

XENA LH/LHe XENA LS

Installation and Operation Guide



AJA
AJA VIDEO SYSTEMS INC

Preliminary

December 8, 2005 P/N101658

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Models: LH/LHe and LS

Chapter 1: Introduction



Overview

The AJA XENA series brings the highest quality HD, SD and analog video/audio to a Windows XP workstation running Adobe After Effects, Photoshop, AJA's Machina capture/playback application, and a variety of other audio/video editing applications. (See *System Requirements*, later in this chapter for tested and approved hardware and software for XENA operation.) XENA digital and analog interfaces are very high quality. XENA LH/LHe models capture HD/SD data from a variety of sources into a format on disk that fits your post-production workflow (XENA LS is standard definition only). Record data directly from SD and HD decks, telecines, and film scanners into any of the following file formats:

- 10-bit DPX and Cineon (LH/LHe only)
- 8-bit RGB (LH/LHe only) and RGBA
- 8-bit TGA
- TIFF
- BMP
- 8/10-bit AVI and QuickTime.

Xena supports up to 8 audio tracks (4 stereo pairs) of 16/24/32-bit Wave and QuickTime embedded digital audio or 2-channel AES and Analog.

And XENA is the only capture board available that supports analog HD. Using superb 12-bit video A/D and D/A converters, analog formats like Sony HDV2 also look excellent. In addition to high quality video, XENA also supports balanced analog, AES/EBU, and embedded audio I/O, working at 24 bits and 48 kHz on the hardware level and translating to 16, 24, or 32-bit in XENA software. For simplified system

integration, XENA includes hardware sample-rate conversion for AES inputs (eliminating annoying synchronization hassles) and RS-422 machine control.

Two Xena LH

The XENA LH, and LHe models provide the same power and functionality, but differ in their bus interfaces. The LHe offers a PCI Express interface for use with the latest Windows XP workstations. The XENA is a PCI card that plugs into a PC chassis. Both models work with After Effects, Photoshop, Machina, and other applications to provide a professional editing suite, corporate/industrial video center, or high-powered desktop video setup. And for even easier connectivity, an optional KL-Box rack mountable breakout box can be purchased for either model—XENA ships with its own cable set.

This manual covers the installation and operation of XENA LS, LH and LHe models and discusses using them with supported editing applications. Instructions for installing the KL-Box are shipped with the KL-Box.

Features

For ease of discussion, the text in this manual refers to the LS, LH and LHe models as “XENA”, except where differences are specifically noted.

The XENA card offers a large number of unique features for optimum quality, ease of use, and support for a wide variety of workflows and environments. XENA provides flexible standard definition and high definition (LH/LHe only) capture and playback, a hardware downconverter (LH/LHe only) for working in mixed SD/HD environments—and it supports both analog and digital audio/video I/O.

Hardware

- 10-bit uncompressed SD/HD capture card
- 12-bit HD Analog Component I/O
- 12-bit SD Analog Component/Composite/S-Video I/O
- 10-bit hardware HD-to-SD downconversion
- Dynamic RT Extreme hardware acceleration
- SDI or HD-SDI Input, 2 independent SDI/HD-SDI outputs (LH/LHe)
- 2-channel analog balanced XLR audio I/O
- 2-channel AES XLR audio I/O
- 8-channel SDI embedded audio I/O
- HD/SD genlock on analog video inputs
- RS-422 Machine Control
- Support for AJA Machina, After Effects, PhotoShop, Combustion, Fusion 5 and more software
- Cables standard

- Optional KL-box Breakout Box—provides rack mounting and flexible easy I/O (KL-box cabling is included with the KL-box). When ordering, specify the XENA model you're using.
- 3-year warranty

XENA Audio

XENA supports 2-channel 24-bit 48 kHz AES audio via XLR connections, and 8 channel embedded 24 bit 48 kHz audio over the same single SDI connection as the video. If you are using a digital deck—you'll have the proper connections to the deck.

For analog audio, XENA provides two-channel balanced audio input and output. If you purchase the optional KL-Box breakout box, you also get two-channel unbalanced audio output (RCA jacks).

XENA 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, 32-96 kHz, and then convert it to 24 bit 48 kHz audio, perfectly locked to internal XENA video. Sample rate conversion is done at very high quality (over 120db THD).

Software

- XENA control software and plugins for tightly integrated operation with a variety of compositing packages providing source selection and controlling XENA within the Windows XP environment (Desktop, Input Pass-through, and more).
- Supports all popular standard and high definition formats: 8/10 bit uncompressed.
- Support for After Effects, Adobe PhotoShop, Autodesk Combustion, and Other Applications (application software not included).

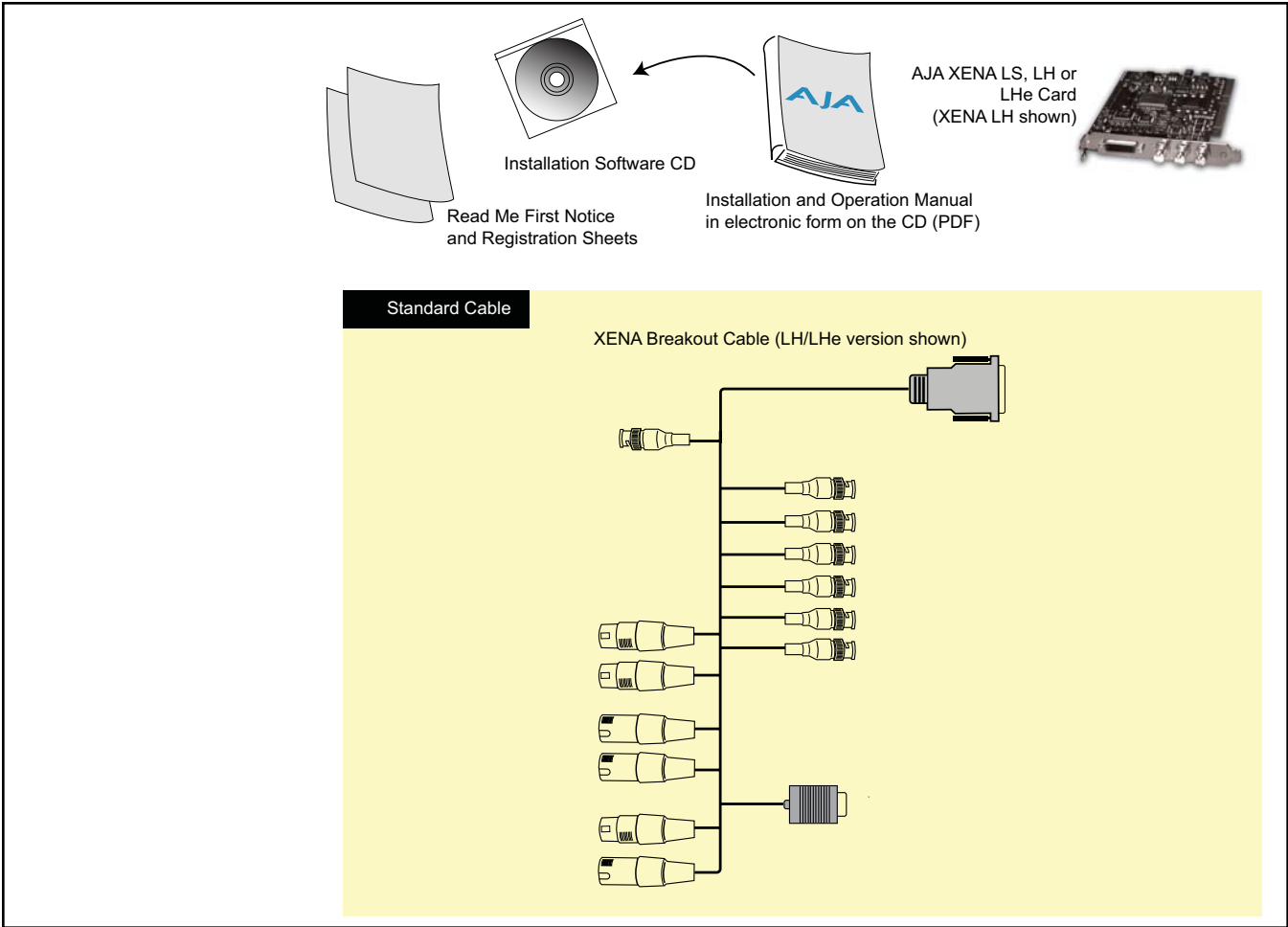
AJA's XENA software and hardware were developed for use with a variety of video/motion graphics compositing applications for powerful integrated video/audio capture, compositing, and video production. With a Windows XP workstation, and XENA, you have an ideal high-quality cost-effective system for standard definition, high definition, and analog video production workflows. Software is supplied on CD, including AJA's Machina Capture/Playback application, drivers for the card itself, and all files necessary interfacing with After Effects, PhotoShop, Combustion and other application support (Third-party software applications not included).

What's In The Box?

When you unpack your AJA XENA LH, LHe, or LS, you'll find the following components:

- AJA XENA Software and Documentation CD-ROM—this CD contains the software installer to place XENA drivers, Plugin's, and the AJA Machina capture/playback application on a Windows XP workstation. 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).
- XENA LHe PCI Express card, XENA LH or LS PCI 66/64 card, depending on the model you ordered.
- Cable, XENA Standard Breakout, with Analog video, audio, AES, Reference Input, and RS-422 Machine Control. SD-SDI and HD-SDI In/Out connectors are on the XENA card itself.
- Read Me First Notice—Contains late-breaking news and/or errata related to XENA and the documentation.
- Registration Sheet—allows you to register your card by mail or online (details provided).

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



XENA 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
Windows XP Operating System	XP Service Pack 2, with QuickTime 7.0
Workstation	HP XW8200
Internal Storage (inside PC)	74 GB 10K RPM Raptor

Understanding Disk Storage Methods

The XENA card, an Windows XP workstation, and the variety of XENA-supported editing software, 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 Windows XP workstation 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 workstation to disk (read/write). There are a variety of system configurations and peripherals that can provide this level of performance. Refer to *Workstation Configuration* in Chapter 3 for approved and tested system configurations.

Cable Connections

XENA offers unsurpassed cable connectivity for a video/audio capture card. Connections are made via a supplied breakout cable and three BNCs on the XENA Card endplate.

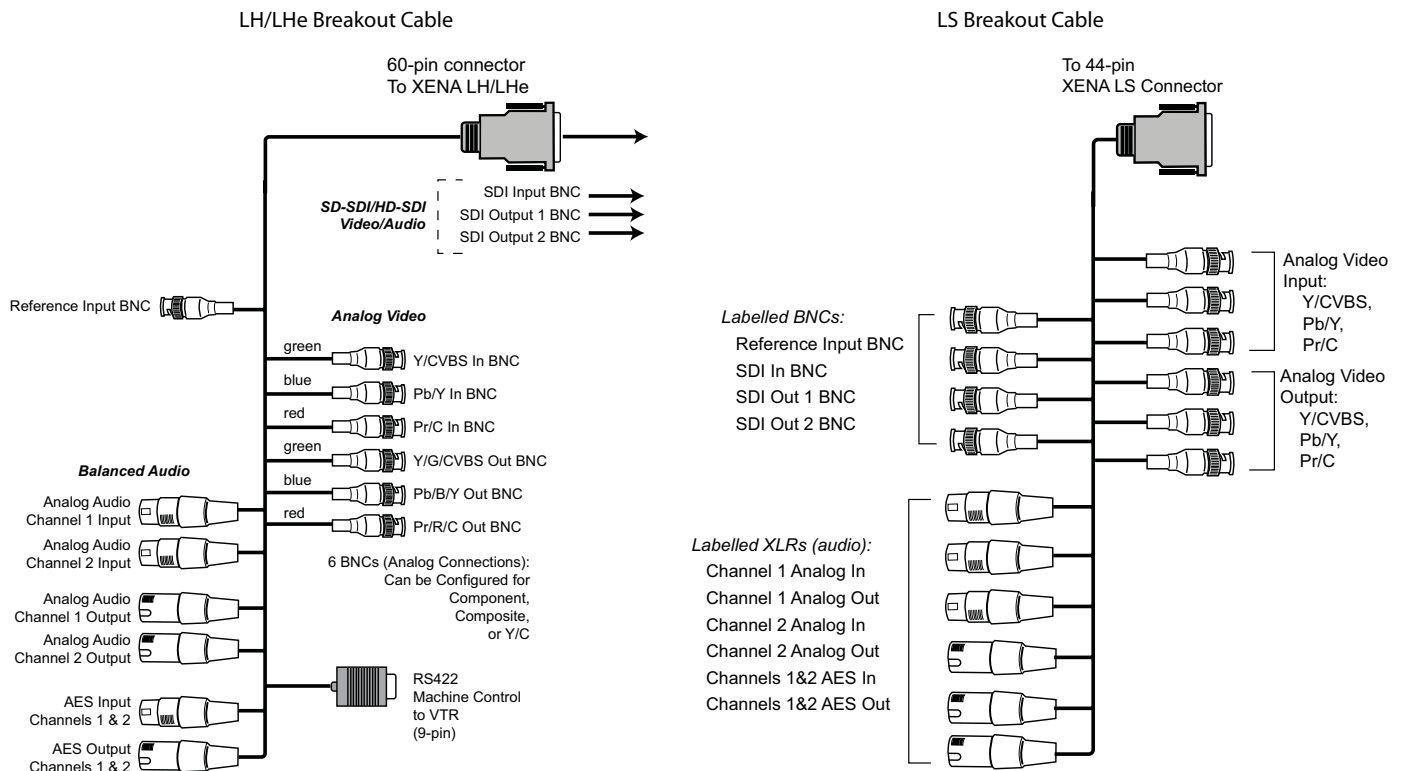
Using the Breakout Cable and 3 BNCs

The breakout cable supports:

- Reference Input (BNC)
- Component/Composite/S Video Input (3x BNC)
- Component/Composite/S Video Output (3x BNC)
- AES In (2x XLR)
- AES Out (2x XLR)
- Balanced Audio In (2x XLR)
- Balanced Audio Out (2x XLR)
- RS-422 Machine Control (9 pin D)

The three BNCs on the XENA Card endplate additionally provide:

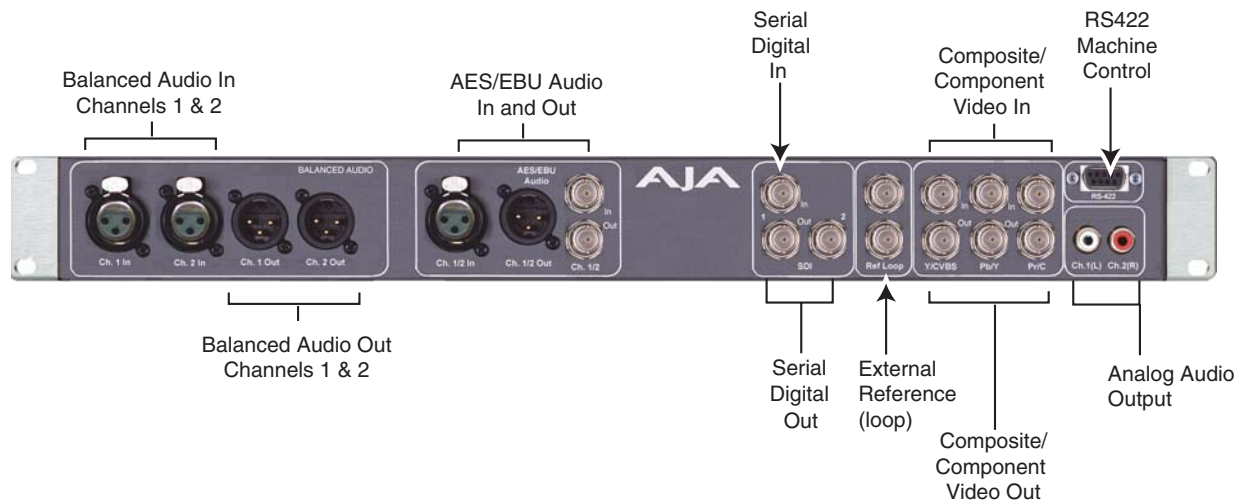
- Standard-definition and High-definition (LH/LHe only) SDI input (BNC)
- 2 SDI outputs (2x BNC, independent outputs)



XENA Breakout Cables

Using KL-box

The KL-box attaches to the XENA card via cables that attach to the back of the KL-box. These cables are supplied with the KL-Box (one 60-pin to 60-pin, and one 3-BNC to 3-BNC). When you purchase the optional KL-Box, you get two-channel unbalanced audio output (2 RCA Jacks)—not available with the standard cable.

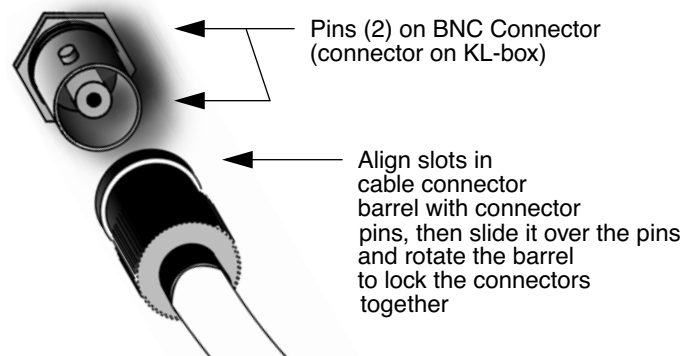


AJA KL-box Panel Connectors

About BNC 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.



Connector Descriptions—Cables and KL-box

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

SDI Input and Outputs

BNC connectors are provided on the XENA card endplate for one SD-SDI or HD-SDI (LH/LHe only) input and two SDI outputs (independent of the input). The SDI input and outputs support video and 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.).

2-Channel Digital AES/EBU Audio Inputs And Outputs

One female XLR connector is provided for the channel 1 and 2 inputs, while a male XLR connector carries channel 1 and 2 outputs. AES/EBU signals are handled internally as 24-bit digital. The optional KL-box also provides XLR audio connections on the front panel.

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

Analog 2-Channel Balanced Audio

Two sets of analog XLR connectors, one for each channel, support balanced audio connections. Male XLRs are provided for outputs and female XLRs are provided for inputs. Balanced audio (differential) connections provide better analog audio quality over longer cable runs. Most professional quality VTRs and audio equipment have XLR style connectors for analog audio. Analog audio signals are converted internally to 24-bit digital.

Analog 2-Channel Unbalanced Audio (KL-box only)

On the KL-box are two analog output connectors, one for each channel. These connectors are RCA-style phono jacks.

RS422 Machine Control

A female DB9 connector on the breakout cable provides connection for VTRs, camcorders, disk media servers, and other devices using RS422 SMPTE (Sony) protocol. This connector is also present on the optional KL-box. (Connector pinout is listed in Appendix A: Specifications.)

Analog Monitor Out (Component/Composite HD/SD)

Both the standard I/O cable and the optional KL-Box feature two groups of 3 BNC connectors (each) for input and output of component, composite and Y/C functions. The signals are labelled on both the cable and KL-Box connectors.

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, XENA supports it. However, because the XENA (and SMPTE SDI) 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 XENA software.

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. XENA uses the modern YPbPr terminology exclusively. XENA 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 XENA software.

Reference Video

A single BNC on the standard XENA cable—or two BNC connectors on KL-box (it loops through)—allow you to synchronize XENA 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 XENA outputs video it uses this reference signal to lock to. When connecting a reference video source, the locking signal should be the same format as the Primary format selected in the XENA software. It is possible in some circumstances to use an alternate format video signal as long as the basic frame rate is compatible.

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 XENA in a typical Video environment. Typical workflows are discussed.

Chapter 3 provides complete instructions for installing and configuring the AJA XENA card and Workstation. The user is guided through unpacking, installing the card into a Windows XP workstation, installing XENA 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 XENA when used with AJA's Machina capture/playback application.

Chapter 5 discusses operational aspects of XENA when used with Adobe After Effects compositing software.

Chapter 6 discusses operational aspects of XENA when used with Adobe PhotoShop photo/graphics editing application.

Chapter 7 discusses operational aspects of XENA when used with Autodesk Combustion software.

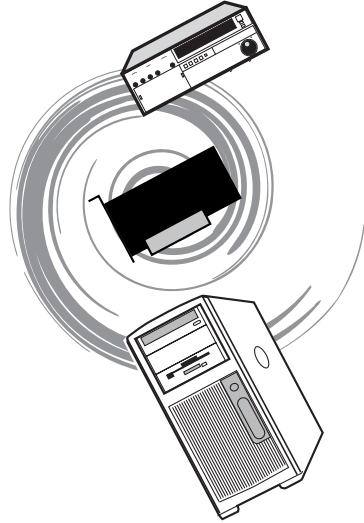
Chapter 8 discusses operational aspects of XENA when used with eyeon Fusion software.

Chapter 9 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.



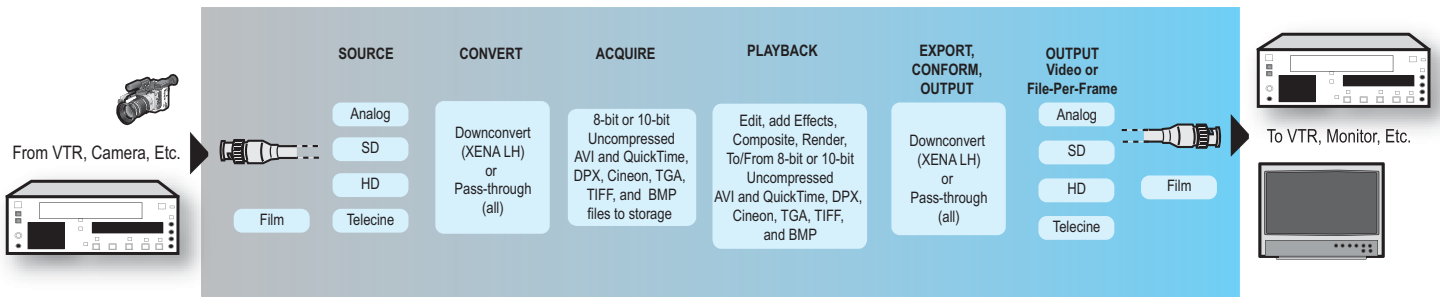
Chapter 2: XENA WORKFLOW



XENA 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 supported editing software such as Adobe After Effects and XENA 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 XENA applications supported. After the diagram, we also discuss some typical applications.



