

KONA³

Installation and Operation Guide



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Web: <http://www.aja.com>

Support Email: support@aja.com

Sales Email: sales@aja.com

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KONA³

Chapter 1: Introduction



Overview

AJA KONA 3 brings the highest quality SD, HD, and Dual Link HD video and audio to an Apple PCI-Express G5 Power Mac running Final Cut Pro software. Offering unsurpassed 10-bit uncompressed video, 8-channel digital AES and 16-channel SDI embedded audio, hardware-based up/down HD/SD format conversion—and 1080-to-720 or 720-to-1080 cross conversion, DVCPRO HD® hardware support, and HD/SD component analog output. KONA 3 is designed to be the ultimate capture and playback card. AJA provided software supplies utilities and applications provides leading features inside and outside of Final Cut.

A state-of-the-art PCI-Express card, KONA 3 plugs into a PCI-Express G5 chassis and works with Final Cut Pro and other applications to provide a professional editing suite, corporate/industrial video center, or high-powered desktop video setup—or just about anything in between. Included with KONA 3 are a cable set that connects to most every kind of SD, HD, and Dual Link HD equipment you are likely to encounter. And for even easier connectivity, an optional K3-Box rack mountable breakout box can also be purchased—it ships with its own cable set.

This manual covers the installation and operation of KONA 3 and K3-Box and discusses using it with Final Cut Pro and other applications.

Features

The KONA 3 card offers a large number of unique features for optimum quality, ease of use, and support for a wide variety of workflows and environments.

Hardware

- SDI, HD-SDI, Dual Link HD-SDI 4:4:4, and 4:4:4:4
- 2K Frame Support
- 4-Lane PCI-Express Bus Interface
- DVCProHD hardware acceleration
- HDV hardware acceleration
- Dynamic RT Extreme hardware acceleration
- Broadcast Quality hardware 10-bit Up-convert
- Broadcast Quality hardware 10-bit Down-convert
- Broadcast Quality hardware Cross-convert (1080-to-720 or 720-to-1080)
- 12-bit HD component and SD component/composite analog output
- 10-bit HD/SD Video/Key Output
- Internal HD/SD Live Hardware Keyer
- 8-Channel 24-bit and 48/96khz AES Audio
- 16-Channel SDI Embedded Audio
- RS-422 Control Port (Sony), 9-pin D, for machine control
- Genlock/Reference Video (looping)
- Cables Standard (2), *K3-Box* breakout box optional

Broadcast-Quality Conversion

KONA 3 features hardware-based full 10-bit Broadcast quality motion adaptive SD to HD up-conversion, HD to SD down-conversion, 1080-to-720 or 720-to-1080 cross-conversion, and automatic HD/SD 12-bit component analog output. The quality of the conversion features are virtually identical to AJA's award winning stand-alone products as used throughout post-production markets. The KONA 3 built-in up-converter uses a full 10-bit data path, fully motion adaptive de-interlacing, and large multi-point digital interpolators. Down conversion uses large multi-point digital anti-alias filtering and interpolation. Cross-conversion is high-quality hardware-based, providing capability to streamline dailies and offer true broadcast picture quality in real time. Because these functions are in hardware on the card, they are available full time, all the time—with no CPU load. Such conversion is useful for cost effective monitoring, making standard definition dubs of an HD project, or up-converting from a standard definition FCP project to an HD deck for dubbing.

KONA 3 Audio

KONA 3 supports 8-channel 24-bit 48 or 96 kHz AES audio via XLR (balanced) connections (using the standard cable set) or XLR and BNC (unbalanced) connections—when used with the optional K3-Box breakout box. KONA 3 also supports 16 channel embedded 24 bit 48kHz audio over the same single SDI connection as the video. If you are using a Digital Betacam Deck, HDCAM, DVCPRO HD, D5, D9 or even an HDCAM SR—you'll have the proper connections to the deck.

KONA 3 supports 8 AES audio channels in and out via the hardware. KONA 3 also features AES input sample rate conversion; this feature eliminates the requirement for audio source synchronization. Sample rate converters auto-lock to any AES input, 32-96KHz, and then convert it to 24 bit 48 or 96 KHz audio, perfectly locked to internal KONA 3 video. Sample rate conversion is done at very high quality (over 120db THD).

Dual Link

KONA 3 supports Dual Link 4:4:4 HD-SDI, an emerging technology on the Macintosh platform with Final Cut Pro. Commonly known in the broadcast video industry as Sony HDCAM SR or Thompson Viper Format, Dual Link offers a full HD raster (1920x1080) at 10-bit. KONA 3 supports SMPTE-372M compliant 4:4:4 RGB video at 10-bits.

2K Workflow Support

The KONA 3 2K path offers significant cost and labor savings over a tape-based approach to 2K. In a unique development for customers on the Macintosh platform, you can go straight from telecine to disk with 2K media and eliminate the steps of using tape stock and then digitizing those tapes for the nonlinear editor. 2K telecine to KONA 3 saves time and steps in the process by directly and simultaneously creating 2K DPX files and 2K QuickTime™ reference movies. Material can be played out at 2K via HSDL (High Speed Data Link), offering further synergy with other 2K products available in the market.

Additionally, KONA 3 allows 2K files to be viewed on HD 1080 24P-supported video monitors, lowering the price barrier for recording to tape and viewing 2K material. This 1080 HD playback can be down-converted to SD in real time, giving the 2K DI pipeline a powerful solution for multi-format video playback of 2K material.

By generating 2K DPX files during the digitize phase, different parts of the process, for example—delivery of full-resolution media for shots intended for visual effects—can be done much earlier. Offline editing can be done in Final Cut Pro and because of the flexibility of Final Cut Pro and QuickTime, even a 2K online is possible.

HDV, DVCPROHD, and Dynamic RT Extreme Acceleration

Final Cut Pro users will likely notice the DVCPROHD, HDV, and Apple RT Extreme hardware acceleration provided by KONA 3, developed in close cooperation with Apple. KONA 3 hardware takes a portion of the codec processing load off the CPU, allowing more Real Time effects in Final Cut Pro HD when outputting to HD-SDI. KONA 3 also has hardware support when capturing from HD-SDI to these codecs. With KONA 3, any source can be captured using the DVCPROHD and HDV codecs—giving you online HD quality at remarkably low data rates. This feature allows HD to be used where only SD would have been considered due to budget or time constraints. KONA 3 even supports the DVCPROHD and HDV codecs with up or down conversion—allowing projects to be downconverted to SD, or even upconverted for DVCPROHD capture.

How does KONA 3 accelerate DVCPROHD, HDV, and Apple RT Effects? The precision hardware scalar in KONA 3 does what the G5 processor would otherwise have to do, speeding up the system considerably — at full 10-bit broadcast quality.

When using the Final Cut Pro HDV codec, the KONA 3 advanced scaling engine takes the native frame (long GOP 1440 HD) and outputs it via hardware—in real time. Precision AJA circuitry re-sizes the video to proper 1920 x 1080, providing instantaneous playback of HDV captured by Final Cut Pro for both monitoring and recording.

Unlike the DV25 format, which can preview in realtime natively via Final Cut Pro, the MPEG structure of HDV is much more complex. Fortunately, KONA 3 can provide real time monitoring and playback to both HD and SD monitors and decks via the realtime hardware scaler and down-converter on board.

The Panasonic DVCPRO HD format takes advantage of the KONA scaling engine as well. When playing the format back, KONA 3 handles the work of properly scaling the video for monitoring and output—which also provides for more streams of RT effects, since the G5 processors are freed up to handle the RT.

In addition to speeding up Final Cut Pro Dynamic RT by using the KONA scalar, multiple frame size RT (1/4 size, 1/2 size, full size)—a Final Cut Pro 5 feature—also benefits from KONA 3. The frame count and image size are dynamically changed during file playback, so you don't get the “un-rendered” message in Final Cut Pro. The KONA 3 scalar handles the dynamic multiple frame sizes seamless, so the Dynamic RT you see on the Mac monitor is the same as that shown on your professional Broadcast Monitor.

Internal HD/SD Live Hardware Keyer

Available for the first time on any QuickTime capture card is a powerful hardware keyer that can place graphic files with an alpha channel over video in, a selectable matte, or the contents of the card's framebuffer (KONA TV/Final Cut Pro). If that weren't enough, you can also key video that has an alpha channel over video input or a matte. For example, you could load a QuickTime clip that has an alpha-channel-a flying logo perhaps-into KONA TV and then place it over live video coming into the card.

Software

- KONA 3 Control Panel for source selection and controlling KONA 3 within the overall MacOS environment (Macintosh Desktop, Input Pass-through, etc.).
- AJA QuickTime™ Drivers for tightly integrated hardware/software operation.
- Support for Apple Final Cut Pro™ (application software not included).
- Support for After Effects, Combustion, Motion, and Other Applications (application software not included).
- AJA Utilities: KONA TV, VTR Xchange, KONA System Test, AJA Data Rate Calculator, KONA QTtoDPXtranslator, and KONA DPXtoQTtranslator (some available for free download at www.aja.com/html/support_kona3_swd.html)

AJA's KONA 3 software and hardware were developed for use with Final Cut Pro for powerful integrated video/audio capture, editing, and video production. With an Apple G5, FCP, and KONA 3, you have the ultimate system for standard definition—and high definition—video production and DI work. Software is supplied on CD, including the KONA 3 Control Panel, drivers for the card itself, and all files necessary for Final Cut Pro and other application support.

KONA 3 Supports Final Cut Multi-cam Feature

Final Cut Pro 5 provides multi-cam playout—and KONA 3 supports it. With KONA hardware and a sufficient storage solution, you can handle up to 16 sources in real time. Each stream of video is captured individually and then ganged together in Final Cut Pro 5 for a multi-cam editing workflow. The KONA 3 hardware plays the multi-cam clips out to professional broadcast monitors or decks, via SDI, HD-SDI or component video. Up to 16 sources can be viewed in real time via the KONA (4-up, 6-up, 9-up, 16-up, etc.) —or each individual source can be viewed as it is selected via Final Cut Pro 5.

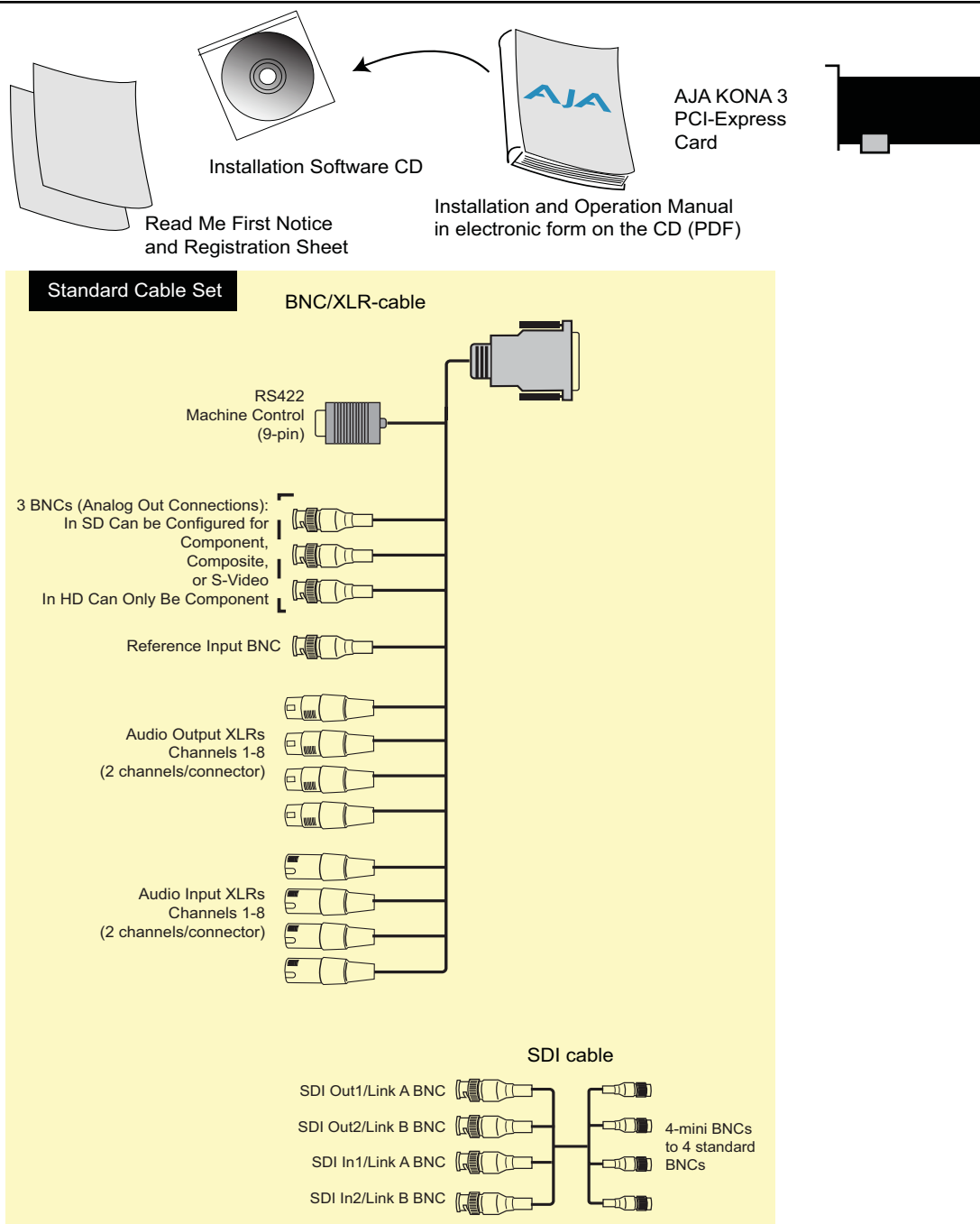
What's In The Box?

When you unpack your AJA KONA 3, you'll find the following components:

- AJA KONA 3 Software and Documentation CD-ROM—this CD contains the software installer to place KONA 3 drivers and the Control Panel on an Apple Power Mac. Install the software as discussed in this manual in *Chapter 3: Installation and Configuration*. The CD also contains a wide variety of useful information, including this manual you're reading (PDF format).
- KONA 3 4-Lane PCI-Express card.
- Cable, KONA 3 SDI In/Out—mini-connectors on the card (technically called "1.0/2.3 connectors") connect to full-size BNCs for ease of use and compatibility with professional equipment.
- Cable, KONA 3 AES, RS422, and Reference Input—Audio connectors are XLRs.

- **Read Me First Notice**—Contains late-breaking news and/or errata related to KONA 3 and the documentation.

Please save all packaging for shipping the KONA 3 should you wish to do so when moving or sending it in for service.



KONA 3 Shipping Box Contents

System Requirements

AJA Video recommends that your system meet minimum hardware and software requirements to achieve a satisfactory level of performance when operating it. Here, we provide minimum and recommended requirements and then discuss disk storage issues that should be understood for proper system configuration.

Minimum and Recommended System and Software Requirements

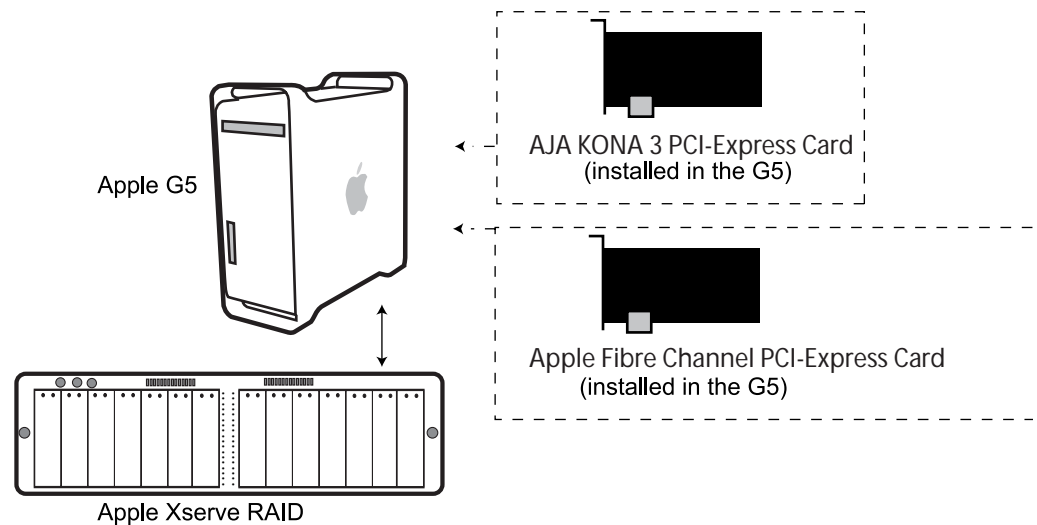
The following table outlines the system hardware and software needed.

Item	Minimum	Recommended
Macintosh Operating System	OS X, version 10.4, QuickTime 7	OS X latest release. QuickTime 7 or Latest
Editing/Production Software Suite	Final Cut Pro 5	Final Cut Pro Studio
Macintosh	Power Mac G5 (dual) PCI-Express 2GHz with 1GB or more RAM	Power Mac G5 PCI-Express (dual) 2.3 GHz or Quad 2.5GHz with 1GB or more RAM
Internal Storage (inside Mac) For DV only; uncompressed SD requires external RAID.	SATA (1 internal HD)	SATA (2 internal HDs RAIDed)
RAID Interface	Fibre Channel or SCSI	Fibre Channel or SCSI
Disk Storage Note: see Storage Methods topic that follows later in this Chapter	4 SCSI Hard Drives External RAID	Apple Xserve RAID or other high-performance multi-channel Fibre Channel RAID array

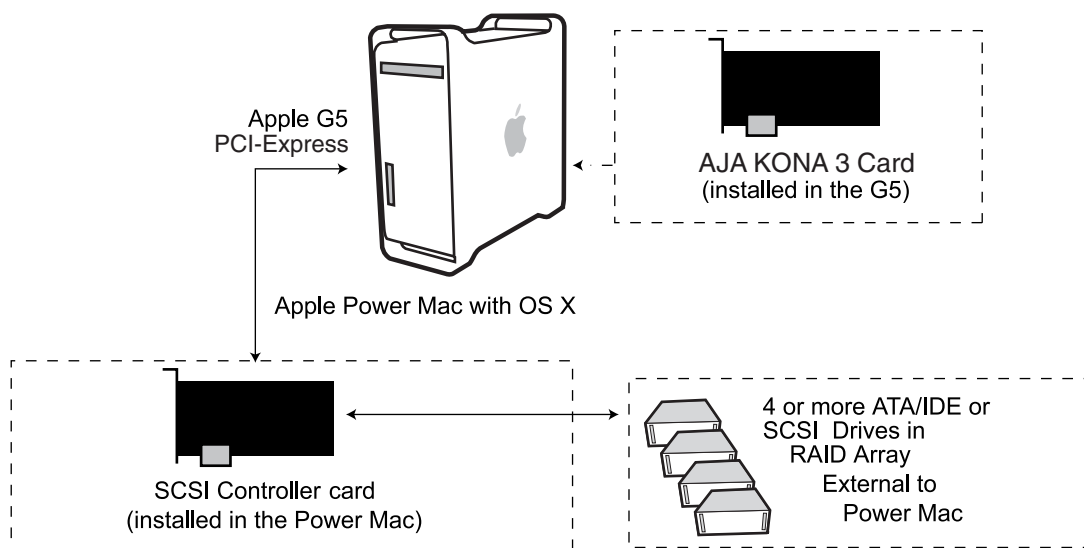
Understanding Disk Storage Methods

The KONA 3 card, an Apple PCI-Express Power Mac, and Final Cut Pro, together offer an unprecedented level of features and performance for all Video/Audio production applications. However, to ensure performance and quality, the disk storage system used with the Apple Power Mac must be able to meet the demands of storing realtime uncompressed media. At the very minimum, the disk storage system must be able to provide and maintain a consistent 50 MB/s transfer rate from the Power Mac to disk (read/write). There are a variety of system configurations and peripherals that can provide this level of performance. Possible system configurations are listed following:

Storage Method	Features/Limitations	Cost
Xserve RAID	Features up to 14 ATA/100 drive channels, dual independent RAID controllers, and a dual 2Gb Fibre Channel host interface. Xserve provides up to 5.6TB of storage with throughput of up to 400 megabytes per second.	Expensive, although the cost per gigabyte is excellent when large storage is needed
External SATA, ATA/IDE or SCSI RAID	Scalable. Performance almost as good as Xserve, although it can be more complex to set up and maintain. Many vendors offer solutions (too many to list here; check with your Apple dealer for SCSI Storage solutions for details). Although the connection to the external RAID chassis is SCSI, the drives themselves may be SCSI, SATA, or ATA. A pure SCSI array will offer higher performance at a higher cost.	Moderately Expensive



Disk Storage Solutions—G5 with Xserve RAID



Disk Storage Solutions—External SATA/ATA/IDE or SCSI RAID

About RAIDs

Redundant Array of Independent Disks, or RAID, is a group of hard drives that appears to the host Power Mac as a single high-speed storage unit. RAID systems enable you to increase storage capacity and get the performance, reliability, and data protection needed for video production, but not possible from a single hard drive. RAID drives inside the array operate simultaneously, increasing overall throughput. RAID technology is comprised of these techniques (some or all):

- Striping data across multiple drives for storage performance (RAID 0).
- Mirroring for redundancy (RAID 1).
- Parity for data protection (RAID 5 [plus others]).

Most RAID configurations, or RAID levels, combine these to provide a balance of protection and performance.

Striping divides a logical drive into data blocks, or stripes, that are distributed across an array of physical drives. Striping a set of disks improves storage performance because each drive operates concurrently. However, striping alone, known as RAID level 0, offers no data protection.

Mirroring involves writing identical copies of all data to a pair of physical drives. This results in very high data reliability: If one drive fails, the data is still available on the remaining disk drive. However, it also results in a storage efficiency of only 50 percent, because two physical drives are required to achieve a single drive's capacity. Mirroring alone is known as RAID level 1.

Parity provides data protection without requiring complete duplication of the drive contents. In the event of a drive failure, parity information can be used with data on surviving drives to reconstruct the contents of a failed drive. Parity data can be stored on a dedicated drive, as in RAID 3, or distributed across an array of drives, as in RAID 5. Parity provides much greater storage efficiency than mirroring—up to 85 percent for a set of seven drives.

Software For Striping

AJA recommends the Disk Utility software provided by Apple with OS X for creating and striping RAIDs, including 3rd-party, SCSI, and Xserve RAIDs. It is very easy to use and has been tested to work well. The utility can be found in *Macintosh HD/Applications/Utilities*, where “*Macintosh HD*” is the name of the system drive.

AJA KONA 3 and Xserve RAID

For the optimum in disk storage with Final Cut Pro and AJA KONA 3—for all formats other than 2K, we recommend Apple’s Xserve RAID. Xserve RAID holds up to 14 hot-swap Apple Drive Modules—5.6TB of storage—in a rack-optimized 3U enclosure. Each 7200-RPM hard drive connects to a dedicated ATA/100 drive channel, eliminating a traditional source of bottlenecks and maximizing the 2Gb/s Fibre Channel host connection(s). By adding more Xserve RAID systems, you’ll have very large expansion capabilities: A standard 42U rack can hold over 78TB of Xserve RAID storage.

Note: 2K is a format that requires a very high-performance disk storage system. Due to the emerging changes in storage system, we recommend you work with your AJA dealer when buying and configuring a storage system for 2K workflows.

Xserve RAID is designed for nonstop operation. Redundant hot-swap power and cooling modules allow the system to keep functioning even if one module fails. A high-availability architecture and dual independent RAID controllers support RAID levels 0, 1, 3, 5, and 0+1. In addition, Xserve RAID supports hybrid RAID levels 10, 30, and 50 when used in conjunction with host-based software RAID. Remote Xserve RAID management capabilities are provided via Apple’s Java-based RAID Admin application.

Note: When creating and striping an Xserve RAID for KONA 3 using the Apple Disk Utility provided with OS X, use *RAID 50*. In other words, the internal Xserve RAID drives are set up as RAID 5; the Xserve RAID then shows up in Disk Utility as two drives (regardless of the number of internal drives) which must be configured together as RAID 0. Apple calls this configuration “RAID 50.”

Storage capacity

No matter which storage system you choose, pick one that can scale to meet your needs over time. Ideally, you should be able to increase storage capacity or switch to a RAID level offering increased data protection in the future. Balance current and future storage needs with your budget and choose accordingly.

FORMAT	Transfer Rate in MB/sec	Storage Requirement in GB/Hour	Hours of Storage Per Terabyte of Disk
10 bit Uncompressed Standard Definition	28	101	9.9
8 bit Uncompressed Standard Definition	21	76	13.1
DV50 Standard Definition	6.3	23	43.4
DV25 Standard Definition	3.1	11	90.0
Photo JPEG Standard Definition	2.5	9	111
8-bit Uncompressed 1080i @59.94/60Hz	124	448	2.2
10-bit Uncompressed 1080i@59.94/60Hz	166	597	1.7
Dual Link 1080psf@29.97/30Hz	249	896	1.1
8-bit Uncompressed 1080i @50Hz	104	373	2.7
10-bit Uncompressed 1080i@50Hz	138	498	2.0
Dual Link 1080psf@25Hz	207	746	1.3
8-bit Uncompressed 1080psf@23.98/24Hz	100	358	2.8
10-bit Uncompressed 1080psf@23.98/24Hz	133	478	2.1
Dual Link 1080psf@23.98/24Hz	199	717	1.4
8-bit Uncompressed 720p@59.94/60Hz	100	358	2.8
10-bit Uncompressed 720p@59.94/60Hz	133	478	2.1
DVCPRO HD	12.5	45	22.2
MB = MegaBytes GB = GigaBytes			

Note: for uncompressed formats, PAL and NTSC transfer rates and storage requirements are about the same because PAL has a lower frame rate, but more lines.

Cable Connections

When KONA 3 is installed in a PowerMac, it connects to the outside world via either the standard cable set supplied, or the optional K3-Box Breakout Box (using the cables and directions supplied with it). Use the cables or the optional Breakout Box to connect your VTR, input and output sources, and external reference video (genlock).

Using the Standard Cables

KONA 3 offers you complete I/O connectivity choices. One cable provides AES/EBU digital XLR connections and analog monitoring video connections. The other cable has 4 mini-connectors on one end, and 4 BNCs on the other, and provides SDI connections for both single link and dual-link SD/HD SDI connections. Cable connections are marked on both the KONA 3 card endplate and on the cable connectors for easy identification.

Using The Breakout Box

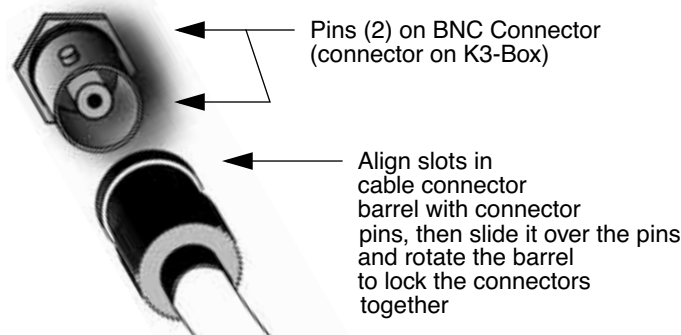
The KONA 3 Breakout Box attaches to the KONA 3 card via cables supplied with it that attach to the back of the Box.

For additional functionality, the K3-Box Breakout Box provides some features not present in the standard break-out cables: simultaneous XLR and BNC AES output, 2 channel RCA analog audio monitoring, and looping BNC Genlock reference connectors.

About BNC and Mini-Connectors

Although most video professionals are used to BNC connectors, you may not have seen them if you've been using primarily desktop video equipment. BNC connectors ensure a positive connection by the act of locking the connectors together via pins in one connector that fit into slots in the corresponding connector.

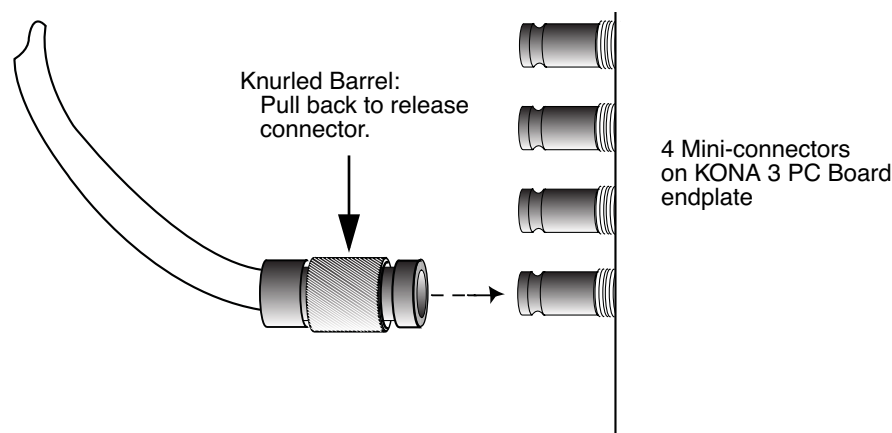
To make a BNC connection, slide the cable connector over the panel connector and then when seated, rotate the barrel of the cable connector 90° clockwise until the connectors are locked together. When properly locked, the cable cannot accidentally be pulled out.



The four mini-connectors found on the KONA 3 endplate are not common on video equipment but offer small size, ease-of-use, and high reliability. (The connectors are also called “mini-BNCs” and “1.0/2.3 Connectors”.) To make a connection with these connectors simply push the cable mini-connector onto the endplate mini-connector. It will lock in place when fully seated.

To remove a mini-connector, just grasp the knurled barrel on the connector and pull the connector off.

Note: Do not try to remove the mini-connector by pulling on the cable itself as this action will not remove the connector—but can stress the cable.



Connector Descriptions— Cables and K3-Box

Connectors on the standard cable set are labelled as to their function for easy installation and maintenance. Similarly, connectors on the optional Breakout Box are also labelled.

