# Intel® Server Board X38ML
# Memory List Test Report Summary

Revision 12.0
February 2009

| Revision History | | |
|---|---|---|
| **Date** | **Rev** | **Modifications** |
| Dec/07 | 1.0 | Initial Release |
| Jan/08 | 2.0 | Additional memory parts added (in shaded area). |
| Mar/08 | 3.0 | Additional memory parts added (in shaded area). |
| Apr/08 | 4.0 | Additional memory parts added (in shaded area). |
| Apr/08 | 5.0 | Additional memory parts added (in shaded area). |
| May/08 | 6.0 | Additional memory parts added (in shaded area). |
| June/08 | 7.0 | Additional memory parts added (in shaded area). |
| Oct/08 | 8.0 | Additional memory parts added (in shaded area). |
| Nov/08 | 9.0 | Additional memory parts added (in shaded area). |
| Dec/08 | 10.0 | Additional memory parts added (in shaded area). |
| Feb/09 | 11.0 | Additional memory parts added (in shaded area). |
| Feb/09 | 12.0 | Additional memory parts added (in shaded area).<br><br>**Note:** Supported adapters, peripherals, hard drives and memory have been added for each Intel® Server product in the Server Configurator Tool. This document will be discontinued in March 2009. Please refer to the Sever Configuration tool for a complete list of tested memory at: http://serverconfigurator.intel.com/default.aspx |

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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.*

# Table of Contents

# Overview of Memory Testing

The following procedure is used to test memory modules for use in the Intel® Server Board X38ML. 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®'s Server and Workstation Board 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 Server 2003* Enterprise Edition 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:

Office: (949) 716-8690          Computer Memory Test Lab (CMTL)
Fax (949) 716-8691              24 Hammond Suite F
                               Irvine,  CA 92618
                               http://www.cmtlabs.com/

# Qualified Memory for the Intel® Server Board X38ML

The memory module on the Intel® Server Board X38ML has 4 DIMM sockets, which can hold up to 8 GB of Unbuffered ECC and non-ECC DDR2-667 or DDR2-800 memory using four 72-bit DIMM modules. The following memory features are supported:

- DDR2-667 and DDR2-800 Unbuffered ECC and non-ECC compatible 1.8V modules (in compliance with the DDR JEDEC DIMM Specification).

- DIMMs with capacity of 512 MB, 1 GB and 2 GB. Other DRAM sizes may function correctly but will not be validated.

- Minimum configuration is 512 MB using one 512 MB DIMM.

- Maximum configuration is 8 GB.

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

| DDR2-667 Unbuffered SDRAM Module Matrix | | | | | |
|---|---|---|---|---|---|
| DIMM Capacity | DIMM Organization | SDRAM Density | SDRAM Organization | # SDRAM Devices/rows/Banks | # Address bits rows/Banks/column |
| 512 MB | 64M x 72 | 256Mbit | 32M x 8 | 18/2/4 | 13/2/10 |
| 512 MB | 64M x 72 | 512Mbit | 64M x 8 | 9/1/4 | 14/2/10 |
| 1 GB | 128M x 72 | 512Mbit | 64M x 8 | 18/2/4 | 14/2/10 |
| 1 GB | 128M x 72 | 1Gbit | 128M x 8 | 9/1/8 | 14/3/10 |
| 2 GB | 256M x 72 | 1Gbit | 128M x 8 | 18/2/8 | 14/3/10 |
| DDR2-800 Unbuffered SDRAM Module Matrix | | | | | |
| DIMM Capacity | DIMM Organization | SDRAM Density | SDRAM Organization | # SDRAM Devices/rows/Banks | # Address bits rows/Banks/column |
| 512 MB | 64M x 72 | 256Mbit | 32M x 8 | 18/2/4 | 13/2/10 |
| 512 MB | 64M x 72 | 512Mbit | 64M x 8 | 9/1/4 | 14/2/10 |
| 1 GB | 128M x 72 | 512Mbit | 64M x 8 | 18/2/4 | 14/2/10 |
| 1 GB | 128M x 72 | 1Gbit | 128M x 8 | 9/1/8 | 14/3/10 |
| 2 GB | 256M x 72 | 1Gbit | 128M x 8 | 18/2/8 | 14/3/10 |