Workflow Scenarios

Understanding Typical Workflows

XENA and After Effects allow more workflow flexibility than ever before. Users can independently select different formats for capture and storage media, while also outputting to an array of analog and digital uncompressed formats—with all outputs active simultaneously. Capture can accept a range of formats from analog, SD and HD digital. Media can be stored on disk as the highest quality 8- or 10-bit uncompressed SD and HD.

Chapter 3:

Installation & Configuration



Installation Overview

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

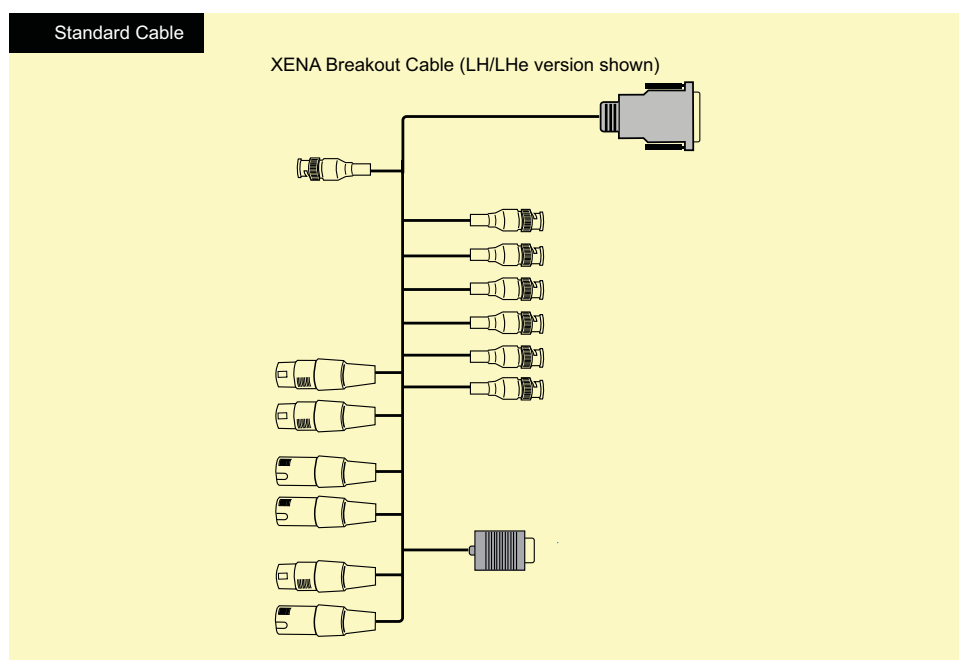
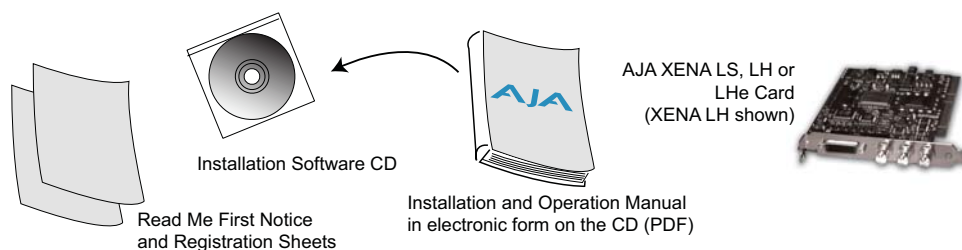
1. Unpack the shipping box
2. If not previously installed on your PC, ensure that your editing or capture/playback applications are installed as detailed in their user documentation. These applications *must be installed and have been run at least once prior to installing AJA XENA software to allow proper interface setup.*
3. Configure your HP XW8200 Workstation as appropriate for your workflow requirements. Refer to the diagrams provided for eight different XENA and RAID storage configurations.
4. Install AJA XENA software on your Workstation from the supplied AJA CD-ROM
5. Cable the system audio and video sources, VTR, audio monitor, and video monitor. If you purchased the optional KL-box, install it in an equipment rack or place it on a desk and connect its two cables to the XENA card. If you are using the standard cable set instead, connect those directly to the equipment.

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

Unpacking

Shipping Box Contents

XENA is shipped with a CD containing system software and an Installation and User manual (a PDF on the CD), and a cable assembly. If you purchased the optional KL-box breakout box, it ships with its own set of cables and instructions for connection to the XENA card.



Contents, XENA Shipping Box

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 XENA 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 XENA Card

1. Place the PC 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 PC to discharge any static electricity you have. Remove the power cable from the back of the PC.
3. Open the PC to gain access to the card slots as described in your Workstation User Manual.
4. Remove the XENA card from its protective anti-static bag; place the card on top of the bag.
5. Install the XENA card and RAID controller card (SCSI or Fibre Channel) as shown in the following diagram that best meets your workflow requirements.

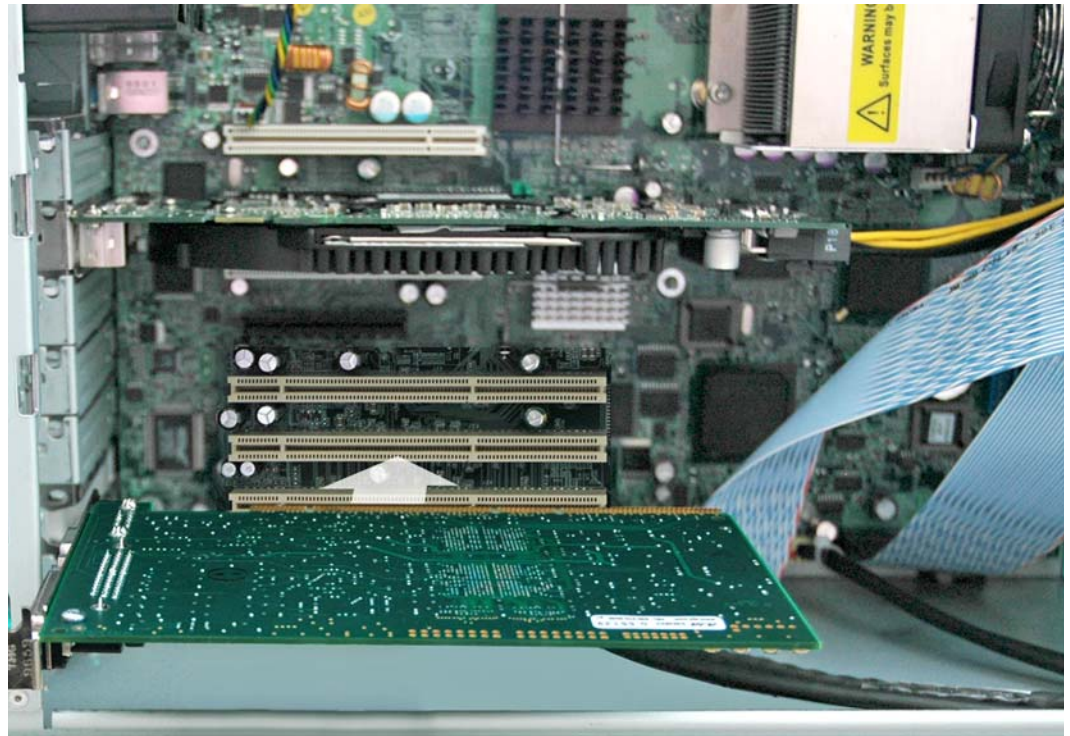
Note: Always put the RAID controller and XENA on separate PCI busses. This improves performance by reducing bus contention.

6. Open the card retainer bar on the left side of the chassis cardcage. Remove the card edge access cover from the desired slot where you will be inserting the XENA card.
7. Holding the XENA card by the card edge plate and an outside edge, carefully insert the XENA card by rocking it slowly into the slot. Ensure the card edge aligns properly with the PC'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 replacing the card retainer bar.
9. Replace the PC's panel/door as removed in step 3.



Remove the XENA Card From The Anti-Static Bag (LH/LHe shown)

PCI Slots →



Locate the PCI Slots Inside Your PC and Insert the XENA Card

Workstation Configuration

Eight workstation configurations that are tested and approved by AJA are depicted in the following four diagrams illustrating:

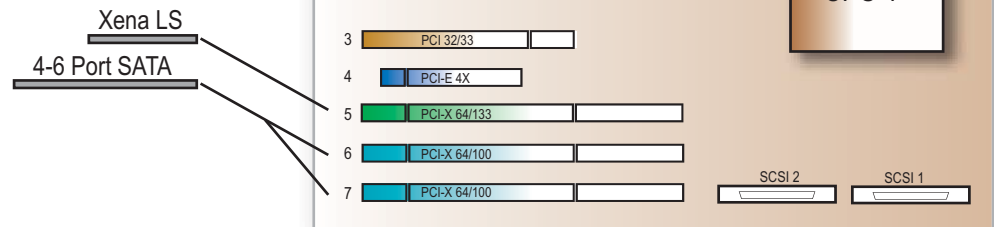
1. XENA LS with internal SATA storage
2. XENA LS with SCSI storage
3. XENA LH with internal SCSI storage
4. XENA LHe with internal SCSI storage
5. XENA LH with external SCSI storage
6. XENA LH with external Fiber storage
7. XENA LHe with external SCSI storage
8. XENA LHe with external Fiber storage

HP XW8200 AJA/Xena Required Setup

74 GB 10K RPM Raptor mounted on bottom of chassis*
 DVD Optical Drive
 2 GB Ram
 x16 PCIe Graphics card

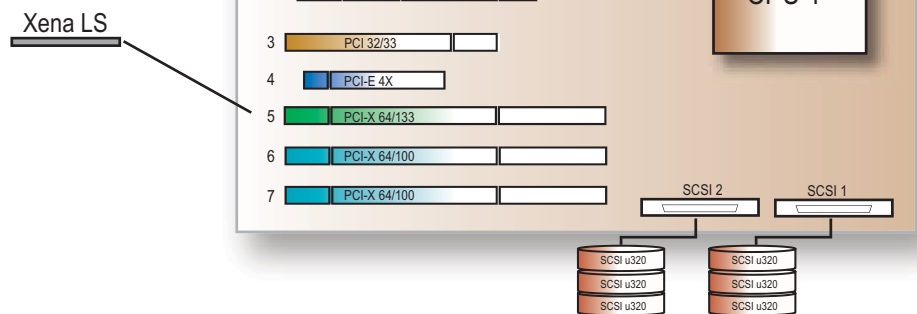
Standard definition
 uncompressed &
 still format PCI slot
 configuration using
 internal SATA storage*

Supports: NTSC/PAL
 Uncompressed 4:4:4
 & Still Format 4:4:4:4



Standard definition
 uncompressed &
 still format PCI slot
 configuration using
 internal SCSI storage*

Supports: NTSC/PAL
 Uncompressed 4:4:4
 & Still Format 4:4:4:4



*By mounting the 74 GB Boot drive on the bottom off the system the HP XW8200 can hold 6 internal hard drives 4 in the 3.5" drive bays and 2 in the 5.25" drive bays

Workstation with XENA LS SATA and SCSI internal storage

HP XW8200 AJA/Xena Required Setup

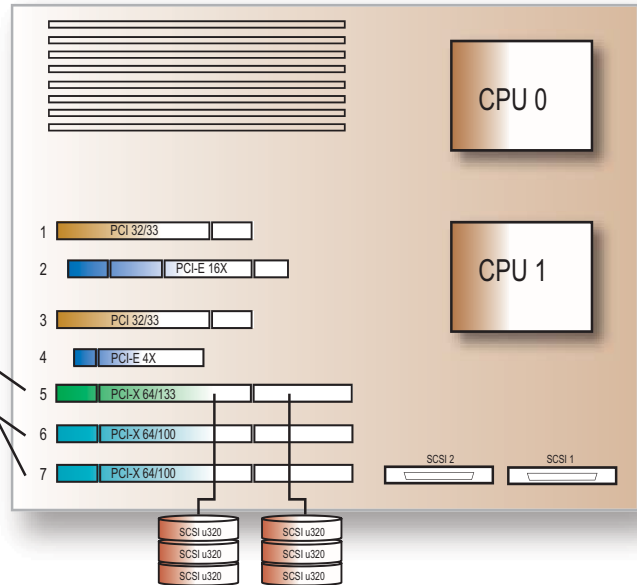
74 GB 10K RPM Raptor mounted on bottom of chassis*
 DVD Optical Drive
 2 GB Ram
 x16 PCIe Graphics card

High definition
 uncompressed &
 still format PCI slot
 configuration using
 internal SCSI storage*

Supports:
 720p/1080p/1080i
 Uncompressed 4:2:2
 & Still Format 8 Bit 4:4:4

Adaptec 39320A-R

Xena LH

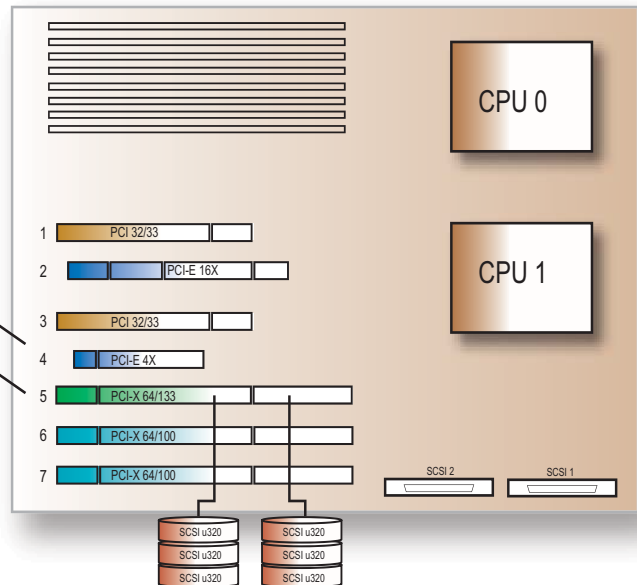


High definition
 uncompressed &
 still format PCI slot
 configuration using
 internal SCSI storage*

Supports:
 720p/1080p/1080i
 Uncompressed 4:2:2
 & Still Format 8 Bit 4:4:4

Xena LHe

Adaptec 39320A-R



*By mounting the 74 GB Boot drive on the bottom off the system the HP XW8200 can hold 6 internal hard drives 4 in the 3.5" drive bays and 2 in the 5.25" drive bays

Workstation with XENA LH & LHe internal SCSI storage

HP XW8200 AJA/Xena Required Setup

74 GB 10K RPM Raptor mounted on bottom of chassis*

DVD Optical Drive

2 GB Ram

x16 PCIe Graphics card

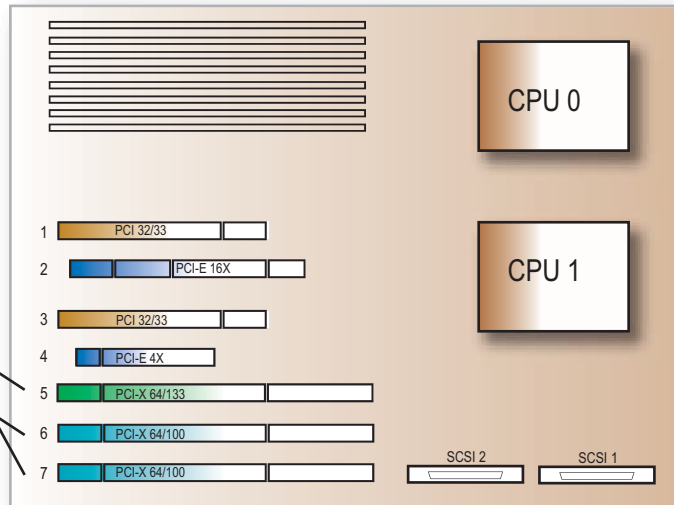
High definition
uncompressed &
still format PCI slot
configuration using
external SCSI storage

Supports:
720p/1080p/1080i
Uncompressed 4:2:2
& Still Format 8-bit 4:4:4



Adaptec 39320A-R

Xena LH



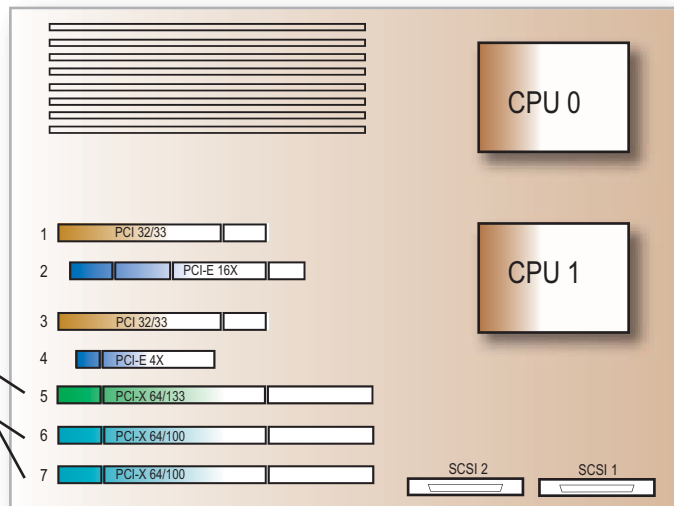
High definition
uncompressed &
still format PCI slot
configuration using
External Fiber storage

Supports:
720p/1080p/1080i
Uncompressed 4:2:2
& Still Format 8-bit 4:4:4



ATTO 4 Port Fiber Card

Xena LH



*By mounting the 74 GB Boot drive on the bottom off the system the HP XW8200
can hold 6 internal hard drives 4 in the 3.5" drive bays and 2 in the 5.25" drive bays

Workstation with XENA LH with external SCSI and external Fiber storage

HP XW8200 AJA/Xena Required Setup

74 GB 10K RPM Raptor mounted on bottom of chassis*
 DVD Optical Drive
 2 GB Ram
 x16 PCIe Graphics card

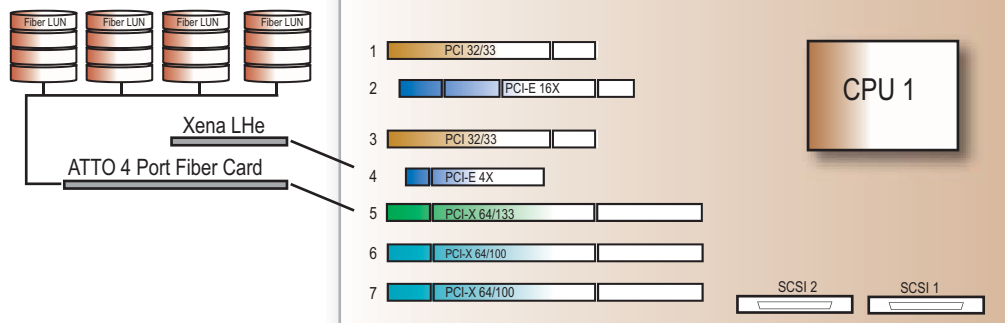
High definition
 uncompressed &
 still format PCI slot
 configuration using
 external SCSI storage

Supports:
 720p/1080p/1080i
 Uncompressed 4:4:4 Video only
 & Still Format 4:4:4 Video only



High definition
 uncompressed &
 still format PCI slot
 configuration using
 external Fiber storage

Supports:
 720p/1080p/1080i
 Uncompressed 4:4:4
 & Still Format 4:4:4:4



*By mounting the 74 GB Boot drive on the bottom off the system the HP XW8200 can hold 6 internal hard drives 4 in the 3.5" drive bays and 2 in the 5.25" drive bays

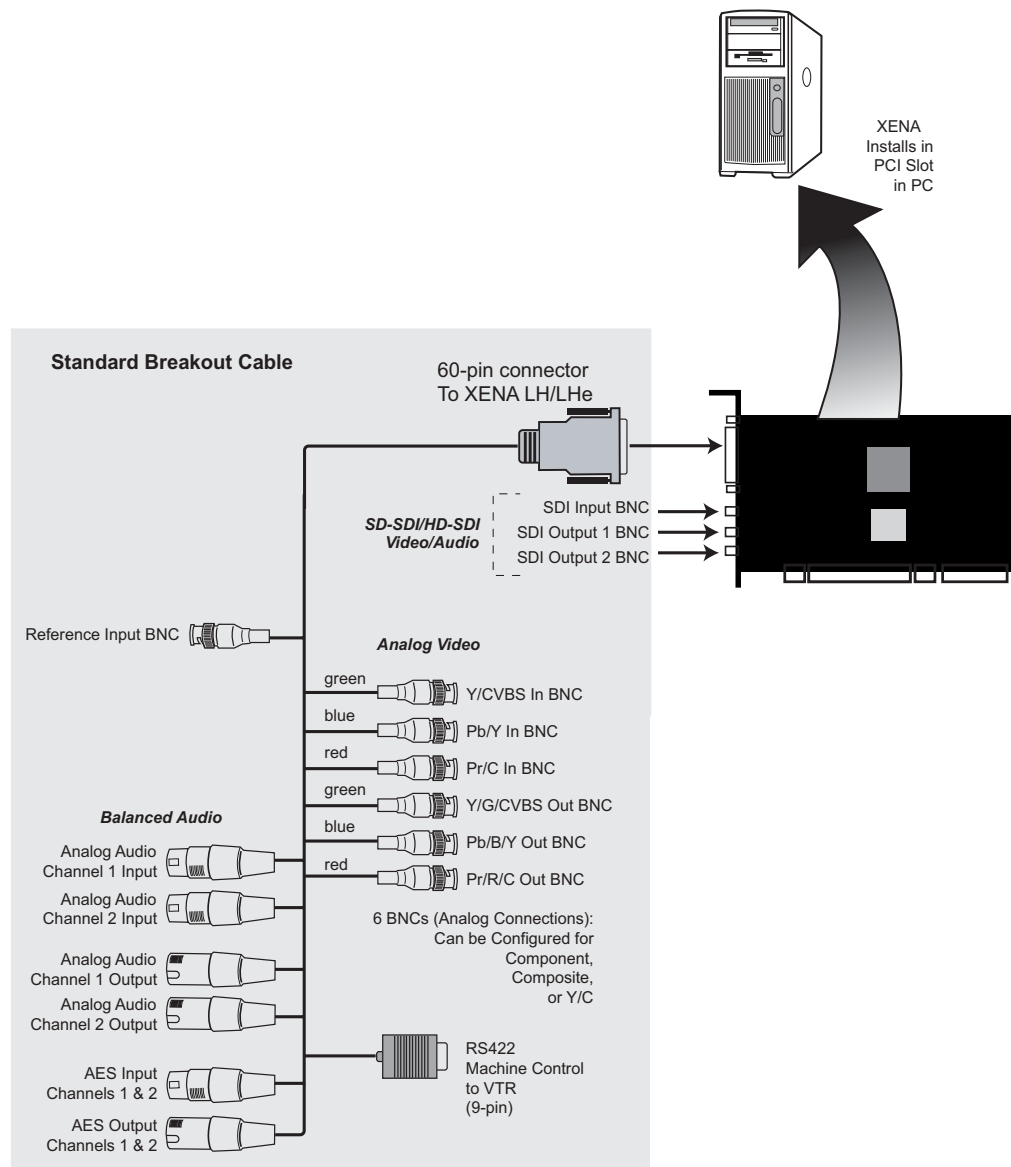
Workstation with XENA LHe with external SCSI and external Fiber storage

