/4	14/2/11

The following tables list DIMM devices tested to be compatible with the Intel® Server Board. This document and the DIMM list will be updated as qualified memory is added during the life of the server board.

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 SE7320SP2 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 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 SE7320SP2
Registered ECC, DDR266 DIMM Modules
256MB Size (32M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Micron*	MT9VDDT3272G-265G3	MT46V32M8-6T G	Micron		6/17/04		(32Mx8)* 9	
+Legend*	L3272YC5-RU1HDC5B	HY5DU56822BT-J rev B	Hyundai	DRR1U081 8-A rev 1	9/23/04		(32Mx8)* 9	

Registered ECC, DDR333 DIMM Modules
256MB Size (32M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Apacer*	75.85393.505				7/2/041			
Micron	MT9VDDF3272G-335G3	MT46V32M8FG-6	Micron		8/3/04		(32Mx8)* 9	
~ Qimonda (Infineon)*	HYS72D32300GBR-6-C	HYB25D256800CC- 6	~ Qimonda (Infineon)		8/30/04		(32Mx8)* 9	
+ATP Electronics*	AB32L72V8BFB3S	K4H560838E-GCB3 rev E	Samsung	SB184V08L 1	9/20/04		(32Mx8)* 9	
Samsung*	M312L3223EG0-CB3	K4H560838E-GCB3	Samsung		10/4/04		(32Mx8)* 9	
~ Qimonda (Infineon)	HYS72D32300GBR-6-B	HYB25D256800BC- 6	~ Qimonda (Infineon)		10/6/04		(32Mx8)* 9	
Micron	MT9VDDF3272G-335C1	MT46V32M8FG-6	Micron		10/8/04		(32Mx8)* 9	
Samsung	M312L3223EZ0-CB3	K4H560838E-ZCB3	Samsung		2/24/05	Yes	(32Mx8)* 9	
Samsung	M312L3223EZ3-CB3	K4H560838E-ZCB3	Samsung		11/15/05	Yes	(32Mx8)* 9	
Samsung	M312L3223EG3-CB3	K4H560838E-GCB3	Samsung		211/15/0 5		(32Mx8)* 9	

Modules shaded in blue are Lead Free.

~ Effective May 1st, 2006, Infineon memory products will be known as Qimonda

(+) 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/>

Caution: Some modules on this list may contain "stacked" DRAM parts. These parts may have thermal & physical limitations in some chassis configurations. It is advised to verify that your chassis configuration will support "stacked" parts before purchase.

Verify that the DRAM part number matches the DRAM on this list before purchasing.

Intel® Server Board SE7320SP2
Registered, ECC, DDR266 DIMM Modules
512 MB Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Micron	MT9VDDT6472G-265C2	MT46V64M8-75 C	Micron		6/16/04		(64Mx8)* 9	
~ Qimonda (Infineon)	HYS72D64300GBR-7F-B	HYB25D256400BC-7F	~ Qimonda (Infineon)		6/24/04		(64Mx4)* 18	
+TRS*	TRS21151	HYB25D256400BT-7 rev B	~ Qimonda (Infineon)	M0530LA1 rev 1	8/16/04		(64Mx4)* 18	
+TRS	TRS21152	HYB25D256800BT-7 rev B	~ Qimonda (Infineon)	M0529LA1 rev 1	8/27/04		(64Mx8)* 9	
+Legend	L6472YC5-182HDD5A	HY5DU56422AT-K rev A	Hyundai	184RL rev 2	8/25/04		(64Mx4)* 18	
+Legend	L6472TC5-RR2HDC5A	HY5DU56822AT-H rev A	Hyundai	DRR720818 A rev 2	8/20/04		(64Mx8)* 9	
+Legend	L6472YC5-RU1HDC5B	HY5DU56822BT-J rev B	Hyundai	DRR1U0818 -A rev 1	8/31/04		(32Mx8)* 18	
+Legend	L6472YC5-PPASDD5D	K4H560438D-TCB3 rev D	Samsung	18-25141A Rev A	9/9/04		(64Mx4)* 18	
+Avant Technology*	AVM7264R39C5266K1-MVA	V58C2256804SAT5 B rev A	Mosel Vitelic	50-1411-01-A rev A	10/12/04		(32Mx8)* 18	
+Swissbit*	SDR06472D1B22IN-75	HYB25D256800BT-6 rev B	~ Qimonda (Infineon)	BRDA80A	11/12/04		(32Mx8)* 18	
Micron	MT18VDDT6472G-265G3	MT46V64M4-75 G	Micron		11/19/04		(32Mx8)* 18	
Hynix*	HYMD264G726D4M-HAA	HY5DU56422DT-H	Hynix		12/16/04		(64Mx4)* 18	
Samsung	M312L6420EUS-CB0	K4H560438E-UCB0	Samsung		7/25/05	Yes	(64Mx4)* 18	
Samsung	M312L6420ETS-CB0	K4H560438E-TCB0	Samsung		7/25/05		(64Mx4)* 18	
+Legacy Electronics Inc.*	88M6JDFR-1JDG	MT46V64M4TG-75 rev C	Micron	LE18DDT18 44RRM rev B	9/1/05		64Mx4)* 18	

