Osprey-300 User's Guide

ViewCast
OSPREY VIDEO

ViewCast

Osprey-300 Capture Card
AVStream Driver Version 3.1
User's Guide For Windows XP

Releases 3.1 and later.

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FCC Notice

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the computer and the receiver.
- Connect the computer into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded Cables

Connections between this device and peripherals must be made using shielded cables in order to maintain compliance with FCC radio emission limits.

Modifications

Modifications to this device not approved by Osprey Technologies, Inc. could void the authority granted to the user by the FCC to operate the device.

Note to CATV Installer

This reminder is provided to call to the CATV installer's attention Section 820-40 of the NEC, which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

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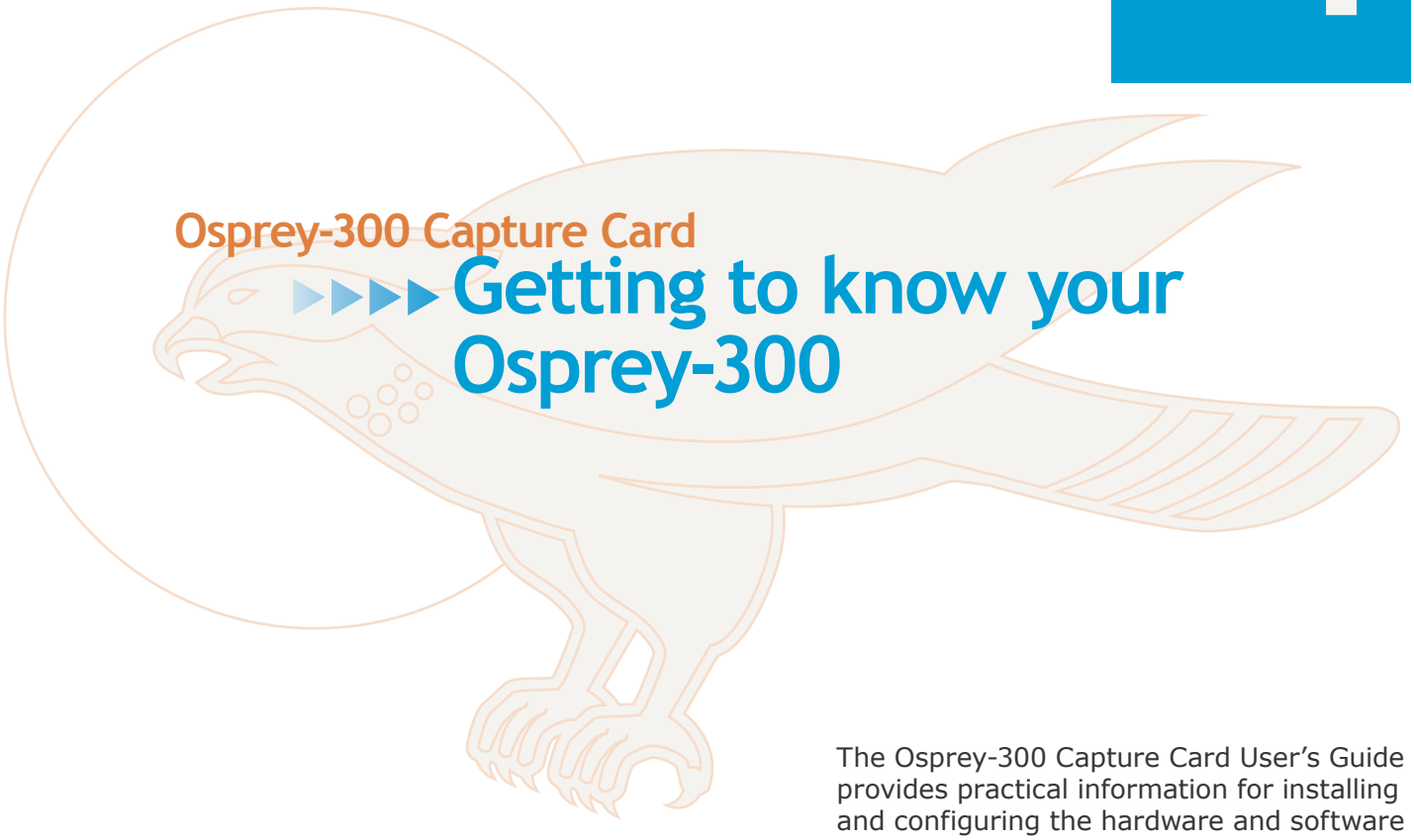
CHAPTER 1



Osprey-300 Capture Card

Getting to know your Osprey-300

The Osprey-300 Capture Card User's Guide provides practical information for installing and configuring the hardware and software for the Osprey-300 Capture Card. This guide has been designed with the needs of the end user in mind, particularly first-timers and those working with existing applications.

- Symbols
- Introduction
- Features
- Software Included
- Compatible Third-Party Applications
- Getting Help

Symbols

In this manual, these symbols will point out important notes and warnings.

Introduction

If you already have a working knowledge of the Osprey cards and their capabilities, you may want to skip ahead to Chapter 2, Hardware and proceed with installation.

The Osprey-300 Capture Card is a single-slot PCI card combining analog and digital video capture and delivering uncompressed video and audio real time to media applications. Supporting the latest in DV capture for IEEE-1394b (800mbs), the Osprey-300 is an "all-in-one" analog video capture/IEEE-1394 card that maximizes PCI slot usage. All formatting and scaling of images are processed within the hardware, allowing for maximum system efficiency and speed. The product also provides on-board audio capture capability. This product consists of a PCI board (based on the Conexant Bt878A single-chip video capture device) and DirectShow compliant software drivers for Windows XP.

Features

The Osprey-300 can provide audio and video to host applications from any of the following sources:

- Decompressed DV video and audio from IEEE-1394b DV devices
- Video from Composite sources
- Audio from Balanced or Unbalanced analog sources

The Osprey-300 also offers the following features:

- OHCI compliant
- Cascadable architecture allows for multiple Osprey-300's per chassis
- Advanced DMA for ultra-high performance (30 fps)
- Hardware audio gain control for analog audio inputs
- Closed Caption extraction
- Hardware Cropping and Bitmap Overlay
- PCI-X compatible
- SimulStream ready (analog only)

FireWire 800 Features

The 1394b port on the Osprey-300 functions at the maximum IEEE-1394b rated speed of 800 megabits per second. The ports are fully backward compatible with S100, S200 and S400 rated 1394 devices.

The Osprey card is equipped with two 1394 connectors:

- 6-pin connector for S100, S200 and S400 rated 1394 devices (standard FireWire)
- 9-pin connector for the latest FireWire800 devices.

Up to 63 devices may be connected in a chain through either of these ports.

NOTE: Although both ports can support high-speed communication, 1394b devices should always be connected to the 9-pin connector to ensure that connected devices take advantage of 1394b communication protocol enhancements and avoid earlier cable length restrictions. Older 1394 devices may be connected to either port appropriate cables.

FireWire devices are designed to be hot-pluggable; it is not necessary to power down the host PC when connecting or disconnecting devices to the Osprey 300's FireWire ports.

Audio/Video Specifications

Video input
- NTSC/PAL
- Composite (BNC style)
- DV - 1394a and b

Audio input
- Balanced stereo (2 x XLR connectors)
- Unbalanced stereo (2 x RCA connectors)
- DV audio (via same 1394 connector as DV Video)

Audio Outputs
- Unbalanced audio (two RCA connectors)
- DV audio (via same 1394 connector as DV Video)

Audio Processing
- Auto sample rate selection for analog inputs (32 kHz/44.1 kHz/48 kHz).
- Audio sample rate down conversion based on application requirements.
- Audio sample rate up conversion based on application requirements.
- Gain and Attenuation can be controlled in hardware for analog inputs. For digital inputs a software gain or attenuation can be applied.