Cabling the System

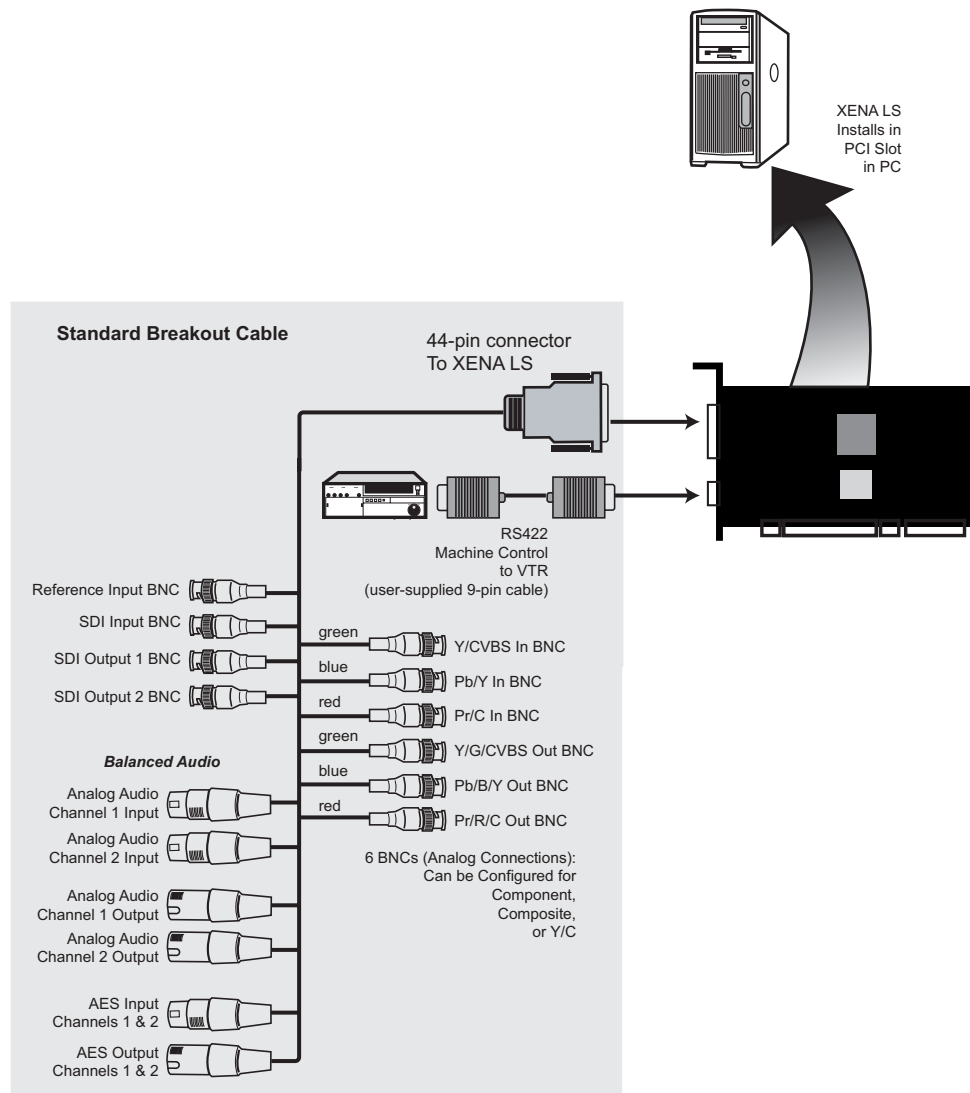
System Video/ Audio Cable Connections

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 for XENA LH/LHe and XENA LS.

System Cabling When Using The Breakout Cable



XENA System Using The XENA LH/LHe Breakout Cable



XENA System Using The XENA LS Breakout Cable

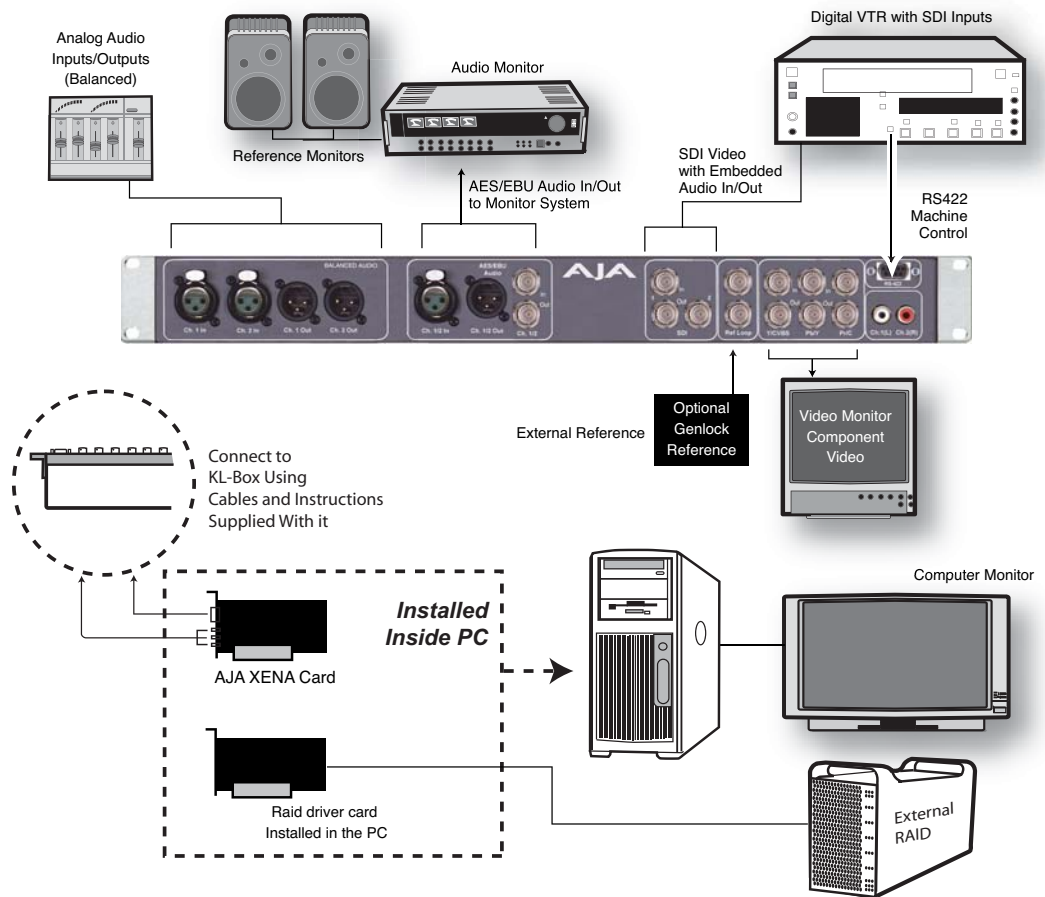
Typical System

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 XENA *Ref Loop* connector (BNC). The second XENA Ref Loop connector on the KL-box (if used) can be connected to the VTR or terminated with a 75-ohm terminator.
2. Connect a Video Monitor to the XENA *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 XENA breakout cable *RS-422* machine control connector.
4. Connect two SDI cables between XENA (BNCs are on the card endplate) and your digital VTR (Digital Betacam etc.): one from XENA *SDI In* to the VTR SDI Out, and one from XENA *SDI Out* (1 or 2) to the VTR SDI In.

The XENA SDI connections have embedded audio so the VTR must be configured accordingly.

5. If you have an AES/EBU-ready audio monitoring system, then connect the two channels of AES/EBU output from XENA's XLR connectors (channels 1 and 2) to the monitoring system AES/EBU inputs. If you instead have an analog audio monitoring system, you can use either the XLR balanced audio connectors or the two RCA-style unbalanced stereo output jacks on the Optional KL-box for output.



Typical System Connections—Shown with Optional KL-Box

Installing XENA Software

First ensure that your capture application software is installed as detailed in its user documentation. These applications *should be installed and have been run at least once prior to installing AJA XENA software*. Next, use the CD-ROM supplied with the XENA system to install necessary software drivers and AJA's Machina Capture/Playback application (if desired). You cannot use XENA with third-party applications until the AJA XENA software has been installed on the host workstation.

If you add XENA supported applications at a later date, you must run the install program again selecting the appropriate application support software to be installed.

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

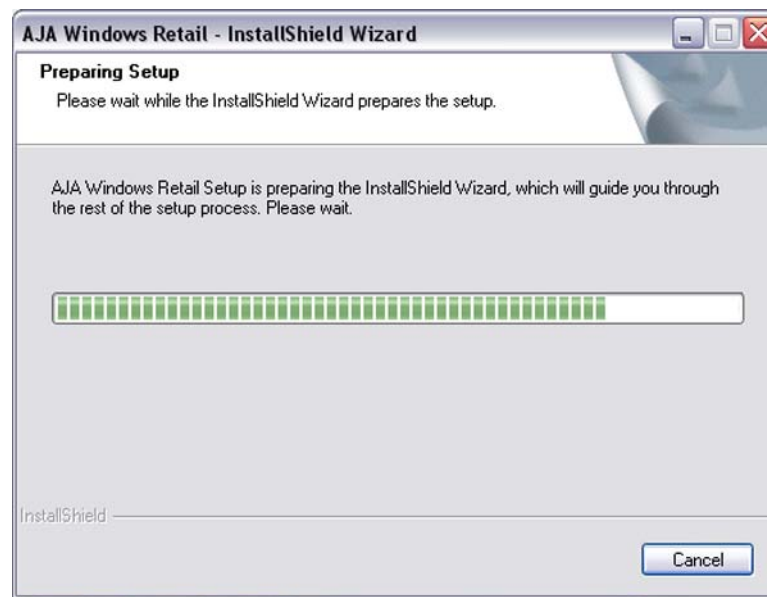
Note: If your PC has previously had another video capture or multimedia card installed, ensure you remove the card and uninstall any related software before installing XENA. This will prevent any hardware or software conflicts.

Software Installation Procedure

Locate the AJA XENA Software CD packaged with your system. Then follow the procedure below to put the required software on the host system to be used with XENA. The system must be a Windows XP XW 8200 workstation. Minimum system requirements for the host were described in *Chapter 1*, see *System Requirements*.

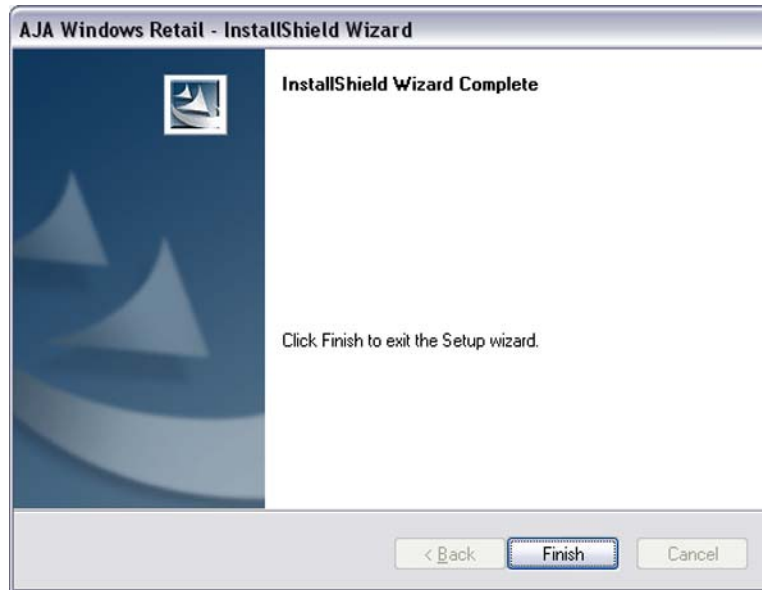
Note: Before installing XENA software, turn off any virus protection and security software that you may have installed on your computer.

1. Insert the XENA CD in the PC
2. The XENA installation program will launch and prompt you through the procedure during which you will accept the XENA license agreement.
3. The installer will run and put all the necessary XENA drivers, XENA Machina Capture application, presets and software on the desired hard drive.



Install Wizard Processing

4. When it has completed installation, a final screen will be displayed announcing that “software was successfully installed.” Click on the *Finish* button after the installation is complete.



Installer Finish 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 XENA 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 XENA cables and optional KL-box breakout box, house sync is connected to "Ref Loop".



Chapter 4:

AJA Machina Application

Machina Capture/Playback Application

Machina is AJA's powerful standalone capture/playback application that includes full VTR machine control. It is an easy-to-use interface that provides access to any and all XENA supported file formats, video standards, and video conversions. Captured files can be imported into virtually any software package that supports these file formats, for example, 3D animation programs, audio editing programs, and more. With Machina, you can also accurately output to tape files exported from these same programs.

The Machina application is part of the software package that came with your XENA card. If you haven't already done so, launch the XENA Install CD, follow the prompts and click on the Machina short-cut placed on the desktop to launch Machina.

The chapter you are reading addresses configuration and setup unique to use of XENA LS, LH, and LHe models with Machina.

Machina Overview

AJA's Machina provides three tabbed windows that perform the following:

- Setup – set Activation, Capture, Playback, Device Control, and General options
- Capture – set Capture file and Clip options and Control the capture
- Play – set Playback file options and Control the playback

This section of the manual will discuss each of these windows in detail and discuss how various Pull-down menu options, hot text entry fields, and play/record controls function and interact.

Note: The specific options available to you are determined by the XENA model that is installed in your workstation and you are currently controlling. This section will describe all possible options for Machina and note the options that are exclusive to a particular XENA model.

| Window Selection Tabs |



Machina Application Interface – Setup Menu

Setup Window

To configure the Machina operation, click on the Setup tab at the top of the window. In the left-most column are the Activation Options. The next column will toggle between Capture and Playback options when you click on the arrow tabs to the left and right of the header text. Next, Device Options address machine control settings. Finally, General Options establish paths to file storage directories for Video and Audio files and enable other options.

Activation Options

Board – The Board window/menu reports the current Type of XENA card selected and acts as a pull-down menu if you have multiple XENAs installed in your workstation.

Activation Mode – Machina or XENA plugins in other applications can be set for Automatic or Manual activation using the Activation Mode pull-down menu.

Automatic is the default setting and is recommended for normal operation. Current activation status is reported below the pull-down menu.

The XENA card can be accessed by multiple client windows but only one device can have access at a time. In automatic mode, the application or plugin can take active control at any time the card is not being used. When it is done (and any processing initiated is complete), it relinquishes control making the XENA card available.

Note: Since only one client window can have control of the XENA card at a time. If the window you click on does not access the card (reporting Board: Active), either another window is still processing operations or it is set in **Manual** activation mode and must be disabled (check-box, at left of Board Status, blanked).

In Manual mode, you must click on the enable check-box to activate board-control and un-check it to release control.

XENA Information – At the bottom of this column is the vital information about your specific XENA board—license type, serial number, and version.

Capture Options

Under Capture Options you select the appropriate formats and settings for your workflow. Before configuring your workflow, it is necessary to understand the concept of Primary and Secondary formats. In XENA operation, the Primary format is that which is written to disk and is the format of the content in the working framebuffer. Secondary format is that which may be input for capture or output from XENA to downstream devices.

Primary & Secondary Formats: The Primary Format menu allows you to select the video format to be used in the current project in XENA's framebuffer. (The current selection is reported in the display of the pull-down menu.)

Throughout Machina, choices are always presented based on which XENA card you are using and what it can do with the signals available and the inputs/outputs selected. For example, if the outputs or inputs are a different format than the primary, the Secondary Format pull-down menu will allow you to view and edit the available secondary format selection if it differs from the Primary format.

Note: The XENA Secondary Format nomenclature places (O) or (I) at the end of the signal format: **(O)** = Output only and **(I)** = Input only.

Primary and Secondary Format Options Supported by XENA cards:

Video Signal Formats	XENA LS	XENA LH/LHe
720x576 @ 25.00i	Yes	Yes
720x576 (Wide) @ 25.00i	Yes	Yes
720x486 @ 29.97i	Yes	Yes
720x480 @ 29.97i	Yes	Yes
720x480 (Wide) @ 29.97i	Yes	Yes
1280x720 @ 23.976p		Yes
1280x720 @ 24.00p		Yes
1280x720 @ 29.97p		Yes
1280x720 @ 30.00p		Yes
1280x720 @ 50.00p		Yes
1280x720 @ 59.94p		Yes
1280x720 @ 60.00p		Yes
1920x1080 @ 23.976sF		Yes
1920x1080 @ 24.00sF		Yes
1920x1080 @ 25.00sF		Yes
1920x1080 @ 29.97sF		Yes
1920x1080 @ 30.00sF		Yes
1920x1080 @ 25.00i		Yes
1920x1080 @ 29.97i		Yes
1920x1080 @ 30.00i		Yes
1920x1080 @ 23.976p		Yes
1920x1080 @ 24.00p		Yes
1920x1080 @ 25.00p		Yes
1920x1080 @ 29.97p		Yes
1920x1080 @ 30.00p		Yes

Convert Mode: Facilitates down-conversion from High Definition to Standard Definition formats using the AJA 10-bit hardware HS/SD converter (LH/LHe models only). When an input or output is a different standard than the current project's Primary Format, the XENA LH/LHe can down-convert the signal to standard definition if desired (LS does not support HD).

Down Conversion choices that may be available include:

- 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 horizontally to fit new screen size

Video Input: Use the Video Input pull-down menu to select the appropriate signal type of your input. (The current selection is reported in the display of the pull-down menu.)

Video Input always shows all the available input options based on your Primary and Secondary format configuration. XENA software looks at 1) what model you have, 2) Primary Format, and 3) Secondary Format (in that order) to determine what input options are appropriate.

Video Input Options Supported by XENA cards include:

- | | |
|--------------------------|---|
| • Single Link SDI | • Component Betacam NTSC-J |
| • Composite NTSC | Component SMPTE NTSC-J |
| • S-Video NTSC | • Composite PAL |
| • Component Betacam NTSC | • S-Video PAL |
| • Component SMPTE NTSC | • Component Betacam PAL |
| • Composite NTSC-J | • Component SMPTE PAL |
| • S-Video NTSC-J | • Component XVGA (High Definition only) |

Audio Input: Use the Audio Input pull-down menu to select the appropriate signal type for your input. (The current selection is reported in the Status Display.)

Audio Input Options Supported by XENA cards include:

- Embedded SDI
- Digital AES/EBU - XLR
- Digital AES/EBU - BNC (only applies if you are using a KL-box)
- Analog

SDI Outputs 1 & 2: The SDI outputs will be Single Link only if there is no Secondary Video Output Format selected. If you have a Secondary format selected, you can choose between Single Link SDI – Primary and Single Link SDI – Secondary as your output.

Analog Output – Analog format choices in the Analog Output pull-down menu vary depending upon file format

Analog Output Options Supported by XENA cards include:

- Composite + S-Video NTSC
- Composite PAL
- Composite + S-Video NTSC-J
- S-Video PAL
- Component Betacam NTSC
- Component Betacam PAL
- Component Betacam NTSC-J
- Component SMPTE PAL
- Component SMPTE
- Component XVGA (High Definition only)
- Component RGB

Display to Desktop – Select one of four modes of desktop display:

- Off
- Display while idle only (this mode is suggested)
- Display during capture only
- Display Always

Note: Display to Desktop uses system resources and could affect performance during capture.

Timecode Input – Select the type of timecode used by the source video machine—RS422 or Embedded SDI (RP188).

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. After configuring Machina Capture Options, select the Play options by clicking on the toggle arrows on either side of the Capture Options title header.

Play Options

Primary Format, Secondary Format, Convert Mode, Output Type settings, and Display to Desktop are all the same for playback mode as those described previously for the Capture Options window.

Timebase – Use the Timebase pull-down menu to choose between:

- Frames
- Timecode (NDF)
- Timecode (DF)

Play To Desktop Speed – Use this pull-down menu to set a desktop play speed:

- Full Speed – Every frame is displayed to desktop during playback
- Half Speed – Every other frame is displayed to desktop during playback
- Quarter Speed – one out of every four frames is displayed to the desktop



Half Speed and Quarter Speed will reduce the system load that the Display-To-Desktop is using to draw video to your computer.

Reference – Using the Reference pull-down menu, select timing Reference source—Free Run, from External (genlock), or from the video Input signal.

Device Control Options

Device Control Options set options for the RS422 machine control interface on the XENA card. These functions support Print-to-Tape machine control.

Time Code Format – Use this pull-down to select the timecode base supported by your VTR.

- Base 24
- Base 25
- Base 25 NDF (50 frames per second)
- Base 30 DF (30 frames per second)
- Base 30 NDF (30 frames per second)
- Base 30 DF (60 frames per second)
- Base 30 NDF (60 frames per second)

Click on the Hot Text items to enter a value:

- Preroll – 0 to 15; the number of frames required to start the source machine before capture
- Handles – 0 to 60; the number of frames added to the front and back of a sequence for editing flexibility
- Timecode Offset – -30 to +30; timecode adjustment (in frames) forward or back to compensate for discrepancies between the source's burned-in timecode and that of the captured sequence.

