



This Technical Advisory describes an issue which may or may not affect the customer's product

Intel Technical Advisory

TA-1085-4

5200 NE Elam Young Parkway
Hillsboro, OR 97124

June 1, 2016

Advanced Format disks in the Intel® RAID modules and controllers.

Products Affected

All Intel® RAID modules and controllers

AXX4SASMOD	R3YC	RMS25PB040	RS25AB080	RS2PI008	RS3GC008
AXXRMS2AF040	RCS25ZB040	RMS25PB080	RS25DB080	RS2PI008DE	RS3MC044
AXXRMS2AF080	RCS25ZB040LX	RMS25PB080N	RS25FB044	RS2SG244SNGL	RS3SC008
AXXRMS2LL040	RMS25CB040	RMS3CC040	RS25GB008	RS2VB040	RS3UC080
AXXRMS2LL080	RMS25CB080	RMS3CC080	RS25NB008	RS2VB080	RS3WC040
AXXRMS2MH080	RMS25CB080N	RMS3HC040	RS25SB008	RS2WC040	RS3WC080
AXXROMBSASMR	RMS25JB040	RMS3HC080	RS2BL040	RS2WC080	RT3WB080
FALSASMP2	RMS25JB080	RMS3JC040	RS2BL080	RS2WG160	
R3LC	RMS25KB040	RMS3JC080	RS2BL080DE	RS3DC040	
R3LC5	RMS25KB080	RMT3CB080	RS2BL080sngl	RS3DC080	
RS3PC	RMS25LB080	RMT3PB080	RS2MB044	RS3FC044	

All Intel® Server boards.

Intel® Server Board S1200BTLR	Intel® Server Board S2400GP4	Intel® Server Board S2600KPF
Intel® Server Board S1200BTLRM	Intel® Server Board S2400LP	Intel® Server Board S2600KPFRR
Intel® Server Board S1200BTSR	Intel® Server Board S2400SC2	Intel® Server Board S2600KPR
Intel® Server Board S1200KP	Intel® Server Board S2600CO4	Intel® Server Board S2600KPTR
Intel® Server Board S1200KPR	Intel® Server Board S2600COE	Intel® Server Board S2600TP
Intel® Server Board S1200SPL	Intel® Server Board S2600CP2	Intel® Server Board S2600TPF
Intel® Server Board S1200SPO	Intel® Server Board S2600CP4	Intel® Server Board S2600TPFR
Intel® Server Board S1200SPS	Intel® Server Board S2600CW2	Intel® Server Board S2600TPR
Intel® Server Board S1200V3RPL	Intel® Server Board S2600CW2R	Intel® Server Board S2600WP
Intel® Server Board S1200V3RPM	Intel® Server Board S2600CW2S	Intel® Server Board S2600WPF
Intel® Server Board S1200V3RPO	Intel® Server Board S2600CW2SR	Intel® Server Board S2600WPQ
Intel® Server Board S1200V3RPS	Intel® Server Board S2600CWTR	Intel® Server Board S2600WT2
Intel® Server Board S1400FP2	Intel® Server Board S2600CWTSR	Intel® Server Board S2600WTT
Intel® Server Board S1400FP4	Intel® Server Board S2600GL	Intel® Server Board S2600WT2R
Intel® Server Board S1400SP2	Intel® Server Board S2600GZ	Intel® Server Board S2600WTTTR
Intel® Server Board S1400SP4	Intel® Server Board S2600IP4	Intel® Server Board S2600WTTTS1R
Intel® Server Board S1600JP2	Intel® Server Board S2600IP4L	Intel® Server Board S4600LH2
Intel® Server Board S1600JP4	Intel® Server Board S2600JF	Intel® Server Board S4600LT2
Intel® Server Board S2400BB4	Intel® Server Board S2600JFF	Intel® Workstation Board W2600CR2
Intel® Server Board S2400EP2	Intel® Server Board S2600JFQ	Intel® Workstation Board W2600CR2L
Intel® Server Board S2400EP4	Intel® Server Board S2600KI	
Intel® Server Board S2400GP2	Intel® Server Board S2600KP	



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Description

A new disk format configuration for hard drives is being introduced that sets the sector size to 4096 bytes instead of 512 bytes. This new way to organize the information called Advanced Format is considered to be more efficient and it allows more information to be stored in the same area as well as it improves the data recovery capability in case of errors. This document focuses on how this new standard affects Intel® RAID modules and controllers and server boards.

