



Sun StorEdge™ T3 Array Release Notes

Version 1.18 Controller Firmware

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Sun StorEdge T3 Array Release Notes

Introduction

This document contains important information about the Sun StorEdge™ T3 array that was not available at the time the product documentation was published.

Review this document so that you are aware of issues or requirements that can impact the installation and operation of the Sun StorEdge T3 array. The information in this document supplements the information contained in the *Sun StorEdge T3 Array Installation, Operation, and Service Manual* and the *Sun StorEdge T3 Array Administrator's Guide*.

Use this release note in conjunction with other release notes and README files that you may have received with other software products related to the Sun StorEdge T3 array, such as Sun StorEdge Component Manager software and VERITAS Volume Manager.

These release notes are organized as follows:

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Required Patches

Install all the required patches listed below before installing the Sun StorEdge T3 array. These patches are available on the SunSolve™ web site:

<http://sunsolve.sun.com>

To retrieve patches:

1. In the SunSolve Online column, click on Patches.
2. In the Patches column, click on PatchPro.
3. Click on Storage Products.

Wait, the system might be slow.

4. Under Disk Arrays, check the box next to StorEdge T3.
5. Scroll to the bottom of the page and click Generate Patch List.

Refer to the patch README file for download instructions and patch information.

If you do not find a patch listed in TABLE 1, or a particular patch:

- a. Backup to the SUNSOLVE ONLINE Patches page that was obtained from step 1.
- b. Enter a patch ID in the Patch Finder box and click Find Patch.

Note – You may need other patches not listed below for related software products such as Sun StorEdge Component Manager or VERITAS Volume Manager. Refer to the SunSolve web site and to the release notes of these products for their required patches.

TABLE 1 Required Patches

System Type	Solaris™ 2.6 Operating Environment	Solaris 7 Operating Environment	Solaris 8 Operating Environment
All	105356-18 or later (ssd driver)	107458-13 or later (ssd driver)	109524-09 or later (ssd driver)
	106226-02 or later (format patch)	107473-07 or later (luxadm patch)	
	105181-29 or later (kernel update patch)	107834-03 or later (DKIO Extensions Patch)	

TABLE 1 Required Patches *(Continued)*

System Type	Solaris™ 2.6 Operating Environment	Solaris 7 Operating Environment	Solaris 8 Operating Environment
		106541-18 or later (Kernel Update Patch)	
Sun StorEdge T3 array	109115-10 firmware patch	109115-10 firmware patch	109115-10 firmware patch
VERITAS VM 3.1	110253-04	110254-04	110255-04
VERITAS VM 3.1.1	110451-05	110452-05	111118-05
VERITAS VM 3.2	111907-04	111908-04	111909-04
Volume Manager Storage Administrator	111904-04	111904-04	111904-04
PCI (ifp) Only	107280-08 or later (ifp/PCI driver/PCI Systems only)	107292-07 or later (ifp/PCI driver/PCI Systems only)	109189-02 or later (ifp/PCI driver/PCI Systems only)
	109399-03 or later (PCI Host Adapter Firmware Fcode)	109399-03 or later (PCI Host Adapter Firmware Fcode)	109399-03 or later (PCI Host Adapter Firmware Fcode)
SBus/sf-socal Only	105375-26 or later (sf/socal driver/SBus systems only)	107469-08 or later (sf/socal driver/SBus systems only)	109460-05 or later (sf/socal driver/SBus systems only)
	109400-03 or later (SBus Host Adapter Firmware Fcode)	109400-03 or later (SBus Host Adapter Firmware Fcode)	109400-03 or later (SBus Host Adapter Firmware Fcode)
Sun StorEdge Network Foundation software			108984-08 108982-09 108983-08

Required Firmware

The latest controller firmware level is available on the SunSolve web site. You can check the controller firmware level on the Sun StorEdge T3 array using the `ver` command, as described in the *Sun StorEdge T3 Array Administrator's Guide*.

If the Sun StorEdge T3 array is configured with prerelease controller firmware, in addition to upgrading controller firmware, you must upgrade the *.htm files located in the Sun StorEdge T3 array /web directory along with other Sun StorEdge T3 array firmware as described in the *Sun StorEdge T3 Array Installation, Operation, and Service Manual*.

Note – Refer to the README file associated with the firmware upgrade patch for details on verifying the currently installed firmware level.

The latest *.htm files and all other Sun StorEdge T3 array firmware can be copied from the SunSolve web site:

`http://sunsolve.sun.com`

Or contact your Sun representative to obtain the latest firmware releases.

General Issue



Caution – Sun StorEdge T3 and T3+ arrays should never be connected to a public network—only to a secure network.

Firmware Updates and Modifications

The following sections describe changes that have been included in the version 1.18 firmware release.

