Sun Fire™ 280R Server Owner's Guide

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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。

Declaration of Conformity

Compliance Model Number: 350R
Product Name: Sun Fire 280R

EMC

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

EN55022:1998/CISPR22:1997		Class A
EN550024:1998	EN61000-4-2	4 kV (Direct), 8 kV (Air)
	EN61000-4-3	3 V/m
	EN61000-4-4	1.0 kV AC Power Lines, 0.5 kV Signal DC & Power Lines
	EN61000-4-5	1 kV AC Line-Line & Outdoor Signal Lines
		2 kV AC Line-Gnd, 0.5 kV DC Power Lines
	EN61000-4-6	3 V
	EN61000-4-8	1 A/m
	EN61000-4-11	Pass
EN61000-3-2:1995 w/Amendments 1,2		Pass
EN61000-3-3:1995		Pass

Safety

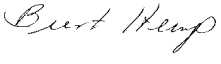
This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:

EC Type Examination Certificates:

EN60950:1992, 2nd Edition, Amendments 1,2,3,4,11	TUV Rheinland Certificate No.
IEC 950:1991, 2nd Edition, Amendments 1,2,3,4	
Evaluated to all CB Countries	CB Scheme Certificate No.
FDA DHHS Accession Number (Monitors Only)	

Supplementary Information

This product was tested and complies with all the requirements for the CE Mark.



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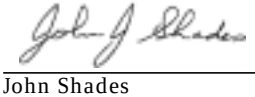

John Shades January 2001
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Safety Agency Compliance Statements

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 switch of this product functions as a standby type device only. The power cord serves as the primary disconnect device for the system. Be sure to plug the power cord into a grounded power outlet that is nearby the system and is readily accessible. Do not connect the power cord when the power supply has been removed from the system chassis.

Lithium Battery

Caution – On Sun CPU boards, there is a lithium battery molded into the real-time clock, SGS No. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, 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 sealed lead acid battery in Sun Fire 280R units. Portable Energy Products No. TLC02V50. There is danger of explosion if the battery pack is mishandled or incorrectly replaced. Replace only with the same type of Sun Microsystems battery pack. Do not disassemble it or attempt to recharge it outside the system. Do not dispose of the battery in fire. Dispose of the battery properly in accordance with local regulations.

System Unit Cover

You must remove the cover of your Sun computer system unit to add cards, memory, or internal storage devices. Be sure to replace the top cover before powering on your computer system.

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.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser KLasse 1

CD-ROM

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 – Der Ein/Aus-Schalter dieses Geräts schaltet nur auf Wartezustand (Stand-By-Modus). Um die Stromzufuhr zum Gerät vollständig zu unterbrechen, müssen Sie das Netzkabel von der Steckdose abziehen. Schließen Sie den Stecker des Netzkabels an eine in der Nähe befindliche, frei zugängliche, geerdete Netzsteckdose an. Schließen Sie das Netzkabel nicht an, wenn das Netzteil aus der Systemeinheit entfernt wurde.

Lithiumbatterie

Achtung – CPU-Karten von Sun verfügen über eine Echtzeituhr mit integrierter Lithiumbatterie (Teile-Nr. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, 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 – Die Geräte Sun Fire 280R enthalten auslaufsichere Bleiakkumulatoren. Produkt-Nr. TLC02V50 für portable Stromversorgung. Werden bei der Behandlung oder beim Austausch der Batterie Fehler gemacht, besteht Explosionsgefahr. Batterie nur gegen Batterien gleichen Typs von Sun Microsystems austauschen. Nicht demontieren und nicht versuchen, die Batterie außerhalb des Geräts zu laden. Batterie nicht ins Feuer werfen. Ordnungsgemäß entsprechend den vor Ort geltenden Vorschriften entsorgen.

Gehäuseabdeckung

Sie müssen die obere Abdeckung Ihres Sun-Systems entfernen, um interne Komponenten wie Karten, Speicherchips oder Massenspeicher hinzuzufügen. Bringen Sie die obere Gehäuseabdeckung wieder an, bevor Sie Ihr System einschalten.

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.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser KLasse 1

CD-ROM

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: – le commutateur d'alimentation de ce produit fonctionne comme un dispositif de mise en veille uniquement. C'est la prise d'alimentation qui sert à mettre le produit hors tension. Veillez donc à installer le produit à proximité d'une prise murale facilement accessible. Ne connectez pas la prise d'alimentation lorsque le châssis du système n'est plus alimenté.

Batterie au lithium

Attention: – sur les cartes CPU Sun, une batterie au lithium (référence MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, 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: – Les unités Sun Fire 280R contiennent une batterie étanche au plomb (produits énergétiques portatifs n˚TLC02V50). Il existe un risque d'explosion si ce bloc-batterie est manipulé de façon erronée ou mal mis en place. Ne remplacez ce bloc que par un bloc-batterie Sun Microsystems du même type. Ne le démontez pas et n'essayez pas de le recharger hors du système. Ne faites pas brûler la batterie mais mettez-la au rebut conformément aux réglementations locales en vigueur.

Couvercle

Pour ajouter des cartes, de la mémoire, ou des unités de stockage internes, vous devrez démonter le couvercle de l'unité système Sun. Ne pas oublier de remettre ce couvercle en place avant de mettre le système sous tension.

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.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser KLasse 1

CD-ROM

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 todas los avisos e instrucciones marcados 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. Pueden haber voltajes peligrosos. 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 sobrecalentamien-tos 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, Parte 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 del que se dispone 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. El enchufe de la fuente de alimentación está diseñado para ser el elemento primario de desconexión del equipo. El equipo debe instalarse cerca del enchufe de forma que este último pueda ser fácil y rápidamente accesible. No conecte el cable de alimentación cuando se ha retirado la fuente de alimentación del chasis del sistema.

Batería de litio

Precaución – En las placas de CPU Sun hay una batería de litio insertada en el reloj de tiempo real, tipo SGS Núm. MK48T59Y, MK48TXXB-XX, MK48T18-XXXPCZ, M48T59W-XXXPCZ, o MK48T08. Las baterías no son elementos reemplazables por el propio cliente. Pueden explotar si se manipulan de forma errónea. No arroje las baterías al fuego. No las abra o intente recargarlas.

Paquete de pilas

Precaución – Las unidades Sun Fire 280R contienen una pila de plomo sellada, Productos de energía portátil nº TLC02V50. 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 paquete 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

Debe quitar la tapa del sistema cuando sea necesario añadir tarjetas, memoria o dispositivos de almacenamiento internos. Asegúrese de cerrar la tapa superior antes de volver a encender el equipo.

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

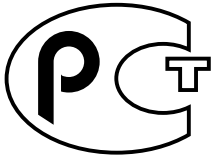
Los productos Sun que utilizan la tecnología de láser cumplen con los requisitos de láser de Clase 1.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser KLasse 1

CD-ROM

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

ADVARSEL – 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

Preface

The *Sun Fire 280R Server Owner's Guide* answers your questions about setting up and running the Sun Fire 280R server. Features and options, setup and installation, system management, hardware and software configuration, network administration information, using internal storage devices, and diagnostics and troubleshooting topics for the Sun Fire 280R server are covered in this manual.

With the exception of internal disk drives in the Sun Fire 280R server, *all component part installation or replacement* is to be performed by a qualified service provider.

This manual presents information in a modular format designed to answer the type of questions that you might ask while installing, configuring, and using the Sun Fire 280R server. Look at the module headings and you'll find the cue words that direct you to the categories of questions and answers, such as:

- How to . . . How do I do something?
- About . . . Is there more information about this topic?
- Reference for . . . Where can I find reference material for something?

You determine how much or how little of the information you need to read.

Using the table of contents, the information or task list on the first page of each chapter, and the index, you can quickly find a specific topic or task. The information modules are brief; however, they are interrelated and refer you to other modules that you may want or need to read. For instance, if you're installing a disk drive and you're already familiar with the task, you could go to "How to Install a Disk Drive" and follow the installation procedure. But if you need more background information before performing the task, you should first read "About Disk Drives."

How This Book Is Organized

Chapter 1 describes the system's hardware and software features. Descriptions of the hardware front and back panel features, the system's devices, and status indicators and controls are included. Software features are summarized and listed.

Chapter 2 describes how to attach the cables needed to get the Sun Fire 280R server hardware up and running. For information about rackmounting the server, consult the *Sun Fire 280R Server Setup and Rackmounting Guide* that accompanied your system. For the operating system software, the chapter explains what you need to do and points you to the appropriate software manuals for additional information.

Chapter 3 focuses on the software in the server and its improved reliability, availability, and serviceability features and system administrative information.

Chapter 4 describes the hardware and software configuration of the system.

Chapter 5 provides what you need to know, and need to do, to install, remove, or replace an internal disk drive. In addition, basic information about how to use the system's internal storage devices such as the hard disk drive, the DVD-ROM drive(s), and tape devices is also covered.

Chapter 6 introduces the diagnostic tools available for the system and explains how to use these tools. It also introduces the suite of software tools and how to use them to monitor your system, isolate problems, and troubleshoot the system. The tools should help you determine what component of the system (if any) needs to be replaced.

Appendix A diagrams the pinouts for accessible system connectors.

Appendix B describes the system's physical, electrical, and environmental specifications.

Using UNIX Commands

This document does not contain comprehensive information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this additional information:

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

Typographic and Command Entry Conventions

Typeface or Symbol	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	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be superuser to do this.
	Command-line command and variable entry; replace the variable with a real name or value, and then press the Return or Enter key	To delete a file, type `rm` *filename.*

Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

The following documents contain topics that relate to the information in the *Sun Fire 280R Server Owner's Guide.*

Application	Title
Server rackmounting and setup	*Sun Fire 280R Server Setup and Rackmounting Guide*
Installation and removal of parts by qualified service providers	*Sun Fire 280R Server Service Manual*
Late-breaking product news and information	*Sun Fire 280R Server Product Notes*
System diagnostics	*SunVTS User's Guide* *SunVTS Test Reference* *SunVTS Test Reference Manual* *SunVTS Toolkit Test Developer's Guide* *SunVTS Quick Reference Card* *OpenBoot Command Reference Manual* *OpenBoot Quick Reference* *OpenBoot Supplement for PCI*
System management	*Sun Management Center Software Documentation Set* *Sun Management Center Software User's Guide* *Sun Management Center Software Release Notes* *Sun Management Center Supplement for Workgroup Servers* *Sun Management Center Developer Environment Release Notes*

Application	Title
System and network administration	*Solaris System Administrator AnswerBook* *SPARC: Installing Solaris Software* *Platform Notes: The eri FastEthernet Driver*
Using operating system software	*Solaris User's Guide*
Miscellaneous	*Solaris 8 on Sun Hardware Collection* *Solaris on Sun Hardware AnswerBook* *Solaris Handbook for Sun Peripherals*
Updating the flash PROM	*Solaris 8 on Sun Hardware Documentation Guide* *Solaris 8 Sun Hardware Platform Guide* *Solaris 8 Sun Hardware Roadmap*
Remote System Control	*Sun Remote System Control (RSC) User's Guide* *Sun Remote System Control (RSC) Release Notes*
Storage management	*Sun StorEdge Component Manager User's Guide* *Sun StorEdge LibMON Installation and User's Guide* *VERITAS Volume Manager Storage Administration Guide* *VERITAS Volume Manager Administrator's Reference Guide* *Sun Release Notes for VERITAS Volume Manager*

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CHAPTER 1

System Overview

This chapter introduces you to the Sun Fire 280R server and explains some of its hardware and software features. The following information is covered in this chapter:

About the Sun Fire 280R Server Hardware

The Sun Fire 280R server is a high-performance, shared-memory, dual-processor multiprocessing system. The server is designed to use one or two of Sun's UltraSPARC™ III CPU modules. Each UltraSPARC III CPU module implements the SPARC™ V-9 Instruction Set Architecture (ISA) and the Visual Instruction Set (VIS) extensions that accelerate multimedia, networking, encryption, and Java™ processing. The UltraSPARC III CPU module also supports new pre-fetch instruction extensions to the VIS to speed overall system performance.

Processing power is provided by one or two UltraSPARC III CPU modules, each with up to 8 Mbytes of local high-speed external cache memory. The system bus synchronizes automatically to the clock rate of the installed CPUs, and operates at a clock rate that is a ratio of the speeds between CPU modules and the bus. For more information about CPU modules, see "About Central Processing Unit (CPU) Modules" on page 83.

System main memory is provided by up to eight next generation dual inline memory modules (DIMMs), each of which is capable of storing 128, 256, 512, or 1024 Mbytes of data. Total main memory is expandable up to 8 Gbytes. To enhance

memory I/O performance, the system transfers 64 bytes of data into or from memory on each memory transfer. For more information about system memory, see “About System Memory” on page 80.

System I/O is handled by two separate Peripheral Component Interconnect (PCI) buses. The PCI industry-standard buses support all main logic board I/O and up to four PCI interface cards. One PCI bus operates at a 33-MHz clock rate and the other bus can operate at either 33 MHz or 66 MHz. All PCI cards plug in to slots provided on the system’s main logic board. For more information about PCI buses, see “About Peripheral Component Interconnect (PCI) Buses” on page 84.

There are four industry-standard Universal Serial Bus (USB) 12-Mbps ports on the back panel. The system supports a Sun Type 6 USB keyboard and a Sun USB mouse; each device uses a separate port. Industry-standard USB hubs are also supported. For more information, see “About the Universal Serial Bus (USB) Ports” on page 102.

Internal disk storage supports up to two 1-inch high, 3.5-inch wide (2.54-cm x 8.89-cm) disk drives using a Fibre Channel-Arbitrated Loop (FC-AL) interface running at up to 106 Mbytes per second. Both drives are supported in a single internal arbitrated loop. The system’s external FC-AL connector is also connected to the loop. Systems configured with two disk drives (currently 18- or 36-Gbyte capacity) can provide software mirroring and hot-pluggable boot drive capability. For more information about disk storage, see “About Internal Disk Drives” on page 91.

External redundant arrays of independent disks (RAID) can be supported by installing single- or dual-channel FC-AL PCI host adapter card(s) with the appropriate system software; or RAID can also be supported by connection to the external FC-AL port’s copper high-speed serial data connector (HSSDC) on the back panel. In addition, the external FC-AL port supports up to 125 different devices (per single FC-AL loop). For more information about FC-AL support, see “About the Fibre Channel-Arbitrated Loop (FC-AL) and Port” on page 104.

Ultra Small Computer System Interface (UltraSCSI) external multi-disk storage subsystems and RAID storage arrays can be independently supported by installing single-channel or multichannel PCI host adapter cards, along with the appropriate system software; or by connecting to the system’s UltraSCSI port. Software drivers supporting UltraSCSI, and other types of devices, are included in the Solaris Operating Environment. For more information about RAID storage support, including hot-plugging and mirroring disk drives, see “About Internal Disk Drives” on page 91.

A standard Remote System Control (RSC) card is installed in every system. The RSC card supports internal host environmental monitoring; host power-on and power-off from the firmware level; remote or local automatic notification via email or pager for hardware and software failures; and viewing of server boot logs and run-time logs. Multiple simultaneous remote access connections to the RSC card on each host are configurable over modem and serial ports, or over the card’s 10-Mbps standard

Twisted-Pair Ethernet (TPE) connection using the `telnet` or the Point-to-Point Protocol (PPP). For more information about RSC hardware, see “About the Remote System Control (RSC) Card and Ports” on page 107.

A 5.25-inch by 1.6-inch (13.35-cm x 4.06-cm) digital video disc-read only memory (DVD-ROM) drive is standard; a tape drive with the same form factor is optional. The drives are installed in the system’s upper bay of the removable media assembly (RMA) and read and write using a Small Computer System Interface (SCSI). The DVD-ROM drive uses the Universal Disk Format (UDF) that is compatible with CD-ROM based media.

You can attach up to four external tape devices to the standard 68-pin 40-Mbyte per second UltraSCSI port. Additional external tape devices are supported with appropriate PCI host adapter cards.

You can easily connect the Sun Fire 280R server to either a 10-Mbps or a 100-Mbps Ethernet by means of an auto-sensing Ethernet interface provided on the system’s main logic board. You can establish Ethernet interfaces or connections to other networks, such as Fiber Distributed Data Interface (FDDI), Asynchronous Transfer Mode (ATM), or to token ring by installing the appropriate PCI interface cards. For more information, see “About Peripheral Component Interconnect (PCI) Buses” on page 84.

The Sun Fire 280R server provides two serial asynchronous/synchronous communication ports through a pair of DB-25 connectors located on the back panel. It also provides one external, 2-Mbyte per second, bidirectional, Centronics-compatible, enhanced parallel port (EPP) for connecting the system to a local printer or other compatible parallel device.

The system console device can be a standard ASCII character terminal, a local windowing subsystem, or it can also be redirected to display over a supported `telnet` connection using the RSC card. You can connect an ASCII terminal to one of the system’s two serial ports, while a local windowing subsystem in a graphics console requires installation of a PCI frame buffer card, monitor, keyboard, and mouse. (Sun’s Universal Port Architecture (UPA) graphics is *not* supported in the Sun Fire 280R server.) You can also administer the server from a remote system connected to the server over an Ethernet network connection, or you can use an Ethernet connection via the RSC and a redirected system console. See “About Communicating With the System” on page 33.

Full power is provided by one 560-watt power supply with its dual internal fans. System configurations with two power supplies provide both redundancy and full hot-swap capability. For more information about the power supplies, see “About Power Supplies” on page 95.

The system is housed in a standard Electronic Industries Association 310 (EIA 310) specification-compliant rackmountable enclosure measuring 6.95 inches high, 17.25 inches wide, and 27.25 inches deep (17.6 cm x 43.8 cm x 69.2 cm). The system has a

maximum weight of 75 lb (34 kg). You can rackmount up to nine systems in a 72-inch (182.80-cm) high EIA-compliant cabinet, such as the Sun™ StorEdge Expansion Cabinet.

The Sun Fire 280R server is shipped with a rackmounting kit for installation into a standard EIA 310-compliant 29-inch to 32-inch (73.6-cm to 81.3-cm) deep and 19-inch (48.26-cm) wide rack, with at least four rack units (7.0 inches, 17.78 cm) of vertical mounting space available per server, and sufficient load-bearing capacity.

Sun Fire 280R system reliability, availability, and serviceability (RAS) are enhanced by features that include:

- Error correction and parity checking for improved data integrity
- Easily accessible LED status indicators
- Hot-pluggable internal disk drives with status indicators and easy front access
- External support for RAID 0, 1, 0 + 1, and 5 implementations
- System environmental monitoring and control
- Power system monitoring and fault notification
- Power supply redundancy
- Hot-swappable power supplies with easy front panel access
- Automatic system recovery
- Improved system diagnostics software
- Enhanced system availability software
- Remote System Control card access to remotely boot, monitor, and control servers
- Easy front or top access to all internal replaceable components

For additional hardware details, see “About System Reliability, Availability, and Serviceability Features” on page 64, and for software details, see “About the Sun Fire 280R Server Software” on page 11 and “About Managing the System” on page 71.

About Front and Back Panel Features

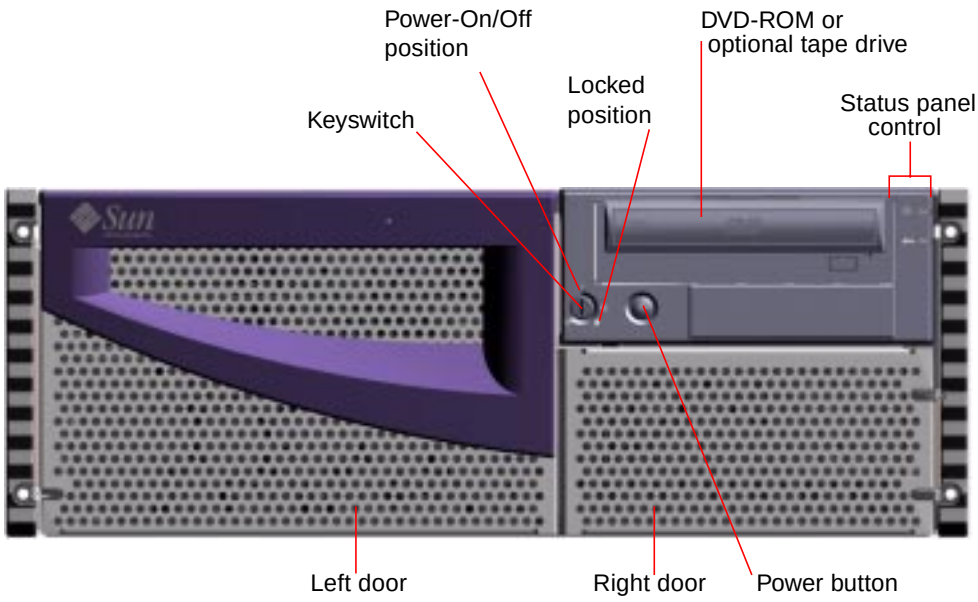
The following sections describe the system front panel, with the doors open and closed, and the system back panel, showing all the ports and standard connectors.

Front Panel Features

The illustration below shows the system control features and status indicators that are accessible from the front panel with the system front doors closed.

When the key in the front panel keyswitch is in the Locked position, the front doors are also locked preventing access to the disk drives and power supplies. Before you close the doors, make sure that the key is in the Power-On / Off position and that you overlap the front doors correctly as you close them. After closing the doors, to lock them insert and turn the key to the Locked position; then remove the key.

Note – This same key also controls the system cover lock on the top of the system (see “Reference for Physical Specifications” on page 218). If you lose the key, contact your Sun sales representative about replacing the key.

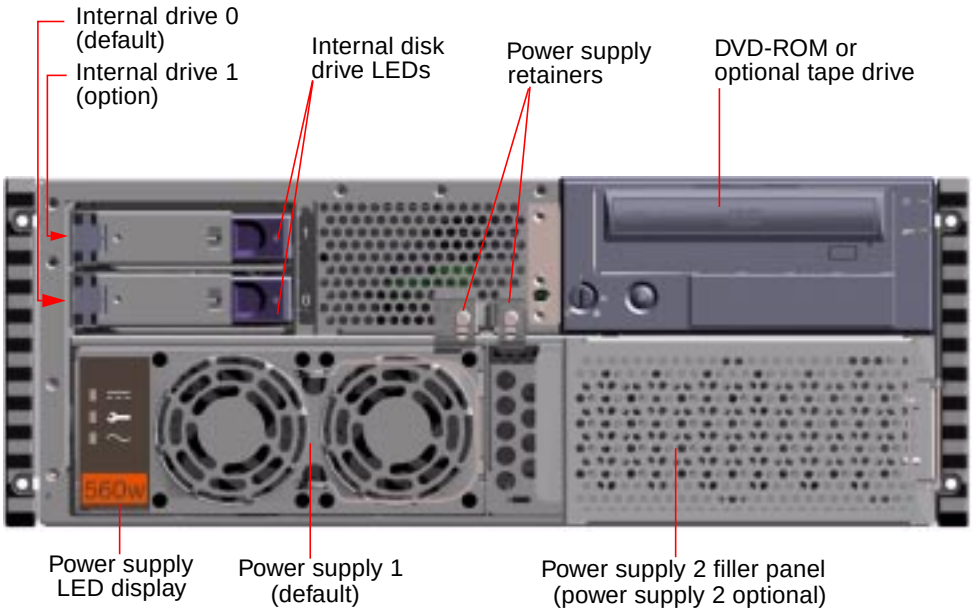


The system's Power button is beside the keyswitch and is controlled by the keyswitch settings. For more information about the keyswitch positions, see "Keyswitch Settings" on page 9.

The system's standard front panel and controls are illustrated in the figure below. An optional tape drive is available in place of the DVD-ROM. For more information about using the DVD-ROM drive, or the optional tape drive (if installed), see Chapter 5.

For more information about status panel controls and indicators, see "Status and Control Panel Features" on page 8.

Opening the system's front doors provides access to the system's hot-pluggable internal disk drives. Releasing the power supply retainers affords qualified service personnel access to the hot-swappable power supplies. The illustration below shows the additional accessible features when the system front doors are open.

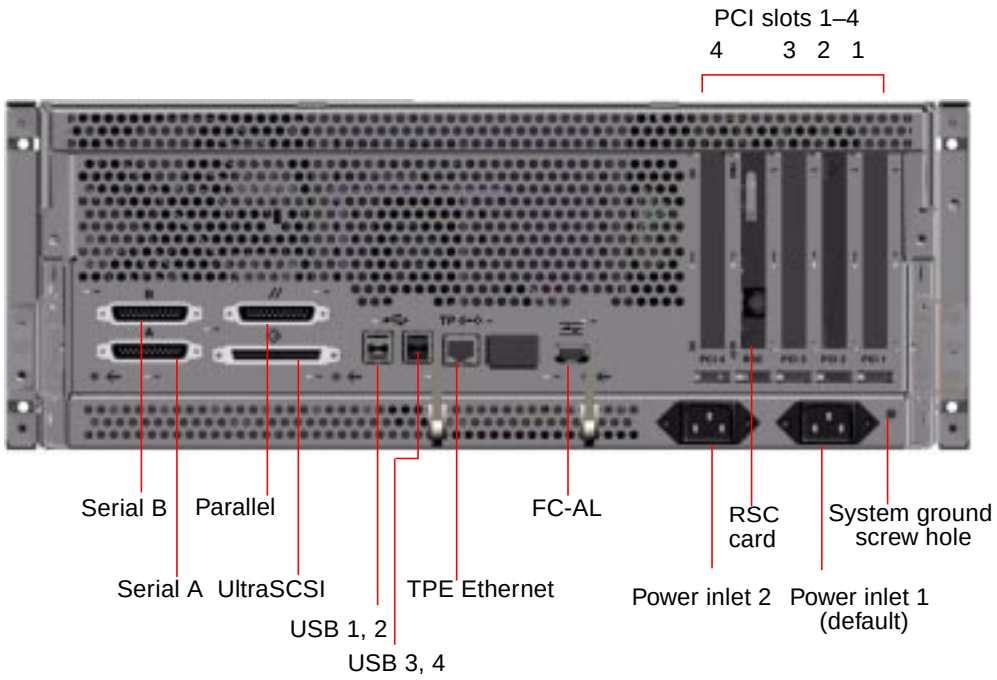


Systems may be configured with one or two power supplies, and one or two disk drives either of which is accessible when the system front doors are open. Each power supply has an LED that displays the AC power, DC power, and fault status of the supply. Only qualified service providers should access the power supplies. See "Power Supply Failure" on page 195 for operational details of the LEDs.

Each disk drive has an LED indicating when lit steadily that the drive is present, and if the LED is blinking that there is activity on the disk. For additional information see "About Power Supplies" on page 95.

Back Panel Features

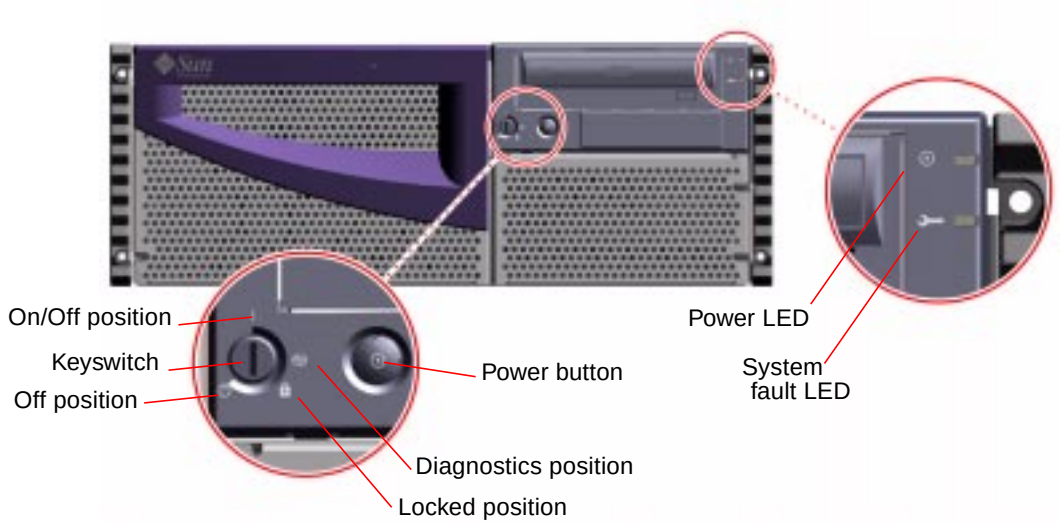
The illustration below shows the system features that are accessible from the back panel.



A ground screw hole 0.157 inch in diameter and 0.236 inch deep (4 mm x 6 mm) is located in the lower-right corner of the back panel. Contact your Sun sales representative if you need a grounding strap.

Status and Control Panel Features

The status and control panel includes a four-position security keyswitch and two system-level LED indicators. After powering the system on, the recommended keyswitch position for standard operation is the Locked position. For more detailed information, see “Keyswitch Settings” on page 9 and “System LED Indicators” on page 10.



Keyswitch Settings

The front panel keyswitch controls the power-on modes of the system. The following table describes the function of each switch setting.

Keyswitch Setting	Icon	Description
Power-On / Off		This setting enables the system's Power button to power on, or to power off, the system. If Solaris software is running, quickly pressing and releasing the Power button initiates a software system shutdown. If the system hangs, holding the Power button down for four seconds while the keyswitch is in this position will cause an immediate hardware power off.
Diagnostics		This setting ensures that the power-on self-test (POST) and the OpenBoot Diagnostics will run at system startup. Level `max` OpenBoot Diagnostics are run if the system is started with the keyswitch in this position. All diagnostic messages are printed to the system console. This setting enables the system's Power button to power on, or to power off, the system.
Locked		This setting disables the system's Power button and also locks the front doors, preventing access to the disk drives and to the power supplies. The Locked position is the recommended setting for normal day-to-day operation of the system.
Off		This setting places the system in power-off mode immediately by turning off any power supply and placing it in standby mode of 5 volts DC output. All other power supply voltages are turned off to all other internal system components *except* to the circuitry on the power distribution board, to the I^2C bus circuitry on the FC-AL backplane, to the RSC card circuitry, and to selected circuits on the main logic board. This setting disables the server's Power button. This setting *does not* allow the RSC card to restart the server. However, the RSC card can still report its data to the software using the system's standby power.

System LED Indicators

The two system LEDs consist of a system power indicator and a fault indicator. The system power indicator lights continuously green to show that the system is powered on. The fault indicator lights when a problem is detected in the system. Because it is important to know that a fault exists in the system after an error condition occurs, the fault indicator remains lit when the system is in normal operating mode. When the system is switched Off using the keyswitch, the LED indicator stays lit for devices drawing standby power.

When you first power on the system, both the system indicator LEDs are lit. The general fault indicator lights steadily for two seconds and is then toggled off. After that, the LEDs operate as described in the following table.

Name	Icon	Description
Power-on / Activity		This green LED lights continuously when the system power is on.
General fault		This amber LED lights steadily when a system hardware fault is detected. For example, the LED lights when: a fault occurs in a power supply indicating an over-temperature condition, an incorrect voltage occurs in a power supply, an electrical short occurs in a power supply, or when a fan failure occurs in a power supply. During the boot process, this LED *flashes* for approximately three seconds. If the user presses the Power button twice within the three seconds, the system will come up with factory-set Safe mode NVRAM variable settings, returning the system to the ok firmware prompt. See “How to Use Default NVRAM Parameters” on page 178 for more information. This amber LED lights steadily if either installed power supply is not a 560-watt power supply. This amber LED lights steadily if there is a single system fan failure, or lit by software. See “About Using Diagnostic Tools to Monitor, Diagnose, and Exercise the System” on page 162 for information about troubleshooting your server.

About the Sun Fire 280R Server Software

The Sun Fire 280R server requires the Solaris 8 Hardware 1/01 Operating Environment or later compatible versions. Together, the Solaris 8 Operating Environment and the server's OpenBoot™ firmware (version 4.0.xx) support a suite of server management, server monitoring, server configuration, and device validation and management tools that extend the reliability, availability, and serviceability features. Used with the Remote System Control (RSC) card, you can control these features network-wide.

The Solaris 8 Operating Environment software supports the following tools.

- Server management software that includes:
  - Sun™ Management Center, which provides a single solution for monitoring and managing multiple Sun servers and systems, devices, and network resources from a single remote system.
  - Solaris Resource Manager™, which controls resource allocation to applications, users, and user groups (Solaris Resource Manager is not bundled with Solaris 8).
  - Solaris™ Bandwidth Manager, which extends resource management control to the network software.
  - Solaris Management Console™, which provides a consistent, easy-to-use interface that is also part of a software development kit (SDK) enabling the integration of new Java™-developed software services into the Solaris console.
  - Solaris 8 implementation of the Internet Engineering Task Force (IETF) specifications for the Internet Protocol Security Architecture, which allows administrators to create and control secure encrypted networks and smart-card authentication at login time.
  - Internet Protocol Network MultiPathing (IPMP) alternate pathing software, which enables failover or redirection of network traffic among PCI networking cards.
  - A Solaris Live Upgrades feature, which executes server reconfiguration and upgrades to the Solaris 8 Operating Environment while Solaris is running. This feature includes dynamically adding new code to the Solaris 8 Operating Environment kernel.
  - Sun Validation Test Suite (SunVTS™), which provides a comprehensive system validation and test suite designed to support Sun hardware platforms and peripherals.
  - Sun Remote System Control (RSC) software, which supports both a graphical and a command-line user interface for using the RSC software features from the operating environment.

- Sun Cluster software, which offers a Solaris-integrated suite of products for clustering that provides high availability and application scalability.
- Solaris PC NetLink software, which allows for personal computer-to-server and server-to-server integration, is shipped on its own CD-ROM. (Solaris PC NetLink software is not bundled with the Solaris 8 Operating Environment.)

For more information about these management features, see Chapter 3. For more information about the Solaris 8 Operating Environment support for testing and diagnostics, see Chapter 6.

The OpenBoot firmware on the Sun Fire 280R server supports the following tools:

- Power-on self-test (POST)
- OpenBoot Diagnostics
- Access to the `ok` prompt for the RSC hardware and software, and system console redirection

The Sun Fire 280R server's RSC card firmware supports:

- Event notification of hardware and software failures via email or pager
- Remote internal environmental monitoring
- Remote power on and power off
- Remote viewing of server boot logs and run-time logs

The operating environment tools complement the firmware tools and provide a comprehensive set of diagnostic tools for the hardware. For more information about the RSC card, see "About the Remote System Control (RSC) Card and Ports" on page 107. For more information about how the RSC card extends the server's software, see "About the Remote System Control (RSC) Software" on page 110.

CHAPTER 2

System Setup

This chapter, used with the *Sun Fire 280R Server Setup and Rackmounting Guide*, describes how to rackmount a server and attach all cords and cables needed to get the Sun Fire 280R server up and running. Where software is involved, this chapter explains some of what you need to do, and then points you to the appropriate software manuals for the rest of the information.

The following information is covered in this chapter:

Tasks covered in this chapter include:

About the Parts Shipped to You

Your system is “configured-to-order,” which means that most internal options that you ordered are pre-installed at the factory. However, if you ordered options that are not factory-installed, these will be shipped to you separately.

You will receive a rackmounting kit (standard) or kits (ordered separately) to install your system(s) into a rackmounting cabinet. See the *Sun Fire 280R Server Setup and Rackmounting Guide* for a list of parts in the rackmounting kit. You may also have separately ordered one or more rackmounting cabinets with accompanying documentation (ordered separately). Verify that you have received everything you ordered.

In addition, you should have received the media and documentation for all appropriate system software (ordered separately). Verify that you have received everything you ordered.

Note – Inspect all shipping cartons for evidence of physical damage. If a shipping carton is damaged, request that the carrier's agent be present when the carton is opened. Keep all contents and packing material for the agent's inspection.

Using the Setup and Rackmounting Guide

Use this Owner’s Guide with the *Sun Fire 280R Server Setup and Rackmounting Guide* to install your server. The Setup and Rackmounting Guide is shipped with your system and describes procedures for rackmounting the server, and for attaching all cords and cables needed to get the server up and running.

Tools Required for Setup and Rackmounting

You will need to locate these tools before you rackmount the server in a standard EIA-compliant rack:

- A Phillips No. 2 screwdriver and a flat-blade screwdriver
- An adjustable wrench to tighten the nuts on the slide bracket assemblies and to adjust the feet on the rackmount cabinet’s anti-tip legs (if necessary)
- Allen wrenches to remove the rackmount cabinet’s side panels (if necessary)
- A spirit level to level the rackmount cabinet front-to-back and side-to-side (if necessary)

How to Install the Sun Fire 280R Server

Before You Begin

The Sun Fire 280R server is a general-purpose server, which you can use for many types of applications. Exactly how you set up your machine depends in some measure upon what you want it to do.

This procedure is intended to be as "generic" as possible, so as to cover the needs of most sites. Even so, you will need to make certain decisions to complete the procedure:

- On which network or networks do you intend your machine to operate? You will need some or all of the following information:
  - Host name of the system you are installing
  - Language and locales you intend to use on the system
  - Host IP address
  - Subnet mask
  - Type of name service (Domain Name Service, Network Information Service, or Network Information Service Plus, for example)
  - Domain name
  - Host name of server
  - Host IP address of name server
  - RSC host name and IP address

    For background information about network support, see "About Network Interface Options" on page 86.

    The RSC card is a significant addition to the basic configuration; consult "About the Remote System Control (RSC) Card and Ports" on page 107, and "About the Remote System Control (RSC) Software" on page 110 for information about RSC.
- How do you want to use/configure your machine's internal disks?

