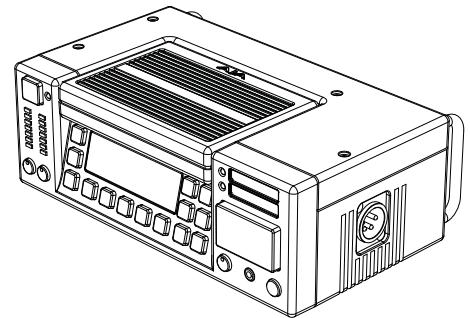


KiPRO



Published: 6/12/09

Installation and Operation Guide

Because it matters.

AJA[®]
VIDEO SYSTEMS



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Contacting Support

To contact AJA Video for sales or support, use any of the following methods:

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

Telephone: 800.251.4224 or 530.274.2048

Fax: 530.274.9442

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

Support Email: support@aja.com

Sales Email: sales@aja.com

When calling for support, first read the Chapter on *Troubleshooting* at the back of this manual. You can often save time and effort by looking there first for simple remedies and information on how to get support from AJA and Apple Computer Inc.

Limited Warranty

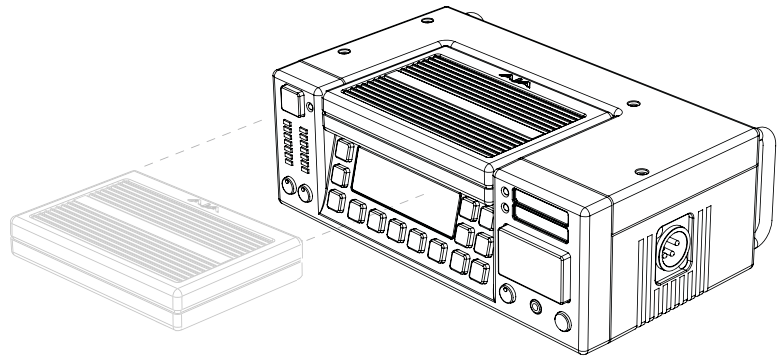
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Chapter 1: Introduction



Overview

Ki Pro is an all new way of connecting production and post. With it, you can now shoot on the same codec as you edit with—Apple ProRes 422—built natively into Ki Pro's stand-alone, portable hardware. Ki Pro simplifies the link between production and post by acquiring on the best codec for use with Apple Final Cut Studio, from virtually any camera, regardless of format. With its massive analog and digital connectivity, virtually any video and audio source can be fed into Ki Pro. Also included is AJA's powerful 10-bit realtime up/down/cross conversion, enabling instantaneous recording of SD or HD from any camera format.

Small and portable, you can use AJA's Ki Pro as a field recorder for creating "ready-to-edit" professional digital video. Ki Pro supports an Apple "file-based" workflow by recording standard Apple ProRes 422 QuickTime files on industry standard media. Ki Pro supports analog and digital audio/video I/O and records on either removable 34mm ExpressCards (up to two can be mounted) or a removable storage module. Two types of storage modules are also available for Ki Pro: a 2.5" SATA hard drive (supplied with the base system), or a Solid-State-Drive (SSD) module you can optionally purchase. When removed, either module functions as a standard FireWire 800 drive when connected to a Mac.

Ki Pro's multi-purpose mechanical design and small form factor allow both "stand-alone" and camera configurations. In standalone mode, it can connect to a camera while sitting on a desk or flat surface. Ki Pro can be used by itself to record and playback media or it can be connected to a Mac Pro or MacBook Pro via FireWire for transferring media. In a camera configuration it mounts between the camera and a tripod using an optional adjustable "exoskeleton" frame. The frame option allows for flexible positioning of the camera head and accessories and attachment to a professional tripod.

Internally, Ki Pro natively supports the amazing Apple ProRes 422 Codecs in hardware, allowing realtime capture directly to ProRes. In fact, while the Camera is recording to its own tape or file-based memory, Ki Pro can simultaneously capture the media as ProRes so it's instantly ready to edit when connected to a Mac, or when the removable storage module or an Expresscard is connected to a Mac. With this kind of flexibility, you can save time, steps, and get your project done quicker and with the highest quality.

Ki Pro is the only recording device in the world that supports Apple's ProRes 422 in hardware—allowing realtime recording of full-raster I-frame media at 4:2:2 quality.

Ki Pro also includes AJA's realtime hardware 10-bit up/down/cross conversion for realtime on the fly recording to alternate formats.

Like AJA's famous KONA and Io HD desktop products, Ki Pro offers unparalleled connectivity. Within its portable and rugged form factor, Ki Pro offers SD/HD analog I/O, SD/HD digital I/O including SDI, HD-SDI and HDMI, two channels of balanced and unbalanced analog audio with switch selectable line levels, plus RS-422, LTC timecode in/out, and LANC (plus loop through).

Control options are also varied and flexible. Ethernet 10/100/1000 connection is possible via an RJ45 for remote control from a Mac/PC, and a FireWire 400 (1394a) connector allows you to pass control and timecode from the camera. A special "AJA Lens Tap" connector provides a unique ability of Ki Pro to intercept lens control data for use in stop/start and automated recording control. For wireless control, Ki Pro features an internal WiFi antenna and radio for connection to wireless devices such as iPhone, iPod, or 802.11 equipped computers. A FireWire 800 connector allows a Mac to mount Ki Pro's storage devices (SSD, HD, and ExpressCards)—and as mentioned earlier you can also simply remove any of the storage devices by themselves for mounting on a Mac via FireWire 800 connectors on them. (For detailed illustrations and discussions of Ki Pro connectors and control features, see Chapter 2.)

This manual covers the installation and operation of Ki Pro and its optional accessories.

Features

Ki Pro offers a large number of unique features for optimum quality, ease of use, and support for a wide variety of workflows and environments. Ki Pro provides flexible standard and high definition recording, with hardware up/down/cross-conversion for versatile operation in a mixed SD/HD environment, plus a wide variety of control methods and storage options.

Hardware

- Apple ProRes 422 and Apple ProRes 422 HQ Codec—SD, HD 720/1080, full-raster 10 bit 4:2:2, realtime, implemented in hardware
- Up/down/cross-conversion, 10-bit, realtime, implemented in hardware
- Component HD/SD analog video I/O (6 BNC)
- Composite video output (1 BNC)
- HD/SD SDI I/O (2 BNC)
- HDMI I/O (2 HDMI)
- 2 channel balanced and unbalanced analog audio I/O (4 XLR, 4 RCA)
- LTC I/O (2 BNC)
- 1394a FireWire port (connection to camera for timecode and control)

- 1394b FireWire (connection to host Mac)
- RS-422 Machine Control—9 pin DE-9 serial port
- IEEE 802.11 wireless
- 10/100/1000 Ethernet LAN
- VFD display (2 line x 20), with 18- button front panel controls
- Front Panel LED Status Indicators: Power On/Off, FireWire (active/inactive), Ref (Genlock), Video (detected at selected input).
- Aspect ratio conversion
- Expressbus storage (cards are user-supplied)
- Storage Module (HD) with FireWire 800 port for use with Mac computers (HFS+ file system)
- 12 Vdc AC adapter with industry standard 4-pin XLR battery-style connector
- 3-year warranty

Software

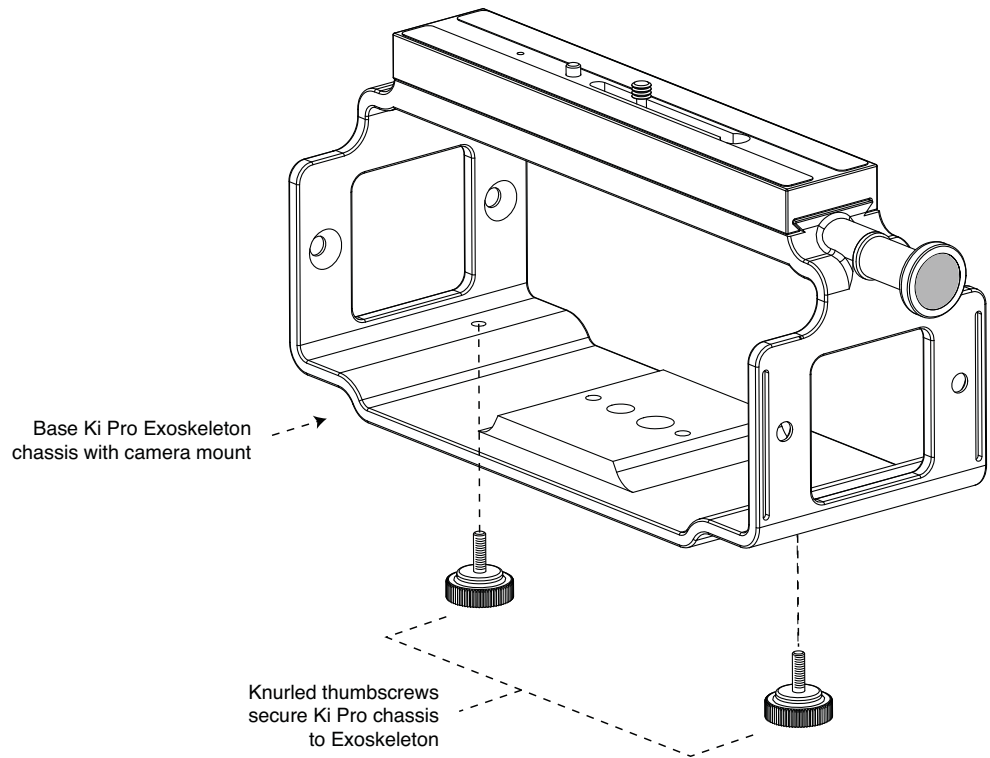
- Remote Browser control software. When a Mac, PC, or WiFi enabled device such as an iPhone are connected via the Ki Pro Ethernet port or its WiFi connection, the device can control the Ki Pro via a web browser.
- Embedded Linux OS with internal web server for remote control via WiFi or LAN
- HFS+ file system support—Ki Pro can be mounted via its FireWire 800 connector, just like a hard drive.

