grass valley

K2

10G RAID Storage

Instruction Manual

www.grassvalley.com

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Affiliate with the N.V. KEMA in The Netherlands

CERTIFICATE

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September 7, 2007	Initial release of the K2 Lx0 RAID Instruction Manual — 071-8614-00 for K2 Software Version 3.2.5
July 31, 2008	Update rack install procedure — 071-8614-01
November xx, 2010	Revisions for 8 Gig controllers, rack install— 071-8778-xx

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Read the following sections for important safety information.

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Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING: Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Safety terms and symbols

Terms in this manual

Safety-related statements may appear in this manual in the following form:

WARNING: Warning statements identify conditions or practices that may result in personal injury or loss of life.

CAUTION: Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the product

These terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the product

The following symbols may appear on the product:

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.

This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.

Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.

Route cable properly — Route power cords and other cables so that they ar not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICS). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

Sicherheit – Überblick

Lesen und befolgen Sie die wichtigen Sicherheitsinformationen dieses Abschnitts. Beachten Sie insbesondere die Anweisungen bezüglich

Brand-, Stromschlag- und Verletzungsgefahren. Weitere spezifische, hier nicht aufgeführte Warnungen finden Sie im gesamten Handbuch.

⚠ ***WARNUNG: Alle Anweisungen in diesem Handbuch, die das Abnehmen der Geräteabdeckung oder des Gerätegehäuses erfordern, dürfen nur von qualifiziertem Servicepersonal ausgeführt werden. Um die Stromschlaggefahr zu verringern, führen Sie keine Wartungsarbeiten außer den in den Bedienungsanleitungen genannten Arbeiten aus, es sei denn, Sie besitzen die entsprechende Qualifikationen für diese Arbeiten.***

Sicherheit – Begriffe und Symbole

In diesem Handbuch verwendete Begriffe

Sicherheitsrelevante Hinweise können in diesem Handbuch in der folgenden Form auftauchen:

⚠ ***WARNUNG: Warnungen weisen auf Situationen oder Vorgehensweisen hin, die Verletzungs- oder Lebensgefahr bergen.***

⚠ ***VORSICHT: Vorsichtshinweise weisen auf Situationen oder Vorgehensweisen hin, die zu Schäden an Ausrüstungskomponenten oder anderen Gegenständen oder zum zeitweisen Ausfall wichtiger Komponenten in der Arbeitsumgebung führen können.***

Hinweise am Produkt

Die folgenden Hinweise können sich am Produkt befinden:

GEFAHR – Wenn Sie diesen Begriff lesen, besteht ein unmittelbares Verletzungsrisiko.

WARNUNG – Wenn Sie diesen Begriff lesen, besteht ein mittelbares Verletzungsrisiko.

VORSICHT – Es besteht ein Risiko für Objekte in der Umgebung, den Mixer selbst oder andere Ausrüstungskomponenten.

Symbole am Produkt

Die folgenden Symbole können sich am Produkt befinden:

⚠ Weist auf eine gefährliche Hochspannung im Gerätegehäuse hin, die stark genug sein kann, um eine Stromschlaggefahr darzustellen.

Weist darauf hin, dass der Benutzer, Bediener oder Servicetechniker wichtige Bedienungs-, Wartungs- oder Serviceanweisungen in den Produkthandbüchern lesen sollte.

Dies ist eine Aufforderung, beim Wechsel von Sicherungen auf deren Nennwert zu achten. Die im Text angegebene Sicherung muss durch eine Sicherung ersetzt werden, die die angegebenen Nennwerte besitzt.

Weist auf eine Schutzerdungsklemme hin, die mit dem Erdungskontakt verbunden werden muss, bevor weitere Ausrüstungskomponenten angeschlossen werden.

Weist auf eine externe Schutzerdungsklemme hin, die als Ergänzung zu einem internen Erdungskontakt an die Erde angeschlossen werden kann.

Weist darauf hin, dass es statisch empfindliche Komponenten gibt, die durch eine elektrostatische Entladung beschädigt werden können. Verwenden Sie antistatische Prozeduren, Ausrüstung und Oberflächen während der Wartung.

Warnungen

Die folgenden Warnungen weisen auf Bedingungen oder Vorgehensweisen hin, die Verletzungs- oder Lebensgefahr bergen:

Gefährliche Spannungen oder Ströme – Schalten Sie den Strom ab, und entfernen Sie ggf. die Batterie, bevor sie Schutzabdeckungen abnehmen, löten oder Komponenten austauschen.

Servicearbeiten nicht alleine ausführen – Führen Sie interne Servicearbeiten nur aus, wenn eine weitere Person anwesend ist, die erste Hilfe leisten und Wiederbelebungsmaßnahmen einleiten kann.

Schmuck abnehmen – Legen Sie vor Servicearbeiten Schmuck wie Ringe, Uhren und andere metallische Objekte ab.

Keine offen liegenden Leiter berühren – Berühren Sie bei eingeschalteter Stromzufuhr keine offen liegenden Leitungen, Komponenten oder Schaltungen.

Richtiges Netzkabel verwenden – Verwenden Sie nur das mitgelieferte Netzkabel oder ein Netzkabel, das den Spezifikationen für dieses Produkt entspricht.

Gerät erden – Schließen Sie den Erdleiter des Netzkabels an den Erdungskontakt an.

Gerät nur mit angebrachten Abdeckungen und Gehäuseseiten betreiben – Schalten Sie dieses Gerät nicht ein, wenn die Abdeckungen oder Gehäuseseiten entfernt wurden.

Richtige Sicherung verwenden – Verwenden Sie nur Sicherungen, deren Typ und Nennwert den Spezifikationen für dieses Produkt entsprechen.

Gerät nur in trockener Umgebung verwenden – Betreiben Sie das Gerät nicht in nassen oder feuchten Umgebungen.

Gerät nur verwenden, wenn keine Explosionsgefahr besteht – Verwenden Sie dieses Produkt nur in Umgebungen, in denen keinerlei Explosionsgefahr besteht.

Hohe Kriechströme – Das Gerät muss vor dem Einschalten unbedingt geerdet werden.

Doppelte Spannungsversorgung kann vorhanden sein – Schließen Sie die beiden Anschlußkabel an getrennte Stromkreise an. Vor Servicearbeiten sind beide Anschlußkabel vom Netz zu trennen.

Zweipolige, neutrale Sicherung – Schalten Sie den Netzstrom ab, bevor Sie mit den Servicearbeiten beginnen.

Fassen Sie das Gerät beim Transport richtig an – Halten Sie das Gerät beim Transport nicht an Türen oder anderen beweglichen Teilen fest.

Gefahr durch mechanische Teile – Warten Sie, bis der Lüfter vollständig zum Halt gekommen ist, bevor Sie mit den Servicearbeiten beginnen.

Vorsicht

Die folgenden Vorsichtshinweise weisen auf Bedingungen oder Vorgehensweisen hin, die zu Schäden an Ausrüstungskomponenten oder anderen Gegenständen führen können:

Gerät nicht öffnen – Durch das unbefugte Öffnen wird die Garantie ungültig.

Richtige Spannungsquelle verwenden – Betreiben Sie das Gerät nicht an einer Spannungsquelle, die eine höhere Spannung liefert als in den Spezifikationen für dieses Produkt angegeben.

Gerät ausreichend belüften – Um eine Überhitzung des Geräts zu vermeiden, müssen die Ausrüstungskomponenten entsprechend den Installationsanweisungen belüftet werden. Legen Sie kein Papier unter das Gerät. Es könnte die Belüftung behindern. Platzieren Sie das Gerät auf einer ebenen Oberfläche.

Antistatische Vorkehrungen treffen – Es gibt statisch empfindliche Komponenten, die durch eine elektrostatische Entladung beschädigt werden können. Verwenden Sie antistatische Prozeduren, Ausrüstung und Oberflächen während der Wartung.

CF-Karte nicht mit einem PC verwenden – Die CF-Karte ist speziell formatiert. Die auf der CF-Karte gespeicherte Software könnte gelöscht werden.

Gerät nicht bei eventuellem Ausrüstungsfehler betreiben – Wenn Sie einen Produktschaden oder Ausrüstungsfehler vermuten, lassen Sie die Komponente von einem qualifizierten Servicetechniker untersuchen.

Kabel richtig verlegen – Verlegen Sie Netzkabel und andere Kabel so, dass Sie nicht beschädigt werden. Stützen Sie schwere Kabelbündel ordnungsgemäß ab, damit die Anschlüsse nicht beschädigt werden.

Richtige Netzkabel verwenden – Wenn Netzkabel mitgeliefert wurden, erfüllen diese alle nationalen elektrischen Normen. Der Betrieb dieses Geräts mit Spannungen über 130 V AC erfordert Netzkabel, die NEMA-Konfigurationen entsprechen. Wenn internationale Netzkabel mitgeliefert wurden, sind diese für das Verwendungsland zugelassen.

Richtige Ersatzbatterie verwenden – Dieses Gerät enthält eine Batterie. Um die Explosionsgefahr zu verringern, prüfen Sie die Polarität und tauschen die Batterie nur gegen eine Batterie desselben Typs oder eines gleichwertigen, vom Hersteller empfohlenen Typs aus. Entsorgen Sie gebrauchte Batterien entsprechend den Anweisungen des Batterieherstellers.

Das Gerät enthält keine Teile, die vom Benutzer gewartet werden können. Wenden Sie sich bei Problemen bitte an den nächsten Händler.

Consignes desécurité

Il est recommandé de lire, de bien comprendre et surtout de respecter les informations relatives à la sécurité qui sont exposées ci-après, notamment les consignes destinées à prévenir les risques d'incendie, les décharges électriques et les blessures aux personnes. Les avertissements complémentaires, qui ne sont pas nécessairement repris ci-dessous, mais présents dans toutes les sections du manuel, sont également à prendre en considération.

⚠ ***AVERTISSEMENT: Toutes les instructions présentes dans ce manuel qui concernent l'ouverture des capots ou des logements de cet équipement sont destinées exclusivement à des membres qualifiés du personnel de maintenance. Afin de diminuer les risques de décharges électriques, ne procédez à aucune intervention d'entretien autre que celles contenues dans le manuel de l'utilisateur, à moins que vous ne soyez habilité pour le faire.***

Consignes et symboles de sécurité

Termes utilisés dans ce manuel

Les consignes de sécurité présentées dans ce manuel peuvent apparaître sous les formes suivantes :

⚠ ***AVERTISSEMENT: Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire même fatales.***

⚠ ***MISE EN GARDE: Les mises en garde signalent des conditions ou des pratiques susceptibles d'occasionner un endommagement à l'équipement ou aux installations, ou de rendre l'équipement temporairement non opérationnel, ce qui peut porter préjudice à vos activités.***

Signalétique apposée sur le produit

La signalétique suivante peut être apposée sur le produit :

DANGER — risque de danger imminent pour l'utilisateur.

AVERTISSEMENT — Risque de danger non imminent pour l'utilisateur.

MISE EN GARDE — Risque d'endommagement du produit, des installations ou des autres équipements.

Symboles apposés sur le produit

Les symboles suivants peut être apposés sur le produit :

⚠ Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.

Signale que l'utilisateur, l'opérateur ou le technicien de maintenance doit faire référence au(x) manuel(s) pour prendre connaissance des instructions d'utilisation, de maintenance ou d'entretien.

Il s'agit d'une invite à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.

Identifie une borne de protection de mise à la masse qui doit être raccordée correctement avant de procéder au raccordement des autres équipements.

I dentifie une borne de protection de mise à la masse qui peut être connectée en tant que borne de mise à la masse supplémentaire.

Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.

Avertissements

Les avertissements suivants signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire même fatales :

Présence possible de tensions ou de courants dangereux — Mettez hors tension, débranchez et retirez la pile (le cas échéant) avant de déposer les couvercles de protection, de défaire une soudure ou de remplacer des composants.

Ne procédez pas seul à une intervention d'entretien — Ne réalisez pas une intervention d'entretien interne sur ce produit si une personne n'est pas présente pour fournir les premiers soins en cas d'accident.

Retirez tous vos bijoux — Avant de procéder à une intervention d'entretien, retirez tous vos bijoux, notamment les bagues, la montre ou tout autre objet métallique.

Évitez tout contact avec les circuits exposés — Évitez tout contact avec les connexions, les composants ou les circuits exposés s'ils sont sous tension.

Utilisez le cordon d'alimentation approprié — Utilisez exclusivement le cordon d'alimentation fourni avec ce produit ou spécifié pour ce produit.

Raccordez le produit à la masse — Raccordez le conducteur de masse du cordon d'alimentation à la borne de masse de la prise secteur.

Utilisez le produit lorsque les couvercles et les capots sont en place — N'utilisez pas ce produit si les couvercles et les capots sont déposés.

Utilisez le bon fusible — Utilisez exclusivement un fusible du type et du calibre spécifiés pour ce produit.

Utilisez ce produit exclusivement dans un environnement sec — N'utilisez pas ce produit dans un environnement humide.

Utilisez ce produit exclusivement dans un environnement non explosible — N'utilisez pas ce produit dans un environnement dont l'atmosphère est explosible.

Présence possible de courants de fuite — Un raccordement à la masse est indispensable avant la mise sous tension.

Deux alimentations peuvent être présentes dans l'équipement — Assurez vous que chaque cordon d'alimentation est raccordé à des circuits de terre séparés. Débranchez les deux cordons d'alimentation avant toute intervention.

Fusion neutre bipolaire — Débranchez l'alimentation principale avant de procéder à une intervention d'entretien.

Utilisez les points de levage appropriés — Ne pas utiliser les verrous de la porte pour lever ou déplacer l'équipement.

Évitez les dangers mécaniques — Laissez le ventilateur s'arrêter avant de procéder à une intervention d'entretien.

Mises en garde

Les mises en garde suivantes signalent les conditions et les pratiques susceptibles d'occasionner des endommagements à l'équipement et aux installations :

N'ouvrez pas l'appareil — Toute ouverture prohibée de l'appareil aura pour effet d'annuler la garantie.

Utilisez la source d'alimentation adéquate — Ne branchez pas ce produit à une source d'alimentation qui utilise une tension supérieure à la tension nominale spécifiée pour ce produit.

Assurez une ventilation adéquate — Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation. Ne déposez aucun document sous l'appareil – ils peuvent gêner la ventilation. Placez l'appareil sur une surface plane.