  For background information about internal disk use, see "About Disk Array Configurations and Concepts" on page 87.

Note – A minimal Solaris 8 installation requires at least 64 Mbytes of memory and at least 1.7 Gbytes of disk space.

- What software do you intend to load?

  Software included in the server media kit or other software products may impose certain disk space or disk partitioning requirements. Refer to the documentation accompanying the software to determine those requirements.

Once you have answered these questions, you are ready to begin the installation procedure.

What to Do

1. **Verify that you have received all the parts of your system.**

   See "About the Parts Shipped to You" on page 14.

2. **Install any optional drive shipped with your system.**

   Many of the options ordered with your system are pre-installed at the factory. For information about how to install other options, see the *Sun Fire 280R Server Service Manual* or contact your qualified service provider. However, if you ordered a second internal disk drive that was not factory-installed, see the section "How to Install a Disk Drive" on page 125.

Note – *Any* additional options, other than the disk drives, should be installed by a qualified service provider.

---

3. **Install the system into the rack.**

   See "About System Rackmounting" on page 21 and the *Sun Fire 280R Server Setup and Rackmounting Guide* for installation instructions for the rack. If the system's slide assembly rails are already mounted in a rack, see "How to Install the System Into the Rack" on page 23.

4. **Ensure that the system's front panel keyswitch is in the Off position.**

   See "Status and Control Panel Features" on page 8.

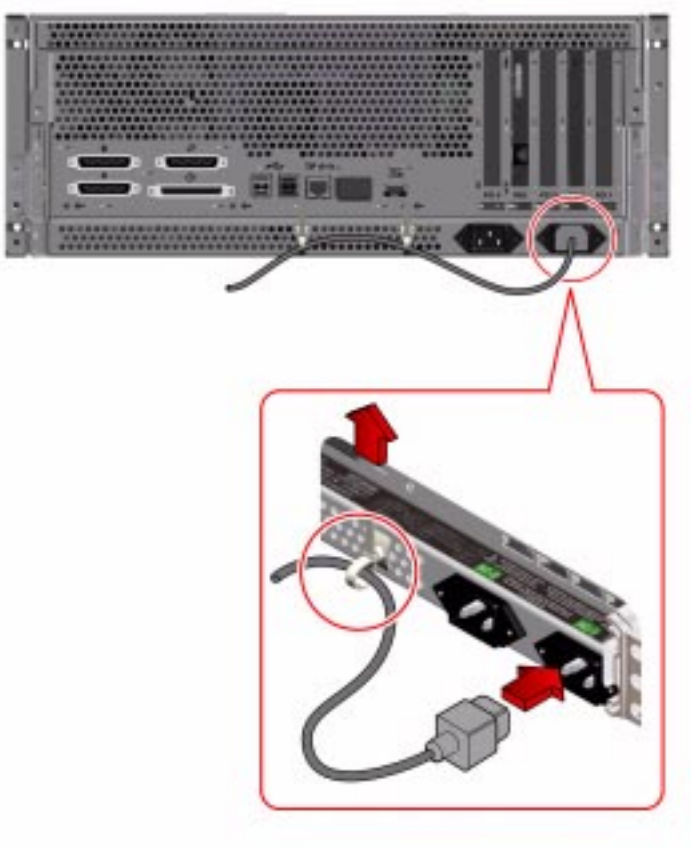
5. **Once the system is installed into the rack, connect the AC power cord to the power inlet labeled (1) at the back of the system.**

6. **Attach a strain relief (if necessary) and connect the other end of the cord to a grounded AC power outlet.**

   To prevent accidental or inadvertent removal of an AC power cord from its inlet, use the strain relief. The strain relief is a plastic tie-wrap and pedestal that is installed into the back panel of the system. Use these reliefs to manage the power cords after you have installed the cords into the AC inlets in the server.

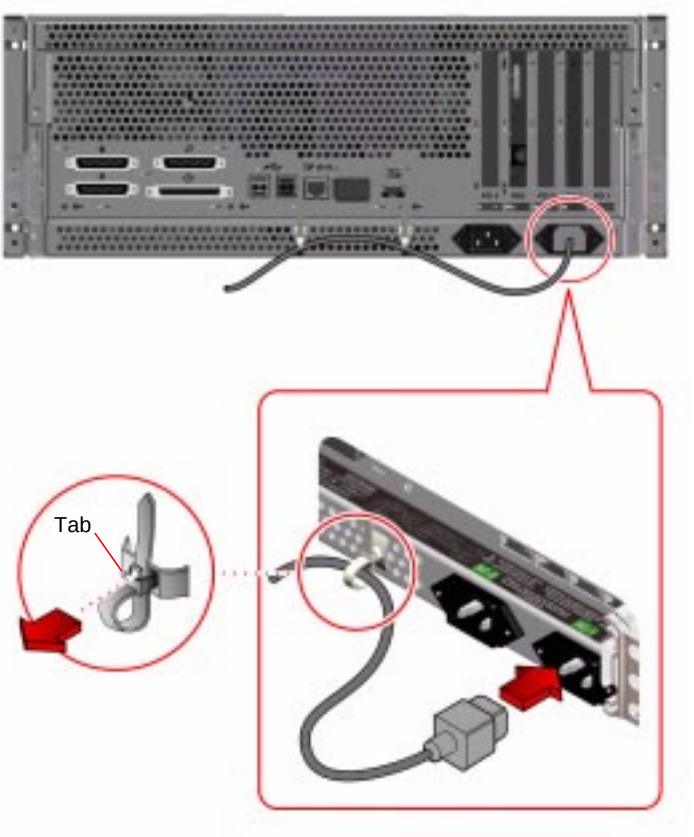
- To attach a strain relief, wrap the loose end of the tie-wrap around the AC power cord and thread the tie-wrap through the opening in the relief pedestal. Pull the end to tighten the tie-wrap.

Note – Each outlet must connect the system to a 15A circuit for North America and Japan, and to a 10A circuit for Europe. See your local electrical codes.



Note – If your server includes a second power supply, connect the second AC power cord to the left inlet labeled (2). You may connect the second power supply to the same AC circuit as the first supply. However, for increased system redundancy connect each power supply to a separate circuit.

- To release the AC power cord from the strain relief, pull the tab away from the strain relief pedestal and loosen the tie-wrap.



7. **Set up a console for installing your server.**

   You must either establish a `tip` connection from another server, or use an ASCII terminal connected to serial port A, or install a graphics card and attach a monitor, mouse, and keyboard to the server. For more information, see "About Communicating With the System" on page 33.

8. **Configure the network interface.**

   The system's standard network interface is a switchable 10BASE-T/100BASE-TX Ethernet interface conforming to the IEEE 802.3u Ethernet standard. The interface configures itself automatically for either 10-Mbps or 100-Mbps operation, depending on network characteristics.

   Supported PCI cards allow connection to additional Ethernet networks, or to token ring, FDDI, or other network types.

   - If you are using the standard Ethernet interface, see "How to Configure the Standard Ethernet Interface" on page 51.
   - If you are using a PCI network interface, see the documentation accompanying the PCI network card.

Note – The RSC card Ethernet and modem interfaces are available only *after* you have installed the operating system software and the RSC software. Consult the *Sun Remote System Control (RSC) User's Guide* for more details about configuring these interfaces.

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9. **Turn on power to your server.**

   See "How to Power On the System" on page 40. For information about the LED status indicators that appear during power-up, see "System LED Indicators" on page 10.

10. **Install and boot the operating system software.**

    You must order the operating system software separately from your system hardware. See "How to Install the System Software" on page 46 and "Installing the Operating Environment From DVD/CD-ROM" on page 46, or "Installing the Operating Environment From a Network Boot Server" on page 47.

11. **Determine your internal disk configuration.**

    Consult the *Solstice DiskSuite User's Guide* for information about implementing your internal disk configuration. For information about possible external configurations, see "About Disk Array Configurations and Concepts" on page 87.

12. Load additional software from the server media kit.

When the installation process prompts you to do so, you can load additional software packages. If you are using the Solaris interactive installation method, read the *Solaris 8 Installation Roadmap* to find how to install other software after the Solaris software is installed.

The server media kit (sold separately) includes several CD-ROM discs containing software to help you operate, configure, and administer your server. See the documents provided in the server media kit for a complete listing of included software and detailed installation instructions.

13. Load the Sun Fire 280R server hardware online documentation.

See the installation instructions that accompany the CD-ROM disc in the Sun Fire 280R documentation set.

About System Rackmounting

You can mount the server in any rack that meets the Electronic Industries Association (EIA) standard specification 310 (EIA 310). The system enclosure measures 6.95 inches high, 17.25 inches wide, and 27.25 inches deep (17.6 cm x 43.8 cm x 69.2 cm) and requires a minimum of four vertical rack units (RUs—1 RU is 1.75 inches or 4.45 cm). The system has a maximum weight of 75 lb (34 kg).

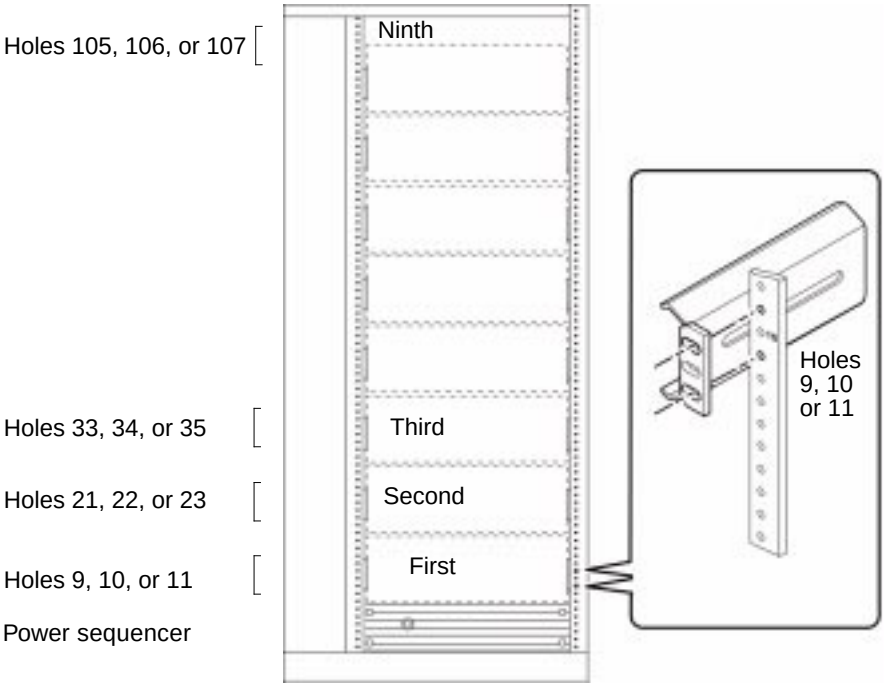
Shipped with your system is the *Sun Fire 280R Server Setup and Rackmounting Guide*, which describes how to rackmount your server. Use the guide for rackmounting instructions.

Rackmounting Guidelines

- Install the slide assemblies for the first server in the lowest possible rack position.
- For stability, install the remaining servers from the lowest system upward into the rack, as shown in the next figure.
- To mount the server in an EIA standard rack, allow four RUs per system to obtain the highest density in the rack. Use the supplied Rack Buddy rackmounting template to locate the correct holes for server placement in the rack.

Use the Rack Buddy to determine at what height in the rack you will install the server slide assemblies (and other subsequent server slide assemblies).

For example, a Sun cabinet might have 36 configurable vertical RUs and could support up to nine servers. To maximize server density in a 72-inch (182.8-cm) rack, install the slide assembly brackets starting for the lowest enclosure at rail hole 9 (in a rack configured with a power sequencer in holes 1 to 6), and add subsequent brackets starting at rail holes 21, 33, 45, 57, 69, 81, 93, and 105. The following figure illustrates such a configuration.



Front view representation of nine servers in a 36 RU cabinet

Note – For the latest configuration information about mixing different systems or peripherals in standard EIA 310-compliant racks, and for information about Sun's rackmounting cabinets, consult the *Rackmount Placement Matrix* located at the URL `http://docs.sun.com`. At the site, click on Storage and Peripherals, find *Rackmount Placement Matrix* among the AnswerBook2 collection titles, and click on the link to display the book.

Caution – A ground screw hole is located in the lower right corner of the chassis back panel. For more information about rackmounting peripherals and grounding them, see the documentation accompanying the peripheral.

How to Install the System Into the Rack

This procedure assumes that the slide assembly is already installed in the rack, and that the rack is stabilized and ready for you to insert the system safely. For additional information on installing the slide assemblies and about rack enclosures, see the *Sun Fire 280R Server Setup and Rackmounting Guide* and "About System Rackmounting" on page 21.

Caution – The chassis is heavy. Two persons are required to place the system into the rack slide assembly in the following procedure.

Before You Begin

Complete these tasks:

- Assemble the correct tools for the procedure. See "Tools Required for Setup and Rackmounting" on page 14.
- Extend the cabinet's anti-tip legs.

Caution – Unless the rack is bolted to the floor, you must extend the cabinet's anti-tip legs and adjust their stabilizing feet to the floor. Level and secure the cabinet to provide a safe working environment.

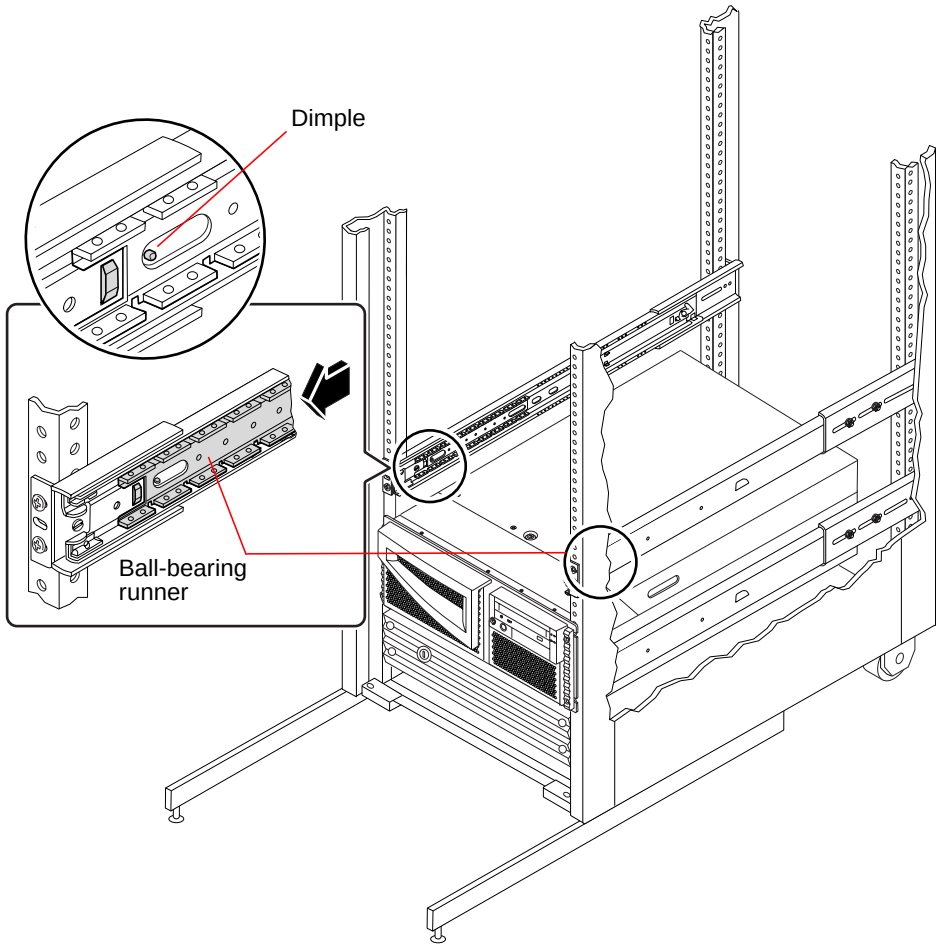
- Identify a person to assist you, and a cart to help move the system(s).
- Discuss each task step and verify that your helper can safely lift and carry 34 lb (17 kg), which is approximately half the weight of a fully-equipped system.
- Open and remove the rack enclosure front door.

Caution – When completing a two-person procedure, always communicate your intentions clearly before, during, and after each step to minimize confusion.

What to Do

1. **Slide the ball-bearing runner forward until the dimple holds the runner in the forward position in each inner rail.**

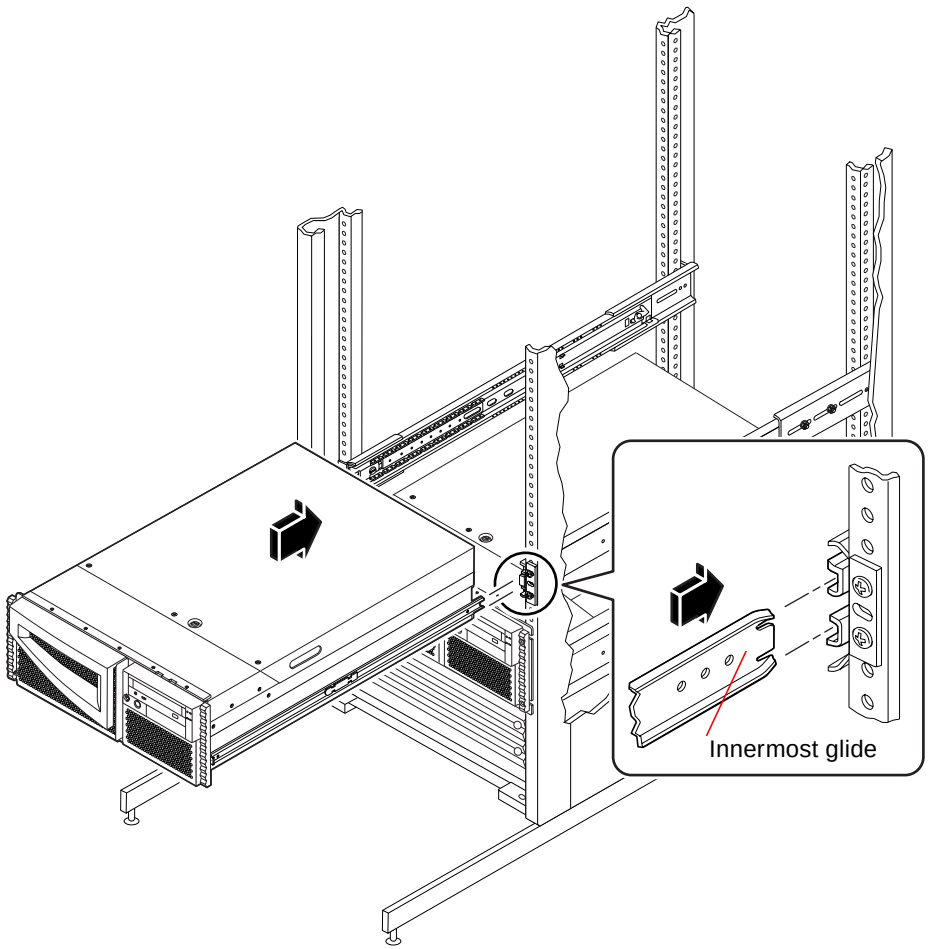
Caution – Ensure that each ball-bearing slide is secured at the *front* of each inner slide assembly before inserting the system into the slide assemblies. Also verify that the inner slides are as far *back* as they can travel into the rack.



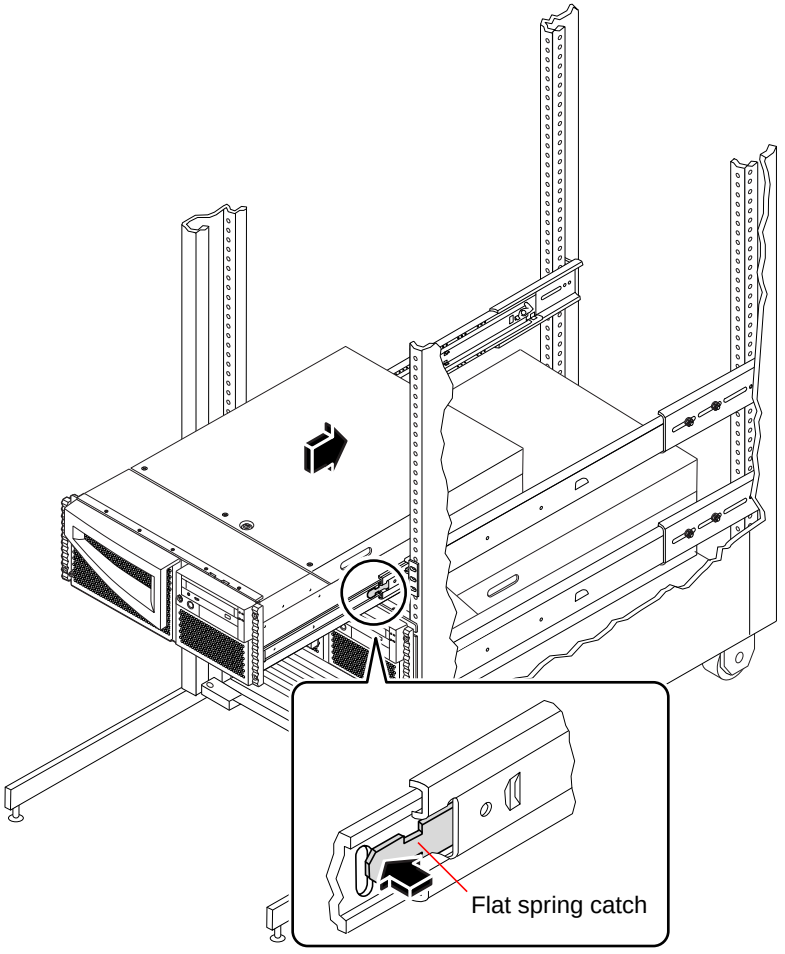
Caution – The system is heavy. Two persons are required to move the system.

2. **Lift the server (one person on each side of the server) and approach the rack with the back of the server facing the front of the rack enclosure.**
3. **Align the crimped ends of the innermost glides on the server with the slide bracket assemblies in the rack enclosure.**
4. **Holding the server level, slide it evenly into the rack enclosure until the innermost glides stop in the slides.**

   The innermost glides are factory installed on the sides of the server enclosure.



5. **On each side of the enclosure, press the flat spring catch mounted on each innermost glide and slide the server all the way into the rack.**



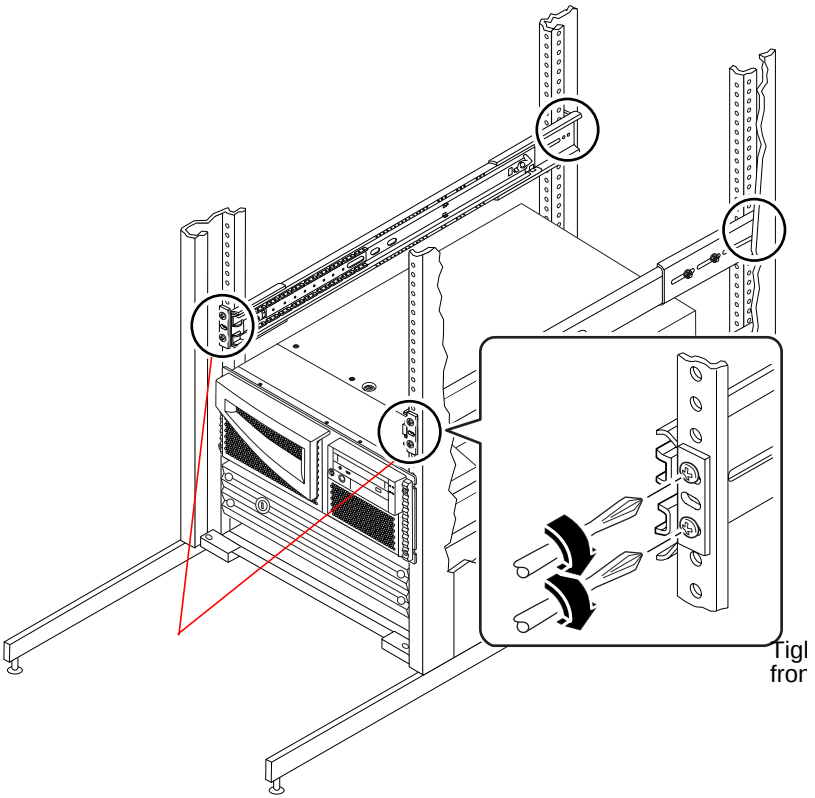
Tip – Slide the server in and out slowly and carefully to ensure that the slide assemblies and the innermost glides are working correctly.

---

6. **Completely tighten all of the slide assembly rackmounting screws.**

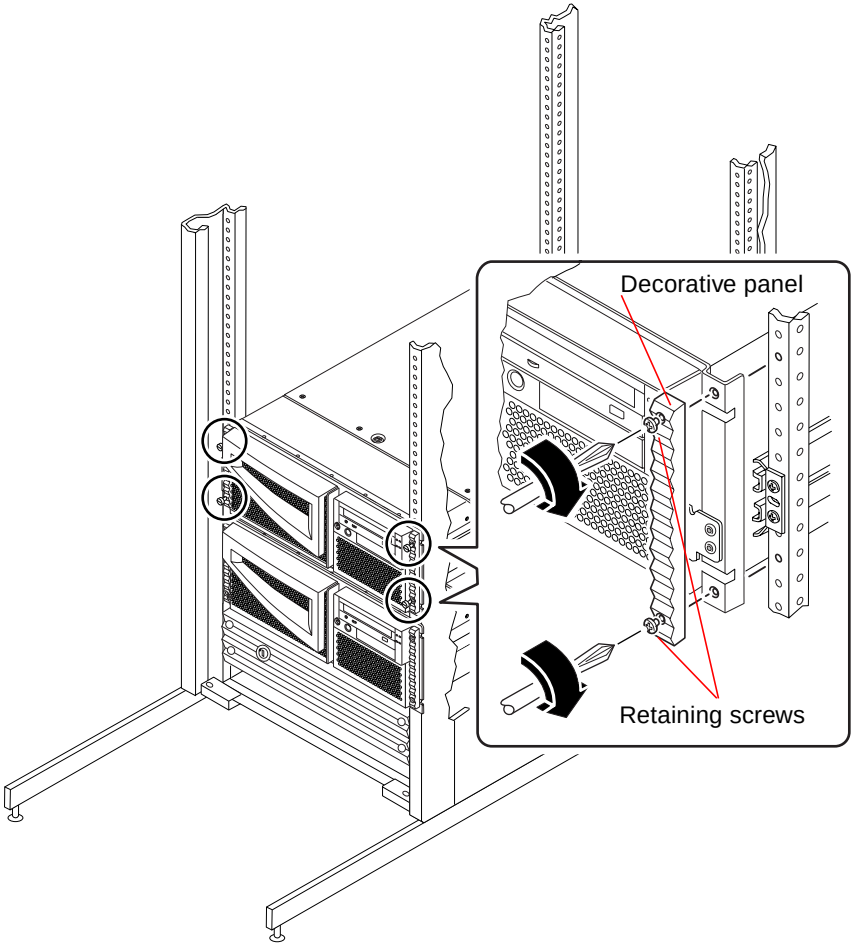
   a. **Make sure that the slide assemblies are level front-to-back and left-to-right.**

   b. **Tighten the eight 10-32 screws that secure the slide assemblies to the vertical rack rails.**



7. **Secure the server to the rails.**

   On both sides of the rack, using the decorative panel retaining screws, secure the top and bottom of the system to the rails.



8. **Connect the external cables to the back panel of the system.**

   As you connect each cable, check it for information indicating the cable's origin and its terminating connection. If you are installing the server for the first time, see the "About Communicating With the System" on page 33 for information about communicating with the server.

9. **Retract the cabinet's anti-tip legs (if necessary).**

10. **Reattach, close, and lock the rack door(s) as appropriate.**

What Next

To power on the system, see:

- "How to Power On the System" on page 40

How to Remove the System From the Rack

With the exception of removing and replacing the main logic board and the power distribution board, qualified service providers can perform all other service procedures while the system is extended from the rack and still attached to the rack rails. If qualified service providers want to remove the system from the rack for any other reason, they should follow the instructions in this section.

Caution – Unless the rack is bolted to the floor, you must extend the cabinet's anti-tip legs and adjust their stabilizing feet to the floor. Level and secure the cabinet to provide a safe working environment.

Caution – The chassis is heavy. Two persons are required to remove the system from the rack enclosure in the following steps.

Before You Begin

Complete these tasks:

- Identify a helper to assist you in removing the system.
- Discuss each task step and verify that your helper can safely lift and carry 34 lb (17 kg), which is approximately half the weight of a fully-equipped system.
- Review the steps in the procedure with your helper beforehand and discuss how to coordinate your efforts to ensure your mutual safety.

Caution – When completing a two-person procedure, always communicate your intentions clearly before, during, and after each step to minimize confusion.

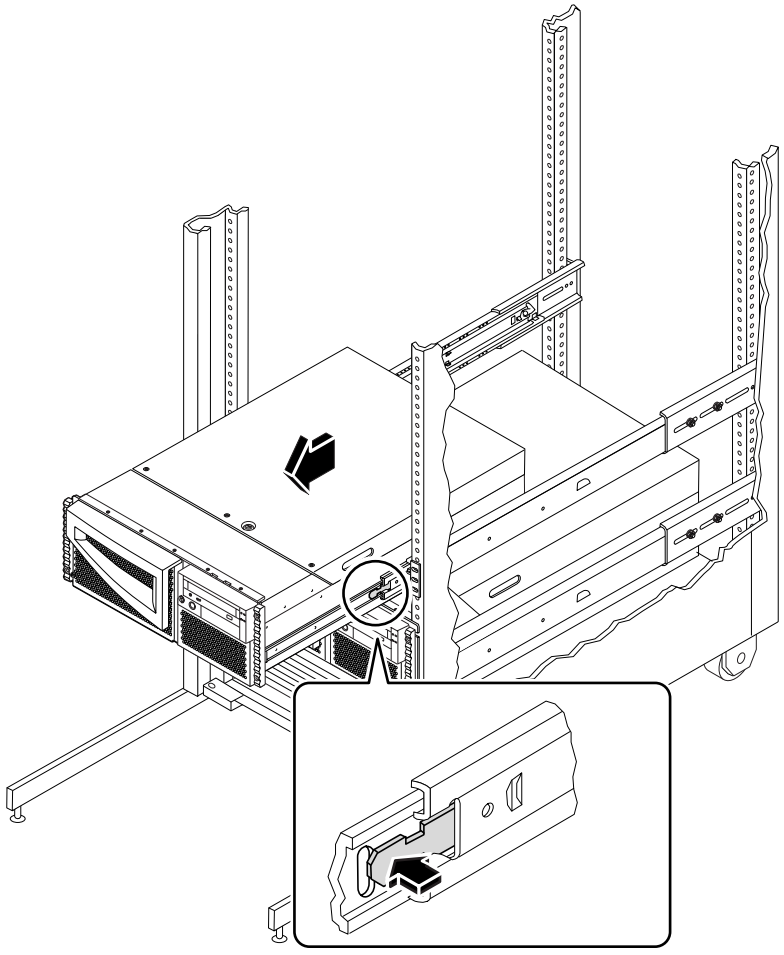
What to Do

1. **Open the rack door (if necessary). Release the decorative panel retaining screws securing the server to the rack, and extend the server from the rack. Position one person on each side of the system, facing the system glides.**

   When you are both in position, verify that your helper understands what to do with the system after you release it and remove it from the rack. Also agree on a route to follow, and visually inspect it for potential safety hazards (for example, cables on the floor, other people working in the vicinity, and so on).

2. **Locate the flat spring catch shown in the following figure.**

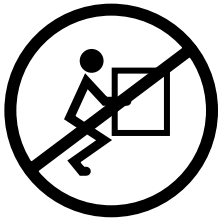
   Each person should visually locate one of the two flat spring catches that release the system from the rack glide. One catch is attached to each inner glide, as shown in the following figure.



3. **Prepare to remove the system.**

   Each person should place one hand on the flat spring catch and the other hand beneath the chassis, palm up, ready to support the weight of the chassis.

Caution – Both persons must know where the server is to be placed, once it is removed from the rack. The chassis is heavy. Two persons are required to remove the system from the rack enclosure in the following steps.



4. **Simultaneously press in on both flat spring catches to release them, and then slide the system out of the glides.**

   Each person presses one spring catch and helps slide the system free of the outer glide, supporting the weight of the system with both hands as the system slides free of the rack.

5. **Set the system on a workbench or other stable surface.**

6. **Slide the empty rack slides back into their protective outer glides.**

7. **Reattach, close, and lock the rack door(s) as appropriate.**

What Next

For information about placing the system into the rack glides, see:

- "How to Install the System Into the Rack" on page 23

About Communicating With the System

To install your server software or to diagnose problems, you need some way to enter system commands and view system console output. There are three ways to do this.

1. Attach an alphanumeric American Standard Code for Information Interchange (ASCII) character terminal to serial port A.

   You can attach a simple terminal to serial port A. The terminal is capable of displaying and entering alphanumeric but not graphical data. For instructions, see "How to Attach an Alphanumeric (ASCII) Terminal" on page 34.

2. Establish a `tip` connection from another Sun system.

   For information about establishing a `tip` connection, see "How to Set Up a `tip` Connection" on page 183 or use the appendix in the *OpenBoot 4.x Command Reference Manual*, an online version of which is included with the *Solaris System Administrator AnswerBook* that ships with Solaris software.

3. Install a local graphics console on your server.

   The server is shipped without a mouse, keyboard, monitor, or frame buffer for the display of graphics. To install a local graphics console on a server, you must install a graphics frame buffer card into a PCI slot, and attach a monitor, mouse, and keyboard to the appropriate back panel ports. After starting the system you must install the correct software driver for the card you have installed. For detailed hardware instructions, see "How to Configure a Local Graphics Console" on page 36.

You may only use the RSC connections (modem or network) after installing the operating environment software and the RSC software. You can then access RSC software from a workstation running the Solaris, Windows 95, Windows 98, or Windows NT operating environment and Sun's RSC Java application, or from an ASCII terminal or device running ASCII terminal emulation software. See "About the Remote System Control (RSC) Card and Ports" on page 107 for more information.

How to Attach an Alphanumeric (ASCII) Terminal

Before You Begin

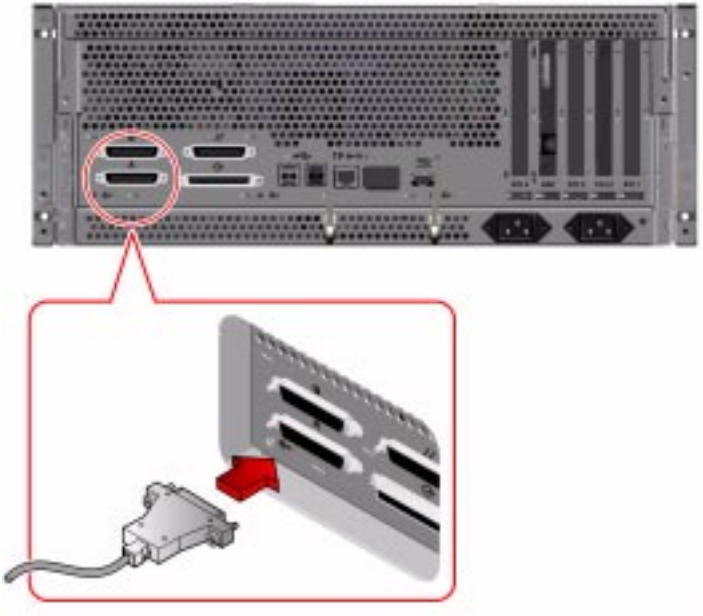
If your server is configured without a local graphics console, you need to attach an alphanumeric (ASCII) terminal to the server in order to install the system software and to run diagnostic tests. To install an ASCII terminal you must have a supported ASCII terminal that operates over a serial port.

Alternatively, you can configure a local graphics console or create a `tip` connection from another Sun system, see:

- "About Communicating With the System" on page 33

What to Do

1. **Connect the terminal's data cable to the serial port A connector on the back panel.**



2. **Connect the terminal's power cable to an AC outlet.**

3. **Set the terminal to receive:**
   - At 9600 baud
   - An 8-bit signal with no parity and 1 stop bit

   See the documentation accompanying your terminal for more information.

What Next

You can now issue system commands from the terminal keyboard and view system messages. Continue with your installation or diagnostic procedure as needed.

How to Configure a Local Graphics Console

Before You Begin

If your server is configured without an alphanumeric (ASCII) terminal, you need to install a local graphics console in order to install the system software and to run diagnostic tests.

Alternatively, you can attach an alphanumeric (ASCII) terminal to the system's serial ports or create a `tip` connection from another Sun system, see:

- "About Communicating With the System" on page 33

To install a local graphics console, you must have:

- A supported PCI-based graphics frame buffer card and software driver
  - An 8-bit Color Graphics PCI Adapter Frame buffer card—Sun part number X3660A is currently supported
  - A 32 8/24-bit Color Graphics PCI Adapter Frame buffer card—Sun part number X3668A is currently supported
- A monitor with appropriate resolution
- A Sun-compatible USB keyboard (Sun USB Type 6 keyboard)
- A Sun-compatible USB mouse (Sun USB mouse) and mouse pad (if necessary)

What to Do

1. **Install the graphics card into an appropriate PCI slot.**

Note – Installation must be performed by a qualified service provider. For further information, see the *Sun Fire 280R Server Service Manual* or contact your qualified service provider.

