12Gb/s SAS Integrated RAID Configuration Utility (SAS3IRCU)

User Guide

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12Gb/s SAS Integrated RAID Configuration Utility User Guide

This document describes the command-line-driven 12Gb/s SAS Integrated RAID configuration utility (SAS3IRCU) to create and manage Integrated RAID volumes on Avago 12Gb/s SAS controllers.

Run the SAS3IRCU commands from a command-line prompt or a shell script. When you use a SAS3IRCU command, the program returns a status value to the operating system when it exits.

You can use the SAS3IRCU application to quickly and efficiently configure Integrated RAID devices on Avago 12Gb/s SAS controllers.

NOTE In this document, the term *disk* means both hard disk drive (HDD) and solid state drive (SSD), and the HDDs or SSDs can support either SAS or SATA protocol.

1 Hardware and Software Requirements

The SAS3IRCU application runs on the following operating system architectures:

- Windows®: x86, x64 (AMD64)
- Linux®: x86, x86_64 (supported with x86 build), PPC64
- Unified Extensible Firmware Interface (UEFI): EFI Byte Code
- FreeBSD®: x86 (or i386)
- AMD64 (or compatible)

The SAS3IRCU application operates with storage devices that are compliant with existing SCSI standards.

1.1 Controller Support

The SAS3IRCU application supports the following Avago 12Gb/s SAS controllers and the host bus adapters based on these controllers:

- SAS3008
- SAS3004
- SAS3108
- SAS3216
- SAS3224
- SAS3316
- SAS3324

1.2 Operating System and Software Support

The SAS3IRCU application requires Peripheral Component Interface® (PCI®) 2.x or PCI 3.0 firmware and Message Passing Interface (MPI) v2.5. The SAS3IRCU application supports the following operating systems.

NOTE Avago recommends that you use the latest version of the driver for any operating system.

- Windows XP, Windows Vista®, Windows 7, Windows Server 2008, Windows Server 2008-R2, Windows 8, and Windows Server 2012
- UEFI, Shell 1.0 and 2.0

- Linux 2.6 Kernel – Red Hat® Enterprise Linux (RHEL) 5 and higher, SuSE® Linux Enterprise Server (SLES) 10 and higher
- MS-DOS® 6.22 and FreeDOS 1.0

  The SAS3IRCU application runs on DOS only if the system BIOS supports 32-bit BIOS services, including the PCI BIOS services. The SAS3IRCU application uses these services to directly access the controller and its interface registers.
- FreeBSD 7.2 and higher in both 32-bit and 64-bit architecture
- VMware® ESXi 5.0 and higher

2 Interface Description

Use this syntax for SAS3IRCU commands:

`sas3ircu <controller_#> <command> <parameters>`

Use a space to separate the program name, the controller number, the command, and the parameters fields. The format of *<parameters>* is command specific.

Information passes between the user environment and the SAS3IRCU application through the command line, the standard output and standard error interfaces, and the program return value. It is possible to redirect the output streams as permitted by the operating system. When the program exits, it returns a value of 0 if the command is successful. Otherwise, it returns a value of 1. If a command fails, the SAS3IRCU application prints the IOC status and IOC log information on the console. This information can help determine the cause of the failure.

3 Commands

The following table shows which commands the SAS3IRCU application supports on each operating system.

Table 1 SAS3IRCU Commands

SAS3IRCU Command	Operating System			
	DOS	Linux	EFI	FreeBSD
CREATE Command	X	X	X	X
DELETE Command	X	X	X	X
DELETEVOLUME Command	X	X	X	X
DISPLAY Command	X	X	X	X
HOTSPARE Command	X	X	X	X
STATUS Command	X	X	X	X
LIST Command	X	X	X	X
CONSTCHK Command	X	X	X	X
ACTIVATE Command	X	X	X	X
LOCATE Command	X	X	X	X
LOGIR Command	X	X	X	X

Table 1 SAS3IRCU Commands (Continued)

