ADC Proposal

Device Server for Auto Load-Unload

Introduction

The location of the Automatic Unload Hold (AUH) bit in the Stream device descriptor implies that the Stream device server processes the unloading of a tape due to 'device specific conditions.' What happens when a device specific condition arises and the ENABLE bit equals zero? Can the Stream device server unload the tape? Does AUH control the cartridge eject?

The text states, 'When it is set to zero, the logical unit ... does not respond to commands.' In 3.1.13, SAM3r05 defines a command as, 'a request describing a unit of work to be performed by a device server.' Whether or not 'device specific conditions' constitute 'requests' is difficult to say. Unloading a tape certainly appears to be a 'unit of work', and, as stated before, the placement of this bit in the Stream device descriptor implies that the Stream device server performs that 'unit of work.'

From these statements, I conclude that the current text disallows the unloading of a tape due to device specific conditions whilst the ENABLE bit in the Stream device descriptor equals zero. As an unload operation cannot occur, control over eject is a non-issue and the setting of AUH doesn't matter.

The location of AUH in the Stream device descriptor raises another problem. It limits the ability a of device that does not contain a Stream device server, such as a CDROM drive, to control automatic unloads.

To alleviate both of these objections, I'd like to see AUH moved to the Automation Drive descriptor; so that the Automation Drive device server processes the automatic unload. I'd also like to add some text to the description of the Automation Drive descriptor to remove any possible ambiguity about its ability to handle automatic unload regardless of the setting of the ENABLE bit.

The AUTOLOAD MODE field and Autoload Mode Override (AMO) bit suffer from a similar problem. Moving them to the Automation Drive device descriptor provides the same solution.

Current Text

6.2.2.3.2 Stream Device descriptor parameters

The descriptor parameters for a stream device (Device Type = 01h) are defined in table 32.

If the ENABLE bit is set to one it indicates the Logical Unit is reported and supported. When it is set to zero, the logical unit is not reported to a REPORT LUNS command and does not respond to commands.

If the OFFLINE bit is set to one, the device shall return CHECK CONDITION to all commands that require the device to be ready. The Sense Key shall be NOT READY. The additional sense code shall be Logical Unit Not Ready, Operation In Progress. If the OFFLINE bit is set to zero, the logical unit shall respond normally to commands.

Table 32 - Stream Device descriptor parameters

Bit Byte	7	6	5	4	3	2	1	0
6	MLUN		Reserved				OFFLINE	ENABLE
7	Reserved		AUH	SUHO	AMO	AUTOLOAD MODE		
8	FUE	DRMODE	Reserved				DENOVR	WP
9	CURRENT DENSITY							
10	SELECT WRITE DENSITY							
11	Reserved							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							
	Identification descriptor list							
16	IDENTIFICATION DESCRIPTOR (first)							
n	IDENTIFICATION DESCRIPTOR (last)							

The modify logical unit name (MLUN) field is used to modify and report modifications to the logical unit's device identifiers, as defined in table 33.

Table 33 — Modify logical unit name field desriptors

MLUN	MODE SENSE	MODE SELECT
00b	The values in the identification descriptor list are the manufacturer assigned device identifiers.	Do not modify the logical unit's device identifiers. The identification descriptor list shall be ignored.
01b	The values in the identification descriptor list have been modified from the manufacturer's assigned values.	Do not modify the logical unit's device identifiers from the current values. The identification descriptor list shall be ignored.
10b	Invalid value for a MODE SENSE.	Set the logical unit's device identifiers to the manufacturer's default values. The values in the identification descriptor list shall be ignored.
11b	Invalid value for a MODE SENSE.	Set the logical unit's device identifiers to the values in the identification descriptor list.

The autoload mode override (AMO) field can be used to override the Autoload Mode settings for the logical unit controlled with the Control mode page for the logical unit. When set to one, the load process shall be controlled by the Autoload Mode field in this page, overriding the settings in the Control mode page. When set to zero, the settings in the Control mode page shall be used to control the load process.

The AUTOLOAD MODE field specifies the action to be taken when a medium is inserted. This field is ignored on the MODE SELECT if the AMO bit is set to zero. The field is defined in table 34.

