Intel® Carrier and Industrial Grade Server TSRLT2 and TSRMT2 Memory List Test Report Summary

Revision 26.0
March 2004

Revision History		
Date	**Rev**	**Modifications**
Feb/02	1.0	Initial Released
June/02	2.0	Released Document
June/02	3.0	Added Aved 256MB & 512MB parts. Added Buffalo 256MB & 512MB parts. Added Dataram 1GB parts. (In shaded area)
July/02	4.0	Added Dataram 1GB parts. (In shaded area)
July/02	5.0	Added Dataram 512MB parts. (In shaded area)
Aug/02	6.0	Added MSC 256MB & 512MB parts. Added Smart Modular 256MB parts. (In shaded area)
Aug/02	7.0	Added Dataram 1GB parts. Added Legend 256MB parts. Added MSC 512MB parts (In shaded area).
Sept/02	8.0	Added MSC 512MB parts. (In shaded area)
Oct/02	9.0	Added Centon 1GB parts. Added Dataram 512MB parts. (In shaded area)
Oct/02	10.0	Added Centon 512MB parts. Added Dataram 256MB & 512MB parts. (In shaded area)
Oct/02	11.0	Added ATP, Dataram & MSC 1GB parts. Added Dataram 256MB parts. Made part number corrections. (In shaded area)
Nov/02	12.0	Added Avant 512MB parts. Added Dataram 1GB parts. Added ITAUCOM 256MB parts. Added Legend 512MB parts. (In shaded area)
Dec/02	13.0	Added Centon 1GB parts. Added Legend 256MB parts. Added ATP & ITAUCOM 512MB parts. (In shaded area)
Jan./03	14.0	Added ATP 256MB parts. Added Centon 512MB parts. (In shaded area)
Jan./03	15.0	Added Avant 1GB parts. Added Micron 512MB & 1G parts. (In shaded area)
Jan./03	16.0	Added Smart 256MB parts. Added Buffalo 512MB parts. Added Micron 256MB, 512MB & 1G parts. (In shaded area)
Mar./03	17.0	Added Avant 512MB parts. (In shaded area)
June/03	18.0	Added Avant & Micron 512MB parts. (In shaded area) Updated EOL status
July/03	19.0	Added Samsung 128MB, 512MB & 1G parts. Updated EOL status
Aug/03	20.0	Added Peripheral 512MB & 1GB parts. (In shaded area). Also Updated EOL status.
Sept/03	21.0	Added Viking & Micron 256MB parts. Added Dataram 1GB parts. (In shaded area)
Oct/03	22.0	Added Dataram 256MB and 512MB parts. Added Viking 512MB parts. (In shaded area)
Nov/03	23.0	Added Viking 512MB and 1GB parts. Micron 512MB & 1G part. (In shaded area)
Feb/04	24.0	Added Micron 256MB part. Added Samsung 1G part. Updated EOL status.
Feb/04	25.0	Added ATP 1GB parts. (In shaded area)
Mar/04	26.0	Added Virtium, Hynix & Infineon 1GB parts. (In shaded area)

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The hardware vendor remains solely responsible for the design, sale and functionality of its product, including any liability arising from product infringement or product warranty. Only approved software drivers and accessories that are recommended for the revision number of the boards and system being operated should be used with Intel products. Please note that, as a result of warranty repairs or replacements, alternate software and firmware versions may be required for proper operation of the equipment.

The Intel® TSRLT2/TSRMT2 Carrier/Industrial Grade Server 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.

* Other brands and names are the property of their respective owners.

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 test memory modules for use in the Intel® Carrier and Industrial Grade Server TSRLT2/TSRMT2 memory is a vital subsystem in a platform. Intel Corporation requires strict guidelines to be met before a memory vendor and part is put onto the qualified memory list. Each Intel Server Board product has a separate qualified memory list.

Memory qualification for Intel's Server Board products is performed by Intel's Memory Validation Laboratory (MVL), and by an independent external test laboratory, Computer Memory Test Lab (CMTL)[1]. CMTL is a leading memory testing organization responsible for testing a broad range of memory products. Memory devices tested by Intel's MVL or CMTL must undergo rigorous tests to ensure that the product will perform the intended server functions.

Intel Server and Workstation Boards 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 memory 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* 2000 Advanced Server for no less than 24 hours. The voltage and temperature margin testing involves testing the memory module on the particular Intel board for which it is being qualified with various test software and operating systems for 48-72 hours under various voltage and temperature margin conditions. Memory modules 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.

For information regarding the testing procedure required to reach each phase, please contact your Intel Representative.