Sun Cluster Support

The 1.18 firmware release supports:

- Sun Cluster 2.2 and Sun Cluster 3.0 single Sun StorEdge T3 array (workgroup) configurations.
- Sun Cluster 3.0 Update 1 single Sun StorEdge T3 array and partner group (enterprise) configurations. (See the next section, “Explicit LUN Failover” on page 5, for other related information.)

For more details on supported Sun StorEdge T3 array Sun Cluster configurations, refer to the Sun Cluster documentation.

Explicit LUN Failover

Explicit LUN failover (ELF) is a feature that allows future host applications to eliminate unintentional Sun StorEdge T3 array LUN failovers. To enable this feature, two new option settings have been added to the `sys mp_support` command: `mpxio` and `std`.

- The `mpxio` setting is used for Sun StorEdge T3 array partner groups in Sun Cluster 3.0 configurations.
- The `std` setting is included in 1.18 firmware to take advantage of future product functionality.

The following screen capture shows all possible `sys mp_support` commands:

```
sys mp_support <none | rw | mpxio | std>
```

For more information on using the `mpxio` utility on Sun StorEdge T3 array partner groups in clustered configurations, refer to the Sun Cluster 3.0 documentation.

Determining Controller Firmware Versions

When using the `fru` command with the `list` option, the output now identifies both level 2 and level 3 controller firmware. In the example below, under Revision, the first date is the level 2 firmware version, and the second date is the level 3 version.

```
# fru list
```

ID	TYPE	VENDOR	MODEL	REVISION	SERIAL
u1ctr	controller card	0301	501-5710-02(0200/020001	101291
u2ctr	controller card	0301	501-5710-02(0200/020001	101786
uld1	disk drive	SEAGATE	ST318203FSUN	D94A	LR465826
uld2	disk drive	SEAGATE	ST318203FSUN	D94A	LR465384
uld3	disk drive	SEAGATE	ST318203FSUN	D94A	LR539076
uld4	disk drive	SEAGATE	ST318203FSUN	D94A	LR450095

Diagnostics Issue



Caution – The Sun StorEdge T3 array `ofdg` utility is for service use only. Use of this feature will make data unavailable.

The Sun StorEdge T3 array firmware provides a command-line and graphical user interface to a diagnostics tab provided by Sun StorEdge Component Manager 2.2. The `ofdg` utility is used to perform offline diagnostic testing. This tool should be used *only* by qualified Sun service providers at this time. The `ofdg` utility is limited in its test capabilities and must be run while the system is offline to avoid problems.

Sun Cluster Issues

4348012: DMP must be disabled in Sun Cluster 2.2 configurations.

If the Sun StorEdge T3 array is part of a Sun Cluster 2.2 configuration and you are using VERITAS Dynamic Multipathing (DMP) software installed on a cluster host, there can be conflicts with SCSI reservations. To avoid this situation, disable the DMP software on the host in the cluster.

4406863: Sun Cluster 2.2 cannot use `recon_rate=high` Sun StorEdge T3 array setting.

If the Sun StorEdge T3 array is configured in a Sun Cluster 2.2 environment, use either the `low` or `med` setting for the `recon_rate`. You can change this setting using the Sun StorEdge T3 array `sys recon_rate` command. The `recon_rate=high` setting on an Sun StorEdge T3 array running in a Sun Cluster 2.2 configuration breaks the clustering software.

VERITAS Issues

4527907: VERITAS Volume Manager 3.2 Encapsulation of Alternate Master Volume can Fail.

If you use an alternate master controller unit disk as the boot disk, VERITAS Volume Manager 3.2 will not select the path to that disk, but will attempt to encapsulate the primary path boot disk. Upon rebooting, the system hangs up and the following message is displayed:

```
# /etc/rcS.d/S86vxvm-reconfig: /etc/vx/reconfig.d/disks-cap: cannot create
```

If building an OS on a multipathed Sun StorEdge T3 and you plan to encapsulate the system boot disk, build the OS on the first device in the device tree. For example, if the two paths to a T3 LUN are c1 and c3, build the OS on c1, even if it is the alternate path to the T3 LUN.

4264118: DMP failback is not automatically enabled (VERITAS Volume Manager 3.0.4 only).

After installing the VERITAS software, to ensure correct operation of VERITAS Dynamic Multipathing (DMP) auto failback operations, type the following command (as root) on host systems connected to Sun StorEdge T3 arrays:

```
# vxdmpadm start restore interval=60 policy=check_all
```

Note – You must run this command after every system reboot.

4282806: vxinstall only displays the first Sun StorEdge T3 array controller for the configuration.