SAS3IRCU Command	Operating System			
	DOS	Linux	EFI	FreeBSD
BOOTIR Command	X	X	X	X
BOOTENCL Command	X	X	X	X
ALTBOOTIR Command	X	X	X	X
ALTBOOTENCL Command	X	X	X	X
SETOFFLINE Command	X	X	X	X
SETONLINE Command	X	X	X	X
HELP Command	X	X	X	X

The commands are not case sensitive. The individual command descriptions use the following conventions:

- Replace text enclosed in < > with a required parameter, such as a controller number or a volume type.
- Replace text enclosed in [ ] with an optional parameter.
- Enter parameters enclosed in { } one or more times, as required for the command.
- Do not use the command-line definition characters < >, [ ], and { } on the command line.

3.1 Common Command-Line Parameters

This section describes command-line parameters that are common to more than one command.

- *<controller_#>*

  The unique controller number that the program assigns to each *PCI function* found on supported controller chips in the system, starting with controller # 0. For example, in a system containing two SAS3008 controllers, controller # 0 references the first controller and controller # 1 references the other controller. Use the `LIST` command to view a list of controllers connected to the system and the controller number for each controller.

  Valid controller number values are 0 to 255 (decimal).

- *<Enclosure:Bay>*

  The enclosure and bay (or slot) of a peripheral device attached to the bus. The argument must use a colon (`:`) as a separator and must follow the *Enclosure:Bay* format. *Enclosure* is a 16-bit `EnclosureHandle` value set by the I/O controller (IOC). A value of 0 is invalid. *Bay/Slot* is a 16-bit slot value set by the IOC. Use the `DISPLAY` command to determine the enclosure number and slot number of a drive.

3.2 CREATE Command

The CREATE command creates Integrated RAID volumes on Avago 12Gb/s SAS controllers.

When you add a disk to an Integrated RAID volume, the volume might not use all of the disk's storage capacity. For example, if you add a 300-GB disk drive to a volume that only uses 200 GB of capacity on each disk drive, the volume does not use the remaining 100 GB of capacity on the disk drive.

The disk identified by the first *Enclosure:Bay* on the command line becomes the *primary disk* drive when you create an Integrated Mirroring (RAID 1) volume. If the controller resynchronizes the disk drives, the data on the primary disk drive becomes available when you access the newly created volume.

When the IR firmware creates a RAID 1 volume, it starts a background initialization of the volume. Use the STATUS command to monitor the status of the initialization.

The following restrictions and defaults apply when you create Integrated RAID volumes and hot spare disks:

- All disks that are part of a volume, including hot spares for that volume, must be connected to the same Avago 12Gb/s SAS controller.
- The supported RAID levels are RAID 0, RAID 1, RAID 1E, and RAID 10.
- You can create a maximum of two Integrated RAID volumes per the Avago 12Gb/s SAS controller.
- The maximum and minimum disk drives per RAID level are as follows:
  - RAID 0: Max = 10; Min = 2.
  - RAID 1: Max = 2; Min = 2.
  - RAID 1E: Max = 10; Min = 3.
  - RAID 10: Max = 10; Min = 3.
- You can create one or two hot spare disks per controller.

  For more information about hot spare disks, see Section 3.6, HOTSPARE Command.
- The SAS3IRCU application does not permit you to create an Integrated RAID volume that combines SAS and SATA HDDs.
- The SAS3IRCU application does not permit you to create an Integrated RAID volume that combines SSDs and HDDs.
- SAS3IRCU supports disk drives with 512-byte sectors and disk drives with 4-KB sectors.

  However, an Integrated RAID volume must use all 512-byte-sector drives or all 4-KB-sector drives. You cannot combine the two types of drives in a single Integrated RAID volume.

NOTE Some operating systems do not fully support 4-KB-sector drives. Refer to the documentation for the operating system you are using.

Command Line

```
sas3ircu <controller_#> create <volume_type> <size> {<Enclosure:Bay>}
[VolumeName] [noprompt]
```

Parameters

- *<controller_#>* – The index of the controller for the newly created volume.
- *<volume_type>* – Volume type for the new volume.

