

Hardcard™ 40. The leading high-performance hard disk expansion board.

Plus



Hardcard™ 40



Hardcard™ 40 is only one inch wide, enabling 42.26MB to fit easily into a single, full-length expansion slot in an IBM® PC™, XT™ or AT™ without compromising adjacent slots.

Hardcard 40 has been tested fully to assure compatibility with the IBM PC, XT, AT; COMPAQ® Portable™, Portable II™, Deskpro 286™ and other Plus-approved leading compatibles.

A complete hard disk sub-system, Hardcard 40 integrates miniaturized versions of proven Winchester technologies, readily available components and custom VLSI circuit designs. Hardcard 40 uses two 3.5 inch (95mm OD, 25mm ID) thin film disks, along with four mini-composite heads. A rotary voice coil actuator provides fast access speeds, with

an average seek time of only 35 ms in the default configuration of two-21.13MB volumes. An optical position encoder and a patented wedge servo ensure accurate positioning of the heads over the disks. An interleave of 3 is utilized to increase the effective system transfer rate of Hardcard 40 across the IBM PC bus.

Whenever power is interrupted, Hardcard 40's read/write heads are automatically retracted to a non-data area called the landing zone. Hardcard 40's patented AIRLOCK® mechanism then locks the heads in the landing zone until power is restored. This gives Hardcard 40 much greater resistance to shock than is typical for hard disk drives. The drive can withstand shock

of up to 100 G non-operating and 10 G operating, making it ideal for use in portables.

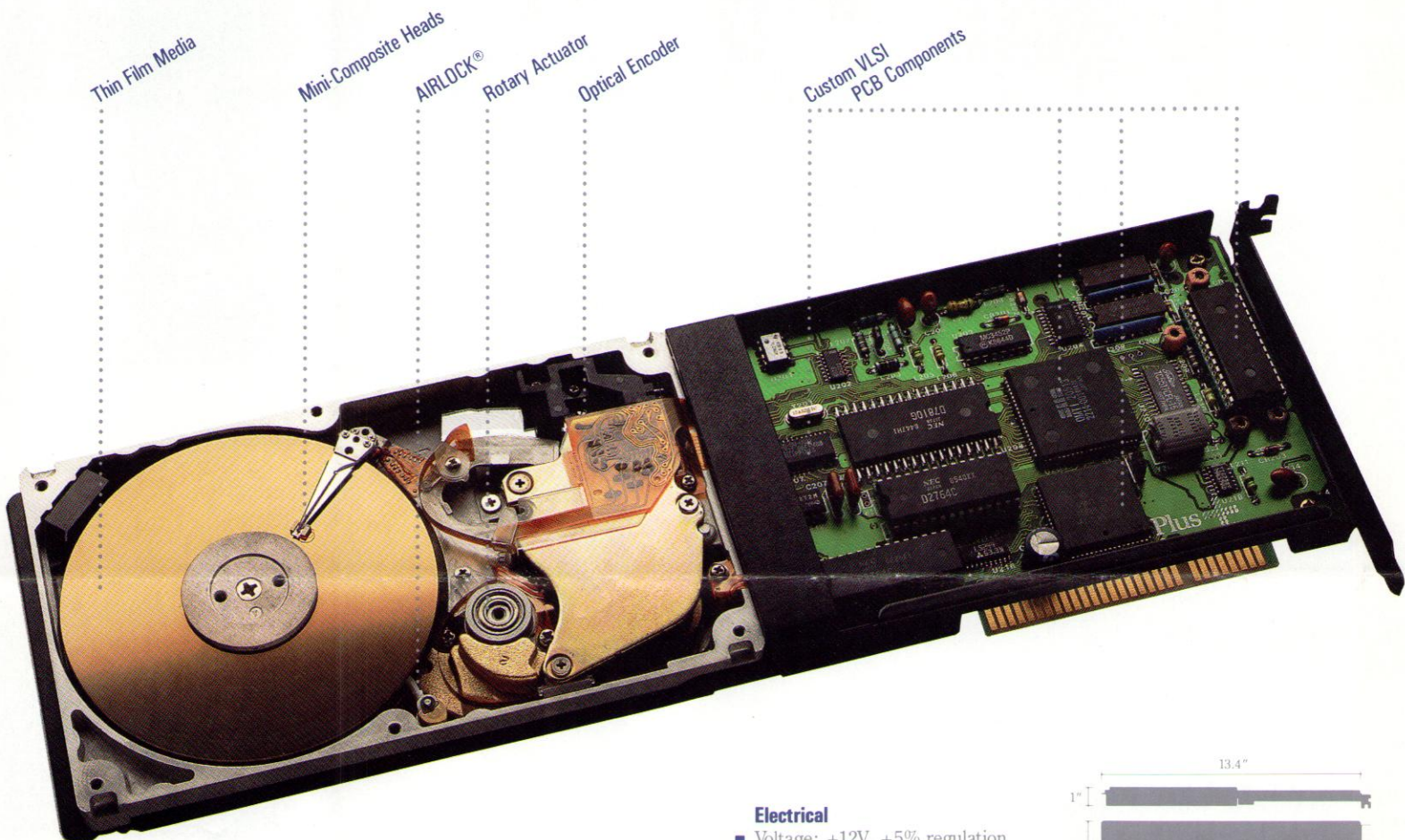
The power draw for Hardcard 40 is only 8 watts, making it the lowest power 40MB product on the market. The controller, which is integrated on a single printed circuit board (PCB) with the drive electronics, consists of VLSI circuitry and is implemented in CMOS for reduced power consumption.