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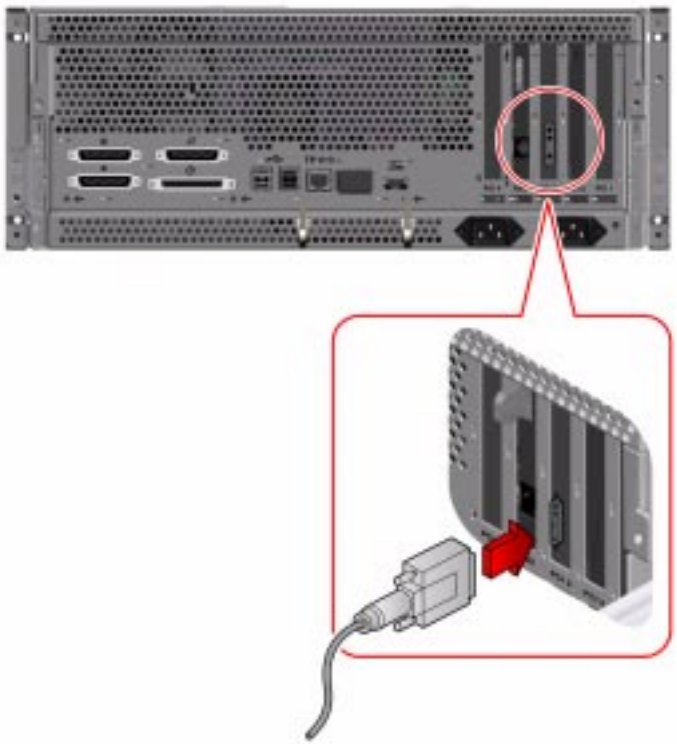
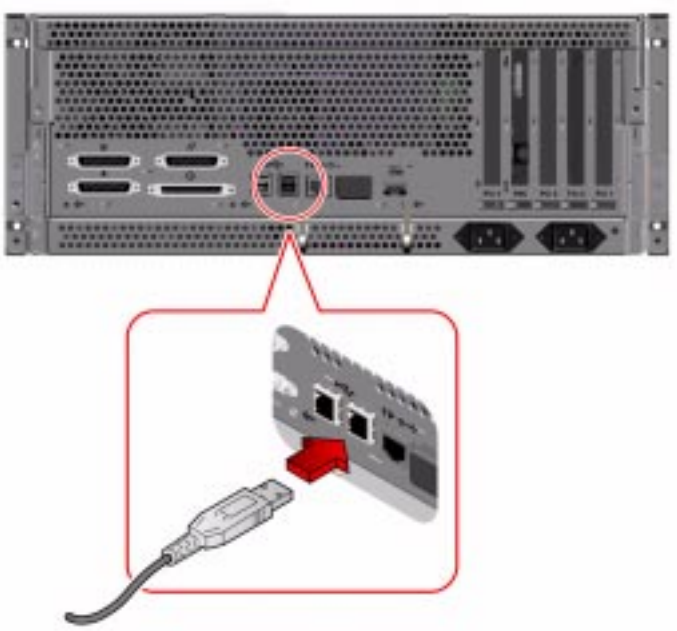
2. **Attach the monitor video cable to the graphic card's video port.**

   Tighten the thumbscrews to secure the connection.

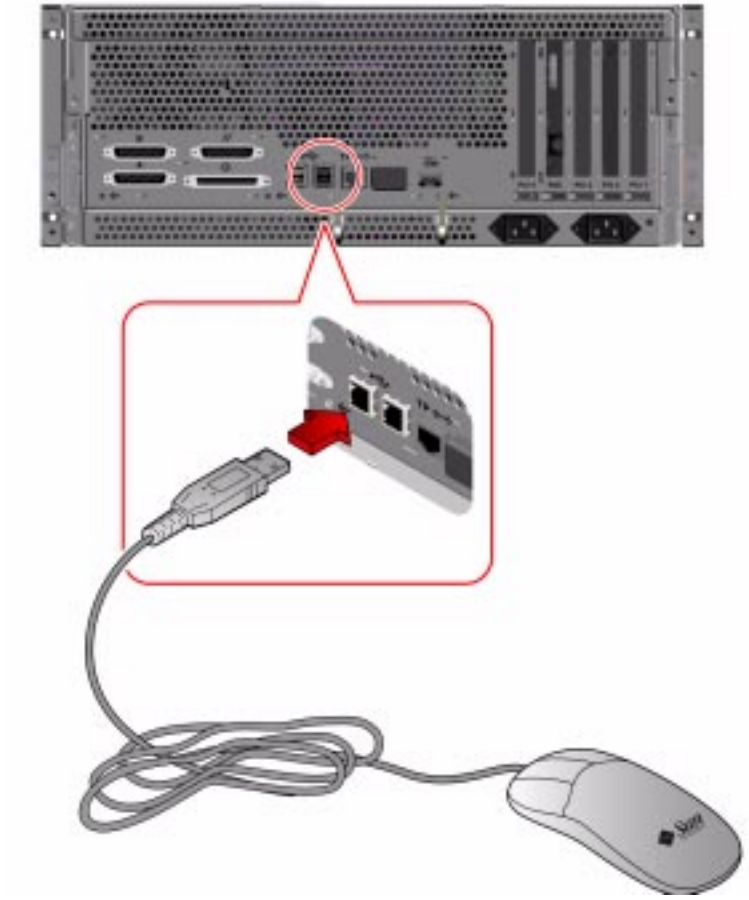


3. **Connect the monitor's power cord to an AC outlet.**

4. **Connect the keyboard USB cable to any USB port on the back panel.**



5. **Connect the mouse USB cable to any USB port on the back panel.**



What Next

You can now issue system commands from the keyboard and view system messages. Continue with your installation or diagnostic procedure as needed.

How to Power On the System

Before You Begin

You need the system key to perform this procedure.

If an ASCII terminal or local graphics console is not already connected to the system, you need to install one before continuing the startup procedure. For information, see:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36

Note – If you have just installed an internal or external storage device *other than* an FC-AL drive or a USB device, or any new part that plugs in to the main logic board, only restart the system to bring it to the operating environment level *after* performing a reconfiguration boot.

The operating system cannot recognize newly added devices or parts until you have performed a reconfiguration boot. The new boot will add any new devices to the factory-configured device tree. For more information, see "How to Initiate a Reconfiguration Boot" on page 136.

What to Do

Caution – Never move the system when system power is on. Movement can cause catastrophic disk drive failure. Always power off the system before moving it. For more information, see "How to Power Off the System" on page 61.

Caution – Before you power on the system, make sure that the top cover is properly installed. See the *Sun Fire 280R Server Service Manual* for more information.

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1. **Turn on power to any peripherals and external storage devices.**

   Read the documentation supplied with the device for specific instructions.

2. **Turn on power to the local graphics console or ASCII terminal.**

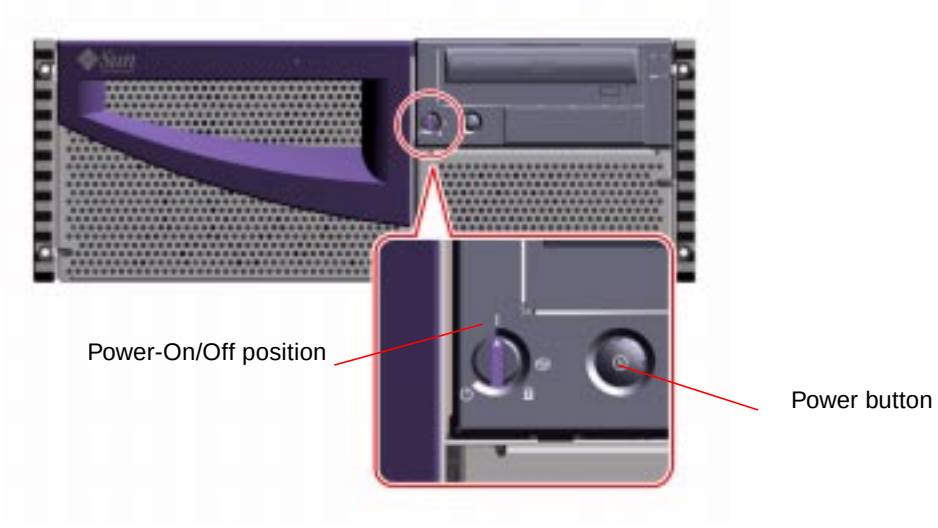
   A local graphics console or ASCII terminal is required for viewing system messages. For setup instructions, see “How to Attach an Alphanumeric (ASCII) Terminal” on page 34 or “How to Configure a Local Graphics Console” on page 36.

3. **Turn the front panel keyswitch to the Power-On/Off position.**

   Insert the system key into the keyswitch. See “Keyswitch Settings” on page 9 for information about each keyswitch setting.

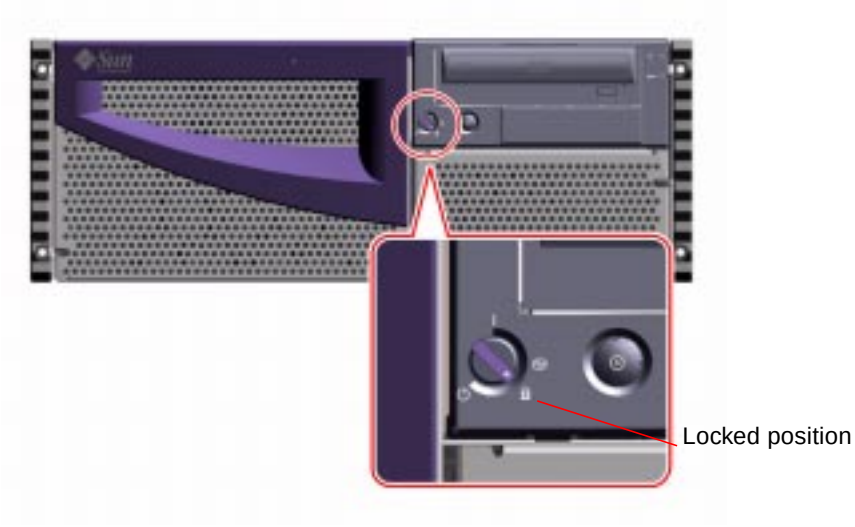
4. **Press the front panel Power button once.**

Note – The system may take anywhere from 30 seconds to several minutes before video is displayed on the system console or the `ok` prompt appears on an attached terminal. This time depends on the level of power-on self-test (POST) diagnostics being performed.



5. **Turn the keyswitch to the Locked position.**

   The Locked position prevents *accidentally* powering-off the system. See “Keyswitch Settings” on page 9 for information about each keyswitch setting.



6. **Remove the key from the keyswitch, and keep it in a secure place.**

How to Power On the System With Full Diagnostics Enabled

Before You Begin

You need the system key to perform this procedure.

If a local graphics console or ASCII terminal is not already connected to the system, you need to install one before continuing the startup procedure. For information, see:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36

Note – If you have just installed an internal or external storage device *other than* an FC-AL drive or a USB device, or any new part that plugs in to the main logic board, only restart the system to bring it to the operating environment level *after* performing a reconfiguration boot.

The operating system cannot recognize newly added devices or parts until you have performed a reconfiguration boot. The new boot will add any new devices to the factory-configured device tree. For more information, see "How to Initiate a Reconfiguration Boot" on page 136.

For more complete interpretation of the diagnostic output from this procedure, consult "About Diagnostic Tools" on page 160.

What to Do

Caution – Never move the system when system power is on. Movement can cause catastrophic disk drive failure. Always power off the system before moving it. For more information, see "How to Power Off the System" on page 61.

Caution – Before you power on the system, make sure that the top cover is properly installed. See the *Sun Fire 280R Server Service Manual* for more information.

1. **Turn on power to any peripherals and external storage devices.**

   Read the documentation supplied with the device for specific instructions.

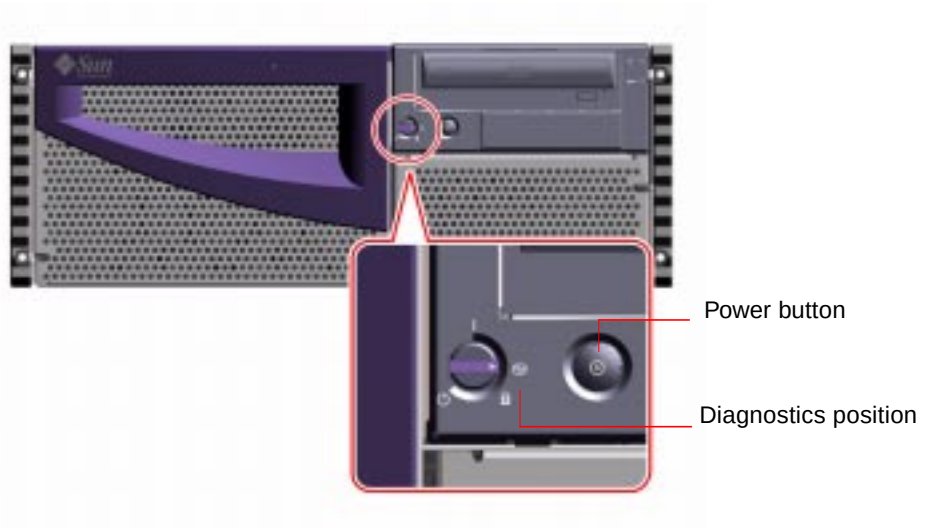
2. **Turn on power to the local graphics console or ASCII terminal.**

   A local graphics console or ASCII terminal is required for viewing system messages. For setup instructions, see “How to Attach an Alphanumeric (ASCII) Terminal” on page 34 or “How to Configure a Local Graphics Console” on page 36.

3. **Turn the front panel keyswitch to the Diagnostics position.**

   Insert the system key into the keyswitch. See “Keyswitch Settings” on page 9 for information about each keyswitch setting.

4. **Press the front panel Power button once.**

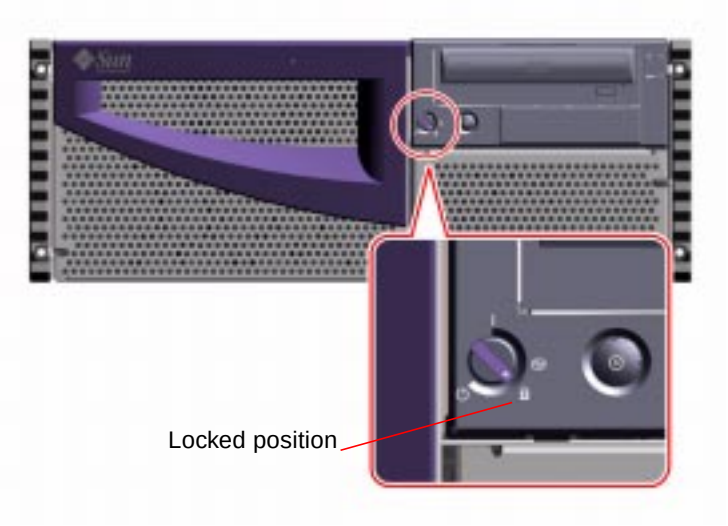


Note – The system may take anywhere from 30 seconds to several minutes before video is displayed on the system monitor or the `ok` prompt appears on an attached terminal. This time depends on the level of power-on self-test (POST) diagnostics being performed.

---

5. **Turn the keyswitch to the Locked position.**

   The Locked position prevents *accidentally* powering-off the system. See “Keyswitch Settings” on page 9 for information about each keyswitch setting.



6. **Remove the key from the keyswitch, and keep it in a secure place.**

How to Install the System Software

The Solaris Operating Environment and system software is ordered separately from your system hardware.

Note – If you have just installed an internal or external storage device *other than* an FC-AL drive or a USB device, or any new part that plugs in to the main logic board, only restart the system to bring it to the operating environment level *after* performing a reconfiguration boot.

The operating system cannot recognize newly added devices or parts until you have performed a reconfiguration boot. The new boot will add any new devices to the factory-configured device tree. For more information see "How to Initiate a Reconfiguration Boot" on page 136.

The method that you will use to boot your system depends on how you will configure the system.

Solaris 8 Installation Requirement

The Sun Fire 280R server requires the Solaris 8 Hardware 1/01 Operating Environment software, or a subsequent compatible operating environment release.

Tip – For a quick summary of your installation options, consult the *Start Here: Installation Instructions for Solaris 8* that accompanies your software.

Installing the Operating Environment From DVD/CD-ROM

If you are installing Solaris software on a single system from a local DVD/CD-ROM drive, choose one of the following methods:

- *Solaris 8 Installation CD*—A single CD-supported turnkey process
- *Solaris Interactive Installation Program*—An interactive program (on the Solaris 8 Software 1 of 2 CDs), followed by the co-packaged software installation programs

The *Solaris Interactive Installation Program* will prompt you interactively for answers, and at the end of the process you will be prompted to insert the second Solaris release CD, and then CDs from the Solaris media kit.

Note – The operating environment CD installation process on the Solaris 8 Software 1 CD installs certain required software upgrade patches to support your Sun Fire 280R server. This update is automatically done before you can use the second (Solaris 8 Software 2) CD.

Installing the Operating Environment From a Network Boot Server

If you are installing Solaris software over a network, read the *Solaris Advanced Installation Guide*. Then follow the normal `boot net` or `boot net - install` procedure, depending on your desired boot device. For more information about defining a boot device, see “How to Select the Boot Device” on page 48.

How to Select the Boot Device

Your system administrator should also help you decide how your system will boot in your environment.

Before You Begin

Before you can select a boot device, you must complete the installation procedure; see:

- "How to Install the Sun Fire 280R Server" on page 15

Specifically, you must perform the following tasks:

- Set up a system console; see "About Communicating With the System" on page 33
- Power on the system; see "How to Power On the System" on page 40

If you want to boot across a network interface, then you must also perform the following tasks:

- Configure the Ethernet port; see "How to Configure the Standard Ethernet Interface" on page 51
- Attach the Ethernet port to a network; see "How to Connect a Twisted-Pair Ethernet (TPE) Cable" on page 57

The device that is used to boot the system is determined by the setting of an OpenBoot firmware configuration parameter called `boot-device`. The default order of settings of this parameter is `disk net`. Because of this setting, the firmware first attempts to boot from the system hard drive, and if that fails, then from the main logic board Ethernet interface.

The following procedure assumes that you are familiar with the OpenBoot firmware and that you know how to enter the OpenBoot environment. For more information about the OpenBoot firmware, see the *OpenBoot 4.x Command Reference Manual* in the *Solaris System Administrator AnswerBook* collection for your specific Solaris release.

What to Do

1. **At the** `ok` **prompt, type:**

Note – After you have installed the Remote System Control (RSC) software, you can also access the `ok` prompt using RSC from a remote server.

```
ok setenv boot-device device-specifier
```

where the *device-specifier* is one of the following:

- `cdrom` – Selects the DVD / CD-ROM drive
- `disk` – Selects the hard disk
- `tape` – Selects the SCSI tape drive
- `net` – Selects the Ethernet interface on the main logic board
- *full path name* – Selects the Ethernet interface specified by the path name

---

Note – You can also specify the name of the program to be booted as well as the way the boot program operates. For more information, see the *OpenBoot 3.x Command Reference Manual* in the *Solaris System Administrator AnswerBook* collection for your specific Solaris release.

If you want to select a network interface other than the system board Ethernet interface as the default boot device, you can determine the full path name of each interface, by typing:

```
ok show-devs
```

The `show-devs` command lists all the installed system devices, including any PCI network interface(s). The output displays the full path name of each PCI device. An example of a PCI path name is shown below:

```
/pci@8,700000/ebus@5/serial@1,400000
```

2. **To retain the new boot device setting and boot the system from the new boot device, type:**

```
ok reset-all
```

Note – You can also power cycle the system using the front panel keyswitch and Power button. See “How to Power On the System” on page 40 for more information.

What Next

For more information about using the OpenBoot firmware, see the *OpenBoot 3.x Command Reference Manual* in the *Solaris System Administrator AnswerBook* collection for your specific Solaris release.

How to Configure the Standard Ethernet Interface

Before You Begin

You must perform the following tasks:

- Complete the prerequisite network-related preparations at the beginning of the section “How to Install the Sun Fire 280R Server” on page 15
- Determine which Ethernet port you want to use; see “About Network Interface Options” on page 86
- Attach a cable to the Ethernet port; see “How to Connect a Twisted-Pair Ethernet (TPE) Cable” on page 57

Note – You can configure only one Ethernet interface during installation of the operating environment. To configure additional interfaces, see “How to Add an Ethernet Interface” on page 54.

What to Do

1. **Assign a host name to the system.**

   The host name must be unique within the network. It can be made up of characters and numbers. Do not use a dot in the host name. Do not begin the name with a number or a special character.

2. **Determine the Internet Protocol (IP) address for the interface.**

   Your network administrator must assign an IP address. Each network device or interface must have a unique IP address.

3. **Resume the installation of the system.**

   See “How to Install the Sun Fire 280R Server” on page 15. When installing the operating system, you will be prompted to enter the host name, IP address, and `netmask` (if necessary) of the system.

Note – If you have installed a PCI card as a second Ethernet interface, the operating system will prompt you to select a primary network interface and then will prompt you for its host name and IP address. You must configure the second interface separately, after the operating system is installed. See "How to Add an Ethernet Interface" on page 54.

Note – This system conforms to the Ethernet *100BASE-T IEEE 802.3u Ethernet Standard*, which states that the Ethernet 10BASE-T link integrity test function should always be enabled on both the host system and the Ethernet hub. If you have problems verifying connection between this system and your hub, verify that the Ethernet hub also has the link test function enabled. See "Network Communications Failure" on page 187 and refer to the manual provided with your hub for more information about the link integrity test function.

What Next

After completing this procedure, the Ethernet hardware interface is ready for operation. However, in order for other network devices to communicate with the system, your network administrator must enter the system's IP address and host name into the namespace on the network name server. For information about setting up a network name service, consult the *Solaris System Administrator AnswerBook* for your specific Solaris release.

The `eri` Fast Ethernet device driver for the system's standard Ethernet interface is automatically installed with the Solaris release. For information about operating characteristics and configuration parameters for the `eri` driver, see *Platform Notes: The eri Fast Ethernet Device Driver.* This document is available on the *Solaris on Sun Hardware AnswerBook*, which is provided on the Solaris Supplement CD for the Solaris release you are running.

If you want to install and configure an additional network interface by means of a PCI card, you must configure it separately, after installing the operating system; see:

- "How to Add an Ethernet Interface" on page 54

How to Configure the Remote System Control (RSC) Ethernet Interface

Before You Begin

You must perform the following tasks:

- Install the system hardware and software; complete the prerequisite network-related preparations at the beginning of the section “How to Install the Sun Fire 280R Server” on page 15
- Attach a cable to the RSC Ethernet port; see “How to Connect a Twisted-Pair Ethernet (TPE) Cable” on page 57
- Install the RSC software package from the Computer Systems Supplement Software CD

Note – You can configure only *one* Ethernet interface during installation of the operating system. You cannot configure the RSC Ethernet port until the RSC software has been installed. To configure additional interfaces, see “How to Add an Ethernet Interface” on page 54.

What to Do

You cannot use the RSC TPE port until you or your system administrator has installed the RSC software and configured the TPE port.

- **Consult the** *Sun Remote System Control (RSC) User’s Guide* **for instructions about how to configure and use the RSC TPE Ethernet port.**

How to Add an Ethernet Interface

Before You Begin

Follow this procedure to install a PCI card and its software for an additional Ethernet interface.

You must perform the following tasks:

- Install the system hardware and software; complete the prerequisite network-related preparations at the beginning of the section “How to Install the Sun Fire 280R Server” on page 15

Note – The following procedure must be performed by a qualified service provider. If you are not a qualified service provider, contact Sun Customer Service through your nearest authorized Sun sales representative.

- Install any additional PCI Ethernet interface cards that you wish to configure; see the *Sun Fire 280R Server Service Manual* for installation instructions
- Attach a cable to the new Ethernet port and to the network; see “How to Connect a Twisted-Pair Ethernet (TPE) Cable” on page 57

What to Do

1. **Assign a network host name to the interface.**

   The host name must be unique within the network. It can be made up of characters and numbers. Do not use a dot in the host name. Do not begin the name with a number or a special character.

   Usually an interface host name is based on the machine host name. For example, if the machine is assigned the host name `zardoz`, then the additional Ethernet interface could be named `zardoz-1`. The machine’s host name is assigned when the operating system software is installed. For more information, see the installation instructions accompanying the Solaris software.

2. **Determine the Internet Protocol (IP) address (and `netmask` if necessary) for the interface.**

   Your network administrator must assign an IP address. Each interface on a network must have a unique IP address and `netmask` (if necessary).

3. **Boot the operating system and log on to the system as superuser.**

   Type the following command at the system prompt and the superuser password:

```
zardoz # su
Password:
```

4. **Create an appropriate** `/etc/hostname` **file for the new interface.**

   The name of the file you create should be of the form `/etc/hostname.`*typenum*, where *type* is the Ethernet type identifier (some common types are `eri`, `hme`, `le`, `nf`, and `ie`) and *num* is the logical number of the interface according to the order in which it was installed in the system.

   For example, the standard interface provided on the system's main logic board is `eri0` (*type* = `eri`, *num* = `0`). If you add a SunSwift PCI Ethernet adapter card as a second `eri` interface, the file name should be `hostname.eri1`.

Note – The documentation accompanying the Ethernet interface should identify its type. For more advanced information about configuring the `eri` software driver, consult *Platform Notes: The eri FastEthernet Device Driver.* Alternatively, you can enter the `show-devs` command from the `ok` prompt to obtain a list of all installed devices.

   The host name also has an associated IP address that you enter in the `/etc/hosts` file. See Step 6.

5. **Type the host name, assigned in Step 1, into the** `/etc/hostname` **file for the new interface.**

   Following is an example of the `/etc/hostname` files required for a machine called `zardoz`, which has two Ethernet interfaces—the standard on-board Ethernet interface (`eri0`) and a second interface provided by a PCI Ethernet adapter card (`eri1`). The host name will be `zardoz` to a network connected to the standard `eri0` interface, and `zardoz-1` to a network connected to the `eri1` interface.

```
zardoz # cat /etc/hostname.eri0
zardoz
zardoz # cat /etc/hostname.eri1
zardoz-1
```

6. **Create an entry in the** `/etc/hosts` **file for each active Ethernet interface.**

   An entry consists of the IP address and the host name for each interface.

   The following example shows the entries in the `/etc/hosts` file for the interfaces identified in the `/etc/hostname` file created in Step 4 and Step 5.

```
zardoz # cat /etc/hosts
...
127.0.0.1     localhost
129.144.10.57 zardoz    loghost
129.144.11.83 zardoz-1
```

7. **Update the** `/etc/netmasks` **file (if you are using a subnetwork).**

8. **Reboot the system, type:**

```
zardoz # reboot -- -r
```

   This command rebuilds the device trees so that the system will recognize the newly installed PCI Ethernet adapter card.

What Next

After completing this procedure, the Ethernet interface is ready for operation. However, in order for other network devices to communicate with the system through this interface, the interface information (its IP address and host name) must be entered into the namespace on the network name server. For information about setting up a network name service, consult the *Solaris System Administrator AnswerBook* for your specific Solaris release.

How to Connect a Twisted-Pair Ethernet (TPE) Cable

Before You Begin

If you are connecting a twisted-pair Ethernet (TPE) cable to the system's standard Ethernet interface, you must perform the following task:

- Install the system hardware and software; complete the prerequisite network-related preparations at the beginning of the section "How to Install the Sun Fire 280R Server" on page 15

If you are installing an additional Ethernet interface, you must perform the following tasks:

- Install the system hardware and software; complete the prerequisite network-related preparations at the beginning of the section "How to Install the Sun Fire 280R Server" on page 15
- Install a PCI Ethernet interface card; see the *Sun Fire 280R Server Service Manual*

What to Do

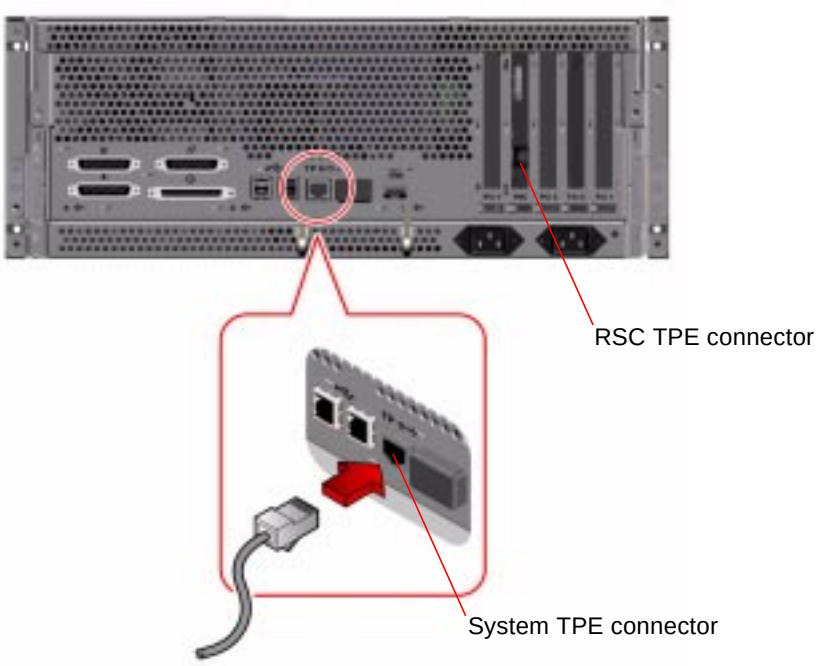
1. **Locate the RJ-45 connector for the appropriate Ethernet interface.**

Note – Select the correct TPE connector for the interface you are installing. The system comes with one system TPE connector on the back panel, and one TPE connector on the back panel of the RSC card. Your system may also include one or more TPE connectors provided via PCI Ethernet interface cards.

---

2. **Plug in the TPE cable to the appropriate RJ-45 connector.**

   You should hear the connector tab snap into place.



3. **Plug in the other end of the cable to the TPE outlet port in the wall or the floor.**

Caution – Ensure that you plug this connector into the TPE RJ-45 port and *not* any phone RJ-45 port. You can damage your TPE equipment if you use the incorrect port. You should hear the connector tab snap into place.

See your network administrator if you need more information about how to connect to your network, and to which port in the wall.

What Next

If you are installing your system, complete the installation procedure. Return to:

- "How to Install the Sun Fire 280R Server" on page 15

If you are installing additional interfaces to the system, then you need to configure those interfaces; see:

- "How to Add an Ethernet Interface" on page 54

How to Boot the System Using the Standard Ethernet Interface

Before You Begin

Before you can boot the system over a network interface, you must complete the installation procedure; see:

- "How to Install the Sun Fire 280R Server" on page 15

Specifically, you must perform the following tasks:

- Set up either an ASCII terminal, see "How to Attach an Alphanumeric (ASCII) Terminal" on page 34; or a local graphics console, see "How to Configure a Local Graphics Console" on page 36
- Configure the Ethernet port; see "How to Configure the Standard Ethernet Interface" on page 51
- Attach the Ethernet port to a network; see "How to Connect a Twisted-Pair Ethernet (TPE) Cable" on page 57
- Power on the system to the ok prompt; see "How to Power On the System" on page 40

Note – To boot the system over an Ethernet network, it is necessary that there be a bootable image for Sun4u architecture somewhere on the network on a boot server. For details, see the installation instructions accompanying your Solaris software.

What to Do

- **At the** ok **prompt, type either of the two following commands:**

  a. To load the operating system into the server's volatile memory, type:

```
ok boot net
```

  This command will bring up the Solaris installation menu.

Note – Because the operating system is only in volatile memory, it is not retained across power cycles.

b. To install the operating system onto the server's internal system disk, type:

```
ok boot net - install
```

Note – The `boot net - install` command assumes a network boot server is set up with appropriate properties defined to allow auto-installation of the operating environment on the internal system disk.

Both commands boot the system, and the system console displays the system prompt.

What Next

If you want to use the main logic board Ethernet interface as the default boot device, you must change the value of certain OpenBoot parameters. For more information, see the *OpenBoot Command Reference Manual* in the *Solaris System Administrator AnswerBook* for your specific Solaris release.

How to Power Off the System

In general, system administrators bring the operating system and applications to a halt in an orderly manner, warning the system users and others of a system shutdown. Follow the instructions below to accomplish an orderly shutdown of the server.

Before You Begin

You need the system key to perform this procedure.

Caution – Before turning off system power, halt the operating system as described below. Failure to halt the operating system properly can result in loss of disk drive data and will sever network connections.

What to Do

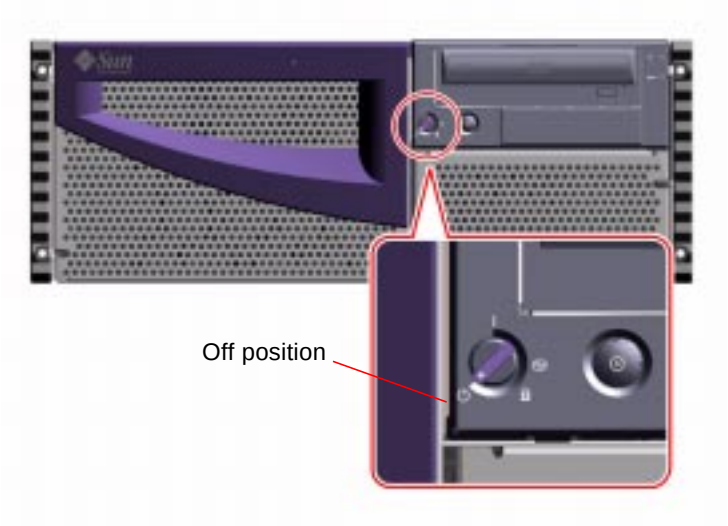
1. **Notify users that the system will be powered down.**
2. **Back up the system files and data, if necessary.**
3. **Halt the operating system using the appropriate commands.**

   Refer to the *Solaris Handbook for Sun Peripherals* that corresponds to your operating system.
4. **Wait for the system halt messages and the** ok **prompt.**

Caution – If the system hangs, hold the Power button down for four seconds while the keyswitch is in either the Power-On/Off or the Diagnostics position, or turn the keyswitch to the Off position. Either of these actions will cause an immediate hardware power off, and you will risk the loss of disk drive data and will sever network connections. For information about these keyswitch positions, see “Keyswitch Settings” on page 9 and “System LED Indicators” on page 10 for more information about restoring the console.

5. **Turn the keyswitch on the front panel of the system to the Off position.**

   Insert the system key into the keyswitch. See “Keyswitch Settings” on page 9 for information about each keyswitch setting.



Note – Standby current (5 V DC) is still present in the system. To remove all current from the system, remove both AC cables from their back panel receptacles.

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6. **Remove the key from the keyswitch, and keep it in a secure place.**

CHAPTER 3

System Administration

This chapter is an overview of the Sun Fire 280R server's enhanced reliability, availability, and serviceability (RAS) features. It also covers administrative information and tools associated with system management, system monitoring, system diagnostics, device troubleshooting, storage management, and personal computer connectivity. Also included is an overview of supported redundant arrays of independent disks (RAID) storage options and of storage monitoring tools.

The following information is covered in this chapter:

About System Reliability, Availability, and Serviceability Features

Reliability, availability, and serviceability (commonly known as RAS) are three design goals contributing to continuous operation and minimizing system downtime. Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. System availability refers to the percentage of time that a system remains accessible and usable. Serviceability relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the system offers the following features:

- Error correction and parity checking for improved data integrity
- Easily accessible LED status indicators
- Hot-pluggable disk drives with status indicators and easy front access
- External support for RAID 0, 1, 0 + 1, and 5 implementations
- System environmental monitoring and control
- Power supply redundancy
- Hot-swappable power supplies
- Automatic system recovery (ASR)
- Improved system diagnostics software
- Enhanced system availability software
  - Alternate pathing (alternate I/O network and disk paths)
  - Sun Cluster software support
- Remote System Control (RSC) hardware and software

Error Correction and Parity Checking

Error-correcting code (ECC) is used on all internal system data paths to ensure high levels of data integrity. All data that moves between processors, I/O, and memory have end-to-end ECC protection.

The system reports and logs correctable ECC errors. A correctable ECC error is any single-bit error in a 64-bit field. Such errors are corrected as soon as they are detected. The ECC implementation can also detect double-bit, triple-bit, and quadruple-bit errors in the same 64-bit field that occur in the same nibble (4 bits).

In addition to providing ECC protection for data, the system offers parity protection on all system address buses. Parity protection is also used on the Peripheral Component Interconnect (PCI), Extended PCI, Fibre Channel-Arbitrated Loop (FC-AL), and Small Computer System Interconnect (SCSI)) buses, and in the UltraSPARC CPU's internal and external cache. In addition there is internal error detection and reporting on all system application specific integrated circuits (ASICs).

Easily Accessible Status LEDs

The system provides easily accessible light-emitting diode (LED) indicators on the front panel, internal disk bays, and power supplies to provide a visual indication of system and component status. These status LEDs eliminate guesswork and simplify problem diagnosis for enhanced serviceability.

The system status LEDs are described in the section "System LED Indicators" on page 10.

Hot-Pluggable Disk Drives

When configured with *hot-plug* software (for example, the Sun Solstice DiskSuite or VERITAS software; see "About Storage Management Tools" on page 76), the system's internal disk drives can be removed and replaced while the system is operational. You can easily access the internal drives from the front of the system.

The same hot-plug technology is also supported via PCI FC-AL, or UltraSCSI adapter cards using external storage. With both internal and external technologies installed, hot-plug technology significantly increases the system's serviceability and availability, by providing the ability to:

- Replace disk drives without service disruption
- Increase storage capacity dynamically to handle larger work loads and improve system performance

For more information about hot-pluggable disk drives, see "About Internal Disk Drives" on page 91 and "About Disk Array Configurations and Concepts" on page 87.

