

K2

Media Client

System Guide

A diagram consisting of a vertical line with an upward-pointing arrow and a horizontal line with a rightward-pointing arrow, intersecting at a small red circle.

SOFTWARE VERSION 3.3

071-8460-06
June 2009



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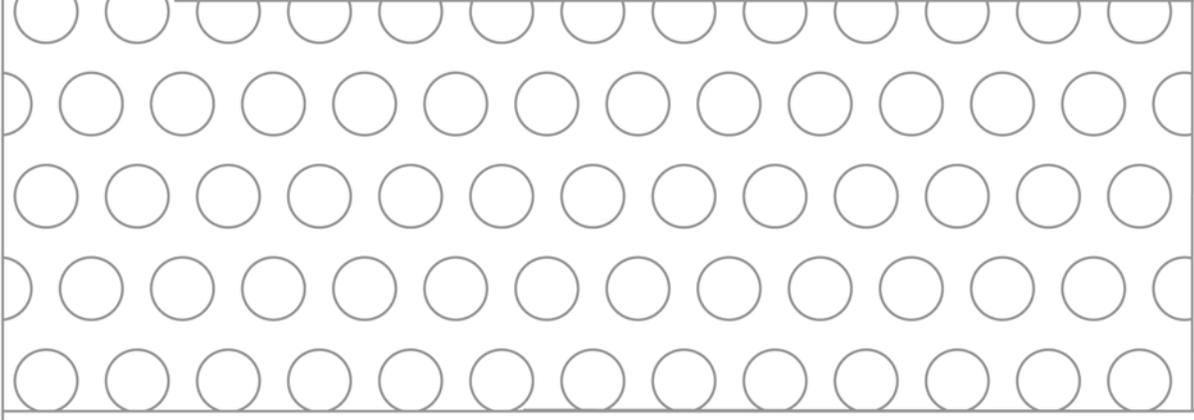
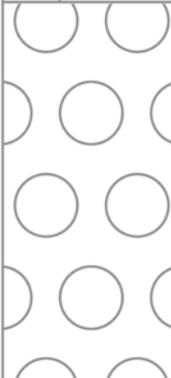
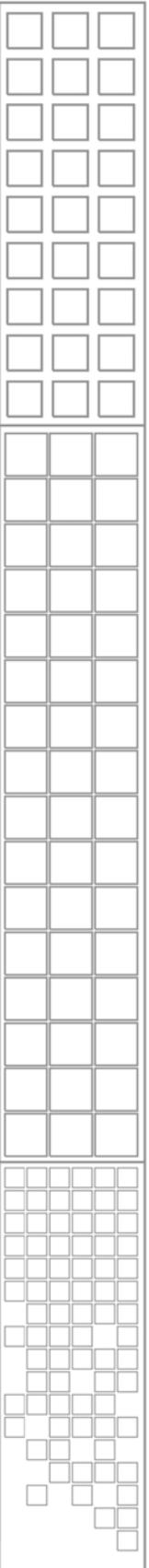
MEDIA CLIENT

System Guide



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071-8460-06
JUNE 2009



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Revision Status

Rev Date	Description
November 23, 2005	Initial release of the K2 Media Client System Guide — 071-8460-00
September 7, 2006	Update information for 3.1 release — 071-8460-01
July 3, 2007	Update information for 3.2 release — 071-8460-02
September 7, 2007	Revised information for direct-connect storage, teaming, HotBins, software version 3.2.5 — 071-8460-03
January 11, 2008	Added information for capture services and Type II motherboard — 071-8460-04
July 28, 2008	Added information for software version 3.2.7, XML Import capture service, ancillary/data track specs ,MIBs — 071-8460-05
June 2009	Added information for software version 3.3, AFD, Pinnacle.support — 071-8460-06

Contents

	Finding Information	11
	Grass Valley Product Support	13
	Telephone Support	14
Chapter 1	Product Description	
	K2 Media Client features	18
	Features of SDA-00 models	18
	Features of SD-00 models	19
	Features of HD-00 models	19
	Features of internal storage models	19
	Features of external storage models	20
	Introducing K2 Media Client models	21
	Introducing the SDA-00 K2 Media Client	21
	Introducing the SD-00 K2 Media Client	21
	Introducing the HD-00 K2 Media Client	22
	Product identification	25
	Front panel indicators	27
	Rear panel view	28
	SDA-00 model rear panel view	28
	SD-00 model rear panel view	29
	HD-00 model rear panel view	30
	Considerations for first startup out of box	30
	K2 Media Client system overview	31
	Application System	32
	Real Time System	32
	Media control and processing	33
	Loop through and E to E	34
	Locations of rear panel boards	38
	RS-422 ports	39
	Ports used by K2 services	40
	RAID drive numbering	41
	QuickTime support	41
Chapter 2	Using K2 Media Client system tools	
	Configuration Manager	43
	Accessing Configuration Manager	43
	Saving and restoring Configuration Manager settings	43
	Restoring default Configuration Manager settings	44
	K2 System Configuration	45
	Storage Utility	46
	NetCentral	47
	Windows Remote Desktop Connection	47
	SiteConfig - a ProductFrame application	48
Chapter 3	System connections and configuration	
	Network connections and configuration	52
	Cable requirements	52
	About Ethernet ports and teaming	52
	Connecting the Ethernet network cabling	53
	Data and streaming for K2 systems	54
	Configure Windows network settings	55
	Streaming video between K2 systems	58
	Teaming Ethernet ports on internal storage models	63
	Identify adapters	63
	Create the Control Team	66
	Create the FTP Team	72
	Name teams	75

Reorder adapters	76
Modifying network settings	77
Using FTP for file transfer	77
Limitations with complex media types	78
Transferring between different types of systems	78
Transfer mechanisms	78
FTP access and configuration	79
FTP access by automation	79
FTP security	79
FTP internationalization	79
FTP access by Internet Explorer	80
FTP commands supported	82
Using the HotBin service	84
About the HotBin service	84
Prerequisite for using the HotBin service	85
Configuring the HotBin service	85
HotBin service components	88
Using the Pathfire capture service	89
About the Pathfire capture service	89
Prerequisites for using the Pathfire capture service	89
Considerations for the Pathfire capture service	90
Configuring the Pathfire capture service	90
Testing the Pathfire capture service	92
Pathfire capture service components	92
Pathfire capture service procedures	93
Installing Pathfire Transfer Service software	93
Licensing Pathfire Transfer Service software	96
Using the DG capture service	97
About the DG capture service	97
Prerequisites for using the DG capture service	97
Configuring the DG capture service	98
Testing the DG capture service	99
DG capture service procedures	99
DG capture service components	100
Using the XML Import capture service	101
About the XML Import capture service	101
Prerequisites for using the XML Import capture service	101
Considerations for the XML Import capture service	102
Configuring the XML Import capture service	102
Testing the XML Import capture service	103
XML Import capture service components	104
Licensing K2 capture service software	104
Pinnacle support	105
Connecting RS-422	109
Connecting GPI	110

Chapter 4

Managing Internal Storage

About the K2 Media Client internal storage system	111
Using Storage Utility	112
About Storage Utility	113
Opening Storage Utility	113
Overview of Storage Utility	115
Checking storage subsystem status	116
Checking controller microcode	116
Identifying disks	117
Get controller logs	118
Check disk mode pages	118

	Disabling a disk	118
	Forcing a disk to rebuild	119
	Unbind LUN	119
	Bind Luns.....	120
	Changing RAID type.....	122
	Making a new media file system.....	122
	Checking the media file system.....	123
	Cleaning unreferenced files and movies	124
	Downloading disk drive firmware.....	125
	Storage Utility operation not supported	125
	Placing the K2 Media Client into online mode	125
Chapter 5	Managing K2 client system software	
	About K2 Media Client system software.....	127
	Software components installed.....	128
	Installing Control Point software	129
	Installing K2 software	130
	Re-installing Grass Valley software	130
	Pre-installed software.....	132
	Backup and recovery strategies	132
Chapter 6	Administering and maintaining the K2 system	
	Licensing	133
	Software version licenses	133
	Licensable options.....	133
	Configuring K2 security	134
	Overview of K2 security features.....	135
	Example: Setting up user access to bins.....	136
	Example: Setting up user access to channels.....	136
	Security and user accounts	137
	Configuring media access security for K2 bins.....	137
	AppCenter operations and media access security	140
	FTP and media access security	140
	K2 Storage Systems and media access security	140
	Protocol control of channels and media access security.....	141
	Configuring channel access security	142
	K2 and NetCentral security considerations	145
	Mapping a NetCentral administrator to the K2 administrator level	146
	Microsoft Windows High Priority updates.....	147
	Virus scanning policies	147
	Network and firewall policies	148
	Enabling and disabling the USB ports	148
	Configuring auto log on	149
	Regional and language settings	150
Chapter 7	Direct Connect Storage	
	Setting up direct-connect RAID storage	151
	Powering up K2 RAID	155
Chapter 8	Shared Storage	
	About load balancing.....	158
	Determining K2 Media Client bandwidth requirements	159
	Preparing the K2 Storage System.....	159
	Preparing K2 Media Clients.....	160
	Adding K2 Media Clients to the K2 Storage System.....	163
	Configuring a K2 Media Client for the K2 Storage System.....	163

Assigning a K2 Media Client to a different FTP server	169
Basic operations for shared storage K2 Media Clients	170
Power on/off procedures	170
Taking a K2 Media Client offline	170
Appendix A Remote control protocols	
Using AMP protocol to control K2 systems	172
Using VDCP protocol to control K2 systems	174
Using BVW protocol to control K2 systems	176
Special considerations for automation vendors	177
Harris settings	177
RS-422 connections	178
RS-422 connectors and AppCenter channels	178
RS-422 connectors and channels on K2 Media Client models	180
RS-422 and Protocol Controller Ports	184
RS-422 and COM ports	185
Security and protocol control	185
Appendix B Specifications	
AC power specification	188
Environmental specifications	188
Mechanical specifications	189
Electrical specifications	189
Serial Digital Video (SDI)	189
Composite Analog Video - SDA-00 models	190
Genlock Reference	190
System Timing	191
AES/EBU Digital Audio	192
Analog Audio - SDA-00 model	192
Audio Monitor - SDA-00 model	192
LTC Input/Output	193
VITC Input/Output	193
RS-422 specification	193
GPI I/O specifications	194
Operational specifications	195
Video codec description K2 Media Client SDA-00 and SD-00	196
Video codec description K2 Media Client HD-00	197
Playouts of multiple formats	197
Active Format Description (AFD) specifications	201
About Active Format Description	201
Storing AFD in the K2 Media Client	201
Ingesting SDI	202
AFD input/output settings	202
Using AFD with file transfers	203
Default generated AFD values	204
VBI/Ancillary/data track specifications	208
Internationalization	215
Video network performance	215
Supported file input/output formats on K2 Media Client and K2 SAN	216
MXF export behavior on K2 Media Client	218
Media file system performance on K2 Media Client and K2 SAN	219
Protocols supported	219
Transfer compatibility with K2 Media Client	220
Control Point PC system requirements	221
MIB specifications	222
K2 client MIBs	223
K2 Media Server MIBs	224

	K2 Appliance (Generic Windows computer based) MIBs.....	225
Appendix C	Connector Pinouts	
	K2 Media Client connector pinouts.....	228
	RS-422 connector pinouts.....	228
	LTC connectors pinouts.....	229
	Analog audio connector pinouts - SDA-00 model.....	230
	GPI I/O connector pinouts.....	230
	K2 Media Server connector pinouts.....	231
	Redundant server heartbeat cable.....	231
Appendix D	Rack mounting	
	Rack mounting the K2 Media Client.....	233
	Rack-mount considerations.....	233
	Rack mount hardware shipped with the K2 client system.....	234
	Mounting the Rack Slides.....	235
	Installing the K2 client system on the rack mount rails.....	236
	Making Rack Slide Adjustments.....	237
	Rack mounting the Control Point PC drawer.....	238
	Index	241

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 lists 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, *Direct Connect Storage*](#)

[Chapter 8, *Shared Storage*](#)

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

[Appendix B, *Specifications*](#)

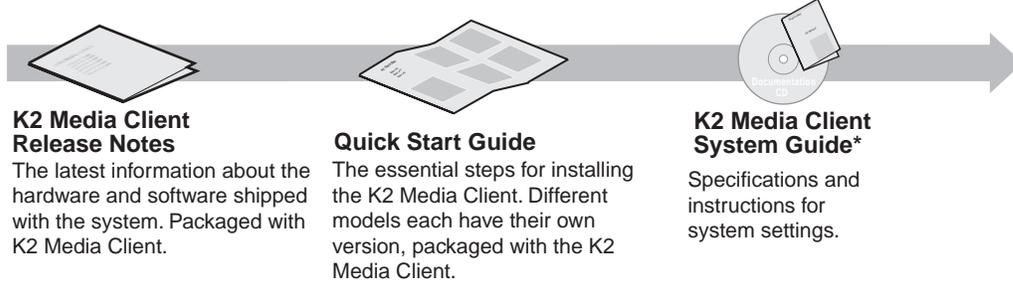
[Appendix C, *Connector Pinouts*](#)

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

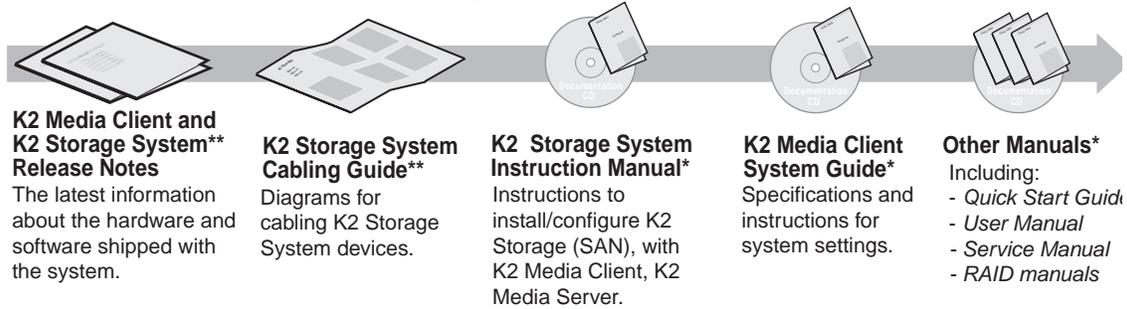
Getting more information

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

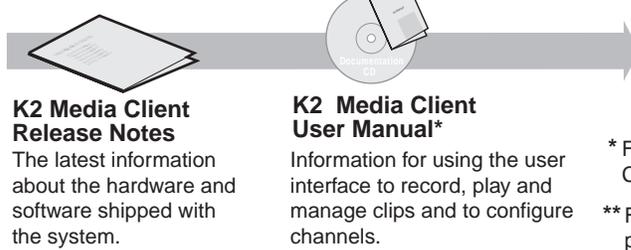
Path for the installer of K2 Media Client models with stand-alone storage



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 ch

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

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 software shipped on your system. 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

For technical assistance, to 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.

Web Technical Support

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

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

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

Telephone Support

Use the following information to contact Product Support by phone.

International Support Centers

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

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

Authorized Local Support Representative

A local support representative may be available in your country. To locate a support center during normal local business hours, refer to the following list. This list is regularly updated on the website for Thomson Grass Valley Product Support (<http://www.grassvalley.com/support/contact/phone/>).

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

Region	Country	Telephone
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	Southeast Asia - Malaysia	+603 7492 3303
	Southeast Asia - Singapore	+65 6379 1769
	Indian Subcontinent	+91 11 515 282 502 +91 11 515 282 504
Pacific	Australia, New Zealand	+61 1300 721 495
Central America, South America	All	+55 11 5509 3440
North America	North America, Mexico, Caribbean	+1 800 547 8949 +1 530 478 4148

Region	Country	Telephone
Europe	UK, Ireland, Israel	+44 118 923 0499
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	Benelux – Belgium	+32 (0) 2 334 90 30
	France	+800 80 80 20 20 +33 1 48 25 20 20
	Germany, Austria, Eastern Europe	+49 6150 104 444
	Belarus, Russia, Tadjhikistan, Ukraine, Uzbekistan	+7 095 258 09 20 +33 (0) 2 334 90 30
	Nordics (Norway, Sweden, Finland, Denmark, Iceland)	+45 40 47 22 37
	Southern Europe – Italy	+39 02 24 13 16 01 +39 06 87 20 35 42
	Southern Europe – Spain	+34 91 512 03 50
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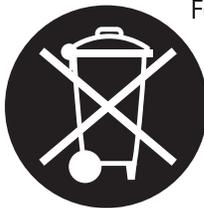


END-OF-LIFE PRODUCT RECYCLING NOTICE

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.

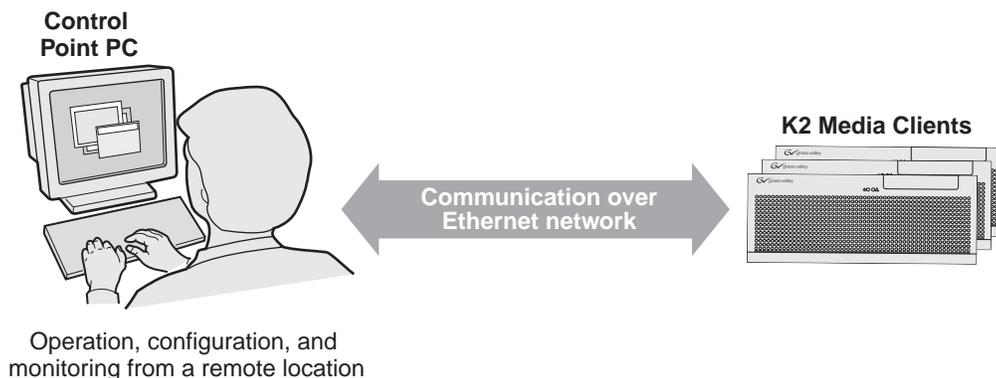


For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information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



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 18](#)
- [“Introducing K2 Media Client models” on page 21](#)
- [“Product identification” on page 25](#)
- [“Front panel indicators” on page 27](#)
- [“Rear panel view” on page 28](#)
- [“Considerations for first startup out of box” on page 30](#)
- [“K2 Media Client system overview” on page 31](#)

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 local 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.

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 21](#).

Features of SD-00 models

SD-00 models have bi-directional video codecs, which means each of the four channels support both 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.

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 21](#).

Features of HD-00 models

HD-00 models 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 22](#).

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. 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. There are two types of external storage for media, as follows:

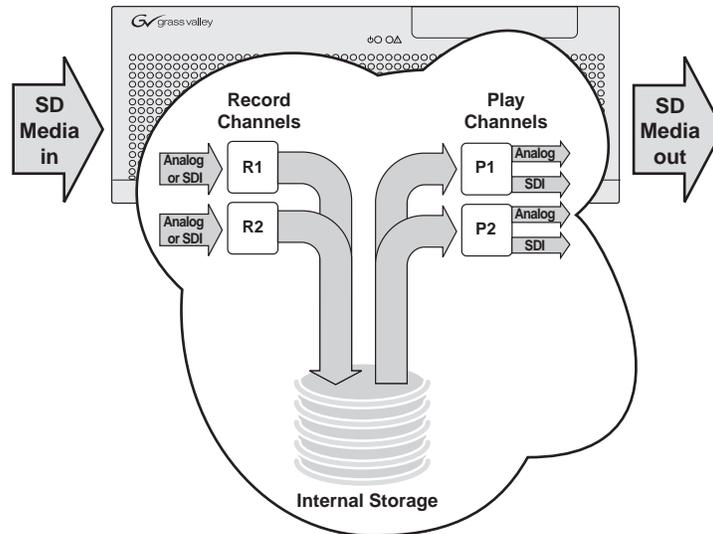
- Shared storage — Multiple external storage K2 Media Clients connect to the K2 Storage System via Gigabit Ethernet to share a common pool of storage. Refer to [Chapter 8, *Shared Storage*](#) and the *K2 Storage System Instruction Manual* for more information.
- Direct-connect storage — A single K2 Media Client with the optional Fibre Channel board installed connects directly to its own external RAID storage device. This makes the direct-connect 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 direct-connect K2 Media Client via Gigabit Ethernet. Refer to [Chapter 7, *Direct Connect Storage*](#) for more information.

Introducing K2 Media Client models

This section provides overview descriptions of the different channel configurations.

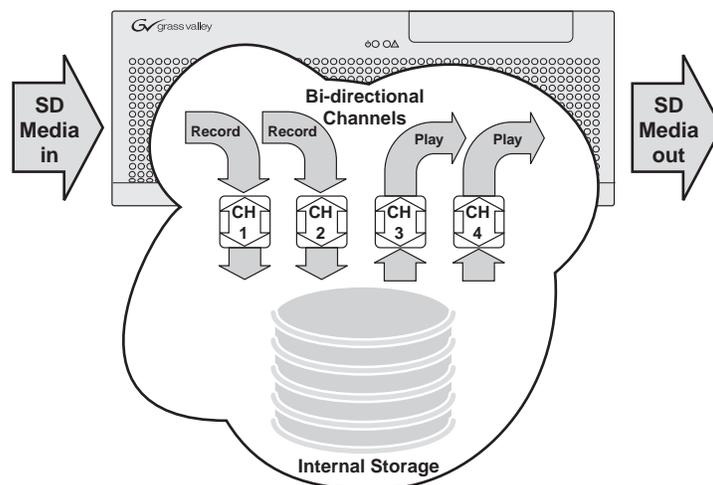
Introducing the SDA-00 K2 Media Client

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

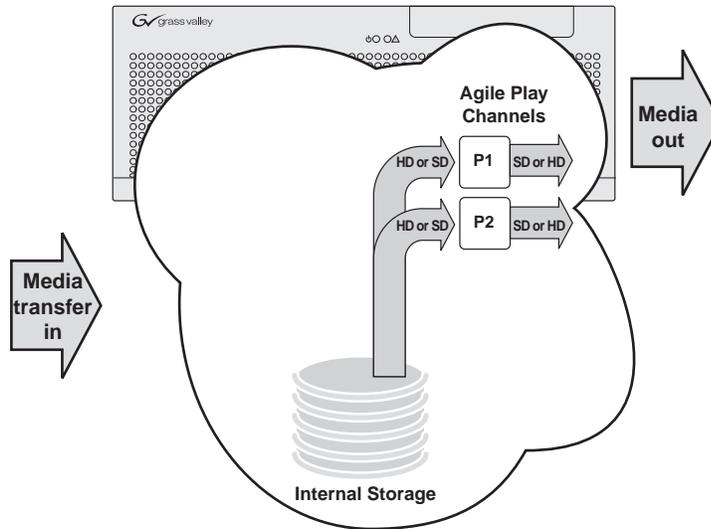
The SD-00 model has four bidirectional channels. Each bi-directional channel supports both record and play operations. You can have four record channels, four play channels, or a combination of record and play channels. The illustration below shows this model with internal storage. An external storage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



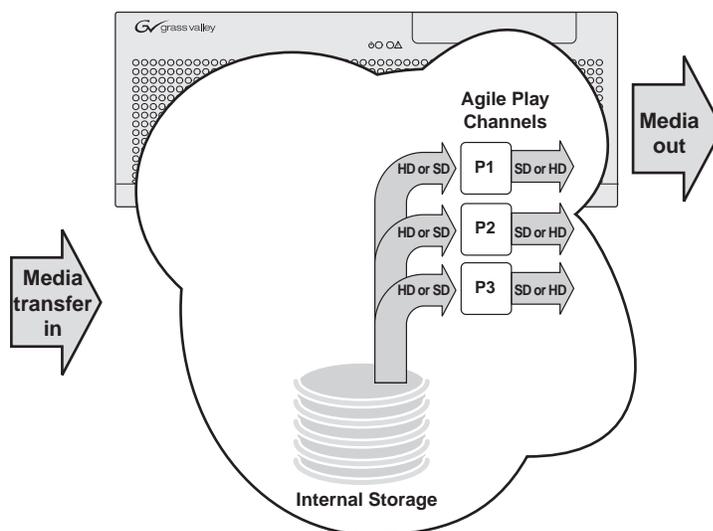
Introducing the HD-00 K2 Media Client

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.

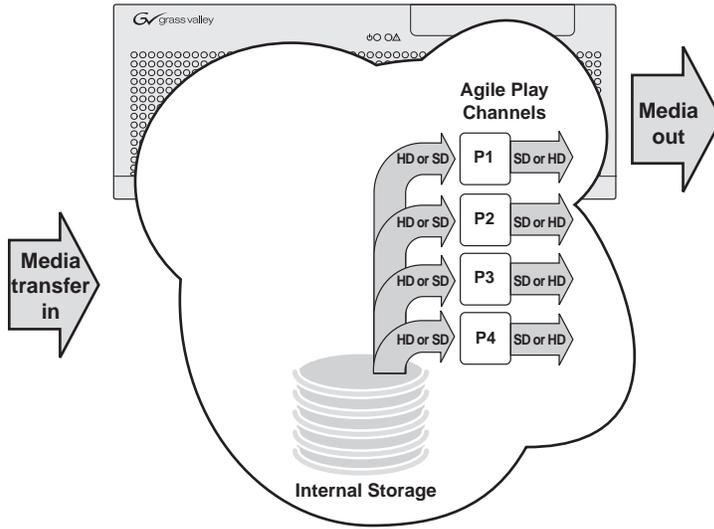
K2- HD-02 channels



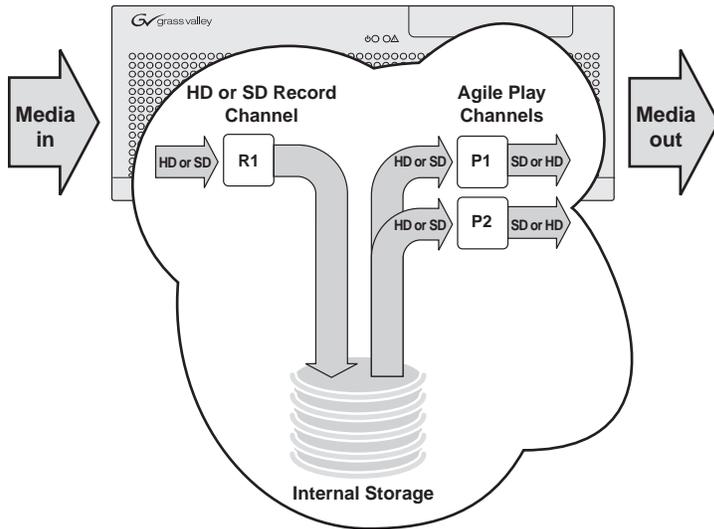
K2-HD-03 channels



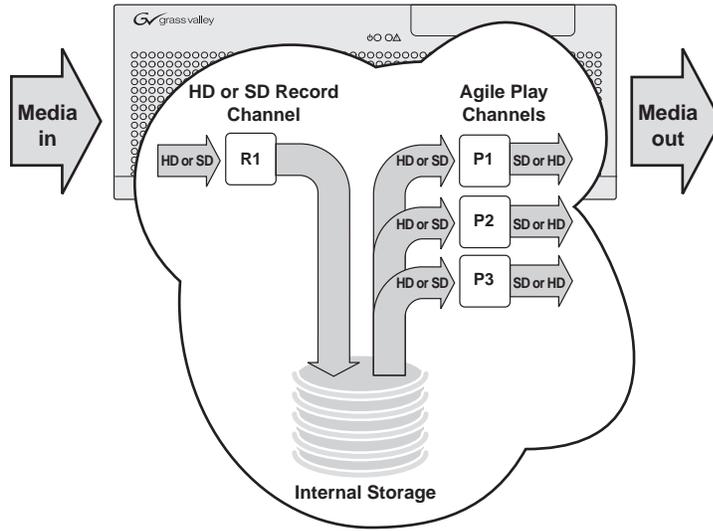
K2-HD-04 channels



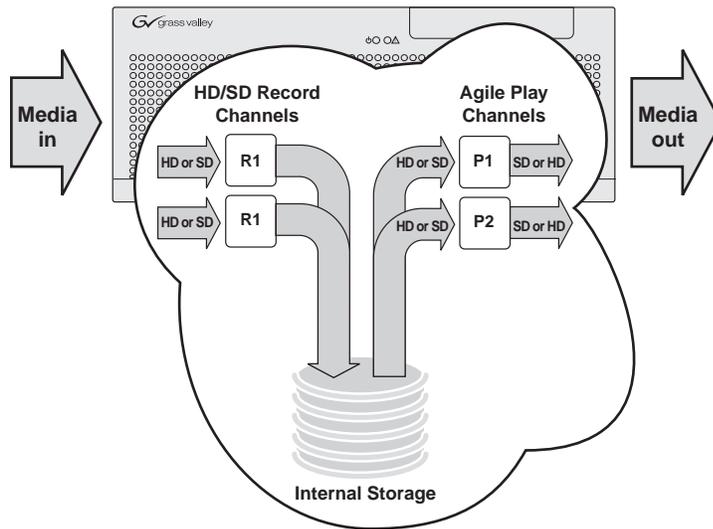
K2-HD-12 channels



K2-HD-13 channels

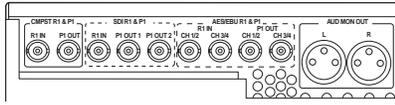
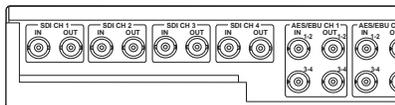
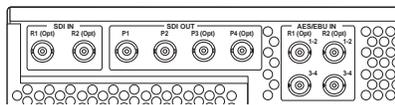


K2-HD-22 channels



Product identification

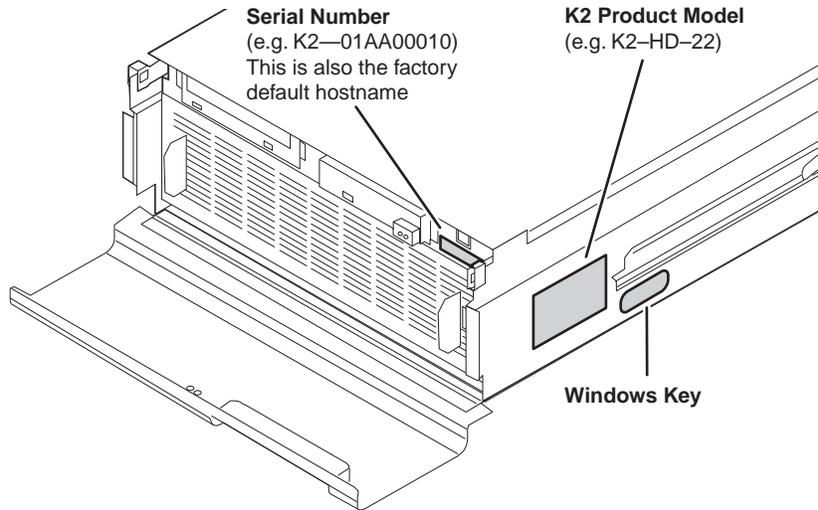
The following table summarizes the ways you can identify the specific client-type of a K2 Media Client.

For this type of K2 Media Client...	The rear panel has these connectors...	The chassis label ^a displays...	In AppCenter ^b , Help About displays...	And unique features are as follows:
SDA-00	 <p>Refer to “SDA-00 model rear panel view” on page 28.</p>	K2-SDA-22		SD Analog/SDI
SD-00	 <p>Refer to “SD-00 model rear panel view” on page 29.</p>	K2-SD-04		SD Bi-directional channels
HD-00	 <p>Refer to “HD-00 model rear panel view” on page 30.</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

^a.Refer to the diagram below to locate the label.

^b.Make sure the channel currently selected in AppCenter is on the K2 Media Client you are identifying.

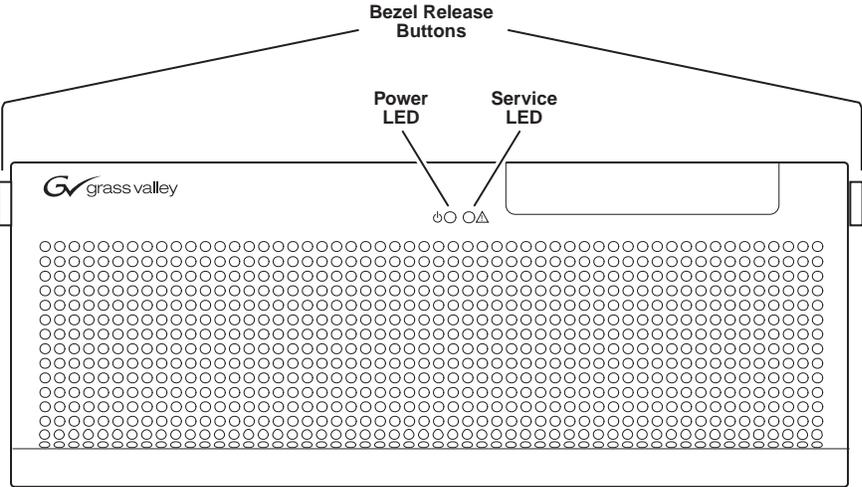
The K2 Media Client has labels affixed to the chassis that provide product identification as in the following diagram:



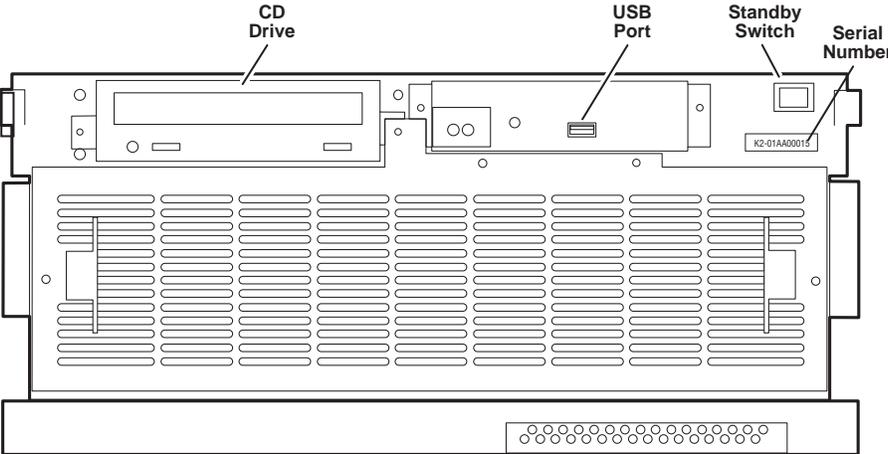
Refer to the product model label when setting up RS-422 connections, as explained in [“RS-422 connections”](#) on page 178.

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.

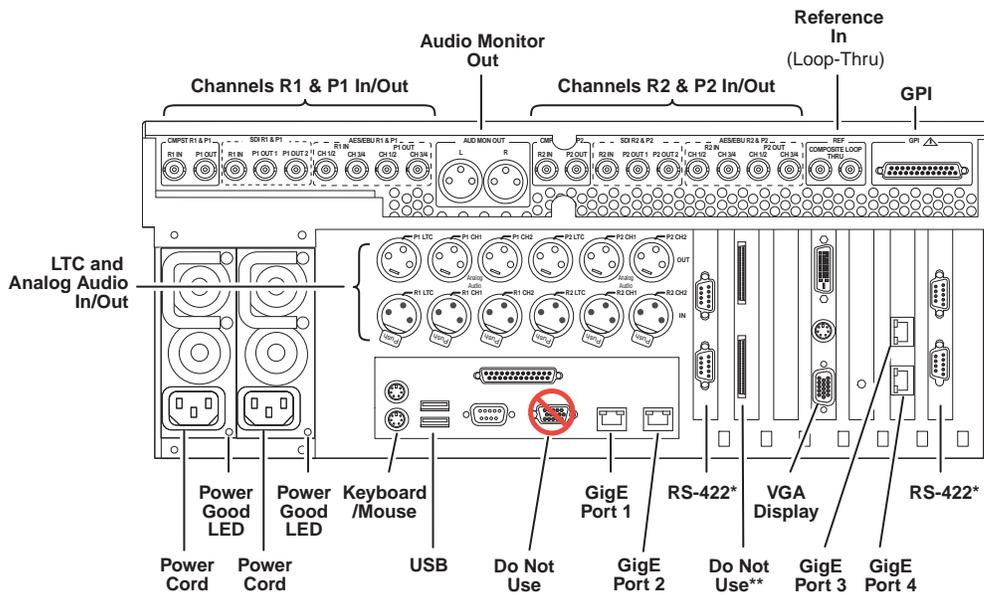


Rear panel view

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

NOTE: All models can have an optional Fibre Channel board. Models with the Fibre Channel option do not have the GigE port 3/port 4 board.

