

# K2

MEDIA CLIENT

System Guide

● → SOFTWARE VERSION 3.2

071-8460-02  
JULY 2007

## Copyright

Copyright © 2007 Grass Valley, Inc. All rights reserved. Printed in the United States of America. Portions of software © 2000 – 2007, Microsoft Corporation. All rights reserved.

This document may not be copied in whole or in part, or otherwise reproduced except as specifically permitted under U.S. copyright law, without the prior written consent of Grass Valley, Inc., P.O. Box 59900, Nevada City, California 95959-7900

This product may be covered by one or more U.S. and foreign patents.

## Trademarks

Grass Valley, K2, Aurora, Turbo, M-Series, Profile, Profile XP, NewsBrowse, NewsEdit, NewsQ, NewsShare, NewsQ Pro, Aurora, and Media Manager are either registered trademarks or trademarks of Grass Valley, Inc. in the United States and/or other countries. Other trademarks used in this document are either registered trademarks or trademarks of the manufacturers or vendors of the associated products. Grass Valley, Inc. products are covered by U.S. and foreign patents, issued and pending. Additional information regarding Grass Valley, Inc. trademarks and other proprietary rights may be found at [www.thomsongrassvalley.com](http://www.thomsongrassvalley.com).

## Disclaimer

Product options and specifications subject to change without notice. The information in this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by Grass Valley, Inc. Grass Valley, Inc. assumes no responsibility or liability for any errors or inaccuracies that may appear in this publication.

## U.S. Government Restricted Rights Legend

Use, duplication, or disclosure by the United States Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7013 or in subparagraph c(1) and (2) of the Commercial Computer Software Restricted Rights clause at FAR 52.227-19, as applicable. Manufacturer is Grass Valley, Inc., P.O. Box 59900, Nevada City, California 95959-7900 U.S.A.

## Revision Status

Rev Date	Description
November 23, 2005	Initial release of the K2 Media Client System Guide — 071-8460-00
September 7, 2006	Initial release of the K2 Media Client System Guide — 071-8460-00
July 3, 2007	Update information for 3.2 release — 071-8460-02

# Contents

---

	<b>Safety Summaries</b> .....	7
	<b>Finding Information</b> .....	13
	Grass Valley Product Support .....	16
<b>Chapter 1</b>	<b>Product Description</b>	
	K2 Media Client features .....	20
	Features of SDA-00 models .....	20
	Features of SD-00 models.....	21
	Features of HD-00 models .....	21
	Features of internal storage models .....	22
	Features of external storage models .....	22
	Introducing K2 Media Client models.....	23
	Introducing the SDA-00 K2 Media Client.....	23
	Introducing the SD-00 K2 Media Client .....	23
	Introducing the HD-00 K2 Media Client .....	24
	Product identification .....	27
	Front panel indicators .....	29
	Rear panel view.....	30
	SDA-00 model rear panel view .....	30
	SD-00 model rear panel view .....	31
	HD-00 model rear panel view .....	32
	Considerations for first startup out of box.....	32
	K2 Media Client system overview .....	33
	Application System .....	34
	Real Time System .....	34
	Media control and processing.....	35
	Loop through and E to E.....	36
	Locations of rear panel boards .....	39
	RS-422 ports .....	39
	Ports used by K2 services .....	40
	RAID drive numbering .....	41
	QuickTime support .....	41
<b>Chapter 2</b>	<b>Using K2 Media Client system tools</b>	
	Configuration Manager.....	43
	Accessing Configuration Manager.....	43
	Saving and restoring Configuration Manager settings .....	43
	Restoring default Configuration Manager settings .....	44
	K2 System Configuration.....	44
	Storage Utility .....	46
	NetCentral .....	47
	Windows Remote Desktop Connection.....	47
<b>Chapter 3</b>	<b>System connections and configuration</b>	
	Network connections and configuration .....	49
	Cable requirements .....	49
	About Ethernet ports and teaming.....	50
	Connecting the Ethernet network cabling.....	50
	Data and streaming for K2 systems .....	51
	Configure Windows network settings .....	52
	Streaming video between K2 systems .....	55
	Teaming Ethernet ports on internal storage models .....	60
	Identify adapters .....	60
	Create the Control Team .....	63
	Create the FTP Team.....	65
	Name teams .....	68

	Reorder adapters .....	69
	Modifying network settings .....	69
	Using FTP for file transfer .....	70
	Limitations with complex media types .....	70
	Transferring between different types of systems .....	70
	Transfer mechanisms .....	71
	FTP access and configuration .....	71
	FTP access by automation .....	72
	FTP security .....	72
	FTP internationalization .....	72
	FTP access by Internet Explorer .....	73
	FTP commands supported .....	75
	Connecting RS-422 .....	77
	Connecting GPI .....	77
<b>Chapter 4</b>	<b>Managing Internal Storage</b>	
	About the K2 Media Client internal storage system .....	79
	Using Storage Utility .....	80
	About Storage Utility .....	81
	Opening Storage Utility .....	81
	Overview of Storage Utility .....	83
	Checking storage subsystem status .....	84
	Checking controller microcode .....	84
	Identifying disks .....	85
	Get controller logs .....	86
	Check disk mode pages .....	86
	Disabling a disk .....	86
	Forcing a disk to rebuild .....	86
	Unbind LUN .....	87
	Bind Luns .....	88
	Changing RAID type .....	89
	Making a new media file system .....	90
	Checking the media file system .....	90
	Cleaning unreferenced files and movies .....	91
	Downloading disk drive firmware .....	92
	Storage Utility operation not supported .....	92
	Placing the K2 Media Client into online mode .....	93
<b>Chapter 5</b>	<b>Managing K2 client system software</b>	
	About K2 Media Client system software .....	95
	Software components installed .....	96
	Installing Control Point software .....	97
	Installing K2 software .....	98
	Re-installing Grass Valley software .....	98
	Pre-installed software .....	100
	Backup and recovery strategies .....	100
<b>Chapter 6</b>	<b>Administering and maintaining the K2 system</b>	
	Synchronizing system clocks .....	101
	Licensing .....	101
	Software version licenses .....	102
	Licensable options .....	102
	Configuring K2 security .....	103
	Overview of K2 security features .....	104
	Example: Setting up user access to bins .....	105
	Example: Setting up user access to channels .....	105

	Security and user accounts .....	106
	Configuring media access security for K2 bins.....	106
	AppCenter operations and media access security .....	109
	FTP and media access security .....	109
	K2 Storage Systems and media access security .....	109
	Protocol control of channels and media access security .....	110
	Configuring channel access security .....	111
	K2 and NetCentral security considerations .....	114
	Mapping a NetCentral administrator to the K2 administrator level .....	115
	Microsoft Windows High Priority updates .....	116
	Virus scanning policies .....	116
	Network and firewall policies .....	117
	Enabling and disabling the USB ports .....	117
	Configuring auto log on .....	118
	Regional and language settings .....	119
<b>Chapter 7</b>	<b>External Storage</b>	
	About load balancing .....	122
	Determining K2 Media Client bandwidth requirements .....	123
	Preparing the K2 Storage System .....	123
	Preparing K2 Media Clients .....	124
	Adding K2 Media Clients to the K2 Storage System .....	126
	Configuring a K2 Media Client for the K2 Storage System.....	127
	Assigning a K2 Media Client to a different FTP server.....	133
	Basic operations for external storage K2 Media Clients.....	134
	Power on/off procedures .....	134
	Taking a K2 Media Client offline .....	134
<b>Appendix A</b>	<b>Remote control protocols</b>	
	Using AMP protocol to control K2 systems .....	136
	Using VDCP protocol to control K2 systems .....	138
	Using BVW protocol to control K2 systems .....	140
	Special considerations for automation vendors.....	141
	Harris settings.....	141
	Connecting RS-422 .....	142
	RS-422 connectors and AppCenter channels .....	142
	RS-422 connectors and channels on K2 Media Client models .....	143
	RS-422 and Protocol Controller Ports .....	144
	RS-422 and COM ports .....	145
	Security and protocol control .....	145
<b>Appendix B</b>	<b>Specifications</b>	
	AC power specification .....	148
	Environmental specifications .....	148
	Mechanical specifications.....	149
	Electrical specifications .....	149
	Serial Digital Video (SDI).....	149
	Composite Analog Video - SDA-00 models.....	150
	Genlock Reference .....	150
	System Timing .....	151
	AES/EBU Digital Audio.....	152
	Analog Audio - SDA-00 model.....	152
	Audio Monitor - SDA-00 model.....	152
	LTC Input/Output .....	153
	VITC Input/Output.....	153
	RS-422 specification.....	153
	GPI I/O specifications .....	153

Operational specifications .....	154
Video codec description – SDA-00 and SD-00 models .....	155
Video codec description – HD-00 models .....	156
Playout of multiple formats .....	157
VBI/Ancillary data specifications .....	160
Internationalization .....	164
Video network performance .....	164
Supported file input/output formats .....	165
MXF export behavior .....	166
Media file system performance .....	166
Protocols supported .....	166
Transfer compatibility considerations .....	167
Control Point PC system requirements .....	168
<b>Appendix C Connector Pinouts</b>	
K2 Media Client connector pinouts .....	170
RS-422 connector pinouts .....	170
LTC connectors pinouts .....	170
Analog audio connector pinouts - SDA-00 model .....	171
GPI I/O connector pinouts .....	171
K2 Media Server connector pinouts .....	173
Redundant server heartbeat cable .....	173
<b>Appendix D Rack mounting</b>	
Rack mounting the K2 Media Client .....	175
Rack-mount considerations .....	175
Rack mount hardware shipped with the K2 client system .....	176
Mounting the Rack Slides .....	177
Installing the K2 client system on the rack mount rails .....	178
Making Rack Slide Adjustments .....	179
Rack mounting the Control Point PC drawer .....	180
<b>Index</b> .....	183

# Safety Summaries

---

## General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

*Only qualified personnel should perform service procedures.*

While using this product, you may need to access other parts of the system. Read the *General Safety summary* in other system manuals for warnings and cautions related to operating the system.

## Injury Precautions

### Use Proper Power Cord

To avoid fire hazard, use only the power cord specified for this product.

### Ground the Product

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

### Do Not Operate Without Covers

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

### Do Not operate in Wet/Damp Conditions

To avoid electric shock, do not operate this product in wet or damp conditions.

### Do Not Operate in an Explosive Atmosphere

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

### Avoid Exposed Circuitry

To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

## Product Damage Precautions

### Use Proper Power Source

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

### Provide Proper Ventilation

To prevent product overheating, provide proper ventilation.

### Do Not Operate With Suspected Failures

If you suspect there is damage to this product, have it inspected by qualified service personnel.

### Battery Replacement

To avoid damage, replace only with the same or equivalent type. Dispose of used battery according to the circuit board manufacturer's instructions.

## Safety Terms and Symbols

### Terms in This Manual

These terms may appear in this manual:



**WARNING:** Warning statements identify conditions or practices that can 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** indicates a personal injury hazard immediately accessible as one reads the marking.

**WARNING** indicates a personal injury hazard not immediately accessible as you read the marking.

**CAUTION** indicates a hazard to property including the product.

### Symbols on the Product

The following symbols may appear on the product:



**DANGER** high voltage



Protective ground (earth) terminal



**ATTENTION** – refer to manual

---

## Service Safety Summary



**WARNING:** *The service instructions in this manual are intended for use by qualified service personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries before performing service.*

### Do Not Service Alone

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

### Disconnect Power

To avoid electric shock, disconnect the main power by means of the power cord or, if provided, the power switch.

### Use Care When Servicing With Power On

Dangerous voltages or currents may exist in this product. Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections

## 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 prescrites 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

The device used in this product is a Class 1 certified laser product. 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:

<b>Standard</b>	<b>Designed/tested for compliance with:</b>
ANSI/UL60950, CAN/CSA C22.2 No. 60950-00 12/01/2000	Safety of Information Technology Equipment, including Electrical Business Equipment (Third edition).
IEC 950	Safety of Information Technology Equipment, including Electrical Business Equipment (Third edition, 1999).
EN60950	Safety of Information Technology Equipment, including Electrical Business Equipment (Third Edition 2000).



# ***Finding Information***

---

This manual describes K2 Media Client systems and provides all the information you need to go beyond factory default settings and customize your system's configuration to meet your site-specific needs. The manual contains information for all models and options, including both internal storage and external storage K2 Media Clients. Refer to the sections that apply to your particular model and options.

## **How this manual is organized**

This manual is organized around the tasks required to install and configure the K2 Media Client. The following describes the chapters included in this manual:

[Chapter 1, \*Product Description\*](#)

[Chapter 2, \*Using K2 Media Client system tools\*](#)

[Chapter 3, \*System connections and configuration\*](#)

[Chapter 4, \*Managing Internal Storage\*](#)

[Chapter 5, \*Managing K2 client system software\*](#)

[Chapter 6, \*Administering and maintaining the K2 system\*](#)

[Chapter 7, \*External Storage\*](#)

[Appendix A, \*Remote control protocols\*](#)

[Appendix B, \*Specifications\*](#)

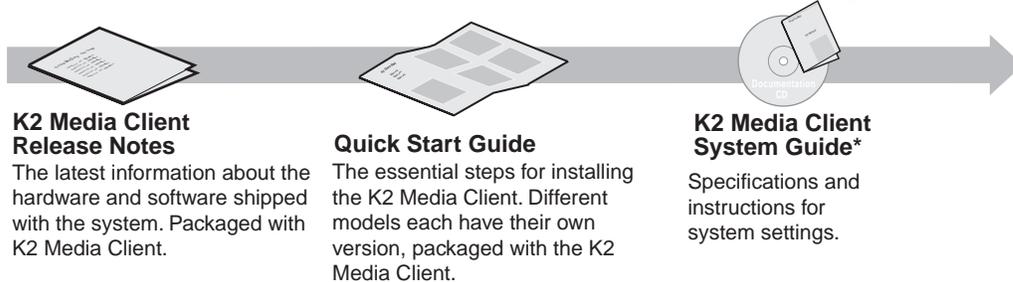
[Appendix C, \*Connector Pinouts\*](#)

[Appendix D, \*Rack mounting\*](#)

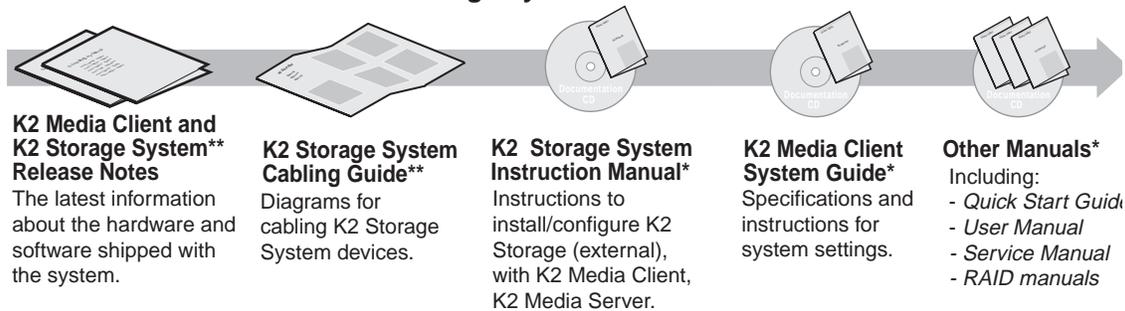
## Getting more information

The following illustration shows the recommended order in which to reference the documentation.

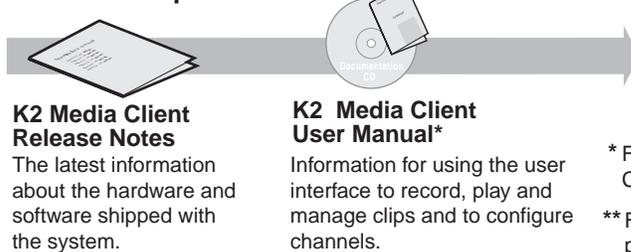
### Path for the installer of K2 Media Client models with internal storage



### Path for the installer of the K2 Storage System with connected K2 Media Clients



### Path for the operator



\* Find the K2 Documentation CD packaged with K2 Media Clients and with K2 RAID Storage devices, primary channel

\*\* Find the Storage Release Notes and Cabling Guide packaged with K2 RAID Storage devices, primary channel

## Quick Start Guide

You receive this guide in the product packaging with your K2 Media Client. The Quick Start Guide provides step-by-step installation instructions for basic installation and operation of your K2 Media Client, including recording and playing clips.

## Release Notes

The release notes contain the latest information about the K2 Media Client software shipped on your system. There are K2 Storage System release notes and K2 Media Client release notes. The information in this document includes software upgrade instructions, software specifications and requirements, feature changes from the previous releases, and any known problems. Because release notes contain the latest information, they are printed out rather than included in the Documentation CD-ROM.

---

## K2 Documentation CD

Except for the release notes, the full set of support documentation, including this manual, is available on the Documentation CD-ROM that you received with your K2 Media Client.

The K2 Documentation CD includes the following documents:

- **K2 Media Client Quick Start Guides** — The Quick Start Guides provides step-by-step installation instructions for basic installation and operation of the K2 Media Client, including recording and playing clips.
- **K2 Media Client User Manual** — Describes the K2 Media Client and provides instructions for operating the product in a variety of applications.
- **K2 Media Client System Guide** — This guide provides all the information you need to go beyond factory default settings and customize your system's configuration to meet your site-specific needs.
- **K2 Media Client Service Manual** — Contains information for solving common setup problems, as well as information on servicing and maintenance.
- **K2 Storage System Instruction Manual** — Contains installation and configuration procedures for shared storage options. Also includes administrative and maintenance procedures.
- **K2 Storage System Cabling Guide** — Contains diagrams for cabling the devices of the K2 Storage System.
- **RAID Storage Instruction Manuals** — Contains procedures for troubleshooting and servicing the different level RAID storage devices.

## NetCentral documentation

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

- **NetCentral User Guide** — This is a printed manual. It provides instructions for installing, using, and administering the NetCentral monitoring system.
- **NetCentral Help** — From the NetCentral interface access on-line help as follows:
  - For general help with NetCentral manager, select **Help | NetCentral Help Topics**. This content is identical to that in the NetCentral User Guide.
  - For help specific to monitoring K2 Media Client system devices, select **Help | Device Providers** and then select the monitored device.

## Thomson 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.thomsongrassvalley.com>.

## Grass Valley Product Support

To get technical assistance, check on the status of a question, or to report new issue, contact Grass Valley Product Support via e-mail, the Web, or by phone or fax. Contact Grass Valley first regarding problems with third party software on Grass Valley products, such as the Microsoft® Windows® operating system, Windows Media® player, Internet Explorer® internet browser, and SQL Server™.

### 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 by searching our Frequently Asked Questions (FAQ) database.

**World Wide Web:** <http://www.thomsongrassvalley.com/support/>

**Technical Support E-mail Address:** [gvtechsupport@thomson.net](mailto:gvtechsupport@thomson.net).

### Phone Support

Use the following information to contact product support by phone during business hours. Afterhours phone support is available for warranty and contract customers.

International (France)	+800 80 80 20 20 +33 1 48 25 20 20	Italy	+39 02 24 13 16 01 +39 06 87 20 35 42
International (United States, Canada)	+1 800 547 8949 +1 530 478 4148	Belarus, Russia, Tadzikistan, Ukraine, Uzbekistan	+7 095 258 09 20 +33 (0) 2 334 90 30
Hong Kong, Taiwan, Korea, Macau	+852 2531 3058	Indian Subcontinent	+91 11 515 282 502 +91 11 515 282 504
Australia, New Zealand	+61 1300 721 495	Germany, Austria, Eastern Europe	+49 6150 104 444
Central, South America	+55 11 5509 3440	Near East, Africa	+33 1 48 25 20 20
China	+861 066 0159 450	Netherlands	+31 (0) 35 62 38 421
Belgium	+32 (0) 2 334 90 30	Northern Europe	+45 45 96 88 70
Japan	+81 3 5484 6868	Singapore	+65 6379 1313
Malaysia	+603 7805 3884	Spain	+41 487 80 02
Middle East	+971 4 299 64 40	UK, Ireland, Israel	+44 118 923 0499

### Authorized Support Representative

A local authorized support representative may be available in your country. To locate the support representative for your country, visit the product support Web page on the Grass Valley Web site.

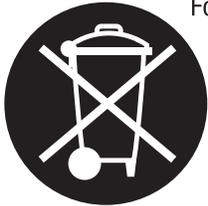


## END-OF-LIFE PRODUCT RECYCLING NOTICE

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.



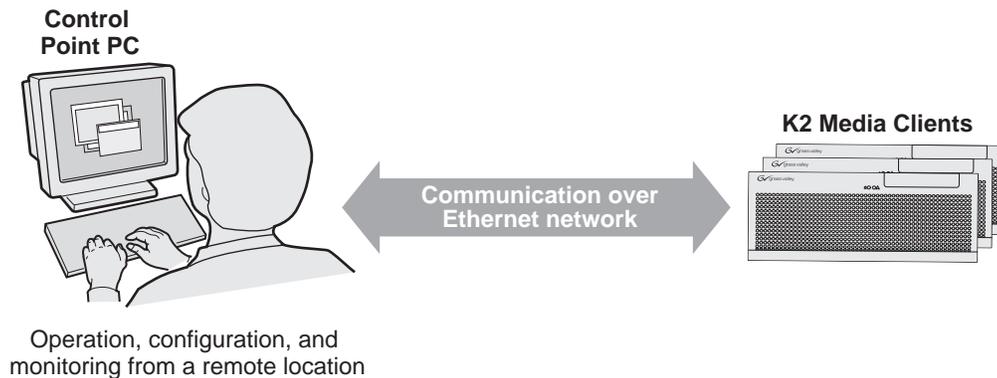
For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information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





## Product Description

The K2 Media Client is a cost-effective Broadcast Enterprise Server that incorporates IT server platform and storage technologies to deliver a networked solution to facilities for ingest, playout, news integration, and media asset management. It is a comprehensive platform that provides a suite of user applications and system tools.



The K2 Media Client is designed for “headless” operation from a remote control point using Grass Valley Control Point software. You can also use the Microsoft Windows Remote Desktop Connection application on your PC to connect to the K2 system for configuration or administration.

The K2 Media Client product is further described in the following sections:

- [“K2 Media Client features” on page 20](#)
- [“Introducing K2 Media Client models” on page 23](#)
- [“Front panel indicators” on page 29](#)
- [“Rear panel view” on page 30](#)
- [“K2 Media Client system overview” on page 33](#)

## K2 Media Client features

This section provides an overview of K2 Media Client features. Refer to [Appendix B, Specifications](#) for details.

The following features are common to all models:

- Four channels (maximum) per chassis
- SDI video inputs and outputs
- AES/EBU or embedded audio inputs and outputs.
- Redundant power supply, RAID 1 protected Windows XP system disk, cooling fans for reliability
- RAID media storage
- Remote operation and configuration via AppCenter
- NetCentral™ provides remote error reporting and monitoring via SNMP (Optional for models using internal storage only)
- Gigabit Ethernet
- AMP, VDCP, and BVW remote control protocols supported
- Remote control over RS-422 or Ethernet
- GPI Trigger (12 I/O)

### Features of SDA-00 models

SDA-00 models record and play analog (composite) video and audio, as well as digital (SDI) video and audio. These models are standard definition only.

SDA-00 models use dedicated encoders for recording and dedicated decoders for playing. They have two record channels and two play channels. You can encode and decode video using the DV25 or MPEG-2 compression standards. You can play clips of any of these compression types through a play channel without any configuration changes. For example, you can play DV25 and MPEG-2 clips back-to-back on the same timeline.

SDA-00 models support encode and decode of VBI data.

The complete product nomenclature for this model is K2-SDA-22, which designates the channel configuration as two record and two play. Internal storage and external storage models are available. Also refer to [“Introducing the SDA-00 K2 Media Client” on page 23](#).

## Features of SD-00 models

SD-00 models have bi-directional video codecs, which means each of the four channels supports both and record and play operations. These models are standard definition only.

You can encode and decode video using the DVCAM, DVCPRO or MPEG-2 compression standards. You can play clips of any of these compression types through any play channel without any configuration changes. For example, you can play DV, DVCPRO25, DVCPRO50, and MPEG-2 clips back-to-back on the same timeline.

SD-00 models support encode and decode of VBI data.

The complete product nomenclature for this model is K2-SD-04, which designates the channel configuration as four record/play channels. Internal storage and external storage models are available. Also refer to [“Introducing the SD-00 K2 Media Client” on page 23](#).

## Features of HD-00 models

HD-00 can process either high definition (HD) or standard definition (SD) video. However, only the MPEG-2 compression standard is used in these HD/SD models. In addition, these models use dedicated encoders for recording and dedicated decoders for playing. The number and type (record or play) of channels in the chassis is determined by the model.

Record channels can record either SD or HD through an HD encoder. Play channels play both SD and HD clips through an Agile HD decoder. Both HD and SD clips are played out in the format specified for the output assigned to the channel. All clips are either up- or down-converted appropriately to play on that output, and their aspect ratios are adjusted. For example, you can play 50 Hz SD 625, HD 1080i at 25 Hz, and HD 720p at 50 Hz clips back-to-back on the same timeline.

HD-00 models support encode and decode of SD VBI data and HD Ancillary data, with appropriate up/down conversion for playout.

The complete product nomenclature for this model designates channel configuration as follows:

- K2-HD-02 — No record channels, two play channels
- K2-HD-03 — No record channels, three play channels
- K2-HD-04 — No record channels, four play channels
- K2-HD-12 — One record channel, two play channels
- K2-HD-13 — One record channel, two play channels
- K2-HD-22 — Two record channels, two play channels

Internal storage and external storage models are available. Also refer to [“Introducing the HD-00 K2 Media Client” on page 24](#).

## Features of internal storage models

SDA-00, SD-00, and HD-00 models are available with internal media storage, with options for five media drives or ten media drives. In addition, there are two drives configured as a RAID 1 mirrored pair, which together are the system drive. This makes the internal storage K2 Media Client a self-contained, stand-alone unit, with no external devices for storage, audio, or video connections required. You can transfer media in and out of the internal storage K2 Media Client via Gigabit Ethernet.

Refer to [Chapter 4, \*Managing Internal Storage\*](#) for more information.

## Features of external storage models

SDA-00, SD-00, and HD-00 models are available as external storage clients. Multiple external storage K2 Media Clients connect to the K2 Storage System via Gigabit Ethernet to share a common pool of storage. The external storage K2 Media Client contains two internal disk drives that make up the RAID 1 system drive. There are no media drives in an external storage K2 Media Client.

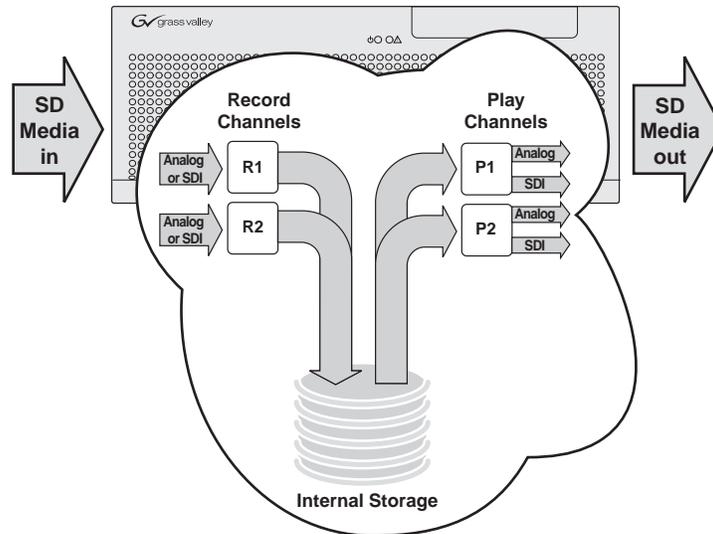
Refer to [Chapter 7, \*External Storage\*](#) and the *K2 Storage System Instruction Manual* for more information.

## Introducing K2 Media Client models

This section provides overview descriptions of the different channel configurations.

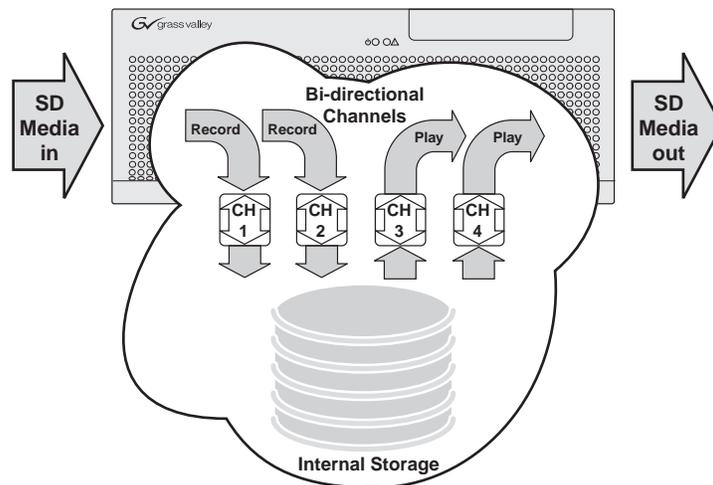
### Introducing the SDA-00 K2 Media Client

The SDA-00 model has two input channels and two output channels. Input channels are configurable to record either Analog or SDI. Output channels can play both analog and SDI at the same time. The illustration below shows this model with internal storage. An external storage model is also available.



### Introducing the SD-00 K2 Media Client

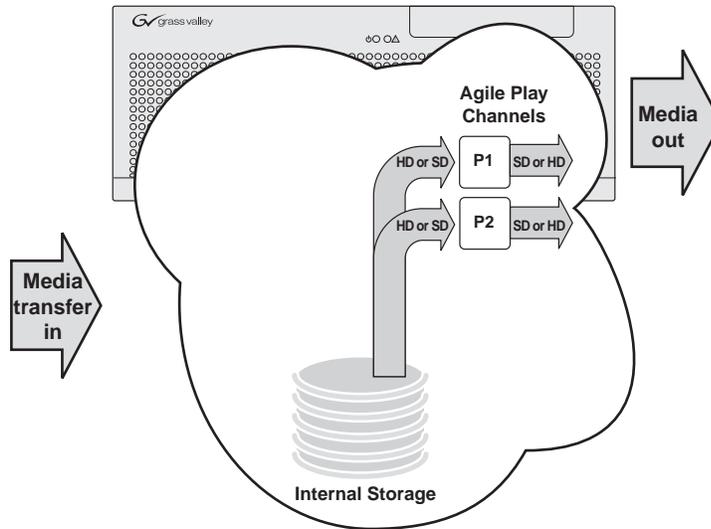
The SD-00 model has four bidirectional channels. Each bi-directional channel supports both record and play operations. You can have four record channels, four play channels, or a combination of record and play channels. The illustration below shows this model with internal storage. An external storage model is also available.



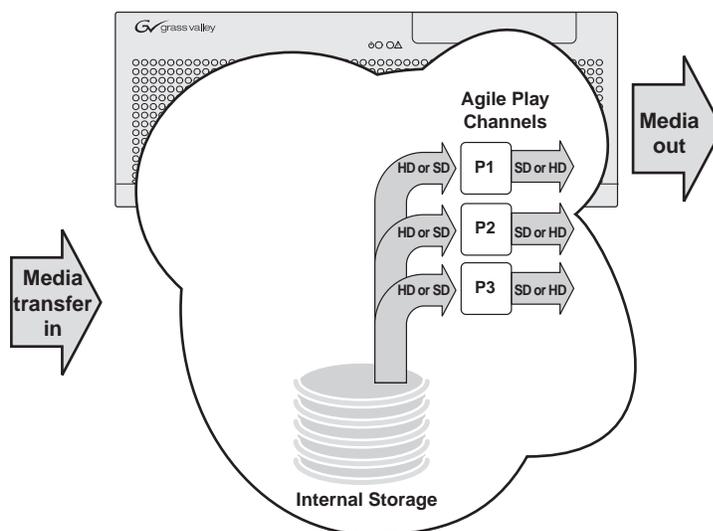
## Introducing the HD-00 K2 Media Client

There are six different channel configurations for HD-00 models, as shown in the following illustrations. Input channels can be configured to record either SD or HD. Output channels are Agile, in that you can configure each channel to output either SD or HD; the clips (either SD or HD) are automatically up-converted or down-converted accordingly. The illustrations below show internal storage models. External storage models are also available.

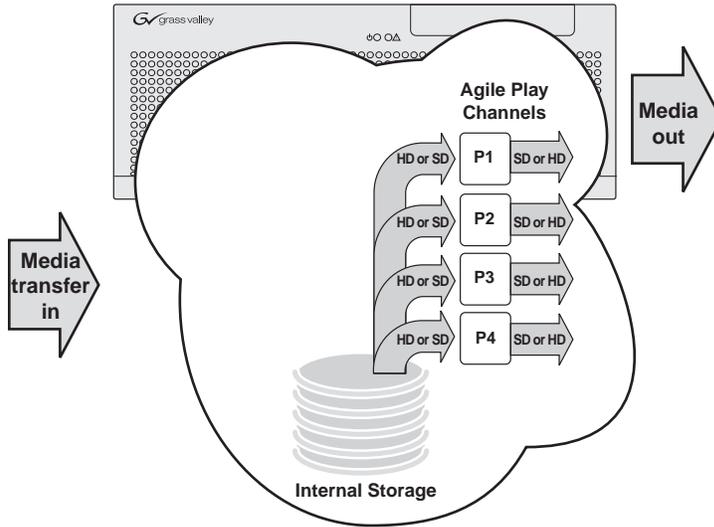
### K2- HD-02 channels



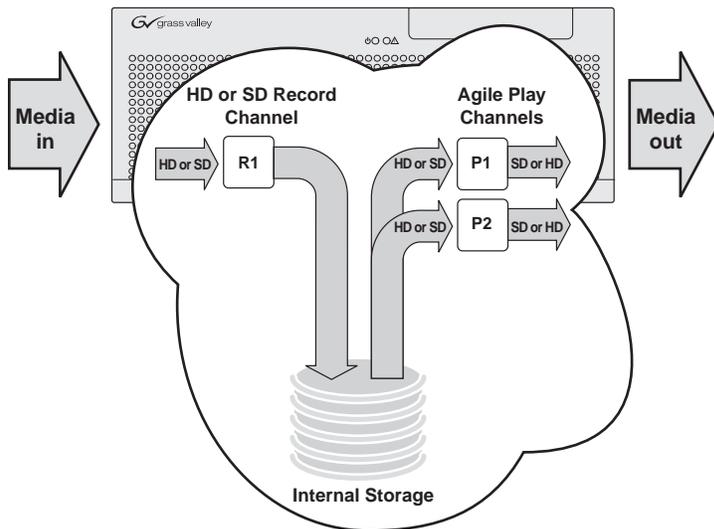
### K2-HD-03 channels



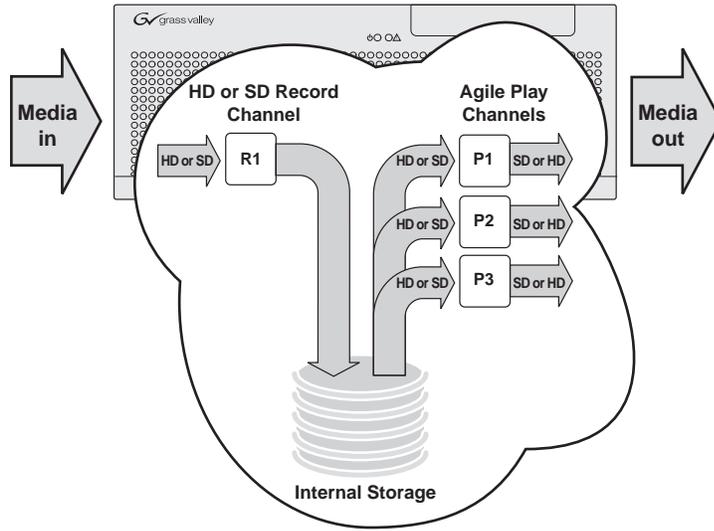
**K2-HD-04 channels**



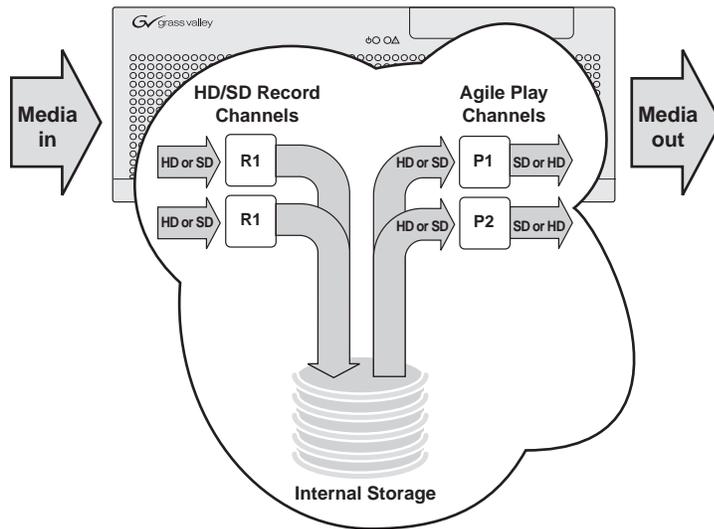
**K2-HD-12 channels**



**K2-HD-13 channels**

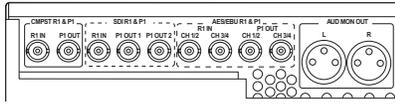
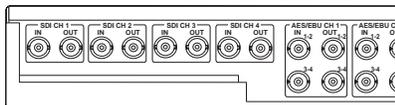
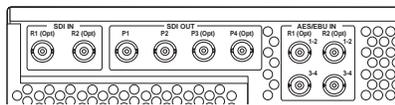


**K2-HD-22 channels**



# Product identification

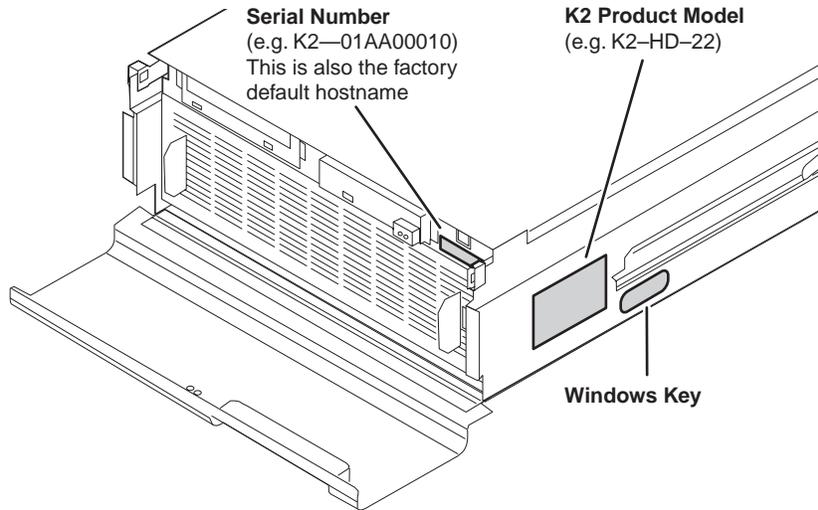
The following table summarizes the ways you can identify the specific client-type of a K2 Media Client.

For this type of K2 Media Client...	The rear panel has these connectors...	The chassis label <sup>a</sup> displays...	In AppCenter <sup>b</sup> , Help   About displays...	And unique features are as follows:
SDA-00	 <p>Refer to “SDA-00 model rear panel view” on page 30.</p>	K2-SDA-22		SD Analog/SDI
SD-00	 <p>Refer to “SD-00 model rear panel view” on page 31.</p>	K2-SD-04		SD Bi-directional channels
HD-00	 <p>Refer to “HD-00 model rear panel view” on page 32.</p>	K2-HD-02		HD/SD two play channels
		K2-HD-03		HD/SD three play channels
		K2-HD-04		HD/SD four play channels
		K2-HD-12		HD/SD one record, two play channels
		K2-HD-13		HD/SD one record, three play channels
		K2-HD-22		HD/SD two record, two play channels

<sup>a</sup>.Refer to the diagram below to locate the label.

<sup>b</sup>.Make sure the channel currently selected in AppCenter is on the K2 Media Client you are identifying.

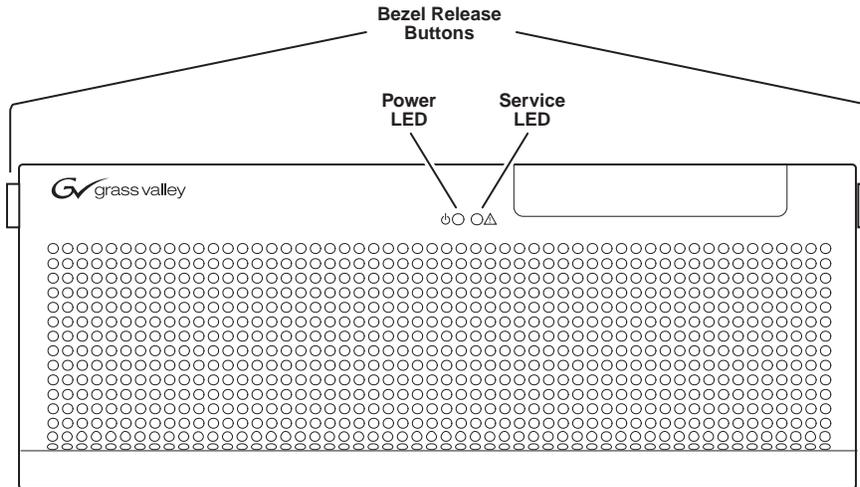
The K2 Media Client has labels affixed to the chassis that provide product identification as in the following diagram:



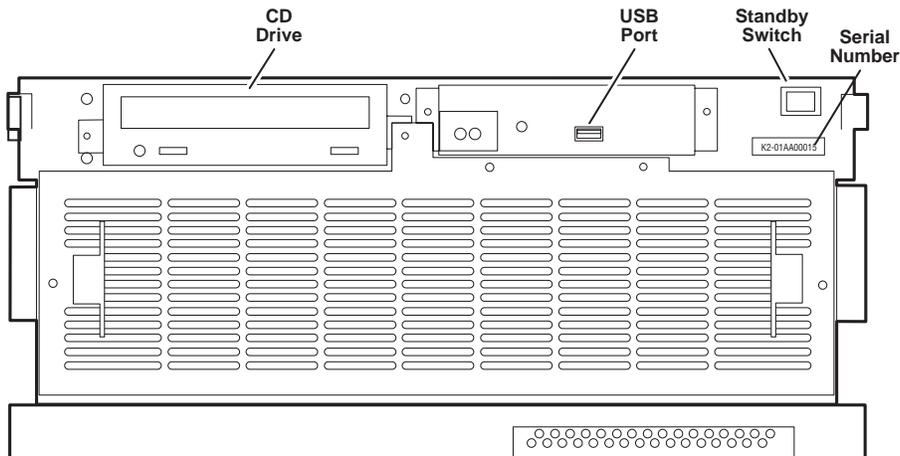
Refer to the product model label when setting up RS-422 connections, as explained in [“Connecting RS-422” on page 142](#).

