The following identifies all the changes since Rev 3 was created, and includes editorial items caught in the translation to Japanese (supplied to me by the delegation from Japan at the ISO SC13 meeting in Copenhagen).

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5.2 Control Signals Drivers and Receivers.

The drivers have the following .....

The signals are driven with an open collector output stage capable of sinking at least 48mA when asserted with maximum voltage of 0.4 **0.5V** measured at the driver. When the line driver is negated the driver transistor is off and collector leakage current is a maximum of 250uA.

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5.4.1 Write Gate Termination.

This line shall be protected .....

*1 Part of terminator pack in last drive of the daisy chain.
*2 Permanently located in the drive. Voltage drop shall be <0.75V **with a Forward Current of <=30mA.**

FIGURE 3: WRITE GATE TERMINATION

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TABLE 6: SUMMARY OF DEFINED COMMANDS FOR ALL DEVICES

Magnetic Disk	Optical Disk
Seek	.....
.....	Track Offset *
Initiate Diagnostics *	Initiate Diagnostics *
~~Set Bytes per Sector *~~	~~Reserved~~
Set Unfrm'd Bytes/Sector*	**Reserved**
Set High Order Value *	.....

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TABLE 7: MAGNETIC DISK COMMAND (CMD) DATA DEFINITION

CMD Fctn Bit 15-12	CMD Function Definition	CMD Modifier Applicable Bits 11-8	CMD Subscript Applicable Bits 7-0	CMD Parameter Applicable Bits 11-0	Status/ Config Data to Ctlr
0000	Seek	.....			
.....		No	No	Yes	No
~~1001~~	~~Set Bytes per Sector *~~	~~No~~	~~No~~	~~Yes~~	~~No~~
1001	Set **Unfr'd Bytes/Sctr ***	No	No	Yes	No
1010	Set High Order Value *	.....			

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7.6.1.1.1 Synchronized Spindles.

In a synchronized spindle .....

ATTENTION shall be asserted whenever there is a change from the synchronized condition (bit 11=**1) to the unsynchronized condition (bit 11=**0).

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TABLE 16: MAGNETIC DISK GENERAL CONFIGURATION RESPONSE BITS

Command Modifier Bits 11-8	Subscript 7-0	Configuration Response	Bit
0 0 0 0	0	Bit Significant Configuration of Drive and Format	
		1 = Rotational Speed Tolerance is >=0.5% < 1.0% *1	11
		1 = Transfer Rate > 10 MHz <= 15 MHz *3	10
		1 = Transfer Rate > 5 Mhz <= 10 Mhz *3	9
		1 = Transfer Rate <= 5 Mhz *3	
0 0 0 0	1	1 = Synchronized Spindles supported	15
		1 = High Speed Data Port (See 7.7.1.2)	14
		1 = Notched Drive with Equal Zones *4	13
		1 = Notched drive with Unequal Zone Sizes	12
		1 = Notched drive Capable of Non-notched operation	11
		Reserved = 0	10-0

*1 Command Complete shall be negated within 15 usec of a head change if this bit is set to 1.
*2 The controller may use the setting of this bit to select an appropriate disk data error correction method. See also **9.3.1.13.**
*3 When notched drives are .....

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7.7.1.8 Intersector Gap Values.

If subscripts 17-19 .....

The ISG Bytes after Index/Sector Pulse field in Configuration **Data** Word 7 **(for Command Modifier 0111)** bits 15-8 is not used if subscripts 17-18 are implemented. This byte should be implemented to support controllers which do not implement subscripts 17-18.

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TABLE 19: OPTICAL DISK GENERAL CONFIGURATION RESPONSE BITS

Command Modifier Bits 11-8	Subscript 7-0	Configuration Response	Bit
0 0 0 0	0	General Configuration of Drive and Format	
		1 = Not Magnetic Disk	
		1 = Head Switch Time > **15 usec**	4
		1 = Not NRZ	

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7.18.1 Synchronized Drives.

The controller may use Set Configuration with synchronized drives to set the selected drive to act as master (7-0 = x'01') or as slave to another drive (7-0 = x'00').

If set to Master Control (7-0 = x'03'), the drive shall generate the Master Sync signal and also respond to the Slave Sync signal received from another source.

A synchronized drive may be set to unsynchronized operation (7-0 = x'02').

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7.18.3 Synchronized Sector Offset

When set to a **the offset** value **is** other than zero, the slave drive **a drive designated as Master Control or Slave** shall offset its synchronized position by the number specified e.g. if set to 64, the slave drive shall offset its position by one quarter rotation beyond that of the master **behind the Slave Sync signal. A drive designated as Master shall reject this command.**

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TABLE 30: SET CONFIGURATION SOFT SWITCH PARAMETER BITS

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	P
CMD Function				Switch No				Switch Parameter								
1	1	1	0	0	0	0	0	.....								
				1	1	0	0	Set Synchronized Drive x\00\0000 0000 = Slave x\01\0000 0001 = Master x\11\0000 0011 = Master Control 0000 0010 = Unsynchronize							
				1	1	0	1	Notched Drive Zone Number								

8.1.1 Read Initialization Time.

The time lapse before READ GATE or ADDRESS MARK ENABLE can be asserted after a head switch is (0.7 x ISG) or according to the value provided in Request General Configuration subscripts **(see Table 17).** Drives not able to meet a 15 usec head switching time shall negate COMMAND COMPLETE upon a head switch.