8 Channel Digital AES/EBU Audio Inputs And Outputs

When using the standard cables, XLR connections are provided for AES/EBU audio input/output. Four female XLR connectors are provided for audio input and four for audio output. Each XLR carries two channels. XLR connectors are labelled as to input/output and channels.

The optional Breakout Box provides both BNC and XLR audio connections on the front panel.

Note: XLR connections are digital and cannot be used with analog equipment having XLR connectors.

Analog 2 Channel Unbalanced Audio (Breakout Box only)

On the optional K3-Box are two analog output connectors, one for each channel. These connectors are RCA-style phono jacks.

RS422 Machine Control

A female DB9 connector provides connection for VTRs, camcorders, disk media servers, and other devices using RS422 SMPTE (Sony) protocol. This connector is present on both the general I/O cables and the optional Breakout Box. (Connector pinout is listed in Appendix A: Specifications.)

SDI Input and Outputs

Mini-connectors are provided for two SDI inputs and two SDI outputs for single or dual-link. A cable with four Mini-connectors on one end and four BNCs on the other end is provided for connecting equipment to the SDI inputs and outputs.

KONA 3 has three video outputs altogether—2 SDI outputs that are used for both high- and standard-definition (SD/HD-SDI), and a component analog output (this last connector is discussed later). Each of the three outputs is independently switchable between HD and SD. For example, if you are working in HD, you can have simultaneous HD-SDI, SD-SDI, and HD-component analog output.

SDI inputs and outputs support video and 16-channel embedded 24-bit digital audio. Use SDI wherever possible for the best quality 10-bit uncompressed video input, capture and output. If peripheral equipment has a variety of inputs/outputs, look to see if it has SDI I/O, and use it where possible. Most high-end professional broadcast equipment supports SDI (VTRs, cameras, media storage servers, etc.).

Note: In the past manufacturers have used separate I/O connections for standard- and high-definition SDI because the circuits were different. On KONA 3 we use the same connectors for both HD and SD-SDI (both input and output). When connecting an input or output to a VTR or other external device, ensure it has separate connectors for SD and HD and choose the appropriate connectors.

Analog Monitor Out (Component/Composite HD/SD)

The analog component output can be switched to full-time SD—for both HD and SD projects. This allows use of an inexpensive analog monitor for both HD and SD work. You can even use a composite video monitor. For dual-link HD-SDI output, HD or SD can be monitored through the component output. Dual link HD can be sent out as 4:4:4 RGB.

KONA 3 features 12-bit component video output for both HD and SD. SD can be switched to composite and Y/C. (The same 3 BNC connectors share component and Y/C functions.) When working with HD, the component output can be independently switched to SD video—this allows you to use an SD monitor for both HD and SD.

Component video signals are generally higher quality than composite, but not as high quality as serial digital (SDI).

A Note About RGB—Although RGB is used less in today’s video systems, KONA 3 supports it for A/V Monitor output. However, because KONA 3’s (and SMPTE SDI’s) native format is YPbPr, AJA recommends the use of YPbPr whenever possible for analog monitoring. Although component video monitors often have RGB inputs, it’s better to use YPbPr when the monitor supports it. The YPbPr format provides “headroom” for “superwhite” and “superblack”—and these video levels *will be clipped* when transcoding to RGB. Also, the RGB/YPbPr transcoding involves a level translation that results in mathematical round-off error. RGB can be configured in the KONA 3 Control Panel.

A Note About YPbPr—Component Video, or YPbPr, has been given several names over time. YUV, Y/R-Y/B-Y, and YCbCr, are just some examples. Although these various formats have some differences in levels, they are all basically the same. KONA 3 uses the modern YPbPr terminology exclusively. KONA 3 supports three different types of YPbPr: SMPTE/EBU N10, Betacam (NTSC), and Betacam (NTSC Japan). These three formats differ in level only and are configured in the KONA 3 Control Panel.

Reference Video

A single BNC on the standard KONA 3 cable—or two BNC connectors on Breakout Box (it loops through)—allows you to synchronize KONA 3 outputs to your house analog reference video signal (or black burst). If you have a sync generator or central piece of video equipment to use for synchronizing other video equipment in your studio, then connect its analog composite output here. When KONA 3 outputs video it uses this reference signal to lock to. When connecting a reference video source, the locking signal should be the same format (1080i29.97, 625i25, etc.) as the Primary format selected in the KONA 3 Control Panel. It is possible in some circumstances to use an alternate format video signal as long as the basic frame rate is compatible (for example, using a 525i29.97 genlock signal to lock a system running 1080i29.97).

In This Manual

Chapter 1 is the introduction you're reading, listing features, box contents, and system requirements.

Chapter 2 gets you started with using KONA 3 in a typical Video environment. Typical workflows for SD, HD, 2K, and Dual-Link are discussed.

Chapter 3 provides complete instructions for installing and configuring the AJA KONA 3 card. The user is guided through unpacking, installing the card into a PowerMac G5, installing KONA 3 Mac Software From CD, cabling the system and then getting it up and running. Important configuration information is also provided on video settings and use of genlock/external reference.

Chapter 4 discusses operational aspects of KONA 3 when used with Final Cut Pro.

Chapter 5 discusses troubleshooting problems with your system and what to do when there's a problem you can't solve.

Appendix A presents a list of technical specifications for the product.

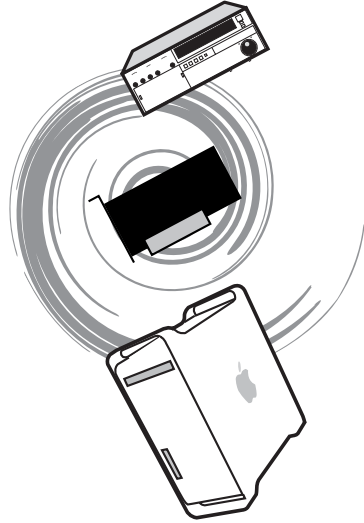
Appendix B gives a glossary of technical terms and acronyms used in the manual.

Appendix C discusses the operational aspects of using 2K workflows with KONA 3.

The remainder of the manual consists of appendices listing specifications and an index section to help you rapidly find topics in the manual.



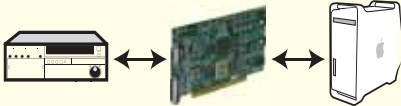
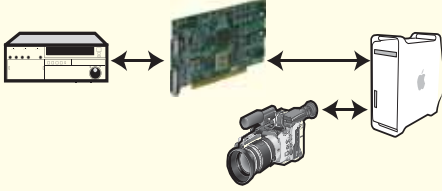
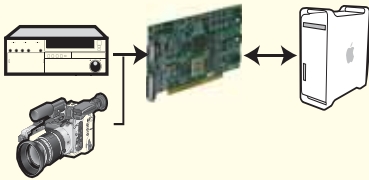
Chapter 2: Getting Started



KONA 3 And Your Workflow

There are a lot of ways to think about the video/audio workflow you follow. Your setup might be categorized as corporate video, professional broadcast, or desktop video. Or the workflow might be categorized by the type of equipment used rather than the nature of work produced—many systems these days are a mixture of equipment from high-end professional to desktop video. This chapter hopes to show how Final Cut Pro and KONA 3 can help fit into whatever workflow you currently have and make it more efficient.

A *Workflow Scenarios* diagram on the following page shows types of equipment, sorted by VTR source, and the types of workflow attributes and KONA 3 applications supported. After the diagram, we also discuss some typical applications.

Source Deck Type(s)		Workflow Attributes	Applications
Digital SD or HD Examples: Digibeta, DV50, DVCPROHD, HDCAM, and DVcam		KONA 3 captures and outputs SDI video (SD or HD) with embedded audio. Use high-quality AES/EBU and/or embedded 8-channel audio output.	Pro Broadcast Corporate/Industrial On-site Editing
Digital capture via Firewire with Output via AJA KONA 3 Example: HDV		Using standard desktop video techniques, video/audio is captured directly from a camcorder or deck. KONA 3 is used for playing back captured media and editing/mastering to tape or DVD using Final Cut 4.5HD and other tools such as After Effects, Combustion, Apple Motion, etc.	Desktop Video Corporate/Industrial On-site Editing Pro Broadcast
Without even using a deck: use the video monitor as a second Mac monitor. The KONA 3 desktop lets you drag graphics from programs like Adobe Photoshop from the computer display to the video monitor. You paint full frame and live onto a broadcast monitor. Output virtually anything to video—ideal for animators and compositors.		Using Final Cut Pro, work with a wide range of old and new SD and HD sources, including dual-rate and dual-link, and then also use desktop graphics and video software for creative power and flexibility.	Post-production Animation Compositing

Workflow Scenarios

Understanding Typical Workflows

KONA 3 and Final Cut Pro allow more workflow flexibility than ever before. Users can independently select different formats for capture and storage media, while also outputting to KONA 3's full array of digital SD or HD uncompressed formats—with all outputs active simultaneously. Capture can range from DV to digital uncompressed. Media can be stored on disk as:

- offline quality at low bit rates
- on-line quality at moderate bit rates
- or with the highest quality as 8 or 10 bit uncompressed SD and HD

As quality and codecs improve, the lines between offline and online are blurring. For example, with the DVCPRO HD codec introduced in FCP HD, native HD editing in that codec is now possible, providing very high quality results (true HD editing) at very low data rates, in some cases as low under 6 MB/sec. (compare this to 100MB/sec and higher for uncompressed HD formats, and you can immediately see the benefits)

Following are summaries of the most common workflows, listing data rates and relative quality levels. Some workflows require a RAID array and some will work using the host Power Mac's internal system drive—it's noted where this is supported in the following discussions.

PhotoJPEG

Data rate: approximately 1-3 MB/second standard definition or high definition—supported by internal system drive

Quality: Very Good

The Apple PhotoJPEG codec offers an excellent compressed media choice for on-line quality at low data rates. PhotoJPEG can use the full-raster at 4:2:2 sampling. Final Cut Pro allows you to adjust quality using a PhotoJPEG control panel. KONA 3 allows for PhotoJPEG monitoring and/or output in both SD and HD. KONA 3 can capture from almost any HD or SD input, directly to PhotoJPEG media.

DV (DV25)

Data rate: 3.13 MB/second (megabyte/second) standard definition only—supported by internal system drive

Quality: Good

In this workflow, DV is usually input to a Power Mac running Final Cut Pro through its FireWire port. DV offers good quality, but it has lower Chroma resolution when compared to DV50, JPEG, or uncompressed. You can use KONA 3 to convert DV projects to uncompressed—in real time—for monitoring and/or output. Alternatively, KONA 3 can capture uncompressed from any input, directly to DV media.

DV50

Data rate: 6.26 MB/second standard definition only—supported by internal system drive

Quality: Very Good

Like DV25, Final Cut Pro also supports the Panasonic DV50 standard definition codec. DV50 is a 4:2:2 compressed format and therefore has higher chroma resolution when compared to DV25. Also like DV25, you can use KONA 3 to convert DV50 projects to uncompressed—in real time—for monitoring and/or output. KONA 3 can capture uncompressed from any input, directly to DV50 media.

DVCPRO HD

Data rate: 12 MB/second high definition—supported by internal system drive

Quality: Excellent

KONA 3's hardware takes a portion of the DVCPRO HD codec processing load off the CPU, allowing more processor time for Real Time effects in Final Cut Pro HD. KONA 3 also has hardware support when capturing from HD-SDI to the DVCPRO HD codec.

HDV

Data rate: 19 MB/second high definition 720p, 25 MB/second high definition 1080i—supported by internal system drive

Quality: Excellent

Final Cut Pro 5 supports the Sony HDV high definition codec. You can use KONA 3 to convert HDV projects to uncompressed—in real time—for monitoring and/or output. KONA 3 can capture uncompressed from any SD-SDI or HD-SDI input, directly to HDV media.

Uncompressed 8-bit

Data rate: 21 MB/second standard definition, or 100-124 MB/second high definition (see later “Storage Capacity” chart in Chapter 1 for the various transfer rates per format)—requires SCSI, Fibre Channel, or ATA drive array

Quality: Excellent

Uncompressed media is KONA 3’s native storage format, offering the highest quality available. Capturing in uncompressed results in no compression artifacts, and video is sampled over the full raster at a 4:2:2 rate. Using uncompressed maintains a higher quality in your project from capture all the way through effects rendering. Final Cut Pro supports RT with uncompressed media using RT Extreme. KONA 3 supports capture of uncompressed through any of its inputs, and uncompressed projects are output to all of its outputs simultaneously.

Uncompressed 10-bit

Data rate: 28 MB/second standard definition, or 133-166 MB/second high definition (see later “Storage Capacity” chart in Chapter 1 for the various transfer rates per format)—requires SCSI, Fibre Channel or ATA drive array

Quality: Excellent, very high quality

Offering all the benefits noted previously for 8-bit uncompressed, 10-bit additionally offers the very highest quality available. With 10-bit media and Final Cut Pro’s 32 bit Floating Point YUV Codec, video quality is second to none—at any price. For more information on this subject, please see the topic at the end of Chapter 4: *Installation and Configuration*, titled “Using 8-bit Versus 10-bit Video.”

Uncompressed 10-bit Dual Link HD

Data rate: 199-249 MB/second high definition (see later “Storage Capacity” chart in Chapter 1 for the various transfer rates per format)—requires SCSI, Fibre Channel, or ATA drive array

Quality: Excellent, highest quality available

Offering all the benefits noted previously for 10-bit uncompressed, Dual-link Dual Link 4:4:4 video uses 2 HD-SDI channels to provide full color resolution as well as luminance. The term “4:4:4” refers to the ratio of sampling frequencies used to digitize the luminance and color difference components (Y, B-Y, R-Y) or the RGB components of a video signal. In this ratio there is always an equal number of samples of all components, providing increased quality over 4:2:2. However, current HDTV and standard definition video formats are 4:2:2 based, so you only get half the color resolution of the original image.

2K Workflow

Data rate: For 2048x1556 2K:

- When seen as a QuickTime movie at 23.98fps with a raster of 2048x1556, the data rate is 305.6MB/second.
- When seen as a single frame DPX file with a 2048x1556 raster, the size is roughly 12.7MB.

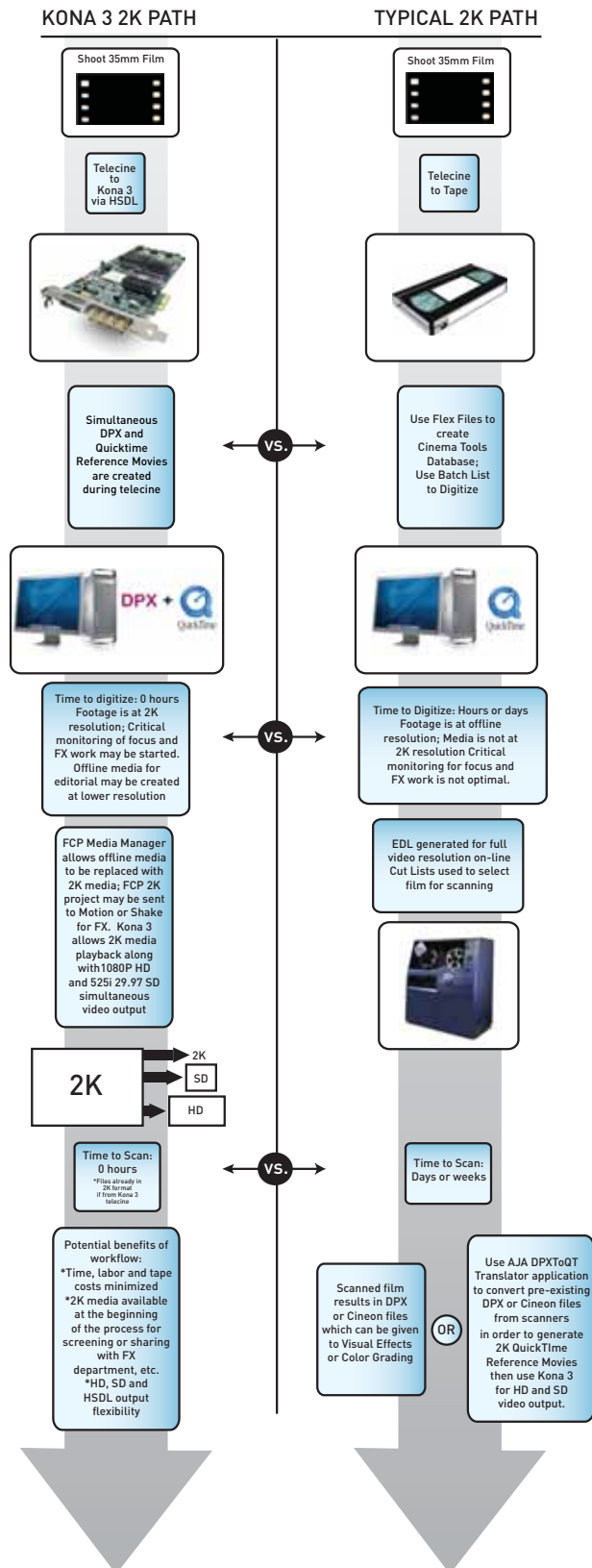
2K Workflows require a high-performance SCSI, Fibre Channel, or ATA drive array.

Quality: Excellent, with additional cost and labor savings over traditional 2K workflows.

For large facilities, KONA 3's 2K support allows ingest of 2K media via HSDL (using SDI connections) from 2K telecine machines into the G5 Mac as 2K sequential DPX files and 2K QuickTime reference movies *simultaneously*. 2K playout via HSDL further enhances the flexibility of KONA 3 to work with other 2K equipment at major facilities working with 2K. For cost-conscious facilities, playback of 2K to HD 24P supported monitors helps lower the price barrier for working with, and especially viewing, 2K material.

When comparing the traditional 2K path and a potential Kona3 2K path, the potential for cost and labor savings becomes apparent. By avoiding the telecine to tape and instead going straight to disk with media, the Kona3 2K path can immediately save users the cost of tape stock and the time associated with then digitizing these tapes into a non-linear editor. By generating 2K DPX files during the digitize phase, the Kona3 also moves a portion of the 2K process up to the beginning instead of the end of the post production process; this means that shots intended for visual effects work could be given to visual effects artists at full resolution at the beginning of the process instead of waiting until near the end of the process. The flexibility of an offline using Final Cut Pro leveraged against the power of QuickTime and Final Cut Pro's media management tools, allows easy access to 2K resolution files and even potential 2K online possibilities. .

Important Note about 2K: Operational procedures and information for working with 2K workflows are presented in *Appendix C* at the back of this manual. 2K workflows are unique and require the use of KONA's *VTR Xchange* software and Final Cut Pro, in conjunction with the 2K Crop features of the KONA Control Panel (discussed in Chapter 4—*2K Crop Screen*). To begin working with 2K, please read Appendix C.



Workflow General Notes

The previously discussed codecs (DVCPRO HD, PhotoJPEG, DVCPRO 50, etc.) are used in different ways based on project characteristics. Some codecs create very high quality offline files at low data rates for projects that will ultimately be delivered as uncompressed; other projects may use these compressed formats as their final masters. These settings can be used in a “capture once—use in many steps” type of process. For example, you might use offline files for editing, digital dailies for review from a digital projector, location footage viewing and editorial performed on powerbooks, and even creating screening cuts of the project for approval and audience testing—all from one QuickTime file using the DVCPRO HD codec. Some examples of these scenario workflows are given following.

HD Offline Scenario #1

A popular way to edit long form content, such as feature films shot at 24fps film (or 23.98 in the case of HD to achieve a film look) is to take the telecine to HD tape masters, or the HD field masters (typically at 23.98fps) and then capture using the KONA 3 to a compressed format. An interesting and very high quality option would be to use the DVCPRO HD codec to capture from whatever deck you are using for your HD masters (typically HDcam or D5). This allows for offline files that in the 1080p raster are under 12MB/sec. and in the 720p raster are under 6MB/sec. This size and processing efficiency allows for the use of multiple layers of RT effects and color correction in FCP HD, as well as the choice of viewing quality (draft or high quality modes) depending on how much RT is required and the speed of your PowerMac hardware. In addition to the low data rates, another advantage here is that your offline files are in the same timebase as your original master tapes, greatly simplifying the online editing and finishing process.

A more traditional way (still supported by the KONA 3 using the on-board down-conversion option, and Cinema Tools software) is to down-convert your HD masters to an SD format (DV for example, at 29.97fps). This allows for traditional lower cost SD monitoring equipment to be used, but you are changing the time base of your media for your offline editing, which then must be dealt with via a somewhat complex series of software steps. Keeping your files in the same timebase allows for a much simpler offline/online process, particularly when dealing with 24p HD media. For 29.97 (59.94) HD projects, the complexity of the changing time base is eliminated, but the same rules apply. In this case, using the 1080i DVCPRO HD setting for your offline gives you great results at data rates about half the size of SD uncompressed files for offline—and you are working in HD.

HD Offline Scenario #2

The PhotoJPEG codec and DV codec have been around for awhile in FCP, providing a well-suited offline editing workflow that has proven to work fine for many projects. Similar to the process described above with the newer DVCPRO HD codec, these codecs can be used to capture from your HD tapes at the native frame rates of those tapes (e.g., 23.98). While not as high quality as DVCPRO HD, the files sizes can be even smaller—as low as 2 MB/sec for the photoJPEG depending on the raster size chosen—and are usually more than adequate for offline purposes.

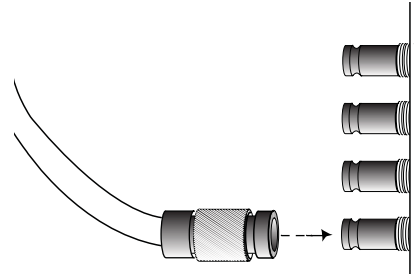
Mixing and Matching Formats in Final Cut

In Final Cut Pro, it works best to use one format consistently. For example, if you capture HDV files and then capture 10-bit uncompressed files, you'll have to rerender one or the other when using the two types on the same Final Cut *sequence* (the timeline where media is edited into a project). You could even capture 8-bit uncompressed and DV, and then place them both on a PhotoJPEG timeline and end up having to render them *both*. You can capture directly, in real time to any supported format, even if it doesn't match the source formats at all.

Therefore, it makes sense to capture media into your system at the highest quality you'll expect to use in Final Cut to eliminate rerendering and ensure best results.

Chapter 3:

Installation & Configuration



Installation Overview

The installation and set up of a KONA 3 is very simple. All of the steps of installation and configuration are documented in this chapter, summarized as follows:

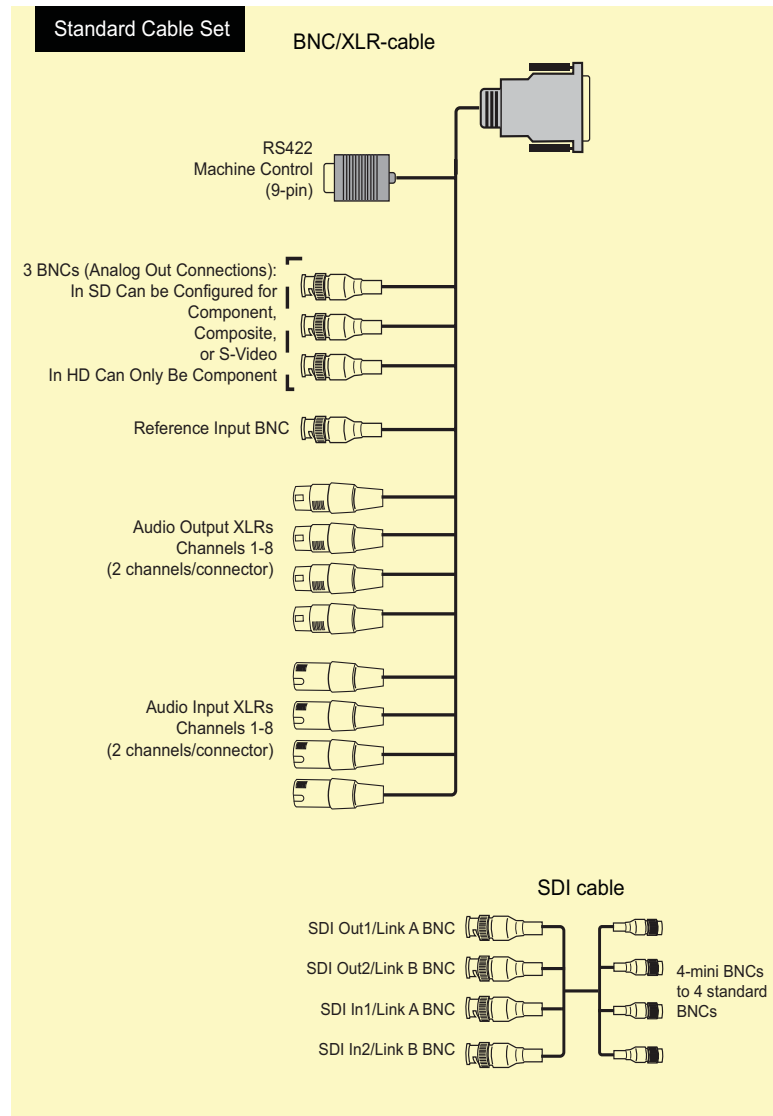
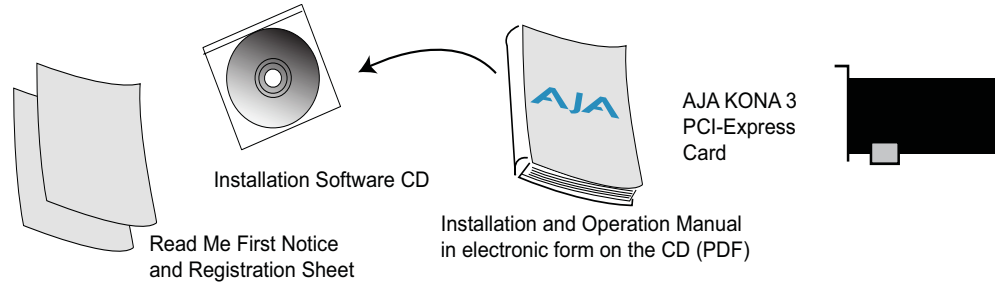
1. Unpack the shipping box
2. If not previously installed on your Power Mac, ensure that Final Cut Pro is installed as detailed in its user documentation. Final Cut Pro *must be installed and have been run at least once prior to installing AJA KONA 3 software.*
3. Lay the PowerMac G5 on it's side (motherboard facing up).
4. Install the KONA 3 capture card into one of the available PCI-Express slots in the G5.
5. Install AJA KONA 3 software on your Power Mac from the supplied AJA CD-ROM
6. Cable the system audio and video sources, VTR, audio monitor, and video monitor. If you purchased the optional Breakout Box, then install it into an equipment rack or place it on a desk and connect its cables to the KONA 3 card. If you're instead using the standard cable set, then use those to connect equipment.

Each of these steps are explained in greater detail in the pages of this chapter.

Unpacking

Shipping Box Contents

KONA 3 is shipped with a CD containing system software and an Installation and User manual (a PDF on the CD), and two cables. If you purchased the optional K3-Box breakout box, it ships with its own set of cables for connection to the KONA 3 card.



Contents, KONA 3 Shipping Box Contents

As you unpack the shipping box(es), carefully examine the contents. Ensure you received everything and that nothing was damaged during shipment. If you find any damage, immediately notify the shipping service and supply them with a complete description of the damage. AJA will repair or replace damaged items. If you find shipping damage, contact your AJA dealer or distributor for details on how to have your KONA 3 repaired or replaced.

Note: Save packing materials and the shipping box. If you ever require service or move your system—use the packaging materials and box for safe shipment.

Installing the KONA 3 Card

1. Place the PCI-Express G5 in a well-lit convenient area, where you will have easy access to the chassis access door.
2. Using your hand, touch the outside of the G5 to discharge any static electricity you have. Remove the power cable from the back of the PowerMac G5.
3. Remove the access door and clear inner panel as described in your Apple G5 User Manual. Lay the G5 on its side, motherboard facing up.
4. Remove the KONA 3 card from its protective anti-static bag; place the card on top of the bag.
5. Visually locate the PCI-Express slots inside the G5 chassis (photo shown on the following page). The KONA card only requires a 4-lane PCI-Express slot, so any of the available slots will work correctly.
6. Remove the card edge access cover from the desired slot where you will be inserting the KONA 3 card. The card edge cover is secured by a phillips screw; save this screw for use in installing KONA 3.
7. Holding the KONA 3 card by the card edge plate and an outside edge, carefully insert the KONA 3 card by rocking it slowly into the slot. Ensure the card edge aligns properly with the G5's opening (where the card edge cover was just removed) and that it is fully seated in the slot.
8. Secure the card in the slot using the screw removed earlier.
9. Replace the G5's clear inner panel and outer access door.