Memory features are detailed in *the Intel® Server Board X38ML Technical Product Specification* available on-line at: http://support.intel.com/support/motherboards/server/X38ML/index.htm

The following table lists DIMM devices known to be compatible with the Intel® Server Board X38ML. 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 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® Server Board X38ML
### Unbuffered, ECC, DDR2-667 DIMM Modules
### 512 MB Sizes (64Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Micron | MT9HTF6472AY-667D4 | 7FD22 D9GMH | Micron | | 5 | (64Mx8)*9 | 11/07 |

### Unbuffered, ECC, DDR2-800 DIMM Modules
### 512 MB Sizes (64Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Micron | MT9HTF6472AY-80ED4 | | Micron | | 5 | (64Mx8)*9 | 11/07 |
| Samsung | M391T6553EZ3-CE7 | K4T51083QE-ZCE7 | Samsung | | 5 | (64Mx8)*9 | 11/07 |
| Qimonda | HYS72T64000HU-25F-B2 | HYB18T512800B2F25F | Qimonda | | 5 | (64Mx8)*9 | 11/07 |
| Hynix | HYMP564U72CP8-S6 | HY5PS12821C FP-S6 | Hynix | | 6 | (64Mx8)*9 | 11/07 |
| Dataram | DTM63359B | HY5PS12821CFP-S5 rev C | Hynix | 40083A rev A | 5 | (64Mx8)*9 | 12/21/07 |
| Ventura Technology Group | D2-52DD63SV-555 | K4T51083QC-ZCE7 rev C | Samsung | D2U72F na | 5 | (64Mx8)*9 | 1/7/08 |
| Dataram | DTM63390A | HYB18T1G160C2F-25F rev C2 | Qimonda | 40104A rev A | 5 | 64M x 16 | 11/14/09 |
| Dataram | DTM63390A | HYB18T1G160C2F-25F rev C2 | Qimonda | 40104A rev A | 5 | 64M x 16 | 11/14/09 |

(+) 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® Server Board X38ML

### Unbuffered, ECC, DDR2-667 DIMM Modules
### 1 GB Sizes (128Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Qimonda | HYS72T128020EU-3S-B2 | HYB18T512800B2F3S | Qimonda | | 5 | (64Mx8)*18 | 11/07 |
| ATP Electronics | AJ28K72F8BJE6S | K4T1G084QD-ZCE6 rev D | Samsung | D2U72F na | 5 | (128Mx8)*9 | 1/4/08 |
| Hynix | HYMP512U72CP8-Y5 | HY5PS12821CFP-Y5 | Hynix | | 5 | (64Mx8)*18 | 1/24/08 |
| Samsung | M391T2953EZ3-CE6 | K4T51083QE-ZCE6 | Samsung | | 5 | (64Mx8)*18 | 1/24/08 |
| STEC | INT72Q8M128M8M-A03GYU | HYB18T512800BF3S rev B | Qimonda | D2U72G na | 5 | (64Mx8)*18 | 1/25/08 |
| Samsung | M391T2863QZ3-CE6 | Kr4T1G084QQ-HCF7 | Samsung | | 5 | (128Mx8)*9 | 3/18/08 |
| Smart Modular Technologies | SG1287UD212852HC | HY5PS1G831CFP-Y5 rev C | Hynix | PG54G240 NUBUB1RF rev A | 5 | (128Mx8)*9 | 4/11/08 |
| Hynix | HYMP112U72CP8-Y5 | HY5PS1G831CFP-Y5 | Hynix | | 5 | (128Mx8)*9 | 6/18/08 |
| STEC | INT72Q8M128M8M-A03GYU | HYB18T512800B2F-3S rev B2 | Qimonda | D2U72G | 5 | 64M x 8 | 09/30/08 |