Registered, ECC, DDR333 DIMM Modules
512MB Size (64M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
~ Qimonda (Infineon)	HYS72D64300GBR-6-C	HYB25D256400CC-6	~ Qimonda (Infineon)		5/22/04		(64Mx4)* 18	
~ Qimonda (Infineon)	HYS72D64300GBR-6-B	HYB25D256400BC-6	~ Qimonda (Infineon)		5/17/04		(64Mx4)* 18	
~ Qimonda (Infineon)	HYS72D64320GBR-6-B	HYB25D256800BC-6	~ Qimonda (Infineon)				(32Mx8)* 18	

**Registered, ECC, DDR333 DIMM Modules
512MB Size (64M x 72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
~ Qimonda (Infineon)	HYS72D64320GBR-6-C	HYB25D256800CC-6	~ Qimonda (Infineon)		6/22/04		(32Mx8)* 18	
Micron	MT18VDDF6472G-335G3	4AGII D9BJR	Micron		6/23/04		(64Mx8)* 9	
Samsung	M312L6420EG0-CB3	K4H560438E-GCB3	Samsung		8/16/04		(64Mx4)* 18	
Micron	MT18VDDF6472G-335C1	MT46V64M4FB-6	Micron		8/30/04		(32Mx8)* 18	
+Dataram*	DTM63676D	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	40018A rev A	8/26/04		(64Mx4)* 18	
+ATP Electronics	AB64L72L4BFB3S	K4H560438E-GCB3 rev E	Samsung	SB184L04L1	9/14/04		(64Mx4)* 18	
Hynix	HYMD264G72DF4N-J AA	HY5DU564220-F-J	Hynix		9/17/04		(64Mx4)* 18	
+ATP Electronics	AB64L72L4BFB3C	HYB25D256400BC-5 rev B	~ Qimonda (Infineon)	SB184L04L1	9/21/04		(64Mx4)* 18	
+Apacer	76.92220.014	K4H560438E-GCCC rev E	Samsung	48.16164.013	10/6/04		(64Mx4)* 18	
+Smart Modular Technologies*	SM6472RDDR6H1BGBC	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	184-22-2	10/8/04		(64Mx4)* 18	
+Apacer	75.96299.555	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	48.16164.013 rev C	9/28/04		(64Mx4)* 18	
+Wintec Industries*	3C944646-L	HYB25D256400CC-5 rev C	~ Qimonda (Infineon)	DR1G472B	11/2/04		(64Mx4)* 18	
Hynix	HYMD264G726DF4N-J AA	HY5DU564220-F-J	Hynix		11/4/04		(64Mx4)* 18	
Hynix	HYMD564G726BF8N-J AA	HY5DU12822BF-J	Hynix		11/19/04		(64Mx8)* 9	
+Legacy Electronics Inc.	88S6JDGR-1NDG	HYB25D256400BC6 rev B	~ Qimonda (Infineon)	LE36DDF1844RC rev B	12/15/04		(64Mx4)* 18	
Samsung	M312L6420EZ0-CB3	K4H560438E-ZCB3	Samsung		2/24/05	Yes	(64Mx4)* 18	
+Dane-Elec*	DLD333R072645H	MT46V64M4FG-5B rev G	Micron	DR1G472B	2/25/05		(64Mx4)* 18	
+Ventura Technology Group*	D52YCK44SV	K4H560438E-GCB3 rev E	Samsung	DR1G472B	2/28/05		(64Mx4)* 18	
+Ventura Technology Group	D52YCK44MV	MT46V64M4FG-6 rev G	Micron	DR1G472B	3/18/05		(64Mx4)* 18	
SimpleTech*	ST72E4K64ML-A06E	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	01269 rev A	4/12/05		(64Mx4)* 18	
+Kingston*	KVR333S4R25/512I	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	2025161-001.B00	4/5/05		(64Mx4)* 18	

