

SONY MAKES NO WARRANTY OF ANY KIND WITH REGARDS TO THIS DOCUMENT. Sony shall not be liable for errors contained herein, or indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this document!

UNIX Configuration Guide v2.10 08/31/2000

INTRODUCTION

This UNIX Compatibility Guide allows Sony tape streamer products to be configured to work with workstations in popular open systems environments:

- +Compaq/Digital Alpha workstations and servers
- +HP workstations and servers
- +IBM workstations and servers
- +PC (intel x86) UNIX workstations (including Linux, SCO, and Solaris x86)
- +SGI workstations and servers
- +SUN workstations and servers
- +SDT-5000 emulation mode (AIT1, AIT2, DDS4 ONLY)

- +Verifying your install is correct
- +Hardware Dipswitch Settings
- +Hardware Jumper Settings

The guide is intended to be used in conjunction with and in addition to the hardware and software installation and operation instructions that accompany your tape drive and your workstation.

This guide covers the following devices (Table.1):

Model	Format	Capacity	Inquiry String	Minimum Firmware Level	Media
SDX-500C TSL-A500C	AIT2	50GB	SDX-500C	0100 and above	AIT1 25GB / 35GB AIT2 36GB / 50GB
SDX-300C TSL-A300C	AIT1	25GB	SDX-300C	0300 and above	AIT1 25GB / 35GB
SDT-10000 SDT-11000 TSL-11000	DDS4	24GB	SDT-10000 SDT-11000 TSL-11000	0100 and above	DDS4, DDS3, DDS2, DDS1
SDT-9000 TSL-9000	DDS3	12GB	SDT-9000	0126 and above	DDS3, DDS2, DDS1
SDT-7000	DDS2	4GB	SDT-7000	0195 and above	DDS2, DDS1

*Sony drive models that are not listed in this table do not have UNIX support (i.e. SDT-5000 and before)

We have verified the following:

- +the drive can be recognized by the system
- +the user can perform simple tar and dd operations

We do not specifically check for the following:

- +drive performance
- +host control over block-size changes
- +host control over hardware compression

+compatibility w/ fancy GUI or 3rd party backup utilities

DRIVE FIRMWARE

These instructions apply only to Sony tape drives with firmware supporting UNIX operation (see table.1 above). If there is any doubt that your Sony tape drive has UNIX firmware support, check the firmware level reported through the drive inquiry command. If your tape drive has a lower level of firmware than shown in this document and you experience problems using the drive in one of the supported environments, contact your reseller for a firmware upgrade.

UNIX CONFIGURATION SWITCH SETTINGS

Sony DDS and AIT tape drives are designed with a set of UNIX configuration switches on the bottom of the drive mechanism. The factory settings may need to be changed to customize the drive for top performance and capacity with your workstation. Ensure also that your drive is configured correctly with regards to SCSI ID, termination, etc. (see DIP switch configuration or Hardware Jumpers).

MEDIA USAGE

Sony recommends the use of Sony branded media on its drives. Sony media is specifically manufactured for full compatibility with its drives. Please see table.1 above for drive and media compatibility. This is especially true for Sony 8mm tape drives, since Sony 8mm media is an Advanced Metal Evaporative (AME) media manufactured exclusively for Sony 8mm drives. Cartridges and media for these drives are not interchangeable with other 8mm tape products.

REGARDING AUTOLOADERS

Sony Autoloaders are compatible with various UNIX systems. However, full functionality may not always be available without third-party software.

In general the autoloader can be configured using the same method as a standalone drive. For example, on an SGI system change the required files using the correct loader inquiry string instead of the standalone drive inquiry string. "TSL-A300C" instead of "SDX-300C".

Autoloaders can be used with the various UNIX workstations via the following methods:

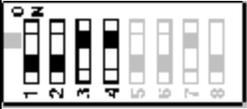
The TSL-9000 and TSL-11000 have a single-tape mode function, where only slot 8 of the magazine is loaded with a tape. In this mode the autoloader will behave as a standalone DAT drive, without any autoloader functionality.

The TSL-9000, TSL-11000, TSL-A300C and TSL-A500C have a Sequential Mode. By default, the autoloader enters this mode when the select button has been pressed and the selected tape is loaded successfully. In this mode the, the autoloader will load cartridges sequentially. Upon receiving a scsi UNLOAD command to LUN 0 the cartridge will be automatically replaced in its slot in the magazine and the next highest cartridge is loaded. This continues for each UNLOAD command until there are no more cartridges. If the UNLOAD command is received for the last cartridge (#8) then the autoloader will simply place it back in the magazine and no further action is taken. On some UNIX systems the **mt** command will allow you to send the UNLOAD command (see the man pages for your particular system and the product manual for your particular autoloader). For example, IRIX uses the **scsicontrol** command and SCO Openserver uses the **tape** command with the unload flag.

On Linux systems the MTX utility can be utilized w/ shell scripting to create automated backups on autoloaders. More info regarding MTX can be found here: <http://mtx.sourceforge.net/>

*Note: The TSL-7000 does not support UNIX systems.

COMPAQ/DIGITAL SYSTEMS

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
AlphaStation AlphaServer	Digital UNIX 3.x, 4.x Digital OpenVMS 6.x, 7.x		

Web reference: <http://www.compaq.com>

Digital OpenVMS 7.x

For VMS, make sure the drive is correctly set up and visible to the system. At the console prompt type: `sho dev`, this should list the devices on the scsi bus. If the device is visible to the system, boot VMS. In VMS issuing the command: `sho dev mk` should list the tape devices available.