### Unbuffered, ECC, DDR2-800 DIMM Modules
### 1 GB Sizes (128Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Micron | M18HTF12872AY-80ED4 | | Micron | | 5 | (64Mx8)*18 | 11/07 |
| Samsung | M391T2953EZ3-CE7 | K4T51083QE-ZCE7 | Samsung | | 5 | (64Mx8)*18 | 11/07 |
| Qimonda | HYS72T128020EU-25F-B2 | HYB18T512800B2F25F | Qimonda | | 5 | (64Mx8)*18 | 11/07 |
| Hynix | HYMP512U72CP8-S6 A | HY5PS12821C FP-S6 | Hynix | | 6 | (64Mx8)*18 | 11/07 |
| Dataram | DTM63358B | HY5PS12821CFP-S5 rev C | Hynix | 40082A rev A | 5 | (64Mx8)*18 | 12/19/07 |
| Ventura Technology Group | D2-54DD64SV-555 | K4T51083QC-ZCE7 rev C | Samsung | D2U72G na | 5 | (64Mx8)*18 | 1/9/08 |
| Apacer | 78.01GAE.42D | E1108ACBG-8E-E rev C | Elpida | 48.16193.09D rev D | 5 | (128Mx8)*9 | 1/14/08 |
| Apacer | 78.01G9Q.423 | E5108AJBG-8E-E rev J | Elpida | 48.18193.093 rev 3 | 5 | (64Mx8)*18 | 1/23/08 |
| Samsung | M391T2863QZ3-CF7 | K4T1G084QQ-HCE6 | Samsung | | 6 | (128Mx8)*9 | 3/18/08 |
| Kingston | KVR800D2E5/1GI | E5108AJBG-8E-E | Elpida | | 5 | (64Mx8)*18 | 3/29/08 |
| Kingston | KVR800D2E5/1GI | NT5TU64M8BE-25C | Nanya | | 5 | (64Mx8)*18 | 3/26/08 |
| Hynix | HYMP112U72CP8-S6 | HY5PS1G831CFP-S6 | Hynix | | 6 | (128Mx8)*9 | 6/18/08 |
| Kingston | KVR800D2E5/1GI | E1108ACBG-8E-E rev C | Elpida | 2025320-0F1.A00 rev A | 5 | 128M x 8 | 10/27/08 |
| Dataram | DTM63393A | HYB18T1G800C2F-25F rev C2 | Qimonda | 40083A rev A | 5 | 128M x 8 | 12/11/08 |

(+) 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® Server Board X38ML

## Unbuffered, Non-ECC, DDR2-667 DIMM Modules
## 1 GB Sizes (128Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Buffalo | D2U667C-1GEJJ | E5108AJBG-6E-E rev J | Elpida | 2DUE28F-AA na | 5 | (64Mx8)*18 | 1/29/08 |
| | | | | | | | |

## Unbuffered, Non-ECC, DDR2-800 DIMM Modules
## 1 GB Sizes (128Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| ATP Electronics | AJ28K64E8BHE7S | K4T51083QE-ZCE7 rev E | Samsung | SJ240E08K1 na | 5 | (64Mx8)*18 | 1/16/08 |
| Buffalo | D2U800CX-S1GECJ | E1108ACBG-8E-E rev C | Elpida | 2D286NF3-AB | 5 | 128M x 8 | 01/19/09 |

