

# SONY



## WORLD CLASS PERFORMANCE

IN DATA STORAGE AND MANAGEMENT

*DTF™ Tape Drives And Libraries.  
Storage For Mainframe, Client/Server,  
UNIX®, NT And Mid-Range Systems.*



## Sony DTF™ tape solutions for backup, processing, archiving and data collection



The Sony DTF (Digital Tape Format) tape drive offers a sustained transfer rate of 12 Mbytes/sec (20 Mbytes with compression) and backs up 100 Gbytes of compressed data in an hour and a half. It stores up to 42 Gbytes of uncompressed user data on a single cassette and up to 108 Gbytes with compression. It has a bit error rate of better than one in  $10^{17}$ . Using industry-standard SCSI-2 Fast/Wide, it interfaces with a wide variety of computer platforms, including mainframe, client/server, UNIX®, Windows®NT, and mid-range systems. It's lightweight and compact. And it integrates easily with a number of Sony tape libraries.

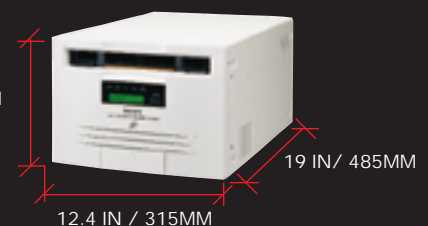
Discover the advantages of Sony DTF drives—world-class storage solutions.

### DTF Tape Drive Features

- 12 Mbytes per second sustained transfer rate
- Up to 20 Mbytes per second transfer rate with compression
- 42 Gbytes of uncompressed user data per cassette
- 108 Gbytes capacity with ALDC compression
- SCSI-2 Fast/Wide interface
- Bit error rate better than 1 in  $10^{17}$
- Various library options
- MIS, commercial, scientific, and film/video post-production applications

Offering significant efficiencies in data throughput, media, maintenance, and personnel support, Sony DTF tape drives are a cost-effective choice for high-performance data storage and management.

8.67 IN / 220MM



12.4 IN / 315MM

19 IN / 485MM



### DMS-B9 Autoloader

- Desk-side and workgroup mass storage
- 378 Gbytes maximum uncompressed capacity
- 981 Gbytes with compression
- 9 large or small cassettes
- SCSI-2 Fast/Wide interface



### DMS-B35 Library

- Mid-range mass storage
- 1 or 2 DTF drives
- Up to 1.47 Tbytes uncompressed capacity
- Up to 3.81 Tbytes with compression
- 70 small or 35 large cassettes
- Interface control options: SCSI-2 Fast/Wide, RS-232C, RS-422



### DMS-8400 PetaSite™ System

- Flagship mass storage
- Multiple modular configurations
- Up to 828 DTF drives
- Uncompressed capacities ranging from 5.4 Tbytes to 2.3 Pbytes
- Interface control options: SCSI-2 Fast/Wide, TCP/IP

# Sony DTF Opens New Possibilities With Economical, High-Performance Storage

Recent dramatic increases in compute power are creating new requirements for reliable high-performance data storage. Sony is meeting these requirements with the DTF 1/2-inch tape storage line.

Sony DTF tape drives offer exciting new possibilities for scientific, commercial and MIS applications using mainframe, client/server, UNIX, NT and mid-range systems. Featuring an uncompressed transfer rate of 12 Mbytes/sec–20 Mbytes/sec with compression—and the ability to store 42 Gbytes of uncompressed data—or 108 Gbytes compressed—on a single cassette, Sony DTF drives and tape libraries offer a breakthrough combination of performance and economy for backup, processing, archiving and data collection.

Applications include:

- MIS Data Centers
- Video/Imaging
  - Post-Production
  - CAD/CAM
  - Video/Audio Archiving
  - Broadcast
  - Video On Demand
- Scientific
- Oil/Seismic
- Data Acquisition

## ADVANTAGE #1: *Higher operational efficiency*



- *Faster processing, backups and restores*
- *Higher system availability for mission-critical operations*

Incorporating a 32 Mbyte buffer, the DTF drive operates at a sustained transfer rate of 12 Mbytes/sec. Turn on ALDC compression and the transfer rate can jump to 20 Mbytes/sec. With throughput like this, combined with a cassette capacity of 42 Gbytes, your backups and restores are accomplished in a fraction of the time it could otherwise take, and your system is far more available for mission-critical operations.