## Front panel indicators

With the front bezel in place, the indicator LEDs are visible. The LEDs indicate the status of the machine. For example, when the Service LED is a steady yellow light, this could signify that one of the power cables is unplugged. For more information on indicator LEDs, see the *K2 Media Client Service Manual*.



With the front bezel flipped down, you have access to the standby switch, USB port, and the removable media drive.

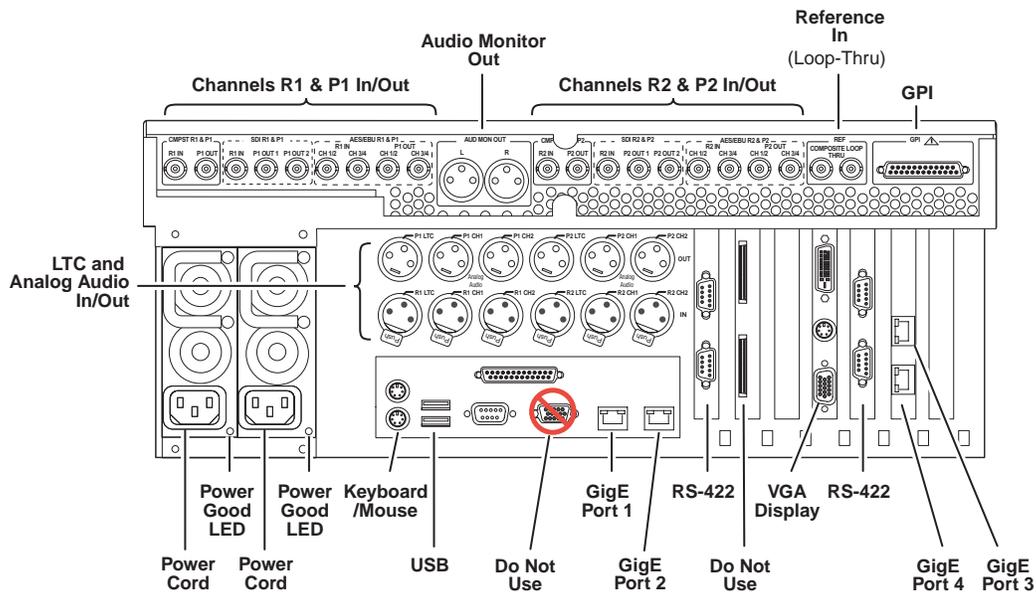


## Rear panel view

The following drawings identify the rear panel connectors and components. Some cards are in different locations for the different models.

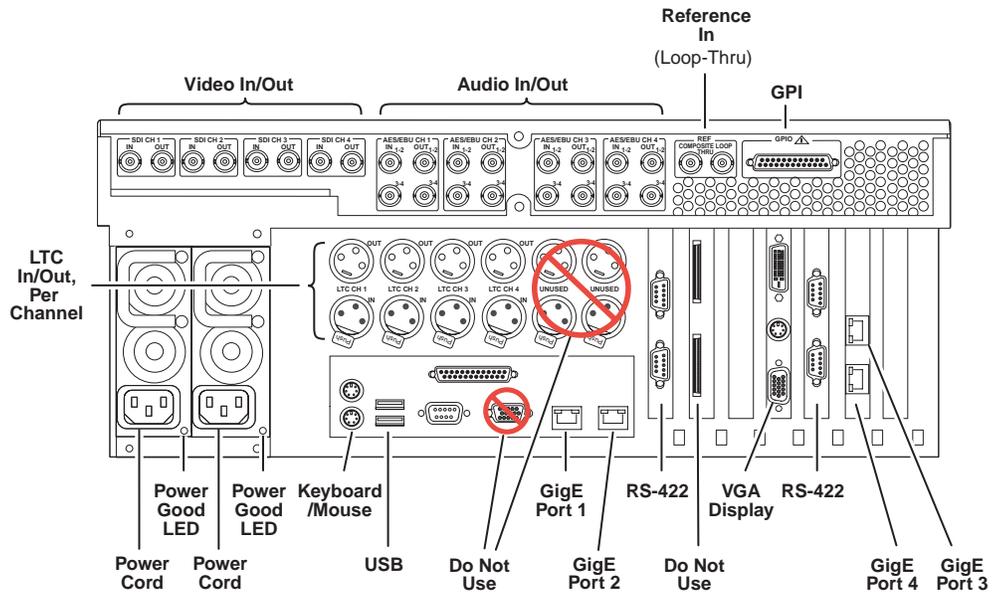
**NOTE:** In all models, the GigE port 3/port 4 board can be replaced by a Fibre Channel board (optional).

### SDA-00 model rear panel view



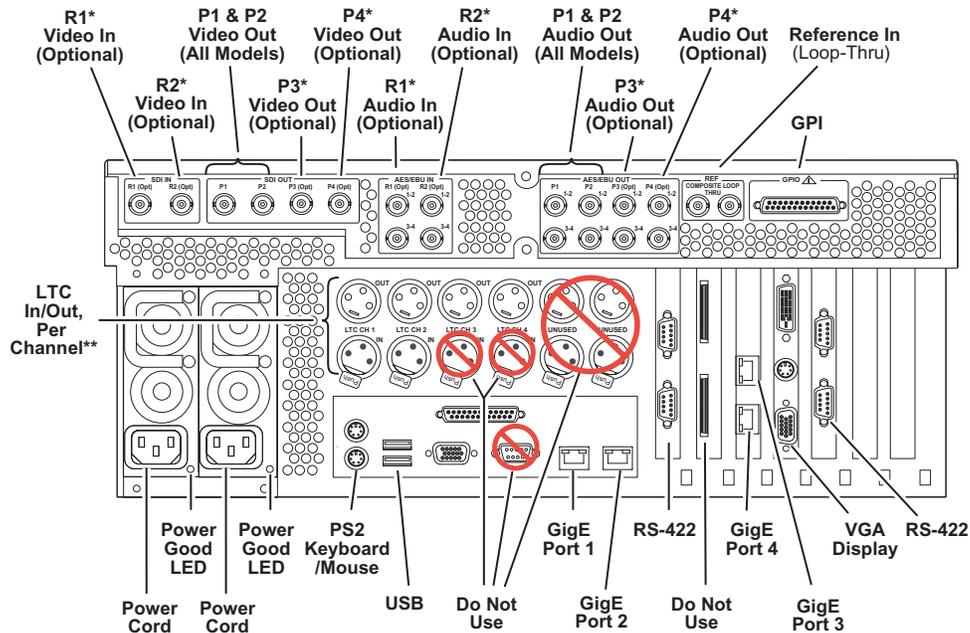
Refer to [“Connecting RS-422” on page 142](#) to connect and configure for RS-422 control.

## SD-00 model rear panel view



Refer to [“Connecting RS-422” on page 142](#) to connect and configure for RS-422 control.

## HD-00 model rear panel view



\*Key to Optional Channels

Channel	Models
R1	HD-12, HD-13
R2	HD-22
P1	All
P2	All
P3	HD-03, HD-04, HD-13
P4	HD-04

\*\*Key to LTC Channels and Play/Record Channels

LTC	Play/Record
CH 1 OUT = P1	
CH 1 IN = R1	
CH 2 OUT = P2	
CH 2 IN = R2	
CH 3 OUT = P3	
CH 3 IN = Not used	
CH 4 OUT = P4	
CH 4 IN = Not used	

Refer to “Connecting RS-422” on page 142 to connect and configure for RS-422 control.

## Considerations for first startup out of box

When you receive a K2 system from the factory, one or more End User License Agreements (EULAs) appear on the screen at first startup. Software licensing agreements require that you accept these EULAs. When you do so, start up processes can proceed. This behavior occurs only at first startup. Subsequent startups do not exhibit this behavior.

The following are examples of the EULAs that you might see.

On a K2 Media Client, at first startup the following behavior occurs:

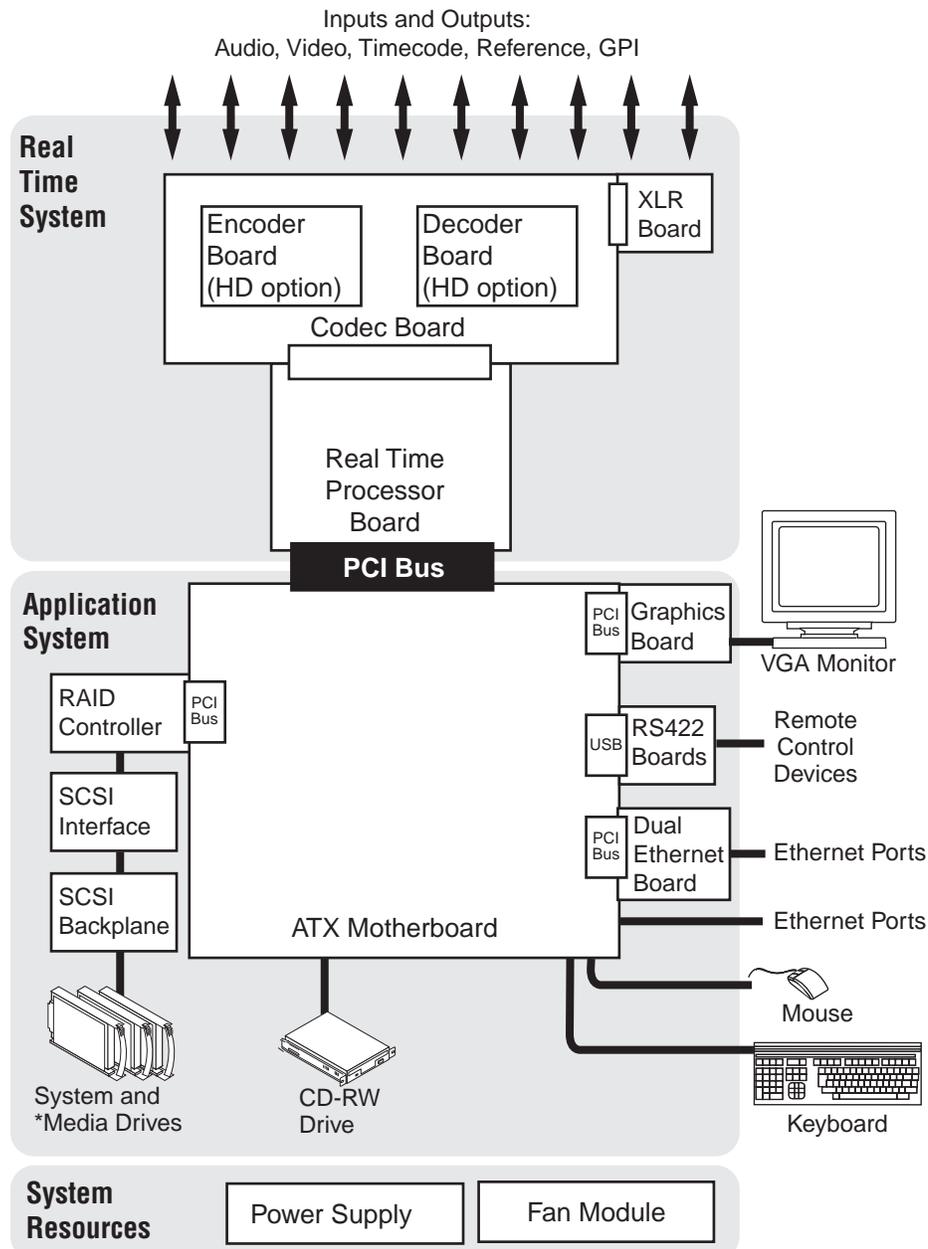
- A Microsoft SQL End User License Agreement (EULA) opens on the screen.

On a K2 Media Server, at first startup the following behavior occurs:

- A Microsoft SQL and Windows Server 2003 End User License Agreement (EULA) opens on the screen.

## K2 Media Client system overview

The K2 Media Client is a standard PCI bus-based Windows computer with extensive enhancements to provide the video disk recorder functionality. This section explains the major architectural blocks.



\*Media Drives not in external storage models

## Application System

The Application system architecture is similar to that of standard PC-type computers. It uses an ATX form factor motherboard that provides PCI board slots for expansion, built in Ethernet, and USB ports.

Standard boards are as follows:

- Graphics Board — This board provides enhanced performance for screen graphics and a connection for a VGA monitor.
- RS422 Boards — The K2 Media Client has two RS422 boards. These standard boards provide four RS-422 ports for connecting remote control devices.
- Dual Ethernet Board — This board provides additional Gigabit Ethernet ports, which are used for redundant connections.
- RAID Controller — This board provides the RAID functionality and SCSI connection for the internal disk drives. This includes both media and system drives for internal storage models, but just the RAID 1 pair of system drives for external storage models. The external ports on this board are not used.

The Application system uses a Windows operating system upon which all K2 Media Client applications run for configuration and control of the unit.

## Real Time System

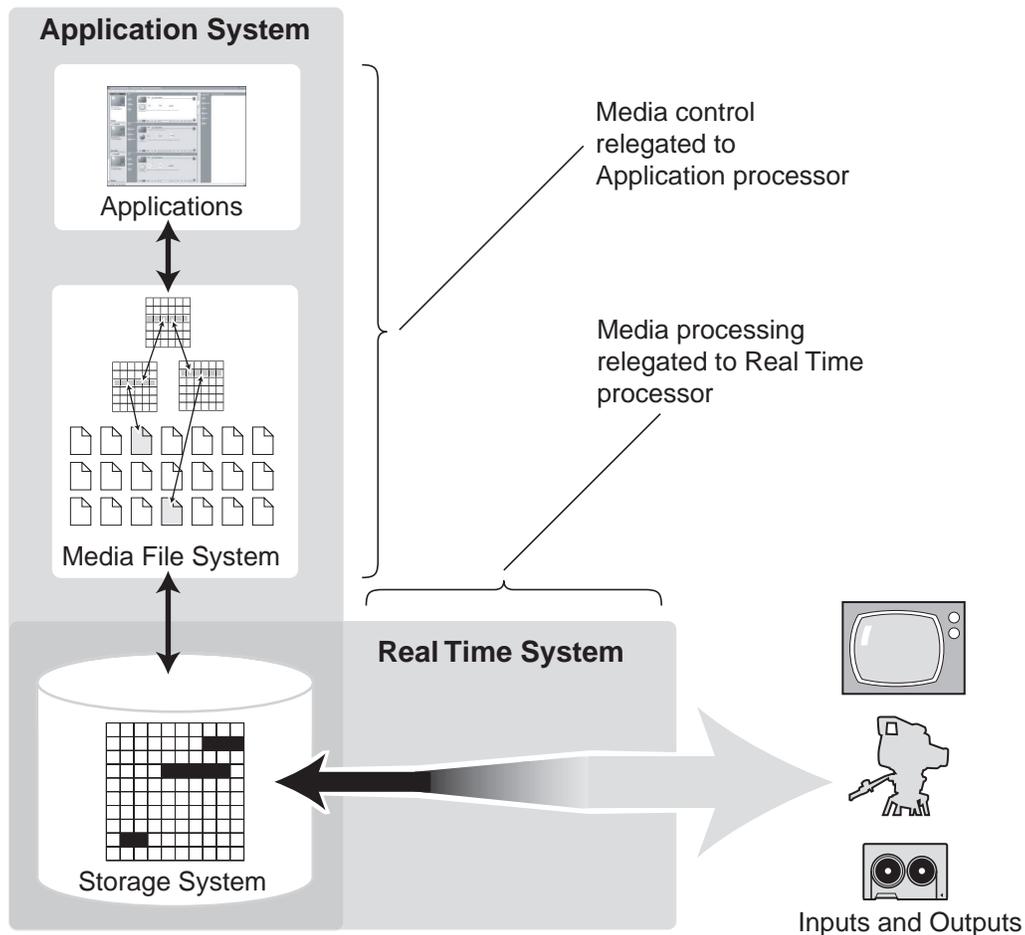
The Real Time system uses Grass Valley boards to provide the core video disk recorder functionality. Primary components are as follows:

- Real Time Processor (RTP) Board — This board provides a dedicated processor and connections for media access and processing. It functions as a riser board, connecting to the PCI slot below and the Codec board above.
- Codec Board — This board hosts the circuits responsible for encoding/decoding video and processing audio and timecode. It also provides the majority of the media-related input and output connectors.
- XLR Board — This board provides XLR connectors. It is primarily an extension of the codec board to allow the space and orientation required for XLR connections.

The Real Time system uses a dedicated operating system. This operating system runs on the RTP board and manages all the hardware involved in controlling the flow of video, audio, timecode, genlock, and GPI in and out of the K2 Media Client.

## Media control and processing

The following section explains how the Application system and the Real Time system work together to provide K2 Media Client functionality.



The high processing requirements of digital video can overwhelm the processor on a standard desktop PC, resulting in wait-times that destroy the video's essential real-time aspect. The K2 Media Client avoids this problem by providing dedicated systems that isolate processing needs. The components that work together to provide this functionality are as follows:

The **Application system** is, at its core, a conventional desktop PC-type system. In the K2 Media Client it is dedicated to control, configuration, and networking functions that do not require real-time accuracy. The Application system has the following components:

- Application software provides the user interface for operating the K2 Media Client. The software runs as Windows programs.
- The Media File system manages clips. It includes a database that associates the clip with its video, audio, and timecode files and a dedicated file system (separate from

the Windows file system) that controls access to the raw data that makes up each file. Any reading and writing of clips, be it through play and record operations or through file transfers and media streaming, is managed by the database. The database and file system run as Windows programs.

The **Storage system** includes the media disk drives, controllers, drivers, and adapters necessary for access and movement of the data. While the primary data flow is within the overall control of the Real Time system, some components and their communication pathways cross over into the Application system. For example, the RAID controller board plugs into the motherboard and accesses media drives in internal storage models, yet it is controlled by Windows. The media drives appear as the V: drive to the Windows operating system.

The **Real Time system** manages the media flow between the Storage system and the inputs and outputs. The Real Time system has a dedicated processor and time-sensitive mechanisms to serve media processing needs while maintaining real-time accuracy.

When you control play and record operations from within the Application system you trigger a chain of events that eventually crosses over into the Real Time system and results in media access. The following sequence is an example of this type of chain of events:

1. A user operates the Player application to play a particular clip. The Player application asks the Media File system for permission to access the clip. The Media File system grants access. In external storage models, the Media File system enforces shared storage policies in order to grant the access. When access is granted, the Player application initiates play access to the clip.
2. The database identifies the files that make up the clip and the file system instructs the Storage system to open access to the files.
3. The Storage system finds the raw data and opens the appropriate read access. At this point both the Application system and the Real Time system are involved. Windows controls the media drives and controllers, so the Real Time system makes file requests to Windows and it causes the data to be transferred to buffers on the Real Time processor. The data is then available to the Real Time system so that it can be processed at exactly the right time.
4. The Real Time system processes the media, decompresses it, adjusts its timing, and moves it as required to play the clip as specified by the user.

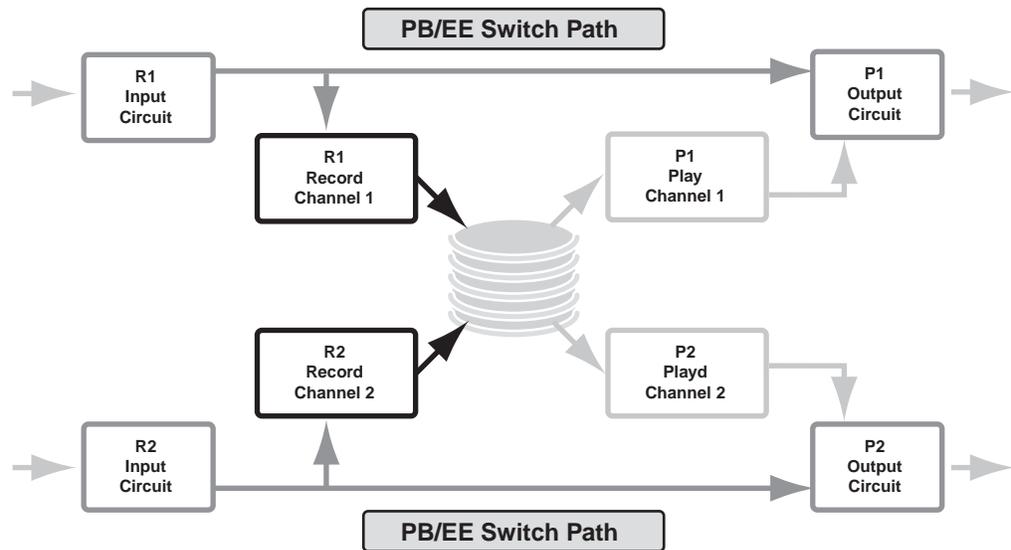
## Loop through and E to E

Each of the K2 Media Client models has different mechanisms and behaviors related to input signals routed to output connectors, as described in the following sections.

Also refer to [Appendix A, Remote control protocols](#) for information regarding E to E commands.

### SDA-00 E to E

SDA-00 models have an E to E path provided for monitoring purposes, as illustrated in the following diagram.



When E to E mode is enabled, the play channel video and audio outputs are switched to the corresponding record channel inputs when the play channel is in stop mode or when no clip is loaded. The following table describes play channel operation depending on the E to E selection.

E to E Setting	Play channel mode	Play channel output
Disabled	Play, FF, Rewind	Show clip
	Stop	Show clip
	Eject	Show black
Enabled	Play, FF, Rewind	Show clip
	Stop	Show input <sup>a</sup> .
	Eject	Show input <sup>a</sup> .

<sup>a</sup>. Output is black if no video input is connected.

If E to E mode is enabled, you can connect an external reference signal which is synchronous to the video input. This eliminates artifacts on the play channel output (periodic vertical shift) due to routing an asynchronous signal through the SDA-00 K2 Media Client. However, this is not required for recording, as the SDA-00 K2 Media Client can record asynchronous signals.

**NOTE: E to E is provided for monitoring the record channel, and is not intended as a program switch.**

### SD-00 loop through

On SD-00 models, for each channel the video, AES audio, and LTC inputs always pass to the output connectors as loop through. You can monitor the output when the channel is a record channel.

This loop through should not be confused with an E to E feature. E to E is not supported on the SD-00 K2 Media Client.

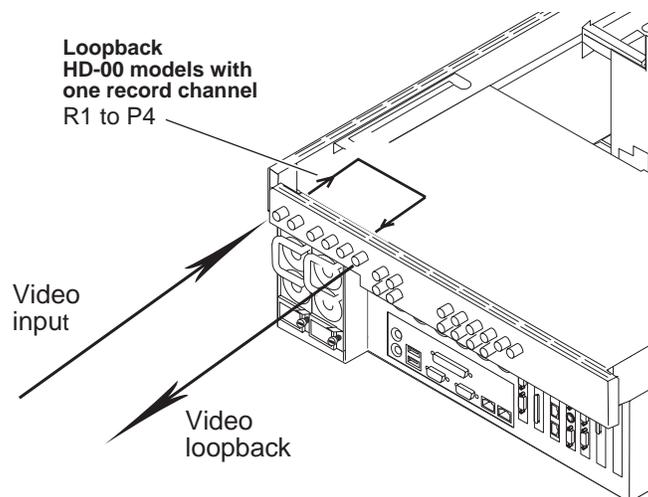
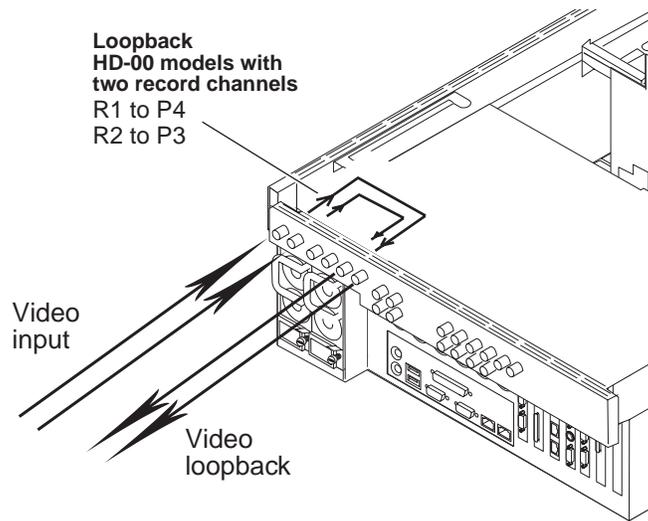
### HD-00 loopback

HD-00 models provide a loopback feature with which you can monitor the video that is being recorded. The video is routed back essentially untouched. Any ancillary data or embedded audio that is on the input video is still there on the loopback. The HD-00 K2 Media Client and the loopback videos must be locked to a video reference for the loopback feature to work properly.

Loopback should not be confused with an E to E feature. E to E is not supported on the HD-00 K2 Media Client.

**NOTE: The loopback path is for monitoring purposes only.**

The loopback mapping for HD-00 models is illustrated in the following diagrams.



## Locations of rear panel boards

Boards are mapped to rear panel slots as follows:

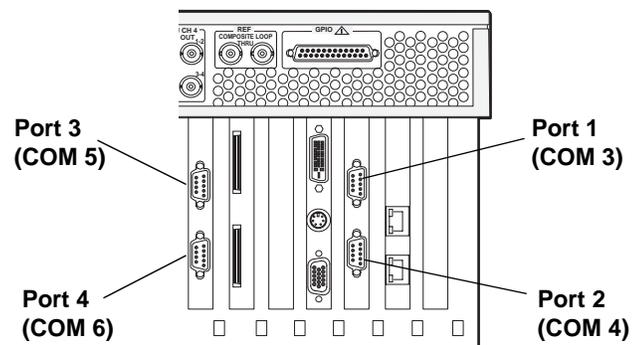
Board	Slot in SDA-00 models	Slot in SD-00 models	Slot in HD-00 models	Comments
ATX Motherboard	—	—	—	—
Dual Ethernet <sup>a</sup>	2	2	5	Plugs into PCI bus
RS422	3	3	3	Occupies a rear panel slot but does not plug into a PCI bus.
Graphics	4	4	4	Plugs into PCI bus
RTP	5	5	2	Plugs into PCI bus
RAID controller	6	6	6	Plugs into PCI bus
RS422	7	7	7	Occupies a rear panel slot but does not plug into a PCI bus.

<sup>a</sup>Can be replaced by a Fibre Channel board (optional)

## RS-422 ports

The Windows COM port assignments to the physical RS-422 port connectors on a K2 Media Client are described in the following illustration. For information on the relationship between RS-422 ports and K2 Media Client channels, see [Appendix A, Remote control protocols](#). The RS-422 ports correspond to internal USB hubs. For more information on USB see “[Enabling and disabling the USB ports](#)” on page 117.

**NOTE:** The designations *Port 1, Port 2, Port 3, Port 4* in this illustration refer to the enumeration of RS-422 connectors on the rear panel. Do not confuse this with other types of ports.



## Ports used by K2 services

The following ports are used by the applications and system tools of the K2 family of products:

Port #	Type of connection	Service name	Description
49168	HTTP	Grass Valley	K2 System Configuration application connection between a Control Point PC and the K2 Storage System device configured. Both HTTP and TCP connections are required. Most functions use the HTTP connection, but a few functions that require longer time periods use TCP.
49169	TCP	K2 Config	
49170	HTTP	Grass Valley Transfer Queue Service	Transfer Manager connection between source system and destination system.
49171	TCP	Grass Valley AppService	AppCenter connection for connection between Control Point PC and K2 Media Client.
49172	HTTP	Grass Valley Storage Utility Host	Connection for Storage Utility between Control Point PC and K2 Media Client or K2 Media Server.

## RAID drive numbering

RAID drives are numbered as follows. This numbering is displayed in Storage Utility and on the K2 Media Client chassis RAID drive labeling. You can see the labeling when you remove the fan module.

Drive numbering	Explanation
System Disk0_0	These two RAID drives make up LUN 0, which holds K2 Media Client system data and functions as the system drive. The system drive has three partitions. The partitions appear to the Windows operating system as C:, D:, and E: drives. Both internal storage models and external storage models have these two drives.
System Disk1_0	
Media Disk0_1	When configured as RAID 1, these two RAID drives make up LUN 1, which holds media data. The media file system lays down media data in a continuous stripe across this LUN and the other media LUNs. Internal storage models have these drives and the other media drives. External storage models do not have any media drives.
Media Disk1_1	
Media Disk0_2	When configured as RAID 1, these two RAID drives make up LUN 2, which holds media data.
Media Disk1_2	
Media Disk0_3	When configured as RAID 1, these two RAID drives make up LUN 3, which holds media data.
Media Disk1_3	
Media Disk0_4	When configured as RAID 1, these two RAID drives make up LUN 4, which holds media data.
Media Disk1_4	
Media Disk0_5	When configured as RAID 1, these two RAID drives make up LUN 5, which holds media data.
Media Disk1_5	

When media drives are configured as RAID 0, each drive is considered its own LUN. As such, the order of LUNs and drive numbers as displayed in Storage Utility does not correlate with the position of drives in the chassis. However, regardless of the RAID type and/or order of drives displayed in Storage Utility, an individual drive number in Storage Utility always correlates with that individual drive's labeling on the chassis.

## QuickTime support

Whenever a new, simple, DV-format clip is created on a K2 system, K2 software creates a corresponding QuickTime reference file. With the QuickTime reference file you can open the K2 clip with QuickTime tools for playback and editing.

The QuickTime reference file is created when the K2 clip's record or import operation is complete. Subsequent modifications to the K2 clip do not affect the QuickTime reference file.

All QuickTime related files are in the V:\assets directory. Mount this directory as read only. To open a QuickTime reference file, browse to V:\assets\

Finished material from QuickTime tools should be exported to the K2 system via FTP.

---

# Using K2 Media Client system tools

Topics in the chapter include the following:

- “Configuration Manager” on page 43
- “K2 System Configuration” on page 44
- “Storage Utility” on page 46
- “NetCentral” on page 47
- “Windows Remote Desktop Connection” on page 47

## Configuration Manager

The Configuration Manager is the primary configuration tool for a K2 Media Client. It makes settings that apply to the overall K2 Media Client system as well as settings that apply to individual channels.

Configuration Manager settings are stored in a database. When the K2 Media Client starts up it reads the current settings from the database and configures itself accordingly. When you modify a setting in Configuration Manager you must save the setting in order to update the database and reconfigure the K2 Media Client.

You can also save settings out of Configuration Manager into a configuration file, which is a stand-alone XML file. Likewise, you can load settings into Configuration Manager from a configuration file. However, you must use Configuration Manager as the means to save the settings to the database before the settings actually take effect. Configuration files are not linked directly to the database.

You can use configuration files as a means to back up your settings. You can also use configuration files to save several different groups of customized settings, each with a unique name, so that you can quickly load settings for specialized applications.

For Configuration Manager procedures, refer to the *K2 Media Client User Guide*.

## Accessing Configuration Manager

You access Configuration Manager through AppCenter from either the local K2 Media Client or the Control Point PC. To access the configuration settings, open AppCenter and select **System | Configuration**.

## Saving and restoring Configuration Manager settings

Settings can be saved as a configuration file. You can save any number of uniquely named custom configuration files. You can load a configuration file to restore system settings.

### To save custom settings:

1. In the Configuration Manager, click the **Save** button.

The Save As dialog opens.

2. Use the up arrow or select folders to navigate to the folder in which you want to save the configuration file.
3. Enter a name for the configuration file.  
Do not name the file *DefaultConfig.xml*, as this name is reserved for the factory default configuration file. Otherwise, standard Windows 2000 and up file naming restrictions apply.
4. Click **Save** and **Close**.

#### To restore custom settings:

1. If you want to save current settings, you should save them as a configuration file before continuing.
2. In the Configuration Manager, click the **Load** button.  
The Open dialog opens.
3. Use the up arrow or select folders to navigate to the custom configuration file.
4. Select the custom configuration file.
5. Click **Open**.  
The custom settings are loaded into Configuration Manager, but they have not been saved and put into effect.
6. Click **OK** to save and apply settings, and to close the Configuration Manager.

### Restoring default Configuration Manager settings

You can restore factory default settings as follows:

- You can restore some individual settings or groups of settings by selecting the **Default** button which appears below the settings in the configuration screen.
- You can restore all the settings in Configuration Manager at once to their default values as explained in the following procedure.

To restore all settings at once to their default values:

1. If you want to save current settings you should work through the previous procedure [“Saving and restoring Configuration Manager settings”](#) before proceeding.
2. In the Configuration Manager dialog, click **Restore**.  
The default settings are loaded into Configuration Manager, but they have not yet been saved and put into effect.
3. Click **OK** to save settings and close Configuration Manager.

## K2 System Configuration

The K2 System Configuration application (K2 Config) is the primary tool for configuring the K2 Storage System. Once the devices of the storage system are cabled and are communicating on the control network, you can do all the configuration required to create a working K2 Storage System using the K2 System Configuration application.

After your K2 Storage System is initially installed and configured, as instructed in the installation chapters in the *K2 Storage System Instruction Manual*, if you need to reconfigure the system you should do so using the K2 System Configuration Application. This enforces consistent policy and sequencing for reconfiguration tasks, which makes the system easier to maintain and aids in troubleshooting should a problem arise.

The K2 System Configuration application runs on a control point PC and accesses the devices of the K2 Storage System via the control network. You can configure the devices of the K2 Storage System as follows:

- K2 Media Client and K2 Media Server — These devices are configured directly by the K2 System Configuration application.
- K2 Level 2 RAID and Level 3 RAID storage devices — The K2 System Configuration application launches a remote instance of Storage Utility, which configures RAID storage devices. Storage Utility components run on the K2 Media Server and the configuration actually takes place via the Fibre Channel connection between the K2 Media Server and the RAID storage device.
- Ethernet switches — The K2 System Configuration application can launch a switch's web-based configuration application.

To open the K2 System Configuration application do the following:

1. On the control point PC open the K2 System Configuration application shortcut on the desktop. The K2 System Configuration application log in dialog box opens.
2. Log in using the designated administrator account for configuring K2 Storage System devices. By default this account is as follows:

Username: administrator

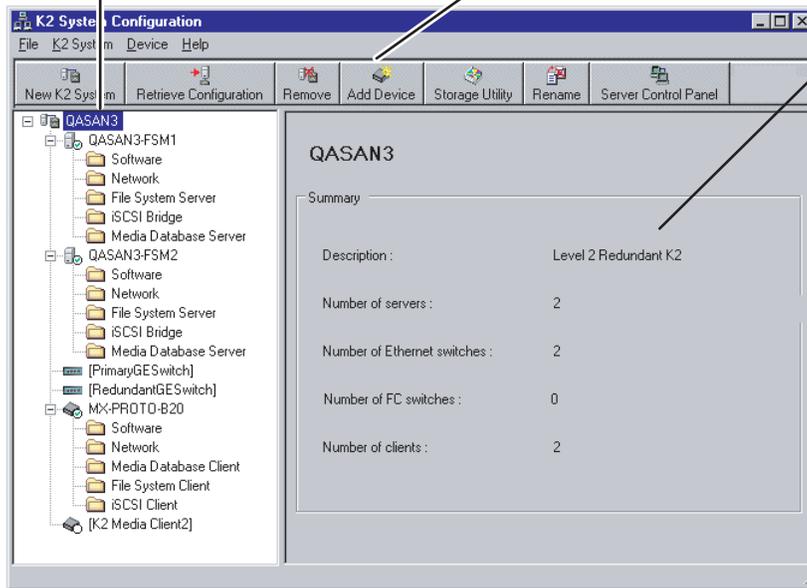
Password: adminK2

3. The K2 System Configuration application opens.

When you select a K2 storage system, device, or subsystem in the tree view...

Toolbar buttons are displayed according to operations available...

And related information and configuration controls appear.



If you have one or more K2 Storage Systems currently configured, the K2 System Configuration application displays the systems in the tree view.

If you have not yet configured a K2 Storage System, the K2 System Configuration application opens with the tree view blank. Refer to the installation chapters in the *K2 Storage System Instruction Manual* to add and configure a new K2 Storage System.

You can expand and select nodes in the tree view to view K2 Storage Systems, individual devices, and configuration settings. When you do so, the K2 System Configuration application displays information as found in a configuration file, rather than continuously polling devices to get their latest information. The configuration file is saved on the V: drive, along with the media files in the shared storage system. The configuration file is updated and saved whenever you change a configuration using the K2 System Configuration application. That is why you must always use the K2 System Configuration application to change settings on the storage system, so the most recently changed configurations will always be stored in the configuration file and displayed.

## Storage Utility

You should be aware that there are two versions of Storage Utility:

- Storage Utility for the K2 Storage System (SAN).
- Storage Utility for internal storage (stand-alone) K2 Media Client models

This manual explains Storage Utility for internal storage K2 Media Client models. Refer to the *K2 Storage System Instruction Manual* to learn about Storage Utility for the K2 Storage System.

**NOTE:** *Do not run Storage Utility on an external storage K2 Media Client. For external storage, run Storage Utility only via the K2 System Configuration application.*

The Storage Utility is your primary access to the media file system, the media database, and the media disks of the K2 Media Client for configuration, maintenance, and repair. It is launched from AppCenter workstation.



**CAUTION:** *Use the Storage Utility only as directed by a documented procedure or by Grass Valley Support. If used improperly, the Storage Utility can render your K2 Media Client inoperable or result in the loss of all your media.*

Refer to [Chapter 4, Managing Internal Storage](#) for Storage Utility procedures.

**NOTE:** *Do not use the “Power Console Plus” (PCP) utility on a K2 Media Client. This utility is for use by qualified Grass Valley Service personnel only. When this utility is opened it scans the SCSI bus and interferes with record and play operations.*

## NetCentral

NetCentral is Grass Valley’s monitoring application. The NetCentral server component runs on a NetCentral server PC, which could also be a K2 system control point PC. The K2 Media Client report status, primarily via Simple Network Management Protocol (SNMP), to NetCentral on the NetCentral server PC.

Refer to the *NetCentral User Guide* to get the NetCentral system installed and operating. You must install a NetCentral device provider on the NetCentral server PC for each type of device you are monitoring. For detailed information about setting up and monitoring each type of device, go to the NetCentral **Help** menu and read the online help for the device-type.

**NOTE:** *NetCentral is optional if you are using a K2 Media Client with internal storage only. NetCentral is required if you are using a K2 Media Client with a shared storage system.*

## Windows Remote Desktop Connection

You can connect to a K2 Media Client or a K2 Media Server remotely using the Microsoft Windows Remote Desktop Connection application. Do not use the Remote Desktop Connection to access the PC running the Control Point software or to access the AppCenter application; results may be unreliable. Also, take care when accessing an online K2 system on which media access is underway. The additional load on network and system resources could cause unpredictable results.

You can use either the name or the IP address to access the K2 system.

**NOTE:** Before you can use the **Remote Desktop Connection**, you need network access and permissions to connect to the K2 system.

To access the Remote Desktop Connection, follow these steps:

1. Click the **Start** button on the Windows task bar

—or—

Press the Windows key  on the keyboard.

2. Select **Programs | Accessories | Communications | Remote Desktop Connection**. The Remote Desktop dialog box displays.



3. Enter the name or IP address of the K2 system and click the **Connect** button. Alternately, you can click the down arrow of the text box and browse for the K2 system or select a previously entered computer.

---

## **System connections and configuration**

This chapter applies to “online” K2 systems, which includes internal storage K2 Media Clients and K2 Storage Systems (with connected external storage K2 Media Clients) Levels 2, 3, and 4.

This chapter contains the following topics:

- [“Network connections and configuration”](#)
- [“Modifying network settings”](#)
- [“Using FTP for file transfer”](#)
- [“Connecting RS-422”](#)
- [“Connecting GPI”](#)

Refer to the *K2 Storage System Instruction Manual* for information about the Nearline K2 Storage System, which is considered an “offline” K2 system.

