

# Generic CentricStor™ Medium Changer

## SCSI REFERENCE

Version: 1.1 26.06.03

### 1. SCSI Commands

The following SCSI commands are supported by Generic CentricStor™ Medium Changer.

Opcode	Command	Chapter
07h	INITIALIZE ELEMENT STATUS	1.1
E7h	INITIALIZE ELEMENT STATUS WITH RANGE	1.2
12h	INQUIRY	1.3
4Dh	LOG SENSE	1.4
1Ah	MODE SENSE	1.5
5Ah	MODE SENSE	1.5
A5h	MOVE MEDIUM	1.6
2Bh	POSITION TO ELEMENT	1.7
1Eh	PREVENT/ALLOW MEDIUM REMOVAL	1.8
B8h	READ ELEMENT STATUS	1.9
17h	RELEASE	1.10
03h	REQUEST SENSE	1.11
16h	RESERVE	1.12
00h	TEST UNIT READY	1.13

## 1.1 INITIALIZE ELEMENT STATUS (07h)

The INITIALIZE ELEMENT STATUS command causes the Generic CentricStor™ Medium Changer to examine the storage cells for cartridge presence. Use the READ ELEMENT STATUS command to return the information obtained by the INITIALIZE ELEMENT STATUS command.

The Generic CentricStor™ Medium Changer supports two INITIALIZE ELEMENT STATUS commands:

- Use the INITIALIZE ELEMENT STATUS command to update the entire cartridge inventory
- Use the INITIALIZE ELEMENT STATUS WITH RANGE command to update a specific part of the cartridge inventory.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (07h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

INITIALIZE ELEMENT STATUS CDB FORMAT

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

### **Initialize Element Status (07h) Status**

After processing the INITIALIZE ELEMENT STATUS command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- An unrecoverable hardware error is experienced.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.

- A problem is encountered while scanning the cartridges.
- The Generic CentricStor™ Medium Changer is not ready or is offline.

**NOTE:**

The Generic CentricStor™ Medium Changer does not support the Auto Inventory Mode, the Inventory is not guaranteed.

## 1.2 INITIALIZE ELEMENT STATUS WITH RANGE (E7h)

The INITIALIZE ELEMENT STATUS WITH RANGE command causes the Generic CentricStor™ Medium Changer to examine the storage cells for cartridge presence. Use the READ ELEMENT STATUS command to return the information obtained by the INITIALIZE ELEMENT STATUS WITH RANGE command.

The Generic CentricStor™ Medium Changer supports two INITIALIZE ELEMENT STATUS commands:

- Use the INITIALIZE ELEMENT STATUS command to update the entire cartridge inventory
- Use the INITIALIZE ELEMENT STATUS WITH RANGE command to update a specific part of the cartridge inventory.

Bits	7	6	5	4	3	2	1	0
Bytes								
0	OP-Code (E7h)							
1	Logical Unit Number			Reserved				Range
2	Starting Element Address							
3								
4	Reserved							
5	Reserved							
6	Number of Elements							
7								
8	Reserved							
9	Reserved							

INITIALIZE ELEMENT STATUS WITH RANGE CDB FORMAT

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Range**

The Range field indicates which elements to check. Values are:

- 0 - Initialize all elements
- 1 - Initialize the range of elements specified by the Element Address field and Number of Elements field.

#### **Starting Element Address**

The Starting Element Address specifies the start address of a set of Element Addresses. This field is ignored if the Range field is 0.

#### **Number of Elements**

This field specifies the number of elements to scan. This field is ignored if the Range field is 0.

### **Initialize Element Status With Range(07h) Status**

After processing the INITIALIZE ELEMENT STATUS WITH RANGE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- An unrecoverable hardware error is experienced.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- A problem is encountered while scanning the cartridges.
- The Generic CentricStor™ Medium Changer is not ready or is offline.
- Invalid Element Address

### 1.3 INQUIRY (12h)

The INQUIRY command requests that the Generic CentricStor Medium Changer returns information about its device parameters.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (12h)							
1	Logical Unit Number			Reserved				EVPD
2	Page Code							
3	Reserved							
4	Allocation Length							
5	Reserved							

#### INQUIRY CDB FORMAT

#### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Enable Vital Product Data (EVPD)**

The EVPD bit indicates which Vital Product Data pages option to report. Set the EVPD bit to request the following:

- 0 - Standard inquiry data.
- 1 - Vital product data, based on the Page Code field.

#### **Page Code**

This field contains the page number of the vital product data page to be returned for this INQUIRY command, if the EVPD bit is set to 1. The Generic CentricStor Medium Changer supports the following page codes:

- 00h - Supported Vital Product Data pages
- 80h-Unit Serial Number page
- C0h - Firmware Revision page
- E0h - Implemented SCSI - Command page
- E1h - Implemented Vendor Specific Command page

If the EVPD bit is set to 0, the Page Code must be 00h.

#### **Allocation Length**

The Allocation Length field specifies the maximum number of bytes that the initiator allocated for returned inquiry data. An Allocation Length of 0 indicates that no Inquiry data is to be transferred. This condition is not considered an error. The Generic CentricStor Medium Changer terminates the Data In phase when it has transferred the lesser of either the number of bytes specified by the Allocation Length field or all of the available inquiry data. The lengths for inquiry data returned by the Generic CentricStor Medium Changer are:

- 31h (49) bytes for the standard inquiry data
- 09h (9) bytes for the Supported Vital Product Data page
- 10h (16) bytes for the Unit Serial Number page
- 1Ah (26) bytes for the Firmware Revision page
- 14h (20) bytes for the Supported SCSI-2 Command page
- 05h (5) bytes for the Vendor Specific Command page

## **Inquiry (12h) Response**

### **Standard Inquiry Data Format**

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	RMB	Device-Type Modifier						
2	ISO Version		ECMA Version		ANSI-Approved Version			
3	AENC	TrmIOP	Reserved		Response Data Format			
4	Additional Length							
5	Reserved							
6	Reserved							
7	RelAdr	Wbus32	Wbus16	Sync	Linked	Rsvd	Cmd Que	SftRe
8 . . 15	Vendor Identification							
16 . . 31	Product Identification							
32 . . 35	Firmware Revision Level							
36 . . 47	Full Firmware Revision Level							
48	Vendor Specific							BarC

#### STANDARD INQUIRY DATA FORMAT

#### **Peripheral Qualifier**

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

#### **Peripheral Device Type**

The value returned by this field is set to 01000b, indicating a Medium Changer device.