Hardcard 40 uses proven technology and fewer parts to achieve a mean time between failure (MTBF) rating of 40,000 power on hours (POH). This MTBF is better than the current industry norm for personal computer mass storage drives. Because Hardcard is a more reliable product, Plus backs it

with a One Year Limited Warranty.

Hardcard 40 comes pre-configured as two-21.13MB volumes and includes a diskette with set-up software. If desired, the two volume configuration can be changed easily with the included software. Several different volume definitions can be set up through menu selections, e.g. four-10MB volumes or three-14MB volumes can be selected. In addition, the menu includes a Manual Volume Definition option for custom defining the number and sizes of Hardcard 40's volumes.

Plus 



Thin Film Media

Mini-Composite Heads

AIRLOCK®

Rotary Actuator

Optical Encoder

Custom VLSI
PCB Components

Physical

- Environmental limits:
- Ambient temperature
 - Storage/shipping: -40 to +62C
 - Operating: +4 to +50C
- Ambient relative humidity
 - Storage/shipping: 5% to 95% RH
 - Operating: 8% to 80% RH
- Altitude
 - Storage: 30,000 ft (9.1 km)
 - Operating: 10,000 ft. (3.0 km)
- Shock
 - Storage (½ sine wave 10 ms): 100 G
 - Operating (½ sine wave 10 ms): 10 G
- Vibration
 - Storage (10-500 Hz P-P): 2.0 G
 - Operating (10-500 Hz P-P): 0.5 G
- EMI (Electro-Magnetic Interference): FCC Class B
- Acoustic noise output: 45 DBA
- Thickness: 1.0 inch (25.4 mm)
- Height: 4.2 inches (106 mm)
- Length: 13.4 inches (341 mm)
- Weight: 2.1 lbs (950 gm)

Operational Features

- Industry standard IBM PC slot bus
- Hardware 48 bit ECC polynomial with up to 11 bit burst correction
- Sector interleave: 3
- Automatic head retract to landing zone and lock when powered down

Performance

- Formatted capacity: 42.26 Mbytes
- Typical seek times: (includes settle time)

Volume	Single	Average	Full
Size	Track	Length	Stroke
10MB	10 ms	29 ms	40 ms
20MB	10 ms	35 ms	55 ms
30MB	10 ms	39 ms	65 ms
40MB	10 ms	40 ms	78 ms
- Average latency: 10 ms

Computer Interface

- DMA channel 3
- Interrupt request level 5
- PC/XT jumper selectable:
- Controller number PC:0, XT:1
- Bios address PC: C8000H, XT: CA000H
- Port address PC: 320H-323H, XT: 324H-327H

Electrical

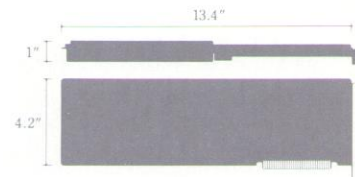
- Voltage: +12V, ±5% regulation
+5V, ±5% regulation
- Ripple and noise: 100 mV P-P (12V)
50 mV P-P (5V)
- Current demand
 - Average: .48 A (12V)
.45 A (5V)
 - Running max.: .53 A (12V)
.50 A (5V)
 - Start-up: 1.27 A (12V)
.45 A (5V)
- Average Power consumption: 8.0 W

