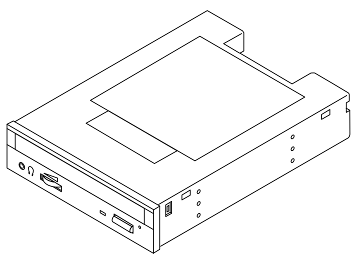
SunCD 4 Technical Product Brief

Overview

The SunCD™ 4 drive offers the highest performance and functionality in CD-ROM technology to meet the most demanding software distribution and multimedia application needs.



SunCD 4 Drive

The SunCD 4 drive is the latest CD-ROM from Sun™ and replaces the SunCD 2Plus™ which was introduced in March 1994.
With a quadruple-speed mechanism and an average access time of only 190ms, it supports the new generation of multimedia applications (sounds, still images and animations, video) and reduces software loading time.

Highlights of the SunCD 4 CD-ROM drive are:

- 600KB/sec data transfer rate (quad-speed mechanism), twice the transfer rate of the SunCD 2Plus
- 190 msec random access time, nearly twice as fast as the SunCD 2Plus
- 256KB buffer
- Motorized tray-loading mechanism
- Supports a wide range of formats like CD-ROM ISO 9660 and RockRidge, CD-Audio, CD-ROM XA and multisession PhotoCD
- Supports CD-Audio over SCSI and the headphone jack
- 1.6” (41mm) high form factor (mechanism)
- Low-power consumption (3.2W @ 100% random access)
- Robust, highly reliable, low cost mechanism with a MTBF of 80,000 hours
- Meets all domestic and international regulations for safety and emissions
- Standard single-ended SCSI-2 interface

Features	Benefits
* Quad-speed mechanism with a 600KB/s transfer rate and 190ms average access time	* Loads software quickly and allows to run multimedia applications directly from the CD-ROM disc
* Supports new multimedia formats	* Access to latest multimedia applications and Photo-CD compact discs
* Supported on Solaris 1.x and 2.x	* Plug and play with installed base of Sun's desktop systems
* Tray-loading	* Does not require the use of expensive caddies

Like all Sun brand mass storage products, the SunCD 4 drive has undergone rigorous drive development and reliability testing. Sun engineers have worked closely with the drive vendor to ensure this drive works optimally on Sun systems and performs reliably in the most demanding operating environments. Sun peripheral packaging is fully certified to meet all regulatory agency environmental specifications and all subsystem cabling is carefully matched to balance impedance for reliable SCSI signal quality.

The SunCD 4 is covered by a one-year warranty.

System Requirements

The SunCD 4 external model (SPARCstorage™ UniPack - Release date September 1995) is supported on the following SPARCstations™ and SPARCservers™:

SPARCstation ELC	SPARCclassic™	SPARCstation 10
SPARCstation IPC	SPARCstation 2	SPARCstation 20
SPARCstation IPX	SPARCstation 4	SPARCserver 1000(E)
SPARCstation LX	SPARCstation 5	Netra™ servers

The SunCD 4 will be released in January 1996 internal to the SPARCserver 1000(E) and SPARCcenter™ 2000(E).
A SunCD 4 internal option will be made available mid-calendar year 96 for the SPARCstation 4, SPARCstation 5 and SPARCstation 20.

The SunCD 4 works with the on-board SCSI host of the above mentioned systems as well as with the host adapters listed below:

SBus Fast SCSI-2/Buffered Ethernet (FSBE/S)
SBus SCSI Host Adapter (SSHA)
SBus SCSI/Buffered Ethernet (SBE/S)

The SunCD 4 will be supported on the SWIS/S card in November 95 with Solaris 2.5.

Software Requirements

The SunCD 4 is supported on Solaris 1.1.1 (SunOS 4.1.3) and later releases, and Solaris 2.3 and later releases.

Specifications

Vendor model:	**Toshiba 5301/5401**
Performance:	
Formatted Capacity	656MB (Mode 1)
Block (Sector) Length Supported	
Standard CD-ROM Mode 1	2048 Bytes user data (+288 Bytes ECC/EDC error correction)
Standard CD-ROM Mode 2	2336 Bytes user data
Rotational Speed	
Normal (1x)	~200 to 530 rpm (variable)
Double (2x)	~400 to 1,060 rpm (variable)
Quadruple (4x)	~800 to 2,120 rpm (variable)
Access Times (including latency)	
Average Random Access Time	
- Normal speed (1x)	320 msec (typical)
- Double speed (2x)	230 msec (typical)
- Quadruple speed (4x)	190 msec (typical)

Average Random Seek Time	
- Normal speed (1x)	210 msec (typical)
- Double speed (2x)	180 msec (typical)
- Quadruple speed (4x)	150 msec (typical)
Average Full-Stroke Access Time	
- Normal speed (1x)	470 msec (typical)
- Double speed (2x)	380 msec (typical)
- Quadruple speed (4x)	340 msec (typical)
Data Transfer Rate	
Sustained, Mode 1	
- Normal speed (1x)	150 KB/sec
- Double speed (2x)	300 KB/sec
- Quadruple speed (4x)	600 KB/sec
Sustained, Mode 2	
- Normal speed (1x)	171 KB/sec
- Double speed (2x)	342 KB/sec
- Quadruple speed (4x)	684 KB/sec
Burst Rate (SCSI Interface)	
Synchronous mode	4.2 MB/sec
Asynchronous mode	1.5 MB/sec
Sustained Block Transfer Rate	
Normal speed (1x)	75 blocks/sec
Double speed (2x)	150 blocks/sec
Quadruple speed (4x)	300 blocks/sec
Spin up Time (4x)	
Typical	3.0 sec
Max	3.5 sec
Signal Interface Type	Single-ended SCSI-2
SCSI buffer	256KBytes
Formats supported	CD-ROM (Yellow Book) i.e. ISO 9660/High Sierra/CD-XA CD-DA (Red Book) Multisession Photo-CD (Beige Book) CD-I ready (Green Book) Video-CD ready (White Book)

