

Burroughs

OEM Products

MD122 Mini Disk Drive

Burroughs Mini Disk Drive is a random access storage device that uses flexible disks as the storage media to provide up to 6 million bytes of on-line storage and unlimited off-line storage.

The MD122 includes an advanced device controller and parallel data interface.

The device is soft sectored and utilizes a microprocessor controller to control the basic positioner and data channel functions. Two flexible 8-inch disks, each containing 3MB, can be mounted on a common spindle and rotated by a single motor. Four heads, mounted on a common assembly are moved across the surface of the disks by a voice coil actuator. Seek positioning is by a photoelectric position grating system. To maintain position accuracy at 150 TPI, alignment tracks are located on each disk and the microprocessor periodically realigns the positioner.

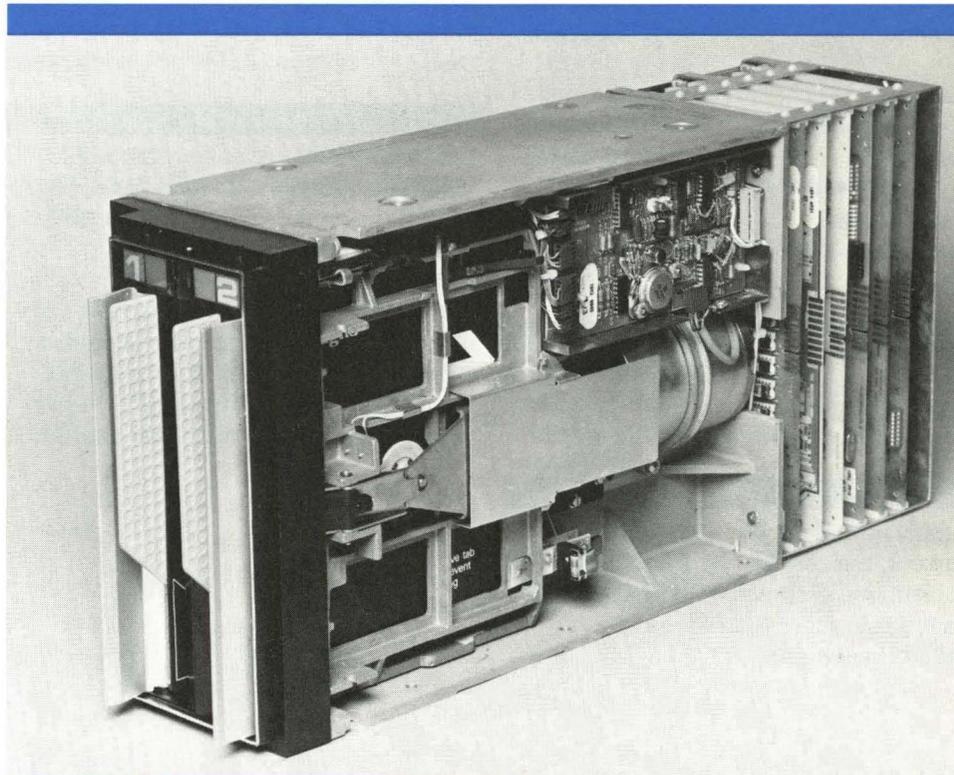
A unique outer sleeve protects the media from damage. The unit is designed so that the disks can only be inserted and removed with the outer sleeve in place. A mechanism in the drive ensures that when a disk is inserted it is fully home and latched before the outer sleeve can be removed.

