

500 disc CD-ROM Changer  
DRM-5004x series  
Changer Mechanism Controller  
SCSI Specifications

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## 1. General

These specifications define an input output bus for interconnecting computers and the changer mechanism controller part of the PIONEER 500 disc CD-ROM Changer.

The changer mechanism controller can be accessed by the host computer as a medium changer device defined in SCSI-2\*1.

These medium changer functions don't control the primary devices (CD-ROM drives). They are defined in the '500 disc CD-ROM Changer CD-ROM drive part SCSI specifications'.

These specifications are based on ANSI X3. 131-199x (SCSI-2 draft proposed American National Standard Revision 10c). Further see them to know general specifications of SCSI.

\*1 SCSI : Small Computer System Interface

**Some parts of these specifications have not been fixed.  
These specifications and other features are subject to change without notice.**

## 2. Basic Definitions

### 2.1 Element

The medium changer command set uses as its address space the set of physical locations and mechanisms within the scope of a medium changer device. The term element is used throughout these specifications to refer to one member of the medium changer address space.

A medium changer is viewed as a set of addressable elements, each of which may contain a unit of media or be used to move a unit of media. Each medium changer element has a unique 16 bit element address. Each element is an instance of one of four classes of element types.

1. MEDIUM TRANSPORT ELEMENT
2. STORAGE ELEMENT
3. IMPORT EXPORT ELEMENT
4. DATA TRANSFER ELEMENT

All discs in the changer are referred to only indirectly by this device model. The discs can be moved to or from any of the elements of the medium changer device. The presence of disc at the various elements in a medium changer can be sensed. In order to ensure exclusive access to a disc, the element where the disc located must be reserved.

- Medium Transport Element

A movement which is used to transport a disk from an element to another element is termed as a Medium Transport Element.

This changer device has one Medium Transport Element whose element address is assigned to 2000h.

Element address zero can be used only in the medium transport element address field of MOVE MEDIUM and EXCHANGE MEDIUM commands to direct the medium changer to use a default or medium changer convenience medium transport element. Because only one medium transport element exists, above operation is always same as addressing 2000h. Medium transport element may be source and/or destination addresses in MOVE MEDIUM command.

- Storage Elements

Storage elements are locations of discs while not in some other element types. A disc in storage element is available for access by the medium transport element. Storage elements may be source and/or destination address in MOVE MEDIUM and EXCHANGE MEDIUM commands.

This changer device has five hundred storage elements whose element addresses are assigned from 0001h to 01F4h.

- Import Export Element

Import export element is a location of a disc which is being inserted into or withdrawn from the changer. A disc in this element is accessible by both the medium transport element or by the operator.

Import export element may be source and/or destination addresses in MOVE MEDIUM command.

This changer device has one import export element whose element address is assigned to 3000h.

The import export element doesn't provide independent storage of a disc.

- Data Transfer Elements

Data transfer elements are locations of the primary devices(drives) which are capable of reading the discs. Data transfer elements may also be viewed as medium changer element addresses of discs loaded in or available for loading in or removal from drives.

This changer device has four data transfer elements whose element addresses are assigned from 4000h to 4003h.

The element addresses are defined as follows in this changer.

Table 2-1

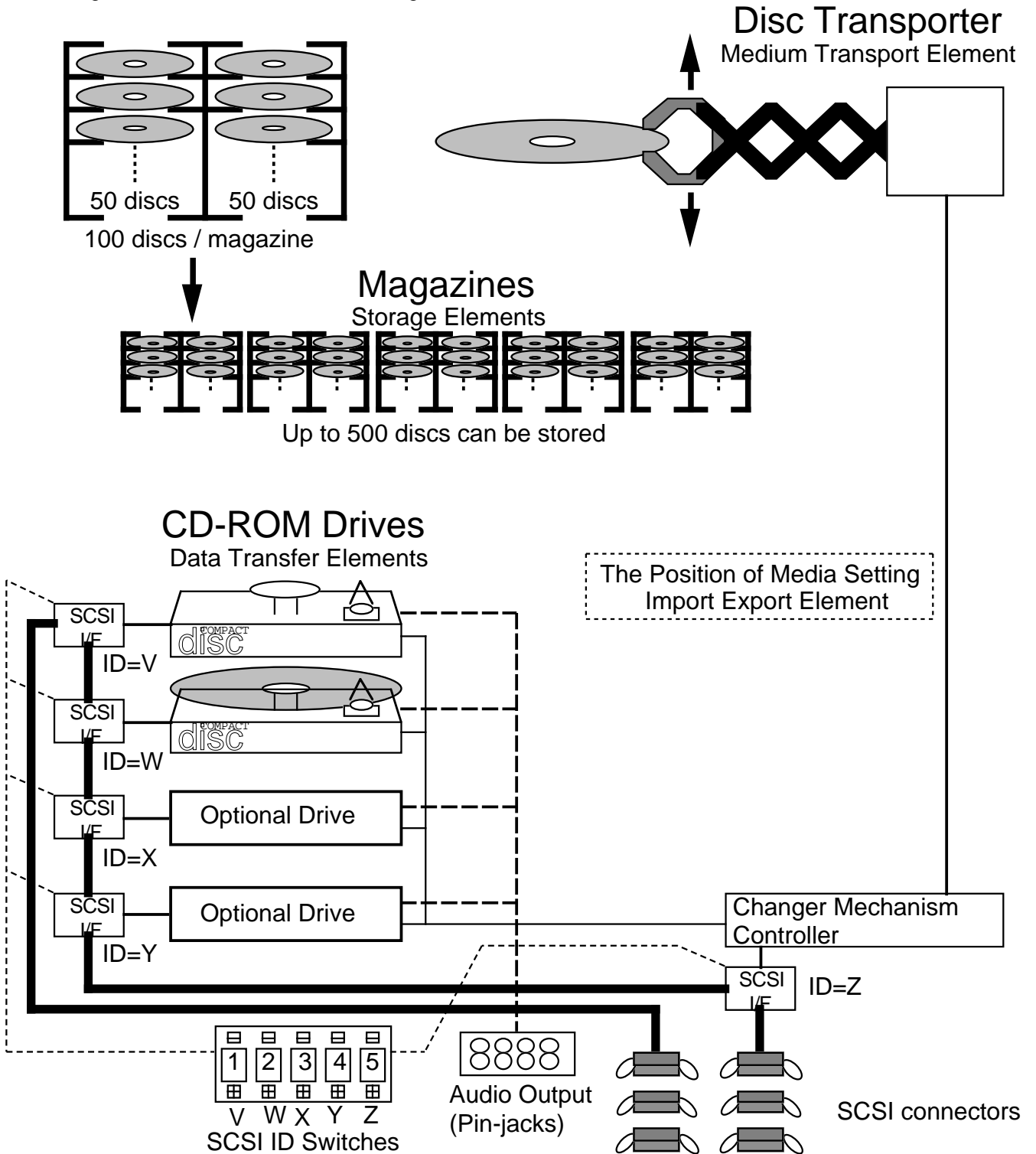
Element Name	Address
Medium Transport Element	2000h (Default : 0000h)
Storage Element	0001h to 01F4h
Import Export Element	3000h
Data Transfer Element	4000h to 4003h

## 2.2 SCSI Addressing of the Changer Mechanism Controller

The changer mechanism controller of the changer responds to a SCSI ID. The SCSI ID can be established to suitable value (0~7) by hardware setting, but it must be different from those used by the drives in the changer, when the changer mechanism controller is connected to same SCSI bus.

The logical unit number zero is assigned as the Medium Changer Device, and the other logical unit numbers are invalid.

2.3 Image Chart of 500 disc CD-ROM Changer



Element : One member of the changer mechanism controller address space  
 ID : SCSI ID Number  
 (Each V ,W ,X ,Y ,Z should be set to one of individual value among zero to seven)



## 2.4 Directions about hand operations

When this changer operates, it is recommended that all magazines are mounted in it. If a magazine is not mounted, all storage elements locating upper the position of no magazine cannot be accessed.

This changer has no slot which a disc can be inserted into or withdrawn from its body. Therefore an import export element has no substance. In this changer, if a red shutter of a medium transport table is opened, the condition is regarded as that the medium transport element is positioned in front of the import export element. While this condition, a disc can be put on or remove from the disc transport table with hand operation.

The vertical position of the import export element is usually same position as #007Eh element, but if #2 magazine is not mounted, it becomes same position as #0029h element.

After the power is turned on, the front door of the changer should be closed. If the door is open, the initialize operation cannot be executed.

### 3 SCSI Command Summary

The SCSI commands described in Table 3-1 are supported.

Table 3-1

Command Name	Operation Code
1. EXCHANGE MEDIUM	A6h
2. INITIALIZE ELEMENT STATUS	07h
3. INQUIRY	12h
4. MODE SENSE(6)	1Ah
5. MOVE MEDIUM	A5h
6. POSITION TO ELEMENT	2Bh
7. READ ELEMENT STATUS	B8h
8. RELEASE	17h
9. REQUEST SENSE	03h
10. RESERVE	16h
11. REZERO UNIT	01h
12. SEND DIAGNOSTIC	1Dh
13. TEST UNIT READY	00h
14. WRITE BUFFER	3Bh
15. READ BUFFER	3Ch

\*Number 8 and 10 commands have not been supported as yet.

### 3.1 EXCHANGE MEDIUM

**A6H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (A6h)							
1	Logical Unit Number			Reserved				
2	(MSB) Transport Element Address							
3	Transport Element Address							(LSB)
4	(MSB) Source Address							
5	Source Address							(LSB)
6	(MSB) First Destination Address							
7	First Destination Address							(LSB)
8	(MSB) Second Destination Address							
9	Second Destination Address							(LSB)
10	Reserved							
11	Reserved							

(2) Function

This command provides a means to exchange the medium in the source element with the medium located at a destination element.

