

Table of Contents

1. Introduction.....	4
2. Terminology Used in this Guide.....	5
3. Getting Started with the Command Line Utility.....	6
3.1. Installing the Command Line Utility.....	6
3.2. Starting the Command Line Utility.....	7
4. Using the Command Line Utility.....	8
4.1. ARCCONF Commands.....	8
4.2. arconf atpassword.....	9
4.3. arconf consistencycheck.....	9
4.4. arconf create.....	10
4.5. arconf delete.....	13
4.6. arconf driverupdate.....	14
4.7. arconf expanderlist.....	14
4.8. arconf expanderupgrade.....	14
4.9. arconf getconfig.....	15
4.10. arconf getconfigson.....	18
4.11. arconf getlogs.....	19
4.12. arconf getsmartstats.....	19
4.13. arconf getstatus.....	20
4.14. arconf getversion.....	20
4.15. arconf identify.....	21
4.16. arconf imageupdate.....	21
4.17. arconf list.....	22
4.18. arconf maxCrypto.....	23
4.19. arconf maxCryptoaccounts.....	25
4.20. arconf maxCryptokey.....	26
4.21. arconf modify.....	27
4.22. arconf passthrough.....	29
4.23. arconf phyerrorlog.....	31
4.24. arconf playconfig.....	31
4.25. arconf rescan.....	32
4.26. arconf refresh.....	33
4.27. arconf romupdate.....	33
4.28. arconf saveconfig.....	34
4.29. arconf savesupportarchive.....	34
4.30. arconf security.....	35
4.31. arconf sedencryption.....	36
4.32. arconf setarrayparam.....	38
4.33. arconf setboot.....	39
4.34. arconf setcache.....	40
4.35. arconf setconfig.....	42
4.36. arconf setconnectormode.....	42
4.37. arconf setcontrollermode.....	43
4.38. arconf setcontrollerparam.....	43

4.39.	arcconf setmaxcache.....	48
4.40.	arcconf setname.....	49
4.41.	arcconf setpower.....	49
4.42.	arcconf setpriority.....	50
4.43.	arcconf setstate.....	50
4.44.	arcconf slotconfig.....	51
4.45.	arcconf smp.....	52
4.46.	arcconf splitmirror.....	53
4.47.	arcconf task.....	54
4.48.	arcconf uninit.....	56
5.	Running ARCCONF in the UEFI Shell.....	57
6.	Smart Controller Device Status.....	60
7.	Controller, Array, Logical, Physical Device, Enclosure, and UBM Backplane Properties	63
8.	Revision History.....	76
	Microchip Information.....	80
	The Microchip Website.....	80
	Product Change Notification Service.....	80
	Customer Support.....	80
	Microchip Devices Code Protection Feature.....	80
	Legal Notice.....	80
	Trademarks.....	81
	Quality Management System.....	82
	Worldwide Sales and Service.....	83

1. Introduction

This guide focuses on using ARCCONF with Adaptec Smart Storage Controllers (SmartRAID/ SmartHBA/SmartIOC/SmartROC). For information about using ARCCONF with Microchip Adaptec Series 8 (legacy) RAID controllers, see the *Adaptec RAID Controller Command Line Utility User's Guide* (ESC-2160659).



Important: All commands in this document may not be supported for your controller. Check the ARCCONF command Help section for controller specific supported commands.

2. Terminology Used in this Guide

Because this guide provides information that can be used to manage multiple Microchip Smart Storage Controllers in a variety of configurations, the generic term “storage space” is used to refer to the controller(s), disk drives, and systems being managed with maxView Storage Manager.

For efficiency, the term “component” or “components” is used when referring generically to the physical and virtual parts of your storage space, such as systems, disk drives, controllers, and logical drives.

Many of the terms and concepts referred to in this guide are known to computer users by multiple names. In this guide, this terminology is used:

- Controller (also known as adapter, board, or I/O card)
- Disk drive (also known as hard disk, hard drive, or hard disk drive)
- Solid State Drive (also known as SSD or non-rotating storage media)
- Logical drive (also known as a logical device array)
- Array (also known as a storage pool or container)
- System (also known as a server, workstation, or computer)
- Enclosure (also known as a storage enclosure or disk drive enclosure)

3. Getting Started with the Command Line Utility

This guide explains how your Microchip Smart Storage controller supports the use of the ARCCONF command line utility.

This utility allows you to:

- Create and delete logical drives
- Encrypt and decrypt logical drive data (if supported by your controller)
- Display configuration settings
- Copy configurations from one computer to another
- Flash new firmware and BIOS onto the controller
- Enable the controller to check the removal and connection of any disk drives
- Provide access to the status and event logs of a controller

Note: This guide focuses on using ARCCONF with Adaptec Smart Storage Controllers (SmartRAID/ SmartHBA/SmartIOC/SmartROC). For information about using ARCCONF with Microchip Adaptec Series 8 (legacy) RAID controllers, see the *Microchip Adaptec RAID Controller Command Line Utility User's Guide* (ESC-2160659).

3.1 Installing the Command Line Utility

Follow the instructions in this section to install ARCCONF on the supported operating systems.

3.1.1 Downloading the Installation Packages

Complete these steps to download the ARCCONF installation package for your operating system(s):

1. Open a browser window, then type `start.adaptec.com` in the address bar.
2. Navigate to your controller product page, then select Storage Manager downloads.
3. Download the ARCCONF Command Line Utility installation package.
4. When the download completes, extract the package contents to the installation directory on your machine (`Program Files` or `/opt` or `/usr`, for instance).
5. On Linux systems, ensure that `arccnf` has 'execute' privilege:

```
chmod arccnf +x
```

3.1.2 Installing ARCCONF Command Line Utility on VMware ESXi 7.x and 8.x

Perform the following steps to install the .zip files for VMware ESXi system. Perform the installation from a remote system running a Telnet/SSH client. Use a terminal emulator to access the ESXi server remotely.

1. Copy the following files from the installer download location to the `/tmp` directory on your local ESXi system. For command line communication, copy the following file:

```
AdaptecArccnf_x.xx.xxxxx-MIS.x.x.x.xxxxxxxx_xxxxxxxx.zip
```

2. Check for existing installation of ARCCONF.

```
esxcli software vib list | grep arccnf
```

3. Remove the existing ARCCONF package.

```
esxcli software vib remove -n arccnf
```

When you remove the package, you receive the message "Reboot Required: true."

4. Set the installation acceptance level to `VMwareAccepted`.

```
esxcli software acceptance set --level=VMwareAccepted
```

5. Install the ARCCONF package.

```
esxcli software vib install -d /tmp/AdaptecArccconf_x.xx.xxxxxx-
MIS.x.x.x.xxxxxxxx_xxxxxxxx.zip
```

When you install the package, you receive the message “Reboot Required: true.”

6. Reboot the system.

3.2 Starting the Command Line Utility

Note: You can run a subset of ARCCONF commands from the UEFI shell. For more information, see [5. Running ARCCONF in the UEFI Shell](#).

1. To start ARCCONF, enter one of the following commands:

Option	Description
Windows	<install_dir>\arccconf.exe
Linux	/<install_dir>/arccconf
VMware ESXi	/opt/arccconf/bin/arccconf

where Install_dir is the directory where the utility is installed.

2. To see a list of available commands, type ARCCONF at the prompt. For help with a specific command, type ARCCONF <command_name> help.

4. Using the Command Line Utility

This chapter explains how to use the command line utility interactively or in batch mode. With Interactive mode, enter commands at the prompt. In Batch mode, create scripts and run the script in the appropriate shell, as described in the following table:

Table 4-1. ARCCONF Batch Environments

Environment	Batch File	Run Script
Windows	.bat	CMD.EXE
Linux/Unix	.sh	sh / bash

In either mode, if your command fails, you immediately see an error message of command failed. Other script messages that you can get are command completed successfully, or command aborted.

The return values for each command are the same:

0x00: SUCCESS

0x01: FAILURE - The requested command failed

0x02: ABORT - The command was aborted because parameters failed validation

0x03: INVALID_ARGUMENTS - The arguments are incorrect. (Displays COMMAND help)

0x06: INVALID_CARD_NUM - Unable to find the specified controller ID

To view a list of commands at the command line, type ARCCONF and press Enter.

To view the online help for a specific command, type ARCCONF <command>, then press Enter.

4.1 ARCCONF Commands

The following commands are available in ARCCONF for Smart Storage controllers. The commands are described on the following pages, in alphabetical order. In the command descriptions, <> indicates a required parameter and [] indicates an optional parameter.



Attention: ARCCONF supports commands for other controllers that are not listed in the following table. In addition, not all commands in the following table are supported by all Smart storage controllers. If you attempt to execute any command not listed in the following table, or any unsupported command for your controller, the firmware returns an error.

Table 4-2. ARCCONF Commands for Smart Storage Controllers

atapassword	imageupdate	saveconfig	setstate
consistencycheck	list	savesupportarchive	slotconfig
create	maxCrypto™	security	smp
delete	maxcryptoaccounts	sedencryption	splitmirror
driverupdate	maxcryptokey	setarrayparam	task
expanderlist	modify	setboot	uninit
expanderupgrade	passthrough	setcache	
getconfig	phyerrorlog	setconfig	
getconfigjson	playconfig	setconnectormode	
getlogs	rescan	setcontrollermode	
getsmartstats	refresh	setcontrollerparam	
getstatus	romupdate	setmaxcache	
getversion		setname	
identify		setpower	
		setpriority	

4.2 arccconf atapassword

Description

Sets or clears the password for SATA drives.

Syntax

```
ARCCONF ATAPASSWORD <Controller#> SET <new password> <Channel# ID#> [noprompt] [nologs]
ARCCONF ATAPASSWORD <Controller#> CLEAR <current password> <Channel# ID#> [noprompt] [nologs]
```

Parameters

new password | current password

New password, current password.

Channel/ID

Lists the space-delimited channel number and device number (ID) pairs for each drive on which to set or clear the password.

SET

Sets the password for the SATA physical device.

CLEAR

Clears the password for the SATA physical device.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF ATAPASSWORD 1 SET uR8ryx 0 1
ARCCONF ATAPASSWORD 1 CLEAR uR8ryx 0 1
```

4.3 arccconf consistencycheck

Description

Toggles the background consistency check modes of the controller.

Syntax

```
ARCCONF CONSISTENCYCHECK <Controller#> <on [Delay]|off> [nologs]
ARCCONF CONSISTENCYCHECK <Controller#> PARALLELCOUNT <Count> [nologs]
ARCCONF CONSISTENCYCHECK <Controller#> EVENTNOTIFY <Enable | Disable> [nologs]
ARCCONF CONSISTENCYCHECK <Controller#> INCONSISTENCYREPAIRPOLICY <Enable | Disable> [nologs]
```

Parameters

Controller#

Controller number.

On [Delay]

Turns background consistency check on, with optional 0 second–30 second delay period. The delay period sets the controller idle time, after which the consistency check will start. A value of 0 disables the consistency check (effectively the same as setting the parameter to Off). If Delay is unspecified, the consistency check mode is set to HIGH. If Delay is specified, the consistency check mode is set to IDLE for the specified period.

When set to high, the check runs in parallel to host I/O and might have an impact on performance. When set to idle, the check only runs during periods of host inactivity and does not impact performance.

PARALLELCOUNT <Count>

Sets the parallel consistency check count. A value of 1 disables the parallel consistency check feature. Logical devices are only scanned one at a time.

EVENTNOTIFY <Enable | Disable>

Sets the inconsistency event notification and serial debug message generation setting for mirrored volumes. The Enable option enables the event notification and serial debug message generation. The Disable option disables the event notification and serial debug message generation.

INCONSISTENCYREPAIRPOLICY <Enable | Disable >

Sets the alternate inconsistency repair policy for RAID6 and RAID60 logical devices on the controller. The Enable option enables the inconsistency repair policy; the Disable option disables the inconsistency repair policy.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF CONSISTENCYCHECK 1 OFF
ARCCONF CONSISTENCYCHECK 1 PARALLELCOUNT 4
ARCCONF CONSISTENCYCHECK 1 EVENTNOTIFY enable
ARCCONF CONSISTENCYCHECK 1 INCONSISTENCYREPAIRPOLICY enable
ARCCONF CONSISTENCYCHECK 1 ON 2
```

4.4 arccnf create

Description

Creates a new encrypted or plaintext logical drive or maxCache logical drive. Refer to the optional parameters to configure the logical device optimally based on your requirements. If the optional parameters are not provided, they are set to default values.

Note: Users cannot mix drives of different interface and drive type.

Syntax

```
ARCCONF CREATE <Controller#> LOGICALDRIVE [Options] <Size> <RAID#> <CHANNEL# ID#> [CHANNEL# ID#] ... [noprompt] [nologs]
ARCCONF CREATE <Controller#> LOGICALDRIVE [Options] <Size> <RAID#> ARRAY <Array#> [noprompt] [nologs]
ARCCONF CREATE <Controller#> LOGICALDRIVE ENCODE <Enable/Disable> USERROLE <userrole> [PASSWORD <password>] [Options] <Size> <RAID#> ARRAY <Array#> [noprompt] [nologs]
ARCCONF CREATE <Controller#> MAXCACHE [Options] DATALD, <LogicalDrive#> <Size> <RAID#> <CHANNEL# ID#> [Channel# ID#]... [noprompt] [nologs]
ARCCONF CREATE <Controller#> MAXCACHE [Options] DATALD, <LogicalDrive#> <Size> <RAID#> ARRAY <maxCache Array#> [noprompt] [nologs]
ARCCONF CREATE <Controller#> RAIDZEROARRAY <Channel# ID#> [Channel# ID#] ... [noprompt] [nologs]
ARCCONF CREATE <Controller#> RAIDZEROARRAY ALL [noprompt] [nologs]
```

Parameters

Controller#

The controller number.

Logical Drive, maxCache

Indicates a logical drive or maxCache Device, with the following options:

- Stripesize <STRIPE>—Allows the logical device stripe size to be built. Optional parameters for specifying a stripe size. STRIPE is specified in kilobytes 16, 32, 64, 128, 256, 512, and 1024 are supported. The default is 256 kB.
- Legs <LEG>—Optional parameters for specifying number of legs. Value is an integer.
 - LEG—Number of legs for RAID level 50 or 60.
 - Default—2 legs
- Name <NAME>—Optional parameter for specifying the alias name of a logical device that is displayed in the utilities. Value is a string of up to 64 characters.
- Method <METHOD>—Initialization method for the logical drive. Valid options include: BUILD, DEFAULT.
- DEFAULT—Initializes parity blocks while the logical device is available for access by the operating system.
- BUILD—Initializes both the data and parity blocks. The logical device remains invisible and unavailable to the operating system until the parity initialization process completes.
- LDcache—Sets the cache state for the logical device:
 - LON— cache on
 - LOFF—cache off
- SSDIOBYPASS <enable | disable>—Specifies to enable/disable SSD I/O bypass path on an array.
- CacheLineSize <CACHELINESIZE>—Specifies the cache line size in KB for maxCache. Adjusting the cache line size can impact maxCache performance and maximum size supported. The larger cache line size can support the larger maxCache size. The default value for this parameter is 64. Valid options can be 64 or 256 based on controller support.
- Wcache—Sets the logical drive write cache mode for maxCache devices. The default value for this parameter is WB.
 - WT—write-through (disabled)
 - WB—write-back (enabled)

Data Logical Drive

Specifies the existing data logical device number to be associated with the newly created cache logical device.

Encode <Enable/Disable>

Optional parameter for specifying whether to create logical device as plaintext or encrypted.

SED—This option is applicable when the controller SED encryption is enabled and the logical device member drives are all SED drives of the same type (OPAL/Enterprise).

Valid options for encode are Disable and Enable. Default value for this parameter is Disable.

- Enable—Creates a SED encrypted logical device.
- Disable—Creates a plaintext (non-encrypted) logical device.

maxCrypto—Valid options for encode are Enable and Disable. Default value for this parameter is Enable.

- Enable—Creates an encrypted logical device.
- Disable—Creates a plaintext (non-encrypted) logical device.

Note:

Plaintext logical device creation is valid only if mixed volumes setting is enabled on the controller.

Userrole <userrole> [Password <password>]

maxCrypto user-role and password. Valid values are:

- crypto (maxCrypto administrator)
- user (standard user)

Array <Array#>

Array number on which to create the logical drive.

ARRAY <maxCache Array#>

The maxCache array number.

RAIDZEROARRAY

Create arrays from list of physical device(s) specified.

Each array will contain exactly one physical device and one RAID 0 logical device.

Default values will be applied for all logical device(s) created.

ALL

Create arrays from list of physical device(s) connected to controller.

SSDIObypass <enable | disable>

Specifies to enable/disable SSD I/O Bypass path on an array.

SSDOverProvisioningOptimization <enable | disable>

Specifies to initialize solid state drives that support the rapid parity initialization feature.

Size

Indicates the size of the logical device in megabytes. Use MAX to set size to available space. Use MAXMBR to set the size to 2 TB.

RAID#

Indicates the RAID level for the new logical drive: 0, 1, 1 Triple, 10, 10 Triple, 5, 6, 50, and 60 are supported.

Note: For a complete list of supported RAID levels for your controller, refer to the product release notes.

Channel# ID#

Lists the space-delimited channel number and device number pairs for each device to add to the logical device.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF CREATE 1 LOGICALDRIVE STRIPESIZE 64 MAX 0 1 0 2 0 3 2 NOPROMPT
ARCCONF CREATE 1 LOGICALDRIVE ssdoverprovisioningoptimization enable 1024 0 ARRAY 0
ARCCONF CREATE 1 LOGICALDRIVE 1024 1 ARRAY 0
ARCCONF CREATE 1 LOGICALDRIVE stripesize 16 method build MAX 5 0 0 0 1 0 2
ARCCONF CREATE 1 MAXCACHE Wcache WB dataid 0 17000 1 0 0 0 1
ARCCONF CREATE 1 MAXCACHE Wcache WB cachelinesize 64 dataid 0 17000 1 0 0 0 1
ARCCONF CREATE 1 MAXCACHE dataid 0 17000 0 ARRAY 0
ARCCONF CREATE 1 LOGICALDRIVE ENCODE disable USERROLE crypto PASSWORD Abc@1234 MAX 5 0 0 0 1 0 2
ARCCONF CREATE 1 RAIDZEROARRAY 0 0 0 1 0 2
ARCCONF CREATE 1 RAIDZEROARRAY ALL
ARCCONF CREATE 1 LOGICALDRIVE encode disable MAX 5 0 0 0 1 0 2
ARCCONF CREATE 1 LOGICALDRIVE encode Enable MAX 5 0 0 0 1 0 2
```

4.5 arccnf delete

Description

Deletes a logical drive, an array, or maxCache logical device . All data stored on the logical drive will be lost.

Syntax

```
ARCCONF DELETE <Controller#> LOGICALDRIVE <LD#> [noprompt] [nologs]
ARCCONF DELETE <Controller#> LOGICALDRIVE ALL [noprompt] [nologs]
ARCCONF DELETE <Controller#> ARRAY <arr#> [noprompt] [nologs]
ARCCONF DELETE <Controller#> ARRAY ALL [noprompt] [nologs]
ARCCONF DELETE <Controller#> MAXCACHE <maxCache ld#> [noprompt] [nologs]
ARCCONF DELETE <Controller#> MAXCACHE ALL [noprompt] [nologs]
```

Parameters

Controller#

Controller number

LD#

LogicalDrive# is the device number of the logical device to be deleted.

arr#

arr# is the device number of the array to be deleted.

maxCache ld#

maxCache ld# is the device number of the maxCache logical device to be deleted.

ALL

Deletes all logical devices or arrays or maxCache.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF DELETE 1 LOGICALDRIVE 1
ARCCONF DELETE 1 ARRAY 0
ARCCONF DELETE 1 ARRAY ALL
ARCCONF DELETE 1 LOGICALDRIVE ALL
ARCCONF DELETE 1 MAXCACHE 0
ARCCONF DELETE 1 MAXCACHE ALL
```

4.6 arcconf driverupdate

Description

Updates the Windows device driver for the controller.

Note: This command is available on Windows systems only.