8.2.5 Write-to-Read Recovery Time.

The time lapse before READ GATE or ADDRESS MARK ENABLE can be asserted after negating the WRITE GATE is defined by the subscripted value provided in subscript 18 of Request General Configuration, or if subscripts are not supported, the ISG Bytes after Index/Sector pulse in Configuration Data Response word 7 **(for Command Modifier 0111).**

8.3.2 Intersector Gap (ISG).

The minimum .....

- Drive required write-to-read recovery time (the minimum time between negation of WRITE GATE and assertion of READ GATE or ADDRESS MARK ENABLE which is specified in **by the "Write-to-Read Recovery Time" subscript, or if subscripts are not supported,** by the "ISG Bytes after Index/Sector" in Configuration Data Response. **See 7.7.1.8).**

8.3.3.1 PLO Sync Field.

These bytes are required by the drive to allow the drive's read-data phase-locked oscillator to become phase and frequency synchronized with the data bits recorded on the media. The controller shall send **a bit string of** zeros during this time.

8.3.3.5 ADR Pad - (ID Pad).

The ID Pad (two bytes minimum) shall be written by the controller and are required by the drive to ensure proper recording and recovery of the last bits of the address field check codes **ADR Check Bytes.** These pad bytes shall be zeros.

8.4.4 Intersector Gap (ISG) **Speed Tolerance and Format** Speed Tolerance Gap.

The ISG is included in the format to allow for all those items discussed in 8.3.2. In addition it shall also account for **any required** intersector speed tolerance. If required\

There may also be an extended ISG at the **a Format Speed Tolerance Gap which extends the ISG at the** end of the track if required. This gap is written during a format and is used as a filler and to allow for speed .....

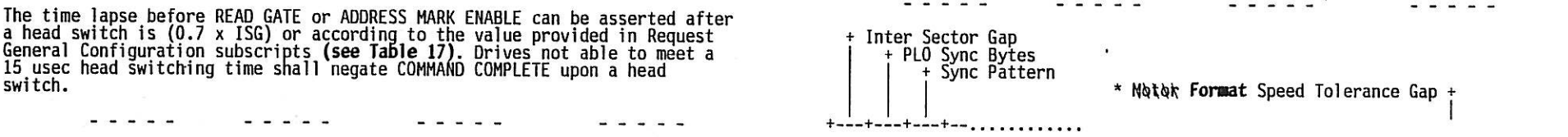

FIGURE 21: FIXED SECTOR OPTICAL FORMAT

9.2.2 Detection and Resynchronization.

In normal operation, the ATTENTION .....

It is also possible for the ATTENTION line to be asserted (Figure 42: Communications Fault) when the controller is attempting to communicate with the drive (i.e. when the controller attempts to send the Read **Request** Status Command to the drive to determine the cause of another fault detected in the drive such as a Write Fault, Seek Fault, etc).

9.3.1.5 Bit 11: Rotational Speed Tolerance is ½ >= 0.5% and < 1.0%.

Typically, this bit is ....

If Bit 11=0, the rotational speed plus data clock rate tolerance is ½ >=0.5% and <1.0%.

9.3.1.6 Bit 10: Transfer Rate **>10 MHz,** <=15 MHz.

9.3.1.8 Bit 8: Transfer rate ½ <=5 MHz.

9.3.1.9 Bit 7: Removable Cartridge Drive.

If Bit 7 is a 1, the disk drive .....

When checking for .....
..... If removable media is present, head 0 should be on the removable media drive. (The number of heads, both fixed and removable, is contained in the "Number of Heads" General Specific Configuration response **(for Command Modifier 0011).**

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9.5.1.5 Bit 11: Reserved **Spindle is Synchronized.**

This bit shall always be set to zero **be set to indicate that a drive capable of being synchronized is synchronized. Upon a change from the synchronized to the unsynchronized condition, the drive shall assert ATTENTION.**

[This has been incorrect for months - it should have been updated when we added Synchronized Spindles to the Section 7]

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Annex K: Synchronized Spindles.
(informative)

The synchronization of spindles .....

There can only be one master drive at a time in a configuration. The MASTER SYNC signal from the slave **drive** selected to be a master may be turned around by the controller to become SLAVE SYNC, or the controller may direct the master drive **designated as Master** to turn around MASTER SYNC internally to become the SLAVE SYNC for the other drives \ MASTER SYNC **(only one SYNC signal is generated). MASTER SYNC** is generated by the drive nominated as the master **designated as Master** at least once per rotation, but may optionally be at a higher frequency.

SLAVE SYNC received by a drive is used as the synchronization signal to lock the spindles in step. The time to achieve synchronization varies, and is indicated by the slave drive asserting READY.

NOTE: A drive nominated as master **Master Control** does not synchronize to its MASTER SYNC signal but to the SLAVE SYNC received. (to avoid any problems that may arise if the controller introduces any delays)\

In the event that a drive previously synchronized loses synchronization, but is otherwise operational, it does not negate READY.

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K.3 Set Configuration.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	P
CMD Function				Switch No				Switch Parameter								
1	1	1	0	1	1	0	0	Set Synchronized Drive x\00\0000 0000 = Slave x\01\0000 0001 = Master x\11\0000 0011 = Master Control 0000 0010 = Unsynchronize								

If a drive is set to Slave it does not generate MASTER SYNC, and it is responsible to synchronize its index to the SLAVE SYNC. signal\

If a drive is set to Master it generates MASTER SYNC and transmits it as the SLAVE SYNC signal for the slaves.

If a drive is set to Master Control it generates MASTER SYNC **and transmits it as a signal.** The output is may be used by the controller to generate SLAVE SYNC to the slaves.

If a drive is set to Unsynchronized it ignores SLAVE SYNC.