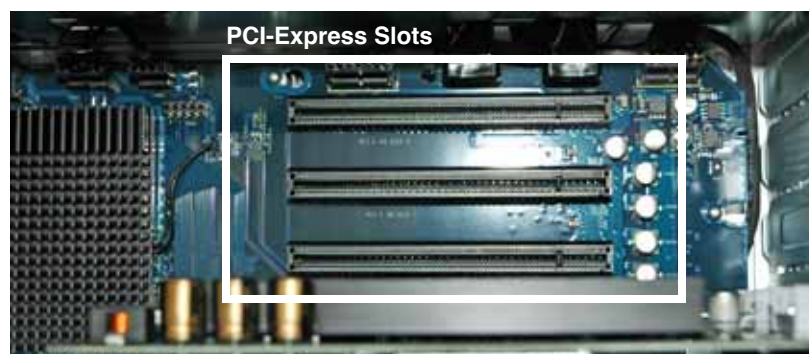
KONA 3 Card

**To Install:**

1. Remove Screw and Cover Plate and Insert KONA Card
2. Secure KONA with Screw Removed Earlier

PCI-Express Slots

PowerMac G5 Cardcage Access



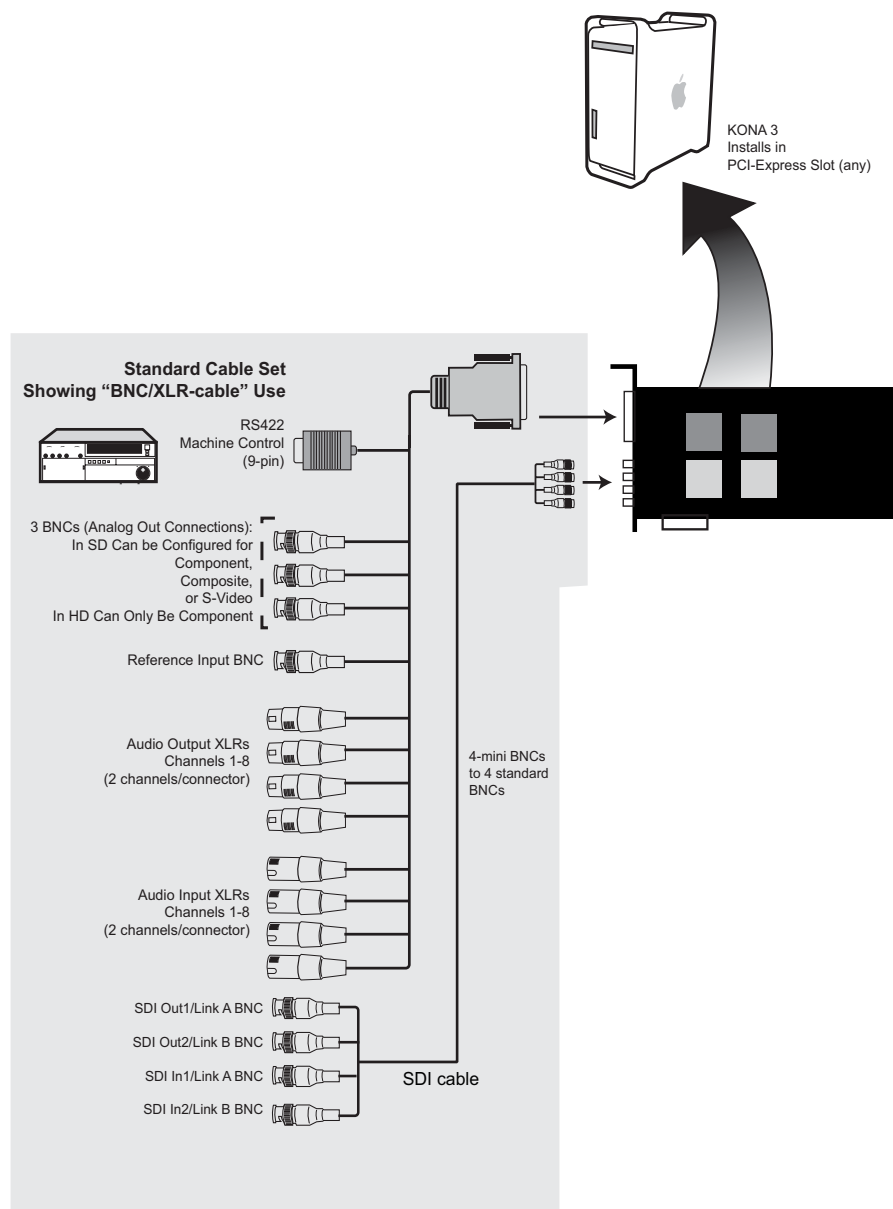
PowerMac G5, PCI-Express Slots: use any available slot for KONA

Note: After you install the KONA 3 card, you may notice that in the MacOSX Network preferences there is a message stating “You have a new network port named KONA 3 —be sure to check the settings...”. There is no need to take any action; this occurs because MacOSX detects the RS-422 serial port on the KONA 3 card that you will use for VTR machine control.

Cabling the System

System Video/ Audio Cable Connections

When installing your system, you’ll make video and audio input/output connections. These connectors are explained individually in chapter 2. Here, system interconnection is shown and described.

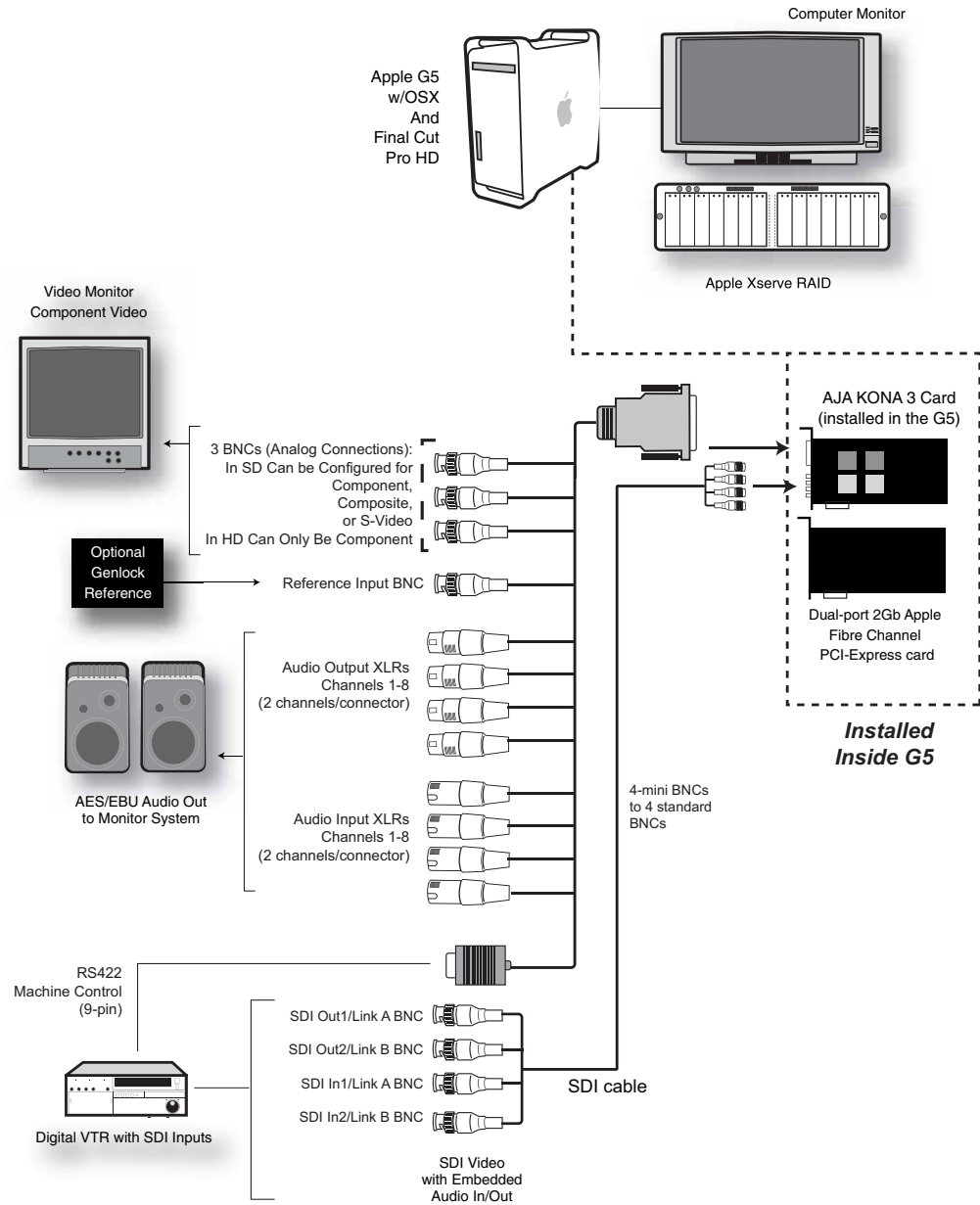


KONA 3 System Using Breakout Cable

Typical System

A figure on the following page shows typical system interconnections for a system with digital A/V sources. Your system may differ depending on VTRs, audio monitoring, and video monitoring.

1. If desired, connect your house reference sync to the KONA 3 *Ref Loop* connector (BNC). The second KONA 3 Ref Loop connector on the Breakout Box (if used) can be connected to your VTR or terminated with a 75 ohm terminator.
2. Connect a Video Monitor to the KONA 3 *Component Analog Video Out* BNC connectors (preferred), or instead connect to a composite monitor.
3. Connect a 9-pin DB9 machine control cable between your VTR's RS422 control port and the KONA 3 *RS-422* machine control connector.
4. Connect two SDI cables between KONA 3 and your digital VTR (Digital Betacam etc.): one from KONA 3 *SDI In* to the VTR SDI Out, and one from KONA 3 *SDI Out* (1 or 2) to the VTR SDI In. The KONA 3 SDI connections have embedded audio (16-channels) so the VTR must be configured accordingly. These connections will be made via the mini-connectors-to-BNC cable or via the optional K3-Box.
5. If you have an AES/EBU-ready audio monitoring system, then connect the eight channels of AES/EBU output from KONA 3's XLR (or BNC connectors—if using an optional K3-Box): 1/2, 3/4, 5/6, and 7/8, to the monitoring system AES/EBU inputs. If you instead have an analog audio monitoring system, you can use the two RCA-style unbalanced stereo output jacks on the Optional K3-Box for output.



Typical System Connections

Installing KONA 3 Software

First ensure that Final Cut Pro is installed as detailed in its user documentation. Next, use the CD-ROM supplied with the KONA 3 system to install necessary software drivers and KONA 3 control panel. You cannot use KONA 3 with Final Cut Pro until the AJA KONA 3 software has been installed on the host G5 Power Mac.

System software updates may occasionally become available to AJA KONA 3 owners on our website (www.aja.com). We recommend checking occasionally for both software updates and additional product information.

Note: If your PowerMac has previously had another video capture or multimedia card installed, ensure you remove the card and uninstall any related software before installing KONA 3. This will prevent any hardware or software conflicts. KONA 3 will operate properly on a PowerMac that also has an AJA Io installed.

Software Installation Procedure

Locate the AJA KONA 3 Software CD packaged with your system. Then follow the procedure below to put the required software on a host system to be used with KONA 3. The system must be an Apple Power Mac G5. Minimum system requirements for the host were described in *Chapter 1: System Requirements*.

Note: Before installing KONA 3 software, turn off any virus protection and security software that you may have installed on your computer.

1. Insert the KONA 3 CD in the Power Mac
2. Locate the KONA 3 CD icon on the OS X desktop.
3. Move the mouse cursor to the icon and double click to see the CD contents, which will appear in its own window.
4. In the window, locate the package file; it has an icon that looks like a box and has a “.mpkg” suffix.

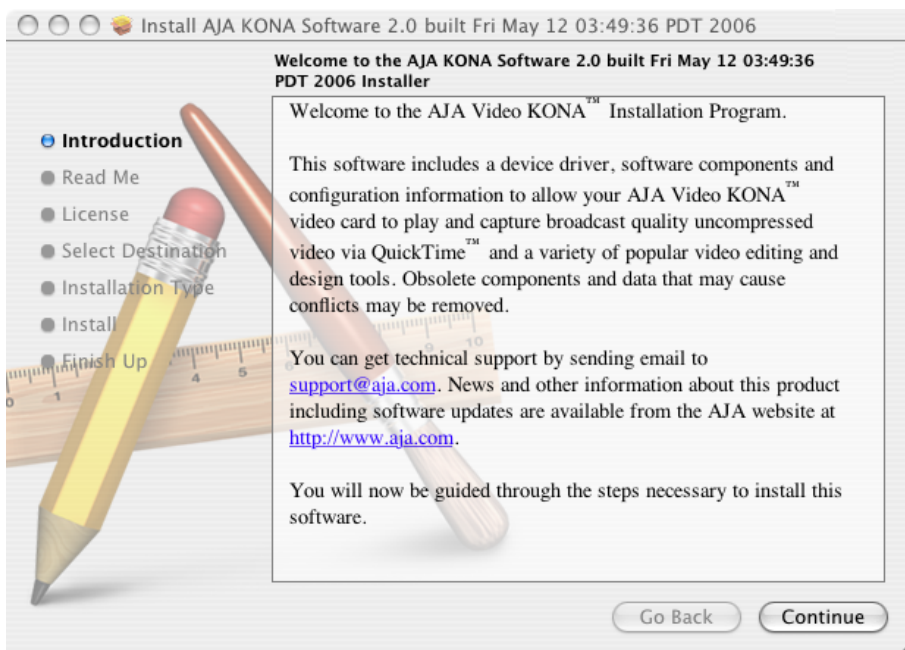
Note: Files ending in the “.mpkg” suffix are OS X installer files. These launch the OS X installer and tell it where and what to install on your system.

5. Double-click the package to log on and begin software installation.
6. The system will respond by asking you to authenticate who you are as currently defined on your OS X user profile. Enter the proper name and password at the Authenticate prompt; if you have multiple users defined, ensure that you log on as a user with administrator-level authority.



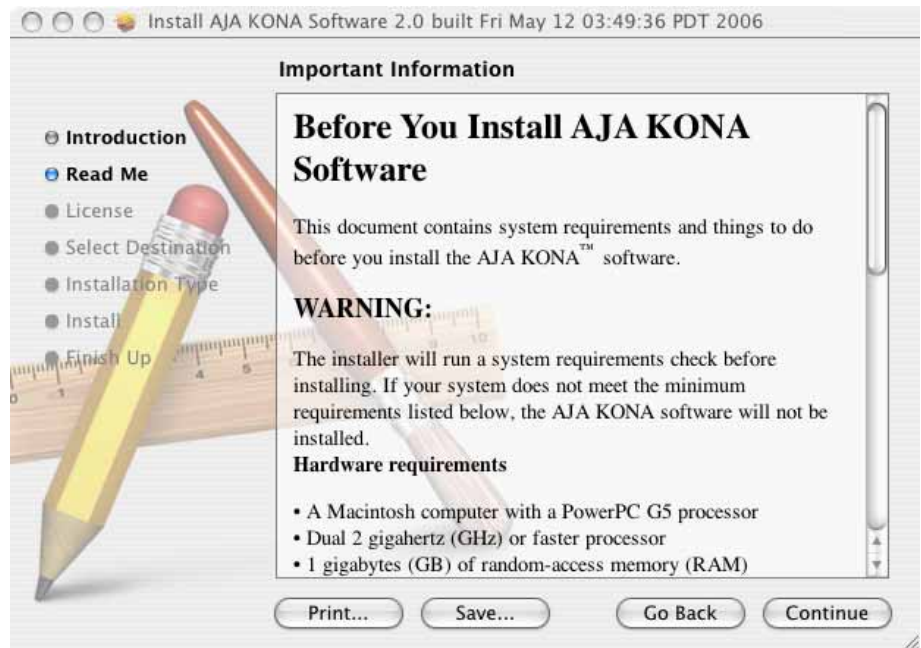
Log On Authenticate Prompt

7. Click on the *OK* button after entering a valid user and password.
8. The installer will launch and you'll see a series of installer screens.



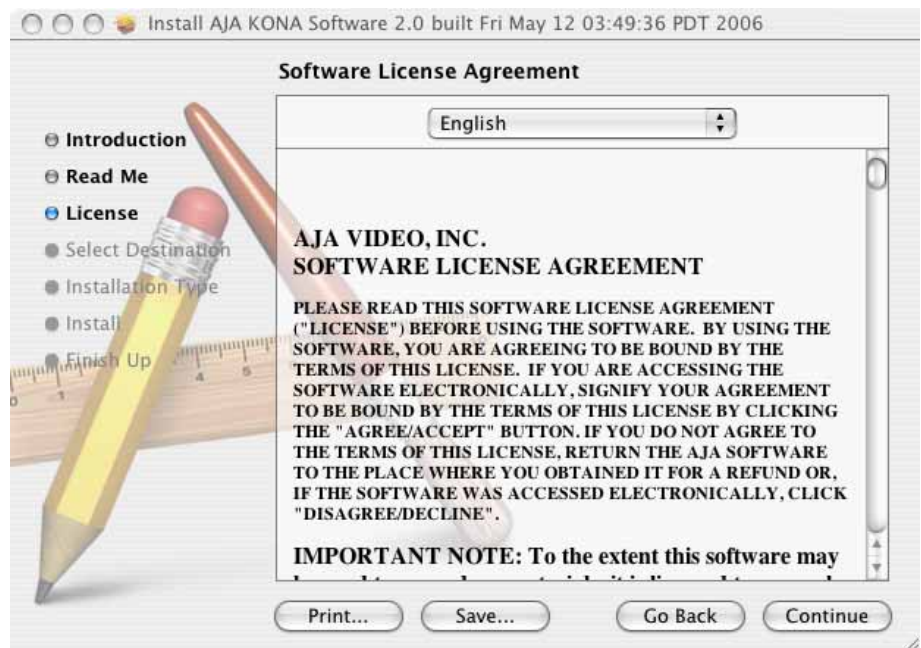
Initial Installer Screen

9. Click *Continue* to begin installation.
10. The next screen lets you know that the installer will check your PowerMac to ensure it has the hardware and software resources required (see Minimum Requirements in Chapter 1).



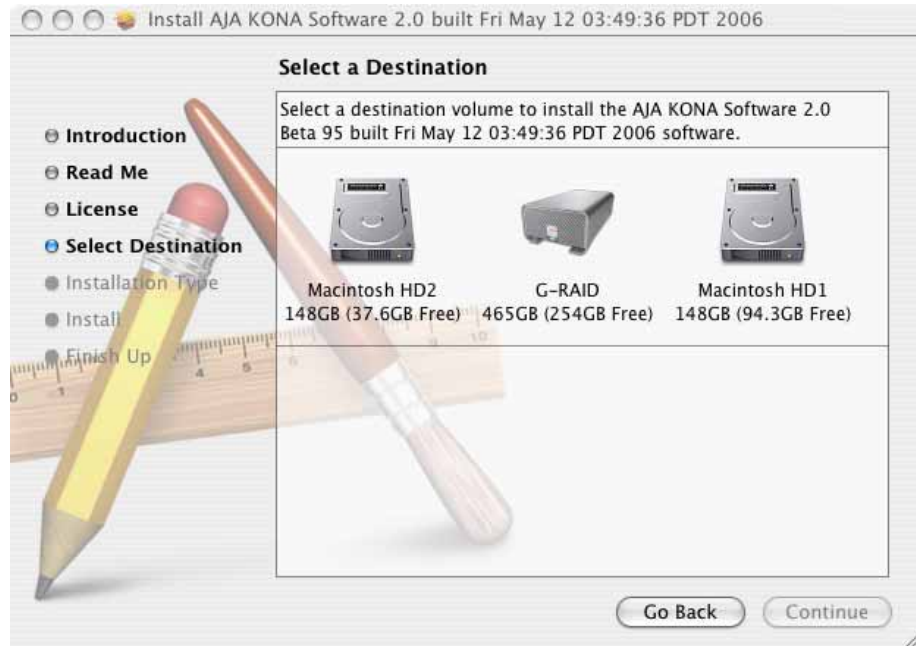
System Check Installer Screen

11. Read and agree to the Software License Agreement.



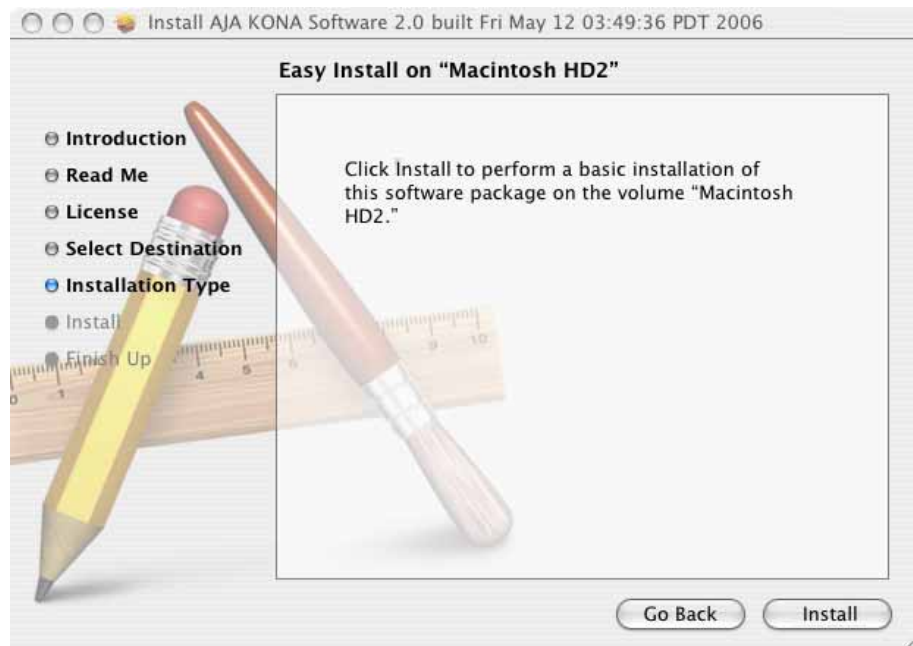
KONA 3 Software License Agreement Screen

12. The next screen shows all the available drives on the Power Mac. Click on the drive that contains your system files (Apple default is "Macintosh HD"). A green arrow will point to the drive you've selected. Click the *Continue* button to proceed with installation.



Select a Destination Drive For the KONA 3 Software

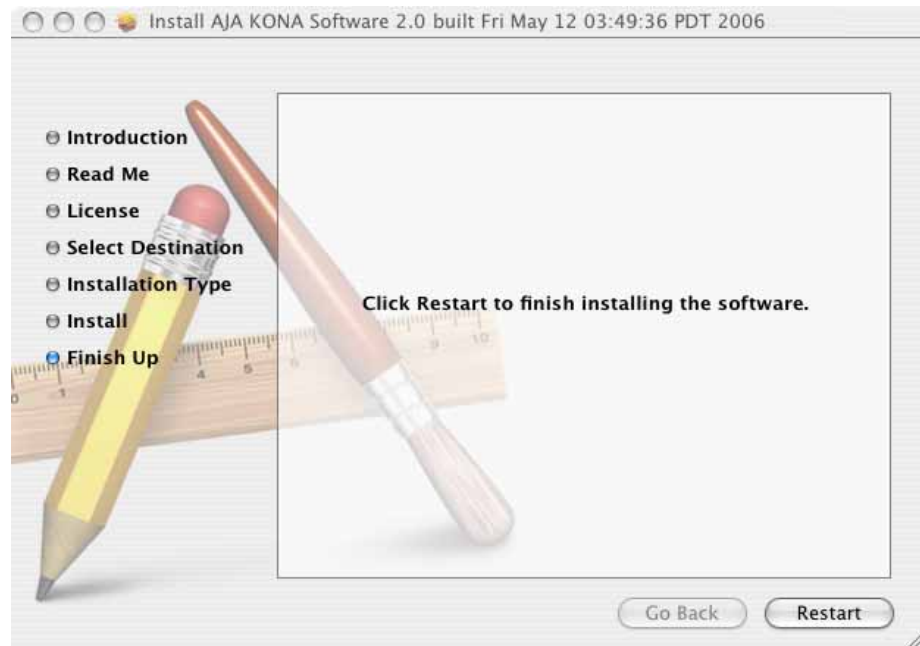
13. At the next screen, click the *Install* button to place the software on the drive you previously selected.



Easy Install, Installer Screen

14. A system prompt will pop up with a reminder that OS X must be restarted after installation. Click the *Continue Installation* button to proceed.

15. The installer will run and put all the necessary KONA 3 drivers, KONA 3 Control Panel, presets and software on the desired hard drive. When it has completed installation, a final screen will be displayed announcing that “software was successfully installed.”
16. Click the Restart button to complete the installation procedure. The system will perform a software restart and be ready for use.



Final Installation Screen

Genlock and Your System

For video stability and proper system operation, it's always best to genlock all equipment to house sync. Although genlock is not absolutely required for KONA 3 or your system, better quality and repeatable operation will be experienced by doing so. Usually, this means using a black burst generator output looped through the system. On the KONA 3 cables and optional K3-Box breakout box, house sync is connected to “Ref Loop”.

Chapter 4:

Final Cut Pro and Other Software



Final Cut Pro

Final Cut Pro

After you install the KONA 3 software on your Power Mac, all you need to do to begin using it is to become familiar with the KONA 3 Control Panel and how Final Cut Pro works with KONA 3.

With Final Cut Pro you'll choose the proper setups from the canned ones provided by AJA. These canned setups are called "Easy Setups" in Final Cut Pro and are available to use and edit under Audio/Video Settings in the "Final Cut Pro" menu (next to the apple menu).

You'll also need to gain familiarity with the KONA 3 Control Panel, which will be used for source selection, configuring many KONA 3 features, and for creating your own preset configurations for different applications.

The manual you are reading does not provide operational information about Final Cut Pro. Please read the Final Cut Pro user documentation provided with it for information on configuration and operation. The chapter you are reading addresses configuration and setup unique to use of KONA 3 with Final Cut Pro and other applications.

Using The KONA 3 Control Panel

The KONA 3 control panel is a software application that provides a simple visual way to see how the KONA 3 card is currently configured and then make changes as desired. Settings—both what you changed and didn't—can be saved as a snapshot for recall at anytime. This lets you save settings associated with all your frequent tasks; then as you switch tasks you don't have to spend extra time constantly resetting card configurations—just load the previously saved settings for each task.

One thing you'll notice instantly about the control panel is that it represents a visual block diagram of how the card is set. The current status of the upconverters/downconverters, the input and output settings, and many other details can be viewed as a color-coded block diagram in the control panel.

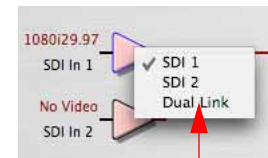
Control Panel Basics

Although the KONA 3 card auto-configures depending on the inputs present, and the Control Panel intuitively shows at a glance much about what the card is doing—there is even more information presented that may not be obvious. To ensure you make the most of the software, run the KONA 3 application and look at its display. Then refer to the “Basics” described here to better understand what you’re seeing and learn how to view and change the KONA 3 system configuration.

Note: The KONA Control Panel also works with KONA LS/LSe, KONA LH/LHe, and KONA 2. However, the actual features and screens displayed differ slightly since the board feature sets differ. Only one KONA card can be installed in a Mac at a time.

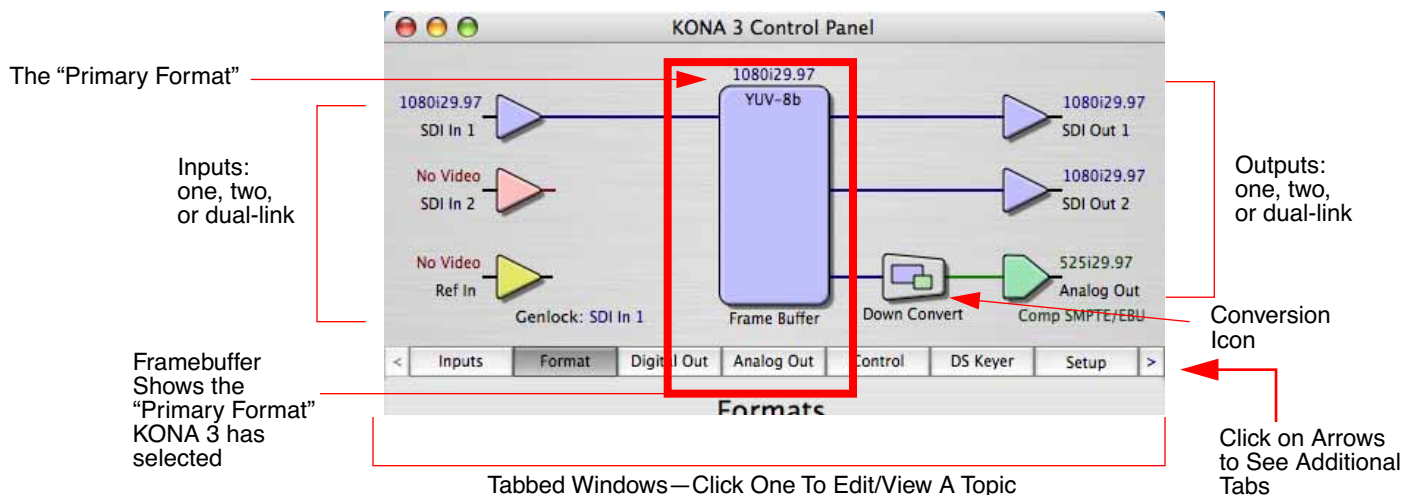
Before we go into too much detail, here are some basic definitions you should know (please refer to the figure that follows for reference). After studying the basics, read “*Who is Controlling KONA 3?*” later in this chapter for more advanced information on how applications interact with the KONA 3 board.

Block Diagram Screen—The top area of the KONA 3 Control Panel shows a visual picture representing the processing (if any) that’s currently occurring, including inputs/outputs, any up/down/cross conversion, reference source, and system status. Lines between inputs, the framebuffer, and outputs, show a video path. Where there are no lines, it shows there is no connection; this can be either because an input or output isn’t selected or because no video is present at the selected input. The lines will also show whether the input or outputs are single inputs/outputs or dual-link (where two channels are used to carry the bandwidth of HD-SDI 4:4:4 video), and whether output is video or video + key.



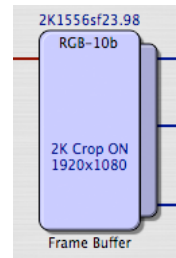
Control-Clicking an Icon Produces a Context-sensitive Menu

Icon objects on the block diagram screen (input/output icons, frame buffer, etc.—also called “widgets”—indicate their status by color (explained later) and can be clicked for context-sensitive information and choices. (These same choices can also be made from the tabbed Control panel screens.)



KONA 3 Control Panel, Block Diagram

Framebuffer—The framebuffer is the “engine” in the KONA 3 card where active video operations take place using Final Cut Pro, other 3rd-party applications, or even KONA 3 itself. The framebuffer has a format (called the “Primary Format” and color space that it follows, as defined in the Tabbed Windows or via external application software (such as the “Easy Setups” in Final Cut). If the framebuffer is processing 2K frame video—and video cropping is *turned ON*, it will indicate the cropping by showing a “shadow” underneath the icon (more later on how it’s cropped).