During the `vxinstall` procedure, only the first connected host bus adapter in a Sun StorEdge T3 array partner group is displayed. This occurs because `vxinstall` displays only the first path to an Sun StorEdge T3 array partner group, even though other paths to the partner group have also been detected. This can be misleading since in Sun StorEdge T3 array configurations, volumes can also exist through second controller data paths.

You do not need to take any special action to correct this. Allow `vxinstall` to proceed to completion. Once the host system has rebooted from the VERITAS installation, all paths to the Sun StorEdge T3 array are properly recognized by the Volume Manager software.

4313336: Enable DMP support for a Sun StorEdge T3 array and StorEdge A3500 configuration.

DMP support is necessary to obtain full redundancy between interconnected Sun StorEdge T3 array controller units. If you are connecting redundant Sun StorEdge T3 arrays to a host running DMP that also has StorEdge A3500 storage devices connected to it, you must remove the Alternate Pathing (AP) file to make sure that both types of storage devices co-exist properly.

To perform the following procedure, you must be logged in as `root`.

1. On the data host, type:

```
# ls -l /kernel/drv/ap
```

2. If the `/kernel/drv/ap` file is of 0 length, remove `/kernel/drv/ap` by typing:

```
# rm /kernel/drv/ap
```

3. Reboot the system.

```
# reboot
```

If the `/kernel/drv/ap` file is *not* of 0 length, AP is installed and you cannot enable DMP because AP and DMP cannot co-exist. Sun Microsystems, Inc. recommends that you remove the AP product entirely using `pkgrm (1m)`. Refer to the AP product documentation for further details.

4253044: Volume usage does not refresh.

Within the Volume Manager Storage Administrator (VMSA) product, volume usage information might not be refreshed correctly. If this problem is encountered, restart the VMSA application to update the volume usage statistics.

Service Issues

FRU removal for longer than 30 minutes will initiate a partner group shutdown

If any field replaceable unit (FRU) is removed for an extended period of time, thermal complications might result. To prevent this, the Sun StorEdge T3 array is designed so that an orderly shutdown occurs when a component is removed for longer than 30 minutes. Therefore, a replacement part must be immediately available before starting a FRU replacement procedure. You must replace a FRU that has been removed within 30 minutes or the Sun StorEdge T3 array, and all attached Sun StorEdge T3 arrays in that partner group, will shut down and power off.

Interconnect Card syslog Notices

The following feature is no longer valid for the 1.18 firmware:

In version 1.17b firmware, the Sun StorEdge T3 array logs a notice message about the interconnect card in the syslog file once every six hours. The following is an example of this notice:

```
SCHD[1]: N: ulctr: ull1 temperature 26.0 Celsius
```

Because this notice is displayed for each interconnect card in a partner group, up to four notices are displayed for a partner group every six hours. This is just a status message and does not affect functionality.

Note – In version 1.18 firmware, the Sun StorEdge T3 array no longer logs this notice message about the interconnect card in the syslog file.

4521218: T3+ Workgroup Password and Set Command Configuration Lost when the Controller is Swapped.

An existing IP address and the root password set on a Sun StorEdge T3 configuration will be lost when:

- A Sun StorEdge T3 controller is upgraded to a T3+ controller in a workgroup configuration.
- If performing maintenance on a T3+ workgroup, it is powered down and the T3+ controller is replaced with a new T3+ controller. This is not a problem with a live controller swap in an enterprise configuration.

Have the “jumpstart” server available before performing the Controller swap to ensure the same IP address is retrieved from the RARP server when the new Sun StorEdge T3 array boots up. Once the system comes up, the root password should be null so this will have to be set up.

4348664: `fru list` command should display new drive firmware versions automatically.

After upgrading the Sun StorEdge T3 array internal drive firmware, perform a `disk version undl-9` operation on the upgraded drives. This Sun StorEdge T3 array command ensures that correct drive firmware version information gets updated correctly in internal databases. If you do not do this after a drive firmware upgrade, it is possible that stale drive firmware version information can be displayed when using the `fru list` command.

For more information on using the `disk version` and `fru list` commands, refer to the *Sun StorEdge T3 Array Administrator's Guide*.

System Level Issues

Dissimilar Disk Drives

All Sun StorEdge T3 array disk drives either in a workgroup or an enterprise configuration must have the same storage capacity and drive speed.

Bootability

The Sun StorEdge T3 array supports *warm* bootability for hosts running the Solaris operating environment that are connected by a Sun StorEdge SBus Dual Fibre Channel Host Bus Adapter, p/n X6730A. Warm bootability means that the Sun StorEdge T3 array must be completely booted before attempting to boot the host from the Sun StorEdge T3 array volume. Warm bootability is supported by Solaris 7 (Release 11/99) and later. Bootability for the Solaris 2.6 operating environment is not currently supported.