The medium in the source element is moved to the first destination element and the medium which previously occupied the first destination element is moved to the second destination element. The second destination element must be different element as the source element.

The transport element address specifies the medium transport element that is to be used in executing this command. The default medium transport element address of zero may be used. If the address specified has not been assigned or has been assigned to an element other than a medium transport element, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

The source address and the second destination address may represent a storage element. If the address specified has not been assigned to a specific element of the medium changer, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

The second destination address must be different from the source address. If  
the second destination address is same as the source address, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

The first destination address may represent a data transfer element. If  
the address specified has not been assigned to a specific element of the medium changer, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

If this command is received and the source element is empty or the first destination element is empty or the second destination element is full, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

If this command is received and the specified medium transport element is full the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

### 3.2 INITIALIZE ELEMENT STATUS

**07H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (07h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

(2) Function

This command will cause the Medium Changer to check all elements for medium and other status relevant to that element.

This command shall be issued when the medium transport element is empty. If this command is issued when the medium transport element is full, the target will return the CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

This command shall be issued when a rack of the changer is changed.

Receiving this command, the changer mechanism controller starts scanning all storage element.

Occasionally, the changer mechanism controller finds the condition that a medium exists on a data transfer element and the source storage element of that medium is filled by another medium. In this case, the hanger mechanism controller moves the medium which is on the storage element to an import export element and aborts the command. Then the target will return the CHECK CONDITION status and set the sense key to ABORTED COMMAND.

It takes about 45(all storage elements are empty) ~ 65(all storage elements are full) minutes to execute this command completely.

### 3.3 INQUIRY

12H

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (12h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Allocation Length							
5	Reserved							

(2) Function

This command requests that information regarding parameters of the target and its attached peripheral device be sent the initiator.

INQUIRY Data format is shown in Table 3-2.

Table 3-2 INQUIRY Data format

Byte	Inquiry data	Descriptions
0	08h	Medium Changer device
1	80h	Removable Medium Bit = 1
2	02h	The device complies to SCSI -2
3	02h	INQUIRY Data format complies to SCSI -2
4	2Ah	Additional Length (42 bytes)
5	00h	Reserved
6	00h	Reserved
7	00h	Any Functions are not supported
8	50h ('P')	Vendor ID byte ( ASCII Code )
9	49h ('I')	Vendor ID byte ( ASCII Code )
10	4Fh ('O')	Vendor ID byte ( ASCII Code )
11	4Eh ('N')	Vendor ID byte ( ASCII Code )
12	45h ('E')	Vendor ID byte ( ASCII Code )
13	45h ('E')	Vendor ID byte ( ASCII Code )
14	52h ('R')	Vendor ID byte ( ASCII Code )
15	20h (' ')	Vendor ID byte ( ASCII Code )
16	43h ('C')	Product ID byte ( ASCII Code )
17	48h ('H')	Product ID byte ( ASCII Code )
18	41h ('A')	Product ID byte ( ASCII Code )
19	4Eh ('N')	Product ID byte ( ASCII Code )
20	47h ('G')	Product ID byte ( ASCII Code )
21	52h ('R')	Product ID byte ( ASCII Code )
22	20h (' ')	Product ID byte ( ASCII Code )
23	44h ('D')	Product ID byte ( ASCII Code )
24	52h ('R')	Product ID bytes ( ASCII Code )
25	4Dh ('M')	Product ID bytes ( ASCII Code )
26	2Dh ('-')	Product ID bytes ( ASCII Code )
27	35h ('5')	Product ID byte ( ASCII Code )
28	30h ('0')	Product ID byte ( ASCII Code )
29	30h ('0')	Product ID bytes ( ASCII Code )
30	34h ('4')	Product ID bytes ( ASCII Code )
31	58h ('X')	Product ID bytes ( ASCII Code )
32--35	'XXXX'	Revision Level byte ( ASCII Code )
36--46	' YYYY/MM/DD'	Date (ASCII Code)

### 3.4 MODE SENSE

**1AH**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (1Ah)							
1	Logical Unit Number			Reserved	DBD	Reserved		
2	PC		Page Code					
3	Reserved							
4	Allocation Length							
5	Reserved							

(2) Function

This command provides a means for a target to report parameters to the initiator.

A disable block descriptors (DBD) bit is ignored. The target will not any block descriptors regardless of the value of this bit.

The page control (PC) field defines the type of parameter values to be returned. The page control field is defined as follows.

[bit 7, 6 = 0, 0] : Report Current Values

[bit 7, 6 = 0, 1]: Report Changeable Values

There is no changeable parameter with this medium changer device.

[bit 7, 6 = 1, 0] : Report Default Values

[bit 7, 6 = 1, 1] : Report Saved Values

The saved values are not implemented.

The target reports the default values for the request.

The Page Code shall be set as one of the followings.

- 1Dh Element Address Assignment Page.
- 1Eh Transport Geometry Parameters Page.
- 1Fh Device Capabilities Page.
- 3Fh Return all Pages to the initiator.

(3) Mode Sense Data

Table 3-3 Mode Sense Data

Byte\Bit	7	6	5	4	3	2	1	0
0	Mode Data Length (n-1)							
1	Reserved							
2	Reserved							
3	Block Descriptor Length (00h)							
4 to n	Page Descriptor(s)							

(4) Device Capabilities Page

Byte\Bit	7	6	5	4	3	2	1	0
0	PS	Reserved	Page Code (1Fh)					
1	Parameter Length (0Eh)							
2	Reserve				StorDT	StorI/E	StorST	StorMT
3	Reserved							
4	Reserved				MT->DT	MT->I/E	MT->ST	MT->MT
5	Reserved				ST->DT	ST->I/E	ST->ST	ST->MT
6	Reserved				I/E->DT	I/E->I/E	I/E->ST	I/E->MT
7	Reserved				DT->DT	DT->I/E	DT->ST	DT->MT
8	Reserved							
9	Reserved							
10	Reserved							
11	Reserved							
12	Reserved				MT<>DT	MT<>I/E	MT<>ST	MT<>MT
13	Reserved				ST<>DT	ST<>I/E	ST<>ST	ST<>MT
14	Reserved				I/E<>DT	I/E<>I/E	I/E<>ST	I/E<>MT
15	Reserved				DT<>DT	DT<>I/E	DT<>ST	DT<>MT

The parameters savable (PS) bit is zero.

The device capabilities page defines characteristics of the element types on this CD-ROM changer. This information may be employed by the initiator to determine functions permitted by the MOVE MEDIUM and EXCHANGE MEDIUM commands.



In the field names on this page, the following element type abbreviations are used:

- MT a medium transport element,
- ST a storage element,
- I/E an import export element, and
- DT a data transfer element.

In the descriptions, XX and YY are any of the element type abbreviations.

A StorXX bit value of one indicated that the defined elements of type XX may provide independent storage for a unit of media. A value of zero indicates that elements of type XX provide virtual sources or destinations, that the location of the unit of media is provided by an element of some other type.

An XX->YY bit value of one indicates that the medium changer device supports MOVE MEDIUM commands where the source is element type XX and the destination is element type YY. An XX->YY bit value of zero indicates that these MOVE MEDIUM commands will be rejected with ILLEGAL REQUEST.

An XX<>YY bit value of one indicates that the medium changer device supports EXCHANGE MEDIUM commands where the source is element type XX, the first destination is element type YY, and the second destination is the same type as the source element type. These bits indicate the support for the possible types of simple exchange operations. An XX<>YY bit value of zero indicates that these EXCHANGE MEDIUM commands will be rejected with ILLEGAL REQUEST.

The returned values of this page is as follows:

Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Values	1Fh	0Eh	0Bh	00h	0Fh	0Fh	0Fh	0Fh	00h	00h	00h	00h	00h	00h	00h	00h

(5) Element Address Assignment Page

Byte\Bit	7	6	5	4	3	2	1	0
0	PS	Reserved	Page Code (1Dh)					
1	Parameter Length (12h)							
2	(MSB)	First Medium Transport Element Address						
3	First Medium Transport Element Address							(LSB)
4	(MSB)	Number of Medium Transport Elements						
5	Number of Medium Transport Elements							(LSB)
6	(MSB)	First Storage Element Address						
7	First Storage Element Address							(LSB)
8	(MSB)	Number of Storage Elements						
9	Number of Storage Elements							(LSB)
10	(MSB)	First Import Export Element Address						
11	First Import Export Element Address							(LSB)
12	(MSB)	Number of Import Export Elements						
13	Number of Import Export Elements							(LSB)
14	(MSB)	First Data Transfer Element Address						
15	First Data Transfer Element Address							(LSB)
16	(MSB)	Number of Data Transfer Elements						
17	Number of Data Transfer Elements							(LSB)
18	Reserved							
19	Reserved							

The parameters savable (PS) bit is zero.

The returned values of this page is as follows:

Byte 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
 Values 1Dh, 12h, 20h, 00h, 00h, 01h, 00h, 01h, 01h, F4h, 30h, 00h, 00h, 01h, 40h, 00h

Byte 16 17 18 19  
 Values 00h, 04h, 00h, 00h

(6) Transport Geometry Parameters Page

Byte\Bit	7	6	5	4	3	2	1	0
0	PS	Reserved	Page Code (1Eh)					
1	Parameter Length (02h)							
2	Reserved						Rotate	
3	Member Number in Transport Element Set							

The parameters savable (PS) bit is zero.

