

# Viper<sup>®</sup> 200 LTO Tape Drive

## Unix Compatibility Guide

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## **Introduction**

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This document describes how to configure various UNIX systems to recognize and obtain optimal performance from the Seagate Viper 200 LTO Ultrium tape drive. It summarizes drive configuration options, as well as changes that may be required at the operating system level.

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### ***A word about SCSI controllers***

The Viper 200 is capable of transferring data at 32 Mbytes per second with 2:1 compression of the data. The Viper 200 also supports the SCSI Ultra2 specification and can transfer data at burst rates of up to 80 Mbytes per second. In order to achieve maximum drive performance, it is important to choose high performance disk drives for your system, as well as high performance SCSI controllers. The table below lists the types of SCSI controllers that Seagate recommends, in order of least preferred to most preferred.

<b>Controller type</b>	<b>Maximum Transfer rate</b>
Fast Wide SCSI	20 Mbytes per second
Wide Ultra SCSI	40 Mbytes per second
Wide Ultra2 SCSI	80 Mbytes per second
Ultra 3 SCSI	160 Mbytes per second

(For definitions of the terms used above, please refer to SCSI Trade Organization web site: <http://www.scsita.org/aboutscsi/index01.html>)

## Configuring for the DEC/Compaq Unix Environment

### Finding existing SCSI controllers and devices

SCSI ID #7 is almost always dedicated to the SCSI controller. Never configure your target device for ID 7 unless you are absolutely sure that the controller is not addressed for ID 7. Figure 1 shows the locations of the SCSI ID address jumpers for the Viper 200.

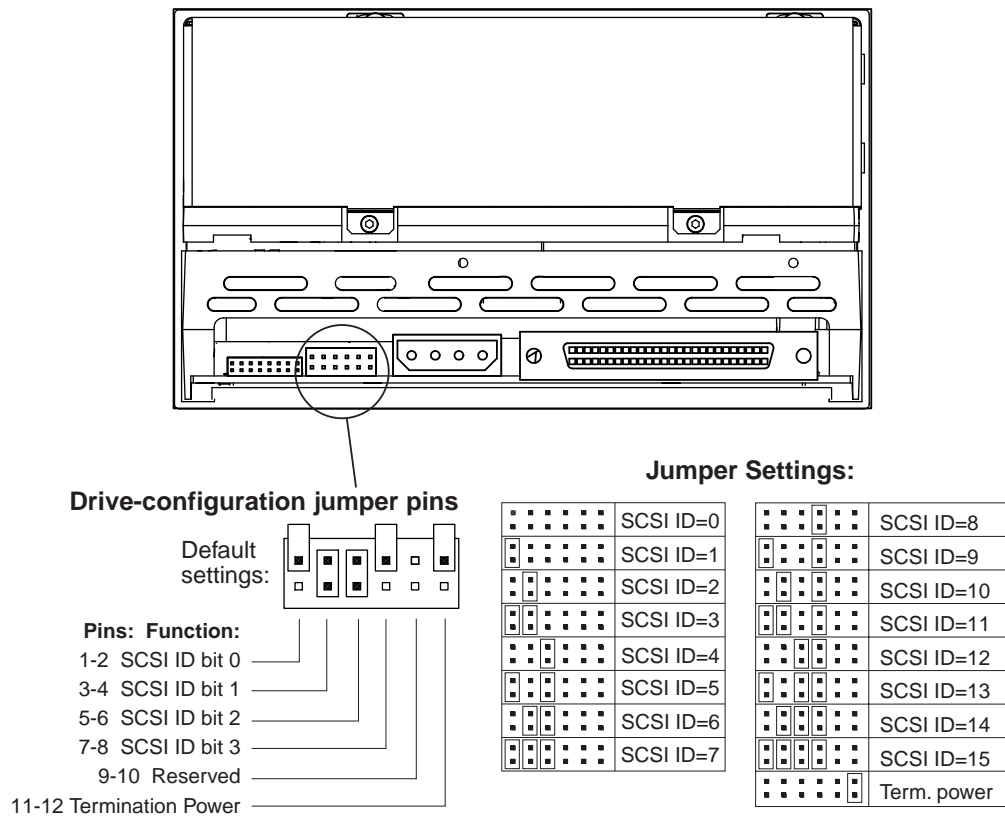


Figure 1: SCSI jumper settings for the Viper 200

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**Digital Unix Version 4.0 and later/Compaq Tru64 Unix 5.x**