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[1] CMTL is an independent memory testing organization responsible for testing a broad range of memory products. Receiving a "PASS" after being tested by CMTL, means that a product functions correctly and consumers can use it 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. CMTL contact:

John Deters	Computer Memory Test Labs (CMTL)
714-960-1243 (voice)	101 Main Street, Suite 2G
714-960-4695 (fax)	Huntington Beach, CA 92648
	http://www.cmtlabs.com/

Qualified Memory for the Intel® Carrier and Industrial Grade Server, TSRLT2 and TSRMT2

The Intel® Carrier/Industrial Grade Server, TSRLT2/TSRMT2 baseboard has 6 DIMM sockets and is capable of supporting up to 6 GB of Registered ECC PC133 memory using six 72 bit DIMM modules. The following memory features are supported:

- 133 MHz, Registered ECC PC-133 compatible 3.3V registered SDRAM modules (in compliance with the PC-133 Registered DIMM Specification)
- DIMMs with capacity of 64MB, 128MB, 256 MB, 512 MB and 1G. Other DRAM sizes may function correctly but will not be validated.
- Minimum configuration is 128MB using two 64MB DIMMs.

Note: Low Profile DIMMs are required for 1U configurations

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

PC-133 Registered SDRAM Module Configurations for Cas Latency 2 & 3					
DIMM Capacity	**DIMM Organization**	**SDRAM Density**	**SDRAM Organization**	**# SDRAM Devices/rows/Banks**	**# Address bits rows/Banks/column**
64MB	8M x 72	64Mbit	8M x 8	9/1/4	12/2/9
128MB	16M x 72	64Mbit	16M x 4	18/1/4	12/2/10
128MB	16M x 72	64Mbit	8M x 8	18/2/4	12/2/10
128MB	16M x 72	128Mbit	16M x 8	9/1/4	12/2/10
256MB	32M x 72	64Mbit	16M x 4	36/2/4	12/2/10
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	64M x 4	9/1/4	13/2/11
256MB	32M x 72	256Mbit	32M x 8	9/1/4	13/2/10
512MB	64M x 72	128Mbit	32M x 4	36/2/4	12/2/11
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
1GB	128M x 72	256Mbit	64M x 4	36/2/4	13/2/11

Additional information regarding the memory subsystem used on the TSRLT2/TSRMT2 Carrier/Industrial Grade Server baseboard can be found in *the Intel®* TSRLT2/TSRMT2 Carrier/Industrial Grade Server *Technical Product Specification* available via iBL

The following table lists DIMM devices known to be compatible with the Intel TSRLT2/TSRMT2 Carrier/Industrial Grade Server. Intel recommends that Advanced Tested DIMMs be used to establish reliable system operation. DIMM devices not listed can be used; but, in the event of unreliable system operation, the DIMM devices should be replaced with functionally Advanced Tested DIMMs to determine whether the DIMM devices are causing the problem.

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.

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.

This list is subject to change without notice.

Intel® Carrier/Industrial Grade Server, TSRLT2/TSRMT2

** The TSRMT is only validated to operate with Low Profile DIMM modules*

Registered, ECC, 133MHz SDRAM DIMM Modules
64MB Sizes (8Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Micron	MT9LSDT872G-133C3	MT48LC8M8A2-75C	Micron		10/01/01	3		
Samsung	M390S0823FT1-C7A		Samsung		10/15/01	3		

Intel® Carrier/Industrial Grade Server, TSRLT2/TSRMT2

** The TSRMT is only validated to operate with Low Profile DIMM modules*

Registered, ECC, 133MHz SDRAM DIMM Modules

128MB Sizes (16Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Samsung	M390S1723CTU-C75	K4S280832C-TC75	Samsung		09/06/01	3	Yes	
Infineon	~HYS72V16301GR-7.5-C2	HYB39S128800CT-7.5-C2	Infineon		09/07/01	3	Yes	
Micron	MT9LSDT1672G-133E2	MT48LC16M8A2-75E	Micron		09/12/01	3	Yes	
Micron	MT9LSDT1672G-133E1	MT48LC16M8A2-75E	Micron		10-03-01	3		
Samsung	M390S1723DT1-C7A	K4S2808320-TC75	Samsung		10-08-01	3		
+PNY	7216ZHSTM4G13TWI-PK0	TC59SM708AFT-75 rev A	Toshiba	40000494 rev A	10/08/01	3	Yes	EOL
+Aved Memory Products	AMP377P1723AT2-C75/H	HY57V28820AT-H rev A	Hyundai	105399 rev B	10/06/01	3	Yes	EOL
+PNY	7216ZHSTM4G13TWI-PH0	HYB39S128800CT-7.5 rev C	Infineon	40000494 rev A	10/10/01	3	Yes	EOL
+Dataram	DTM60158 (60158Z)	MT48LC16M8A2TG-75 rev E	Micron	40484 rev A	10/30/01	3		EOL
+Dataram	DTM60168(60168Z)	MT48LC16M8A2TG-75 rev E	Micron	40506 rev A	10/30/01	3	Yes	EOL
+ATP Electronics	AR16V72L8S4GAS	K4S280832D-TC75 rev D	Samsung	SR168L08V rev 1	11/09/01	3	Yes	EOL
Samsung	M390S1723DTU-C7A	K4S280832D-TC75	Samsung		11/21/01	3	Yes	
Infineon	HYS72V16301GR-7.5 C2	HYB39S128800CT-7.5-C2	Infineon		12/10/01	3		

