

To: T10 Technical Committee  
 From: Rob Elliott, HP (elliott@hp.com)  
 Date: 14 December 2003  
 Subject: 03-354r1 SPC-3 Specify initiator ports in EXTENDED COPY target descriptors

### **Revision history**

Revision 0 (15 October 2003) First revision

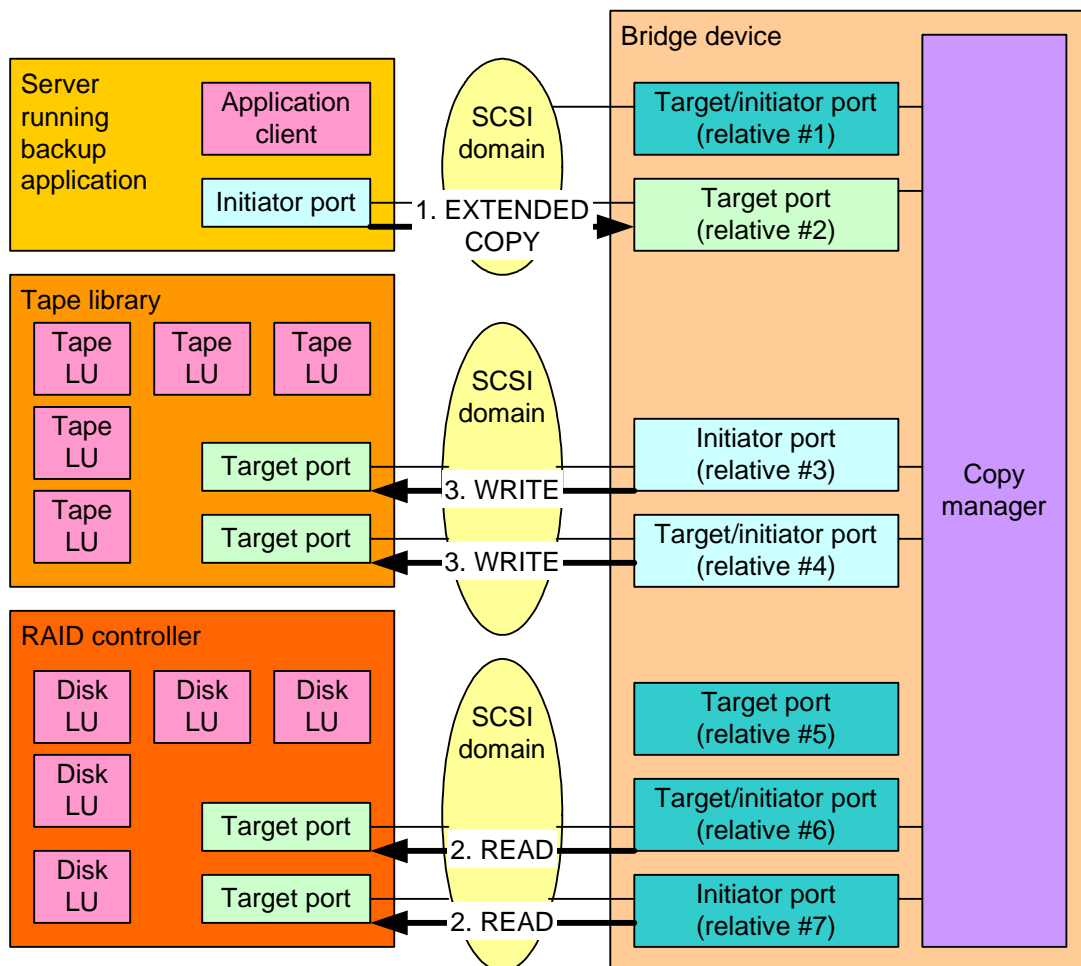
Revision 1 (14 December 2003) Incorporated comment from November 2003 CAP WG and brought terminology in line with the 03-353 merger into 03-344.

### **Related documents**

spc3r15 - SCSI Primary Commands - 3 revision 15  
 03-339 SPC-3 Third-party persistent reservations  
 03-344 SPC-3 Report all target port identifiers  
 03-353 SPC-3 Report initiator port identifiers

### **Overview**

A copy manager can be in a SCSI device with multiple initiator ports, each potentially in different SCSI domains (thus with access to a different set of target ports).



Backup steps:

1. Send EXTENDED COPY to copy manager through target port #1 (or #2)
2. Copy manager reads from disks using initiator ports #6 and/or #7
3. Copy manager writes to tapes using initiator ports #3 and/or #4
4. EXTENDED COPY completes through target port #1 (or #2)

**Figure 1 — Example of a complex copy manager environment**

EXTENDED COPY is silent today on which initiator port to use. This proposal adds a relative initiator port field to the EXTENDED COPY target descriptor so an initiator port to use can be specified. The default value of zero means the choice is vendor-specific (the copy manager can use any initiator port it wants), which is compatible with current implementations.