General Options

Video/Audio Directory Setup – Use these hot text fields to enter the path of the default capture/playback directories.

Audio Files Setup – three audio enable check boxes, when checked, allow you to:

- Enable Audio Scrubbing – Audio will play while you move through frames using the scrub bar (see **Play Controls**).
- Enable Audio Variable Speed – Audio will play at the same speed the video is played (rather than 1x only).
- Enable Audio Auto-Search – XENA software will automatically load the Audio Track list with audio files that have been generated with the same name as the selected video file.

Note: When Audio Auto-Search is active, existing file names in the list will be removed or over-written when the Video File is loaded. (Does not affect the actual audio files.)

Audio Monitor Levels – Choose between +6 dB (US) monitor level and +0 dB (EBU).

Capture Window

Click on the Capture tab to bring up the Capture window. The Figure below shows both the File Options (inset) and the Clip Options accessed by clicking on the hot toggle buttons left and right of the title header.



Machina Capture Window with File Options Inset

File Options

In the File Options menu you will configure the capture file you will be creating by setting the following.

Type – The Type pull-down menu provides a choice of video/audio file formats:

- QuickTime Movie
- AVI Movie
- DPX Sequence (LH/LHe only)
- Cineon (LH/LHe only)
- TGA Sequence
- BMP Sequence
- TIF Sequence

Video/Audio – Use this pull-down menu to select the video/audio input combination you will capture:

- Video Only
- Audio Only
- Video - (minus) Audio – video and audio are recorded in separate files
- Video + (plus) Audio (QuickTime only) – video and audio are recorded in the same file

Note: The options shown are determined by the file format selected. QuickTime captured audio is either embedded with the video file or captured to separate .mov files. All other formats capture audio to Wave Files.

Video Subtype – Video Capture Formats supported by XENA cards (varying according to file type) include:

- | | |
|-------------------------------|---------------------------------|
| • 8-bit YUV 4:2:2 – ‘2vuy’ | • 8-bit RGBA 4:4:4:4 – ‘rgba’ |
| • 8-bit YUV 4:2:2 – ‘2Vuy’ | • 8-bit RGBA 4:4:4:4 – ‘rgba’ |
| • 10-bit YUV 4:2:2 – ‘v210’ | • 8-bit RGBA 4:4:4:4 – ‘bgra’ |
| • 8-bit RGB 4:4:4 – ‘rgb’ | • 10-bit Log RGB 4:4:4 – ‘R10g’ |
| • 8-bit RGB 4:4:4 – ‘bgr’ | • 10-bit RGB 4:4:4 – ‘R10k’ |
| • 8-bit RGBA 4:4:4:4 – ‘argb’ | • 10-bit RGB 4:4:4 – ‘r10k’ |

Audio Subtype – Audio Capture Formats supported by XENA cards include:.

- | | |
|--------------------------|----------------------------|
| • 48 kHz 16-bit PCM Mono | • 48 kHz 16-bit PCM Stereo |
| • 48 kHz 24-bit PCM Mono | • 48 kHz 24-bit PCM Stereo |
| • 48 kHz 32-bit PCM Mono | • 48 kHz 32-bit PCM Stereo |

Audio Tracks – Select the number of audio tracks for this project. XENA models support up to eight (four stereo pairs).

Clip Option

Clip Name – In the Clip Options menu, click on the Clip Name hot text to name the file you will be creating. Subsequent capture file numbers will increment from this one.

Reel Name – Click on the hot text field to enter a source tape name—the name of the tape on the VTR. Only QuickTime and DPX files store this information.

Sequence Offset – When capturing file-per-frame sequences, after naming a file, you can set a Sequence Offset number that will determine the beginning number of the file sequence.

Create New Folder Per Sequence – A check-box is provided to enable this automatic function. When you check selection Machina will gather each frame capture sequence in a new folder, based on clip names, on your disk. (Not applicable to QuickTime or AVI movie files.)

Capture Controls

Standard tape deck icons provide hot buttons for the Capture process. On the top row (from left to right) they are: Rewind (8x), Reverse Play, Still, Play, Fast Forward (8x). On the lower row they are: Reverse 1 frame, Stop, Forward 1 frame.

The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.

The red button is for Record.



VTR Status

The toggle buttons on the top-left step through one of three capture modes:

- Capture Now – manual record/stop (“crash”) capture
- Capture Duration – capture a specified number of frames after manual start, based on the timebase of the selected Primary Format
- Capture In/Out – initiate and end capture using timecode-based in and out settings

The selected mode will activate the appropriate hot text for that mode (to the right of the Capture Mode selection). Click the hot text to enter a timecode value (hours:minutes:seconds:frames). The bottom display indicates the current machine status and timecode from the VTR.

Capture In/Out Mode – The capture in-point is entered by clicking on the left field of eight digits. The out-point can be set by clicking on the right field of eight digits. Alternatively, you can specify a duration in the Duration field and the in- or out-point (whichever you have not entered) will be entered automatically according to duration.

Note: The in-point/out-point field values are inclusive. If both are set to the same value, the capture duration will be 1 frame.

To load the current VTR timecode setting in either field (in-point or out-point) click on the hot text field and enter from your keyboard.

Note: When a hot text field has a dotted underline, you can left-click and hold on the field and drag your cursor to increment or decrement the value.

VTR TC – The current VTR timecode is displayed on the bottom of the control pane and you can click on it and enter a timecode to perform a seek to that timecode on the

VTR. The VTR must be online and in remote rather than local control mode (as reported to the left of the current timecode).

Capture/Board Status – Click on the hot toggle buttons of the Status header to switch between Capture Status and Board Status. Capture Status reports current state of activity, capture duration and number of frames captured in (), and the number of frames that may have been dropped.

Xena Status reports Active/Inactive status, Primary Format setting, Video Input type, and Audio Input type.

Play Window



Machina Play Screen

File Options

On the right side of the desktop display you can use the hot buttons at the top to toggle between File Options and Leader/Trailer Options. In File Options, the current file name and path is loaded into the Video field. Alternatively, you can click on the path hot text to select a file, delete it using the trash icon at the left, or turn it on/off using the check-box at the right.

Format, Colorspace, and total number of frames in the file is reported below the path text.

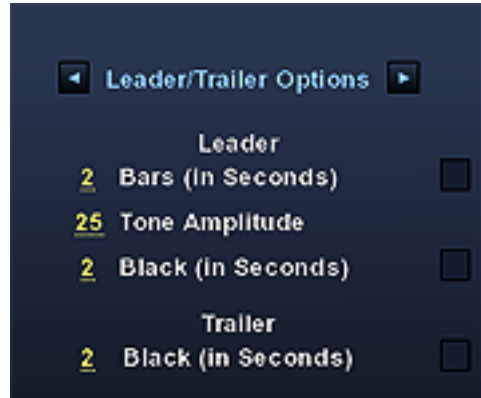
You can preview the effects of a color Look Up Table by clicking on the LUT hot text or delete the selected LUT file by clicking on the trash icon.

You can edit the Audio Track list that is automatically loaded with audio files that have been generated with the same name as the selected video file. QuickTime embedded audio files are automatically appended with a number and will be loaded numerically into the track list. Click on the trash icon to delete a track. Click on the

check-box on the right to enable/disable a track. To manually enter audio files, simply double-click on a track in the list.

Leader/Trailer Options

Leader/Trailer Options allow you to add colorbars, test tone, and black field in a leader to your clip and black field as trailer. Note that the dotted underline indicates that you can left-click down and scroll the mouse to increment/decrement these values.



Play Controls

There are two modes of play control—one for Edit and one for Output. Click the hot buttons at the top-left of the pane to toggle between the two modes.

Edit Mode – In Edit mode, immediately under the mode toggle buttons are standard tape deck icons providing hot buttons for the Play process. From left to right they are:

- Go-to-Previous “Most Significant” frame (see following Note)
- Reverse 1 frame
- Rewind (8x)
- Reverse Play
- Still
- Stop
- Play (1x)
- Fast Forward (8x)
- Forward 1 frame

- Go-to-next “Most Significant” frame (see following Note)



Edit Mode Play Controls and Scrub Bar

Below the Play buttons is a Scrub Bar that allows you to click and drag along the loaded sequence to view individual frames and mark In/Out- points for playback of frame subsets. To set an in-point, click on the left bracket. To set an out-point, click on the right bracket.

To set a in-point click on the left most hot text numeral below the bar and enter the desired frame number. Similarly, enter the out-point by clicking on the right side hot text numeral.

Note: The “first” or “last” frame may be for the entire sequence or for frames in a in/out-marked subset. In this case, first, last, in, and out frames become “Most Significant Frames.” For example, clicking on the Go-to-1st button will move you to the first Most Significant Frame to the left. Clicking on the Go-to-Next button will move you to the first Most Significant Frame to the right.

The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.

Play Modes – Select a Play type by clicking the Play hot toggle buttons above the controls. Choose between: Play All or Play Range.

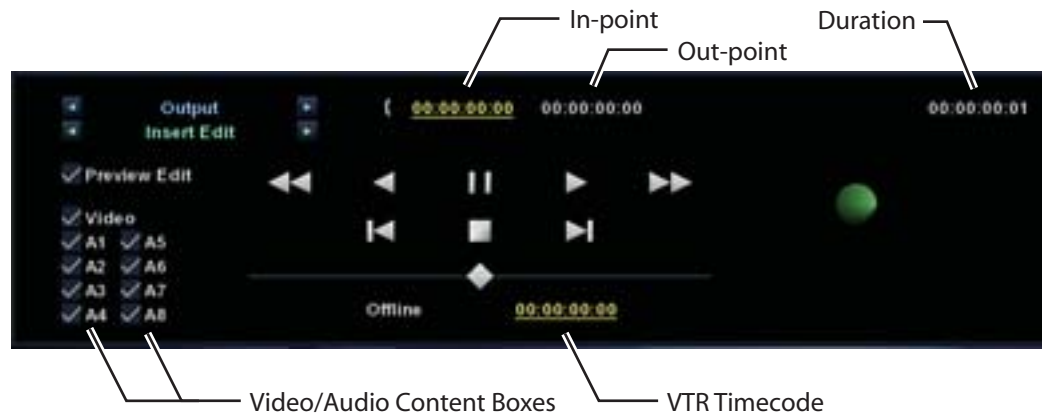
You can select one of three Play Modes by clicking on the Play Mode arrow to the left of the slider control. You will step through the following modes:

- Once (single arrow) – play once through in forward or reverse
- Bounce (double-ended arrow) – play continuously, alternating between forward and reverse play
- Loop (double right-pointing arrow) – play repeatedly, looping in one direction

If you have designated an In/Out sub-segment you can use the hot text brackets (to the right of the Play Mode arrow) to play either the entire clip [] or the marked segment only { }.

Output Modes

Toggle the Play Mode to Output and standard VTR controls and machine control timecode hot text will appear. Beneath the Output mode header are hot-buttons that allow you to choose between two modes of output— Insert Edit or Print-To-Video. Print-To-Video and Insert Edit will output the loaded clip from its in/out-points (if any exist) or from the first to last frame (if no in/out-points have been set).

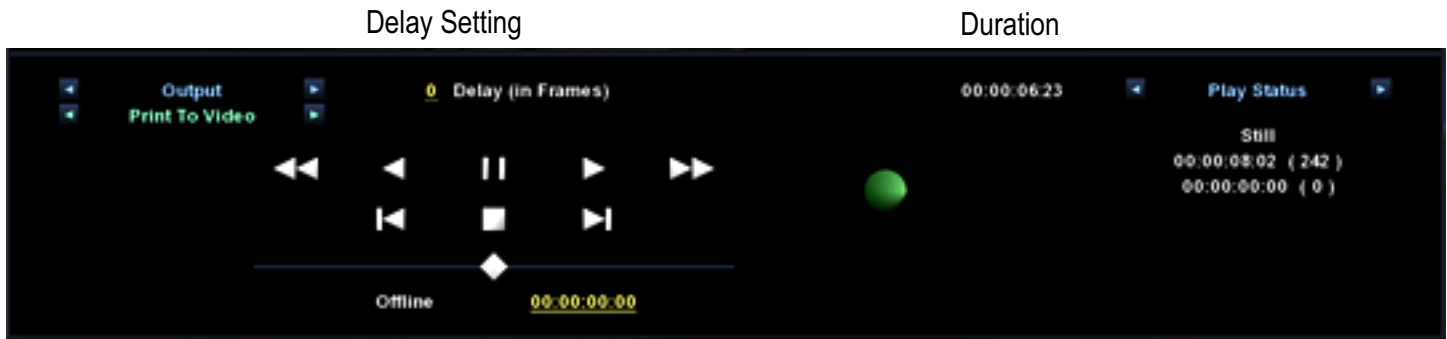


Play Controls for Insert Edit

Insert Edit – In this mode, you can select the Video/Audio content that you want to insert by checking the desired content boxes at the left. Then set an in-point that the recording VTR will use to initiate recording of your segment. Duration is determined by the length of the clip you are outputting.

Note: The **Preview Edit** check-box controls whether the insert edit is in “Preview” mode or not. In preview mode, the deck never goes into record but just simulates the edit without putting anything to tape. You must uncheck this box to perform the actual Insert Edit.

Print-to-Video Mode – This mode allows you to manually put a clip to tape using the VTR's current position. You have the option of adding Delay frames. XENA will wait this many frames after the tape machine start command before outputting the clip. The Duration Field displays the total length of the clip that will go to tape. Click on the green hot button to launch the output sequence.



Play/Board Status – Click on the hot toggle buttons of the Status header to switch between Play Status and Board Status. Play Status reports current state of activity, play duration selected for the current playback, total number of frames in (), and lastly, the number of frames that may have been dropped. Board Status reports Active/Inactive status, Primary Format setting, Video Input type, and Audio Input type.



Chapter 5:

Adobe After Effects

Overview

Adobe After Effects (not included with XENA) ships with information already configured for most common system configurations.

Note: You should have After Effects installed on your workstation before installation of the XENA software.

After you install the XENA software on your Windows XP workstation, all you need to do to begin using it is to become familiar with the XENA After Effects plugins and how After Effects works with XENA.

With After Effects open you'll go to the File pull-down menu and select the AJA Capture plugin to setup your recording work flow, file storage, and other Xena options. Then access the AJA Preview to set options for viewing timeline effects on a monitor. And finally, setup the Playback plugin configuration for output type, timebase, and other options for both video and audio playback.

When you gain familiarity with the XENA plugin screen functional design, you will be immediately at home with the similar XENA plugin features available in Adobe PhotoShop, Autodesk Combustion and other compositing applications.

The manual you are reading does not provide operational information for Adobe After Effects. Please read the After Effects user documentation provided with the application for information on configuration and operation. The chapter you are reading addresses configuration and setup unique to use of XENA LS, LH, and LHe models with Adobe After Effects.

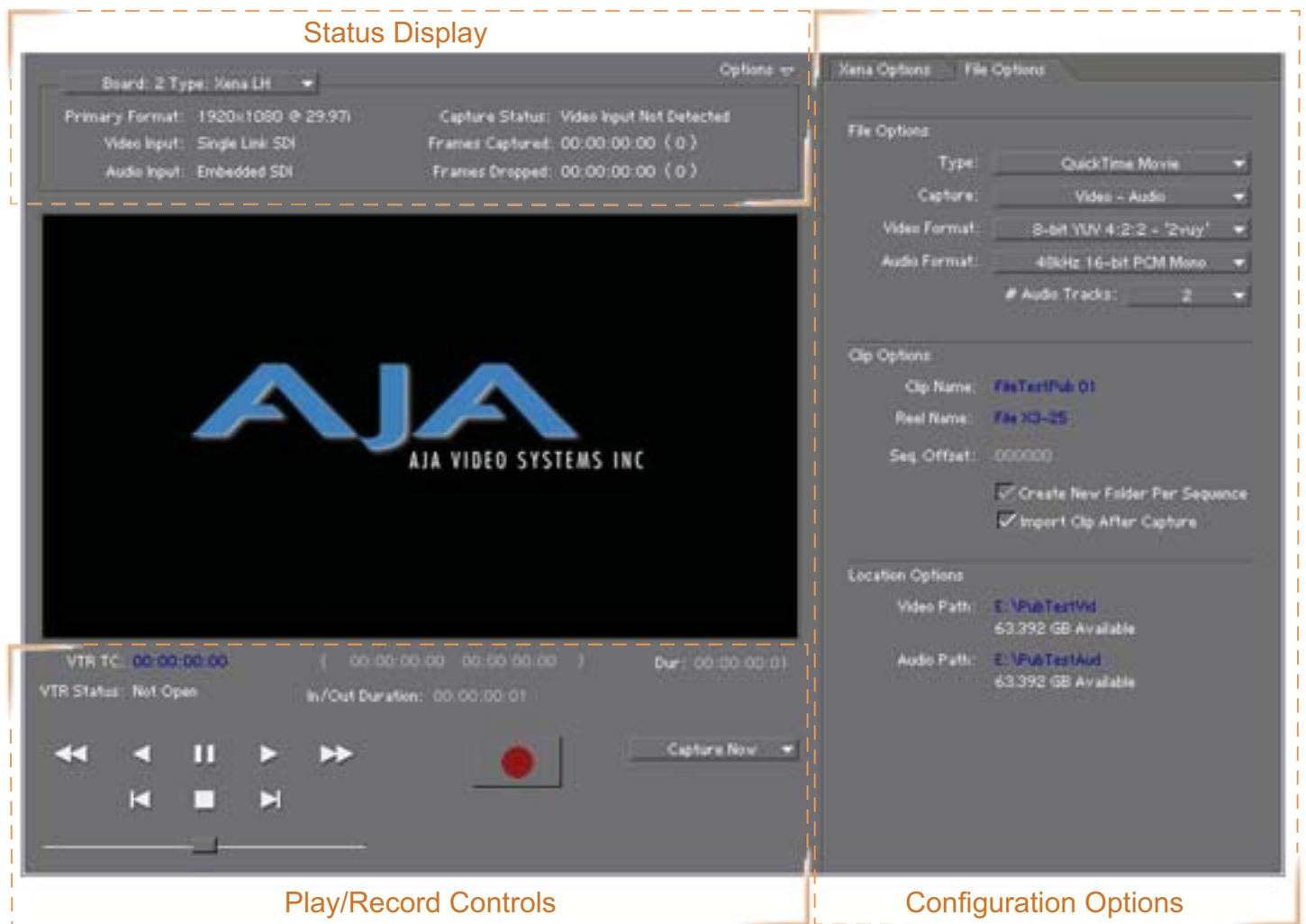
XENA After Effects Plugin Overview

The XENA After Effects plugin is a software application that is integrated into the After Effects application and is accessed under the File menu. The Capture and Playback plugin screens allow you to see and edit how the XENA card workflow is currently configured for recording, storage, and playback of your video and audio data. They provide you with standard tapedeck style play/record functions, status display, and configuration options. The Preview plugin allows you to view the current frame of your working timeline in various formats on a monitor connected to a XENA output.

In this section, you will read about the various pull-down options, hot-text entry fields, and play/record controls and how they interact.

Note: The specific options available to you are determined by the XENA model that is installed in your workstation and you are currently controlling. This section will describe all possible options for After Effects and note the options that are exclusive to a particular XENA model.

There are three functional areas in both the Capture and the Playback screen as indicated in the following illustration (AJA Capture plugin screen is shown): Status Display, Play/Record Controls, and Configuration Options.



XENA After Effects Plugin Layout

The **Status Display** area is read-only information about configuration, current status, and performance.

The **Play/Record Controls** offer standard tape deck controls and more. Hot-text fields are at the top for writing and reading timing data (Capture plugin only). Capture mode will determine which fields are operational.

Note: Capture Play controls are RS422 machine controls for running a VTR tape deck. Playback controls are for XENA playout functions.

The **Configurations Options** section contains tabbed menu selections that provide:

- XENA Options – XENA workflow configuration options
- File Options – File path and formatting information, and
- Advanced – Advanced options (for Playback plugin only).

Note: If you don't see the Configuration Options section, click on the Options triangle switch above the Status Display. In normal operation, you may decide to hide this section when it is not needed.

Basic Plugin Operations and Configuration

This sections discusses settings that are common across plugin windows and how they interact.

Activation Mode

A XENA plugin can be set for Automatic or Manual activation using the Activation Mode pull-down menu. Automatic is the default setting and is recommended for normal operation. In this mode, you merely click between the open plugins to make one active.

Note: Only one plugin window can have control of the XENA card at a time. If the window you click on does not access the card (reporting Board: Active), either another window is still processing operations or it is set in Manual activation mode and must be disabled (check box blanked).

In Manual mode, you must check the Enable XENA box to activate the board control and un-check it to release control. Upon startup of the After Effects application, if the launched plugin window is in Manual mode and enabled (??? Verify), the window will NOT activate until the enable box is clicked again.

The Preview plugin does not need activation since it grabs only one frame (the current working frame) at a time for output to the monitor. It grabs the data on a priority basis when it can or it is off.

After Effects and Preview Note

Double clicking on a captured Project File in the project bin will sometimes open the file in an After Effects player which can be previewed. Some formats will result in the file opening in a third-party viewer (QuickTime for example) and it will not be previewable.