#### **RMB**

The Removable Medium Bit is set to 1 to indicate that media is removable.

#### **Device-Type Modifier**

Returned as 0000000b, indicating no modification.

#### **ISO Version**

Returned as 00b.

### **ECMA Version**

Returned as 00b.

### **ANSI (Approved Version)**

Returned as 0010b, indicating compliance with ANSI Version SCSI-2.

### **Asynchronous Event Notification Capability (AENC)**

Returned as 0 which indicates that AENC is not supported.

### **Terminate I/O Process (TrmIOP)**

Returned as 0 which indicates that TrmIOP message is not supported.

### **Response Data Format**

Returned as 0010b which indicates that data is in SCSI-2 format.

### **Additional Length**

Returned as 2Ch which indicates 44 additional bytes of data, exclusive of the Additional Length byte, that is available to the initiator.

### **Relative Address (RelAdr)**

Returned as 0 which indicates that the Generic CentricStor Medium Changer does not support relative addressing.

### **Wide Bus 32 (Wbus32)**

Returned as 0 to indicate that 32 bit transfer are not supported.

### **Wide Bus 16 (Wbus16)**

Returned as 0 to indicate that 16 bit transfer are not supported.

### **Synchronous Transfer (Sync)**

Returned as 0 to indicate that synchronous transfers are not supported.

### **Linked Commands (Linked)**

Returned as 0 which indicates that linked commands are not supported.

### **Command Queuing (CmdQue)**

Returned as 0 which indicates that command queuing is not supported.

### **Soft Reset (SftRe)**

Returned as 0 to indicate that the Generic CentricStor Medium Changer does not support a soft reset alternative to a reset condition.

### **Vendor Identification**

Unused bytes are padded with the space character.

Returned as FSC.

### **Product Identification**

Unused bytes are padded with the space character.

Returned as CS-TL.

### **Firmware Revision Level**

Unused bytes are padded with the space character.

Returned as the ASCII representation of the firmware revision level.

### **Full Firmware Revision Level**

Unused bytes are padded with the space character.

Returned as the ASCII representation of the full firmware revision level.

### **Vendor Specific**

Returned as 0000000b to indicate no vendor specific parameter.

### **Bar Code (BarC)**

Returned as a 1 which indicates that a bar code scanner is installed.



### Typical Response Bytes 00 through 48

Typical returned data for bytes 00 through 48 is as follows:

08h 80h 02h 02h 2Ch 00h 00h 10h (bytes 00 - 07)

FSC (bytes 08 - 15)

CS-TL (bytes 16 - 31)

81.1 (bytes 32 - 35)

000000000001 (bytes 36 - 47)

01h (byte 48)

Unused bytes in each field contain an ASCII space character.

### Supported Vital Product Data Page

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	Page Code							
2	Reserved							
3	Page Length							
4	First Page Code Supported							
5	Second Page Code Supported							
6	Third Page Code Supported							
7	Fourth Page Code Supported							
8	First Page Code Supported							

#### SUPPORTED VITAL PRODUCT DATA PAGE

#### Peripheral Qualifier

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

#### Peripheral Device Type

The value returned by this field is set to 01000b, indicating a Medium Changer device.

#### Page Code

Returned as 00h which indicates the Supported Vital Product Data Page.

#### Page Length

Returned as 05h which indicates the remaining bytes in this page exclusive of the Page Length byte.

#### First Page Code Supported

Returned as 00h which indicates support for the Supported Vital Product Data Page.

#### Second Page Code Supported

Returned as 80h which indicates support for the Unit Serial Number Page.

#### Third Page Code Supported

Returned as C0h which indicates support for the Firmware Revision Page.

#### Fourth Page Code Supported

Returned as E0h which indicates support for the Implemented SCSI-2 Command Page.

#### Fifth Page Code Supported

Returned as E1h which indicates support for the Implemented Vendor Specific Command Page.

## Unit Serial Number Page

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	Page Code							
2	Reserved							
3	Page Length							
4	Serial Number							
·								
·								
15								

### SERIAL NUMBER PAGE

#### Peripheral Qualifier

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

#### Peripheral Device Type

The value returned by this field is set to 01000b, indicating a Medium Changer device.

#### Page Code

Returned as 80h which indicates the Supported Vital Product Data Page.

#### Page Length

Returned as 0Ch which indicates the remaining bytes in this page exclusive of the Page Length byte.

#### Serial Number

The Serial number is padded with blank characters as needed.

## Firmware Revision Page

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	Page Code							
2	Reserved							
3	Page Length							
4 . . 25	Revision							

### FIRMWARE REVISION PAGE

#### Peripheral Qualifier

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

### Peripheral Device Type

The value returned by this field is set to 01000b, indicating a Medium Changer device.

### Page Code

Returned as C0h which indicates the Supported Vital Product Data Page.

### Page Length

Returned as 16h which indicates the remaining bytes in this page exclusive of the Page Length byte.

### Revision

Returned as the ASCII representation of the firmware revision level.

## Implemented SCSI-2 Command Page

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	Page Code							
2	Reserved							
3	Page Length							
4	TEST UNIT READY							
5	REQUEST SENSE							
6	INITIALIZE ELEMENT STATUS							
7	INQUIRY							
8	MODE SENSE							
9	RESERVE							
10	RELEASE							
11	PREVENT/ALLOW MEDIUM REMOVAL							
12	POSITION TO ELEMENT							
13	LOG SENSE							
14	MOVE MEDIUM							
15	RESID ELEMENT STATUS							
16	MODE SENSE							

### IMPLEMENTED SCSI-2 COMMAND PAGE

### Peripheral Qualifier

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

### Peripheral Device Type

The value returned by this field is set to 01000b, indicating a Medium Changer device.

### Page Code

Returned as E0h which indicates the Supported Vital Product Data Page.

### Page Length

Returned as 0Dh which indicates the remaining bytes in this page exclusive of the Page Length byte.

## Implemented SCSI-2 Commands

Byte 04 through byte 16 list the implemented SCSI-2 commands for the Generic CentricStor Medium Changer library.

