MMC-2 SCSI Implementation Notes

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12.0 SCSI Implementation Notes

This section will describe where possible the use of the contents for SCSI C/DVD devices. This specification is intended to be used in conjunction with the SCSI-3 Architecture Model (SAM) the SCSI-3 Primary Command Set (SPC) standard and the SCSI-3 Block Command Set.

See the X3T10 SCSI-3 Specifications for information on the connection and protocol to be use for a SCSI C/DVD device.

12.1 Introduction

TBD.

12.2 SCSI Signal Utilization

C/DVD Devices will utilize the same signals and timing from the SCSI Standard and Extensions.

12.3 SCSI Compatibility

TBD.

12.3.1 Use of the RelAdr bit

A relative address (RelAdr) bit of one indicates that the logical block address field is a two's complement displacement. This negative or positive displacement shall be added to the logical block address last accessed on the logical unit to form the logical block address for this command. This feature is only available when linking commands. The feature requires that a previous command in the linked group have accessed a block of data on the logical unit.

A RelAdr bit of zero indicates that the logical block address field specifies the first logical block of the range of logical blocks to be operated on by this command. This bit is only supported for Logical Units that make use of a SCSI interface. The command field shows that this bit exists, but is only applicable to SCSI.

12.3.2 Differences from the SCSI Standard

Some of the major differences from the SCSI Standard:

- LUN field of command packets (CDB) is used by this specification.

- SYNCHRONIZE CACHE Command is called FLUSH CACHE. This command also does not make use of the Logical Block or Number of Blocks fields.

- EVENT STATUS NOTIFICATION replaces the AEN capability in SCSI.

- CHANGE DEFINITION is not used.

- INQUIRY Command does not use EVPD or CmdDt CDB bits.

- Unit Attention with INQUIRY DATA HAS CHANGED is not used.

- Peripheral qualifier in the INQUIRY data is not used.

- The AERC, TrmTsk and NormACA are in conflict with the current definition of the INQUIRY data. This specification specifies the ATAPI Transport version in place of these bits.

- EncServ, MultiP, MChngr, ACKREQQ, Addr32, Addr16, RelAdr, WBus32, WBus16, Sync, Linked, TranDis, CmdQue bits in the INQUIRY data is defined as Reserved in this specification.

- Byte 56 and 57 of the INQUIRY data are used to specify the Major and Minor version the Logical Unit is compliant with.

- The Mechanism State in this specification uses a value of 3h for the data port in use and not 1h as is specified in the SCSI Standard.

- The PF bit in the MODE SELECT command is specified as always set to 1.

- The DBD bit in the MODE SENSE is specified as being set to one. This bit is allowed to be set to zero only when the logical unit is a legacy SCSI device.

- EER bit of the Read-Write recovery page is not supported by this specification.

- Correction Span, Head offset count, Data strobe offset count, Recovery Time Limit fields of the Read-Write recovery page are not supported by this specification.

- The power model for this specification is different from that described for SCSI.

- The Information Exceptions Mode Page is called the Fault / Failure Reporting page in this specification.

- LogErr bit in the Information Exceptions mode page is not supported.

- Disconnect/Reconnect, Write Parameter, Verify Error Recovery, Caching, Peripheral Device, Control Mode and Medium Types pages are not supported by this specification.

- DPO bit in the READ Command is not supported by this specification.

- Only the READ(12) is supported by this specification.

- The PMI bit of the READ CAPACITY command is not supported by this specification.

- READ CAPACITY command is recommended not to be used by this specification.

12.4 Reset Functionality

This section describes the functionality of the various resets in SCSI.

12.4.1 Power On Reset

The Power On Reset is an event that causes the Power On condition in SCSI. See "Task and Command Lifetimes" in the SCSI Architecture Model standard (SAM).

12.4.2 Hard Reset

In SCSI, Hard Reset is mapped as Hard Reset in the SCSI Architecture Model. See "Hard Reset" in SAM.

