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1. About This Release

The solution release described in this document includes firmware, OS drivers, tools, and host management software for the solutions from Microchip.

1.1 Release Identification

The firmware, software, and driver versions for this release are shown in the following table.

Table 1-1. Release Summary

Solutions Release	2.8.4
Package Release Date	March 05, 2024
Firmware Version	6.81 ^{1, 2}
UEFI Driver Version	2.12.1
Legacy BIOS	2.12.3
Driver Versions	Windows SmartPQI: <ul style="list-style-type: none"> Windows Server 2019/2022: 1010.96.0.1007 Windows 10/11: 1010.96.0.1007 Linux SmartPQI: <ul style="list-style-type: none"> RHEL 7/8/9: 2.1.28-025 SLES 12/15: 2.1.28-025 Ubuntu 20/22: 2.1.28-025 Debian 10/11/12: 2.1.28-025 Oracle Linux 7/8/9: 2.1.28-025 Citrix XenServer 8: 2.1.28-025 BC Linux 7: 2.1.28-025 OpenEuler 20/22: 2.1.28-025 VMware SmartPQI: <ul style="list-style-type: none"> VMware 7.0/8.0: 4662.0.112 FreeBSD SmartPQI: <ul style="list-style-type: none"> FreeBSD 13/14: 4500.0.1024
arconf/maxView™	4.17.00.26540
PLDM	6.35.8.0

Notes:

- Downgrading to 1.04 B0 or older builds from this release or prior 1.29 releases may cause the board to not boot or have supercap errors due to an incompatibility in SEEPROMs between this release and prior releases. See section "3. Updating the Controller Firmware".
- If Managed SED is enabled, do not downgrade firmware to version 5.00 or earlier because they do not support Managed SED capabilities. Disable Managed SED if downgrading to firmware versions 5.00 or earlier.

1.2 Components and Documents Included in this Release

Download the firmware, drivers, host management software, and supporting documentation for your HBA1100 controller solution from the Microchip Web site at <https://start.adaptec.com>

1.3 Files Included in this Release

This release consists of the files listed in the following tables:

Firmware Files

Table 1-2. Firmware Files

Component	Description	Pre-Assembly Use	Post-Assembly Use
SmartFWx100.bin	Programmable NOR Flash File Use to program NOR Flash for boards that are already running firmware.	—	X
SmartFWx100.fup	Programmable NOR Flash File Used for PLDM type 5 firmware flashing for boards that are already running firmware.	—	X

Table 1-3. Firmware Programming Tools

Tool	Description	Executable
Arcconf romupdate	The command allows to upgrade/downgrade the firmware and BIOS image to the controller.	Refer to Table 1-8
maxView™ firmware upgrade wizard	The firmware upgrade wizard allows to upgrade/downgrade the firmware and BIOS image to one or more controller(s) of same model in the system.	Refer to Table 1-8

Driver Files

Table 1-4. Windows Storport Miniport SmartPQI Drivers

Drivers	Binary	Version
Server 2022 and Server 2019 Windows 10 (version 22H2) and 11 (version 23H2)	SmartPqi.sys	x64
	SmartPqi.inf	x64
	smartpqi.cat	x64

Table 1-5. Linux SmartPQI Drivers for Arm

Drivers	Version
Red Hat Enterprise Linux 9.3, 8.9	Arm®
SuSE Linux Enterprise Server 12 SP5	Arm
SuSE Linux Enterprise Server 15 SP5, SP4	Arm
Ubuntu 22.04.3, 20.04.5	Arm
BC Linux 7.7	Arm
OpenEuler 20.03 SP3 LTS, 22.03 SP2 LTS	Arm

Table 1-6. Linux SmartPQI Drivers for Intel/AMD x64

Drivers	Version
Red Hat Enterprise Linux 9.3, 9.2, 9.1, 8.9, 8.8, 8.7, 7.9	x86_64
SuSE Linux Enterprise Server 12, SP5	x86_64
SuSE Linux Enterprise Server 15 SP5, SP4	x86_64
Oracle Linux 7.9 UEK6U3	x86_64
Oracle Linux 9.3, 9.2, 8.9, 8.8, 8.7 UEK7U2	x86_64
Ubuntu 22.04.3, 22.04.2, 22.04	x86_64
Ubuntu 20.04.6, 20.04.5, 20.04	x86_64

.....continued

Drivers	Version
Debian 12.2, 11.8, 10.13	x86_64
Citrix xenServer 8.2.1, 8.1	x86_64
Fedora 39 (inbox only)	x86_64
OpenEuler 20.03 SP3 LTS	x86_64
OpenEuler 22.03 SP2 LTS	x86_64

Table 1-7. FreeBSD and VMware SmartPQI Drivers

Drivers	Version
FreeBSD 14, 13.2	x64
VMware 8.0 U2/U1, 7.0 U3/U2	x64

Host Management Software

Table 1-8. Host Management Utilities

Description	OS	Executable
ARCCONF Command Line Utility	Windows® x64 Linux® x64 VMware 7.0 and above XenServer FreeBSD x64 Linux ARM	See the Arccnf download package for the OS-applicable installation executable.
ARCCONF for UEFI	—	Included as part of the firmware downloadable image.
maxView™ Storage Manager	Windows x64 VMware 7.0 and above Linux x64 XenServer	See the maxView Storage Manager download package for the OS-applicable installation executable.
maxView™ vSphere Plugin	VMware 7.0 and above	See the VMware maxView Storage Manager download package for the OS-applicable installation executable.
Boot USB (offline or pre-boot) for ARCCONF and maxView Storage Manager	Linux x64	See the maxView BootUSB download package for the .iso file.

