To: INCITS Technical Committee T10

From: Kevin Butt, IBM

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Subject: SSC-3: Configurable Early Warning

1. Revisions

1. 05-423r1 Took concept of Logical End of Partition Early Warning and made a proposal out of it. Added a query to get status of if the device is in early early warning.
2. Made modifications suggested during Sept SSC-3 WG. Changed early-early-warning term to programmable-early-warning.
3. Changed the PEW sense from Unit Attention to Check Condition. Add a new additional sense code.
4. (May 2, 2007) Make PEW into a zone
5. (May 8, 2007) Make changes in SSC-3 Working group.

2. Introduction

Computer Associates responded to a request from ISV's by the SSC and SMC working groups to provide input of functionality that ISV's would like to see added to the standards. CA's request was "Some device support allowing the Early Warning size to be set, but can this be made a standard. This would allow us to calculate how much space we will need at the end of a tape and make sure that there will be sufficient space for dumping our data to the tape before running out of space." This proposal's intent is to accomodate this request. It also allows for handling application client buffers.

3. Proposal

3.1 Add programmable-early-warning to definitions

3.1.16 programmable-early-warning (PEW): A zone between two logical positions used to establish a check condition indicating that the logical position on the medium in the device is between the logical position indicated by the PEWS field (see 8.3.8) and early warning (see xxx).

3.2 Add programmable-early-warning model clause (4.2.3+)

4.2.3+ Programmable early warning

When writing, the application client may need an indication that it is approaching early warning when moving in a direction toward the end of the partition (see 4.2.4). Some application clients have buffers and may need an indication reported early enough for the application client to write any buffered logical objects in the application client buffer to medium.

Application clients that need this indication are expected to set PEWS (see 8.3.8) to a value that creates a PEW that allows sufficient recording space for the data that is in the application client buffer.

If the PEW is entered and exited before the PROGRAMMABLE EARLY WARNING DETECTED additional sense code is returned, the device server does not report PROGRAMMABLE EARLY WARNING DETECTED CHECK CONDITION.

3.3 Add text to Write commands

In 5.6 WRITE(16) command, add:

At the completion of a WRITE(16) command that causes the medium to transition into the PEW the device server shall return CHECK CONDITION status, with the sense key set to NO SENSE, and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. Encountering the PEW shall not cause the device server to perform a synchronize operation or terminate the WRITE(16) command. If processing this command results in any other error, the CHECK CONDITION status associated with that exception condition shall be reported instead. If the PROGRAMMABLE EARLY WARNING DETECTED additional sense was not reported, the next write in PEW that completes with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

> Editors Note: PROGRAMMABLE EARLY WARNING DETECTED is a new ASC/ASCQ (I suggest 00/07)

In 5.7 WRITE FILEMARKS(16) command, add:

At the completion of a WRITE FILEMARKS(16) command that causes the medium to transition into the PEW the device server shall return CHECK CONDITION status, with the sense key set to NO SENSE, and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. Encountering the PEW shall not cause the device server to perform a synchronize operation or terminate the WRITE FILEMARKS(16) command. If processing this command results in any other error, the CHECK CONDITION status associated with that error shall be reported instead. If the PROGRAMMABLE EARLY WARNING DETECTED additional sense was not reported, the next write in PEW that completes with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

In 6.8 WRITE(6) command, add:

At the completion of a WRITE(6) command that causes the medium to transition into the PEW the device server shall return CHECK CONDITION status, with the sense key set to NO SENSE, and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. Encountering the PEW shall not cause the device server to perform a synchronize operation or terminate the WRITE(6) command. If processing this command results in any other error, the CHECK CONDITION status associated with that error shall be reported instead. If the PROGRAMMABLE EARLY WARNING DETECTED additional sense was not reported, the next write in PEW that completes with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

In 6.9 WRITE FILEMARKS(6) command, add:

At the completion of a WRITE FILEMARKS(6) command that causes the medium to transition into the PEW the device server shall return CHECK CONDITION status, with the sense key set to NO SENSE, and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. Encountering the PEW shall not cause the device server to perform a synchronize operation or terminate the WRITE FILEMARKS(6) command. If processing this command results in any other error, the CHECK CONDITION status associated with that error shall be reported instead. If the PROGRAMMABLE EARLY WARNING DETECTED additional sense was not reported, the next write in PEW that completes with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

3.4 Add Programmable Early Warning Field to Device Configuration Extension mode page

In 8.3.8 Device Configuration Extension mode page, add a new field called Programmable Early Warning Size to bytes 6 and 7 of Table 88 — Device Configuration Extension mode page.

6	(MSB)	
		PEWS
7		(LSB)

The Programmable Early Warning Size (PEWS) field specifies the position on the medium that allows recording of the specified number of megabytes native capacity prior to early warning. While recording logical objects to the medium if the device server detects that the logical position has entered the zone between PEWS and EW it shall establish a CHECK CONDITION status set the sense key to NO SENSE and set the additional sense code to PROGRAMMABLE EARLY WARNING DETECTED. The PEWS field set to 0000h specifies that the PEW shall not exist.

3.5 Add an In Programmable Early Warning indicator to Read

Position command

In SSC-3, 7.6 READ POSITION command, add the following In Programmable Early Warning indicator to the returned data in all forms.

In 7.6.2 READ POSITION data format, short form, Table 43 — READ POSITION data format, short form, make bit 0 of byte 0 IPEW. Add the following description of the IPEW bit.

The In Programmable Early Warning (IPEW) bit set to one indicates that the logical object location is in PEW. A IPEW bit set to zero indicates that the logical object location is not in PEW. This bit is not valid if the LOLU bit is set to one.

What should be reported? Query CA, etc. between PEWS and EOP or just PEW and not EW

In 7.6.3 READ POSITION data format, long form, Table 44 — READ POSITION data format, long form, make bit 0 of byte 0 IPEW. Add the following description of the IPEW bit.

The In Programmable Early Warning (IPEW) bit set to one indicates that the logical object location is in PEW. A IPEW bit set to zero indicates that the logical object location is not in PEW. This bit is not valid if the LONU bit is set to one.

In 7.6.4 READ POSITION data format, extended form, Table 45 — READ POSITION data format, extended form, make bit 0 of byte 0 IPEW. Add the following description of the IPEW bit.

The In Programmable Early Warning (IPEW) bit set to one indicates that the logical object location is in PEW. A IPEW bit set to zero indicates that the logical object location is not in PEW. This bit is not valid if the LOLU bit is set to one.

In the same table, bit 2 of byte 0 is incorrectly named LOPU. Correct the to LOLU.

4. SPC-4 Changes

Add the new additional sense code of PROGRAMMABLE EARLY WARNING DETECTED (e.g. 00/07).