Reliability:

Error Rates	
Hard error rates (allowing 5 retries)	
- Mode 1	1 in 10^{-15} bits
- Mode 2	1 in 10^{-12} bits
Seek error rate (allowing 5 retries)	1 in 10^{-6} bits

MTBF (Power On with 20% duty cycle, at 40°C)	80,000 hours
MTTR	0.5 hour
Load/eject	10,000 times or more

Physical specifications:

Drive dimensions (excluding Bezel area)	
Height	1.63 in/4.15 cm
Width	5.75 in/14.6 cm
Depth	7.5 in/19.0 cm
Weight	1.98 lbs/0.9 Kg
Mounting Orientation	
Horizontal	+/- 20°
Vertical (eject button up)	+/- 10°

Audio signal characteristics:

Line Output	
Output Level	0.9 Vrms typical
Load Impedance	47KOhms min.
Distortion	0.025% typical at 1KHz
Signal to Noise Ratio	87dB typical
Frequency response	20Hz to 20KHz at +/- 3dB
Headphone Output	
Output Level	0.7 Vrms typical
Load Impedance	100 Ohms (nominal)
Connector	3.5mm diameter stereo headphone jack

Environmental:

	Operating	Non-Operating	Shipping (Packaged)
Temperature	5 to 50°C	-10 to 60°C	-40 to 65°C
Gradient, max	11°C/hour		
Humidity	8 to 80%, non-condensing	5 to 95%, non-condensing	5 to 95%, non-condensing
Wet Bulb, max	27°C		
Altitude	0 to 3,000 m	0 to 12,000 m	
Gradient, max	1.5 KPa/min	8.0 KPa/min	
Vibration	5 to 500Hz at 0.25g (no soft error within 5 retries) 5 to 500Hz at 1.0g (no damage)	5 to 10Hz at 5mm p-p 10 to 500 Hz at 1g (no damage)	10 to 25 Hz at 1g (no damage)

	Operating	Non-Operating	Shipping (Packaged)
Shock	1.5g (14.7 m/sec^2) - 11ms half sine wave (no soft error within 5 retries) 10g (98 m/sec^2) - 11ms half sine wave (no damage)	50g (490 m/sec^2) - 11ms half sine wave (no damage) (no CD mounted)	0.9m drops once for each 6 surfaces, one edge and one corner (Individual Package) 1 drop at 0.4m - bottom side only (Palletized package)
Acoustical	40 dB average max. at 1 meter		

<u>Power Requirements</u>:

Mechanism	
Operating Voltage	DC +5 V +/- 5% (Operating) DC +5 V +/- 8% (Start up)
Idle	0.75 W
Continuous Read (data/audio - 1x speed)	1.5 W
Average (20% random access - 4x speed)	2.5 W
Maximum (100% random access - 4x speed)	3.2 W
Peak	6.5 W

<u>Other Characteristics</u>:

Tray-loading mechanism	Motorized electronic load/eject, i.e. will automatically and fully open when an “eject” command - software or manual - has been sent and will automatically close when a “close” command has been sent
Medium	4.7 in/12 cm diameter optical disc
Front Panel controls	
Audio output jack	For speakers or headphones
Volume control knob	Sound level control for the audio jack
Eject button	Manual ejection of a disc
Emergency eject hole	Disc ejection when software and manual eject fail
LED indicator	“On” for data access and data transfer “Off” in stand-by status “Blinks” at 3.2s intervals for disc or optics cleaning “Blinks” at 1.6s intervals when playing an audio track

SPARCstorage UniPack information

Enclosure specifications	
Height	2.8 in/7.0 cm
Width	7.5 in/19.0 cm
Depth	12.2 in/31.0 cm
AC Power	100 - 240 VAC, 47-63Hz
Operating Range	10°C to 35°C (50°F to95°F), 20%-80% RH, max wet bulb 26% for removable devices
Non-operating Range	-40°C to 60°C (-40°F to 140°F), 10 to 90% RH, non-condensing
Operating Acoustic Noise	Max 5.8 bels (at 23°C)
Idling Acoustic Noise	Max 4.7 bels (at 23°C)
Operating Altitude	0 to 10,000 ft (0 to 3km)
Non Operating Altitude	0 to 40,000 ft (0 to 12km)

The SPARCstorage UniPack has certain restrictions with respect to host adapters and cables.

SCSI Host Adapters:
The SunCD 4 SPARCstorage UniPack is supported on Sun's SSHA, SBE and FSBE SBus host adapters as well as all on-board host adapters on currently shipping workstation and server platforms. The SunCD 4 SPARCstorage UniPack will be supported on the SWIS host adapter in November 1995.

Cabling:
All UniPack products can be ordered with either a 68-68 pin or 50-68 pin SCSI cable. Cabling guidelines are:
1) The 68-68 pin SCSI cable allows connections to other UniPacks or Fast/Wide host adapter like SWIS/S or future Desktop platforms.
Note: the SunCD 4 is not supported on SWIS/S at time of publication of this document.
2) The 50-68 pin SCSI cable allows connections to 50 pin on-board host adapters offered on the current desktop product line or the older 50 pin storage enclosures.

Regulations:

Safety	UL1950, UL (CSA 950), GS (TUV EN60950)
RFI/EMI	FCC Class B, DOC Class B, VCCI Class 2, EMC Directive (89/336/EEC), EN55022 Class B
Immunity	EMC Directive (89/336/EEC), EN55082-1

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