2. What's New?

This section shows what's new in this release.

2.1 Features

The following table highlights major features supported by each Solutions Release.

Table 2-1. Feature Summary

Feature	Supported Release	
Redfish Resource to Publish SuperCap Properties Support	2.8.2	
Arcconf and Redfish Support in Secureboot ESXi Environment	2.8.2	
Remote Key Management of Managed SED	2.8.0	
Multi-Actuator Drive Support Enhancements	2.7.4	
Managed SED Adapter Password Support	2.7.2	
Managed SED Local Mode Support	2.7.0	
Multi-Actuator Drive Support	2.7.0	
Persistent Event Logging Support	2.6.2	
Out of Band Interface Selection Support of MCTP or PBSI	2.5.2	
MCTP BMC Management	2.4.8	
SMR Drive Support	Enumeration, Unrestricted Command Flow-Through	2.3.0
	SATL Translation for HA/HM SMR Management	
	Identify all Drive Types	
Driver OS Certification Where Applicable	2.3.0	
SNMP Management Software Support	2.3.0	
4Kn, 512e and 512n Support	2.3.0	
Legacy Boot Support	2.3.0	
UEFI Driver, Boot Support	2.3.0	

2.2 Fixes

2.2.1 Firmware Fixes

2.2.1.1 Fixes and Enhancements for Firmware Release 6.81

This release includes the following fixes and enhancements:

- Added additional support to factory reset to erase sensitive data held in the controller.
- Fixed an issue where "Fatal Drive Error/IO Fatal Error" event unexpectedly observed in healthy configuration.
 - Root Cause: When a logical request is sent to a drive and is completed with error status, firmware always posts "Fatal Drive Error/IO Fatal Error" event to the host. For example, the SCSI-ATA pass-through command which requests ATA information to be returned.
 - Fix: "Fatal Drive Error/IO Fatal Error" event should only be posted to the host only if the command is either a read or a write command.
 - Risk Low
- Fixed an issue where controller may lockup when processing Out-Of-Band requests.
 - Root Cause: When multiple Fragment Type MCTP requests are sent to the firmware with the same session ID, it may cause the wrong internal data structure to be allocated for the requests for processing. These internal data structures are indexed based on the session ID.

- Since two requests are sent with same session ID, this can cause the firmware to pick the wrong internal data structure and result in a lockup.
- Fix: If a new request is received with the session ID of an existing Out-Of-Band request, delete the internal data structure belonging to the existing request if it's stuck for more than five minutes and use that session ID for the newly received request. Otherwise return 'Session Already Exists' error for the newly received request. The host application should retry the request.
 - Risk: Low
- Fixed an issue where deleted foreign volume comes back after controller reboot.
 - Root Cause: The foreign SEDs in the foreign volume have been set to otherwise owned before the volume metadata on the drive is cleaned up. That causes the SED's metadata not to be cleared. After a reboot, firmware could read the volume metadata again from the drives and the volume shows up again.
 - Fix: Set the foreign SEDs in the foreign volume to otherwise owned after the metadata has been cleared.
 - Risk: Low
 - Fixed an issue where a LUN reset is waiting for completion on a failed physical drive.
 - Root Cause: When the host issues a LUN reset to the physical drive, the firmware will mark the RESET BUSY flag on the physical drive. Due to persistent timeouts from the physical drive, the firmware will fail the physical drive but fails to clear the RESET BUSY flag on the failed physical drive. Due to this flag, even though firmware completed the LUN reset, it will be waiting for this flag to clear before sending the completion to the host.
 - Fix: Clear the RESET BUSY flag while failing the physical drive.
 - Risk: Low
 - Fixed an issue where an enclosure with drives powered off was unable to be powered on/ discovered by HBA.
 - Root Cause: SES control page clearing device off bit was not sent to enclosure.
 - Fix: Fixed logic to make sure SES control page is sent to enclosure resulting in HBA being able to discover drives.
 - Risk: Low
 - Fixed an issue to remove encryption test failed event on boards that do not support encryption.
 - Root Cause: Encryption test always runs on all boards and result was reported.
 - Fix: Do not log event if board does not support encryption.
 - Risk: Low

2.2.2 UEFI Fixes

Note: Microsoft signed and secure boot is supported.