AJA's Ki Pro software and hardware were developed for use in recording direct to Apple ProRes media for the simplest possible end-to-end file-based Final Cut Pro environment—bridging Camera to Post, using Ki Pro as the interconnecting path. With a camera, an Apple Mac Pro or MacBook Pro, FCP, and Ki Pro, you have an ideal high-quality cost-effective system for onset acquisition, conversion, transport, and post-production workflow.

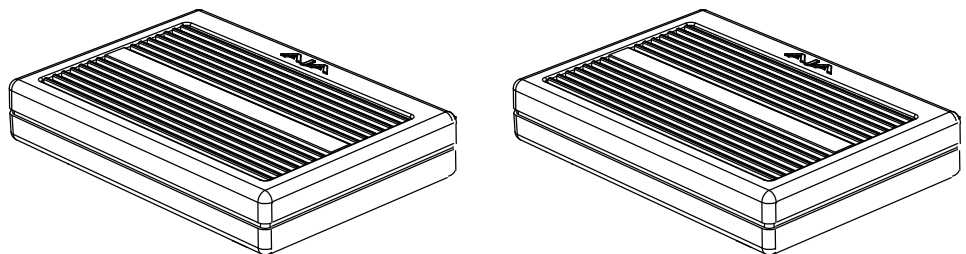
Options

AJA's Ki Pro can be enhanced by purchasing several options:

- Ki Box Exo-skeleton—provides a surrounding chassis for the Ki Pro that can both mount to a tripod and provide a mount for camera on top; this combination allows convenient access to controls.



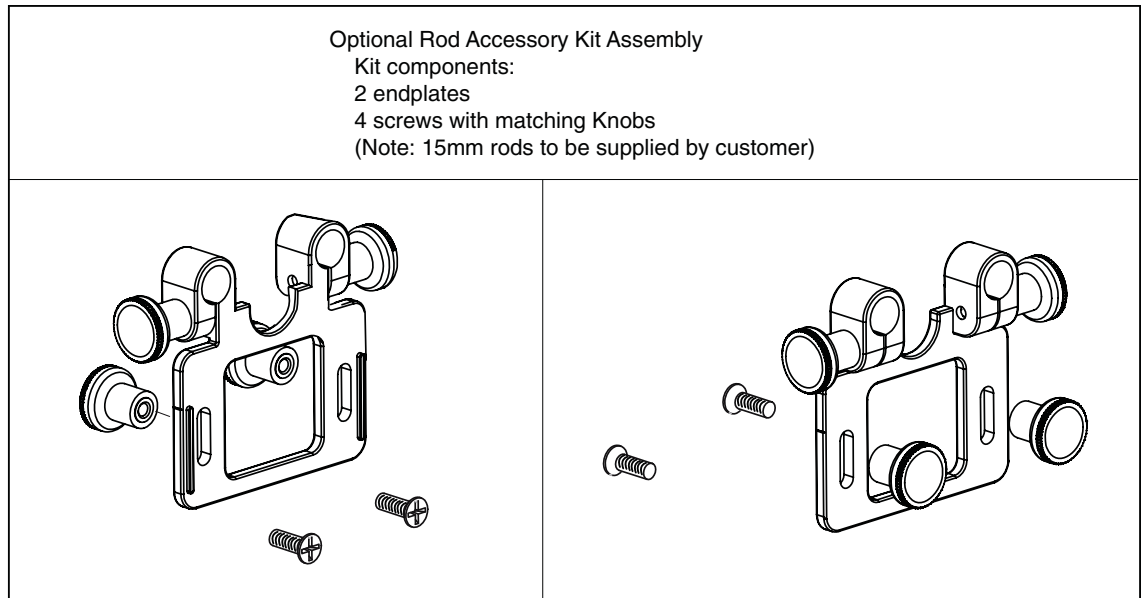
Ki Box Exo-skeleton Option



Storage Module Options: SSD or Hard Drive

- Ki Pro SSD Storage Module—although the Ki Pro comes standard with a removable HDD Storage Module, an optional SSD Storage Module is also available. The Ki Pro Solid State Storage Module (SSD) is recommended for mobile environments where shock-proof sturdiness may be needed. The Ki Pro SSD Storage Module offers the ultimate in media reliability.
- Ki Pro Hard Drive Storage Module—although Ki Pro comes with one removable HDD Storage Module standard, you can buy extras and simply swap them as needed.

- **Ki Pro Rod Accessory Kit**—this kit adds endplates to the Exo-skeleton so you can attach two user-supplied 15mm camera accessory rods. The endplates have knobs for adjusting the height of the rod brackets relative to the camera, as well as a set of knobs for securing the rods in the brackets.



Rod Accessory Kit Option

- **AJA Lens Tap Cable Accessory**—this AJA proprietary cable allows Ki Pro to connect between the lens tap control connector on a lens and camera body, thereby intercepting the lens control signals for use in simple start/stop Ki Pro recording operations.
- **Io Express**—a simple low-cost output interface box for CPU-decoding of compressed formats and playout. It provides uncompressed HD-SDI and SD-SDI output for formats such as Apple ProRes, XDCAM, and DVCPROHD. Io Express also includes an HD-SDI/SD-SDI input for video/audio capture into Final Cut Pro. Io Express attaches to Macs having a free PCIe or ExpressCard slot. The box tethers to the Mac using a small PCIe header card and cable, making it suitable for both laptop and desktop computers—and it will even work with PCs. By having Ki Pro and Io Express, you have a complete Final Cut Pro post-production system for editing, color correcting and playout.

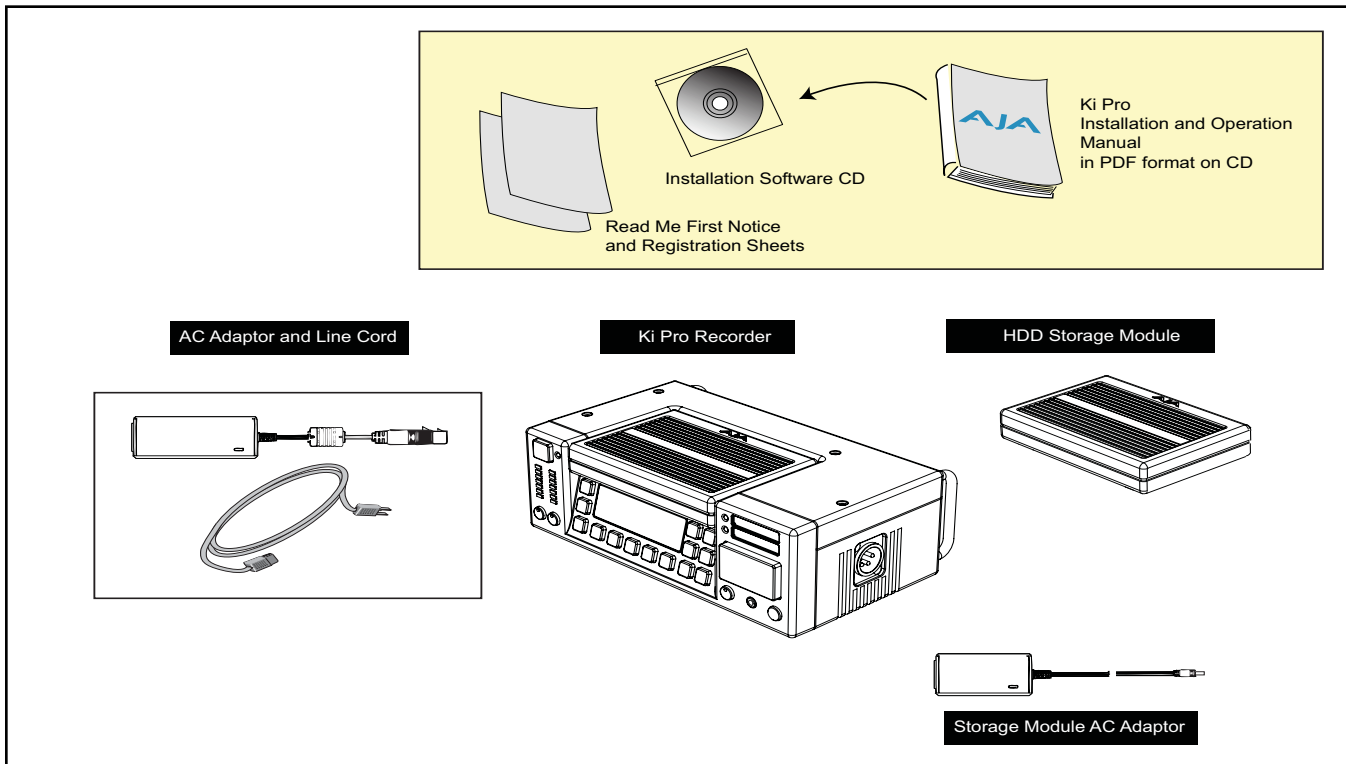
What's In The Box?