Registered, ECC, 133MHz SDRAM DIMM Modules
128MB Sizes (16Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Infineon	HYS72V16301GR-7.5 C2	HYB39S128800C T-7.5-C2	Infineon		12/10/01	3		
Micron	MT9LSDT1672G-13EE2	MT48LC16M8A2-7EE	Micron		12/18/01	2	Yes	
Samsung	M390S1620FT1-C7A	K4S640432F-TC75	Samsung		12/21/01	3		
Micron	MT9LSDT1672G-13EE1	48LC16M8AA2	Micron		3/11/02	2		
Micron	MT9LSDT1672G-13EC2	MT48LC16M4A2-7EC	Micron		3/21/02	2		
+Dataram	DTM60168D	HYB39S128800C T-75 rev C	Infineon	40506 rev A	4/21/02	3	Yes	EOL

Modules shaded in blue are low profile

Note: The current BIOS only supports CL3 and does not utilize the CL2 technology. Therefore CL2 parts will currently only run at CL3 speed.

(~) Part number change/correction

(+) This vendor is part of the CMTL Certification program. This means this part has/will been 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® Carrier/Industrial Grade Server, TSRLT2/TSRMT2

** The TSRMT is only validated to operate with Low Profile DIMM modules*

Registered, ECC, 133MHz SDRAM DIMM Modules
256MB Sizes (32Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Samsung	M390S3253BTU-C75	K4S6083B-TC75	Samsung		09/06/01	3	Yes	
Infineon	~HYS72V32300GR-7.5-C2	HYB39S256800CT-7.5-C2	Infineon		09/08/01	3	Yes	
Samsung	M390S3320CTU-C75	K4280432C-TC75	Samsung		09/10/01	3	Yes	
Micron	MT9LSDT3272G-133B1	MT48LC32M8A2	Micron		09/19/01	3		
Samsung	M390S3253CT1-C7A	K4S60832C-TC75	Samsung		09/19/01	3		
+Dataram	DTM60188 (60188) (M)	MT48LC32M4A2TG-75 rev E	Micron	40506 rev A	10/06/01	3	Yes	EOL
+Aved Memory Products	AMP377P3253BTE-C75/S	K4S560832B-TC75 rev B	Samsung	105399 rev B	10/11/01	3	Yes	EOL
+Aved Memory Products	AMP377P3253BTE-C75/S	K4S560832B-TC75 rev B	Samsung	105399 rev B	10/14/01	3	Yes	EOL
+Aved Memory Products	AMP377P3323AT2-C75/MV	V54C3128804VAT-7 rev A	Mosel-Vitelic	105352 Rev.B	10/30/01	3		EOL
+Dataram	DTM60125 (68014Z)	HY57V28420AT-H rev A	Hyundai	651219-G rev 1	11/05/01	3		EOL
+ATP Electronics	AR32V72N4S4GAS	K4S280432C-TC75 rev C	Samsung	SR168N04V rev 2	11/05/01	3	Yes	EOL
*Smart Modular	SM572324574E03R	K4S280432D-TC75	Samsung	P51G168NEBSIB33 rev B	11/05/01	3		EOL
Samsung	M390S3320DTU-C7A	K4S280432D-TC75	Samsung		11/06/01	3	Yes	
Micron	MT9LSDT3272G-133B2	MT48LC32M8A2	Micron		11/13/01	3	Yes	
Hynix	HYM71V32C735HCT4M-H	HY57V28420HCT-H	Hynix		11/16/01	3	Yes	
+Aved Memory Products	AMP377P3323AT2-C7B/MI	MT48LC16M8A2TG-7E rev A	Micron	105352 rev B	11/16/01	2		EOL
+Dataram	DTM60172 (60172Z)	MT48LC32M8A2TG-75 rev A	Micron	40506 rev A	12/6/01	3	Yes	EOL
Samsung	M390S3320DT1-C7A	K4S2804320-TC75	Samsung		12/04/01	3		
Infineon	HYS72V32300GR-7.5 C2	HYB39S256800CT-7.5-C2	Infineon		12/10/01	3		
Infineon	HYS72V32300GR-7.5 C2		Infineon	HYB39S256800CT-7.5-C2	12/10/01	3		
Kingston	KVR133X72RC3L/256-IS	TC59SM704FT-75	Toshiba	2005086-001 rev B00	12/24/01	3	Yes	EOL
Samsung	M390S3253CTU-C7A		Samsung	K4S560832C-TC75	12/27/01	3	Yes	
+SMART Modular Technologies	SM3272SR301-ICA	TC59S6404CT-75	Infineon	P51G168NEBSIBP3 rev A	1/9/02	3		EOL
+Dataram	~DTM68014B (Old Part# DTM68014(M)	MT48LC32M4A2TG-75 rev E	Micron	651219-G rev 1	2/5/02	3		EOL
Micron	MT18LSDT3272G-13EE1	MT 48LC32M4A2-7E E	Micron		3/7/02	2		
Corsair	CM766S256-133/M	MT48LC32M4A2TG-75 rev B	Micron	50-00096 rev A	3/7/02	3		

