X3T9.2/87-41

AT&T

March 17, 1987

To: X3T9.2 Committee (SCSI)

From: James Semenak (AT&T)

Subject: SCSI MODE SENSE Command Changes

This proposal is in regards to the changes made for the Desired Data Field in the INQUIRY command. I have a problem using the INQUIRY command as a switch when this function has been historically relegated to the MODE SELECT/SENSE commands. Also the definition of this field can cause some side affects that adversely affect the operation of the INQUIRY command. My philosophy of the INQUIRY command is that it is used solely to return information to the initiator about the target and device. The only time a CHECK CONDITION status should occur is if a fatal errors has occurred on the target that prevents the information from being returned. The implementation of the Desired Data Field goes against this philosophy in that it implies that CHECK CONDITIONs can be returned if the requested format is not supported.

The following proposal discusses an alternative method of implementation through the use of the MODE SELECT/SENSE commands and proposes that the Desired Data Format field be removed from the INQUIRY command. See following attachment for description.

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Atts.
Mode Sense Command

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9.1.14. MODE SENSE Command

Peripheral Device Type: Sequential Access
Operation Code Type: Mandatory

Table 9-18: MODE SENSE Command

Bit / Byte	7	6	5	4	3	2	1	0
0	Operation Code (1Ah)							
1	Logical Unit Number			Reserved				
2	PCF		Page Code					
3	Reserved							
4	Allocation Length							
5	Vendor Unique		Reserved				Flag	Link

The MODE SENSE command (Table 9-17) provides a means for a target to report its medium, logical unit, or peripheral device parameters to the initiator. It is a complementary command to the MODE SELECT command (see 9.11).

The page control field (PCF) indicates the type of page parameter values to be returned by the target. The target shall return the same page length for each supported page regardless of the value in the PCF. The combination of the page control field value and the page code being set shall cause the target to return the appropriate values for the page selected by its respective page code. A page code value of 3Fh indicates that all pages implemented by the target shall be returned to the initiator with the values reported defined by the page control field. Page zero, if supported, shall be returned last. The page control field is defined as follows:

Bit 7	Bit 6	
0	0	Report Current Values: The current values are those parameters under which the target is presently configured. The current values are defined to be the following: Those values set in the last successfully completed MODE SELECT command, or the same values as the saved values if saving is supported and if no MODE SELECT commands were issued after the last power-on, or the same values as the default values if parameter saving is not supported or if no saved values are available. Page fields not supported shall be set to zero. The additional page length field returned by the target shall indicate the number of bytes supported in that page.
0	1	Report Changeable Values: The changeable values of any page indicate which parameters the initiator may change by a subsequent MODE SELET command. Any field that is allowed to be changed shall be set to all ones. Fields and bits not allowed to be changed by the initiator shall be set to zero. Attempting to change any field, via MODE SELECT command, that is not changeable shall cause the target to return a CHECK CONDITION status with the sense key set to ILLEGAL REQUEST in the extended sense data. In this case, no parameters in that page shall be changed. If no fields are changeable within a page, the target may or may not return bytes 0 and 1 of the page. If the target returns these two bytes, the additional page length field value shall be set to zero by the target. The additional page length field of each page returned by the target indicates the number of bytes are supported for that particular page.
1	0	Report Default Values: The target shall return to the initiator the field values set to the target's or device's default values. The value of the fields returned with this page control code is intended to avoid confusion over whether the value of zero is the default or indicates that the field is not supported. Fields not supported by the target shall be set to zero. The additional page length field of each page returned by the target indicates the number of bytes supported for that particular page.
1	1	Report Saved Values: The saved values are defined as those page field values which have been saved during the last successfully completed MODE SELECT command with the SP field in the CBD set to one (see 9.13 on MODE SELECT command), or are the default values if saving is not supported.

The additional page length field of each page returned by the target indicates the number of bytes supported for that page. Fields not supported by the target shall be set to zero.

