

Update June 28, 1996

Models WDA-240 & WDA-280

IBM Hard Disk Drive

<http://www.storage.ibm.com/storage/techsup/hddtech/hddtech.htm>

FEATURES

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- 43/86MB formatted capacity (512 bytes/sector)
- AT standard interface
- Integrated controller
- IBM PC-AT Task File Architecture
- 1:1 interleave
- 1,7 Run-Length Limited (RLL) encoding
- 32KB Read look-ahead buffer
- Self diagnostics on power up
- Automatic retry and data correction on read errors
- No preventative maintenance required
- Media data transfer rate: 11.1 Mbits/Sec
- Closed loop actuator servo (embedded sector servo)
- Rotary voice coil actuator
- Automatic actuator lock
- Dedicated head landing zone
- Average seek time = 18.5 mS (WDA-240)
16.5 mS (WDA-280)
- All axis (6 directions) mounting permitted
- MTBF 150,000 hours

PERFORMANCE

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	WDA-240	WDA280
Media Read/Write, Data Transfer Rate in Mbits/Second	11.1	11.1
Seek times (in mS):		
Single Track	5.0	5.0
Average Length	18.5	16.5
Full Length	29.5	29.5
Power ON to Drive Ready	6 Sec (ave)	
Power OFF to Spindle Stop	5 Sec (max)	

DATA ORGANIZATION

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	WDA-240	WDA-280
Physical Layout		
Bytes per Sector	512	512
Total Data Sectors	84150	168300
Total Data Bytes	43,084,800	86,169,600
Sectors per Track	38	38
Sectors per Cylinder	75	150
Spare Sectors per Cylinder	1	2
Numbers of Data Heads	2	4
Numbers of Disks	1	2
Logical Layout		
Logical Heads	8	10

Sectors/Track	17	17
Logical Cylinders	619	989
Data Bytes	43,032,576	85,995,520

DC POWER REQUIREMENTS

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Supply Voltage (single supply)	+5 Volts
Voltage Tolerance (incl. Ripple)	+/-250mV
Ripple (0-20 MHz)	100mVp-p

Power Supply Current (average value in Amps)	Logic	Motor
-----	-----	-----
WDA-240		
Spin-up	0.13	0.57
Seek	0.37	0.08
Write	0.36	0.08
Read	0.36	0.08
Idle	0.18	0.08
Standby	0.06	-
WDA-280		
Spin-up	0.13	0.71
Seek	0.38	0.09
Write	0.37	0.09
Read	0.37	0.09
Idle	0.19	0.09
Standby	0.06	-

Power Consumption (average value in Watts)	WDA-240	WDA-280
-----	-----	-----
Spin-up	3.5	4.4
Seek	2.5	2.6
Write	2.2	2.3
Read	2.2	2.3
Idle	1.3	1.4
Standby	0.3	0.3

Notes:

A soft reset is not required to exit 'Standby' mode
(the drives can respond to I/F commands while they are in 'Standby').
When a 'Sleep' command is issued, the drives go into 'Standby' mode
which allows a faster response than from 'Sleep' mode.

ELECTRICAL INTERFACE

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Drive Address

A jumper fitted to position JP-1 will select drive address 0 (Master).
If no jumper is installed, the drive address is 1 (Slave).

Interface Connector

The drive connector is 2mm pitch. AMP, DuPont, and Hirose all make
suitable mating connectors.

Cabling

Maximum cable length from host system to HDD shall not exceed 18 inches (45.7cm).

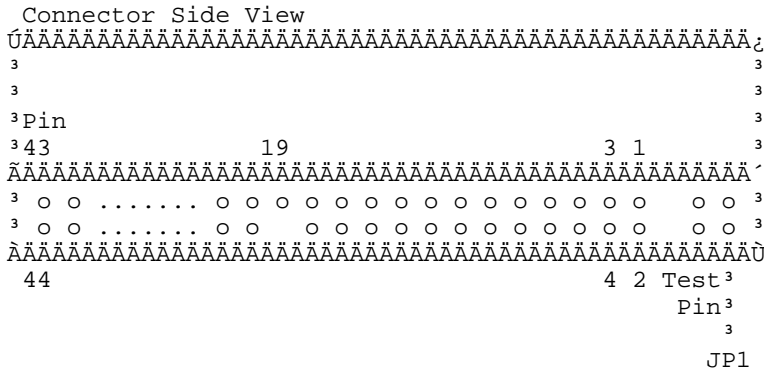


Figure 1 44 pin AT connector and jumper pin

OPERATING MODES
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Description

Spin-Up

The time taken for the motor to reach full speed from a stopped or powered down condition.