Utilisez des procédures antistatiques - Les composants sensibles à l'électricité statique présents dans l'équipement sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.

N'utilisez pas la carte CF avec un PC — La carte CF a été spécialement formatée. Le logiciel enregistré sur la carte CF risque d'être effacé.

N'utilisez pas l'équipement si un dysfonctionnement est suspecté — Si vous suspectez un dysfonctionnement du produit, faites inspecter celui-ci par un membre qualifié du personnel d'entretien.

Acheminez les câbles correctement — Acheminez les câbles d'alimentation et les autres câbles de manière à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.

Utilisez les cordons d'alimentation adéquats — Les cordons d'alimentation de cet équipement, s'ils sont fournis, satisfont aux exigences de toutes les réglementations régionales. L'utilisation de cet équipement à des tensions dépassant les 130 V en c.a. requiert des cordons d'alimentation qui satisfont aux exigences des configurations NEMA. Les cordons internationaux, s'ils sont fournis, ont reçu l'approbation du pays dans lequel l'équipement est utilisé.

Utilisez une pile de remplacement adéquate — Ce produit renferme une pile. Pour réduire le risque d'explosion, vérifiez la polarité et ne remplacez la pile que par une pile du même type, recommandée par le fabricant. Mettez les piles usagées au rebut conformément aux instructions du fabricant des piles.

Cette unité ne contient aucune partie qui peut faire l'objet d'un entretien par l'utilisateur. Si un problème survient, veuillez contacter votre distributeur local.

Certifications and compliances

Canadian certified power cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

FCC emission control

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 not installed and used in accordance with the instruction manual, 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. Changes or modifications not expressly approved by Grass Valley can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

EN55103 1/2 Class A warning

This product has been evaluated for Electromagnetic Compatibility under the EN 55103-1/2 standards for Emissions and Immunity and meets the requirements for E4 environment.

This product complies with Class A (E4 environment). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC emission limits

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, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

Laser compliance

Laser safety requirements

This product may contain a Class 1 certified laser device. Operating this product outside specifications or altering its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter 1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the "Laser Product Performance Standard," Code of Federal Regulation (CFR), Title 21, Subchapter J.

The International Electrotechnical Commission (IEC) Standard 825, "Radiation of Laser Products, Equipment Classification, Requirements and User's Guide," governs laser products outside the United States. Europe and member nations of the European Free Trade Association fall under the jurisdiction of the Comité Européen de Normalization Electrotechnique (CENELEC).

Safety certification

This product has been evaluated and meets the following Safety Certification Standards:

Standard	Designed/tested for compliance with:
ANSI/UL 60950-1	Safety of Information Technology Equipment, including Electrical Business Equipment (Second edition 2007).
IEC 60950-1 with CB cert.	Safety of Information Technology Equipment, including Electrical Business Equipment (Second edition, 2005).
CAN/CSA C22.2 No. 60950-1	Safety of Information Technology Equipment, including Electrical Business Equipment (Second edition 2007).
BS EN 60950-1	Safety of Information Technology Equipment, including Electrical Business Equipment 2006.

ESD Protection

Electronics today are more susceptible to electrostatic discharge (ESD) damage than older equipment. Damage to equipment can occur by ESD fields that are smaller than you can feel. Implementing the information in this section will help you protect the investment that you have made in purchasing Grass Valley equipment. This section contains Grass Valley's recommended ESD guidelines that should be followed when handling electrostatic discharge sensitive (ESDS) items. These minimal recommendations are based on the information in the "Sources of ESD and Risks" area. The information in "Grounding Requirements for Personnel" on page 26 is provided to assist you in selecting an appropriate grounding method.

Recommended ESD Guidelines

Follow these guidelines when handling Grass Valley equipment:

- Only trained personnel that are connected to a grounding system should handle ESDS items.
- Do not open any protective bag, box, or special shipping packaging until you have been grounded.

Note: When a Personal Grounding strap is unavailable, as an absolute minimum, touch a metal object that is touching the floor (for example, a table, frame, or rack) to discharge any static energy before touching an ESDS item

- Open the anti-static packaging by slitting any existing adhesive tapes. Do not tear the tapes off.
- Remove the ESDS item by holding it by its edges or by a metal panel.
- Do not touch the components of an ESDS item unless it is absolutely necessary to configure or repair the item.
- Keep the ESDS work area clear of all nonessential items such as coffee cups, pens, wrappers and personal items as these items can discharge static. If you need to set an ESDS item down, place it on an anti-static mat or on the anti-static packaging.

Sources of ESD and Risks

The following information identifies possible sources of electrostatic discharge and can be used to help establish an ESD policy.

Personnel

One of the largest sources of static is personnel. The static can be released from a person's clothing and shoes.

Environment

The environment includes the humidity and floors in a work area. The humidity level must be controlled and should not be allowed to fluctuate over a broad range. Relative humidity (RH) is a major part in determining the level of static that is being generated.

For example, at 10% - 20% RH a person walking across a carpeted floor can develop 35kV; yet when the relative humidity is increased to 70% - 80%, the person can only generate 1.5kV.

Static is generated as personnel move (or as equipment is moved) across a floor's surface. Carpeted and waxed vinyl floors contribute to static build up.

Work Surfaces

Painted or vinyl-covered tables, chairs, conveyor belts, racks, carts, anodized surfaces, plexiglass covers, and shelving are all static generators.

Equipment

Any equipment commonly found in anESD work area, such as solder guns, heat guns, blowers, etc., should be grounded.

Materials

Plastic work holders, foam, plastic tote boxes, pens, packaging containers and other items commonly found at workstations can generate static electricity.

Grounding Requirements for Personnel

The information in this section is provided to assist you in selecting a grounding method. This information is taken from ANSI/ESD S20.20-2007 (Revision of ANSI/ ESD S20.20-1999).

Product Qualification

Personnel Grounding Technical Requirement	Test Method	Required Limits
Wrist Strap System*	ANSI/ESD S1.1 (Section 5.11)	< 3.5×10^7 ohm
Flooring / Footwear System – Method 1	ANSI/ESD STM97.1	< 3.5×10^7 ohm
Flooring / Footwear System – Method 2 (both required)	ANSI/ESD STM97.1	< 10^9 ohm
	ANSI/ESD STM97.2	< 100 V

Product qualification is normally conducted during the initial selection of ESD control products and materials. Any of the following methods can be used: product specification review, independent laboratory evaluation, or internal laboratory evaluation.

Compliance Verification

Personnel Grounding Technical Requirement	Test Method	Required Limits
Wrist Strap System*	ESD TR53 Wrist Strap Section	< 3.5×10^7 ohm
Flooring / Footwear System – Method 1	ESD TR53 Flooring Section and ESD TR53 Footwear Section	< 3.5×10^7 ohm

Personnel Grounding Technical Requirement	Test Method	Required Limits
Flooring / Footwear System – Method 2 (both required)	ESD TR53 Flooring Section and ESD TR53 Footwear Section	< 1.0 x 10^9 ohm

* For situations where an ESD garment is used as part of the wrist strap grounding path, the total system resistance, including the person, garment, and grounding cord, must be less than 3.5 x 10^7 ohm.

Preface

About this manual

K2 10G RAID Storage includes primary and expansion chassis corresponding to NEC D4-30 with D4 controller(s). It provides RAID protected storage for the K2 Storage System. If you are responsible for installing and servicing K2 10G RAID, you should read this manual.

How this manual is organized

The *K2 10G RAID Storage Instruction Manual* is organized around the tasks you'll be performing to install and service your K2 RAID External Storage System. You can see this reflected in the chapter titles chosen for this manual. The following identifies and describes the chapters included in this manual:

Chapter 1, *About the K2 10G RAID*
Introduces the K2 10G RAID Storage. You can read this chapter to get familiar with the K2 10G RAID external storage key features and components.

Chapter 2, *K2 10G RAID Installation Information*
Describes how to install a K2 10G RAID Storage and K2 10G Expansion Chassis, including rack mounting. Refer to the *K2 SAN Installation and Service Manual* for connection and configuration information.

Chapter 3, *Servicing the K2 10G RAID*
Describes how to replace FRUs, such as disk modules, and add disk modules and redundant FRUs.

Chapter 4, *K2 10G RAID Technical Specifications and Operating Limits*
This appendix consists of electrical and environmental specifications.

Glossary
The Glossary explains terms used throughout this manual.

Terminology used in this manual

In order to avoid confusion between the storage types, the following terms will be used consistently throughout the K2 documentation:

Internal storage — K2 client models with internal storage access their own internal media storage drives, as a "stand-alone" system.

Direct-connect storage — K2 client models with direct-connected (i.e. not shared) storage access their own external media storage drives that are contained in a K2 RAID chassis, and are also considered stand-alone systems.

Shared storage — K2 client models with shared storage access RAID protected media storage drives that are part of a K2 Storage System (SAN). The K2 Storage System incorporates one or more RAID chassis, such as K2 10G RAID Storage.

K2 Storage System — specifically refers to the shared K2 SAN.

Stand-alone K2 client — refers to K2 Media Clients or K2 Summit Production Clients with internal storage or direct-connect storage.

Getting more information

The following sections help you find the information you need in product manuals and elsewhere.

For the installer of a K2 product with internal storage

If you are installing a K2 client with stand-alone internal storage or a K2 Solo Media Server, refer to documentation in the following sequence:

	Find this document…	In these locations…	In these formats:
1	K2 Release Notes	K2 software CD	PDF file
		Grass Valley Website	PDF file
2	Quick Start Guide for the K2 product	K2 product shipping box	Printed
		K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
3	K2 System Guide	K2 Documentation CD	PDF file
		Grass Valley Website	PDF file

For the installer of a K2 client with direct connect storage

If you are installing a K2 client with stand-alone direct connect storage, refer to documentation in the following sequence:

	Find this document…	In these locations…	In these formats:
1	K2 Release Notes	K2 software CD	PDF file
		Grass Valley Website	PDF file
2	K2 Storage Cabling Guide	K2 RAID shipping box	Printed
		K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
2	Quick Start Guide for the K2 product	K2 product shipping box	Printed
		K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
3	K2 System Guide	K2 Documentation CD	PDF file
		Grass Valley Website	PDF file

For the installer of K2 clients and K2 SAN shared storage

If you are installing a K2 SAN with connected K2 clients, refer to documentation in the following sequence:

	Find this document...	In these locations...	In these formats:
1	K2 Release Notes	K2 software CD	PDF file
		Grass Valley Website	PDF file
2	K2 Storage Cabling Guide	K2 RAID shipping box	Printed
		K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
2	Quick Start Guide for the K2 product	K2 product shipping box	Printed
		K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
3	K2 SAN Installation and Service Manual	K2 Documentation CD	PDF file
		Grass Valley Website	PDF file
3	K2 System Guide	K2 Documentation CD	PDF file
		Grass Valley Website	PDF file

Release Notes

The K2 Release Notes contain the latest information about the software shipped on your system. The release notes include software upgrade instructions, software specifications and requirements, feature changes from the previous releases, and any known problems. You should always check the Grass Valley Website to determine if there is an updated version of release notes available.

K2 Storage Cabling Guide

The cabling guide provides instructions for K2 Storage Area Network cabling and external configuration. The cabling guide provides instructions for each pre-defined level of K2 SAN and covers both redundant and basic (non-redundant) systems. You can find the cabling guide packaged with the primary RAID storage chassis.

Documentation CD

Except for the release notes, the full set of support documentation, including this manual, is available on the K2 Documentation CD that you receive with your K2 product. You can find the Documentation CD packaged in K2 product shipping boxes.

The Documentation CD includes the following:

- **K2 AppCenter User Manual** — Provides instructions for configuring and operating the media channels of product.
- **Quick Start Guides** — The Quick Start Guide provides step-by-step installation instructions for basic installation and operation of the K2 product.

- **K2 System Guide** — Contains the product specifications and instructions for modifying system settings.
- **Service Manuals** — Contains information on servicing and maintaining the K2 product.
- **K2 SAN Installation and Service Manual** — Contains installation, configuration, and maintenance procedures for shared storage options.
- **K2 Storage Cabling Guide** — Contains diagrams for cabling the devices of the K2 client.
- **RAID Instruction Manuals** — There is an Instruction Manual for each type of RAID storage device that can be a part of a K2 client. These manuals contain procedures for configuring and servicing the device.
- **Fibre Channel Switch Installation Manual** — Contains information on configuring and servicing the Fibre Channel switch.

On-line Help Systems

K2 AppCenter Help — In the AppCenter user interface menu bar select **Help,** then choose **AppCenter Help Topics** from the drop-down menu.

SiteConfig Help — In the SiteConfig user interface menu bar select **Help,** then choose **SiteConfig Help Topics** from the drop-down menu.

NetCentral Help — From the NetCentral interface select **Help | NetCentral Help Topics**.

NetCentral documentation

The NetCentral product has its own documentation set, described as follows:

- **NetCentral Quick Start Guide** — Provides an overview of the installation process to quickly set up and run NetCentral.
- **NetCentral Installation Guide** — Identifies requirements and procedures to correctly set up servers and devices, as well as provides detailed instructions to install and configure NetCentral software.
- **NetCentral User Guide** — Describes how to use the NetCentral Manager to monitor devices.
- **NetCentral Help** — From the NetCentral interface access on-line help. Select **Help | NetCentral Help Topics**.

Grass Valley Web Site

This public Web site contains all the latest manuals and documentation, and additional support information. Use the following URL.

http://www.grassvalley.com.

Grass Valley Product Support

To get technical assistance, check on the status of a question, or to report a new issues, contact Grass Valley Product Support via e-mail, the Web, or by phone or fax.

Web Technical Support

To access support information on the Web, visit the product support Web page on the Grass Valley Web site. You can download software or find solutions to problems.

World Wide Web:http://www.grassvalley.com/support/

Technical Support E-mail Address:gvgtechsupport@grassvalley.com

Telephone Support

Use the following information to contact Product Support by phone.

International Support Centers

Our international support centers are available 24 hours a day, 7 days a week.

Support Center	Toll free	In country
France	+800 80 80 20 20	+33 1 48 25 20 20
United States	+1 800 547 8949	+1 530 478 4148

Authorized Local Support Representative

A local support representative may be available in your country. To locate a support center during normal local business hours, refer to the following list. This list is regularly updated on the website for Grass Valley Product Support

(http://www.grassvalley.com/support/contact/phone/)

After–hours local phone support is also available for warranty and contract customers.