The returned values of this page is as follows:

Byte    0    1    2    3  
 Values 1Eh, 02h, 00h, 00h

### 3.5 MOVE MEDIUM

**A5H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (A5h)							
1	Logical Unit Number			Reserved				
2	(MSB) Transport Element Address							
3	Transport Element Address (LSB)							
4	(MSB) Source Address							
5	Source Address (LSB)							
6	(MSB) Destination Address							
7	Destination Address (LSB)							
8	Reserved							
9	Reserved							
10	Reserved							
11	Reserved							

(2) Function

This command requests that the target move a unit of media from a source element to a destination element.

The source address specifies the location that the medium is taken from, and the destination address specifies the location that the medium is moved to.

If this command is received and the source element is empty or the destination element (if different from the source element) is full, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

The transport element address specifies the medium transport element that is to be used in executing this command. The default medium transport element address of zero may be used. If the address specified has not been assigned or has been assigned to an element other than a medium transport element, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

The source address and the destination address may represent a storage element, an import export element, a data transfer element, or a medium transport element. If the address specified has not been assigned to a specific element of the medium changer, the target will return CHECK CONDITION status and set the sense key to ILLEGAL REQUEST.

When this command is issued with the source address field set to an import export element, the medium transport element shall be positioned in front of the import export element in advance.

### 3.6 POSITION TO ELEMENT

**2BH**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (2Bh)							
1	Logical Unit Number			Reserved				
2	(MSB) Transport Element Address							
3	Transport Element Address							(LSB)
4	(MSB) Destination Address							
5	Destination Address							(LSB)
6	Reserved							
7	Reserved							
8	Reserved							
9	Reserved							

(2) Function

This command will position the transport element specified in front of the destination element specified.  
 This command will the destination address set to an import export element should be issued before stalling a disc using the import export element.

### 3.7 READ ELEMENT STATUS

**B8H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (B8h)							
1	Logical Unit Number			0	Element Type Code			
2	(MSB) Starting Element Address							
3	Starting Element Address (LSB)							
4	(MSB) Number of Elements							
5	Number of Elements (LSB)							
6	Reserved							
7	(MSB) Allocation Length							
8	Allocation Length							
9	Allocation Length (LSB)							
10	Reserved							
11	Reserved							

(2) Function

This command requests the target report the status of its internal elements to the initiator.

The element type code field specifies the particular element type(s) selected for reporting by this command. A value of zero specifies that status for all element types will be reported. The element type codes are defined in Table 3-4.

Table 3-4

Code	Description
0h	All element types reported
1h	Medium Transport Element
2h	Storage Element
3h	Import Export Element
4h	Data Transfer Element
5h - Fh	Reserved

The starting element address specifies the minimum element address to report. Only elements with an element type code permitted by the element type code specification and an element address greater than or equal to the starting element address will be reported. Element descriptor blocks are not generated for undefined element address.

The number of elements specifies the maximum number of element descriptors to be created by the target for this command. The value specified by this field is not the range of element address to be considered for reporting but rather the number of defined elements to report. If the allocation length is not sufficient to transfer all the element descriptors, the target will transfer only requested byte of data and this will not be considered an error.

(3) Element Status Data

The data returned by this command will be as shown in following tables. Element status data consists of an eight-byte header, Table 3-5 followed by one or more element status pages.

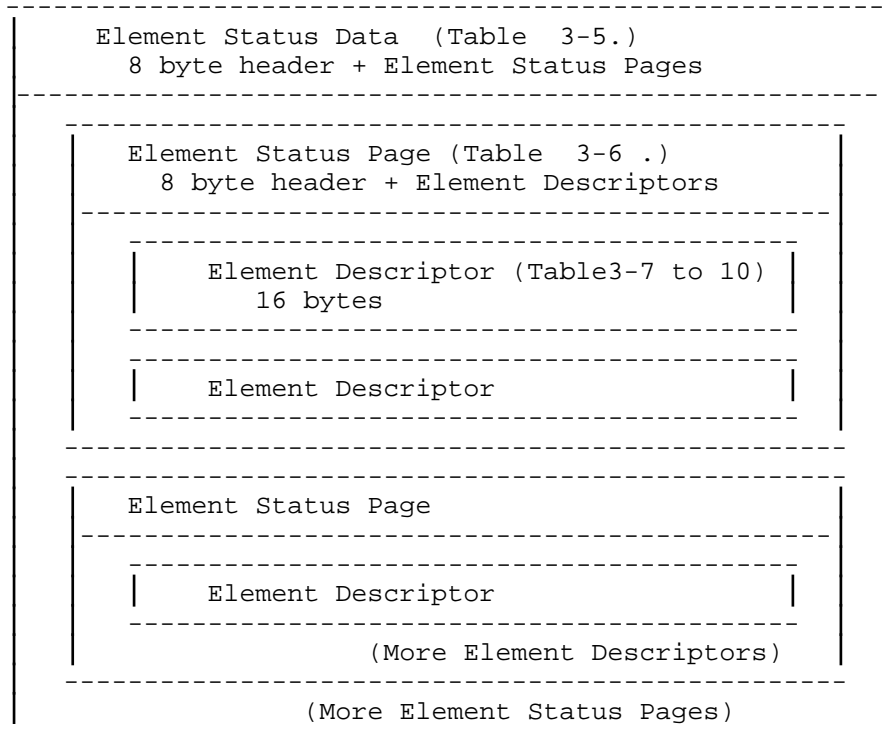


Figure 3-1

Table 3-5

Byte\Bit	7	6	5	4	3	2	1	0	
0	(MSB)	First Element Address Reported							
1		First Element Address Reported						(LSB)	
2	(MSB)	Number of Elements Reported							
3		Number of Elements Reported						(LSB)	
4		Reserved							
5	(MSB)	Byte Count of Report Available (all pages, x-7)							
6		Byte Count of Report Available (all pages, x-7)							
7		Byte Count of Report Available (all pages, x-7)						(LSB)	
8 to		Element Status Page(s)							
x		Element Status Page(s)							

The first element address reported field indicates the element address of the element with the smallest element address found to meet the CDB request.

The number of elements field indicates the number of elements meeting the request in the command descriptor block. The status for these elements is returned if sufficient allocation length was specified.

The byte count of report available field indicates the number of bytes of element status page data available for all elements meeting the request in the command descriptor block.

(4) Element Status Page

Table 3-6

Byte\Bit	7	6	5	4	3	2	1	0	
0	Element Type Code								
1	Reserved								
2	(MSB)	Element Descriptor Length							
3	Element Descriptor Length							(LSB)	
4	Reserved								
5	(MSB)	Byte Count of Descriptor Data Available (this page,y-7)							
6	Byte Count of Descriptor Data Available (this page,y-7)								
7	Byte Count of Descriptor Data Available (this page,y-7)							(LSB)	
8 to	Element Descriptor (s)								
y	Element Descriptor (s)								

The element status page is defined in Table 3-6. Each element status page includes an eight-byte header followed by one or more element descriptor blocks. The page header includes the element type code, the length of each descriptor block and the number of bytes of element descriptor information which follow the header for this element type.

The element type code field indicates the element type reported by this page.

The element descriptor length field indicates the number of bytes in each element descriptor.

The byte count of descriptor data available field indicates the number of bytes of element descriptor data available for elements of this element type meeting the request in the CDB.

Each element descriptor includes the element address, status flags and may contain sense code information as well as other information depending on the element type.



(5) Medium Transport Element Descriptor

Table 3-7

Byte\Bit	7	6	5	4	3	2	1	0
0	(MSB) Element Address							
1	Element Address							(LSB)
2	Reserved					Except	0	Full
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7	Reserved							
8	Reserved							
9	SValid	Reserved						
10	(MSB) Source Storage Element Address							
11	Source storage Element Address							(LSB)
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							

The element address field gives the address of the medium changer element whose status is reported by this element descriptor block.

An exception (Except) bit of one indicates the element is in an abnormal state. An exception bit of zero indicates the element is in a normal state. If this bit is one, information on the abnormal state will be available in the additional sense code and additional sense code qualifier bytes. When this bit is set to one, the connived codes shown in Table 3-11 are provided for the additional sense code and the additional sense code qualifier fields.

A full bit value of one indicates that the element contains a unit of media. A value of zero indicates that the element does not contain a unit of media.

A source valid (SValid) bit value of one indicates that the source storage element address field is valid. A value of zero indicates that the values in these fields are not valid.

The source storage element address field provides the address of the last storage element this unit of media was moved from. This field is valid only if the SValid bit is one.

(6) Storage Element Descriptor

Table 3-8

Byte\Bit	7	6	5	4	3	2	1	0
0	(MSB) Element Address							
1	Element Address (LSB)							
2	Reserved			Access	Except	0	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7	Reserved							
8	Reserved							
9	SValid	Reserved						
10	(MSB) Source Storage Element Address							
11	Source Storage Element Address (LSB)							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							

The element address field gives the address of the medium changer element whose status is reported by this element descriptor block.

An access bit of one indicates access to the element by a medium transport element is allowed. An access bit of zero indicates access to the element by a medium transport element is denied.

An exception (Except) bit of one indicates the element is in an abnormal state. An exception bit of zero indicates the element is in a normal state. If this bit is one, information on the abnormal state will be available in the additional sense code and additional sense code qualifier bytes.

When this bit is set to one, the connived codes shown in Table3-11 are provided for the additional sense code and the additional sense code qualifier fields.

A full bit value of one indicates that the element contains a unit of media. A value of zero indicates that the element does not contain a unit of media.

A source valid (SValid) bit value of one indicates that the source storage element address field is valid. A value of zero indicates that the values in these fields are not valid. The SValid bit is always set to zero in this descriptor.