## Implemented Vendor Specific Command Page

Bits Bytes	7	6	5	4	3	2	1	0
0	Peripheral Qualifier			Peripheral Device Type				
1	Page Code							
2	Reserved							
3	Page Length							
4	INITIALIZE ELEMENT STATUS WITH RANGE							

### IMPLEMENTED VENDOR SPECIFIC COMMAND PAGE

#### Peripheral Qualifier

The return value 0 indicates that the Generic CentricStor Medium Changer is a single LUN device.

#### Peripheral Device Type

The value returned by this field is set to 01000b, indicating a Medium Changer device.

#### Page Code

Returned as E1h which indicates the Supported Vital Product Data Page.

#### Page Length

Returned as 01h which indicates the remaining bytes in this page exclusive of the Page Length byte.

#### Implemented Vendor Specific SCSI-2 Command

Byte 04 lists the implemented vendor specific SCSI commands.

## Inquiry (12h) Status

After processing the INQUIRY command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### Good

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### Check Condition

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- Invalid Page Code.

## 1.4 LOG SENSE (4Dh)

The LOG SENSE command allows the initiator to retrieve statistical information about the Generic CentricStor Medium Changer. When this command is used, the following information is returned:

- Drive statistics

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (4Dh)							
1	Logical Unit Number			Reserved			PPC	SP
2	PC		Page Code					
3	Reserved							
4	Reserved							
5	Parameter Pointer							
6								
7	Allocation Length							
8								
9	Reserved							

LOG SENSE CDB FORMAT

### **CDB Format:**

#### **PPC**

The Parameter Pointer Control (PPC) bit is always 0. A Parameter Pointer Control bit value of 0 requests that the Generic CentricStor Medium Changer return data starting with the parameter code specified in the Parameter Pointer field and return the number of bytes specified in the Allocation Length field in ascending order. A PPC bit of 0 and a Parameter Pointer field of 0 requests that the Generic CentricStor Medium Changer return all available parameter data for that page code.

#### **SP**

The Save Parameters (SP) bit is always set to 0 and indicates that the Generic CentricStor Medium Changer performs the LOG SENSE command and does not save the log parameters.

#### **PC**

The Page Control (PC) field is always set to 01b. This value causes the Generic CentricStor Medium Changer to return cumulative values of any log parameter rather than threshold or default values.

#### **Page Code**

The Page Code field identifies which log page is being requested by the initiator. If the page is not supported, the command terminates with a CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and the ASC is set to INVALID FIELD IN CDB.

Page Code	Page Name	Page Description
00h	Supported Log Pages	Returns list of supported log pages
30h	Drive Statistics	Returns Drive Statistics

LEGAL VALUES FOR PAGE CODE FIELD

## Parameter Pointer

The Parameter Pointer field allows the initiator to specify at which parameter within a log page the requested data should begin.

## Allocation Length

The Allocation Length field is used to determine the maximum amount of returned data. If the Allocation Length value exceeds the amount of transfer data, the Generic CentricStor Medium Changer terminates the Data In phase after all of the data transfers. Specify FFFFh to include all available data.

## Log Sense (4Dh) Response

The Log Sense command returns a single log page specified in the Page Code field of the CDB.

## Log Page Format

The following is a description of the log pages and their respective log page structure. The 4-byte page header, followed by zero or variable length log parameters, is returned in ascending order.

Bits Bytes	7	6	5	4	3	2	1	0
0	Reserved		Page Code					
1	Reserved							
2	Page Length (n-3)							
3								
4	Log Parameter (First)							
.								
.								
n								

LOG SENSE PAGE HEADER FORMAT

## Page Code

The Page Code field identifies which log page is being transferred

## Page Length

The Page Length field indicates the total number of bytes that follow the Page Length byte. The value returned for this field depends on the value specified for the Page Code and the Parameter Pointer in the CDB.

## Log Parameters

Log Parameters are data structures that are contained in log pages as follows:

- Data counters that capture a count of a particular event.

## Log Parameter Format

Following the four byte page header are one or more log parameters.

Bits Bytes	7	6	5	4	3	2	1	0
0	Parameter Code							
1								
2	DU	DS	TSD	ETC	TMC		RSVD	LP
3	Parameter Length (n-3)							
4	Parameter Value							
n								

### LOG PARAMETER FORMAT

#### Parameter Code

The Parameter Code field identifies which log parameter was transferred. The valid values for this field depend on the type of requested log page.

#### Disabled Update (DU)

The DU parameter control bit is always 0 which indicates that the Generic CentricStor Medium Changer updates the log parameter value to reflect all events that should be recorded by that parameter.

#### Disable Save (DS)

The DS parameter control bit is always 1 which indicates that the Generic CentricStor Medium Changer does not support saving of the particular log parameter.

#### Target Save Disable (TSD)

The TSD parameter control bit is always 0 which indicates that the Generic CentricStor Medium Changer provides a self-defined method for saving log parameters.

#### Enable Threshold Comparison (ETC)

The ETC parameter control bit is always 0 which indicates a comparison to the threshold value is not performed whenever the cumulative value is updated.

#### Threshold Met Criteria (TMC)

The TMC parameter control bit is always 0 which indicates the basis for comparison of the cumulative and threshold values.

#### List Parameter (LP)

The LP parameter control bit is set to 0 for counter data and set to 1 for a list parameter.

#### Parameter Length

The Parameter Length field specifies the length in bytes of the Parameter Value field.

#### Parameter Value

The Parameter Value field can be designated by one of the following:

- A data counter for an event.
- A value that indicates the state of a component of the Generic CentricStor Medium Changer hardware. If this field is 1, the state of the component is on. If this field is 0, that state of the component is off.
- A string that describes a history event.

## Supported Log Page

The Supported Log Page lists all log pages that the Generic CentricStor Medium Changer supports.

Bits Bytes	7	6	5	4	3	2	1	0
0	Reserved		Page Code					
1	Reserved							
2	Page Length							
3								
4	Supported Log Page							
5	Drive Statistics Log Page							

### SUPPORTED LOG PAGE

#### Page Code

This value is always 000000b for the Support Log Pages.

#### Page Length

This value is 0002h.