Video Frame Rates and Performance

The Osprey-300 Capture Card can deliver to the host 30 frames per second (fps) full resolution NTSC (720x480) as well as 25 fps full resolution PAL (720x576). The Osprey-300 uses Direct Memory Access (DMA) to efficiently perform this delivery of data to the host. Once the data is in host memory, performance is directly affected by how the data is processed, transmitted or saved. The Osprey-300 Capture Card also supports Direct Show compatible overlays for displaying video with minimal load on the system processor.

Hardware/Software Specifications

Computing Platforms
- Windows XP

Hardware System
- 64-bit/3.3-volt PCI card.
- Full PCI Rev. 2.2 compliance.
- Multi-board support.

Software Included

The products for Windows XP include:
- A DirectShow compatible video capture driver
- A DirectShow compatible audio mixer and audio wave (capture) driver
- SwiftCap – An audio/video capture application
- Applets for device control, closed captioning, cropping, logo setup and VBI viewing. (Source available in the Software Developers Kit)

Compatible Third-Party Applications

The Osprey-300 Capture Card works with any DirectShow based application and has limited functionality with Video for Windows applications. For the latest product news, please continue to visit our ViewCast Corporation web site http://www.viewcast.com/ for the Osprey-300.

Getting Help

Before contacting support, please do the following:
- Work through the section Chapter 4 entitled Testing the Installation.
- Read through Chapter 9 - Troubleshooting.
- Visit our web site at http://www.viewcast.com/ and read the Osprey Capture Cards FAQs by selecting Osprey-300, then clicking on the FAQ button.

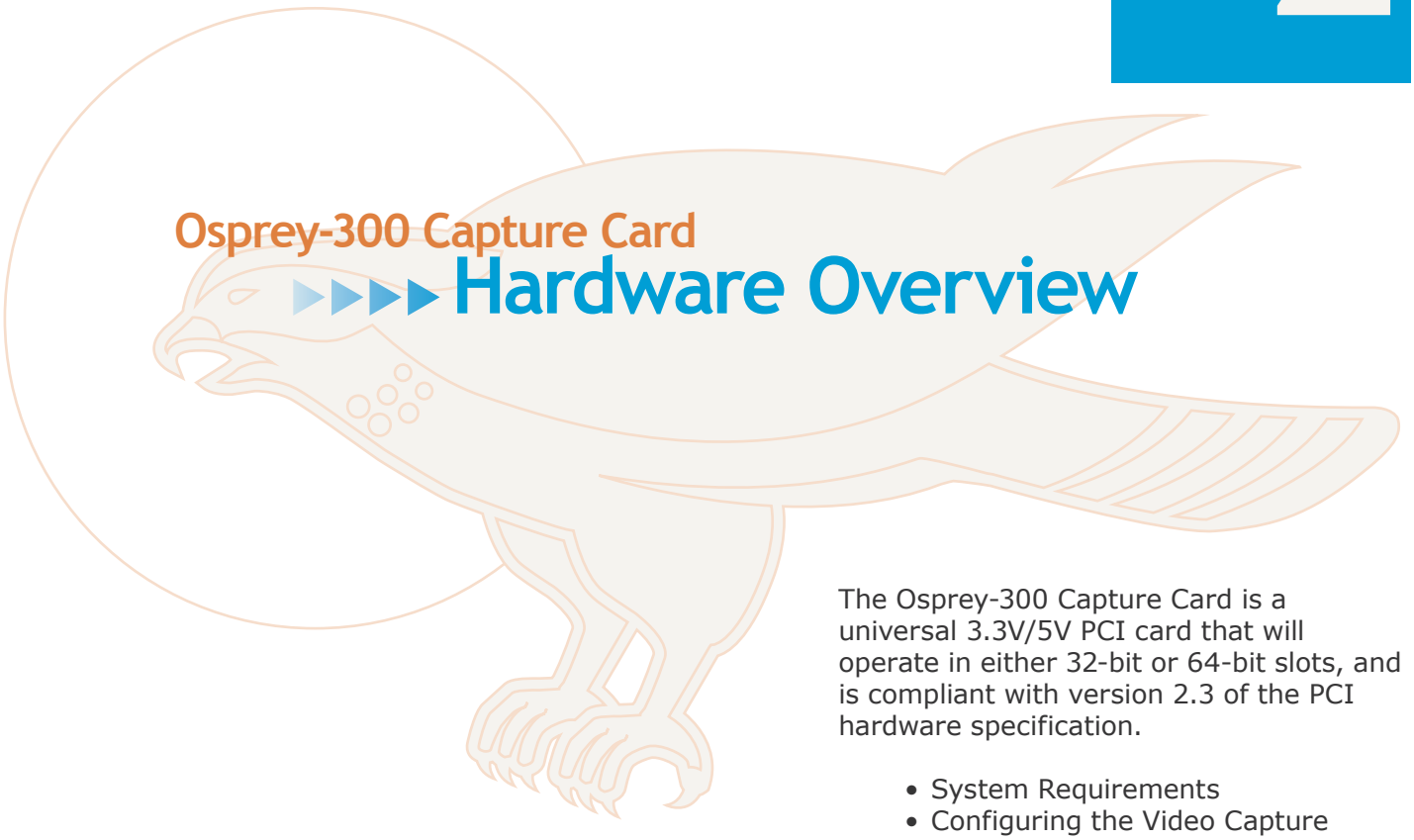
If you have tried the above and you're still having problems, contact the Osprey Support Group at the following numbers :

Toll free: (888) 540-4119
Voice: (972) 488-7200
Fax: (972) 488-7299
Email: support@viewcast.com

When you contact support, especially if it is by email, please include the following information:
- Which product you have.
- Which operating system you are using.
- Which version of the Osprey driver you are using. The version information can be found in the ReadMe.Txt file under the Start > Programs > Osprey Capture menu item.
- The type of audio and video sources being used (for example: S-Video and composite audio) and the type of equipment being used as the source (for example: a DVD player).
- Any additional details about your system configuration would be helpful – for example, the system speed, processor type, motherboard chipset, whether you have a SCSI or IDE hard drive, whether you have a network adapter card, and the type of display adapter card.
- A detailed description of the problem.

CHAPTER 2

Osprey-300 Capture Card
Hardware Overview



The Osprey-300 Capture Card is a universal 3.3V/5V PCI card that will operate in either 32-bit or 64-bit slots, and is compliant with version 2.3 of the PCI hardware specification.

- System Requirements
- Configuring the Video Capture Driver
- Installing the Card
- Connecting Cables

System Requirements

The minimum capability of the computer required for the capture card itself is fairly low. It is typically the application being used with the capture card that sets the minimum requirements of the computer. For example, pure video capture applications typically do not require hefty machines. Yet the various streaming encoding applications, for example RealProducer or Windows Media Encoder, may require up to dual 2 GHz processor for some of their challenging encoding profiles.

For x86 PCs, the minimum system requirements are as follows:

- 300 MHz Pentium II processor or higher with at least 128Mb RAM
- One available PCI slot
- Windows XP
- Approximately 7.5 megabytes of storage for system files

For optimum performance, we recommend at least the following additional features.

