PIPELINE

Mac OS X

Firmware Version 2.5
Direct Version 2.5
Control for Mac OS X Version 2.5

User's Guide

Pipeline SC
Pipeline Quad
Pipeline HD Dual

Telestream

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Preface

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CHAPTER 1

Introduction

Pipeline is an industry-first network-based video capture and playout device for moving SD & HD SDI video & audio in and out of Mac OS X & Windows file-based workflows. Pipeline systems provide real-time SD and HD SDI ingest and capture into industry-standard QuickTime, MXF OP1a, and MXF OPAtom directly to any storage location.

Pipeline can also be used as the front-end capture system supplying media files that can be immediately used directly with Telestream's transcoding workflow automation tools. It can encode media into QuickTime or MXF for use in products including Apple's Final Cut Pro, Avid Media Composer, and Adobe Premiere Pro.

Pipeline captures media from tape or live sources, making it ideal for integration in broadcast, production, postproduction, government, and other professional media workflow applications. A Pipeline software development kit (SDK) is also available from Telestream, which enables integration in custom applications.

PIPELINE AUTOMATES REAL-TIME MEDIA WORKFLOWS

Designed into Pipeline is ease of use for broadcasters, post-production houses, government agencies, universities, and video professionals. Setting up a Pipeline is easy. Connect Ethernet and SDI, attach an optional VTR, and configure your network settings – you're often up and running in under ten minutes.

Figure 1–1. Pipeline automates and adds value to real-time transcoding workflows

Telestream's Pipeline Family of Products

Pipeline SC

Pipeline SC is a single-channel, single-session device. It is ideally suited for low-volume workflows where easy location and setup is important.

Figure 1–2. Pipeline SC – compact, and easy to set up

Pipeline SC offers these features:

- Network-accessible SDI video encoding and playout
- Real-time encoding from standard definition NTSC/PAL SDI to DV, DVCPro, IMX 30|40|50, ProRes 422 SQ (SD), MJPEG A, and MPEG-2 50 mb/sec I-frame video
- Real-time decoding from SD DV, DVCPro, IMX, and ProRes 422 SQ to PAL/NTSC SDI video
- Extends FlipFactory, Final Cut Pro, and Episode to include workflows with tape or live sources
- VBI closed caption and timecode data extraction
- Shared network access to Pipeline saves time, effort and money
- Digitizes tapes into online libraries for an end-to-end DAM solution
- Records clips to tape for sharing with clients or colleagues.

Pipeline Quad

Pipeline Quad is a four-channel, rack-mounted device with Gigabit Ethernet and four independent Pipeline channels. Pipeline Quad also has a Sync Input for synchronizing output streams and for extracting VITC timecode.

Figure 1–3. Pipeline Quad – four-channels for high-volume applications

The Pipeline Quad's rack-mount form is ideal for high-volume, scalable workflows where throughput and performance are important factors.

Pipeline Quad performs all encoding and decoding available in Pipeline SC, and adds these features:

- Four concurrent, independent Pipeline channels on a single, rack-mount device
- SDI Sync reference channel (sync in only) for frame-synchronized playout across all channels
- Optional, configurable confidence monitoring of client-bound video on a dedicated channel
- Gigabit Ethernet and dual, common power supplies for increased fail-safe operation.

Pipeline HD Dual

Pipeline HD Dual is a two-channel, rack-mounted system with dual Gigabit Ethernet enabling two independent Pipeline HD channels. Pipeline HD Dual also has an SDI Reference input for synchronizing output streams and for extracting VITC timecode.

Figure 1–4. Pipeline HD Dual – two channels for high-volume HD applications

The Pipeline HD Dual's rack-mount form is ideal for high-volume, scalable workflows where throughput and performance are important factors.

Pipeline HD Dual performs all encoding and decoding available in Pipeline SC, and adds these features:

- HD codec support for Uncompressed SD 8-bit, DVCPro50, Apple ProRes 422 HD, Avid DNxHD, and DVCProHD
- Two concurrent, independent Pipeline HD channels on a single, rack-mount device
- Sync reference channel (sync in only) for frame synchronized playout across all channels
- Gigabit Ethernet for each channel and dual, common power supplies for increased fail-safe operation.

Pipeline Benefits

A better way to capture and playout baseband media

Telestream Pipeline is a network-based video capture and playout device for moving HD and SD video and audio in and out of any file-based workflow. This cross-platform solution offers Mac OS X and Windows users more choices for fast, robust, reliable video capture.

Accessible from any workstation on your network

Pipeline provides freedom from the hassles, limitations, and expense of traditional capture-card solutions on a dedicated workstation. Common network protocols, RS-422 deck control, and frame-accurate ingest/playout make Pipeline a smart choice for any video workflow.

Pipeline provides direct support for MXF workflows, creating OPAtom and OP1a media. For users who need to maintain closed captions and other ancillary data, Pipeline offers methods of achieving this via MXF, TIFO, and Avid/Apple proprietary schemes.

In addition to capture, Pipeline provides an easy Print to Tape interface for users who need to insert edit, assemble edit, controlled playout, or crash playout back to tape.

Edit or transcode while capture for quick turnaround

Pipeline allows you to edit or transcode your media files while they are being captured. There is no need to wait for the complete file to arrive. Batch ingest from an EDL file allows you to encode multiple clips from a single tape. Plus, real-time reliable hardware encoding removes capture

card/workstation operating system and driver incompatibilities.

Cost-effective network import/export station

Pipeline enables any machine on the network to act as a dedicated, network import/export station – making it very cost effective. In addition, Pipeline offers support for direct extraction and preservation of ancillary data and a wide variety of timecode sources. A powerful Web service API makes it easy to develop applications that automate control of multiple Pipeline systems. A comprehensive SDK is available for easy integration into any workflow.

Multi-channel scalability

Pipeline Quad and Pipeline HD Dual offer unparalleled encoding power in a compact 1RU box, plus they include dual power supplies for critical workflows. Pipelines can be stacked or racked for scalability to an unlimited number of channels.

Ingest into editing workflows

Pipeline saves significant time and costs over traditional ingest solutions by importing media directly into your editing workflow. A single workstation or server can handle the demands of ingesting multiple SD or HD streams. QuickTime movie files are ready immediately, allowing incoming events and breaking news to be edited while they are being captured. External encoding allows you to use your workstation for editing instead of waiting for clips to be rendered. Additionally, Pipeline's keyboard commands allow you to set up your workflow the way you want.

Ingest into transcoding workflows

Use Pipeline for high-quality baseband ingest into your transcoding workflow. Telestream's FlipFactory, Vantage, Agility, and Episode products allow you to simultaneously create high-res files for storage while creating a low-res proxy, or create any number of additional file formats in near-realtime. Transcoding begins immediately while ingesting media, saving you time and money. Pipeline also preserves important metadata throughout your transcoding workflow.

CHAPTER 2

Pipeline Hardware, Installation & Setup

Use this chapter to unpack and set up Pipeline SC, Pipeline Quad, and Pipeline HD Dual devices, connect video equipment, and configure the Pipeline for a LAN connection. Before proceeding, work with your network administrator to determine network setting requirements: IP address netmask, and the gateway address. You should also understand your media workflow requirements and read Disk and Network Requirement by Media Format (page 41).

Note

Topics in this chapter refer to all Pipeline devices unless specifically noted.

To set up and configure your Pipeline correctly, complete the tasks in this chapter, referring to Chapter 5, Using the Configure Panel on page 51 for network configuration tasks.

Topics

- Environmental Operating Requirements (page 6)
- Power Requirements (page 6)
- Unpack the Pipeline (page 6)
- Locate the Pipeline SC (page 7)
- Locate the Pipeline Quad | Pipeline HD Dual (page 7)
- Pipeline SC Hardware (page 9)
- Pipeline Quad Hardware (page 11)
- Pipeline HD Dual Hardware (page 15)
- Connecting Pipeline to Mac OS X or Windows Computers (page 19)
- Adding Pipeline to a Network (page 20)
- Powering up the Pipeline (page 21)
- Configuring & Connecting to Pipelines (page 22)
- Registering Your Pipeline with Telestream (page 22)

Environmental Operating Requirements

Plan adequate space for cable routing from the back of the chassis. Ensure that the Pipeline is in close proximity to your Ethernet and video cables, and that cable connectors are not stressed, bent, or crimped. Also make sure that you have adequate space for a VTR deck, if necessary.

Caution

Do not place more than two Pipeline SCs in a stack. If you do, you risk overheating a unit, potentially leading to operational failure.

Allow at least six inches (15 cm) of space between the Pipeline and the nearest object to ensure adequate airflow. Keep the temperature range within acceptable limits (table below), and keep humidity moderate in the vicinity. Temperature specifications are as follows:

Table 2–1. Operating and Storage Temperature Parameters

Modes	Temperature Ranges
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-40°C to 60°C (-40°F to 140°F)

Power Requirements

Input Voltage. Auto-sensing 100 to 240V AC, 50/60Hz

Caution

Telestream recommends connecting computer equipment to AC power through an uninterruptible power supply (UPS) with surge protection. Fluctuations in commercial supply voltage can damage unprotected electronic equipment.

A high quality surge suppressor may be substituted if a UPS is not available, but it may not provide adequate protection.

Unpack the Pipeline

Unpack the contents of the original shipping container; identify each component and determine that they are in satisfactory condition. If any shipping damage is visible, note it on your shipping documents and contact your shipping agent and Telestream or authorized Telestream distributor.

Note

Save all packaging materials and store them in a safe place. If you require service – or move your Pipeline – the packaging materials may be used for safe shipment.

Pipeline SC Shipping Container Contents

In addition to the Pipeline itself, each package contains the following:

- Software Installation and User's Guide CD-ROM
- Power adapter with power cord
- Quick Start Guide (in CD case)

Pipeline Quad Shipping Container Contents

In addition to the Pipeline itself, each package contains the following:

- Software Installation and User's Guide CD-ROM
- Power cords
- Quick Start Guide (in CD case)

Pipeline HD Dual Shipping Container Contents

In addition to the Pipeline itself, each package contains the following:

- Software Installation and User's Guide CD-ROM
- Power cords
- Quick Start Guide (in CD case)

Locate the Pipeline SC

For permanent locations, select a stable and level, smooth, hard surface. Avoid carpeted or cloth-covered surfaces which inhibit airflow or reduce heat dissipation, which contributes to overheating. Select an isolated area that provides a proper operating environment and protection from accidental damage to the Pipeline. Route power, Ethernet, and other cables to protect users from a tripping hazard and damage to the Pipeline.

Locate the Pipeline Quad | Pipeline HD Dual

For permanent locations, mount the Pipeline Quad|HD Dual in a single rack-unit slot in a computer rack and secure it in place. Make sure the following issues are adequately addressed:

Elevated Operating Ambient Temperature. If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified (Operating and Storage Temperature Parameters on page 6).

Reduced Air Flow. Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading. Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading. Consideration should be given to the connecting equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be given when addressing this concern.

Reliable Earthing. Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

PIPELINE SC HARDWARE

The Pipeline SC is 7.5 inches (19.1 cm) wide, 5.5 inches (14.0 cm) deep, and 1.5 inches (3.8 cm) high.

Pipeline SC is a compact, network-ready SDI encoder/decoder device equipped with 10/100Mb Ethernet using TCP/IP, UDP, RTSP, and RTP. It uses Bonjour for service discovery. Additionally, it employs Serial Digital Interface (BNC, SMPTE-259M 270mb/sec) with 8-channel embedded audio input and output ports, plus automatic detection of 525/625. It also has an RS-422 deck control port using Sony 9 Pin Protocol.

Pipeline can capture and play out NTSC/PAL having DV/DVCPRO 25Mb, IMX 30|40|50 and MPEG-2 I-Frame 50Mb MJPEG, ProResSQ video (capture only) video, and 48 KHz, 16/24 bit, uncompressed audio.

Processing VBI Closed Captions and Timecode Data

Pipeline automatically processes Vertical Blanking Interval (VBI) data on ingest operations to obtain closed caption and timecode data. Closed captions are extracted from line 21, and timecode from lines 16 through 20 (5 lines beginning with line 16). The last line (usually 20) with a valid timecode is the line whose data is used. Pipeline encodes the closed caption and timecode data into the data stream of the digital output, making it available for processing by client applications, such as FlipFactory, Vantage, Agility, and Episode.

Front Panel Indicators

The front panel contains LED indicators, making it easy to check its status.

Figure 2–1. Pipeline SC front panel

There are three LEDs you use to determine the state of the Pipeline:

Power. Displays green light when power is present.

SDI In. Display green light when Pipeline is configured to encode SDI In and send it out via Ethernet. How media is encoded is determined by the selected codec. If the LED lights orange, data is being lost. The reason should be corrected before continuing operation. During a firmware upgrade, this LED lights yellow until you reboot.

SDI Out. Displays green light when the Pipeline is configured to decode digital media from the Ethernet port, and send decoded media to the SDI Out port. If the LED lights orange, data is being lost. The reason should be corrected before continuing operation.

Rear Panel Ports and Connectors

The rear panel contains the power jack, plus video and network connector ports.

Figure 2–2. Pipeline SC rear panel

When connecting video equipment, Ethernet, and RS-422 cables, be sure that the power supply is disconnected from the Pipeline. Failure to do so may result in equipment malfunction or damage.

DC Power Port. Use to connect and turn on the Pipeline. Only connect the Pipeline to power using the Telestream-supplied power supply.

10/100 Ethernet Port. The Ethernet port has two LEDs:
Link (left LED): If the LED is not lit, no link is available. If the LED is lit orange, link has been established.

Connection/Activity (right LED): If the port is connected at 100 Mb, the LED lights green, and blinks on activity. If the port is connected at 10 Mb, the LED is unlit, but blinks green during activity.

RS-422. Female DB-9 RS-422 port for VTR, using Sony 9 Pin protocol.

SDI In. BNC jack for SDI input signal.

SDI Out. BNC jack for SDI output.

Caution

If the Connection LED is unlit, the Pipeline is operating at 10 Mb, which is unacceptable for real time video traffic. Resolve the problem before continuing, to avoid video stream data loss.

Pipeline Quad Hardware

The Pipeline Quad is 17.3 inches (43.9 cm) wide, 13.2 inches (33.5 cm) deep, and 1.5 inches (3.8 cm) high. Pipeline Quad is a single rack unit device, with four onboard SDI encoder/decoder devices equipped with an external Gigabit Ethernet port and an onboard switch routing 100Mb Ethernet to each device, using TCP/IP, UDP, RTSP, and RTP and Bonjour for service discovery. Serial Digital Interfaces are provided for each device (BNC, SMPTE-259M 270mb/sec).

There are 4 SDI in and out ports (per Quad, not per channel), each supporting up to 16 channels of embedded audio, with four SDI in and out ports (per Quad) with automatic detection of 525/625, and RS-422 deck control ports, using Sony 9 Pin Protocol.

Pipeline Quads can encode and decode NTSC or PAL with DV/DVCPRO 25Mb, IMX 30, 40, 50, MPEG2 I-Frame 50Mb MJPEG, and ProRes SQ video (encode only, in FlipFactory workflows), and 48 kHZ, 16 and 24 bit, uncompressed audio, in up to four concurrent sessions; each individual Pipeline channel operates independently, each communicating via a common physical Ethernet port on the Quad's backplane.

The Pipeline Quad and HD Dual provides common, dual power supplies for redundancy and fail-safe operation. Telestream highly recommends that both power supplies be connected during operations. The Pipeline can operate normally on a single power supply, however you will lose the redundant safety of the second power supply.

Using SDI Sync Input

The SDI Sync Input is used in both capture and playout modes but for two different purposes.

In capture mode, the SDI Sync Input is used as a method for supplying a common timecode reference to all input channels. For the timecode to be extracted, the SDI signal connected to the SDI Sync Input must contain a valid timecode in the vertical blanking area of the signal. This timecode is usually referred to as VITC (vertical interval timecode). The SDI signal must be a digital signal that is frame synchronized with the SDI signals used as the input video source for the timecode extraction to work properly. An analog signal cannot be connected to the SDI Sync input.

In playout mode, the SDI Sync Input is used as a frame synchronization source for each of the SDI outputs. Any timecode on the SDI Sync Input is ignored in this mode. If no signal is connected to the SDI Sync Input, each of the SDI outputs will free run (i.e. they will not be synchronized with each other or with any house reference).

Using SDI Sync Out

The SDI Sync Out port is a re-clocked loop-through port of SDI Sync In. You can use this re-clocked reference for additional Pipelines or other devices.

Processing Closed Caption and Timecode Data

Pipeline automatically processes Ancillary Data on ingest operations to obtain closed captions and timecode data. Pipeline encodes the closed caption and timecode data into the data stream of the digital output, making it available for further processing by client applications, such as FlipFactory, Vantage, Agility, and Episode.

The Pipeline automatically analyzes the signal during the Vertical Blanking Interval (VBI) on ingest operations to obtain closed captions and timecode data. Closed caption data is extracted from line 21, and timecode data from lines 16 through 20 (the 5 lines beginning with line 16). The last line (usually line 20) with a valid timecode is the line whose data is used.

Front Panel Indicators

The front panel contains LED indicators, making it easy to check its status.

Figure 2–3. Pipeline Quad front panel

SDI In. One per channel. Lights green when the Pipeline is configured to encode SDI In and send it out via the Ethernet port. Media is encoded based on the selected codec. If the LED lights orange, data is being lost. Correct problem before continuing. During a firmware upgrade, the LED lights yellow until the upgrade completes and the Pipeline is automatically rebooted.

SDI Out. One per channel. Lights green when the Pipeline is configured to decode digital media from the Ethernet port, and send decoded media to the SDI Out port. If the LED lights orange, data is being lost. The problem should be corrected before continuing operation.

The LED blinks orange at one second intervals when the internal Ethernet switch and network that connects the four Pipelines has failed. Usually, at least one of the Pipelines can't communicate, indicating that potentially an input channel has failed, and confidence monitoring is not operational. Reboot Pipeline to solve the problem, or contact Telestream customer service.

Link. Lights green when Ethernet link has been established.

Sync. Lights green when an SDI signal is detected on the sync reference input channel.

PWR 1 & 2. Lights green when power is present and the power supply is operating normally. PWR1 indicates power supply 1; PWR2 indicates power supply 2. An orange PWR LED indicates a failed power supply or that no power is present.

If a power supply fails, complete jobs in progress. RMA the Pipeline to Telestream for repair as soon as practical.

Front Panel Reset Switches

With the front panel bezel removed, five recessed reset buttons are exposed. They are not labeled.

Figure 2–4. Pipeline Quad reset switches behind front panel

Channel 1 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 1. The channel will be disconnected from any client currently attached.

Channel 2 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 2. The channel will be disconnected from any client currently attached.

Channel 3 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 3. The channel will be disconnected from any client currently attached.

Channel 4 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 4. The channel will be disconnected from any client currently attached.

Factory Default Reset. Insert a pointed object to depress the recessed button to restore the factory defaults of the Pipeline device. Both channels are returned to their original factory default values, including IP address and global options selected. During reset all LEDs glow green. When reset is complete, the LEDs return to their normal state.

Note

Resetting factory defaults does not change the firmware or app loader versions.

Rear Panel Ports and Connectors

The rear panel contains power plugs, plus video and network connector ports.

Figure 2–5. Pipeline Quad rear panel

When connecting video equipment, Ethernet, and RS-422 cables, be sure that the power supply is disconnected from the Pipeline. Failure to do so may result in equipment malfunction or damage.

AC Power Plugs. Use to connect and turn on the Pipeline. Only connect the Pipeline Quad to power using the Telestream-supplied power cords. To insure fail-safe operation, be sure to use both power supplies. These supply common power to the Pipeline; if one power supply fails, the Pipeline continues to operate.

Sync In. The SDI Sync Input is used in both capture and playout modes but for two different purposes. In capture mode it is used as a method for supplying a common timecode reference to all input channels. In playout mode it is used as a frame synchronization source for each of the SDI output channels (Using SDI Sync Input on page 11).

Sync Out. Re-clocked loop-through port of SDI Sync In. You can use this re-clocked reference for additional Pipelines or other devices.

RS-422. Female DB-9 RS-422 port for VTR, using Sony 9 Pin Protocol (one per channel).

SDI In. BNC jack for SDI input (one per channel).

SDI Out. BNC jack for SDI output (one per channel).

WARNING

SDI-OUT is intended to be used for monitoring of the looped SDI-IN input source and should *not* be used to distribute this source to additional capture channels. Do not connect the looped SDI-OUT signal into any other Pipeline SDI-IN port. This may cause unintended capture interruptions on the channel connected to the looped source.

Gigabit Ethernet Port. The Ethernet RJ-45 jack has two LEDs: If the left, orange LED is lit and the right, green LED is lit, the port is operating at 1Gbs (gigabit). If only the orange LED is lit, the Ethernet port is not connected. Be sure to use CAT-6 cabling end-to-end from Pipeline to your Macintosh or Windows PC client for best results.

Caution

If only the green LED is lit or the LED is unlit, the Pipeline is operating at 100 or 10 Mb respectively. These data rates are unacceptable for real time video traffic from all four channels. Resolve the problem by connecting at 1 Gbs before processing jobs to avoid data loss.

Pipeline HD Dual Hardware

The Pipeline HD Dual is 17.3 inches (43.9 cm) wide, 13.2 inches (33.5 cm) deep, and 1.5 inches (3.8 cm) high. Pipeline HD Dual is a single rack unit device with two onboard HD/SD-SDI encoder/decoder devices equipped with two external Gigabit Ethernet ports. It uses TCP/IP, UDP, RTSP, and RTP and Bonjour for service discovery. Serial Digital Interfaces are provided for each device (BNC, SMPTE-259M 270mb/sec) with 2 SDI in and out ports (per HD Dual), each supporting up to 16 channels of embedded audio, with automatic input format detection. It also provides RS-422 deck control ports using Sony 9-Pin Protocol.

Pipeline HD Dual can encode DV/DVCPRO 25/50, IMX 30|40|50, MPEG-2 50M I-frame (FlipFactory workflows) MJPEG, ProRes HQ/SQ/LT/Proxy, Avid DNxHD and DVCProHD video, and 48 KHz, 16/24 bit, uncompressed audio.

The Pipeline Quad and HD Dual provides dual power supplies for redundancy and fail-safe operation. Telestream highly recommends that both power supplies be connected during operations. Pipeline can operate normally on a single power supply, however you will lose the redundant safety of the second power supply.

Using SDI Sync Input

The SDI Sync Input is used in both capture and playout modes but for two different purposes.

In capture mode, the SDI Sync Input is used as a method for supplying a common timecode reference to all input channels. For the timecode to be extracted, the SDI signal connected to the SDI Sync Input must contain a valid timecode in the vertical blanking area of the signal. This timecode is usually referred to as VITC (vertical interval timecode). The SDI signal must be a digital signal that is frame synchronized with the SDI signals used as the input video source for the timecode extraction to work properly. An analog signal cannot be connected to the SDI Sync input.

In playout mode, the SDI Sync Input is used as a frame synchronization source for each of the SDI outputs. Any timecode on the SDI Sync Input is ignored in this mode. If no signal is connected to the SDI Sync Input, each of the SDI outputs will free run (i.e. they will not be synchronized with each other or with any house reference).

Processing Closed Caption and Timecode Data

Pipeline automatically processes Ancillary Data on ingest operations to obtain closed captions and timecode data. Pipeline encodes the closed caption and timecode data into the data stream of the digital output, making it available for further processing by client applications, such as FlipFactory and Episode.

When a Standard Definition SDI signal is connected, the Pipeline automatically analyzes the signal during the Vertical Blanking Interval (VBI) on ingest operations to obtain closed captions and timecode data. Closed caption data is extracted from line 21, and timecode data from lines 16 through 20 (the 5 lines beginning with line 16). The last line (usually line 20) with a valid timecode is the line whose data is used.

When an HD SDI signal is connected, the Pipeline automatically processes all ancillary data packets to obtain closed captions and timecode data. Closed caption data is extracted from Ancillary data packets with a DID of 0x161 and timecode data is extracted from Ancillary data packets with a DID of 0x260.

Front Panel Indicators

The front panel contains LED indicators, making it easy to check its status.

Figure 2–6. Pipeline HD Dual front panel

SDI In. One per channel. Lights green continuously when an HD source is connected. Flashes green when an SD source is connected. If the LED flashes orange, data is being lost. The problem should be corrected before continuing operation.

SDI Out. One per channel. Lights green continuously when HD format media is being output. Flashes green when SD format media is being output. If the LED lights orange, data is being lost. The problem should be corrected before continuing operation.

Mode. Lights green continuously when the selected codec is creating HD content. Flashes green when the selected codec is creating SD content.

Reference. Lights green continuously when an HD source signal is detected on the sync input reference channel. Flashes green when the source signal is SD.

Sync. Lights green when an HD source signal is detected on the sync input reference channel. Flashes green when the source signal is SD.

LAN. Flashes green to indicate LAN activity.

PWR 1 & 2. Lights green when power is present and the power supply is operating normally. PWR1 indicates power supply 1; PWR2 indicates power supply 2. Orange indicates a failed power supply or that power is not present. If a power supply fails, complete jobs in progress and RMA the Pipeline to Telestream for repair as soon as practical.

Front Panel Reset Switches

With the front panel bezel removed, three recessed reset buttons are exposed. They are not labeled.

Figure 2–7. Pipeline HD Dual reset switches behind front panel

Channel 1 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 1. The channel will be disconnected from any client currently attached.

Channel 2 Reset. Insert a pointed object to depress the recessed button to perform a hardware reset on Channel 2. The channel will be disconnected from any client currently attached.

Factory Default Reset. Insert a pointed object to depress the recessed button to restore the factory defaults of the Pipeline device. Both channels are returned to their original factory default values, including IP address and global options selected. During reset all LEDs glow green. When reset is complete, the LEDs return to their normal state.

Note

Resetting factory defaults does not change the firmware or app loader versions.

Rear Panel Ports and Connectors

The rear panel contains power plugs, plus video and network connector ports.

Figure 2–8. Pipeline HD Dual rear panel

When connecting video equipment, Ethernet, and RS-422 cables, be sure that the power supply is disconnected from the Pipeline. Failure to do so may result in equipment malfunction or damage.

AC Power Plugs. Use to connect and turn on the Pipeline. Only connect the Pipeline Quad to power using the Telestream-supplied power cords. To insure fail-safe operation, be sure to use both power supplies. These supply common power to the Pipeline; if one power supply fails, the Pipeline continues to operate.

Sync In. The SDI Sync Input is used in both capture and playout modes but for two different purposes. In capture mode it is used to supply a common timecode reference to all channels. In playout mode it is used as a frame synchronization source for each SDI output channel. (See "Using SDI Sync Input" on page 11.)

