Sun StorEdge™ T3 Disk Tray Installation, Operation, and Service Manual

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303
U.S.A. 650-960-1300

Part No. 806-1062-11
July 2000, Revision A

Send comments about this document to: docfeedback@sun.com

Please
Recycle

Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Industry Canada Equipment Standard for Digital Equipment (ICES-003) - Canada
- Voluntary Control Council for Interference (VCCI) — Japan
- Bureau of Standards Metrology and Inspection (BSMI) — Taiwan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables to comply with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ICES-003 Class B Notice - Avis NMB-003, Classe B

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

VCCI 基準について

クラス A VCCI 基準について

クラス A VCCI の表示があるワークステーションおよびオプション製品は、クラス A 情報技術装置です。これらの製品には、下記の項目が該当します。

この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

クラス B VCCI 基準について

クラス B VCCI の表示  があるワークステーションおよびオプション製品は、クラス B 情報技術装置です。これらの製品には、下記の項目が該当します。

この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをしてください。

BSMI Class A Notice

The following statement is applicable to products shipped to Taiwan and marked as Class A on the product compliance label.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻 干擾，在這種情況下，使用者 會被要求採取某些適當的對策。

Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems product.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this book:

Caution – There is risk of personal injury and equipment damage. Follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

On – Applies AC power to the system.

Depending on the type of power switch your device has, one of the following symbols may be used:

Off – Removes AC power from the system.

Standby – The On/Standby switch is in the *standby* position.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product

Caution – Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

Caution – The workplace-dependent noise level defined in DIN 45 635 Part 1000 must be 70Db(A) or less.

SELV Compliance

Safety status of I/O connections comply to SELV requirements.

Power Cord Connection

Caution – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sun product.

Caution – Your Sun product is shipped with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

The following caution applies only to devices with a **Standby** power switch:

Caution – The power switches of this product function as standby type devices only. The power cords serve as the primary disconnect device for the system. ALL power cords must be disconnected to remove power from the product. Be sure to plug the power cords into a grounded power outlet that is nearby the system and is readily accessible.

Lithium Battery

Caution – On the system control board, there is a lithium battery molded into the real-time clock, SGS No. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, M4T28 XXYYSHZ or MK48T08. Batteries are not customer replaceable parts. They may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble it or attempt to recharge it.

Battery Pack

Caution - There is a Nickel Metal Hydride battery in the product power supply. Panasonic Model HHR200SCP. There is danger of explosion if the battery is mishandled or incorrectly replaced. Replace only with the same type of Sun Microsystems battery. Do not disassemble it or attempt to recharge it outside the system. Do not dispose of the battery in fire. Dispose of thebattery properly in accordance with local regulations.

System Unit Cover

Caution – Do not operate Sun products without the top cover in place. Failure to take this precaution may result in personal injury and system damage.

Laser Compliance Notice

Sun products that use laser technology comply with Class 1 laser requirements.

Caution – Use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Einhaltung sicherheitsbehördlicher Vorschriften

Auf dieser Seite werden Sicherheitsrichtlinien beschrieben, die bei der Installation von Sun-Produkten zu beachten sind.

Sicherheitsvorkehrungen

Treffen Sie zu Ihrem eigenen Schutz die folgenden Sicherheitsvorkehrungen, wenn Sie Ihr Gerät installieren:

- Beachten Sie alle auf den Geräten angebrachten Warnhinweise und Anweisungen.
- Vergewissern Sie sich, daß Spannung und Frequenz Ihrer Stromquelle mit der Spannung und Frequenz übereinstimmen, die auf dem Etikett mit den elektrischen Nennwerten des Geräts angegeben sind.
- Stecken Sie auf keinen Fall irgendwelche Gegenstände in Öffnungen in den Geräten. Leitfähige Gegenstände könnten aufgrund der möglicherweise vorliegenden gefährlichen Spannungen einen Kurzschluß verursachen, der einen Brand, Stromschlag oder Geräteschaden herbeiführen kann.

Symbole

Die Symbole in diesem Handbuch haben folgende Bedeutung:

Achtung – Gefahr von Verletzung und Geräteschaden. Befolgen Sie die Anweisungen.

Achtung – Hohe Temperatur. Nicht berühren, da Verletzungsgefahr durch heiße Oberfläche besteht.

Achtung – Gefährliche Spannungen. Anweisungen befolgen, um Stromschläge und Verletzungen zu vermeiden.

Ein – Setzt das System unter Wechselstrom.

Je nach Netzschaltertyp an Ihrem Gerät kann eines der folgenden Symbole benutzt werden:

Aus – Unterbricht die Wechselstromzufuhr zum Gerät.

Wartezustand (Stand-by-Position) - Der Ein-/Wartezustand-Schalter steht auf Wartezustand. Änderungen an Sun-Geräten.

Nehmen Sie keine mechanischen oder elektrischen Änderungen an den Geräten vor. Sun Microsystems übernimmt bei einem Sun-Produkt, das geändert wurde, keine Verantwortung für die Einhaltung behördlicher Vorschriften.

Aufstellung von Sun-Geräten

Achtung – Um den zuverlässigen Betrieb Ihres Sun-Geräts zu gewährleisten und es vor Überhitzung zu schützen, dürfen die Öffnungen im Gerät nicht blockiert oder verdeckt werden. Sun-Produkte sollten niemals in der Nähe von Heizkörpern oder Heizluftklappen aufgestellt werden.

Achtung – Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70Db(A) oder weniger.

Einhaltung der SELV-Richtlinien

Die Sicherung der I/O-Verbindungen entspricht den Anforderungen der SELV-Spezifikation.

Anschluß des Netzkabels

Achtung – Sun-Produkte sind für den Betrieb an Einphasen-Stromnetzen mit geerdetem Nulleiter vorgesehen. Um die Stromschlaggefahr zu reduzieren, schließen Sie Sun-Produkte nicht an andere Stromquellen an. Ihr Betriebsleiter oder ein qualifizierter Elektriker kann Ihnen die Daten zur Stromversorgung in Ihrem Gebäude geben.

Achtung – Nicht alle Netzkabel haben die gleichen Nennwerte. Herkömmliche, im Haushalt verwendete Verlängerungskabel besitzen keinen Überlastungsschutz und sind daher für Computersysteme nicht geeignet.

Achtung – Ihr Sun-Gerät wird mit einem dreiadrigen Netzkabel für geerdete Netzsteckdosen geliefert. Um die Gefahr eines Stromschlags zu reduzieren, schließen Sie das Kabel nur an eine fachgerecht verlegte, geerdete Steckdose an.

Die folgende Warnung gilt nur für Geräte mit Wartezustand-Netzschalter:

Achtung – Die Ein/Aus-Schalter dieses Geräts schalten nur auf Wartezustand (Stand-By-Modus). Um die Stromzufuhr zum Gerät vollständig zu unterbrechen, müssen Sie die Netzkabel aus der Steckdose ziehen. Alle Netzkabel müssen ausgesteckt sein, um die Stromverbindung zum Produkt zu unterbrechen. Schließen Sie die Stecker der Netzkabel an eine in der Nähe befindliche, frei zugängliche, geerdete Netzsteckdose an.

Lithiumbatterie

Achtung – Systemsteuerungskarten verfügen über eine Echtzeituhr mit integrierter Lithiumbatterie (Teile-Nr. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, M4T28 XXYYSHZ oder MK48T08). Diese Batterie darf nur von einem qualifizierten Servicetechniker ausgewechselt werden, da sie bei falscher Handhabung explodieren kann. Werfen Sie die Batterie nicht ins Feuer. Versuchen Sie auf keinen Fall, die Batterie auszubauen oder wiederaufzuladen.

Batterien

Achtung – Das Netzteil des Panasonic-Modells HHR200SCP enthält eine Nickel-Metall-Hydridbatterie. Werden bei der Behandlung oder beim Austausch der Batterie Fehler gemacht, besteht Explosionsgefahr. Tauschen Sie Batterien nur gegen Batterien gleichen Typs von Sun Microsystems aus. Demontieren Sie die Batterie nicht, und versuchen Sie nicht, die Batterie außerhalb des Geräts zu laden. Werfen Sie die Batterie nicht ins Feuer. Entsorgen Sie die Batterie ordnungsgemäß entsprechend den vor Ort geltenden Vorschriften.

Gehäuseabdeckung

Achtung – Bei Betrieb des Systems ohne obere Abdeckung besteht die Gefahr von Stromschlag und Systemschäden.

Einhaltung der Richtlinien für Laser

Sun-Produkte, die mit Laser-Technologie arbeiten, entsprechen den Anforderungen der Laser Klasse 1.

Warnung – Die Verwendung von anderen Steuerungen und Einstellungen oder die Durchfhrung von Prozeduren, die von den hier beschriebenen abweichen, knnen gefhrliche Strahlungen zur Folge haben.

Conformité aux normes de sécurité

Ce texte traite des mesures de sécurité qu'il convient de prendre pour l'installation d'un produit Sun Microsystems.

Mesures de sécurité

Pour votre protection, veuillez prendre les précautions suivantes pendant l'installation du matériel :

- Suivre tous les avertissements et toutes les instructions inscrites sur le matériel.
- Vérifier que la tension et la fréquence de la source d'alimentation électrique correspondent à la tension et à la fréquence indiquées sur l'étiquette de classification de l'appareil.
- Ne jamais introduire d'objets quels qu'ils soient dans une des ouvertures de l'appareil. Vous pourriez vous trouver en présence de hautes tensions dangereuses. Tout objet conducteur introduit de la sorte pourrait produire un court-circuit qui entraînerait des flammes, des risques d'électrocution ou des dégâts matériels.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés :

Attention : risques de blessures corporelles et de dégâts matériels. Veuillez suivre les instructions.

Attention : surface à température élevée. Evitez le contact. La température des surfaces est élevée et leur contact peut provoquer des blessures corporelles.

Attention : présence de tensions dangereuses. Pour éviter les risques d'électrocution et de danger pour la santé physique, veuillez suivre les instructions.

MARCHE : votre système est sous tension (courant alternatif).

Un des symboles suivants sera peut-être utilisé en fonction du type d'interrupteur de votre système:

ARRET : votre système est hors tension (courant alternatif).

VEILLEUSE : l'interrupteur Marche / Veilleuse est en position « Veilleuse ».

Modification du matériel

Ne pas apporter de modification mécanique ou électrique au matériel. Sun Microsystems n'est pas responsable de la conformité réglementaire d'un produit Sun qui a été modifié.

Positionnement d'un produit Sun

Attention : pour assurer le bon fonctionnement de votre produit Sun et pour l'empêcher de surchauffer, il convient de ne pas obstruer ni recouvrir les ouvertures prévues dans l'appareil. Un produit Sun ne doit jamais être placé à proximité d'un radiateur ou d'une source de chaleur.

Attention : le niveau de pression acoustique au poste de travail s'élève selon la norme DIN 45 635 section 1000, à 70 dB (A) ou moins.

Conformité SELV

Sécurité : les raccordements E / S sont conformes aux normes SELV.

Connexion du cordon d'alimentation

Attention : les produits Sun sont conçus pour fonctionner avec des alimentations monophasées munies d'un conducteur neutre mis à la terre. Pour écarter les risques d'électrocution, ne pas brancher de produit Sun dans un autre type d'alimentation secteur. En cas de doute quant au type d'alimentation électrique du local, veuillez vous adresser au directeur de l'exploitation ou à un électricien qualifié.

Attention : tous les cordons d'alimentation n'ont pas forcément la même puissance nominale en matière de courant. Les rallonges d'usage domestique n'offrent pas de protection contre les surcharges et ne sont pas prévues pour les systèmes d'ordinateurs. Ne pas utiliser de rallonge d'usage domestique avec votre produit Sun.

Attention : votre produit Sun a été livré équipé d'un cordon d'alimentation à trois fils (avec prise de terre). Pour écarter tout risque d'électrocution, branchez toujours ce cordon dans une prise mise à la terre.

L'avertissement suivant s'applique uniquement aux systèmes équipés d'un interrupteur VEILLEUSE:

Attention : les commutateurs d'alimentation de ce produit fonctionnent comme des dispositifs de mise en veille uniquement. Ce sont les prises d'alimentation qui servent à mettre le produit hors tension. Vous devez débrancher TOUTES les prises d'alimentation afin de couper l'alimentation du produit. Veillez donc à installer le produit à proximité d'une prise murale facilement accessible.

Batterie au lithium

Attention : sur la carte de contrôle du système, une batterie au lithium (référence MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, M4T28-XXXYYSHZ ou MK48T08) a été moulée dans l'horloge temps réel SGS. Les batteries ne sont pas des pièces remplaçables par le client. Elles risquent d'exploser en cas de mauvais traitement. Ne pas jeter la batterie au feu. Ne pas la démonter ni tenter de la recharger.

Bloc-batterie

Attention : l'alimentation du produit contient une batterie nickel-hydrure métallique (Panasonic modèle HHR200SCP). Il existe un risque d'explosion si cette batterie est manipulée de façon erronée ou mal mise en place. Ne remplacez cette batterie que par une batterie Sun Microsystems du même type. Ne la démontez pas et n'essayez pas de la recharger hors du système. Ne faites pas brûler la batterie mais mettez-la au rebut conformément aux réglementations locales en vigueur.

Couvercle

Attention : il est dangereux de faire fonctionner un produit Sun sans le couvercle en place. Si l'on néglige cette précaution, on encourt des risques de blessures corporelles et de dégâts matériels.

Conformité aux certifications Laser

Les produits Sun qui font appel aux technologies lasers sont conformes aux normes de la classe 1 en la matière.

Attention : l'utilisation de contrôles, de réglages ou de performances de procédures autre que celle spécifiée dans le présent document peut provoquer une exposition à des radiations dangereuses.

Normativas de seguridad

El siguiente texto incluye las medidas de seguridad que se deben seguir cuando se instale algún producto de Sun Microsystems.

Precauciones de seguridad

Para su protección observe las siguientes medidas de seguridad cuando manipule su equipo:

- Siga todos los avisos e instrucciones que se indican en el equipo.
- Asegúrese de que el voltaje y la frecuencia de la red eléctrica concuerdan con las descritas en las etiquetas de especificaciones eléctricas del equipo.
- No introduzca nunca objetos de ningún tipo a través de los orificios del equipo. El voltaje puede ser peligroso. Los objetos extraños conductores de la electricidad pueden producir cortocircuitos que provoquen un incendio, descargas eléctricas o daños en el equipo.

Símbolos

En este libro aparecen los siguientes símbolos:

Precaución – Existe el riesgo de lesiones personales y daños al equipo. Siga las instrucciones.

Precaución – Superficie caliente. Evite el contacto. Las superficies están calientes y pueden causar daños personales si se tocan.

Precaución – Voltaje peligroso presente. Para reducir el riesgo de descarga y daños para la salud siga las instrucciones.

Encendido – Aplica la alimentación de CA al sistema.

Según el tipo de interruptor de encendido que su equipo tenga, es posible que se utilice uno de los siguientes símbolos:

Apagado – Elimina la alimentación de CA del sistema.

En espera – El interruptor de Encendido/En espera se ha colocado en la posición de *En espera*.

Modificaciones en el equipo

No realice modificaciones de tipo mecánico o eléctrico en el equipo. Sun Microsystems no se hace responsable del cumplimiento de las normativas de seguridad en los equipos Sun modificados.

Ubicación de un producto Sun

Precaución – Para asegurar la fiabilidad de funcionamiento de su producto Sun y para protegerlo de sobrecalentamientos no deben obstruirse o taparse las rejillas del equipo. Los productos Sun nunca deben situarse cerca de radiadores o de fuentes de calor.

Precaución – De acuerdo con la norma DIN 45 635, sección 1000, se admite un nivel de presión acústica para puestos de trabajo máximo de 70Db(A).

Cumplimiento de la normativa SELV

El estado de la seguridad de las conexiones de entrada/salida cumple los requisitos de la normativa SELV.

Conexión del cable de alimentación eléctrica

Precaución – Los productos Sun están diseñados para trabajar en una red eléctrica monofásica con toma de tierra. Para reducir el riesgo de descarga eléctrica, no conecte los productos Sun a otro tipo de sistema de alimentación eléctrica. Póngase en contacto con el responsable de mantenimiento o con un electricista cualificado si no está seguro del sistema de alimentación eléctrica que existe en su edificio.

Precaución – No todos los cables de alimentación eléctrica tienen la misma capacidad. Los cables de tipo doméstico no están provistos de protecciones contra sobrecargas y por tanto no son apropiados para su uso con computadores. No utilice alargadores de tipo doméstico para conectar sus productos Sun.

Precaución – Con el producto Sun se proporciona un cable de alimentación con toma de tierra. Para reducir el riesgo de descargas eléctricas conéctelo siempre a un enchufe con toma de tierra.

La siguiente advertencia se aplica solamente a equipos con un interruptor de encendido que tenga una posición "En espera":

Precaución – El interruptor de encendido de este producto funciona exclusivamente como un dispositivo de puesta en espera. Los enchufes de la fuente de alimentación están diseñados para ser el elemento primario de desconexión del equipo. Debe desconectar TODOS los enchufes de alimentación del equipo antes de desconectar la alimentación. El equipo debe instalarse cerca del enchufe de forma que este último pueda ser fácil y rápidamente accesible.

Batería de litio

Precaución – En las placas de control del sistema hay una batería de litio insertada en el reloj de tiempo real, tipo SGS Núm. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, M4T28-XXYYSHZ o MK48T08. El usuario no debe reemplazar las baterías por sí mismo. Pueden explotar si se manipulan de forma errónea. No arroje las baterías al fuego. No las abra o intente recargarlas.

Paquete de pilas

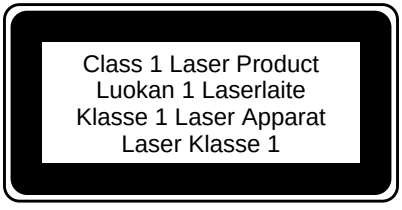
Precaución – Existe una pila de hidruro metálico de níquel en el sistema de alimentación de la unidad Panasonic modelo HHR200SCP. Existe riesgo de estallido si el paquete de pilas se maneja sin cuidado o se sustituye de manera indebida. Las pilas sólo deben sustituirse por el mismo tipo de pilas de Sun Microsystems. No las desmonte ni intente recargarlas fuera del sistema. No arroje las pilas al fuego. Deséchelas siguiendo el método indicado por las disposiciones vigentes.

Tapa de la unidad del sistema

Precaución – Es peligroso hacer funcionar los productos Sun sin la tapa superior colocada. El hecho de no tener en cuenta esta precaución puede ocasionar daños personales o perjudicar el funcionamiento del equipo.

Aviso de cumplimiento con requisitos de láser

Los productos Sun que utilizan la tecnología de láser cumplen con los requisitos de láser de Clase 1.



Precaución – El manejo de los controles, los ajustes o la ejecución de procedimientos distintos a los aquí especificados pueden exponer al usuario a radiaciones peligrosas.

GOST-R Certification Mark

Nordic Lithium Battery Cautions

Norge

A D V A R S E L – Litiumbatteri — Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

Sverige

VARNING – Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Danmark

ADVARSEL! – Litiumbatteri — Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

Suomi

VAROITUS – Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Contents

Figures

Preface

This manual contains information on how to install, operate, and service the Sun StorEdge™ T3 disk tray. Most of the procedures in this manual can be performed by an experienced system administrator. Some of the advanced features, however, should not be attempted unless the administrator is highly knowledgeable in the related area.

Before You Read This Book

Make sure you have prepared for the installation by reviewing the *Sun StorEdge T3 Site Preparation and Planning Guide* and the *Sun StorEdge T3 Configuration Guide*, available from your Sun™ representative. Work with your Sun representative to determine if you require any external hardware or software products for using this device. Being prepared with this knowledge and the appropriate tools will simplify the installation.

How This Book Is Organized

This manual is organized as follows:

Chapter 1 provides an overview of the Sun StorEdge T3 disk tray, describing features, components, architecture, and supported configurations.

Chapter 2 describes how to install the disk tray in either a single-unit or partner-group configuration.

Chapter 3 describes options for operating your disk tray, such as reconfiguring the default settings and monitoring disk tray activity.

Chapter 4 provides information on how to approach troubleshooting the disk tray and references troubleshooting tools.

Chapter 5 describes how to service the major components of the disk tray and how to upgrade disk tray firmware.

Appendix A contains listings of disk tray specifications.

Appendix B contains an illustrated parts list.

Glossary is a list of words and phrases and their definitions. Glossary terms are italicized in the text.

Using UNIX Commands

This document contains some information on basic UNIX® commands and procedures such as booting the devices. For further information, see one or more of the following:

- AnswerBook2™ online documentation for the Solaris™ software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized, glossary terms	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#
Sun StorEdge T3 disk tray	`t300:/:`

Related Documentation

TABLE P-3 Related Documentation

Application	Title	PartNumber
Installation overview	*Sun StorEdge T3 Disk Tray Installation Task Map*	806-1061
Administration	*Sun StorEdge T3 Disk Tray Administrator's Guide*	806-1063
Release notes	*Sun StorEdge T3 Disk Tray Release Notes*	806-1497
Disk drive specifications	*18 Gbyte 10K rpm Disk Drive Specifications*	806-1493
	36 Gbyte, 10K rpm Disk Drive Specifications	806-1491
Component Manager installation	*Sun StorEdge Component Manager Installation Guide*	806-4811
Using Component Manager	*Sun StorEdge Component Manager User's Guide*	806-4812
Component Manager Release Notes	*Sun StorEdge Component Manager Release Notes*	806-4813
Installing and using StorTools	*Sun StorEdge StorTools User's Guide*	806-1946
StorTools Release Notes	*Sun StorEdge StorTools Release Notes*	806-1947

Ordering Sun Documentation

Fatbrain.com, an Internet professional bookstore, stocks select product documentation from Sun Microsystems, Inc.

For a list of documents and how to order them, visit the Sun Documentation Center on Fatbrain.com at:

```
http://www1.fatbrain.com/documentation/sun
```

Accessing Sun Documentation Online

The docs.sun.com[sm] web site enables you to access Sun technical documentation on the Web. You can browse the docs.sun.com archive or search for a specific book title or subject at:

```
http://docs.sun.com
```

Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at:

```
docfeedback@sun.com
```

Please include the part number (806-1062-11) of your document in the subject line of your email.

CHAPTER 1

Sun StorEdge T3 Disk Tray Overview

This chapter provides a high-level introduction to the Sun StorEdge T3 disk tray product line and is organized as follows:

1.1 Product Description

The Sun StorEdge T3 disk tray is a high-performance, modular, scalable storage device that contains an internal RAID controller and nine disk drives with Fibre Channel connectivity to the data host. Extensive reliability, availability, and serviceability (RAS) features include redundant components, notification of failed components, and the ability to replace components while the unit is online.

