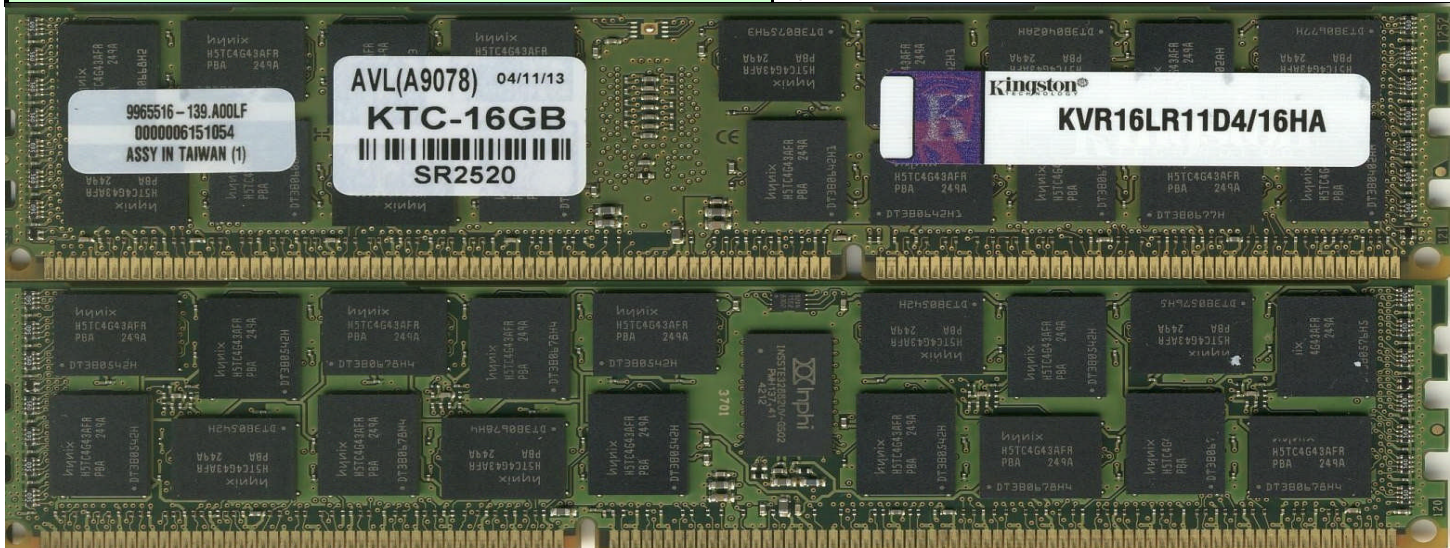
	<b>AVL Supermicro server platform Memory Module Qualification Test</b>		
	Intel E5-2650(SNB-EP) x 2, Intel C602	Test Results	<b>Pass</b>
	PN: KVR16R11D4/16HA (16GB / RDIMM / ECC ) On: X9DR3-LN4F+ Rev.1.1		

RP77D3x-106-KI-SQ-SMC-V2		Module Information		Rev 05/30/2012
AVL WorkOrder #	WC6881	AVL A#	9078	
Start Date	7/15/2013	End Date	7/18/2013	
Tested By	Van N.			
Module Manufacturer	Kingston			
Module Part Number	KVR16R11D4/16HA			
Module BOM Number	9965516-139.A00LF			
Module Capacity / Memory Type / ECC	16GB / RDIMM / ECC			
Module Configuration (Width, # of devices, # of Ranks)	2Gx72 /36 Devices / 2 Ranks			
Speed Tested (Data rate of Mbps, CL-tRP-tRCD)	DDR3-1600 /11-11-11			
DRAM Device Vendor	Hynix			
DRAM Device Part Number / Date code	H5TC4G43AFR-PBA			1249
DRAM Die Revision / Process Technology ( nm )	A			
DRAM Device Config (Density / Width)	4Gbit / x4 /1024Mx4bit			
Thermal Sensor Device Vendor / Part Number / Revision	STMicro			
Register Device Vendor / Part Number / Revision	Inphi	INSSTE32882UV-GS02	2.1	