Region	Country	Telephone
Asia	China	+86 10 5883 7575
	Hong Kong, Taiwan, Korea, Macau	+852 2531 3058
	Japan	+81 3 6848 5561
	Southeast Asia - Malaysia	+603 7492 3303
	Southeast Asia - Singapore	+65 6379 1313
	India	+91 22 676 10324

Region	Country	Telephone
Pacific	Australia	1 300 721 495
	New Zealand	0800 846 676
	For callers outside Australia or New Zealand	+61 3 8540 3650
Central America, South America	All	+55 11 5509 3440
North America	North America, Mexico, Caribbean	+1 800 547 8949; +1 530 478 4148
Europe	UK, Ireland, Israel	+44 1189 230 499
	Benelux – Netherlands	+31 (0) 35 62 38 421
	Benelux – Belgium	+32 (0) 2 334 90 30
	France +	800 80 80 20 20; +33 1 48 25 20 20
	Germany, Austria, Eastern Europe	+49 6150 104 444
	Belarus, Russia, Tadzhikistan, Ukraine, Uzbekistan	+7 495 258 09 20
	Northern Europe	+45 404 72 237
	Southern Europe – Italy	+39 06 87 20 35 28
	Southern Europe – Spain	+34 91 512 03 50
Middle East, Near East, Africa	Middle East	+971 4 299 64 40
	Near East and Africa	+800 80 80 20 20; +33 1 48 25 20 20

Waste Electrical and Electronic Equipment Directive

grass valley

END-OF-LIFE PRODUCT RECYCLING NOTICE

Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive, the United States Environmental Protection Agency, and U.S. state and local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight. However, you are responsible for the removal of the equipment from your facility and packing the equipment to make it ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information concerning the program can be found at: www.thomsongrassvalley.com/environment

THOMSON images & beyond

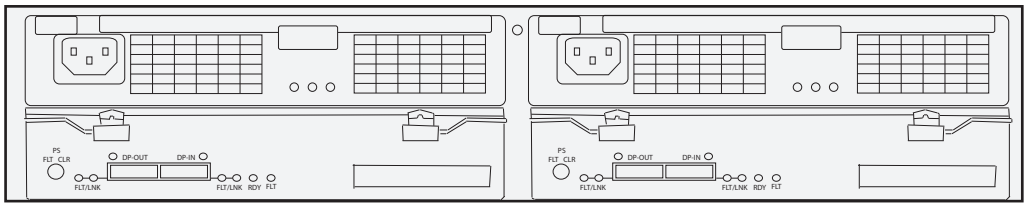
Chapter 1

About the K2 10G RAID

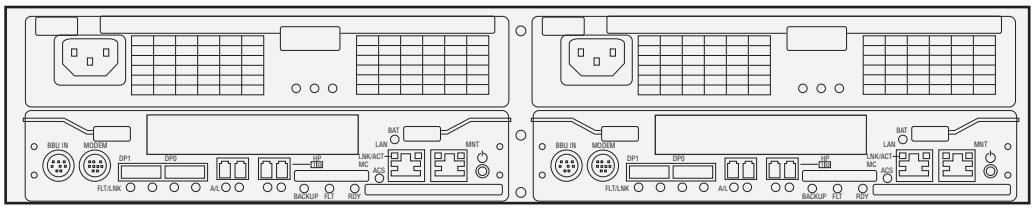
This chapter introduces the K2 10G RAID Storage. Topics include:

K2 10G RAID features

The K2 10G RAID is a high performance, high availability mass storage system used in K2 10G and K2 10G Expansion K2 Storage Systems. The K2 10G chassis 8 Gb/s host interface supports industry-standard technology.



Condor RAID Expansion Chassis



Condor RAID Chassis

The K2 10G RAID has a minimum of two host ports per controller. Each chassis is equipped with two power supplies. Individual high-speed SAS links connect drives.

Depending on your configuration, the K2 10G RAID chassis contains:

- Two or four host ports
- Up to 12 SAS or SATA disk drives
- One or two hardware RAID Controllers in a 2U high rack-mountable chassis

The K2 10G RAID Expansion Chassis provides additional storage capacity. It contains:

- Two Expansion Adapters
- Up to eleven K2 10G RAID Expansion Chassis can be connected to a single K2 10G RAID chassis
- A single disk-array storage system with up to 144 drives

K2 10G RAID components

The K2 10G RAID components are:

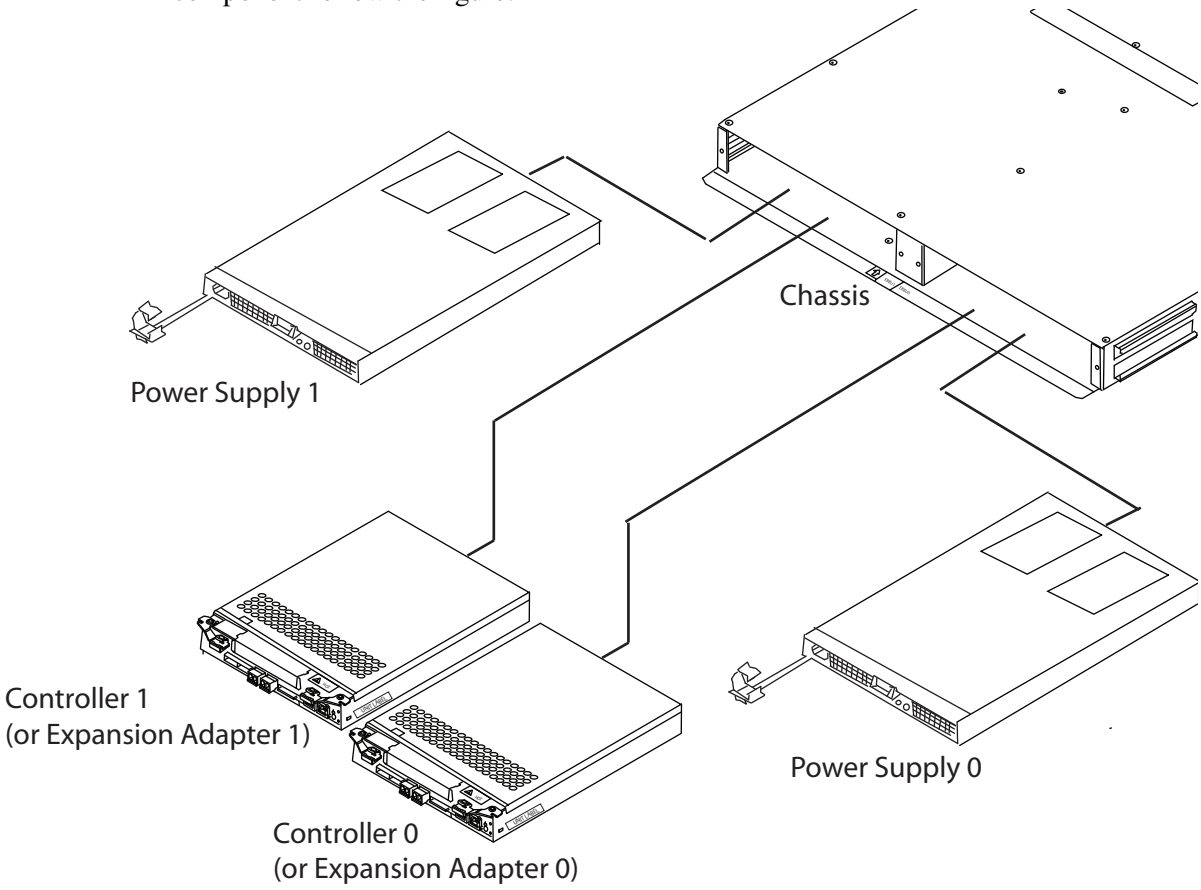
- One 2U high rack-mountable chassis
- One or two (K2 10G RAID redundant) RAID controllers or two expansion adapters (Expansion chassis)
- As many as twelve SAS or SATA disk drives per chassis
- Two RAID chassis power supplies

All configurations have SNMP ports, slots for primary and secondary controllers, and chassis with redundant power. Any unoccupied slot (RAID controller or disk module) has a filler module to maintain air flow and compliance with electromagnetic interference (EMI) standards.

The RAID controllers, expansion adapters, disk drives and power supplies are hot-swappable field replaceable units (FRUs), which means you can add or replace them while the K2 10G RAID is powered up.

An optional second RAID controller module in the K2 10G RAID allows for continued access to the K2 10G RAID if the primary RAID controller fails. Refer to the *K2 SAN Installation and Service Manual* for detailed connection and configuration instructions.

The following figure shows the RAID Storage Chassis components. Details on each component follow the figure.



NOTE: Every K2 10G RAID chassis controller includes a backup battery so that if electrical power is lost, data stored in cache memory will be saved.

Chassis

The chassis is a sheet-metal housing that contains chassis slots for the RAID controllers or expansion adapters, disk drives, power supplies, and the LAN card.

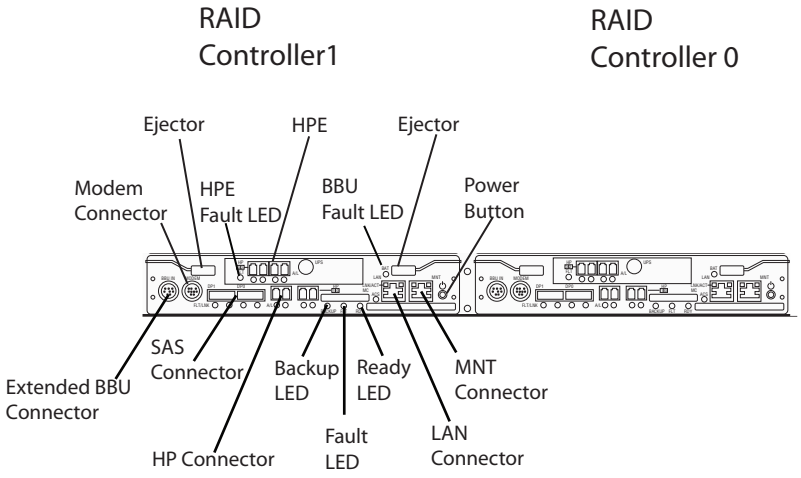
K2 10G RAID Circuit board modules

There are two circuit board modules used: the RAID controller module and the expansion adapter. The RAID controller module is in the primary RAID chassis. It manages the disk drives and provides an interface to the K2 Media Server system or switch. The expansion adapter is in an Expansion chassis. It manages the disk drives, in conjunction with the connected RAID controller and provides an SAS interface to the primary chassis.

K2 10G RAID Storage Chassis circuit board modules

The K2 10G RAID includes one or two RAID controller modules. This provides redundant host interface ports.

The following figure shows a K2 10G RAID with the two RAID controller modules.

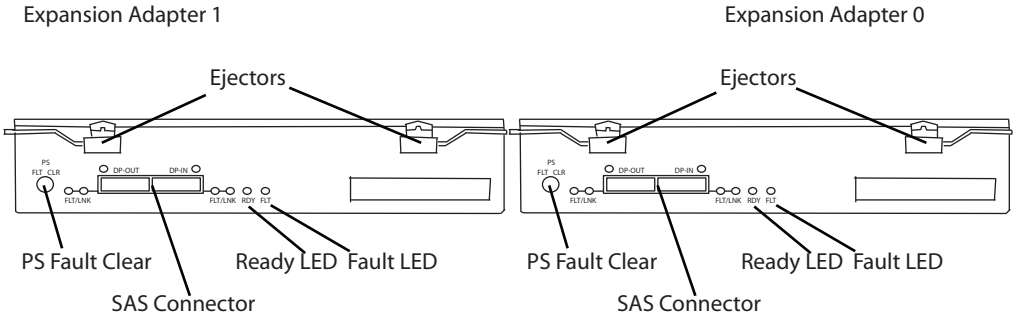


The RAID controller module has two host ports (HP0/HP1) and two Expansion Chassis SAS ports (DL1/DL0). The Host ports require LCC cables (optical) for the Fibre Channel connection to a K2 Media Server or to a Fibre Channel switch. The Expansion Chassis Ports require SAS cables for the SAS connections with a K2 10G Expansion Chassis. There are two port status LEDs for each Host port and each SAS port. Refer to "Interpreting controller status LEDs" on page 56.

When the redundant controller option is not installed in the K2 10G RAID Storage Chassis, a blank fills the other RAID controller slot.

K2 10G Expansion RAID Expansion Chassis circuit board modules

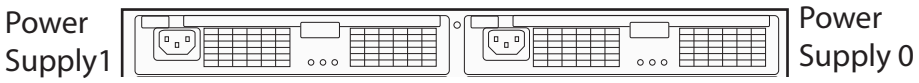
The K2 10G Expansion RAID Expansion Chassis has two expansion adapters as shown in the following figure.



The expansion adapter in the K2 10G Expansion has two SAS ports: DP-IN and DP-OUT. SAS cabling connects the DP-IN port to a K2 10G. There are two port status LEDs for each SAS port. Refer to "Interpreting expansion adapter status LEDs" on page 59.

Power supplies

There are two auto-ranging power supplies, each with a power cord. Each supply supports a fully configured K2 10G External RAID and shares load currents with the other supply, if it is present. The power supplies are designed so as to protect the disk drives if you install them while the K2 10G External RAID is powered up. A disk with power-related faults will not adversely affect the operation of any other disk.



Each power supply has status LEDs visible from the rear panel. The status LEDs are described in the "Interpreting power supply status LEDs" on page 60. You can add or remove one power supply in the RAID Storage Chassis while the RAID Storage Chassis is powered up, but the operation must be completed within two minutes. Even if a power supply is disabled, the fan in the non-functioning power supply can run off the second power supply to cool the RAID for a couple of minutes.

Disk modules

Each disk module consists of a SAS or SATA disk drive in a carrier assembly. If a disk drive fails, and needs replacing, you can do so while the RAID Storage Chassis is powered up. Replacement disk drives begin rebuilding immediately after being installed. (See "Removing and installing disk modules" on page 61.)

The following table shows how disk modules are identified based on the chassis address and physical location. The chassis with an address set to 0 contains drives from 00 to 0B; the expansion chassis are numbered X0 through XB, where X indicates the chassis number.