  Valid values are RAID 0, RAID 1, RAID 10, or RAID 1E.
- *<size>* – Size of the RAID volume in MB, or MAX for the maximum size available.
- *<Enclosure:Bay>* – The *Enclosure:Bay* value of the disk drive for the new RAID volume.

  Determine these values from the output of the DISPLAY command.
- *[VolumeName]* – A user-specified string to identify the volume.
- [noprompt] – This optional parameter prevents warnings and prompts from appearing while the command is running.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.3 DELETE Command

The DELETE command deletes all RAID 0, RAID 1, RAID 10, and RAID 1E Integrated RAID volumes and hot spare drives from the specified Avago 12Gb/s SAS controller. The command does not change any other controller configuration parameters.

Command Line

```
sas3ircu <controller_#> delete [noprompt]
```

Parameters

- *<controller_#>* – The index of the controller with the volume or volumes that you want to delete.
- [noprompt] – This optional parameter prevents warnings and prompts from appearing while the command is running.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.4 DELETEVOLUME Command

The DELETEVOLUME command deletes a specific RAID 0, RAID 1, RAID 10, or RAID 1E volume and the associated hot spare drives on the specified controller. The hot spare is deleted only if it is inappropriate for any of the remaining volumes. No other controller configuration parameters are changed. Use the STATUS command or the DISPLAY command to determine the volumeID of the volume you want to delete.

Command Line

```
sas3ircu <controller_#> deletevolume <volumeID> [noprompt]
```

Parameters

- *<controller_#>* – The index of the controller with the volume or volumes that you want to delete.
- *<volumeID>* – The *volumeID* of the specific IR volume that you want to delete.
- [noprompt] – This optional parameter prevents warnings and prompts from appearing while the command is running.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.5 DISPLAY Command

The DISPLAY command displays information about Avago 12Gb/s SAS controller configurations, including controller type, firmware version, BIOS version, volume information, physical drive information, and enclosure. See the following sample output example.

The physical device information section displays the duplicate device of a dual-port SAS drive.

Command Line

```
sas3ircu <controller_#> display [filename]
```

Parameters

- *<controller_#>* – The index of the controller for which you want to display information.
- [*filename*] – An optional valid filename to store the command output to a file.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output The following is a sample of the information that the DISPLAY command returns.

```
Read configuration has been initiated for controller 0
------------------------------------------------------------------------
Controller information
------------------------------------------------------------------------
  Controller type                          : SAS3008
  PI Supports                              : Yes
  PI Mixing                                : Enabled
  BIOS version                             : 7.00.02.00
  Firmware version                         : 00.250.19.0
  Channel description                      : 1 Serial Attached SCSI
  Initiator ID                             : 112
  Maximum physical devices                 : 62
  Concurrent commands supported            : 266
Slot                                       : 3
Segment                                    : 0
  Bus                                      : 64
  Device                                   : 1
  Function                                 : 0
  RAID Support                             : Yes
------------------------------------------------------------------------
IR Volume information
------------------------------------------------------------------------
IR volume 1
  Volume ID                                : 286
  PI Supported                             : Yes
  PI Enabled                               : Yes
  Status of volume                         : Okay (OKY)
  Volume wwid                              : 0677c0fb06777e7b
  RAID level                               : RAID1
  Size (in MB)                             : 139236
  Boot                                     : Primary
  Physical hard disks                      :
  PHY[0] Enclosure#/Slot#                  : 1:0
  PHY[1] Enclosure#/Slot#                  : 1:1
------------------------------------------------------------------------
Physical device information
------------------------------------------------------------------------
Initiator at ID #0

Device is a Hard disk
  Enclosure #                              : 1
  Slot #                                   : 0
```

```
  SAS Address                                : 5000c50-0-1ab7-3406
  State                                      : Optimal (OPT)
  Size (in MB)/(in sectors)                  : 140014/286749487
  Manufacturer                               : SEAGATE
  Model Number                               : ST9146852SS
  Firmware Revision                          : 0005
  Serial No                                  : 6TB008T700009038TL1L
  GUID                                       : 5000c5001ab73407
  Protocol                                   : SAS
  Drive Type                                 : SAS_HDD

Device is a Hard disk
  Enclosure #                                : 1
  Slot #                                     : 1
  SAS Address                                : 5000c50-0-33ba-3d0e
  State                                      : Optimal (OPT)
  Size (in MB)/(in sectors)                  : 286102/585937499
  Manufacturer                               : SEAGATE
  Model Number                               : ST9300603SS
  Firmware Revision                          : 0006
  Serial No                                  : 6SE35RZL0000B134JFS2
  GUID                                       : 5000c50033ba3d0f
  Protocol                                   : SAS
  Drive Type                                 : SAS_HDD
-------------------------------------------------------------------------
Enclosure information
-------------------------------------------------------------------------
Enclosure#                                   : 1
Logical ID                                   : 51234567:89012345
Numslots                                     : 8
StartSlot                                    : 0
Primary Boot Slot                            : 2
SAS3IRCU: Command DISPLAY Completed Successfully.
```

