X3T9.2/89-2 001 (2)

HITACHI

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John Lohmeyer
Chairman X3T9.2
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Dear John,

In the ESDI Committee, the specification of disk drive "INDEX TO INDEX" spindle synchronization has been determined, although, that does not cover the "INDEX TO SECTOR" synchronization, which has became a subject of interest to several participants in this industry. To the best of my knowledge, ANSI X3T9.3 (Section7.18.1 Synchronized Drive) does not specify this subject at all. I believe that it is certainly a proper subject for consideration by X3T9.2, and that is should be scheduled for discussion in the near future.

Please regard the attached internal idea as an implementation proposal.

K. KUMAZAWA
Assistant Engineering Manager

CC:Mr. Dal Allan, Vice Chairman X3T9.2

1. COMMAND DATA DIFINITION

--ANSI STANDARD--

CMD Fctn Bit 15 - 12	CMD Function Definition	CMD Mod Bit 11-8	CMD SUB Bit 7-0	CMD PMT Bit 11--0	STA CONF Data to Ctlr
0 0 0 0	Seek	No	No	Yes	No
0 0 0 1	Recalibrate	No	No	No	No
0 0 1 0	Req Status	Yes	Yes	No	Yes
0 0 1 1	Req Conf	Yes	Yes	No	Yes
0 1 0 0	Sel Hd Grp*	No	No	Yes	No
0 1 0 1	Control	Yes	No	No	No
0 1 1 0	Dt St Ofst*	Yes	Yes	No	No
0 1 1 1	Trk Ofst *	Yes	Yes	No	No
1 0 0 0	Int Diag *	No	No	Yes	No
1 0 0 1	St Byt/Sec*	No	No	Yes	No
1 0 1 0	St H o Val*	No	No	Yes	No
1 0 1 1	Reserved	-	-	-	-
1 1 0 0	Reserved	-	-	-	-
1 1 0 1	Reserved	-	-	-	-
1 1 1 0	St Conf *	Yes	Yes	No	No
1 1 1 1	Reserved	-	-	-	-

Note : *;Optional Command

TABLE 1-1 CMD DATA CONFIGURATION (ANSI STANDARD)

--HITACHI IDEA--

CMD Fctn Bit 15 - 12	CMD Function Definition	CMD Mod Bit 11-8	CMD SUB Bit 7-0	CMD PMT Bit 11--0	STA CONF Data to Ctlr
0 0 0 0	Seek	No	No	Yes	No
0 0 0 1	Recalibrate	No	No	No	No
0 0 1 0	Req Status	Yes	Yes	No	Yes
0 0 1 1	Req Conf	Yes	Yes	No	Yes
0 1 0 0	Sel Hd Grp*	No	No	Yes	No
0 1 0 1	Control	Yes	No	No	No
0 1 1 0	Dt St Ofst*	Yes	Yes	No	No
0 1 1 1	Trk Ofst *	Yes	Yes	No	No
1 0 0 0	Int Diag *	No	No	Yes	No
1 0 0 1	St Byt/Sec*	No	No	Yes	No
1 0 1 0	St H o Val*	No	No	Yes	No
1 0 1 1	ST TGT SEC**	No	No	Yes	No
1 1 0 0	Reserved	-	-	-	-
1 1 0 1	Reserved	-	-	-	-
1 1 1 0	St Conf *	Yes	Yes	No	No
1 1 1 1	Reserved	-	-	-	-

Note :* ;Optional Command
**;SET TARGET SECTOR COMMAND

TABLE 1-2 CMD DATA DEFINITION (HITACHI IDEA)

2. SET COMMAND CONFIGURATION

--ANSI STANDARD--

15 - 12 CMD MOD	11 - 8 SW NO	7 - 0 SW PMT
1 1 1 0	1 1 0 0	X - X 0 0 = Set Slave X - X 0 1 = Set Master

TABLE 2-1 SYNCHRONIZATION CMD CONFIGURATION (ANSI STD)

--HITACHI IDEA--

15 - 12 CMD MOD	11 - 8 SW NO	7 - 0 SW PMT
1 1 1 0	1 1 0 0	X - X 0 0 0 = Set "Index" Slave X - X 1 0 0 = Set "Sector" Slave X - X X 0 1 = Set Master X - X X 1 0 = Set Off Line X - X 0 1 1 = Set "Index" Master Control X - X 1 1 1 = Set "Sector" Master Control

TABLE 2-2 SYNCHRONIZATION CMD CONFIGURATION (HITACHI IDEA)

3. COMMAND SEQUENCE

3-1. SET "INDEX TO INDEX" MASTER/SLAVE CONFIGURATION

STEP 1: Master drive is set to (X01).
STEP 2: Slave drives are set to (000).
STEP 3: Attention and Status Response Bit 11 becomes "True" after spindles are synchronized.

Note : If above sequence are not taken, device reports Attention with Status Response Bit 11 "False". To clear this Attention, Host has to send Reset Attention CMD.

3-2. SET "INDEX TO SECTOR" MASTER/SLAVE CONFIGURATION

STEP 1: Slave drives shall be set offset sector number with SET TARGET SECTOR COMMAND (1011).
STEP 2: Master drive is set to (X01).
STEP 3: Slave drives are set to (100).
STEP 4: Attention and Status Response Bit 11 becomes "True" after spindles are synchronized.

Note : If above sequence are not taken, device reports Attention with Status Response Bit 11 "False". To clear this Attention, Host has to send Reset Attention CMD.

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3-3. RELIEVE MASTER/SLAVE CONFIGURATION

STEP 1: Slave drives are set to (X10).
STEP 2: Master drive is set to (X10).

Note : If above sequence are not taken, device reports Attention with Status Response Bit 11 "False". To clear this Attention, Host has to send Reset Attention CMD.

4. COMMAND DEFINITION

4-1. SET "INDEX" SLAVE (000)

This CMD sets the drive as a Slave drive and the drive starts to synchronize the "INDEX" pulse from the Master.

4-2. SET "SECTOR" SLAVE (100)

This CMD sets the drive to be synchronized with the Master drive "INDEX" pulse with pre-set offset sector number, which is specified by the "SET TARGET SECTOR" CMD.

4-3. SET MASTER (X01)

This CMD sets the drive as a Master drive and the Master drive starts to generate the "INDEX" pulse, over the synchronous spindle control line.

4-4. SET OFF LINE (X10)

This CMD sets the synchronized drives non-synchronized (normal) mode.

4-5. SET "INDEX" MASTER CONTROL (011)

This CMD sets the Slave drives begin to synchronize with the Master drive "INDEX" pulse.

4-6. SET "SECTOR" MASTER CONTROL (111)

This CMD sets the Slave drives begin to synchronize with the Master drive "INDEX" Pulse.

4-7. SET TARGET SECTOR (1011)

This CMD specifies the offset sector number to the Slave drive.