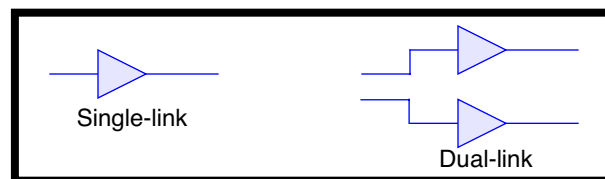


It is important to realize that inside the Macintosh many applications can use the KONA 3 card (as you switch from window to window) and it may not always be obvious which is currently controlling it. The KONA 3 Control Panel displays the name of the application controlling the card. In some cases, applications may not always properly “let go” of the card as another takes over—you’ll be able to tell by looking at the Control Panel.

Primary Format—The video format currently assigned to KONA 3. This is the format that the framebuffer will use and is shown in the Control Panel using the color blue. All icons in blue are the same as the Primary Format used by the framebuffer. Also any text descriptions in the block diagram that appear in blue also indicate that something is in the primary format. So, for example, if you see that the input and output icons are blue, then you know that the same format is used throughout the video path and that no format conversion is being performed. If a different color is displayed on the input or output, say green for example, then you know that KONA 3 is performing a format conversion in the video path.

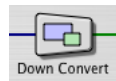
Secondary Format—Any format other than the currently selected Primary Format, is a secondary format. As described previously, this means that either the Inputs or Outputs are somehow different from the framebuffer’s assigned format (i.e., the “Primary Format”). This can be seen at a glance because the color will be different than blue.

Input/Output Icons—The input and output icons are triangles that together with their color show all the input and outputs and their status (selected, not selected, input present or not, format, etc.). A complete video path is shown when inputs and outputs are connected with lines going to/from the framebuffer.



Input/Output Icons

Conversion Icons—When an input or output is a different standard (SDI, or HD-SDI) than the framebuffer's then the KONA 3 may up-convert or down-convert the signal to the proper standard. This may be automatic, because it's detected an input signal that differs from the standard currently selected, or because you've explicitly told it to convert. In either case, the block diagram will show the conversion by displaying a conversion icon in between the input/output and the framebuffer. When an HD input or output is a different frame size than the framebuffer's then the KONA 3 may also cross-convert the signal to the proper standard: 720 to 1080 or 1080 to 720. In the case of cross-conversion, the type will be shown under the icon (in the example that follows, it's "1080 to 720").



Down Convert



Up Convert



1080 to 720

Down, Up, and Cross Conversion Icons

Color Meanings—All items in the KONA 3 Control Panel block diagram are color-coded to show what is happening in realtime. This applies to both icons and text. These colors have the following corresponding meanings:

Blue: video is same format as the Primary Format (framebuffer)

Red: the selected operation cannot be performed.

Yellow: reference video (black burst or other reference source)

Green: indicates that KONA 3 is performing some kind of active change to the video, to make it different from the Primary Format (e.g., up/down convert, format change, etc.).

Tabbed Windows—The bottom area of the KONA 3 Control Panel provides different information categorized by topic. Clicking on a "Tab"—or a block diagram element—will result in an information screen corresponding to a tabbed topic. The arrows at either side of the displayed tabs can be clicked to see any additional tabs not visible on the screen. If an arrow is "grayed out", then it means there are no additional tabs in that direction. Each of these tabbed windows are described on the following pages. Tabs available are:

Inputs: view and edit input selections and how they are mapped

Formats: select the framebuffer primary video format, any secondary formats, and up, down, or cross conversion for inputs/outputs

Digital Out: assign outputs

Analog Out: configure the component/composite analog output

Control: configures KONA 3 operation (pass through, desktop, etc.) plus setting output timing.

DS Keyer: configure the hardware-based downstream keyer for putting logos, or other video material on top of video being played or printed to tape.

Setup: configures Video and Audio options such as composite black level and analog audio monitor level.

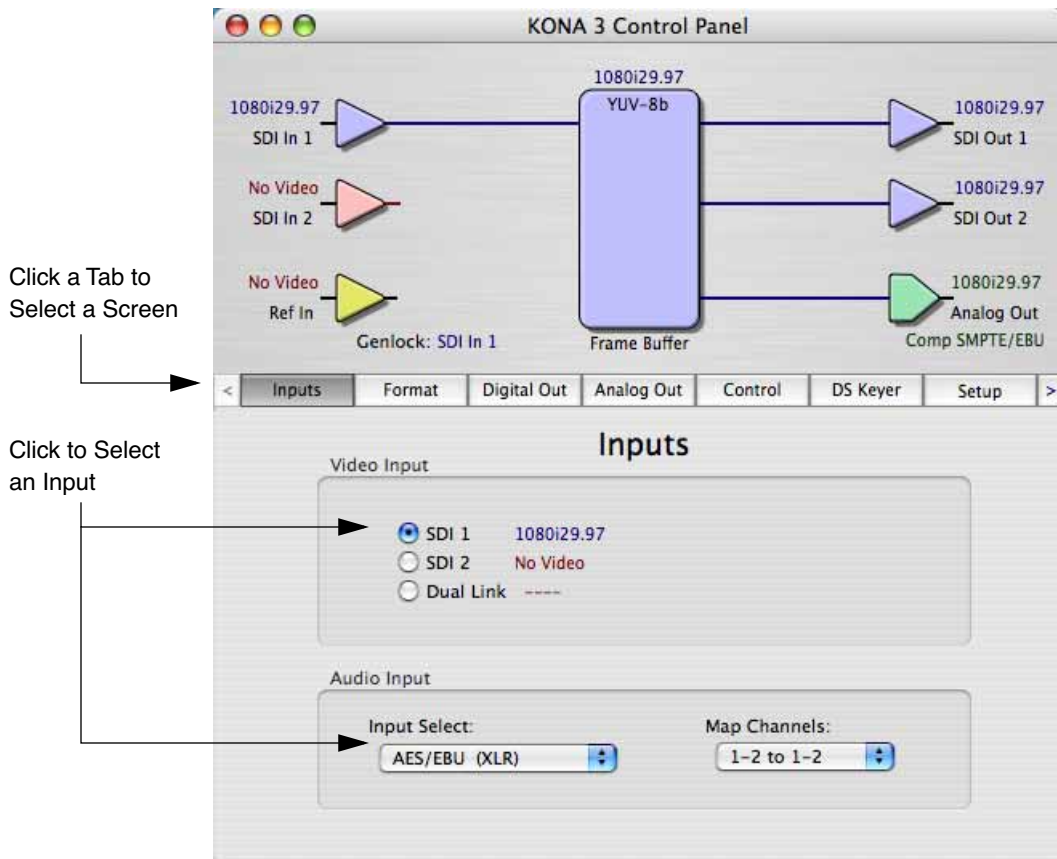
Codec: used to select codec options such as whether a pause stops on a full frame or a single field (jitter shown or not) and 24 to 30 fps padding patterns.

Timecode: monitor and configure timecode

2K Crop: select a 2K crop mode and the position of active video displayed from the overall frame

Info: displays status information about the KONA 3 card and how it is installed in the host Macintosh. This information is generally intended for troubleshooting/support.

Input Screen



KONA 3 Control Panel, Inputs Tab

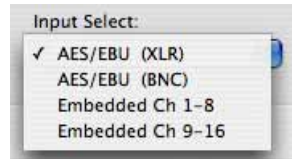
On the Inputs screen you can view the currently selected video and audio input sources and map audio sources to the channels supported by Final Cut Pro (more on this later). Two information panes in the screen are provided: Video Input and Audio Input.

Input Screen Settings

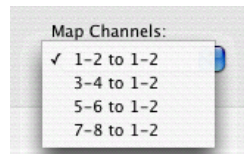
Video Input—These radio buttons allow you to see and change what's currently selected and the video format that KONA 3 has detected there (if any). In the example shown previously, it shows that video is selected at the SDI 1 input and the format is 1080i with a frame rate of 29.97. Since this text is shown in blue, you can tell that it does match the framebuffer's primary format you've set in the "Formats" screen. If you wish to select a different input you can do so by clicking a different radio button.

Audio Input—This pulldown menu allows you to pick where the audio comes from. KONA 3 supports up to 8 channels of AES or 16 channels of SDI embedded audio. You can choose out of the 16 channels embedded in the SDI, and pick which 8 to bring in (1-8 or 9-16). Here you can also select which two channels from the 8 embedded that will be mapped to Final Cut's two channels.

When a KONA 3 has a Breakout Box attached, there are two ways to connect AES/EBU inputs: XLR or BNC connectors. The Audio Input pulldown allows you to select which of the two connector groups will be used.



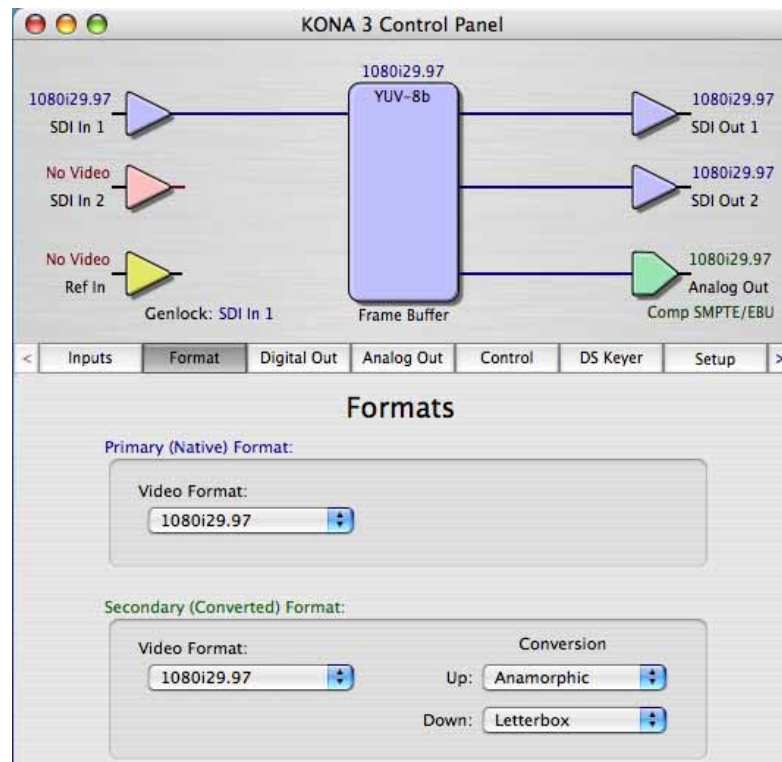
Audio Input Select Choices



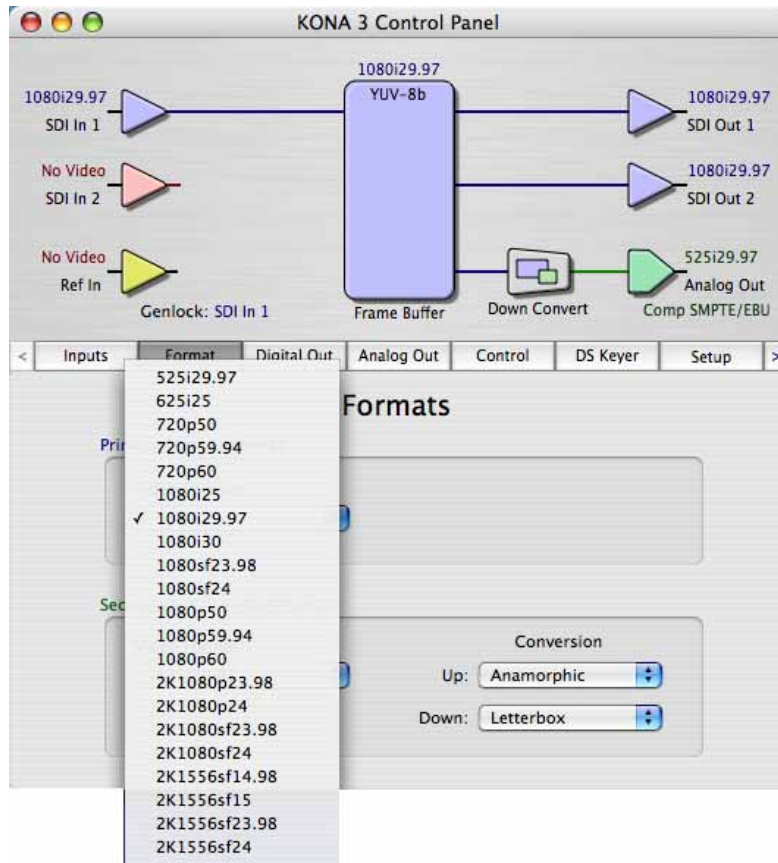
Audio Map Channel Choices

Formats Screen

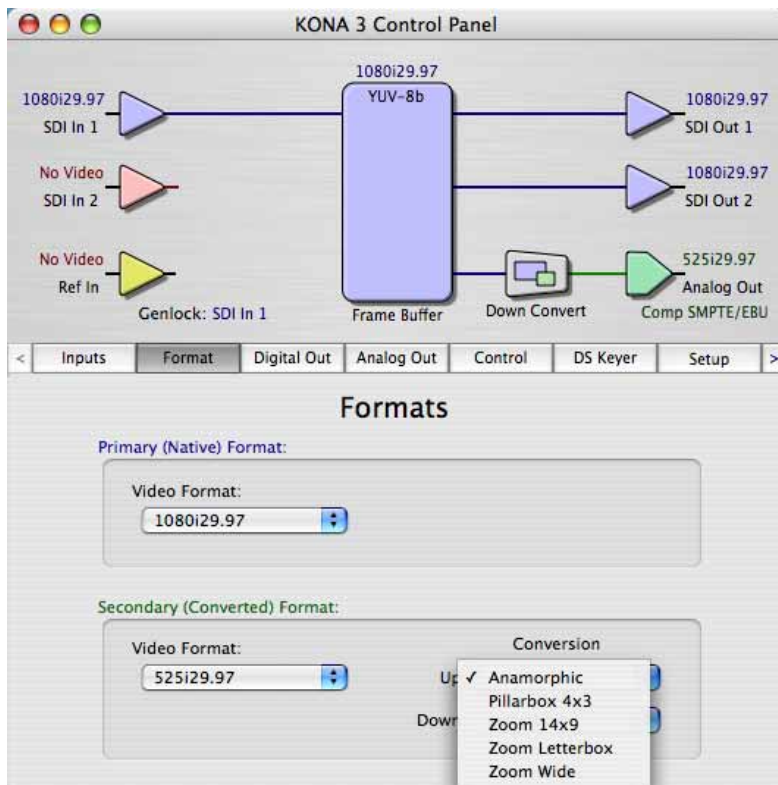
The Formats screen shows the video format currently in use by the KONA 3 framebuffer (called the *Primary Format*) and allows you to change it. All throughout the Control Panel, choices are always presented based on what KONA 3 can do with the signals available and the inputs/outputs selected. For example, on the Formats screen, if the output or inputs are a different format than the primary, then you'll see an additional information pane that allows you to view and edit the secondary format—including control over whether up/down/cross conversion is employed.



KONA 3 Control Panel, Formats Tab



KONA 3 Control Panel, Formats Tab, Showing Primary Formats Pulldown Menu



KONA 3 Control Panel, Formats Tab Showing Conversion Pulldown Menu

Format Screen Settings

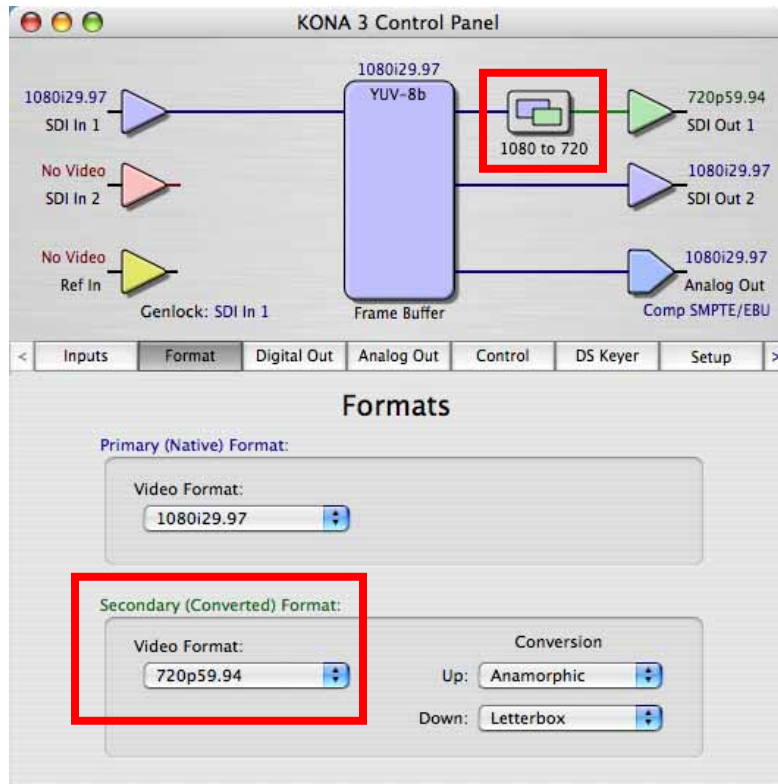
Video Format—This pull-down menu shows the currently selected format. This pull-down appears in both the Primary Format area of the Formats screen as well as the Secondary Format area (if present). If you select an alternate value in the Primary Format using the pull-down, it will change the format used by KONA 3's framebuffer. Video Format can only be changed when the Control Tab menu has the setting "Input Pass through". When a change is made via the Video Format pull-down or by clicking an icon (widget) and selecting a new format via a contextual menu, the block diagram will change to reflect the new format. In the case of a Secondary Format, the formats available can vary based on what the Primary Format is and the input signal (frame rates of input sources limits the to/from conversion choices). The "Secondary Video Format" pull-down menu lists all compatible formats (incompatible formats are shown in gray and cannot be selected). This allows you to see what you've chosen, and also see those formats that are compatible with the selected Primary format.

KONA 3 Formats include:

525i 29.97
625i 25
720p50
720p 59.94
720p 60
1080i 25
1080i 29.97
1080i 30
1080sf 23.98
1080sf 24
1080p50
1080p59.94
1080p60
2K1080p23.98
2K1080p24
2K1080sf23.98
2K1080sf24
2K1556sf14.98
2K1556sf15
2K1556sf23.98
2K1556sf24

Note: The AJA Control Panel software uses the abbreviation "sf" instead of "psf" when referring to "progressive segmented frame". In the manual and in other literature you may see either of these acronyms used interchangeably.

Cross-conversion: if you have an HD format as your primary and then select a secondary format with a different frame size, the KONA 3 card will place a cross-converter where necessary (input or output). This can be seen in the block diagram by the appearance of a cross-converter icon (see following).



KONA 3 Control Panel, Formats Tab Showing Cross-conversion

Up (Conversion)—The Up and Down pull-down menus are available when conversion has been selected for the video path to/from the framebuffer. Different choices will be available depending on the type of conversion and formats being converted. Choices that may be available:

Anamorphic: full-screen

Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars

Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black sidebars

Zoom Letterbox: results in image zoomed to fill full screen

Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down (Conversion)—Choices that may be available:

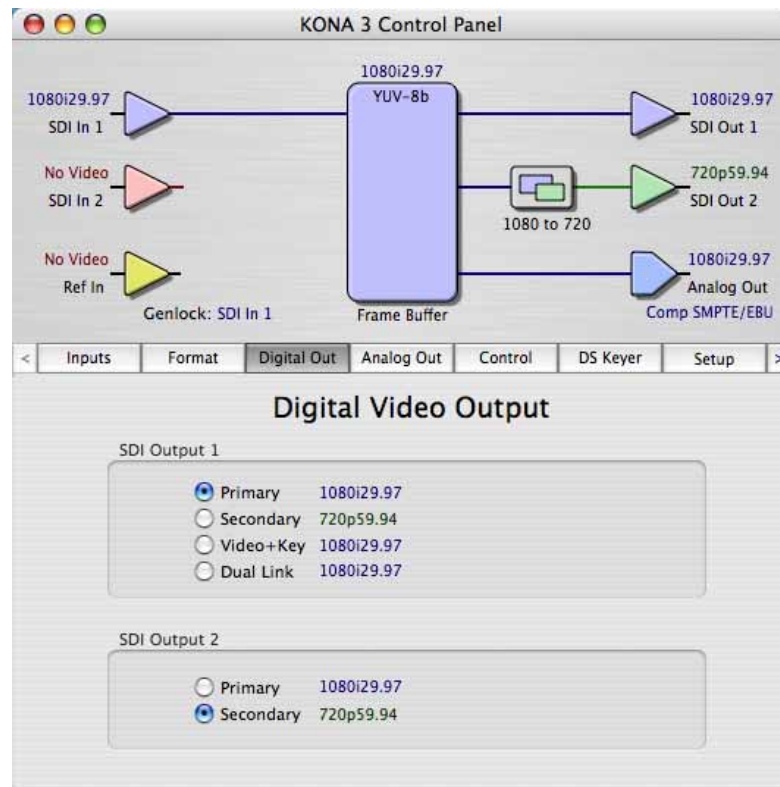
Anamorphic: full-screen

Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved

Crop: image is cropped to fit new screen size

Digital Out Screen

The Digital Out screen shows the current settings for both the SDI outputs. If an input/output has no video, it will be indicated on the block diagram (“No Video”).



KONA 3 Control Panel, Digital Out Tab

Digital Out Screen Settings

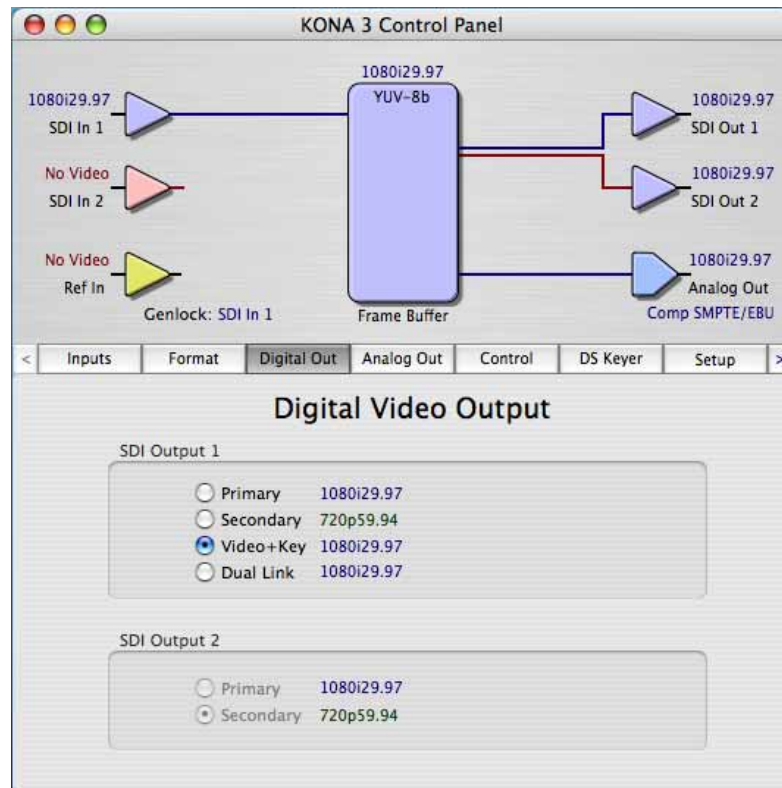
Separate information panes will be listed (as applicable) for SDI Outputs 1 and 2. Information that can appear includes the following items. You can view the current setting or click on another to change to it:

Primary—when selected, this indicates that the SDI output is set to the same format as the framebuffer. That value will be listed in blue.

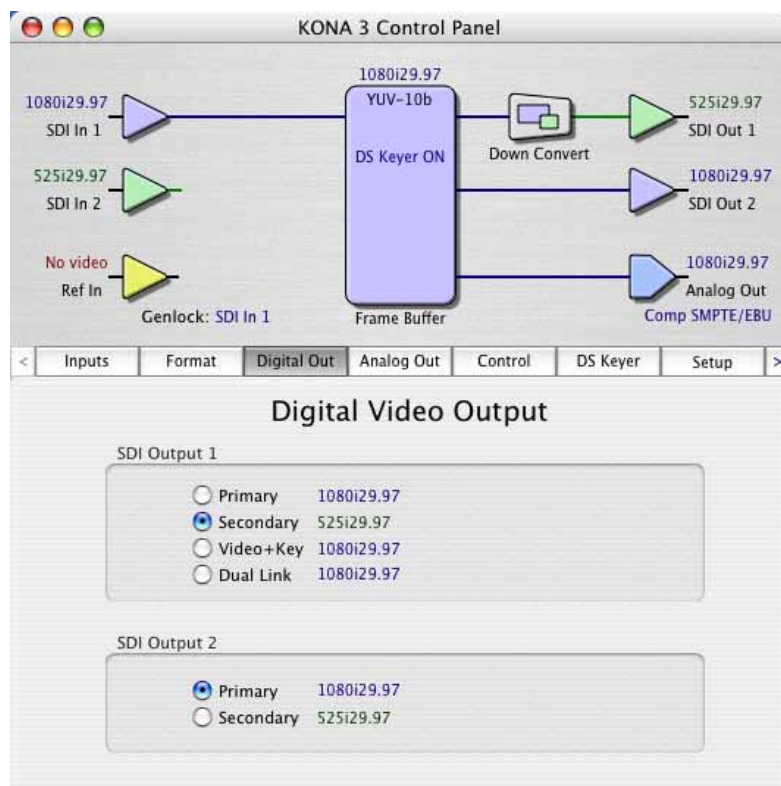
Secondary—when selected, this indicates that the SDI output is set to a format different from the framebuffer (Primary Format). That secondary format value will be listed in green. This shows that active processing of the video is taking place (format change and possibly even up/down-conversion).

Dual Link—when selected, this indicates that both SDI outputs are being used together to output a 4:4:4 dual-link signal from the KONA 3 card.

Video+Key—when selected, this indicates that the SDI output 1 video is set to the same format as the framebuffer. SDI output 2 is set to a video key signal associated with output 1 (the shape of the hole to cut). Using the second KONA output as an Alpha Channel key, with the video output, may be useful for feeding production switchers, DVEs or other professional video equipment. If Video+Key has been selected as an output, the block diagram will indicate the SDI outputs with video in blue and the key in red.



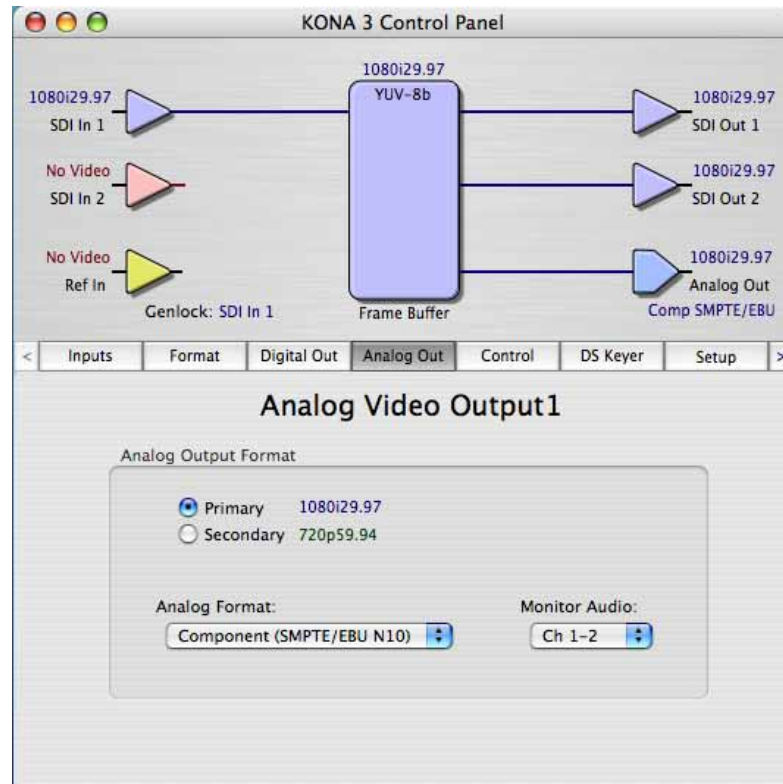
KONA 3 Control Panel, Digital Out Tab, Video+Key Output



KONA 3 Control Panel, Digital Out Tab, Showing Downconvert (secondary format)

Analog Out Screen

KONA 3 provides a high-quality analog component or composite output, generally used for monitoring. This screen shows the current settings for that analog output, and allows you to re-configure it when desired (format and black-level).



KONA 3 Control Panel, Analog Out Tab

Analog Out Screen Settings

Analog Output Format—choices in the Analog Format pulldown menu vary depending upon the Analog Output video standard. For example, the “Composite + Y/C” selection is only available when an SD (525i29.97 or 625i25) format is in use. Analog formats can include:

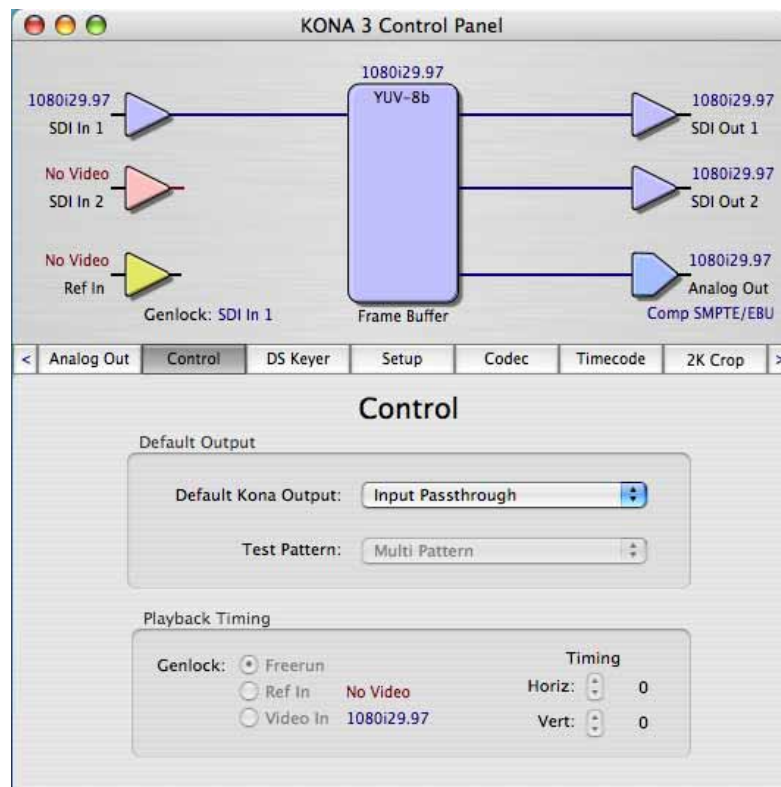
- Composite +Y/C
- Component (SMPTE/EBU N10)
- Component (Beta)
- Component (RGB)
- Component (RGB -HV)

Monitor Audio—Here you can select which two channels will be mapped to the analog audio output (K3-Box only).