Digital Unix v3.x

If for some reason there is a problem with Digital UNIX v3.x. It can be reconfigured to explicitly use the Sony drive using the following procedure:

1) Modify the following information in the `cam_devdesc_tab` structure of the file `/usr/sys/data/cam_data.c`

2) Copy the TLZ09 or TLZ10 or TZS20 entry and change the inquiry string to

`"SONY SDT-7000"` or `"SONY SDT-9000"` or `"SONY SDX-300C"`

 *note 4 spaces *note 4 spaces *note 4 spaces

It should look something like this:

```
/*SONY tape drive*/
{
    /*SONY tape drive*/
    {
        "SONY SDT-7000, 13, DEV_TZRDAT,
        (ALL_DTYPE_SEQUENTIAL<<DTYPE_SHFT)|SZ_RDAT_CLASS,
        (struct pt_info *)ccmn_null_sizes, SZ_NO_BLK, (DEC_MAX_REC-1),
        &tlz09_dens, NO_MODE_TAB, SZ_NO_FLAGS,
        NO_OPT_CMDS, SZ_READY_DEF, SZ_NO_QUE,
        DD_REQSNS_VAL|DD_INQ_VAL,
        36,64
    },
}
```

3) Rebuild the kernel using the `>doconfig` script and reboot the system.

4) Device files can be created by typing the following:

```
#cd /dev/rmt #./MAKEDEV tzX
```

where $x = (8 * \text{bus ID}) + \text{SCSI ID}$

The following files will be created:

/dev/rmt/rmtXh	Rewind compression enabled
/dev/rmt/rmtXm	
/dev/rmt/rmtXl	Rewind compression disabled
/dev/rmt/rmtXa	
/dev/rmt/nrmtXh	no rewind compression enabled
/dev/rmt/nrmtXm	
/dev/rmt/nrmtXl	No rewind compression disabled
/dev/rmt/nrmtXa	

Digital Unix v4.0x

Sony tape devices will run on Digital Unix 4.0x without any kernel modifications. However, the maximum block size supported in the default configuration is 64K. Significant performance improvements can be achieved by using 256K block sizes. To reconfigure Digital UNIX to support $BS > 64K$:

1) log in as root

2) `cd /etc`

3) make a backup copy of the DDR database source file `cp ddr.dbase ddr.dbase_orig`

4) edit the DDR database source file: `vi ddr.dbase`

5) locate the SCSIDEVICE entry for "TZS20". Make a copy of this entire entry. Change "**DEC**" to "**SONY**" and change "**TZS20**" to "**SDX-300C**". Save the changes and exit vi.

If you wish to add an SDT-7000. Locate the SCSIDEVICE entry for "TLZ09". Make a copy of this entire entry. Change "**DEC**" to "**SONY**" and change "**TLZ09**" to "**SDT-7000**". Save the changes and exit vi.

If you wish to add an SDT-9000. Locate the SCSIDEVICE entry for "TLZ10". Make a copy of this entire entry. Change "**DEC**" to "**SONY**" and change "**TLZ10**" to "**SDT-9000**". Save the changes and exit vi.

If you wish to add an SDT-10000. Locate the SCSIDEVICE entry for "TLZ10". Make a copy of this entire entry. Change "**DEC**" to "**SONY**" and change "**TLZ10**" to "**SDT-10000**". Save the changes and exit vi.

If you wish to add an SDX-500C. Locate the SCSIDEVICE entry for "TZS20". Make a copy of this

entire entry. Change "DEC" to "SONY" and change "TZS20" to "SDX-500C". Save the changes and exit vi.

This is what the original entry should look like:

```
SCSIDEVICE
#
    Type=tape
    Name="DEC" "TZS20"
    #
        PARAMETERS:
        TypeSubClass=8mm
        TagQueueDepth=0
        MaxTransferSize=0x0fffffff#(16MB-1)
        ReadyTimeSeconds=90#seconds
        DENSITY:
            #
            DensityNumber=0,3,4,5,6,7
            DensityCode=default
            CompressionCode=0x0
            Buffered=0x1
            DENSITY:
                #
                DensityNumber=1,2
                DensityCode=default
                CompressionCode=0x1
                Buffered=0x1
```

Find the entry: `scsi_density_table_size = 0x30` or

Find the entry: `scsi_density_table_size = 0x31` or

Change entry to: `scsi_density_table_size = 0x31` and / or

Change entry to: `scsi_density_table_size = 0x32`

Find the entry: `scsi_tape_density[0x29] = "density_code_29" 0 0`

Append with: `scsi_tape_density[0x30] = "density_code_30" 0 0` and

Append with: `scsi_tape_density[0x31] = "density_code_31" 0 0`

Compile the DDR database: `#ddr_config -c ddr.dbase`

Create tape devices as required: (most versions of 4.x will dynamically create device files on bootup)

```
./MAKEDEV tz
```

Compaq Tru64 Unix (v5.0x)

Sony tape devices will run on Tru64 Unix without any kernel modifications as generic devices. However for explicit support you can do the following:

1) log in as root

2) **cd /etc**

3) make a backup copy of the DDR database source file **cp ddr.dbase ddr.dbase_orig**

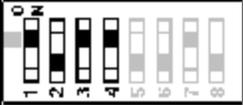
4) edit the DDR database source file: **vi ddr.dbase**

5) locate the SCSIDEVICE entry for whichever tape device you wish to add. For example, search for "SDX-300C" or "SDX-500C" for AIT products or "SDT-9000" or "SDT-11000" for DDS products .

Make a copy of this entire entry. Change "**COMPAQ**" to "**SONY**". Save your changes and exit vi.