The disk tray can be used either as a standalone storage unit or as a building block, interconnected with other Sun StorEdge T3 disk trays and configured in various ways to provide a storage solution optimized to the host application. The disk tray can be placed on a table top or rackmounted in a server cabinet or expansion cabinet.

The Sun StorEdge T3 disk tray *expansion unit* contains the same components as the Sun StorEdge T3 disk tray *controller unit* except for the internal RAID controller. When connected to a controller unit, the expansion unit enables you to increase your storage capacity without the cost of an additional controller. An expansion unit must be connected to a controller unit to operate because it does not have its own controller.

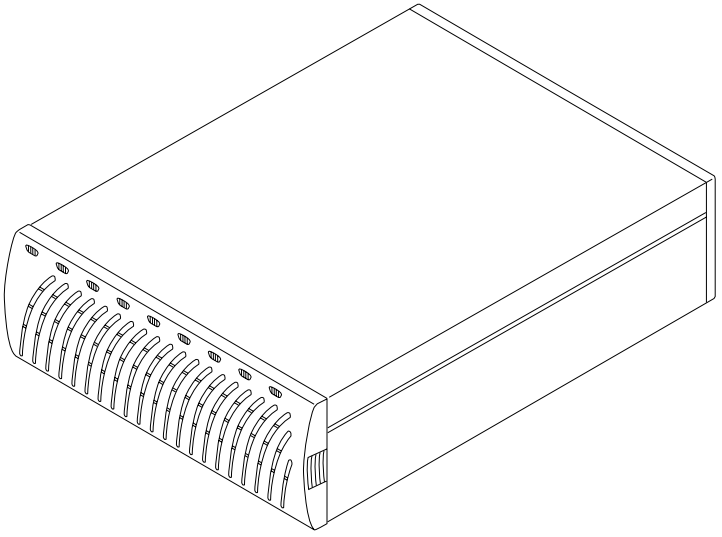


FIGURE 1-1 Sun StorEdge T3 Disk Tray

1.2 Disk Tray Features

The Sun StorEdge T3 disk tray provides high reliability while being simple to administer and maintain. It features a design that supports high availability, high performance, configuration flexibility, and scalability of bandwidth, capacity, and input/output operations per second (IOPS). These key features are summarized in the following table depicting a disk tray with nine 18-Gbyte drives.

Note – Other drive capacities are available. Check with your Sun representative for more information on storage capacities currently available.

TABLE 1-1 Sun StorEdge T3 Disk Tray Key Features—18-Gbyte Drive

Feature	Description
Capacity per unit	• 162 GB (9 x 18.2 GB drives) • 256 MB cache
Performance per controller	• 90+ MB/sec for large RAID 5 reads from disk (64K >) • 85+ MB/sec for large RAID 5 writes to disk • 4,400 IOPS for 8 KB (100% cache hit reads)
Connectivity per controller	• FC-AL copper for optical using MIA provided • 10BASE-T network port
Scalability (one to two units, one to two controllers)	• 324 GB maximum capacity • 256 to 512 MB cache • One to two host Fibre Channel interfaces • 90 to 180 MB/sec bandwidth • 4,400 to 8,800 IOPS (100% cache hit reads)
Reliability/redundancy	• RAID 0/1 (1+0)/5 • Redundant back-end data loops • Redundant interconnect cards • Passive centerplane connector board • Redundant power/cooling/UPS units and power cables • Redundant back-end FC-AL interconnect cables • Redundant controller configuration (two StorEdge T310 units only)
Administration	• Telnet access (CLI interface) • Component Manager (GUI interface) • SNMP Version 1

1.3 Components

The Sun StorEdge T3 disk tray contains four basic components that can be easily replaced:

- Disk drive
- Controller card
- Interconnect card
- Power and cooling unit

All components plug into a centerplane; there is no internal cabling. For information on how to remove and replace these components see the service procedures in Chapter 5.

Note – The disk tray centerplane and external chassis are physically connected and are available as one field replaceable unit (FRU). This FRU must be replaced by a qualified field-service representative only.

1.3.1 Disk Drive

Behind the panel at the front of the disk tray are nine Fibre Channel disk drives, numbered drive 1 through drive 9 from left to right. Each drive is in an enclosed canister that is easily installed and removed from the disk tray. Drive *light-emitting-diodes* (LEDs), which are visible through the front panel, indicate drive activity and status. See Chapter 4 for more information on LED locations and descriptions. See Chapter 5 for information on how to service the disk drives.

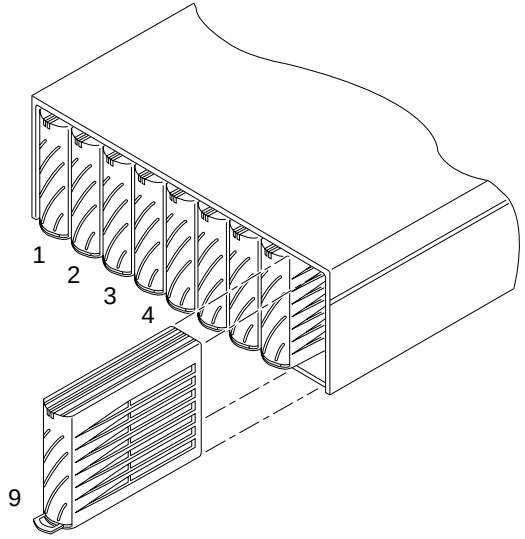


FIGURE 1-2 Disk Drives (Front View)

1.3.2 Controller Card

The controller card contains the RAID controller hardware and firmware, as well as a host Fibre Channel interface, an Ethernet 10BASE-T host interface, an RS-232 serial port for special service procedures, and 256 Mbytes of high-speed synchronous-dynamic-random-access-memory (SDRAM) data cache. Chapter 5 provides information on how to service the controller card.

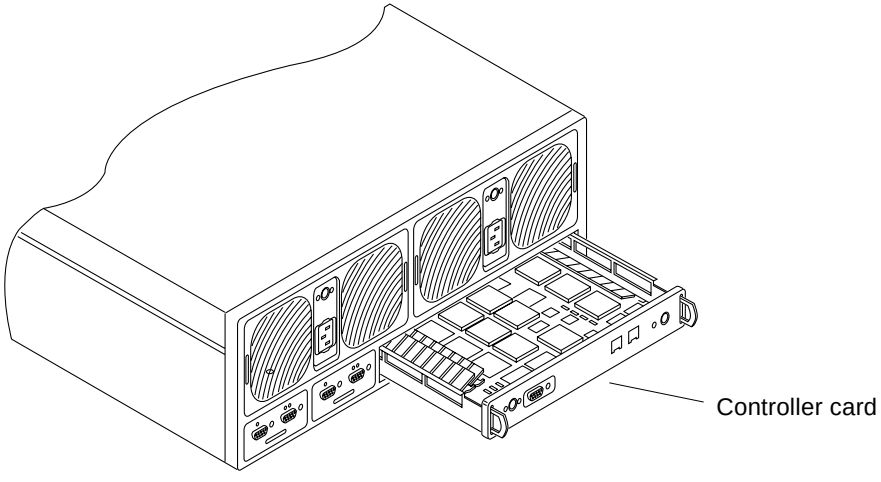


FIGURE 1-3 Controller Card (Rear View)

1.3.3 Interconnect Card

The interconnect card contains the interface circuitry and two connectors for interconnecting multiple Sun StorEdge T3 disk trays. It provides loop-switch capability and contains an environmental monitor for the disk tray. Each disk tray contains two interconnect cards for redundancy. For information on how to service the interconnect card, see Chapter 5.

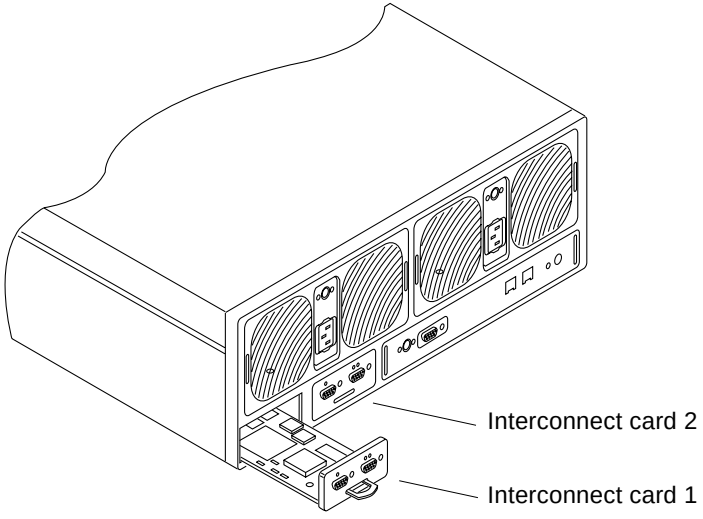


FIGURE 1-4 Interconnect Cards (Rear View)

1.3.4 Power and Cooling Unit

The power and cooling unit contains a power supply, two cooling fans, an integrated *uninterruptible power source* (UPS) battery, and LED status indicators for AC power. Each tray contains two power and cooling units for redundancy. See Chapter 5 for information on how to service the power and cooling unit and for information on UPS battery maintenance.

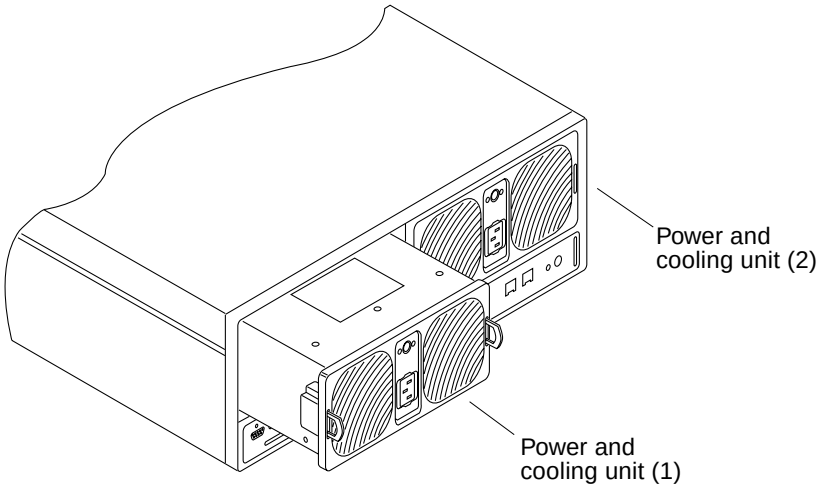


FIGURE 1-5 Power and Cooling Units (Rear View)

1.4 Architecture

The Sun StorEdge T3 disk tray is uniquely designed to be a modular, scalable, reliable, serviceable, high-performance building block with a flexible configuration. The design allows for multiple disk trays to be combined in various ways to provide complete storage solutions that are optimized for all applications—from transaction processing to decision support and high-performance computing, from workgroup environments to data centers.

The disk tray units have redundant components for high reliability. Components are hot swappable and field replaceable for serviceability. Controller units have a cached hardware RAID controller for high performance. Expansion units can be added to scale capacity. Controllers can be added to expansion units to scale performance. Controller units can be paired in a *partner group*, providing controller and data path redundancy and mirrored caches for high availability. Partner groups support host-based alternate pathing for enhanced availability.

Data and administrative paths are completely independent for reliability, security, serviceability, and ease of use. The network-based administrative path allows for centralized configuration and monitoring of large numbers of Sun StorEdge T3 disk tray configurations providing storage to multiple application servers.

Each disk drive has a drive label, a small portion of which is reserved for the *system area.* Approximately 150 Mbytes is reserved for the system area, which contains the configuration data, boot firmware, and file system information. This information is mirrored across all nine drives for redundancy so that data can be recovered from the other functional drives.

Finally, the unique switched-loop architecture provides the flexibility to configure multiple units together for scalability and availability, while enabling loops to be reconfigured dynamically for diagnosis and recovery in case of loop-related failures.

1.5 Supported Configurations

Currently, two configurations are supported:

- **Single controller unit**. This standalone disk tray is a high-performance, high-RAS configuration with a single hardware RAID cached controller. The unit is fully populated with redundant *hot-swap* components and nine disk drives.

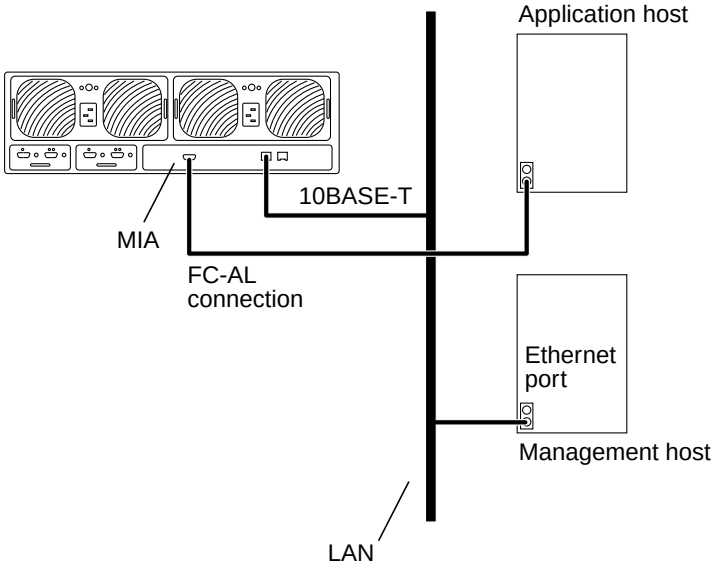


FIGURE 1-6 Single Controller Unit Configuration

- **Partner group**. This is a configuration of two controller units paired using interconnect cables for back-end data and administrative connections. The partner group provides all the RAS of single controller units, plus redundant hardware RAID controllers with mirrored caches, and redundant host channels for continuous data availability for host applications.

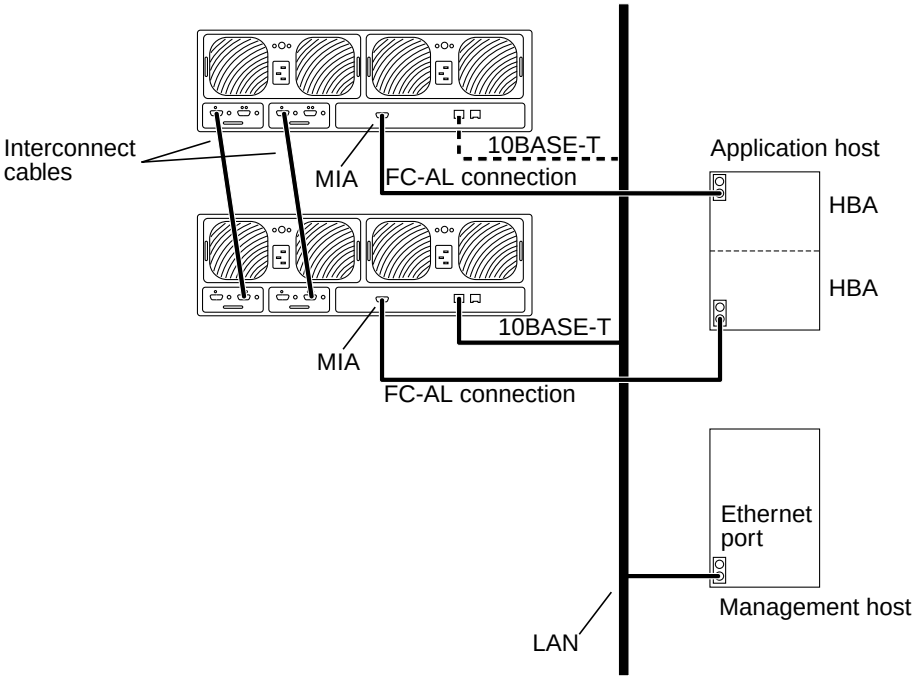


FIGURE 1-7 Partner Group Configuration

CHAPTER 2

Installation

This chapter describes how to install the Sun StorEdge T3 disk tray in either a single or partner-group (dual controller unit) configuration. The sections that follow describe specific steps of the installation. Follow these directions in the order provided to ensure a successful installation.

Note – This chapter is for installing new disk tray units only. To reconfigure existing single controller units into a partner group, contact your Sun service representative.

Caution – For security reasons, connect the disk tray to a private network only.

2.1 Preparing for the Installation

Before you install the disk tray, make sure that you have all the equipment necessary to complete the installation, such as additional cabling or adapters. A Sun sales representative will help you determine your configuration needs for additional hardware and software.

The disk tray is designed to be easily installed. A flat-blade screwdriver is required for installing the tray into a rack and is helpful for removing and replacing components.

Note – The Sun StorEdge T3 disk tray requires a 10BASE-T Ethernet connection for each controller unit. The 10BASE-T cable is not included with the ship kit and must be purchased separately.

2.1.1 Electrical Requirements

The disk tray uses nominal input voltages of 100–120 VAC or 200–240 VAC. Sun products are designed to work with single-phase power systems that have a grounded neutral conductor. See Appendix A for additional specifications.

Caution – To reduce the risk of electrical shock, do not connect Sun products into another type of power source. Contact your facilities manager or a qualified electrician if you are unsure what type of power is supplied to your building.

2.1.2 Placement

See Section 2.4.1 “Tabletop Placement” on page 2-7 for information about placing the Sun StorEdge T3 disk tray on an appropriate surface.

See Section 2.4.2 “Cabinet Installation” on page 2-8 for information on rackmounting the disk tray in a Sun StorEdge expansion cabinet.

2.2 Inspecting the Disk Tray

Caution – This procedure requires two people to lift and move the disk tray. Use care to avoid injury. A disk tray can weigh up to 67 pounds (30 kg).

1. **Unpack the disk tray.**

   You should have the following items:

   - Sun StorEdge T3 disk tray
   - One media interface adapter (MIA)
   - One 5m fiber-optic cable
   - Two power cords

   The MIA and cables are illustrated in Appendix B and in Section 2.5 “Connecting the Cables” on page 2-17.

2. **Inspect the disk tray for evidence of damage.**

   If the disk tray is damaged, keep all contents and packing materials for the shipping company’s agent to inspect.

3. **Save the packing materials for future use.**

4. **Remove the front panel of the disk tray by pressing in on the side latches and pulling the cover off (**FIGURE 2-1**).**

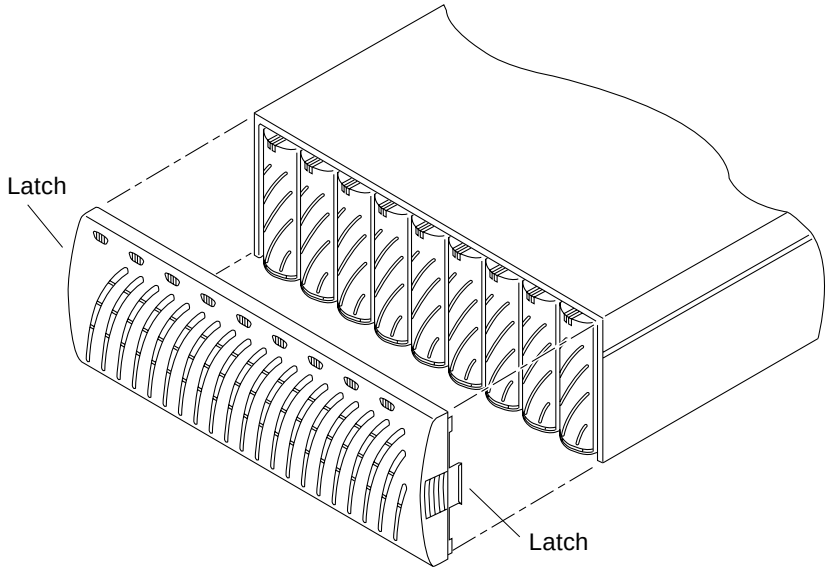


FIGURE 2-1 Removing the Front Panel

5. **Locate the pull-out tab at the left side of the disk tray next to the first disk drive (**FIGURE 2-2**).**

   This tab contains the disk tray serial number and media access control (MAC) address. Record this information; you will need the MAC address for the installation.

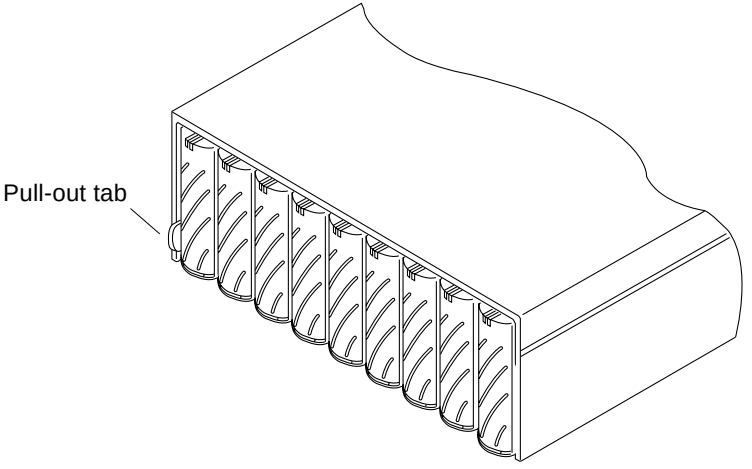


FIGURE 2-2 Serial Number and MAC Address on Pull-out Tab

6. **Make sure that all the disk drives, the power and cooling units, the interconnect cards, and the controller card (if present) are firmly seated in the unit.**

7. **Replace the front cover.**

Caution – You must replace the front panel for the disk tray to meet regulatory emissions requirements.

2.3 Editing the Host Files

The JumpStart™ feature automatically downloads the assigned IP address to the disk tray. To enable this feature, you must edit your host file before cabling the disk tray. After you cable the disk tray and power on, the IP address is automatically assigned. Before you begin, make sure you have the following:

- **MAC address**. See FIGURE 2-2 in the previous section for the MAC address location. See Step 1 of the following procedure for the format of the MAC address.
- **IP address.** For this information, contact the person who maintains your network.
- **Disk tray name.** This is the user-assigned name of the disk tray you are installing.

Note – If you are configuring a redundant controller configuration (partner group), you need the MAC address that will be assigned only to the master-unit disk tray. In a partner group, this is the disk tray that is located on the bottom. In Step 1, enter the MAC address for the master unit. When you install the disk tray in the next section, make sure that the master unit is placed on the bottom of the configuration.

Do *not* use the MAC address of the disk tray that you are placing on the top. In a partner group, the disk tray that is placed on top is referred to as the alternate master unit.