Support for RAID Disk Configurations

Redundant arrays of independent disks (RAID) storage configurations are supported using PCI adapter cards and the system's external UltraSCSI or FC-AL ports. Solstice DiskSuite or VERITAS software provides the ability to configure disk storage in a variety of different RAID levels. You choose the appropriate RAID configuration based on the price, performance, reliability, and availability goals for your system.

RAID 0 (striping), RAID 1 (mirroring), RAID 0+1 (striping plus mirroring—sometimes called RAID 10), and RAID 5 (striping with interleaved parity) configurations can all be implemented using Solstice DiskSuite and VERITAS software. You can also configure one or more drives to serve as a hot spare to fill in automatically for a defective array drive in the event of a disk failure. For more information about RAID configurations, see "About Disk Array Configurations and Concepts" on page 87.

System Environmental Monitoring and Control

The system features an environmental monitoring subsystem designed to warn you of threats to the system's operation, such as:

- Extreme temperatures
- Lack of air flow through the system
- Power supply problems

Monitoring and control capabilities reside at the operating system level as well as in the system's on-board flash PROM firmware and in the Remote System Control (RSC) firmware. In addition, you can monitor the system remotely using the RSC card. This ensures that monitoring capabilities are operational both locally and remotely (if configured), even if the system has halted or is unable to boot. For more information about RSC software, see "Using the Sun Remote System Control (RSC) Card" on page 74.

The environmental monitoring subsystem uses an industry-standard Inter-Integrated Circuit (I^2C) bus implemented throughout the system. The I^2C bus is a simple two-wire serial bus, used to allow the monitoring and control of temperature sensors, power supplies, disk drives, and status LEDs.

Temperature Controls

Temperature sensors (thermistors) are located on the system's Remote System Control (RSC) card and on the CPU modules, and allow monitoring of each CPU module and the system ambient temperature.

Prior to Solaris control, or following a Stop-A (L1-A) keyboard command, the OpenBoot firmware will issue a warning message to the console after a temperature of 75 ˚C (167 ˚F) is reached.

To indicate an overheating condition, the operating system monitoring subsystem generates a warning or error message, and depending on the nature of the condition, may even shut down the system. If a CPU module reaches shutdown temperature, the system generates a warning message and automatically shuts itself down.

In the case of a power supply, a warning is not generated until its shutdown temperature is reached and the power supply (if there is redundancy) *or* the system is shut down, and a system fault is displayed on the system front panel LED. An error message is logged in the `/var/adm/messages` file that the supply has failed.

All error and warning messages are displayed on the system console (if one is attached) or they are redirected to the RSC console and are logged in the `/var/adm/messages` file. Front panel fault LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

System Fans

The monitoring subsystem is also designed to detect and respond to fan failures. The system includes one fan tray assembly comprising three fans that normally run at full speed. A single or multiple fan failure in the fan tray assembly causes the monitoring subsystem to generate an error message, and lights the amber system LED.

Power Supplies

The power panel is monitored in a similar fashion. The monitoring subsystem periodically polls a power supply status register to verify power supply status. If the panel detects a problem with a power supply, an error message is displayed on the console (if one is attached) and the message is logged in the `/var/adm/messages` file. The LEDs located on the power supply itself will indicate a failure or out-of-spec voltage condition, and if two power supplies are installed, will indicate which supply is the source of the fault.

An individual power supply will shut down itself at an internal temperature of approximately 90 ˚C (194 ˚F), depending on the ambient temperature, system loading, and the availability of a redundant power supply.

Power Supply Redundancy

The system can accommodate one or two power supplies. All system configurations can operate with only one power supply installed. You can use a second supply to provide redundancy, enabling the system to continue operating should one of the power supplies fail. When both power supplies are installed and functioning, they share the power load. For more information about power supplies, redundancy, and configuration rules, see “About Power Supplies” on page 95.

Hot-Swappable Power Supplies

Power supplies in a redundant configuration feature a *hot-swap* capability. A qualified service provider can remove and replace a faulty power supply without turning off the system power, or even shutting down the operating system. A redundant power supply can also be added to the system without shutting down the operating system. The power supplies are easily accessed from the front of the system. For information about removing and installing a power supply, see the *Sun Fire 280R Server Service Manual*.

Automatic System Recovery

The system firmware provides for automatic system recovery (ASR), which enables the system to resume operation after faults or failures that cause a system reset. Recovery from a system reset is automatic from the operating environment level for the following types of failures:

- Operating environment failure
- Intermittent transient hardware failure

If the operating environment software hangs or crashes, the system is configured to automatically reboot and for the operating environment to resume.

In a running system, some types of hardware failures (for example, intermittent transient memory errors) can shut down the system. If this happens, the ASR functionality enables the system to reboot immediately.

Automatic self-test features enable the system to detect failed hardware components. During the power-on self-test (POST) sequence, if a faulty hardware component is detected, the boot sequence halts at the `ok` prompt. A full suite of diagnostic software is provided to diagnose such failures (see the following section for a summary of these software tools, and Chapter 6 for information about using these diagnostic tools).

Automated remote event notification of system problems is configurable through RSC software. For more information about RSC software, see “Using the Sun Remote System Control (RSC) Card” on page 74.

Control over the system’s ASR firmware functionality is provided by the OpenBoot PROM commands. These are described in the current version of the document *OpenBoot Command Reference Manual*.

Improved System Diagnostics Software

For enhanced serviceability and availability, the system provides different tools for diagnostic testing and monitoring, namely:

- Power-on self-test (POST)
- OpenBoot Diagnostics
- SunVTS diagnostics
- Sun Management Center diagnostics
- Remote System Control (RSC) software

POST and OpenBoot Diagnostics are *firmware-resident* diagnostics that can run even if the server is unable to boot the operating system. Application-level diagnostics, such as SunVTS and Sun Management Center, offer additional troubleshooting capabilities once the operating environment is running. The RSC software offers monitoring and remote notification while the operating environment software is running, and in addition provides access to the `ok` firmware prompt if the operating environment is not running.

POST diagnostics provide a quick but thorough check of the most basic hardware functions of the system. For more information about POST, see “How to Isolate Failures Using Power-On Self-Test (POST)” on page 179, “About Isolating Failed Components” on page 165, and “Isolating Failed Components” on page 72.

OpenBoot Diagnostics provide a more comprehensive test of the system, including external interfaces. OpenBoot Diagnostics is described in “About Using Diagnostic Tools to Monitor, Diagnose, and Exercise the System” on page 162, in “How to Isolate Failures Using OpenBoot Diagnostics” on page 181, and in “Isolating Failed Components” on page 72.

At the operating environment level, you have access to SunVTS diagnostics. Like OpenBoot Diagnostics, SunVTS provides a comprehensive test of the system, including its external interfaces. SunVTS also allows you to run tests remotely over a network connection, for example using RSC. You can only use SunVTS software if the operating system is running. For more information about SunVTS, see “About Exercising the System Using SunVTS Software” on page 173, and “How to Check Whether SunVTS Software Is Installed” on page 198.

Sun Management Center (formerly known as Sun Enterprise SyMON), another operating environment level program, provides you with a variety of continuous system monitoring capabilities. It enables you to monitor system hardware status and operating system performance of your server. For more information about Sun Management Center software, see “How to Monitor the System Using Sun Management Center Software” on page 177.

Remote System Control (RSC) hardware and software combine to extend all the diagnostic and OpenBoot firmware control from your local server to any remote system from which you wish to connect to the local server. In addition, you can use monitoring software such as Sun Management Center to monitor the system remotely. RSC software supplies the following features:

- Remote system monitoring and error reporting, including output from POST and OpenBoot Diagnostics
- Remote server reboot, power-on, and power-off on demand
- Ability to monitor the CPU temperature and fan sensors without being near the managed server, even when the server is offline
- Ability to run diagnostic tests from a remote console
- Remote event notification of server problems
- A detailed log of RSC events
- Remote console functions on both the modem and Ethernet ports

For more information about RSC hardware, see “Using the Sun Remote System Control (RSC) Card” on page 74.

Enhanced System Availability Software

The Sun Fire 280R system supports alternate pathing for network connections and for disk drives. Network availability is supported using multipathing features in the Internet Protocol Network MultiPathing(IPMP) software in the Solaris 8 Operating Environment. Disk availability is improved using VERITAS software. For more information see “About Multipathing Software” on page 115.

Sun Cluster 3.0 software provides higher levels of availability than are possible with a single server by connecting together a cluster of servers. The software enables automatic recovery from any single hardware or software failure within the cluster by automatically restarting a failed application or by migrating the application and its resources to a backup server. For more information, see “About Sun Clustering Software” on page 117.

About Managing the System

The following sections provide an overview of the Solaris Operating Environment system management software, the system device test firmware and operating environment software, and the tools available for diagnosing problems with system parts in your remote or your local server(s).

The new tool set, described in the following sections, facilitates system management:

Managing and Monitoring System Performance

The Solaris 8 Operating Environment supports the following suite of new software applications and extends system management and administrative capabilities network-wide:

- Solaris Resource Manager™ software, which controls resource allocation to applications, users, and user groups (not bundled with Solaris 8 software).
- Solaris Bandwidth Manager software, which extends resource management control to the network software.
- Sun Remote System Control (RSC) software, which supports a graphical user interface for using the RSC system monitoring features from the operating environment level, *and* ok prompt access to the firmware. The software is contained on the Solaris Supplement CD and is supported by the preinstalled RSC card.
- Sun Management Center software, which provides a single solution for monitoring and managing multiple Sun servers and systems, devices, and network resources from a single remote or local system.
- Internet Protocol Network MultiPathing (IPMP) software, which enables failover or redirection of network traffic among PCI networking cards permitting, for example, the replacement of a system's PCI card while network traffic continues to use another configured card.
- Sun Cluster 3.0 software, which provides higher levels of availability than is possible with a single server by connecting a cluster of servers.

- Solaris Management Console software, which provides a consistent easy-to-use interface that is also part of a software development kit (SDK), enabling the integration of new Java technology-developed software services into the Solaris console.
- Implementation of the Solaris 8 Internet Engineering Taskforce (IETF) specifications for the Internet Protocol Security Architecture, which permits administrators to create and control secure encrypted networks and smart-card authentication at login time.

Isolating Failed Components

The following firmware tools are available for diagnosing and testing devices and functions in your server:

- Power-on self-test (POST) diagnostics software
- OpenBoot Diagnostics software
- Sun Remote System Control (RSC) firmware and software

You can run POST even if the system is unable to boot. For more information about POST, see "How to Isolate Failures Using Power-On Self-Test (POST)" on page 179.

OpenBoot Diagnostics software focuses on system I/O and peripheral devices. Like POST, you can run these diagnostics even if the system is unable to boot. For more information about OpenBoot Diagnostics, see "About OpenBoot Diagnostics Tests" on page 168 and "How to Isolate Failures Using OpenBoot Diagnostics" on page 181. Which method or tool you use to diagnose system problems depends on the nature of those problems:

- If your machine is not able to boot its operating environment software, you need to run POST and OpenBoot Diagnostics tests at the firmware level.
- If your machine is "healthy" enough to start up and load the operating environment software, you can use the Sun Validation Test Suite (SunVTS) software to diagnose system problems, or the Sun Management Center software to monitor the system from the operating environment level.

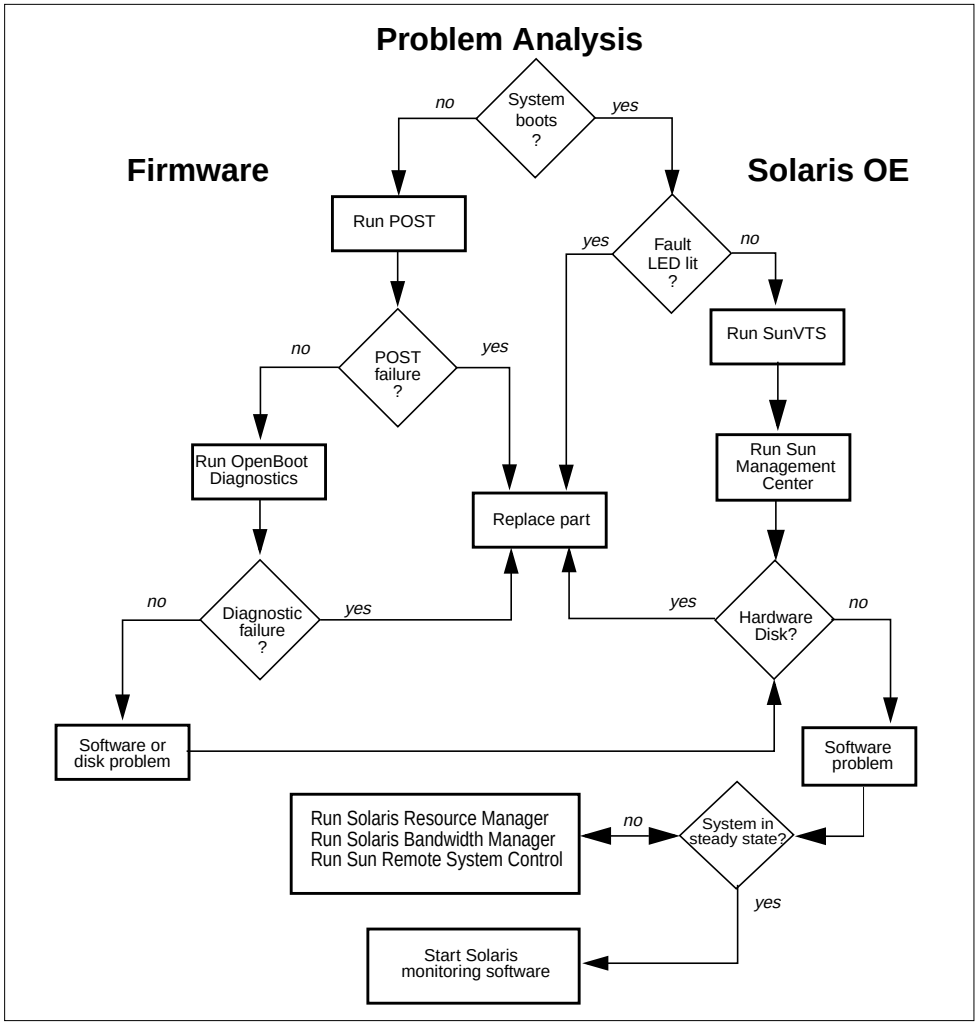
Diagnosing Intermittent Problems

If your system passes the firmware-based diagnostics and boots the operating system, yet does not function correctly, use SunVTS software to run additional tests.

SunVTS system exerciser is a graphics-oriented UNIX application that permits the continuous exercising of system resources and internal and external peripheral equipment. For more information about SunVTS software, see "How to Exercise the System Using SunVTS Software" on page 199.

When to Use the Tools

The following diagram provides an overview of the sequence of events when a local server boots. It illustrates which of the tools you can use at the firmware and at the operating environment levels, when diagnosing hardware and software problems. Successful diagnosis leads to system performance monitoring and system management at the resource level. A description of RSC hardware and software and the integration with these tools follows.



Using the Sun Remote System Control (RSC) Card

The Sun Remote System Control (RSC) card is an integrated hardware card that supports a system management console and a diagnostics and administrative software package for the Sun Fire 280R and other workgroup servers. The card supports the console through either or both an Ethernet port and a modem.

With the RSC card in the Sun Fire 280R server, the Sun Management Center and all other supported Solaris 8 software can now monitor multiple Sun servers and systems, devices, and network resources from a single system. The RSC hardware and software extend the server's available RAS features to the network. You can install the RSC software from the Solaris Supplement CD.

From a remote host command-line interface (CLI), you can log in to the card (using `telnet` or the modem line) and execute commands that remotely control the host server. The next figure shows how the RSC card and its software in the local server extend the available monitoring, control, diagnostic, and remote notification features, making them available to a system manager working on a remote system.

In addition, RSC provides both a graphical user interface (GUI) as well as its own CLI. The RSC GUI is available to users of:

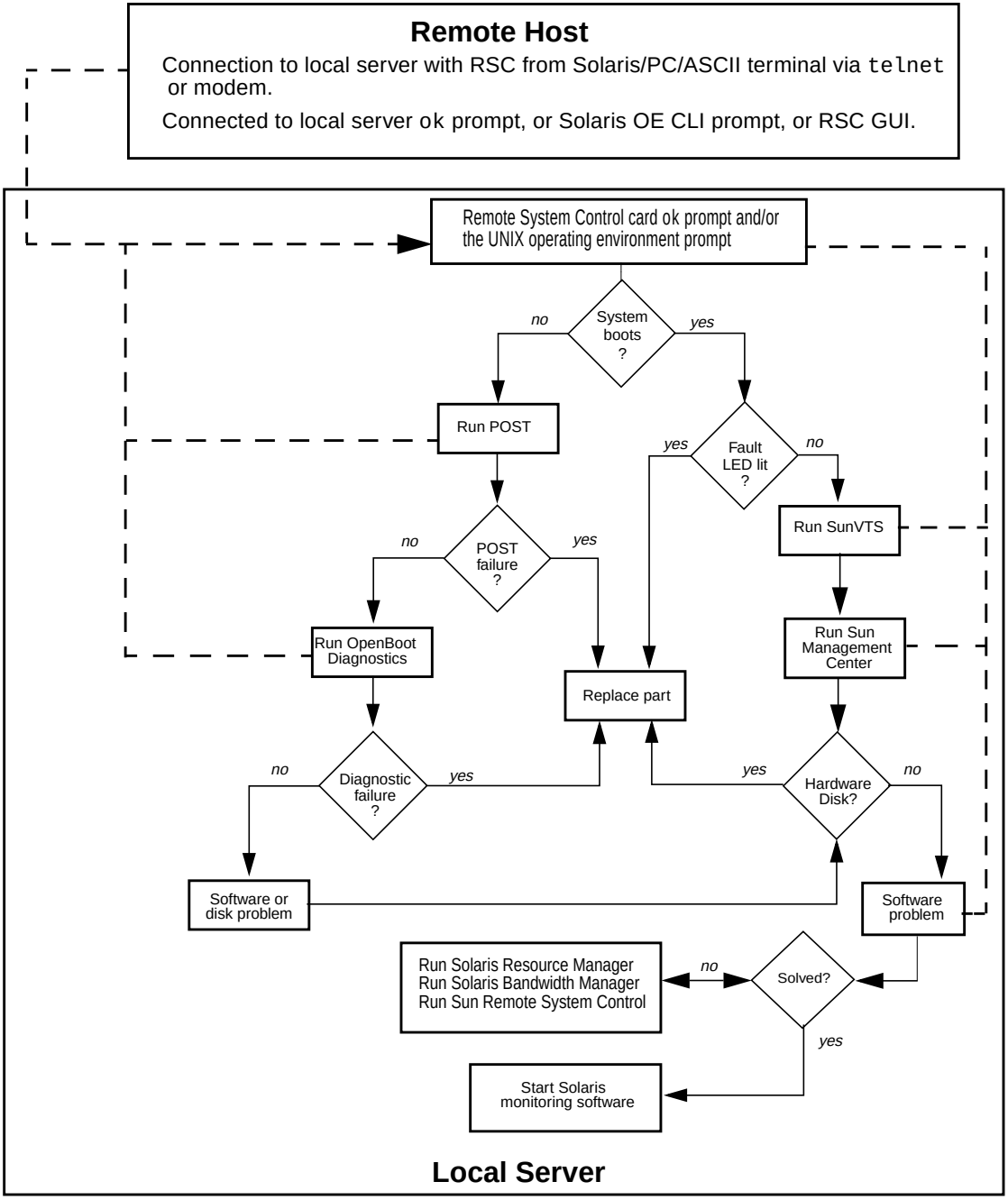
- Solaris 8 Operating Environment and later compatible software
- Windows 95 operating environment
- Windows 98 operating environment
- Windows NT Workstation operating environment

RSC features include:

- Remote system monitoring and error reporting, including output from power-on self-test (POST) and OpenBoot Diagnostics and the `kadb` kernel debugger
- Remote server reboot, power-on, and power-off on demand
- Ability to monitor the CPU temperature and fan sensors without being near the managed server, even when the server is offline
- Ability to run diagnostic tests from a remote console
- Remote event notification of server problems
- A detailed log of RSC events
- Remote console functions on both the modem and Ethernet ports

For a more complete list of features in the RSC software, see "About the Remote System Control (RSC) Software" on page 110. For additional information about RSC software, see `http://www.sun.com/servers/rsc.html`.

For more information about the RSC hardware, see "About the Remote System Control (RSC) Card and Ports" on page 107.


Remote Host
Connection to local server with RSC from Solaris/PC/ASCII terminal via telnet or modem.
Connected to local server ok prompt, or Solaris OE CLI prompt, or RSC GUI.
Remote System Control card ok prompt and/or the UNIX operating environment prompt
System boots ?
no
yes
Run POST
Fault LED lit ?
yes
no
Run SunVTS
POST failure ?
no
yes
Run OpenBoot Diagnostics
Run Sun Management Center
Replace part
Diagnostic failure ?
no
yes
Hardware Disk?
yes
no
Software or disk problem
Software problem
Run Solaris Resource Manager
Run Solaris Bandwidth Manager
Run Sun Remote System Control
Solved?
no
yes
Start Solaris monitoring software
Local Server

About Storage Management Tools

The following software tools are supported on the Sun Fire 280R server for managing either the system's internal drives, or externally connected storage devices.

- Sun StorEdge™ Management Console

  Sun StorEdge Management Console software serves as the storage management framework for Java technology-based management browser plug-in software, making it easier to operate, administer, and maintain storage area networks. The Java technology-based GUI gives system administrators and service personnel a centralized point for storage administration.

  Sun StorEdge Management Console software enhances the reliability, availability, and serviceability (RAS) of storage assets. It includes elements of the proposed specification for the Jiro™ Platform to enable automated management services and interoperability across heterogeneous storage area networks.

- Sun StorEdge Component Manager

  Sun StorEdge Component Manager software enables system administrators to monitor array enclosures and their contents via an intuitive GUI. It also provides event logging, alarm indicators and remote problem notification via email. Command panels provide simple access to control disks and their enclosures for maintenance operations. Its Java technology-based look-and-feel is common with other StorEdge management browser plug-in software, making these tools easy to learn and simple to use, leading to fewer errors.

- Sun StorEdge LibMON™

  Sun StorEdge LibMON (Library Monitor) is host-based software used to monitor and administer tape libraries via a Java-enabled web browser. The Library Monitor enables event logging and notification, remote diagnostics, remote configuration, and remote monitoring of library activity and status.

- Solstice DiskSuite

  Solstice DiskSuite is a software product that enables you to manage a large number of disks and the data on those disks. DiskSuite can also increase the availability of data by using mirrors and RAID technology. The comprehensive suite of Solstice products extends the basic Solstice DiskSuite function enabling backup, site management, and domain management of your storage repository.

- VERITAS File System

  VERITAS File System (VxFS) is a high-performance, quick recovery file system. VxFS augments Solaris 8 file management with high availability, increased bandwidth, and updated structural reliability.

- VERITAS Volume Manager

  VERITAS Volume Manager provides easy-to-use online disk storage management for enterprise computing environments.

- Alternate pathing for disk drives is supported currently in the VERITAS virtual disk manager's disk controller multipathing using the VERITAS Disk MultiPathing (DMP) feature.

For more information contact your Sun sales representative. More storage software information can be found at:

- `http://www.sun.com/storage/software/mgmtconsole.html`
- `http://www.sun.com/storage/software/index.html`

About Personal Computer Connectivity

Based on AT&T's Advanced Server for UNIX, Solaris PC NetLink software enables Sun servers to integrate with Microsoft Windows systems by implementing Windows NT services on the Sun environment. This enables companies to consolidate services and applications onto an open, scalable, highly reliable platform.

- Solaris PC NetLink has the following features:
  - Enables Sun Fire 280R servers, Sun Enterprise servers, and the Solaris Operating Environment to run in Windows NT domains, coexisting with or replacing Windows NT servers
  - Enables Sun Fire 280R servers and Sun Enterprise servers to provide transparent Windows NT file, print, directory, and security services to Microsoft Windows 3.11, Windows 95, Windows 98, and Windows NT clients
  - Uses native Windows NT tools to manage key server and network functions
  - Enables transparent change on the client and requires no added client software

The Solaris PC NetLink product is composed of the following:

- Solaris Easy Access Server software
- Solaris PC NetLink software

For more information about Solaris PC NetLink, see the *Solaris PC NetLink Administration Guide* and the *Solaris PC NetLink Installation Guide.*

CHAPTER 4

Hardware and Software Configuration

This chapter describes the hardware and software configuration of the Sun Fire 280R system. Topics covered in this chapter include:

About System Memory

The system's main logic board provides eight slots for high-capacity dual in-line memory modules (DIMMs), divided into two groups of four DIMMs each that may be subdivided again into four logical banks. For the DIMM bank organization and numbering scheme, see the table on next page, or see "DIMM Failure" on page 196.

The system supports Sun standard 200-pin, 3.3-volt, 60-nanosecond memory modules. Modules of 128-, 256-, 512-, or 1024-Mbyte capacity can be installed in the system. Total main memory capacity is expandable up to 8 Gbytes.

Memory modules are delicate. Ensure that you take appropriate precautions to avoid damaging them through electrostatic discharge. The memory modules must be replaced or installed by a qualified service provider. For information about removing and installing DIMMs, see the *Sun Fire 280R Server Service Manual*.

Configuration Rules

The following memory configuration rules apply to your system:

- At least one memory group consisting of 4 slots (slots J0101, J0203, J0305, and J0407; or slots J0100, J0202, J0304, and J0406) must be filled for the system to boot.
- All DIMMs in a group must be of the same type.

Note – DIMM capacities can differ from one group to the next—for example, four 128-Mbyte DIMMs installed in group 0 and four 256-Mbyte DIMMs installed in group 1 is permissible, but performance may be impacted.

Caution – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static from your clothes or work environment can destroy the modules. Do not remove any DIMM from its antistatic packaging until you are ready to install it on the system board. Handle the modules only by their edges. Do not touch the components or any metal parts. Always wear a grounding strap when you handle the modules.

System Memory Interleaving

CPU processing rate is slowed by memory module response time, and limited by the word size (64 bytes) of its read or write requests—referred to as the processing stride. System memory interleaving is a technique to increase CPU throughput by splitting the memory system into independent banks that answer CPU read or write requests independently and in parallel.

Main memory on the Sun Fire 280R server supports interleaving across all eight slots on 64-byte boundaries, and the memory system can support from one to four logical banks. The processing stride at 64 bytes produces no interleaving, at 128 bytes it produces two-way interleaving, and at 256 bytes it produces four-way interleaving. The Sun Fire 280R system is limited to four-way interleaving. The group addresses are listed in the following table.

Group	Physical Address	Bank[1]
1	J0407	1
0	J0406	0
1	J0305	1
0	J0304	0
1	J0203	3
0	J0202	2
1	J0101	3
0	J0100	2

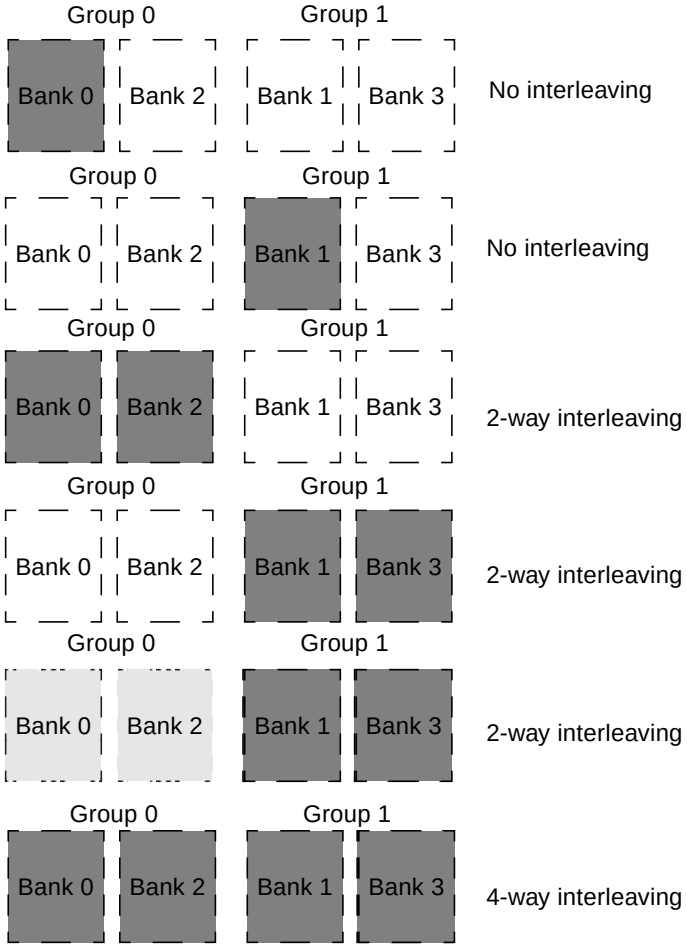
1 Logical banks are created on the DIMM.

For interleaving purposes, all banks are treated identically regardless of their physical location. Two successive accesses to distinct logical banks located in the same group of DIMMs are processed the same as accesses to logical banks that are in separate groups of DIMMs.

For maximum interleaving performance:

- Install identical capacity DIMMs in all four banks.

The next figure illustrates the possible system interleaving configurations. In only one configuration is it possible to interleave by four. Both groups must be populated with DIMMs of the same size supporting four banks.



About Central Processing Unit (CPU) Modules

The UltraSPARC III CPU module is a high-performance, highly-integrated superscalar processor implementing the SPARC-V9 64-bit reduced instruction set computer (RISC) architecture. The CPU module has been updated and improved to further advance UltraSPARC's reliability, availability, scalability, and serviceability features.

The system's main logic board provides slots for two UltraSPARC III CPU modules. Each processor module includes one CPU chip with integrated cache memory for data and instructions, as well as up to 8 Mbytes of external static random access memory (SRAM) cache memory.

The CPU modules communicate with the system's main memory and I/O subsystem via the system's high-speed data bus. The system CPU modules are automatically synchronized with the system bus that runs at clock speeds up to 150 MHz providing maximum data throughput of 1.2 Gbytes per second.

A qualified service provider must remove and replace CPU modules in your system. For information about installing and removing CPU modules, see the *Sun Fire 280R Server Service Manual*.

Configuration Rules

The following rules apply for your system:

- You can install one or two UltraSPARC III CPU modules into the server.
- Insert the first CPU module into CPU slot 0 (J0501 and J0601).
- Install two CPU modules into CPU slot 0 (J0501 and J0601) and into CPU slot 1 (J0701 and J0801).
- If you install more than one CPU module, the modules must operate at identical clock speeds and they must have the same size cache memory. This generally means the CPU modules must have the same part number.

For information about the CPU slot locations on the main logic board, see the *Sun Fire 280R Server Service Manual*.

About Peripheral Component Interconnect (PCI) Buses

All system communication between the CPU / memory subsystem and all external devices, network interfaces and internal storage / removable media is handled by the host-bus to PCI-bridge application specific integrated circuit (ASIC). This bridge ASIC manages communication between the system bus and the two PCI buses. These PCI buses support slots for up to four PCI interface cards. One PCI bus (bus A) also handles communication between the system and the on-board Fibre Channel-Arbitrated Loop (FC-AL) controller for the internal drives and the external high-speed serial data connector (HSSDC). The other PCI bus (bus B) handles communication between the system and the main logic board's SCSI controller, Ethernet controller, Universal Serial Bus (USB) controller, and serial and parallel port controller.

PCI cards are available in a variety of configurations. Not all cards will fit or operate in all PCI slots, so it is important to know the specifications of your PCI cards and the types of cards supported by each PCI slot in the system.

Some PCI cards are as short as 6.875 inches (17.46 cm) in length (called "short" cards), while the maximum length of PCI cards is 12.28 inches (31.19 cm, called "long" cards). Each slot in the system can accommodate either a long or a short card.

Older PCI cards communicate over 32-bit PCI buses, while many newer cards communicate over wider 64-bit buses. All four of the PCI slots accept either 32-bit or 64-bit wide cards.

Older PCI cards operate at 5 VDC, while newer cards are designed to operate on 3.3 VDC. Cards that require 5 volts will not operate in 3.3-volt slots, and 3.3-volt cards will not operate in 5-volt slots. "Universal" PCI cards are designed to operate on either 3.3 volts or 5 volts, so these cards can be inserted into either type of slot. The system provides three slots for 5-volt cards and one slot for a 3.3-volt card. All four PCI slots accept universal cards.

Most PCI cards operate at clock speeds of 33 MHz, while some newer cards operate at 66 MHz. All four PCI slots can accept 33-MHz cards. 66-MHz cards are restricted to the slot labeled PCI 1.

The table below shows the mapping of the PCI slots to the two PCI buses and the type of PCI cards supported in each slot.

Back Panel Slot Label	Board Address	PCI Bus	Slot Width (bits)/ Card Type (bits)	Clock Rates (MHz)	DC Voltage/ Card Type
PCI 1	J2301	A	64 / 32 or 64	33 or 66	3.3 v or Universal
PCI 2	J2401	B	64 / 32 or 64	33	5.5 v or Universal
PCI 3	J2501	B	64 / 32 or 64	33	5.5 v or Universal
PCI 4	J2601	B	32 / 32	33	5.5 v or Universal

For the board addresses of the PCI slots on the main logic board, see the *Sun Fire 280R Server Service Manual*.

Configuration Rules

The following rules apply for your system:

- All slots support PCI universal cards.
- All slots support PCI long or short cards.
- Each slot can supply up to 15 watts of power.
- The total power used for all four slots must not exceed 60 watts.

You can install PCI cards into any compatible PCI slots. Slots need not be filled in any particular order. In most cases, the system's I/O performance will be unaffected by placement of PCI cards in the slots. Heavily loaded systems, however, will deliver better overall performance by installing high-throughput interface cards on separate buses. Examples of high-throughput interfaces are dual-channel UltraSCSI host adapters and ATM-622 interfaces.

You can also improve overall system availability by installing redundant storage or network interfaces on separate PCI buses.

About Network Interface Options

The system is supplied with a standard Ethernet port, and an administrative network interface available via the Remote System Control (RSC) card Ethernet port.

To operate standard Ethernet network protocols, the system's main logic board provides an auto-sensing, switchable 10BASE-T/100BASE-TX Ethernet interface conforming to the IEEE 802.3u Ethernet standard. The interface configures itself automatically for either 10-Mbps or 100-Mbps operation, depending on network characteristics.

A back panel RJ-45 connector, for connecting a twisted-pair Ethernet (TPE) cable, provides access to the built-in Ethernet interface.

For instructions on configuring the main logic board Ethernet interface, see "How to Configure the Standard Ethernet Interface" on page 51. For information about operating characteristics and configuration parameters for the `eri` FastEthernet device driver, see *Platform Notes: The eri FastEthernet Device Driver*. This document is available on *Solaris on Sun Hardware AnswerBook*, which is provided on the Solaris Supplement CD for the Solaris release you are running.

The RSC card's back panel connectors provide a built-in administrative network interface via Ethernet (up to 10 Mbps) or over a modem supporting connections. The ports provide access to the RSC card via:

- The RJ-45 connector for a TPE cable supporting a 10BASE-T Ethernet interface conforming to the IEEE 802.3u Ethernet standard
- The RJ-11 phone jack connector for connecting to a standard telephone modem cable

For instructions on configuring the RSC card Ethernet interface, see "How to Configure the Remote System Control (RSC) Ethernet Interface" on page 53.

Additional network interfaces are available through PCI cards, which provide connection to Ethernet, token ring, fiber distributed data interface (FDDI), and other network types. For more information, see "About Peripheral Component Interconnect (PCI) Buses" on page 84, "How to Add an Ethernet Interface" on page 54, and the documentation supplied with the PCI network interface card.

About Disk Array Configurations and Concepts

The Sun Fire 280R server expands support for disk array configurations by adding Fibre Channel-Arbitrated Loop (FC-AL) to its UltraSCSI implementation over the Peripheral Component Interconnect (PCI) buses. For more information, see “About the Fibre Channel-Arbitrated Loop (FC-AL) and Port” on page 104.

The Sun Solstice DiskSuite and VERITAS software is designed for use with the Sun Fire 280R server’s internal and external disk drives. The software supports a variety of configurations called *disk arrays*, which improve storage performance, capacity, and availability.

Note – Sun Solstice DiskSuite and other software must be ordered separately.

The VERITAS software also supports disk arrays and disk redundancy. For more information, see “About Multipathing Software” on page 115.

This section describes some of the most popular and useful of the disk configurations using two or more disk drives, including:

- Disk concatenation
- Disk mirroring (RAID 1)
- Disk striping (RAID 0)
- Disk striping with parity (RAID 5)
- Hot spares
- Hot plug

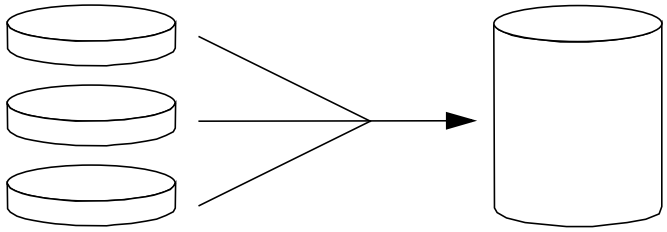
The DiskSuite software creates *metadevices*—logical disk devices consisting of one or more physical disks or partitions from several disks. Once you use Solstice DiskSuite to create a metadevice, the operating system uses and maintains the metadevice as if it were a single device.

