

X3T13/D96125R1

Vendor Specific And Optional Proposal

To: X3T13 Technical committee
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**Subj: Proposal for changing some Vendor Specific and
Optional items in ATA-4**

Introduction:

Much concern has been expressed about the number of items that are designated "vendor specific" or "optional" in ATA-3. Users can not depend on these items to be consistent from vendor to vendor, from product to product from a particular vendor, or even to be implemented at all. Therefore, in many cases, "vendor specific" or "optional" designate items that are virtually meaningless to anyone using this specification. The following document reviews many of the occurrences of "vendor specific" and "optional" in ATA-3 and proposes changes for several of those items for inclusion in the ATA-4 draft specification. The goal of this proposal is that, where possible, items that are currently designated as vendor specific or optional should be redefined to be something non-vendor specific and non-optional upon which all can agree, or the items should be made to be obsolete or deleted from the specification.

The following is the list of recommended changes that were accepted by the working group at the February meeting:

- 1) Table 4, Note 1: "VS=vendor specific" shall be deleted
 - 2) 5.2.12 IORDY, Paragraph 3 shall be changed to: "If the device requires extending the host transfer cycle time at PIO modes 3 and above, the device shall utilize IORDY. Hosts that use PIO transfer modes 3 and above shall support IORDY."
 - 3) 6.2.13 Status Register, Field/Bit Description, DRDY, item b) shall be changed to: "EXECUTE DEVICE DIAGNOSTICS, et al., may be issued by the host and shall be accepted by the device when DRDY is equal to zero."
 - 4) 6.2.13 Status Register, Field/Bit Description, DF: This bit shall be made obsolete.
 - 5) 6.2.13 Status Register, Field/Bit Description, CORR: This bit shall be made obsolete.
 - 6) 6.2.13 Status Register, Field/Bit Description, IDX: This bit shall be made obsolete.
 - 7) 7.2 Sector Addressing, Paragraph 1, sentence 2: "The mapping of logical sector addresses to the actual physical location of the data sector on the media is vendor specific." This shall be changed to: "There is no implied relationship between logical and physical sector addresses."
- NOTE:** ATA-3 was searched for all occurrences of "logical" and "physical". The above is the only reference to the relationship between logical and physical addressing.
- 8) 7.3 Power management feature set, Paragraph 2: The following sentence shall be deleted: "Additional vendor specific commands and functions are allowed."
 - 11) 7.5 Security mode feature set: A line shall be included here like the Power Management Feature Set: "A device that implements the Security Mode Feature Set shall implement the following minimum set of functions:"
 - 12), 13), 14) and 15): Sections 7.6.1 Attributes, 7.6.2 Attribute Thresholds, 7.6.3 Attribute Values and 7.6.4 Threshold Exceeded Condition shall be deleted.
 - 16) 7.6.5 SMART commands: The second paragraph of this section shall be updated to read:

If the SMART feature set is implemented, the following commands shall be implemented.

- SMART ENABLE OPERATIONS
- SMART DISABLE OPERATIONS
- SMART RETURN STATUS
- SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE

The third paragraph of this section shall be deleted.

- 23) 8.6 FORMAT TRACK: This command shall be made obsolete.

- 24) IDENTIFY DEVICE, Table 9:

Word 47, bits 15-8 Will be changed to obsolete in **ATA-4**

Word 49, bits 7-0 Will be changed to obsolete in **ATA-4**

Word 51, bits 7-0 Will be changed to obsolete in **ATA-4**

Word 52, bits 7-0 Will be changed to obsolete in **ATA-4**

27) 8.7.22, .23, and .24, Notes 9, 10 and 11 shall be deleted.

31) 8.15, 8.18, 8.19, 8.35 and 8.38, READ and WRITE commands: The phrases “with retries and without retries,” “with retries,” and “without retries” shall be deleted from the text for these commands along with the last sentence in each of these command descriptions: “Error recovery performed by the device either with or without retries is vendor specific.”

The command codes previously used for commands “with retries” shall be given the same meaning as the command codes for the commands “without retries.”

32) 8.16 READ LONG and **51)** 8.36 WRITE LONG shall be made obsolete along with 8.7.12 Word 22 in the IDENTIFY DEVICE data.

33) 8.20 RECALIBRATE shall be made obsolete.

37) 8.28.3 Enable/disable automatic defect reassignment subcommands shall be made obsolete.

38) 8.28.4 Enable/disable retries subcommands shall be made obsolete.

39) 8.28.5 Vendor specific data appended subcommand shall be made obsolete.