**Registered, ECC, DDR333 DIMM Modules
512MB Size (64M x 72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
+Apacer	76.92220.016	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	48.16164.0 13 rev 3	5/4/05		(64Mx4)* 18	
+Avant Technology	AVM7264R38C5333K6-MTG	MT46V64M4FG-5B rev G	Micron	RCE0020-01 rev 1	5/2/05		(64Mx4)* 18	
+Kingston	KVR333S4R25/512I	K4H560438E-GCB3 rev E	Samsung	2025161-001.B00 na	7/13/05		(64Mx4)* 18	
+Viking*	VI4CR647224DBKL1	HYB25D256400CC-6 rev C	~ Qimonda (Infineon)	0000999B rev B	7/26/05		(64Mx4)* 18	
Micron	MT9VDDF6472G-335D3	MT46V64M8FG	Micron		9/26/05		(64Mx8)* 9	
Samsung	M312L6523CZ0-CB3	K4H510838C-ZCB3	Samsung		9/28/05	Yes	(64Mx8)* 9	
Hynix	HYMD564G726CFP8N-J	HY5DU12822CFP-J	Hynix		10/24/05	Yes	(64Mx8)* 9	
Samsung	M312L6523CZ3-CB3	K4H510838C-ZCB3	Samsung		11/15/05	Yes	(64Mx8)* 9	
Samsung	M312L6420EZ3-CB3	K4H560438E-ZCB3	Samsung		11/15/05	Yes	(64Mx4)* 18	
Samsung	M312L6420EG3-CB3	K4H560438E-GCB3	Samsung		11/15/05		(64Mx4)* 18	
~ Qimonda (Infineon)	HYS72D64301HBR-6-C	HYB25D512800CF-6	~ Qimonda (Infineon)		1/31/06	Yes	(64Mx8)* 9	
+TRS	TRS21220	HYB25D256400BC-6 rev B	~ Qimonda (Infineon)	M0545LA1 rev 1	3/8/06		(64Mx4)* 18	
TRS	TRS21180	HYB25D256400CC-6 rev C	Infineon	M0545LA1 rev 1	04/06/06			
Kingston	KVR333S4R25/512I	HYB25D256400CF-5 rev C	Qimonda	2025161-001.B00 na	3/20/07	Yes	(64Mx4)* 18	

Modules shaded in blue are Lead Free.

~ Effective May 1st, 2006, Infineon memory products will be known as Qimonda

(+) 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/>

Caution: Some modules on this list may contain "stacked" DRAM parts. These parts may have thermal & physical limitations in some chassis configurations. It is advised to verify that your chassis configuration will support "stacked" parts before purchase.