Table 34 — Autoload mode field desriptors

Value	Definition
000b	Medium shall be loaded for full access.
001b	Medium shall be loaded for medium auxiliary memory access only.
010b	Medium shall not be loaded.
011b – 111b	Reserved.

The SCSI unload hold override (SUHO) bit shall be set to one to override the Hold bit in the SCSI UNLOAD command. When set to one, the Hold bit in a SCSI UNLOAD command shall be ignored and the medium shall not be ejected. When set to zero, the Hold bit in the SCSI UNLOAD command shall control if the medium is ejected or not.

The automatic unload hold (AUH) bit shall be set to one to disable ejecting the medium when it is unloaded due to device specific conditions. These conditions can include cleaning complete, invalid medium type, firmware update complete, unsupported format, or other error conditions detected by the device. This bit does not affect the unload operation initiated by the front panel.

The write protect (WP) bit shall write protect the medium when set to one. This bit shall be set to zero by the device each time a medium is unloaded.

The density override (DENOVR) bit is use to override the Density Code field in the Mode Descriptor Block used by the device. When set to one, any write operation that the device

is capable of selecting a density by using the Mode Descriptor Block shall use the density in the SELECT WRITE DENSITY field. When the DENOVR field is set to zero, the density shall be selected through other means and the SELECT WRITE DENSITY field shall be ignored. The DENOVR field shall be set to zero by the device each time a medium is unloaded. On a MODE SENSE command, the SELECT WRITE DENSITY field shall contain the density code that will be used by the device should a write operation be started such that the device is capable of selecting a density.

The firmware update enable (FUE) bit shall be set to one to prepare the device to accept a medium containing a firmware image. This bit shall be set to zero by the device once the firmware update process is complete or aborted.

The disaster recovery mode (DRMODE) bit shall be set to one to place the device into Disaster Recovery Mode. When set to zero, the device shall operate in normal mode. The definition of Disaster Recovery mode is beyond the scope of this standard.

The CURRENT DENSITY field shall be set to the density code indicating the density in which the device is currently operating. This field shall be ignored by the device on MODE SELECT commands.

The IDENTIFICATION DESCRIPTOR fields are the same as used in the Device Identification VPD page as described in SPC-2.

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6.2.2.3.4 Automation Drive descriptor parameters

The descriptor parameters for an Automation Drive device (Device Type = 12h) are defined in table 36.

Table 36 - Automation Drive descriptor parameters

Bit Byte	7	6	5	4	3	2	1	0
6	Reserved							ENABLE
7	Reserved							

If the ENABLE bit is set to one it indicates the Logical Unit is reported and supported on the primary interface. Commands received for this logical unit shall be passed on to the automation drive command set device server. When it is set to zero, the logical unit is not reported to a REPORT LUNS command and does not respond to commands on the primary interface. This sub-page has no effect on the availability of the ADC device server on the ADT Service Delivery Port if one is available on the device.

Detailed Changes to Draft Technical Standard

6.2.2.3.2 Stream Device descriptor parameters

The descriptor parameters for a stream device (Device Type = 01h) are defined in table 32.

If the ENABLE bit is set to one it indicates the Logical Unit is reported and supported. When it is set to zero, the logical unit is not reported to a REPORT LUNS command and does not respond to commands.

If the OFFLINE bit is set to one, the device shall return CHECK CONDITION to all commands that require the device to be ready. The Sense Key shall be NOT READY. The additional sense code shall be Logical Unit Not Ready, Operation In Progress. If the OFFLINE bit is set to zero, the logical unit shall respond normally to commands.

Table 32 - Stream Device descriptor parameters

Bit Byte	7	6	5	4	3	2	1	0
6	MLUN		Reserved				OFFLINE	ENABLE
7	Reserved		SUHO	Reserved				
8	FUE	DRMODE	Reserved				DENOVR	WP
9	CURRENT DENSITY							
10	SELECT WRITE DENSITY							
11	Reserved							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							
	Identification descriptor list							
16	IDENTIFICATION DESCRIPTOR (first)							
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01b	The values in the identification descriptor list have been modified from the manufacturer's assigned values.	Do not modify the logical unit's device identifiers from the current values. The identification descriptor list shall be ignored.
10b	Invalid value for a MODE SENSE.	Set the logical unit's device identifiers to the manufacturer's default values. The values in the identification descriptor list shall be ignored.
11b	Invalid value for a MODE SENSE.	Set the logical unit's device identifiers to the values in the identification descriptor list.