2.2.2.1 Fixes and Enhancements for UEFI Driver 2.12.1/Legacy BIOS 2.12.3

This release includes the following UEFI fixes and enhancements:

- Added support to display UBM Backplane firmware information in both Decimal and Hexadecimal format.
- Added support of status menu for driver health ignore option.
- Fixed an issue where the driver health status is shown as failed even after selecting ignore driver health state.
 - Root Cause: Driver health ignore state was considered only at the controller level not for the entire driver.

- Fix: Flag to detect ignored driver health state considered for both controller and driver level.
- Risk: Low.
- Fixed an issue where Managed SED controller password countdown timer was not getting displayed when failed unlock attempts are exceeded.
 - Root Cause: Controller password countdown timer and remaining attempt information are shown only when attempts are remaining.
 - Fix: Show Controller password countdown timer and remaining attempt information in HII even when no attempts are available.
 - Risk: Low
- Fixed the incorrect Chinese translation for SED OPAL in HII.
 - Root Cause: No translation required for technical term Opal.
 - Fix: Changed translations to keep the original technical term Opal.
 - Risk: Low

2.2.3 Driver Fixes

2.2.3.1 Fixes and Enhancements for Linux Driver Build 2.1.28-025

This release includes the following fixes and enhancements.

- Fixed an issue to handle multi-path failover.
 - Root Cause: Controller firmware does not return the proper error code for I/O errors caused by a multi-path path failure.
 - Fix: The driver maps I/O errors returned by the controller firmware into errors that cause the multi-path layers in the OS to detect the failure of a path.
 - Risk: Low

2.2.3.2 Fixes and Enhancements for FreeBSD Driver Build 4500.0.1024

This release includes the following fixes and enhancements:

- Added the ability to set the driver debugging levels in the `loader.conf` file.
- Fixed an issue where a panic is observed while hot-removing a drive with an INVARIANTS enabled kernel.
 - Root Cause: `pqisrc_free_device` function frees the device memory inside the spinlock.
 - Fix: Move the memory freeing outside the spinlock.
 - Risk: Low

2.2.3.3 Fixes and Enhancements for Windows[®] Driver Build 1010.96.0.1007

There are no known fixes for this release.

2.2.3.4 Fixes and Enhancements for VMware Driver Build 4500.0.1024

This release includes the following fixes and enhancements:

- Fixed an issue where the firmware version shows only revision.
 - Root Cause: The firmware version information currently used by driver comes from a 4-byte field returned as part of the 'ID controller' inquiry reply. This 4 byte field worked for previous products, but newer controllers have a more verbose versioning scheme and 4 bytes won't work. The 4-byte field is deprecated, and a 32-byte field is now available, containing the full ASCII character string for the firmware version.
 - Fix: Populate the VMware SAS Adapter structure's firmware field using content of the longer 32-byte firmware version field returned by 'ID controller' inquiry.
 - Risk: Low

2.2.4 Management Software Fixes

2.2.4.1 Fixes and Enhancements for Arconf/maxView™ Build 4.17.00.26540

This release includes the following fixes and enhancements for Arconf/maxView:

- Added support in maxView and arconf to display the backplane firmware version in both Decimal and Hexadecimal format.
- Added GETCONFIGJSON Arconf command to get the configuration in JSON format.
- Deprecated the MNPdelay property and settings from maxView and arconf. Deprecated the arconf SETPERFORM command and moved the 'Degraded Performance Optimization (DPO) property under SETCONTROLLERPARAM command.
- Fixed an issue where the manufacturing part number property was not displayed in the "arconf GETCONFIG" command output.
 - Root Cause: Incorrect check was present to get manufacturing part number from manufacturing data.
 - Fix: Implemented changes to get the part number from the manufacturing data structure.
 - Risk: Low

2.2.4.2 Fixes and Enhancements for PLDM Release 6.35.8.0

This release includes the following fixes and enhancements:

- Added support for RDE ACTION operation on #Storage.SetEncryptionKey. This feature allows Redfish clients to enable SED encryption with local key management (LKM) and change the master key/master key identifier when MSED LKM is enabled. The GetPDR response for the Storage resource's RedfishAction PDR will now include the ActionName "Actions/Storage.SetEncryptionKey". The response for a RDE READ operation on a Storage resource will include #Storage.SetEncryptionKey as part of the Storage.Actions property only when EncryptionMode is UseLocalKey or disabled. To enable local SED encryption, the RDE ACTION operation payload should be as follows:

```
{
  "EncryptionKey": "The local encryption key to set on the storage subsystem.",
  "EncryptionKeyIdentifier": "The local encryption key identifier used by the storage subsystem."
}
```

To change the master key and/or master key identifier when MSED LKM is enabled, the RDE operation payload should be as follows:

```
{
  "EncryptionKey": "The local encryption key to set on the storage subsystem.",
  "EncryptionKeyIdentifier": "The local encryption key identifier used by the storage subsystem."
}
```

Note: In both of these cases, EncryptionKeyIdentifier is an optional parameter. If LKM MSED is being enabled initially and the EncryptionKeyIdentifier is not provided in the payload, then it will be given a default value. If LKM MSED is already enabled and the EncryptionKeyIdentifier is not provided in the payload, then it will be left at its current value.