(7) Import Export Element Descriptor

Table 3-9

Byte\Bit	7	6	5	4	3	2	1	0
0	(MSB) Element Address							
1	Element Address (LSB)							
2	Reserved	InEnab	ExEnab	Access	Except	ImpExp	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved							
7	SCSI Bus Address							
8	Reserved							
9	SValid	Reserved						
10	(MSB) Source Storage Element Address							
11	Source Storage Element Address (LSB)							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							

The element address field gives the address of the medium changer element whose status is reported by this element descriptor block.

An import enable (InEnab) bit of one indicates that the red shutter of the medium transport table is opened, and so that this element supports import action. An InEnab bit of zero indicates that the red shutter of the medium transport table is closed, and so that this element does not support import action.

An export enable (ExEnab) bit of one indicates that the red shutter of the medium transport table is opened, and so that this element supports export action. An InEnab bit of zero indicates that the red shutter of the medium transport table is closed, and so that this element does not support export action.

An access bit of one indicates access to the element by a medium transport element is allowed. An access bit of zero indicates access to the element by a medium transport element is denied.

An exception (Except) bit of one indicates the element is in an abnormal state. An exception bit of zero indicates the element is in a normal state. If this bit is one, information on the abnormal state will be available in the additional sense code and additional sense code qualifier bytes. When this bit is set to one, the combined codes shown in Table 3-11 are provided for the additional sense code and the additional sense code qualifier fields.

The ImpExp bit and the full bit are always set to zero in this type of descriptor.

A source valid (SValid) bit value of one indicates that the source storage element address field is valid. A value of zero indicates that the values in these fields are not valid. The SValid bit is always set to zero in this descriptor.

(8) Data Transfer Element Descriptor

Table 3-10

Byte\Bit	7	6	5	4	3	2	1	0
0	(MSB) Element Address							
1	Element Address (LSB)							
2	Reserved			Access	Except	0	Full	
3	Reserved							
4	Additional Sense Code							
5	Additional Sense Code Qualifier							
6	Reserved		ID Valid	LU Valid	0	Logical Unit Number		
7	SCSI Bus Address							
8	Reserved							
9	SValid	Reserved						
10	(MSB) Source Storage Element Address							
11	Source storage Element Address (LSB)							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							

The element address field gives the address of the medium changer element whose status is reported by this element descriptor block.

An access bit of one indicates access to the element by a medium transport element is allowed. An access bit of zero indicates access to the element by a medium transport element is denied.

An exception (Except) bit of one indicates the element is in an abnormal state. An exception bit of zero indicates the element is in a normal state. If this bit is one, information on the abnormal state will be available in the additional sense code and additional sense code qualifier bytes. When this bit is set to one, the combined codes shown in Table 3-11 are provided for the additional sense code and the additional sense code qualifier fields.

A full bit value of one indicates that the element contains a unit of media. A value of zero indicates that the element does not contain a unit of media.

An ID Valid bit value of one indicates that the SCSI bus address field contains valid information. An LU Valid bit value of one indicates that the logical unit number field contains valid information. The SCSI bus Address field, if valid, provides the SCSI Address (binary representation) of the CD-ROM drive served by the medium changer at this element address. The logical unit number field, if valid, provides the logical unit number within the SCSI bus device of the CD-ROM drive served by the medium changer at this element address. ID Valid, LU Valid, SCSI Bus Address, and Logical Unit Number are established by hardware setting.

A source valid (SValid) bit value of one indicates that the source storage element address field is valid. A value of zero indicates that the values in these fields are not valid.

(9) Additional Sense Code and Additional Sense Code Qualifier in Element Descriptor.

Table 3-11 Additional Sense Codes

ASC	ASCQ	Description	Element Type Code
04	02	LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED	2
04	03	LOGICAL UNIT NOT READY, MANUAL INTERVENTION REQUIRED	2,4
28	01	IMPORT OR EXPORT ELEMENT ACCESSED	1
3A	00	MEDIUM NOT PRESENT	2,4

### 3.8 RELEASE

17H

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (17h)							
1	Logical Unit Number			3rdPty	Third Party Device ID			Element
2	Reservation Identification							
3	Reserved							
4	Reserved							
5	Reserved							

(2) Function

This command is used to release previously reserved units or previously reserved elements within units. It is not an error for an initiator to attempt to release a reservation that is not currently active. In this case, the target will return GOOD status without altering any other reservation.

(3) Logical Unit Release

If the element bit is zero, this command will cause the target to terminate all non-third party unit and element reservations that are active from the initiator to the specified logical unit.

(4) Element Release

If the element bit is one, this command will cause any reservation from the requesting initiator with a matching reservation identification to be terminated. Other reservations from the requesting initiator will remain in effect.

(5) Third Party Release

If the third-party (3rdpty) bit is zero, the third-party release option is not requested. If the 3rdpty bit is one, the target will release the specified unit or elements, but only if the reservation was made using the third-party reservation option by the initiator that is requesting the release for the same SCSI device as specified in the third-party device ID field.

### 3.9 REQUEST SENSE

**03H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (03h)							
1	Logical Unit Number			Reserved				
3	Reserved							
3	Reserved							
4	Allocation Length							
5	Reserved							

(2) Function

This command requests that the target transfer the sense data to the initiator. The sense data is valid for a CHECK CONDITION status returned on the prior command. This sense data is preserved by the target for the initiator until retrieved by the REQUEST SENSE command or until the receipt of any other command for the same logical unit from the initiator that issued the command resulting in the CHECK CONDITION status.

The sense data format is shown in Table 3-12.

Table 3-12 Sense Data Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Valid	Error Code (70h)						
1	Segment Number (0)							
2	Reserved				Sense Key			
3	(MSB) Information Byte							
4	Information Byte							
5	Information Byte							
6	Information Byte							(LSB)
7	Additional Sense Length (0Ah)							
8	Reserved							
9	Reserved							
10	Reserved							
11	Reserved							
12	Additional Sense Code							
13	Additional Sense Code Qualifier							
14	Reserved							
15	Reserved							
16	Reserved							
17	Reserved							

- Valid : If the valid bit is one, the information bytes contain valid information.
- Sense Key : Described in Table 3-13.
- Additional Sense Code : Described in Table 3-14
- Additional Sense Code Qualifier: Described in Table 3-14
- Information Byte : This field have not been defined as yet.



Table 3-13 Sense Key

Sense Key	Description
0h	NO SENSE. Indicates that there is no specific sense key information to be reported for the designated logical unit. This would be the case for a successful command.
2h	NOT READY
4h	HARDWARE ERROR.
5h	ILLEGAL REQUEST.
6h	UNIT ATTENTION.
Bh	ABORTED COMMAND

Table 3-14 Additional Sense Codes (in REQUEST SENSE data)

ASC	ASCQ	Description	Sense Keys	
40h	NNh	DIAGNOSTIC FAILURE ON COMPONENT NN (NN has not been defined as yet.)	4h	HARDWARE ERROR
53h	81h	DOOR IS OPENED	Bh	ABORTED COMMAND
53h	82h	DOOR OPEN	2h	NOT READY
21h	80h	ILLEGAL EXCHANGE OPERATION	5h	ILLEGAL REQUEST
28h	01h	IMPORT OR EXPORT ELEMENT ACCESSED	6h	UNIT ATTENTION
49h	00h	INAPPROPRIATE MESSAGE	4h	HARDWARE ERROR
48h	00h	INITIATOR DETECTED ERROR MESSAGE RECEIVED	Bh	ABORTED COMMAND
20h	00h	INVALID COMMAND OPERATION CODE	5h	ILLEGAL REQUEST
21h	01h	INVALID ELEMENT ADDRESS	5h	ILLEGAL REQUEST
24h	00h	INVALID FIELD IN CDB	5h	ILLEGAL REQUEST
26h	00h	INVALID FIELD IN PARAMETER LIST	5h	ILLEGAL REQUEST
53h	85h	INVALID SOURCE STORAGE ELEMENT ADDRESS	Bh	ABORTED COMMAND
04h	02h	LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED	2h	NOT READY
04h	03h	LOGICAL UNIT NOT READY MANUAL INTERVENTION REQUIRED	2h	NOT READY
25h	00h	LOGICAL UNIT NOT SUPPORTED	5h	ILLEGAL REQUEST
15h	01h	MECHANICAL POSITIONING ERROR	4h	HARDWARE ERROR
3Bh	0Dh	MEDIUM DESTINATION ELEMENT FULL	5h	ILLEGAL REQUEST
53h	80h	MEDIUM RELEASE IS IMPOSSIBLE	2h	NOT READY
3Bh	0Eh	MEDIUM SOURCE ELEMENT EMPTY	5h	ILLEGAL REQUEST
3Bh	80h	MEDIUM TRANSPORT ELEMENT FULL	5h	ILLEGAL REQUEST
00h	00h	NO ADDITIONAL SENSE INFORMATION	0h	NO SENSE
29h	00h	POWER ON, RESET, OR BUS DEVICE RESET OCCURRED	6h	UNIT ATTENTION
53h	83h	RACK MOUNTED INCORRECTLY	2h	NOT READY
47h	00h	SCSI PARITY ERROR	Bh	ABORTED COMMAND
53h	84H	SOURCE STORAGE ELEMENT OVERLAP	Bh	ABORTED COMMAND

Other codes have not been defined as yet.

### 3.10 RESERVE

16H

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (16h)							
1	Logical Unit Number			3rdPty	Third Party Device ID			Element
2	Reservation Identification							
3	Reserved							
4	Reserved							
5	Reserved							

(2) Function

This command is used to reserve units or elements within units for the use of the initiator. The third-party reservation allows units or elements to be reserved for another specified SCSI device.

