

X3T9.2/87-189

To: X3T9.2 Membership

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Subject: General Comments on SCSI 2 Rev 2

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## 1.0 SECTION 5

### 1.1 PAGE 5-15 NOP MESSAGE

#### BACKGROUND

Section 5.5.1 on page 5-15 discusses message protocol. It states, "The first message sent by the initiator after the Selection phase shall be either the IDENTIFY, ABORT, or BUS DEVICE RESET message."

Although admittedly outside the realm of reasonable operation, may an initiator send a NOP message as the first message without it being considered illegal? On the one hand, it makes no sense for an initiator to raise ATN just to send a NOP. On the other hand, NOP has always been considered a DON'T CARE operation from the view of the target and only serves as a mechanism for the initiator to respond to a Message Out phase when it on does not currently have any other valid message to send.

Since this is a question of reasonableness for the target and not the initiator, should/must the target check and call it an error if NOP is the first message?

#### PROPOSAL

Due one of the following:

1. Modify section 5.5.1 paragraph 1 on page 5-15 to indicate that NOP is an acceptable first message in addition to IDENTIFY, ABORT and BUS DEVICE RESET.
2. Modify section 5.5.2 NOP message description on page 5-18 to explicitly state that either
  - a. a NOP may not be the first message sent during the post-selection message sequence.
  - b. a NOP can be sent at anytime and shall never be considered an error.

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## 2.0 SECTION 6

### 2.1 PAGE 6-1, REDEFINE UNIT ATTENTION SENSE CODE 3Fh (UCODE)

#### BACKGROUND

Page 8-97 lists the sense code for Unit Attention. Code 3Fh is defined as MICROCODE has been Downloaded.

This sense code should be more generalized and not indicate the source of the ucode load. The ucode could just as easily come from the medium.

#### PROPOSAL

Change sense code 3Fh under Unit Attention to state  
MICROCODE CHANGE HAS OCCURRED

### 2.2 PAGE 6-1, TABULATE AND ADD CAUSE FOR UNIT ATTENTION

#### BACKGROUND

Section 6.1.3 paragraph 1 specifically lists the causes for unit attention as

- removable medium has been changed
- Mode Select parameters affecting this initiator were changed
- target was reset

An additional cause which should be listed is the additional sense code 3Fh found on page 8-97 indicating ucode change.

#### PROPOSAL

Create a table listing all causes of Unit Attention and add the ucode change as one of those causes.

### 2.3 PAGE 6-1 HOW MANY UNIT ATTENTIONS ARE ENOUGH?

#### BACKGROUND

With all the different causes for unit attention, is it required or not for a device record and report each cause separately? This may not be a major problem but it is a peculiar situation when a device which has just reset, loads new ucode which alters Mode parameters and SCSI version number.

By providing specific sense codes for different unit attention conditions, the standard implies that there is value in knowing the specific cause. This seems redundant since the recovery action for the initiator is the same in all cases.

That is, the initiator assumes all bets are off and begins the process of Inquiry, Mode Sense, Read Capacity, Mode Select to reconfigure the device.

#### PROPOSAL

Modify section 6.1.3 to state that either

1. each cause of Unit Attention shall be reported separately.
2. it is permissible for the target to bundle a number of unit attention with the most appropriate cause being determined by the target.

In addition, a note should be made in section 6.1.3 to indicate that the initiator recovery action should be the same regardless of the cause returned in the sense code. This will ensure that future additional causes for unit attention do not obsolete the initiators recovery action and to accomodate devices which bundle a number of unit attention conditions into a single sense code.

### 3.0 FORMAT COMMAND

#### 3.1 PAGE 8-4, 'P' AND 'G' LIST DESCRIPTIONS

##### BACKGROUND

The descriptive text accompanying the P list description indicates the P list is

1. outside user addressable space
2. not normally accessible except through Read Defect command

The same 2 points could be made for the G list as well. In addition, the term "NORMALLY" accessible is superfluous since the only standard SCSI architected method for referencing the P or G list is via the Read Defect Data command.

##### PROPOSAL

1. Remove the word NORMALLY from descriptive text.
2. Either remove descriptive text altogether or have it encompass both the P and G lists.