Syntax

```
ARCCONF DRIVERUPDATE <DirName> [nologs]
```

Parameters

DirName

Absolute path to directory containing the Windows driver for the controller.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF DRIVERUPDATE C:\WINDOWSALL
```

4.7 arcconf expanderlist

Description

Returns a list of disk drive expanders on a controller.

Syntax

```
ARCCONF EXPANDERLIST <Controller#> [nologs]
```

Parameters

Controller#

Controller number.

Examples

```
ARCCONF EXPANDERLIST 1
```

4.8 arcconf expanderupgrade

Description

Allows new firmware to be flashed to an enclosure or expander.

Syntax:

```
ARCCONF EXPANDERUPGRADE <Controller#> ENCLOSURE <Connector# Channel# ID#> [ChunkSize#]
<UpgradeType> <Filename> [Mode#] [noprompt] [nologs]
ARCCONF EXPANDERUPGRADE <Controller#> ENCLOSURE <ConnectorName Channel# ID#> [ChunkSize#]
<UpgradeType> [Filename] [Mode#] [noprompt]
```

Parameters

Controller#

Controller number.

Channel#

Channel number of the device to be updated.

ID#

Device number of the device to be updated.

Connector#

Connector number of the device to be updated.

ConnectorName

Connector name of the device to be updated.

ChunkSize#

Chunk size in bytes to be used to update the firmware. The default value is 4096 bytes.

Filename

Absolute path of the firmware update file.

UpgradeType

EXPANDER—update the firmware image on the expander or enclosure.

MFG—update the manufacturing image (BOOT SEEPROM) on the expander or enclosure.

CPLD—update the CPLD image on the expander or enclosure.

Note: MFG and CPLD upgrade types are supported on the Microchip Adaptec AEC-82885T expander only.

Mode#

The Mode parameter applies to EXPANDER and MFG upgrade types only. Valid values are:

- 2—download microcode only; requires system reset or power cycle to activate (default).
- 6—download microcode with offsets and activate.
- 7—download microcode with offsets, save, and activate.
- E—download microcode with offsets and defer activation.
- F—activate deferred microcode. It does not require the filename as an input.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF EXPANDERUPGRADE 1 ENCLOSURE 2 0 0 1024 EXPANDER C:\FirmwareImage.bin 7
ARCCONF EXPANDERUPGRADE 1 ENCLOSURE 2 0 0 512 MFG C:\FirmwareImage.rom 6
ARCCONF EXPANDERUPGRADE 1 ENCLOSURE 2 0 0 256 CPLD C:\CPLDImage.bin noprompt
ARCCONF EXPANDERUPGRADE 1 ENCLOSURE CN0 0 0 EXPANDER ados.lod 2
```

4.9 arconf getconfig

Description

Lists the following information:

- Array status, size and member drives
- Controller type, status, World Wide Name (WWN), manufacturing information, and mode
- Device driver, SEEPROM, CPLD, and firmware versions

- Logical drive status, RAID level and size
- Logical drive mount points, Consistency Check Information
- RAID 10, 50, 60, 10 Triple segment and group information
- maxCache status, SSD information
- Device type, Device ID, presence of PFA
- Physical device state, mount point (for drives with OS partition) and LUN information.
- Enclosure information: fan, power supply, and temperature status
- UBM backplane Information
- SGPIO virtual SEP information (virtual enclosure device for SGPIO backplanes)
- Connectors backplane discovery protocol
- Connector Information
- Green Backup Information:
 - Backup Power Status
 - Battery/Capacitor Pack Count
 - Hardware Error

If Power type is Supercap the following properties are displayed:

- Power Type
- Current Temperature
- Maximum Temperature
- Threshold Temperature
- Voltage
- Maximum Voltage
- Current
- Health Status
- Relative Charge
- maxCrypto properties: status, mode, number of encrypted logical devices, master key configuration, account configuration
- Out-of-Band interface properties
- PBSI properties
- MCTP properties
- SED encryption properties
- Temperature sensors information
- SPDM properties

Notes: When displaying adapter information (AD keyword), the Controller Status field is set to `Ok` or `Not Ok`. Its value is set to `Not Ok` only if:

1. Communication with the controller fails. This occurs when the driver returns an error code after attempting to send a command to the controller.
2. A logical drive was created with a newer version of `arcconf`. Update to the latest utilities.
3. The controller mode (RAID/Mixed/HBA) is supported by the hardware, but not the firmware. Usually, this means that an older version of `arcconf` is being used against a newer controller. Update to the latest utilities.
4. Dirty cache flush failure scenario: Controller status will be set to `OK`. To repair the dirty cache flush failure errors, reboot the system.

Syntax

```
ARCCONF GETCONFIG <Controller#> [AD|LD [LD#]| AR[AR#]|PD [Channel# ID# Channel# ID#...]PD
[Channel# ID# LUN#]|MC|CN| BP|[AL]] [nologs]
ARCCONF GETCONFIG <Controller#> AD [ RAID | CACHE | OOB | SPDM ] [nologs]
```

Parameters

Controller#

Controller number

LD#

Display information about the specified logical device

AR#

Display information about the specified array, including the associated split mirror array, if applicable

AD/PD/AL...

- AD—Adapter information only (including maxCrypto properties)
- LD—Logical drive information only
- AR—Array information only
- PD—Physical device information only
- BP—Backplane information only
- MC—maxCache information only
- LUN—Physical device LUN ID for Multi-Actuator drive
- CN—Connector information only
- AL—All information
- LD#—Optionally displays information about the specified logical device
- AR#—Optionally displays information about the specified array
- DEBUGTOKEN— Debug token information

RAID

Display raid properties information

CACHE

Display cache properties information

OOB

Display OOB interface properties information

SPDM

Display SPDM properties information

Channel# ID#

Channel# ID#: The Channel and ID of the physical device to be display

Examples

```
ARCCONF GETCONFIG 1
ARCCONF GETCONFIG 1 AD
ARCCONF GETCONFIG 1 AR
ARCCONF GETCONFIG 1 AR 0
ARCCONF GETCONFIG 1 LD
ARCCONF GETCONFIG 1 LD 0
ARCCONF GETCONFIG 1 PD
ARCCONF GETCONFIG 1 PD 0 0
ARCCONF GETCONFIG 1 PD 0 0 1
ARCCONF GETCONFIG 1 MC
ARCCONF GETCONFIG 1 CN
ARCCONF GETCONFIG 1 AL
ARCCONF GETCONFIG 1 DEBUGTOKEN
ARCCONF GETCONFIG 1 AD RAID
ARCCONF GETCONFIG 1 BP
```

4.10 arccnf getconfigjson**Description**

Displays the current system configuration in JSON format.

Syntax:

```
ARCCONF GETCONFIGJSON ALL [FILENAME] [nologs]
ARCCONF GETCONFIGJSON <Controller#> [FILENAME] [nologs]
ARCCONF GETCONFIGJSON <Controller#> LOGICALDRIVE <LogicalDrive#> [FILENAME] [nologs]
ARCCONF GETCONFIGJSON <Controller#> DEVICE <Channel# ID#> [FILENAME] [nologs]
ARCCONF GETCONFIGJSON <Controller#> ARRAY <Array#> [FILENAME] [nologs]
ARCCONF GETCONFIGJSON SCHEMA [SCHEMA FILENAME] [nologs]
```

Parameters**Controller#**

Controller number

Channel#

The channel number for the drive.

ID#

Device number for the device.

LogicalDrive#

Logical drive number

Array#

Array number

FILENAME

Optional parameter that, if specified, outputs the configuration to a JSON file. The provided filename must be accompanied by a .json extension.

ALL

Displays the configuration in JSON format for all controllers.

SCHEMA

Schema about a connected controller configuration and its associated devices.

SCHEMA FILENAME

Optional parameter that, if specified, outputs schema to a JSON file. The provided filename must be accompanied by a .json extension.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF GETCONFIGJSON ALL
ARCCONF GETCONFIGJSON 1
ARCCONF GETCONFIGJSON 1 LOGICALDRIVE 0
ARCCONF GETCONFIGJSON 1 DEVICE 2 0
ARCCONF GETCONFIGJSON 1 ARRAY 0
ARCCONF GETCONFIGJSON ALL C:\configuration.json
ARCCONF GETCONFIGJSON ALL /var/log/configuration.json
ARCCONF GETCONFIGJSON SCHEMA
ARCCONF GETCONFIGJSON SCHEMA C:\schema.json
ARCCONF GETCONFIGJSON SCHEMA /var/log/schema.json
```

4.11 arccnf getlogs

Description

Provides access to event logs including:

- A log of special events that may have occurred (rebuilds, LDMs, and so on)

Syntax

```
ARCCONF GETLOGS <Controller#> EVENT[tabular] [nologs]
ARCCONF GETLOGS <Controller#> DEVICE <clear> <Channel# ID#> [nologs]
ARCCONF GETLOGS <Controller#> DEVICE <clear> ALL [nologs]
```

Parameters

Controller#

Controller number.

EVENT

Controller event log.

Clear

Clears the error counter for one or all physical drives on a controller.

Clear device error counter is not applicable on 'Not Supported' drives.

Channel/ID

Channel and number of the physical device on the controller.

Tabular

Displays events in tabular (vs XML) format.

ALL

All devices connected to controller.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF GETLOGS 1 DEVICE clear 0 0
ARCCONF GETLOGS 1 DEVICE clear ALL
ARCCONF GETLOGS 1 EVENT tabular
```

4.12 arccnf getsmartstats

Description

Displays SMART statistics for the hard drives, Solid State Drives (SSDs), and NVMe on a controller.

Syntax

```
ARCCONF GETSMARTSTATS <Controller#> [Tabular] [nologs]
```

Parameters**Controller#**

Controller number.

Tabular

Creates output in tabular format.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF GETSMARTSTATS 1
ARCCONF GETSMARTSTATS 1 TABULAR
```

4.13 arccnf getstatus**Description**

The GETSTATUS function displays the status of any background task that is currently running. The information includes the type of operation, status, logical drive number and logical drive size (for a logical device), channel ID/device ID (for a physical drive), and percentage of the operation completed.

Syntax

```
ARCCONF GETSTATUS <Controller#> [json] [nologs]
```

Parameters**Controller#**

Controller number.

json

Displays the status of any background task that is currently running in JSON format.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF GETSTATUS 1 JSON
ARCCONF GETSTATUS 1
```

4.14 arccnf getversion**Description**

Lists version information for all controllers or a specific controller's software components, including information about the version of driver, firmware, SEEPROM, and CPLD.

Syntax

```
ARCCONF GETVERSION [nologs]
ARCCONF GETVERSION <Controller#> [nologs]
```

Parameters**Controller#**

Controller number

Examples

```
ARCCONF GETVERSION
ARCCONF GETVERSION 1
```

4.15 arccnf identify

Description

Identifies a physical device by blinking its LEDs. Also, identifies all the physical devices that are used to create a logical drive, maxCache, or array.

Syntax

```
ARCCNF IDENTIFY <Controller#> ALL [TIME <BlinkTime>] [STOP] [nologs]
ARCCNF IDENTIFY <Controller#> LOGICALDRIVE <LogicalDrive#> [TIME <BlinkTime>] [nologs]
ARCCNF IDENTIFY <Controller#> DEVICE <Channel# ID#> ... [TIME <BlinkTime>] [nologs]
ARCCNF IDENTIFY <Controller#> ARRAY <Array#> [TIME <BlinkTime>] [nologs]
ARCCNF IDENTIFY <Controller#> MAXCACHE [TIME <BlinkTime>] [nologs]
```

Parameters

Controller#

Controller number

LogicalDrive#

Device number of the logical drive to be identified

Array#

Array number to be identified

MAXCACHE

maxCache device to be identified

Channel# ID#

Channel number and ID number for the physical device(s) to be identified

ALL

Blinks all physical devices on the controller

TIME <BlinkTime>

Time, in seconds, for the LEDs to continue blinking. Maximum time limit is 86400 seconds.

STOP

Stops blinking the device

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCNF IDENTIFY 1 DEVICE 0 0
ARCCNF IDENTIFY 1 ALL TIME 60
ARCCNF IDENTIFY 1 ALL STOP
ARCCNF IDENTIFY 1 LOGICALDRIVE 0 TIME 60
ARCCNF IDENTIFY 1 LOGICALDRIVE 0
ARCCNF IDENTIFY 1 DEVICE 0 1 TIME 30
ARCCNF IDENTIFY 1 ARRAY 0
ARCCNF IDENTIFY 1 MAXCACHE
```

4.16 arccnf imageupdate

Description

Allows new firmware to be flashed to the hard drive and backplane.

Syntax:

```
ARCCNF IMAGEUPDATE <Controller#> DEVICE <Channel# ID# ChunkSize# Filename> [Mode#]
[BufferID#] [noprompt] [nologs]
ARCCNF IMAGEUPDATE <Controller#> BACKPLANE <BackplaneID# UBMControllerID#|All Filename>
[noprompt]
```

Parameters**Controller#**

Controller number.

Channel#

Channel number of the device or backplane to be updated.

ID#

Device number of the device or backplane to be updated.

ChunkSize#

Chunk size, in bytes, to be used to update the firmware.

Note: For SATA drives, the chunk size must be a multiple of 512.

Mode#

Firmware update mode. Valid values for physical drives are:

- 7—Download microcode with offsets, save, and activate
- 5—Download microcode in single transfer and activate
- 14(E)—Download microcode in 'ChunkSize' byte chunks, but do not activate
- 239(E+F)—Download microcode in 'ChunkSize' byte chunks and activate

BufferID#

Mandatory for tape drive firmware update.

BackplaneID#

Backplane ID of UBM controller.

UBMControllerID#

UBM controller ID whose firmware will be updated.

All

All the UBM controllers connected to specified backplane whose firmware will be updated

Filename

Absolute path of the device or backplane firmware update file.

noprompt

Optional parameter that suppresses alert messages.

Examples

```
ARCCONF IMAGEUPDATE 1 DEVICE 0 0 32768 ados.lod 3
ARCCONF IMAGEUPDATE 1 BACKPLANE 2 0 xyz.hex
```

4.17 arcconf list**Description**

Lists all controllers in the system, or the configuration of a specific controller.

Syntax

```
ARCCONF LIST [Controller#] [nologs]
```

Parameters**Controller#**

The controller number.

Examples

```
ARCCONF LIST
ARCCONF LIST 1
```

4.18 arccnf maxCrypto

Description

Configures maxCrypto settings, including:

- maxCrypto master key
- Mode (enable/disable)
- Administrator account credentials
- Support for mixed encrypted/plaintext volumes

Also toggles the maxCrypto mode, encodes/encrypts arrays and logical drives, and shows the maxCrypto certificate.

Syntax

```
ARCCONF MAXCRYPTO <Controller#> SETUP manual MODE <enable <ACCEPT <yes | no> > |
disable> KEYMANAGEMENTMODE <local | remote> MIXEDVOLUMES <enable | disable> MASTERKEY
<masterkeystring> USERROLE crypto [PASSWORD <crypto password>] [noprompt] [nologs]
ARCCONF MAXCRYPTO <Controller#> MODE <enable <ACCEPT <yes | no> > | disable> USERROLE <crypto
| user> [PASSWORD <crypto/user password>] [nologs]
ARCCONF MAXCRYPTO <Controller#> ENCODE LOGICALDRIVE <logicaldrive#> DATA <preserve/discard>
USERROLE <crypto | user> [PASSWORD <crypto/user password>] [nologs]
ARCCONF MAXCRYPTO <Controller#> ENCODE ARRAY <array#> DATA <preserve/discard> USERROLE
<crypto | user> [PASSWORD <crypto/user password>] [nologs]
ARCCONF MAXCRYPTO <Controller#> SHOW certificate [nologs]
ARCCONF MAXCRYPTO <Controller#> LOCALKEYCACHE <enable> ATTEMPTS <attempts> RETRYINTERVAL
<retryintervals> USERROLE <crypto> [PASSWORD <crypto>] [noprompt][nologs]
ARCCONF MAXCRYPTO <Controller#> LOCALKEYCACHE <disable> USERROLE <crypto> [PASSWORD <crypto>]
[noprompt] [nologs]
ARCCONF MAXCRYPTO <Controller#> VOLATILEKEY <enable> LOGICALDRIVE <logicaldrive#> <withbackup
| withoutbackup> USERROLE <crypto> [PASSWORD <crypto>] [noprompt] [nologs]
ARCCONF MAXCRYPTO <Controller#> VOLATILEKEY <disable> LOGICALDRIVE <logicaldrive#> USERROLE
<crypto> [PASSWORD <crypto>] [noprompt] [nologs]
```

Parameters

Controller#

Controller number.

SETUP manual

Enables manual setup; all parameters are required.

MODE <enable <ACCEPT <yes | no> > | disable>

Enables creation of encrypted and plaintext logical devices and allows you to accept the maxCrypto Terms of Use. Valid values are:

- Enable: Authorized users can create encrypted logical devices or plaintext logical devices, based on the value of the MIXEDVOLUMES property.
- Disable: Authorized users can create plaintext (non-encrypted) logical devices only.

KEYMANAGEMENTMODE local | remote

Enables local or remote key management.

MIXEDVOLUMES

Enables mixing of encrypted and plaintext logical devices. Valid values are:

- Enable: Authorized users have the option to create encrypted logical devices or plaintext logical devices.

- **Disable:** New logical devices will be encrypted, with no option to create plaintext logical devices.

MASTERKEY <masterkeystring>

A 10 to 32 character string, using all printable ASCII characters.



Important: Be sure to record the master key and store in a safe place. Once set, the master key cannot be displayed or recovered, only Reset.

USERROLE <userrole> [PASSWORD <password>]

maxCrypto user role and password. Valid values are:

- crypto (maxCrypto administrator)
- user (standard user)

The password is a 8-16 character string, comprising all printable ASCII characters. It must include at least one uppercase character, one lowercase character, one numeric, and one special character (#,!,@,...). If password is not entered on the command line, a prompt appears during command execution.

ENCODE

Encrypts an existing array or logical drive, based on the maxCrypto mode and MIXEDVOLUMES property.

DATA <preserve | discard>

Preserves or discards original data in encoded logical device.

SHOW certificate

Displays the maxCrypto Terms of Use certificate.

nologs

An optional parameter that suppresses log output to the log files.

LOCALKEYCACHE

Enables the key manager authentication. Encryption keys are stored in a cache locally to allow access to encrypted logical devices, when the remote key server is offline.

The local key cache functionality is only applicable in the remote key management mode.

attempts

Number of attempts to access the key manager before deleting the local key cache.

Valid range is between 0–10 attempts (0 is set to prevent cache entries).

retryinterval

Time in minutes between contacting the key manager and verifying the key cache attempts.

Valid range is between 1–15 minutes.

VOLATILEKEY

Enables volatile key on encrypted volume. Encrypted data keys are stored in the volatile memory instead of the disk. This provides stronger data protection, but it can also cause the data to be inaccessible if there is a power loss.

The volatile key functionality is only applicable in the Remote Key Management mode.

withbackup

Backup option creates a backup of volatile maxCrypto keys.

withoutbackup

Volatile maxCrypto keys are not backed up.

noprompt

An optional parameter that suppresses the user confirmation prompt.

Examples

```
ARCCONF MAXCRYPTO 1 SETUP manual MODE enable ACCEPT yes KEYMANAGEMENTMODE local MIXEDVOLUMES
enable MASTERKEY xxxxxx USERROLE crypto PASSWORD xxxxxx
ARCCONF MAXCRYPTO 1 SETUP manual MODE disable KEYMANAGEMENTMODE local MIXEDVOLUMES enable
MASTERKEY xxxxxx USERROLE crypto password xxxxxx
ARCCONF MAXCRYPTO 1 MODE disable USERROLE crypto PASSWORD xxxxxx
ARCCONF MAXCRYPTO 1 ENCODE ARRAY 0 DATA preserve USERROLE crypto
ARCCONF MAXCRYPTO 1 ENCODE LOGICALDRIVE 0 DATA preserve USERROLE crypto PASSWORD XXXXXX
ARCCONF MAXCRYPTO 1 MODE enable ACCEPT yes USERROLE crypto
ARCCONF MAXCRYPTO 1 LOCALKEYCACHE enable ATTEMPTS 10 RETRYINTERVAL 15 USERROLE crypto
ARCCONF MAXCRYPTO 1 LOCALKEYCACHE disable USERROLE crypto
ARCCONF MAXCRYPTO 1 VOLATILEKEY enable LOGICALDRIVE 0 withbackup USERROLE crypto PASSWORD
Abc@1234 noprompt
ARCCONF MAXCRYPTO 1 VOLATILEKEY disable LOGICALDRIVE 0 USERROLE crypto
```

4.19 arccnf maxCryptoaccounts

Description

Creates a maxCrypto standard user (non-administrator) account, sets password recovery question/answer, changes passwords, and recovers passwords.

Syntax