Note – Warm bootability is not supported with the ifp (Qlogic 2100) HBA. *Cold* bootability—that is, booting the Sun StorEdge T3 array and the host at the same time—is not supported at this time.

Note – In the next firmware upgrade, the Sun StorEdge SBus Dual Fibre Channel Host Bus Adapter, p/n X6730A, will not be supported as a bootable host bus adapter.

Note – See issue 4253419 that follows. The delayed time required for a Sun StorEdge T3 array to become fully available to host I/O operations may cause issues, especially if the array is used as a boot device. If you have encountered this situation, contact an authorized Sun Service provider or Sun Service at 1-800-USA-4SUN for an evaluation.

4253419: Sun StorEdge T3 array controller extended boot times.

In some cases, host systems running the Solaris operating environment can boot faster than Sun StorEdge T3 arrays. This results in a host configuration that might not be able to detect all available Sun StorEdge T3 array storage during a full AC power-loss boot cycle. This can occur when the host system has minimal amounts of memory (or memory power-on self-test operations have been disabled).

When powering up a configuration, always power on the Sun StorEdge T3 arrays *before* the host server.

If this scenario still occurs, contact an authorized Sun Service provider or Sun Service at 1-800-USA-4SUN for an evaluation and suggested workaround.

Note – Any modification to the system non-volatile random access memory (NVRAM) configuration should be avoided as errors can result in extensive system down time. Before making modifications to NVRAM, contact Sun Service.

4497814: Must telnet from the Same Subnet.

The `telnet` command must be run from a host on the same subnet as the Sun StorEdge T3 array.

4415132: Auto Cache Mode for a Sun StorEdge T3 Array Workgroup Configuration Runs in Write-Behind Mode.

A Sun StorEdge T3 Array workgroup configuration with the Auto caching mode set, uses the write-behind cache mode. This configuration does not offer the redundancy to provide cache mirroring, and operating without a host-based mirroring solution could lead to data loss in the event of a controller failure.

With workgroup configurations, use a host-based mirroring solution to protect data.

4427874: Running `boot -i` command during firmware upgrades can cause command to hang.

On Sun StorEdge T3 arrays running pre-1.17 firmware versions, using the `boot -i` command to upgrade the controller firmware to version 1.18 can, in rare cases, cause the `boot -i` command to hang. If this happens, reset the Sun StorEdge T3 array and run the `boot -i` command again.

4427400: `bootdelay` parameter set to 60 seconds causes a Sun StorEdge T3 array partner group boot failure.

The default `bootdelay` parameter for the Sun StorEdge T3 array is set to a value of 3. To avoid problems with booting the Sun StorEdge T3 array system, do not reset the `bootdelay` parameter to a higher value than the default setting.

4435299: Third-party security penetration test software causes a controller reset.

If you use third-party security penetration test software, be aware that this can cause a Sun StorEdge T3 array controller reset, causing the system to crash.



Caution – Due to the fact that most security checking software can attempt to test target devices by massive attempts to break into a given device, running these types of applications against a Sun StorEdge T3 array is risky and is not recommended. To ensure adequate network security with a data center of Sun StorEdge T3 arrays, it is recommended that the Sun StorEdge T3 arrays only be connected to a private, tightly controlled network.

4309324: Extend RARP time-out to better support Ethernet switches.

In a first-time installation, the Sun StorEdge T3 array is assigned its IP address from a RARP server that has been configured with the address. When first powered on, the Sun StorEdge T3 array waits for the RARP server response. If the Sun StorEdge T3 array and RARP server are connected to a Cisco Catalyst switch, the switch takes longer to activate the interface than the Sun StorEdge T3 array, and the Sun StorEdge T3 array will time out waiting for the RARP server response.

To avoid this problem, change the spanning tree setting of the Cisco Catalyst port to “portfast,” which allows the switch to first enable the port and then check for integrity using the spanning tree algorithm. By default, the switch checks the integrity of the spanning tree first and then enables the port. To change the port settings, refer to the switch documentation for instructions.

4395542: SUNWlux package installation required for hosts running Solaris 2.6 environment.

The SOC patch (105375) for the Solaris 2.6 software environment will install and not fail, even when SUNWlux packages are not installed on the host. This results in a configuration where the host can see only one LUN on a Sun StorEdge T3 array. If this occurs and there is no indication of other problems, check that SUNWlux packages are installed correctly on the host.

4362567: Use default port addressing on the Sun StorEdge T3 array.

The default setting for Sun StorEdge T3 array port addressing is `hard`. Although it is possible to change this setting, use the default setting to avoid unexpected system behavior.

4426672: Power management on host is not supported.

If a Sun StorEdge T3 array is connected to a host bus adapter (HBA) with power management enabled, it can cause failover issues. To avoid this, disable power management on HBAs.