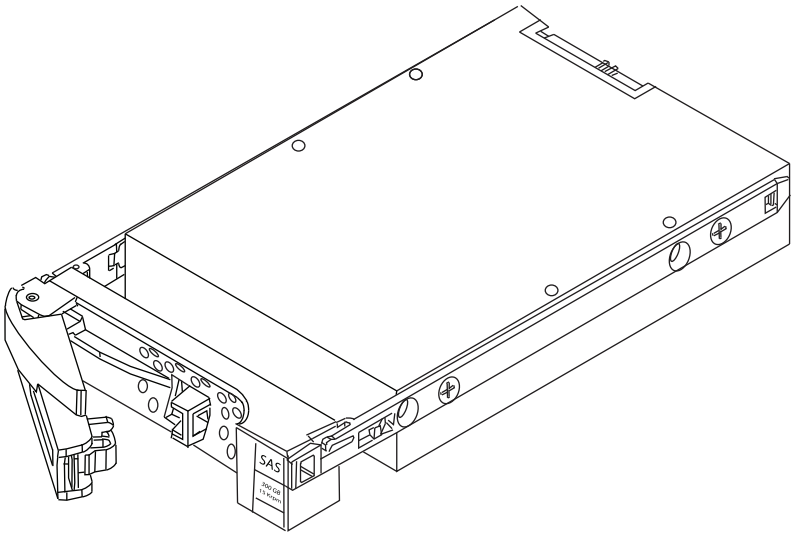
00	01	02	03
04	05	06	07
08	09	0A	0B

For information on cabling expansion chassis, see the *K2 SAN Installation and Service Manual*

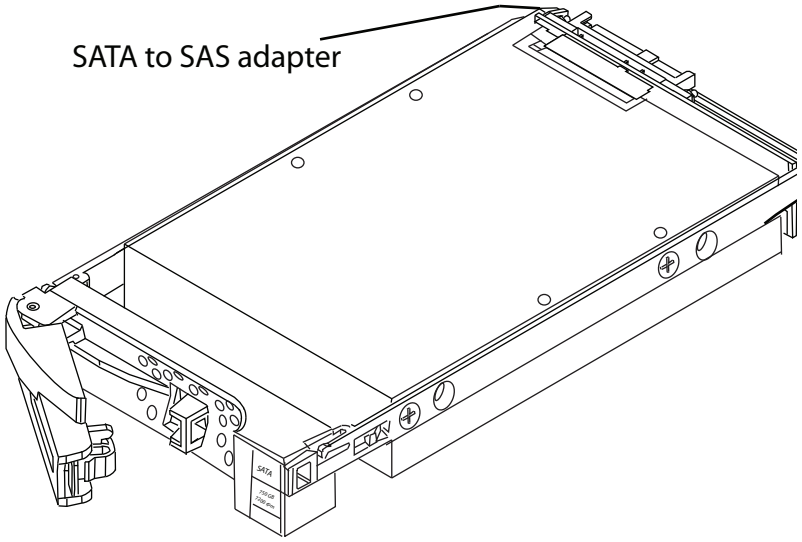
An operating primary RAID chassis must have, at a minimum, the first three physical drives (00 - 02) installed, as the RAID configuration information is written to these drives. Microcode is also written to these disks when RAID controller microcode is loaded.

The SAS and SATA disk drives are shown in the following illustrations. The SATA drive has an adapter to fit it to the K2 10G RAID Chassis.

SAS disk drive



SATA disk drive



Chapter 2

K2 10G RAID Installation Information

This chapter describes information you'll need to install the K2 10G RAID Storage (K2 10G Expansion Chassis). Major topics are:

- "Installation requirements"
- "Installing a K2 10G RAID in an equipment rack"
- "K2 10G RAID power-up and initialization"
- "K2 10G RAID power-down"

Installation requirements

This section describes the following requirements:

Site requirements

For proper K2 10G Expansion Chassis operation, the installation site must conform to certain environmental specifications. These are detailed below and in Chapter 4, *K2 10G RAID Technical Specifications and Operating Limits*.

Power

Refer to "Data handling specifications" on page 70 for AC power requirements. If one of the two power supplies fails, the remaining power supply and cord can support the full load. You must use a rack mount cabinet with AC power distribution, and have main branch AC distribution that can handle these values for the number of K2 10Gs and K2 10G Expansion Chassis units that you will interconnect.

Cooling

Make sure your site has air conditioning of the correct size and placement to maintain the specified ambient temperature range. The air conditioning must be able to handle the requirements of the K2 10Gs and any connected K2 10G Expansions as indicated under "Environmental limits" on page 71.

Cabling requirements

It is recommended that you use the cables shipped with your K2 10G RAID when making connections. For cable specifications, refer to "Cable lengths" on page 71. Host cables must meet the appropriate 8-Gbit HPA compliance standards.

NOTE: Also refer to the** K2 SAN Installation and Service Manual **for cabling diagrams and step-by-step instructions.

Binding disk modules into groups

After cabling a K2 10G RAID and any K2 10G Expansion Chassis, you must bind disk modules using the Storage Utility provided by Grass Valley. Once bound, the order of the drives is important. Do not rearrange drives once they have been bound. Refer to the *K2 SAN Installation and Service Manual* for information on using the Storage Utility to bind drives.

Installing a K2 10G RAID in an equipment rack

Use the information in this section to unpack the K2 10G RAID chassis and mount in an equipment rack.

Procedures include:

- "Unpacking the chassis"
- "Installing the rack mounts"
- "Inserting the K2 10G RAID chassis in the rack"

Unpacking the chassis

Unpack the K2 10G RAID chassis, cables, and installation kit, as illustrated by the diagram on the outside of the packing box.

⚠ ***CAUTION: A K2 10G RAID chassis is heavy. Three people should lift and move it.***

NOTE: Save the chassis packaging. Use only K2 approved packaging to ship.

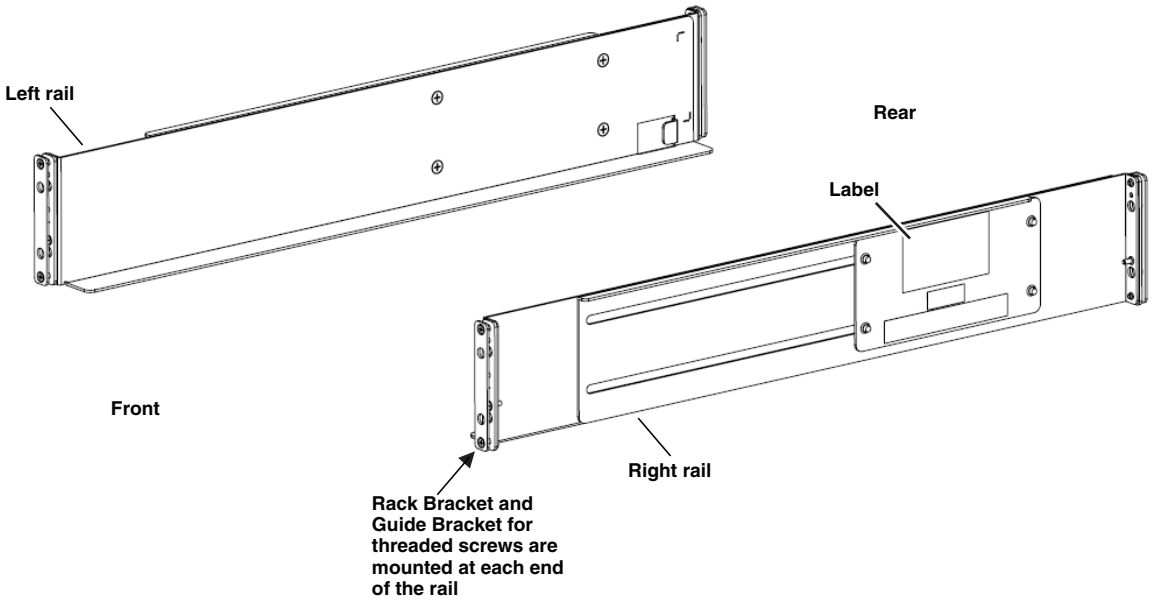
Installing the rack mounts

The rack kit consists of left side rail and right side rail. The rack kit has Guide Brackets as follows:

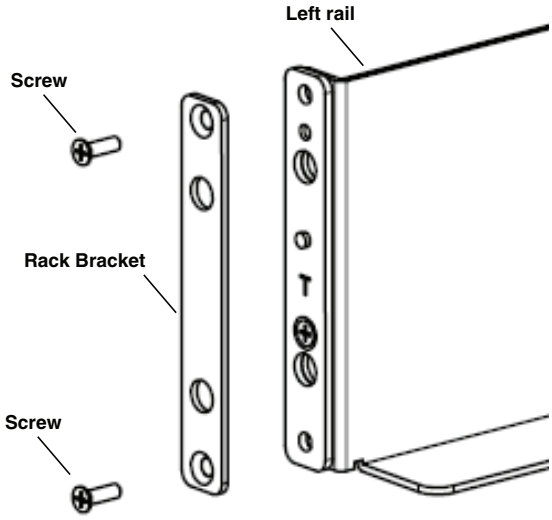
- H — For racks with 0.281 inch round holes
- T — For racks with No. 10-32 UNF threaded holes

These instructions apply to the left side rack. Install as directed, then apply similarly to the right side rack.

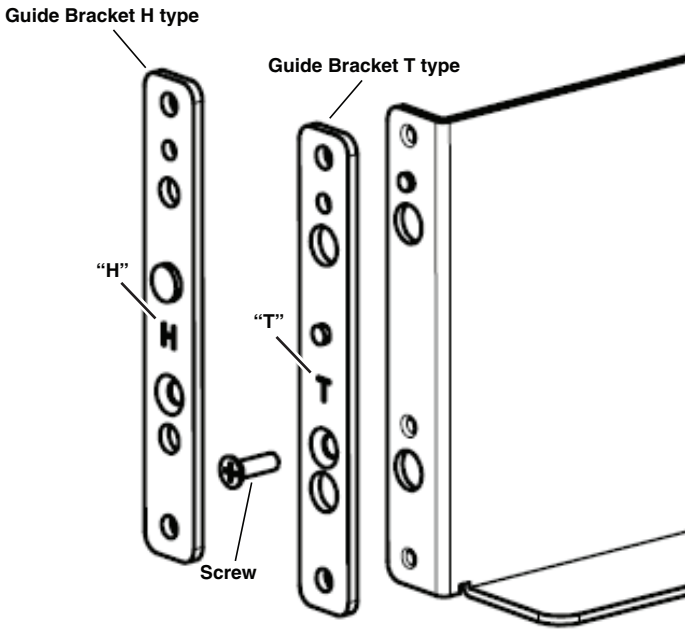
1. Stand facing the front of the rack to orient right and left sides.
2. Identify right side and left side rails as follows:
   - The right side rail has an installation diagram affixed. When installed correctly, this diagram faces the outside of the rack.
   - The left side rail has no diagram affixed.



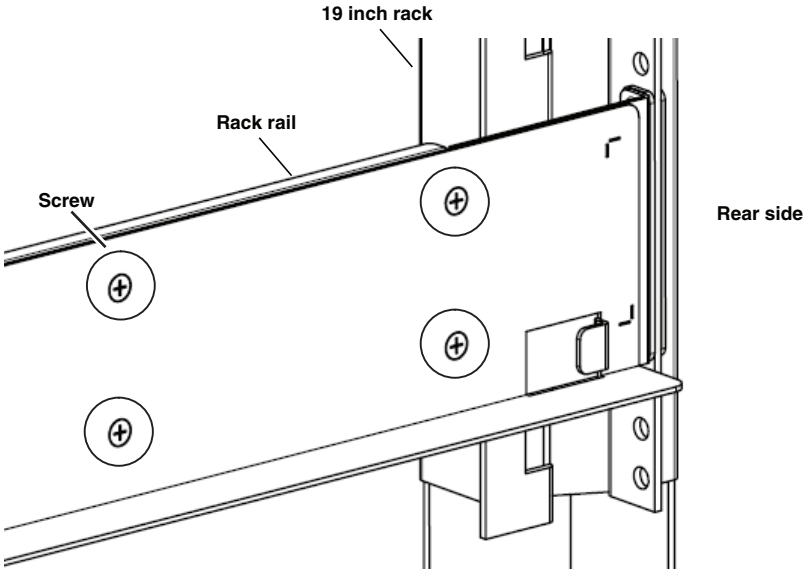
3. Remove the rack brackets from the guide brackets at both ends of the rail. Save the rack brackets and the M3 screws, as they are used later in this procedure.



4. Proceed as follows:
   - If your rack has 10-32 threaded holes, skip the next step.
   - If your rack has 0.281-inch round holes, proceed with the next step.
5. For a rack with 0.281-inch round holes, at both ends of the rail replace the T type guide brackets with the H type guide brackets.