```
ARCCONF MAXCRYPTOACCOUNTS <Controller#> CREATEUSER [CRYPTOPASSWORD <crypto password>
USERPASSWORD <user password>] [nologs]
ARCCONF MAXCRYPTOACCOUNTS <Controller#> CHANGEPASSWORD USERROLE <crypto | user> [OLDPASSWORD
<crypto/user password> NEWPASSWORD <crypto/user password>] [nologs]
ARCCONF MAXCRYPTOACCOUNTS <Controller#> SETRECOVERYPARAM QUESTION <"Question"> ANSWER
<"Answer"> USERROLE crypto [PASSWORD <crypto password>] [nologs]
ARCCONF MAXCRYPTOACCOUNTS <Controller#> RECOVERPASSWORD ANSWER <"Answer"> USERROLE crypto
[NEWPASSWORD <crypto password>] [nologs]
ARCCONF MAXCRYPTOACCOUNTS <Controller#> RECOVERPASSWORD SHOW question [nologs]
```

Parameters

Controller#

Controller number.

CREATEUSER

Creates a standard user account, using the maxCrypto Administrator account (crypto).

Note: The standard user account is limited to lock/unlock firmware update; see [4.38. arccnf setcontrollerparam](#).

CRYPTOPASSWORD <crypto password>

maxCrypto Administrator account (crypto) password. If crypto password is not entered on the command line, a prompt appears during command execution.

USERPASSWORD <user password>

maxCrypto standard account (user) password. The password is a 8-16 character string, comprising all printable ASCII characters. It must include at least one uppercase character, one lowercase character, one numeric, and one special character (#,!,@,...). If user password is not entered on the command line, a prompt appears during command execution.

CHANGEPASSWORD

Changes the password for the standard user or crypto (Administrator) account.

USERROLE <crypto | user>

The account type: crypto (Administrator) or user (standard user).

OLDPASSWORD <crypto/user password> NEWPASSWORD <crypto/user password>

The old password and new password for the crypto account or user account. The password is a 8-16 character string, comprising all printable ASCII characters. It must include at least one uppercase character, one lowercase character, one numeric, and one special character (#,!,@,...). If the password is not entered on the command line, a prompt appears during command execution.

SETRECOVERYPARAM QUESTION <"Question"> ANSWER <"Answer">

Sets the password recovery question and answer for the crypto (Administrator) account. The question and answer must be enclosed in quotes.

RECOVERPASSWORD ANSWER <"Answer"> [NEWPASSWORD <crypto password>]

Answers the recovery question and sets the new password for the crypto (Administrator) account. If the password is not entered on the command line, a prompt appears during command execution.

RECOVERPASSWORD SHOW question

Shows the recovery question.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF MAXCRYPTOACCOUNTS 1 CHANGEPASSWORD USERROLE crypto OLDPASSWORD Abc@1234 NEWPASSWORD
Abc@123456
ARCCONF MAXCRYPTOACCOUNTS 1 CREATEUSER CRYPTOPASSWORD Abc@1234 USERPASSWORD Abc@123456
ARCCONF MAXCRYPTOACCOUNTS 1 SETRECOVERYPARAM QUESTION "Which planet are you from?" ANSWER "i
am from planet earth" USERROLE crypto PASSWORD Abc123456
ARCCONF MAXCRYPTOACCOUNTS 1 RECOVERPASSWORD SHOW question
ARCCONF MAXCRYPTOACCOUNTS 1 RECOVERPASSWORD ANSWER "i am from planet earth" NEWPASSWORD
Abc@123456
```

4.20 arccnf maxCryptokey

Description

Performs maxCrypto key management functions, including changing the master key, generating a new key for an encrypted array or logical drive, and importing a master key for a logical drive moved from another controller (allows the controller to access the encrypted data).

Syntax

```
ARCCONF MAXCRYPTOKEY <Controller#> CHANGEMASTERKEY <masterkey> USERROLE <crypto | user>
[PASSWORD <crypto/user password>][nologs]
ARCCONF MAXCRYPTOKEY <Controller#> REKEY ARRAY <array#> USERROLE <crypto | user> [PASSWORD
<crypto/user password>][nologs]
ARCCONF MAXCRYPTOKEY <Controller#> REKEY LOGICALDRIVE <logicaldrive# | ALL> USERROLE <crypto
| user> [PASSWORD <crypto/user password>][nologs]
ARCCONF MAXCRYPTOKEY <Controller#> IMPORT MASTERKEY <masterkey> USERROLE <crypto | user>
[PASSWORD <crypto/user password>][nologs]
```

Parameters**Controller#**

Controller number.

CHANGEMASTERKEY <masterkeystring>

A 10 to 32 character string, using all printable ASCII characters.



Important: Be sure to record the new master key and store in a safe place. Once set, the master key cannot be displayed or recovered, only reset.

IMPORT MASTERKEY <masterkeystring>

Imports the master key for a logical drive moved from another controller. The master key is a 10 to 32 character string, using all printable ASCII characters.

REKEY

Generates a new key for an encrypted array or logical drive.

USERROLE <crypto | user> [PASSWORD <crypto/user password>]

maxCrypto user role: crypto (Administrator) or user (standard account), with optional password. If password is not entered on the command-line, a prompt appears during command execution.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF MAXCRYPTOKEY 1 CHANGEMASTERKEY Abc@1234567 USERROLE crypto PASSWORD Abc@123456
ARCCONF MAXCRYPTOKEY 1 REKEY ARRAY 0 USERROLE crypto PASSWORD Abc@123456
ARCCONF MAXCRYPTOKEY 1 IMPORT MASTERKEY Abc@1234567 USERROLE crypto PASSWORD Abc@123456
ARCCONF MAXCRYPTOKEY 1 CHANGEMASTERKEY Abc@1234567 USERROLE crypto
ARCCONF MAXCRYPTOKEY 1 REKEY ARRAY 0 USERROLE crypto
```

4.21 arccnf modify

Description

Morphs a logical device from one RAID level to another (RAID Level Migration). Expands a logical device from original size to one with larger capacity (Online Capacity Expansion).

Expands, shrinks, heals or moves an array, or moves a logical device to a new array.

Note: Do not mix SMR and PMR in an array.

Syntax

```
ARCCONF MODIFY <Controller#> FROM <LogicalDrive#> TO [Options] <Size> <RAID#> <CHANNEL# ID#>
[CHANNEL# ID#] ... [noprompt] [nologs]
ARCCONF MODIFY <Controller#> ARRAY <Array#> MOVE <Channel# ID#> [Channel# ID#] ... [nologs]
ARCCONF MODIFY <Controller#> ARRAY <Array#> HEAL <Channel# ID#> [Channel# ID#] ... [nologs]
ARCCONF MODIFY <Controller#> LOGICALDRIVE <LD#> MOVEARRAY <Array#> [nologs]
ARCCONF MODIFY <Controller#> LOGICALDRIVE <LD#> NEWARRAY <Channel# ID#> [Channel# ID#] ...
[nologs]
ARCCONF MODIFY <Controller#> ARRAY <Array#> EXPAND [modifyparitygroups] <Channel# ID#>
[Channel# ID#] ... [nologs]
ARCCONF MODIFY <Controller#> ARRAY <Array#> SHRINK [modifyparitygroups] <Channel# ID#>
[Channel# ID#] ... [nologs]
```

Parameters

Controller#

The controller number

LogicalDrive#

The logical drive number to be modified

Array#

The array ID of the array to be modified

Options

One of the following:

- **Stripesize <size>**—indicates the stripe size in KB. Options are 16, 32, 64, 128, 256, 512, and 1024. the default is 256KB.

Size

- Size in MB.
- MAX indicates that you want to use all available space on the disk.

Legs <LEG>

Optional parameter for specifying number of legs. LEG is the number of legs for RAID level 50 or 60. Default value for this parameter is 2.

RAID#

RAID level for Migration, Expansion or Move logical device.

Channel# ID#

Channel number and device ID for the device

Note: The CHANNEL# and ID# parameters are the list of devices that will contain the target modification object. Channel and ID are repeatable parameters.

MOVE

Moves an array to a new set of physical devices. Number of new physical devices must equal the number of physical devices in the original array.

EXPAND

Expands an array by adding physical device(s) to it. Only the physical device(s) that need to be added should be specified.

SHRINK

Shrinks an array by removing physical device(s) from it. Only physical device(s) that need to be removed should be specified.

HEAL

Replaces failed physical devices in the array with the specified devices.

MOVEARRAY

Moves a logical device to an existing array.

NEWARRAY

Moves a logical device to a new array created with the specified physical devices.

modifyparitygroups

Reconfigures the logical device(s) parity groups based on the final number of physical devices in the array.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF MODIFY 1 FROM 2 TO 2048 0 0 123 0 124 0 117
ARCCONF MODIFY 1 ARRAY 1 MOVE 0 2 0 3
ARCCONF MODIFY 1 ARRAY 1 HEAL 0 0 0 1
ARCCONF MODIFY 1 LOGICALDRIVE 0 MOVEARRAY 1
ARCCONF MODIFY 1 LOGICALDRIVE 0 NEWARRAY 0 4 0 5
ARCCONF MODIFY 1 ARRAY 1 EXPAND 0 0 0 1
ARCCONF MODIFY 1 ARRAY 1 SHRINK 0 0 0 1
ARCCONF MODIFY 1 ARRAY 1 EXPAND MODIFYPARITYGROUPS 0 0 0 1
ARCCONF MODIFY 1 ARRAY 1 SHRINK MODIFYPARITYGROUPS 0 0 0 1
ARCCONF MODIFY 1 FROM 0 TO stripesize 16 1024 1 0 0 0 1
```

4.22 arccconf passthrough

Description

Sends a passthrough SCSI command. The CDB bytes are enclosed in square brackets, hex encoded, space-delimited, and must number 6, 10, 12, or 16 bytes. Read data may be redirected to a file. Write data is taken from the specified file. Transfers are limited to 2048 bytes. Transfer lengths are inferred for common SCSI CDBs but may be overridden using the length parameter.

Syntax

```
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <read|nottransfer> [length] <[> CDB> <]>
[rawhex] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <readwithsense|nottransferwithsense> [length]
<[> <CDB> <]> [rawhex] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <write> [length] <[> <CDB> <]> <Filename>
[rawhex] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <writewithsense> [length] <[> <CDB> <]>
<Filename> [rawhex] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#1-ID#2> <read> [length] <[> <CDB> <]> [rawhex]
[noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#1, ID#2, #ID#3> <read> [length] <[> <CDB> <]>
[rawhex] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <read|readwithsense> [length] <[> <CDB> <]>
[rawhex|rawbinary] [noprompt] [nologs]
ARCCONF PASSTHROUGH <Controller#> <Channel# ID#> <read|readwithsense> [length] <[> <CDB> <]>
[rawhex|rawbinary] [Filename] [noprompt] [nologs]
```

Parameters

CDB

SCSI Command Descriptor Block. The CDB bytes are enclosed in square brackets, hex encoded, space-delimited, and must be 6, 10, 12, or 16 bytes.

length

Read/write data buffer length.

Read

Command direction is read.

Write

Command direction is write.

nottransfer

No command direction (No data to read/write from/to the device).

readwithsense

Command direction is read with sense data.

writewithsense

Command direction is write with sense data.

nottransferwithsense

Read only the sense data.

rawhex

Displays Hex data only of the Passthrough response.

Controller#

The controller through which the passthrough CDB is to be sent.

Channel# ID#

The channel and ID of the physical device.

FileName

Write the CDB data input file.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Supported Commands

Refer to the SCSI primary/block command specification for command format for each of the following commands.

Table 4-3. Passthrough CDB Commands

Opcode	Command	Direction
0x00	TEST UNIT READY	nottransfer
0x03	REQUEST SENSE	read
0x08	READ (6)	read
0x0A	WRITE (6)	write
0x12	INQUIRY	read
0x15	MODE SELECT (6)	write
0x1A	MODE SENSE (6)	read
0x1B	START STOP UNIT	nottransfer
0x1C	RECEIVE DIAGNOSTIC RESULTS	read
0x1D	SEND DIAGNOSTIC	write
0x25	READ CAPACITY (10)	read
0x28	READ (10)	read
0x2A	WRITE (10)	write
0x2E	WRITE AND VERIFY (10)	write
0x3B	WRITE BUFFER	write
0x3C	READ BUFFER	read
0x4C	LOG SELECT	write
0x4D	LOG SENSE	read
0x55	MODE SELECT (10)	write
0x5A	MODE SENSE (10)	read
0x5E	PERSISTENT RESERVE IN	read
0x5F	PERSISTENT RESERVE OUT	write
0x85	ATA PASSTHROUGH (16)	write
0x88	READ(16)	read
0xA0	REPORT LUNS	read
0xA8	READ (12)	read
0xAA	WRITE (12)	write
0xAE	WRITE AND VERIFY (12)	write

Examples

```
ARCCONF PASSTHROUGH 1 0 1 read 512 [ 28 00 00 00 00 00 00 02 00 00 ]
ARCCONF PASSTHROUGH 1 0 1 readwithsense 512 [ 28 00 00 00 00 00 00 02 00 00 ]
ARCCONF PASSTHROUGH 1 0 1 read 512 [ 28 00 00 00 00 00 00 02 00 00 ] rawhex
ARCCONF PASSTHROUGH 1 0 1 read 512 [ 28 00 00 00 00 00 00 02 00 00 ] rawbinary
ARCCONF PASSTHROUGH 1 0 1 read 512 [ 28 00 00 00 00 00 00 02 00 00 ] rawhex C:\file.txt
ARCCONF PASSTHROUGH 1 0 1 write 512 [ 2A 00 00 00 00 00 00 02 00 00 ] C:\file.txt
ARCCONF PASSTHROUGH 1 0 1 writewithsense 512 [ 2A 00 00 00 00 00 00 02 00 00 ] C:\file.txt
ARCCONF PASSTHROUGH 1 0 1 writewithsense 512 [ 2A 00 00 00 00 00 00 02 00 00 ] /usr/file.txt
```

4.23 **arccnf phyerrorlog**

Description

Displays PHY error logs for physical devices on a controller .

Syntax

```
ARCCNF PHYERRORLOG <Controller#> DEVICE <Channel# ID#> [nologs]
ARCCNF PHYERRORLOG <Controller#> DEVICE ALL [nologs]
ARCCNF PHYERRORLOG <Controller#> ENCLOSURE <Connector# Channel# ID#> EXPANDER <ExpanderID#>
PHY <PHY#> [noprompt]
ARCCNF PHYERRORLOG <Controller#> ENCLOSURE <Connector# Channel# ID#> EXPANDER <ExpanderID#>
PHY ALL [noprompt]
ARCCNF PHYERRORLOG <Controller#> [noprompt]
```

Parameters

Controller#

Controller number.

Channel/ID

Channel and number of the physical device on the controller.

ALL

Displays PHY error log for all physical devices.

PHY#

PHY identifier.

Expander#

Expander ID to whom the command needs to be sent.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCNF PHYERRORLOG 1 DEVICE 0 0
ARCCNF PHYERRORLOG 1 DEVICE ALL
ARCCNF PHYERRORLOG 1 ENCLOSURE 0 2 0 EXPANDER 0 PHY 8
ARCCNF PHYERRORLOG 1 ENCLOSURE 0 2 0 EXPANDER 0 PHY ALL
ARCCNF PHYERRORLOG 1
```

4.24 **arccnf playconfig**

Description

Configures a controller using a XML server template file produced by the SAVECONFIG command (see [4.28. arccnf saveconfig](#)). Use this command to deploy the same controller configuration on multiple servers in your storage space.

Notes:

1. The XML server template file (default, saveconfig.xml) is editable. For example, you may need to change the disk drive capacity, logical drive size, or RAID level.
2. Drives from the same vendor with slightly different capacities (147GB vs 150GB, for instance) are considered interchangeable. If the interchange results in a change in logical drive capacity, the drive is scaled, as needed. For example, if the new drives have 4% more capacity due to vendor or model changes, then all logical drives are increased in size by 4%.
3. Be sure to check the log file to verify that the controller was configured successfully. The exit codes, shown in the following table, indicate the success or failure of the operation and if the system needs to be rebooted.

Code	Value	Meaning
SUCCESS	0	Configuration succeeded, no reboot is required.
FAILURE_GENERAL	1	An error occurred and the configuration could not be completed.
SUCCESS_REBOOT	2	Configuration succeeded, but a reboot is required.

Syntax

```
ARCCONF PLAYCONFIG <Input XML File> [LogFile] [FORCE ALL|LOGICALSIZE] [SLOTID][nologs]
```

Parameters

Input XML File

The pathname of the server template file. The default server template file is available at C:\PMCS\Logs\saveconfig.xml.

LogFile

Sets the pathname of the error log file. By default, the error log is available at C:\PMCS\Logs\playconfig.log.

FORCE

Forces deployment of the server even if the controller does not support all features, or the drive capacity does not match the configuration in the input XML file. Use FORCE ALL to force deployment of all features; use FORCE LOGICALSIZE to force deployment of just the logical drives.

SLOTID

Apply the configuration based on Slot ID instead of Device ID.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF PLAYCONFIG server1_config.xml playconfig.log FORCE ALL
```

4.25 arccnf rescan

Description

Enables the controller to check for the removal of any disk drives and to check for the connection of any new disk drives to the controller. Controller rescan runs in the background, asynchronously. When rescan is started, a message is displayed stating that the process is running in the background and may take 10 minutes to complete. Another message is displayed if a rescan is started while one is already in progress.

Syntax

```
ARCCONF RESCAN <Controller#> [nologs]
ARCCONF RESCAN ALL [nologs]
```

Parameters

Controller#

The controller number

ALL

Rescans all controllers in the system

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF RESCAN 1
ARCCONF RESCAN ALL
```

4.26 arccnf refresh

Description

Refresh the security status of Self Encryption Drive (SED).

Syntax

```
ARCCONF REFRESH <Controller#> SEDSECURITYSTATUS <LockedOnly|ALL> [nologs]
ARCCONF REFRESH <Controller#> SEDSECURITYSTATUS DEVICE <Channel# ID#> [Channel# ID#] ...
[nologs]
```

Parameters

Controller#

The controller number

SEDSECURITYSTATUS

SED security status

LockedOnly

Option to refresh the security status of locked SED drives.

ALL

Option to refresh the security status of all SED drives.

Channel# ID#

The Channel and ID of the SED physical device.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF REFRESH 1 SEDSECURITYSTATUS LockedOnly
ARCCONF REFRESH 1 SEDSECURITYSTATUS Device 0 5
```

4.27 arccnf romupdate

Description

Allows new firmware and BIOS to be flashed to the controller. A reboot is required for the new firmware to take effect.

Note:

1. This command is supported on all OSs that support maxView Storage Manager.

Syntax

```
ARCCONF ROMUPDATE <Controller#> <ImagePath> [once] [noprompt] [nologs]
ARCCONF ROMUPDATE 1 toggle [noprompt] [nologs]
```

Parameters

Controller#

The controller number.

ImagePath

This is the full path of the ROM image file.

toggle

Toggles active ROM image to backup ROM image.

once*

If specified, only the backup ROM is flashed with the new image.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF ROMUPDATE 1 C:\firmwareImage\SmartFW.bin noprompt
ARCCONF ROMUPDATE 1 toggle
ARCCONF ROMUPDATE 1 C:\firmwareImage\SmartFW.bin once
```

4.28 arccnf saveconfig

Description

Note: This command is supported on all OSs that support arccnf/maxView Storage Manager.

Saves the controller configuration to a XML server template file, including the controller type, operational settings, physical drive size, logical drive size, RAID level, and more. Use this file with the PLAYCONFIG command to deploy the same controller configuration to other servers in your storage space; see [4.24. arccnf playconfig](#) for more information.

Note: Be sure to check the log file to verify that the configuration XML file was created successfully. The exit codes, shown in the following table, indicate the success or failure of the operation.

Code	Value	Meaning
SUCCESS	0	Configuration XML generated successfully.
FAILURE_GENERAL	1	An error occurred and the configuration XML could not be generated.

Syntax

```
ARCCONF SAVECONFIG [Input XML File] [LogFile] [nologs]
```

Parameters**Input XML File**

The pathname of the server template file. The default name (if you omit this parameter) is C:\PMCS\Logs\saveconfig.xml.

LogFile

The pathname of the error log file. By default, the error log is available at C:\PMCS\Logs\saveconfig.log.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SAVECONFIG server1_config.xml C:\LOGS\SERVER1.LOG
```

4.29 arccnf savesupportarchive

Description

Saves configuration and status information to help diagnose a problem with your system. Saved information includes device logs, event logs, error logs, controller logs, basecode logs, and SMART statistics.

By default, the log files are saved in the Support folder in the standard logs directory for your operating system (/var/log for Linux, and so on).

