



# Sun Fire™ 280R Server Service Manual

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# 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.

## 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.

## 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。

## 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 server

## 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

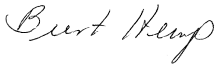
This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:

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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# Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems Sun Fire 280R server.

## 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:



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

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

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

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**On** – Applies AC power to the system.

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



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**Off** - Removes AC power from the system.

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

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## 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



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**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.

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

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## SELV Compliance

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

## Power Cord Connection



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**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.

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**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.

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**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.

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



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**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.

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## Lithium Battery



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**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.

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## Battery Pack



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**Caution** – There is a sealed lead acid battery in Sun Fire 280R servers. 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.

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## System Unit Cover



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**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.

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## 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 ausgetauscht 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 server 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 Laserlaitte  
Klasse 1 Laser Apparat  
Laser Klasse 1

## CD-ROM



**Warnung** – Die Verwendung von anderen Steuerungen und Einstellungen oder die Durchführung von Prozeduren, die von den hier beschriebenen abweichen, können gefährliche 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. Évitez 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



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**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.

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**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.

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## Conformité SELV

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

## Connexion du cordon d'alimentation



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**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.

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**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.

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**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.

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



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**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.

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## Batterie au lithium



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**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.

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## Bloc-batterie



**Attention:** – Les unités Sun Fire 280R server 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 Laserlaitte  
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 las 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.



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

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**Encendido** – Aplica la alimentación de CA al sistema.

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



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**Apagado** - Elimina la alimentación de CA del sistema.

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

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## Modificaciones en el equipo

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

## Ubicación de un producto Sun



---

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

---



---

**Precaución** – De acuerdo con la norma DIN 45 635, 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 server contienen una pila de plomo sellada, Productos de energía portátil n° 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.



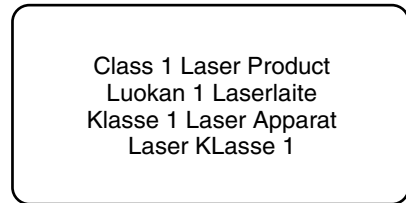
---

**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.



## CD-ROM

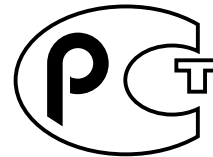


---

**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.

---

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---

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# Preface

---

The *Sun Fire 280R Server Service Manual* provides detailed procedures that describe the removal, installation, and replacement of serviceable parts and options in the Sun Fire™ 280R server. This service manual also includes information about diagnostics and maintenance of the system. This book is written for technicians, system administrators, qualified Sun™ service providers, and advanced computer system end users who have experience troubleshooting and replacing server hardware.

This manual presents information in a modular format designed to answer the type of questions that you might ask while servicing the Sun Fire 280R server. Typically, the modules cover specific tasks for a service-related procedure for a specific component.

Service providers who would like more general information about the system should refer to the appropriate chapter or section in the *Sun Fire 280R Server Owner's Guide*.

---

# How This Book Is Organized

The chapters in this manual refer to a series of related service tasks. Using the table of contents or the task list on the first page of each chapter, you can quickly find the information you need to perform a specific task. The information modules for the tasks are brief; however, they are interrelated and refer to other modules in the book. For instance, the procedure “Replacing the Main Logic Board” is related to many tasks covered by other modules. You must perform these requisite tasks before or after replacing the main logic board.

This book is divided into six chapters and appendixes, as described below.

- Chapter 1 describes tasks that you need to perform before or after each service procedure.
- Chapter 2 explains tasks related to main logic board components.
- Chapter 3 provides information about tasks related to system storage devices.
- Chapter 4 describes tasks related to system backplanes and cables.
- Chapter 5 explains tasks related to various subassemblies in the system.
- Chapter 6 details the diagnostic tools and troubleshooting procedures for the system.
- The appendixes list system specifications, accessible connector pinouts, and field-replaceable unit (FRU) information.

---

# Using UNIX Commands

This document may not contain information on basic UNIX<sup>®</sup> commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

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

---

# Typographic Conventions

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

---

# Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
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 Service Manual*.

<b>Application</b>	<b>Title</b>
Server rackmounting and setup	<i>Sun Fire 280R Server Setup and Rackmounting Guide</i>
Setting up and running the system; features and options; troubleshooting; and network administration for the system	<i>Sun Fire 280R Server Owner's Guide</i>
Late-breaking product news and information	<i>Sun Fire 280R Server Product Notes</i> <i>Sun Fire 280R Server Supplemental Product Notes</i>
System diagnostics	<i>SunVTS User's Guide</i> <i>SunVTS Test Reference Manual</i> <i>SunVTS Toolkit Test Developer's Guide</i> <i>SunVTS Quick Reference Card</i> <i>OpenBoot Command Reference Manual</i> <i>OpenBoot Quick Reference</i> <i>OpenBoot Supplement for PCI</i>
System management	<i>Sun Management Center Software Documentation Set</i> <i>Sun Management Center Software User's Guide</i> <i>Sun Management Center Software Release Notes</i> <i>Sun Management Center Supplement for Workgroup Servers</i> <i>Sun Management Center Developer Environment Release Notes</i>
System and network administration	<i>Solaris System Administrator AnswerBook</i> <i>SPARC: Installing Solaris Software</i> <i>Platform Notes: The eri FastEthernet Driver</i>
Using operating system software	<i>Solaris User's Guide</i>
Miscellaneous	<i>Solaris 8 on Sun Hardware Collection</i> <i>Solaris on Sun Hardware AnswerBook</i> <i>Solaris Handbook for Sun Peripherals</i>

Application	Title
Updating the flash PROM	<i>Solaris 8 on Sun Hardware Documentation Guide</i> <i>Solaris 8 Sun Hardware Platform Guide</i> <i>Solaris 8 Sun Hardware Roadmap</i>
Remote System Control	<i>Sun Remote System Control (RSC) User's Guide</i> <i>Sun Remote System Control (RSC) Release Notes</i>
Storage management	<i>Sun StorEdge Component Manager User's Guide</i> <i>Sun StorEdge LibMON Installation and User's Guide</i> <i>VERITAS Volume Manager Storage Administration Guide</i> <i>VERITAS Volume Manager Administrator's Reference Guide</i> <i>Sun Release Notes for VERITAS Volume Manage</i>

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# Preparing to Service the System

---

This chapter tells you what you need to know about preparing for and completing service procedures.

Except for removing and installing disk drives, this system should be serviced by a qualified Sun service provider. Please be sure to keep the following guidelines in mind:

- Internal disk drives and power supplies are hot-pluggable. For the servicing of any other parts internal to the system, you must first power off the system. See “How to Power Off the System” on page 5.
- All parts are serviceable while the system is installed in the rack, *except* for the following:
  - Main logic board
  - Power distribution board

See “How to Position the System for Service” on page 14.

The following tasks are covered in this chapter:

- “How to Power Off the System” on page 5
- “How to Power On the System” on page 6
- “How to Power On the System With Full Diagnostics Enabled” on page 9
- “How to Initiate a Reconfiguration Boot” on page 12
- “How to Position the System for Service” on page 14
- “How to Slide the System Into the Rack” on page 18
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- “How to Place the System Into the Rack” on page 24
- “How to Remove the System Cover” on page 30
- “How to Replace the System Cover” on page 33
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Attach an Alphanumeric Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39

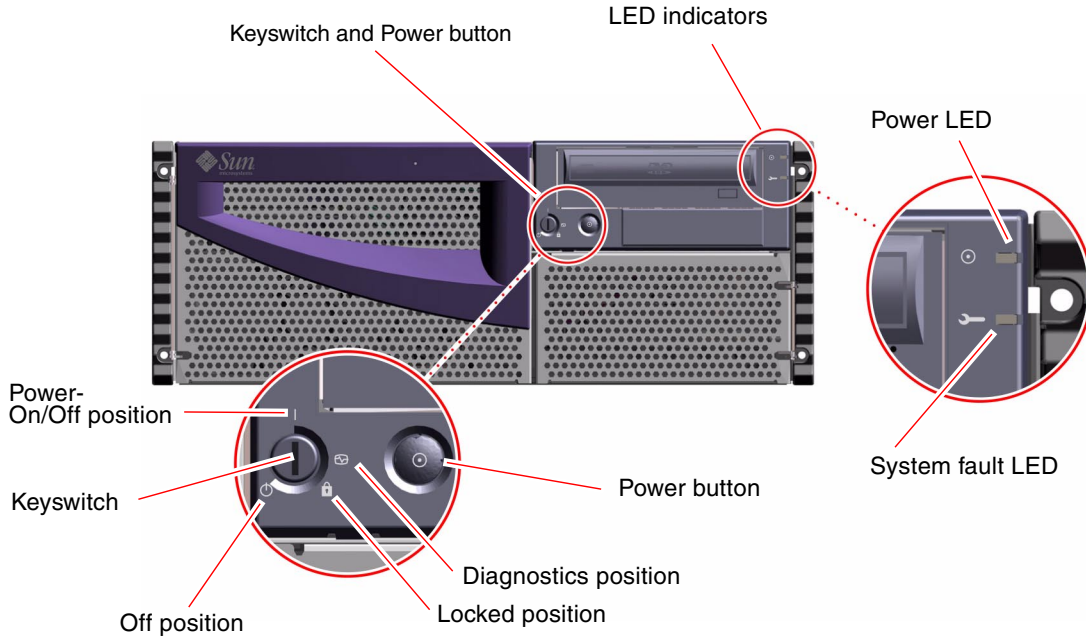
The following information is also included:

- “About the Status and Control Panel” on page 2
- “Tools Required for Installation and Service” on page 14
- “About Communicating With the System” on page 37

---

## About the Status and Control Panel





The status and control panel includes a four-position security keyswitch and two system-level LED indicators. After powering on the system, the recommended keyswitch position for standard operation is the Locked position. For more detailed information, see “Keyswitch Settings” on page 3 and “System LED Indicators” on page 4.





## 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		<p>This setting enables the system's Power button to power on, or to power off, the system.</p> <p>If Solaris software is running, quickly pressing and releasing the Power button initiates a graceful system shutdown.</p> <p>If the system hangs, holding the Power button in for four seconds while the keyswitch is in this position will cause an immediate hardware power off.</p>
Diagnostics		<p>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.</p> <p>This setting enables the system's Power button to power on, or to power off, the system.</p>
Locked		<p>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.</p> <p>The Locked position is the recommended setting for normal day-to-day operation of the system.</p>
Off		<p>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 <i>except</i> to the circuitry on the power distribution board, to the I<sup>2</sup>C bus circuitry on the FC-AL backplane, to the RSC card circuitry, and to selected circuits on the main logic board.</p> <p>This setting disables the server's Power button.</p> <p>This setting <i>does not</i> 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.</p>

## 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 to Forced Off mode using the keyswitch, the LED indicators lose power and turn off.

When you first power on the system, both system indicator LEDs are lit. The general fault indicator flashes briefly 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		<p>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.</p> <p>During the boot process, this LED <i>flashes</i> for approximately three seconds. If you press 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 175 for more information.</p> <p>This amber LED lights steadily if either installed power supply is not a 560-watt power supply.</p> <p>This amber LED lights steadily if there is a single system fan failure, or lit by software.</p> <p>See “Diagnostics, Monitoring, and Troubleshooting” on page 155 for information about troubleshooting your server.</p>

---

# 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.



---

**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.

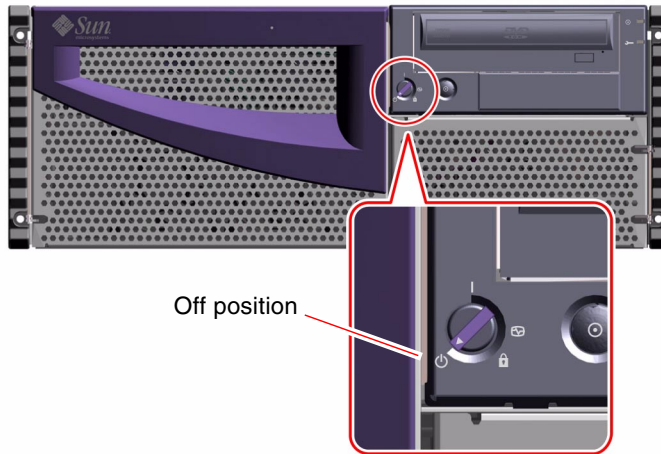
4. **Wait for the system halt messages and the `ok` prompt.**

---

**Note** – 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. This 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 3.

---

5. Turn the keyswitch on the front panel of the system to the Off position.  
See “Keyswitch Settings” on page 3 for information about each keyswitch setting.



---

## How to Power On the System

### Before You Begin

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

- “How to Attach an Alphanumeric Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39

---

**Note** – If you have just installed an internal or external storage device *other than* a Fibre Channel-Arbitrated Loop (FC-AL) drive or a Universal Serial Bus (USB) device, or any new part that plugs in to the main logic board, bring up the system after performing a reconfiguration boot (boot -r).

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 12.

---

## 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 5.

---



---

**Caution** – Before you power on the system, make sure that the top cover and front doors are properly installed. See “How to Replace the System Cover” on page 33 for more information.

---

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

Read the documentation supplied with the device for specific instructions.

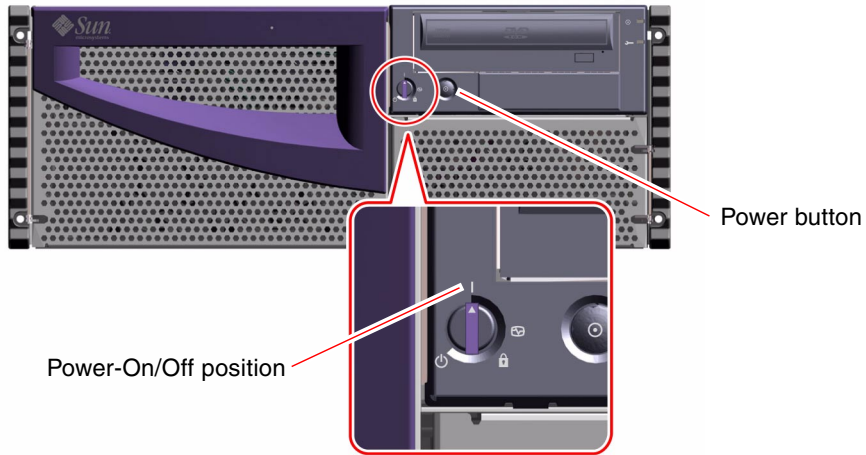
- 2. Turn on power to the local graphics console or ASCII terminal.**

A local graphics console or ASCII terminal is required for viewing system messages. For setup instructions, see “How to Attach an Alphanumeric Terminal” on page 38 or “How to Configure a Local Graphics Console” on page 39.

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

See “Keyswitch Settings” on page 3 for information about each keyswitch setting.

4. Press the front panel Power button once.



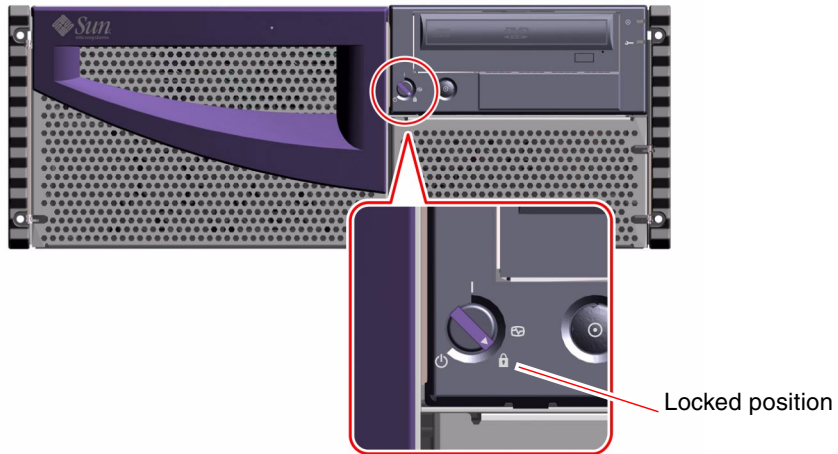
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**Note** – The system may take anywhere from 30 seconds to several minutes before video is displayed on the system console or the ok prompt appears on an attached terminal. This time depends on the level of power-on self-test (POST) diagnostics being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

---

5. Turn the keyswitch to the Locked position.

The Locked position prevents accidentally powering-off the system. See “Keyswitch Settings” on page 3 for information about each keyswitch setting.



---

## How to Power On the System With Full Diagnostics Enabled

### Before You Begin

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

- “How to Attach an Alphanumeric Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39

---

**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, bring up the system after performing a reconfiguration boot (boot -r).

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 12.

---

For more complete interpretation of the diagnostic output from this procedure, consult “About Diagnostic Tools” on page 157.

## 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 5.

---



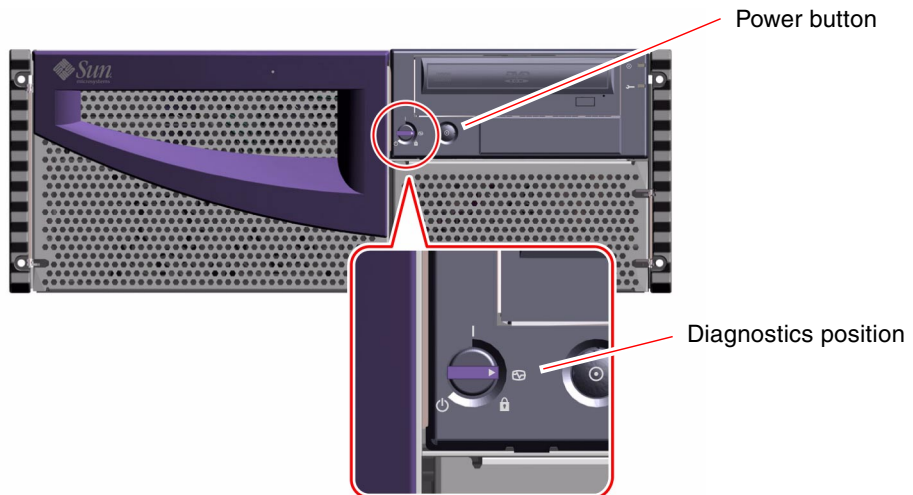
---

**Caution** – Before you power on the system, make sure that the top cover and front doors are properly installed. See “How to Replace the System Cover” on page 33.

---



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 Terminal” on page 38 or “How to Configure a Local Graphics Console” on page 39.
3. **Turn the front panel keyswitch to the Diagnostics position.**  
See “Keyswitch Settings” on page 3 for information about each keyswitch setting.
4. **Press the front panel Power button once.**



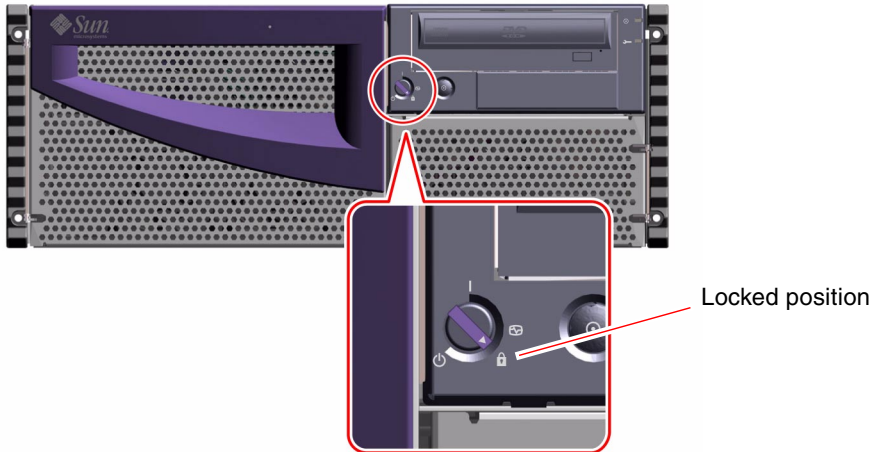
---

**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 3 for information about each keyswitch setting.



---

## How to Initiate a Reconfiguration Boot

### Before You Begin

After you have installed the operating system, and after you have installed any new part that plugs in to the main logic board or any internal or external storage device, 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 hot-plugging a disk drive or a USB device.

# 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 5.

---



---

**Caution** – Before you power on the system, make sure that the system cover and front doors are properly installed. See “How to Replace the System Cover” on page 33.

---

**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 Terminal” on page 38 or “How to Configure a Local Graphics Console” on page 39.

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

See “About the Status and Control Panel” on page 2.

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 “Diagnostics, Monitoring, and Troubleshooting” on page 155.

**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 several 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 a successful reconfiguration reboot, the system prompt is displayed.

---

## Tools Required for Installation and Service

The following tools are required to install and service the system:

- Screwdriver, Phillips No. 1
- Screwdriver, Phillips No. 2
- Screwdriver, long flat-blade No. 2
- Needle-nose pliers
- Wrench, 5/16ths inch
- Wrench, 1/2 inch
- Torque indicator driver, mounted on the inside of the chassis
- Electrostatic discharge (ESD) mat, Sun part number 250-1088, or equivalent
- Grounding wrist or foot strap

The latter two items help protect the server against damage due to electrostatic discharge. For more information, see “How to Avoid Electrostatic Discharge” on page 35.

---

## How to Position the System for Service

This procedure describes placing the system in position for service by sliding it out of the rack enclosure without removing it from the rack. All service procedures except removing and replacing the main logic board can be performed while the system is still attached to the rack enclosure.

---

**Note** – Sliding the system out of the rack is not required for servicing disk drives and power supplies.

---

## Before You Begin

---



**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. You must level and secure the cabinet to provide a safe working environment. See “Tools Required for Installation and Service” on page 14 for useful tools required for this procedure.

---

## What to Do

1. **Extend and adjust the cabinet’s anti-tip legs.**
2. **Open (or remove) the front and back rack enclosure doors.**
3. **Disconnect all external cables attached to the back panel of the system.**

As you disconnect each cable, label it with a strip of masking tape indicating the cable’s origin and its terminating connection.

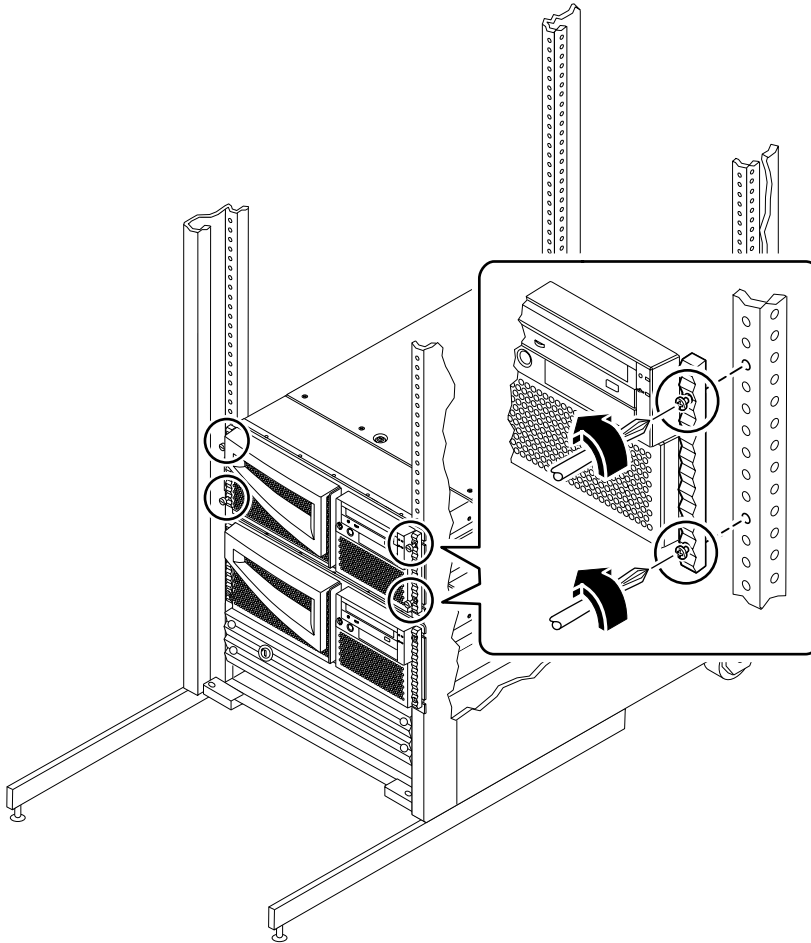


**Caution** – Do not disconnect the power cable(s) from the system power inlet(s) unless you are installing or replacing the power distribution board, the main logic board, or the Remote System Control (RSC) card. The power cord grounds the system.

---

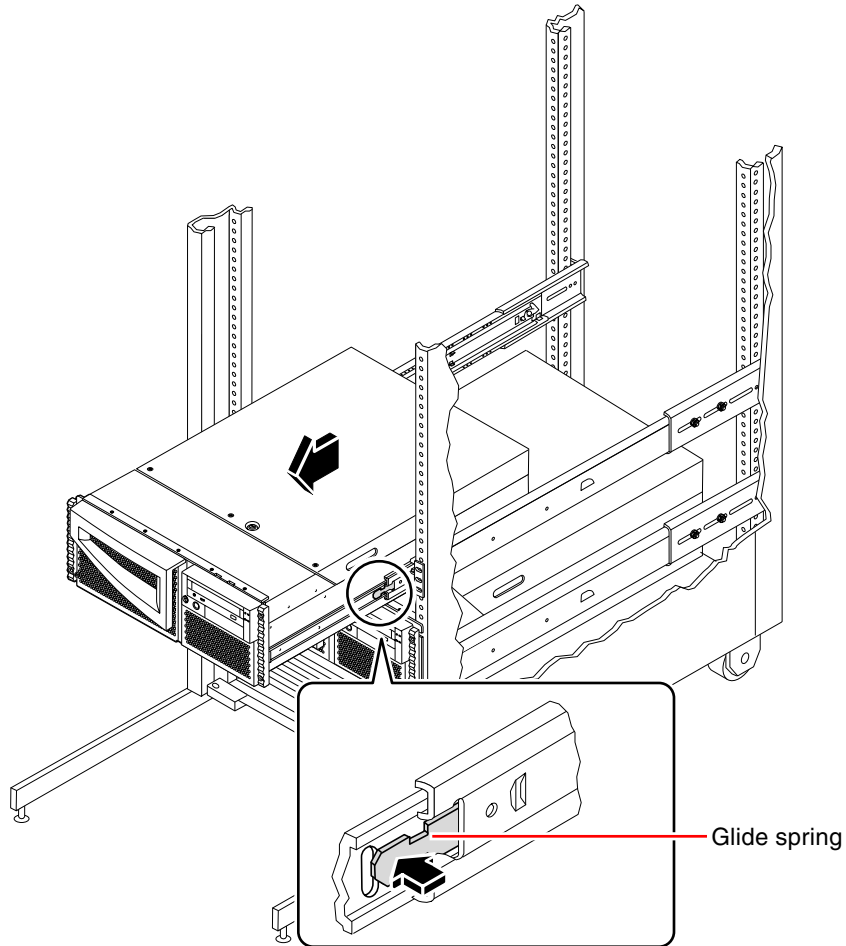
**4. Loosen the four captive screws that secure the system to the left and right vertical rails at the front of the rack.**

Use a Phillips No. 2 screwdriver to loosen the captive screws, which are in recessed access holes in the decorative panels affixed to the system's front panel.



**5. Slide the system chassis evenly out of the rack enclosure until the inner glides stop in the slide.**

Grasp the system's front bezel and pull the system smoothly out of the enclosure. Continue pulling the system until the back of the chassis clears the enclosure and you hear the flat spring catches in the glides with an audible clicking sound. The system is then fully extended and secure.



## What Next

To slide the system into the rack enclosure, see:

- "How to Slide the System Into the Rack" on page 18

---

# How to Slide the System Into the Rack

## Before You Begin

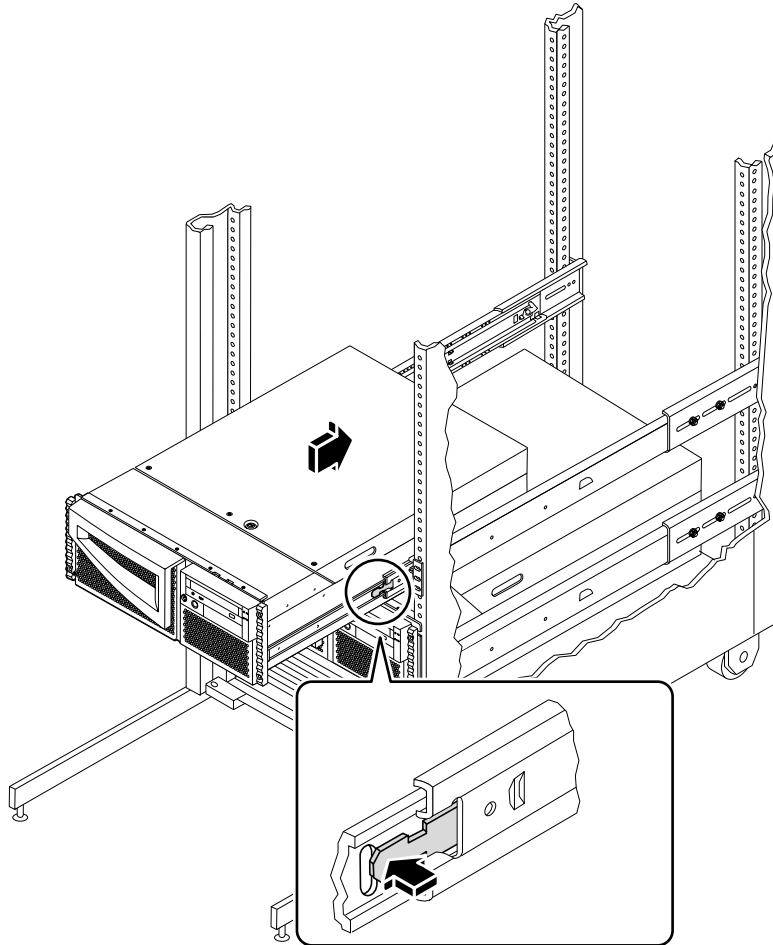
If you have been working inside the system, see:

- “How to Replace the System Cover” on page 33



# What to Do

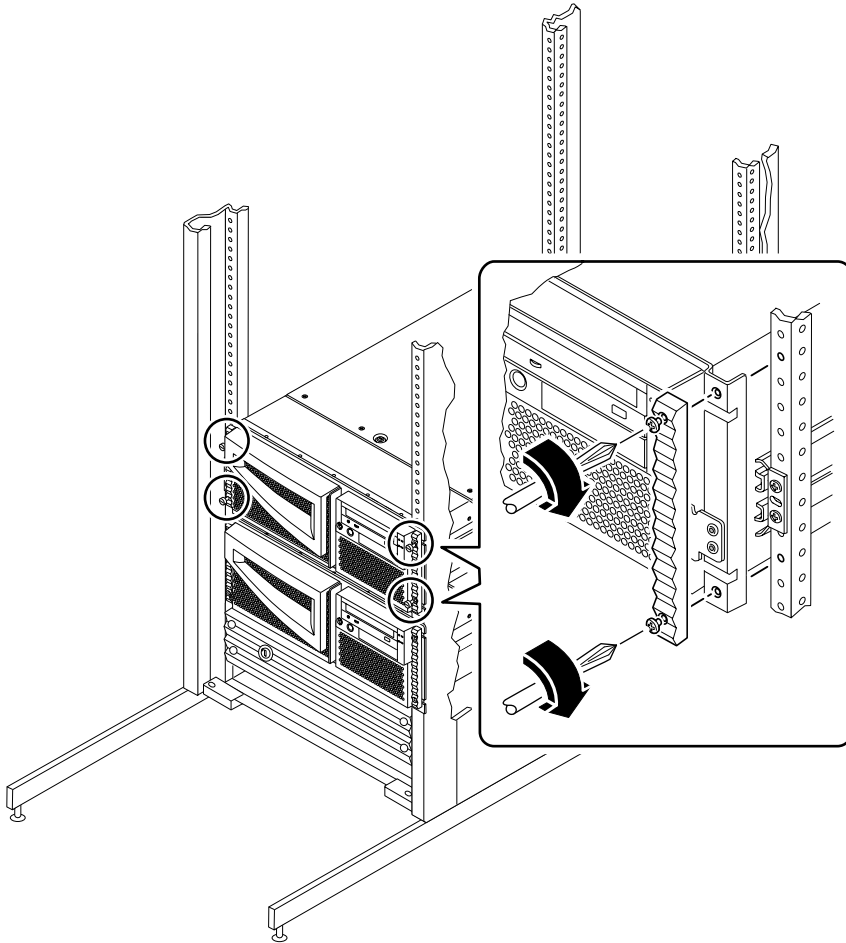
- 1. Release the two flat spring catches that lock the system into its current position.**  
Press in on both spring catches to free the system glides. One flat spring catch is attached to each inner glide on the system chassis, as shown in the following figure.



- 2. Slide the system chassis evenly into the rack enclosure until the system comes to a complete stop.**

3. **Tighten the four captive screws securing the system to the left and right vertical rails at the front of the rack.**

Use a Phillips No. 2 screwdriver to tighten the four captive screws, which are in recessed access holes in the decorative panels affixed to the system's front panel.



4. **Connect all external cables that were attached to the back panel of the system.**

Examine each disconnected cable for information indicating the cable's origin and its terminating connection.

5. **Replace, close, and lock the rack enclosure doors, as appropriate.**

## What Next

To power on the system, see:

- “How to Power On the System” on page 6

---

## How to Remove the System From the Rack

You must remove the system from the rack when doing the following:

- Removing and replacing the main logic board
- Removing and replacing the power distribution board

You can perform all other procedures while the system is still attached to the rails extended from the rack. If you want to remove the system from the rack for any other reason, follow the instructions in this section.