Devices that comply with this specification follow a simple model and the initiator is mapped to the Host and a target is mapped to the device. Hard Reset for a SCSI Device will:

- Abort all tasks in all task sets;

- Clear all auto contingent allegiance conditions;

- Release all SCSI device reservations;

- Return any device operating modes to their appropriate initial conditions, similar to those conditions that would be found following device power-on. The MODE SELECT conditions shall be restored to their last saved values if saved values have been established. MODE SELECT conditions for which no saved values have been established shall be returned to their default values;

- Unit Attention condition shall be set.

12.4.2.1 TARGET RESET task management function

A response to a TARGET RESET task management request, issued by an initiator.

Different from ATA/ATAPI, in SCSI, the TARGET RESET can reset a devices individually. When a SCSI initiator is wishes to reset all the devices connected on one cable with TARGET RESET request, the initiator must issue the TARGET RESET task management request to every device.

> NOTE: The TARGET RESET task management function was called a "Bus Device Reset" in SCSI-2.

> NOTE: The LOGICAL UNIT RESET function is gone from SCSI-3 SAM revision 18. If this function is issued by the host to this a C/DVD device, the reaction of the device shall be same as the TARGET RSET task management function.

12.4.2.2 Reset Events.

A protocol specific event which may trigger a Hard Reset response from a SCSI device.

For example, SIP SCSI-3 Parallel Interface, there's a Reset Service generated by assertion of the RST- (reset) bus signal. This is one of the reset events and is a kind of Task Management Service defined in SIP SCSI-3 Interlocked Protocol specification, as a ULP, upper layer protocol.

SIP : SCSI Interlocked Protocol specification (X3T10/856D) SPI : SCSI Parallel Interface specification (X3T10/855D)

Table 221 - Example Hard Reset Implementation

Mt Fuji	Generic SCSI-3 SAM	Example SCSI-3 SIP,SPI
Hard Reset	TARGET RESET task management function	TARGET RESET message
	Reset events	RST bus signal activated

12.4.3 Device Reset

In SCSI, Device Reset is not equivalent with the ATA/ATAPI Device Reset. For SCSI devices there are two possible Device Reset alternatives, ABORT TASK SET or CLEAR TASK SET. The ABORT TASK SET is mandatory for all SCSI devices, but the function is a little different from the ATA/ATAPI Device Reset. The CLEAR TASK SET is not always supported by the SCSI devices that don't support tagged tasks. CLEAR TASK SET is different from ABORT TASK SET in that CLEAR TASK SET clears all the queued tasks for all initiators. If the device is in a single initiator SCSI environment, ABORT and CLEAR TASK SET are the same.

As in ATAPI Device Reset, these "resets" in SCSI don't set to defaults the Mode Parameters, or SCAM functions and does not flush the contents of any cached lead-in data.

The ABORT/CLEAR TASK SET:

- Does not immediately reset SCSI bus protocol.

- Does not reset parameters in mode page to default values

- Always keep the disc information such as disc TOC information

- Does not change the Persistent Prevent state

Although the host may use the ABORT/CLEAR TASK SET functions to provide a Device Reset, when something is wrong with the SCSI communications it may be necessary for the Host to use stronger means, such as Hard Reset (a TARGET RESET or a Reset Event).

Table 222 - Reset Function Comparison

Function	Power-On/ Hard Reset	SCSI-3 ABORT/CLEAR TASK SET
Initialization sequence required	Yes	No
Immediate Bus Release	Yes	No
Mode parameters	Reset to default or saved parameters	No change allowed
Cached Lead-in information	Discarded	Not Specified
Persistent Prevent Flag	Unlocked	No change allowed
Key Management	Reset to Default state	Reset to Default state

12.4.3.1 Device Reset Issues for SCSI Devices

The Host may generate a Device Reset to bring the hung-up (something wrong or the communication is broken) device back to operation. For this purpose, this will work well in ATAPI. But in SCSI, this may not work well. Even the Hard

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Reset (a TARGET RESET or a Reset Event) may not work well in SCSI system because these Hard Resets are not always HARDWARE based resets, and it depends on the device design. Thus the application should consider the

NOTE: In the SCSI-3 standard, the term "Soft Reset" is no longer defined.