Suggested Screen Presentation Settings

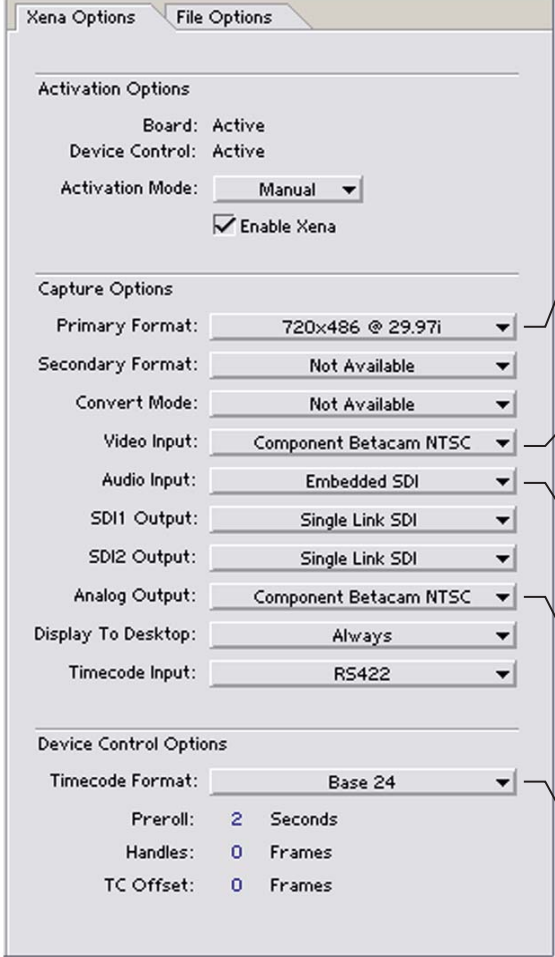
Overall visual presentation of After Effects and XENA plugins can be enhanced by using the "Silver Theme" Windows desktop presentation (refer to Windows documentation) and adjusting After Effects' User Interface Brightness. To adjust After Effects brightness, go to File>Preferences>User Interface Colors and move the User Interface Brightness slider all the way to the left and click OK. (verify).

At the same time, you may change the color of Hot Text if you'd like.

Using the AJA Capture Plugin

The first order of business is to Activate the XENA from the Capture window and setup your workflow by defining Input and Output formats and timing options. To do this you will click on the XENA Options tab. XENA stores the workflow settings you make until they are next changed. Then you will access the File Options tab to name the capture file, set file options, and setup the path to your file storage directory.

XENA Options Menu



XENA LS options shown

- 720x576 @ 25.00i
- 720x576 (Wide) @ 25.00i
- 720x486 @ 29.97i
- 720x480 @ 29.97i
- 720x480 (Wide) @ 29.97i

Capture Options

- Primary Format: 720x486 @ 29.97i
- Secondary Format: Not Available
- Convert Mode: Not Available
- Video Input: Component Betacam NTSC
- Audio Input: Embedded SDI
- SDI1 Output: Single Link SDI
- SDI2 Output: Single Link SDI
- Analog Output: Component Betacam NTSC
- Display To Desktop: Always
- Timecode Input: RS422

Device Control Options

- Timecode Format: Base 24
- Preroll: 2 Seconds
- Handles: 0 Frames
- TC Offset: 0 Frames

Other Options

- Single Link SDI
- Composite NTSC
- S-Video NTSC
- Component Betacam NTSC
- Component SMPTE NTSC
- Composite NTSC-J
- S-Video NTSC-J
- Component Betacam NTSC-J
- Component SMPTE NTSC-J
- Embedded SDI
- Digital AES/EBU
- Analog
- Composite + S-Video NTSC
- Composite + S-Video NTSC-J
- Component Betacam NTSC
- Component Betacam NTSC-J
- Component SMPTE
- Component RGB
- Base 24
- Base 25
- Base 30 DF (30 fps)
- Base 30 NDF (30 fps)
- Base 30 DF (60 fps)
- Base 30 NDF (60 fps)

Activation

For Activation details, see Basic Plugin Operations and Configuration.

Capture Options

Under Capture Options you select the appropriate formats and settings for your workflow. Before configuring your workflow, it is necessary to understand the concept of Primary and Secondary formats. In XENA operation, the Primary format is that which is written to disk and is the format of the content in the

working framebuffer. Secondary format is that which may be input for capture or output from XENA to downstream devices.

Primary & Secondary Formats: The Primary Format menu allows you to select the video format to be used in the current project in XENA's framebuffer. (The current selection is reported in the display of the pull-down menu.)

Choices are always presented based on which XENA card you are using and what it can do with the signals available and the inputs/outputs selected. For example, if the outputs or inputs are a different format than the primary, the Secondary Format pull-down menu will allow you to view and edit the available secondary format selection if it differs from the Primary format.

Note: The XENA Secondary Format nomenclature places (O) or (I) at the end of the signal format: **(O)** = Output only and **(I)** = Input only.

Primary and Secondary Format Options Supported by XENA cards:

Video Signal Formats	XENA LS	XENA LH/LHe
720x576 @ 25.00i	Yes	Yes
720x576 (Wide) @ 25.00i	Yes	Yes
720x486 @ 29.97i	Yes	Yes
720x480 @ 29.97i	Yes	Yes
720x480 (Wide) @ 29.97i	Yes	Yes
1280x720 @ 23.976p		Yes
1280x720 @ 24.00p		Yes
1280x720 @ 29.97p		Yes
1280x720 @ 30.00p		Yes
1280x720 @ 50.00p		Yes
1280x720 @ 59.94p		Yes
1280x720 @ 60.00p		Yes
1920x1080 @ 23.976sF		Yes
1920x1080 @ 24.00sF		Yes
1920x1080 @ 25.00sF		Yes
1920x1080 @ 29.97sF		Yes
1920x1080 @ 30.00sF		Yes
1920x1080 @ 25.00i		Yes
1920x1080 @ 29.97i		Yes
1920x1080 @ 30.00i		Yes
1920x1080 @ 23.976p		Yes
1920x1080 @ 24.00p		Yes
1920x1080 @ 25.00p		Yes
1920x1080 @ 29.97p		Yes
1920x1080 @ 30.00p		Yes

Convert Mode: Facilitates down-conversion from High Definition to Standard Definition formats using the AJA 10-bit hardware HS/SD converter (LH/LHe models only). When an input or output is a different standard than the current project's Primary Format, the XENA LH/LHe can down-convert the signal to standard definition (if desired).

Down Conversion choices that may be available include:

- 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 horizontally to fit new screen size

Video Input: Use the Video Input pull-down menu to select the appropriate signal type of your input. (The current selection is reported in the display of the pull-down menu.)

Video Input always shows all the available input options based on your Primary and Secondary format configuration. XENA software looks at 1) what model you have, 2) Primary Format, and 3) Secondary Format (in that order) to determine what input options are appropriate.

Video Input Options Supported by XENA cards include:

- | | |
|------------------------|---------------------------------------|
| • Single Link SDI | • Component Betacam NTSC-J |
| • Composite NTSC | Component SMPTE NTSC-J |
| • S-Video NTSC | • Composite PAL |
| Component Betacam NTSC | • S-Video PAL |
| Component SMPTE NTSC | • Component Betacam PAL |
| Composite NTSC-J | • Component SMPTE PAL |
| S-Video NTSC-J | Component XVGA (High Definition only) |

Audio Input: Use the Audio Input pull-down menu to select the appropriate signal type for your input. (The current selection is reported in the Status Display.)

Audio Input Options Supported by XENA cards include:

- Embedded SDI
- Digital AES/EBU - XLR
- Digital AES/EBU - BNC (only applies if you are using a KL-box)
- Analog

SDI Outputs 1 & 2: The SDI outputs will be Single Link only if there is no Secondary Video Output Format selected. If you have a Secondary format selected, you can choose between Single Link SDI – Primary and Single Link SDI – Secondary as your output.

Analog Output: Analog format choices in the Analog Output pull-down menu vary depending upon file format.

- Composite + S-Video NTSC
- Composite PAL
- Composite + S-Video NTSC-J
- S-Video PAL
- Component Betacam NTSC
- Component Betacam PAL
- Component Betacam NTSC-J
- Component SMPTE PAL
- Component SMPTE
- Component XVGA (High Definition only)
- Component RGB

Display to Desktop – Select one of four modes of desktop display:

- Off
- Display while idle only (this mode is suggested)
- Display during capture only
- Display Always

Note: Display to Desktop uses system resources and could affect performance.

Timecode Input – Select the type of timecode used by the source video machine—RS422 or Embedded SDI (RP188).

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.

Device Control Options

Device Control Options are settings for the RS422 machine control interface on the XENA card.

Time Code Format – Use this pull-down to select the timecode base supported by your VTR.

- Base 24
- Base 25
- Base 25 NDF (50 frames per second)
- Base 30 DF (30 frames per second)

- Base 30 NDF (30 frames per second)
- Base 30 DF (60 frames per second)
- Base 30 NDF (60 frames per second)

The timecode format 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 XENA's RS-422 port).

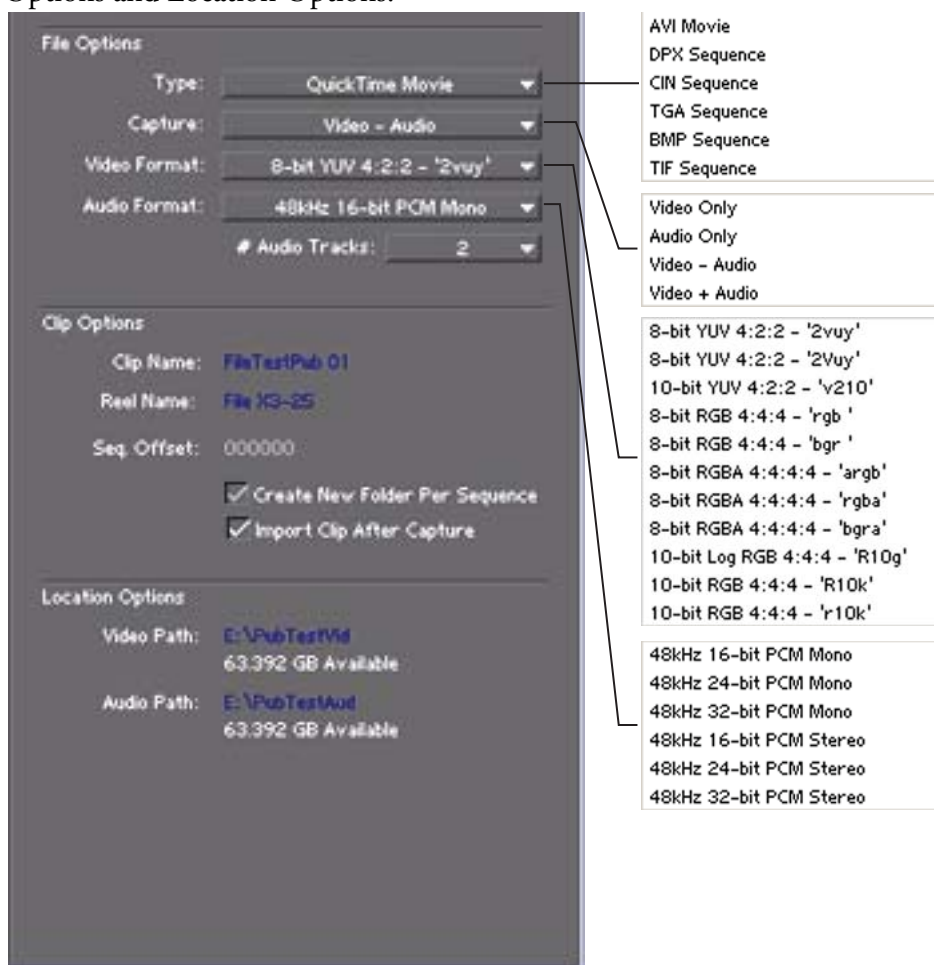
Clicking on the Hot Text items will bring up an entry field in which to enter a value:

- Preroll – 0 to 15; the number of frames required to start the source machine before capture
- Handles – 0 to 60; the number of frames added to the front and back of a sequence for editing flexibility
- Timecode Offset – -30 to +30; timecode adjustment (in frames) forward or back to compensate for discrepancies between the source's burned-in timecode and that of the captured sequence.

After configuring XENA Options, select the File Options tab.

File Options Menu

In the File Options menu there are three operation panes—File Options, Clip Options and Location Options.



In the File Options pane you will select the capture file type, capture content (video/audio), video format, audio format and the number of audio tracks included.

File Options

Type – The Type pull-down menu provides a choice of video/audio file formats:

- QuickTime Movie
- AVI Movie
- DPX Sequence (LH/LHe only)
- Cineon (LH/LHe only)
- TGA Sequence
- BMP Sequence
- TIF Sequence

Capture – Use the Capture pull-down menu to select the video/audio input combination you will capture:

- Video Only
- Audio Only
- Video - (minus) Audio – video and audio are recorded in separate files

- Video + (plus) Audio (QuickTime only) – video and audio are recorded in the same file

Note: The options shown are determined by the file format selected. QuickTime captured audio is either embedded with the video file or captured to separate .mov files. All other formats capture audio to Wave Files.

Video Format – Video Capture Formats supported by XENA cards (varying according to file type) include:

- | | |
|-------------------------------|---------------------------------|
| • 8-bit YUV 4:2:2 – ‘2vuy’ | • 8-bit RGBA 4:4:4:4 – ‘rgba’ |
| • 8-bit YUV 4:2:2 – ‘2Vuy’ | • 8-bit RGBA 4:4:4:4 – ‘rgba’ |
| • 10-bit YUV 4:2:2 – ‘v210’ | • 8-bit RGBA 4:4:4:4 – ‘bgra’ |
| • 8-bit RGB 4:4:4 – ‘rgb’ | • 10-bit Log RGB 4:4:4 – ‘R10g’ |
| • 8-bit RGB 4:4:4 – ‘bgr’ | • 10-bit RGB 4:4:4 – ‘R10k’ |
| • 8-bit RGBA 4:4:4:4 – ‘argb’ | • 10-bit RGB 4:4:4 – ‘r10k’ |

Audio Format – Audio Capture Formats supported by XENA cards include:.

- | | |
|-------------------------|---------------------------|
| • 48kHz 16-bit PCM Mono | • 48kHz 16-bit PCM Stereo |
| • 48kHz 24-bit PCM Mono | • 48kHz 24-bit PCM Stereo |
| • 48kHz 32-bit PCM Mono | • 48kHz 32-bit PCM Stereo |

Audio Tracks – Select the number of audio tracks for this project, XENA supports up to eight (four stereo pairs).

Clip Options

Clip Name – In the Clip Options menu, click on the Clip Name hot text to name the file you will be creating. Subsequent capture file numbers will increment from this one.

Reel Name – Click on the hot text field to enter a source tape name—the name of the tape on the VTR. Only QuickTime and DPX files store this information.

Sequence Offset – When capturing file-per-frame sequences, after naming a file, you can set a Sequence Offset number that will determine the beginning number of the file sequence.

Create New Folder Per Sequence – A check-box is provided to enable this automatic function. When you check selection Machina will gather each frame capture sequence in a new folder, based on clip names, on your disk. (Not applicable to QuickTime or AVI movie files.)

Import Clip After Capture – imports the completed capture file into After Effects Project window.

Location Options

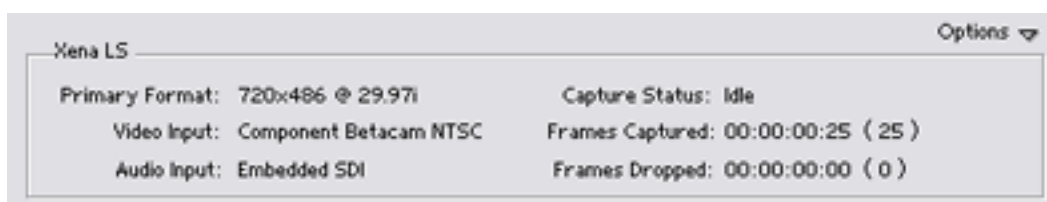
In the Location Options pane, enter the path to the RAID location you have dedicated for Video and Audio captures.

After XENA and File Options are configured, you are ready to perform your video/motion graphics capture.

Status Display

The Status Display section of the AJA Capture plugin, in the left column, reports the settings that you have selected for the XENA board to use when you have control of it:

- Primary Format
- Video Input type
- Audio Input type



In the right column you will see current information for:

- Capture Status
- Number of frames successfully captured
- Number of frames dropped from the capture sequence

Capture Status reports the detected signal status of the XENA input:

- Off Line – the capture plugin does not control the XENA card
- Idle – Ready, the plugin has control and the proper input signal is present
- Video Input Not Detected – no input present
- [format of input detected] – if the input is not a match with the chosen input format, the mismatched signal format will be displayed here

Play/Record Controls

Standard tape deck icons provide hot buttons for the Play/Record process. On the top row (from left to right) they are: Rewind (8x), Reverse Play, Still, Play, Fast Forward (8x). On the lower row they are: Reverse 1 frame, Stop, Forward 1 frame.

The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.

The red button is for Record.



The pull-down menu on the right enables one of three capture modes:

- Capture Now – manual record/stop (“crash”) capture
- Capture Duration – capture a specified number of frames after manual start, based on the timebase of the selected Primary Format
- Capture In/Out – initiate and end capture using timecode-based in and out settings

The selected mode will activate the appropriate hot text for that mode. Clicking the hot text brings up an entry field (hours:minutes:seconds:frames). The upper left display indicates the current timecode from the VTR.

Capture In/Out – The capture in-point is entered by clicking on the left field of eight digits in the bracketed fields above the In/Out Duration field. The out-point can be set by clicking on the right field of eight digits. Or you can specify a duration in the In/Out Duration field and the in- or out-point (whichever you have not entered) will be entered automatically according to duration.

Note: The in-point/out-point field values are inclusive. If both are set to the same value, the capture duration will be 1 frame.

To load the current VTR timecode setting in either field (in-point or out-point) click on the bracket ({ or }) next to the field.

VTR TC – The VTR timecode field displays the current machine timecode and you can click on it and enter a timecode to perform a seek to that timecode on the VTR. The VTR must be online and in remote rather than local control mode (as reported in the **VTR Status** field).

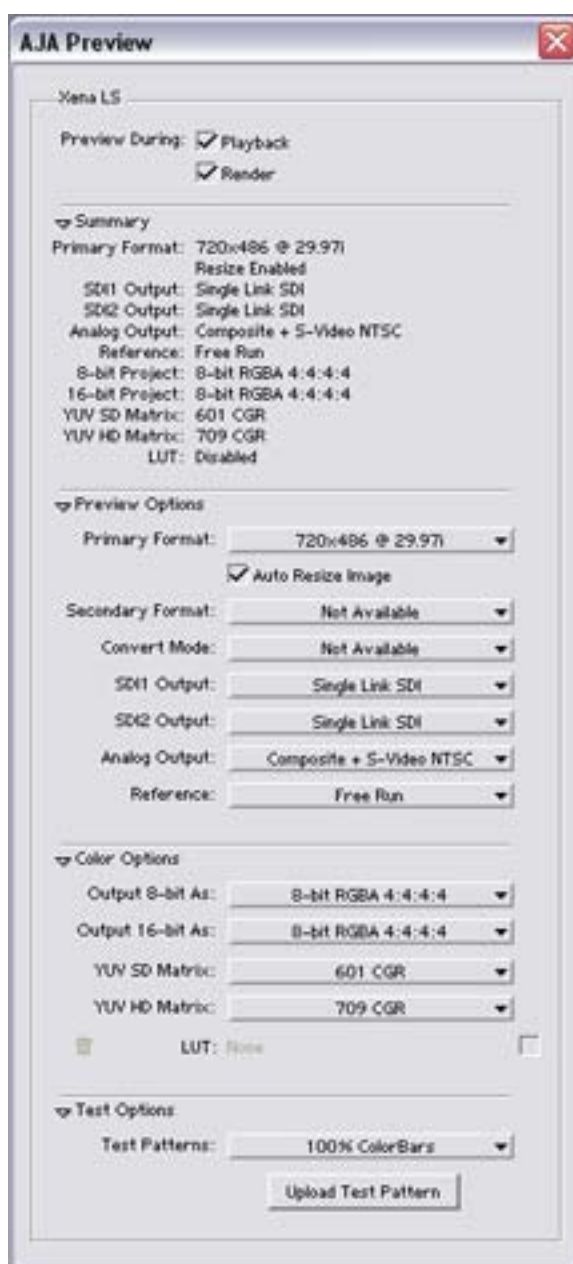
Using the AJA Preview Plugin

The Preview Plugin allows you to view on a monitor the current frame you are working on in the timeline as it will appear at the XENA output.

In **Preview Options**, you can vary the Secondary signal format, Convert mode, SDI and Analog output type (as applicable), and select timing Reference mode—Free Run, External (genlock), or from the video Input signal.

In **Color Options**, you can change color standards and view the resulting output on monitor. You can select a 10-bit Look Up Table (LUT) file and turn it on and off using the check-box at the right.

You can output a Test Pattern selection using the pull-down menu under **Test Options**.



Using the AJA Playback Plugin

Use the Playback Plugin to view rendered files that are produced from the After Effects effects timeline. You've previewed your composition, made final adjustments, and rendered it to a movie or sequence. Now you want to view it in real-time.

