

X3T10/95-103R0

To: Membership of X3T10

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Subject: Attached Medium Changer Operation Codes

During the past few weeks, the SCSI Reflector has hosted a discussion about conflicting operation codes for CD-ROM devices with attached medium changers. This proposal, if approved, will resolve those conflicts.

I believe that approved document X3T9.2/92-006r1 (Enhancement of Command Sets for Removable Media Devices with Medium Changers) intended that CD-ROM device be capable of having attached medium changers. However, even in SCSI-2 R10C the MOVE MEDIUM command shared operation code A5h with the PLAY AUDIO(12) command. During preparation of the SCSI-3 Multi-Media Commands, we compounded this by making the READ ELEMENT STATUS command share operation code B8h with the SET CD-ROM SPEED command.

As a result, CD-ROM devices cannot have attached medium changers. In particular, the MOVE MEDIUM and READ ELEMENT STATUS read element status commands cannot be directed to a LUN with peripheral device type code 05h. The setting of the MChngr bit in the INQUIRY data is irrelevant. The LUN will not be able to distinguish MOVE MEDIUM from PLAY AUDIO(12) or READ ELEMENT STATUS from SET CD-ROM SPEED.

N.B. CD-ROM devices may still implement a medium changer as a separate LUN. However, the requirement to do this is absolutely counter to the intent of approved document X3T9.2/92-006r1. I believe that X3T10 must either fix this conflict or reverse its prior approval of 92-006r1.

I propose that the conflict be fixed by assigning different operation codes to the MOVE MEDIUM and READ ELEMENT STATUS commands for their attached medium changer usage. I propose that Table B.2 of the SCSI-3 Primary Commands be updated as follows:

OP	DTLP	WRSOM	CA	Description
+ BBh	OO	OO	O	MOVE MEDIUM (attached)
	BBh		O	REDUNDANCY GROUP (OUT)
+ BFh	OO	OO	O	READ ELEMENT STATUS (attached)
	BFh		O	VOLUME SET (OUT)

In this proposal, operation codes BBh and BFh are shared between attached medium changer devices and storage array devices. I doubt that there will be any problems with this sharing. Storage array devices should embed any medium changers that they support

as LUNs. Any other mechanism conflicts with the basic concepts of a storage array. However, if this operation code sharing is a problem, a few completely unused operation codes are available in group 5.

If approved, this proposal also requires equivalent changes in the Table 5 of the SCSI-3 Primary Commands, changes in all the SCSI-3 command documents that list the attached medium changer commands, and changes in the SCSI-3 Medium Changer Commands document.