Whether you're backing up the work of the last hour or the last day, Sony DTF drives will keep you ahead of the processing crunch.

### *How much time do you spend on backups?*

#### TIME REQUIRED TO BACK UP:

Drive transfer rate (Mbytes/sec)	12 GBYTES	42 GBYTES	200 GBYTES	1 TBYTE
1.0	3.3 hours	12.0 hours	2.3 days	11.6 days
1.5	2.2 hours	7.8 hours	1.5 days	7.7 days
3.0	1.1 hours	3.9 hours	18.5 hours	3.9 days
<b>12.0 (DTF)</b>	<b>16.7 minutes</b>	<b>58.3 minutes</b>	<b>4.6 hours</b>	<b>23.0 hours</b>



ADVANTAGE #2: *Lower media costs*



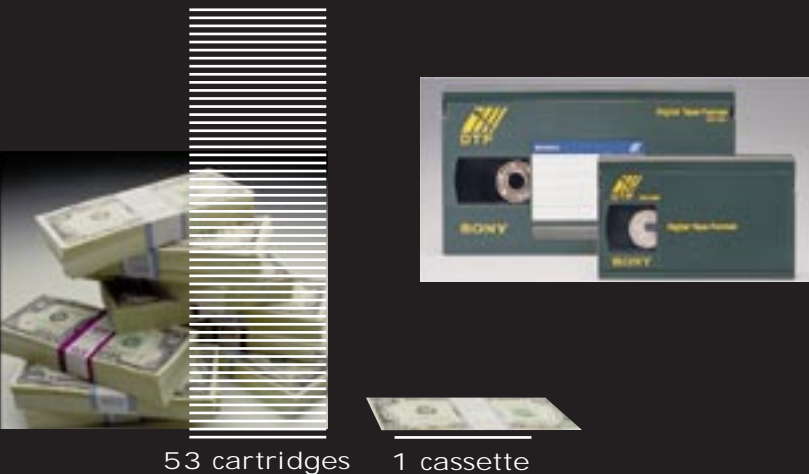
- Fewer tapes to buy and maintain
- Multiple volumes per tape
- Far less time spent swapping tapes
- Increased productivity for your people and systems

The DTF drive uses advanced cassette-based 1/2-inch metal particle tape with a shelf life of up to 30 years. A large DTF cassette holds 42 Gbytes of uncompressed data—the equivalent of fifty-three 3490 cartridges. A small cassette holds 12 Gbytes uncompressed. A user-selectable feature applies the high-performance Adaptive Lossless Data Compression (ALDC) scheme to compress your data at an average ratio of 2.59:1. This increases the maximum capacity of a large cassette to 108 Gbytes; the top capacity of a small cassette goes to 31 Gbytes.

*How much are you spending on media?*

36 track

DTF



53 cartridges

1 cassette

DTF technology offers another significant advantage: You can create multiple volumes on a single cassette. This greatly reduces the need for multiple tapes, cuts the effort and expense of physically managing your data, and enhances the value of your media dollars.

ADVANTAGE #3: *Faster data access*

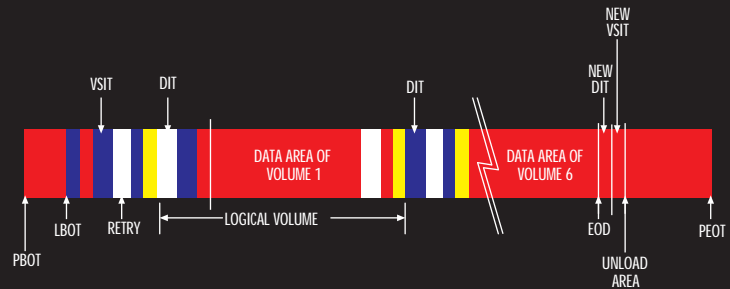


- Advanced, intelligent format
- Multiple logical volumes per tape
- Quick, easy access to volumes and files

DTF is a new standard which Sony created specifically for the easy management of large volumes of information using industry-standard SCSI-2 command sets.

The DTF format provides two levels of management for recorded data. Logical volumes created on a DTF tape are tracked within a Volume Set Information Table (VSIT). Files belonging to a given volume are tracked through a Directory Information Table (DIT). Once a tape is loaded, these two levels of management, together with DTF's 300 Mbyte/sec search speed, enable the drive to quickly move the tape forward or backward directly to a specified file address. The VSIT and DIT can be written anywhere along the tape.

