



Intel® Turbo Memory

Release Notes

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Revision 1.5.0.1013



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Revision History

Package Definition	Intel® Turbo Memory Driver Revision	Intel® Matrix Storage Manager Driver Revision	Release Date
1.5 PV	1.5.0.1013	7.8.0.1012	October 19, 2007
1.1 PV	1.1.0.1010	7.0.1.1001	July 24, 2007
1.0 PV	1.0.0.1082	7.0.0.1020	March 13, 2007



1 Introduction

1.1 Supported Operating Systems:

- Microsoft Windows Vista* x32 Edition (RTM Version)
- Microsoft Windows Vista* x64 Edition (RTM Version)

1.2 Supported Hardware:

- Intel® Mobile 965 Express Chipset based Platforms supporting AHCI Mode
 1. For Intel 965 Express Chipset based Mobile Customer Reference Boards, use either Legacy BIOS 0.43 (or later) or Framework BIOS 0.69 (or later) and ensure that the Upham III PCI Express to Mini-PCI Express adapter used is a FAB 3.
- Intel® 3 Series Chipsets utilizing ICH9R Desktop Platforms supporting AHCI or RAID Mode
- Intel® Turbo Memory Technology
 1. [Mobile Only]: Berg Lake Production Modules
 2. [Desktop Only]: Cariboo River ES Modules
 3. Kit-based Intel Turbo Memory solutions



2 Behavioral Considerations

2.1 Power Policy Considerations

The power policies defined by Microsoft Windows Vista (Balanced, Power saver, and High performance) impact both power and performance of a specific system. When conducting any drive level testing, please consider that the hard drive will be spun down more often in an aggressive power policy at the expense of a several second delay when the hard drive is spun back up.

2.2 Resume Time Measurement considerations

There is a discrepancy between the use of Microsoft's Power Test utility in WDK and stopwatch method in measuring resume from standby (S3) and hibernate (S4). Until this is resolved, Intel recommends the stopwatch method for measuring these times.

2.3 ReadyBoost Status

On a Windows ReadyBoost* enabled system, each time the OS boots up, there is a short window when the Windows ReadyBoost status in the Intel Turbo Memory Console shows as disabled. This is caused by the OS generating the ReadyBoost file. Once the file is created, the Intel Turbo Memory Console will show the status as enabled.

2.4 NVCACHE Drive Initialization Considerations

Under limiting circumstances, it has been seen that the NVCACHE drive used for ReadyBoost may not be configured properly. If configuration issues arise, available options are to use either the console or the TurboConfig application to correctly configure the disk volume. For a volume which is unallocated, a reboot will be required for changes to take effect. If using the console, simply open it, check the ReadyBoost support option, then restart the system. If using the TurboConfig application, simply run "TurboConfig -rb e" at the command prompt, then restart the system. For an allocated volume which has a drive letter assigned, the quickest corrective action is to run "TurboConfig -initnvc" at the command prompt to delete the drive letter. In this single step, no reboot is required. If using the console to remove the drive letter, delete the volume via the Disk Management OS service (another option: open the console, disable ReadyBoost, and then restart the system), open the console, check the ReadyBoost support option, and then restart the system.



2.5 Intel® Turbo Memory Upgrade/Replacement Considerations

Any Intel Turbo Memory hardware change on an enabled system requires that the driver package be uninstalled before the hardware is changed and re-installed after the hardware has been changed. The steps when changing the hardware are as follows: Uninstall the driver (go to "Programs and Features" in Control Panel), power down, change hardware, boot to the OS, re-install the driver package.

