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Digital Equipment Corporation

ENGINEERING SPECIFICATION

Date: March 4, 1998

Title: PCXRA-AR 2.1GB UDMA IDE Interface 3 1/2" Disk Drive

REVISIONS						
REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A	Release to ECO Control	Intial	P. Raikunen	9/97	B. McLane	9/97
B	ECO	#1	D. Pham	1/9/98	B. McLane	1/9/98

ECO History:

* Document Initial Released 9/97 at rev A
  To release the Quantum Ultra DMA/33 ST2.1A drive with Firmware rev: A0F.08 and A0F:0E
  Digital p/n PCXRA-AR A01 and A03
* ECO#1 1/9/98 document rev B
  To reflect the newer Quantum UDMA Fireball SE2.1A FW: API.0C drive as the replacement for the ST2.1A
  Digital p/n PCXRA-AR rev. A04

Engineer	Approved	Size	Code	Number	Rev
D. Pham	**B. McLane**	**K**	**SP**	**PCXRA-AR-DBT**	**B**
		Sheet 1 of 1			

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Title: PCXRA-AR 2.1GB UDMA IDE Interface 3 1/2" Disk Drive

GENERAL DESCRIPTION:

This specification defines the detailed requirements of a 3 1/2 inch, 2.1 gigabyte (formatted) disk drive with an Integrated Drive Electronics (IDE) Interface. This disk drive, which is a low cost, random-access, rotating memory device stores data in fixed-length blocks on rigid media disks. The storage medium contained within the drive is in a fixed, non-operator-removable configuration

APPLICABLE DOCUMENTS (per latest revision on date of order):

International Organization For Standardization Standards:

ISO DIS 7779	Acoustics: Measurement of Noise Emitted from Computer Business Equipment - Second draft proposal June, 1982
ISO 9000	Quality Management and Quality Assurance

Federal Communications Commission:

FCC Part 15, Subpart B for class B equipment in an enclosure

Underwriter's Laboratories, Inc.

UL-STD-1950	Safety of information Technology Equipment with sub clauses 1-7 Applicable Appendix and Supplement B.

Canadian Standards Association:

CSA-STD-C22.2	No. 950 Safety of Information Technology Equipment including Electrical Business Equipment.

International Electrotechnical Commission:

EN-60950(IEC 950)	Safety of Telecommunications Apparatus including Information Processing Equipment

C.I.S.P.R.-22 Class B

Title: PCXRA-AR 2.1GB UDMA IDE Interface 3 1/2" Disk Drive

The Council of European Communities:

89/366/EEC	C E Mark

SFF Committee:

SFF-8035i	Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T.)

Quantum Corporation:

81-114823-01	Quantum Fireball SE2.1A Product Manual

2.0 Drive Requirements:
This drive will comply to the product description in the supplier's product manual, for the Quantum SE2.1A and this specification.

2.1 Drive Performance:
The following parameters are the minimum requirements to meet this product specification.

A. Formatted Capacity:

Per Drive (megabytes)	2,111
Per Block(bytes)	512
Blocks per Drive(User)	4,124,736
Interleave	1:1

B. Transfer Rate:

To/From Media (Max)	19.75 Mbyte/sec
To/From Buffer (Max)	16.67 Mbyte/sec PIO Mode 4
To/From Buffer (Max)	16.67 Mbyte/sec DMA Mode 2
To/From Buffer (Max)	33.00 Mbyte/sec UDMA Mode 2
Buffer Size	128 Kbyte

C. Seek Time:(all times are nominal)

Track to Track (msec)	2.0
Average Read (msec)	9.5
Average Write (msec)	11.0
Full Stroke (msec)	20.0

D. All times are for nominal power and environmental conditions. Average seek time is determined by dividing the total time required to seek between all possible pairs of track addresses in the forward and reverse direction, by the total number of these possible seeks.

Average Rotational Latency	5.56 msec	
Rotational Speed (± 0.5%)	5400 RPM	
Power-on to Drive Ready	Typical: 11 sec	Worst case: 45 sec
Standby to Interface Ready	Typical: 6 sec	Worst case: 45 sec
Spindown - Standby Command	Typical: 6 sec	Worst case: 15 sec
Spindown - Power Loss	Typical: 12 sec	Worst case: 30 sec

