NCR CORPORATION

Intracorporation

NCR

Date   February 11, 1987

To   John Lohmeyer
Location X3T9.2 Vice Chairman

From   Terry Johnson
Location Controller Firmware Development
Extension (316) 688-8647

Subject **X3T9.2 SCSI-2 DRAFT PROPOSAL**

Attached is a proposal of an enhanced page for MODE SELECT
that defines additional flexible disk parameters for SCSI-2.
I met with Daniel Loski on February 6, 1987 and together we
defined the new parameters. This proposal presents my
understanding of our agreement. Mr. Loski has not had a
chance to review the document.

In addition to the new page, we recommend that the Density
Code (Byte 0) be eliminated from the Block Descriptor for
flexible disks.

TJ/kl

Attachment

cc: D. Bangle
      W. Burr, X3T9.2 Chairman
      M. Francis
      D. Loski

8.1.7.4   FLEXIBLE DISK DRIVE PARAMETERS

BIT BYTE	7	6	5	4	3	2	1	0
0	RESERVED	RESERVED	PAGE CODE					
1	PAGE LENGTH IN BYTES							
2	(MSB)	TRANSFER RATE						
3								(LSB)
4	NUMBER OF HEADS							
5	SECTORS PER TRACK							
6	(MSB)	DATA BYTES PER PHYSICAL SECTOR						
7								(LSB)
8	(MSB)	NUMBER OF CYLINDERS						
9								(LSB)
10	(MSB)	STARTING CYLINDER-WRITE PRECOMPENSATION						
11								(LSB)
12	(MSB)	STARTING CYLINDER-REDUCED WRITE CURRENT						
13								(LSB)
14	(MSB)	DRIVE STEP RATE						
15								(LSB)
16	DRIVE STEP PULSE WIDTH							
17	(MSB)	HEAD SETTLE DELAY						
18								(LSB)
19	MOTOR ON DELAY							
20	MOTOR OFF DELAY							

(CONTINUED)

1

BIT BYTE	7	6	5	4	3	2	1	0
21	TRDY	SSN	MO	RESERVED				
22	RESERVED					SPC		
23	WRITE PRECOMPENSATION LEVEL							
24	HEAD LOAD DELAY							
25	HEAD UNLOAD DELAY							
26	PIN 34				PIN 2			
27	PIN 4				RESERVED			
28	RESERVED							
29	RESERVED							
30	RESERVED							
31	RESERVED							

IMPLEMENTORS NOTE: **This page is mainly intended for defining parameters of flexible disk drives, but may be used for other devices, if applicable.**

The Transfer Rate indicates in kilobits per second the data rate of the peripheral device interface.

Transfer Rate

MSB	LSB	DESCRIPTION OF TRANSFER RATE
00h	FAh	250 kbit/second transfer rate
01h	2Ch	300 kbit/second transfer rate
01h	F4h	500 kbit/second transfer rate
03h	E8h	1 megabit/second transfer rate
07h	D0h	2 megabit/second transfer rate
13h	88h	5 megabit/second transfer rate

The number of Heads defines the physical number of heads used for data storage. Heads used for servo information are excluded.

The Sectors per Track defines the number of physical sectors on one surface of the medium under one head per revolution of the medium.

The Data Bytes per Physical Sector defines the actual number of bytes of user accessible data in a physical sector.

The Number of Cylinders defines the number of physical cylinders accessible by the controller and used for data storage. It excludes the cylinders used for landing zone.

The Starting Cylinder for Write Precompensation is the physical cylinder at which write precompensation is to begin. The first cylinder is number zero. The target shall return a **CHECK CONDITION** status with the sense key set to **ILLEGAL REQUEST** if the Starting cylinder for Write Precompensation exceeds the Number of cylinders.

The Starting cylinder for Reduced Write Current is the physical cylinder at which write current is reduced. The first cylinder is number zero. The target shall return a CHECK CONDITION status with the sense key set to ILLEGAL REQUEST if the Starting Cylinder for Reduced Write Current exceeds the Number of Cylinders.

The Drive Step Rate indicates the step rate in units of 100 microseconds (tenths of milliseconds). The target may round up to its nearest capable value. A value of zero requests the target to set its default value.

