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X3T9.2/87-184

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MEMORANDUM

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TO: John Lohmeyer, Chairman X3T9.2
FROM: Bill Spence, Texas Instruments
SUBJECT: RECONCILIATION OF SEQUENTIAL-ACCESS POSITIONAL TERMS--STEP 2

In X3T9.2/87-176, it was presented that there are 7 sequential-access positional terms used in Rev 2 of SCSI-2, after redundant terms for the same concept are eliminated. They were, however, not much aligned with the terms proposed in Gary Stephens' Tape Model, X3T9.2/87-96, and at least one of them --physical-end-of-medium--was ill defined in terms of modern serpentine usage. They did not reflect the new concept of partitions. And further analysis discloses that, from the viewpoint of the standard: the term load-point also is redundant. There are, however, new positional concepts in the new READ POSITION command.

The following proposals are offered to overcome these shortcomings and to give us a set of terms calculated to be applicable for all the sequential-access devices currently foreseen. The new terms achieve their unique definitions and freedom from conflict with old definitions in part by use of the partition concept, made possible by the concept that a volume may comprise a single partition. In other words, partition is an all inclusive term either for a complete volume or for subdivisions of a volume.

Gary Stephens has reviewed and made major contributions to these proposals. They enjoy his blessing as representing an acceptable compromise among all the conflicting pressures on such definitions.

DEFINITION OF TERMS:

Beginning-of-partition -- The position at the beginning of the permissible recording region of a partition.
Beginning-of-medium -- the extreme point along the medium in the direction away from the supply reel which can be accessed by use of the REWIND command.
BOP -- BOP bit in READ POSITION command.
Early-warning -- a physical mark or device-computed position near but logically before the end-of-partition (independent of physical direction). (See REW bit in Scn 9.1.4.)
End-of-data -- end of data in a partition, denoted in format-specific manner.
End-of-partition -- The position at the end of the permissible recording region of a partition.
EOM -- EOM bit in Sense Data return.
EOP -- EOP bit in READ POSITION command.
EOT -- EOT bit in LOAD/UNLOAD command.

Partition -- The entire usable region of recording and reading paths in a volume or in a portion of a volume, defined in device-specific manner. If there is more than one partition, they shall be numbered, starting with 0: e.g., beginning-of-partition-0.
Volume -- A recording medium together with its physical carrier.

It is proposed that the table of definitions above be inserted in Scn. 9.1, right after Table 9-1.

These terms fit in well with Gary Stephens Model and Glossary. By some minor adjustments to his creations, he may be able to improve the fit further.

GENERAL RULES:

1. Replace "beginning-of-medium or load-point" with "beginning-of-medium".
2. Replace "beginning-of-medium side" with "beginning-of-partition side".
3. Replace "end-of-medium (EOM) bit" with "EOM bit".
4. Replace "early-warning end-of-medium (EOM) bit" with "EOM bit".
5. Replace "early-warning end-of-medium ..." [e.g., condition] with "early-warning ..." [e.g., condition]. In such phrase, delete "(EOM)", if present.
6. Replace "end-of-medium side" with "end-of-partition side".
7. Replace "logical end-of-data" with "end-of-data".
8. Replace "physical end-of-medium" with "end-of-partition".

The unqualified phrase "end-of-medium" is eliminated. As presently used, it has two meanings--both different from Gary's, I believe--and has a confusing relationship to the EOM bit which appears throughout Scn. 7.1.8 and all of Scn. 9.

It appears to me that making global replacements runs into too many exceptional conditions. The following list of specific changes is therefore appended.

SPECIFIC CHANGES:

Page	Par or Table	Line	Term	Replacement
7-28	4	1	end-of-medium (EOM)	EOM
7-28	4	1	end-of-medium condition	early-warning condition
7-28	4	4	early-warning end-of-tape	early-warning
7-28	4	5	beginning-of-tape	beginning-of-medium
7-32	7-25	Dh	end-of-medium	end-of-partition
9-3	1	2	early-warning end-of-medium	early-warning
9-4	2	2	or load point	DELETE
9-5	2	2	at EOT	as far forward as possible
9-5	3	2	positioned at BOT	rewound
9-20	10	1	early-warning end-of-medium	early warning
9-21	2	1	early-warning end-of-medium	early warning
9-21	2	2	report the EOM condition	set the EOM bit
9-21	2	4	physical end-of-medium	end-of-partition
9-21	last	3	EOM	early-warning
9-21	last	4	EOM	early-warning
9-22	1	4	physical end-of-medium	end-of-partition
9-22	1	7	physical end-of-medium	end-of-partition
9-31	2	13	end-of-medium side	end-of-partition side
9-32	4	4	end-of-medium side	end-of-partition side
9-32	5	8	end-of-medium side	end-of-partition side
9-32	last	4	end-of-medium side	end-of-partition side