Verify that the DRAM part number matches the DRAM on this list before purchasing.

Intel® Server Board SE7320SP2
Registered, ECC, DDR266 DIMM Modules
1GB Size (128M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
+Legend	L1272YC5-183HDD5A	HY5DU56422AS-H rev A	Hyundai	184RL rev 3	8/23/04		(64Mx4)*36	
+Ventura Technology Group	D54WYK42SV	K4H510838B-TCB3 rev B	Samsung	DR1G872-A	9/2/04		(64Mx8)*18	
+TRS	TRS21174	HYB25D512800AT-7 rev A	~ Qimonda (Infineon)	M0529LA1 rev 1	8/31/04		(64Mx8)*18	
+TRS	TRS21171	HYB25D256400BC-7 rev B	~ Qimonda (Infineon)	M0533LA1 rev 1	9/3/04		(64Mx4)*36	
+Legend	L1272YC5-RU1HDH5A	HY5DU12822AT-H rev A	Hyundai	DRR1U0818-A rev 1	9/13/04		(64Mx8)*18	
+TRS	TRS21203	HYB25D512400BE-7 rev B	~ Qimonda (Infineon)	M0530LA1 rev 1	10/13/04		(128Mx4)*18	
+Swissbit	SDR12872C1A2 2IN-70	HYB25D256400BC-7 rev B	~ Qimonda (Infineon)	B6R400 rev A	11/8/04		(64Mx4)*36	
+Swissbit	SDR12872K1A3 2IN-70	HYB25D256400CC-5 rev C	~ Qimonda (Infineon)	B6R404 rev 1	2/7/05		(64Mx4)*36	
Micron	MT18VDDT1287 2G-265D2	MT46V128M4TG-6T	Micron		7/8/05		(128Mx4)*18	
Hynix	HYMD512G726B 4M-H	HY5DU12422BT-H	Hynix		7/8/05		(128Mx4)*18	
Samsung	M312L2828EZ0-CB0	K4H510638E-UCB0	Samsung		7/25/05	Yes	(64Mx4)*36	
Samsung	M312L2828ET0-CB0	K4H510638E-TCB0	Samsung		7/25/05		(64Mx4)*36	
Samsung	M312L2920CUS-CB0	K4H510438C-UCB0	Samsung		9/21/05	Yes	(128Mx4)*18	
Smart Modular Technologies	SG12872RDDR3 08BTSC	K4H510838C-UCCC rev C	Samsung	PG52G184N EBZ6RCL rev A	05/18/06	Yes	(64Mx8)*18	