- Added support to perform RDE UPDATE on Storage.EncryptionMode. This feature allows Redfish clients to enable remote mode SED encryption or to disable SED encryption.

Note: This feature does NOT allow Redfish clients to modify/enable controller-based encryption.

RDE operations targeting the Storage resource will have the update access bit (bit 1) of PermissionFlags set. The following changes have been made to RDE READ on a Storage resource:

- Updated the @Redfish.WriteableProperties property to indicate if "EncryptionMode" can be updated.
- Added EncryptionMode@Redfish.AllowableValues if "EncryptionMode" can be updated. The allowable values are:
 - If current SED encryption is Disabled, "UseExternalKey" to enable remote SED encryption will be published.
 - If current SED encryption is set to local mode, "Disabled" to disable SED encryption will be published.
 - If current SED encryption is set to remote mode, "Disabled" to disable SED encryption will be published.

The following steps are followed to manage remote mode SED encryption using RDE UPDATE operations on the Storage resource:

- To disable SED encryption, the following payload should be used with a RDE UPDATE operation on the Storage resource:

```
{
  "EncryptionMode": "Disabled"
}
```

Disabling SED encryption requires a long running task, so MCs are required to support long-running tasks.

- To enable remote mode SED encryption, the following payload should be used with a RDE UPDATE operation on the Storage resource:

```
{
  "EncryptionMode": "UseExternalKey"
}
```

- Added support to perform RDE UPDATE on Volume.Encrypted. This feature allows Redfish clients to take ownership of an SED or revert a SED to OFS.

Note: This feature is only applicable to HBA volumes representing SEDs. An HBA volume representing a SED will have its "EncryptionTypes" set to "NativeDriveEncryption."

The following changes were made:

- RDE operations targeting a HBA Volume resource will have the update access bit (bit 1) of PermissionFlags set.
- Changes to RDE READ on a HBA Volume resource:
 - Added @Redfish.WriteableProperties property to indicate if "Encrypted" can be updated.
- RDE UPDATE on HBA Volume resource:
 - To take ownership of a SED, the RDE UPDATE operation payload should be as follows:

```
{
  "Encrypted": true
}
```

- To revert a SED to OFS, the RDE UPDATE operation payload should be as follows:

```
{
  "Encrypted": false
}
```

- Added the following properties to the RDE READ responses for the associated resources:

- Drive.Status.Conditions
- Port.Status.Conditions
- StorageController.Status.Conditions
- Volume.Status.Conditions

These properties are of array type containing Condition objects whose MessageId child properties are taken from the DMTF Redfish StorageDevice v1.1.0 message registry. For a given resource, the Status.Conditions array will be empty, if the associated Status.Health value is Ok.

- Updated the PLDM base (Type 0) command GetPLDMTypes to indicate support for PLDM for File Transfer (PLDM Type 7).
- Updated the PLDM base (Type 0) command GetPLDMVersion to indicate new support for the following specification versions:
 - DSP0240 - PLDM Base Spec (Type 0) -> v1.1.0 and v1.2.0
 - DSP0248 - PLDM for Platform Monitoring and Control (Type 2) -> v1.3.0
 - DSP0242 - PLDM for File Transfer (Type 7) -> v1.0.0
- Updated the PLDM base (Type 0) command GetPLDMCommands to indicate support for the following commands:
 - Type 0 command 0x07 - NegotiateTransferParameters
 - Type 0 command 0x09 - MultipartReceive
 - Type 7 command 0x01 - DfOpen
 - Type 7 command 0x02 - DfClose
 - Type 7 command 0x06 - DfHeartbeat
- Added support for the PLDM Type 0 command NegotiateTransferParameters for PLDM Type 7. Implemented the PLDM Type 0 command `NegotiateTransferParameters` to allow an MC and device to negotiate the transfer part size to be used for multipart transfers using the PLDM Type 0 commands `MultipartSend` and `MultipartReceive`. This command will accept a transfer part size that is a power of two that is at least 256 bytes and will support negotiation for PLDM Type 7 (PLDM for file transfer). A successful response will report a responder part size of 512 bytes for PLDM Type 7.
- Added support for PLDM Type 0 MultipartReceive command. Only PLDMType of 7 is supported for the MultipartReceive command. A successful XFER_ABORT will have the following response:
 - CompletionCode set to SUCCESS
 - TransferFlag set to ZERO
 - NextDataTransferHandle set to ZERO
 - DataLengthBytes set to ZERO
- Updated the GetPDR response for the controller's EntityAssociation PDR to include a contained entity representing the crash dump Device File. This contained entity will be published at the tail end of the contained entities array and will be addressed with the following:
 - EntityType = Device File (0x09, defined in DSP0249 v1.2.0)
 - EntityInstanceNumber = 1
 - ContainerId = 0x9005
- Added support for reporting a PDR of type FILE_DESCRIPTOR for controller's crash dump log. The new PDR will be reported as part of PLDM Type 2 GetPDR command. The `FileClassification` field of the GetPDR response will be set to CrashDump.
- Added a new State Sensor class PDR that will define state sensor readings for the crash dump device file. This PDR will report the following field values:

- StateSetId - 68 (Device File, defined in DSP0249 v1.2.0)
- PossibleStates - Bit 1 (Updated), Bit 4 (Max Size), and Bit 5 (Unchanged)
- PossibleStatesSize - 5

Updated `GetStateSensorReadings` to handle requests for the `sensorId` provided in the crash dump device file's State Sensor PDR. The reported state will be determined based on the current size of the crash dump relative to the last reading request.

- Added support for reporting a Crash Dump Numeric Sensor PDR of type `NUMERIC_SENSOR` to monitor the file size for a crash dump device file. The new PDR will be reported as part of PLDM Type 2 `GetPDR` command. Readings of numeric sensors associated with a given `FileDescriptor` PDR will be supported using the existing Type 2 commands `GetSensorReading` and `GetSensorThresholds`.
- Added support to implement the PLDM Type 7 command `DfOpen` to allow opening a file for reading. This command will support opening a file with exclusive, regular (non-FIFO) read access. On success, a file descriptor will be provided that can be used as a handle for accessing and managing the opened file. Implemented the PLDM Type 7 command `DfClose` to close the file associated with a given file descriptor.

Implemented the PLDM Type 7 command `DfHeartbeat` that allows the MC and device to negotiate a timeout interval that will allow the device to close the file if no read or heartbeat refresh activity has occurred within that negotiated interval. On a successful negotiation, a response containing a `ResponderInterval` of 30000 milliseconds will be returned, and the smaller of that value and the requested `RequesterInterval` will govern as the `NegotiatedInterval` for the open file's heartbeat timer.

To successfully read the crash dump file, a file client MC should execute the following sequence:

- Send the `NegotiateTransferParameters` command to indicate a valid `RequesterPartSize` for PLDM Type 7.
- Send the `GetPDR` command to read the controller's `CrashDump` File Descriptor PDR and obtain the associated `FileIdentifier`.
- Send the `GetPDR` command to read the numeric sensor PDR associated with the crash dump file entity, and check that it has a non-zero size using `GetSensorReadings` with the appropriate `sensorId`.
- Send the `DfOpen` command with the crash dump file's `FileIdentifier` and requesting exclusive read access, obtaining a valid `FileDescriptor`.
- If desired, optionally send the `DfHeartbeat` command to negotiate a heartbeat interval for the open `FileDescriptor`.
- Send a sequence of `MultipartReceive` commands with `PLDMType = 7`, `TransferContext` equal to the open `FileDescriptor`, and the appropriate `TransferOperation` based on the progress through the file read as detailed in DSP0240.
- If a heartbeat interval has been negotiated and the file client is unable to handle another `MultipartReceive` request and response within that interval, send the `DfHeartbeat` command again to keep the open `FileDescriptor` alive.
- After concluding the full sequence of `MultipartReceive` requests and responses, send the `DfClose` command to close and free up the open `FileDescriptor`.
- Fixed an issue where an MC sends a `NegotiateRedfishParameters` request with the "BEJ v1.1 encoding and decoding supported" bit of `MCFeatureSupport` unset, that is, with the intent to negotiate for only BEJ v1.0 support, all RDE response bodies from the controller will be encoded using BEJ v1.1.
 - Root Cause: The BEJ version v1.1 was hard-coded into all RDE READ responses and extended info messages as well as all Redfish alert messages.