Syntax

```
ARCCONF SAVESUPPORTARCHIVE [Path] [Firmware|Arcconf|Storlib|Basecode|GUI|Redfish] [Firmware
Uartlog|Diagnostics] [nologs]
```

Parameters**Path**

Path to store the log files.

Log type:

One of these options:

- Firmware: saves Firmware logs
- Type
 - Uartlog—saves controller serial logs
 - Diagnostics—saves controller debug logs
- Arcconf: saves Arcconf logs
- Storlib: saves StorLib logs
- Basecode: saves basecode logs
- GUI: saves GUI logs
- Redfish: saves Redfish logs

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SAVESUPPORTARCHIVE
ARCCONF SAVESUPPORTARCHIVE Firmware
ARCCONF SAVESUPPORTARCHIVE C:\Adaptec\maxView Firmware
ARCCONF SAVESUPPORTARCHIVE firmware diagnostics
```

4.30 arcconf security**Description**

Operations for SPDm certificate feature for controller. Some controllers do not support this operation.

Syntax

```
ARCCONF SECURITY <Controller#> SPDm GETCERTIFICATE SLOT <slot# | all> [filename] [nologs]
ARCCONF SECURITY <Controller#> SPDm SETCERTIFICATE SLOT <slot# | all> <filename> [nologs]
ARCCONF SECURITY <Controller#> SPDm INVALIDATE SLOT <slot# | all> [nologs]
```

Parameters**SPDM**

Security Protocol and Data Model.

GETCERTIFICATE

Retrieves and stores certificate chains from specific slot.

SETCERTIFICATE

Import a certificate chain to a slot.

INVALIDATE

Invalidate certificate chain on the slot.

SLOT

SPDM certificate chain slots.

- slot#: SPDM certificate slot ID. Valid range is 0 - 7.
- all: Will apply the operation to all SPDM certificate chain slots.

filename

Absolute file path of the certificate chain to set or get on the controller.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SECURITY 1 SPDM GETCERTIFICATE SLOT 0 spdm_certificate_slot_0.bin
ARCCONF SECURITY 1 SPDM GETCERTIFICATE SLOT ALL
ARCCONF SECURITY 1 SPDM SETCERTIFICATE SLOT 0 spdm_certificate_slot_0.bin
ARCCONF SECURITY 1 SPDM SETCERTIFICATE SLOT ALL spdm_certificate_slot_0.bin
ARCCONF SECURITY 1 SPDM INVALIDATE SLOT 0
ARCCONF SECURITY 1 SPDM INVALIDATE SLOT ALL
```

4.31 arccconf sedencryption

Description

Sets up the SED encryption feature for controller.

Syntax

```
ARCCONF SEDENCRYPTION <Controller#> MODE enable KEYMANAGEMENTMODE local MASTERKEY
<masterkeystring> [MASTERKEYIDENTIFIER <masterkeyidentifierstring>] [CONTROLLERPASSWORD
controllerpasswordstring] [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> MODE enable KEYMANAGEMENTMODE remote [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> MODE disable [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> CONTROLLERPASSWORD <set | update>
<controllerpasswordstring> MASTERKEY <masterkeystring> [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> CONTROLLERPASSWORD unlock <controllerpasswordstring>
[noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> CONTROLLERPASSWORD clear MASTERKEY <masterkeystring>
[noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> CHANGEMASTERKEY NEWMASTERKEY <newmasterkeystring>
MASTERKEY <masterkeystring> [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> CHANGEMASTERKEYIDENTIFIER NEWMASTERKEYIDENTIFIER
<newmasterkeyidentifierstring> MASTERKEY <existingmasterkeystring> [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> TAKEOWNERSHIP device all [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> TAKEOWNERSHIP device <Channel# ID#> [Channel# ID#] ...
[noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> REVERTTOOFS device all [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> REVERTTOOFS device <Channel# ID#> [Channel# ID#] ...
[noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> REVERTTOOFS device <Channel# ID#> PSID
physicalsecureidstring [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> IMPORT array <array ID#> FOREIGNKEY <foreignkeystring>
[FOREIGNRESETKEY <foreignresetkeystring>] [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> IMPORT device <Channel# ID#> [Channel# ID#] ...
FOREIGNKEY <foreignkeystring> [FOREIGNRESETKEY <foreignresetkeystring>] [noprompt] [nologs]
ARCCONF SEDENCRYPTION <Controller#> IMPORT FOREIGNKEY <foreignkeystring> [FOREIGNRESETKEY
<foreignresetkeystring>] [noprompt] [nologs]
```

Parameters

MODE

Enable or disable SED encryption

KEYMANAGEMENTMODE

This mode sets local and remote key management mode for SED encryption according to a parameter specified.

MASTERKEY

To set the master key.

Valid master key must be 8 to 32 characters long with ASCII characters only. It must be a combination of alphanumeric characters including, at least one upper-case character, at least one lower-case character, at least one numeric character, and one non-alphanumeric character (such as “#” or “\$”).



Important: Record the master key. After the value is set, the master key cannot be recovered or displayed. Failure to provide the master key might result in encrypted data becoming inaccessible.

MASTERKEYIDENTIFIER

To set the master key identifier.

The master key identifier is a hint to the master key used for encryption. The master key identifier must be 0 to 32 characters long for Local Key Management mode, using only ASCII characters.

CONTROLLERPASSWORD

When controller password is enabled, the controller does not use the master key to unlock any SEDs until the password is supplied and validated.

set

Sets the controller password.

The controller password must be 8 to 32 characters long, using only ASCII characters.

Update

Updates the controller password.

clear

Removes the controller password.

unlock

This operation provides the option to unlock the SED locked offline logical device, which might occur when the controller password is not entered or an invalid controller password is entered at boot time. This option is only applicable when a controller password is configured, and the SED encryption status is “Waiting on Controller Password”.

CHANGEMASTERKEY

Sets new masterkey.

NEWMASTERKEY

New masterkey to be applied.

MASTERKEY

Existing master key of the controller.

CHANGEMASTERKEYIDENTIFIER

Sets new masterkey identifier.

NEWMASTERKEYIDENTIFIER

New master key identifier to be applied.

TAKEOWNERSHIP

The controller will take the ownership of the selected SED drives and manage their encryption settings.

REVERTTOOFS

Returns the SED to original factory state.

PSID

Physical Secure ID of the device.

IMPORT

Import foreign device or array with foreign key and foreign reset key, value must be in ASCII or HEX string with prefix '0x'.

FOREIGNKEY

Foreign SED is a Self Encrypting Drive (SED), which is imported from the different controller, where SED based encryption was setup using a different master key. To unlock this device, the foreign SED master key is required.

FOREIGNRESETKEY

SED was removed from a system where the device was undergoing a rekey or rekey was queued. Importing such SED also requires the old master key before the rekey.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Note: Some controller(s) supports only Local Key Management mode with masterkeyidentifier length 8 to 32 characters.

Examples

```
ARCCONF SEDENCRYPTION 1 mode enable keymanagementmode local masterkey Abc@1234567
masterkeyidentifier helloworld
ARCCONF SEDENCRYPTION 1 mode enable keymanagementmode local masterkey Abc@1234567
CONTROLLERPASSWORD Xyz@1234567 masterkeyidentifier helloworld
ARCCONF SEDENCRYPTION 1 mode enable keymanagementmode local masterkey Abc@1234567
CONTROLLERPASSWORD Xyz@1234567
ARCCONF SEDENCRYPTION 1 mode enable keymanagementmode remote
ARCCONF SEDENCRYPTION 1 mode disable
ARCCONF SEDENCRYPTION 1 CONTROLLERPASSWORD set Xyz@1234567 masterkey Abc@1234567
ARCCONF SEDENCRYPTION 1 CONTROLLERPASSWORD update Xyz@1234567 masterkey Abc@1234567
ARCCONF SEDENCRYPTION 1 CONTROLLERPASSWORD clear masterkey Abc@1234567
ARCCONF SEDENCRYPTION 1 CONTROLLERPASSWORD unlock Xyz@1234567
ARCCONF SEDENCRYPTION 1 CHANGEMASTERKEY newmasterkey Mchp@1234567 masterkey Abc@1234567
ARCCONF SEDENCRYPTION 1 CHANGEMASTERKEYIDENTIFIER newmasterkeyidentifier mysecuredkey
masterkey Mchp@1234567
ARCCONF SEDENCRYPTION 1 TAKEOWNERSHIP device all
ARCCONF SEDENCRYPTION 1 TAKEOWNERSHIP device 0 1 0 2
ARCCONF SEDENCRYPTION 1 REVERTTOOFS device all
ARCCONF SEDENCRYPTION 1 REVERTTOOFS device 0 1 0 2
ARCCONF SEDENCRYPTION 1 REVERTTOOFS device 0 1 PSID 6A1CD2C0349789FFAB5D034766DD9C66
ARCCONF SEDENCRYPTION 1 IMPORT array 0 FOREIGNKEY Xyz@1234567
SEDENCRYPTION 1 IMPORT array 0 FOREIGNKEY 0x58797A4031323334353637 FOREIGNRESETKEY
0x4162634031323334353637
ARCCONF SEDENCRYPTION 1 IMPORT array 0 FOREIGNKEY Xyz@1234567 FOREIGNRESETKEY Abc@1234567
ARCCONF SEDENCRYPTION 1 IMPORT device 0 1 0 2 FOREIGNKEY Xyz@1234567 FOREIGNRESETKEY
Abc@1234567
ARCCONF SEDENCRYPTION 1 IMPORT FOREIGNKEY Xyz@1234567 FOREIGNRESETKEY Abc@1234567
```

4.32 arccnf setarrayparam**Description**

Changes a parameter of an array.

Syntax

```
ARCCONF SETARRAYPARAM <Controller#> <Array#> SPARETYPE <Type> [noprompt] [nologs]
ARCCONF SETARRAYPARAM <Controller#> <Array#> SSDIOBYPASS <enable/disable> [nologs]
```

Parameters**Controller#**

Controller number

Array#

Array number to be modified

SPARETYPE

Sets the spare type for the array:

- 1—Dedicated—A spare that replaces a failed drive in the array, and is shareable between arrays.
- 2—Autoreplace—A spare that replaces a failed drive in the array, and is *not* sharable between arrays.

SSDIOBYPASS

Enables or disables I/O bypass for all logical devices in the array. Default is enabled.

- Enable—I/O bypass on array will be enabled.
- Disable—I/O bypass on array will be disabled.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETARRAYPARAM 1 0 SPARETYPE 1
ARCCONF SETARRAYPARAM 1 0 SSDIOBYPASS enable
```

4.33 arcconf setboot**Description**

Sets the logical or physical device as a boot device for the system.

Syntax

```
ARCCONF SETBOOT <Controller#> LOGICALDRIVE <LogicalDrive#> [TYPE <Boot Type>] [noprompt]
[nologs]
ARCCONF SETBOOT <Controller#> DEVICE <Channel# ID#> TYPE <Boot Type> [noprompt] [nologs]
```

Parameters**Controller#**

Controller number

LogicalDrive#

Logical drive number to mark as the boot device

Channel# ID#

Channel and ID of the physical device to mark as the boot device.

TYPE <Boot Type>

Boot type of the logical or physical device:

- Primary—Primary boot logical/physical device

- Secondary—Secondary boot logical/physical device
- All—Primary and secondary boot logical/physical device.
- None—Makes logical/physical device non-bootable.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETBOOT 1 LOGICALDRIVE 0 TYPE primary
ARCCONF SETBOOT 1 DEVICE 0 5 TYPE secondary
```

4.34 arccnf setcache

Description

Changes the cache settings, cache mode for a logical drive, or the write cache mode for drives of different drive type on a controller.

Syntax

```
ARCCONF SETCACHE <Controller#> LOGICALDRIVE <LogicalDrive# | All> <logical mode> [noprompt]
[nologs]
ARCCONF SETCACHE <Controller#> DRIVEWRITECACHEPOLICY <DriveType> <CachePolicy> [noprompt]
[nologs]
ARCCONF SETCACHE <Controller#> CACHERATIO <read#> <write#> [nologs]
ARCCONF SETCACHE <Controller#> WAITFORCACHEROOM <enable | disable> [nologs]
ARCCONF SETCACHE <Controller#> NOBATTERYWRITECACHE <enable | disable> [noprompt] [nologs]
ARCCONF SETCACHE <Controller#> WRITECACHEBYPASSTHRESHOLD <threshold size> [nologs]
ARCCONF SETCACHE <Controller#> RECOVERCACHEMODULE [nologs]
```

Parameters**Controller#**

The controller number

LogicalDrive#

The number of the logical drive whose cache will be altered

Logical mode

Logical drive cache mode:

- con—cache enabled
- coff—cache disabled

DRIVETYPE

- Configured—drive write cache policy for configured drives
- Unconfigured—drive write cache policy for unconfigured drives
- HBA—drive write cache policy for HBA drives

CachePolicy

Write cache policy setting; choose any of the following values

- 0—default
- 1—enable
- 2—disable
- 3—Unchanged

Note: “Unchanged” write cache policy is only applicable for configured drives.

CACHERATIO <read#> <write#>

Sets the cache ratio for the controller:

- read#—read cache percentage
- write#—write cache percentage

Note: Some controllers support 8 GB DDR but only 4 GB can be backed up by the backup power source. In such scenario, write cache ratio can be configured to a maximum of 50 percent.

WAITFORCACHEROOM

Wait for room in the read/write cache when full instead of automatically bypassing it in favor of higher performance. Enabling this feature prevents RAID 1 inconsistencies that occur whenever the host changes buffer contents during write operations.

- Enable—wait for room in the read/write cache
- Disable—do not wait for room in the read/write cache

NOBATTERYWRITECACHE

Enables write caching when a battery or supercapacitor is not present or fully charged. This setting applies to all logical drives on the controller; at least one logical drive must exist before usage.

- Enable—enable write caching on controller without fully charged battery or supercapacitor
- Disable—disable write caching on controller without fully charged battery or supercapacitor



Enabling write caching without a fully charged battery/supercapacitor may cause data loss in the event of a power failure.

WRITECACHEBYPASSTHRESHOLD

Sets the write cache bypass threshold for the controller. This allows you to choose a value to bypass the cache when the large write reaches that threshold and will be written directly to the disk for non-parity RAID volumes. Units are in KB and the value must be a multiple of 16 KB. The target can be any valid controller.

- Threshold size—the valid threshold size is between 16 KB and 1040 KB.

RECOVERCACHEMODULE

Recovers the failed cache module.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETCACHE 1 LOGICALDRIVE 0 con
ARCCONF SETCACHE 1 LOGICALDRIVE All con
ARCCONF SETCACHE 1 CACHERATIO 60 40
ARCCONF SETCACHE 1 WAITFORCACHEROOM enable
ARCCONF SETCACHE 1 NOBATTERYWRITECACHE enable
ARCCONF SETCACHE 1 DRIVEWRITECACHEPOLICY Configured 0 Unconfigured 1 hba 2
ARCCONF SETCACHE 1 WRITECACHEBYPASSTHRESHOLD 1040
ARCCONF SETCACHE 1 RECOVERCACHEMODULE
```

4.35 **arccnf setconfig**

Description

Clears the controller configuration. Boot volumes are cleared, logical drives are deleted, hard disks are reset to the READY state. Optionally, you can clear the maxCrypto configuration, including all keys, passwords, and maxCrypto users (administrator and standard user).

Syntax

```
ARCCONF SETCONFIG <Controller#> <DEFAULT | CLEARMAXCRYPTOCONFIG> [noprompt] [nologs]
```

Parameters

Controller#

The controller number.

Default

Clears the controller's configuration. Boot volumes, Logical devices, arrays, maxCache Logical devices and array are deleted, and hard drives are reset to the ready state.

Clearmaxcryptoconfig

Clears all secret keys and passwords from the controller, including the crypto user password.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETCONFIG 1 DEFAULT
ARCCONF SETCONFIG 1 CLEARMAXCRYPTOCONFIG
```

4.36 **arccnf setconnectormode**

Description

Use this command to configure controller connectors to different operating modes:

- HBA Mode—Allows the connector to act and be used as a Host Bus Adapter. RAID functions of the controller are disabled. All attached drives are surfaced as RAW devices.
- RAID: Hide RAW—All RAID functions of the controller are enabled for the connector, but RAW devices are not exposed to the operating system.
- Mixed—RAID volumes and RAW drives on the connector are exposed to operating system.

Syntax:

```
ARCCONF SETCONNECTORMODE <Controller#> <Connector #> <Functional Mode#> <Connector #>
<Functional Mode#> ... [noprompt] [nologs]
```

Parameters

Controller#

Controller number.

Connector#

Connector number.

Functional Mode#

One of the following values:

- 1—HBA Mode

- 2—RAID: Hide RAW
- 3—Mixed

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETCONNECTORMODE 1 1 1
ARCCONF SETCONNECTORMODE 1 3 3
```

4.37 arccnf setcontrollermode**Description**

Use this command to configure the controller operating mode for all connectors:

- HBA Mode—Allows the controller to act and be used as a Host Bus Adapter. RAID functions of the controller are disabled. All attached drives are surfaced as RAW devices.
- RAID: Hide RAW—All RAID functions of the controller are enabled, but RAW devices are not exposed to the operating system.
- Mixed—RAID volumes and RAW drives are exposed to operating system.

Syntax

```
ARCCONF SETCONTROLLERMODE <Controller#> <Controller Mode> [nologs]
```

Parameters**Controller Mode**

Change a controller's mode.

- 2—HBA Mode
- 3—RAID: Hide RAW
- 5—Mixed

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETCONTROLLERMODE 1 2
```

4.38 arccnf setcontrollerparam**Description**

Changes a parameter of a controller.

Syntax

```
ARCCONF SETCONTROLLERPARAM <Controller#> QUEUEDEPTH <QDepth> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> SPAREACTIVATIONMODE <Mode> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> ELEVATORSORT <Enable | Disable> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> LATENCY <Latency> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> SANITIZELOCK <sanitizeLock> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> MIXEDVOLUMES <Enable | Disable> USERROLE <userrole>
PASSWORD <password> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> FWLOCK <Enable | Disable> USERROLE <userrole>
PASSWORD <password> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> DISCOVERYPROTOCOL <All discoveryProtocol> [noprompt]
[nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> DISCOVERYPROTOCOL <Connector# discoveryProtocol>
```

```
[Connector# discoveryProtocol] ... [noprompt] [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> DISCOVERYPROTOCOL <All DirectAttachedCable
NUMBEROFTARGETS NumberOfTargets#> [noprompt] [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> DISCOVERYPROTOCOL <Connector# DirectAttachedCable
NUMBEROFTARGETS NumberOfTargets#> [Connector# DirectAttachedCable NUMBEROFTARGETS
NumberOfTargets#]... [noprompt] [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> QUEUEDEPTH <QDepth> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> ELEVATORSORT <Enable | Disable> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> LATENCY <Latency> [nologs] ARCCONF
SETCONTROLLERPARAM <Controller#> OOBINTERFACE <OOBinterface> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> OOBINTERFACE PBSI I2CADDRESS <i2cAddress>
I2CCLOCKSPD <i2cClockSpeed> I2CCLOCKSTRETCH <i2cClockStretch> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> OOBINTERFACE MCTP I2CADDRESS <i2cAddress>
SMBUSDEVICETYPE <SMBusDeviceType> SMBUSCHANNEL <SMBusChannel> STATICEID <StaticEID>
VDMNOTIFICATION<VDMNotification> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> EXPANDERSCANDURATION <duration> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> PERSISTENTEVENTPOLICY <policy> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> MRRS <size>[nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> UEFIHEALTHREPORTINGMODE <Enable/Disable> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> SPINDOWNSPARESPOLICY <Enable/Disable> [nologs]
ARCCONF SETCONTROLLERPARAM <Controller#> DPO <Enable/Disable> [nologs]
```

Parameters

Controller#

Controller number

QUEUEDEPTH <QDepth>

Sets the queue depth for the controller. Valid values are 0, 2, 4, 8, 16, and 32. A value of 0 indicates automatic queue depth.

SPAREACTIVATIONMODE <mode>

Sets the spare activation mode from activation on failure to predictive spare activation. Valid values are:

- 0—Activate on failure (default)
- 1—Activate on predictive failure

ELEVATORSORT

Sets the behavior of the controller cache write Elevator sort algorithm.

- Enable—Enables elevator sort
- Disable—Disables elevator sort

LATENCY

Sets the flexible latency scheduler. Valid values are:

- 0—Disable (default).
- 1—Low. Sets value to 250.
- 2—Medium. Sets value to 100.
- 3—High. Sets value to 50.
- 4—Aggressive level 1. Sets value to 30.
- 5—Aggressive level 2. Sets value to 10.