Use File Manager to open the file /etc/ddr.dbase and create an entry as follows:

```
SCSIDEVICE
#
Type = tape
Name = "SEAGATE" "ULTRIUM"
#
PARAMETERS:
    TypeSubClass      = tk
    TagQueueDepth     = 0
    MaxTransferSize   = 0x0fffffff # (16MB - 1)
    ReadyTimeSeconds  = 180          # seconds
        CMD_PreventAllow    = supported
        CMD_ExtReserveRelease = supported
    BlockSize         = 0
    PwrMgmt_capable   = 0

DENSITY:
#
DensityNumber = 0,2,3,4,5,6,7
DensityCode = default
CompressionCode = 0x0
Buffered = 0x1

DENSITY:
#
DensityNumber = 1
DensityCode = default
CompressionCode = 0x1
Buffered = 0x1
```

Save the file.

Run the following command:

```
ddr_config -c
```

*ddr\_config* will take the default input file, ddr.dbase, and build a new device database. This is effective immediately, and there is no need to rebuild the kernel.

**Note:** ddr.dbase is a unix shell script and is not written in C. This means # is used to signify a comment, not /\* and \*/ or //, as used in C. Make sure any comments included in this file are preceded with the # character.

To enable the tape driver to turn on data compression when writing data to tape use the 'c' option.

For commands that use density and tape size settings the tape density is 124,000 bpi and the tape length is 1800 feet. For commands that use a blocking factor we recommend a blocking factor of 64 as a minimum, preferably 128.

## ***Configuring for the Sun Environment (Solaris 2.4, 2.5, 2.6, 7, and 8)***

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Use the following for attaching the Viper 200 to Sun Sparc and Intel systems.

### ***Finding current SCSI controllers and targets***

In order to properly attach SCSI devices to hosts it is necessary to ensure that each target device has a unique SCSI address. The commands 'modinfo' and 'dmesg' can be used to find the SCSI controllers in use and the SCSI target devices installed.

For example, the command "dmesg | egrep "target" | sort | uniq" can find all SCSI controllers and SCSI targets. The output may look similar to:

```
sd32 at ithps0: target 2 lun 0
sd34 at ithps0: target 4 lun 0
st21 at ithps1: target 0 lun 0
st22 at ithps1: target 1 lun0
```

In this case the Viper 200 could be set for SCSI ID address 2 thru 6 and attached to controller ithps1 (this particular controller also supports SCSI addresses 8 thru 15). See figure 1 to view how to set the SCSI ID address jumpers for the Viper 200.

### ***Types of controllers***

You may be able to view the man pages of three types of SCSI controllers for Sun Sparc systems, esp, glm and isp. We recommend that the Viper

200 not be attached to esp controllers. This controller is not fast enough to work with the Viper 200. The minimum recommended controller would be a glm controller which is a Ultra Wide controller.

We recommend Ultra2 SCSI capable controllers capable of 80MB/s data transfer. Ultra 3 controllers supporting 160MB/s transfer rates can also be used.

### ***Configuring the device file st.conf***

To configure Solaris 2.4 and above to use the Viper 200 correctly, add the following lines to the file `st.conf` in the directory `/kernel/drv`.

```
tape-config-list=  
"SEAGATE ULTRIUM06242-XXX", "Seagate LTO", "SEAGATE_LTO";  
SEAGATE_LTO = 1, 0x36, 0, 0x1d639, 4, 0x00, 0x00, 0x00, 0x00, 1;
```

**Note:** The inquiry string above contains one space between SEAGATE and ULTRIUM.

The value 0x1d639 equates to the manner in which the Viper 200 will be configured to operate in the Solaris environment. This value enables the Viper 200 to:

- Support variable length records (variable length block size)
- Backspace over files (same as 'mt bsf' command to backspace over filemarks)
- Backspace over records (same as 'mt bsr', backspace over individual tape blocks)
- Long timeout for long erase function (it is not recommended to try and erase the entire tape)
- Viper 200 knows when end of data has been encountered
- Device driver is unloadable
- Long timeouts ( 5 times longer than normal)
- Buffered writes supported
- Variable record size not limited to 64k

- Uses Mode Select Page 10h to enable/disable compression

Once `st.conf` has been modified, the kernel must be reconfigured by booting the system using the `boot -r` command. If you are replacing a tape device with the same SCSI ID you may want to delete the `st` devices from the `/dev/rmt` directory (recommended).

When using commands that require a blocking factor such as `tar`, `ufsdump`, `ect.`, we suggest a minimum factor of 64. The preferred factor is 128.