Seek, Read, Write

Seek, Read, or Write operating modes.

Idle

Spindle motor and servo system working, all modules (except servo control and interface) are 'sleeping'. Commands can be received and processed immediately.

Standby

Spindle motor is stopped, all modules (except interface) are 'sleeping'. The drive is waiting for an interrupt and commands can be processed immediately. This is the lowest power dissipation mode.

SIGNAL DEFINITION
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The pin assignments of interface signal are listed as follows:

PIN	Signal	I/O	PIN	Signal	I/O
01	-HRESET	I	02	GND	
03	HD07	I/O	04	HD08	I/O
05	HD06	I/O	06	HD09	I/O
07	HD05	I/O	08	HD10	I/O
09	HD04	I/O	10	HD11	I/O

11	HD03	I/O	12	HD12	I/O
13	HD02	I/O	14	HD13	I/O
15	HD01	I/O	16	HD14	I/O
17	HD00	I/O	18	HD15	I/O
19	GND		(20)	Key	
21	(Resv)		22	GND	
23	-HIOW	I	24	GND	
25	-HIOR	I	26	GND	
27	IORDY	O	28	(Resv)	
29	(Resv)		30	GND	
31	HIRQ	O	32	-HIOCS16	O
33	HA01	I	34	-PDIAG	I/O
35	HA00	I	36	HA02	I
37	-HCSO	I	38	-HCS1	I
39	-DASP	I/O	40	GND	
41	+5V Logic		42	+5VMaster	
43	GND		44	-XT/AT	I

Note:

 "O" designates an output from the Drive.
 "I" designates an input to the Drive.
 "I/O" designates an input/output common.
 "PWR" designates a power supply to the Drive.
 "(Resv)" designates reserved pins and all of these
 have to be left unconnected.

Note:

 There are two input pins for the +5 Volt supply, the '+5V LOGIC' line is connected to the internal logic circuits and the '+5V MOTOR' line connects to the spindle motor and associated drivers. This allows the user to reduce power consumption by switching the '+5V LOGIC' supply on and off. The '+5V MOTOR' line should be connected directly into the system power supply to minimize voltage drop caused during motor spin-up, etc.

If this power management option is applied, all signal lines that will be electrically active in the host system while the Drive is disconnected from 5 volt logic supply must be isolated through "TRI-STATE" drivers.

For normal installation of these drives, connect the '+5V LOGIC' and '+5V MOTOR' lines together.

Command Description
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The following Commands are supported by the Drive:

Commands	(HEX)
-----	-----
Check Power Mode	(E5)
Execute Drive Diagnostics	(90)
Format Track	(50)
Identify Drive	(EC)
Idle	(E3)
Idle Immediate	(E1)
Initialize Drive Parameters	(91)
Read Buffer	(E4)
Read Long (retry)	(22)
Read Long (no retry)	(23)
Read Multiple	(C4)

Read Sectors (retry)	(20)
Read Sectors (no retry)	(21)
Read Verify Sectors (retry)	(40)
Read Verify Sectors (no retry)	(41)
Recalibrate	(1X)
Seek	(7X)
Set Features	(EF)
Set Multiple	(C6)
Sleep	(E6)
Standby	(E2)
Standby Immediate	(EO)
Write Buffer	(E8)
Write Long (retry)	(32)
Write Long (no retry)	(33)
Write Multiple	(C5)
Write Sectors (retry)	(30)
Write Sectors (no retry)	(31)
Write Verify	(3C)

OPERATING ENVIRONMENT
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Humidity:

Operating Relative 8% to 90% noncondensing
Nonoperating Relative 5% to 95% noncondensing

Wet Bulb Temperature:

Maximum Wet Bulb:
Operating 29.4 degrees Centigrade noncondensing
Nonoperating 35.0 degrees Centigrade noncondensing

Elevation:

Operating Altitude -100 to 3000m
Ship/Storage Altitude -300 to 12000m

Temperature:

Operating 5 to 55 degrees Centigrade
Storage -40 to 65 degrees Centigrade
Shipping -40 to 65 degrees Centigrade
Temperature Gradient 15 degrees Centigrade per hour (maximum)
(Operating, Storage and Shipping)

Air Cooling Requirement

The host system must provide sufficient air flow across the drive to maintain the temperature at less than 60 degrees Centigrade (measured at the center of the drives' top cover).

Operating and Nonoperating Vibration

Due to the complexity of this subject, we recommend that users contact the Distributor to discuss how to perform the necessary measurements if they believe this to be an area which requires evaluation.