SANITIZELOCK

Sets the Sanitize lock on the controller.

- sanitizeLock
 - None—No freeze lock or anti-freeze lock commands are sent to any physical device.
 - Freeze—Supported physical devices are freeze locked and sanitize is not allowed.

- AntiFreeze—Supported physical devices are anti-freeze locked and freezing the physical devices is not allowed.

MIXEDVOLUMES

Enables mixing of encrypted and plaintext logical devices. Valid values are:

- Enable—Authorized users have the option to create encrypted logical devices or plaintext logical devices (not encrypted).
- Disable—New logical devices will be encrypted, with no option to create plaintext logical devices.

FWLOCK

Locks/unlocks controller firmware update. Valid values are:

- Enable—Authorized users can update the controller firmware.
- Disable—Controller firmware cannot be updated.

USERROLE <userrole> PASSWORD <password>

maxCrypto user-role and password. Valid values are:

- crypto (maxCrypto administrator)
- user (standard user)

OOBINTERFACE

Sets the Out-of-band interface settings for the controller. Parameters for configuring OOB interface:

- PBSI
- MCTP

PBSI

Sets the Out-of-band interface as PBSI.

PBSI Parameters	Description
I2CADDRESS	Sets the I ² C Address of the controller. Hexadecimal input from range of 0x00—0xFF
i2cClockSpeed	Sets I ² C clock speed • 0—I²C clock speed disable (Default) • 1—I²C clock speed 10 kHz • 2—I²C clock speed 100 kHz • 3—I²C clock speed 400 kHz • 4—I²C clock speed 800 kHz
i2cClockStretch	Sets the I ² C clock stretch • Enable—Enables I²C Clock Stretching • Disable—Disables I²C Clock Stretching

MCTP

Sets the Out-of-band interface as MCTP.

MCTP parameters	Description
I2CADDRESS	Sets the I ² C address of the controller. Hexadecimal input. For valid range, refer to the Management Component Transport Protocol (MCTP) SMBus/I ² C Transport Binding Specification document.
SMBusDeviceType	Sets System Management(SM) Bus Device Type • 0—Default

MCTP parameters	Description
	1—Fixed: Fixed and not discoverable. If this value is set, the I²C address is fixed and will not be able to be assigned with ARP. 2—Address Resolution Protocol (ARP) capable Bus master can assign the I²C address dynamically to slave devices to resolve the address conflicts.
SMBusChannel	Sets the System Management(SM) Bus Channel setting - Enable—Enables SM Bus Channel - Disable—Disables SM Bus Channel
StaticEID	Sets the Static End Point Identifier (EID) Setting - Enable—Enables Static EID - Disable—Firmware passes EID as 0 (internally) and the bus owner assigns the EID.
VDMNotification	Sets the Vendor Defined Message (VDM) discovery notification - Enable—Enabling VDM Discovery Notify supports sending discovery notification during a PCI bus re-enumeration. This message is available for use as a common message for enabling an endpoint to announce its presence to the bus owner. This is typically used as a part of the endpoint discovery process when an MCTP device is hot-plugged onto or becomes powered-up on an MCTP bus. - Disable—Disables VDM discovery Notification

DISABLE

Sets the Out-of-band interface as Disable

RESET

Resets the Out-of-band interface

DISCOVERYPROTOCOL

Sets the protocol of a connector to discover the connected backplane.

Available connector discovery protocols are: Autodetect, UBM, SGPIO, VPP and DIRECTATTACHEDCABLE.

- All: Sets the discovery protocol for all the connectors
- DiscoveryProtocol:
 - AutoDetect*: The controller attempts to automatically detects the discovery protocol of the backplane attached to the connector.
 - UBM: The controller uses the UBM protocol to communicate with the backplane attached to the connector.
 - SGPIO: The controller uses the SGPIO protocol to communicate with the backplane attached to the connector.
 - VPP: The controller uses the VPP protocol to communicate with the backplane attached to the connector.
 - DIRECTATTACHEDCABLE : The controller firmware uses the direct-attached cable protocol to communicate with direct attached drives. Number of targets (Physical devices) must be set to match the cable's supported target.
 - NUMBEROFTARGETS: Sets the maximum number of physical devices that can be attached to the connector.
 - NumberOfTargets# : This option is applicable and mandatory for direct-attached cable. If the number of targets is not configured correctly, the target drives may not be discovered. The possible values are 2, 4, and 8¹.
Note: 1. Default parameter in most circumstances.

EXPANDERSCANDURATION

Controller waits for the specified seconds to scan/discover the drives attached to the expander on the next power cycle. Set this to a nonzero value if some devices do not appear in the topology after controller boot or on rescan requests.

- **duration:** Time duration a controller will wait for during expander discovery. Time duration should be in seconds.

PERSISTENTEVENTPOLICY

Policy setting for persistent event log of the controller.

PersistentEventPolicy

- 0—Event policy setting to persist the oldest events.
- 1—Event policy setting to persist the newest events.

MRRS

PCIe Maximum Read Request Size (MRRS) for the controller. This option enables optimization of data flow to improve the controller performance.

size

PCIe MRRS in bytes. The valid values are 128, 256, 512, 1024, 2048, and 0. The value '0' indicates to use the server's default MRRS setting.

UEFIHEALTHREPORTINGMODE

UEFI Health Reporting mode setting for the controller.

Enable—Enables UEFI Health Reporting mode. All the errors related to the controller configuration is reported in UEFI.

Disable—Disables UEFI Health Reporting mode. No errors related to the controller configuration is reported in UEFI.

SPINDOWNSPARESPOLICY

Spindown spares policy setting for controller.

Enable—Enables spindown spares policy. All the inactive spares in the configuration are spundown.

Disable—Disables spindown spares policy. No spares in the configuration are spundown.

DPO

The Degraded Performance Optimization (DPO) setting applies to RAID 5/RAID 50/RAID 6/RAID 60 logical drives that are in a degraded state.

Enable—Directs the controller to attempt to improve the performance of large read requests by buffering physical drive requests.

Disable—Directs the controller to read from the same physical drives multiple times.

noprompt

An optional parameter that suppresses log output to the log files.

nologs

An optional parameter that suppresses the user confirmation prompt.

Examples

```
ARCCONF SETCONTROLLERPARAM 1 FWLOCK enable USERROLE crypto
ARCCONF SETCONTROLLERPARAM 1 QUEUEDEPTH 16
ARCCONF SETCONTROLLERPARAM 1 SPAREACTIVATIONMODE 0
ARCCONF SETCONTROLLERPARAM 1 ELEVATORSORT disable
ARCCONF SETCONTROLLERPARAM 1 LATENCY 2
ARCCONF SETCONTROLLERPARAM 1 MIXEDVOLUMES enable USERROLE crypto PASSWORD Abc@1234
```

```

ARCCONF SETCONTROLLERPARAM 1 MIXEDVOLUMES enable USERROLE crypto
ARCCONF SETCONTROLLERPARAM 1 SANITIZELOCK Freeze
ARCCONF SETCONTROLLERPARAM 1 MIXEDVOLUMES enable USERROLE crypto PASSWORD Abc@1234
ARCCONF SETCONTROLLERPARAM 1 FWLOCK enable USERROLE crypto PASSWORD Abc@1234
ARCCONF SETCONTROLLERPARAM 1 OOBINTERFACE Disable
ARCCONF SETCONTROLLERPARAM 1 OOBINTERFACE PBSI I2CAddress 0xD0 I2CCLOCKSPEED 3
I2CCLOCKSTRETCH Enable
ARCCONF SETCONTROLLERPARAM 1 OOBINTERFACE MCTP I2CAddress 0xD0 SMBUSDEVICETYPE 1 SMBUSCHANNEL
Enable STATICID Enable VDMNotification Enable
ARCCONF SETCONTROLLERPARAM 1 OOBINTERFACE Reset
ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL ALL UBM
ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL 0 SGPIO 1 UBM 2 SGPIO
ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL 0 VPP
ARCCONF SETCONTROLLERPARAM 1 EXPANDERSCANDURATION 5
ARCCONF SETCONTROLLERPARAM 1 PERSISTENTEVENTPOLICY 0
ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL 0 SGPIO 1 UBM 2 AutoDetect 3
DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL ALL
DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL 1
DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1 DISCOVERYPROTOCOL 0 SGPIO
1 UBM 2 AutoDetect 3 DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1
DISCOVERYPROTOCOL ALL DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1
DISCOVERYPROTOCOL 1 DirectAttachedCable NUMBEROFTARGETS 8 ARCCONF SETCONTROLLERPARAM 1 MRRS
2048 ARCCONF SETCONTROLLERPARAM 1 UEFIHEALTHREPORTINGMODE Enable
ARCCONF SETCONTROLLERPARAM 1 SPINDOWNSPARESPOLICY Enable
ARCCONF SETCONTROLLERPARAM 1 DPO Enable

```

4.39 arccnf setmaxcache

Description

Updates the maxCache write cache policy for one or more logical drives.

Syntax: Write Caching

```
ARCCONF SETMAXCACHE <Controller#> LOGICALDRIVE <LD#> MAXCACHEWRITEPOLICY <Policy> [nologs]
```

Parameters

Controller#

The controller number.

LogicalDrive#

The number of the logical device whose cache will be altered.

MAXCACHEWRITEPOLICY

Changes the MaxCache Write Cache policy on the logical device.

- Policy - MaxCache Write Cache Policy
 - WB - Write Back Cache Policy
 - WT - Write Through Policy

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETMAXCACHE 1 LOGICALDRIVE 0 MAXCACHEWRITEPOLICY wt
```


4.40 arccconf setname

Description

Renames a logical drive.

Note: ARCCONF does not allow a duplicate name for logical devices in the configuration.

Syntax

```
ARCCONF SETNAME <Controller#> LOGICALDRIVE <LogicalDrive#> <New Name> [nologs]
```

Parameters

Controller#

Controller number

LogicalDrive#

Logical device ID to be renamed

New Name

The new name of the logical drive, and must be of 1 to 64 characters long, using only ASCII characters.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETNAME 1 LOGICALDRIVE 1 BACKUP_A
```

4.41 arccconf setpower

Description

Modifies the power management settings.

Syntax

```
ARCCONF SETPOWER <Controller#> POWERMODE <mode>[nologs]
ARCCONF SETPOWER <Controller#> SURVIVALMODE <mode>[nologs]
```

Parameters

Controller#

The controller number.

POWERMODE

Specifies the power mode for the controller.

- 1—Minimum power¹-Set static settings to lowest possible values and reduce power dynamically based on workload.
- 2—Balanced power¹-Set static settings based on configuration and reduce power dynamically based on workload.
- 3—Maximum performance-Set static settings to highest possible values and do not reduce power dynamically.

Note:

1. Some controllers do not support this mode.

SURVIVALMODE

Survival mode allows the controller to throttle back dynamic power settings to their minimum when temperatures exceed the warning threshold.

This allows the server to continue running in more situations, but performance may decrease.

- Enable—Survival mode enabled.
- Disable—Survival mode disabled.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETPOWER 1 POWERMODE 2
ARCCONF SETPOWER 1 SURVIVALMODE Enable
```

4.42 arccnf setpriority

Description

Changes a controller's rebuild or expand priority.

Syntax

```
ARCCONF SETPRIORITY <Controller#> <REBUILD|EXPAND> <New Priority> [nologs]
```

Parameters

Controller#

The controller number

New Priority

LOW, MEDIUM, or HIGH. For REBUILD only: MEDIUMHIGH (if rapid rebuild priority is supported on the controller).

REBUILD

Sets the controller's rebuild priority. Rebuild priority will default to MEDIUM if the new priority specified is not supported.

EXPAND

Sets the controller's capacity expansion (OCE) priority.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETPRIORITY 1 EXPAND LOW
ARCCONF SETPRIORITY 1 REBUILD MEDIUM
```

4.43 arccnf setstate

Description

Changes the state of a physical device or logical device or maxcache from its current state to the designated state.

Syntax

```
ARCCONF SETSTATE <Controller#> DEVICE <Channel# ID#> <State> [noprompt] [nologs]
ARCCONF SETSTATE <Controller#> DEVICE <Channel#> <Device#> <State> [ARRAY <AR#> [AR#] ... ]
[SPARETYPE <TYPE>] [noprompt] [nologs]
ARCCONF SETSTATE <Controller#> LOGICALDRIVE <LD#> OPTIMAL [ADVANCED <option>] [noprompt]
[nologs]
ARCCONF SETSTATE <Controller#> MAXCACHE <LD#> OPTIMAL [noprompt] [nologs]
```

Parameters**Controller#**

The controller number

Channel#

The channel number for the drive.

Device#

Device number for the device.

LD#

Logical drive number.

AR#

Array number.

State

- HSP—Create a hot spare from a ready drive. Dedicates the HSP to one or more .
- RDY—Remove a hot spare designation. Attempts to change a drive from Failed to Ready.
- DDD—Force a drive offline (to Failed).
- EED—Enable the erased drive.

MAXCACHE

Optional keyword for maxCache devices only. Include if State is HSP or RDY, and the hot spare is for a maxCache device.

- maxCache Id#—maxCache logical Device ID to be forced optimal.

SPARETYPE

Sets the sparetype for the array.

- Type
 - 1—Dedicated—A dedicated spare temporarily takes over for a failed drive and can be shared between arrays.
 - 2—Autoreplace—An autoreplace spare replaces a failed drive and cannot be shared between arrays.

noprompt:

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SETSTATE 1 DEVICE 0 0 HSP ARRAY 0
ARCCONF SETSTATE 1 MAXCACHE 0 OPTIMAL
ARCCONF SETSTATE 1 DEVICE 0 0 DDD
ARCCONF SETSTATE 1 DEVICE 0 0 RDY
ARCCONF SETSTATE 1 DEVICE 0 0 HSP ARRAY 0 SPARETYPE 2
ARCCONF SETSTATE 1 LOGICALDRIVE 1 OPTIMAL
```

4.44 arccnf slotconfig**Description**

Lists the channel ID and device ID of the devices in each slot of an enclosure. A slot with no devices marked as EMPTY.

Syntax

```
ARCCONF SLOTCONFIG <Controller#> <ConnectorID# EnclosureID#|BackplaneID#> <Slot#> [nologs]
ARCCONF SLOTCONFIG <Controller#> <ConnectorID# EnclosureID#|BackplaneID#> MAP [nologs]
ARCCONF SLOTCONFIG <Controller#> <ConnectorName EnclosureID#|BackplaneID#> <Slot#> [nologs]
ARCCONF SLOTCONFIG <Controller#> <ConnectorName EnclosureID#|BackplaneID#> MAP [nologs]
ARCCONF SLOTCONFIG <Controller#> ALL MAP [nologs]
```

Parameters

Controller#

The controller for which slot configuration is required.

ConnectorID#

The connector ID of enclosure or UBM backplane whose slot configuration is needed.

ConnectorName

The connector name of enclosure or UBM backplane whose slot configuration is needed.

EnclosureID#

The enclosure where slot configuration is required.

BackplaneID#

The UBM backplane whose slot configuration is needed.

Slot#

The slot number of the drive where information is required.

ALL

Display the slot configuration of all enclosures and UBM backplanes connected to controller.

MAP

Display the slot configuration of enclosures and UBM backplanes.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SLOTCONFIG 1 0 2 2
ARCCONF SLOTCONFIG 1 CN0 1 0
ARCCONF SLOTCONFIG 1 CN0 2 MAP
ARCCONF SLOTCONFIG 1 ALL MAP
```

4.45 arccnf smp

Description

Sends a SAS Management Protocol (SMP) function request to a SMP target device.

Syntax:

```
ARCCONF SMP <Controller#> Enclosure <Connector# Channel# Device#> Expander <Expander#>
<CommandType1> [ASCII] [nologs]
ARCCONF SMP <Controller#> Enclosure <Connector# Channel# Device#> Expander <Expander#>
<CommandType2> PHY <PHY#> [ASCII] [nologs]
```

Parameters

Controller#

Controller number.

Connector# Channel# ID#

Connector ID, Channel ID and Device ID of the enclosure that contains the expander.

Expander#

Expander number on the controller (SMP target device).

PHY#

The PHY Identifier (valid only for Discover and PHY Error Log Request).

CommandType#

CommandType1:

- RGR—Report General Request
- RMR—Report Manufacturer Request

CommandType2:

- DR—Discover Request
- RPELR—Report PHY Error Log Request

ASCII

Displays the SMP response in ASCII format along with Hex formatted output.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SMP 1 Enclosure 1 2 0 Expander 0 RGR
ARCCONF SMP 1 Enclosure 1 2 0 Expander 1 DR PHY 0
```

4.46 **arccconf splitmirror**

Description

Splits an array consisting of one or more RAID 1, RAID 10, RAID 1 Triple or RAID10 Triple logical devices into two new arrays with identical contents.

Syntax

```
ARCCONF SPLITMIRROR <Controller#> ARRAY <Array#> SPLITWITHBACKUP [noprompt] [nologs]
ARCCONF SPLITMIRROR <Controller#> ARRAY <Array#> REMIRROR [noprompt] [nologs]
ARCCONF SPLITMIRROR <Controller#> ARRAY <Array#> ROLLBACK [noprompt] [nologs]
ARCCONF SPLITMIRROR <Controller#> ARRAY <Array#> ACTIVATEBACKUP [noprompt] [nologs]
```

Parameters**Controller#**

Controller number

Array#

Array number

SPLITWITHBACKUP

Splits the array into two new arrays: a primary array and a backup array, with the following characteristics:

- If the original array contained RAID 1 or RAID 10 drives, the primary array will contain RAID 0 drives.
- If the original array contained RAID 1 Triple drives, the primary array will contain RAID 1 drives.
- If the original array contained RAID 10 Triple drives, the primary array will contain RAID 1+0 drives.

The backup array always contains RAID 0 logical drives. The primary array continues to be fully accessible to the operating system while the backup array is hidden from the operating system.

REMIRROR

Remirrors the array by preserving the existing data and discarding the backup array. This option re-creates the original mirrored array with the contents of the primary array.

ROLLBACK

Remirrors the array by rolling back to the contents of the backup array and discarding existing data. This option re-creates the mirrored array but restores its contents to the point in time when the backup array was created.



We do not recommend using this option while the array is online, or while the logical drive to be rolled back is mounted or in use by the operating system.

ACTIVATEBACKUP

Activates the backup array and makes it fully accessible to the operating system.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF SPLITMIRROR 1 ARRAY 0 SPLITWITHBACKUP
ARCCONF SPLITMIRROR 1 ARRAY 0 REMIRROR
ARCCONF SPLITMIRROR 1 ARRAY 0 ROLLBACK
ARCCONF SPLITMIRROR 1 ARRAY 0 ACTIVATEBACKUP
```

4.47 arccconf task

Description

Performs a task on a logical drive, physical drive, array, or maxCache logical device. Uninitializes physical drives on a controller. Erases an encrypted logical drive or array, encodes (encrypts) a plaintext logical drive, and creates a new key for an encrypted logical device.

Syntax:

```
ARCCONF TASK START <Controller#> DEVICE <Channel# ID#> <secureerase> PATTERN <erasePattern>
[Unrestricted] [noprompt] [nologs]
ARCCONF TASK START <Controller#> DEVICE ALL UNINITIALIZE [nologs]
ARCCONF TASK START <Controller#> DEVICE <Channel# ID#>UNINITIALIZE [nologs]
ARCCONF TASK STOP <Controller#> DEVICE <Channel#> <ID#> [nologs]
```

Syntax: maxCrypto Usage

```
ARCCONF TASK START <Controller#> LOGICALDRIVE <LogicalDrive#> CRYPTOERASE USERROLE <userrole>
PASSWORD <password>
ARCCONF TASK START <Controller#> ARRAY <Array#> CRYPTOERASE USERROLE <userrole> PASSWORD
<password>
ARCCONF TASK START <Controller#> LOGICALDRIVE <LogicalDrive#> ENCODE DATA <Preserve |
Discard> USERROLE <userrole> PASSWORD <password>
ARCCONF TASK START <Controller#> LOGICALDRIVE <LogicalDrive#> REKEY USERROLE <userrole>
PASSWORD <password>
ARCCONF TASK START <Controller#> ARRAY <Array#> REKEY USERROLE <userrole> PASSWORD <password>
```

Parameters

Controller#

The controller number

Channel# ID#

Channel number and device ID for the device

Options:

- Physical device options:
 - secureerase PATTERN <pattern>—removes all data from the drive in a secure fashion to prevent any possible recovery of the erased data. Erase patterns:
 - 1—Zero - Initializes all blocks to zero.
 - 2—Random Zero - This erase method writes random data on the drive for the first pass then writes zeros for the second pass.
 - 3—Random Random Zero - This erase method writes random data on the drive for the first and second passes and then zeros for the third pass.
 - Sanitize erase patterns
 - 4—Crypto Scramble Sanitize Method - HDDs and SSDs. Causes the physical device to change encryption keys to prevent correct decryption of previously stored information, which may cause protection information, if any, to be indeterminate.
 - 5—Block Erase Sanitize Method - SSDs only. Erase voltage is applied to all NAND cells.
 - 6—Overwrite Sanitize Method - HDDs only. Initializes blocks using complex multibyte data pattern.
 - Unrestricted—Applicable only to the sanitize erase methods (Crypto Scramble/Block Erase/Overwrite). With the Sanitize Erase option, the physical device is available for configuration if sanitize erase fails or could not complete. If not provided, value defaults to 'Restricted'. With the default option, if Sanitize Erase fails, the only operation allowed is to start another sanitize.
 - UNINITIALIZE—When specified with ALL, clears meta-data from all drives on the controller; existing data on the drive is destroyed.