---

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

---



## Before You Begin

Complete these tasks:

- Identify a helper to assist you in removing the system.
- 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 next section with your helper beforehand and discuss how to coordinate your efforts to ensure your mutual safety.
- Assemble the correct tools for the procedure. See “Tools Required for Installation and Service” on page 14.
- “How to Power Off the System” on page 5.

- Open and remove the rack enclosure front door.
- Slide each rack assembly's inner slide back into its assembly until the slide comes to a complete stop against the interior glide tab.



---

**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. Disconnect all external cables from the back panel.

Note each cable's origin and its terminating connection.

### 2. 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. See "Tools Required for Installation and Service" on page 14 for tools required for this procedure.

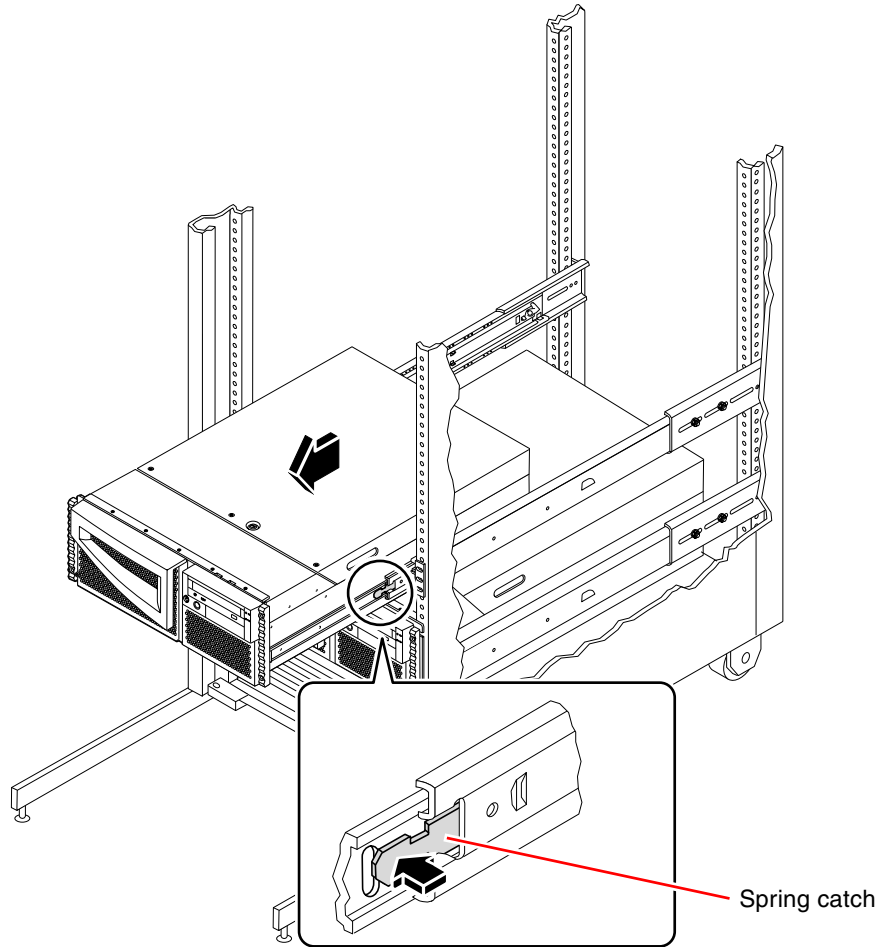
---

### 3. Extend the server from the rack, and then 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 the server and remove it. 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).

**4. 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.



**5. Prepare to remove the system.**

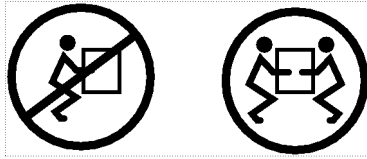
Each person should place one hand on the flat spring catch and their other hand beneath the chassis, palm up, ready to support the weight of the chassis.



---

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

---



6. **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.

7. **Set the system on a workbench or other stable surface.**
8. **Slide the empty rack slides back into their protective outer glides.**
9. **Reattach, close, and lock the rack doors as appropriate.**

## What Next

To place the system into the rack glides, see:

- “How to Place the System Into the Rack” on page 24

---

## How to Place the System Into the Rack

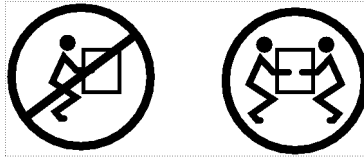
This procedure assumes that the slide assembly is already installed in the rack. For further information on assembling the slide assemblies and rack enclosures, see the *Sun Fire 280R Server Setup and Rackmounting Guide*.



---

**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 the following tasks:

- Identify a helper to assist you in removing the system.
- 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 next section with your helper beforehand and discuss how to coordinate your efforts to ensure your mutual safety.
- Assemble the correct tools for the procedure. See “Tools Required for Installation and Service” on page 14.
- Open and remove the rack enclosure front door.
- Slide each rack assembly’s inner slide back into its assembly until the slide comes to a complete stop against the interior glide tab.



---

**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. **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. See “Tools Required for Installation and Service” on page 14 for useful tools required for this procedure.

---

**2. Position one person on each side of the system, facing the inner glides on the system chassis.**

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

**3. Lift the system.**

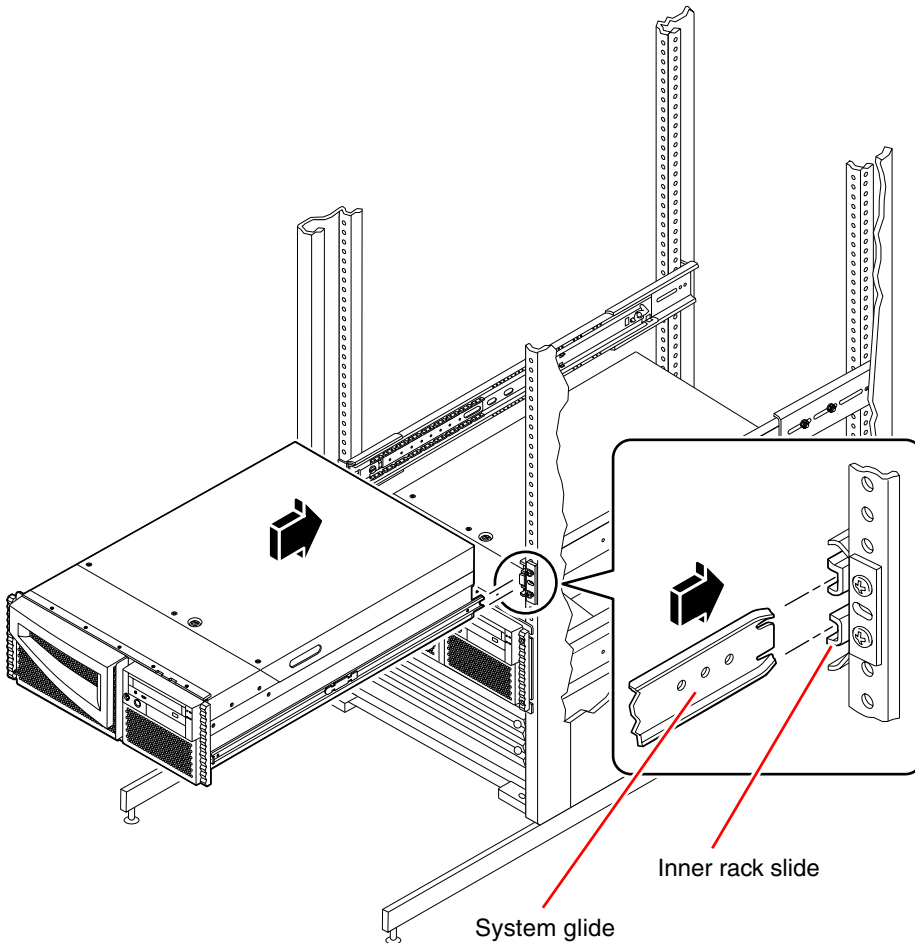
Each person should place both hands beneath the chassis and support half the weight of the system.

**4. Carry the system to the front of the rack enclosure.**



**5. Insert the system glides into the inner slides of the rack glides.**

Verify that the empty rack slides are completely inside their protective outer glides. Slide the ball-bearing runner forward as far as it will go in the slide. Slide the crimped end of each system glide into the corresponding inner slide.



**6. Slide the system smoothly into the rack slide until it is stopped inside the rack enclosure.**

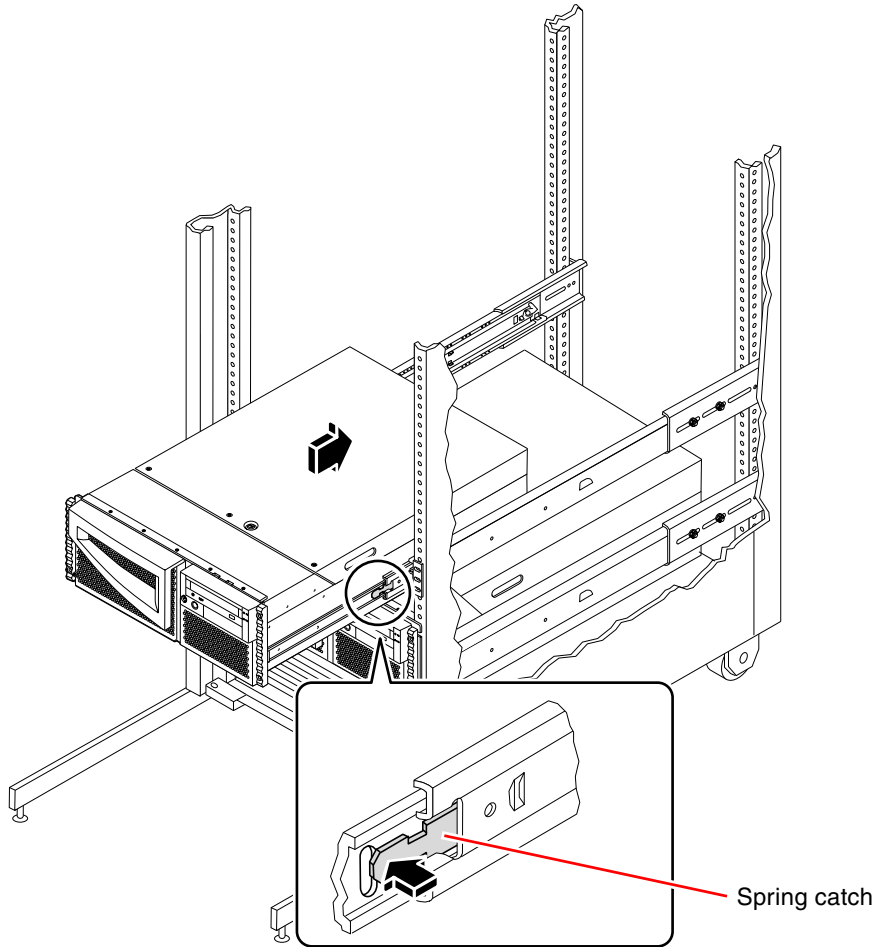
---

**Note** – The server is not yet fully installed. The flat spring catches on *both* slide assemblies will prevent the slide assembly from totally closing as you slide the server into the rack.

---

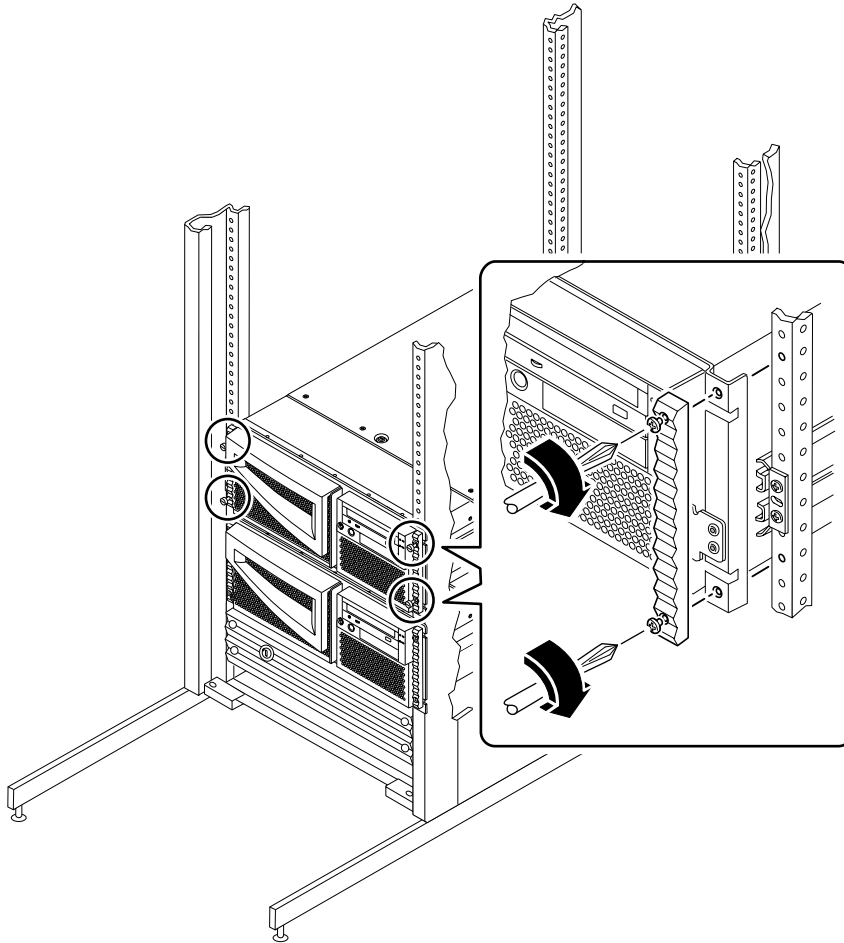
**7. Simultaneously press in on both flat spring catches and slide the system completely into the rack.**

Each person presses one spring catch and helps slide the system completely into the rack enclosure.



**8. Secure the system to the left and right vertical rails at the front of the rack.**

Use a Phillips No. 2 screwdriver to tighten the four captive screws that secure the system in the rack enclosure. These screws are in recessed access holes in the decorative panels affixed to the system's front panel.



**9. Connect all external cables that were attached to the back panel of the system.**

Examine each disconnected cable for information indicating the cable's origin and its terminating connection.

**10. Replace, close, and lock the rack enclosure doors, as appropriate.**

## What Next

To power on the system, see:

- “How to Power On the System” on page 6

---

# How to Remove the System Cover

## Before You Begin



---

**Caution** – To ensure adequate cooling and airflow, the system must run at all times with the cover closed. Do not operate the system while the system cover is removed.

---

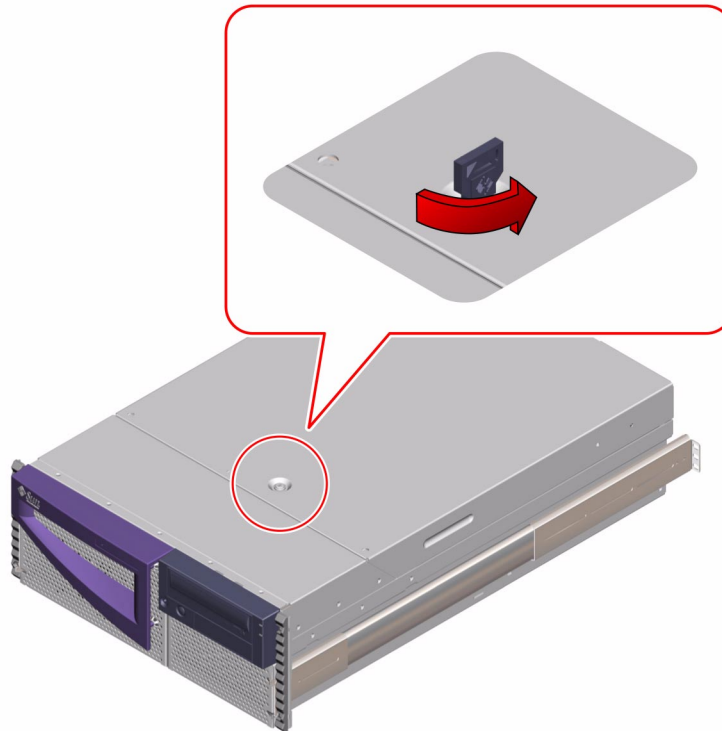
Complete this task:

- “How to Position the System for Service” on page 14

# What to Do

## 1. Unlock the system cover.

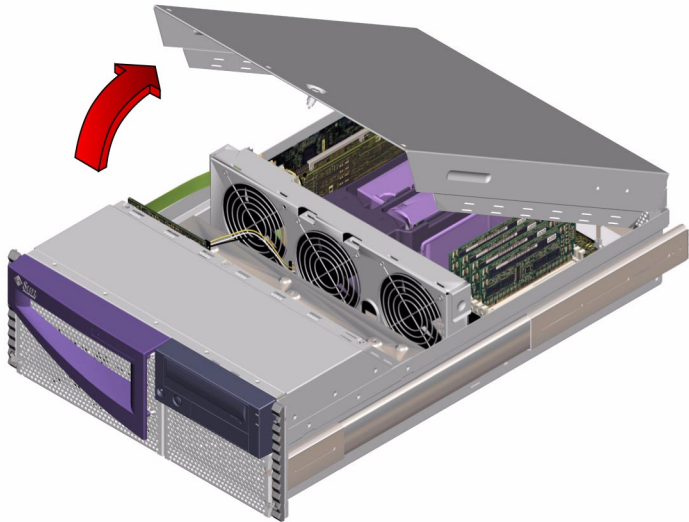
Use the front door key; turn the key counterclockwise to release the system cover lock.



## 2. Using a No. 2 Phillips screwdriver, loosen the three captive screws securing the cover to the enclosure.

3. Grasp the system cover by its sides, and lift the cover up and away from the front of the enclosure. Remove the cover and set it aside.

The system cover hinges on two cutouts in the enclosure back panel. Lift the system cover away from the back of the enclosure.



## What Next

You are now ready to install, remove, or replace components inside the system chassis.

To reassemble the system, see:

- “How to Replace the System Cover” on page 33

---

# How to Replace the System Cover

## Before You Begin



---

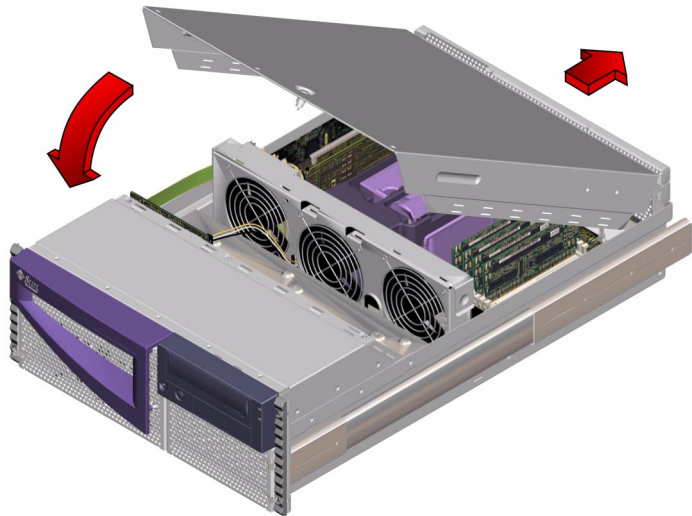
**Caution** – To ensure adequate cooling and airflow, the system must run at all times with the cover closed. Do not operate the system while the system cover is removed.

---

## What to Do

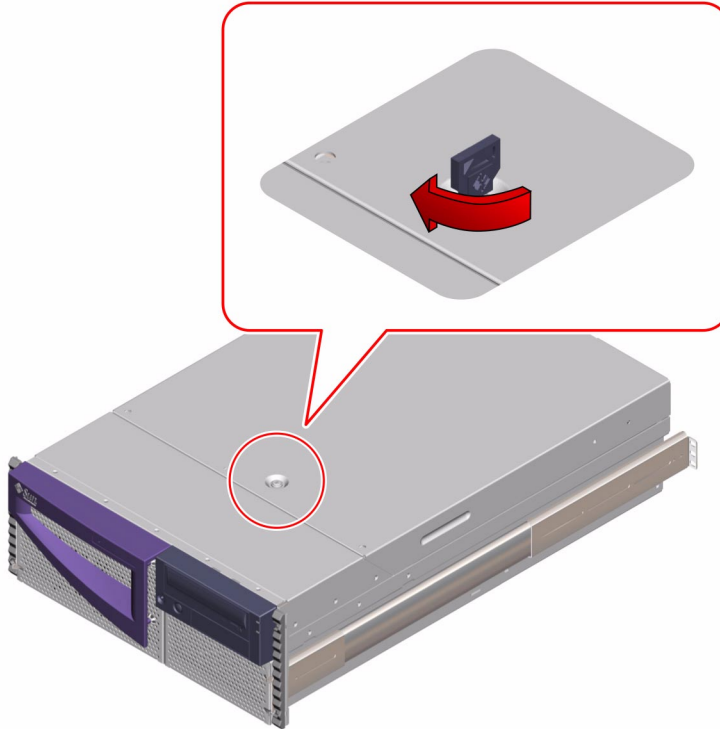
1. Insert the system cover into the recessed hinge cutouts on the back panel. Grasp the system cover by its sides, and lower the cover down and toward the front of the enclosure.

The system cover hinges on two recessed cutouts on the back panel of the enclosure.



2. Using a No. 2 Phillips screwdriver, tighten the captive screws securing the panel to the enclosure.
3. Lock the system cover.

Using the front door key, turn the key clockwise to engage the system cover lock.



## What Next

To restart the system, see:

- “How to Slide the System Into the Rack” on page 18
- “How to Power On the System” on page 6

If you reconfigured the system, complete the following procedure:

- “How to Initiate a Reconfiguration Boot” on page 12



---

# How to Avoid Electrostatic Discharge

Use the following procedure to prevent static damage whenever you are accessing any of the internal components of the system.

## Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30

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 or any metal parts without taking proper antistatic precautions.

---

**1. Disconnect the AC power cord from the wall power outlet only when performing the following procedures:**

- Removing and replacing the power distribution board
- Removing and replacing the main logic board
- Removing and replacing the Remote System Control (RSC) card

The AC power cord provides a discharge path for static electricity, so it should remain plugged in except when you are servicing the parts noted above.

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

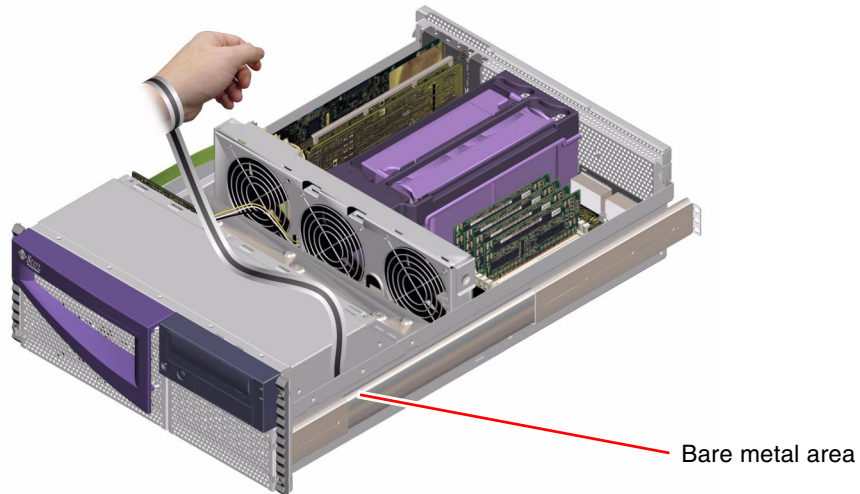
When performing any installation or service procedure, place static-sensitive parts, such as boards, cards, and disk drives, on an antistatic surface. The following items can be used as an antistatic surface:

- The bag used to wrap a Sun replacement part

- The shipping container used to package a Sun replacement part
- Sun electrostatic discharge (ESD) mat, Sun part number 250-1088 (available through your Sun sales representatives)
- 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.



---

**Note** – Make sure that the wrist strap is in direct contact with the metal on the chassis.

---

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

## What Next

To reassemble the system, see:

- “How to Replace the System Cover” on page 33

---

# About Communicating With the System

To install your system 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 (ASCII) character terminal to serial port A.

You can attach a simple terminal (or modem line) to serial port A. The terminal can be capable of displaying and entering alphanumeric but not graphical data. For instructions, see “How to Attach an Alphanumeric Terminal” on page 38.

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 180.

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 the server, you must install a graphics frame buffer card into a Peripheral Component Interconnect (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 39.

You may use the Remote System Control (RSC) connections (modem or network) only after installing the operating environment software and the RSC software. You can then access RSC 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 your *Sun Fire 280R Server Owner’s Guide* for more information.

---

# How to Attach an Alphanumeric Terminal

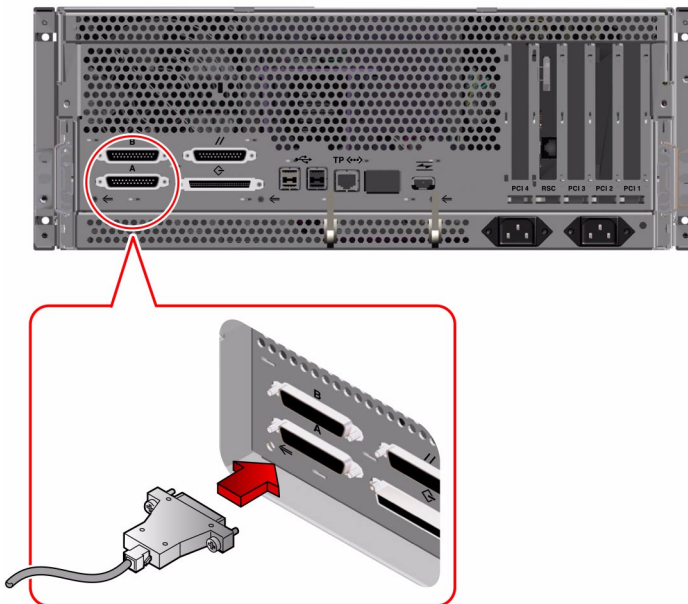
## Before You Begin

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 37 for more information.

## 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 and to run diagnostic tests. For background information, see “About Communicating With the System” on page 37.

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)

Alternatively, you can attach an alphanumeric (ASCII) terminal to the system's serial port or create a `tip` connection from another Sun system. See “About Communicating With the System” on page 37 for more information.

# What to Do

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

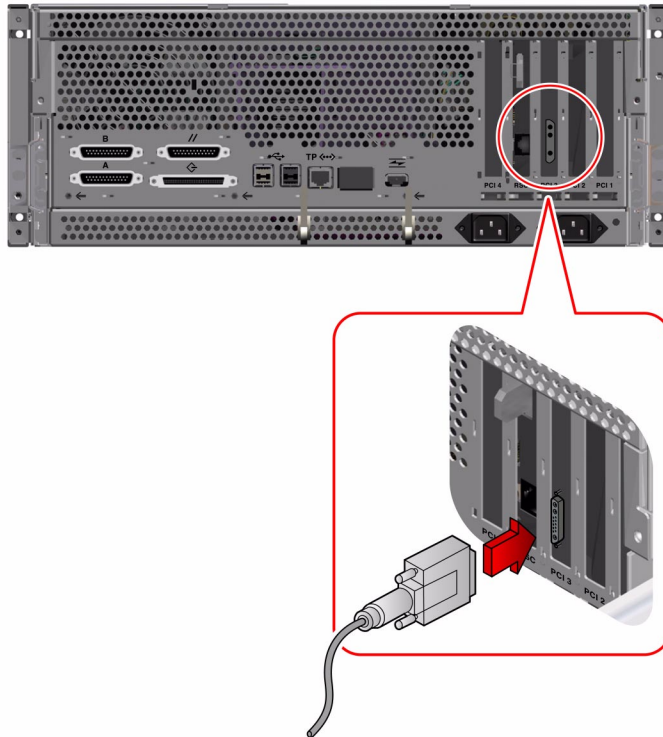
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**Note** – Installation must be performed by a qualified service provider. For further information, see “How to Install a PCI Card” on page 61 or contact your qualified service provider.

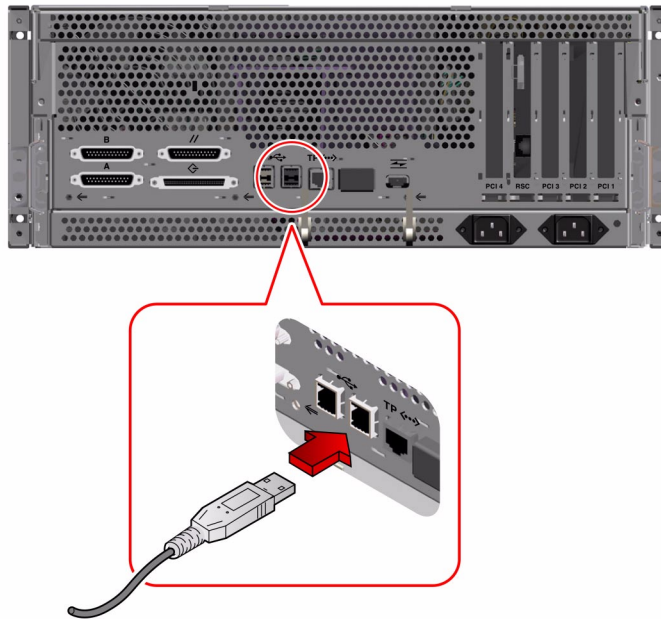
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2. Attach the monitor video cable to the graphic card’s video port.

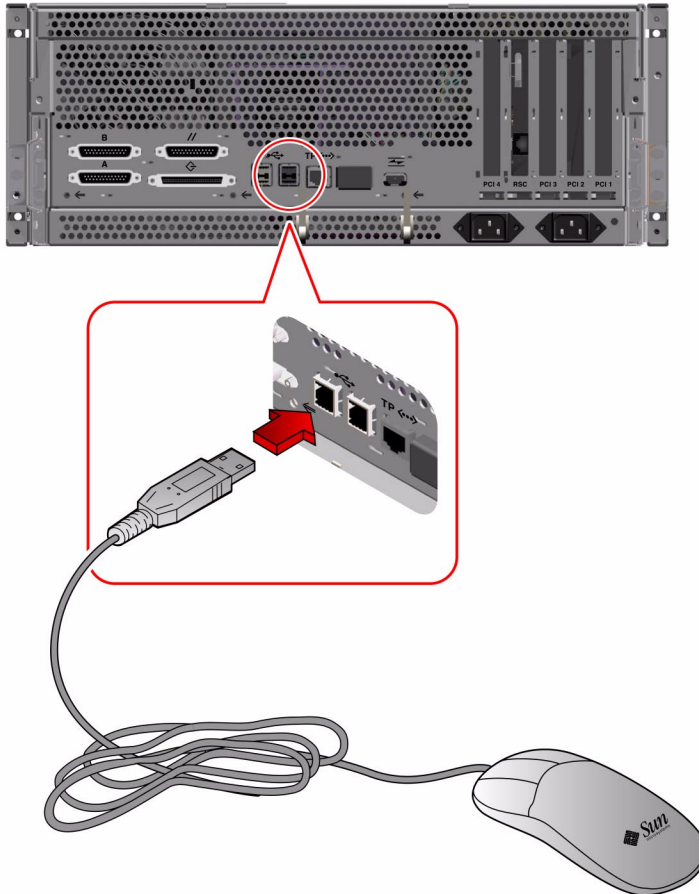
Tighten the thumbscrews to secure the connection.



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.



## Servicing the Main Logic Board and Components

---

This chapter describes how to remove and replace the system main logic board and its components, and how to set the flash PROM jumpers. For a list of part numbers for field-replaceable units (FRUs) and optional equipment, see “Illustrated Parts Breakdown” on page 217.

The following tasks are covered in this chapter:

- “How to Remove a Memory Module” on page 44
- “How to Install a Memory Module” on page 46
- “How to Remove the RSC Card” on page 50
- “How to Replace the RSC Card” on page 54
- “How to Remove a PCI Card” on page 58
- “How to Install a PCI Card” on page 61V
- “How to Remove a CPU Module” on page 65
- “How to Install a CPU Module” on page 69
- “How to Remove the ID EEPROM Module” on page 74
- “How to Replace the ID EEPROM Module” on page 77
- “How to Remove the Air Guide” on page 79
- “How to Replace the Air Guide” on page 81
- “How to Remove the Main Logic Board” on page 82
- “How to Replace the Main Logic Board” on page 85
- “How to Set the Flash PROM Jumpers” on page 88

---

# How to Remove a Memory Module

Memory modules for this system are next generation dual inline memory modules (DIMMs). Each DIMM group must contain four DIMMs of equal density (for example, four 128-Mbyte DIMMs, one in each slot in group 0, or one in each slot of group 1). You can have memory groups with different densities (for example, 128-Mbyte DIMMs in group 0, and 512-Mbyte DIMMs in group 1). Supported DIMM configuration options are 128, 256, 512, and 1024 Mbytes. See the *Sun Fire 280R Server Owner's Guide* for more information.

## Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35



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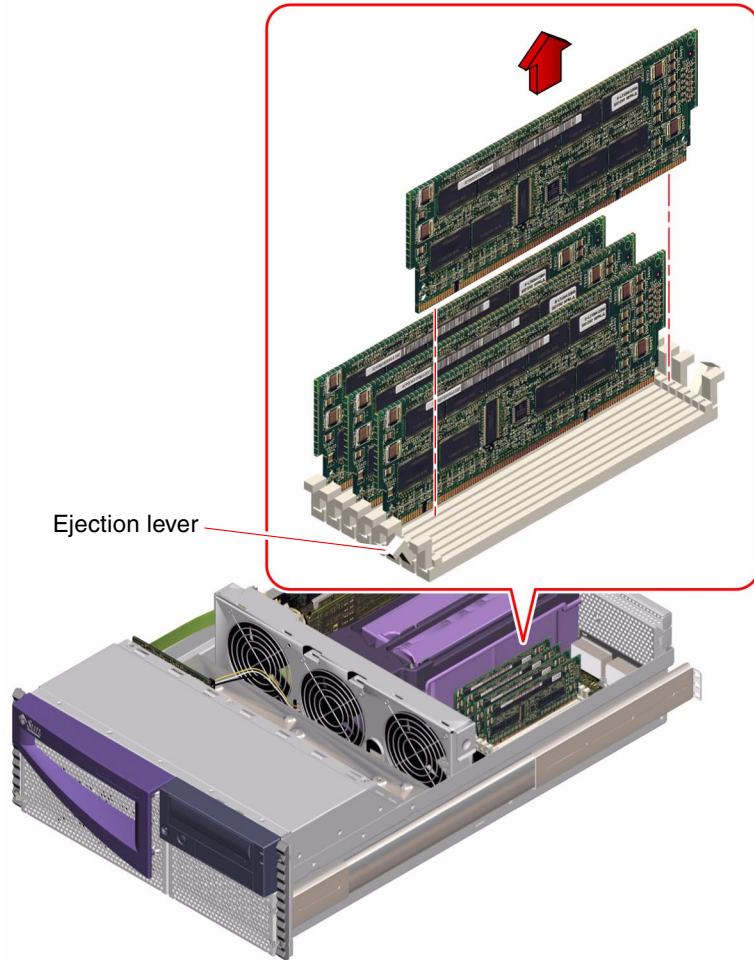
**Caution** – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static electricity from your clothes or work environment can destroy the DIMM. Do not remove any DIMM from its antistatic packaging until you are ready to install it. Handle the modules only by their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

---

## What to Do

1. **Locate the memory module(s) to be removed.**
2. **Press down the ejection lever at each end of the DIMM connector and eject the memory module from the socket.**

3. Grasp the top corners of the memory module and pull it up and out of its socket.



4. Place the module on an antistatic mat.
5. Repeat Step 1 through Step 4 for each memory module being removed.

## What Next

To install a memory module, complete this task:

- “How to Install a Memory Module” on page 46

---

# How to Install a Memory Module

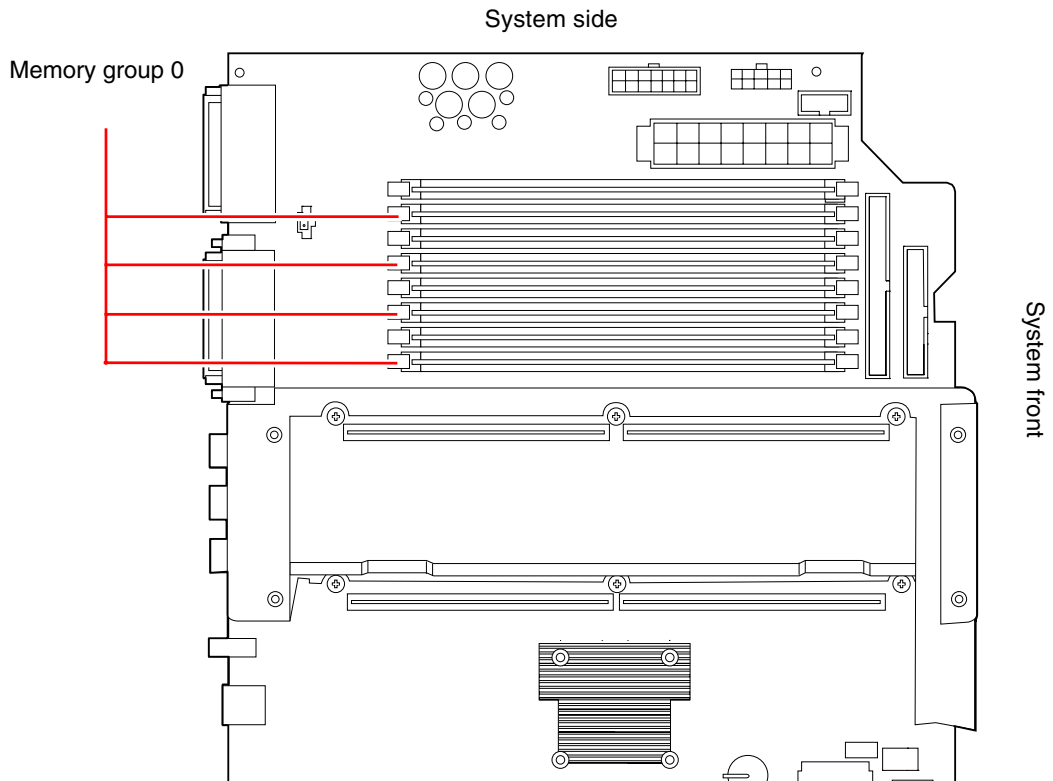
Memory modules for this system are next generation dual inline memory modules (DIMMs). Each DIMM group must contain four DIMMs of equal density (for example, four 128-Mbyte DIMMs installed in group 0, or four 128-Mbyte DIMMs installed in group 1). Supported DIMM configuration options are 128, 256, 512, and 1024 Mbytes. See the *Sun Fire 280R Server Owner's Guide* for more information.

## Configuration Rules

The following memory configuration rules apply to your system:

- At least one memory group (all four slots in either group 0 or group 1) must be filled for the system to boot.
- DIMMs must be added four at a time within the same group.
- DIMM capacities can differ from one group to the next; for example, you can install four 128-Mbyte DIMMs in group 0 and four 512-Mbyte DIMMs in group 1.

The following figure shows the location of the memory slots, with group 0 highlighted.



## Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35



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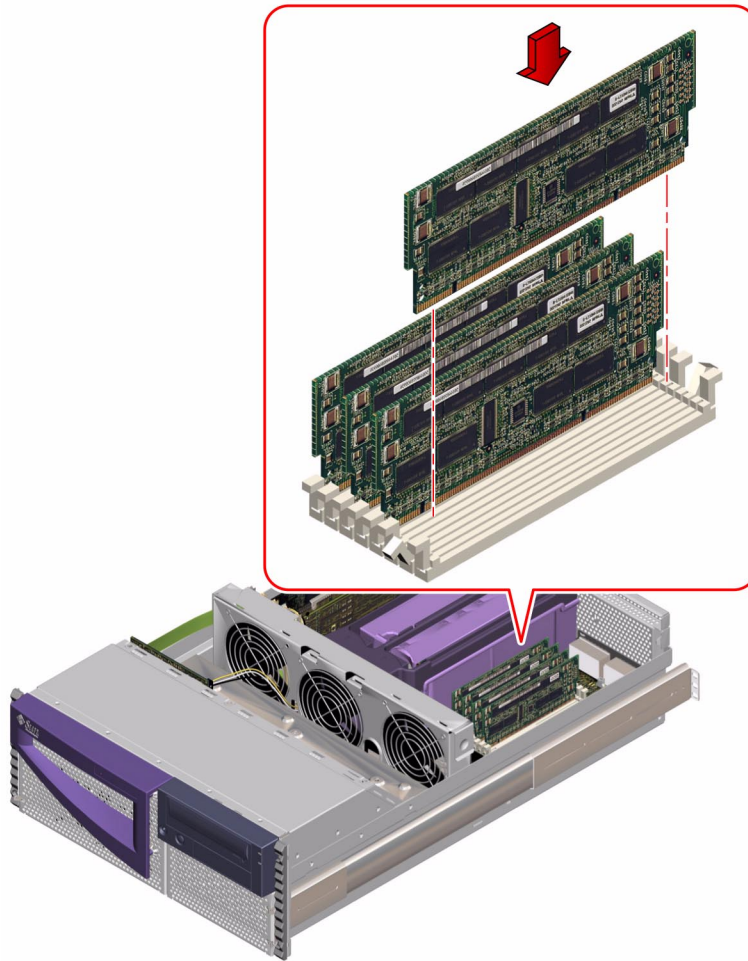
**Caution** – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static electricity from your clothes or work environment can destroy the DIMM. Do not remove a DIMM from its antistatic packaging until you are ready to install it. Handle the modules only by their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

---

## What to Do

1. **Remove the new memory module from its antistatic packaging.**
2. **Locate the socket into which you will install the module.**

3. **Align the notches in the module connector with the notches in the slot, until the module contacts the socket evenly along the socket's length.**



4. **Press down firmly on both corners of the module until the bottom edge is fully seated in the socket and the levers click into place.**  
You will hear a clicking sound when the module is fully seated.
5. **Repeat Step 1 through Step 4 for each module you want to install.**  
Make sure that you install modules in all four slots of group 0 or group 1.

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the new parts you have just installed. For additional information, see the following:

- “About OpenBoot Diagnostics Tests” on page 166

---

## How to Remove the RSC Card

### Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

### What to Do



---

**Caution** – The system supplies electricity to the Remote System Control (RSC) card even when the system is powered off. To avoid personal injury or damage to the RSC card, you must disconnect the AC power cord(s) before servicing the RSC card.

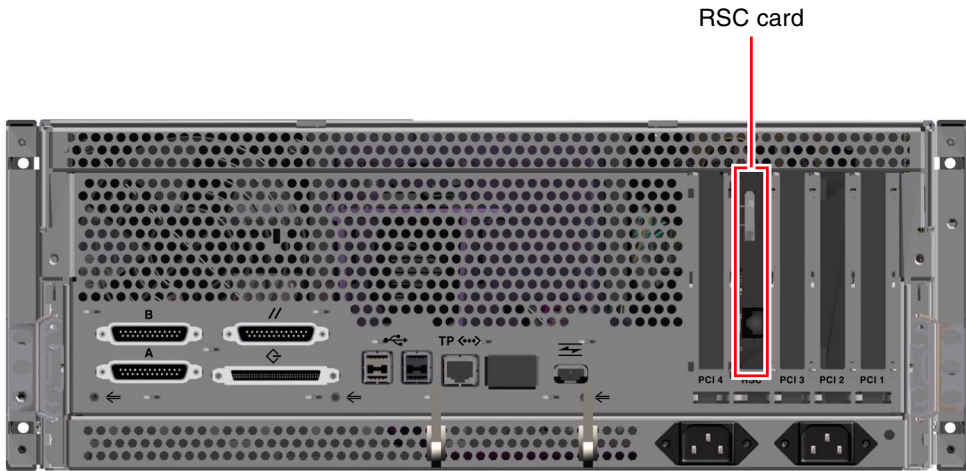
---

1. **Disconnect the AC power cord(s) from the back of the system.**



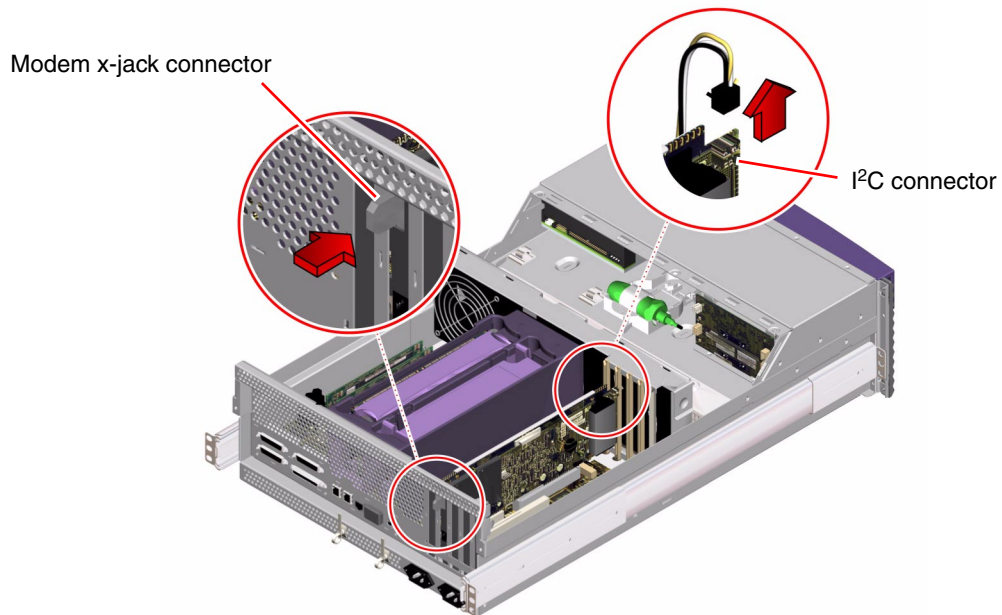
**2. Locate the RSC card.**

The RSC card is installed in the fourth slot from the edge of the main logic board; it is labeled “RSC” on the back panel.



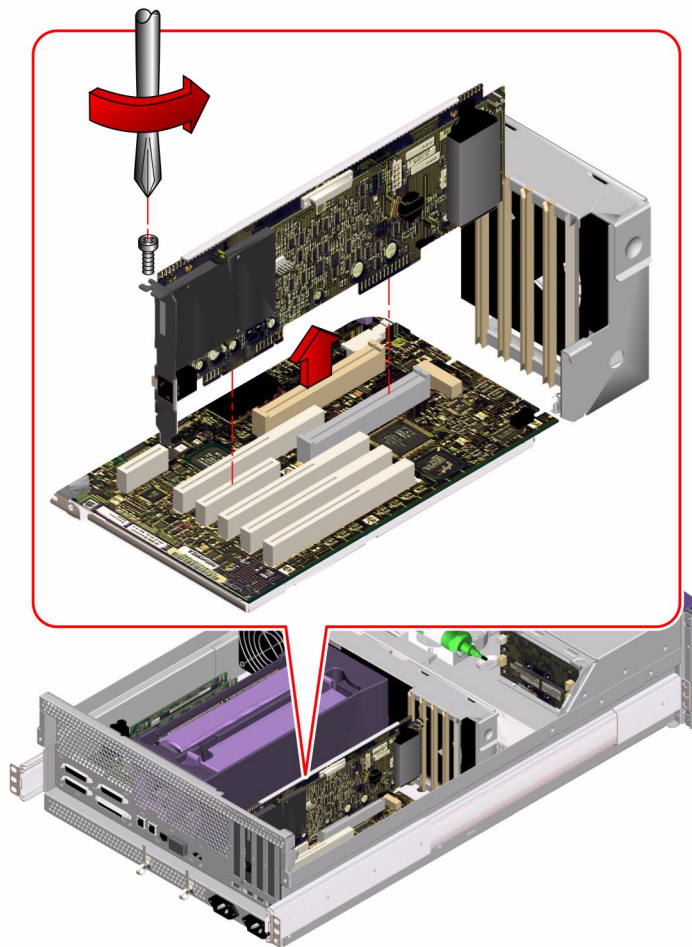
**3. Disconnect any external cable(s) attached to the faceplate of the RSC card.**

4. Push the modem x-jack connector back into the RSC card faceplate.



5. Locate the I<sup>2</sup>C cable connected to the RSC internal connector.
6. Press the release clip on the I<sup>2</sup>C cable connector and remove the cable from the RSC card.
7. Drape the I<sup>2</sup>C cable over the air guide and out of the way.

- Using a Phillips No. 2 screwdriver, remove the screw that secures the card to the chassis back panel.



- Pull the RSC card from its slot.



---

**Caution** – Do not apply excessive force to one end or one side of the board. Doing so could damage the card.

---



---

**Caution** – Be sure that the modem connector is fully retracted.

---

Hold the RSC card by the faceplate and its opposite edge, and pull up while rocking the card from end to end until it is freed from its slot.

10. Place the RSC card on an antistatic mat.

## What Next

To replace the RSC card, complete this task:

- “How to Replace the RSC Card” on page 54

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# How to Replace the RSC Card



---

**Caution** – Before replacing the RSC card, be sure that the AC power cords have been disconnected from the back panel.

---

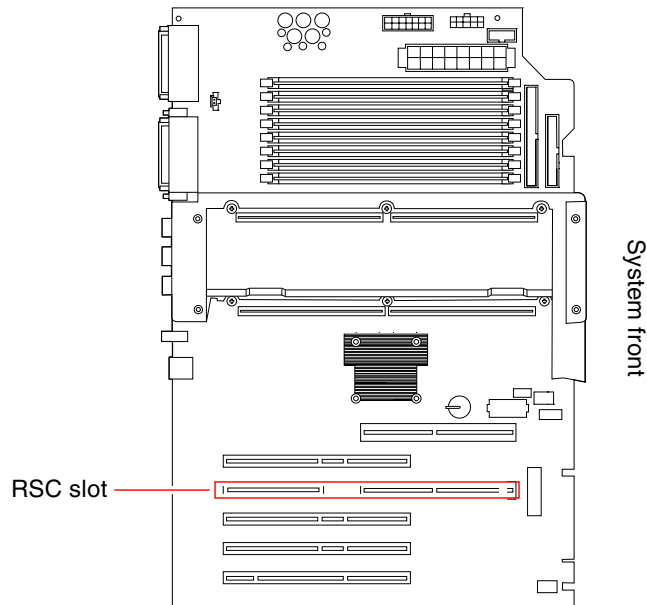
## Before You Begin

Complete this task:

- “How to Remove the RSC Card” on page 50

# What to Do

1. Locate the slot for the RSC card, the fourth slot from the edge of the main logic board.



---

**Note** – Make sure to install the RSC card in the RSC slot. Though the RSC card can physically fit in a PCI slot, it will not function if installed there.

---

2. Insert the RSC card into its slot on the main logic board.

---

**Note** – Be sure that the modem x-jack connector is fully retracted.

---

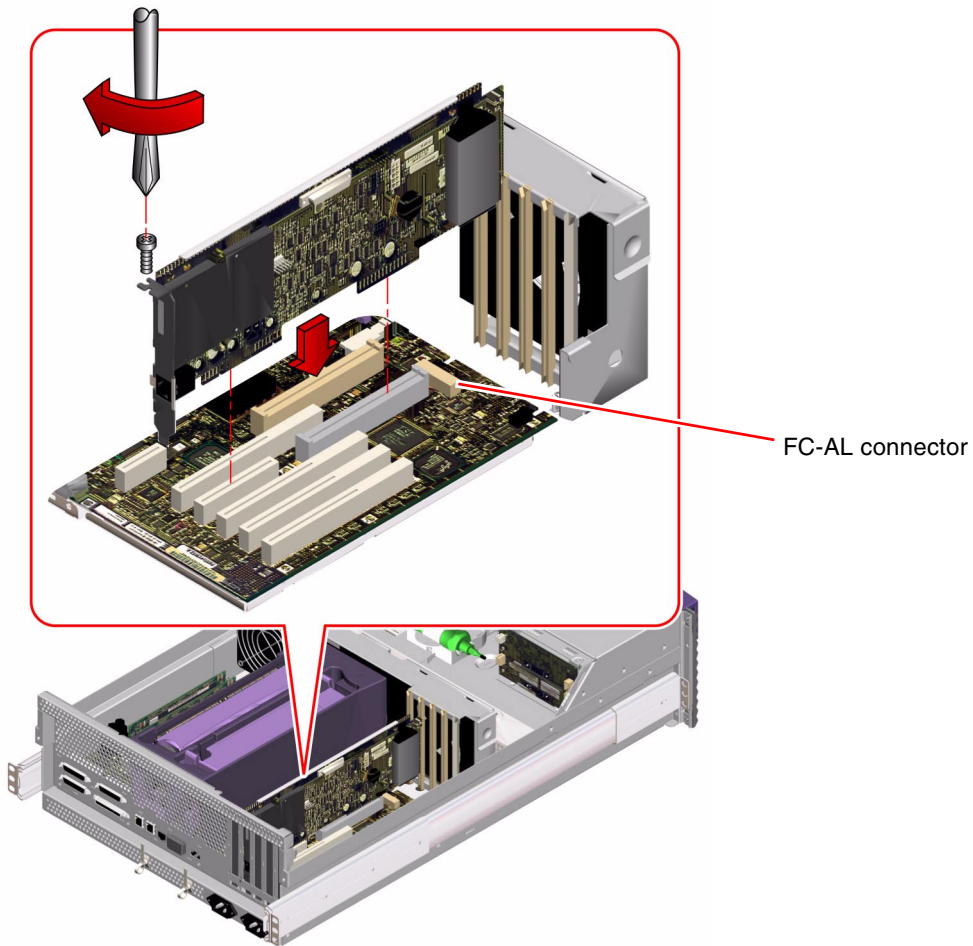
- a. Insert the faceplate end of the card into the appropriate opening in the back panel.
- b. Insert the opposite end of the card into the appropriate fan bracket card guide so that the card is aligned evenly with the connectors on the main logic board.



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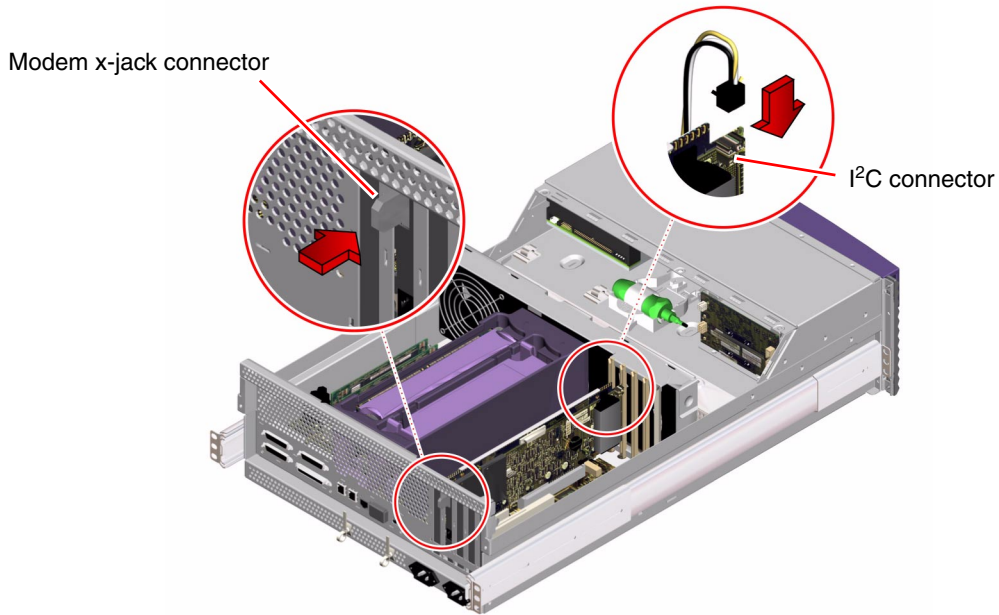
**Caution** – The Fibre Channel-Arbitrated Loop (FC-AL) cable is connected to the main logic board directly underneath the RSC card. When you perform the following step, be careful not to press so hard on the RSC card that you loosen the FC-AL cable’s connection to the main logic board.

---



- c. Push the card into the connectors on the main logic board.  
Apply even pressure along the edge of the card.
3. Secure the RSC card faceplate to the back panel with the Phillips screw.

4. Connect the I<sup>2</sup>C cable to the RSC card's internal connector.



- a. Align the release clip on the I<sup>2</sup>C cable connector with the tab on the top of the RSC card's internal connector.
  - b. Slide the I<sup>2</sup>C cable connector into the RSC card connector until it catches.
5. Connect the Ethernet and/or modem cable to the faceplate of the RSC card.
  6. Reconnect the AC power cord(s) to the back of the system.

## What Next

To reassemble the system, complete this task:

- "How to Replace the System Cover" on page 33

---

# How to Remove a PCI Card

## Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35

## What to Do

1. **Disconnect any external cable(s) attached to the faceplate of the PCI card.**
2. **Disconnect any cables connected to the PCI internal connectors.**
3. **Using a Phillips No. 2 screwdriver, remove the screw that secures the card to the chassis back panel.**

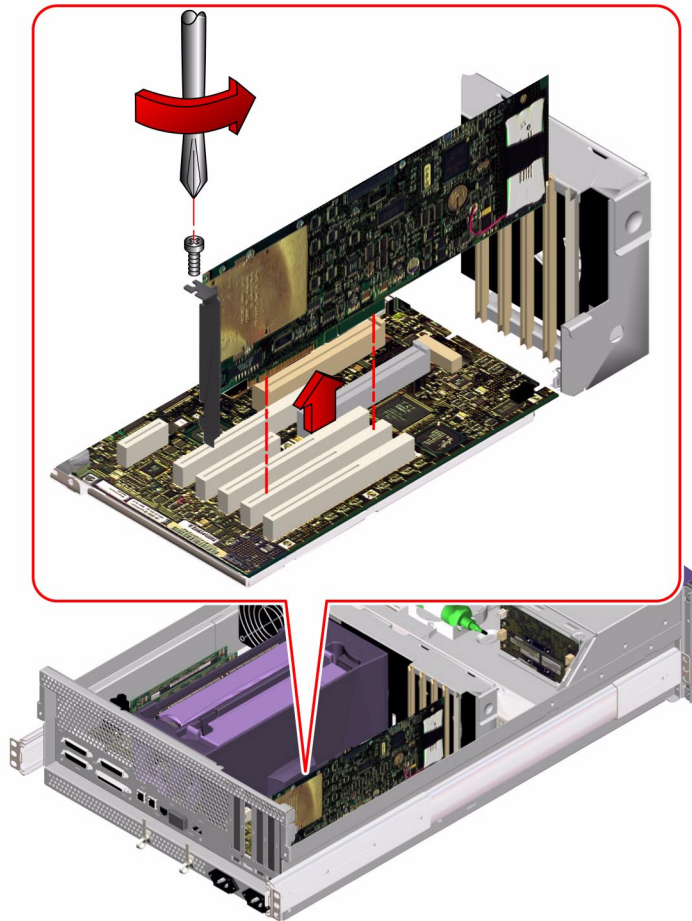




---

**Caution** – Do not apply excessive force to one end or one side of the card. Doing so could damage the card.

---



**4. Pull the PCI card from its slot.**

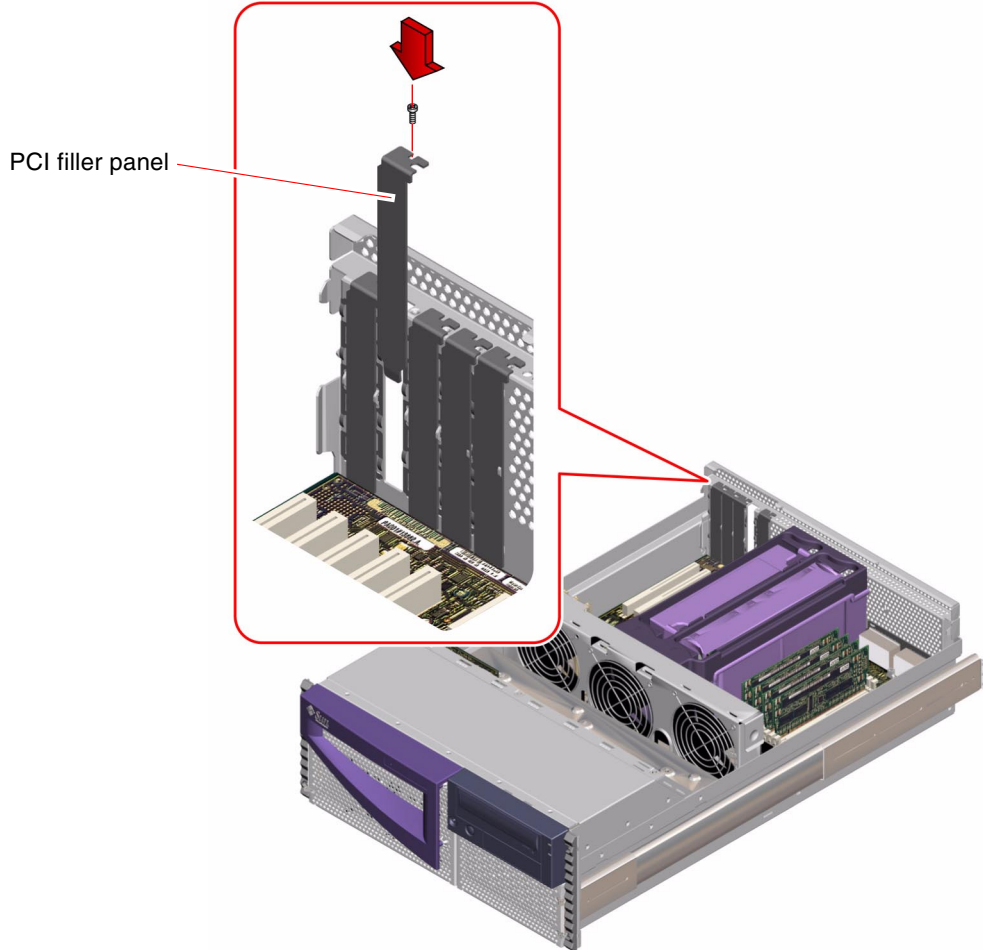
Hold the card by the faceplate and its opposite edge, and pull up while rocking the card from end to end until it is freed from its slot.

**5. Place the PCI card on an antistatic mat.**

**6. If you are not replacing the PCI card, cover the vacated space with a PCI filler panel.**

- a. Slide the filler panel into the appropriate slot.

- b. Replace the Phillips screw that secures the filler panel to the chassis back panel.



## What Next

To install a PCI card, complete this task:

- “How to Install a PCI Card” on page 61

# How to Install a PCI Card

## Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

Read the documentation supplied with the PCI card for information about jumper settings, PCI slot requirements, and cable connections.

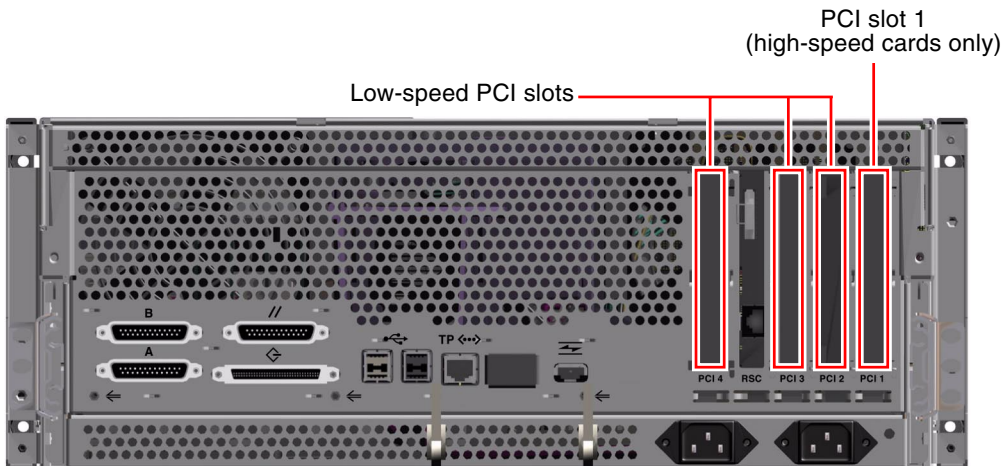
## What to Do

### 1. Locate an unused PCI slot.

---

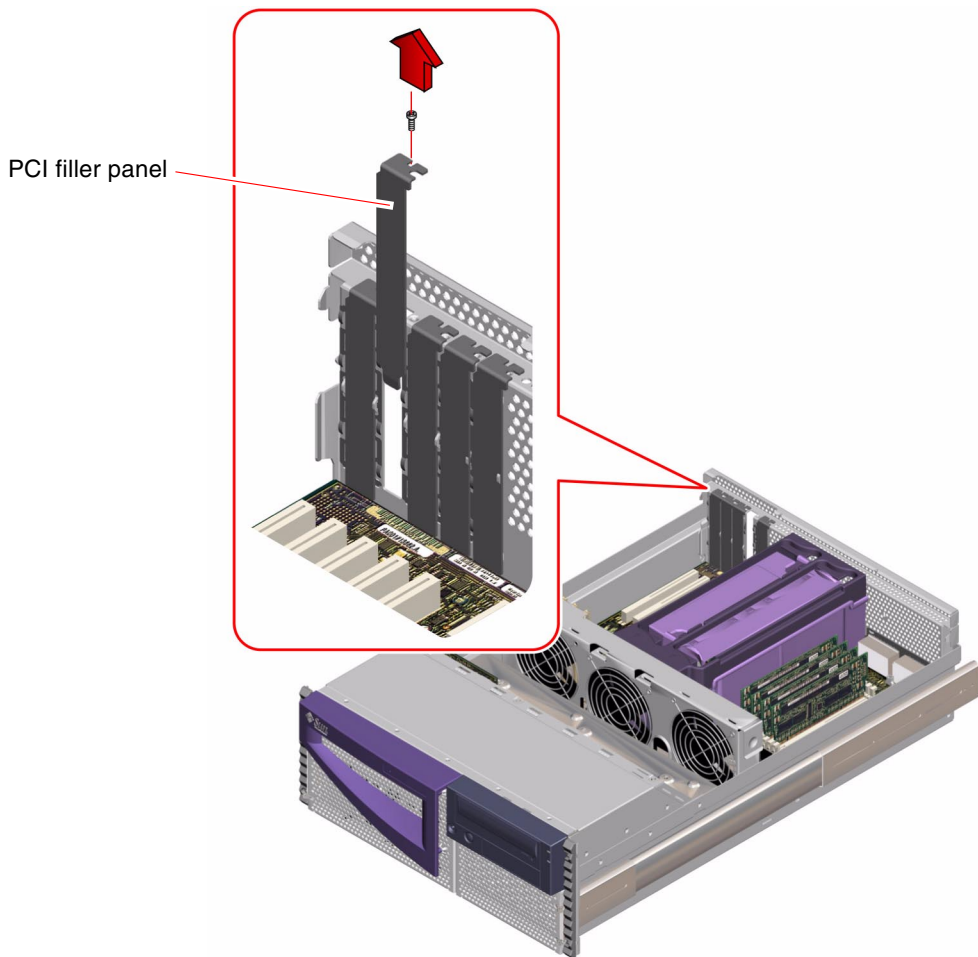
**Note** – PCI slot 1 is reserved for high-speed (66-MHz) cards. Installing a low-speed (33-MHz) card into PCI slot 1 will affect FC-AL performance. Do not install a low-speed card into PCI slot 1.