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9-33	2	4	logical end-of-data	end-of-data
9-33	2	5	logical end-of-data	end-of-data
9-33	2	7	end-of-medium side	end-of-partition side
9-33	3	1	physical end-of-medium	end-of-partition
9-33	last	3	end-of-medium (EOM)	EOM
9-37	9-29	0h	LEP	EOP
9-37	2	1	Logical end-of-partition	End-of-partition
9-37	2	1	LEP	EOP
9-37	2	2	physical end-of-partition	end-of-partition
9-37	2	5	LEP	EOP
9-39	1	3	beginning-of-medium side	beginning-of-partition side
9-39	1	4	physical end-of-medium	end-of-partition
9-39	1	7	beginning-of-medium side	beginning-of-partition side
9-39	1	9	beginning-of-medium	beginning-of-medium, or beginning-of-partition if recognizable by device
DELETE				
9-39	1	9	or load point	or beginning-of-partition
9-39	1	13	or load point	DELETE
9-39	1	16	or load point	DELETE
9-39	1	last	sentence	DELETE, as indicated by [JBL]
9-39	last	last	beginning-of-medium side	beginning-of-partition side
9-44	last	4	end-of-medium side	end-of-partition side
9-44	last	7	beginning-of-medium side	beginning-of-partition side
9-45	1	2	end-of-medium side	end-of-partition side
9-45	1	3	beginning-of-medium side	beginning-of-partition side
9-45	3	1	logical end-of-data	end-of-data
9-45	3	4	logical end-of-data	end-of-data
9-45	3	5	logical end-of-data	end-of-data
9-45	4	1	physical end-of-medium	end-of-partition
9-45	4	3	end-of-medium (EOM)	EOM
9-45	5	1	or load point	DELETE
9-45	5	3	end-of-medium (EOM)	EOM
9-45	last	last	beginning-of-medium side	beginning-of-partition side
9-46	1	1	physical end-of-medium	end-of-partition
9-46	2	1	logical end-of-data	end-of-data
9-46	2	3	logical end-of-data	end-of-data
9-46	3	1	logical end-of-data	end-of-data
9-47	2	last	end-of-medium side	end-of-partition side
9-47	3	last	end-of-medium side	end-of-partition side
9-48	1	1	early-warning end-of-medium	early warning
9-48	5	2	physical end-of-medium	end-of-partition
9-48	5	4	physical end-of-medium	end-of-partition
9-52	3	2	physical end-of-medium	end-of-partition

This proposal is completely presented above. What follows is explanation of why this seems to me to be the best set of terms for us to use.

There are some points to remember in proceeding into this quagmire. Sequential access devices are presumably not restricted to magnetic tape, so terminology is generalized to refer to the "medium". In this manner the EOT marker on 1/2" reel-to-reel tape gave its new name to the EOM bit in SCSI. Unfortunately, the only way that the EOT marker is related to the real end-of-tape is that it is stuck on near the end. What it marks is Early Warning. Nonetheless, the EOM bit is now firmly fixed in our Sense Data return format, with meanings as defined in Write and Read commands and used throughout Scn 9. I propose that we leave EOM as the name of the bit but let its various uses define its meaning. Where it actually occurs in physical position depends on how the current partition is physically located.

Gary has 15 positional terms in his glossary. Four more of historical significance, BOT, EOT, EW and LP were presented in my glossary, 87/65 Rev 1. These 19 terms are needed for a complete physical understanding of the model and its historical antecedents, but the SCSI standard for a logical interface needs only 9. The challenge seems to be to find 9 terms for the standard which meet the needs thereof and also reasonably well locate themselves in Gary's model.

To this end, I suggest the following points.

1. SCSI is a logical interface, and the modifier "logical" may be vital in defining terms. For instance, logical-early-warning, logical end-of-data, and logical-end-of-partition (as the point beyond which access is not possible for the initiator) all have meanings which transcend direction and thus free us from the positional problems of serpentine recording. By contrast, when there is reason to refer to the actual physical position where the first sequential recording may start, reference to the more physical concept of beginning-of-medium makes the distinction. Finally, since most SCSI terms are logical, it seems that the term "logical" may be dropped--everything is logical unless there is some physical reference.
2. Across the logical interface, it is immaterial whether the EOM return on a write command was triggered by reaching a physical or a computed point on the medium. The definition of the term early-warning given above seems to eliminate the need for an early-early-warning term. And the use of the term early-warning avoids the unfortunate positional associations of the end-of-medium-warning (EMW) term. It is immaterial at which end of the medium or in which direction the early-warning occurs. (In this connection, see the REW bit in Scn 9.1.4.)
3. The partition concept, in addition to its utility in describing itself, has an additional potential use--to describe logical positions without reference to beginning and ending ends of the physical medium.

Following along these lines of reasoning, one is led to a sequential-access mini-model with only 3 logical positional terms: beginning-of-partition, early-warning, and end-of partition. After a partition is written to, a fourth positional term exists: end-of-data. These would define the entire accessible span of a partition, serpentine or not, and thus the entire accessible span of a one-partition tape path, serpentine or not. Allowing that the REWIND command still requires reference to the beginning-of-medium, it appears that the requirements of the standard can be met by the glossary of (almost) unsullied terms given in the 4th paragraph (above).

It should be noted that end-of-partition does not mean quite what physical-end-of-medium meant, but the meaning of physical-end-of-medium was not quite right for its use. The events occurring when writing or reading to what was called physical-end-of-medium in the standard actually occur at the end of the partition, wherever it physically may fall.

So I propose that these 9 terms, along with an early and transcendent presentation of the partition and volume concepts in a sequential-access glossary right near the front of Scn 9, be introduced into the standard in place of existing sequential-access positional terms. I propose further that Gary modify his model in such minor ways as necessary to permit locating therein any of these terms not already present, as well as possibly recognizing the historical terms BOT, EOT, EW, and LP.