Compile the DDR database: **#ddr_config -c ddr.dbase**

HP SYSTEMS

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
Workstation Server	HP UX 9.x HP UX 10.x HP UX 11.x		

Web reference: <http://www.hp.com>

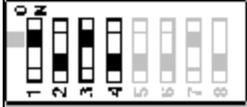
HP-UX 9.05 and later

To configure HP-UX to explicitly use the SDT-7000, SDT-9000, SDX-300C, and SDX-500C the Kernel must be reconfigured using the SAM utility. To use the SAM utility do the following:

- 1) Log on as root.
- 2) Run SAM: `$/usr/bin/sam`
- 3) Choose Peripheral Devices and activate [Open].
- 4) Choose Tape Drives and activate [Open]
- 5) From the "Actions" menu in the "Tape Device Manager" window, choose Add...
- 6) Within the "Add a Tape Drive" window, read the instructions, then active [OK].
- 7) SAM may detect that your HP-UX kernel lacks the drivers necessary to make use of the tape drive. If so, within the "Device Driver Check" window, read the messages and choose the appropriate action. If you choose, Build a new kernel and shutdown the system immediately, SAM will create the kernel you need and reboot your computer. The rebooted system will be able to use the tape drive.
- 8) If you had to shutdown your system in order to physically connect the tape drive, re-enter SAM and repeat step 3 through 6 above.
- 9) Choose the new tape drive.
- 10) From the "Actions" menu, choose Create Device Files.
- 11) Activate [OK] and exist SAM.

*Note: 800 Series systems will not recognize Sony tape devices if running HP-UX 10.x. However, they will recognize Sony devices if running HP-UX 11.x.

IBM SYSTEMS

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
Workstation	AIX 3.2 AIX 3.2.x		

Web reference: <http://www.ibm.com>

AIX 3.2 and AIX 3.2.x

The Sony SDT-7000, SDT-9000, SDX-300C, and SDX-500C can be configured to work with AIX 3.2, and AIX 3.2.x by reconfiguring the kernel using the SMIT "Other SCSI Device" option. To configure AIX using the SMIT utility do the following:

- 1) Type: **smit tape**
- 2) Select "add a tape drive".
- 3) Select "SCSI tape drive".
- 4) Select "change/show characteristics of a tape drive" and set the appropriate connection address.
- 5) Select "Other SCSI tape drive". Do not select "4mm2gb" or else the following error will be reported: "Device to be configured does not match the physical device at the specified connection location".
- 6) The default block size is 512 bytes. Here are the smit configuration specifics:

Here are the smit configuration specifics:

```

Tape Drive                                rmt#
Tape Drive Type                           ost
Tape Drive Interface                       scsi
Description                               Other SCSI Tape Drive
Status                                     Available
Location                                   #-##-##-##
Parent Adapter                             vscsil
Connection Address                         ##
BLOCK size (0=variable length)             0
Use DEVICE BUFFERS during writes           yes
Use EXTENDED file marks                    yes
BLOCK SIZE for variable length support     0
DENSITY setting #1                         0
DENSITY setting #2                         0
Set delay after a FAILED command           45
Set timeout for the READ or WRITE command  600

```

AIX 4.2.5 and 4.3.1

The Sony default mode dip switch settings (all UNIX switches off) can be used to configure the drives to work with AIX 4.x.

After the drive is connected and SCSI bus integrity has been verified:

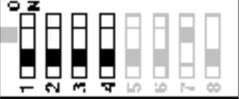
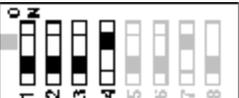
+boot the RS6000, log in as root, and start a terminal window.

+to list a hardware inventory of the configured SCSI devices type: **lsdev -C -s scsi**

The tape should be marked as 'available' with an rmt device name. It will be configured as a generic device. It is not necessary to use 'smit' to modify any of the tapes software control parameters.

+The tape can now be used for data operations. For example, to create a bootable backup of the system onto tape: **/usr/bin/mksysb '-i' /dev/rmt0<cr>**

PC SYSTEMS (Intel x86)

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
Intel x86 PC systems	Linux Solaris x86 SCO	 [Sony default] or  [variable mode]	 [Sony default] or  [variable mode]

Sony tape devices will work correctly under most Intel x86 based UNIX workstations without any modifications.

Linux distributions:

Sony tape devices are compatible with various distributions of Linux, specifically we have verified the RedHat and Suse distributions. You must have a supported scsi adapter and scsi support built into the kernel. The tape device may be accessed by referencing the scsi tape driver /dev/st* or the scsi generic driver /dev/sg*.

In most cases the drive should work correctly, however for install and kernel configuration see the Linux SCSI programming How-to available here :

<http://howto.tucows.com/otherhowto/SCSI-Programming-HOWTO>

SCO:

OpenServer 5.x.x:

Sony tape devices are certified for SCO Openserver Release 5 v5.05. Please look here for info: <http://www.sco.com>

Search under support for the section entitled: Adding tape drives. After reboot the drive may be referenced by /dev/rmt/*tape1, where:

- ctape1 - non-retensioning rewinding device
- ntape1 - non-retensioning non-rewinding device
- rtape1 - retensioning rewinding device
- nrtape1 - retensioning non-rewinding device
- utape1 - unload on close device

At this point, the standard unix utilities can be used: backup, restore, cpio, tar, volcopy, ufsdump, and ufs restore Or emergency_disk and emergency_rec commands can be used to create bootable

diskettes and tape(s) to restore the system.

UnixWare 7

Sony tape devices are certified for SCO UnixWare 7 v7.x. Please look here for info:
<http://www.sco.com>

Also Computer Associates ArcServeIT 6.6 supports some of the tape products.

Sun Microsystems:

Solaris 7 x86:

<http://access1.sun.com/drivers/hcl/7/oct98/files/c0111.htm>

Solaris 2.6 x86:

<http://access1.sun.com/drivers/hcl/2.6/oct98/files/c0111.htm>

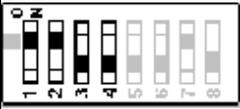
Solaris 2.5.1 x86:

<http://access1.sun.com/drivers/hcl/2.5.1/x86hcl.ascii>

*The SDT-5000, SDT-5200, SDT-7000, and SDT-9000 will work on the above platforms in Sony default mode.