#### Supported Log Page

This value is 00h.

#### Drive Statistics Log Page

This value is 30h.

## Drive Statistics Log Page

The Drive Statistics Log Page lists returns Drive Statistics.

Bits Bytes	7	6	5	4	3	2	1	0
0	Parameter Code (Index of Log Page)							
1								
2	DU=0	DS=1	TSD=0	ETC=0	TMC=0	Reserved		LP=0
3	Parameter Length=0x06							
4	Drive Element Address							
5								
6								
7	Number of Mounts							
8								
9								

### DRIVE STATISTICS LOG PAGE



### **Log Sense (4Dh) Status**

After processing the LOG SENSE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- The PC field is not set to 01b.
- Invalid Page Code.
- Invalid Parameter Pointer.
- The PPC field is not set to 0b.
- The SP field is not set to 0b.

## 1.5 MODE SENSE (1Ah/5A)

The MODE SENSE command reports one or all mode parameter pages to the initiator. The transfer data includes four/eight bytes of parameter list header and the specific number of the requested page bytes. Byte counts are:

- 20 bytes for the Element Address Assignment page
- 4 bytes for the Transport Geometry Descriptor page
- 16 bytes for the Device Capabilities page

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (1Ah)							
1	Logical Unit Number			Rsvd	DBD	Reserved		
2	PC	Page Code						
3	Reserved							
4	Allocation Length							
5	Reserved							

MODE SENSE CDB FORMAT (1Ah)

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (5Ah)							
1	Logical Unit Number			Rsvd	DBD	Reserved		
2	PC	Page Code						
3	Reserved							
4	Reserved							
5	Reserved							
6	Reserved							
7	Allocation Length							
8								
9	Reserved							

MODE SENSE CDB FORMAT (5Ah)

### CDB Format:

#### Logical Unit Number

This field is always set to 0.

#### DBD

The Disable Block Descriptor (DBD) bit is not used, and must be set to 1.

#### PC

The Page Control field indicates the type of page parameter values to be returned to the host.

Page Control	Description
0 0	Report Current Parameter Values
0 1	Report Changeable Values
1 0	Report Default Values
1 1	Report Saved Values (default values if no pages are saved)

## Page Code

The Page Code field determines which pages should be reported.

Page Code	Description
1Dh	Element Address Assignment Page
1Eh	Transport Geometry Descriptor Page
1Fh	Device Compatibilities Page
3Fh	All Pages

## Allocation Length

This field specifies the number of bytes that the host allocated for returned MODE SENSE data. An Allocation Length of 0 means that the Generic CentricStor™ Medium Changer returns no MODE SENSE data. This is not considered an error and GOOD status is returned.

## Mode Sense (1A/5Ah) Response

The Mode Sense Response consists of a Parameter List Header, followed by 0 or more pages.

### Parameter List Header

Bits Bytes	7	6	5	4	3	2	1	0
0	Sense Data Length							
1	Reserved							
2	Reserved							
3	Reserved							

### PARAMETER LIST HEADER (1A)

Bits Bytes	7	6	5	4	3	2	1	0
0	Sense Data Length							
1								
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							
6	Reserved							
7	Reserved							

### PARAMETER LIST HEADER (5A)

## Sense Data Length

The Sense Data Length specifies the length in bytes that is available to be transferred during the DATA IN phase. The Sense Data Length does not include itself but does include the remaining 3 bytes of parameter list header.

## Element Address Assignment Page (1D)

Bits Bytes	7	6	5	4	3	2	1	0
0	PS	Rsvd	Page Code					
1	Parameter List Length=0x12							
2	First Medium Transport Element Address							
3								
4								
5	Number of Medium Transport Elements							
6	First Storage Element Address							
7								
8								
9	Number of Storage Elements							
10	First Import/Export Element Address							
11								
12								
13	First Data Transfer Element Address							
14	First Data Transfer Element Address							
15								
16								
17	Number of Data Transfer Elements							
18	Reserved							
19								

### Element Address Assignment Page

#### PS

The Page Saveable (PS) field value is 0. This indicates that the Generic CentricStor™ Medium Changer cannot save this page.

#### Page Code

The Page Code identifies the Element Address Assignment page. The value of this field is 1Dh.

#### Parameter List Length

This field indicates the length of the Element Address Assignment parameter list. The value of the field is 12h which indicates 18 additional bytes of parameter data.

## Transport Geometry Descriptor Page (1E)

Bits Bytes	7	6	5	4	3	2	1	0
0	PS	Rsvd	Page Code					
1	Parameter List Length=0x02							
2	Reserved							Rotate
3	Member Number in Tranport Element Set							

### Transport Geometry Descriptor Page

## PS

The Page Saveable (PS) field value is 0. This indicates that the Generic CentricStor™ Medium Changer cannot save this page.

## Page Code

The Page Code identifies the Transport Geometry Descriptor page. The value of this field is 1Eh.

## Parameter Length

This field indicates the length of the Transport Geometry Descriptor parameter list. The value of the field is 02h which indicates 2 additional bytes of parameter data.

## Rotate

The Rotate bit identifies the ability of the accessor to handle two-sided media. Since the library uses only one-sided media, the value for this field is 0.

## Member Number in Transport Element Set

This field identifies the specific accessor in the system to which this descriptor applies. Since the Generic CentricStor™ Medium Changer has only one transport element, the value for this field is 0.

## Device Capabilities Page (1F)

Bits Bytes	7	6	5	4	3	2	1	0
0	PS	Rsvd	Page Code					
1	Parameter List Length=0x0E							
2	Reserved				DT 1	I/E 1	ST 1	MT 1
3	Reserved							
4	Reserved				MTtoDT 0	MTtoI/E 0	MTtoST 0	MTtoMT 0
5	Reserved				STtoDT 1	STtoI/E 1	STtoST 1	STtoMT 0
6	Reserved				I/EtoDT 1	I/EtoI/E 1	I/EtoST 1	I/EtoMT 0
7	Reserved				DTtoDT 1	DTtoI/E 1	DTtoST 1	DTtoMT 0
8 . . 15	Reserved							

## Device Capabilities Page

## PS

The Page Saveable (PS) field value is 0. This indicates that the Generic CentricStor™ Medium Changer cannot save this page.

