Personal Computer Hardware Reference Library

High Capacity Diskette Drive

Contents

Notes:

Description

The IBM Personal Computer AT High Capacity Diskette Drive is a direct-access device that can store 1.2Mb of data on a dual-sided 5-1/4 inch diskette. All data format and access control is in the system. The following figure describes the type of high-density diskette required by this drive. Diskettes, which meet these specifications may not be used in either a 160/180Kb or a 320/360Kb diskette drive.

Characteristic	Requirement
Certification	Double Sided 96 TPI 80 Tracks/Surface Soft Sector
Recording Density	9,646 Bits Per Inch
Media Coercivity	600 to 650 Oersteds
Jacket	Standard 5-1/4 Inch

Diskette Requirements

The signals for operating the diskette drive are generated through the IBM Personal Computer AT Fixed Disk and Diskette Drive Adapter.

> **Note:** This drive also can read diskettes formatted for a 320/360Kb dual-sided drive or a 160/180Kb single-sided drive.

Interfaces

The diskette drive has two types of interface: control and dc power. The following show the signals and pin assignments for the control interface.

Signal Name	I/O	Signal Pin	Ground Pin
-Reduced Write	I	2	1
Reserved	-	4	3
-Drive Select 3	I	6	5
-Index	O	8	7
-Drive Select 0	I	10	9
-Drive Select 1	I	12	11
-Drive Select 2	I	14	13
-Motor On	I	16	15
-Direction Select	I	18	17
-Step	I	20	19
-Write Data	I	22	21
-Write Gate	I	24	23
-Track 00	O	26	25
-Write Protect	O	28	27
-Read Data	O	30	29
-Side 1 Select	I	32	31
-Diskette Change	O	34	33

Control Interface (P1/J1)

The signals and pin assignments for the dc power interface are as follows:

Signal Name	Pin
+12 Vdc	1
+12 Vdc Return	2
+5 Vdc Return	3
+5 Vdc	4

DC Power Interface (P2/J2)

All signals operate between +5 Vdc and ground with the following definitions:

Inactive Level: +2.5 to +5.25 Vdc

Active Level: 0.0 to +0.4 Vdc

All outputs from the drive can sink 40 mA at the active level. The system provides pull-up registers.

Input Signals

Following are descriptions of the input signals.

-Reduced Write

The inactive state of this signal indicates that high-density media is present requiring normal write currents, and the active state indicates low-density media is present, requiring a reduced write current.

-Drive Select 0, 1, 2, and 3

The Drive Select signals enable or disable all other drive interface signals, except '-motor on'. When '-drive select' is at the active level, the drive is enabled. When it is at the inactive level, all controlled inputs are ignored, and all drive outputs are disabled. The enabled or disabled condition of the drive is established within 500 nanoseconds after a change to the '-drive select' input, excluding head-load time and settling time.

-Motor On

The spindle motor runs when this input is active. The drive requires a 750 millisecond delay after '-motor on' becomes active before a read or write operation.

-Direction Select

If this input is at a inactive level the '-step' input signal moves the heads away from the drive spindle. An active level causes the opposite. This input is stable for a minimum of 1 microsecond before and after the trailing edge of the step pulse.

-Step

A 1-microsecond active pulse on this input causes the read/write heads to move one track. The state of '-Direction Select' at the trailing edge of the Step pulse determines the direction of motion.

-Write Data

A 150-nanosecond pulse on this input causes a bit to be written on the disk if '-Write Gate' is active. These pulses may occur with either a 2, 3, 3.3, 4, 5, or 6.67-microsecond spacing ±0.5%. When Write Gate is inactive, pulses do not appear on this input.

-Write Gate

An active level of this input enables the write current circuits, and the '-Write Data' input controls the writing of information. Transitions of this line occur 4 to 8 microseconds before the first significant data bit, and 4 to 8 microseconds after the last significant data bit. Making this input inactive removes all current from the read/write heads and allows the read circuits to operate within 590 microseconds. All motor-start, head-settle, and head-load times are complied with before the line becomes active.

-Side 1 Select

This signal determines which side of the two-sided diskette will be used for reading or writing. An inactive level of this signal selects the read/write head on the 0 side of the diskette; an active level selects the 1 side. A 100-microsecond delay must be allowed after switching from one head to the other before starting to read or write.