**Registered, ECC, DDR333 DIMM Modules
1GB Size (128M x 72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
~ Qimonda (Infineon)	HYS72D128321 GBR-6-B	HYB25D512800BC -6 B	~ Qimonda (Infineon)		5/18/04		(64Mx4)*36	
~ Qimonda (Infineon)	HYS72D128320 GBR-6-B	HYB25D256400BC -6	~ Qimonda (Infineon)		6/10/04		(64Mx4)*36	
Samsung	M312L2820EG0-CB3	K4H560438E-GCB3	Samsung		6/1/04		(64Mx4)*36	
~ Qimonda (Infineon)	HYS72D128320 GBR-6-C	HYB25D256400CC -6	~ Qimonda (Infineon)		7/21/04		(64Mx4)*36	
Apacer	75.07299.561				7/23/04			
Micron	MT18VDDF1287 2G-335D3	MT46V128M4FN-6	Micron		8/30/04		(128Mx4)*18	
+Apacer	76.02220.012	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	48.16164.01 3 rev 3	8/23/04		(128Mx4)*18	
Kingston	KVR333X72RC2 5/1G	HYB25D256400CC -6 rev C	~ Qimonda (Infineon)	2025247-001.A00	8/25/04		(64Mx4)*36	
+Smart Modular Technologies	SM12872RDDR6 H2BGIC	HYB25D256400CC -6 rev C	~ Qimonda (Infineon)	P54G184NE SZBRCD rev B	8/16/04		(64Mx4)*36	
+Smart Modular Technologies	SM12872RDDR6 H1BGAI	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	P52G184NE SZBGAX rev A	8/31/04		(128Mx4)*18	
+Viking	VI4CR287224DB KL2	K4H560438E-GCB3 rev E	Samsung	0000972B	9/7/04		(64Mx4)*36	
SimpleTech	ST72E4L128ML-A06E	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	01269 rev A	4/12/05		(128Mx4)*18	
+Ventura Technology Group	D54YFK44SV	K4H510438C-ZCB3 rev C	Samsung	DR1G472B	4/1/05		(128Mx4)*18	
+ATP Electronics	AB28L72Y4BFB3 C	HYB25D256400BC -5 rev B	~ Qimonda (Infineon)	SB184Y04L 1	9/23/04		(64Mx4)*36	
+Smart Modular Technologies	SM12872RDDR6 H8BGIB	HYB25D512800BC -6 rev B	~ Qimonda (Infineon)	P51G184NE BZBIB1 rev A	9/22/04		(64Mx8)*18	
+TRS	TRS21197	HYB25D256400CC -6 rev C	~ Qimonda (Infineon)	M0533LA1 rev 1	9/16/04		(64Mx4)*36	
+Dataram	DTM63677F	HYB25D256400CC -6 rev C	~ Qimonda (Infineon)	40599A rev A	10/1/04		(64Mx4)*36	
+Smart Modular Technologies	SM12872RDDR6 H2BGAS	K4H560438E-GCB3 rev E	Samsung	P54G184NE SZBRCD rev B	10/14/04		(64Mx4)*36	
+ATP Electronics	AB28L72L4BFB3 C	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	SB184L04L1	10/25/04		(128Mx4)*18	
+Swissbit	SDR12872C1A2 2IN-60	HYB25D256400BC -6 rev B	~ Qimonda (Infineon)	B6R400 rev A	11/15/04		(64Mx4)*36	
+Ventura Technology Group	D54YCK34SV	K4H560438E-GCB3 rev E	Samsung	V223	11/11/04		(64Mx4)*36	
+Wintec Industries	3C954641D-L	HYB25D256400CC -5 rev C	~ Qimonda (Infineon)	ZK4096M84 RCJB	10/28/04		(64Mx4)*36	
+Legacy Electronics Inc.	89S6MDZR-1NDG	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	LE18DDF18 44R rev A	11/24/04		(128Mx4)*18	
Micron	MT36VDDF1287 2G-335G3	MT46V64M4FG-6	Micron		1/14/05		(64Mx4)*36	