- Video display adapter with 4 MBytes memory minimum (16 Mbytes or more recommended) and Direct Draw capability
- An up-to-date display device with DirectDraw capability
- DirectX version 9.0a or later

Minimum System Requirements for DV Editing

When using the Osprey 300 1394 ports with video editing applications such as Adobe Premiere Pro, the host PC must meet the following minimum system requirements :

- Intel Pentium III 500MHz or faster
- Microsoft XP, XP Pro, or later operating system
- UDMA 66 IDE or SCSI hard disk disk array
- 256MB or more of system RAM
- Microsoft DirectX 8.0 or newer
- Sound card capable of 16-bit stereo or higher

The Osprey 300 FireWire ports use the 1394 driver stack included in all versions of Microsoft Windows XP or later operating systems. ViewCast does not install these drivers as part of the Osprey 300 installation process. The analog video capture portion of the Osprey 300 uses drivers supplied by ViewCast. Use of this card in operating systems older than Windows XP may restrict the user to the analog inputs only.

Installing the Card

All computer cards are sensitive to electrostatic discharge. Slight discharges from clothing or even from the normal work environment can adversely affect these cards. By following these simple guidelines, however, you can minimize the chance of damaging your Osprey card.

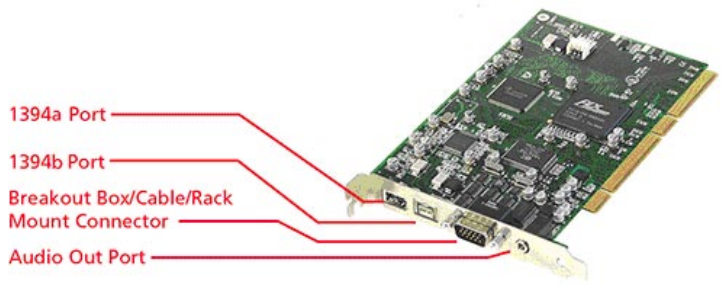
- To be used only with UL Listed computers that include instructions for user installed accessories.
- Handle cards only by the non-conducting edges.
- Do not touch the card components or any other metal parts.
- Wear a grounding strap while handling the cards (especially when located in a high static area).
- Provide a continuous ground path by leaving the power cord plugged into a grounded power outlet.
- Ensure that the workstation is powered OFF before installing any components.

Use the following steps to install the Osprey card:

1. Power down the computer. Make sure that the computer's power switch is turned OFF. Read caution note above for grounding precautions.
2. Remove the computer's cover.
3. Locate an empty PCI slot.
4. Remove the slot-cover screw from the empty PCI slot's cover, set the screw aside, and remove the slot cover.
5. Remove the card from its anti-static bag.
6. Install the Osprey card into the empty slot and make sure that it is seated evenly in the slot.
7. Secure the back panel of the card with the slot's cover screw.
8. Replace the computer cover.
9. Connect video and audio cables to the Osprey card. Refer to Connecting Cables for details of the card's back panel connector.
10. Turn the computer on.

Osprey-300 Back Plate

The Osprey-300 is assembled with a back plate for standard systems (figure 1).



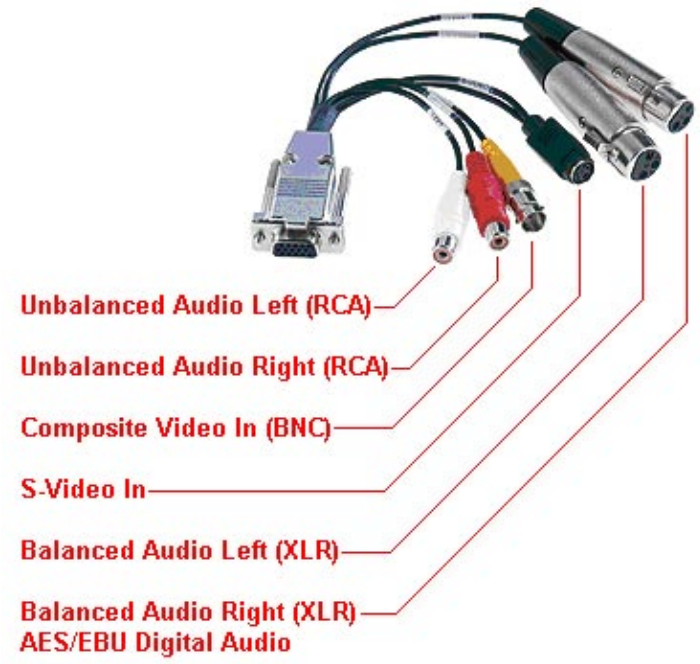
1 *The Osprey-300 Back Plate*

Note! If you are not familiar with how to install a PCI bus card, refer to your system's documentation for more complete, step-by-step instructions. You should install the Osprey-300 card before installing the software driver. However, with Windows XP you also have the option to pre-install the software before installing the hardware. analog inputs only.

Osprey-300 Input Breakout Cable

The Osprey-300 card is shipped with a breakout cable (figure 2). The breakout connector has inputs for composite video, S-Video, balanced and unbalanced audio, and professional digital audio. The breakout cable has a set (L/R) of unbalanced RCA style audio connectors and a set (L/R) of balanced (XLR) audio connectors. Additionally, the right XLR balanced input also is used as the professional digital audio input.

The input breakout cable is ViewCast Part Number 34-05009-01.

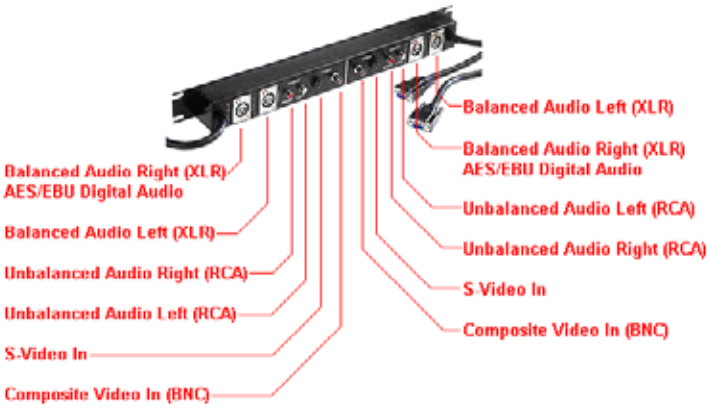


2 *The Osprey-300 Input Breakout Cable*

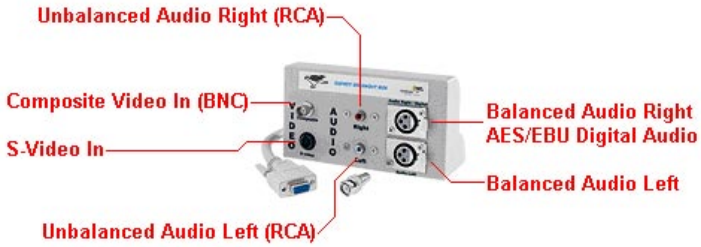
Osprey-300 Input RackMount Panel (optional)

A rackmount version of the breakout box is also available (figure 3). The 1 unit high rack mount input box has the same inputs as the breakout box but includes two sets of inputs. Thus a single rackmount input unit provides for two Osprey-300 cards. The rackmount unit is pictured above.

The rackmount breakout box is ViewCast Part Number 95-00151-02. Exact connector layouts are subject to change.



3 *The Osprey-300 Input Rack-Mount Panel*



4 *Osprey-300 Input Breakout Box*

Osprey-300 Input Breakout Box (optional)

The breakout box has inputs for composite video, S-Video, balanced and unbalanced audio, and professional digital audio. The breakout cable/box has a set (L/R) of unbalanced RCA style audio connectors and a set (L/R) of balanced (XLR) audio connectors. Additionally, the right XLR balanced input also is used as the professional digital audio input for the Osprey-500 PRO and Osprey-500 DV PRO.

The input breakout box is ViewCast Part Number 95-00157-01.