(3) Logical Unit Reservation

If the element bit is zero, this command will request that the entire unit be reserved for another valid RESERVE command from the initiator that made the reservation is superseded by another valid RESERVE command from the same initiator that made the reservation or until released by a RELEASE command from the same initiator that made reservation, by a BUS DEVICE RESET message from any initiator, by a hard RESET condition, or by a power off/on cycle. A unit reservation will not be granted if the unit or any element is reserved by another initiator. It will be permissible for an initiator to reserve a unit that is currently reserved by that initiator. If the element bit is zero, the reservation identification and the element list length will be ignored.

If the unit, or any element within the unit is reserved for another initiator, the target will respond by returning RESERVATION CONFLICT status.

If, after honoring the reservation, any other initiator attempts to perform any command on the reserved unit other than an INQUIRY, REQUEST SENSE, ALLOW MEDIUM REMOVAL, RESERVE, or a RELEASE command, the command will be rejected with RESERVATION CONFLICT status.

(4) Element Reservation

The reservation identification provides a means for an initiator to identify each element reservation. The reservation identification is used in the RELEASE command to specify which reservation is to be released. It is also used in superseding RESERVE command to specify which reservation is to be superseded.

Only 00h is supported as the reservation identification.

If the element bit is one, the target shall process the reservation request as follows:

(i) The element list shall be checked for valid element addresses. If any element address is invalid for this unit, the command will be terminated with CHECK CONDITION status and the sense key will be set to ILLEGAL REQUEST. The element list will be checked for invalid element overlaps with other element descriptors in the element list and if invalid overlaps are found, the command will be terminated with CHECK CONDITION status and the sense key will be set to ILLEGAL REQUEST.

(ii) If the requested reservation does not conflict with any active or previously requested reservation, the elements specified will be reserved until superseded by another valid RESERVE command from the initiator that made the reservation or until released by a RELEASE command from the same initiator, by a BUS DEVICE RESET message from any initiator, or by a hard RESET condition. If either of the last two conditions occur, the next command from each initiator will be terminated with CHECK CONDITION status and the sense key will be set to UNIT ATTENTION.

(iii) If the reservation request conflicts with a reservation already active the target will return RESERVATION CONFLICT status.

Table 3-15

Byte\Bit	7	6	5	4	3	2	1	0	
0	Reserved								
1	Reserved								
2	(MSB)	Number of Elements							
3		Number of Elements						(LSB)	
4	(MSB)	Element Address							
5		Element Address						(LSB)	

The size of the element list will be defined by the element list length parameter. The element list will consist of zero or more descriptors as shown in Table 3-15. Each element list descriptor defines a series of elements beginning at the specified element address for the specified number of elements. If the number of elements is zero, the element list will begin at the specified element address and continue through the last element address on the unit.

If an initiator issues a command to an element that has been reserved by a different initiator, the command will not be performed and the command will be terminated with a RESERVATION CONFLICT status. If a reservation conflict precludes any part of the command, none of the command will be performed.

(5) Third Party Reservation

If the third-party (3rdpty) bit is zero, the third-party reservation option is not requested. If the 3rdpty bit is one, the RESERVE command will reserve the specified unit or elements for the SCSI device specified in the third-party device ID field. The target will preserve the reservation until it is superseded by another valid RESERVE command from the initiator that made the reservation or until it is released by the same initiator, by a BUS DEVICE RESET message from any initiator, or a hard RESET condition. The target will ignore any attempt to release the reservation made by any other initiator.

(6) Superseding Reservations

An initiator that holds a current reservation may modify that reservation by issuing another RESERVE command to the same unit and, if the element bit is one, using the same reservation identification. The superseding RESERVE command will release the previous reservation in place when the new reservation request is granted. The current reservation will not be modified if the new reservation request cannot be granted. If the superseding reservation cannot be granted because of conflicts with a previous active reservation (other than the reservation being superseded), the target will return RESERVATION CONFLICT status.

### 3.11 REZERO UNIT

01H

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (01h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

(2) Function

This command requests that the target set the changer mechanism to a state listed below.

All media on the medium transport element and on the data transfer elements are returned to their source storage elements. A source storage element means the last storage element which the medium moved from. After that operation, the medium transport mechanism moves to a safety

This command should be issued before the changer is turned off, or change a magazine.

If the source storage element where a medium should be return is filled by another medium, the changer mechanism controller moves the medium which the controller intended to return, to an import export element and aborts the command. Then the target will return the CHECK CONDITION status and set the sense key to ABORTED COMMAND.

If the source storage element address of a medium to return is not valid, the changer mechanism controller moves the medium to an import export element and aborts the command. Then the target will return the CHECK CONDITION status and set the sense key to ABORTED COMMAND.

### 3.12 SEND DIAGNOSTIC

**1DH**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (1Dh)							
1	Logical Unit Number			Reserved		ST (1)	0	0
2	Reserved							
3	Parameter List Length =00h (MSB)							
4	Parameter List Length =00h (LSB)							
5	Reserved					Flag	Link	

- Operation Code : 1Dh
- SelfTest (S T) : This self test bit must be set to one.
- Parameter List : Length: Shall be set to zero and no data shall be transferred.

(2) Function

This command is valid only when the Self Test bit in the CDB is set to one; Completes the self test of the changer controller. If the self test fails, a CHECK CONDITION status is returned and the sense key is set to HARDWARE ERROR. Thereafter, no command other than INQUIRY or REQUEST SENSE will be valid.

### 3.13 TEST UNIT READY

**00H**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (00h)							
1	Logical Unit Number			Reserved				
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							

(2) Function

This command provides a means to check if the logical unit is ready.

### 3.14 WRITE BUFFER

**3BH**

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0	
0	Operation Code (3Bh)								
1	Logical Unit Number			Reserved		Mode			
2	Buffer ID								
3	(MSB)	Buffer Offset							
4	Buffer Offset								
5	Buffer Offset						(LSB)		
6	(MSB)	Parameter List Length							
7	Parameter List Length								
8	Parameter List Length						(LSB)		
9	Reserved								

(2) Function

The number of data specified as the transfer length are transferred during the DATA OUT phase and are stored the specified buffer beginning at the buffer offset.

The mode field and the buffer ID are valid in following combination.

MODE	Buffer ID	Description	Buffer Offset	Parameter List Length
010b	00h~04h	Disc Management Map	0(Fixed)	Dh (Fixed)
101b	0Fh	Download Microcode and Save	0(fixed)	20000h (fixed)



[ Buffer ID=00h~04h]

The disc management map will be transferred and be saved in a non-volatile memory. The format of the map is show in Table3-16. This operation will serve for INITIALIZE ELEMENT STATUS command, but must be issued with utmost care. Because the wrong data may brake a disc.

Table 3-16 (Buffer ID 0~4 data format )

Byte\Bit	7	6	5	4	3	2	1	0
0	#1	#2	#3	#4	#5	#6	#7	#8
1	#9	#10	#11	#12	#13	#14	#15	#16
~								
11	#89	#90	#91	#92	#93	#94	#95	#96
12	#97	#98	#99	#100	Void			

A Bufer ID correspond with a magazine. Because each element has one bit of disc existence information, each buffer has one hundred bits of informations.

The informations are transferred with a format shown in Table 3-16.

Each number discribed in the table means the disc stocker number in the magazine.

The transferred data length is fixed to thirteen bytes, so that the four bit of void field cannot be changed.

The element address is calculated by following expression.

$$EA = M \times 100 + D$$

EA : Element Address  
M : Buffer ID  
D : Disc Stocker Number internal Magazine

[ Buffer ID=0Fh ] Update Firmware

The firmware of a changer mechanism controller will be transferred and be saved in a flash memory. No attention assertion will be accepted after starting data transfer.

**If one of the following illegal conditions occur unfortunately,it is necessary to replace a memory chip.**

If the data transfer is completed successfully the target will return the GOOD status,and then the initiator shall make SCSI reset condition. After that the changer mechanism controller starts up in new version.

If the data transfer is failed,the target will return the CHECK CONDITION status,but any action will not be guaranteed after that.

If the wrong micro code which is not provided by pioneer is written, the changer will not operates after the reset.

While transferring the data,if power goes down,any action will not be guaranteed after that.

### 3.15 READ BUFFER

3CH

(1) Command Format

Byte\Bit	7	6	5	4	3	2	1	0
0	Operation Code (3Ch)							
1	Logical Unit Number			Reserved		Mode		
2	Buffer ID							
3	(MSB)	Buffer Offset						
4	Buffer Offset							
5	Buffer Offset							(LSB)
6	(MSB)	Parameter List Length						
7	Parameter List Length							
8	Parameter List Length							(LSB)
9	Reserved							

(2) Function

The number of data specified as the transfer length are restored from the specified buffer beginning at the buffer offset and are transferred during DATA IN Phase.

The mode field and the buffer ID are valid in following combination.

MODE	BUffer ID	Description	Buffer Offset	Allocation Length
010b	00h~04h	Disc Management Map	0(Fixed)	Dh(fixed)
010b	0Fh	Extract Microcode	0(fixed)20000h ( fixed )	

[Buffer ID = 00h~04h]

The disc management map will be transferred to the initiator . The format of the map is shown in table 3-17. This operation will used in conjunction with the WRITE BUFFER command.

Table 3-17 (Buffer ID 0~4 data format )

Byte\Bit	7	6	5	4	3	2	1	0
0	#1	#2	#3	#4	#5	#6	#7	#8
1	#9	#10	#11	#12	#13	#14	#15	#16
~								
11	#89	#90	#91	#92	#93	#94	#95	#96
12	#97	#98	#99	#100	Void			

A Buffer ID correspond with a magazine.

Because each element has one bit of disc existence information, each buffer has one hundred bits of informations.

The informations are transferred with a format shown in Table 3-17.

Each number discribed in the table means the disc stocker number in the magazine.