6. Loosen the rail adjustment screws so that the inner rail slides freely.

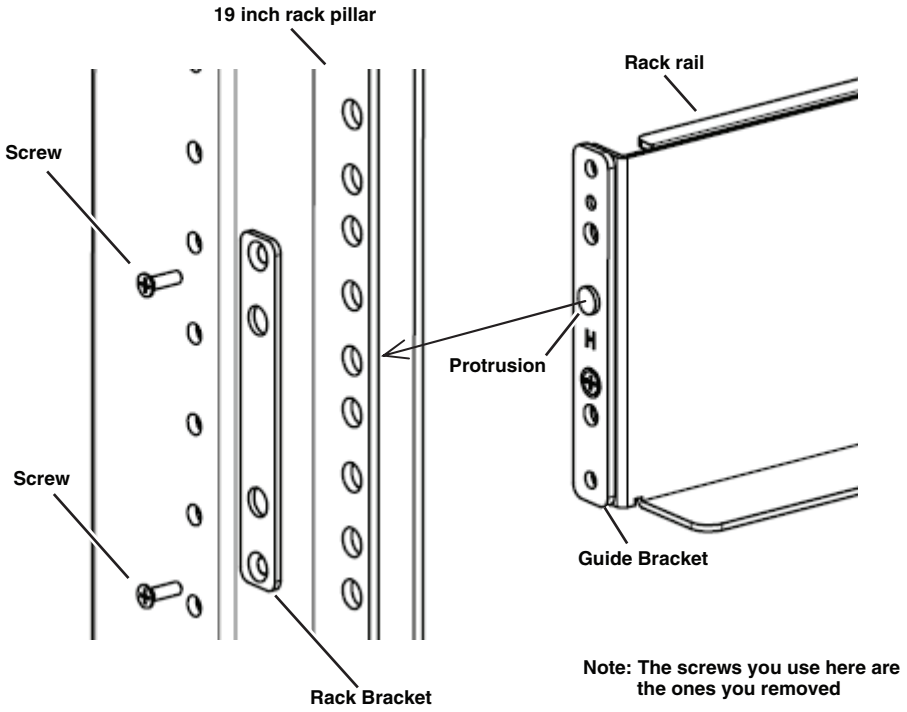


7. Determine a vertical position for the rail to support the RAID unit.

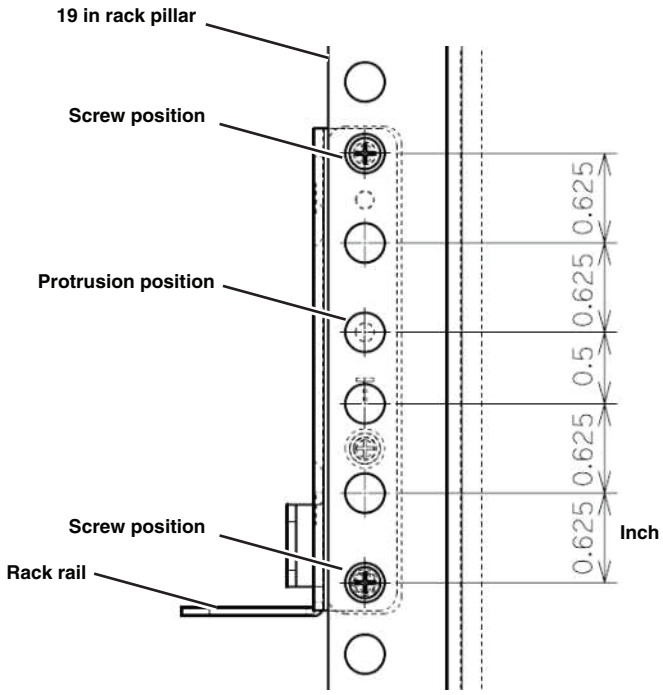
   The protrusion on the Guide Bracket guides the rack rail to the appropriate position on the rack.

8. Place the rack rail inside the front pillar of the rack.

9. Affix the rack rail with two M3 flat head screws at each end of the rack rail.



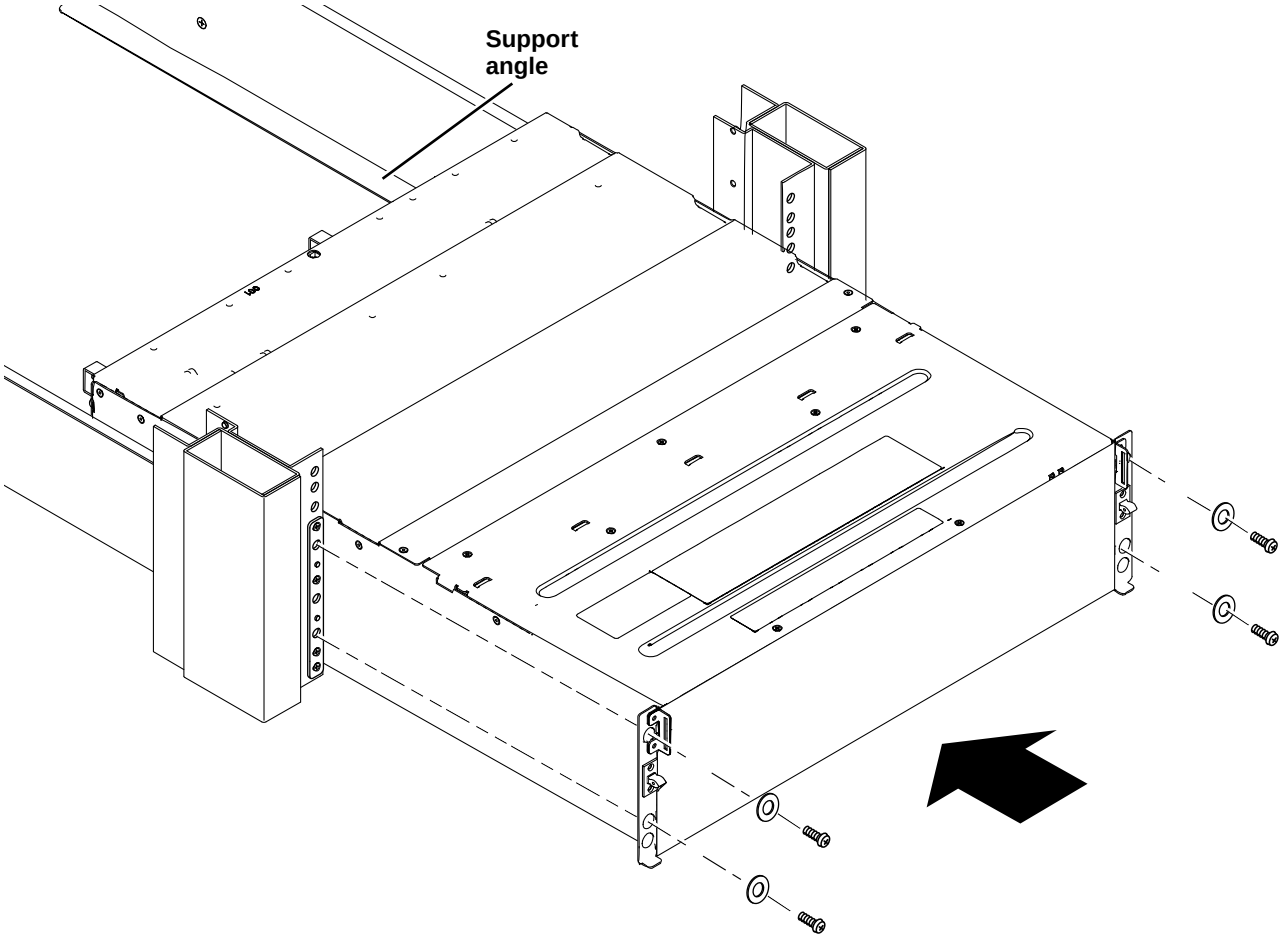
10. Refer to the following diagram for detail of the relationship between the holes in the rack and the holes in the Guide Bracket.



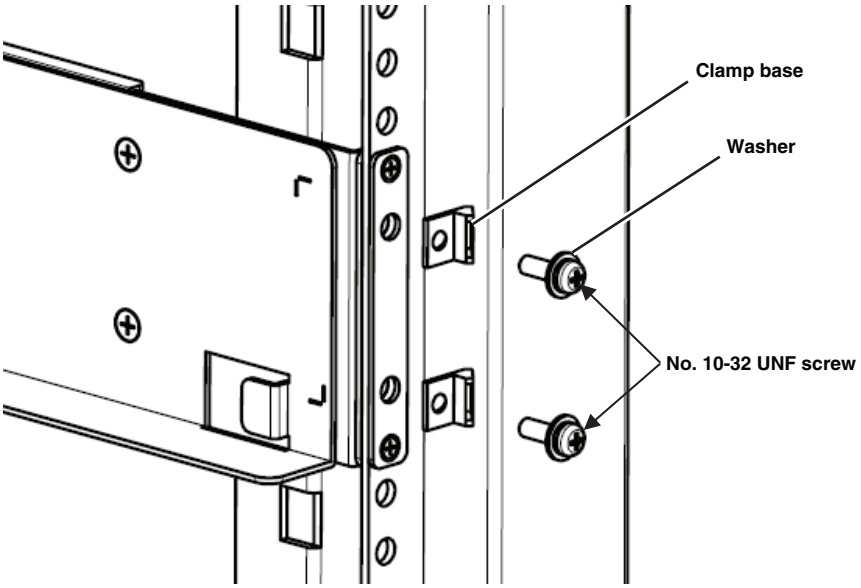
11. Apply previous steps to attachment at the rear pillar of the rack.
12. Firmly tighten the rail adjustment screws.
13. Repeat this procedure for the other side rail.

Inserting the K2 10G RAID chassis in the rack

1. Rest the chassis on the support angles shown. Slide the chassis back and into place
2. Secure the chassis to the rack with the 10-32 mounting screws. On racks with threaded holes the mounting screws engage the rack's threaded holes. On racks without threaded holes the mounting screws engage the H type guide bracket's threaded holes.

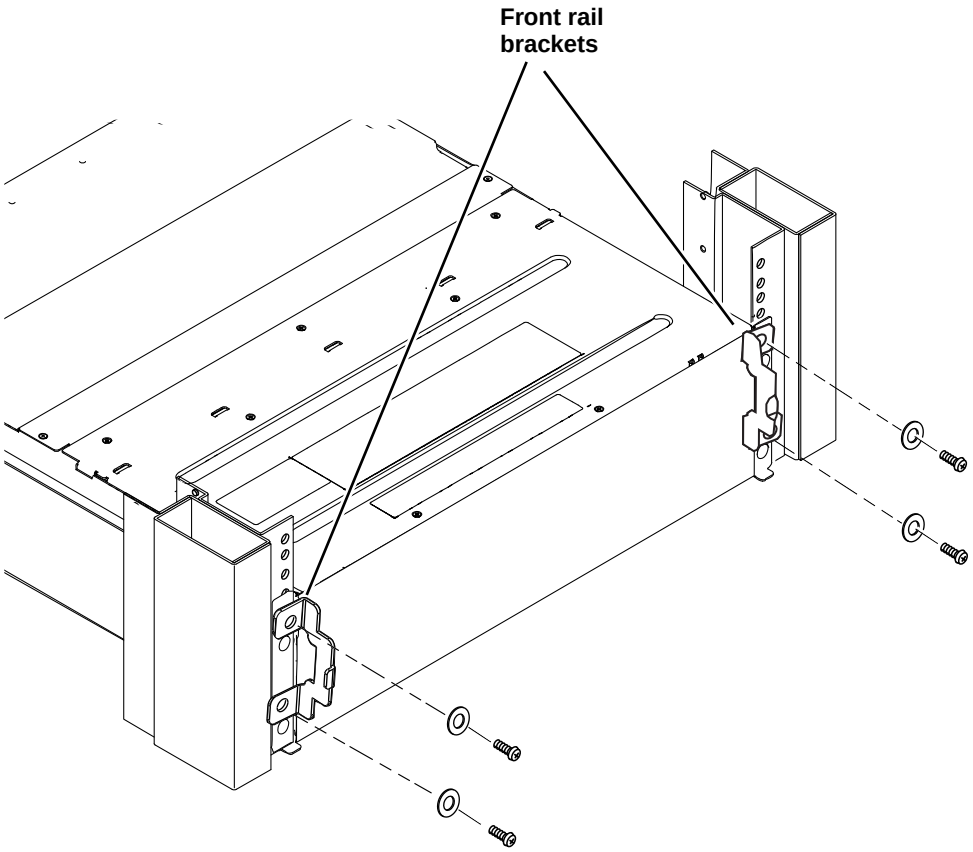


3. At the rear of the rack, insert and tighten the 10-32 mounting screws, with cable clamps, through the rear rack brackets. On racks with threaded holes the mounting screws engage the rack's threaded holes. On racks without threaded holes the mounting screws engage the H type guide bracket's threaded holes.

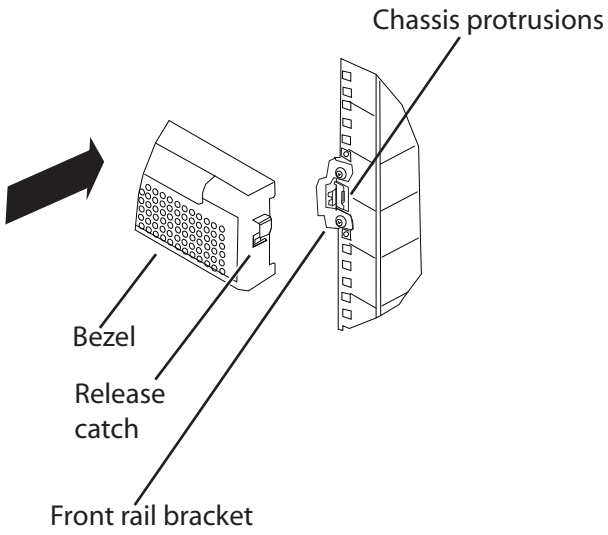


The 10-32 screws in the rear provide necessary reinforcement to the M3 screws.

4. Secure the two front rail brackets to the front rails with four M5 screws, two on either side. Place the screws above and below the chassis protrusions as shown in the following diagrams.



5. To install the Grass Valley bezel to the front of the chassis, slide the bezel directly on to the front rail brackets. To remove the bezel, press the release catches on either side of the bezel and pull it straight back.



6. Repeat this procedure to insert each K2 10G RAID chassis in the rack.

K2 10G RAID power-up and initialization

This section gives information about connecting power and powering-on the K2 10G RAID system.

Connecting electrical cables

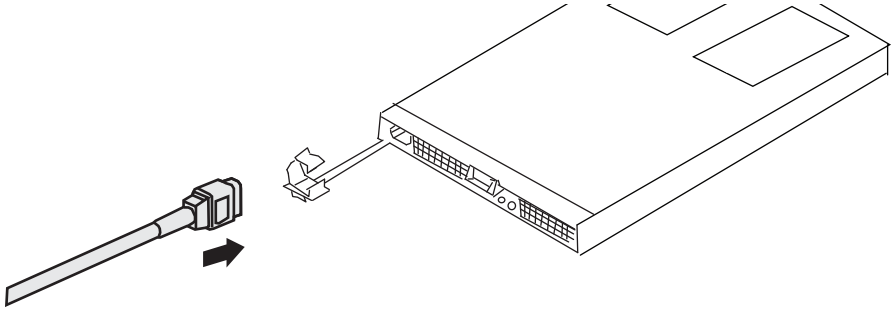
For each chassis, there are two electrical cables (one for each power supply) that should be connected to separate outside power sources.