*How long does your system take to access data?*



This intelligent approach to file access means that—unlike conventional, one-spool cartridges—a two-spool DTF tape cassette can be loaded or unloaded within any logical volume without a time-consuming rewind to the logical beginning of tape (LBOT). This minimizes the wear and tear on the drive and media, and significantly reduces the time spent swapping tapes in library environments. Most important, it maximizes the time your drive is available for productive work.

ADVANTAGE #4: *High reliability*



- Proven recording technology
- Bit error rate better than  $1 \times 10^{17}$
- Low maintenance cost

Designed to provide the optimum in reliability and availability, the DTF drive incorporates the same robust 1/2-inch helical-scan recording technology used in Sony's Digital Betacam® professional recorders. Some 400,000 Betacam Series recorders have been sold worldwide since we introduced Betacam technology.

An advanced, three-part tape transport mechanism combines with an immensely powerful double Reed-Solomon error correction scheme and an automatic read/write retry facility to provide bit error rate performance of better than one in  $10^{17}$  bits read.

Drive reliability is extremely high, with an overall MTBF of greater than 200,000 hours.

ADVANTAGE #5: *Advanced diagnostics and maintenance*



- Automatic head alignment
- Automatic head cleaning system
- Serial port status

With the use of a single alignment tape, the DTF drive automatically performs its own head alignment, thus simplifying the task of head replacement and making the unit completely field serviceable.

To help ensure the integrity of your data, the DTF drive incorporates an automatic cleaning system which cleans the tape heads during normal operation. In addition, a sapphire tape cleaner cleans each tape as it moves, further ensuring the integrity of your data.

Sophisticated built-in diagnostics provide complete status information for the drive and media, including occurrences such as uncorrectable errors and media mounts and unmounts. A built-in SCSI logger provides a complete history of communication between the drive and host system.



ADVANTAGE #6: *A migration path to even higher performance*

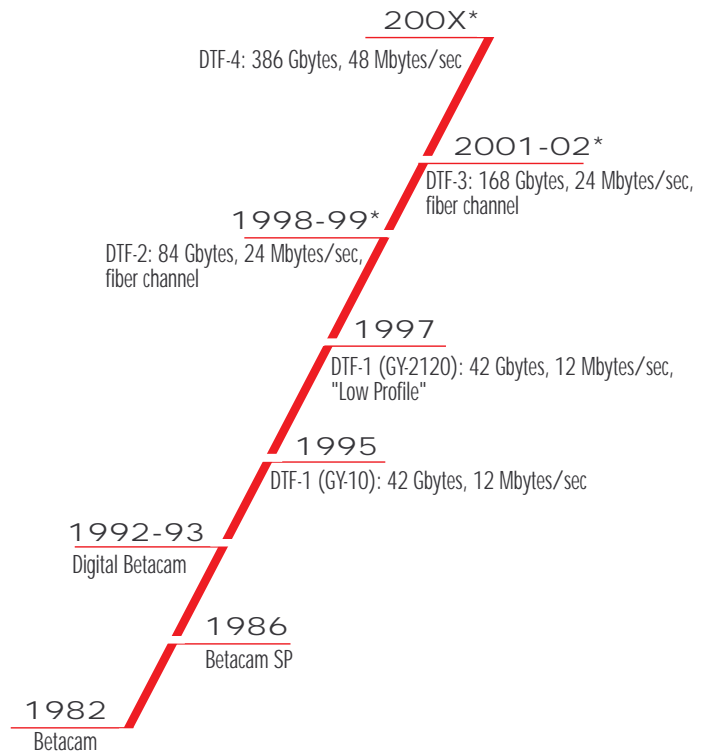


- DTF-2: double-density/double speed, 84 Gbytes native capacity, 24 Mbytes/sec sustained transfer rate
- DTF-3: 168 Gbytes native capacity
- DTF-4: 386 Gbytes native capacity, 1 Tbyte compressed capacity, 48 Mbytes/sec sustained transfer rate

DTF format is proving to be an extremely robust technology with an abundance of potential for further development. The GY-2120 tape drive featured in this brochure is the second-generation model in the DTF product line. Future generations, already in development, will provide even greater speed and capacity while maintaining the same magnitude of cost per performance advantage. All DTF generations will assure full backward compatibility.

DTF-2, the next generation, will be a double-density and double-speed format enabling an uncompressed capacity of 84 Gbytes per large cassette, with a 24 Mbytes native sustained transfer rate. The DTF-2 drive will be supported by all of the library options featured here.