To set the network IP address for the disk tray:

1. **On a host connected to the same subnet as the disk tray, edit the `/etc/ethers` file by adding the MAC address and disk tray name.**

   For example:

```
8:0:20:7d:93:7e disk-tray-name
```

In this example:

- `8:0:20:7d:93:7e` is the MAC address.
- *disk-tray-name* is the name of the disk tray you are installing.

2. Edit the `/etc/hosts` file with the IP address and disk tray name.

For example:

```
192.129.122.111 disk-tray-name
```

In this example:

- `192.129.122.111` is the assigned IP address.

3. Edit the `/etc/nsswitch.conf` file to reference the local system files.

To ensure that the Solaris software environment uses the changes made to `/etc/ethers` and `/etc/hosts` files, edit the `host` and `ethers` entries in the `/etc/nsswitch.conf` file so that the `files` parameter appears before the `[NOTFOUND=return]` statements.

```
hosts:      nis files [NOTFOUND=return]
ethers:     nis files [NOTFOUND=return]
```

4. Determine if the RARP daemon is running by typing:

```
# ps -eaf | grep rarpd
```

- If the RARP daemon is running, proceed to Section 2.4 “Installing the Disk Tray” on page 2-7.
- If the RARP daemon is not running, proceed to the next step.

5. Start the RARP daemon in the Solaris software environment by typing:

```
# /usr/sbin/in.rarpd -a &
```

The IP address will automatically download to the disk tray after you install the disk tray and power on.

Note – In some cases, it is possible that the disk tray could time out before it receives the RARP request through an Ethernet switch. If this happens, the disk tray cannot receive the assigned IP address. If the disk tray should time out before receiving the RARP request, it could be due to an improper spanning-tree setting of the Ethernet switch. Refer to your switch vendor documentation for information on spanning-tree settings and how to change them. Changing this setting properly will enable the disk tray to receive the RARP request before timing out.

2.4 Installing the Disk Tray

This section describes the procedures for installing either a single controller unit or partner group configuration. (See Chapter 1 for an explanation of each configuration.) There are two types of installation: tabletop placement and rackmounted in a server cabinet or expansion cabinet.

- If you are placing the disk tray(s) on a table, proceed to Section 2.4.1 “Tabletop Placement” on page 2-7.
- If you are mounting the disk tray(s) in a server cabinet or expansion cabinet, proceed to Section 2.4.2 “Cabinet Installation” on page 2-8.

2.4.1 Tabletop Placement

The disk tray is designed to sit on a desk or table. Use the following guidelines to prepare a location for your system.

- Choose a desk or table that can support up to 67 pounds (30 kg) for one fully configured disk tray or 135 pounds (60 kg) for two disk trays.
- Leave enough space in front and in back of the disk tray to access components.
- Provide a minimum space of 6 inches (15 cm) in front and in back of the disk tray for adequate air flow.
- Keep power and interface cables clear of foot traffic. Route cables inside walls, under the floor, through the ceiling, or in protective channels. Route interface cables (excluding fiber-optic cables) away from motors and other sources of magnetic or radio frequency interference.
- Make sure that the fiber-optic and power cable lengths do not exceed cable length limitations. See Appendix A for cable lengths.
- Ensure that the operating environment for the disk tray does not exceed the specifications. See Appendix A for environmental specifications.

Caution – Use two people to lift the disk tray to avoid injury. It can weigh up to 67 pounds (30 kg).

1. **Place the Sun StorEdge T3 disk tray horizontally in the designated location.**

Caution – Do not place the disk tray in a vertical position.

2. **If you are installing a second disk tray, stack it on top of the first disk tray or place it next to the first one.**

   The second disk tray is the alternate master unit. The first disk tray, or the bottom disk tray in the stack, is the master unit.

Caution – Do not stack more than two disk trays together. Stacking more than two disk trays could damage them.

You are now ready to begin cabling. Proceed to Section 2.5 “Connecting the Cables” on page 2-17 for cabling instructions.

2.4.2 Cabinet Installation

Note – Refer to your product announcement literature from your Sun sales representative to determine if mounting the disk tray in a cabinet is an available option at this time.

You can install the disk tray unit in either a server cabinet or an expansion cabinet. If you are installing a partner group, the master unit must be installed at the first empty slot at the bottom of the cabinet, and the alternate master unit must be installed in the next slot on top.

Rackmount placement information for the disk tray, as well as for other devices that can be mounted in Sun cabinets, is available on the Web at:

```
http://docs.sun.com
```

Click on “Storage” in the Hardware section, and then open the *Rackmount Placement Matrix* document.

If you do not have access to the Web, contact your service provider.

Note – Retrieve the placement information for the disk tray before beginning the installation.

Caution – This procedure requires two people to lift and move the disk tray. Use care to avoid injury. A disk tray with a baseplate attached can weigh up to 87 pounds (39 kg).

2.4.2.1 Installing the Baseplate

1. **With the aid of an assistant, invert the disk tray so that the bottom faces up and the front is facing you.**
2. **Remove the feet from the disk tray by turning each one counterclockwise (**FIGURE 2-3**).**

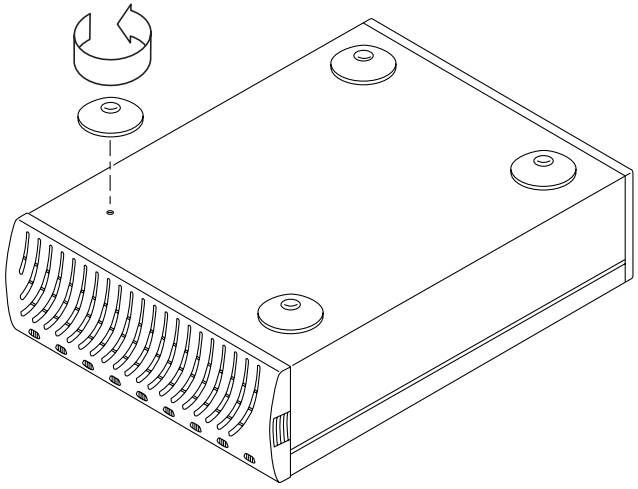


FIGURE 2-3 Removing the Feet

3. **Place the baseplate on the disk tray, loosely thread the four screws into the four holes on the baseplate to secure it, and then tighten the screws.**

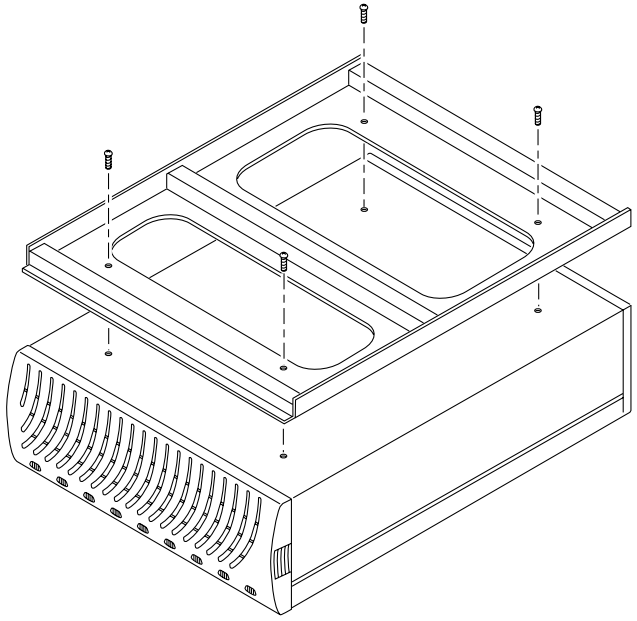


FIGURE 2-4 Baseplate for Sun StorEdge Expansion Cabinet

4. **With the aid of an assistant, restore the disk tray to the upright position with the front of the disk tray facing you.**

2.4.2.2 Preparing the Cabinet

Follow the instructions on preparing for service in your server cabinet or expansion cabinet documentation. Be sure to:

- Extend the stabilizer legs
- Remove or open the top front panel
- Remove or open the vented rear panel

2.4.2.3 Installing the Rails

Two types of rail kits available for installing the Sun StorEdge T3 disk tray in a Sun StorEdge expansion cabinet:

- A single-tray rail kit (fits one disk tray only)
- A dual-tray rail kit (fits two disk trays)

Both kits are installed in the same manner with minor differences that are detailed in the illustrations that follow.

1. **Loosely thread the two top screws into the hole numbers as specified in the** *Rackmount Placement Matrix.*

   The side rails could be easily misaligned if you select the wrong holes.

2. **Place the left side rail in the cabinet. Align the open-slotted holes at the top of the rail with the screws you installed in Step 1.**

   See FIGURE 2-5 for a single-rail installation. See FIGURE 2-6 for a dual-tray rail installation.

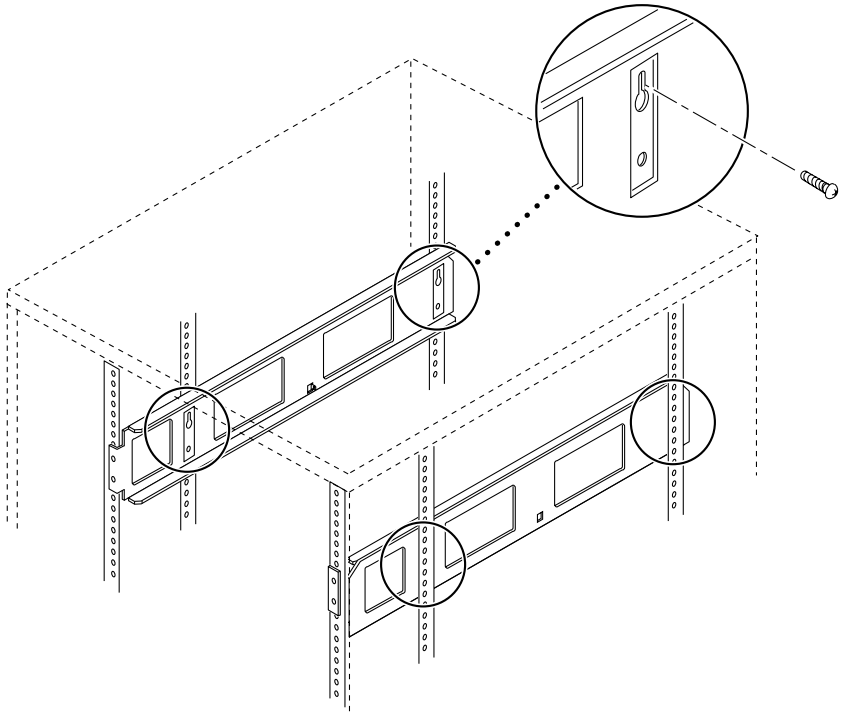


FIGURE 2-5 Positioning a Single-Tray Rail and Threading Screws

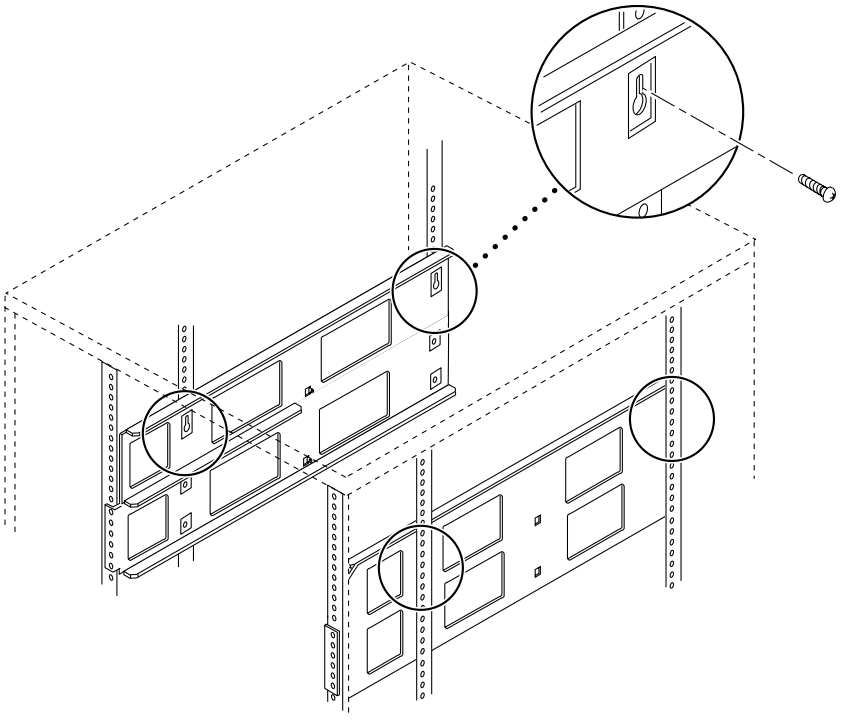


FIGURE 2-6 Positioning a Dual-Tray Rail and Threading Screws

Note – If the length of your cabinet from front to back is longer than the rails, you will need to use the extension plates that are packaged with the kit.

3. **Install the screws in the bottom rail holes.**
   - If you are installing a single-tray rail kit, install two screws in the bottom holes.
   - If you are installing a dual-tray rail kit, install four screws in the bottom holes.
4. **Tighten all screws.**
5. **Repeat Step 1 through Step 4 for the right side rail.**

2.4.2.4 Installing the Disk Tray Chassis in the Cabinet

Caution – The cabinet can become front-heavy while the disk tray is being installed. Unless your cabinet is bolted to the floor, ensure that the stabilizer legs are extended before proceeding. Failure to extend the legs can result in the cabinet tipping forward and injuring personnel.

Caution – This installation requires two people to lift and move the disk tray. Use care to avoid injury. A disk tray with a baseplate attached can weigh up to 87 pounds (39 kg).

1. **With the aid of an assistant, lift the disk tray (one person on each side) and approach the cabinet with the back of the disk tray entering the cabinet first.**
2. **Line up the chassis with the mating side rails in the cabinet (**FIGURE 2-7**).**

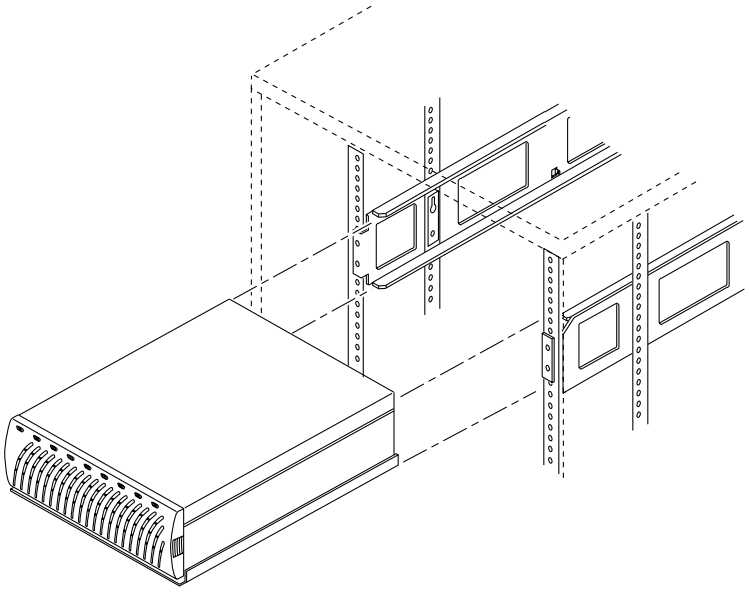


FIGURE 2-7 Aligning the Disk Tray Chassis and Baseplate With the Side Rails

3. Rest the disk tray chassis on the side rails and then slide the chassis in.

4. **Secure the disk tray into the rails by threading the two screws into the baseplate at the back of the disk tray chassis.**

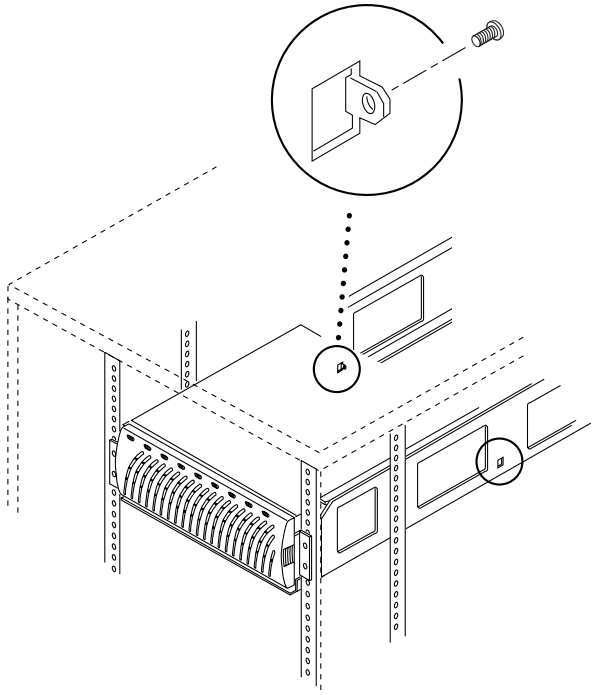


FIGURE 2-8 Securing the Disk Tray Chassis

5. **If you are installing a second disk tray into a dual-tray rail, repeat Step 1 through Step 4 (**FIGURE 2-9**).**

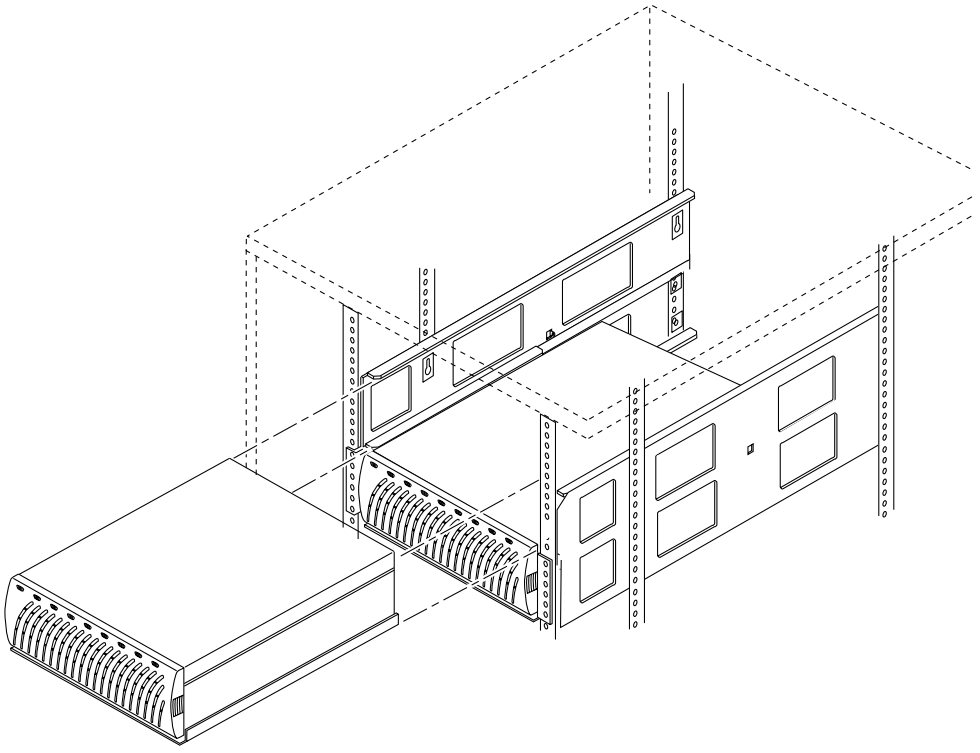


FIGURE 2-9 Installing a Second Disk Tray Into a Dual-Tray Rail

After completing the rackmount installation, proceed to Section 2.5 “Connecting the Cables” on page 2-17.

Caution – If you need to remove the disk tray, make sure you have someone to assist you; one of you should be positioned at the front of the cabinet and one at the back. The person at the back of the cabinet can push it forward slightly after removing the mounting screws. The person at the front of the cabinet should be ready to take hold and stabilize the tray once it starts to move forward. Use two people to fully pull it out of the rails.

2.5 Connecting the Cables

This section explains how to connect cables for both a single disk tray and for a partner group.

Note – If you are connecting a single disk tray, skip the steps that start with the lead-in “Partner group only” and proceed to the next step.

Before you begin, make sure you have all of the required cables and adapters (FIGURE 2-10):

- Fiber-optic cable, one per unit
- Media interface adapter (MIA), one per unit
- AC power cords, two per unit
- 10BASE-T interface cable, 1 per controller unit (not illustrated)

  The 10BASE-T cable is not packaged with the disk tray and must be purchased separately.
- Interconnect cables, one pair of cables per partner group

Note – Your Sun StorEdge T3 disk tray packaging might not have included interconnect cables. If you want install a partner group configuration and do not have interconnect cables, contact your Sun service representative.

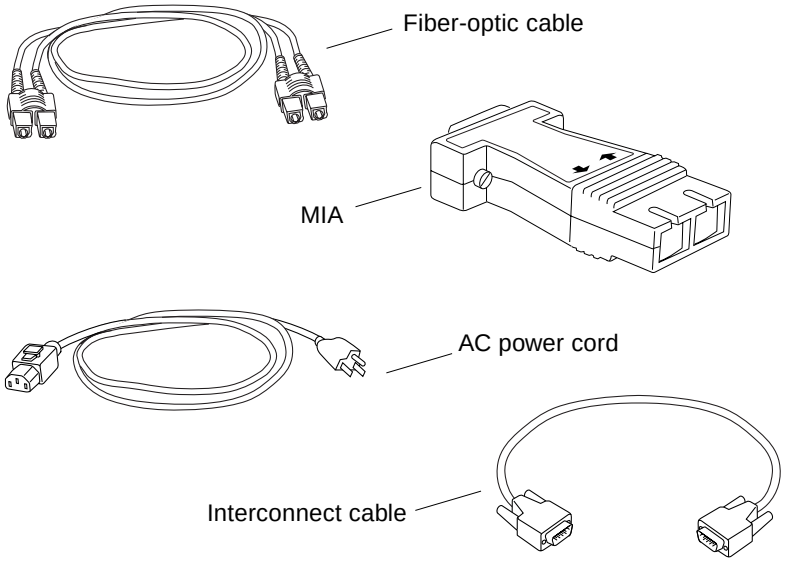


FIGURE 2-10 Cables and Adapters

1. **Connect one end of the fiber-optic cable to the host adapter.**
2. **Attach an MIA to the other end of the fiber-optic cable (**FIGURE 2-11**).**
3. **Connect the MIA to the FC-AL connector on the controller board at the back of the master unit.**

   Tighten the retaining screws.