The SCSI unload hold override (SUHO) bit shall be set to one to override the Hold bit in the SCSI UNLOAD command. When set to one, the Hold bit in a SCSI UNLOAD command shall be ignored and the medium shall not be ejected. When set to zero, the Hold bit in the SCSI UNLOAD command shall control if the medium is ejected or not.

The write protect (WP) bit shall write protect the medium when set to one. This bit shall be set to zero by the device each time a medium is unloaded.

The density override (DENOVR) bit is use to override the Density Code field in the Mode Descriptor Block used by the device. When set to one, any write operation that the device is capable of selecting a density by using the Mode Descriptor Block shall use the density in the SELECT WRITE DENSITY field. When the DENOVR field is set to zero, the density shall be selected through other means and the SELECT WRITE DENSITY field shall be ignored. The DENOVR field shall be set to zero by the device each time a medium is unloaded. On a MODE SENSE command, the SELECT WRITE DENSITY field shall contain the density code that will be used by the device should a write operation be started such that the device is capable of selecting a density.

The firmware update enable (FUE) bit shall be set to one to prepare the device to accept a medium containing a firmware image. This bit shall be set to zero by the device once the firmware update process is complete or aborted.

The disaster recovery mode (DRMODE) bit shall be set to one to place the device into Disaster Recovery Mode. When set to zero, the device shall operate in normal mode. The definition of Disaster Recovery mode is beyond the scope of this standard.

The CURRENT DENSITY field shall be set to the density code indicating the density in which the device is currently operating. This field shall be ignored by the device on MODE SELECT commands.

The IDENTIFICATION DESCRIPTOR fields are the same as used in the Device Identification VPD page as described in SPC-2.

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6.2.2.3.4 Automation Drive descriptor parameters

The descriptor parameters for an Automation Drive device (Device Type = 12h) are defined in table 35.

Table 35 - Automation Drive descriptor parameters

Bit Byte	7	6	5	4	3	2	1	0
6	Reserved							ENABLE
7	Reserved			AUH	AMO	AUTOLOAD MODE		

If the ENABLE bit is set to one it indicates the Logical Unit is reported and supported on the primary interface. Commands received for this logical unit shall be passed on to the automation drive command set device server. When it is set to zero, the logical unit is not reported to a REPORT LUNS command and does not respond to commands on the primary interface. The Automation Drive device server shall process tasks and task management functions addressed to its logical unit and received over the ADT Service Delivery Port regardless of the setting of the ENABLE bit. The Automation Drive device server shall process automatic load and automatic unload events detected by the data transfer device regardless of the setting of the ENABLE bit.

The autoload mode override (AMO) field selects the mode parameter that controls automatic loading of media. When AMO equals one, the Autoload Mode field in this page controls the automatic loading of a medium, overriding the settings in the Data Transfer Device's Control mode page. When the AMO bit equals zero, the Autoload Mode field, in the Data Transfer Device's Control mode page, control the automatic loading of a medium.

The AUTOLOAD MODE field specifies the action to be taken when a medium is inserted. This field is ignored on the MODE SELECT if the AMO bit is set to zero. The field is defined in table 36.

Table 36 — Autoload mode field descriptors

Value	Definition
000b	Medium shall be loaded for full access.
001b	Medium shall be loaded for medium auxiliary memory access only.
010b	Medium shall not be loaded.
011b – 111b	Reserved.

The automatic unload hold (AUH) bit shall be set to one to disable ejecting the medium when it is unloaded due to device specific conditions. These conditions can include cleaning complete, invalid medium type, firmware update complete, unsupported format, or other error conditions detected by the device. This bit does not affect the unload operation initiated by the front panel.