

## Notes and Items Planned for the Next Edition

This document is a list of subjects that I plan to add to a future edition of *FYSOS: Media Storage Devices*, found at [http://www.fysnet.net/media\\_storage\\_devices.htm](http://www.fysnet.net/media_storage_devices.htm)

These notes are added so that you may benefit from the information now instead of waiting for the next edition. I will add information as time and interest allows.

Thank you for your support,  
Ben

## Bytes per DRQ Assertion

Before sending the packet command, you need to tell the device how many bytes you expect to send or receive per DRQ assertion. For example, if you are reading one or more sectors, you place in the `ATA_LBA_MID_BYTE` and `ATA_LBA_HIGH_BYTE` registers the count of bytes per sector you expect to receive, since the device will transmit one sector per DRQ assertion. If you are using a different command, the Request Sense command for example, you place in these registers the size in bytes of the requested data to return.

After sending the 12- or 16-byte packet and waiting for the drive to be ready, you can read these two registers to retrieve the actual amount of data that will be transferred. For example, to determine the size of a sector, you can place a value of 4096 in these registers before the packet command, then read these registers after to get the actual count of bytes the device will send, in turn determining the actual size of a sector. The same goes for other commands.

For example, the Request Sense command can send up to 252 bytes, though the normal return count is 18 bytes. If your code is fixed at 18 bytes and the device is sending 36 for example, your code will read the first 18 bytes and move on, while the device is still expecting you to read 18 more. Therefore, you should read the `ATA_LBA_MID_BYTE` and `ATA_LBA_HIGH_BYTE` registers to determine the actual count of bytes to read back for each command.



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The reading of these registers to get the actual count of bytes to retrieve is quite important when it comes to some commands. For example, the Request Sense command will clear its internal data on each call to the command. If you only retrieve the first 18 bytes when 36 are expected, the remaining 18 bytes will be lost after the command is complete.

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## Device Check Condition

ATAPI devices use the ERR bit in the Status register as a CHK bit, or Check Condition. This Check Condition mechanism happens after a power up, hard reset, or when an error occurs. Therefore after a hard reset via the controller, only a few ATAPI commands sent via the Send Packet command, will be allowed to execute. Two of these commands are the Inquiry and Request Sense commands. Most all other packet commands will return an error until you clear this Check Condition state.

To clear this state and allow all commands again, you send the Request Sense command. However, multiple Check states can be queued within the drive, so after a hard reset, you might have to send the Request Sense command twice, ignoring the return from the first.



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The data returned from all Request Sense commands while a Check Condition state is active is considered invalid. i.e.: As long as the CHK bit is set within the Status register, after the call, the data returned is invalid.

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Commands or changes that can and usually do set this Check Condition state are changes to the state of the device. For example, a disc change via a Disc Changing device or any change that effects the values returned via an Inquiry command.

When you send a command via a 12- or 16-byte packet, you may receive a Not Ready or Check Condition, a value of 6 in the Sense Key field. Most commands will return this sense until the Check Condition state is cleared. The Request Sense, Inquiry, Mode Sense, and Mode Select are a few that should not return a Not Ready state.