Platform System Information				
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)	X9DR3-LN4F+	1.1	0M23S40378	SN9374
BIOS Revision / BIOS Date	2		1/11/2013	
CPU / Speed	Intel E5-2650(SNB-EP) x 2		2.0GHz	
Chipset info (Stepping)	Intel C602			



## AVL Supermicro server platform Memory Module Qualification Test

Intel E5-2650(SNB-EP) x 2, Intel C602

PN: KVR16R11D4/16HA (16GB / RDIMM / ECC ) On: X9DR3-LN4F+ Rev.1.1

**Test Results:**

PASS

*Comments:*

### AVL Memory Module Qual Test Results Summary

Test # and name	Test Description	Specs	Test	Comments
			Results	
<b>1. Latest BIOS Upgrade &amp; Configuration</b>	Download / Upgrade latest BIOS & record size and speed detection		Done	
<b>2. SPD Check</b>	Memory module SPD content check for JEDEC compliance	JEDEC	Done	Use proprietary tools
<b>3. Reset Cycle</b>	Run Linux based diags & utility software @ 55°C	50 loops	Pass	1 DIMM Per Channel when applicable
<b>4a. Stress Application Test</b>	Run Linux based diags & utility software @55°C	8 Hour per config	Pass	DIMM Loading per spec
<b>4b. Stream Benchmark Test</b>		5 loop per config	Pass	DIMM Loading per spec
<b>4b. Reset Cycle</b>		200 loop per config	Pass	DIMM Loading per spec
<b>5. Functional Stress Test</b>	Memory Stress Test @55°C	12hrs	Pass	DIMM Loading per spec
<b>6. Stress Application Test</b>	Run Linux based diags & utility software @55°C	8hrs	Pass	3 DIMM Per Channel when applicable

Note: All test under IMC Vdd=Nom, Vref=Vddnom/2



**AVL Supermicro server platform Memory Module Qualification Test**

Intel E5-2650(SNB-EP) x 2, Intel C602

PN: KVR16R11D4/16HA (16GB / RDIMM / ECC) On: X9DR3-LN4F+ Rev.1.1

SPD Check Results (Proprietary SPD check tools)							Test By	Van N
CTC Platform ID / AVL SN	CTC-3A-35	SB7176	CTC test script version	SPD_Check_rev 34(SCUD)	SPD Rev. :		1.1	
AVL A#	SR2498	* Speed Bin (MT/s)	1600	* CL:			11	
* tRCD:	11	* tRP:	11	* DRAM Density:			4Gb	
* Raw Card Type	E	* Nominal Vdd	1.5V	* Module Type			RDIMM	
* Thermal Sensor	YES	* SDRAM silicon Type	MONO	* Heat Spreader			N/A	
* Register Vendor	INPHI	* Register Revision	2.1	SPD Check Results:			<b>Pass</b>	
List ALL Failed Byte# & error messages (Don't forget to review SDRAM & Module Attributes per tested module spec)								
Comments:								

MB (IMC Vdd=Nom & All Vrefs=Vdd/2 - Max DIMMs loading) @55°C Test Results													
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Stress App Test 3DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1				SN9374	
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0GHz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499	SR2500	SR2502	SR2503	SR2504	SR2505	SR2506	SR2507	SR2508	SR2509	SR2510		
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512	SR2513	SR2514	SR2515	SR2516	SR2517	SR2518	SR2519	SR2520	SR2521	SR2494		
Verify BIOS before starting the test				Memory Size (GB)				384				Memory Speed (MHz)	1066
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
6 Hour Minnum								Test Result				<b>Pass</b>	
Comments: 3DPC Speed tested at 1066Mhz, 1.5V													