Subsequent projected developments will support the growth of DTF customers' requirements comfortably into the next century, with native capacity reaching 386 Gbytes and a data transfer rate of 48 Mbytes/sec or higher.



\*Projected availability dates.

ADVANTAGE #7: *A range of tape libraries*



- Options from desk side to data warehouse
- Capacities from 378 Gbytes to 2.3 Pbytes

The DTF product line offers automation and flexible system growth through three mass storage solutions employing the DTF tape drive.



The DMS-B9 auto loader is a compact solution designed to meet smaller scale—even desk-side—mass storage requirements. It holds 9 large or small cassettes, providing a maximum uncompressed capacity of 378 Gbytes (982 Gbytes with 2:59:1 ALDC compression). A built-in SCSI-2 Fast/Wide interface enables both sequential and random access. The DMS-B9 features a cassette interchange time of less than 20 seconds, powerful built-in self-diagnostics, and an EXB-210 emulator which permits instant connection to most computer systems. A cassette bar code reader is built into the unit.



To meet mid-range library requirements, Sony offers the DMS-B35, a field-proven tape library based on systems Sony has supplied to the professional broadcast industry for many years. The DMS-B35 can house either one or two DTF tape drives, offering the advantage of a doubled transfer rate of 24 Mbytes/sec when two drives are employed.

When used with one tape drive, the DMS-B35 accommodates 35 large or 70 small cassettes, providing an uncompressed capacity of up to 1.47 Tbytes (3.81 Tbytes assuming 2.59:1 ALDC compression). The cassette access and interchange time is less than 6 seconds. A bar code reader is built in.

Interface control options include RS-232C, RS-422 and SCSI-2 Fast/Wide. Sequential and random access modes are both available. The unit incorporates a powerful self-diagnostics capability.



The smallest possible DMS-8400 PetaSite solution combines one Basic Console and one Drive Console to provide an uncompressed capacity of 5.4 Tbytes.

For applications requiring mass storage on a larger scale, the DTF line provides the DMS-8400 PetaSite, a flexible modular system which can be scaled and configured to meet a variety of storage requirements, space constraints, and budgets. The DMS-8400—Sony's newest tape mass storage product—is a true flagship data storage and management system. Capacities range from 5.4 Tbytes to 2.3 Petabytes uncompressed.

Flexibility to fit various installation spaces—along with various capacity and efficiency requirements—is one of the DMS-8400 PetaSite system's key advantages. It is achieved through a modular approach to system configuration which uses four types of console modules:

- Each system requires one Basic Console, which manages the library robotics and performs insertion and ejection of cassettes. In addition, the Basic Console houses up to 15 cassettes, providing maximum data storage of 0.6 Tbytes.
- The number of Drive Consoles in a system is based on application-related factors such as desired throughput, capacity and system operating efficiency. Each Drive Console accommodates as many as four tape drives and up to 115 cassettes. The console offers a maximum uncompressed storage capacity of 4.8 Tbytes.



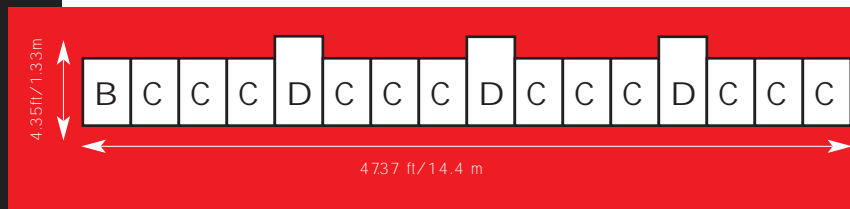
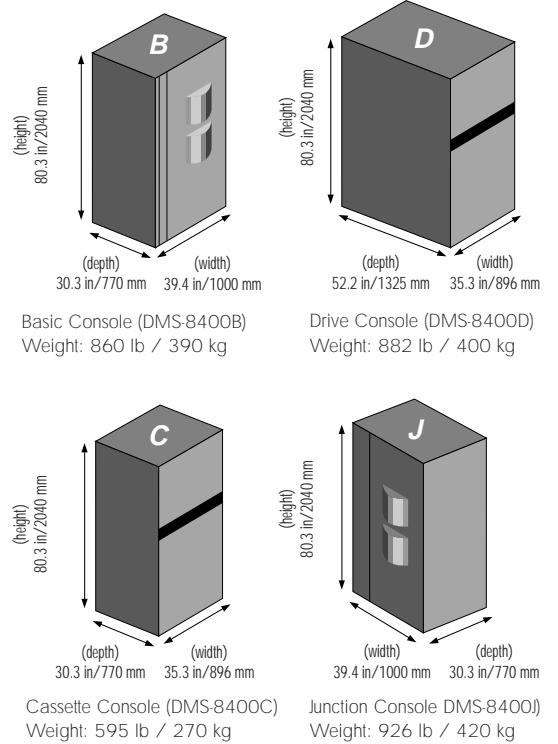
The PetaSite concept offers a high degree of flexibility, allowing almost any user-specified configuration of consoles.