For commands that use density and tape size settings the tape density is 124,000 bpi and the tape length is 1800 feet. We suggest using the `ufsdump/ufsrestore` commands. These commands automatically detect end of tape without the need of the density and tape length settings.

To enable the `st` driver to turn on data compression when writing data to tape use the 'c' option. For example, `tar cf /dev/rmt/0c` would cause the Seagate Ultrium tape drive to compress the data before writing the data to tape.

## ***Configuring for the IBM AIX Environment (AIX Version 4.1.x and later)***

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### ***Finding existing SCSI controllers and devices***

Enter the following command: `lsdev -Cs scsi`. This will show all of the SCSI target id's known to the system. Note the SCSI target id's and choose a SCSI id for the Viper 200 that will not conflict with the id's shown from the `lsdev` command. SCSI ID #7 is almost always dedicated to the SCSI controller. Never configure your target device for ID 7 unless you are absolutely sure that the controller is not addressed for ID 7. See figure 1 to view how to set the SCSI ID address jumpers for the Viper 200.

### ***Configuring the Viper 200 using SMIT***

The Seagate Viper 200 tape drive can be configured to work with AIX Versions 4.1.x and later by using the SMIT "Other SCSI Tape Drive" option. **NOTE: Record the SCSI ID of the tape drive before installing it.** To configure AIX using the SMIT utility, use the following procedure:

1. Enter SMIT at the Tape Drive menu by typing "smit tape"

2. Select "Add a tape Drive"
3. Select the type of tape drive you will be adding. Use the "Other SCSI Tape Drive" option.
4. Select the Parent SCSI Adapter from the available list
5. The Add a tape Drive "Entry Fields" now appear. Some of the standard options need can be changed to maximize drive performance and functionality:
  1. Set the Connection Address with the Drives Target and Lun ( always use Lun 0 ). ***In the list, the Target is the first number and the Lun is the second. For example, if the drive is ID 5, choose 5,0***
  2. Set the "BLOCK size" to 0
  3. Set "Use DEVICE BUFFERS during writes" to yes.
  4. Set "RETURN error on ape change or reset" to no
  5. Set "Use EXTENDED file marks" to yes.
  6. Set "RESERVE/RELEASE support" to yes
  7. Set "BLOCK SIZE for variable length support(Num.)" to 0
  8. Set "Density 1" to 0

Leave the "Set delay. . ." and "Set timeout. . ." lines at the default value. Click on OK and the drive will be installed in the system database, and devices created. There is no need to reboot the system.

Now exit SMIT

**Notes:** We suggest using the AIX commands 'backup' and 'restore' when transferring data to and from the Viper 200. These commands transfer data more quickly than other commands such as tar and cpio. For cpio we suggest a blocking factor of 128. For tar we suggest using the -N option and a factor of 128. Some older systems with poor video controllers may experience a reduction in performance when using the -v option which prints the path names



on the standard console during the backup. Unless there is a real need to see the filenames as they are backed up we suggest not using the `-v` option. For commands that use density and tape size settings the tape density is 124,000 bpi and the tape length is 1800 feet.

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## **Configuring for SCO Open Server 5.0.x**

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### ***Finding existing SCSI controllers and devices***

The files `/usr/adm/hwconfig` and `/var/adm/messages` list the devices found during boot up of Open Server. The current SCSI controllers can be found using the command:

```
grep adapter /usr/adm/hwconfig
```

which will produce an output similar to:

```
%adapter 0x6400 - 0x64FF    11    type=alad    ha=0    bus=0    id=7  
fts=st0.
```

The current tape drives can be found using the command:

```
grep tape /usr/adm/hwconfig
```

which will produce an output similar to:

```
%tape type=S ha=0 id=6 lun=0 bus=0 ht=alad
```

The information above shows that an Adaptec SCSI controller is installed (`alad`) and a SCSI tape drive (`type=S`) is installed as target id 6. SCSI ID #7 is almost always dedicated to the SCSI controller. Never configure your target device for ID 7 unless you are absolutely sure that the controller is not addressed for ID 7. See figure 1 to view how to set the SCSI ID address jumpers for the Viper 200.

### ***Configuring the Viper 200 with mkdev***

Once connected to the system, installation of the drive is carried out using the following command:

```
mkdev tape
```

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A numeric based menu will appear. If you are replacing an existing SCSI tape drive use option 3 to remove the existing tape drive from the configuration files. Then follows the instructions below to add the Viper 200.