Sync Out. Re-clocked loop-through port of SDI Sync In. Use for additional Pipelines or other devices.

RS-422. Female DB-9 RS-422 port for VTR, using Sony 9 Pin Protocol (one per channel).

SDI In. BNC jack for SD-SDI or HD-SDI input (one per channel).

SDI Out. BNC jack for SD-SDI or HD-SDI output (one per channel).

WARNING

SDI-OUT is intended to be used for monitoring of the looped SDI-IN input source and should *not* be used to distribute this source to additional capture channels. Do not connect the looped SDI-OUT signal into any other Pipeline SDI-IN port. This may cause unintended capture interruptions on the channel connected to the looped source.

Gigabit Ethernet Ports. Each Ethernet RJ-45 jack has two LEDs: If the left, orange LED is lit and the right, green LED is lit, the port is operating at 1Gbs (gigabit). If only the orange LED is lit, the Ethernet port is not connected. Be sure to use CAT-6 cabling end-to-end from Pipeline to your Macintosh or Windows PC client for best results.

Caution

If only the green LED is lit or the LED is unlit, the Pipeline is operating at 100MB or less – rates unacceptable for real time video on all four channels. Resolve the problem by connecting at 1 Gb/sec. before processing jobs to avoid data loss.

Connecting Pipeline to Mac OS X or Windows Computers

Pipeline can be connected to a Mac OS X computer – a Final Cut Pro workstation or Episode Engine server, for example. Or, it can be connected to a Windows computer – a FlipFactory server or Pipeline Control workstation, for example. You can connect Pipelines directly or via LAN using a Gigabit Ethernet (Gig-E) switch for Pipeline Quad|HD Dual or 100MB Ethernet for Pipeline SC..

Note

For workstations or servers with multiple network adapters, you should always connect the Pipeline (or switch) to the second interface on the system (Windows: Local Area Connection 2, Mac OS X: en1).

If you are not able to connect to Pipelines using this configuration you may have devices on your first network using the same address scheme as your Pipelines. To correct this, run the following commands in a command window (verify with your network administrator).

This example is for modifying your system's routing table for a Pipeline configuration using the default 169.254.xxx.xxx self-assigned address scheme. Modify these commands accordingly for your configuration:

Mac OS X:

To remove:
sudo route delete -net 169.254.0.0/16

To add it back to en1:
sudo route add -net 169.254.0.0/16 -interface en1

***Windows**:*

When Pipeline Control discovers Pipelines on the network, it records the Network Interface Card (NIC) that the Pipeline responded on. The computer's routing tables are then examined to see if a valid route is available to the Pipeline Control application on which to communicate. If a valid route is not found then Update Route is displayed. Click Update Route to add a valid entry into the computer's routing table.

Click R

Click Update Route

Click R to refresh status. A green bullet icon indicates that this Pipeline is available. A red bullet indicates that it is currently busy (connected to another client application). Gray indicates offline; yellow indicates an unknown state. To enable you to select a Pipeline to set up a document for use later, you can select a Pipeline regardless of its state. This dialog reports the Pipeline's current status (idle, capturing, recording, unknown), name, input source, firmware version, device type (SD or HD) and system NIC connection.

Use the instructions in this section to make Ethernet and video connections to your Pipeline when connecting it to a Mac OS X or Windows computer – either directly or via a switch.

Figure 2–9. Pipeline video, VTR & network connections

1. Make sure the Pipeline is not plugged in.
2. Connect the Pipeline Ethernet port directly, or via a switch, to the computer with an Ethernet cable. (A crossover cable may be required for direct connections with some NICs.)
3. Connect your VTR SDI Out port to the Pipeline SDI In port with a BNC coax cable connected to your video source – a VTR, for example.
4. (Optional) Connect the VTR RS-422 port to the Pipeline RS-422 port.
5. (Pipeline Quad/HD – Optional) Connect video equipment to your Sync In and Sync Out video ports.

Adding Pipeline to a Network

One or more Pipelines can connect to a LAN. To assure acceptable performance, be sure to connect Pipelines to a media network or a *single* Gigabit switch dedicated specifically for Pipelines, edit stations, and media servers. If you connect to a backbone, ensure it is Gigabit, to handle the real-time traffic. Make certain that switches do not have a firewall, and that TCP and UDP ports 7000/7002 (video), 7004/7006 (audio), 7008/7010 (status), 554 (RTSP), and 80 (http) are open.

Each Pipeline channel is assigned a unique, automatically assigned, link-local IP address in the range 169.254.1.0 to 169.254.255.255, so that it can communicate directly with your computer without a gateway. Each of the Pipelines (*channels*) in a Pipeline HD Dual and Pipeline Quad is assigned an incremental IP address.

You can also set up the Pipeline with a static address. Make IP address modifications with Pipeline Administrator, a Web application built into each Pipeline (Using the Configure Panel on page 51).

Use these instructions to make power, Ethernet, and video connections to one or more Pipelines when connecting it to a LAN where FlipFactory server or Final Cut Pro editing stations are located.

Figure 2–10. Pipeline video, VTR control & network LAN connections

1. Make sure the Pipeline is not plugged in.
2. Connect the Pipeline Ethernet port to a network switch with an Ethernet cable on the same LAN as your Final Cut Pro editing station or FlipFactory server.
3. Connect each Pipeline SDI IN port to an SDI source such as your VTR or SDI router with a BNC cable.
4. (Optional) Connect each Pipeline's RS-422 port to an RS-422 control, such as your VTR.
5. (Pipeline Quad and HD Dual – Optional) Connect video equipment to your Sync In and Sync Out video ports.

Powering up the Pipeline

For Pipeline SC, plug the Telestream-supplied power adapter jack into the power port on the rear panel, and then connect the power cord to an AC source (or power converter) to power the Pipeline on.

For Pipeline HD Dual and Pipeline Quad (with redundant power supplies) plug both Telestream-supplied power cords into the power plugs on the rear panel, and then connect each power cord to an AC source (or power converter) to power the Pipeline on.

Configuring & Connecting to Pipelines

As with other network devices, each Pipeline has a fixed MAC address and a default IP address, which you can change. Before using Pipeline, you'll need to contact your IT administrator (especially when connecting to a LAN) to determine which IP address and net mask to use for each Pipeline and how to set it up (automatic link-local, DHCP F/W v2.4 or earlier, or static), based on your facility's network address policy.

Configuring Pipeline Network Settings

To view and modify the Pipeline's network configuration, log on and display the Configure panel (click Configure in the toolbar at the top of Pipeline Administrator). See Using the Configure Panel on page 51.

After plugging the Pipeline into the network and powering it on, you can connect to Pipeline via Bonjour, or you can use the Pipeline's default IP address.

When you connect, Pipeline Administrator displays in your browser. For details on using Pipeline Administrator, see Chapter 5, Using Pipeline Administrator on page 47.

Note

In the unlikely event that you can't connect, try these steps:

Make sure the Pipeline is connected to a switch on your LAN and powered on, and the Power LED on the front is lit.

Ping the Pipeline using the IP address. If you can't ping it, there may be an IP address conflict, causing Pipeline to use a secondary address. Unplug the Pipeline and connect the Pipeline directly to a computer via an Ethernet cable, plug it in and ping it again.

If you're connected directly to a computer, but can't ping it, you may be using a standard Ethernet cable, but due to computer limitations, you need to use a cross-over cable.

If you can ping the Pipeline but still can't connect, you may have a firewall blocking the connection.

See Appendix A, TroubleShooting, for assistance.

Registering Your Pipeline with Telestream

When the Pipeline is operational and you can connect via Pipeline Administrator, register the Pipeline with Telestream – display the About panel and click the Register button. Follow the steps on the Web page to complete registration.

If the computer you're using is on a LAN without Internet access, use a computer that has Internet access and go to dynamic.telestream.net/pipeline-register/register.asp to register your Pipeline. You should register your Pipeline to ensure ongoing warranty service and customer service, per the terms of service.

CHAPTER 3

Installing Pipeline Software

Use this chapter to install, update, or uninstall Pipeline software.

Topics

- Installing Pipeline Software (page 24)
- Updating Pipeline Software (page 24)
- Removing Pipeline Software (page 25)

Note

Telestream recommends that Pipeline Control be installed on a computer that is not hosting FlipFactory, Episode Engine, or other media processing applications: intense disk and CPU consumption can interfere with proper operation of both applications.

Be sure to review your platform, system and workflow requirements before installing Pipeline software. When you install or update Pipeline client software, you may have to upgrade the firmware revision in your Pipeline hardware (Xref).

Installing Pipeline Software

Pipeline for Mac OS X consists of:

- Pipeline Plugin for Final Cut Pro and Episode/Episode Pro 5.x.
- Pipeline Control

All components are installed, so that you can use the components as you want.

Pipeline Software for Mac OS X is available from www.telestream.net as a disk image file. It is also distributed on the Pipeline CD as an installer package file.

When you download or open the dmg file with Safari, Mac OS X automatically mounts the disk image (if necessary) and runs the installer. When you download a dmg file using another Web browser, mount the file yourself. Then, double-click it to run the installer.

Note

You'll be asked for an administrator name & password during installation. If you don't have an administrative account, you'll need to obtain one in order to perform installation. You must restart Final Cut Pro and Episode Desktop for the Pipeline plugin to work correctly.

The installer will attempt to close QuickTIme, Final Cut Pro, Episode Desktop, and Pipeline Control before installing the software. If any of these applications cannot be closed (for example, because they have an open document that hasn't been saved) installation will fail after about a minute (unless you click Save or Discard during this time to close the application).

Updating Pipeline Software

Follow the instructions in Installing Pipeline Software (immediately preceding) to update your software.

Software updates are periodically posted on Telestream's Web site at www.telestream.net. Click Support > Support Home, then select Pipeline under the Pipeline section – software updates are in the left column.

Note

You can set up the Pipeline plugin and Pipeline Control to check for updates periodically. Go to Preferences and click the Update tab to check for updates immediately, and determine how often you want to check for upgrades on a regular basis.

When you open schedules created in previous versions, you may need to reset the audio and video settings before using them.

Make sure that Final Cut Pro, Episode Desktop, Pipeline Control, and QuickTime are not running, before you upgrade your software.

Removing Pipeline Software

To uninstall Pipeline software, remove the following files and restart your computer:

/Applications/Pipeline Control
~/Library/Application Support/Final Cut Pro System Support/Plugins/Pipeline Plugin.bundle
~/Library/Application Support/Pipeline/PlugIns/Copy File.plugin
~/Library/Application Support/Pipeline/PlugIns/EpisodeEngine.plugin
~/Library/Application Support/Pipeline/PlugIns/Final Cut Pro.plugin
~/Library/Application Support/Pipeline/PlugIns/FlipFactory.plugin
~/Library/Application Support/Pipeline/PlugIns/Instant Message.plugin
~/Library/QuickTime/TIFO.component
~/Library/QuickTime/Telestream IMX.component
~/Library/QuickTime/Telestream DvcProHD.component

Note

The ~ character in front of a path indicates that this path is in your active user's folder.

Removing Pipeline does not remove any schedules or log and capture documents you've created, or any media you've saved on this computer.

CHAPTER 4

Implementing Pipeline Workflows

To implement Pipeline workflows, which capture or play out media on Mac OS X or Windows, you'll need to install Pipeline software. Use this chapter to determine your workflow and system requirements, and to install, update, or uninstall Pipeline software.

Note

Telestream recommends that you only install Pipeline Control on a computer that is not hosting FlipFactory, Vantage, Agility, Episode Engine, or other media processing applications: intense disk and CPU consumption can interfere with proper operation of both applications.

When you install or update Pipeline client software, you may have to upgrade the firmware revision in your Pipeline hardware.

Topics

- Pipeline Application Feature Comparison (page 28)
- Workflow System Requirements (page 30)
- General Pipeline System Setup Information (page 30)
- Disk Buffering Details (page 39)
- Disk and Network Requirement by Media Format (page 41)

Note

If you haven't installed the Pipeline yet, proceed to Chapter 2, Pipeline Hardware, Installation & Setup on page 5 before continuing.

Before you use a Pipeline to capture and play out media, the device must be configured using Pipeline Administrator (Chapter 5, Using Pipeline Administrator on page 49).

Pipeline Application Feature Comparison

Pipeline software includes two applications – Pipeline Control and Pipeline Plugin for Episode and Final Cut Pro, compared below.

Pipeline Control. Pipeline Control is available for Mac OS X Leopard and Snow Leopard, Windows XP, Vista Ultimate, Windows 2003 Server, Windows 2008 Server, and Windows 7. You can use Pipeline Control to capture or play out media from/to Pipeline SC, Pipeline Quad, and Pipeline HD Dual.

Pipeline Plugin for Final Cut Pro and Episode | Episode Pro. The feature set of Telestream's Pipeline applications vary by platform, and by program type - application or plugin. The following table identifies the features implemented in each Pipeline program:

Table 4–1. Feature comparison of Pipeline client applications

Pipeline Software Features	Pipeline Control (Windows)	Pipeline Control (Mac OS X)	Pipeline Log & Capture Plugin
Supports Pipeline HD Dual	✓	✓	✓
Supports Pipeline SC and Pipeline Quad	✓	✓	✓
24-hour recurring record	✓	✓	
24-hour recurring playout		✓	
Log & Capture with deck control	✓	✓	✓
Triggered manual and automated capture	✓	✓	
Print to Tape – Insert Edit	✓	✓	✓
Print to Tape – Assemble Edit	✓	✓	✓
Print to Tape – Crash Playout	✓	✓	✓
Web Service API	✓	✓	
Open directly from Final Cut Pro			✓
Open directly from Episode Desktop			✓
Edit while capturing	✓	✓	
Transcode while capturing (FlipFactory|Episode Engine)	✓	✓	
Import Pipeline G4G EDL files	✓	✓	✓
Import|Export Final Cut Interchange files	✓	✓	✓
Create QuickTime Open files directly	✓	✓	
Create QuickTime Closed files directly	✓	✓	✓
Create TIFO files directly	✓	✓	
Controlled Playout (Virtual VTR)	✓		
Video Wall	✓		

Pipeline Software Features	Pipeline Control (Windows)	Pipeline Control (Mac OS X)	Pipeline Log & Capture Plugin
Create Avid AAF/MXF OPAtom files directly (Available only on 32 bit OS)	✓	✓	
Create Generic MXF DNxHDOP1a files with with DV|DVCPro|IMX video essence	✓	✓	

Pipeline Log and Capture Plugin

You can install the Pipeline Plugin in Final Cut Pro Version 5.01 or later, and you can install it in Episode v5.x (this plug-in is not compatible with Episode v6).

When you install the plugin, you can use all of the Pipeline features listed in the table above. For complete details, Using Pipeline in Final Cut Pro & Episode Desktop on page 63.

Workflow System Requirements

Pipeline applications can be used with these versions of FlipFactory, Vantage, Episode, and Final Cut Pro:

- FlipFactory 6.0 with Service Pack 5, FlipFactory 6.1, 7.0 and 7.1.
- Episode Engine version 5.0 or greater
- Final Cut Pro Version 5.1.4 or newer
- Vantage 1.0 or later

General Pipeline System Setup Information

Pipeline is a unique, network-attached encoder that can be used in a variety of capture and playout workflows. As a network device, architectural constraints figure prominently in configuring an efficient and reliable Pipeline workflow.

Pipeline System Architecture

Pipeline capture workflows consist of ingesting baseband HD/SD-SDI input, compressing it, creating a file with the compressed data, and delivering the completed file to a folder location. You can connect one or more Pipelines (Single, Quad, or HD Dual) to a Pipeline host computer (Mac OS X or Windows).

Pipelines should be connected directly via CAT6 Ethernet to a Pipeline host computer or via an enterprise class, fully non-blocking, professional-quality Ethernet switch.

The key components include the Pipeline device itself, the network, the Pipeline host computer, the Pipeline Control application, software and the Pipeline media disk storage device. Each of these components is described below.

The Pipeline Device

Each Pipeline has one to four channels each (single channel, Quad or HD Dual) with SDI I/O for capture and play out. The SDI connectors ingest baseband SD/HD-SDI signals, compress them into one of many supported formats and stream the compressed data out their respective Ethernet ports using Real Time Streaming Protocol (RTSP). Each channel's RTSP stream contains video, audio and application/control data in RTP transport packets. These streams are ingested by the Pipeline Control application running on a Pipeline host computer.

Pipeline Host & Pipeline Application Software

The Pipeline Control wraps each RTSP stream into the appropriate file wrapper and delivers these files to their respective media storage locations. The Pipeline host computer is primarily responsible for delivering one or more Pipeline channel's RTSP streams via Ethernet to the Pipeline application it is hosting.

A Pipeline host computer can control multiple Pipeline channels concurrently. See the examples below to determine how best to configure a Pipeline System to meet your particular needs.

Pipeline applications, such as Pipeline Control, perform many tasks. These tasks include scheduled capture and play out, log/capture from tape sources, manual and automated capture from live sources, print to tape, and controlled playout.

Pipeline applications also provide interfaces to (or within) video edit software, FlipFactory, Vantage, Agility, Episode Engine, Episode desktop, and disk file systems.

There are five key factors to consider when configuring your Pipeline host system:

- CPU cores and speed
- Disk storage systems (both for the media destination and for disk buffering)
- Network connection
- System RAM
- System Video Card

Use the system descriptions, recommended systems chart, and network and storage sections to configure your Pipeline host system appropriately for your workflow requirements.

Pipeline Network

For best results, Pipelines should be connected directly to a Pipeline host computer or via a single enterprise class, fully non-blocking professional-quality Ethernet switch via CAT6 Ethernet cabling. Multiple hops via routers and switches increase the risk that video frames will not be processed in a timely manner resulting in lost frames. It is highly recommended that the Pipeline host's network adapter be based on Intel Gigabit cards.

Capturing across multiple switches or routers is possible with Pipeline only when the link is a full 1 gigabit. Always consult with your network administrator when attempting to utilize Pipeline across multiple switches, networks or VLAN's.

Recommended network switches:

- Extreme Networks
- Force 10, Cisco
- Foundry (Brocade)

Use of a private Pipeline video VLAN is highly recommended

Special care must be taken to insure that a real-time process can be achieved. Other network processes, such as file copying, can consume unbounded bandwidth and excessive network stack cycles which can cause Pipeline real-time streams to be interrupted. When constructing a Pipeline system utilizing an existing information network, be aware of local processes using the network that could affect Pipeline traffic. The best practice is to separate Pipeline traffic from data traffic by using more than one network adapter within the Pipeline host computer. Design your system with one (or more) Ethernet ports dedicated to the incoming Pipeline streams and separate Ethernet port(s) for general data and media delivery traffic.

As a rule of thumb, never exceed 50% usage of any one Ethernet port or network switch. For example when capturing Pro Res 422 HQ at 220Mbps use one GigE Ethernet port for every two (2) streams. Multiple port Ethernet is required for this purpose.

Network examples

Figure 4–1. Eight channel Pipeline SD capture system

Figure 4–2. Four channel Pipeline HD capture system

Capture-only Workflows

For capture-only workflows, when writing to internal or direct attached (non-shared) RAID arrays, you only need to calculate the overall write speed requirements. Configure your media storage array based on the write performance required for the number of streams being captured.

Figure 4–3. Configuration for capturing 4 HD streams onto Fibre-attached storage.

Concurrent Edit/Transcode Workflows

For capture with concurrent edit or transcode workflows, calculate the total read/write speed requirements based on the write processes of Pipeline streams and read processes for edit and transcode operations.

Note

Disk buffering is required when the destination path is located on a NAS, shared storage device, shared network folder, or when edit/transcode while capture operations are to be performed on the incoming Pipeline media files.

Some format wrappers do not support this feature. Take special care when writing these file types to shared disks.

To guarantee error-free operations when writing to NAS, you must use disk buffering. Use an internal or direct-attached non-shared RAID array that meets the read/write performance requirement (Disk Buffering Details on page 39).

Pipeline's media storage location (NAS, direct-attached shared storage, or shared network folder) must also meet certain read/write performance requirements. When using NAS, direct-attached shared storage or shared network folder, be sure to verify that your system has the communications bandwidth for writing all Pipeline media data to the media storage location in real-time.

For SD, Telestream recommends that the host's disk storage system provide and maintain a sustained 10 MB/sec. transfer rate per stream from the Pipeline host computer to the media disk (read/write).

For DVCPro HD, ProRes 422/SQ/LT/Proxy and standard quality DNxHD, Telestream recommends that the Pipeline host's disk storage system provide and maintain a sustained 40 MB/sec. transfer rate per stream from the Pipeline host computer to media disk (read/write). For ProRes 422 HQ and high quality DNxHD, Telestream recommends at least a 50 MB/second sustained transfer rate.

Capture Workflows Utilizing NAS|Direct-Attach Storage|Network Folders

For capture writing to NAS, direct-attached shared storage or shared network folder, you should enable Pipeline disk buffering (Disk Buffering Details on page 39).

Note

Disk buffering is required when the destination path is located on a NAS, Shared Storage device, a shared network folder, or when edit/transcode while capture operations are to be performed on the incoming Pipeline media files.

Some format wrappers do not support this feature. Take special care when writing these file types to shared disks.

Disk buffering requires a separate RAID array to guarantee error-free write operations of media streams.

Figure 4–4. Configuration for capturing four HD streams onto NAS with Fibre-attached buffer.

When calculating disk buffer RAID array read/write performance requirements, you should use two times the required Pipeline streams write requirements. This is required to support a write and a read operation on the data buffer array for each Pipeline stream.

The Pipeline's media storage location (NAS, direct-attached shared storage or shared network folder) must meet the write performance requirements. When using NAS, direct-attached shared storage or shared network folder, be sure to verify that your system has the communications bandwidth for writing all Pipeline media data to the media storage location in real-time.

Caution

Capturing video is a disk intensive operation. It is important that you create a system with adequate disk performance for writing and reading real-time video files. In addition to the information provided below, make sure that the disks used for Pipeline operations are defragmented often. A fragmented drive can decrease performance and may cause capture and playout operations to fail.

Pipeline Media Storage

In determining storage requirements, there are two main factors to consider – the overall sustained read/write performance and local data disk buffering.

To ensure performance and quality, the disk storage systems used with the Pipeline host computer must be able to meet the demands of reading and writing one or more real-time SD and HD media streams.

For SD, Telestream recommends that the Pipeline host's disk storage system provide and maintain a sustained 10 MB/sec transfer rate per stream from the Pipeline host computer to the media disk (read/write).

For DVCPro HD, ProRes 422/SQ/LT/Proxy, and standard quality DNxHD, Telestream recommends that the Pipeline host's disk storage system provide and maintain a sustained 40 MB/sec transfer rate per stream from the Pipeline host computer to media disk (read/write) for each stream. For ProRes 422 HQ and high quality DNxHD, Telestream recommends at least a 50 MB/sec transfer rate for each stream.

To evaluate your needs, first take into account the data rate for the format that you'll be using and the number of streams your system will be capturing concurrently. Disk and Network Requirement by Media Format on page 41 provides approximate data rates for a variety of formats and resolutions. Use these tables to calculate the overall read/write performance requirements for your main storage disk system and if needed for your local data buffering storage disk system.

Capture-only, writing to internal or direct-attached RAID array. For systems utilizing internal or direct attached (non-shared) storage for capture only operations, you only need to calculate the overall write speed requirements. Configure your media storage array based on the write performance requirement for the number of streams being captured.

Figure 4–5. Four channel Pipeline HD with direct attached Fibre RAID storage

Capture with concurrent edit or transcode. For systems that are capturing with concurrent edit or transcode operations, you should calculate the overall read/write speed requirements based on the write processes of Pipeline streams, and the read processes for the edit and transcode operations. To guarantee error-free operations you must use Pipeline's data buffering feature utilizing an internal or direct attached non-shared storage RAID array for data buffering that meets the desired read/write performance requirement (see Disk Buffering Details on page 39). The Pipeline's media storage location (NAS, direct attached shared storage or shared network folder) must also meet these minimum read/write performance requirements. When using NAS, direct attached shared storage or shared network folder, be sure to verify that your system has the communications bandwidth for writing all Pipeline media data to the media storage location in real-time.

Capture writing to NAS, direct attached shared storage or shared network folder. For systems that are capturing media written to a NAS or shared network folder, the Pipeline data buffering feature must be enabled (see Disk Buffering Details on page 39). Data Buffering requires a separate data buffer RAID array to guarantee error-free write operations of Pipeline media streams. Calculating the disk buffer RAID array read/write performance requirements use 2X the required Pipeline streams write requirements. This is needed to support a write and a read operation on the data buffer array for each Pipeline stream.

The Pipeline's media storage location (NAS, direct attached shared storage or shared network folder) must meet the minimum write performance requirements. When using NAS, direct attached shared storage or shared network folder, be sure to verify that your system has the communications bandwidth for writing all Pipeline media data to the media storage location in real-time.

Figure 4–6. Four channel Pipeline HD with direct attached data buffer RAID

Example Systems

Distributed Pipeline model. Individual workstations controlling individual channels, each workstation meeting the Pipeline channel specification with a network to support all traffic:

Centralized Pipeline ingest model. A central workstation controlling multiple Pipeline channels. The central workstation meets the multiple Pipeline channel specification with a network and storage system to support the workflow:

Four channel HD with data buffering. Four channels of HD hosted by a central workstation with delivery to a NAS. Data Buffering is enabled through directly attached RAID storage:

Multiple channel Transcode while capture. Multiple Pipeline channels hosted by a central workstation with delivery to a directly attached storage device. The storage is shared to the transcoding servers for concurrent processing:

Multiple channel edit while capture. Multiple Pipeline channels hosted by a central workstation with delivery to shared storage device. Internal 15K RAID array is used as a Disk Buffer in case the shared storage cannot maintain real time writes:

Disk Buffering Details

When Disk Buffering is checked, video and audio data are written into a FIFO disk buffer file in a local folder before the data is written to the media file destination.

Note

Disk Buffering must be enabled when the destination path is a located on a NAS, Shared Storage device, a shared network folder, or when edit/transcode while capture operations are to be performed on the incoming Pipeline media files.

During capture operations, when the file destination drive's performance is reduced due to additional read processes (when performing transcoding, file editing or other disk-intensive activity), data is placed into the FIFO (First In, First Out) buffer.

Figure 4–7. FIFO disk buffering enhances file writing performance

Disk buffering prevents the RAM buffer from overflowing when disk writes are temporarily blocked or performance is reduced on the media file destination disk.