When you unpack your Ki Pro, you'll find the following components:

- **Ki Pro CD-ROM**—this CD contains software and documentation—including this manual you're reading (PDF format).
- **Ki Pro Recorder**
- **Ki Pro 250GB Hard Drive Storage Module and AC Adaptor**
- **AC Adapter 110/220** with industry standard 4-pin XLR connector for supplying power to the Ki Pro.

- FireWire 800 cable
- Read Me First Notice—Contains late-breaking news and/or errata related to Ki Pro.
- Registration Sheet—allows you to register your card by mail or online (details provided).

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



Ki Pro Shipping Box Contents

System Requirements

AJA Video recommends that the Mac Pro or MacBook Pro used with the Ki Pro offer a FireWire 800 port and support Apple ProRes 422 with a satisfactory level of performance. Consult Final Cut Pro documentation when setting up and configuring your system for editing; ensure you have an adequate storage system (RAID array) and any needed video/audio interfaces.

Apple ProRes 422 Advantages

Data rate: 145 MB/second ProRes 422, 220 MB/second ProRes 422 HQ—supported by internal system drive or attached storage

Quality: Excellent, broadcast quality

Captured media is virtually indistinguishable from pristine uncompressed sources. Better yet, ProRes maintains the quality during editing, surviving multiple encoding/decoding generations without degradation. It was designed by Apple for editing, rather than as a transmission/distribution codec as are most popular codecs. Some of the advantages include:

- Full-size 1920-by-1080 and 1280-by-720 HD resolutions.
- Full-size 720-by-486 and 720-by-576 SD resolutions.
- 4:2:2 chroma sampling. Provides precise compositing and blending at sharp saturated-color boundaries.
- 10-bit sample depth. Preserves subtle gradients of 10-bit sources (perfect for green-screen compositing, graphics or color correction) with no visible banding artifacts.
- I frame-only encoding. Ensures consistent quality in every frame and no artifacts from complex motion.
- Variable bit-rate (VBR) encoding. “Smart” encoding analyzes the image and allocates more bits to complex frames.
- Low data rate requirements make for more storage options and require less drive space to store high quality video.

In This Manual

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

Chapter 2 gets you started with Ki Pro, introducing the front and rear panel features, connections and indicators, and all the options available.

Chapter 3 provides complete instructions for operating the Ki Pro from the front panel.

Chapter 4 discusses remote web browser control of Ki Pro via Ethernet or WiFi.

Chapter 2: Getting Started

Overview

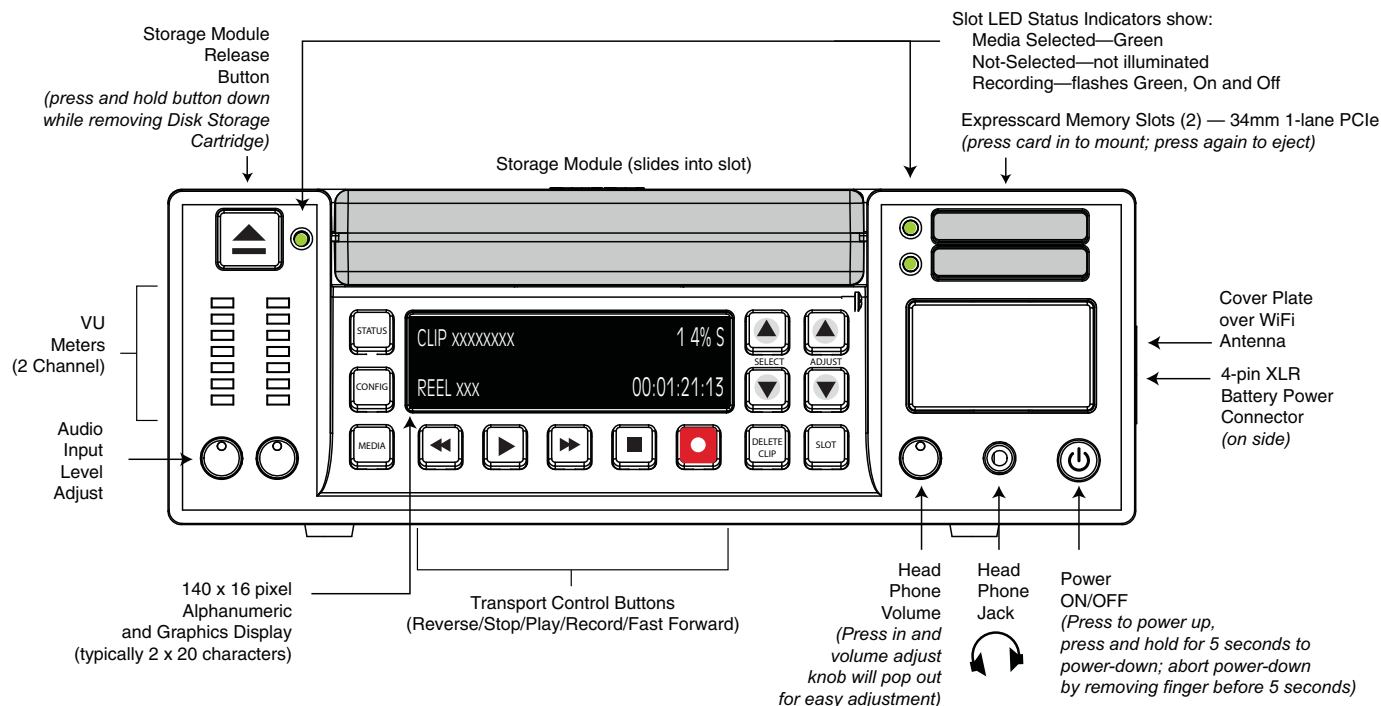
When using Ki Pro, you'll make media cable connections to a variety of equipment based on how it's being used. Onset, it can be connected direct to a camera; at other times, you may want to connect it to a Mac Pro or MacBook Pro for accessing stored media you've shot. Chapters 2 and 3 discuss how to operate and use the Ki Pro in its many configurations—this chapter introduces the operating configurations, power supply options, plus all indicators, controls, and connections so you'll have a working knowledge of how it can be used to tie together the worlds of acquiring media (production) and post-production. For ease of explanation, we'll talk about these two ways of using the Ki Pro:

- Stand-alone—in standalone use for *acquiring media*, the Ki Pro unit is placed on a desktop or surface and connected by cable to video/audio sources, usually a camera or camcorder. After acquiring media, you can use the media on a Mac, by removing the Ki Pro storage module and directly connecting it to the Mac via FireWire 800, or alternatively, the whole Ki Pro unit can be connected to a Mac via a FireWire 800 cable.
- Camera Mount with Exo-skeleton—for the optimum in onset flexibility, an optional Ki Pro Exo-skeleton camera mount can be attached to a tripod, the Ki Pro mounted within it, and the camera mounted on top of the Exo-skeleton. This creates a complete self contained acquisition system for acquiring Apple ProRes 422 media in realtime as the camera is shooting. As in the standalone mode, the storage media can be easily inserted or removed for shooting and shuttling to your editing system—without having to remove Ki Pro from the tripod. The exo-skeleton offers many adjustments and an optional rod accessory kit is available for vertical/horizontal camera adjustment with respect to the rod and accessories.

Learning about the front panel indicators will be useful in selecting operational modes and monitoring what is happening on Ki Pro as well as troubleshooting problems that can occur. Becoming familiar with the Ki Pro front and rear panels will simplify installation, setup, and operation of the system.

On the following pages are front and rear panel illustrations with notations that summarize all of the connectors and indicators. Detailed descriptions of each of the connectors and indicators follow afterward.

Operator Side—Buttons and Display



Ki Pro Operator Side (front panel)

Controls and Displays

The Operator Side of Ki Pro features a variety of buttons, knobs, jacks, and indicators for operating Ki Pro directly. Each of the items found on the “Operator Side” are described here and on the following pages. This side is referred to as the “Operator Side” because when mounted in the exoskeleton, it matches the operator side of the camera. When controlling camera features, you’ll also be looking at all the Ki Pro control features for ease of use.

Buttons

Power ON/OFF Button—Controls system power on/off and shows whether power is ON (when illuminated) or OFF. To turn power on, press the button once. It isn’t necessary to press hard or depress the button—it’s a “soft” button sensed by the processor inside. When OFF, and the button is touched, it will begin powering up and display start-up progress on the alphanumeric display.

To power down, you must press and hold the power button down for 3 seconds. This action prevents accidental power-off during normal operation. When the unit is powering down you can abort the power-down process by simply removing your finger from the power button before 2 seconds have elapsed.

STATUS Button—Pressing the STATUS button, when not lit, enters the I/O Status menu. Repeatedly pressing the STATUS button will cycle through I/O Status, Alarms, and Off (returning to the TRANSPORT menu). STATUS menus can be accessed at any time—including when the machine is in an active transport mode (PLAY, RECORD, FF, REV). The ALARM state displayed on the display

shares functionality with STATUS. The STATUS button can be used to toggle through alarms. All menus and front panel operations are described in Chapter 3.

CONFIG Button—Pressing CONFIG when not lit, enters the CONFIG menu.

Pressing CONFIG when it is lit turns Off the CONFIG menu (returning you to the default TRANSPORT menu). The CONFIG menu can only be entered from the STOP mode. The CONFIG menu remembers which parameter it is set to when exited, and will return to that same parameter when the menu is re-entered.

MEDIA Button—Pressing MEDIA when not lit, enters the MEDIA menu. Pressing

MEDIA when it is lit will turn Off the MEDIA menu (returning to the default TRANSPORT menu). The MEDIA menu can only be entered from the STOP mode. The MEDIA menu remembers which parameter it is set to when exited, and will return to that same parameter when the menu is re-entered.