4292162: Permanent serial cable connections to the Sun StorEdge T3 array are not recommended.



Caution – The serial port cable must be disconnected from the Sun StorEdge T3 array to meet regulatory emissions requirements. Do not leave it connected after performing a procedure.

Note – The serial cable is used for special service procedures only and should not be used by anyone except authorized, qualified service personnel. The serial cable must be removed when the service procedure has been completed.

Because the Sun StorEdge T3 array serial port provides diagnostic and EPROM access to the system during the boot cycle, there is a risk of a security breach if the serial cable is left connected to the Sun StorEdge T3 array. To avoid this risk, remove the serial cable connection from the Sun StorEdge T3 array to external host systems after use.

Command-Line Error Messages

Types of Error Messages

The Sun StorEdge T3 array issues a variety of error messages to the command line, indicating an incorrectly entered command or invalid operation. When you enter a command by itself, or the error is purely syntactic (for example, missing an argument or using the wrong format), the Sun StorEdge T3 array displays the command synopsis. Otherwise, the Sun StorEdge T3 array displays an error message consisting of a name in capital letters, a numerical code in hexadecimal digits, and a text message.

The following tables list the errors that Sun StorEdge T3 array displays. TABLE-2 lists the types of errors and the numerical range associated with each.

TABLE-2 Error Message Types

Type of Error	Numerical Range	Description
Logical volume manager (LVM) driver error codes	0x10001-0x1000A	Disk drive-related errors
Virtual Node ("VN") error codes	0x200000-0x200025	Errors related to <code>vol</code> and other command-line operations.
Port error codes	0x300000-0x300006	Errors related to the <code>port</code> command.
Sys error codes	0x400000	Only one error, indicating a bad value.
FRU error codes	0x500001-0x500076	Errors related to field replaceable units (FRUs).
pSOS operating system errors	00000001-C000FFFF	pSOS errors (embedded operating system).

RAID Errors and Other Common Errors

VN_ERRORS are the most common error messages displayed. The following table lists names and values of these errors.

TABLE-3 Volume-Related (VN) Errors

Error Name	Numerical Value	Message
VN_BADUNIT	0x200000	Bad unit number
VN_BADDRIVE	0x200001	Bad drive number
VN_BADPART	0x200002	Bad partition id
VN_VOLEXISTS	0x200003	Volume already in use
VN_VOLNOTFOUND	0x200004	Volume name not found
VN_PARTHASFS	0x200005	Partition already has file system
VN_FACLOCKED	0x200006	Facility locked by other command
VN_BADATTR	0x200007	Unable to read attributes
VN_MOUNTED	0x200008	Volume already mounted
VN_UNMOUNTED	0x200009	Volume not mounted
VN_MNTINUSE	0x20000A	Mount point in use
VN_NOMEMORY	0x20000B	Could not allocate memory for operation
VN_ALREADYDSBL	0x20000C	There's already a disabled drive
VN_NODSBL	0x20000D	No drives are disabled
VN_ABORTED	0x20000E	Operation aborted
VN_NOTSUP	0x20000F	Operation not supported
VN_UNKVOL	0x200010	Unknown volume
VN_RAIDERR	0x200015	RAID error
VN_NOPART	0x200016	Partition has size 0
VN_PARTSMALL	0x200017	Partition too small
VN_UNKVIF	0x200019	Unknown interface
VN_UNKVIFTYP	0x20001A	Unknown interface type
VN_BADVOLNAME	0x20001B	Bad volume name
VN_BADVOLNAMELEN	0x20001C	Bad volume name too long

TABLE-3 Volume-Related (VN) Errors *(Continued)*

Error Name	Numerical Value	Message
VN_CFGNOTSUPPORTED	0x20001D	Unsupported volume configuration
VN_BADSTANDBYUNIT	0x20001E	Standby unit number is wrong
VN_DEVINVALID	0x20001F	Invalid drive specified
VN_LOCVOLBAD	0x200020	Local volume bad
VN_PORTMAPRM	0x200021	Volume still mapped to a port
VN_UNINITIALIZED	0x200022	Volume is uninitialized
VN_PENDING	0x200023	Operation is pending
VN_BADMODE	0x200024	Cache mode must be set to auto for mirroring
VN_MIRRORON	0x200025	Cannot change cache mode when mirroring is on
VN_CANTMOUNT	0x200026	Cannot mount volume because multiple disabled drives
VN_STARTPARAM	0x200027	Slice start parameter invalid or in use
VN_VSLBADNAME	0x200028	Bad slice name
VN_MAXSLICEERR	0x200029	No more slice can be created
VN_VSLNOTFOUND	0x20002A	Slice not found
VN_SIZEPARAM	0x20002B	Incorrect slice size parameter encountered
VN_VSLBADNAMELEN	0x20002C	Slice name exceeded 12 characters allowed
VN_VSLEXISTS	0x20002D	Slice name already exists
VN_NOSLICEINVOL	0x20002E	Volume does not have slice(s) to be removed
VN_VSLRAIDERR	0x20002F	RAID error in Volume slicing