Connecting a Composite Source

If your video source provides only composite video, connect the source's output cable to the Composite Video In connector.

Connecting an S-Video Source

If your video source supports S-Video, connect the source's output cable to the S-Video In connector. Compared to composite signals, S-Video provides a sharper image with better color separation. S-Video uses a four-pin mini-DIN connector that provides separate Y (luminance) and C (chrominance) signals. Refer to Chapter 6 - Osprey-300 Video Control Dialog for instructions on configuring the driver for S-Video.

Connecting an IEEE 1394/DV Source

The Osprey-300 has two DV inputs, 1394a and 1394b. DV carries digital audio and video and both can be independently used by the Osprey-300. The DV inputs include a 9-pin for 1394b, and 6-pin for 1394a connections.

Guidelines for Connecting FireWire Devices

FireWire devices can be connected in any combination of branching and chaining. There are no SCSI-style ID numbers to set and no termination requirements. The Osprey 300's 6-pin FireWire port can support up to 16 consecutive cable hops of 4.5 meters (14.76 feet) each.

The Osprey 300's nine-pin FireWire 800 port allows the use of various types of cabling designed for 1394b operation of speeds up to 800 megabits per second. Selection of the proper interconnect cables allows hop lengths of up to 100 meters.

FireWire 800 / 1394b devices connected to the Osprey 300 9-pin port communicate over long connections directly; no hub is required to gain this added distance benefit in a pure FireWire 800 /1394b connection.

If you need to connect older FireWire devices at a greater distance than the devices can support directly, use a FireWire800 hub device connected to the Osprey 300's 9-pin port. FireWire 800 /1394b hubs make it possible to connect older FireWire 400 / 1394a devices up to 100 meters apart. Neither the computer nor the remote devices need to support FireWire 800 / 1394b since the selected FireWire 800 /1394b hub and its associated cables work with FireWire 400 / 1394a devices.

The Osprey 300 is designed to allow the FireWire network to continue operating even if the computer is shut down. Loss of power to the computer will not affect the interoperation of other devices on the same FireWire bus as long as they are self-powered (i.e., do not require power from the host PC).

Powerering FireWire devices via the Osprey 300's FireWire ports

The Osprey 300's two FireWire (1394) ports are capable of supplying power to certain FireWire devices designed to receive DC power from the host PC. There are two options available:

- If the total DC power requirement for the connected devices is 9 watts or less (at 12 VDC) the on-board DC power connector does not need to be connected to a power source.
- If the total load exceeds 9 watts, connect a compatible power source to the DC power connector at the rear of the Osprey 300 card, as shown below. Typically a DC power connector from the PC's internal power supply of the type normally used to supply power to a floppy disk drive may be connected here without modification.

When this method is used the FireWire ports can supply up to 30 watts of power.

About 1394 connectors

All 1394 devices are connected via one of three connectors specified in the 1394 standards.

- The original 4-pin connector is found on most consumer Digital Video (DV) devices such as camcorders. This connector supports 1394a communication but does not support later changes to 1394 standards that allow attached devices to be powered by the bus.
- The 6-pin connector was introduced to add the option to power the connected device via the 1394 bus.
- The 9-pin connector was introduced to support the bus speeds of FireWire800 and to support enhanced device identification and control protocol. The 9-pin connector is described as Bi-Lingual since you are allowed to connect any 1394 device via the appropriate adapter cable.

Cables with appropriate combinations of all of these connectors are available from most AV equipment retailers and electronics.

Connecting Analog Audio with the Osprey-300

The Osprey-300 audio connectors are made for line level audio stereo equipment, such as VCR or DVD outputs and can also take headphone level outputs when the volume is adjusted midway between high and low settings. It should be noted that if you are using a camcorder or VCR with only a single audio output, the volume needs a slight adjustment.

Although the Osprey-300 accepts line level inputs, the standard microphone shipped with most soundcards is not compatible. You need to use a powered microphone using connectors with 1-volt peak-to-peak output.

RCA-style connectors for left and right line-level audio are used on the Osprey-300.

The selection of audio input to capture is independent of the video input selection.

The Osprey-300 breakout cable includes three audio inputs and one audio output. You should not connect an audio source simultaneously to all three connections. Either connect a stereo 3.5 mm cable or an RCA-style audio cable to the input/output.

CHAPTER 3

Osprey-300 Capture Card

Installing the Software for Windows XP

The CD which comes packaged with the Osprey-300 Capture Card contains software compatible with Windows XP. After you've installed the software, you can test the card and software by running the included application program, SwiftCap.

- Installing From the CD
- Downloading and Installing Updated Drivers
- Installation Scenario 1: Osprey Card(s) not Physically Installed in the PC
- Installation Scenario 2: Osprey Card(s) Physically Installed, but Osprey Software not Installed
- Testing the Installation
- Uninstalling the Software

Installing From the CD

Insert the Osprey CD into your CDROM drive. The installation instructions assume this is the "D:" drive. Substitute the proper drive name as it appears on your system where appropriate.

To run the installation program:

1. Click the Start button.
2. Click Run....
3. Enter d:\winxp\setup.exe in the dialog box.
4. Click OK.

Downloading and Installing Updated Drivers

The latest software drivers for Osprey Capture Cards are available via FTP (file transfer protocol), at the following location:

ftp://ftp.viewcast.com/pub/OSP-300/winXP/latest

There are also links to the drivers from our web site, http://www.viewcast.com/

To download an updated driver:

1. Use your web browser, such as Microsoft Internet Explorer or Netscape Navigator, to find our FTP site.
2. Download the web package file in ...winXP/latest to your hard disk.
3. Run the web package program.

To run the web package program:

1. Click the Start button.
2. Click Run.
3. Enter <pathname> in the dialog box, where <pathname> is the location and name of the file that you have downloaded.
4. Click OK. The program prompts you for a temporary location to unpack the install files to.
5. Select an apprpriate location and click OK.

These files are not to be automatically deleted after setup has run. This is so that you can perform the manual Plug and Play install if you want to. So make a note of where these files are located, and delete them after the install if you want to conserve disk space. analog inputs only.

Two Installation Scenarios

There are two main situations that might apply to you:

- Scenario 1: Osprey Card(s) not Physically Installed in the PC
- Scenario 2: Osprey Card(s) Physically Installed, but Osprey Software not Installed

In all cases, the most efficient and complete installation method is to run the setup.exe program on the product CD or in the web package that you downloaded. The setup program automates the Plug and Play steps required to install the drivers and ensures that they are performed correctly. It also installs the bundled applets and User's Guide. If you have multiple Osprey capture cards in the system it configures all of the boards at the same time.

You can skip the detailed instructions if you are upgrading from one Osprey driver version to another. Just run the setup.exe file, and all the updated components will be installed.

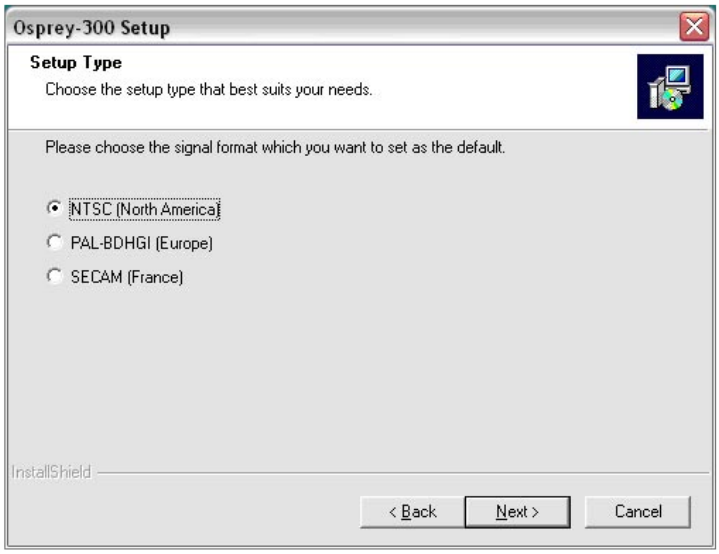
Scenario 1: Osprey Card(s) not Physically Installed in the PC

This is the method that we recommend if you are installing an Osprey card for the first time on a system, and the Osprey software has not yet been installed. This scenario is called the "Preinstall Scenario". After the install is run, as soon as an Osprey card is installed in the PC, it is detected and its drivers are started automatically.