Cryptoerase

Erases an encrypted logical drive or array. (After erasing, the logical device remains encrypted.)

Encode Data <Preserve | Discard>

Encrypts a logical drive or array, with option of preserving or discarding the original data.

Rekey

Generates a new key for encrypted devices.

noprompt

An optional parameter that suppresses the user confirmation prompt.

nologs

An optional parameter that suppresses log output to the log files.

USERROLE <userrole> PASSWORD <password>

maxCrypto user-role and password. Valid values are:

- crypto (maxCrypto administrator)
- user (standard user)

Examples

```
ARCCONF TASK START 1 DEVICE 0 0 SECUREERASE PATTERN 1
ARCCONF TASK STOP 1 DEVICE 0 0
```

```
ARCCONF TASK START 1 DEVICE ALL UNINITIALIZE
ARCCONF TASK START 1 LOGICALDRIVE 0 CRYPTOERASE USERROLE crypto password Abc@1234
ARCCONF TASK START 1 LOGICALDRIVE 0 ENCODE DATA preserve USERROLE crypto password Abc@1234
ARCCONF TASK START 1 ARRAY 0 REKEY USERROLE crypto password Abc@1234
```

4.48 arccnf uninit

Description

Firmware reserves 32 MiB at the end of each disk for storing configuration information. Storing the configuration on the drives allows for controller replacement or drive movement without configuration loss. In the HBA mode, physical drives with RAID configuration data are masked from the operating system. Uninitializing the drives clears the Smart configuration (Reserve Information Sector) data and allows the drive to be exposed to the operating system.

Syntax:

```
ARCCONF UNINIT <Controller#> <Channel# Drive#> [Channel# Drive#] ... [nologs]
ARCCONF UNINIT <Controller#> ALL [nologs]
```

Parameters

Controller#

Controller number.

Channel#

The channel number of the device to be uninitialized.

Drive#

The drive number of the device to be uninitialized.

ALL

Uninitializes all physical devices on the controller.

nologs

An optional parameter that suppresses log output to the log files.

Examples

```
ARCCONF UNINIT 1 0 12 0 13
ARCCONF UNINIT 1 ALL
```


5. Running ARCCONF in the UEFI Shell

This appendix describes how to run ARCCONF in the UEFI shell. UEFI/ARCCONF supports a subset of commands available on the command-line. Most commands have the same form and syntax as their command-line counterparts, with the exceptions noted in [5. UEFI/ARCCONF Commands](#). Additionally, some commands are supported in UEFI/ARCCONF only.

Prerequisites

To run UEFI/ARCCONF, ensure that your system meets these requirements:

- System is running UEFI Shell v2.2 or higher
- MSCC UEFI driver is installed:
 - a. Boot the machine to the UEFI shell prompt.
 - b. Type: `drivers`
 - c. Verify that 'MSCC UEFI Driver (version)' is listed.

Starting UEFI/ARCCONF

To start UEFI/ARCCONF:

1. Boot the machine to the UEFI shell prompt.
2. At the prompt, enter a command in the form:

```
arccnf <command_name> <parameters> ...
```

3. To see a list of supported commands, type `ARCCONF` at the prompt; to include pagebreaks, type `ARCCONF -b`. For help with a specific command, type `ARCCONF <command_name> help`.

UEFI/ARCCONF Commands

The following table lists the commands supported in UEFI/ARCCONF. Follow the link in the **Usage** column for command forms and syntax. Where syntax differs from the command line, a separate usage statement is listed.

Table 5-1. UEFI/ARCCONF Commands

Command	Description	Usage
CONSISTENCYCHECK	Toggles background consistency check modes of the controller. Usage: CONSISTENCYCHECK <Controller#> <on [Delay] off> [noprompt] Usage: CONSISTENCYCHECK <Controller#> PARALLELCOUNT <Count> Usage: CONSISTENCYCHECK <Controller#> INCONSISTENCYREPAIRPOLICY <Enable Disable> see 4.3. arccnf consistencycheck	
CREATE	Creates a new logical drive; optionally, enables logical drive read caching, write caching.	See 4.4. arccnf create
DELETE	Deletes a logical drive.	See 4.5. arccnf delete
EXPANDERLIST	Returns list of disk drive expanders on a controller.	See 4.7. arccnf expanderlist
EXPANDERUPGRADE	Allows new firmware to be flashed to an enclosure or expander.	See 4.8. arccnf expanderupgrade
GETCONFIG	Lists information about controllers and physical drives.	See 4.9. arccnf getconfig
GETLOGS	Provides access to controller status, event logs, and usage statistics.	See 4.11. arccnf getlogs
GETSMARTSTATS	Displays SMART statistics for the hard drives and Solid State Drives (SSDs) on a controller.	See 4.12. arccnf getsmartstats

.....continued

Command	Description	Usage
GETSTATUS	The GETSTATUS function displays the status of any background task that is currently running. The information includes the type of operation, status, logical drive number and logical drive size (for a logical device), channel ID/device ID (for a physical drive), and percentage of the operation completed.	See 4.13. arccconf getstatus
GETVERSION	Lists version information for all controllers or a specific controller's software components.	See 4.14. arccconf getversion
IDENTIFY	Identifies a physical device by blinking its LEDs.	See 4.15. arccconf identify
IMAGEUPDATE	Allows new firmware to be flashed to the hard drive and UBM backplane.	See 4.16. arccconf imageupdate
LIST	Lists controllers in the system.	See 4.17. arccconf list
PASSTHROUGH	Sends SCSI passthrough protocol (SCSI) function request to a disk drive.	See 4.22. arccconf passthrough
RESCAN	Check for removal of disk drives and for connection of new disk drives to the controller.	See 4.25. arccconf rescan
ROMUPDATE	Allows new firmware and BIOS to be flashed to the controller. Usage: ROMUPDATE <Controller#> <ImagePath> [noprompt] [nologs]	See 4.27. arccconf romupdate
SAVESUPPORTARCHIVE	Saves configuration and status information. Usage: SAVESUPPORTARCHIVE [Path] see 4.29. arccconf savesupportarchive	
SECURITY	Operations for SPDM certificate feature for controller. Some controllers do not support this operation.	See 4.30. arccconf security
SEDENCRYPTION	Sets up SED Encryption feature for controller.	See 4.31. arccconf sedencryption
SETARRAYPARAM	Changes a parameter of an array.	See 4.32. arccconf setarrayparam
SETBOOT	Sets controller as a boot device for the system.	See 4.33. arccconf setboot
SETCACHE	Changes the cache settings for a logical drive, or the write cache mode for drives of different drive type on a controller.	See 4.34. arccconf setcache
SETCONFIG	Clears the controller configuration. Usage: SETCONFIG <Controller#> <DEFAULT> [noprompt] [nologs] see 4.35. arccconf setconfig	
SETCONNECTORMODE	Change the connector operating mode.	See 4.36. arccconf setconnectormode
SETCONTROLLERMODE	Changes controller mode settings.	See arccconf setcontrollermode
SETCONTROLLERPARAM	Changes a parameter of a controller.	See 4.38. arccconf setcontrollerparam
SETSTATE	Changes the state of a physical device or logical device.	See 4.43. arccconf setstate
SLOTCONFIG	Lists the channel ID and Device ID of the devices in each enclosure and UBM backplane slot. A slot with no device is marked as EMPTY for enclosure.	See 4.44. arccconf slotconfig
SMP	Sends a SAS Management Protocol (SMP) function request to a SMP target device.	See 4.45. arccconf smp
SETMAXCACHE	Updates the maxCache write cache policy for one or more logical drives.	See 4.39. arccconf setmaxcache
SETNAME	Renames a logical drive.	See 4.40. arccconf setname

.....continued

Command	Description	Usage
SETPOWER	Modifies the power management settings.	See 4.41. arccconf setpower
SETPRIORITY	Changes a task's execution priority or a controller's global background task priority.	See 4.42. arccconf setpriority
SPLITMIRROR	Splits an array consisting of one or more RAID 1, RAID 10, RAID 1 Triple or RAID10 Triple logical devices into two new arrays with identical contents.	See 4.46. arccconf splitmirror
TASK	Performs a task on a logical drive, physical drive, array, or maxCache logical device. Uninitializes physical drives on a controller. Erases an encrypted logical drive or array, encodes (encrypts) a plaintext logical drive, and creates a new key for an encrypted logical device.	See 4.47. arccconf task
UNINIT	Uninitializes one or more physical drives. The uninitialize command clears the meta-data from a drive; existing data on the drive is destroyed.	See 4.48. arccconf uninit

6. Smart Controller Device Status

The following tables provide the status and their description of the controller, array, logical device, and physical device.

Table 6-1. Status Details of the Controller

Status	Description
Optimal	The controller is healthy.
Controller Has Incompatible Driver	The controller has an incompatible driver.
Failed	The controller is not in working condition.
Inaccessible	Controller communication failure error
Down/Offline	Controller offline error
Controller Lockup Error	Controller failed with a lockup error.
Missing SG Module	Controller missing module error. In order to configure this controller, you must load the SCSI Generic (SG) module.
Controller Powered OFF	Controller power off error
Sys PQI Driver Conflict	This controller has an incompatible driver.
Unknown	Controller unknown error

Table 6-2. Status Details of the Array

Status	Description
Ok	The array has all the logical device(s) in an optimal state.
Has Initializing Logical Device	One or more member logical device(s) has Rapid Parity Initialization (RPI) in progress.
Logical Devices Not Contiguous	The logical devices in this array are not in contiguous order. Perform consolidate space operation to consolidate all the free space to the end of the array.
Has Failed Physical Device	Device array has a bad or a missing physical device.
Has Failed Logical Device	One or more logical device(s) in the array has failed.
Failed	A physical device or logical device in the array has failed.
Has Erasing Drive	The array currently has a drive erase operation queued, running, stopped, or completed on a logical or a physical device.
Spare Drive Size Too Small	The array has a spare drive assigned which is smaller than the smallest data drive in the array.
One or more logical drives undergoing or failed SED Qualification	The array has the logical device(s) with status as "SED Qualification in Progress" or "SED Qualification Failed".
Has Logical Drive with Foreign SED	Indicates the presence of foreign logical device, which is imported from a different controller.
Has Offline Logical Drive	The array has an offline or a data locked logical device(s).

Table 6-3. Status Details of the Logical Device

Status	Description
Optimal	The logical device is healthy and is readily accessible by the host.
Queued for Expansion	The logical device is queued for expansion.
Expanding	The logical device is undergoing online capacity expansion.
Ready for Recovery	The logical device is queued to be recovered from a failed physical device.
Recovering	The logical device is rebuilding a physical device from fault tolerant data.
Wrong Drive Replaced	A wrong physical device is replaced.
RPI In Progress	RPI is currently in progress on this logical device.
RPI Queued	RPI is currently queued on this logical device. It starts once other progress tasks are completed.

.....continued

Status	Description
Unsupported on The Controller	Logical device is unsupported on this controller. Host access to this volume is denied. Logical device can still be deleted/reconfigured with data loss.
Encrypted Logical Device Without Key	The encrypted logical device is exported from a foreign controller with different master key. Import the foreign master key to access the logical device.
Encryption Migration	The logical device is being migrated between plaintext and ciphertext.
Encrypted Logical Device Rekeying	The logical device is encrypted and all data is being re-keyed using the background "Online Capacity Expansion" transformation task. The cache memory is being used to keep track of progress.
Encrypted Logical Device With maxCrypto Off	The logical device is encrypted, exported from a foreign controller and cannot be accessed as the controller does not have the encryption enabled or is not configured.
Encryption Migration Requested	The logical device has received a request to migrate from plaintext to ciphertext. But this process has not yet started. The plaintext volume is currently online.
Encrypted Logical Device Rekey Requested	The logical device is encrypted and has received a request to re-key all the data with a new encryption key.
Unknown	The status of the logical device is unknown.
Erase In Progress	The logical device is offline and has the erase operation in progress.
Ejected	The logical device is offline from being ejected. Reinstall the removed physical devices.
Not Yet Available	An expand, shrink, or move operation on the array is in progress. This logical device remains in this state until all expand, shrink, or move operations on this array are completed. All I/O requests sent to the logical drive in this state will be rejected.
Not Configured	The logical device is not yet configured.
Interim Recovery	The logical device has a bad or missing drive. Logical device is operating with reduced performance and a further physical drive failure may result in data loss depending on the fault tolerance. To correct this problem, check the data and power connections to the physical drives or replace the failed drive.
Failed	The logical device has bad or missing physical device(s).
Disabled From SCSI ID Conflict	A conflict with an existing SCSI ID exists. Check all the SCSI components to make sure they all have a unique SCSI ID.
Drive Improperly Connected	A physical device is not properly connected.
Hardware Has Overheated	A physical device temperature has crossed the threshold value.
Hardware Is Overheating	A physical device temperature is about to reach the threshold value.
Optimal (Background Parity Initialization)	Logical device is undergoing the Parity Initialization in background.
Rapid Parity Initialization	Logical device is undergoing the RPI and may not be available until it is completed.
Logical Device Reconfiguring	Logical device is reconfiguring.
Plaintext Volume Rejected in Encrypting Mode	Logical device is plaintext and cannot be accessed as the controller is in encryption-only mode.
SED Qualification in Progress	This state indicates that the SED qualification is in progress.
SED Qualification Failed	This state indicates that the SED qualification is failed.
SED Locked	Indicates the presence of foreign logical device, which is imported from a different controller.
Data Locked	Indicates that the controller is waiting on controller password. Data is locked out on the physical device.

Table 6-4. Status Details of the Physical Device

Status	Description
Ready	The physical device is readily available for RAID configuration.
Optimal	The physical device is part of an array/logical device.
Waiting For Rebuild	The physical device is waiting to be rebuilt.
Rebuilding	The data on the physical device is being rebuilt. The physical device is accessible. But the performance will be less than optimal during the rebuilding process.

.....continued

Status	Description
Queued For Erase	The physical device is currently queued for erase and it is not available for use until the erase operation is completed.
Erase In Progress	The physical device is currently being erased and it is not available for use until the erase operation is completed.
Erase Completed	The erase process has been completed on the physical device and the physical device is offline. The physical device may now be brought online through the initialize operation.
Erase Failed	The physical device erase process is failed and the device is offline. The physical device may now be brought online through the initialize operation.
Erase Aborted	The physical device is offline due to an aborted erase process.
Predictive Failure	This physical device is predicted to fail soon. Backup all the data on the drive and replace the drive.
Transient Data Drive	The physical device is in transition from being a member of an array to being an unassigned physical device as a result of shrink array/move array operation.
Failed	The physical device is bad or missing.
Failed Due To Predictive Spare Activation	The physical device has been failed by the controller after completing a predictive spare activation.
Unsupported	The physical device is not supported by the controller.
Not Supported	The controller firmware version does not support this physical device. Replace the physical device with the one supported by the controller.
Dedicated Hot Spare	A dedicated hot spare is assigned to one or more arrays.
Auto Replace Hot Spare	An auto-replace hot spare is assigned to a specific array. After using an auto-replace spare to rebuild a failed logical drive, it becomes a permanent part of the array.
Raw	A physical device is in RAW state which has no or unknown file system.
Size Not Valid	The physical device size is not valid.
Data Locked	Indicates that the controller is waiting on controller password. The data is locked out on the physical device.

7. Controller, Array, Logical, Physical Device, Enclosure, and UBM Backplane Properties

This appendix provides detailed description of the controller, array, logical, physical device, enclosure, and UBM backplane properties of ARCCONF in the command-line.

Table 7-1. Controller

Properties	Description
Controller Status	Overall status of the controller based on its resources.
Controller Mode	Operating mode of the controller.
Channel description	Channel description of the controller.
Controller Model	Model name of the controller connected to the system.
Vendor ID	Vendor ID of the controller
Device ID	Device ID of the controller
Subsystem Vendor ID	Subsystem Vendor ID of the controller
Subsystem Device ID	Subsystem Device ID of the controller
Controller Serial Number	A unique number assigned to the controller, used for identification and inventory purposes.
Controller World Wide Name	A World Wide Name (WWN) is a unique identifier of the controller.
Physical Slot	PCI slot number to which the controller is connected.
Temperature	Current temperature of the controller.
Negotiated PCIe Data Rate	Negotiated PCIe data-rate of the controller.
PCI Address (Domain:Bus:Device:Function)	PCI address describes the PCI address for the controller.
Number of Ports	Describes number of internal and external ports of the controller.
Internal Port Count	Describes number of internal ports of the controller.
External Port Count	Describes number of external ports of the controller.
Defunct disk drive count	Number of failed drive.
NCQ status	Native Command Queuing, or NCQ, lets SATA disk drives arrange commands into the most efficient order for optimum performance.
Queue Depth	Queue Depth controls the behavior of the cache write queue. This option is used to tune controller performance for video applications. The valid values are 2, 4, 8, 16, 32, or Automatic.
Monitor and Performance Delay	This option controls the behavior of the controller Monitor and Performance Analysis Delay and is expressed in values ranging from 0 to 1440 minutes. This option is primarily used to tune the controller's performance for video applications.
Elevator Sort	This option controls the behavior of the controller cache write elevator sort algorithm. This option is used to tune controller performance for video applications. The possible options are Enable or Disable.
Degraded Mode Performance Optimization	Degraded Mode Performance Optimization setting applies to RAID 5 logical devices in Degraded mode only. Enabling this setting directs the controller to improve performance of large read requests by buffering physical drive requests. Disabling this feature forces the controller to read from the same drives multiple times. This option is used to tune controller performance for video applications. The possible options are Enable or Disable.

.....continued

Properties	Description
Latency	Latency describes Flexible Latency Schedule (FLS) setting. Flexible Latency Scheduler (FLS) is a controller option where the controller can re-prioritize I/O requests to prevent some requests to HDDs from timing out. Under normal operation (when FLS is disabled, or in controllers that don't support FLS), the controller will sort incoming requests in order to minimize the amount of travel for the HDD read heads (Elevator Sort). This strategy works well for workloads that access sequential data, or workloads that require multiple requests from localized sectors in the drive. For highly random workloads, such as transaction processing, some requests will end up on the wrong side of the disk platter and, due to their high latency, will be marked as timed out. When FLS is enabled, it will detect these high-latency requests and apply a cutoff value, after which it will suspend elevator sorting and service the request right away.
Post Prompt Timeout	Post prompt timeout describes the F1/F2 Post prompt timeout for the controller during system boot.
Statistics Data Collection Mode	Use the Statistics Viewer to view the advanced statistics for the controllers, hard drives, SSDs, logical drives, and maxCache devices in your storage space, including virtual volumes and the maxCache container.
Boot Controller	Boot controller can be changed only in the offline environment and only applies to booting in Legacy BIOS Boot mode. The boot controller is the first controller that the system examines (after power-up) to find a bootable logical device or a physical device. The controller boots from the first local drive by default. It is recommended that leaving the default setting disabled to prevent an error when booting after replacing the boot volume or controller.
Primary Boot Volume	Describes which logical device or physical device is the primary boot volume on the current controller.
Secondary Boot Volume	Describes which logical device or physical device is the secondary boot volume on the current controller.
Driver Name	Driver name describes the name of the driver.
Driver Supports SSD I/O Bypass	Driver supports SSD I/O Bypass describes whether the driver supports the SSD I/O Bypass feature.
Manufacturing Part Number	Describes the hardware part number information about the controller.
Manufacturing Spare Part Number	Describes the hardware spare part number information about the controller.
Manufacturing Wellness Log	Describes the hardware wellness log information about the controller.
Manufacturing SKU Number	Describes the hardware SKU number information about the controller.
Manufacturing Model	Describes the manufacturing model information about the controller.
NVMe [®] Supported	Describes whether the controller supports NVMe devices in the configuration.
NVMe Configuration Supported	Describes whether NVMe devices can be used for configuring logical devices.
NVRAM Checksum Status	Describes the NVRAM Checksum status.
Sanitize Lock Setting	Describes the sanitize lock policy of the controller. This policy is applicable for SATA drives. The valid values are Freeze, Anti-Freeze, or None.
Expander Minimum Scan Duration	Describes the time duration a controller waits for expander discovery.
Expander Scan Time-out	Describes the scan time-out for expander discovery.
Reboot Required Reasons	Describes reasons why the controller needs a reboot.
Pending Sanitize Lock Setting	Sanitize lock is in pending state, reboot the system and requires all physical devices to be power cycled or hot-plugged for the lock state to be applied to the physical devices.
Power Consumption	Power consumption is a total power of all the power sensors measured in mW.
Current Power Mode	Power mode setting that determines controller static settings based on workload.
Pending Power Mode	Power mode setting is in pending state, reboot the system for the new power mode setting to be applied.

