

# T10/05-233r0 SAT - ATA Errors to SCSI Errors - Translation Map

To: T10 Technical Committee  
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Subject: T10/05-233r0 SAT - ATA Errors to SCSI Errors - Translation Map

## Revision History

Revision 0 (June 8, 2005) first revision

## Related Documents

(T10) sat-r04 – SCSI to ATA Translation (SAT), Revision 4  
(T10) spc-3 r22 – SCSI Primary Commands - 3, Revision 22  
(T13) ata7v1r4b – AT Attachment with Packet Interface -7 Volume1, Revision 4b

## Overview

1. All ATA errors must be properly translated to appropriate SCSI errors.
2. Incorrect error translations can result in improper responses from the SCSI application client. As a result, drastically incorrect actions may be taken by a data center storage manager (device removal, etc.).
3. **CLOSE SCRUTINY OF THIS PROPOSAL BY THE ATA COMMUNITY IS REQUESTED.**

## Suggested Changes

[Note to editor: Currently, information does not exist in section 12 relating to error reporting. This first proposal revision is an error “map” of the ATA register set bits that pertain to error conditions to the SCSI error reporting methodology of sense key, additional sense code, and additional sense code qualifier. It is not the purpose of this proposal, at least at this time, to provide a map of this data into a SAS SSP Response IU or define how that is done.]

## **12.2 Error Translation – ATA (non-packet device) to SCSI error map**

“ATA” non-packet device errors must be mapped (or translated) to the appropriate SCSI errors. The ATA Status register and Error register bit settings provide the information to be translated into SCSI sense key, additional sense code, and additional sense code qualifier for error reporting. Table 1 provides the acronyms of all the ATA Status and Error register bits. Table 2 provides the translation map of all ATA non-packet device errors to SCSI errors. (Table 3 provides exactly the same data in reverse order (one shall be deleted.))

**Table 1: ATA Registers and bits – “All old and new bit definitions”**

Register	bit	7	6	5	4	3	2	1	0
Status		BSY	DRDY	DWF / SE / DF	DSC / #	DRQ	CORR Obsolete	IDX Obsolete	ERR / CHK
Error		BBK / ICRC	UNC / WP	MC / TAG	IDNF	MCR	ABRT / REL	TKONF / NM / I/O / EOM	AMNF / MED / ILI / C/D / CCTO / obs

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**Table 2: ATA errors to SCSI errors**

SCSI			ATA								
KEY	ASC	ASCQ	bit reg	7	6	5	4	3	2	1	0
?	?	?	Status	-	DRDY	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
04h	44h	00h	Status	-	-	DF	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
?	?	?	Status	-	-	-	DSC	-	-	-	-
			Error	-	-	-	-	-	-	-	-
01h	17h	00h	Status	-	-	-	-	-	CORR	-	-
			Error	-	-	-	-	-	-	-	-
01h	17h	01h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
01h	18h	00h	Status	-	-	-	-	-	-	IDX	-
			Error	-	-	-	-	-	-	-	-
03h	13h	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	-	-	-	-	-	-
02h	3Ah	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	-	-	-	-	NM	-
0Bh	4Ah	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	-	-	-	ABRT	-	-
05h	20h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
05h	22h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
05h	24h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
05h	26h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
05h	26h	01h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
05h	26h	02h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
06h	5Ah	01h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	-	-	MCR	-	-	-
03h	12h	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	-	IDNF	-	-	-	-
03h	13h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
03h	14h	01h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
03h	21h	00h	Status	-	-	-	-	-	-	-	-
			Error	-	-	-	-	-	-	-	-
06h	28h	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	-	MC	-	-	-	-	-
03h	11h	00h	Status	-	-	-	-	-	-	-	ERR
			Error	-	UNC	-	-	-	-	-	-
0Bh	47h	03h	Status	-	-	-	-	-	-	-	ERR
			Error	ICRC	-	-	-	-	-	-	-

[Note to SAT W.G.: The areas with question marks need simply to be discussed if something should be done here. (BSY & DRQ have been left out since it is believed they do not factor into the intent of this map). ABRT (especially), CORR, and IDNF need to be very closely scrutinized for reporting the appropriate SCSI error. ABRT in particular needs to be discussed due its “multiplicity” of applications to ATA errors (abort means several things in ATA which does not resolve to a specific error to map to SCSI's key/asc/ascq).