Reliability

- MTBF (POH): 40,000 hours
- Preventive maintenance: none
- Component life (years): 5
- Data reliability assured through 48 bit ECC on Data Field and 16 bit CRC on ID Field

Function

- Rotational speed: 3000 rpm
- Track density: 812 tpi
- Logical cylinders: 612
- Logical tracks: 4896
- Read/write heads
 - Physical: 4
 - Logical: 8
- Data disks: 2
- Encoding scheme: RLL 2,7 Code
- Logical sectors/track: 17



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TM

Hardcard™ 20. The Leading High-Performance Hard Disk Expansion Board.



Hardcard™ 20 is only one inch in thickness, making it the only true single slot hard disk expansion board available. A complete hard disk subsystem, Hardcard 20 can be installed in minutes into any expansion slot in an IBM PC or XT. It offers true IBM PC compatibility and requires no additional power supply. Hardcard 20 also has been fully tested to assure compatibility with the IBM PC XT, the IBM 3270 PC, the Compaq Portable, Compaq Plus, Compaq Deskpro (8086), and the AT&T PC 6300.

Hardcard 20 integrates miniaturized versions of proven Winchester technologies, readily available components and custom VLSI circuit designs. It uses two 3.5 inch (95mm OD 25mm ID) oxide disks, along with four 3370-type heads and flexures. A rotary voice coil

actuator provides fast access speeds, with an average seek time of only 49 ms, while an optical position encoder and a patented wedge servo ensure accurate positioning of the heads over the disks. An interleave of 3 is also utilized to increase the effective system transfer rate of Hardcard 20 across the IBM PC bus.


Whenever power is interrupted, Hardcard 20's read/write heads are automatically moved to a non-data area called the landing zone. Hardcard 20's patented AIRLOCK® mechanism then locks the heads in the landing zone until power is restored. This gives Hardcard 20 much greater resistance to shock than is typical for hard disk drives. The drive can withstand shock of up to 100 G non-operating and 10 G operating, making it ideal for use in portables.

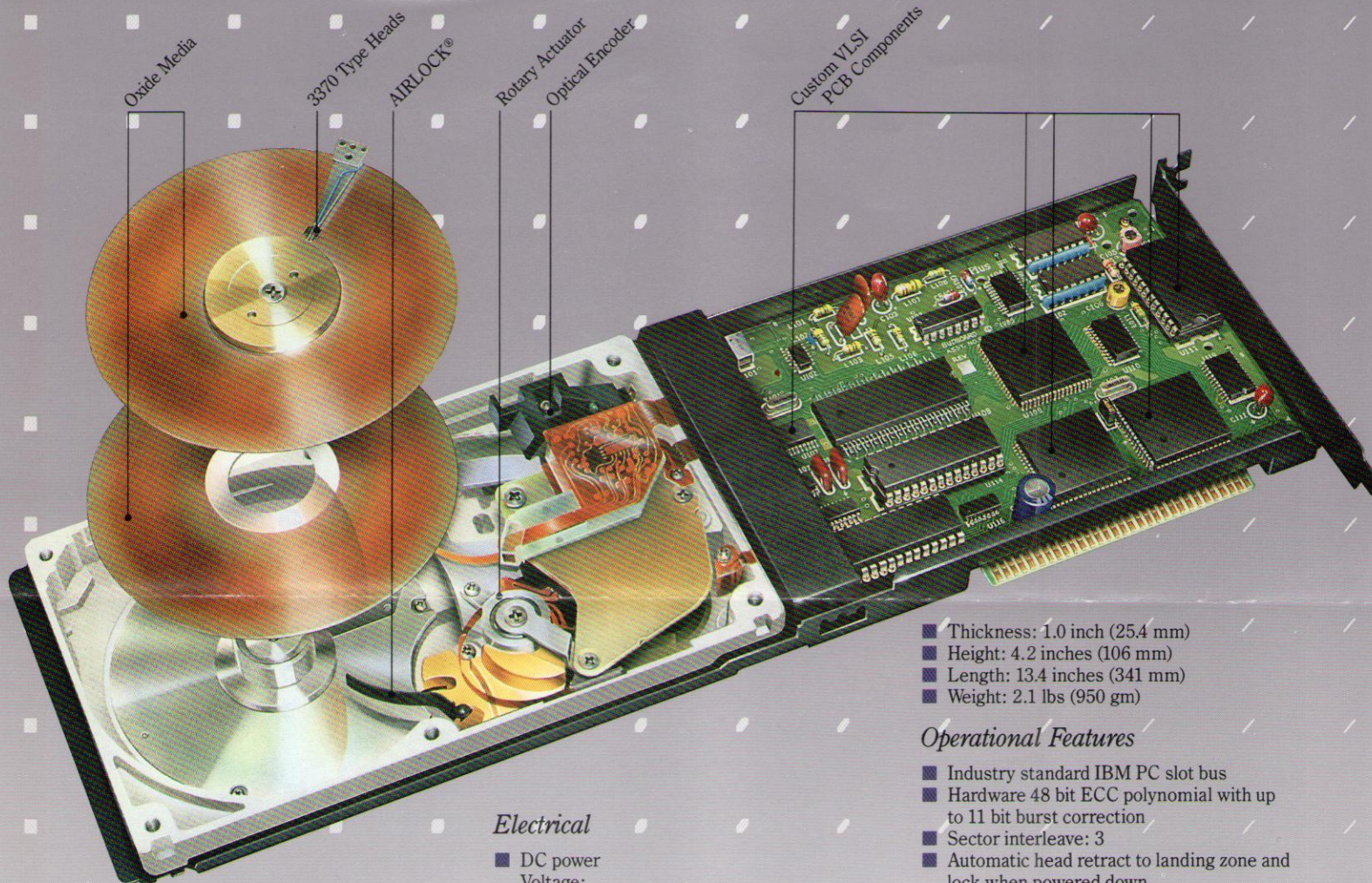
The power draw for Hardcard 20 is only 8 watts, making it the lowest power 20 MB product on the market. The controller, which is integrated on a single