Some of these errors are generated more often than others, such as VN_MOUNTED, VN_UNMOUNTED, VN_MNTINUSE, VN_CFGNOTSUPPORTED, VN_DEVINVALID, VN_LOCVOLBAD, VN_UNINITIALIZED, VN_BADMODE, and VN_MIRRORON. In particular, VN_RAIDERR, code 0x200015, can result from a variety of scenarios and these warrant attention. The Sun StorEdge T3 array uses a specific protocol for carrying out commands, and this protocol uses the RAID error as a general error message to be sent to the user. As such, the RAIDERR may result from any of a number of software or hardware conditions. Some cases involve problems related to the user configuration, which can be remedied easily. Other cases are more subtle and are

related to the function of the Sun StorEdge T3 array's internal software. Detailed information for specific instances of the RAID error can be found in the `syslog`; an overview of the scenarios are provided here.

The following is a list of the categories that the Sun StorEdge T3 array's embedded protocol uses for RAID errors and a few of the cases within each category. Each category code, which can be useful in reference to the `syslog`, is included. Though not exhaustive, this list provides a general breakdown of common RAID error generators:

1. Command Incomplete (0x1A): The command was not executed correctly internally. The software responded to the command with too much or too little information. In certain cases, the command may simply be paused and will resume.
2. Partial (conditional) Success (0x19): This category includes the following cases:
 - a. Aborting a non-existent command: A user has issued a command, then tried to abort it after the command is executed.
 - b. Retry error: The command was retried one or more times.
 - c. Target error: A volume is offline or disabled.
3. Invalid Response (part of the category above; 0x19): The software did not provide a valid response to the user command. These cases are more specific than the Command Incomplete category.
 - a. Invalid information type (parameter): The software responded with the wrong type of information.
 - b. Error in information returned: The information returned in response to the command is erroneous. This case implies an embedded software error.
 - c. Function failed: The command failed to retrieve the appropriate information.
 - d. Zero size: The command accessed a volume with zero size.
4. Command Aborted(0x18): The command is aborted, often because of a time-out. A command aborts when a component in the system freezes or if a connection is defective.
5. Command Exception (0x17): This category includes cases where the command cannot be executed. This error type is generated when a disabled, unavailable, or invalid drive or volume is specified. For example, after using a hot spare (standby) to reconstruct the data on a drive, you cannot refer to it again as a hot spare.
 - a. Invalid name / address: Either the user or the internal software used a volume or disk drive name that is invalid or does not match the current configuration.

- b. Invalid command fields: The command is no longer supported or the internal software used a command opcode that is unsupported.
 - c. Missing fields: The user or the internal software issued a command with missing information.
 - d. Drive (module) errors: The disk drive referenced may be unattached, disabled, substituted, or in the process of being reconstructed.
6. Machine Exception (0x16): This category includes cases where there is a hardware error, or where other commands are being executed, thereby giving a busy response.
- a. Drive fatal error: There is an error internal to a referenced drive.
 - b. Autoreconstruct or disable attempted: A drive that is being reconstructed or disabled is specified.
 - c. Queue full or busy response: The command cannot be executed because the system is busy processing other commands.
 - d. Unknown host: The specified host address is invalid or unreachable.
 - e. Single Drive errors: A drive referenced by the command was not detected, the connection could not be opened, or the sysarea on the drive could not be created. This case implies that the drive or the connection to it, is faulty. Alternatively, a retry of a command accessing a disk could fail to execute.
 - f. Multiple disk failure: An error occurred involving more than one drive.
 - g. Standby already in use: (This error resembles the one in the Command Exception category). In this case, the drive is busy processing a previous command. This case applies when the command is complete and if the drive configuration has changed as a result.
 - h. Volume (LUN) errors: A volume may be inaccessible, or its configuration may be corrupted and represented as nonvalid.
7. Intervention Required (0x14): Here, an error results when a volume is mounted or unmounted, in contrast to what is expected. Alternatively, a physical connection may be broken and should be reinstated (by replacing the appropriate FRUs).

RAIDERRS can result from invalid command arguments or from a system problem. The error may refer to the configuration of a volume or an individual drive. For example, you can encounter the error while reconfiguring the Sun StorEdge T3 array with volumes that have been added but not mounted, or the problem may be related to the hardware or an embedded component.