The drive is designed to be incorporated into host system cabinetry with host-supplied D.C. voltages

The Burroughs MD 122 Mini Disk Drive may be used in a wide variety of applications, including:

- Small Business Systems Data Storage
- Program Loading
- Word Processing/Electronic Mail
- Data Entry/Collection
- Fixed Disk Load/Dump

- 6 Megabyte Capacity
- Advanced Microprocessor Controller
- CRC generation
- Error Detect, Retry and Correct
- Dual Sector Buffers
- Sector Relocation
- File Search using host supplied parameters
- Media Wear Monitoring and Warning
- Error Logging and Analysis
- Confidence/Diagnostic Tests
- Parallel Data Interface
- Interface Compatibility with Burroughs FD 210 Series of Fixed Disk Drives



Storage Characteristics

Data Capacity (formatted)

Data bytes per sector	256
Data sectors per track	44
Data bytes per track	11,264
Data tracks per surface	139
Surfaces per disk	2
Data bytes per disk	3,131,392
Disks per spindle	2
Spindles per drive	1
Data bytes per drive	6,262,784

Recording

Bit density, bits per inch	7,100
Track density, tracks per inch	150
Areal density, bits per inch ²	1.07x10 ⁶
Recording mode	MFM

Performance Characteristics

Seek time (settling time incl.)	
average	100 ms
maximum	200 ms

Latency	
average	57.25 ms
maximum	114.50 ms

Transfer rate	
data rate	1,000,000 bits/sec
RPM	524

Media Characteristics

MD 110-1
8 inch mylar disk
50 microinch coating pre-initialized

Electrical Requirements

Supply voltage: +5V, +12V, -12V
Current, typical: 11.1A, 2.5A, 1.0A
Current, maximum: 14.0A, 7.0A, 3.5A
Heat dissipation: 100W typical,
150W maximum

Environmental

Operating temperature: 13° to 40°C
Humidity: 20% RH to 85% RH (non-condensing)
Air flow: 70 C.F.M.
Non-operating temperature: -40° to 60°
humidity 5% RH to 90% RH (non-condensing)

Reliability

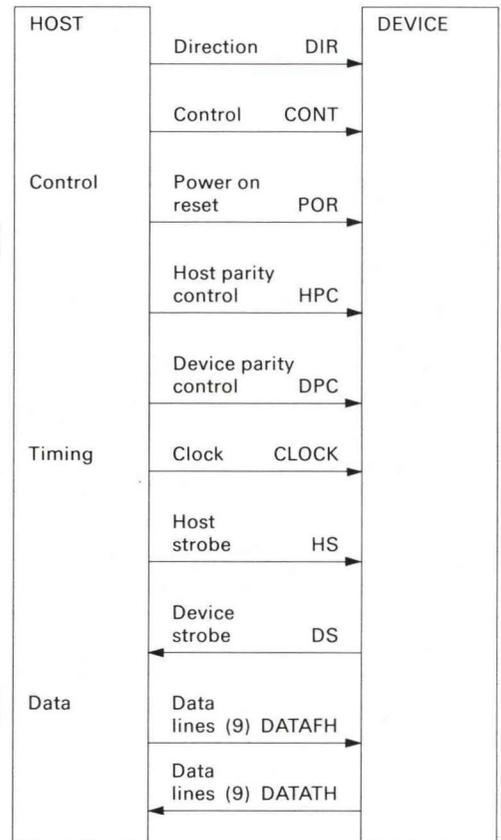
MTBF
Drive and basic electronics 2,150 hrs.
Device controller 5,000 hrs.
MTTR
Component replacement 1.5 hrs.
Board replacement 0.75 hrs.
Service life 7 years or 14,000 hrs. AOT

Data error rate 1 in 10¹¹ bits max.
Preventive maintenance None
Media life, minimum:
Track 2.0x10⁶ revs
Disk 1.0x10⁷ revs

Mechanical Characteristics

Length (in/mm) 20.5/520.7
Width (in/mm) 5.5/139.7
Height (in/mm) 10.0/254.0
60 Pin I/O Connector
7 Pin Power Connector

Interface



Transfer Format

All transfers are formatted similarly in both directions: 9-bit parallel, character serial. Data integrity is supported by an odd vertical parity check (VPC) with each data byte and an even longitudinal parity check (LPC) with each transfer sequence. The LPC byte terminating a sequence has an odd VPC bit.