(+) 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® Server Board X38ML

## Unbuffered, ECC, DDR2-667 DIMM Modules
## 2 GB Sizes (256Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Micron | MT18HTF25672AY-667E1 | 7EEII D9HNL | Micron | | 5 | (128Mx8)*18 | 11/07 |
| Qimonda | HYS72T256020HU-3S-B | HYB18T1G800AF-3S | Qimonda | | 5 | (128Mx8)*18 | 11/07 |
| Qimonda | HYS72T256020EU-3S-B | HYB18T1G800BF-3S-B | Qimonda | | 5 | (128Mx8)*18 | 1/08 |
| Hynix | HYMP125U72CP8-Y5 | HY5PS1G831CFP-Y5 | Hynix | | 5 | (128Mx8)*18 | 1/08 |
| ATP Electronics | AJ56K72G8BJE6M | MT47H128M8HQ-3 rev E | Micron | SJ240G08K 1 na | 5 | (128Mx8)*18 | 2/08 |
| ATP Electronics | AJ56K72G8BJE6S | K4T1G084QD-ZCE6 rev D | Samsung | SJ240G08K 1 na | 5 | (128Mx8)*18 | 1/08 |
| STEC | INT72Q8W256M8M-A03GYU | MT47H128M8HQ-3 rev E | Micron | D2U72G na | 5 | (128Mx8)*18 | 1/08 |
| TRS | TRS30321X | E1108AB-6E-E rev B | Elpida | M0540LA1 rev 1 | 5 | (128Mx8)*18 | 3/08 |
| Samsung | M391T5663QZ3-CE6 | Kr4T1G084QQ-HCF7 | Samsung | | 5 | (128Mx8)*18 | 3/08 |
| Kingston | KVR667D2E5/2GI | E1108ACSE-6E-E | Elpida | | 5 | (128Mx8)*18 | 4/10/08 |

## Unbuffered, ECC, DDR2-800 DIMM Modules
## 2 GB Sizes (256Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Micron | MT18HTF25672AY-80EE1 | 7HEII D9HNQ | Micron | | 5 | (128Mx8)*18 | 11/07 |
| Samsung | M391T5663DZ3-CE7 | K4T51083QE-ZCE6 | Samsung | | 5 | (128Mx8)*18 | 11/07 |
| Smart Modular Technologies | SG2567UDR212851ME | MT47H128M8HQ-25E rev E | Micron | PG58G240 NUBUB1RG rev A | 5 | (128Mx8)*18 | 12/07 |
| ATP Electronics | AJ56K72G8BJE7M | MT47H128M8HQ-25E rev E | Micron | SJ240G08K 1 na | 5 | (128Mx8)*18 | 1/08 |
| Apacer | 78.A1GAE.423 | E1108ACBG-8E-E rev C | Elpida | 48.18193.09 3 rev 3 | 5 | (128Mx8)*18 | 1/08 |
| Samsung | M391T5663QZ3-CF7 | K4T1G084QQ-HCE6 | Samsung | | 6 | (128Mx8)*18 | 3/08 |
| Kingston | KVR800D2E5/2GI | HY5PS1G831CFP-S5 | Hynix | | 5 | (128Mx8)*18 | 4/4/08 |
| Hynix | HYMP125U72CP8-S6 | HY5PS1G831CFP-S6 | Hynix | | 6 | (128Mx8)*18 | 6/18/08 |
| Kingston | KVR800D2E5/2GI | E1108ACBG-8E-E | Elpida | | 5 | (128Mx8)*18 | 6/5/08 |

(+) 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® Server Board X38ML

## Unbuffered, non-ECC, DDR2-800 DIMM Modules
## 2 GB Sizes (256Mx72)

| Manufacturer | Part Number | DRAM Part Number | DRAM Vendor | PCB Part Number | CAS Latency | DRAM Organization | Date |
|---|---|---|---|---|---|---|---|
| Buffalo | D2U800CX-2GECJ | E1108ACBG-8E-E rev C | Elpida | 2D286NF3-AB | 5 | 128M x 8 | 01/22/09 |
| | | | | | | | |