Transport Control Buttons—The transport buttons are always active—except during CONFIG and MEDIA menu operations where they are locked out.

STOP ■: Press STOP to end playback or a media operation (PLAY, FF, REV, or RECORD). When stopped, DDX displays the current point in the stopped clip. STOP can also be considered a “pause” button. If the PASSTHROUGH parameter is set to ON, then stopping playback returns the device to E-to-E. If the PASSTHROUGH parameter is set to OFF, then the last recorded frame is displayed as output. If the PASSTHROUGH parameter is set to AUTO, then the last recorded frame is displayed until a double depression of the STOP button is performed.

PLAY ▶: Press PLAY to begin forward playback of the current clip at normal speed.

RECORD ●: Press the red button to begin recording. Once in RECORD mode, all other transport buttons are locked-out except the STOP button.

FFWD ►►: Press button to begin fast playback of the current clip at 2x speed. Successive pushes increase the speed to 4x, 8x, and 16x. (Pushing the button after 16x speed is reached has no further effect.) When fast-forwarding, audio is muted.

REV ◄◄: Pressing REV when not lit, begins playback of the current clip in reverse at 1x speed. Successive pushes increase the speed to 2x, 4x, 8x, and 16x. (Pushing the button after 16x speed is reached has no further effect.) When playing in reverse, audio is muted for all speeds above 1x.

SELECT (up/down): while in the TRANSPORT menu, the SELECT buttons select clips and operate like “previous” and “next” keys. When a clip is selected it is “cued” to the beginning of the clip. Note that ordering and playback of clips is based on timestamp order, not clip name.

ADJUST (up/down): while in the TRANSPORT menu, and in the “STOP” mode, the ADJUST buttons will “single step” the current clip at a rate of one frame per button push (up=forward, down=reverse).

DELETE CLIP Button—Dedicated button that when pressed, deletes the currently selected clip. When pressed, the system displays a precautionary “ARE YOU SURE?” prompt. Press the up-arrow ADJUST button to say “Yes” and delete the clip, or the down-arrow ADJUST button to abort the deletion. When a clip is deleted, the next clip is then cued for deletion. Pressing DELETE CLIP, STOP or any other button—while the “ARE YOU SURE” prompt is displayed—cancels the delete operation. Pressing any button other than up-arrow ADJUST always aborts deletion.

DELETE CLIP can be used in either the TRANSPORT menu or the MEDIA menu. When pressed in the TRANSPORT menu with a current clip active (PLAY, REV, FF, RECORD), the active mode will continue until the DELETE CLIP is confirmed. DELETE CLIP works on both un-tagged clips and on tagged-for-deletion clips. Within the MEDIA menu, clips can be tagged for deletion (TAG FOR DELETE) and then DELETE CLIP used to delete all tagged clips. A rapid double-pressing of DELETE CLIP results in display prompt of “DELETE TAGGED CLIPS?” and “ADJUST UP=YES, DOWN=NO”; if you then press ADJUST up-arrow, all tagged clips will be deleted.

SLOT Button—Selects which storage is accessed by the system—either the storage module slot or one of the Expresscard slots. Push SLOT repeatedly to cycle through the 3 possible slots. This function is only active when in the “STOP” mode and requires a “PRESS STOP TO CONFIRM” if not stopped. After you select a slot, the system returns to the last selected clip and timecode for that slot. If the media has been changed since the slot was last selected (physically removed/media replaced), then the “first” clip will be “cued” to its start point. If no media is present in the selected slot, the system will display “WARNING NO MEDIA.” To clear the warning, either select another slot by pressing the SLOT button again or insert media into the selected slot. If inserted media has any issues, additional prompts may be displayed as appropriate such as: “WARNING FRMT MEDIA” or “WARNING MEDIA LOW.”

Note: On power up, the storage module is the initial storage system selected and accessed by Ki Pro.

SELECT Buttons—



In the CONFIG and MEDIA menus the SELECT buttons cycle through parameters in the menus. In the STATUS menu(s) the SELECT buttons have no function. In the TRANSPORT menu, the SELECT buttons select clips and operate like “previous” and “next” buttons. When a clip is selected it is cued to the beginning of the clip. Ordering and playback of clips is based on timestamp order—not clip name.

ADJUST Buttons—In the CONFIG and MEDIA menus, the ADJUST buttons alter the value of the parameter chosen by the SELECT buttons. In the STATUS menu(s) the ADJUST buttons have no function. In the TRANSPORT menu, and in the “STOP” mode, the ADJUST buttons single-step the current clip at a rate of one frame per button-push (up=forward, down=reverse).

Disk Storage Module Release Button—Press and hold to physically release a storage module from the unit; you must pull out the storage module while pressing the button. This action prevents a storage module from accidental removal while recording/playing. For safe removal of any media, either storage module or Expresscards, the corresponding slot LED must be unlit. Note: the ExpressCard/34 media is push-to-eject media and does not require this release button to be pressed for removal.

Caution: *removing any media with the slot LED lit, or while flashing, can result in corrupted media or potential damage to the SSD, hard drive or ExpressCard/34 media.*

Audio Input Level Adjust Knobs—Knobs underneath the VU meters allow you to adjust the input levels for each of the two audio channels. To adjust a level, press the knob inward and the knob will then pop out for easy adjustment. This feature allows knobs to be recessed, preventing accidental changes in a production environment.

Head Phone Volume Knob—To adjust headphone listening level, press the knob inward and the knob will then pop out for easy adjustment—just like the audio input level knobs.

Displays and Indicators

Alphanumeric and Graphics Display—Display details: The display is a 140x16 Graphics display. Normally, it will be configured in a 2x20 character format. All menus are designed to fit into this format.

Operational note: The display power consumption is directly related to the number of pixels that are turned on and the intensity. Therefore, the default brightness is an intensity value of 6 (on a scale of 1-8) and users will be able to diminish this value as they see fit in order to conserve as much as 22% power consumption for the VFD. The intensity setting of the VFD also correlates to the backlit buttons on the unit (play, select up, select down, etc.)

During a period of 3 minutes of inactivity, the VFD will go to a screensaver mode and the buttons backlights will turn off.

VU Meters—7-segment LEDs show audio input levels for the 2 audio channels (respectively). Knobs underneath the VU meters allow you to adjust the input levels independently to prevent clipping and ensure proper signal amplitude.

Green—audio source signal level is in the “safe” area (no clipping). Vertically, the green LEDs also show the signal strength, so you can see if the signal level is low. Generally, it’s preferred to have the signal near the top of the green or even occasionally peaking into the yellow LEDs.

Yellow—audio source signal levels are at the peak edge of the safe area before clipping will occur.

Red—audio source amplitude is too hot and the signal is clipping at its signal peaks. You should reduce the input gain at its source (camera, mixer or source equipment supplying the signal).

ExpressCard Slot LED Status Indicators—Each of the 3 media slots (S1, S2, D1) have an associated LED status indicator. The following states for the LED indicator denote the status of the media:

LED lit/on: selected media

LED unlit/off: inactive media, okay to eject or no media inserted

LED flashing: recording in progress

Disk Storage Module LED Status Indicator—The following states for the LED indicator denote the status of the media:

LED lit/on: selected media

LED unlit/off: inactive media, okay to eject or no media inserted

LED flashing: recording in progress

Other Front Panel Features

ExpressCard Memory Slots (2)—Both of these slots support ExpressCard/34 (34 mm wide) memory cards (not ExpressCard/54). Cards must be very fast to be used with Ki Pro. Visit the Ki Pro support page on our website for a list of AJA-qualified cards:

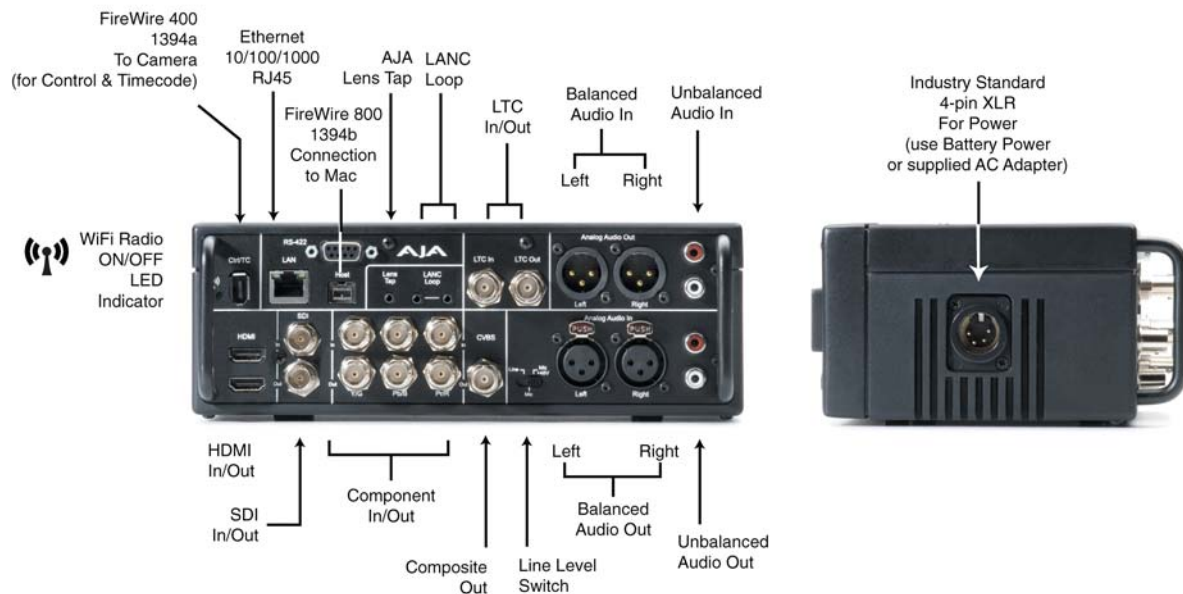
<http://www.aja.com/support/ki-pro/ki-pro.php>

Head Phone Jack—1/8" (3.5mm) miniature stereo TRS connection for standard stereo headphones.

