

Model 7640 OEM Optical Storage Unit

Technical Data

Storage Technology
Corporation

Storage Technology's Model 7640 Optical Storage Unit introduces a new era in data storage. This exciting new laser based technology capitalizes on the best features of both high-performance disk and tape devices. Important among its many features, the 7640 randomly accesses up to 4.0 gigabytes of user data on a removable optical media unit. This results in unlimited off-line data storage capacity with a projected ten-year useful life. The 7640 features an average random access time of 84.7 milliseconds. It has an instantaneous data transfer rate of 3.0 Megabytes per second with a speed matching buffer to accommodate slower channels.

In appearance, the 7640 looks very much like a standard disk drive. Similarities include a disk-like platter spun by a brushless D.C. motor and a read/write mechanism that transverses the media's surface. Unlike disk drives, however, laser light is used to both read from and write to the platter. Because of this, physical contact between the read/write mechanism and the media is completely avoided.

The 7640 major subassemblies include the control electronics, a fixed optics assembly, a positioning actuator, a cartridge loading assembly, air circulation system, power supply, and maintenance module.

The Control Electronics Module has six microprocessors supplying intelligence at the device level eliminating host overhead. Functions handled internally include interface communications, actuator positioning and tracking, read/write, serialization/-deserialization, encoding/decoding, data buffering, defect skipping during writes, index sorting and searching, automatic cartridge handling, and performance of standalone and remote diagnostics. Incorporating all control electronics into each individual storage unit minimizes system downtime since the failure of one control unit will not interfere with the operation of the remaining storage units.

Storage Technology's 7440 Optical Media Unit consists of a 14-inch platter enclosed in a protective cartridge. The 7640 records data on one side of the media according to a predefined physical hierarchy. The platter is preformatted into 713 user data bands. Each band has space for 48 user written data tracks. Each track can contain 118.6 kilobytes of user data. This data is formatted in fixed logical blocks of 7904 bytes.

The 7640's Optical Assembly consists of a maintenance free optics plate containing both a gas read laser and a semiconductor write laser. These are

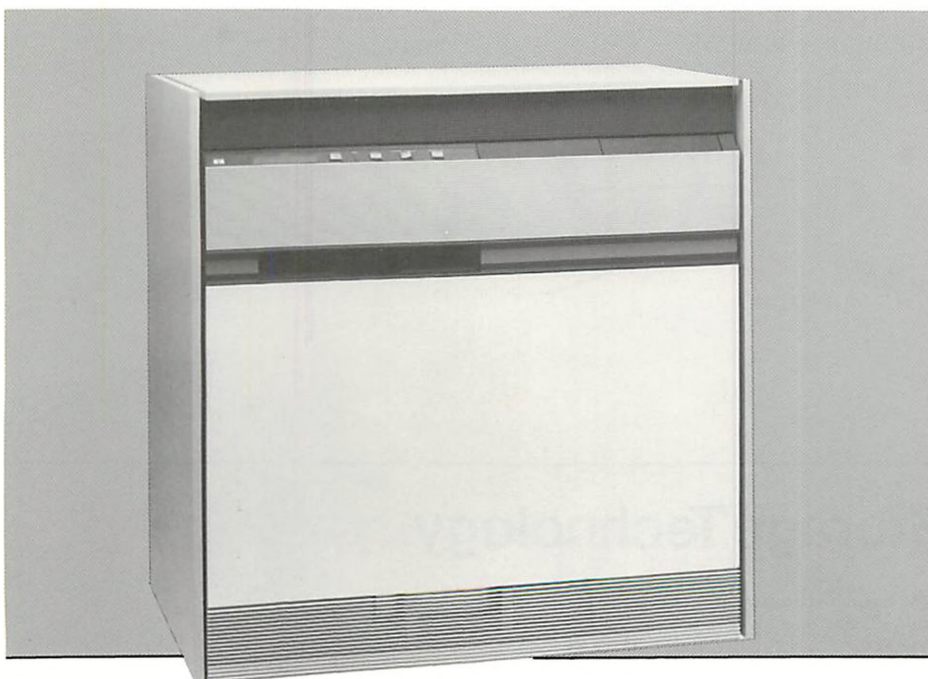
precision aligned to a fixed optics path consisting of colimating lenses, defraction gratings, beam splitters, and polarizing filters. The rest of the read/write system consists of an actuator which positions a mirror and objective lense assembly over a desired data band. A separate galvanometer mounted mirror minutely changes the position of the laser beam accomplishing fine seeks used to access individual data tracks.

This Dual Servo System does both the coarse and fine seeks. A coarse seek, used to locate a desired band, provides rapid access to large data files. Fine seeks, used to locate tracks within a band, provide very fast access to individual records. The platter directory or Index Band is presorted and stored immediately after spin-up in the 7640's index RAM. By keeping this index stored in dynamic memory, normal index seeks on the platter are eliminated. This results in a much improved random access performance.