---

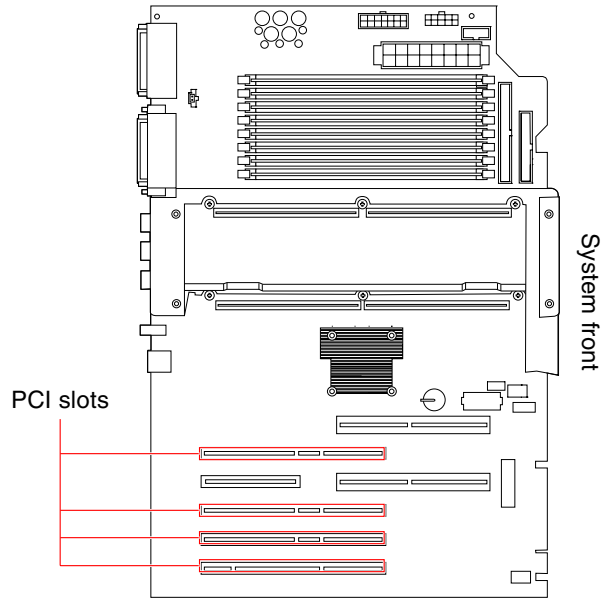


2. If you are installing a PCI card into an unused slot, remove the corresponding filler panel from the chassis back panel. Otherwise go to Step 3.

- a. Remove the Phillips screw that secures the PCI filler panel to the chassis back panel.
- b. Lift out the filler panel.

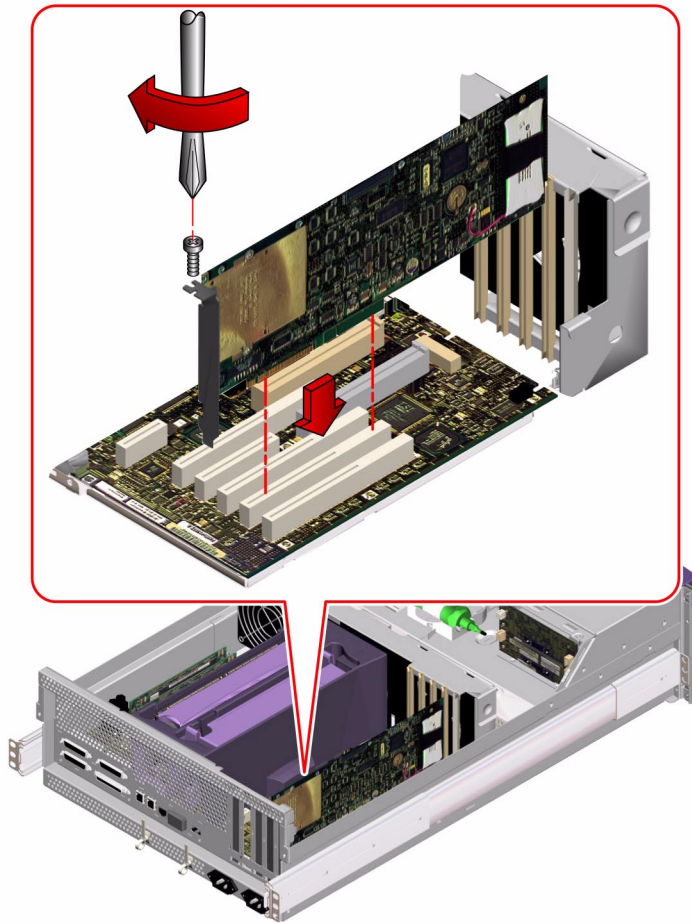


- 3. Insert the PCI card into the appropriate slot on the main logic board.**  
There are four PCI slots on the main logic board.



- a. Insert the faceplate end of the card into the appropriate opening in the back panel.**  
If you are installing a PCI long card, guide the opposite end of the PCI card into the card slot on the fan tray assembly.

- b. Push the card into the corresponding connector on the main logic board.  
Apply even pressure along the edge of the card.



---

**Caution** – Do not apply excessive force to one end or one side of the card. Doing so could damage the card.

---

4. Secure the PCI card faceplate to the back panel with the Phillips screw.
5. If necessary, connect any internal cables to the PCI card's internal connectors.
6. If necessary, connect any external cables to the PCI card.

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the new parts you have just installed. For additional information, see:

- “About OpenBoot Diagnostics Tests” on page 166

You must also perform a reconfiguration boot so that your system is able to recognize the new PCI card. For additional information, see:

- “How to Initiate a Reconfiguration Boot” on page 12

---

## How to Remove a CPU Module

### Before You Begin

Complete these tasks:

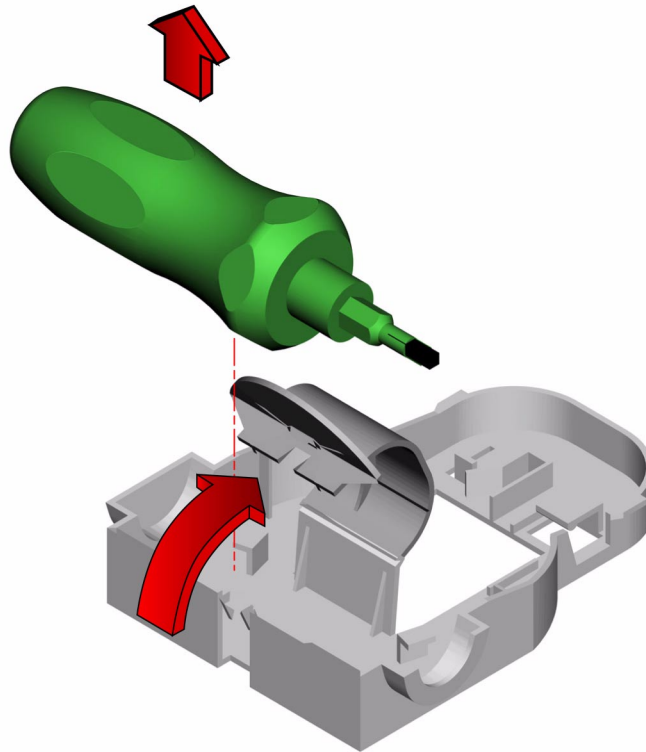
- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the Air Guide” on page 79

### What to Do

- 1. Locate the CPU module to be removed from the main logic board.**

For information about the CPU module location, see “How to Install a CPU Module” on page 69.

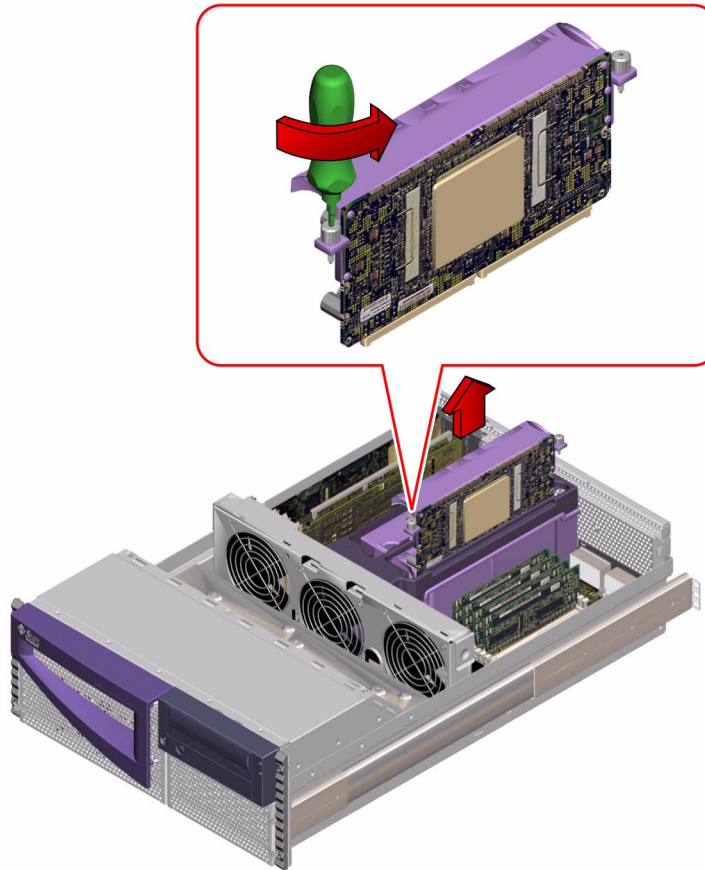
2. Remove the torque screwdriver mounted to the inside of the chassis.





**3. Loosen the two captive torque screws on either side of the CPU module.**

Alternately unscrew each side one full turn until the screws are loose enough to turn with your fingers.



**4. Continue loosening both screws with your fingers until you can lift the CPU module out of its bracket.**

**5. Pull the CPU module up from the main logic board to disengage the module from its main logic board connector.**

Place a finger under the lip on each side of the CPU module and gently lift the module up and away from the main logic board.

**6. Slide the CPU module out of the bracket.**



---

**Caution** – Do not touch the electrical contacts on the CPU module or the main logic board. They are very delicate and can be damaged easily.

---

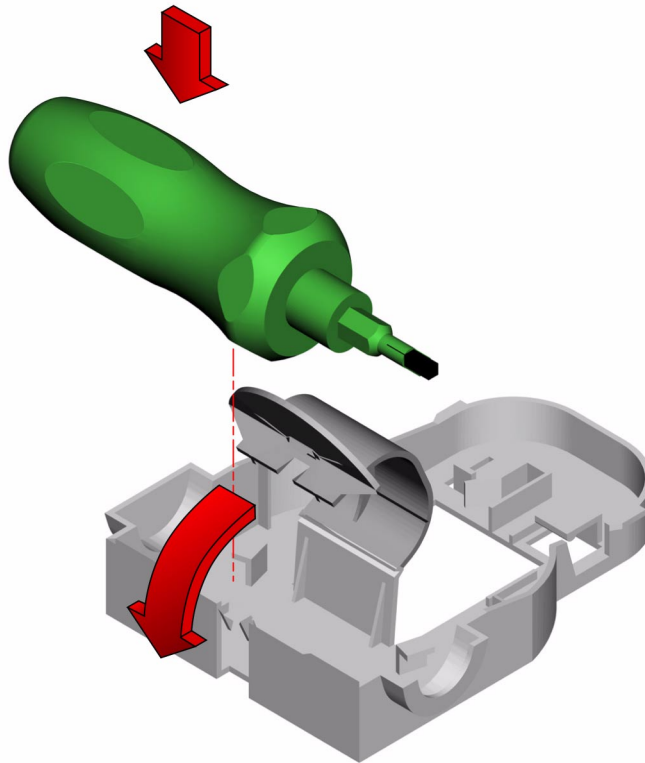
7. Place the module on an antistatic mat.

---

**Note** – If you plan to restart the system with only one CPU module installed, make sure the remaining CPU module is installed in CPU slot 0. The system will not boot without a CPU module in slot 0.

---

8. Mount the torque screwdriver into its holder inside the chassis.



## What Next

To install a CPU module, complete this task:

- “How to Install a CPU Module” on page 69

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# How to Install a CPU Module

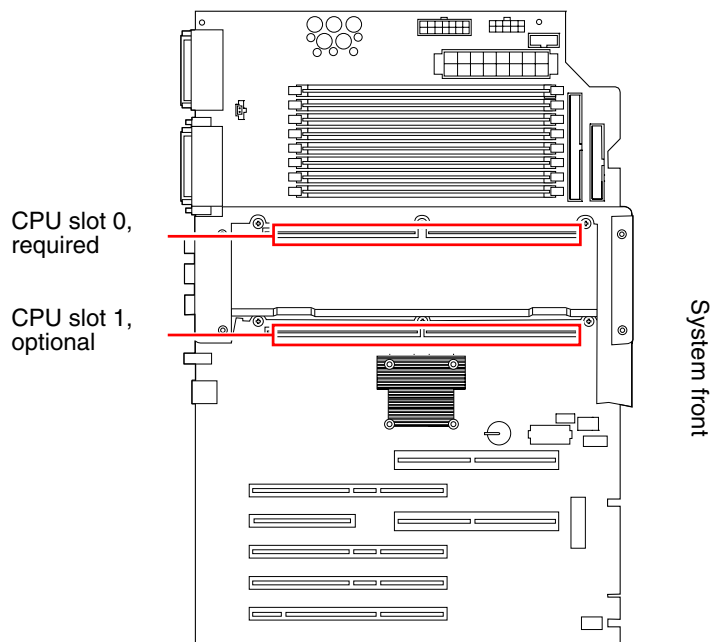
## Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

The system supports one and two CPU module configurations. When replacing or installing CPU modules, you must fill the CPU slots in the following order.

<b>System Configuration</b>	<b>Main Logic Board CPU Slot</b>
One CPU	CPU slot 0
Two CPUs	CPU slots 0 and 1



For more information about CPU modules, see your *Sun Enterprise Sun Fire 280R Server Owner's Guide*.

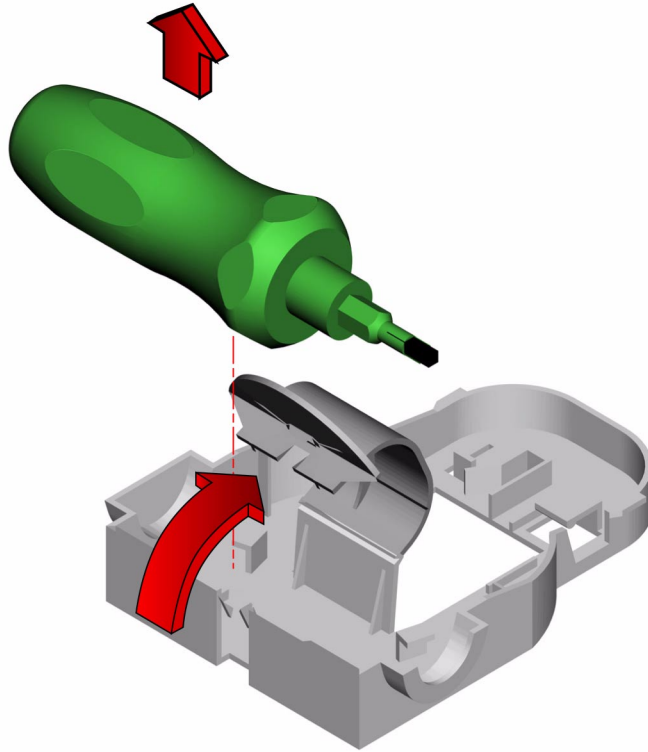
## What to Do

1. **Locate the appropriate slot for the CPU module that you are installing into the CPU card cage on the main logic board.**

If you are installing a CPU module into CPU slot 1, remove the CPU filler panel if one is installed.

2. **Align the CPU module with the slot in the CPU card cage, ensuring that the screws (one on each side of the module) are aligned with the screw holes in the top of the CPU card cage.**
3. **Slide the CPU module evenly into the slot in the CPU card cage until the module touches the socket on the main logic board.**

4. Remove the torque screwdriver mounted to the inside of the chassis.



5. Using the torque screwdriver, tighten the captive screws alternately one-half turn until the screws are tightened.

The torque screwdriver will “pop” when you reach the correct torque setting on the CPU module mounting screws.

---

**Note** – You can also use an adjustable torque screwdriver set at 5 in-lbs.

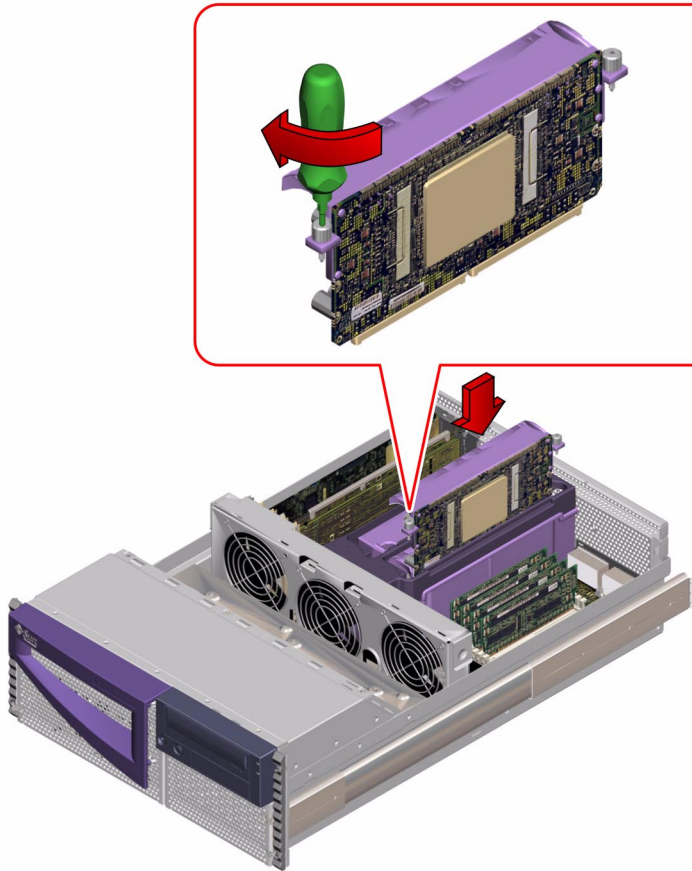
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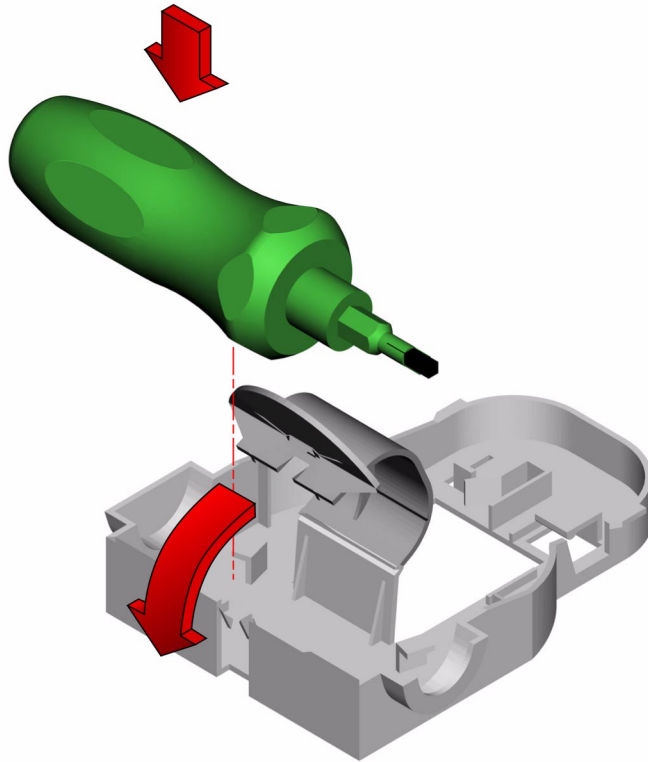
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**Caution** – If you overtighten the captive screws, you can severely damage the main logic board. If you undertighten the captive screws, you may cause a loss of continuity and the system may fail to start. Use the torque screwdriver supplied with the CPU module to tighten the screws the correct amount.

---



6. Mount the torque screwdriver into its holder inside the chassis.



## What Next

To reassemble the system, complete these tasks:

- “How to Replace the Air Guide” on page 81
- “How to Replace the System Cover” on page 33

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the new parts you have just installed. For additional information, see:

- “About OpenBoot Diagnostics Tests” on page 166

---

# How to Remove the ID SEEPR0M Module

There are two serially electrically erasable and programmable read-only memory (SEEPR0M) modules on the main logic board. One SEEPR0M contains data about the main logic board itself; this data is used by the RSC software for diagnostic purposes and cannot be removed from the board. (For more information about using the RSC software, see the RSC documentation and the *Sun Fire 280R Server Owner's Guide*.) The other SEEPR0M contains the system host identification (ID) and Ethernet address, and is removable.

This section explains how to remove a functioning ID SEEPR0M module so that you can install it on a new main logic board, thereby preserving the system's host ID information. If you are replacing a defective ID SEEPR0M module and want to retain the same host ID, consult your authorized Sun sales representative or service provider for assistance with programming the new ID SEEPR0M module with the existing host ID and Ethernet address.

## Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35
- "How to Remove a PCI Card" on page 58

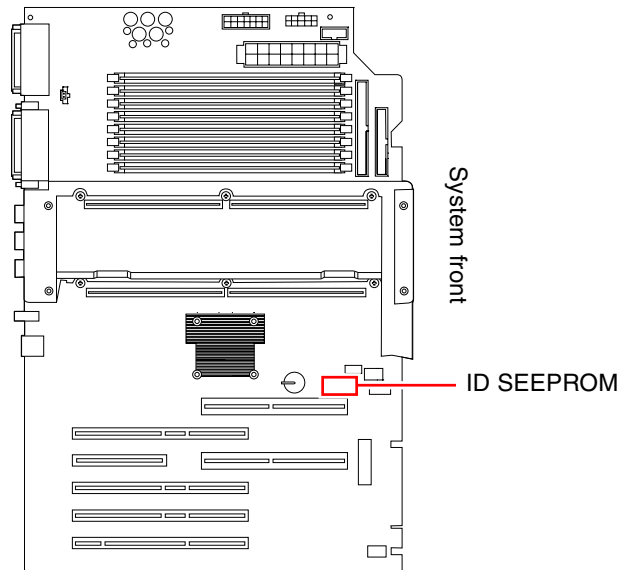
## What to Do

1. Remove the PCI card from PCI slot 4, if one is installed there.



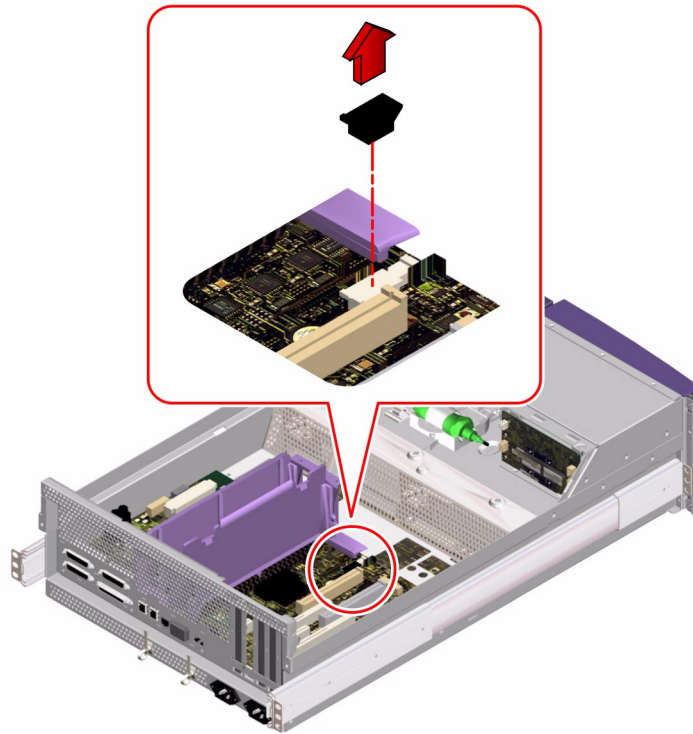
**2. Locate the ID SEEPROM module on the main logic board.**

The ID SEEPROM module is located between CPU slot 1 and PCI slot 4, toward the front of the main logic board.



**3. Grasp the ID SEEPROM module at each end and pull it straight up.**

If necessary, gently rock the ID SEEPROM module from side to side to facilitate removal.



**4. Place the ID SEEPROM module on an antistatic mat.**

## What Next

To replace the ID SEEPROM module, complete this task:

- “How to Replace the ID SEEPROM Module” on page 77

---

# How to Replace the ID SEEPROM Module

## Before You Begin

Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

---

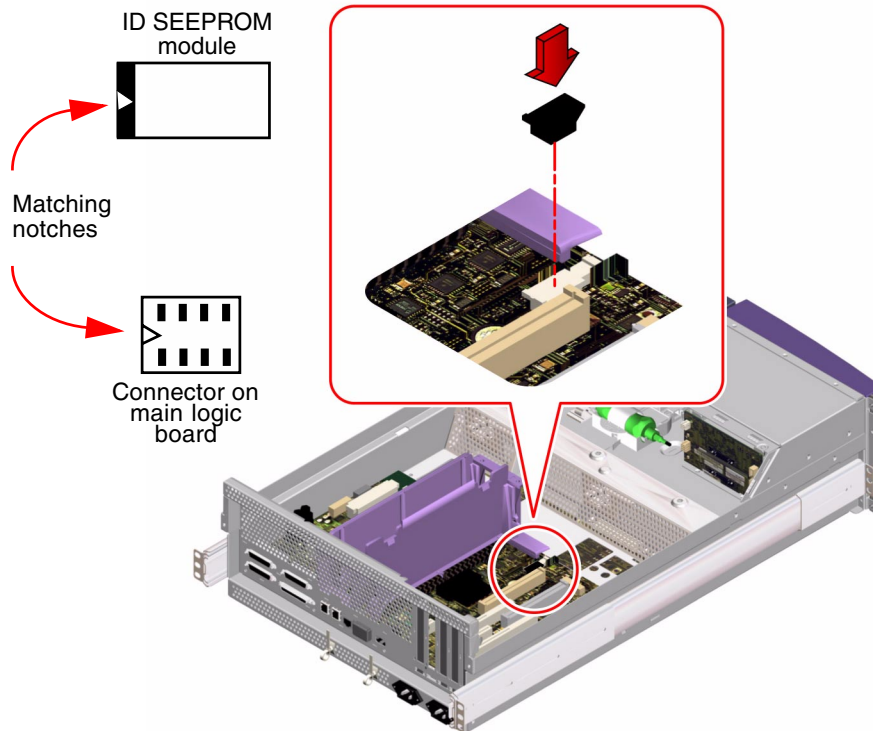
**Note** – If you are installing a new ID serially electrically erasable and programmable read-only memory (SEEPROM) module, it must be programmed by an authorized Sun service representative before your system can resume normal operation. If you are installing a new main logic board, remember that you can migrate your former ID SEEPROM module in order to preserve your system’s host ID and Ethernet address.

---

## What to Do

### 1. Insert the ID SEEPROM module into its socket on the main logic board.

Make sure that the notch on the ID SEEPROM module is on the same side as the notch on the connector on the main logic board.



### 2. Push down firmly on the ID SEEPROM module until it seats in its socket.

## What Next

To reassemble the system, complete these tasks:

- If you had to remove a PCI card from PCI slot 4, "How to Install a PCI Card" on page 61
- "How to Replace the System Cover" on page 33

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the new part you have just installed. For additional information, see:

- “About OpenBoot Diagnostics Tests” on page 166

If you changed the configuration of the system, perform a reconfiguration boot so that your system is able to recognize any new parts. For additional information, see:

- “How to Initiate a Reconfiguration Boot” on page 12

---

## How to Remove the Air Guide

### Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

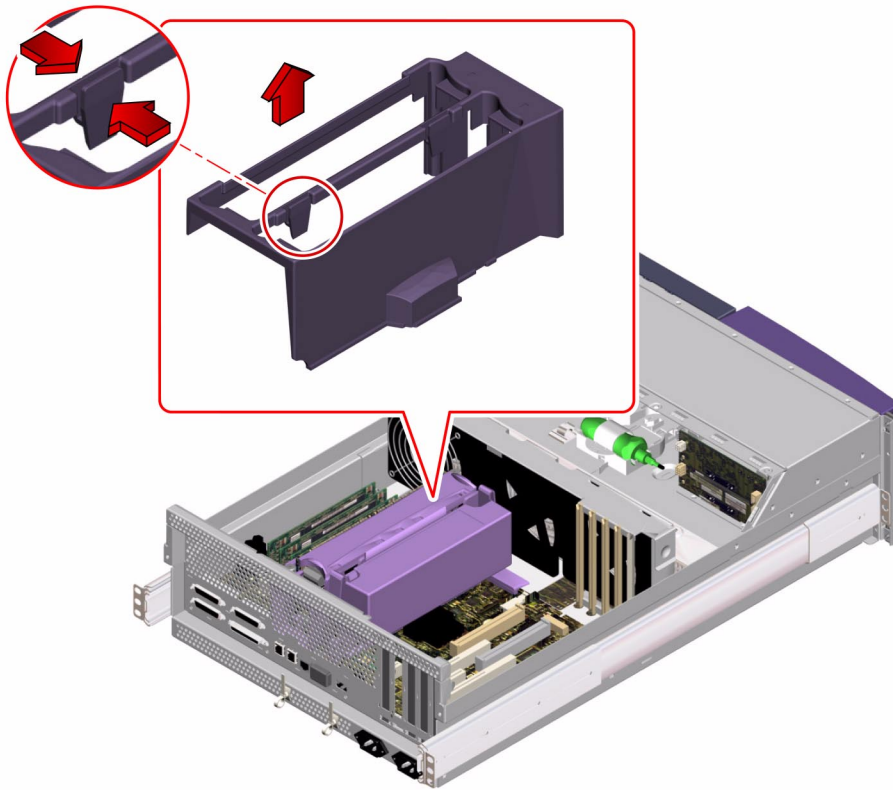
### What to Do

#### 1. **Locate the air guide.**

The air guide is the plastic enclosure that fits over the CPU module(s) and directs air from the center fan over the CPU module(s).

**2. Pinch the two tabs on the center divider of the air guide.**

This releases the air guide from the CPU module cage.



**3. Lift the air guide up from the CPU module cage and remove it from the system.**

## What Next

To replace the air guide, complete this task:

- “How to Replace the Air Guide” on page 81

---

# How to Replace the Air Guide

## Before You Begin

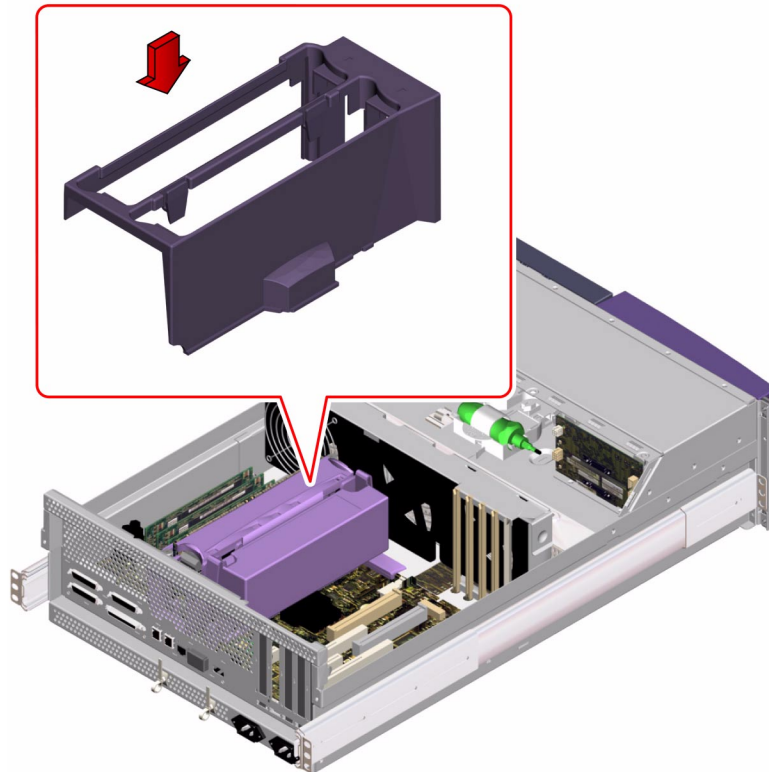
Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

1. **Position the air guide on the CPU module cage.**

Align the two tabs on the top of the air guide with the slots on the CPU card cage assembly.



2. **Press down on the air guide until it snaps into place.**

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33

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# How to Remove the Main Logic Board

## Before You Begin



---

**Caution** – Use an antistatic mat when working with the main logic board. An antistatic mat provides the cushioning required to protect under the board, to prevent the board from flexing, and to provide antistatic protection.

---



---

**Caution** – Perform this procedure on a workbench. Sun Microsystems does not support changing the main logic board while the system is installed in a rack.

---

The ID SEEPRM module contains the system host ID and Ethernet address. You can migrate your ID SEEPRM module from your old board to preserve your host ID and Ethernet address. However, if you are replacing the ID SEEPRM module and want to retain the same host ID and Ethernet address on the new main logic board, consult your authorized Sun service or sales representative. If you are removing the main logic board to access other components in the system, you do not need to remove the ID SEEPRM module.

Before you remove the main logic board, you must remove all removable components from it. You can then transfer the components to the new main logic board after you install it. Complete these tasks to remove the necessary components:

- “How to Power Off the System” on page 5
- “How to Remove the System From the Rack” on page 21
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove a Memory Module” on page 44
- “How to Remove the RSC Card” on page 50
- “How to Remove a PCI Card” on page 58
- “How to Remove the ID SEEPRM Module” on page 74
- “How to Remove a CPU Module” on page 65
- “How to Remove the Air Guide” on page 79





---

**Caution** – Do not remove components from the board after you have removed it from the chassis. Doing so can damage the main logic board.

---

## What to Do

---

**Note** – You should already have removed the system from the rack and placed it on a workbench with all the power cords disconnected.

---

**1. Disconnect the following internal cables from the main logic board.**

Press the tab on the cable connector to detach each cable.