Registered, ECC, 133MHz SDRAM DIMM Modules
256MB Sizes (32Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
+Dataram	~DTM60199A (Old Part# DTM60199(M))	MT48LC32M4A2TG-75 rev E	Micron	40551 rev A	3/14/02	N/A	Yes	EOL
+ATP Electronics	AR32V72L8S8GAS	K4S560832C-TC/L75	Samsung	SR168L08V1 rev 1	3/11/02	3	Yes	
Samsung	M390S3253DT1-C7A	K4S560432C-TC75	Samsung		3/28/02			
+Dane-Elec	DP133R072323IL	NT5SV32M8AT-7KT	Nanya	DE082030 rev B	4/1/02	2	Yes	
+Dataram	DTM60172D	HYB39S256800CT-75 rev C	Infineon	40506 rev A	4/7/02	3	Yes	EOL
+Dataram	DTM60172E	HYB39S256800DT-7 rev D	Infineon	40506 rev A	5/22/02	3	Yes	EOL
+MSC Vertriebs GmbH	MSC256M00040	HYB39S256800CT-7.5 rev C	Infineon	M0508LA1	5/31/02	3		EOL
+Aved Memory Products	AMP377P3323CT3-C75/N	NT5SV16M8CT-7K rev C	Nanya	GR-6437 rev A	6/20/02	3		EOL
+Buffalo	VS133-R256/ME	48LC16M8A2-75 rev E	Micron	ZEY8RWF-AA	6/19/02	3		EOL
+MSC Vertriebs GmbH	MSC256M00142	HYB39S256800CT-7.5 rev C	Infineon	M0493LA2	7/31/02	3	Yes	EOL
+Smart Modular Technologies	SM572324574E03R01	K4S280432D-TC75 rev D	Samsung	P52G168NEBSKGSI rev A	8/5/02	3	Yes	EOL
+Legend	L3272QC3-59AIS73C	HYB39S128800CT-7.5 rev C	Infineon	B5982 rev A	8/12/02	3		EOL
+Dataram	DTM60172F	MT48LC32M8A2TG-75 rev C	Micron	40506 rev A	10/14/02	3	Yes	EOL
ITAUCOM	256E1333R28	ICM4V560806-5	Micron	0198 B	11/11/02	3	Yes	EOL
+Legend	L3272QC3-59BHSC3B	HY57V56820BT-H rev B	Hyundai	B5982 rev B	11/19/02	3		EOL
+ATP Electronics	AR32V72Q8S8GAS	K4S560832D-TC75 rev D	Samsung	BRSA80A	12/5/02	3	Yes	EOL
Micron	MT9LSDT3272G-133C2	MT48LC32M8A2-75 C	Micron		1/20/03	3	Yes	
+Smart Modular Technologies	SM5NET32M72LMDOG	K4S560832D-TC75	Samsung	P512168NEBSKGAX rev A	1/21/03	3	Yes	EOL
Micron	MT18LSDT3272G-133E1	MT48LC32M4A2 -75E	Micron		1/29/03	3		
+Avant Technology	AVE7232R37A2133E1-A	NT5SV32M4CT-7K rev C	Nanya	50-1412-01-A rev A	2/17/03	2	Yes	EOL
+Buffalo	VS133-RS256/MC	MT48LC32M8A2TG-75 rev C	Micron	YEY8RWF-AA	2/3/03	3		EOL

Registered, ECC, 133MHz SDRAM DIMM Modules 256MB Sizes (32Mx72)								
Manufacturer	**Part Number**	**DRAM Part Number**	**DRAM Vendor**	**PCB Part Number**	**Date**	**CAS Latency**	**Low Profile**	**EOL**
Samsung	M390S3320ETU-C7A	K4S280432E-TC75	Samsung		7/28/03	3	Yes	
+Viking	VI8AR327238DTEL1	K4S560832D-TC75 rev D	Samsung	0000967A	8/11/03	3	Yes	
Micron	MT9LSDT3272G-133D2	MT48LC32M8A2-75 D	Micron		8/25/03	3	Yes	
+Dataram	DTM60172H	MT48LC32M8A2TG-75 rev D	Micron	40506 rev A	9/5/03	3	Yes	
Micron	MT18LSDT3272G-133G3	MT48LC32M4A2-75 G	Micron		1/30/04	3		

Modules shaded in blue are low profile

Note: The current BIOS only supports CL3 and does not utilize the CL2 technology. Therefore CL2 parts will currently only run at CL3 speed.