SGI SYSTEMS

The Sony SDT-9000 and SDX-300C are command-line compatible with Irix 5.x and Irix 6.x using the configuration switch settings for SGI workstations. For device file control and tape access from the Irix desktop, the Kernel needs to be modified or the correct patch must be loaded. However, not all functionality is available under all versions of Irix.

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
Indy Irix 5.3 Indigo Irix 6.2 O2 Irix 6.3 (limited)* Octane 6.4 IRIX 6.5	IRIX 5.3 IRIX 6.x IRIX 6.4 IRIX 6.5		

Web reference: <http://www.sgi.com>

*under 6.3 SDX-300C drive compression cannot be controlled via the device types, it is always enabled. However compression can always be enabled/disabled via drive hardware settings.

Set the configuration switches as shown above. Make sure that the current SGI recommended patch sets are installed. See SGI support website for current releases, you will need a support contract for access to most of the patches.

As of 9/21/98 these are the patches needed:

IRIX Version	Patch#	Description
IRIX 5.3	2184 1948 2224	+5.3 Tape driver bug fixes +HINV rollup +SCSI Rollup for 5.3
IRIX 6.2	2861	+6.2 Tape Driver rollup
IRIX 6.3	2838	+6.3 Tape driver fixes
IRIX 6.4	3301 2998 3305	+SCSI rollup +6.4 Tape driver fixes +HINV rollup

To start looking for the latest available SGI patches look here:

http://www.sgi.com/support/patch_intro.html

A searchable patches database is available here:

<http://support.sgi.com/surfzone/patches>

*You'll need to register to access this area.

2. For **IRIX 5.3, 6.2, and 6.3** you must do two things:

+add the following entry to **/dev/MAKEDEV.d/TPS_base**

search for the following entry:

```
*Drive?type:*DAT*|*Drive?type:*8mm?8200*)
  set s nrs ns "" nrns nr sv nrsv nsv v nrnsv nrv ;
  for add in 0 1 2 2 3 3 4 5 6 6 7 7 ; do
    mdev=`expr $minor + $add`;
    mknod ${prf}$1 c ${C_TPS} $mdev;
    case "$stat" {
      *Device:*Python*01931*) # DDS2 drive with compression
        mdev=`expr $mdev + 8`;
        mknod ${prf}$1c c ${C_TPS} $mdev;
        ;;
    }
    shift;
  done ;;
```

add the (**blue**) entry so that the entire entry looks like this:

```
*Drive?type:*DAT*|*Drive?type:*8mm?8200*)
  set s nrs ns "" nrns nr sv nrsv nsv v nrnsv nrv ;
  for add in 0 1 2 2 3 3 4 5 6 6 7 7 ; do
    mdev=`expr $minor + $add`;
    mknod ${prf}$1 c ${C_TPS} $mdev;
    case "$stat" {
      *Device:*Python*01931*) # DDS2 drive with compression
        mdev=`expr $mdev + 8`;
        mknod ${prf}$1c c ${C_TPS} $mdev;
        ;;
      *Device:*SDT-9000*)
        mdev=`expr $mdev + 8`;
        mknod ${prf}$1c c ${C_TPS} $mdev;
        ;;
      *Device:*SDX-300C*)
        mdev=`expr $mdev + 8`;
        mknod ${prf}$1c c ${C_TPS} $mdev;
        ;;
    }
    shift;
  done ;;
```

*You can substitute the correct inquiry string for any Sony drive you wish to add here, including autoloaders. For example, instead of ***Device:*SDX-300C*)** you can use ***Device:*TSL-A300C*)**

+add the following entry to **/var/sysgen/master.d/scsi**

```
{
  DATTAPE,TPDAT,4,8,"SONY","SDT-9000",0,0,{0,0,0,0},
  MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
  MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|
  MTCAN_VAR|MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|
  MTCAN_CHTYPEANY|MTCAN_SETDEN,
  60,4*60,4*60,6*60,512,512*512
},
```

or

```
{
  DATTAPE,TPDAT,4,8,"SONY","SDX-300C",0,0,{0,0,0,0},
  MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
  MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|
  MTCAN_VAR|MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|
  MTCAN_CHTYPEANY|MTCAN_SETDEN,
  60,4*60,4*60,6*60,512,512*512
},
```

*You can substitute the correct inquiry string for any Sony drive you wish to add here, including autoloaders. For example, instead of `*Device:*SDX-300C*)` you can use `*Device:*TSL-A300C*)`

3. After modifying the **scsi** file use **autoconfig** to rebuild the kernel. (see the autoconfig man page)

For **IRIX 6.4** support for both the SDT-9000 and SDX-300C you must get at least the following patches from SGI. (It is always a good idea to search the SGI website for the latest available patches, see patch table above):

```
#2837 SCSI rollup
#2863 Tape driver updates
#2871 HINV rollup
```

After loading the required patches you may need to follow the IRIX 5.3, 6.2, and 6.3 procedure above to modify the kernel. If the `/dev/MAKEDEV.d/TPS_base` and the `/var/sysgen/master.d/scsi` files already contain the appropriate entries you will just need to run **autoconfig**.

For **IRIX 6.5** support for both the SDT-9000 and SDX-300C no kernel modifications are necessary.

SGI specific notes:

1. Kernel must be rebuilt with Sony drive configuration information or correct patch must be loaded for drive to appear on desktop. *SGI is always releasing patches, for the latest patches please check SGI support website.