### **Network connections and configuration**

Refer to the following list of procedures, then perform the ones required to set up the Gigabit (1GBaseT) Ethernet network for your application:

- [“Cable requirements”](#)  
Lists the requirements for Ethernet cables.
- [“About Ethernet ports and teaming”](#)  
Explains the default configuration of the Ethernet ports.
- [“Connecting the Ethernet network cabling”](#)  
Shows how to connect the K2 Media Client to an Ethernet network using the standard 1GBaseT ports.
- [“Data and streaming for K2 systems”](#) Contains instructions for configuring the network connection to support the following:
  - Remote control of the K2 Media Client with AppCenter or with remote protocol applications over Ethernet.
  - Streaming media transfers between K2 systems.
  - Standard data network capability

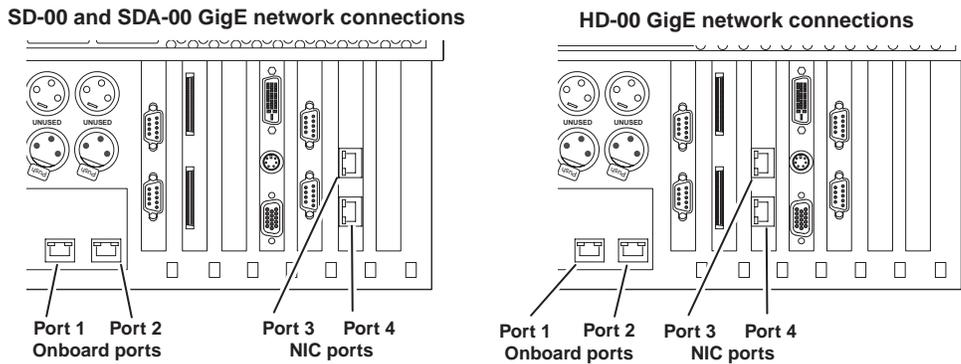
### **Cable requirements**

For making Ethernet connections, cabling must meet the following requirements:

- CAT5 or higher
- Maximum cable length is 50 meters

## About Ethernet ports and teaming

The K2 Media Client can have four Gigabit Ethernet ports: two on the motherboard and two on the Network Interface Card. The location of the ports varies on the different K2 Media Clients models, as in the following illustration:



On internal storage models, ports are not teamed at the factory. They are independent ports, each with the same configuration. If you chose to team ports to provide redundancy, do so only as instructed in [“Teaming Ethernet ports on internal storage models”](#) on page 60.

On external storage models, the first port on the motherboard (Port 1) and the first port on the Gigabit Ethernet card (Port 3) are configured at the factory as a teamed pair. This is the Control Team. The teamed pair appears to the network as a single adapter with one IP address. Do not modify this teaming configuration. If you need to reset teaming to factory specifications, refer to the *K2 Media Client Service Manual*.

On external storage models, the second port on the motherboard (port 2) and the second port on the Gigabit Ethernet card (port 4) must be independent ports (unteamed). These are the media ports, used for iSCSI traffic only. Refer to [Chapter 7, External Storage](#) and to the *K2 Storage System Instruction Manual* for more information about the media ports.

## Connecting the Ethernet network cabling

This section is divided into two parts:

[“Connecting the network cabling for K2 Media Clients with internal storage”](#) on page 50

[“Connecting the network cabling for K2 Media Clients with external \(shared\) storage”](#) on page 51

### Connecting the network cabling for K2 Media Clients with internal storage

On a K2 Media Client with internal storage, port 1 is the control port, used to transmit command information, AMP protocols, etc. Connect the control network to port 1.

Port 2 is used for FTP/streaming transfers. Connect the FTP/streaming network to port 2. Refer to [“Using FTP for file transfer”](#) on page 70 for more information about the FTP/streaming network.

Do not use ports 3 and 4 on a K2 Media Client with internal storage, except if you have teamed your ports. Refer to [“Teaming Ethernet ports on internal storage models” on page 60](#).

### **Connecting the network cabling for K2 Media Clients with external (shared) storage**

In the K2 Media Client with shared storage, ports 1 and 3 are the control team, used to transmit control information, while port 2 and port 4 (not teamed) are used for iSCSI traffic, which is the recording or playing of media.

#### **Control Network**

For a non-redundant K2 Storage System, make a control connection from the GigE switch to port 1.

For a redundant K2 Storage System, make a control connection from the “A” GigE switch to port 1 and a control connection from the “B” GigE switch to port 3.

#### **Media/iSCSI network**

For a non-redundant K2 Storage System, connect the media/iSCSI network to port 2.

For a redundant K2 Storage System, connect the “A” media/iSCSI network to port 2 and the “B” media/iSCSI network to port 4.

Refer to the *K2 Storage System Instruction Manual* for more information.

### **Data and streaming for K2 systems**

After making 1GBaseT network connections as described in [“Connecting the Ethernet network cabling” on page 50](#), use the following procedure to configure the network settings. Once configured, you can perform the following tasks:

- General networking tasks such as file sharing and mapping network drives.
- Remote control and configuration of the K2 Media Client using AppCenter from a Control Point PC.
- Remote control of the K2 Media Client using devices and applications software developed for the K2 Media Client that use industry standard remote control protocols over Ethernet.
- Stream media transfers between K2 systems and other supported Grass Valley systems. Streaming transfers allow loading and playing a clip before the transfer is complete.

Setting up the K2 system for FTP/streaming transfer has the following network requirements:

- For internal storage K2 Media Clients, the K2 Media Client itself is the source/destination for FTP/streaming transfers. FTP/streaming traffic uses the FTP GigE port on the K2 Media Client.
- For K2 Media Clients with external (shared) storage on a K2 Storage System, a K2 Media Server is the source/destination for FTP/streaming transfers. FTP/streaming traffic uses the FTP GigE port on the K2 Media Server. No transfers go to/from the external storage K2 Media Client directly.
- Some kind of name resolution process must be followed. You must either reference

host names through hosts files located on each networked device or edit the DNS entries. To edit the DNS entries, see your network administrator. To set up host files, see [“Connecting the Ethernet network cabling” on page 50](#).

- The host name of all peer K2 systems, M-Series iVDRs, and Profile XP systems must be added to a Remote host registry using the K2 Media Client Configuration Manager.
- To import to or export from a K2 system, both the source and destination need to be in the same domain.

This procedure guides you to relevant settings, but does not instruct you on the specific settings required for your network. It is assumed that you understand Ethernet networks in general and your particular network needs and that you can apply that understanding to make the required settings using standard Windows procedures. If you need help with these procedures, contact your network administrator.

## Configure Windows network settings

Topics in this section include the following:

- [“Configure Windows network settings for K2 Media Client with internal storage” on page 52](#)
- [“Configure Windows network settings for K2 Media Clients with shared storage” on page 54](#)
- [“Set up hosts files” on page 55](#)
- [“Add network hosts names for streaming” on page 58](#)



**CAUTION:** *The K2 Media Client is not a general purpose Windows workstation. The Windows configuration on the K2 system has been specifically set for use as a real time device. To avoid partial or total system failure, do not modify any operating system settings unless approved by Grass Valley, including but not limited to the following:*

- *Do not use the User Manager*
- *Do not use the Disk Administrator*
- *Do not load any third party software*
- *Do not install any Windows updates other than “High Priority Updates” without contacting Grass Valley Product Support. (See [“Configuring K2 security” on page 103](#).)*

### Configure Windows network settings for K2 Media Client with internal storage

The internal storage K2 Media Client ships from the factory DHCP configured. If your control network has DHCP/DNS and you are satisfied to use the factory default K2 Media Client host name (which is the serial number), then no local configuration of the control connection is required.

There are special name resolution requirements for the FTP/streaming network. If you require FTP/streaming transfers for the internal storage K2 Media Client, refer to [“Streaming video between K2 systems” on page 55](#) to determine your method of providing this name resolution and the configuration required.

If the Windows network settings for the internal storage K2 Media Client need to be configured, you must have Windows administrator security privileges on the K2 Media Client.

To configure network settings on an internal storage K2 Media Client, do the following:

1. Access the Windows desktop on the K2 system. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
2. Open the Network Connections dialog box:
  - In the Windows Classic view, select **Start | Settings | Network Connections**
  - In the Windows XP view, select **Start | Control Panel | Network Connections**
3. Continue with standard Windows procedures to configure the TCP/IP protocol properties. You can set up the network using DHCP, DNS, WINS, or other standard networking mechanisms.

**NOTE:** *On small networks or networks with certain security policies a DHCP server or domain name server (DNS) might not be available. In this case you can set up a static IP address and create a Host file on each K2 system. The Host file specifies a device name for each IP address used on the network. Refer to the Windows documentation or your network administrator for more information.*

4. Configure the control connection on the internal storage K2 Media Client as follows:

- On a system with the factory default network configurations, configure the network connection with the following name:

*Control Connection #1*

This is GigE port 1 on the rear panel.

- If you have teamed your ports, configure the network connection with the following name:

*Control Team*

This is GigE ports 1 and 3 on the rear panel. Refer to [“Teaming Ethernet ports on internal storage models” on page 60](#) for more information about teaming.



**CAUTION:** *Under no circumstances should you modify the loopback adapter. The loopback IP address is 192.168.200.200. Keep that IP address reserved on your network. Don't assign it to any other device. (If this causes conflicts with your existing network, consult your Grass Valley representative.)*

5. Configure the FTP/streaming connection (if needed) on the internal storage K2 Media Client. This connection must have an IP address that is on a different subnet from the control connection. Configure as follows:

- On a system with the factory default network configurations, configure the network connection with the following name:

*Media Connection #1*

This is GigE port 2 on the rear panel.

- If you have teamed your ports, configure the network connection with the following name:

*FTP Team*

This is GigE ports 2 and 4 on the rear panel. Refer to [“Teaming Ethernet ports on internal storage models” on page 60](#) for more information about teaming.

6. If prompted, shutdown and restart Windows.
7. If you are going to FTP/stream video between K2 systems, proceed to [“Streaming video between K2 systems”](#); otherwise, the K2 system is ready for standard data networking tasks.

### **Configure Windows network settings for K2 Media Clients with shared storage**

The only network configuration that you must do on an external (shared) storage K2 Media Client is for the control connection. Once the control connection is configured, you use it to connect to the K2 Media Client from the control point PC and then use the K2 System Configuration application to do the remainder of the network configuration.

The K2 Media Client ships from the factory DHCP configured. If the control network you are using with your K2 Storage System has DHCP/DNS and you are satisfied to use the factory default K2 Media Client host name (which is the serial number), then no local configuration of the control connection is required.

If the control connection needs to be configured, you must have Windows administrator security privileges on the K2 Media Client.

To configure the control connection on the external storage K2 Media Client, do the following:

1. Access the Windows desktop on the K2 system. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
2. Open the Network Connections dialog box:
  - In the Windows Classic view, select **Start | Settings | Network Connections**
  - In the Windows XP view, select **Start | Control Panel | Network Connections**
3. Continue with standard Windows procedures to configure the TCP/IP protocol properties. You have the following options to set up the control network:
  - You can set up the network using DHCP, DNS, WINS, or other standard networking mechanisms.
  - You can use host tables for name resolution. There are special name resolution requirements for the FTP/streaming network, so if you decide to use host tables for the control network, you should be aware of these requirements. Refer to the [“Streaming video between K2 systems” on page 55](#) and the *K2 Storage System Instruction Manual* for a complete discussion of host tables.
4. Configure the control connection on the external storage K2 Media Client. In the Network Connections window, it is the connection with the following name:

### *Control Team*

This is GigE ports 1 and 3 on the rear panel.

Do not attempt to configure connections named *Control Connection #1* or *Control Connection #2*, as these have been combined in the Control Team.

***NOTE: Be sure to configure only the connection that is labelled “Control Team” in the Name column. Under no circumstances should you modify the loopback adapter. The loopback IP address is 192.168.200.200. Keep that IP address reserved on your network. Don’t assign it to any other device. (If this causes conflicts with your existing network, consult your Grass Valley representative.)***

5. Do not configure connections named *Media Connection #1* or *Media Connection #2*, as these are reserved for the external storage media (iSCSI) network and should only be configured using the K2 System Configuration application. Refer to the *K2 Storage System Instruction Manual*.
6. If prompted, shutdown and restart Windows.
7. You must add the external storage K2 Media Client to the K2 Storage System. Refer to [Chapter 7, External Storage](#).
8. If you are going to stream video between K2 systems, proceed to [“Streaming video between K2 systems”](#).

## Streaming video between K2 systems

It is required that FTP/streaming traffic be on a separate subnet from control traffic and, in the case of a K2 Storage System with external storage K2 Media Clients, separate from media (iSCSI) traffic. To reserve bandwidth and keep FTP/streaming traffic routed to dedicated ports, IP addresses for FTP/streaming ports must have double name resolution such that hostnames are appended with the “\_he0” suffix. You can use host tables or another mechanism, such as DNS, to provide the name resolution. This directs the streaming traffic to the correct port.

In most K2 systems, network name resolution is provided by host tables. The following procedure describes how to set up hosts tables to provide name resolution for both the control network and the FTP/streaming network. If you are using other mechanisms for name resolution, use the host table examples here to guide you. For external storage K2 Media Clients, also refer to the *K2 Storage Instruction Manual* for a discussion of host tables.

### Set up hosts files

Set up a hosts file located in *c:\WINDOWS\system32\drivers\etc\hosts* on each K2 system. If you include the names and addresses of all the systems on all the network, then you can copy this information to all the machines instead of entering it in the hosts file on each machine.

To provide the required name resolution for the FTP/streaming network, in the host file each system that is a transfer source/destination has its host name listed twice: once for the control network and once for the FTP/streaming network. The host name for the streaming network has the extension “\_he0” after the name. The K2 systems use this information to keep the FTP/streaming traffic separate from the control traffic.

For FTP transfers to/from a K2 Storage System (SAN), transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the external storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “\_he\_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

One optional step is to provide “error correction” aliasing for external storage (SAN) K2 Media Clients as well. For each external storage K2 Media Client, add the “\_he0” extension to the hostname but then associate that hostname with the K2 Media **Server’s** FTP/streaming network IP address, **not** the K2 Media **Client’s** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. This “error correction” host file aliasing redirects to the K2 Media Server, which is the correct transfer source/destination. Use this technique with caution, as it can mask transfer problems and hamper your ability to troubleshoot and find the root cause.

To see an example of a K2 Media Client configuration setup and hosts file, refer to the [“Sample K2 Media Client configuration and hosts file” on page 57](#). Otherwise, proceed with the following steps to set up your hosts file.

On each K2 system, set up the hosts file as follows:

1. Open the following file using Notepad or some other text editor.

```
c:\WINDOWS\system32\drivers\etc\hosts
```

2. Enter text in two lines for each K2 system that is a transfer source/destination.
  - a. Type the IP address for the control network, then use the TAB key or Space bar to insert a few spaces.
  - b. Type the machine name, such as **K2-MediaClient**. This sets up the host file for resolving the machine name on the control network. The machine name cannot have any spaces in it.
  - c. On the next line, type the IP address for the FTP/streaming network, then use the TAB key or Space bar to insert a few spaces.
  - d. Type the machine name followed by the characters “\_he0”. Be sure to use the zero character, not the letter ‘o’. Refer to the following example:

```
10.16.42.10 K2-MediaClient
10.0.0.10 K2-MediaClient_he0
```

3. If you choose to add the “error correction” aliasing to the FTP/streaming network line for a K2 Media Server, do so as in the following example:

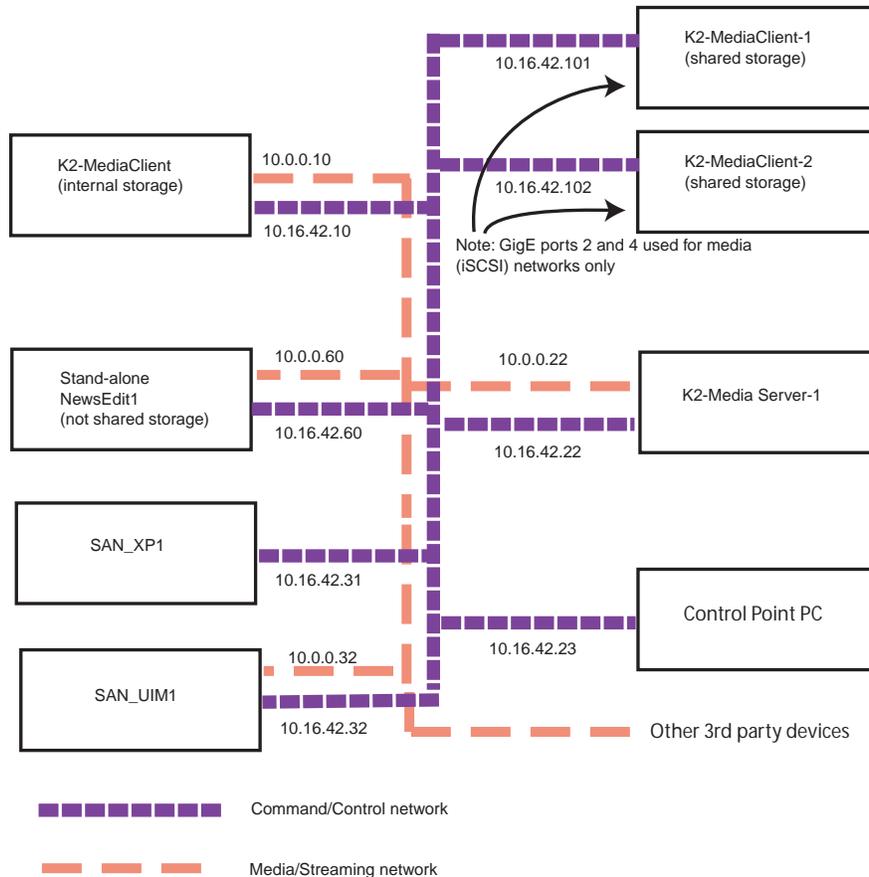
```
10.0.0.22 K2-MediaServer-1_he0 K2-MediaClient-1_he0 K2-MediaClient-2_he0
```

4. For systems that are not a transfer source/destination, the second line (for the FTP/streaming network) is not required.
5. If there are UIM systems on the FTP/streaming network, make sure you follow the UIM naming conventions. Refer to the *UIM Instruction Manual*.
6. Once you have added the host names for all the systems on the networks for which the host file provides name resolution, save the file and exit the text editor.

7. Copy the new hosts file onto all the other machines to save you editing it again.
8. Proceed to “Add network hosts names for streaming”.

**Sample K2 Media Client configuration and hosts file**

The following diagram illustrates one possible configuration setup, with both a K2 Media Client with internal storage and a K2 Media Client with shared storage, as well as other Grass Valley systems.



The following example shows the contents of a default Windows hosts file with new lines added that match the IP addresses and host names in the previous sample diagram.

All lines beginning with a # are comments and can be ignored or deleted.

```
# Copyright (c) 1993-1995 Microsoft Corp.
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
```

```
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
# 102.54.94.97 rhino.acme.com # source server
# 38.25.63.10 x.acme.com # x client host

127.0.0.1 localhost

10.16.42.10 K2-MediaClient
10.0.0.10 K2-MediaClient_he0

10.16.42.101 K2-MediaClient-1
10.16.42.102 K2-MediaClient-2

10.16.42.22 K2-MediaServer-1
10.0.0.22 K2-MediaServer-1_he0 K2-MediaClient-1_he0 K2-MediaClient-2_he0

10.16.42.23 ControlPointPC

10.16.42.60 NewsEdit1
10.0.0.60 NewsEdit1_he0

10.16.42.31 SAN_XP1
10.0.0.32 SAN_XP1_he0 SAN_UIM1_he0
10.16.42.32 SAN_UIM1
```

### Add network hosts names for streaming

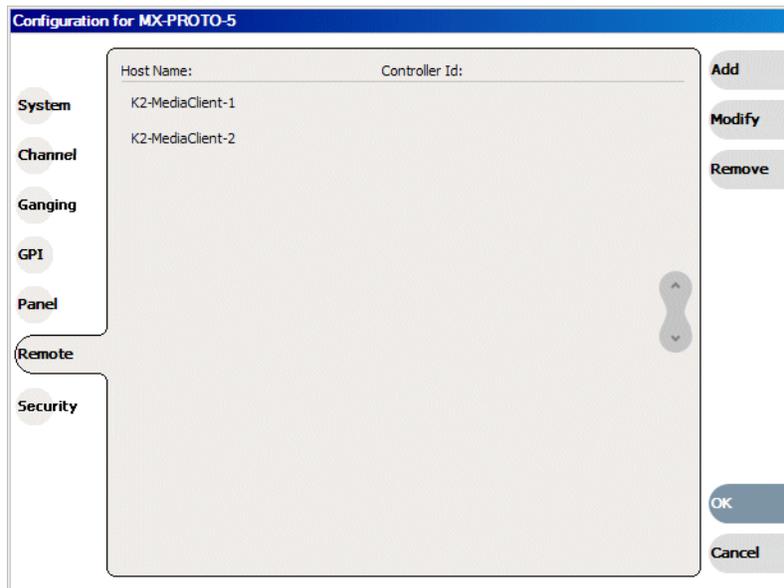
You must add the host names of all peer K2 systems on the network that support streaming transfers. Adding host names is required to allow selection of networked K2 systems in the AppCenter user interface and to provide a successful network connection for streaming. The host names added will appear in the “Import” and “Send to” dialog boxes.

**NOTE:** By default, the K2 system host name is the same as the Windows computer name. To determine the K2 system computer name, right-click K2 Media Client or K2 Media Server (My Computer) on the Windows desktop, then properties. Select the Network Identification tab and look for the “Full computer name”.

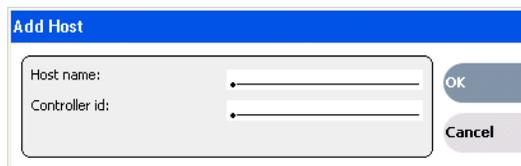
To add network host names:

1. Open AppCenter for the K2 Media Client.
2. In AppCenter toolbar, select **System**, then choose **Configuration**.
3. Select the **Remote** tab.

The Remote Settings dialog box displays, showing any network host names that have been added.



4. Select **Add**, to open the Add Host dialog box, then do the following:
  - a. Select the Host name field, then enter the computer name of a peer K2 system. Make sure to enter the exact computer name. Any differences will result in being unable to connect to the K2 system.



- b. If you are using VDCP remote protocol to perform video network transfers, use the following steps to add a unique Controller ID for each host. Otherwise, you can ignore this step and proceed to the next step.
      - Select controller id field.
      - Enter the controller ID of the K2 system, then select **OK**. Use a number between 1 and 255 that is not assigned to any other K2 system.
    - c. Select **OK** in the Add Host dialog box.
5. Repeat the previous step for the remaining K2 systems.
6. In the Configuration dialog box, select **OK** to save settings.

Once the host names are added, the K2 system is ready for streaming operation. For information on transfer compatibility and supported formats, refer to [Appendix B, Specifications](#). For procedures on transferring media, refer to the *K2 Media Client User Guide*.

**NOTE:** If you have trouble, try using the ping utility in the Windows command prompt using either the IP address or host name. Troubleshoot as needed. Also, refer to the K2 Media Client Service Manual for troubleshooting procedures.

## Teaming Ethernet ports on internal storage models

When you receive an internal storage K2 Media Client from the factory, the Ethernet ports are independent ports, each with the same configuration. Ports are not teamed at the factory. However, if your K2 Media Client has four Ethernet ports, you have the option of teaming the Ethernet ports to provide redundancy. Do not team Ethernet ports on K2 Media Clients that have just two Ethernet ports. Consult your system design or your network administrator to determine the level of redundancy applicable to the internal storage K2 Media Client.

**NOTE:** Do not use these procedures on an external storage K2 Media Client. There is a required teaming configuration on external storage K2 Media Clients, which must not be changed. If you must restore the required teaming on an external storage K2 Media Client, refer to the K2 Media Client Service Manual.

If you choose to team the Ethernet ports on an internal storage K2 Media Client, do so only as instructed in the following procedures.

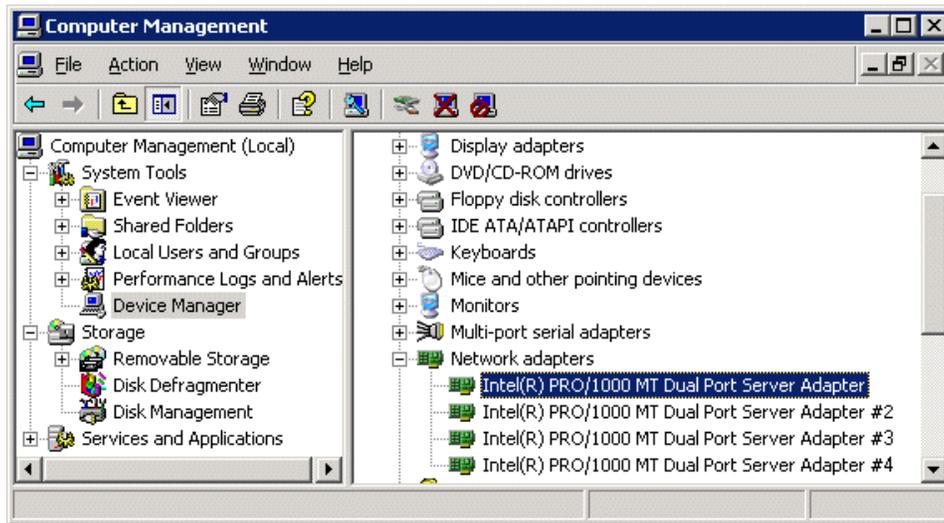
- “Identify adapters”
- “Create the Control Team”
- “Create the FTP Team”
- “Name teams”
- “Reorder adapters”

### Identify adapters

**NOTE:** The K2 Media Client is configured at the factory with a loopback adapter. Do not modify this adapter. Refer to “[Modifying network settings](#)” on page 69.

Before attempting to team Ethernet ports, it is critical that you correctly associate the software names of the adapters with the physical ports. In some cases previous configuration changes can cause the software names to change from their factory default names, which can make this association confusing. Use the following procedure to verify software names and ports:

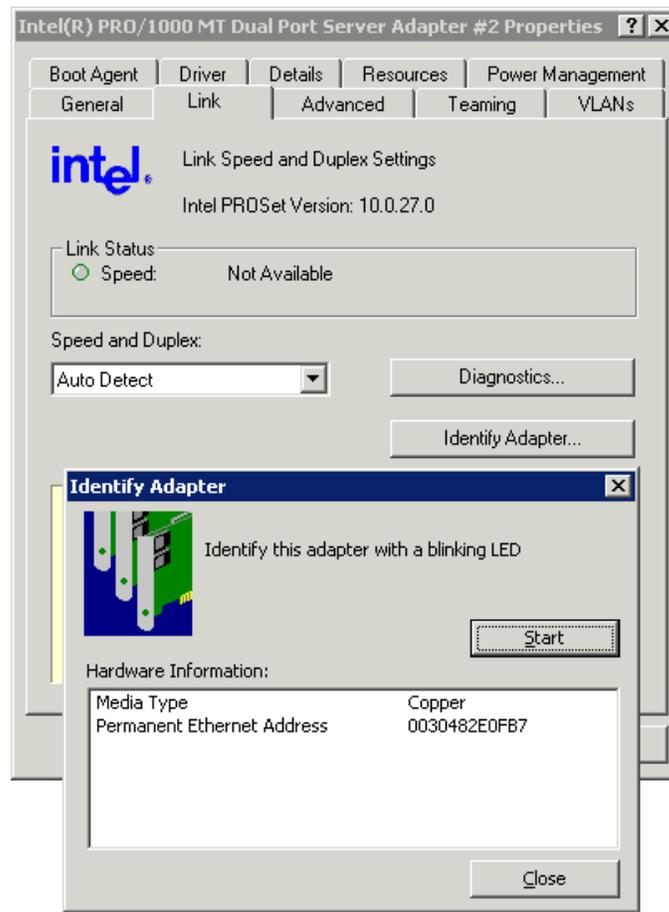
1. Access the Windows desktop on the K2 system. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
2. Open Device Manager as follows:
  - a. On the Windows desktop, right-click **K2 Media Client** (My Computer) and select **Manage**. The Computer Management window opens.



- b. In the left pane select **Device Manager**. Device Manager opens in the right pane.
3. In Device Manager, verify that adapter names are the correct default names as follows:
  - a. Expand **Network Adapters**.
  - b. Verify that there are four adapters listed, named as follows:
    - Intel® PRO/1000 MT Dual Port Server Adapter
    - Intel® PRO/1000 MT Dual Port Server Adapter #2
    - Intel® PRO/1000 MT Dual Port Server Adapter #3
    - Intel® PRO/1000 MT Dual Port Server Adapter #4

Sometimes adapter names change due to PNP device removal and re-creation. If you are having this problem, remove all network devices, then reboot and let Windows PNP enumerate network adapters. The default network names should reappear numbered correctly. If the numbering is still incorrect, shut down the K2 Media Client, remove the dual Ethernet card, then start up the K2 Media Client. This forces the system to scan the motherboard ports first and enumerate properly. Then shutdown the K2 Media Client, replace the dual Ethernet card, and start up the K2 Media Client. This time the dual Ethernet card is scanned and enumerated after the motherboard ports.

4. For each adapter name shown, verify that the adapter name is mapped correctly to a physical port, as follows:
  - a. Under Network adapters, right-click an adapter and select **Properties**. The Properties dialog box opens.



5. Select the **Link** tab and then click **Identify Adapter**. The Identify Adapter dialog box opens.
6. Click **Start**.
7. Verify that the LED is blinking next to the physical network port corresponding to that adapter software name, as follows:

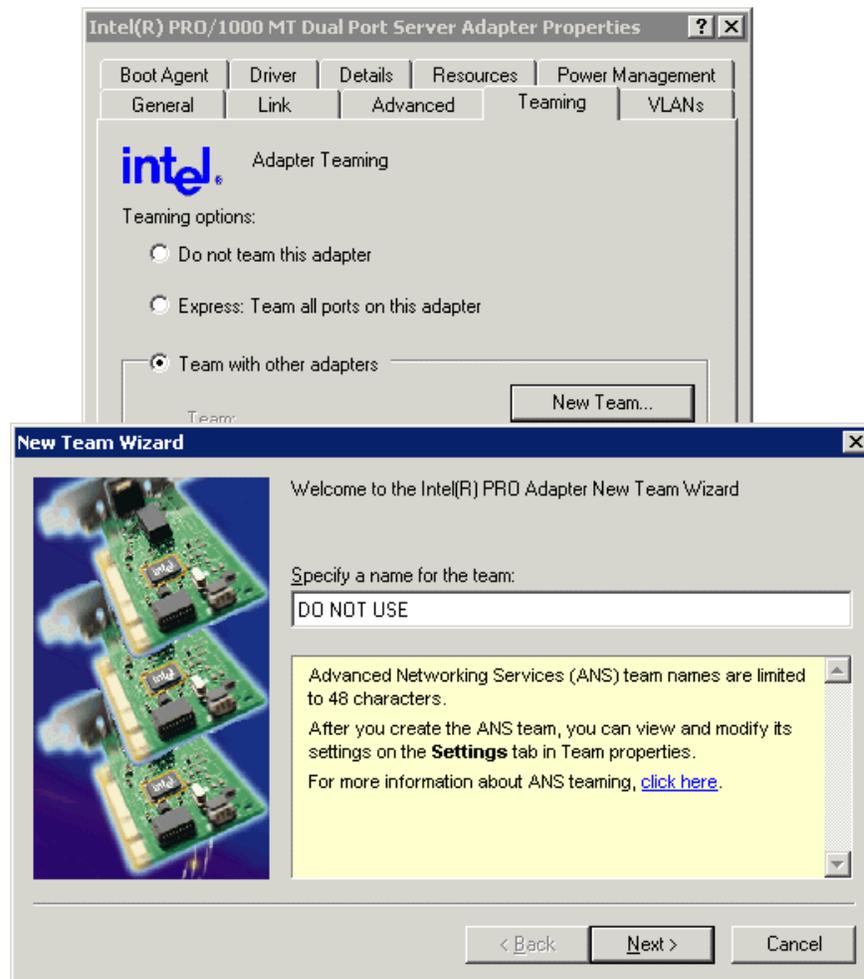
Software adapter name	Physical port
...MT Dual Port Server Adapter	1st (left) port on the motherboard
...MT Dual Port Server Adapter #2	2nd (right) port on the mother board
...MT Dual Port Server Adapter #3	1st (upper) port on the dual Ethernet adapter
...MT Dual Port Server Adapter #4	2nd (lower) port on the dual Ethernet adapter

8. Continue with the next procedure [“Create the Control Team”](#).

## Create the Control Team

The goal of teaming is to create two teams, one for the control network and one for the FTP/streaming network. The teaming should be set up such that the first physical port on the motherboard and the first physical port on the dual Ethernet adapter are teamed for control. The second physical port on the motherboard and the second physical port on the dual Ethernet adapter are teamed for FTP.

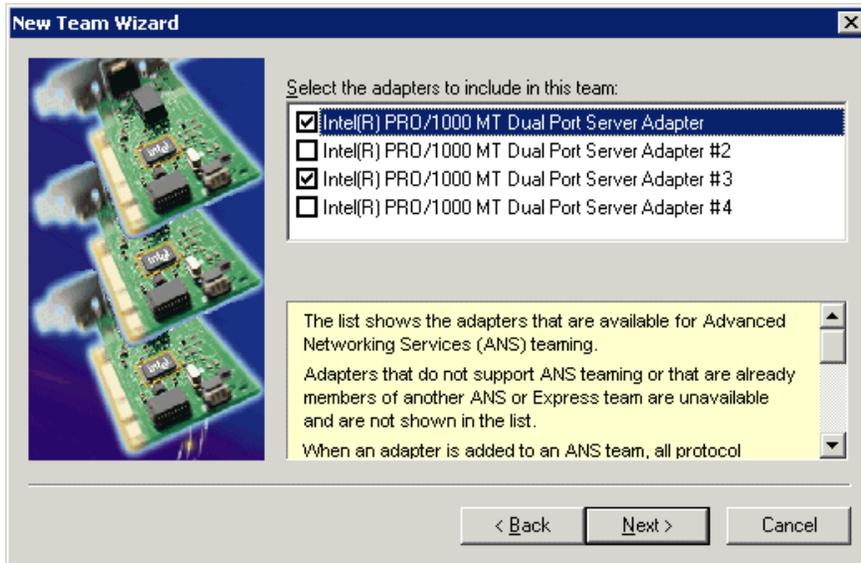
1. In Device Manager, right-click ...**MT Dual Port Server Adapter** and select **Properties**. The Properties dialog box opens.
2. Select the **Teaming** tab.



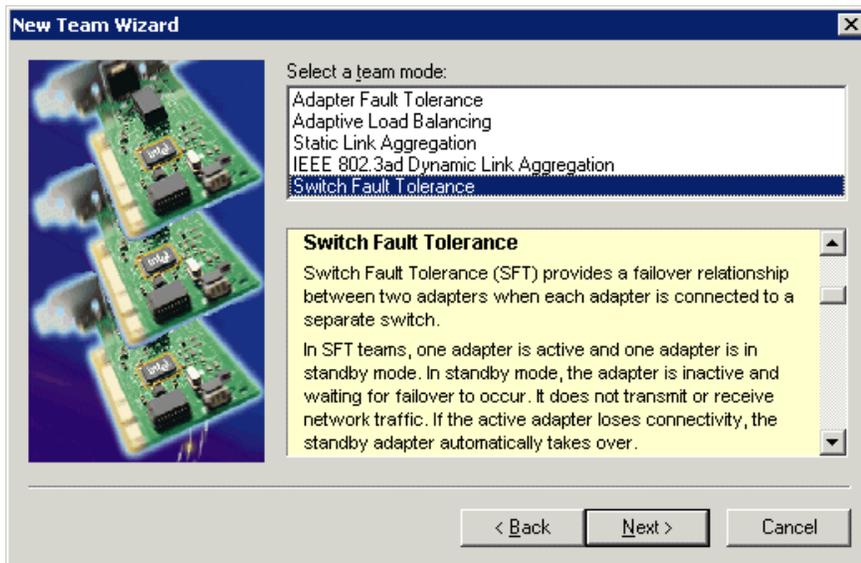
3. Select **Team with other adapters**, then click **New Team**. The New Team Wizard opens.
4. Enter **DO NOT USE**.

You enter this name because there is a bug in the teaming software that creates a “phantom” entry with this name, however that entry is not usable. Continue with this procedure to work around the bug.

Click **Next**.



5. Select the check box for **...Adapter** and **...Adapter #3**. Click **Next**.



6. Select **Switch Fault Tolerance**. Click **Next**.

7. Click **Finish** and wait a few seconds for the adapters to be teamed.

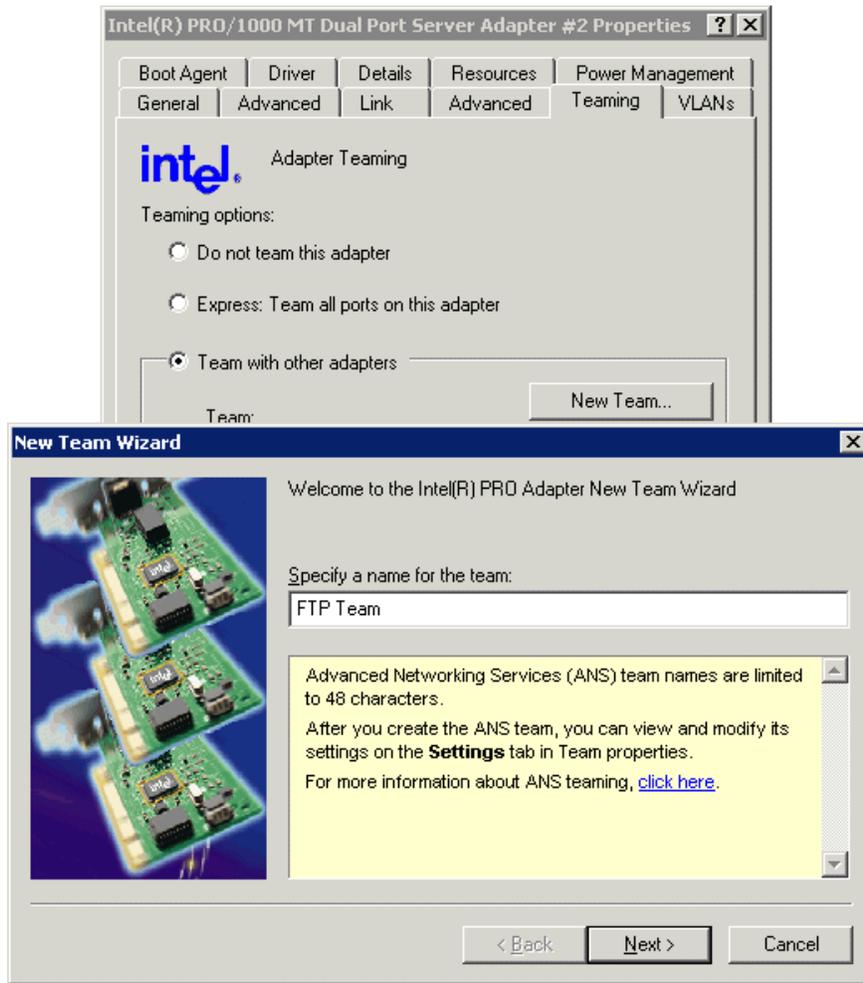
8. Open the Modify Team dialog box as follows:

- a. In Device Manager | Network Adapters, right-click **Intel® Advanced Network Services Virtual Adapters #2** (make sure it is the adapter identified as a **Virtual** adapter) and select **Properties**. The Properties dialog box opens.

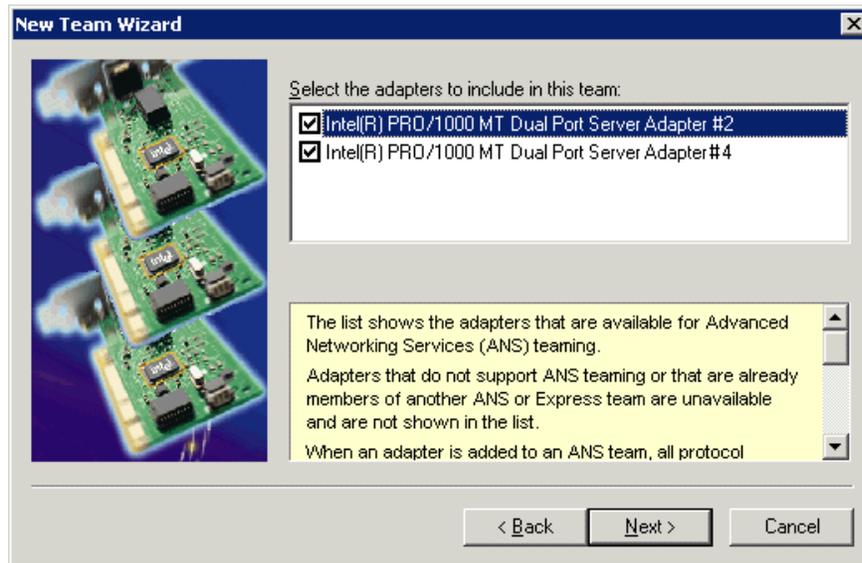
- b. Select the **Settings** tab.
  - c. Click **Modify Team**. A dialog box opens.
9. On the **Adapters** tab, do the following:
- a. Select **Intel® PRO/1000 MT Dual Port Server Adapter** (the top entry) and click **Set Primary**.
  - b. Select **Intel® PRO/1000 MT Dual Port Server Adapter #3** and click **Set Secondary**.
10. Click **Name** tab and rename to *Control Team*.
11. Click **OK** and **OK** and to close dialog boxes.
- Continue with the next procedure "[Create the FTP Team](#)".