.....continued

Properties	Description
Survival Mode	Enabling survival mode will allow the controller to throttle back dynamic power settings to their minimum when temperature exceeds the warning threshold. This allows the server to continue running in more situations, but performance may decrease.
Cache Status	Determines the preservation status of the cache module.
Cache State	Indicates the cache disable reason of the controller.
Cache Serial Number	A unique number assigned to the cache module.
Cache memory	Cache memory size in the controller. Value in MB.
Read Cache Percentage	The current read cache percent for the controller.
Write Cache Percentage	The current write cache percent for the controller.
No-Battery Write Cache	This setting decides the controller to enable write cache when no battery is present or when the battery fails. Values are Enable or Disable.
Wait for Cache Room	This setting causes the controller to always wait for room in the read/write cache when full, instead of automatically bypassing it in favor of higher performance.
Write Cache Bypass Threshold Size	All writes larger than the specified value will bypass the write cache and be written directly to the disk for non-parity RAID volumes. Value in KB.
Backup Power Status	Describes the status of the battery or capacitors.
Battery/Capacitor Pack Count	Describes the backup power source counts (battery/capacitor and so on) of the controller.
Hardware Error	Describes the hardware error information of the controller.
Power Type	The property indicated the power type of the controller backup.
Current temperature	Current temperature of supercap in degree Celsius.
Maximum Temperature	Maximum temperature in degree Celsius recorded during supercapacitor's lifetime.
Threshold Temperature	Maximum allowable temperature in degree Celsius for the supercap.
Voltage	Current voltage in millivolts of the supercap.
Maximum Voltage	Maximum voltage in milivolts recorded during supercapacitor's lifetime.
Current	Active current draw in milliamps of the supercap.
Health Status	Predicted health of the supercap expressed as a percentage.
Relative Charge	Indicates the relative charge available in percentage.
Configured Drives	Sets the write cache policy for the configured physical devices on the controller. • Default: Allows the controller to control the drive write cache policy of all configured physical devices. • Enabled: The drive write cache for the physical device will be enabled by the controller. Setting to enabled can increase write performance but risks losing the data in the cache on sudden power loss to all configured physical devices. • Disabled: The drive write cache for the physical devices will be disabled by the controller. • Unchanged: Sets the physical devices factory default policy for all configured drives.

.....continued

Properties	Description
Unconfigured Drives	Sets the write cache policy for the unconfigured physical devices on the controller. - Default: The controller does not modify the drive write cache of the physical devices. - Enabled: The drive write cache for the physical device will be enabled by the controller. Setting to enabled can increase write performance but risks losing the data in the cache on sudden power loss to all unconfigured physical devices. - Disabled: The drive write cache for the physical devices will be disabled by the controller.
HBA Drives	Sets the write cache policy for the HBA physical devices on the controller. - Default: The controller does not modify the drive write cache of the physical devices. - Enabled: The drive write cache for the physical drive will be enabled by the controller. - Setting to enabled can increase write performance but risks losing the data in the cache on sudden power loss to all physical devices. - Disabled: The drive write cache for the physical devices will be disabled by the controller.
maxCache Version	maxCache version of controller.
maxCache RAID5 WriteBack Enabled	Status of write back setting for RAID5 maxCache at controller level.
Persistent Event Log Policy	Describes the policy setting for persistent event log of the controller. Values are Oldest and Newest. Oldest indicates the event policy setting to persist the oldest events whereas Newest persists the newest events.
Logical devices/Failed/Degraded	Total number of logical devices/number of logical devices failed/number of logical devices degraded.
Spare Activation Mode	Spare activation mode feature enables the controller firmware to activate a spare drive. The firmware starts rebuilding a spare drive only when a data drive fails when the mode is Failure. With the predictive failure activation mode, rebuilding can begin before the drive fails when a data drive reports a predictive failure (SMART) status which will reduce the likelihood of data loss that could occur if an additional drive fails.
Active PCIe MRRS	Indicates the active PCIe MRRS for the controller. The valid values are 128, 256, 512, 1024, and 2048.
Pending PCIe Maximum Read Request Size	Indicates pending PCIe maximum read request size for the controller. The valid values are 128, 256, 512, 1024, 2048, and Default.
PCIe Maximum Payload Size	Indicates PCIe maximum payload size for the controller.
UEFI Health Reporting Mode	Indicates the UEFI Health Reporting mode of the controller. The available options are Enable/Disable: - Enabling the mode allows reporting of all the errors related to the controller configuration in UEFI. - Disabling the mode stops reporting of errors related to the controller configuration in UEFI.
Background consistency check	If your controller supports background consistency check, controller firmware continually and automatically checks your logical drives for bad or inconsistent data when they are in use. When supported, the controller enables this check by default and runs during idle periods. When enabled, Consistency Check performs a background check on logical drives every 14 days from the time the last check was completed. Factors that may extend this time include the Priority mode, parallel count, number of logical devices, and host I/O activity.

.....continued

Properties	Description
Consistency Check Delay	Determines the time interval for which a controller must be inactive before a consistency check is initiated on the logical drives. The value can be between 0 and 30 to specify the duration of the delay in seconds. A value of 0 disables the scan. Controller default value is 3 seconds.
Parallel Consistency Check Supported	Status of the Parallel Consistency Check support.
Parallel Consistency Check Count	Parallel consistency check count describes the number of logical devices on which the controller will perform consistency check in parallel.
Inconsistency Repair Policy	Inconsistency repair policy searches for a single inconsistent strip and repairs the strip on that one drive only.
Consistency Check Inconsistency Notify	This property enables the event notification messages and serial debug log messages for mirrored volumes.
Rebuild Priority	Rebuild priority determines the urgency with which the controller treats an internal command to rebuild a failed logical drive. At the low setting, normal system operations take priority over a rebuild. At the medium setting, rebuilding occurs for half of the time, and normal system operations occur for the rest of the time. At the medium high setting, rebuilding is given a higher priority over normal system operations. At the high setting, the rebuild takes precedence over all other system operations.
Expand Priority	Determines the urgency with which the controller treats an internal command to expand an array. At the low setting level, normal system operations take priority over an array expansion. At the medium setting, expansion occurs for half of the time, and normal system operations occur for the rest of the time. At the high setting, the expansion takes precedence over all other system operations.
Spindown Spares Policy	Indicates if the controller spins down inactive spares to a state of lower power consumption. When the Spindown Spares policy is disabled, the controller does not spin down inactive spares.
Firmware	Active firmware version of the controller.
Driver	Current version of driver installed on the system.
SEEPROM Version	Describes the controller SEEPROM revision.
Property after SEEPROM Version	
CPLD Revision	Describes the controller CPLD revision.
Hardware Revision	Describes the hardware revision information about the controller.
Hardware Minor Revision	Describes the hardware minor revision of the controller.
maxCrypto™ Supported	maxCrypto feature ensures the sensitive data is encrypted and protected by secure 256 bit AES, in-line encryption.
maxCrypto Status	Indicates whether maxCrypto is enabled or disabled.
Crypto Officer Password	Crypto officer password indicates, whether the crypto officer(Admin) has configured password or not.
User Password	User officer password indicates whether the user has configured password or not.
Controller Password	Indicates whether the controller has configured password or not.
Allow New Plaintext Logical device(s)	Allow new plaintext logical device(s) indicates, whether the new logical devices created can be encrypted or Plaintext (Non-Encrypted).
Master Key	Master key is a cryptographic secret key.
FW Locked for Update	Firmware locked for update prevents the updating of firmware on the controller.
Password Recovery Parameters Set	Crypto officer password recovery parameters indicates, whether the crypto officer has set the recovery question and answer.
Controller Password Unlock Attempts Remaining	Indicates the number of controller login attempts remaining.

.....continued

Properties	Description
SSD I/O Bypass Mixing	maxCrypto/SSD I/O bypass mixing indicates that mixing of maxCrypto and SSD I/O bypass is supported or not.
maxCache Mixing	Indicates whether mixing of maxCrypto and maxCache is supported or not.
Crypto Account Password Unlock Attempts Remaining	Indicates the number of crypto officer login attempts remaining.
User Account Password Unlock Attempts Remaining	Indicates the number of user login attempts remaining.
Number of maxCrypto Physical devices	Total number of encrypted physical device which are part of encrypted logical device.
Number of maxCrypto Data Logical devices	Total number of encrypted logical device.
Number of maxCrypto Foreign Logical devices without key	Encrypted Foreign Logical Device Count, Total number of encrypted foreign logical device.
Number of maxCrypto Logical devices with maxCrypto off	Total number of logical devices without maxCrypto.
Sensor ID	ID describes unique sensor identifier within the controller.
SED Encryption	Indicates whether the controller SED encryption status is enabled or not. Possible values are Enabled/Disabled.
Key Management Mode	Describes the controller's encryption configuration mode. Available modes are local and remote. Local key management keeps encryption self-contained on the controller, while remote key management requires a key management server setup.
Master Key Reset in Progress	Indicates whether the encryption master key reset is in progress.
Local Key Cache	Encryption keys are stored in a cache locally to allow access to encrypted logical drives when the remote key server is offline.
Attempts Remaining Before Clearing Local Key Cache	Indicates the number of remaining attempts before clearing the controller's key cache. The valid range is between 0 to 10 (0 is set to prevent cache entries).
Retry Interval In Minutes	Indicates the controller's key cache retry interval in minutes. The valid range is between 1 to 15 minutes.
Controller Locked	Indicates whether controller's maxCrypto status is locked.
SED Encryption Status	Indicates the controller SED encryption status.
Key Management Mode	Describes the controller's SED encryption configuration mode. Available modes are local and remote. Local key management keeps encryption self-contained on the controller, while remote key management requires a key management server setup.
SED Operation in Progress	Displays information about the progress of controller SED encryption.
Master Key Identifier	Master key identifier of controller SED encryption.
SED Controller Password Status	It is used at system boot time for extra security. When the SED controller password is set, encrypted volumes will be offline at boot time. The user must enter the controller password to bring encrypted volumes online.
Countdown Timer	Indicates the controller password countdown timer in seconds.
Attempts Left	Indicates the controller password attempts remaining.
Current Value	Current temperature of the specific sensor.
Max Value Since Powered On	Maximum temperature of the specific sensor after being powered on the controller.
Location	Location of the specific sensor on the controller.
Expander Scan Duration	Time duration in seconds until which a controller waits for expander discovery.
I2C Address	I2C address describes the Inter-Integrated Circuit (I2C) slave address.
I2C Clock Speed	I2C clock speed describes the I2C clock speed.

.....continued

Properties	Description
I2C Clock Stretching	I2C stretching status describes the I2C clock status.
Expander Scan Time-out	Maximum time(seconds) that controller waits for expander scanning devices completion.
Reboot Required Reasons	Have controller settings changed requiring reboot. Property provides list of reasons for a reboot.
Backup Power Status	The backup power status of the controller.
Battery/Capacitor Pack Count	The total installed battery pack count.
Hardware Error	The backup hardware error.
OOB Interface	Out of Band Interface setting.
Pending OOB Interface	Out of Band Interface is in pending state, reboot the system for the new setting to be applied.
I2C Address	The Inter-Integrated Circuit(I2C) slave address.
Pending I2C Address	I2C address is in pending state, reboot the system for the new setting to be applied.
Power settings	Power setting information (The total board power, which is the total power of all the power sensors plus a static board value.)
PBSI related properties	
I2C Clock Speed	I2C clock speed. Value in KHz.
Pending I2C Clock Speed	I2C clock speed is in pending state, reboot the system for the new setting to be applied.
I2C Clock Stretching	I2C clock stretching is enabled or disabled.
Pending I2C Clock Stretching	I2C clock stretching is in pending state, reboot the system for the new setting to be applied.
MCTP related properties	
SMBus Device Type	System Management(SM) Bus Device Type
SMBus Channel	System Management(SM) Bus Channel setting
Static EIDs Use On Initialization	Static End Point Identifiers(EID) usage during initialization
VDM Notification	Vendor Defined Message(VDM) discovery notification
Pending SMBus Device Type	SMBus Device Type is in pending state, reboot the system for the new setting to be applied.
Pending SMBus Channel	SMBus Channel is in pending state, reboot the system for the new setting to be applied.
Pending Static EIDs Use On Initialization	Static EIDs Use On Initialization is in pending state, reboot the system for the new setting to be applied.
Pending VDM Notification	VDM Notification is in pending state, reboot the system for the new setting to be applied.
SPDM Related Properties	
Version	SPDM version
Endpoint ID	Endpoint identifier
Crypto Timeout Exponent	Time requires for cryptographic processing
Authority Key ID	Authority key identifier
Slot [0...7]	Slot identifier
Capabilities Related Properties	
Cache Negotiated State	Responder supports the ability to cache the Negotiated state across a Reset.
Digests and Certificate	Responder supports digests and certificate messages.
Challenge	Responder supports challenge request message.
Measurements Without Signature	Responder supports measurements but cannot perform signature generation.

.....continued

Properties	Description
Measurements With Signature	Responder supports measurements and can perform signature generation.
Measurements Fresh	Responder can recompute all measurements in a manner that is transparent to the rest of the system.
Single Pre-Shared Key	The Responder supports one pre shared key.
Derived Pre-Shared Key	The Responder supports derived pres shared key.

Table 7-2. Array

Properties	Description
Array Number	ID describes unique array identifier within the controller.
Status	Status of array is based on health of the member disk drives.
Name	Name describes unique name of an array.
Interface	Disk drives that are the member of array can have interface type such SAS, SATA, SAS SSD, SATA SSD, and NVMe [®] . The interface type of array is based on the member disk drives interface type.
Total size	Total usable size is the total space available in the array for creating logical device.
Unused Size	Unused size is the free space available to create new logical device to store the data.
Block size	Block size indicates the maximum size of data block on disk drives that are member of an array (can be 512 Bytes or 4K).
Array Utilization	Total space utilization of an array.
Type	Describes the type of the array such as data array, backup array, and so on.
Associated Split Mirror Array	Name of its associated array, if array is of type split mirror.
Transformation Status	Indicates if any logical drive of the array is undergoing transformation.
Spare Rebuild Mode	Spare Rebuild mode describes the spare type for the array. It can be “dedicated” or “auto replace” if the array is valid.
SSD I/O Bypass	SSD I/O Bypass enables an optimized data path to high performance solid state drives. The optimized path bypasses the controllers RAID processing components and sends I/O directly to the drives.
SED Encryption	Indicates whether the array SED encryption status is enabled or not. Possible values are Enabled/Disabled.

Table 7-3. Logical Device

Properties	Description
Logical Device Number	ID describes unique logical device identifier within the controller.
Logical Device Name	Logical device name can be of maximum 64 characters and it should contain only ASCII characters in Operation System.
Disk Name	Name of the logical disk drive.
Block Size of member drives	Maximum size of data block on disk drives which are RAID member of logical device (can be 512 Bytes or 4K).
Array	Identifier of the Array on which the logical device.
RAID level	RAID level on which the logical device has been created.
Unique Identifier	The logical device unique identifier.
Status of Logical Device	Status of logical device based on health of RAID members of logical device.
maxCache state	State of the associated maxCache logical device.
Additional details	Describes the way of logical device creation.
Parity Initialization Status	RPI status of this logical device.

.....continued

Properties	Description
maxCache Status	Status of maxCache.
Size	Logical device size.
Stripe-unit size	Stripe size is the amount of data (in KB) written to one disk drive, before moving to the next disk drive in the logical device. Stripe size options vary, depending on your controller and RAID level.
Full Stripe Size	Full stripe size refers to the combined size of all the strips across all physical devices, excluding parity-only devices.
Cache Line Size	Specifies the cache line size (KB).
Interface Type	Disk drives which are the member of logical can have interface type such SAS, SATA, SAS SSD, SATA SSD, and NVMe.
Device Type	Indicates logical drive is of type data or cache.
Heads	Indicates the predefined space set aside for RAID redundant information on a logical device.
Boot Type	Indicates whether the logical drive is primary or secondary boot device for the system.
Sectors Per Track	Specifies the number of sectors that are to comprise each track.
Cylinders	Indicates the set of all tracks having equal diameter in a logical device.
Caching	Indicates the setting of cache used for this logical device.
Mount Points	Describes the operating system device names of the logical device and vice versa.
Associated Logical Id	Associated logical device for maxCache.
maxCache write cache policy	maxCache policy setting to WT or WB.
maxCache write cache preferred setting	Indicates the status of maxCache write cache setting if it is write-through (WT) or write-back (WB).
Backup Creation Timestamp	Split Mirror Set Backup logical creation time.
LD Acceleration Method	Setting of the LD acceleration method. Controller cache or SSD I/O Bypass or maxCache.
SED Encryption	Indicates whether the logical drive SED encryption status is enabled or not. Possible values are Enabled/Disabled.
Volume Unique Identifier	Logical device unique string identifier.
Plaintext (Non-Encrypted) Logical Device	Setting to identify a non-encrypted logical device.
Volatile maxCrypto™ Keys	Setting to identify if logical device supports Volatile key.
Boot Type	A bootable logical device is a logical device that the system can attempt to boot from after a system power-on. A controller can have up to two bootable logical device, where one is a primary boot logical device and the other a secondary boot logical device. When the system looks at a controller for a boot logical device, it will first attempt to boot from a primary boot logical device, and if that fails, then it will attempt to boot from a secondary boot logical device.
maxCrypto	Setting of the maxCrypto for the logical device.
Encrypted	Indicate user whether the logical device is encrypted or not.
maxCache statistics	
Read Cache Hits	Read Cache Hits
Read Cache Miss (Total)	Total read cache miss
Read Cache Hit Rate	Read cache hit rate
Write Cache Hits	Write cache hits
Write Cache Miss (Total)	Write cache miss

.....continued

Properties	Description
Write Cache Hit Rate	Write cache hit rate
Consistency Check Information	
Consistency Check Status	Indicates if a consistency check is currently in progress or not running. It is not applicable for non-redundant logical device.
Last Consistency Check Completion Time	Indicates the date and time of the last consistency check that occurred in the logical drive.
Last Consistency Check Duration	Indicates how long the last consistency check took for that logical device (seconds).

Table 7-4. Physical Device

Properties	Description
SED Security Status	SED Security status is locked or not?
SED Qualification Status	Device qualification status is in progress or failed.
SED Ownership Status	Describes the current encryption ownership status of the physical drive.
SED Type	Describes the current SED type of the physical drive.
Device	The SCSI ID for a physical device reported by the controller.
Device Type	Type of physical device such as "hard disk drive", "solid state drive" or "shingled magnetic recording (SMR) hard disk drive."
State	Current state of the physical device based on the operations done on it.
Drive has stale RIS data	Specifies whether the physical device has stale RIS data.
Disk name	Name of the physical disk drive in Operating System.
Block Size	Maximum size of the data block on disk drives that are RAID member of the logical device (can be 512 Bytes or 4K).
Physical Block Size	It indicates the physical block size in bytes. Valid only for physical drives (HDD/SSD).
Dedicated Spare for drive	If drive is acting as spare.
Transfer Speed	Description of the drive speed.
Reported Channel, Device (T:L)	The channel ID and SCSI Device ID to which the physical device is connected.
Reported Location	Physical location information of the drive that contains enclosure/backplane/direct attached, slot, and connector information available.
Array	Specifies the array ID, where the drive is constituent as a data or spare drive.
Vendor	Physical device manufacturer name.
Model	Product model; name of the physical device.
Firmware	Firmware version of the physical device.
Serial number	Serial number of the physical device.
World Wide Name	Reported world wide name provided by the manufacturer.
Total Size	Total data storage capacity of the physical device.
Reserved Size	Reserved space for internal use.
Used Size	Used space of the drive.
Unused Size	Unused space of the drive.
Write Cache	Indicates the write cache policy on the device.
S.M.A.R.T.	SMART supported.
S.M.A.R.T. warnings	Any SMART error reported in the physical device.
Unsupported Reason(s)	Describes reasons why the physical drive is unsupported.
SSD	If drive type is SSD.