The read/write performance for a volume used for disk buffering needs to be able to support the media format and number of channels being captured. As a rule of thumb, the buffer disk should be RAID-0 with the appropriate number of drives to support the read and write requirements for the number of channels with the respective media format used (Disk and Network Requirement by Media Format (page 41)).

Note

The disk used for buffering should be used exclusively for Pipeline buffering. Using the disk buffer drive for other read/write processes may cause unpredictable results.

Enable Disk Buffering whenever your media file destination is not a local drive or array – such as a NAS, or shared network folder.

Figure 4–8. Pipeline buffering process

Caution

The disk selected for buffering should be used exclusively for Pipeline video/audio data buffering. Using the disk buffer drive for other read/write processes may cause unpredictable results.

Never write to a disk buffer that does not meet the minimum performance requirement for the number of channels and media format being captured. See Disk and Network Requirement by Media Format (page 41)**.**

The disk buffering drive must never be the same as the media file destination drive. This will result in doubling the amount of read and writes operations to this drive and will severely degrade overall disk performance.

When schedule events are touching (one file stops and the other starts at the same moment) and there is a handle setting of more than zero, the amount of data being processed and written to disk doubles for the duration of the handle.

Double capturing may result in data loss in workflows on slow computers, or in workflows with multiple simultaneous ingests, since the application may be pushing the limits of CPU capacity or disk write speed.

Platform and System Requirements

General Pipeline Host System Requirements

- Pipeline firmware v2.5 or later
- CPU: Intel Core 2 Duo, Intel Quad Core, or greater
- Operating System:
  - — Mac OS X Version 10.5 (Leopard) or 10.6 (Snow Leopard). Requires QuickTime Version 7.5.5 or newer with ProRes decoder component.
  - — Mac OS X 10.4 or earlier is not supported.
  - — Windows XP Pro SP3 (or later), Windows Vista Ultimate 32/64 bit, Windows 7 32/64 bit, Windows Server 2003 and 2008 (32 bit and 64 bit editions). NET Framework v3.5 SP1
- Video card with minimum 256MB RAM (for Mac OS X - card must support Quartz Extreme/OpenGL accelerated surfaces and be attached to a compatible video display)
- GigE or faster Ethernet adapter
- Final Cut Pro Version 5.0.1 or newer is required when using Pipeline plug-in

System Requirements for FlipFactory Pipeline Workflows

FlipFactory supports workflows utilizing Pipeline SD systems.

- FlipFactory v6.0 with Update Packs 1-5 or FlipFactory v6.1
- Concurrent Pipeline ingest streams may vary depending on CPU and disk speeds
- Recommended server spec:

- Dual 2.3Ghz (or higher) Intel Quad Core CPU
- Dedicated RAID-0 media storage
- 2GB RAM

PIPELINE HOST COMPUTER RECOMMENDATIONS

Network and Hard Disk Performance Requirements (per stream)

Table 4–2. Disk and Network Requirement by Media Format

CODECS	Disk Read/Write Mbps	Network Throughput Mbps	Storage (per hour) Required for 8-Channel Audio
SD Codecs			
Motion JPEG A	0.75	8	5GB
DV/DVC Pro	4.4	35	15GB
IMX30	5.3	43	16GB
IMX40	7.0	56	20GB
IMX50/DVCPro50	8.3	67	25GB
ProRes422 SQ	7.3	58	21GB
Uncompressed 8-bit 422	22	175	80GB
HD Codecs (range based on codec and bit rate)			
DVCPro HD	16.5	135	73GB
ProRes 422 HQ	10-36	62-240	50-100GB
DNxHD	10-36	62-240	50-100GB

Recommended Hardware Systems

Note: *All systems assume media storage local (internal or direct attached) to the host system with adequate storage to support 24 hours of content at the chosen format, and drive array is less than 80% full without serious fragmentation.*

Standard Definition

Single channel system

- CPU - Intel Dual Core 2.0Ghz CPU or faster
- RAM - 3GB RAM minimum
- Network's sustained bandwidth for Pipeline channel – 75Mb/s
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (32 or 64 bit)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - — Capture only – 10MB/s

  - Play out only – 12MB/s
  - Transcode/Edit/Disk Buffering while Capture – 20MB/s

Two channel system

- CPU - Intel Dual Core 2.0Ghz CPU or faster
- RAM - 6GB RAM minimum
- Network's sustained bandwidth for Pipeline channels – 150Mb/s
- Operating System
  - Mac OS X 10.5 or 10.6
  - Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (32 or 64 bit)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - Capture only – 20MB/s
  - Play out only – 24MB/s
  - Transcode/Edit/Disk Buffering while Capture – 40MB/s

Four channel system

- CPU - Intel Quad Core (4 cores) 2.33 GHz CPU or faster
- RAM - 8GB RAM minimum
- Network's sustained bandwidth for Pipeline channels – 300Mb/s
- Operating System
  - Mac OS X 10.5 or 10.6
  - Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write read and/or write speeds (separate from OS drive)
  - Capture only – 40MB/s
  - Play out only – 48MB/s
  - Transcode/Edit/Disk Buffering while Capture – 80MB/s

Eight channel system

- CPU - Intel Quad Core (4 cores) 2.33 GHz CPU or faster
- RAM - 10GB RAM minimum
- Dual Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 600Mb/s
  - Use an adapter with a minimum of two (2) 1Gb ports
  - Port aggregation many be necessary
- Operating System
  - Mac OS X 10.5 or 10.6
  - Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - Capture only – 80MB/s
  - Play out only – 100MB/s
  - Transcode/Edit/Disk Buffering while Capture – 175MB/s

High Definition – DVCPro HD (ingest only)

Note: *Edit while ingest and transcode while ingest workflows require increased disk I/O performance to support the additional read processes, and may require disk buffer cache drive system (see Pipeline User Guide disk buffering details). Viewing HD preview stream(s) can consume high levels of CPU which may cause dropped frames. It is recommended that preview be turned off during capture. Playout of the preserved VANC requires compatible hardware devices.*

Single channel system

- CPU - Intel Dual Core 2.53Ghz CPU or faster
- RAM - 4GB RAM minimum
- Network's sustained bandwidth for Pipeline channels – 150Mb/s
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (32 or 64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - — Capture only – 20MB/s
  - — Play out only – 30MB/s
  - — Transcode/Edit/Disk Buffering while Capture – 45MB/s

Two channel system

- CPU - Intel Quad Core 2.8 GHz CPU or faster
- RAM - 8GB RAM minimum
- Dual Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 300Mb/s
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - — Capture only – 40MB/s
  - — Play out only – 60MB/s
  - — Transcode/Edit/Disk Buffering while Capture – 100MB/s

Three/Four channel system

- CPU - Dual Intel Quad Core 2.8 GHz CPU or faster
- RAM - 12GB RAM minimum
- Quad Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 600Mb/s
  - — Use an adapter with a minimum of two (2) 1Gb ports
  - — Port aggregation many be necessary
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)

— Capture only – 80MB/s

— Play out only – 120MB/s

— Transcode/Edit/Disk Buffering while Capture – 200MB/s

Five channel system

- CPU - Dual Intel Quad Core (8 cores) 3.0 GHz CPU or faster
- RAM - 16GB RAM minimum
- Quad Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 750Mb/s
  - — Use an adapter with a minimum of two (2) 1Gb ports
  - — Port aggregation many be necessary
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 ()64 bit only
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - — Capture only – 120MB/s
  - — Play out only – 180MB/s
  - — Transcode/Edit/Disk Buffering while Capture – 300MB/s

High Definition – DNxHD 220/Pro Res 422 HQ (ingest only)

Note: *Edit while ingest and transcode while ingest workflows require increased disk I/O performance to support the additional read processes, and may require disk buffer cache drive system (see Pipeline User Guide disk buffering details). Viewing HD preview stream(s) can consume high levels of CPU which may cause dropped frames. It is recommended that preview be turned off during capture. Playout of the preserved VANC requires compatible hardware devices.*

Single channel system

- CPU - Intel Dual Core 2.53Ghz CPU or faster
- RAM - 6GB RAM minimum
- Network's sustained bandwidth for Pipeline channels – 260Mb/s
- Operating System
  - — Mac OS X 10.5 or 10.6
  - — Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (32 or 64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - — Capture only – 40MB/s
  - — Play out only – 60MB/s
  - — Transcode/Edit/Disk Buffering while Capture – 100MB/s

Two channel system

- CPU - Dual Intel Quad Core (8 cores) 2.8 GHz CPU or faster
- RAM - 12GB RAM minimum
- Dual Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 520Mb/s

  - Use an adapter with a minimum of two (2) 1Gb ports
  - Port aggregation many be necessary
- Operating System
  - Mac OS X 10.5 or 10.6
  - Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - Capture only – 100MB/s
  - Play out only – 140MB/s
  - Transcode/Edit/Disk Buffering while Capture – 220MB/s

Three channel system

- CPU - Dual Intel Quad Core (8 cores) 3.0 GHz CPU or faster
- RAM - 16GB RAM minimum
- Quad Port 1Gb NIC for exclusive use of Pipeline traffic
- Network's sustained bandwidth for Pipeline channels – 800Mb/s
  - Use an adapter with a minimum of two (2) 1Gb ports
  - Port aggregation many be necessary
- Operating System
  - Mac OS X 10.5 or 10.6
  - Windows XP Pro, Vista Ultimate, 7 Ultimate, Server 2003 R2 (64 bit only)
- Media Storage sustained read and/or write speeds (separate from OS drive)
  - Capture only – 140MB/s
  - Play out only – 200MB/s
  - Transcode/Edit/Disk Buffering while Capture – 320MB/s

CHAPTER 5

Using Pipeline Administrator

Pipeline Administrator is a Web application embedded in each Pipeline, which enables you to connect to Pipeline devices on your network with a Web browser.

You can use Pipeline Administrator to perform administrative tasks on the Pipeline, including network configuration and firmware upgrades.

Topics

- Supported Web Browsers (page 48)
- Launching Pipeline Administrator (page 48)
- Using Pipeline Administrator (page 47)
- Using the About Panel (page 50)
- Using the Configure Panel (page 51)
- Using the Quad Panel (page 55)
- Using the Counters Panel (page 58)
- Using the Upgrade Panel (page 60)

Supported Web Browsers

You can configure Pipeline using your Browser of choice. However, you may need a plug-in for Bonjour if you want to discover Pipelines automatically.

Note

Web browsers are supported only on the platform specified. You may encounter situations where features may not function correctly in all cases. In particular when running Windows 7 or Windows Server 2008 with Internet Explorer, you may encounter security issues that prevent Pipeline Administrator from displaying correctly or from saving configuration changes. In these cases consult with your IT administrator to adjust the browser's security setting to allow Pipeline Administrator to run properly. Alternatively you can install another browser such as Mozilla Firefox or Google Chrome as your default.

You can run Pipeline Administrator from anywhere on your network. You can run it directly on a Pipeline host system or any computer with visibility to the Pipeline device.

Launching Pipeline Administrator

The Pipeline Administrator can be accessed through a web browser. To connect to a Pipeline and launch Pipeline Administrator perform one of the following steps:

- **Using a known Pipeline channel IP address:** Open a web browser and enter the IP Address in the browsers address bar.
- **In Mac OS X:** Open Safari and select Bookmarks > Show All Bookmarks. In the Collections panel, click Bonjour. From the list of available devices double-click the Pipeline you wish to connect to, to display Pipeline Administrator.
- **In Windows:** Open Pipeline Control and select any document type (Schedule, Log and Capture, Trigger, Print-to-Tape or Controlled Playout). Select the Pipeline you wish to connect to from the Pipeline dropdown list. Open the Diagnostics panel and click on the Administer button. This will open the selected Pipeline's Administrator page in your default browser.

If this is the first time connecting to this Pipeline since starting the browser, and if the Pipeline is password-protected (configure panel > Security), the browser displays a Pipeline Authentication dialog. Enter the

username (always *administrator*) and a password (if you added one), and click OK to connect to the Pipeline and display Pipeline Administrator:

Figure 5–1. Connect dialog – enter your username and password to connect

Enter the username (administrator) and password if you added one, and click OK to connect.

USING PIPELINE ADMINISTRATOR

Pipeline Administrator has several panels you can use to perform various tasks:

- Using the About Panel – provides general information about Pipeline and registration.
- Using the Configure Panel – displays Pipeline and network settings, allows you to change network settings and options.
- Using the Quad Panel – displays when connected to a Pipeline Quad, to control confidence monitoring.
- Using the Counters Panel – displays statistical information about Pipeline activity.
- Using the Upgrade Panel – enables you to upgrade the firmware and Pipeline Administrator.

You can access the Pipeline User's Guide (the document you are currently reading) from each panel by clicking the User's Guide link at the bottom of each panel.

Using the About Panel

To display the About panel, click **about** in the menu bar at the top of the window:

Figure 5–2. The About panel displays a link to product registration.

Register the Pipeline by clicking the Register button. Follow the steps on the Web page to complete registration. If you've already registered this Pipeline, the Register button no longer displays.

If the computer you're using is on a LAN without Internet access, use a computer that has Internet access and go to dynamic.telestream.net/pipeline-register/register.asp to register your Pipeline. You should register your Pipeline to ensure ongoing warranty service and customer support.

The About panel – as well as the other panels – provides online access to the Pipeline User's Guide (this document), by clicking the link in the lower left corner.

Using the Configure Panel

To display the Configure panel, click **configure** in the menu bar at the top of the window:

Figure 5–3. Configure panel displays details & allows you to change settings

Use the Configure panel to view and make changes to Pipeline's identity, IP settings, and options. Click the LAN, Security, Options, and EDL toolbar to view their respective control panels, as shown in the callouts in the figure above. Each control is described in the following table:

Table 5–1. Configure Panel controls and descriptions.

Control	Description
Pipeline Identity	

Control	Description
Name	Editable field. Default for Pipeline SC: *Pipeline-XXXX*, where *XXXX* is the serial number printed on the bottom of the Pipeline. Default for Pipeline Quad: *PipelineQuadXXXX_N* where *N* is the device number 1 through 4. Default for Pipeline HD Dual: *PipelineHDDual_XXXX_N* where *N* is the device number 1 through 2. To change the name, enter a new name, and click Save Changes. The name is updated in the Pipeline, and is reflected in the Bonjour panel. Limit: 255 characters. If you enter a friendly name that already exists, Pipeline adds (1), (2,), as necessary to maintain uniqueness. For best naming practices, you should identify the Pipeline model (SC or Quad), uniquely name it, and, in the case of the Quad, refer to the channel number. For example, *PipelineQuad_Prod7_Channel2*.
App (firmware version)	Displays Pipeline's firmware version number, composed of <Major Version>,<Minor Version><Build Number>,<Channel Number Identifier>. For example: 2,2,33165,00 indicates Version 2.2, Build 33165, channel 0. On Pipeline SC, the channel number ID is always 0. Upgrades are identified by major version and minor version numbers: 2.2, for example.
Loader (version)	Displays Pipeline's boot loader version number, composed of <Major Version>,<Minor Version><Build Number>,<Channel Number Identifier>.
CPLD Version	CPLD chip version number on the Pipeline, for Telestream use.
FPGA	FPGA chip version number on the Pipeline, for Telestream use.
Serial Number	Four digit serial number of the device, not changeable.
LAN	When changing the IP address, you should click Save Changes to update the Pipeline, then close Internet Explorer or Safari. Wait about 30 seconds, then restart your Web browser and log back on. If you don't, your Control application will behave incorrectly, and Pipeline Administrator will periodically display an error: "Can't communicate with Pipeline".
Self-Assigned	Select to utilize the default link-local IP address, generated based on the Pipeline's serial number; incremented on Pipeline 2, 3, and 4 on Quad.
DHCP	Select to have the DHCP server assign an IP address. If DHCP fails after about 1 minute, the IP address reverts to the self-assigned address. *The DHCP selection is only available with firmware revision 2.4 or earlier.*
Static	Select to use the IP address, subnet mask, & gateway, entered manually.
IP Address	Enter the IP address assigned by your network administrator.
Mask	Enter the subnet mask assigned by your network administrator.
Gateway	Enter the gateway address provided by your network administrator.
Security	
Password	Editable field. No password is assigned by default. (Username is always *administrator*.) Limited to 15 characters; standard HTTP password rules apply. May be empty to disable authentication.
Confirm Password	Editable field. Enter second time to confirm.

Control	Description
Options	
Default format when no input connected	Select the default format from the menu. On HD Pipelines, you can choose an SD NTSC|PAL or various HD 720|1080 profiles. On SC/Quad Pipelines, choose SD NTSC|PAL. If the channel boots with no SDI input it will default to the value specified here. If the channel is already running with SDI input, selecting this setting will do nothing until the next time it boots without SDI input. If the channel is already running with SDI input and the input is removed, selecting a setting and clicking the save button will set the channel to the selected format.
Default to black if SDI not present	Pipeline generates a test pattern when no SDI input signal is present. If this option is checked the test pattern is a black frame, otherwise the generated test pattern is color bars. The pattern is generated in NTSC or PAL (or HD formats on HD Dual), based on the mode the Pipeline is in. The last valid SDI signal sets the mode unless there is no SDI present when it boots. In this case it reverts to the setting specified above.
Ignore input discontinuities	Unchecked by default, to insure capture quality. Check when you don't want Pipeline to report missing/partial frames in input stream during capture. This is useful if, for example, you're capturing from a satellite feed where errors occur more often and you don't want Pipeline to report the error to the Final Cut Pro plugin, because it will abort the capture.
Disable loopback	Prevents input SDI from being present on the output SDI during capture. Consider disabling when exporting or capturing to a deck and the deck complains about the reference signal. ***NOTE***: Due to hardware limitations it is never fully disabled. Even a small amount of signal causes some decks to complain. If this happens the user should physically remove either the SDI input or output (depending on capture or playout) from either the video source or the Pipeline.
Assume F2 dominant input	When checked, during encoding, Pipeline constructs a frame by using a field pair consisting of an F2 field followed temporally by an F1 field. This is in contrast to normal operation, which constructs a frame using a field pair consisting of an F1 field followed temporally by an F2 field.
Burn in Timecode	When checked, Pipeline overlays the timecode it is using as its primary clock on the video image.
Remove VBI data before compression	When checked, Pipeline strips each frame of VBI data, replacing it with black before passing it to the encoder for compression.

Control	Description
EDL	
Use IP address instead of Pipeline name	Check when you want communication to utilize the IP address of the Pipeline, instead of using the Pipeline name and resolving it via Bonjour.
Signal to abort on dropped frames	Check when you want FlipFactory to abort the capture process if a dropped frame occurs.
Buttons	If another user is connected and processing media with this Pipeline, using these buttons will interrupt the process, and it must be re-started.
Save Changes	Click to update the Pipeline with the new settings. If you change the IP address (by any means – returning to self-assigned, enabling DHCP, or assigning a static address), in about 30 seconds, Pipeline Administrator displays an error: “Unable to communicate with Pipeline”. Click OK, then reconnect to the Pipeline using the new IP address.
Default	Return settings to default. After returning the settings to default, be sure to click Save to make the settings take effect.
Reboot	This reboot performs a hardware-level reset, which disconnects Pipeline from any client which may attach without warning. You are warned if you attempt to reboot the channel while it's in use. Click to reboot the Pipeline if you change the password, to log on using the new password. You do not need to reboot when changing IP settings.
Soft Reboot	This reboot resets the Pipeline and any clients WILL lose their connection. Pipeline Administrator displays an alert to warn you. In cases where the Pipeline is non-responsive, click Soft Reboot to clear the problem.

Using the Quad Panel

The Quad panel only displays when Pipeline Administrator is connected to one of the Pipeline channels on a Pipeline Quad. When you're connected to any other Pipeline device, this page does not display.

To display the Quad panel, click **quad** in the menu bar at the top of the window:

Figure 5–4. Quad panel controls confidence monitoring

Choose which channel if any, to monitor.

Be sure to click Save Changes to make the change.

Use the Quad panel to set up confidence monitoring.

Table 5–2. Configure Panel controls and descriptions.

Control	Description
Confidence Monitoring	
Normal Operation – no monitoring	Check to disable confidence monitoring. When confidence monitoring is disabled, channel 4 (Pipeline 4 on the Quad) operates normally, and can be used for capture/playout operations. *Note: This option is only enabled when you log on to channel 4. You cannot make this change from other channels.*
Monitor channel 1 | 2 | 3	Check to enable confidence monitoring and encode and send the rendered stream of the selected channel on channel 4 SDI Out as well. Click Save Changes when you're done to update the settings.

Confidence Monitoring

Confidence monitoring is the process of employing channel 4 on the Pipeline Quad to sniff the exact same video packets being captured from any of the other Pipeline channels on the Quad and processed by the client application during a capture operation (crash recording), for the purpose of verifying that the output is a true representation of the input, or that the output meets certain quality limits or other metrics.

Confidence monitoring can be enabled when you are performing a capture operation or crash recording from channels 1, 2, or 3 on a Pipeline Quad. When enabled, Pipeline 4 is also dedicated to the capture operation for the duration of the capture operation.

Figure 5–5. Confidence monitoring is performed by channel 4 via internal Ethernet bridge

As SDI is being fed into the capture channel's SDI In port, it is encoded and sent out in TCP packets on the Ethernet port to the client application (Pipeline Control, Pipeline Administrator, FlipFactory, Episode, Final Cut Pro, and other media systems). Unlike other confidence monitoring that just re-encodes the media directly in the same device, the channel 4 Pipeline sniffs the very same packets on the Ethernet just as the client does; it then decodes the Ethernet input, and outputs the resulting SDI on its own SDI Out port.

Operators can attach monitors and vector scopes to the SDI out to view and measure the actual media in a full-circle operation, confident that they are testing and viewing exactly the same input as the client system is receiving.

Note

To enable confidence monitoring, you must log on to channel 4 to display the enabled confidence monitoring option on the Quad panel. Channel 4 must be idle before you can enable confidence monitoring. You can confidence monitor both capture operations and crash recording operations.

When confidence monitoring is enabled and the preview media stream from the channel selected is being consumed by Pipeline Control, Pipeline Administrator, or in FlipFactory, the confidence monitor (channel 4 SDI Out) displays black.

If the monitored channel's stream is DV, DVCPro, IMX, MPEG-2, or ProRes then the confidence monitor displays the full frame video as it is encoded.

If the monitored channel is not streaming media on the LAN, then the confidence monitor displays a banner on the image. The frame background is either the last frame of the previous stream or black.

Figure 5–6. Confidence monitor displays a banner when no media stream is present

Using the Counters Panel

To display the Counters panel, click **counters** in the menubar at the top of the window:

Figure 5–7. Counters panel displays various processing values

Use the Counters panel to view various values related to encoding and decoding to determine if operations are normal or if there are failures that must be corrected. These values are reset each time a new RTSP connection is made. This information may also be utilized when you are working with Telestream Customer Service to resolve an issue.

Table 5–3. Counters Panel controls and descriptions.

Value	Description
Frames	The number of frames processed during this RTSP session.
Process	The number of frames dropped because of excessive CPU load. If this number is greater than zero, you're losing frames and quality. Determine the cause of the error and reprocess the media.
Video Sent	Number of video frames sent over RTP connection during an capture operation.
Audio Sent	The number of audio frames sent during capture over RTP.
Status Sent	The number of status frames sent during capture over RTP.

Value	Description
Video Encode Time	Number of microseconds it took to process the current video frame.
Video Queue	The number of video frames dropped due to excessive network traffic. If this number is greater than zero, you're losing frames and quality. Determine the cause of the error and reprocess the media
Audio Queue	The number of audio frames dropped due to excessive network traffic. If this number is greater than zero, you're losing frames and quality. Determine the cause of the error and reprocess the media
Status Queue	The number of status frames dropped due to excessive network traffic.
Video Sequence	Count of frames where the timecode (as observed on the RS-422 connection) was not incrementally increasing.
Audio Align	Number of times the audio processor re-synchronized due to an Embedded SDI audio error.
Video Align	Number of times the video processor had to re-synchronize due to an SDI video error.
Video Frame Exceeded	CBR codec error counter.
Audio Frames Requested	During playout, Pipeline requests audio and video frames serially. This is the number of audio frames requested, and should be the same number as Audio Frames Received.
Audio Frames Received	Number of audio frames received during playout.
Video Frames Requested	Number of video frames requested during playout. Should be the same number as Video Frames Received
Video Frames Received	Number of video frames received during playout.
TCP retransmissions	Number of times TCP packets had to be retransmitted.

Using the Upgrade Panel

To display the Upgrade panel, click **upgrade** in the menubar at the top of the window:

Figure 5–8. Upgrade panel allows you to upgrade Pipeline firmware

Pipeline is designed so its firmware and Pipeline Administrator Web application can be upgraded easily when new revisions of Pipeline software are made available by Telestream.

Note

To determine the current version of your Pipeline, log on and display the Configure page. The version number is the value in the App field, which displays the firmware version number: <Major Version>,<Minor Version><Build Number><Internal Use>. For example: 2,2,33165,00 indicates Version 2.2, Build 33165.

You can periodically check the Pipeline support page at www.telestream.net/telestream-support/pipeline/updates.htm to determine if there is newer software. (Registered users are notified of upgrades via E-mail.) On the site, click Support > Support Home in the main menu at the top of the page, then select Pipeline > Updates on the right, under Enterprise Product Support. Pipeline firmware updates are available on this page.

To upgrade a Pipeline, follow these steps:

1. Connect to the target Pipeline with a Web browser and determine the current firmware version via the Configure panel (Using the Configure Panel on page 51).
2. Log on to the Pipeline support page at www.telestream.net/telestream-support/pipeline/updates.htm.
3. Download the Pipeline firmware file (*firmware-xxxxx.pln*) to your computer.

After downloading the firmware file, upgrade the firmware by following these steps:

1. Log on to the target Pipeline using a Web browser.
2. Select Upgrade from the menu to display the Upgrade panel.

3. Click Choose File to locate and select the firmware file (*firmware.xxxxx.pln*) you plan to use.
4. Click Upgrade and observe the progress bar and notes about the process.

   During a firmware upgrade, the front SDI In LED (on left) lights yellow during the upgrade process. When the Pipeline has been upgraded, Pipeline Administrator reboots the Pipeline channel and displays a rebooting message on the Upgrade page. In about 15 to 30 seconds, both the In and Power LEDs light green. Pipeline Administrator reconnects automatically and displays the Configure panel.

CHAPTER 6

Using Pipeline in Final Cut Pro & Episode Desktop

Use this chapter to learn how the Pipeline Plugin works in Final Cut Pro and enables you to import and export media via Pipeline. The Pipeline plugin also works in Episode 5.x | Episode Pro Desktop 5.x for importing media from Pipeline.