SDA-00 model rear panel view

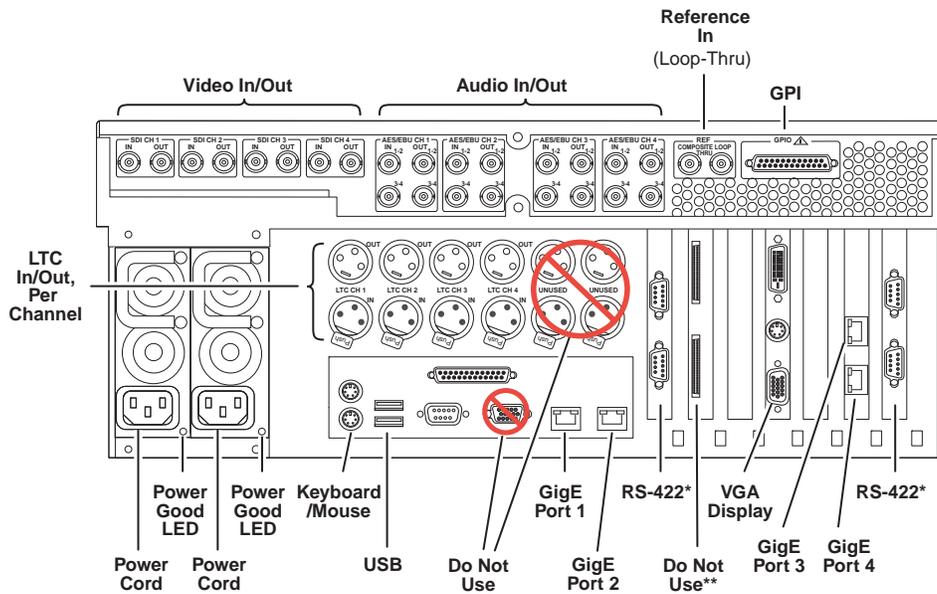


*RS-422 configuration varies. Some systems have one RS-422 board.

**Not present on some external storage models.

Refer to [“RS-422 connections” on page 178](#) to connect and configure for RS-422 control.

SD-00 model rear panel view

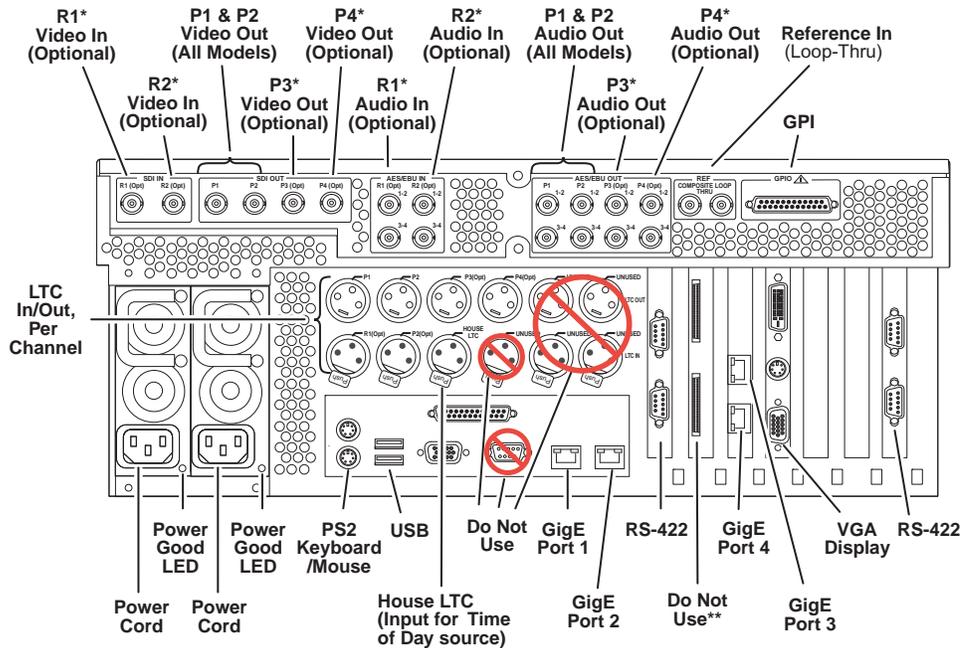


*RS-422 configuration varies. Some systems have one RS-422 board.

**Not present on some external storage models.

Refer to [“RS-422 connections”](#) on page 178 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

**Not present on some external storage models.

Refer to “RS-422 connections” on page 178 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:

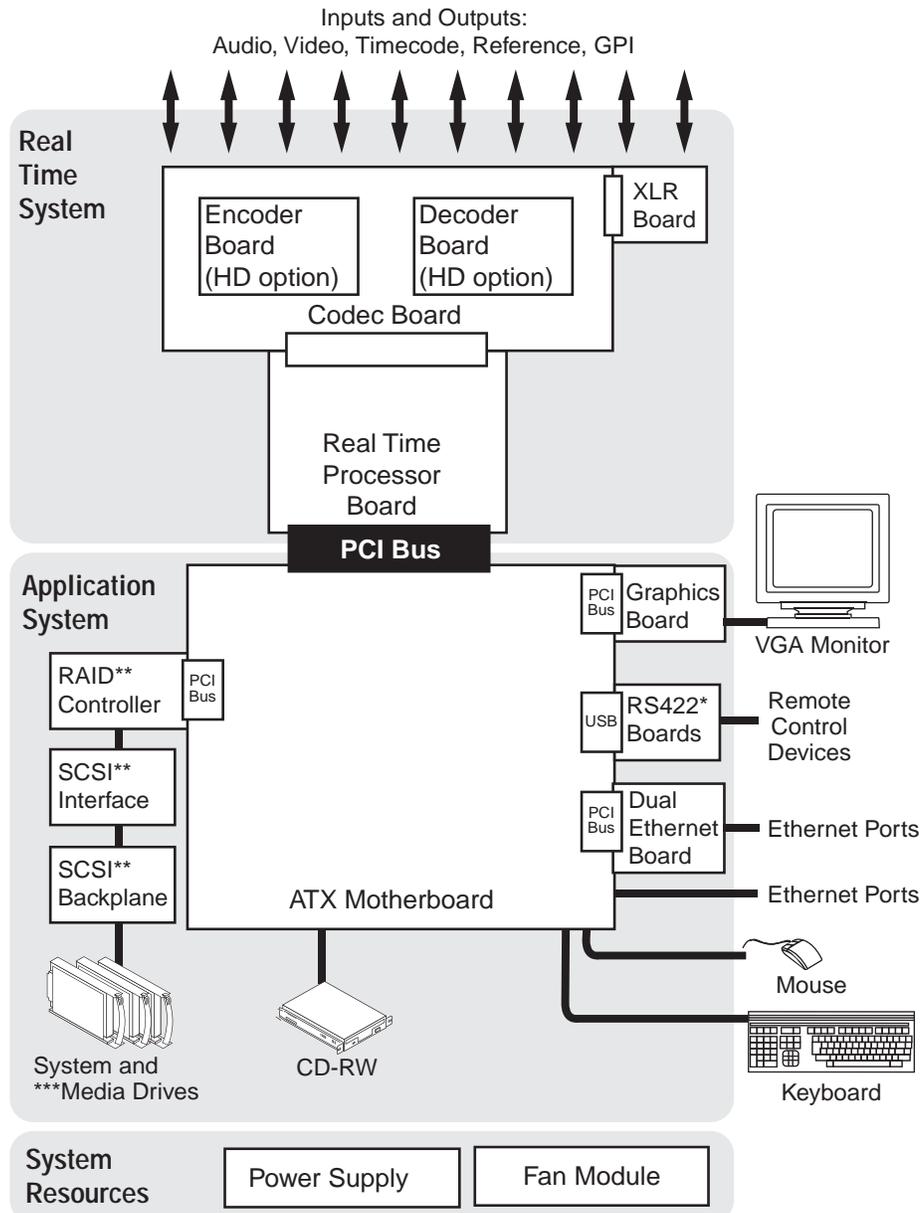
- A Microsoft SQL End User License Agreement (EULA) opens on the screen.

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.



*Some K2 Media Clients have a PCI RS-422 board

**Some models have SATA drive connector boards rather than a SCSI interface and backplane

***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 — K2 Media Clients have been manufactured with two types of RS-422 configurations, as follows:
 - A K2 Media Client can have two RS-422 adapters. Each adapter is connected via an internal USB cable to the motherboard, so while a RS-422 adapter does occupy a rear panel slot, it does not plug into a PCI bus. Each adapter provides two RS-422 ports for connecting equipment for remote control of the K2 Media Client.
 - A K2 Media Client can have one RS-422 adapter. The adapter is connected via PCI slot to the motherboard. The adapter includes an external interface with eight ports. On the external interface, ports 1–4 are active. This provides the four ports for connecting equipment for remote control of the K2 Media Client.
- 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. Some external storage models provide RAID controller functionality on the motherboard instead. Also on these models, RAID drive connections are provided by a SATA drive connector board rather than a SCSI backplane.

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

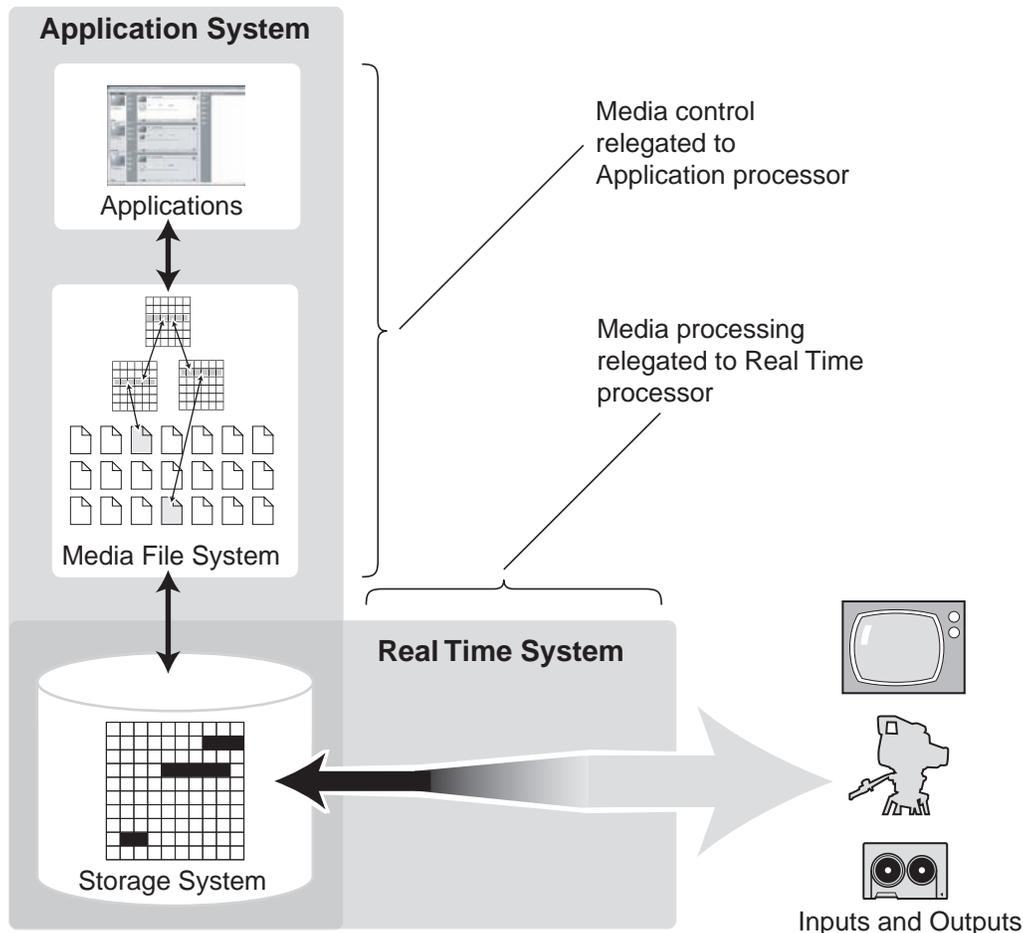
The Real Time system uses Grass Valley boards to provide the core video disk recorder functionality. Primary components are as follows:

- 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 shared 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.

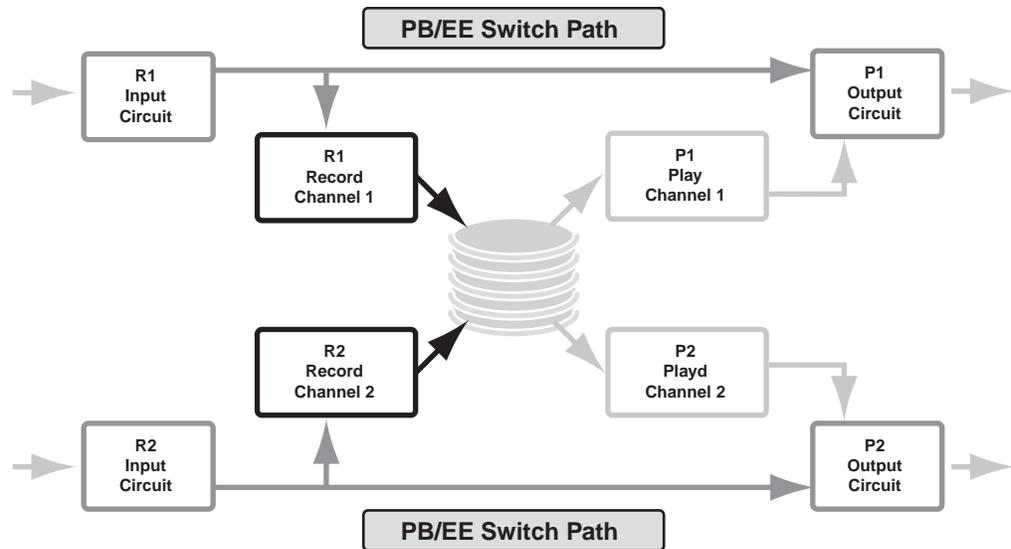
Loop through and E to E

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 ^a .
	Eject	Show input ^a .

^a 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

The Player/Recorder application has a “E-to-E (LoopThru) mode” selection on the Control menu. This mode applies when the channel is under local AppCenter control as well as when it is under remote control, for all protocols.

This “E-to-E (LoopThru) mode” feature allows you to monitor the video that is being recorded. The video is routed back essentially untouched. Any AES audio or LTC that is on the input video is still there on the loop through. The SD-00 K2 Media Client and the loop through videos must be locked to a video reference for the loop through feature to work properly. This “E-to-E (LoopThru) mode” feature should not be confused with true E to E, such as that on the SDA-00 K2 Media Client. True E to E is not supported on the SD-00 K2 Media Client.

When “E-to-E (LoopThru) mode” is not selected, the channel behaves as follows:

- “PB” is displayed on the channel pane, next to the Timecode Source indicator.
- When no clip is loaded, black plays out.
- When a record operation stops, Recorder becomes Player and the clip remains in the Player. The clip’s last frame plays out.

When “E-to-E (LoopThru) mode” is selected, the channel behaves as follows:

- “EE” is displayed on the channel pane, next to the Timecode Source indicator.
- When no clip is loaded, the signal that is currently present at the channel input plays out.
- When a record operation stops, Recorder stays Recorder and the clip remains in the Recorder. The signal that is currently present at the channel input plays out.

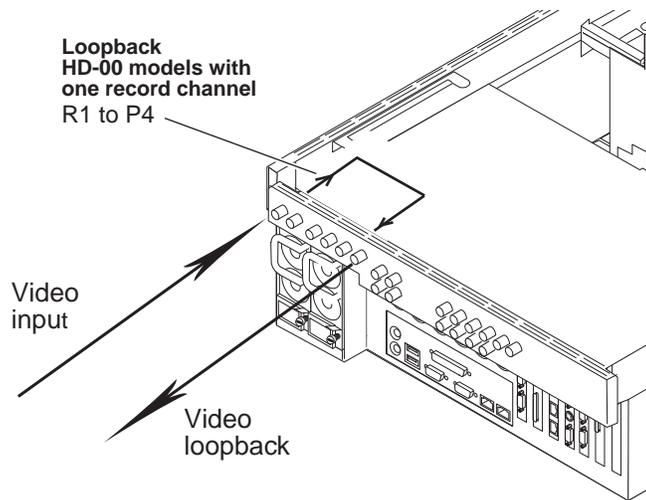
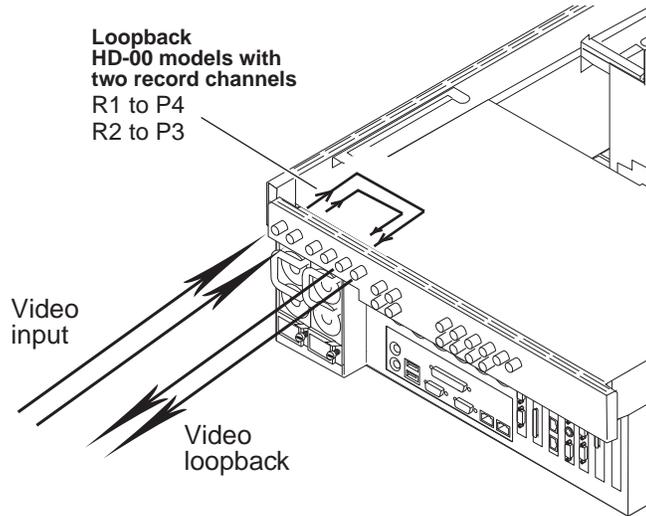
HD-00 loopback

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. When viewed from the rear, slot 1 is on the right and slot 7 is on the left.

Type I motherboard

Slot	SDA-00 and SD-00	HD-00	Comments
1	—	—	—
2	Dual Ethernet or Fibre Channel (optional)	RTP	Plugs into a PCI bus.
3	USB RS-422 dual-port	USB RS-422 dual-port	Occupies a rear panel slot but does not plug into a PCI bus.
4	Graphics	Graphics	Plugs into a PCI bus.
5	RTP	Dual Ethernet or Fibre Channel (optional)	Plugs into a PCI bus.
6	RAID controller	RAID controller	Plugs into a PCI bus.
7	USB RS-422 dual-port	USB RS-422 dual-port	Occupies a rear panel slot but does not plug into a PCI bus.

Type II motherboard

Slot	SDA-00 and SD-00	HD-00	Comments
1	Fibre Channel (optional)	Fibre Channel (optional)	Plugs into a PCI bus.
2	Dual Ethernet	RTP	Plugs into a PCI bus.
3	PCI RS-422 8 port	PCI RS-422 8 port	Plugs into a PCI bus.
4	Graphics	Graphics	Plugs into a PCI bus.
5	RTP	Dual Ethernet	Plugs into a PCI bus.
6	RAID controller	RAID controller	Plugs into a PCI bus.
7	—	—	Plugs into a PCI bus.

Type III motherboard

Slot	SDA-00 and SD-00	HD-00	Comments
1	USB RS-422 dual-port	USB RS-422 dual-port	Occupies a rear panel slot but does not plug into a PCI bus.
2	Dual Ethernet	RTP	Plugs into a PCI bus.
3	Fibre Channel (optional)	Fibre Channel (optional)	Plugs into a PCI bus.
4	Graphics	Graphics	Plugs into a PCI bus.
5	RTP	Dual Ethernet	Plugs into a PCI bus.
6	RAID controller	RAID controller	Plugs into a PCI bus ^a .
7	USB RS-422 dual-port	USB RS-422 dual-port	Occupies a rear panel slot but does not plug into a PCI bus.

^aThis board not present on some external storage models.

RS-422 ports

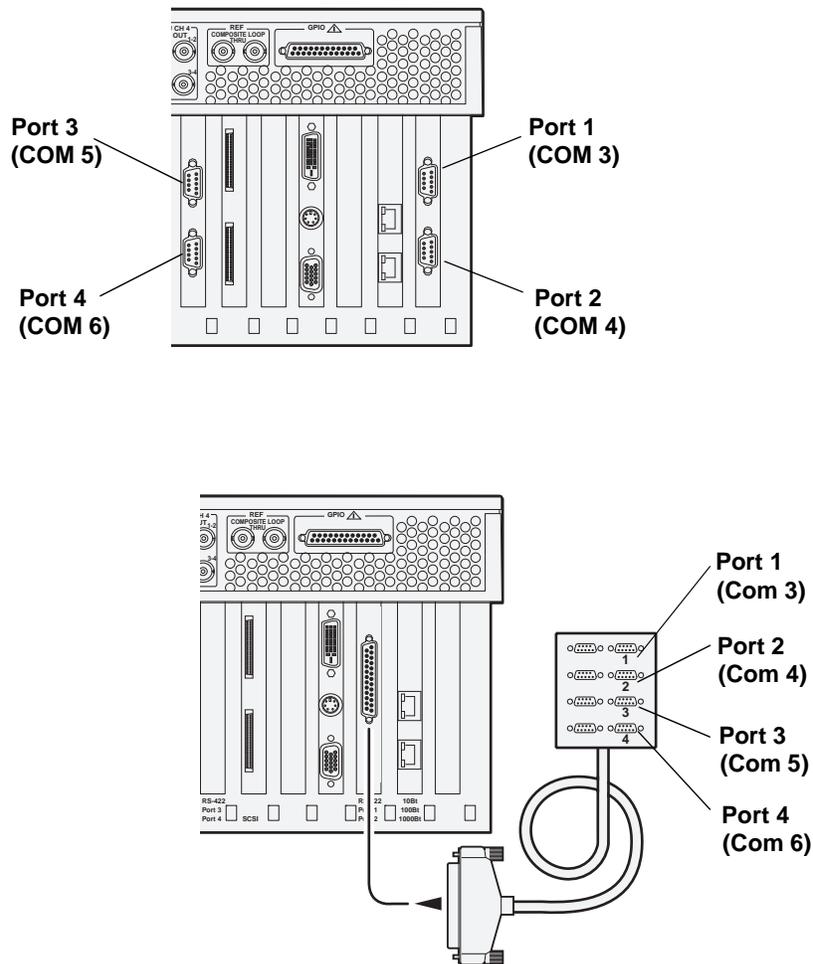
K2 Media Clients have been manufactured with two types of RS-422 configurations, as follows:

- Two dual-port adapters, connected to the motherboard via USB cables
- One adapter (with external 8-port interface), connected to motherboard via PCI slot

Refer to the appropriate illustration below.

The Windows COM port assignments to the physical RS-422 connectors are described in the following illustrations. For information on the relationship between RS-422 ports and K2 Media Client channels, see [Appendix A, Remote control protocols](#). For RS-422 ports that correspond to internal USB hubs, refer to “[Enabling and disabling the USB ports](#)” on page 148.

NOTE: *The designations Port 1, Port 2, Port 3, Port 4 in these illustrations refer to the labelling of the physical RS-422 connectors. 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
3389	TCP	Remote Desktop	Used by SiteConfig.
18262	TCP	GV ProductFrame Configuration Service, ProductFrame Discovery Agent Service	Used by SiteConfig.
18263	UDP	ProductFrame Discovery Agent Service	GV NetConfig Device Broadcast/Unicast Protocol. Used by SiteConfig. Sent by ControlPoint, received by Devices
18264	UDP	ProductFrame Discovery Agent Service	GV NetConfig Controller Protocol. Used by SiteConfig. Sent by Devices, received by ControlPoint
49168	HTTP	Grass Valley K2 Config	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		
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

Internal 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

The GV Connect feature provides support for QuickTime and access to K2 assets for Final Cut Pro. Refer to the *K2 Storage System Instruction Manual*.

Using K2 Media Client system tools

Topics in this chapter include the following:

- “Configuration Manager”
- “K2 System Configuration”
- “Storage Utility”
- “NetCentral”
- “Windows Remote Desktop Connection”
- “SiteConfig - a ProductFrame application”

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, Level 3, Level 10–30 (SAS and SATA), and Nearline 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

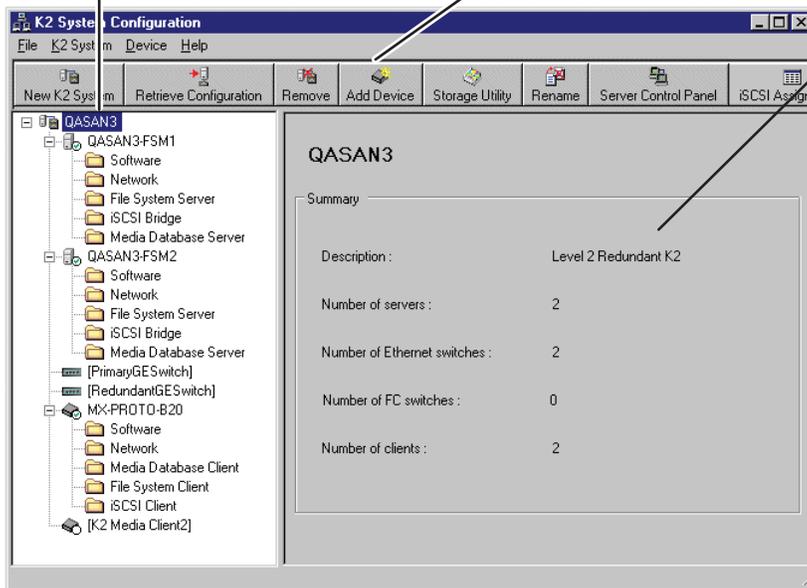
Password: adminK2

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 stand-alone K2 Media Clients with their own storage

This manual explains Storage Utility for stand-alone K2 Media Clients. Refer to the *K2 Storage System Instruction Manual* to learn about Storage Utility for the K2 Storage System.

NOTE: *For shared 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 stand-alone 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.

SiteConfig - a ProductFrame application

ProductFrame is a integrated platform of tools and product distribution processes for system installation and configuration. SiteConfig is a ProductFrame application and it is the recommended tool for network configuration and software deployment.

You can use SiteConfig as a stand-alone tool for planning and system design, even before you have any devices installed or cabled. You can define networks, IP addresses, hostnames, interfaces, and other network parameters. You can add devices, group devices, and modify device roles in the system.

As you install and commission systems, SiteConfig runs on the control point PC. It discovers devices, configures their network settings, and manages host files. SiteConfig also manages software installations and upgrades and provides a unified software package for deployment across multi-product systems.

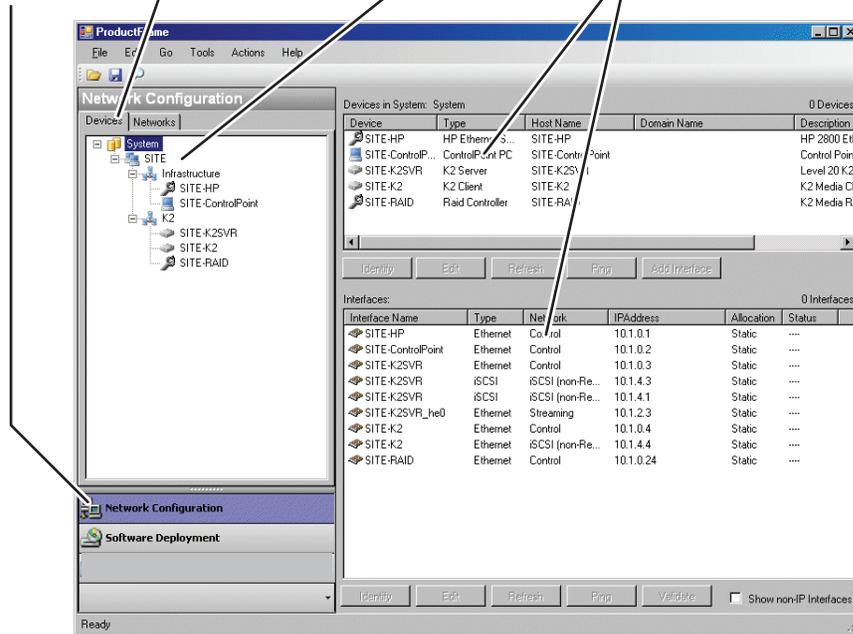
You should use SiteConfig for network configuration and software deployment at installation and throughout the life of the system in your facility. This enforces consistent policy and allows SiteConfig to capture changes, which makes the system easier to maintain and aids in troubleshooting should a problem arise.

To open SiteConfig, do the following:

1. On the control point PC open the SiteConfig shortcut on the desktop.

The SiteConfig application opens.

Select a module... And a tree view tab... Then select an item in the tree view... To display list view details...



SiteConfig displays information from a system description file, which is an XML file.

SiteConfig has different modules that correspond to a system's life-cycle phases, such as network configuration and software deployment. You can expand nodes and select elements in the tree view and the list view to view and modify networks, systems, individual devices, software deployment, and configuration settings.

System connections and configuration

This chapter applies to “online” K2 systems, which includes stand-alone K2 Media Clients and K2 Storage Systems with connected shared storage K2 Media Clients. In contrast, the Nearline K2 Storage System is considered an “offline” K2 system. Refer to the *K2 Storage System Instruction Manual* for information about Nearline K2 Storage Systems.

This chapter contains the following topics:

- “Network connections and configuration”
- “Teaming Ethernet ports on internal storage models”
- “Modifying network settings”
- “Using FTP for file transfer”
- “Using the HotBin service”
- “Using the Pathfire capture service”
- “Using the DG capture service”
- “Using the XML Import capture service”
- “Licensing K2 capture service software”
- “Pinnacle support”
- “Connecting RS-422”
- “Connecting GPI”

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

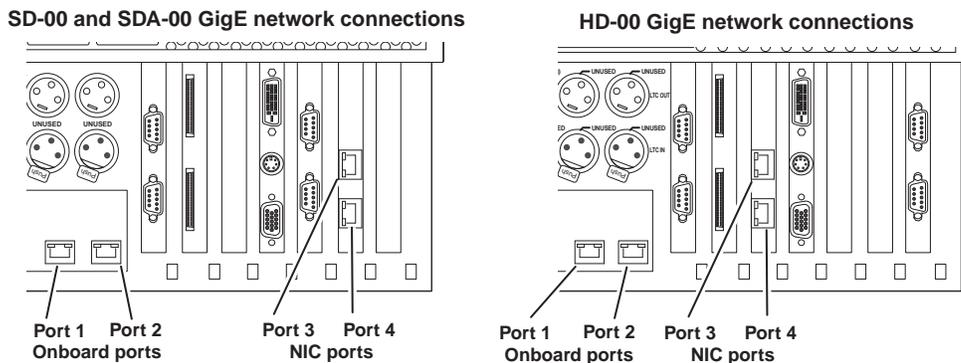
Cable requirements

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

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.

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 63.](#)

- On shared storage (iSCSI SAN) 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 shared (iSCSI SAN) 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 8, Shared Storage](#) and to the *K2 Storage System Instruction Manual* for more information about the media ports.

- On direct-connect storage models, the Fibre Channel board replaces the Gigabit Ethernet card, so the only Ethernet ports are those on the motherboard. There is no teaming on a direct-connect K2 Media Client.

Connecting the Ethernet network cabling

This section is divided into two parts:

[“Connecting the network cabling for stand-alone K2 Media Clients” on page 53](#)

[“Connecting the network cabling for K2 Media Clients with shared storage” on page 53](#)

Connecting the network cabling for stand-alone K2 Media Clients

On a K2 Media Client with internal storage and on a K2 Media Client with direct-connect 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 77](#) 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 63.](#)

Connecting the network cabling for K2 Media Clients with 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 53](#), 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 stand-alone 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 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 shared 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 53](#).
- 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 a stand-alone K2 Media Client” on page 55](#)
- [“Configure Windows network settings for K2 Media Clients with shared storage” on page 57](#)
- [“Set up hosts files” on page 58](#)
- [“Add network hosts names for streaming” on page 61](#)



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 134.)*

Configure Windows network settings for a stand-alone K2 Media Client

The internal storage K2 Media Client and the direct-connect K2 Media Client ship 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 stand-alone K2 Media Client, refer to [“Streaming video between K2 systems” on page 58](#) to determine your method of providing this name resolution and the configuration required.

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

To configure network settings on a stand-alone 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 stand-alone 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 63](#) 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 stand-alone 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 63](#) 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 shared 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 58](#) and the *K2 Storage System Instruction Manual* for a complete discussion of host tables.
4. Configure the control connection on the shared 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 shared 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 shared storage K2 Media Client to the K2 Storage System. Refer to [Chapter 8, Shared 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 shared 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 shared 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 shared 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 shared storage (SAN) K2 Media Clients as well. For each shared 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 60. Otherwise, proceed with the following steps to set up your hosts file.