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3 Feature Set

Table 1. Feature Set

Feature	Description
Windows ReadyDrive*	The Intel® Turbo Memory driver supports Windows ReadyDrive technology by providing full implementation of the NVCACHE Command Handling as defined by the T13 specification. See product specifics for support of this feature.
Windows ReadyBoost*	The Intel Turbo Memory driver supports Windows ReadyBoost technology. See product specifics for support of this feature.
Power Tuning	When system is idle in DC balanced mode, the drive spins down more aggressively to conserve power.
Intel Turbo Memory Console	The Console reports Intel Turbo Memory information and allows enable/disable of its functionality.
1 GB SKU Support	Support for 1 GB SKUs. See product specifics for support of this feature.
32-bit OS Support	Support for Microsoft Vista x32 Edition (RTM Version)
64-bit OS support	Support for Microsoft Vista x64 Edition (RTM Version)
Dynamic DFOROM Update	The DFOROM will be updated to match the driver's version if a DFOROM mismatch is detected during installation or during boot. The installer must be used in order for this feature to be supported.
Device Serial Number Format	The Intel Turbo Memory Device supports a 31 character alphanumeric string for the serial number.
Graceful Cache Degradation	Implementation of graceful degradation of caching in case of NAND wear-out.
Localization support	Intel Turbo Memory is currently supported in 9 languages in addition to English.
ReadyDrive Registry Auto-population	The Intel Turbo Memory installer supports automatic population of the Windows ReadyDrive challenge results and enables Windows ReadyDrive on first boot after install. Feature is dependent on ReadyDrive support.



4 *Feature Set – New to this release*

Table 2. Features new to this release

Feature	Description
ICH9 Support	Support has been added for all ICH9R-based platforms. For these platforms, 901MB of ReadyBoost support will be provided on the 1GB SKUs. ReadyDrive is not supported on any ICH9R platform.
RAID Support	Support for RAID Mode has been added for ICH9R-based platforms.

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5 Registry Value definitions

Table 3. Registry value definitions

Registry Name	Description
CaDisableASPML1	<p>Registry definition has been added to control ASPM L1 through the driver.</p> <p>Location:</p> <p>LM\System\CurrentControlSet\Services\IaVvStor\Parameters</p> <p>Type:</p> <p>DWORD</p> <p>Definition:</p> <p>Undefined = ASPM L1 is disabled for A1 silicon only in the driver (Default)</p> <p>CaDisableASPML1 = 0 = ASPM L1 is unconditionally enabled in the driver</p> <p>CaDisableASPML1 = 1 = ASPM L1 is unconditionally disabled in the driver</p>
CaEnableAdvPerf	<p>Registry definition has been added to control the driver write caching policy.</p> <p>Location:</p> <p>HKLM\System\CurrentControlSet\Services\IaVvStor\Parameters</p> <p>Type:</p> <p>DWORD</p> <p>Definition:</p> <p>Undefined = OS Write Caching Policy (Default)</p> <p>CaEnableAdvPerf = 0 = OS Write Caching Policy</p> <p>CaEnableAdvPerf = 1 = Ignore OS Write Caching Policy</p> <p>Disclaimer:</p> <p>Setting this value to 1 will enable Intel® Turbo Memory to use a high-performance write-caching policy. In the event of a power outage, or equipment failure, data loss or corruption could occur. Recommended only for disks with a backup power supply.</p>



6 Tools Support

Table 4. Tools Support

Feature	Description
NANDCFG	The NANDCfG Utility is a Microsoft MS-DOS* based manufacturing utility used to program, initialize and update the Option ROM on a product supporting Intel(R) Turbo Memory.
NANDCPLY	The NANDCply Utility is a Microsoft MS-DOS* based utility used to report and verify the Intel(R) Turbo Memory module, the Intel(R) Flash Cache Logic Chip Interface, the DFOROM, and the System BIOS for compliance.
NANDDIAG	The NANDDiag Utility is a Microsoft MS-DOS* based diagnostic utility used to test the erase blocks on a product supporting Intel(R) Turbo Memory.
TurboConfig	The TurboConfig Utility is a Microsoft WIN32 based utility used enable, disable and retrieve the status of both ReadyBoost and ReadyDrive on a given platform.