Connector Side

Connect any camcorder, camera, or audio source—digital or audio—regardless of brand or format, to Ki Pro's many connectors. The Connector side of Ki Pro contains almost all of the available connections, protected by handles that extend out for easy grip while protecting the connectors when out of the exoskeleton. On the Back Side of the unit is a single power connector for supplying the 12-Volt DC operating voltage (see *installation* later in this chapter).

The function of Ki Pro's inputs and outputs depend on the operational mode. Ki Pro's active input (the one to be recorded) is selected by front panel, web browser, or WiFi browser action. Ki Pro's outputs are active all the time. In other words, the same output video appears simultaneously on the HDMI, SDI, component, and composite outputs. (Note: composite is an SD only format, so it will not output HD material.) This method of operation allows simultaneous connection to source devices, onset monitoring displays, and audio equipment.



Ki Pro Connector Side and Back Side

Connections

- HDMI—v1.1 video with embedded audio (2 channels input, 8 channels output), 1x connector for input and 1x connector for output.

- HD/SD-SDI Input and Output, with 8 channel embedded audio (2x BNC)
- HD/SD Component YPbPr/RGB Video, 3x BNCs for input, and 3x BNCs for output.
- Composite video output (CVBS, 1x BNC)
- 2 channel balanced analog audio Input and Output (4x XLR RCA)
- 2 channel unbalanced analog audio Input and Output (4x RCA)
- Line Level Switch (analog audio input level)
- LTC Input and Output (2x BNC)
- Lens Tap
- LANC
- 1394a FireWire port (connection to camera for timecode and control)
- 1394b FireWire port (connection to host computer)
- LED Indicator for IEEE 802.11 Radio ON/OFF
- 10/100/1000 Ethernet LAN
- 9 pin serial port (for future use)

LTC Timecode Input And Output

Two BNCs provide connections to the house LTC timecode generator or source. Connections are high impedance. One BNC is for input and the other for output.



SDI Input and Outputs

Two BNC connectors are provided for SDI input and output. SDI input and output supports SD-SDI and HD-SDI video and embedded 24-bit digital audio. If your camera has multiple outputs, look to see if it has SDI I/O, and use it where possible for the highest quality.



Component YPbPr

Connect component YPbPr video cables from a VTR, Camera, or other source to the three YPbPr input BNCs: Y/G, Pr/R, and Pb/B. Then connect the YPbPr Out BNCs to a monitor, or other component device. Component input video signals are A/D (input) converted (10-bit). Similarly, component output video signals are D/A converted (10-bit). Component video signals are higher quality than composite.



A Note About RGB—Although RGB is used less in today’s video systems, Ki Pro supports it at both input and output. Because Ki Pro’s (and SMPTE SDI) native format is YPbPr, AJA recommends the use of YPbPr whenever possible. 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.

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. Ki Pro supports three different types of YPbPr: SMPTE/EBU N10, Betacam (NTSC), and Betacam (NTSC Japan). These three formats differ in level only.

CVBS Composite NTSC/PAL Output

One BNC connector supplies composite NTSC or PAL output. Connect the CVBS Out BNC to a monitor, or other Composite video device. Composite video signals are D/A (output) converted (10-bit).



HDMI

Two HDMI connectors provide for input and output of HDMI compatible video (version 1.1) and multi-channel embedded audio (2 input/8 output). HDCP is not supported on either input or output. The HDMI input is designed to support long cable runs: up to 100 ft when using 22 or 24AWG HDMI cable, or up to 50 ft using 28 or 30AWG HDMI cable. The HDMI output supports standard HDMI cables only.



Formats supported (video only):

525i, 625i, 720p 50/59.94/60, and 1080i 50/59.94/60 are supported on input and output.

1080p23.98, 1080p24, 1080p25, 1080p29.97, and 1080p30 are supported for output only.

Analog 2 Channel Balanced Audio Input and Output

Four XLRs, 2 female for input and 2 male for output, provide 2 channels of balanced audio. Audio is high-quality 24-bit A/D input and D/A output at 48kHz. Level adjustments are made via software or a switch for line-level, microphone with phantom power (condenser mic), or microphone without phantom power (dynamic mic).



Analog 2 Channel Unbalanced Audio Input and Output

Two RCA connectors provide an unbalanced stereo audio input pair for use with consumer camcorders, VTR/VCRs and other A/V devices. For output, two RCA connectors provide an unbalanced stereo audio output pair for driving inexpensive audio monitoring systems.

9-pin DE9 Connector

Reserved for future use.



Host (FireWire 800)

IEEE 1394b FireWire™ connector for connecting to the 800 Mb/s FireWire connector on an Apple Mac Pro or MacBook Pro for passing data. This connector does not support connection to any other FireWire devices such as cameras or hard drives.



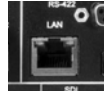
CTRL/TC (FireWire 400)

IEEE 1394a FireWire™ connector for connecting Ki Pro to a camera for timecode control. This connector does not support connection to hard drives.



Ethernet

An RJ45 connector provides a 10/100/1000 Ethernet port for connecting Ki Pro directly to a computer or Ethernet hub or switch for connecting to a LAN. Ki Pro is compatible with CAT-5 straight-through or cross-over Ethernet cables, automatically detecting which is used. Once connected and properly configured, Ki Pro can then be controlled by a web browser on the LAN.



LANC Loop

This connector accepts a LANC plug (2.5mm 3-conductor TRS jack) and then loops it through to a second connector (loop). LANC or Local Application Control Bus System (sometimes called Control-L) is a Sony protocol for synchronizing cameras. Available on many brands of cameras, LANC enables accessories like Tripods with a control handle to control camera and Ki Pro record/stop.



Lens Tap

This connector supports an optional “Lens Tap” kit AJA offers for controlling Ki Pro. A proprietary AJA cable connects between the camera body and the lens, intercepting the camera’s own interconnecting cable. This allows the Ki Pro transport control (record/stop) to happen by simply operating the shutter/record button on the camera.

LED Indicator for IEEE 802.11 Radio

This LED shows the status of the internal 802.11 radio used to transmit and receive WiFi data. When illuminated, the LED shows the radio is ON.

Power Connector (back of unit)

On the back of Ki Pro is a standard 4-pin male XLR connector for supplying 12-Volt DC power to the unit. You can use either the supplied AC Adapter or furnish your own battery source. Since the connector is an industry standard pinout, choices are varied and flexible. Many 3rd-party vendors offer products using this standardized power connector.



Warning: *Ki Pro has no user-serviceable parts. An internal fuse protects the circuitry; however, it can only be replaced by AJA service centers or AJA dealers. To remove power from the unit, remove power from the 4-pin XLR power connector to ensure disconnection.*

Storage

Record hours of media to a portable removable hard-drive storage module with built-in FireWire 800, or to flash-based ExpressCard/34 cards, that both instantly mount on your OSX desktop for immediate editing and file access. Ki Pro ships with a 250GB hard disk that can store up to 2 hours of Apple Pro Res media. For additional storage you can buy a variety of storage types.

ExpressCard/34 Memory Cards

Although AJA doesn't make or sell ExpressCard/34 memory cards, Ki Pro provides two slots where they can be used. With the rapid industry development of these cards and many manufacturers providing them, brands and models will change often. AJA will post on the Ki Pro support web page which brands AJA has tested and found to work acceptably. Since cards have to be fast enough to sustain throughput without dropping frames, not all ExpressCard/34 cards will qualify for Ki Pro usage.

Search here to find list of qualified cards:

<http://www.aja.com/support/ki-pro/ki-pro.php>



ExpressCard/34 Memory Card

Removable Storage Modules (HDD or SSD)

Although the Ki Pro comes standard with a removable 250GB SATA HDD Storage Module, an optional SDD Storage Module is also available. The Ki Pro Solid State Storage Module (SSD) is recommended for mobile environments where shock-proof sturdiness may be needed. The Ki Pro SSD Storage Module offers the ultimate in media reliability.

You may also choose to purchase extra HDD or SSD Storage Modules so you can quickly load and unload media from the Ki Pro unit while onset.

Storage Modules can be powered via the FireWire 800 cable, or via an AC adapter (supplied).

Check with your AJA dealer or the AJA website for Storage Module offerings as capacities and models may change.



Storage Module (HDD and SSD look identical)

Selecting Media

To select which storage device is used for media recording and playback, press the SLOT button on the bottom right side of Ki Pro (operator side). The currently selected storage device will have a lit green LED. Pressing the SLOT button switches to the next available device from the possible three (storage module, ExpressCard 1 and ExpressCard 2).