Control Screen

The KONA 3 can be controlled by various software applications running on a host PowerMac as well as be used as a Macintosh Desktop extension. The Control Screen is where you select how the KONA 3 directs video and is used by application software. This screen also provides control for configuring output timing with regard to external reference video and horizontal/vertical delay.

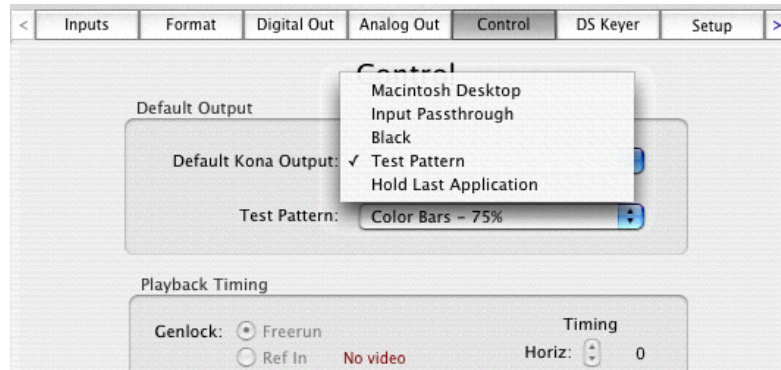
At the top of the Control screen it will show the current Default KONA 3 output and the application currently controlling the KONA 3 card (if there is one). For example, in the screen shown here, the default output is the Macintosh Desktop and the only controlling application is the KONA 3 Control Panel itself.



KONA 3 Control Panel, Control Tab

Control Screen Settings

Default Kona Output—This is where you select what KONA 3 will output as a default *when no application has control of the board*, such as when the Finder is active. Since KONA 3 can be controlled by software applications as well as its own control panel, the output can change dynamically. When you select many video applications, they will grab control of the KONA 3 card inputs/outputs. These settings determine what happens when an application that doesn't grab the KONA 3 inputs/outputs is active.



KONA 3 Control Panel, Control Tab, Default Kona Output Pulldown Menu

Default Kona Output Choices available and their meanings:

Macintosh Desktop: when selected, this selection causes the KONA 3 program video output (digital and analog) to be an extension of the Macintosh desktop. MacOS windows and applications can appear (when applicable) on the KONA outputs.

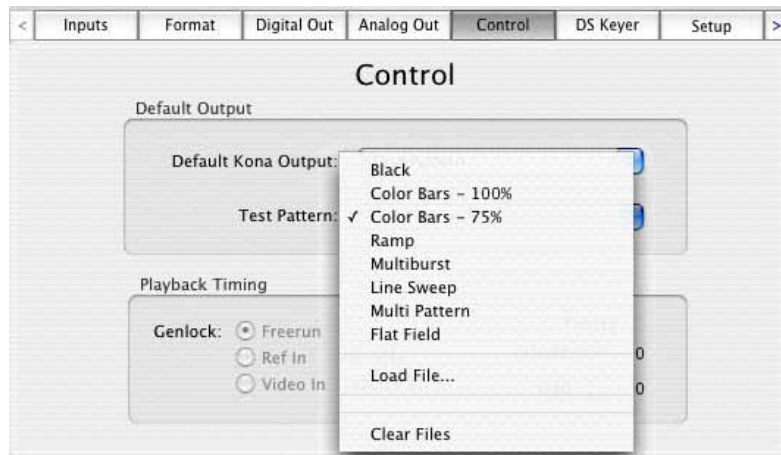
Input Pass through: this selection directs KONA 3 to route video from its selected input through the card for processing and output. When this selection is in effect, all Primary/Secondary Format selections are available for selection in controlling the output. This is similar to using the KONA 3 as a VTR (as far as video/audio pass through).

Black: this selection directs KONA 3 to output video black whenever an application isn't controlling the card.

Test Pattern: this selection directs KONA 3 to output a choice of preset patterns—when no other QuickTime application is using the KONA board. In addition to the preset test pattern choices, a “*Load File...*” selection at the bottom of the menu allows you to load any standard Mac RGB graphics file (.tif, .psd, etc.) into the frame buffer for display.

Note: the graphic file will not be scaled to fit. If it's smaller than the current frame buffer format, KONA 3 will center it in the frame. If it's larger than the current frame buffer format, it will be cropped on the right and bottom.

Once a graphic file is loaded into the frame buffer it will be retained until it is overwritten by another graphic or test pattern, or when power is turned off. Graphic file names are only “remembered” in the menu as long as the Kona Control Panel application is running.



KONA 3 Control Panel, Test Pattern Choices

Hold Last Application: this selection directs KONA 3 to hold and output the last frame of video from the last application to control KONA 3. This can be helpful when operating in an environment where you're switching back and forth between multiple application windows.

Tip: Pressing and holding the Apple *COMMAND* key while clicking in the KONA Control panel—while in any software application (Final Cut, etc.)—causes control of the KONA card to stay with that application, rather than shifting to the Control Panel. This works regardless of the setting of “Default Kona Output.”

Genlock (*Freerun, Ref In, Input 1, or Input 2*)—Selects how KONA 3 will synchronize program video:

Freerun: in this mode, KONA 3 generates sync without an external reference source

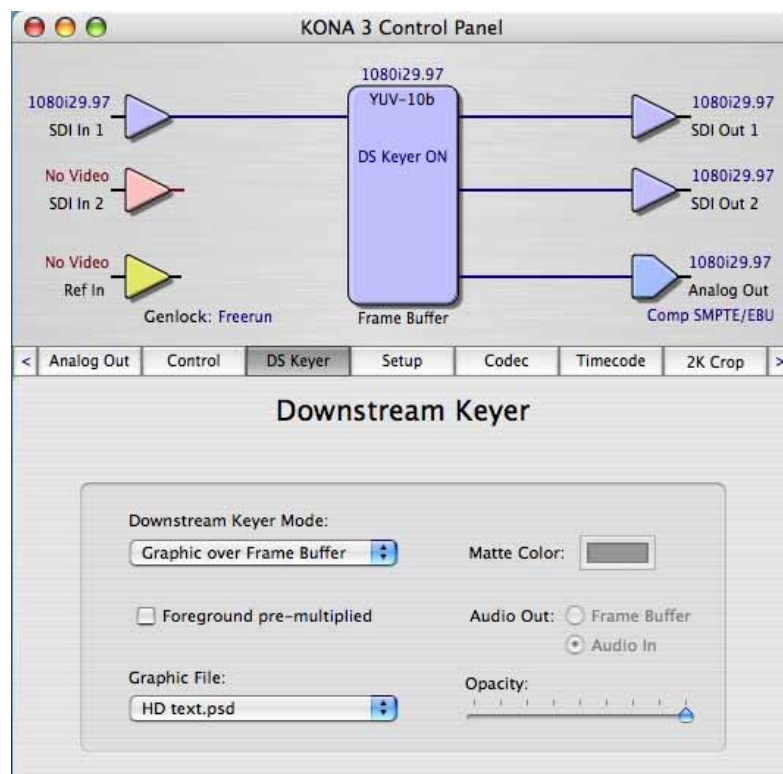
Ref In: directs KONA 3 to use the Ref Video source for sync (usually an analog black burst video signal)

Video: directs KONA 3 to use whichever video input source has been selected in the *Inputs* tab window for sync

Timing (*Horiz* and *Vert*)—these two pull-downs allow output timing adjustment with reference to the Ref Video source selected. The Horizontal reference can be adjusted by selecting a number of pixels (clocks) to offset. Vertical can be adjusted by specifying a number of lines to offset.

DS Keyer

The KONA 3 has a hardware-based downstream keyer that is ideal for putting logos, “bugs” or other video material on top of video being played out or printed to tape. A typical application would be putting a television station’s call letters or channel over program video content. Keyed video can be from the KONA’s internal Frame Buffer (from storage, video In, Kona TV, etc.) or from a graphics file that has an alpha channel (PhotoShop etc.).



KONA 3 Control Panel, Downstream Keyer Tab

Settings in the DS Keyer tab provide control over how the keyer operates and whether it’s turned on or off. Controls and their meanings in the Tabbed screen are as follows:

Downstream Keyer Mode:

Downstream Keyer Off — when this pulldown menu item is selected the downstream keyer will be turned off

Frame Buffer over Matte— places the keyed video with alpha channel currently in the Frame Buffer over a fixed color matte determined by the “Matte Color” setting set separately.

Frame Buffer over Video In—places the keyed video currently in the Frame Buffer over the video input for playout or print-to-tape.

Graphic over Matte—places a graphics file having an alpha channel (chosen in

“Graphic File” pulldown) over a fixed color matte determined by the “Matte Color” setting set separately.

Graphic over Video In—places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over the video input for playout or print-to-tape.

Graphic over Frame Buffer—places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over the current contents of the KONA card’s Frame Buffer (which might be from storage, video In, Kona TV, etc.).

Matte Color: only available when the pulldown “Frame Buffer over Matte” or “Graphic over Matte” are selected—pressing this button brings up a color selection dialog. The dialog provides a variety of ways to select a matte color including a color wheel, color picker (choose from a location anywhere on the computer screen), numeric sliders, swatches, “crayons”, and spectrums. The matte chosen will be used as a video background under the keyed video.

Foreground pre-multiplied (checkbox): use to avoid “matte lines” and improve the appearance of the foreground (key) being composited over the background.

Audio Out:

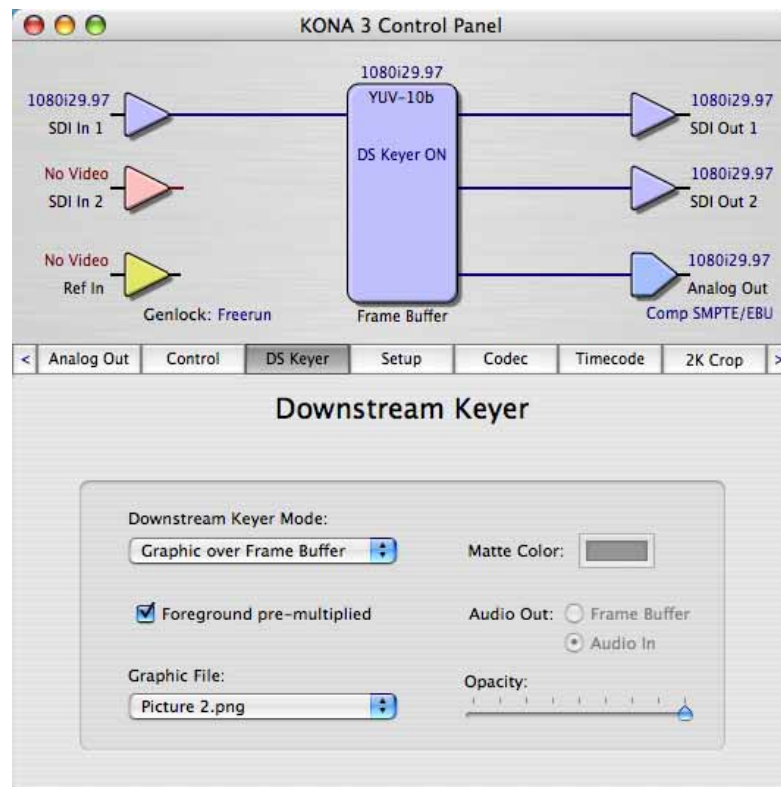
Frame Buffer—select audio out to be routed from the contents of the Frame Buffer.

Audio In—select audio out to be routed from KONA’s currently selected input(s).

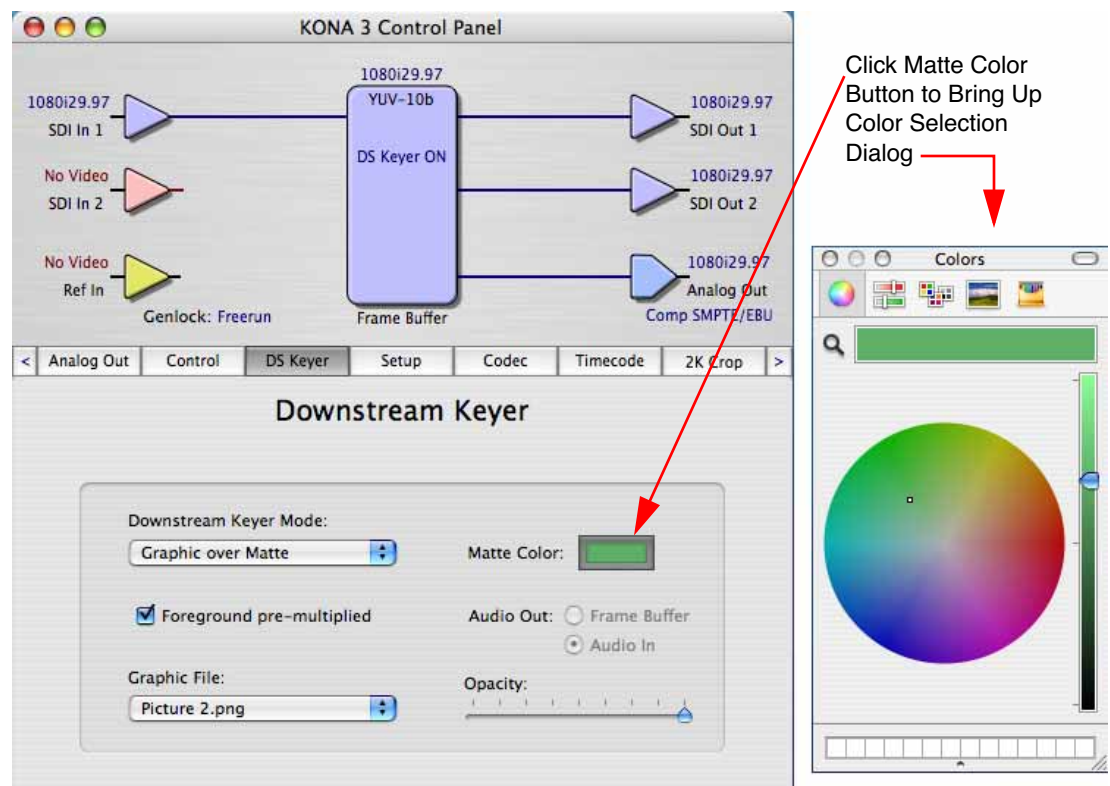
Opacity: this slider controls the transparency of the keyed video (over the background) from translucent to completely opaque.

Graphic File: this pulldown allows you to choose from any recently accessed file or select a new file (“Load File...”), which then brings up a file dialogue.





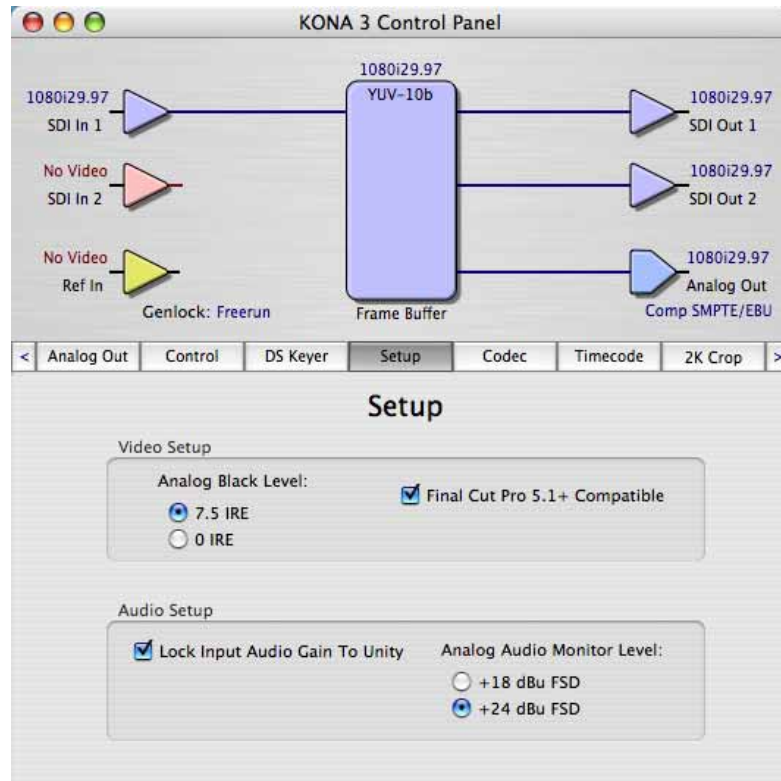
KONA 3 Control Panel, DS Keyer Tab, Loading a Graphic File to Place Over Framebuffer



KONA 3 Control Panel, DS Keyer Tab, Loading a Graphic File to Place Over a Matte

Setup Screen

KONA 3 provides a high-quality analog component or composite output, generally used for monitoring. This screen shows the current settings for that analog output, and allows you to re-configure it when desired.



KONA 3 Control Panel, Setup Tab

Setup Screen Settings

Analog Black Level—choices in the black Level pulldown menu are only available for the two Composite analog formats. Choices presented are for US or Japan settings:

7.5 IRE (NTSC US)

0 IRE (NTSC Japan)

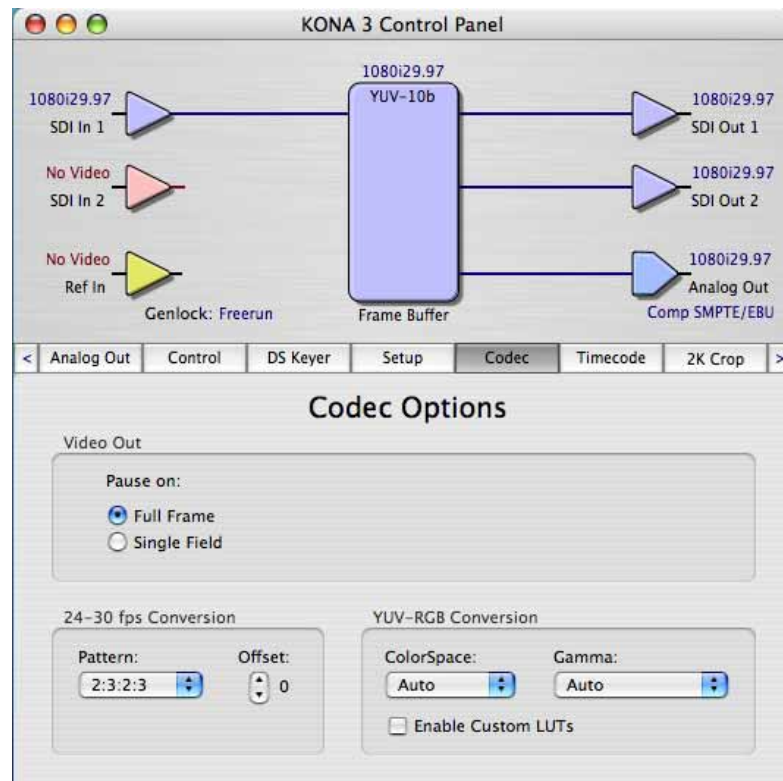
Final Cut Pro 5.1+ Compatible—set this checkbox if you are running Final Cut Pro 5.1 or newer software. Not checking the box when running 5.1 (or newer) results in reduced capture accuracy.

Analog Audio Monitor Level Audio—when a Breakout Box is connected to KONA 3, the button selected determines the audio level that will appear at the Analog Audio Output RCA connector pair (“FSD” is *full-scale-deflection* reading as measured on a VU meter). Select +18 for Europe or +24 for USA.

Lock Input Audio Gain To Unity—when set, the KONA card will ignore the Final Cut Pro gain setting and set the audio gain at unity. Not setting this checkbox tells the KONA card to get the audio gain setting from Final Cut Pro.

Codec Screen

This screen offers a variety of controls that determine how the card behaves under Final Cut Pro.



KONA 3 Control Panel, Codec Tab

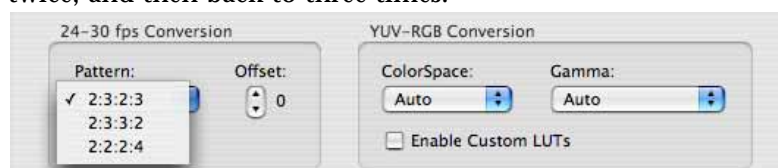
Codec Screen Settings

Pause On—these two choices determine what happens when Final Cut Pro is paused in stop mode:

Full Frame: both fields are displayed resulting in some jitter while paused.

Single Field: a single field is displayed, showing no flicker (useful when color correcting or whenever the flickering would be a distraction).

24-30 FPS Conversion—the value selected in this pulldown is used whenever, due to format selection, you've chosen to do 24 frames-per-second to 30 conversion where extra fields will be added to pad the existing ones. Depending on video content, selection of different field patterns may be useful in reducing jitter due to the content of adjacent fields. The numbers in the pattern choices specify the frequency with which inserted fields will be repeated. For example, "2:3:2:3" means duplicate a field twice, then the next field three times, then the next twice, and then back to three times.



KONA 3 Control Panel, Codec Tab, Frame-padding Pattern Choices

YUV-RGB Conversion: These pulldowns select industry standard color space and gamma transfer functions for the YUV-RGB conversion, or allow you to direct the KONA card to automatically determine it for you.

Colorspace—choose from:

Rec 601

Rec 709

Auto

Gamma—choose from the following:

Linear (1.8)

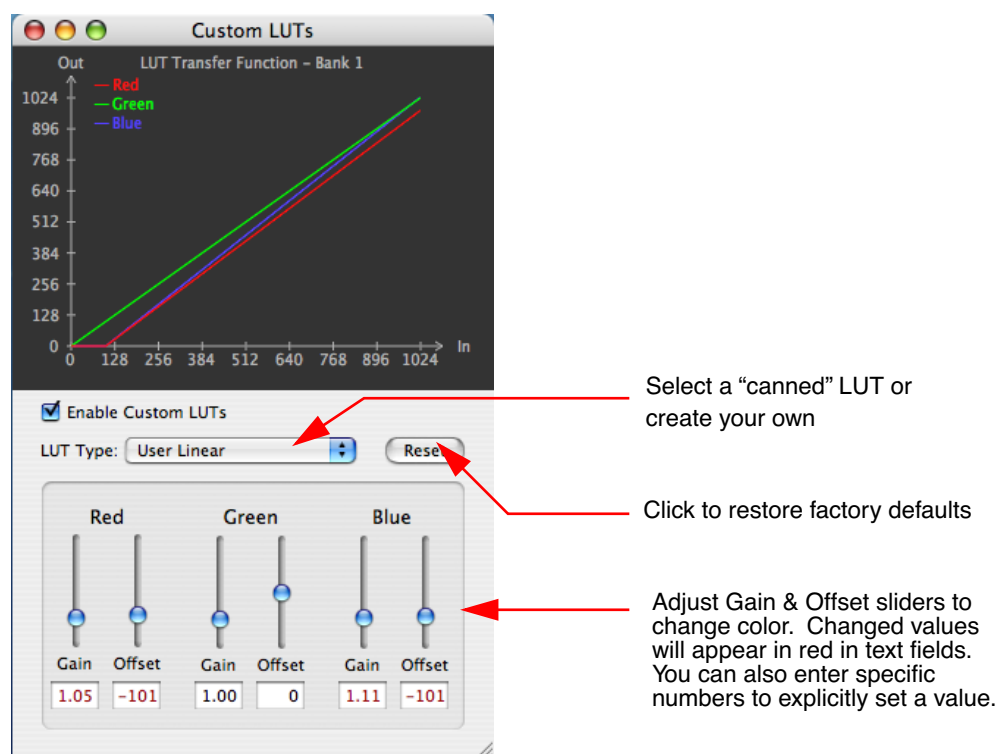
Rec 601 (2.20)

Rec 709 (2.22)

Auto

Enable Custom LUTs—this checkbox enables a custom color lookup table (LUT) for use in Final Cut Pro. When checked, there will be a new “Custom LUT” menu item under the *Windows* menu in Final Cut. Selecting that item brings up the KONA 3 Control Panel “Custom LUTs” dialog shown below. Defining a LUT applies it to the KONA 3 output. The custom LUT will be saved with the Final Cut Pro presets.

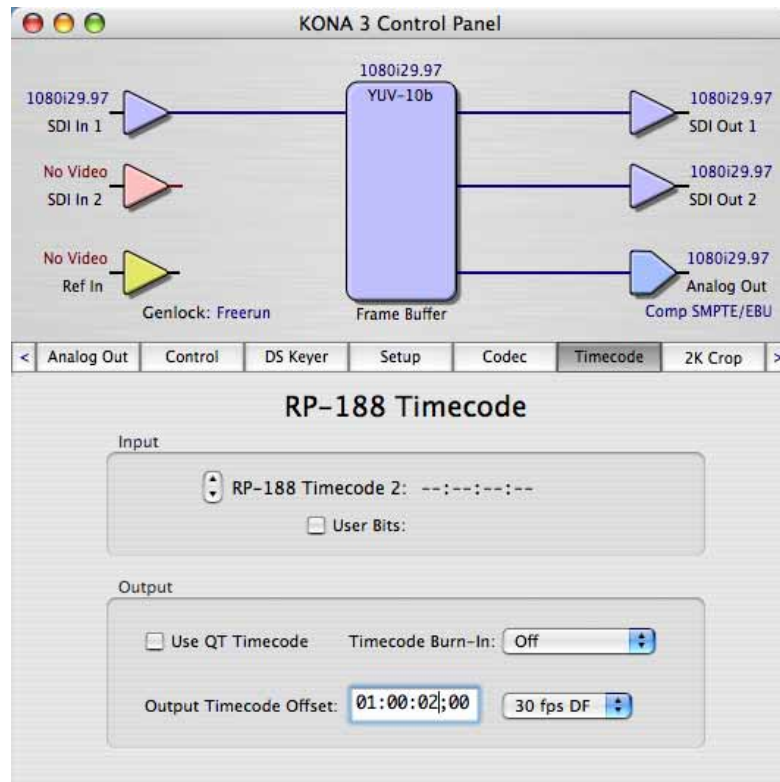
Note: Custom LUTs only work with RGB material.



KONA 3 Custom LUTs Dialog

Timecode Screen

The timecode screen is used for both monitoring the RP-188 timecode embedded in the digital data stream and for selecting a timecode offset (if required) for the attached VTR (connected to KONA 3's RS-422 port)—to be sent during assemble-edit mode.

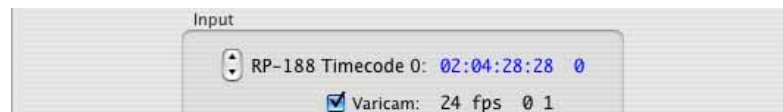


KONA 3 Control Panel, Timecode Tab

Timecode Screen Settings

RP-188 Timecode <n>—in RP-188 timecode there can be multiple timecode values in the data stream. Use this pull-down to select the one you wish to monitor. The selection will be displayed in the timecode value displayed to the right of the pull-down.

User Bits—For monitoring Varicam timecode, you may wish to monitor the user bits embedded in the timecode. If you set this checkbox, KONA 3 will detect and interpret the Varicam user bits and display them next to the checkbox.



KONA 3 Control Panel, Timecode Tab, User Bits Checked

Use QuickTime Timecode—when checked, this directs KONA to output timecode from the QuickTime timecode track. When not checked, KONA uses the *Output Timecode Offset* value plus the number of frames into the movie. Note: not all QuickTime applications use or support timecode tracks—so sometimes the QuickTime timecode is missing or not meaningful.

Output Timecode Offset (entry field and FPS pull-down)—this text entry field allows you to specify a timecode offset for use with Final Cut Pro (or any other application that has timecode offsets that are user-controlled). In FCP, go to “Timeline Options” and locate the “Starting Timecode” value. Use that same value here as the “Output Timecode Offset” to ensure the timecode is synchronized.

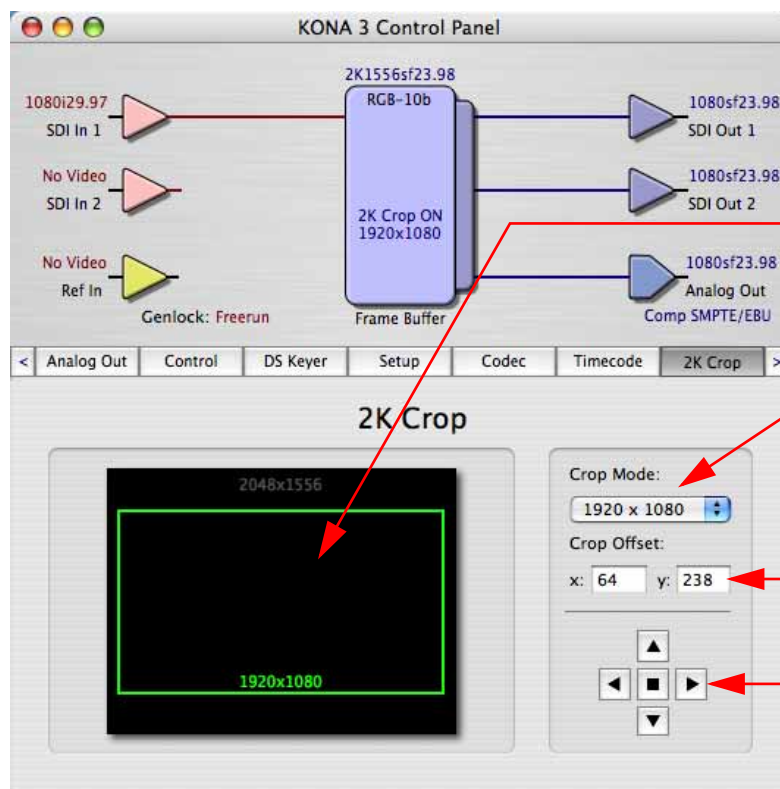
Timecode Burn-in—this pulldown selects whether the timecode value is “burned-in” on video output from KONA 3. If set to “OFF”, timecode will not be keyed over the video. If set to “timecode”, then the timecode value will be keyed over the output video. This can be useful for synchronizing, choosing edit points, dailies, and many other purposes.