(~) Part number change/correction

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

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Intel® Carrier/Industrial Grade Server, TSRLT2/TSRMT2

** The TSRMT is only validated to operate with Low Profile DIMM modules*

Registered, ECC, 133MHz SDRAM DIMM Modules
512 MB Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Samsung	M390S6450BTU-C75	K4S560432B-TC75	Samsung		09/06/01	3	Yes	
Infineon	HYS72V64500GR-7.5-C2	HYB39S256400CT-7.5-C2	Infineon		09/07/01	3	Yes	
Samsung	M390S6450CT1-C7A	K4S560432C-TC75	Samsung		09/13/01	3		
Infineon	HYS72V64300GR-7.5-C2	HYB395256400CT-7.5-C2	Infineon		10-10-01	3		
+Dataram	DTM60176(60176Z)	HM5225805BTT-75 rev B	Hitachi	40511 rev A	10/10/01	3	Yes	EOL
+Dataram	DTM60176(60176Z)	HYB39S256800CT-7.5	Infineon	40511 rev A	10/11/01	3	Yes	EOL
+Aved Memory Products	AMP377P6450BT3-C75/S	K4S560432B-TC75 rev B	Samsung	105349 rev C	10/17/01	3		EOL
+Dataram	DTM60176(60176Z)	HYB39S256800CT-7.5	Infineon	40511 rev A	10/14/01	3	YES	EOL
+PNY	7264WHSTM8G24TWR-PK0	TC59SM808BFT-75 rev B	Toshiba	40000476 rev B	10/17/01	3		EOL
+PNY	7264WHSTM8G24TWR-PH0	HYB39S256800CT-7.5 rev C	Infineon	40000476 rev B	10/19/01	3		EOL
+Dataram	DTM60133 (68015Z)	HY57V56420T-H	Hyundai	651219-G rev 1	11/07/01	3		EOL
Micron	MT18LSDF6472G-133B1	MTN2NJILB11DBHBF	Micron		11/13/01	3	Yes	
+ATP Electronics	AR64V72N4S8GAS	K4S560432C-TC75 rev C	Samsung	SR168N04V rev 2	11/13/01	3	Yes	EOL
Virtium Technology Inc	VM375S6550E-GASC	K4S650432C-TC75 rev C	Samsung	16-25142A	11/21/01	3	Yes	EOL
Micron	MT36LSDF6472G-133B2		Micron		11/28/01	3		
Simple Tech	ST72R8F64L-A75A	MT48LC32M8A2TG-75 B	Micron	930	12/6/01	3	Yes	EOL
+Dataram	~DTM60194A (Old Part#DTM60194(M))	MT48LC64M4A2TG-75	Micron	40551 rev A	12/3/01	3	Yes	EOL
+Legend	L6472WC3-21ASSG3C	K4S560432C-TC75 rev C	Samsung	16-21040 rev A	12/19/01	3	Yes	EOL
Kingston	KVR133X72RC3L/512-IS	NT5SV64M4AT-7K	Nanya	2005086-001 rev B00	12/24/01	3	Yes	EOL
+Dataram	DTM68015 (68015Z)	HY57V56420T-HP	Hyundai	651219-G rev 1	12/28/01	3		EOL
+Dataram	~DTM68015B (Old Part#DTM68015(M))	MT48LC64M4A2TG-75	Micron	651219-G rev 1	1/9/02	3		EOL
+Dataram	~DTM60194C (Old Part# DTM60194(E))	HYB39S256400CT-75 rev C	Infineon	40551 rev A	1/28/02	3	Yes	EOL
+Dataram	DTM60194 (H)	HM5225405BTT-75 rev B	Hitachi	40551 rev A	1/30/02	3	Yes	EOL
+SMART Modular Technologies	SM6472SR301-ICA	K4S560432C-TC75 rev C	Samsung	P51G168NEBSIBP3	1/28/02	3		EOL