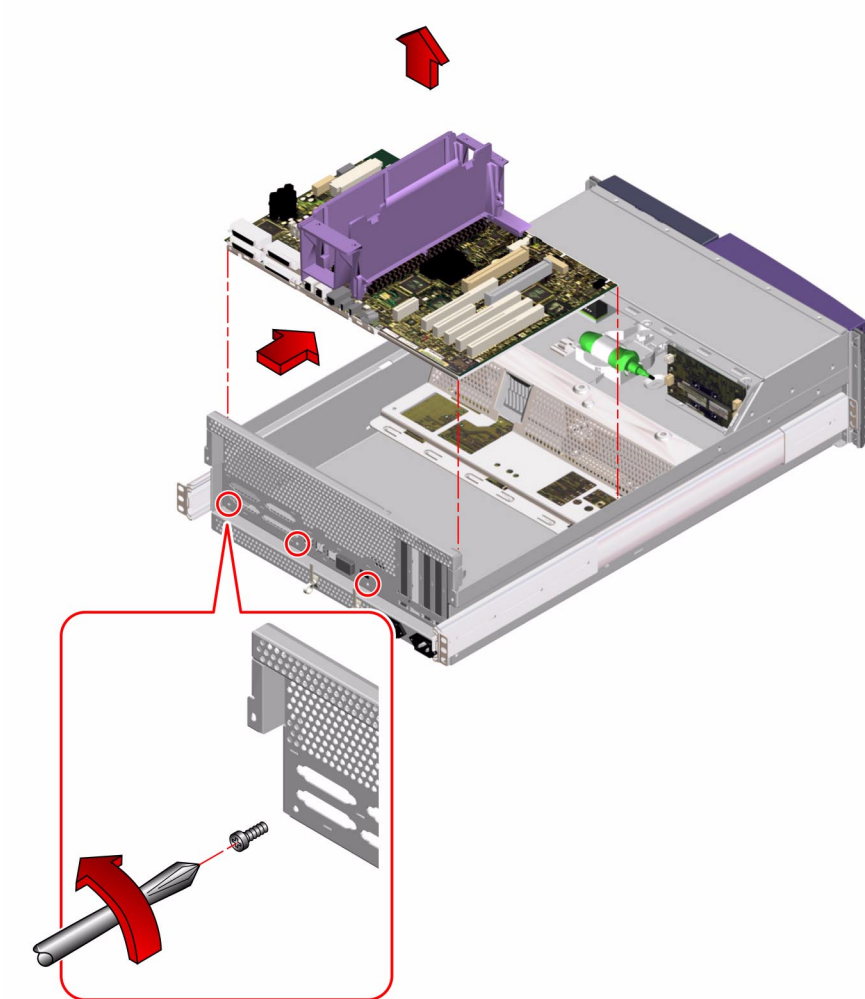
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**Note** – For information about cable connector locations, see “Main Logic Board Connectors” on page 128.

---

- a. **Disconnect the main power cables from J3601.**
  - b. **Disconnect the CPU power sense cable from J3603.**
  - c. **Disconnect the UltraSCSI data cable from J5002.**
  - d. **Disconnect the FC-AL data cable from J2901.**
  - e. **Disconnect the power interlock switch cable from J3602.**
- 2. Remove the three screws securing the main logic board to the chassis back panel.**  
Small arrows on the back panel point to the screws you must loosen.

3. Slide the main logic board away from the back panel until it clears the notched hold-down tabs.



4. Lift the main logic board out of the chassis.
5. Place the main logic board on an antistatic mat.
6. If you are replacing this main logic board, note the flash PROM jumper settings. You will need to make sure that the jumper settings on the new main logic board match the settings on the old main logic board. For more information, see "How to Set the Flash PROM Jumpers" on page 88.

## What Next

To replace the main logic board, complete this task:

- “How to Replace the Main Logic Board” on page 85

---

# How to Replace the Main Logic Board

## Before You Begin

You should have removed all removable components from the old main logic board before removing the board from the chassis. You can transfer the components to the replacement board after it is installed in the chassis. For more information, see:

- “How to Remove the Main Logic Board” on page 82



---

**Caution** – Use an antistatic mat when working with the main logic board. An antistatic mat provides the cushioning required to protect under the board, to prevent the board from flexing, and to provide antistatic protection.

---



---

**Caution** – Perform this procedure on a workbench. Sun Microsystems does not support changing the main logic board while the system is installed in a rack.

---



---

**Caution** – Do not attempt to install components on the main logic board while it is outside the chassis. Doing so can damage the main logic board.

---

Be sure to complete these tasks before starting the procedure:

- “How to Power Off the System” on page 5
- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

---

**Note** – You should already have removed the system from the rack and placed it on a workbench with all the power cords disconnected.

---



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**Caution** – Handle the main logic board by its backing panel or the edges only.

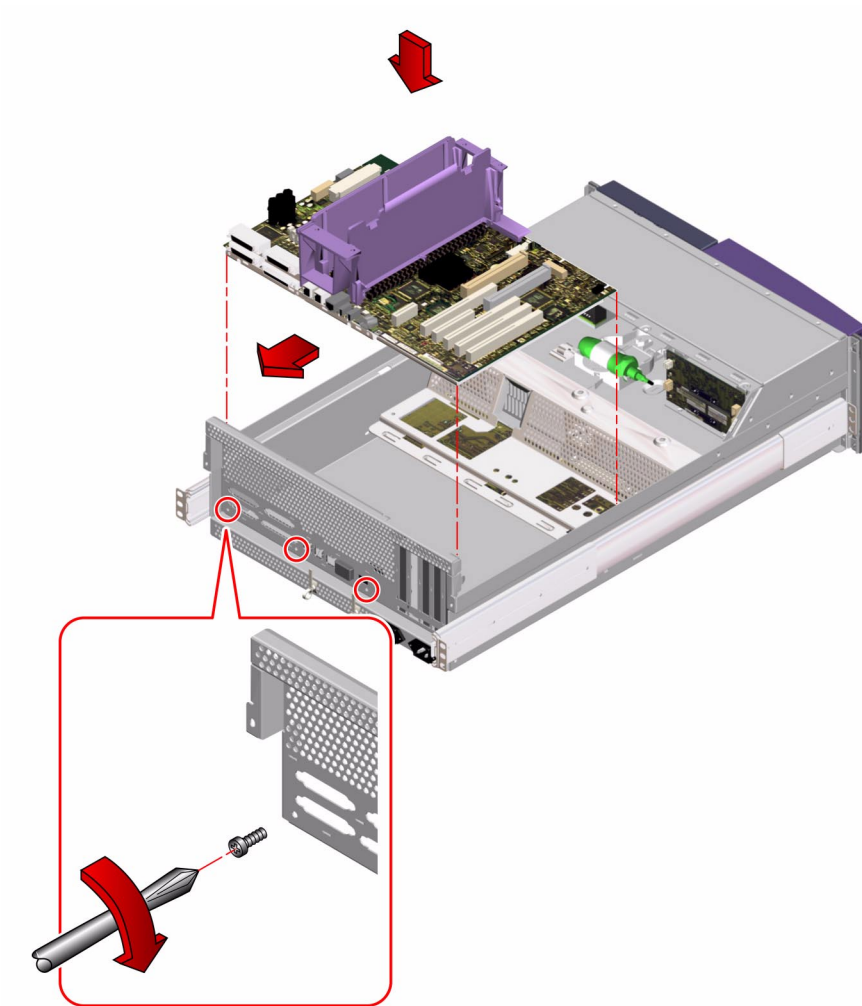
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1. Remove the main logic board from its antistatic packaging and place it on an antistatic mat.
2. Set the jumper settings on the replacement main logic board so that they match the jumper settings on the original main logic board.

See “How to Set the Flash PROM Jumpers” on page 88.

3. Position the replacement main logic board in the chassis.

Align the notches on the sides of the board with the corresponding tabs on the chassis.



**4. Slide the main logic board toward the back of the chassis.**

Ensure that each connector on the main logic board slides through the corresponding cutout in the chassis back panel.

**5. Replace the three screws securing the main logic board to the chassis back panel.**

**6. Connect the following internal cables to the main logic board.**

The connectors are keyed to connect in only one way.

---

**Note** – For information about cable connector locations, see “Main Logic Board Connectors” on page 128.

---

**a. Connect the main power cables at J3601.**

**b. Connect the power interlock switch cable at J3602**

**c. Connect the CPU power sense cable at J3603.**

**d. Connect the UltraSCSI data cable at J5002.**

**e. Connect the FC-AL data cable at J2901.**

## What Next

If you are keeping the old host ID, complete the following task:

- “How to Replace the ID EEPROM Module” on page 77

To reassemble the system, complete these tasks:

- “How to Replace the Air Guide” on page 81
- “How to Install a CPU Module” on page 69
- “How to Install a Memory Module” on page 46
- “How to Replace the RSC Card” on page 54
- “How to Install a PCI Card” on page 61
- “How to Replace the System Cover” on page 33
- “How to Place the System Into the Rack” on page 24

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the parts you have just installed.

For additional information, see:

- “About OpenBoot Diagnostics Tests” on page 166

If you changed the configuration of the system, perform a reconfiguration boot so that your system is able to recognize any new parts. For additional information, see:

- “How to Initiate a Reconfiguration Boot” on page 12

---

# How to Set the Flash PROM Jumpers

The system uses flash PROMs to permit the reprogramming of specific boot code blocks that are held in non-volatile system memory, and to permit remote reprogramming of that code by an authorized system administrator over a local area network. For more information about programming the flash PROM, see your *Sun Fire 280R Server Owner's Guide*.

Two jumpers, J2103 and J2104, on the main logic board are for reprogramming specific code blocks and remote programming of the flash PROM. The default shunt setting of J2103 is on pins 1 and 2. Placing a shunt on pins 2 and 3 enables reprogramming of the flash PROM.

## Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35

## What to Do

### 1. Locate the jumpers on the main logic board.

A main logic board jumper is identified by its jumper address, labeled on the board with the letter "J" followed by four numbers (Jxxxx). Jumper pins are located immediately adjacent to the jumper address. On the board, pin 1 is marked with an asterisk.

### 2. Set the main logic board jumpers J2103 and J2104.

Using long-nose pliers, place a shunt over the appropriate pins according to the following table.

Flash PROM jumper	A shunt on pins 1 and 2 selects	A shunt on pins 2 and 3 selects	The default shunt is on pins	Signal that is controlled
J2103	Write-protect	Write-enable	1 and 2	FLASH PROM PROG ENABLE
J2104	Disable flash	Enable flash	2 and 3	FLASH ENABLE



**Caution** – If you disable the flash PROM (J2104 on pins 1 + 2) the system will not boot. Keep J2104 on its default setting.

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33





## Removing and Installing Storage Devices

---

This chapter describes how to remove and install the system's storage and removable media devices. For a list of part numbers for field-replaceable units (FRUs) and optional equipment, see "Illustrated Parts Breakdown" on page 217.

The following tasks are covered in this chapter:

- "How to Remove a Disk Drive" on page 92
- "How to Install a Disk Drive" on page 94
- "How to Remove a Disk Drive Using the Hot-Plug Operation" on page 97
- "How to Install a Disk Drive Using the Hot-Plug Operation" on page 101
- "How to Remove the Removable Media Assembly" on page 104
- "How to Replace the Removable Media Assembly" on page 107
- "How to Remove a DVD-ROM or Tape Drive" on page 110
- "How to Install a DVD-ROM or Tape Drive" on page 111

---

# 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 you want to perform a hot-plug removal, see “How to Remove a Disk Drive Using the Hot-Plug Operation” on page 97.

## Before You Begin

For additional information on disk drives, see your *Sun Fire 280R Server Owner's Guide*.

Perform the following prerequisite task:

- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

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

See “How to Power Off the System” on page 5.

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

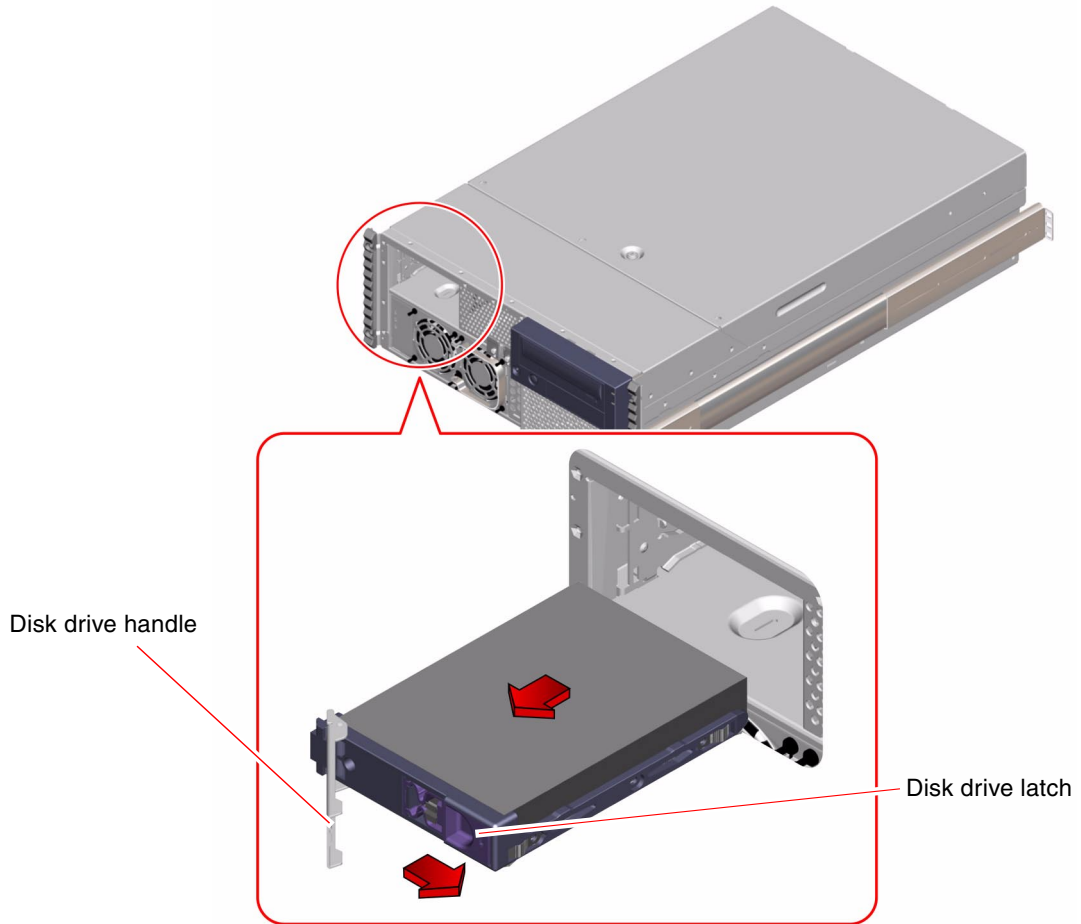
Turn the keyswitch to the Power-On/Off position. This unlocks the system front doors.

- 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 94

---

# How to Install a Disk Drive

This procedure describes the physical installation of a disk drive. 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 you want to perform a disk drive hot-plug installation, see “How to Install a Disk Drive Using the Hot-Plug Operation” on page 101.

## Before You Begin

For additional information on internal disk drives and configuring disk drive arrays, see your *Sun Fire 280R Server Owner's Guide*.

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

- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

1. **If you are not performing a hot-plug operation, halt the operating system and turn off system power.**

See “How to Power Off the System” on page 5.

---

**Note** – If you are performing a hot-plug operation, you must stop the drive and take it offline. See “How to Install a Disk Drive Using the Hot-Plug Operation” on page 101.

---

**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.**

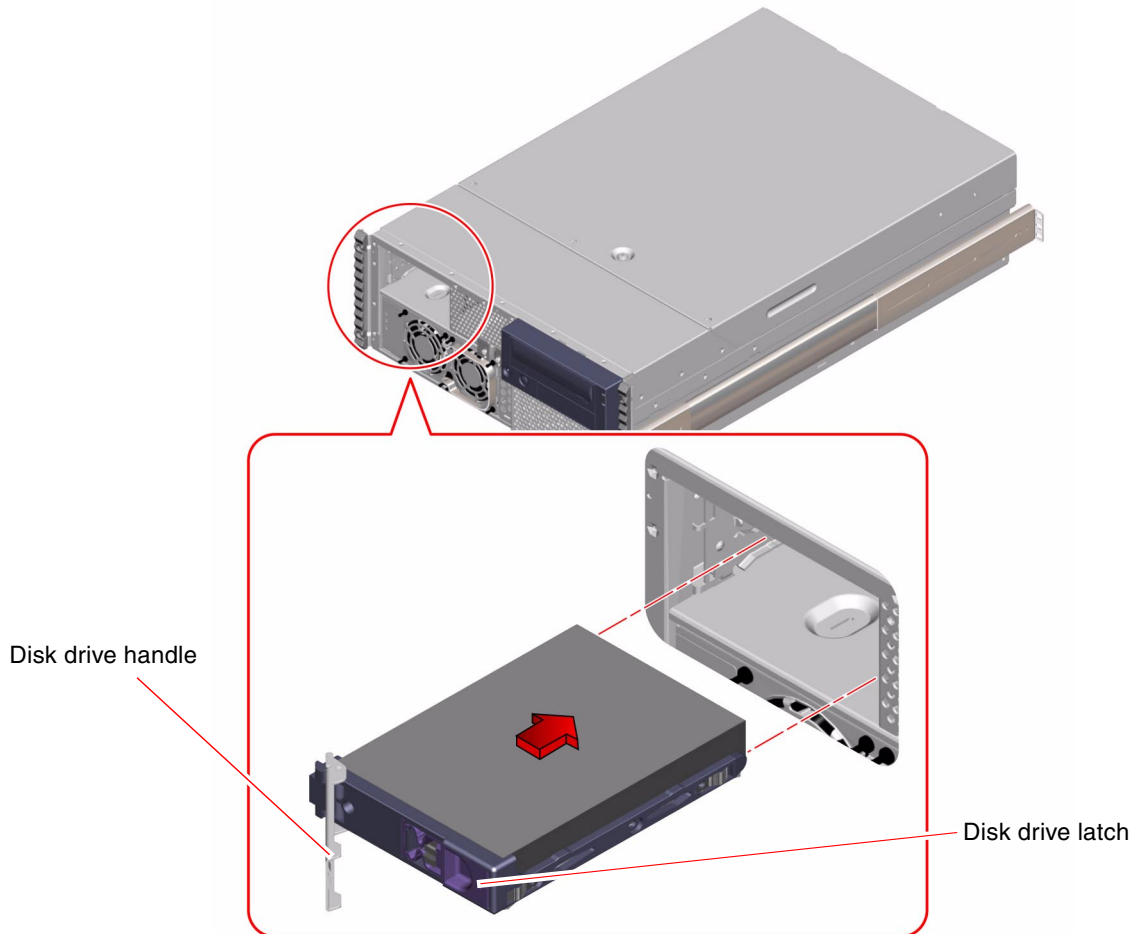
Orient the drive so that the drive handle's hinge faces the outside of the drive bay.

---

**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 6.

## 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 your *Sun Fire 280R Server Owner's Guide*.

If you need to remove a disk drive, see:

- “How to Remove a Disk Drive” on page 92

---

# 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 reconfigure 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 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:

- “About Communicating With the System” on page 37
- “How to Attach an Alphanumeric Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39

---

**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, but *not* the boot disk.

---

- Obtain the logical device name(s) for the device(s) you plan to remove. See your *Sun Fire 280R Server Owner's Guide* 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 35