### **Suggested changes**

## **6.3.6 Target descriptors**

### **6.3.6.1 Target descriptors introduction**

All target descriptors are 32 bytes in length and begin with a four-byte header (see table 47) containing the DESCRIPTOR TYPE CODE field that identifies the format of the descriptor. The assigned descriptor type code values are shown in table 46. Support for each target descriptor format is optional. If a copy manager receives an unsupported descriptor type code in a target descriptor, the command shall be terminated with CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to UNSUPPORTED TARGET DESCRIPTOR TYPE CODE.

**Table 1 — Target descriptor format**

Byte\Bit	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE CODE (00h - FFh)							
1	LU ID TYPE		NUL	PERIPHERAL DEVICE TYPE				
2	(MSB)							
3	<div><div>Reserved</div><div>RELATIVE INITIATOR PORT</div></div> (LSB)							
4	Target descriptor parameters							
27								
28	Device type specific parameters							
31								

The DESCRIPTOR TYPE CODE field is described in 6.3.5.

The LU ID TYPE field (see table 48) specifies the interpretation of the LU IDENTIFIER field in target descriptors that contain a LU IDENTIFIER field.

**Table 48 — LU ID type codes**

[table not shown]

Support for LU ID type codes other than 00b is optional. If a copy manager receives an unsupported LU ID type code, the command shall be terminated with a CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST and the additional sense code shall be set to INVALID FIELD IN PARAMETER LIST.

If the LU ID TYPE field specifies that the LU IDENTIFIER field contains a logical unit number, then the LU IDENTIFIER field specifies the logical unit within the SCSI device specified by other fields in the target descriptor that shall be the source or destination for EXTENDED COPY operations.

If the LU ID TYPE field specifies that the LU IDENTIFIER field contains a proxy token (see 8.3.1.6.2), then the copy manager shall use the LU IDENTIFIER field contents to obtain proxy access rights to the logical unit associated with the proxy token. The logical unit number that represents the proxy access rights shall be the source or destination for EXTENDED COPY operations.

The copy manager should obtain a LUN value for addressing this logical unit by sending an ACCESS CONTROL OUT command with ASSIGN PROXY LUN service action (see 8.3.3.11) to the access controls coordinator of the SCSI device that is identified by other fields in the target descriptor. The copy manager shall use a LUN assigned on the basis of a proxy token only for those commands that are necessary for the processing of the EXTENDED COPY command whose parameter data contains the proxy token. When the copy manager has completed EXTENDED COPY commands involving a proxy token, the copy manager should release the LUN value using an ACCESS CONTROL OUT command with RELEASE PROXY LUN service action (see 8.3.3.12).

EXTENDED COPY access to proxy logical units is to be accomplished only via LU ID type 01b. If the copy manager receives a target descriptor containing LU ID type 00b and a logical unit number matching a LUN value that the copy manager has obtained using an ACCESS CONTROL OUT command with ASSIGN PROXY LUN service action, the EXTENDED COPY command shall be terminated with a CHECK CONDITION status, the sense key shall be set to COPY ABORTED and the additional sense code shall be set to COPY TARGET DEVICE NOT REACHABLE.

A null device (NUL) bit set to zero indicates that the target descriptor identifies a SCSI device that is expected to respond to an INQUIRY command and to which data movement commands may be sent. A NUL bit set to one indicates that the descriptor identifies a null device that is not expected to be the recipient of any SCSI commands. If NUL is one, bytes 4-27 of the target descriptor shall be ignored. If the processing required by a segment descriptor necessitates sending a command to a copy target device whose target descriptor has the NUL bit set to one, then the EXTENDED COPY command shall be terminated as if an unreachable target had been encountered (see 6.3.3).

NOTE 1 Target descriptors with the NUL bit set to one are useful for processing the residual data from previous segment descriptors without affecting any media. For example, a segment descriptor of type 06h (stream device to discard) with a byte count of zero, CAT equal to zero, and a null source target descriptor with PAD equal to one may be used to discard all residual data.

The PERIPHERAL DEVICE TYPE field is described in 6.4.2. The value in the DESCRIPTOR TYPE CODE field determines the format of the target descriptor parameters that follow the four-byte header and precede the device type specific parameters. The values in the DESCRIPTOR TYPE CODE field are listed in table 46.