Note: SMPTE RP 188 defines a standard for the transmission of time code and control code in the ancillary data space of a digital television data stream. Time code information is transmitted in the ancillary data space as defined in ANSI/SMPTE 291M. Multiple codes can be transmitted within a single digital video data stream. Other time information, such as real time clock, DTTR tape timer information, and other user-defined information, may also be carried in the ancillary time code packet instead of time code. The actual information transmitted through the interface is identified by the coding of a distributed binary bit. Equipment manufacturers can use the meta data for different purposes.

2K Crop Screen

This Tabbed screen allows you to determine how 2K frames captured with VTR Xchange and brought into Final Cut will be cropped. You can select a crop mode and then pan and scan around to choose the area that will be displayed. This can be done dynamically with a mouse or by entering explicit numbers



One way to move the crop area:

Moving the mouse cursor while holding the mouse button down moves the crop rectangle within the 2K frame

Select crop mode via pulldown

Two other ways to move the crop area:

Explicitly specify an X and/or Y Offset for the crop

Select a crop area by moving the rectangle using these navigation buttons (arrows). Square button at center is used to re-center the crop.

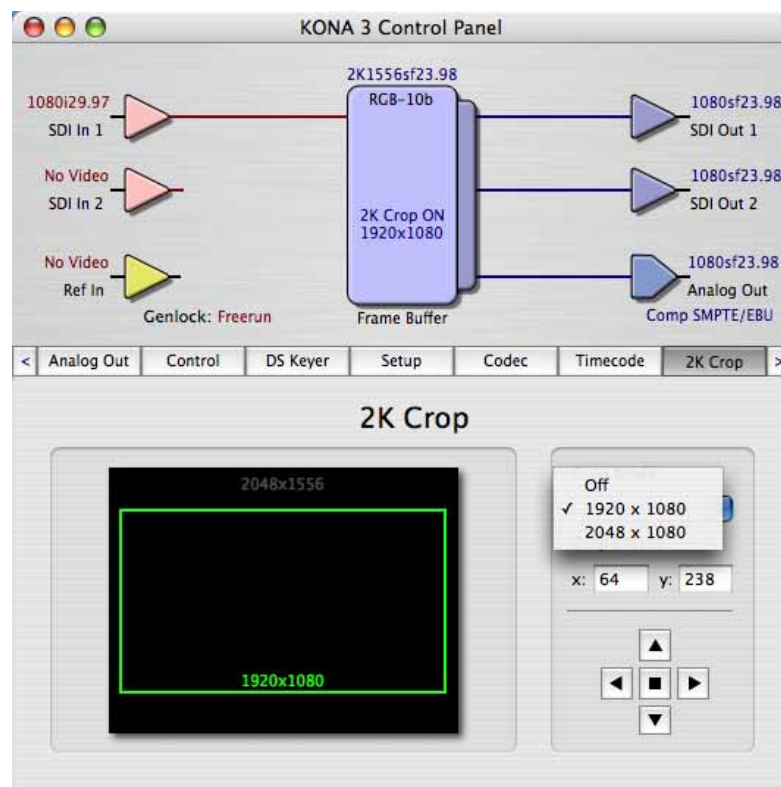
KONA 3 Control Panel, 2K Crop Tab

Select a crop mode by choosing 1920 x 1080 or 2048 x 1080 from the pulldown menu; choosing “Off” turns off 2K frame cropping.

Once a crop is selected, KONA 3 defaults to the crop being placed in the center area of the 2K frame. You can change or move the cropped area from within the frame by selecting the green rectangle with the mouse cursor and dragging it to a desired spot.

Tip: Using the Command key held down in conjunction with the mouse cursor within the Control Panel 2K Crop screen—while in another application (i.e., Final Cut)—allows that application to retain control of the KONA output while adjusting the crop. This is highly useful for visualizing the changes you’re making.

Or, you can also use the arrow buttons at the right of the screen to move the crop area up, down or sideways. The square button in the center returns the crop area to the center of the screen. Alternatively, you can also enter a specific X and/or Y pixel offset by typing a number into the text fields above the arrow buttons.

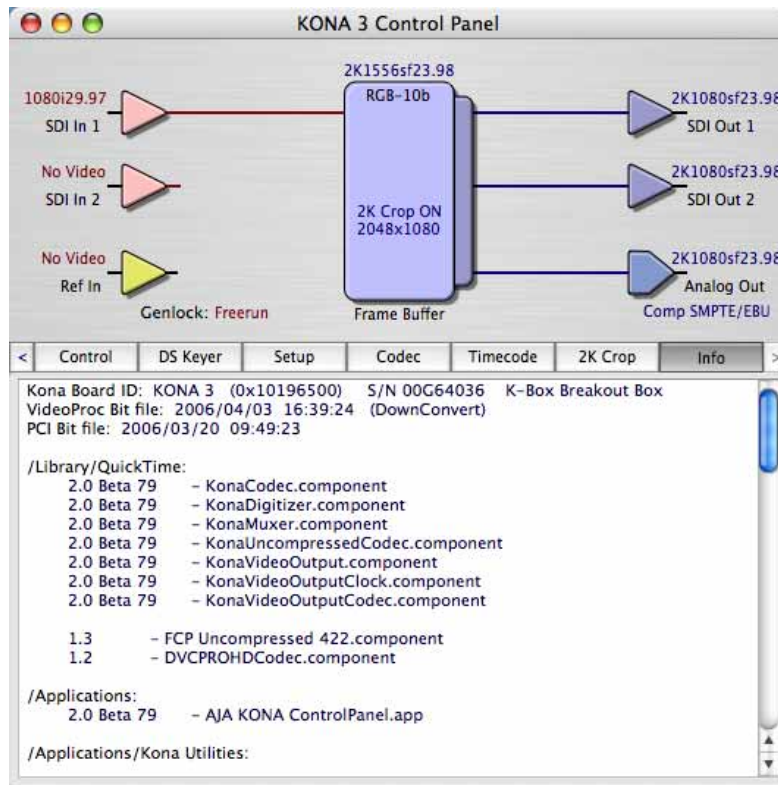


KONA 3 Control Panel, 2K Crop Tab, Selecting Crop Mode

Important Note about 2K: Operational procedures and information for working with 2K workflows are presented in Appendix C at the back of this manual. 2K workflows are unique and require the use of KONA’s VTR Xchange software and Final Cut Pro, in conjunction with the 2K Crop features discussed above in the KONA Control Panel.

Info Screen

This Tabbed screen shows the KONA 3 software files that have been installed on your system. This information may be needed if you talk to an AJA Customer Service representative to determine if files are missing or need updating.



KONA 3 Control Panel, Info Tab

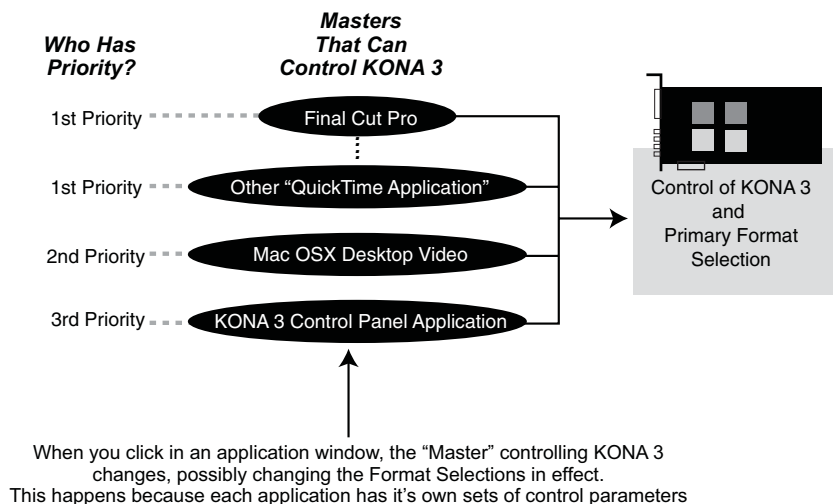
Saving Your Control Panel Presets

After configuring the KONA 3 Control Panel via the Tabbed screens, you can then save all your settings as a snapshot for later recall—called a preset. In this way, you can organize the presets for all your typical tasks, saving time by not having to manually reconfigure each time. To save a preset, simply go to “File -> Save Preset...”. Be sure to give the preset a meaningful name. Thereafter the preset will be available under the Control Panel “Presets” menu.

Who is Controlling KONA 3?

If you are consistent in the workflows and formats you use between applications, you generally won't be surprised by how your system operates. KONA 3 is very flexible and most applications perform the necessary housekeeping so they work correctly when they're active and when they're not. However, since several applications using KONA 3 can be running at once, with one active, it can create confusion when settings are different in each and you switch back and forth. To prevent confusion, we recommend you run the KONA 3 Control Application and have it visible somewhere on your Macintosh desktop. It will tell you, even when it's not the “active” application, who has control of KONA 3 and what the current format selections are.

For further understanding, read on and we'll give you some further background on KONA 3 control. The main issue you'll generally want to know, is what application *has control of KONA 3's Primary Format at the current moment*.



TIP: If you keep the KONA 3 Control Panel window in view, it displays the application that is in control and what the Primary and Secondary Format Selections are at all times.

KONA 3 Control Priorities

The KONA Control Panel is one of three masters contending for control—and it's the lowest priority of the three. The other two masters are: any currently running QuickTime application (e.g. Final Cut Pro, KONA TV, Apple Motion, After Effects, etc.) using the board and the Mac "Desktop" display. The priority of these three "masters" is:

1. QuickTime Application
2. Macintosh Desktop
3. KONA 3 Control Panel

By "*Master*", we mean a process that can control and change what the KONA 3 is doing and the Primary and Secondary formats that it uses (as set in the Control Panel "Formats" tab screen).

QuickTime Application—1st Priority

If a running QuickTime application uses KONA 3 for capture or output, it controls the Primary format via its own menus and settings. For example, when Final Cut Pro is active (it's the topmost application) and has KONA 3 as its "A/V Device", then the KONA 3'S Primary format is determined by Final Cut's "Video Playback" submenu (under the "View" menu) or in its "Audio/Video Settings..." dialog under A/V Devices.

When a QuickTime application is in control of the KONA 3 board—versus one of the other masters—it will be indicated by a label in both the KONA Control Panel's *Formats* and *Control* tabs. The KONA 3 Control Panel's *Primary Format* menu will also indicate that it is not active while the QuickTime application is running—it will be grayed-out.

What can be confusing is that QuickTime applications can start and stop and change modes—even while they are running! And the behavior of different QuickTime applications can vary: some applications take control of the board as soon as they are launched and don't give it up until they quit, while other applications take control of the board only when they are the “front-most” running application and then relinquish control when they're not. Final Cut Pro is one of the latter type QuickTime applications. This difference in behavior can surprise you when you click in and out of multiple QuickTime application windows.

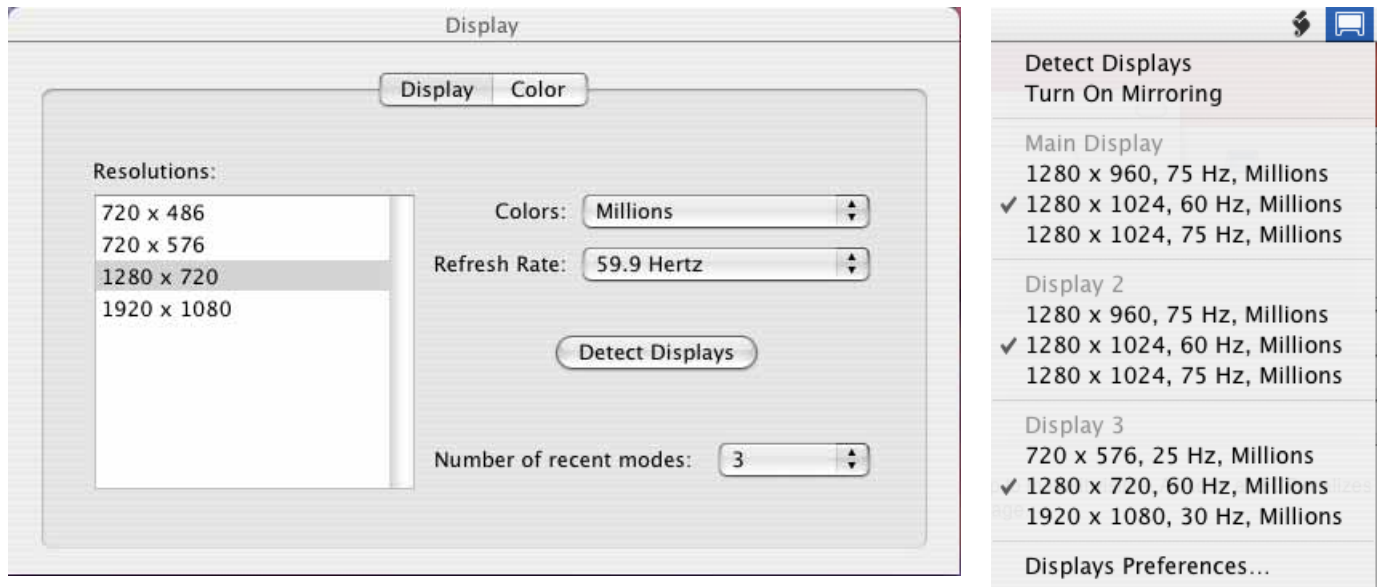
To illustrate such possible confusion, consider this multiple application scenario:

1. Open Final Cut Pro, select KONA 3 as the A/V device. FCP takes control of the board and tells it what Primary format to use. If one of the FCP windows covers up the KONA Control Panel application (which typically happens), you won't be able to see the *“Kona card is in use by Final Cut Pro”* message displayed in the Control Panel, or be able to tell which format FCP has selected. (This is why we recommend you arrange your display so you can see the Control Panel at all times.)
2. Next, you want to see what the KONA card is doing, so you find the KONA Control Panel application by clicking around on the desktop, eventually clicking on the Control Panel to make it visible. As soon as FCP realizes it is now running in the background, it gives up control of the KONA 3 board. The KONA Control Panel application takes away the *“...Final Cut Pro”* message.
3. With the Control Panel the topmost application—and in control of the board—you now switch to a different Primary format.
4. However, when you click back on Final Cut Pro and bring it back to continue your project, it becomes the master again and resets the board's Primary format to the one determined by Final Cut's A/V Settings dialog. To further the surprise, if FCP's windows are covering the KONA Control Panel window, the change will be hidden and you won't know why the board isn't doing what you told it earlier via the Control Panel.

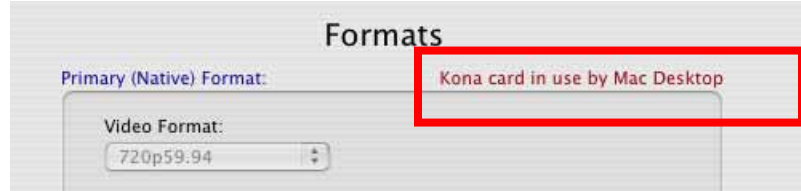
The moral of the story: keep the Control Panel visible so you can learn what various QuickTime applications are doing when they control KONA 3—and then you can step in and change the application's settings and Control Panel settings as desired to get the configuration you expect.

Mac Desktop Video—2nd Priority

If you choose “Macintosh Desktop” as your KONA Default Video Output (in the Control Tab), then the Mac Finder uses the KONA 3 board as a second (or third, or fourth...) graphics “desktop” output—*as long as there isn't a QuickTime application running*. When the Finder is in control, the Primary Format is dictated by the System Preferences “Displays” panel or by you selecting “Show Displays in the menu bar”, from the Displays menu near the right-hand side of the main menu bar).



When the Finder is in control of the KONA board, the KONA Control Panel disables the Primary Format popup and puts a message in the KONA Control Panel “Formats” tab as follows:



KONA Control Panel—3rd Priority

If a QuickTime application *is not running* and the *Default Video Output* is not set to *Mac Desktop*, then the KONA 3 Control Panel gets control of the board.

Control Recommendations

To avoid surprises, run the KONA 3 Control Panel, keep it visible on the desktop—and stay consistent in your settings within the various QuickTime applications while working on a project. For example, if you’re working in a particular format (e.g. 525i29.97), it would make sense to set Final Cut Pro for 525i29.97, the Mac Desktop size to 720x486, and the KONA Control Panel for 525i29.97. Then, when you switch between applications, the output will stay in the same format. Having the Control Panel running and visible helps because you can always check and see what the board is doing and who has control of it—even when the Control Panel is running in the background.

Easy Setups for Typical Uses

Final Cut and KONA 3 together make working with multiple formats an easy proposition. Inside of Final Cut, equipment and setting presets are available in groups called Easy Setups, from which you can choose typical system configurations. A large set of Easy Setups are supplied with KONA 3 and installed along with the KONA 3 software. These canned choices can be used directly or as the basis for making your own customized Easy Setups unique to your system. By duplicating an Easy Setup and then making changes to it, you simplify the process of configuring and re-configuring when working with new formats.

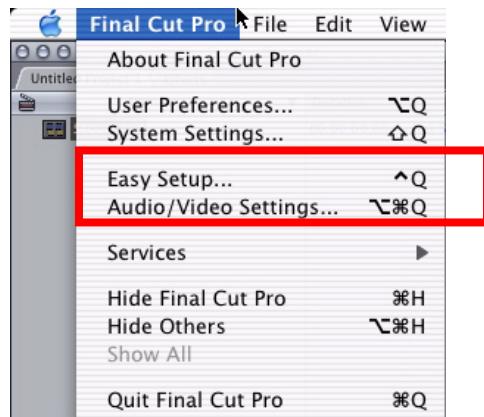
Although this manual assumes you're familiar with Final Cut Pro and have read its documentation, let's review Easy Setups and how to use them effectively with KONA 3.

At the simplest level, Final Cut lets you choose and edit presets for capturing media, device control, and for project sequences. These presets are defined in the *Audio/Video Settings* menu. Just like Easy Setups, here also there are factory defined choices, plus you can create and make your own. When you have a set of presets you want to use again, you can store them as an "Easy Setup."

On the following pages we'll further review the *Easy Setups* menu and *Audio/Video Settings* Menu.

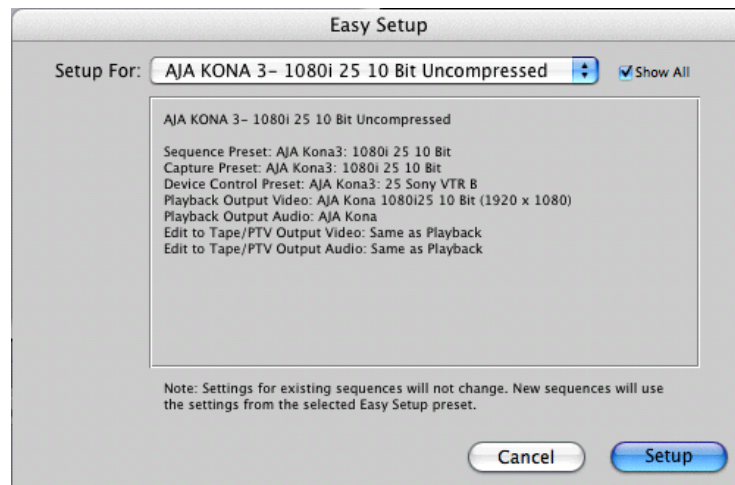
Easy Setups Menu

Both the Easy Setups menu item and the Audio/Video Settings menu item are located under the main *Final Cut Pro* menu.



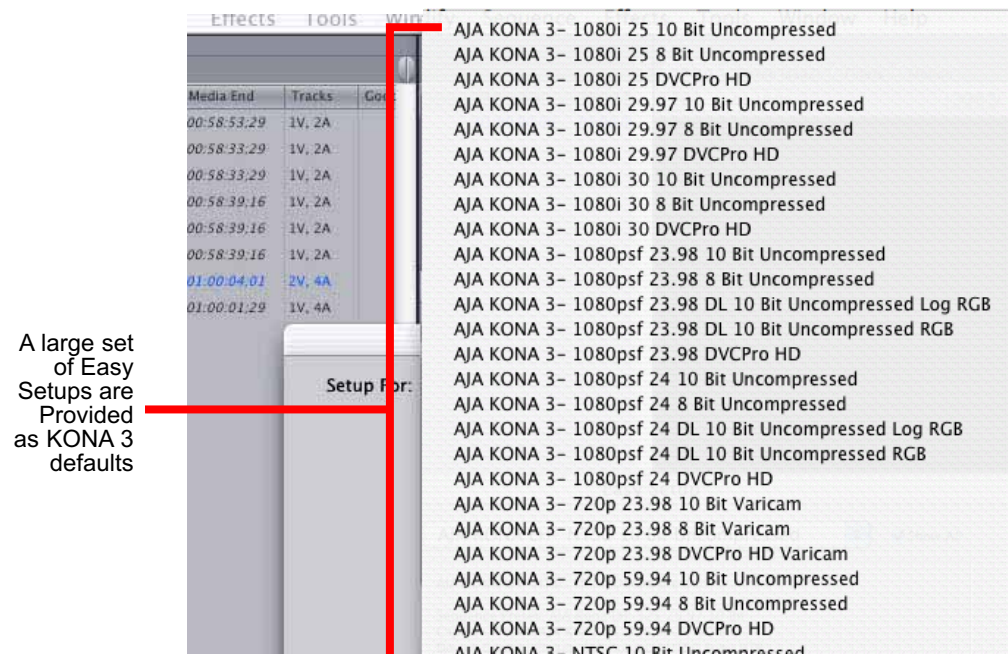
Easy Setup and Audio/Video Menu Items

Click on the Easy Setups menu item and Final Cut Pro will present the Easy Setup dialog window:



Easy Setup Dialog

At the top of the Easy Setup dialog is the currently selected Easy Setup. It can be changed by clicking on the pulldown arrow at the right. Doing so results in a long list of the factory Easy Setups stored on the system. If you wish to see all of the Easy Setups, factory and user-defined, then ensure the “Show All” checkbox is marked at the right side of the dialog. By default, all AJA Easy Setups will be checked.



Factory Easy Setups

To choose a new Easy Setup from the list, click on the pulldown menu and select a desired choice. The choice won't take effect until you click the *Setup* button, but you will be able to see the description for the choice just by selecting it (without clicking

the *Setup* button). Descriptions provide a paragraph summarizing what the Easy Setup is intended for and then each of the presets are explained (Sequence, Capture, Device, Playback Output, and Edit to Tape Video/Audio Outputs).

Easy Setups For Use With KONA 3

The factory default Easy Setups currently shipped with KONA 3 are shown below. In addition to those shown in the listing, there are additional easy setups available on your KONA Software CD. Your list may differ as AJA is continually improving and adding functionality.

Easy Setup (as listed in FCP Pulldown)	Description/Usage
AJA KONA 3- PAL 8 bit uncompressed	Use this preset when working with 625 at a 25 framerate. Material will be processed as Uncompressed 8-bit.
AJA KONA 3- PAL 10 bit uncompressed	Use this preset when working with 625 at a 25 framerate. Material will be processed as Uncompressed 10-bit.
AJA KONA 3- PAL DV	Use this preset when working with 625 at a 25 framerate. Material will be processed as DV.
AJA KONA 3- PAL DVCPRO	Use this preset when working with 625 at a 25 framerate. Material will be processed as DVCPRO.
AJA KONA 3- PAL DVCPRO50	Use this preset when working with 625 at a 29.97 framerate. Material will be processed as DVCPRO50.
AJA KONA 3- NTSC 8 bit uncompressed	Use this preset when working with 525 at a 29.97 framerate. Material will be processed as Uncompressed 8-bit.
AJA KONA 3- NTSC 10 bit uncompressed	Use this preset when working with 525 at a 29.97 framerate. Material will be processed as Uncompressed 10-bit.
AJA KONA 3- NTSC 8 Bit to DV	Use this preset when working with 525 at a 29.97 framerate. Material will be processed as DV.
AJA KONA 3- NTSC 8 Bit to DVCPRO50	Use this preset when working with 525 at a 29.97 framerate. Material will be processed as DVCPRO50..
AJA KONA 3- NTSC 23.98 8 Bit uncompressed	Use this preset when working with 525 at a 23.98 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- NTSC 23.98 10 Bit uncompressed	Use this preset when working with 525 at a 23.98 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 720p 23.98 8 bit Varicam	Use this preset when working with high-definition Varicam 720p at a 23.98 framerate. Material will be processed as 8 bit uncompressed Varicam.
AJA KONA 3- 720p 23.98 10 bit Varicam	Use this preset when working with high-definition Varicam 720p at a 23.98 framerate. Material will be processed as 10 bit uncompressed Varicam
AJA KONA 3- 720p 23.98 DVCPRO HD Varicam	Use this preset when working with high-definition Varicam 720p at a 23.98 framerate. Material will be processed as DVCPRO HD Varicam.
AJA KONA 3- 720p 59.94 DVCPRO HD	Use this preset when working with high-definition 720p at a 59.94 framerate. Material will be processed as DVCPRO HD.
AJA KONA 3- 720p 59.94 8 bit uncompressed	Use this preset when working with high-definition 720p at a 59.94 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 720p 59.94 10 bit uncompressed	Use this preset when working with high-definition 720p at a 59.94 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080i 25 8 bit uncompressed	Use this preset when working with high-definition 1080i at a 25 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 1080i 25 10 bit uncompressed	Use this preset when working with high-definition 1080i at a 25 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080i 25 DVCPRO HD	Use this preset when working with high-definition 1080i at a 25 framerate. Material will be processed as DVCPRO HD.
AJA KONA 3- 1080i 29.97 8 bit uncompressed	Use this preset when working with high-definition 1080i at a 29.97 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 1080i 29.97 10 bit uncompressed	Use this preset when working with high-definition 1080i at a 29.97 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080i 29.97 DVCPRO HD	Use this preset when working with high-definition 1080i at a 29.97 framerate. Material will be processed as DVCPRO HD.

Easy Setup (as listed in FCP Pulldown)	Description/Usage
AJA KONA 3- 1080i 30 8 bit uncompressed	Use this preset when working with high-definition 1080i at a 30 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 1080i 30 10 bit uncompressed	Use this preset when working with high-definition 1080i at a 30 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080i 30 DVCPRO HD	Use this preset when working with high-definition 1080i at a 30 framerate. Material will be processed as DVCPRO HD.
AJA KONA 3- 1080psf 23.98 8 bit uncompressed	Use this preset when working with high-definition 1080psf at a 23.98 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 1080psf 23.98 10 bit uncompressed	Use this preset when working with high-definition 1080psf at a 23.98 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080psf 23.98 DVCPRO HD	Use this preset when working with high-definition 1080psf at a 23.98 framerate. Material will be processed as DVCPRO HD.
AJA KONA 3- 1080psf 23.98 DL 10 Bit Uncompressed Log RGB	Use this preset when working with high-definition dual link input (both SDI inputs being fed a dual link source) at 1080psf with a 23.98 framerate. Material will be processed as 10-bit uncompressed 4:4:4 log RGB.
AJA KONA 3- 1080psf 23.98 DL 10 Bit Uncompressed RGB	Use this preset when working with high-definition dual link input at 1080psf with a 23.98 framerate. Material will be processed as 10-bit uncompressed 4:4:4 RGB.
AJA KONA 3- 1080psf 24 8 bit uncompressed	Use this preset when working with high-definition 1080psf at a 24 framerate. Material will be processed as 8 bit uncompressed.
AJA KONA 3- 1080psf 24 10 bit uncompressed	Use this preset when working with high-definition 1080psf at a 24 framerate. Material will be processed as 10 bit uncompressed.
AJA KONA 3- 1080psf 24 DVCPRO HD	Use this preset when working with high-definition 1080psf at a 24 framerate. Material will be processed as DVCPRO HD.
AJA KONA 3- 1080psf 24 DL 10 Bit Uncompressed Log RGB	Use this preset when working with high-definition dual link input (both SDI inputs being fed a dual link source) at 1080psf with a 24 framerate. Material will be processed as 10-bit uncompressed 4:4:4 log RGB.
AJA KONA 3- 1080psf 24 DL 10 Bit Uncompressed RGB	Use this preset when working with high-definition dual link input at 1080psf with a 24 framerate. Material will be processed as 10-bit uncompressed 4:4:4 RGB.
AJA KONA 3- 2K x 1556 psf 23.98 10 Bit Uncompressed Log RGB	Use this preset when working with high-definition 2K frame Log RGB input via HSDL. Material will be processed as 10-bit uncompressed.
AJA KONA 3- 2K x 1556 psf 23.98 10 Bit Uncompressed RGB	Use this preset when working with high-definition 2K frame RGB input via HSDL. Material will be processed as 10-bit uncompressed.

Audio/Video Settings Menu

The Audio/Video Settings menu in Final Cut Pro contains a series of tabbed windows where you define the presets in specific categories such as A/V devices or in what format media is captured. When you open the Audio/Video Settings window, it shows a summary of the currently selected Easy Setup. Other tabbed windows are available with greater details about each category. On the initial summary window you can see the selected presets for the Easy Setup as well as change specific presets.

