SERIES 5500 STORAGE MODULE DRIVE

FEATURES

- Removable Disc Pack
- 40 MByte Capacity
- Minimal Latency Time
- High Transfer Rate

PRODUCT BULLETIN

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

STORAGE MODULE DRIVE

Featuring an average access time of only 38 milliseconds and a transfer rate of 9.68 MHz, the Harris Series 5500 Storage Module Drive Systems provide high-performance, medium-capacity, random-access storage for Harris Computer Systems. The Storage Module Drive (SMD) consists of a disc pack spindle and associated drive motor, flying heads and servo positioning mechanism, speed and position sensing devices, an air supply and filtration system and the electronic circuitry for reading, writing, positioning, control and interface.

A shroud cover on the drive allows access to the spindle for disc pack installation or removal. During operation, this cover seals the disc shroud area so that the air filtration system can maintain clean airflow past the disc pack. A separate enclosure cover provides access to the electronics, heads and servo mechanism for maintenance purposes. Cabinet doors provide access to the interface controller and controller power supplies in the Model 5510 SMD.

The read/write heads, attached to a carriage assembly, are driven by a voice-coil linear actuator. Position feedback information is provided by the servo surface of the installed disc pack. Data is recorded by the write-compensated modified frequency modulation method. A phase-locked oscillator provides read data recovery.

DISC PACK

The Model 5525 Disc Pack consists of five discs stacked vertically on a common hub. The disc pack is enclosed in a protective container when not in use. The container handle is used to lift, load and lock the disc pack onto the SMD spindle. The top and bottom discs provide protection for the three magnetic oxide coated center discs. Five of the six surfaces provided are used for data storage. The sixth surface contains 411 pre-recorded servo tracks that define the recording track positions and provide timing signals. Each recording Head, when correctly positioned, defines a Track. The five vertical recording tracks define a Cylinder. The primary tracks are located in Cylinders 0 through 403. There are seven spare tracks on each surface that may be used as an alternate for any primary track that is defective. Each track is accessed by a cylinder and head address number which is pre-recorded in the Header Address Word of each sector.

CONTROLLER

The interface controller provides all functions required to operate the SMD on-line with the CPU. In operation, the controller communicates through a Chain Block Controller (CBC) or an Automatic Block Controller (ABC) I/O Channel. The commands establish the operational mode and special conditions and also specify the drive, cylinder, head and sector addresses. In the Write mode, 24-bit parallel output data words are converted to a bit-serial data stream and transmitted to the drive. The controller automatically formats this data into sectors and generates a preamble and postamble for each sector. A checksum comparison technique is used for error detection. In the Read mode, the bit-serial data received from the drive is stripped of the preamble and postamble and converted to parallel 24-bit data words for transfer to the I/O channel. Sector, head, and cylinder address "spills" are performed automatically by the controller during read, write or search operations.

Up to three additional Model 5511 drives may be operated by the controller in the Model 5510 SMD. Status information from the SMD and controller is transferred to the CPU upon command. An interrupt request is generated by the controller logic in response to error conditions or at the end of read, write or motion-type commands. A diagnostic program is supplied with each system to verify the operation of the controller and exercise the drive.

SPECIFICATIONS

STORAGE MODULE DRIVE	MODELS 5510 and 5511
Spindle Speed	3600 RPM; +2, –3%
Positional Access	
Single Seek	10 m sec, maximum; between adjacent tracks
Average Seek	30 m sec; average for all possible combinations
Maximum Seek	55 m sec, maximum; from track 0 to track 410
Rotational Access	
Average Latency	8.33 m sec at 3600 RPM, nominal
Maximum Latency	17.2 m sec at 3492 RPM (3600 RPM –3%)
Number of Heads	5 recording and 1 servo
Recording Method	Modified Frequency Modulation (MFM)
Data Transfer Rates	
Serial Bit Stream	9.6768 MHz, nominal
24-bit Words	403,200 words per second; burst rate within a sector. 342,720 words per second; formatted rate within a Cylinder.