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

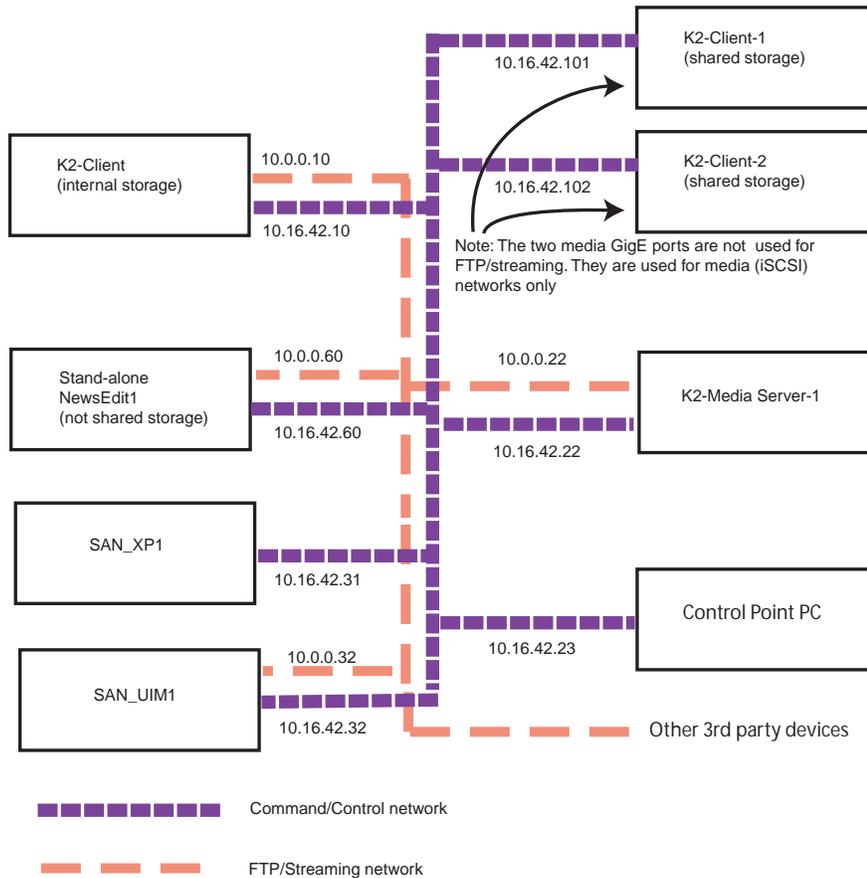
1. Open the following file using Notepad or some other text editor.

```
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

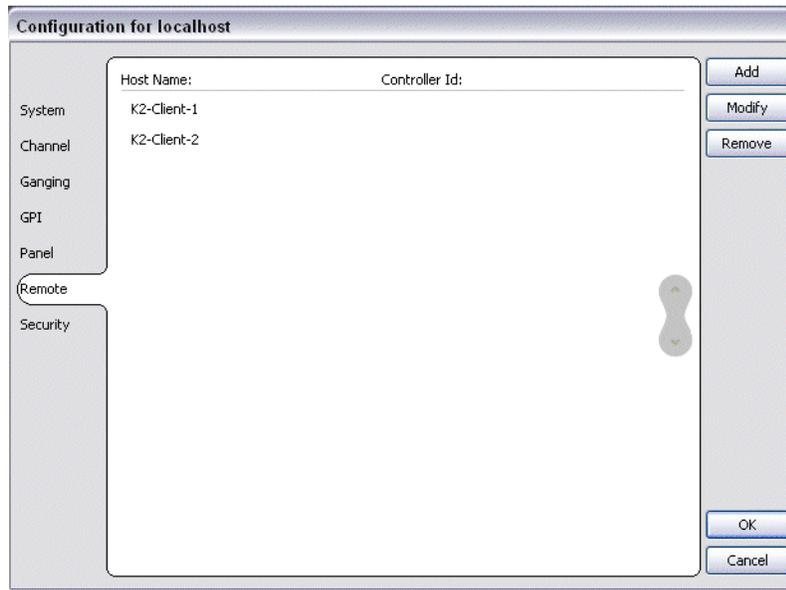
You must add the host names of all peer K2 systems on the network that support streaming transfers. Adding host names is required to allow selection of networked K2 systems in the AppCenter user interface and to provide a successful network connection for streaming. The host names added will appear in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

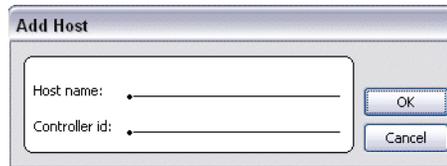
To add network host names:

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, such as a direct-connect storage K2 Media Client. 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 shared storage K2 Media Client. There is a required teaming configuration on shared storage K2 Media Clients, which must not be changed. If you must restore the required teaming on an shared 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.

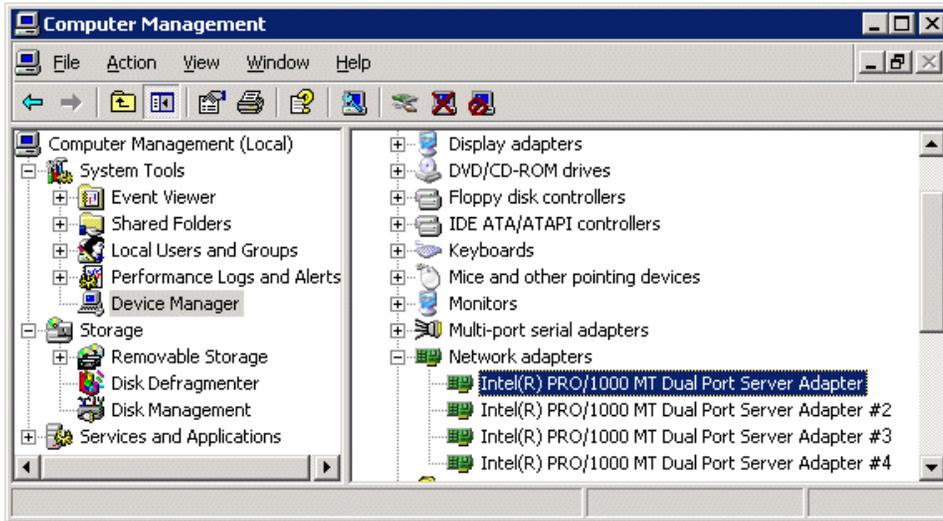
- “Identify adapters”
- “Create the Control Team”
- “Create the FTP Team”
- “Name teams”
- “Reorder adapters”

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 77.

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:

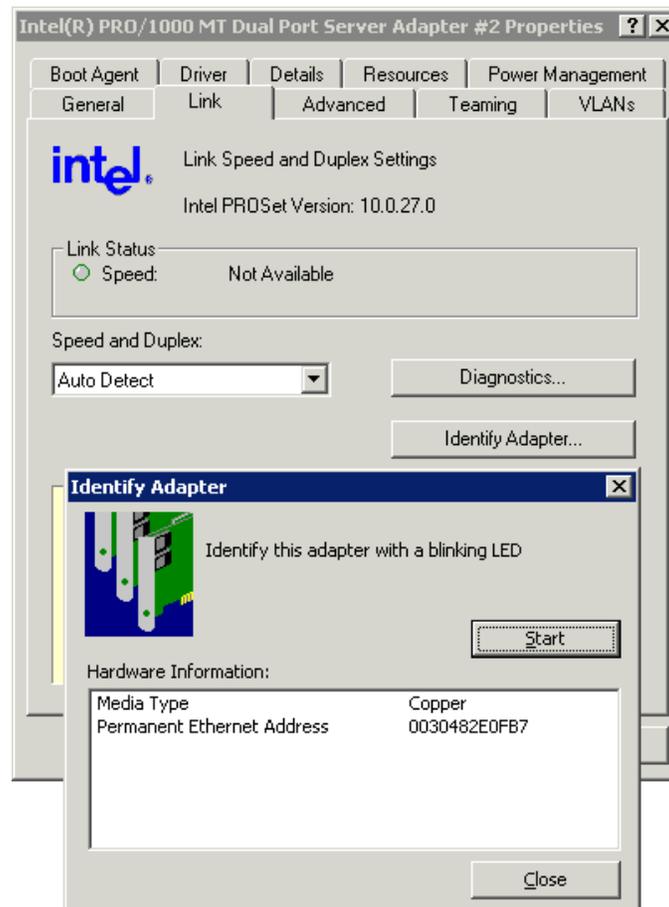
1. Access the Windows desktop on the K2 system. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
2. Open Device Manager as follows:
 - a. On the Windows desktop, right-click **K2 Media Client** (My Computer) and select **Manage**. 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. If a Type I motherboard, 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
 - c. If a Type II motherboard, verify that there are four adapters listed, named as follows:
 - Intel® PRO/1000 EB Network Connection with I/O Acceleration
 - Intel® PRO/1000 EB Network Connection with I/O Acceleration #2
 - Intel® PRO/1000 MT Dual Port Server Adapter
 - Intel® PRO/1000 MT Dual Port Server Adapter #2

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 Type I Motherboard	Software adapter name Type II Motherboard	Physical port (as viewed facing the rear panel)
...MT Dual Port Server Adapter	...EB Network Connection...	1st (left) port on the motherboard
...MT Dual Port Server Adapter #2	...EB Network Connection...#2	2nd (right) port on the mother board
...MT Dual Port Server Adapter #3	...MT Dual Port Server Adapter	1st (upper) port on the dual Ethernet adapter
...MT Dual Port Server Adapter #4	...MT Dual Port Server Adapter #2	2nd (lower) port on the dual Ethernet adapter

External storage K2 Media Clients with the optional Fibre Channel card installed do not have the dual Ethernet adapters.

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

Create the Control Team

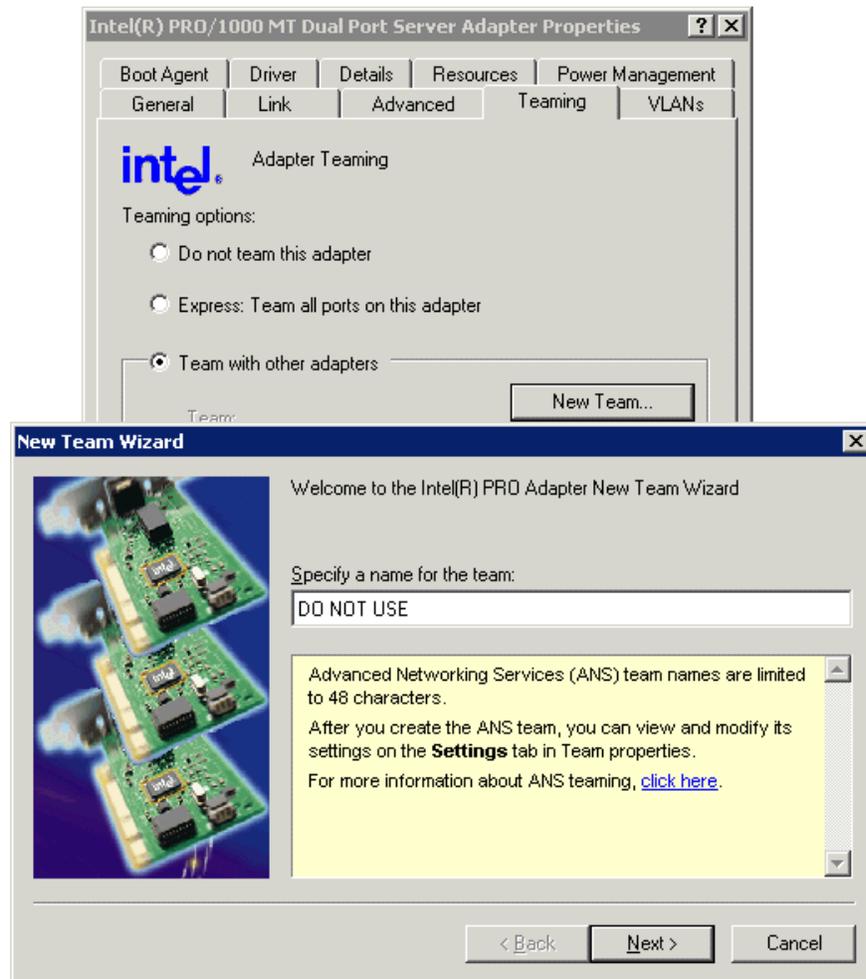
The goal of teaming is to create two teams, one for the control network and one for the FTP/streaming network. The teaming should be set up such that the first physical port on the motherboard and the first physical port on the dual Ethernet adapter are teamed for control. The second physical port on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

Prior to K2 system software release 3.2.5x in the Fall of 2007, there was a bug in the teaming software for which the work around required creating a team named “DO NOT USE”. With release 3.2.5x., drivers were updated and the bug was fixed. The fix is available on K2 Media Clients shipping after the release of 3.2.5x. Earlier K2 Media Clients retain the same drivers, even if the system software is updated, and so must use continue to use the “DO NOT USE” work around if teaming must be configured. Use the procedure appropriate for your K2 Media Client.

Create the Control Team on systems shipping before 3.2.5x

Use this procedure if the K2 Media Client shipped from Grass Valley prior to release 3.2.5x in the Fall of 2007.

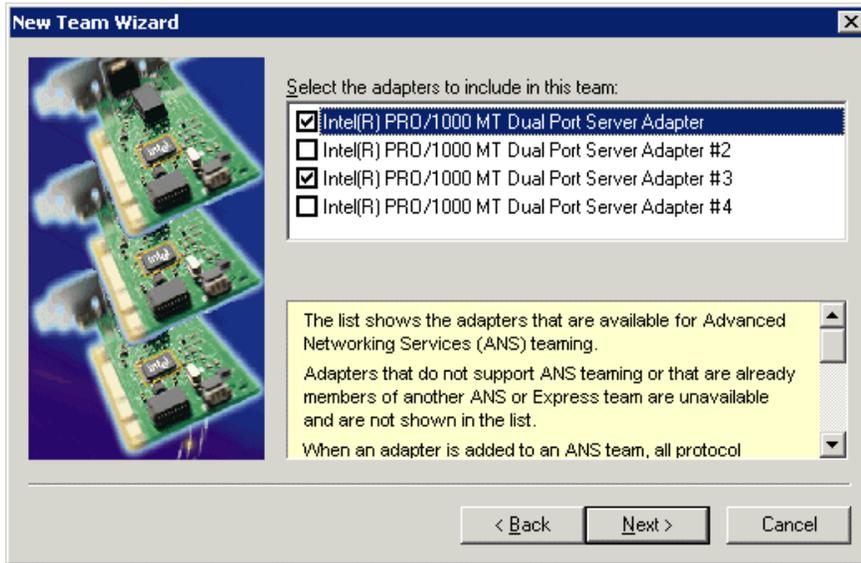
1. In Device Manager, right-click **...MT Dual Port Server Adapter** and select **Properties**. The Properties dialog box opens.
2. Select the **Teaming** tab.



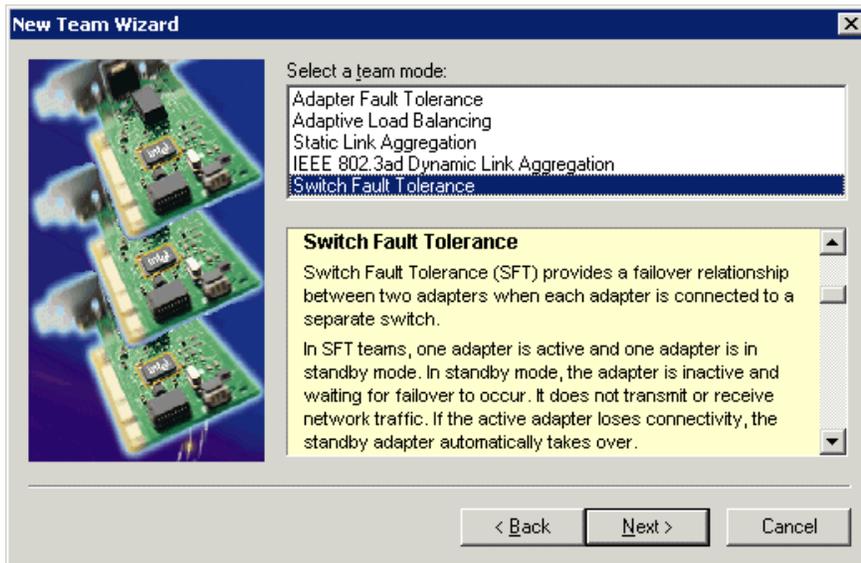
3. Select **Team with other adapters**, then click **New Team**. The New Team Wizard opens.
4. Enter DO NOT USE .

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:

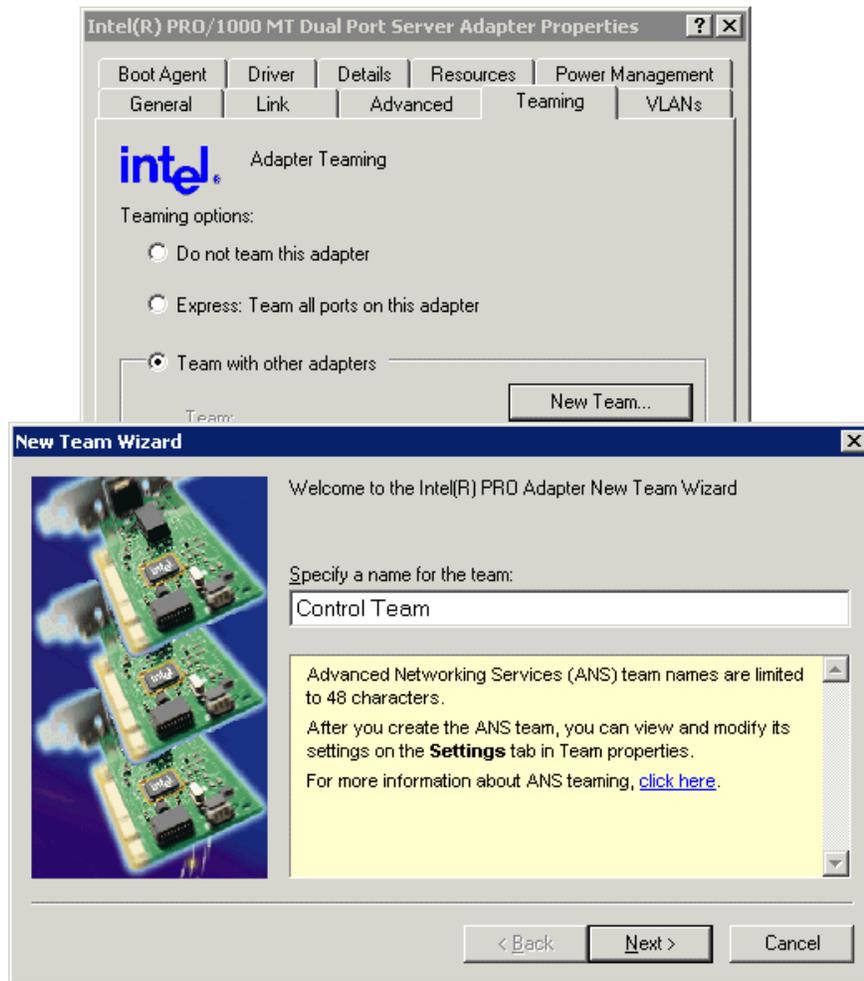
- a. In Device Manager | Network Adapters, right-click **Intel® Advanced Network Services Virtual Adapters #2** (make sure it is the adapter identified as a **Virtual** adapter) and select **Properties**. The Properties dialog box opens.
- b. Select the **Settings** tab.

- c. Click **Modify Team**. A dialog box opens.
 9. On the **Adapters** tab, do the following:
 - a. Select the top entry, which is **Intel® PRO/1000 MT Dual Port Server Adapter** (Type I MB) or **Intel® PRO/1000 EB Network Connection with I/O Acceleration** (Type II MB), and click **Set Primary**.
 - b. Select **Intel® PRO/1000 MT Dual Port Server Adapter #3** (Type I MB) or **Intel® PRO/1000 MT Dual Port Server Adapter** (Type II MB) 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 [“Create the FTP Team” on page 72](#).

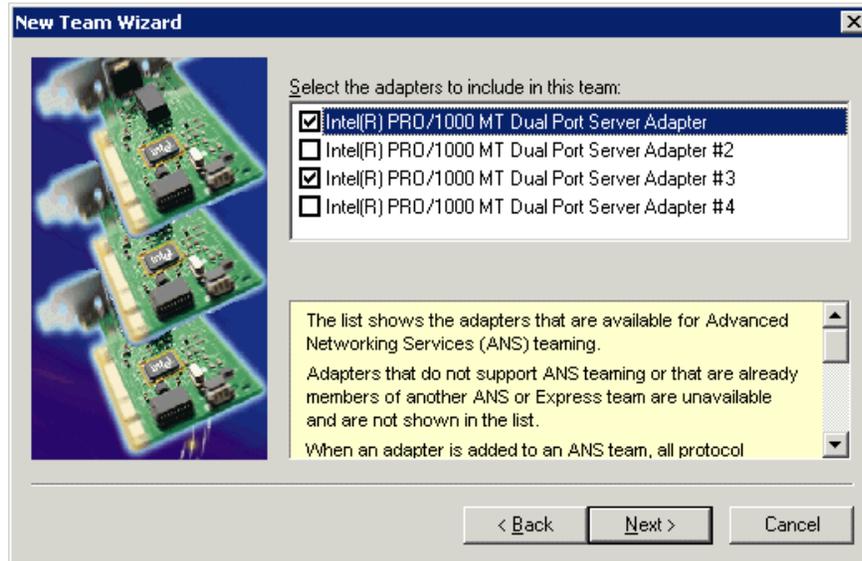
Create the Control Team on systems shipping after 3.2.5x

Use this procedure if the K2 Media Client shipped from Grass Valley after release 3.2.5x in the Fall of 2007.

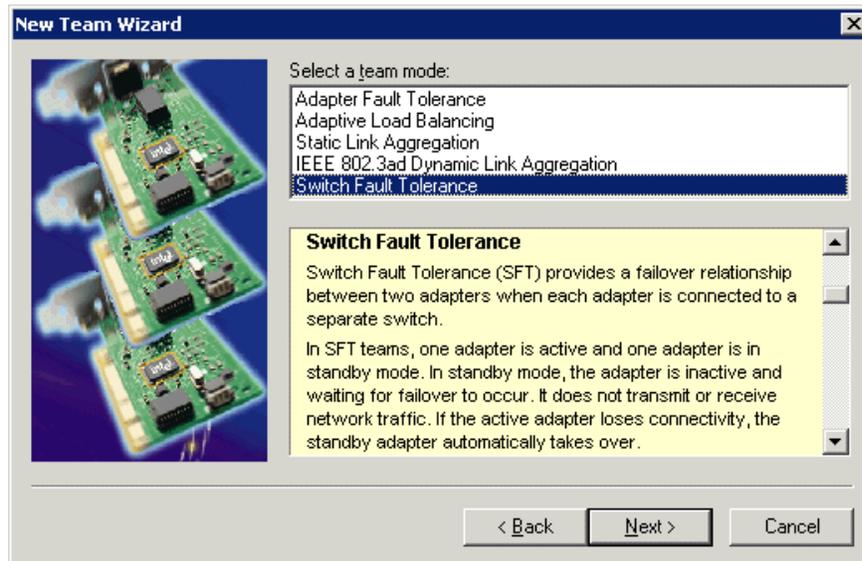
1. In Device Manager, right-click **...MT Dual Port Server Adapter** and select **Properties**. The Properties dialog box opens.
2. Select the **Teaming** tab.



3. Select **Team with other adapters**, then click **New Team**. The New Team Wizard opens.
4. Enter Control Team.
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:

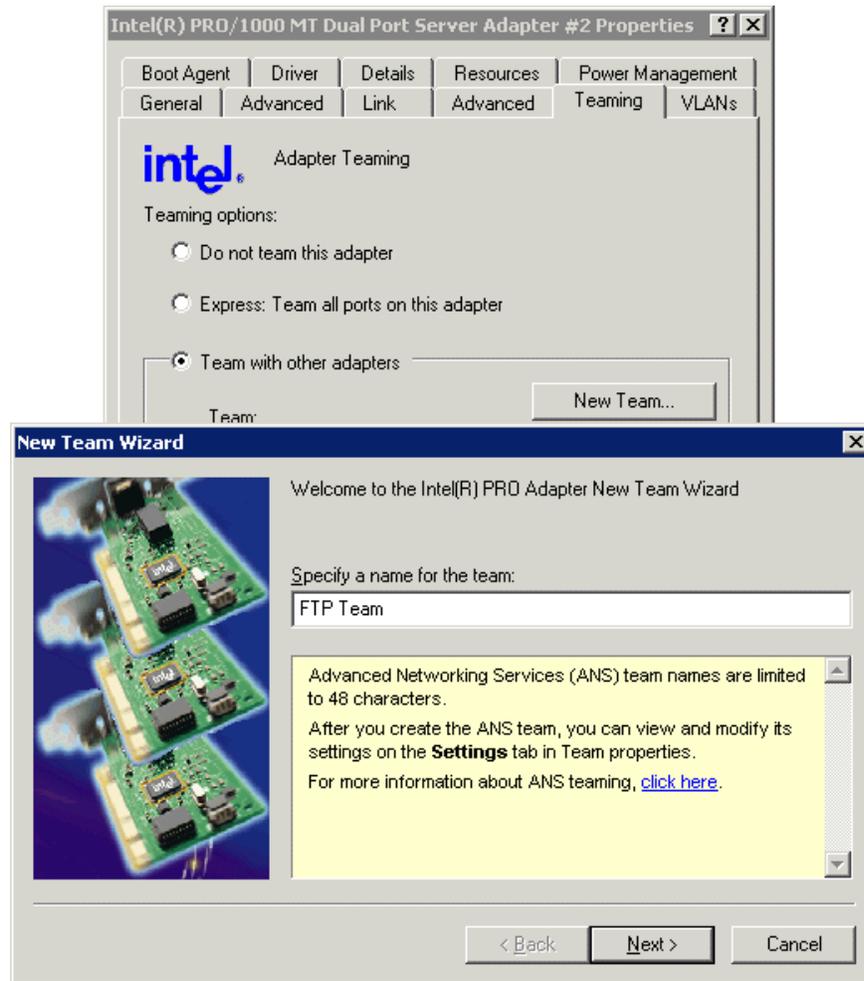
- a. In Device Manager | Network Adapters, right-click **Intel® Advanced Network Services Virtual Adapters #2** (make sure it is the adapter identified as a **Virtual** adapter) and select **Properties**. The Properties dialog box opens.
- b. Select the **Settings** tab.

- c. Click **Modify Team**. A dialog box opens.
9. On the **Adapters** tab, do the following:
 - a. Select the top entry, which is **Intel® PRO/1000 MT Dual Port Server Adapter** (Type I MB) or **Intel® PRO/1000 EB Network Connection with I/O Acceleration** (Type II MB), and click **Set Primary**.
 - b. Select **Intel® PRO/1000 MT Dual Port Server Adapter #3** (Type I MB) or **Intel® PRO/1000 MT Dual Port Server Adapter** (Type II MB) and click **Set Secondary**.
10. Click **OK** and **OK** and to close dialog boxes.

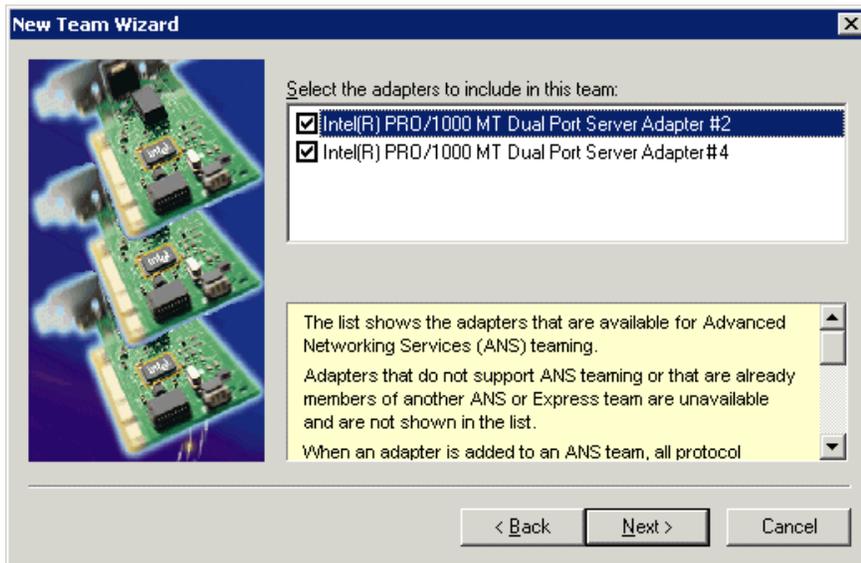
Continue with the next procedure [“Create the FTP Team”](#).

Create the FTP Team

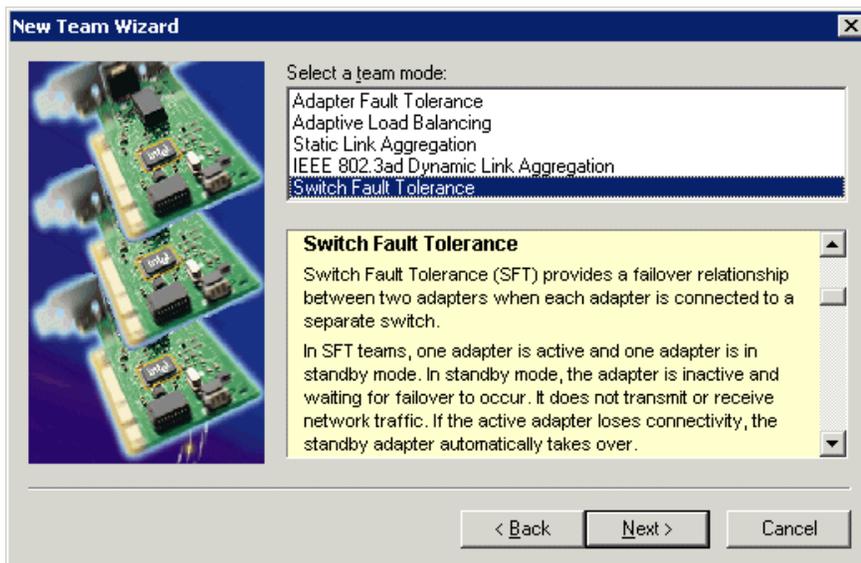
1. In Device Manager, right-click **...MT Dual Port Server Adapter #2** (Type I MB) or **...EB Network Connection with I/O Acceleration #2** (Type II MB) and select **Properties**. The Properties dialog box opens.
2. Select the **Teaming** tab.



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:

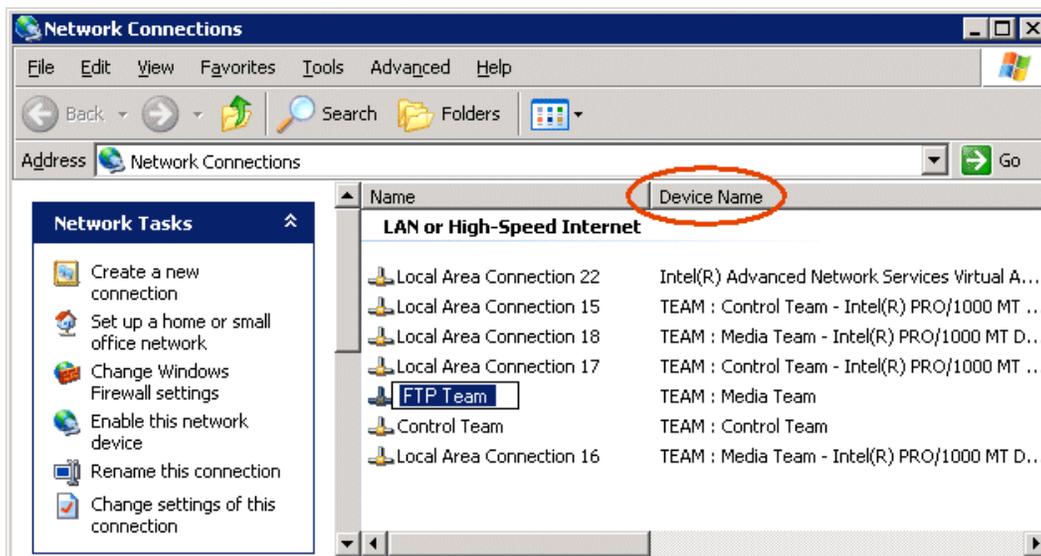
- a. In Device Manager | Network Adapters, right-click **TEAM: FTP TEAM** and select **Properties**. The Properties dialog box opens.
- b. Select the **Settings** tab.
- c. Click **Modify Team**. A dialog box opens.

9. On the **Adapters** tab, do the following:
 - a. Select the top entry, which is **Intel® PRO/1000 MT Dual Port Server Adapter #2** (Type I MB) or **Intel® PRO/1000 EB Network Connection with I/O Acceleration #2** (Type II MB), and click **Set Primary**.
 - b. Select the bottom entry, which is **Intel® PRO/1000 MT Dual Port Server Adapter #4** (Type I MB) or **Intel® PRO/1000 MT Dual Port Server Adapter #2** (Type II MB) 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

This procedure applies only to internal storage K2 Media Clients on which you have created a Control Team and a FTP Team, as instructed in previous procedures.

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 (Type I MB) -or- TEAM : Control Team - Intel® PRO/1000 EB Network Connection... (Type II MB)
...Connection #2	TEAM : Control Team - Intel® PRO/1000 MT Dual Port Server Adapter #3 (Type I MB) -or- TEAM : Control Team - Intel® PRO/1000 MT Dual Port Server Adapter (Type II MB)
Control Team	TEAM : Control Team
...Connection #3	Team : DO NOT USE ^a
Loopback	Microsoft Loopback Adapter
Media Connection #1	TEAM : Media Team - Intel® PRO/1000 MT Dual Port Server Adapter #2 (Type I MB) -or- TEAM : Media Team - Intel® PRO/1000 EB Network Connection...#2 (Type II MB)
Media Connection #2	TEAM : Media Team - Intel® PRO/1000 MT Dual Port Server Adapter #4 (Type I MB) -or- TEAM : Control Team - Intel® PRO/1000 MT Dual Port Server Adapter #2 (Type II MB)

^a. This team only on K2 Media Clients shipping before system software version 3.2.5x.

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.
2. On the menu bar at the top of the window, select **Advanced**, then **Advanced Settings...**
3. On the **Adapters and Bindings** tab, depending on the K2 Media Client’s storage, order adapters as follows:

Internal storage unteamed	Internal storage teamed	Direct-connect storage	Shared (SAN) storage
Loopback	Loopback	Loopback	Control Team
Control Connection #1	Control Team	Control Connection #1	Media Connection #1
Control Connection #2	FTP Team	Media Connection #1	Media Connection #2
Media Connection #1	—	—	Loopback
Media Connection #2	—	—	—

4. Click **OK** to close Advanced settings and accept the changes.

5. Close the Network Properties window.

The network configuration procedure is complete.

Modifying network settings

Before modifying network settings, consider the following:

- Loopback adapter — 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.)

- Hostname changes — 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 79](#) 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 stand-alone K2 Media Clients, it is important to understand that it does *not* run on shared 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 215](#).

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 134](#).

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 with K2 Media Client” on page 220](#).

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 stand-alone K2 Media Client or a K2 Media Server on the same network. For more information, refer to [“FTP access by automation” on page 79](#).
 - 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 stand-alone and shared 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 140.

FTP internationalization

The K2 FTP interface supports internationalization as follows:

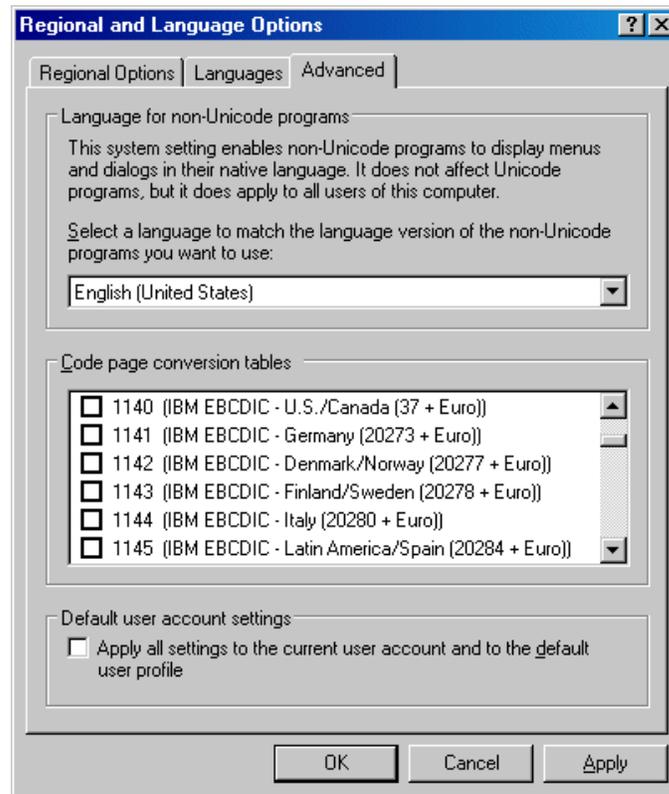
- Non-ASCII localized characters represented as UTF-8 characters.
- All FTP client/server commands are in ASCII.
- The named movie asset is Unicode 16-bit characters
- The K2 FTP client converts between Unicode and UTF-8 strings explicitly.

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 a 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

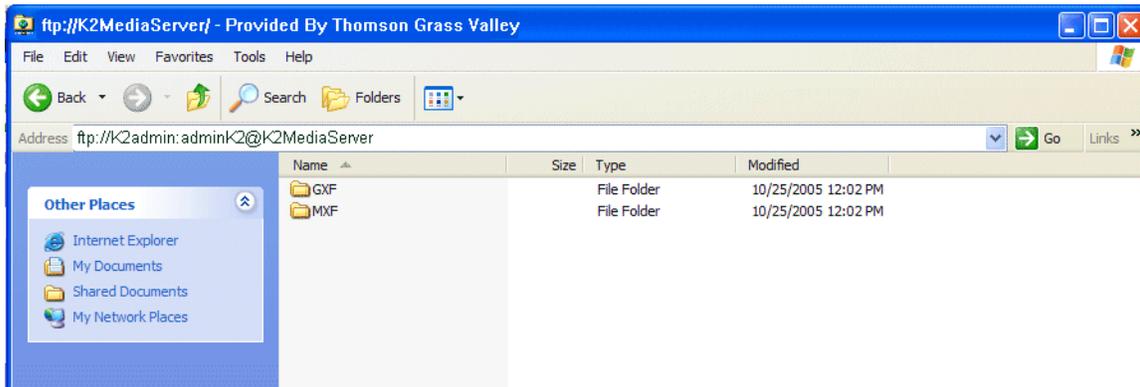
You can use Internet Explorer to transfer files via FTP between a PC and the FTP interface on a stand-alone K2 Media Client or a K2 Media Server, so long as both source and destination machines are on the same network.

While the K2 FTP interface supports local languages (see [“Internationalization” on page 215](#)) 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 140 for information about accounts and FTP access. The hostname can be the name of a stand-alone K2 Media Client or it can be the name of a K2 Media Server. (You cannot make a FTP connection to a K2 Media Client with shared storage or to a K2 Control Point PC.)

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



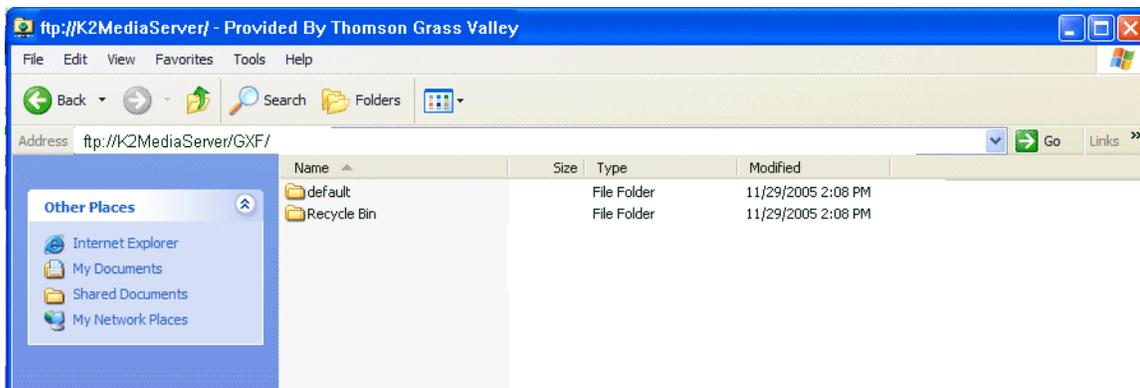
GXF — General Exchange Format (SMPTE 360M). This is the standard Grass Valley file interchange format, which supports:

- 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 stand-alone 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

Using the HotBin service

The following sections provide information for the K2 HotBin service.

- [“Prerequisite for using the HotBin service”](#)
- [“Configuring the HotBin service”](#)
- [“HotBin service components”](#)

About the HotBin service

The HotBin service (Grass Valley File-Import Watcher) provides a way to automate the import of files as clips into the K2 media file system and database. This is similar to what happens when you manually import files one at a time using K2 AppCenter import features, except with the HotBin service the files are automatically imported. The HotBin service can import any file or stream type that is supported as a K2 file-based import, as specified in [“Supported file input/output formats on K2 Media Client and K2 SAN”](#) on page 216.

By default, the HotBin service does not start automatically. If you have never configured or used the HotBin service, the service (Grass Valley File-Import Watcher) is set to startup type Manual. When you configure the HotBin service for the first time, the service is set to startup type Automatic. However, if you upgrade or otherwise re-install your K2 System Software, the service is re-set to startup type Manual. Therefore, you must re-configure the service after K2 System Software upgrade/reinstall in order to set the startup type back to Automatic.

There is no Grass Valley license required specifically for the HotBin service.

Before you can use the HotBin service, it must be configured through the K2 Capture Services utility. The HotBin service must be configured on the K2 system that receives the imported media. The K2 system that receives the imported media can be either a stand-alone K2 Media Client or the K2 Media Server with the role of primary FTP server on a K2 Storage System.

Once configured, the HotBin service monitors a watched folder (a HotBin). The watched folder is a specified source directory on a source PC. The watched folder can be on a stand-alone K2 Media Client, a K2 Media Server, a Windows PC, or a Macintosh. When files are placed in the watched folder, the HotBin service imports them as a clip into the specified destination bin. The destination bin is on the K2 system that receives the imported media and is within that K2 system’s media file system and database.

The HotBin service automatically creates sub-directories in the watched folder (source directory), described as follows:

- **Success** — After the HotBin service successfully imports the files in the source directory into the destination bin on the K2 system, it then moves those files into the Success directory.
- **Fail** — If the HotBin service can not successfully import the files in the source directory into the destination bin on the K2 system, it moves the failed files into the Fail directory.
- **Archive** — If there are files in the source directory when the Hot Bin service first starts up, it does not attempt to import those files into the K2 system. Instead, it

moves those files into the Archive directory. This occurs when you first configure the Hot Bin service, if you manually stop/start the Hot Bin service, and when you upgrade K2 system software.

Prerequisite for using the HotBin service

- K2 system software must be at version 3.2.56 or higher.

Configuring the HotBin service

When configuring the HotBin service, bear in mind the following considerations:

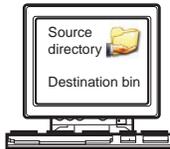
- You need to be logged with administrator privileges on the local K2 system as well as having the appropriate security permissions to access the source directory.
- If using the HotBin service on a K2 system with shared storage, the K2 Capture Services utility must be on a K2 server that is also an FTP server. (If your K2 system has multiple FTP servers, the utility must be on the primary FTP server.)
- The “Cleanup Frequency” (purge) feature deletes files in the Success sub-directory and in the Fail sub-directory. It does not delete files in the Archive sub-directory.
- Files in the Success, Fail, and Archive sub-directories are “hidden” files in Windows Explorer. To see these files you must select Show Hidden Files in the Windows Explorer Folder Options dialog box.
- It is recommended that you keep the source directory and destination bin located on the local V: drive, which is their default location.
- If you require that the source directory and destination bin be on different systems, system clocks must be synchronized. The Cleanup Frequency function depends on accurate system clocks.
- If you specify a destination bin name that does not yet exist, the K2 system creates it when files are transferred to it.

Grass Valley recommends that you use the HotBin service as demonstrated in the following diagram.

Using the HotBin service with a K2 client (Stand-alone)

1

On the K2 client, make the source directory a shared folder.



K2 client (stand-alone)

2

On your system, map a drive to the shared folder.



3

Transfer media files from your system to the shared folder on the mapped drive.

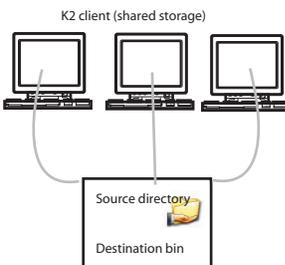
4

The HotBin service automatically imports files to the destination bin on the K2 client.

Using the HotBin service with a K2 SAN

1

On the K2 Media Server, make the source directory a shared folder.



K2 Media Server

2

On your system, map a drive to the shared folder.



3

Transfer media files from your system to the shared folder on the mapped drive.

4

The HotBin service automatically imports files to the destination bin on the K2 System.

While not preferred, you can also use the HotBin service if the source directory is on another system. The following table lists the requirements for accessing a source directory located on various operating systems.

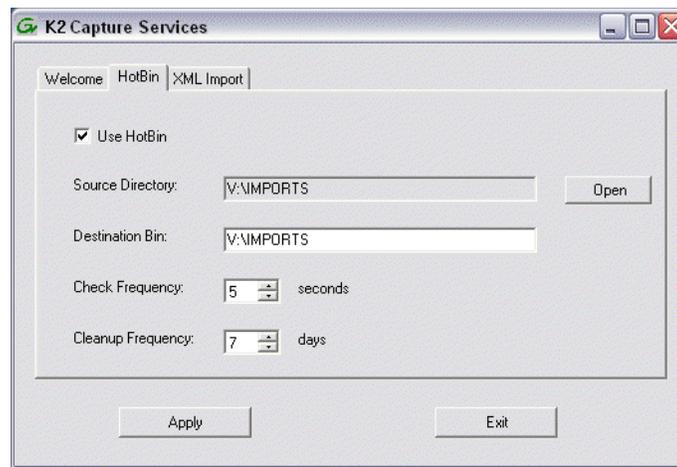
If your source directory is on:	... and the source directory is on a shared folder on a mapped drive, you need:
Another Windows system	<ul style="list-style-type: none"> Administrator privileges for the K2 system A user account with log-in service rights for your system
Macintosh operating system	<ul style="list-style-type: none"> Privileges as listed above. The identical user name and password on both systems. (For example, if you have a Macintosh user named Jane, you would need to have a user named Jane on your Windows system with the same password. From the Windows Control Panel, select administrator tools local security policy user rights assignment log on as service and click Add new user.)

HotBin imports are serialized. For example, if fourteen items are already queued up from ordinary transfers, and you drop a clip into the HotBin, the HotBin clip will get

transferred as the fifteenth clip in the transfer queue. Unlike the normal transfer process, the HotBin service does not queue the second clip until the first clip is imported.

To configure the HotBin service (Grass Valley File-Import Watcher), follow these steps:

1. From the **Start** menu, access the **Programs** menu and select **Grass Valley | K2 Capture Services**.
2. The K2 Capture Services utility dialog box is displayed. Click on the HotBin tab.



3. Enter the paths to the source directory and destination bin. If the source directory does not currently exist, it will automatically be created.
4. Specify how often you want the folder checked for new files and the file deletion age for files in the Success and Fail sub-directories, and click **Apply**.
5. If the source directory is not on the local K2 system, a User Account dialog box displays. Enter the user information that you use to access the source directory. If part of a domain, enter the domain name. Click **OK**.
6. A success message displays. Click **OK**. The HotBin service (Grass Valley File-Import Watcher) will keep running after you exit.

The HotBin service immediately checks the source directory for files. If files are present, the HotBin service moves them to the Archive sub-directory. It does not import the files into the destination bin on the K2 system.

7. Place files in the source directory to trigger the Hot Bin import processes.

HotBin service components

The following table describes the components of the HotBin service.

Name	Description
HotBin service (Grass Valley File-Import Watcher)	A service that will monitor a watched folder, also known as a source directory, that you specify. Files placed in this watched folder are automatically imported into the K2 system by the HotBin service (Grass Valley File-Import Watcher).
K2 Capture Services utility	Configures the HotBin service (Grass Valley File-Import Watcher).
Source directory (HotBin)	The watched folder that you can specify. Files placed in this watched folder are automatically imported to the K2 system. By default, the location of the source directory is <code>V: / IMPORTS</code> .
Check frequency	Determines how often the source directory is checked for new files.
Cleanup frequency	Determines how long a file remains in the Success sub-directory or in the Fail sub-directory. A file with a file-creation date older than the specified number of days is deleted.
Destination bin	The clip bin on the K2 where files from the source directory are imported into. By default, <code>V: / IMPORTS</code> .

Using the Pathfire capture service

The following sections provide information for the K2 Pathfire capture service.

- [“Prerequisites for using the Pathfire capture service”](#)
- [“Considerations for the Pathfire capture service”](#)
- [“Testing the Pathfire capture service”](#)
- [“Pathfire capture service components”](#)
- [“Installing Pathfire Transfer Service software”](#)
- [“Licensing Pathfire Transfer Service software”](#)

About the Pathfire capture service

The K2 Pathfire capture service provides a way to have Pathfire-delivered content automatically imported into a K2 system. The Pathfire capture service has a watched folder. The watched folder is a standard file system directory that can be recognized by the Windows operating system. The K2 system that hosts this directory (the watched folder) appears as a destination in the Pathfire application on the Pathfire system, so you can push the Pathfire-delivered content to the directory using the Pathfire application.

When media files arrive in the watched folder, they are detected by the K2 Pathfire capture service. The capture service then goes into action and does the necessary processing to import the media into the K2 media storage. This is similar to what happens when you manually import media using K2 AppCenter import features. The media is then available as a K2 clip, ready for playout.

The K2 Pathfire capture service and its watched folder must be on a K2 system that hosts the K2 FTP interface, as follows:

- A stand-alone K2 Media Client — When media files are pushed to the watched folder, the capture service imports the media into the internal media storage or direct-connect media storage of the K2 Media Client. The watched folder must be on the K2 Media Client’s V: drive.
- A K2 Media Server with role of FTP server — When media files are pushed to the watched folder, the capture service imports the media into the shared media storage of the K2 SAN. The watched folder must be on the K2 Media Server’s V: drive.

Prerequisites for using the Pathfire capture service

Before you can configure and use the Pathfire capture service, the following requirements must be satisfied:

- K2 system software must be at a version that supports the Pathfire capture service. Refer to *K2 Release Notes* for information on Pathfire capture service version compatibility.
- The K2 Pathfire capture service must be licensed on the stand-alone K2 Media Client or K2 Media Server. This is a Grass Valley software license.
- Pathfire Transfer Service software must be installed on the stand-alone K2 Media Client or on the K2 Media Server.

- The Pathfire Transfer Service software must be licensed on the stand-alone K2 Media Client or on the K2 Media Server. This is a Pathfire software license. If you are importing both HD content and SD content, two licenses are required.
- The K2 Pathfire capture service's watched folder must be configured as a destination for Pathfire-delivered content. You do this configuration as a part of the installation of the Pathfire Transfer Service software on the stand-alone K2 Media Client or on the K2 Media Server.
- The Pathfire system in your facility must be installed and operating correctly before you integrate it with the K2 Pathfire capture service.

Use procedures later in this section as appropriate to satisfy prerequisites.

Considerations for the Pathfire capture service

When you are configuring and using the K2 Pathfire capture service, bear in mind the following considerations:

- You must be logged in with administrator privileges on the stand-alone K2 Media Client or the K2 Media Server as well as having the appropriate security permissions to access the watched folder.
- If using the Pathfire capture service on a K2 SAN, the K2 Capture Services utility and the watched folder must be on a K2 Media Server that is also an FTP server. If your K2 SAN has multiple FTP servers, the utility must be on the primary FTP server.
- After the capture service imports media into K2 media storage successfully, the capture service immediately deletes the original media files from the watched folder. If the import fails, the original media files are retained in the watched folder for the number of days specified as the Cleanup Frequency.
- The transfer from the Pathfire system to the watched folder must be 100% complete before the K2 Pathfire capture service begins the import into K2 media storage.
- Imports are serialized. For example, if you drop two clips of Pathfire-delivered content into the watched folder, the Pathfire capture service does not queue the second clip for import until the first clip is imported. This is different than the ordinary K2 transfer process.
- Pathfire capture service imports are serialized with other K2 transfers. For example, if fourteen items are already queued up from ordinary K2 transfers, and you drop Pathfire-delivered content into the watched folder, the import triggered by the Pathfire capture service becomes the fifteenth clip in the transfer queue.
- When the Pathfire-delivered content becomes a K2 clip, it is given 16 audio tracks by default. If the original Pathfire-delivered content has less than 16 audio tracks, the remaining audio tracks of the K2 clip are silent.

Configuring the Pathfire capture service

To configure the K2 Pathfire capture service, follow these steps:

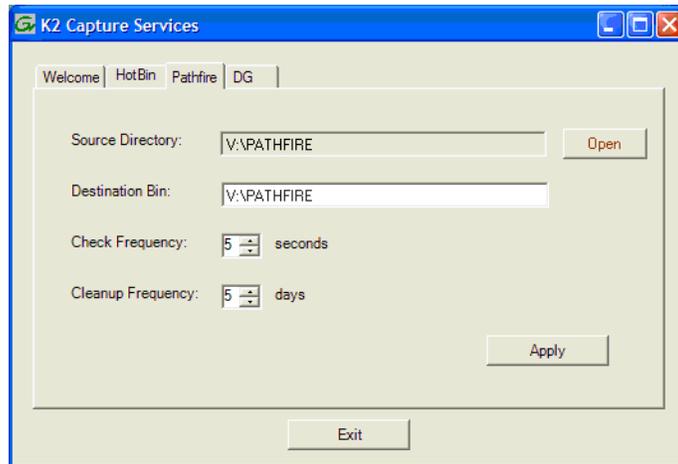
NOTE: *Once configured, the service deletes files in the watched folder (source directory) that are older than the specified cleanup frequency.*

1. From the **Start** menu, access the **Programs** menu and select **Grass Valley | K2 Capture Services**.

The K2 Capture Services utility dialog box is displayed.

2. Click on the Pathfire tab.

If you have not yet licensed the Pathfire capture service, a “...start the process of getting a license now?” message appears. Follow on-screen instructions to obtain a license. After licensing, restart the K2 Capture Services utility and continue with this procedure.



3. Enter the paths to the source directory and destination bin, which are defined as follows:

- **Source Directory** — This is the watched folder. It is a standard file system directory. It must be on the K2 system’s V: drive. When a file is placed in this directory, the Pathfire capture service automatically imports it into the K2 media storage.

NOTE: *The directory you configure here as the Source Directory must be configured as a destination for Pathfire-delivered content.*

- **Destination Bin** — The clip bin in the K2 media storage that receives the media imported by the K2 Pathfire capture service. The destination bin is in the K2 media database and it appears in AppCenter as a media bin. The bin must be on the K2 system’s V: drive. If you specify a destination bin name that does not yet exist, the K2 system creates it when files are imported to it.
4. For Check Frequency, it is recommended that you accept the default value. This value specifies how often you want the capture service to check the source directory for new files.
 5. For the Cleanup Frequency, it is recommended that you accept the default value. This value specifies the maximum age of files in the source directory. The capture service deletes files that are older than this age.
 6. When your Pathfire capture service settings are complete, click **Apply**.

7. A success message displays. Click **OK**. The Pathfire capture service starts up and continues to run after you exit.

The service immediately checks the source directory for any files that are beyond the specified cleanup age and deletes them from the directory.

Testing the Pathfire capture service

1. In the Pathfire application, drag Pathfire-delivered content onto the K2 system.
2. On the K2 System, open Windows Explorer, browse to the watched folder and verify that the files have arrived from Pathfire. The transfer from Pathfire must be 100% complete before the K2 Pathfire capture service triggers the import into K2 media storage.
3. Open AppCenter and use Transfer Monitor to verify that the transfer into K2 media storage is underway.
4. After the transfer into K2 media storage completes, verify that the media appears in the destination bin.
5. Playout the media to verify that the import was successful.

Pathfire capture service components

The following table describes the components that support K2 Pathfire capture service functionality.

Name	Description
Grass Valley Pathfire Bin service	This is the Pathfire capture service. It is the service that does the automatic import from the watched folder (source directory) to the K2 media storage (destination bin).