The Drive Step Pulse Width indicates the width of the step pulse in microseconds. The target may round up to its nearest capable value. A value of zero requests the target to set its default value.

The Head Settle Delay indicates the head settle time in units of 100 microseconds (tenths of milliseconds). The target may round up to its nearest capable value. A value of zero requests the target to set its default value.

The Motor On Delay indicates in tenths of a second the time which the target will wait before trying to access the medium after the motor on signal is assert, if a true ready signal is not available. The Motor on Delay indicates in tenths of a second the time which the target will wait for drive ready status before aborting a medium access if a true ready signal is available.

The Motor Off Delay indicates in tenths of a second the time which the target will wait before deasserting the motor on signal after an idle condition exists. A value of FFh indicates that the motor on signal is not to be deasserted. The **START/STOP UNIT** command is not affected by this parameter.

A True Ready (TRDY) bit of one indicates that the drive provides a signal which indicates that the medium is ready to be accessed.

A Start Sector Number (SSN) bit of one indicates that the starting sector number is one (standard). A bit of zero indicates that the starting sector number is zero (non standard).

A Motor On (MO) bit of one indicates that Pin 16 (motor on) will remain de-asserted. This bit shall be set to one when using high capacity (192 TPI) drives and their pre-formatted diskettes. A bit of zero indicates that Pin 16 (motor on) will be asserted.

The Step Pulse per cylinder (SPC) field is used to specify the number of additional step pulses required per cylinder. Non-zero values allow a drive to read a diskette formatted on a drive with a lower number of tracks per inch. For example, a value of "1" will allow a 96 TPI drive to access tracks on a diskette from a 48 TPI drive.

The Write Compensation Level is used to specify the level of write compensation to be used starting at the cylinder specified by the Starting Cylinder - Write Precompensation (bytes 10 and 11). The meaning of different levels and the correlation to actual write precompensation time values is vendor unique.

The Head Load Delay indicates the head loading time in milliseconds. The target may round up to its nearest capable value. A value of zero requests the target to set its default value.

The Head Unload Delay indicates the head unloading time in milliseconds. The target may round up to its nearest capable value. A value of zero requests the target to set its default value.

Pin 34 defines the usage of Pin 34 of the Flexible disk drive interface. This pin is used differently by drive vendors and drive models. The following settings allow the user to select how Pin 34 shall be interpreted by the controller.

```
BIT 7   6   5   4
-------------------

    P   0   0   0   OPEN
    P   0   0   1   READY
    P   0   1   0   DISK CHANGED
    P   0   1   1   RESERVED
    P   1   X   X   RESERVED-X is 0 OR 1
    :
    :
    :----- POLARITY BIT - "0" IS ACTIVE LOW,
                          "1" IS ACTIVE HIGH
```

4

Pin 2 defines the usage of Pin 2 of the Flexible disk drive interface. This pin is used differently by drive vendors and drive models. The following settings allow the user to select how Pin 2 shall be interpreted by the controller.

```
BIT 3   2   1   0
-------------------

    P   0   0   0   OPEN
    P   0   0   1   READY
    P   0   1   0   DISK CHANGED
    P   0   1   1   SPEED
    P   1   0   0   TRANSFER RATE
    P   1   0   1   DENSITY
    P   1   1   0   REDUCED WRITE CURRENT
    P   1   1   1   RESERVED
    :
    :------- POLARITY BIT - "0" IS ACTIVE LOW,
                            "1" IS ACTIVE HIGH
```

Pin 4 defines the usage of Pin 4 of the Flexible disk drive interface. This pin is used differently by drive vendors and drive models. The following settings allow the user to select how Pin 4 shall be interpreted by the controller.

```
BIT 7   6   5   4
--------------------

    P   0   0   0   OPEN
    P   0   0   1   IN USE
    P   0   1   0   EJECT
    P   0   1   1   HEAD LOAD
    P   1   X   X   RESERVED - X IS "0" OR
    :               "1"
    :------POLARITY BIT - "0" IS ACTIVE LOW,
                          "1" IS ACTIVE HIGH
```

5