**Registered, ECC, DDR333 DIMM Modules
1GB Size (128M x 72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
+Smart Modular Technologies	SM12872RDDR6 H1BGBI	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	184-22-2	2/21/05		(128Mx4)*18	
+Legacy Electronics Inc.	89L6MDGR-1PDG	BGA128MX4DDRNLF	Legacy	LE36DDF18 44RC rev C	2/24/05		(128Mx4)*18	
+ATP Electronics	AB28L72L4BFB3 S	K4H510438C-ZCB3 rev C	Samsung	SB184L04L1	2/23/05		(128Mx4)*18	
+Legacy Electronics Inc.	89S6JDGM-1NDG	HYB25D256400BC 6 rev B	~ Qimonda (Infineon)	LE36DDF18 44RRF rev A	2/14/05		(64Mx4)*36	
+Swissbit	SDR12872K1A3 2IN-60	HYB25D256400CC -5 rev C	~ Qimonda (Infineon)	B6R404 rev 1	2/17/05		(64Mx4)*36	
+Ventura Technology Group	D54YFK44MV	MT46V128M4FN-6 rev D	Micron	DR1G472B	3/8/05		(128Mx4)*18	
+Dane-Elec	DLD333R072285 M	MT46V128M4FN-5B rev D	Micron	DR1G472B	3/2/05		(128Mx4)*18	
+Avant Technology	AVM7228R38C5 333K4-MTG	MT46V64M4FG-6 rev G	Micron	B6R400 rev 1	4/27/05		(64Mx4)*36	
+Dataram	DTM63694B	K4H510438C-ZCB3 rev C	Samsung	40018A rev A	5/26/05		(128Mx4)*18	
+Kingston	KVR333S4R25/1 GI	HYB25D512400BC -6 rev B	~ Qimonda (Infineon)	2025318-001.A00 na	6/27/05		(128Mx4)*18	
Samsung	M312L2820EZ0-CB3	K4H560438E-GCB3	Samsung		6/22/05	Yes	(64Mx4)*36	
Samsung	M312L2920CZ0-CB3	K4H510438C-ZCB3	Samsung		6/27/05	Yes	(128Mx4)*18	
+Kingston	KVR333D4R25/1 GI	K4H560438E-GCB3 rev E	Samsung	2025247-001.A00 na	7/18/05		(64Mx4)*36	
Samsung	M312L2923CZ0-CB3	K4H510838C-ZCB3	Samsung		7/25/05	Yes	(64Mx8)*18	
~ Qimonda (Infineon)	HYS72D128300 GBR-6-B	HYB25D512400BC -6 B	~ Qimonda (Infineon)		7/25/05		(128Mx4)*18	
Hynix	HYMD512G726B F4N-J	HY5DU12422B-F-J	Hynix		7/25/05		(64Mx4)*18	
+Legacy Electronics Inc.	89B6MDZR-1NDG	K4H510438C-ZCB3 rev C	Samsung	LE18DDF18 44R rev A	10/13/05		(128Mx4)*18	
+Avant Technology	AVM7228R53C5 333K6-NYBP	NT5DS128M4BG-6K rev B	Nanya	RCE0020-01 rev 1	10/28/05		(128Mx4)*18	
Hynix	HYMD512G726C-FP4N-J	HY5DU12422CFP-J	Hynix		10/24/05	Yes	(128Mx4)*18	
+Legend	L1272YC6-PPXSMD1B	K4H510438B-GCB3 rev B	Samsung	M312L6420 G0 na	11/30/05		(128Mx4)*18	
+Legend	L1272YC6-PPXSDD2E	K4H560438E-GCB3 rev E	Samsung	DR2G472B na	12/5/05		(64Mx4)*18	
Samsung	M312L2820EZ3-CB3	K4H510438B-ZCB3	Samsung		11/15/05	Yes	(64Mx4)*36	
Samsung	M312L2820EG3-CB3	K4H510438B-GCB3	Samsung		11/15/05		(64Mx4)*36	
Samsung	M312L2923CZ3-CB3	K4H510838C-ZCB3	Samsung		11/15/05	Yes	(64Mx8)*18	
Samsung	M312L2920CZ3-CB3	K4H510438C-ZCB3	Samsung		11/15/05	Yes	(128Mx4)*18	

Registered, ECC, DDR333 DIMM Modules 1GB Size (128M x 72)								
Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
~ Qimonda (Infineon)	HYS72D128321 HBR-6-C	HYB25D512800CF -6	~ Qimonda (Infineon)		1/31/06	Yes	(64Mx8)*18	
+TRS	TRS21196	HYB25D256400BC -6 rev B	~ Qimonda (Infineon)	M0533LA1 rev 1	3/14/06		(64Mx4)*36	
Kingston	KVR333D4R25/1 GI	HYB25D256400CF -5 rev C	Infineon	2025247-001.A00 na	04/04/06	Yes		
TRS	TRS21229	HYB25D512400BC -6 rev B	Infineon	M0545LA1 rev 1	04/13/06			
Kingston	KVR333S4R25/1 GI	K4H510438C-ZCB3 rev C	Samsung	2025324-001.A00 na	8/22/06	Yes	(128Mx4)*18	
Kingston	KVR333S4R25/1 GI	K4H510438C-ZCCC rev C	Samsung	2025324-001.A00 na	10/5/06	Yes	(128Mx4)*18	
Kingston	KVR333S4R25/1 GI	HYB25D512400CF -5 rev C	Qimonda	2025324-001.A00 na	4/30/07	Yes	(128Mx4)*18	
Kingston	KVR333S4R25/1 GI	HYB25D512400BF -5 rev B	Qimonda	2025324-001.A00 na	9/27/07	Yes	(128Mx4)*18	