Output Signals

Following are descriptions of the output signals.

-Index

When a diskette's index hole aligns with the hole in the diskette jacket, a 1- to 8-millisecond active pulse is generated on this line.

-Track 00

This signal is active when the upper head is on Track 00.

-Write Protect

An active level of this signal means that a diskette without a write-protect notch is in the drive. The drive will not write when a protected diskette is loaded.

-Read Data

Each bit detected provides a 150-nanosecond active pulse on this line. These pulses may occur with either a 2, 3, 3.33, 4, 5, or 6.67-microsecond spacing $\pm 0.5\%$.

-Diskette Change

This output is active unless a diskette is present and a step pulse is received when the drive is selected.

Drive-in-Use Indicator

The Drive-in-Use indicator lights when the drive is selected.

Specifications

The following figures show the physical and performance specifications for this drive.

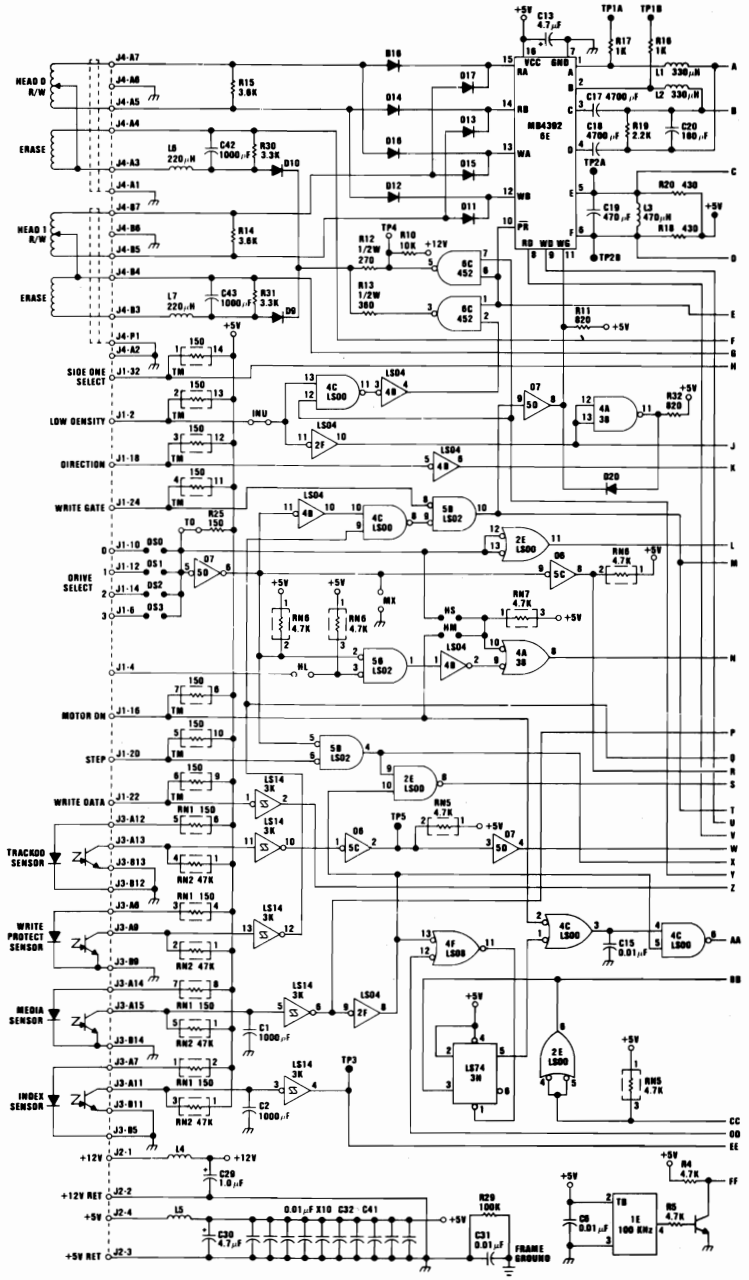
Power Dissipation	11 W (TYP)
Operating Limits	Ambient Temperature 5 to 46 Degrees Celsius (41 to 114.8 Degrees Fahrenheit) Relative Humidity 20 to 80 % Maximum Wet Bulb 29 Degrees Celsius (84 Degrees Fahrenheit)
Non-operating Limits	Ambient Temperature -40 to 60 Degrees Celsius (-40 to 140 Degrees Fahrenheit) Humidity no Condensation
Mechanical Dimensions	Width 146.0 mm (5.8 in) Height 41.0 mm (1.6 in) Depth 203.2 mm (8 in)
Weight	1.6 kg