Operating Shock

The drive will withstand (with no hard error) a 10G half-sine wave shock

pulse of 11mS duration.

Non-Operating Shock

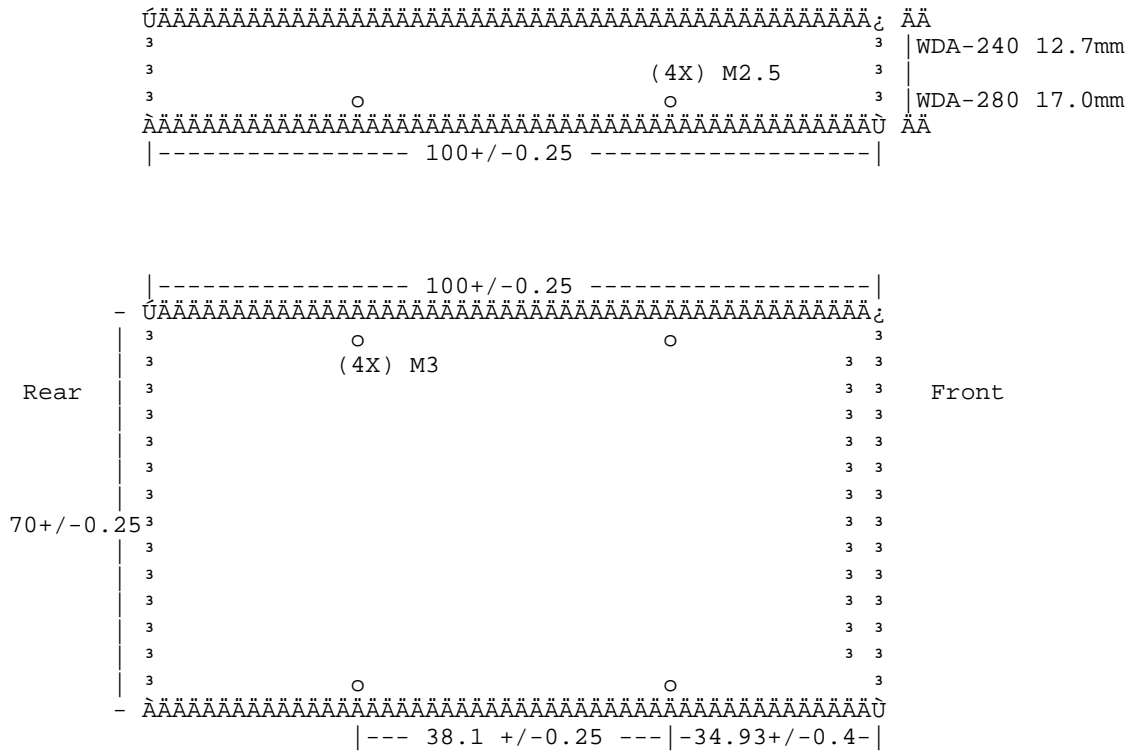
 The drive will withstand (with no permanent damage or loss of data)
 a 100G half-sine wave shock pulse of 11mS duration.

MECHANICAL DATA
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Dimensions	WDA-240	WDA-280
Height	12.7 +0.35mm -0.3mm	17.0 +0.35mm -0.3mm
Width	70+/-0.25mm	70+/-0.25mm
Depth	100+/-0.25mm	100+/-0.25mm
Weight	140g maximum	180g maximum

Mounting Orientation:

 The Drive can be mounted horizontally, or vertically, on either side.



Note: Maximum screw lengths must not be exceeded.

ELECTROMAGNET COMPATIBILITY:

 The Drive meets the following EMC requirements when installed in the user
 system and exercised with a random accessing routine at maximum data rate:
 - United States Federal Communication Commission (FCC) Rules and
 Regulations, Part 15, Subject J--Computer Devices, "Class B Limits."

- European Economic Community (EEC) directive #76/889 related to the control of radio frequency interference and the Verband Deutscher Elektrotechniker (VDE) requirements of Germany (GOP).

WARNING:

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This disk drive can be damaged by Electrostatic Discharge; please follow recommended ESD procedures before unpacking or handling the drive. Ask your Dealer for details if you need assistance.

PACKAGING:

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The drive must be protected against Electrostatic Discharge especially when being handled. The safest way to avoid damage is to put the drive in an antistatic bag before ESD wrist straps etc, are removed.

Drives should only be shipped in approved containers; severe damage can be caused to the drive if the packaging does not adequately protect against the shock levels induced when a box is dropped. Consult the dealer if you do not have an approved shipping container.

This data sheet is not a substitute for the full product specification which should be used when detailed information is required.

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