Root Cause

Earlier generations of hard drives were organized using 512-byte sectors, which are referred to as 512 native drives or 512n drives. The new 4096 sector size drives are referred to as 4K native drives or 4Kn drives. These new 4Kn drives use a different way to organize the information which may result in compatibility issues with the disk controllers that have not been updated to support the new format type. In order to solve this problem and smooth the transition, the disk drive manufacturers are introducing transitional 4K-byte sector sized drives that communicate with the host system as if they were 512-byte sector drives, with the drive's electronics performing the needed translation. These drives are called 512e or 512 emulation drives. These 512e drives need a certain alignment in the partition structure and also need the data transfers to be in multiples of 4k bytes in order to perform optimally, due to this, the user may encounter compatibility issues as well. In addition, the operating system may also need to be updated to support this new drive sector configuration.

Resolution

For new deployments use the new advanced format drives if possible, either 4Kn or 512e drives, it's expected that with time 512n drives will become difficult to procure. The current generation of Intel server boards, modules and SAS/SATA controllers offer support for these new drives (See tables below). Also, please consult your OS manufacturer in order to determine if the OS version being used is 4Kn or 512e compliant.

For an existing deployment you may need to update the firmware on the SAS/SATA controller as well as upgrade or patch your OS. Compatibility tables for the Intel SAS/SATA modules, controllers, and server boards with the new disk formats can be found below.

NOTE: Only 512n and 512e drives can be mixed together in the same RAID configuration, as long as the controller can support them. For example, when replacing a failed 512n drive in an existing array, either a 512n or a 512e drive can be used as a replacement, but not a 4Kn drive.

NOTE: SAS and SATA drives should not be used together in the same RAID array and should not be mixed in the same backplane.

NOTE: 4Kn drives can only boot when the system is in UEFI mode, the same happens with drives or RAID volumes larger than 2TB, independent of the sector format. Those 4Kn or large capacity volumes may not be supported by the system BIOS and may not be a bootable drive unless the system supports UEFI optimized boot mode. Please check your system documentation. More information on GPT support can be found here:

<http://www.intel.com/support/motherboards/server/sb/CS-031158.htm>



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Table 1. Advanced Format support on the Intel modules and controllers.

Product	512e support	SATA 4K support	SAS 4K support	Product	512e support	SATA 4K support	SAS 4K support	Product	512e support	SATA 4K support	SAS 4K support
AXX4SASMOD	No	No	No	RMS25LB080	Yes ³	Yes ³	Yes ³	RS2BL080sngl	Yes ¹	No	No
AXXRMS2AF040	Yes ¹	No	No	RMS25PB040	Yes ²	Yes ²	Yes ²	RS2MB044	Yes ¹	No	No
AXXRMS2AF080	Yes ¹	No	No	RMS25PB080	Yes ²	Yes ²	Yes ²	RS2PI008	Yes ¹	No	No
AXXRMS2LL040	Yes ¹	No	No	RMS25PB080N	Yes ²	Yes ²	Yes ²	RS2PI008DE	Yes ¹	No	No
AXXRMS2LL080	Yes ¹	No	No	RMS3CC040	Yes	Yes	Yes	RS2SG244SNGL	Yes ¹	No	No
AXXRMS2MH080	Yes ¹	No	No	RMS3CC080	Yes	Yes	Yes	RS2VB040	Yes ¹	No	No
AXXROMBSASMR	No	No	No	RMS3HC040	Yes	Yes	Yes	RS2VB080	Yes ¹	No	No
FALSASMP2	No	No	No	RMS3HC080	Yes	Yes	Yes	RS2WC040	Yes ¹	No	No
R3LC ⁵	Yes	Yes	Yes	RMS3JC040	Yes	Yes	Yes	RS2WC080	Yes ¹	No	No
R3LC5 ⁶	Yes	Yes	Yes	RMS3JC080	Yes	Yes	Yes	RS2WG160	Yes ¹	No	No
RS3PC ⁸	Yes	Yes	Yes	RMT3CB080	Yes ^{2,4}	Yes ²	N/A	RS3DC040	Yes	Yes	Yes
R3YC ⁷	Yes	Yes	Yes	RMT3PB080	Yes ^{2,4}	Yes ²	N/A	RS3DC080	Yes	Yes	Yes
RCS25ZB040	Yes ²	Yes ²	Yes ²	RS25AB080	Yes ²	Yes ²	Yes ²	RS3FC044	Yes	Yes	Yes
RCS25ZB040LX	Yes ²	Yes ²	Yes ²	RS25DB080	Yes ²	Yes ²	Yes ²	RS3GC008	Yes	Yes	Yes
RMS25CB040	Yes ²	Yes ²	Yes ²	RS25FB044	Yes ³	Yes ³	Yes ³	RS3MC044	Yes	Yes	Yes
RMS25CB080	Yes ²	Yes ²	Yes ²	RS25GB008	Yes	Yes	Yes	RS3SC008	Yes	Yes	Yes
RMS25CB080N	Yes ²	Yes ²	Yes ²	RS25NB008	Yes ²	Yes ²	Yes ²	RS3UC080	Yes	Yes	Yes
RMS25JB040	Yes ³	Yes ³	Yes ³	RS25SB008	Yes ²	Yes ²	Yes ²	RS3WC040	Yes	Yes	Yes
RMS25JB080	Yes ³	Yes ³	Yes ³	RS2BL040	Yes ¹	No	No	RS3WC080	Yes	Yes	Yes
RMS25KB040	Yes ³	Yes ³	Yes ³	RS2BL080	Yes ¹	No	No	RT3WB080	Yes ^{1,4}	No	No
RMS25KB080	Yes ³	Yes ³	Yes ³	RS2BL080DE	Yes ¹	No	No				