For instance, you can combine the two disks `c1t2d0s2` and `c1t3d0s2` into the metadevice `/dev/md/rdsk/d0`.

The Sun Fire 280R server’s internal disks support RAID 1 and RAID 0. More complicated configurations, including RAID 0+1 and RAID 5, are supported by additional disks and external disk arrays with one or more PCI host adapter cards.

Disk Concatenation

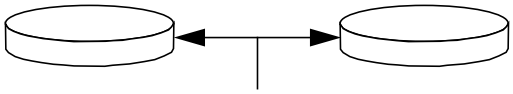
Disk concatenation is a method for increasing logical volume size beyond the capacity of one disk drive by creating one large metadevice from two or more smaller drives. This lets you create arbitrarily large partitions.



Using this method, the concatenated disks are filled with data sequentially, with the second disk being written to when no space remains on the first, the third when no room remains on the second, and so on.

Disk Mirroring: RAID 1

Disk mirroring is a technique that uses data redundancy—two complete copies of all data stored on two separate disks—to protect against loss of data due to disk failure. One metadevice is created from two disks.

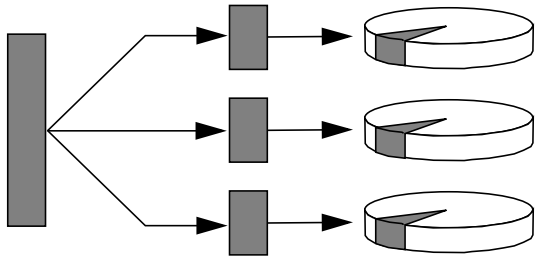


Whenever the operating system needs to write to the mirrored metadevice, both disks are updated. The disks are maintained at all times with exactly the same information. When the operating system needs to read from the mirrored metadevice, it reads from whichever disk is more readily accessible at the moment. The scheme is sometimes called RAID 1, where RAID stands for redundant arrays of independent disks.

RAID 1 offers the highest level of data protection, but storage costs are high, since all data is stored twice.

Disk Striping: RAID 0

Disk striping (sometimes called RAID 0) is a technique for increasing system throughput by using several disk drives in parallel. Whereas in non-striped disks the operating system writes a single block to a single disk, in a striped arrangement each block is divided and portions of the data are written to different disks.



System performance using RAID 0 will be better than using RAID 1 or 5, but the possibility of data loss is greater because there is no way to retrieve or reconstruct data stored on a failed drive.

Disk Striping With Parity: RAID 5

RAID 5 is an implementation of disk striping in which parity information is included with each disk write. The advantage of the technique is that if any one disk in a RAID 5 array fails, all the information on the failed drive can be reconstructed from the data and parity on the remaining disks.

System performance using RAID 5 will fall between that of RAID 0 and RAID 1, but the system is fully protected from data loss.

Hot Spares

In a *hot-spares* arrangement, one or more disk drives are installed in the system but are unused during normal operation. Should one of the active drives fail, disk write operations are automatically redirected to a hot-spare disk and the failed disk drive is retired from operation.

Hot Plug

The system's disk bays are designed to permit disk drive removal and insertion while the system is powered on. *Hot-plug* technology significantly increases the system's serviceability and availability, by providing the ability to:

- Add hardware dynamically to enable the system to handle an increasingly larger work load, perform load balancing, and improve performance of a running system
- Remove and replace faulty hardware with minimal system service disruption

For more information about hot-pluggable disk drives, see "About Internal Disk Drives" on page 91.

For More Information

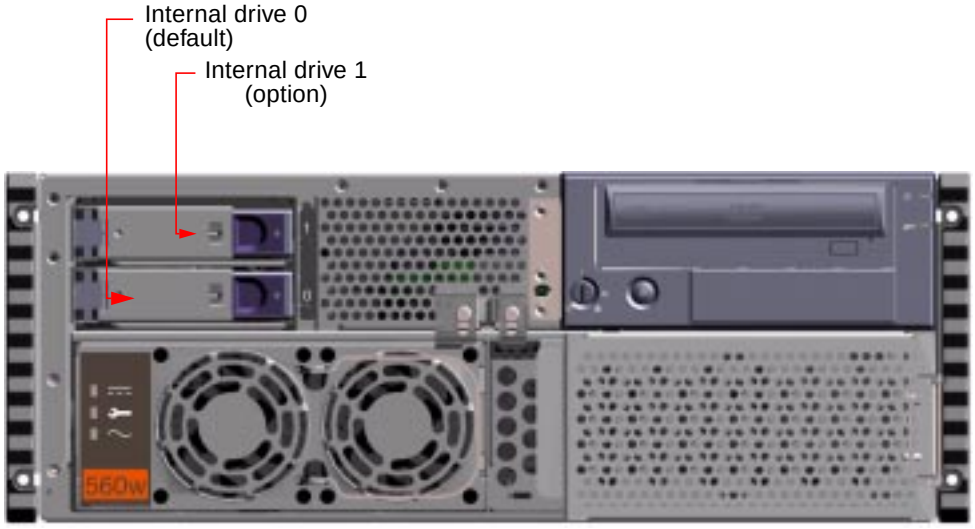
See the documentation supplied with the Solstice DiskSuite software.

About Internal Disk Drives

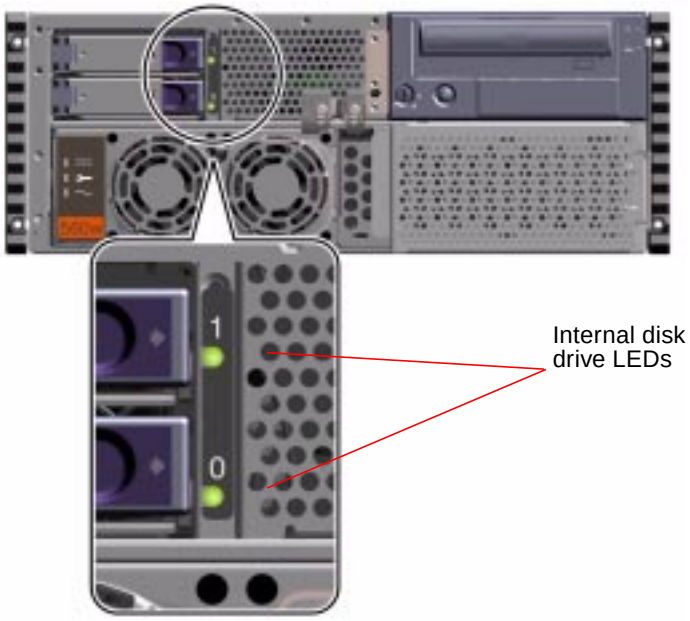
The Sun Fire 280R server supports up to two internal, hot-pluggable Fibre Channel-Arbitrated Loop (FC-AL) disk drives. Drives are 3.5 inches wide and 1 inch high (8.89 cm x 2.54 cm).

The drives are supported by the up to 106-Mbyte per second FC-AL interface on the system's main logic board. Both drives plug in to the two-disk backplane, which mounts to the system's chassis.

The following figure shows the system's two internal disk drives. Disk drives are numbered 0 and 1, with the 0 drive being the default system disk.



On the right side of each installed disk drive is a green indicator LED. These LEDs indicate the operating status associated with each disk drive. If the drive is being accessed its LED blinks. Continuous LED lighting indicates the drive is ready for the system to use.



The Solstice DiskSuite software supplied with the Solaris server media kit lets you use *internal* disk drives in two RAID configurations: RAID 0 (striping), RAID 1 (mirroring). You can also configure data drives as hot-spares. For more information on all supported RAID configurations, see “About Disk Array Configurations and Concepts” on page 87.

The hot-plug feature of the system’s internal disk drives allows the removal and installation of one of the drives (if two drives are configured) while the system is operational. This capability significantly reduces system down-time associated with disk drive replacement.

Hot-Plug Configuration Rules

The following rules apply for your system:

- You must use Sun supported standard 3.5 inch wide and 1 inch high (8.89 cm x 2.5 cm) disk drives that are FC-AL compatible and run at 10,000 revolutions per minute (rpm).
- The FC-AL IDs for the disks are hardwired on the disk backplanes. There is no need to set any jumpers on the disk drives themselves. The FC-AL target address of each disk drive is determined by the slot location where the drive is connected to its FC-AL backplane.
- The internal disk drives share the internal FC-AL with the external FC-AL connector.

For information about implementing RAID configurations, see “About Disk Array Configurations and Concepts” on page 87. For information about implementing FC-AL configurations, see “About the Fibre Channel-Arbitrated Loop (FC-AL) and Port” on page 104.

Hot-Plug Device Information

In order to perform a disk hot-plug procedure, you must know the physical or logical device name for the drive that you want to install or remove. If your system encounters a disk error, often you can find messages about failing or failed disks in your system console. This information is also logged in the `/var/adm/messages` file(s). These error messages typically refer to a failed disk drive by its physical device name (such as `/devices/pci@1f,4000/pci@3/sd@b,0`) or by its logical device name (such as `c0t1d0`). In addition, some applications may report a disk slot number (0 or 1).

You can use the following table to associate internal disk slot numbers with the logical and physical device names for each internal FC-AL disk drive.

Disk Slot Number	Logical Device Name	Physical Device Name
Slot 0	`c0t0d0`	`/devices/pci@8,600000/SUNW,qlc@4/fp@0,0/disk@0,0`
Slot 1	`c0t1d0`	`/devices//pci@8,600000/SUNW,qlc@4/fp@0,0/disk@1,0`

For more information about FC-AL device names see “Internal Fibre Channel-Arbitrated Loop (FC-AL) Physical Disk Drive Name(s) Are Variable” on page 105.

Hot-Plug Procedure Information

The disk drive hot-plug remove or install procedures involve software commands for preparing the system prior to removing and installing a hot-pluggable disk drive, and commands for reconfiguring the operating environment after removing or replacing the drive. For instructions about removing or inserting hot-plug drives, see:

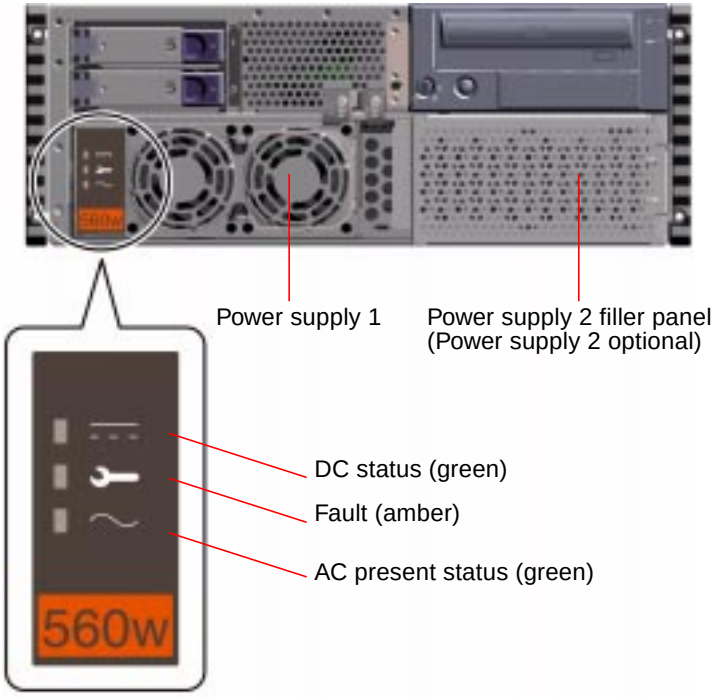
- “How to Remove a Disk Drive Using the Hot-Plug Operation” on page 128
- “How to Install a Disk Drive Using the Hot-Plug Operation” on page 132

About Power Supplies

A power distribution board delivers DC power for all internal system components. The system's power supplies plug in to connectors on this board, and when both supplies are installed, they share equally in satisfying the power demands of the system.

The system can accommodate one or two power supplies. Each power supply provides up to 560 watts of DC power. All system configurations can operate with only one power supply installed.

Power supplies are modular units, designed for fast, easy installation or removal, even while the system is fully operational. Supplies are installed in bays at the front of the system, as shown in the following figure.



You can use a second supply to provide redundancy, allowing the system to continue operating should one of the power supplies fail. If your server includes a second power supply, connect the second AC power cord to the left inlet (labeled 2

on the back panel). You may connect the second power supply to the same AC circuit as the first supply. However, for increased system redundancy you should connect each power supply to a separate circuit.

Removing and replacing a power supply should only be performed by a qualified service provider. For information about removing and installing power supplies, see the *Sun Fire 280R Server Service Manual*.

Power supplies in a redundant configuration feature a hot-swap capability. This means that you can remove and replace a faulty power supply without turning off the system power or even shutting down the operating system. If the system is running on one power supply, you can also add a second supply without interrupting processing.

Three LED indicators on the front of the power supply display AC and DC status, and fault conditions. For additional details, see “Power Supply Failure” on page 195.

Note – Sun Fire 280R power supplies shut down automatically in response to certain over-temperature and power fault conditions. To recover from an automatic shutdown, you must disconnect the AC power cord, wait roughly 10 seconds, and then reconnect the power cord.

About the Serial Ports

The system provides two serial communication ports through a pair of DB-25 connectors located on the back panel. Both ports are capable of synchronous and asynchronous communication.

In synchronous mode, each port operates at any rate from 50 Kbaud to 256 Kbaud when the clock is generated internally. When the clock is generated from an external source, synchronous communication occurs at rates up to 384 Kbaud.

In asynchronous mode, either port supports baud rates of 50, 75, 110, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200, 153600, 230400, 307200, and 460800 baud.

Both serial ports can be configured to provide EIA-423 or EIA-232D signal levels. Signal levels are controlled by software. The default setting is EIA-423. For more information about changing the serial port configuration, see “About Changing Serial Port Settings” on page 113.

See “Reference for the Serial Port A and B Connectors” on page 204 for the connector diagram, back panel icon, and pin assignments.

About the Small Computer System Interface (SCSI) Port

External Small Computer System Interface (SCSI) devices are supported via a 68-pin SCSI connector located on the system's back panel. This bus is UltraSCSI-capable (40 Mbytes per second) and can support additional external, single-ended, wide or narrow SCSI devices. The external SCSI bus is separate from the internal SCSI bus for removable media devices and internal disk drives. See "Reference for the UltraSCSI Connector" on page 208 for a diagram and pinout of the external SCSI connector.

The external SCSI bus will support up to four external SCSI tape devices if the bus is used exclusively for tape devices. When other types of SCSI devices are present on the bus, a maximum of two SCSI tape devices are supported on the external SCSI bus. Additional external tape devices can be supported by installing appropriate PCI host adapter cards.

Target Devices

Up to 12 Sun-compensated devices can operate on the external SCSI bus at 20 Mbytes per second. For UltraSCSI performance of 40 Mbytes per second, no more than seven devices may be connected. Target addresses for the external SCSI bus (also known as SCSI IDs) are available in a range of 0 through 15. Target address 7 is reserved for the SCSI host adapter located on the main logic board. All devices on the bus must have unique target addresses.

The addresses for the internal Digital Video Disc-Read Only Memory (DVD) drive (6) and tape drive (4 or 5) are determined by jumpers located on the drives. If the DVD and tape drives have been factory-installed, they are configured with the correct addresses for the system. Internal disk drives use 0 and 1.

Configuration Bus Lengths

For UltraSCSI performance on the external SCSI bus, you must adhere to the following bus length restrictions for daisy-chained SCSI devices:

- For one to three devices, the maximum bus length is 9.84 feet (3 meters)
- For four to seven devices, the maximum bus length is 4.92 feet (1.5 meters)

You must include the Sun Fire 280R server internal bus length of .2226 feet (.067 meter) in your bus length calculations.

If you exceed these bus length restrictions, UltraSCSI devices may operate at less than 40 Mbytes per second. Under such conditions, an UltraSCSI device may experience errors that eventually cause it to reset and operate at 20 Mbytes per second.

For fast/wide performance on the external SCSI bus, the maximum SCSI bus length for daisy-chained SCSI devices is 19.7 feet (6 meters), including the Sun Fire 280R server internal bus length of .2226 feet (.067 meter).

External UltraSCSI-compliant SCSI cables have an impedance of 90 ohm (+/- 6 ohm) and are required for UltraSCSI interface. Sun's implementation of UltraSCSI requires that the total SCSI bus length be limited to no more than approximately 20 feet (6 meters) with up to 12 Sun-compensated devices.

Due to the short bus length, an approximately 32-inch (0.8-meter) UltraSCSI-compliant external cable is supported (Sun part number 530-2883) in addition to a 6.5-ft (2-meter) UltraSCSI-compliant external cable (Sun part number 530-2884).

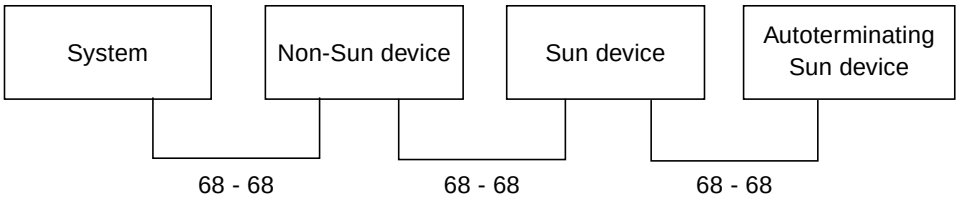
External SCSI Cabling and Termination

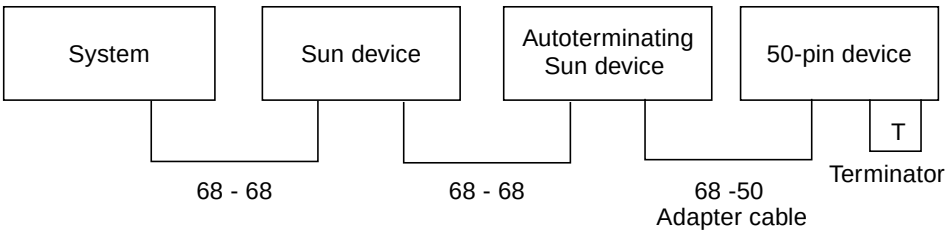
Use the following cabling guidelines to ensure proper device cabling and termination on the external SCSI bus:

- In order to maintain UltraSCSI performance, all cables used must be UltraSCSI-compliant.
- The external SCSI bus must be correctly terminated. Most Sun devices use autotermination. See the documentation supplied with the device.
- If all external mass storage devices use 68-pin connectors, connect all non-Sun devices to the system first and connect a Sun autoterminating device to the end of the chain.
- If external mass storage devices consist of 68-pin devices and 50-pin devices, connect the Sun 68-pin devices to the system first and terminate the chain with a 50-pin device and its terminator. The 68-pin device connected to the 68-50 pin adapter cable must be autoterminating in order to terminate the high-order bits.

Caution – Do not connect 68-pin devices after 50-pin devices; SCSI bus errors will occur.

The following figures provide a summary of the cabling guidelines.





Multi-initiator Support

The SCSI implementation of the system includes multi-initiator support: any external host adapter on the bus can drive Termpower. This means that if the system should lose power, the devices on the SCSI bus (except those powered by the system) can continue to operate.

About the Parallel Port

The system provides one IEEE 1284-compatible, bidirectional parallel port for connecting the system to a local printer or other compatible parallel device. Connectivity is provided by a standard 25-pin DB-25 connector on the back panel of the system.

The parallel port operates at a 2-Mbyte per second data transfer rate and supports the enhanced parallel port (EPP) protocol modes as well as standard Centronics, Nibble, and Byte modes.

See “Reference for the Parallel Port Connector” on page 212 for the connector diagram, back panel icon, and pin assignments.

About the Universal Serial Bus (USB) Ports

The system provides two low-speed industry-standard Universal Serial Bus (USB) ports for connecting the system to standard USB devices and compatible USB hubs.

Connectivity is provided by the four standard four-pin USB connectors on the back panel of the system. The Sun Type 6 USB keyboard (a Sun Type 5 keyboard with a USB interface), and a Sun USB mouse are supported for direct system I/O and require one 4-pin USB connector each.

The USB ports, connectors J3001 and J3002, operate at a 12-Mbps data transfer rate. See “Reference for the Universal Serial Bus (USB) Connectors” on page 215 for the connector diagram, back panel icon, and pin assignments.

About the Standard Ethernet Port

The system's main logic board provides an autosensing, switchable 10BASE-T/100BASE-TX Ethernet interface conforming to the IEEE 802.3u Ethernet standard. The autosensing interface configures itself automatically for either 10-Mbps or 100-Mbps operation, depending on network characteristics.

One preconfigured RJ-45 back panel connector, for connecting a Category-5 twisted-pair Ethernet (TPE) cable, provides access to the Ethernet interface.

For instructions on configuring the main logic board Ethernet interface, see "How to Configure the Standard Ethernet Interface" on page 51.

For the connector diagram, back panel icon, and pin assignments, see "Reference for the Twisted-Pair Ethernet (TPE) Connector" on page 206.

For information about operating characteristics and configuration parameters for the `eri` Fast Ethernet device driver, see *Platform Notes: The eri FastEthernet Device Driver.* This document is available on the *Solaris on Sun Hardware AnswerBook*, which is provided on the Solaris Supplement CD for the Solaris release you are running.

About the Fibre Channel-Arbitrated Loop (FC-AL) and Port

Fibre Channel (FC) is a standard that defines a high-performance serial interconnection designed for bidirectional, point-to-point communication among servers, workstations, and storage systems.

Fibre Channel-Arbitrated Loop (FC-AL), an important enhancement to the FC standard, was developed specifically to meet the needs of storage system interconnections. FC-AL employs a simple loop topology that can support both simple configurations and complex arrangements of multiple loops attaching many devices (hubs, switches, servers, and storage systems).

FC-AL devices employ a serial interface, which transfers multiple standard protocols such as Small Computer System Interface (SCSI) and Asynchronous Transfer Mode (ATM). By supporting these standard protocols, FC-AL preserves your investment in existing legacy systems, firmware, applications, and software.

The Sun Fire 280R system supports a single FC-AL loop. The internal FC-AL disk controller application specific integrated circuit (ASIC)—the QLogic 2200A—is the interface between the 64-bit 66-MHz PCI bus and the rest of the FC-AL loop, and serves as the loop controller. The FC-AL disk controller ASIC also supports fabric switches, and thus both additional public and private loops are configurable using the external port. PCI adapter cards can also be on the same loop as the QLogic 2200A controller ASIC.

The FC-AL host controller ASIC provides a 64-bit, 66-MHz Extended PCI (EPCI) interface and the disk drives are connected to the loop through a hub. Access to the loop for the disk drives is through the FC-AL backplane. Access to the loop via the external port for mass storage is through the copper High-Speed Serial Data Connector (HSSDC) on the back panel. No Gigabit Interface Converter (GBIC) adapter is supported.

On the FC-AL controller, internal signal detect circuitry on the hub automatically detects any signal coming from the external connector, which then enables the external port. Lack of an external signal causes the external connection to be disconnected from the loop. The individual ports can also be bypassed manually via a software probe and programming a General Programming I/O (GPIO) register in the FC-AL controller.

The host controller implements the FC protocol through a microcoded engine. The memory for the firmware is external and is implemented with synchronous 128-Kbyte static random access memory (SRAM). For the connector diagrams, back panel icon, and pin assignments, see “Reference for the Fibre Channel-Arbitrated Loop (FC-AL) Port Connector” on page 214.

Configuration

The FC-AL disk controller ASIC supports fabric switches, and both public and private loops are configurable using the external port. Optical links are not used internally on the server, but are supported for mass storage externally via a supported PCI adapter card.

- Up to four dual-ported PCI card controllers can be used in the system's PCI slots.
- Only one controller can be present on the internal loop.
- Up to 125 external nodes (devices) can be supported on a single FC-AL loop.

Internal Fibre Channel-Arbitrated Loop (FC-AL) Physical Disk Drive Name(s) Are Variable

The internal FC-AL disks will never be controller 0 and their controller number and device name will vary depending on the type and number of PCI cards configured in the system.

Device names are currently assigned to devices depending on the order they are probed. Commands that return device names poll installed devices in this order: on-board SCSI devices, SCSI PCI slot cards (if present), on-board internal FC-AL devices, and last PCI FC-AL cards (if present).

Because of this, the first controller (controller 0, or zero) is always the CD-ROM/DVD-ROM drive. Other device names vary depending where they fall in the order of polling and on the number and type of device installed in the system. The following examples in the table show the resulting device names in two cases.

Controller Number	Device	Physical Device Name
1st Case: 4 SCSI PCI cards are installed in the four PCI slots		
Controller 0	CDROM/DVD drive	/pci@8,700000/scsi@6
Controller 1	EXTERNAL SCSI PORT	/pci@8,700000/scsi@6,1
Controller 2	PCI SCSI CARD	/pci@8,600000/scsi@1
Controller 3	PCI SCSI CARD	/pci@8,700000/scsi@1
Controller 4	PCI SCSI CARD	/pci@8,700000/scsi@2
Controller 5	PCI SCSI CARD	/pci@8,700000/scsi@3
Controller 6	FCAL INTERNAL DISK(s)	/pci@8,600000/SUNW,qlc@4

Controller Number	Device	Physical Device Name
2nd Case: 2 SCSI PCI cards and 2 FC-AL PCI cards are installed in the PCI slots		
Controller 0	CDROM / DVD drive	/ pci@8,700000 / scsi@6
Controller 1	EXTERNAL SCSI PORT	/ pci@8,700000 / scsi@6,1
Controller 2	PCI SCSI CARD	/ pci@8,600000 / scsi@1
Controller 3	PCI SCSI CARD	/ pci@8,700000 / scsi@1
Controller 4	FCAL INTERNAL DISK(s)	/ pci@8,600000 / SUNW,qlc@4
Controller 5	PCI FCAL CARD	/ pci@8,700000 / SUNW,qlc@2
Controller 6	PCI FCAL CARD	/ pci@8,700000 / SUNW,qlc@3

Both of the above cases assume that devices are attached to each controller.

Initial Support

Sun Fire 280R system's FC-AL external port supports the following products:

- Sun StorEdge Multipack-FC
- Sun StorEdge T3 Arrays

The following optional FC-AL controller PCI adapter card is supported:

- Sun StoreEdge Dual-Loop PCI FC / AL host adapter

The adapter card supports all current Sun Storage FC-AL options, including A5000 series and StorEdge Multipacks.

For more information about setting up and configuring Sun disk arrays, see the *Sun StorEdge StorTools User's Guide* and the *Sun StorEdge Component Manager User's Guide*.

For more information about setting up and configuring T3 arrays, see the *Sun StorEdge T3 Administrator's Guide*.

About the Remote System Control (RSC) Card and Ports

The Remote System Control (RSC) host controller card provides resident firmware, a power-on self-test (POST), standby power, backup battery power, and RSC software that provides simultaneous remote access to the RSC host via the RSC Ethernet or modem ports.

Caution – The hardware card is installed in every system in the RSC slot. Never move the RSC card to another system slot, as it is *not* a PCI-compatible card.

The card, installed in every system in the RSC slot, features on-board devices that can monitor and trigger alerts, for example, about host system resets or power supply failures, or other host system changes. An on-board RSC thermistor supplies ambient temperature data about the host system to the firmware and to the installed software.

The RSC card also supports redirection of its host's console to the RSC connection, and thus provides remote system administration for geographically distributed or physically inaccessible systems. For information about redirecting the system console, see "How to Redirect the Host Console to RSC" on page 111.

Console access also provides secure access to the host system firmware and permits remote system diagnosis, system reconfiguration, and remote system rebooting from the ok prompt in the host firmware.

RSC Features and Ports

The RSC firmware runs independently from the host, and uses standby power from the server (or from its own battery backup for up to 30 minutes). At system power up the RSC card is incorporated into the system device tree. But, because of standby power and the ability to redirect the system console, RSC remains functional (provided the RSC software has been installed) should the host system software become unavailable.

Therefore, the RSC hardware and RSC software continue to be effective when the server operating system goes offline. Even in the absence of the operating environment software, RSC can send notification of hardware failures or other events that may be occurring on your server.

The preconfigured RSC back panel ports provide the following connectors:

- One RJ-45 connector for connecting a Category-5 twisted-pair Ethernet (TPE) cable, see "Reference for the Twisted-Pair Ethernet (TPE) Connector" on page 206
- One standard Personal Computer Memory Card International Association (PCMCIA) modem pop-out RJ-11 connector

All RSC connection ports can be used simultaneously. The modem supports regular asynchronous serial protocol, and can also support the Point-to-Point Protocol (PPP). When running PPP, a standard internet TCP/IP 10-Mbps protocol stack is available over the modem interface.

RSC Jumpers

The following table describes the RSC flash PROM jumper addresses, functions, and settings. Default jumper settings are marked with an asterisk.

Address	Function	Shunt on Pins	Description
J0403	FRU SEEPROM access	P1-P2	Write enable*
		P2-P3	Write protect
J0501	Flash PROM boot selection	P1-P2	Normal booting*
		P2-P3	Not used
J0502	Flash PROM mirror	P1-P2	Not used
		P2-P3	Disable mirror*

Note – Never change RSC card address J0502 default jumper setting, as the RSC card will not boot.

RSC Monitoring

The RSC card contributes significantly to improvements in environmental monitoring. The Sun Fire 280R system RSC monitors the following devices or events:

- Power supplies
- System keyswitch
- System fans
- CPU module(s) temperature(s)
- System ambient temperature

The following LED information is displayed through the RSC software interface:

- The system fault LED lights when a fan fault, a power supply mismatch, a power supply fault, or a software triggered fault has occurred.
- The system power-on LED lights when the system is functioning normally.
- The system fault LED lights when the system is hung or the operating environment software is brought down in some way.

In addition the four front panel keyswitch positions are monitored; see “Status and Control Panel Features” on page 8.

How to Use the RSC Ports

To access the RJ-11 telephone jack:

1. **Quickly press on the PCMCIA recessed telephone connector to release the connector.**

   The connector pops out from its receptacle in the RSC card.

2. **Plug the RJ-11 telephone jack into the RJ-11 connector.**

   Be sure to use the open side of the connector. The closed side has a copper lockout bar that prevents inserting the telephone jack into the wrong side.

   To configure the port, install the RSC software and follow the directions in the *Sun Remote System Control (RSC) User’s Guide*.

To access the standard RJ-45 TPE Ethernet connector:

- **Plug the standard TPE cable into the RJ-45 connector.**

  To configure the port, install the RSC software and follow the directions in the *Sun Remote System Control (RSC) User’s Guide*.

About the Remote System Control (RSC) Software

The RSC hardware and the RSC software combine to provide a server management tool that allows you to monitor and control your server over modem lines and over a network. For more information about RSC hardware, see “About the Remote System Control (RSC) Card and Ports” on page 107.

RSC software requirements are documented in the *Sun Remote System Control (RSC) User’s Guide*.

RSC software supports the following features:

- A view of the server’s front panel, including keyswitch positions and LEDs
- Remote system monitoring and error reporting, including output from power-on self-test (POST) and OpenBoot Diagnostics
- Remote server reboot, reset, power-on, power-off, and power-off on-demand
- Remote display of system environmental monitoring information without being near the managed server, even when the server is offline
- Enables an administrator to run diagnostic tests from a remote console
- Remote console functions available through both the Ethernet port and over the modem
- Remote event notification via email or pager of hardware and software failures
- PCMCIA modem on the RSC card
- RSC battery backup and the RSC card that enable RSC software use after a complete power failure
- Remote viewing of server boot logs and run-time logs

RSC complements existing Sun monitoring and diagnostics tools such as Sun Management Center, SunVTS, the kadb kernel debugger, OpenBoot PROM, and OpenBoot Diagnostics. Sun Management Center software operation remains unchanged, and it continues to be the main tool for observing system operation behavior and performance while the server operating system is up and running.

Note – To use the RSC command shell, a client must be an ASCII character terminal or have ASCII character terminal emulation software installed.

For instructions about connecting the hardware on the RSC card, see “About the Remote System Control (RSC) Card and Ports” on page 107. The RSC Ethernet port is configured just like the standard Ethernet connector on the main logic board. For more information, see “How to Configure the Remote System Control (RSC) Ethernet Interface” on page 53.

For instructions about how to configure the RSC hardware for the RSC software, and about installing and using the RSC software, see the *Sun Remote System Control (RSC) User’s Guide*.

How to Redirect the Host Console to RSC

After RSC software is installed and configured, the host system console is still available as on any Sun machine. To define RSC as the system console device instead, you must log in to the server.

- **Enter the following commands at the** ok **prompt:**

```
ok diag-output-to rsc

ok setenv input-device rsc-console

ok setenv output-device rsc-console
```

These commands take effect *after* the next server reset. At any time, you can use the following commands to remove RSC as the default console:

```
ok diag-output-to ttya

ok setenv input-device keyboard

ok setenv output-device screen
```

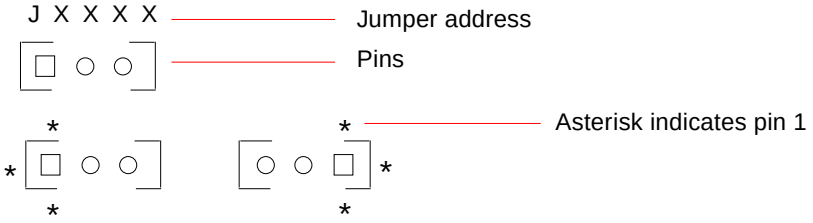
These commands take effect after the next server reset.

About the Main Logic Board Jumpers

The jumpers on the main logic board affect the operation of the flash PROM located on the main logic board. For information about the flash PROM jumper settings, see “About Flash Permanent Read Only Memory (PROM) Jumpers” on page 114.

Modifying jumper settings should only be performed by a qualified service provider. For more information about changing jumper settings, see the *Sun Fire 280R Server Service Manual*.

Jumpers are marked on the main logic board with jumper addresses. For example, the serial port jumper is marked J2103. Jumper pins are located immediately adjacent to the jumper address. Pin 1 is marked with an asterisk (*) in one of the positions shown below.



About Changing Serial Port Settings

The serial port jumper on the Sun Fire 280R permits the configuration of the system's two serial ports for either EIA-423 or EIA-232D signal levels. EIA-423 levels are the default standard for North American users. EIA-232D levels are required for digital telecommunication in nations of the European Community.

How to Configure Serial Settings

Configuring jumpers can be performed from the `ok` prompt. Follow these steps:

Note – The default setting at serial ports A and B is RS-423 mode. To change the serial port to RS-232 mode proceed as follows.

---

1. **To select RS-232 mode at serial ports A and B, at the `ok` prompt, type:**

```
ok setenv ttya-mode 9600,8,n,1,-,rs232

ok setenv ttyb-mode 9600,8,n,1,-,rs232
```

To set the ports back to RS-423 mode, substitute `rs423` for `rs232` in the above commands.

2. **To implement the new mode, at the `ok` prompt, type:**

```
ok reset-all
```

Note – Setting only one of the `ttya` or `ttyb` `rs232/rs423` mode variables causes both ports to be set to that mode.

For pin assignments, back panel icons, and connector diagram, see "Reference for the Serial Port A and B Connectors" on page 204.

About Flash Permanent Read Only Memory (PROM) Jumpers

The system uses flash PROM jumpers to permit the reprogramming and use of specific boot code blocks that are held in nonvolatile (NVRAM) system memory, and to permit remote reprogramming of that code by an authorized system administrator over a local area network.

One jumper on the main logic board controls flash PROM operation. The table below describes its function.

Jumper	Shunt on Pins 1 + 2 Selects	Shunt on Pins 2 + 3 Selects	Default Shunt on Pins	Signal Controlled
J2103	Write protect	Write enable	1 + 2	FLASH PROM PROG ENABLE

Modifying the jumper setting should only be performed by a qualified service provider. For the location of the flash PROM jumper on the main logic board, and for configuration instructions, see the *Sun Fire 280R Server Service Manual*.

Note – The jumper setting on J2104 must remain on its factory-supplied setting (shunt on pins 1 and 2).

For information about how jumpers are marked on the main logic board with jumper addresses, see “About the Main Logic Board Jumpers” on page 112.

For more information about flash PROM programming, see the *Sun Fire 280R Server Service Manual*.

About Multipathing Software

Multipathing software enables you to define and control redundant physical paths to I/O devices such as disk storage arrays and network interfaces. If the active path to a device becomes unavailable, the software automatically switches to an alternate path to maintain availability. This capability is known as *automatic failover.* Automatic failover allows a qualifed service provider to remove and replace the faulty component without impacting normal system operations.

To take advantage of multipathing capabilities, your server must be configured with redundant hardware, such as redundant network interfaces or disk drives.

For the Sun Fire 280R system, two different types of multipathing software are available:

- Solaris IP Network Multipathing – Provides multipathing and load-balancing capabilities for IP network interfaces
- VERITAS Volume Manager – Includes a feature called Dynamic Multipathing (DMP) for disk storage arrays

The Solaris implementation of IP Network Multipathing provides the following configurable features:

- Failure detection – The ability to detect when one of a configured group of network adapters fails and to automatically switch (failover) the network access to an alternate adapter in the group.
- Repair detection – The ability to detect when a network adapter that failed previously has been repaired and to automatically switch network access back (failback) to include the repaired adapter.
- Load spreading – The ability to spread network packets across multiple network adapters to achieve higher throughput. Load spreading occurs only when the network traffic is flowing to multiple destinations using multiple connections.

For instructions on how to configure and administer Solaris IP Network Multipathing, consult the *IP Network Multipathing Administration Guide* provided with your specific Solaris release.