## 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/ rdisk/ <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/ rdisk/ c1t1d0s2
Node WWN: 20000020371b1f31
Device Type: Disk device
Device Paths:
/dev/ rdisk/ 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/ rdisk/ c1t1d0s2.... Done
offlining: /dev/ rdisk/ 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 92. The system responds with the following message:

```
Hit <Return> after removing the device( s).
<date> <systemname> picld[87]: Device DISK1 removed
Device: /dev/ rdisk/ c1t1d0s2
No FC devices found. - /dev/ rdisk/ 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 101

---

# 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. 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:

- “About Communicating With the System” on page 37
- “How to Attach an Alphanumeric Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39

---

**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, but *not* the boot disk.

---

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

- “How to Avoid Electrostatic Discharge” on page 35

# 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 94. 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 entering 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 97.

---

# How to Remove the Removable Media Assembly

---

**Note** – The removable media assembly (RMA) can include a DVD-ROM drive or 4-mm tape drive.

---

## Before You Begin

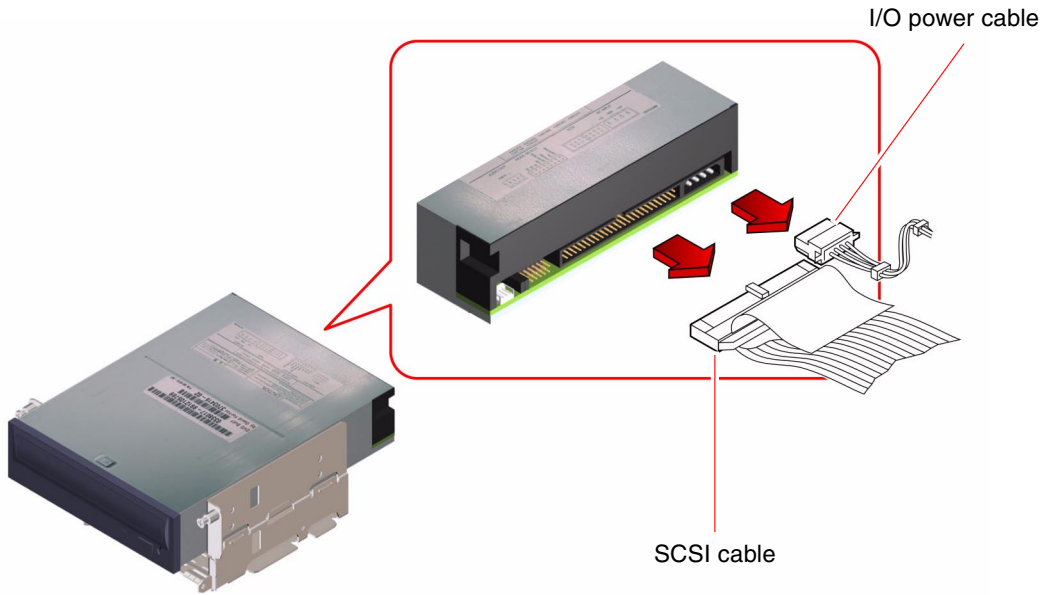
Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

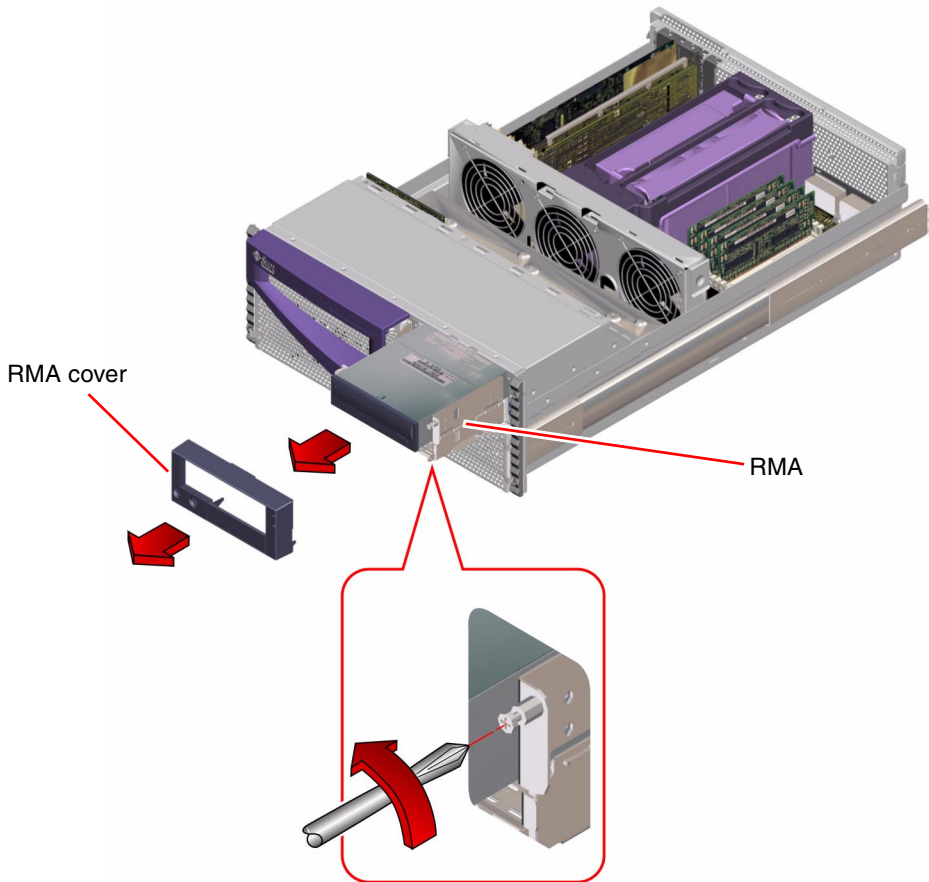
1. **Disconnect the I/O power cable from the removable media power connector.**  
See the illustration in Step 3 for the location of the RMA in the system.

2. Disconnect the removable media SCSI cable from the removable media SCSI connector.



**3. Pull off the plastic cover from the front of the RMA.**

Press down on the top of the plastic cover with your fingers until the tab on the top of the cover disengages from the chassis.



**4. Loosen the two captive Phillips screws securing the RMA to the chassis.**

**5. Slide the RMA out of the chassis.**

**6. Place the assembly on an antistatic mat.**



## What Next

For information about removing drives from, or installing drives into the RMA, see:

- “How to Remove a DVD-ROM or Tape Drive” on page 110
- “How to Install a DVD-ROM or Tape Drive” on page 111

To replace the removable media assembly, complete this task:

- “How to Replace the Removable Media Assembly” on page 107

---

# How to Replace the Removable Media Assembly

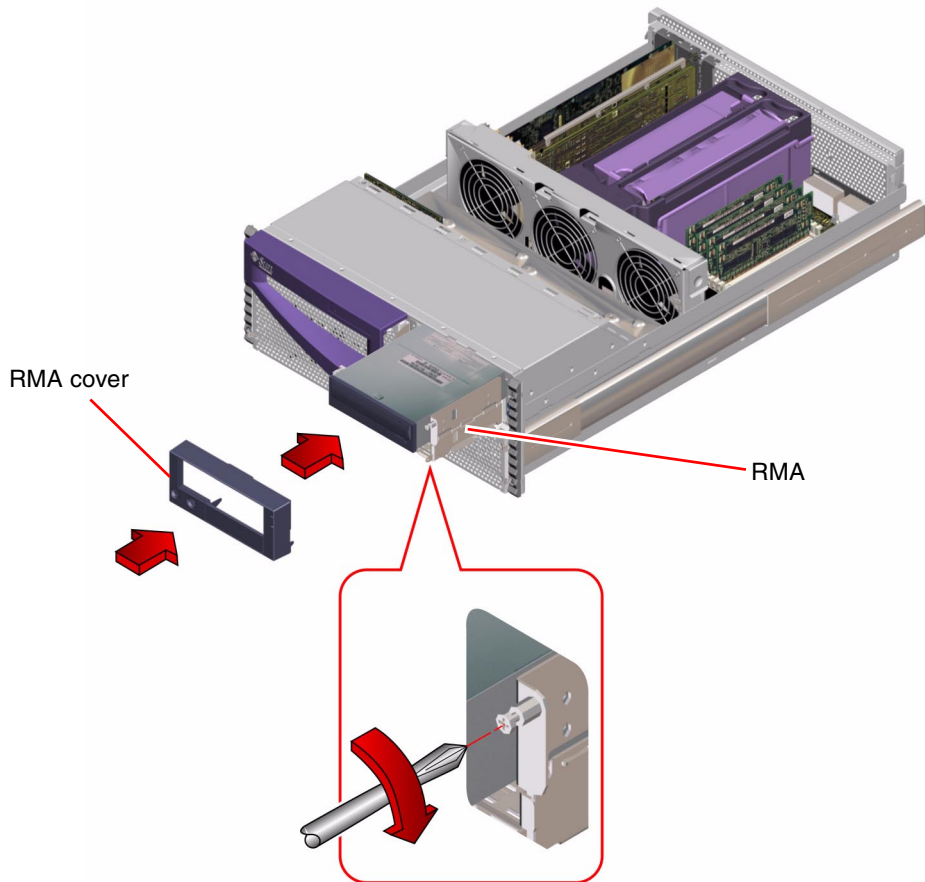
## Before You Begin

Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

# What to Do

1. Slide the removable media assembly (RMA) into the chassis.



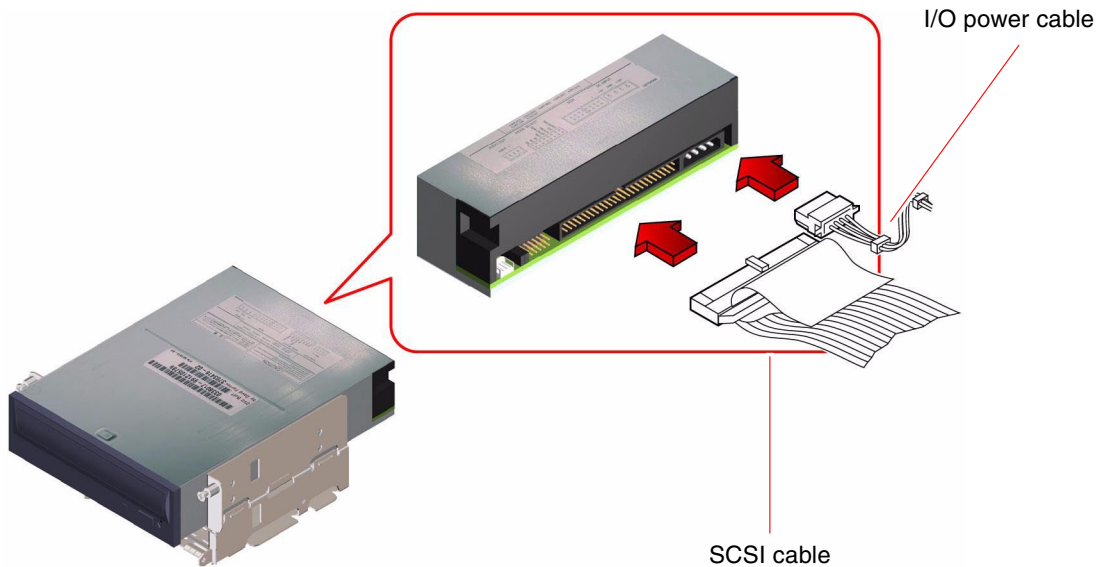
2. Tighten the two captive Phillips screws securing the RMA to the chassis.
3. If necessary, install one or more plastic filler panels into any empty drive bay openings in the RMA plastic cover.  
Align the filler panel with its opening and press it into place.

**4. Replace the RMA plastic cover.**

Align the two posts on the bottom of the cover with the corresponding holes at the front of the chassis, and align the tab on the top of the cover with its corresponding hole. Press down on the top of the center of the cover evenly until it snaps into place.

**5. Connect the removable media SCSI cable to the removable media SCSI cable connector.**

The connector is keyed so that it connects in only one way. For information about cable connector locations, see “How to Connect the System Cables” on page 130.



**6. Connect the I/O power cable to the removable media power connector.**

The connector is keyed so that it connects in only one way.

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33

---

# How to Remove a DVD-ROM or Tape Drive

## Before You Begin

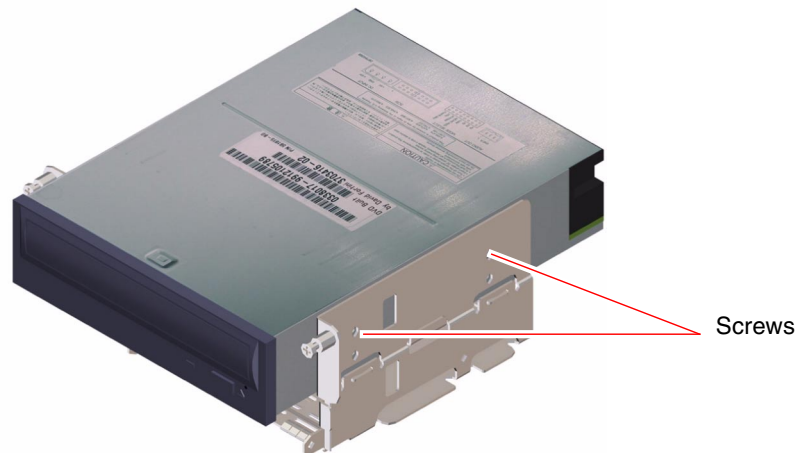
Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the Removable Media Assembly” on page 104

## What to Do

1. **Remove the four Phillips screws securing the drive to the removable media assembly (RMA).**

There are two screws on each side of the drive.



2. **Slide the drive out from the front of its bay in the RMA.**  
Push the drive from the back to start the removal process.
3. **Place the drive on an antistatic mat.**

## What Next

To install a DVD-ROM or tape drive, complete this task:

- “How to Install a DVD-ROM or Tape Drive” on page 111

---

# How to Install a DVD-ROM or Tape Drive

## Before You Begin

Know the configuration guidelines for installing removable media devices. For detailed information, see your *Sun Fire 280R Server Owner's Guide*.

Complete these tasks:

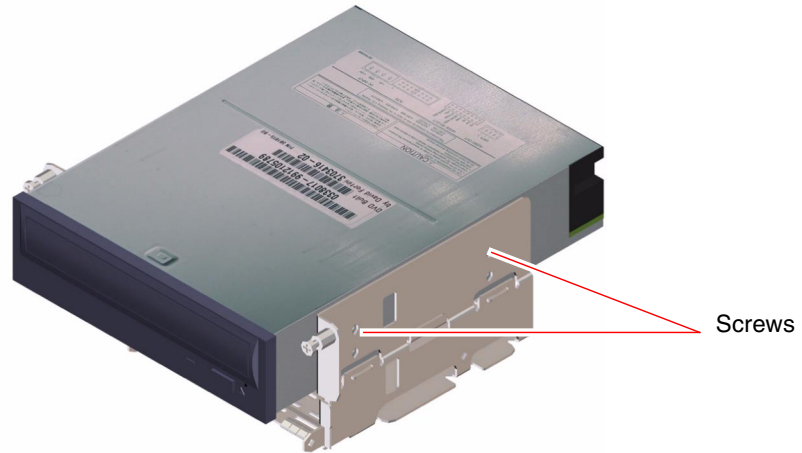
- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the Removable Media Assembly” on page 104

## What to Do

1. **If necessary, remove the plastic filler panel from the RMA plastic cover.**  
On the back side of the RMA cover, push the filler panel retainer tabs inward to disengage the filler panel.
2. **If you are replacing a defective drive, make sure that the jumper settings on the new drive match the settings on the old drive.**

**3. Slide the DVD-ROM or tape drive into its drive bay.**

Align the two screw holes on each side of the drive with the corresponding holes in each side of the drive bay.



**4. Insert and tighten the four Phillips screws that secure the drive in its bay.**

There are two screws on each side that secure the drive in the RMA.

## What Next

To reassemble the system, complete these tasks:

- “How to Replace the Removable Media Assembly” on page 107
- “How to Replace the System Cover” on page 33

When you are ready to restart the system, be sure to run OpenBoot Diagnostics tests to verify that the system functions correctly with the new parts you have just installed. For additional information, see:

- “About OpenBoot Diagnostics Tests” on page 166

You must also perform a reconfiguration boot so that your system is able to recognize any new device(s). For additional information, see:

- “How to Initiate a Reconfiguration Boot” on page 12

## Removing and Replacing Backplanes and Cables

---

This chapter describes how to remove and replace backplanes and cables within the system. For a list of part numbers for field-replaceable units (FRUs) and optional equipment, see “Illustrated Parts Breakdown” on page 217.

The following tasks are covered in this chapter:

- “How to Remove the FC-AL Backplane” on page 113
- “How to Replace the FC-AL Backplane” on page 116
- “How to Remove the Power Distribution Board” on page 118
- “How to Replace the Power Distribution Board” on page 122
- “How to Connect the System Cables” on page 130
- “How to Remove the FC-AL Cable” on page 131
- “How to Replace the FC-AL Cable” on page 133
- “How to Remove the I<sup>2</sup>C Cable” on page 135
- “How to Replace the I<sup>2</sup>C Cable” on page 137

The following information is also included:

- “About the System Cables” on page 126

---

## How to Remove the FC-AL Backplane

### Before You Begin

Complete these tasks:

- “How to Remove a Disk Drive” on page 92 or “How to Remove a Disk Drive Using the Hot-Plug Operation” on page 97

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

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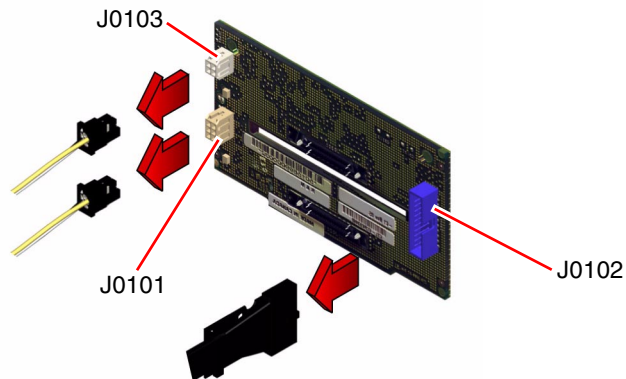
**Note** – You must remove all disk drives from the disk drive bay. Be sure to note the disk slot number associated with each drive. Later, when you reinstall the disk drives, it is important to return each drive to its original location.

---

## What to Do

1. **Disconnect the I/O power cable from the Fibre Channel-Arbitrated Loop (FC-AL) backplane at J0101.**

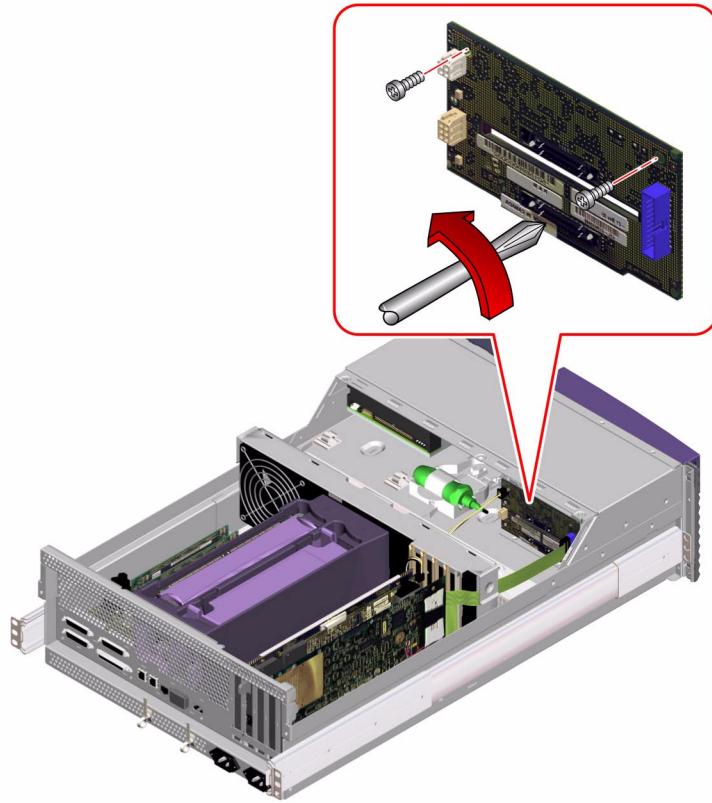
See Step 4 for the location of the FC-AL backplane in the system.



2. **Disconnect the FC-AL data cable from the FC-AL backplane at J0102.**  
Pull the cable out by its connector, not by the cable itself.
3. **Disconnect the I<sup>2</sup>C cable from the FC-AL backplane at J0103.**



4. Remove the two Phillips screws that secure the FC-AL backplane to the chassis.



5. Remove the backplane from the chassis.  
Place the backplane on an antistatic mat.

## What Next

To replace the FC-AL backplane, complete this task:

- “How to Replace the FC-AL Backplane” on page 116

---

# How to Replace the FC-AL Backplane

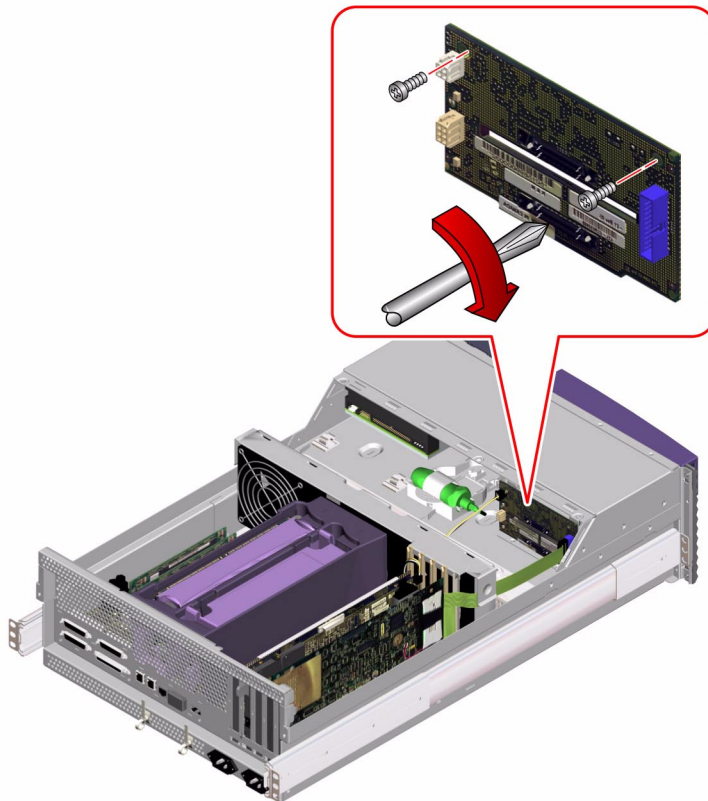
## Before You Begin

Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

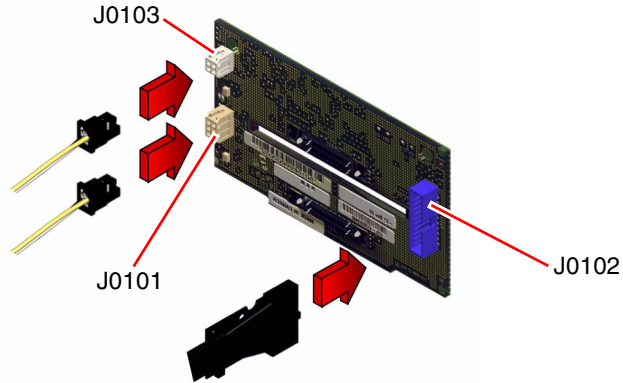
## What to Do

1. **Position the FC-AL backplane in place behind the disk drive bay in the chassis.**  
Insert the bottom tab on the backplane into the slot on the chassis.
2. **Replace the two Phillips screws that secure the FC-AL backplane to the chassis.**



3. **Connect the FC-AL data cable from the main logic board at J0102 on the FC-AL backplane.**

The connector is keyed to attach in only one way.



4. **Connect the I/O power cable at J0101 on the FC-AL backplane.**

The connector is keyed to attach in only one way.

5. **Connect the I<sup>2</sup>C cable at J0103 on the FC-AL backplane.**

The connector is keyed to attach in only one way.

## What Next

To reassemble the system, complete these tasks:

- “How to Replace the System Cover” on page 33
- “How to Install a Disk Drive” on page 94 or “How to Replace the Removable Media Assembly” on page 107

---

# How to Remove the Power Distribution Board

## Before You Begin



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**Caution** – Perform this procedure on a workbench. Sun Microsystems does not support changing the power distribution board while the system is installed in a rack.

---

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Remove the System From the Rack” on page 21
- “How to Remove a Power Supply” on page 139
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the RSC Card” on page 50
- “How to Remove a PCI Card” on page 58
- “How to Remove the Air Guide” on page 79
- “How to Remove the Fan Tray Assembly” on page 145

## What to Do



---

**Caution** – Unplug the AC power cord(s) from the back of the system before performing this procedure. Attempting to remove the power distribution board while the AC power cord is plugged in to a power source can result in serious personal injury.

---

### 1. Disconnect the following cables from the power distribution board:

---

**Note** – See “Power Distribution Board Connectors” on page 130 for connector locations.

---

- a. Disconnect the I/O power cable from the power distribution board at J0210.
- b. Disconnect the main power cable at J0201.

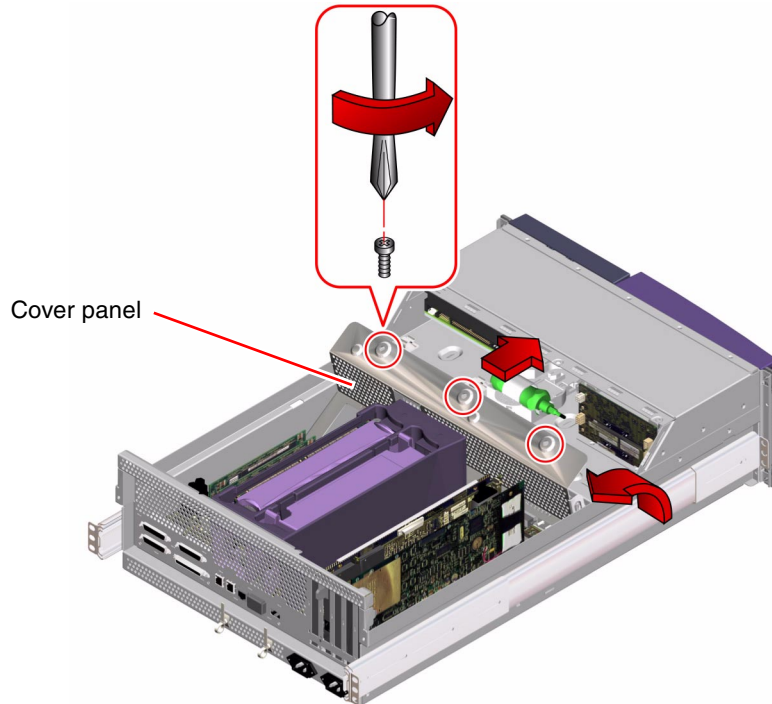
- c. Disconnect the power interlock cable at J0209.
  - d. Disconnect the I<sup>2</sup>C cable at J0505.
  - e. Disconnect the CPU power sense cable at J0205.
  - f. Disconnect the keyswitch/Power button/LED cable at J0500.
2. Loosen the three captive Phillips screws that secure the power distribution board cover panel to the chassis.
  3. Remove the power distribution board cover panel.
    - a. Tilt the panel toward the back of the chassis approximately 30 degrees.  
Hold the cover panel by the edge nearest the front of the chassis.
    - b. Gently pull the cover panel forward and up, out of the chassis.  
Set the power distribution cover panel aside.



---

**Caution** – Be careful not to damage the main logic board when removing the cover panel.

---





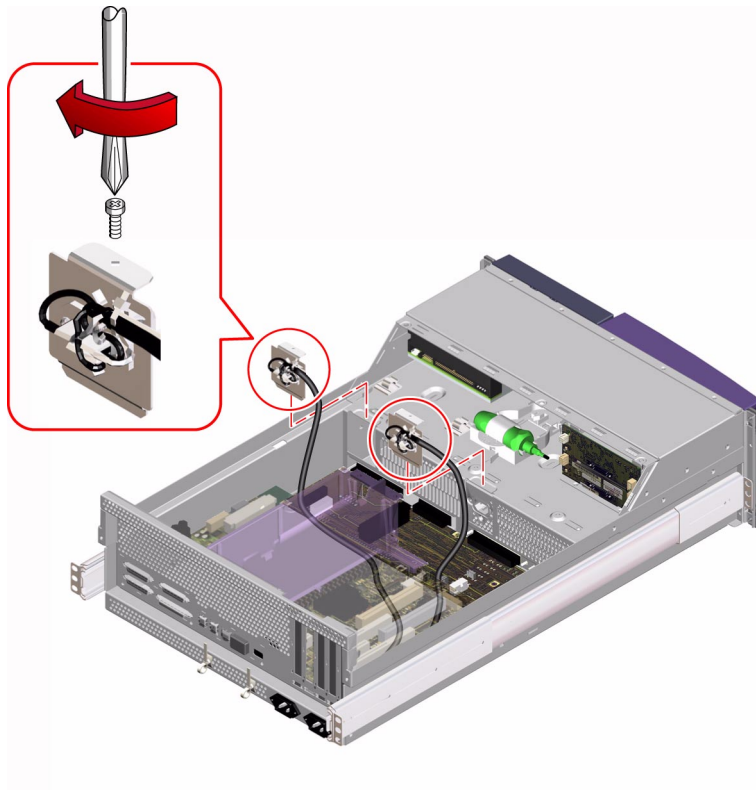
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**Caution** – Be sure that all AC power cords are disconnected from the system before continuing. Attempting to remove the power distribution board while the AC power cord is plugged in to a power source can result in serious personal injury.

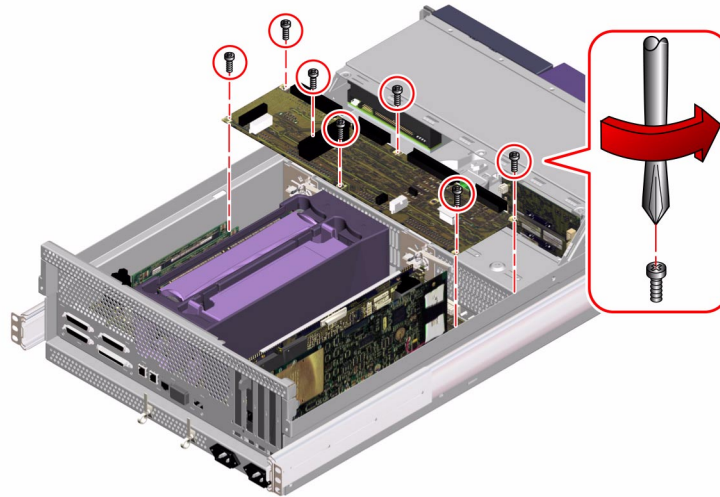
---

**4. Remove the AC power connector assemblies from the system.**

Keep the cables attached to the connector assemblies. Use a Phillips No. 2 screwdriver to remove the screws. Do not mix up the cables. Drape the right-hand cable over the right side of the chassis and the left-hand cable over the left side of the chassis, so that you can easily lift the power distribution board out of the chassis.



5. Remove the seven screws securing the power distribution board to the chassis.



6. Adjust the cable connected to the center AC power connector assembly so that it does not interfere with lifting the power distribution board out of the chassis.
7. Lift the power distribution board out of the chassis.

Tilt the rear of the power distribution board forward 20 to 30 degrees from the chassis and lift the board out toward the back of the system.



---

**Caution** – Be careful not to damage the main logic board when lifting the power distribution board out of the chassis.

---

8. Place the power distribution board on an antistatic mat.

## What Next

To replace the power distribution board, complete this task:

- “How to Replace the Power Distribution Board” on page 122

---

# How to Replace the Power Distribution Board

## Before You Begin

Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

## What to Do



---

**Caution** – Be sure that all AC power cords are disconnected from the back of the system before performing this procedure. Attempting to replace the power distribution board while the AC power cord is plugged in to a power source can result in serious personal injury.

---

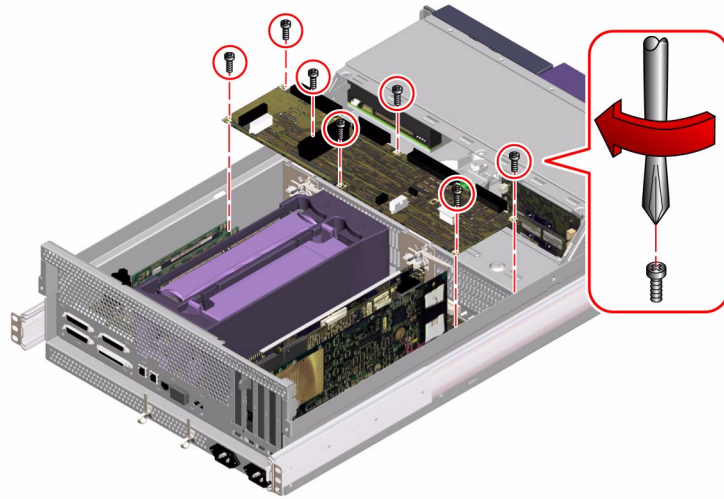
**1. Position the power distribution board in the chassis floor.**

You may need to adjust the cable attached to the center AC power connector assembly so that it does not interfere with the positioning of the power distribution board.

**2. Insert the power supply connectors into their slots in the chassis.**

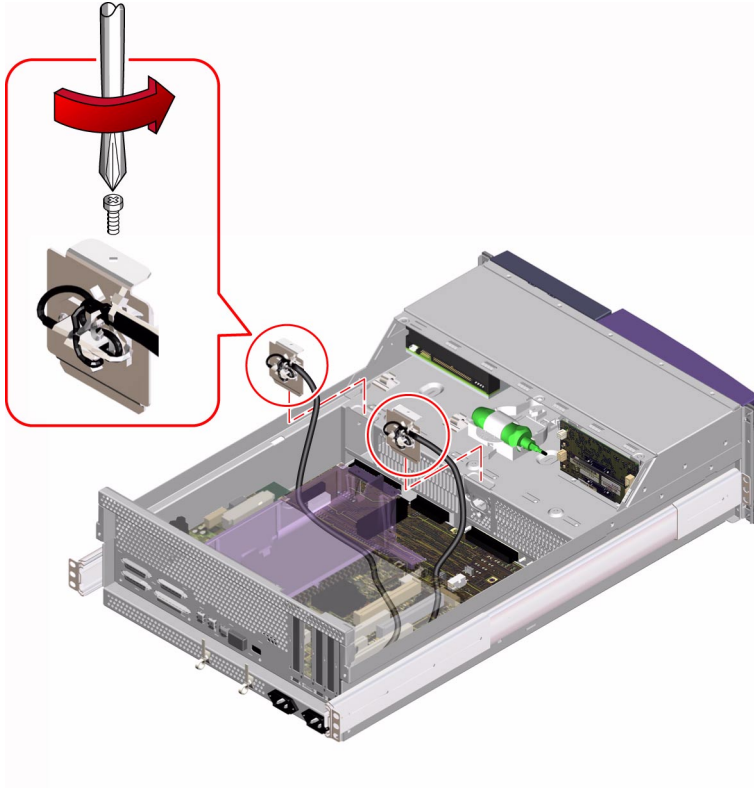


3. Replace the seven Phillips screws that secure the board to the chassis.



**4. Replace the AC power connector assemblies and the cables attached to them.**

Use a Phillips No. 2 screwdriver to secure the screws. Do not reverse the power connector assemblies; attach the left-hand connector to the left-hand power supply, and the right-hand connector to the right-hand power supply.



5. Replace the power distribution board cover panel.

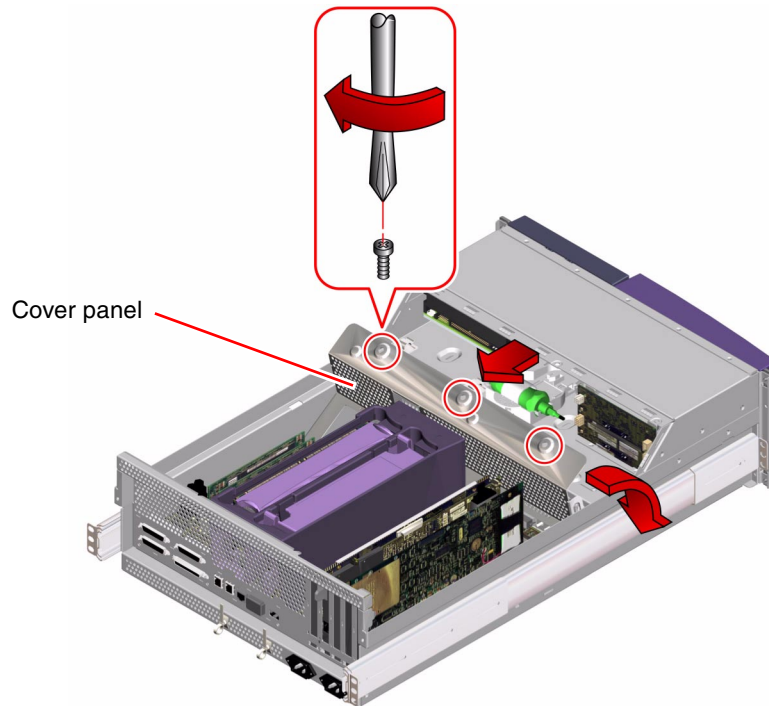
a. Position the cover in place over the chassis.

Hold the cover at an approximately 30-degree angle from the chassis, aligning the slots on the cover with the tabs on the main logic board mounting plate.

b. Lower the cover into place.

Make sure that you insert the slots on the cover around the tabs on the main logic board mounting plate.

6. Tighten the three captive Phillips screws that secure the power distribution board cover panel to the chassis.



7. Reconnect the power distribution board cables:

---

**Note** – See “Power Distribution Board Connectors” on page 130 for connector locations.

---

a. Connect the power interlock switch cable at J0209.

b. Connect the I<sup>2</sup>C cable at J0505.

- c. Connect the main power cable at J0201.
- d. Connect the CPU power sense cable at J0205.
- e. Connect the keyswitch/power button/LED cable at J0500.
- f. Connect the I/O power cable at J0210.

## What Next

To reassemble the system, complete the following tasks:

- “How to Install a PCI Card” on page 61
- “How to Replace the RSC Card” on page 54
- “How to Replace the Air Guide” on page 81
- “How to Replace the Fan Tray Assembly” on page 147
- “How to Install a Power Supply” on page 142
- “How to Replace the System Cover” on page 33
- “How to Place the System Into the Rack” on page 24

---

## About the System Cables

This section provides an overview of cable connector locations and cable routing. Procedures for removing and replacing cables not covered in this chapter are included within the removal and replacement process of the assemblies with which these cables are associated.

In addition, this section provides illustrations depicting connector locations on the system boards.

# Cable Connectors and Routing

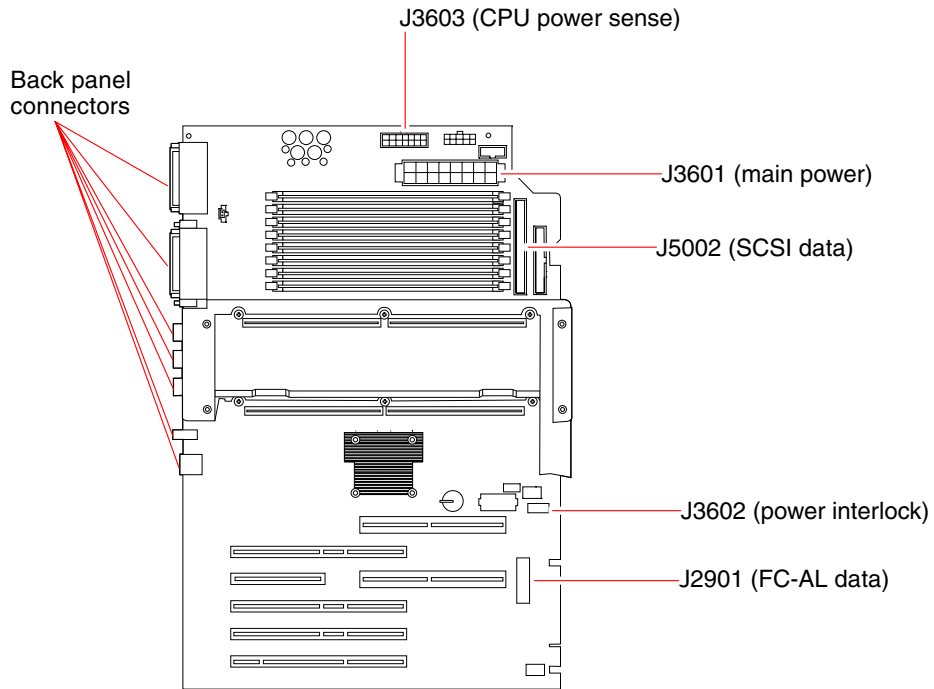
Cable Name	Connections	Routing and Management
CPU power sense cable	From: Power distribution board (J0205) To: Main logic board (J3603)	Routed from under the fan tray assembly to the main logic board
Main power cable	From: Power distribution board (J0201) To: Main logic board (J3601)	Routed from under the fan tray assembly to the main logic board
I/O power cable	From: Power distribution board (J0210) To: FC-AL backplane (J0101) and To: Removable media I/O power connector	Routed from under the fan tray assembly, through the notch on the fan tray assembly to the FC-AL backplane and the removable media power connector
FC-AL data cable	From: Main logic board (J2901) To: FC-AL backplane (J0102)	Routed flat under the tab on the side of the fan tray assembly
Removable media SCSI cable	From: Main logic board (J5002) To: Removable media SCSI connector	Routed from the FC-AL backplane to the removable media SCSI connector
Keypad/Power button/LED cable	From: Power distribution board (J0500) To: Front of chassis	Routed under the notch on the fan tray assembly
Power interlock switch cable	From: Power distribution board (J0209) To: Main logic board (J3602)	Routed from under the fan tray assembly to the main logic board
I <sup>2</sup> C cable	From: Power distribution board (J0505) To: FC-AL backplane (J0103) and To: RSC card (J0402)	Routed under the notch on the fan tray assembly

---

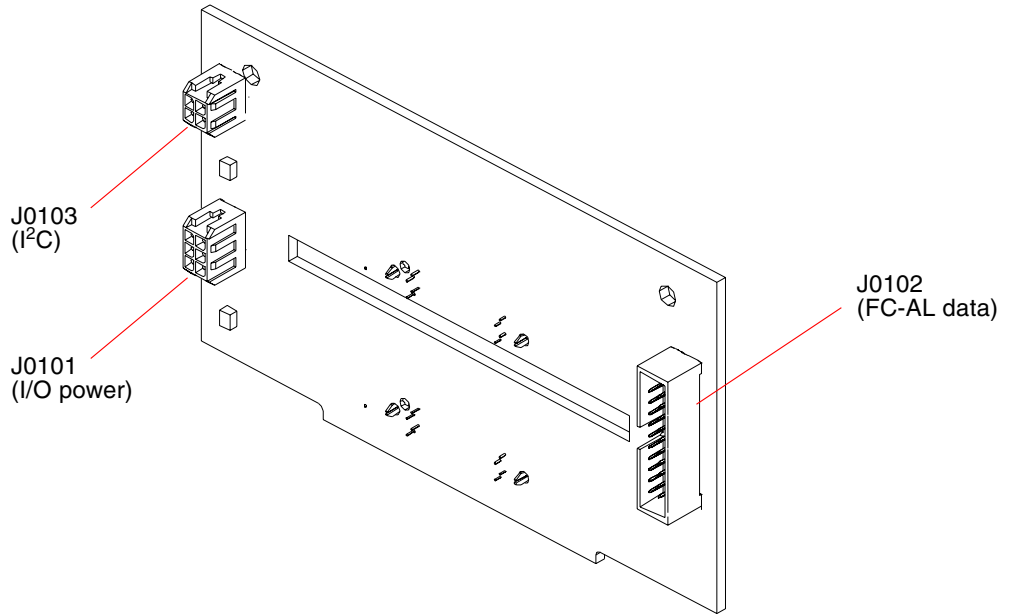
**Note** – See the illustrations in the following sections for the locations of the connectors described in this table.

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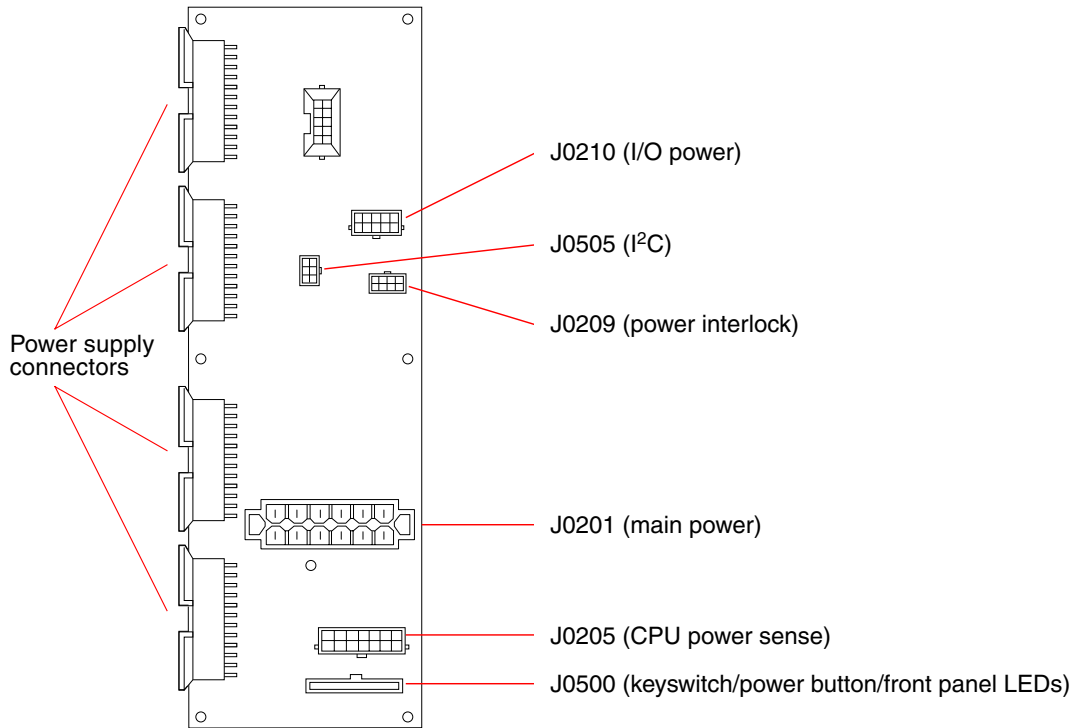
# Main Logic Board Connectors



# FC-AL Backplane Connectors



## Power Distribution Board Connectors



---

## How to Connect the System Cables

### Before You Begin

Complete these tasks:

- "How to Power Off the System" on page 5
- "How to Position the System for Service" on page 14
- "How to Remove the System Cover" on page 30
- "How to Avoid Electrostatic Discharge" on page 35



## What to Do

1. **Identify the cable that you want to install or replace.**
2. **Use the information in “About the System Cables” on page 126 to determine how each cable is routed.**
3. **Install the cable according to the routing and cable management instructions in the procedures described further in this chapter.**

Connectors are keyed so that they can attach in only one way.

## What Next

Once you replace or install a cable, complete this task:

- “How to Replace the System Cover” on page 33

---

# How to Remove the FC-AL Cable

## Before You Begin

Complete these tasks:

- Read the section, “About the System Cables” on page 126
- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the RSC Card” on page 50

## What to Do

1. **Locate the Fibre Channel-Arbitrated Loop (FC-AL) cable.**

The FC-AL cable is connected to the FC-AL backplane and the main logic board.

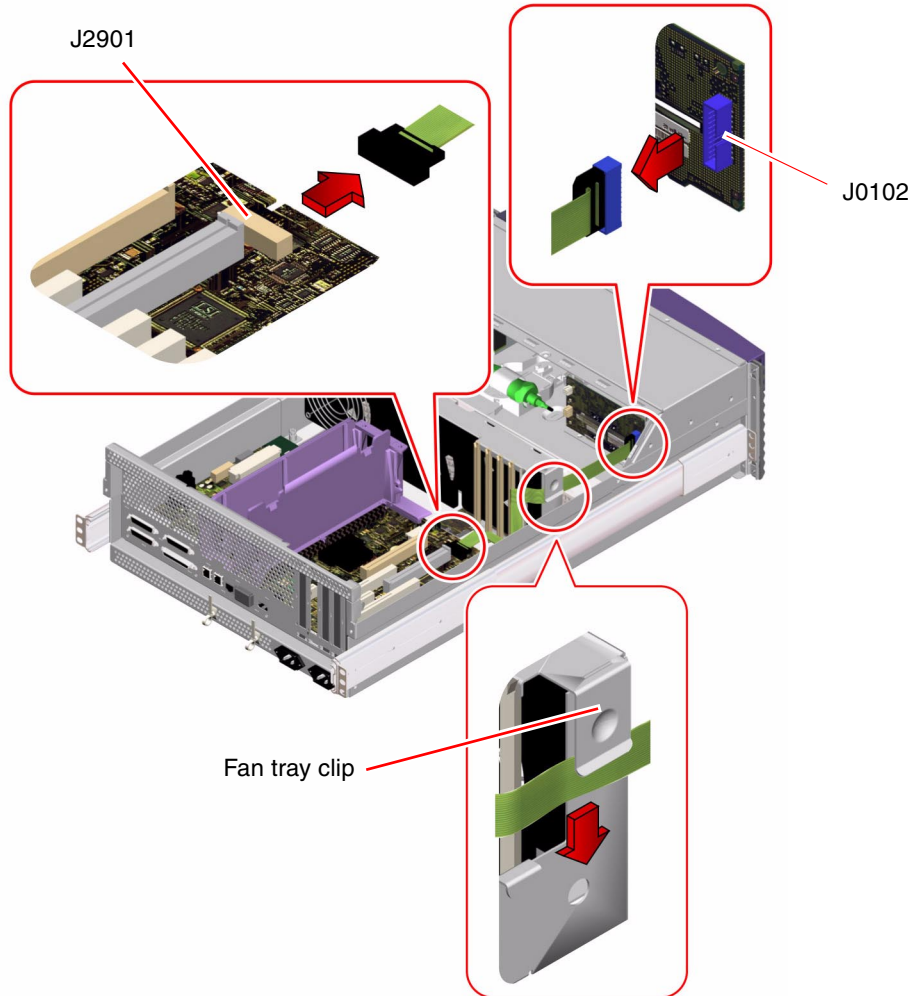
2. **Unplug the FC-AL cable from its connectors:**

---

**Note** – Pull the cable out by its connector, not by the cable itself.

---

- a. Unplug the cable end from J0102 on the FC-AL backplane.
- b. Unplug the remaining cable end from J2901 on the main logic board.



3. Slide the FC-AL cable out from under the clip on the side of the fan tray.

## What Next

To replace the FC-AL cable, complete this task:

- “How to Replace the FC-AL Cable” on page 133

---

# How to Replace the FC-AL Cable

## Before You Begin

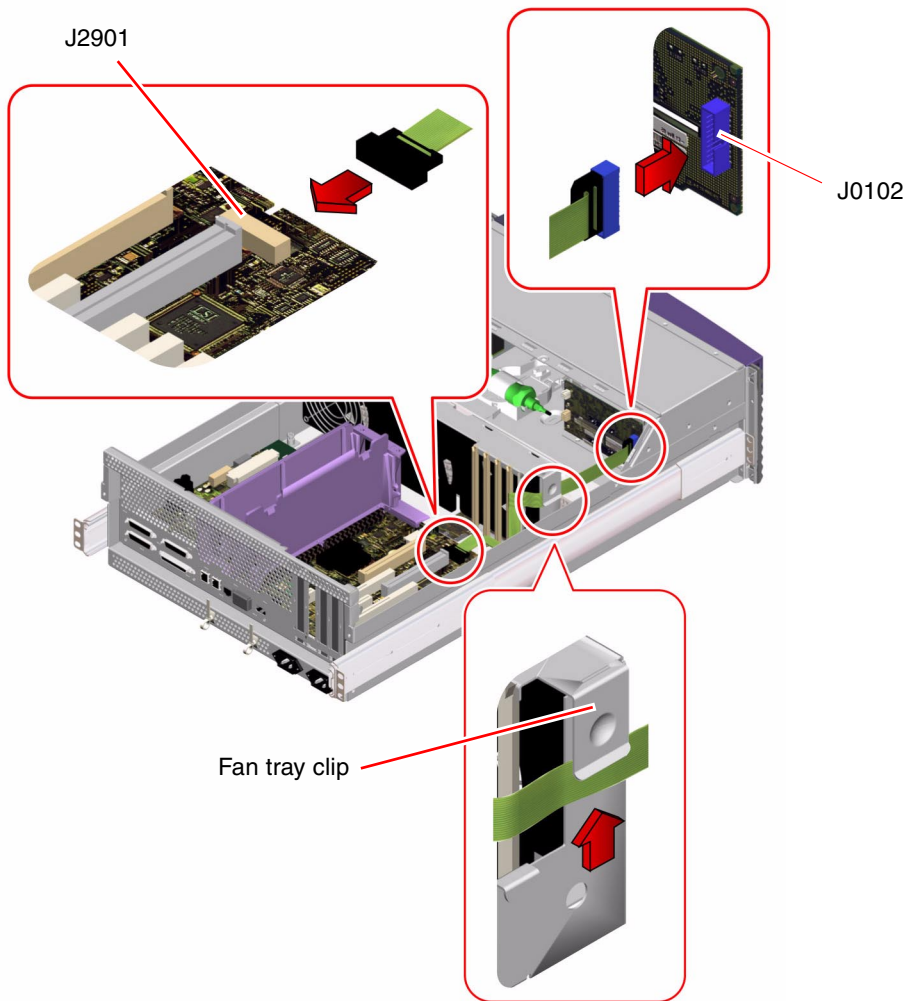