## Page Code

This field identifies the page code for the Device Capabilities page. The returned value is 1Fh.

### **Parameter Length**

The Parameter Length is 0Eh (14) which indicates 14 additional bytes of device capabilities data.

### **Data Transfer (DT)**

The value returned for this field is 1. The tape drives can store cartridges.

### **Import/Export (I/E)**

The value returned for this field is 1. The Mailbox can store cartridges.

### **Storage Location (ST)**

The value returned for this field is 1. The storage cells can store cartridges.

### **Medium Transport (MT)**

The value returned for this field is 0. The accessor cannot store cartridges.

### **MT to DT**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is the accessor and the destination is a tape drive.

### **MT to I/E**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is the accessor and the destination is the Mailbox.

### **MT to ST**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is the accessor and the destination is a storage cell.

### **MT to MT**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is the accessor and the destination is the accessor.

### **ST to DT**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a storage cell and the destination is a tape drive.

### **ST to I/E**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a storage cell and the destination is the Mailbox.

### **ST to ST**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a storage cell and the destination is a storage cell.

### **ST to MT**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is a storage cell and the destination is the accessor.

### **I/E to DT**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is the Mailbox and the destination is a tape drive.

### **I/E to I/E**

The value returned for this field is 1. The library supports the MOVE MEDIUM (A5h) command when the source is the Mailbox and the destination is the Mailbox.

### **I/E to ST**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is the Mailbox and the destination is a storage cell.

### **I/E to MT**

The value returned for this field is 0. The Generic CentricStor™ Medium Changer does not support the MOVE MEDIUM (A5h) command when the source is the Mailbox and the destination is the accessor.

### **DT to DT**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a tape drive and the destination is a tape drive.

**DT to I/E** The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a tape drive and the destination is the Mailbox.

### **DT to ST**

The value returned for this field is 1. The Generic CentricStor™ Medium Changer supports the MOVE MEDIUM (A5h) command when the source is a tape drive and the destination is a storage cell.

### **DT to MT**

The value returned for this field is 0. The library does not support the MOVE MEDIUM (A5h) command when the source is a tape drive and the destination is the accessor.

## **Mode Sense (1A/5Ah) Status**

After processing the MODE SENSE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- Invalid Value for Allocation Length.
- Invalid Value in the DBD Field.
- Invalid Page Code

## 1.6 MOVE MEDIUM (A5h)

The MOVE MEDIUM command allows the initiator to request that the Generic CentricStor™ Medium Changer moves a cartridge from one element address to another element address.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (A5h)							
1	Logical Unit Number			Reserved				
2	Transport Element Address							
3								
4	Source Address							
5								
6	Destination Address							
7								
8	Reserved							
9	Reserved							
10	Reserved							
11	Reserved							

MOVE MEDIUM CDB format

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Transport Element Address**

This field is checked for the value be 0 or the element address of the accessor.

#### **Source Address**

This field specifies the element address from where the cartridge is to be taken.

#### **Destination Address**

This field specifies the element address where the cartridge is to be placed.

### **Move Medium (A5h) Status**

After processing the MOVE MEDIUM command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.



**Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- An unrecoverable error is experienced.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- The Generic CentricStor™ Medium Changer is not ready or is offline.
- Invalid Element Address
- Invalid Transport Element Address
- Invalid Source Element Address
- Invalid Destination Element Address
- Destination Element Full
- Source Element Empty
- Source Cartridge is Loaded, not Accessible
- Destination for Move Operation cannot be Accessor
- Source for Move cannot be Accessor

## 1.7 POSITION TO ELEMENT (2Bh)

The POSITIONTO ELEMENT command allows the initiator to move the accessor to a specific element address position.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (2Bh)							
1	Logical Unit Number			Reserved				
2	Transport Element Address							
3								
4	Destination Address							
5								
6	Reserved							
7								
8	Reserved							
9	Reserved							

POSITION TO ELEMENT CDB format

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Transport Element Address**

This field is checked for the value be 0 or the element address of the accessor.

#### **Destination Address**

This field specifies the element of the Destination Address

### **Position to Element (2Bh) Status**

After processing the POSITION TO ELEMENT command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.

- The Generic CentricStor™ Medium Changer is not ready or is offline.
- Invalid Transport Element Address
- Invalid Destination Element Address

## 1.8 PREVENT/ALLOW MEDIUM REMOVAL (1Eh)

The PREVENT/ALLOW MEDIUMREMOVAL command prevents/allows the following operator actions:

- Inserting a cartridge
- Ejecting a cartridge

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (1Eh)							
1	Logical Unit Number			Reserved				
2	Reserved							
3								
4	Reserved							Prevent
5	Reserved							

PREVENT/ALLOW MEDIUM REMOVAL CDB format

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Prevent**

The Prevent bit indicates the following:

0 - Allow Inserting/Ejecting a cartridge.

1 - Prevent Inserting/Ejecting a cartridge, until either a power on reset, command reset, or all initiators have issued an ALLOW MEDIUM REMOVAL command by setting the Prevent field to 0.

### **Prevent/Allow Medium Removal (1Eh) Status**

After processing the PREVENT/ALLOW MEDIUM REMOVAL command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- The Generic CentricStor™ Medium Changer is not ready or is offline.

## 1.9 READ ELEMENT STATUS (B8h)

The READ ELEMENT STATUS command allows an initiator to request the status of the element addresses. This command returns the data created by the INITIALIZE ELEMENT STATUS command or INITIALIZE ELEMENT STATUS WITH RANGE command.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (B8h)							
1	Logical Unit Number			VolTag	Element Type Code			
2	StartingElement Address							
3								
4	Number of Elements							
5								
6	Reserved							DVCID
7	Allocation Length							
8								
9								
10	Reserved							
11	Reserved							

READ ELEMENT STATUS CDB format

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **VolTag**

This field indicates whether the volume tag (bar code label) information is returned. The possible values are:

- 0 - Do not return volume tag information
- 1 - Return volume tag information

#### **Element Type Code**

This field specifies the selected element types for the return information.