The transferred data length is fixed to thirteen bytes, so that the four bit of void field cannot be changed.  
The element address is calculated by following expression.

$$EA = M \times 100 + D$$

EA : Element Address  
M : Buffer ID  
D : Disc Stocker Number internal Magazine

[Buffer ID = 0Fh]

The firmware of a changer mechanism controller will be transferred to the initiator.  
This operation will be used in conjunction with the WRITE BUFFER command.

## 4 STATUS

A status byte is sent from the target to the initiator during the STATUS phase at the completion of each command unless the command is cleared by an ABORT message, by a BUS DEVICE RESET message, by a hard reset condition, or an unexpected disconnect. The status codes are specified in Table 4-1

Table 4-1

Status Code	Descriptions
00h	GOOD
02h	CHECK CONDITION
08h	BUSY
18h	RESERVATION CONFLICT

### GOOD

This status indicates that the target has successfully completed the command.

### •CHECK CONDITION

This status indicates that a contingent allegiance condition has occurred.

### •BUSY

This status indicates that the target is busy. This status will be returned whenever the changer mechanism controller is unable to accept a command from an initiator except for reservation conflict. The recommended initiator recovery action is to issue the command again at a later time.

### •RESERVATION CONFLICT

This status will be returned whenever an initiator attempts to access a logical unit or element which is reserved with a conflicting reservation type for another SCSI device (see the RESERVE and RELEASE commands).

## 5 Various Conditions

### 5.1 Contingent Allegiance Condition

The contingent allegiance condition will exist following the return of CHECK CONDITION status or an unexpected disconnect. The contingent allegiance condition will be preserved for the I\_T\_L nexus until it is cleared. The contingent allegiance condition will be cleared upon the generation of a hard reset condition, or by an ABORT message, a BUS DEVICE RESET message, or any subsequent command for the I\_T\_L nexus. While the contingent allegiance condition exists the changer mechanism controller will preserve the sense data for the initiator.

### 5.2 Unit Attention Condition

The changer mechanism controller will generate a unit attention condition for each initiator whenever one of the following events occurs:

- (1) The changer mechanism controller has been reset by a BUS DEVICE RESET message, a hard reset condition, or by a power-on reset. In this case, additional sense code is set to POWER ON, RESET, OR BUS DEVICE RESET OCCURRED (ASC:29h, ASCQ:00h).
- (2) The door of the changer has closed. It indicates that the media in the changer may have been taken out or the media may have been newly inserted by an operator. In this case, additional sense code is set to IMPORT OR EXPORT ELEMENT ACCESSED (ASC:28h, ASCQ:01h).

The unit attention condition will be preserved for each initiator until that initiator clears the condition as described in the following paragraphs.

If an INQUIRY command is received from an initiator to the changer mechanism controller with a pending unit attention condition (before the target generates the contingent allegiance condition), the controller will perform the INQUIRY command and will not clear the unit attention condition. If the INQUIRY command is received after the controller has generated the contingent allegiance condition for a pending unit attention condition, then the unit attention on the controller will be cleared, and the controller will perform the INQUIRY command.

If any other command is received after the controller has generated the contingent allegiance condition for a pending unit attention condition, the unit attention condition on the controller will be cleared, and the controller will perform the command.

If a REQUEST SENSE command is received from an initiator with a pending unit attention condition (before the target generates the contingent allegiance condition), then the target will report the unit attention condition, discard any pending sense data, and clear the unit attention condition on the controller for that initiator.

If a REQUEST SENSE command is received from the initiator after the controller has generated the contingent allegiance condition for the unit attention condition, the controller will report the unit attention condition and discard any pending sense data for that initiator.

If an initiator issues a command other than INQUIRY or REQUEST SENSE while a unit attention condition exists for that initiator (prior to generating the contingent allegiance condition for the unit attention condition), the controller will not perform the command and will report CHECK CONDITION status unless a higher priority status (BUSY or RESERVATION CONFLICT).

If after generating the contingent allegiance condition for a pending unit attention condition, the next command received from the initiator is not REQUEST SENSE, then that command will be performed and the unit attention condition will be cleared for that initiator and the sense data will be lost.

## 6 Error Code Summary

(Sense Key - Additional Sense Code - Additional Sense Code Qualifier) [HEX]

•NO ADDITIONAL SENSE INFORMATION (0-00-00)

Indicates that there is no information to be reported to the initiator. This would be the case for a successful command.

•LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED (2-04-02)

Indicates that the destination element specified in the CDB is not initialized, so that the EXCHANGE MEDIUM or MOVE MEDIUM command cannot be executed.

•LOGICAL UNIT NOT READY, MANUAL INTERVENTION REQUIRED(2-04-03)

Indicates that the magazine which contains the element specified in the CDB, or the drive which is assigned the element specified in the CDB is not mounted, so that the EXCHANGE MEDIUM, MOVE MEDIUM, POSITION TO ELEMENT, or REZERO UNIT command cannot be executed.

•MEDIUM RELEASE IS IMPOSSIBLE (2-53-80)

Indicates that the spindle of the specified drive is not stopped, so the move or exchange operation cannot be executed. In this case, the initiator should stop the spindle of the drive by issuing a START/STOP UNIT command, and then issue the move or exchange medium command again.

•DOOR OPEN (2-53-82)

Indicates that the door of the changer is open so the changer mechanism operation cannot be executed.

•RACK MOUNTED INCORRECTLY (2-53-83)

Indicates that the rack in the changer is mounted incorrectly.

•MECHANICAL POSITIONING ERROR (4-15-01)

Indicates that the changer mechanism cannot be positioned correctly.

•DIAGNOSTIC FAILURE ON COMPONENT NN (4-40-NN)

Indicates that the diagnostics of the component #NN was failed in the SEND DIAGNOSTIC command, INITIALIZE ELEMENT STATUS command, or during the mechanism controller self-checking operation. The component numbers have not been defined as yet. The contents of the mechanism controller self-checking operation have not been defined as yet.

•HARDWARE ERROR INAPPROPRIATE MESSAGE (4-49-00)

Indicates that the command is terminated by the inappropriate message sent from the initiator.

•INVALID COMMAND OPERATION CODE (5-20-00)

Indicates that the invalid SCSI command which is not implemented is issued by the initiator.

•INVALID ELEMENT ADDRESS (5-21-01)

Indicates that the element address(es) specified in CDB is not assigned to any member. This error code is also set when neither zero nor 2000h is specified as the Transport Element Address field in EXCHANGE MEDIUM command or MOVE MEDIUM command, or when non 2000h value is specified as the Transport Element Address field in POSITION TO ELEMENT command.

•ILLEGAL EXCHANGE OPERATION (5-21-80)

Indicates that the element address are overlapped the designation of the source element, and the second in CDB of the EXCHANGE MEDIUM command.

•INVALID FIELD IN CDB (5-24-00)

Indicates that the invalid code(s) or bit(s) is set in CDB.

•LOGICAL UNIT NOT SUPPORTED (5-25-00)

Indicates that the logical unit number specified in the IDENTIFY message or in CDB is invalid.

•INVALID FIELD IN PARAMETER LIST (5-26-00)

Indicates that the invalid code(s) or bit(s) is set in the parameter list sent by the initiator during the DATA OUT phase.

•MEDIUM DESTINATION ELEMENT FULL (5-3B-0D)

In the EXCHANGE MEDIUM command, it indicates that the specified second destination element is full, so that the command cannot be executed. In the MOVE MEDIUM command, it indicates that the specified destination element is full, so that the command cannot be executed.

\* Full : Medium exists

•MEDIUM SOURCE ELEMENT EMPTY (5-3B-0E)

In the EXCHANGE MEDIUM command, it indicates that the specified source or first destination element is empty, so that the command cannot be executed.

In the MOVE MEDIUM command, it indicates that the specified source element is empty, so that the command cannot be executed.

\* Empty : Medium doesn't exist

•MEDIUM TRANSPORT ELEMENT FULL (5-3B-80)

In the EXCHANGE MEDIUM command, it indicates that the medium transport element is full and the first destination element is not specified to the medium transport element.

In the MOVE MEDIUM command, it indicates that the medium transport element is full and the source element is not specified to the medium transport element.

\*Full : Medium exists

•IMPORT OR EXPORT ELEMENT ACCESSED (6-28-01)

Indicates that the door of the changer was opened and then closed.

In other words, it indicates that the media in the changer may have changed by an operator.

•POWER ON, RESET, OR BUS DEVICE RESET OCCURRED (6-29-00)

Indicates that the power is turned on. It also indicates that the mechanism controller has been reset by the SCSI bus RST signal is true or by the BUS DEVICE RESET message sent from the initiator.

•SCSI PARITY ERROR (B-47-00)

Indicates that the mechanism controller detects the parity error and aborts the command.

•INITIATOR DETECTED ERROR MESSAGE RECEIVED (B-48-00)

Indicates that the mechanism controller receives the INITIATOR DETECTED ERROR message from the initiator and aborts the command.

•DOOR IS OPENED (B-53-81)

Indicate that the door of the changer is opened while the changer mechanism is operating.