This function is only active when in “STOP” mode and requires a “PRESS STOP TO CONFIRM” if not stopped. After you select a slot, the system returns to the last selected clip and timecode for that slot. If the media has been changed since the slot was last selected (physically removed/media replaced), then the “first” clip will be “cued” to its start point. If no media is present in the selected slot, the system will display “WARNING NO MEDIA.” To clear the warning, either select another slot by pressing the SLOT button again or insert media into the selected slot. If inserted media has any issues, additional prompts may be displayed as appropriate such as: “WARNING FRMT MEDIA” or “WARNING MEDIA LOW.”

Note: On power up, the storage module is the initial storage system selected and accessed by Ki Pro.

Formatting Media

To reformat storage media, it must first be selected using the SLOT button (see previous topic). Once selected, follow these steps:

1. Press the STOP button
2. Press the MEDIA button
3. Press SELECT (up or down) repeatedly until you see the menu 16.1 Format Media.
4. Press ADJUST up arrow. Ki Pro will display “ERASE MEDIA nn?” (where “nn” is the storage device D1 for storage module or S1 for the top ExpressCard, or S2 for the bottom ExpressCard). Press the ADJUST up arrow button. Ki Pro will display “CONFIRM ERASE”—press and hold the ADJUST up arrow button for 2 seconds or longer and then formatting will begin. Ki Pro will display progress and when done, you’ll see the 16.1 Format Media menu once again.

Installation

The following topic details set up and installation of Ki Pro. There are two different ways to set up and use the Ki Pro portable recorder:

- Stand-alone use
- Camera and mounting with optional Exoskeleton (with or without a tripod)

Software setup is the same for both uses. Choices you will make include how Ki Pro will be controlled (front panel, 802.11 wireless, or Ethernet & web-browser) and the physical system requirements for your application (camera mount or not, video and audio monitoring choices, and media workflows). First we’ll discuss mounting methods and then follow up with software configuration and setup.

Stand-alone Usage

In stand-alone use, Ki Pro is simply a box that connects to the video and audio output connector(s) from a camera or camcorder, recording whatever media is output. Here are some typical workflows and applications:

- Recording a live video feed from a security camera; Ki Pro is rackmounted, receiving component video input.
- Recording a corporate video live from a camera; Ki Pro sits on a computer work desk receiving component video input and audio from a mixer.
- Recording on location, Ki Pro is truck-mounted, powered off 12 volt battery.
- Desk mounted in an AV media library, recording legacy material from a variety of decks, formats and sources, converting dissimilar media to standardized Apple Pro Res for archival.
- Recording live house-of-worship services, Ki Pro sits on a shelf receiving a feed from a wall mounted remote camera and audio feed from house mixer.
- Recording live music at a remote location, Ki Pro receives video feed from event producer's switcher and picks up audio from a stereo pair of phantom-powered condenser microphones.



Camera Mounting with Exoskeleton

Ki Pro's applications become even wider, when you add in the optional Exoskeleton that provides for mounting of both a camera and/or a tripod. Here are some typical workflows and applications:

- Handheld camcorder with Ki Pro mounted underneath and a battery pack used for live sports—recorded media is ready to edit immediately.
- Broadcast usage with Ki Pro's hardware-based conversion capability to take camera's (1080 or 720) input and realtime convert to another format.



Ki Pro with Exoskeleton and camera on mount

- Onset application: camera operator controls shooting via optional AJA lens tap—whenever shutter is pressed, recording/stop occurs. An assistant remotely names clips and content using an iPhone communicating with Ki Pro wirelessly.
- Multi-camera shoot, with different brands of cameras, different internal camera codecs, all mounted with Ki Pros and delivering the same format of media: Apple Pro Res 422, ready to edit immediately after filming. No log and capture necessary.

Ki Pro with Exoskeleton and optional endplates with user-supplied accessory rods

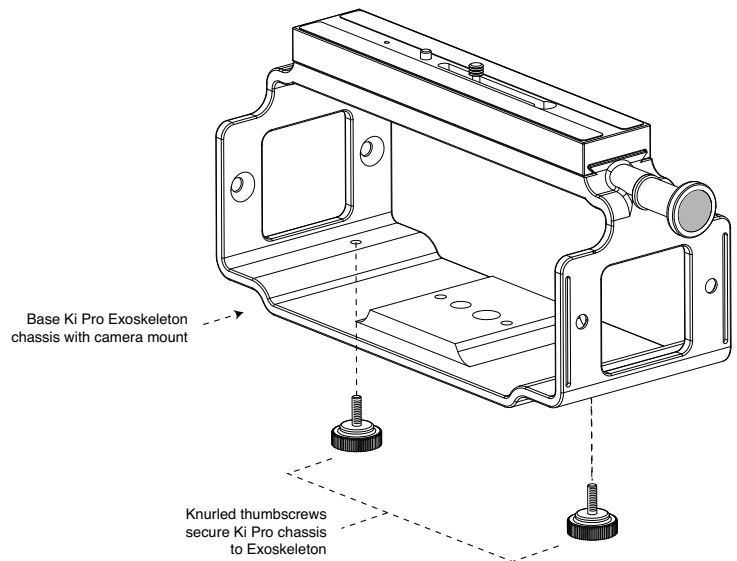


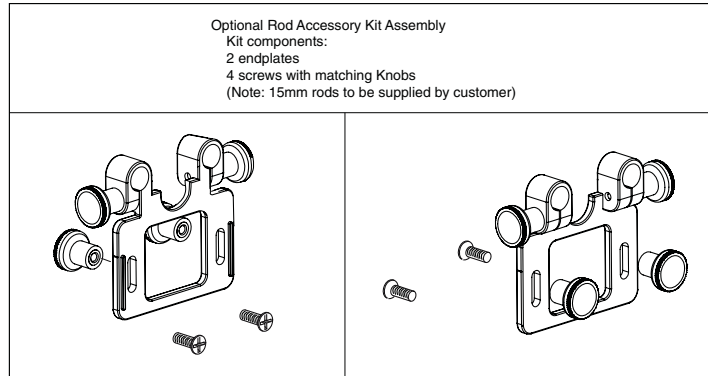
When mounting a camera inside the Exoskeleton frame, all Ki Pro controls will face the same direction as the camera controls, so the camera operator can easily make adjustments. Power to Ki Pro exits on the same side as the back of the camera so cables don't clutter the lens side of the setup.

Exoskeleton Setup and Adjustment

The Exoskeleton option has two configurations. As it comes out of the box, it contains an adjustable camera mount on top, a plate on the bottom for tripod mounting, and two thumbscrews for securing the Ki Pro unit to the Exoskeleton.

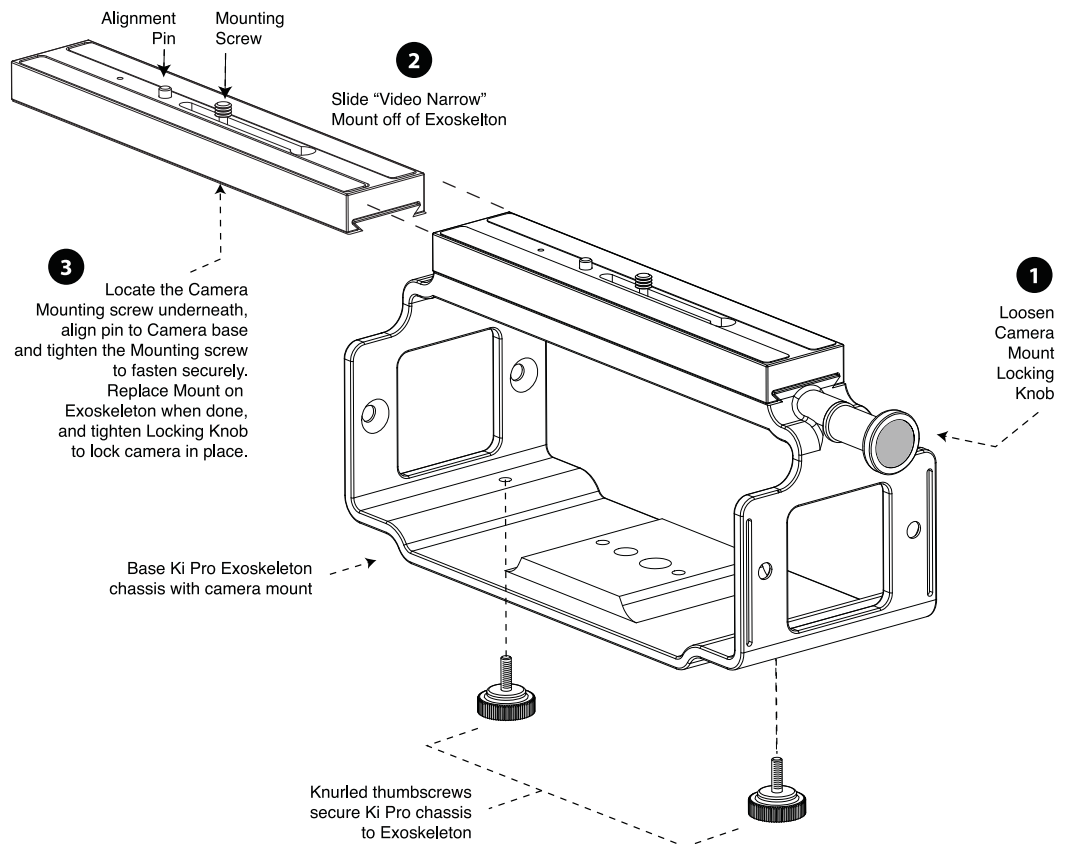
An option that can be added is an *accessory rod kit* that adds plates to each side of the Exoskeleton frame so that 15mm user-supplied rods can be used with the camera. Rods are handy for mounting battery packs, matte boxes, and a wide variety of other options.