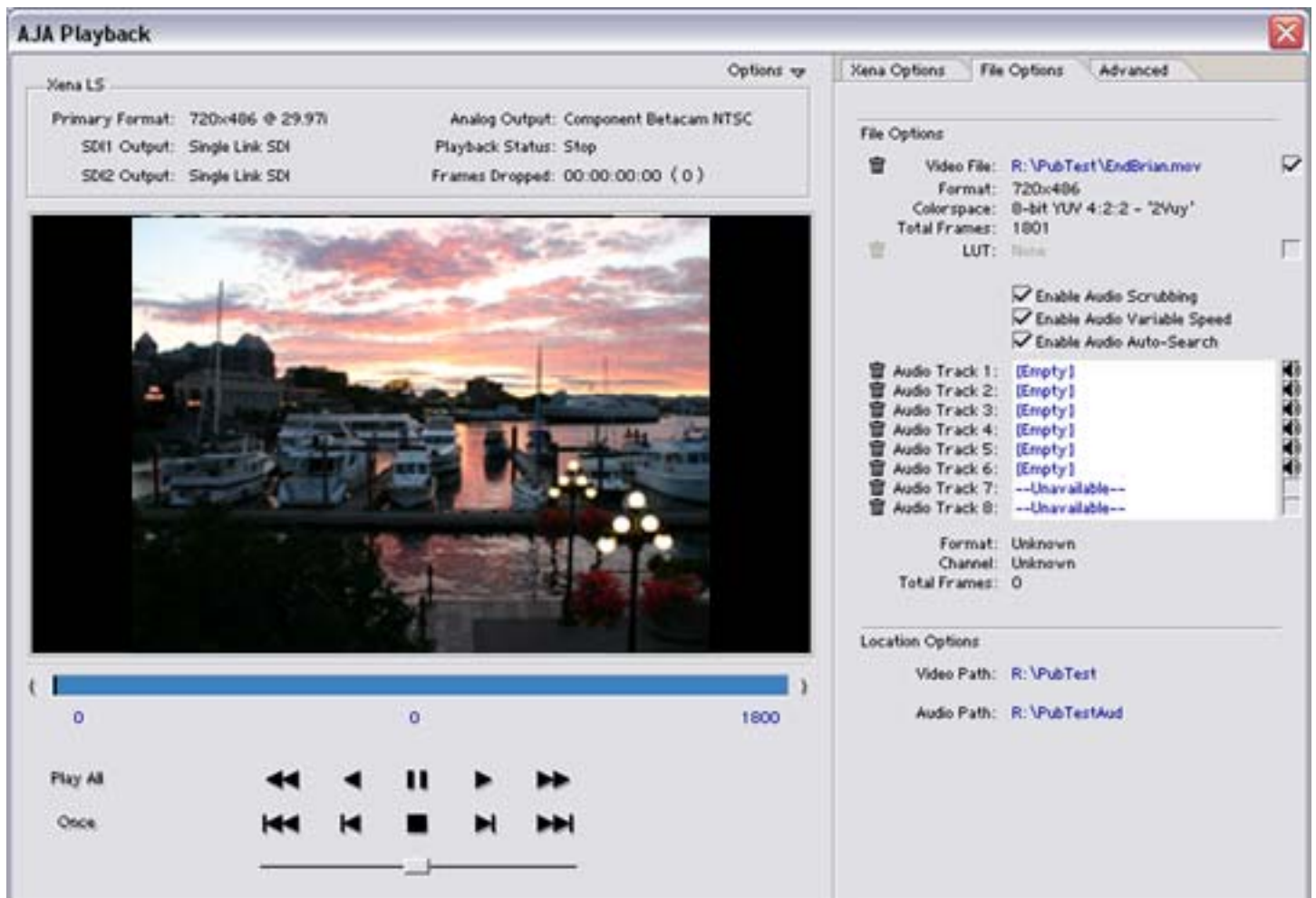
The Playback Plugin offers the same functional layout as the Capture Plugin—Status Display, Configuration Options, Play Controls but with variations suitable for playback.

Loading a File and Setting File Options

You can load a file (one file only) into your Playback window by simply dragging it from disk or the After Effects bin to the active Playback window. Select the **File Options** tab to see the file name and path is loaded into the Video File field. Alternatively, you can click on the path hot text to select a file, delete it using the trash icon at the left, or turn it on/off using the check-box at the right.

Format, Colorspace, and total number of frames in the file is reported below the path text.

You can select a color Look Up Table by clicking on the LUT hot text, delete the existing LUT file by clicking on the trash icon, or turn the file on/off in the check-box.



Audio Files Setup – three audio enable check boxes, when checked, allow you to:

- Enable Audio Scrubbing – Audio will play while you move through frames using the scrub bar (see **Playback Controls**).
- Enable Audio Variable Speed – Audio will play at the same speed the video is played (rather than 1x only).
- Enable Audio Auto-Search – XENA software will automatically load the Audio Track list with audio files that have been generated with the same name as the selected video file.

Note: When Audio Auto-Search is active, existing file names in the list will be removed or over-written when the Video File is loaded. (Does not affect the actual audio files.)

You can edit the Audio Track list that is automatically loaded with audio files that have been generated with the same name as the selected video file. QuickTime embedded audio files are automatically appended with a number and will be loaded numerically into the track list. Click on the trash icon to delete a track. Click on the speaker icon check-box on the right to enable/disable a track. To manually enter audio files, simply double-click on a track in the list.

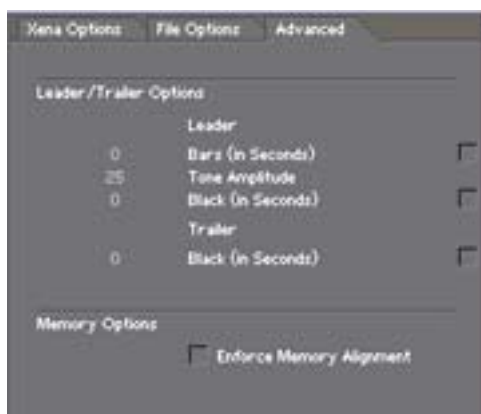
Format, Channel, and number of frames in the sequence are reported below the list.

Location Options – You can use the Video and Audio path hot text fields to create a new Playback directory (separate from your capture directory).

Advanced Options

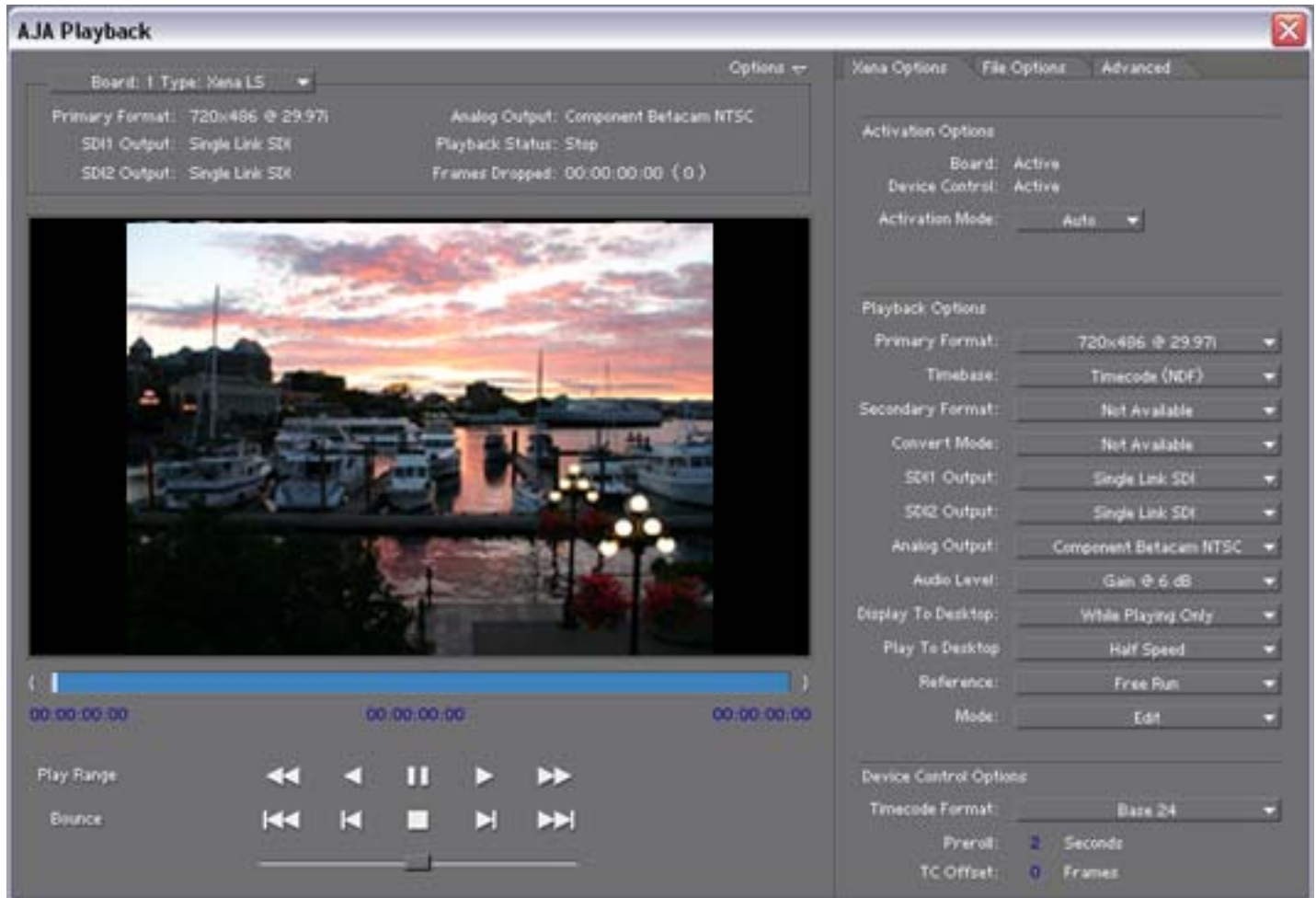
Under the Advanced Options tab, you will find **Leader/Trailer Options** and **Memory Options**. Leader/Trailer Options allow you to add colorbars, test tone, and black field in a leader to your clip and black field as trailer.

Under Memory Options, always leave Enforce Memory Alignment unchecked. It is for SATA controller use only.



XENA Options Tab for Playback

The XENA Options for Playback are much the same as those for Capture. Playback options, however, are for output.



Activation Options – Same as Capture Plugin

Playback Options – Primary Format, Secondary Format, Convert Mode, and Output type setting are all the same as those described for the Capture window.

Use the Timebase pull-down menu to choose between:

- Frames
- Timecode (NDF)
- Timecode (DF)

Audio Level – Choose between +6 dB (US) monitor level and +0 dB (EBU).

Display to Desktop – Select one of four modes of desktop display:

- Off
- Display while idle only (this mode is suggested)
- Display during capture only
- Display Always

Note: Display to Desktop uses system resources and could affect performance during capture.

Play To Desktop Speed – Use this pull-down menu to set a desktop play speed:

- Full Speed – Every frame is displayed to desktop during playback
- Half Speed – Every other frame is displayed to desktop during playback
- Quarter Speed – one out of every four frames is displayed to the desktop

Half Speed and Quarter Speed will reduce the system load that the Display-To-Desktop is using to draw video to your computer.

Using the **Reference** pull-down menu, select timing Reference source—Free Run, from External (genlock), or from the video Input signal.

The **Mode** option menu offers types of Playback—Edit or Print-to-Video. This selection varies the Play Control pane as follows.

Edit Mode – In Edit mode,



Edit Mode Play Controls and Scrub Bar

Below the video display is a Scrub Bar that allows you to click and drag along the loaded sequence to view individual frames and mark In and Out frames for playback of frame subsets. To set an in-point, click on the left bracket. To set an out-point, click on the right bracket.

Alternatively, you can set an in-point by clicking on the left most hot text numeral below the bar and enter the desired frame number for an in-point. Similarly, enter the out-point frame by clicking on the right side hot text numeral.

Note: The “first” or “last” frame may be for the entire sequence or for frames in a in/out-marked subset. In this case, first, last, in, and out frames become “Most Significant Frames.” For example, clicking on the Go-to-1st button will move you to the first Most Significant Frame to the left. Clicking on the Go-to-Next button will move you to the first Most Significant Frame to the right.

Immediately under the scrub bar are standard tape deck icons providing hot buttons for the Play process. From left to right they are:

- Go-to-Previous “Most Significant” frame
- Reverse 1 frame
- Rewind (8x)
- Reverse Play
- Still
- Stop
- Play (1x)
- Fast Forward (8x)
- Forward 1 frame
- Go-to-next “Most Significant” frame

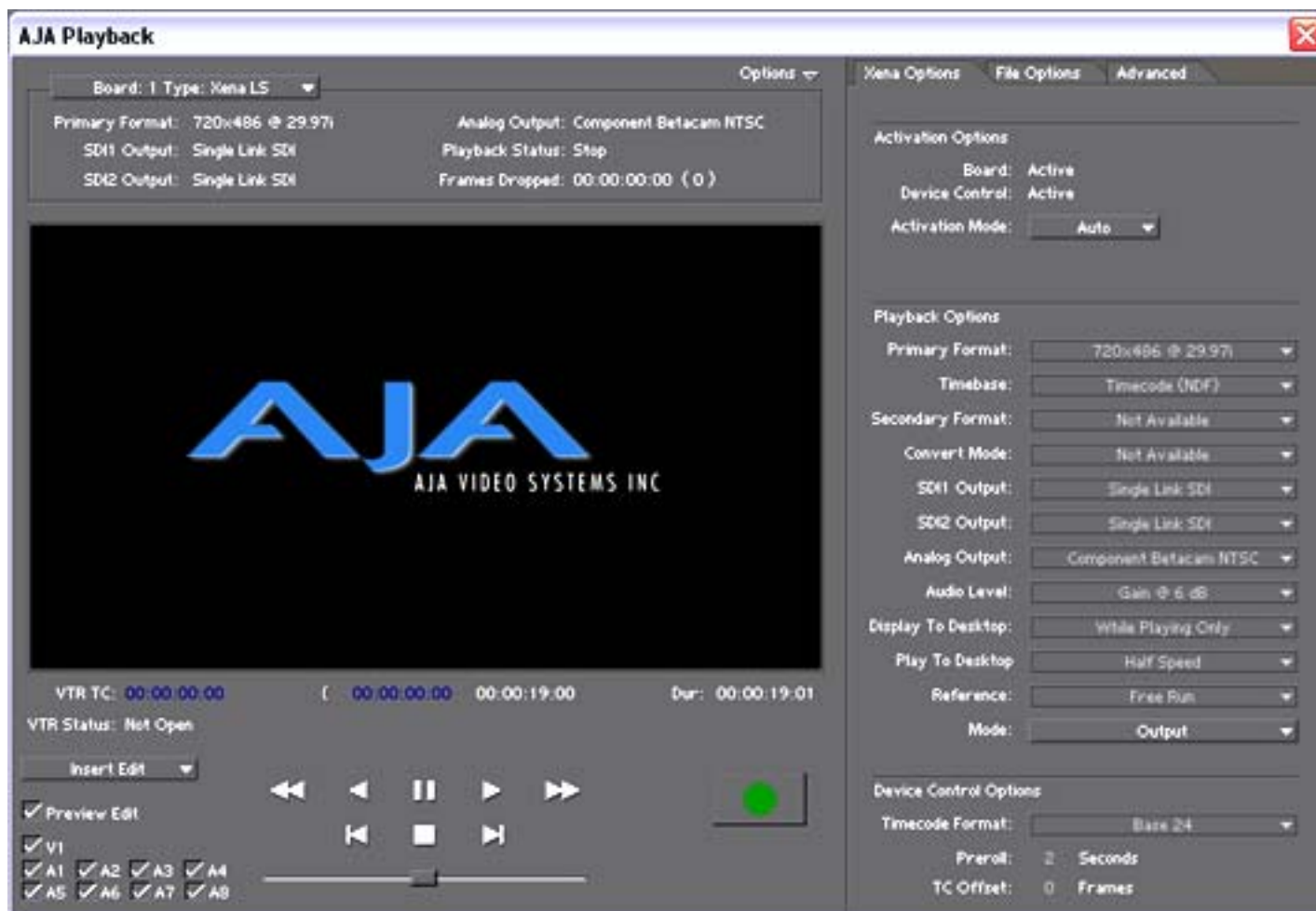
The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.

Output Modes

Use the **Mode** pull-down menu to select **Output**.

Note: The Playback Options section is disabled in this mode to prevent format changes during output.

Standard VTR controls and machine control timecode hot text are provided for outputting your segment. A pull-down menu beneath VTR Status allows you to choose between two modes of output— Insert Edit or Print-To-Video. Print-To-Video and Insert Edit will output the loaded clip from its in/out- points (if any exist) or from the first to last frame (if no in/out-points have been set).



Insert Edit Mode

Insert Edit –In this mode, you can select the Video/Audio content that you want to insert by checking the desired content boxes at the left. Then set an in-point that the recording VTR will use to initiate recording of your segment. Duration is determined by the length of the clip you are outputting.

Note: The **Preview Edit** check-box controls whether the insert edit is in “Preview” mode or not. In preview mode, the deck never goes into record but

just simulates the edit without putting anything to tape. You must uncheck this box to perform the actual Insert Edit.

Print-to-Video Mode – This mode allows you to manually put a clip to tape using the VTR's current position. You have the option of adding Delay frames. XENA will wait this many frames after the tape machine start command before outputting the clip. The Duration Field displays the total length of the clip that will go to tape. Click on the green hot button to launch the output sequence.



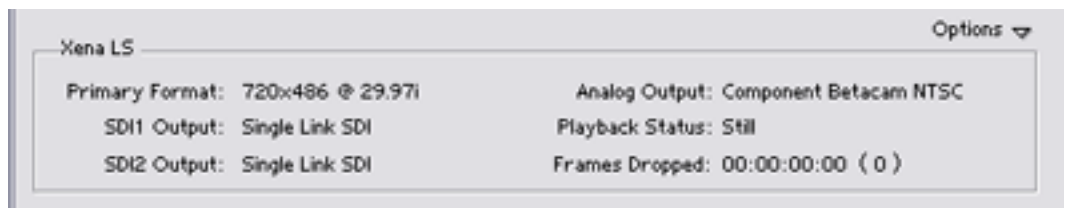
Play Controls for Print-To-Video

Device Control Options – Select the Timecode Format and enter Preroll and Timecode Offset settings for the destination machine in the Print-to-Video operation.

Status Display

The Status Display section of the AJA Playback plugin reports the settings that you have selected for the XENA board you are controlling:

- Primary Format
- SDI1 Output type
- SDI2 Output type
- Analog Output type



In the right column you will also see current information for:

- Playback Status: Stop, Still, Playing
- Frames Dropped: a live frame count display followed by a total count of any frames dropped from the sequence in parens ()

Play Controls

Immediately under the picture display is a Scrub Bar that allows you to click and drag along the loaded sequence to view individual frames and mark Start and Stop frames for playback of frame subsets. To quickly move to the first frame (0), click on the left bracket. To move the last frame, click on the right bracket.

To mark a Start frame click on the left most hot text numeral below the bar and enter the desired frame number. Similarly, enter the Stop frame by clicking on the right side hot text numeral.

Select a Play type by clicking the Play hot text. Choose between: Play All or Play Range.

You can select one of three Play Modes:

- Once – play once through in forward or reverse
- Bounce – play continuously, alternating between forward and reverse play
- Loop – play repeatedly, looping in one direction

Standard tape deck icons provide hot buttons for the Play process. On the top row (from left to right) they are: Rewind (8x), Reverse Play, Still, Play, Fast Forward (8x). On the lower row they are: Go-to-1st frame (see Note), Reverse 1 frame, Stop, Forward 1 frame, Go-to-Last frame (see Note).

Note: The “first” or “last” frame may be for the entire sequence or for frames in a marked subset. In this case, first, last, in/out frames become “Most Significant Frames.” For example, clicking on the Go-to-1st button will move you to the first Most Significant Frame to the left. Clicking on the Go-to-Last button will move you to the first Most Significant Frame to the right. Clicking on the hot brackets at each end of the scrub bar will do the same.

The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.



Chapter 6:

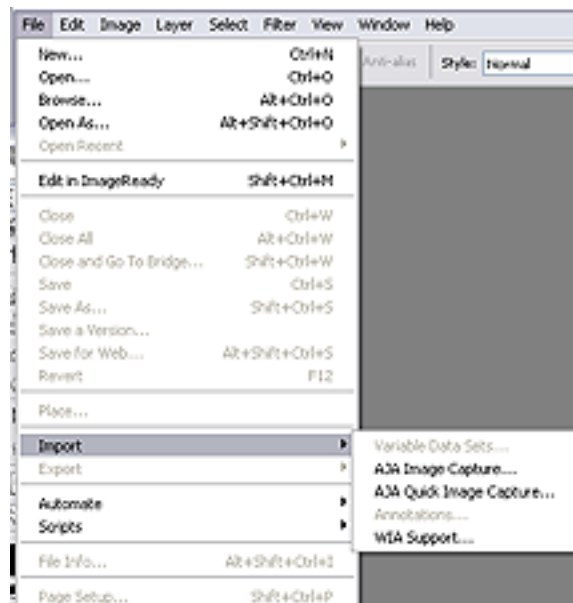
Adobe Photoshop CS2

Overview

Adobe Photoshop CS2 (not included with XENA) ships with information already configured for most common system configurations. After you install the XENA software on your Windows XP workstation, all you need to do to begin using it is to become familiar with the XENA Plugins and how Photoshop CS works with XENA.

With Photoshop open, you'll go to the File pull-down menu and select Import>AJA Image Capture to set up your workflow, source device control, and other XENA options. Then access Export>AJA Preview Setup to configure the preview output to your monitor. Quick capture and simple send-to-preview functions are also available in these menus.

The manual you are reading does not provide operational information for Adobe Photoshop. Please read the Photoshop user documentation provided with the application for information on configuration and operation. The chapter you are reading addresses configuration and setup unique to use of XENA LS, LH, and LHe models with Adobe Photoshop.