⚠ ***WARNING: Make sure the power cords meet local safety and electrical standards.***

⚠ ***CAUTION: The K2 10G RAID system must be electrically grounded. Operating the system without proper grounding can damage disk drives. If the outlet you use is not grounded, make sure that a licensed electrician replaces it and installs a grounding conductor.***

To prevent the plug from being inadvertently disconnected, secure the electrical cable into the outlet by doing the following:

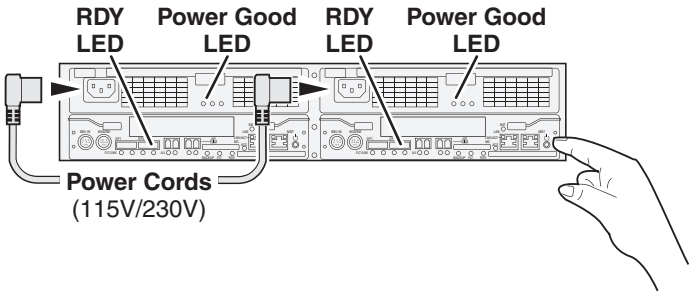
1. Check that the power switch on the RAID chassis and those on the host system are all set to OFF.
2. Insert the power cord into the power supply.



3. Secure the power cord with the power cable clamp.
4. Insert the plug of the power cord into an AC outlet. Use a grounded AC outlet.

Powering-up the K2 10G RAID system

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

   Refer to sections in Chapter 3, "Servicing the K2 10G RAID" for information on interpreting status LED behavior.

NOTE: Refer to the K2 SAN Installation and Service Manual for complete system power-up procedures.

K2 10G RAID power-down

NOTE: If your K2 10G RAID system is part of a shared storage system, refer to the *K2 SAN Installation and Service Manual* ***for instructions on shutting down the shared storage before powering down a K2 10G RAID.***

To power-down the K2 10G RAID correctly:

1. Stop all read/write activity to the K2 10G RAID storage system.
2. On the primary RAID controller chassis, press and hold down the power button.
3. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second.

NOTE: Do not hold down the power button for longer than 15 seconds.

The power is turned off for the primary and expansion RAIDs. Power-off normally occurs within 20 seconds. It is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.

To turn on power, refer to "K2 10G RAID power-up and initialization" on page 49.

Battery Backup

Every K2 10G RAID chassis power supply includes a backup battery so that if electrical power is lost, data stored in cache memory will be saved.

Chapter 3

Servicing the K2 10G RAID

This chapter describes how to monitor K2 10G External RAID status and replace Field Replaceable Units (FRU).

Topics include:

Maintenance procedures using Grass Valley Storage Utility

Several maintenance procedures can be performed using the Grass Valley Storage Utility.

To perform the following tasks, refer to the *K2 SAN Installation and Service Manual*:

- Checking RAID controller microcode version
- Loading RAID controller microcode
- Identifying disk modules prior to removal
- Downloading K2 10G Expansion disk drive firmware
- Disabling a K2 10G Expansion RAID controller for removal
- Disabling a K2 10G Expansion disk module for removal
- Configuring K2 10G Expansion network and SNMP settings

Monitoring K2 10G External RAID status using NetCentral

You can monitor K2 10G External RAID Storage systems using Grass Valley's NetCentral monitoring software. Enabled by SNMP, NetCentral can continuously monitor the storage system and send notifications if there is a problem. The SNMP agent software required for NetCentral monitoring resides on the RAID storage device itself. As a result, the K2 10G External RAID appears in NetCentral as a standalone device rather than as a subsystem of the K2 client.

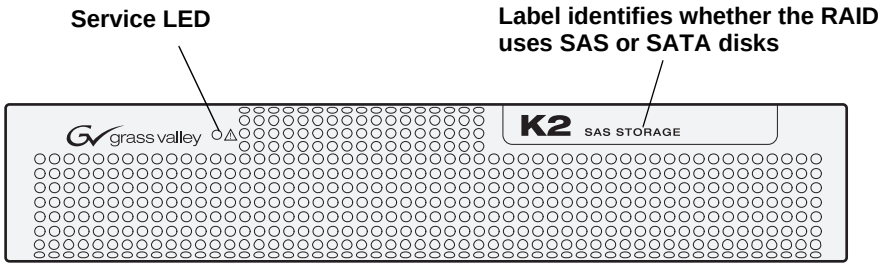
Communication with NetCentral takes place over the Ethernet connection on each RAID controller. To monitor the K2 10G External RAID, you must connect network cabling, power on the system, then configure network and SNMP settings as described in the *K2 SAN Installation and Service Manual*.

Refer to the *NetCentral On-line Help* for information on monitoring the K2 10G RAID with NetCentral.

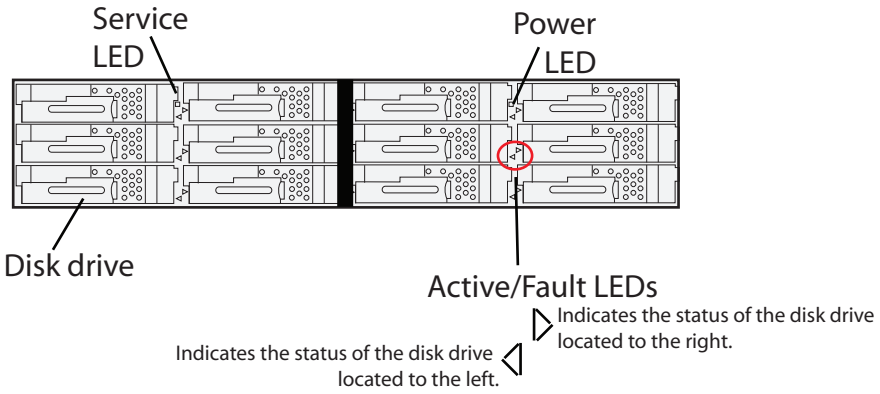
Interpreting front panel LEDs

Use the following illustrations (with and without the bezel) and table to identify and interpret front panel LEDs.

With the bezel on, only the Service LED is visible on the front panel.



With the bezel off, the Power LED and Active Fault LEDs are visible.

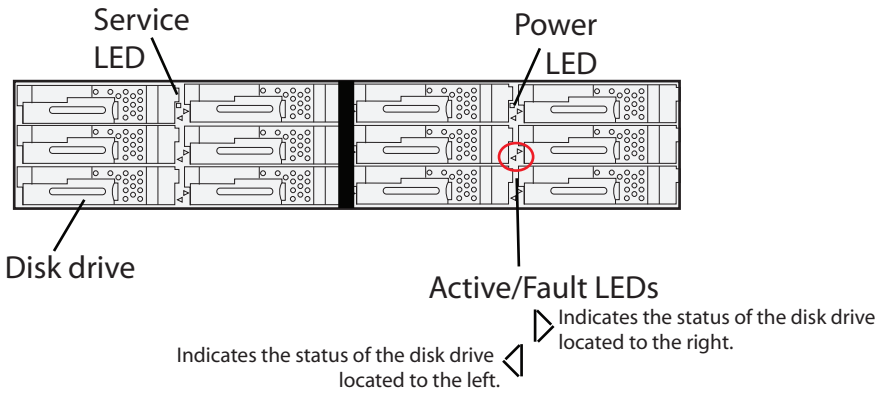


Primary and Expansion RAID chassis

Operating Condition	Power LED	Service LED	Meaning
Running	On	Off	Normal operation
	On	On	Requesting maintenance or processing a maintenance task, such as system recovery.
	On	On	Requesting maintenance or processing a maintenance task (such as system recovery). Further information provided via NetCentral.
Starting up	On	Flash	(Primary RAID only) One of the following sequences are in progress: Power-on Online download Automatic download To identify the sequence, use the controller's Ready and Fault LEDs. Do not turn off the power supply while a sequence is in progress. For more information, see "K2 10G RAID power-up and initialization" on page 49.
	On	Flash (5 sec.) and Off (7 sec.)	(Primary RAID only) Requesting maintenance. (Battery backup failure, cache write data may have been lost)
Shutting down	Flash (.2 sec) and Off (.7 sec)	Off	(Primary RAID only) Shutdown sequence is in progress.
	Off	Off	Shutdown sequence is complete.

Interpreting disk module LEDs

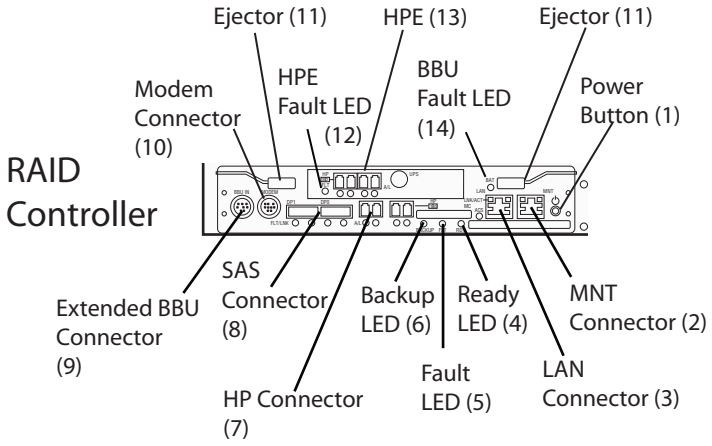
Use the following illustration and table to identify and interpret disk module LEDs. For each disk drive or dummy carrier, a single Active/Fault LED indicates the states of the disk drive.



Active/Fault LED		Meaning
Green	On	Normal state (ready)
Green	Blinking	Normal status (accessing)
Green/ Orange	Blinking in turn	Rebuilding
Orange only	Blinking	HDD low power state
Orange	On	Abnormal status

Interpreting controller status LEDs

Use the following illustration and table to identify and interpret controller LEDs.



Indicator	Description	
Power button (1)	Turns power on and off	
MNT connector (2)	Connects the controller to a maintenance PC	
LAN connector(3)	Connects the controller to a Storage Manager or a LAN for SNMP.	
	On the left is the LINK LED (green), which indicates that a LAN is physically connected.	On the right is the Active LED (orange), which illuminates during a TCP protocol connection from a host.

Ready LED (4) (green)	Fault LED (5) (orange)	Meaning
Blinking	Off	Normal operation
On	Off	Starting
Blinking (2 times/ second)	Off	Shutdown sequence in progress
Blinking asynchronously		Online/automatic download sequence in progress
Blinking synchronously		In download mode
Blinking	On	Disk interface is unavailable
On	On	Occurrence of fault

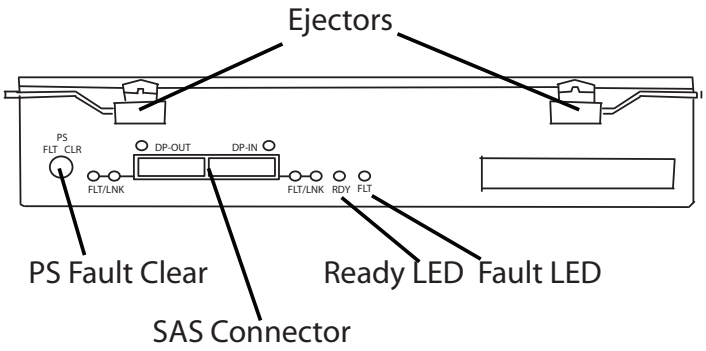
Ready LED (4) (green)	Fault LED (5) (orange)	Meaning
On	Blinking	Waiting for disk enclosure power-on
Off	Off	Powered off

Indicator	Description	
Backup LED (6)	Blinks orange light to indicate the battery backup state	Blinks if the controller has lost power, was improperly shut down, or faulted, with data in its cache that has not been written to disk. These conditions need to be rectified before the backup battery discharges (about 24 hours).
HP connector (7)	Connects the disk array unit to a host. Without an expansion port, there are two ports per controller. With an expansion port, there are four ports per controller. On the left is the Access LED, which shows the state of I/O processing. On the right is the Link LED, which shows the state of the FC link. Locations and port numbers HP3 HP 2 HP1 HP0	Both LEDs blinking in a one-second cycle shows the port if offline Both LEDs blinking quickly (500ms cycle) shows the shutdown sequence is in progress. Any other simultaneous blinking shows that the port setting is not correct.
SAS connector (8)	Connects the K2 10G RAID to expansion chassis. Two connectors per controller. Locations and port numbers: DP1 DP 0	
	Link LED (green)	Illuminates to indicate that the link-up is being executed on the Expansion chassis. Off state indicates that the link-down is being executed on the Expansion chassis
	Fault LED (orange)	Illuminates to indicate an error.
Extended BBU connector (9)	Not used.	
Modem connector (10)	Not used.	
Ejector (11)	Used to install or remove the controller.	
HPE Fault LED (12) (Orange)	Illuminates to indicate an abnormality in the host port extension.	

Indicator	Description	
HPE (13)	Expands the HP connector.	
BBU Fault LED(14) (Orange)	BBU Fault LED	Illuminates to indicate that an error has occurred in the battery backup unit (BBU). Blinks to indicate that the BBU must be replaced (due to its life). For more information, see "Replacing a battery" on page 66

Interpreting expansion adapter status LEDs

Use the following illustration and table to identify and interpret expansion adapter LEDs

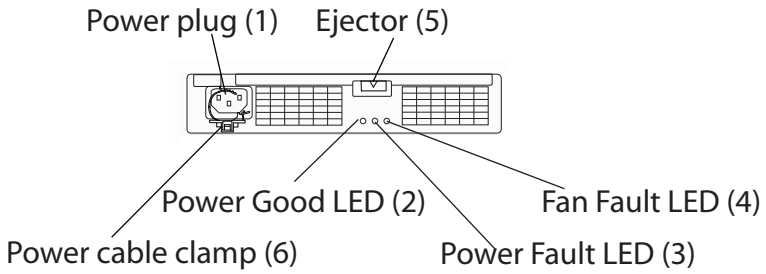


Ready LED	Fault LED	Meaning
Off	Off	No connection or powered off. (The K2 10G Expansion Chassis is powered on when the connected K2 10G RAID is turned on.)
On	Off	Normal operation
Blinking	Off	FW copying
On	On	Fault inside the adapter, must be replaced.
Off	On	
On	Blinking	Communication failure between the ADP is detected.

Connector	Description
SAS	Connects the adapter to a K2 10G RAID or K2 10G Expansion Chassis. A Fault LED and Link LED are located below each connector.
	Fault LED (green) Illuminated - indicates link-up Off - indicates link-down
	Link LED (orange) Illuminated or blinking indicates that an abnormality was detected. Off - normal operation
	Locations and names of SAS connectors DP-IN - connects to controller or adapter on the side near the controller DP-OUT - connects to adapter of next disk enclosure
Ejectors	Used to install or remove the adapter.
PS Fault Clear	Used to clear the fault status of the corresponding power supply.