12.4.4 Power management and Device Reset in SCSI

12.5 Command Utilization for a SCSI Logical Unit

Table 223 - Command Utilization

Command	Feature Set or Type	Where
BLANK		MMC
CHANGE DEFINITION		SPC

Table 223 – Command Utilization (Continued)

Command	Feature Set or Type	Where
CLOSE TRACK / SESSION		MMC
COMPARE		SPC
COPY		SPC
COPY AND VERIFY		SPC
FLUSH CACHE	Core	section 9.1.1 on page 89
FORMAT UNIT		section A-6 on page 267
GET EVENT STATUS NOTIFICATION		section 9.1.2 on page 91
INQUIRY	Core	section 9.1.3 on page 97
LOAD / UNLOAD C/DVD		section 9.1.4 on page 101
LOCK/UNLOCK CACHE		SBC
LOG SELECT		SPC
LOG SENSE		SPC
MECHANISM STATUS	Core	section 9.1.5 on page 103
MODE SELECT(6)	Core	SPC
MODE SENSE(6)	Core	SPC
MODE SELECT(10)	Core	section 9.1.6 on page 107
MODE SENSE(10)	Core	section 9.1.7 on page 109
PERSISTENT RESERVE IN		SPC
PERSISTENT RESERVE OUT		SBC
PAUSE/RESUME		section 10.1.1 on page 177
PLAY AUDIO	CD Audio	section 10.1.2 on page 179
PLAY AUDIO(12)	CD Audio	MMC
PLAY AUDIO MSF	CD Audio	section 10.1.3 on page 182
PLAY CD	Core	section 10.1.4 on page 185
PREFETCH		SBC
PREVENT/ALLOW MEDIUM REMOVAL		section 9.1.9 on page 131 v
READ(12)		section 9.1.10 on page 133
READ BUFFER		SPC
READ C/DVD CAPACITY		section 9.1.12 on page 141
READ CD		section 10.1.5 on page 189
READ CD MSF		section 10.1.6 on page 201
READ DISC INFORMATION		section 10.1.7 on page 203
READ DVD STRUCTURE		section 9.1.11 on page 135
READ FORMATTED CAPACITY		section 9.1.17 on page 159
READ HEADER		
READ SUB-CHANNEL		
READ LONG		SBC
READ TOC/PMA/ATIP		section 10.1.10 on page 221
READ TRACK INFORMATION		section 10.1.11 on page 235
RECEIVE DIAGNOSTIC RESULTS		SPC
RELEASE		SPC
REPORT KEY		section 9.1.15 on page 151
REPORT LUNS		SPC
REQUEST SENSE		section 9.1.18 on page 163
RESERVE		SPC
RESERVE TRACK		MMC
REZERO		SBC
SCAN		section 10.1.12 on page 241
SEEK		section 9.1.19 on page 171
SEND DIAGNOSTIC		SPC
SEND KEY		section 9.1.13 on page 143
SEND OPC INFORMATION		MMC

Table 223 – Command Utilization (Continued)

Command	Feature Set or Type	Where
SET C/DVD SPEED	Legacy	MMC
START STOP UNIT		section 9.1.14 on page 147
STOP PLAY / SCAN		section 10.1.13 on page 245
TEST UNIT READY		section 9.1.20 on page 173
VERIFY (12)		section A-7 on page 271
WRITE (12)		section A-8 on page 273
WRITE BUFFER		SPC
WRITE CD		MMC
WRITE DVD STRUCTURE		FUJI-2
WRITE and VERIFY (12)		section A-9 on page 275