MB (IMC Vdd=Nom & All Vrefs=Vdd/2 - Max DIMMs) Stream Benchmark Test 3DPC													
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Stream Benchmark Test 3DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1				SN9374	
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0GHz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499	SR2500	SR2502	SR2503	SR2504	SR2505	SR2506	SR2507	SR2508	SR2509	SR2510		
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512	SR2513	SR2514	SR2515	SR2516	SR2517	SR2518	SR2519	SR2520	SR2521	SR2494		
Verify BIOS before starting the test				Memory Size (GB)				384				Memory Speed (MHz)	1066
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
Avg (MB/s)	Avg Copy =		Avg Scale =		Avg Add =		Avg Triad =						
Comments: 3DPC Speed tested at 1066Mhz, 1.5V													

Red Hat Enterprise Linux 6.2 Kernel 2.6.32 Reset Cycle Test - 3DPC													
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Reset Cycle Test - 3DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1				SN9374	
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0GHz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499	SR2500	SR2502	SR2503	SR2504	SR2505	SR2506	SR2507	SR2508	SR2509	SR2510		
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512	SR2513	SR2514	SR2515	SR2516	SR2517	SR2518	SR2519	SR2520	SR2521	SR2494		
Verify BIOS before starting the test				Memory Size (GB)				384				Memory Speed (MHz)	1066
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
Run 200 loops								Test Result				<b>Pass</b>	
Comments: 3DPC Speed tested at 1066Mhz, 1.5V													

DOS Memory Stress Test				Memory Stress Test v1077 3DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1		SN9374			
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0Ghz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499	SR2500	SR2502	SR2503	SR2504	SR2505	SR2506	SR2507	SR2508	SR2509	SR2510		
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512	SR2513	SR2514	SR2515	SR2516	SR2517	SR2518	SR2519	SR2520	SR2521	SR2494		
Verify BIOS before starting the test				Memory Size (GB)				384		Memory Speed (MHz)		1066	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
12 Hour Minnum				Test Result						Pass			
Comments:				3DPC Speed tested at 1066Mhz, 1.5V									
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Stress App Test 2DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1		SN9374			
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0Ghz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499		SR2502	SR2515		SR2505	SR2506		SR2508	SR2509			
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512		SR2514	SR2515		SR2517	SR2518		SR2520	SR2521			
Verify BIOS before starting the test				Memory Size (GB)				256		Memory Speed (MHz)		1600	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
6 Hour Minnum				Test Result						Pass			
Comments:				2DPC speed tested at 1600Mhz, 1.5V									
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Stream Benchmark Test 2DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1		SN9374			
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0Ghz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499		SR2502	SR2515		SR2505	SR2506		SR2508	SR2509			
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512		SR2514	SR2515		SR2517	SR2518		SR2520	SR2521			
Verify BIOS before starting the test				Memory Size (GB)				256		Memory Speed (MHz)		1600	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
Avg (MB/s)				Avg Copy =				Avg Scale =				Avg Triad =	
Comments:				2DPC speed tested at 1600Mhz, 1.5V									
Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Reset Cycle Test 2DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1		SN9374			
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0Ghz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499		SR2502	SR2515		SR2505	SR2506		SR2508	SR2509			
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512		SR2514	SR2515		SR2517	SR2518		SR2520	SR2521			
Verify BIOS before starting the test				Memory Size (GB)				256		Memory Speed (MHz)		1600	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
Run 200 loops				Test Result						Pass			
Comments:				2DPC speed tested at 1600Mhz, 1.5V									
DOS Memory Stress Test				Memory Stress Test v1077 2DPC								Test By	Van N
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+				1.1		SN9374			
BIOS Revision / BIOS Date				2				1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0Ghz					
Chipset info (Stepping)				Intel C602									
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)													
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3		
SR2498	SR2499		SR2502	SR2515		SR2505	SR2506		SR2508	SR2509			
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3		
SR2511	SR2512		SR2514	SR2515		SR2517	SR2518		SR2520	SR2521			
Verify BIOS before starting the test				Memory Size (GB)				256		Memory Speed (MHz)		1600	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.													
12 Hour Minnum				Test Result						Pass			