Note 1: From MR 4.10p (FW version 2.130.383-2315 in FWPKG v12.13.0-0154)

Note 2: From MR 5.5 (firmware version 3.230.05-2100 in FWPKG-v23.11.0-0021)

Note 3: From Ph 17 (firmware version 17.00.01.00 in FWPKG- 2013.12.17)

Note 4: Only SATA

Note 5: RAID controller for the Intel® AHWKPTP12GBGB bridge board for the HWFF systems.

Note 6: RAID controller for the Intel® AHWKPTP12GBGBR5 bridge board for the HWFF systems.

Note 7: On-board LSI 3008 SAS RAID controller for the Intel® Server Boards S2600CW2S and S2600CW2SR.

Note 8: RAID controller for the Intel® FHWKPTPBGB24 bridge board for the HWFF systems.



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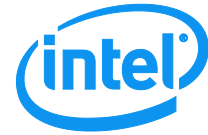
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Table 2. Advanced Format support on the Intel server boards using the ESRT2 or RSTe embedded RAID controllers.

Product	ESRT2			RSTe		
	512e support	SATA 4Kn support	SAS 4Kn support	512e support	SATA 4Kn support	SAS 4Kn support
Intel® Server Board S1200BTLR	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1200BTLRM	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1200BTSR	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1200KP	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1200KPR	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1200SPL	Yes	Yes ⁶	N/A	Yes	No	N/A
Intel® Server Board S1200SPO	Yes	Yes ⁶	N/A	Yes	No	N/A
Intel® Server Board S1200SPS	Yes	Yes ⁶	N/A	Yes	No	N/A
Intel® Server Board S1200V3RPL	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S1200V3RPM	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S1200V3RPO	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S1200V3RPS	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S1400FP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1400FP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1400SP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1400SP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1600JP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S1600JP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400BB4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400EP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400EP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400GP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400GP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400LP	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2400SC2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600CO4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600COE	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600CP2	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600CP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600CW2	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600CW2R	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600CW2S	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600CW2SR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A



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Table 2. Advanced Format support on the Intel server boards using the ESRT2 or RSTe embedded RAID controllers (Continued).

Product	ESRT2			RSTe		
	512e support	SATA 4Kn support	SAS 4Kn support	512e support	SATA 4Kn support	SAS 4Kn support
Intel® Server Board S2600CWTR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600CWTSR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600GL	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600GZ	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600IP4	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600IP4L	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600JF	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600JFF	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600JFQ	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600KI	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600KP	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600KPF	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600KPFR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600KPR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600KPTR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600TP	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600TPF	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600TPFR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600TPR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600WP	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600WPF	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600WPQ	Yes ^{3,4}	No	No	Yes	No	No
Intel® Server Board S2600WT2	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600WTT	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600WT2R	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600WTTR	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S2600WTTS1R	Yes ⁷	Yes ^{5,6,7}	N/A	Yes	No	N/A
Intel® Server Board S4600LH2	Yes ^{3,4}	No	No	Yes	No	N/A
Intel® Server Board S4600LT2	Yes ^{3,4}	No	No	Yes	No	N/A
Intel® Workstation Board W2600CR2	Yes ^{3,4}	No	No	Yes	No	N/A
Intel® Workstation Board W2600CR2L	Yes ^{3,4}	No	No	Yes	No	N/A



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Note 3: From BIOS version R02.03.0004.

Note 4: Not boot capable in UEFI mode.

Note 5: From BIOS version 01.01.0008.

Note 6: Bootable only in UEFI mode.

Note 7: Boot support in UEFI mode from BIOS version 01.01.0009.

Please contact your Intel Sales Representative if you require more specific information about this issue.

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