Interpreting power supply status LEDs

Use the following illustration and table to identify and interpret power supply LEDs



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LED	Action	Meaning
Power Good (green)	On	AC power is supplied to the chassis.
Power Fault (orange)	On	Fault in power supply (excluding the fan) or battery backup unit. This LED works when AC power of either PS0 or PS1 is supplied.
Fan Fault (orange)	On	Fault in the fan. This LED works when AC power of either PS0 or PS1 is supplied.

Moving disk modules

⚠ ***CAUTION: Once bound and added to file system, don't re-arrange the disk modules and change the discovery order. You can destroy the media file system beyond recovery if you move a disk module to a different slot. The service person can move a disk module when you don't care about losing the media in the media file system and under the following cautions:***

- The disk module must be unbound.
- Moving a drive module that is part of a LUN to another slot makes all information on the LUN inaccessible.
- You must remove and install the disk module while the storage system is powered up.
- In a location that does not mount a disk drive, mount a dummy carrier. It is necessary for the cooling of the unit.

A disk module must be inserted all the way or removed entirely. Do not leave a disk module partially removed except for periods when you are allowing it to spin down. When replacing multiple disks, observe the following:

- The RAID chassis configuration information is written to the first three disk modules. If all of these disk modules are replaced with new devices with the power supplies turned off, the information is lost. This condition is indicated by the SERVICE LED blinking at a high rate at chassis power up. Therefore, do not replace the first three disk modules with the power supplies turned off. Do not take out more than one of the disk drives inserted in locations 00, 01, and 02 at one time.
- When multiple disk modules are subject to replacement, they must be replaced with new disk modules one by one. Do not replace multiple disk modules simultaneously. After checking that the Ready LED on the front panel of the current disk module is lit, commence replacing the next disk module.
- Stick on the physical label indicating the installation position on each newly installed disk module.

⚠ ***CAUTION: Handle a disk module gently and use an ESD wristband. Do not remove a faulty disk module until you have a replacement module (with the same part number) or a filler module available.***

Removing and installing disk modules

Use the following instructions to replace a faulty disk module. It should be replaced while the RAID chassis is running (hot-swapped).

Removing a disk module

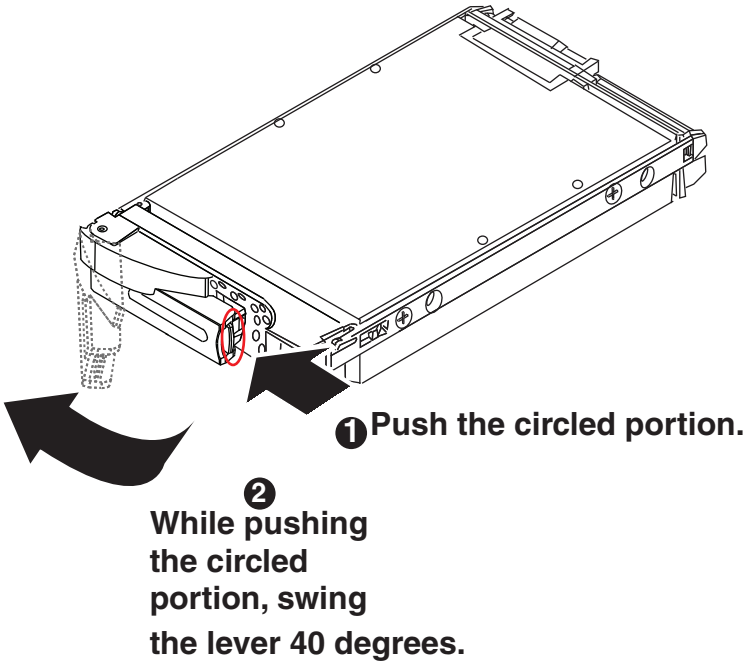
NOTE: If a disk module has been bound, do not move it to another slot unless you do not care about the data on the disk module . Each module has identifying information written when it is bound. Moving it to another slot can make this information inaccessible.

Generally, you should not remove a disk module unless it is faulty. Refer to "Interpreting front panel LEDs" on page 53 and "Monitoring K2 10G External RAID status using NetCentral" on page 52.

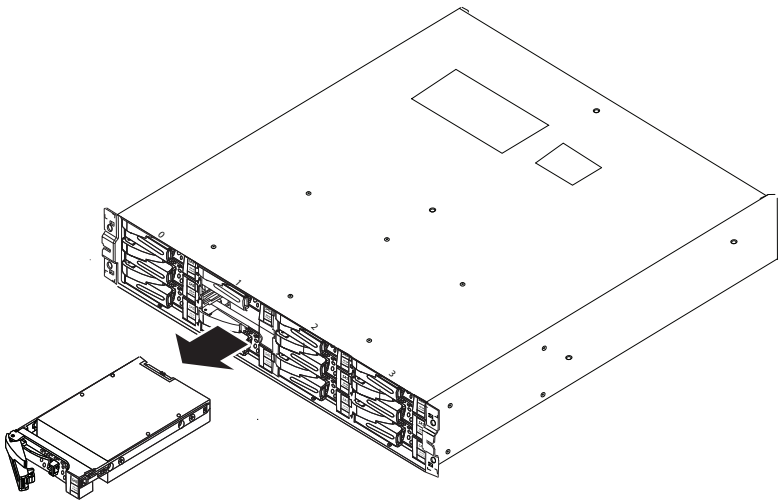
NOTE: If you wish to remove an operational disk module, use the Grass Valley Storage Utility to disable the disk before removing it.

To remove the disk module:

1. Look in Storage utility and verify that the disk is reported as disabled or offline. If it is not, disable the disk before proceeding.
2. Confirm the location of the faulty disk module by checking its Fault LED. Also check NetCentral messages. NetCentral messages can report disk faults by disk module number.
3. Open the disk module as illustrated in the following diagram.



4. With both hands, hold the sides and underside of the disk module. Remove the disk module as illustrated in the following diagram.



Installing disk module

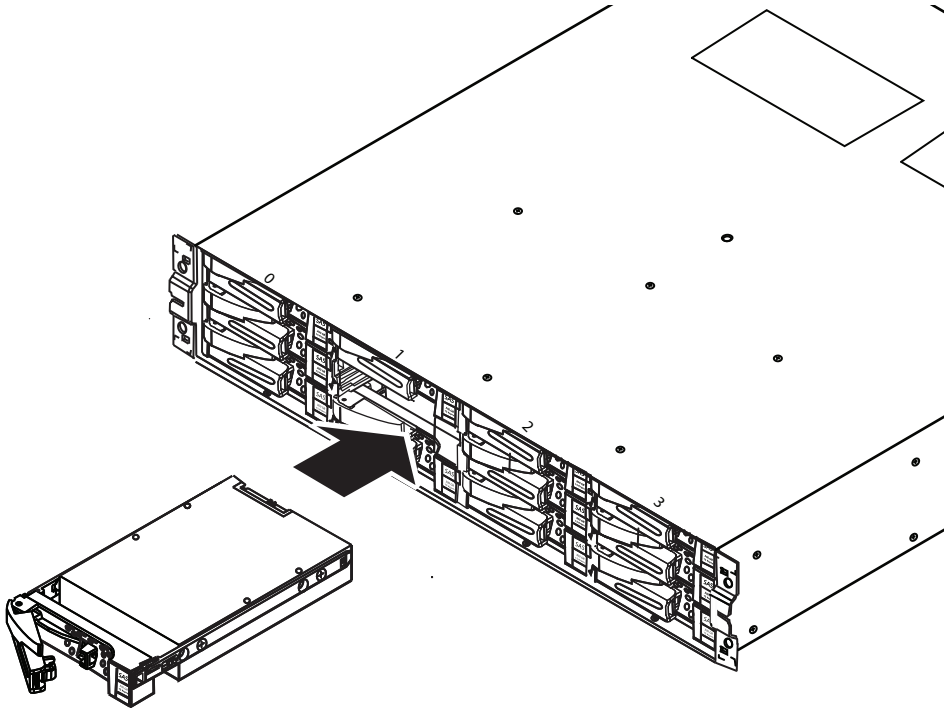
⚠ ***CAUTION: If the RAID chassis does not have the redundant controller option, when a replacement disk module is inserted there can be a 1.5 second disruption. Video record/play is not affected.***

Before installing the disk module, make sure that you:

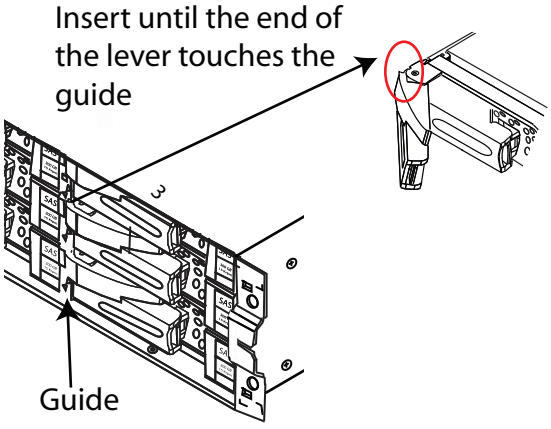
- Wait at least three minutes after removing the previous disk module.
- Put a location label on the replacement disk drive, as appropriate for the slot into which it is installed.

To install a disk module:

1. Open the lever of the disk module, as demonstrated in "Removing a disk module" on page 61.
2. Insert the drive in the unit.



3. Insert the drive as shown in the following diagram.



4. Close the lever all the way.

   The disk spins up automatically upon installation and, if the inserted disk is a

replacement for a failed drive in a bound LUN, data recovery begins.

Refer to "Interpreting controller status LEDs" on page 56 for disk module LED status during rebuild. Afterward, check disk module status using NetCentral or the Grass Valley Storage Utility.

Replacing a RAID controller or expansion adapter

Use the following instructions to replace a RAID controller or expansion adapter. On a chassis with two controllers, the controller or expansion adapter should be replaced while the chassis is powered up (hot-swapped).

On a chassis with two controllers, if the controller microcode on the replacement controller is not the same as that on the other currently installed controller, the microcode on the replacement controller is automatically upgraded or downgraded to match that on the currently installed controller.

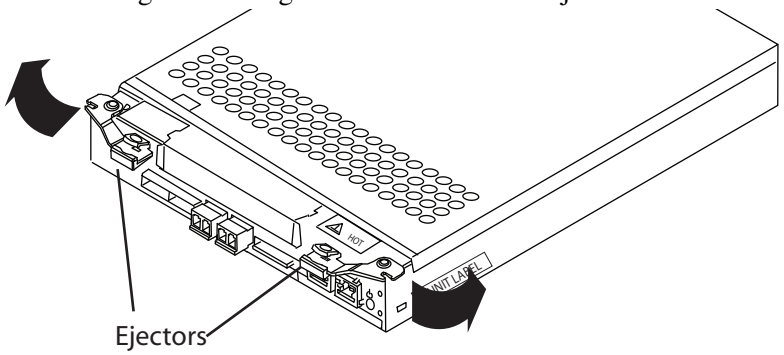
Removing a RAID controller or expansion adapter

To remove a RAID controller or expansion adapter:

1. If you are removing a redundant controller or an expansion adapter, identify the module to be replaced using NetCentral or verify that the module's Fault LED is on. If you are removing an operational RAID controller, use the Grass Valley Storage Utility to disable the RAID controller. If there is no redundant controller, power down the system.
2. Disconnect all the cables.

NOTE: The cable to the SAS connectors has a blue tab labeled "Press." Be sure to press* forward *on the blue tab, rather than down.

3. Remove the power cable and the controller cable connected to the module. Note where the cables connect to the module. The SAS cables for the K2 10G Expansion Chassis are keyed so that one end can only be used with the DP-IN connector and the other end can only be used with the DP-OUT connector.
4. Take an ejector of the module in each hand. Open them to the left and the right. (The ejectors are locked at the bottom.) The module comes out by freeing it on the left and right. The diagram below shows the ejectors on a controller.



5. Holding the ejectors in both hands, pull horizontally approximately 4 inches.

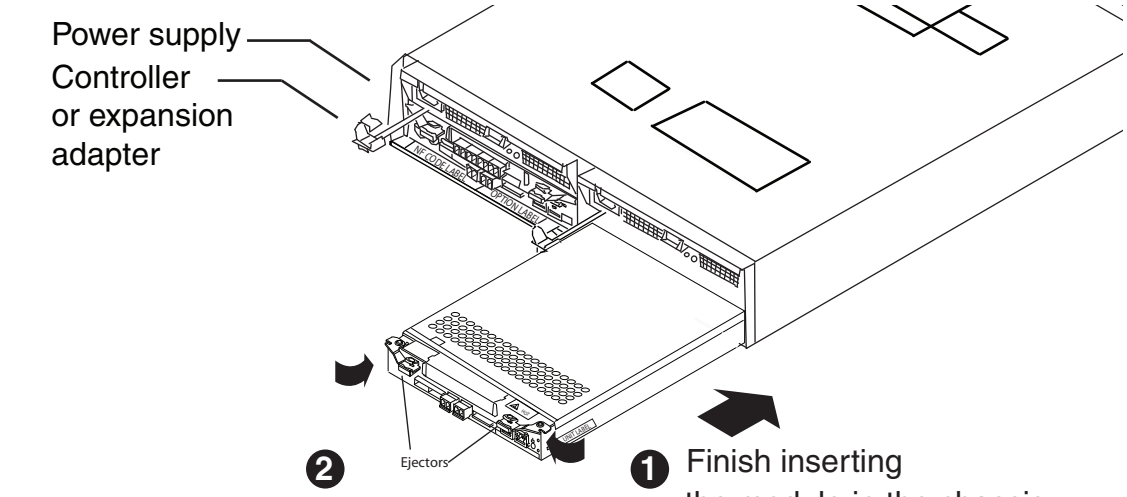
6. Hold the module firmly in both hands and pull it all the way out.

⚠ ***CAUTION: The module might be hot.***

Installing a RAID controller or expansion adapter

To install a RAID controller or expansion adapter:

1. Install the module part way into the chassis, far enough in so that it is supported physically by the housing.
2. Connect the cables.
3. Continuing installing the module in the chassis, as shown in the following diagram.



4. If inserting an expansion adapter on a system that has a redundant controller, remove and reinsert the controller to start initialization. If inserting a controller or expansion adapter on a system that does not have a redundant controller, power up the system.
5. Verify RAID controller initialization as displayed by the module's Ready LED. This process takes approximately three to eight minutes. Refer to "Interpreting controller status LEDs" on page 56.
6. Check RAID controller status using NetCentral or the Grass Valley Storage Utility.