## **Create the FTP Team**

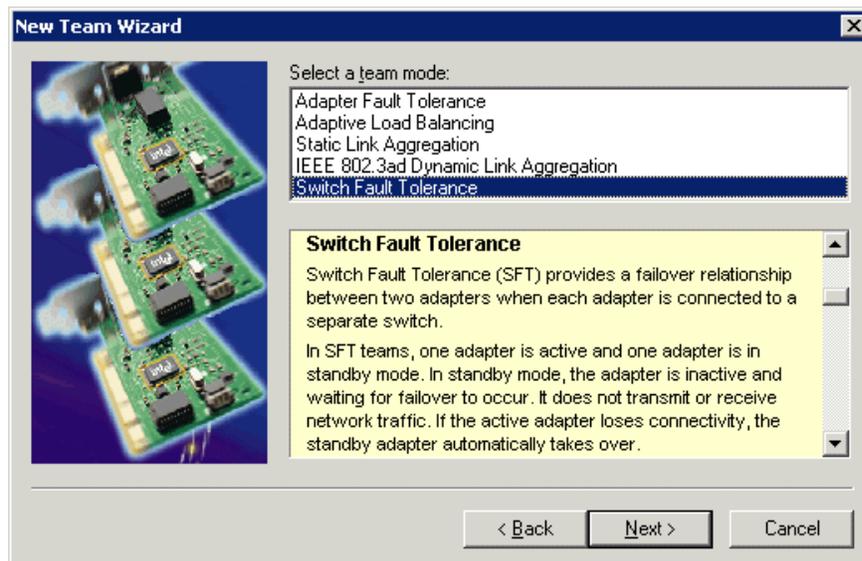
1. In Device Manager, right-click **...MT Dual Port Server Adapter #2** and select **Properties**. The Properties dialog box opens.
2. Select the **Teaming** tab.



3. Select **Team with other adapters**, then click **New Team**. The New Team Wizard opens.
4. Enter **FTP Team**. (Some earlier systems used the name “Media Team”.) Click **Next**.



5. Select the check box for **...Adapter #2** and **...Adapter #4**. Click **Next**.



6. Select **Switch Fault Tolerance**. Click **Next**.

7. Click **Finish** and wait a few seconds for the adapters to be teamed.

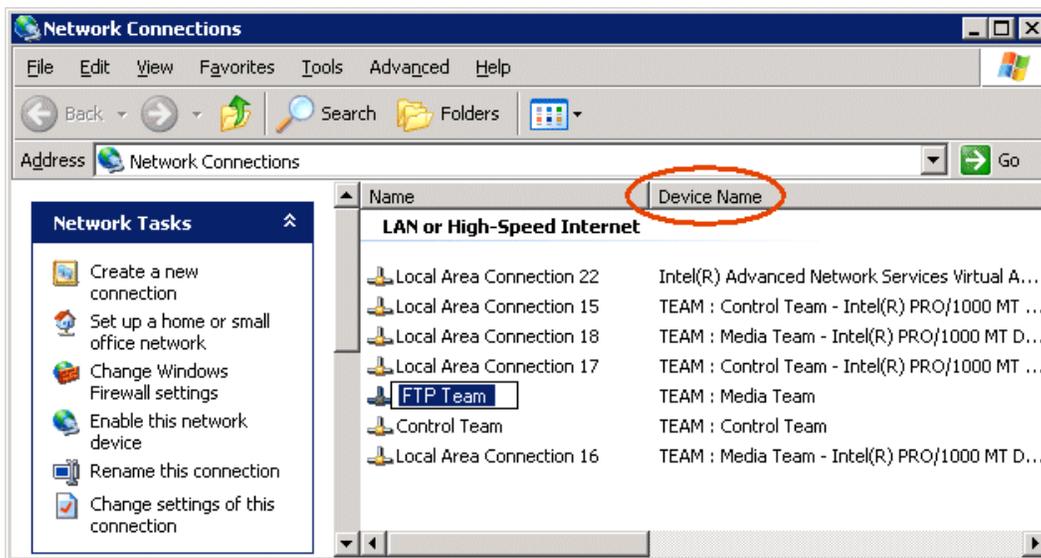
8. Open the Modify Team dialog box as follows:

- a. In Device Manager | Network Adapters, right-click **TEAM: FTP TEAM** and select **Properties**. The Properties dialog box opens.
- b. Select the **Settings** tab.
- c. Click **Modify Team**. A dialog box opens.

9. On the **Adapters** tab, do the following:
    - a. Select **Intel® PRO/1000 MT Dual Port Server Adapter #2** (the top entry) and click **Set Primary**.
    - b. Select **Intel® PRO/1000 MT Dual Port Server Adapter #4** (the bottom entry) and click **Set Secondary**.
  10. Click **Name** tab and rename to *FTP Team*, if not already named.
  11. Click **OK** and **OK** and to close dialog boxes.
  12. Restart the K2 Media Client.
- Continue with the next procedure “[Name teams](#)”.

## Name teams

1. On the Windows desktop right-click **My Network Places** and select **Properties**. The Network Connections window opens.



2. Identify the adapter that in the “Device Name” column is labeled “TEAM : Control Team”. Rename the adapter follows:
  - a. Click the Adapter Name.
  - b. Select **File | Rename** to enter rename mode.
  - c. Type Control Team.
3. Identify the adapter that in the “Device Name” column is labeled “TEAM : FTP Team”. Rename the adapter follows:
  - a. Click the Adapter Name.
  - b. Select **File | Rename** to enter rename mode.
  - c. Type FTP Team.

4. Ensure that eight entries are named as follows in Network Properties:

Name	Device Name
...Connection #1	TEAM : Control Team - Intel® PRO/1000 MT Dual Port Server Adapter
...Connection #2	TEAM : Control Team - Intel® PRO/1000 MT Dual Port Server Adapter #3
Control Team	TEAM : Control Team
Loopback	Microsoft Loopback Adapter
Media Connection #1	TEAM : FTP Team - Intel® PRO/1000 MT Dual Port Server Adapter #2
Media Connection #2	TEAM : FTP Team - Intel® PRO/1000 MT Dual Port Server Adapter #4
FTP Team	TEAM : FTP Team
...Connection #3	Team : DO NOT USE

Continue with the next procedure “[Reorder adapters](#)”.

## Reorder adapters

1. On the Windows desktop right-click **My Network Places** and select **Properties**. The Network Connections window opens.
4. On the menu bar at the top of the window, select **Advanced**, then **Advanced Settings...**
5. On the **Adapters and Bindings** tab, scroll down and select **Control Team** in Connections field.
6. Use the up arrow button, move the Control Team to TOP priority (1st).
7. Select **FTP Team**, and then use up arrow to move just below Control Team.
8. Select **Loopback** adapter, and then move it to the bottom of the list (leaving it above Remote Access).
9. Click **OK** to close Advanced settings and accept the changes.
10. Close the Network Properties window.

The network configuration procedure is complete.

## Modifying network settings

When you receive a K2 Media Client from the factory, it has a loopback adapter installed. The loopback adapter allows the media file system to continue operating if an Ethernet cable is disconnected. Do not modify the loopback adapter. If you need to restore the loopback adapter, refer to the *K2 Media Client Service Manual*.

The loopback IP address is 192.168.200.200. Keep that IP address reserved on your network. Don't assign it to any other device. (If this causes conflicts with your existing network, consult your Grass Valley representative.)

If you change the host name when using a shared storage system, AppCenter could have difficulty connecting. Grass Valley strongly recommends that you do not change the host name IP address unless following the documented K2 System Configuration procedure. For more information, refer to the *K2 Storage System Instruction Manual*.

## Using FTP for file transfer

An application writer may choose to initiate media file transfers via FTP. The K2 FTP interface has a GXF folder and an MXF folder. Use the appropriate folder, depending on if you are transferring GXF or MXF. Refer to [“FTP access by automation” on page 72](#) for examples.

If connecting to the FTP server on a K2 system from a third-party Windows PC, make sure that the PC has TCP Window scaling enabled. (For more information on TCP Window scaling, see the Microsoft Support Knowledge Base web site.)

The K2 FTP server runs on K2 Media Servers that have the role of FTP server. While it also runs on internal storage K2 Media Clients (stand-alone), it is important to understand that it does *not* run on external storage K2 Media Clients. When you FTP files to/from a K2 Storage System, you use the FTP server on the K2 Media Server, not on the K2 Media Client that accesses the shared storage on the K2 Storage System. For information on streaming/transfer procedures in general, see the *K2 Media Client User Guide*.

K2 FTP protocol supports clip and bin names in non-English locales (international languages) using UTF-8 character encoding. Refer to [“Internationalization” on page 164](#).

If clips are created by record or streaming on a K2 file system such that media files have holes/gaps, i.e. unallocated disk blocks, in them, then that clip represents a corrupt movie that needs to be re-acquired. The K2 system handles corrupt movies of this type on a best-effort basis. There is no guarantee that all available media, especially media around the edges of the holes/gaps, is streamed.

You can also apply K2 security features to FTP access. Refer to [“Configuring K2 security” on page 103](#).

**NOTE:** *When using FTP in a shared storage environment, ensure that all FTP communication takes place on the FTP/Streaming network, and not on the Command/Control network.*

## Limitations with complex media types

- Depending on the system software versions of source and destination devices, it is possible that lists or programs made from lists that contain movies with mixed video compression types or mixed audio types cannot stream to other devices, nor can they be exported to a file. Refer to release notes for the specific software versions for details.
- MXF OP1A supports transfer of simple media types only, which are a subset of K2’s encode/decode/metadata capabilities. For example, MXF OP1A does not support the transfer of complex clips, such as a subclip that spans two media files. Do not attempt MXF OP1A transfers of complex clips.

## Transferring between different types of systems

While GXF transfer of media with mixed format (such as an agile playlist) is supported between K2 systems, it might not be supported between a K2 system and a non-K2 system, depending on system software versions. Refer to the release notes for the software version.

If using remote control protocols to initiate transfers, refer to [Appendix A, Remote control protocols](#).

Also refer to “[Transfer compatibility considerations](#)” on page 167.

## Transfer mechanisms

You can move material between systems using the following mechanisms, each of which offers a different set of features:

- Manual mechanisms — These are the AppCenter transfer features. Refer to the *K2 Media Client User Manual* for AppCenter instructions. When transferring between K2 systems you can browse and select files for transfer. When transferring between K2 systems and other types of systems, one or more of the following might be required, depending on software versions. Refer to release notes for the version information:
  - Specify the IP address, path, and file name to initiate a transfer.
  - Add the remote host in Configuration Manager before the transfer.
  - Enter machine names in compliance with UIM naming conventions.
- Automatic mechanisms, including the following:
  - K2 FTP interface — This interface supports transfers via third party FTP applications. For example, you can use Internet Explorer to transfer files between a PC and the FTP interface on a K2 Media Client (with internal storage only) or a K2 Media Server on the same network. For more information, refer to “[FTP access by automation](#)” on page 72.
  - Remote control protocols — Industry standard remote control automation applications can initiate transfers. The protocol command must be sent to the K2 Media Client. This applies to both internal storage and external storage K2 Media Clients. For more information, refer to [Appendix A, Remote control protocols](#).

## FTP access and configuration

For basic LAN access, the following Grass Valley products can connect as an FTP client to the K2 FTP server with no special configuration required:

- K2 Media Client
- M-Series iVDR
- UIM-connected Profile XP Media Platform

For WAN access, contact your Grass Valley representative for assistance.

If the FTP client is not one of these Grass Valley products, contact the product’s supplier or your network system administrator for assistance with configuring TCP window scaling. Any computer that connects as an FTP client to the K2 FTP server must have TCP window scaling enabled. Refer to <http://support.microsoft.com/kb/q224829/> for more information on this feature. Never set `Tcp1323Opts` without setting `TcpWindowSize`. Also, Windows NT 4.0 does not support TCP window scaling, but will still communicate with Grass Valley products in a LAN environment.

## FTP access by automation

Using FTP, third parties can initiate transfers between two K2 systems or between a K2 system and another FTP server. Transfers of this type are known as “passive” FTP transfers, or “server to server” transfers.

If you are managing transfers with this scheme from a Windows operating system computer, you should disable the Windows firewall on that computer. Otherwise, FTP transfers can fail because the Windows firewall detects FTP commands and can switch the IP addresses in the commands.

**NOTE:** *You should disable the Windows firewall on non-K2 systems issuing passive FTP transfer commands.*

## FTP security

Refer to [“FTP and media access security”](#) on page 109.

## FTP internationalization

The K2 FTP interface supports internationalization as follows:

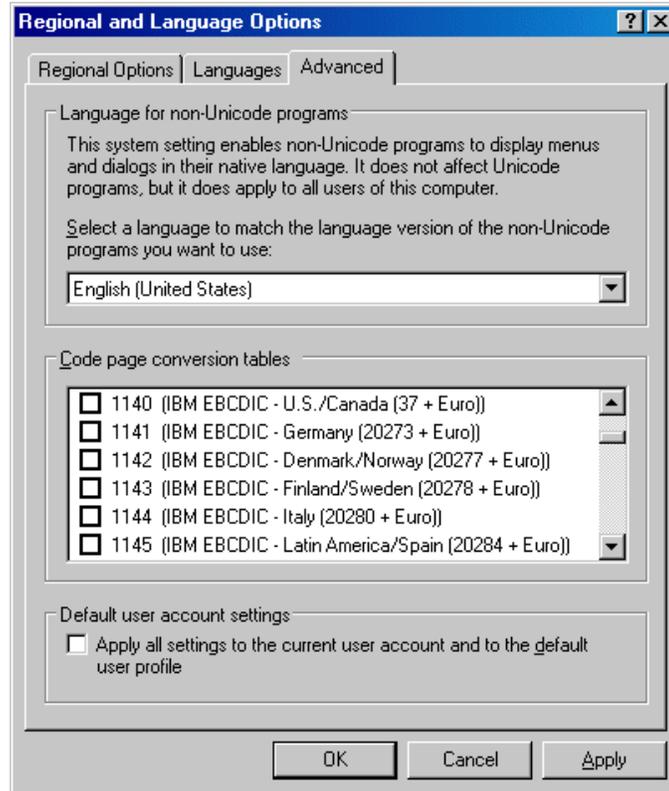
- Non-ASCII localized characters represented as UTF-8 characters.
- All FTP client/server commands are in ASCII.
- The named movie asset is Unicode 16-bit characters
- The K2 FTP client converts between Unicode and UTF-8 strings explicitly.

The Microsoft FTP client does not convert from a Unicode string to a UTF-8 string. Instead, it passes the Unicode string to the FTP server directly, which cause the errors. To avoid these errors, in the FTP command, every reference to the clip path must be in UTF-8.

A specific language setting is required on the computer that hosts the K2 FTP interface. This requirement applies to both a K2 Media Server and an internal storage (stand-alone) K2 Media Client, as they both host the K2 FTP interface.

To make this language setting, do the following:

1. Open the **Regional and Language Options** control panel.



2. On the **Advanced** tab for the “Language for non-Unicode programs” setting, select **English (United States)**.
3. Click **Apply** and **OK**, and when prompted restart the computer to put the change into effect.

## FTP access by Internet Explorer

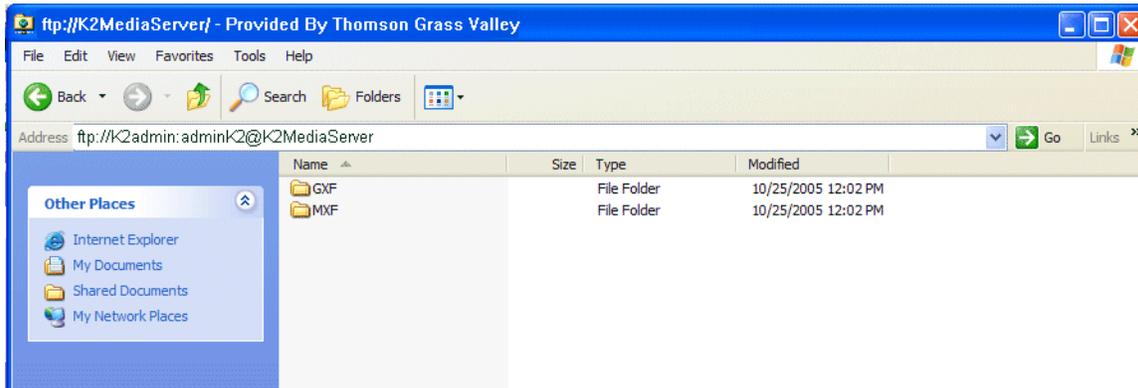
You can use Internet Explorer to transfer files via FTP between a PC and the FTP interface on a K2 Media Client (internal storage) or a K2 Media Server, so long as both source and destination machines are on the same network.

While the K2 FTP interface supports local languages (see [“Internationalization” on page 164](#)) some international characters are not displayed correctly in Internet Explorer. Use only English language characters with Internet Explorer.

To access FTP using Internet Explorer, use the following syntax in the Address field: `ftp://<username:password@hostname>`. The username/password can be any account set up on the machine hosting the FTP interface. Also refer to [“FTP and media access security” on page 109](#) for information about accounts and FTP access.

The hostname can be the name of a K2 Media Client with internal storage or it can be the name of a K2 Media Server. (You cannot make a FTP connection to a K2 Media Client with external storage or to a K2 Control Point PC.)

Once you have logged in, the two virtual directories are displayed.



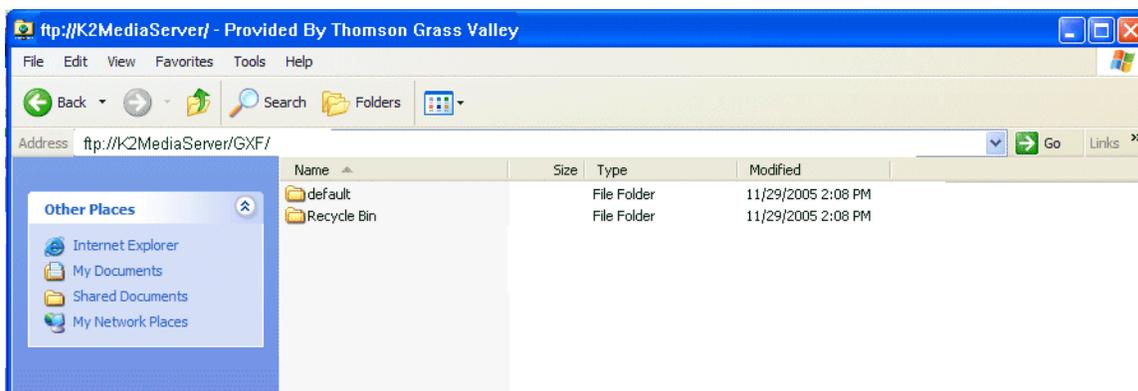
**GXF** — General Exchange Format (SMPTE 360M). This is the standard Grass Valley file interchange format, which supports:

- SD
- HD
- Simple clips
- Playlists

**MXF** — Media Exchange Format (SMPTE 377M). K2 implementation of MXF transfers supports:

- SD
- Simple clips

Inside the GXF and MXF folders you can see contents of the system.



The subfolders are organized in typical Windows fashion, with columns denoting the file's name, size, etc. The Size column refers to the clip duration (in video fields).



You can use Internet Explorer to drag a file from your K2 Media Client or K2 Media Server and drop it in a folder on your PC. You can also drag a file from your PC and drop it in the appropriate folder on your K2 Media Client or K2 Media Server.

Be careful not to mix files from the two types of file interchange formats. GXF files can only be transferred to the GXF folder, and MXF files can only be transferred to the MXF folder. If you try to drop a clip into the incorrect folder, the transfer fails. For example, clip1.gxf can be dropped into the K2-MediaSVR/GXF/default/ folder, but not into the K2-MediaSVR/MXF/default/ folder.

The following section describes the supported FTP commands.

## FTP commands supported

The following table lists the FTP commands that the K2 FTP server supports.

FTP command name	FTP command description	K2 FTP support
USER	User Name	Supported
PASS	Password	Supported
ACCT	Account	Not supported
CWD	Change working directory	Supported
CDUP	Change to parent directory	Supported
SMNT	Structure mount	Not supported
REIN	Reinitialize	Not supported
QUIT	Logout	Supported
PORT	Data port	Supported
PASV	Passive	Supported
TYPE	Representation type	Supported

STRU	File structure	Not supported
MODE	Transfer mode	Not supported
RETR	Retrieve	Supported
STOR	Store	Supported
STOU	Store unique	Not supported
APPE	Append (with create)	Not supported
ALLO	Allocate	Not supported
REST	Restart	Not supported
RNFR	Rename From	Supported
RNTO	Rename To	Supported
ABOR	Abort	Supported
DELE	Delete	Supported
RMD	Remove directory	Supported
MKD	Make directory	Supported
PWD	Print working directory	Supported
LIST	List	Supported. Reports size in number of video fields.
NLST	Name List	Supported
SITE	Site Parameters	Supported
SYST	System	Supported
SIZE	Size of file (clip)	Supported. Reports size in Bytes.
STAT	Status	Supported
HELP	Help	Supported
NOOP	No Operation	Supported

## Connecting RS-422

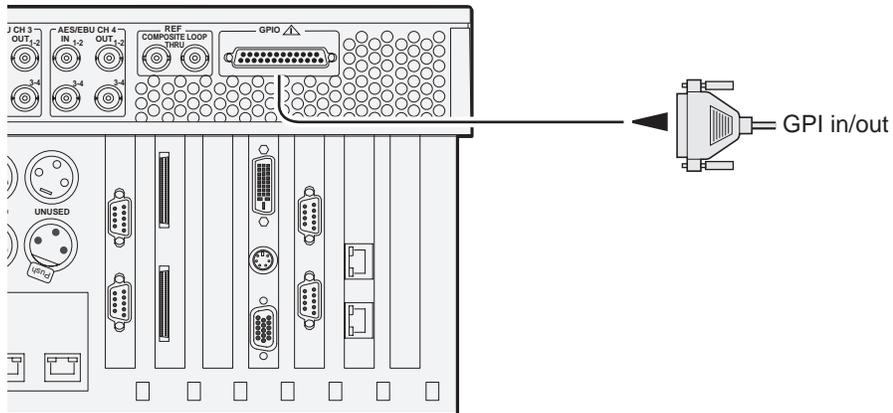
You can control the K2 system with remote control devices and software developed for the K2 system that use industry-standard serial protocols: AMP, BVW, and VDCP.

Refer to the following for more information about RS-422 and protocol control:

- [Appendix A, Remote control protocols](#)
- *K2 Media Client User Guide* to configure the K2 system for remote control.

## Connecting GPI

The K2 system provides 12 GPI inputs, and 12 GPI outputs on a single DB-25 rear panel connector.



Also see the following related sections of this manual:

- [“GPI I/O specifications” on page 153](#)
- [“GPI I/O connector pinouts” on page 171](#)

Refer to the *K2 Media Client User Guide* for GPI configuration procedures.



---

## **Managing Internal Storage**

Topics in this chapter include the following:

- [“About the K2 Media Client internal storage system”](#)
- [“Using Storage Utility”](#)

### **About the K2 Media Client internal storage system**

SDA-00, SD-00, and HD-00 models are available with internal media storage. This makes the internal storage K2 Media Client a self-contained, stand-alone unit, with no external devices for storage, audio, or video connections required.

The storage system on an internal storage K2 Media Client includes the following:

**RAID drives** — There are slots for twelve RAID drives, located behind the fan module in the front of the unit. Two drives are configured as a RAID 1 pair, or LUN. This LUN is the system drive. The remainder of the drives are for media storage. Media drives are available in five drive and ten drive options. Media drives can be configured as RAID 0 or RAID 1. Media data is written or “striped” across media drives in a continuous fashion, which makes them a “stripe group”. This media stripe group appears as the V: drive to the Windows operating system.

**SCSI controller adapter** — This is a PCI board installed in the rear of the chassis. It provides the SCSI controller functionality for the internal RAID disks. Both system and media data require this RAID controller functionality, as both are stored on the internal RAID disks.

**SCSI interface board** — This board provides the SCSI interface for the RAID drives. It monitors and reports the status of the RAID drives, the chassis fans, and the power supplies. It also controls the individual RAID status LEDs and the front panel Power and Service LEDs. It is mounted horizontally in the front of the unit, above the RAID drives.

**RAID 1** — Drives configured as RAID 1 provide redundancy. The two drives that make up the system disk must be RAID 1. Media drives can be RAID 1 or RAID 0. The two disks in a RAID 1 LUN are redundant partners. Any single disk in a LUN can fail and disk access can continue. When a disk fails, error messages in the AppCenter StatusPane or in NetCentral inform you of the problem. You can then replace the failed disk. The data is rebuilt on the replacement disk and redundancy is restored.

**RAID 0** — Media drives configured as RAID 0 offer no redundancy. If any single RAID 0 media drive fails, all data is lost on all media drives.

## Using Storage Utility

This section includes the following topics:

- [“About Storage Utility”](#)
- [“Opening Storage Utility”](#)
- [“Overview of Storage Utility”](#)
- [“Checking storage subsystem status”](#)
- [“Checking controller microcode”](#)
- [“Identifying disks”](#)
- [“Get controller logs”](#)
- [“Check disk mode pages”](#)
- [“Disabling a disk”](#)
- [“Forcing a disk to rebuild”](#)
- [“Unbind LUN”](#)
- [“Bind Luns”](#)
- [“Changing RAID type”](#)
- [“Making a new media file system”](#)
- [“Checking the media file system”](#)
- [“Cleaning unreferenced files and movies”](#)
- [“Downloading disk drive firmware”](#)
- [“Storage Utility operation not supported”](#)
- [“Placing the K2 Media Client into online mode”](#)

## About Storage Utility

You can use Storage Utility for general maintenance tasks on a K2 Media Client with internal media storage. Refer to the *K2 Media Client Service Manual* for repair procedures, such as those required to replace a failed drive. Also refer to “[Storage Utility](#)” on page 46 for a general description of Storage Utility.

***NOTE: Do not run Storage Utility on an external storage K2 Media Client. For external storage, run Storage Utility only via the K2 System Configuration application, as explained in the K2 Storage System Instruction Manual.***

The Storage Utility runs on either the local K2 Media Client or from a Control Point PC. In both cases the Storage Utility’s primary functionality is hosted by the K2 Media Client. The Storage Utility uses the internal connection to the RAID disks for access and configuration.

The K2 Media Client runs in either an online mode or an offline mode. These modes are required for Storage Utility operations, as follows:

- Online mode — This is the K2 Media Client’s normal operating mode. When the K2 Media Client is in the online mode and you open Storage Utility, you can stay in this mode while you view the devices, LUNs, and disks of the internal storage system, but you can not configure the storage system. However, some operations are available that do not configure the storage system, such as identify a drive (flash the drive LEDs), get controller logs, disable a drive, and force a drive to rebuild.
- Offline mode — In this mode the K2 Media Client channels are disconnected and all media access operations are disabled. You are prompted to put the K2 Media Client into offline mode when you select an operation that configures the storage system. When the K2 Media Client is in the offline mode you can configure the storage system and perform all Storage Utility operations. When you exit Storage Utility you can put the K2 Media Client back into online mode.



***CAUTION: Use the Storage Utility only as directed by a documented procedure or by Grass Valley Support. If used improperly, the Storage Utility can render your K2 Media Client inoperable or result in the loss of all your media.***

## Opening Storage Utility

There are two ways to open Storage Utility for work on an internal storage K2 Media Client, as explained in the following sections.

### Opening Storage Utility through AppCenter

Unless prevented by a system problem, you should always open Storage Utility through AppCenter. When you do this your AppCenter login permissions are passed to Storage Utility, so you do not have to log into Storage Utility separately.

If you are running AppCenter on the local K2 Media Client, as Storage Utility opens it connects to the storage system of that K2 Media Client. If you are running AppCenter on a control point PC, as Storage Utility opens it connects to the storage system of the K2 Media Client that hosts the channel currently selected in AppCenter.

To open Storage Utility through AppCenter, do the following:

1. Open AppCenter, either on the local K2 Media Client or on the control point PC and logon.

Make sure you logon to AppCenter with appropriate privileges, as this logon is passed to Storage Utility. Administrator-level permission is necessary for most Storage Utility operations. If you log in with user-level permissions, the Storage Utility menu item is disabled.

2. If you are running AppCenter from a control point PC and you have channels from multiple K2 Media Clients in your channel suite, select a channel from the K2 Media Client whose internal storage you intend to configure with Storage Utility. This is important as Storage Utility automatically connects to the K2 Media Client that hosts the currently selected channel.

**NOTE: Make sure you are connecting to a K2 Media Client with internal storage. You should never connect Storage Utility directly to a K2 Media Client that uses external storage.**

3. From the AppCenter **System** menu, select **Storage Utility**.

Storage Utility opens.

4. If you are connecting from a control point PC, you should verify that you are connected to the correct K2 Media Client. To verify this, use the Identify feature to flash the disks on the K2 Media Client. Refer to [“Identifying disks” on page 85](#).

### Opening Storage Utility Independently

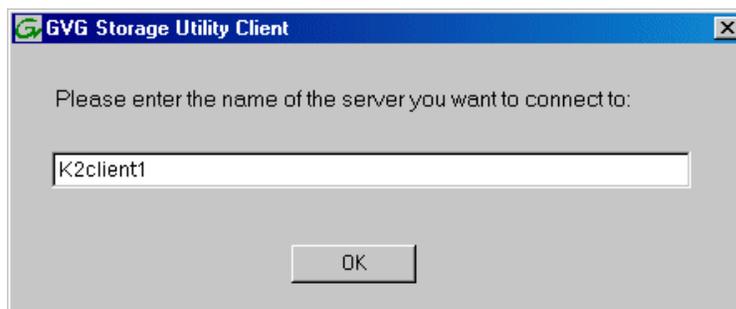
Do not open Storage Utility independently unless there is a problem that prevents you from opening it through AppCenter.

To open Storage Utility independently, do the following:

1. Open the Storage Utility shortcut on the Windows desktop or from the Windows Start Menu at **Programs | Grass Valley | Storage Utility**.

A dialog box opens in which you specify the machine to connect to with Storage Utility.

**NOTE: Make sure you are connecting to a K2 Media Client with internal storage. You should never connect Storage Utility directly to a K2 Media Client that uses external storage.**



2. Enter the name or IP address of the K2 Media Client for which you intend to use

Storage Utility. If you are opening Storage Utility on a local K2 Media Client, enter the name of that K2 Media Client. Click **OK**.

The Storage Utility logon dialog box opens.

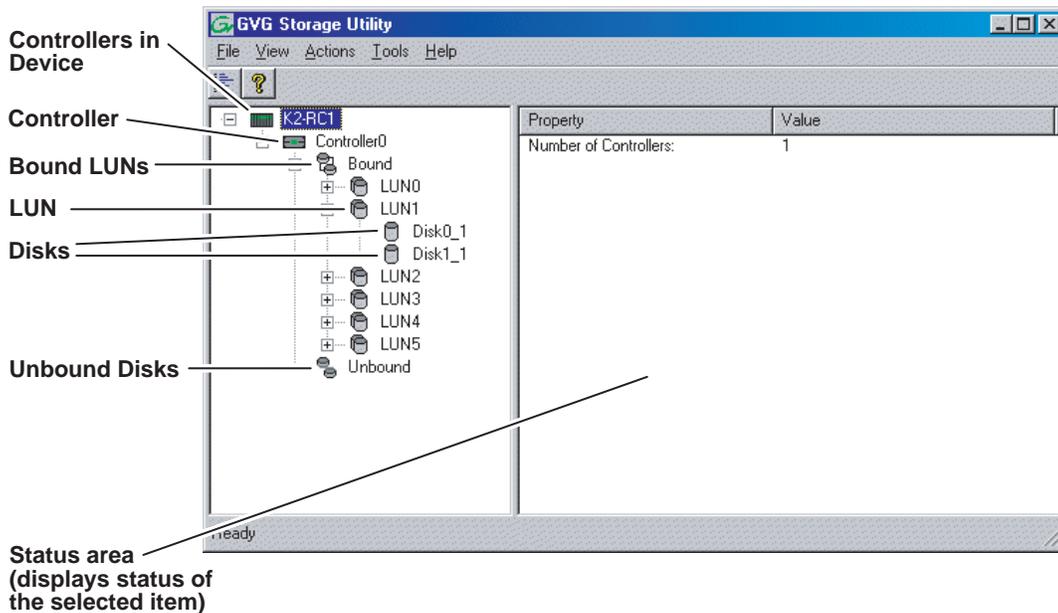


3. Logon to Storage Utility. Make sure you logon with appropriate privileges. Administrator-level permission is necessary for most Storage Utility operations. For User name, you might need to enter the machine name as the domain to successfully log on.

Storage Utility opens.

4. If you are connecting from a control point PC, you should verify that you are connected to the correct K2 Media Client. To verify this, use the Identify feature to flash the disks on the K2 Media Client. Refer to [“Identifying disks” on page 85](#).

## Overview of Storage Utility



The Storage Utility user interface includes a tree view in the left-hand pane, and a status information area displayed in the right-hand pane. The tree view displays the hardware that makes up the storage system connected. The context menus in the tree view are used to configure storage. The right-hand status pane displays information about the item selected in the tree view. The tree view hierarchy is as follows:

**Controllers in Device** - Provides a logical grouping of RAID Controllers by device.

**Controller** - Represents the RAID Controllers found. These are numbered in the order discovered. The controller icon represents both RAID Controller A and, if installed, RAID Controller B. To determine if an optional RAID Controller B is installed, select the Controller icon in the tree view, then examine the status pane for peer status.

**Bound LUNs** - Expanding the Bound node displays all bound LUNs.

**LUN** - Represents a bound LUN. Expanding the LUN node displays the disk modules that make up the LUN.

**UnBound disks** - Expanding the UnBound node, displays all unbound disk modules.

**Disks** - Represents the disk modules.

The Storage Utility detects disks available and lists them on the opening screen. The Storage Utility names the disks by the number of the slot in which they are installed.

Refer to the following procedures to use Storage Utility for maintenance tasks

## Checking storage subsystem status

Some limited status information for storage subsystems is displayed in the Storage Utility. This can be helpful when configuring storage. You can view status information by selecting items in the tree view.

Item in tree view	Status information displayed
Controllers in Device	Number of Controllers
Controller	Microcode Version
Bound	Number of LUNs
LUN	Binding Type, such as RAID 1 State (online or offline)
Disk	Firmware Vendor State Product ID Capacity
Unbound	Number of disks

## Checking controller microcode

As explained in the previous section, to check controller microcode, select the controller in the tree view and the microcode version is displayed.

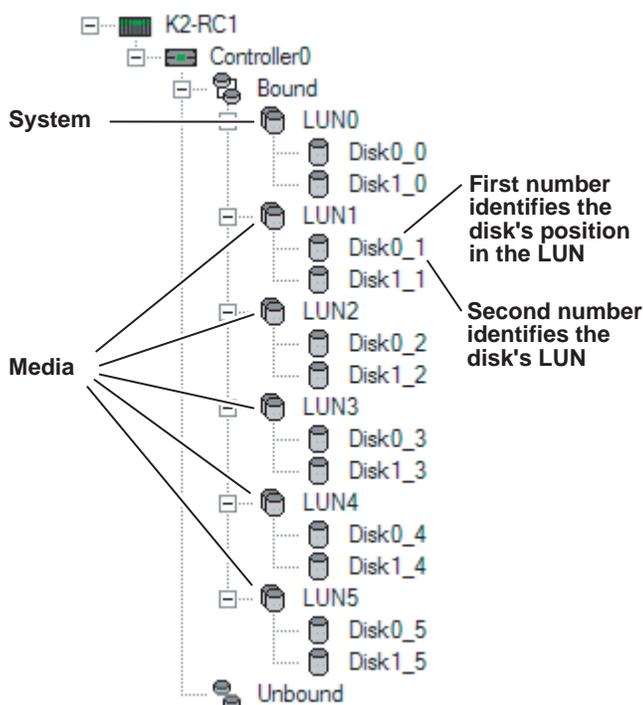
## Identifying disks

The Identify feature allows you to flash the disk LEDs so that you can physically locate a specific disk module or group of disk modules that make up a LUN. Always use the disk identify feature before removing and replacing a failed disk module. Accidentally removing the wrong disk module can destroy all data on the disk drives.

You can also use this feature to verify the K2 Media Client to which you are currently connected.

To identify RAID disks do the following:

1. Open Storage Utility and in the tree view expand all nodes so that all disks are displayed. Disk0\_0 and Disk1\_0 are configured as RAID 1 to make LUN0, which is the system drive. Remaining disks are configured as RAID 1 (shown) or RAID 0.



2. Remove the fan module from the K2 Media Client chassis.

**NOTE: Replace the fan module within one minute to maintain system cooling.**

3. Compare the RAID drive labeling on the K2 Media Client chassis and the disk numbering displayed in Storage Utility to identify drive locations. To understand RAID drive numbering, refer to [“RAID drive numbering” on page 41](#). Then position yourself so you can see the RAID drive LEDs, which are in the rear of the drive bay.
4. Identify the disks in a LUN or identify a single disk, as follows:
  - a. In the Storage Utility tree view, right-click a LUN or right-click a single disk, then select **Identify LUN** or **Identify Disk** in the context menu. A message box

opens with a message that informs you that a disk or disks are blinking.

- b. The LEDs on the disk or disks display a flashing pattern alternating yellow/green once a second. Verify the location of the disk or disks.

## Get controller logs

1. In the tree view, select the controller.
2. Click **Actions | Get Controller Logs**.
3. A message informs you of the location of the logs.
4. Find the following files on the local K2 Media Client at `C:\profile\logs`:
  - MegaRaidDriveFailureLog.txt
  - MegaRaidNVRAMLog.txt
  - tty.log

## Check disk mode pages

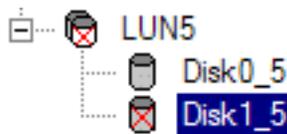
1. In the tree view, right-click the controller and select **Check Disk Mode Pages**.
2. Messages report the results of the check. For each disk that has mode pages set incorrectly, click **Yes** when prompted "...restore the default mode page settings?".

## Disabling a disk

1. In the tree view, right-click the disk and select **Advanced | Disable** and **OK** to confirm.

A message "The drive is spinning down...Please wait" appears.

The Service LED on the K2 Media Client displays a flashing yellow pattern three time a second.
2. When the message "Operation succeeded...now safe to remove disk" appears, click **OK**.
3. The Storage Utility displays red Xs on tree view icons to represent a disk fault and a degraded LUN.



**NOTE:** Remember that the LUN 0 (disks 0\_0 and 0\_1) is the system drive. Do not attempt disk operations on the system drive.

## Forcing a disk to rebuild

With RAID 1, if media access (record/play) is underway, when you insert a media disk it automatically begins to rebuild. If there is no media access underway, to start the rebuild process either begin a media operation or use the following procedure:

1. In the tree view, identify the faulty disk.  If the disk is not currently in the fault state, the Rebuild option is not available.
2. In the tree view, right-click the faulty disk and select **Rebuild**.
3. When the message “Succeeded to start rebuild...” appears, click **OK**.  
The Service LED on the K2 Media Client displays a flashing pattern alternating yellow/green once a second.

## Unbind LUN

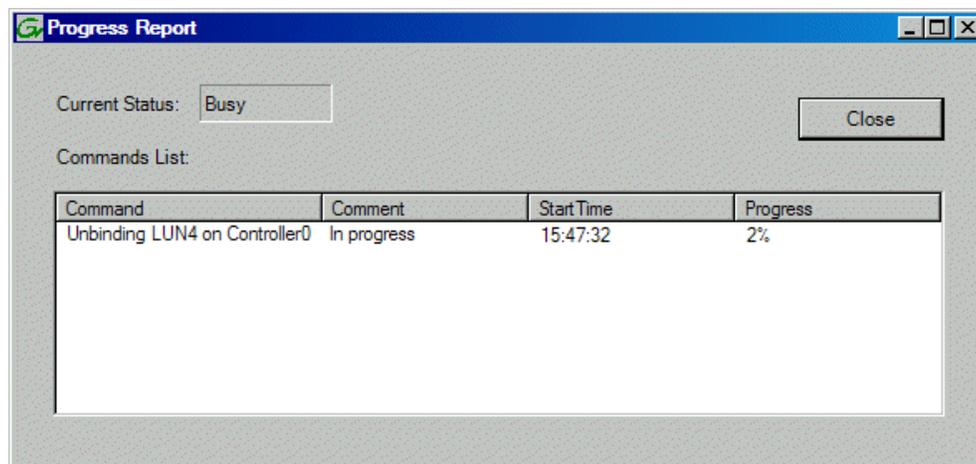
You can only unbind one LUN at a time. Also make sure the controller is not busy with other processes, such as rebuilding a disk. If the controller is busy, the unbind LUN operation fails.



**CAUTION:** *Unbinding destroys all data stored on disk modules.*

To unbind a LUN, do the following:

1. In the tree view, right-click the LUN and select **Unbind LUN**.
2. If the K2 Media Client is online, messages appear “...offline mode now?” and “...continue?”. Click **Yes** to put the K2 Media Client in offline mode.  
AppCenter channels go offline.
3. When warning messages appear “...destroy all existing media...” and “Are you sure?”, click **OK** to continue.
4. The Progress Report opens and displays unbind progress.



5. When progress reports 100% complete, the LUN is unbound.
6. Restart the K2 Media Client.

**NOTE:** Remember that the LUN 0 (disks 0\_0 and 0\_1) is the system drive. Do not attempt disk operations on the system drive.