The page code allows the initiator to select any specific or all of the pages supported by a target. Page codes defined in this document can be found in Table 9.14.2.

The allocation Length specifies the number of bytes that the initiator has allocated for returned MODE SENSE data. An allocation length of zero indicates that no MODE SENSE data shall be transferred. This condition shall not be considered as an error. Any other value indicates the maximum number of bytes that shall be transferred. The target shall terminate the DATA IN phase when allocation length bytes have been transferred or when all available MODE SENSE data have been transferred to the initiator, whichever is less.

The MODE SENSE data (Table 9-18) contains a four-byte header, followed by zero or more eight-byte block descriptors, followed by zero or more variable length pages.

Table 9-19: MODE SENSE Data

Bit / Byte	7	6	5	4	3	2	1	0
0	Sense Data Length							
1	Medium Type							
2	WP	Buffered Mode			Speed			
3	Block Descriptor Length							
	Block Descriptor(s)							
0	Density Code							
1	(MSB)							
2	Number of Blocks							
3								(LSB)
4	*Current Version Supported*			*Version(s) Implemented*				
5	(MSB)							
6	Block Length							
7								(LSB)
	Page Descriptor(s)							
0	PS	Reserved		Page Code				
1	Additional Page Length							
2 - n	Page Defined or Vendor Unique Parameter Byte(s)							

The sense data length specifies the length in bytes of the following mode sense data that is available to be transferred during the DATA IN phase. The sense

data length does not include itself.

Code values for the medium type field shall be assigned as follows:

00h	Default (Only one medium type supported)
01h - 7Fh	Reserved
80h - FFh	Vendor unique

A write protected (WP) bit of zero indicates that the medium is write enabled. A write protected bit of one indicates that the medium is write protected.

A buffered mode of zero indicates that the target does not report a GOOD status on WRITE commands until the data blocks are actually written on the medium. A buffered mode of one indicates that the target may report a GOOD status on WRITE commands as soon as the data block has been transferred to the target's buffer. One or more blocks may be buffered prior to writing the block(s) to the medium. Buffered modes of 2h through 7h are reserved.

Code values for the speed field shall be assigned as follows:

0h	Default (only one speed supported)
1h	Lowest peripheral device speed
2h - Fh	Increasing peripheral device speeds

The block descriptor length specifies the length in bytes of all the block descriptors. It is equal to the number of block descriptors times eight and does not include the vendor unique parameters, if any. A block descriptor length of zero indicates that no block descriptors shall be included in the parameter list. This condition shall not be considered as an error. The block descriptor length shall not include the length of the pages.

Each block descriptor specifies the medium characteristics for all or part of a logical unit. Each block descriptor contains a density code, a number of blocks, and a block Length.

Values for the density code field are defined in Table 9-14.1. The density code 7Fh is reserved for MODE SENSE only.

The number of blocks field specifies the number of logical blocks on the medium that meet the density code and block length in the block descriptor. A number of blocks field of zero indicates that an unspecified (or unknown) number of the remaining logical blocks of the logical unit may have the medium characteristics specified by the block descriptor.

The current version supported field indicates the version of SCSI the target is currently configured. Currently configured means that the target is in a mode which can emulate all aspects of the SCSI version reported (i.e. INQUIRY response data format, MODE SELECT and MODE SENSE formats).

The version(s) implemented field indicates the version(s) of SCSI the target can emulate. Note: Some targets may support multiple versions of the SCSI standard. Version implemented means that all aspects of that version have been implemented. This field is not changeable by the initiator and is only supported as a MODE SENSE field. The values for the version are defined as:

00h	SCSI ANSI X3.131-1986
01h	SCSI CCS Version
02h	SCSI-2 Version
03h	Multiple Versions Supported
04h - ffh	Reserved

The block length specifies the length in bytes of each logical block described by the block descriptor. A block length of zero indicates that the length is variable.