Physical Specifications

Capacity Unformatted	1604Kb
Capacity Formatted	
15 Sectors Per Track	1.2Mb
Recording Density	9646 Bits Per Inch
Track Density	96 TPI
Cylinders	80
Tracks	160
Encoding Method	MFM
Rotational Speed	360 RPM
Transfer Rate	500K Bits/Second
Latency (Average)	83 ms
Access Time	
Average	91 ms
Track to Track	3 ms
Settling Time	18 ms
Head Load Time	50 ms
Motor Start Time	750 ms

Performance Specifications

Logic Diagrams



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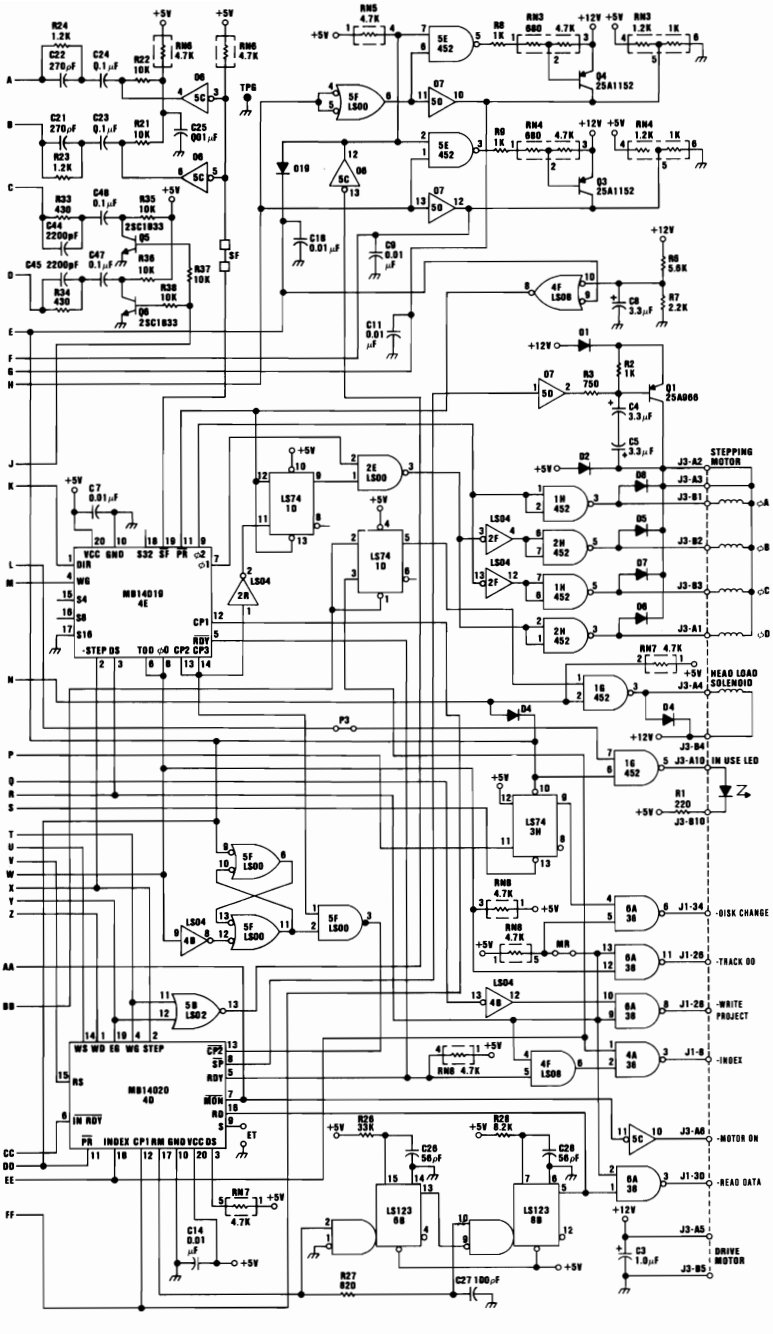

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