Bit 3	Bit 2	Bit 1	Bit 0	Selected Element Type
0	0	0	0	All Element Types reported (from starting address)
0	0	0	1	Accessor
0	0	1	0	Storage
0	0	1	1	Mailbox
0	1	0	0	Tape Drives

#### **Starting Element Address**

This field indicates the starting element address. Elements equal to or greater than the starting address are returned. Note: The Starting Element Address field must indicate a valid element but does not necessarily have to match the Element Type Code field.

## Number of Elements

This field specifies the maximum number of element descriptors to return.

## DVCID

This field indicates whether device identifiers for a specified range are returned. The possible values are:

- 0-Do not return device identifiers
- 1 - If available, return the device identifiers

## Allocation Length

This field specifies the byte length for returned element descriptors. Only complete element descriptors are returned. The library returns element descriptors until one of the following conditions are met:

- All available element descriptors are returned
- or—
- The number of element descriptors specified in the Number of Elements field are returned
- or—
- The number of bytes of complete element descriptors specified in the Allocation Length field are returned
- or—
- There is less allocation length space available than is required by the next complete element descriptor

## Read Element Status (B8h) Response

### Element Status Header

The Generic CentricStor™ Medium Changer returns one header for each READ ELEMENT STATUS command.

Bits Bytes	7	6	5	4	3	2	1	0
0	First Element Address Reported							
1								
2	Number of Elements Reported							
3								
4	Reserved							
5	Byte Count of Report Available							
6								
7								

Element Status Header

### First Element Address Reported

This field indicates the lowest element address found.

### Number of Elements Reported

This field indicates the number of elements found.

### Byte Count of Report Available

This field indicates the number of available element status bytes that meet the CDB requirements. The value does not include the 8 byte element status header and is not adjusted to match the value specified in the Allocation Length field of the CDB.

### Element Status Page

The Generic CentricStor™ Medium Changer returns one Element Status Page header for each group of element descriptors of the same type.

Bits Bytes	7		6		5		4		3		2		1		0	
0	Element Type Code															
1	PVolTag		AVolTag		Reserved											
2	Element Descriptor Length															
3																
4	Reserved															
5	Byte Count of Descriptor Data Available															
6																
7																

Element Status Page

### Element Type Code

This field indicates the specific element type being returned by the element descriptor.

#### PVolTag

This field indicates that the primary volume tag (bar code label) information is present or not as follows:

- 0 - Volume tag bytes are omitted
- 1 - Volume tag bytes are included

#### AVolTag

Alternate volume tags are not supported. The return value for this bit field is 0.

### Element Descriptor Length

This field indicates the number of bytes contained in a single element descriptor.

Field		Value
PVolTag = 0	DVCID = 0	10h all
PVolTag = 0	DVCID = 0	10h non-drives 1Ah drives
PVolTag = 1	DVCID = 0	34h all
PVolTag = 1	DVCID = 0	34h non-drives 3Eh drives

### Byte Count of Descriptor Data Available

This field indicates the number of element descriptor data bytes available for the elements of this element type that met the CDB requirements. This value represents the Element Descriptor Length field multiplied by the number of element descriptors for this element type. This value does not include the 8 byte Element Status Page header.

## Element Descriptors

The following sections contain the field definitions for the following element descriptors:

- Medium transport element: accessor
- Storage elements: each storage cell
- Import/Export elements: each Mailbox cell
- Data transfer elements: each tape drive

Each element descriptor includes the element address and status flags. Sense code and other information depends on the element type.

## Medium Transport Element Descriptor

Bits Bytes	7	6	5	4	3	2	1	0
0	Element Address							
1								
2	Reserved				Exept	Reserved	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7								
8								
9	Svalid	Invert	Reserved					
10	Source Storage Element Address							
11								
12 . . 47	Primary Volume Tag Information (Field omitted if PVolTag = 0)							
48 . . 51	Reserved (Field moved up if Primary Volume Tag Information field is omitted)							

Medium Transport Element Descriptor Format

### Element Address

This field contains the element address of the accessor.

### Except

This field is set to 0.

### Full

This field is set to 0.

### Additional Sense Code

This field is set to 0.

### Additional Sense Code Qualifiers

This field is set to 0.



### SValid

This field is set to 0.

### Invert

This field is set to 0.

### Source Storage Element Address

This field is set to 0.

### Primary Volume Tag

This field is set to 0.

## Storage Element Descriptor

Bits Bytes	7	6	5	4	3	2	1	0
0	Element Address							
1								
2	Reserved				Exept	Reserved	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7								
8								
9	Svalid	Invert	Reserved					
10	Source Storage Element Address							
11								
12 . . 47	Primary Volume Tag Information (Field omitted if PVolTag = 0)							
48 . . 51	Reserved (Field moved up if Primary Volume Tag Information field is omitted)							

Storage Element Descriptor Format

### Element Address

This field contains the address of the cartridge storage cell.

### Access

This field indicates that the Accessor can access the storage cell. The value of this field is 1.

### Except

The exception field indicates the current condition of the cartridge cell as follows:

- 0 - The storage cell is in a normal condition
- 1 - The storage cell is in an abnormal condition as specified in the Additional Sense Code (ASC) and Additional Sense Code Qualifier (ASCQ) fields.

## Full

This field indicates if a storage cell contains a cartridge as follows:

- 0 - The storage cell is empty
- 1 - The storage cell is full

## Additional Sense Code (ASC)

If the Storage cell is in an abnormal state, this field contains ASC values.

## Additional Sense Code Qualifier (ASCQ)

Supported ASCQ values.

## SValid

This bit field indicates the validity of the Source Element Address field as follows:

- 0 - The Source Element Address field is invalid
- 1 - The Source Element Address field is valid

## Invert

Double sided media is not supported. This field is 0.

## Source Element Address

This field indicates the previous element address of the cartridge.

## Primary Volume Tag Information

When the PVolTag field in the CDB is set to 1, this field contains the volume tag (bar code label) information for the element address. Only six or seven bytes of volser information is returned.

## Import/Export Element Descriptor

Bits Bytes	7	6	5	4	3	2	1	0
0	Element Address							
1								
2	Reserved	InEnab	ExEnab	Access	Exept	Imp/Exp	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7								
8								
9	Svalid	Invert	Reserved					
10	Source Element Address							
11								
12 . . 47	Primary Volume Tag Information (Field omitted if PVolTag = 0)							
48 . . 51	Reserved (Field moved up if Primary Volume Tag Information field is omitted)							

## Import/Export Element Descriptor Format

### **Element Address**

This field contains the address of the Mailbox element cell.