MTCAN notes for `/var/sysgen/master.d/scsi` file:

These device file names can be interpreted as follows:

Device Name	Function
nr	No rewind on close
v	Device supports variable block sizes

ns	Device does not byte-swap
s	Device does byte-swap
stat	Allows the device to be used when one of the other device files specifying the same physical device is already opened

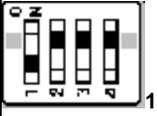
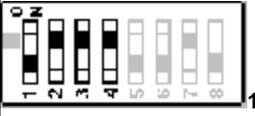
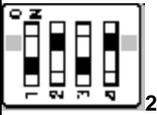
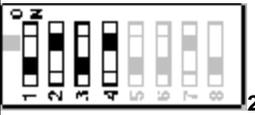
The MTCAN values have the following functions:

MTCAN value	Capability Enabled
APPEND	Append to existing tape data
BSF	Backspace file
BSR	Backspace record
CHKRDY	Determine if tape cartridge is present
CHTYPEANY	Change density and/or fixed to variable at points other than beginning of tape
PART	Multiple Partitions
PREV	Prevent media removal
SEEK	Seek to a particular block
SETMK	Setmarks
SETSZ	Fixed Block Size can be set
SILI	Suppress illegal length indicators
SPEOD	Space to end of data
SYNC	Synchronous Mode SCSI
VAR	Variable block sizes

The constants have the following functions:

Constant	Description
40	Transfer time-out in "inverse ticks"
4*60	Minimum time-out in seconds for any command
4*60	Space command time-out in seconds
5*60	Time-out in seconds for long operations (such as rewinds)
512	Default block size in bytes for fixed block size mode
64*512	Recommended blocking factor in bytes for the upper limit of read/write commands

SUN SYSTEMS

Hardware	Operating System	SDT-7000 SDT-9000 TSL-9000	SDX-300C / TSL-A300C SDX-500C / TSL-A500C SDT-10000 SDT-11000 / TSL-11000
Sparc	SunOS	 1	 1
UltraSparc	Solaris	 2	 2

Web reference: <http://www.sun.com>

1 [for SunOS] - Mode Selects for non-buffer mode are accepted but ignored for performance reasons.

2 [for Solaris] - Mode Selects for non-buffer mode are accepted and will set non-buffer mode.

SunOS 4.1.x

To configure SunOS 4.1.x to explicitly use the SDT-7000, SDT-9000, TSL-9000, SDT-10000, SDT-11000, TSL-11000, SDX-300C, TSL-A300C, and SDX-500C the **stdef.h** and **st_conf.c** files in directory **/usr/sys/scsi/targets** must be modified and the kernel rebuilt.

1. Modify the **stdef.h** file by adding a define statement for the Sony drive as follows:

```
#define ST_TYPE_SONY
```

Add this line after the last ST_TYPE_ define statement in the file and use the next incremental hexadecimal value. Depending on the release and device support included in the system the value used may be different. For example:

If the last entry is,

```
#define ST_TYPE_METRUM 0x2d
```

Add the following define for Sony:

```
#define ST_TYPE_SONY 0x2e
```

2. Modify the **st_conf.c** file by adding the following line at the end of the device definition list:

for the DDS drives:

```
/* Sony Helical scan device support */
{
  "Sony Helical Scan",4,"SONY",ST_TYPE_SONY,10240,
```

```

(ST_VARIABLE|ST_BSF|ST_BSR|ST_LONG_ERASE|ST_KNOWS_EOD),
    5000,5000,
    {0x13,0x13,0x8C,0x8C},
    {0,0,0,0}
}

```

for AIT drives:

```

/* SONY AIT 8mm drive */
{
  "Sony 8mm Helical Scan",15,"SONY      SDX-300C",
  ST_TYPE_EXB8500, 1024,(ST_VARIABLE |ST_BSF |ST_BSR
  |ST_LONG_ERASE |ST_KNOWS_EOD),
  5000, 5000,
  {0x13,0x8c,0x8C,0x8C},{0,0,0,0}
},

```

note: "SONY SDX-300C" contains 4 spaces.

3. Rebuild the Kernel to include the new device definition by using the config command. Please refer to the config and st man pages for more information.

Solaris 2.3

To configure Solaris 2.3 to use the SDT-7000, SDT-9000, TSL-9000, SDT-10000, SDT-11000, TSL-11000, SDX-300C, TSL-A300C, SDX-500C and TSL-A500C add the following (blue)lines to the **/kernel/drv/st.conf** file and reboot the system using the **boot -r** option:

```

tape-config-list =
"SONY      SDT-7000", "Sony DDS-2 4mm DAT", "SONY_TAPE",
"SONY      SDT-9000", "Sony DDS-3 4mm DAT", "SONY_TAPE",
"SONY      TSL-9000", "Sony DDS-3 4mm DAT Autoloader", "SONY_TAPE",
"SONY      SDT-10000", "Sony DDS-4 4mm DAT", "SONY_TAPE",
"SONY      SDT-11000", "Sony DDS-4 4mm DAT", "SONY_TAPE",
"SONY      TSL-11000", "Sony DDS-4 4mm DAT Autoloader", "SONY_TAPE",
"SONY      TSL-A500C", "Sony AIT1 8mm Autoloader", "SONY_TAPE",
"SONY      SDX-500C", "Sony AIT2 8mm", "SONY_TAPE",
"SONY      TSL-A300C", "Sony AIT1 8mm Autoloader", "SONY_TAPE",
"SONY      SDX-300C", "Sony AIT1 8mm", "SONY_TAPE"; <- notice the semi-colon!
/*---- (4 spaces between      SONY and SDX)*/

```

```
SONY_TAPE = 1, 0x34, 1024, 0x1639, 4, 0x13, 0x8c, 0x8c, 0x8c,3;
```

Please note that the tape-config-list can be limited to support only the device needed. For example, to support only the SDX-300C the following is all that is required:

```

tape-config-list =
"SONY      SDX-300C", "Sony AIT 8mm", "SONY_TAPE"; <- notice the semi-colon!
/*---- (4 spaces between SONY and SDX)*/

```

```
SONY_TAPE = 1, 0x34, 1024, 0x1639, 4, 0x13, 0x8c, 0x8c, 0x8c,3;
```

Now, reboot the system using the **boot -r** option. The -r option will force

the system to check for any new devices and will update the /dev device file directory.