You can import media from Pipeline via the Pipeline Plugin in two ways: crash record, and log and capture. In crash record, you import real-time media from the Pipeline; during log and capture, you can create a clip list and then record the media defined by each clip in the list.

Topics

- Setting Preferences (page 64)
- Crash Recording Media From Pipeline (page 68)
- Logging and Capturing Media Clips from Pipeline (page 70)
- Loading and Saving Clip List (EDL) Files (page 77)
- Exporting Media to Pipeline From Final Cut Pro (page 79)

Note

Before using Pipeline with Final Cut Pro or Episode, the Pipeline must be installed and configured (Chapter 2, Pipeline Hardware, Installation & Setup on page 5).
Configure Pipeline using Pipeline Administrator (Chapter 5, Using Pipeline Administrator on page 47).

Setting Preferences

The Pipeline Plugin allows you to set up your import and export preferences, determine how often to check for software updates, and select preset or custom keyboard settings of your choice. Pipeline Plugin Preferences are displayed directly from the Pipeline Plugin Import and Export windows.

Displaying the Preferences Panel

Final Cut Pro. Open Final Cut Pro and select File > Import > Pipeline Crash Record or Pipeline Log & Capture or File > Export > Pipeline.

Episode. Open Episode and select File > Import > Pipeline Crash Record or Pipeline Log & Capture.

The Pipeline Plugin displays the Pipeline Settings dialog.

Figure 6–1. Use the Pipeline dialog to select the Pipeline, configure it, and connect.

Select a Pipeline, configure it, and click OK to connect.

Figure 6–2. Display Preferences from the Pipeline Plugin Import or Export window.

Click Preferences to display Pipeline Preferences.

Click Preferences to display the Pipeline Preferences window. (The Preferences button is also displayed on the Pipeline export window for your convenience.)

In addition to the tabs, the window displays two important buttons:

Default. Click to return all preferences to their default settings.

OK. Click to update all preferences and close the window. You can display each tab and make changes before clicking OK.

Setting Import Preferences

In the Pipeline Preferences dialog, click Import to display the Import Preferences panel:

Figure 6–3. Import Preferences.

Preroll Duration. Specify the number of seconds to pre-roll video from start timecode during import operations.

Postroll Duration. Specify the number of seconds to post-roll video past end timecode during import operations.

Automatically Eject Tapes. Check to have the Pipeline plugin automatically eject the tape from the deck when it is finished capturing. The tape is only ejected if another tape is required. This occurs when clips are logged from multiple tapes.

Default. Click to return all preferences to default settings.

OK. Click to save changes and close the dialog.

Setting Export Preferences

In the Pipeline Preferences dialog, click Export to display the Export panel:

Figure 6–4. Export Preferences.

Leader Duration. Specify the number of seconds of time to write blank media to the file before encoding.

Trailer Duration. Specify the number of seconds to write blank media to the file after encoding.

Preroll Duration. Specify the number of seconds to pre-roll video from start timecode during export operations.

Pipeline Frame Queue Size. Set the queue size (in number of frames). The minimum is 8 frames and the maximum is 22 frames. The default is 22 frames, in order to provide the most reliability.

During playout, Pipeline keeps a queue of frames in memory to compensate for network latencies. If queue size is set for a large number of frames, the Pipeline can 'ride out' higher transient latencies in the network. However, a large number also introduces a longer delay between the time the frame is emitted on the network and the time that the frame appears on the SDI connection (roughly 1/4 second for 8 frames, up to about 3/4 second for 22 frames).

If you are concerned with latency between the time video is exported from the computer and the time it is sent out the Pipeline device, you should adjust the value lower. However, lowering this value will make the export connection more susceptible to errors due to insufficient CPU power or network bandwidth.

Pipeline Frame Offset. Set the offset size (number of frames). The minimum is -5 frames and the maximum is +5 frames. The default is 0 frames. Frames can occur early or late depending on the deck used. This adjustment offsets the playout based on the number of frames chosen and compensates for decks that are not 100% frame accurate to the timecode provided. This adjustment is made by a process of trial and error.

Ignore lost frames. When checked, a playout session continues even if frames have been lost. If unchecked, the playout session aborts when any lost frames occur.

Setting Update Preferences

In the Pipeline Preferences dialog, click Update to display the Update panel:

Figure 6–5. Update Preferences.

Check for Updates. Select how often Pipeline Plugin should check for updates, or select never.

Check Now. Click to check for updates immediately. If Pipeline Plugin can make a connection to the Telestream Web site, you'll be notified if your software is up-to-date or an update is available.

Setting Keyboard Preferences

In the Pipeline Preferences dialog, click Keyboard to display the Keyboard panel:

Figure 6–6. Keyboard Preferences.

Preset. Select among available preset keyboard shortcuts (which updates the Action table), or select Custom to set your own.

Action Table. Select a key on any row in the table to edit its value.

Crash Recording Media From Pipeline

You can use the Pipeline Plugin to crash record media in any format into Final Cut Pro or Episode Desktop as a QuickTime movie. You must use an HD Pipeline to record HD media. You can crash record live feeds or video playing out from a playback device such as a VTR into the Pipeline via SDI.

Note

When capturing or crash recording from Pipeline Quad, you can perform confidence monitoring to qualify your video. See *Confidence Monitoring (page 56)**.*

In both Final Cut Pro and Episode, when the Pipeline Plugin installed, two new Pipeline menu items are added to the Import menu (example shown in Final Cut Pro):

Figure 6–7. Use File > Import > Pipeline Crash Record to import media from Pipeline in real time.

Two new import options displays when you install the Pipeline Plugin:

Click Import > Pipeline Crash Record to select a Pipeline and capture video in real time from your Pipeline.

To crash record media from Pipeline, follow these steps:

1. **Display Pipeline Settings Window**. Select File > Import > Pipeline Crash Record to display the Pipeline Settings window.

Figure 6–8. Use the Pipeline Selector dialog to select a Pipeline and set the codec for this session.

Select the Pipeline from the list of available Pipelines.

Next, select your video and audio preset, and timecode clock source.

You can also change your media storage location.

Click OK to connect.

2. **Select Pipeline, Codec Settings, and Connect**. Select the Pipeline. Then, select the codec you want to use and your timecode clock source. Optionally, you can change your storage location.

Note

If your Pipeline is in NTSC mode, DVCPro is in the list, because from the NTSC video compression perspective, there is no difference between DV and DVCPro: both are 720x480, 25mb/sec using 4:1:1 chroma sampling.

In PAL mode, DV compression is 720x576, 25mb/sec with 4:2:0, while DVCPro compression is 720x576, 25mb/sec with 4:1:1. Therefore, both DV and DVCPRO display in the list.

3. Click OK to connect and display the Pipeline Crash Record window.

Figure 6–9. Click Record to crash record; clips display in the clip list.

4. **Crash Record your Clips**. Queue up your video and click the Capture (red dot) button to begin recording.

   You can use the controls to queue the tape if VTR-controlled. When you click Capture, the Pipeline Plugin begins capturing the streaming media. Click the Capture button again to stop capturing. The clip is listed in the Clip List with a Captured icon. You can record one or more clips.

5. **Import your Clips**. Click Import to import the clips into the Final Cut Pro bin or the Episode job batch window (example in Final Cut Pro).

Logging and Capturing Media Clips from Pipeline

You can use the Pipeline Log and Capture window to log (create) one or more clips, and then encode and import each clip as a QuickTime movie directly from a Pipeline that is attached via Ethernet (directly or via LAN). You can capture your clips in any supported format.

Note

When capturing or crash recording from Pipeline Quad, you can perform confidence monitoring to qualify your video. See *Confidence Monitoring (page 56)**.*

In both Final Cut Pro and Episode, when the Pipeline Plugin is installed, two new Pipeline menu items are added to the Import menu (example shown in Final Cut Pro):

Figure 6–10. Use File > Import > Pipeline to import media clips from Pipeline.

Two new import options displays when you install the Pipeline Plugin:

Click Import > Pipeline Log & Capture to select a Pipeline and log clips, then capture them from your Pipeline.

To log and capture clips and import them from Pipeline, follow these steps:

1. **Display Pipeline Settings Window**. Select File > Import > Pipeline Log & Capture to display the Pipeline Settings window.

Figure 6–11. Pipeline browser displays all Pipelines – select one and set the codec for this import.

Select the Pipeline from the list of available Pipelines.

Next, select your video and audio preset, and timecode clock source.

You can also change your media storage location.

Click OK to connect.

2. **Select Pipeline, Codec Settings, and Connect**. Select the Pipeline and then select the codec you want to use for this import operation, and your timecode clock source. Optionally, you can change your storage location and handles (added video before and after capture added to the file)

Note

If your Pipeline is in NTSC mode, DVCPro is in the list, because from the NTSC video compression perspective, there is no difference between DV and DVCPro: both are 720x480, 25mb/sec using 4:1:1 chroma sampling.

In PAL mode, DV compression is 720x576, 25mb/sec with 4:2:0, while DVCPro compression is 720x576, 25mb/sec with 4:1:1. Therefore, both DV and DVCPRO display in the list.

Click OK to connect and display the Pipeline Import dialog.

3. **Log Your Clips**. Use the mark in and mark out buttons to select start and end timecodes, or enter them manually, then click the Log button to add the clip to the queue. The VTR buttons can be used to queue the deck if necessary. Clips with overlapping timecodes cannot be captured in the same import session.

   You can either use the mark in and mark out buttons or manually enter the timecodes.

   As each clip is logged, it displays in the clip list at the right with a yellow, three-dot icon to indicate it hasn't been captured yet. The codec that was selected in the Pipeline Settings window will be used.

Figure 6–12. Use the Pipeline Import window to log & capture video streaming from your Pipeline.

In the following figure, the Pipeline Import dialog is depicted in Episode Desktop:

Figure 6–13. The Pipeline Plugin Import dialog in action, depicted in Episode Desktop.

When you connect, streaming media (if present) displays in the video preview region. A clip list displays on the right. VTR and Clip List controls, preferences and Import commands display at the bottom of the panel.

If you have a VTR and it is in Remote mode, you can control your video using the VTR controls and queue clips to be encoded and imported, or the video can be crash recorded. (If you're viewing a live feed, you can only crash record media.)

4. **Capture your Clips**. When you're done logging clips, you capture them by selecting them in the clip list and clicking the Capture button (the button with 3 vertical dots directly below the clip list). Select multiple clips by clicking and dragging or using Command-click.

   As clips are captured, the yellow button on each thumbnail is replaced with a green check mark.

5. **Import your Clips**. Click Import to import them into the Final Cut Pro bin or the Episode Desktop job batch window (example shown is Episode Desktop).

The Pipeline Plugin ingests the uncaptured clips by controlling the VTR via the Pipeline to encode each clip and stream it to the plugin, then writes the media to a QuickTime movie (.mov) file, and saves each file in the destination folder. After the files have been captured and imported, they are all added to the Final Cut Pro bin or Episode Desktop job batch window.

When the import process completes, the Pipeline Import dialog is closed.

Using the Video Panel

The video panel displays the encoded video stream in real time.

Figure 6–14. Pipeline Import dialog's video panel.

Video preview region displays video, bars & tone, or black, depending on state of Pipeline.

***Start**: Timecode of next clip to be added to the list. Click icon at right to update.*

***Current**: Real-time timecode of stream.*

***Duration**: Calculated length of next clip, when available. Click lock icon (right) to lock the duration.*

***End**: End point of next clip to be added. Click icon at right to update.*

Click Log to add the clip to the clip list.

At the bottom, the video panel displays start, current, duration and end timecodes and mark in/out buttons, and a log button for adding a clip to the clip list. The Log button is disabled unless both timecode values are entered. If the start value is greater than or equal to the end value, an error is displayed.

Non-drop-frame timecode separators are all colons. Drop-frame notation applies a semi-colon between the second and frame values. For example: 00:29:30;16 is a drop-frame timecode.

Using the Clip List Panel

The Clip List panel displays a list of clips you've created.

Figure 6–15. The Clip List panel allows you to work with and import clips.

Clips with a green check icon have already been captured, and the file is saved on disk in the scratch location.

Clips with a yellow icon have not been captured.

To create a clip entry, you play video, then click the Start button to mark the start timecode (at right of start timecode value field). Click the End button to mark the end timecode (at right of end timecode value field). When you have a start and end timecode value (and the start timecode is previous to the end timecode) you can click Log to add the clip to the list. Optionally, enter a start timecode and a duration – the end timecode will be calculated for you.

You can also delete, import, and preview selected clips using the Clip List buttons displayed directly below the Clip List panel, in the control panel below.

Status Badges

Clip thumbnails are marked with status badges to help you identify the status of each clip at a glance.

Status Badge	Description
	Indicates that Pipeline Control attempted to capture the clip, but failed. This may be due to lack of storage, network or Pipeline problems, or excessive pre-roll at the beginning of a tape, for example. Resolve the problem and retry.
	During capture state only, this indicates that this clip has not been captured yet.
	Indicates that this clip is in the process of being captured.
	Indicates that this clip has been successfully captured.

Editing Clip List Metadata

At any time when a clip list is displayed, you can view or edit metadata. To view or edit metadata, double-click a specific clip list entry to display the Clip Information dialog:

Figure 6–16. The Clip Information dialog allows you to view and enter metadata values.

Enter metadata values, or select from recently-added values in the popup menu.

Edit the values for each metadata tag, or select recently added values from the popup menu. Click OK to close the window and save the metadata

Using the Video Controls Panel

The video controls panel contains VT controls, shuttle/jog wheels, clip list buttons, and Preferences and Import buttons.

Figure 6–17. Use the control panel to control your VTR and import clips.

VTR Controls

Shuttle. Click and drag to roll left and right, moving the tape reverse and forward, increasing in speed the farther from center you go. When you release the wheel, it returns to center and stops the tape. You can also click on the shuttle wheel to left or right of center to shuttle in small increments and then return to center. The further from center you click, the more frames you'll play, in either direction.

Fast Reverse. Click to rewind tape.

Halt. Click to stop tape.

Pause. Click to pause tape – this command sends a shuttle zero command to the VTR.

Play. Click to preview/play video at normal forward speed.

Fast Forward. Click to roll tape forward.

Jog. Click and drag to roll tape forward or reverse frame by frame.

Note

You can also jog media using the scroll wheel or scroll ball on a mouse so equipped.

Keyboard Shortcuts

The Pipeline Plugin enables you to use keyboard shortcuts for video control – Play, Rewind, Log, Mark Out, Fast Forward, Mark In, Step Forward, Step Backward, Go To Mark In, and Go To Mark Out. Keyboard shortcuts can be customized to your own preferences, or you can select default Final Cut Pro or Avid shortcuts. To view and customize your shortcuts, see Setting Keyboard Preferences (page 67).

Clip Buttons

Delete. Click to permanently remove the selected clips from the list. Or, press Delete on the keyboard.

Capture. Click to capture selected clips. If not captured, they must be captured or discarded during Import.

Preview. Click to preview the selected clips. When the preview button is clicked, that part of the tape is queued up and played back, not the video file that was (or will be) captured.

Buttons

About. Click to display the About dialog, which displays the version that is installed.

Preferences. Click to display the Preferences dialog (see below).

Help. Click to display help on using this panel.

Cancel. Click to close the dialog without importing media.

Import. Click to save the capture clips as files and add them to the bin. Clips that haven't been captured as temporary files must be captured (or discarded) during the Import process.

Note

Clips that display a green check logo have already been captured and have a permanent (not temporary) file. If you click Cancel, these files will be deleted.

If there are uncaptured clips the Pipeline Plugin displays a dialog so you can choose what to do with them:

Loading and Saving Clip List (EDL) Files

Loading and saving clip list (EDL) files facilitates the transfer of clip lists between applications without manually re-creating them. The Pipeline Plugin enables you to load a clip list from an EDL or an XML file or save a clip list as an XML file in Final Cut Pro's XML Interchange format.

For example, you can save (export) a clip list as XML from the Pipeline Plugin in Final Cut Pro, and then import the list into the Pipeline Plugin in Episode Desktop to ingest the clips from tape directly into Episode Desktop under control of the clip list.

These interchange files can be used for time-shifting your work, to avoid performing the same actions multiple times, or to participate in workflow tasks with others. For example, one person can define a list of clips, save the list as an XML file, and then pass the file on to someone else on the network who uses the clip list to ingest the required media.

You can create and save a clip list before capturing begins. When you click the Save XML button, the XML file is created, based on the clips in the list at the time. The Save XML button is deactivated while the plugin is capturing so you must save the XML file either before or after capturing the clips.

To load or save clip lists, use the buttons just below the clip list panel:

Figure 6–18. The Clip List buttons allow you to open clip list files and save clip lists as a file.

Click Load EDL to populate the clip list with entries from a Pipeline EDL file.

Click Load XML to populate the clip list with entries from an EDL file in Final Cut Pro XML Interchange Format.

Click Save XML to create a file with entries for this clip list, in Final Cut Pro XML Interchange Format.

Loading the Clip List from an EDL File

To load the clip list from an EDL file, click Load EDL. EDL files can be created from Pipeline Administrator.

Figure 6–19. Click Load EDL to locate an EDL file and load the entries into the Clip list.

Use the Open window to browse and open clip list files you've saved previously.

When you click Load EDL, Pipeline Plugin displays a File Open dialog which you use to browse and locate the EDL file you want to load. Select the file (only files with the edl suffix are available) and click Open to load the clips in the EDL file into your Clip list.

Loading the Clip List from an XML File

To load the clip list from an XML file, click Load XML.

Click Load XML to locate a clip list XML file and load it. You can load a Clip List from an XML file that has been saved in Final Cut Pro, the Pipeline Plugin, Pipeline Control, or any other application that supports Final Cut Pro XML Interchange format.

Figure 6–20. Click Load XML to locate a clip list file and load the entries into the Clip list.

Use the Open window to browse and open XML files you've saved previously.

When you click Load XML, Pipeline Plugin displays a File Open dialog, which you can use to browse and locate the XML file you want to load. Select the file (only files with the xml extension are available), and click Open to load the clips in the list into your Clip list.

Save the Clip List as an XML File

To save the clips in the list as entries in XML, click Save XML, select a folder location and save the file.

Exporting Media to Pipeline From Final Cut Pro

The Pipeline plugin enables you to export QuickTime sequences or clips, using print to tape (via insert, assemble, and crash edits) directly to Pipeline for decoding and conversion to SDI in real time. (To export – play out – media in other wrapper/file formats, use Pipeline Control.) Export and playout is supported for SD/HD media, in QuickTime format.

In most cases, you'll set your sequence setting the same as your clip format to avoid format conversion, because you're performing decoding to SDI directly in the Pipeline.

Note

Final Cut QuickTime sequences use stereo audio tracks by default. You can export SD sequences or clips with essences of any supported codec in the selected Pipeline. Audio must be uncompressed linear PCM 16 or 24 bit (Little or Big Endian), in mono or stereo tracks.

When exporting media to Pipeline Quad for playout, use the SDI Sync In port to sync your output with a house reference signal. See *Using SDI Sync Input on page 11**.*

During an export operation, for capturing to tape or other archival operations, the SDI out port of the Pipeline should be connected to an RS-422-controlled VTR. Pipeline exporting performs an insert, assemble, or crash edit, and the tape should not be read-only (record inhibit).

If you don't have an RS-422 deck or your tape is read-only/record inhibit, Pipeline displays an error.

With the Pipeline Plugin installed, a new Pipeline menu item is added to the Export menu:

Figure 6–21. Select File > Export > Pipeline to export media to your Pipeline.

To export sequences or clips to Pipeline, follow these steps:

1. **Select the Media to Export.** Select a clip or sequence.
2. **Display the Pipeline Settings Window.** Select File > Export > Pipeline to display the Pipeline Settings dialog.

Figure 6–22. Use the Pipeline Settings dialog to select the Pipeline for this export.

3. **Select the Pipeline and Connect.** Select the Pipeline you're exporting to, and click OK to connect. The Pipeline Plugin displays the Pipeline Export window:

Figure 6–23. Use the Pipeline Export window to stream clips to your Pipeline.

The VTR controls on the Pipeline Export dialog emulate the controls on a VTR. Select Play to play the tape in the VTR. All other VTR control operation respectively.

If you want to preview the VTR output, connect the SDI out port of the VTR to the Pipeline's SDI In port. When you connect, the Pipeline plugin displays the video that is present on the Pipeline's SDI In port coming from the deck (which is connected to the VTR's SDI Out port), because you may want to queue

up your tape or roll it to a specific point before exporting the media. (***Note***: This step only applies when doing insert or assemble edits.)

4. **Select Video and/or Audio Channels to Play Out.** Directly on your deck, check Video edit and/or Audio Edit. Most decks support 2 channels of audio, other support 4 channels. The deck may allow you to map your video to different channels. For example, you may be able to map Audio Edit 1 and Audio Edit 2 to different channels, for example. Refer to your deck's documentation for information on how to set up audio mapping appropriately for your workflow. (***Note***: This step only applies when doing insert or assemble edits.)
5. **Queue Your Tape**. Either manually enter a start timecode where you want the edit inserted or with the VTR in Remote mode, use the controls to queue the tape. Next, set a mark-in point for the start timecode where your insert edit will begin. Note that the deck may pre-roll when you begin exporting.
6. **Export your media.** Now, export your media from Final Cut Pro. Press Record (the round red button) to play out the clip or sequence in real time from Final Cut Pro, and perform a frame-accurate insert edit on the tape. (***Note***: Does not apply to assemble or crash edits.)

During the time that Final Cut Pro is playing out media, the Pipeline Export dialog displays "Exporting *clip or sequence name*" and displays the progress bar over the clips that is exporting, until export is complete.

Using the Video Panel

The video panel displays the encoded video stream in real time.

Figure 6–24. Pipeline Export dialog video panel.

Start*: Timecode of beginning of current clip.*

Current*: current timecode of the clip.*

Duration*: Length of clip being exported.*

End*: Initially blank. When a start time is selected this value is updated to start timecode + duration.This is the timecode on the tape where Pipeline will stop exporting.*

At the bottom, the video panel displays start, current, duration (from the clip or sequence you're exporting and end timecode), and end (start timecode + duration).

Non-drop-frame timecode separators are all colons. Drop-frame notation displays a semi-colon between the seconds and frame values. For example: 00:29:30;16 is a drop-frame timecode.

Using the VTR Control Panel

The VTR control panel contains VTR, shuttle and jog controls, plus a Preferences button. The VTR controls on the Pipeline Export dialog emulate the controls on a VTR. Selecting Play will play the tape in the VTR. All other VTR control operation respectively.

Figure 6–25. Use the control panel to control your VTR and export clips.

VTR Controls

Shuttle. Click and drag to roll left or right, moving the tape reverse or forward, increasing in speed the farther from center you move the wheel. When you release the wheel, it returns to center and stops the tape. You can also click on the shuttle wheel to left or right of center to shuttle in small increments and then automatically return to center and stop. The further from center you click, the more frames you'll play, in either direction.

Fast Reverse. Click to rewind tape.

Halt. Click to stop tape.

Pause. Click to pause tape.

Play. Click to play out video at normal forward speed.

Record. Click once to start playing out the selected clip or sequence. During playout, click to stop playout.

Fast Forward. Click to roll tape forward.

Jog. Click and drag to roll tape forward or reverse frame by frame. You can also use the scroll wheel or scroll ball while the mouse is hovering over the Jog wheel.

Keyboard Shortcuts

The Pipeline Plugin enables you to use keyboard shortcuts for video control – Play, Rewind, Log, Mark Out, Fast Forward, Mark In, Step Forward, Step Backward, Go To Mark In, and Go To Mark Out. Not all shortcuts apply to the Export dialog.

Keyboard shortcuts can be customized to your own preferences, or you can select default Final Cut Pro or Avid shortcuts. To view and customize shortcuts, see Setting Keyboard Preferences (page 67).

Buttons

About. Click to display the About dialog, which displays the Pipeline Plugin version you have installed.

Preferences. Click to display the Preferences dialog (see below).

Help. Click to display help on using this panel.

Cancel. Click to close the dialog without importing media.

Performing Multiple Serial Export Operations

After you've completed an export, you can export the same clip or sequence again, as many times as you need, in serial. You may want to export the clip again if you placed it at the wrong part of a tape, or you want the same clip or sequence export repeated several times.

After the export is complete, you can optionally enter a new value in the start timecode field manually or by navigating to the start timecode with the VTR controls and clicking the 'mark in' button. Press the Record button. Pipeline Plugin displays a progress bar dialog with Done button in the lower right corner. You can repeat the same process over and over again.

CHAPTER 7

Using Pipeline Control

Use this chapter to learn about Pipeline Control and how to use Pipeline Control's general features.

Pipeline Control is a client application for controlling digital media capture and play out from Pipeline devices. Pipeline Control is available for both Mac OS X and Windows users. Pipeline control provides different document types to provide log and capture, scheduled capture and play out, triggered manual and automated capture, and various types of print to tape operations.

Pipeline Control supports both SD and HD – Pipeline SC, Pipeline Quad, and Pipeline HD Dual.

Topics

- Pipeline Control Overview (page 86)
- Starting Pipeline Control (page 87)
- Creating Pipeline Control Documents (page 88)
- Pipeline Control Menus (page 89)
- Using The Pipeline Settings Panel (page 91)
- Configuring Publishers (page 99)
- Using the Pipeline Status Panel (page 106)
- Using the Video Preview Panel (page 107)
- Using the Audio Preview Panel (page 108)
- Loading and Saving Clip List Files (page 109)
- Setting Preferences (page 110)
- Using the Diagnostics Panel (page 113)
- Telestream Intermediary Format (TIFO) (page 114)
- Supported File Formats/Wrappers (page 113)

Pipeline Control Overview

Pipeline Control enables you to select a specific Pipeline on your network and configure it for your workflow requirements.

Pipeline Control provides windows to support various recording and playout tasks: scheduled capture and playout, log & capture, triggered manual and automated capture, and print to tape.

Pipeline Control allows you to open multiple windows at the same time and work with them simultaneously.

Figure 7–1. Typical Pipeline Control window (Schedule window shown)

Pipelines are discovered and tracked on your network by two methods: via Bonjour or manually. Bonjour is preferred on most networks, because it's automatic. You can also use the manual discovery feature (Manually Adding Pipelines) to discover and track Pipelines across subnets or when Bonjour traffic is blocked.

Pipeline Control executes the tasks on each window independently of tasks in other active windows.

Before you start working in a window, make sure the active window is actually the one you want to update.

Starting Pipeline Control

You can start Pipeline Control by double-clicking its icon in the Applications folder.

You can also add the Pipeline Control icon to the Dock for convenient access. To add it to the dock, open the Applications folder and drag the Pipeline Control icon directly onto the dock. Position it among the other icons where you want it displayed, and release it.