VERITAS Volume Manager software actively supports multiported disk arrays. It automatically recognizes multiple I/O paths to a particular disk device within an array. VERITAS DMP provides increased reliability by providing a path failover mechanism. If one connection to a disk is lost, VERITAS Volume Manager continues

to access the data over the remaining connections. DMP also provides greater I/O throughput by balancing the I/O load uniformly across multiple I/O paths to each disk device.

For additional information about VERITAS Volume Manager and its Dynamic Multipathing feature, see “About Sun Clustering Software” on page 117 and refer to the documentation provided with VERITAS Volume Manager software.

About Sun Clustering Software

The Sun Fire 280R server supports Sun Cluster 3.0 software running with the Solaris 8 Hardware 1/01 Operating Environment software.

Sun Cluster 3.0 software connects a group of servers into a *cluster* system to avoid a loss of service by managing failures on a larger scale than on a single server. Sun Cluster software allows multiple Sun servers to be interconnected in a cluster configuration. A cluster is a group of nodes that are interconnected to work as a single, highly available and scalable system. A node is a single instance of Solaris software – it may be a standalone server or a domain within a standalone server.

Avoiding service loss is accomplished by combining hardware redundancy with software monitoring and restart capabilities into the software cluster. Such measures reduce and forestall the following types of single-point failures in the cluster:

- Server operating environment failure because of a crash or a panic
- Data service failure
- Server hardware failure
- Network interface failure
- Disk media failure

Sun Cluster software enables automatic recovery from any single hardware or software failure within the cluster by automatically restarting a failed application, or by migrating the application and its resources to a backup server. Sun Cluster software provides:

- Hardware and software failure detection
- System administration
- System failover and automatic restart of data services in the event of a failure
- A set of high availability (HA) data services
- Application programming interface (API) software to create other HA data services by integrating them within the Sun Cluster framework

The Sun Cluster system uses Solstice DiskSuite or VERITAS Volume Manager (VxVM) software to administer multihost disks arrays that are accessible from multiple Sun Cluster servers. The volume management software provides disk mirroring, concatenation, striping, and hot sparing. VxVM also provides RAID 5 capability. For more information about RAID, see “About Disk Array Configurations and Concepts” on page 87.

For more information about Sun Cluster software, see the *Sun Cluster Software Planning and Installation Guide*, the *Sun Cluster Hardware Service Manual*, and the *Sun Cluster System Administration Guide.*

CHAPTER 5

Using and Servicing Internal Storage Devices

This chapter describes the internal storage devices in your system, and how to use them when the operating environment is running. With the exception of internal disk drives in the Sun Fire 280R server, *all other component or part installation or replacement* must be performed by a qualified service provider. The chapter covers what you need to know, and need to do, to install, remove, or replace the internal disk drives.

The following service tasks are covered in this chapter:

The following storage device tasks are covered in this chapter:

The following storage device information is also included:

How to Avoid Electrostatic Discharge

Use the following procedure to prevent static damage whenever you are accessing the system internal drives.

Before You Begin

Complete this task:

- "How to Power Off the System" on page 61, *only* if you are performing a cold swap of your disk. If you are hot-plugging a disk drive, do not power-off the system, but follow the procedures in your software instructions.

You must have the following items:

- Antistatic wrist or foot strap
- Antistatic mat (or the equivalent)

What to Do

Caution – Printed circuit boards and hard disk drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or the work environment can destroy components. Do not touch the components themselves or any metal parts without taking proper antistatic precautions.

1. **Disconnect the AC power cord from the wall power outlet** *only if you will be handling the power distribution board***.**

   The AC power cord provides a discharge path for static electricity, so you generally want to leave it plugged in during installation and repair procedures. The only time you should unplug the cord is when you service the power distribution board.

2. **Use an antistatic mat or similar surface.**

   When performing any option installation or service procedure, place static-sensitive parts, such as disk drives, on an antistatic surface. The following items can be used as an antistatic surface:

   - The bag used to wrap a Sun replacement part
   - The shipping container used to package a Sun replacement part
   - Sun electrostatic discharge (ESD) mat (part number 250-1088, available through your Sun sales representative)
   - Disposable ESD mat, shipped with replacement parts or options

3. **Use an antistatic wrist strap.**

   Attach the appropriate end to the system chassis sheet metal and attach the other end of the strap to your wrist. Refer to the instructions that come with the strap.

4. **Detach both ends of the strap after you have completed the installation or service procedure.**

How to Remove a Disk Drive

This procedure describes the physical drive removal. The procedure for removing a disk drive varies if you are removing a drive using a hot-plug operation or if you are removing one without using a hot-plug operation. If want to perform a hot-plug removal, see “How to Remove a Disk Drive Using the Hot-Plug Operation” on page 128.

Before You Begin

For additional information, see:

- “About Internal Disk Drives” on page 91
- “About Disk Array Configurations and Concepts” on page 87

Perform the following prerequisite task:

- “How to Avoid Electrostatic Discharge” on page 120

What to Do

1. **Halt the operating system and turn off the system power.**

   See “How to Power Off the System” on page 61.

2. **Unlock the front doors and swing them open.**

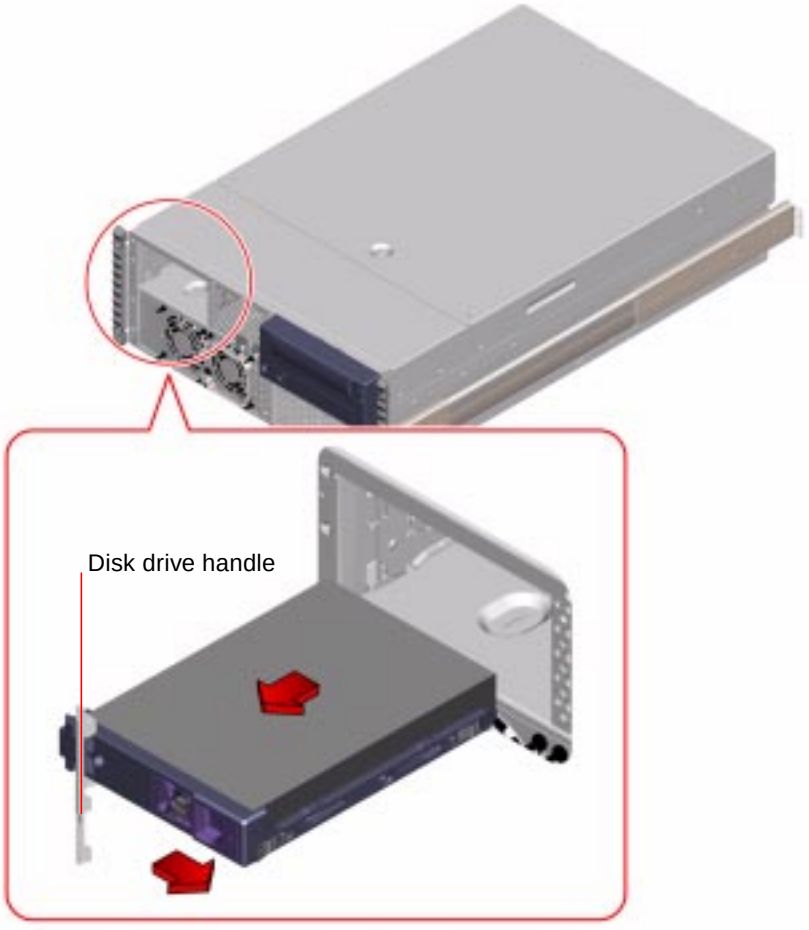
   Turn the keyswitch to the Power-On/Off position. This unlocks the system front doors.

3. **Identify the disk drive to be removed and note the bay in which it is installed.**

   The lower bay is the default system disk location.

4. **Using your thumb and forefinger, pinch the disk drive latch sideways to release the drive handle.**

   Pull the handle away from the drive until you feel the drive connector disengage from the backplane connector.



5. **Holding the disk drive by the handle, slide it out of the drive bay.**

Note – When you reinstall the drive (or a replacement drive), be sure to install it into the same drive bay as the one from which it was just removed.

---

6. **Place the disk drive on an antistatic mat.**

7. **Repeat the procedure for the other drive (if necessary).**

If you have finished removing or installing disk drives, remove the antistatic strap.

What Next

To install a disk drive, complete this task:

- "How to Install a Disk Drive" on page 125

How to Install a Disk Drive

This procedure describes the physical drive installation. The procedure for installing a disk drive varies if you are installing a drive using a hot-plug operation or if you are installing one without using a hot-plug operation. If want to perform a disk drive hot-plug installation, see “How to Install a Disk Drive Using the Hot-Plug Operation” on page 132.

Before You Begin

For additional information, see:

- “About Internal Disk Drives” on page 91
- “About Disk Array Configurations and Concepts” on page 87

You must follow antistatic precautions when handling a disk drive. Complete this task:

- “How to Avoid Electrostatic Discharge” on page 120

What to Do

1. **Halt the operating system and turn off system power.**

   See “How to Power Off the System” on page 61.

2. **Unlock the front doors and swing them open.**

   Turn the keyswitch to the Power-On/Off position. This unlocks the system front doors.

3. **Release the drive handle on the disk drive.**

   Use your thumb and forefinger to pinch the drive latch sideways to open it.

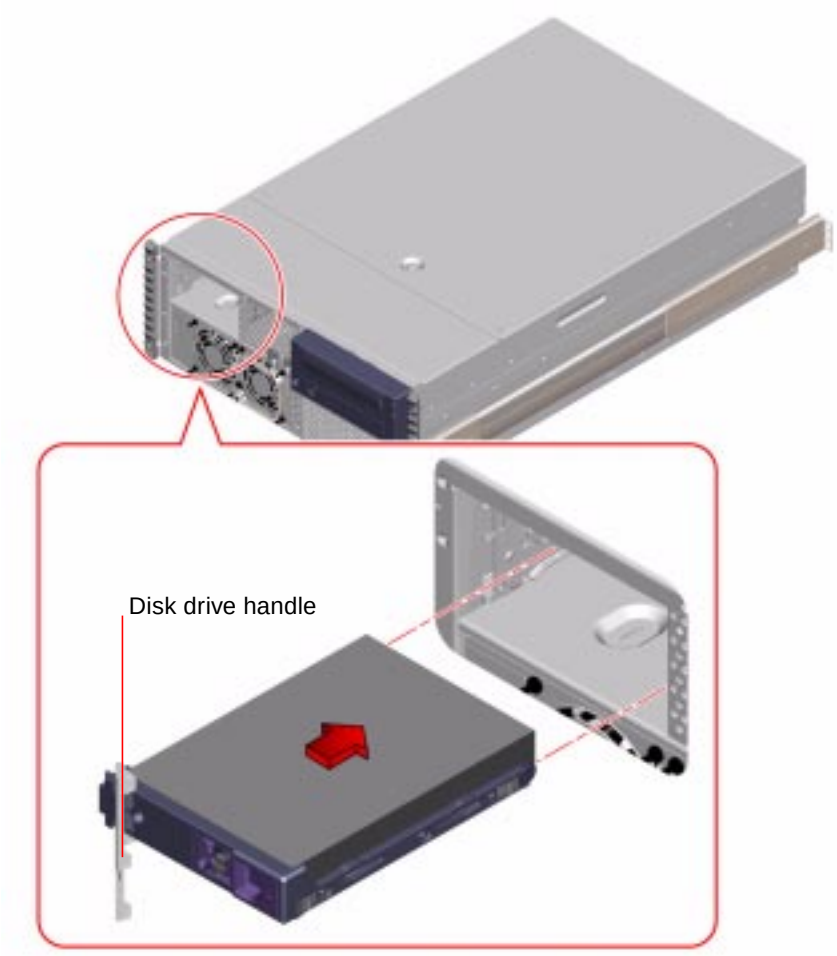
4. **Align the disk drive to its drive bay.**

   Orient the drive so that the drive handle's hinge faces the outside of the drive bay.

Note – If you are replacing a drive that you removed previously, be sure to install the drive in the same drive bay from which it was removed.

---

5. **Holding the drive by its handle, fit the drive into the drive bay guide rails.**



6. **Slide the drive into the bay until it barely contacts the backplane.**

7. **Press carefully on the center of the drive and watch as the handle begins to close.**

   The drive handle begins to close as the drive engages its backplane connector.

8. **Press the handle toward the drive until the latch closes, securing the drive in place.**

9. **Repeat the procedure for the other drive (if necessary).**

   If you have finished removing and installing disk drives, remove the antistatic strap.

10. **Close and then lock the system front doors.**

    Turn the keyswitch to the Locked position. This locks the system front doors preventing access to the power supply(s) and to the disk drive(s) installed in the system.

11. **Restart the system and return the keyswitch to the Locked position.**

    For more information, see “How to Power On the System” on page 40.

What Next

When you restart the system, be sure to run power-on self-test (POST) and OpenBoot Diagnostics tests to verify that the system functions correctly with the new parts you have just installed. You do not have to perform a reconfiguration boot with FC-AL drives. For additional information, see:

- “How to Isolate Failures Using Power-On Self-Test (POST)” on page 179
- “How to Isolate Failures Using OpenBoot Diagnostics” on page 181

If you need to remove a disk drive, see:

- “How to Remove a Disk Drive” on page 122

How to Remove a Disk Drive Using the Hot-Plug Operation

The system's disk *hot-plug* feature enables you to remove a disk drive without shutting down the operating system or turning off the system power. The way in which you remove a disk drive depends on the application you are using and if you are replacing a drive, adding a new one, or removing a drive permanently.

When you remove a drive using the hot-plug operation, you need to stop the drive and take it offline to remove the logical software links to the drive, and to re-configure the file systems so that they now ignore the removed drive. You may also have to reconfigure your application software to operate without the removed drive.

Use the `luxadm` and the `devfsadm` software tools to remove the Sun Fire 280R server's internal disk drive(s) using the hot-plug operation. The following procedure describes the general steps involved, but your specific device names may be different.

Caution – Do not hot-plug drives without the correct preparations. The system supports hot-plugging disk drives, but there are software procedures that you must perform before you remove or install any drive.

Before You Begin

If the server is set up without a terminal or local graphics console, you need to set up one of the communication options in order to issue software commands. See:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36
- "About Communicating With the System" on page 33

Note – If you have not configured the system with two boot disks, you cannot hot-plug a single boot disk. You can only hot-plug the boot disk if you have configured a two-disk mirror of the boot disk for hot-plugging. If the system is configured with a boot disk and a data disk, you may hot-plug the data disk, *not* the boot disk.

- Obtain the logical device name(s) for the device(s) you plan to remove. See "Hot-Plug Device Information" on page 93 for more information.
- Select the disk and stop any activity or applications accessing the drive.

- Synchronize and unmount any file systems mounted on the drive.

You must follow antistatic precautions when handling a disk drive. Complete this task:

- "How to Avoid Electrostatic Discharge" on page 120

What to Do

1. **Become superuser or the root user.**

```
% su
Password: <root_password>
#
```

2. **Type the following** `luxadm` **command:**

   Where *<c1t1d0s2>* is the logical device name for the drive. The system dialogue follows the command.

```
# luxadm remove_device /dev/rdsk/<c1t1d0s2>
WARNING!!! Please ensure that no file systems are mounted on
these device( s).
All data on these devices should have been backed up.
The list of devices which will be removed is:
1: Device name: /dev/rdsk/c1t1d0s2
Node WWN: 20000020371b1f31
Device Type: Disk device
Device Paths:
/dev/rdsk/c1t1d0s2
```

3. **Type** `c` **at the prompt to verify the list of devices:**

```
Please verify the above list of devices and
then enter c or <CR> to Continue or q to Quit. [Default: c]:c
stopping: /dev/rdsk/c1t1d0s2.... Done
offlining: /dev/rdsk/c1t1d0s2.... Done
```

   The drives are now offline and spun down.

4. **Physically remove the disk drive and press the Return key.**

   Follow the instructions in Step 2 through Step 7 of "How to Remove a Disk Drive" on page 122. The system responds with the following message:

```
Hit <Return> after removing the device( s).
<date> <systemname> picld[87]: Device DISK1 removed
Device: /dev/rdsk/c1t1d0s2
No FC devices found. - /dev/rdsk/c1t1d0s2.
```

   The `picld` daemon notifies the system that the disk has been removed, and (in this example) that no other FC-AL devices were found.

5. **Type the `ls` command to list the current system's `c1t1d*` devices.**

```
# ls /dev/ rdsk/ c1t1d*
/dev/rdsk/c1t1d0s0 /dev/rdsk/c1t1d0s1 /dev/rdsk/c1t1d0s2
/dev/rdsk/c1t1d0s3 /dev/rdsk/c1t1d0s4 /dev/rdsk/c1t1d0s5
/dev/rdsk/c1t1d0s6 /dev/rdsk/c1t1d0s7
```

   The system responds with all the logical links present in the directory.

6. **Type the following `devfsadm -C` command to initiate `devfsadm` cleanup subroutines:**

```
# devfsadm -C
```

Note – The default `devfsadm` operation is to attempt to load every driver in the system and attach these drivers to all possible device instances. `devfsadm` then creates device special files in `/devices` and logical links in `/dev`. The `devfsadm -C` option cleans up the `/dev` directory and removes any dangling logical links to the device link names.

---

7. **List the system's current `c1t1d*` device links again.**

```
# ls /dev/rdsk/c1t1d*
No match
```

   The output confirms that the cleanup command has removed all dangling links, and the operating environment can proceed to use the remaining devices.

For more information, refer to the `luxadm` documentation in the *Solaris on Sun Hardware AnswerBook*. This AnswerBook documentation is provided on the Solaris Supplement CD for the Solaris release you are running.

Refer also to `luxadm(1M)` and to `devfsadm(1M)` man pages.

What Next

If you need to install a drive using a hot-plug operation, see:

- "How to Install a Disk Drive Using the Hot-Plug Operation" on page 132

How to Install a Disk Drive Using the Hot-Plug Operation

The system's disk *hot-plug* feature enables you to insert a disk drive without shutting down the operating system or turning off the system power. When installing a disk, you must insert the disk drive and wait for it to spin up to operating speed. Then you create logical software links to the drive, and re-create or reconfigure the file systems so that the Solaris environment recognizes the drive. Finally you configure your application (if necessary) to operate with this new drive.

Use the `luxadm` and the `devfsadm` software tools to hot-plug the Sun Fire 280R server's internal disk drive(s). The following procedure describes the general steps involved, but your specific device names may be different.

Caution – Do not hot-plug drives without the correct preparations. The system supports hot-plugging disk drives, but there are software procedures that you must perform before you remove or install any drive.

Before You Begin

If the server is set up without a local terminal or graphics console, you need to set up one of the communication options in order to issue software commands. See:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36
- "About Communicating With the System" on page 33
- Obtain the logical device name(s) for the device(s) you plan to install. See "Hot-Plug Device Information" on page 93 for more information.

Note – If you have not configured the system with two boot disks, you cannot hot-plug a single boot disk. You can only hot-plug the boot disk if you have configured a two-disk mirror of the boot disk for hot-plugging. If the system is configured with a boot disk and a data disk, you may hot-plug the data disk, *not* the boot disk.

You must follow antistatic precautions when handling a disk drive. Complete this task:

- "How to Avoid Electrostatic Discharge" on page 120

What to Do

1. **Become superuser or the root user.**

```
% su
Password: <root_password>
#
```

2. **Insert the drive into its disk drive bay.**

   Follow Step 2 through Step 10 of "How to Install a Disk Drive" on page 125. The system responds with the following message.

```
#<date> <systemname> picld[87]: Device DISK1 inserted
```

3. **Type the `ls` command to list the current system's `c1t1d*` devices.**

```
# ls /dev/rdsk/c1t1d*
No match
```

   The output confirms there are no links present for the inserted drive.

4. **Type the following `devfsadm -C` command to initialize `devfsadm` device driver links:**

```
# devfsadm -C
```

Note – The default `devfsadm` operation is to attempt to load every driver in the system and attach the drivers to all possible device instances. `devfsadm` then creates device special files in `/devices` and logical links in `/dev`. The `-C` option also removes any dangling links.

---

5. **List the system's current `c1t1d*` logical device links again.**

```
# ls /dev/ rdsk/ c1t1d*
/dev/rdsk/c1t1d0s0 /dev/rdsk/c1t1d0s1 /dev/rdsk/c1t1d0s2
/dev/rdsk/c1t1d0s3 /dev/rdsk/c1t1d0s4 /dev/rdsk/c1t1d0s5
/dev/rdsk/c1t1d0s6 /dev/rdsk/c1t1d0s7
```

The system responds with the logical links present in the directory.

6. **Format the disk by typing the following command:**

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

The system responds with the disks available for formatting.

7. **Type the number of the hot-plug drive you are formatting.**

```
AVAILABLE DISK SELECTIONS:

0. c1t0d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
/pci@ 8,600000/ SUNW, qlc@ 4/ fp@ 0,0/ ssd@w210000203760c2fe, 0

1. c1t1d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
/pci@ 8,600000/ SUNW, qlc@ 4/ fp@ 0,0/ ssd@ w21000020371b1f31,0

Specify disk (enter its number): 1
selecting c1t1d0
[disk formatted]
```

8. **Repeat Step 2 through Step 7 for every drive you are hot-plugging.**

For more information, refer to the `luxadm` documentation in the *Solaris on Sun Hardware AnswerBook*. This AnswerBook documentation is provided on the Solaris Supplement CD for the Solaris release you are running.

Refer also to `luxadm(1M)`, `devfsadm(1M)`, and `format(1M)` man pages.

What Next

Mount and synchronize any file systems associated with the drive. Restart any applications accessing the drive.

If you need to remove a disk drive using the hot-plug operation, see:

- “How to Remove a Disk Drive Using the Hot-Plug Operation” on page 128

How to Initiate a Reconfiguration Boot

Before You Begin

After you have installed the operating system, and after installing any internal or external storage device, or any new part that plugs in to the main logic board, except CPU modules or DIMMs, you must perform a reconfiguration boot so that your system is able to recognize the newly installed option(s).

Performing a reconfiguration boot is *not* necessary after a hot-plug operation, or after replacing an FC-AL disk drive, or after replacing a USB device.

Caution – Before you power on the system, make sure that the system cover and doors are properly installed.

What to Do

1. **Turn on power to any peripherals and external storage devices.**

   Read the documentation supplied with the device for specific instructions.

2. **Turn on power to the monitor or terminal and open your console.**

   A terminal or monitor is required for viewing system messages. For setup instructions, see “How to Attach an Alphanumeric (ASCII) Terminal” on page 34 or “How to Configure a Local Graphics Console” on page 36.

3. **Turn the front panel keyswitch to the Power-On/Off position and press the Power button once.**

   See “Status and Control Panel Features” on page 8.

   To run power-on self-test (POST) and OpenBoot Diagnostics tests to verify that the system functions correctly with the new part(s) you have just installed, see “How to Power On the System With Full Diagnostics Enabled” on page 43, or see “About Diagnostic Levels” on page 167.

4. **When the system banner is displayed on the monitor or terminal, immediately enter the Stop-a sequence on the Sun keyboard or press the Break key on the terminal keyboard.**

   The system banner contains the Ethernet address and host ID. To enter the Stop-a sequence, hold down the Stop key and press the a key. The keyswitch must be in the Power-On/Off position.

Note – The system may take anywhere from 30 seconds to two minutes before the system banner appears. This time depends on the level of POST diagnostics being performed.

---

5. **When the** ok **prompt is displayed, type the following command**:

```
ok boot -r
```

This command rebuilds the device trees for the system, incorporating any newly installed options. After a device has been added to a device tree, it can be recognized by the system. After the system has successfully completed the reconfiguration boot, the system prompt is displayed.

Caution – Never move the system when system power is on. Movement can cause catastrophic disk drive failure. Always power off the system before moving it.

What Next

The system's front panel LED indicators provide power-on status information. For more information about the system LEDs, see:

- "System LED Indicators" on page 10

About the Digital Video Disc (DVD) Drive

There are a number of different digital video disc-read only memory (DVD-ROM) drives offered by Sun Microsystems for your system. These drives support both DVDs and compact discs (CDs). Each drive is shipped with a specification sheet that contains the following information:

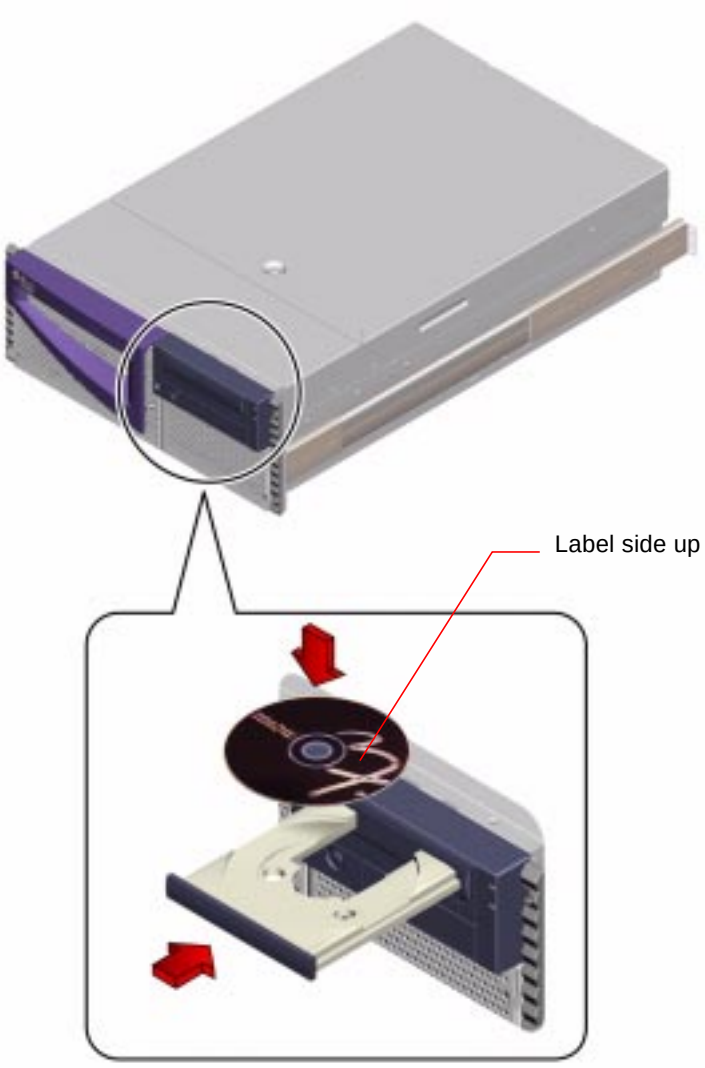
- Type of drive and the type of discs that can be used with the drive
- Handling and storage information
- Physical characteristics
- Power requirements
- Cleaning instructions
- Description of drive controls, indicators, and jumper setting

How to Insert a Digital Video Disc (DVD) Into the Drive

What to Do

1. **Push the Eject button on the drive to release the drive tray.**
2. **Place a DVD or CD into the drive tray, label side up.**

   A disc is a single- or double-sided storage medium. Place it into the tray with the appropriate label side up, as shown.



3. **Gently push the tray back into the drive.**

   The drive has an automated closing mechanism that retracts the tray into the drive.

What Next

You can eject a DVD or CD from the drive by using one of three methods:

- With software commands; see “How to Eject a Digital Video Disc (DVD) With Software Commands” on page 141
- Manually; see “How to Eject a Digital Video Disc (DVD) Manually” on page 143
- Using an emergency procedure; see “How to Eject a Digital Video Disc (DVD) in an Emergency” on page 145

How to Eject a Digital Video Disc (DVD) With Software Commands

Before You Begin

- Verify that no users are accessing the drive

Note – You should warn users before abruptly halting processes. The command `fuser -u /cdrom/cdrom0` helps you identify who's accessing the DVD drive. Refer to the *Solaris System Administrator's Guide* for more information about the `fuser` command.

If the server is set up without a local console, you need to set up a console on it in order to issue software commands; see:

- "About Communicating With the System" on page 33

What to Do

1. **Kill processes accessing the DVD drive, if necessary.**

   The disc will not eject while the drive is in use. To kill any processes accessing the DVD drive, become superuser and type the following:

```
% su
Password:
# fuser -k /cdrom/cdrom0
```

2. **From the console device, type:**

```
% eject cdrom0
```

The drive ejects the DVD drive tray and you can remove the disc.

What Next

You can also eject a DVD or CD from the drive using one of these methods:

- Manually; see "How to Eject a Digital Video Disc (DVD) Manually" on page 143
- Using an emergency procedure; see "How to Eject a Digital Video Disc (DVD) in an Emergency" on page 145

How to Eject a Digital Video Disc (DVD) Manually

Before You Begin

- Verify that no users are accessing the drive.

Note – Warn users before abruptly halting processes. The command `fuser -u /cdrom/cdrom0` helps you identify who's accessing the ROM drive. Refer to the *Solaris System Administrator's Guide* for more information about the `fuser` command.

What to Do

1. **Kill processes accessing the DVD drive, if necessary.**

   The front panel Eject button will not eject a disc while the disc is in use. To kill any processes accessing the DVD or CD, become superuser and type the following:

```
% su
Password:
# fuser -k /cdrom/cdrom0
```

2. **Press the Eject button on the front panel.**

   The drive ejects the DVD drive tray and you can remove the disc.

What Next

You can also eject a DVD or CD by using one of these methods:

- With software commands; see “How to Eject a Digital Video Disc (DVD) With Software Commands” on page 141
- Using an emergency procedure; see “How to Eject a Digital Video Disc (DVD) in an Emergency” on page 145

How to Eject a Digital Video Disc (DVD) in an Emergency

Before You Begin

Use the emergency ejection procedure if you unmounted the disc, and the Eject button does not function.

What to Do

Caution – If this procedure is used while a disc is mounted, you can degrade or destroy data in your system.

1. **Turn off the power to your system.**

   See “How to Power Off the System” on page 61.

2. **Unfold and straighten one end of a large wire paper clip.**

3. **Insert the straightened end of the clip into the emergency eject hole and press firmly.**

   Pull the tray from the drive after the clip is inserted into the hole.

What Next

You can also eject a DVD or CD by using one of these methods:

- With software commands; see “How to Eject a Digital Video Disc (DVD) With Software Commands” on page 141
- Manually; see “How to Eject a Digital Video Disc (DVD) Manually” on page 143

How to Clean a Digital Video Disc (DVD)

Before You Begin

The following procedure applies equally well to DVDs and to CDs. Eject the DVD or CD and remove it from the tray; see:

- "How to Eject a Digital Video Disc (DVD) With Software Commands" on page 141
- "How to Eject a Digital Video Disc (DVD) Manually" on page 143

Note – If the drive cannot read a disc, you may have a dusty or dirty disc.

What to Do

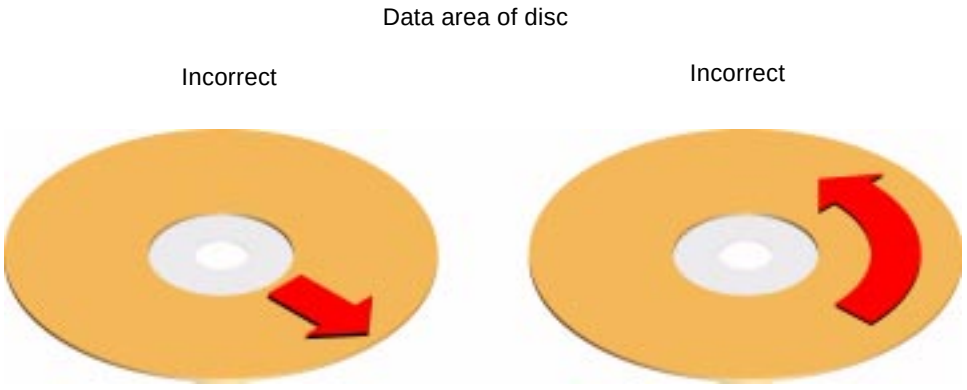
1. **Clean the disc with compressed air.**

   Compressed air can remove most accumulations of dust and large dirt particles. If you have access to the drive's read-head, verify it is dust free also.

2. **If spraying with compressed air** ***fails*** **to remove the dirt on a disc, wipe the disc using a soft, clean, lint-free,** ***dry*** **cloth.**

   - Wipe the data areas of the disc (on both sides if necessary) *radially* from the center to the outside.
   - Do *not* wipe in a circular motion.
   - Wipe only the affected areas of the disc.

The figure below shows the correct and incorrect ways to clean a DVD or CD.



What Next

To insert the disc into the drive, see:

- "How to Insert a Digital Video Disc (DVD) Into the Drive" on page 138.

About the Tape Drive and Tape Cartridges

There are a number of different tape drives offered by Sun Microsystems for your system. The system only supports one storage device installed into the internal drive bay, and you cannot install an internal DVD drive and an internal tape drive in the same bay. Each tape drive is shipped with a specification sheet that contains the following information:

- Type of cartridges that can be used with the drive
- Cartridge storage capacity
- Handling and storage information
- Physical characteristics
- Power requirements
- Cleaning instructions
- Description of controls, indicators, and jumper setting

Handling and Storing Tape Cartridges

The following general handling and storage information applies to cartridges for any of the tape drives offered for your system:

- Keep cartridges away from anything magnetic.
- Store cartridges in a dust-free environment.
- Keep cartridges away from direct sunlight and sources of heat, cold, or humidity. Constant room temperature and 50% humidity is recommended.
- Do not touch the surface of the tape.

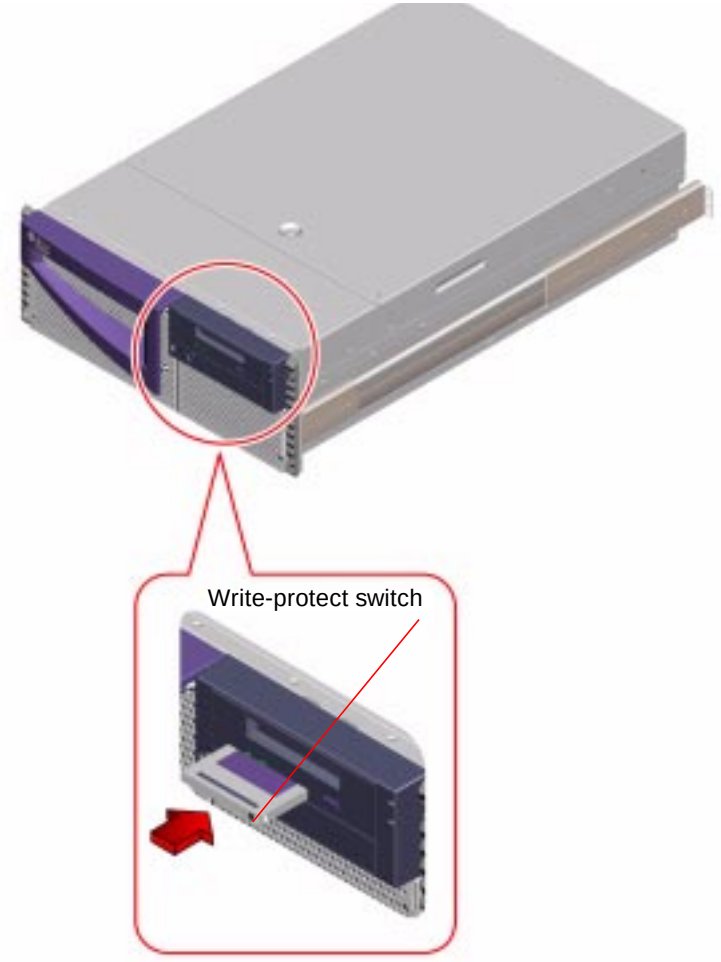
Thermal Conditioning

To ensure proper thermal conditioning, keep the tape cartridge at the same temperature as the drive for 24 hours. This applies to cartridges for any of the tape drives offered for your system.

How to Insert a Tape Cartridge

What to Do

1. **Verify that the tape cartridge write-protect switch is set correctly.**
   If the lock window is open, the tape is write-protected.
2. **Insert the cartridge into the drive, label side up.**



3. **Push gently on the cartridge until it is pulled into the drive.**

What Next

To remove a tape cartridge from the drive, see:

- “How to Remove a Tape Cartridge” on page 152

How to Remove a Tape Cartridge

Before You Begin

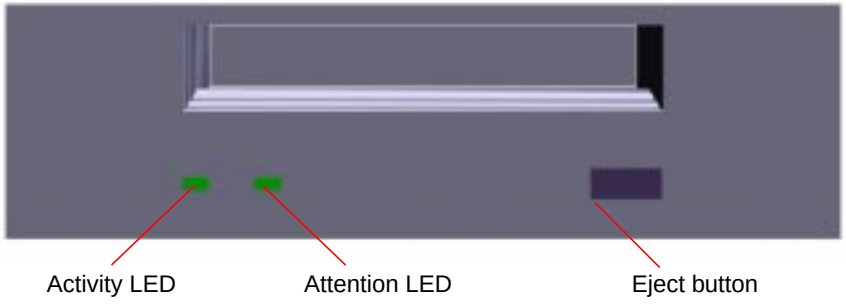
Note – The information in this section applies to a DDS-4 tape drive. If you have a different type of tape drive installed, see the specifications shipped with the drive for information.

What to Do

1. **Check that there is no drive activity.**

   The green activity LED should be unlit. A flashing LED indicates drive activity.

Caution – Do not eject the tape cartridge when the drive is active, or you may incur data loss or equipment damage.



2. **Push the Eject button and remove the tape cartridge.**

What Next

To insert a cartridge into the drive, see:

- “How to Insert a Tape Cartridge” on page 150

How to Control the Tape Drive

What to Do

For information about software commands needed to read and write data with your tape drive, refer to the *Solaris Handbook for Sun Peripherals* or the *Solaris User's Guide*.

