To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 03-350r0 SPC-3 Changing Control mode page with commands in the task set

Revision history
Revision 0 (15 October 2003) First revision

Related documents
spc3r15 - SCSI Primary Commands - 3 revision 15
92-218r1 - Global logging target save disable bit

Overview
It is unclear what happens to commands currently in the task set if the Control mode page D_SENSE bit
(descriptor format sense data) is changed. Options include:
   a) abort all commands affected by the change
   b) use the new D_SENSE bit value for all commands that complete after the MODE SELECT completes
   c) use the D_SENSE bit value that was in effect when each command was received
   d) use the old new D_SENSE bit value for commands in the task set, and use the new D_SENSE bit value
       for all newly received commands

Since this is not a bit that should be changed very often, allowing any of the above except a) seems
appropriate. Sense data is self-describing, so applications should be able to figure out which format is being
returned (response codes 70h/71h vs 72h/73h). Applications should not change the D_SENSE bit to zero while
8-byte LBA commands are outstanding (just like they shouldn't issue those commands when the D_SENSE bit
is zero).

The same general issue applies to other bits in the mode page that affect tasks, so a general statement is
proposed in the introductory paragraph of this mode page.

A few editorial changes involving the global logging target save disable bit (GLTSD) are also included.

Suggested changes

6.5 LOG SELECT command

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Saving of log parameters is optional and indicated for each log parameter by the DS bit in the log page. Log
parameters also may be saved at vendor specific times subject to the TSD bit (see 7.2) in the log parameter ~~or~~
and the GLTSD bit in the Control mode page (see 7.4.6). If the target does not implement saved parameters for
any log parameter and the SP bit is set to one, the command shall be terminated with CHECK CONDITION
status. The sense key shall be set to ILLEGAL REQUEST, and the additional sense code set to INVALID
FIELD IN CDB.

7.2.1 Log page structure and page codes for all device types

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A target save disable (TSD) bit set to zero indicates that the target ~~provides a target-defined method for saving~~
implicitly saves the log parameter~~s~~ at vendor-specific intervals. This implicit saving operation shall be done
frequently enough to insure that the cumulative parameter values retain statistical significance (i.e., across
power cycles). A TSD bit set to one indicates that either the target does not ~~provide a target-defined method for~~
~~saving~~ implicitly save the log parameter~~s~~ or the ~~target-defined method~~ implicit save has been disabled
individually by an application client setting the TSD bit to one. An application client may disable the
~~target-defined method~~implicit save for ~~saving~~ all log parameters without changing any TSD bits~~. See~~ with the
GLTSD bit in the Control mode page (see 7.4.6).

7.4.6 Control mode page

The Control mode page (see table 223) provides controls over several SCSI features that are applicable to all device types such as tagged queuing and error logging. If a field is changed while there is a task already in the task set, it is vendor specific whether the old or new value of the field applies to that task.

[Table 223 — Control mode page]

A task set type field (TST) specifies the type of task set in the logical unit (see table 224).

[Table 224 — Task set type]

If the ~~logical unit maintains separate mode pages for each initiator port~~mode page policy (see 6.7) for this mode page is per-initiator or per-I_T nexus, the TST field, if changeable, shall reflect in the mode pages for all initiator ports the state selected by the most recent MODE SELECT from any initiator port (i.e., the TST bit is always shared). If the most recent MODE SELECT changes the setting of this field the device server shall establish a unit attention condition for all initiator ports except the one that issued the MODE SELECT command (see SAM-2). The device server shall set the additional sense code to MODE PARAMETERS CHANGED.

A descriptor format sense data (D_SENSE) bit set to zero ~~indicates~~specifies that the device server shall return the fixed format sense data (see 4.5.3) when returning sense data in the same I_T_L_Q nexus transaction (see 3.1.39) as a CHECK CONDITION status. A D_SENSE bit set to one ~~indicates~~specifies that the device server shall return descriptor format sense data (see 4.5.2) when returning sense data in the same I_T_L_Q nexus transaction as a CHECK CONDITION status.

~~A global logging target save disable (GLTSD) bit set to zero allows the SCSI target device to provide a vendor-specific method for saving log parameters. A GLTSD bit set to one indicates that either the SCSI target device has disabled the vendor specific method for saving log parameters or, when set by the application client, specifies that the vendor specific method shall be disabled.~~

A global logging target save disable (GLTSD) bit set to zero specifies that the SCSI target device implicitly saves, at vendor-specific intervals, each log parameter in which the TSD bit (see 7.2) is set to zero. A GLTSD bit set to one specifies that the logical unit shall not implicity save any log parameters.

[Editor's note: The GLTSD bit is from x3t9.2/92-218r1 and allows a single bit to disable saving all log pages. The change from "target defined method" to "vendor specific method" made this definition inconsistent with the TSD bit definition. Both bit descriptions are reworded to try to clarify their interaction.]

A report log exception condition (RLEC) bit set to one specifies that the device server shall report log exception conditions as described in 7.2.1. A RLEC bit set to zero specifies that the device server shall not report log exception conditions.

The QUEUE ALGORITHM MODIFIER field (see table 225) specifies restrictions on the algorithm used for reordering tasks having the SIMPLE task attribute (see SAM-3).

[Table 225 — Queue algorithm modifier]

A value of zero in the QUEUE ALGORITHM MODIFIER field specifies that the device server shall order the processing sequence of tasks having the SIMPLE task attribute such that data integrity is maintained for that ~~initiator port~~I_T nexus (i.e., if the transmission of new SCSI transport protocol requests is halted at any time, the final value of all data observable on the medium shall have exactly the same value as it would have if all the tasks had been given the ORDERED task attribute).