You can also start Pipeline Control by double-clicking a Pipeline document you've saved. Or, by dropping a Pipeline document onto the Pipeline Control icon in the Applications folder or the dock.

Note

Pipeline Control can only be used with Pipelines whose firmware is compatible.

When you install or update Pipeline software, you may need to update your Pipeline firmware as well. If you select a Pipeline with older firmware that is incompatible with the current version of Pipeline Control, you will be warned that this may cause problems.

When you open schedules created in previous versions of Pipeline Control, you may need to reset the audio and video settings before using them.

By default, Pipeline documents are saved in your Documents folder. When you open Pipeline Control in this manner, the Pipeline document you double-clicked is displayed. The default location for saved documents is the storage location specified in the wrapper settings.

Note

If you're opening Pipeline Control for the first time, you should set up preferences. For details, see *Setting Preferences (page 110)**.*

Creating Pipeline Control Documents

Pipeline Control provides specific document types to support various tasks you can perform.

Creating Documents via the Task Selector

When you start Pipeline Control, it displays a Task Selector panel that allows you to choose which task you want to perform (and thus, which type of document to display):

Figure 7–2. Use the Task Selector to create new documents.

Schedule Capture or Playout. Click to create and display a new, untitled Schedule document. For details, see Using Schedule Documents on page 123.

Log & Capture. Click to create and display a new, untitled Log & Capture document. For details, see Using Log & Capture Documents on page 135.

Capture with Trigger. Click to create and display a new, untitled Trigger document. For details, see Using Trigger Documents on page 143.

Print to Tape. Click to create and display a new, untitled Print to Tape document. For details, see on page 151.

Creating New Documents via the File Menu

You can also create a new, untitled window by selecting the menu item of the appropriate document type in the File menu: New Schedule, New Log & Capture, New Trigger, and New Print to Tape.

Pipeline Control Menus

Use this section as a quick reference for Pipeline Control menu items. (General menus and menu items are not described.)

Pipeline Control Menu

About Pipeline Control. Displays the About dialog with the Pipeline Control version number.

Preferences. Displays Capture, Play Out, Device, and Update preferences panels. For details, see Setting Preferences (page 110).

File Menu

Open. Displays an Open File dialog so you can browse and open previously saved documents.

New Schedule. Creates and displays a new, untitled Schedule document.

New Log & Capture. Creates and displays a new, untitled Log & Capture document.

New Trigger. Creates and displays a new, untitled Trigger document.

New Print to Tape. Creates and displays a new, untitled Print to Tape document.

Import Pipeline Edit Decision List. Displays an Open dialog, so you can select and import a Pipeline or GVG 4 EDL from a file. (Loading and Saving Clip List Files (page 109)).

Import Final Cut Pro XML. Displays an Open dialog, so you can select and import a Final Cut Pro XML Interchange file. (Loading and Saving Clip List Files (page 109)).

Export Final Cut Pro XML. Displays a File dialog, so you can save the current clip list as a Final Cut Pro XML Interchange file. (Loading and Saving Clip List Files (page 109)).

Close. Closes the selected (front-most) window. If the document has not been saved or has unsaved changes, Pipeline Control asks you if you want to save the document before closing.

Save. Saves the changes to the active window.

Save All. Saves changes to all open documents.

Save As. Displays a Save File dialog, so you can save the current window as a document with a different name or in a different location.

Control Menu

The menu items under the control menu control the state of the selected (active) window.

Connect. Select to connect to the selected Pipeline.

Stop. Stops preview or capture.

Capture. Begins capturing media specified in the document from the selected Pipeline.

Play Out. Begins playing out media specified in the document to the selected Pipeline.

Device Menu and Keyboard Shortcuts

The Device menu provides commands for controlling the VTR of the connected device using the following keyboard commands and keyboard shortcuts.

Play – Space. Put VTR in play mode and play the video forward at normal forward speed.

Stop – K. Stop the VTR at the current play point.

Rewind – J. Play video backward at the deck's rewind speed.

Fast Forward – L. Play forward at deck's fast forward speed.

Step Backward – [(Left Brace). Step one frame backward.

Step Forward –] (Right Brace). Step one frame forward.

Go To Start (local playback only) – Command-[(Left Brace). Return the clip to the beginning of the clip/tape at highest speed.

Go To End (local playback only) – Command-] (Right Brace). Go to end of clip/tape at highest speed.

Preview Video (Mac OS X). Select to enable video during preview|capture; select again to disable it.

Preview Audio (Mac OS X). Select to turn sound on during preview|capture; select again to turn it off.

Clip Menu

Clip menu commands enable you to edit or delete clips and provide keyboard shortcuts for easy operation.

Add. Creates a new event.

Delete. Remove the selected clip (the file is not deleted from the file system.) The selected clip is indicated with a blue border in the Log & Capture window.

Edit. Edit the selected clip details and metadata – indicated in the Log & Capture window by caution tape above and below the tabs.

Review. In Schedule and Trigger windows, select to preview a clip in the video panel.

The following menu items are only available for Log and Capture documents:

Quick Mark – M. Single-click feature for logging a clip and setting a new mark in point. Click to set the current point on the tape as the mark out point and logs the clip. The last clip's mark out point becomes the new mark in point, so that you only have to click Quick Mark again to set the out point and log the clip.

Set Mark In – I. Set the current timecode on the tape as the clip's in point.

Set Mark Out – O. Set the current timecode on the tape as the clip's out point.

Go To Mark In. Roll the tape to the timecode specified in the Mark In field.

Go To Mark Out. Roll the tape to the timecode specified in the Mark Out field.

Log Clip – P. Create a clip under the current tape name in the tape field, using the values in the General and metadata tabs.

Help

Pipeline Control Help. Displays the Pipeline User's Guide (the guide you are reading) via the Internet, when your computer has Internet access.

Using The Pipeline Settings Panel

At the top of each window is the Pipeline Settings panel. There are several selectors in the panel. These selectors enable you to select a specific Pipeline, and configure the document to use it specifically for the tasks/workflow you intend. Some selectors do not display in certain document types. For example, in a Trigger document, the Handles selector doesn't display.

Note

In preview, playout, or capture mode, these settings are disabled and you can't make changes. To make changes, you must first return to idle mode.

Figure 7–3. Pipeline Settings panel.

***Pipeline Selector**. Click to select a Pipeline.*

***Wrapper**. Click to select a wrapper or file type.*

***Video**. Click to select and configure the video codec.*

***Publish**. Click to select an action to perform when each clip is ready.*

***Audio**. Click to select and configure the audio codec.*

***Clock**. Click to select a timecode clock source.*

***Handles**. Adjust the time value of handles (not displayed in Trigger documents).*

These settings are saved with the document. When the document is connected to a Pipeline, the Pipeline is configured for the task, based on these settings.

Selecting a Pipeline

Click the Pipeline dropdown menu and select Other to display a list of all Pipelines on your network for you to choose from.

Figure 7–4. Mac OS X Pipeline browser and selection window.

Status	Name	IP Address	Version	Format	Codecs
Idle	PL3079_31631	169.254.13.8:554	1.1	NTSC	DV, DVCPro, IMX
Idle	LAB>JMM>QUAD-2>HVR-1500>PAL	169.254.1.18:554	1.2	PAL	DV, DVCPro, IMX, ProRes
Idle	Pipeline_3249	169.254.13.178:554	1.1	NTSC	DV, DVCPro, IMX
Idle	Jeremy's Pipeline	169.254.12.192:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Idle	LAB>DVCAM>3019>NTSC	169.254.12.204:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Monitoring	LAB>JMM>QUAD-4>MONITOR	169.254.1.20:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Idle	LAB>JMM>QUAD-1>BETACAM-SP	169.254.1.17:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Idle	WLH_ALPHA	169.254.12.201:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Playing	Engineering>David>Live Feed 1	169.254.12.237:554	1.2	NTSC	DV, DVCPro, IMX, ProRes
Idle	Engineering>David>Live Feed 2	169.254.12.194:554	1.2	NTSC	DV, DVCPro, IMX, ProRes

A green bullet icon indicates that this Pipeline is available for Preview or Capture. A red bullet indicates that it is currently busy (connected and in preview, playout or capture by another client). Gray indicates offline; orange indicates an unknown state. To enable you to select a Pipeline to set up a document for use later, you can select a Pipeline regardless of its state.

Manually Adding Pipelines

You can manually add (and remove) Pipelines across subnets or when Bonjour traffic is blocked.

To add a Pipeline manually, determine its IP address. Next, click the Plus icon (at the bottom left of the Pipeline selector) to display the Add Pipeline dialog:

Figure 7–5. Add Pipeline dialog.

Enter the IP address and click OK to add it to the list.

To delete a manually-entered Pipeline, select it and click the Minus icon.

Selecting a Wrapper

Click the Wrapper dropdown menu to select the wrapper/file format for this clip when captured.

For details about supported file formats and wrappers, see Supported File Formats/Wrappers (page 113).

QuickTime

QuickTime (Open) files can be edited in Final Cut Pro as they are being captured. Because of this characteristic, the length specified in the QuickTime file header is set at the beginning of the capture event. If the captured event stops before the predetermined time, the QuickTime file retains the initial length.

Note

Although the file retains the initial length, the file's size is determined by the actual captured media.

Although Open QuickTime files can be played while capturing, the behavior of QuickTime is different between Mac OS X and Windows. In QuickTime for Mac OS X, the clip can be played to the current point of capture. In QuickTime for Windows, the clip can only be viewed to the point that had been captured when the clip was opened in QuickTime. This is a limitation of QuickTime for Windows.

For example, when a Pipeline is capturing media to a network share, on Mac OS X you can open the clip in QuickTime and play it to the current point of capture. However, if the same clip is opened in QuickTime for Windows it can only be viewed to the point that had been captured *at the moment the clip was opened*.

Closed QuickTime files can't be opened while they are being captured. Use closed QuickTime files if you will not be editing or reviewing (playing out in QuickTime player) while capturing. Use closed QuickTime files when crash recording an event, and a specific duration is not known in advance.

When you select QuickTime format, Pipeline Control displays this configuration dialog:

Table 7–1. QuickTime File Configuration

Storage Location. Click to navigate to and select a storage directory for your files.

Open|Closed. Select Open QuickTime or Closed QuickTime by selecting the appropriate radio button.

Disk Buffering. Check to use disk buffering during capture (Disk Buffering Details (page 39)).

Buffer Directory. Click to navigate to and select a buffer directory.

Audio Track Format. Select Mono or Stereo tracks.

Avid AAF+MXF

Avid AAF+MXF files created by Pipeline Control can be imported into Avid editors.

When you select Avid AAF+MXF format, Pipeline Control displays this configuration dialog:

Table 7–2. Avid AAF+MXF File Configuration

AAF Location. Click to navigate to and select a local storage directory for the Avid AAF files associated with each clip. Import the AAF master clip file into your Avid edit application.

MXF Location. Click to navigate to and select a media directory for the MXF audio and video files associated with this clip. In most cases this should be the *Avid Mediafiles/MXF/1* folder used by the Avid edit system.

Generic MXF (OP1a)

Generic MXF (OP1a) files are an MXF Operational Pattern 1a (OP1a, SMPTE 379M-2004) file with a generic container mapped to DV25, DVCPro HD, IMX or DNxHD (VC-3) video essence.

When you select Generic MXF (OP1a) format, Pipeline Control displays this configuration dialog:

Table 7–3. Generic MXF (OP1a) File Configuration

Storage. Click to navigate to and select a storage directory for your files.

Disk Buffering. Check to use disk buffering during capture (Disk Buffering Details (page 39)).

Buffer Directory. Click to navigate to and select a buffer directory.

XDCAM MXF

XDCAM files are an MXF Operational Pattern 1a (OP1a) file compatible with Sony XDCAM MXF and are limited to DV25 and IMX video essences. Disk buffering is not supported for XDCAM files. Use XDCAM MXF when capturing clips you want to import into Avid edit systems.

When you select XDCAM MXF format, Pipeline Control displays this configuration dialog:

Table 7–4. XDCAM MXF File Configuration

Storage Location. Click to navigate to and select a storage directory for your files.

TIFO

TIFO files can be transcoded with FlipFactory or Episode Engine as they are being captured. This wrapper type can be used with Pipeline Control's FlipFactory or Episode Engine publish plug-in (Mac OS X only) to allow for real time transcode while capturing. (For details, see FlipFactory Publisher (page 99) and Episode Engine Publisher in the Pipeline User's Guide for Mac OS X).

The same workflow can be achieved on Windows by using Episode Engine's Pipeline File monitor, which is an input monitor that transcodes TIFO files as they're written.

When you select TIFO format, Pipeline Control displays this configuration dialog:

Table 7–5. TIFO File Configuration

Storage Location. Click to navigate to and select a storage directory for your files.

Disk Buffering. Check to use disk buffering during capture (Disk Buffering Details (page 39). Click to navigate to and select a buffer directory.

TIFO Format Selection. Use the default of Version 3 when creating files for use with FlipFactory 7.2 (or earlier) and Vantage 2.0 (or earlier). Select Version 4 if you are writing files to be processed by Episode v5 and v6 (or later). Future versions of FlipFactory and Vantage will support TIFO 4. TIFO version 4 adds an anticipated duration to the file header which allows applications using TIFO to display a real-time progress bar while processing these files.

Selecting and Configuring Codecs

When you don't have a Pipeline selected (None), all codecs display. When you select a specific Pipeline, only those codecs supported by the target Pipeline display. When choosing the frame rate, make sure you're providing an appropriate (NTSC or PAL) source.

Figure 7–6. Pipeline Control notifies you when a codec is not supported by the Pipeline.

Based on your Pipeline, you can select from Uncompressed, DV, DVCPro, IMX, DVCPro HD, ProRes, DNxHD, MPEG2 I-Frame, or Motion JPEG codecs. Each codec has one or more profiles from which you can choose.

Each codec's profile details are located in Appendix B, Pipeline Control Codec Profiles (page 161).

When you select a codec only the resolutions that apply to that codec are hinted. When a setting is hinted it has a green dot next to it. Unsupported settings are selectable but may not work correctly. Frame Rate and Quality settings are filtered based on the resolution you select. Based on the SDI signal of the

connected Pipeline, resolutions and frame rates that display a green dot are compatible with the current signal.

Note

If the source is HD and you choose an SD codec, Pipeline down-converts the video according to your settings. However, the video quality may not meet your production workflow requirements.

The SD SDI stream being ingested by the Pipeline may be an NTSC or a PAL source: if you select an NTSC frame rate to encode PAL, or a PAL frame rate to encode NTSC, Pipeline Control displays an error and prevents the capture from occurring.

In capture mode, each clip is encoded in the selected codec's format. In playout mode, each of the clips in the schedule must contain a track in the selected codec. The codec is also used in preview mode, and affects the way the preview is displayed.

When selecting a Quality setting for NTSC or PAL captures be sure to select a setting with an Anamorphic suffix if the SDI source of the Pipeline requires anamorphic encoding. When selected, video preview is displayed at the correct aspect ratio and Pipeline Control embeds a display size flag in the QuickTime file so that other QuickTime applications can determine the correct display aspect ratio.

Selecting and Configuring a Video Codec

Click the Video drop down menu to select the video codec you want to use. Based on your selection, the frame size, frame rate, and quality dropdown menus populate with available values. Select the frame size, rate, and quality from the dropdown menus to meet your workflow requirements.

Selecting and Configuring an Audio Codec

Click the Audio drop down menu to select the audio codec you want to use (for this version, only Linear PCM is available). Select the number of channels, bit rate, and sample size from the dropdown menus. Valid options for the selected codec display with a green dot (hinted).

Note

Settings are hinted when they are known to work with the selected Pipeline or wrapper and its current input signal. However, you may be creating documents for later use, when the signal is different, so you can select settings that may work if you change the Pipeline's input signal.

Hints also indicate the settings that are known to work given the selected wrapper format, such as QuickTime, TIFO, or MXF-OP1a. If both the selected wrapper and the selected Pipeline support the setting, it is hinted.

If you've already selected a codec and settings – and you select a Pipeline that doesn't support it – Pipeline Control will notify you when you connect that it doesn't support the selected codec.

Selecting and Configuring a Video Codec

Click the Video drop down menu to select the video codec you want to use and configure it to meet your workflow requirements.

Figure 7–7. Typical video codec settings panel.

Selecting and Configuring the Audio Codec

Click the Audio drop down menu to select the audio settings and configure it for this workflow.

Figure 7–8. Typical audio codec settings panel.

When you don't have a specific Pipeline selected (None), all Quality settings can be selected. Audio parameters include Channels (2, 4, 8, or 16), Sample Rate (always 48K) and Quality (16-bit | 24-bit Big Endian | Little Endian).

Selecting a Timecode Clock Source

Click the Clock dropdown menu to select which device provides the timecode clock source signal. You must be connected to a Pipeline in order to obtain a timecode clock source, except when you choose Computer Clock. Choose from Auto, RS422 Device, Sync Input (Pipeline Quad and Pipeline HD Dual) Video Input, Pipeline Clock | Internal Clock (Windows only), or Computer Clock. When connected to a Pipeline Quad, you can select Channel One. When you change your timecode clock source, save your file to save changes.

Note

When you configure clock settings in a schedule they are stored with the schedule, and do not change the settings in the selected Pipeline.

Auto. When you select Auto the Pipeline system will search for the first appropriate time source in the following order: RS422, Ext Sync SDI VITC, Input Signal VITC, Zero Based.

For example, if you're connected to a Pipeline SC and RS-422 has a timecode, it will be used because it is highest priority (column on right). If not, SDI timecode will be used (2nd priority), etc.

RS-422 Device. Uses the timecode provided by the device attached to the RS-422 port on the target Pipeline; usually a VTR. If the timecode is not available, the Pipeline timecode is provided.

Sync Input. For use with Pipeline Quad and HD Dual only. Uses the timecode provided through the Reference Input signal in VBI or VANC. If the timecode is not available, a zero-based timecode is provided. *Do not select Sync Input if you are connected to a single-channel Pipeline*.

Video Input. Uses the timecode provided on the Pipeline's video input signal in VBI or VANC. If the timecode is not available a zero-based timecode is provided.

Pipeline Clock. Uses the timecode provided by the Pipeline itself.

Computer Clock. Uses the timecode provided by the host computer on which Pipeline Control is running.

Channel 1. When connected to a Pipeline Quad you can select Channel One's timecode. This enables multiple channels of a Quad to share a common timecode when an external timecode, either on the video input or the Reference input, is not available.

Setting up Handles

The handles setting displays only in Log & Capture and Schedule windows. Enter the SMPTE timecode value HH:MM:SS:FF (max. 5:59 min.) to capture before and after the scheduled capture time.

Selecting a Publisher

Click the Publish dropdown menu to select the system that you want to notify for each clip event. FlipFactory and Episode Engine plugins automatically send jobs when the file is ready. For details about setting up each type of publisher, see Configuring Publishers (page 99).

FlipFactory, Episode Engine, Final Cut Pro, and Copy publishers are used for capture workflows.

If you don't want to directly connect to another system in your workflow to pass the saved media file and optional metadata, select None.

CONFIGURING PUBLISHERS

Publishers are methods of notifying a specific system that an event has occurred, or that media is available for processing. Methods differ, based on the notification requirements of the system you've selected. When you select a publisher, you're prompted to configure it. Publishers include two media processing systems from Telestream: FlipFactory and Episode Engine. You can also publish instant messages to IM users to notify them of events occurring in your schedule. You can select and use one publisher per schedule.

- FlipFactory Publisher (page 99)
- Episode Engine 5.x Publisher (Mac OS X only) (page 102)
- Final Cut Pro Publisher (Mac OS X only) (page 105)
- Copy File Publisher (page 106)

FlipFactory Publisher

Set up and use the FlipFactory publisher in Pipeline Control when you want to automatically submit media to a factory for processing.

Note

Telestream recommends installing Pipeline Control on a computer that is not hosting FlipFactory or other media processing applications: intense disk and CPU consumption can interfere with proper operation of both applications.

To publish media for processing by FlipFactory, you must be running FlipFactory version 6.0 (with update packs 1 through 4 installed), or greater. (See FlipFactory support Web page at www.telestream.net for the latest updates.)

When submitting jobs with TIFO files, it is important to save the file directly on the FlipFactory or Episode Engine server. Refer to Workflow System Requirements (page 30) *when writing media files to a shared storage location (SAN, NAS or shared network folder).*

To speed your workflow to near real-time by starting transcoding as soon as capture starts, select TIFO as the file type. When capturing media in TIFO files, FlipFactory and Episode Engine are notified as soon as the file is created and transcoding the media occurs as soon as it is available, thus shortening the total processing time.

When capturing media in QuickTime files, FlipFactory is notified when the operation is complete and the file is closed.

To select FlipFactory as a publisher, select Publish > FlipFactory. The following panel displays:

Figure 7–9. FlipFactory publisher panel allows you to submit media to a specific factory.

Configure the settings in the panel and click OK. Make sure you test before putting the document into production.

FlipFactory Server. Select the target FlipFactory from the list.

Address. Displays the currently-selected FlipFactory; allows you to enter one manually – enter its IP address or server name and port number in the form <IP address|ServerName>.local:<Port Number (default 9000)> in the Address field.

If you're submitting jobs to a FactoryArray, enter the FactoryArray's virtual IP Address in the Address field. After selecting or entering the FlipFactory server's ID, the FlipFactory Publisher will connect to the FlipFactory database to obtain the accounts and associated factories and display them.

Account. Select the account on the selected FlipFactory from the popup menu. When you select an account, Pipeline Control queries FlipFactory for a list of factories in the account, and takes a few seconds.

Factory. Select the factory from the list of factories in the selected account. If this factory has metadata labels, they will be displayed so that you can provide metadata values to submit to the factory.

File Location. Drill down into the drives available on the selected FlipFactory server to select the directory. Or, manually enter a path to the file in UNC format – either Drive Letter format (*C:\CaptureMedia*, for example) or \\server\dir format (*\\FlipServer\CaptureMedia*, for example). When selecting a directory from the File location list, note that it is formed from the perspective of the FlipFactory server. When manually entering the path, it must be valid from the FlipFactory server's view.

When publishing files to FlipFactory, Pipeline Control inserts the path into the FlipFactory MDML message to process the job:

```
<file name="mxf-test 2.tifo" path="ff-pipeline1/nabfiles/mxf-test 2.tifo"
version="original"> <protocol name="Universal Naming Convention" role="destination"
seperator="/" type="unc" user="#USER#"> Pipeline Control <connection name="Network
File" type="pull">
```

To make files on Mac OS X accessible to FlipFactory, follow these guidelines:

- File Sharing must be on (System Preferences > Sharing).
- Share files and folders using SMB (Samba) must be checked (System Preferences > Sharing > File Sharing > Options).
- The folder where the source files are located must be added as a share (System Preferences > Sharing > File Sharing). In the Shared Folders list in the Sharing panel, click the + icon to add a folder. Navigate to the folder (for example, the default Movies folder in your user account) and add it.
- Users must include an entry for Everyone (or a specific user, if known), with read only access to the shared folder.

To make files on Windows accessible to FlipFactory, follow these guidelines:

- Windows File Sharing must be enabled.
- The folder where the source files are located must be added as a share.
- Users must include an entry for Everyone (or a specific user, if known), with read only access.

Episode Engine 5.x Publisher (Mac OS X only)

Set up and use an Episode Engine publisher in Pipeline Control when you want to automatically submit media to a specific setting in Episode Engine for processing when it is ready (or while capturing in the case of TIFO wrapper).

Note

Telestream recommends that Pipeline Control be installed on a computer that is not hosting Episode Engine or other media processing applications: intense disk and CPU consumption can interfere with proper operation of both applications.

To publish media for processing by Episode Engine, you must be running Episode Engine version 5.x.

When submitting jobs with TIFO files, it is important to save the file directly on the Episode Engine server. Refer to Workflow System Requirements (page 30) *when writing media files to a shared storage location (SAN, NAS or shared network folder).*

Select and configure the Episode Engine publisher to submit media to the target Episode Engine.

To speed up your workflow to near real-time by starting transcoding as soon as capture starts, select TIFO as the file type. When capturing to TIFO files, Episode Engine is notified as soon as the file is created, and transcoding the media occurs as soon as it is available, thus shortening the total processing time.

If you capture media in QuickTime, Episode Engine is notified when capture is complete and the file is closed.

Note

As an alternative method of accessing media from Pipeline, consider Episode Engine input monitors: specifically, Network File Monitor and Pipeline File Monitor.

To select Episode Engine as a publisher, select Publish > Episode Engine. Pipeline Control displays the following edit panel. Complete the panel and click OK. Make sure you test your configuration before putting the document into production.

Figure 7–10. Episode Engine publisher allows you to submit media to a specific Episode Engine.

Episode Engine Address/IP Address. Click to select the target Episode Engine from the list or enter the IP address of the target Episode Engine manually in the IP Address field.

User. Enter the user name (default: *anonymous*).

Password. Enter the password (default: *anonymous*).

File Location. Enter a path or URI to the file, including the host, path, and file name or use permitted tokens, including slashes but without spaces between them, to form a valid path to the source file being ingested. The path must be valid from the Episode Engine server's view.

%HOST% Token: The %HOST% token resolves to the name of the Mac OS X computer where Pipeline Control is running. When the source file is on the same computer as Pipeline Control, you can use the %HOST% token to supply the name of the computer. When the source file is on another platform (a server, or an Xsan, for example), do not use the %HOST% token. Enter the host name manually.

%FILEPATH% Token. When the source file is on the same Mac OS X computer as the Episode Engine server, you can use the %FILEPATH% token and %FILENAME% tokens, which provide the fully-qualified path to the file. Be sure to add the remaining / before the %FILENAME% token. If the file is not on the same platform as the Episode Engine, do not use this token, because the fully-qualified path is not valid when it is used on another computer.

%FILENAME% Token. The %FILENAME% token resolves to the name of the file, including the extension. This token is required in all scenarios.

Forming Paths to Files on the Episode Engine server. When the file is located on the same computer as Episode Engine. Do not use the %HOST% or the %FILEPATH% token – enter the path manually, followed by /%FILENAME%.

Example: */MacHD/media/%FILENAME%*

Forming URIs to Files on Other Mac OS X and Windows Servers. When the source file is on a Mac OS X or Windows platform that is separate from the computer where the target Episode Engine is running, you must mount the target share on the Episode Engine computer. In Finder, select Go > Connect to Server, and open the target share in the Finder.

Because the share name may be different in Finder from the actual share name, open Terminal (in Utilities), and drag the share from the Finder window onto the Terminal window, to resolve it.