7 Issues – Fixed in this release

Table 5. Issues fixed in this release

Reference No:	Description
N/A	Please see Intel® Matrix Storage Manager Release Notes for a description of the supported driver fixes.
2447788	Sporadic 0x7F BSOD during system boot when memory pressure is applied.
2482260	Sporadic 0x9F BSOD during S4 resume on platforms with low system memory. Note: Since the 1.1 PV release, this issue has been seen during Sx cycling in various system memory configurations.
2484716	DFOROM does not support ICH9R platforms in ReadyBoost only mode.
2484717	Driver does not support ICH9R platforms in ReadyBoost only mode.
2484880	Sporadic black screen issue during Sx cycling testing.
2485099	DFOROM 8254 counter2 usage causes some DOS tools to fail when outputting information through the legacy speaker.
2485905	Occasional 8086(101, x, 1F, x) BSOD seen in DC Mode during Sx cycling testing when certain SMART commands are used.
2516091	Zip and EXE release packages not correctly using "Intel(R)TurboMemory" in their names.
2519069	32-bit Intel® Turbo Memory Drive does not contain an embedded signature.
2551207	URLs listed in help menu to not point correctly to Intel® Turbo Memory sites.



8 Issues – Fixed in previous releases

Table 6. Issues fixed in the 1.1.0.1010 release

Reference No:	Description
N/A	Please see Intel® Matrix Storage Manager Release Notes for a description of the supported 7.0.0.1020 Driver package.
2293725	DFOROM update application does not check that the version of the DFOROM to be updated matches the loaded driver version prior to upgrading the DFOROM.
2325288	Sporadic BSODs seen during testing (0x8086). These failures have been seen to occur at a very sporadic rate (e.g.: 10 machines tested, 1000 S4 cycles, 1 machine fails at cycle 579). Note: All BSODs are listed in the “Issues – Known in this Release” section.
2326588	Host Initiated Power management continues to request SLUMBER Mode after the first STANDBY immediate command.
2335473	DFOROM checksum value is incorrect after DFOROM initialization.
2437475	0x0A BSOD upon reboot after INF driver installation.
2437722	NANDCPLY utility not checking for a DFOROM on the correct 512Byte Boundary.
2438303	Windows ReadyDrive is selectable in console when the driver is installed and a Hybrid Hard Drive is present as the boot drive.
2439655	ReadMe file in Intel Matrix Storage Manager Start Folder is not valid.
2440574	“Help” button in system information “Print” screen causes popup failure.
2440881	Performance issue seen with Office Productivity sub-test in SYSmark® 2007. Note: The performance issue is addressed by setting CaEnableAdvPerf = 1 in registry. See the new features section for more details.
2441001	0xC2 BSOD during driver installation when 2 HDDs are connected and Intel® Matrix Storage Manager has been previously loaded.
2441732	NVCACHE Drive is not properly configured when installer is run after INF installation has completed.
2442090	Sporadic 0x9F BSOD during restart when DTM Tests are running and Intel® Turbo Memory Driver is loaded. Note: This fix was made to the 7.0.1.1001 Intel® Matrix Storage Manager release.
2442116	NANDDIAG utility sporadically returning incorrect pass percentage value.
2444127	Yellow bang occurs in Device Manager upon reboot after INF driver installation and no DFOROM is programmed.
2444135	High rate of BSODs seen when memory pressure (Not enough system memory) is applied.