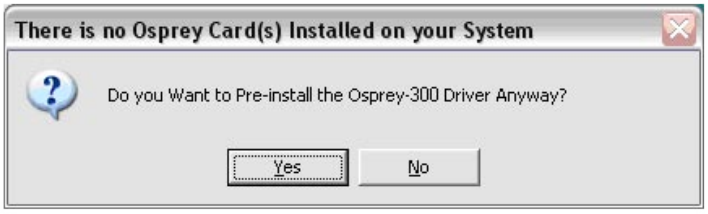
To preinstall the Osprey drivers:

1. Using Windows Explorer, locate and access the CD-ROM drive containing the Osprey Installation CD-ROM.
2. Navigate to the WINXP directory.
3. Double-click SETUP.EXE. The Osprey Capture Driver window displays.
4. Click Next. The Software License Agreement window displays.

5. Click Yes to accept the End User Software Agreement. If you do not wish to accept the agreement, click No to terminate the installation routine. The Information window displays.
6. Click Next. The Osprey-300 Driver window appears.
7. Click the radio button to select the default signal format (figure 1). See Video Standard for more information about signal formats.
8. Click Next. The Choose Destination Location window displays.
9. If you wish to change the destination location for the files, click Browse.
10. Click Next. The Start Copying Files window displays.
11. Click Next. The Pre-installation question window displays (figure 2).
12. Click Yes. The Software Installation window displays (figure 3).
13. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The files begin copying to the computer. The ViewCast Corporation/Osprey Video Division Special Offers Shortcut window displays.
14. If you would like a shortcut installed on your desktop, click Yes and a shortcut is created on the desktop. If not, click No. Once you have made your choice, an information window displays.
15. Click OK to continue the installation. The AVStream User Manual window displays.
16. If you would like to view the AVStream User Manual, click Yes and an Acrobat Reader window opens. If not, click No.
17. Once you have made your choice, click OK. The Product Registration window displays.
18. If you would like to register your Osprey-300 Capture card, click Yes and a browser window will open with a registration page. If not, click No. Once you have made your choice, the Setup Complete window displays.
19. Click Finish to complete the installation.



1 ***The Osprey-300 Setup window***



2 ***The Pre-installation question window***

3 ***The Software Installation window***

Note!

A product registration link is also available on the Programs menu or on the Osprey Video web site (http://www.viewcast.com/).

Note!

When you start your computer after physically installing the Osprey hardware, the Found New Hardware Wizard runs upon detecting new hardware. The sequence of windows are similar to that in Appendix H - Adding/ Moving Boards in Windows 2000 and XP.

Scenario 2: Osprey Card(s) Physically Installed, but Osprey Software not Installed

In this case you have two options:

- Option A: Run the Installation Program (Recommended)
- Option B: Use the New Hardware Found Wizard (Not Recommended)

Option A: Run the Installation Program (Recommended)

When Windows XP is first started for the first time after the Osprey card is installed, the New Hardware Found wizard displays one or more times. Cancel out of these wizards. After Windows XP has finished starting, perform the following steps.

To install the Osprey drivers:

1. Using Windows Explorer, locate and access the CD-ROM drive containing the Osprey Installation CD-ROM.
2. Navigate to the WINXP directory.
3. Double-click SETUP.EXE. The Osprey Capture Driver window displays.
4. Click Next. The Software License Agreement window displays.
5. Click Yes to accept the End User Software Agreement. If you do not wish to accept the agreement, click No to terminate the installation routine. The Information window displays.
6. Click Next. The Select Components window displays.
7. Click the radio button to select the default signal format. See Video Standard for more information about signal formats.
8. Click Next. The Choose Destination Location window displays.
9. If you wish to change the destination location for the files, click Browse.
10. Click Next. The Start Copying Files window displays.
11. Click Next. The Hardware Installation window displays.
12. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The Hardware Installation window displays.

13. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The files begin copying to the computer.

The ViewCast Corporation/Osprey Video Division Special Offers Shortcut window displays.

14. If you would like a shortcut installed on your desktop, click Yes and a shortcut is created on the desktop. If not, click No. Once you have made your choice, an information window displays.
15. Click Next. The AVStream User Manual window displays
16. If you would like to view the AVStream User Manual, click Yes and an Acrobat Reader window opens. If not, click No.
17. Once you have made your choice, click OK. The Product Registration window displays.
18. If you would like to register your Osprey-300 Capture card, click Yes and a browser window will open with a registration page. If not, click No. Once you have made your choice, the Setup Complete window displays.
19. Click Finish to restart the computer.

You must restart your computer to complete the installation. Do not attempt to use your Osprey card until after restarting the system.

Note!

When Windows XP starts, it detects the new card(s) and starts the Found New Hardware wizard. When the Found New Hardware Wizard detects a device, please note the terminology in the Wizard. It displays either a Video Controller or an Audio Controller.

The Found New Hardware Wizard first detects one of the following 2 devices:

"Osprey Video Capture Device"

"Osprey Audio Capture Device"

4 ***The Found New Hardware Wizard window***

Option B: Use the New Hardware Found Wizard (Not Recommended)

This method is more complicated than Option A. It is particularly inconvenient if you are installing multiple cards at once, since each card has to be set up separately.

When the Found New Hardware Wizard window displays...

1. Click to select Install from a list or specific location and click Next to continue. The Found New Hardware Wizard window appears (figure 4).
2. Click to select Search for the best driver in these locations.
3. Click to select the checkbox Include this location in the search, and type in the drive letter of your CD-ROM drive followed by "\WinXP" to provide the location of the Windows XP driver on your distribution CD.
4. Click Next to continue. The "Please wait while the wizard searches..." window displays briefly, and then is covered by the Hardware Installation window.
5. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The Setting System Restore Point window displays briefly, and then is replaced by the Completing the Found New Hardware Wizard window.
6. Click Finish. Next the Wizard finds and installs the audio portion of the device. The Found New Hardware Wizard window displays.
7. Click to select Install the software automatically and click Next to continue. The Hardware Installation window displays.
8. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The Completing the Found New Hardware Wizard window displays.
9. Click Finish.

If you are installing a single Osprey card, you do not need to restart the computer. If you are installing more than one Osprey card, you are required to restart the computer.

After completing the Found New Hardware Wizard, the applications for the Osprey driver must also be installed. To do this, navigate to the directory containing the Windows XP driver for your Osprey card, and run SETUP.EXE.

For detailed steps, please refer to Option A: Run the Installation Program (Recommended).

Testing the Installation

1. Verify the hardware installation is complete, in accordance with the directions in Chapter 2.
2. Connect a camera, VCR, or other video signal source to the Osprey card's connectors.
3. Open the Osprey Capture group in the Start menu.
4. Click the SwiftCap icon.
5. Verify the screen displays a still video frame from the Osprey card. Click the Preview button. The screen should display moving video frames.
6. If the video area is a plain blue field, it could be for one of the following reasons:

   - The driver is looking for video on the wrong input connector. You can either move the video cable to another connector, or reconfigure the driver using its Control Dialog (refer to Chapter 6 - Osprey-300 Video Control Dialog).
   - The video source is not turned on or activated.