#### 3.2 PAGE 8-12, REDUNDANT INITIALIZATION PATTERN TYPE FIELD

##### BACKGROUND

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Of what use is the INITIALIZATION PATTERN TYPE (IPT) field? The information contained within the IPT merely duplicates that of the length field. An IPT value of 00h, indicating that the target should use its default initialization pattern value, is implicit in an INITIALIZATION PATTERN LENGTH field of zero. Similarly, an IPT value of 01h, indicating that the initiator supplied pattern should be replicated, can be accommodated by simply adding a note about replication to the description of the length field. As it now stands, the only use for the IPT field is to force the target to write additional software to verify the contents of a field which provides nothing of value.

##### PROPOSAL:

1. Unless additional Pattern Type values are added to the standard, the need for the IPT field disappears and should be redefined as reserved.
2. Add sentence to the description of the INITIALIZATION PATTERN LENGTH field which states that if the pattern length is less than the block size, it shall be repeated to fill the logical block.

#### 3.3 PAGE 8-8 CERTIFICATION ERROR RECOVERY PARAMETERS

##### BACKGROUND

The certification option of the Format command does not identify the defect criteria for the certification process. Since any defects detected during certification are added to the G list, the criteria to be used by the target for identifying those defects should be defined in the standard as well. Two options for modifying the standard are as follows:

1. Allow the target to specify its own criteria. The advantage here is that the target knows its own error rate and error recovery capabilities. If the power of the ECC is an integral first step in recovery and it was disallowed by the initiator, then the device certification may identify an unwarranted large number of defects. The disadvantage is the lack of any control by the initiator over the criteria used during certification.
2. Define the use of an existing Mode Select recovery page to be used during the certification process. This could either be the Page 1 READ/WRITE RECOVERY or the new Page x VERIFY RECOVERY page. Verify demanded a unique certification page to reduce performance degradation resulting from frequent re-issuing of the mode select command in a system which regularly interspersed READ/WRITE and VERIFY operations. Certification, however, occurs only rarely during format so performance considerations are not relevant and a new mode select page is not justified.

##### PROPOSAL

Use the READ/WRITE ERROR RECOVERY page 1 to define the error criteria for the certification process. This READ/WRITE page is more appropriate than the VERIFY page since the verify commands are optional in SCSI-2 and the VERIFY page may not be implemented. Add the following paragraph to section 8.1.1 on 8-8 following the description of the DCRT bit.

If the optional MODE SELECT command READ/WRITE ERROR RECOVERY Page 1 is implemented by the target, then the target shall use those parameters as the criteria for defect identification and re-assignment.

#### 3.4 PAGE 8-8 STPF BIT DESCRIPTION INCONSISTENCIES

##### BACKGROUND

The description of the STPF bit defines the action of the target when one of two events occurs. Both events specifically state that the STPF bit only applies to when either the P or G list can not be located or can not be determined to exist.

Below the two events is further definition for the STPF bit which defines additional sense codes PRIMARY DEFECT LIST NOT FOUND and DEFECT LIST ERROR.

The problem is that neither of the 2 events for which STPF applies suggest anything to do with DEFECT LIST ERROR. The 2 events are very explicit and only

identify the inability to locate the P or G list as criteria for using the STPF bit.

A second problem is that the 2 events identify the G list as a possible source of error. However, the definition only accommodates the P list additional sense code.

What was intended here????

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#### 4.0 RELEASE COMMAND

##### 4.1 PAGE 8-72, 3RD PARTY RELEASE WITH IMPROPER 3RD PARTY ID

###### QUESTION

How should the target handle the situation where a 3rd party reserve is active and a third party release command is issued from the reserving initiator for a different 3rd party device ID? Is this covered by paragraph 1 on page 8-71 which states, "it is not an error for an initiator to attempt to release a reservation that is not currently active."

## 5.0 RESERVE COMMAND

### 5.1 3RD PARTY ID SAME AS SELECTING INITIATOR

#### BACKGROUND

What should be the proper response in the case where the Reserve command is issued with a 3rd party ID which is the same as the 1st party initiator sending the reserved command? There appears to be three choices.

1. Treat as 1st party reservation honoring all commands.
2. Treat as 3rd party where only honoring non-medium access commands such as Inquiry, Request Sense, Reserve/Release.
3. Consider it an error in CDB, point to third party ID or 3rd party bit.

#### PROPOSAL

Since this is a seemingly improper situation, I would encourage the adoption of option 3 and add the following to section 8.1.15.3

If the 3rdPty bit is one and the Third Party Device ID field value is the same as that of the initiator issuing the Reserve command, then the target shall reject the RESERVE command with a CHECK CONDITION status and the sense key shall be set to ILLEGAL REQUEST.