## Bind Luns

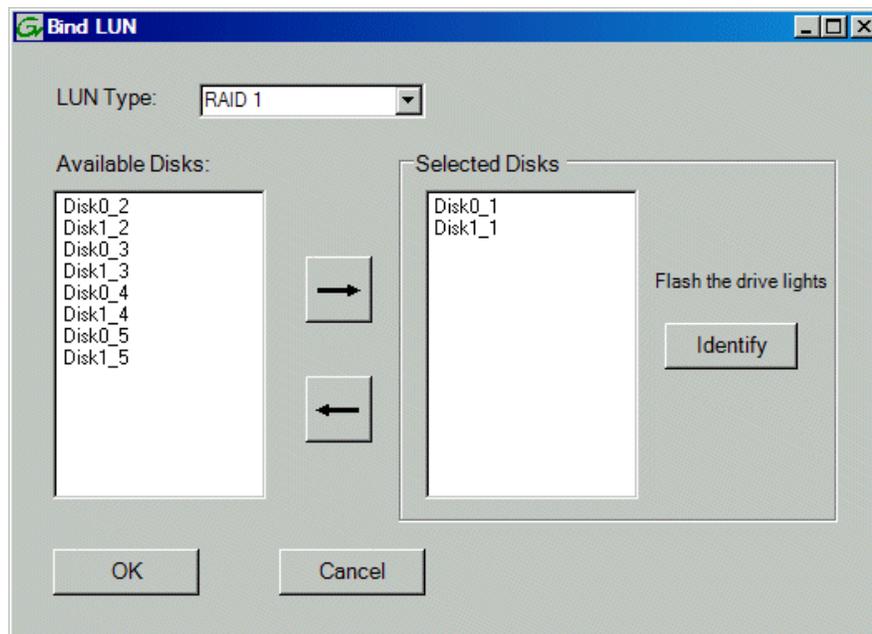
When you bind a LUN, you select one or more unbound disks and create a new LUN. The Storage Utility places this new LUN at the bottom of the list and numbers it accordingly. However, disk numbers are enforced by the chassis slot in which the disk resides. Therefore, depending on the number and sequence of LUNs created, it is possible that the LUN numbers and the disk numbers do not match. When you create a new file system, this mismatched numbering does not hamper functionality. However, to make the K2 Media Client easy to service, you should retain the correct numbering sequence. To do this you must unbind all media LUNs (not the System LUN) and then bind disks in sequence.

To bind a LUN, do the following:

1. In the tree view, right-click the **Unbound** node and select **Bind LUN**.
2. If the K2 Media Client is online, messages appear "...offline mode now?" and "...continue?". Click **Yes** to put the K2 Media Client in offline mode.

AppCenter channels go offline.

The Bind LUN dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



3. In the LUN Type drop-down list, select either RAID 0 or RAID 1, then proceed as follows:
  - RAID 0 — In the Available Disks list, select one media disk, then click the arrow button to add it to the Selected Disks list.

- RAID 1 — In the Available Disks list, select two contiguous disks, then click the arrow button to add them to the Selected Disks list. (TIP: Use ‘shift-click’ or ‘control-click’ to select disks.)

**NOTE: As an aid in identifying a disk module’s physical location, select it in the Selected Disks list, then click Identify Disks. This causes the disk drive LED to flash.**

4. Click **OK** to close the Bind LUN dialog box and begin the binding process.  
The Progress Report opens and displays binding progress.
5. Repeat the previous steps for remaining unbound disks. You do not need to wait until the first LUN is bound before you can start binding the next LUN. Multiple LUNs can be in the binding process all at the same time.
6. When progress reports 100% complete for all the LUNs that you are binding, proceed to the next step.
7. Restart the K2 Media Client.
8. After binding one or more new LUNs, you must make a new file system, as explained in [“Making a new media file system” on page 90](#).

## Changing RAID type

You can change the media storage on an internal storage K2 Media Client to be either RAID 1 or RAID 0, as follows:

- RAID 1 — Recommended for the ten media drive option. Not recommended for the five media drive option. With RAID 1, the ten media drives are configured as five LUNs, each of which is a mirrored pair of drives. The capacity of each LUN is roughly equivalent to the capacity of one drive, so your total media storage capacity is equivalent to the capacity of five drives. Since drives are mirrored in each LUN, your media is protected against drive failure. If a drive fails, the other drive in the LUN provides continued media access while you replace the failed drive.
- RAID 0 — Recommended for either the ten media drive option or the five media drive option. With RAID 0 there is no mirroring, so your total media storage capacity is roughly equivalent to that of all drives combined. However, your media has no RAID protection against drive failure. If one media drive fails, the entire group of drives fails and you lose all your media.

Depending on your needs for capacity versus protection, you can change from one RAID type to another, as explained in the following procedure.

**NOTE: This procedure loses all media.**

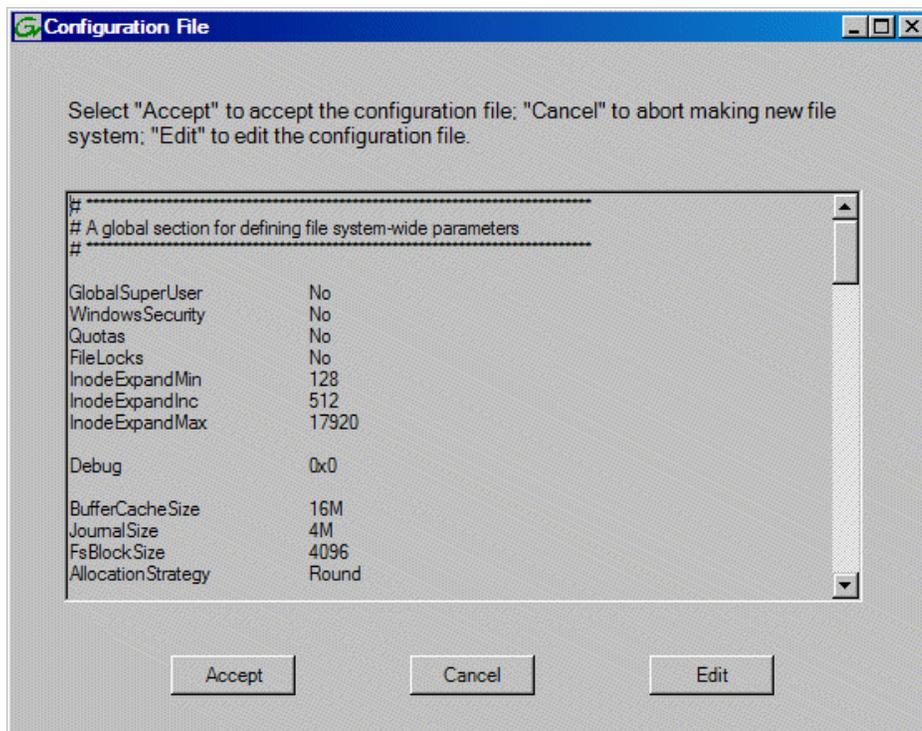
To change RAID-type configuration, do the following:

1. If you need to retain media, transfer it to another K2 system or otherwise back it up.
2. Unbind all media LUNs, as instructed in [“Unbind LUN” on page 87](#). Do not unbind LUN 0, as this is the system drive.
3. Bind media drives, using the procedure [“Bind Luns” on page 88](#), as one of the following:

- RAID 0 — Bind each media drive as a RAID 0 LUN.
  - RAID 1 — Bind the ten drives as five RAID 1 LUNs.
4. Make a new file system, as explained in [“Making a new media file system”](#) on page 90.
  5. If you backed up your media, you can now transfer it back.

## Making a new media file system

1. Click **Tools | Make New File System**.
2. If the K2 Media Client is online, messages appear “...offline mode now?” and “...continue?”. Click **Yes** to put the K2 Media Client in offline mode.  
AppCenter channels go offline. The Configuration File window opens.



3. You can view media file system settings, but do not attempt to change them. Click **Accept**.  
A “Making new file system. Please wait” message box displays progress.
4. When a message “Succeeded to make the new file system. The server will be restarted now” appears, click **OK** to restart the K2 Media Client.

## Checking the media file system

This procedure checks the media file system but retains current media files.

1. Click **Tools | Check File System**.
2. If the K2 Media Client is online, messages appear “...offline mode now?” and

“...continue?”. Click **Yes** to put the K2 Media Client in offline mode.

AppCenter channels go offline.

3. A message box appears “Checking media file system. Please wait”. Observe progress.

If problems are discovered they are reported. If the check process passes, when the process is complete a message appears to confirm success.



4. Click **OK** to dismiss the results.

Your file system has been checked.

## Cleaning unreferenced files and movies

These procedures allow you to keep the media database and the media files in sync. You can check the movies (clips) in the media database for the references to media files that should be currently stored on the media disks. Likewise, you can check for media files that are not referenced by a movie in the media database. If you find any unreferenced files or movies, you can delete them.

To clean unreferenced files, do the following:

1. Click **Tools | Clean Unreferenced Files**.
2. If the K2 Media Client is online, messages appear “...offline mode now?” and “...continue?”. Click **Yes** to put the K2 Media Client in offline mode.  
AppCenter channels go offline.
3. A message box appears “...searching...Please wait”. Observe progress.
4. A message box reports results. Respond as follows:
  - If no unreferenced files are found, click **OK** to dismiss the results.
  - If unreferenced files are discovered, you are prompted to delete them. Click **Yes** to delete the files or **No** to leave the files intact.

To clean unreferenced movies, do the following:

1. Click **Tools | Clean Unreferenced Movies**.
2. If the K2 Media Client is online, messages appear “...offline mode now?” and “...continue?”. Click **Yes** to put the K2 Media Client in offline mode.  
AppCenter channels go offline.
3. A message box appears “...searching...Please wait”. Observe progress.
4. A message box reports results. Respond as follows:

- If no unreferenced movies are found, click **OK** to dismiss the results.
- If unreferenced movies are discovered, you are prompted to delete them. Click **Yes** to delete the movies or **No** to leave the movies intact.

## Downloading disk drive firmware

You might be instructed in K2 release notes to upgrade disk drive firmware. This allows you to take advantage of the disk drive enhancements and benefit from improved performance and reliability.

To determine your disk drive type and current firmware version, select a disk drive icon in the Storage Utility tree view, then note the drive properties reported in the right-hand pane. Use the following procedure if you need to download disk drive firmware.

***NOTE: The disk drives are upgraded one at a time which can take as long as 2 minutes per drive. Take this into consideration when scheduling the upgrade.***

To download disk drive firmware, do the following:

1. Refer to *K2 Media Client Release Notes* to determine firmware types, versions, files, and any other special instructions regarding the particular disk drive firmware you are downloading.
2. In the Storage Utility, right-click a disk in the tree view, then select **Advanced | Download Disk Firmware** in the context menu.
3. If the K2 Media Client is online, messages appear "...offline mode now?" and "...continue?". Click **Yes** to put the K2 Media Client in offline mode.  
AppCenter channels go offline. The Open File dialog box opens.
4. In the Open File dialog box, browse to the latest firmware file for your disks, select the file, and click.
5. Click **OK**.

Watch the lights on the drive to which you are downloading firmware. The lights flash as firmware loads. Wait until the lights have completed their flashing pattern. This can take several minutes.

The Progress Report window appears showing the disk firmware download task and the percentage completion.

6. Repeat this procedure on each drive.
7. When finished, exit Storage Utility, put AppCenter channels back online, and restart the K2 Media Client.

## Storage Utility operation not supported

The following option is displayed in the Storage Utility menu system, but the operation is not supported on the K2 Media Client:

- Expand File System by Capacity

## **Placing the K2 Media Client into online mode**

If the K2 Media Client is in offline mode and you have completed your storage system configuration tasks, you have the following options to return the K2 Media Client to the online mode:

- **Exit Storage Utility and bring channels online** — If Storage Utility is closed, first open Storage Utility and then exit Storage Utility. When you exit Storage Utility you are prompted "...back to online mode?". Click **Yes**.

After exiting Storage Utility, if AppCenter is open the channels remain offline. To bring channels online, if you are running AppCenter on a control point PC, select **System | Reconnect**. If you are running AppCenter on a local K2 Media Client, close and reopen AppCenter.

- **Restart the K2 Media Client** — Restarting automatically resets the K2 Media Client to online mode. When you log into AppCenter channels connect and come up online.



# Managing K2 client system software

This chapter contains the following topics:

- “About K2 Media Client system software”
- “Installing Control Point software”
- “Installing K2 software”
- “Backup and recovery strategies”

## About K2 Media Client system software

The primary software installations for the K2 Media Client and K2 products are as follows:

This software...	Is distributed on...	With the installation file located at...	Which is installed on...	And is described as follows:
K2 Client	The K2 System Software CD	..\K2Client\setup.exe	K2 Media Clients	Provides core functionality for all K2 Media Client models, including SDA-00, SD-00, HD-00, internal storage, and external storage models.
K2 Server	The K2 System Software CD	..\K2Server\setup.exe	K2 Media Servers	Provides core functionality for all K2 Media Servers in all roles.
Control Point	The K2 System Software CD	..\ControlPoint\setup.exe	Control Point PCs	Provides remote control and configuration of K2 Media Clients (both internal and external storage) as well as the K2 Storage System.
Media File System (SNFS)	The K2 System Software CD	..\snfs\SNFSxxxSimple.exe	K2 Media Servers and internal storage K2 Media Clients	The version number is part of the file name. These “simple” install programs are for use on K2 systems only. Do not use standard SNFS install programs. Install only as instructed by release notes.
		..\snfs\SNFSxxxSimple_clientonly.exe	External storage K2 Media Clients	
NetCentral	The NetCentral Manager CD	..\ServerSetup.exe	The NetCentral server PC (this can be a Control Point PC)	Provides remote monitoring of all K2 products.

In addition, the following software is installed in special cases:

- Multi-Path I/O software — You must install this software on K2 Media Clients that are part of a redundant (Level 2R or 3R) K2 Storage System. Refer to “[External Storage](#)” on page 121 for more information.

## Software components installed

Each of the K2 installation packages installs software components that provide the functionality for various applications and system tools. The components installed are as follows:

Software	Components installed	Comments
K2 Client	Core system software	Provides the primary media functionality.
	AppCenter user interface	Allows you to operate AppCenter on the local machine.
	AppServer	Provides AppCenter functionality. It is accessed by both the remote AppCenter (on a Control Point PC) and the local AppCenter user interface.
	Storage Utility	Configures the media storage on internal storage K2 Media Clients only. Do not run Storage Utility on external storage K2 Media Clients.
	K2 System Configuration	Installed only on external storage models. Provides to the remotely connected K2 System Configuration application the ability to configure the local machine. You cannot run the K2 System Configuration user interface on the local K2 Media Client.
	Multi-Path I/O	Installation files copied to K2 Media Client but software not installed.
K2 Server	Core system software	Provides the primary media functionality.
	Storage Utility	Provides functionality for the remotely connected Storage Utility that runs on the Control Point PC. You should not run Storage Utility locally on the K2 Media Server.
	K2 System Configuration	Provides to the remotely connected K2 System Configuration application the ability to configure the local machine. You cannot run the K2 System Configuration user interface on the local K2 Media Server.
Control Point	AppCenter user interface	Connects to K2 Media Clients for control and configuration of channels.
	K2 System Configuration user interface	Connects to K2 Media Clients, K2 Media Servers, RAID storage, and Gigabit switches for configuration of the K2 Storage System.
	Storage Utility	Connects to the K2 Media Server, and through the K2 Media Server to the RAID storage, for configuration of the media file system, media database, and RAID storage.

## Installing Control Point software

If you are using the Grass Valley Control Point PC, it comes from the factory with software installed, so you should not need to install software.

If you intend to use a PC that you own as a Control Point PC, make sure that you choose a PC that meets system requirements for supporting Control Point software. Refer to “[Control Point PC system requirements](#)” on page 168. Then install software and configure as follows:

1. Set up Windows user accounts according to your site’s security policies. The accounts and passwords that match the factory default accounts on K2 systems are as follows:
  - Administrator:adminK2
  - K2admin:K2admin
  - K2user:K2user
2. Install the following software, as it is required to support K2 Control Point software:
  - MSXML 4.0
  - .NET Framework 1.1

You can find this software on the K2 System Software CD.
3. Install K2 Control Point PC software, as referenced earlier in this chapter.
4. It is recommended that you install the following software, so that you can accomplish a broad range of operational and administrative tasks from the control point PC:
  - Java Real Time Environment Update 7 or higher. Required for the HP Ethernet Switch configuration interface, which is used for K2 Storage Systems (external storage).
  - QuickTime 7, for local viewing of exported media. You can find this on the K2 System Software CD.
  - Adobe Acrobat Reader, for reading documentation from the K2 Documentation CD.
5. Install NetCentral and its supporting software, such as the following:
  - NetCentral Manager
  - Basic IIS 6.0 package
  - SNMP (Windows Components)

Refer to the *NetCentral User Guide* for complete installation and configuration instructions.

NetCentral is required and included as part of the product for external storage K2 Media Clients and the K2 Storage System. NetCentral is optional but recommended for internal storage K2 Media Clients.

6. Create a backup image using the K2 Media Client Recovery CD. Refer to the *K2 Media Client Service Manual*.

## Installing K2 software

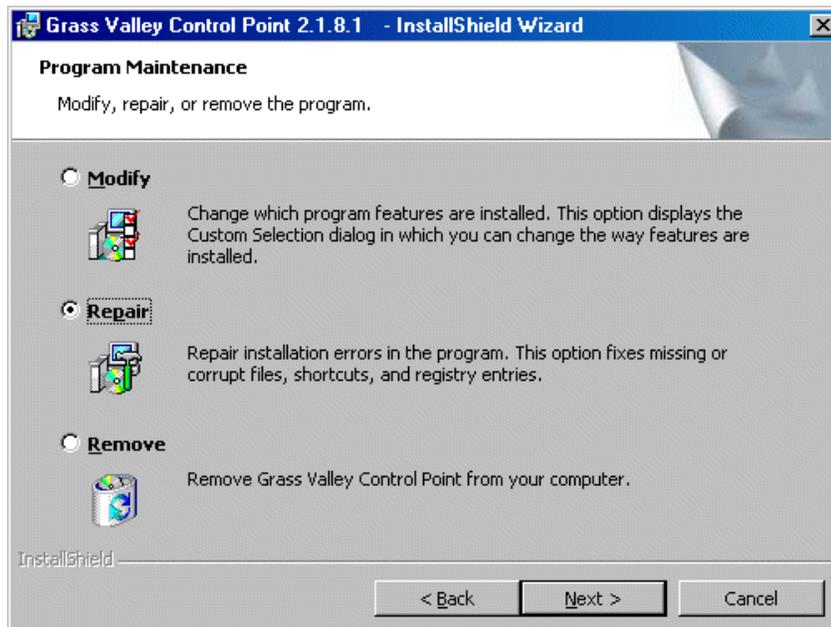
Except as noted in the preceding sections, when you receive your K2 Media Client, you do not need to install software. The system has the most recent software pre-installed at the factory.

If you are upgrading software on a K2 Media Client, refer to the *K2 Media Client Release Notes* for that version of software for specific upgrade procedures. If you are upgrading external storage K2 Media Clients, you must use the proper sequence and upgrade all K2 Media Servers and K2 Media Clients to the same software version. Upgrade K2 Media Servers first, then K2 Media Clients. Refer to *K2 Storage System Release Notes* for the complete explanation of the rules that apply to upgrading software on the K2 Storage System.

Before upgrading K2 software, you should make a recovery disk image. Refer to the *K2 Media Client Service Manual* for disk image information.

## Re-installing Grass Valley software

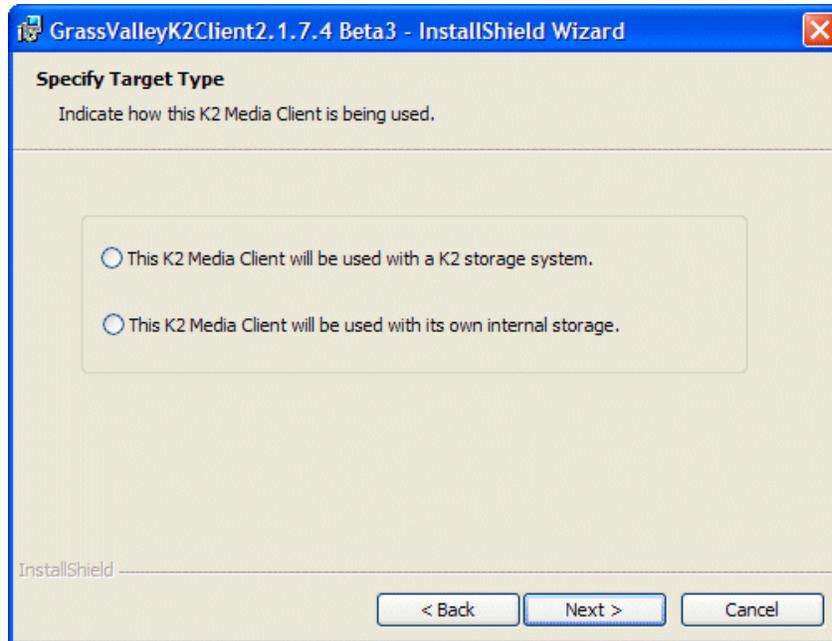
Follow these instructions if you need to re-install software. If you are upgrading to a new release version, see the Release Notes for the latest information on installation procedures. For more information on recovery procedures, see [“Backup and recovery strategies” on page 100](#).



At the opening screen of the install wizard, select **Repair**, then use the following instructions for the type of software you are installing:

**K2 Client software**

1. Follow the onscreen instructions, clicking **Next** on each page.



2. When you arrive at the Specify Target Type page, select as follows:
  - **This K2 Media Client will be used with a K2 storage system** — Select this option if you are installing on an external storage K2 Media Client.
  - **This K2 Media Client will be used with its own internal storage** — Select this option if you are installing on an internal storage K2 Media Client.
3. Click **Next** and **Finish** to complete the installation.
4. When prompted, restart the machine.

**NOTE:** *You must restart after installing K2 software.*

5. When the K2 Media Client starts up, you can verify that the correct versions of software are installed as follows:
  - a. Log on to AppCenter.
  - b. In AppCenter click **Help | About**. The About dialog box opens.

c. Identify versions as follows:

System Version	These should both report the same version number. This is the K2 System
RTS Version	Software version number, such as 3.1.0.x
Media File System	This is the SNFS version, such as 2.6.4.b41

#### **K2 Server software**

Refer to the *K2 Storage System Instruction Manual* for information about re-installing K2 Server software.

#### **Control Point software**

Follow the onscreen instructions. Click **Next** and **Finish** to complete the installation.

## **Pre-installed software**

Software is pre-installed on K2 products when you receive them from the factory. This load of pre-installed software is referred to as the “golden drive”. Refer to *K2 Media Client Release Notes* and *K2 Storage System Release Notes* for version updates.

## **Backup and recovery strategies**

There are three partitions on the K2 Media Client system drive to support backup and recovery strategies as follows:

- The C: drive is for the Windows operating system and applications.
- The D: drive is for media file system (SNFS) metadata files and media database data files. This allows you to restore the Windows operating system yet keep your media metadata intact.
- The E: drive is for storing a system image of the other partitions. From the E: drive you can restore images to the C: and D: drives. When you receive your K2 Media Client from the factory, the default factory image is stored on the E: drive.

For more information on backup and recovery strategies, see the *K2 Media Client Service Manual*.

---

# Administering and maintaining the K2 system

This chapter contains the following topics:

[“Synchronizing system clocks” on page 101](#)

[“Licensing” on page 101](#)

[“Configuring K2 security” on page 103](#)

[“K2 and NetCentral security considerations” on page 114](#)

[“Microsoft Windows High Priority updates” on page 116](#)

[“Virus scanning policies” on page 116](#)

[“Enabling and disabling the USB ports” on page 117](#)

[“Configuring auto log on” on page 118](#)

[“Regional and language settings” on page 119](#)

## Synchronizing system clocks

If you are using a K2 Media Client with internal storage, then synchronizing system clocks is not required. However, if you are using a K2 Media Client with external storage or as part of a larger network, the system clocks on the devices of the K2 system must be kept synchronized. The main purpose for this time synchronization is so that entries in the various logs on the K2 system devices can be correlated. The following procedure describes a mechanism by which clocks are synchronized. If your facility has other mechanisms by which you synchronize system clocks, you can use your own methods, as long as it accomplishes the goal of keeping the system clocks synchronized.

To synchronize system clocks, do the following:

1. Designate a K2 Media Server as the time server.
2. On each K2 Media Client, iSCSI client, and any additional K2 Media Servers, in the Windows **Control Panel** open **Date and Time**.
3. On the **Internet Time** tab, enter the K2 Media Server that is the time server.

## Licensing

Grass Valley continues to develop the K2 product family to better meet the needs of a wide range of customer requirements. As these developments become available, you can add the specific functionality you need with Grass Valley software licenses. Detailed procedures for installing licenses come with option kits or are included in release notes for K2 products. Contact your Grass Valley representative to learn more about the licensing structure and for purchasing information.

## **Software version licenses**

At major software releases, significant new features are added. If you are licensed for the software release, you can upgrade your software and received the benefits of the new features.

## **Licensable options**

Optional applications, bundles of advanced features, and enhanced functionality are available as licensable options for K2 products. The following list includes examples of some of the options:

- For SDA-00 and SD-00 models, a codec upgrade is available that adds D10 and DV50 compression and increases available MPEG-2 compression data rate up to 50Mbps, 4:2:2.
- TimeDelay is an optional application for use with K2 systems.
- AppCenter Pro

This is not a complete list of all options. As development continues, new options become available. Contact your Grass Valley representative to learn more about current options.

## **Configuring K2 security**

The section includes the following topics:

- [“Overview of K2 security features” on page 104](#)
- [“Example: Setting up user access to bins” on page 105](#)
- [“Example: Setting up user access to channels” on page 105](#)
- [“Security and user accounts” on page 106](#)
- [“Configuring media access security for K2 bins” on page 106](#)
- [“AppCenter operations and media access security” on page 109](#)
- [“FTP and media access security” on page 109](#)
- [“K2 Storage Systems and media access security” on page 109](#)
- [“Protocol control of channels and media access security” on page 110](#)
- [“Configuring channel access security” on page 111](#)

## Overview of K2 security features

K2 security features reference Windows operating system user accounts and groups on the local K2 system to determine permission levels. Depending on the account used to log on to the Windows operating system, to log on to K2 applications, or to otherwise authenticate system access, permission is granted for various levels of operational and media access.

K2 systems offer security features as follows:

- Windows operating system — Depending on the current Windows logon, permission is granted to make settings in the Windows operating system. Refer to the next section [“Security and user accounts” on page 106](#).
- K2 applications — Depending on the user account used to log on to the application, permission is granted to control and configure the application. These K2 applications include AppCenter, Storage Utility, and the K2 System Configuration application. Refer to the next section [“Security and user accounts” on page 106](#).
- Media access — There are three types of media access security, as follows:
  - Media access in AppCenter — You can set user permissions on the K2 bins that store your media. Then, depending on the current AppCenter logon, permission is granted for AppCenter operations on the media in the bins. Refer to [“AppCenter operations and media access security” on page 109](#).
  - Media access via FTP — The user permissions set on K2 bins in AppCenter also determine access via FTP. Depending on the FTP session logon, permission is granted for FTP commands accessing the media in the bins. Refer to [“FTP and media access security” on page 109](#).
  - Media access via protocols — The permissions set on K2 bins in AppCenter also determine access for channels controlled by protocols. Depending on the channel accessing the media, permission is granted for operations on the media in the bins. Refer to [“Protocol control of channels and media access security” on page 110](#).
- Channel access — You can set user permissions for each channel. Then, depending on the current AppCenter logon, permission is granted or denied to operate the channel. Refer to [“Configuring channel access security” on page 111](#).

## Example: Setting up user access to bins

In this example User A requires a private bin in which only they can see media or have any access to media. User B requires a bin that provides media to other users, but prevents other users from modifying the media. To set up security features to meet these requirements, do the following:

Task	Documentation
<input type="checkbox"/> Log on to the local K2 Media Client with Windows administrator permissions.	<a href="#">“Security and user accounts” on page 106</a>
<input type="checkbox"/> Configure a “userA” account and a “userB” account on the local K2 Media Client. Do not assign these users to the administrators group.	Use standard Windows procedures
<input type="checkbox"/> Log on to AppCenter with K2 administrator permissions.	<a href="#">“Security and user accounts” on page 106</a>
<input type="checkbox"/> Create a “userA_private” bin and a “userB_share” bin on the local K2 Media Client.	K2 Media Client User Guide
<input type="checkbox"/> For bin “userA_private” configure an access control list with permissions as follows: - Everyone: Remove this group from the access control list - BUILTIN/Administrators: Deny Full Control - userA: Allow Full Control	<a href="#">“Configuring media access security for K2 bins” on page 106</a>
<input type="checkbox"/> For bin “userB_share” configure an access control list with permissions as follows: - Everyone: Remove this group from the access control list - userA: Allow Full Control - All accounts except userA: Allow Explore Bin, Deny Rename Clips, Deny Delete Clips	<a href="#">“Configuring media access security for K2 bins” on page 106</a>
<input type="checkbox"/> Log on to AppCenter as userA. Test userA access to bins. Log off.	—
<input type="checkbox"/> Log on to AppCenter as userB. Test userB access to bins. Log off.	—

## Example: Setting up user access to channels

In this example User A requires exclusive access to channels 1 and 2 and User B requires exclusive access to channels 3 and 4. To set up security features to meet these requirements, do the following:

Task	Documentation
<input type="checkbox"/> Log on to the local K2 Media Client with Windows administrator permissions.	<a href="#">“Security and user accounts” on page 106</a>
<input type="checkbox"/> Configure a “userA” account and a “userB” account on the local K2 Media Client. Do not assign these users to the administrators group.	Use standard Windows procedures
<input type="checkbox"/> Log on to AppCenter with K2 administrator permissions.	<a href="#">“Security and user accounts” on page 106</a>
<input type="checkbox"/> For channels 1 and 2, configure access control lists with permissions as follows: - Everyone: Remove this group from the access control list - userA: Allow	<a href="#">“Configuring channel access security” on page 111</a>
<input type="checkbox"/> For channels 3 and 4, configure access control lists with permissions as follows: - Everyone: Remove this group from the access control list - userB: Allow	<a href="#">“Configuring channel access security” on page 111</a>
<input type="checkbox"/> Log on to AppCenter as userA. Test userA access to channels. Log off.	—
<input type="checkbox"/> Log on to AppCenter as userB. Test userB access to channels. Log off.	—

## Security and user accounts

To provide a basic level of security, the K2 Media Client ships from the factory with three pre-configured Windows operating system user accounts, with login usernames Administrator, K2admin, and K2user. From these accounts, the K2 system enforces security levels, as shown in the following table.

	<b>Windows administrator</b>	<b>K2 administrator</b>	<b>K2 user</b>	<b>Unknown user (a login that is not one of the default accounts)</b>
<b>Login</b>	Administrator	K2admin	K2user	N/A <sup>a</sup>
<b>Password</b> (case sensitive)	adminK2	K2admin	K2user	N/A
<b>AppCenter Configuration Manager</b>	Full access	Full access	Can view	Can't access
<b>AppCenter</b>	Full access	Full access	Full access; requires an account on the K2 Media Client(s)	Can view channel suites, channel status, on-line help and System Status pane. Can export logs.
<b>Storage Utility</b>	Full access <sup>b</sup>	Full access	Can't access	Can't access
<b>K2 System Configuration application</b>	Full access <sup>b</sup>	Full access	Can't access	Can't access
<b>Windows Operating System</b>	Full access	Limited access (based on Windows login privileges)	Limited access (based on Windows login privileges)	Limited access (based on Windows login privileges)

<sup>a</sup>. The unknown user, like all others who access the K2 system, must have a valid Windows login for the K2 Media Client or the control point PC through which the K2 system is being accessed.

<sup>b</sup>. For more information about Storage Utility or the K2 System Configuration application security, see the *K2 Storage System Instruction Manual*.

Using standard Windows operating system procedures and the Microsoft Management Console, you can set up additional local users and groups, as well as domain users and groups. Once these are set up, they are available to K2 security features. In this way you can set up a security framework to match your site's unique security requirements.

## Configuring media access security for K2 bins

The permissions you set on a K2 bin restricts access to the media in the bin via AppCenter operations, via FTP, and via protocol control of channels.

Security on K2 bins is enforced through the media database. It is not enforced through the Windows file system. Even though the configuration for permissions on K2 bins appears similar to that for Windows folders, do not confuse the two types of security.

Do not use Windows procedures to configure file system security on a folder and expect it to be enforced as a part of K2 media access security. Likewise, do not configure K2 media access security and expect it to affect Windows file system operations.

You can set permissions on a K2 bin as follows:

- Rename — Allow or deny access to rename any of the clips located in the bin.
- Delete — Allowed or deny access to delete any of the clips located in the bin.
- Explore Bin — Allow or deny access to explore the contents of the bin. This permission also controls access to transfer clips in/out of the bin and to perform search operations on the bin.
- Full Control — Allow or deny all of the above permissions plus the ability to modify the permissions on a bin.

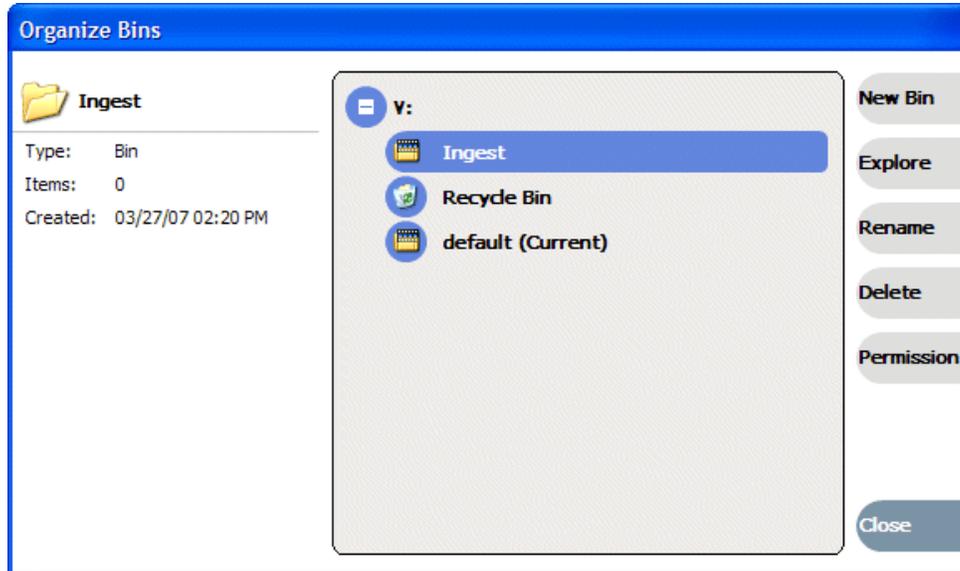
As you configure permissions, take the following into account:

- In case of conflicts, the Deny permission always overrides the Allow permission.
- Do not restrict access for the *movie* and *mxfmovie* accounts. These accounts are used for access by applications and modifying permissions can cause applications and transfers to fail. If your security policy requires restricting access to these accounts, contact Grass Valley Support.
- By default, the “Everyone” group is set to Full Control, with all permissions allowed. When you create a new bin it has these default permissions applied automatically.
- Avoid using the “Everyone” group to restrict permissions. Doing so causes some or all operations to fail, regardless of the account currently logged on.
- You can remove the “Everyone” group from the access control list. In most cases this gives you better control for selectively allowing and denying permissions.
- The *BUILTIN\Administrators* account retains the ability to modify permissions, even if you set the permission for this account to deny Full Control.

If you need to restrict access to a K2 bin that you have created, set up a media access control list on the bin, as instructed in the following procedure.

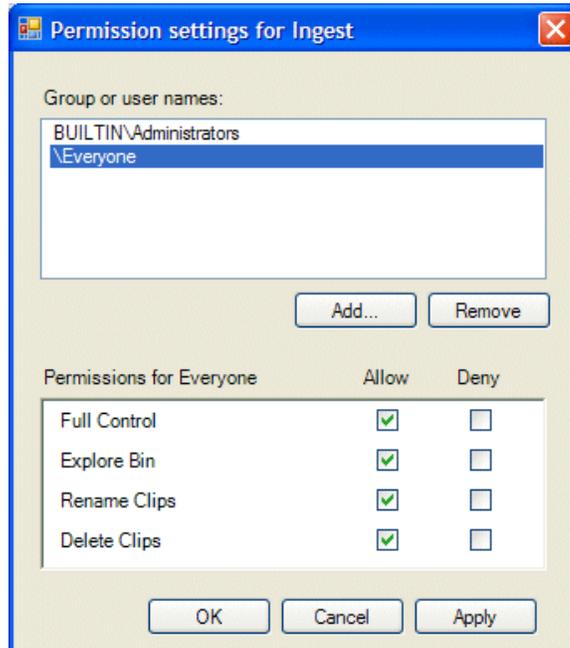
1. Make sure you are logged on to Windows and AppCenter with administrator privileges.
2. Create user accounts and bins as necessary to support your permission policies.

3. In the Clips pane, select the Current Bin drop-down list, then select **Organize Bins**. The Organize Bins dialog box opens.



4. Create a bin if necessary, or otherwise select the bin for which you are setting permissions and then click **Permission**. The Permission settings dialog box opens.

**NOTE:** You can not set permissions on the default bin or on the Recycle bin.



5. Add users and groups to the access control list and set permissions as follows:
  - a. Click **Add**. The Select Users or Groups dialog box opens. This is the standard Windows operating system interface to users and groups, so you can use standard Windows procedures. In the “Enter the object names...” box, you can enter the users or groups for which you want to set permissions, then click **OK**.
  - b. In the Permission settings dialog box, select a user or group and then set permissions as desired.
6. Click **Apply**, **OK**, and **Close** to save settings and close dialog boxes.

## AppCenter operations and media access security

AppCenter uses the credential information for the current AppCenter logon and checks it against the access control list for a K2 bin. This is the access control list that you set up through the Organize Bins dialog box in AppCenter. In this way, AppCenter determines whether to allow or deny operations on media in a K2 bin.

Once permissions are granted based on the current logon account, those permissions remain in place until that account logs off of AppCenter.

## FTP and media access security

The following systems host the K2 FTP interface:

- An internal storage (stand-alone) K2 Media Client
- A K2 Media Server that takes the role of FTP server host the K2 FTP interface.

The way in which the K2 FTP interface applies media access security is explained in this section.

The K2 FTP interface uses the credential information for the current FTP session logon and checks it against the access control list for a K2 bin. This is the access control list that you set up through the Organize Bins dialog box in AppCenter. Any media access related operations such as *get*, *put*, *dir*, *rename* and *delete* are checked against the FTP session’s logon credentials to access the media. For example, if an FTP session is denied access to explore bin A, then the session can not initiate a *dir* operation on bin A to list the contents of the bin. Furthermore, the session can not transfer clips into bin A using the *put* operation.

For the purpose of compatibility FTP access conventions, accounts for user *movie* or user *mxfmovie* are provided on the K2 system. These accounts are automatically set up when you install K2 software version 3.2 or higher. Do not restrict access for these accounts. If your security policy requires restricting access to these accounts, contact Grass Valley Support.

On a K2 Storage System, authentication takes place on the K2 Media Server. Setting up FTP security for specific local users and groups is not supported on a K2 Storage System, with the exception of the local *movie* and *mxfmovie* accounts. However, you can set up FTP security for domain users and groups.

## K2 Storage Systems and media access security

This section applies to media access security, not FTP security. Refer to the preceding section for information about FTP security.

On a K2 Storage System, the users and groups referenced by media access security features are the users and groups on the K2 Media Clients, not the K2 Media Server. To simplify account setup and maintenance, you can use domain users and groups rather than local users and groups.

If you use local users and groups, to support media access security you must have those same exact local accounts set up on each K2 Media Client within the K2 Storage System. However, you don't need to set up security via AppCenter on each K2 Media Client. When you modify permissions on a shared storage bin from one K2 Media Client, then permissions are enforced similarly on all of the K2 Media Clients in the K2 Storage System.

## **Protocol control of channels and media access security**

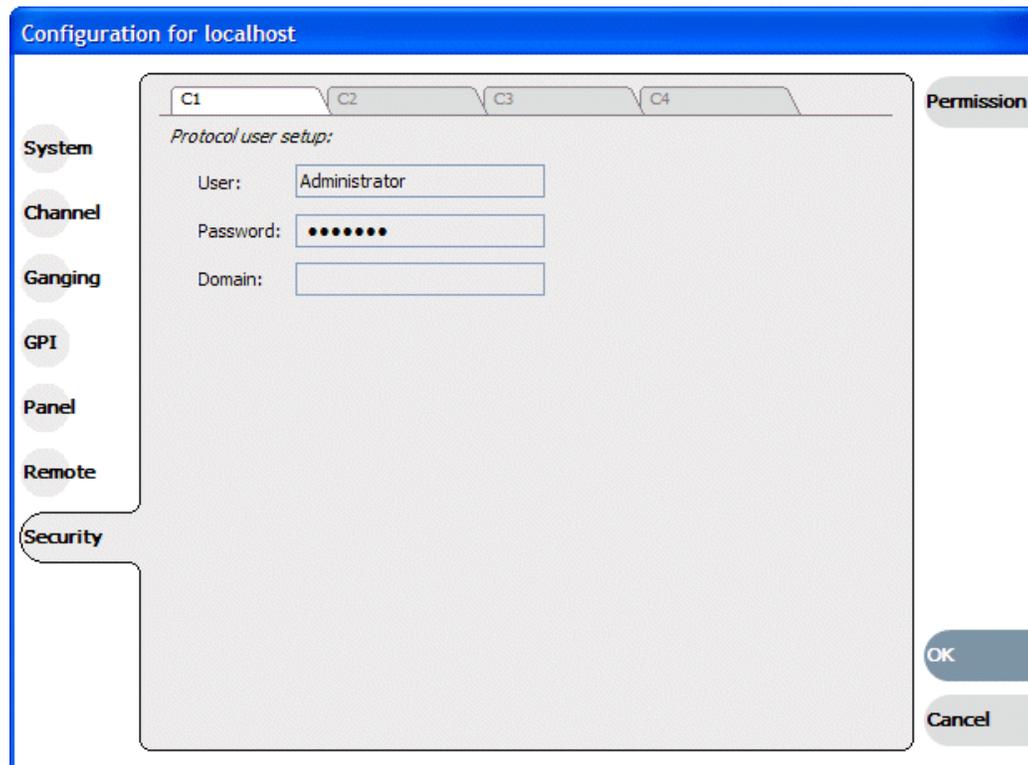
Protocol security restricts a channel in its access to the media in a bin, regardless of what user is currently logged on to AppCenter. This is different than the other types of media access security, in which the security restricts the user (as currently logged on to AppCenter) in their access to the media in a bin, regardless of what channel is being used.