➤ The number of Cassette Consoles is based on the desired system capacity. Each Cassette Console holds up to 180 cassettes, for a maximum capacity of 7.5 Tbytes uncompressed.

➤ The number and positioning of Junction Consoles are based on the desired direction(s) of cassette transfer as well as the layout of the room that houses the PetaSite system. Each Junction Console houses up to 15 cassettes, providing storage for a maximum of 0.6 Tbytes of uncompressed capacity. The Junction Console also provides an elevator assembly and eight cassette insertion/ejection ports.

The smallest DMS-8400 system consists of one Basic Console and one Drive Console housing up to four tape drives. This composition offers an uncompressed capacity of 5.4 Tbytes. Once this basic investment has been made, it is relatively economical to gain significantly more storage by adding one or more Cassette Consoles, each providing 7.5 Tbytes of uncompressed capacity.

The DMS-8400 combines the best in technologies and engineering expertise to assure smoothly functioning and highly reliable operation. The robotics elements of the system draw on Sony's many years of experience providing automated tape libraries for professional broadcast, and more recently, instrumentation and computing environments. Previous generations of Sony robotics have been enhanced by the integration of robust metal-type sensors for assured precision of cassette positioning during tape load/unload, and by the introduction of a new x-y-z coordinate positioning mechanism for the robotics hand to further assure highly precise transfer of cassettes between bins or between a bin and a tape drive.



(Example Configuration)  
Capacity: 105 Tbytes uncompressed / 272 Tbytes compressed  
DTF tape drives: 12

**Other key technology features include:**

- > A unique system of optical (infrared) robotics control which eliminates conventional wiring between the Basic Console and library elevator to provide higher reliability and mobility of the robotics hand.
- > Unique, fully automated cassette input/output via a "mail box"-style mechanism which makes cassette loading easy and virtually eliminates the possibility of dust and other airborne particulates entering the system.
- > A sophisticated, fully automated, on-board bar code management system.
- > Comprehensive built-in self-diagnostics, with monitoring via the PetaSite Controller Software.
- > Interface options including SCSI-2 Fast/Wide and TCP/IP.

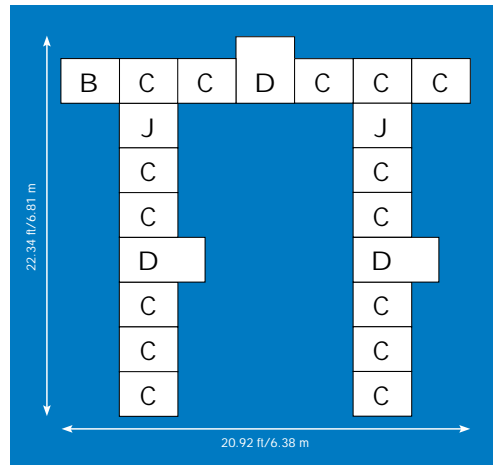
Sony's PetaSite Controller (PSC) software provides a convenient graphical user interface for monitoring library and drive utilization, drive status, system logging, and system diagnostics. The PSC is designed to run under Windows® NT on a standard PC with a 100 MHz Pentium processor and 32 Mbytes of RAM or better.

SCSI and TCP/IP control options are available. Using a PCI bus adapter, the SCSI option allows the PSC server to act as a SCSI target and respond to commands from a SCSI initiator. It supports the ANSI SCSI-2 specification for media changers and provides volume management functionality via a SCSI-2 interface. The TCP/IP option comprises a client library which allows an application access to functionality provided by the PSC server over a standard network connection. The client library provides volume management functionality via a comprehensive Application Program Interface. Each type of control interface is independent of the SCSI-2 data path(s) to the drive(s) in the library.