The IR Volume state values are as follows:

- Okay (OKY) – The volume is active and drives are functioning properly.

The user data is protected if the current RAID level provides data protection.

- Degraded (DGD) – The volume is active.

  User data is not fully protected because the configuration has changed or a drive has failed.
- Failed (FLD) – The volume has failed.
- Missing (MIS) – The volume is missing.
- Initializing (INIT) – The volume is initializing.
- Online (ONL) – The volume is online.

The physical device state values are as follows:

- Online (ONL) – The drive is operational and is part of a volume.
- Hot Spare (HSP) – The drive is a hot spare that is available to replace a failed drive in a volume.
- Ready (RDY) – The drive is ready for use as a normal disk drive, or it is ready to be assigned to a volume or a hot spare pool.
- Available (AVL) – The drive might not be ready, and it is not suitable for use in a volume or a hot spare pool.
- Failed (FLD) – The drive failed and is now offline.

- Missing (MIS) – The drive has been removed or is not responding.
- Standby (SBY) – The device is not a hard-disk device.
- Out of Sync (OSY) – The drive, which is part of an IR volume, is not synchronized with other drives that are part of the volume.
- Degraded (DGD) – The drive is part of a volume and is in degraded state.
- Rebuilding (RBLD) – The drive is part of a volume and is currently rebuilding.
- Optimal (OPT) – The drive is optimal and is part of a volume.

The physical device Drive Type values are as follows:

- SAS_HDD – The drive is a SAS HDD.
- SATA_HDD – The drive is a SATA HDD.
- SAS_SSD – The drive is a SAS SSD.
- SATA_SSD – The drive is a SATA SSD.

Physical device Protocol values are as follows:

- SAS – The drive supports SAS protocol.
- SATA – The drive supports SATA protocol.

3.6 HOTSPARE Command

The HOTSPARE command adds a hot spare drive to spare pool 0 or deletes a hot spare drive. The capacity of the hot spare drive must be greater than or equal to the capacity of the smallest drive in the RAID volume. Determine if this is true by using the DISPLAY command on the drive.

Observe the following rules when creating hot spare disks:

- You cannot create a hot spare disk unless at least one RAID 1, RAID 10, or RAID 1E volume already exists.
- You cannot create a hot spare and add it to an inactive Integrated RAID volume.
- For HDDs, you cannot add a SAS hot spare disk if the existing volumes on the controller use SATA disks.

  You cannot add a SATA hot spare disk if the existing volumes on the controller use SAS disks.
- For SSDs, you can add a SAS hot spare SSD to a volume with SATA SSDs and you can add a SATA hot spare SSD to a volume with SAS SSDs, if the Integrated RAID firmware permits it.
- The maximum permissible number of hot spare drives is two per controller.
- You cannot add an SSD hot spare to a volume that has HDDs, and you cannot add an HDD hot spare to a volume that has SDDs.

Command Line

`sas3ircu <controller_#> hotspare [delete] <Enclosure:Bay>`

Parameters

- *<controller_#>* – The index of the controller on which you want to create the hot spare disk.
- *<Enclosure:Bay>* – The *Enclosure:Bay* value for the hot spare disk drive.