The difference between configuring Solaris 2.3 and Solaris 2.4 or later is that the block size specified for the third parameter of SONY_TAPE is different. For Solaris 2.3 that parameter is 1024 and for Solaris 2.4 and later the parameter is zero (0). A block size of zero (0) indicates variable block mode. Solaris 2.3 must have this value set to something other than zero (0). In this case it should be set to 1024.

Solaris 2.4, 2.5.1, 2.6, and Solaris 7

To configure Solaris 2.4 and up to use the SDT-7000, SDT-9000, SDT-10000, SDX-300C, TSL-A300C, SDX-500C, and TSL-A500C add the following (blue)lines to the **/kernel/drv/st.conf** file and reboot the system using the **boot -r** option:

```
"SONY      SDT-7000", "Sony DDS-2 4mm DAT", "SONY_DAT",
"SONY      SDT-9000", "Sony DDS-3 4mm DAT", "SONY_DAT ",
"SONY      TSL-9000", "Sony DDS-3 4mm DAT Autoloader", "SONY_DAT ",
"SONY      SDT-10000", "Sony DDS-4 4mm DAT", "SONY_DAT ",
"SONY      SDT-11000", "Sony DDS-4 4mm DAT", "SONY_DAT ",
"SONY      TSL-11000", "Sony DDS-4 4mm DAT Autoloader", "SONY_DAT",
"SONY      TSL-A500C", "Sony AIT1 8mm Autoloader", "SONY_AIT",
"SONY      SDX-500C", "Sony AIT2 8mm", "SONY_AIT",
"SONY      TSL-A300C", "Sony AIT1 8mm Autoloader", "SONY_AIT",
"SONY      SDX-300C", "Sony AIT1 8mm", "SONY_AIT"; <- notice the semi-colon!
/*----- (4 spaces between SONY and SDX)*/

SONY_DAT = 1, 0x34, 0, 0xd679, 4, 0x00, 0x00, 0x00, 0x00,0;
SONY_AIT = 1, 0x36, 0, 0xd679, 4, 0x00, 0x00, 0x00, 0x00,0;
```

Please note that the tape-config-list can be limited to support only the device needed. For example, to support only the SDX-300C the following is all that is required:

```
tape-config-list =
"SONY      SDX-300C", "Sony AIT 8mm", "SONY_AIT"; <- notice the semi-colon!
/*----- (4 spaces between SONY and SDX)*/

SONY_AIT = 1, 0x36, 0, 0xd679, 4, 0x00, 0x00, 0x00, 0x00,0;
```

Now, reboot the system using the **boot -r** option. The -r option will force the system to check for any new devices and will update the /dev device file directory.

***Ultra Series NOTE

On Sun Ultra series systems using the Symbios 53C875 scsi chip, the console will recognize the devices, but may not create device files. If this happens set the drive to the IRIX switch settings and rebuild the kernel as above.

Solaris specific notes:

The **st.conf** file entries have the following meaning (see man pages for **st** and the **/kernel/drv/st.conf** file for more details and examples):

[The following info is from the Solaris 2.6 man pages]
The st tape driver has a built-in configuration table for all Sun supported tape drives. In order to support the addition of third party tape devices or to override a built-in configuration, drive information can be supplied in st.conf as global properties that apply to each node, or as properties that are applicable to one node only. The st driver looks for the property called "tape-config-list". The value of this property is a list of triplets, where each triplet consists of three strings.

The formal syntax for the **st.conf** file is:
tape-config-list = <triplet> [, <triplet> *];

where each entry is:

<vendor_id + product_id>, <pretty print>, <data-property name>

each data-property is defined as:

<data-property name> = <version>, <type>, <bsize>, <options>, <number of densities>, <density> [, <density>*], <default-density>;

*Note that a semicolon (;) is used to terminate a prototype devinfo node specification. Individual elements listed within the specification should not be separated by a semicolon. (Refer to driver.conf(4) for more information.)

<vendor_id + product_id> is the string that is returned by the tape device on a SCSI inquiry command. This string may contain any character in the range 0x20-0x7e. Characters such as " " (double quote) or "' ' (single quote), which are not permitted in property value strings, are represented by their octal equivalent (for example, \042 and \047). Trailing spaces may be truncated.

<pretty print> is used to report the device on the console. This string may have zero length, in which case the will be used to report the device.

<data-property-name> is the name of the property which contains all the tape configuration values (such as, <type>, <bsize>, etc.) corresponding for the tape drive for the specified .

<version> is a version number and should be 1. In the future, higher version numbers may be used to allow for changes in the syntax of the value list.

<type> is a type field. Valid types are defined in

/usr/include/sys/mtio.h. For third party tape configuration, the following generic types are recommended:

```
MT_ISDAT    0x34
MT_IS8MM    0x35
MT_ISOTHER  0x36
```

<bsize> is the preferred block size of the tape device. The value should be 0 for variable block size drives.