- Fix: Modified the response and message encoding to use the lowest common BEJ version supported by both the MC and the controller.
 - Risk: Low
- Fixed an issue where the `Drive.Manufacturer` property was not published during an RDE READ on SAS drives.
 - Root Cause: The logic to publish `Drive.Manufacturer` property was being set to `False` on some controllers.
 - Fix: Corrected the logic to publish `Drive.Manufacturer` for SAS drives on all supported controllers.
 - Risk: Low
- Fixed an issue where the `BlockSizeBytes` and `LogicalUnitNumber` are missing from the RDE READ response for all volume resources with `RAIDType = None`, that is, HBA Volumes.
 - Root Cause: BEJ encoding for these two properties was missing from the function handling RDE READ operations for HBA volumes.
 - Fix: Modified the HBA Volume RDE READ operation handler function to publish `BlockSizeBytes` and `LogicalUnitNumber` for HBA volumes.
 - Risk: Low
- Fixed an issue where incorrect state and health is observed when controller password is required. When the controller is waiting for boot password for CBE or SED encryption, the RDE READ on Storage Resource operation returns `Ok` for health and `Enabled` for state.
 - Root Cause: The function which encodes the RDE READ response for the `StorageController` resource did not check the situation when the controller is waiting for boot password.
 - Fix: Modified the RDE READ response encoder function for the `StorageController` resource to check whether the controller is waiting for boot password on CBE and SED encryption. If so, set controller health as `Warning` and state as `StandbyOffline`.
 - Risk: Low
- Fixed an issue where the response data of RDE command `0x12` (`RetrieveCustomResponse`) is incorrect. In the response to a `RetrieveCustomResponseParameters` command, the size of the `NewResourceID` field is 2 bytes instead of the spec-defined size of 4 bytes.
 - Root Cause: The internal structure used to build the command response assigned a type of `uint16` instead of `uint32` to the `NewResourceID` field.
 - Fix: Updated the command response structure to assign the `uint32` type to the `NewResourceID` field.
 - Risk: Low
- Fixed an issue to accommodate DMTF definition of `bejBoolean` for any non-`0x00` value as `TRUE`. BEJ boolean values other than numeric one are being set to `False`. However the DMTF specification indicates that a numeric value of zero indicates boolean `False` while any other value indicates `True`.
 - Root Cause: The decoded boolean numeric value is being compared to one. If the numeric value is one, then the boolean value is being set to `True`. Otherwise, the boolean value is being set to `False`.
 - Fix: When the numeric value for the boolean has been decoded, it will be compared to zero. If the numeric value is zero, then it will stay zero. If the numeric value is not zero, then it will be set to one.
 - Risk: Low

- Fixed an issue where incorrect severity was observed in Redfish Eventing for Foreign SED Drive. When a Foreign owned Drive is inserted, DriveOffline alerts will have a severity of OK instead of Warning.
 - Root Cause: There is no existing DriveOffline status with a severity of Warning. Default Severity is OK for this specific DriveOffline condition.
 - Fix: Modified the drive offline status event logic at time of drive insertion to have a severity of Warning.
 - Risk: Low
- Fixed an issue with improper capacity information in Redfish drive Name. The capacity in the drive name property does not include a 2 digit remainder, when the whole part of the capacity is over one digit.
 - Root Cause: When calculating capacity, the calculation of the remainder would be blocked if the whole part was larger than a single digit.
 - Fix: Capacity remainder is now calculated as long the whole part of the capacity is less than four digits.
 - Risk: Low

2.3 Limitations

2.3.1 General Limitations

This release includes the following general limitation:

- The following are the limitations of Multi-Actuator:
 - Supports only
 - HBA drive
 - Windows/Linux/VMware
 - Intel/AMD
 - UEFI mode (for multi-LUN display)

2.3.2 Firmware Limitations

2.3.2.1 Limitations for Firmware Release 6.81

This release includes the following firmware limitations:

- Persistent Event Logs (PEL) are getting cleared when:
 - Upgrading from firmware releases prior to 5.61 to 5.61 or later firmware releases.
 - Downgrading from firmware releases 5.61 or later to firmware releases prior to 5.61.
- Firmware downgrade from firmware version 6.22 B0 to any older firmware version is blocked if Managed SED is enabled.
 - Workaround: Disable Managed SED and try firmware downgrade.
- Managed SED cannot be enabled on the controller, where reboot is pending after firmware downgrade from firmware version 6.22 B0 to any older firmware version.
 - Workaround: Reboot the controller and enable the Managed SED.

2.3.2.2 Limitations for Firmware Release 1.32 Build 0

- Firmware release 1.32b0 may become unresponsive while attempting to flash firmware or execute other RAID logical drive operations.
 - Description: Refer to entry "Fixed an issue where firmware may become unresponsive while attempting to flash firmware or execute other RAID logical drive operations" in the Firmware fixes section.

- A fix for this issue is available in the 1.60 B0 firmware release. If a firmware flash failure is occurring, try the following workarounds:
 - Workaround: If there are no target devices (expanders or drives) attached to the controller, attach a target device to the controller and try the host management operation again.
 - Workaround: If the system is operating using UEFI, the HII tool can be used to flash the firmware to this release as outlined in the *Microchip SmartIOC 2100/SmartROC 3100 Installation and User's Guide (ESC-2170577)*, appendix entry "Updating the SmartIOC 2100/SmartROC 3100 Controller Firmware".
 - Workaround: If there are target devices attached to the controller and this issue occurs or none of the workarounds can be used, contact Microchip Support.

2.3.3 UEFI Limitations

2.3.3.1 Limitations for UEFI Build 2.12.1/Legacy BIOS Build 2.12.3

There are no known limitations for this release.

