



EXTERNAL MEMO

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SUBJ.: ATA Download Microcode Command

This is a follow up on my public review comment on the need for a download microcode command in the ATA standard to mirror the functionality provided by SCSI-2. This draft concentrates on a more specific description of the functionality of that command. Some of the specifics (e.g. op code) are yet TBD. I intend to revise this document for the September working group for final discussion, then present final wording to the editors.

- o **Address space:** Normally an AT command has a transfer length of up to 128 KBytes. The standard could make allowance for code space which is greater than this amount. A longer transfer length can be generated through use of other bits, e.g. the sector register. While this can be done by defining segments of 128 KBytes each, and updating segments individually, it can also be done by simply concatenating the additional 8 bits to make a 16 bit (32 MByte) code space.

My bias is towards a single 32 MByte updatable address space. This is the current SCSI practice. This eliminates the need to worry about partially updated code. Note that in reality drive firmware is nowhere near 32 MBytes, so I expect most updates will continue to only use the lower 8 bits provided by the sector count register, with the sector register at 0, for some time to come.

- o **When Change Takes Effect:** using a single 16 bit address space allows us to update code in a single command. Thus the update will become effective when the update command is successfully completed, as in SCSI. Since we have a single "initiator," there is no possibility of the code being updated without the host being aware of the change.
- o **Saving Microcode:** A change can be saved to disk and become the default code for all subsequent time if another bit is set. I suggest using the LSB of the head register for this purpose (0 = do not save, 1 = save).

This would provide a command with the same functionality of SCSI. Some additional functions, such as integrity checking of the new code, would still be provided in a vendor unique manner (e.g. through incorporating a checksum in the downloaded code, along with some embedded header information that identifies the drive model and revision levels for which the code works).