### **InEnab**

This field indicates that the Mailbox supports cartridge loading mechanism (set to 0b).

### **ExEnab**

This field indicates that the Mailbox supports cartridge Unloading mechanism (set to 0b).

### **Access**

This field indicates whether the accessor can access the cartridge in the Mailbox as follows:

- 0 - The Mailbox is opened and the accessor cannot access cartridges
- 1 - The Mailbox is closed and the accessor can access the cartridge

### **Except**

This field indicates the current condition of the Mailbox cell as follows:

- 0 - The Mailbox cell is in a normal state
- 1 - The Mailbox cell is in an abnormal state as indicated by

Additional Sense Code (ASC) and Additional Sense Code Qualifier field

### **Imp/Exp**

This field indicates how the cartridge was placed in the Mailbox cell:

- 0 - The accessor placed the cartridge in the Mailbox
- 1 - The operator placed the cartridge in the Mailbox

### **Full**

This field indicates that this Mailbox cell contains a cartridge as follows:

- 0 - No cartridge in the cell
- 1 - Cartridge in the cell

### **Additional Sense Code (ASC)**

If the Mailbox cell is in an abnormal state, this field contains ASC values.

### **Additional Sense Code Qualifier**

If the Mailbox cell is in an abnormal state, this field contains ASC values.

### **SValid**

This bit field indicates the validity of the Source Element

Address field as follows:

- 0 - The Source Element Address field is invalid
- 1 - The Source Element Address field is valid

### **Invert**

Double sided media is not supported. This field is 0.

### **Source Element Address**

This field indicates the previous element address of the cartridge.

### **Primary Volume Tag Information**

When the PVolTag field in the CDB is set to 1, this field contains the volume tag (bar code label) information for the element address. Only six bytes of volser information is returned.

## Data Transfer Element Descriptor

Bits Bytes	7	6	5	4	3	2	1	0
0	Element Address							
1								
2	Reserved			Access		Exept	Reserved	Full
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	NotBus	Reserved	IDValid	LUVValid	Reserved	Logical Unit Number		
7	SCSI Bus Address							
8	Reserved							
9	SValid	Invert	Reserved					
10	Source Element Address							
11								
12 . . 47	Primary Volume Tag Information (Field omitted if PVolTag = 0)							
48	Reserved				Code Set			
49	Reserved				Identifier Type			
50	Reserved							
51	Identifier Length							
52 . . 61	Identifier (Omitted if DVCID = 0)							

Data Transport Element Descriptor Format

### Element Address

This field contains the element address of the tape drive.

### Access

This field indicates whether the Accessor can pick or place a cartridge at the tape drive location as follows:

- 0 - The cartridge at the tape drive is not accessible to the accessor (cartridge is not unloaded)
- 1 - The cartridge at the tape drive is accessible by the accessor (cartridge is unloaded or not present)

### Except

The exception field indicates the current condition of the tape drive as follows:

- 0 - The tape drive is in a normal state
- 1 - The tape drive is in an abnormal state as indicated by the Additional Sense Code (ASC) and the Additional Sense Code Qualifier (ASCQ) fields

## **Full**

This field indicates if the tape drive contains a cartridge as follows:

- 0 - No cartridge in tape drive
- 1 - Cartridge in tape drive

## **Additional Sense Code (ASC)**

If the Data Transport cell is in an abnormal state, this field contains ASC values.

## **Additional Sense Code Qualifier (ASCQ)**

If the Mailbox cell is in an abnormal state, this field contains ASC values.

## **NotBus**

This field is not supported and is set to 0.

## **IDValid**

This field indicates whether the drive SCSI id (byte 7) is valid:

- 0 - The SCSI id is not valid
- 1 - The SCSI id is valid

## **LUValid**

This field is not supported and is set to 0.

## **Logical Unit Number**

This field is not supported and is set to 0.

## **SCSI Bus Address**

This field contains the tape drive SCSI address.

## **SValid**

This bit field indicates the validity of the Source Element Address field as follows:

- 0 - The Source Element Address field is invalid
- 1 - The Source Element Address field is valid

## **Invert**

Double sided media is not supported. This field is 0.

## **Source Element Address**

This field indicates the previous element address location of a cartridge.

## **Primary Volume Tag Information**

When the PVolTag field in the CDB is set to 1, this field contains the volume tag (bar code label) information for the element address.

Only six bytes of volser information is returned.

## **Code Set**

This field is set to 2h to indicate that ASCII values are returned.

## **Identifier Type**

This field is set to 0h.

## **Identifier Length**

This field contains the length in bytes of the Identifier field, and is set to 0Ah. If no device identifier is available, or the DVCID bit in the CDB is zero, the Identifier Length field is 0h and the Code Set and Identifier Type field are also 0h.

## **Identifier**

This field provides the serial number of the device associated with the data transfer element. If no device identifier is available for the element, or the DVCID bit in the CDB is zero, this field is omitted.

## **Read Element Status (B8h) Status**

After processing the READ ELEMENT STATUS command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- The Generic CentricStor™ Medium Changer is not ready or is offline.
- Invalid Start Element Address
- Invalid Element Type Code

## 1.10 RELEASE (17h)

The RELEASE command allows the initiator to release a previous reservation. It is not an error to issue the RELEASE command when no previous reservation was made. The Release command is initiator dependent. Only the initiator previously reserving the library may release the library.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (17h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

RELEASE CDB format

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

### **Release (17h) Status**

After processing the RELEASE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.

## 1.11 REQUEST SENSE (03h)

The REQUEST SENSE command allows the initiator to request sense data from the target. Sense data (18 bytes) is provided in extended sense data format. The sense data is saved for each individual initiator. The data is preserved for each initiator until either the REQUEST SENSE command or any other command is received.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (03h)							
1	Logical Unit Number			Reserved				EVPD
2	Reserved							
3	Reserved							
4	Allocation Length							
5	Reserved							

REQUEST SENSE CDB FORMAT

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

#### **Allocation Length**

This field specifies the number of sense bytes requested by the initiator.

