

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

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 end-of-partition (see 4.2.3+).

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 the end of the permissible recording area 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 while still leaving enough room for additional recorded logical objects. This indication is called programmable-early-warning (PEW).

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 and the data that is in the device logical object buffer.

3.3 Add text to Write commands

In 5.6 WRITE(16) command, add:

If the device server enters PEW during the processing of a WRITE(16) command, an attempt to finish transferring any data shall be made. The command shall complete with CHECK CONDITION status, the sense key shall be set to NO SENSE, and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. Returning this CHECK CONDITION status shall have no effect on the processing of the 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 would complete with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

If the device server is unable to transfer any data, buffered or unbuffered, when PEW is entered, the sense key shall be set to VOLUME OVERFLOW.

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

Entering PEW should not cause a synchronize operation.

In 5.7 WRITE FILEMARKS(16) command, add:

If the device server enters PEW during the processing of a WRITE FILEMARKS(16) command, an attempt to finish writing any data shall be made. The command shall terminate with CHECK CONDITION status and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. If all data that is to be written is successfully transferred to the medium, the sense key shall be set to NO SENSE. If the device server is unable to transfer any data, buffered or unbuffered, when PEW is entered, the sense key shall be set to VOLUME OVERFLOW.

In 6.8 WRITE(6) command, add:

If the device server enters PEW during the processing of a WRITE(6) command, an attempt to finish writing any data shall be made. The command shall terminate with CHECK CONDITION status and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. If all data that is to be written is successfully transferred to the medium, the sense key shall be set to NO SENSE. 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 would complete with GOOD status, shall return the programmable-early-warning CHECK CONDITION instead.

If the device server is unable to transfer any data, buffered or unbuffered, when PEW is entered, the sense key shall be set to VOLUME OVERFLOW.

Encountering PEW should not cause a synchronize operation.

In 6.9 WRITE FILEMARKS(6) command, add:

If the device server enters PEW during the processing of a WRITE FILEMARKS(6) command, an attempt to finish writing any data shall be made. The command shall terminate with CHECK CONDITION status and the additional sense code shall be set to PROGRAMMABLE EARLY WARNING DETECTED. If all data that is to be written is successfully transferred to the medium, the sense key shall be set to NO SENSE. If the device server is unable to transfer any data, buffered or unbuffered, when PEW is entered, the sense key shall be set to VOLUME OVERFLOW.

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 the End of Partition (EOP). While recording logical objects to the medium if the device server detects that the logical position has entered the zone between PEWS and EOP 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 results in no check condition being returned for entering the zone between PEWS and EOP.

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.

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).