In general, RAID errors can be diagnosed by checking the status of the volumes mounted on the Sun StorEdge T3 array. Often, an existing but unmounted volume can trigger the error. Other times, a conflict occurs when a new version of the binary is downloaded while previous volumes are still being used.

Here are some guidelines for investigating RAID errors:

1. **Check the state of the current volumes with the `vol stat` command.**
 - If the volumes are unmounted, try re-mounting them and then resetting the system using the Sun StorEdge T3 `reset` command.
 - If you are unable to re-mount the volumes, try removing all the volumes, resetting the system, then adding them back before re-mounting them.

2. **Check the host connection to the Sun StorEdge T3 array.**

On hosts running the Solaris software environment, the `format` command should match the number of volumes present on the Sun StorEdge T3 array. If the number of volumes listed do not match, refer to chapter 5 of the *Sun StorEdge T3 Array Administrator's Guide* for troubleshooting instructions. Specifically, the T300 entries listed by the `format` command should be recognized and labeled, and the number of these entries should equal the number of volumes mounted on the Sun StorEdge T3 array.

3. **If you suspect that a hardware problem may be causing the RAID error, use the `fru list` and `fru stat` commands to check the status of the components.**

It may also be worthwhile to check the cables and connections between partner-group units and between the host and the Sun StorEdge T3 arrays.

More detail regarding the error may be available in the `syslog`, in which case note the date and time of the error for lookup. However, most common cases can be handled as described above.

Port Errors

The following table lists the port error messages that can be displayed.

TABLE-4 Port Errors

Error Name	Numerical Value	Message
PRT_UNKNOWPORT	0x300000	Bad port number
PRT_ALREADYMAPPED	0x300001	Port is already mapped unmap first
PRT_INVALIDNAME	0x300002	Volume name is not correct
PRT_VOLNOTFOUND	0x300003	Volume name not found

TABLE-4 Port Errors (Continued)

Error Name	Numerical Value	Message
PRT_INVALID	0x300004	Port number is incorrect
PRT_LUNNOTMAPPED	0x300005	This lun is not mapped
PRT_ACCESSINVALID	0x300006	Need to specify the access mode

Interconnect Card and Other FRU Errors

The following table lists the various FRU-related errors that you can encounter. These include various power and cooling unit fault conditions, missing disks, and interconnect card errors.

TABLE-5 Unit-Related Errors (Interconnect Card and Other FRUs)

Error Name	Numerical Value	Message
PS1_NOTEXIST	0x500001	Power Supply 1 Not Present
PS2_NOTEXIST	0x500002	Power Supply 2 Not Present
PS1_NOBATT	0x500003	Power Supply 1 Battery Not Present
PS2_NOBATT	0x500004	Power Supply 2 Battery Not Present
PS1_DISABLED	0x500005	Power Supply 1 Disabled
PS2_DISABLED	0x500006	Power Supply 2 Disabled
PS1_DISABLE	0x500007	Power Supply 1 Shutting off...
PS2_DISABLE	0x500008	Power Supply 2 Shutting off...
PS1_FAN1FAIL	0x500011	Power Supply 1 Fan 1 Failed
PS2_FAN1FAIL	0x500012	Power Supply 2 Fan 1 Failed
PS1_FAN2FAIL	0x500013	Power Supply 1 Fan 2 Failed
PS2_FAN2FAIL	0x500014	Power Supply 2 Fan 2 Failed
PS1_OVERTEMP	0x500015	Power Supply 1 Over Temperature
PS2_OVERTEMP	0x500016	Power Supply 2 Over Temperature
PS1_SWOFF	0x500017	Power Supply 1 Switch Off
PS2_SWOFF	0x500018	Power Supply 2 Switch Off
PS1_DCNOK	0x500019	Power Supply 1 DC Not OK
PS2_DCNOK	0x50001A	Power Supply 2 DC Not OK
PS1_ONBATT	0x500021	Power Supply 1 On Battery