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Intel® Server Board SE7320SP2
Registered, ECC, DDR266 DIMM Modules
2GB Size (256M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Kingston	KVR266X72RC25/2G	K4H510438B-TCB0 rev B	Samsung	2025148-001.A00	8/18/04		(128Mx4)*36	
+Ventura Technology Group	D56WXK28SV	K4H510438B-TCB3 rev B	Samsung	V213	10/15/04		(128Mx4)*36	
+Viking	VI4CR567224EYHL3	K4H510438B-TCB3 rev B	Samsung	03-0307 rev B	12/16/04		(128Mx4)*18	
+Smart Modular Technologies	SG25672RDDR6H2B GSC	K4H510438C-ZCB3 rev C	Samsung	PG54G184NES ZB1RF rev A	5/17/05		(128Mx4)*18	
+TRS	TRS21218	HYB25D512400BE-7 rev B	~ Qimonda (Infineon)	M0531LA1 rev 1	7/28/05		(128Mx4)*18	
Samsung	M312L5628BT0-CB0	K4H1G0638B-TCB0	Samsung		7/29/05		(128Mx4)*36	
Samsung	M312L5628CU0-CB0	K4H1G0638C-UCB0	Samsung		8/19/05	Yes	(128Mx4)*36	
Micron	MT36VDDF25672G-265D2	MT46V128M4FN	Micron		9/12/05		(128Mx4)*36	

**Registered, ECC, DDR333 DIMM Modules
2GB Size (256M x 72)**

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Micron	MT36VDDF25672G-335D2	MT46V128M4FN	Micron		8/3/04		(128Mx4)*36	
+Dataram	DTM63680F	HYB25D512400BF-6 rev B	~ Qimonda (Infineon)	40020A rev A	8/24/04		(128Mx4)*36	
+Smart Modular Technologies	SM25672RDDR6H2B GAI	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	P54G184NESZ B1RF rev A	9/8/04		(128Mx4)*36	
+TRS	TRS21155	HYB25D512400AT-7 rev A	~ Qimonda (Infineon)	M0531LA1 rev 1	9/21/04		(128Mx4)*36	
+Wintec Industries	35964741-L	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	85616658	10/7/04		(128Mx4)*36	
+Legacy Electronics Inc.	8AL6MDGM-1PDG	BGA128MX4DDRNC	Legacy	LE36DDF1844 RRF rev B	12/6/04		(128Mx4)*18	
+Apacer	75.A7299.570	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	48.16164.014 rev 4	12/13/04		(128Mx4)*18	
+Smart Modular Technologies	SM25672RDDR6H2B GBI	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	184-25-2	1/13/05		(128Mx4)*18	
+ATP Electronics	AB56L72Z4BFB3C	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	SB184Z04L1	1/27/05		(128Mx4)*18	
+Dataram	DTM63680H	MT46V128M4BN-6 rev D	Micron	40020A rev A	2/14/05		(128Mx4)*18	
+ATP Electronics	AB56L72Z4BFB3S	K4H510438C-ZCB3 rev C	Samsung	SB184Z04L1	3/1/05		(128Mx4)*18	
+Kingston	KVR333D4R25/2GI	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	2025294-001.A00	3/31/05		(128Mx4)*18	
+Apacer	76.A2220.017	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	48.16164.014 rev 4	5/4/05		(128Mx4)*18	
+Avant Technology	AVM7256R53C5333 K7-MTD	MT46V128M4FN-6 rev D	Micron	B6R404 rev 1	5/10/05		(128Mx4)*18	
~ Qimonda (Infineon)	HYS72D256320GBR-6-B	HYB25D512400BC-6 B	~ Qimonda (Infineon)		6/27/05		(128Mx4)*36	
Samsung	M312L5720CZ0-CB3	K4H510438C-ZCB3	Samsung		7/25/05	Yes	(128Mx4)*18	
+Kingston	KVR333D4R25/2GI	MT46V128M4FN-6 rev D	Micron	2025294-001.A00 na	10/7/05		(128Mx4)*18	
Samsung	M312L5720CZ3-CB3	K4H510438C-ZCB3	Samsung		11/15/05	Yes	(128Mx4)*36	
~ Qimonda (Infineon)	HYS72D256320HBR-6-C	HYB25D512400CF-6	~ Qimonda (Infineon)		1/31/06	Yes	(128Mx4)*36	
+TRS	TRS21225	HYB25D512400BC-6 rev B	~ Qimonda (Infineon)	M0546LA1 rev 1	2/28/06	Yes	(128Mx4)*36	
Kingston	KVR333D4R25/2GI	K4H510438C-ZCB3 rev C	Samsung	2025294-001.A00 na	7/19/06	Yes	(128Mx4)*36	
Kingston	KVR333D4R25/2GI	HYB25D512400CF-5 rev C	Qimonda	2025294-001.A00 na	4/16/07	Yes	(128Mx4)*36	
Kingston	KVR333D4R25/2GI	HYB25D512400BF-5 rev B	Qimonda	2025294-001.A00 na	9/24/07	Yes	(128Mx4)*36	