Nevertheless, permissions for protocol channels are still derived from user accounts. In AppCenter's Configuration Manager, on the Security tab you can associate a user account with a channel of protocol control. Based on that association, when a protocol controls the channel, AppCenter checks the credential information for the associated user account against the access control list for a K2 bin. This is the access control list that you set up through the Organize Bins dialog box in AppCenter. In this way, AppCenter determines whether to allow or deny that channel's operations on the media in the bin.

By default, protocols have administrator privileges for media access. In addition, protocols are always allowed access to a channel.

To associate a protocol channel with a user account, do the following:

1. Make sure you are logged on to Windows and AppCenter with administrator privileges.
2. Create user accounts and bins as necessary to support your permission policies.
3. Click **System | Configuration**. Configuration Manager opens.
4. Click a channel tab.
5. Click the **Security** tab.



6. Enter the username, the password, and (if applicable) the domain for the user account that you are associating with the channel.

When this channel is under protocol control and it accesses media in a bin for which permissions have been set, AppCenter makes the channel's access to the media equivalent to this user's access to the media.

7. Click **OK** to save Configuration Manager settings and close Configuration Manager.
8. Restart AppCenter to put the change into effect.

## Configuring channel access security

Channel access security restricts the user (as currently logged on to AppCenter) in their use of an AppCenter channel, regardless of what bin or what media is involved. This is different than media access security, in which the security restricts the user in their access to the media in a bin, regardless of what channel is being used.

You can set up an access control list for each channel through the channel's Permissions dialog box. AppCenter uses the credential information for the current AppCenter logon and checks it against the access control list for a channel. In this way, AppCenter determines whether to allow or deny access to the channel's controls.

When you set up a channel access control list, you select the permissions for the channel as follows:

- Allow — The user can operate the channel. All channel controls are enabled.

- Deny — The user can not operate the channel. The controls are not displayed on the channel pane.

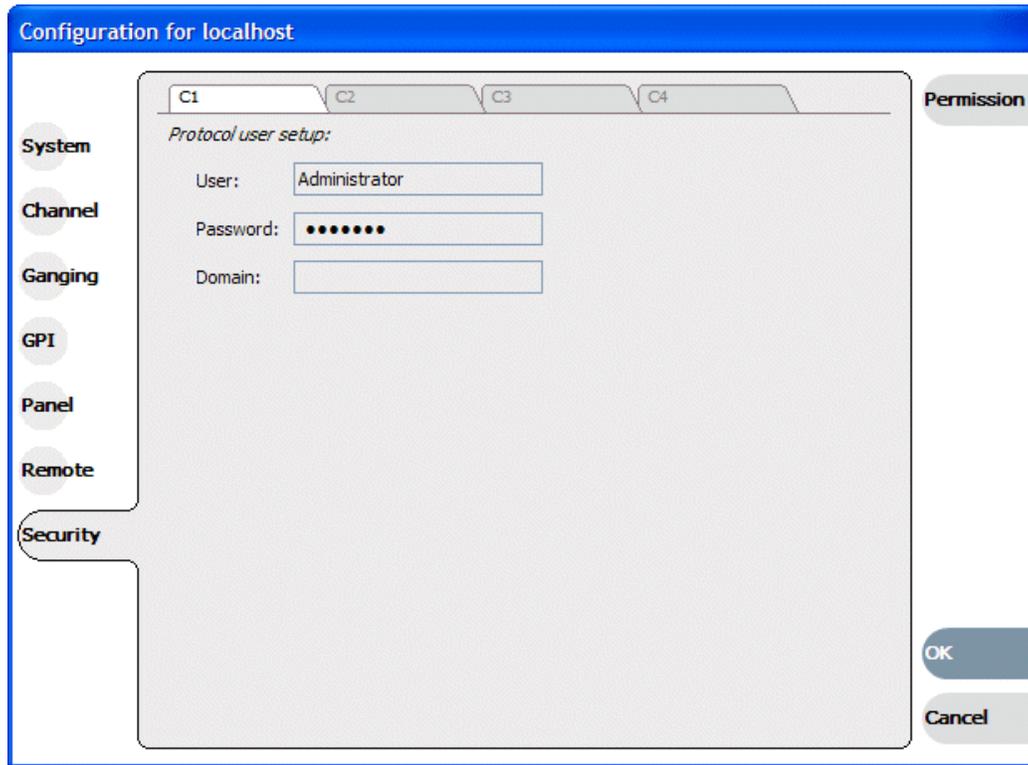
You configure these permissions to apply to users and groups. By default, all channels have their permission set to allow access to “Everyone”. In case of conflicts arising from a user belonging to multiple groups, the Deny permission always overrides the Allow permission.

When you log on to AppCenter on a local K2 Media Client, permissions for all four local channels are based on the single user logged on. Therefore channel permissions are enforced for just one user at a time across the four local channels. If you require that channel permissions be enforced simultaneously for different users each accessing their own channel or channels on a single K2 Media Client, those users must log on via a remote AppCenter channel suite from a Control Point PC. The remote AppCenter channel suite allows each channel to be operated by a different user.

Once permissions are granted based on the current logon account, those permissions remain in place until that account logs off of AppCenter.

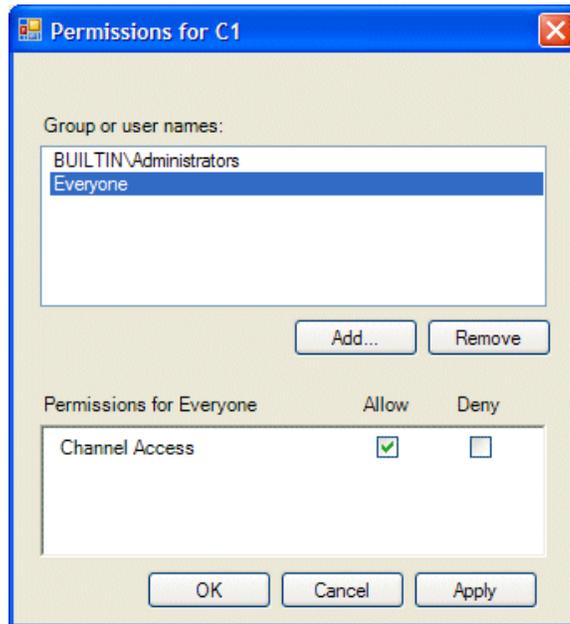
If you need to restrict access to an AppCenter channel, set up a channel access control list, as instructed in the following procedure:

1. Make sure you are logged on to Windows and AppCenter with administrator privileges.
2. Create user accounts and bins as necessary to support your permission policies.
3. Click **System | Configuration**. Configuration Manager opens.
4. Click a channel tab.
5. Click the **Security** tab.



**NOTE:** Do not configure protocol user setup. This is for protocol media access security only and has nothing to do with channel access security.

6. Click **Permission**. The Permissions dialog box opens.



7. Add users and groups to the access control list and set permissions as follows:
  - a. Click **Add**. The Select Users or Groups dialog box opens. This is the standard Windows operating system interface to users and groups, so you can use standard Windows procedures. In the “Enter the object names...” box, you can enter the users or groups for which you want to set permissions, then click **OK**.
  - b. In the Permission settings dialog box, select a user or group and then set permissions as desired.

Remember that by default, “Everyone” is set to Allow. You might need to change this in order to configure your permission policies.

**NOTE:** You can not change permissions for the *BUILTIN\Administrators* account.

8. Click **Apply** and **OK** to save settings and close the Permissions dialog box.
9. Click **OK** to save Configuration Manager settings and close Configuration Manager.
10. Restart AppCenter to put the change into effect.

## K2 and NetCentral security considerations

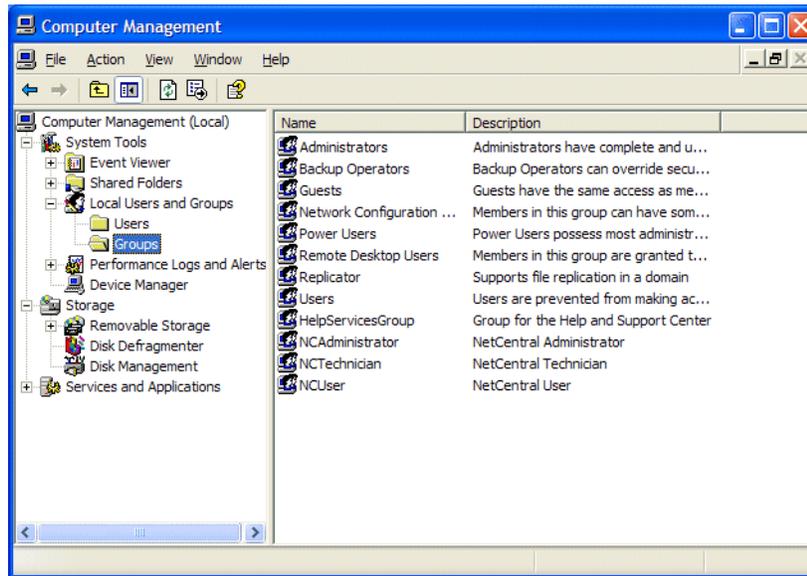
When using K2 with NetCentral, bear in mind that NetCentral has its own levels of security. Grass Valley recommends mapping the NetCentral administrator with the K2 administrator level application access. You need Windows administrator privileges to add or modify a user’s privileges.

## **Mapping a NetCentral administrator to the K2 administrator level**

The following procedure uses K2admin as an example of a user name. You may want to modify the administrator accounts to bring them in line with your site's security policies.

A user who belongs to a group has all the rights and permissions granted to that group. To be able to use NetCentral and K2, you need to create a local K2admin user account and add it to the NCAdministrator group on the NetCentral Server PC. (This could also be the Control Point PC.)

1. Create the user named K2admin:
  - a. Open Computer Management.
  - b. In the console tree, right-click on the Users folder.
  - c. Select New User.
  - d. In the New User dialog box, enter the user name **K2admin** and the password **K2admin**.
  - e. Select or clear the check boxes, as desired, for:
    - User must change password at next logon
    - User cannot change password
    - Password never expires
    - Account is disabled
  - f. Click Create, and then click Close.
2. Add the NCAdministrator group to the K2admin user:
  - a. Open Computer Management.
  - b. In the console tree, click Users.
  - c. Right-click the K2admin user and select Properties.
  - d. Select the Member Of tab and click Add.
  - e. Enter the group name **NCAdministrator** and click OK.



For more information on NetCentral security, see the NetCentral on-line Help.

## Microsoft Windows High Priority updates

Grass Valley recognizes that it is essential to be able to deploy Microsoft security patches to our Windows-based products as quickly as possible. As Grass Valley systems are used to meet the mission-critical requirements of your environment, we feel it is imperative that systems be kept up to date in order to maintain the highest level of security available. To that end, we encourage you to install all high priority operating system updates provided by Microsoft. In the unlikely event that one of these updates causes ill effects to a Grass Valley system, you are urged to uninstall the update and contact Grass Valley customer service as soon as possible. Grass Valley will investigate the incompatibility and, if necessary, provide a software update or work-around to allow our products to properly function with the Microsoft update in question.

Please note that this policy applies to “High Priority” updates only. There are countless other updates not classified as “High Priority” which are made available by Microsoft. If you feel that one or more of these other updates must be applied, we request that you contact Grass Valley prior to installation.

You should exercise common sense when applying these updates. Specifically, updates should not be downloaded or installed while a Grass Valley product is being used for mission critical purposes such as play to air.

## Virus scanning policies

The K2 system is based on a standard Windows PC platform. It is important to defend this system against virus or SpyWare attacks. Grass Valley supports the scanning of the K2 system drives (the disk drives or drive partition used to house the operating system and installed application software) from a PC that is running the scanning

program while the K2 is being used to record or play video to air. The anti-virus package executing on the PC can be scheduled to scan the system drives of multiple K2 Systems.

The following strategies are recommended for virus scanning:

- Run the scanning software on a dedicated PC that connects to the K2 system via a network mount. Do not run scanning software locally on the K2 Media Client.
- Connect to the K2 Media Client via 100BaseT network. This constrains the bandwidth and system resources consumed, so as to not interfere with media operations. Do not connect and scan via Gigabit Ethernet.
- Grass Valley does not support the running of anti-virus programs on a K2 System itself at the same time the system is being used to record or play video to air.

With these recommended strategies, you should be able to scan the K2 Media Client without interrupting media access.

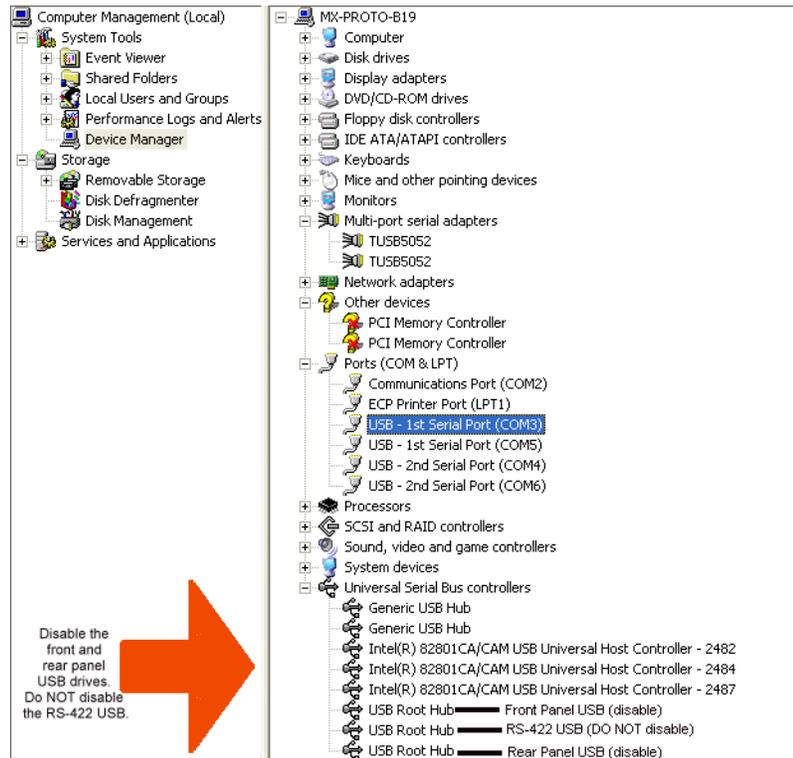
## Network and firewall policies

The following protection policies are recommended:

- Where possible, the K2 system should be run in a closed and protected environment without network access to the corporate IS environment or the outside world.
- If the K2 system must operate in a larger network, Grass Valley recommends that access be through a gateway or firewall to provide anti-virus protection. The firewall should allow incoming HTTP (TCP ports 80 and 280) connections for client and configuration connections to the K2 system inside the private network.
- If operating with an Aurora Browse system, ports should allow incoming packets so requests to the Proxy NAS can be properly processed. The port that needs to be open is port 445 for TCP and UDP for Windows and SAMBA shares. If your site's policies require that these port numbers change, contact Grass Valley support for assistance.
- Access to the K2 system should be controlled in order to limit the likelihood of malicious or unintended introduction of viruses.
- The front and rear USB ports of the K2 system should normally be disabled; they should only be used by Windows administrators. (Be careful not to disable the RS-422 USB.) For more information, see [“Enabling and disabling the USB ports” on page 117](#).

## Enabling and disabling the USB ports

Grass Valley recommends that the front and rear USB ports be disabled. This protects the K2 Media Client from exposure to unauthorized files. Do not disable the RS-422 USB. The following illustration shows which USB ports should be disabled in Windows Device Manager.



Only the Windows administrator, working locally, can enable or disable USB ports. To enable a USB port, right-click on the USB device in Windows Device Manager and select **Enable**. You cannot enable the K2 Media Client USB port via a control point PC.

To transfer to or from a USB drive on an internal storage K2 Media Client, the Windows administrator should first enable the USB port. When the transfer is complete, the Windows administrator should then disable the USB port to prevent unauthorized use. Transferring to and from a USB drive is supported on a local internal storage K2 Media Client only. USB drive transfers on external storage K2 Media Clients, K2 Media Servers, or control point PCs are not supported. Assets must be exported to a USB drive one at a time. Attempts to export more than one asset at the same time will result in the transfer aborting.

## Configuring auto log on

If you set the K2 Media Client to automatically log on to Windows at startup, AppCenter honors this setting. This means that at startup AppCenter bypasses its log on dialog box and opens automatically. For more information about how to turn on automatic logon in Windows XP, including security risks and procedures, refer to the related Microsoft knowledge base article.

## **Regional and language settings**

On all K2 Media Clients and K2 Media Servers, in the Windows Control Panel “Regional and Language Options”, you can make settings on the “Regional Options” tab and on the “Languages” tab as desired. AppCenter supports these settings and displays dates, times, and other values as appropriate. However, there are special requirements for the settings on the “Advanced” tab to support FTP transfers. Do not change settings on the “Advanced” tab. Refer to [“FTP internationalization” on page 72](#) for more information.

Also refer to [“Internationalization” on page 164](#).



---

## **External Storage**

Work through the following topics to connect K2 Media Client models with external storage to the K2 Storage System:

- [“About load balancing” on page 122](#)
- [“Determining K2 Media Client bandwidth requirements” on page 123](#)
- [“Preparing the K2 Storage System” on page 123](#)
- [“Preparing K2 Media Clients” on page 124](#)
- [“Adding K2 Media Clients to the K2 Storage System” on page 126](#)
- [“Basic operations for external storage K2 Media Clients” on page 134](#)

## About load balancing

When you purchase a K2 Storage System to provide the shared storage for your K2 Media Clients, your Grass Valley representative sizes the storage system based on your bandwidth requirements. These bandwidth requirements are based on how you intend to use the channels of your K2 Media Clients. The bit rates, media formats, and ratio of record channels to play channels all effect your bandwidth requirements.

As you add your K2 Media Clients to the K2 Storage System, you must assign a bandwidth value to each K2 Media Client. This value is based on your intended use of the channels of that K2 Media Client. There is a page in the K2 System Configuration application on which you enter parameters such as channel count, bit rate, and track count per channel to calculate the bandwidth value for a K2 Media Client. The K2 System Configuration application takes that bandwidth value and load balances it across the K2 Storage System, so that the K2 Media Client has adequate bandwidth for its intended media access operations. When the bandwidth values you enter in the K2 System Configuration application match the overall bandwidth requirements upon which your K2 external storage is sized, you have sufficient bandwidth for all your K2 Media Clients.

Load balancing is important for the K2 Storage System because of the relative bandwidth constraints inherent in Gigabit Ethernet and the iSCSI protocol. The K2 Storage System uses a mechanism called a TCP/IP Offload Engine (TOE) as a bridge across which all media must travel between the iSCSI/Gigabit world and the SCSI/Fibre Channel world. Each TOE has a limit as to how much bandwidth it can handle.

Depending on the level of your K2 Storage System, you have one or more TOEs available for load balancing. A TOE is hosted by the iSCSI interface board, which also provides the Gigabit Ethernet connection.

As you configure your K2 Storage System, the K2 System Configuration application assigns a K2 Media Client to a specific TOE and keeps track of the bandwidth so subscribed to each TOE. A single K2 Media Client can only subscribe to a single TOE. However, a single TOE can have multiple K2 Media Clients subscribed to it. The K2 System Configuration application assigns K2 Media Clients to TOEs, filling each TOE until its subscription is full.

You should add your highest bandwidth K2 Media Clients first to the K2 Storage System, so that the K2 System Configuration application can distribute them equally across the available TOEs. Then when you add the lower bandwidth K2 Media Clients, the K2 System Configuration application can add them to the TOEs with bandwidth remaining.

It is important to realize that this load balancing does not adjust itself dynamically. If you change your intended use of a K2 Media Client and increase its bandwidth requirements, you risk oversubscribing the TOE to which that K2 Media Client is assigned. If this happens, media access fails on all the clients assigned to the TOE.

To prevent oversubscription problems you should load balance your K2 Storage System again if you must increase the bandwidth requirements of a K2 Media Client. Contact your Grass Valley representative for help with load balancing. To stay under the total bandwidth limit of the K2 Storage System, you might have to decrease the bandwidth requirements of another K2 Media Client. In any case you must again load balance.

## Determining K2 Media Client bandwidth requirements

The K2 System Configuration application provides a page in the Configure K2 Client wizard that calculates the bandwidth requirement for a K2 Media Client. On this page you enter information regarding the channel count, bit rate, and tracks per channel for your intended use of the K2 Media Client. The page then calculates the bandwidth requirement and make it available for load balancing. Refer to [“Adding K2 Media Clients to the K2 Storage System”](#) on page 126 for procedures.

## Preparing the K2 Storage System

Refer to the *K2 Storage System Instruction Manual* to install and configure the K2 Storage System so that it is prepared for the addition of your external storage K2 Media Clients.

The following K2 Storage System preparations are required to support K2 Media Clients:

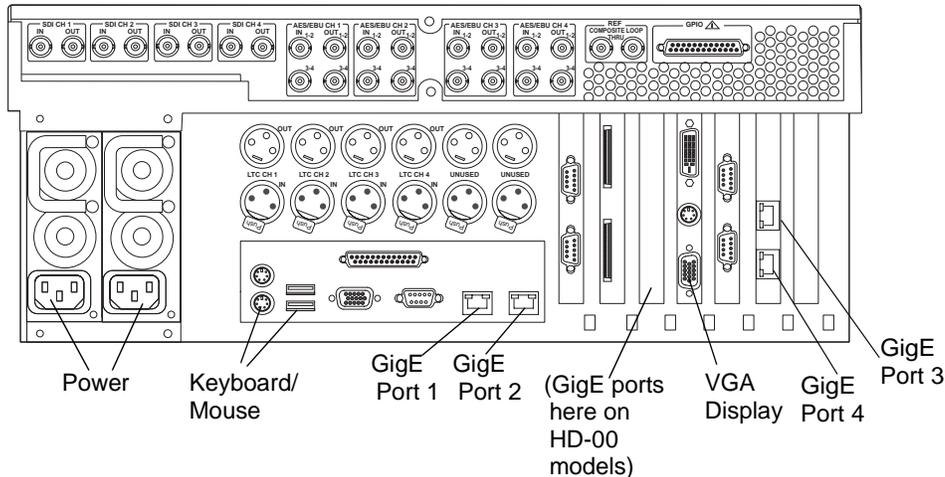
- All K2 Media Servers and/or K2 RAID storage devices must be installed and cabled.
- The control network must be operational with K2 devices communicating. At the command prompt, use the *ping* command to verify.
- For non-redundant (Levels 2 and 3) K2 Storage Systems, the media network must be operational. You can check this with the K2 System Configuration application.
- For redundant (Levels 2R and 3R) K2 Storage Systems, media network A and media network B must be operational. You can check this with the K2 System Configuration application.
- K2 RAID devices must have LUNs bound and be configured as required for operation on the K2 Storage System.
- K2 Media Servers must be configured such that an operational media file system is present.
- K2 Ethernet switches must be configured and have V-LANs set up.
- The storage system to which you are adding your K2 Media Clients must be defined with the appropriate number and type of clients. In other words, in the K2 System Configuration application tree view you should see the K2 Media Clients you are about to add represented as unconfigured devices.

**NOTE:** Do not run *Storage Utility* on an external storage K2 Media Client. For external storage, run *Storage Utility* only via the *K2 System Configuration application*.

## Preparing K2 Media Clients

Do the following to each K2 Media Client in preparation for its addition to the K2 Storage System:

1. Install the K2 Media Client in its permanent location.
2. Provide power to the K2 Media Client.
3. Connect cables as follows:



Connect GigE port 1 to a control port on the K2 Ethernet switch. For a redundant connection connect GigE port 1 to a control port on the A Ethernet switch and GigE port 3 to a control port on the B Ethernet switch.

Connect GigE port 2 to a media (iSCSI) port on the K2 Ethernet switch. For a redundant connection connect GigE port 2 to a media port on the A Ethernet switch and GigE port 4 to a media port on the B Ethernet switch.

**NOTE:** *The connections to GigE ports 2 and 4 documented here are only valid for external storage K2 Media Clients that access shared storage on a K2 Storage System. To connect GigE ports 2 and 4 on internal storage K2 Media Clients, refer to the Internal Storage chapter earlier in this manual*

Connect keyboard, mouse, and VGA monitor, if configuring locally. You can also access the Windows desktop remotely with Windows Remote Desktop Connection.

Connect other cabling as required.

4. Power on the K2 Media Client and log on to Windows as Windows administrator, which is username *administrator* and password *adminK2* by default. Ignore startup messages referring to a missing media storage system.
5. Assign a control network IP address and configure other network settings for the K2 Media Client. Refer to the *K2 Storage System Instruction Manual* for networking information. Ports 1 and 3 are teamed, so even if are making a connection to port 1 only, you must configure network settings for the Control Team, as follows:

- a. On the Windows desktop, right-click **My Network Places** and select **Properties**. The Network Connections window opens.
  - b. Look in the **Device Name** column and identify the entry named **TEAM : Control Team**.
  - c. Right-click the icon for this entry and select **Properties**. The Properties dialog box opens.
  - d. On the **General** tab select **Internet Protocol (TCP/IP)** and click the **Properties** button. The Internet Protocol (TCP/IP) Properties dialog box opens.
  - e. Configure network settings as appropriate for the control network as implemented in your facility.
6. Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures.
  7. If the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric, such as in Levels 2R and 3R, install Multi-Path I/O software. Refer to the next procedure "[Installing Multi-Path I/O Software](#)".
  8. Copy the K2 Storage System *hosts* file onto the K2 Media Client. Refer to the *K2 Storage System Instruction Manual* for information about the *hosts* file and networking.

### Installing Multi-Path I/O Software

The following procedure is required for external storage K2 Media Clients that have their Gigabit Media ports (ports 2 and 4) connected to the two iSCSI Media networks. This configuration is used for redundant K2 Storage Systems, such as Level 2R and Level 3R.

The installation files for the Multi-Path I/O software are copied on to the K2 Media Client when the K2 Client software is installed.

To install Multi-Path I/O software, do the following:

1. Access the Windows desktop on the K2 system. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
2. Stop all media access. If AppCenter is open, close it.
3. Click **Start | Run**, type `cmd` and press **Enter**. The MS-DOS command prompt window opens.
4. From the command prompt, navigate to the `C:\profile\mpio` directory.
5. Type the following at the command prompt:  
`C:\profile\mpio>gdsminstall.exe -i c:\profile\mpio gdsm.inf Root\GDSM`
6. Press **Enter**. The software is installed. The command prompt window reports the following:

```
Pre-Installing the Multi-Path Adapter Filter...
Success
```

Installing the Multi-Path Bus Driver...

Success

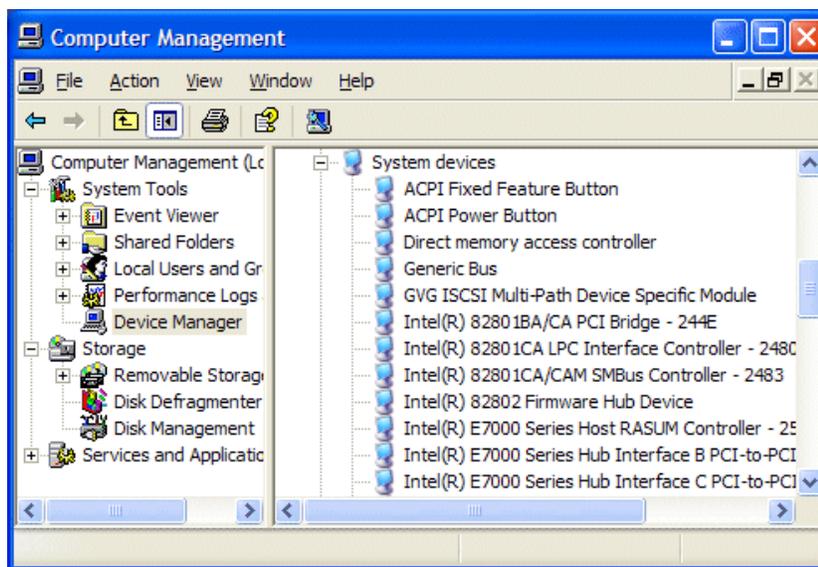
Installing the Device Specific Module...

Success

Installing the Multi-Path Device Driver...

Success (but need a reboot)

7. Restart the K2 Media Client.
8. After restart, to verify that the software is installed, on the Windows desktop right-click **My Computer** and select **Manage**. The Computer Management window opens.



9. In the left pane select **Device Manager**.
10. In the right pane open the **System devices** node and verify that **GVG ISCSI Multi-Path Device Specific Module** is listed.

## Adding K2 Media Clients to the K2 Storage System

For each of your K2 Media Clients, use the procedures in this section to configure for operation using the K2 Storage System as the shared media storage.

Before beginning with these procedures, make sure the K2 Storage System and the K2 Media Clients are prepared as specified in the sections earlier in this chapter. Cabling must be complete, K2 Media Clients must be communicating on the control network, and the K2 Storage System must have a viable media file system.

## Configuring a K2 Media Client for the K2 Storage System

Configure a K2 Media Client as follows:

1. On the K2 configuration control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the correct administrator account. By default this as follows:

- Username: administrator
- Password: adminK2

Refer to the security topic elsewhere in this manual for more information about administrator accounts and logging in to applications.

3. In the K2 System Configuration application tree view, verify that the K2 Storage System is correctly defined. You should see the correct number of K2 Media Clients. If the correct number of K2 Media Clients is not currently added to the K2 Storage System, you can add or remove clients now (before clients are configured), as follows:

- Select the top node of the storage system and click the **Add Device** button
- Select a unconfigured K2 Media Client and click the **Remove** button.

4. Select the top K2 Media Client. 

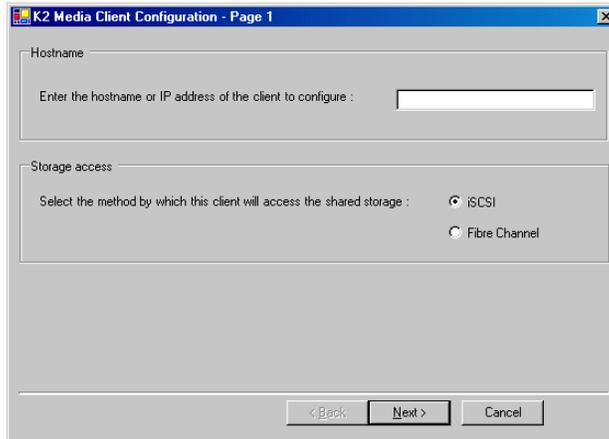
5. Click the **Configure** button.  The K2 Media Client Configuration wizard opens. Follow the on-screen text as described in the following table.:

**NOTE:** If your system has a large number of K2 Media Clients and other iSCSI clients, you are prompted to restart the K2 Media Server when you configure clients and cross the following thresholds: 64 clients; 80 clients; 96 clients.

On this page...

Do this...

Page 1



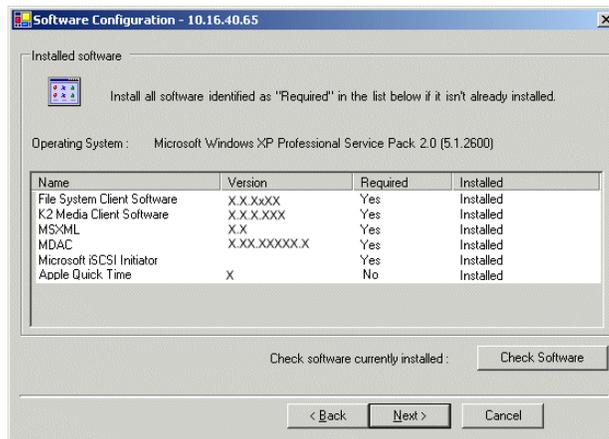
Enter the IP address or network name for a K2 Media Client, as currently configured on the K2 Media Client. You should configure your highest bandwidth K2 Media Clients first, as this ensures load balancing is correct. Refer to the load balancing topic earlier in this chapter for information on load balancing.

For the Storage Access settings, leave **iSCSI** selected. Click **Next**

### Software Configuration

This page checks the K2 Media Client for required software.

**NOTE: Multi-Path I/O software must be installed on K2 Media Clients connected to a redundant K2 Storage System.**



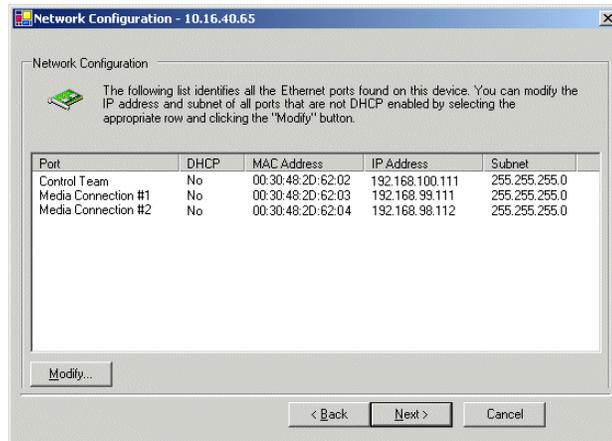
If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Client before continuing. Refer to [Chapter 5, “Managing K2 client system software”](#). After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

**On this page...**

**Do this...**

**Network Configuration**

This page configures both control and media (iSCSI) network connections. The K2 Media Client actually has four Gigabit Ethernet ports, but ports 1 and 3 are configured as a teamed pair (the control team), while ports 2 and 4 (the media connections) are individual. The teamed pair shares an IP address and appears on this page as a single port.



The top port is the port (teamed) over which the K2 System Configuration application is communicating with the K2 Media Client. If correctly configured, it is already assigned the control network IP address, which is displayed in the window.

Select **Media Connection #1** and click **Modify**. A network configuration dialog box opens. Configure as follows:

- If a non-redundant K2 Storage System, enter the media network IP address. Also enter the subnet mask.
- If a redundant K2 Storage System, enter an IP address for the "A" media (iSCSI) network. Also enter the subnet mask.

If a non-redundant K2 Storage System, do not configure Media Connection #2.

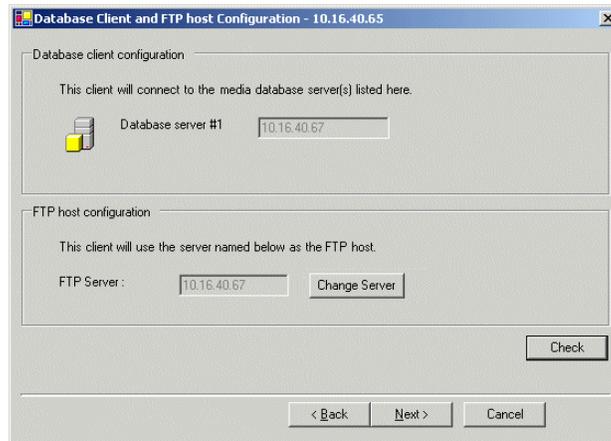
If a redundant K2 Storage System, select **Media Connection #2** and click **Modify**. A network configuration dialog box opens. Enter an IP address for the "B" media (iSCSI) network. Also enter the subnet mask. Click **Next**.

**On this page...**

**Database Client Configuration**

This page connects the K2 Media Client as a media database client to the K2 Media Server taking the role of media database server. If there are redundant K2 Media Servers, both are listed on this page as database servers.

**Do this...**



Verify that the K2 Media Client is connecting to the correct K2 Media Server or Servers, as follows:

- For Level 2, the client connects to the only server.
- For Level 2R, the client connects to server A as database server 1 and sever B as database server 2.
- For Level 3, the client connects to server 1.
- For Level 3R, the client connects to server 1A as database server 1 and sever 1B as database server 2.

Refer to the *K2 Storage System Instruction Manual* to identify servers. If there are multiple FTP servers, the K2 System Configuration application automatically assigns the K2 Media Client to a FTP server to provide optimum FTP bandwidth across the system.

Do not attempt to change the assignment to a different FTP server as part of the initial configuration. Refer to [“Assigning a K2 Media Client to a different FTP server” on page 133](#).

Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

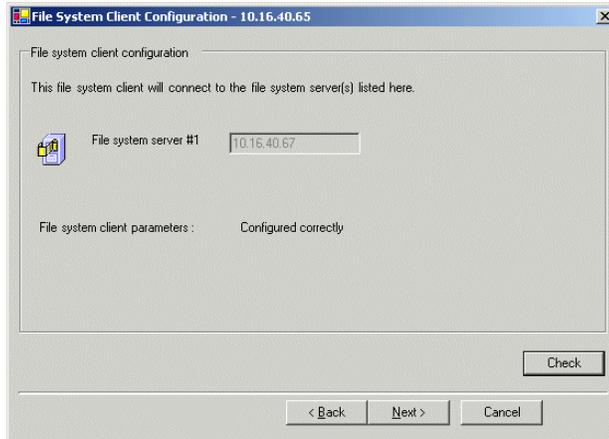
---

**On this page...**

**File System Client Configuration**

This page connects the K2 Media Client as a media file system client to the K2 Media Server taking the role of media file system server. If there are redundant K2 Media Servers, both are listed on this page as file system servers.

**Do this...**



Verify that the K2 Media Client is connecting to the correct K2 Media Server or Servers, as follows:

- For Level 2, the client connects to the only server.
- For Level 2R, the client connects to server A as file system server 1 and server B as file system server 2.
- For Level 3, the client connects to server 1.
- For Level 3R, the client connects to server 1A as file system server 1 and server 1B as file system server 2.

Refer to the *K2 Storage System Instruction Manual* to identify servers. Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

---

**On this page...**

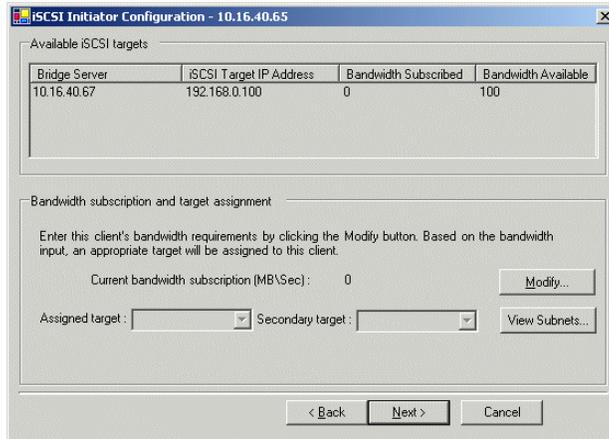
**iSCSI Initiator Configuration**

This page load balances the K2 Media Client's iSCSI connection to the K2 Storage System. The iSCSI adapters on your K2 Media Server or servers are listed here as iSCSI targets.

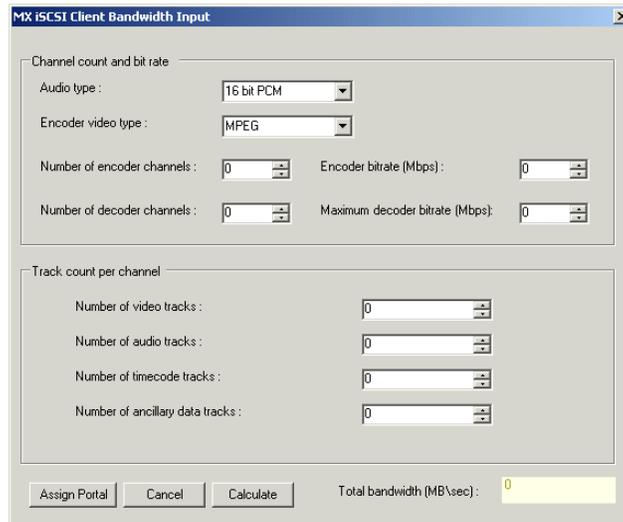
For pre-defined K2 Storage System (Levels 2, 2R, 3, 3R), the K2 System Configuration application determines the iSCSI target to which each K2 Media Client subscribes, based on the bandwidth values that you enter. This enforces policies by which each K2 Media Client has sufficient bandwidth for its intended use and no individual iSCSI target is oversubscribed.

For custom K2 Storage Systems (Level 4), qualified system designers can view subnets to help assign iSCSI targets.

**Do this...**



Click **Modify**. The Bandwidth Input dialog box opens.



Enter the channel count, bit rate, and track count per channel information according to your intended use of the K2 Media Client.

Click **Calculate** and verify that the total bandwidth is correct according to the system design for your shared storage system. You should be configuring your highest bandwidth K2 Media Clients first, to ensure that they are distributed equally across iSCSI targets. To verify this, while you are on this page for your first K2 Media Client, you can temporarily enter information and calculate the bandwidth for each of your K2 Media Clients and compare bandwidth values.

Click **Assign Portal**, then **OK** to confirm.

If you have a redundant K2 Storage System, the K2 System Configuration application makes the appropriate assignment to the redundant server, as reported in the Secondary target box.

Click **Next**.

**Completing the Configuration Wizard**

Click **Finish**. The K2 Media Client restarts and the wizard closes.