TABLE-5 Unit-Related Errors (Interconnect Card and Other FRUs) *(Continued)*

Error Name	Numerical Value	Message
PS2_ONBATT	0x500022	Power Supply 2 On Battery
PS1_FANHIGH	0x500023	Power Supply 1 Fan High
PS2_FANHIGH	0x500024	Power Supply 2 Fan High
PS1_REFBATT	0x500025	Power Supply 1 Refresh Battery
PS2_REFBATT	0x500026	Power Supply 2 Refresh Battery
DK1_NOTEXIST	0x500031	Disk 1 Not Present
DK2_NOTEXIST	0x500032	Disk 2 Not Present
DK3_NOTEXIST	0x500033	Disk 3 Not Present
DK4_NOTEXIST	0x500034	Disk 4 Not Present
DK5_NOTEXIST	0x500035	Disk 5 Not Present
DK6_NOTEXIST	0x500036	Disk 6 Not Present
DK7_NOTEXIST	0x500037	Disk 7 Not Present
DK8_NOTEXIST	0x500038	Disk 8 Not Present
DK9_NOTEXIST	0x500039	Disk 9 Not Present
DK_NONE	0x50003A	No Disk Present
DK1_BYPASSED	0x500041	Disk 1 Bypassed
DK2_BYPASSED	0x500042	Disk 2 Bypassed
DK3_BYPASSED	0x500043	Disk 3 Bypassed
DK4_BYPASSED	0x500044	Disk 4 Bypassed
DK5_BYPASSED	0x500045	Disk 5 Bypassed
DK6_BYPASSED	0x500046	Disk 6 Bypassed
DK7_BYPASSED	0x500047	Disk 7 Bypassed
DK8_BYPASSED	0x500048	Disk 8 Bypassed
DK9_BYPASSED	0x500049	Disk 9 Bypassed
DK1_NOTREADY	0x500051	Disk 1 Not Ready
DK2_NOTREADY	0x500052	Disk 2 Not Ready
DK3_NOTREADY	0x500053	Disk 3 Not Ready
DK4_NOTREADY	0x500054	Disk 4 Not Ready
DK5_NOTREADY	0x500055	Disk 5 Not Ready
DK6_NOTREADY	0x500056	Disk 6 Not Ready

TABLE-5 Unit-Related Errors (Interconnect Card and Other FRUs) *(Continued)*

Error Name	Numerical Value	Message
DK7_NOTREADY	0x500057	Disk 7 Not Ready
DK8_NOTREADY	0x500058	Disk 8 Not Ready
DK9_NOTREADY	0x500059	Disk 9 Not Ready
CT_NOTEXIST	0x500061	Controller Not Present
CT_QLOGNRDY	0x500062	Qlogic Chip Not Ready
CT_SEL_ID	0x500063	Select ID Changed
LP_VSC_ERR	0x500064	VSC7120 Loop Failed
LC1_OFFLINE	0x500065	Loop Card 1 Offline
LC2_OFFLINE	0x500066	Loop Card 2 Offline
LP_CABLE1	0x500067	Cable 1 Not Present
LP_CABLE2	0x500068	Cable 2 Not Present
LC1_NSTART	0x500069	Loop Card 1 Failed to Start
LC2_NSTART	0x50006A	Loop Card 2 Failed to Start
CT_NOALTLP	0x50006B	No Alternate Loop
LP_SWITCH1	0x500071	Switch to Loop 1
LP_SWITCH2	0x500072	Switch to Loop 2
LP_MUX_ISO	0x500073	Loop Mux Changed to Isolated
LP_MUX_TOP	0x500074	Loop Mux Changed to Top
LP_MUX_MID	0x500075	Loop Mux Changed to Middle
LP_MUX_BOT	0x500076	Loop Mux Changed to Bottom

Other Errors

You will rarely see other types of errors, such as logical volume manager (LVM) errors (range 0x10001-0x1000A) and operating system errors (range 00000001-C000FFFF). The `tftp` error (numerical values 10060001-10060005) is an exception that you can see when you try to download a new binary. The `tftp` errors are usually generated by one of the following:

- The permissions for the file to be downloaded are too restrictive. In general, binaries should be world readable and executable.
- The checksum for the binary file to be downloaded is erroneous.

- The Sun StorEdge T3 arrays have not been recognized by the network. In this case, a system administrator should make sure that the IP addresses of the Sun StorEdge T3 arrays are entered in the network database.

The following table lists pSOS errors:

TABLE-6 Embedded Operating System and Driver Errors

Error Type	Numerical Value
pSOS+	0000'0001 0000'0FFF
(reserved)	0000'1000 0000'1FFF
embedded file system	0000'2000 0000'2FFF
pREPC+	0000'3000 0000'3FFF
(reserved)	0000'4000 0000'4FFF
pNA+, pRPC+, pX11+	0000'5000 0000'5FFF
(reserved)	0000'6000 0000'FFFF
Networking libraries	0110'0000 01FF'FFFF
MMUlib	0120'0000 0120'00FF
(reserved)	0120'0100 1000'FFFF
serial driver	1001'0000 1001'FFFF
tick timer driver	1002'0000 1002'FFFF
(reserved)	1003'0000 1003'FFFF
RAM disk driver	1004'0000 1004'FFFF
(reserved)	1005'0000 1005'FFFF
TFTP driver	1006'0000 1006'FFFF
SLIP driver	1007'0000 1007'FFFF
(reserved)	1008'0000 1004'FFFF
SCSI driver	1050'0000 105F'FFFF
(reserved)	1060'0000 FFFF'FFFF