1. From the menu choose "Configure a SCSI or Enhanced IDE tape drive".
2. From the next menu choose "Install a SCSI tape drive".
3. When prompted enter the SCSI adapter string. You may want to use the `h` option to view the list of supported SCSI adapters.
4. Enter the number of the SCSI host adapter the drive is attached to. If only one SCSI adapter exists then enter the number zero (0).
5. Enter the number of the SCSI bus the drive is attached to on the adapter. Refer to the SCSI adapter documentation (for many adapters this will be zero(0)).
6. Enter the SCSI id of the drive as shown by the jumpers on the rear of the drive (see Figure 1).
7. Enter the number zero (0) for the LUN of the device.
8. When prompted to "Update the SCSI configuration? (y/n)" enter `y`.
9. Enter "SEAGATE" when prompted for Vendor Identification string (no quote marks).
10. Enter the number three (3) when prompted to enter the SCSI version that the tape drive conforms to.
11. Enter the number two (2) when prompted to enter the Response Data Format the tape drive uses.
12. When prompted choose the Generic SCSI-1/SCSI-2 tape drive option.
13. When the process takes you back to the two Main Menu screens press 'q'.
14. When asked to create a new kernel enter yes. When asked if you want the new kernel to boot by default press 'y'. When asked if you want the kernel environment to be rebuilt press 'y'. When finished reboot the system.

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**Notes:**

Not all of the SCO 'tape' commands will operate or be applicable to the Seagate Viper 200 drive (execute the command 'man tape' for the specifics on how the tape command works). The following tape commands are not available for use with the Viper 200: getcomp, setcomp (the Viper 200 will always compress the data before writing the data to tape under SCO Open Server 5.0.x), partition, setpart, getpart, getspeed, setspeed, rsm, wsm. The following tape commands are available for use with the Viper 200: status, load, reset, rewind, retention, getblk, setblk, unload, eod.

When using the GUI Backup Manager utility set the block size to 32768 minimum, 65536 preferred. When using commands such as tar we suggest using the tape command to set the block size to 512 and then using a blocking factor of 80 for the tar command. For commands that use density and tape size settings the tape density is 124,000 bpi and the tape length is 1800 feet.

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**Configuring for Linux**

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***Finding existing SCSI controllers and devices***

Before installing the Seagate Viper Ultrium tape drive first ensure that the requisite SCSI controllers and device drivers are installed on your system.

To find existing SCSI controllers execute the command:

```
dmesg | grep SCSI
```

You may see output similar to:

```
(scsi0)<Adaptec AHA-294XX Ultra2 SCSI host adapter> found at  
PCI 0/16/0
```

To find existing SCSI devices execute the command:

```
cat /proc/scsi/scsi
```

You may see output similar to:

```
Host: scsi0 Channel: 0 Id:6 Lun:00  
Vendor: SEAGATE Model: ULTRIUM06242-XXX  
Type: Sequential Access ANSI SCSI Revision 03
```

Use the output of these two commands to see which SCSI target id numbers are free. In the above example a tape drive is attached at target id 6. SCSI ID #7 is almost always dedicated to the SCSI controller. Never configure your target device for ID 7 unless you are absolutely sure that the controller is not addressed for ID 7. See figure 1 to view how to set the SCSI ID address jumpers for the Viper 200.

The widely available distributions of Linux will automatically install the proper SCSI and tape device drivers. If you executed the cat command above you are already ensured that the SCSI driver for your controller is installed. To view currently loaded modules execute the `lsmod` command. Ensure that one of the entries is `st`.

To view the `st` device number for your attached tape drive execute the command:

```
dmesg | grep tape
```

You should see output similar to:

```
Detected SCSI tape st0 and scsi0 . . .
```

### ***Using the Viper 200***

The Viper 200 can be configured via the `mt` command options and a default configuration can be setup using the 'stsetoptions' command from within the `mt` command. Refer to the man page for `mt` for details. We suggest not using the `erase` command nor commands which attempt to partition the tape. Partitioning is not supported in the LTO format.

For commands that use density and tape size settings the tape density is 124,000 bpi and the tape length is 1800 feet. For commands which use a blocking factor we suggest a factor of 128.