Large-scale UNIX distributed computing environments can benefit greatly by employing a DMS-8400 PetaSite system in conjunction with PetaServe™, Sony's Hierarchical Storage Management (HSM) system based on the IEEE Mass Storage Reference Model v4/v5. The primary function of PetaServe software is to manage the automatic and transparent migration of inactive or infrequently accessed files from costly fixed-disk storage on servers and/or clients to inexpensive removable-media storage, including networked optical disks as well as tape cassettes housed in the PetaSite system. PetaServe HSM also handles the restoration of archived data when migrated files are accessed, and performs other management tasks within the PetaSite unit itself. MOTIF GUIs make it simple to install and configure.

The DMS-8400 PetaSite model is expandable to a system offering an uncompressed capacity of 2.3 Pbytes. A system configuration incorporating as many as 828 DTF tape drives is achievable.



(Example Configuration)  
Capacity: 129 Tbytes uncompressed/334 Tbytes compressed  
DTF tape drives: 12

## Specifications

### GY-2120 Tape Drive

<b>Format</b>	Sony DTF™ (Digital Tape Format) ECMA 248	
<b>Storage capacity (formatted)</b>	Large cassette:	42 Gbytes uncompressed 108 Gbytes compressed
	Small cassette:	12 Gbytes uncompressed 31 Gbytes compressed
<b>Data compression</b>	Adaptive Lossless Data Compression (IBM ALDC) Average compression ratio 2.59:1	
<b>Data transfer rate</b>	12 Mbytes/sec (sustained) Up to 20 Mbytes/sec with compression	
<b>Interface</b>	SCSI-2 Fast/Wide (differential or single-ended)	
<b>Buffer memory</b>	32 Mbytes	
<b>Bit error rate</b>	Better than $1 \times 10^{-17}$	
<b>Head life</b>	Average greater than 5,000 hours	
<b>MTBF</b>	Greater than 200,000 hours	
<b>Read/write passes</b>	Greater than 20,000	
<b>Search speed</b>	300 Mbytes/sec	
<b>Dimensions (W x H x D)</b>	315 x 220 x 485 (mm) 12.4 x 8.67 x 19 (in)	
<b>Weight</b>	Less than 18 kg (39.6 lb)	
<b>Power consumption</b>	200W	
<b>Recording media</b>	Advanced 1/2" metal particle DTF tape in anti-static cassette shell	

	DMS-B9 Auto Loader	DMS-B35 Tape Library
<b>Number of DTF drives</b>	1	1 or 2
<b>Maximum number of tapes</b>	9 large or small	35 large or 70 small
<b>Storage capacity (formatted)</b>	<b>Large cassettes:</b> 378 Gbytes uncompressed 982 Gbytes compressed <b>Small cassettes:</b> 108 Gbytes uncompressed 280 Gbytes compressed	<b>1 drive (uncompressed/compressed):</b> 35 large cassettes– 1.47 Tbytes/3.8 Tbytes 70 small cassettes– 0.84 Tbyte/2.17 Tbytes <b>2 drives (uncompressed/compressed):</b> 30 large cassettes– 1.26 Tbytes/3.24 Tbytes 60 small cassettes– 0.72 Tbyte/1.86 Tbytes
<b>Cassette access time</b>	Less than 20 sec (average)	6 sec (average)
<b>Cassette access</b>	Random or sequential	
<b>Interface</b>	SCSI-2 Fast/Wide (differential or single-ended)	
<b>Bar code reader</b>	Standard; built-in	
<b>MCBF</b>	More than 200,000	
<b>MTTR</b>	Within 30 minutes	
<b>Dimensions (W x D x H)</b>	424 x 925 x 660 (mm) 16.7 x 38 x 26 (in)	600 x 1100 x 1980 (mm) 23.5 x 43.4 x 78 (in)
<b>Weight</b>	42 kg (72 lb)	199.6 kg (440 lb)
<b>Power consumption</b>	80W (without tape drive)	1KVA
<b>Safety regulations</b>	UL, CE	UL, CE
<b>EMC regulations</b>	FCC Class B, DOC, CE, VCCI-1	FCC Class A, CE, VCCI-1



For more information, contact Sony Data Systems.

Phone: 1-800-829-7669

Fax: 201-358-4215

Email: [datastorage@mail.sel.sony.com](mailto:datastorage@mail.sel.sony.com)

Mail: 1 Sony Drive, Park Ridge, NJ 07656 USA

[www.sony.com/professional](http://www.sony.com/professional)