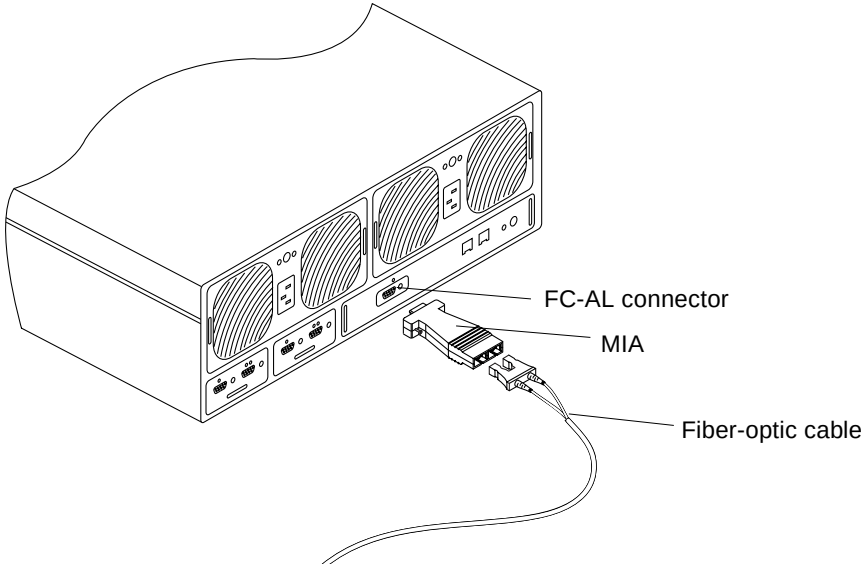


FIGURE 2-11 Connecting the Fiber-Optic Cable and MIA to the FC-AL Connector

4. **Partner group only**: **Repeat Step 1 through Step 3 to connect a second fiber-optic cable to a separate host adapter and to the alternate master unit.**

5. **Attach one end of the 10BASE-T cable to the Ethernet port on the controller board of the master unit (**FIGURE 2-12**).**

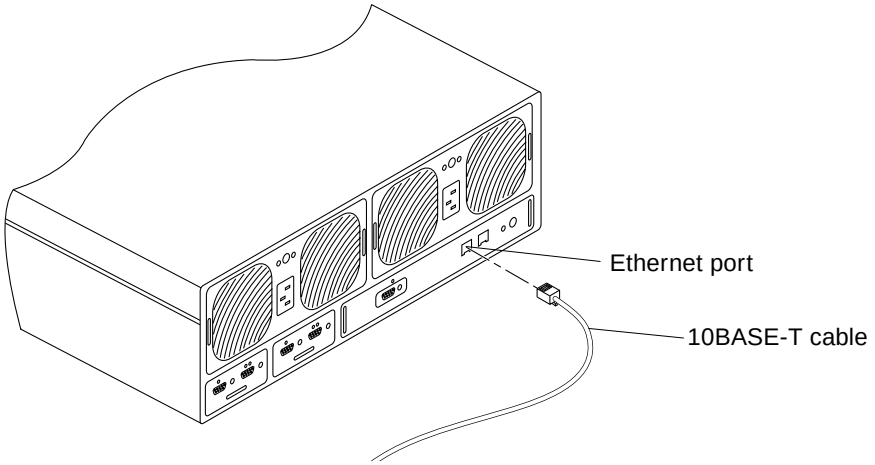


FIGURE 2-12 Connecting the 10BASE-T Cable

6. **Attach the other end of the 10BASE-T cable to a network hub or router.**

Note – You must use a shielded 10BASE-T interface cable to comply with regulatory emissions requirements.

---

7. **Partner group only: Repeat Step 5 and Step 6 to connect the alternate master unit to a hub or router using a second 10BASE-T cable.**

   Connect this cable to a hub or router on the same network as the master unit.

8. **Attach the two power cords to the two power and cooling units on the back of the master unit (**FIGURE 2-13**).**

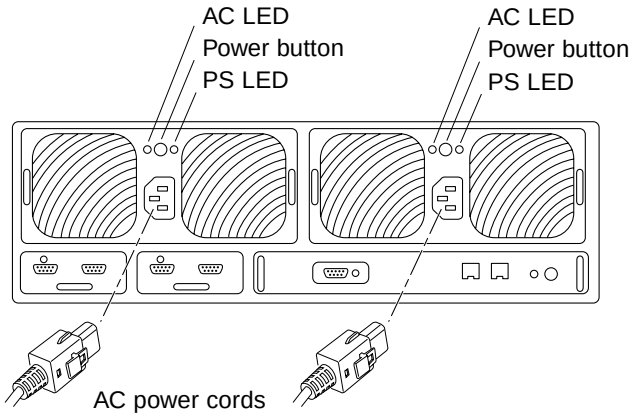


FIGURE 2-13 Connecting the Power Cords

9. **Partner group only**: **Repeat Step 8 to connect the power cords to the alternate master unit.**

Caution – Do *not* power on the units yet. If you are connecting a single disk tray unit, proceed to Section 2.6 “Powering On and Verifying the Hardware Configuration” on page 2-24 for instructions on powering on the unit. If you are connecting a partner group, proceed to Step 10.

10. **Partner group only: Connect the interconnect cables to the interconnect cards as shown in** FIGURE 2-14**.**

    Make sure you connect the cables to the correct interconnect card connectors exactly as shown in the figure. This cable connection determines the master and alternate master relationship. Tighten the retaining screws.

    The remaining connectors are reserved for expansion units.

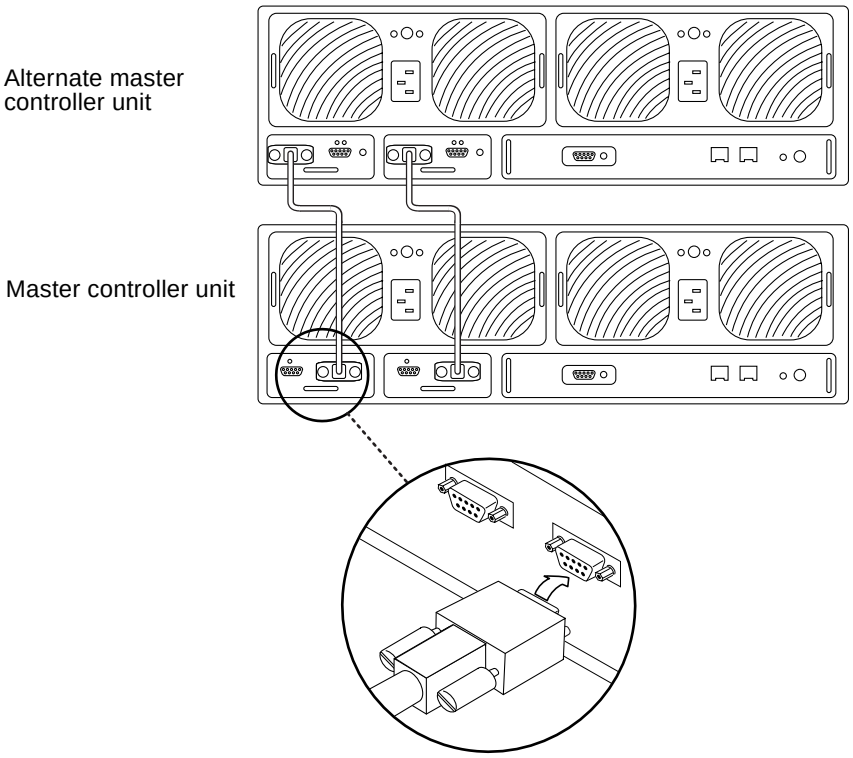


FIGURE 2-14 Connecting the Interconnect Cables

A fully cabled partner group is shown in FIGURE 2-15.

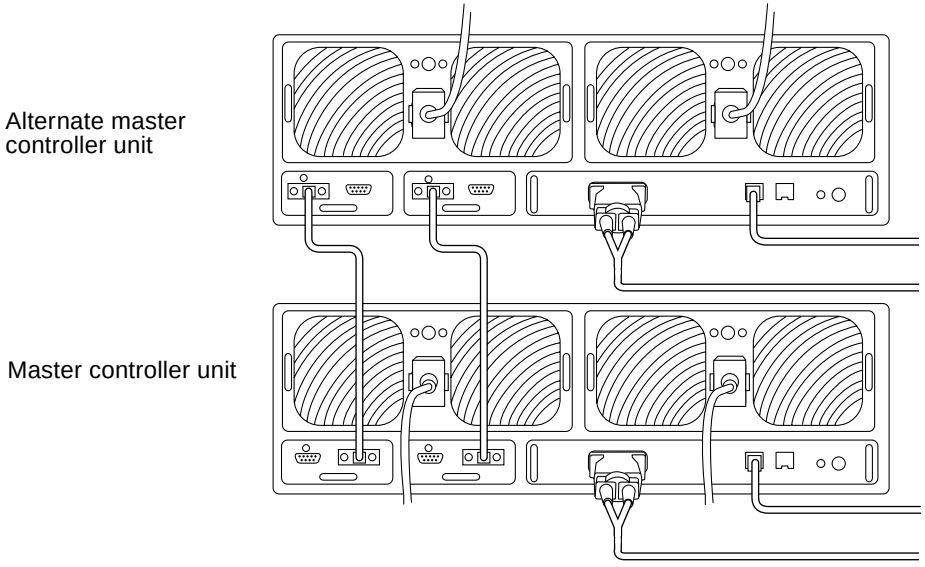


FIGURE 2-15 Fully Cabled Partner Group

Note – The cabling for a single disk tray configuration would appear similar to the disk trays shown in FIGURE 2-15, except there would not be interconnect cables attached to the interconnect cards.

2.6 Powering On and Verifying the Hardware Configuration

To power on and verify the hardware configuration:

1. **Plug the other end of the power cords from the disk tray(s) into AC outlets.**

   Use alternate power sources to make sure that power and cooling unit features are redundant.

2. **Verify that AC power is present on each power and cooling unit.**

   The AC LED on each power and cooling unit will be solid amber and the fans will turn at low speed.

3. **Press the power button on each power and cooling unit on all disk trays to power on the units.**

   FIGURE 2-13 on page 2-21 shows the power button location. The AC and power supply (PS) LEDs on the power and cooling units will be green.

4. **Check the LEDs at the front and back of the unit to ensure that all components are receiving power and are functional.**

   While the drives are spinning up, the LEDs will blink. The disk tray boot time will take up to several minutes, after which all LEDs should be solid green, indicating that the unit is receiving power and that there is no drive activity.

   For more information on the LEDs and how to interpret them, see Section 4.1.4 “Disk Tray LEDs” on page 4-3.

Note – The batteries in the power and cooling units recharge after you power on the unit. While the batteries are recharging, write-behind cache is disabled.

2.7 Establishing a Network Connection

Use the 10BASE-T network connection to initialize the network addresses and to administer the disk tray. The IP address was automatically downloaded using the JumpStart program when you powered on the disk tray.

Note – Have the Gateway IP address information before beginning this procedure. Contact the person who maintains your network for this information.

Note – The telnet session will not connect until the controller LEDs are green.

---

1. **On the host, use the `telnet` command with the disk tray name (or IP address) to connect to the disk tray.**

   For example:

```
# telnet disk-tray-name
Trying 129.150.47.101...
Connected to 129.150.47.101.
Escape character is '^]'.

pSOSystem (129.150.47.101)
```

Note – The telnet session will verify that your network connection is good. If you cannot connect through the telnet session, see the troubleshooting information in the *Sun StorEdge T3 Disk Tray Administrator's Guide* or the *Sun StorEdge Component Manager User's Guide* to analyze the problem.

---

2. **Type** `root` **as the login and press Return at the password prompt.**

   The disk tray displays the banner information, which appears similar to the following:

```
Login: root
Password: <Return>

T300 Release 1.13 2000/05/17 16:15:41 (129.150.47.104)
Copyright (C) 1997-2000 Sun Microsystems, Inc.
All Rights Reserved.

t300:/:<1>
```

3. **Use the** `passwd` **command to set a password for the root account.**

   Press Return when prompted for the `OLD password`.

```
t300:/:<1>passwd
OLD password: <Return>
NEW password: New password
NEW password (confirm): New password
t300:/:<2>
```

Note – It is important to set a `root` password for security reasons.

---

4. **Set the gateway using the** `set gateway` **command.**

   The gateway address enables you to access the disk tray outside the subnet.

   For example:

```
t300:/:<3>set gateway 129.150.47.1
```

5. **Set the netmask using the** `set netmask` **command.**

   The netmask specifies the network mask used to implement IP subnetting.

```
t300:/:<4>set netmask 255.255.255.0
```

6. **Set the host name using the** `set hostname` **command.**

```
t300:/:<5>set hostname hostname
```

7. **Use the `tzset` command to set the time zone and confirm the setting.**

   The time zone is off-set from Greenwich mean time (GMT), also known as Universal time coordinated (UTC). The numerical value used with the `tzset` command is the difference in the number of hours between your time zone and the GMT, based on international standardized time-zone designations.

   For example, if you are located in the Pacific standard time (PST) time zone, the difference would be minus (-) eight hours (0800) from GMT as shown:

```
t300:/:<6>tzset -0800
t300:/:<7>tzset
GMT-0800
t300:/:<8>
```

8. **Set the date using the `date` command.**

   The date syntax is `yyyymmddHHMM.SS`.

   For example:

```
t300:/:<9>date 200005171620.30
Wed May 17 16:20:30 2000
t300:/:<10>
```

9. **Reset the disk tray using the `reset` command.**

   Answer `y` when prompted for confirmation. A reset will disconnect the telnet session with the disk tray.

```
t300:/:<110>reset
Reset the system, are you sure? [N]: Y
```

   The disk tray will reboot. This can take up to several minutes.

10. **On the host, exit the telnet session by pressing Control and the right bracket (`]`) symbol.**

    The telnet prompt is displayed. Type `quit`.

```
# <Control>]
telnet>quit
#
```

2.8 Verifying the Firmware Level and Configuration

The Sun StorEdge T3 disk tray has four types of firmware:

- Controller firmware
- Disk drive firmware
- Interconnect card firmware
- Controller erasable programmable read-only memory (EPROM) firmware

Make sure you are running the latest firmware versions and that the disk tray configuration information indicates that the unit is ready for operation. You can check the firmware versions and disk tray information in a telnet session with the disk tray.

1. **On the host, use the** `telnet` **command with the disk tray name (or IP address) to connect to the disk tray.**

   For example:

```
# telnet disk-tray-name
Trying 129.150.47.101...
Connected to 129.150.47.101.
Escape character is '^]'.

pSOSystem (129.150.47.101)
```

2. **Log in to the disk tray by typing** `root` **and your root password at the prompts.**

   The disk tray prompt is displayed.

3. **Type** `ver` **to identify the controller firmware.**

   For example:

```
t300:/:<5>ver

T300 Release 1.13 2000/05/17 16:15:41 (129.150.47.104)
Copyright (C) 1997-2000 Sun Microsystems, Inc.
All Rights Reserved.
```

   The `ver` command displays the header information. In the example above, the controller firmware is listed as `Release 1.13`.

4. **Type `fru list` to display the firmware for the disk drives, interconnect card, and EPROM level.**

   For example (partner group configuration):

```
t300:/:<6>fru list
ID      TYPE                VENDOR       MODEL          REVISION       SERIAL
------  ------------------  -----------  -----------  -------------  --------
u1ctr   controller card     SCI-SJ       375-0084-01- 0210           000980
u2ctr   controller card     SCI-SJ       375-0084-01- 0210           001098
u1d1    disk drive          SEAGATE      ST118202FSUN EA29           LKG78761
u1d2    disk drive          SEAGATE      ST118202FSUN EA29           LKG89101
u1d3    disk drive          SEAGATE      ST118202FSUN EA29           LKG86881
u1d4    disk drive          SEAGATE      ST118202FSUN EA29           LKG89487
u1d5    disk drive          SEAGATE      ST118202FSUN EA29           LKH31924
u1d6    disk drive          SEAGATE      ST118202FSUN EA29           LKH32009
u1d7    disk drive          SEAGATE      ST118202FSUN EA29           LKG90435
u1d8    disk drive          SEAGATE      ST118202FSUN EA29           LKG82282
u1d9    disk drive          SEAGATE      ST118202FSUN EA29           LKG95302
u2d1    disk drive          SEAGATE      ST118202FSUN EA29           LKG63405
u2d2    disk drive          SEAGATE      ST118202FSUN EA29           LKH57340
u2d3    disk drive          SEAGATE      ST118202FSUN EA29           LKD20515
u2d4    disk drive          SEAGATE      ST118202FSUN EA29           LKG89040
u2d5    disk drive          SEAGATE      ST118202FSUN EA29           LKG89845
u2d6    disk drive          SEAGATE      ST118202FSUN EA29           LKG82866
u2d7    disk drive          SEAGATE      ST118202FSUN EA29           LKG95090
u2d8    disk drive          SEAGATE      ST118202FSUN EA29           LKG90324
u2d9    disk drive          SEAGATE      ST118202FSUN EA29           LKG95460
u1l1    loop card           SCI-SJ       375-0085-01-  5.01 Flash    001594
u1l2    loop card           SCI-SJ       375-0085-01-  5.01 Flash    001579
u2l1    loop card           SCI-SJ       375-0085-01-  5.01 Flash    001562
u2l2    loop card           SCI-SJ       375-0085-01-  5.01 Flash    001735
u1pcu1  power/cooling unit  TECTROL-CAN  300-1454-01( 0000           001274
u1pcu2  power/cooling unit  TECTROL-CAN  300-1454-01( 0000           001566
u2pcu1  power/cooling unit  TECTROL-CAN  300-1454-01( 0000           002283
u2pcu2  power/cooling unit  TECTROL-CAN  300-1454-01( 0000           002072
u1mpn   mid plane           SCI-SJ       370-3990-01- 0000           000963
u2mpn   mid plane           SCI-SJ       370-3990-01- 0000           000833
```

In this example:

- EPROM firmware version is listed as `controller card, Revision 0210`
- Disk drive firmware version is listed as `Revision EA29`
- Interconnect card (`loop card`) firmware version is listed as `Revision 5.01 Flash`

Note – For a single controller unit configuration, the `fru list` output would not show a second unit (`u2d1` through `u2d9`).

5. **Refer to the SunSolve[SM] web site at `http://sunsolve.sun.com` for the latest firmware release information:**

   a. **Select "Patches" from the SunSolve Online column.**

   b. **Select "Storage Products" from the Patches web page.**

      Refer to the README file on the web page for specific details on downloading firmware.

Note – If you do not have access to the SunSolve web site, contact your Sun service provider for patch information.

6. **If you need to upgrade the firmware, do so now by following the instructions in Section 5.3 "Upgrading Firmware" on page 5-16.**

   If you do not need to upgrade firmware, proceed to Step 7.

7. **Type `port list` to display how the paths are mapped from the host to the volumes.**

   An example of `port list` output for a single controller unit:

```
t300:/:<7>port list

port   targetid   addr_type   status   host   wwn
u1p1      1        hard       online   sun    50020f23000002ba
```

Use the world wide number (`wwn`) from the `port list` output to map the volume to the Solaris environment using the `format(1m)` utility on the data host. In the following example, the output for the `format` command would show the same wwn, listed in the last line, as the wwn in the `port list` output.

```
# format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
     /pci@1f,4000/scsi@3/sd@0,0
    1. c2t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
      /pci@6,2000/SUNW,ifp@1/ssd@w50020f23000002ba,0
```

8. **Type** `sys stat` **to view the controller status.**

   - An example of `sys stat` output for a single controller unit:

```
t300:/:<9>sys stat
Unit   State      Role    Partner
-----  ---------  ------  -------
  1    ONLINE     Master
```

   - An example of `sys stat` output for a partner group:

```
t300:/:<10>sys stat
Unit   State      Role    Partner
-----  ---------  ------  -------
 1     ONLINE     Master    2
 2     ONLINE     AlterM    1
```

9. **Type** `vol mode` **to display the cache and mirror settings and to determine whether the volume is mounted.**

   The default settings for a single controller unit are as follows:

```
t300:/:<11>vol mode

volume        mounted    cache         mirror
v0            yes        writethrough  off
```

10. Type `fru stat` to display the health status of each FRU.

All FRUs must be in optimal condition, as shown in this example for a partner group:

```
t300:/:<12>fru stat
CTLR    STATUS   STATE       ROLE        PARTNER    TEMP
------  -------  ----------  ----------  -------    ----
u1ctr   ready    enabled     master      u2ctr      32.5
u2ctr   ready    enabled     alt master  u1ctr      32.5

DISK    STATUS   STATE       ROLE        PORT1      PORT2      TEMP  VOLUME
------  -------  ----------  ----------  ---------  ---------  ----  ------
u1d1    ready    enabled     data disk   ready      ready      37    v0
u1d2    ready    enabled     data disk   ready      ready      39    v0
u1d3    ready    enabled     data disk   ready      ready      36    v0
u1d4    ready    enabled     data disk   ready      ready      38    v0
u1d5    ready    enabled     data disk   ready      ready      37    v0
u1d6    ready    enabled     data disk   ready      ready      35    v0
u1d7    ready    enabled     data disk   ready      ready      40    v0
u1d8    ready    enabled     data disk   ready      ready      36    v0
u1d9    ready    enabled     data disk   ready      ready      29    v0
u2d1    ready    enabled     data disk   ready      ready      42    v1
u2d2    ready    enabled     data disk   ready      ready      36    v1
u2d3    ready    enabled     data disk   ready      ready      35    v1
u2d4    ready    enabled     data disk   ready      ready      35    v1
u2d5    ready    enabled     data disk   ready      ready      40    v1
u2d6    ready    enabled     data disk   ready      ready      36    v1
u2d7    ready    enabled     data disk   ready      ready      35    v1
u2d8    ready    enabled     data disk   ready      ready      37    v1
u2d9    ready    enabled     data disk   ready      ready      33    v1

LOOP    STATUS   STATE       MODE        CABLE1     CABLE2     TEMP
------  -------  ----------  -------     ---------  ---------  ----
u2l1    ready    enabled     master      installed  -          29.5
u2l2    ready    enabled     slave       installed  -          33.0
u1l1    ready    enabled     master      -          installed  28.0
u1l2    ready    enabled     slave       -          installed  32.0

POWER   STATUS   STATE       SOURCE  OUTPUT  BATTERY  TEMP    FAN1    FAN2
------  -------  ---------   ------  ------  -------  ------  ------  ------
u1pcu1  ready    enabled     line    normal  normal   normal  normal  normal
u1pcu2  ready    enabled     line    normal  normal   normal  normal  normal
u2pcu1  ready    enabled     line    normal  normal   normal  normal  normal
u2pcu2  ready    enabled     line    normal  normal   normal  normal  normal
```

Proceed to Section 2.9 “Installing the Administration Tools” on page 2-33 to continue with the installation.