<options> is a bit pattern representing the drive options, as defined in **/usr/include/sys/scsi/targets/stddef.h**. Valid flags for tape configuration are:

```
ST_VARIABLE      0x0001
ST_QIC           0x0002
ST_REEL          0x0004
ST_BSF           0x0008
ST_BSR           0x0010
ST_LONG_ERASE    0x0020
ST_AUTODEN_OVERRIDE 0x0040
ST_NOBUF         0x0080
ST_KNOWS_EOD     0x0200
ST_UNLOADABLE   0x0400
ST_SOFT_ERROR_REPORTING 0x0800
ST_LONG_TIMEOUTS 0x1000
ST_BUFFERED_WRITES 0x4000
ST_NO_RECSIZE_LIMIT 0x8000
ST_MODE_SEL_COMP 0x10000
ST_NO_RESERVE_RELEASE 0x20000
ST_READ_IGNORE_ILI 0x40000
ST_READ_IGNORE_EOF 0x80000
ST_SHORT_FILEMARKS 0x100000
```

<number of densities> is the number of densities specified. Each tape drive can support up to four densities. The value entered should therefore be between 1 and 4; if less than 4, the remaining densities will be assigned a value of 0x0.

<density> is a single-byte hexadecimal number. It can either be found in the drive specification manual or be obtained from the drive vendor.

<default density> has a value between 0 and (<number of densities> - 1).

The following files may be helpful in debugging:

/kernel/drv/st.conf

driver configuration file

/usr/include/sys/mtio.h

structures and definitions for mag tape io control commands

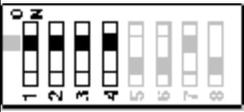
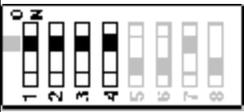
/usr/include/sys/scsi/targets/stddef.h

definitions for SCSI tape drives

/dev/rmt/[0- 127][l,m,h,u,c][b][n]

where l,m,h,u,c specifies the density (low, medium, high, ultra/compressed), b the optional BSD behavior (see `mtio(7I)`), and n the optional no rewind behavior. For example, `/dev/rmt/0lbn` specifies unit 0, low density, BSD behavior, and no rewind.

EMULATION MODE*

Hardware	
SDT5000 emulation *1	 <p>SDT-10000, SDT-11000, TSL-11000, SDX-300C & TSL-A300C only</p>
SDX-300C emulation *2	 <p>SDX-500C & TSL-A500C</p>

- 1) The firmware offers the ability to set the tape drive to report the inquiry string of the Sony SDT5000 DDS2 drive. This feature enables the Sony AIT drive to be addressed by applications that don't recognize the SDX-300C inquiry string. Using this mode does not change the performance or capacity of the drive.
- 2) The SDX-500C firmware offers the ability to set the tape drive to report the inquiry string of the Sony SDX-300C AIT1 drive. This feature enables the Sony AIT2 drive to be addressed by applications that don't recognize the SDX-500C inquiry string. Using this mode does not change the performance or capacity of the drive.

VERIFYING INSTALLATION

If you are having trouble with your install. Verify the following items first:

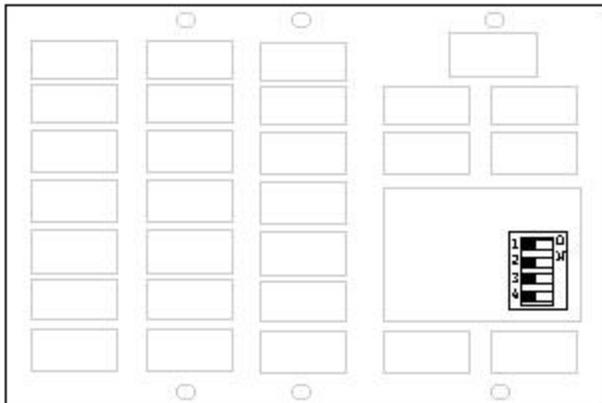
- +Correct and valid SCSI bus
 - +no ID conflicts
 - +proper termination
 - +proper SCSI signal type, for example single-ended to single-ended, etc
- +Device is powered on.
- +The new device is recognized by the system hardware (host controller, system console, etc).
- +The new device is recognized by the operating system and knows how to communicate with the device via proper kernel configuration and device files.
- +If you are using a 3rd part backup application, make sure that the new device is supported.

As part of the installation process, you will have installed the appropriate device driver for your UNIX system, and created device files to communicate with the tape drive.

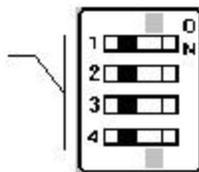
In outline, the procedure is as follows:

1. Write test data to a tape using **tar**.
2. Read the test data from the tape using **tar**.
3. Compare the data read from the tape with the original data on disk using **cmp**.

UNIX SWITCH LOCATIONS



UNIX
Compatibility
Switches



DDS Series:

SDT-7000

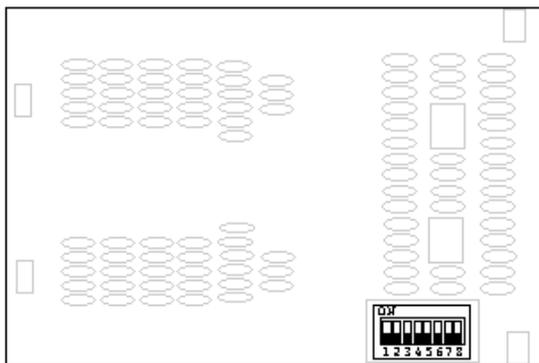
SDT-9000 / TSL-9000

SDT-10000 (bank of 8 switches)

SDT-11000 (bank of 8 switches)

TSL-11000 (bank of 8 switches)

*refer to AIT series for remaining switch configurations.