7. If the video area is scrambled or has bad color, the signal format of your video source may be different from the signal format selected in the driver software. Since the driver defaults to NTSC-M signal format, users of PAL and SECAM equipment always need to change the driver's signal format the first time they run the driver. Please see Video Standard in Chapter 6 – Osprey-300 Video Control Dialog.

Uninstalling the Software

If you ever need to remove the Osprey driver from your system, proceed as follows:

1. Open the Control Panel.
2. Double-click Add/Remove Programs.
3. Click to select Change or Remove Programs.
4. Highlight the Osprey Capture Driver entry.
5. Click Change/Remove in the Osprey entry. The uninstall program begins.
6. Click Yes to proceed.
7. Click OK when the process is complete.
8. Reboot your computer to complete the uninstall process.

Configuring the Video Capture Driver

Use the video capture application SwiftCap to access the Osprey driver properties described in Chapter 5 - Analog Video Driver Properties.

SwiftCap is included with the Osprey package. It is useful for testing the installation and for general purpose viewing of video. Refer to Chapter 8 for instructions on using this applet.

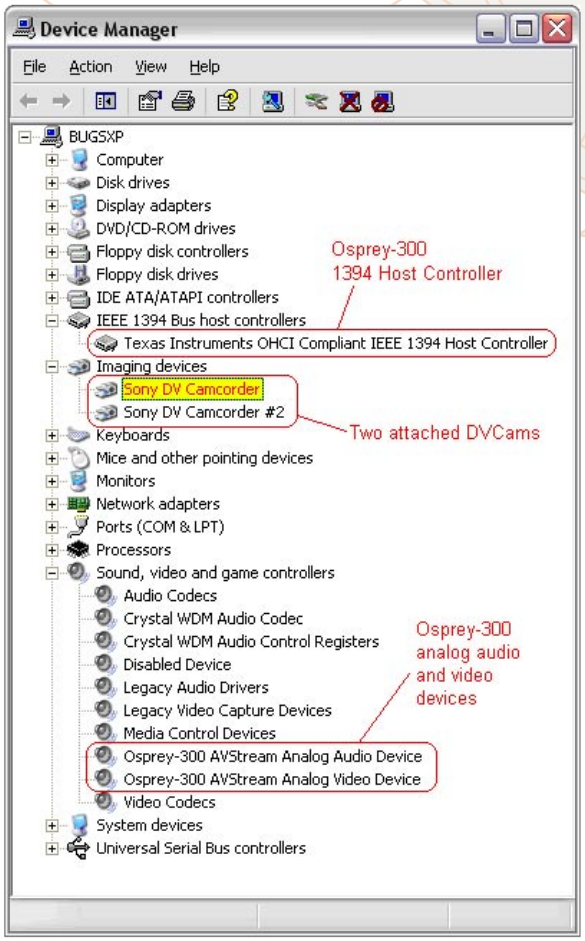
Configuring FireWire Drivers for Windows XP

Windows XP will typically install the FireWire drivers as a "Texas Instruments OHCI Compliant IEEE 1394 Host Controller". Successful installation can be verified in the Windows Device Manager (see figure 1 in Chapter 4).

CHAPTER 4

Osprey-300 Capture Card

Digital Video on the Osprey-300



1 ***The Windows XP Device Manager***

The Osprey-300 IEEE 1394 inputs connect to standard Microsoft drivers rather than to the Osprey AVStream driver. Osprey customers who are familiar with the Osprey-500, -540, and -560 should understand that the DV implementation is completely different. On the Osprey-5XX cards, the DV connector and capture hardware sit behind the Osprey audio and video capture devices and are controlled by the Osprey driver. On the Osprey-300, the DV is an entirely independent device.

If you look at the Windows XP Device Manager (figure 1) after installing an Osprey-300 you will see something like this. Under the category "IEEE 1394 Bus host controllers" there will be an entry for the Texas Instruments controller on the Osprey-300. This device is automatically activated whenever the card is plugged into the system. If you plug a DVCam into the Osprey card, an entry for it will appear under the "Imaging devices" heading. Both the 1394 controller and any devices plugged into it are logically distinct from the Osprey-300 analog audio and video devices shown under Sound, video and game controllers.

In theory you should be able to connect any 1394 device to the card, not just a digital video (DV) source. In this chapter, however, we focus on using the 1394 connector with DV devices such as camcorders.

Most major multimedia applications will recognize DV devices and work with them fully. For example, we have verified that Windows Media Encoder 9 supports a DVCam attached to an Osprey-300. With major applications the DV connection should "just work" and the information here is for background and reference only.

Specifics of DV Capture

The DirectShow filter used for DV capture is called the "Microsoft DV Camera and VCR". This filter can capture video only, or audio and video together. In this respect it is different from the Osprey analog capture driver, which has logically distinct modules for audio and video capture.

Unlike the Osprey analog driver, which captures video into many user-selectable sizes and formats, the DV capture filter delivers just one format for each video standard.

For 525-line (NTSC) video, the video size is 720x480 and the video rate is 29.97 frames per second.

For 625-line (PAL/SECAM) video, the video size is 720x576 and the video rate is 25 frames per second.

The video format is always a compressed format designated with the four-character identifier "dvsd" (case-sensitive, and lower case). In this format, one NTSC video frame is 120,000 bytes, and one PAL./SECAM video frame is 144,000 bytes. By comparison, one uncompressed YUY2 NTSC frame, requiring 2 bytes per pixel, is 691,200 bytes, and one uncompressed YUY2 half-sized frame (360x240) is 172,800 bytes; that is to say, the half-sized YUY2 frame is significantly larger than the full-sized dvsd frame.

The dvsd format comes in two flavors - video-only, and audio + video interleaved. The audio + video data rate is slightly higher than the 120,000 or 144,000 bytes per frame quoted above - for NTSC it is about 129,000 bytes per frame, or about 3,866,130 bytes per second.

The dvsd format can be captured directly to AVI files. There are two subformats - Type 1 and Type 2. The Type 1 format stores the audio + video data as a single stream. The Type 2 format stores the audio and video data as two separate streams. The Type 1 format is more compact and efficient but is not backward-compatible with Video for Windows. Osprey's SwiftCap application, as described below, currently supports only the Type 1 format. With other suitable applications the Osprey-300 DV connector can capture in either format.

Several additional DirectShow filters support the DV capture module.

The most important is the DV Video Decoder. This filter accepts dvsd video-only streams as input. As output it delivers an uncompressed YUY2 stream at full, half, 1/4, or 1/8 size. This filter is always used when rendering video. When capturing video without compression, it is normally not used, but could be useful for capturing quarter-sized or 1/8-sized video, at some savings in data rate. (Note that the full- and half-size options would increase the data rate to no purpose.) When video is captured with compression, a DV Video Decoder will be placed in front of the compressor, to deliver the YUY2 input that the compressor uses.

The other specialized DV filter commonly used in capture is the DV splitter, which accepts a dvsd audio + video interleaved stream as input, and outputs dvsd video-only on one pin, and standard uncompressed audio on the other.