2.9 Installing the Administration Tools

The Sun StorEdge T3 disk tray can be used with management software, such as Sun StorEdge Component Manager, to aid in its operation. Component Manager provides a graphical user interface (GUI) to monitor and manage one or more Sun StorEdge T3 disk trays that are connected to a host.

The Component Manager software enables you to administer some of the components of the disk tray, and it constantly monitors system health. Alarm notification and remote reporting alert the administrator to abnormal activities or conditions that require attention.

The *Sun StorEdge Component Manager Installation Guide* provides instructions for installing the software and also covers the necessary steps to verify the installation, launch the software, and uninstall the software. The *Sun StorEdge Component Manager User's Guide* describes how to use the GUI to administer Sun StorEdge T3 disk trays.

2.10 Defining and Mounting Volumes

This section includes information on defining and mounting volumes for both a single controller unit configuration and a partner group. For information on the commands used in this section, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

The Sun StorEdge T3 disk tray has been set up with a default RAID 5 configuration. To view the configuration, use the `vol list` command while in a telnet session with the disk tray. For example:

```
t300:/:<1>vol list

volume        capacity   raid   data     standby
v0            143.2 GB    5     u1d1-9    none
```

In this example:

- `v0` is the volume.
- `143.2 GB` is the total disk space of the volume.
- `5` is the RAID level.
- `u1d1-9` is the number of the disk tray (`u1`) and the numbers of the disk drives (`d1` through `d9`).

- none indicates that there is no standby (hot spare) disk drive.

The physical location of the disk drives is shown in FIGURE 2-16.

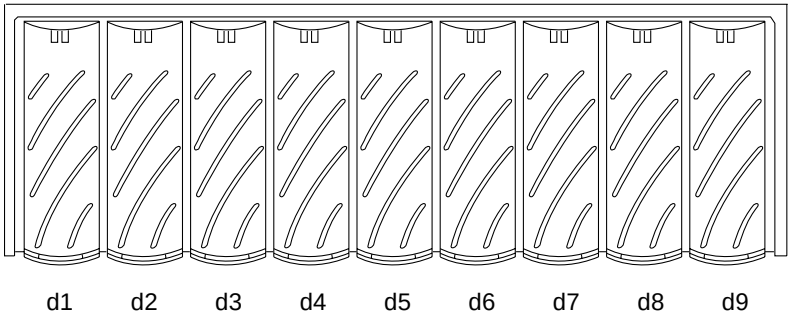


FIGURE 2-16 Disk Drive Physical Numbering

- If you want to change the default configuration, do not continue with this section. Instead, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for information on how to remove the default volume and reconfigure the disk drives.
- If you have a *single controller unit* configuration and want to mount the default volume, proceed to Section 2.10.1 "Single Controller Unit Configuration" on page 2-35.
- If you have a *partner group* configuration and want to mount the default volumes, skip to Section 2.10.2 "Partner Group Configuration" on page 2-37.

Note – If you are creating new volumes or changing the volume configuration, you must first manually rewrite the label of the previous volume using the `autoconfigure` option of the `format(1M)` utility. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information on this procedure.

Note – The default configuration does not include a hot spare. If you want to add a hot spare to the configuration, you must remove the existing volume and re-create the configuration. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for information on adding a hot spare.

2.10.1 Single Controller Unit Configuration

To display and mount the default volume of a single controller unit:

1. **On the disk tray, type** `vol stat` **to check the status of the volume.**

```
t300:/:<2> vol stat
v0            u1d1   u1d2   u1d3   u1d4   u1d5   u1d6   u1d7   u1d8   u1d9
unmounted      0      0      0      0      0      0      0      0      0
```

Where:

- `v0` is the name of the volume.
- `unmounted` is the status of the volume.
- `u1d1 - u1d9` are the disk drives in the volume.
- `0` is the status of the disk drives in the volume.

All the disk drives should show a status of `0`. Other possible status messages are listed in the following table.

TABLE 2-1 Drive Status Messages

Value	Description
0	Drive mounted
2	Drive present
3	Drive is spun up
4	Drive is disabled
7	Invalid system area on drive
9	Drive not present
D	Drive disabled; drive is being reconstructed
S	Drive substituted

- If the `vol stat` output shows the volume as *mounted*, skip to Step 4.
- If the `vol stat` output shows the volume as *unmounted*, go to the next step.

2. **Use the** `vol mount` **command to mount the volume.**

```
t300:/:<3>vol mount volume-name
```

3. **Use the** `vol stat` **command to verify that the volume is mounted.**

```
t300:/:<5> vol stat
v0            u1d1   u1d2   u1d3   u1d4   u1d5   u1d6   u1d7   u1d8   u1d9
mounted        0      0      0      0      0      0      0      0      0
```

Once the volume is mounted, it becomes available to the attached host system.

4. **Use the** `luxadm(1M)` **command to recognize the new volume.**

The `luxadm(1M)` command probes for new devices. Refer to the `luxadm(1M)` man page for more information on this command.

a. Make sure there is a `/dev/es` **directory on the host system. If not, type:**

```
# mkdir /dev/es
```

The `/dev/es` directory is necessary for running the `luxadm` command.

b. On the host system, type `luxadm insert`**:**

```
# luxadm insert
```

Note – If the `luxadm` utility is not available, you will have to do a reconfiguration reboot (`boot -r`) to ensure that the host recognizes the new volumes. It is preferable, however, to use the `luxadm` command for this procedure instead of the `boot -r` command.

---

5. **Verify that the new volume is available to the host system by using the** `format[1M]` **command on the data host.**

```
7# format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
      /pci@1f,4000/scsi@3/sd@0,0
    1. c2t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
      /pci@6,2000/SUNW,ifp@1/ssd@w50020f23000002ba,0
```

Proceed to Section 2.12 “Connecting the Host System” on page 2-40 to continue the installation.

2.10.2 Partner Group Configuration

To define and mount the default volumes of a partner group, you must first make sure the volume on the master unit is mounted and then add a volume on the alternate master as follows:

1. **On the disk tray, type** `vol stat` **to check the status of the volume.**

   Only the volume on the master controller unit is displayed.

```
t300:/:<1>vol stat
v0            u1d1   u1d2   u1d3   u1d4   u1d5   u1d6   u1d7   u1d8   u1d9
unmounted      0      0      0      0      0      0      0      0      0
```

   Where:

   - `v0` is the name of the volume.
   - `unmounted` is the status of the volume.
   - `u1d1 - u1d9` are the disk drives in the volume.
   - `0` is the status of the disk drives in the volume.

   All the disk drives should show a status of `0`. Possible status messages are listed in TABLE 2-1.

   - If the `vol stat` output shows the volume as *mounted*, skip to Step 4.
   - If the `vol stat` output shows the volume as *unmounted*, go to the next step.

2. **Type** `vol mount` **to mount the volume.**

```
t300:/:<2>vol mount v0
```

3. **Type** `vol stat` **to verify that the volume on the master controller unit is mounted.**

```
t300:/:<3> vol stat
v0            u1d1   u1d2   u1d3   u1d4   u1d5   u1d6   u1d7   u1d8   u1d9
mounted        0      0      0      0      0      0      0      0      0
```

4. **Use the** `vol add` **command to create the default volume on the alternate master as follows:**

   a. **Define the volume name (**`vol add v1`**).**

   b. **Define the drives on which the volume will reside (**`data u2d1-9`**).**

   c. **Define the RAID level (**`raid 5`**).**

```
t300:/:<4>vol add v1 data u2d1-9 raid 5
```

- `v1` is the volume name
- `u2d1-9` indicates the location of the volume: unit 2, disk drives 1 through 9
- `raid 5` is RAID level 5

5. **Type** `vol stat` **to check the status of the volumes.**

   The status of all drives must be `0`. For example:

```
t300:/:<5>vol stat

v0            u1d1   u1d2   u1d3   u1d4   u1d5   u1d6   u1d7   u1d8   u1d9
mounted        0      0      0      0      0      0      0      0      0
v1            u2d1   u2d2   u2d3   u2d4   u2d5   u2d6   u2d7   u2d8   u2d9
unmounted      0      0      0      0      0      0      0      0      0
```

6. **Use the** `vol init` **command to initialize the volume on the alternate master.**

```
t300:/:<6>vol init v1 data
```

   Depending on system activity at the time of initialization, it can take up to an hour to initialize a volume. Only one volume can be initialized at a time

7. **Use the** `vol mount` **command to mount the volume on the alternate master.**

```
t300:/:<7>vol mount v1
```

8. **Type** `vol list` **to confirm that you created the volume correctly.**

```
t300:/:<8>vol list

volume        capacity   raid   data     standby
v0            143.2 GB    5     u1d1-9    none
v1            143.2 GB    5     u2d1-9    none
```

9. **Use the** `luxadm(1M)` **command to recognize the new volume.**

   The `luxadm(1M)` command probes for new devices. Refer to the `luxadm(1M)` man page for more information on this command.

   a. **Make sure there is a** `/dev/es` **directory on the host system. If not, type:**

```
# mkdir /dev/es
```

   The `/dev/es` directory is necessary for running the `luxadm` command.

   b. **On the host system, type** `luxadm insert`**:**

```
# luxadm insert
```

Note – If the `luxadm` utility is not available, you will have to do a reconfiguration reboot (`boot -r`) to ensure that the host recognizes the new volumes. It is preferable, however, to use the `luxadm` command for this procedure instead of the `boot -r` command.

---

10. **Verify that the new volume is available to the host system by using the** `format[1M]` **command on the data host.**

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
     /pci@1f,4000/scsi@3/sd@0,0
    1. c2t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
      /pci@6,2000/SUNW,ifp@1/ssd@w50020f23000002ba,0
    2. c1t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
     /pci@6,0/SUNW,socal@1,0/sf@0,0/ssd@w50020f2300000121,0
```

2.11 Changing the Default Configuration

The default configuration for the Sun StorEdge T3 disk tray is a RAID 5 volume.

- If you want to change the default configuration, do so now before continuing the installation process. Configuration options for the disk tray are discussed in Chapter 3. The command-line procedures for reconfiguring the disk tray are in the *Sun StorEdge T3 Disk Tray Administrator's Guide*. Once you have reconfigured the disk tray, return to this chapter and proceed to Section 2.12 "Connecting the Host System" on page 2-40.
- If you are *not* changing the default configuration, proceed to Section 2.12 "Connecting the Host System" on page 2-40.

2.12 Connecting the Host System

This section contains procedures that are performed on the host system for the disk tray. Have the documentation for the host available to assist you in completing these tasks.

2.12.1 Verifying the Data Host Connection

Once the physical connection between the host and the disk tray has been established, you can use a utility, such as the `format(1M)` command in the Solaris environment, to verify the existence of a volume on the disk tray. For example:

```
# format
Searching for disks...done

c1t1d0: configured with capacity of 133.38GB


AVAILABLE DISK SELECTIONS:
       0. c0t2d0 <drive type unknown>
          /sbus@1f,0/SUNW,fas@e,8800000/sd@2,0
       1. c0t3d0 <SUN2.1G cyl 2733 alt 2 hd 19 sec 80>
          /sbus@1f,0/SUNW,fas@e,8800000/sd@3,0
       2. c1t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
         /sbus@1f,0/SUNW,socal@1,0/sf@0,0/ssd@w50020f2300000121,0
Specify disk (enter its number):
```

In this example, device number 2 is the disk tray, as identified by the `SUN-T300-0113` label.

Note – If you are creating new volumes or changing the volume configuration, you must first manually rewrite the label of the previous volume using the `autoconfigure` option of the `format(1M)` utility. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information on this procedure.

2.12.2 Establishing Logical Volumes on the Host

Using the `format(1M)` utility within the Solaris environment, you can view the disk space available on the disk tray from the host. At this point in the installation process, you can use this disk space as you would any physical disk. This includes performing operations such as installing a file system, using the device as a raw device, or partitioning the device. Refer to the data host documentation for more information on establishing logical volumes.

Note – There are two commands available to determine the drive volume capacity of the Sun StorEdge T3 disk tray. Within the disk tray, the `vol` command is used to display the raw volume capacity. Within the Solaris environment, the `format(1M)` utility (among others) can be used to display the capacity of a newly created volume. When comparing volume capacities between the internal Sun StorEdge T3 disk tray `vol` command and the Solaris environment `format(1M)` command, the Solaris `format(1M)` command reports a smaller volume capacity. This is due to the Solaris environment reporting volume sizes using 1,024 bytes per Kbyte capacities.

For example, using the Sun StorEdge T3 disk tray `vol` command, a 4-drive 18-Gbyte RAID 0 volume would report a 71.6 Gbyte capacity within the disk tray. This is calculated as follows:

$$139857920 \text{ blks} * 512 \text{ bytes/blk} * 1 \text{ Gbyte}/1000^3 = 71.6 \text{ Gbytes}$$

The `format(1M)` command in the Solaris environment reports a 66.69 Gbyte capacity for the same volume using 1,024 bytes per Kbyte, calculated as follows:

$$139857920 \text{ blks} * 512 \text{ bytes/blk} * 1 \text{ Gbyte}/1024^3 = 66.69 \text{ Gbytes}$$

There is no loss of actual disk capacity.

2.12.3 Creating Soft Partitions on the Data Host

The Sun StorEdge T3 disk tray's native volume management can support a maximum of two volumes or logical units (LUNs) per disk tray unit. This can result in very large volumes (128 Gbytes in a configuration of single 7+1 RAID 5 LUN plus hot spare, with 18 Gbyte drives). Some applications cannot use such large volumes effectively. There are two solutions, which can be used separately or in combination.

- First, use the partitioning utility available on the data host's operating system. In the Solaris environment, this is the `format` utility, which can create up to seven distinct partitions per volume. Note that in the case of the configuration described above, if each partition is equal in size, this will result in 18 Gbyte partitions, which still may be too large to be used efficiently by legacy applications.
- Second, you can use third-party software on the host to create as many partitions as desired from a given volume. In the Solaris environment, VERITAS Volume Manager can be used for this purpose.

For information on using the `format` utility, refer to the `format(1M)` man page. For more information on third-party software such as VERITAS Volume Manager, refer to the documentation for that product.

Note – This completes the installation process for a single disk tray installation. If you are configuring a partner group, you must continue to the next section.

2.12.4 Establishing Alternate Pathing on the Host

This task applies only when two controller units are configured as a partner group.

In a partner group, controller caches are mirrored so that if one controller fails, no data is lost. Any data that is in the cache of the failed controller but is not yet written to disk is preserved in the cache of the partner controller and is written to disk by means of one of the back-end Fibre Channel loops connecting the two units.

The back-end Fibre Channel loops are used to maintain host access to the disks of the unit with the failed controller (or any failure in the host data path to that controller). This requires the use of a host-based alternate pathing mechanism such as the dynamic multipathing (DMP) feature of VERITAS Volume Manager or the Solaris alternate pathing software. When a failure occurs in the host data path, the alternate pathing mechanism reroutes data to the other disk tray controller in the partner group. The controller then redirects the data across one of the back-end loops to the disks of the other controller, thus maintaining data availability to the host application.

For more information and for instructions on installing and configuring alternate pathing, refer to the documentation for the alternate pathing tool selected.

For the alternate pathing software to function properly, you must enable multipathing support on the disk tray for partner group configurations. To do so, use the following procedure:

1. **If you are not already in a telnet session with the disk tray, start one.**

   If you are in a telnet session, skip to Step 2.

   a. **On the host, use the** `telnet` **command with the disk tray name (or IP address) to connect to the disk tray.**

```
# telnet disk-tray-name
Trying 129.150.47.101...
Connected to 129.150.47.101.
Escape character is '^]'.

pSOSystem (129.150.47.101)
```

   b. **Log in to the disk tray by typing** `root` **and your password at the prompts.**

2. **At the disk tray prompt, type:**

```
t300:/:<1>sys mp_support rw
```

3. **Use the** `sys list` **command to verify that the** `mirror` **setting is set to** `auto`**.**

```
t300:/:<2>sys list
blocksize          : 64k
cache              : auto
mirror             : auto
mp_support         : rw
rd_ahead           : on
recon_rate         : med
sys memsize        : 32 MBytes
cache memsize      : 256 MBytes
```

4. **Type** `port list` **to display how the paths are mapped from the host to the volumes.**

   An example of `port list` output for a partner group:

```
t300:/:<7>port list

port   targetid   addr_type   status   host   wwn
u1p1      1         hard       online   sun    50020f23000003c3
u2p1      2         hard       online   sun    50020f2300000341
```

   Use the world wide number (`wwn`) from the `port list` output to map the volume to the Solaris environment using the `format(1m)` utility on the data host. In the following example, the output for the `format` command would show the same wwn, listed in the second to last line (`u1`) and last line (`u2`), as the wwn in the `port list` output.

```
7# format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
     /pci@1f,4000/scsi@3/sd@0,0
    1. c1t0d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
      /pci@6,2000/SUNW,ifp@1/ssd@w50020f23000003c3,0
    2. c2t1d0 <SUN-T300-0113 cyl 34145 alt 2 hd 64 sec 128>
      /pci@6,2000/SUNW,ifp@1/ssd@w50020f2300000341,0
```

5. **On the host, exit the telnet session by pressing Control and the right bracket (]) symbol.**

   This command takes you to the telnet prompt; type `quit`.

Note – After multipathing support is enabled and the host is rebooted, from the host side you will see two paths available to the same volume: a primary path and an alternate path. This means that if you are using the `format(1M)` utility in the Solaris environment, you will see two paths for each volume.

This completes the installation process for a partner-group configuration. For information on available Sun StorEdge T3 disk tray settings and monitoring options, see Chapter 3.

CHAPTER 3

Operation

This chapter describes the basic operations that can be performed on a Sun StorEdge T3 disk tray:

3.1 Powering Off and On

You do not need to power off the disk tray except under the following circumstances:

- Hardware reconfiguration
- Relocation
- Replacement of the centerplane and chassis
- Emergency, such as a threat of flooding

3.1.1 Powering Off

Caution – This procedure will power off the disk tray and all disk trays connected to it.

Note – If the disk tray is operating in the Solaris environment and there are volumes mounted, unmount the volumes on the data host before powering off the disk tray.

1. **Ensure that the data path between the host and the disk tray has been quiesced.**

   There must not be any I/O activity.

2. **In a telnet session with the disk tray, type:**