How to Clean the Tape Drive

Before You Begin

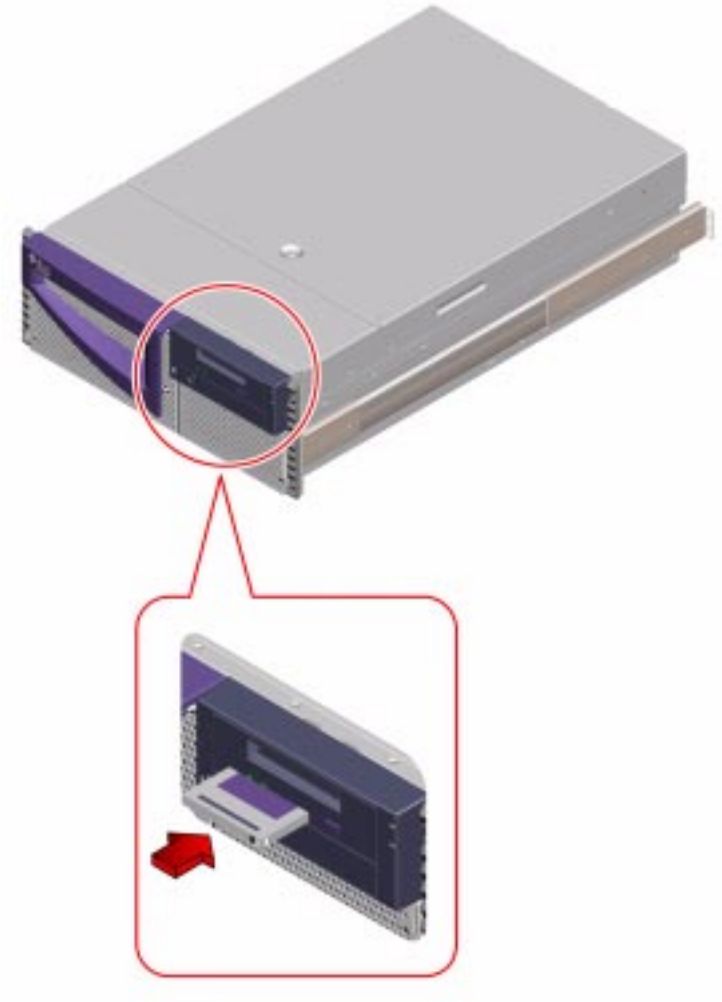
Observe these rules about *when* to clean a tape drive:

1. Clean the drive after the first four hours of use with a new tape.
2. After that, clean the tape drive after every 25 hours of use to maintain reliable operation.
3. Clean the drive twice as often if you use it in a dusty environment or operate it infrequently.

What to Do

- **Insert a cleaning cartridge into the drive.**

  The tape should play for a short while, and then eject automatically.



Do not use any cartridge other than a DDS-approved cleaning tape cartridge to clean your tape drive.

CHAPTER 6

Diagnostics, Monitoring, and Troubleshooting

The Sun Fire 280R server and its accompanying software contain many tools and features that help you:

- *Monitor* the status of a functioning system
- *Isolate* problems when there is a failure of a field-replaceable component
- *Exercise* the system to disclose an intermittent or incipient problem

For step-by-step instructions, turn to the relevant section.

For background information about diagnostics and monitoring tools and features, read the following section, “About Diagnostic Tools” on page 160, or turn to a specific topic.

In addition, this chapter contains information designed to help you troubleshoot some common problems given their symptoms.

About Communicating With the System

To diagnose problems with your server, you need some way to enter system commands and view output. There are three ways to do this.

1. *If console output is not redirected to the RSC console*, attach an ASCII character terminal to serial port A.

   You can attach a simple terminal or modem line to serial port A. For instructions, see "How to Attach an Alphanumeric (ASCII) Terminal" on page 34.

2. Establish a `tip` connection from another Sun system.

   The `tip` utility establishes a full-duplex terminal connection to a remote host. Once the connection is established, a remote session using `tip` behaves like an interactive session on a local terminal. For information about establishing a `tip` connection, see "How to Set Up a `tip` Connection" on page 183.

3. Install a local graphics console on your server.

   The server is shipped without a mouse, keyboard, monitor, or frame buffer for the display of graphics. To install a local graphics console on a server, you must install a graphics frame buffer into a PCI slot, and attach a mouse, monitor, and keyboard to the appropriate back panel ports. See "How to Configure a Local Graphics Console" on page 36 for detailed instructions.

Note – If you lose access to the console, but have a local display and physical access to the server, you may gain access to the `ok` prompt using default NVRAM parameters. For more information, see "How to Use Default NVRAM Parameters" on page 178.

Note – If console output is redirected to the RSC console, you can also log in to an RSC account on the server by using the RSC graphical user interface, or start a command-line interface session by dialing in to the RSC modem or by using `telnet`. Using RSC has the advantage of allowing access to the server console and other RSC features even when the server operating system is not running. See the *Sun Remote System Control (RSC) User's Guide* for complete information about RSC.

About Diagnostic Tools

Both firmware-based and software-based diagnostic tools help you identify and isolate hardware problems.

Two firmware tools are available that can run only before the Solaris Operating Environment takes control. These tools are:

- Power-on self-test (POST) diagnostics
- OpenBoot Diagnostics

POST diagnostics can run as part of the power-on sequence. You can run OpenBoot Diagnostics interactively from the `ok` prompt. You can run both of these tools locally, and you can also run them remotely by using Sun Remote System Control (RSC) to connect to the system console. However, RSC is not available until the server operating environment software and RSC client and server software have been installed and configured.

Two software tools are available that run directly from the Solaris Operating Environment prompt. These software tools are:

- Sun Validation Test Suite (SunVTS) software
- Sun Management Center software

You can run both of these tools locally, and if the server operating environment is running, you can also use the `rlogin` command to connect to the server remotely and then use SunVTS or Sun Management Center software.

Local Diagnostic Tool Use

POST diagnostics verify the core functionality of the system, including the main logic board, system memory, the central processing units (CPUs), the system bus, and the cache memory. You can run POST even if the system is unable to boot. For more information about POST, see “About Isolating Failures Using Power-On Self-Test (POST)” on page 166 and “How to Isolate Failures Using Power-On Self-Test (POST)” on page 179.

OpenBoot Diagnostics tests focus on system I/O and peripheral devices. Like POST, you can run OpenBoot Diagnostics even if the system is unable to boot. For more information about OpenBoot Diagnostics, see “About Isolating Failures Using OpenBoot Diagnostics” on page 166 and “How to Isolate Failures Using OpenBoot Diagnostics” on page 181.

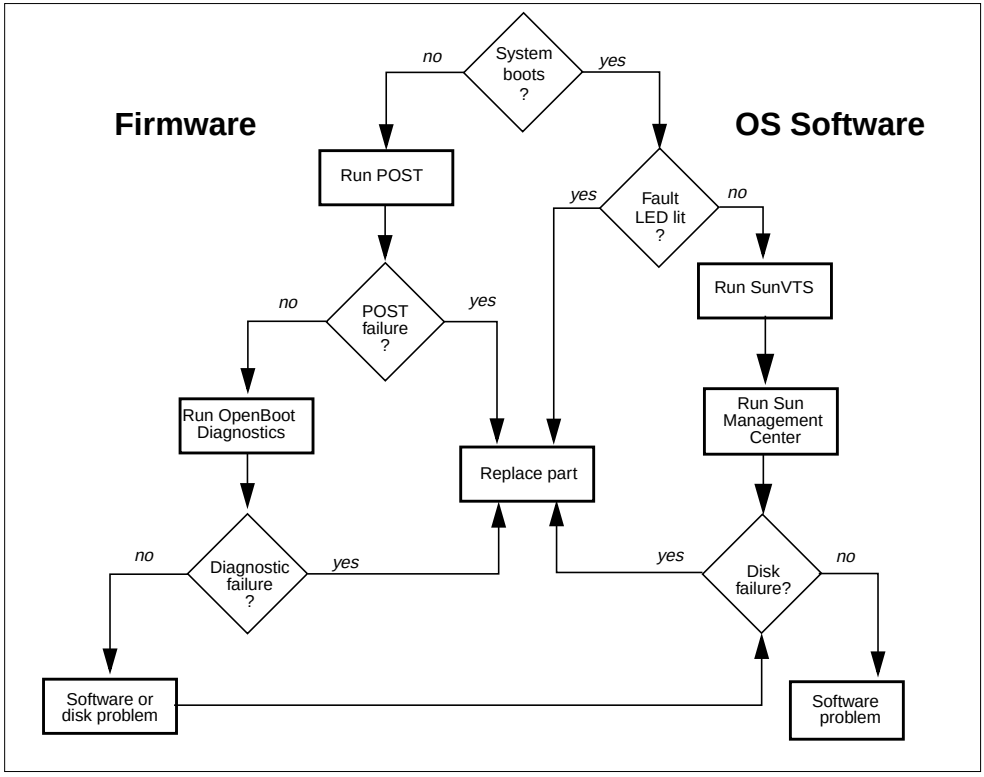
The SunVTS system exerciser is a graphics-oriented UNIX application that enables the continuous exercising of system resources and internal and external peripheral equipment. For more information about SunVTS software, see “About Exercising the System Using SunVTS Software” on page 173.

UNIX-based Sun Management Center (formerly Sun Enterprise SyMON) software allows you to monitor the system hardware status and operating system performance of your server. For information about Sun Management Center software, see “How to Monitor the System Using Sun Management Center Software” on page 177.

Which method or tool you use to diagnose system problems depends on the nature of those problems. If your machine cannot load the operating environment software, use POST and OpenBoot Diagnostics to isolate failed components. If your machine starts up and loads the operating environment software, use SunVTS software and Sun Management Center software to monitor or exercise the system.

The following chart provides an overview of which tools to use to diagnose hardware problems locally.

.



About Using Diagnostic Tools to Monitor, Diagnose, and Exercise the System

People often think of diagnostic tools as a way to identify a failed field-replaceable unit (FRU), so that it can quickly be replaced. While this is a very important goal, it is also important to be able to monitor an ostensibly “healthy” system, and to exercise a system that is functioning in a questionable way. Sun provides tools that help you do all three of these things. In addition, Sun Remote System Control (RSC) enables you to monitor a server remotely, and even to diagnose problems when the server is not running.

About Monitoring the System

When the system is up and running, RSC and Sun Management Center software can give you advance warning of difficulties and prevent future downtime.

These monitoring tools let you specify system criteria that bear watching. For instance, you might want to set a threshold for system temperature and be notified if that threshold is exceeded. Warnings can be reported by visual indicators in the software’s interface. Additionally, you could set RSC to send an email or pager alert whenever a problem occurs.

About Monitoring the System Using Sun Remote System Control (RSC)

Sun Remote System Control (RSC) enables you to monitor and control your server over modem lines and over a network. Taking advantage of firmware built into the RSC card, RSC software provides remote system administration for geographically distributed or physically inaccessible machines.

You can access RSC either from a workstation running the Solaris, Windows 95, Windows 98, or Windows NT operating environment and Sun’s RSC Java application, or from an ASCII terminal or device running ASCII terminal emulation software.

The RSC card runs independently, and uses standby power from the server. Therefore, RSC firmware and software continue to be effective when the server operating system goes offline, and can send notification of hardware failures or other

server events. The RSC card also includes a backup battery that supplies approximately 30 minutes of power to the RSC card in case of a complete system power failure.

RSC lets you monitor the following on your Sun Fire 280R server.

Item Monitored	What RSC Reveals
Disk drives	Whether each slot has a drive present, and whether it reports OK status
Fan tray	Whether the fan tray reports OK status
CPU modules	Whether each bay has a CPU module present, and its temperature including temperature warning and failure status
Power supplies	Whether each bay has a power supply present, and whether it reports OK status
System temperature	System ambient temperature as measured at the RSC card, including temperature warning and failure status

In addition, RSC enables you to:

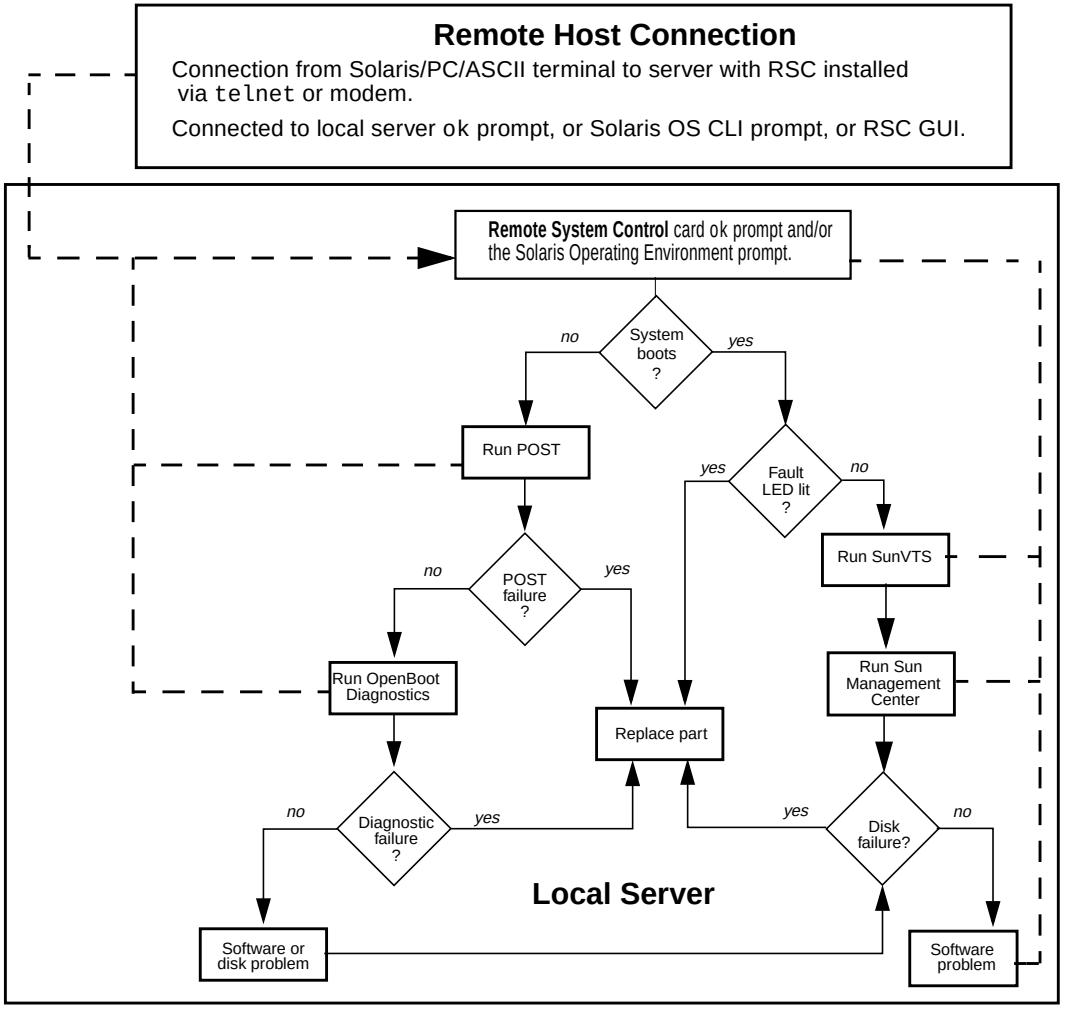
- View the server front panel including keyswitch position and LEDs
- Access the system console (`ok` prompt)
- Access server console logs and the RSC event log
- Power the server on or off
- Reset the server (hard or soft reset)
- Send a `break` command to the server
- Set the server boot mode for a reboot that occurs within 10 minutes

See the *Sun Remote System Control (RSC) User's Guide* for complete information about RSC.

Before you can start using RSC, you must install and configure its software on the server and client systems. Instructions for doing this are given in the *Sun Remote System Control (RSC) User's Guide*. You also have to make any needed physical

connections and set OpenBoot configuration variables that redirect the console output to RSC. These tasks are described in “How to Monitor the System Using Sun Remote System Control (RSC)” on page 175.

The following chart provides an overview of connections enabled after RSC has been installed and configured.



About Monitoring the System Using Sun Management Center Software

Sun Management Center software is an open, extensible system monitoring and management solution. It uses Java software protocol and Simple Network Management Protocol (SNMP) to provide an integrated and comprehensive enterprise-wide management of Sun products and their subsystems, components, and peripheral devices.

Sun Management Center lets you monitor boards, tapes, power supplies, and disks as well as operating system parameters like load, resource usage, and disk space. You can create alarm thresholds and be notified when these are exceeded.

The system must be up and running if you want to use Sun Management Center, since this tool runs on top of the Solaris Operating Environment. For instructions, see "How to Monitor the System Using Sun Management Center Software" on page 177. For detailed information about the product, see the *Sun Management Center Software User's Guide*.

About Isolating Failed Components

The Sun Fire 280R server includes a collection of software and firmware tools that let you quickly determine what FRU needs to be replaced in a malfunctioning system.

About Isolating Failures Using Sun Remote System Control (RSC)

You can use Sun Remote System Control (RSC) to find out whether any of the following system components are reporting problems or failures:

- Internal disk drives
- Fan tray
- Power supplies
- CPU modules

RSC also gives you access to output from power-on self-test (POST) and OpenBoot Diagnostics. RSC displays an alert to users logged in to an RSC account on the server, and can also send alert messages by email or pager.

About Isolating Failures Using Power-On Self-Test (POST)

The POST diagnostic code resides in the flash PROM on the main logic board. If the OpenBoot PROM configuration variable `diag-switch?` is set to `true` (the default setting is `false`), POST runs whenever the system is powered on. POST tests the following system components:

- CPU modules
- Memory modules
- System switch Application-Specific Integrated Circuits (ASICs)
- Input/output host bridge
- System bus
- Peripheral Component Interconnect (PCI) Bridge ASIC bus (POST tests for shorts only)

By default, POST displays detailed diagnostic and error messages on a local terminal, if one is attached to the system's serial port A. Redirecting the system console to RSC after RSC has been installed enables remote viewing of POST messages, either while POST is running or by viewing console logs after POST stops, and disables use of a local console on serial port A. For information about running POST, see "How to Isolate Failures Using Power-On Self-Test (POST)" on page 179. For information about RSC, see "About the Remote System Control (RSC) Software" on page 110.

About Isolating Failures Using OpenBoot Diagnostics

OpenBoot Diagnostics is a set of diagnostic self-tests that reside in flash PROM on the main logic board. OpenBoot Diagnostics verifies that system devices are working properly by testing internal registers and confirming the integrity of any subsystems. OpenBoot Diagnostics can isolate errors in the main logic board and in any option card that has an on-board self-test. OpenBoot Diagnostics can be run at the `ok` prompt only after power-on or system reset. To get to the `ok` prompt, the OpenBoot PROM configuration variable `auto-boot?` must be set to `false` (the default setting is `true`). When you run OpenBoot Diagnostics you can select which tests you want to perform. For instructions on how to run OpenBoot Diagnostics interactively, see "How to Isolate Failures Using OpenBoot Diagnostics" on page 181.

About Diagnostic Levels

Four different levels of diagnostic testing are available for power-on self-test (POST) and OpenBoot Diagnostics control. The level of testing performed is based on the setting of the OpenBoot PROM configuration variable `diag-level`, as follows:

- `off` — Either no testing or initialization only
- `min` — Fast, minimum level of testing (the default setting)
- `max` — Extensive and time-consuming testing
- `menus` — POST runs to completion, and then brings up the following POST menu, which you can use to run individual power-on self-tests

```
{0}     0    Return
{0}     1    Run all Tests in this Menu
{0}     2    Change Test Control Flags
{0}     3    * Reset Menu
{0}     4    * CPU Tests
{0}     5    * Ecache Tests
{0}     6    * Memory Tests
{0}     7    * Schizo Tests
{0}     8    * RIO Tests
{0}     9    * Estar Test (UP only)
{0}     a    * ECC Tests
{0}     b    * MP Tests
{0}     c    * BIST
{0}     d    * System Frequency and CPU Ratio
{0}     e    * I2C/Fan/Temperature/Smart card
{0}     f    * Run POST
{0}    10    * Return to OBP
{0}Selection:
```

For instructions on how to set the level of diagnostic testing, see “How to Set the Diagnostics Level” on page 186. Note that if the `diag-level` setting is `menus`, OpenBoot Diagnostics uses the setting `min` or `max`, depending on the test performed.

You can also use RSC to temporarily set the boot mode for a reboot that occurs within 10 minutes. Using RSC to set the boot mode is similar to using L1-N key combinations on non-USB Sun keyboards (the Sun Fire 280R server uses a USB keyboard). See the *Sun Remote System Control (RSC) User’s Guide* for information about the `bootmode` and `rscadm bootmode` commands.

About OpenBoot Diagnostics Tests

This section describes the OpenBoot Diagnostics tests you can run and explains what each test does. For instructions on running OpenBoot Diagnostics tests, see “How to Isolate Failures Using OpenBoot Diagnostics” on page 181.

When you use the `obdiag` command at the `ok` prompt, OpenBoot Diagnostics displays a menu of available tests. The menu is dynamic, and test numbers are not fixed. Following is an example of the menu.

```
|                              o b d i a g                                  |
|___________________________ ___________________________ ___________________|
|                           |                           |                   |
|  1 SUNW,qlc@4             |  2 bbc@1,0                |  3 ebus@5         |
|  4 flashprom@0,0          |  5 gpio@1,300600          |  6 i2c@1,2e       |
|  7 i2c@1,30               |  8 network@5,1            |  9 parallel@1,300278   |
| 10 pmc@1,300700           | 11 rsc-control@1,3062f8 | 12 rtc@1,300070     |
| 13 scsi@6                 | 14 scsi@6,1               | 15 serial@1,400000  |
| 16 usb@5,3                |                           |                   |
|___________________________|___________________________|___________________|
|   Commands: test test-all except help what printenvs setenv versions exit  |
|____________________________________________________________________________|
```

The `test` Command

You can run a specific self-test at the `obdiag>` prompt by entering `test` *n*, where *n* is the number of the test in the menu. (Enter `help` at the `obdiag>` prompt for information about other OpenBoot Diagnostics commands.) An Ethernet cable must be attached to the system and to an Ethernet tap or hub, or the external loopback test will fail if invoked. To quit OpenBoot Diagnostics, use the `exit` command, which returns you to the `ok` prompt.

You can also run OpenBoot Diagnostics commands from the `ok` prompt for any device by invoking its self-test method. If a device has no self-test method, the message `No selftest method for device` *name* is displayed. To run the self-test method for a device, type the OpenBoot PROM `test` command at the `ok` prompt, followed by the device alias or device path name. For example:

```
ok test net
Testing network
ok
```

The following table describes what each self-test does.

Test	Function
`bbc`	Tests the registers in the boot bus controller, and then verifies that at least one processor has boot bus access.
`ebus`	Accesses the Ebus through the RIO port and then tests DMA controller functionality.
`flashprom`	Performs a checksum and read / write test on the flash PROM containing the main logic board boot code.
`gpio`	Tests the registers of the general purpose input / output subsystem.
`i2c@1,2e`	Tests SEEPROM devices.
`i2c@1,30`	Tests SEEPROM devices and I^2C port expanders. Also performs various read and write tests on the I^2C temperature controller devices.
`network`	Tests the registers of the RIO Ethernet controller.
`parallel`	Tests the parallel port using both supported parallel port modes: ECPP and extended parallel mode.
`pmc`	Tests the registers of the power management controller.
`rsc-control`	Calls RSC POST and verifies loopback functionality through the RSC console.
`rtc`	Tests the registers of the realtime clock, then ensures that interrupts are firing correctly.
`SUNW,qlc`	Tests the registers of the Fibre Channel-Arbitrated Loop (FC-AL) subsystem.
`scsi`	Tests the SCSI disk controller registers and verifies DMA functionality.
`serial`	Tests the `ttya` and `ttyb` serial lines, and then performs an internal loopback test on each.
`usb`	Tests the registers on each RIO Universal Serial Bus.

Note – Use of the OpenBoot PROM configuration variable `test-args` can affect the behavior of OpenBoot Diagnostics. The `test-args` variable is empty by default. Use the `help` command for more information on `test-args`.

The `test-all` Command

You can use the `test-all` command to run all tests in the OpenBoot Diagnostics menu in sequence. You can exclude specific tests using the `except` command (enter `help` at the `obdiag>` prompt for more information). You can use a path as an argument, or no path. All devices in and under the path are tested. Tests are sequentially executed in device-tree order (viewed with the show-devs command).

The following example shows typical output from the OpenBoot Diagnostics `test-all` command.

```
obdiag> test-all
Hit the spacebar to interrupt testing
Testing /pci@8,700000/ebus@5/bbc@1,0 ................. passed
Testing /pci@8,700000/ebus@5 ......................... passed
Testing /pci@8,700000/ebus@5/flashprom@0,0 ............ passed
Testing /pci@8,700000/ebus@5/gpio@1,300600 ............ passed
Testing /pci@8,700000/ebus@5/i2c@1,2e ................. passed
Testing /pci@8,700000/ebus@5/i2c@1,30 ................. passed
Testing /pci@8,700000/network@5,1 ..................... passed
Testing /pci@8,700000/ebus@5/parallel@1,300278 ........ passed
Testing /pci@8,700000/ebus@5/pmc@1,300700 ..............passed
Testing /pci@8,700000/ebus@5/rtc@1,300070 ..............passed
Testing /pci@8,600000/qlc@4 ........................... passed
Testing /pci@8,700000/scsi@6 .......................... passed
Testing /pci@8,700000/scsi@6,1 ........................ passed
Testing /pci@8,700000/ebus@5/serial@1,400000 .......... passed
Testing /pci@8,700000/usb@5,3 ......................... passed
Hit any key to return to the main menu
```

Note – The OpenBoot PROM configuration variables `test-args` and `diag-level` affect the behavior of OpenBoot Diagnostics. Set `diag-level` to `max` for maximum coverage. Enter `help` at the `obdiag>` prompt for more information on the use of `test-args`.

Error Messages

When a test fails, OpenBoot Diagnostics displays a message similar to the following example.

```
obdiag> test 4
Hit the spacebar to interrupt testing
Testing /pci@8,700000/ebus@5/flashprom@0,0

   ERROR  : FLASHPROM CRC-32 is incorrect
   SUMMARY: Obs=0x4374a5be Exp=0xffffffff XOR=0xbc8b5a41 Addr=0xfeffffc
   DEVICE : /pci@8,700000/ebus@5/flashprom@0,0
   SUBTEST: selftest
   CALLERS: (f00aeeb4)
   MACHINE: Sun Fire 280R (2 X UltraSPARC-III)
   SERIAL#: 12134113
   DATE   : 10/31/2000 19:13:39  GMT

Selftest at /pci@8,700000/ebus@5/flashprom@0,0 (return:1,errors:1) ... failed

Hit any key to return to the main menu
```

About OpenBoot PROM Commands

This section describes the OpenBoot PROM commands you can run and explains what each command does.

The `show-devs` *Command*

Use the OpenBoot PROM `show-devs` command to list the devices in the system configuration.

The `printenv` *Command*

Use the OpenBoot PROM `printenv` command to display the OpenBoot PROM configuration variables stored in the system NVRAM. The display includes the current values for these variables as well as the default values. You can also specify a variable to display the current value for that variable only.

The watch-clock *Command*

The watch-clock command displays a number that increments once per second. During normal operation, the seconds counter repeatedly increments from 0 to 59. The following shows an example snapshot of output from the watch-clock command.

```
{0} ok watch-clock
Watching the ‘seconds’ register of the real time clock chip.
It should be ‘ticking’ once a second.
Type any key to stop.
4
```

The watch-net *and* watch-net-all *Commands*

The watch-net and watch-net-all commands monitor Ethernet packets on the Ethernet interfaces connected to the system. Good packets received by the system are indicated by a period (.). Errors such as the framing error and the cyclic redundancy check (CRC) error are indicated with an X and an associated error description.

The following examples show watch-net and the watch-net-all command output.

```
{0} ok watch-net
gme register test --- succeeded.
Internal loopback test -- succeeded.
Transceiver check -- Using Onboard Transceiver - Link Up. up

Using Onboard Transceiver - Link Up.
Looking for Ethernet Packets.
‘.’ is a Good Packet. ‘X’ is a Bad Packet.
Type any key to stop.............................
```

```
{0} ok watch-net-all
/pci@8,700000/network@5,1
gme register test --- succeeded.
Internal loopback test -- succeeded.
Link is  -- Using Onboard Transceiver - Link Up Up.
```

```
Using Onboard Transceiver - Link Up.
Looking for Ethernet Packets.
‘.’ is a Good Packet. ‘X’ is a Bad Packet.
Type any key to stop.
...
```

The `probe-scsi` *and* `probe-scsi-all` *Commands*

The OpenBoot PROM commands `probe-scsi` and `probe-scsi-all` report information about SCSI devices on the server that are active and connected. To run either command, type it at the `ok` prompt.

The `probe-scsi` command transmits an inquiry command to internal and external FC-AL and SCSI devices connected to the system on-board SCSI or FC-AL interface. If a device is connected and active, the target address, unit number, device type, and manufacturer name are displayed.

The `probe-scsi-all` command transmits an inquiry command to all devices connected to the system. The first identifier listed in the display is the SCSI host adapter address in the system device tree, and is followed by the SCSI device identification data.

About Exercising the System

It is relatively easy to detect when a system component fails outright. However, when a system has an intermittent problem or seems to be “behaving strangely,” a software tool that stresses or exercises the computer’s many subsystems can help disclose the source of the emerging problem and prevent long periods of reduced functionality or system downtime.

Sun provides a standard tool for exercising its desktop and server systems: the Sun Validation Test Suite (SunVTS).

About Exercising the System Using SunVTS Software

SunVTS is a comprehensive software diagnostic package that tests and validates Sun hardware by verifying the connectivity and functionality of most hardware controllers, devices, and platforms. Use SunVTS software as part of troubleshooting, periodic maintenance, and system or subsystem stress testing.

SunVTS software lets you view and control a testing session over modem lines or over a network. Using a remote machine, you can view the progress of a testing session, change testing options, and control all testing features of another machine on the network.

The system must be up and running if you want to use SunVTS, since this tool runs on top of the Solaris Operating Environment.

For instructions on running SunVTS software to exercise your Sun Fire 280R server, see “How to Exercise the System Using SunVTS Software” on page 199. For more information about the product, see:

- *SunVTS User’s Guide* (806-6515-10) — Describes SunVTS features as well as how to start and control the various user interfaces.
- *SunVTS Test Reference Manual* (806-6516-10) — Describes each SunVTS test, option, and command-line argument.
- *SunVTS Quick Reference Card* (806-6519-10) — Gives an overview of the main features of the graphical user interface (GUI).

These documents are available on the Solaris Supplement CD-ROM and on the Web at `http://docs.sun.com`

How to Monitor the System

Before you can monitor your Sun Fire 280R system, you must install and configure one of the monitoring tools provided by Sun. These tools include:

- Sun Remote System Control (RSC), which is available on the Solaris Supplement CD-ROM and on the Web at `http://www.sun.com/servers/rsc.html`
- Sun Management Center software, which is available on the Sun Management Center 3.0 CD-ROM packaged with your server, and on the Web at `http://www.sun.com/sunmanagementcenter`

This manual describes the hardware aspects of setting up and using these monitoring tools. For more information, see "Managing and Monitoring System Performance" on page 71. For complete documentation of RSC and Sun Management Center software, refer to the User's Guides for these products.

How to Monitor the System Using Sun Remote System Control (RSC)

You can use RSC to monitor a system remotely.

Before You Begin

Install the RSC software server and client packages. They are part of the default Solaris installation on the Solaris Supplement CD-ROM, and are also available for download on the Web at `http://www.sun.com/servers/rsc.html`. Follow the instructions in the *Sun Remote System Control (RSC) User's Guide* to configure the software on the server.

For information about redirecting the system console to RSC, see:

- "How to Redirect the Host Console to RSC" on page 111

How to Start the Sun Remote System Control (RSC) Graphical User Interface

If you are using a client running the Solaris Operating Environment, start the RSC graphical user interface (GUI) by entering this command at the UNIX prompt:

```
% /opt/rsc/bin/rsc
```

If you are using a client running the Windows 95, Windows 98, or Windows NT operating environment, follow these steps to start the RSC GUI:

1. **Click on the Start menu.**
2. **Select Programs in the Start menu.**
3. **Select the Sun Remote System Control program group.**
4. **Click on Remote System Control.**

If you have created a shortcut to Remote System Control, you can also double-click on the Remote System Control icon on your desktop.

When the login screen appears, it prompts you to enter an RSC device name or Internet address, your RSC username, and your password.

Note – It is important that you enter the name or Internet address of the RSC device, not the name or Internet address of the server.

To monitor or control more than one server, start a separate GUI session for each.

How to Start a Sun Remote System Control (RSC) Command-Line Interface Session

- **For instructions on connecting to RSC and using the RSC command-line interface, see the** *Sun Remote System Control (RSC) User's Guide.*

How to Use Sun Remote System Control (RSC) Software

- **For instructions on using RSC software, see the** *Sun Remote System Control (RSC) User's Guide.*

How to Monitor the System Using Sun Management Center Software

Sun Management Center software is a GUI-based or ASCII-based diagnostic tool designed to monitor system hardware status and UNIX operating system performance. It offers simple, yet powerful monitoring capabilities that enable you to:

- Diagnose and address potential problems such as capacity problems or bottlenecks
- Display physical and logical views of your exact server configuration
- Monitor your server remotely from any location in the network
- Isolate potential problems or failed components

Sun Management Center software is supported on the Sun Fire 280R server. To download the current Sun Management Center software packages, and to obtain information about the software documentation, go to the Web site `www.sun.com/software/sunmanagementcenter`.

- **For instructions about installing and using Sun Management Center software, see the** *Sun Management Center Software User's Guide***.**

How to Isolate Failed Components

The following sections describe how to isolate failed components using RSC, POST, OpenBoot Diagnostics, and how to use a second Sun server to diagnose problems.

How to Use Default NVRAM Parameters

During the boot process, if you lose access to the system console due to a failed nonvolatile random access memory (NVRAM) configuration change, use the Safe NVRAM mode to regain access to the console. This function replaces the Stop-N (Stop-shift-n) keyboard sequence that is not supported from the keyboard in the Sun Fire 280R server.

What to Do

To reset the NVRAM parameters to a known recovery mode, perform the following steps:

1. **Power-on the system.**
2. **Watch the wrench LED for rapid flashing during the boot process.**

   The amber wrench LED flashes for approximately three seconds.
3. **While the wrench LED is flashing, press the Power button twice in quick succession.**

   The following output appears after the system boots to the `ok` prompt.

```
Safe NVRAM mode, the following nvram configuration variables have
been overridden:
  'diag-switch?' is true
  'use-nvramrc?' is false
  'input-device', 'output-device' are defaulted
  'ttya-mode', 'ttyb-mode' are defaulted

These changes are temporary and the original values will be
restored after the next hardware or software reset.
ok
```

Note – *Before* attempting to boot again, restore a working system configuration by resetting the appropriate variables in the NVRAM using the OpenBoot `setenv` command at the `ok` prompt. The Safe NVRAM mode settings are temporary session settings to ensure a successful recovery boot.

How to Isolate Failures Using Sun Remote System Control (RSC)

- **Run each OpenBoot Diagnostics test from the `ok` prompt.**

  When you type `obdiag`, the utility displays a numbered list of available tests.

How to Isolate Failures Using Power-On Self-Test (POST)

When you turn on the system power, POST diagnostics run automatically if any of the following conditions apply:

- The OpenBoot PROM configuration variable `diag-switch?` is set to `true` when you power on the system.
- You turn the keyswitch to the Diagnostics setting and press the Power button.

Note – The Stop-D (Stop-Shift-d) keyboard sequence functionality is closely emulated by using Safe NVRAM mode. Perform the procedure “How to Use Default NVRAM Parameters” on page 178, and then set the variable `diag-switch?` to `true` and power-on the system.

Note – The Stop-D (Stop-Shift-d) and the Stop-F (Stop-Shift-f) keyboard sequences are not supported on systems with USB keyboards.

For information about the various keyswitch positions, see “Status and Control Panel Features” on page 8.

Before You Begin

You can set up your server to display POST and diagnostics output in the system console or in the RSC console, but not on both at the same time.

To view POST and diagnostics error messages in the local system console, you need to connect an alphanumeric terminal or graphics console, or establish a `tip` connection to another Sun system. For more information, see:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36
- "How to Set Up a `tip` Connection" on page 183

You must also verify baud rates between a system and a monitor or a system and a terminal when using a `tip` connection. See:

- "How to Verify the Baud Rate" on page 185

After RSC software is installed, you can redirect the system console output from the server serial port A to RSC and view the POST and diagnostic error messages using an RSC account. After this redirection, the local system console is not available. For more information about redirecting a console after the RSC software is installed, see:

- "How to Redirect the Host Console to RSC" on page 111

You can choose to run an abbreviated POST with concise error and status reporting or run an extensive POST with more detailed messages. For more information, see:

- "How to Set the Diagnostics Level" on page 186

What to Do

Ensure that the front panel keyswitch is in the Power-On/Off position. For descriptions of the keyswitch settings, see "Keyswitch Settings" on page 9.

You can initialize POST one of two ways:

- By setting the `diag-switch?` to `true` and the `diag-level` to `max`, `min`, or `menus`, followed by power cycling the system unit
- You turn the keyswitch to the Diagnostics setting and press the Power button.