printed circuit board (PCB) with the drive electronics, consists of VLSI circuitry and is implemented in CMOS for reduced power consumption.

Hardcard 20 uses fewer parts and proven technology to achieve a mean time between failure (MTBF) rating of 40,000 power on hours (POH). This MTBF is four times the current industry norm for PC mass storage drives. Because Hardcard 20 is a more reliable product, Plus backs it with a One Year Limited Warranty.

Hardcard 20 comes pre-formatted and includes installation and directory software. An INSTALL program automatically transfers DOS files from a DOS System diskette onto Hardcard 20 so that, following installation, the system will boot without using a floppy diskette. Hardcard Directory is a menu driven program designed to organize programs and data onto Hardcard 20. A separate guide, Installing Application Software onto Hardcard, contains step-by-step instructions explaining how to install many of the leading business software packages.

Plus ™



Performance

- Formatted capacity: 21.20 Mbytes (min.)
- Transfer rate: 5.00 Mb/bytes/sec
- Seek times (includes settle time)
 - Track to track: 10 ms
 - Average: 49 ms
 - Full stroke: 90 ms
 - Average latency: 8.33 ms

Function

- Rotational speed: 3600 rpm
- Recording density: 13,917 bpi
- Flux density: 9278 fci
- Track density: 812 tpi
- Cylinders
 - Physical: 615 Logical: 615
- Tracks: 2460
- Read/Write Heads
 - Physical: 4 Logical: 4
- Data disks: 2
- Encoding scheme: RLL 2,7 Code
- Sectors/track: 17 (+1 spare)

Computer Interface

Jumper Position	PC	XT
■ BIOS address	C8000H	CA000H
■ Port address	320H-323H	324H-327H
■ Controller number	0	1
■ DMA channel	3	
■ Interrupt request level	5	

Electrical

- DC power
 - Voltage:
 - +12V, ±5% regulation
 - +5V, ±5% regulation
 - Ripple and noise: 100 mV P-P (12V)
 - 50 mV P-P (5V)
- Current demand
 - Average: .48 A (12V) .45 A (5V)
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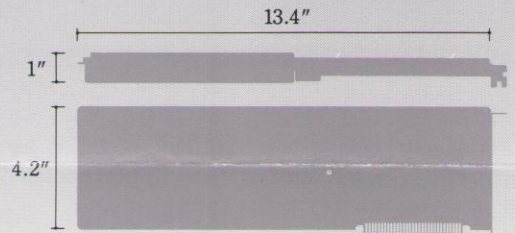
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