For example, your target file is on the server *Venus*, in a share called *CaptureMedia*. When mounted in Finder, the share icon is named *CaptureMedia*. Drag this icon into the Terminal window, and it displays as */Volumes/CaptureMedia*.

Don't use the %HOST% token or the %FILEPATH% token – it provides the fully-qualified path to the file.

Be sure to add the / before the %FILENAME% token: */%FILENAME*.

Example: */Volumes/CaptureMedia/%FILENAME%*

The best way to validate the correct URI is to browse to the source file's location directly on the Episode Engine computer, and compare it to the entry you've entered in the File Location text field.

To make remote files accessible to Episode Engine, follow these guidelines:

- File Sharing must be enabled.
- The folder where the source files are located must be added as a Share.
- Users must include an entry for Everyone (or a specific user, if known), with Read Only access.
- The target share *must be mounted* on the target Episode Engine computer.

Setting. Select the setting that you want to process the file with, from the list.

Final Cut Pro Publisher (Mac OS X only)

Set up and use a Final Cut Pro publisher when you want to generate a Final Cut Pro XML Interchange file for each clip that is created while running a document. Using Final Cut Pro XML Interchange files makes importing clips easier in Final Cut Pro, because you can store the video clip on a server designated for video storage, and just share the XML files that point to the video. You can also set up Pipeline Control to drop the XML files into a Final Cut Server watched folder, for automatic video ingest.

Final Cut Pro XML Interchange files are intended to be imported into Final Cut Pro or other applications that are compatible. Use one of the following methods to import these files:

- Double-click the Final Cut Pro XML Interchange file
- Drag the Final Cut Pro XML Interchange file to the Final Cut Pro icon on the desktop or in the Dock
- Drag the Final Cut Pro XML Interchange file into a Final Cut Pro bin
- Select File->Import->XML in Final Cut Pro.

The XML file is created when the clip event occurs. Files referenced by the XML file may already be complete and closed when the XML file is opened in Final Cut Pro. Or, the file may still be in the process of being captured. Creating the XML file immediately permits Final Cut Pro to open QuickTIme MOV files (not TIFO files) and begin editing them, while they are in the process of being created by Pipeline.

To select Final Cut Pro as a publisher, select Publish > Final Cut Pro. Pipeline Control displays the following edit panel:

Figure 7–11. Final Cut Pro publisher allows you to create an FCP XML Interchange file.

Complete the panel and click OK to save these settings and close the dialog. Make sure you test your settings in Final Cut Pro or Final Cut Server before putting the schedule into production.

XML Interchange File Output Location. Click to display the File System dialog, and select the server and folder where you want these FCP Interchange XML Interchange files stored. This location is used in FInal Cut Pro to import the referenced file, or in Final Cut Server's watched folder to automatically ingest the referenced file.

Next, choose how to set the path to all video files in the XML file (Set Path to files in XML):

Original Location. Select Original Location when you want to reference the videos in the location specified in Storage where it was created. You might choose this option when you plan to capture and edit while encoding, for example.

Replace with a New Path. Use Replace with New Path to specify a network path to the media file when the Final Cut Pro system accessing them is on a system other than the one running Pipeline Control.

Copy File Publisher

The Copy File publisher can be used to copy a captured clip to another local or network location. Configuration settings include the destination of the copied file, options for when a file of the same name already exists and whether to append the date/time to the file name.

To select Copy File as a publisher, select Publish > Copy File. The following edit panel displays.

Figure 7–12. Copy File publisher allows you to duplicate just-completed clips.

Complete the panel and click OK. Save the document to save these settings. Make sure you test your configuration before putting the document into production.

Copy File To. Click to display the File System dialog, and select the folder where you want to copy the file.

If File Already Exists. Select what action to take if there is already a file of the same name in this folder: Replace the existing file, save the new file with a unique name, or don't copy the new file.

Append date and time to file name. The date and time is appended, in the format *YYYY-MM-DD HH-MM-SS.* For example, if the file *Pipeline10.MOV* was created on December 5, 2008 at 13:15 when copied, it would be named *Pipeline10 2008-12-05 13-15-00.MOV.*

Note

When using the Avid AAF+MXF wrapper, only the AAF/XML files will be copied.

Using the Pipeline Status Panel

The topmost panel on the left side of each Pipeline Control window is the Pipeline Status panel.

Figure 7–13. The status window displays current Pipeline activity.

***Status**. Displays status messages in preview, idle, playout, and capture mode.*

The status bar in the window displays the current Pipeline activity: Idle, Closing connection, establishing a connection, previewing, capturing, preparing, playing out, and progress when recording.

Figure 7–14. The status window displays progess when recordong.

***Status**. Displays progress when recording.*

USING THE VIDEO PREVIEW PANEL

The video preview panel displays video whenever a clip event is in progress (converting an SDI signal to a digital media file) and when a clip playout event is in progress (converting a media file to SDI), along with the current timecode of the Pipeline video, in HH:MM:SS:FF format. Scrubber control buttons are directly below the timecode control.

Disable Video Preview (by closing the panel) to decrease CPU load during capture or playout. You can also play local clip files (events that have already been captured) in the schedule. Hover over the event and select Play.

Figure 7–15. When playing a local clip, you can scrub it.

***Scrubber**. When playing a local clip, you can use the scrubber.*

When you play a local clip the timecode panel (directly below the preview panel) displays a scrubber instead of the status bar, and also displays the current timecode of the selected clip, in HH:MM:SS:FF format. When you play a local clip attached to an event a scrubber displays, so that you can use the preview scrubber to scrub to any point in the clip.

Figure 7–16. Use the Video Preview panel to view incoming and outgoing video streams.

***Video**. Displays video during playout and capture mode.*

***Playback Controls**. Only active when playing a local clip from the event schedule.*
***NOTE**: These controls have dual use. When connected to a device with RS-422 these buttons are used to control the device*

***Timecode**. Displays timecode in HH:MM:SS:FF format.*

***Connect**. Click to connect to the selected Pipeline for previewing video.*

Shuttle Wheel

Jog Wheel

When incoming video is being encoded and streamed from the Pipeline, you can preview the media. When Pipeline Control is in Capture or Playout mode, video that is being captured or played out may be displayed in the preview panel.

If you have more than one document window open, the previewed video frame rate is scaled back to prevent excessive CPU usage. Preview is played at full frame rate as long as the Pipeline host computer has one processor (or core) per 720 X 486 pixel frame being decoded.

Using the VTR Controls

To use the VTR, first click Connect to establish a session with the selected Pipeline.

Figure 7–17. You can use preview controls to control preview or play local clips.

Mark In. Click to set the mark in point – applies only in Log and Capture and Print to Tape documents.

Jump to Start. Click to rewind the clip to the start of clip.

Fast Reverse. Click to rewind at double speed.

Stop. Click to stop the clip or VTR.

Pause. When playing, click to pause the clip or VTR.

Play. When paused, click to play video at normal forward speed.

Fast Forward. Click to roll video forward at double speed.

End of Clip. Click to go to the end of the file.

Mark Out. Click to set the mark out point – applies only in Log and Capture documents.

Jog and Shuttle Wheels

Jog. Click and drag to roll the tape or local clip forward or reverse, frame by frame.

Shuttle. Click and drag to roll left and right, moving the tape reverse and forward, increasing in speed the farther from center you go. When you release the wheel, it returns to center and stops the tape. You can also click on the shuttle wheel to left or right of center to shuttle in small increments and then return to center. The further from center you click, the more frames you'll play, in either direction.

Using the Audio Preview Panel

Use the Audio panel when playing video to view the decibel output of up to 16 channels of audio.The volume meters depict the volume of the currently playing audio.

Figure 7–18. Volume meters display decibels in real time for each audio channel.

Disable Audio Preview (by closing the panel) to decrease CPU load during capture or playout. The scale of the meter is -72 dBFS to 0S dBFs.

Loading and Saving Clip List Files

In capture-oriented documents (all except the Print to Tape document), Pipeline Control enables you to load clip lists from an EDL or a Final Cut Pro XML Interchange file. You can also save a clip list you've made, in XML format. Loading and saving clip lists via files promotes interchange between applications and systems, without manually re-creating them. These interchange files can be used for time-shifting your work, to avoid performing the same actions multiple times, or to participate in workflow tasks with others.

For example, one person can define a list of clips, save the list as an XML file, and then pass the file on to someone else on the network who performs the actual capture.

To load a clip list, use one of the following menu items:

File > Import Pipeline EDL. Select to populate the clip list with entries from a Pipeline EDL file.

File > Import Final Cut Pro XML. Select to populate the clip list with entries from an EDL file in Final Cut Pro XML Interchange Format.

Pipeline Control displays an open dialog. Navigate to the location where the file you want to open is stored, select it, and click Open to load the clip list.

You can also save clip list entries as a file in Final Cut Pro XML Interchange Format.

File > Export Final Cut Pro XML. Select to save the clip list in Final Cut Pro XML Interchange Format.

Pipeline Control displays a Save dialog. Enter the name of the file to save, and select the location where you want to save the file. Click Save to save the clip list in XML Interchange Format.

XML Interchange Format can be generated from Final Cut Pro, or any other application that supports this format. XML Interchange Format is the file format that Pipeline import/export or capture/playout programs load from and save in, in order to promote interoperability with other applications. Clip list files can also be generated and/or edited manually.

For further details, refer to Apple's documentation on XML Interchange Format:

http://developer.apple.com/library/mac/#documentation/AppleApplications/Reference/FinalCutPro_XML/AboutThisDoc/AboutThisDoc.html

Setting Preferences

Use the Preferences panels to set up Pipeline Control the way you want to use it.

Capture Preferences

Figure 7–19. Capture Preferences

Default File Naming Conventions. Enter a phrase to use as the basename for new video files and any token types. Token types can be Date, Time, Mark In (inclusive First Frame TC), Mark Out (exclusive Last Frame TC), Counter (increments by 1), Pipeline (name), Tape (name), Codec and Frame Rate. The use of date and counter ensures unique names.

Schedule - Ignore Lost Frames. When checked, a capture session continues even if frames have been lost. If unchecked, the capture session aborts when any lost frames occur. This setting applies to Schedule documents only.

Trigger - Maximum number of clips displayed in clip history. Use slider bar to limit the number of events stored in trigger history (1 to 100). This list is configured FIFO (first in first out). Default is 100 events. This setting applies to Trigger documents only.

Offset. Set the offset size (in number of frames): minimum is -5 frames, maximum is +5 frames, default is 0 frames. Since frames can occur early or late, depending on the deck used, this adjustment offsets the capture based on the number of frames chosen. It also compensates for decks that are not 100% frame accurate (or for systems with routing latency compared to the timecode). This adjustment must be made by a process of trial and error.

Playout Preferences

Figure 7–20. Playout Preferences

Queue Size. Set the queue size (number of frames). The minimum is 8 frames and the maximum is 22 frames. The default is 22 frames, in order to provide the most reliability.

During playout, the Pipeline queues frames in memory to compensate for network latencies. If queue size is set for a large number, it can 'ride out' higher transient latencies. However, a large number also introduces a longer delay between the time the frame is emitted and the time that the frame appears on the SDI connection (about 1/4 second for 8 frames, up to about 3/4 second for 22 frames).

If you are concerned with latency between the time video is exported from the computer and the time it is sent out the Pipeline, you should adjust the value lower. However, lowering this value makes the connection more susceptible to errors due to insufficient CPU power or network bandwidth.

Offset Size. Set the offset size (number of frames). The minimum is -5 frames and the maximum is +5 frames. The default is 0 frames.

Frames can occur early or late depending on the deck used. This adjustment offsets the playout based on the number of frames chosen and compensates for decks that are not 100% frame accurate to the timecode provided. This adjustment is made by a process of trial and error.

Note

Not Applicable to Crash mode playout.

Ignore Lost Frames. When checked, a playout session continues even if frames have been lost. If un-checked, the playout session aborts when any lost frames occur.

Device Preferences

Figure 7–21. Device Preferences

Preroll Duration. Specify the seconds to preroll video from start timecode during import operations.

Postroll Duration. Specify the seconds to postroll video from end timecode during import operations.

Automatically Eject Tapes. Check to have Pipeline Control eject the tape when capture is complete, if another tape is required.

Update Preferences

Figure 7–22. Update Preferences

The Update panel displays the current version, the last time the Telestream Web site was checked for availability of an update, and to determine when to check for updates from the Web site.

Check for Updates. Select Daily, Weekly, Monthly, or Never, to check for application updates.

Check Now. Click Check Now to check Telestream's Web site for application updates right now, and let you know if Pipeline Control is up to date or updates are available.

Using the Diagnostics Panel

The diagnostics panel is for advanced users as an aid to providing easy access to a Pipeline device's diagnostic and administration interfaces during trouble shooting and technical support. The diagnostic panel provides debugging information about Pipeline hardware and Pipeline Control that may be useful to Telestream Customer Service (Obtaining Pipeline Support | Information | Assistance (page i)).

For more details on troubleshooting, see Appendix A, Troubleshooting (page 157).

Figure 7–23. Diagnostics window provides advanced information.

The Pipeline Console text box displays debug information produced by the Pipeline firmware, which is useful in debugging by providing a glimpse at the firmware perspective of the system.

During capture operations an emptierbuffer is better; for playout, fuller is better. The RAM meter displays the percentage of the video or audio (which ever is more full) frame buffer that is currently full, as well as a high-water mark that displays the largest size the buffer has been in the last five seconds.

During normal operations, the meter displays green. If the meter displays yellow, marginal conditions exist; red indicates that Pipeline Control is likely to underflow/overflow the buffer, which will cause the current operation to abort.

If disk buffering is enabled (available for certain wrapper formats), the Disk meter displays how much data (as a percentage) is remaining to be transferred to its final destination (see Disk Buffering, below). When this grows, it indicates that Pipeline Control is no longer able to write to the final destination at the same speed it is receiving the data, which is usually caused by a network or I/O issue.

Supported File Formats/Wrappers

Storage Models

The Pipeline's application software implements a variety of media wrapper formats. These wrapper formats are described below and include TIFO, QuickTime (Open and Closed), Avid AAF+MXF, MXF OP1a, XDCAM MXF OP1a.

Each wrapper format has different requirements of, or assumptions about the storage system used to capture and playback the media.

The storage requirements and application of a wrapper format are collectively defined by a storage model. This section describes the storage models used by the Pipeline application.

Direct Attached Storage (DAS) Model

This storage model is employed by wrapper formats that require:

- The ability to seek to random points within the file.
- The ability to disable or control the zero-fill behavior of the file system.
- No buffering by the application to achieve optimal I/O performance.

Storage Area Network (SAN) Model

This storage model is used in high performance capture applications. Wrapper formats that implement this model make the following assumptions:

- The wrapper file can be sequentially constructed.
- Optimal performance is achieved by writing to the file in large (> 1 MB) sequential blocks.
- The zero-fill behavior of the file system cannot be disabled.

Network Attached Storage (NAS) Model

This storage model is used in applications where the capture destination is a network attached file system (NFS, Samba, etc,) and when the network bandwidth or performance of that file system is unpredictable.

In this model the media is captured to a temporary file with the assumptions defined by the SAN model. The temporary file is then sequentially (and concurrently) delivered to the target file system as network bandwidth allows. When the media is successfully delivered to the target file system the temporary file is removed.

This storage model require is enabled by selecting Disk Buffering within the Wrapper selection dialog.

Format Wrappers

Pipeline Control supports several industry-standard and proprietary wrappers: TIFO, QuickTime (Open and Closed), Avid AAF+MXF, Generic MXF, and XDCAM MXF.

Telestream Intermediary Format (TIFO)

TIFO files can be transcoded with FlipFactory or Episode Engine as they are being captured. This wrapper type can be used with Pipeline Control's FlipFactory or Episode Engine publish plug-in to enable real time transcode while capturing. (For details, see FlipFactory Publisher (page 99) and Episode Engine 5.x Publisher (Mac OS X only) (page 102)).

The same workflow can be achieved on Windows by using Episode Engine's Pipeline File monitor, which is an input monitor that transcodes TIFO files as they're written.

Telestream Intermediary Format (TIFO) is an intermediate media wrapper format designed by Telestream as a uniform, interchangeable file format to ensure interoperability among Telestream's media processing solutions, including FlipFactory, Episode, and Pipeline. TIFO provides a lightweight, low-overhead wrapper that is essence-agnostic, with out-of-band metadata, timecode, and closed caption support.

Using TIFO improves the ability to move media files between Telestream's media processing solutions with all media essence elements and metadata intact, preserving the widest range of transcoding options.

Workflow Considerations

TIFO format should be used when you are transcoding your files with FlipFactory or Episode. TIFO files are unique, in that they can be transcoded as they are being captured in FlipFactory and Episode Engine, enabling you to create multiple output files in real-time. TIFO files can be processed by Episode Desktop when they have been closed. TIFO files can also contain metadata such as closed captions and timecode, which can be processed by FlipFactory or Episode.

Storage Model. TIFO wrapper implements the SAN and NAS storage models (Storage Models on page 113).

Table 7–6. TIFO Format Summary

Video	Motion JPEG-A, DV, DVCPro, IMX, MPEG2-I-Frame, DVCProHD, ProRes, DNxHD, Uncompressed
Audio	16 channels, 16/24 bit, 48 kHz
Timecode	Video sample header
Closed captions	Video sample parameter ("ATOM")
Ancillary data	Video sample parameter ("ATOM")

Usage Considerations

TIFO files are a Telestream proprietary format and are not playable or readable by non-Telestream applications. You should only use TIFO format if your workflow requires processing by Telestream workflow automation applications. The maximum length of a TIFO file is 9 hours.

QuickTime

QuickTime (Open) files can be edited in Final Cut Pro as they are being captured. Because of this characteristic, the length specified in the QuickTime file header is set at the beginning of the capture event. If the captured event stops before the predetermined time, the QuickTime file retains the initial length.

Note

Although the file retains the initial length, the file's size is determined by the actual captured media.

Although Open QuickTime files can be played while capturing, the behavior of QuickTime is different between Mac OS X and Windows. In Mac OS X, the QuickTime clip can be played to the current point of capture. In QuickTime for Windows, the clip can only be viewed to the point that had been captured when the clip was opened in QuickTime. This is a limitation of QuickTime for Windows.

For example, when a Pipeline is capturing media to a network share, in Mac OS X you can open the clip in QuickTime and play it to the current point of capture. However, if the same clip is opened in QuickTime for Windows it can only be viewed to the point that had been captured *at the moment the clip was opened*.

Closed QuickTime files can't be opened while they are being captured. Use closed QuickTime files if you do not plan to edit or review (playing out in QuickTime player) while capturing. Use closed QuickTime files when crash recording an event, and a specific duration is not known in advance.

If 608 closed captions are available in the source during capture, they are automatically embedded into a QuickTime closed caption track. When played in QuickTime Player, the closed caption data is overlaid on the player display by selecting Show Closed Captioning in the View menu.

Figure 7–24. QuickTime File Configuration

QuickTime (Open)

Workflow Considerations

Use Open QuickTime files if you will be editing or reviewing (playing out in QuickTime player) while capturing. Be aware of the disk I/O implications of this workflow by reading Workflow System Requirements (page 30).

Note

When writing files to a shared folder on a computer, the security settings must allow full read/write for the user accessing the file for edit.

Storage Model. QuickTime Open wrapper implements the SAN and NAS storage models (Storage Models on page 113).

Table 7–7. QuickTime Open Format Summary

Video	Motion JPEG-A, DV, DVCPro, IMX, MPEG2-I-Frame, DVCProHD, ProRes, DNxHD, Uncompressed
Audio	16 channels, 16/24 bit, 48 kHz, 1/2 channels per track
Timecode	Timecode ('tmcd') track
Closed captions	Closed caption ('clcp') track, EIA-608 caption data
Ancillary data	Essence storage only

Table 7–8. QuickTime Open Applicable Standards

Standard	Title
IEC 14496-14	MP4 File Format
	QuickTime File Format Specification

Usage Considerations

The maximum length of an open QuickTime file is 9 hours. When using a Schedule document in Pipeline, an event can't exceed 9 hours. Capturing an open QuickTime in a Trigger document without first specifying a duration results in a QuickTime file that reports a duration of 9 hours, no matter how long the actual recorded event is.

QuickTime (Closed)

Workflow Considerations

Closed QuickTime files can't be opened while they are being captured. Use closed QuickTime files if you will not be editing or reviewing (playing out in QuickTime player) while capturing. Use closed QuickTime files when crash recording an event, and a specific duration is not known in advance.

Storage Model. QuickTime Closed wrapper implements the SAN and NAS storage models (Storage Models on page 113).

Table 7–9. QuickTime Closed Format Summary

Video	Motion JPEG-A, DV, DVCPro, IMX, MPEG2-I-Frame, DVCProHD, ProRes, DNxHD, Uncompressed
Audio	16 channels, 16/24 bit, 48 kHz, 1/2 channels per track
Timecode	Timecode ('tmcd') track
Closed captions	Closed caption ('clcp') track, EIA-608 caption data
Ancillary data	Essence storage only

Table 7–10. QuickTime Closed Applicable Standards

Standard	Title
IEC 14496-14	MP4 File Format
	QuickTime File Format Specification

Usage Considerations

The maximum length of a closed QuickTime file is 9 hours. When using a Schedule document, no event can exceed 9 hours. Capturing a closed QuickTime file in a Trigger document without first specifying a duration (or specifying a duration longer than 9 hours) always results in a 12-hour QuickTime file.

Avid AAF+MXF

Workflow Considerations

Avid AAF+MXF produces MXF Operational Pattern Atom (OPAtom) files compatible with Avid professional edit systems. Avid AAF+MXF can be used with DV25, DVCPro HD, IMX or DNxHD (VC-3) video essences. Avid AAF+MXF creates a unique set of files consisting on an AAF master clip file and individual MXF files for video and audio. The AAF file and associated media files can be delivered into separate folders that are specified in the Avid AAF+MXF selection dialog. Avid AAF+MXF files can't be opened while they are being captured.

Use Avid AAF+MXF when your workflow requires compatibility with Avid edit systems.

Storage Model. Avid AAF+MXF wrapper implements the DAS storage models (Storage Models on page 113).

Table 7–11. Avid AAF+MXF Format Summary

Video	DV, DVCPro, DVCProHD, IMX, DNxHD
Audio	16 channels, 16/24 bit, 48 kHz, PCM
Timecode	SMPTE 377M timecode track
Closed captions	Essence storage only
Ancillary data	SMPTE 436M ANC track/atom

Table 7–12. Avid AAF+MXF Applicable Standards

Standard	Title	Notes
SMPTE 377M-2004	Material Exchange Format (MXF)	
SMPTE 390M-2004	MXF Operational Pattern Atom	
SMPTE 382M-2007	Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container.	Each channel contained in a separate AES3 track/atom.
SMPTE 383M-2008	Mapping DV-DIF Data into the MXF Generic Container	Defines clip-wrapped DV-DIF essence.
SMPTE 386M-2004	Mapping Type D-10 Essence Data to the MXF Generic Container	Clip-wrapped D-10 is not defined (Avid is 2KB KAG padded, Apple is 512B KLV filled).
SMPTE 436M-2006	MXF Mappings for VBI Lines and Ancillary Data Packets	
SMPTE 2019-4-2008	Mapping VC-3 Coding Units into the MXF Generic Container	Defines clip-wrapped VC-3 essence.

Usage Considerations

The Avid AAF+MXF file wrapper can't be used in conjunction with Pipeline Control's Disk Buffer feature. Take extra care when writing Avid AAF+MXF files to shared disk subsystems. See Workflow System Requirements (page 30).

The maximum length of an Avid AAF+MXF file is 9 hours. When using a Schedule document, no event can exceed 9 hours. Capturing Avid AAF+MXF files in a Trigger document without first specifying a duration always results in Avid AAF+MXF files that report the exact duration of the recorded event.

Generic MXF OP1a

Workflow Considerations

Generic MXF produces an MXF Operational Pattern 1a (OP1a, SMPTE 379M-2004) file with a generic container mapped to DV25, DVCPro HD, IMX or DNxHD (VC-3) video essence. Generic MXF files can't be opened while they are being captured.

Use Generic MXF when your workflow requires the video and audio essence to be wrapped in a single file meeting the SMPTE 379M-2004 generic MXF specification. To produce an MXF D-10 file use Generic MXF in conjunction with the IMX video codec.

Storage Model. Generic MXF OP1a implements both the SAN and NAS storage models. (Storage Models on page 113).

Table 7–13. Generic MXF Format Summary

Video	DV, DVCPro, DVCProHD	IMX	DNxHD
Audio	16/24 bit, 48 kHz		
	16 channels	8 channels	16 channels
	PCM	PCM	PCM
Timecode	SMPTE 377M Timecode track		
	SMPTE 385M System item		SMPTE 405M System item
Closed captions	Essence storage only		
Ancillary data	SMPTE 436M ANC track		

Table 7–14. Generic MXF Applicable Standards

Standard	Description	Note
SMPTE 331M-2004	Elements and Metadata Definitions for SDTI-CP	
SMPTE 377M-2004	Material Exchange Format (MXF)	
SMPTE 378M-2004	MXF Operational Pattern 1a	
SMPTE 379M-2004	MXF Generic Container	
SMPTE 382M-2007	Mapping AES3 and Broadcast Wave Audio into MXF Generic Container	DV (AES3), DNxHD (BWF)
SMPTE 383M-2008	Mapping DV-DIF Data into MXF Generic Container	DV
SMPTE 385M-2004	Mapping SDTI-CP Essence and Metadata into MXF Generic Container	DV, IMX
SMPTE 386M-2004	Mapping Type D-10 Essence Data to MXF Generic Container	IMX
SMPTE 394M-2006	System Scheme 1 for MXF Generic Container	DNxHD
SMPTE 405M-2006	Elements and Individual Data Items for MXF Generic Container System Scheme 1	DNxHD
SMPTE 436M-2006	MXF Mappings for VBI Lines and Ancillary Data Packets.	
SMPTE 2019-4-2008	Mapping VC-3 Coding Units into MXF Generic Container	DNxHD

Usage Considerations

The maximum length of a Generic MXF file is 9 hours. When using a Schedule document, no event can exceed 9 hours. Capturing a closed Generic MXF file in a Trigger document without first specifying a duration always results in a Generic MXF file that reports the exact duration of the recorded event.

XDCAM MXF OP1a

Workflow Considerations

XDCAM produces an MXF Operational Pattern 1a (OP1a) file compatible with Sony XDCAM MXF and is limited to DV25, DVCPro, and IMX video essences. XDCAM files can't be opened while they are being captured. Use XDCAM when your workflow requires the video and audio essence to be wrapped in a single file compatible with Sony XDCAM MXF. Use XCDAM MXF when capturing OP1a clips that you want to import into an Avid system.