K2 Capture Services utility	Configures K2 capture services.
Source directory	This is the watched folder. It is a standard file system directory. When a file is placed in this directory, the Pathfire capture service automatically imports it into the K2 media storage. By default, the location of the source directory is V:\PATHFIRE.
Check frequency	Determines how often (in seconds) the watched folder is checked for new files.
Cleanup frequency	Determines how long (in days) a file remains in the watched folder. A file with a file-creation date older than the specified number of days is deleted.
Destination bin	The clip bin in the K2 media storage that receives the media imported by the K2 Pathfire capture service. The destination bin is in the K2 media database and appears in AppCenter as a media bin. By default, its location is V:\PATHFIRE.
DMGtransfer.exe	A program installed with Pathfire Transfer Service software. It appears only in the Windows operating system Task Manager.
Pathfire EsdClient service	A service installed with Pathfire Transfer Service software. It appears in the Windows operating system Services control panel. Its status should be Started, with startup type Automatic.

Name	Description
Pathfire logs	Find Pathfire logs at C:\Program Files\pathfire\logs.
Catch server	A generic term for a server dedicated to the purpose of downloading, capturing, and managing media content as it arrives via a specific distribution mechanism at a broadcast or media production facility. Examples of catch servers are a Pathfire DMG Server and a DG Spot Box.

Pathfire capture service procedures

Use the following procedures as necessary to support the operation of the Pathfire capture service in your facility.

Recovery after a failed Pathfire transfer

If the transfer of the Pathfire-delivered content into the watched folder fails, the Pathfire system manages the failure and reports errors. For some failure modes, such as a network outage, there might be some *.tmp files remaining in the watched folder as a result of the failed transfer. These files do not cause problems with subsequent transfers. Once you correct the problem that caused the original failure, if you restart the Pathfire transfer service and then transfer the same Pathfire-delivered content again, the transfer is successful. If the content is not transferred again, the *.tmp files persist until manually deleted.

Installing Pathfire Transfer Service software

To support K2 Capture Service features for automatically importing media from a Pathfire catch server, Pathfire software must be installed on a stand-alone K2 Media Client or on a K2 Media Server. This software is Pathfire software, not Grass Valley software. Likewise, its license is a Pathfire license, not a Grass Valley license.

You must procure a license file for the Pathfire license. Follow the instructions on the Software License sheet that you received from Grass Valley. You must prepare a text file with unique system identifiers and send the text file to Grass Valley in order to received license files.

Refer to *K2 Release Notes* for information on the compatible version of Pathfire Transfer Service software.

NOTE: The Pathfire Transfer Service software install deletes files in C:\temp. If you have any files in C:\temp that you want to save, copy the files to a different location before proceeding.

To install Pathfire software, you must run multiple installation programs, as directed by the following procedures:

Install first DMG Master software

1. If you have any files in C:\temp that you want to save, copy the files to a different location.
2. Place the Pathfire Transfer Service CD in the CD-ROM drive of the K2 Media Client or K2 Media Server.

3. On the CD, open *DMGMASTER40IT79.exe*. The name of this file might change slightly, depending on the version of Pathfire Transfer Service software.
InstallShield Wizard opens and extracts files for two sets of data. The entire extracting process is less than 3 minutes. When the process completes, the Pathfire Digital Media Gateway Installation program opens and runs.
4. When the Welcome to the InstallShield Wizard for DMG window displays, click **Next** to progress through the wizard.
5. When you arrive at the License Agreement window, click **Yes**.
6. In the Installation Type window, select **Station Integration (3xx, 6xx)** and then click **Next**.
7. In the Enter Text window, enter the IP address of the Pathfire DMG Receive Server from which you are pulling content as input for the K2 Pathfire capture service.
If an IP address is already entered, it is the IP address of the server as detected from a previous install.
8. Once the IP address of the Pathfire DMG Receive Server is correctly entered, click **Next**.
A series of message boxes display for approximately twelve minutes as the necessary “skins” are installed. Once completed, the DMG Install Complete dialog box displays.
9. In the DMG Install Complete dialog box, respond as appropriate to restart and allow the K2 Media Client or K2 Media Server to restart.
10. Continue with the next procedure [“Install second DMG Master software”](#).

Install second DMG Master software

Prerequisites for this procedure are as follows:

- The first DMG Master software is installed on the K2 Media Client or K2 Media Server.
1. If you have any files in *C:\temp* that you want to save and you have not already done so, copy the files to a different location.
 2. If you have not already done so, place the Transfer Service CD in the CD-ROM drive of the K2 Media Client or K2 Media Server.
 3. On the CD, open *DMGMASTER.exe*.
InstallShield Wizard opens and extracts files.
The Pathfire Digital Media Gateway Installation program opens and runs installation processes. This takes approximately two minutes. When installation processes are complete, the DMG Install Complete dialog box displays.
 4. In the DMG Install Complete dialog box, respond as appropriate to restart and allow the K2 Media Client or K2 Media Server to restart..
 5. Continue with the next procedure [“Install DMG Transfer Service software”](#).

Install DMG Transfer Service software

Prerequisites for this procedure are as follows:

- The first DMG Master software and the second DMG Master software is installed on the K2 Media Client or K2 Media Server.

Transfer Service has the capability to transfer HD content and SD content. However, HD does not transfer to a SD destination nor does SD transfer to a HD destination. Therefore, if both types of content flow through the Transfer Service process, they each require their own destination.

1. If you have any files in *C:\temp* that you want to save and you have not already done so, copy the files to a different location.
2. If you have not already done so, place the Transfer Service CD in the CD-ROM drive of the K2 Media Client or K2 Media Server.
3. On the CD, open *DMGTRANSFER.exe*.
InstallShield Wizard opens and extracts files, then the Pathfire Digital Media Gateway Installation program opens.
4. In the Information window, click **Next**.
5. In the Type window, select **Server Connect for Programming** and then click **Next**.
6. In the Destinations window, select **Configure destination one** and then click **Next**.
If SD and HD destinations are required, configure the SD first.
7. In the Enter Text window, type the name of the K2 Media Client or K2 Media Server on which you are now installing the Pathfire software.
This name does not have to match any DNS names or computer names. However, it should be a name that is recognized when working in the Destinations window of the Pathfire DMG application.
8. In the Destinations window, click **Next**.
9. In the next Enter Text window, type a description that applies to the K2 Media Client or K2 Media Server on which you are now installing the Pathfire software, and then click **Next**.
10. In the Transfer Engine window, select **DirectConnect** and then click **Next**.
11. In the Video Resolution window, select the video resolution for this destination. If SD and HD destinations are required, configure destination one for SD and destination two for HD. Then click **Next**.
The Enter default output directory window dialog box opens.
12. Enter the path that specifies the K2 Pathfire capture service watched folder and then click **OK**.
In the K2 Capture Services utility, this watched folder is labeled the Source Directory.
13. In the Destinations window, do one of the following:
 - If you require another destination (such as the HD destination), select **Configure destination two** and click **Next**. Repeat previous steps to configure the

destination.

- If all your required destinations are configured, select **Done** and then click **Next**.

After a few seconds of inactivity, a series of install windows flash.

When the install is complete the installation programs close and the Windows desktop appears.

14. Restart (boot) the K2 Media Client or K2 Media Server using the Windows operating system restart procedure.
15. Continue with the next procedure "[Licensing Pathfire Transfer Service software](#)".

Licensing Pathfire Transfer Service software

There are two licenses required for operation of the Pathfire capture service, as follows:

- The Pathfire Transfer Service license, as explained in this section. The license for Pathfire Transfer Service software is a Pathfire license, not a Grass Valley license. You must license the Pathfire software on the stand-alone K2 Media Client or the K2 Media Server.
- The K2 Pathfire capture service license, which is a Grass Valley license. Refer to "[Licensing K2 capture service software](#)" on page 104.

Prerequisites for this procedure are as follows:

- The first DMG Master software, the second DMG Master software, and the DMG Transfer Service is installed on the K2 Media Client or K2 Media Server.
- You have procured the license file. Follow the instructions on the Software License sheet that you received from Grass Valley. You must prepare a text file with unique system identifiers and send the text file to Grass Valley in order to receive license files.

1. Copy the license file to *C:\Program Files\pathfire\dmg\skippy\dat*.
2. Click **Start | All Programs | StartUp | Transfer**.
3. Press **Ctrl + Alt + Delete**. The Windows Security dialog box opens.
4. Click **Task Manager**. Windows Task Manager opens.
5. In Task Manager, confirm that **DMGTransfer.exe** is running.
6. Restart (boot) the K2 Media Client or K2 Media Server using the Windows operating system restart procedure.

The Pathfire software is installed and licensed.

Using the DG capture service

The following sections provide information for the K2 DG capture service.

- [“About the DG capture service”](#)
- [“Prerequisites for using the DG capture service”](#)
- [“Configuring the DG capture service”](#)
- [“Testing the DG capture service”](#)
- [“DG capture service procedures”](#)
- [“DG capture service components”](#)

About the DG capture service

The K2 DG capture service provides a way to have DG spots automatically imported into a K2 system. The DG capture service watches for DG spots as they become available on DG Spot Box. When an operator on the DB Spot Box assigns a house ID to a DG spot, the spot is detected by the K2 DG capture service. The capture service then goes into action and does the necessary processing to import the spot into the K2 media storage. This is similar to what happens when you manually import media using K2 AppCenter import features. The spot is then available as a K2 clip, ready for playout.

The K2 DG capture service controls transfers and manages house IDs for spots. In order to track house IDs, the K2 capture service creates two instances in the K2 media database for each spot. One instance is in the destination bin. The other instance is in a tracking bin. Playout and other normal media operations take place from the destination bin. The tracking bin is used internally by the DG capture service for house ID tracking purposes. The tracking bin is not available for normal operations.

The DG capture service must run on a K2 system that hosts the K2 FTP interface, as follows:

- A stand-alone K2 Media Client — The K2 DG capture service imports DG spots into the internal media storage or direct-connect media storage of the K2 Media Client.
- A K2 Media Server with role of FTP server — The K2 DG capture service imports DG spots into the shared media storage of the K2 SAN.

Prerequisites for using the DG capture service

Before you can configure and use the DG capture service, the following requirements must be satisfied:

- K2 system software must be at a version that supports the DG capture service. Refer to *K2 Release Notes* for information on DG capture service support.
- The DG capture service must be licensed on the stand-alone K2 Media Client or K2 Media Server. This is a Grass Valley software license.
- The DG system in your facility must be installed and operating correctly before you can integrate it with the K2 DG capture service.

Use procedures later in this section as appropriate to satisfy pre-requisites.

Configuring the DG capture service

When configuring the K2 DG capture service, bear in mind the following considerations:

- You must be logged in with administrator privileges on the stand-alone K2 Media Client or the K2 Media Server.
- If using the DG capture service on a K2 SAN, the K2 Capture Services utility must be on a K2 Media Server that is also an FTP server. If your K2 SAN has multiple FTP servers, the utility must be on the primary FTP server.
- Imports are serialized. For example, if two clips become available on the DG Spot Box, the DG capture service does not queue the second clip for import until the first clip is finished importing. This is different than the ordinary K2 transfer process.
- DG capture service imports are serialized with other K2 transfers. For example, if fourteen items are already queued up from ordinary K2 transfers, and a DG spot becomes available for import, the import triggered by the DG capture service becomes the fifteenth clip in the transfer queue.

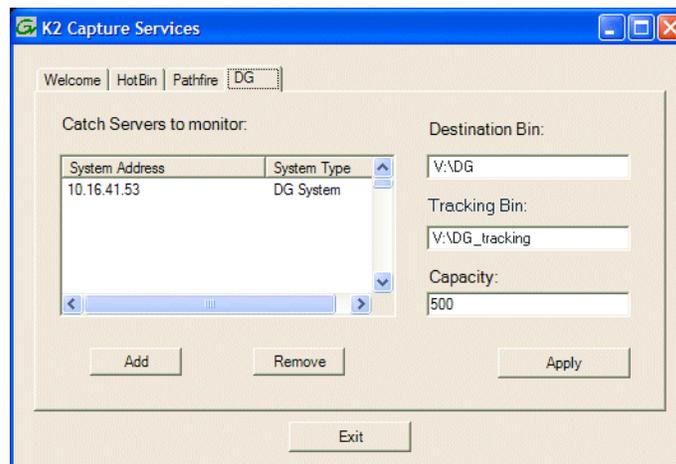
To configure the DG capture service, follow these steps:

1. From the **Start** menu, access the **Programs** menu and select **Grass Valley | K2 Capture Services**.

The K2 Capture Services utility dialog box is displayed.

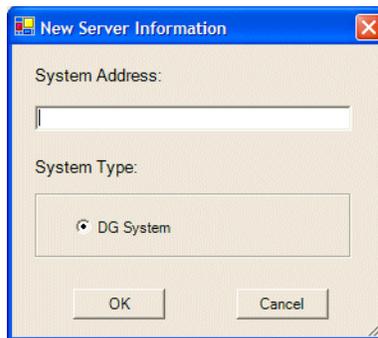
2. Click on the DG tab.

If you have not yet licensed the DG capture service, a "...start the process of getting a license now?" message appears. Follow on-screen instructions to obtain a license. After licensing, restart the K2 Capture Services utility and continue with this procedure.



3. Enter the paths to the destination bin and the tracking bin, which are defined as follows:

- **Destination Bin** — This is the clip bin in the K2 media storage that receives the media imported by the DG capture service. The destination bin is defined by the K2 media database and appears in AppCenter as a media bin. The bin must be on the K2 system's V: drive.
 - **Tracking Bin** — This is another clip bin in the K2 media storage. This bin is used by the K2 capture service. It stores a second instance of each spot, for the purpose of tracking house IDs. You do not use it for normal K2 media operations. The bin must be on the K2 system's V: drive. If you specify a bin name that does not yet exist, the K2 system creates it when files are imported to it.
4. Set the Capacity, which specifies the maximum number of DG spots retained in K2 media storage. When this maximum number is reached, the DG capture service deletes the five oldest spots from the K2 media storage. Set the capacity to be larger than the capacity of the DG Spot Box.
 5. Click **Add**. The New Server Information dialog box opens.



6. Enter the IP address of the DG Spot Box and click **OK**.
7. When your DG capture service settings are complete, on the K2 Capture Services utility dialog box, click **Apply**.
8. A success message displays. Click **OK**. The DG capture service starts up and continues to run after you exit.

Testing the DG capture service

1. On the DG Spot Box, assign a house ID to a spot.
2. On the K2 system, open AppCenter and verify that the media has been imported into the destination bin.
3. Playout the media to verify that the import was successful.

DG capture service procedures

Use the following procedures as necessary to support the operation of the DG capture service in your facility.

Deleting a spot

If you want to delete a spot, you must delete for all instances of the spot in the proper sequence so that no references to the house ID remain. Use the following procedure:

1. In AppCenter, delete the spot from the destination bin.
2. In AppCenter, delete the spot from the tracking bin.
3. On the DG Spot Box, delete the spot.

DG capture service components

The following table describes the components that support K2 DG capture service functionality.

Name	Description
Grass Valley DG Capture service	This is the DG capture service. It is the service that does the automatic import of DG spots to the K2 media storage.
K2 Capture Services utility	Configures K2 capture services.
Destination Bin	This is the clip bin in the K2 media storage that receives the media imported by the DG capture service. The destination bin is in the K2 media database and appears in AppCenter as a media bin. The bin must be on the K2 system's V: drive. By default, the location is V:\DG.
Shallow Copy Bin	This is another clip bin in the K2 media storage. This bin is used by the K2 capture service. It stores a second instance of each spot, for the purpose of tracking house IDs. You do not use it for normal K2 media operations. The bin must be on the K2 system's V: drive. By default, the location is V:\DG_Tracking.
Capacity	The maximum number of DG spots retained in K2 media storage. When this maximum number is reached, the DG capture service deletes the five oldest spots from the K2 media storage.
Catch server	A generic term for a server dedicated to the purpose of downloading, capturing, and managing media content as it arrives via a specific distribution mechanism at a broadcast or media production facility. Examples of catch servers are a Pathfire DMG Server and a DG Spot Box.

Using the XML Import capture service

The following sections provide information for the K2 XML Import capture service.

- [“Prerequisites for using the XML Import capture service”](#)
- [“Considerations for the XML Import capture service”](#)
- [“Configuring the XML Import capture service”](#)
- [“Testing the XML Import capture service”](#)
- [“XML Import capture service components”](#)

About the XML Import capture service

The K2 XML Import capture service provides a way to have media automatically imported into a K2 system when it is pushed to the K2 system by a third party application. The XML Import capture service has a watched folder. The watched folder is a standard file system directory that can be recognized by the Windows operating system. You push the media to the directory using the third party application.

After all the media files are finished being transferred to the watched folder, the third party application then transfers an XML file to the watched folder. This XML file defines the media files and specifies how they are to be assembled to create a K2 clip. When the XML file finishes transferring to the watched folder, the capture service goes into action and validates the XML file to make sure it has the proper structure. If the XML file is valid, the capture service then does the necessary processing to create the clip in the K2 media storage. The media is then available as a K2 clip, ready for payout.

The K2 XML Import capture service and its watched folder must be on a K2 system that hosts the K2 FTP interface, as follows:

- A stand-alone K2 Media Client — When media files and the XML file are pushed to the watched folder, the capture service creates a K2 clip in the internal storage or direct-connect media storage of the K2 Media Client. The watched folder must be on the K2 Media Client’s V: drive.
- A K2 Media Server with role of FTP server — When media files are pushed to the watched folder, the capture service creates a K2 clip in the shared media storage of the K2 SAN. The watched folder must be on the K2 Media Server’s V: drive.

Prerequisites for using the XML Import capture service

Before you can configure and use the XML Import capture service, the following requirements must be satisfied:

- K2 system software must be at a version that supports the XML Import capture service. Refer to *K2 Release Notes* for information on XML Import capture service version compatibility.
- The K2 XML Import capture service must be licensed on the stand-alone K2 Media Client or K2 Media Server. This is a Grass Valley software license.
- The application that pushes the media files and XML file to the watched folder must provide valid files according to K2 XML Import capture service

requirements. Developers of applications can contact Grass Valley Developer Support for more information.

Use procedures later in this section as appropriate to satisfy prerequisites.

Considerations for the XML Import capture service

When you are configuring and using the K2 XML Import capture service, bear in mind the following considerations:

- You must be logged in with administrator privileges on the stand-alone K2 Media Client or the K2 Media Server as well as having the appropriate security permissions to access the watched folder.
- If using the XML Import capture service on a K2 SAN, the K2 Capture Services utility and the watched folder must be on a K2 Media Server that is also an FTP server. If your K2 SAN has multiple FTP servers, the utility must be on the primary FTP server.
- After the capture service creates the clip in the K2 media storage successfully, the capture service immediately deletes the original media files from the watched folder. If the import fails, the original media files are retained in the watched folder for the number of days specified as the Cleanup Frequency.
- The transfer of the media files, then the XML file, must be 100% complete before the K2 XML Import capture service begins to create the clip in K2 media storage.

Configuring the XML Import capture service

To configure the K2 XML Import capture service, follow these steps:

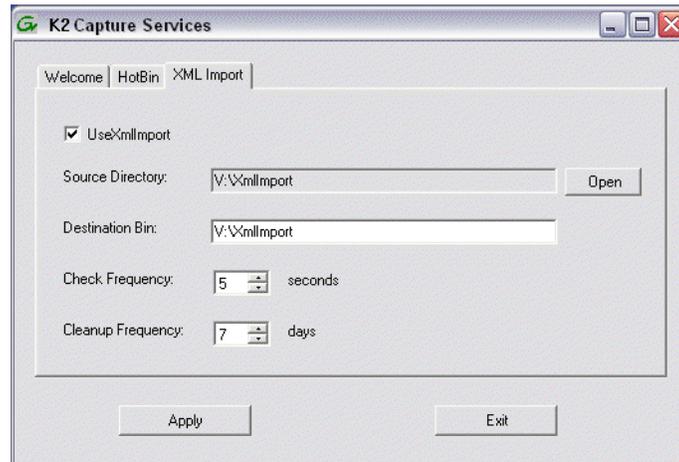
NOTE: *Once configured, the service deletes files in the watched folder (source directory) that are older than the specified cleanup frequency.*

1. From the **Start** menu, access the **Programs** menu and select **Grass Valley | K2 Capture Services**.

The K2 Capture Services utility dialog box is displayed.

2. Click on the **XML** tab.

If you have not yet licensed the XML Import capture service, a "...start the process of getting a license now?" message appears. Follow on-screen instructions to obtain a license. After licensing, restart the K2 Capture Services utility and continue with this procedure.



3. Enter the paths to the source directory and destination bin, which are defined as follows:
 - **Source Directory** — This is the watched folder. It is a standard file system directory. It must be on the K2 system's V: drive. When media files, then a valid XML file, are placed in this directory, the XML Import capture service automatically creates a K2 clip in the K2 media storage.
 - **Destination Bin** — The clip bin in the K2 media storage that receives the media processed by the K2 XML Import capture service. The destination bin is in the K2 media database and it appears in AppCenter as a media bin. The bin must be on the K2 system's V: drive. If you specify a destination bin name that does not yet exist, the K2 system creates it when the K2 clip is created.
4. For Check Frequency, it is recommended that you accept the default value. This value specifies how often you want the capture service to check the source directory for new files.
5. For the Cleanup Frequency, it is recommended that you accept the default value. This value specifies the maximum age of files in the source directory. The capture service deletes files that are older than this age.
6. When your XML Import capture service settings are complete, click **Apply**.
7. A success message displays. Click **OK**. The XML Import capture service starts up and continues to run after you exit.

The service immediately checks the source directory for any files that are beyond the specified cleanup age and deletes them from the directory.

Testing the XML Import capture service

1. Place media files into the watched folder.
2. On the K2 System, open Windows Explorer, browse to the watched folder and verify that the files have completed the transfer. The transfer must be 100% complete before proceeding.
3. Place a valid XML file into the watched folder.

4. On the K2 System, open Windows Explorer, browse to the watched folder and verify that XML file has completed the transfer. The transfer must be 100% complete before the K2 XML Import capture service triggers the processes to create the K2 clip.
5. After the K2 clip is created, verify that the media appears in the destination bin.
6. Playout the media to verify that the clip was successfully created.

XML Import capture service components

The following table describes the components that support K2 XML Import capture service functionality.

Name	Description
Grass Valley XML Movie Importer service	This is the XML Import capture service. It is the service that automatically creates the K2 clip from the media files in the watched folder (source directory) and puts the K2 clip in the K2 media storage (destination bin).
K2 Capture Services utility	Configures K2 capture services.
Source directory	This is the watched folder. It is a standard file system directory. When media files, then a valid XML file, are placed in this directory, the XML Import capture service automatically creates a K2 clip in the K2 media storage. By default, the location of the source directory is <code>V:\XmlImport</code> .
Check frequency	Determines how often (in seconds) the watched folder is checked for new files.
Cleanup frequency	Determines how long (in days) a file remains in the watched folder. A file with a file-creation date older than the specified number of days is deleted.
Destination bin	The clip bin in the K2 media storage that receives the K2 clip created by the K2 XML Import capture service. The destination bin is in the K2 media database and appears in AppCenter as a media bin. By default, its location is <code>V:\XmlImport</code> .

Licensing K2 capture service software

Licensing is required for K2 capture service software as follows:

- To use the Pathfire capture service, you must obtain a Pathfire capture service license from Grass Valley.
- To use the DG capture service, you must obtain a DG capture service license from Grass Valley.
- To use the XML Import capture service, you must obtain a XML Import capture service license from Grass Valley.

Licenses are requested through the K2 License Wizard and managed through the SabreTooth License Manager, which are installed with K2 system software.

To start the licensing process, open the K2 Capture Services utility and click on either the Pathfire tab or the DG tab. If you do not yet have a license, a "...start the process of getting a license now?" message appears. Click **Yes** and **OK** to open the K2 License Wizard for the type of license. Refer to *K2 Release Notes* for procedures and information on obtaining and managing licenses.

Pinnacle support

The K2 system can automatically convert Pinnacle material into K2 clips as part of a FTP transfer or a HotBin import, as described in the following sections:

Pinnacle material that can be converted

A Pinnacle clip is stored as a folder on a Pinnacle MediaStream server. The folder structure for its MPEG program/system stream based content is as follows:

- <folder> clipname
 - <file> header (contains Pinnacle clip metadata)
 - <file> ft (Pinnacle version of "Frame Index Table")
 - <file> info (File used to hold automation specific data. Not used by Pinnacle.)
 - <file> std (The MPEG program or system stream - essence/media)

You have the following options for the Pinnacle material to convert:

- Convert only the media essence (the *std* file).
- Convert the metadata along with the media essence.

Import mechanisms

You have the following options for import/transfer mechanisms:

- K2 HotBin import — This method converts only the media essence. It does not convert the Pinnacle clip metadata. You drop the Pinnacle clip's *std* file into a K2 HotBin. Then the K2 HotBin process imports, converts, and creates a K2 clip. The K2 clip is available for playout when the process is complete.
- K2 FTP import — This method converts only the media essence. It does not convert the Pinnacle clip metadata. Your third-party FTP client connects to the K2 FTP server as a normal K2 FTP session and puts the Pinnacle clip's *std* file.
- Pinnacle emulation K2 FTP import — This method converts the Pinnacle clip metadata along with the media essence. Your third-party automation vendor or FTP client connects to the K2 FTP server with the Pinnacle specific login, creates a new directory, and puts the Pinnacle clip files in the new directory. The K2 FTP server creates a corresponding K2 clip. The K2 clip is available for playout while the content is being transferred. The K2 clip contains timecode, mark in/out points, and other metadata as defined by the Pinnacle clip metadata.

Enabling Pinnacle import

You must configure the K2 Media Server or stand-alone K2 client system to detect and convert Pinnacle material. To do this, the following registry value must be created before importing the media:

```
HKEY_LOCAL_MACHINE\Software\Grass Valley Group\Streaming  
REG_DWORD "ImportPinnacleStreams" = 1
```

If, optionally, you want the K2 system to extract VITC timecode that is carried as uncompressed VBI lines in the Pinnacle private data of the program stream, you must create the following registry value before importing the media:

```
HKEY_LOCAL_MACHINE\Software\Grass Valley Group\Streaming  
REG_DWORD "ExtractPinnacleVite" = 1
```

Similarly, if you want the K2 system to extract and demodulate close-captioning or teletext data from Pinnacle uncompressed VBI lines, you must create the following registry value before importing the media:

```
HKEY_LOCAL_MACHINE\Software\Grass Valley Group\Streaming  
REG_DWORD "ExtractPinnacleCaptions" = 1
```

Importing via K2 Hot Bin

1. If you have not already done so, configure a K2 HotBin.
2. Rename the Pinnacle clip's *std* file with your desired K2 clip name and a *.mpg* extension.
3. Drop the file in the K2 HotBin.

Importing via K2 FTP

1. With your third-party FTP client, connects to the K2 FTP server as a standard K2 FTP session.
2. Use the FTP *put* command to transfer the Pinnacle clip's *std* file with your desired K2 clip name.

Use the following example as a guideline:

```
ftp mx-proto-b14  
Connected to mx-proto-b14.  
220 FTP Server (1, 0, 0, 1) ready.  
User (mx-proto-b14:(none)): administrator  
331 Password required for user administrator.  
Password:  
230 Logged in, and aspect successfully set to MOVIE,  
stream mode GXF.  
ftp> bin  
200 Type set to IMAGE.
```

```
ftp> put std /MPG/V:/default/646405_IMX30_ MXF_IPN
200 PORT command okay.
150 Opening MOVIE mode data connection for /
explodedFile/V:/default/646405_IMX30_ MXF_IPN.
226 Transfer complete.
ftp: 54547968 bytes sent in 14.05Seconds 3883.25Kbytes/
sec.
ftp> quit
221 Goodbye.
```

Importing via Pinnacle emulation K2 FTP

1. With your third-party automation vendor or FTP client, connect to the K2 FTP server as follows:
 - FTP username: vf_server
 - FTP password: .vf_serverThe username and password are case sensitive.
2. Create a directory named for the Pinnacle clip.
3. Put the following Pinnacle clip files in the directory in the following order:

```
header
ft
info (optional)
std
```

Use the following example as a guideline:

```
J:\>ftp mx-proto-b14
Connected to mx-proto-b14.
220 FTP Server (1, 0, 0, 1) ready.
User (mx-proto-b14:(none)): video_fs
331 Password required for user video_fs.
Password:
230 Logged in, and aspect successfully set to MOVIE,
stream mode PIN.
ftp> bin
200 Type set to IMAGE.
ftp> mkdir pinnacle_clip
250 Command "XMKD pinnacle_clip" succeeded.
ftp> cd pinnacle_clip
250 Change of directory to explodedFile/V:/default/
pinnacle_clip successful, xfer mode PIN.
```