Complete these tasks:

- Read the section, “About the System Cables” on page 126
- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

1. **Facing the front of the system, slide the FC-AL cable under the clip on the left side of the fan tray.**
2. **Connect the FC-AL cable connectors:**
  - a. **Connect the cable end with the shorter pull tab at J2901 on the main logic board.**

b. Connect the other cable end at J0102 on the FC-AL backplane.



## What Next

To reassemble the system, complete these tasks:

- "How to Replace the RSC Card" on page 54
- "How to Replace the System Cover" on page 33

---

# How to Remove the I<sup>2</sup>C Cable

## Before You Begin

Complete these tasks:

- Read the section, “About the System Cables” on page 126
- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35
- “How to Remove the Fan Tray Assembly” on page 145

## What to Do

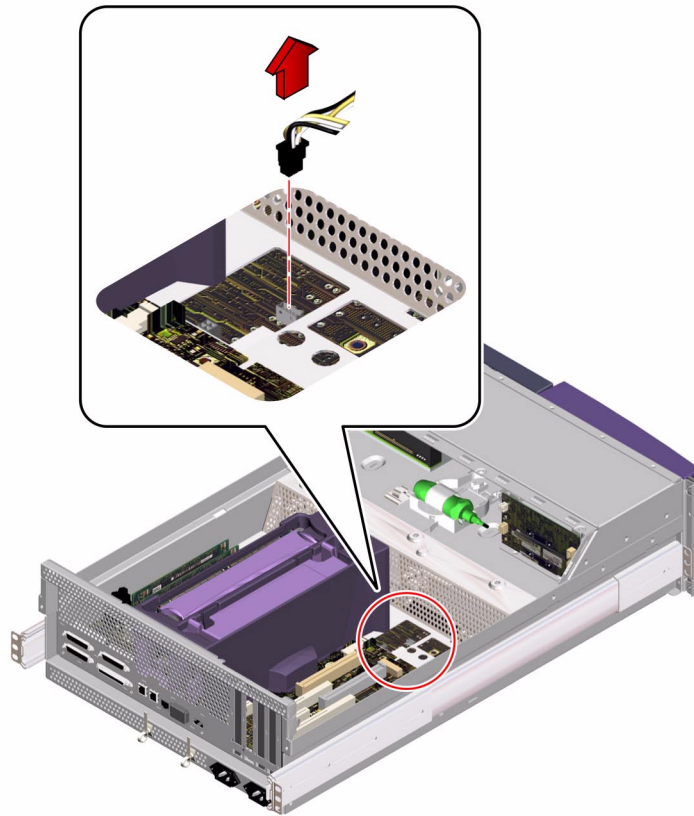
### 1. Locate the I<sup>2</sup>C cable.

The I<sup>2</sup>C cable connects the RSC card, FC-AL backplane, and power distribution board.

### 2. Disconnect the P2 connector from J0402 on the corner of the RSC card.

### 3. Disconnect the P2 connector from J0103 on the back of the FC-AL backplane.

4. Disconnect the P3 connector from J0505 on the power distribution board.



## What Next

To replace the I<sup>2</sup>C cable, complete this task:

- “How to Replace the I<sup>2</sup>C Cable” on page 137

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# How to Replace the I<sup>2</sup>C Cable

## Before You Begin

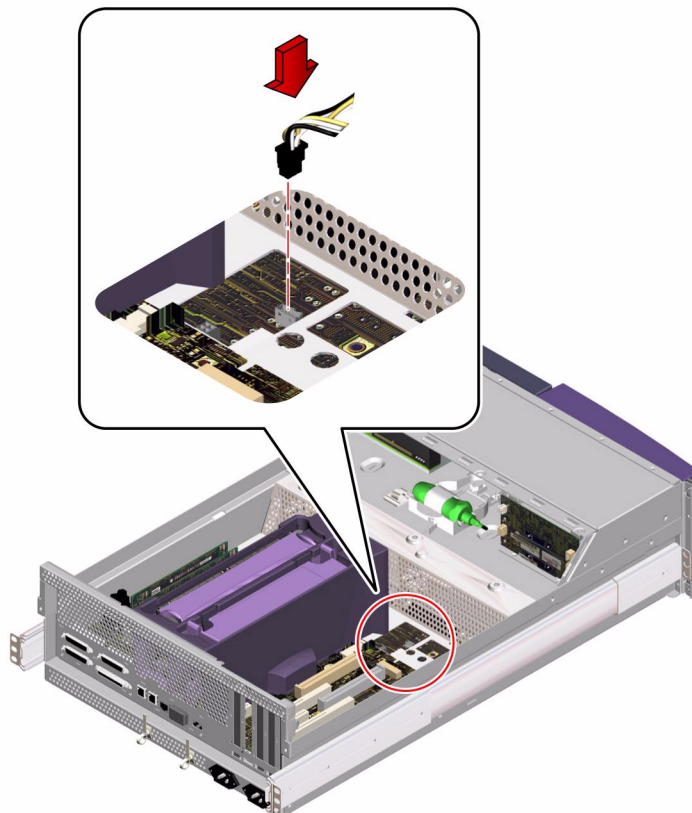
Complete these tasks:

- Read the section, “About the System Cables” on page 126
- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

1. **Connect the P3 connector to J0505 on the power distribution board.**

The connector is keyed to attach in only one way.



**2. Connect one P2 connector to J0103 on the FC-AL backplane.**

The two four-pin ends of the I<sup>2</sup>C cable are interchangeable. The connector is keyed to attach in only one way.

**3. Connect the other P2 connector to J0402 on the RSC card.**

The two four-pin ends on the I<sup>2</sup>C cable are interchangeable. The connector is keyed to attach in only one way.

## What Next

To reassemble the system, complete these tasks:

- “How to Replace the Fan Tray Assembly” on page 147
- “How to Replace the System Cover” on page 33



## Removing and Replacing Miscellaneous Assemblies

---

This chapter describes how to remove and replace the miscellaneous assemblies within the system. For a list of part numbers for field-replaceable units (FRUs) and optional equipment, see “Illustrated Parts Breakdown” on page 217.

The following tasks are covered in this chapter:

- “How to Remove a Power Supply” on page 139
- “How to Install a Power Supply” on page 142
- “How to Remove the Fan Tray Assembly” on page 145
- “How to Replace the Fan Tray Assembly” on page 147
- “How to Remove a System Door” on page 149
- “How to Replace a System Door” on page 152

---

## How to Remove a Power Supply

### Before You Begin

It is not necessary to power off the system if you are removing a redundant power supply. For more information, see “About Power Supplies” in your *Sun Fire 280R Server Owner’s Guide*.

If your system has only one power supply, complete this task:

- “How to Power Off the System” on page 5

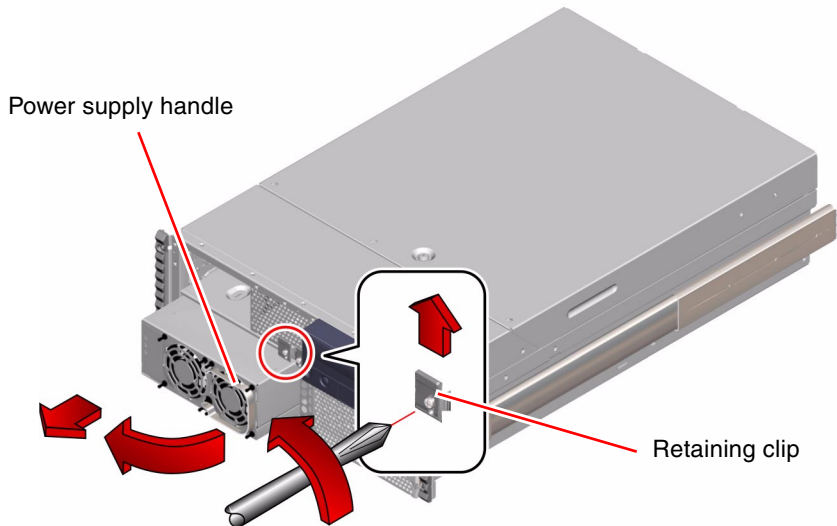
# What to Do

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**Note** – If a power supply has failed and you do not have a replacement available, leave the failed power supply installed, or replace it with a filler panel.

---

1. **Identify the power supply that you want to remove.**
2. **Unlock the system doors and swing them open.**  
Turn the keyswitch to the Power-On/Off position. This unlocks the system front access doors.
3. **Loosen the Phillips screw that secures the power supply retaining clip until you can push the clip up.**
4. **Using your thumb, push up the retaining clip until it clears the power supply.**  
Hold up the retainer clip with your thumb as you slide out the power supply from its bay.
5. **With your other hand, rotate the power supply handle so that it is perpendicular to the front face of the unit.**



6. **Pull out the power supply in a smooth motion until the unit is free of the bay.**



---

**Caution** – When removing a hot-pluggable power supply, do not disengage and reengage the supply in rapid succession.

---



---

**Caution** – Never insert your hand into the power supply bay while the system is running or while it is connected to AC power. Doing so could result in serious personal injury.

---

- 7. If you have removed a redundant power supply and are not replacing it immediately, install a power supply filler panel.**

The filler panel maintains proper system cooling and prevents electromagnetic interference. Align the filler panel over the empty bay and push it into place.

---

**Note** – If a filler panel is unavailable, keep the old power supply installed in your system until a new power supply is available.

---

- 8. Lower the power supply retaining clip.**
- 9. Tighten the Phillips screw on the power supply retaining clip.**

## What Next

To install a power supply, complete this task:

- “How to Install a Power Supply” on page 142

---

# How to Install a Power Supply

## Before You Begin

If you are installing a redundant power supply, it is not necessary to power off the system. For more information, see “About Power Supplies” in your *Sun Fire 280R Server Owner’s Guide*.

## What to Do

1. **Unlock the system doors and swing them open.**

Turn the keyswitch to the Power-On/Off position. This unlocks the system front access doors.
2. **If you are installing a replacement power supply for a system’s only power supply, power off the system.**

See “How to Power Off the System” on page 5.
3. **Loosen the Phillips screw that secures the power supply retaining clip until you can push the clip up.**

If your system has only one power supply, you can skip to Step 4.
4. **If you are upgrading your system with an additional power supply, remove the filler panel covering the power supply bay.**
  - a. **With one hand, push up the retaining clip until it clears the filler panel.**
  - b. **Partially pry the top of the filler panel out of the bay, using a flat-blade screwdriver.**
  - c. **Lift the filler panel out and away from the bay, and set it aside.**
  - d. **Keep the filler panel in case you need to remove the power supply later.**

The filler panel maintains proper system cooling and prevents electromagnetic interference in the absence of a second power supply.



---

**Caution** – Never insert your hand into the power supply bay while the system is running or while it is connected to AC power. Doing so could result in serious personal injury.

---

5. Using your thumb, push up the retaining clip until there is enough clearance to slide the power supply into its bay.
6. With your other hand, align the new power supply with its bay.

---

**Note** – If you are hot-swapping a power supply, wait until the system displays a console message confirming removal of the old power supply. See “About Communicating With the System” on page 37.

---

7. Slide the new power supply into the power supply bay until the power supply connectors start to engage the connectors on the power distribution board.  
Be sure your thumb keeps holding up the retainer clip out of the way as you slide the power supply into its bay.
8. When the front of the power supply has cleared the retainer clip and is in the bay, release the clip.
9. Push on the front of the power supply firmly to engage the connectors with the power distribution board.



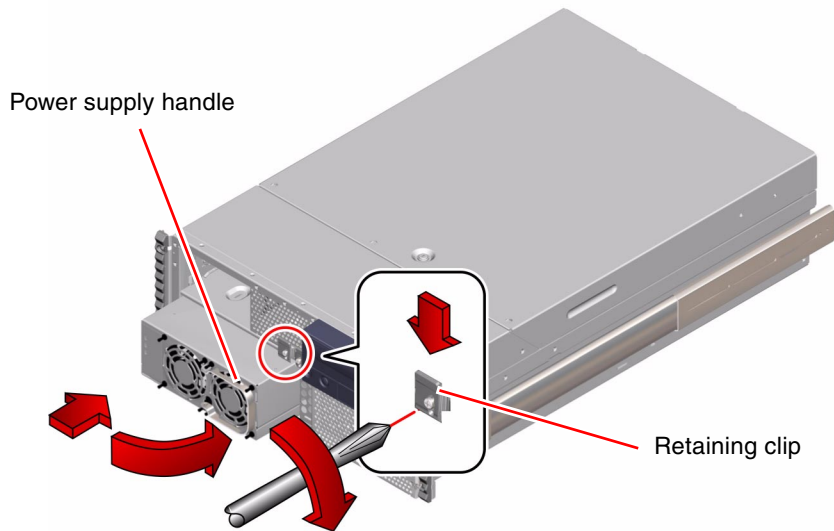
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**Caution** – If you are hot-plugging a redundant supply, take care to avoid jarring the system, as some movements could adversely affect the system while it is running.

---

10. Lower the power supply retaining clip.

**11. Tighten the Phillips screw on the power supply retaining clip.**



---

**Note** – As you tighten the screw, the lower end of the retaining clip presses on the front of the power supply. Fully tighten the Phillips screw to ensure that the power supply is properly seated in its bay.

---

**12. Close and lock the system front doors.**

Turn the keyswitch to the Locked position to lock the doors.

## What Next

Verify correct operation of the power supply by checking the fault and LED indicators on the power supply. You should hear the power supply fan start spinning and two green LEDs should light within three seconds of completing a hot-plug installation or after restoring power to the system.

For more information about the power supply LEDs, see:

- “About the Status and Control Panel” on page 2

If your system has only one power supply, complete this task:

- “How to Power On the System” on page 6

---

# How to Remove the Fan Tray Assembly

## Before You Begin

Complete these tasks:

- Read the section, “About the System Cables” on page 126.
- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14
- “How to Remove the System Cover” on page 30
- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

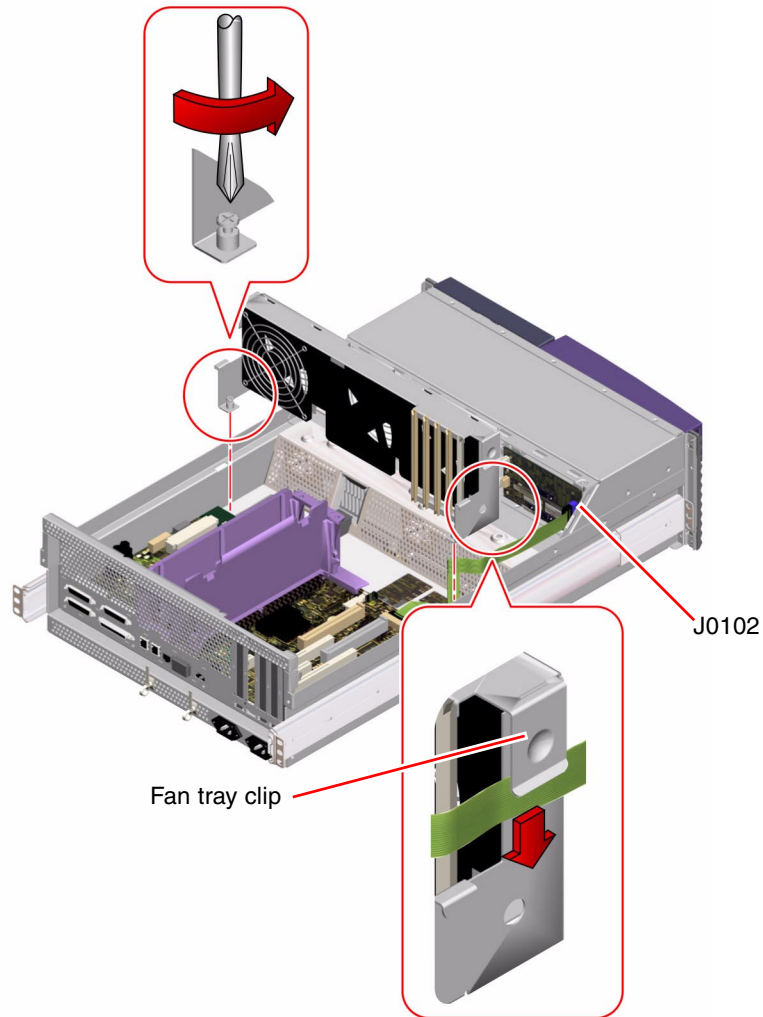
1. **Disconnect the FC-AL cable connector from J0102 on the FC-AL backplane and drape it out of the way.**

Push the cable down and out from under its clip on the fan tray assembly. Be careful not to damage the cable.

2. **Disconnect the SCSI cable from the removable media SCSI connector and drape it out of the way.**

Push the ribbon cable down and out from under its clip on the fan tray assembly. Be careful not to damage the cable.

3. Loosen the two captive Phillips screws securing the fan tray assembly to the chassis.



4. Lift the fan tray assembly out of the chassis.

## What Next

To replace the fan tray assembly, complete this task:

- “How to Replace the Fan Tray Assembly” on page 147



---

# How to Replace the Fan Tray Assembly

## Before You Begin

Complete this task:

- “How to Avoid Electrostatic Discharge” on page 35

## What to Do

1. **Position the fan tray approximately 2 inches (5 centimeters) over its location in the chassis.**
2. **Make sure the main power and keyswitch/Power button/LED cables are routed under the right notch on the fan tray assembly.**  
For information about cable locations, see “About the System Cables” on page 126.
3. **Make sure the I/O power cable is routed under the left notch on the fan tray assembly.**

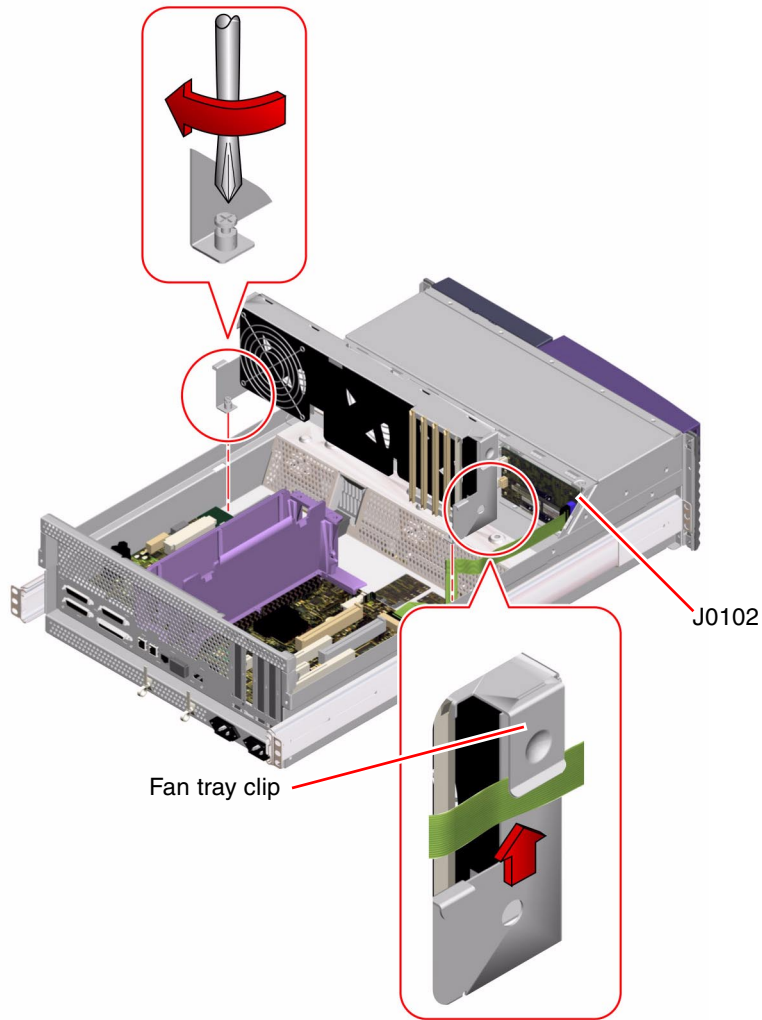
---

**Note** – As you lower the fan tray assembly, ensure that the cables remain properly routed under their notches on the fan tray assembly.

---

4. **Lower the fan tray into place in the chassis.**  
Align the tabs on the fan tray assembly with the notches on the chassis.

5. Tighten the two captive Phillips screws securing the fan tray assembly to the chassis.



6. Connect the SCSI cable connector to the removable media SCSI connector.  
Route the SCSI cable under its clip on the fan tray assembly. Be careful not to damage the cable.
7. Connect the FC-AL cable connector to J0102 on the FC-AL backplane.  
Route the FC-AL cable under its clip on the fan tray assembly. Be careful not to damage the cable.

## What Next

To reassemble the system, complete this task:

- “How to Replace the System Cover” on page 33

---

# How to Remove a System Door

## Before You Begin

Complete these tasks:

- “How to Power Off the System” on page 5
- “How to Position the System for Service” on page 14

## What to Do

**1. Unlock the system doors and swing them open.**

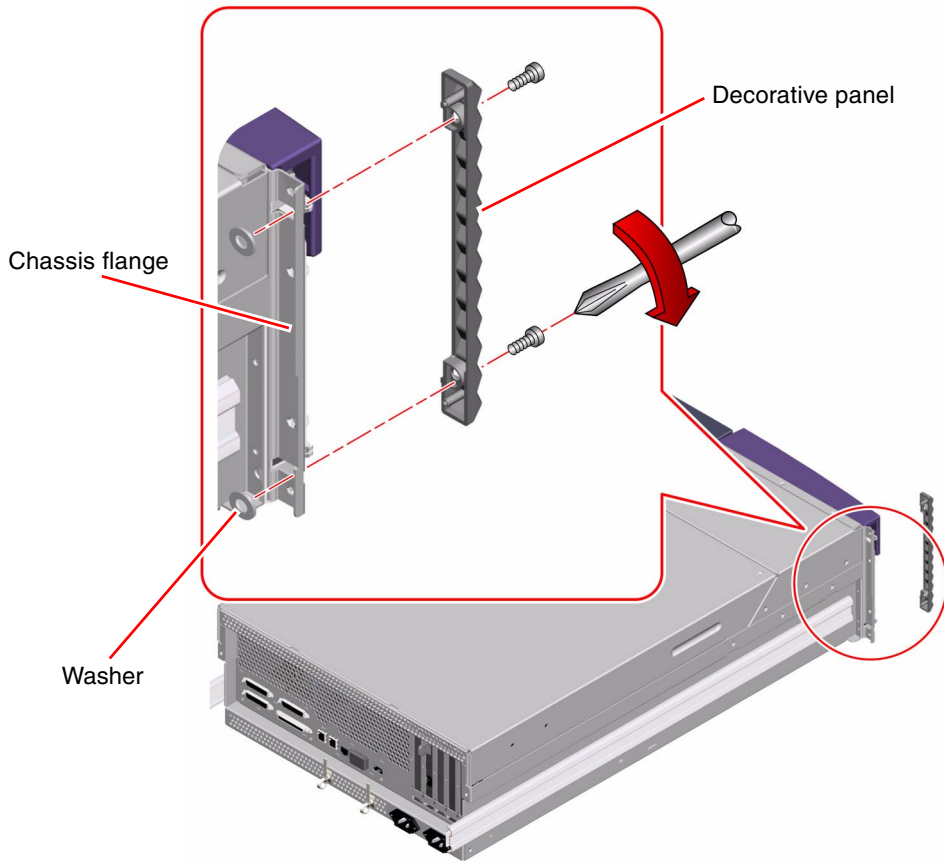
Turn the keyswitch to the Power-On/Off position. This unlocks the system front access doors.

**2. Remove the decorative panel from the flange on the chassis faceplate.**

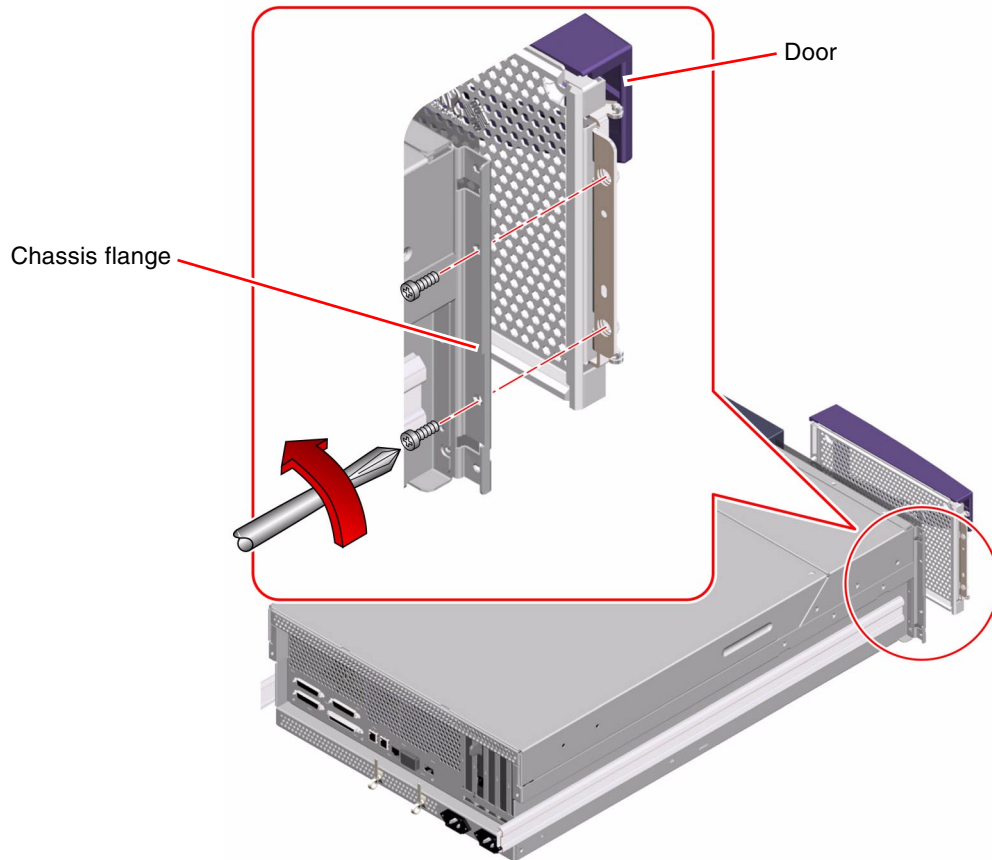
**a. Remove the washers from the screws securing the decorative panel to the flange on the front of the chassis.**

The washers are on the captive screws that attach the chassis to the rack rails. Use a Phillips No. 2 screwdriver.

b. Pull the decorative panel off the chassis flange.



3. **Unscrew the hinge from the chassis flange and remove the system door.**  
Use a Phillips No. 2 screwdriver.



## What Next

To replace a door, complete this task:

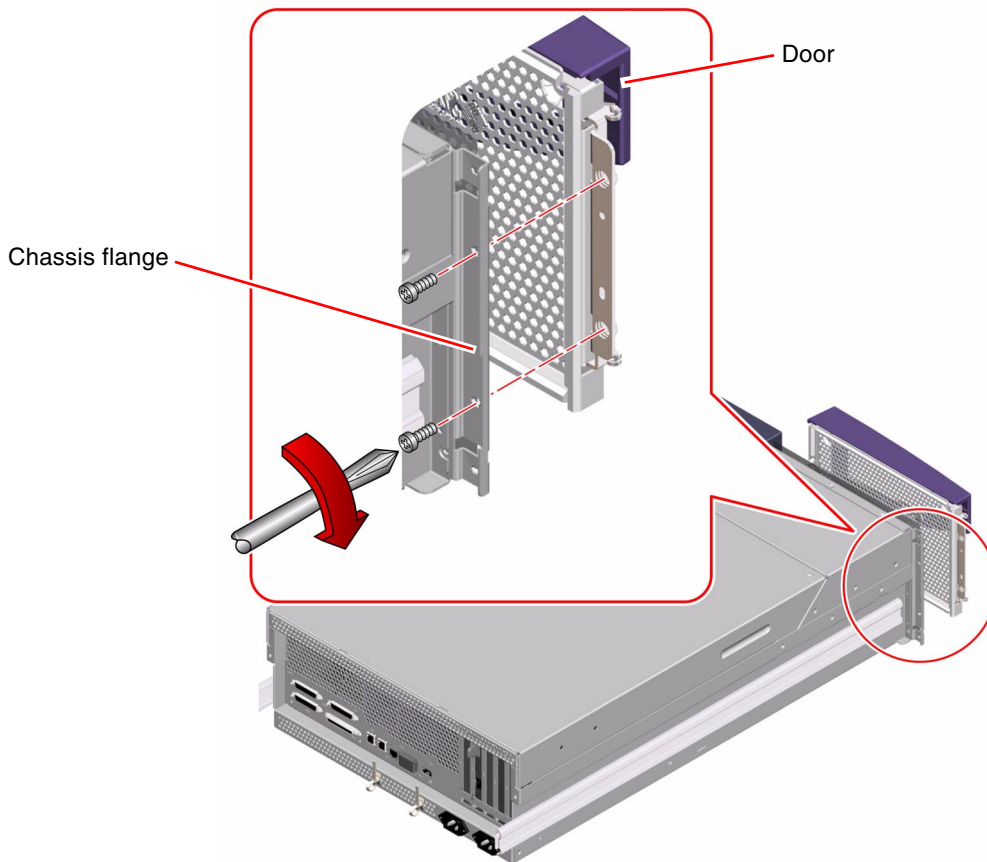
- “How to Replace a System Door” on page 152

---

# How to Replace a System Door

## What to Do

- 1. Position the door hinge on the chassis flange.**  
The hinge goes on the front of the chassis flange.
- 2. Replace the two hinge screws securing the hinge to the chassis flange.**  
Use a Phillips No. 2 screwdriver.

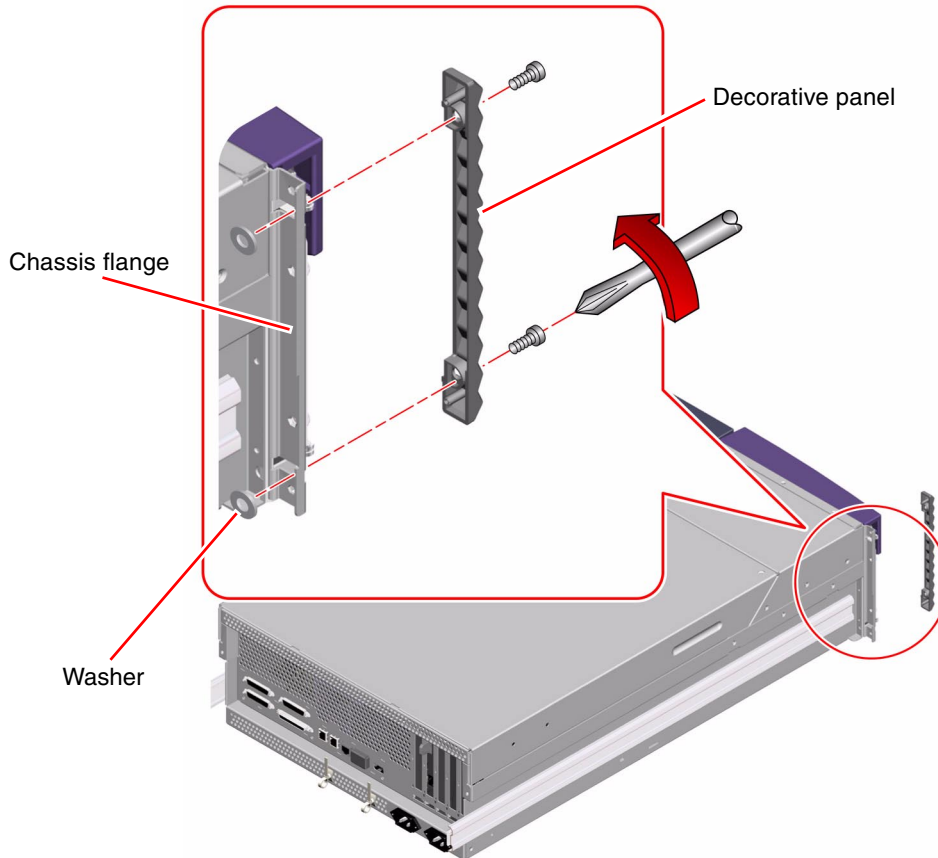


- 3. Replace the decorative panel on the chassis flange.**

a. Press the decorative panel into place on the chassis flange.

b. Replace the washers on the back of the decorative panel captive screws.

Tighten the washers on the screws until the decorative panel is secure on the flange.



4. Close and lock the system doors.

Turn the keyswitch to the Locked position to lock the doors.

## What Next

To reassemble the system, complete this task:

- “How to Slide the System Into the Rack” on page 18
- “How to Power On the System” on page 6





# Diagnostics, Monitoring, and Troubleshooting

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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.

- “How to Monitor the System” on page 172
  - “How to Monitor the System Using Sun Remote System Control (RSC)” on page 173
  - “How to Monitor the System Using Sun Management Center Software” on page 174
- “How to Isolate Failed Components” on page 175
  - “How to Use Default NVRAM Parameters” on page 175
  - “How to Isolate Failures Using OpenBoot Diagnostics” on page 176
  - “How to Isolate Failures Using Power-On Self-Test (POST)” on page 176
  - “How to Isolate Failures Using OpenBoot Diagnostics” on page 178
  - “How to Set Up a `tip` Connection” on page 180
  - “How to Configure a Local Graphics Console” on page 183
  - “How to Set the Diagnostics Level” on page 183
  - “How to Diagnose Specific Problems” on page 184
- “How to Exercise the System” on page 194
  - “How to Check Whether SunVTS Software Is Installed” on page 194
  - “How to Exercise the System Using SunVTS Software” on page 195

For background information about diagnostics and monitoring tools and features, read the following section, “About Diagnostic Tools” on page 157, or turn to a specific topic.

- “About Monitoring the System” on page 160
  - “About Monitoring the System Using Sun Remote System Control (RSC)” on page 160
  - “About Monitoring the System Using Sun Management Center Software” on page 163
- “About Isolating Failed Components” on page 163
  - “About Isolating Failures Using Sun Remote System Control (RSC)” on page 163
  - “About Isolating Failures Using Power-On Self-Test (POST)” on page 164
  - “About Isolating Failures Using OpenBoot Diagnostics” on page 164
  - “About OpenBoot Diagnostics Tests” on page 166
- “About Exercising the System” on page 171
  - “About Exercising the System Using SunVTS Software” on page 171

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 Terminal” on page 38.

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 180.

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 39 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 175.

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---

**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.

---

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## 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 164 and “How to Isolate Failures Using Power-On Self-Test (POST)” on page 176.

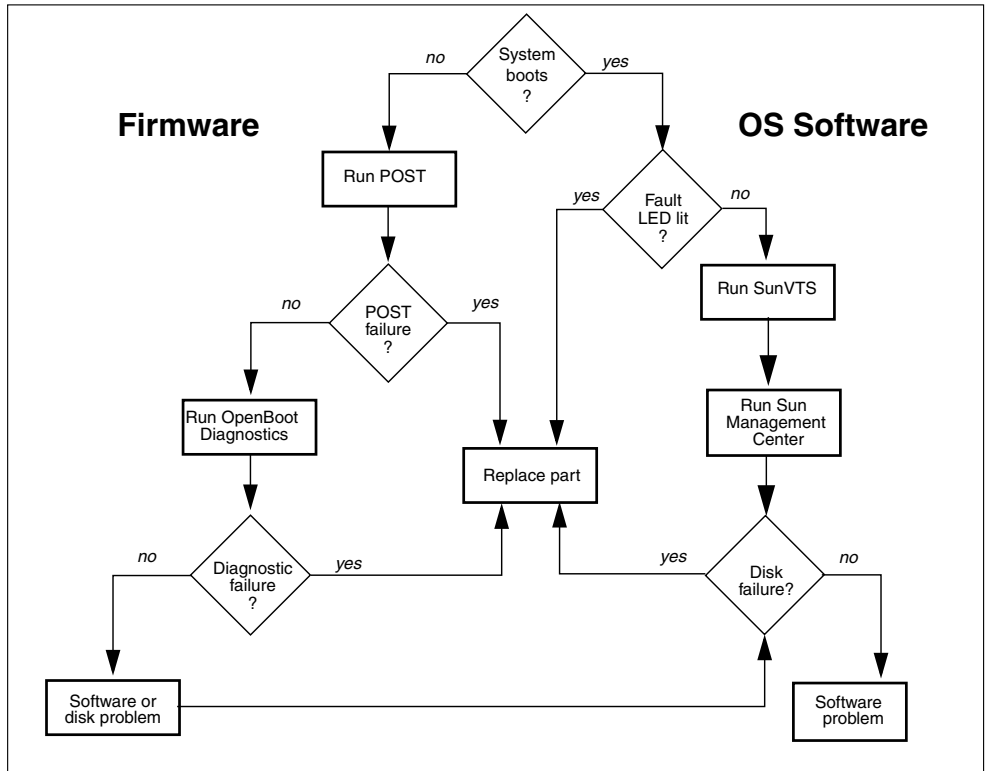
OpenBoot Diagnostics tests focus on system I/O and peripheral devices. Like POST, you can run OpenBoot Diagnostics even if the system is unable to boot. For more information about OpenBoot Diagnostics, see “About Isolating Failures Using OpenBoot Diagnostics” on page 164 and “How to Isolate Failures Using OpenBoot Diagnostics” on page 178.

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 171.

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 174.

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

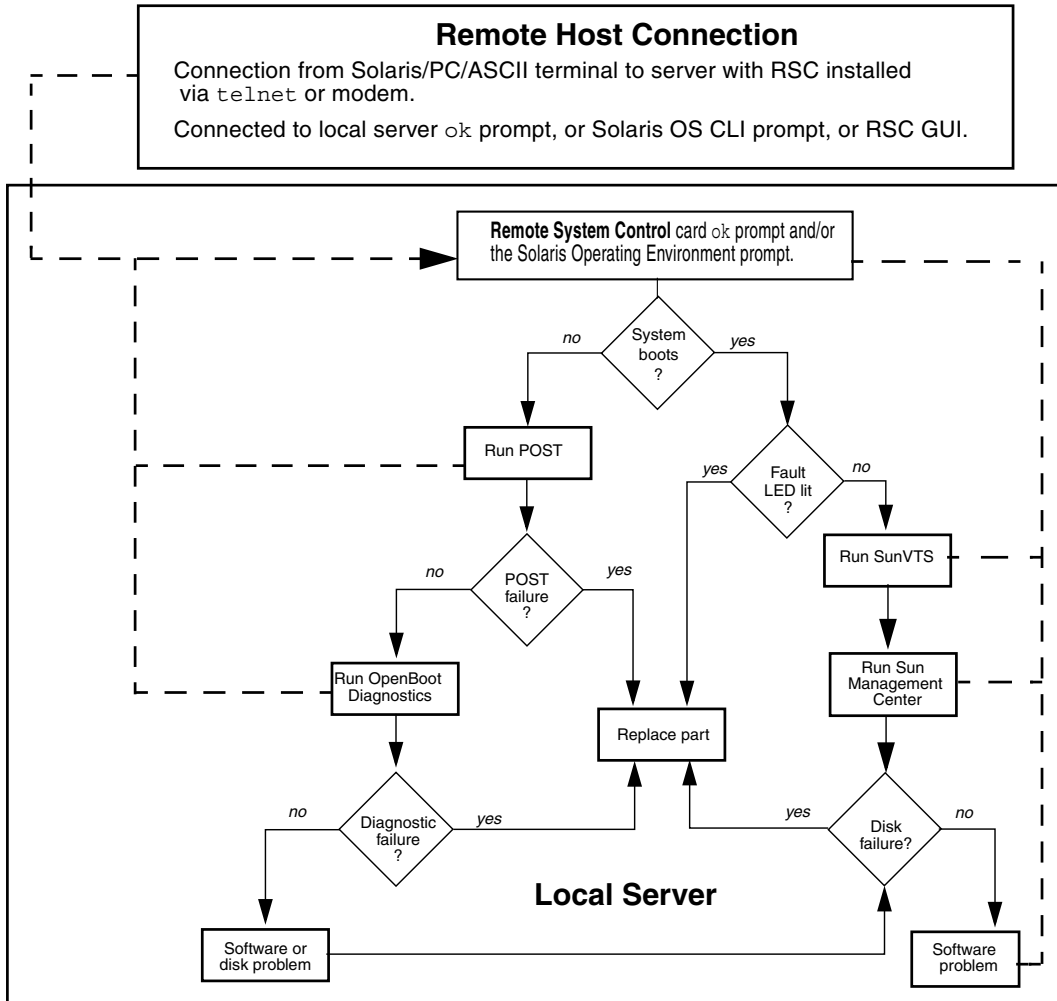
In addition, RSC enables you to:

- 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 173.

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 174. 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 software 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 176. For information about RSC, see your *Sun Fire 280R Server Owner's Guide*.

## 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 178.

## 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 183. 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 178.

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.

---

<b>Test</b>	<b>Function</b>
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 <sup>2</sup> C port expanders. Also performs various read and write tests on the I <sup>2</sup> C 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=0xfeffffffc
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 195. 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 and on the Web at <http://docs.sun.com>

---

## How to Monitor the System

Before you can monitor your Sun Fire 280R server, you must install and configure one of the monitoring tools provided by Sun. These tools include:

- Sun Remote System Control (RSC) software, which is available on the Solaris Supplement CD 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 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 your *Sun Fire 280R Server Owner's Guide*. 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, 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 your *Sun Remote System Control (RSC) User's Guide*.

## 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](http://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 OpenBoot Diagnostics

- **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 the Safe NVRAM mode. Perform the procedure “How to Use Default NVRAM Parameters” on page 175, 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 “About the Status and Control Panel” on page 2.

## 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 diagnostic 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 Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39
- “How to Set Up a `tip` Connection” on page 180

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 182

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 your *Sun Fire 280R Server Owner’s Guide*.

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 183

## 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 3.

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
- By pressing the keyboard `Stop-D` (`Stop-Shift-d`) keys while power is applied to the system unit, or by setting the keyswitch to the Diagnostics position and pressing the Power button

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, 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 Attach an Alphanumeric Terminal" on page 38
- "How to Configure a Local Graphics Console" on page 39
- "How to Set Up a `tip` Connection" on page 180

Also, see:

- "About Isolating Failures Using OpenBoot Diagnostics" on page 164



## 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 183.

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 166 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 hardware
connected
```