UNIX
Switches



AIT Series:

SDX-300C / TSL-A300C

SDX-500C / TSL-A500C

for Rev A SDX-300C / TSL-A300C Hardware:

- 5) Reserved (OFF)
- 6) Reserved (OFF)
- 7) Compression enable(ON)
- 8) Parity enable (ON)

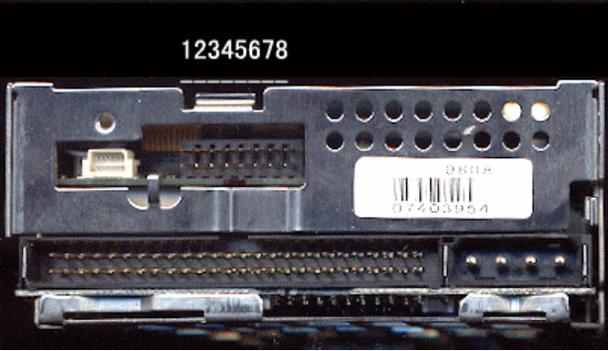
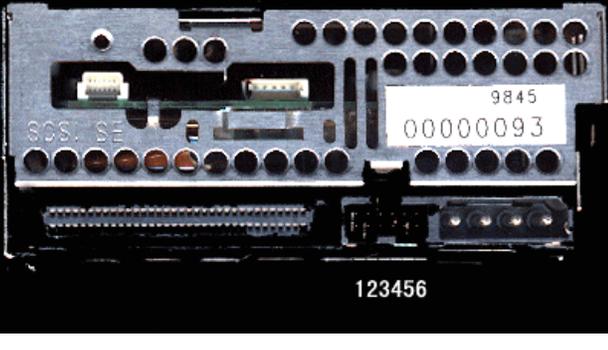
for Rev B SDX-300C / TSL-A300C and above Hardware:

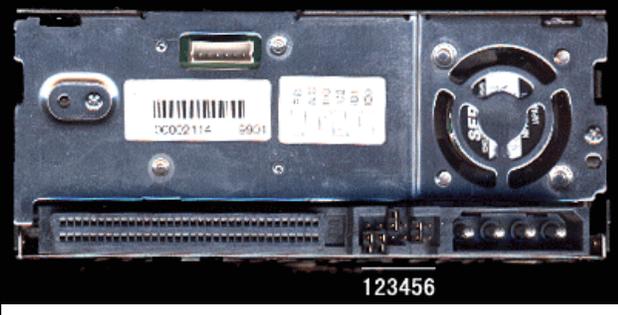
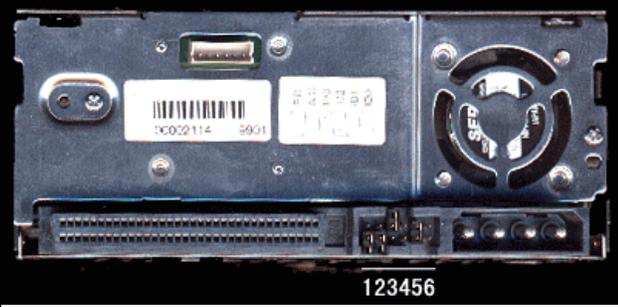
- 5) Term Power enable
- 6) Terminator enable
- 7) Host Compression Control 1
- 8) Host Compression Control 2

for SDX-500C/TSL-A500C Hardware:

- 5) Term Power enable
- 6) Reserved (OFF)
- 7) Host Compression Control 1
- 8) Host Compression Control 2

HARDWARE JUMPER SETTINGS

<p>SDT-7000 / SDT-9000 / TSL-9000</p> <p>12345678</p> 	<ul style="list-style-type: none">1 – ID22 – ID13 – ID04 – Data Compression Disable5 – Parity Disable6 – Reserved7 – Termination Enable8 – Term PWR
<p>SDT-10000 / SDT-11000 / TSL-11000</p>  <p>123456</p>	<ul style="list-style-type: none">1 - Parity Enable2 - Reserved3 - ID34 - ID25 - ID16 - ID0

<p>SDX-300C / TSL-A300C (Rev A Hardware)</p> 	<p>1 - ID3 2 - ID2 3 - ID1 4 - ID0 5 - Termination Enable 6 - Term PWR</p>
<p>SDX-300C, TSL-A300C, SDX-500C, TSL-A500C (Rev B Hardware)</p> 	<p>1 - Parity Disable 2 - Reserved 3 - ID3 4 - ID2 5 - ID1 6 - ID0</p>

Revision History:

- +2.10 08/31/00 added info about TSL-A500C and clarified some other loader details, added HP-UX 11.x.
- +2.09 08/16/00 added info about Linux autoloader control using mtx (updated link to sourceforge), added info about Compaq Tru64 Unix, added embedded clickable hyperlinks, updated SCO data under PC-based section, and cleaned up some formatting.
- +2.08 02/28/00 added SDT-11000 and TSL-11000 notes.
- +2.07 09/30/99 modified info for st.conf file under Solaris for better performance, added more info on HP 800 series systems, added AIT2 density code for Digital UNIX, modified colors so doc is more fax friendly, added note about lack of SDT5000 support, added SCO unixware devices, fixed SDX dipswitch graphics to reflect default settings, added AIT2 170m media length, removed other IBM setting (combined in firmware), clarified differences between Sun settings, changed table colors for better faxing.
- +2.06 05/10/99 added more TSL info, added all Sony drives to Sun tape_config, removed references to SDT-5000 emulation mode for AIT2, added SDX-300C emulation mode for AIT2.
- +2.05 04/15/99 added info on SDX-500C (AIT2) and SDT-10000 (DDS4), removed references to TSL-7000, new format, better jumper/dipswitch graphics, pdf format.
- +2.04 01/04/99 added more detail for Digital Unix 3.x., Rev.B AIT dipswitch settings were incorrect for Termination and Term Power.
- +2.03 11/09/98 added more detail for PC-based UNIX systems.
- +2.02 11/06/98 clarified Irix 6.4 details.
- +2.01 11/04/98 changed AIX 4.x details and Sun Ultra series hardware using Symbios 8c375 scsi chips.
- +2.0 10/14/98 Official Release
- +1.x 10/01/98 First draft.

SONY MAKES NO WARRANTY OF ANY KIND WITH REGARDS TO THIS DOCUMENT. Sony shall not be liable for errors contained herein, or indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this document!