```
ftp> put header
200 PORT command okay.
150 Opening MOVIE mode data connection for header.
226 Transfer complete.
ftp: 132 bytes sent in 0.00Seconds 132000.00Kbytes/sec.
ftp> put ft
200 PORT command okay.
150 Opening MOVIE mode data connection for ft.
226 Transfer complete.
ftp: 393216 bytes sent in 0.11Seconds 3574.69Kbytes/sec.
ftp> put std
200 PORT command okay.
150 Opening MOVIE mode data connection for /
explodedFile/V:/default/pinnacle_clip.
226 Transfer complete.
ftp: 56097960 bytes sent in 16.25Seconds 3452.18Kbytes/
sec.
ftp> quit
221 Goodbye.
```

Specifications for Pinnacle support

- Pinnacle clips do not indicate timecode as “drop-frame”. The K2 import assumes non-drop-frame values.
- The time-code used in the header file and recorded into the MPEG Video GOP header starts out as 00:00:00:00 by default. If the option to extract VITC is not enabled, or no VITC is detected on import, timecode extracted from the MPEG Video GOP manifests as the timecode track for the imported K2 clip.
- Pinnacle servers preserve non-MPEG-1 (Musicam) audio as Pinnacle-private elementary streams within the program stream *std* file. Pinnacle clips allow up to 8 channels of audio. On import the K2 system detects the private stream audio packets when they are present and generates the appropriate K2 audio track(s).
- When importing Pinnacle content recorded as an MPEG1 system stream, any Pinnacle-private audio from MPEG2 program stream based clips is lost.
- The K2 system supports extraction of the following kinds of Pinnacle-private audio:
 - PCM-16, PCM-20 (PCM-20 is converted into PCM-24 on import)
 - DolbyE and AC-3
- If you enable the option via registry key, the K2 system examines specific VBI lines when it detects Pinnacle-private VBI lines, as follows:
 - Line 21 (default, can be overridden via registry) is examined for the presence of

close captioning or SDP teletext. If detected, this is appropriately de-modulated into EIA-608 close caption or OP-47 subtitling packets and inserted as ancillary data packets into an ancillary data track on the imported clip.

- Line 19-PAL and 14-NTSC (default, can be overridden via registry) is examined for the presence of VITC. If detected, this is appropriately de-modulated into SMPTE 12M compliant time-code values which is inserted as time-code values into the time-code track on the imported clip.
- The following applies to the Pinnacle emulation K2 FTP import:
 - All supported FTP commands, with the exception of those mentioned below, respond as they do for a conventional K2 FTP session. For instance, commands such as renames and deletes operate on K2 clips, directory listings reveal K2 clips and bins, and so on.
 - Navigation (*cd*) to K2 bins is allowed. By default, the *default* K2 bin is projected as the FTP root.
 - The *MKD/XMKD* command does not create a K2 bin for the argument specified, but merely retains the argument as the name of the K2 clip to be created based on following *STOR* commands.
 - The *CWD/XCWD* command does not allow navigation to a K2 bin. If the Pinnacle clip name used in a previous *MKD* command is used as an argument to *CWD*, the K2 FTP server does not internally navigate to that “bin”, but rather merely returns a success status.
 - The *STOR* command only honors *ft*, *std*, or *header* as arguments, or filenames with a *.mxf* extension. When the K2 FTP server receives data for the *std* file it creates a K2 clip with the name issued by a previous *MKD/XMKD* command.

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.

K2 Media Clients have been manufactured with two types of RS-422 configurations, as follows:

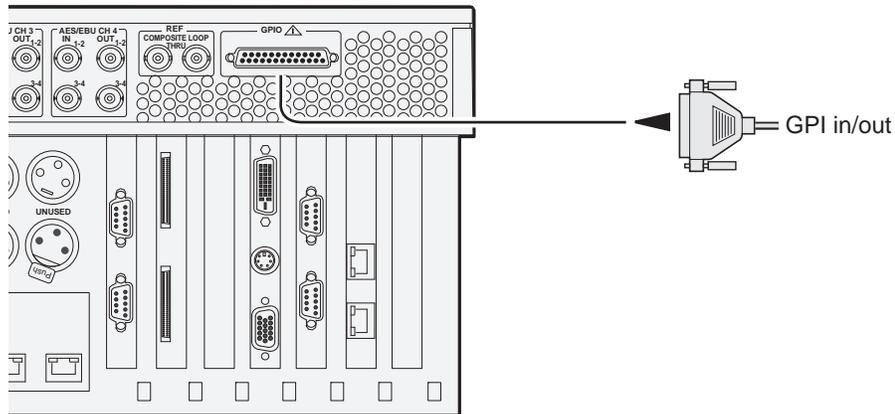
- Two dual-port adapters.
- One adapter with an external 8-port interface. On the external interface, ports 1–4 are active.

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 194](#)
- [“GPI I/O connector pinouts” on page 230](#)

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 stand-alone K2 Media Client. 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 a shared storage (SAN) K2 Media Client. For shared 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 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 a stand-alone 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 stand-alone K2 Media Client whose 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 stand-alone K2 Media Client. You should never connect Storage Utility directly to a K2 Media Client that uses shared (SAN) 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 117](#).

Opening Storage Utility Independently

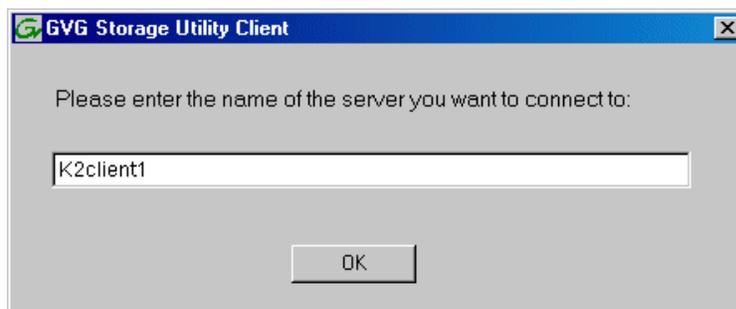
Do not open Storage Utility independently unless there is a problem that prevents you from opening it through AppCenter.

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 stand-alone K2 Media Client. You should never connect Storage Utility directly to a K2 Media Client that uses shared 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.

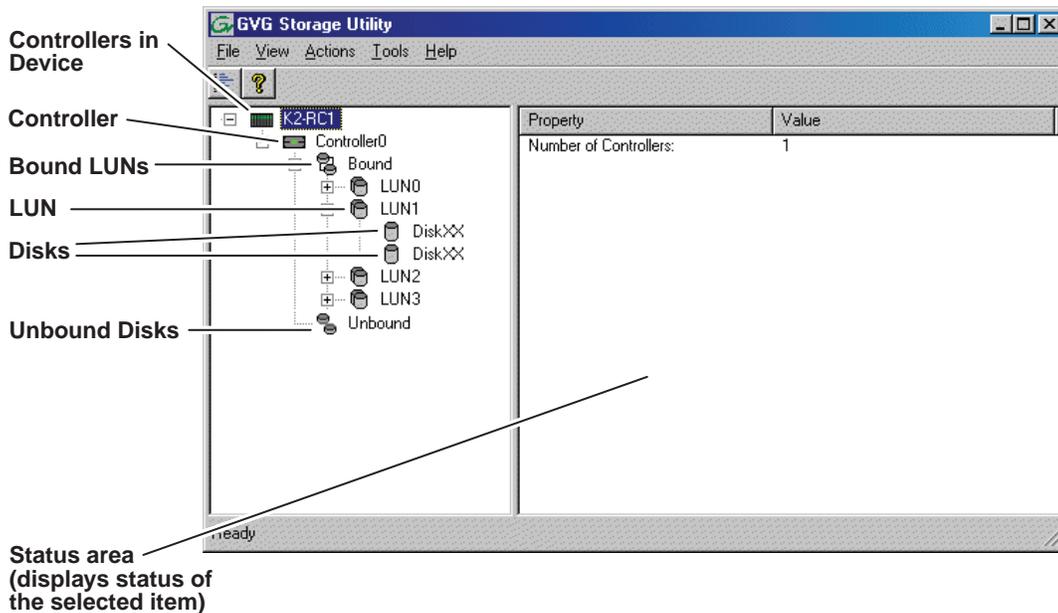


3. Logon to Storage Utility. Make sure you logon with appropriate privileges. Administrator-level permission is necessary for most Storage Utility operations. For User name, you might need to enter the machine name as the domain to successfully log on.

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 117](#).

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.

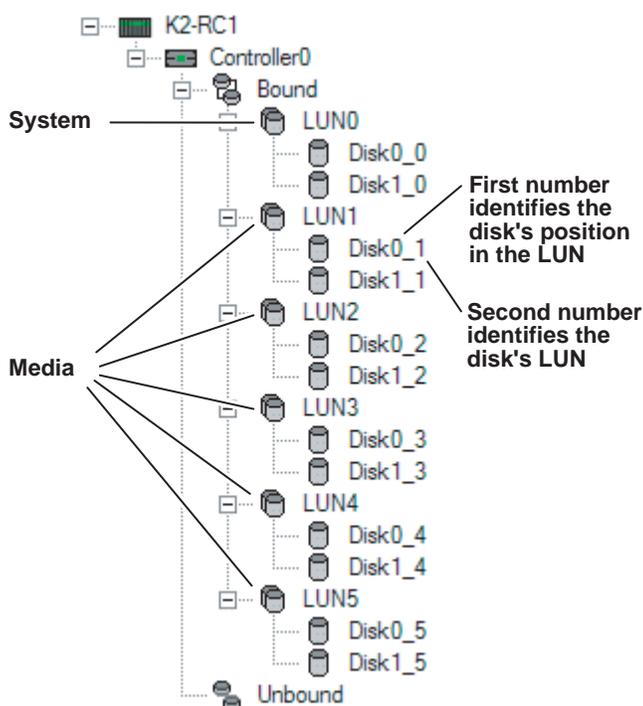
Identifying disks

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 internal storage 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 internal storage disk or disks display a flashing pattern alternating yellow/green once a second. This flashing pattern can stop automatically after a specific time interval, such as ten seconds. 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 0 there is no RAID redundancy, so disks do not rebuild. With other RAID types, such as 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

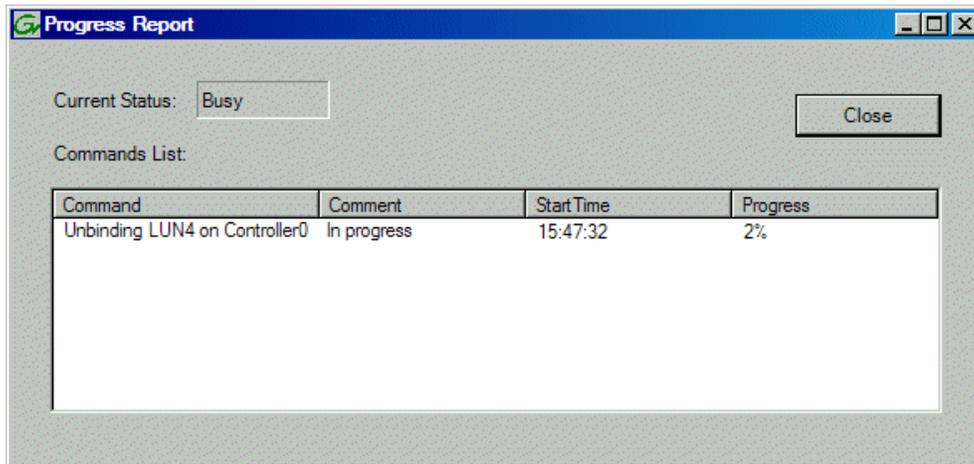
You can only unbind one LUN at a time. Also make sure the controller is not busy with other processes, such as rebuilding a disk. If the controller is busy, the unbind LUN operation fails.



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

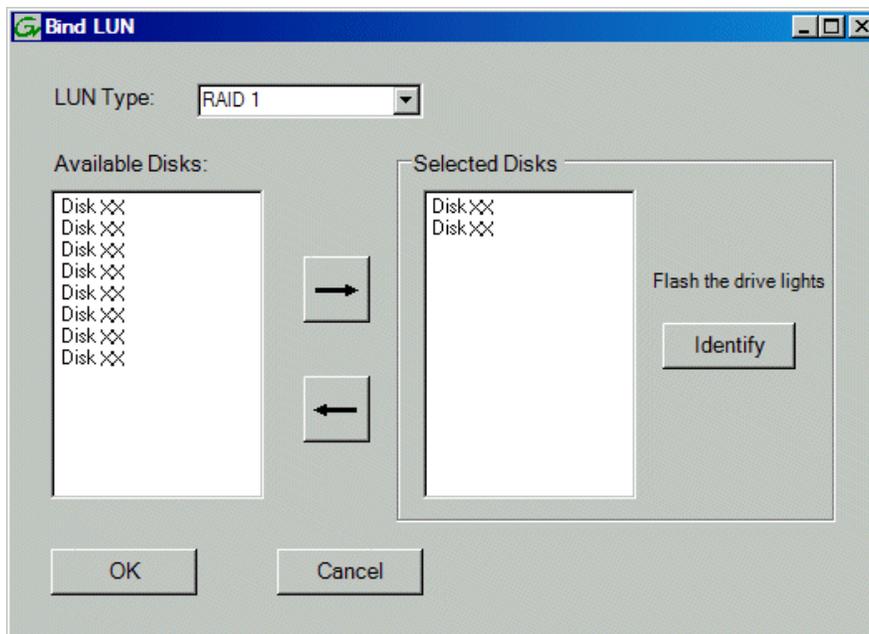
When you bind a LUN, you select one or more unbound disks and create a new LUN. The Storage Utility places this new LUN at the bottom of the list and numbers it accordingly. However, disk numbers are enforced by the chassis slot in which the disk resides. Therefore, depending on the number and sequence 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 internal storage 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.)

For direct-connect RAID, refer to [Chapter 7, Direct Connect Storage](#).

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 122](#).

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.*

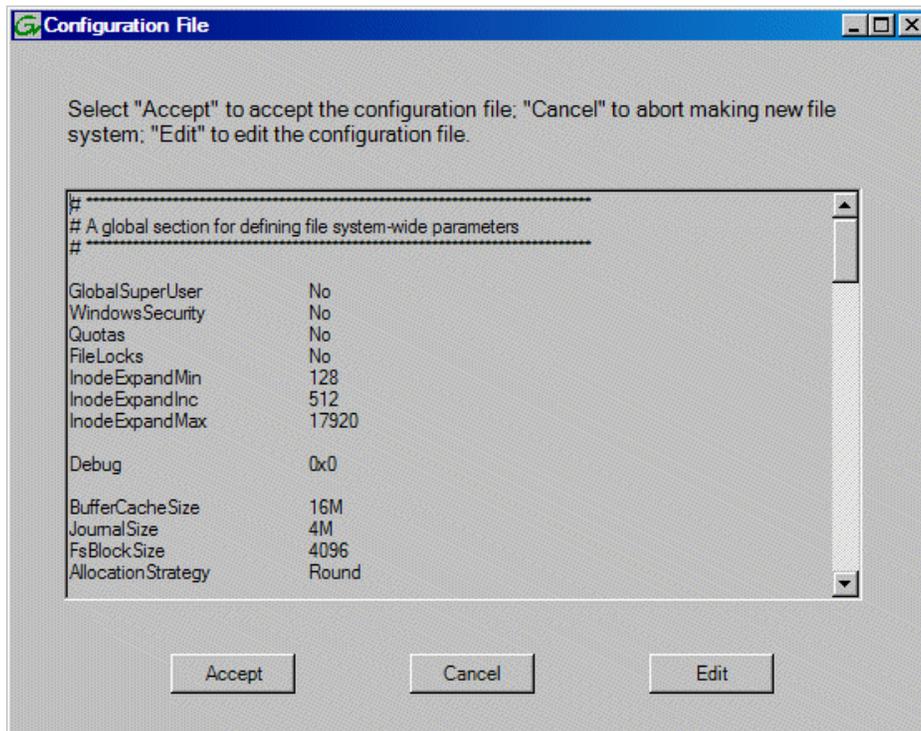
To change internal storage RAID-type configuration, do the following:

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 119](#). Do not unbind LUN 0, as this is the system drive.
3. Bind media drives, using the procedure [“Bind Luns” on page 120](#), 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 122](#).
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 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

Check *K2 Release Notes* for the latest information about software.

At the time of this writing, 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\gvSnfsxxSetupK2.bat	K2 Media Servers, stand-alone K2 Media Clients, and shared storage (SAN) K2 Media Clients	Provides a dedicated file system for access to media data. Install only as instructed by release notes.
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 (Levels 2R, 3R, 10R, 20R, 30R) K2 Storage System and on K2 Media Clients with direct-connect storage. Refer to [Chapter 8, Shared Storage](#) and [Chapter 7, Direct Connect Storage](#) 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 shared storage K2 Media Clients.
	K2 System Configuration	Installed only on shared 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 221. 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 (shared 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 shared storage K2 Media Clients and the K2 Storage System. NetCentral is optional but recommended for stand-alone 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

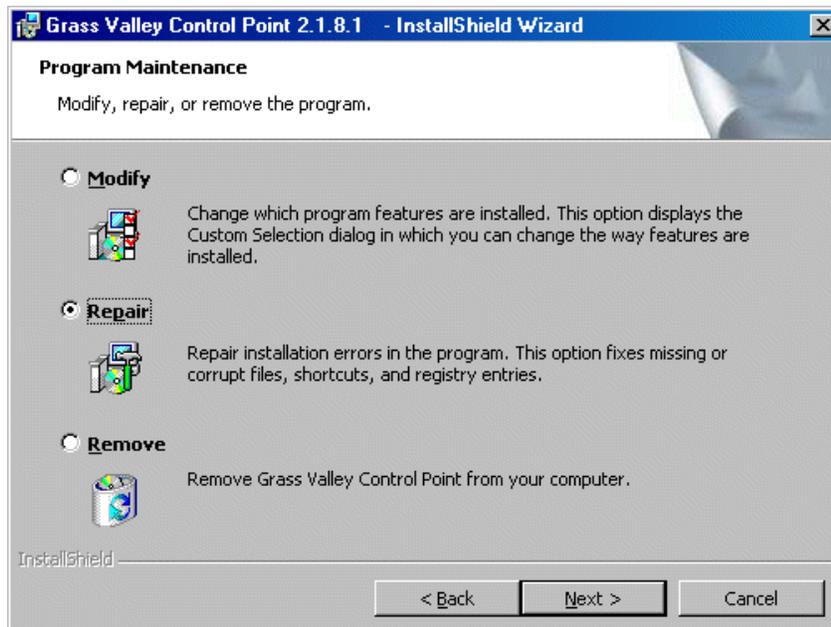
Except as noted in the preceding sections, when you receive your K2 Media Client, you do not need to install software. The system has the most recent software pre-installed at the factory.

If you are upgrading software on a K2 Media Client, refer to the *K2 Release Notes* for that version of software for specific upgrade procedures. If you are upgrading shared storage (SAN) 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 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

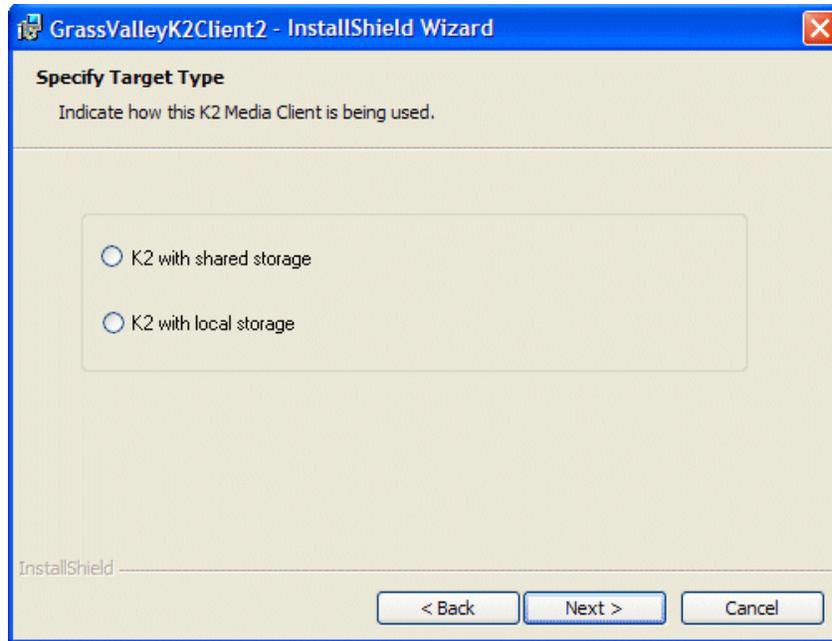
Follow these instructions if you need to re-install software. If you are upgrading to a new release version, see the Release Notes for the latest information on installation procedures. For more information on recovery procedures, see [“Backup and recovery strategies” on page 132](#).



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:
 - **K2 with shared storage** — Select this option if you are installing on a shared storage (SAN) K2 Media Client.
 - **K2 with local storage** — Select this option if you are installing on an internal storage K2 Media Client or on a direct-connect 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. Refer to *K2 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:

[“Licensing” on page 133](#)

[“Configuring K2 security” on page 134](#)

[“K2 and NetCentral security considerations” on page 145](#)

[“Microsoft Windows High Priority updates” on page 147](#)

[“Virus scanning policies” on page 147](#)

[“Enabling and disabling the USB ports” on page 148](#)

[“Configuring auto log on” on page 149](#)

[“Regional and language settings” on page 150](#)

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 receive 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. Refer to the *K2 Media Client User Guide* for a list of options, and contact your Grass Valley representative to learn more about options.

Configuring K2 security

The section includes the following topics:

- [“Overview of K2 security features” on page 135](#)
- [“Example: Setting up user access to bins” on page 136](#)
- [“Example: Setting up user access to channels” on page 136](#)
- [“Security and user accounts” on page 137](#)
- [“Configuring media access security for K2 bins” on page 137](#)
- [“AppCenter operations and media access security” on page 140](#)
- [“FTP and media access security” on page 140](#)
- [“K2 Storage Systems and media access security” on page 140](#)
- [“Protocol control of channels and media access security” on page 141](#)
- [“Configuring channel access security” on page 142](#)

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 137](#).
- 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 137](#).
- 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 140](#).
 - 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 140](#).
 - 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 141](#).
- 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 142](#).

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.	“Security and user accounts” on page 137
<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.	“Security and user accounts” on page 137
<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	“Configuring media access security for K2 bins” on page 137
<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	“Configuring media access security for K2 bins” on page 137
<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.	“Security and user accounts” on page 137
<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.	“Security and user accounts” on page 137
<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	“Configuring channel access security” on page 142
<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	“Configuring channel access security” on page 142
<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.

	Windows administrator	K2 administrator	K2 user	Unknown user (a login that is not one of the default accounts)
Login	Administrator	K2Admin	K2User	N/A ^a
Password (case sensitive)	adminK2	K2admin	K2user	N/A
AppCenter Configuration Manager	Full access	Full access	Can view	Can't access
AppCenter	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.
Storage Utility	Full access ^b	Full access	Can't access	Can't access
K2 System Configuration application	Full access ^b	Full access	Can't access	Can't access
Windows Operating System	Full access	Limited access (based on Windows login privileges)	Limited access (based on Windows login privileges)	Limited access (based on Windows login privileges)

^a. 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.

^b. 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.

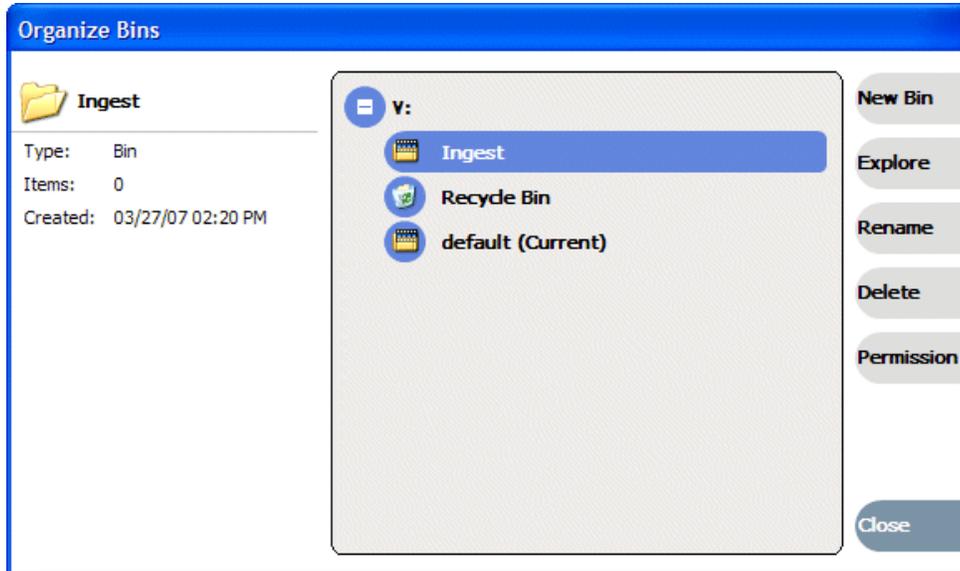
As you configure permissions, take the following into account:

- 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.

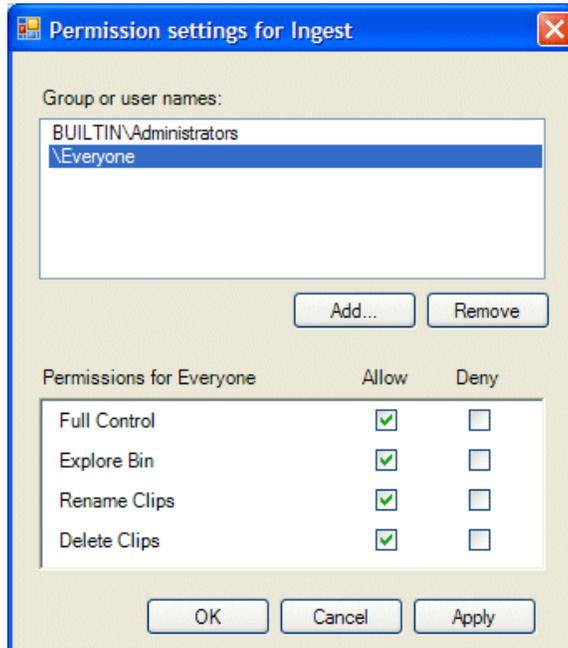
1. Make sure you are logged on to Windows and AppCenter with administrator privileges.
2. Create user accounts and bins as necessary to support your permission policies.

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



- 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:

- A stand-alone K2 Media Client
- A K2 Media Server that takes the role of FTP server

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

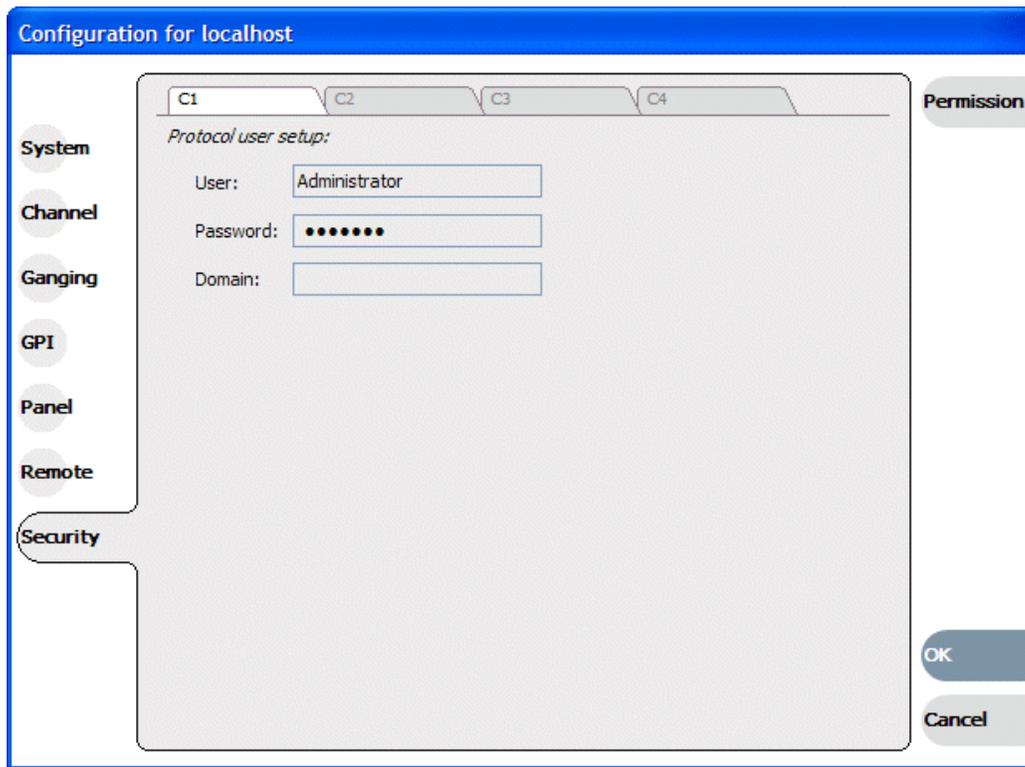
Protocol security restricts a channel in its access to the media in a bin, regardless of what user is currently logged on to AppCenter. This is different than the other types of media access security, in which the security restricts the user (as currently logged on to AppCenter) in their access to the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

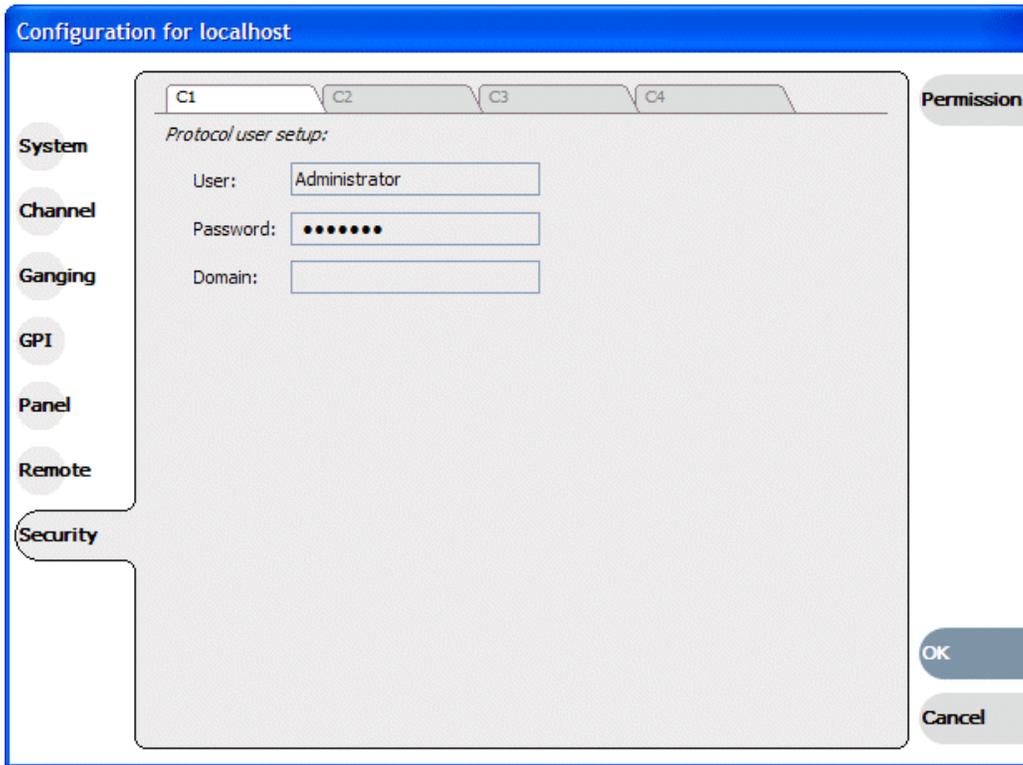
You configure these permissions to apply to users and groups. By default, all channels have their permission set to allow access to “Everyone”. In case of conflicts arising from a user belonging to multiple groups, the Deny permission always overrides the Allow permission.

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.

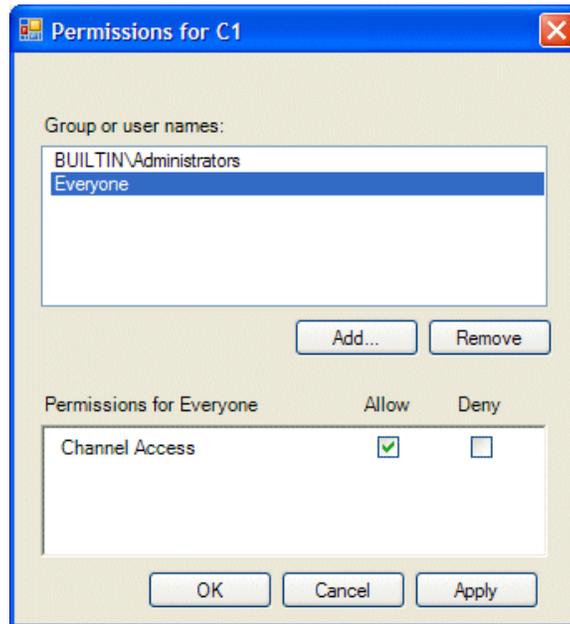
If you need to restrict access to an AppCenter channel, set up a channel access control list, as instructed in the following procedure:

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

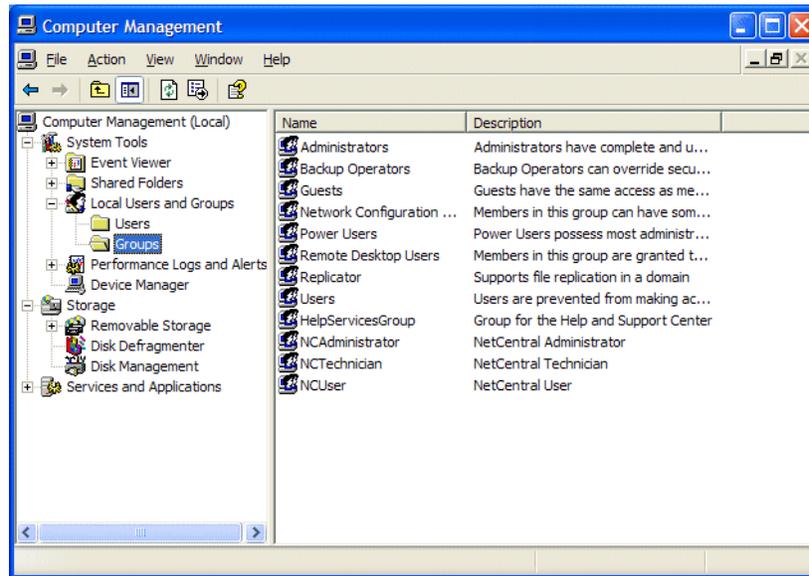
When using K2 with NetCentral, bear in mind that NetCentral has its own levels of security. Grass Valley recommends mapping the NetCentral administrator with the K2 administrator level application access. You need Windows administrator privileges to add or modify a user’s privileges.

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.

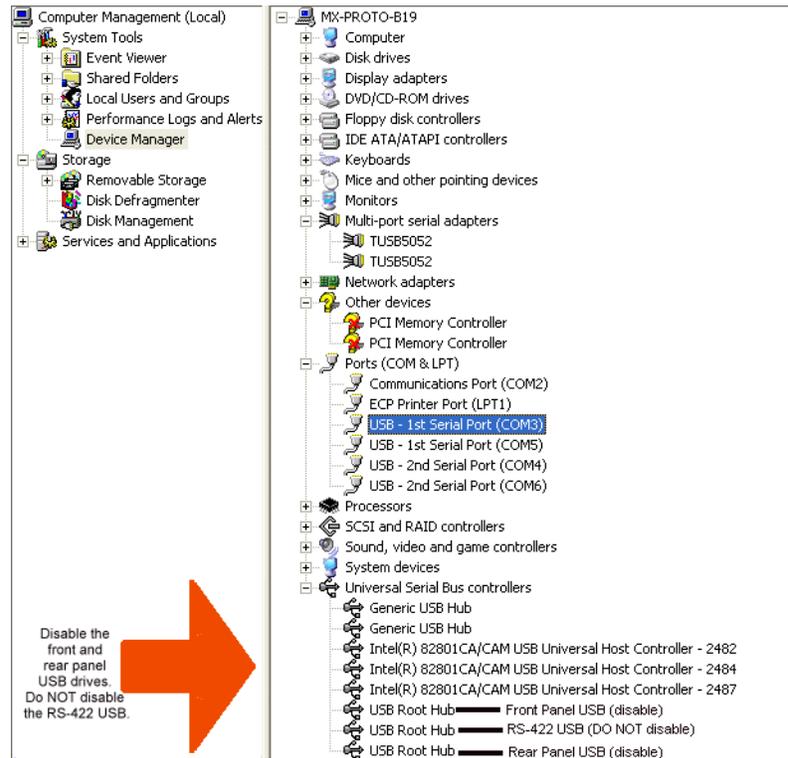
Network and firewall policies

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. (If the K2 Media Client has USB RS-422 cards, be careful not to disable the RS-422 USB.) For more information, see [“Enabling and disabling the USB ports” on page 148](#).

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. If the K2 Media Client has USB RS-422 cards, 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 shared 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 79](#) for more information.

Also refer to [“Internationalization” on page 215](#).

Direct Connect Storage

Use the following topics to install direct-connect storage for a K2 Summit Production Client or K2 Media Client:

- [“Setting up direct-connect RAID storage” on page 151](#)
- [“Powering up K2 RAID” on page 155](#)

Setting up direct-connect RAID storage

The direct-connect K2 Media Client or K2 Media Client has a direct Fibre Channel connection to external K2 RAID. The K2 client must have the optional Fibre Channel card installed to support this connection. This gives the K2 client the large storage capacity of the external RAID, yet its media related functionality is that of a “stand-alone” K2 client, similar to a K2 client with internal storage.

A K2 Media Client has one type of optional Fiber Channel card, the 4 Gb/s LSI Fibre Channel card.

A K2 Media Client has two types of optional Fibre Channel cards. The type of card installed can be identified from the rear panel, as follows:

- The 2 Gb/s GVG SCSI Fibre Channel card. The exposed plate of the card has vent holes and there are no LEDs on the card.
- The 4 Gb/s LSI Fibre Channel card. The exposed plate of the card is solid (no vent holes), and there are LEDs on the card.

The following procedure is intended for the initial installation of a factory-prepared direct-connect system that you have ordered new from Grass Valley. If you are repurposing equipment or otherwise putting together direct-connect storage with equipment that is not factory-prepared, refer to the Service Manual for your model of K2 client for the complete restore/recover procedure.

As you work through the following procedure, refer as necessary to the *K2 SAN Installation and Service Manual* “Installing” chapters for information about cabling and configuring K2 RAID.

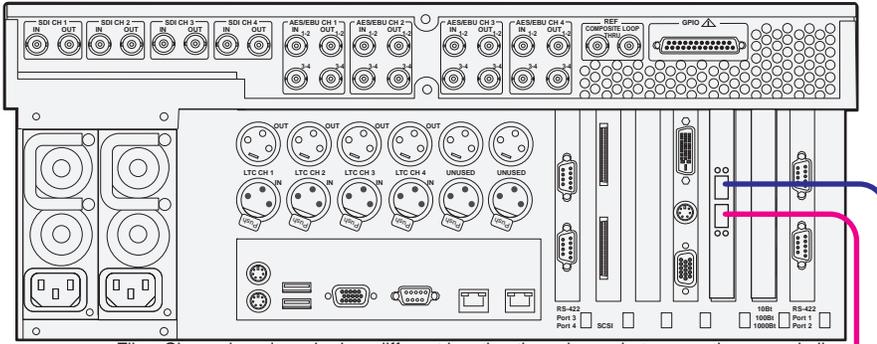
Prerequisites for the following procedure are as follows:

- If a 2 Gb/s GVG SCSI Fibre Channel card on a K2 Media Client, RAID controllers must be configured for 2 Gb/s. Contact Grass Valley Support for information about this configuration.
- If a 4 Gb/s LSI Fibre Channel card on a K2 Media Client or K2 Summit Production Client, RAID controllers must be configured for 4 Gb/s. This is the default configuration as shipped from Grass Valley.

To set up media storage for a direct connect RAID K2 client, do the following:

1. Connect the K2 client and RAID devices as shown in the following illustrations. Use the illustration appropriate for the K2 client model.

K2 Media Client

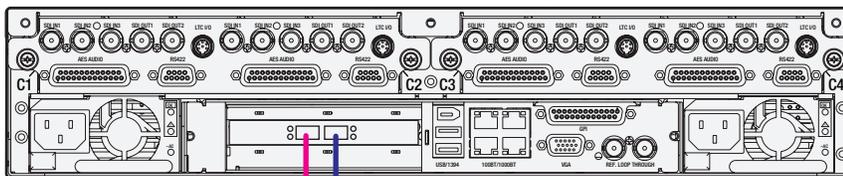


Fibre Channel card can be in a different location than shown, but connections are similar.

To K2 RAID Controller

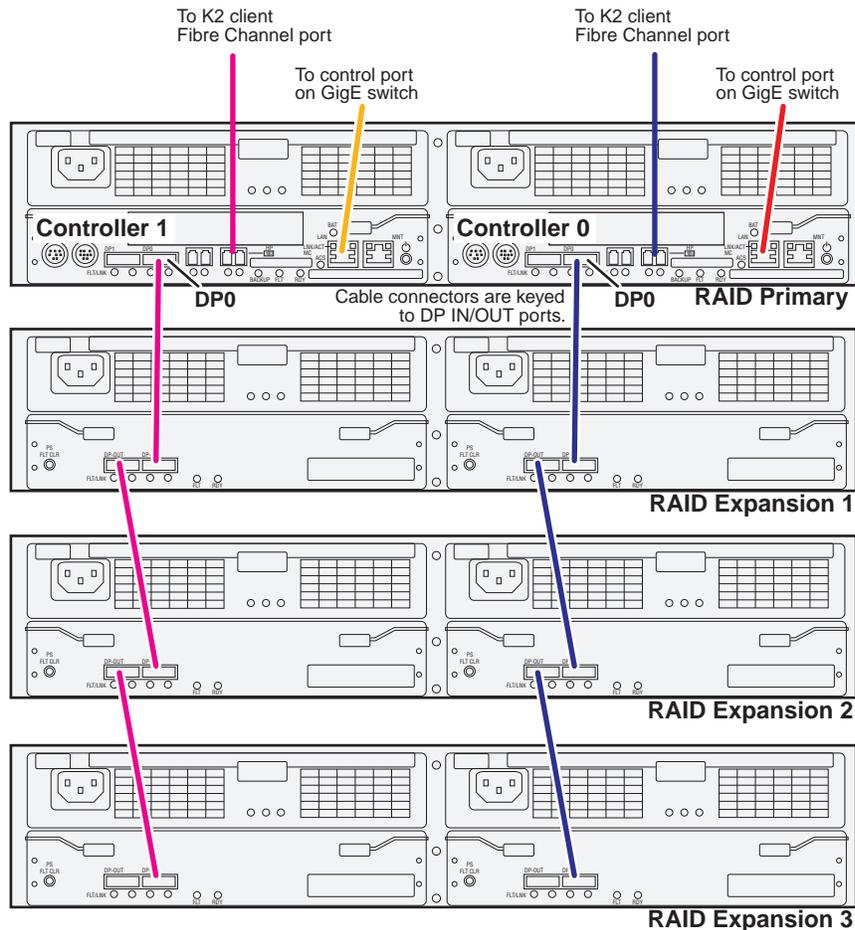
To K2 RAID Controller

K2 Summit Production Client



To K2 RAID Controller

To K2 RAID Controller



Connect K2 client Fibre Channel ports to RAID controllers. Connect Fibre Channel port 1 to RAID controller 0. If you have the redundant controller, connect Fibre Channel port 2 to RAID controller 1.

Connect RAID controller LAN ports to control ports on a K2 GigE switch. If you have redundant switches, connect controller 0 to switch A and controller 1 to switch B.

Connect RAID controller DP0 ports to the first Expansion chassis DP-IN ports.

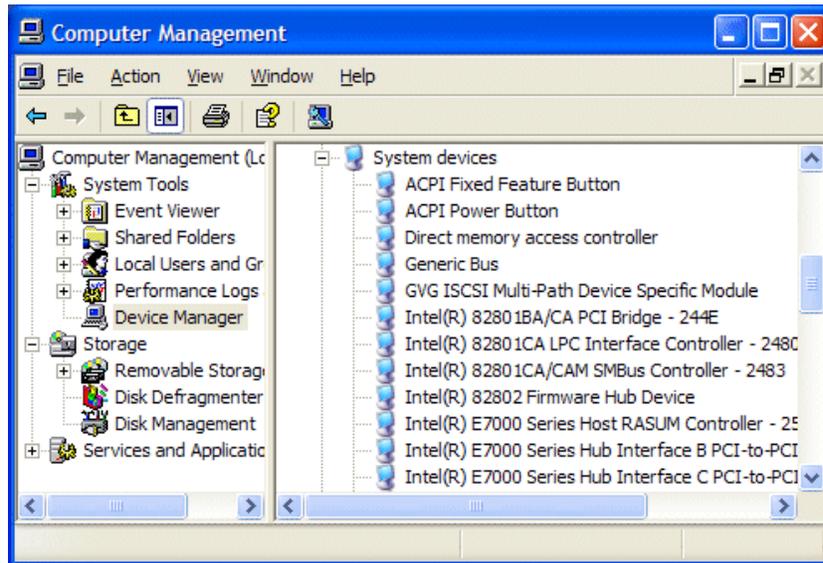
Connect remaining Expansion chassis using DP-OUT and DP-IN ports.

2. Connect power cables and power up the RAID devices. Refer to “[Powering up K2 RAID](#)” later in this chapter.
3. Connect remaining cables to the K2 client. Refer to the Quick Start Guide for the particular K2 client model for cabling details.
4. Start up the K2 client.
 - The Windows initialization screen shows the progress bar but does not complete.
5. Power down the K2 client.
6. Disconnect all Fibre Channel cables from the K2 client.

7. Start up the K2 client and log in to Windows.
8. Uninstall Multi-Path I/O (MPIO) software as follows:
 - a. On the K2 client, from the Windows desktop click **Start | Run**, type `cmd` and press **Enter**. The MS-DOS command prompt window opens.
 - b. From the command prompt, navigate to the `C:\profile\mpio` directory.
 - c. Type the following at the command prompt:
`gdsminstall.exe -u C:\profile\mpio gdsm.inf Root\GDSM`
 - d. Press **Enter**.
The MPIO software is uninstalled.
9. Restart the K2 client and log in to Windows.
10. Power down the K2 client.
11. Reconnect Fiber Channel cables.
12. Start up the K2 client and log on to Windows.
13. On the K2 client, open Storage Utility.
14. In Storage Utility, do the following:
 - a. Configure network and SNMP settings for controllers.
 - b. Bind the disks in the external RAID. Bind in groups of six disks as RAID 5.

NOTE: On a K2 Media Client, do not attempt to unbind or otherwise configure the RAID 1 system drive, which is made up of the two RAID disks in the K2 Media Client chassis.

- c. When the binding process completes, proceed to the next step.
15. Restart the K2 client and log in to Windows.
16. Install MPIO software as follows:
 - a. From the Windows desktop click **Start | Run**, type `cmd` and press **Enter**. The MS-DOS command prompt window opens.
 - b. From the command prompt, navigate to the `C:\profile\mpio` directory.
 - c. Type the following at the command prompt:
`gdsminstall.exe -i c:\profile\mpio gdsm.inf Root\GDSM`
 - d. Press **Enter**.
The MPIO software is installed.
17. Restart the K2 client and log in to Windows.
18. To verify that the software is installed, on the Windows desktop right-click **My Computer** and select **Manage**. The Computer Management window opens.



19. In the left pane select **Device Manager**.
20. In the right pane open the **System devices** node and verify that **GVG ISCSI Multi-Path Device Specific Module** is listed.
21. In Storage Utility, make a new file system
If you get a "...failed to remove the media database..." message, you can safely proceed.
22. Restart the K2 client and log in to Windows.
23. Open AppCenter and manually remove all clips and bins except the default bin and the recycle bin.
24. Uninstall and then reinstall both SNFS software and K2 Client software. Use the sequence and detailed procedure in the *K2 Release Notes* for the version of K2 Client software currently on the K2 client.
25. As you install K2 Client software, when you arrive at the Specify Target Type page, select **K2 with local storage**.
26. Restart the K2 client.
27. On a K2 Media Client, from the Windows desktop system tray, open SQL Server Service Manager and verify that **Auto-start service when OS starts** is selected. (This is not required on a K2 Media Client.)

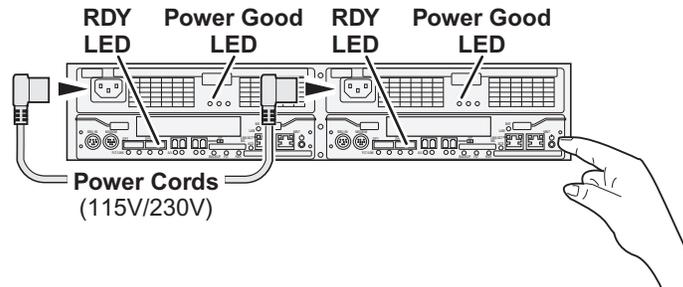
The K2 client is now ready for record/play operations.

NOTE: If you ever unbind LUNs, you must do the above procedure again, starting at step 5.

Powering up K2 RAID

To power up K2 RAID devices, do the following:

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



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

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

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

Shared Storage

Work through the following topics to connect external storage K2 Media Client models to the shared (SAN) K2 Storage System:

- [“About load balancing” on page 158](#)
- [“Determining K2 Media Client bandwidth requirements” on page 159](#)
- [“Preparing the K2 Storage System” on page 159](#)
- [“Preparing K2 Media Clients” on page 160](#)
- [“Adding K2 Media Clients to the K2 Storage System” on page 163](#)
- [“Basic operations for shared storage K2 Media Clients” on page 170](#)

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 shared 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.

The K2 System Configuration application provides a report of iSCSI assignments, which lists for each TOE the iSCSI clients assigned and their bandwidth subscription.

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 163 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 shared storage K2 Media Clients.

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

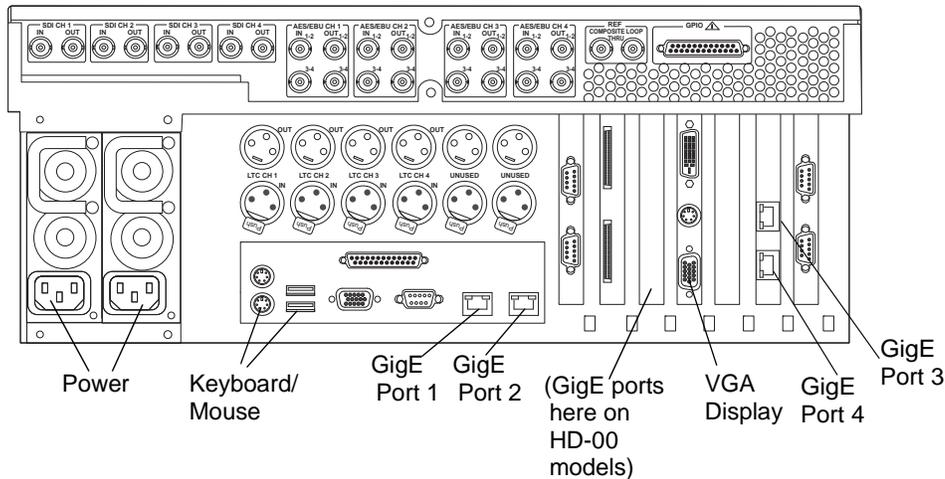
- All K2 Media Servers and/or K2 RAID storage devices must be installed and cabled.
- The control network must be operational with K2 devices communicating. At the command prompt, use the *ping* command to verify.
- For non-redundant (Levels 2, 3, 10, 20, and 30) K2 Storage Systems, the media network must be operational. You can check this with the K2 System Configuration application.
- For redundant (Levels 2R, 3R, 10R, 20R, and 30R) 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 disks 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 a shared storage K2 Media Client. For shared 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, 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 shared 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 levels 2R, 3R, 10R, 20R, and 30R.

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:
`gdsminstall.exe -i c:\profile\mpio gdsminf 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

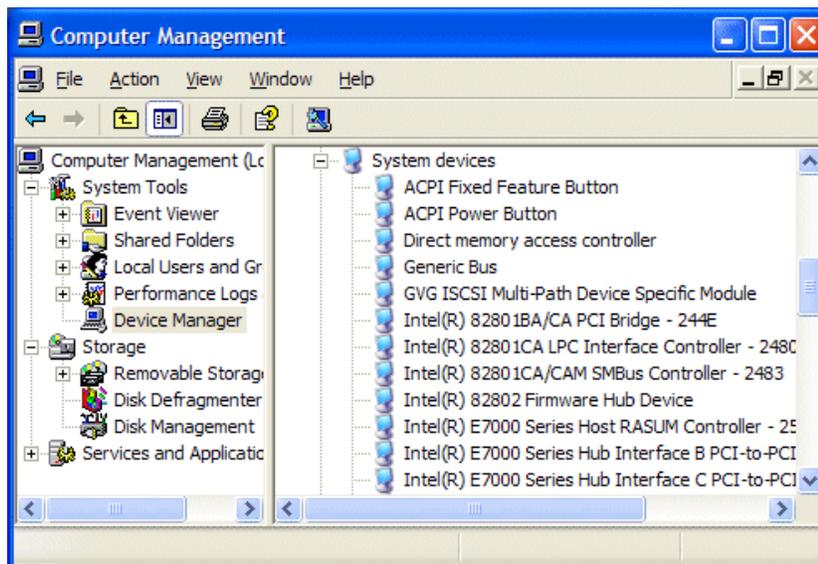
Installing the Multi-Path Device Driver...

Success

Restarting all SCSI adapters...

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:

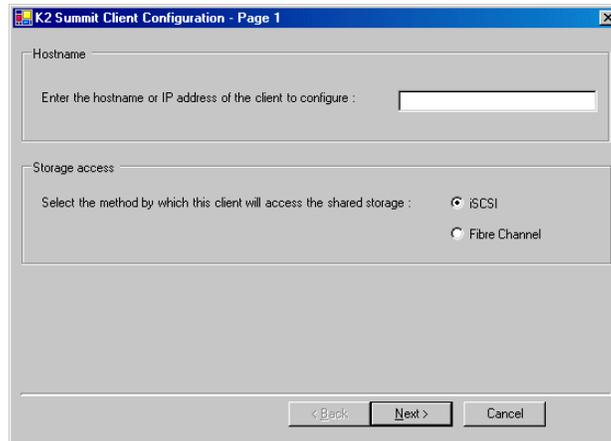
- To add a client, select the top node of the storage system and click the **Add Device** button
- To remove a client, select an unconfigured K2 Media Client and click the **Remove** button.

4. Select the top K2 Media Client.  [K2 Media Client1]

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	



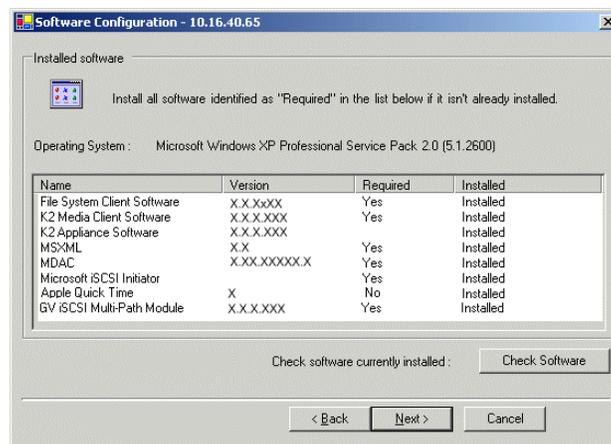
Enter the IP address or network name for a K2 Media Client, as currently configured on the K2 Media Client. You should configure your highest bandwidth K2 Media Clients first, as this ensures load balancing is correct. Refer to the load balancing topic earlier in this chapter for information on load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



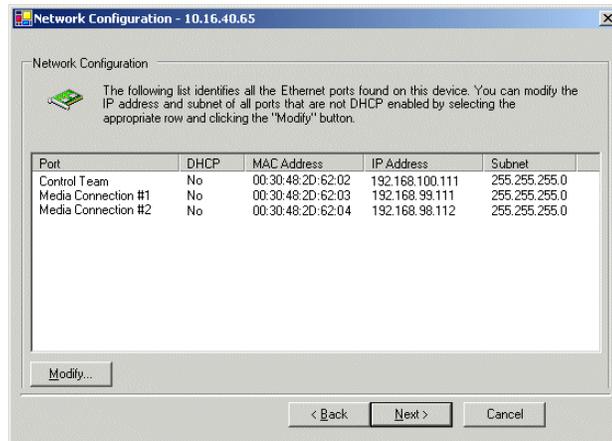
If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Client before continuing. Refer to [Chapter 5, “Managing K2 client system software”](#). After installing the software, click **Check Software**. When all required software reports as *Installed*,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

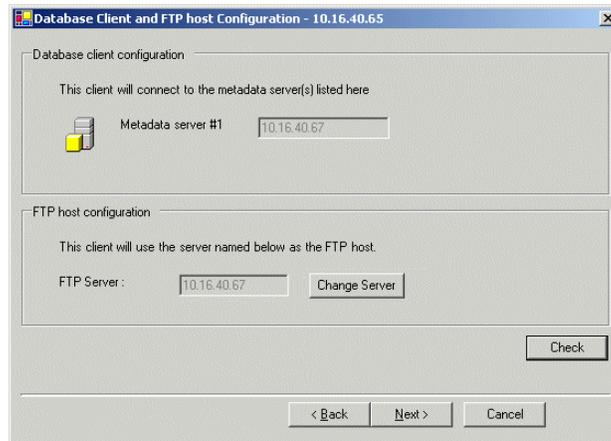
If a redundant K2 Storage System, select **Media Connection #2** and click **Modify**. A network configuration dialog box opens. Enter an IP address for the "B" media (iSCSI) network. Also enter the subnet mask. Click **Next**.

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 Levels 2, 10, 20, and 30, the client connects to the only server.
- For Levels 2R, 10R, 20R, and 30R, 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 (such as the optional NH 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 169](#).

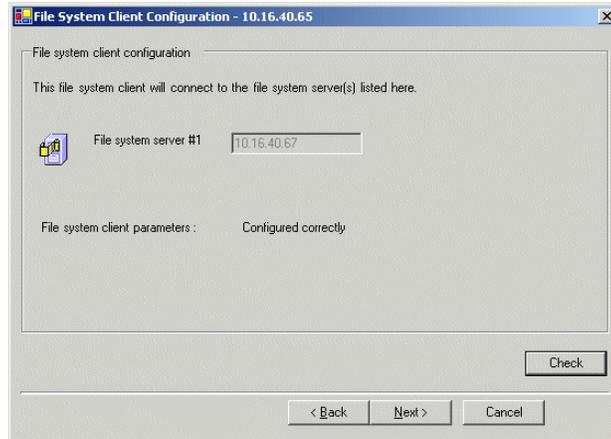
Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page...

Do this...

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.



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

- For Levels 2, 10, 20, and 30, the client connects to the only server.
- For Levels 2R, 10R, 20R, and 30R, 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.

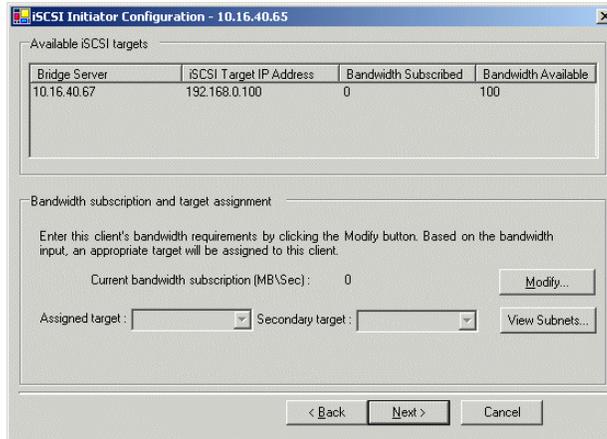
Refer to the *K2 Storage System Instruction Manual* to identify servers. Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page...**iSCSI Initiator Configuration**

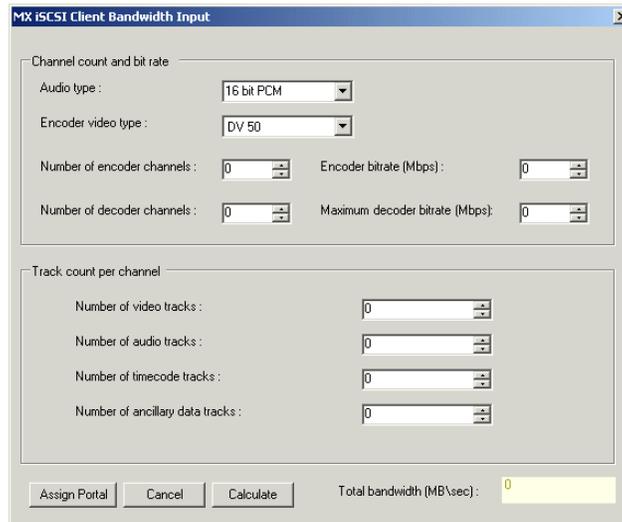
This page load balances the K2 Media Client's iSCSI connection to the K2 Storage System. The iSCSI adapters on your K2 Media Server or servers are listed here as iSCSI targets.

For pre-defined K2 Storage System levels, 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 or 40), 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.

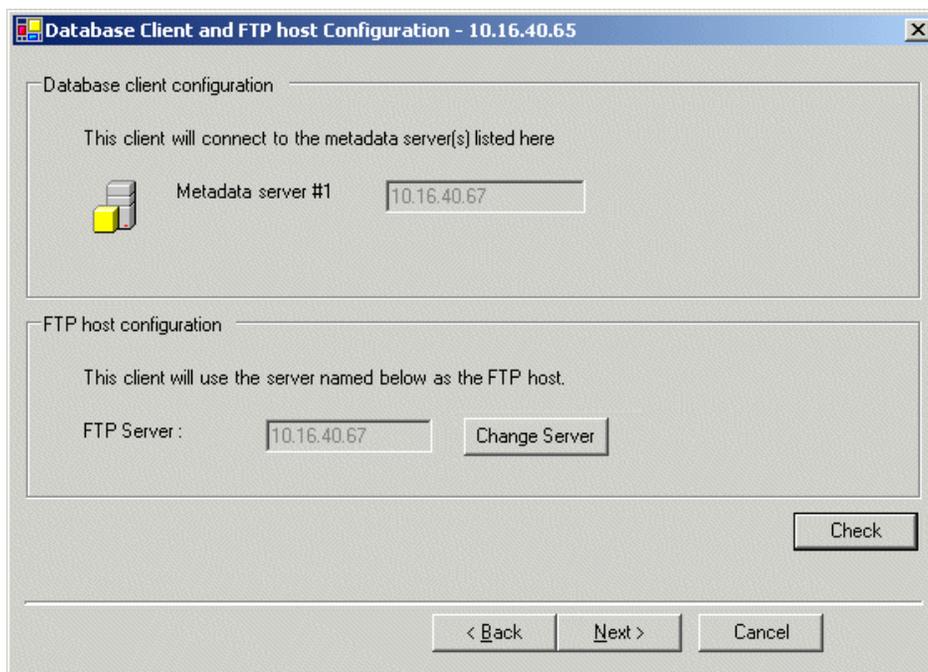
6. Repeat this procedure for each of your K2 Media Clients.

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, such as when you have one or more options NH servers, 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 shared 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 133 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. 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 itself 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”](#)
- [“RS-422 connections”](#)