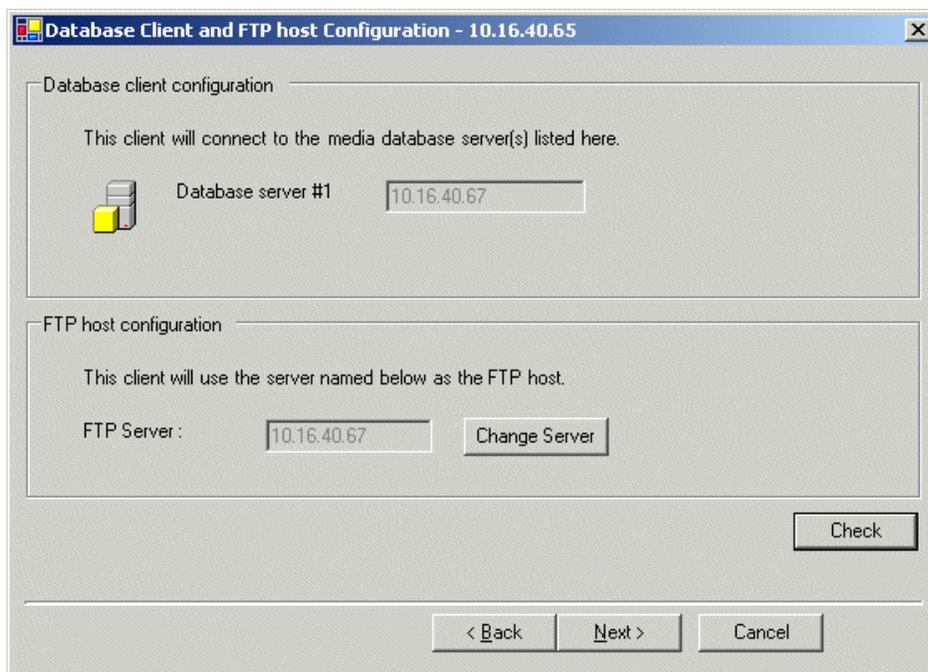
6. Repeat this procedure for each of your K2 Media Clients.

## Assigning a K2 Media Client to a different FTP server

If your K2 Storage System has multiple K2 Media Servers that take the role of FTP server, you can change the FTP assignment of a K2 Media Client so that it uses a different FTP server. This is helpful if one of the FTP servers requires service work or otherwise becomes unavailable. In this case, you might want a K2 Media Client assigned to that FTP server to use a different FTP server, so that its FTP access can continue.

To change the FTP assignment of a K2 Media Client, do the following:

1. From the Control Point PC, open the K2 System Configuration application.
2. For each K2 Media Client, open the Media Database page.



3. Identify the K2 Media Clients assigned to the FTP server that is about to become unavailable.
4. For those K2 Media Clients, click **Change Server**.  
A message box appears that asks if you are sure you want to change the FTP server.
5. In the message box, click **Yes**.  
The K2 System Configuration application finds the FTP server with the most available FTP bandwidth and re-assigns the K2 Media Client to that FTP server.
6. On each K2 Media Client for which you changed the FTP server assignment, restart AppCenter. This puts the change into effect, so that the next time the K2 Media Client needs FTP access, it uses the newly assigned FTP server.

## Basic operations for external storage K2 Media Clients

Use the following procedures as you operate your K2 Media Clients with the K2 Storage System:

- “Power on/off procedures”
- “Taking a K2 Media Client offline”

For other procedures refer to “Administering and maintaining the K2 system” on page 101 and the *K2 Storage System Instruction Manual*.

### Power on/off procedures

As long as the K2 Storage System remains operational, you can use the standard power on and power off procedures for K2 Media Clients attached to the K2 Storage System. When a K2 Media Client goes offline or comes online it does not disrupt the K2 Storage System.

However, if you are powering down or otherwise taking the K2 Storage System out of service, you must follow the correct procedure as specified in the *K2 Storage System Instruction Manual*. You must first stop all media access on your K2 Media Clients to ensure that they do not cause error conditions. You can power off the K2 Media Clients or take them offline using the K2 System Configuration application.

When powering up the K2 Storage System, power on the K2 Media Clients last so that they can verify their media storage as part of their start up processes.

### Taking a K2 Media Client offline

1. Stop all media operations on the device. This includes, play, record, and transfer operations.
2. Shut down the K2 Media Client.

## ***Remote control protocols***

This section provides information for using remote control protocols to operate K2 Media Clients. It is intended for use by installers, system integrators, and other persons responsible for setting up automation systems at a customer site. Topics are provided as follows:

- “Using AMP protocol to control K2 systems”
- “Using VDCP protocol to control K2 systems”
- “Using BVW protocol to control K2 systems”
- “Special considerations for automation vendors”
- “Connecting RS-422”
- “Security and protocol control”

For information about configuring AppCenter to enable protocol control of a K2 Media Client channel, refer to the *K2 Media Client User Manual*.

## Using AMP protocol to control K2 systems

Advanced Media Protocol (AMP) is an extension of the Odetics protocol.

AMP commands are available via Ethernet or RS-422 serial ports.

The automation setting for preroll should be at least 10 frames.

The AMP's socket interface uses IANA assigned port number 3811 for both TCP and UDP.

E to E commands have no effect on the K2 Media Client. Do not issue E to E commands. Also refer to [“Loop through and E to E” on page 36](#).

In AppCenter, you must set a channel's options to enable protocol control of the channel. Subsequently, when the K2 Media Client starts up, the channel is immediately available for protocol control. Manual log on is not required.

For channels in gang mode, the protocol must connect to the lowest numbered channel in the gang. This is required to support jog/shuttle of ganged channels.

### Two-Head Player Model

The AMP protocol supports the use of a *two-head player model* in that two clips can be loaded for playout, as follows:

- **Current clip** — The AMP “preset id” is the active clip.
- **Preview clip** — The AMP “preview preset id” is the preview clip. The preview clip becomes the current clip and begins playing when the current clip completes. When controlling AMP in Auto mode, the “in preset” (and “out preset”) command should be sent before the Preview in commands.

### Controlling transfers with AMP

Remote control automation applications can initiate transfers via AMP. The AMP command must be sent to the K2 Media Client. This applies to both internal storage and external storage K2 Media Clients.

If using AMP to initiate transfers between K2 systems and Profile XP systems, you must send the AMP command to the K2 system, not the Profile XP system. Transfers (both push and pull) are successful if the K2 system hosts the command. Transfers fail if the Profile XP system hosts the command.

Transfers initiated by AMP between K2 systems and M-Series iVDRs are not supported.

### AMP channel designations

The following table lists the channel designations for the AMP protocol. When using AMP protocol with Ethernet, channels must always be identified as 'VTR1', 'VTR2', etc. When using AMP protocol with RS-422, the first channel maps to P1, the second channel maps to the P2, and so on.

**NOTE:** In reference to RS-422 connections, the terms P1, P2, etc., refer to Port 1, Port 2, and so on. Do not confuse them with player channels P1,P2, etc.

AMP Protocol (Ethernet)	VTR1	VTR2	VTR3	VTR4
AMP Protocol (RS-422)	P1 (COM3)	P2 (COM4)	P3 (COM5)	P4 (COM6)

### **Internationalization**

AMP supports UTF-8. Unicode movie names pass through as opaque bits.

## Using VDCP protocol to control K2 systems

Video Disk Control Protocol (VDCP) commands are available via RS-422 serial ports.

The automation setting for preroll should be at least 10 frames.

The K2 AppCenter Recorder application in protocol mode allows a default bin to be assigned to each record channel.

In AppCenter, you must set a channel's options to enable protocol control of the channel. Subsequently, when the K2 Media Client starts up, the channel is immediately available for protocol control. Manual log on is not required.

For channels in gang mode, the protocol must connect to the lowest numbered channel in the gang. This is required to support jog/shuttle of ganged channels.

The following categories of VDCP commands are not supported:

- Deferred (Timeline) Commands --these are the basic timeline commands but use the time specified by the PRESET STANDARD TIME
- Macro commands
- Archive Commands
- E to E commands have no effect on the K2 Media Client. Do not issue E to E commands. Also refer to [“Loop through and E to E” on page 36](#).
- To control a given K2 Media Client channel, use only that channel's specific RS-422 rear panel connector. Send the VDCP “Open Port” and “Select Port” commands only to the RS-422 connector that is associated with the channel being controlled.

### Two-Head Player Model

The VDCP protocol supports the use of a *two-head player model* in that two clips may be loaded for playout, as follows:

- **Current clip** — The VDCP “preset id” is the current clip.
- **Preview clip** — The VDCP “preview preset id” is considered the preview clip. When a play command is received, the preview clip becomes the active clip and begins playing after the preroll time has passed. If a play command has not been issued by the end of the clip, playout stops according to the VDCP end mode settings for that channel (last frame, black, first frame of preview clip).

### Controlling transfers with VDCP

Remote control automation applications can initiate transfers via VDCP. The VDCP command must be sent to the K2 Media Client. This applies to both internal storage and external storage K2 Media Clients.

If you are using VDCP to perform video network transfers, you must configure the K2 Media Client so that there is a unique Controller ID for each host. Refer to [“Add network hosts names for streaming” on page 58](#).

If using VDCP to initiate transfers between K2 systems and Profile XP systems, you must send the VDCP command to the K2 system, not the Profile XP system. Transfers (both push and pull) are successful if the K2 system hosts the command. Transfers fail if the Profile XP system hosts the command.

Transfers initiated by VDCP between K2 systems and M-Series iVDRs are not supported.

### **Internationalization**

VDCP does not support UTF-8 or Unicode, so use ASCII only for clip names and bin names.

## Using BVW protocol to control K2 systems

BVW commands are available via RS-422 serial ports.

A subset of BVW commands is supported through AppCenter in protocol mode.

Insert/Edit is not supported.

E to E commands have no effect on the K2 Media Client. Do not issue E to E commands. Also refer to [“Loop through and E to E” on page 36](#).

In AppCenter, you must set a channel's options to enable protocol control of the channel. Subsequently, when the K2 Media Client starts up, the channel is immediately available for protocol control. Manual log on is not required.

For channels in gang mode, the protocol must connect to the lowest numbered channel in the gang. This is required to support jog/shuttle of ganged channels.

## Special considerations for automation vendors

The following information is provided for your convenience as you set up your chosen automation product to control K2 systems. Consult your automation vendor for complete information.

### Harris settings

The Harris automation product uses VDCP protocol.

The following settings are required for the Harris automation product:

<b>Setting</b>	<b>Value</b>	<b>Comments</b>
Disk Prerolls	10 frames	—
Frames to send Play early (Preroll Play)	10 frames	These two settings should be the same as the Disk Prerolls setting. However, if there is extra fixed latency in your RS-422 communication path, you might need to adjust the settings differently.
Frames to send Record early (Preroll Record)	10 frames	
Disk Port Comm Timeout	60 frames	This is the minimum required by K2. Do not use the Harris default value, which is 10.
Back To Back Rec	Unchecked	K2 does not support this feature.

## Connecting RS-422

You can control the K2 client system with remote control devices and software developed for the K2 client system that use industry-standard serial protocols: AMP, BVW, and VDCP. (AMP protocols can also use Ethernet connections.) You can connect up to four RS-422 cables to control K2 client system channels depending on your remote control needs. Connect the RS-422 cabling as required, then refer to the *K2 Media Client User Guide* to configure the K2 client system for remote control.

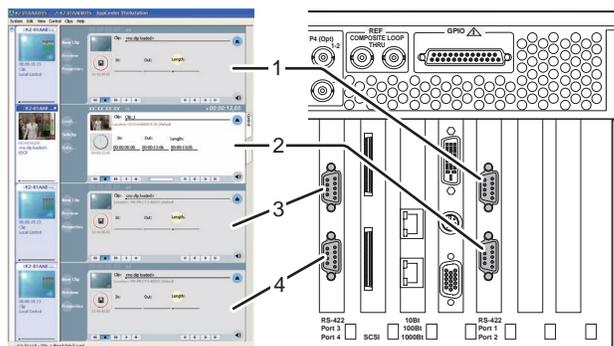
To verify correct connection and configuration of automation software, do the following:

1. Connect to only one RS-422 rear panel connector on the K2 Media Client.
2. Test the automation software and verify that it is correctly controlling the one channel associated with that RS-422 rear panel connector.
3. Connect to each RS-422 rear panel connector in turn, and test the automation software similarly for each connection. Verify correct operation of each connection and its associated one channel before making multiple connections.

The following sections provide the information you need to identify and verify the K2 Media Client channel associated with each RS-422 rear panel connector.

### RS-422 connectors and AppCenter channels

The order of channels as they appear in AppCenter, from top to bottom, is the order in which channels map to RS-422 connectors Port 1, Port 2, Port 3, and Port 4, as in the following illustration:

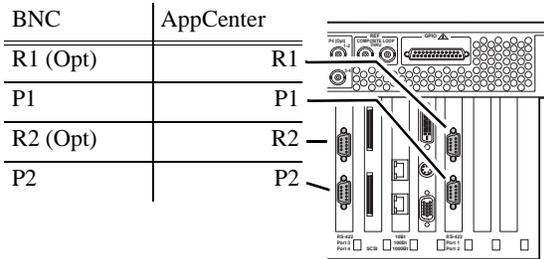


Depending on the K2 Media Client model, the ordering of channels in AppCenter varies. This is detailed in the next section [“RS-422 connectors and channels on K2 Media Client models”](#).

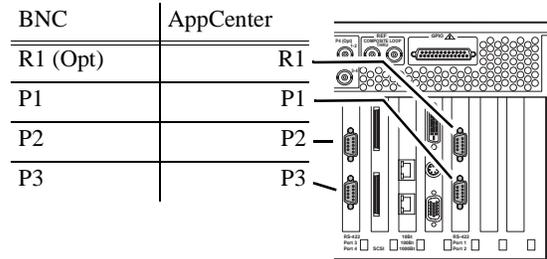
## RS-422 connectors and channels on K2 Media Client models

For each K2 Media Client model, RS-422 connectors map to rear panel BNC input/output connectors and to AppCenter channels as follows:

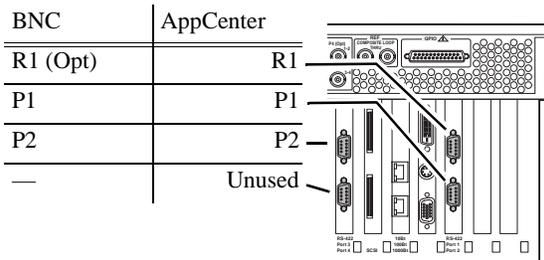
Model HD-22: Two record channels, two play channels



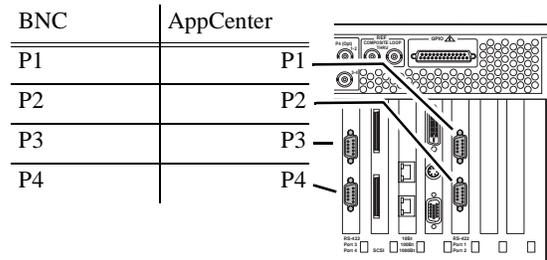
Model HD-13: One record channel, three play channels



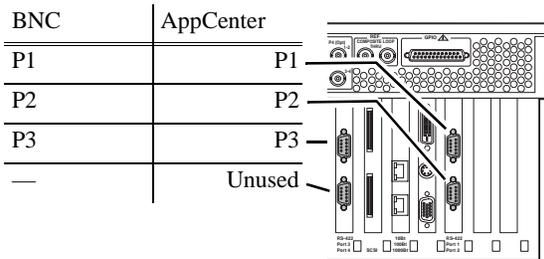
Model HD-12: One record channel, two play channels



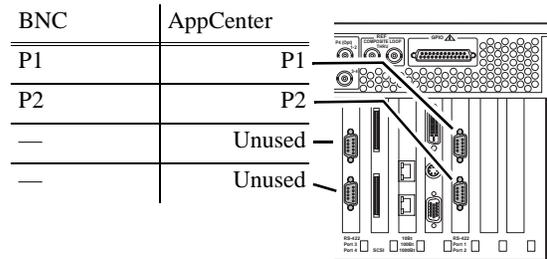
Model HD-04: No record channel, four play channels



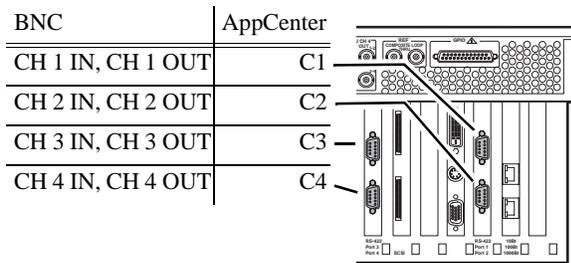
Model HD-03: No record channel, three play channels



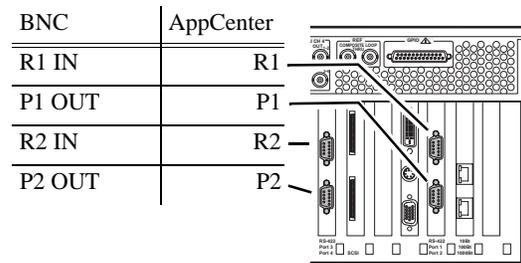
Model HD-02: No record channel, two play channels



Model SD-04: Four recorder/player (R/P) channels

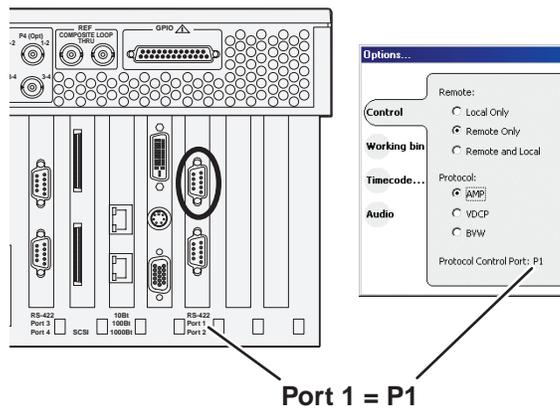


Model SDA-22: Two record channels, two play channels



## RS-422 and Protocol Controller Ports

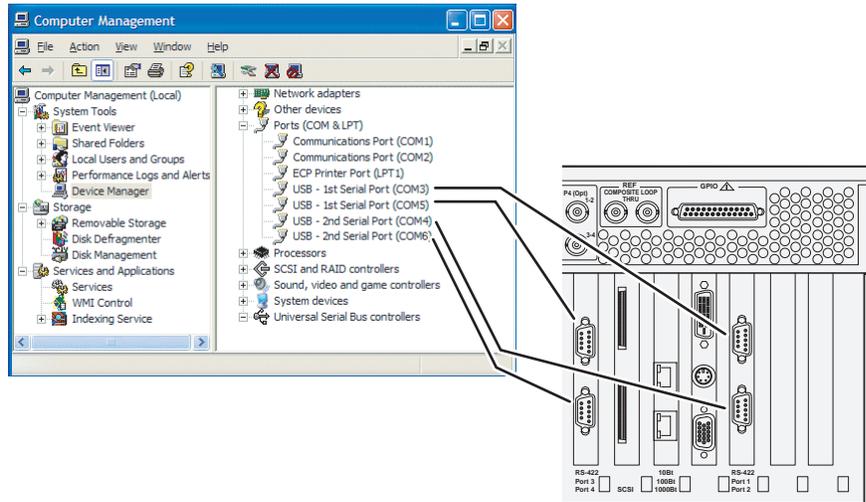
When you view a channel's Options dialog box, the Protocol Control Port is reported as P1, P2, P3, or P4. A Protocol Control Port maps to a RS-422 rear panel connector as in the following illustration:



For the Protocol Control Port reported in the Options dialog, the labels P1, P2, P3, and P4 refer to RS-422 rear panel connectors (ports) 1, 2, 3, and 4.

## RS-422 and COM ports

When you view the Windows Device Manager, the COM ports map to the RS-422 rear panel connectors as in the following illustration:



If your automation software is not controlling channels as you expect, check the COM ports and verify that the configuration is correct.

## Security and protocol control

The K2 security features can be configured to restrict protocol control of channels. Refer to [“Protocol control of channels and media access security”](#).



# Appendix **B**

---

## **Specifications**

Specifications in this chapter:

- “AC power specification”
- “Environmental specifications”
- “Mechanical specifications”
- “Electrical specifications”
- “Operational specifications”
- “Control Point PC system requirements”

## AC power specification

The K2 Media Client AC power specification is shown in the following table.

Characteristic	Specification
Power supply	Dual, redundant
Mains Input Voltage	100V to 240V auto-range, 50-60Hz
Power consumption	300W typical, 500W maximum



**WARNING:** Always use a grounded outlet to supply power to the system. Always use a power cable with a grounded plug, such as the one supplied with the system.

## Environmental specifications

Characteristic	Specification
Ambient Temperature Non-Operating	-40° to +60° C
Ambient Temperature Operating	10° to +40° C
Relative Humidity	Operating 20% to 80% from -5 to +45 C Non-Operating 10% to 80% from -30 to +60 C Do not operate with visible moisture on the circuit boards
Operating Altitude	To 10,000 feet IEC 950 compliant to 2000 meters
Storage Altitude	To 40,000 feet
Non-Operating Mechanical Shock	Class 5 (30G) Thomson Grass Valley 001131500
Random Vibration	Operational: Class 6 Thomson Grass Valley 001131500 Non-Operational: Class 5 Thomson Grass Valley 001131500
Transportation	Thomson Grass Valley 001131500
Equipment Type	Information Technology
Equipment Class	Class 1
Installation Category	Category II Local level mains, appliances, portable equipment, etc.
Pollution Degree	Level 2 operating environment, indoor use only.

## Mechanical specifications

Dimension	Measurement
Height	7 in (177 mm)
Width	17.75 in (450 mm)
Depth <sup>a</sup>	25.75 in (654 mm)
Weight:	69.5 lbs (31.5 kg) maximum

<sup>a</sup> Adjustable rack-mounting ears accommodate different rack depth limitations.

## Electrical specifications

The following sections describe the electrical specifications:

### Serial Digital Video (SDI)

Parameter	Specification
Video Standard	525 Line or 625 Line component
Number of Inputs	1 per record channel
Number of Outputs	1 per play channel on SD-00 and HD-00 models. 2 per play channel on SDA-00 model.
Data format	Conforms to SMPTE 259M (SD) and 292M (HD)
Number of bits	10bits
Embedded Audio Input	SD data format conforms to SMPTE 259M (48kHz, 20bits) HD data format conforms to SMPTE 299. 48 kHz (locked to video) and 16- or 24- bit PCM Compatible with AC-3 and Dolby-E
Embedded Audio Output	Output data format is 48 kHz 24-bit User can disable embedded audio on SDI output
Connector	BNC, 75 ohm, No loop-through
Max Cable Length	225 meters (738 ft) (Belden 8281 type cable)
Return Loss	≥15db, 5Mhz to 270Mhz

## Composite Analog Video - SDA-00 models

Parameter	Specification
Composite Video Standard <sup>a</sup>	NTSC, 525 line (59.94Hz) Conforms to SMPTE170M, or PAL, 625 line (50Hz) Conforms CCIR Report 624
Number of Inputs	1 per record channel
Number of Outputs	1 per play channel
Connectors	BNC, 75 ohm

<sup>a</sup> Can record signals from most non-timebase corrected signal sources such as color under video playback devices, e.g. VHS or U-Matic VTRs, and low cost cameras. However, for reliable recording performance some devices may require external signal conditioning products, e.g. timebase correction.

## Genlock Reference

Characteristic	Description
Signal Type	NTSC/PAL Color Black Composite Analog
Connectors	2 BNC, 75 ohm passive loop through
Burst Frequency Lock Range	PAL, $\pm 10$ Hz at subcarrier NTSC, $\pm 20$ Hz at subcarrier
Signal Amplitude Lock Range	Stays locked to +6 dB and -3 dB
Input Return Loss	$\geq 40$ dB to 5 MHz
Tri-level sync	Not supported

## System Timing

Characteristic	Description <sup>a</sup>
Encoder timing	Derived from the video input
Nominal Playback Output Delay	Adjustable (Default: Zero timed to reference genlock)
SD Output Delay Range (Independent for each play channel)	525 lines Frames: 0 to +1 Lines: 0 to +524 Samples: 0 to +1715 clock samples
	625 lines Frames: 0 to +3 Lines: 0 to +624 Samples: 0 to +1727 clock samples
HD Output Delay Range (Independent for each play channel)	1080i at 29.97 FPS (SMPTE 274M-5) Frames: 0 to +1 Lines: 0 to +1124 Pixels: 0 to +2199
	720p at 59.94 FPS (SMPTE 296M-2) Frames: 0 to +1 Lines: 0 to +749 Pixels: 0 to +1649
	1080i at 25 FPS (SMPTE 274M-6) Frames: 0 to +1 Lines: 0 to +1124 Pixels: 0 to +2639
	720p at 50 FPS (SMPTE 296M-3) Frames: 0 to +1 Lines: 0 to +749 Pixels: 0 to +1979
Loop through <sup>b</sup>	On SD-00 models, the video, AES, and LTC inputs pass to the their output connectors as loop through.
Loop back <sup>b</sup>	On HD-00 models, record channels loop back to play channels
E to E video <sup>b</sup>	Supported on SDA-00 only

<sup>a</sup> All delay values shown are relative to Black Reference.

<sup>b</sup> Also refer to [“Loop through and E to E” on page 36](#).

## AES/EBU Digital Audio

Parameter	Specification
Standard	AES3
Audio Inputs	4 Channels per video input; 2 dedicated BNC connectors per video input; two channels per BNC connector. Embedded audio from video input. <sup>a</sup> Supports 48kHz, 16 bit, 20 bit, or 24 bit digital audio sources.
Audio Outputs	4 Channels per video output; 2 dedicated BNC connectors per video output; two channels per BNC connector. Embedded audio on video output. Audio mapping is direct and fixed. AES outputs are active at all times; embedded audio insertion on outputs can be disabled. Audio is output using a 48kHz clock derived from the video reference. Supports 16- or 24-bit media. On playout, audio is synchronized with video as it was recorded. Compatible with AC-3 and Dolby-E
Input Impedance	75 ohms, unbalanced
Audio time shift	Configurable relative to video for both record and playout.

<sup>a</sup> On the SDA-00 K2 Media Client, SDI embedded audio is supported on either the first two channels of a group or all four channels from a single group.

## Analog Audio - SDA-00 model

Parameter	Specification
Audio Standard	Balanced differential analog
Audio Inputs	2 per record channel, Female XLR
Audio Outputs	2 per play channel, Male XLR
Impedance	Input: 15k ohms, balanced Output: 50 ohms per side, balanced
Sampling and encoding	48 KHz and 16-bit pcm

## Audio Monitor - SDA-00 model

Parameter	Specification
Audio Standard	Balanced differential analog; Stereo pair on two Male XLRs
Signal Source	Switched to monitor the audio of the selected channel
Output Impedance	50 ohms per side, balanced

## LTC Input/Output

Parameter	Specification
Standard	SMPTE 12M Longitudinal Time Code, AC coupled, differential input
Number of Inputs	1 per video input - Female XLR
Number of Outputs	1 per video output - Male XLR
Input Impedance	1K ohm
Output Impedance	50 ohm
Minimum Input Voltage	0.1 V peak-to-peak, differential
Maximum Input Voltage	2.5 V peak-to-peak, differential
Nominal Output Voltage	2.0 V peak-to-peak differential.
LTC Reader	LTC reader will accept LTC at rates between 1/30 and 80 times the nominal rate in either forward or reverse directions.
LTC Transmitter	LTC transmitter outputs LTC at the nominal frame rate for the selected standard at 1x speed, forward direction only.

## VITC Input/Output

Parameter	Specification
VITC	lines 10-20 NTSC (525 Line); lines 10-22 PAL (625 Line) VITC is decoded on each SDI input and inserted on each SDI output. VITC Reader configurable for a search window (specified by two lines) or set to manual mode (based on two specified lines). VITC Writer inserts VITC data on two selectable lines per field in the vertical interval. The two lines have the same data. VITC is not decoded off of the video reference input.

## RS-422 specification

The RS-422 interface conforms to ANSI/SMPTE 207M-1997 standard (SMPTE 422).

## GPI I/O specifications

Characteristic	Description
Number of Inputs/Outputs	12 inputs and 12 outputs.
Connector type	25pin D
GPI Input	TTL 0-0.8 V Low; 2.4-5 V High; 1 mA external current sink
GPI Output	Max Sink Current: 100 ma; Max Voltage: 30 V Outputs are open drain drivers. Max. voltage when outputs are open = 45V Max. current when outputs are closed = 250ma Typical risetimes approximately 625ns Typical falltimes approximately 400ns

## Operational specifications

Topics include:

- “Video codec description – SDA-00 and SD-00 models” on page 155
- “Video codec description – HD-00 models” on page 156
- “Playout of multiple formats” on page 157
- “VBI/Ancillary data specifications” on page 160
- “Internationalization” on page 164
- “Video network performance” on page 164
- “Supported file input/output formats” on page 165
- “Media file system performance” on page 166
- “Protocols supported” on page 166
- “Transfer compatibility considerations” on page 167
- “Control Point PC system requirements” on page 168

## Video codec description – SDA-00 and SD-00 models

Format	Sampling	Frame Rate	Data Rate	Other
DVCPRO25 (720X480/576)	4:1:1	29.97, 25	3.6 MBps	—
DVCPRO50 <sup>a</sup> (720X487.5/585)	4:2:2	29.97, 25	7.2 MBps	—
DVCAM (720X480/576)	4:1:1/ 4:2:0	29.97, 25	3.6 MBps	—
MPEG-2 (720X480/576)	4:2:0	29.97, 25	2-15 Mbps	I-frame and long GoP <sup>b</sup>
MPEG-2 (720X480/576)	4:2:2	29.97, 25	4-50 <sup>a</sup> Mbps	I-frame and long GoP <sup>b</sup>
MPEG-2 (720X512/608)	4:2:2	29.97, 25	4-50 <sup>a</sup> Mbps	I-frame and long GoP <sup>b</sup>
D10/IMX <sup>a</sup> (720X512/608)	4:2:2	29.97, 25	30, 40, 50 Mbps	I-frame only

<sup>a</sup> A licensable option is available that adds D10 and DV50 compression and increases the available MPEG-2 compression data rate up to 50Mbps, 4:2:2.

<sup>b</sup> If an open long GoP clip is imported, it is fully supported, including trimming the clip, playout of the clip, using the clip in playlists, and exporting the clip.

## Video codec description – HD-00 models

Format	Sampling	Frame Rate	Data Rate	GoP <sup>a</sup>
SD formats				
MPEG-2 (720X480/576)	4:2:0	29.97, 25	2-15 Mbps	I-frame and long GoP
MPEG-2 (720X480/576)	4:2:2	29.97, 25	4-50 Mbps	I-frame and long GoP
MPEG-2 (720X512/608) <sup>b</sup>	4:2:2	29.97, 25	4-50 Mbps	I-frame and long GoP
HD formats <sup>c</sup>				
MPEG-2 (1920x1080)	4:2:0	29.97, 25	20-80 Mbps	I-frame and long GoP <sup>d</sup>
MPEG-2 (1440x1080) <sup>e, f</sup>	4:2:0	29.97, 25	18-50 Mbps	I-frame and long GoP
MPEG-2 (1920x1080)	4:2:2	29.97, 25	20-100 Mbps	I-frame and long GoP
MPEG-2 (1280x720)	4:2:0	59.94, 50	12-80 Mbps	I-frame and long GoP
MPEG-2 (1280x720) <sup>f</sup>	4:2:2	59.94, 50	20-100 Mbps	I-frame and long GoP

<sup>a</sup> If an open long GoP clip is imported, it is fully supported, including trimming the clip, playout of the clip, using the clip in playlists, and exporting the clip.

<sup>b</sup> Supports D10/IMX 30/40/50 playout

<sup>c</sup> Low bitrate I-frame encoding is not recommended

<sup>d</sup> Decode of lower bit rate is possible

<sup>e</sup> Recording 1440 supported only as XDCAM-HD (25, 35, or 50 Mbps; Long GoP)

<sup>f</sup> Includes playout of HDV. There is no IEEE-1394 connection on a K2 system, so HDV is available only via transfer to the K2 system.

## Playout of multiple formats

The K2 Media Client automatically handles material of various types and formats as specified in the following sections:

### Playout on SDA-00 and SD-00 models

On SD-00 models, for a given frame rate, you can play clips of any format back-to-back on the same timeline. Refer to table “[Video codec description – SDA-00 and SD-00 models](#)” earlier in this section for a list of the supported formats.

On SD-00 models, both 16:9 and 4:3 SD aspect ratio formats can be played on the same timeline. However, there is no aspect ratio conversion mode applied, as there is on the HD-00 model.

SDA-00, SD-00, and HD-00 models support mixed clips with uncompressed and compressed (Dolby-E) audio on the same timeline. (requires external Dolby-E decoder).

Also refer to “[VBI/Ancillary data specifications](#)” on page 160.

### Playout on HD-00 models

On HD-00 models, for similar frame rates (25/50 fps or 29.97/59.95 fps), MPEG SD material transferred or recorded into the K2 Media Client along with its audio is up-converted when played on a HD output channel. Likewise, HD material is down-converted along with its audio when played on SD output channel. HD and SD clips can be played back-to-back on the same timeline, and aspect ratio conversion is user configurable. Refer to “[Aspect ratio conversions on HD-00 models](#)” on page 159. Refer to the following tables for specifications on SD and HD conversions.

Also refer to “[VBI/Ancillary data specifications](#)” on page 160.

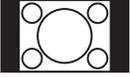
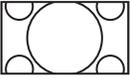
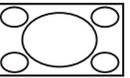
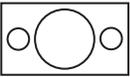
### 25/50 fps conversions on HD-00 models

		Converted SD format	Converted HD formats		
		625 at 25 fps	1080i at 25 fps	720p at 50 fps	
Source	SD format	625 at 25 fps	No conversion	Up-convert SD to HD	Up-convert SD to HD
	HD formats	1080i at 25 fps	Down-convert HD to SD	No conversion	Cross-convert from 1080i to 720p
720p at 50 fps		Down-convert HD to SD	Convert HD to HD	No conversion	

**29.97/59.95 fps conversions on HD-00 models**

		Converted SD format	Converted HD formats	
		525 at 29.97 fps	1080i at 29.97 fps	720p at 59.94 fps
Source SD format	525 at 29.97 fps	No conversion	Up-convert SD to HD	Up-convert SD to HD
	1080i at 29.97 fps	Down-convert HD to SD	No conversion	Convert HD to HD
Source HD formats	720p at 59.94 fps	Down-convert HD to SD	Convert HD to HD	No conversion

**Aspect ratio conversions on HD-00 models**

Source aspect ratio	Source image	Conversion option	Conversion description	Converted aspect ratio	Converted image
4:3		Bar	The 4:3 aspect ratio is maintained, centered on the screen, with black bars filling the left and right portions of the 16:9 display.	16:9	
		Half Bar	The picture aspect ratio is maintained, but the image is slightly enlarged. The top and bottom of the image are slightly cropped, and thin black bars fill the left and right portions of the 16:9 display.	16:9	
		Crop	The picture aspect ratio is maintained, but the image is enlarged so that it horizontally fills the HD display. The top and bottom of the 4:3 SD image are cropped to fit in the 16:9 display.	16:9	
		Stretch	The picture aspect ratio is distorted. The image fills the screen vertically without cropping, and is stretched horizontally to fill the 16:9 display. This conversion up-converts Full Height Anamorphic (FHA) 16:9 SD material.	16:9	
16:9		Bar	The 16:9 aspect ratio is maintained, centered on the screen, with black bars filling the top and bottom portions of the 4:3 display.	4:3	
		Half Bar	The picture aspect ratio is maintained, but the image is slightly enlarged. The left and right sides the image are slightly cropped, and thin black bars fill the top and bottom portions of the 4:3 display.	4:3	
		Crop	The picture aspect ratio is maintained, but the image is enlarged so that it vertically fills the SD display. The left and right sides of the 16:9 HD image are cropped to fit in the 4:3 SD display	4:3	
		Stretch	The picture aspect ratio is distorted. The image fills the screen horizontally without cropping, and is stretched vertically to fill the 4:3 display. This conversion generates Full Height Anamorphic (FHA) 16:9 SD material.	4:3	

## VBI/Ancillary data specifications

The K2 Media Client supports SD Vertical Blanking Interval (VBI) data and HD Ancillary (Anc) data as specified in the following sections:

### VBI data support on SDA-00 and SD-00 models

Video format	Compressed VBI	Uncompressed VBI <sup>a</sup>	Closed Captioning	Comments
DVCPRO25 525 line (NTSC)	Not supported	Not supported by DVCPRO25 format	Supported, as native to DVCPRO25. VCHIP data supported.	—
DVCPRO25 625 line (PAL)	Not supported	Not supported by DVCPRO25 format	Not supported. Teletext not supported	—
DVCPRO50 525 line (NTSC)	Supported	Not supported by DVCPRO50 format	Supported, as native to DVCPRO50 (compressed VBI). VCHIP data supported.	DVCPRO50 is a licensable option.
DVCPRO50 625 line (PAL)	Supported	Not supported by DVCPRO50 format	Closed Captioning not supported. Teletext supported, as native to DVCPRO50 (compressed VBI).	—
DVCAM 525 line (NTSC)	Not supported	Not supported by DVCAM format	Supported, as native to DVCAM.	—
DVCAM 625 line (PAL)	Not supported	Not supported by DVCAM format	Closed captioning and teletext supported, as native to DVCAM.	—
MPEG-2 525 line (NTSC)	Supported as 16 lines per field. Range: 7–22	Supported. Six lines per field. User selectable. Range: 10–22  Selected lines are saved in MPEG user data space and restored on playout.	Supported and always on. Not selectable.	—
MPEG-2 625 line (PAL)	Supported as 16 selectable lines per field. Range: 7–22	Supported. Six lines per field. User selectable. Range: 6–22 Selected lines are saved in MPEG user data space and restored on playout.	Teletext not supported <sup>b</sup>	—
MPEG-D10 525 line (NTSC)	Supported	Not supported by D10 format.	Supported, as native to D10.	—
MPEG-D10 625 line (PAL)	Supported	Not supported by D10 format.	Closed captioning and teletext supported, as native to D10.	—

<sup>a</sup> SDA-00 does not support recording uncompressed VBI.

<sup>b</sup> For 625/PAL, CC user data is disabled, so the only way to get Teletext is by either using Uncompressed VBI Line 21 (if an MPEG format), or Compressed VBI for the 625/PAL formats.

Only Luma VBI/Closed-captioning data is saved/encoded. Chroma VBI/  
Closed-captioning data is ignored on playback.

Ancillary data is not supported on SDA-00 or SD-00 models, except as data bridging when material is transferred to or from a HD-00 model. Refer to [“Data bridging of native material on HD-00 models”](#) on page 162.

### VBI data support for SD channels configured on HD-00 models

Video format	Compressed VBI	Uncompressed VBI	Closed Captioning	Comments
SD MPEG-2 525 line (NTSC)	Supported for record. Not supported for playback.	Supported as six selectable lines per field. Range: 10–22 Selected lines are saved in MPEG user data space and restored on playout.	Supported and always on. Not selectable.	—
SD MPEG-2 625 line (PAL)	Supported for record. Not supported for playback.	Supported as six selectable lines per field. Range: 6–22 Selected lines are saved in MPEG user data space and restored on playout.	Teletext not supported <sup>a</sup>	—

<sup>a</sup> To pass through PAL MPEG-2 Teletext to playout, record it on VBI line 21, compressed or uncompressed.

Only Luma VBI/Closed-captioning data is saved/encoded. Chroma VBI data is ignored on playback.

### Ancillary data support on HD-00 models

Video format	Data	Supported as follows:
HD MPEG-2	Vertical interval ancillary data packets	Extracted at input and stored on an ancillary data track. Upon playout, the data packets are inserted into the video stream on specified lines. Maximum 8 packets per field.

Luma ancillary data packets are stored. Chroma ancillary data packets are not supported. Both VANC and HANC packets are stored if they are luma packets.

**Data bridging of native material on HD-00 models**

With MPEG-2 material, data is bridged as follows:

Source format	Source data	Conversion →	Converted format	Converted data
SD 525 line	Closed-captioning (CC) on line 21 (EIA-608) can be stored as UserData CC packets <sup>a</sup> or UserData VBI Line21 (Uncompressed VBI Line21)	Up-convert	HD	Ancillary Closed Caption EIA-708-B packets
SD 625 line	Teletext on line 21	No up conversion to HD		
SD 625 line 525 line	Ancillary data	No up conversion to HD		
HD	EIA-708 & 608 Ancillary data packets	Down-convert	SD	Closed-captioning on line 21 (EIA-608 standard).
HD	Teletext	No down conversion to SD		
HD 1080i	Ancillary data	Cross-convert	HD 720p	Moved to valid lines
HD 720p	Ancillary data	Cross-convert	HD 1080i	Moved to valid lines. Any data on lines 21-25 is moved to line 20 on 1080i output.

<sup>a</sup> UserData CC packets always on. If CC exists, it is recorded and played back.

**HD-00 models data compatibility with PVS models**

When material is transferred between a PVS Profile XP Media Platform and a K2 Media Client, SD VBI data and HD Ancillary data is supported as follows:

Source device	Source format	Source data	Destination device	Data support: SD Playout	Data support: HD Playout
PVS	SD MPEG-2	Any supported on PVS	SDA-00 or SD-00 K2 Media Client	All supported	NA
		Uncompressed VBI	HD-00 K2 Media Client	Yes	Yes, with data bridging for CC only. Other VBI lines are discarded.
		Closed captioning	HD-00 K2 Media Client	Yes	Yes. Ancillary data packets
		Compressed VBI	HD-00 K2 Media Client	No	No
		Ancillary data	HD-00 K2 Media Client	No	No
	HD MPEG-2	Ancillary data	HD-00 K2 Media Client	Yes	Yes
SDA-00 or SD-00 K2 Media Client	SD MPEG-2	Any supported on K2 Media Client	PVS	All supported	NA
HD-00 K2 Media Client	SD MPEG-2	Compressed VBI	PVS	Yes	No
		Uncompressed VBI	PVS	Yes	No
		Closed captioning	PVS	No	No
	HD MPEG-2	Ancillary data	PVS	Yes, with data bridging for ancillary CC packets only.	Yes.