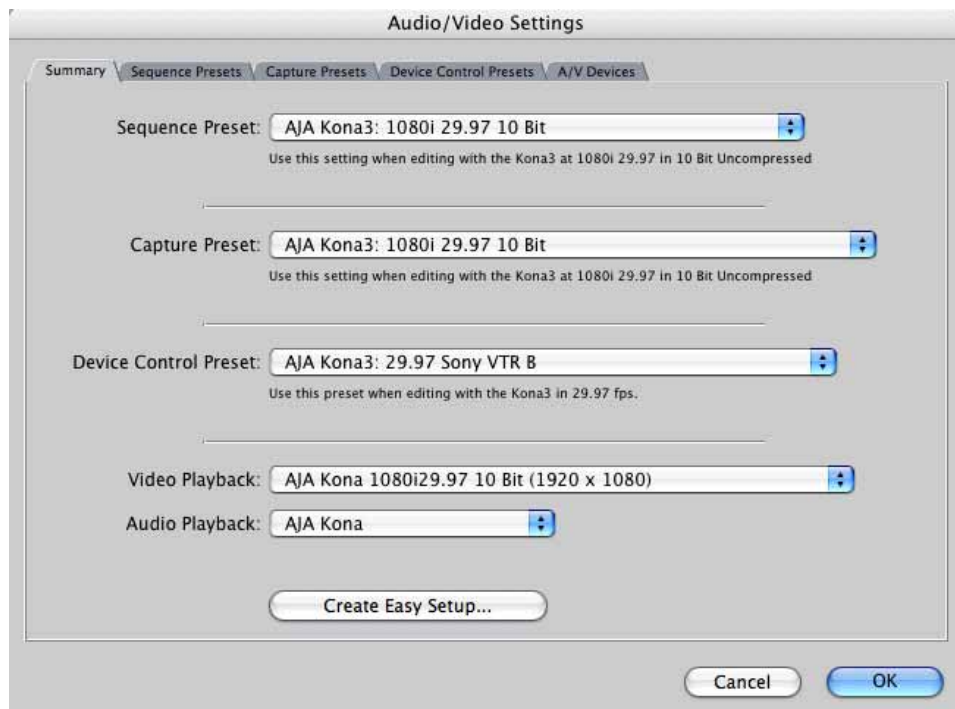
The presets you can change on the Summary window are:

Sequence Preset—select one of these as the editing timebase for new sequences. If you make a change to Sequence Presets, the change will only take effect on any new sequences you create—currently active sequences will not see the change.

Capture Preset—select one of these to set the incoming source format you'll be capturing. Ideally select the maximum quality format you'll be using for most of the material so there will be no need to re-render later as clips are added from the bin to the sequence.

Device Control Preset—select the AJA Video KONA 3 device (NTSC or PAL as desired). This tells Final Cut that the KONA 3 will control the VTR attached to KONA 3.

A/V Devices (Audio and Video Playback)—select the KONA 3 as video and audio playback devices for Final Cut and the format to be output.

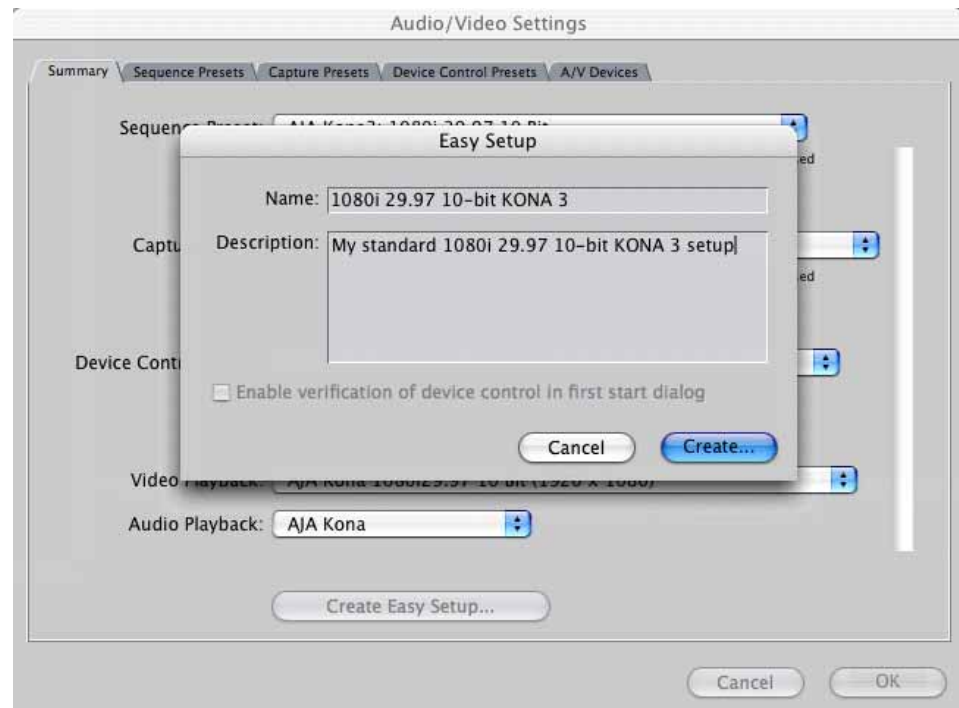


Audio/Video Settings, Summary Window

To Create A New Easy Setup

If you have a group of presets that you'd like to use continually, then you can create a new Easy Setup by modifying the settings of Easy Setup currently selected (pick one most like the one you want to create) and then saving it under a new name:

1. Change the currently selected Easy Setup by making changes at the Summary tabbed window via the pulldown menus.
2. When everything is set as desired, click on the *Create Easy Setup* button at the bottom of the Summary window.
3. A new dialog will pop up. Enter a descriptive name for the new Easy Setup (i.e., 10-bit SDI from Video Server) in the *Name* field.
4. Enter a sentence or two describing what is unique about the Easy Setup in the *Description* field.
5. Click the *Create* button to store the new Easy Setup.

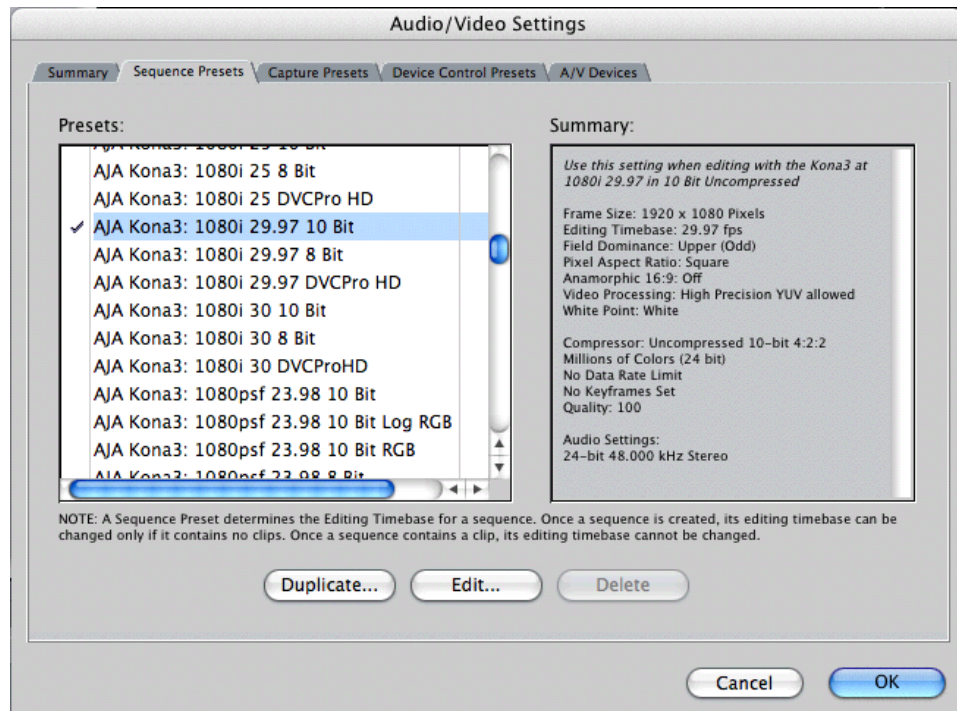


Audio/Video Settings, Creating a New Easy Setup

At any point in the above procedure you can go to the other tabbed windows and make additional changes. For example, in the Sequence Presets, Capture Presets, and Device Control Presets windows you can select a preset and click on an *Edit* button to change specific aspects of the preset. As an example, under *Device Control Preset* you might wish to change the Time Source on your VTR from LTC to VITC, or change the pre-roll and post-roll values. When you save a Setup, it defaults to saving in the Final Cut Pro *Custom Setups* folder.

Each of the tabbed preset screens are described on the following pages for your convenience. For more information, please read the Final Cut Pro user documentation.

The Sequence Presets Window



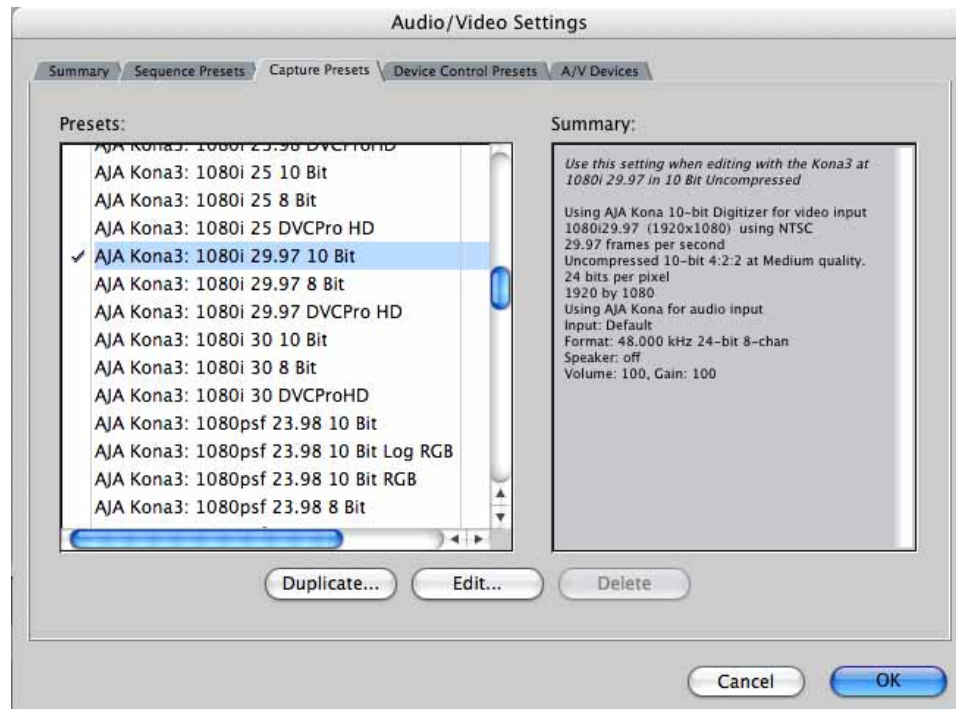
Audio/Video Settings, Sequence Presets Window

This window allows you to select an editing timebase for the current sequence. Once you add a clip to the sequence this cannot be changed. For example, once you've selected uncompressed 10-bit NTSC 48 kHz, you then have to stay in that timebase and can't switch to another. By clicking in the leftmost column (see the checkmark in the sample screen above), you select a new Sequence Preset for use. The checkmark tells which Preset is in use—highlighting a choice alone does not select it.

If you select an editing timebase you can then edit it (click the Edit button) or copy and rename it as another (click Duplicate). When editing a timebase you can change the following:

- Select video processing properties (how to render)
- Frame size and aspect ratio
- Pixel aspect ratio
- Field dominance (none, upper, or lower)
- Editing timebase
- Set QuickTime video codec settings (quality and type)
- Select audio sample rate

The Capture Presets Window



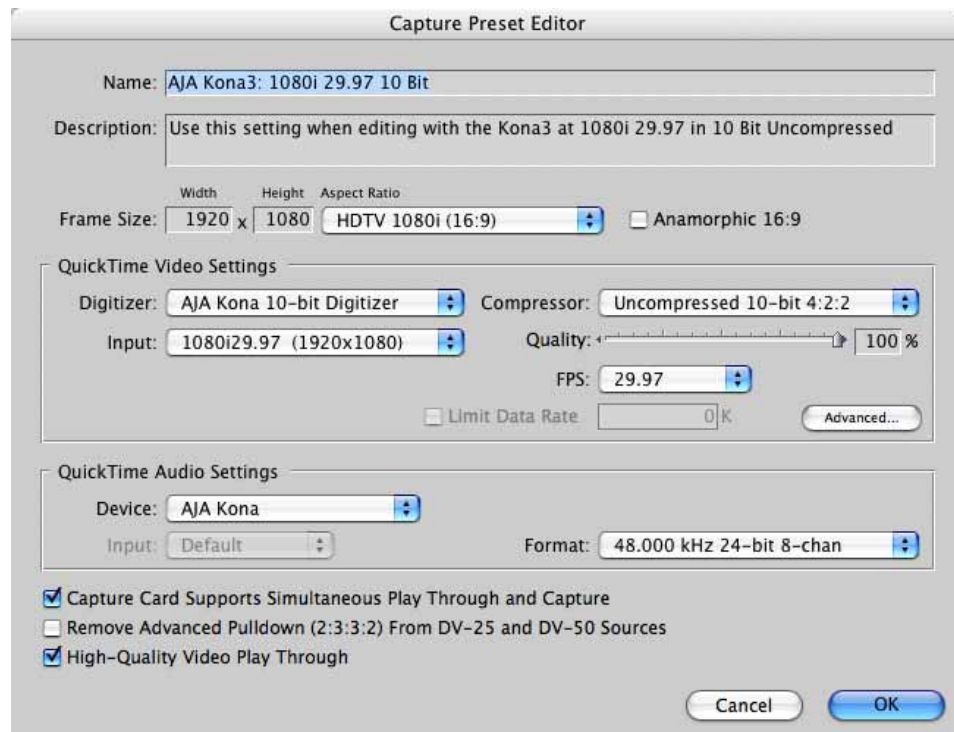
Audio/Video Settings, Capture Presets Window

This window lets you choose a preset format for incoming source video and audio media you'll be capturing. Select the maximum quality format you'll be using for most of the material so there will be no need to re-render later. The information on the right window pane describes the preset and all its parameters. If you select a format by making a checkmark in the left column, you can edit it (click the Edit button) or copy and rename it as another (click Duplicate). The only exceptions to this are those presets marked with a lock icon; those can be duplicated, but when you try to edit one the system reports they're locked and can only be copied (it will create the copy for you when you try to edit).

Factory AJA presets are easily identified by "AJA" at the beginning of their name.

Since Capture Presets will be used frequently as you bring media into KONA 3, we'll discuss the edit screen next.

Capture Presets Editing



Audio/Video Settings, Capture Presets Editing Window

Note: Whenever a Preset is being copied as the basis of a new preset, always change the name and description to fit the new preset so users aren't confused between it and the original.

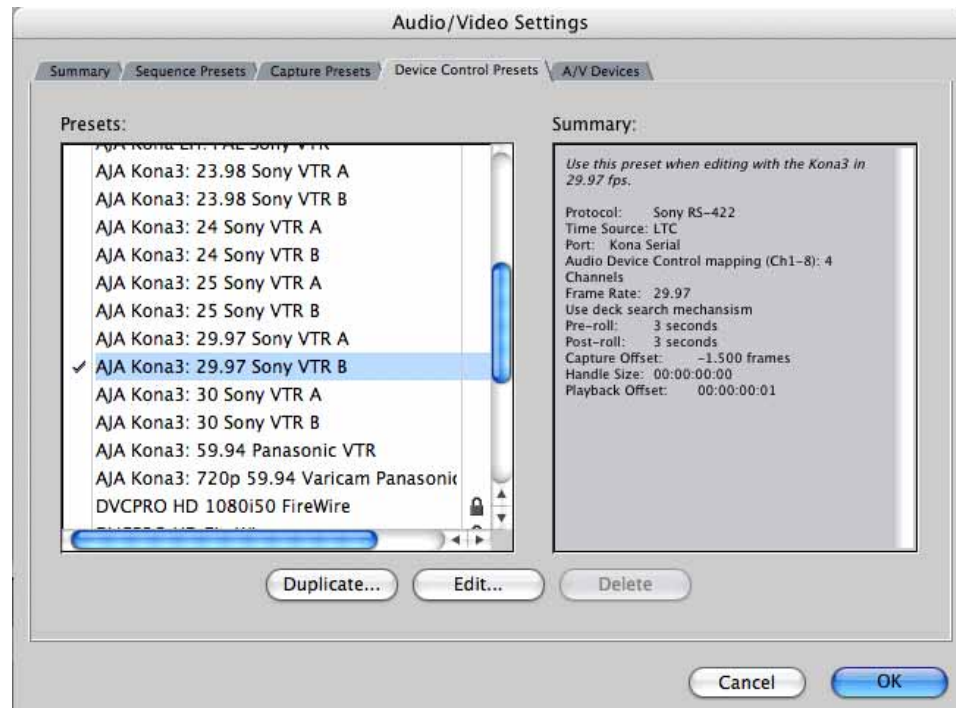
Frame Size—below the name and description are the frame size settings. These can be changed via the pulldown menu. Selecting a new *Aspect Ratio* value also changes the values in the width and height fields.

QuickTime Video Settings—these settings select a video input source and affect how it's processed by Final Cut Pro. The *Digitizer* pull-down menu selects whether you want the selected input source to be digitized as 8-bit or 10-bit uncompressed video as it comes into KONA 3. The *Input* pull-down selects the primary format KONA 3 will use to capture input video. The *Compressor* pull-down selects a codec that tells Final Cut how to process the video; the codec selected should be chosen for compatibility with the Digitizer setting selected. For example, if your Digitizer setting is 10-bit Uncompressed, then the Compressor setting should be one of the 10-bit choices available. The *Quality* slider should be set to 100 percent when capturing uncompressed; for other formats use an appropriate quality level. Set the *FPS* (Frames Per Second) setting to the correct frame rate. The *Advanced* settings button opens a new screen providing choices of codec-specific options. For uncompressed codecs these probably are not unneeded; for other codecs choose the options desired.

QuickTime Audio Settings—these settings select an audio input source and affect how it's processed by Final Cut Pro. The *Device* pull-down should be set to KONA 3. The *Input* pull-down selects that KONA 3 will be used for capturing audio—it does not select the specific inputs. For specific audio input selection use

the KONA 3 Control Panel. The *Rate* pull-down selects a sample rate; it should always be set to 48 kHz for KONA 3. By clicking on the *Advanced* button, a new screen will be displayed where you can select between 8- and 16-bit sampling—AJA recommends 16-bit for optimum sound quality. (This has nothing to do with input format, as KONA 3 supports 24-bit embedded HD audio, 20-bit SD embedded audio, and 24-bit AES audio.)

The Device Control Presets Window



Audio/Video Settings, Device Control Presets Window

This window selects machine control parameters for an attached VTR. Your choice here tells Final Cut that KONA 3 is handling the machine control parameters for the VTR attached to KONA 3. Alternatively, you could also select a different device for input/output instead of KONA 3; for example, if you have a IEEE 1394 camcorder attached to the Power Mac's FireWire port you might choose "FireWire NTSC." The information on the right window pane describes the current machine control settings and parameters for the VTR attached. For KONA 3 presets this means the VTR attached at the RS422 port on KONA 3. For non-KONA 3 presets, this means camcorder/VTRs attached directly at the FireWire port or via some other interface.

If you select a preset you can edit it (click the Edit button) or copy and rename it as another (click Duplicate). The only exceptions to this are those presets marked with a lock icon; those can be duplicated, but when you try to edit one the system reports they're locked and can only be copied (it will create the copy for you when you try to edit).

When editing a Device Control preset you can change the following:

- Name and description of Device Control preset
- Protocol for capture/playback VTR (for KONA 3 this will be RS422)
- Audio Mapping
- Time Source (LTC/VITC/both/etc.)
- Port
- Frame Rate
- Default Timecode (Drop Frame etc.)
- Capture/Playback Offsets (to correct for VTR versus Final Cut timing issues)
- Handles/Pre-roll/Post-roll
- Auto Record and PTV

KONA 3 ships with VTR Device Control Presets for Sony and Panasonic VTRs. Select a Device Control Preset for the desired frame rate. Presets for both Sony and Panasonic VTRs are provided with these frame rates: 23.98, 24, 25, 29.97, and 59.94.

The A/V Devices Window



Audio/Video Settings, A/V Devices Window

The A/V Devices window selects the current playback device for both audio and video. Typically, you'll select KONA 3 for both playback devices. The format chosen determines the Primary format for the KONA 3 board during playback..

The Video *Options* button is greyed out for KONA 3 (use the KONA 3 Control Panel for video configuration; the Audio *Options* button opens a second dialog where Final Cut gives options for changing bit depth, number of channels, and the sample rate.

Since Final Cut currently only supports 2 channels of audio, AJA recommends you leave all of these settings as set in the factory defaults.

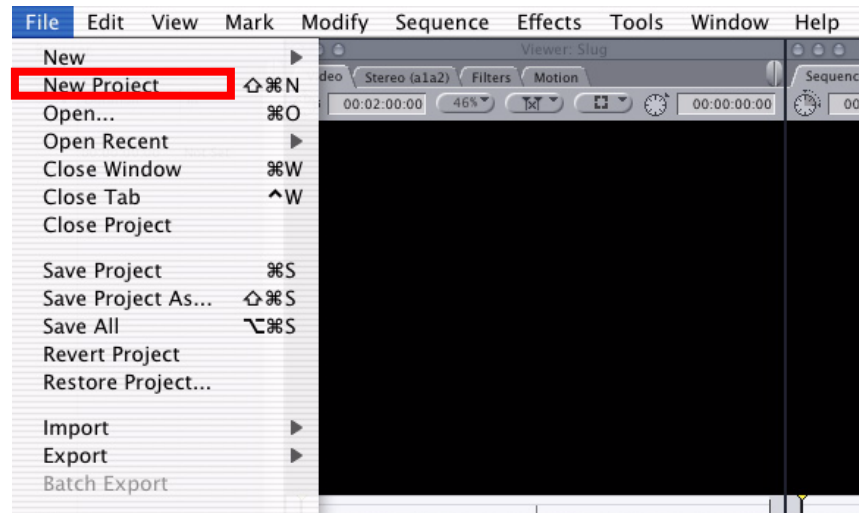
You may wish to use a different KONA 3 output for final Print-to-tape from Final Cut. You can select that in this window by clicking the checkbox “Different Output for Edit to Tape/Print to Video.” This allows you to select via a pull-down menu any KONA 3 video output and audio output.

The window also allows you to turn on and off device and audio output warnings.

Checking the System with a Simple Test Project of Bars and Tone

To test that you’ve installed the KONA 3 drivers and have audio and video monitoring correctly configured, try creating a simple Final Cut Pro project with bars and tone.

1. Select an Easy Setup as previously discussed (go to the Final Cut Pro menu and select *Easy Setup*, then select a desired preset).
2. Select *New Project* from the File menu.



Create a New Project

3. The Sequence window will be at the bottom of the screen and a Browser window will be at the top left. Look at the Browser window and locate the “Effects” tab at the top right. Click on it.
4. Locate the Viewer window in Final Cut and click on the Filmstrip pulldown menu button (it’s a “filmstrip” icon with an “A” on it). Select “Bars and Tone NTSC” or “Bars and Tone PAL”. The viewer window will display bars after you do this.
5. Click the mouse cursor on the Bars and Tone in the Viewer window and drag it to the beginning of the sequence window. You’ll see the bars and tone show up on the sequence where it can then be played.

6. Go to the beginning of the sequence by clicking on the left-most icon and then click the “Play” icon. You should see and hear the bars and tone on your video monitor and audio monitoring system.

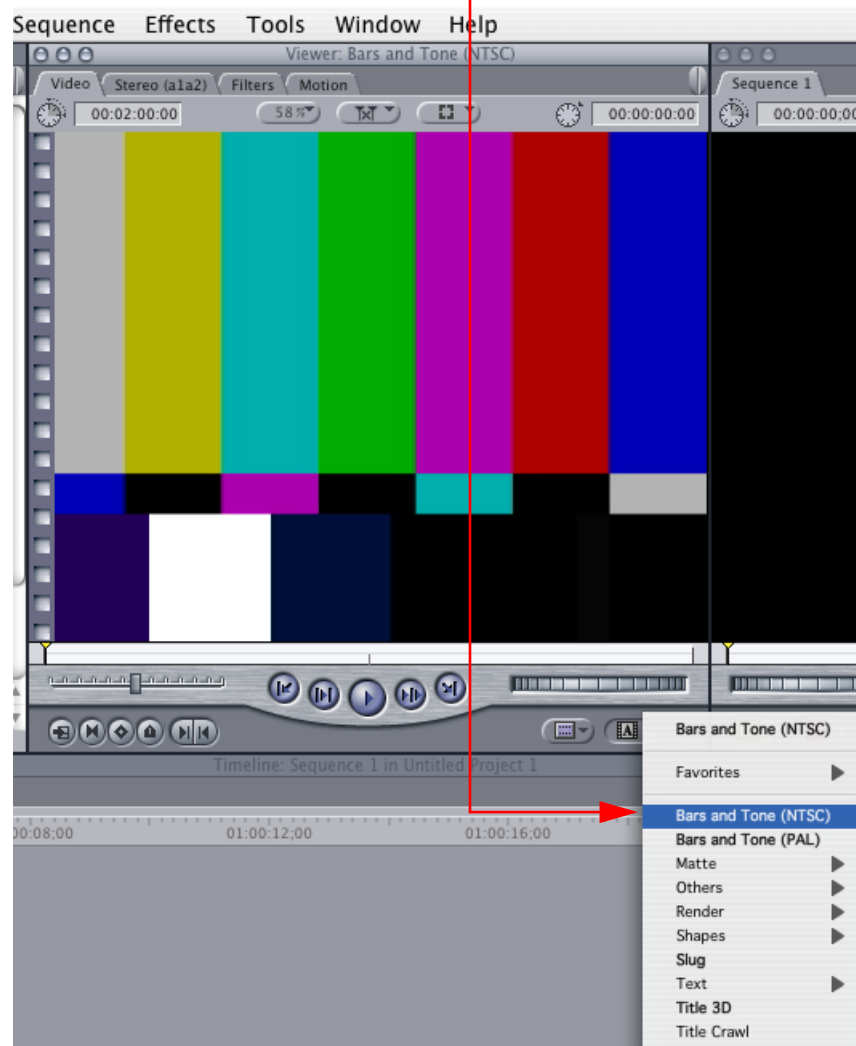
If you don't see bars on the external video monitor and hear tone, check your connections and ensure KONA 3 is selected in the Easy Setups and Audio/Video Settings as necessary.



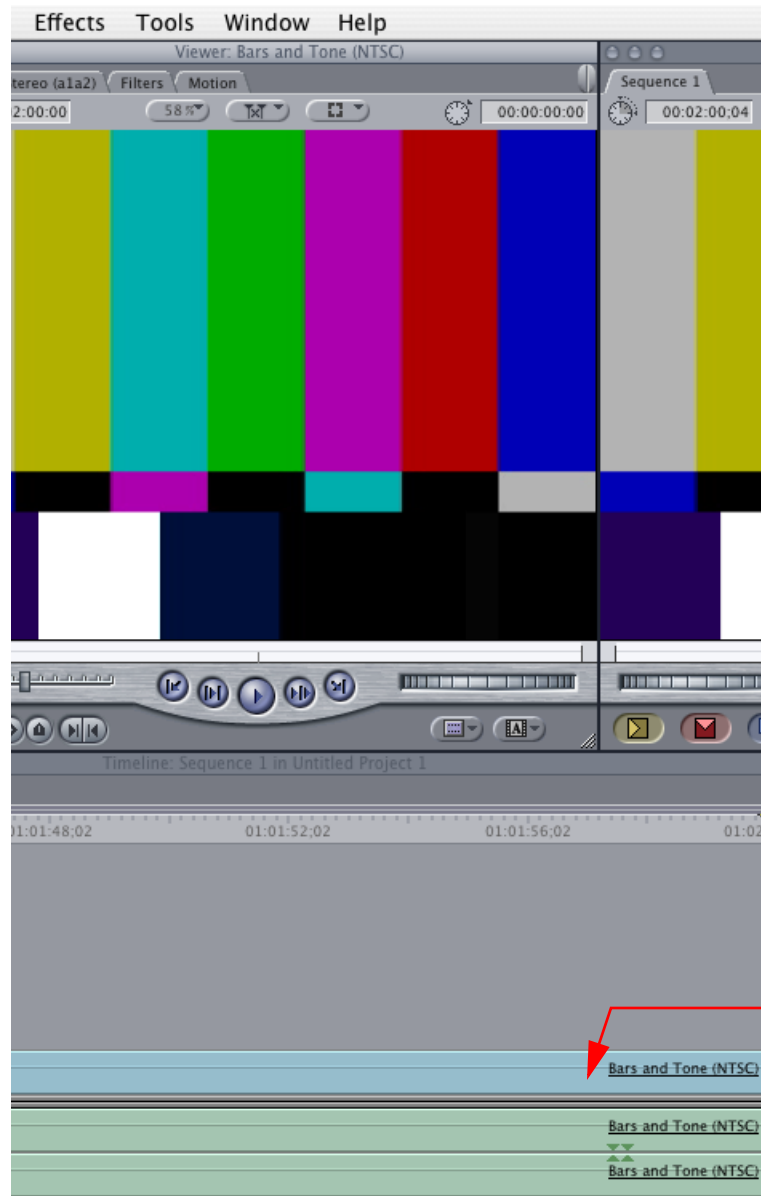
Click Filmstrip Button in Viewer Window

...Then select “Bars and Tone”

Finally, click in the viewer window and drag the “bars” to the Sequence window.



Click and Drag Bars and Tone From Viewer Window to Sequence



Bars and Tone
In Sequence
Window

Click "Play" to
Test the
System

Sequence Window Showing Bars and Tone Clip Dragged from Viewer

If everything works properly, go ahead and try capturing audio and video media from your VTR.