40) 8.28.6 Set cache segments subcommand shall be made obsolete.

45) 8.28.11 Set maximum prefetch subcommand shall be made obsolete.

46) 8.30 SLEEP, DESCRIPTION, Paragraph 2 shall be changed to “Because some host systems may not read the Status register and clear the interrupt, a device may automatically deassert INTRQ and enter Sleep mode after a time period of not less than 2 s.”

47), 48) and 49) 8.31.4 SMART READ ATTRIBUTE THRESHOLDS, 8.31.5 SMART READ ATTRIBUTE VALUES and 8.31.5 SMART READ ATTRIBUTE VALUES shall be made obsolete.

53) and 54) 9.1.2 Power on and hardware resets - device 1, item j), sentence 3, and 9.2.2 Software resets - device 1, item i), sentence 3: These shall be changed to “Device 1 shall clear the BSY bit, assert PDIAG- if device 1 has passed its diagnostics no later than [the remainder of the sentence]...”

The following is the list of recommendations that were rejected by the working group:

21) 8.4 DOWNLOAD MICROCODE: A new bit shall **not** be added to the IDENTIFY DEVICE data to inform the host if the command was implemented on a given device. This should be covered by Words 23-26, Firmware revision level.

29) 8.13 NOP: This command shall **not** be made obsolete.

41) 8.28.7 Enable/disable read look-ahead shall **not** be made obsolete.

The following items are to be included in the discussion of the GET FEATURES proposal:

28), 30), 50) and 52) 8.8 IDENTIFY DEVICE DMA, 8.14 READ BUFFER, 8.34 WRITE BUFFER and 8.39 WRITE VERIFY: It was recommended that bits should be defined in the IDENTIFY DEVICE data that could inform the host if these commands were implemented on a given device.

35) 8.31 SET FEATURES, DESCRIPTION, Paragraph 2: “At power on, or after a hardware reset, the default setting of the functions specified by the subcommands are vendor specific.” It was recommended that a place to report the default settings should be allocated in the IDENTIFY DEVICE information for any commands that we decide to keep in ATA-4.

42) 8.28.8 Enable/disable reverting to defaults (optional): “Subcommand codes CCh and 66h allow the host to enable or disable the device from reverting to power on default values. A setting of 66h allows settings of greater than 80h which may have been modified since power on to remain at the same setting after a software reset.” It was recommended that this subcommand should be made obsolete.

The following items were moved to the issues list, deferred or need to be revisited:

9) 7.3.2 Power management commands, Paragraph 3, sentence 4: “The [power management] mode selected by the device [after receiving a reset] is based on the type of reset received and on [a] vendor specific implementation.” It was recommended that the specification should say: “A device shall return to the mode it was in before receiving the reset, unless the device was in the sleep mode. If the device was in the sleep mode when receiving a reset, it should return to the standby mode.”

There were questions as to whether this should be a guideline or recommendation, or not accepted at all.

10) 7.3.4 Idle mode transition: “The transition to Idle mode is vendor specific and may occur as a result of an IDLE or IDLE IMMEDIATE command, or in vendor specific way.”

With the exception of what is reported in the task file upon a CHECK POWER MODE command, the condition of a device being in the idle mode as it is defined in the specification is transparent to the host. It was recommended that this should be changed to: “If a device accepts the IDLE IMMEDIATE command, the device shall transition to the Idle mode after receipt of the command. If the device accepts the IDLE command it shall transition to the idle mode as describe in Section.”

There was much discussion about deleting this entire section with the definition of what happens during power management transitions taking place in Figure 3. It was decided that Figure 3 needs additional work, as well. During this discussion the question was also raised as to whether it should be specified when cache should be flushed during power management operations. Therefore, these items were moved to the issues list to be discussed at a later time.

17) 7.6.6 SMART operation with power management modes It was recommended that this section should be updated to reflect the wording of the latest SFF-8035 document.

This document was not available at the last meeting, but is available now. The new section reads as follows:

When used in a system that is utilizing the ATA Power Management Feature set, it is

recommended that a S.M.A.R.T. enabled device automatically save its attribute values upon receipt of an IDLE IMMEDIATE, STANDBY IMMEDIATE or SLEEP command or upon return to an active or idle power saving mode from a standby power saving mode (see the S.M.A.R.T. capability bytes in the device attribute data structure in Section 2.7).

If a S.M.A.R.T. enabled device has been set to utilize its Standby timer, it is recommended that the device automatically perform a S.M.A.R.T. SAVE ATTRIBUTE VALUES function prior to going from an idle power saving mode to the standby power saving mode or upon return to an active or idle power saving mode from a standby power saving mode (see the S.M.A.R.T. capability bytes in the device attribute data structure in Section 2.7).