## Internationalization

When you enable internationalization on a K2 Media Client, you can name your media assets in a local language. The K2 Media Client supports the local language name as specified in the following table:

System	Internationalization support
Media database	<ul style="list-style-type: none"> <li>All external views of movie assets can be represented as wide-file names</li> <li>AppCenter runs in Unicode</li> <li>Only movie assets and searchable User Data keys are Unicode.</li> </ul>
Media file system	<ul style="list-style-type: none"> <li>Support for Kanji and wide-character file and folder names.</li> <li>File-folder representation of movie are internationalized, as well as the QuickTime reference file it contains.</li> <li>Key names (V:\PDR) remain unchanged, but are Unicode.</li> <li>Elementary streams remain as GUIDs, but are Unicode.</li> </ul>
K2 Media Client applications	<ul style="list-style-type: none"> <li>Movie assets are described in Unicode.</li> <li>Application user interfaces are Unicode compliant.</li> </ul>
Protocols	Refer to <a href="#">Appendix A, Remote control protocols</a> .
FTP transfers	Refer to <a href="#">“FTP internationalization” on page 72</a> .

## Video network performance

The K2 Media Client supports streaming transfers to and from K2 Media Clients, M-Series iVDRs, Profile XP Media Platforms, or any device that supports General Exchange Format (GXF) as described in SMPTE 360M.

Parameter	Specification	Comments
Transfer bandwidth per internal storage K2 Media Client	Up to 50 MBytes per second	—
Transfer bandwidth per Level 2 K2 Storage	50 MBytes per second	—
Transfer bandwidth per Level 3 K2 Storage	80 MBytes per second	Additional K2 Media Servers dedicated as FTP servers add 80 MBytes per second each
Maximum concurrent transfers per transfer engine	4 to 10, configurable	Additional transfers are queued.
Minimum delay from start of record to start of transfer	20 seconds	This applies to both 60Hz timing and 50Hz timing.
Minimum delay between start of transfer into destination and start of play on destination	20 seconds.	—

## Supported file input/output formats

The K2 Media Client can send and receive files of various formats using import, export, and transfer mechanisms. Formats supported are as follows:

Streaming file format	Video elementary format	Audio elementary format	File based <sup>a</sup>		FTP stream		Other information
			Import	Export	Import	Export	
GXF	DV25/50 DVCAM MPEG-2	48 kHz, 16 bit, or 24 bit PCM, Dolby-E, or AC-3	Yes	Yes	Yes	Yes	Streaming between online K2 Systems supports complex movies and agile playlists of mixed format. See <a href="#">“Transfer compatibility considerations” on page 167.</a>
MXF	DV25/50 DVCAM D10 <sup>b</sup> MPEG-2	48 kHz, 16 bit, or 24 bit PCM, Dolby-E, or AC-3)	Yes	Yes	Yes	Yes	MXF OP 1A. Standard Definition and High Definition supported. Supports XDCAM-HD transfer. See <a href="#">“MXF export behavior” on page 166.</a>
AVI	DV25 DV50 DVCAM	48 kHz, 16 bit, or 24 bit PCM	Yes	Yes	No	No	Type-2 (non-interleaved) DV video only. Audio tracks handled as stereo pairs
QuickTime	DV25 DV50 DVCAM	48 kHz, 16 bit, or 24 bit PCM	Yes	Yes	No	No	Audio tracks handled as stereo pairs
MPEG	MPEG-2	48kHz MPEG-1 (layer 1 & 2) SMPTE 320M AES3 LPCM AC-3 DVD/VOB LPCM DVD/VOB AC-3	Yes	No	Yes	No	Supports import of MPEG-2 program and transport streams. If the transport stream contains multiple programs, the first detected program in the transport stream is imported as a K2 clip.
WAV audio	NA	48 kHz 16 bit stereo PCM	Yes	No	No	No	Audio tracks handled as stereo pairs

<sup>a</sup> Based on a file that is visible from the operating system. For example, AppCenter import/export features are file based.

<sup>b</sup> A D10 MXF stream is handled as an eVTR style D10AES3 stream. Maximum 8 channels audio. Uncompressed audio only.

## MXF export behavior

The following sections specify how a K2 system handles file formats when they are exported as MXF.

### XDCAM (SD and HD): Behavior on MXF export from K2 systems

Upon MXF export the K2 system checks media for XDCAM specifications as listed in the table below. If specifications match, the media is exported as the appropriate XDCAM format.

Format Designation	Compression Type	Sampling Format	Sampling Resolution	Recorded Video Bit Rate	Audio Format	# Audio Tracks	Audio Sample Resolution
XDCAM	DV	4:1:1 (525/60i)	720x486	25 Mbps	Uncompressed	4	16
XDCAM	DVCAM	4:2:0 (625/50i)	720x576	25 Mbps	Uncompressed	4	16
XDCAM	D10 (MPEG-2 4:2:2 MP@ML)	4:2:2 (525/60i)	720x486	50/40/30 Mbps	Uncompressed	2/4/8	16-24
XDCAM-HD	MPEG-2 MP@HL	4:2:0	1440x1080	560 Mbps	Uncompressed	2/4	16

The K2 Media Client allows you to alter clips so that they no longer match the standard XDCAM specifications. For example, you can add audio tracks to exceed the “# of Audio Tracks” specification. If you alter a XDCAM clip in this way, on MXF export the K2 system exports the clip but it is not XDCAM compatible.

## Media file system performance

Parameter	Internal Storage Specification	External Storage Specification
Maximum number of clips <sup>a</sup>	20,000	50,000
Minimum delay between start record and start playout when record and play is on the same K2 Media Client	10 seconds	20 seconds
Minimum delay between start record and start playout when record and play is on different K2 Media Clients	NA	20 seconds
Maximum length continuous record	24 hours	24 hours

<sup>a</sup> The maximum number of clips is based on clips with 16 or less audio tracks. Large quantities of clips with more than 16 audio tracks proportionally reduce the maximum number of clips.

## Protocols supported

AMP, VCDP, and BVW protocols are supported. Refer to [Appendix A, Remote control protocols](#) for more information.

## Transfer compatibility considerations

When transferring material between K2 systems and other Grass Valley products, you must consider the specifications of the different products. The following table illustrates some of these considerations:

Source device	Destination device	Material transferred	Compatibility
K2 system	Turbo iDDR	SD MPEG 4:2:0 long GoP clips up to 15 Mbps. HD MPEG 1920x1080 and 1280x720 4:2:0 long GoP clips up to 25 Mbps.	Playout supported.
		SD clips above 15 Mbps. HD clips above 25 Mbps. DV25, DV50, D10, XDCAM-HD, HDV formats.	Supported for storage only. Transfer is successful but playout not supported.  Avoid transfer of clips with ancillary data. These clips include data that cannot be played or deleted.
K2 system	Profile XP Media Platform	HD 4:2:0 80 Mb or less SD 4:2:2	Supported. Can be played out.
		720p/50 HD 4:2:2 XDCAM-HD HDV 1440x1080	Supported for storage only. Transfer is successful but playout not supported.
K2 system	M-Series iVDR	DV25, DV50, and MPEG I-frame	Playout supported
		1080i	Not supported.
Turbo iDDR	K2 system	All types of material supported, according to the SD and/or HD capability of the model. For example, ancillary data in SD not supported.	
Profile XP Media Platform	K2 system		
M-Series iVDR	K2 system		

Transfer of media with mixed format might not be supported between a K2 system and a non-K2 system, depending on system software versions. Refer to the release notes for the software version.

Also refer to [“Protocols supported” on page 166](#).

## Control Point PC system requirements

If you are building your own Control Point PC, the machine you chose must meet the following requirements. These requirements assume that the PC is dedicated to its function as the control point for the K2 Media Client and that no other applications run on the PC that could interfere with system performance.

Control Point PC system requirements are as follows:

Requirements	Comments
Operating System	Microsoft Windows XP Professional, Service Pack 2 (Must be a U.S. version)
RAM	Minimum 512 MB, 1 GB recommended
Graphics acceleration	Must have at least 128 MB memory
Processor	Pentium 4 or higher class, 2 GHz or greater
Hard disk space	400 MB
Microsoft .NET Framework	Version 1.1 and 2.0
Java JRE	1.3.1_12 and 1.4.2_05 or higher Required for the HP Ethernet Switch configuration interface, which is used for K2 Storage Systems (external storage).
XML	Microsoft XML 4 Service Pack 2 is required. You can install it from the <i>msxml4sp2</i> file on the K2 System Software CD.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

## ***Connector Pinouts***

This appendix contains the following topics:

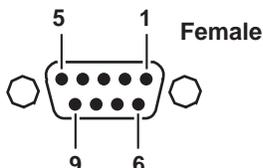
- [“K2 Media Client connector pinouts”](#)
- [“K2 Media Server connector pinouts”](#)

## K2 Media Client connector pinouts

The following sections describe K2 Media Client rear panel connector pinouts.

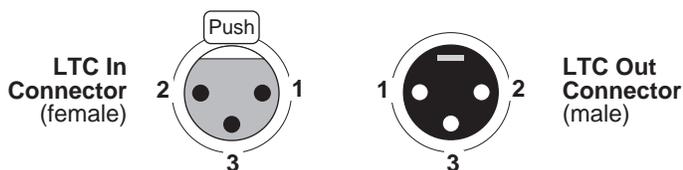
### RS-422 connector pinouts

The RS-422 interface conforms to ANSI/SMPTE 207M-1997 standard (SMPTE 422).



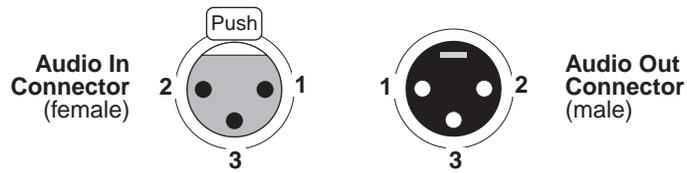
Pin #	Signal	Description
1	GND	Frame Ground
2	-TXD	Differential Transmit Data (low)
3	+RXD	Differential Receive Data (high)
4	GND	Transmit Signal Common
5	NC	Spare
6	GND	Receive Signal Common
7	+TXD	Differential Transmit Data (high)
8	-RXD	Differential Receive Data (low)
9	GND	Signal Ground

### LTC connectors pinouts



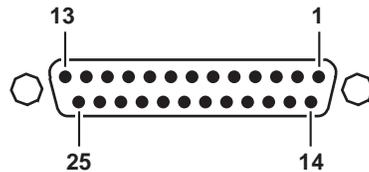
Pin #	LTC In	Pin #	LTC Out
1	Signal Ground	1	Signal Ground
2	(+)	2	(+)
3	(-)	3	(-)

## Analog audio connector pinouts - SDA-00 model



Pin #	Audio In	Pin #	Audio Out
1	Signal Ground	1	Signal Ground
2	(+)	2	(+)
3	(-)	3	(-)

## GPI I/O connector pinouts



Pin	Signal	Pin	Signal
1	Output 1	14	Input 1
2	Output 2	15	Input 2
3	Output 3	16	Input 3
4	Output 4	17	Input 4
5	Output 5	18	Input 5
6	Output 6	19	Input 6
7	Output 7	20	Input 7
8	Output 8	21	Input 8
9	Output 9	22	Input 9
10	Output 10	23	Input 10
11	Output 11	24	Input 11
12	Output 12	25	Input 12

---

*Appendix C Connector Pinouts*

<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
13	Ground		

## **K2 Media Server connector pinouts**

The following sections describe K2 Media Server rear panel connector pinouts.

### **Redundant server heartbeat cable**

Take care to use the proper serial cable to interconnect redundant K2 Media Servers that take the role of file system/database servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system (Grass Valley part number 174-8137-00) and has a pin configuration as follows:

- 1 – 4
- 2 – 3
- 3 – 2
- 4 – 1&6
- 5 – 5
- 6 – 4
- 7 – 8
- 8 – 7
- 9 – No Connect



## **Rack mounting**

This appendix contains the following topics:

- [“Rack mounting the K2 Media Client”](#)
- [“Rack mounting the Control Point PC drawer”](#)

### **Rack mounting the K2 Media Client**

This section contains the following topics:

- [“Rack-mount considerations”](#)
- [“Rack mount hardware shipped with the K2 client system”](#)
- [“Mounting the Rack Slides”](#)
- [“Installing the K2 client system on the rack mount rails”](#)
- [“Making Rack Slide Adjustments”](#)

#### **Rack-mount considerations**

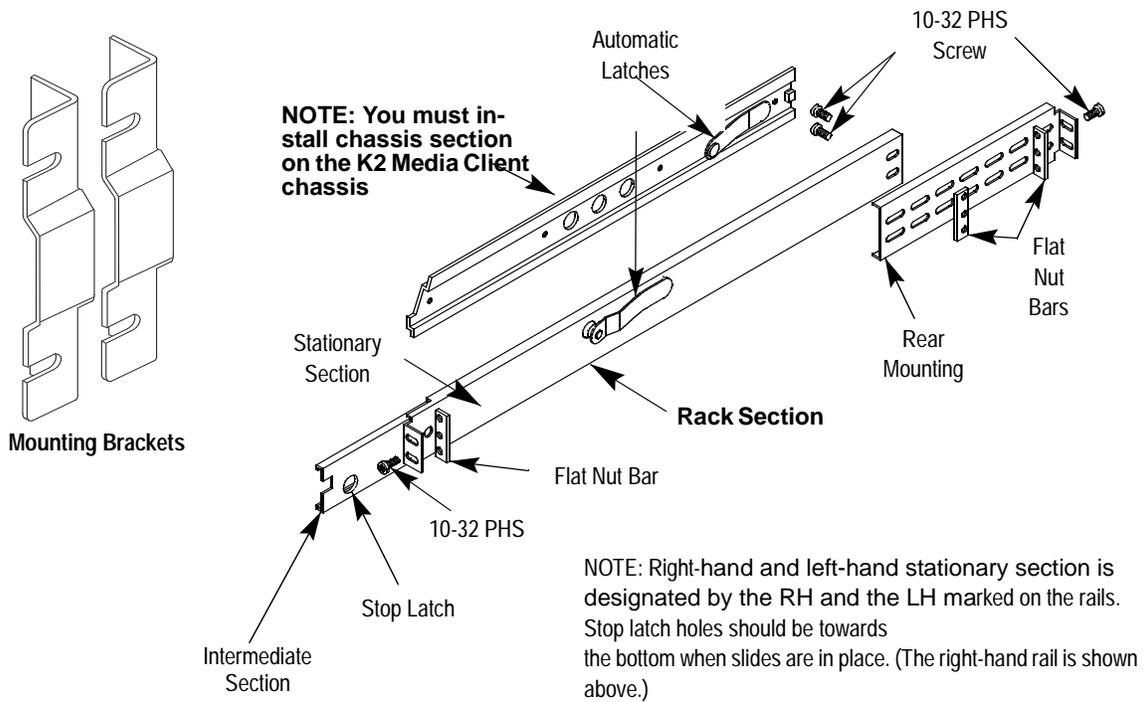
When planning the placement of equipment in your equipment rack, bear in mind the following:

- Insure adequate air flow around the chassis to provide sufficient cooling. Operating ambient temperature will affect the amount of air circulation required to keep the K2 client system within its temperature limitations. See [“Environmental specifications” on page 130](#) for details.
- If the system is installed with its ventilation intakes near another system's exhaust or in a closed or multi-unit rack assembly, the operating ambient temperature inside the chassis may be greater than the room's ambient temperature. Install the system in an environment compatible with this recommended maximum ambient temperature.
- Ensure the rack is anchored to the floor so that it cannot tip over when the K2 client system is extended out of the rack.
- Be sure to mount the K2 client system in a way that ensures even weight distribution in the rack. Uneven mechanical loading can result in a hazardous condition. Secure all mounting bolts when installing the chassis to the rack.

The following sections describe installing the K2 Media Client step-by-step.

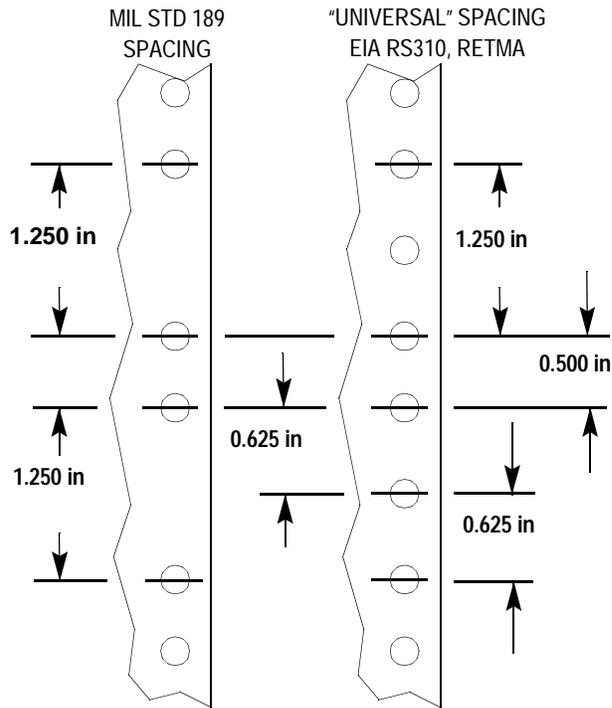
## Rack mount hardware shipped with the K2 client system

Your K2 client system rack-mount kit comes with rack mounting hardware as shown.

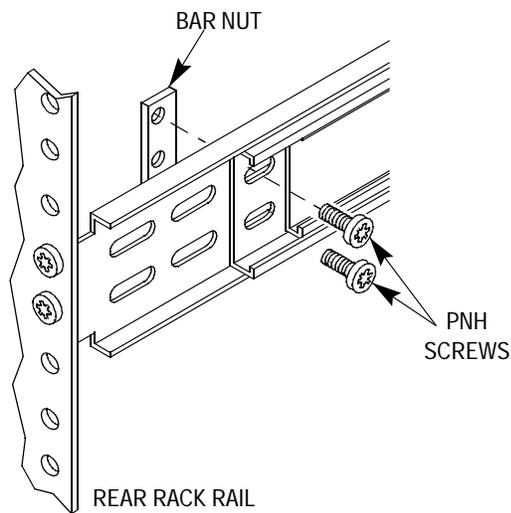
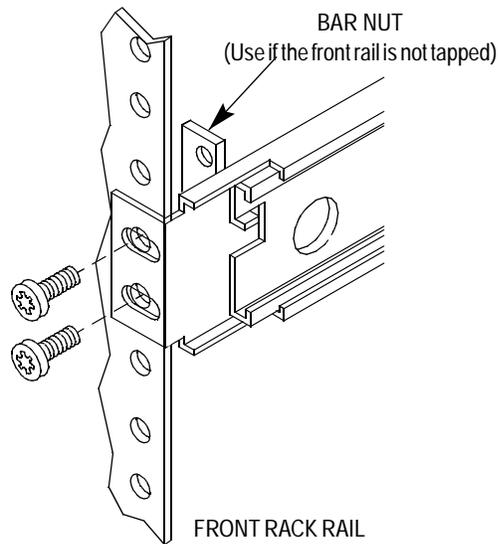


## Mounting the Rack Slides

Choose the proper set of rail mounting holes on the rack. Notice that the hole spacing can vary with the rack type. When mounting the slides in racks with EIA spacing, make sure that the slides are attached to the 0.5-inch spaced holes.



Front and rear rack rail mounting hardware is provided with the rack mount kit. Mount the rails using the enclosed hardware. Make sure the stationary sections are horizontally aligned and are level, as well as parallel to each other.



## Installing the K2 client system on the rack mount rails

To install the K2 client system on the rack mount rails:

1. Pull the slide-out track section to the fully extended position.



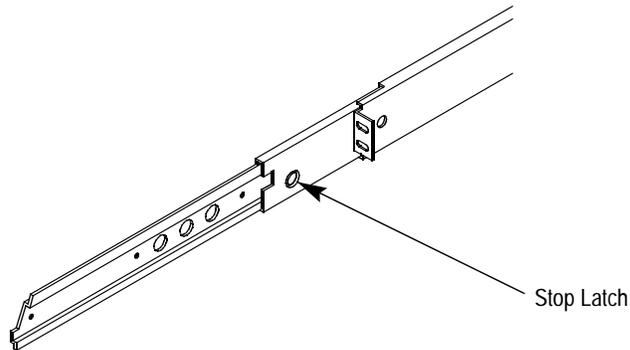
**WARNING:** To prevent injury, two people are required to lift the K2 client system. It is too heavy for one person to install in the rack.



**WARNING:** To prevent serious injury, insure that the rack is anchored to the floor so that it cannot tip over when the K2 client system is extended out of the rack.

2. Insert the ends of the chassis sections into the slide-out sections.

3. Push the chassis toward the rack until the chassis sections lock into the intermediate sections.
4. Press the stop latches in the intermediate sections and push the chassis toward the rack until the latches snap into their holes.



5. Again, press the stop latches and push the cabinet fully into the rack.
6. Insert and tighten the front panel retaining screws.

## **Making Rack Slide Adjustments**

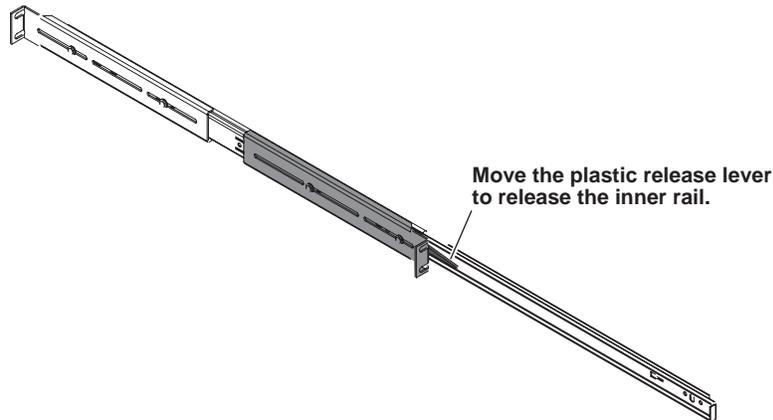
After installation, binding may occur if the slide tracks are not properly adjusted. To adjust the tracks:

1. Slide the chassis out approximately 10 inches.
2. Slightly loosen the mounting screws holding the tracks to the front of the rails and allow the tracks to seek an unbound position.
3. Tighten the mounting screws and check the tracks for smooth operation by sliding the chassis in and out of the rack several times.
4. Tighten the front panel retaining screws once the cabinet is in place within the rack to complete the installation.

## Rack mounting the Control Point PC drawer

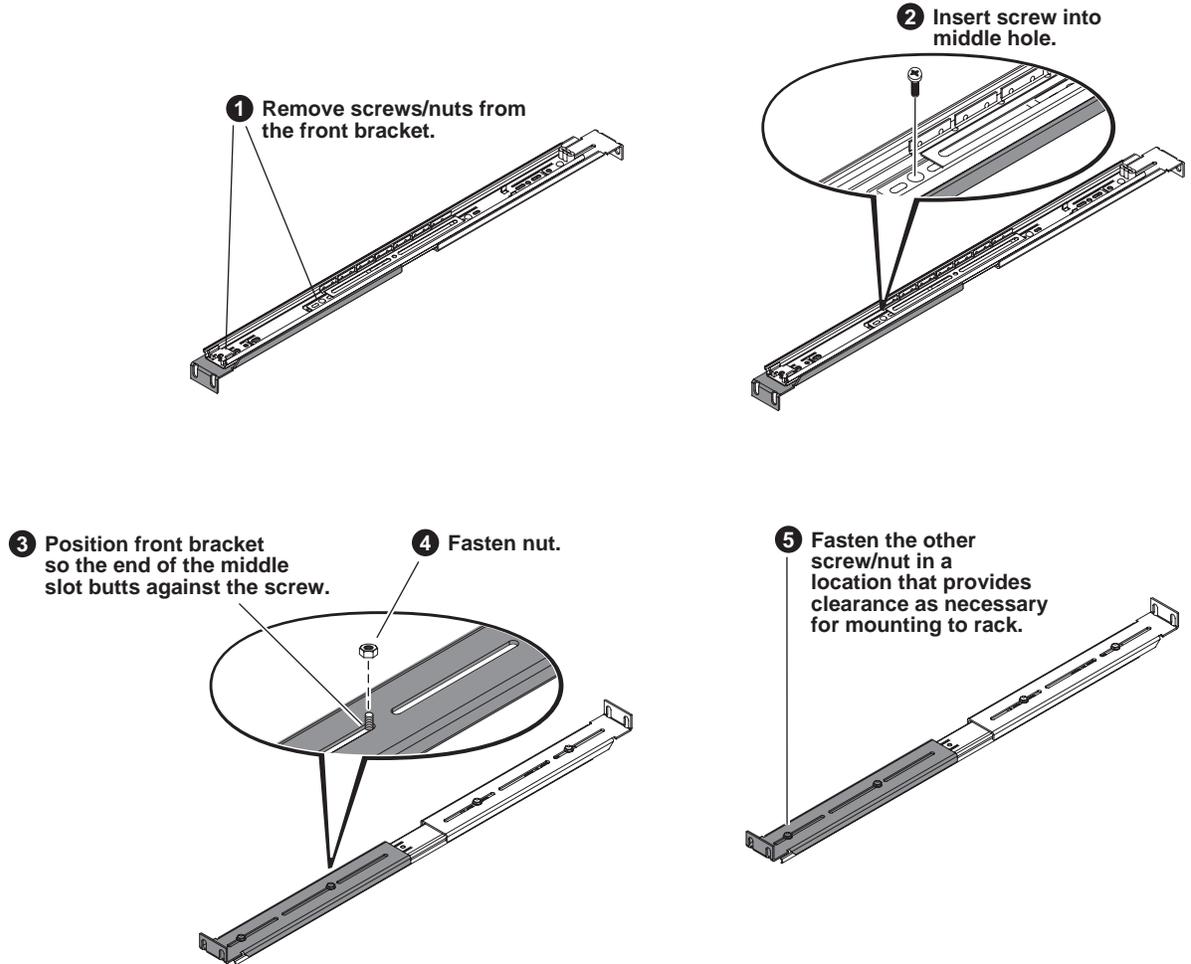
The pull out PC notebook drawer kit consists of two slide assemblies with front and rear brackets fitted and a drawer. The kit does not include rack screws or cage nuts.

1. On both slide assemblies, release the inner rail from the outer slide as follows:



The plastic release lever moves up on the left-hand rail and down on the right-hand rail. You might need a slotted screwdriver to move the plastic release lever.

2. Fasten the inner rails to the drawer with the screws provided. The screws are on the drawer.
3. Adjust both slide assemblies as illustrated. This is necessary to provide the proper inset for the flip-down drawer front. With this adjustment to the slide assemblies, it is not necessary to change the position of the rails fastened to the drawer.



4. Mount the outer slides to the rack with the front bracket with the cam lock stop on the right side (as you look at the rack from the front) with rack screws. **DO NOT** tighten the rack screws at this time.
5. Adjust the rear brackets to fit your rack. (**DO NOT** adjust the front brackets.)
6. Slide the PC notebook drawer into the frame between the outer slides.
7. Make adjustments as required to the brackets for smooth sliding action. Tighten the rack screws.



# Index

---

## Symbols

\_he0, using in a host table 55

## A

AC power, specification 148

adapter

    identifying 60

    network loopback 69

    reordering 69

    SCSI controller 79

administrator

    mapping NetCentral administrators with  
    K2 115

    password 106

AES/EBU audio

    specification 152

AMP

    channel designations 136

    protocol settings 136

    RS-422 connections 143

    transfers 136

analog audio connector pinouts 171

ancillary data specifications 160

AppCenter

    channel access security 111

    user access 106

application system

    architecture 34

    software 35

aspect ratio

    HD-00 159

    SD-00 157

ATX 34

audio

    analog audio specification 152

    digital audio specification 152

    Dolby-E 157

auto logon 118

AVI, supported formats 165

## B

backup, strategies 100

bandwidth 123

battery replacement 8

binding LUNs 88

bins, configuring security 106

board

    codec 34

    map 39

    real time processor 34

    SCSI interface 79

    XLR 34

BVW

    protocol settings 140

    RS-422 connections 143

## C

cable

    redundant server heartbeat 173

    requirements, Ethernet connections 49

certifications and compliances 9

channels

    security 111

    VBI data support for SD on HD-00 161

cleaning unreferenced files and movies 91

clips, maximum number 166

clocks, synchronizing system 101

closed captioning 160

codec board 34

commands, FTP 75

composite video, specification 150

configuration

    auto logon 118

    channel access security 111

    customizing 43

    file 46

    K2 Media Client security 103

    loading defaults 44

    media access security for K2 bins 106

    opening 43

    protocol security 110

    sample K2 Media Client hosts file 57

    saving and restoring 43

    Windows network settings 52

Configuration Manager, description 43

connections

    GPI 77

    RS-422 77, 142

connector pinouts

    analog audio 171

    GPI 171

- LTC connector 170
- RS-422 170, 173
- continuous record
  - maximum length 166
- Control Point PC
  - installing software 97
  - rack mounting drawer 180
  - screen resolution problem with NetCentral 168
  - software components 96
  - system requirements 168
  - where software is installed 95
- control team, creating 63
- controller
  - microcode, checking 84
  - obtaining logs 86
- corrupt movies 70
  
- D**
- data bridging, HD-00 162
- database, description 35
- delay, minimum 166
- disk
  - checking disk mode pages 86
  - disabling 86
  - downloading firmware PFR 700 92
  - identifying 85
  - rebuilding forcibly 86
- downconverting 157
- drive
  - disabling 86
  - numbering RAIDs 41
  - striping media 79
- DV, creating DV-format clips 41
  
- E**
- E to E
  - protocols 136
  - SDA models 36
- electric shock, avoiding 7
- electrical specification 149
- emission limits, certifications 9
- environmental specification 148
- Ethernet
  - cable requirements 49
  - cabling, K2 Media Client 50
  - teaming ports, internal storage 60
- exporting, supported formats 165

- external storage
  - adding a K2 Media Client to a K2 Storage System 124
  - installing Multi-Path I/O software on a K2 Media Client 125
  - K2 Media Client 121
  - load balancing 122
  - specification, media file system 166

**F**

- features
  - external storage 22
  - HD-00 21
  - internal storage 22
  - K2 Media Client 20
  - SD-00 21
  - SDA-00 20
- file system, description 35
- files, cleaning unreferenced 91
- fire hazard, avoiding 7
- firewall policies 117
- formats, supported 165
- fps conversions on HD-00 models 157
- front panel
  - enabling and disabling USB ports 117
  - indicators 29
- FTP
  - access and configuration 71
  - accessing with Internet Explorer 73
  - automated access 72
  - clips with gaps 70
  - creating a team 65
  - internationalization 72
  - K2 FTP server 70
  - specifying language 73
  - streaming from a K2 Storage System 56
  - streaming ports 55
  - streaming transfer network requirements 51
  - supported commands 75
  - using for file transfer 70

**G**

- genlock, specification 150
- golden drive, description 100
- GPI
  - connector pinout 171
  - electrical specification 153
  - inputs 77

grounding, safety 7

GXF

description 74

supported formats 165

## H

hardware

rack mount 176

Harris settings, protocol 141

HD-00

ancillary data support 161

aspect ratio conversions 159

data bridging, native material 162

data compatibility, PVS 163

description 24

features 21

fps conversions 157

loopback 38

playout 157

rear panel 32

RS-422 connectors and channels 143

VBI data support for SD channels 161

video codec specification 156

host name

adding 58

problems when changing 69

hosts file

editing 56

K2 Media Client sample 57

using \_he0 55

HTTP, port connections 40

## I

identify

adapters 60

disks 85

importing, supported formats 165

indicators, front panel 29

injury precautions 7

installing

Control Point software 97

re-installing software 98

internal storage

changing RAID types 89

K2 Media Client 79

internationalization

AMP 137

FTP 72

K2 Media Client 164

VDCP 139

Internet Explorer, FTP access 73

## K

K2 Config, see K2 System Configuration

K2 FTP

interface 71

internationalization 72

security 109

specifying language 73

supported commands 75

K2 FTP server 70

configuration with M-Series iVDR 71

configuration with Profile XP 71

K2 Media Client

adding to a K2 Storage System 122

administrator 106

auto logon 118

changing RAID types 89

configuring security 103

connecting remotely 47

connector pinouts 170

description 19

determining bandwidth requirements 123

external storage 121

features 20

FTP configuration 71

HD-00 compatibility with PVS

identifying specific client-types 27

installing Multi-Path I/O software 125

installing software 98

internal storage system, description 79

internationalization 164

licensing 101

modes, online and offline 81

network and firewall policies 117

network cabling, external storage 51

network cabling, internal storage 50

network loopback adapter 69

playout formats 157

pre-installed software 100

preparing to add to a K2 Storage System 124

rack mounting 175

returning to online mode 93

sample configuration and hosts file 57

security considerations with NetCentral 114

software components 96

- streaming transfers 164
- supported transfer formats 165
- synchronizing system clocks 101
- system overview 33
- system tools, using 43
- teaming Ethernet ports, internal storage 60
- user 106
- user accounts 106
- virus scanning 116
- where software is installed 95

**K2 Media Server**

- connecting remotely 47
- connector pinouts 173
- security considerations with NetCentral 114
- software components 96
- where software is installed 95

**K2 Storage System**

- configuring for K2 Media Clients 123
- load balancing 122
- security 109

**K2 System Configuration** 44

**K2admin** 106

**K2user** 106

**L**

language

- AMP 137
- K2 Media Client support 164
- restrictions in Internet Explorer 73
- specifying in K2 FTP 73
- VDCP 139

licensing

- description 101
- options 102

load balancing, description 122

logs, obtaining controller 86

loop through

- description 36
- SD models 37

loopback adapter

- network IP address 69

loopback, HD models 38

**LTC**

- input/output 153

**LTC connector pinouts** 170

**LUN**

- binding 88
- unbinding 87

**M**

making new media file system 90

mapping

- COM ports to RS-422 rear panel connectors 145
- RS-422 panel connectors to protocol controllers 144

mechanical specifications 149

media

- access security for AppCenter 109
- access security for FTP 109
- access security for K2 bins, configuration 106
- access security for K2 Storage Systems 109
- access security for protocols 110
- changing RAID types 89
- control and processing 35
- limitations with complex types 70
- making new media file system 90
- naming disk drive 84
- striped data 79
- transferring mixed formats 70

media file system

- checking 90
- description 35
- performance 166
- software location

microcode, checking controller 84

Microsoft Windows

- see Windows

minimum between start of record and playout 166

mode

- checking disk mode pages 86
- online and offline 81
- online, returning K2 Media Client 93

monitor

- SDA-00 audio 152

movie

- cleaning unreferenced 91
- corrupt 70

MPEG, supported formats 165

**M-Series iVDR**

- FTP configuration with K2 FTP server 71
- transfer compatibility 167
- transferring to K2 Media Client 164

**Multi-Path I/O software, installing on a K2 Media Client** 125

**MXF**

- implemented in K2 74

supported formats 165

## N

NetCentral 47

- mapping administrators with K2 115
- screen resolution problem with Control Point PC 168
- security considerations 114
- software location

network

- 100BaseT, setup 51
- adding host names
- cabling, connecting for external storage 51
- cabling, connecting for internal storage 50
- control 51
- Control Team settings 124
- FTP/streaming transfer requirements 51
- host file, setup 55
- media/iSCSI 51
- modifying settings 69
- policies 117
- reordering adapters 69
- video performance 164
- Windows settings, configuring 52

## O

offline mode, description 81

online mode

- description 81
- returning K2 Media Client 93

## P

passwords 106

permissions

- AppCenter 109
- channel access 111
- FTP 109
- K2 bins 106
- K2 Storage Systems 109
- protocols 110

PFR700, downloading disk firmware 92

pinouts 169

playout

- HD-00 157
- minimum delay between start of record 166
- SDA-00 and SD-00 157

ports

COM ports mapping to RS-422 145

enabling and disabling USB 117

RS-422 and protocol controller 144

used by K2 services 40

power cords, certification 9

product damage precautions 7

Profile XP

compatibility with HD-00

FTP configuration with K2 FTP server 71

transfer compatibility 167

transferring to K2 Media Client 164

protection, network and firewall 117

protocol

AMP channel designations 136

associating with a user account 110

controller ports and RS-422 144

Harris settings 141

mapping RS-422 panel connectors 144

remote control, transferring 71

security 110

PVS

see Profile XP

## Q

QuickTime

reference file 41

supported formats 165

## R

rack mounting 175

adjusting 179

Control Point PC drawer 180

hardware 176

rails 178

slides 177

RAID

binding LUNs 88

changing type 89

checking disk mode pages 86

disabling disks 86

drive numbering 41

drives, description 79

identifying disks 85

rebuilding disks forcibly 86

unbinding LUNs 87

Real Time Processor (RTP) 34

real time system

components 34

- description 36
- rear panel
  - board locations 39
  - connector pinouts 170
  - enabling and disabling USB ports 117
  - GPI 77
  - RS-422 connections 77, 142
  - view 30
- rebuilding disks forcibly 86
- record, maximum length of continuous 166
- recovery, strategies 100
- redundant server heartbeat cable 173
- reference file, QuickTime 41
- remote control protocols
  - controlling with RS-422 77, 142
  - transferring 71
- requirements
  - bandwidth, K2 Media Client 123
  - Control Point PC system 168
  - FTP/streaming 51
- restrictions
  - AppCenter 109
  - channel access 111
  - FTP 109
  - K2 bins 106
  - K2 Storage Systems 109
  - NetCentral and K2 security
    - considerations 114
  - protocols 110
- RS-422
  - boards 34
  - COM ports 145
  - connector pinout 170, 173
  - ports 39
  - rear panel connections 77, 142
  - specification 153
  - USB port 117

## S

- safety
  - certification 11
  - grounding 7
  - summary 7
  - terms and symbols 8
- SCSI
  - controller adapter 79
  - interface board 79
- SD-00

- aspect ratio formats 157
- description 23
- features 21
- loop through 37
- playout 157
- rear panel 31
- RS-422 connectors and channels 144
- VBI data support 160
- video codec specification 155
- SDA-00
  - analog audio connector pinouts 171
  - audio monitor 152
  - audio specification 152
  - description 23
  - E to E 36
  - features 20
  - playout 157
  - rear panel view 30
  - RS-422 connectors and channels 144
  - VBI data support 160
  - video codec specification 155
- SDI 149
- security
  - AppCenter operations 109
  - configuring
    - channel access 111
    - FTP security 109
    - K2 bins 106
    - K2 Storage Systems security 109
    - protocol security 110
  - mapping NetCentral administrators with
    - K2 115
  - Microsoft Windows updates 116
  - NetCentral 114
  - overview 103
  - passwords 106
  - user accounts 106
- service safety summary 9
- slot map 39
- SNFS, see media file system
- specification
  - AC power 148
  - AES/EBU 152
  - analog audio 152
  - composite analog video 150
  - electrical 149
  - environmental 148
  - external storage, media file system 166
  - genlock 150

- GPI 153
- HD-00 video codec 156
- LTC 153
- mechanical 149
- media file system performance 166
- operational 154
- RS-422 153
- SDA-00 and SDA-00 video codec 155
- system timing 151
- transferring 164
- VBI/ancillary data 160
- VITC 153
- storage system, description 36
- Storage Utility 45, 46
  - checking subsystem status 84
  - description 81
  - opening through AppCenter 81
  - operation not supported 92
  - overview 83
- streaming
  - see transferring
- stripe
  - group 79
  - media 79
- subsystem status, checking with Storage Utility 84
- synchronizing the media file system 91
- system clocks, synchronizing 101
- system timing 151
- System Tools, K2 Media Client 43

**T**

- TCP
  - IP 122
  - port connections 40
- teaming
  - creating the control team 63
  - creating the FTP team 65
  - renaming connections 68
  - with Ethernet ports 50
- third-party FTP access 72
- time, synchronizing system clocks 101
- TOE 122
- transferring
  - between a K2 and a non-K2 system 70
  - compatibility considerations 167
  - HD-00 and PVS compatibility
  - HD-00 material 157

- K2 FTP interface 71
  - mechanically or automatically 71
- MPEG SD 157
- M-Series iVDRs 164
- remote control protocols 71
- specification 164
- supported formats 165
- using Internet Explorer 73
- using third-parties 72
- transfers
  - VDCP 138
- Turbo iDDR
  - transfer compatibility 167

**U**

- unbinding LUNs 87
- Unicode, UTF-8
  - AMP 137
  - VDCP 139
- USB, enabling and disabling ports 117
- user
  - accounts, passwords 106
  - associating protocols with an account 110
  - names 106

**V**

- V drive 36, 79
- VBI
  - ancillary data specifications 160
  - compression 160
  - Line 21 data services 160
- VBI data support
  - SD channels on HD-00 161
- VDCP
  - Harris settings 141
  - protocol settings 138
  - RS-422 connections 143
  - transfers 138
- ventilation 7
- view
  - front panel 29
  - rear panel 30
- Virus scanning policies 116
- VITC input/output 153

**W**

- WAV, supported formats 165

web site, for Thomson Grass Valley 15  
Windows  
    high priority updates  
    Remote Desktop, using 47  
    system description 34  
Windows, configuring network settings 52

**X**

XLR board 34  
XML 43