Using 8-bit Versus 10-bit Video

While both 8- and 10-bit uncompressed video are capable of providing excellent quality broadcast video, 10-bit represents a significantly higher quality and is preferable in many situations.

Because 10-bit video has four times the numerical precision when compared to 8-bit, it has a signal-to-noise ratio 12 db higher than 8-bit video.

Visually, in 8-bit video compared to 10-bit video, you will notice a substantial difference. In 8-bit video there will be “contour lines” or “striations” visible, particularly noticeable in scenes having soft gradients like a ramp or sunset. For example, if a sky region is mostly the same color but varies by only a few digital numbers from one side of the picture to another, you may see contour lines where the signal passes from one digital value to the next higher value.

Since each numerical value in a 10-bit system is only one fourth as large as an 8-bit system's, these contours become invisible and the sky varies smoothly.

10-bit video is often used when the source and output video (or “master”) is also 10-bit. Even if the input and/or output video is 8-bit, a 10-bit “project” will still maintain a higher quality when there is a significant amount of effects rendering involved.

Industry standard professional mastering formats—Sony Digital Betacam for Standard Definition and Panasonic D5 for High Definition—are both true 10-bit formats.



Chapter 5:

Troubleshooting

If You Run Into Problems

One useful way to find the source of problems is to isolate your system to the smallest size where the problem still occurs and then note all the symptoms. This serves to eliminate areas not involved in the problem and make finding the problem easier.

Once you've noted problem symptoms, look through the following table and see if any of the symptoms are listed. If so, check the items listed. If you later need to call for customer service, let them know all of the things you've tried and when and how the symptoms appeared.

Table 5-1. Problem Solving by Matching Symptoms to Remedies

Symptom	Check
Disk RAID cannot keep up (dropped frames etc.).	Ensure the disk system is providing at least 50 MB/second sustained transfer rate
Dropped frames during playback.	<ol style="list-style-type: none">1. Canvas/Viewer zoom setting exceeds the fit-to-window setting. Change to "Fit-to-Window."2. RAID cannot sustain the data rate of the clip/sequence.3. The sequence setting does not match the "playback output setting" found at FCP Audio/Video Settings -> AV Output.4. Virus checking software running in the background (disable it).5. Scratch drive not set to the RAID.
Dropped frames during record.	<ol style="list-style-type: none">1. RAID cannot sustain the data rate of the capture preset codec.2. Virus checking software running in the background (disable it).3. Scratch drive not set to the RAID.
Media is not being captured from desired external device.	Check the settings in the <i>Input</i> tab of the KONA 3 Control Panel application. Also check equipment cables.

Table 5-1. Problem Solving by Matching Symptoms to Remedies

Symptom	Check
Dropped frames during playback	Look for scroll bars in the viewer or canvas as a warning sign that the zoom setting exceeds the fit-to-window.
Changes made to Final Cut's configuration aren't remembered or you need to force a change to them.	<p>Under some circumstances, Final Cut Pro may need to be initialized back to the factory default state as it was when you installed it. The easiest way to do this is to locate Final Cut's preference file and discard it.</p> <p>To do so, follow this procedure:</p> <ol style="list-style-type: none"> 1. Locate the file named "Final Cut Pro Preferences". <i>Note: path to file is "Macintosh HD/users/username/library/preferences/final cut user data."</i> 3. Click and drag that file to the Trash Can icon and drop it there. <p>When you next start up Final Cut Pro, it will present the "Choose Setup" prompt (as in initial installation) where you can again choose a desired KONA 3 input format in the "Setup For" pulldown and re-enter a desired system scratch disk (your RAID).</p>
Video in the canvas stays frozen during playback.	<ol style="list-style-type: none"> 1. The sequence setting does not match the "playback output setting" found at FCP Audio Video Settings -> AV Output. 2. Canvas/Viewer zoom setting exceeds the fit-to-window setting. Change to "Fit-to-Window."
Video output is black.	<ol style="list-style-type: none"> 1. External video is set to "No Frames" (View -> External Video). 2. The "Playback output setting" found at FCP Audio Video Settings -> AV Output is set to "none" or to a non-KONA 3 device.
Video stutter during playback.	RAID cannot sustain data rate.
Red render bar occurs when placing a clip on a sequence.	The sequence setting does not match the clip setting.

Updating Software

Check on the AJA Video website (www.aja.com/html/support_kona3_swd.html) for software updates. If any are available, download the file and read any associated instructions prior to installing the software.

Support

When calling for support, first check over your system configuration and ensure everything is connected properly and that current Final Cut presets and Easy Setups match what you are trying to do. Even if you cannot find the cause of the problem, having this information at hand will help when you call Apple or AJA Customer Support for help.

If the problem is unknown or you need general help, first contact the dealer where you purchased the product. AJA dealers offer product support for many service requirements.

If the problem is a Final Cut Pro operational issue, Power Mac system issue, or Xserve RAID issue, then call Apple Customer Support for help.

If the problem is an AJA Video KONA 3 issue, then contact AJA Video Customer Support using one of the methods listed below:

Contacting by Mail Address:

443 Crown Point Circle, Grass Valley, CA. 95945 USA

Telephone: +1.800.251.4224 or +1.530.274.2048

Fax: +1.530.274.9442

Web: <http://www.aja.com>

Support Email: support@aja.com

Apple Resources

Apple provides a large amount of support information online at their support website. Information provided includes answers to top questions, discussions on specific topics, and software downloads for updates and utilities.

You may also enroll in AppleCare for extended support of hardware and software products. Information is provided on the Apple Support website on how to enroll in AppleCare.

General Apple Support Website for information on all products:

<http://www.info.apple.com/>

Power Mac Support Area: <http://www.apple.com/support/powermac/>

Xserve Support Area: <http://www.info.apple.com/usen/xserve/>

Xserve Discussion Area:

<http://discussions.info.apple.com/>

WebX?f50@176.UAD8aKWnmb.0@.3bb84b79

Final Cut Pro Web Support: <http://www.info.apple.com/usen/finalcutpro/>

Final Cut Discussion Area:

<http://www.apple.com/support/finalcutpro/>



Appendix A:

Specifications

Video Input

HD-SDI/SDI, SMPTE-259/292/296
Dual-link HD 4:4:4
Dual-rate
2K HSDL

Video Formats

525i 29.97
625i 25
720p 50
720p 59.94
720p 60
1080i 25
1080i 29.97
1080i 50
1080psf 23.98
1080psf 24
1080p50
1080p59.94
1080p60
2048 x 1080p 23.976
2048 x 1080psf 23.976
2048 x 1080p 24
2048 x 1080psf 24
2048 x 1556psf 14.98
2048 x 1556psf 15
2048 x 1556psf 23.98

Video Output

Digital:
SD-SDI, SMPTE, 259M, 10-bits, BNC
HD-SDI SMPTE, 292/296, 10-bits, BNC
Dual-link HD 4:4:4
Analog SD and HD Output, 12-bits, BNC:
HD: YPbPr, RGB
SD: YPbPr, RGB (component mode)
Composite/YC (composite mode)

Downstream Keyer: can output graphics with alpha channel over video, matte or framebuffer
or framebuffer content over video or matte

Audio

24-bit embedded HD audio
20-bit SD embedded audio
24-bit AES audio

A

Up-Conversion

Hardware 10-bit
Anamorphic: full-screen
Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars
Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black sidebars
Zoom Letterbox: results in image zoomed to fill full screen
Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down-Conversion

Hardware 10-bit
Anamorphic: full-screen
Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
Crop: image is cropped to fit new screen size

Cross-Conversion

Hardware 10-bit
1080i to 720p
720p to 1080i

Reference Input

Analog Color Black (1V) or Composite Sync (2 or 4V)
Non terminating, Looping, 75 ohm

Machine Control

RS-422, Sony 9-pin protocol. 9-pin D-connector pinout is as follows:

1	.....	GND
2	.....	RX-
3	.....	TX+
4	.....	GND
5	.....	No Connection
6	.....	GND
7	.....	RX+
8	.....	TX-
9	.....	GND
Shell	.....	GND

Appendix B:

Glossary

Reference Terms

3:2 Pull Down	3:2 pull down is a process where six frames are added to a film's original 24-frames-per-second format so that it can work within the 30 fps NTSC standard.
24P	A term for 24 full frames per second digital video progressively captured. It generally refers to the HD format of 1920x1080, although it is also used with 1280x720 images as well.
1080i	Refers to a picture resolution of 1920 vertical pixels by 1080 horizontal pixels. The "i" stands for interlaced scanning. Interlaced scanning is based on the principle that the screen shows every odd line at one scan of the screen and then all the even lines in a second scan.
1080p	Refers to a picture resolution of 1,920 vertical pixels by 1,080 horizontal pixels. The "p" stands for progressive scanning. This format works on the same principle as 720p; the only difference is that in this type there are more pixels and the resolution is better.
16:9	Refers to the aspect ratio of movie screen and widescreen DTV formats used in all HDTV (High Definition TV) and some SDTV (Standard Definition TV). The ratio is 16 arbitrary units of width for every 9 arbitrary units of height.
4:3	The aspect ratio of traditional National Television Systems Committee (NTSC) TV screens. The ratio refers to four units of width for every three units of height.

720p	Refers to a picture that is 1,280 vertical pixels by 720 horizontal pixels. The “p” stands for progressive scanning. Progressive scanning offers a smoother picture as 720 horizontal lines are scanned progressively or in succession in a vertical frame repeated 30 times a second.
Anamorphic video	Refers to video images that are "squeezed" or “stretched” (depending on whether the video is being upconverted or downconverted) to fit a video frame. When 16:9 anamorphic video is displayed on a 4:3 screen size (downconvert), the images will appear unnaturally tall and narrow.
Aspect ratio	A ratio of screen width to height. It may be traditional 4:3 or 16:9 widescreen.
ATSC	An acronym for Advanced Television Systems Committee, which is responsible for developing and establishing Digital-HDTV Standards. It is also the name of the DTV system used by broadcasters in the U.S.
Barn Doors	When a 4:3 image is viewed on a 16:9 screen, the viewer sees black bars on the sides of the screen, sometimes referred to as “barn doors.”
Codec	A short term for “Coder-decoder.” This device converts analog video and audio signals into digital format, or digital signals into an analog format.
Decoder	See "codec." A device or program that translates encoded data into its original format (i.e., it decodes the data.).
Deinterlacing	The process of converting an interlaced-scan video signal (where each frame is split into two sequential fields) to a progressive-scan signal (where each frame remains whole). Advanced de-interlacers include a feature called 3-2 pulldown processing. Sometimes de-interlacing is referred to as "line-doubling."
Downconvert	Refers to format conversion from a higher resolution input standard to a lower one. For example, converting a 1080i input to a 720p display.
DTV (Digital Television)	DTV stands for Digital Television. It refers to all digital television formats and standards established by the Advanced Television Systems Committee (ATSC). Two basic DTV standards are HDTV (high-definition television) and SDTV (standard-definition television)
Frame rate	The rate at which frames are displayed. In regular NTSC video, the frame rate is 30 fps. The frame rate of a progressive-scan format is twice that of an interlaced-scan. The frame rate for film projects is 24 frames per second (24 fps).
HDTV (High-Definition Television)	High Definition Television refers to the highest-resolution formats of the DTV formats. Offering twice the vertical and horizontal picture resolution of standard definition, an HD picture is much sharper. HDTV has a widescreen aspect ratio of 16:9. HD formats 1080i and 720p both offer reduced motion artifacts like ghosting and dot crawl.

HD-SDI	Refers to a high definition signal provided on a serial digital connection.
High Definition	A video format consisting of either 720 active lines of progressive video or 1080 active lines, using either progressive or interlaced scanning.
Interlaced Scanning	A scanning method based on the visible screen showing every odd line at one scan of the screen and the even lines in a second scan.
Letterbox	Letterbox refers to the image of a wide-screen picture on a standard 4:3 aspect ratio screen. Usually black bars are shown above and below the picture to fill the unused space. Letter-boxing maintains the original aspect ratio of the source (often a film source of 16:9 aspect ratio or wider).
Luminance	The brightness or black-and-white component of a color video signal. Luminance determines the level of picture detail.
Progressive Scanning	Progressive scanning provides a picture made up of 720 or 1080 horizontal lines scanned progressively in succession, within a vertical frame. The frame repeats 30 times a second.
Resolution	Resolution usually refers to the density of lines, and dots per line, that represent an image. It is measured by the number of pixels displayed. A higher number of lines and dots provides sharper and more detailed picture content. Analog television pictures have over 200,000 color pixels while HDTV—at 1080 vertical pixels by 1920 horizontal pixels—offer greater than 2 million pixels per picture.
Sampling	A digital process by which analog information is measured in intervals to convert analog to digital.
SDTV (Standard- Definition Television)	Standard Definition Television pictures are higher quality than NTSC, however, they do not reach the quality and resolution of HD. SDTV is based on 480 lines of vertical resolution, available with both interlaced and progressively scanned formats.
SD-SDI	Refers to a standard definition signal provided on a serial digital connection.
Upconverting	Process by which a standard definition picture is changed to a simulated high-definition picture.
Widescreen	Widescreen TV is a picture with a 16:9 aspect ratio. 16:9 is the aspect ratio of movie screen and widescreen DTV formats used in all HDTV (High Definition TV) and some SDTV (Standard Definition TV); it stands for 16 units of width for every 9 units of height.



Appendix C:

Working With 2K Workflows

Introduction

This chapter provides a simple overview of 2K workflow and how the KONA 3 can be used as an integral part of it.

Overview of 2K and Its Uses In Digital Cinema

2K is a term, like SD and HD, used to describe a particular image size and quality of data. 2K data exceeds our pre-existing television broadcast standards for both SD and HD and is therefore most commonly associated with traditional cinema and the emerging digital cinema initiative.

As a point of reference, HD is commonly referred to by the 1920x1080 or 1280x720 pixel frame sizes. 2K, like HD, is commonly defined by two basic frame sizes. When working with data for eventual cinematic projection, FX work or digital intermediate purposes, 2K is usually defined as 2048x1556 pixels. This size represents the “full” size of the 35mm film between the sprockets. Therefore the result, 2048x1556 pixels, appears as a 4x3 image when compared to an HD image which is typically 16x9. In 2K, other images sizes can be derived from this 2048x1556 source by taking a cropped portion of the image for use or via scaling of the image. For a traditional cinematic projection scenario, the final delivery of this 2048x1556 data is onto 35mm film. The film then undergoes photochemical and mechanical processes before the image (digital image) reaches the screen.

The other common size attributed to 2K is 2048x1080 and this is the standard to which digital cinema currently adheres. Most digital cinema projectors have this 2048x1080 image size as a supported resolution and in many cases, as a maximum resolution.

So the first obvious advantage of working with 2K images as opposed to HD images when considering a traditional cinematic path is the size of the image that can be generated, worked with, and ultimately projected. Some will argue that a better choice for cinematic work is a 4K resolution. Certainly this is true, but this requires double 2K's already large data requirements to be handled and therefore is beyond the scope of nearly most modern equipment be it scanners, storage or projectors. To be fair, some 4K and beyond resolution is already being performed for select feature films and even then for select shots in many cases. Perhaps in the future 4K will supplant 2K as HD has SD but that day seems to be quite distant so for now a large body of the motion picture community has settled on 2K as a high quality image size.



2K Color: More Like Film than Video

2K images, like SD and HD images, can come in 8 bit, 10 bit, 12 bit, 16 bit, and other sizes. But most commonly, 2K files are written in a 10 bit Log RGB or RGB format. This provides for 1024 gradations of a given color in three equivalent colors of red, green and blue. By using RGB, 2K data can emulate, to some extent, film—which achieves its color reproduction via red, green and blue layers of emulsion.

The actual 2K image sizes of 2048x1556 and 2048x1080 are usually written in two similar, but slightly differing, file formats: Cineon or DPX (Digital Picture Exchange format). The Cineon file format traces its roots back to one of the earliest “film as digital” devices, the Kodak Cineon. The Kodak Cineon, introduced in 1992, was a scanner that took film images and translated them into digital data. Today many devices from a number of manufacturers allow for such a process.

Since files bearing the .cin extension were always related to film, they tend to always be in Log RGB. Log RGB is a color scheme designed to best approximate the characteristics of film emulsion in a digital environment. An easy analogy is this: Log RGB is like a “digital film negative” while linear RGB (usually just referred to as RGB) is like a “digital film positive.” To transform a log RGB image into a “positive”, Look Up Tables (LUTs) can be applied to the image so that before, during or after processing the raw image can be seen as it would be if it were a finished product.

As already mentioned, Cineon files are not the only file format that can be used to house the 2K data. DPX (Digital Picture Exchange) is quickly becoming the standard since being defined by SMPTE. Like files bearing the .cin extension, files bearing the .dpx extension can be Log RGB, but they can also be linear RGB.

Cineon and DPX files at full size, 2048x1556 and full 10 bit quality tend to exist as individual frames that occupy 12.2 MB of data. At 12.2 MB/sec., data rates for a second of video climb to 291.5 MB/sec. By comparison, the highest quality HD video images rarely exceed 200MB/sec. and most HD formats use only a little over 100MB/sec. Furthermore, HD material is usually somewhat compressed in order to be recorded onto tape formats, whereas the 2K data can achieve an uncompressed status having never had to be recorded onto a tape, but instead directly recorded onto a harddrive.

If the first major advantage of working with 2K images is their size, then the second advantage is their handling of color. A 2K color scheme can be used that more closely emulates films properties than video. Furthermore, this color information need not be compressed due to the limitations of tape recording, but rather the data can be dealt with as uncompressed.

The Source of 2K Data: Scanning, Telecine and Digital Cameras

Until recently, the only way to acquire a 2K image was to shoot on 35mm film and then scan the original camera negative (OCN). To be fair, most 2K data is still generated in this method since film is still seen as the de facto medium for recording moving images for projection at the highest possible resolution. 2K scanning has persisted as the solitary method of creating 2K data until recently when a handful of telecine machines have come on the market that can move data at 2K resolution.

Now we are seeing the first generation of what can truly be referred to as “digital cinema” cameras as they lack video recording devices, specifically tape recording capability, in their design and instead concentrate on producing electronic data that

aims to emulate the image quality of traditional photochemical film processes. This era is still early in its development but the pace of development promises that it will soon draw close to the quality, and in some users opinions, the ease of use of capturing images to motion picture film.

Transporting 2K Data: HSDL Defined

Moving 2K data is no small task; remember that at 12.2MB/frame, data moves at nearly 300MB/sec. Storage devices, such as RAID's or SANs must have very high bandwidth capabilities to handle recording or playing back data at full speed. The storage devices must also have adequate space to hold this data as an hour of 2K just exceeds 1 Terabyte.

But storage devices are for storing the data; transporting the data is something different. HSDL (High Speed Data Link) is easiest for video professionals to understand in this way: HSDL is like Dual Link HD for the transmission of 2K data. Where Dual Link HD moves across two SDI cables as video, HSDL moves 2K data over the SDI cables. Because of the amount of data previously mentioned, full size 2048x1556 images cannot be transmitted over the dual SDI lines at full frame rate. Instead of moving the data at 23.98 (24) frames per second, the HSDL transport stream often adheres to 14.98 frames per second. Because this is transmitted data, not video, the data can be recorded at the 14.98 frames per second rate to a high speed storage device and then played back from this high speed storage device at full speed, typically 23.98 frames per second. In contrast to 2048x1556 images, 2048x1080 digital cinema 2K can move across HSDL at the full frame rate of 23.98 frames per second.

Facilities with two lines of HD-SDI rated cable, in a limited sense, are already prepared for the transmission of 2K data when attached to HSDL devices. If a facility already has storage that can exceed 300MB per second, that facility might also be ready to record and play back 2K data at full frame rate. Again, this transition to a “digital film” environment is far less cumbersome than a 4K digital environment where such numbers double those of 2K.

So a third advantage, beyond image size and color reproduction, is the ability of 2K data to use pre-existing elements of HD infrastructure when adopting 2K. For many facilities, be they large full-service or boutique, this makes the financial transition from HD to 2K less of a burden. While a transition to 4K would produce higher quality for most facilities, it would not be nearly as easy to achieve financially.

The AJA KONA 3: An Ideal 2K Input/Output Device

Opening the door to data-centric workflow and universal mastering, the AJA KONA 3 card represents a perfect input/output device (capture card) for facilities considering entering the “film as digital” landscape. The card is ideal because it's capable of working with SD, HD, Dual Link HD and 2K. The KONA 3 card can receive and send 2K data via HSDL—making it compatible with a number of devices such as telecines and digital disk recorders (DDRs) already on the market and working with 2K data.

The advantages of using the KONA 3 as an input/output device extend beyond its 2K HSDL functionality. Not only can users ingest 2K data as simultaneous 2K DPX files and QuickTime files, edit this information, and then output 2K data, but users can also elect to ingest 2K data and output simultaneous HD from a crop directly derived from the 2K

media. An SD downconvert of this HD video can also be created simultaneously, if so desired. For review of 2K data on HD and SD monitors, and for some mastering scenarios, the KONA 3 card can be used as a very flexible and effective tool.

Existing 2K data files in the Cineon and DPX file formats can be “wrapped” into 2K QuickTime Reference Movies via AJA's DPXToQT Translator application so that users can take advantage of the aforementioned flexibility without writing any new data to their drives. QuickTime reference movies only point back to the source original DPX files from which they are derived. The main advantage of this, beyond not writing any new data to the drives, is that the cumbersome sequence of potentially thousands of frames can be consolidated non-destructively to a single file.

Furthermore, once media exists as a 2K QuickTime movie, it can be converted back into sequential DPX files that can be given to facilities using software or hardware, such as film recorders, that do not accept QuickTime files. This conversion can be accomplished via the AJA QTToDPX Translator application. This process, it should be noted, does require writing new data because it may reflect creative changes to the images that the user desired, such as effects.

Note: The QTToDPX Translator and DPXToQT Translator are both available from the AJA website in the KONA 3 support area:

www.aja.com/html/support_kona3_swd.html

AJA Video Systems, Inc. along with other 2K HSDL device manufacturers, has seen the growing need for a high quality image source, like 2K, in an evolving data-centric workflow. A 2K source can be used to derive the high quality film, digital cinema, HD and SD deliverables without compromise outside of a cumbersome leap to 4K. 2K capable devices, like the AJA KONA 3 card, will help facilities and filmmakers enter a data-centric workflow that results in a universal mastering environment.

The KONA 3 2K Process—Ingest to Output

The following step-by-step procedure outlines the task of bringing in 2K material from telecines or other HSDL devices connected to the dual SDI inputs on the KONA 3 card. The 2K ingest process requires the use of the AJA *VTR Xchange* software and configuration of the AJA KONA Control Panel.

The procedure for ingest of 2K is as follows:

1. Connect the telecine with HSDL output (or other HSDL output capable device) to the KONA 3's two SDI inputs. (If you already have 2K DPX or Cineon files on storage capable of 300MB/sec., you can elect to use the AJA *DPXToQT Translator* application to “wrap” the sequential DPX or Cineon files to QuickTime Reference Movies. If this is the case, skip ahead to step 6 of these instructions.
2. Configure the AJA Kona Control Panel as follows:
 - A. For the Input tab of the KONA Control Panel, make certain that *Dual Link* is selected for Video Input.
 - B. For the Format tab of the KONA Control Panel, make certain that the Video Format for Primary and Secondary is matched and matches the incoming “video”—which should be indicated in the graphic portion of the KONA Control Panel next to the SDI in 1 and SDI in 2 icons.

3. Run AJA VTR Xchange software. Go to the *Capture* pulldown menu in the application and select Video Settings. Choose *Source* from the three options of Adjustments, Compression and Source. From within this menu, select the appropriate format that is being indicated in the KONA Control Panel, i.e. 1556x2Kpsf14.98 10 Bit (2048x1556). Now select *Compression* from the three choices of Adjustments, Compression and Source. In the pulldown for Compression type, select *AJA Kona 10-bit Log RGB Codec* or *AJA Kona 10-bit RGB Codec*. (For maximum flexibility, and with most equipment, the *AJA Kona 10-bit Log RGB Codec* will be the best choice.) For the *Frames per second*, select 23.98 as this is the frame rate that will be set for the QuickTime Reference Movie that you will create simultaneously with the sequential DPX files. From the Preferences (AJA VTR XChange pulldown menu), look under the Capture heading and select *Save as Numbered Files*. You should also select a storage device capable of a minimum of 300+MB/sec. for the data under the Capture heading, Captured Clips Folder; if no selection is made, the application will prompt you to choose a location for your captured media.
4. You're now ready to capture the material from the 2K output device. Begin playback on a non-controllable device or mark in and out points for a clip coming from a controllable device (like a digital disk recorder). If you have no device control, you can only select “capture now”—meaning that you will be crash recording the data onto your disks. If you do have a device that can be controlled, you can set in and out points and then select “capture”.
5. While capturing, VTR Xchange is creating the QuickTime Reference Movie and the series of sequential DPX files; these files are written to the target folder defined by the VTR Xchange application based on the selection you made for their location from within the *Preferences>Captured Clips* Folder.
6. For editorial, run Final Cut Pro. From within the Final Cut Pro application, go to the Final Cut Pro pulldown menu and choose Easy Setup. If the *Show All* checkbox is not checked, check it and then from the pulldown, select the 2K easy setup that reflects your media (If you ingested from telecine, in all likelihood you will select the *AJA Kona 3-2K x 1556 psf 23.98 10 Bit Uncompressed Log RGB* as an example.) Within your new project you can import the QuickTime Reference Movies created by VTR Xchange into the Browser window.

Note: Note: Since these QuickTime movies reference the 2K sequential DPX files, you will be able to play and scrub the footage as expected, however if you wish to play the footage backward, be sure to adhere to first holding down the “K” key on the keyboard and while holding this key, then the “J” key can be depressed for reverse playback. This is simply a limitation of reading the sequential DPX files; all other functions such as scrubbing the playhead in the timeline or using the “L” key for forward play and transport will behave as expected. In the event that you do use the “J” key solely, you may experience a lag and will need to wait for the application before further operations can be performed.

7. You can elect to either view the footage out of the card on monitors in one of three ways (two of which may occur simultaneously) or output from the Kona 3 card via HSDL to another HSDL compliant device. For monitoring, the 2K Crop tab of the Kona Control Panel can be configured to output 1920x1080 from the 2K source. These settings are described in Chapter 4 earlier in this manual under the description of the “2K Crop Screen.”

The 1920x1080 crop can be sent to a Dual Link HD-SDI capable monitor by connection of both of the HD-SDI outputs (Link A and Link B) of the KONA to the Dual Link inputs of a monitor. Or if a single link HD output is desired, the signal may be routed via single link HD-SDI out from the card. An additional single link HD-SDI output can be obtained from the card or one SD-SDI output from the card—both of which can happen simultaneously. The component output of the card can also be configured to output HD or SD in conjunction with the SDI outputs. The settings for the various outputs are accessed via the KONA Control Panel's *Format* tab by setting the Secondary (Converted) Format. For HSDL output, the 2K Crop function must be turned to *Off* in the Crop Mode and from the *Digital Out* tab of the KONA Control Panel, *Dual Link* must be selected.

8. For HSDL output, you can select to output 2048x1556 at 14.98fps (which is a standard among many HSDL devices), or you may elect to output via HSDL 2048x1080 at 23.98fps, which is what digital cinema devices tend to use. Or, you may elect to output the timeline as a QuickTime movie that can be translated back into a sequence of DPX files via the AJA *QuickTimeToDPX* Translator application.

Note: Note: This may be necessary for some devices and applications that do not accept QuickTime files or the AJA Kona 10-bit Log RGB or AJA Kona 10-bit RGB codecs but instead accept DPX files.

Additional Advice

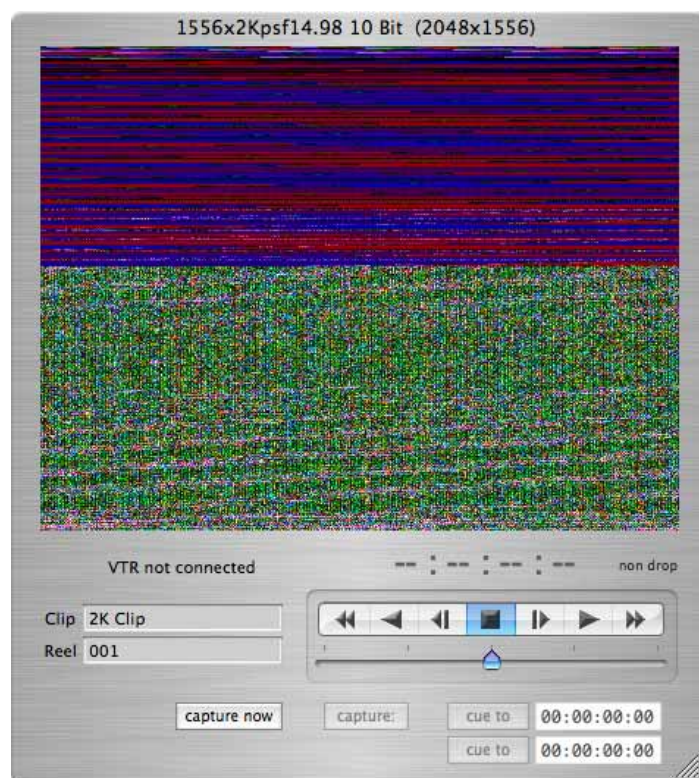
Due to the flexible nature of Final Cut Pro, the timeline where the 2K files reside during editing, can be sent to other applications to be worked on at 2K resolution; Motion and Shake are examples of this. The 2K edit in Final Cut Pro can be referred to by other applications via XML or EDL, like Silicon Color's Final Touch 2K, so that the 2K DPX files or their associated QuickTime Reference Movies may be accessed.



Note: *KONA Utility Applications that can be used for 2K Workflow. All are available free from: www.aja.com/html/support_kona3_swd.html*



VTR Xchange Preferences Screen—Click “Save as Numbered Files” for file-per-frame capture



VTR Xchange Main Window Screen



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