For most uses with an Exoskeleton, you'll want to first mount the camera or camcorder to the adjustable mount on top, before sliding in the Ki Pro unit and locking it. To mount a camera, follow these steps:

1. Locate the camera mount locking knob on the Exoskeleton and loosen it.
2. Slide the camera mount off of the mounting rail.
3. Place the camera on the mount, orienting the mount's alignment pin to camera's corresponding pin socket. Once aligned, tighten the mounting screw to secure the camera.
4. Slide the camera and mount back on the rail and tighten the locking knob.



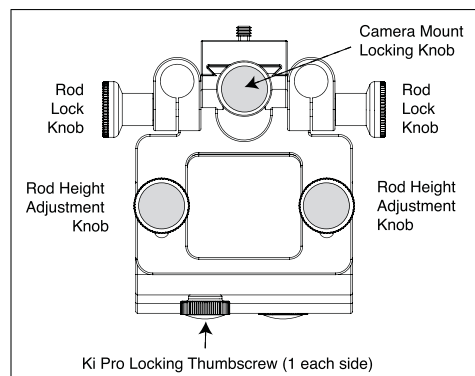
Exoskeleton Camera Mounting

Attaching the rod accessory kit is simple:

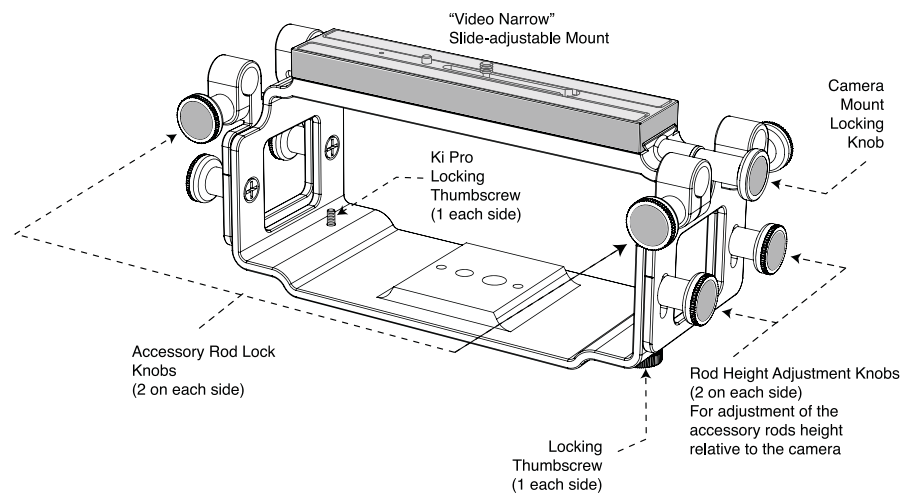
1. Place an endplate from the kit on the outside of the Exoskeleton frame, aligning its two screw slots with the two screw holes in the frame.
2. Insert one of the supplied screws from the inside of the frame through the frame hole and slot. While holding the screw from the inside, screw one of the supplied knobs on the threaded end of the screw.
3. Repeat step 2 for each of the 4 knobs and screws.

Once the kit is installed, you can then loosen the rod lock knobs, insert user-supplied 15mm accessory rods, and then mount any desired accessories.

To raise or lower the rods, simply loosen the rod height adjustment knobs (the ones you installed in step 2), lift the rods to the desired height, and then tighten the knobs once complete.



Side View



Exoskeleton Endplates and Rod Height Adjustment

Applying Power

The installation and set up of a Ki Pro is straight-forward. If you'll be controlling the unit from the front panel buttons and display, it's ready right out of the box. Just cable the system's audio and video sources, VTR(s), monitors, and audio equipment, mount the Ki Pro unit as desired, and begin recording. However, if you wish to control Ki Pro from a web browser or 802.11 device (iPhone etc.), then there are additional configuration steps necessary.

Using AC Power

To begin using Ki Pro, plug the 4-pin XLR on the supplied AC adapter into the XLR power socket on the back of Ki Pro. Then plug the AC adapters line cord into 110 VAC or 220 VAC (the supply is autosensing).

Warning: *Do not open the chassis. There are no user-serviceable parts inside. Hazardous voltage is present inside the unit, presenting a risk of electric shock or serious personal injury. Opening the chassis will void the warranty unless performed by an AJA service center or licensed facility. Remove the supplied AC line cord from mains power when moving the unit. Do not defeat the safety purpose of the grounding-type plug.*

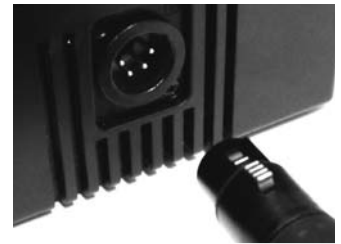
Using DC Power



1. Locate Line Cord



2. Insert into DC supply

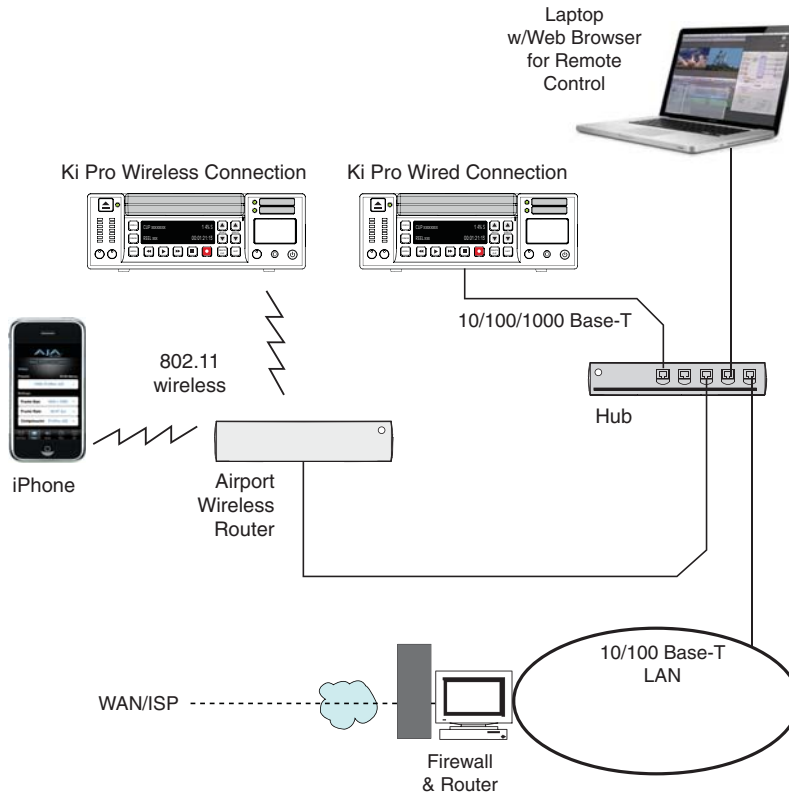


3. Insert 4-pin XLR into
12Vdc Ki Pro power socket

Remote Network Control

Topics Here TBD.

WiFi versus wired-Ethernet



Ki Pro Networking Example

Network Connections

Ki Pro can be networked directly to a MacBook Pro or Mac using a single Ethernet cable (straight or cross-over)—or it can be connected to a local area network (LAN). If wireless networking is desired, Ki Pro can also be controlled via an iPhone or laptop browser using 802.11 and communicating through a wireless access point (Airport).

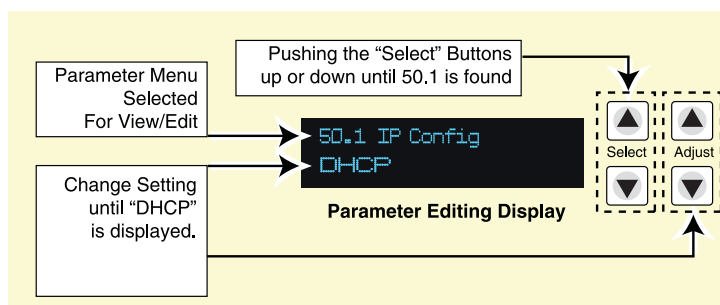
In hard-wired configurations, Ki Pro connects via its 10/100/100 Base-TX Ethernet connector. In a direct connection, you simply connect the Ki Pro to an Ethernet-equipped computer having a browser using a Cat-5 cable. If connecting via a LAN, you then connect the Ki Pro's Ethernet connector to a hub or switch on the LAN. A LAN is a shared network that includes other Ethernet devices all attached via a hub or digital switch. LANs may be divided into zones separated by software or hardware routers. Devices on a LAN have IP addresses which may be fixed and permanent, or dynamically assigned by the network (DHCP). When attaching Ki Pro to a LAN, you should first talk to your network administrator and find out how they want it connected (static IP or DHCP). Your IT department will be able to supply the information you need to install Ki Pro on a LAN.

TCP/IP Information You'll Need

If your LAN has a DHCP server that assigns IP addresses dynamically, then you don't have to configure anything (Ki Pro defaults to DHCP). If for some reason your IT administrator prefers an assigned IP address that is fixed (called a "static IP"), then get the IP address—you'll be entering it in the "IP CONFIG parameter." If your LAN requires static IP addresses, then also ask your IT administrator for the *Subnet Mask* and *default gateway* IP address (your LAN's internet router). The following two topics discuss two different ways to set up Ki Pro: via DHCP or via a static IP address.