  Determine these values from the output of the DISPLAY command. DOS does not support addressing by *Enclosure:Bay*.
- [delete] – This optional command deletes the hot spare disk at *Enclosure:Bay*.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.7 STATUS Command

The STATUS command displays the current status of any existing Integrated RAID volumes and the status of any operation that is currently in progress on the selected controller. If no operation is in progress, SAS3IRCU prints a message indicating this condition before it exits.

Command Line

```
sas3ircu  <controller_#> status
```

Parameters

- *<controller_#>* – The index of the controller with the volumes whose status you want to display.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output Following is an example of the information that the STATUS command returns. In this example, a background initialization is in progress on IR Volume 1, and no operation is in progress on IR Volume 2.

```
Background command progress status for controller 0...
IR Volume 1
  Volume ID                               : 322
  PI Supported                                    : Yes
  PI Enabled                                      : Yes
  Current operation                       : Background Init
  Volume status                           : Enabled
  Volume state                            : Optimal
  Volume wwid                             : 054f59a844a86682
  Physical disk I/Os                      : Not quiesced
  Volume size (in sectors)                : 285155328
  Number of remaining sectors             : 283997632
  Percentage complete                     : 0.41%
IR Volume 2
  Volume ID                               : 323
  Current operation                       : None
  Volume status                           : Enabled
  Volume state                            : Optimal
  Volume wwid                             : 0e2ca3c68dc5dc20
  Physical disk I/Os                      : Not quiesced
SAS3IRCU: Command STATUS Completed Successfully.
SAS3IRCU: Utility Completed Successfully.
```

The possible values for the fields in the status data are as follows:

- Current operation: *Synchronize, Consistency Check, OCE, Background Init,* or *None*
- Volume status: *Enabled* or *Disabled*
- Volume state: *[Inactive] Optimal*, *Degraded, Missing*, or *Failed*
- Physical disk I/Os: *Quiesced* or *Not quiesced*

3.8 LIST Command

The LIST command displays a list of all controllers in the system, along with each corresponding controller index. You need the controller index as an input parameter for other SAS3IRCU commands.

Command Line

```
sas3ircu list
```

Parameters

None.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Command failed.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output Following is an example of the output of the LIST command. The format and fields in the output vary depending on the types of installed controllers.

Index	Adapter Type	Vendor ID	Device ID	PCI Address	SubSys Ven ID	SubSys Dev ID
0	SAS3008	0x1000	0x72	0x00:0x01:0x00:0x00	0x1000	0x00DA
1	SAS3008	0x1000	0x72	0x00:0x05:0x00:0x00	0x1000	0x00DA

3.9 CONSTCHK Command

The CONSTCHK command requests the Integrated RAID firmware to start a consistency check operation on the specified volume.

Command Line

```
sas3ircu <controller_#> constchk <volumeId> [noprompt]
```

Parameters

- *<controller_#>* – The index of the controller on which the consistency check operation runs.
- *<volumeId>* – The volume ID of an Integrated RAID volume, as listed in the DISPLAY command, on which the consistency check operation runs.
- [noprompt] – This optional parameter prevents warnings and prompts from appearing while the command is running.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.10 ACTIVATE Command

The ACTIVATE command activates an inactive Integrated RAID volume.

Command Line

```
sas3ircu  <controller_#>  activate <volumeId>
```

Parameters

- *<controller_#>* – The index of the controller with the volume that requires activation.
- *<volumeId>* – The volume ID of an Integrated RAID volume currently in the Inactive state.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.11 LOCATE Command

The LOCATE command locates a specific drive in a volume by turning on its location indicator and flashing its LED. The command works only for drives installed in a disk enclosure. It does not work for drives attached directly to the controller.