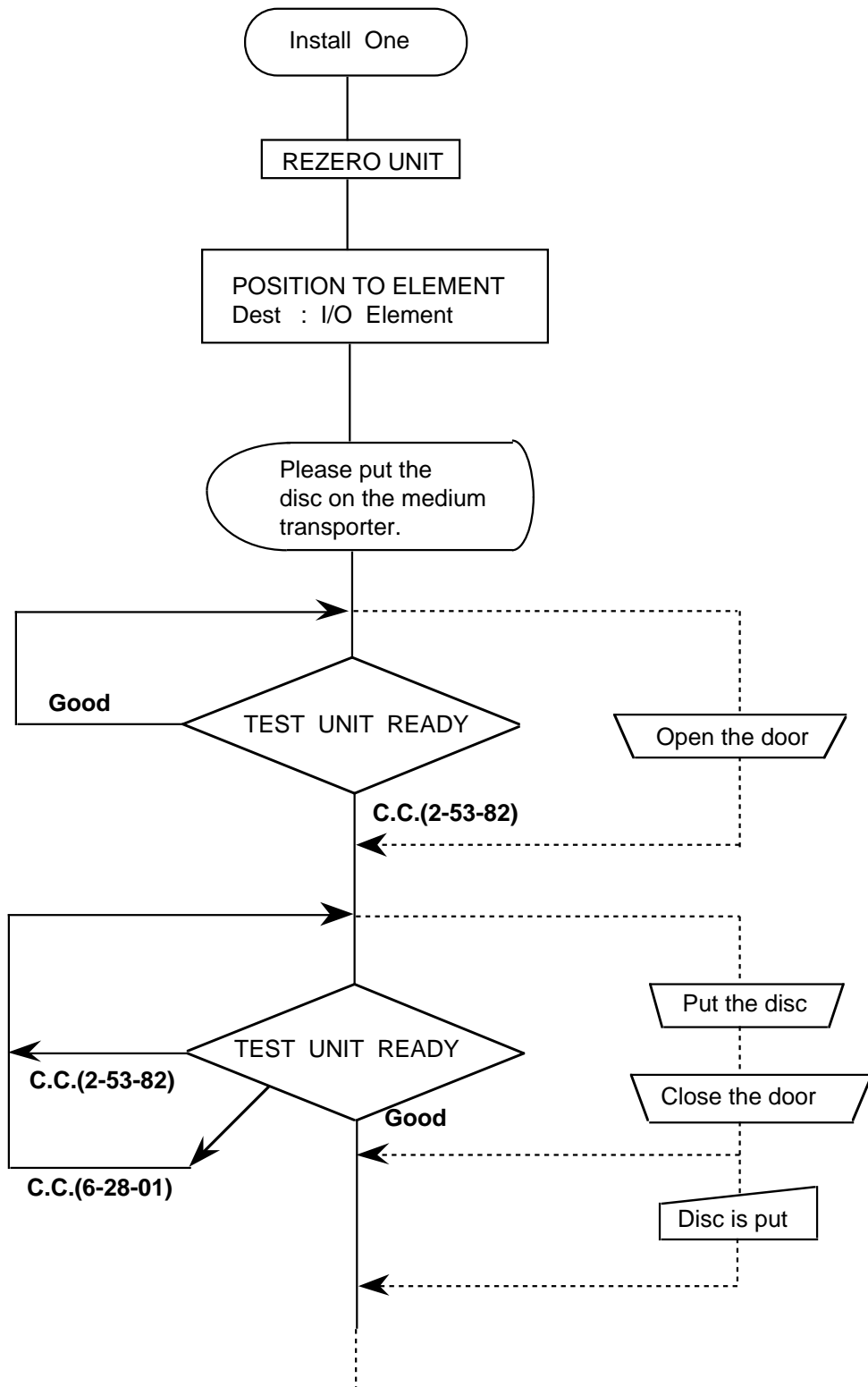
•SOURCE STORAGE ELEMENT OVERLAP (B-53-84)

Indicate that the source storage element of a medium is filled with another medium, so that the command is aborted.

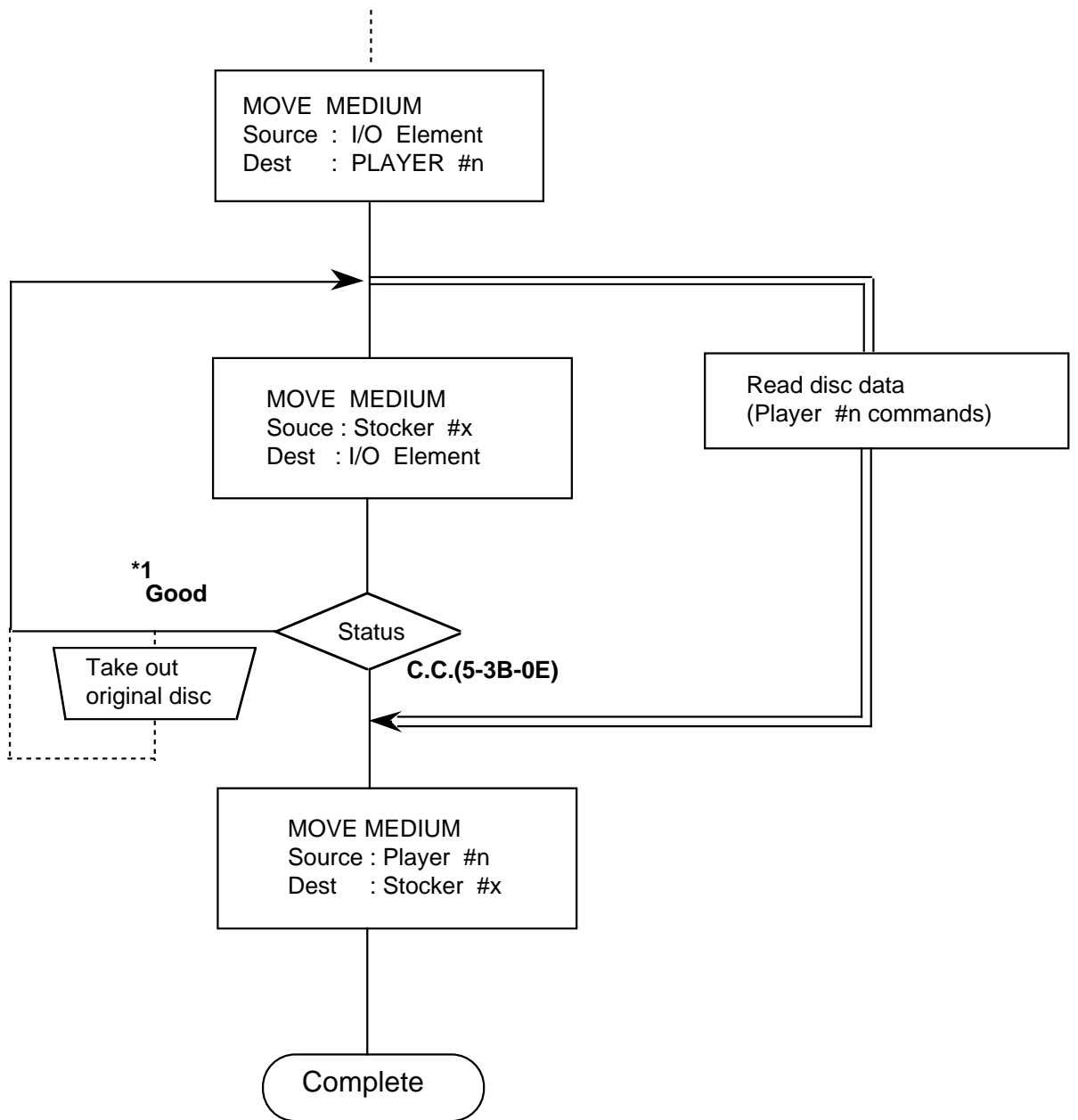
•INVALID SOURCE STORAGE ELEMENT ADDRESS (B-53-85)

Indicate that the source storage element of a medium is invalid, so that the command is aborted.

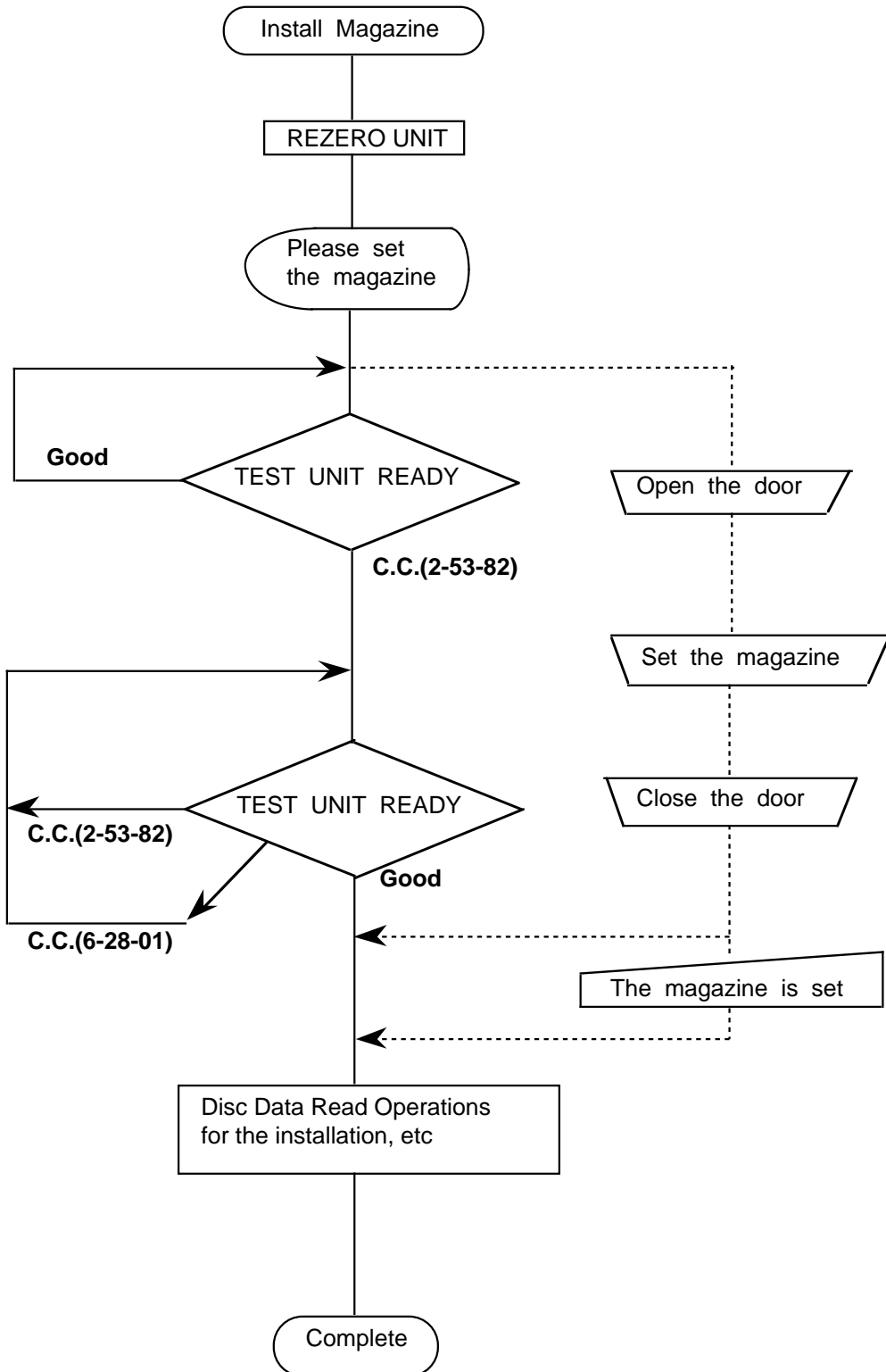
Appendix A : An Example of the install and take out sequence.