AJA Image Capture in Photoshop File>Import Menu

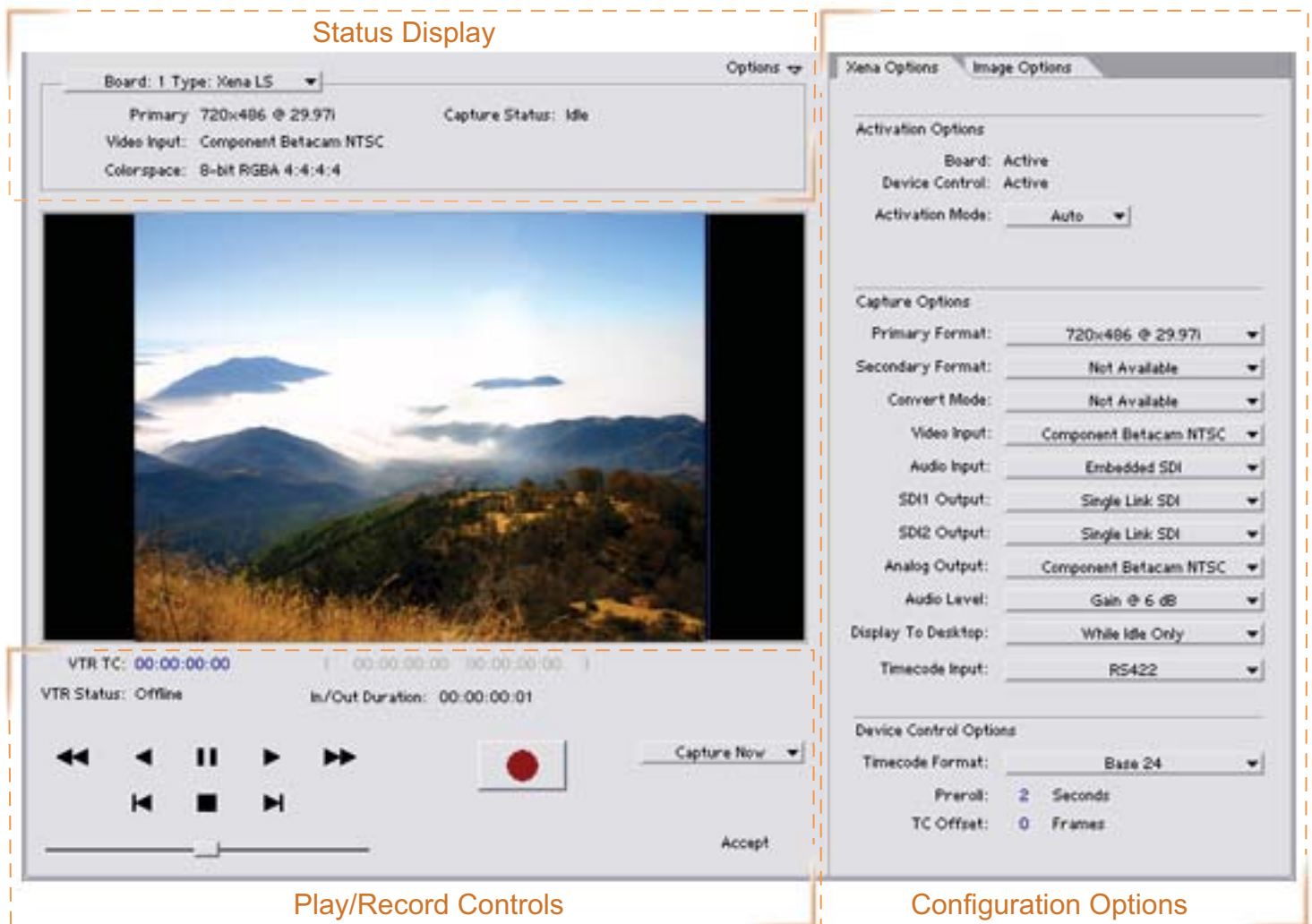
XENA Photoshop Plugin Overview

The XENA Photoshop plugin is a software application that is integrated into the Photoshop application and is accessed under the File menu. The Capture plugin provides you with standard tapedeck style play/record functions, status display, and configuration options. The Preview plugin allows you to adjust output formats and view your current project frame on a monitor connected to a XENA output before rendering to file.

In this section, you will read about the various pull-down options, hot-text entry fields, and play/record controls and how they interact.

Note: The specific options available to you are determined by the XENA model that is installed in your workstation and you are currently controlling. This section will describe all possible options for the Photoshop plugin and note the options that are exclusive to a particular XENA model.

There are three functional areas in the Capture screen as indicated in the following illustration—Status Display, Play/Record Controls, and Configuration Options.



XENA Photoshop Capture Plugin Layout

The **Status Display** area is read-only information about configuration, current status, and performance.

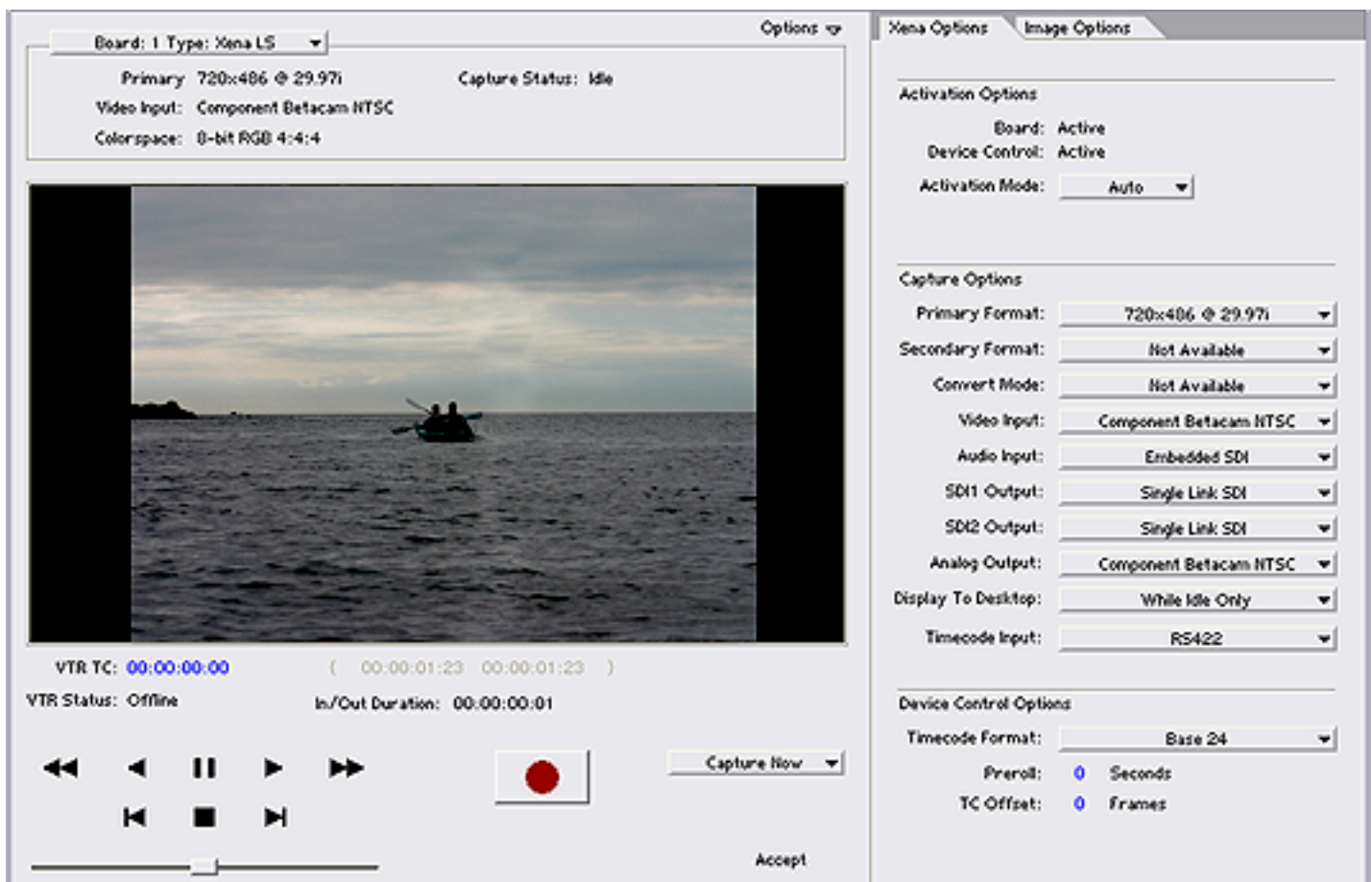
The **Play/Record Controls** offer standard tapedeck controls and more. The hot-text fields beneath the video display are for writing and reading timing data. Capture mode will determine which fields are operational.

Note: Capture Play controls are RS422 machine controls for running a VTR tape deck with timecode data.

The **Configurations Options** section contains tabbed menu selections that provide:

- XENA Options – XENA workflow configuration options
- Image Options – Image formatting colorspace, frame, and crop information

If you don't see the Configuration Options section, click on the Options triangle switch above the Status Display. In normal operation, you may decide to hide this section when it is not needed.



XENA Photoshop Plugin Screen with Image Options

Basic Plugin Operations and Configuration

This section discusses settings that are common across plugin windows and how they interact.

Activation Mode

A XENA plugin can be set for Automatic or Manual activation using the Activation Mode pull-down menu. Automatic is the default setting and is recommended for normal operation. In this mode, you merely click between the open plugins to make one active.

Note: Only one plugin window can have control of the XENA card at a time. If the window you click on does not access the card (reporting Board: Active), either another window is still processing operations or it is set in Manual activation mode and must be disabled (check box blanked).

In Manual mode, you must check the Enable XENA box to activate the board control and un-check it to release control. Upon startup of the Photoshop application, if the launched plugin window is in Manual mode and enabled (Verify), the window will NOT activate until the enable box is clicked again.

The Preview plugin does not need activation since it grabs only one frame (the current working frame) at a time for output to the monitor. It grabs the data on a priority basis when it can or it is off.

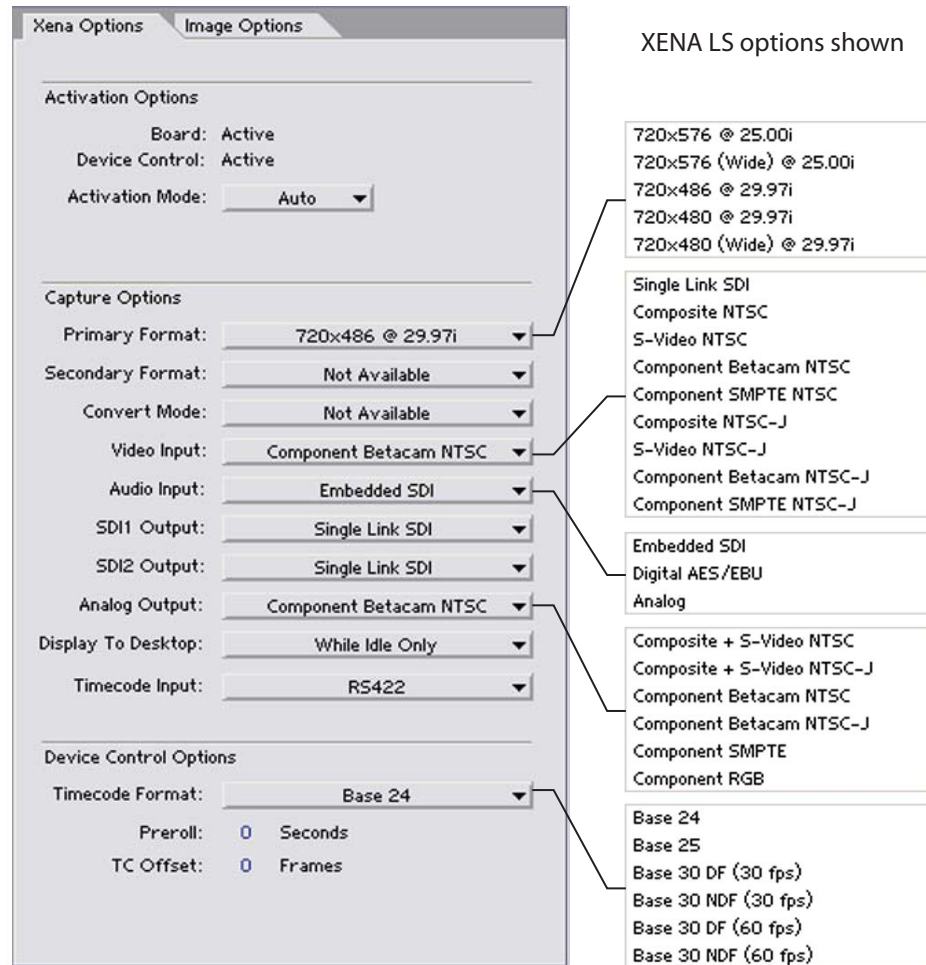
Suggested Screen Presentation Settings

Overall visual presentation of Photoshop and XENA plugins can be enhanced by using the “Silver Theme” Windows desktop presentation (refer to Windows documentation).

Using the AJA Capture Plugin

The first order of business is to Activate the XENA card from the Capture window and setup your workflow by defining Input and Output formats and timing options. To do this you will click on the XENA Options tab. (XENA stores the workflow settings you make until they are next changed.) Next you will access the Image Options tab to set colorspace and framing options, and make Alpha Channel (for RGBA scanned-in images) and image crop settings if required.

XENA Options Menu



Activation

For Activation details, see [Basic Plugin Operations and Configuration](#).

Capture Options

Before configuring your workflow, it is necessary to understand the concept of Primary and Secondary formats. In XENA operation, the Primary format is that which is written to disk and is the format of the content in the working framebuffer.

Secondary format is that which is input for capture or output from XENA to storage or downstream devices.

Primary & Secondary Formats: The Primary Format menu allows you to select the video format to be used in the current project in XENA's framebuffer. (The current selection is reported in the Status Display.)

Throughout the plugin, choices are always presented based on which XENA card you are using and what it can do with the signals available and the inputs/outputs selected. For example, if the outputs or inputs are a different format than the primary, the Secondary Format pull-down menu will allow you to view and edit the available secondary format selection if it differs from the Primary format.

Note: The XENA format nomenclature places (O) or (I) at the end of the signal format: **(O)** = Output only and **(I)** = Input only.

Primary and Secondary Format Options Supported by XENA cards:

6

Video Signal Formats	XENA LS	XENA LH/LHe
720x576 @ 25.00i	Yes	Yes
720x576 (Wide) @ 25.00i	Yes	Yes
720x486 @ 29.97i	Yes	Yes
720x480 @ 29.97i	Yes	Yes
720x480 (Wide) @ 29.97i	Yes	Yes
1280x720 @ 23.976p		Yes
1280x720 @ 24.00p		Yes
1280x720 @ 29.97p		Yes
1280x720 @ 30.00p		Yes
1280x720 @ 50.00p		Yes
1280x720 @ 59.94p		Yes
1280x720 @ 60.00p		Yes
1920x1080 @ 23.976sF		Yes
1920x1080 @ 24.00sF		Yes
1920x1080 @ 25.00sF		Yes
1920x1080 @ 29.97sF		Yes
1920x1080 @ 30.00sF		Yes
1920x1080 @ 25.00i		Yes
1920x1080 @ 29.97i		Yes
1920x1080 @ 30.00i		Yes
1920x1080 @ 23.976p		Yes
1920x1080 @ 24.00p		Yes

6

Video Signal Formats	XENA LS	XENA LH/LHe
1920x1080 @ 25.00p		Yes
1920x1080 @ 29.97p		Yes
1920x1080 @ 30.00p		Yes

Convert Mode: Facilitates down-conversion from High Definition to Standard Definition formats using the AJA 10-bit hardware HS/SD converter (LH/LHe models only). When an input or output is a different standard than the current project's Primary Format, the XENA LH/LHe can down-convert the signal to standard definition (if desired).

Down Conversion choices that may be available include:

- 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 horizontally to fit new screen size

Video Input: Use the Video Input pull-down menu to select the appropriate signal type of your input. (The current selection is reported in the display of the pull-down menu.)

Video Input always shows all the available input options based on your Primary and Secondary format configuration. XENA software looks at 1) what model you have, 2) Primary Format, and 3) Secondary Format (in that order) to determine what input options are appropriate.

Video Input Options Supported by XENA cards include:

- | | |
|------------------------|---------------------------------------|
| • Single Link SDI | • Component Betacam NTSC-J |
| • Composite NTSC | Component SMPTE NTSC-J |
| • S-Video NTSC | • Composite PAL |
| Component Betacam NTSC | • S-Video PAL |
| Component SMPTE NTSC | • Component Betacam PAL |
| Composite NTSC-J | • Component SMPTE PAL |
| S-Video NTSC-J | Component XVGA (High Definition only) |

Audio Input: Use the Audio Input pull-down menu to select the appropriate signal type for your input. (The current selection is reported in the Status Display.)

Audio Input Options Supported by XENA cards include:

- Embedded SDI
- Digital AES/EBU - XLR
- Digital AES/EBU - BNC (only applies if you are using a KL-box)
- Analog

SDI Outputs 1 & 2: The SDI outputs will be Single Link only if there is no Secondary Video Output Format selected. If you have a Secondary format selected, you can choose between Single Link SDI – Primary and Single Link SDI – Secondary as your output.

Analog Output: Analog format choices in the Analog Output pull-down menu vary depending upon file format.

- | | |
|------------------------------|---|
| • Composite + S-Video NTSC | • Composite PAL |
| • Composite + S-Video NTSC-J | • S-Video PAL |
| • Component Betacam NTSC | • Component Betacam PAL |
| • Component Betacam NTSC-J | • Component SMPTE PAL |
| • Component SMPTE | • Component XVGA (High Definition only) |
| • Component RGB | |

Display to Desktop – Select the mode of desktop display:

- Off
- Display while idle only (this mode is suggested)

Timecode Input – Select the type of timecode used by the source video machine—RS422 or Embedded.

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.

Device Control Options

Device Control Options are settings for the RS422 machine control interface on the XENA card.

Time Code Format – Use this pull-down to select the timecode base supported by your VTR.

- Base 24
- Base 25
- Base 25 NDF (50 frames per second)
- Base 30 DF (30 frames per second)
- Base 30 NDF (30 frames per second)
- Base 30 DF (60 frames per second)
- Base 30 NDF (60 frames per second)

The timecode format 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 XENA's RS-422 port).

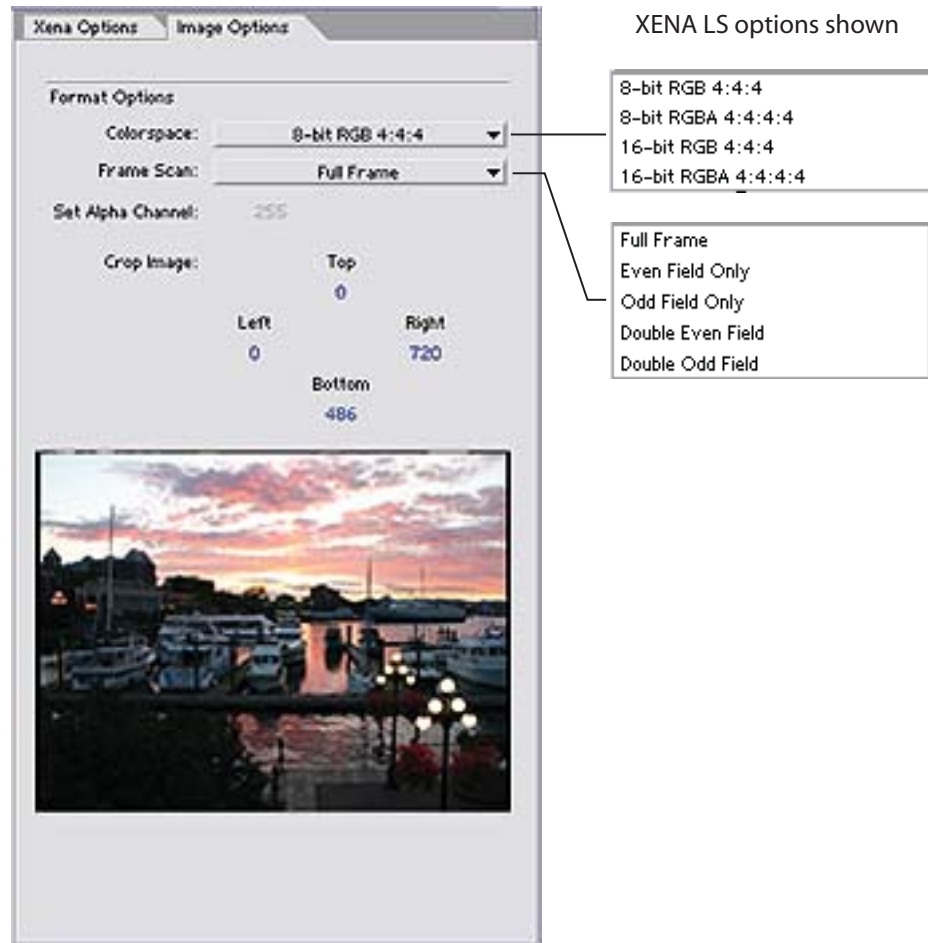
Clicking on the Hot Text items will bring up an entry field in which to enter a value:

- Preroll – 0 to 15; the number of frames required to start the source machine before capture
- Timecode Offset – -30 to +30; timecode adjustment (in frames) forward or back to compensate for discrepancies between the source's burned-in timecode and that of the captured sequence.

After configuring XENA Options, select the Image Options tab.

Image Options Menu

In the Image Options menu there are four configuration settings—Colorspace, Frame Scan, Set Alpha Channel, and Crop Image.



Photoshop Plugin Image Options Tab

Note: You can enlarge the thumbnail capture image to full-screen by double-clicking on the image. To return, double-click again.

Colorspace – Choose between 8- and 16-bit color in either RGB 4:4:4, or RGBA 4:4:4:4 mode.

Frame Scan – Work with a Full Frame or capture Even or Odd fields only in single or double modes.

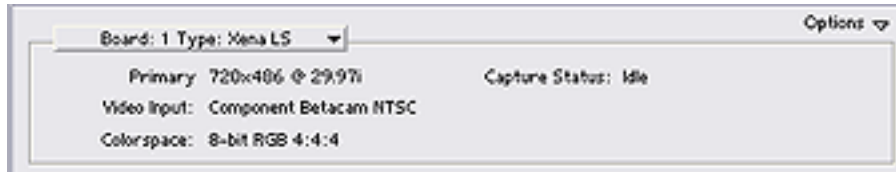
Set Alpha Channel – The Alpha channel image applies only to RGBA scanned-in images and then you can set it to 255 (default) which is zero transparency or 0 which is 100 percent transparency when the image is imported into Photoshop.

Crop Image – Use the hot text fields to enter value for pixels cropped from Top, Left, Right, and Bottom of the captured image. When you import (Accept) the image into Photoshop, it will be cropped to these specifications.

Status Display

The Status Display section of the Photoshop Capture plugin, in the left column, reports the settings that you have selected for the XENA board to use when you have control of it:

- Primary Format
- Video Input type
- Selected Colorspace



If you have more than one XENA card installed in your workstation, you can select another card to work with by using the Board pull-down menu at the top. If your XENA cards are set for Auto Activation and are idle (not processing), you will immediately take control of the new Board (see *Basic Plugin Operations and Configuration*).

In the right column Capture Status reports the detected signal status of the XENA input:

- Off Line – the capture plugin does not control the XENA card
- Idle – Ready, the plugin has control and the proper input signal is present
- Video Input Not Detected – no input present

Play/Record Controls

Standard tape deck icons provide hot buttons for the Play/Record RS-422 machine control of a source VTR. On the top row (from left to right) they are: Rewind (8x), Reverse Play, Still, Play, Fast Forward (8x). On the lower row they are: Reverse 1 frame, Stop, Forward 1 frame.