For use of the W.G the sense key, additional sense code, and additional sense code qualifier field values and descriptions for the values in Table 2 are provided as follows:

SCSI			Definitions
KEY	ASC	ASCQ	
01h	17h	00h	RECOVERED ERROR - RECOVERED DATA WITH NO ERROR CORRECTION APPLIED
01h	17h	01h	RECOVERED ERROR - RECOVERED DATA WITH RETRIES
01h	18h	00h	RECOVERED ERROR - RECOVERED DATA WITH ERROR CORRECTION APPLIED
02h	3Ah	00h	NOT READY - MEDIUM NOT PRESENT

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03h	11h	00h	MEDIUM ERROR - UNRECOVERED READ ERROR
03h	12h	00h	MEDIUM ERROR - ADDRESS MARK NOT FOUND FOR ID FIELD
03h	13h	00h	MEDIUM ERROR - ADDRESS MARK NOT FOUND FOR DATA FIELD
03h	14h	01h	MEDIUM ERROR - RECORD NOT FOUND
03h	21h	00h	MEDIUM ERROR - LOGICAL BLOCK ADDRESS OUT OF RANGE
04h	44h	00h	HARDWARE ERROR - INTERNAL TARGET FAILURE
05h	20h	00h	ILLEGAL REQUEST - INVALID COMMAND OPERATION CODE
05h	22h	00h	ILLEGAL REQUEST - ILLEGAL FUNCTION
05h	24h	00h	ILLEGAL REQUEST - INVALID FIELD IN CDB
05h	26h	00h	ILLEGAL REQUEST - INVALID FIELD IN PARAMETER LIST
05h	26h	01h	ILLEGAL REQUEST - PARAMETER NOT SUPPORTED
05h	26h	02h	ILLEGAL REQUEST - PARAMETER VALUE INVALID
06h	28h	00h	UNIT ATTENTION - NOT READY TO READY CHANGE, MEDIUM MAY HAVE CHANGED
06h	5Ah	01h	UNIT ATTENTION - OPERATOR MEDIUM REMOVAL REQUEST
0Bh	47h	03h	ABORTED COMMAND - INFORMATION UNIT iuCRC ERROR DETECTED
0Bh	4Ah	00h	ABORTED COMMAND - COMMAND PHASE ERROR

and....an additional copy of the “error map” table with a different layout is provided below....

bit reg	ATA								SCSI		
	7	6	5	4	3	2	1	0	KEY	ASC	ASCQ
Status	-	DRDY	-	-	-	-	-	-	?	?	?
Error	-	-	-	-	-	-	-	-			
Status	-	-	DF	-	-	-	-	-	04h	44h	00h
Error	-	-	-	-	-	-	-	-			
Status	-	-	-	DSC	-	-	-	-	?	?	?
Error	-	-	-	-	-	-	-	-			
Status	-	-	-	-	-	CORR	-	-	01h	17h	00h
Error	-	-	-	-	-	-	-	-	01h	17h	01h
									01h	18h	00h
Status	-	-	-	-	-	-	IDX	-	?	?	?
Error	-	-	-	-	-	-	-	-			
Status	-	-	-	-	-	-	-	ERR	03h	13h	00h
Error	-	-	-	-	-	-	-	AMNF			
Status	-	-	-	-	-	-	-	ERR	02h	3Ah	00h
Error	-	-	-	-	-	-	NM	-			
Status	-	-	-	-	-	-	-	ERR	0Bh	4Ah	00h
									05h	20h	00h
									05h	22h	00h
									05h	24h	00h
									05h	26h	00h
									05h	26h	01h
									05h	26h	02h
Error	-	-	-	-	-	ABRT	-	-			
Status	-	-	-	-	-	-	-	ERR	06h	5Ah	01h
Error	-	-	-	-	MCR	-	-	-			
Status	-	-	-	-	-	-	-	ERR	03h	12h	00h
									03h	13h	00h
Error	-	-	-	IDNF	-	-	-	-	03h	14h	01h
									03h	21h	00h
Status	-	-	-	-	-	-	-	ERR	06h	28h	00h
Error	-	-	MC	-	-	-	-	-			
Status	-	-	-	-	-	-	-	ERR	03h	11h	00h
Error	-	UNC	-	-	-	-	-	-			
Status	-	-	-	-	-	-	-	ERR	0Bh	47h	03h
Error	ICRC	-	-	-	-	-	-	-			

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