Personal Computer Hardware Reference Library

Double Sided Diskette Drive

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Description

The IBM Personal Computer AT Double Sided Diskette Drive is a direct-access device that can store 320/360Kb 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 diskette required by this drive.

Characteristic	Requirement
Certification	Double-Sided 48 TPI 40 Tracks/Surface Soft Sector
Recording Density	5876 Bits Per Inch
Media Coercivity	300 to 350 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.

Interfaces

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

Signal Name	I/O	Signal Pin	Ground Pin
Reserved	-	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
Reserved	-	34	33

Control Interface (P1/J1)

Following are the signals and pin assignments for the dc power interface.

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

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

All input signals are active when low.

Drive Select 0 through 3

These '-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 select input, excluding head-load time and settling times.

-Motor On

An active level of this signal starts the drive motor. There must be a 750 millisecond delay after '-motor on' becomes active before any read or write operation starts.

-Direction Select

This signal determines the direction the read/write head moves when the step signal is pulsed. An active level indicates away from the center of the diskette (out); an inactive level indicates toward the center of the diskette (in). Any change in the '-direction select' signal must be made at least 1 microsecond before the leading edge of the step pulse, and at least 1 microsecond after the trailing edge of the step pulse.

-Step

This signal causes the read/write heads to move in the direction determined by the '-direction select' signal. Motion is started

each time the signal changes from an active to inactive level (at the trailing edge of the pulse).

-Write Data

Each time this signal changes from the inactive to active level, the current through the read/write heads reverses, and writes a data bit. This signal is enabled when '-write gate' is at the active level. A 250-nanosecond active pulse of this signal causes a bit to be written on the diskette. These pulses may occur with either a 4, 6, or 8-microsecond spacing (±0.5%).

-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. After deactivating '-write gate', deactivation of '-drive select' and '-motor on', and changing '-side 1 select' must be delayed 1 millisecond, because the erase head is active for this period.

-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

-Index

When the drive senses the index hole in the diskette, it generates a 1- to 8-microsecond active pulse on this line.

-Track 00

An active level of this signal means that the read/write heads are at Track 00 (the outermost track).

-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

A 250-nanosecond active pulse is provided on this line for each bit detected on the diskette. These pulses may occur with either 4, 6, or 8-microsecond spacing.

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.

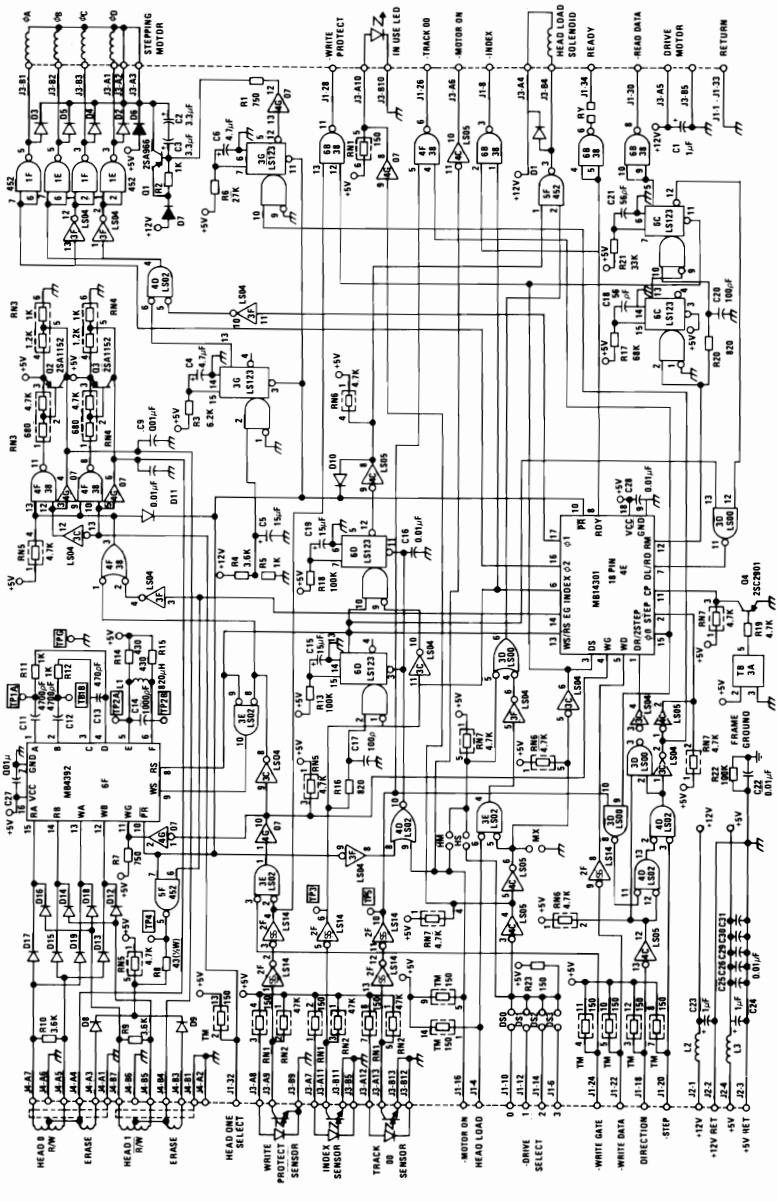
Power Dissipation	11 W (Typical)
Operating Limits	Ambient Temperature 5 to 46 Degrees C (41 to 114.8 Degrees Fahrenheit) Relative Humidity 20 to 80 % Maximum Wet Bulb 29 Degrees Celsius (84 Degrees Fahrenheit)
Non-Operating Limits	Ambient Temperature -40 to 60 Degrees C (-40 to 140 Degrees Fahrenheit) 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	500Kb
Capacity Formatted:	
9 Sectors Per Track	368.6Kb
8 Sectors Per Track	320.0Kb
Recording Density	5876 Bits Per Inch
Track Density	48 TPI
Cylinders	40
Tracks	80
Encoding Method	MFM
Rotational Speed	300 RPM
Transfer Rate	250K Bits/Second
Latency (Average)	100 ms
Access Time:	
Average	81 ms
Track to Track	5 ms
Settling Time	20 ms
Head Load Time	50 ms
Motor Start Time	750 ms