The slider on the bottom is a variable speed forward/reverse control. Positions from left to right are: (Reverse) 16x, 8x, 4x, 2x, 1/2, 1/4, Still, (Forward) 1/4, 1/2, 2x, 4x, 8x, and 16x.

The red Record button is used to initiate a capture.



The pull-down menu on the right enables one of two capture modes:

- Capture Now – manual record/stop (“crash”) capture
- Capture In/Out – initiate a capture using timecode-based in or out settings

The selected mode will activate the appropriate hot text for that mode. Clicking the hot text brings up an entry field (hours:minutes:seconds:frames). The upper left display indicates the current timecode from the VTR.

Capture In/Out – Enter a timecode Capture point by clicking on either the left field or right field of eight digits in the bracketed fields above the In/Out Duration field. Since Photoshop capture is a single-frame function, the In and Out settings will always be the same and the frame duration will always be one frame.

Note: The in-point/out-point field values are inclusive. When both are set to the same value, the capture duration will be 1 frame.

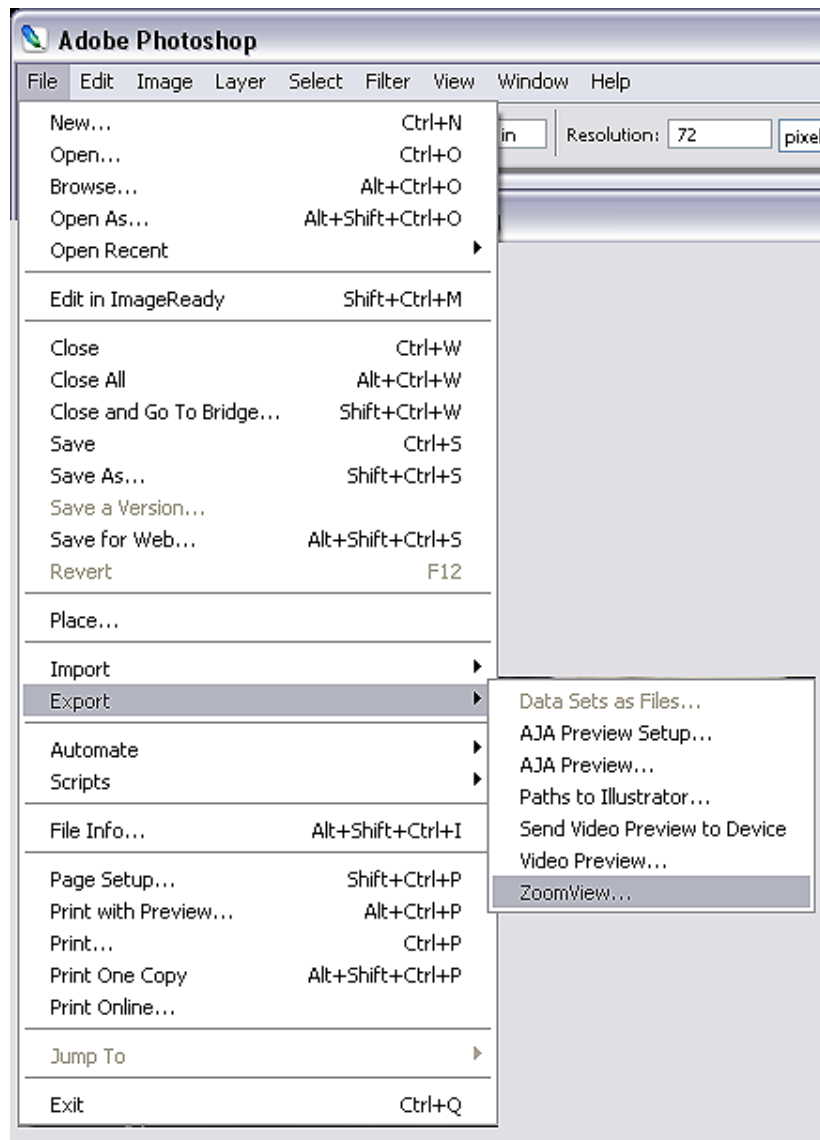
To load the current VTR timecode setting in either field (in-point or out-point) click on the bracket ({ or }) next to the field.

VTR TC – The VTR timecode field displays the current machine timecode and you can click on it to roll the VTR to another frame setting. The VTR must be online and in remote rather than local control mode (as reported in the **VTR Status** field.)

Accept – When you have successfully captured the frame you wish to use in Photoshop, Click on Accept in the bottom right corner of the Play/Record pane. The XEN capture plugin will close and your frame will be opened in Photoshop for editing.

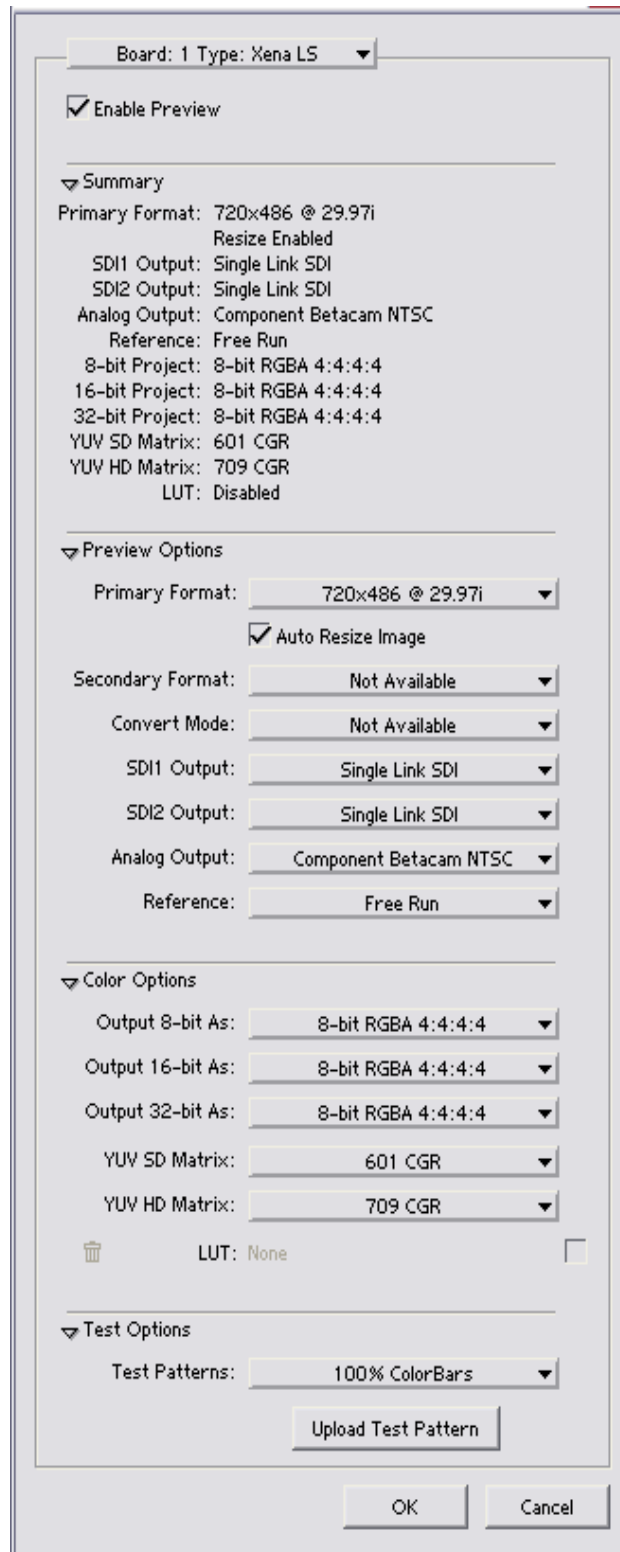
Using the AJA Preview Plugin

The Preview Plugin allows you to view on a monitor the current frame you are working on in Photoshop. Go to File>Import>AJA Preview Setup to configure previews. When you have Preview Setup the way you want it, subsequent Previews are output by selecting AJA Preview (below Setup).



AJA Export Plugins for Photoshop

The pull-down menu at the top allows you to select any XENA board you have installed in your workstation (subject to Activation rules). A check box is provided to enable/disable the Preview function..



Board: 1 Type: Xena LS ▼

☒ Enable Preview

▼ Summary

Primary Format: 720x486 @ 29.97i
Resize Enabled
SDI1 Output: Single Link SDI
SDI2 Output: Single Link SDI
Analog Output: Component Betacam NTSC
Reference: Free Run
8-bit Project: 8-bit RGBA 4:4:4:4
16-bit Project: 8-bit RGBA 4:4:4:4
32-bit Project: 8-bit RGBA 4:4:4:4
YUV SD Matrix: 601 CGR
YUV HD Matrix: 709 CGR
LUT: Disabled

▼ Preview Options

Primary Format: 720x486 @ 29.97i ▼
☒ Auto Resize Image
Secondary Format: Not Available ▼
Convert Mode: Not Available ▼
SDI1 Output: Single Link SDI ▼
SDI2 Output: Single Link SDI ▼
Analog Output: Component Betacam NTSC ▼
Reference: Free Run ▼

▼ Color Options

Output 8-bit As: 8-bit RGBA 4:4:4:4 ▼
Output 16-bit As: 8-bit RGBA 4:4:4:4 ▼
Output 32-bit As: 8-bit RGBA 4:4:4:4 ▼
YUV SD Matrix: 601 CGR ▼
YUV HD Matrix: 709 CGR ▼
LUT: None ☐

▼ Test Options

Test Patterns: 100% ColorBars ▼
Upload Test Pattern

OK Cancel

AJA Preview Setup Menu for Photoshop

The **Summary** section reports current configuration settings.

In **Preview Options**, you can change the Primary and Secondary signal formats, Convert mode, SDI and Analog output type (as applicable), and select timing Reference mode—Free Run, External (genlock), or from the video Input signal.

In **Color Options**, you can change color standards and view the resulting output on your monitor. You can select a 10-bit Look Up Table (LUT) file and turn it on and off using the check-box at the right.

Finally, for picture quality adjustment, you can output a Test Pattern selection using the pull-down menu under **Test Options**. Click OK to output your Preview.

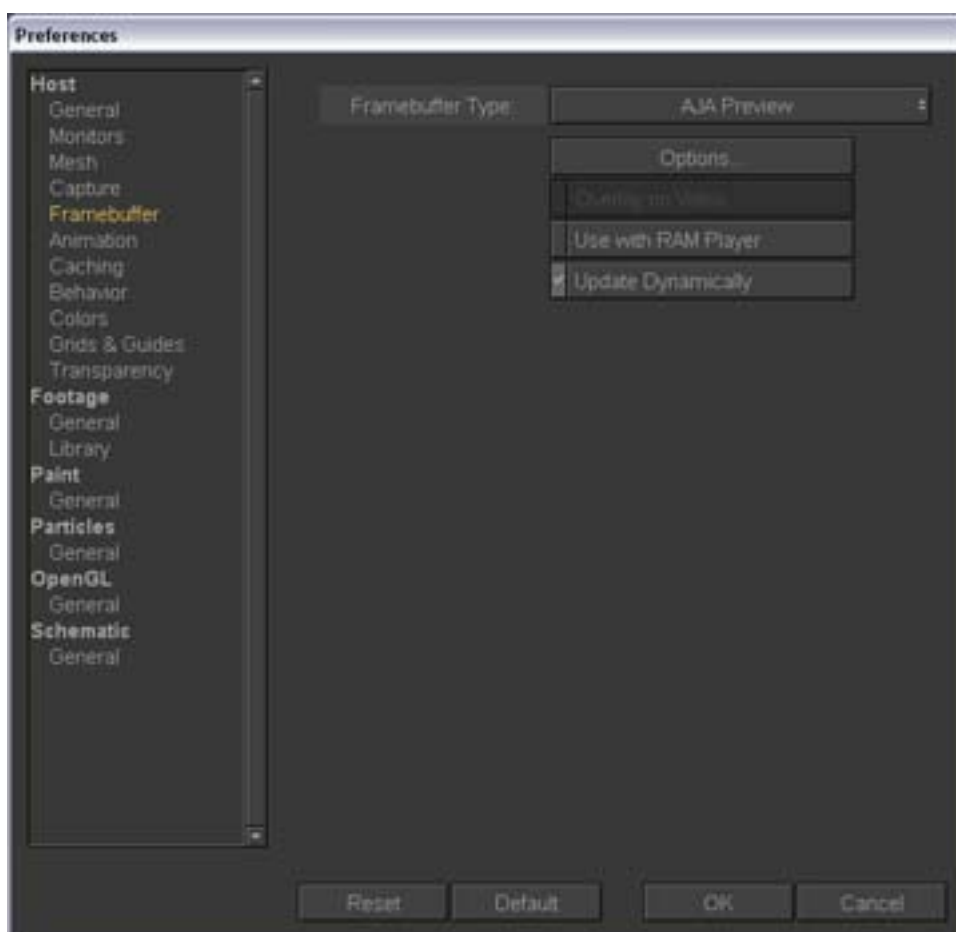


Chapter 7:

Autodesk Combustion

Using XENA with Combustion

AJA's XENA Plugins for Autodesk Combustion are used for Preview functions only.



Combustion Preferences>Framebuffer Menu

The Preview Plugin allows you to view on a monitor the current project you are working on in Combustion as it will appear at the XENA output. With a Combustion project open, go to File>Preferences and select Host>Framebuffer. In the pull-down window, select AJA Preview to configure previews.

If you use XENA Machina for capture and your Video Input format is 8-bit YUV 4:2:2, then select the **2Vuy** mode (uppercase V). Select Update Dynamically to output every frame as you play a segment. Alternatively, you can output only the frame you have stopped on and are currently viewing by deselecting Update Dynamically. This mode can speed up processing by minimizing use of system resources.

The pull-down menu at the top allows you to select any XENA board you have installed in your workstation (subject to Activation rules). A check box is provided to enable/disable the Preview function.



AJA Preview Setup Menu

The **Summary** section reports current configuration settings.

In **Preview Options**, you can change the Primary and Secondary signal formats, Convert mode, SDI and Analog output type (as applicable), and select timing Reference mode—Free Run, External (genlock), or from the video Input signal.

In **Color Options**, you can change color standards and view the resulting output on your monitor. You can select a 10-bit Look Up Table (LUT) file and turn it on and off using the check-box at the right.

Finally, for picture quality adjustment, you can output a Test Pattern selection using the pull-down menu under **Test Options**. Click OK to output your Preview.

Primary & Secondary Formats

The Primary Format menu allows you to select the video format to be used in the current project in XENA's framebuffer. (The current selection is reported in the display of the pull-down menu.)

Choices are always presented based on which XENA card you are using and what it can do with the signals available and the inputs/outputs selected. For example, if the outputs or inputs are a different format than the primary, the Secondary Format pull-down menu will allow you to view and edit the available secondary format selection if it differs from the Primary format.

Note: The XENA Secondary Format nomenclature places (O) or (I) at the end of the signal format: **(O)** = Output only and **(I)** = Input only.

Primary and Secondary Format Options Supported by XENA cards:

Video Signal Formats	XENA LS	XENA LH/LHe
720x576 @ 25.00i	Yes	Yes
720x576 (Wide) @ 25.00i	Yes	Yes
720x486 @ 29.97i	Yes	Yes
720x480 @ 29.97i	Yes	Yes
720x480 (Wide) @ 29.97i	Yes	Yes
1280x720 @ 23.976p		Yes
1280x720 @ 24.00p		Yes
1280x720 @ 29.97p		Yes
1280x720 @ 30.00p		Yes
1280x720 @ 50.00p		Yes
1280x720 @ 59.94p		Yes
1280x720 @ 60.00p		Yes
1920x1080 @ 23.976sF		Yes
1920x1080 @ 24.00sF		Yes
1920x1080 @ 25.00sF		Yes
1920x1080 @ 29.97sF		Yes

Video Signal Formats	XENA LS	XENA LH/LHe
1920x1080 @ 30.00sF		Yes
1920x1080 @ 25.00i		Yes
1920x1080 @ 29.97i		Yes
1920x1080 @ 30.00i		Yes
1920x1080 @ 23.976p		Yes
1920x1080 @ 24.00p		Yes
1920x1080 @ 25.00p		Yes
1920x1080 @ 29.97p		Yes
1920x1080 @ 30.00p		Yes

Convert Mode

Convert Mode enables down-conversion from High Definition to Standard Definition formats using the AJA 10-bit hardware HS/SD converter (LH/LHe models only). When an input or output is a different standard than the current project's Primary Format, the XENA LH/LHe can down-convert the signal to standard definition (if desired).

Down Conversion choices that may be available include:

- 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 horizontally to fit new screen size

SDI Outputs 1 & 2

The SDI outputs will be Single Link only if there is no Secondary Video Output Format selected. If you have a Secondary format selected, you can choose between Single Link SDI – Primary and Single Link SDI – Secondary as your output.

Analog Output

Analog format choices in the Analog Output pull-down menu vary depending upon file format. Choices that may be available include:

- Composite + S-Video NTSC
- Composite PAL
- Composite + S-Video NTSC-J
- S-Video PAL
- Component Betacam NTSC
- Component Betacam PAL
- Component Betacam NTSC-J
- Component SMPTE PAL
- Component SMPTE
- Component X VGA (High Definition only)
- Component RGB

Chapter 8: eyeon Fusion

Using XENA with Fusion

Note: AJA XENA supports Fusion but information on XENA operation was not available for the release of this publication. Contact AJA for more information.



Chapter 9:

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 makes 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.

Updating Software

Check on the AJA Video website (www.aja.com/support_xena.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 Presets and 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 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 an AJA Video XENA 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

Appendix A: Specifications

XENA LH and XENA LHe Specifications

XENA LH

PCI and PCI-X compatible

XENA LHe

PCIe 4-lane compatible

Look Up Tables

Real-time primary LUT

Import/export text-based LUT files

File Import/Export

Import (capture) and export (playback) standard

file formats: DPX*, Cineon*, TGA, TIFF,

BMP, and AVI, QuickTime, WAVE.

* LH/LHE only

Video Formats SD:

525i 29.97

625i 25

HD:

720p Variable Frame Rate

(23.976, 24, 29.97, and 30)

720p 50

720p 59.94

720p 60

1080i 25

1080i 29.97

1080i 30

1080p 23.976

1080psf 23.976

1080p 24

1080psf 24

1080p 25

A

1080psf 25

1080p 29.97

1080psf 29.97

1080p 30

1080psf 30

Video Input

Digital:

HD-SDI/SDI, SMPTE-259/292/296

Analog:

SD and HD Input, BNC

HD: YPbPr, RGB

SD: YPbPr, RGB (component mode)

Composite/YC (composite mode)

12-bit A/D

Video Output SD and HD Output, BNC

HD: YPbPr, RGB

SD: YPbPr, RGB (component mode)

Composite/YC (composite mode)

12-bit D/A

Audio Input

Digital:

2-channel 16/24/32-bit AES/EBU, 48KHz sample
rate

Synchronous or Non-synchronous

(Internal sample rate conversion)

16/24/32-bit SMPTE-259 SDI embedded

audio, 8-Ch, 48kHz synchronous

Analog:

2-channel balanced output

+24dbu Full Scale Digital

16/24/32-bit D/A, 48 KHz sample rate

+/- 0.2db 20 to 20 KHz Frequency Response

Audio Output Digital:

2-channel 16/24/32-bit AES/EBU, 48KHz

sample rate

16/24/32-bit AES/EBU, 48 KHz sample rate

16/24/32-bit SMPTE-259 SDI embedded

audio, 8-Ch, 48 KHz synchronous

Analog:

2-channel balanced output

+24dbu Full Scale Digital

16/24/32-bit D/A, 48 KHz sample rate

+/- 0.2db 20 to 20 KHz Frequency Response

Down-Conversion

Hardware 10-bit output, 16/24/32-bit internal processing

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 horizontally

Reference Input

Analog Color or HD Tri-level

1 BNC on standard breakout cable (75 ohm terminating)

KL-Box (optional): 2 BNCs, passive loop

Machine Control

RS-422, Sony 9-pin protocol Connector provided on XENA LH/LHe breakout cable and on optional KL-Box.

XENA LS Specifications

File Import/Export

Import (capture) and export (playback) standard file formats: TGA, TIFF, BMP, and AVI, QuickTime, WAVE.

Video Formats

SD:

525i 29.97

625i 25

Video Input**Digital:**

8 or 10-bit SDI, SMPTE-259

Analog:

SD: YPbPr, RGB (component mode)

Composite/YC (composite mode)

12-bit A/D

Video Output**Digital:**

8 or 10-bit SDI x2 BNC, SMPTE-259

Analog:

SD: YPbPr, RGB (component mode)

Composite/YC (composite mode)

12-bit A/D

Audio Input**Digital:**

2-channel 16/24/32-bit AES/EBU, 48KHz

sample rate

Synchronous or Non-synchronous

(Internal sample rate conversion)

16/24/32-bit SMPTE-259 SDI embedded

audio, 6-Ch, 48kHz synchronous

Analog:

2-channel balanced input

+24dbu Full Scale Digital

16/24/32-bit A/D, 48 KHz sample rate

+/- 0.2db 20 to 20 KHz Frequency Response

Audio Output**Digital:**

2-channel 16/24/32-bit AES/EBU, 48KHz

sample rate

16/24/32-bit SMPTE-259 SDI embedded

audio, 6-Ch, 48 KHz synchronous

Analog:

2-channel balanced output (XLR)

+24dbu Full Scale Digital (0dbFS)
16/24/32-bit D/A, 48 KHz sample rate
+/- 0.2db 20 to 20 KHz Frequency Response
2-channel unbalanced output (RCA-jack):
requires KL-Box option

Reference Input

Analog Color Black
1 BNC on standard breakout cable (75 ohm
terminating)
KL-Box (optional): 2 BNCs, passive loop

Machine Control

RS-422, Sony 9-pin protocol Connector provided
on XENA LS breakout cable and on
optional KL-Box.