Note – The Stop-D (Stop-Shift-d) keyboard sequence functionality is closely emulated by using Safe NVRAM mode. Perform the procedure "How to Use Default NVRAM Parameters" on page 178, and then set the variable `diag-switch?` to `true` and power-on the system.

To set the `diag-switch?` to `true` and power cycle the system unit:

1. **When the `ok` prompt is displayed, type the following command:**

```
ok setenv diag-switch? true
```

2. **After a few seconds, press the Power button on the system once.**

   The keyswitch must be set to the Power-On/Off position.

The system runs the POST diagnostics. POST displays status and error messages in the system console.

While POST is running, you can observe its progress and any error indications in the system console. You can view these results on an ASCII terminal, on a graphics console, or through a `tip` connection. In addition, if the RSC has been installed, you can view them on a remote system over either a `telnet` or modem connection.

Observing POST in Progress

As POST runs, it displays detailed diagnostic status messages in the system console. If POST detects an error, it displays an error message in the system console that indicates the failing part. A sample error message is provided below:

```
Power On Self Test Failed. Cause: DIMM U0702 or System Board
ok
```

POST status and error conditions are indicated by the general fault LED on the system front panel. The LED blinks slowly to indicate that POST is running. It remains lit if POST detects a fault.

If POST detects an error condition that prevents the system from booting, it will halt operation and display the `ok` prompt. The last message displayed by POST prior to the `ok` prompt indicates which part you need to replace.

How to Isolate Failures Using OpenBoot Diagnostics

This section describes how to run the various OpenBoot Diagnostics tests.

Before You Begin

Make sure that the power to the system is on and the keyswitch is in the Power-On/Off position. Access your server's system console either through a remotely connected workstation or by an alphanumeric terminal or graphics console connected to the server's serial port. See:

- "How to Set Up a `tip` Connection" on page 183
- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36

Also, see:

- "About Isolating Failures Using OpenBoot Diagnostics" on page 166

What to Do

1. **Press the Break key on your alphanumeric terminal's keyboard, or enter the `Stop-a` sequence on a Sun keyboard.**

   The `ok` prompt is displayed.

2. **Reset the system by typing the `reset-all` command:**

```
ok reset-all
```

3. **Set the diag-level configuration variable.**

   Two different levels are available for testing. To achieve the maximum coverage set `diag-level` to `max`. See "How to Set the Diagnostics Level" on page 186.

4. **Display the menu of diagnostic tests by typing the `obdiag` command:**

```
ok obdiag
```

   The OpenBoot Diagnostics menu appears. This menu displays a numbered list of all available tests.

5. **At the `obdiag>` prompt, type the command you want to run.**

   For more information about what each available command does, see "About OpenBoot Diagnostics Tests" on page 168 or use the `help` command.

Note – Use of the OpenBoot PROM configuration variable `test-args` can affect the behavior of OpenBoot Diagnostics. The `test-args` variable is empty by default. Use the `help` command for more information on `test-args`.

If any problems are found by the test, OpenBoot Diagnostics displays an error report on the console. The first line of the error report describes the possible problem. The optional summary line displays the associated memory address and values.

What Next

Replace any field-replacable unit (FRU) that the OpenBoot Diagnostics test determines is defective.

How to Use a Second Sun Server to Diagnose Problems

You can use the `ttya` or `ttyb` ports on your UltraSPARC system to connect to a second Sun server. By connecting two systems in this way, you can use a shell window on the Sun server as a terminal to your UltraSPARC system.

How to Set Up a `tip` Connection

The `tip` method is preferable to simply connecting to a dumb terminal, since it lets you use windowing and operating system features when working with the boot PROM. A communications program or another non-Sun computer can be used in the same way, if the program can match the output baud rate used by the PROM TTY port. (See the `tip` man page for detailed information about terminal connection to a remote host.)

Note – In the following procedures, “UltraSPARC system” refers to your system, and “Sun server” refers to the system you are connecting to your system.

---

1. **Connect the Sun server `ttyb` serial port to your UltraSPARC system `ttya` serial port using a serial connection cable. Use a 3-wire Null Modem Cable, and connect wires 3-2, 2-3, and 7-7.**

   Refer to your system installation manual for specifications on null modem cables.

2. **At the Sun server, add the following lines to the `/etc/remote` file.**

   If you are running a version of the Solaris Operating Environment previous to 2.0, type:

```
hardwire:\
    :dv=/dev/ttyb:br#9600:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

   If you are running version 2.0 or later of the Solaris Operating Environment, type:

```
hardwire:\
    :dv=/dev/term/b:br#9600:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

3. **In a Shell Tool window on the Sun server, type:**

```
hostname% tip hardwire
connected
```

The Shell Tool window is now a `tip` window directed to the Sun server `ttyb` port.

Note – Use a Shell Tool, not a Command Tool; some `tip` commands may not work properly in a Command Tool window.

---

4. **At your UltraSPARC system, enter the Forth Monitor so that the `ok` prompt is displayed.**

Note – If you do not have a video monitor attached to your UltraSPARC system, connect the UltraSPARC system `ttya` serial port to the Sun server `ttyb` serial port and turn on the power to your UltraSPARC system. Wait for a few seconds, and press Stop-a to interrupt the power-on sequence and start the Forth Monitor. Unless the system is completely inoperable, the Forth Monitor is enabled, and you can continue with the next step in this procedure.

---

5. **If you need to redirect the standard input and output to the `ttya` serial port, type:**

```
ok ttya io
```

There will be no echoed response.

6. **Press Return on the Sun server keyboard.**

The `ok` prompt shows in the `tip` window.

Note – *Do not* type `Stop-a` from a Sun server being used as a `tip` window to your UltraSPARC system. Doing so will abort the operating system on the server. (If you accidentally type `Stop-a`, you can recover by immediately typing `go` at the `ok` prompt.) Typing ~# in the `tip` window is equivalent to pressing `Stop-a` at the UltraSPARC system.

---

7. **When you are finished using the `tip` window, end your `tip` session and exit the window.**

8. **Redirect the input and output to the screen and keyboard, if needed, by typing:**

```
ok screen output keyboard input
```

Note – When entering ~ (tilde character) commands in the `tip` window, the tilde must be the first character entered on the line. To ensure that you are at the start of a new line, press Return first.

How to Verify the Baud Rate

To verify the baud rate between the Sun Fire 280R server and a terminal or another Sun system monitor:

1. **Open a shell window.**
2. **Type** `eeprom`**.**
3. **Verify the following serial port default settings as follows:**

```
ttyb-mode = 9600,8,n,1
ttya-mode = 9600,8,n,1
```

Note – Ensure that the settings are consistent with TTY-type terminal or system monitor settings.

Common Problems With `tip` Connections

This section describes solutions for `tip` problems occurring in Solaris Operating Environments versions previous to 2.0.

Problems with `tip` may occur if:

- The lock directory is missing or incorrect.

There should be a directory named `/usr/spool/uucp`. The owner should be `uucp` and the mode should be `drwxr-sr-x`.

- The `ttyb` serial port is enabled for logins.

The status field for `ttyb` (or the serial port you are using) must be set to `off` in `/etc/ttytab`. Be sure to execute `kill -HUP 1` (see `init(8)`) as root if you have to change this entry.

- `/dev/ttyb` is inaccessible.

Sometimes, a program will have changed the protection of `/dev/ttyb` (or the serial port you are using) so that it is no longer accessible. Make sure that `/dev/ttyb` has the mode set to crw-rw-rw-.

- The serial line is in tandem mode.

If the `tip` connection is in tandem mode, the operating system sometimes sends XON (^S) characters (particularly when programs in other windows are generating lots of output). The XON characters are detected by the Forth word `key?`, and can cause confusion. The solution is to turn off tandem mode with the `~s !tandem tip` command.

- The `.cshrc` file generates text.

The `tip` connection opens a sub-shell to run `cat`, thus causing text to be attached to the beginning of your loaded file. If you use `dl` and see any unexpected output, check your `.cshrc` file.

How to Configure a Local Graphics Console

- **For information about how to configure a local graphics console, see “How to Configure a Local Graphics Console” on page 36.**

How to Set the Diagnostics Level

Before You Begin

Make sure that the power to the system is on and the keyswitch is in the Power-On/Off position. Access your server’s system console either through a remotely connected workstation or by an alphanumeric terminal or graphics console connected to the server’s serial port. See:

- “How to Attach an Alphanumeric (ASCII) Terminal” on page 34
- “How to Configure a Local Graphics Console” on page 36
- “How to Set Up a `tip` Connection” on page 183

For background information about the available levels of testing, see:

- “About Diagnostic Levels” on page 167

What To Do

1. **Press the Break key on your alphanumeric terminal's keyboard, or enter the** `Stop-a` **sequence on a Sun keyboard.**

   The `ok` prompt is displayed.

2. **Set the desired diagnostics level, type**:

```
ok setenv diag-level value
```

   where *value* is `off`, `min`, `max`, or `menus`, as described in "About Diagnostic Levels" on page 167.

3. **Reset the system, type**:

```
ok reset-all
```

How to Diagnose Specific Problems

This section provides help in diagnosing specific problems you may encounter.

Network Communications Failure

Symptom

The system is unable to communicate over the network.

Action

Your system conforms to the Ethernet 10BASE-T/100BASE-TX standard, which states that the Ethernet 10BASE-T link integrity test function should always be enabled on both the host system and the Ethernet hub. The system cannot communicate with a network if this function is not set identically for both the system and the network hub (either enabled for both or disabled for both). This problem applies only to 10BASE-T network hubs, where the Ethernet link integrity test is optional. This is not a problem for 100BASE-TX networks, where the test is enabled by default. Refer to the documentation provided with your Ethernet hub for more information about the link integrity test function.

1. **Use the `test` command to test the network device, type:**

```
ok test net
```

2. **If you connect the system to a network and the network does not respond, use the OpenBoot PROM command `watch-net-all` to display conditions for all network connections, type:**

```
ok watch-net-all
```

For most PCI Ethernet cards, the link integrity test function can be enabled or disabled with a hardware jumper on the PCI card, which you must set manually. (See the documentation supplied with the card.) For the standard TPE main logic board port, the link test is enabled or disabled through software, as shown on the next page.

Note – Some hub designs permanently enable (or disable) the link integrity test through a hardware jumper. In this case, refer to the hub installation or user manual for details of how the test is implemented.

Following is typical output from the `watch-net-all` command:

```
ok watch-net-all
/pci@8,700000/network@5,1
gme register test --- succeeded.
Internal loopback test -- succeeded.
Link is  -- Using Onboard Transceiver - Link Up.
up
Using Onboard Transceiver - Link Up.
Looking for Ethernet Packets.
'.' is a Good Packet.  'X' is a Bad Packet.
Type any key to stop.
.............................................................
..............
....
ok
```

To enable or disable the link integrity test for the standard Ethernet interface, or for a PCI-based Ethernet interface, you must first know the device name of the desired Ethernet interface. To list the device name use either solution described below.

Use this method while the operating system is running:

1. **Become superuser.**
2. **Type**:

```
# eeprom nvramrc="probe-all install-console banner apply
disable-link-pulse device-name"
  (Repeat for any additional device names.)
# eeprom "use-nvramrc?"=true
```

3. **Reboot the system to make the changes effective.**

Use this method when the system is already at the OpenBoot prompt:

1. **Shut down the operating system and take the system to the** ok **prompt.**
2. **Determine the device name for the desired Ethernet interface.**
3. **At the** ok **prompt, type**:

```
ok nvedit
0: probe-all install-console banner
1: apply disable-link-pulse device-name
(Repeat this step for other device names as needed.)
(Press CONTROL-C to exit nvedit.)
ok nvstore
ok setenv use-nvramrc? true
```

4. **Reboot the system to make the changes effective.**

Power-On Failure

Symptom

The system attempts to power on but does not boot or initialize the terminal or monitor.

Action

1. **Verify that the CPU modules and memory are seated correctly.**

   If RSC software has been installed and configured, connecting to the RSC using `telnet` or a modem connection may allow monitoring through the redirected system console.

2. **Run POST diagnostics.**

   See "How to Isolate Failures Using Power-On Self-Test (POST)" on page 179.

3. **Observe POST results.**

   The front panel general fault LED should blink slowly to indicate that POST is running. Check the POST output using a locally attached terminal or a `tip` connection. If you see no front panel LED activity, a power supply may be defective. See "About Power Supplies" on page 95.

   If the POST output contains an error message, then POST has failed. The most probable cause for this type of failure is the main logic board. However, before replacing the main logic board you should run the OpenBoot Diagnostics `test-all` command by typing:

   ```
   ok test-all
   ```

4. **If the `test-all` command shows any defective components, remove them from the main logic board and run POST again.**

   Replace any failed components that are not optional. Be sure to leave DIMMs in Bank 0.

5. **If POST still fails after you have removed or replaced all failed components, then replace the main logic board.**

Video Output Failure

Symptom

No video at the system monitor.

Action

1. **Check that the power cord is connected to the monitor and to the wall outlet.**

2. **Verify with a volt-ohm meter that the wall outlet is supplying AC power.**

3. **Verify that the video cable connection is secure between the monitor and the video output port.**

   Use a volt-ohm meter to perform the continuity test on the video cable.

4. **If the cables and their connections are okay, then troubleshoot the monitor and the graphics card.**

5. **Use the** `test` **command, type:**

```
ok test screen
```

FC-AL Disk Drive Failure

Symptom

A disk drive read, write, or parity error is reported by the operating system or a software application.

Action

- **Replace the drive indicated by the failure message.**

Symptom

Disk drive fails to boot or is not responding to commands.

Action

1. **At the system** `ok` **prompt, type:**

```
ok reset-all
ok probe-scsi
```

   If the device responds and a message is displayed, the system FC-AL controller has successfully probed the internal drive. This indicates that the main logic board is operating correctly.

2. **Use the `test` command to get more information, type:**

```
ok test /SUNW,qlc
```

3. **Take one of the following actions depending on what the `probe-scsi` command reports:**

   a. **If one drive does not respond to the FC-AL controller probe but the others do, replace the unresponsive drive.**

   b. **If only one internal disk drive is configured with the system and the `probe-scsi` test fails to show the device in the message, replace the drive.**

4. **If the problem is still evident after replacing the drive, replace the main logic board.**

5. **If replacing both the disk drive and the main logic board does not correct the problem, replace the associated FC-AL data cable and FC-AL backplane.**

Note – You can also use the `probe-scsi` command to look for failures on the FC-AL loop. An `Unable to initialize error` message indicates a problem on the loop. Proceed by disconnecting all the loop devices and then probe the loop again. If the loop is present, then swap drives in and out first, then cables, and finally loop-device backplanes to isolate the problem.

FC-AL Controller Failure

Symptom

A disk drive fails to boot or is not responding to commands.

Action

To check whether the main logic board FC-AL controller is defective, first test the drive response to the `probe-scsi` command and then run OpenBoot Diagnostics.

1. **At the `ok` prompt, type:**

```
ok probe-scsi
```

   If a message is displayed for each installed disk, the system FC-AL controllers have successfully probed the devices. This indicates that the main logic board is working correctly.

2. **Use the `test` command to get more information, type:**

```
ok test /SUNW,qlc
```

3. **Take one of the following actions depending on what the `probe-scsi` command reports:**

   a. **If one drive does not respond to the FC-AL controller probe but the others do, replace the unresponsive drive.**

   b. **If only one internal disk drive is configured with the system and the `probe-scsi` test fails to show the device in the message, replace the drive.**

4. **If the problem is still evident after replacing the drive, replace the main logic board.**

5. **If replacing both the disk drive and the main logic board does not correct the problem, replace the associated FC-AL data cable and FC-AL backplane.**

DVD/CD-ROM or SCSI Drive Failure

Symptom

A DVD/CD-ROM drive or externally connected SCSI drive read error or parity error is reported by the operating system or a software application.

Action

1. **Run the `test` command, type:**

```
ok test scsi
```

2. **Replace the drive indicated by the failure message.**

Symptom

DVD/CD-ROM or external SCSI drive fails to boot or is not responding to commands.

Action

Test the response of the drive(s) to the `probe-scsi-all` command as follows:

1. **At the system `ok` prompt, type:**

```
ok reset-all
ok probe-scsi-all
```

2. **Use the `test` command to gather more information, type:**

```
ok test scsi
```

   If the system has more than one SCSI disk, you must specify an address.

3. **If the SCSI device responds correctly to `probe-scsi-all`, a message similar to the one shown in "The `probe-scsi` and `probe-scsi-all` Commands" on page 173 is printed out.**

   If the device responds and a message is displayed, the system SCSI controller has successfully probed the device. This indicates that the main logic board is operating correctly.

   a. **If the problem is still evident after replacing the DVD/CD-ROM drive, replace the main logic board.**

   b. **If replacing both the disk drive and the main logic board does not correct the problem, replace the associated UltraSCSI data cable and UltraSCSI backplane.**

Note – You can also use the `probe-scsi-all` command to look for failures on the external UltraSCSI loop.

SCSI Controller Failure

Symptom

An external SCSI drive fails to boot or is not responding to commands.

Action

To check whether the main logic board SCSI controllers are defective, first test the external drive response to the `probe-scsi-all` command. Then run OpenBoot Diagnostics by entering `test scsi` at the `ok` prompt. You can use the OpenBoot PROM `printenv` command to display the OpenBoot PROM configuration variables stored in the system NVRAM. The display includes the current values for these variables as well as the default values. See "The `printenv` Command" on page 171 for more information.

Test the external drive response to the `probe-scsi-all` command as follows:

1. **At the `ok` prompt, type:**

```
ok probe-scsi-all
```

   If a message is displayed for each installed disk, the system SCSI controllers have successfully probed the devices. This indicates that the main logic board is working correctly.

2. **Gather more information by using the `test` command, type:**

```
ok test scsi
```

3. **If a disk does not respond, replace the unresponsive drive.**

4. **If the problem remains after replacing the drive, contact your qualified service provider to replace the associated SCSI cable and backplane.**

Power Supply Failure

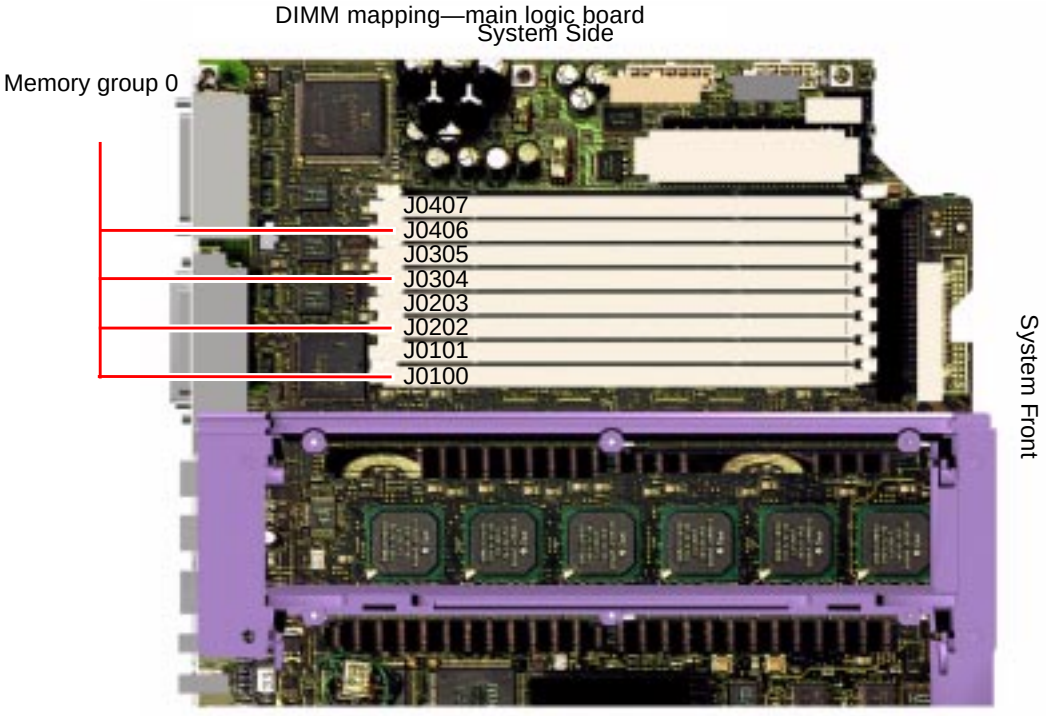
If there is a problem with a power supply, the system fault indicator lights on the front panel. If you have more than one power supply, then you can use the LEDs located on the power supplies themselves to identify the faulty supply. The power

supply LEDs will indicate any problem with the AC input or DC output. See “About Power Supplies” on page 95 for more information about the LEDs. To replace a power supply, contact a qualified service provider.

DIMM Failure

SunVTS and POST diagnostics can report memory errors encountered during program execution. Memory error messages typically indicate the DIMM location number (“J” or “U” number) of the failing module. To replace a DIMM, contact a qualified service provider.

Use the following diagram to identify the location of a failing memory module from its J (or U) number:



After you have identified the defective DIMM, for more information see the *Sun Fire 280R Server Service Manual*; to replace any defective part(s) contact your qualified service provider.

How to Exercise the System

Sun provides the Sun Validation Test Suite (SunVTS) tool for exercising your server and its subsystems. If your system does not seem to function correctly, yet it still passes the firmware-based diagnostics and boots its operating system, then you can use SunVTS to run individual tests that verify the functionality of most hardware controllers and devices.

How to Check Whether SunVTS Software Is Installed

Before You Begin

SunVTS software is an optional package that may or may not have been loaded when your system software was installed.

To check whether SunVTS software is installed, you must access your system from a remote machine logged in to the server, connect an alphanumeric terminal or graphics console to the server, or establish a `tip` connection to another Sun system. For more information, see:

- "How to Attach an Alphanumeric (ASCII) Terminal" on page 34
- "How to Configure a Local Graphics Console" on page 36
- "How to Set Up a `tip` Connection" on page 183

What to Do

1. **Type the following:**

```
% pkginfo -l SUNWvts
```

- If SunVTS software is loaded, information about the package will be displayed.
- If SunVTS software is not loaded, you will see an error message:

```
ERROR: information for "SUNWvts" was not found
```

2. **If necessary, use the** `pkgadd` **utility to load the** `SUNWvts` **package onto your system from the Solaris Supplement CD-ROM.**

   Note that `/opt/SUNWvts` is the default directory for installing SunVTS software.

What Next

For more information, refer to the appropriate Solaris documentation, as well as the `pkgadd` reference manual (man) page.

How to Exercise the System Using SunVTS Software

What to Do

You can run SunVTS locally or remotely. The following procedure assumes you will test your Sun Fire 280R server by running a SunVTS session from a remote machine using the SunVTS graphical interface. For information about SunVTS interfaces and options, see the *SunVTS User's Guide*.

You will need root access to run SunVTS tests.

1. **Use the** `xhost` **command to give the remote server access to your system.**

   On the machine from which you will be running the SunVTS graphical interface, type:

   ```
   # /usr/openwin/bin/xhost + remote_hostname
   ```

   Substitute the name of the Sun Fire 280R server for *remote_hostname*.

2. **Log in to the remote machine as superuser (root).**

3. **Check whether SunVTS software is loaded on your system.**

   SunVTS software is an optional package that may or may not have been loaded when your system software was installed. For more information, see "How to Check Whether SunVTS Software Is Installed" on page 198.

4. **Type**:

```
# cd /opt/SUNWvts/bin
# ./sunvts -display local_hostname:0
```

Substitute the name of the workstation you are using for *local_hostname*. Note that `/opt/SUNWvts/bin` is the default directory for SunVTS binaries. If you have installed SunVTS software in a different directory, use the appropriate path instead.

5. **Fine-tune your testing session by selecting only the tests you want to run.**

Click to select and deselect tests. (A check mark in the box means the item is selected.) Some tests useful to run on a Sun Fire 280R server are listed below.

SunVTS Test	Description
`cdtest`, `dvdtest`	Tests the DVD/CD-ROM drive by reading the disc and verifying the DVD/CD table of contents (TOC), if it exists
`cputest`	Tests the CPU
`disktest`	Verifies local disk drives
`env5test`, `i2ctest`	Tests power supply, fan tray, LEDs
`fputest`	Checks the floating-point unit
`fstest`	Tests the integrity of the software's file systems
`m64test`	Tests the PCI graphics board
`mptest`	Verifies multiprocessor features (for systems with more than one processor)
`nettest`	Checks all the hardware associated with networking (for example, Ethernet, token ring, quad Ethernet, fiber optic, 100-Mbit per second Ethernet devices)
`pmem`	Tests the physical memory (read only)
`rsctest`	Tests the RSC card
`sptest`	Tests the system's on-board serial ports
`tapetest`	Tests the various Sun tape devices
`usbkbtest`	Tests the keyboard
`vmem`	Tests virtual memory (a combination of the swap partition and the physical memory)

What Next

If SunVTS tests indicate an impaired or defective part, with the exception of an internal disk drive, contact your qualified service representative. For information about replacing the part, see the *Sun Fire 280R Server Service Manual*.

APPENDIX **A**

Connector Signal Descriptions

This appendix describes the Sun Fire 280R server main logic board connector signals and pin assignments that are accessible from the back panel.

The following topics are covered in this appendix:

Reference for the Serial Port A and B Connectors

The serial port A and B connectors (J2001) are DB-25 type connectors located on the main logic board back panel. Both serial ports conform to RS-423/RS-232 specifications.

Serial Port A and B Connector Diagram

Serial Port Signals

Pin	Signal	Description
1	NC	Not connected
2	SER_TDX_A_CONN	Transmit Data
3	SER_RXD_A_CONN	Receive Data
4	SER_RTS_A_L_CONN	Ready To Send
5	SER_CTS_A_L_CONN	Clear To Send
6	SER_DSR_A_L_CONN	Data Set Ready
7	Gnd	Signal Ground
8	SER_DCD_A_L-CONN	Data Carrier Detect

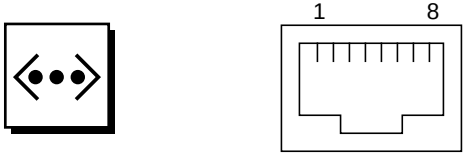
Pin	Signal	Description
9	NC	Not connected
10	NC	Not connected
11	NC	Not connected
12	NC	Not connected
13	NC	Not connected
14	NC	Not connected
15	SER_TRXC_A_L_CONN	Transmit Clock
16	NC	Not connected
17	SER_RXC_A_L_CONN	Receive Clock
18	NC	Not connected
19	NC	Not connected
20	SER_DTR_A_L_CONN	Data Terminal Ready
21	NC	Not connected
22	NC	Not connected
23	NC	Not connected
24	SER_TXC_A_L_CONN	Terminal Clock
25	NC	Not connected

Reference for the Twisted-Pair Ethernet (TPE) Connector

The twisted-pair Ethernet (TPE) connector is a RJ-45 type connector located on the main logic board back panel.

Caution – Connect only TPE cables into the TPE connector.

TPE Connector Diagram



TPE Connector Signals

Pin	Signal Name	Description
1	Common mode termination	Termination
2	Common mode termination	Termination
3	TX+	Transmit Data +
4	+5VDC	+5 VDC
5	TX-	Transmit Data -
6	RX+	Receive Data +
7	RX_	Receive Data -
8	Common mode termination	Termination

TPE Cable-Type Connectivity

You can connect the following types of TPE cables to the TPE connector.

- For 10BASE-T applications, unshielded twisted-pair (UTP) cable:
  - Category 3 (UTP-3, voice grade)
  - Category 4 (UTP-4)
  - Category 5 (UTP-5, data grade)
- For 100BASE-T applications, UTP cable: Category 5 (UTP-5, data grade)

External UTP-5 Cable Lengths

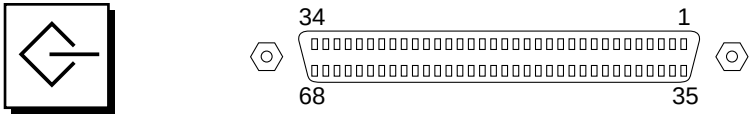
The following list describes the TPE UTP-5 cable applications and maximum lengths.

- Cable type—UPT-5, data grade
- Applications—10BASE-T or 100BASE-T
- Maximum Length—109 yards (100 meters)

Reference for the UltraSCSI Connector

The Ultra Small Computer System Interface (UltraSCSI) connector (J2202) is located on the main logic board back panel.

UltraSCSI Connector Diagram



UltraSCSI Connector Signals

Pin	Signal Name	Description
1	Gnd	Ground
2	Gnd	Ground
3	NC	Not connected
4	Gnd	Ground
5	Gnd	Ground
6	Gnd	Ground
7	Gnd	Ground
8	Gnd	Ground
9	Gnd	Ground
10	Gnd	Ground
11	Gnd	Ground
12	Gnd	Ground
13	Gnd	Ground
14	Gnd	Ground
15	Gnd	Ground

Pin	Signal Name	Description
16	Gnd	Ground
17	TERMPOWER	Termpower
18	TERMPOWER	Termpower
19	NC	Not connected
20	Gnd	Ground
21	Gnd	Ground
22	Gnd	Ground
23	Gnd	Ground
24	Gnd	Ground
25	Gnd	Ground
26	Gnd	Ground
27	Gnd	Ground
28	Gnd	Ground
29	Gnd	Ground
30	Gnd	Ground
31	Gnd	Ground
32	Gnd	Ground
33	Gnd	Ground
34	Gnd	Ground
35	SCSI_B_DAT<12>	Data 12
36	SCSI_B_DAT<13>_	Data 13
37	SCSI_B_DAT<14>_	Data 14
38	SCSI_B_DAT<15>_	Data 15
39	SCSI_B_PAR<l>	Parity 1
40	SCSI_B_DAT<0>_	Data 0
41	SCSI_B_DAT<1>_	Data 1
42	SCSI_B_DAT<2>_	Data 2
43	SCSI_B_DAT<3>_	Data 3

Pin	Signal Name	Description
44	SCSI_B_DAT<4>	Data 4
45	SCSI_B_DAT<5>	Data 5
46	SCSI_B_DAT<6>	Data 6
47	SCSI_B_DAT<7>	Data 7
48	SCSI_B_PAR<0>	Parity 0
49	Gnd	Ground
50	NC	Not connected
51	TERMPOWER_B	Terminal B Power
52	TERMPOWER_B	Terminal B Power
53	NC	Not connected
54	Gnd	Ground
55	SCSI_B_ATN_L	Attention
56	Gnd	Ground
57	SCSI_B-BSY_L	Busy
58	SCSI_B_ACK_L	Acknowledge
59	SCSI_B_RESET_L	Reset
60	SCSI_B_MSG_L	Message
61	SCSI_B_SEL_L	Select
62	SCSI_B-CD_L	Command
63	SCSI_B_REQ_L	Request
64	SCSI_B_IO_L	In/out
65	SCSI_B_DAT<8>	Data 8

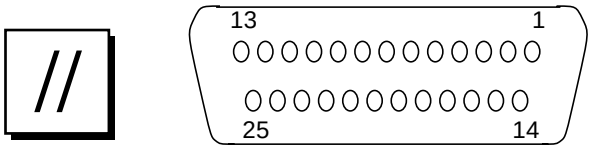
Pin	Signal Name	Description
66	SCSI_B_DAT<9>	Data 9
67	SCSI_B_DAT<10>	Data 10
68	SCSI_B_DAT<11>	Data 11

Note – _L signifies active low.

Reference for the Parallel Port Connector

The parallel port connector is a DB-25 type connector (J2202) located on the main logic board back panel.

Parallel Port Connector Diagram



Parallel Port Signals

Pin	Signal	Description
1	PAR_DS_L_CONN	Data Strobe Low
2 to 9	PP_DAT[0..7]_CONN	Data0 Through Data7
10	PAR_ACK_L_CONN	Acknowledge Low
11	PAR_BUSY_CONN	Busy
12	PAR_PE_CONN	Parity Error
13	PAR_SELECT_L_CONN	Select Low
14	PAR_AFXN_L_CONN	Auto Feed Low
15	PAR_ERROR_L_CONN	Error Low
16	PAR_INIT_L_CONN	Initialize Low
17	PAR_IN_L_CONN	Peripheral Input Low

Pin	Signal	Description
18	Gnd	Ground
19	Gnd	Ground
20	Gnd	Ground
21	Gnd	Ground
22	Gnd	Ground
23	Gnd	Ground
24	Gnd	Ground
25	Gnd	Ground

Reference for the Fibre Channel-Arbitrated Loop (FC-AL) Port Connector

The Fibre Channel-Arbitrated Loop port connector (J2902) is an 8-pin connector located on the main logic board back panel.

FC-AL Port Connector Diagram

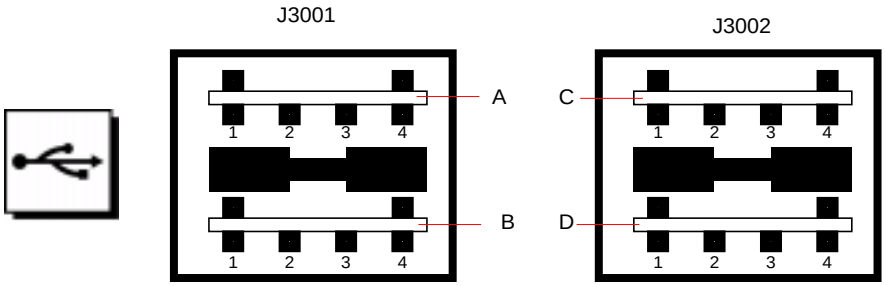
FC-AL Connector Pin Assignments

Pin	Signal	Description
1	T_CM_FC_TX_EX_P	TX +
2	GND	Ground
3	T_CM_FC_TX_EX_N	TX -
4, 5	NC	Not connected
6	FC_RX_EX_N	RX +
7	GND	Ground
8	FC_RX_EX_P	RX -

Reference for the Universal Serial Bus (USB) Connectors

Four Universal Serial Bus (USB) connectors (J3001, J3002) are located on the main logic board back panel. The port pin assignments are identical.

USB Port Connector Diagram



USB Connector Pin Assignments

Pin	Signal Name	Description	Pin	Signal Name	Description
A1	USB0_VCC	5 Volts	C1	USB2_VCC	5 Volts
A2	CM_USB_D0_N	Signal negative	C2	CM_USB_D0_N	Signal negative
A3	CM_USB_D0_P	Signal positive	C3	CM_USB_D0_P	Signal positive
A4	Gnd	Ground	C4	Gnd	Ground
B1	USB1_VCC	5 Volts	D1	USB3_VCC	5 Volts
B2	CM_USB_D1_N	Signal negative	D2	CM_USB_D1_N	Signal negative
B3	CM_USB_D1_P	Signal positive	D3	CM_USB_D1_P	Signal positive
B4	Gnd	Ground	D4	Gnd	Ground

APPENDIX **B**

System Specifications

This appendix provides the following product specifications for the Sun Fire 280R server:

Reference for Physical Specifications

Specification	U.S.A.	Metric
Height	6.95 inches	17.6 centimeters
Width	17.25 inches	43.8 centimeters
Depth	27.25 inches	69.2 centimeters
Weight (estimated, fully configured)	75 pounds	34 kilograms

The system key fits into the system cover lock on the top of the system.

Reference for Electrical Specifications

Parameter	Value
Input	
Nominal Frequencies	50 Hz or 60 Hz
Nominal Voltages	100, 120, 220, or 240 VAC
Maximum Current AC RMS	9.2 A @ 100 VAC, 4.2 A @ 220 VAC
AC Operating Range	90 to 264 Vrms, 47 to 63 Hz
Outputs	
5.1 VDC[1]	0.1 to 1.5 A
+3.3 VDC[2]	3 to 60 A
+5 VDC[3]	3 to 70 A
+12 VDC	0.5 to 5.5 A
-12 VDC	0 to 0.5 A
Maximum DC Power Output	560 Watts
Maximum AC Power Consumption	810 Watts
Maximum Heat Dissipation	3140 BTUs/hr
Volt-Ampere Rating	900 VA with 560 Watt load

1. Standby output.
2. Combined output power of the +3.3 VDC and +5 VDC outputs must not exceed 480 Watts.
3. Combined output power of the +3.3 VDC and +5 VDC outputs must not exceed 480 Watts.

Reference for Environmental Specifications

These environmental specifications are for a rackmounted system.

Parameter	Value
Operating	
Temperature	5˚C to 40˚C (41˚F to 104˚F)—IEC 60068-2-1, 60068-2-2
Humidity	20% to 80% RH (noncondensing), 27 ˚C max wet bulb—IEC 60068-2-56
Altitude	0 to 3000 meters (0 to 10,000 feet)—IEC 60068-2-13
Vibration	0.0002 G^2 / Hz, flat from 5–500 Hz (0.31 GRMS); z-axis only—IEC 60068-2-64
Shock	3 G peak, 11 milliseconds half-sine pulse—IEC 60068-2-27
Declared Acoustics	6.9 Bel
Non-Operating	
Temperature	-20˚C to 60˚C (-4˚F to 140˚F)—IEC 60068-2-1, 60068-2-2
Humidity	93% RH—IEC 60068-2-56
Altitude	0 to 12,000 meters (0 to 40,000 feet)—IEC 60068-2-13
Vibration	x-axis and y-axis: 0.0004 G^2 / Hz flat from 5–500 Hz (0.472 GRMS); z-axis: 0.0008 G^2 / Hz flat from 5–500 Hz (0.629 GRMS)—IEC 60068-2-64
Handling Drops	100 mm (unmounted unit)—IEC 60068-2-31

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