2.3.4 Driver Limitations

2.3.4.1 Limitations for Linux Driver Build 2.1.28-025

This release includes the following limitations:

- On some distributions (RHEL7.9, RHEL8.2, RHEL8.3, SLES15SP2, SLES15SP3, OpenEuler 20.03LTS, and 22.03LTS including SP releases), the driver injection (DUD) install will hang if an attached drive (either HBA mode or Logical Volume) has Write Cache enabled.
 - Workaround: There are two workarounds for this issue:
 - Ensure that the Write Cache is disabled for any attached drive.
 - For RHEL7.9/8.2/8.3 and OpenEuler 20.03LTS, 22.03LTS, add `rd.driver.blacklist=smartpqi` to the grub entry along with `inst.dd`.
- RHEL driver injection (DUD) install where OS ISO is mounted as virtual media on BMC based servers (non-ILO). Installer will hang after driver injection. It is reported on RHEL 8.5, 8.6, 9.0, and 9.1.
 - Workaround:
 - Load the OS from USB device instead of virtual media.
 - Load the OS from virtual media but initiate ISO verification (media test) during the installation followed by ESC to cancel the media test.
 - Edit grub to include the boot argument "nompath". Replace "inst.dd" with "nompath inst.dd" for DUD install.
- Oracle 9 UEK 7 kernel causes SmartPQI rpm dependency failures. This is an issue with how the kernel package was created by Oracle. Correct UEK7 kernel for Oracle 9, which is expected in the mid-October UEK7 release, version number is still pending.

Note: This does not affect Oracle 8 UEK 7.

 - Workaround: Install the rpm using "`--nodeps`" when dependency failures occur.
 - Update:
 - For SmartPQI driver versions > 2.1.20-020 and UEK7 kernels >= 5.15.0-3.60.2.el9uek.x86_64, the SmartPQI rpm will install normally.
 - For UEK7 kernels < 5.15.0-3.60.2.el9uek.x86_64, the SmartPQI rpm needs to be installed using the "`--nodeps`".
- On AMD systems, the system might crash or hang due to a bug in the IOMMU module. For details, see lore.kernel.org/linux-iommu/20191018093830.GA26328@suse.de/t/.

- Workaround: Disable the IOMMU setting option in BIOS.
- On some distributions (including RHEL 9.0/Oracle Linux 9.0), you are unable to inject the OOB driver (DUD) during install when a multi-actuator drive is attached.
 - Workaround: Install using the inbox driver, complete OS installation, then install the OOB driver.

2.3.4.2 Limitations for Windows Driver Build 1010.96.0.1007

This release includes the following limitation:

- In certain circumstances, the installation may fail on Windows Server 2016 and Windows 2012 R2 after selecting drives.
 - Workaround: Follow these steps to ensure drives are clean and all partitions are removed before beginning a new installation:
 - a. Hit Shift + F10 to open the command prompt
 - b. Type `Diskpart`
 - c. Type `List Disk`
 - d. Select the disk you want to clean. For example, to select Disk 0 type `select disk 0`.
 - e. Type `Clean`
- A system crash may occur when hibernating a system installed on a Dual Actuator drive.
 - Workaround:
 - Avoid hibernating the system while running heavy I/Os to multiple Dual Actuator drives.
 - Stop running the I/Os to the drives and then hibernate the system.
 - Reboot the server to recover the system.

2.3.4.3 Limitations for FreeBSD Driver Build 4500.0.1024

This release contains the following limitations:

- FreeBSD 13.2 and later OS installations will fail with the out of box driver.
 - Workaround: Install with inbox driver then update to latest.
- If an ATA locked drive is connected to the controller, the system may experience a hang during shutdown.
 - Workaround: There are two workarounds for this issue:
 - Perform a force reboot using the following command: `reboot -q -n -f`.
 - If the shutdown is hung, hot removing the ATA locked drive will allow the shutdown process to complete gracefully.

2.3.4.4 Limitations for VMware Driver Build 4662.0.112

This release includes the following limitation:

- Legacy interrupt mode is not supported from this release.
- A controller lockup may occur when using VMDirectPath on a single-processor AMD system. These lockups have been seen with VMs running Linux and Windows. No known workaround at the present time. If a lockup of a passed-through controller occurs, a reboot of the ESXi server may be required to clear the lockup condition and restore the virtual machine to working condition.

2.3.5 Management Software Limitations

2.3.5.1 Limitations for Arconf/maxView Build 4.17.00.26540

There are no known limitations for this release.

2.3.5.2 Limitations for PLDM Release 6.35.8.0

There are no known limitations for this release.

2.3.6 Hardware Limitations

This release includes the following hardware limitations:

- Two Wire Interface (TWI) address conflicts can cause system DDR memory to not be discovered.
 - Description: The HBA1100 boards include two TWI targets on the host-facing SMBUS interface with the following slave addresses:
 - 0xA0 – Field Replaceable Unit (FRU) SEEPROM
 - 0xDE – PBSI (default)
According to the JEDEC specification, the default TWI addresses for the DDR SPD is 0xA0-0xAE (the spec uses 7 bit addressing which is 0x50-0x57). On platform system board designs with SMBUS wiring that has both PCIe slots and DDR slots shared on the same TWI bus, the TWI devices for the DDR and Smart controller are exposed to address conflicts which can result in the system memory not being discovered. The Smart controller PBSI interface defaults to a value of 0xDE (0x6F in 7-bit addressing) and is not a problem unless it is changed to an address that conflicts with the JEDEC defined values. The Smart controller FRU SEEPROM is hardwired to 0xA0.
 - Workaround: None available. If this issue is encountered, contact your Microchip support engineer to determine the next steps for your system.
 - Performance with workaround: Not applicable
 - Performance without workaround: Not applicable

3. Updating the Controller Firmware

This section describes how to update the board's firmware components to the latest release.