Registered, ECC, 133MHz SDRAM DIMM Modules
512 MB Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Corsair	CM764S512LP-133/M	MT48LC32M8A2TG-75 rev B	Micron	50-00103 rev A	3/7/02	3	Yes	
Hynix	HYM72V64C736T4M-H	HY57V56420T-H	Hynix		3/21/02			
+MSC Vertriebs GmbH	MSC512M00001	HYB39S256400CT-7.5	Infineon	M0507LA1	3/24/02	3	Yes	
Ventura Technology Group	S52SVJ23EV	HYB39S256800CT-7.5 Rev C	Infineon	V204	3/24/02	3		
Apacer	AM512LS62R13304	K4S560432C-TC75 rev C	Samsung	48.16103.012	3/27/02	N/A		
Samsung	M390S6450DT1-C7A	K4S560432D-TC75	Samsung		3/28/02			
Samsung	M390S6450CTU-C7A	K4S560432C-TC75	Samsung		3/29/02			
+ATP Electronics	AR64V72M8S8GAS	K4S560832C-TC/L75 rev C	Samsung	SR168M08V rev 2	3/29/02	N/A		
+Dane-Elec	DP133R072643IL	K4S560832C-TC75 rev C	Samsung	DE082030 rev B	4/4/02	2	Yes	
+MSC Vertriebs GmbH	MSC512M00002	K4S560432C-TC75 rev C	Samsung	M0507LA1	4/30/02	3		EOL
Hanbit Electronics	HSD64M72D18RP-13	K4S560432C-TC75 rev C	Samsung	PB-159A	5/9/02	3	Yes	EOL
Samsung	M390S6450DTU-C7A	K4S560432D-TC75	Samsung		5/13/02			
+MSC Vertriebs GmbH	MSC512M00037	K4S560832C-TC rev C	Samsung	M0508LA1	5/20/02	3		EOL
+MSC Vertriebs GmbH	MSC512M00041	HYB39S256800CT-7.5 rev C	Infineon	M0508LA1	5/20/02	3		EOL
+Buffalo	VS133-R512/MB	48LC32M8A2-75 rev B	Micron	ZEY8RWF-AA	7/2/02	3		EOL
+Dataram	DTM60194D	HYB39S256400DT-7 rev D	Infineon	40551 rev A	7/12/02	3	Yes	EOL
+MSC Vertriebs GmbH	MSC512M00149	HYB39S256400DT-7 rev D	Infineon	M0507LA1	7/26/02	2		EOL
+MSC Vertriebs GmbH	MSC512M00148	K4S510832C-KC75 rev C	Samsung	M0493LA2	8/15/02	3	Yes	EOL
+Dataram	DTM68015E	MT48LC64M4A2TG-75 rev C	Micron	40544 rev A	9/23/02	3		EOL
+Centon Electronics	TOP02-C004D (Old Part# CMB512M/RP133S)	K4S560432C-TC75 rev C	Samsung	LE12872R LP rev C	10/1/02	2	Yes	EOL
+Dataram	DTM60194F	MT48LC64M4A2TG-75 rev C	Micron	40551 rev A	10/7/02	3	Yes	EOL
+Dataram	DTM60194E	K4S560432D-TC75 rev D	Samsung	40551 rev A	7/23/02	3	Yes	EOL
+Avant Technology	AVE7264R38A2133E1-A	NT5SV64M4AT-7K rev A	Nanya	501412-01-A rev A	11/8/02	2	Yes	EOL
+Avant Technology	AVE7264R38A3133E1-A	K4S560432D-TC75 rev D	Samsung	501412-01A rev A	11/4/02	3	Yes	EOL
+Legend	L6472QC3-59BHSC3B	HY57V56820BT-H rev B	Hyundai	B5982 rev B	11/13/02	3		EOL
+ATP Electronics	AR64V72Q8S8GAS	K4S560832D-TC75 rev D	Samsung	BRSA80A	11/25/02	3	Yes	EOL

Registered, ECC, 133MHz SDRAM DIMM Modules
512 MB Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
ITAUCOM	512E1333R28	ICM4V560806-5	Micron	0156 A	11/21/02	3		EOL
+Centon Electronics	TOP02-C007G	48LC64M4A2TG75 rev C	Micron	LE12872R LP rev C	12/20/02	2	Yes	EOL
Micron	MT18LSDT6472G-133C2	MT48LC64M4A2-75 C	Micron		1/15/03	3	Yes	
Micron	MT18LSDT6472G-13EB1	MT48LC64M4A2-7E B	Micron		1/29/03	2		
+Buffalo	VS133-R512/MC	MT48LC32M8A2TG -75 rev C	Micron	ZEY8RWF-AA	1/29/03	3		EOL
+Avant Technology	AVE7264R39A3133 E4-A	HY57V56820BT-H rev B	Hyundai	BRSA80A rev A	3/19/03	3	Yes	EOL
Micron	MT18LSDF6472G-133C1	MT3AC22 DBHBF	Micron		2/6/03	3	Yes	
Samsung	M390S6450ETU-C7A	K4S560432E-TC75	Samsung		7/28/03	3	Yes	
Peripheral Enhancements	INTEL00512MSCB2	LES64408TA-7	Legacy	LE12872R LP rev C	7/29/03	3	Yes	
+Dataram	DTM60194I	MT48LC64M4A2TG -75 rev D	Micron	40551 rev A	8/26/03	3	Yes	
+Viking	VI8AR647238DTEL1	K4S560832D-TC75 rev D	Samsung	0000967A	9/16/03	3	Yes	
+Viking	VI8AR647234DTEL1	K4S560432D-TC75 rev D	Samsung	0000891B	9/29/03	3	Yes	
Micron	MT18LSDT6472G-133D2	MT48LC64M4A2-75 D	Micron		10/17/03	3	Yes	

Modules shaded in blue are low profile

Note: The current BIOS only supports CL3 and does not utilize the CL2 technology. Therefore CL2 parts will currently only run at CL3 speed.