.....continued

Properties	Description
Device-On-Boot Connector	Device connected through the boot connector.
NCQ status	Indicates whether the native command queuing is enabled/disabled on this physical device.
NCQ supported	Specifies whether this physical device supports native command queuing.
Rotational Speed	Indicates the rotational speed of the physical device.
Current Temperature	Current temperature of the physical device.
Maximum Temperature	The maximum temperature reported by the physical device.
Threshold Temperature	The threshold temperature reported by the physical device.
PHY Count	Drive PHY count.
Drive Configuration Type	Determines the presence/type of logical devices of which this physical device is a part.
Foreign Key Identifier	Foreign SED master key identifier of the device.
Foreign Reset Key Identifier	Foreign Reset key identifier of the device.
Original Factory State (OFS)	This describes that the drive is in OFS.
Drive SKU Number	Drive stock keeping unit of the number.
Drive Part Number	Describe the part number of the drive.
Multi-Actuator Drive	Describes whether the drive is Multi-Actuator drive or not. The values are 'Yes' or 'No'.
Multi-Actuator Drive LUN Count	Describes the LUN count that is available on the Multi-Actuator drive.
Mount Point(s)	Mount point(s) describes the operating system device names of the physical device.
Drive Exposed to OS	Indicates whether the physical device is exposed to the operating system.
Sanitize Erase Support	Specifies whether the sanitize erase is supported by this physical device.
Sanitize Lock Freeze Support	Specifies whether the sanitize freeze is supported by this physical device.
Sanitize Lock Anti-Freeze Support	Specifies whether the sanitize lock anti-freeze is supported by this physical device.
Sanitize Lock Setting	Sanitize Lock Setting information.
Power On Hours	The number of operational power-on hours of SSD.
Usage Remaining	SSD life utilization.
SSD Smart Trip Wearout	SSD wear out occurred.
56 Day Warning Present	SSD have lesser than or equal to 56 days of the calculated usage left.
Drive Unique ID	ID to uniquely identify the physical device.
Last Failure Reason	Describes previous drive failure reason.
Encrypted	A SED (or Self-Encrypting Drive) is a type of hard drive that automatically and continuously encrypts the data on the drive without any user interaction.
Volatile maxCrypto™ Key	Whether this device has volatile keys.
Interface Type	Interface type supported by the physical device.
Boot Type	A bootable physical device is a physical device from which the system attempts to boot after a system power-on. A controller can have up to two bootable physical devices, where one is a primary boot physical device and the other is a secondary boot physical device. When the system looks at a controller for a boot physical device, it will first attempt to boot from a primary boot physical device, and if that fails, then it will attempt to boot from a secondary boot physical device.
Encrypted Drive	Indicates whether this physical device is a part of any encrypted logical device.
Drive Encryption Capability	Device is Self-Encryption Drive or not?

.....continued

Properties	Description
Drive PHY information	
Negotiated Physical Link Rate	Indicating the negotiated physical link rate on all the PHYs of this device.
Negotiated Logical Link Rate	Indicating the negotiated logical link rate on all the PHYs of this device.
Maximum Link Rate	Maximum possible link rate for a PHY.
Negotiated Link Rate	PHY negotiated link rate.
Device Error Counters	
Aborted Commands	Aborted Commands
Bad Target Errors	Bad Target Errors
ECC Recovered Read Errors	ECC Recovered Read Errors
Failed Read Recovers	Failed Read Recovers
Failed Write Recovers	Failed Write Recovers
Format Errors	Format Errors
Hardware Errors	Hardware Errors
Hard Read Errors	Hard Read Errors
Hard Write Errors	Hard Write Errors
Hot Plug Count	Hot Plug Count
Media Failures	Media Failures
Not Ready Errors	Not Ready Errors
Other Time Out Errors	Other Time Out Errors
Predictive Failures	Predictive Failures
Retry Recovered Read Errors	Retry Recovered Read Errors
Retry Recovered Write Errors	Retry Recovered Write Errors
SCSI Bus Faults	SCSI Bus Faults
Sectors Reads	Sectors Reads
Sectors Written	Sectors Written
Service Hours	Service Hours

Table 7-5. Connector Information

Properties	Description
Connector	The ID for a connector reported by the controller
Connector Name	Connector name reported by the controller.
Functional Mode	Operating mode of the connector. Possible values RAID(Hide RAW), HBA and Mixed.
Connector Location	Physical location of the connector on the controller.
SAS Address	SAS address of the connector.
Current Discovery Protocol	The current backplane discovery protocol connector operates in.
Pending Discovery Protocol	Backplane discovery protocol is in pending state, reboot the system for the new setting to be applied.
PHY Count	The number of PHYs the connector has.
Current Number of Targets	Number of devices supported on the connector when the protocol is set to "Direct-Attached Cable".

.....continued

Properties	Description
Pending Number of Targets	Number of targets has changed and is in pending state, reboot the system for the new value to be applied. Valid only for discovery protocol "Direct-Attached Cable".
Enclosure	
Enclosure ID	Indicates the enclosure identifier.
Enclosure Logical Identifier	Indicates the enclosure logical identifier.
Expander ID	Indicates the expander identifier.
Expander SAS Address	Indicates the expander SAS address.
SEP Device ID	Indicates the SEP device identifier.
Type	Indicates the type of enclosure.
Vendor	Enclosure manufacturer name.
Model	Product model; name of the enclosure device.
Firmware	Firmware version of the enclosure device.
Status of Enclosure Services Device	
Temperature Sensor Status #	Indicates the temperature reading from Sensor # on the enclosure device.
UBM Backplane	
Backplane ID	Indicates the backplane identifier.
UBM Controller ID	Indicates the UBM Controller.
Type	Indicates the type of backplane.
Firmware	Indicates the firmware of the backplane in decimal and hexadecimal format.
Part Number	It indicates ASCII string of the UBM product string.
Model	Product model name of the enclosure device.
Device Code	It indicates manager device code of a UBM backplane.
PCI Vendor ID	Indicates the PCI vendor identifier.

8. 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
L	01/2024	The following is the summary of changes in revision L of this document: • Added new section—arccnf getconfigson • Removed section—arccnf setperform • Updated the syntax/examples of—arccnf setcontrollerparam • Added new parameters in—arccnf setcontrollerparam (DPO) • Added a note in arccnf setname • Updated UBM Backplane firmware description in Connector Information table
K	10/2023	The following is the summary of changes in revision K of this document: • Updated Downloading the Installation Packages section • Removed section—Installing Remote ARCCONF • Added new sections—Installing ARCCONF Command Line Utility on VMware ESXi 7.x and 8.x and Smart Controller Device Status • Updated the description of—arccnf getconfig, arccnf getsmartstats, arccnf modify, arccnf savesupportarchive, arccnf setboot, arccnf setcache, arccnf setconfig, arccnf setpriority, and arccnf unitit • Updated the description of parameters in—arccnf create (Logical Drive, maxCache, and RAID#), arccnf expanderupgrade (Filename), arccnf getconfig (AD/PD/AL...), arccnf getlogs (Tabular), arccnf getstatus (Controller#), arccnf delete (Controller#), arccnf getversion (Controller#), arccnf identify (Array#), arccnf modify (RAID# and Channel# ID#), arccnf passthrough (noprompt and nologs), arccnf romupdate (once*), arccnf sedencryption (IMPORT), arccnf setconfig (Default and Clearmaxcryptoconfig), arccnf setmaxcache (LogicalDrive#), arccnf setname (LogicalDrive#), and arccnf slotconfig (ConnectorID#, ConnectorName, ALL, and MAP) • Updated the syntax/examples of—arccnf getconfig, arccnf imageupdate, arccnf sedencryption, arccnf setcontrollerparam, arccnf setmaxcache, arccnf setpower, and arccnf slotconfig • Added new parameters in—arccnf imageupdate (BackplaneID#, UBMControllerID#, and ALL), arccnf setcontrollerparam (SPINDOWNSPARESPOLICY), and arccnf slotconfig (BackplaneID#) • Removed parameter in—arccnf setcache (Channel/ID) • Updated notes in arccnf getconfig • Added the following commands in UEFI/ARCCONF Commands table: – GETSMARTSTATS – GETSTATUS – SETCACHE – UNINIT • Updated the following commands in UEFI/ARCCONF Commands table: – IMAGEUPDATE – SETCONFIG – SLOTCONFIG • Added the following properties in the Controller Properties table: – Spindown Spares Policy – Power On Hours • Removed Runtime Error Counters section in Physical Device table • Updated Connector Information table

.....continued

Revision	Date	Description
J	5/2023	- Added a new command—arccconf security - Updated the syntax/examples of—arccconf getconfig, arccconf imageupdate, arccconf sedencryption, arccconf setarrayparam, arccconf setconfig - Updated the description of —arccconf getconfig, arccconf getversion, arccconf imageupdate (Channel#, ID#), arccconf sedencryption (MASTERKEYIDENTIFIER), arccconf setarrayparam (Enode), arccconf setcache (WRITECACHEBYPASSTHRESHOLD), - Added new parameter RAID, CACHE, OOB, SPDM, Parameter Name, Parameter Description - Updated the following in the UEFI/ARCCONF Commands table: - SECURITY - Added/updated the following in the Controller, Array, Logical, Physical Device, Enclosure, and UBM Backplane tables: - Manufacturing SKU Number - Power Type, Current temperature, Maximum Temperature, Threshold Temperature, Voltage, Maximum Voltage, Current, Health Status, and Relative Charge in Hardware Error - Property in EEPROM Version - Version, Endpoint ID, Crypto Timeout Exponent, Authority Key ID, Slot [0..7], Cache Negotiated State, Digests And Certificate, Challenge, Measurements Without Signature, Measurements With Signature, Measurements Fresh, Single Pre-Shared Key, and Derived Pre-Shared Key in SPDM related properties. - Enclosure—Enclosure ID, Enclosure Logical Identifier, Expander ID, Expander SAS Address, SEP device ID, Type, Vendor, Model, Firmware - Status of Enclosure Services Device—Temperature Sensor Status and Speaker Status - UBM Backplane—Reported Channel, Device(T:L), Version (Major.Minor), Backplane ID, Type, Part Number, Model, Device Code, and PCI Vendor ID
H	2/2023	- Updated the syntax/examples of—arccconf getconfig, arccconf setcontrollerparam - Added new parameter LUN in arccconf getconfig - Added new parameter MRRS, size, and UEFIHEALTHREPORTINGMODE in arccconf setcontrollerparam - Updated the description of the POWERMODE paramter in arccconf setpower - Updated the following in the Controller, Array, Logical and Physical Device Properties tables: - Added these properties: - Active PCIe Maximum Read Request Size - Pending PCIe Maximum Read Request Size - PCIe Maximum Payload Size - PCIe Maximum Payload Size, UEFI Health Reporting Mode - Multi-Actuator Drive - Multi-Actuator Drive LUN Count - Added SATA SSD and NVMe[®] to the description of Interface, and Interface Type

.....continued

Revision	Date	Description
G	11/2022	- Updated the syntax/examples of—arccnf expanderupgrade, arccnf getstatus, arccnf maxCrypto™, arccnf sedencryption, and arccnf setcontrollerparam - Added new parameter ConnectorName in arccnf expanderupgrade - Updated description of arccnf getconfig - Updated description of arccnf getversion - Added new parameters to arccnf maxcrypto - Updated description of the parameter KEYMANAGEMENTMODE in arccnf sedencryption - Updated description of arccnf setcache - Added new parameters to arccnf setcontrollerparam - Updated description of the REBUILD parameter in arccnf setpriority - Updated the following in the Controller, Array, Logical and Physical Device Properties tables: - Updated description of Sanitize Lock Setting, Configured Drives, Unconfigured Drives, HBA Drives, Consistency Check Delay, maxCache write cache policy - Added following new properties: - Persistent Event Log Policy - EEPROM Version - Key Management Mode - Master Key Reset in Progress - Local Key Cache - Retry Interval in Minutes - Controller Locked - Consistency Check Information - Unsupported Reason(s)
F	07/2022	- Added new command—arccnf sedencryption - Updated the syntax/examples of arccnf create, arccnf getlogs, arccnf maxcryptokey, arccnf passthrough, arccnf phyerrorlog - Added ALL parameter in arccnf getlogs - Updated the table on UEFI/ARCCNF commands with following commands: DRIVERUPDATE, MODIFY, PHYERRORLOG, PLAYCONFIG, REFRESH, SAVECONFIG, SETCONTROLLERMODE, SETCONTROLLERPARAM, SETMAXCACHE, SETNAME, SETPERFORM, SETPOWER, SETPRIORITY, SPLITMIRROR, TASK, and UNINIT - Updated the Controller table with the following properties: Negotiated PCIe Data Rate, NVMe* Supported, NVMe Configuration Supported, Expander Minimum Scan Duration, Expander Scan Time-out, Reboot Required Reasons, Power Consumption, Cache State, Backup Power Status, Battery/Capacitor Pack Count, Hardware Error, Hardware Minor Revision, SED Encryption, Key Mode, SED Encryption Status, SED Operation in Progress, Master Key Identifier, Countdown Timer, and Attempts Left - Updated the Array table with the following properties: Transformation Status, and SED Encryption. - Updated the Logical Devices table with the following properties: Boot Type, and SED Encryption. - Updated the Physical Devices table with the following properties: SED Ownership status, SED Type, Physical Block Size, Reported Location, Write Cache, Foreign Key Identifier, Foreign Reset Key Identifier, Original Factory State(OFS), Drive SKU Number, and Drive Part Number. - Updated the Connector Information table with the following property: Connector Name

.....continued

Revision	Date	Description
E	02/2022	- Removed arconf key - Updated noprompt and nolog parameters for most of the commands - Updated the syntax/examples of arconf getconfig, arconf maxcrypto, arconf modify, arconf passthrough, arconf refresh, arconf setcache, arconf setpower, arconf setstate - Updated TYPE<Boot Type> in arconf setboot - Updated the Default parameter in arconf setconfig - Updated the Options parameter in arconf task - Updated ELEVATORSORT and PBSI parameters in arconf setcontrollerparam - Added Legs <LEG> to Options parameter in arconf modify
D	11/2021	- Updated the syntax/description/examples of arconf atapassword, arconf consistencycheck, arconf create, arconf expanderupgrade, arconf getlogs, arconf getstatus, arconf identify, arconf maxcrypto, arconf maxcryptoaccounts, arconf maxcryptokey, arconf phyerrorlog, arconf savesupportarchive, arconf setarrayparam, arconf setboot, arconf setcache, arconf setcontrollerparam, arconf setperform, arconf setpower, arconf setstate, arconf slotconfig, arconf smp, and arconf splitmirror - Removed arconf restatisticscounter and arconf setstatsdatacollection
C	07/2021	- Updated the Introduction section - Updated the description in arconf consistencycheck - Updated description of Wcache, CacheLineSize <CACHELINESIZE>, and Legs <LEG> in arconf create - Updated syntax and description of options parameter in arconf task - Added DEBUGTOKEN in arconf getconfig - Updated syntax of arconf getstatus - Updated the description for Mode# parameter in arconf imageupdate - Updated parameters in arconf getlogs - Updated the Controller, Array, Logical and Physical Device Properties section - Added a new table "Connector Information" in the Controller, Array, Logical and Physical Device Properties section
B	05/2021	- Added VPP to DISCOVERYPROTOCOL in arconf setcontrollerparam - Removed CONSOLIDATESSPACE from arconf setarrayparam - Updated CachePolicy in arconf setcache - Updated the description for Configured Drives, Unconfigured Drives, HBA Drives in the Controller, Array, Logical and Physical Device Properties section.
A	02/2021	Initial Revision (previously, ESC-2161616)

Microchip Information

The Microchip Website

Microchip provides online support via our website at www.microchip.com/. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

Product Change Notification Service

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to www.microchip.com/pcn and follow the registration instructions.

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the website at: www.microchip.com/support

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.
- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable". Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.

Legal Notice

This publication and the information herein may be used only with Microchip products, including to design, test, and integrate Microchip products with your application. Use of this information in any other manner violates these terms. Information regarding device applications is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure

that your application meets with your specifications. Contact your local Microchip sales office for additional support or, obtain additional support at www.microchip.com/en-us/support/design-help/client-support-services.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL, OR CONSEQUENTIAL LOSS, DAMAGE, COST, OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION.

Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, CryptoMemory, CryptoRF, dsPIC, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, ClockWorks, The Embedded Control Solutions Company, EtherSynch, Flashtec, Hyper Speed Control, HyperLight Load, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, TimeCesium, TimeHub, TimePictra, TimeProvider, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, Clockstudio, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, EyeOpen, GridTime, IdealBridge, IGaT, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, IntelliMOS, Inter-Chip Connectivity, JitterBlocker, Knob-on-Display, MarginLink, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mSiC, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, Power MOS IV, Power MOS 7, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SmartHLS, SMART-I.S., storClad, SQL, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, Trusted Time, TSHARC, Turing, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2024, Microchip Technology Incorporated and its subsidiaries. All Rights Reserved.

ISBN: 978-1-6683-3703-5

Quality Management System

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: www.microchip.com/support Web Address: www.microchip.com	Australia - Sydney Tel: 61-2-9868-6733 China - Beijing Tel: 86-10-8569-7000 China - Chengdu Tel: 86-28-8665-5511 China - Chongqing Tel: 86-23-8980-9588 China - Dongguan Tel: 86-769-8702-9880 China - Guangzhou Tel: 86-20-8755-8029 China - Hangzhou Tel: 86-571-8792-8115 China - Hong Kong SAR Tel: 852-2943-5100 China - Nanjing Tel: 86-25-8473-2460 China - Qingdao Tel: 86-532-8502-7355 China - Shanghai Tel: 86-21-3326-8000 China - Shenyang Tel: 86-24-2334-2829 China - Shenzhen Tel: 86-755-8864-2200 China - Suzhou Tel: 86-186-6233-1526 China - Wuhan Tel: 86-27-5980-5300 China - Xian Tel: 86-29-8833-7252 China - Xiamen Tel: 86-592-2388138 China - Zhuhai Tel: 86-756-3210040	India - Bangalore Tel: 91-80-3090-4444 India - New Delhi Tel: 91-11-4160-8631 India - Pune Tel: 91-20-4121-0141 Japan - Osaka Tel: 81-6-6152-7160 Japan - Tokyo Tel: 81-3-6880-3770 Korea - Daegu Tel: 82-53-744-4301 Korea - Seoul Tel: 82-2-554-7200 Malaysia - Kuala Lumpur Tel: 60-3-7651-7906 Malaysia - Penang Tel: 60-4-227-8870 Philippines - Manila Tel: 63-2-634-9065 Singapore Tel: 65-6334-8870 Taiwan - Hsin Chu Tel: 886-3-577-8366 Taiwan - Kaohsiung Tel: 886-7-213-7830 Taiwan - Taipei Tel: 886-2-2508-8600 Thailand - Bangkok Tel: 66-2-694-1351 Vietnam - Ho Chi Minh Tel: 84-28-5448-2100	Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393 Denmark - Copenhagen Tel: 45-4485-5910 Fax: 45-4485-2829 Finland - Espoo Tel: 358-9-4520-820 France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79 Germany - Garching Tel: 49-8931-9700 Germany - Haan Tel: 49-2129-3766400 Germany - Heilbronn Tel: 49-7131-72400 Germany - Karlsruhe Tel: 49-721-625370 Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44 Germany - Rosenheim Tel: 49-8031-354-560 Israel - Ra'anana Tel: 972-9-744-7705 Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781 Italy - Padova Tel: 39-049-7625286 Netherlands - Drunen Tel: 31-416-690399 Fax: 31-416-690340 Norway - Trondheim Tel: 47-72884388 Poland - Warsaw Tel: 48-22-3325737 Romania - Bucharest Tel: 40-21-407-87-50 Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91 Sweden - Gothenberg Tel: 46-31-704-60-40 Sweden - Stockholm Tel: 46-8-5090-4654 UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820