Storage Model. XDCAM MXF Op1a wrapper implements the DAS storage models (Storage Models on page 113).

XDCAM MXF OP1a Format Summary

Video	DV, DVCPro	IMX
Audio	2, 4, and 8 channels, 16/ 24 bit, 48 kHz	
Timecode	SMPTE 377M Timecode track	
	SMPTE 385M System item	
Closed cap-tions	Essence stor-age only	
Ancillary data		SMPTE 385M Data item

Table 7–15. XDCAM OP1a Applicable Standards

Standard	Description	Note
SMPTE 331M-2004	Element and Metadata Definitions for the SDTI-CP	
SMPTE 377M-2004	Material Exchange Format (MXF)	
SMPTE 378M-2004	MXF Operational Pattern 1a	
SMPTE 379M-2004	MXF Generic Container	
SMPTE 385M-2004	Mapping SDTI-CP Essence and Metadata into the MXF Generic Container	DV, IMX
SMPTE 382M-2007	Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container	DV
SMPTE 383M-2008	Mapping DV-DIF Data into the MXF Generic Container	DV
SMPTE 386M-2004	Mapping Type D-10 Essence Data to the MXF Generic Container	IMX
SMPTE RDD03	eVTR MXF Interoperability Specification	DV, IMX

Usage Considerations

The XDCAM file wrapper can't be used in conjunction with Pipeline Control's Disk Buffer feature. Take extra care when writing XDCAM files to shared disk subsystems. See Workflow System Requirements (page 30).

The maximum length of an XDCAM file is 9 hours. When using a Schedule document, no event can exceed 9 hours. Capturing an XDCAM file in a Trigger document without first specifying a duration always results in a XDCAM file that reports the exact duration of the recorded event.

CHAPTER 8

Using Schedule Documents

Use this chapter to learn how to use Pipeline Control to create schedules for capturing media from Pipeline and for playing media out on Pipeline. Capturing or playing media on a schedule is achieved using the Schedule document.

You can only play out schedule documents in Pipeline Control for Mac OS X, and video must be in QuickTime format, with essences of any supported SD codec in the selected Pipeline.

Topics

- Using The Schedule Window (page 124)
- About Schedules (page 125)
- Creating Capture Schedules (page 126)
- Creating Playout Schedules (page 127)
- Using the Schedule Panel (page 128)

Using The Schedule Window

The Schedule document is designed to facilitate the creation of clip capture and playout schedules.

Figure 8–1. Schedule Window panels and toolbars.

Each window displays several panels, each designed to help you perform the tasks the window was designed for. Each panel, toolbar, and feature is described below. For details on how to use the Pipeline Settings panel and all panels and controls on the left, see Chapter 7, Using Pipeline Control (page 85).

The schedule window is composed of a 24-hour schedule panel (on the right), and video/audio, state and diagnostics panels on the left. You can open multiple windows at a time.

About Schedules

A *schedule* is a list of one or more clip events to be processed in a recurring 24-hour period. Each schedule also has information about Pipeline selection and settings, and optional publisher specifications. Each schedule is displayed in a different window in Pipeline Control. Because Pipeline Control is a multi-document application, you can open, edit, and execute (in playout or capture mode) several schedules at the same time. The number of media files you can capture or play out simultaneously is based on the power of the CPU and disk write or read speed in your computer and your network bandwidth (Disk and Network Requirement by Media Format on page 41).

Creating Schedules. To create a schedule, select File > New Schedule to display a new schedule window. To save a schedule, select File > Save or Save as, name the document and select a folder to save it in. When you save a schedule, it is saved as a document. You can copy Pipeline Control documents and move them to other folders or other computers. You can treat Pipeline Control documents just like you do any other document.

When you close a schedule window, if it hasn't been saved before, you'll be asked to name it. If you've changed it, you'll be asked if you want to save changes

Note

Active schedules must first be deactivated to close them. You may be interrupting a clip event, so check first.

Each schedule contains several important groups of information: a selected Pipeline and its settings, plus a list of one or more clip events arranged in a 24-hour timeline, along with their file names and optional metadata, and optional publishers. Pipeline Control uses the schedule information to execute each clip event at the correct time, to either capture the clip, or play out the clip.

Schedules are Symmetrical. That is, if you *capture* a given schedule, Pipeline Control runs the schedule and ingests encoded media from a specific Pipeline's SDI port based on the clip events you've created in the schedule, and saves it as a specific type of file, based on your settings. You can also *play out* the same schedule and the reverse occurs: each file you specify with a clip event is opened at the correct time and the media is played out to the specified Pipeline for decoding and playout as SDI.

You can make as many schedules as you need to organize your workflows and tasks efficiently. You might create schedules for each Pipeline you're using, or you might create schedules for a specific set of clips you need to capture or play out each day (or work shift). Or, you can create schedules based on how you want the media encoded, for use in an edit system, for example.

Pipeline Control automatically reconnects a schedule document if network connectivity or video signal is lost, and continues processing events. If an event is being recorded or played out, the file (or output of the file) is invalid.

Creating Capture Schedules

A *capture* schedule is a schedule with one or more clip events, which you use to capture SDI video in real time. The SDI video is converted to a specific media format, depending on the codec you specify in Pipeline Control, and saved as a digital media file in the wrapper/file format you select in Pipeline Control.

Use these steps and use a capture schedule:

1. If Pipeline Control isn't running, start it now (Starting Pipeline Control on page 87).
2. Create a new, untitled Schedule document (Select File > New Schedule) if one isn't open.
3. Select the Pipeline device which is supplying the video feed you want to capture (Selecting a Pipeline (page 91)).
4. Select the video codec and configure it to meet your video encoding requirements (Selecting and Configuring a Video Codec (page 97).
5. Likewise, configure the audio codec to meet your audio encoding requirements (Selecting and Configuring the Audio Codec (page 97).
6. Specify your timecode clock source (Selecting a Timecode Clock Source (page 97)).
7. Select your wrapper (file) format (Selecting a Wrapper (page 92)), configure it, and specify the storage location where you want your media clips saved.
8. Set up handles as necessary (Setting up Handles (page 98)).
9. Optionally, select and configure a publisher to perform additional actions as part of a workflow (Selecting a Publisher (page 98)).
10. Save your schedule and name it, then continue.
11. Add one or more clip events to the schedule (Creating Clip Events (page 129)). Each clip has a start time and a duration.
12. For each clip, enter a file name if you want it to be different than the default, and optionally, select a metadata label and enter metadata (Editing a Clip Event's Property Sheet (page 130)).
13. Save the schedule.
14. Click Capture to place the schedule into capture mode.
15. Pipeline Control displays the incoming video stream – verify the stream is what you expect. Pipeline Control waits for each clip event, and saves each clip as a file in the essence and format you specify.

Creating Playout Schedules

A playout schedule is a schedule created with the intent of decoding the media in QuickTime files on a Pipeline device, and converting them to SDI for playout in real time.

You can only create play out schedules in Pipeline Control on Mac OS X. Pipeline Control for Windows does not support scheduled play out.

SD QuickTime files containing supported video formats are capable of playout by Pipeline Control. Audio must be uncompressed linear PCM 16 or 24 bit (Little or Big Endian), in mono or stereo tracks.

Audio formats can be mixed in a playout schedule. For example, you can have one clip with 24 bit Big Endian in dual mono, and another with 16 bit Little Endian in stereo. However, you can not mix audio formats in a single clip and you must have at least the number of audio channels that you want to play out (you can have more).

Use these steps to create and use a playout schedule:

1. If Pipeline Control isn't running, start it now (Starting Pipeline Control on page 87).
2. Create a new, untitled Schedule document (Select File > New Schedule) if one isn't open.
3. Select the Pipeline device which you want to use to playout your video clips as SDI (Selecting a Pipeline (page 91)).
4. Select the video codec and configure it to meet your video decoding requirements (Selecting and Configuring a Video Codec (page 97)).
5. Likewise, configure the audio codec to meet your audio decoding requirements (Selecting and Configuring the Audio Codec (page 97)).
6. Specify your timecode clock source (Selecting a Timecode Clock Source (page 97)).
7. Optionally, select and configure a publisher to perform additional actions as part of a workflow (Selecting a Publisher (page 98)).
8. Save your schedule and name it, then continue.
9. Add one or more QuickTime files as clips to the schedule (Creating Clip Events (page 129)).
10. Save the schedule.
11. Click the Play button to place the playout schedule into play mode.

Now, Pipeline Control displays the outgoing video stream. Pipeline Control waits for each clip event, reads the media file, and delivers each clip's media in real-time to the Pipeline, which decodes it and plays it out as SDI.

Using the Schedule Panel

The schedule panel (on the right side of the window) is a vertically-oriented view of a 24-hour period. A time scale displays on the left, with space on the right to add clip events. The time is controlled by the timecode clock source you specify.

Figure 8–2. The schedule panel allows you to create clip events.

Schedule/List View. *Click to display the full event list in schedule view or just display the list of clip events.*

Clip Event. *Click and drag to create a new event or drop a file onto the schedule from the Finder.*

Event Menu. *Enables you to delete an event, edit it, or show the enclosing folder in the Finder.*

Schedule Toolbar. *Provides buttons for frequently used functions.*

Event Timer. *Indicates current time in schedule.*

Capture, Idle, and playout buttons.

At the far left is a toolbar with buttons for frequently used functions. Above the event area is a Schedule/List view button that enables you to display the complete schedule or just a table of events.

You add clip events by clicking and dragging in the schedule (for capture) or by dragging and dropping a file onto the schedule (for playout) from the Finder. Each file you add is checked to make sure that the file contains supported audio and video tracks, or it is rejected.

Figure 8–3. Clip events in your schedule provide details about the clip.

Status Badge*. Indicates the state of the clip in real time.*

Title*. Displays the start and end time, and name of clip.*

When you add a new clip event, it snaps to a preset block of time based on how far you are zoomed in on the schedule. A capture clip event only displays the time and name of the clip in the title. Once the event has been captured, a file is associated with the clip event, so it displays a Play icon in the body when you hover over it.

When you add a *local* file to a schedule (by dragging it onto the schedule), it also creates a clip event. When you hover over the clip, it immediately displays a Play icon in the body. Click the Play icon to preview the clip.

You can resize a clip (up to 9 hours long) by dragging either the top or bottom and resizing it. When you resize a clip, it snaps to preset time lengths (half hour, quarter hour, five minutes, or one minute, depending on the magnification of the schedule.

To snap to preset lengths at half the displayed time scale press the control key while resizing the clip. You can zoom in to increase your view of the schedule with greater detail (but with smaller clip lengths). You can also edit the time down to the second by double-clicking on the clip event title to display its property sheet.

If you adjust the time of a clip event which is currently associated with a file and execute the event in playout mode, the file will play when the clip event is scheduled to start. It will end at the actual end of file or at the end of the clip event, whichever is shorter.

Schedule Panel Keyboard Shortcuts

You can work with clips in your schedule using the following keyboard shortcuts:

Delete. Deletes the selected clip event

Left Arrow. Select the previous clip event

Shift+Left Arrow. Select the first clip event

Right Arrow. Select the next clip event

Shift+Right Arrow. Select the last clip event

Up Arrow. Move the selected clip up the schedule by the current block size (half hour, quarter hour, minute, thirty seconds, etc.), based on your current zoom increment.

Down Arrow. Moves the selected clip event down by the current block size.

Home. Scroll to the top of schedule.

End. Scroll to the bottom of schedule.

Creating Clip Events

To add a clip event to a schedule, choose one of several actions:

- Move your cursor into the schedule panel and position it at the approximate start time. Now, click and drag downward for a maximum of 9 hours or until the end of the clip event (you can adjust the time accurately later) and release the button.
- Open a folder on your computer or LAN server and drag and drop media files (those that can be opened with QuickTime) onto the schedule panel, at any time position that doesn't overlay other clips already on the schedule. Clip events that are attached to a file are titled with the file name.
- Drag a clip from one schedule to another, if the clip has already been captured.
- Click the Add Clip icon (the plus sign icon) at the top of the schedule toolbar or select Clip > Add.

Once a clip has been placed on the schedule, you can drag it up and down the timeline (by clicking in the body of the event – not the title) to change the start/stop time. Or, open the property sheet (double-click the title) and adjust the start and stop time. You can't create a single clip event lasting longer than 9 hours.

You typically create new clip events directly in the event panel, when you're creating a capture schedule. You typically create new events by dragging and dropping, when you're creating a playout schedule. When clips are captured, they are saved in the folder specified by the storage location.

You can move a clip by clicking in the body of the clip event and dragging it up or down. This avoids the necessity of moving a clip by adjusting both the start and stop times correctly. You can't overlap clip events on a schedule.

To play a local clip (directly on your computer, SAN, or connected server), hover the mouse over the clip event and click the Play button that displays. If the file exists and is accessible, it plays in the preview area.

Deleting Clip Events

To delete a clip you've selected, choose one of several actions:

- Press the Delete key on the keyboard
- Click the X icon to the left of the schedule
- Right-click and select Delete from the context menu.

Deleting a clip does not delete an associated file, if one is present.

Showing Media in Finder

When an event in the schedule is connected to a local file, you can open the folder that contains the file directly. Select the event. Then, control-click and select Show Storage Location in Finder. Pipeline Control sends a command to the Finder to display the clip in the enclosing folder.

Editing a Clip Event's Property Sheet

Each clip event has its own property sheet. To display a clip event's property sheet:

- Double-click in the event's title bar
- Select the clip and click the *i* icon in the toolbar to the left of the timeline
- Right-click to display the context menu and select Edit Properties.

Viewing and Updating General Properties

To view or update the general properties of a clip event, double-click in the clip event's title, then click the General tab to display this sheet.

Figure 8–4. Clip event general properties – file name, start/end time, event color.

***Analog Clock**. Click and drag the hour, minute, and second hands to adjust the start and stop time.*

***Link**. Click to maintain the duration, linking the two clocks together. When in Link mode, adjusting one clock causes the other to adjust automatically, maintaining the duration.*

***Digital Clock**. Select and edit the hour, minute, and second value to adjust the start and stop time.*

***Clip Name**. Enter or edit the clip name for this clip.*

***Color**. Select the color you want to represent this clip event in the schedule panel.*

Start and End Time. Edit the digital clock (or the analog clock, by clicking and dragging the hour, minute and second hands) to adjust the start and end times of the clip event.

Link. Check Link to adjust the start or end time while maintaining the duration.

Name. Enter the name of the clip and/or naming tokens using the pull-down menu.

Color. Select a color to display in the schedule panel for this clip event.

Click OK to save your changes or click Cancel to leave them unchanged.

Viewing and Updating Metadata Labels

To view or update the label values of a clip event, double-click in the clip title on the schedule; then click the Embedded or Final Cut Pro tab to display the appropriate sheet.

There may be more than one metadata label. The Embedded label is always available; others (including Final Cut Pro, and QuickTime) are dynamically generated as appropriate.

Values you enter in the Embedded label are embedded in the file that is created.

Figure 8–5. Clip event label values.

***Label Sets**. Select the label set you want to use for this clip.*

***Labels**. The labels for the selected set display in this table. Enter or update the label values in the right column.*

Values. Edit each value as appropriate for this clip.

Click OK to save these values or click Cancel to leave them unchanged.

The Schedule Mode Toolbar

Use the schedule mode toolbar to place the schedule into a specific mode. Schedules have three modes.

Figure 8–6. Use the Schedules Mode toolbar to place the schedule into various states.

***Capture Mode**. Click to start the schedule in capture mode. Clip events are executed by creating the file if necessary and saving the media in it.*

***Idle Mode**. Click to stop the schedule and disconnect from the Pipeline, and change settings.*

***Playout Mode (Mac OS X only)**. Click to start the schedule in playout mode. Clip events are executed by opening pre-existing files and playing out their contents.*

Capture Mode. Click to place the schedule into capture mode. Clip events are captured as files as they occur in the schedule. In this mode, locks display on clips and you can't edit the schedule (add, edit, delete or play clips) or change your settings. When a clip event is executed in capture mode, the current settings in the Pipeline Selector and Settings panel are used, even if they are not saved. Pipeline Control does not automatically save settings. To save settings, select File > Save.

When you press Capture, Pipeline Control checks to make sure you have enough disk space for the clip events on your schedule.

Idle Mode. In idle mode, Pipeline Control is disconnected from the selected Pipeline and the schedule is de-activated. When the schedule is in capture, playout, or preview mode, you must click the Idle button before setting another mode. In idle mode, you can edit the schedule and change your settings.

Playout Mode (Mac OS X only). Click to place the schedule into playout mode. Clip events are played out to the Pipeline as they occur in the schedule. During the time that clips are not playing out (empty spaces in the schedule), Pipeline Control streams black filler video.

In playout mode, locks display on clips and you can't edit the schedule (add, edit, delete or play clips) or change your Pipeline settings. When a clip event is executed in playout mode, the current settings in the Pipeline Selector and Settings panel are used, even if they are not saved. Pipeline Control does not automatically save settings. To save settings, select File > Save.

For a schedule to remain active, the Pipeline Control application must be open, and the Schedule document must also be open. Additionally, your Macintosh drive must not be in sleep mode. Pipeline Control prevents the computer from automatically putting the hard drive to sleep, but it can not prevent you from selecting Sleep from the Apple menu, or pressing the power button. If the Pipeline Control application or the Schedule document is closed, or if your hard drive is in sleep mode, clip events aren't executed.

Using the Schedule Toolbar

The schedule toolbar displays vertically, on the left of the schedule panel. It provides easy access to various schedule commands you use to create and manage clip events.

Figure 8–7. Schedule Toolbar.

Add Clip. Use to add a new clip event. Each time you add an event, it is added as early in the schedule as possible, where space is available. The newly-created clip is automatically selected so that you can immediately display its properties and add metadata, or adjust start and stop times.

Information. Click to display the property sheet for the selected clip.

Review. Review the local clip.

Delete. Click to remove the selected clip event from the schedule. When you remove a clip event, the actual file that it references (if present) is left intact – it is not deleted.

Zoom In/Zoom Out. Use the top magnification glass icon to zoom in on your schedule, and use the bottom magnification icon to zoom out. You can also use the slider to dynamically zoom your schedule.

When you zoom out all the way, on most monitors you can view the entire schedule from an hourly perspective. As you zoom in closer and closer, you can view half and quarter hours, 5 minutes, one minute. Zoom to the magnification that is best for the size of clips you're working with.

Select and show the first clip. Click to select and zoom in on the first clip in the schedule.

Select and show the previous clip. Click to select and zoom in on the clip immediately prior to the currently-selected clip.

Go to Current Time. With the time source (Auto, RS422, etc.) and Pipeline selected, click to scroll the schedule so that the current time is as close to the center of the schedule as possible, so that it is visible. If you are not connected to a Pipeline device, Pipeline Control displays the schedule beginning at midnight.

Select and show the next clip. Click to select and zoom in on the next clip after the selected clip.

Select and show the last clip. Click to select and zoom in on the last clip in the schedule.

CHAPTER 9

Using Log & Capture Documents

Pipeline Control's log and capture document enables you to create and save clip lists, and capture media defined by the clips in various formats via Pipeline, independently of your video editing/encoding software.

You can use the Log & Capture window in Pipeline Control to create clip lists, then capture and encode each clip in any supported SD or HD format and any wrapper/file format directly from a Pipeline.

Note

When capturing media from Pipeline Quad, you can perform confidence monitoring to qualify your video. See Confidence Monitoring (page 56).

Topics

- Creating Clip Lists for Log and Capture (page 136)
- Using the Log & Capture Window (page 137)
- Using Log & Capture Controls (page 138)
- Using the Clip List Panel (page 139)

Creating Clip Lists for Log and Capture

To encode and capture media clips from a VTR, follow these steps:

1. **Create a New Log & Capture Window**. If a Log & Capture window isn't open, select File > New Log & Capture to create a new, untitled window or open an existing Log & Capture document.

   The Clip List panel, on the right, includes the General Tab for mark-in and mark-out points, several metadata tabs, plus the clip list at the bottom. For details, see Using the Clip List Panel (page 139).

2. **Select and Configure your Pipeline**. If you haven't already selected and configured Pipeline for this task, do so now. After configuring Pipeline for your workflow requirements, save the file. For details, see (Using The Pipeline Settings Panel (page 91)).

   Note

   If your Pipeline is in NTSC mode, DVCPro is selectable because from the NTSC video compression perspective, there is no difference between DV and DVCPro: both are 720x480, 25mbs using 4:1:1 chroma sampling.

   In PAL mode, DV compression is 720x576, 25mbs with 4:2:0. DVCPro compression is 720x576, 25mbs with 4:1:1. Therefore, both DV and DVCPRO display in the list.

   ---

3. **Connect to the Pipeline.** When you connect, streaming media (if present) displays in the video panel. If you're connected to a VTR and it is in Remote mode, you can control your video using the VTR controls and produce clips to be encoded and imported.

4. **Create a Clip List**. Insert tapes in your VTR, then use the VTR controls to scrub media, create mark in and mark out points (General Tab), add metadata as necessary, then click the Log button to create the clip and add it to the list.

   If you want to capture clips from multiple tapes, enter the name of the tape (or category) in the General > Tape field for the clip you're creating. To capture clips from multiple tapes in one session, select All Tapes before clicking Capture. Before capturing clips, select the tape (or category) from the clip list on the left, to display the clips you want to capture. You can use the tape name to filter your list.

5. **Capture the Clips**. Click the Capture button below the clip list to capture the clips displayed in the clip list and save each one as a file. You will be prompted to insert the correct tape when necessary (if selected in preferences) and the previous tape will be ejected.

Using the Log & Capture Window

The Log & Capture window is similar to the schedule window: at the top is the Pipeline Settings panel, and to the left side is the Preview panel with connection, status, and timecode. VTR controls have added Mark In and Out buttons on either side. For details on how to use the Pipeline Settings panel and all panels and controls on the left, see Chapter 7, Using Pipeline Control (page 85).

Figure 9–1. Use the Log & Capture window to create clip lists and capture media from a VTR.

The right side of the window is specifically designed to support log and capture activities. It has tabs for general values, and metadata values. Below the tabs is the clip list, including tape names when logging clips from multiple tapes.

At the bottom center is the red Capture button.

Using Log & Capture Controls

In addition to the controls described in (Using the Video Preview Panel on page 107), the Preview panel in Log & Capture window has additional controls to support log and capture activities.

Figure 9–2. Timecode, VTR, Jog and Shuttle in the Log & Capture window.

VTR Tape Status Indicator

TAPE OUT *Displays when tape is out*

TAPE IN *Displays when tape is in*

Deck RS-422 Control Status

NO RS422 *Displays when Pipeline does not have control*

RS422 *Displays when Pipeline has control*

Mark In

Mark Out

Shuttle Control

Jog Wheel

VTR Remote Status Indicator

LOCAL *Displays when VTR is in Local mode*

REMOTE *Displays when VTR is in Remote mode*

VTR Tape Status

TAPE IN. Displays when a tape is in the attached VTR.

TAPE OUT. Displays when a tape is not in the attached VTR.

Deck RS-422 Control Status

NO RS422. Displays when Pipeline does not have control over the attached VTR.

RS422. Displays when Pipeline has control over the attached VTR.

Mark In/Out Buttons

Mark In. Click to update the Mark In point to the tape's current timecode.

Mark Out. Click to update the Mark Out point to the tape's current timecode.

VTR Remote Status

LOCAL. Displays when the VTR is in Local mode.

REMOTE. Displays when the VTR is in Remote mode.

Using the Clip List Panel

The Clip List panel displays on the right of the Log & Capture window – it includes the General Tab for mark-in and mark-out points, several metadata tabs, plus the clip list, and a Capture button below the list. Each of the tabs holds data for the selected clip.

Figure 9–3. The Clip List panel allows you to work with and capture clips.

Status Badges

Clip thumbnails are marked with status badges to help you identify the status of each clip at a glance.

Status Badge	Description
	Indicates that Pipeline Control attempted to capture the clip, but failed. This may be due to lack of storage, network or Pipeline problems, or excessive pre-roll at the beginning of a tape, for example. Resolve the problem and retry.
	During capture state only, this indicates that this clip has not been captured yet.
	Indicates that this clip is in the process of being captured.
	Indicates that this clip has been successfully captured.

Clip List Buttons

Mark In. Click to update the Mark In point to the tape's current timecode.

Duration. Click to disengage the lock (black). The duration is calculated as the end time minus the start time. While the lock button is disengaged (black), changes to the start timecode will cause the end timecode to remain the same, and the duration timecode to change. Any changes to the end timecode will similarly cause the start timecode to remain the same and the duration timecode to change.

Click again to engage the lock (blue). Duration always stays the same. When the lock button is engaged (blue), changes to the start or end timecode leave the duration timecode locked – as is. If you change the start timecode, the end timecode will adjust to match the new start time and the locked duration. If you change the end timecode, the start timecode will adjust to match the new end timecode and the locked duration.

For example, given a clip at 29.97 FPS, if the duration is set to 00:00:30;00 with the In point at 01:00:00;00, the Out point is 01:00:29;29. If the In point is changed to 01:00:10;00 the Out point will change to 01:00:39;29. Likewise, if the out point is changed from 01:00:39;29 to 01:00:49;29 the In point will change to 01:00:20;00.

A blue lock does not mean that the duration fields are locked (not editable). When the lock is blue, the duration value can be changed manually by entering a new duration in the duration fields.

Mark Out. Click to update the Mark Out point to the tape's current timecode.

Replace Thumbnail. Click to replace the current preview thumbnail with the frame currently displayed.

Remove Thumbnail. Click to remove the current thumbnail.

Clear All. Click to remove all data (name, timecode, and metadata, for example) from fields for the selected clip.

Save. In edit mode, click to permanently save the changed metadata values in the selected clip.

Log. In log mode, click to add the new clip to the clip list along with clip values and metadata. Make sure to use the correct tape name, if you're using multiple tapes.

Capture. (Red button at bottom or Control > Capture) Click to capture (play and encode) each clip for the currently tape name (or All Tapes) and save it as a file.

Pipeline Control captures clips by controlling the VTR via the Pipeline to encode the clip and stream each clip's media to Pipeline Control, which writes the media out to a file of the format/wrapper specified, and saves each file in the destination folder.

When the capture process completes, Pipeline Control disconnects from the Pipeline.