```
t300:/:<1>shutdown
Shutdown the system, are you sure? [N]: y
```

3. **Press the power button once on each power and cooling unit to turn the switch off (**FIGURE 3-1**).**

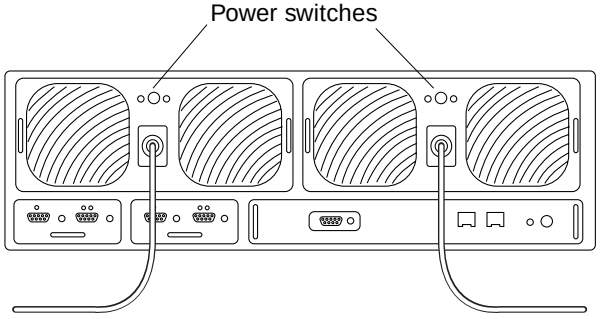


FIGURE 3-1 Power Switch Locations

3.1.2 Powering On

When powering on a configuration, always power on the Sun StorEdge T3 disk trays before booting the host server.

- **Power on the master unit by pressing the power button on each power and cooling unit.**

  At this point, all power and cooling unit LEDs on the disk tray and any units connected to it will turn green, indicating that power has been restored.

Note – If the green power and cooling unit LEDs on connected units do not light, then press the power switches on those units.

3.2 Reconfiguring the Disk Tray Settings

The disk tray has been set with the following default configuration:

- RAID 5 volume; no hot spare
- Cache mode set to auto
- Autodisable and autoreconstruction of disk drives

These default settings and other possible configurations are described in the following sections. After reading this information, if you determine that you would like to use a different configuration for your environment, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for instructions on how to change the disk tray settings.

Some of the terminology as used in this chapter is defined as follows:

- *Volume*, also known as a logical unit (LUN), is the basic structure you create across the drive group to retrieve and restore data. A volume is a set of physical drives that has been configured into RAID level 0, 1, or 5.
- *Hot spare* is a drive containing no data that acts as a standby in case another drive fails in a RAID 1 or 5 volume. The hot spare drive adds another level of redundancy; if a drive fails, the hot spare takes over for the failed drive until you replace it. When you replace the failed drive, data from the hot spare is copied back to the replaced drive and the hot spare returns to a standby status.
- *Parity* is additional information stored along with the data that enables the controller to rebuild data after a drive failure. Only RAID 5 volumes have parity. RAID 1 uses mirroring, not parity, which enables the controller to reconstruct data after a drive failure.

3.2.1 Unit Volume Configurations

The drives in a unit can be grouped into one or two volumes (LUNs). The minimum number of drives to compose a volume is two; the maximum is nine. A hot spare drive can be configured in the unit as an option. If you are configuring a hot spare in the volume, you can use only drive 9 in the disk tray as a hot spare. You can have only one hot spare per disk tray, which can be shared by two volumes.

If you choose to include a hot spare disk drive in your configuration, add it when you initially create the volume. If you want to add a hot spare at a later date, you must remove the existing volume and re-create the configuration.

You can also configure the two volumes into smaller partitions or combine multiple volumes into a single volume by using specialized third-party software such as VERITAS Volume Manager.

Note – If you are creating new volumes or changing the volume configuration, you must first manually rewrite the label of the previous volume by using the `autoconfigure` option of the `format(1M)` utility. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information on this procedure.

Examples of valid volume configurations are shown in the following table:

TABLE 3-1 Volume Configuration Examples

Volume 1	Volume 2	Hot spare
9 disk RAID 5	None	
8 disk RAID 5	None	X
9 disk RAID 1	None	
8 disk RAID 1	None	X
2 disk RAID 1	7 disk RAID 5	
2 disk RAID 1	6 disk RAID 5	X
2 disk RAID 1	7 disk RAID 1	
2 disk RAID 1	6 disk RAID 1	X
4 disk RAID 0	5 disk RAID 1	
2 disk RAID 0	6 disk RAID 5	X

3.2.2 RAID Levels

The RAID level determines how the controller reads and writes data and parity on the drives. The Sun StorEdge T3 disk tray can be configured with RAID level 0, RAID level 1 (1+0), or RAID level 5. The default configuration is a RAID level 5.

The following sections describe the data layout for each of the three RAID levels.

3.2.2.1 RAID 0

Data blocks in a RAID 0 volume are striped across all the drives in the volume in order. There is no parity data, so RAID 0 uses the full capacity of the drives. There is no redundancy, however; if a single drive fails, all data on the volume is lost. TABLE 3-2 shows the data layout in a RAID 0 volume.

TABLE 3-2 RAID 0 Data Blocks[1]

Stripe	Drive1	Drive2	Drive3	Drive4	Drive5	Drive6	Drive7	Drive8	Drive9
0	0	1	2	3	4	5	6	7	8
1	9	A	B	C	D	E	F	10	11
2	12	13	14	15	16	17	18	19	1A

1. Block numbers are written in hexadecimal notation.

3.2.2.2 RAID 1

Each data block in a RAID 1 (1+0) volume is mirrored on two drives, and the blocks are striped across all the drives in the volume. If one of the mirrored pair fails, the data from the other drive is used. Because the data is mirrored in a RAID 1 configuration, the volume has only half the capacity of the assigned drives. For example, if you create a four-drive RAID 1 volume with 18-Gbyte drives, the resulting data capacity is 2 x 18 = 36 Gbytes. TABLE 3-3 shows the data blocks in a RAID 1 (1+0) volume with 9 drives.

TABLE 3-3 RAID 1 (1+0) Data Blocks[1]

Stripe	Drive1	Drive2	Drive3	Drive4	Drive5	Drive6	Drive7	Drive8	Drive9
0	0	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8	0
2	9	A	B	C	D	E	F	10	11

1. Block numbers are written in hexadecimal notation.

3.2.2.3 RAID 5

In RAID level 5, data is striped across the drives in the volumes in segments, with parity information striped across the drives as well. Because of this parity, if a single drive fails, data can be recovered from the remaining drives. Two drive failures cause all data to be lost. A RAID 5 volume has the data capacity of all the drives in the logical unit less one. For example, a 5-drive RAID 5 volume with 18-Gbyte drives

has a data capacity of 4 x 18 = 72 Gbytes. TABLE 3-4 shows the data blocks in a RAID 5 volume. The location of the parity drive in the stripe rotates from right to left in order to eliminate a performance bottleneck.

TABLE 3-4 RAID 5 Data Blocks[1]

Stripe	Drive1	Drive2	Drive3	Drive4	Drive5	Drive6	Drive7	Drive8	Drive9
0	0	1	2	3	4	5	6	7	P
1	9	A	B	C	D	E	F	P	8
2	12	13	14	15	16	17	P	10	11
3	1B	1C	1D	1E	1F	P	18	19	20
4	24	25	26	27	P	20	21	22	23
5	2D	2E	2F	P	28	29	2A	2B	2C
6	36	37	P	30	31	32	33	34	35
7	3F	P	38	39	3A	3B	3C	3D	3E
8	P	40	41	42	43	44	45	46	47
9	48	49	4A	4B	4C	4D	4E	4F	P

1. Block numbers are written in hexadecimal notation.

3.2.3 Cache Modes

Data cache is used for the following purposes:

- **Buffering**. Data that is being transferred between the host and the drives.
- **Read caching**. Data for future retrieval, to reduce disk I/O as much as possible.
- **Write caching**. Data that is used to build up stripes of data, eliminating the read-modify-write overhead. Write caching improves performance for applications that are writing to disk.

Four cache modes are supported: auto, write-behind, write-through, and none. The default mode for the Sun StorEdge T3 disk tray is set to auto.

In the *auto* cache mode, if the disk tray has full redundancy available, then the caching mode is write-behind. If any component is nonredundant, then the cache mode is set to write-through. Read caching is always performed. This mode provides the best performance while retaining full redundancy protection.

The *write-behind* cache mode forces write-behind caching to always be used. There is the possibility of data loss in this mode if the units are not a fully redundant configuration (partner group) and a disk tray system failure occurs.

The *write-through* cache mode forces write-through caching to always be used. Read caching is also performed in this mode.

The *none* cache mode forces no write caching and no read caching.

Caution – If there is a failure of one of the redundant components, the cache mode is set to write-through. In the write-through mode, mirroring is not used and data is not being cached. If you were to view the cache mode at this time using the `vol mode` command, the setting for `cache` is displayed as `writethrough` and the setting for `mirror` is displayed as `on`. This means, however, that mirroring is enabled, but it is *not* being used.

The following table highlights the system states that can cause write-behind cache to be disabled. In cases where write-behind cache has been disabled, the disk tray is designed to protect the data in cache. If any hardware component fails that might compromise the safety of this data, the disk tray will disable write-behind cache, causing outstanding cached data to be flushed to disk. Write-behind caching is re-enabled when the failed condition has been corrected.

TABLE 2 Cache Transition States

Failure or Problem	Write-Behind Cache State
Disk hard failure (RAID 5)	Disable
Disk hard failure (RAID 1)	Disable
Disk hard failure (RAID 0)	Disable
Disk reconstruct	Disable
Disk copy-back operation	Disable
Interconnect Card 1	Disable
Interconnect Card 2	Disable
Interconnect Card 1+2	Disable (system down)
Controller	Disable (controller failover)
Battery	Disable
Battery warranty expires	Disable
Battery refresh	Disable (hold time low)
14-day battery refresh	Disable (during 12-minute battery discharge)[1]
Power and cooling unit 1	Disable
Power and cooling unit 2	Disable
Power and cooling unit 1+2	Disable (system down)

TABLE 2 Cache Transition States *(Continued)*

Failure or Problem	Write-Behind Cache State
Battery DC not OK	Disable
Host cable	Enable (LUN failover)
Media Interface Adapter	Enable (LUN failover)
Host GBIC	Enable (LUN failover)
Missing FRU	Disable

1. Battery discharge may be slightly longer or shorter than 12 minutes.

3.2.4 Disabling and Reconstructing the Drive

If a drive fails, it is automatically disabled by the system. This prevents any further access to the drive. The data on the drive is available by reconstructing it using RAID redundancy data in the volume. When a drive is disabled, the volume is operating without any further redundancy protection, so the failed drive needs to be replaced as soon as possible.

If the volume has a hot spare configured and that drive is available, the data on the disabled drive is reconstructed on the hot-spare drive. When this operation is complete, the volume is operating with full redundancy protection, so another drive in the volume may fail without loss of data.

After a drive has been replaced, the original data is automatically reconstructed on the new drive. If no hot spare was used, the data is regenerated using the RAID redundancy data in the volume. If the failed drive data has been reconstructed onto a hot spare, once the reconstruction has completed, a copy-back operation begins where the hot spare data is copied to the newly replaced drive.

3.3 Monitoring the Disk Tray

You can monitor the Sun StorEdge T3 disk tray remotely by using any of the following tools:

- Sun StorEdge Component Manager software
- Simple Network Management Protocol (SNMP) notification
- `syslog` error reports

3.3.1 Sun StorEdge Component Manager

The Sun StorEdge Component Manager software provides a graphical user interface (GUI) to monitor and manage one or more Sun StorEdge T3 disk trays that are connected to a host. The software enables you to administer some of the components of the disk tray and also constantly monitors system health. Alarm notification and remote reporting alert the administrator to abnormal activities or conditions that require attention. Component Manager can run on any host connected to the same network as the disk tray.

For more specific information regarding Component Manager and its functions, refer to the *Sun StorEdge Component Manager User's Guide*. For information on installing the software, refer to the *Sun StorEdge Component Manager Installation Guide*.

3.3.2 SNMP Notification

SNMP notification directs the software to send remote notification of disk tray events to the administrator's host by using SNMP traps. An SNMP trap is a UDP datagram sent to a set of hosts that are identified by their IP addresses. The contents of the trap message include header information that identifies the type of trap and the data associated with the trap message.

When an event occurs in the disk tray unit that requires attention, a trap is asynchronously sent to the host, reporting the event. The host(s) to which a trap is sent is configured by the user. The host software that receives the trap is an SNMP management package.

The Sun StorEdge T3 disk tray uses the `/etc/syslog.conf` file to trigger the SNMP trap. This file contains four levels of error warning to the administrator. For instructions on how to set up SNMP notification for the Sun StorEdge T3 disk tray, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

An SNMP MIB file is provided with the Sun StorEdge T3 disk tray for use with SNMP-based applications. The MIB file is located in the following directory on the disk tray:

```
/web/snmp/t300.mib
```

To use this file, ftp this MIB file from the disk tray to your SNMP management host and refer to your specific SNMP management documentation for correct MIB file installation procedures.

Note – SNMP notification can be used in combination with the Component Manager software.

3.3.3 `syslog` Error Reports

A `syslog` daemon exists in the hardware RAID controller that records system messages and provides for remote monitoring. There are four possible levels of messages:

- **Error**. Indicates a critical system event requiring immediate user intervention or attention. (For example, an over-temperature condition or a removed FRU.)
- **Warning**. Indicates a system event that will eventually require user intervention. (For example, a FRU being disabled and a recovery procedure being executed.)
- **Notice**. Indicates a system event that may be a side effect of other events or possibly a normal condition. (For example, the power switch turned off.)
- **Information**. Indicates a system event that has no effect on the health of the system. (For example, the healthy state of a FRU.)

You can configure the level of error reporting to receive only certain types of messages, such as error and warning messages only. For more information on configuring remote system logging, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

CHAPTER 4

Troubleshooting

This chapter describes how to approach troubleshooting the Sun StorEdge T3 disk tray. Use the information in this chapter along with the *Sun StorEdge T3 Disk Tray Administrator's Guide* or *Sun StorEdge Component Manager User's Guide* to determine the service required. This chapter is organized as follows:

4.1 Analyzing the Problem

To begin the problem analysis, check one or a combination of the following four resources:

- A host-generated message, found in the `/var/adm/messages` file, indicating a problem with the host-channel connection to the disk tray unit
- A message generated by the Sun StorEdge Component Manager software indicating a problem
- A telnet session that monitors the disk tray unit for its status
- The disk tray LEDs, which provide a visual status

4.1.1 Host-Generated Message

The data host sees the disk tray as one or two logical volumes. A host-generated message might indicate that the host cannot communicate with the disk tray through the FC-AL channel, or that an excessive number of channel errors are occurring. If the host loses access to the disk tray through the channel connection, then any host

messages regarding the disk tray will refer only to the logical volume(s). To see details of problems internal to the Sun StorEdge T3 disk tray, use the tool(s) that you installed on your management console.

In a partner-group configuration where alternate pathing failover has been established, the failure of a channel path or disk tray controller causes the host to redirect I/O from the failed channel to the second FC-AL connection.

4.1.2 Sun StorEdge Component Manager

Sun StorEdge Component Manager communicates with the disk tray unit by means of an Ethernet connection. The software must be installed, configured, and initialized on the management host; it does not have to be the same host that is directly connected to the disk tray.

The software recognizes the unit through the Ethernet address and monitors it through a polling routine. The Component Manager GUI displays information on the unit, including the suspected problem area. The software can be configured to route error messages to a log file, generate an email, or page an on-call person. The log file contains information that you can use to determine the fault and what caused the message to be sent.

4.1.3 Telnet Session

The telnet session is a direct network link to the disk tray unit by means of the command- line interface (CLI). Individual commands can be run to query and repair the unit from this interface. The telnet session requires access to the unit's IP address. The CLI can then be run from any host that is part of the same network.

You can quickly determine the status of the disk tray from the CLI. You can also examine the `syslog` file of the disk tray file system through the CLI. The `syslog` file contains a record of events that have occurred in the unit.

For more information on how to set up the `syslog` file and interpret it, and for information on how to use the CLI commands, see the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

4.1.4 Disk Tray LEDs

Each FRU component within the disk tray (except for the chassis) has a set of LEDs that indicate health and status. Component LEDs and a description of the LED states are shown in the following sections.

Even though the LED indicates a FRU failure, you should always verify the FRU status using either the CLI or Component Manager before replacing the component. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* or the *Sun StorEdge Component Manager User's Guide* for instructions.

Note – See Chapter 5 for instructions on how to service a failed FRU.

4.1.4.1 Disk Drive LEDs

The top of each disk drive has LEDs that indicate drive activity and status. These LEDs can be seen with the front cover on the unit. TABLE 4-1 lists the possible drive LED states and describes each state.

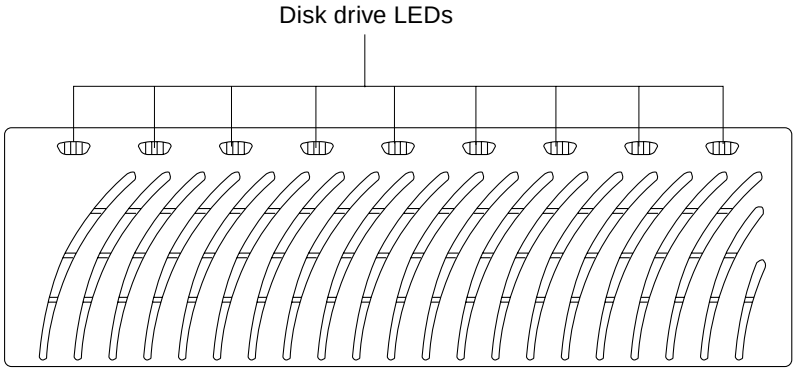


FIGURE 4-1 Disk Drive LEDs (Viewed Through Front Cover)

TABLE 4-1 Disk Drive LED Descriptions

Drive Activity (green)	Drive Status (amber)	Description
Off	Off	• Drive not installed (not recognized)
Slow blink	Off	• Drive is spinning up or down
Solid	Off	• Drive OK, idle
Flashing	Off	• Drive OK, activity
n/a	Solid	• Drive reconstruct/firmware download in progress
n/a	Slow blink	• Drive failure; OK to replace drive Note—Verify a drive failure using the CLI or Component Manager.

Note – See Chapter 5 for instructions on how to service a failed disk drive.

4.1.4.2 Power and Cooling Unit LEDs

Each power and cooling unit has an AC LED and a power-supply (PS) LED. TABLE 4-2 lists the possible conditions of these LEDs and describes each state.

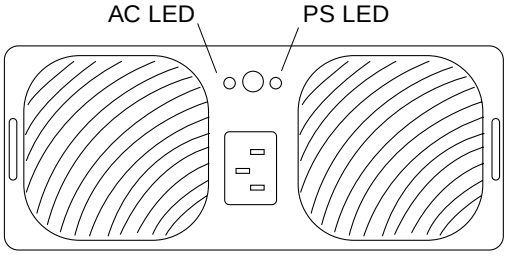


FIGURE 4-2 Power and Cooling Unit LEDs

TABLE 4-2 Power and Cooling Unit LED Descriptions

AC LED (green or amber)	PS LED (green or amber)	Description
Off	Off	• Power is off • No AC input
Amber	Off	• Power is off • Power switch turned off • AC power is available
Green	Off	Occurs when disk tray is shut down: • PCU disabled • AC power is available
Green	Green	Normal operating state: • PCU receiving AC power • Power switch is turned on • AC power is available
Amber	Amber	• Switch is off; disk tray will power off after PCU is disabled

TABLE 4-2 Power and Cooling Unit LED Descriptions

AC LED (green or amber)	PS LED (green or amber)	Description
Green	Amber	Indicates one or more of following: • Over-temperature condition; PCU disabled • DC power not available; PCU disabled • Both fans fault; PCU disabled • Battery on refresh cycle
Green	Blinking green	• Battery not OK
Green	Blinking amber	Indicates one or more of following: • PCU disabled • One fan fault • Battery hold-time low; PCU remains enabled • Battery out of warranty; PCU remains enabled • Battery life-span failure; PCU remains enabled Note—Verify a power and cooling unit failure using the CLI or Component Manager.

Note – See Chapter 5 for instructions on how to service a failed power and cooling unit.

4.1.4.3 Interconnect Card LEDs

Each interconnect card has a status LED for each interconnect cable. TABLE 4-3 lists the possible interconnect card status LED states with descriptions of each state.

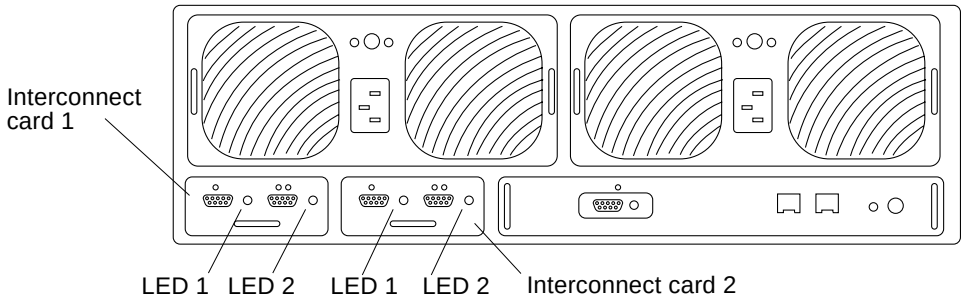


FIGURE 4-3 Interconnect Card LEDs

TABLE 4-3 Interconnect Card LED Descriptions

Interconnect Card Status LED (green or amber)	Description
Off	• Interconnect card not installed (not recognized)
Green-solid	• Interconnect card OK • Cable OK (if present)
Green-slow blink	• Interconnect card OK • Cable bad; OK to replace cable
Amber-solid	• Interconnect card firmware download in progress
Amber-slow blink	• Interconnect card failure; OK to replace interconnect card Note—Verify an interconnect card or cable failure using the CLI or Component Manager.

Note – See Chapter 5 for instructions on how to service a failed interconnect card.

4.1.4.4 Controller Card LEDs

The controller card has a channel-active LED for the host interface port, a controller status (online) LED, and a reset switch. TABLE 4-4 lists the possible states of the channel-active LED and describes each state. TABLE 4-5 lists the possible states and descriptions for the controller status LED.

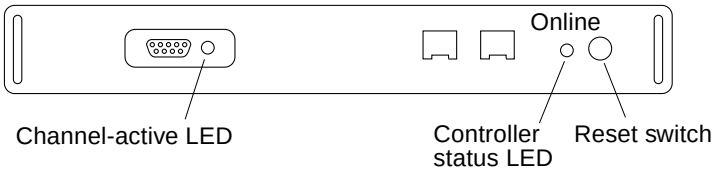


FIGURE 4-4 Controller Card LEDs

TABLE 4-4 Channel-Active LED Descriptions

Channel Active LED (green)	Description
Off	• Port disabled
Solid	• Port enabled, idle
Blinking	• Port enabled, activity

TABLE 4-5 Controller Status LED Descriptions

Controller Status LED (green or amber)	Description
Off	• Controller not installed (not recognized)
Green	• Controller OK
Amber	• Controller boot/shutdown/firmware download in progress
Blinking amber	• Controller failure; OK to replace controller
	Note—Verify a controller card failure using the CLI or Component Manager.

Note – See Chapter 5 for instructions on how to service a failed controller card.

4.2 Channel Connection Failures

Host-to-disk tray channel failures occur when the connection between the disk tray and the host is either severed or intermittent. The components that make up this data channel connection are:

- Host bus adapter (HBA), which resides on the host
- GBIC adapter, used to connect the FC-AL cable to an SBus HBA
- Fibre-Channel cable that connects the disk tray to the host
- Media interface adapter (MIA), which converts the light source from the host to an electron source for use in the disk tray
- Channel interface port in the disk tray

Errors in the host data channel are outside the scope of the Sun StorEdge T3 disk tray. To determine failures in the data path, you must use host-based application diagnostics, such as the StorTools™ product for the Solaris operating environment.

Refer to the documentation of the selected diagnostics tool for information on identifying data channel failures.

4.3 FRU Failures

FRU failures are reported by means of an alarm or message notification from the tool used to monitor the disk tray. The failed FRU will also most likely display a blinking amber LED. Before replacing a FRU based on the LED indicator, verify its failure by using the command-line interface (CLI) or the health-check mechanism in Component Manager.

To check for a FRU failure using the CLI, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide*. To use Component Manager to diagnose a failed FRU, refer to the *Sun StorEdge Component Manager User's Guide*.

CHAPTER 5

Service

This chapter contains information about removing and replacing the field-replaceable units (FRUs) and upgrading software and firmware.

This chapter is divided into the following sections:

Caution – Any FRU that is removed must be replaced within 30 minutes or the Sun StorEdge T3 disk tray and all attached disk trays will automatically shut down and power off.

5.1 Preparing for Service

Follow these procedures to help prevent damaging FRUs:

- Before handling a FRU, discharge any static electric charge by touching a ground surface.
- Wear a grounding wrist strip.
- Do not remove a FRU from its antistatic protective bag until it is ready for installation.
- When removing a FRU from the disk tray, immediately place it in an antistatic bag and packaging.
- Handle a FRU only by its edges and avoid touching the circuitry.
- Do not slide a FRU over any surface.
- Avoid having plastic, vinyl, and foam in the work area.
- Limit body movement (which builds up static electricity) during FRU installation.

Caution – Although the disk tray will remain operational for up to 30 minutes with a FRU removed, replace a failed FRU as soon as you have removed it from the disk tray.

5.2 Removing and Replacing Components

This section contains instructions for servicing the following disk tray FRUs:

5.2.1 Disk Drives

Caution – Replace only one disk drive in a disk tray at a time to ensure that no data is lost. Ensure that the disk drive is fully reenabled before replacing another disk drive in the same disk tray.

The default configuration for the disk tray is to automatically spin up and reenable a replaced disk drive, then automatically reconstruct the data from the parity or hot-spare disk drives. Disk drive spinup takes about 30 seconds, and reconstruction of the data on the disk drive can take up to one hour depending on system activity.

Note – In some cases, if disk drives are removed and replaced on a powered-down or incompletely booted disk tray, the internal system monitoring facilities may not correctly detect the drive replacement. Therefore, replace disk drives on powered-up, fully-booted disk trays only.

5.2.1.1 Disk Drive LEDs

The top of each disk drive has LEDs that indicate drive activity and status. For information about the disk drive LEDs and how to interpret them to diagnose a drive failure, see Section 4.1.4.1 “Disk Drive LEDs” on page 4-4.

Note – Even if the LED indicates a drive failure, you should always verify the FRU status using either the CLI or Component Manager before replacing the drive. Refer to the *Sun StorEdge T3 Disk Tray Administrator’s Guide* or the *Sun StorEdge Component Manager User’s Guide* for instructions.

5.2.1.2 Removing and Replacing a Disk Drive

1. **Observe static electricity precautions.**
2. **Remove the front panel by pressing in on the side latches and pulling the front panel forward.**

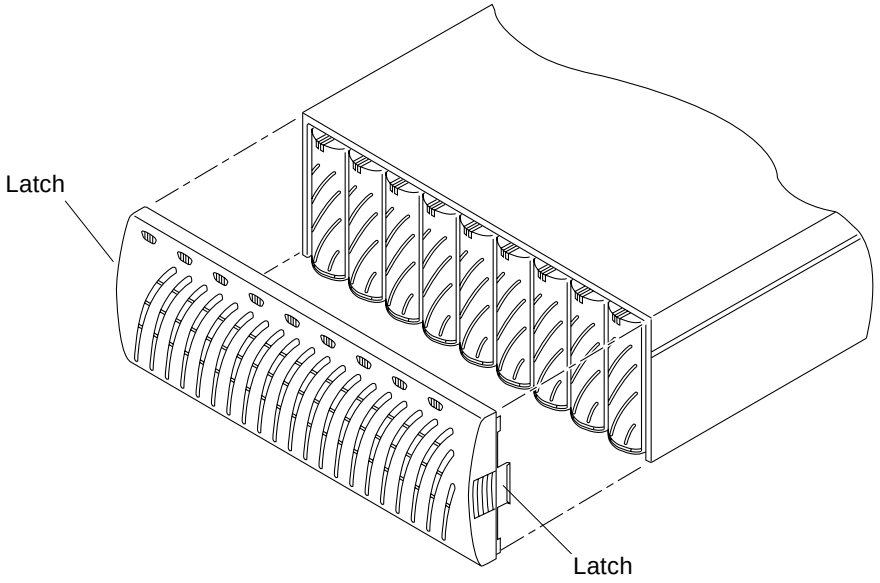


FIGURE 5-1 Removing the Front Panel

3. **Locate the disk drive that needs to be replaced.**

   Disk drives are numbered from 1 to 9 starting on the left side of the disk tray.

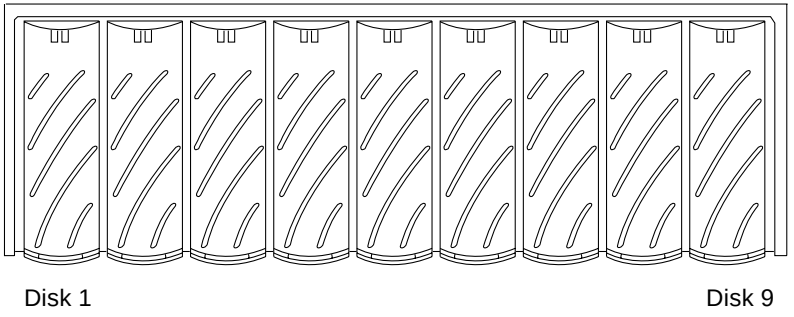


FIGURE 5-2 Disk Drive Numbering

4. **Use a coin or small screwdriver to press in and release the drive latch handle.**

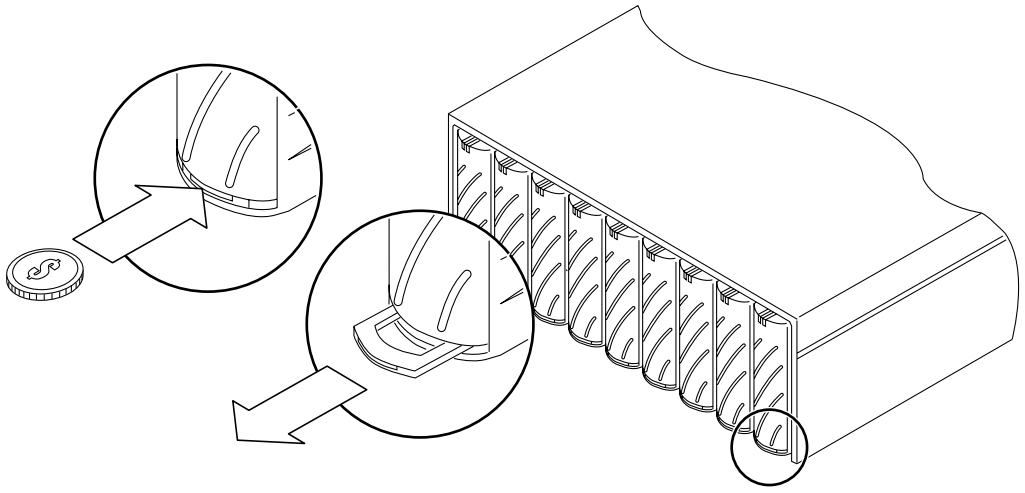


FIGURE 5-3 Releasing the Latch Handle

5. **Use the latch handle to slowly pull the disk drive out an inch.**

   Wait 30 seconds before pulling the drive out completely, giving the disk drive time to spin down.

6. **Remove the disk drive from the disk tray (**FIGURE 5-4**).**

Caution – Any disk drive that is removed must be replaced within 30 minutes or the Sun StorEdge T3 disk tray and all attached disk trays will automatically shut down and power off.

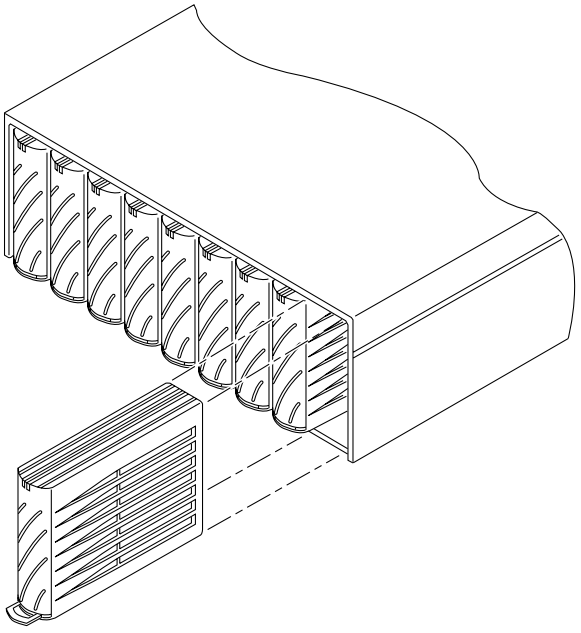


FIGURE 5-4 Removing a Disk Drive

7. **Push in the latch handle on the removed disk drive to protect it from damage.**
8. **Release the latch handle on the disk drive to be installed.**
9. **Insert the new disk drive gently on the middle of the rails and push it in until it is seated with the centerplane connector.**
10. **Use a coin or small screwdriver to press in and lock the latch handle.**
11. **Replace the front panel.**

Caution – You must replace the front panel for the disk tray to meet FCC safety regulations.

12. **Using Component Manager or the CLI, verify that there are no disk drive errors.**

    Refer to the *Sun StorEdge Component Manager User's Guide* or the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information.

5.2.2 Power and Cooling Units

The power and cooling unit has two active power sources: standby and primary power. Standby power, which is used to power the microcontroller on the interconnect card, is activated when AC power is present. Primary power, which is used to power all remaining circuits and disk drives, is activated when AC or battery power is present and the power switch is on.

Each power and cooling unit has a power switch in the rear upper center of the unit. Turning off the power on a power and cooling unit affects only that power and cooling unit. Therefore, to power off all primary power to the unit, both power switches on both power and cooling units must be turned off. After the switches are turned off, system primary power will not actually turn off until the controller has performed an orderly shutdown, including writing any data cache to disk. This process can take up to two minutes.

Separate power cords are used for the connector on each power and cooling unit to provide redundant cabling. The power cords need to be connected to alternate AC power sources for full redundancy.

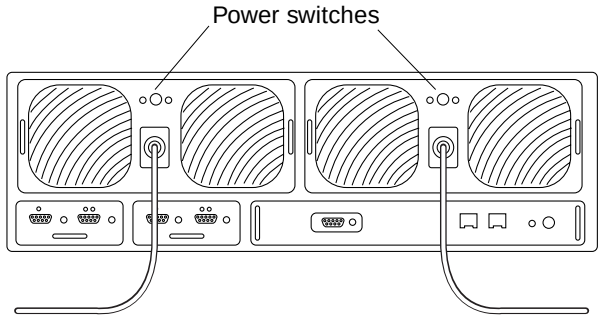


FIGURE 5-5 Power Cords Connected to the Power and Cooling Units

Caution – Do not handle the power and cooling unit when the power cord is connected. Line voltages are present within the power and cooling unit when the power cord is connected even if the power switch is off.

At the rear of the power and cooling unit is a recessed PC card connector. Do not touch this connector or allow any metal object to touch it. The power and cooling unit contains the UPS battery backup. There are no serviceable parts inside this unit.

5.2.2.1 Power and Cooling Unit LEDs

Each power and cooling unit has an AC LED and a power-supply (PS) LED. For information about the power and cooling unit LEDs and how to interpret them to diagnose a failure, see Section 4.1.4.2 “Power and Cooling Unit LEDs” on page 4-5.

Note – Even if the LED indicates a power and cooling unit failure, you should always verify the FRU status using either the CLI or Component Manager before replacing the unit. Refer to the *Sun StorEdge T3 Disk Tray Administrator’s Guide* or *Sun StorEdge Component Manager User’s Guide* for more information.

5.2.2.2 Removing and Replacing a Power and Cooling Unit

Caution – To ensure correct airflow for system cooling, both power and cooling units must be in the installed position for normal operation. A failed power and cooling unit should be removed only when a replacement power and cooling unit is available to be inserted.

Caution – Replace only one power and cooling unit at a time to prevent system interruption.

To replace a power and cooling unit:

1. **Power off the power and cooling unit by pressing the power switch (**FIGURE 5-5**).**

   Make sure that the AC LED is amber and the PS LED is off.

2. **Disconnect the power cord from the AC outlet.**

3. **Disconnect the power cord from the power and cooling unit connector by squeezing both sides of the connector and pulling straight out (**FIGURE 5-5**).**

4. **Unlock the power and cooling unit by using a coin or small screwdriver to push in and release the two latch handles (**FIGURE 5-6**).**

5. **Pull the power and cooling unit out of the disk tray.**

   Put one index finger through each of the latch handles. With your thumbs on the top of the chassis for support, pry the power and cooling unit out of its connectors with an upward rotation. Once it is out approximately .5 inches (2 cm), it will be free to slide out of the frame on its rails.

Caution – Any power and cooling unit that is removed must be replaced within 30 minutes or the Sun StorEdge T3 disk tray and all attached disk trays will automatically shut down and power off.

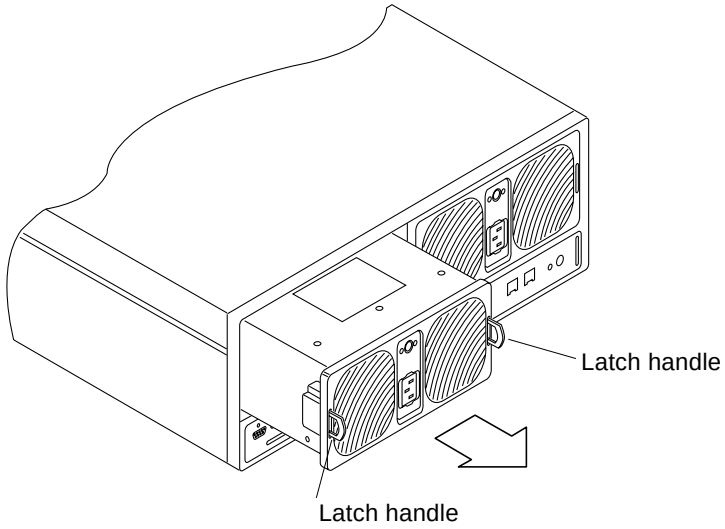


FIGURE 5-6 Removing the Power and Cooling Unit

6. **Insert the new power and cooling unit.**
7. **Lock the new power and cooling unit by pushing in both latch handles.**
8. **Insert the power cord into the power and cooling unit connector.**
9. **Connect the power cord to the AC outlet.**

   Verify that the AC LED on the power and cooling unit is amber, indicating that AC power is present.
10. **Push the power and cooling unit power switch on.**

    Verify that both LEDs on the power and cooling unit are green, indicating that the unit is receiving power.

5.2.3 UPS Battery

The UPS battery is located within the power and cooling unit. The battery provides backup in case of a complete AC power failure and will sustain power to the disk tray long enough to flush cache data to the drives.

During a power failure, if the battery is flushing cache data to the drives, battery power becomes depleted. Once AC power is available, the battery will recharge. While the battery is recharging, write-behind cache mode is disabled and write-through cache mode is enabled until the battery is fully recharged. The battery recharge could take up to 12 hours, depending on the length of the power outage and the amount of cache data that was flushed to the drives.

5.2.3.1 Battery Maintenance

The Sun StorEdge T3 disk tray has been factory configured to initiate a battery refresh cycle that occurs automatically once every 14 days. This battery refresh cycle involves a discharge of the battery followed by a recharge. The refresh cycle is sequential; the second power and cooling unit will not start a refresh until the first power and cooling unit successfully completes the refresh cycle, ensuring that only one battery in a disk tray is refreshed at a time. This refresh cycle verifies the health of the battery. During the refresh, if a problem is detected with the battery, future refresh operations are suspended until the problem is fixed. If this happens, write-behind caching is turned off automatically as a safety precaution. A refresh cycle will not begin unless both power and cooling units are in optimal condition.

Note – During the discharge period of a refresh cycle (approximately 12 minutes), write-behind cache is turned off.

A battery refresh operation in progress is indicated in the `syslog` file. During the battery refresh operation, the battery health is determined by the discharge time of the battery. This time is written into the `syslog` file and is displayed as battery hold time. If the discharge time of the battery is greater than six minutes, the battery is considered healthy. If the battery is not healthy, the system will disable the battery, disable write cache, and indicate that the power and cooling unit needs to be replaced. The following is an example of the battery hold time as displayed in the `syslog` file:

```
May 21 00:19:22 driver24 BATD[1]: N: u1pcu1: hold time was 1159 seconds.
```

You can use the `refresh -s` command to view an active refresh operation. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information on this command.

The battery service life is two years. When the battery approaches the end of its life span, warning messages are sent to the `syslog` file. The first message is sent 45 days before the end of the life span, followed by a warning message every 5 days thereafter. Replace the power and cooling unit that contains the battery as soon you receive these warning messages.

You can view information on the battery, including the life span, using the CLI or Component Manager. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* or the *Sun StorEdge Component Manager User's Guide* for instructions.

5.2.3.2 Removing and Replacing the UPS Battery

The UPS battery itself is *not* a serviceable FRU. To replace the battery, you must replace the entire power and cooling unit. The warning message will indicate which power and cooling unit needs to be replaced. See Section 5.2.2.2 "Removing and Replacing a Power and Cooling Unit" on page 5-8 for instructions.

5.2.4 Interconnect Cards

The interconnect cards contain the interface circuitry and two connectors on each card for interconnecting multiple Sun StorEdge T3 disk trays. The interconnect card also contains the environmental monitor for the disk tray. If an interconnect card or cable fails, the disk tray continues to function using the remaining interconnect card and cable.

The interconnect cards in a disk tray are assigned a *master* and *slave* status, similar to the controller card. If you unplug or remove the master interconnect card from the unit and then put it back, the new status is reported as "slave." The corresponding interconnect card that was the slave then becomes the master. You can view the status of the interconnect cards using the `fru stat` command on the disk tray. There is no performance impact to the disk tray if the interconnect cards change status, and it is not necessary to alter the state back to the original master/slave configuration.

For more information on the `fru stat` command and other disk tray commands, refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

5.2.4.1 Interconnect Card LEDs

Each interconnect card has an interconnect status LED for each interconnect cable. For the location of and information about the interconnect card status LEDs and how to interpret them to diagnose a failure, see Section 4.1.4.3 "Interconnect Card LEDs" on page 4-7.

Note – Even if the LED indicates an interconnect card failure, you should always verify the FRU status using either the CLI or Component Manager before replacing the unit. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* or *Sun StorEdge Component Manager User's Guide* for more information.

5.2.4.2 Removing and Replacing an Interconnect Card

Caution – The interconnect cables must be used only to cable Sun StorEdge T3 disk trays together using the interconnect card connectors. Do *not* use these cables for any other FC-AL connection.

Caution – The interconnect card FRUs are extremely sensitive to static electricity. Use proper grounding wrist straps and antistatic procedures when handling these FRUs. See Section 5.1 "Preparing for Service" on page 5-2 for a list of static electricity precautions.

Caution – Replace one interconnect card at a time. Follow the procedure as described to ensure that there is no interruption in system operation or loss of data.

To prevent interruption of system operation during interconnect card replacement, make sure that:

- In a single controller unit configuration, remove only the failed interconnect card. Leave the second interconnect card intact in the disk tray.

Caution – Removing both interconnect cards at the same time in a single unit will cause the unit to shut down immediately. Remove only one card at a time.

- In a partner group, remove the interconnect cable only from the failed interconnect card. Leave the interconnect cable attached to the working interconnect card.

To replace an interconnect card:

1. **Ensure that the interconnect card to be replaced is showing failure status.**
2. **Observe static electricity precautions.**

   If you have a single controller unit configuration, proceed to Step 4.

3. **Remove the interconnect cable from the failed interconnect card only.**

   Mark the connector with either 1 or 2.

4. **Unlock the failed interconnect card by pushing in on the latch handle.**

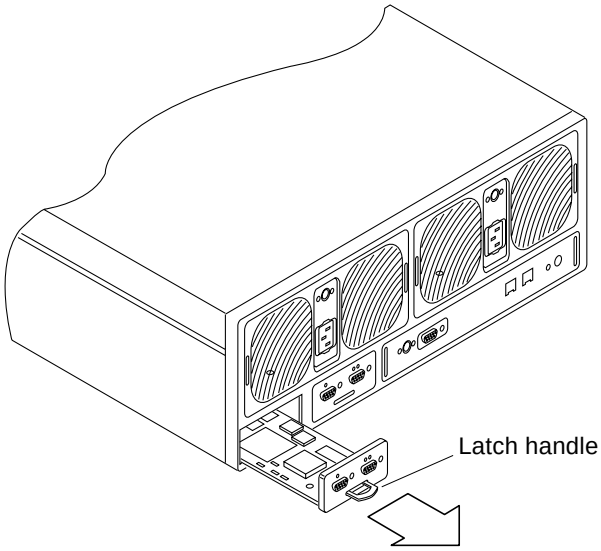


FIGURE 5-7 Removing the Interconnect Card

5. **Pull the interconnect card out using the latch handle.**

Caution – The interconnect card that is removed must be replaced within 30 minutes or the Sun StorEdge T3 disk tray and all attached disk trays will automatically shut down and power off.

6. **Insert the new interconnect card, making sure that the card sits on the frame.**
7. **Lock the new interconnect card in place by pushing in on the latch handle.**
8. **Reconnect the interconnect cable to the interconnect card.**
9. **Verify that the LEDs on the interconnect card show that the interconnect card has initialized properly.**

   You can verify the status of the interconnect card using either the CLI or Component Manager. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* or the *Sun StorEdge Component Manager User's Guide* for instructions.

5.2.5 Controller Card

The controller card is redundant only when the disk tray is configured in a partner group; that is, interconnected with another disk tray that contains a controller card.

In a partner-group configuration, if there is a controller card failure in a master unit, the controller would failover to the alternate master, which would then assume master controller status. After the failed controller card is replaced in the master unit, that unit assumes the role of alternate master. The new master unit (previously the alternate master) retains all the necessary information, such as the unit IP address, to continue functioning without system interruption. The partner group can be returned back to its original, prefailover configuration of master and alternate master by performing a `reset` command.

In a single controller unit configuration, system activity is interrupted until the controller card is replaced and is back online. When a controller card is replaced, the disk tray automatically downloads the previous settings to the new controller card. The disk tray is fully functional once the new controller card is installed and the controller is online.

5.2.5.1 Controller Card LEDs

The controller card has a channel-active LED for the host interface port, a controller status (online) LED, and a reset switch. For the locations of and information about the LEDs and how to interpret them to diagnose a failure, see Section 4.1.4.4 “Controller Card LEDs” on page 4-8.

Note – Even if the LED indicates a controller card failure, you should always verify the FRU status using either the CLI or Component Manager before replacing the unit. Refer to the *Sun StorEdge T3 Disk Tray Administrator’s Guide* or *Sun StorEdge Component Manager User’s Guide* for more information.

5.2.5.2 Removing and Replacing a Controller Card

A controller card can be replaced without system interruption only if the disk tray is part of a partner group (redundant controller unit configuration).

To replace the controller card:

1. **Observe static electricity precautions.**
2. **Ensure that the controller card is showing failure status.**
3. **Remove the Ethernet cable from the 10BASE-T connector.**

4. **Remove the fiber-optic cable and MIA from the FC-AL connector.**
5. **Unlock the controller card by pushing in on the latch handles (**FIGURE 5-8**).**
6. **Pull the controller card out using the latch handles.**

Caution – The controller card that is removed must be replaced within 30 minutes or the Sun StorEdge T3 disk tray and all attached disk trays will automatically shut down and power off.

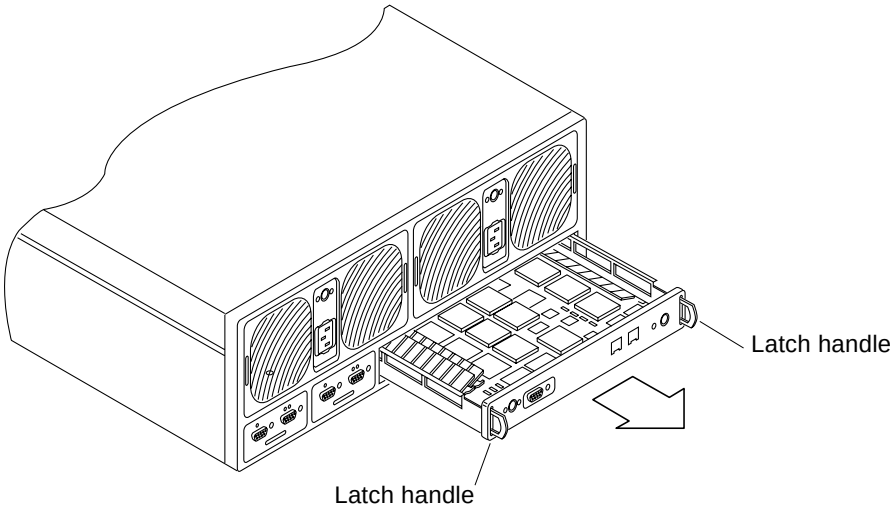


FIGURE 5-8 Removing the Controller Card

7. **Insert the new controller card.**
8. **Lock the new controller card by pushing in the latch handles.**
9. **Insert the fiber-optic cable and MIA back into the FC-AL connector.**
10. **Insert the Ethernet cable into the 10BASE-T connector.**
11. **Check the controller status LED to determine when the controller is operational.**

    While the controller boots, the controller status LED will be solid amber. When the controller is operational, the LED will turn green.

5.2.6 Chassis

The disk tray chassis rarely needs to be replaced. However, the chassis part number is available to replace the centerplane and chassis if necessary. (These must be replaced together, because they are factory aligned.)

Problems with the centerplane would most likely occur due to an electrical short or a bent or broken pin connector. These problems would first appear as a failure of another FRU component, such as an interconnect failure or drive failure. If replacing the FRU that appears to be failed does not correct the problem, then the centerplane connector that the FRU connects to should be examined for bent or broken pins. If nothing is obvious, then another spare FRU could be installed to verify that it is not a failed FRU component causing the problem. If you have eliminated all possibility of a FRU component failure and the problem still remains, it is likely to be a centerplane failure.

If there is a centerplane failure, contact your Sun service representative. Only trained, qualified service providers should replace a disk tray chassis and centerplane.

5.3 Upgrading Firmware

The firmware upgrade procedures that follow must be done through the Ethernet connection. The latest firmware versions are located on the SunSolve web site:

```
http://sunsolve.sun.com
```

From the SunSolve web site, select Patches under the SunSolve Online column, then select the Storage Products option from the Patches web page. Refer to the README file on the web page for specific details on upgrading the firmware.

Note – If you do not have access to the SunSolve web site, contact your Sun service provider for patch information.

The firmware file-naming restrictions are as follows:

- The name is a string that consists of 1 to 12 characters.
- The name must start with an alphabetic character, not a numeral. For example:
  - `file1.bin` is acceptable
  - `1file.bin` is not acceptable

- The characters can be a combination of alphabetic letters; digits (0 through 9); and special characters such as _ (underscore), . (period), $ (dollar symbol), or - (hyphen).
- Names are case sensitive. (For example, `ABC` and `abc` are separate files.)

5.3.1 Upgrading Controller Firmware

When upgrading controller firmware, make sure there are no additional telnet or FTP sessions to the Sun StorEdge T3 disk tray. Halt all disk tray activity (no I/Os running from the host), and keep activity through the one remaining telnet session to a minimum. Also, be sure the system is in an optimal state before starting the upgrade by verifying the system controller states:

- Use the `port listmap` command to verify that no failover conditions have occurred.
- Use the `vol stat` command to verify that all disk drives in the partner group are optimal.

Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* for more information on these commands.

To upgrade the controller firmware:

1. **Start an FTP session from the management host to the disk tray.**

   For example:

```
mngt_host:/:<15>ftp 129.150.47.101
Connected to 129.150.47.101.
Escape character is '^]'.