Command Line

```
sas3ircu <controller_#> locate <Enclosure:Bay> <action>
```

Parameters

- *<controller_#>* – The index of the controller with the drives that you need to locate.
- *<Enclosure:Bay>* – The enclosure and bay number of the drive.
- *<action>* – The possible actions are as follows:
  - ON – Turn on the location indicator of the drive.
  - OFF – Turn off the location indicator of the drive.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.12 LOGIR Command

The LOGIR command uploads or clears the Integrated RAID log information.

Command Line

```
sas3ircu <controller_#> logir <action> [filename] [noprompt]
```

Parameters

- *<controller_#>* – The index of the controller with the logs that you need to upload or clear.
- *<action>* – The possible actions are as follows:
  - UPLOAD – Upload the controller logs to a file.
  - CLEAR – Clear the controller logs.
- *[filename]* – This optional parameter specifies the filename where the logs must be uploaded.
  The default filename is LOGIR.LOG.
- noprompt – This optional parameter prevents warnings and prompts from appearing while the command is running.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

3.13 BOOTIR Command

The BOOTIR command selects an existing RAID volume as the primary boot device.

If an IR volume is selected as the boot device, the DISPLAY command displays this information in the IR Volume information section, if the selected IR boot volume is available to the controller. If you attempt to set a failed RAID volume as the primary boot device, the command fails with a warning message. For example, if volume 322 is in the failed state and you attempt to set it as the primary boot device, SAS3IRCU displays the following error message:
`SAS3IRCU: Volume specified by 322 is in Failed state!`

Command Line

`sas3ircu <controller_#> bootir <volumeID>`

Parameters

- *<controller_#>* – The index of the controller with the RAID volume that you want to select as the primary boot device.
- *<volumeID>* – The volume ID of the RAID volume that you want to select as the primary boot device.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output Following is an example of the output of the BOOTIR command, showing a RAID volume as the primary boot device, after it was selected with the BOOTIR command. The format and fields in the output vary depending on the types of installed controllers.

```
------------------------------------------------------------------------
IR Volume information
------------------------------------------------------------------------
IR volume 1
Volume ID : 174
Status of volume : Degraded (DGD)
RAID level : RAID1
Size (in MB) : 69376
Boot : Primary
Physical hard disks :
PHY[0] Enclosure#/Slot# : 2:8
PHY[1] Enclosure#/Slot# : 2:11
------------------------------------------------------------------------
```

3.14 BOOTENCL Command

The BOOTENCL command selects a specific enclosure/slot as the primary boot device. If an enclosure/slot is selected as the boot location, the DISPLAY command displays this information in the Enclosure information section.

Command Line

`sas3ircu <controller_#> bootencl <Enclosure:Bay>`

Parameters

- *<controller_#>* – The index of the controller with the enclosure/slot that you want to select as the primary boot device.
- *<Enclosure:Bay>* – The *Enclosure:Bay* value of the disk drive that you want to select as the primary boot device.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output Following is an example of the output of the BOOTENCL command, showing an *Enclosure:Bay* value as the primary boot device, after it was selected with the BOOTENCL command. The format and fields in the output vary depending on the types of installed controllers.

```
-------------------------------------------------------------------------
Enclosure information
-------------------------------------------------------------------------
Enclosure# : 1
Logical ID : 50000000:80000000
Numslots : 8
StartSlot : 0
Enclosure# : 2
Logical ID : 70000000:6546343f
Numslots : 38
StartSlot : 0
Primary Boot Slot : 2
-------------------------------------------------------------------------
```

3.15 ALTBOOTIR Command

The ALTBOOTIR command lets you select an alternate boot device using a volume ID.

Command Line

`sas3ircu <controller_#> altbootir <volumeID>`

Parameters

- *<controller_#>* – The index of the controller with the RAID volume that you want to select as the alternate boot device.
- *<volumeID>* – The volume ID of the RAID volume that you want to select as the alternate boot device.

Program Return Value

0x00 SUCCESS: Command completed successfully.

0x01 FAILURE: Bad command-line arguments or operational failure.

0x02 ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output

```
./sas3ircu 1 altbootir 323
```

Where 323 is the volume ID.

3.16 ALTBOOTENCL Command

The ALTBOOTENCL command lets you select an alternate boot device using an enclosure ID.