2.2 Drive Logical Parameters:

Cylinders	4,092
Heads	16
Sectors	63
Blocks per Drive	4,124,736

3.0 Physical Specifications:

3.1 Mechanical Dimensions (See Figure 1):

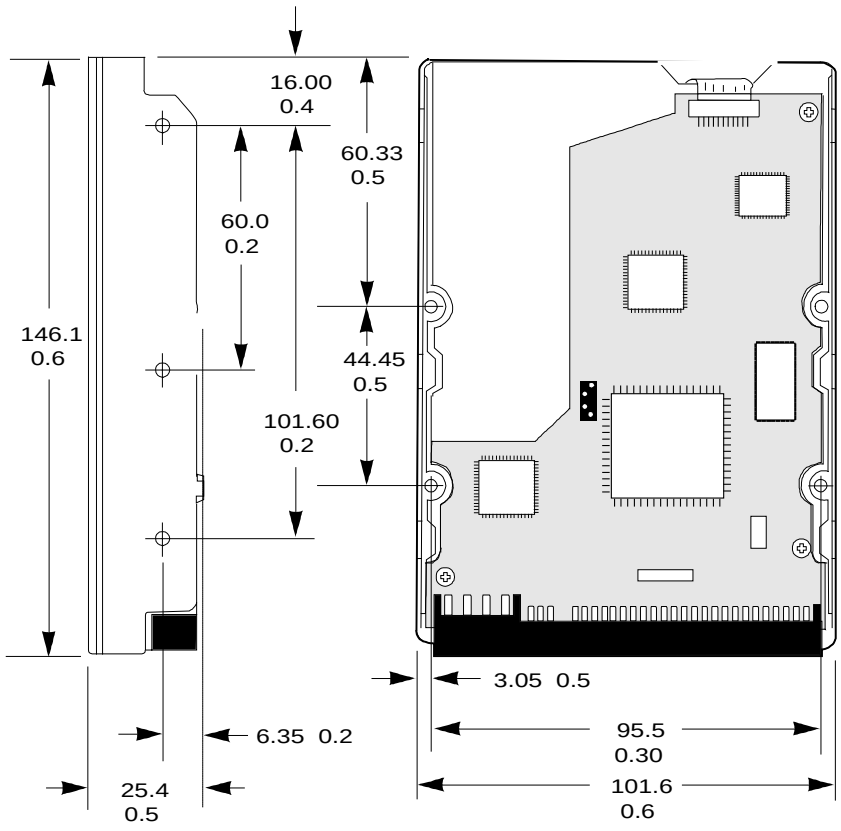
Height (Max)	25.90 mm (1.02 Inches)
Width (Max)	102.20 mm (4.02 Inches)
Depth (Max)	146.70 mm (5.77 Inches)
Weight (Max)	0.549 Kg (1.21 Pounds)

3.2 Drive Mounting:

The mounting holes allow the drive to be mounted in any orientation. For mounting, #6-32 x 1/4 UNC screws are recommended. Mounting screw torque should be 8 lbf-inch maximum.

NOTE: Caution should taken to ensure that the mounting screws do not damage the drive PCBA

Figure 1: Typical Drive Mounting Dimensions



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4.0 Power Requirements:

Supply Voltage Requirement: The voltages required to operate the drive are +5VDC ±5%, and +12VDC ±10% measured at the interface side of the power connector referenced to it's associated return ground. Maximum power supply ripple allowed: 100 mV(+5V) 250 mV(+12V) peak to peak, 0-20 MHz.

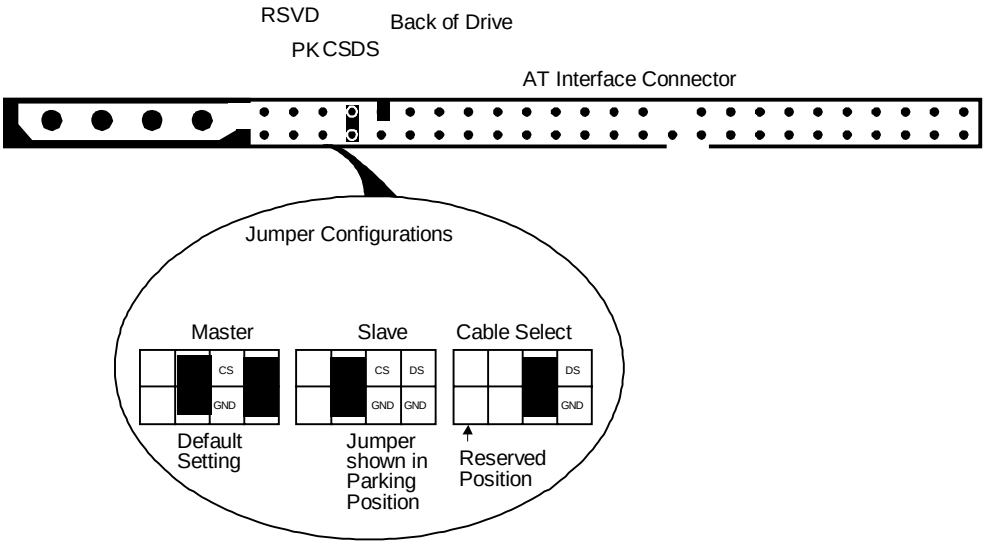
4.1 Drive Current Requirements: All values are typical except Spin-up Mode.