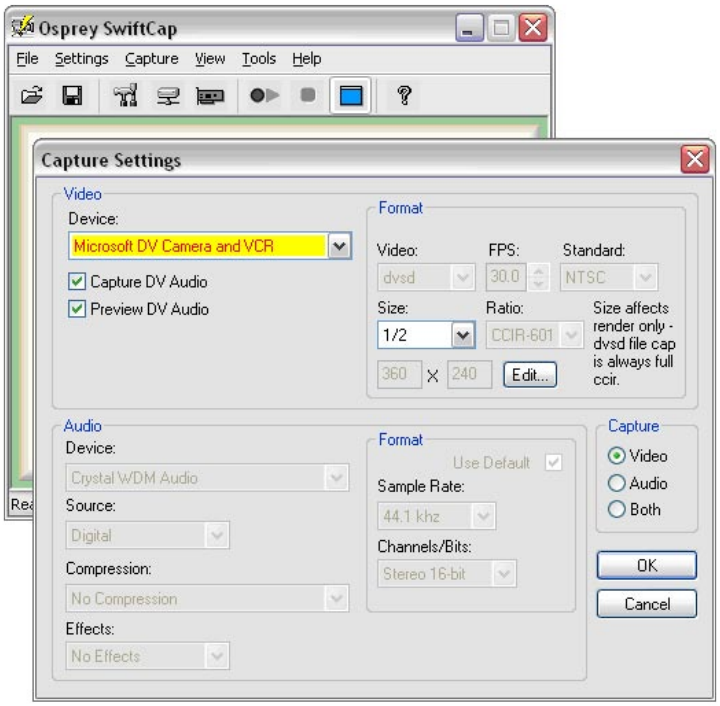
Following the how-to description of SwiftCap, there are some sample DirectShow graphs that show some of the ways these components can be connected together.

SwiftCap

This section provides specific information about how the bundled capture application SwiftCap supports DV capture on the Osprey-300. Note that this manual also contains a more complete general reference section on SwiftCap that is oriented towards its support of the Osprey analog driver.

Note - only more recent versions of SwiftCap work with DV devices. The "Help -> About SwiftCap" message should show a version number 3.1.1.0 or later, and be copyrighted 2004 or later. The SwiftCap version supplied with the Osprey-300 driver package is 3.1.1.0.

The main features of SwiftCap's DV support are highlighted in figure 2.



2 ***SwiftCap's Digital Video Capture Options***

If a device such as a DV camcorder is connected to the Osprey-300, it will appear in the video device list as a "Microsoft DV Camera and VCR". The Capture Settings dialog will appear as shown only when a DV device is selected; for analog vidcap devices the dialog is set up differently.

Note that even though a DVCam is an audio + video device, DirectShow classifies and enumerates it as a video device only. SwiftCap adheres to this logic by displaying a DVCam as a video device choice, but not as an audio device choice. If you want to capture both audio and video from a DVCam, you should select "Video" in the Capture group at the right. If you want to capture DV video, and audio from another analog source, select "Capture Both" and uncheck "Capture DV Audio" (You can even work to capture both DV audio and analog audio at the same time).

If you select "Preview DV Audio", SwiftCap will preview audio both in preview-only mode and when capture is happening. (SwiftCap does not preview audio with analog capture devices.) This capability could be useful when capturing audio from a remote or recorded source - but you will want to turn it off for capture from a live source, to avoid feedback.

Two checkboxes in the Video group, "Capture DV Audio" and "Preview DV Audio," control DV audio.

The video Size control affects size of previewed video only, not captured video. As previously explained, dvsd video from the DV Video Capture Filter is always full sized and in CCIR-601 format, that is, 720x480 NTSC or 720x576 PAL/SECAM. While a DV Video Decoder Filter could be used to downsize the video, SwiftCap does not currently support this. SwiftCap also does not support compression of DV video at this time.

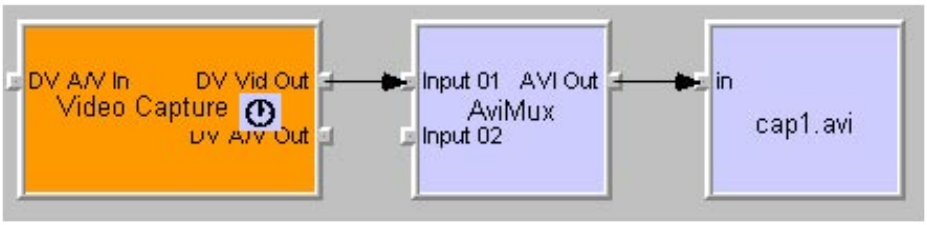
As you can see, the rest of the Video Format controls are greyed and read-only. The video format from a DVCam is always "dvsd", as described above. SwiftCap will determine for you whether the camera is NTSC and 30 frames per second, or PAL and 25 frames per second. The aspect ratio from DVCams is always CCIR-601, meaning that the pixel width is 720.

Graphs

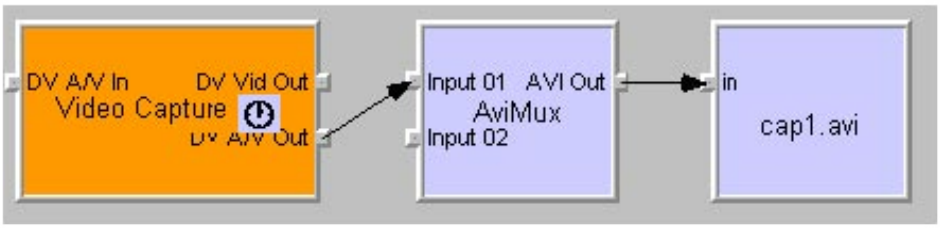
This section contains more technical information that may give some users helpful insight into DV capture and rendering operations. The illustrations are DirectShow graphs as displayed by GraphEdit.

For still more advanced information, refer to the DirectX 9 SDK documentation available from Microsoft.

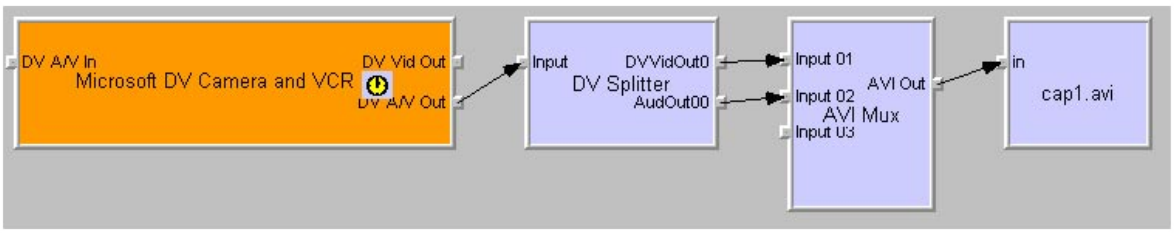
This graph shows the simplest possible video-only DV capture graph.



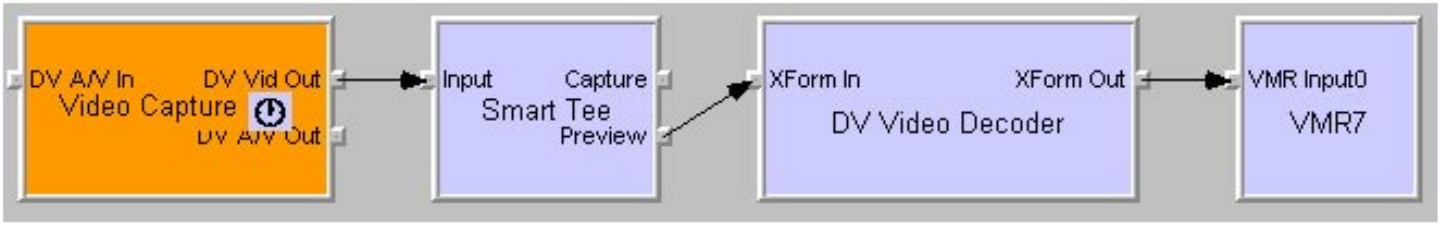
This is the simplest possible audio + video DV capture graph. The difference is that the DV Capture Filter's A/V Out pin is used, which delivers an interleaved A/V stream rather than a pure video stream. The AVI file will be "Type 1" - that is, the audio + video will be structured as a single stream; this format is efficient but is DirectShow-only, not backwards-compatible to Video for Windows.