The value in the PERIPHERAL DEVICE TYPE field determines the format of the device type specific parameters that follow the target descriptor parameters. The device type specific parameters convey information specific to the type of device identified by the target descriptor.

Table 49 lists the peripheral device type code values having formats defined for the device type specific parameters in a target descriptor. Peripheral device types with code values not listed in table 49 are reserved in the EXTENDED COPY parameter list.

**Table 49 — Device type specific parameters in target descriptors**

[table not shown]

The RELATIVE INITIATOR PORT field specifies the relative port identifier (see 7.6.x) of the initiator port that the copy manager shall use to access the logical unit described by the target descriptor, if such access requires use of an initiator port (i.e., if the logical unit is in the same SCSI device as the copy manager, the RELATIVE INITIATOR PORT field is irrelevant). A RELATIVE INITIATOR PORT field value of 0000h specifies that the copy manager may use any initiator port(s) it chooses.

The copy manager may, as part of processing a segment descriptor, verify the information in a target descriptor's device specific fields. However, when verifying the information, the copy manager shall not issue any commands that change the position of read/write media on the target without restoring it. Any errors encountered while verifying the information shall be handled as described in 6.3.3.

### 6.3.6.2 Identification descriptor target descriptor format

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Table 2 — Identification descriptor target descriptor formay

Byte\Bit	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE CODE (E4h)							
1	LU ID TYPE		NUL	PERIPHERAL DEVICE TYPE				
2	(MSB)							
3	<div><div>Reserved</div><div>RELATIVE INITIATOR PORT</div></div>							
4	(LSB)							
...								
31								

The DESCRIPTOR TYPE CODE, PERIPHERAL DEVICE TYPE ~~and~~, NUL, [and RELATIVE INITIATOR PORT](#) fields and the device type specific parameters are described in 6.3.6.1.

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#### 6.3.6.3 Alias target descriptor format

The target descriptor format shown in table 51 instructs the copy manager to locate a SCSI target device and logical unit using the alias list (see 3.1.7) designation associated with the specified alias value. The alias list is maintained using the CHANGE ALIASES command (see 6.2).

Table 3 — Alias target descriptor formay

Byte\Bit	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE CODE (E6h)							
1	LU ID TYPE		NUL	PERIPHERAL DEVICE TYPE				
2	(MSB)							
3	<div><div>Reserved</div><div>RELATIVE INITIATOR PORT</div></div> (LSB)							
4								
31	...							

The DESCRIPTOR TYPE CODE, PERIPHERAL DEVICE TYPE ~~and~~, NUL, [and RELATIVE INITIATOR PORT](#) fields and the device type specific parameters are described in 6.3.6.1.

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### 7.5 Protocol specific parameters

#### 7.5.3 EXTENDED COPY protocol specific target descriptors

##### 7.5.3.1 Introduction to EXTENDED COPY protocol specific target descriptors

The [protocol-specific](#) target descriptors ~~present in~~ [supported in](#) the parameter data of the EXTENDED COPY command (see 6.3) and [some](#) SBC-2 commands (e.g. REBUILD, REGENERATE, and XDWRITE

EXTENDED) ~~may have protocol specific formats~~are described in this subclause. An introduction to EXTENDED COPY target descriptors is provided in 6.3.6.1. The descriptions of EXTENDED COPY target descriptors in this subclause assume usage by the EXTENDED COPY command and may not match the description in SBC-2.

NOTE 2 - In the EXTENDED COPY command the target in target descriptor refers to the target (source or destination) of an EXTENDED COPY operation, not necessarily a SCSI target device. ~~EXTENDED COPY target descriptors may specify SCSI target devices, not SCSI target ports.~~ Target descriptors always specify logical unit identifiers and may also specify initiator ports, target ports, and SCSI target devices used to access those logical units.

#### 7.5.3.2-9 [various] EXTENDED COPY target descriptor format

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Editor's Note 1: In each target descriptor format table in 7.5.3.2 to 7.5.3.9, change bytes 2/3 from Reserved to relative initiator port and change the paragraph following each table as described.

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Table 4 — <various> descriptor format

Byte\Bit	7	6	5	4	3	2	1	0
0	DESCRIPTOR TYPE CODE (<various>)							
1	LU ID TYPE		NUL	PERIPHERAL DEVICE TYPE				
2	(MSB)							
3	<div>Reserved</div> <div>RELATIVE INITIATOR PORT</div> <div>(LSB)</div>							
4								
31	...							

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Editor's Note 2: Change the paragraph following each table as described:

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The DESCRIPTOR TYPE CODE, PERIPHERAL DEVICE TYPE ~~and~~ NUL, and RELATIVE INITIATOR PORT fields and the device type specific parameters are described in 6.3.6.1.