If a S.M.A.R.T. enabled device has been set to utilize its Standby timer and the device has its automatic off-line data collection feature enabled, the device may automatically perform a set of S.M.A.R.T. off-line data collection activities prior to going from an idle power saving mode to a standby power saving mode.

A device shall not execute either an attribute autosave routine or an automatic off-line data collection routine while in a standby or sleep power saving mode.

18), 19) and 20) 8.2 DOOR LOCK, 8.3 DOOR UNLOCK and 8.12 MEDIA EJECT: It was recommended that this command set should be described -- like the other optional feature sets -- in Section 7.4. If all removable media devices implement all three of these commands then it should be specified that they are mandatory if the command set is implemented.

There is a removable feature set, which will be included as such in the document. However, this topic will be put on the issues list as additional discussion of this topic is required.

21) 8.4 DOWNLOAD MICROCODE: It was recommended that a bit should be defined in the IDENTIFY DEVICE data that could inform the host if the command was implemented on a given device.

Upon further review, the only items that could be in IDENTIFY DEVICE are whether the device has the ability to respond to the values in the Features register that cause the downloaded code to be used temporarily or for future use. However, it is specified that if the device does not support one of these subcommands that it will respond with an Aborted Command error.

22) 8.5 EXECUTE DEVICE DIAGNOSTIC: 255 possible values are given for diagnostic codes (see Table 8). All but 01h and 81h are listed as vendor specific: Device 0 passed and Device 1 passed or not present, and Device 0 passed and Device 1 failed. It was recommended that other diagnostic codes could be associated with other conditions, e.g.: Device 0 failed and Device 1 passed. Any remaining "vendor specific" diagnostic codes should be made "obsolete".

During the discussion it was stated that this needs to be reworded to say something like 01 and 81 are as described, all others are Device 1 and or Device 0 failed.

It was also discussed that Section 9.1.1 & 9.1.2 step h, et al., need to be clarified in regard to EXECUTE DEVICE DIAGNOSTICS.

24) IDENTIFY DEVICE, Table 9, Word 0, bits 1-5 and 8-14, and Words 7-9. It was recommended that these bits should be made obsolete.

It was determined tha additional investigation into the usage of these bits was needed, particularly in regard to possible useage by PCMCIA devices.

25) 8.7.13 Word 23-26: Firmware revision: The new recommendation is that this should read like the definitions for serial and model number, e.g.:

“This field contains the firmware revision number of the device. The contents of this field is an ASCII character string of eight bytes. The device shall pad the character string with spaces (20h), if necessary, to ensure that the string is the proper length.”

26) 8.7.17.1 Standby timer support, Sentence 3: “If bit 13 [of Word 49] is cleared to zero, the timer values utilized are vendor specific.” This conflicts with the statement under INPUTS for the IDLE command: “The value in the Sector Count register ... *shall* determine the time period ... [the italics are mine].”

It was recommended that the value of zero in this field should not be allowed, that if devices implement the Power Management Feature Set, then they should implement the timer as specified.

However there was much discussion on non-timer initiated transitions. Therefore, this item was moved to the issues list for later consideration.

34) 8.27 SEEK: The ERROR OUTPUTS and DESCRIPTION are both vendor specific. It was recommended that we should agree on specifically what this command does or make it be obsolete.

It was stated that we would work on developing a specific definition to which we could all agree.

36) 8.28.1 Enable/disable write cache: It was recommended that these subcommands should be made mandatory and work so that they completely enable and disable write cache, and that when the subcommand to disable write cache is issued, the device should flush cache to non-volatile memory before posting command complete.

It was decided to talk about this during other cache flush discussions.

43) 8.28.9 Enable/disable ECC (optional): In today’s devices, much of this is handled in hardware and is not able to be disabled. It was recommended that if the intent is to minimize performance impact, this could be redefined as disabling any non-hardware ECC that might impact performance (though this is vague). Otherwise this should be made obsolete.

It was decided that this section could be redefined to be more clear.

44) 8.28.10 Set device current (optional): It was recommended that this section should be deleted.

During the discussion it was recommended that Mark Evans speak with Faisal Haq from Quantum who originally wanted this included for some sort of flash card requirements.

Faisal Haq is no longer with Quantum, nor does Quantum currently have any interest in PCMCIA devices of any sort. It is more appropriate with someone who has an interest in this item to offer a rebuttal to the original recommendation.