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## ***Configuring for SGI Irix***

### ***Finding current SCSI controllers and targets***

In order to properly attach SCSI devices to hosts it is necessary to ensure that each target device has a unique SCSI address. The command `hinvt`

can be used to find all attached SCSI controllers and target devices. To search for all SCSI controllers and devices use the command:

```
hinv -v | grep SCSI
```

The output of the command will be similar to the following:

```
Integral SCSI controller 0: Version ADAPTEC 7880  
Disk drive unit 1 on SCSI controller 0  
CD ROM unit 4 on SCSI controller 0  
Integral SCSI controller 1: Version ADAPTEC 7880  
Tape drive: unit 6 on SCSI controller 1: DAT
```

This output shows that a tape drive is present on SCSI controller 1 at SCSI ID address #6. Available SCSI ID's are 0,2,3,5 6, 8 – 15 on controller 0 and ID's 1 – 5 and 8 – 15 on controller 1 (this particular controller supports Wide/Ultra SCSI).

**Note:** SCSI ID #7 is almost always dedicated to the SCSI controller. Never configure your target device for ID 7 unless you are absolutely sure that the controller is not addressed for ID 7. See figure 1 to view how to set the SCSI ID address jumpers for the Viper 200.

### ***Modifying the configuration file***

To attach the Viper 200 to IRIX the file 'scsi' needs to be modified by a text editor. The file can be found in /var/sysgen/master.d . Open the file and use the text editor to add the following at the end of the tape device entries:

For IRIX 6.2 :

```
{DATTAPE, TPDAT, 7, 7, "SEAGATE", "ULTRIUM06242", 0,0, {0},  
  
MTCAN_BSF | MTCAN_BSR | MTCAN_APPEND | MTCAN_SETMK |  
  
MTCAN_PREV | MTCAN_SYNC | MTCAN_SPEOD | MTCAN_CHKRDY |  
MTCAN_VAR | MTCAN_SETSZ | MTCAN_SILI | MTCAN_SEEK |  
MTCAN_COMPRESS,  
  
40, 5*60, 10*60, 10*60, 3*3600, 512, 256*512, 0, (u_char*)  
0},
```

For IRIX 6.4/6.5:

```
{DATTAPE, TPDAT, 7, 7, "SEAGATE", "ULTRIUM06242", 0,0, {0},
MTCAN_BSF | MTCAN_BSR | MTCAN_APPEND | MTCAN_SETMK |
MTCAN_PREV | MTCAN_SYNC | MTCAN_SPEOD | MTCAN_CHKRDY |
MTCAN_VAR | MTCAN_SETSZ | MTCAN_SILI | MTCAN_SEEK |
MTCAN_COMPRESS,
40, 5*60, 10*60, 10*60, 3*3600, 512, 256*512,
tpsc_default_dens_count, tpsc_default_hwg_dens_names,
tpsc_default_alias_dens_names, {0}, 0, 0, 0, 0, (u_char*)
0},
```

After modifying the configuration file, recompile the kernel with the "autoconfig" command and reboot the system. If you are replacing an existing storage device with the same SCSI ID remove the device files prior to using the autoconfig command and rebooting the system.

## **Configuring for HP-UX 11.0**

### ***Finding current hardware/driver configuration***

To find currently installed SCSI controllers and devices the `ioscan` command can be used. The syntax would be `ioscan -f`. This command will list all of the system devices and their device names.

### ***Attaching the Seagate Viper 200***

Choose a SCSI address which does not conflict with any already attached SCSI devices on your SCSI controller. See figure 1 for jumper installation for the Viper 200. Attach the Viper 200 LTO drive and apply power to the Viper 200 and the host system. After the boot process is complete and you have logged in as superuser issue the command:

```
ioscan -C tape -f.
```

You should see output similar to:

<u>Class</u>	<u>I</u>	<u>H/W Path</u>	<u>Driver</u>	<u>S/W State</u>	<u>H/W type</u>	<u>Description</u>
Tape	7	8/12.6.0	stape	Claimed	Device	SEAGATE ULTRIUM

From the root directory and as superuser issue the command:

```
/sbin/insf -C tape.
```

Now issue the command:

```
/sbin/mksf -d stape -H x/x.x.x -I y -c 1 -n -u /dev/rmt/zcnb
```

Where *x* is the data under `H/W Path` from the `ioscan` , *y* is the data under `I` from the `ioscan` and *z* is tape device identifier number. You can execute an `ls` command for the `/dev/rmt` directory to choose an identifier number which has not already been used. Also, you can choose a unique device name such as `cnb` to more easily remember which device name will enable data compression during write. Please refer to the man pages for `mksf` to review settings for rewind/no rewind, Berkeley mode, AT&T mode, ect.

After performing the `insf` and `mksf` commands check the installation by using the command `ioscan -fn | grep -C tape`. You should see output showing the hardware and device addressing and also the device name attached to the Viper 200.