## 6.0 MODE SELECT

### 6.1 PAGE 8-18, MORE ENCOMPASSING UNIT ATTENTION DEFINITION

#### BACKGROUND

Note: Refer to "Section 6" on page 5 as it relates to this item.

The wording of paragraph 2 on page 8-18 clearly indicates that Unit Attention shall be set if parameters are altered via the Mode Select command which may effect another initiator. However, Unit Attention should not be limited to just the Mode Select command. In a device which loads RAM based ucode from the medium, it is possible that both the parameter values as well as the set of alterable parameters may change in the transition from ROM to RAM. In such a case, Unit Attention must be created also. With current wording, single initiator designs may assume that they will never see Unit Attention because of parameter changes.

#### PROPOSAL

Add the following sentence after sentence 1 of paragraph 2 on page 8-18.

Unit Attention shall also be set for all initiators whenever internal device activity (i.e. RAM code load), causes a change to either a parameter value or to the set of supported current or saveable parameters.

### 6.2 PAGE 8-23, DEFINE QUALIFIED POST ERROR BIT (QPE)

#### BACKGROUND

The PER bit is used to enable/disable the reporting of all recovered errors. Unfortunately, this single control parameter does not provide adequate sensitivity to the different levels of recovered errors as illustrated by the following two examples.

In example one, the initiator wants to be informed of all recovery activity. This mode would be useful in device qualification or when the initiator feels it is necessary to find an area of medium with meets suitable error rate criteria.

In example two, the initiator wants to be informed of only those recovery actions that were severe enough to be of concern. This may signal the growth of a defect which should be re-assigned before it becomes hard and data can not be recovered.

Example one is covered by the current definition of the PER bit. Example two is not. In a device with error log analysis capability, the unrecovered errors which contribute to the error logs should not be reported to the initiator. However, following analysis, if an error site is deemed re-assignable, the de-

vice can surface this site as a recovered error. A single PER bit does not provide this capability.

#### PROPOSAL

Define a Qualified Post Error bit (QPE) for page 1 Read/Write Error Recovery parameters. Define the bit as follows:

The Qualify Post Error (QPE) is only valid when the PER bit is one. If the PER bit is zero, the QPE bit shall be zero. A QPE bit of one, indicates that the target should only report recovered errors which exceed a device defined threshold level for acceptable error recovery and that initiator action to either log or re-assign the logical block is recommended. A QPE bit of zero indicates that the target shall report recovered errors as defined by the PER bit.



## 7.0 MODE SENSE

### 7.1 PAGE 8-49, EQUIVALENT SET OF SAVEABLE AND CHANGEABLE PARAMETERS

#### BACKGROUND

There is an un-stated presumption that the set of Changeable and Saveable Mode Select parameters are the same. Since SCSI does not have a means of identifying Saveable parameters, they can not be a subset of changeable.

Imagine the confusion if, after requesting changeable parameters, the initiator executes a Mode Select command to change and save them. If the target only saves a portion of them, the initiator is left with the confusion of not knowing what was saved. The initiator must then follow-up every Mode Select with another Mode Sense to determine which (if any) were saved. If this is the only full-proof process, then it should be so stated in the SCSI standard. If, on the other hand, the set of Changeable and Saveable parameters are required to be the same in the standard, then the process becomes simpler and deviant device implementations will not arise.

#### PROPOSAL

Add the following implementers note to paragraph 1 section 8.1.5.4 on page 8-49.

(Implementers note: The set of saved parameters shall be equal to the set of changeable parameters.)

### 7.2 PAGE 8-49, CONFUSION OF SAVED VALUES IMPLEMENTERS NOTE

#### BACKGROUND

The following implementers note appears in paragraph 1 in section 8.1.5.4.

(Implementers note: The value of the parameters returned is intended to avoid confusion over whether the value of zero is the default or the unsupported value.

This note IS CONFUSING. The following example illustrates this. Given a target support for the AWRE bit of Mode Select page 1 as changeable and saveable which has a saved and current and default value of zero. How can returning the saved value of zero distinguish between supported and non-supported. The request for CHANGEABLE values does distinguish this however.

#### PROPOSAL

Move implementers note from Save Values section 8.1.5.4 to Changeable Values section 8.1.5.2.