(+) 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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# Sales Information

| Vendor Name | Web URL | Vendor Direct Sales Info |
|---|---|---|
| **ATP Electronics** | http://www.atpusa.com/ | Tel (1) 408-732-5000, ext 5858<br>Fax 408-732-5893<br>sales@atpusa.com |
| **ATP Electronics -- Taiwan Inc.** | http://www.atpusa.com/ | Tel 011-886-2-2659-6368<br>Fax 886-2-2659-4982 |
| **Avant Technology** | http://www.avanttechnology.com | Brad Scoggins<br>Phone: (512)491-7411<br>Fax: (512)491-7412<br>brads@avanttechnology.com |
| **Aved Memory Products** | http://www.avedmemory.com/ | |
| **Buffalo Technology** | http://www.buffalotech.com/ | (800) 967-0959<br>memory@buffalotech.com |
| **Centon Electronics** | http://www.centon.com | Tel: 949-855-9111<br>Fax: 949-855-6035 |
| **Corsair** | http://www.corsairmicro.com/ | Tel: 510-657-8747<br>Fax: 510-657-8748 |
| **Crucial** | http://www.crucial.com/intel | Toll-free: 888-363-4167 (US & Canada only)<br>Tel: 208-363-5790<br>Fax: 208-363-5560<br>crucial.sales@micron.com |
| **Dane-Elec** | http://www.dane-memory.com/ | Michal Hassan @ (949)450-2941 or email @<br>Michal@Dane-memory.com |
| **Dataram** | http://www.dataram.com/ | Paul Henke, 800-328-2726 x2239 in USA<br>phenke@dataram.com<br>Peter Jauss, +49-69-680-9070 in EMEA<br>pjauss@dataram.com |
| **GoldenRAM** | http://www.goldenram.com | Jason M. Barrette @ 800-222-861 x7546<br>jasonb@goldenram.com<br> or Michael E. Meyer @800-222-8861 x7512<br>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<br>Tel: 82-32-817-9740<br>s.jeon@jitco.net |
| **Kingston** | http://www.kingston.com | US.- Call (877) 435-8726<br>Asia – Call 886-3-564-1539<br>Europe – Call +44-1932-755205 |
| **Legacy Electronics Inc.** | http://www.legacyelectronics.com | U.S. Contact: Keri Albers 888 466 3853 ext. 307<br> European Contact: 49 89 370 664 11 |
| **Legend** | http://www.legend.com.au | |
| **Micron** | http://www.micron.com | |
| **MSC Vertriebs GmbH** | http://www.msc-ge.com | William Perrigo<br>49-7249-910-417<br>Fax: 49-7249-910-229<br>wpe@msc-ge.com |
| **Netlist, Inc** | http://www.netlistinc.com | Christopher Lopes<br>949.435.0025 tel<br>949.435.0031 fax<br>sales@netlistinc.com |

| Vendor Name | Web URL | Vendor Direct Sales Info |
|---|---|---|
| **Peripheral Enhancements** | http://www.peripheral.com/ | |
| **PNY** | http://www.pny.com/internet_explorer/LPB.HTML | |
| **Samsung** | http://www.korea.samsungsemi.com/locate/buy/list_na.html | For US customers go to:<br>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** | www.smartm.com/channel/hpc/ | Gene F. Patino<br>Tel: 949 439-6167<br>gene.patino@smartm.com |
| **TechnoLinc Corporation** | http://www.technolinc.com | David Curtis<br>510-445-7400<br>davidc@technolinc.com |
| **TRS* Tele-Radio-Space GmbH** | http://www.certified-memory.com<br>http://www.certified-memory.de | Vender Direct Sales Info: Andreas Gruendl<br>Tel: +49.89.945532-34<br>Fax: +49.89.945532-41<br>Andreas.gruendl@trs-eu.com |
| **Unigen** | http://www.unigen.com | |
| **Ventura Technology Inc** | http://www.venturatech.com | Sam Lewis<br>760 724-8700 ext. 103 |
| **Viking InterWorks** | http://www.vikinginterworks.com | Adrian Proctor<br>Tel: 949-643-7255<br>adrian.proctor@sanmina-sci.com |
| **Virtium Technology Inc** | http://www.virtium.com | Tod Skelton @ (949) 460-0020 ext. 146 or email @ tod.skelton@virtium.com |
| **Wintec Industries** | http://www.wintecindustries.com | Tel 510-360-6300<br>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.