220 129.150.47.101 pSOSystem (NUPPC/2.0.0-G) ready

Name (129.146.81.201:root):
```

2. **Log in to the disk tray by typing** `root` **and the root password at the prompts.**

```
Name (129.146.81.201:root): root

331 Password required for root.
Password: password
230 User root logged in.
ftp>
```

3. **Type** `binary` **to set the transfer mode.**

```
ftp> binary
```

4. **Copy the** *firmware* **file from the working directory on the host to the /directory on the disk tray.**

```
ftp> put firmware
200 PORT command successful.
150 Binary data connection for filename (129.150.47.101,1031).
226 Binary Transfer complete.
162 bytes received in 1 seconds (0 Kbytes/s)
ftp>
```

5. **Type** `quit` **to exit the** `ftp` **session.**

```
ftp>
quit
221 Goodbye.
mngt_host:/:
```

6. **Install the firmware using the** `boot -i` **command.**

```
t300:/:<2>boot -i filename
```

7. **Reboot the disk tray using the** `reset` **command.**

```
t300:/:<3>reset
```

5.3.2 Upgrading Controller EPROM Firmware

The EPROM firmware is stored in the FLASH memory device (FMD) on the controller card. The disk tray can be operational during the EPROM firmware upgrade.

Note – If you are upgrading the EPROM firmware in a partner group, you need to do this procedure only once for it to affect both units.

To upgrade the EPROM firmware:

1. **Start an FTP session from the management host to the disk tray.**

   For example:

```
mngt_host:/:<15>ftp 129.150.47.101
Connected to 129.150.47.101.
Escape character is '^]'.

220 129.150.47.101 pSOSystem (NUPPC/2.0.0-G) ready

Name (129.146.81.201:root):
```

2. **Log in to the disk tray by typing** `root` **and the root password at the prompts.**

```
Name (129.146.81.201:root): root

331 Password required for root.
Password: password
230 User root logged in.
ftp>
```

3. **Type** `binary` **to set the transfer mode.**

```
ftp> binary
```

4. **Copy the** *firmware* **file from the working directory on the host to the /directory on the disk tray.**

```
ftp> put firmware
200 PORT command successful.
150 Binary data connection for filename (129.150.47.101,1031).
226 Binary Transfer complete.
162 bytes received in 1 seconds (0 Kbytes/s)
ftp>
```

5. **Type** `quit` **to exit the** `ftp` **session.**

```
ftp>
quit
221 Goodbye.
mngt_host:/:
```

6. **Install the firmware using the** `ep download` **command.**

```
t300:/:<2>ep download filename
```

The `ep` command downloads EPROM firmware to both the master and alternate master in a partner group at the same time. You do not have to reboot the disk tray for the EPROM firmware to become effective. However, the release version number will not be updated in a `fru list` output until the disk tray is rebooted.

5.3.3 Upgrading Interconnect Card Firmware

The interconnect card firmware is stored in the FLASH memory device on the interconnect card. The disk tray can be operational during the interconnect card firmware upgrade.

1. **Start an FTP session from the management host to the disk tray.**

   For example:

```
mngt_host:/:<15>ftp 129.150.47.101
Connected to 129.150.47.101.
Escape character is '^]'.

220 129.150.47.101 pSOSystem (NUPPC/2.0.0-G) ready

Name (129.146.81.201:root):
```

2. **Log in to the disk tray by typing** `root` **and the root password at the prompts.**

```
Name (129.146.81.201:root): root

331 Password required for root.
Password: password
230 User root logged in.
ftp>
```

3. **Type** `binary` **to set the transfer mode.**

```
ftp> binary
```

4. **Copy the** *firmware* **file from the working directory on the host to the /directory on the disk tray.**

```
ftp> put firmware
200 PORT command successful.
150 Binary data connection for filename (129.150.47.101,1031).
226 Binary Transfer complete.
162 bytes received in 1 seconds (0 Kbytes/s)
ftp>
```

5. **Type** `quit` **to exit the** `ftp` **session.**

```
ftp>
quit
221 Goodbye.
mngt_host:/:
```

6. **Install the firmware using the** `lpc` **command.**

   This example shows downloading the firmware to a partner group (four interconnect cards).

```
t300:/:<2>lpc download u1l1 filename
t300:/:<3>lpc download u1l2 filename
t300:/:<4>lpc download u2l1 filename
t300:/:<5>lpc download u2l2 filename
```

   You must install the firmware on each interconnect card as shown in the example.

7. **Verify the version level by typing** `lpc version`**.**

   You do not have to reboot the disk tray for the interconnect card firmware to become effective.

5.3.4 Upgrading Disk Drive Firmware

During a disk drive firmware download, there are limitations on what the disk tray can be doing during the download. To avoid system problems:

- Ensure that the data path to the host has been quiesced. There must not be any I/O activity during the disk drive firmware download.
- Ensure that the Ethernet connection is not being used. If Component Manager is being used, it must be set to "Disable Polling." There is an option to select this setting. Refer to the *Sun StorEdge Component Manager User's Guide* for instructions on disabling polling.

Caution – Disable Component Manager polling during this procedure to avoid problems.

- Do not perform any command line or Component Manager interaction with the system during the firmware download.

To upgrade the disk drive firmware:

1. **Start an FTP session from the management host to the disk tray.**

   For example:

```
mngt_host:/:<15>ftp 129.150.47.101
Connected to 129.150.47.101.
Escape character is '^]'.

220 129.150.47.101 pSOSystem (NUPPC/2.0.0-G) ready

Name (129.146.81.201:root):
```

2. **Log in to the disk tray by typing** `root` **and the root password at the prompts.**

```
Name (129.146.81.201:root): root

331 Password required for root.
Password: password
230 User root logged in.
ftp>
```

3. **Type** `binary` **to set the transfer mode.**

```
ftp> binary
```

4. **Copy the** *firmware* **file from the working directory on the host to the /directory on the disk tray.**

```
ftp> put firmware
200 PORT command successful.
150 Binary data connection for filename (129.150.47.101,1031).
226 Binary Transfer complete.
162 bytes received in 1 seconds (0 Kbytes/s)
ftp>
```

5. **Type** `quit` **to exit the** `ftp` **session.**

```
ftp>
quit
221 Goodbye.
mngt_host:/:
```

6. **Install the firmware using the** `disk` **command.**

```
t300:/:<2>disk download u1d1-9 filename
```

Caution – If the disk tray is configured with various types of disk drives, then the `disk` command can download firmware for only one drive type at a time. Verify that the download was successful using either the CLI or Component Manager. Refer to the *Sun StorEdge T3 Disk Tray Administrator's Guide* or the *Sun StorEdge Component Manager User's Guide* for more information.

You do not have to reboot the disk tray for the disk drive firmware to become effective.

APPENDIX **A**

Specifications

This appendix contains the following sections:

A.1 Power Specifications

TABLE A-1 Power Specifications

Specification	Rating
Voltage and frequency	100 to 240 VAC, 47 to 63 Hz
Input current	5A max
Input power	450W max
Heat load	1540 BTUs/hr max

A.2 Environmental Specifications

TABLE 1 Environmental Specifications

Specifications	Operating	Nonoperating	Notes
Temperature	5C to 35C with maximum gradient 20C per hour	-20C to 60C with maximum gradient 20C per hour	
Relative humidity	20 to 80% noncondensing with maximum gradient 10% per hour	5 to 93% noncondensing with maximum gradient 10% per hour	
Effective altitude (from drive specification)	–1,000 to +10,000 feet (-305 to +3,048 meters)	-1,000 to +40,000 feet (-305 to +12,192 meters)	
Shock (from drive specification)	4g for maximum duration of 11 ms (half sinewave)	10g for maximum duration of 11 ms (half sinewave)	Shock can be applied from any axis X,Y,Z
Vibration (from drive specification)	5 to 500 Hz @ 0.25g (swept sinewave)	5 to 500 Hz @ 1.0g (swept sinewave)	Vibration can be applied from any axis X,Y,Z

A.3 Mechanical Specifications

Installation clearances: For FRU replacement, allow accessibility in front and rear of chassis. Allow a minimum of four inches in the front and rear for air circulation.

TABLE A-2 Physical Specifications

Height	Width	Depth	Weight
5.25 inches	17.5 inches	18.5 inches	67 lbs
13.33 cm	44.45 cm	46.99 cm	30.39 kilograms

A.4 Cable Specifications

TABLE A-3 Cable Specifications

Cable Type	Connector	Maximum Length
Host interface (FC-AL) (requires copper adapter)	DB-9 copper	25 meters
Shielded Ethernet (10BASE-T)	RJ45	100 meters
RS-232 (COM)	RJ11-6	25 meters
Power (110V)	Standard	n/a
Power (220V)	Standard	n/a
Disk tray interconnect cable	DB-9 (not FC-AL compliant)	14 in. (36 cm) 24 in. (61 cm)

A.5 Connectors

This section contains specifications for the 10BASE-T and RS-232 connectors.

A.5.1 10BASE-T Connector

The controller card has a 10BASE-T connector (RJ45). A shielded twisted-pair Ethernet cable is used to connect the controller server to the site's network hub for administration of the disk tray.

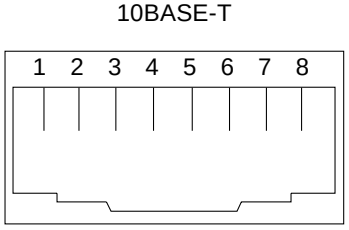


FIGURE A-1 10BASE-T Connector

Pin	Function
1	TD+
2	TD-
3	RD+
4	Reserved
5	Reserved
6	RD-
7	Reserved
8	Reserved

A.5.2 RS-232 Serial Port Connector

The controller card has an RS-232 serial port connector (RJ11-6). A standard serial cable is used to connect the controller service interface to a dumb terminal (or computer serial port with terminal emulation).

Note – The serial port is reserved for special service procedures that can be performed only by qualified, trained service personnel. Do not attempt to perform any procedures through the serial port or you risk damaging the disk tray configuration and data.

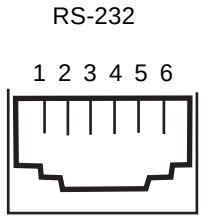


FIGURE A-2 RS-232 Serial Port Connector (RJ11-6)

Pin	Function
1	GND
2	Reserved
3	Reserved
4	GND
5	RXD
6	TXD

APPENDIX **B**

Illustrated Parts

This appendix contains part numbers and illustrations of field-replaceable units (FRUs).

TABLE B-1 Illustrated Parts

Part	Part Number	Page Number
Disk drive in canister; various capacities available	Contact your Sun service representative	page B-2
Controller card	F375-0084	page B-2
Interconnect card	F375-0085	page B-2
Power and cooling unit	F300-1454	page B-3
Interconnect cable: • 14 in. (36 cm) • 24 in. (61 cm)	 F530-2842 F530-2843	page B-3
Power cord	F180-1918	page B-3
5m fiber-optic cable	F537-1020	page B-3
Media interface adapter (MIA)	F370-3989	page B-3
Front panel	F540-4306	page B-4
Empty Sun StorEdge T3 disk tray chassis with centerplane	F370-3990	Not shown

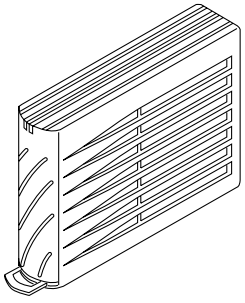


FIGURE B-1 Disk Drive in Canister

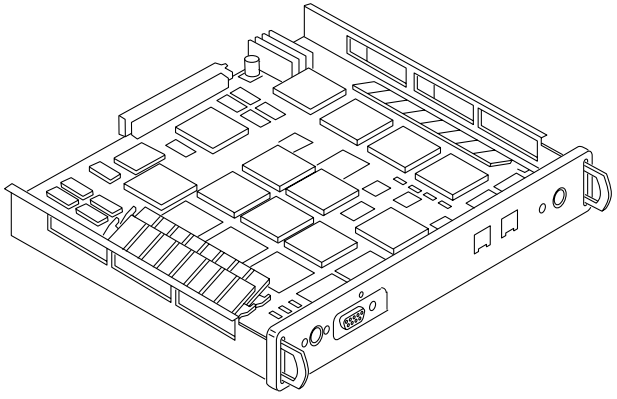


FIGURE B-2 Controller Card

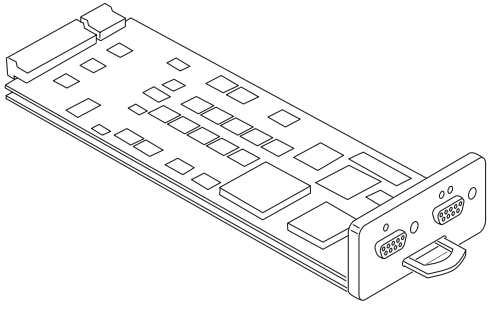


FIGURE B-3 Interconnect Card

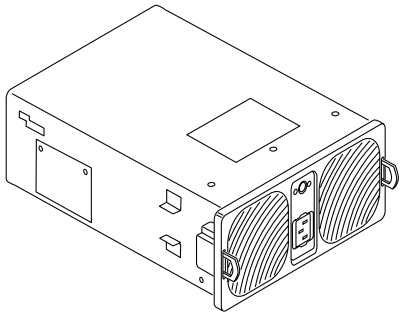


FIGURE B-4 Power and Cooling Unit

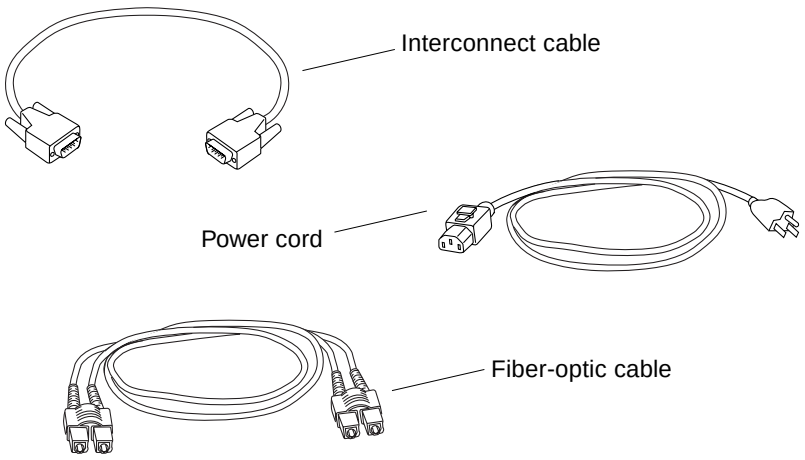


FIGURE B-5 Cables and Cords

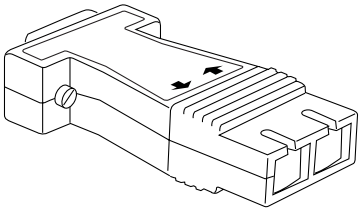


FIGURE B-6 Media Interface Adapter (MIA)

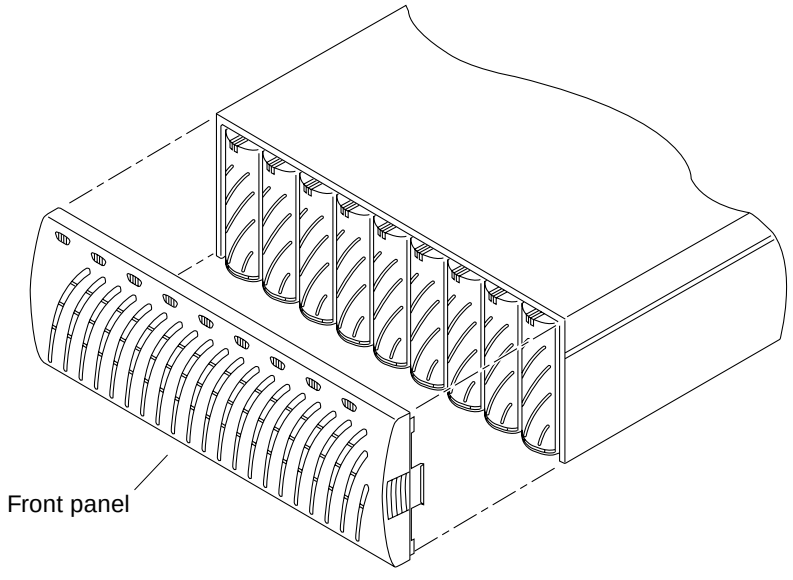


FIGURE B-7 Front Panel

Glossary

A

administrative domain Partner groups (interconnected controller units) that share common administration through a master controller.

alternate master unit The secondary disk tray unit in a partner group that provides failover capability from the master unit.

alternate pathing (AP) A mechanism that reroutes data to the other disk tray controller in a partner group upon failure in the host data path. Alternate pathing requires special software to perform this function.

auto cache mode The default cache mode for the Sun StorEdge T3 disk tray. In a fully redundant configuration, cache is set to write-behind mode. In a nonredundant configuration, cache is set to write-through. Read caching is always performed.

B

buffering Data that is being transferred between the host and the drives.

C

command-line interface (CLI) The interface between the Sun StorEdge T3 disk tray's pSOS operating system and the user in which the user types commands to administer the disk tray.

controller unit A Sun StorEdge T3 disk tray that includes a controller card. It can be use as a standalone unit or configured with other Sun StorEdge T3 disk trays.

E

erasable programmable read-only memory (EPROM) Memory stored on the controller card; useful for stable storage for long periods without electricity while still allowing reprogramming.

expansion unit A Sun StorEdge T3 disk tray without a controller card. It must be connected to a controller unit to be operational.

F

Fibre Channel Arbitrated Loop (FC-AL) A 100 MB/s serial channel, which allows connection of multiple devices (disk drives and controllers).

field-replaceable unit (FRU) A component that is easily removed and replaced by a field service engineer or a system administrator.

G

gigabit interface converter (GBIC) An adapter used on an SBus card to convert fiber-optic signal to copper.

gigabyte (GB or Gbyte) One gigabyte is equal to one billion bytes (1x109).

graphical user interface (GUI) A software interface that enables configuration and administration of the Sun StorEdge T3 disk tray using a graphic application.

H

hot spare A drive in a RAID 1 or RAID 5 configuration that contains no data and acts as a standby in case another drive fails.

hot-swap The characteristic of a field-replaceable unit (FRU) to be removed and replaced while the system remains powered on and operational.

I

input/output operations per second (IOPS) A performance measurement of the transaction rate.

interconnect cable An FC-AL cable with a unique switched-loop architecture that is used to interconnect multiple Sun StorEdge T3 disk trays.

interconnect card A disk tray component that contains the interface circuitry and two connectors for interconnecting multiple Sun StorEdge T3 disk tray units.

L

light-emitting diode (LED) A device that converts electrical energy into light that is used to display activity.

logical unit number (LUN) One or more drives that can be grouped into a unit; also called a volume.

M

master unit The main controller unit in a partner-group configuration.

media access control (MAC) address A unique address that identifies a storage location or a device.

media interface adapter (MIA) An adapter that converts fiber-optic light signals to copper.

megabyte (MB or Mbyte) One megabyte is equal to one million bytes (1x106).

megabytes per second (MB/s) A performance measurement of the sustained data transfer rate.

P

parity Additional information stored with data on a disk that enables the controller to rebuild data after a drive failure.

partner group A pair of interconnected controller units. Expansion units interconnected to the pair of controller units can also be part of the partner group.

power and cooling unit A FRU component in the Sun StorEdge T3 disk tray. It contains a power supply, cooling fans, and an integrated UPS battery. There are two power and cooling units in a Sun StorEdge T3 disk tray.

R

read caching Data for future retrieval, to reduce disk I/O as much as possible.

redundant array of independent disks (RAID) A configuration in which multiple drives are combined into a single virtual drive, to improve performance and reliability.

reliability, availability, serviceability (RAS) A term to describe product features that include high availability, easily serviced components, and very dependable.

S

Simple Network Management Protocol (SNMP) A network management protocol designed to give a user the capability to remotely manage a computer network.

synchronous dynamic random access memory (SDRAM) A form of dynamic random access memory (DRAM) that can run at higher clock speeds than conventional DRAM.

system area Located on the disk drive label, the space that contains configuration data, boot firmware, and file-system information.

U

uninterruptable power source (UPS) A component within the power and cooling unit. It supplies power from a battery in the case of an AC power failure.

V

volume Also called a LUN, a volume is one or more drives that can be grouped into a unit for data storage.

W

world wide number (WWN) Number used to identify disk tray volumes in both the disk tray system and Solaris environment.

write caching Data used to build up stripes of data, eliminating the read-modify-write overhead. Write caching improves performance for applications that are writing to disk.

Index

T

U

V