(~) Part number change/correction

(+) This vendor is part of the CMTL Certification program. This means this part has/will been 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® Carrier/Industrial Grade Server, TSRLT2/TSRMT2

** The TSRMT is only validated to operate with Low Profile DIMM modules*

Registered, ECC, 133MHz SDRAM DIMM Modules
1G Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
Samsung	M390S2858BTU-C75	K4S5604326-TC75	Samsung		09/06/01	3	Yes	
Infineon	HYS72V128320GR-7.5-C2	HYB39S256400CI-75	Infineon		09/21/01	3		
Samsung	M390S2858CT1-C7A	K4S560432C-TC75	Samsung		09/24/01	3		
Samsung	M390S2858CTU-C7A	K4S560432C-TC75	Samsung		10/17/01	3	Yes	
+Dataram	~DTM60192C (Old Part# DTM60192(E))	HYB39S256400CT-75 rev C	Infineon	40481 rev A	11/07/01	3		EOL
+PNY	72A0UHSTM8G24KWR-PH0	HYB39S256400CT-7.5 rev C	Infineon	40000475 rev B	10/31/01	3		EOL
+PNY	72A0UHSTM8G24KWR-PK0	TC59SM804BFT-75 rev B	Toshiba	40000475 rev B	11/08/01	3		EOL
+ATP Electronics	AR128V72N4SMGAS	K4S560432C-TC75 rev C	Samsung	SR168N04V rev 2	11/09/01	3	Yes	EOL
Micron	MT36LSDF12872G-133B1	~MT48LC64M4A2FB-75	Micron		10/17/01			
Virtium Technology Inc	VM375S2850E-GASC	K4S650432C-TC75 rev C	Samsung	16-25142A	11/27/01	3	Yes	EOL
Kingston	KVR133X72RC3L/1024I	12953-23	Toshiba	2025086-001 rev B00	12/3/01	3	Yes	EOL
Virtium Technology Inc	VM375S2850E-GA	K4S650432C-TC75 rev C	Samsung	16-25142A	11/28/01	3	Yes	EOL
Infineon	~HYS72V128520GR-7.5-C2	HYB39S256400CT-7.5-C2	Infineon		9/26/01	3	Yes	
Elpida	HB52RF1289E2U-75B		Hitachi		12/14/01	3	Yes	
+Legend	L1272WC3-21ASSG3C	K4S560432C-TC75	Samsung	16-21040 rev A	12/19/01	N/A	Yes	EOL
+Dataram	~DTM60193A (Old Part# DTM60193(M))	MT48LC64M4A2FB-75 rev B	Micron	40554 rev A	12/28/01	2	Yes	EOL
+SMART Modular Technologies	SM12872SR301-ICA	K4S560432C-TC75 rev C	Samsung	P51G168NEBSIBP3	1/31/02	3		EOL
+SMART Modular Technologies	SM12872SR301-ICA	K4S560432C-TC75 rev C	Samsung	P51G168NEBSIBP3	1/31/02	3		
Ventura Technology Group	S54SWJ27SV	K4S560432A-TC75 rev A	Samsung	V211	2/25/02	3		
Samsung	M390S2858DT1-C7A	K4S560432D-TC75	Samsung		4/25/02	3		
Samsung	M390S2858DTU-C7A	K4S560432D-TC75	Samsung		5/13/02	3	Yes	
Transcend Information, Inc	TS128MLR72V6L	K4S560432C-TC75 rev C	Samsung	09-1350	5/31/02	N/A	Yes	EOL
+Dataram	DTM60192D	HYB39S256400DT-7 rev D	Infineon	40481 rev A	6/10/02	3		EOL
+Dataram	DTM60192E	K4S560432D-TC75 rev D	Samsung	40481 rev A	6/26/02	3		EOL
+Dataram	DTM60193C	MT48LC64M4A2FB-75 rev B	Micron	40554A rev A	8/16/02	3	Yes	EOL

Registered, ECC, 133MHz SDRAM DIMM Modules
1G Sizes (64Mx72)