## Request Sense (03h) Response

### **Sense Information Format**

Bits Bytes	7	6	5	4	3	2	1	0
0	Valid	Error Code=0x70						
1	Reserved							
2	Reserved				Sense Key			
3 . . 6	Information Bytes							
7	Additional Sense Length							
8 . . 11	Command Specific Bytes							
12	Additional Sense Code (ASC)							
13	Additional Sense Code Qualifier (ASCQ)							
14	Service Action Code							



Band: 5101 Abschnitt: 58 Titel: Generic CentricStor™ Medium Changer – SCSI Reference		SINIX-2000-Y/-Z V8.0A/V8.1A/V8.3A Schnittstellenbeschreibung Version: 1.1		Kapitel: 52 Bandlaufnummer: 00535	
15	SKSV	C/D	Reserved	BPV	Bit Pointer
16	Field Pointer				
17					

## SENSE INFORMATION FORMAT

### Valid

The Valid field is set to 0 to indicate the information field does not contain valid information.

### Error Code

The Error Code field is set to 70h to indicate that the Scalar 100 will return only current errors.

### Sense Key

Sense Key values.

Sense Key	Description
0h	No Sense. No specific sense key information to report.
2h	Not Ready. The library is not ready.
4h	Hardware Error. A hardware error was detected and operator intervention may be required.
5h	Illegal Request. The CDB or supplied parameter data contains an unsupported
6h	Unit Attention. The Scalar 100 operating status changed.

## SENSE KEYS

### Information Bytes

This field is not supported and is set to 0.

### Additional Sense Length

This field specifies the number of additional sense bytes to follow after this byte. The value returned is 0Ah (10) to indicate that 10 more bytes of sense data are available.

### Command Specific Bytes

Command Specific Bytes are not supported by the library. The value returned is 0.

### Additional Sense Code (ASC)

This field denotes a specific error condition.

### ASCQ

This field provides additional information for the ASC.

### Service Action Code

This field contains a service action code that indicates to a Customer Service representative what problem is to be fixed (set to 00h).

### Sense Key Specific Value (SKSV)

The SKSV returns the following values:

- 0 - The information in bytes 15 through 17 are not valid
- 1 - The information in bytes 15 through 17 are valid for a Sense Key of Illegal Request (05h) only.

### Command/Data (C/D)

The C/D byte indicates which parameter, command or data caused the Check Condition status:

- 0 - Indicates that the illegal parameter was detected in the Parameter List supplied by the initiator.
- 1 - Indicates that the illegal parameter was detected in the CDB.

### Bit Pointer Valid (BPV)

0 - Indicates that the Bit Pointer field is not valid

1 - Indicates that the Bit Pointer field is valid

### Bit Pointer

This field indicates which bit of the byte designated by the field pointer is in error. For a multi-bit field, it points to the most significant bit of the field.

### Field Pointer

This field indicates which byte of the CDB or Parameter List (starting with 00) was in error. For a multi-byte field, the Field Pointer points to the most significant byte.

## Returned Error Codes

Sense Key	Condition	ASC	ASCQ	Description
00h	No Sense	00h	00h	No Additional Sense Code
02h	Not Ready	04h	00h	Unit not ready
			01h	Unit is becoming ready
			8Dh	Unit offline
04h	Hardware Error	3Bh	0Dh	The destination element is full
			0Eh	The source element is empty
		42h	00h	Drive Error
		44h	00h	Internal target failure
05h	Illegal Request	1Ah	00h	Parameter list length error
		20h	00h	Illegal opcode in CDB
		21h	01h	Invalid element address in CDB
		24h	00h	Invalid field in CDB
		26h	00h	Invalid field in Parameter List
			02h	Invalid parameter in Parameter List
		3Bh	0Dh	Destination element full for MOVE MEDIUM command
			0Eh	Source element empty for MOVE MEDIUM command
			85h	Destination of MOVE MEDIUM command cannot be accessor
			86h	Source of MOVE MEDIUM command cannot be accessor
			90h	Source cartridge loaded into tape drive and not accessible
		83h	04h	Drive not installed
06h	Unit Attention	29h	00h	Power-on, SCSI bus reset, or Bus device reset occurred
		28h	00h	Not Ready to Ready

### ADDITIONAL SENSE CODES AND QUALIFIERS

**Request Sense (03h) Status**

After processing the REQUEST SENSE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

**Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

**Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A reserved bit is set to 1 or a parameter is invalid in the CDB.

## 1.12 RESERVE (16h)

The RESERVE command allows the initiator to reserve the entire Generic CentricStor™ Medium Changer. The reservation remains in effect until:

- The initiator that made the reservation sends a RELEASE command.
- A reset, or a power-on of the library is preformed.

After reserving the entire Generic CentricStor™ Medium Changer, only the INQUIRY, RELEASE, REQUEST SENSE, and ALLOWMEDIUM REMOVAL commands are accepted from other initiators. All other commands result in a Reservation Conflict status.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (16h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

RESERVE CDB FORMAT

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

### **Reserve (17h) Status**

After processing the RESERVE command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.

## 1.13 TEST UNIT READY (00h)

The **TEST UNIT READY** command allows the initiator to verify that the Generic CentricStor™ Medium Changer is ready to accept all commands.

Bits Bytes	7	6	5	4	3	2	1	0
0	OP-Code (00h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

TEST UNIT READY CDB FORMAT

### **CDB Format**

The following section describes the parameters in the CDB.

#### **Logical Unit Number**

This field is always set to 0.

### **Test Unit Ready (00h) Status**

After processing the TEST UNIT READY command, the Generic CentricStor™ Medium Changer returns a status byte as follows:

#### **Good**

The Generic CentricStor™ Medium Changer returns a Good status when it was able to process the command without errors.

#### **Busy**

The Generic CentricStor™ Medium Changer returns Busy status when it is processing a command for a different initiator.

#### **Reservation Conflict**

The Generic CentricStor™ Medium Changer returns Reservation Conflict status when it is reserved by a different initiator.

#### **Check Condition**

The Generic CentricStor™ Medium Changer returns the Check Condition status when the following situations occur:

- A Unit Attention condition is pending for the initiator.
- An unrecoverable hardware error is experienced.
- A reserved bit is set to 1 or a parameter is invalid in the CDB.
- The Generic CentricStor™ Medium Changer is not ready or is offline.