Important:

- If Managed SED is enabled, do not downgrade firmware to version 5.00 or earlier because they do not support Managed SED capabilities. Disable Managed SED if downgrading to firmware versions 5.00 or earlier.
- When downgrading firmware, there may be cases when newer hardware is not supported by an older version of firmware. In these cases, attempting to downgrade firmware will be prevented (fail). It is recommended to regularly qualify newer firmware versions, to ensure that newer hardware is supported in your system(s).

3.1 Updating the Controller Firmware

This procedure describes how to prepare your board to be programmed with the latest firmware.

Note:

1. Complete these procedures exactly as described for proper functionality. If you do not follow all of the steps correctly, you could encounter unusual runtime behavior.

Flashing the board to the latest firmware:

This section describes how to update all the firmware components on HBA 1100 Adapter boards to the latest release.

If the controller is currently running 1.60 b0 firmware or newer, follow these steps:

1. **Mandatory:** Flash the target with the provided " SmartFWx100.bin" image with arconf/maxView software.
2. **Mandatory:** Use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

Note:

After completing the firmware update, if the firmware version is still showing the prior version, retry the firmware update steps.

If the controller is currently running 1.32 b0 firmware, follow these steps:

1. **Mandatory:** Flash the target with the provided "SmartFWx100.bin" image with arconf/maxView software.
 - If the arconf/maxView software becomes unresponsive or hangs then power cycle the system to recover and refer to firmware limitation section [2.3.2.2. Limitations for Firmware Release 1.32 Build 0](#).
2. **Mandatory:** If flashing completes, use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

Note:

After completing the firmware update, if the firmware version is still showing the prior version, retry the firmware update steps.

If the controller is currently running 1.04 b0 firmware, follow these steps:

1. **Mandatory:** Flash the controller with the provided "SmartFWx100_v1.29_b314.bin" image with arconf/maxView software.

2. **Mandatory:** Reboot the system to refresh all components.
3. **Mandatory:** Flash the target with the provided " SmartFWx100.bin" image with arconf/maxView software.
4. **Mandatory:** Use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

At this point, the controller would be updated and would be ready to use. Install the SmartPQI driver and the latest version of the Arconf/maxView management utility to monitor and configure the controller.

Note: Downgrading firmware could lead to unexpected behavior due to an incompatibility in SEEPROMs between this release and the prior release.

4. Installing the Drivers

See the “*Microchip Adaptec® HBA 1100 Series Host Bus Adapters Installation and User's Guide* (DS00004281D, previously ESC-2161232)” for complete driver installation instructions.

5. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
M	03/2024	SR 2.8.4 Production Release.
L	12/2023	SR 2.8.0 Patch Release with maxView version B26068
K	11/2023	SR 2.7.0 Patch Release with maxView version B25339
J	11/2023	SR 2.8.2 Production Release
H	07/2023	SR 2.8.0 Production Release
G	03/2023	SR 2.7.4 Production Release
F	11/2022	SR 2.7.2 Production Release
E	08/2022	SR 2.7.0 Production Release
D	03/2022	VMware driver version updated from 4250.0.120 to 4252.0.103
C	02/2022	SR 2.6.6 Production Release
B	12/2021	SR 2.6.4.1 Patch Release with maxView™ version B24713. Updated Fixes and Enhancements for maxView Storage Manager/ARCCONF section for log4j vulnerabilities.
A	11/2021	SR 2.6.4 with VMware driver version 4230.0.103 (previously ESC-2162192)
22	08/2021	SR 2.6.2 with VMware driver version 4150.0.119
21	04/2021	SR 2.6.1.1 with VMware driver version 4054.2.118
20	03/2021	SR 2.6.1 with VMware driver version 4054.1.103
19	02/2021	SR 2.6 Production Release
18	10/2020	SR 2.5.4 Production Release
17	08/2020	SR 2.5.2.2 Production Release with Firmware 3.00
16	02/2020	Update for SR 2.5.2
15	10/2019	Update for SR 2.5
14	08/2019	Update for SR 2.4.8 Release
13	03/2019	Update for SR 2.4.4 Release
12	01/2019	SR2.4 Production Release
11	10/2018	SR2.3 firmware update with Cavium/ARM support and Ubuntu driver.
10	06/2018	SR2.3 Production Release
8	10/2017	Update supported OSs
8	10/2017	First Production Release
1-7	10/2016 to 07/2017	Pre-Production Release.

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