Networking via DHCP

The default configuration (from the factory) automatically looks for a DHCP server to issue an IP address. So, as long as your network has a DHCP server (usually part of your router—e.g. an Airport base station wireless router), then you need to do nothing other than plugging the Ki Pro into the net. To manually select DHCP: use the Select buttons to navigate to the parameter "50.1 IP CONFIG", and then use the Adjust buttons to select "DHCP". That's it!



Here are the steps to communicate with Ki Pro after choosing the DHCP selection:

1. Use the Select buttons to navigate to parameter 50.2. Note on a piece of paper the DHCP supplied IP address shown.
2. With your laptop or desktop computer connected to the same LAN and DHCP enabled, type the IP address you noted in step 1 into the browser address bar. You should now see Ki Pro's browser status screen.

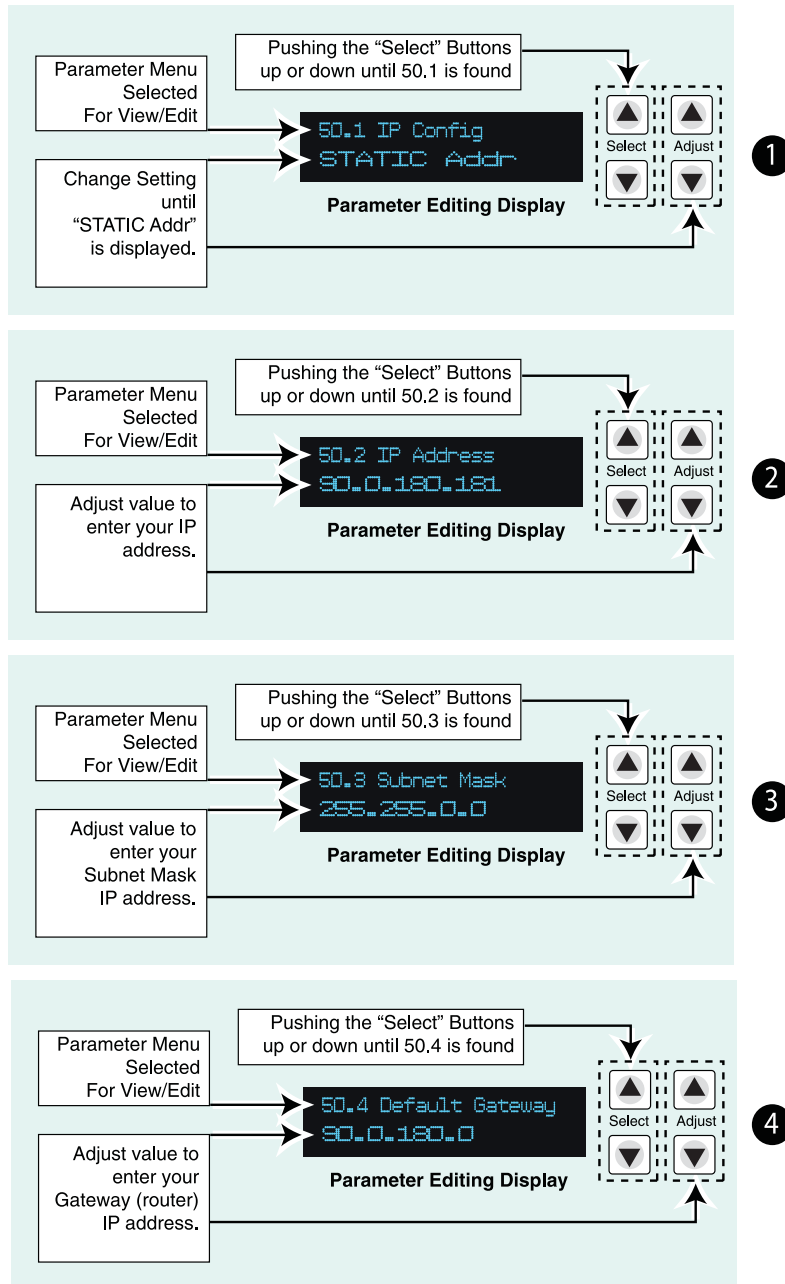
If Ki Pro cannot get an address from the DHCP server on the LAN while Ki Pro is set to DHCP via parameter 50.1, it will then automatically drop back to a preset factory IP address of 192.168.0.2. In this instance you can follow these alternate steps to communicate with Ki Pro:

1. Set the computer's Ethernet IP address to 192.168.0.n (where n is not 2).
2. Set the computer's Subnet mask to 255.255.255.0 (most computers default to the proper netmask when the address is set).
3. Run a browser on the computer and type "192.168.0.2" (the factory fallback IP address). You should now see Ki Pro's browser status screen.

Note: (If Ki Pro fails to find a DHCP server via its network connection, it will fall back to using the factory default static IP of 192.168.0.2—or whatever IP address you've previously defined. AJA recommends you define a Static IP address with parameter 50.2 so you'll be prepared in the event your DHCP server fails.)

Networking Ki Pro using a Static IP Address

To set a static IP address for Ki Pro, you'll have to make some simple Parameter menu selections. The illustration below shows the four menu selections you need to make, while entering the information provided to you by your IT administrator (as discussed earlier).



Note: for parameters 50.2, 50.3, and 50.4, you will be setting IP addresses that consist of "octets" separated by a period (i.e., 90.0.180.0).

For these parameters, the *Select* button selects the octet and then the *Adjust* buttons select the desired number. Pressing *Select* again advances to the next octet. At the final octet, the address will flash—pressing *Select* at that point confirms the setting.

Configuring Ki Pro with a Static IP Address

Networking Ki Pro using the Factory Default IP

If you don't want to use DHCP to network Ki Pro and also don't want to set your own static IP address, you can simply use a Default setting to use a factory setting of 10.65.74.65. This might be useful for an application where you directly connect a laptop or computer to Ki Pro and want to get networking quickly. Here are the steps to set up this method of communication:

1. Use the *Select* buttons to navigate to parameter "50.1 IP CONFIG", and then use the *Adjust* buttons to select "Default".

2. Set your laptop or desktop computer Ethernet IP address to 10.m.n.m (where m is not 65 and n is not 74).
3. Also on the computer, set the Subnet mask to 255.0.0.0 (most PCs default to the proper netmask when the address is set—so you may not have to do anything here).
4. Run a browser on the computer and type “10.65.74.65” (the *Default* factory IP address). You should now see the FS1’s browser status screen.

Test Ki Pro’s Network Connection with “Ping”

After setting the IP address and other TCP/IP settings and connecting Ki Pro’s Ethernet connection to a LAN or directly to a computer, ensure that you have a valid connection by “Pinging” the Ki Pro. Pinging ensures that other devices on the network, or a computer directly attached to it, can see it. Simply run the Ping utility from a computer on the same LAN as Ki Pro, or one attached directly to Ki Pro. Here’s how to Ping a Ki Pro from a Mac OSX computer or Windows PC:

Mac Ping Procedure

1. Find the Applications Folder, and then find the Utilities Folder inside of the Applications Folder.
2. Locate the “Terminal” utility application and double-click it.
3. On the Ki Pro, go to parameter menu 50.2 and read the IP address.
4. At the Terminal prompt, enter the IP address noted in step 3. For example: ping 192.168.0.2
5. If successful, the ping utility will respond that packets were sent, received and how long it took. For example:
64 bytes from 192.168.0.2: icmp_seq=0 ttl=64 time=0.590 ms
6. If unsuccessful, check Ki Pro’s network settings and resolve the problem with your IT administrator.

Controlling Ki Pro from a web-browser

To control Ki Pro from a web-browser on a network attached computer, you must enter Ki Pro’s IP address as a URL in the browser. For example, if Ki Pro’s IP address were “90.0.6.31”, you would then type into the web browser: `http://90.0.6.31`

This topic is explained in greater detail in *Chapter 4: Browser Remote Control*.

Controlling Ki Pro via WiFi

Another option for remote control is Ki Pro’s built-in 802.11 wireless transceiver which can communicate with properly configured 802.11 wireless access points such as an Airport Basestation or 802.11 wireless router (linksys etc.).

You can enable or disable WiFi control of Ki Pro for security. Further, you can select a type of wireless security to match other devices; popular methods such as WEP, WPA and WPA2 are supported. To use wireless control you’ll follow this basic process:

- Enable wireless control of Ki Pro
- Select a wireless network to connect to (as set on the access point you’ll communicate with).
- Select the type of security, if any, to be used. If there is security, you’ll also enter its password.
- Lastly, you’ll select from two choices the type of location and 802.11 radio environment where Ki Pro will reside—indoor or outdoor.

- Once configured, you can control Ki Pro from an iPhone or other 802.11 wireless device that supports browser control (iTouch et al).

Wireless control of Ki Pro is managed using menus 53.1 through 53.5 as listed in Chapter 3, under *Config Menu Parameters*. The steps of setting up and using Wireless control are then discussed later in Chapter 4 under *Browser Remote Control*.

Using Ki Pro as a FireWire 800 Hard Drive

We've already discussed how Ki Pro's storage module can be used as a stand-alone hard drive to immediately edit data recorded—you simply remove it and connect it to a Mac via a FireWire 800 cable. Similarly, you can also connect the whole Ki Pro unit (with Storage Module and any desired ExpressCard/34 cards installed) also via a FireWire 800 cable to a Mac. When a Ki Pro is connected, all available storage media installed in that Ki Pro will mount on the Mac's desktop. For example, if you have a 250GB HDD storage module and an ExpressCard/34 8GB card installed, then you'll see those two volumes mount on the desktop with their HFS file systems, ready for editing.

This feature may not be enabled in Version 1.0 Ki Pro software.