Logic Signals

Direction (DIR) and Control (CON): these establish the four transfer modes as follows:

DIR	CONT	MODE	Transfer Description	BUS Used
0	0	Status	Status	DATATH
1	0	Command	Commands	DATAFH
0	1	Host Receive	Data	DATATH
1	1	Host Send	Data	DATAFH

Host Strobe (HS) and Device Strobe (DS): depending on mode, these signal the host or device to read a data bus or acknowledge that a data bus has been read. See table below.

Host Parity Control (HPC) and Parity Control (DPC): used by unit to indicate that the current byte is a LPC byte. Used by a receiving unit to indicate parity errors, both VPC and LPC. See table below.

Signal Indication

Command and Host Send Modes

HS	Device should read DATAFH
DS	Host has read DATAFH
HPC	LPC byte now on DATAFH
DPC	Parity error on DATAFH

Host Receive and Status Modes

DS	Host should read DATATH
HS	Host has read DATATH
DPC	LPC byte now on DATATH
HPC	Parity error on DATATH

Data bus (DATAFH): a 9-line bus consisting of 8 data lines and one parity bit line. DATAFH 7 is the most significant bit. Transfer is from host.

Data bus (DATATH): same as DATAFH except transfer is to host.

CLOCK: a self-starting, free-running, 1 MHz clock generated by the host. Used by device to trigger all changes on the interface.

Power On Reset (POR): generated by the host upon power-up or programmatically after. It causes the device controller to reset itself and connected drives. POR overrides any on-going commands in the device.

Commands

Format: a command consists of a variable number of bytes depending on the particular command. The first byte consists of two hexadecimal digits and is the "op code" for that command. Subsequent bytes express command parameters (e.g., drive, sector address, number of bytes, etc.).

Command Set: these are listed in three groups below according to whether a seek and data transfer are both involved, a data transfer only, or neither.

Group 1

- Read
- Read Statistics
- Read Location Map
- Write

Group 2

- Search
- Read Search Result
- Read Device Attribute Record
- Read Status
- Host Receive Maintenance Test Routine
- Host Send Maintenance Test Routine

Group 3

- Abort Device Controller
- Abort Drive
- Reset
- Set Write Protect
- Reset Write Protect
- Unlock Door
- Lock Door

Status Format

The device reports its status condition by the transfer of one or more bytes to the host. Set bits have the significance shown:

Bit	Byte 1
0	Drive address, bit 0
1	Drive address, bit 1
2	Drive address, bit 2 (most significant)
3	Transfer delay
4	N sectors before read
5	N sectors before write
6	Operation complete
7	Interrupt
	Byte 2
0	Error
1	Search unsuccessful
2	Corrected
3	Command not accepted
4	Command error
5	Address error/end of drive
6	Mandatory interrupt to host
7	Address not found
	Byte 3
0	Not ready – Class 2
1	Disk expiring – Class 2
2	Write protected
3	New disk
4	Danger – Class 2
5	Confidence test completed
6	Temporarily not available – Class 2
7	Unassigned

Note: Class 2 indicates a status of a "steady state" nature.

Electrical Interface

Supply voltage: +5V \pm 10%

Common mode voltage: absolute value between host and device grounds must be less than 5V.

Line drivers/receivers: differential, RS422 compatible, types MC 3487-Burroughs 2767 4498 and MC 3486-Burroughs 2767 4506, or equivalent.

Line termination: 88.7 ohms \pm 2%.
Cable: balanced twisted pair, characteristic impedance 87 ohms \pm 5%, maximum cable length 25 ft. (7.6m).

For further information, reference this bulletin number and write to Burroughs OEM Marketing, Burroughs Place, Detroit, MI. 48232; or call one of our special sales/application numbers (313) 972-8031 in Detroit or (714) 835-7335 in California. For overseas inquiries, write Burroughs OEM Marketing, Langwood House, High Street, Rickmansworth, Herts., England. Tel. (44) 9237-70545.

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