Dynamic Defect Skipping insures that data is written correctly at all times. During write operations, data is held in the write buffer. The read laser beam immediately follows the write laser beam and, by comparing what's read to data held in the write buffer, errors are detected as they occur. The bad data sector is automatically flagged and subsequently rewritten from memory on-the-fly without host intervention or retransmission of the data.

Error Correction Codes are calculated and appended to each block of data as it is written. When the record is read, the ECC is used to detect any errors that may be present and correct these errors on-the-fly. This powerful error detection and correction feature can correct a raw bit error rate up to eight orders of magnitude.

The Cartridge Loading Assembly provides simple two step operation. Once the operator inserts the Optical Media Unit and presses LOAD, the device automatically draws the cartridge inside, opens and removes the platter. An elevator assembly raises the platter up to the spindle motor



and clamps it onto the hub. The complete process from LOAD to ready state takes less than ten seconds.

The Air Circulation System provides both cooling for the electronics and clean filtered air for the optical disk and optical elements. Pressurized filtered air eliminates the possibility of contaminating the disk surface and optics.

The Maintenance Module features a dedicated microprocessor that allows maintenance, utility and diagnostic operations to be performed either local or remote. Most maintenance routines operate in-line with minimal performance impact.

This support module contains the 7640's 8-inch floppy disk drive and two maintenance communication ports. Floppy diskettes are used as source for operational microcode, resident micro diagnostics and machine configuration information. Usage and error information is logged to diskette. The two maintenance ports are capable of multi-speed operation and act as local or remote interfaces for diagnosis and test.

All 7640 components are accessible from the front and top saving space and facilitating maintenance. Storage Technology's modularized design approach utilizes component isolation packaging to ease maintenance, lessen the impact of failures and simplify upgrades.

Standard Features

- Auto Cartridge Load/Unload
- Resident Diagnostics
- Operator's Write Protect Switch
- UL/CSA/FCC/BRH
- Platter Manufacturer ID
- Dynamic Defect Skipping
- Speed Matching Buffer
- Device Level Control
- Local or Remote Diagnostics
- Index Buffer
- 60 HZ Single Phase Power

Optional Features

- Dual Device Interface — Permits access of the 7640 by either of two control units or directors.
- OEM Interface — The 7640 is available with either the standard Control Interface (CTL-1) or the optional Intelligent Peripheral Interface (IPI)
- 50 HZ Single Phase Power
- IEC

7640 OPTICAL STORAGE UNIT SPECIFICATIONS

TECHNOLOGICAL CHARACTERISTICS

MEDIA	7440 Optical Media Unit
CAPACITY—Formatted	4.0 Gigabytes
POSITIONING	Microprocessor Controlled Actuator
INTERFACE	CTL-1 or IPI (Optional)

PERFORMANCE CHARACTERISTICS

SEEK— Track to Track	1.0 millisecond
— Average to any Track	61.9 milliseconds
— Average Rotational Latency	22.8 milliseconds
— Average Total Access Time	84.7 milliseconds
— Maximum Access Time	148.6 milliseconds
MEDIA ACCESS — Load Cycle time	12.0 seconds
TRANSFER RATE — Instantaneous	3.0 MBytes per second
— Buffered	1.5 MBytes per second
BIT ERROR RATE — Raw	1 in 10 ⁵
— Corrected	1 in 10 ¹³

PHYSICAL CHARACTERISTICS

SIZE — Height	55.0 in. (140.0 cm)
— Width	52.0 in. (132.0 cm)
— Depth	32.0 in. (81.0 cm)
WEIGHT	900.0 lbs. (408.0 kg)

ENVIRONMENTAL CHARACTERISTICS

TEMPERATURE — Operating	59°F to 90°F (15°C to 32°C)
— Non-Operating	50°F to 104°F (10°C to 40°C)
HUMIDITY — Operating	20% to 80% Non-Condensing
— Non-Operating	5% to 95% Non-Condensing
ALTITUDE—Operating	0 to 6,500 ft. (0 to 1,982 m.)
— Non-Operating	0 to 12,000 ft. (0 to 3,660 m.)
HEAT DISSIPATION—Maximum	5,800 BTU per hour (1,460 KgCAL per hour)

POWER REQUIREMENTS

SERVICE	60 Hz/Single Phase
VOLTAGE	200/208/220/230/240 VAC
INPUT CURRENT—Peak	12.0 Ampere, 3 Wire
POWER —Nominal	1950 Watts
SERVICE	50 Hz/Single Phase
VOLTAGE	200/220/230/240 VAC
INPUT CURRENT—Peak	12.0 Ampere, 3 Wire
POWER —Nominal	1950 Watts

The 7640 optical storage unit is offered on behalf of a joint venture between Storage Technology Corporation and Storage Technology Partners II.

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