Performance Specifications

Logic Diagrams



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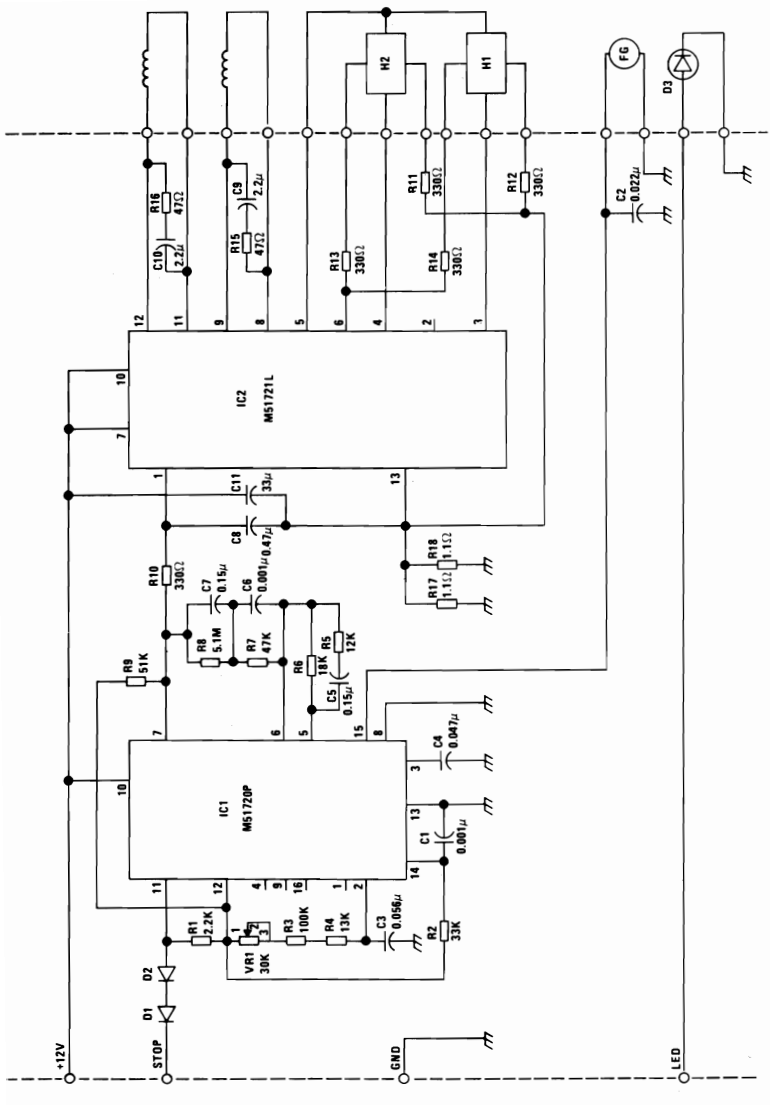

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