DISC PACK	MODEL 5525
Number of Discs	3 recording and 2 cover plates
Recording Surfaces	5 data and 1 servo
Recording Density	
Outer Track	4038 BPI, nominal
Inner Track	6038 BPI, nominal
Track Spacing	192 Tracks per inch
Tracks/Surface	404 plus 7 spares
Bits/Track	161,280, nominal (unsectored)
Dimensions	
Diameter	14.0 in (35.6 cm)
Height	4.0 in (10.2 cm)
Weight	6.3 lbs (2.9 kg)

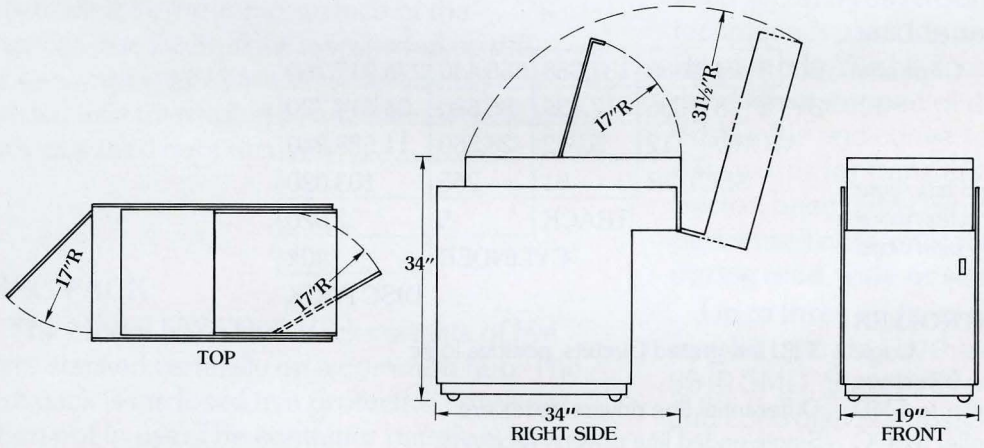
Formatted Data Capacity

e.g; 8 bits/byte
3 bytes/word
24 bits/word

BIT	8	24	2688	137,088	685,440	276,917,760
BYTE		3	336	17,136	85,680	34,614,720
WORD			112	5,712	28,560	11,538,240
SECTOR				51	255	103,020
TRACK					5	2,020
CYLINDER						404
DISC PACK						

CONTROLLER	
Logic	TTL Integrated Circuits, positive logic
Interface	
Controller to SMD	Differential line drivers/receivers
Controller to IOC	Single-ended line drivers/receivers
Operating Control	On-line with Harris Computer Systems via blocked Input/Output Channels.
IOC Requirements	ABC/SE/24-IOC for use with all Harris Computer Systems except the SLASH 4. CBC/SE/24-IOC for use with the Harris SLASH 4 Computer Systems.
Configuration	Model 5510 SMD includes the controller. Up to three additional Model 5511 SMD's may be connected to this controller.
Formatting	The controller formats the data into the standard 112 Words per Sector and 51 Sectors per track. A Sector is comprised of a Preamble, 112 24-bit data Words and a Postamble (including the Checksum).

Interrupt	An interrupt is generated at the end of Read, Write and motion-type commands or if an error condition is detected.
ELECTRICAL	**MODELS 5510 and 5511**
Voltage	102 to 128 VAC (195 to 235 VAC, optional)
Frequency	59.0 to 60.6 Hz (49.0 to 50.5 Hz, optional)
Current	
@120 VAC/60Hz	8.0 Amps RMS, run (up to 30 Amps RMS, surge)
@220 VAC/50Hz	5.5 Amps RMS, run (up to 23 Amps RMS, surge)
Phase	Single Phase. 3 wire, polarized connector.
Power	PF=0.77@60Hz, 0.60@50 Hz; 740 Watts, nominal
ENVIRONMENTAL	
Temperature	
Operating	+60°F to +90°F (+16°C to +32°C), ambient air
Storage	–30°F to +150°F (–34°C to +65°C), ambient air
Humidity	
Operating	20% to 80%, relative (non-condensing)
Storage	8% to 80%, relative (non-condensing)
Thermal Shock	
Operating	12°F/hour (7°C/hour), maximum
Storage	20°F/hour (11°C/hour), maximum
Altitude	
Operating	–1000 ft to +6000 ft (–305m to +1829m)
Storage	–1000 ft to +15000 ft (–305m to +4572m)
Heat Dissipation	2523 BTU/hour (636 kg-cal/hour), nominal
Cooling	Centrifugal fan, approximately 70 CFM
DIMENSIONS	
Height	34.0 in (86.4 cm)
Width	19.0 in (48.9 cm)
Depth	34.0 in (86.4 cm)
Weight	218 lbs (99 kg)
Installation & Access	See Below



Models 5510 and 5511 SMD Installation Layout

Specifications are subject to change without written notice.

HARRIS COMMUNICATIONS AND INFORMATION HANDLING

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