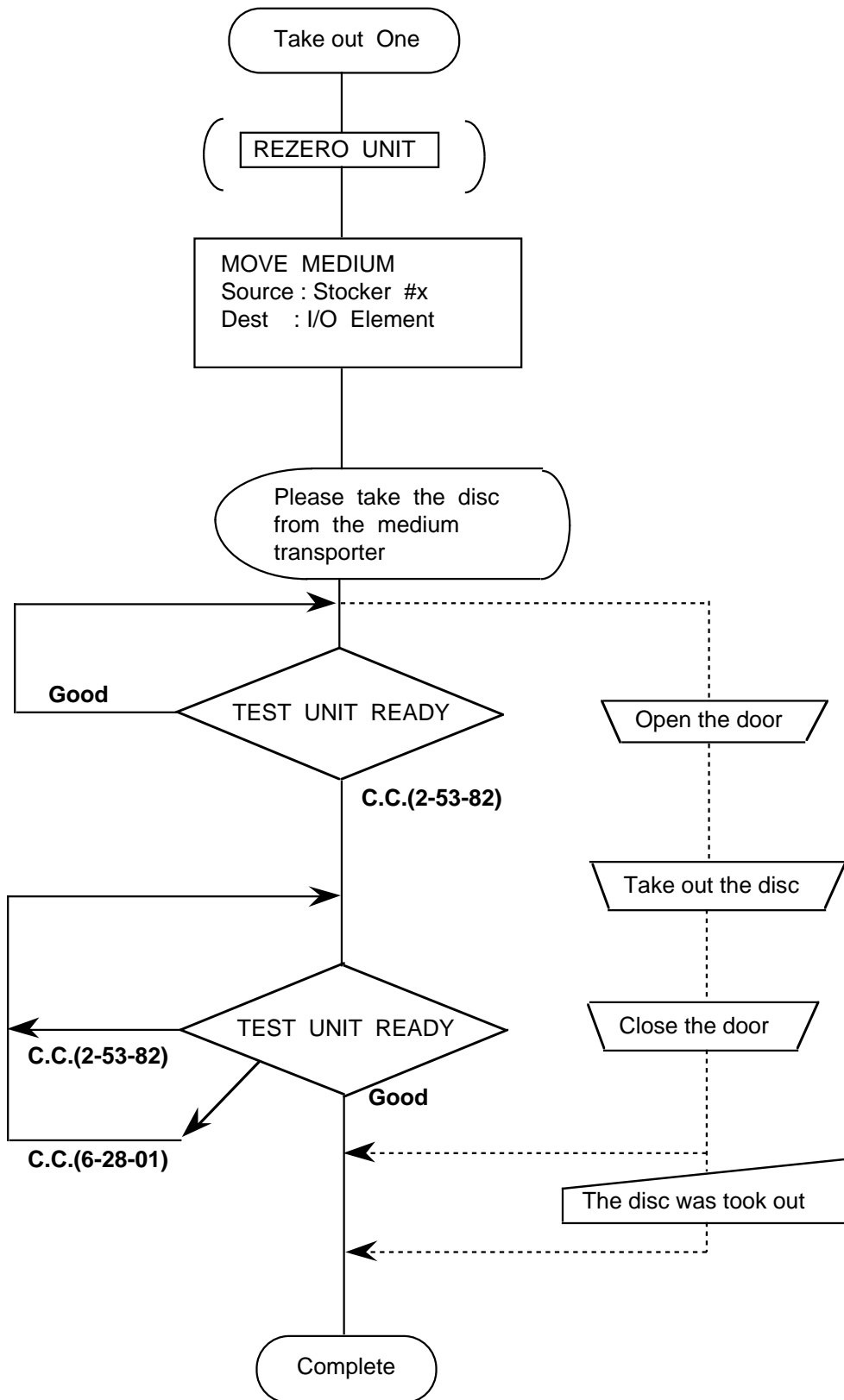


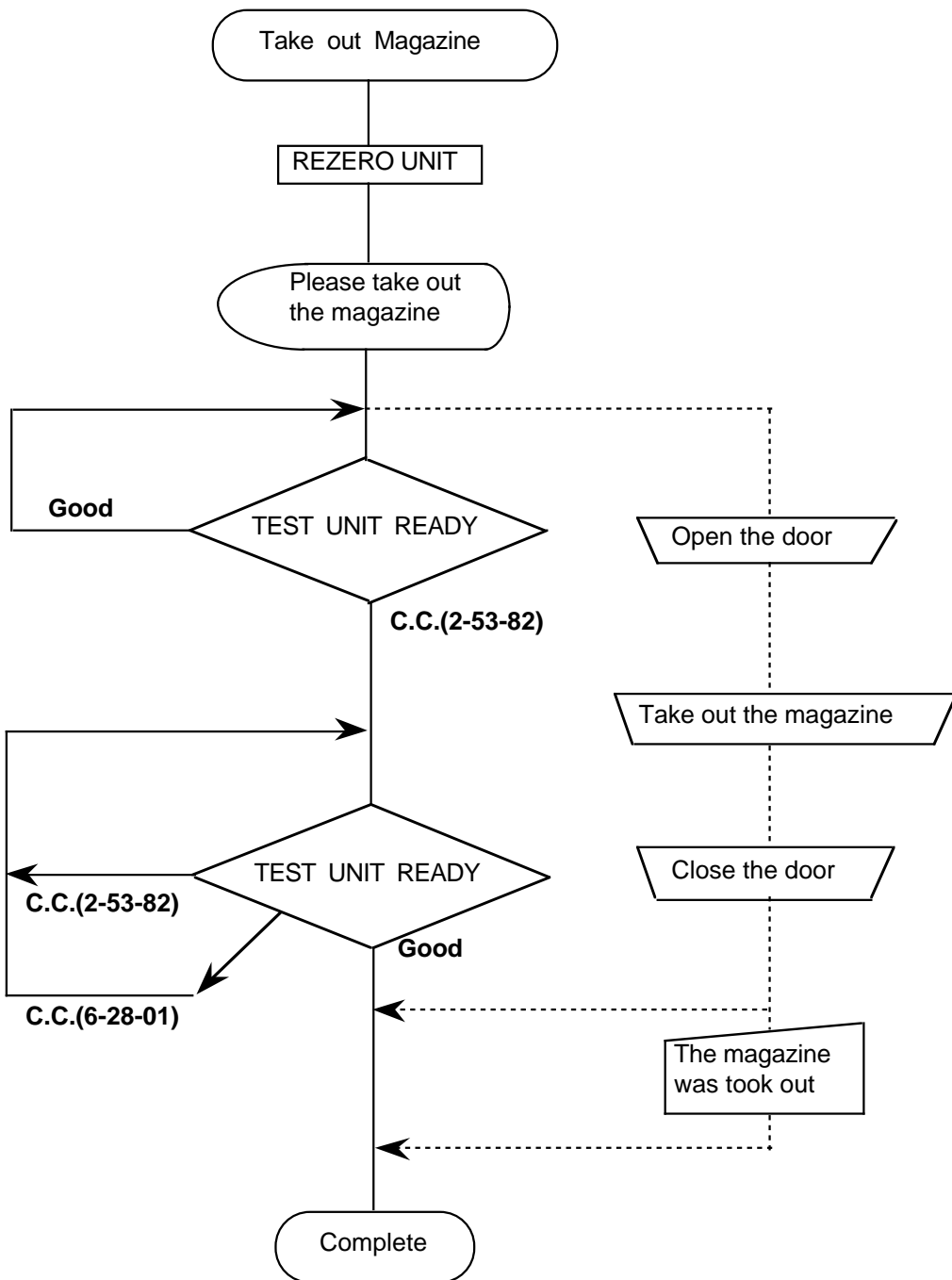




\*1. The stocker which is intended to set the disc contains another disc. In this case, it is necessary take out the originally set disc.







**Player #n** : Using the data read for installation the disc.

**Stocker #x** : The stocker to be set or remove the disc.

**Good** : Good status is returned.

**C.C. (SKEY-ASC-ASCQ)** : CHECK CONDITON status is returned.

# *500 disc CD-ROM Changer*

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