Creating a Clip

To create a clip, insert your tape, make sure the Pipeline is connected, and follow these steps:

1. Click the General tab to display mark-in and mark-out controls.
2. Play/scrub the video using the VTR controls, then click the Mark In button to mark the start timecode (at right of Mark In code value field in the General tab of the Clip List panel).
3. Click the Mark Out button to mark the end timecode (at right of end timecode value field). When you have a start and end timecode value (and the start timecode is previous to the end timecode).
4. Optionally, enter a start timecode and a duration – the end timecode will be calculated for you.
5. Optionally, enter metadata on the Embedded, Final Cut Pro, and FlipFactory tabs.
6. Click Log to create the clip and add it to the list.

When not in edit mode, any data entry or edits you perform in any tab is for the next clip you may create.

Deleting a Clip

To delete a clip, select it from the clip list and press the Delete key or select Clip > Delete. Deleting a clip does not delete the file associated with the clip, if any.

Editing a Clip's Metadata

To edit the metadata of an existing clip, you must double-click the clip (or click a clip and select Clip > Edit).

Note

When not in edit mode, any data entry or edits you perform in any tab is for the next clip you may create.

Pipeline Control displays caution tape at the top and bottom, to indicate that you're in edit mode:

Figure 9–4. The Clip List panel allows you to work with and capture clips.

Click on the target tab, and edit the values for each metadata tag.

Click Save to save the metadata with the clip and return to view mode.

CHAPTER 10

Using Trigger Documents

Pipeline Control's Trigger document enables you to manually or automatically capture media in real time from a live source or VTR. You can perform the capture process in three ways: manually, automatically via Web services and using Timecode Break.

Note

When capturing media from Pipeline Quad, you can perform confidence monitoring to qualify your video. See Confidence Monitoring (page 56).

Topics

- Using the Trigger Document (page 144)
- Using the Video Preview Panel's Controls (page 145)
- Using the Clip List Panel (page 146)
- Manually Recording Media (page 146)
- Setting up and Enabling Automatic Capture (page 148)
- Setting up and Capturing via Timecode Break Recording (page 148)

Using the Trigger Document

The Trigger document is similar to the Schedule window. Pipeline Control can record files of any supported profile in any format/wrapper, up to 9 hours in length.

Figure 10–1. The Trigger document captures video in real time.

Web service for automatic recording

Manual recording

Manual record button

Captured clip list

Activate / Deactivate the document for Web Service recording.

At the top is the Pipeline Settings panel, and to the left side is the Video Preview panel with connection, status, and timecode. For details on how to use the Pipeline Settings panel and all panels and controls on the left, see Chapter 7, Using Pipeline Control (page 85).

If your VTR is in remote mode, the VTR controls allow you to scrub media, and shuttle and jog controls are displayed directly below.

The right side is designed to support crash recording and automation. The clip panel has settings to enable and configure automatic and manual recording. In addition to Web Service and Manual there is a third trigger that starts new clips based on timecode breaks. Below is the clip list, which displays a list of all clips recorded in this window.

Pipeline Control automatically reconnects a Trigger document if network connectivity or video signal is temporarily lost, but it will not continue processing future events. The document will continue to process Web service events as they are received, after reconnecting.

Using the Video Preview Panel's Controls

In addition to controls described in Using the Video Preview Panel on page 107, the Video Preview panel in the Trigger document has additional controls. If an optional VTR is attached, you can use the VTR controls to view VTR status, and in Remote mode, control it.

Figure 10–2. Jog and Shuttle in the Trigger document's Video Preview panel.

VTR Tape Status Indicator

TAPE OUT *Displays when tape is out*

TAPE IN *Displays when tape is in*

Deck RS-422 Control Status

NO RS422 *Displays when Pipeline does not have control*

RS422 *Displays when Pipeline has control*

Shuttle Control

Jog Wheel

VTR Remote Status Indicator

LOCAL *Displays when VTR is in Local mode*

REMOTE *Displays when VTR is in Remote mode*

VTR Tape Status

TAPE IN. Displays when a tape is in the attached VTR.

TAPE OUT. Displays when a tape is not in the attached VTR.

Deck RS-422 Control Status

NO RS422. Displays when Pipeline does not have control over the attached VTR.

RS422. Displays when Pipeline has control over the attached VTR.

VTR Remote Status

LOCAL. Displays when VTR is in Local mode.

REMOTE. Displays when VTR is in Remote mode.

Using the Clip List Panel

The Clip List panel displays on the window's right side. It displays controls to enable and configure automatic (Web service) and manual recording, plus media clips you've recorded, a Record button, and an Activate button.

Figure 10–3. Clip list panel.

Manually Recording Media

To manually record – encode and capture media – from Pipeline in real time, follow these steps:

1. **Open a New Trigger document**. If a Trigger document isn't open, select File > New Trigger to display and create a new, untitled Trigger document. You can also click the Capture with Triggers icon in the Tasks dialog, which displays when you first start Pipeline Control.

   Or, you can open a previously-saved trigger document.

2. **Select and Configure your Pipeline**. If you haven't already selected and configured Pipeline for this task, do so now. After configuring Pipeline for your workflow requirements, save the document. For details, see (Using The Pipeline Settings Panel (page 91)).

3. **Set up your live feed**. Connect your live feed or insert tapes in your VTR.

4. **Enable Manual recording**. Check Manual to enable direct user-control of this document, specify the file name and, optionally, enter a duration. Use the VTR controls to scrub your media. ***NOTE***: When no

unifying token is used the record button becomes yellow and two warning signs alert the user that files may be overwritten.

Figure 10–4. Manual Recording settings panel.

Name and Duration. In the Name field, enter a text phrase and/or filename tokens to name the root file name (not including the suffix). Optionally, you can enter a duration for the amount of time Pipeline Control should record media to the file. Or, just click the Record button to stop recording when you choose.

5. **Activate the Document**. Click the Activate button at the bottom of the clip list to activate the document, enabling the Capture button.
6. **Capture the Video**. Click the Capture button in the manual trigger to capture the clip and display it in the clip list, saving it as a file. If you didn't supply a duration, click Capture again, to stop recording and log the clip. If you are using a VTR without RS-422 connected via RS-422, you need to manually put your VTR into play mode before capturing your video.

Setting up and Enabling Automatic Capture

To set up automatic recording, which is performed by HTTP GET requests from another application, check Web Service. Then, connect the feed or insert your tape, make sure the Pipeline is configured and connected. After you've set up your configuration (details below), click Activate to enable automatic recording.

Web Services and Port Number. Check Web services, and set the port number that the Web service should listen for incoming HTTP GET requests on. The port number value must be between 1025 and 49151, and the TCP port must be open on the host system.

You can record all formats and file wrappers in this manner, depending on your Pipeline settings. All files have a 9 hour maximum clip length.

Figure 10–5. Automatic Capture settings panel.

Enable/Disable automatic recording via Web service.

Specify the port number.

When the Web service is enabled and the Pipeline document is placed into an active state, the Web service begins listening for requests on the specified port. You're warned if the port is in use by another Trigger document or by some other service on the host computer.

Click Activate to cause the Web service to begin listening for HTTP GET requests. You can send HTTP GET requests to Pipeline Control to start and stop recording in the active document, (plus status requests) from a Web browser or custom applications that you develop.

Note

The response codes are sent as XML and HTTP response headers. The XML is viewable in a Web browser.

For more details on setting up automatic recording Web service and using the Pipeline Web Service API, see Appendix C, Pipeline Web Service Version 2.1 API on page 167.

Setting up and Capturing via Timecode Break Recording

To set up timecode break recording, which is performed by timecode breaks in the feed, connect the tape (or live feed) and make sure the Pipeline is configured and connected. After you've set up your configuration (details below), click Activate to enable timecode break recording.

Generally these tapes have been recorded using time of day timecode. Once activated the Timecode Break feature will create separate files when a break in the timecode is detected. To accommodate for dropped frames when the tape was recorded, a Frame Threshold parameter is available.

Name. The default file name is automatically entered based on the parameters set in Preferences. To change the file name, modify the basename and any token types desired. Token types can be Date, Time, Mark In (inclusive First Frame TC), Mark Out (exclusive Last Frame TC), Counter (increments by 1), Pipeline (name), Tape (name), Codec and Frame Rate. The date and counter tokens ensures unique names.

Max Duration. Max Duration is the maximum duration of any one individual clip. If the max duration is reached before a timecode break is detected any clip being captured will stop. The system will continue in capture mode and will start a new clip at the next timecode break. Max Duration default is 00:00:00:00 which allows for Max Duration of 9 hours.

Threshold. Enter the minimum number of frames between timecode breaks that trigger a new clip. For example. If the Threshold is set to 3, a new clip will be created when a break of 3 or more frames is detected. If a timecode break of less than 3 frames is detected, it will be ignored and capturing will continue until a time break of 3 or more frames is detected. Capturing can also end if the Max Duration is achieved for this clip, the end of tape is detected, or the Record button is selected which stops the capture session.

Note

When connected to a VTR via RS-422, the Timecode Break feature prevents files from being created when the VTR SERVO lock is disabled. This allows an operator to jog, shuttle, and otherwise move to an appropriate place on the tape before files are created.

CHAPTER 11

Using Print to Tape Documents

Pipeline Control's Print To Tape document enables you to implement various types of print to tape operations from media files played out via Pipeline to your VTR. You can use the Print To Tape document to specify a set of clips and perform assemble and insert edits or crash print to tape.

Topics

- Print to Tape Overview (page 152)
- Creating Print to Tape Documents (page 153)
- Using the Clip Panel (page 155)

Print to Tape Overview

The Print To Tape document is designed to facilitate print to tape operations via Pipeline. You can set up the following print to tape operations:

- Assemble edits
- Insert edits
- Crash records.

Figure 11–1. Print to Tape window panels and toolbars.

At the top of the window is the Pipeline Settings panel, and to the left is the Preview panel. For details on how to use these panels, see Chapter 7, Using Pipeline Control (page 85).

When your VTR (or VTR-enabled camera) is connected via RS-422 in remote mode, VTR controls below the Preview panel enable you to scrub the tape.

The Print to Tape Configuration Panel (on the right) displays configuration settings and timecode settings. Below the timecode settings is the clip list, which displays a list of the clips you have added.

Pipeline Control automatically reconnects a Print To Tape document if network connectivity or video signal is lost when you are previewing the tape, but it will not reconnect if the document is activated and connectivity is lost.

Creating Print to Tape Documents

A *Print to Tape document* contains one or more clip file events in QuickTime (mov) format, which you use to play out SDI video from Pipeline in real time. The video format is automatically detected, and decoded by the appropriate codec in the Pipeline, and played out under control of Pipeline Control.

Here are the steps you'll take to create and use a Print to Tape document:

1. **Open a New Print To Tape Window**. If a Print To Tape document isn't open, select File > New Print To Tape Document to create and display a new, untitled document. Or, open a saved document.
2. **Select your Pipeline**. If you haven't already selected the Pipeline for this workflow, do so now. All other settings are automatically configured when you add the first clip to the list. All other clips you add must conform to the same video settings. Clips that don't conform to the first clip are rejected. For details, see Using The Pipeline Settings Panel (page 91).
3. **Select insert, assemble, or crash Print Mode**. Select the type of operation you want to perform from the Print Mode dropdown menu and configure your Preview, Video, and Audio settings.

Figure 11–2. Print To Tape configuration panel.

Preview. Check to test your clips, timecodes, and settings by playing out the clip list to the VTR or other destination, without sending a record command to the VTR – without performing the actual print to tape operation (available in Insert edit mode and Assemble edit mode).

Video. Check to play out video (available in Insert edit mode only).

For analog and digital audio playout, to route selected channels based on the deck configuration. These are enabled in Insert edit mode only:

Analog Audio. Check the audio flags to play out.

Digital Audio. Check the audio flags to play out.

Figure 11–3. Print To Tape Timecode panel.

Mark In. Enter the timecode of the first frame on the tape where media will begin to be laid down (insert and assemble edits only).

Leader. Enter the length of black leader to play out before the first clip.

Padding. Enter the length of black video between clips as they are played out.

Trailer. Enter the length of black trailer to play out at the end of the last clip.

4. **Add your Clips**. Using the Clip panel, add your clip files to the list, trimming each file as appropriate. You can only add QuickTime files that conform to the requirements of the Print to Tape document. All clips must have the same essence. For details, see (Using the Clip Panel (page 155)).

Note

When the first file is added the audio and video parameters will change to match those of the added file. All subsequent files must match these settings.

5. **Play Out the Video as Print To Tape**. Click the Activate button at the bottom of the window to start playing out all of the clips in order, according to your settings.

Using the Clip Panel

The clip panel (on the bottom, right side of the window) allows you to specify a set of clip files to play out in a print to tape operation, view a virtual tape track, and adjust the trim on each clip.

Figure 11–4. The clip panel allows you to create a collection of clip files to print to tape.

Print Time Tape. *Visual track for each leader, clip, and padding, by timecode.*

Clips. *Drag in QuickTime mov files or click + to add them to the list. Click and drag to rearrange.*

At the top of the print time tape is the Mark In; at the bottom is the Mark Out. By convention, the terms Mark In and Mark Out are inclusive-exclusive. Thus, Mark Out is the timecode of the first frame NOT recorded. Clip start and clip end times are inclusive-inclusive.

Adding, Organizing, and Deleting Clips

To add a clip, drag a QuickTime movie file (containing media essences supported by Pipeline) onto the clip panel. You can only drag one clip file at a time using this method.

Note

You can not use drag and drop to add clips into the list on Mac OS X 10.5 (Leopard). Drag and drop is supported under Mac OS X 10.6 (Snow Leopard).

Or, click + (Plus icon) in the toolbar to display a File System dialog. Navigate and select files to add to the clip list.

To delete a clip, select it in the clip list and click the - (Minus) icon in the toolbar.

To rearrange clips, click and drag them to the position you want them laid down on the tape.

Clip Panel Toolbar

At the far right is a toolbar with buttons for frequently used functions.

Figure 11–5. The Clip Panel toolbar displays icons for frequently used commands.

Add Clip. *Click to navigate and select clips to add to the list.*

Delete Clip. *Click to delete the selected clip from the list.*

Play Preview. *Plays currently selected clip in preview panel.*

Show In Finder. *Opens the folder where the clip is stored, and selects it.*

Print Time Tape

To the left of the clip list is the Print Time Tape. The Print Time Tape is a virtual representation of the order and time the leaders and clips will be applied to the tape.

Figure 11–6. The Print Time Tape.

The print time tape helps you visualize how the clips will be printed, and includes leader, trailer and padding so that you can visualize and confirm the result of the print to tape operation before you actually perform it.

Clip Events

Each clip file you add to the clip list is identified by a clip event.

Figure 11–7. Clip events in your schedule provide details about the clip.

Each clip event has several controls:

Preview Thumbnails. Assigned when you created the mark-in and mark out points.

File Path. Displays the full path and file name of the clip for this clip event.

Duration. Specifies the duration of playout for that clip, as calculated by the clip in and clip out points.

Clip In & Clip Out. Set by using the scrubber controls to adjust clip in and clip out points. Or, enter the values manually.

Trimmer. Use the scrubber controls at the left and right to set your clip in and clip out points.

Appendix A

Troubleshooting

This appendix provides instructions for gathering information to assist in troubleshooting. For a complete and current list of potential issues and recommendations, go to http://www.telestream.net/download-files/pipeline/guides/Pipeline_FAQ.pdf

This information may be useful to Telestream Customer Service when you're obtaining support (Obtaining Pipeline Support | Information | Assistance (page i)).

Gathering Information for Troubleshooting

These topics enable you to gather various details that aid in troubleshooting, depending on your workflow and environment.

- Workflow Information (immediately following)
- Pipeline Device Firmware Information (page 159)
- Pipeline Administrator Counters Panel Details (page 159)
- Obtaining Debug Logs from Pipeline Control (page 159)

Workflow Information

First, briefly document the workflow and obtain system information about your source and/or destination system: FlipFactory (immediately following), Episode Engine (Page 158), Pipeline Control for Mac OS X (Page 158), Pipeline Control for Windows (Page 158), or Final Cut Pro (Page 159).

FlipFactory

Obtain FlipFactory information using FlipFactory's automatic support email or obtain it manually.

To obtain the information automatically, send email to Telestream by using the Email Tech Support button on the FlipFactory System Settings window (see the FlipFactory User's Guide, Chapter 5, Using FlipFactory, in the Sending Email to Tech Support section).

To obtain this information manually:

- Get FlipFactory version and all update packs which are installed
- Get a copy of the FlipFactory license file
- Get account and factory details – obtain an XML output of the account when possible
- Obtain the FlipFactory server and/or Pipeline client system information:

1. Click Start > Help and Support.
2. On the Help and Support panel, click Support from the top menu.
3. Click Advanced System Information.
4. Click View detailed system information.
5. On the System Information dialog, select File > Save to save an nfo file containing your system information to the desktop of the computer.

Episode Engine

Obtain the Episode Engine version and export your compression template to a file.

Obtain the Mac OS X system profile:

1. Launch the System Profiler, which is located at: /Applications/Utilities/System Profiler.
2. Select Save As... from the File menu.
3. Select Rich Text Format (RTF) from the Format popup menu.
4. Save the file to the desktop.

Pipeline Control for Mac OS X

Obtain the Pipeline Control for Mac OS X version and the Pipeline device firmware version (Pipeline Device Firmware Information (page 159)).

Obtain the Mac OS X system profile:

1. Launch the System Profiler, which is located at: /Applications/Utilities/System Profiler.
2. Select Save As... from the File menu.
3. Select Rich Text Format (RTF) from the Format popup menu.
4. Save the file to the desktop.

Save the Pipeline document(s) containing all of your settings, and send the system profile document and all Pipeline documents to Telestream support with other debug information.

If you are using a FlipFactory or Episode Engine publisher, obtain all of the system information associated with these systems (FlipFactory (page 157) and Episode Engine (page 158)).

Pipeline Control for Windows

Obtain the Pipeline Control for Windows version and the Pipeline device firmware version (Pipeline Device Firmware Information (page 159)).

Obtain the Windows system information profile:

1. Run the System Information tool: Start > All Programs > Accessories > System Tools > System Information.
2. Select Export from the File menu.
3. Save the System Information file to the desktop.

Save the Pipeline document(s) containing your settings and send the system profile document and Pipeline documents to Telestream support with other debug information.

If you are using a FlipFactory publisher, obtain all of the system information associated with these systems (FlipFactory (page 157)).

Final Cut Pro

Obtain the Final Cut Pro version and Pipeline plug-in revision.

Obtain the Mac OS X system profile:

1. Launch the System Profiler, which is located at: /Applications/Utilities/System Profiler
2. Select Save As... from the File menu.
3. Select Rich Text Format (RTF) from the Format popup menu.
4. Save the file to the desktop.

Pipeline Device Firmware Information

Obtain the Pipeline's firmware revision number. Locate the Main and App Loader revision numbers on the Configure panel of Pipeline Administrator (Using the Configure Panel (page 51)).

Obtain Network Details

Pipeline IP address – default, static or DHCP (F/W v2.4 or earlier).

Document whether the connection is direct or through a switch.

If the connection is through a switch, is the route through more than one?

Are there any managed switches between the Pipeline and the target system?

What is the speed of each leg of the connection: 100Mb or 1000Mb (Gigabit).

Document whether the LAN is used for general data traffic and video traffic or only video traffic.

Pipeline Administrator Counters Panel Details

If a video or audio issue is being reported, repeat the encode or playout process while running Pipeline Administrator and viewing the counters on the Counters panel (see Using the Counters Panel (page 58) for a description of these parameters). To display the Counters panel, click counters in Pipeline Administrator's menu.

Obtaining Debug Logs from Pipeline Control

Debugging Pipeline components (hardware, client applications, etc.) can rarely be done independently. Since they all work as a system, they must be debugged as a system. The information obtained through these techniques can point to a problem anywhere in the system, and even to problems in multiple points in the system.

Mac OS X

Debug logs for Pipeline Control are generated only when you enable them, by editing property list files:

- Net.telestream.system.plist
- Net.telestream.PipelineControl.plist
- Net.telestream.tifo.plist
- Net.telestream.dvcprohd.plist
- Net.telestream.imx.plist

Each of these files controls, among other things, the output of debug information for different subsystems. The system plist handles enabling and disabling debug logging for the Pipeline Engine, the lowest layer of the Pipeline software suite. The second plist, *PipelineControl*, handles application level logging – the Pipeline Control application itself. The media format plists (tifo, devprohd, and imx, for example), handle debug logging for various QuickTime decompressor components.

To enable debug logging, first exit Pipeline Control. If you want to obtain debug logging for QuickTime decompressors, then you'll need to also exit QuickTime-enabled applications including QuickTime Player or Final Cut Pro.

Now, add a *DebugLevel* key to the plist as a number (for example, *NSNumber*), and a value 5. Save the changes to the plist and start PipelineControl again. Optionally, you can add a *DebugLog* key as a string (for example, *NSString*) to the plist, with a complete absolute path to a target text file. This causes debug logging to be output to the target text file instead of to the default location, which is viewable by the Console application.

To view the logs, you can open the Console application (located in Applications/Utilities) and select the log from the panel on the left. This panel may need to be opened first – click the Show Log List icon in the upper left. After selecting the desired log file in the list, select File > Save As to save a copy to send to Customer Service.

Windows

Pipeline Control for Windows saves details in trace (...trace.log) files, located at:

XP: C:\Program Files\Telestream\Pipeline Control.

Vista & Win7: C:\Users\<username>\AppData\Local\Telestream\Pipeline Control.

When requested, E-mail the latest log file, along with other details, to Customer Service.

APPENDIX B

Pipeline Control Codec Profiles

This appendix describes each Pipeline codec's preset profiles. SD profiles are available in Pipeline SC and Pipeline Quad. Both SD and HD codec profiles are available in Pipeline HD Dual.

Some wrapper/file formats do not support all possible audio / video options. For example, MXF wrappers (Avid, XDCam, and Op1a) do not support 16 channels of audio.

Video Profiles

- DNxHD Profiles (page 162)
- DV and DVCPro Profiles (page 162)
- DVCPro HD Profiles (page 162)
- IMX Profiles (page 163)
- ProRes Profiles (page 163)
- SD Uncompressed Profiles (page 164)

Audio Profiles

- Linear PCM Profiles (page 164)

DNxHD Profiles

Table B–1. DNxHD Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality
720p	1280	16:9	23.976, 25, 29.97, 50, 59.94	8bit SQ, 8bit HQ, 10bit HQ
1080i*	1440	16:9	25, 29.97	8bit SQ
1080i*	1920	16:9	25, 29.97	8bit SQ, 8bit HQ, 10bit HQ
1080p	1920	16:9	23.976, 24, 25	8bit LQ
1080p	1920	16:9	23.976, 24, 25, 29.97	8bit SQ, 8bit HQ, 10bit HQ

*1080i Field Order: Upper Field First

DV and DVCPro Profiles

Table B–2. DV and DVCPro Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
480i*, 486i*	720	4:3, 16:9	29.97	25, 50***
576i**	720	4:3, 16:9	25	25, 50***

*NTSC Field Order: Lower Field First

**PAL Field Order: Upper Field First

*** Available with Pipeline HD Dual Channel Only

DVCPro HD Profiles

Table B–3. DVCPro HD Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
720p	960	16:9	23.976, 25, 29.97, 50, 59.94	100
1080p	1280	16:9	23.976	100
1080i*, 1080p	1280	16:9	29.97	100
1080i*, 1080p	1440	16:9	25	100

*1080i Field Order: Upper Field First

IMX Profiles

Table B–4. IMX Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
486i*	720	4:3, 16:9	29.97	30, 40, 50
576i**	720	4:3, 16:9	25	30, 40, 50

*NTSC Field Order: Lower Field First
**PAL Field Order: Upper Field First

ProRes Profiles

ProRes SQ is supported in SD profiles; SQ and HQ are supported in HD profiles.

Table B–5. ProRes Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
486i*	**720**	**4:3, 16:9**	**29.97**	**SQ, HQ**
576i**	720	4:3, 16:9	25	SQ, HQ
720p	960, 1280	16:9	23.976, 25, 29.97, 50, 59.94	SQ, HQ, LT, Proxy
1080p	1440, 1920	16:9	23.976	SQ, HQ, LT, Proxy
1080i***, 1080p	1440, 1920	16:9	25, 29.97	SQ, HQ, LT, Proxy

*NTSC Field Order: Lower Field First
**PAL Field Order: Upper Field First
***1080i Field Order: Upper Field First

Motion JPEG Profiles

Motion JPEG A is supported in SD profiles; Standard and HQ are supported in HD profiles.

Table B–6. Motion JPEG Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
240p	320	4:3	25, 29.97	Q80
240p	427	16:9	25, 29.97	Q80

SD Uncompressed Profiles

Table B–7. SD Uncompressed Profiles

Vertical	Horizontal	Aspect Ratios	Frame Rates	Quality (Mbps)
480i*, 486i*	720	4:3, 16:9	29.97	8
576i**	720	4:3, 16:9	25	8

*NTSC Field Order: Lower Field First

**PAL Field Order: Upper Field First

Linear PCM Profiles

Table B–8. Linear PCM Profiles

Parameter	Value
Channels	2 | 4 | 8 | 16
Sample Rate	48 KHz
Quality	16 | 24 bit, Big Endian | Little Endian

Appendix C

Multiple Pipeline Control Utility

The Multiple Pipeline Control Utility is a simple Mac OS X application you can use to start and stop multiple Pipeline Trigger documents simultaneously. Use this utility from any Macintosh computer on your network to remotely control one or more Pipeline capture sessions. The Multiple Pipeline Control Utility is located on the Pipeline CD in the Utilities folder. You can also download it from the Pipeline download page at www.telestream.net.

Figure C–1. Multiple Pipeline Control Utility

The Multiple Pipeline Control Utility displays a list of Pipeline Control Trigger documents, with the TCP/IP address of the Pipeline host system running the respective Trigger document and its port number, plus the file name of the captured file, and the status of the connection to the respective Trigger document.

Setting Up the Multiple Pipeline Control Utility

Before using the utility, you must first open and activate one or more Pipeline Control Trigger documents on their respective Pipeline host systems and enable the Web service trigger (Chapter 10, Using Trigger Documents on page 143).

Next, add one or more Trigger document details by clicking the Plus button. Each entry requires the Pipeline host system IP Address (or fully-qualified DNS system name), a corresponding port number and an optional filename.

When each Trigger document reports that it is in idle mode you are ready to start capturing.

Start All Pipelines. Click to start capture operations on each of the Pipelines in the list.

Stop All Pipelines. Click to stop capture operations currently underway.

Status Phrases

Idle. Waiting to capture; The Trigger document is ready to capture

Can't establish a connection. The utility can’t communicate with the Trigger document on the specified Pipeline. Check the IP address/name and port number. Make sure the port is open on the host system.

Recording. The Trigger document is currently capturing the video and recording it to the file.

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