Command Line

sas3ircu <*controller_#*> altbootencl <*enclID*>

Parameters

- <*controller_#*> – The index of the enclosure that contains the RAID volume you want to select as the alternate boot device.
- <*enclID*> – The ID of the RAID enclosure that contains the alternate boot device.

Program Return Value

0x00 SUCCESS: Command completed successfully.

0x01 FAILURE: Bad command-line arguments or operational failure.

0x02 ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output

```
./sas3ircu 1 altbootencl 1:2
```

3.17 SETOFFLINE Command

The Set Offline (-setoffline) command forces a physical drive that is part of a RAID volume offline.

Command Line

sas3ircu <*controller_#*> SETOFFLINE <*Enclosure:Bay*>

Parameters

- <*controller_#*> – A controller number between 0 and 255.
- <*Enclosure:Bay*> – A valid enclosure and bay pair to identify the drive.

Program Return Value

0x00 SUCCESS: Command completed successfully.

0x01 FAILURE: Bad command-line arguments or operational failure.

0x02 ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output

```
sas3ircu 1 setoffline 1:3
```

3.18 SETONLINE Command

The Set Online (`-setonline`) command brings a drive that is in an offline state into an online state.

Command Line

`sas3ircu <controller_#> SETONLINE <Enclosure:Bay>`

Parameters

- *<controller_#>* – A controller number between 0 and 255.
- *<Enclosure:Bay>* – A valid enclosure and bay pair to identify the drive.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.
0x02	ADAPTER_NOT_FOUND: Cannot find specified adapter.

Sample Output

```
sas3ircu 1 setonline 1:3
```

3.19 HELP Command

The HELP command displays usage information for the command specified in the input parameter.

Command Line

`sas3ircu help <commandname>`

Parameters

- *<commandname>* – The name of a supported SAS3IRCU command.

Program Return Value

0x00	SUCCESS: Command completed successfully.
0x01	FAILURE: Bad command-line arguments or operational failure.

4 Glossary

B

BIOS

basic input/output system

The computer BIOS is stored on a Flash memory chip. The BIOS controls communications between the microprocessor and peripheral devices, such as the keyboard and the video controller, and miscellaneous functions, such as system messages.

E

EBC

EFI byte code

EFI

extensible firmware interface

H

HDD

hard disk drive

I

IOC

I/O controller

IR

integrated RAID

L

LED

light-emitting diode

M

MPI

message passing interface

R

RAID

Redundant Array of Independent Disks

RHEL

Red Hat Enterprise Linux

S

SAS

Serial-Attached SCSI

SAS is a serial, point-to-point, enterprise-level device interface that leverages the SCSI protocol set. The SAS interface provides improved performance, simplified cabling, smaller connectors, lower pin count, and lower power requirements when compared to parallel SCSI.

SATA

Serial Advanced Technology Attachment

A physical storage interface standard. SATA is a serial link that provides point-to-point connections between devices. The thinner serial cables allow for better airflow within the system and permit smaller chassis designs.

SAS3IRCU

12Gb/s SAS Integrated RAID configuration utility

SCSI

Small Computer Systems Interface

SLES

SuSE Linux Enterprise Server

SSD

solid state drive

SuSE

Gesellschaft für Software-und Systementwicklung MBH

U

UEFI

Unified Extensible Firmware Interface

5 Revision History

5.1 DB15-000986-02, Version 1.2, September xx, 2015

- Added the following commands.
  - ALTBOOTIR Command
  - ALTBOOTENCL Command
  - SETOFFLINE Command
  - SETONLINE Command
- Updated to Avago document number (pub-005178).
- Minor rewrites for clarity and consistency.

5.2 DB15-000986-01, Version 1.1, November 2012

- Added information about new commands DELETEVOLUME, BOOTIR, BOOTENCL, and HELP.
- Added support for 4-KB sector disk drives.
- Updated information about supported operating system architecture and supported operating systems.

5.3 DB15-000986-00, Version 1.0, July 2012

Initial release of document.


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