- [“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 TCP.

E to E commands have no effect on the HD-00 K2 Media Client. Do not issue E to E commands to the HD-00 K2 Media Client. Also refer to [“Loop through and E to E” on page 38](#).

In AppCenter, you must set a channel's options to enable protocol control of the channel. Subsequently, when the K2 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.

AMP PlayAt and StopAt commands do not work on a SD-00 K2 Media Client channel that is cued for play or is playing, if the channel is configured for VITC timecode. Under these conditions the VITC-input reader is not connected. To make those commands work, configure the channel for a different timecode source.

The AMP device type request (00.11) command returns a unique value for SD-00 K2 Media Clients (D8.03) and HD-00 K2 Media Clients (D8.04).

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 client, not the K2 Media Server. This applies to both stand-alone and shared storage K2 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 with the K2 Media Client. 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 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.

Loop-play mode on the K2 client is not supported under VDCP control.

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
- To control a given K2 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 client, not the K2 Media Server. This applies to both stand-alone and shared storage K2 clients.

If you are using VDCP to perform video network transfers, you must configure the K2 client so that there is a unique Controller ID for each host.

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 HD-00 K2 Media Client. Do not issue E to E commands to the HD-00 K2 Media Client. Also refer to [“Loop through and E to E” on page 38](#).

In AppCenter, you must set a channel's options to enable protocol control of the channel. Subsequently, when the K2 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.

Loop-play mode on the K2 Media Client is not supported.

To set in and out points with BVW protocol, load clips only from the working bin.

The BVW extended device type request (00.11.00) command returns a unique value for SD-00 K2 Media Clients (D8.03) and HD-00 K2 Media Clients (D8.04).

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:

Setting	Value	Comments
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.

RS-422 connections

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.

K2 Media Clients have been manufactured with two types of RS-422 configurations, as follows:

- Two dual-port adapters.
- One adapter with an external 8-port interface. On the external interface, ports 1–4 are active.

Refer to the following sections as appropriate for the RS-422 configuration of your K2 Media Client.

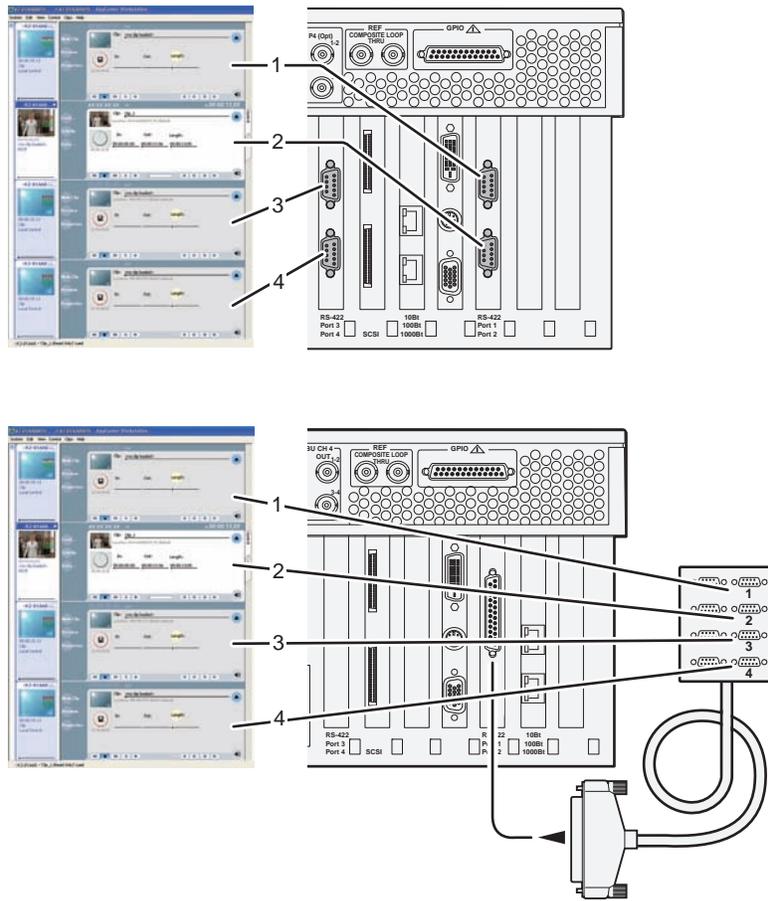
To verify correct connection and configuration of automation software, do the following:

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:



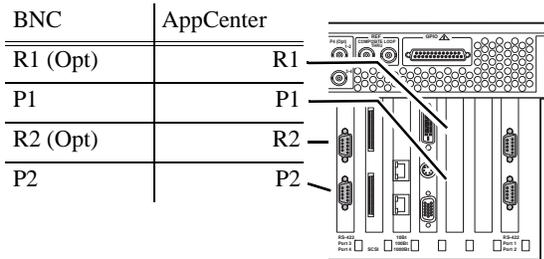
Depending on the K2 Media Client model, the ordering of channels in AppCenter varies. This is detailed in the next section “[RS-422 connectors and channels on K2 Media Client models](#)”.

RS-422 connectors and channels on K2 Media Client models

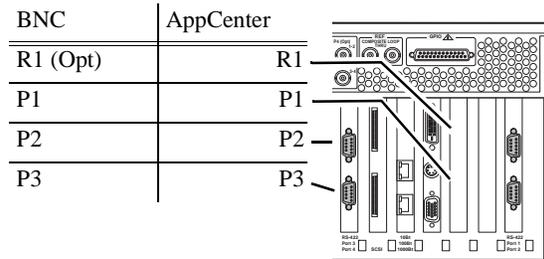
For each K2 Media Client model, RS-422 connectors map to rear panel BNC input/output connectors and to AppCenter channels as follows:

K2 Media Clients with two dual-port RS-422 boards

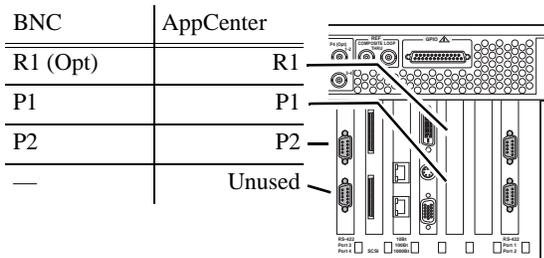
Model HD-22: Two record channels, two play channels



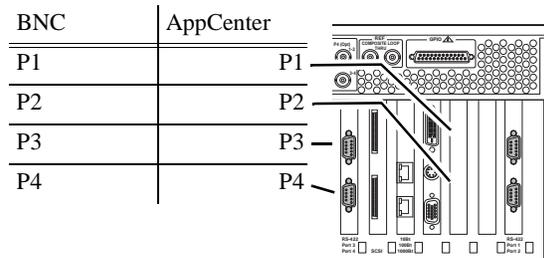
Model HD-13: One record channel, three play channels



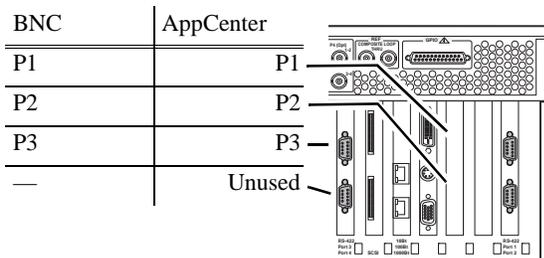
Model HD-12: One record channel, two play channels



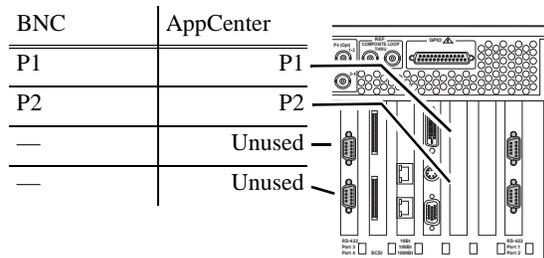
Model HD-04: No record channel, four play channels



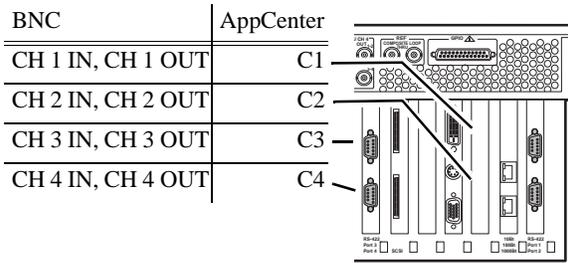
Model HD-03: No record channel, three play channels



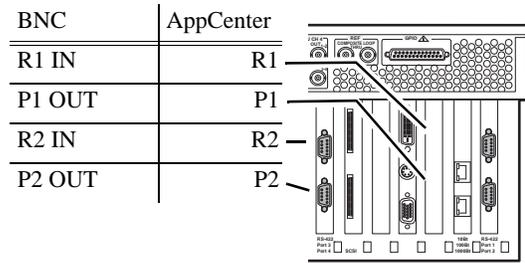
Model HD-02: No record channel, two play channels



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

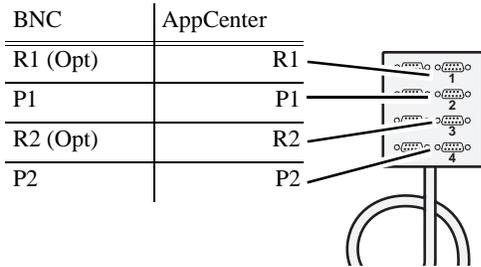


Model SDA-22: Two record channels, two play channels

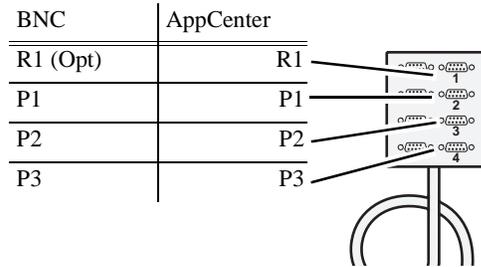


K2 Media Clients with one RS-422 board and external interface

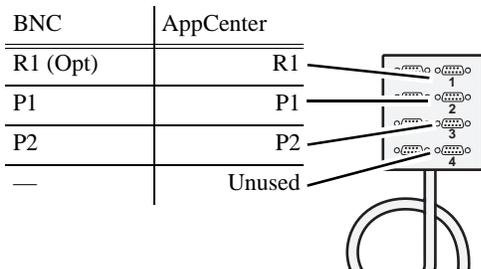
Model HD-22: Two record channels, two play channels



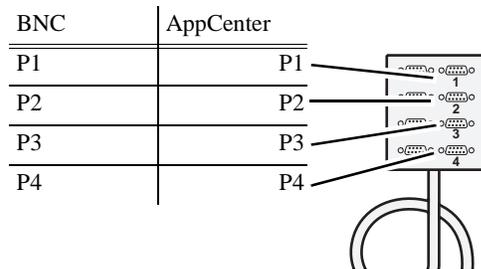
Model HD-13: One record channel, three play channels



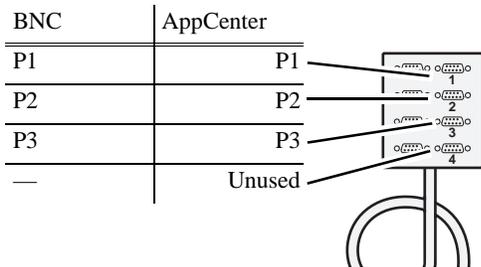
Model HD-12: One record channel, two play channels



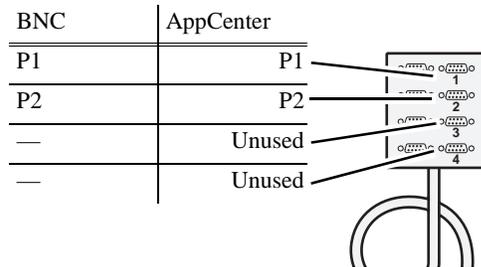
Model HD-04: No record channel, four play channels



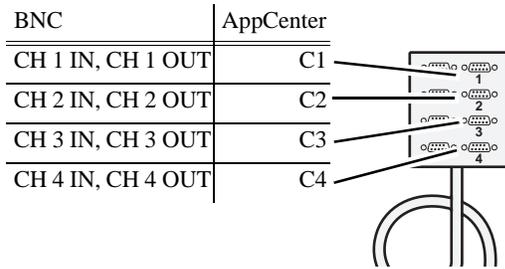
Model HD-03: No record channel, three play channels



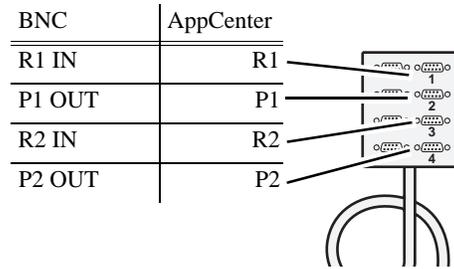
Model HD-02: No record channel, two play channels



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

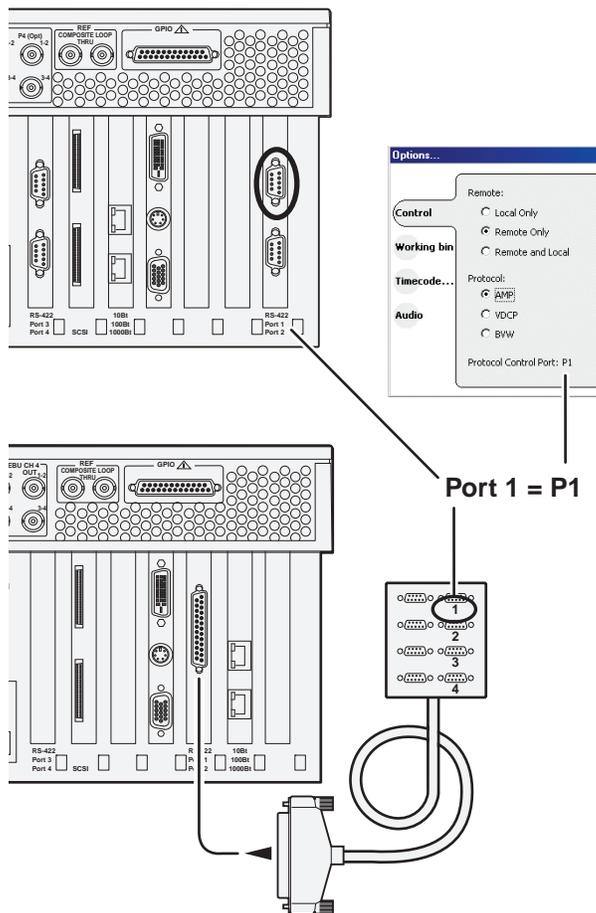


Model SDA-22: Two record channels, two play channels



RS-422 and Protocol Controller Ports

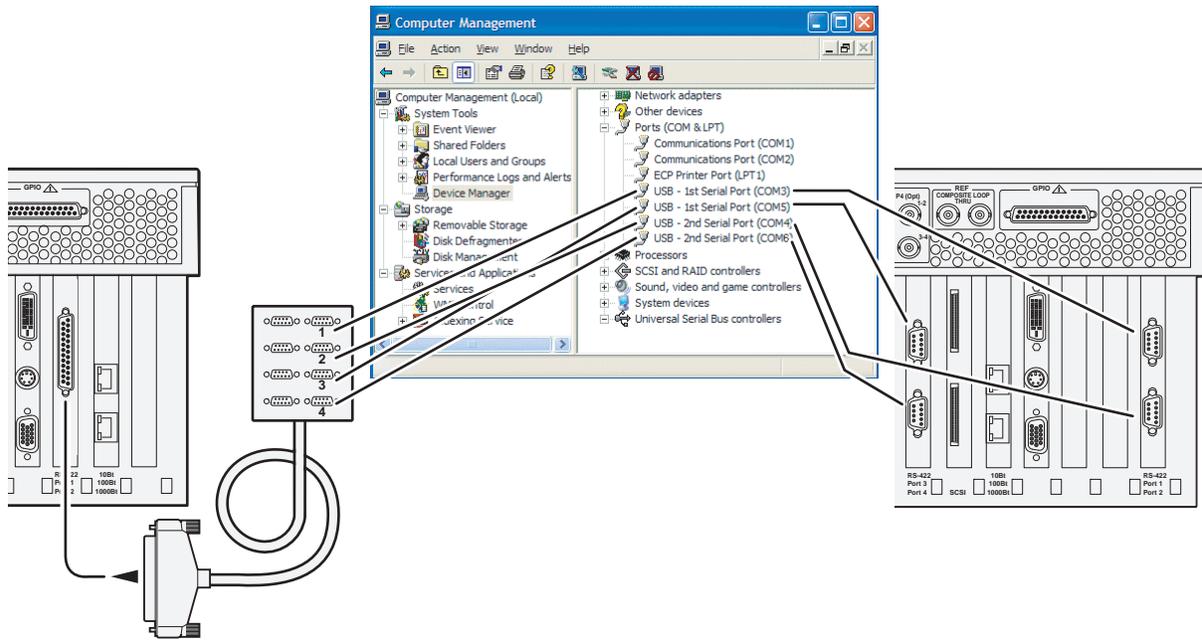
When you view a channel's Options dialog box, the Protocol Control Port is reported as P1, P2, P3, or P4. A Protocol Control Port maps to a RS-422 rear panel connector as in the following illustration:



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”
- “MIB specifications”

AC power specification

The K2 Media Client 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, maximum AC current 6A @ 115VAC, 3A@230VAC



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

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

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

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

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

^a Adjustable rack-mounting ears accommodate different rack depth limitations.

Electrical specifications

The following sections describe the electrical specifications:

Serial Digital Video (SDI)

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

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

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

Parameter	Specification
Composite Video Standard ^a	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

^a 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

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

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

System Timing

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

Characteristic	Description ^a
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 ^b	On SD-00 models, the video, AES, and LTC inputs pass to the their output connectors as loop through.
Loop back ^b	On HD-00 models, record channels loop back to play channels
E to E video ^b	Supported on SDA-00 only

^a All delay values shown are relative to Black Reference.

^b Also refer to “Loop through and E to E” in the K2 Media Client System Guide.

AES/EBU Digital Audio

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

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. ^a 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 playback, 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 playback.

^a 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

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

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

The K2 Media Client specification is shown in the following table

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

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

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

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

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

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

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 K2 Media Client SDA-00 and SD-00”
- “Video codec description K2 Media Client HD-00”
- “Playout of multiple formats”
- “Active Format Description (AFD) specifications”
- “VBI/Ancillary/data track specifications”
- “Internationalization”
- “Video network performance”
- “Supported file input/output formats on K2 Media Client and K2 SAN”
- “MXF export behavior on K2 Media Client”
- “Media file system performance on K2 Media Client and K2 SAN”
- “Protocols supported”
- “Transfer compatibility with K2 Media Client”
- “Control Point PC system requirements”

Video codec description K2 Media Client SDA-00 and SD-00

Format	Sampling	Frame Rate	Data Rate	Other
DVCAM (720x480/576)	4:1:1/ 4:2:0	29.97, 25	28.8 Mbps	—
DVCPRO25 (720x480/576)	4:1:1	29.97, 25	28.8 Mbps	—
DVCPRO50 ^a (720x487.5/585)	4:2:2	29.97, 25	57.6 Mbps	—
MPEG-2 (720x480/576)	4:2:0	29.97, 25	2-15 Mbps	I-frame and long GoP ^b
MPEG-2 (720x480/576)	4:2:2	29.97, 25	4-50 ^a Mbps	I-frame and long GoP ^b
MPEG-2 (720x512/608)	4:2:2	29.97, 25	4-50 ^a Mbps	I-frame and long GoP ^b
D10/IMX ^a (720x512/608)	4:2:2	29.97, 25	30, 40, 50 Mbps	I-frame only

^a 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.

^b 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 K2 Media Client HD-00

Format	Sampling	Frame Rate	Data Rate	GoP ^a
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) ^b	4:2:2	29.97, 25	4-50 Mbps	I-frame and long GoP
HD formats ^c				
MPEG-2 (1920x1080)	4:2:0	29.97, 25	20-80 Mbps	I-frame and long GoP ^d
XDCAM-HD (1440x1080)	4:2:0	29.97, 25	25 or 35 Mbps	Long GoP
XDCAM-EX (1920x1080 or 1280x720)	4:2:0	1080i: 29.97, 25 720p: 59.94, 50	35 Mbps	Long GoP
XDCAM-HD422 (1920x1080 or 1280x720)	4:2:2	1080i: 29.97, 25 720p: 59.94, 50	50 Mbps	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) ^e	4:2:2	59.94, 50	20-100 Mbps	I-frame and long GoP

^a 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.

^b Supports D10/IMX 30/40/50 playout

^c Low bitrate I-frame encoding is not recommended

^d Decode of lower bit rate is possible

^e 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 client automatically handles material of various types and formats as specified in the following sections:

Playout on K2 Media Client 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 the video codec description 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 track specifications” on page 208.](#)

Playback on K2 Media Client 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 K2 client” on page 200.](#) Refer to the following tables for specifications on SD and HD conversions.

Also refer to [“VBI/Ancillary/data track specifications” on page 208.](#)

25/50 fps conversions on HD K2 client models

The following specifications apply to the HD-00 K2 Media Client and to K2 Summit Production Client channels with the XDP (HD) license.

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

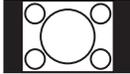
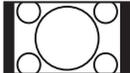
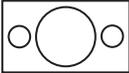
29.97/59.95 fps conversions on HD K2 client models

The following specifications apply to the HD-00 K2 Media Client and to K2 Summit Production Client channels with the XDP (HD) license.

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

Aspect ratio conversions on HD K2 client

The following specifications apply to the HD-00 K2 Media Client and to K2 Summit Production Client channels with the XDP (HD) license.

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	

Active Format Description (AFD) specifications

NOTE: This topic only applies to SD and HD channels on K2 Media Clients and K2 Summit Production Clients.

Active Format Description (AFD) can be used to automatically determine the proper aspect ratio to use for up- and down-conversions. Previous versions of the K2 Media Client let you set the aspect ratio conversion (ARC) on a clip-by-clip basis or per channel. Now, you can use the AFD code to set the aspect ratio of the clip and the ARC performed. If no AFD is set, the ARC setting operates as it did in previous versions of the K2 software. For more information about ARC settings, see [“Playout of multiple formats” on page 197](#).

About Active Format Description

The AFD is defined during production. By inserting metadata about the aspect ratio into the vertical ancillary data, AFD can define the aspect ratio of the signal as it progresses through ingest, editing, up/down conversion and playout. If the aspect ratio is altered during processing, then the AFD passed on downstream might need to be modified to ensure the correct aspect ratio is obtained.

NOTE: If ARC leads to unsupported active video format (postage stamp), the new AFD code will be the ‘undefined’ value of 0000.

The playback aspect ratio conversion is prioritized according to the following table:

Playback aspect ratio conversion priority	
1	Clip property (ARC or AFD-based conversion rules)
2	Output channel (ARC configuration property)

To see the full list of AFD input/output settings, refer to [“AFD input/output settings” on page 202](#).

NOTE: Bar data is not supported on the K2 system.

Storing AFD in the K2 Media Client

The K2 Media Client stores clip metadata in clip properties and uses this data throughout the workflow. Users can modify the AFD setting in AppCenter. For more information on applying AFD settings in the UI, see [“Applying AFD settings” on page 240](#).

You can store AFD in a data track. Grass Valley recommends selecting this for HD clips; if using SD, this is optional. This method takes more storage (it is approximately equal to four tracks of audio) but this method enables AFD and CC/Teletext support for HD.

Ingesting SDI

An SDI video signal stores AFD in the vertical ancillary data. If present, the AFD setting from two seconds into the file is copied into the clip properties. (If selected, the ANC data is copied into the K2 data track.)

AFD input/output settings

The following table shows the various AFD input settings, and the resulting output values.

Input and Settings				Output AFD Value					
AFD set in the clip properties	AFD already in the data Track	ARC Performed	AFD in Config Mgr setting	AFD set in Clip property	Translated from the clip property according to the ARC performed ^a	Same as data track settings	Translated from AFD values on the data track ^a	No AFD	Default AFD ^b
n/a	Y	n/a	Never			X			
Y	n/a	N	Always or When Known	X					
Y	n/a	Y	Always or When Known		X				
N	Y	N	Always or When Known			X			
N	Y	Y	Always or When Known				X		
N	N	n/a	Always						X
N	N	n/a	When Known					X	
n/a	N	n/a	Never					X	

^a For a list of supported AFD conversions, see [“Supported conversions from SD to HD using AFD”](#) on page 207 and [“Supported conversions from HD to SD using AFD”](#) on page 207.

^b For a list of default AFD settings, see [“Default generated AFD values”](#) on page 204.

Using AFD with file transfers

The following tables describe the AFD file priorities and the AFD behavior with GXF and MXF transfers.

File transfer AFD priority	
1	AFD from the MXF or GXF metadata is copied to the K2 clip properties.
2	If there is no AFD metadata in the MXF/GXF metadata, the AFD is taken from the ancillary data (two seconds in on the data track) and copied to the K2 clip properties.
3	If there is no AFD in either the MXF/GXF or the data track, no AFD is set.

GXF Export: (both AFD and ARC values inserted into XML of stream)	
Condition	Description
Exported to pre-3.3 system	Unrecognized AFD is ignored
Exported to 3.3 system	AFD overrides ARC settings

GXF Import	
Condition	Description
Imported from pre-3.3 system	ARC remains unchanged
Imported from 3.3 system	AFD overrides ARC settings

MXF Export (No ARC in the MXF stream)	
Condition	Description
AFD from clip property added to properties of the video in the header metadata	If clip property is not set, do not add property in stream
AFD from data track in stream's ancillary data	No change required

MXF Import (No ARC in the MXF stream)	
Imported stream has AFD in the header metadata	AFD is stored in the clip property setting of the clip
Imported stream has AFD in the data track	AFD is stored in the clip property setting of the clip. (AFD is taken from the ancillary data two seconds from the beginning, or, if the clip is less than 2 seconds long, from the last valid AFD.)
Imported stream has no AFD	No AFD

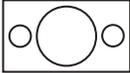
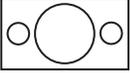
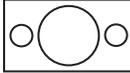
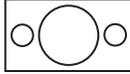
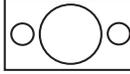
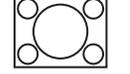
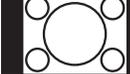
Default generated AFD values

Default AFD values are generated when the three following conditions are met:

- The AFD output setting in the Configuration Manager is set to **always**
- The clip does not have AFD in the data track, and
- The clip does not have AFD specified in its clip properties

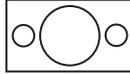
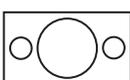
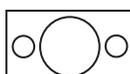
Under these conditions, default AFD is generated and inserted, based on ARC performed and the source material format. Default generated AFD settings are described in the table below.

Default generated AFD values when up-converting to HD

Source aspect ratio	Presumed ^a source image	Conversion option	Converted AFD and aspect ratio	Converted image
16:9 HD		No conversion	AFD = 1010 AR 16:9 HD	
16:9 SD		Scale up Crop vertical	AFD = 1010 AR 16:9 HD “crop”	
		Scale up	AFD = 1010 AR = 16:9 HD	
		Scale up Crop vertical Pillarbox	AFD = 1011 AR = 16:9 HD “half bars”	
		Scale up Pillarbox	AFD = 1011 16:9 HD “bars”	

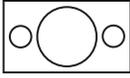
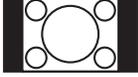
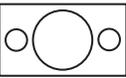
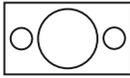
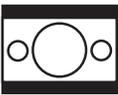
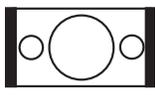
^a Source image is presumed based on the conversion that has been selected.

Default generated AFD values when down-converting to SD

Source aspect ratio	Presumed ^a source image	Conversion option	Converted AFD and aspect ratio	Converted image
4:3 SD		No conversion	AFD = 1001 AR 4:3 SD	
16:9 SD		No conversion (only if ARC set to 'stretch')	AFD = 1010 AR 16:9 SD	
16:9 HD		Scale down letterbox	AFD = 1010 AR 4:3 SD "bars"	
		Scale down Crop horizontal	AFD = 1001 AR 4:3 SD "crop"	
		Scale down	AFD = 1010 AR = 16:9 SD "stretch"	
		Scale down Crop horizontal Letterbox	AFD = 1011 AR = 4:3 SD "half bars"	

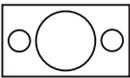
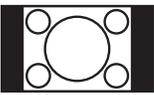
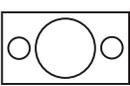
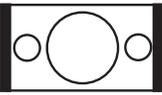
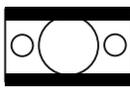
^a Source image is presumed based on the conversion that has been selected.

Supported conversions from SD to HD using AFD

Source AFD and aspect ratio	Source image	Conversion performed	Converted AFD and aspect ratio	Converted image
AFD = 1010 AR 4:3 SD		Scale up crop vertical	AFD = 1010 AR 16:9 HD	
AFD = 1001 ^a AR 4:3 SD		Scale up pillarbox	AFD = 1001 AR 16:9 HD	
AFD = 1010 ^a AR 16:9 SD		Scale up	AFD = 1010 ^a AR 16:9 HD	
AFD = 1011 AR = 4:3 SD		Scale up Crop vertical pillarbox	AFD = 1011 AR 16:9 HD	

^a The SMPTE standard describes two valid AFD codes. The K2 system uses the second value.

Supported conversions from HD to SD using AFD

Source AFD and aspect ratio	Source image	Conversion performed	Converted AFD and aspect ratio	Converted image
AFD = 1010 ^a AR = 16:9		Scale down letterbox	AFD = 1010 AR = 4:3	
AFD = 1001 AR = 16:9		Scale down crop horizontal	AFD = 1001 AR = 4:3	
AFD = 1010 ^a AR = 16:9		Scale down	AFD = 1010 ^a AR = 16:9	
AFD = 1011 AR = 16:9		Scale down Crop horizontal letterbox	AFD = 1011 AR = 4:3	
AFD = 1111 AR = 16:9		Scale down crop horizontal	AFD = 1001 AR = 4:3	

^a The SMPTE standard describes two valid AFD codes. The K2 system uses the second value.

VBI/Ancillary/data track specifications

This section contains the following topics:

- [“Definitions”](#)
- [“Data track support on K2 Summit Production Client HD channels”](#)
- [“Subtitling system support”](#)
- [“Data compatibility between K2 Summit Production Client and PVS models”](#)

Definitions

Terms in this section are defined as follows:

Ancillary data	Ancillary data (ANC data) as specified in this section is primarily a means by which timecode, Closed Captioning, and Teletext information is embedded within the serial digital interface. Other Type 2 ancillary data packets are stored and played back without modification. Ancillary data is standardized by SMPTE 291M.
Closed Captioning (CC)	Line 21 NTSC Closed Captioning as defined in EIA-608 and used as a subset of EIA-708. EIA-708 has been updated and renamed to CEA-708. Includes other Line 21 services such as V-Chip.
Teletext (TT)	Teletext System B subtitles as defined ETSI EN 300 706 and other documents. The Australian standard for digital TV is Free TV Operational Practice OP-47. It has been ratified as SMPTE RDD 8.
Captioning	Denotes both NTSC Closed Captioning and Teletext subtitling.

Luma/Chroma VBI support on SD K2 Media Client

The following table applies when in Configuration Manager, the Data Track settings are configured as:

- Record ancillary data: No

Or as:

- Record ancillary data: Yes
- Record Uncompressed VBI and captioning data to track: No

Use these Data Track settings to retain compatibility with legacy systems, such as the Profile XP Media Platform.

Model	Luma: Record^a VBI, CC	Luma: Playout VBI	Chroma: Record^a VBI	Chroma: Playout VBI
SDA-00	No	Yes	No	No
SD-00	Yes	Yes	Yes	Yes
SD channel on HD-00	Yes	Yes	Yes	Yes

^a A given line of VBI data can be stored as either Luma or Chroma, but not both.

VBI data support on K2 Media Client SDA-00 and SD-00 models

The following table applies when in Configuration Manager, the Data Track settings are configured as:

- Record ancillary data: No

Or as:

- Record ancillary data: Yes
- Record Uncompressed VBI and captioning data to track: No

Use these Data Track settings to retain compatibility with legacy systems, such as the Profile XP Media Platform.

Video format	Compressed VBI	Uncompressed VBI ^a	Captioning	Comments
DVCPRO25 525 line (NTSC)	Not supported	Not supported by DVCPRO25 format	CC supported, as native to DVCPRO25. VCHIP data supported.	—
DVCPRO25 625 line (PAL)	Not supported	Not supported by DVCPRO25 format	TT not supported as VBI data.	—
DVCPRO50 525 line (NTSC)	Supported	Not supported by DVCPRO50 format	CC 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	TT supported, as native to DVCPRO50 (compressed VBI).	—
DVCAM 525 line (NTSC)	Not supported	Not supported by DVCAM format	CC supported, as native to DVCAM.	—
DVCAM 625 line (PAL)	Not supported	Not supported by DVCAM format	TT 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.	CC supported and always on. Not selectable.	—
MPEG-2 625 line (PAL)	Supported as 16 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.	TT supported only as compressed or uncompressed VBI.	—
MPEG-D10 525 line (NTSC)	Supported	Not supported by D10 format.	CC supported, as native to D10.	—
MPEG-D10 625 line (PAL)	Supported	Not supported by D10 format.	TT supported, as native to D10.	—

^a SDA-00 model does not support recording uncompressed VBI.

VBI data support for SD channels configured on K2 Media Client HD-00 models

The following table applies when in Configuration Manager, the Data Track settings are configured as:

- Record ancillary data: No

Or as:

- Record ancillary data: Yes
- Record Uncompressed VBI and captioning data to track: No

Use these Data Track settings to retain compatibility with legacy systems, such as the Profile XP Media Platform.

Video format	Compressed VBI	Uncompressed VBI	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.	CC 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.	TT not supported	—

Data track support on K2 Media Client SD channels

The following table applies to SD channels on both SD-00 models and HD-00 models, when in Configuration Manager the Data Track settings are configured as follows:

- Record ancillary data: Yes
- Record Uncompressed VBI and captioning data to track: Yes

Data track is not supported for record or playout on SDA-00 models.

Video format	Data	Supported as follows:
525 line (NTSC)	Closed Captioning	Stored in EIA-708 packets. On playback, modulate to VBI line 21.
625 line (PAL)	Teletext	Stored in OP-47 packets. On playback, modulate to VBI line specified in OP-47 packet.
All supported SD formats	Uncompressed VBI	Selectable per line. Limited to 5 lines. The 5 line limit does not include any lines used for CC or TT. Can select either Luma or Chroma for each line, but not both.
	Ancillary timecode	Ancillary timecode is preserved only. No timecode track is constructed from ancillary timecode data. The timecode track is not inserted as ancillary timecode on playout.

Data track support on K2 Media Client HD channels

The data track can contain ancillary data and other types of data. 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.

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.
	Ancillary timecode	For record, selectable to use VITC or LTC ancillary timecode as timecode source. For playout, selectable to insert recorded timecode track as ancillary data VITC or LTC timecode packets. If the recorded timecode track is inserted as VITC ancillary timecode and VITC ancillary timecode packets are already stored on the data track, then the recorded timecode track overrides the stored VITC ancillary timecode packets. If the recorded timecode track is inserted as LTC ancillary timecode and LTC ancillary timecode packets are already stored on the data track, then the recorded timecode track overrides the stored LTC ancillary timecode packets.

Subtitling system support

An API is provided for access to subtitling data, allowing Closed Captioning and Teletext systems to produce timecode correlated subtitles for an existing K2 clip.

Data bridging of VBI information on K2 Media Client HD-00 models

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 ^a or UserData VBI Line21 (Uncompressed VBI Line21)	Up-convert	HD	Ancillary Closed Caption EIA-708-B packets
	EIA-708	Up-convert	HD	EIA-708
SD 625 line	Teletext (except as below)	No up-conversion to HD		
	5 lines of VBI Teletext in OP-47 packets	Up-convert	HD	OP-47 ancillary data packet in SD data track file. SD Teletext is in ancillary data location as specified in OP-47 packet.
SD 625 line 525 line	Ancillary data	Up-convert	HD	Moved to valid lines
HD	EIA-708 & 608 Ancillary data packets	Down-convert	SD	Closed-captioning on line 21 (EIA-608 standard).
HD	Teletext as OP-47 packets	Down-convert	SD	Output as VBI waveforms on lines specified in OP-47 packet.
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.

^a UserData CC packets always on. If CC exists, it is recorded and played back.

Data compatibility between K2 Media Client and PVS models

When material is transferred between a PVS Profile XP Media Platform and a K2 Media Client, 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	SD-00 K2 Media Client	All supported	NA
		Luma VBI from MPEG user data	SDA-00 K2 Media Client	Yes	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	Yes	Yes
	HD MPEG-2	Ancillary data	HD-00 K2 Media Client	Yes	Yes
SDA-00 K2 Media Client	SD MPEG-2	NA	PVS	No	No
SD-00 K2 Media Client	SD MPEG-2	Recorded on K2 Media Client with Profile compatible setting. ^a	PVS	All supported	NA
		Uncompressed VBI and captioning on data track	PVS	Not supported. Do not attempt to transfer to PVS.	
HD-00 K2 Media Client	SD MPEG-2	Compressed VBI	PVS	Yes	No
		Uncompressed VBI	PVS	Yes	No, except for bridging of CC data, which requires Profile software v5.4.9.
		Closed captioning	PVS	No	No
		Uncompressed VBI and captioning on data track	PVS	Not supported. Do not attempt to transfer to PVS.	
	HD MPEG-2	Ancillary data	PVS	Yes. CC bridging requires data-bridging SDI board.	Yes.

^a When Record ancillary data = No or when Record Uncompressed VBI and captioning data to track = No

Internationalization

When you enable internationalization on a K2 client, you can name your media assets in a local language. The K2 client supports the local language name as specified in the following table:

System	Internationalization support