Replacing a power supply

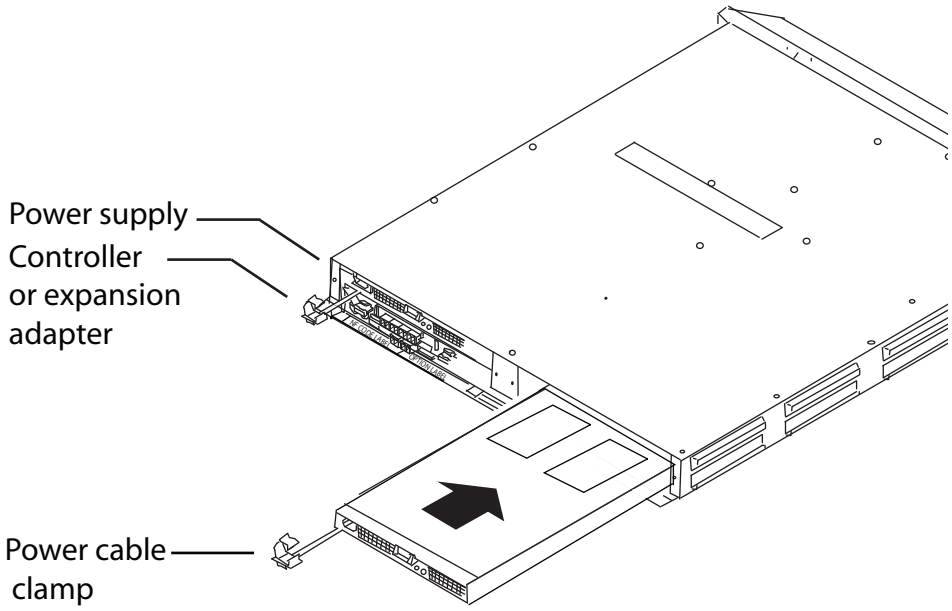
- Use power cables that are shipped with the RAID unit.
- The K2 10G RAID and K2 10G Expansion Chassis have dual power supply configurations so that they do not halt if one power supply breaks down. Even if a

power supply is not functioning, the fan inside can draw power from the other power supply, preventing overheating for a couple of minutes.

> ***CAUTION: Make sure the correct type of replacement power supply is on hand and you are otherwise prepared to complete the procedure within two minutes. If the time exceeds two minutes, the protective feature of the RAID chassis triggers a shutdown sequence.***

To replace the power supply:

1. Identify the faulty power supply by verifying that its Fault LED is on.
2. Unplug the power cable from the power supply.
3. Use the ejector to pull out the old power supply. Remove the power supply.
4. Push in the new power supply.



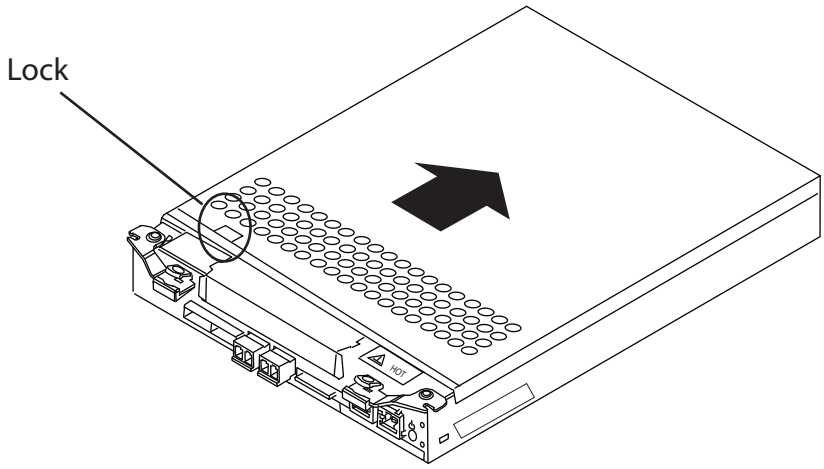
5. Reattach the power cable.
6. Secure the power cord by firmly fitting the power cable clamp.
7. Check that the Good LED of the new power supply is on.
8. Monitor the status of the power supply using NetCentral.

Replacing a battery

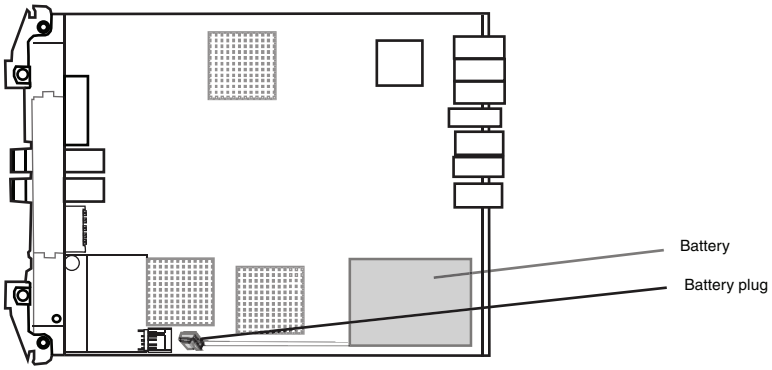
Do not replace the internal battery unless the BBU Fault LED is blinking. (For more information on controller LEDs, see "Interpreting controller status LEDs" on page 56.)

To replace the battery, follow these steps:

1. Remove the controller from the chassis. For information on how to remove the controller, see "Replacing a RAID controller or expansion adapter" on page 64.
2. Remove the cover by sliding it while pressing the lock, as indicated in following diagram.



3. Holding the battery plug, unplug it from the controller. Do not pull while holding on the cable.



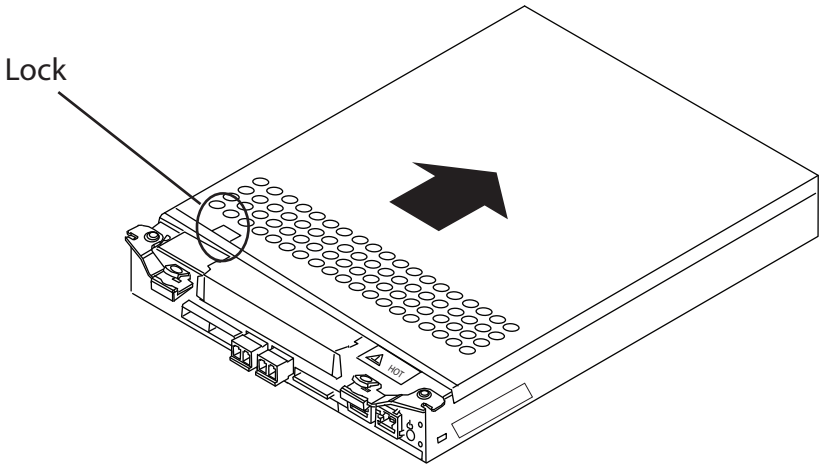
4. Remove the battery from the controller.
5. Place the new battery in the controller, and firmly insert the plug into the battery connector.
6. Replace the controller cover.
7. Return the controller to the chassis as described in "Installing a RAID controller or expansion adapter" on page 65.

Adding expansion ports

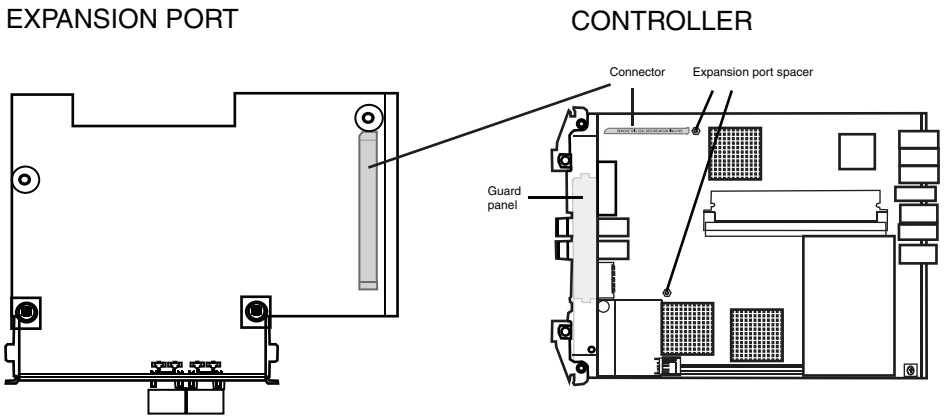
With K2 10G RAID, additional expansion ports can be added to the controller or controllers.

To install additional expansion ports, follow these steps:

1. Remove the controller from the chassis. For information on how to remove the controller, see "Replacing a RAID controller or expansion adapter" on page 64.
2. Remove the cover by sliding it while pressing the lock, as indicated in following diagram.



3. Remove the guard panel from the controller, as indicated in the following diagram.



4. Insert the expansion port by matching the connector locations. Confirm that it is firmly inserted and there is no play in the expansion port.
5. Secure with screws at the expansion port spacers.
6. Replace the controller cover.
7. Return the controller to the chassis as described in "Installing a RAID controller or expansion adapter" on page 65.

Chapter 4

K2 10G RAID Technical Specifications and Operating Limits

Data handling specifications

Characteristic	Specification
Host interface	Fibre Channel
Data transfer rate	800 MB/s max
Number of host ports	2 ports per controller standard. 2 additional ports optional.
Cache memory	8 GB

AC power requirements

Item		Measurement
Input voltage	100 to 240 VAC ±10% (x2), 50/60 Hz	
Power consumption[a] Power supply	Power supply: Basic cabinet: 2118 BTU/W Expansion cabinet: 1470 BTU/W	
Maximum power consumption[a.] Basic Chassis	SAS AC: 660VA/640W	SATA AC: 590VA/570W
Maximum power consumption[a.] Expansion Chassis	SAS AC: 450VA/430W	SATA AC: 380VA/370W
Labeling according to the energy saving act	SAS Category: i Energy consumption rate: AC:0.050	SATA Category: i Energy consumption rate: AC:0.013

a. For UPS choice, a safety allowance of 30% of the power consumption is necessary.

If one of the two power supplies fails, the remaining supply and cord must support the full load. Your rackmount cabinet must include AC power distribution that can handle these values.

Size and weight

Item	Measurement
Cabinet dimensions (excluding bezel)	Basic cabinet: 445mm W x 540mm D x 86.5mm H (same for primary chassis and expansion chassis)
Weight	Basic cabinet: 31 kg or lighter Expansion cabinet: 29 kg or lighter

Cable lengths

It is recommended that you use the cables shipped with your K2 10G RAID when making connections. Host cables must meet the appropriate standards for 8 Gb/s HBA compliance (maximum cable length 150m). SAS cables are used to connect the RAID chassis with the expansion chassis.

Environmental limits

The system includes two temperature level sensors used to issue auto-warning and auto-shutdown in case the over temperature limit is reached.

Characteristic	Specification
Ambient temperature	Operating: 5°C to 40°C Storage: -10°C to 60°C
Relative humidity (without condensation)	Operating: 10% to 80% Storage: 5% to 80%
Allowable vibration level	Operating: 0.25 G or less Resting: 0.5 G or less

Life expectancies of components

Item	Measurement
Battery backup unit	5 years
Fan (power supply)	5 years

Glossary

The terms and definitions listed below are related to the storage system described in this manual. Understanding them will aid your understanding of the storage system.

bind

In the context of a disk-array storage system, the procedure by which you hardware-format one or more disk modules into one logical unit. Grass Valley Storage Utility lets you bind disks into a logical unit recognized by the Windows operating system, the media file system, and other software. Storage Utility labels this group of disks a *rank*.

BTU (British Thermal Unit)

A standard measure of a device's heat output.

cache

See storage-system caching.

direct-connect storage

K2 client models access their own external media storage drives that are contained in a K2 RAID chassis. Referred to as stand-alone systems. *See* internal storage, shared storage.

disk-drive module

Another name for disk module.

disk unit

A short name for physical disk unit.

disk module

A self-contained disk drive that slides into one of the slots in the front of the storage system. It consists of the carrier assembly, which holds the disk drive and the regulator board. Also called disk-drive module.

EMI (electromagnetic interference)

Electronic radiation emitted by an electrical device. The levels of EMI are strictly controlled for data processing equipment. The EMI standards are explained after the Notice page near the beginning of the manual.

ESD (electrostatic discharge)

The discharge of an accumulated electrical charge (static). This can severely damage delicate electronic circuits.

field-replaceable unit

See FRU (field-replaceable unit).

FRU (field-replaceable unit)

A hardware assembly that can be replaced on site, instead of at the point of manufacture.

hot repair

See replace under power.

internal storage

K2 client models with internal storage access their own internal media storage drives. Referred to as a stand-alone system. *See* also direct-connect storage, shared storage.

K2 10G RAID Storage

A storage system that includes a chassis, up to 12 disk modules, one or two RAID controllers, and two power supplies. A K2 10G can support up to eleven K2 10G Expansion Chassis (with up to 12 disk modules each) in addition to its own 12 disk modules.

K2 10G Expansion Chassis

A storage system that includes a chassis, up to 12 disk modules, two expansion adapters, and two power supplies.

K2 client

A Broadcast Enterprise Server that incorporates IT server platform and storage technologies. Includes both K2 Media Client and K2 Summit Production Client. The K2 client can be used with internal, direct-connect, or shared storage.

power supply

An essential element of the storage-system power supply. A storage system can have two power supplies. With two, it can survive failure of one supply. You can replace a power supply under power without interrupting applications.

rank

See bind.

replace under power

The storage system provides replace under power capability, allowing you to replace, for example, a disk module or a power supply module without powering down the storage system. Applications continue while you replace the failed module.

SCSI (small computer system interface)

A well-known protocol and standard for connecting computers and peripheral devices.

SES (SCSI enclosure services)

A functional subset of SCSI III commands that allow a server to communicate with storage enclosures using their disk modules.

server

In the context of storage systems, a processor that runs an operating system and uses a disk-array storage system for data storage and retrieval.

SFF

Small Form Factor Committee

shared storage

K2 client models with shared storage access RAID protected media storage drives that are part of a K2 Storage System (SAN). The K2 Storage System incorporates one or more RAID chassis, such as K2 10G RAID Storage. *See* also direct-connect storage, internal storage.

storage chassis

A storage device that includes a chassis, up to 12 disk modules, one or two RAID controllers, one LAN card, and two power supplies.

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