Manufacturer	Part Number	DRAM Part Number	DRAM Vendor	PCB Part Number	Date	CAS Latency	Low Profile	EOL
+Centon Electronics	TOP02-C005E (Old Part# CMB1G/RP133S)	K4S560432D-TC75 rev D	Samsung	LE12872R LP rev C	9/27/02	2	Yes	EOL
+ATP Electronics	AR128V72N4SMGA	NT5SV64M4AT-7K	Nanya	SR168N04 V rev 2	10/17/02	3	Yes	EOL
+Dataram	DTM60193E	MT48LC64M4A2FB -75 rev C	Micron	40554A rev A	10/25/02	3	Yes	EOL
+MSC Vertriebs GmbH	MSC 001G00150	HYB39S256400DT-7 rev D	Infineon	M0507LA1	10/22/02	2		EOL
+Dataram	DTM60192F	MT48LC64M4A2TG -75 rev C	Micron	40481 rev A	10/29/02	3		EOL
+Centon Electronics	TOP02-C008H	48LC64M4A2TG75 rev C	Micron	LE12872R LP rev C	12/2/02	2	Yes	EOL
+Avant Technology	AVE7228R82A3133E1-A	NT5SV64M4AT-7K rev A	Nanya	501412-01-A rev A	12/31/02	3	Yes	EOL
Micron	MT36LSDT12872G-133C2	MT48LC64M4A2-75C	Micron		1/15/03	3	Yes	
Micron	MT36LSDF12872G-133C1	MT48LC64M4A2FC -75	Micron		1/29/03	3		
Samsung	M390S2858ETU-C7A	K4S510632E-TC75	Samsung		7/28/03	3	Yes	
Peripheral Enhancements	INTEL00001GSCB2	LES64408TA-7	Legacy	LE12872R LP rev C	8/5/03	3	Yes	
+Dataram	DTM60193H	MT48LC64M4A2FB -75 rev D	Micron	40554A rev A	8/18/03	3	Yes	
+Viking	VI8AR287234DYEL1	K4S560432D-TC75 rev D	Samsung	0000891B	10/6/03	3	Yes	
Micron	MT36LSDF12872G-133D1	MT48LC64M4A2FD -75	Micron		10/14/03	3		
Micron	MT36LSDT12872G-133D2	MT48LC64M4A2-75D	Micron		10/14/03	3	Yes	
Samsung	M390S2858ET1-C7A	K4S510632E-TC75	Samsung		2/10/04	3		
+ATP Electronics	AR128V72N4SMGAS	K4S560432E-TC75 rev E	Samsung	SR168N04 V2 rev 2	2/5/04	3	Yes	
+Virtium Technology Inc	VM375S2850EGASE	K4S560432E-TC75 rev E	Samsung	16-21040A1 rev A	3/10/04	3	Yes	
Hynix	HYM72V12C736BS4-H-AA	HY57V56420BS-H	Hynix		3/02/04	3		
Infineon	HYS72V128321GR-7.5-D	HYB39S512400DR-7.5	Infineon		3/02/04	3		

Modules shaded in blue are low profile

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Sales Information

Vendor Name	Web URL	Vendor Direct Sales Info
ATP Electronics	http://www.atpusa.com/	Florence Hsieh Tel 408-732-5831 Fax 408-732-5055 sales@atpusa.com
ATP Electronics -- Taiwan Inc.	http://www.atpusa.com/	Patty Kuo 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/	Robert Olszak @ 800-822-0071 ext. 2404
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/	
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	
Legend	http://www.legend.com.au	
Micron	http://silicon.micron.com/mktg/'http://silicon.micron.com/mktg/mbqual/qual_data.cfm	
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
Peripheral Enhancements	http://www.peripheral.com/	
PNY	http://www.pny.com/internet_explorer/LPB.HTML	

Vendor Name	Web URL	Vendor Direct Sales Info
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/salescontacts.shtml	
Simple Tech	http://www.simpletech.com	Ron Darwish @ (949) 260-8230 or email @ Rdarwish@Simpletech.com
SMART Modular Technologies	http://www.smartm.com	Leo Alafriz 949-753-0116 ext. 125 leo.alafriz@smartm.com
TechnoLinc Corporation	http://www.technolinc.com	David Curtis 510-445-7400 davidc@technolinc.com
TRS	http://www.certified-memory.com	William Perrigo 49-7249-910-417 Fax: 49-7249-910-229 wpe@msc-ge.com
Unigen	http://www.unigen.com	
Ventura Technology Inc	http://www.venturatech.com	Don Hummel @ 805-581-0800 x 108 or email @ don@venturatech.com
Viking InterWorks	http://www.vikinginterworks.com	
Virtium Technology Inc	http://www.virtium.com	Tod Skelton @ (949) 460-0020 ext. 146 or email @ tod.skelton@virtium.com
Legend	http://www.legend.com.au	Tel: 800-338-2361 Fax: 949-459-8577 orderdesk@vikingcomponents.com
Wintec Industries	http://www.wintecindustries.com	Tel 510-770-9239 Fax 510-770-9338

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 Validation 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 boxed processors. 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 boxed processor baseboard. 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.