Modules shaded in blue are Lead Free.

~ Effective May 1st, 2006, Infineon memory products will be known as Qimonda

(+) 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/>

Caution: Some modules on this list may contain "stacked" DRAM parts. These parts may have thermal & physical limitations in some chassis configurations. It is advised to verify that your chassis configuration will support "stacked" parts before purchase.

Intel® Server Board SE7320SP2
Registered, ECC, DDR266 DIMM Modules
4GB Size (512M x 72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	Lead Free	DRAM Organization	EOL
Micron	MT36VDDT51272G-265A2	MT46V256M4TG-75A	Micron		7/8/05		(256Mx4)*36	
Samsung	M312L5128MT0-CB0	K4H2G0638M-TCB0	Samsung		7/25/05		(256Mx4)*36	

Modules shaded in blue are Lead Free.

Note: When using 4GB DIMMs, you can only install two DIMMs to reach the supported 8GB maximum for this board.

(+) 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/>

Caution: Some modules on this list may contain “stacked” DRAM parts. These parts may have thermal & physical limitations in some chassis configurations. It is advised to verify that your chassis configuration will support “stacked” parts before purchase.

Verify that the DRAM part number matches the DRAM on this list before purchasing.

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
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/	
Hyundai/Hynix Semiconductor	http://www.hea.com/	
~ Qimonda (Infineon)	http://www.infineon.com/business/distribut/index.htm	
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://silicon.micron.com/mktg/http://silicon.micron.com/mktg/mbqual/qual_data.cfm	

Vendor Name	Web URL	Vendor Direct Sales Info
MSC Vertriebs GmbH	http://www.msc-ge.com	William Perrigo 49-7249-910-417 Fax: 49-7249-910-229 wpe@msc-ge.com
Netlist, Inc	http://www.netlistinc.com	Christopher Lopes 949.435.0025 tel 949.435.0031 fax sales@netlistinc.com
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Samsung	http://www.korea.samsungsemi.com/locate/buy/list_na.html	For US customers go to: http://www.mymemorystore.com/
Silicon Tech	http://www.silicontech.com/contact/sales_contacts.shtml	
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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 bank 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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