Comments: 2DPC speed tested at 1600Mhz, 1.5V

Red Hat Enterprise Linux 6.2 Kernel 2.6.32				Reset Cycle Test - 1DPC				Test By	Van N		
Motherboard Info (Model# & MB Revision & MB S/N & AVL S/N)				X9DR3-LN4F+		1.1		SN9374			
BIOS Revision / BIOS Date				2		1/11/2013					
CPU / Speed				Intel E5-2650(SNB-EP) x 2				2.0GHz			
Chipset info (Stepping)				Intel C602							
Fill out DIMM# with AVL S/N at Slots (CPU# . Channel# . DIMM#)											
P1-A1	P1-A2	P1-A3	P1-B1	P1-B2	P1-B3	P1-C1	P1-C2	P1-C3	P1-D1	P1-D2	P1-D3
SR2498			SR2502			SR2505			SR2508		
P2-E1	P2-E2	P2-E3	P2-F1	P2-F2	P2-F3	P2-G1	P2-G2	P2-G3	P2-H1	P2-H2	P2-H3
SR2511			SR2514			SR2517			SR2520		
Verify BIOS before starting the test				Memory Size (GB)		128		Memory Speed (MHz)		1600	
Please set / check appropriate item in BIOS or SW tool to verify for Single Bit Error (SBE) failure.											
Run 50 loops				Test Result				Pass			
Comments:											



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 Fountain Valley, CA 92708  
 714-435-2630 Fax:714-427-3752  
[www.validationlabs.com](http://www.validationlabs.com)

## AVL's DDR3 Memory Module SPD Check

<b>Test Results:</b>	<b>Pass</b>
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General Information			
AVL W/O#	WC6881	AVL A#	9078
JEDEC Speed Grade	DDR3-1600	DRAM Density	16GB
JEDEC Raw Card#	E	Module Type	/ RDIMM
Module ECC or Non-ECC	/ ECC	Test By	Van N.

General Information			
Supplier		Module P/N	
Kingston Technology		9965516-139.A00LF	
Module Type	RDIMM	CAS Latency Supported	
Memory Type	DDR3	6,7,8,9,10,11	
SPD Rev.	1.1	Total SPD Bytes	256
CRC Coverage	0~116	SPD Bytes Used	176
tCK	1.25 nS	tRAS	35 nS
tRP	13.125 nS	tWR	15 nS
tAA	13.125 nS	tFAW	30 nS
tRC	48.125 nS	tWTR	7.5 nS
tRTP	7.5 nS	tRCD	13.125 nS
tRFC	260 nS	tRRD	6 nS

SDRAM Attributes	
SDRAM Density	4 Gb
# of Banks	8
Column Address Bits	11
Row Address Bits	16
SDRAM Device Type	Standard monolithic
SDRAM Device Width	4 bits

SDRAM Optional Feature Support			
Extended Temp Refresh Rate		2X	
Extended Temp Range		0~95	
RZQ/7	Yes	RZQ/6	Yes
ASR	Yes	DLL-Off Node	Yes
PASR	No	ODTS Readout	No

Module Attributes	
Module Thermal Sensors	Yes
Primary Bus Width	64 bits
Bus Width Extension	8 bits (ECC)
# of Ranks	2
For either UDIMM or RDIMM R/C# JEDEC Spec	
Nominal High Max in mm	29 < height <= 30 mm
Max Thickness (Front)	1 < thickness <= 2 mm
Max Thickness (Back)	1 < thickness <= 2 mm
Reference Raw Card	E
Reference Raw Card Rev.	2
Rank 1 Mapping (UDIMM)	

RDIMM Only					
Register Supplier	Inphi Corporation	# of Rows of DRAMs	2	Heat Spreader Used	Not incorporated
Register Type	SSTE32882	# of Registers Used	1	Register Revision	2.1