The Shell Tool window is now a `tip` window directed to the Sun server `ttymb` 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 `ttymb` 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 terminal window.
2. Type `eeeprom`.
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 39.**

## 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 Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39
- “How to Set Up a `tip` Connection” on page 180

For background information about the available levels of testing, see:

- “About Diagnostic Levels” on page 165

## *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 165.

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 next.

*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 176.

### 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 your *Sun Fire 280R Server Owner's Guide* for more information.

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 memory modules 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 or SCSI Drive Failure

### *Symptom*

A DVD 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 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. Check the system output.

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 171 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. Replace the SCSI data cable.

If the problem is still evident, replace the DVD drive.

#### b. Replace the DVD drive.

If the problem is still evident after replacing the DVD drive, replace the main logic board.

#### c. Replace the main logic board.

---

**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 169 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, 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 your *Sun Fire 280R Server Owner's Guide* for more information about the LEDs. To replace a power supply, see the following sections:

- “How to Remove a Power Supply” on page 139
- “How to Install a Power Supply” on page 142

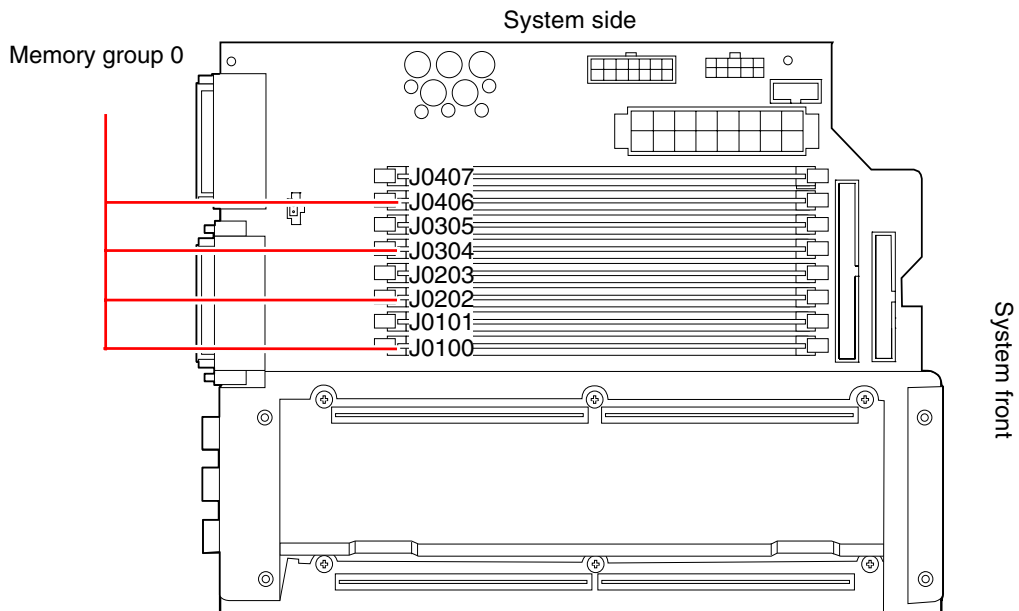
## Memory Module Failure

SunVTS and POST diagnostics can report memory errors encountered during program execution. Memory error messages typically indicate the memory module location number (“J” or “U” number) of the failing module. To replace a memory module, see the following:

- “How to Remove a Memory Module” on page 44
- “How to Install a Memory Module” on page 46

Use the following diagram to identify the location of a failing memory module from its J (or U) number:

Memory module mapping—main logic board



---

# 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 Terminal” on page 38
- “How to Configure a Local Graphics Console” on page 39
- “How to Set Up a `tip` Connection” on page 180

### 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.**

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 194.

#### 4. Type the following:

```
# 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 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
fptest	Checks the floating-point unit
fstest	Tests the integrity of the software's file systems
m64test	Tests the PCI graphics board
mpctest	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
uskbtest	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, replace the part. For information about replacing the part, see the appropriate section in this service manual.



## Connector Signal Descriptions

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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:

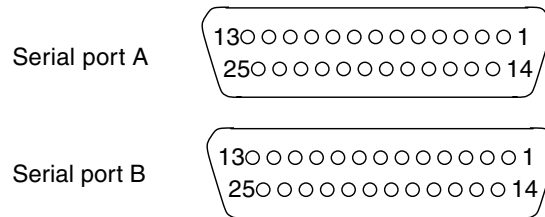
- “Reference for the Serial Port A and B Connectors” on page 200
- “Reference for the Twisted-Pair Ethernet (TPE) Connector” on page 202
- “Reference for the UltraSCSI Connector” on page 204
- “Reference for the Parallel Port Connector” on page 208
- “Reference for the FC-AL Port Connector” on page 210
- “Reference for the Universal Serial Bus (USB) Connectors” on page 211

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# 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

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
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

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# 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.

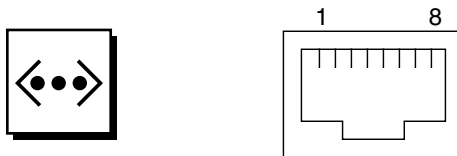


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**Caution** – Connect only TPE cables into the TPE connector.

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## TPE Connector Diagram



## TPE Connector Signals

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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

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## 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.

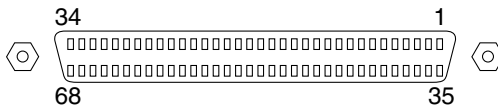
- Cable type – UPT-5, data grade
- Applications – 10BASE-T or 100BASE-T
- Maximum Length – 109 yards (100 meters)

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# 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

<b>Pin</b>	<b>Signal Name</b>	<b>Description</b>
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<1>	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

<b>Pin</b>	<b>Signal Name</b>	<b>Description</b>
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

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<b>Pin</b>	<b>Signal Name</b>	<b>Description</b>
66	SCSI_B_DAT<9>	Data 9
67	SCSI_B_DAT<10>	Data 10
68	SCSI_B_DAT<11>	Data 11

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**Note** – \_L signifies active low.

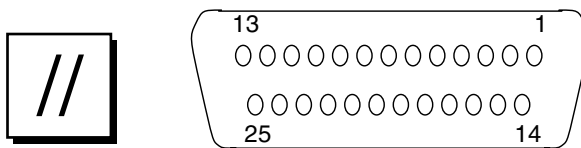
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# Reference for the Parallel Port Connector

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	Data 0 Through Data 7
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

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
18	Gnd	Ground
19	Gnd	Ground
20	Gnd	Ground
21	Gnd	Ground
22	Gnd	Ground
23	Gnd	Ground
24	Gnd	Ground
25	Gnd	Ground

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# Reference for the FC-AL Port Connector

The Fibre Channel-Arbitrated Loop (FC-AL) 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

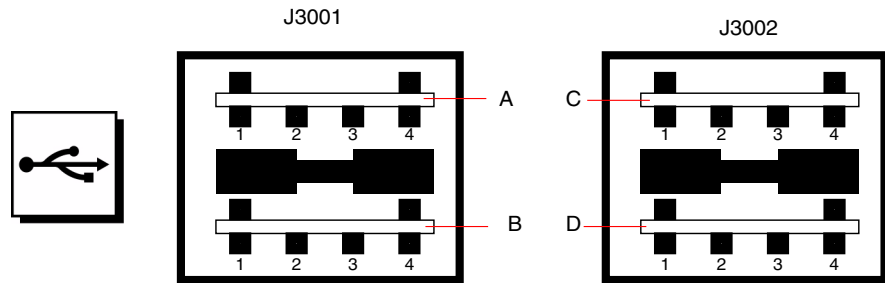
Pin	Signal	Description
1	T_CM_FC_TX_EX_P	TX +
2	GND	Ground
3	T_CM_FC_TX_EX_N	TX -
4, 5	NC	Not connected
6	FC_RX_EX_N	RX +
7	GND	Ground
8	FC_RX_EX_P	RX -



# Reference for the Universal Serial Bus (USB) Connectors

Four Universal Serial Bus (USB) connectors (J3001, 3002) 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



## System Specifications

This appendix provides the following product specifications for the Sun Fire 280R server:

- “Reference for Physical Specifications” on page 213
- “Reference for Electrical Specifications” on page 213
- “Reference for Environmental Specifications” on page 215

### 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

### Reference for Electrical Specifications

Parameter	Value
<b>Input</b>	
Nominal Frequencies	50 Hz or 60 Hz
Nominal Voltages	100, 120, 220, or 240 VAC

<b>Parameter</b>	<b>Value</b>
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
<b>Outputs</b>	
5.1 VDC <sup>1</sup>	0.1 to 1.5 A
+3.3 VDC <sup>2</sup>	3 to 60 A
+5 VDC <sup>3</sup>	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.

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# Reference for Environmental Specifications

These specifications are for a rackmounted system.

Parameter	Value
<b>Operating</b>	
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	0.002 g <sup>2</sup> /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
<b>Non-Operating</b>	
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 <sup>2</sup> /Hz flat from 5–500 Hz (0.472 GRMS); Z-axis: 0.0008 G <sup>2</sup> /Hz flat from 5–500 Hz (0.629 GRMS)—IEC 60068-2-64
Handling Drops	100 mm (unmounted unit)—IEC 60068-2-31



## Illustrated Parts Breakdown

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This appendix consists of a sequence of illustrations that show how the various pieces of the system fit together. Part numbers are also provided.

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### Part Numbers

The following items for the Sun Fire 280R server can be replaced at the customer site by a qualified service provider.

The part numbers listed in the following table are correct as of the service manual publication date but are subject to change without notice. Consult your authorized Sun sales representative or service provider to confirm a part number prior to ordering a replacement part.

<b>Category</b>	<b>Part</b>	<b>Part Number</b>
Main Logic Board Components	Main Logic Board	501-4143
	Air Guide	Not a FRU
	ID-SEEPROM	515-1788
	CPU Module, 750 Mhz	501-5675
	CPU Filler Panel	330-2983
	128 MB DIMM	501-4489
	256 MB DIMM	501-5401
	512 MB DIMM	501-5030
	1 GB DIMM	501-5031
	RSC Card	501-5901
Backplanes	FC-AL Backplane	501-5699
	Power Distribution Board	501-5775
Storage Devices	18 GB 10K RPM Disk Drive	540-4191
	36 GB 10K RPM Disk Drive	540-4525
	12-24 GB 4mm DDS4 Tape Drive	390-0028
	10x DVD/CD-ROM Drive	390-0025
Miscellaneous Assemblies	Fan Tray Assembly	540-4434
	Power Supply	300-1457
	PCI Filler Panel	Not a FRU
	RMA Filler Panel (Plastic)	Not a FRU

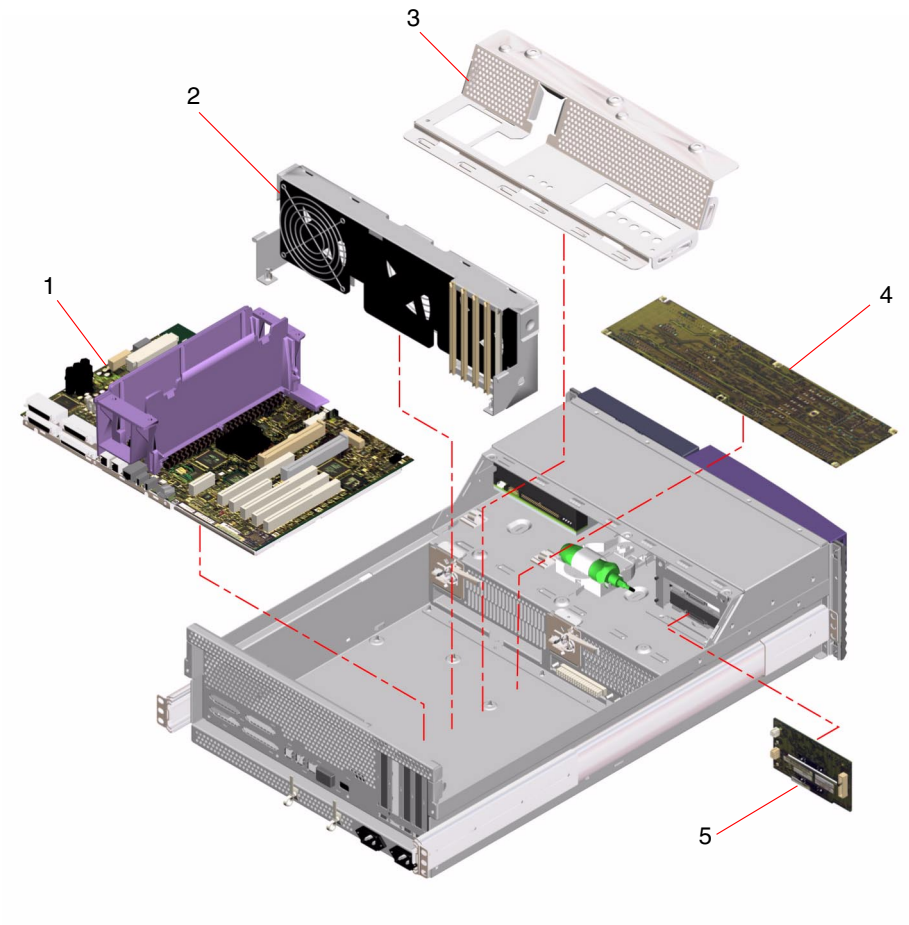


<b>Category</b>	<b>Part</b>	<b>Part Number</b>
Panels and Doors	Front Door - Left	540-4186
	Front Door - Right	540-4230
	RMA Cover (Plastic)	540-4219
	Key	250-1317
	Rails	340-5883
	Back Panel	540-4365
Internal Cables	CPU Power Sense Cable	530-2941
	Main Power Cable	530-2822
	I/O Power Cable	530-2864
	FC-AL Data Cable	530-3019
	Removable Media SCSI Cable	530-2942
	Keyswitch/Power Button/LED cable	530-2824
	Power Interlock Switch Cable	530-2830
	I <sup>2</sup> C Cable	530-2943
Internal Line Filter	530-2819	

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# System Components

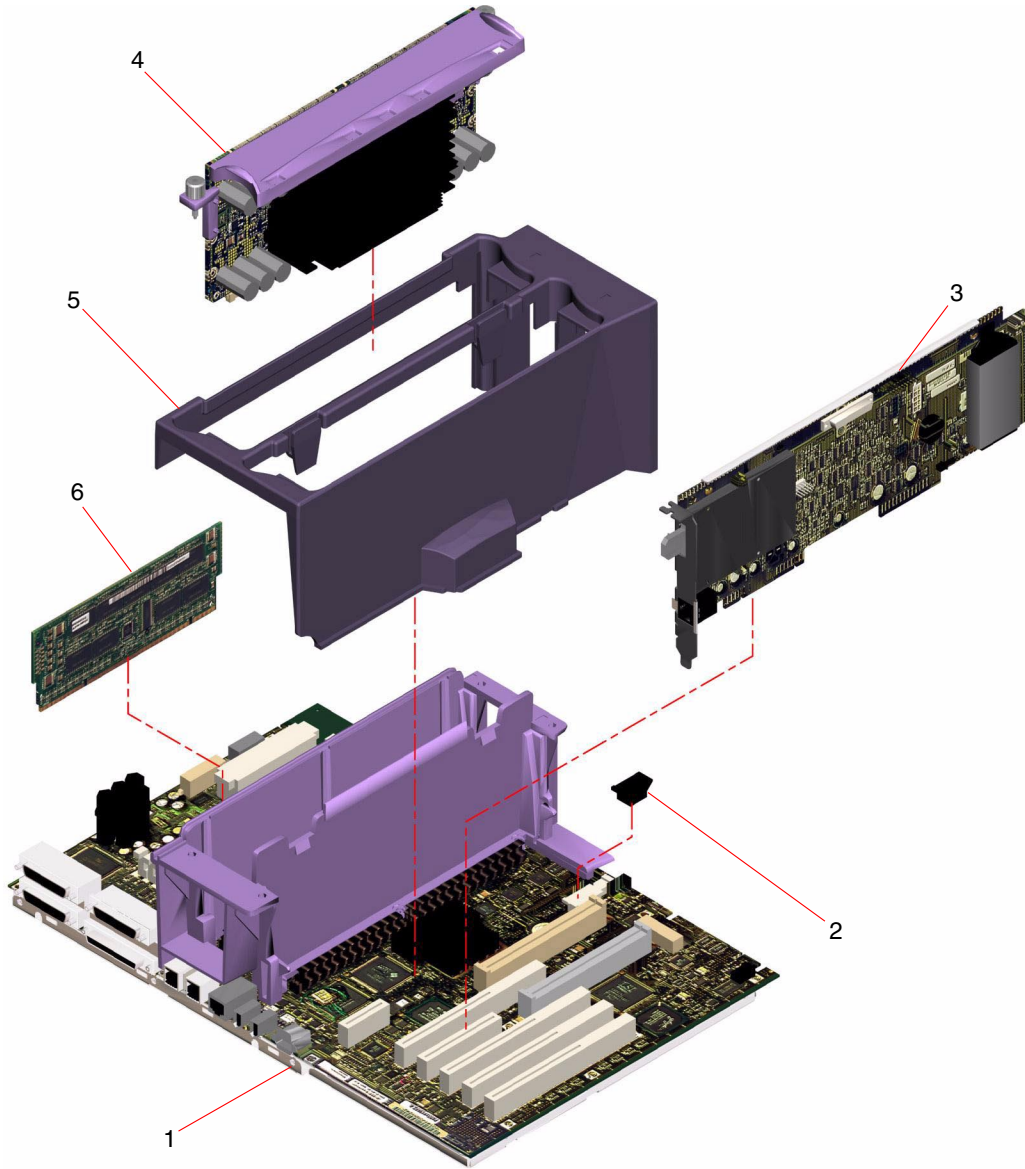
Reference Number	Part	Part Number
1	Main Logic Board Components	See next illustration
2	Fan Tray Assembly	540-4434
3	Power Distribution Board Cover	Not a FRU
4	Power Distribution Board	501-5775
5	FC-AL Backplane	501-5699



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# Main Logic Board Components

Reference Number	Part	Part Number
1	Main Logic Board	501-4143
2	ID SEEPROM	515-1788
3	RSC Card	501-5901
4	CPU Module, 750 MHz	501-5675
5	Air Guide	Not a FRU
6	128 MB DIMM	501-4489
Not Shown	256 MB DIMM	501-5401
Not Shown	512 MB DIMM	501-5030
Not Shown	1 GB DIMM	501-5031
Not Shown	CPU Filler Panel	Not a FRU



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# Chassis Components

Reference Number	Part	Part Number
1	System Cover	Not a FRU
2	Front Door - Left	540-4186
3	18 GB 10K RPM UltraSCSI Disk Drive	540-4191
Not Shown	36 GB 10K RPM UltraSCSI Disk Drive	540-4525
Not Shown	12-24 GB 4mm DDS4 Tape Drive	390-0028
4	Power Supply	300-1457
5	RMA Filler Panel (Plastic)	Not a FRU
6	RMA Cover	530-2824
7	10X DVD/CD-ROM Drive	390-0025
8	RMA Cage Assembly	Not a FRU
9	Front Door - Right	540-4230
10	Power Supply Filler Panel	Not a FRU