Issues – Fixed in previous releases

Reference No:	Description
	Note: This fix was initially made in the 1.0.1.1004 Intel® Turbo Memory Release.
2444316	A driver upgrade requires a 2nd reboot to update the DFOROM such that Windows ReadyDrive will get enabled.
2445814	The console checkboxes do not get updated properly if user makes a change and does not reboot. Note: For the 1.1 console, "Parameter" = current boot state, while "Select the cache policy you want to enable" = Next boot state.
2446080	Windows ReadyBoost does not get enabled due to NVCACHE Drive not getting properly configured during installation/upgrade when anti-virus software is active.
2447043	Incorrect name presented in the OS Device Manager when driver is installed. Note: Name is now correctly listed as "Intel® Turbo Memory Controller".
2447045	0x7E BSOD upon boot when memory pressure is applied.
2448113	8086 (101, x, 1B, x) BSOD seen during testing. Note: BSOD due to ASPM/L1 Errata reported in the WW26 MofW.
2448883	DFOROM memory region incorrectly assuming DFOROM permanent conventional memory is 64-byte aligned.
2449918	8086(301, x, 9, x) BSOD seen during testing. Note: BSODs due to ASPM/L1 Errata reported in the WW26 MofW.
2450262	Installer not providing correct error status on exit when incorrect commands are passed in.
2481968	The DTM 1.0a DiskIo Test Fails. Note: This fix was initially reported in the WW24 MofW and is fixed by the 1.0.1.1004 Intel® Turbo Memory Release



9 Issues – Known in this release

Table 7. Issues known in this release

Reference No:	Description
N/A	Standby and Resume issues have been seen on SATA Ports where an ACPI _PS3 method to power down a given hard drive is defined and the hard drive is being cached by Intel® Turbo Memory. For the Santa Rosa Customer Reference Boards, the cached hard drive should only be connected to either Port 1 or Port 2, as Port 0 does implement the ACPI _PS3 method.
N/A	A few I/Os take significantly longer than majority of the other I/Os. This can result in larger than expected variances on some performance tests, and also non-representative averages due to the outliers. Customers measuring performance of individual I/Os are requested to discard such outliers for this release. Intel will continue to tune the driver to further reduce the outliers.
2195901	Intel® Turbo Memory driver currently does not pass the WDK Piton test called Power Performance Test. This issue is under discussion with Microsoft.
2211046	Resume from S4 takes longer with Intel Turbo Memory than without. The delay is anywhere between 1 to 3 seconds.
2257120	[Localization]: The console has inconsistent Font when installed in Japanese.
2257122	[Localization]: For Japanese, Chinese Simplified, and Chinese Traditional languages, in the Intel Turbo Memory Console System Information, the ™ and ® characters are corrupted.
2290701	Console showing junk values in System Information for the hard drive "Model Name" and "Capacity" when Intel Turbo Memory is loaded but the Intel Matrix Storage Manager is not.
2333491	[Localization]: For Japanese, Chinese Simplified, and Chinese Traditional languages, the Report.txt generated by console will show the ® character as corrupted in the section of the report that is in English.
2438081	[ReadyDrive]: Unchecking the Windows ReadyDrive checkbox in the console will not fully disable the Windows ReadyDrive feature.
2438311	Windows ReadyBoost will be reported as enabled in the console when a USB Thumb Drive is connected and Windows ReadyBoost is enabled on the thumb drive.
2442583	Sporadic 0xD1 BSOD when doing short duration restart testing. Note: This issue has been seen only when implementing 15 second restart cycles.
2443768	Drive Letter sometimes assigned to the NVCACHE Partition.
2517403	[Localization]: Control Panel Add/Remove string is not right to left in Arabic and Hebrew.
2517406	[Localization]: Error message popup is seen instead of Help Menu when the help menu is evoked in unsupported languages.
2517425	[Localization]: Copyright symbol is corrupted when English UI is displayed in



Issues – Known in this release

Reference No:	Description
	Thai operating system.
2518169	[Desktop]: Console showing junk values in System Information for the hard drive "Model Name" and "Capacity" when Intel Turbo Memory is loaded and the system is in RAID 0 configuration.
2550957	Sporadics BSODs seen during S4 cycling testing.
2551633	DFOROM uses up to 16KB of system memory below EBDA during OROM Initialization.
N/A	Sporadic 8086 (0, 0, 0, 0) BSODs seen with certain HDD vendors.

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