Mode	12V +/- 10%	5VDC +/- 5%	Power
Max Seek	780 ma	520 ma	12.0 W
R/W On Track	270 ma	650 ma	6.5 W
Idle	240 ma	420 ma	5.0 W
Standby/Sleep	18 ma	170 ma	1.1 W
Spin-up(Max)	1,650 ma	650 ma	23.0 W

5.0 Acoustics: at Idle 35 dBa Max @ 1 meter

6.0 Jumper Configuration:

DS Drive Select
PK Jumper Parking Position
CS Cable Select



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7.0 AT Interface connector pin assignments:

7.1 In the following table:
- indicates active low signal.
Direction(Dir) is with respect to the drive.
IN indicates input to the drive.
OUT indicates output from the drive.
I/O indicates the signal is bi-directional
Reserved pins/ground do not have direction
PDIAG- and DASP- are used for communication between the Master and Slave drives.

Pin	Signal	Dir	Pin	Signal	Dir
1	RESET-	IN	2	Ground	-
3	Data Bit 7	I/O	4	Data Bit 8	I/O
5	Data Bit 6	I/O	6	Data Bit 9	I/O
7	Data Bit 5	I/O	8	Data Bit 10	I/O
9	Data Bit 4	I/O	10	Data Bit 11	I/O
11	Data Bit 3	I/O	12	Data Bit 12	I/O
13	Data Bit 2	I/O	14	Data Bit 13	I/O
15	Data Bit 1	I/O	16	Data Bit 14	I/O
17	Data Bit 0	I/O	18	Data Bit 15	I/O
19	Ground	-	20	Key	No Pin
21	DMARQ	OUT	22	Ground	-
23	DIOW- STOP	IN	24	Ground	-
25	DIOR- HDMARDY- DMA ready on data in bursts HSTROBE Data strobe on data out bursts	IN	26	Ground	-
27	IORDY DDMARDY- DMA ready on data out bursts DSTROBE Data strobe on data in bursts	OUT	28	CSEL	-
29	DACK1-	IN	30	Ground	-
31	INTRQ	OUT	32	Reserved	-
33	DA1	IN	34	PDIAG-	I/O
35	DA0	IN	36	DA2	IN
37	CS1FX-	IN	38	CS3FX-	IN
39	DASP-	I/O	40	Ground	-

7.2 Interface Connectors:
The recommended connectors and their numbers are shown below:

7.3	40-Pin Connector	3M 3417-7000 or equivalent
	Strain Relief	3M 3448-2040 or equivalent
	Flat Cable(Stranded 28 AWG)	3M 3365-40 or equivalent
	Flat Cable(Stranded 28 AWG)	3M 3517-40 (shielded) or equivalent

Note: The Maximum cable length is 45.7 cm(18 in), to key the IDE mating connector you must plug the hole at pin 20.

7.4 DC Power Connector:

4-pin power connector	AMP P/N 84069-1 or equivalent
Loose-piece contacts	AMP P/N 61173-4 or equivalent
Strip contacts	AMP P/N 350078-4 or equivalent
Strip contacts	Molex P/N 39-00-0023 or equivalent
Loose-piece contacts	Molex P/N 39-00-00341 or equivalent

8.0 Reliability:

8.1 MTBF:

The disk drive shall demonstrate 500,000 hours MTBF as measured by the Ongoing Reliability Test and schedule defined in Exhibit "C" of the Basic Order Agreement.

9.0 Drive Ship Configuration: The following drive parameters will be set at the factory prior to shipment.

9.1 Quantum Jumper Configuration:

DS Jumpered.
PK Jumpered.

9.2 Quantum Configuration page:

Byte 32

Prefetch Enable	Enabled
Cache Enable	Enabled

Byte 36

Auto Write Reallocation Enable	Enabled
Auto Read Reallocation	Enabled
Read Continuous	Disabled
Enable Early Correction	Disabled
Disable Correction	Disabled

Byte 37

Number of Retries	Set to Eight

Byte 38

ECC Correction Span	Set to 24

Byte 39

Write Cache Enable	Enabled
Reallocate Uncorrectable Errors	Enabled