A value of one in the QUEUE ALGORITHM MODIFIER field specifies that the device server may reorder the processing sequence of tasks having the SIMPLE task attribute in any manner. Any data integrity exposures related to task sequence order shall be explicitly handled by the application client through the selection of appropriate commands and task attributes.

The queue error management (QERR) field (see table 226) specifies how the device server shall handle other tasks when one task receives a CHECK CONDITION status (see SAM-3). The task set type (see the TST field definition in this subclause) defines which other tasks are affected. If the TST field equals 000b, then all tasks from all initiator ports are affected. If the TST field equals 001b, then only tasks from the initiator port that receives the CHECK CONDITION status are affected.

[Table 226 — Queue error management (QERR) field]

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A task aborted status (TAS) bit set to zero specifies that aborted tasks shall be terminated by the device server without any response to the application client. A TAS bit set to one specifies that tasks aborted by the actions of another initiator port shall be terminated with a TASK ABORTED status (see SAM-2).

The report a check (RAC) bit provides control of reporting long busy conditions or CHECK CONDITION status. A RAC bit set to one specifies that a CHECK CONDITION status should be reported rather than a long busy condition (e.g., longer than the busy timeout period). A RAC bit set to zero specifies that long busy conditions (e.g., busy condition during auto contingent allegiance) may be reported.

The unit attention interlocks control (UA_INTLCK_CTRL) field (see table 227) controls the clearing of unit attention conditions reported in the same I_T_L_Q nexus transaction (see 3.1.39) as a CHECK CONDITION status and whether returning a status of BUSY, TASK SET FULL or RESERVATION CONFLICT results in the establishment of a unit attention condition (see SAM-3).

[Table 227 — Unit attention interlocks control (UA_INTLCK_CTRL) field]

A software write protect (SWP) bit set to one specifies that the logical unit shall inhibit writing to the medium after writing all cached or buffered write data, if any. When SWP is one, all commands requiring writes to the medium shall return CHECK CONDITION status and shall set the sense key to DATA PROTECT and the additional sense code to WRITE PROTECTED. When SWP is one and the device type's command set defines a write protect (WP) bit in the DEVICE-SPECIFIC PARAMETER field in the mode parameter header, the WP bit shall be set to one for subsequent MODE SENSE commands. A SWP bit set to zero specifies that the logical unit may allow writing to the medium, depending on other write inhibit mechanisms implemented by the logical unit. When the SWP bit is set to zero, the value of the WP bit, if defined, is device type specific. For a list of commands affected by the SWP bit and details of the WP bit see the command standard (see 3.1.17) for the specific device type.

The AUTOLOAD MODE field specifies the action to be taken by a removable medium device server when a medium is inserted. For devices other than removable medium devices, this field is reserved. Table 228 shows the usage of the AUTOLOAD MODE field.

[Table 228 — AUTOLOAD MODE field]

The BUSY TIMEOUT PERIOD field specifies the maximum time, in 100 milliseconds increments, that the application client allows for the device server to remain busy for unanticipated conditions that are not a routine part of commands from the application client. This value may be rounded down as defined in 5.4. A 0000h value in this field is undefined by this standard. An FFFFh value in this field is defined as an unlimited period.

The EXTENDED SELF-TEST COMPLETION TIME field contains advisory data that is the time in seconds that the device server requires to complete an extended self-test when the device server is not interrupted by subsequent commands and no errors occur during processing of the self-test. The application client should expect this time to increase significantly if other commands are sent to the logical unit while a self-test is in progress or if errors occur during execution of the self-test. Device servers supporting SELF-TEST CODE field values other than 000b for the SEND DIAGNOSTIC command (see 6.26) shall support the EXTENDED SELF-TEST COMPLETION TIME field.

Bits 0, 1, and 2 of byte 4 as well as bytes 6 and 7 provide controls for the obsolete asynchronous event reporting feature.

B.3 LOG SENSE command

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Table B.3 lists all possible save options for the LOG SENSE command.

The listed options define the save operations that occur as a direct result of the LOG SENSE command. Further save operations are a function of the TSD bit in the log parameter control byte and the GLTSD bit in the Control mode page (see 7.4.6).

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Table A.5 lists all possible save options for the LOG SELECT command.

All the log parameters that are selected for saving are saved to nonvolatile storage after the device server performs the specified LOG SELECT operation. Further save operations are a function of the TSD bit in the log parameter control byte and the GLTSD bit in the Control mode page (see 7.4.6)..

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B.5 Exception conditions during logging

B.5.1 Overview of exception conditions during logging

The logging operations may be setup to keep track of many different vendor specific items. This subclause describes how a device server informs an application client when a log reaches a critical point, thereby creating an exception condition.

Table B.7 and table B.8 list the definitions of the parameter control byte of the log parameter. Table B.7 lists parameter control byte values that affect parameter saving. Table B.8 lists parameter control byte values that affect parameter updating and reporting.

Table 1 — Log Parameter Control Byte saving definitions

Log Parameter Control Byte Values		Control Mode Page (09h)	Description
DS bit	TSD bit	GLTSD bit	
0	-	-	Indicates that the device server supports saving of the log parameter.
1	-	-	Indicates that the device server does not support saving of the log parameter in response to a LOG SELECT or LOG SENSE command.
-	0	0	Indicates that the device server ~~provides a target-defined method of saving~~ implicitly saves the log parameter~~s~~.
-	1	0	Indicates that either the device server does not ~~provide a target-defined method for saving~~implicitly save the log parameter~~s~~ or the ~~target-defined method~~implicit save has been disabled by an application client for this log parameter.
-	x -	1	Indicates that either the device server does not~~provide a target-defined method for saving~~implicitly save any log parameters or the ~~target-defined method~~implicit save has been disabled by an application client for all log parameters.