Media database	<ul style="list-style-type: none"> All external views of movie assets can be represented as wide-file names AppCenter runs in Unicode Only movie assets and searchable User Data keys are Unicode.
Media file system	<ul style="list-style-type: none"> Support for Kanji and wide-character file and folder names. File-folder representation of movie are internationalized, as well as the QuickTime reference file it contains. Key names (V:\PDR) remain unchanged, but are Unicode. Elementary streams remain as GUIDs, but are Unicode.
K2 Media Client applications	<ul style="list-style-type: none"> Movie assets are described in Unicode. Application user interfaces are Unicode compliant.
Protocols	Refer to Appendix A, Remote control protocols, in the K2 Media Client System Guide.
FTP transfers	Refer to “FTP internationalization” in the K2 Media Client System Guide.

Video network performance

K2 systems support streaming transfers to and from K2 Summit Production Clients, K2 Media Clients, K2 SANs, 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 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 on K2 Media Client and K2 SAN

The K2 Media Client and K2 SAN 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 ^a		FTP stream		Other information
			Import	Export	Import	Export	
GXF ^b	DV25/50 DVCAM MPEG-2 ^c	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 “Transfer compatibility with K2 Media Client” on page 220.
MXF	DV25/50 DVCAM D10 ^d 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 “MXF export behavior on K2 Media Client” on page 218.
AVI ^e	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 ^e	DV25 DV50 DVCAM	48 kHz, 16 bit, or 24 bit PCM	Yes	Yes	No	No	Audio tracks handled as stereo pairs
	D10/IMX XDCAM-HD XDCAM-EX XDCAM-422 HDV	48 kHz, 16 bit, or 24 bit PCM	Yes	No	No	No	Audio tracks handled as stereo or mono audio channels
MPEG	MPEG-2	48kHz MPEG-1 (layer 1 & 2) SMPTE 302M 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

^a Based on a file that is visible from the operating system. For example, AppCenter import/export features are file based.

^b GXF supports all formats that can be stored on a K2 system.

- ^c Includes all MPEG-2 formats (IMX, XDCAM, etc.) that can be stored on a K2 system.
- ^d A D10 MXF stream is handled as an eVTR style D10AES3 stream. Uncompressed audio only. Maximum 8 channels audio. If you want to export clips with more than 8 audio tracks, export as GXF
- ^e K2 software version 3.2.7 or higher required to export as AVI or MOV with SD data track.

MXF export behavior on K2 Media Client

The following sections specify how a K2 Media Client 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@H-14	4:2:0	1440x1080	25/35Mbps CBR	Uncompressed	2/4	16
XDCAM-HD422	MPEG-2 422P@HL	4:2:2	1920x1080i or 1280x720p	50Mbps CBR	Uncompressed	8	24
XDCAM-EX	MPEG-2 MP@HL	4:2:0	1920x1080i or 1280x720p	35Mbps VBR	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 on K2 Media Client and K2 SAN

Parameter	Internal Storage Specification	Shared Storage Specification
Maximum number of clips ^a	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

^a 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 in the *K2 System Guide* for more information.

Transfer compatibility with K2 Media Client

When transferring material between a K2 Media Client 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 Media Client	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, DVCPRO50, 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 Media Client	Profile XP Media Platform	HD 4:2:0 80 Mb or less SD 4:2:2, XDCAM-HD422, XDCAM-EX	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 Media Client	M-Series iVDR	DVCPRO25, DVCPRO50, and MPEG I-frame	Playout supported
		1080i	Not supported.
K2 Media Client	K2 Summit Client	DVCPRO25, DVCRPRO50, DVCAM	Playout supported
		MPEG	Not supported.
Turbo iDDR	K2 Media Client	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 Media Client		
M-Series iVDR	K2 Media Client		
K2 Summit Client	K2 Media Client	DVCPRO25, DVCPRO50, DVCAM	Supported
		DVCPRO100	Not supported

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.

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 system 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 (Must be a U.S. version): XP Professional Service Pack 2, Server 2003, or Vista Enterprise Service Pack 1.
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, Version 1.1 hotfix, Version 3.5 SP1
Sun Java 2 Runtime Environment	Version 1.5.0_11, Version 1.6.0 or higher Required for the HP Ethernet Switch configuration interface, which is used for K2 SAN (shared 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.
Quicktime	Version 7 or higher
Acrobat Reader	Version 8 or higher

Find software at Internet locations such as the following:

- <http://msdn.microsoft.com/en-us/netframework/default.aspx>
- <http://java.sun.com/javase/downloads/index.jsp>
- <http://www.microsoft.com/downloads/details.aspx?FamilyId=3144B72B-B4F2-46DA-B4B6-C5D7485F2B42&displaylang=en>
- <http://www.apple.com/quicktime/download/>
- <http://get.adobe.com/reader/>

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

MIB specifications

This section specifies Management Information Base (MIB) information for monitoring K2 devices with the Simple Network Management Protocol (SNMP). This information is intended for SNMP developers. MIB files can be obtained from the Grass Valley Developers website.

In addition to the MIBs specified in this section, a K2 device might support other MIBs based on third party software/hardware. To determine whether other MIBs are supported by the operating system or independent hardware/software vendors, perform a “MIB walk” operation on the K2 device using conventional SNMP utilities and determine MIBs supported.

MIBs specified in this section are as follows:

- “K2 client MIBs”
- “K2 Media Server MIBs”
- “K2 Appliance (Generic Windows computer based) MIBs”

K2 client MIBs

Grass Valley MIBs

MIB	Description
gvg-reg.mi2 (GVG-REG)	Grass Valley SMI enterprise namespace
gvg-element.mi2 (GVG-ELEMENT-MIB)	Common object definitions for a Grass Valley device. - Generic device tracking information - SNMP trap target configuration - Generic IO/signal status information
gvg-prod.mi2 (GVG-PROD-REG)	Product sysObjectOID registrations for the Grass Valley devices
gvg-drs.mi2 (GVG-DRS-MIB)	Video disk recorder/server status information
gvg-tcm.mi2 (GVG-TCM-MIB)	Media transfer (import/export) statistical information
gvg-manclient.mi2 (GVG-MANCLIENT-MIB)	SAN client status information. Available only when the K2 client is connected to a SAN.

Other MIBs

MIB	Description
RFC1213-MIB.mib (RFC1213-MIB)	MIB-2 support as implemented by Microsoft for the Windows operating system.
hostmib.mib (HOST-RESOURCES-MIB)	Generic system information as implemented by Microsoft for the Windows operating system
lmmib2.mib (LanMgr-Mib-II-MIB)	Generic Windows networking, user account and service information as implemented by Microsoft for the Windows operating system
SUPERMICRO-SMI.my (SUPERMICRO-SMI)	Motherboard electromechanical sensor information (motherboard temperature hotspots, CPU fan, voltages, etc.)
SUPERMICRO-HEALTH-MIB.my (SUPERMICRO-HEALTH-MIB)	
MEGARAID.mib (RAID-Adapter-MIB)	Internal RAID-1 SCSI drive and controller information

K2 Media Server MIBs

Grass Valley MIBs

MIB	Description
gvg-reg.mi2 (GVG-REG)	Grass Valley SMI enterprise namespace
gvg-element.mi2 (GVG-ELEMENT-MIB)	Common object definitions for a Grass Valley device. - Generic device tracking information - SNMP trap target configuration
gvg-prod.mi2 (GVG-PROD-REG)	Product sysObjectOID registrations for the Grass Valley devices
gvg-ssr.mi2 (GVG-SSR-MIB)	K2 Storage roles configured for the server by the K2 System Configuration application and their status information
gvg-sbs.mi2 (GVG-SBS-MIB)	K2 iSCSI Bridge and TOE (TCP Offload Engine) related status information. Available only if the K2 Media Server has the iSCSI Bridge role.
gvg-manfsm.mi2 (GVG-MANFSM-MIB)	Video File System and Clip Database (FSM) related status information. Available only if the K2 Media Server has role(s) of media file system server and/or database server.
gvg-tcm.mi2 (GVG-TCM-MIB)	Media transfer (import/export) statistical information. Available only if the K2 Media Server is configured to be a transfer/FTP/hotbins server.
gvg-manclient.mi2 (GVG-MANCLIENT-MIB)	SAN client status information. Available only when the K2 Media Server is a media system and/or database client. For example, if the K2 Media Server has the role of FTP server only, then it must be a media file system/database client to another K2 Media Server that is the media file system/database server.

Other MIBs

MIB	Description
RFC1213-MIB.mib (RFC1213-MIB)	MIB-2 support as implemented by Microsoft for the Windows operating system.
hostmib.mib (HOST-RESOURCES-MIB)	Generic system information as implemented by Microsoft for the Windows operating system
lmmib2.mib (LanMgr-Mib-II-MIB)	Generic Windows networking, user account and service information as implemented by Microsoft for the Windows operating system
mssql.mib (MSSQLSERVER-MIB)	Microsoft SQL Server information
10892.mib (MIB-Dell-10892)	Dell PowerEdge chassis related electro-mechanical status information
arymgr.mib (ArrayManager-MIB)	Dell RAID1 system disk (PERC) and controller information

K2 Appliance (Generic Windows computer based) MIBs

For details on the hardware/chassis running the K2 Appliance, check the chassis vendor's MIBs.

Grass Valley MIBs

MIB	Description
gvg-reg.mi2 (GVG-REG)	Grass Valley SMI enterprise namespace
gvg-element.mi2 (GVG-ELEMENT-MIB)	Common object definitions for a Grass Valley device. - Generic device tracking information - SNMP trap target configuration
gvg-prod.mi2 (GVG-PROD-REG)	Product sysObjectOID registrations for the Grass Valley devices
gvg-ssr.mi2 (GVG-SSR-MIB)	K2 Storage roles configured for the server by the K2 System Configuration application and their status information
gvg-tcm.mi2 (GVG-TCM-MIB)	Media transfer (import/export) statistical information. Available only if the K2 Media Server is configured to be a transfer/FTP/hotbins server.
gvg-manclient.mi2 (GVG-MANCLIENT-MIB)	SAN client status information. Available only when the K2 appliance is a media system and/or database client.

Other MIBs

MIB	Description
RFC1213-MIB.mib (RFC1213-MIB)	MIB-2 support as implemented by Microsoft for the Windows operating system.
hostmib.mib (HOST-RESOURCES-MIB)	Generic system information as implemented by Microsoft for the Windows operating system
lmmib2.mib (LanMgr-Mib-II-MIB)	Generic Windows networking, user account and service information as implemented by Microsoft for the Windows operating system

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.

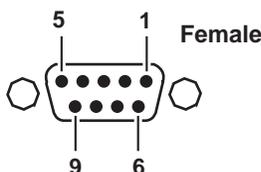
RS-422 connector pinouts

K2 Media Clients have been manufactured with two types of RS-422 configurations, as follows:

- A K2 Media Client can have two RS-422 adapters. Each adapter is connected via an internal USB cable to the motherboard, so while a RS-422 adapter does occupy a rear panel slot, it does not plug into a PCI bus. Each adapter provides two RS-422 ports for connecting equipment for remote control of the K2 Media Client.
- A K2 Media Client can have one RS-422 adapter. The adapter is connected via PCI slot to the motherboard. The adapter includes an external interface with eight ports. On the external interface, ports 1–4 are active. This provides the four ports for connecting equipment for remote control of the K2 Media Client.

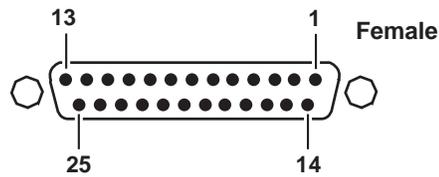
The RS-422 interface conforms to ANSI/SMPTE 207M-1997 standard (SMPTE 422).

Pinouts for the individual DB9 connectors are as follows:



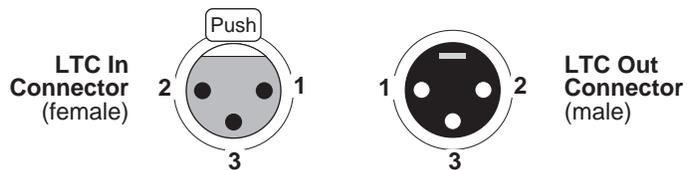
Pin #	Signal	Description
1	GND	Frame Ground
2	-TXD	Differential Transmit Data (low)
3	+RXD	Differential Receive Data (high)
4	GND	Transmit Signal Common
5	NC	Spare
6	GND	Receive Signal Common
7	+TXD	Differential Transmit Data (high)
8	-RXD	Differential Receive Data (low)
9	GND	Signal Ground

Pinouts for the DB25 connector on the PCI RS-422 board are as follows:



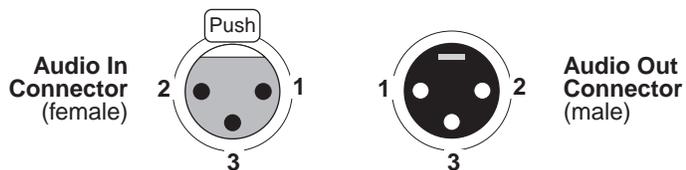
Pin #	Signal	Description
1-6	Not Used	
7	GND	
8-14	Not Used	
15	+RXD	
16	Not Used	
17	-RXD	
18	Not Used	
19	+TXD	
20-24	Not Used	
25	-TXD	

LTC connectors pinouts



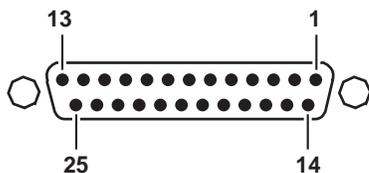
Pin #	LTC In	Pin #	LTC Out
1	Signal Ground	1	Signal Ground
2	(+)	2	(+)
3	(-)	3	(-)

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
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

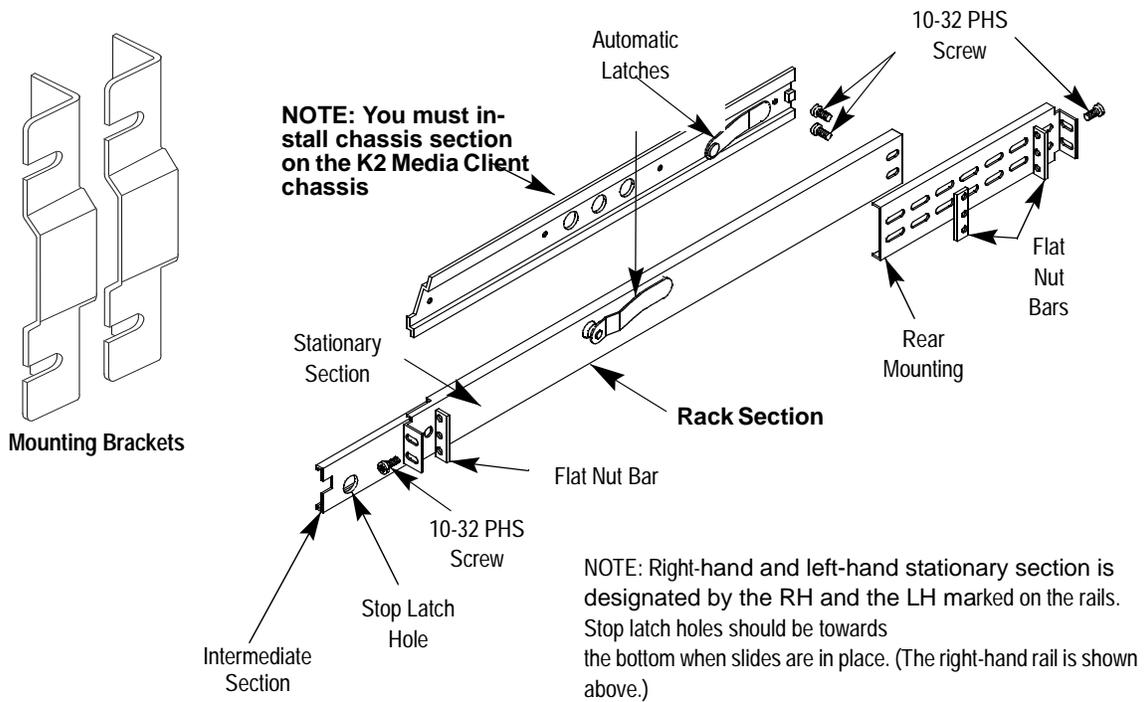
When planning the placement of equipment in your equipment rack, bear in mind the following:

- 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.

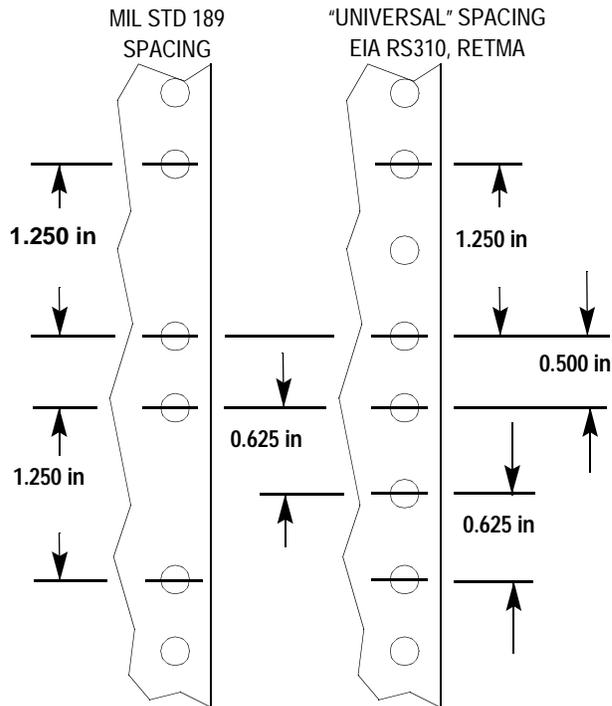
Rack mount hardware shipped with the K2 client system

Your K2 client system rack-mount kit comes with rack mounting hardware as shown.

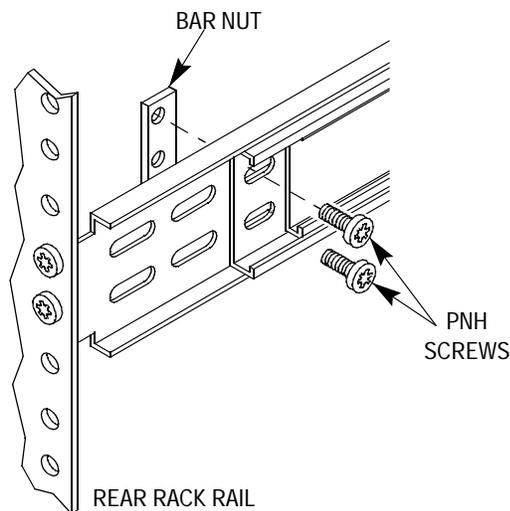
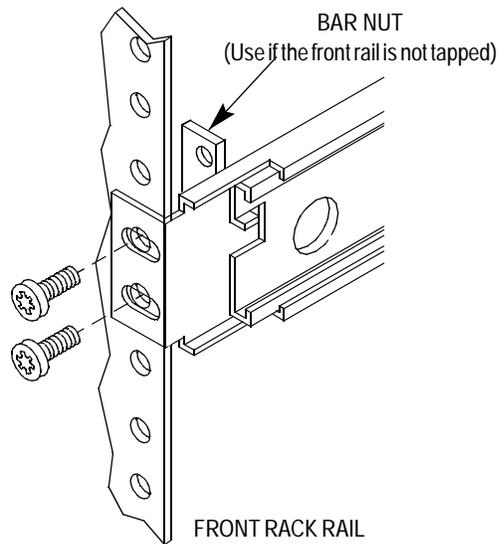


Mounting the Rack Slides

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.



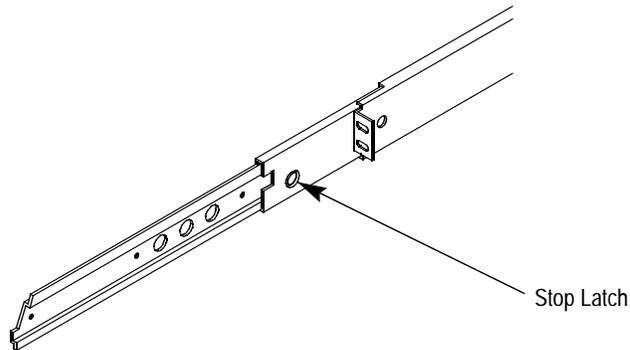
WARNING: To prevent injury, two people are required to lift the K2 client system. It is too heavy for one person to install in the rack.



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

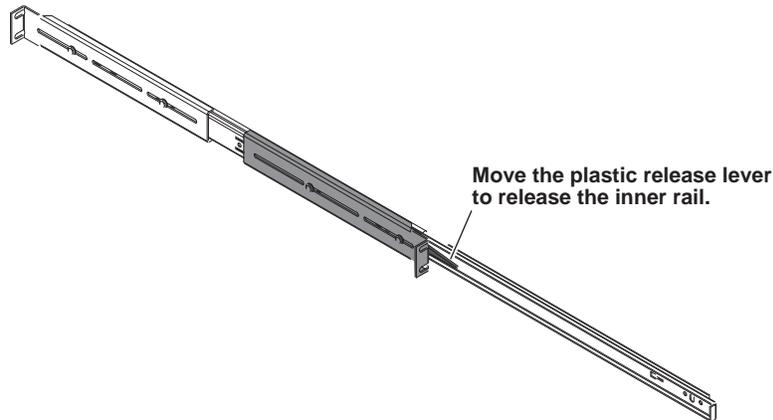
After installation, binding may occur if the slide tracks are not properly adjusted. To adjust the tracks:

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

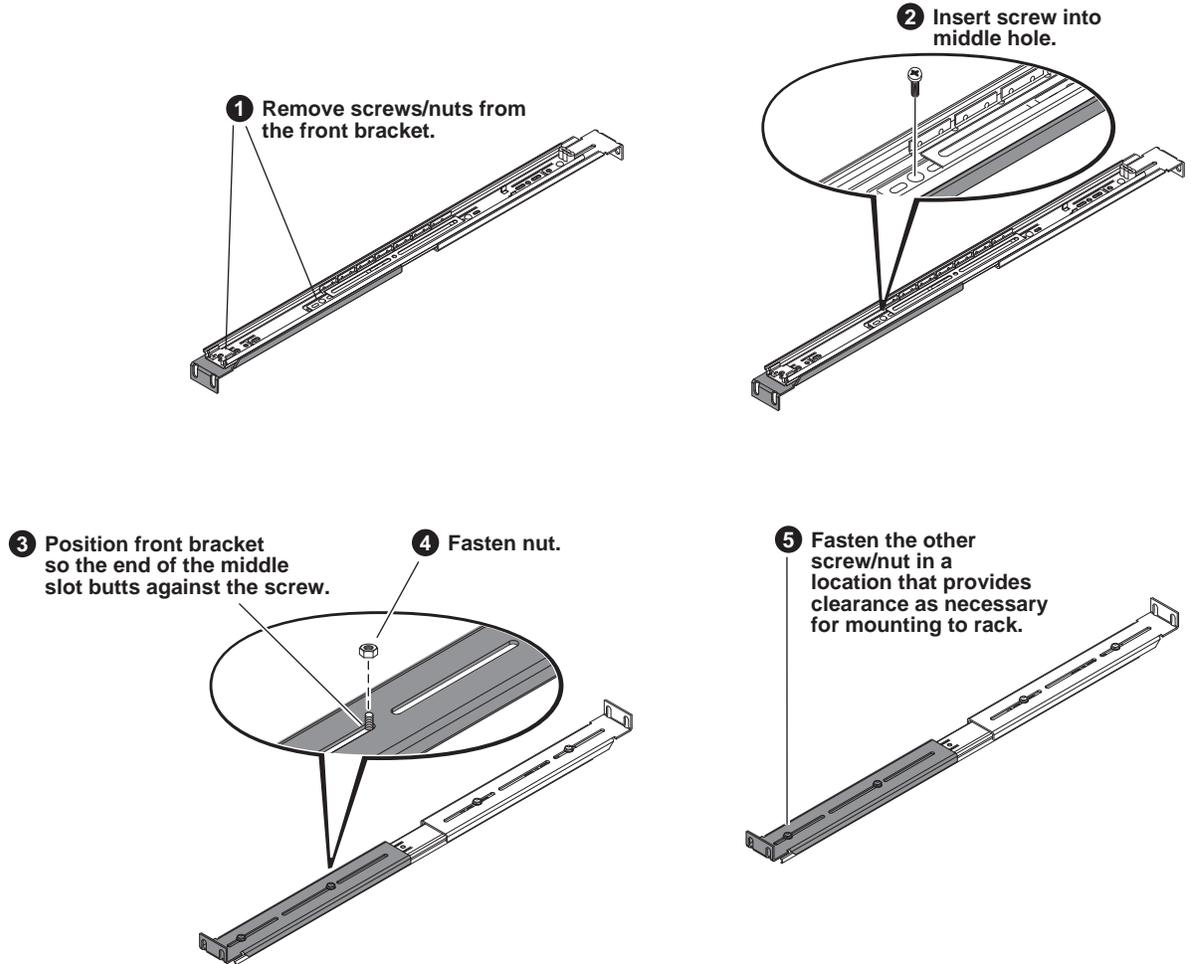
The pull out PC notebook drawer kit consists of two slide assemblies with front and rear brackets fitted and a drawer. The kit does not include rack screws or cage nuts.

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 58

A

AC power, specification 188

adapter

 identifying 63

 network loopback 77

 reordering 76

 SCSI controller 111

administrator

 mapping NetCentral administrators with
 K2 146

 password 137

AES/EBU audio

 specification 192

AMP

 channel designations 173

 protocol settings 172

 RS-422 connections 180

 transfers 172

analog audio connector pinouts 230

ancillary data specifications 208

AppCenter

 channel access security 142

 user access 137

application system

 architecture 32

 software 33

aspect ratio

 HD-00 200

 SD-00 198

ATX 32

audio

 analog audio specification 192

 digital audio specification 192

 Dolby-E 198

auto logon 149

AVI, supported formats 216

B

backup, strategies 132

bandwidth 159

binding LUNs 120

bins, configuring security 137

board

 codec 32

 map 38

 real time processor 32

 SCSI interface 111

 XLR 32

BVW

 protocol settings 176

 RS-422 connections 180

C

cable

 redundant server heartbeat 231

 requirements, Ethernet connections 52

channels

 security 142

 VBI data support for SD on HD-00 211

cleaning unreferenced files and movies 124

clips, maximum number 219

closed captioning 208

codec board 32

commands, FTP 82

composite video, specification 190

configuration

 auto logon 149

 channel access security 142

 customizing 43

 file 46

 K2 Media Client security 134

 loading defaults 44

 media access security for K2 bins 137

 opening 43

 protocol security 141

 sample K2 Media Client hosts file 60

 saving and restoring 43

 Windows network settings 55

Configuration Manager, description 43

connections

 GPI 110

 RS-422 109, 178

connector pinouts

 analog audio 230

 GPI 230

 LTC connector 229

 RS-422 228, 231

continuous record

- maximum length 219
- Control Point PC
 - installing software 129
 - rack mounting drawer 238
 - screen resolution problem with
 - NetCentral 221
 - software components 128
 - system requirements 221
 - where software is installed 127
- control team, creating 66
- controller
 - microcode, checking 116
 - obtaining logs 118
- corrupt movies 77

- D**
- database, description 34
- delay, minimum 219
- DG capture service 97
- direct-connect storage
 - K2 Media Client 151
- disk
 - checking disk mode pages 118
 - disabling 118
 - downloading firmware PFR 700 125
 - identifying 117
 - rebuilding forcibly 119
- downconverting 198
- drive
 - disabling 118
 - numbering RAIDs 41
 - striping media 111

- E**
- E to E
 - protocols 172
 - SDA models 35
- electrical specification 189
- environmental specification 188
- Ethernet
 - cable requirements 52
 - cabling, K2 Media Client 53
 - teaming ports, internal storage 63
- exporting, supported formats 216
- external storage
 - adding a K2 Media Client to a K2 Storage System 160
 - installing Multi-Path I/O software on a K2

- Media Client 161
- K2 Media Client 157
- load balancing 158
- specification, media file system 219

F

- features
 - external storage 20
 - HD-00 19
 - internal storage 19
 - K2 Media Client 18
 - SD-00 19
 - SDA-00 18
- file system, description 34
- files, cleaning unreferenced 124
- firewall policies 148
- formats, supported 216
- fps conversions on HD-00 models 198
- front panel
 - enabling and disabling USB ports 148
 - indicators 27
- FTP
 - access and configuration 79
 - accessing with Internet Explorer 80
 - automated access 79
 - clips with gaps 77
 - creating a team 72
 - internationalization 79
 - K2 FTP server 77
 - specifying language 80
 - streaming from a K2 Storage System 58
 - streaming ports 58
 - streaming transfer network requirements 54
 - supported commands 82
 - using for file transfer 77

G

- genlock, specification 190
- GPI
 - connector pinout 230
 - electrical specification 194
 - inputs 110
- GXF
 - description 81
 - supported formats 216

H

hardware

- rack mount 234

Harris settings, protocol 177

HD-00

- aspect ratio conversions 200
- description 22
- features 19
- fps conversions 198
- loopback 36
- playout 198
- rear panel 30
- RS-422 connectors and channels 180, 182
- VBI data support for SD channels 211
- video codec specification 197

host name

- adding 61
- problems when changing 77

hosts file

- editing 59
- K2 Media Client sample 60
- using _he0 58

HotBins, about 84

HTTP, port connections 40

I

identify

- adapters 63
- disks 117

importing, supported formats 216

indicators, front panel 27

installing

- Control Point software 129
- re-installing software 130

internal storage

- changing RAID types 122
- K2 Media Client 111

internationalization

- AMP 173
- FTP 79
- K2 Summit Production Client 215
- VDCP 175

Internet Explorer, FTP access 80

K

K2 Config, see K2 System Configuration

K2 FTP

- interface 78

- internationalization 79

- security 140

- specifying language 80

- supported commands 82

K2 FTP server 77

- configuration with M-Series iVDR 79

- configuration with Profile XP 79

K2 Media Client

- adding to a K2 Storage System 158

- administrator 137

- auto logon 149

- changing RAID types 122

- configuring security 134

- connecting remotely 47

- connector pinouts 228

- description 17

- determining bandwidth requirements 159

- direct-connect storage 151

- external storage 157

- features 18

- FTP configuration 79

- identifying specific client-types 25

- installing Multi-Path I/O software 161

- installing software 130

- internal storage system, description 111

- licensing 133

- modes, online and offline 113

- network and firewall policies 148

- network cabling, external storage 53

- network cabling, internal storage 53

- network loopback adapter 77

- pre-installed software 132

- preparing to add to a K2 Storage System 160

- rack mounting 233

- returning to online mode 125

- sample configuration and hosts file 60

- security considerations with NetCentral 145

- software components 128

- supported transfer formats 216

- system overview 31

- system tools, using 43

- teaming Ethernet ports, internal storage 63

- user 137

- user accounts 137

- virus scanning 147

- where software is installed 127

K2 Media Server

- connecting remotely 47

- connector pinouts 231

- security considerations with NetCentral 145
- software components 128
- where software is installed 127
- K2 Storage System
 - configuring for K2 Media Clients 159
 - load balancing 158
 - security 140
- K2 Summit Production Client
 - internationalization 215
 - layout formats 197
 - streaming transfers 215
- K2 System Configuration 45
- K2admin 137
- K2user 137

L

- language
 - AMP 173
 - K2 Summit Production Client support 215
 - restrictions in Internet Explorer 80
 - specifying in K2 FTP 80
 - VDCP 175
- licensing
 - description 133
 - options 133
- load balancing, description 158
- logs, obtaining controller 118
- loop through
 - description 34
 - SD models 36
- loopback adapter
 - network IP address 77
- loopback, HD models 36
- LTC
 - input/output 193
- LTC connector pinouts 229
- LUN
 - binding 120
 - unbinding 119

M

- making new media file system 122
- mapping
 - COM ports to RS-422 rear panel connectors 185
 - RS-422 panel connectors to protocol controllers 184
- mechanical specifications 189

- media
 - access security for AppCenter 140
 - access security for FTP 140
 - access security for K2 bins, configuration 137
 - access security for K2 Storage Systems 140
 - access security for protocols 141
 - changing RAID types 122
 - control and processing 33
 - limitations with complex types 78
 - making new media file system 122
 - naming disk drive 116
 - striped data 111
 - transferring mixed formats 78
- media file system
 - checking 123
 - description 34
 - performance 219
 - software location
- MIB 222
- microcode, checking controller 116
- Microsoft Windows
 - see Windows
- minimum between start of record and layout 219
- mode
 - checking disk mode pages 118
 - online and offline 113
 - online, returning K2 Media Client 125
- monitor
 - SDA-00 audio 192
- movie
 - cleaning unreferenced 124
 - corrupt 77
- MPEG, supported formats 216
- M-Series iVDR
 - FTP configuration with K2 FTP server 79
 - transfer compatibility 220
 - transferring to K2 Summit Production Client 215
- Multi-Path I/O software, installing on a K2 Media Client 161
- MXF
 - implemented in K2 81
 - supported formats 216
- N**
- NetCentral 47
 - mapping administrators with K2 146
 - screen resolution problem with Control Point

- PC 221
- security considerations 145
- software location

network

- 100BaseT, setup 54
- adding host names
- cabling, connecting for external storage 53
- cabling, connecting for internal storage 53
- control 53
- control team settings 160
- FTP/streaming transfer requirements 54
- host file, setup 58
- media/iSCSI 54
- modifying settings 77
- policies 148
- reordering adapters 76
- video performance 215
- Windows settings, configuring 55

O

- offline mode, description 113
- online mode
 - description 113
 - returning K2 Media Client 125

P

- passwords 137
- Pathfire capture service 89
- permissions
 - AppCenter 140
 - channel access 142
 - FTP 140
 - K2 bins 137
 - K2 Storage Systems 140
 - protocols 141
- PFR700, downloading disk firmware 125
- pinouts 227
- playout
 - HD-00 198
 - minimum delay between start of record 219
 - SDA-00 and SD-00 197
- ports
 - COM ports mapping to RS-422 185
 - enabling and disabling USB 148
 - RS-422 and protocol controller 184
 - used by K2 services 40
- ProductFrame 48
- Profile XP

- FTP configuration with K2 FTP server 79
- transfer compatibility 220
- transferring to K2 Summit Production Client 215

- protection, network and firewall 148
- protocol
 - AMP channel designations 173
 - associating with a user account 141
 - controller ports and RS-422 184
 - Harris settings 177
 - mapping RS-422 panel connectors 184
 - remote control, transferring 78
 - security 141

Q

- QuickTime
 - reference file 41
 - supported formats 216

R

- rack mounting 233
 - adjusting 237
 - Control Point PC drawer 238
 - hardware 234
 - rails 236
 - slides 235

RAID

- binding LUNs 120
- changing type 122
- checking disk mode pages 118
- disabling disks 118
- drive numbering 41
- drives, description 111
- identifying disks 117
- rebuilding disks forcibly 119
- unbinding LUNs 119

Real Time Processor (RTP) 32

- real time system
 - components 32
 - description 34
- rear panel
 - board locations 38
 - connector pinouts 228
 - enabling and disabling USB ports 148
 - GPI 110
 - RS-422 connections 109, 178
 - view 28

- rebuilding disks forcibly 119

- record, maximum length of continuous 219
- recovery, strategies 132
- redundant server heartbeat cable 231
- remote control protocols
 - controlling with RS-422 109, 178
 - transferring 78
- requirements
 - bandwidth, K2 Media Client 159
 - Control Point PC system 221
 - FTP/streaming 54
- restrictions
 - AppCenter 140
 - channel access 142
 - FTP 140
 - K2 bins 137
 - K2 Storage Systems 140
 - NetCentral and K2 security
 - considerations 145
 - protocols 141
- RS-422
 - boards 32
 - COM ports 185
 - connector pinout 228, 231
 - ports 39
 - rear panel connections 109, 178
 - specification 193
 - USB port 148

S

- SCSI
 - controller adapter 111
 - interface board 111
- SD-00
 - aspect ratio formats 198
 - description 21
 - features 19
 - loop through 36
 - playout 197
 - rear panel 29
 - RS-422 connectors and channels 181, 183
 - VBI data support 210
 - video codec specification 196
- SDA-00
 - analog audio connector pinouts 230
 - audio monitor 192
 - audio specification 192
 - description 21
 - E to E 35

- features 18
- playout 197
- rear panel view 28
- RS-422 connectors and channels 181, 183
- VBI data support 210
- video codec specification 196
- SDI 189
- security
 - AppCenter operations 140
 - configuring
 - channel access 142
 - FTP security 140
 - K2 bins 137
 - K2 Storage Systems security 140
 - protocol security 141
 - mapping NetCentral administrators with
 - K2 146
 - Microsoft Windows updates 147
 - NetCentral 145
 - overview 134
 - passwords 137
 - user accounts 137
- SiteConfig
 - description 48
- slot map 38
- SNFS, see media file system
- specification
 - AC power 188
 - AES/EBU 192
 - analog audio 192
 - composite analog video 190
 - electrical 189
 - environmental 188
 - external storage, media file system 219
 - genlock 190
 - GPI 194
 - HD-00 video codec 197
 - LTC 193
 - mechanical 189
 - media file system performance 219
 - operational 195
 - RS-422 193
 - SDA-00 and SDA-00 video codec 196
 - system timing 191
 - transferring 215
 - VBI/ancillary data 208
 - VITC 193
- storage system, description 34
- Storage Utility 45, 46

- checking subsystem status 116
- description 113
- opening through AppCenter 113
- operation not supported 125
- overview 115
- streaming
 - see transferring
- stripe
 - group 111
 - media 111
- subsystem status, checking with Storage Utility 116
- subtitles 212
- synchronizing the media file system 124
- system description
 - file 49
- system timing 191
- System Tools, K2 Media Client 43

T

- TCP
 - IP 158
 - port connections 40
- teaming
 - creating the control team 66
 - creating the FTP team 72
 - renaming connections 75
 - with Ethernet ports 52
- third-party FTP access 79
- TOE 158
- transferring
 - between a K2 and a non-K2 system 78
 - compatibility considerations 220
 - HD-00 material 198
 - K2 FTP interface 78
 - mechanically or automatically 78
 - MPEG SD 198
 - M-Series iVDRs 215
 - remote control protocols 78
 - specification 215
 - supported formats 216
 - using Internet Explorer 80
 - using third-parties 79
- transfers
 - VDCP 174
- Turbo iDDR
 - transfer compatibility 220

U

- unbinding LUNs 119
- Unicode, UTF-8
 - AMP 173
 - VDCP 175
- USB, enabling and disabling ports 148
- user
 - accounts, passwords 137
 - associating protocols with an account 141
 - names 137

V

- V drive 34, 111
- VBI
 - ancillary data specifications 208
 - compression 208
 - Line 21 data services 208
- VBI data support
 - SD channels on HD-00 211
- VDCP
 - Harris settings 177
 - protocol settings 174
 - RS-422 connections 180
 - transfers 174
- view
 - front panel 27
 - rear panel 28
- Virus scanning policies 147
- VITC input/output 193

W

- WAV, supported formats 216
- web site, for Thomson Grass Valley 13
- Windows
 - high priority updates
 - Remote Desktop, using 47
 - system description 32
- Windows, configuring network settings 55

X

- XLR board 32
- XML 43
- XML import capture service 101