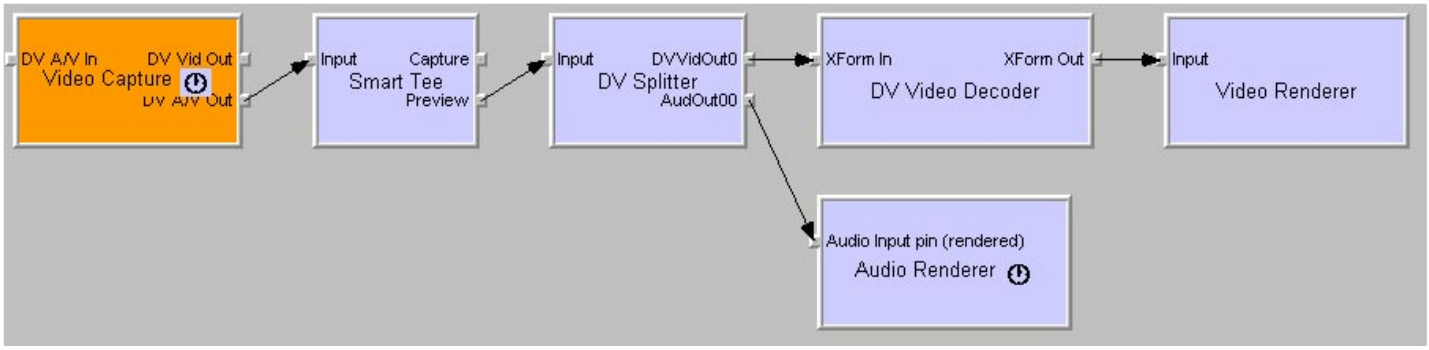
This is the simplest possible audio + video "Type 2" graph. The AVI file, now Video for Windows compatible, is now structured as an "auds" stream plus a "vids" stream. The DV Splitter Filter splits the interleaved A/V stream in to a dvsd video stream plus a PCM audio stream.



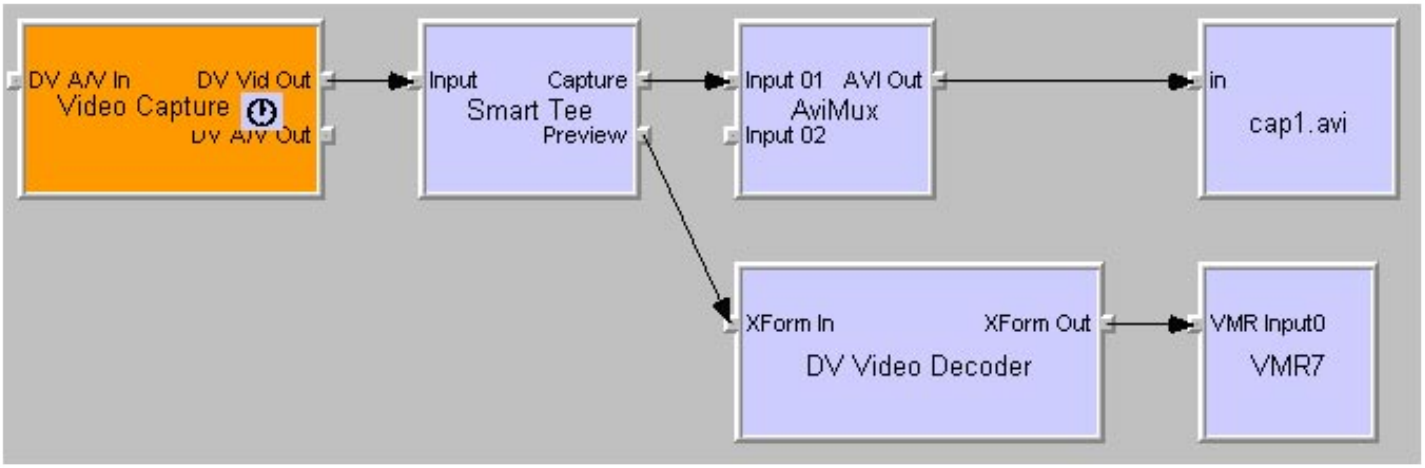
This graph shows basic video-only rendering. The DV Video Decoder converts the "dvsd" DV video stream to the YUY2 format required by the video renderer. The Smart Tee allows a capture stream to be connected as well as the preview stream. It is optional in this particular graph; however, the normal graph-building process usually inserts a SmartTee automatically.



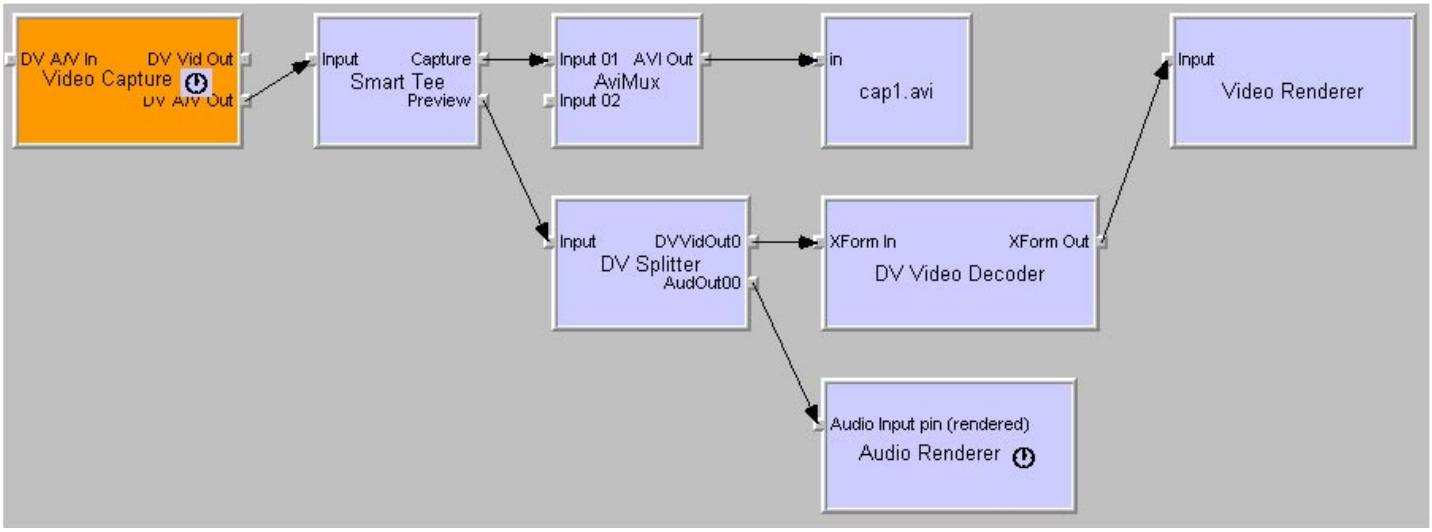
This graph renders both audio and video. The Capture Filter's DV A/V Out pin is used instead of the video-only pin. A DV Splitter is added to the graph to split the interleaved A/V stream into separate audio and video. The audio stream is standard PCM audio which can be directly rendered by a standard rendering filter. The video stream is in dvsd format and as before is converted to YUY2 by the DV Video Decoder before rendering.

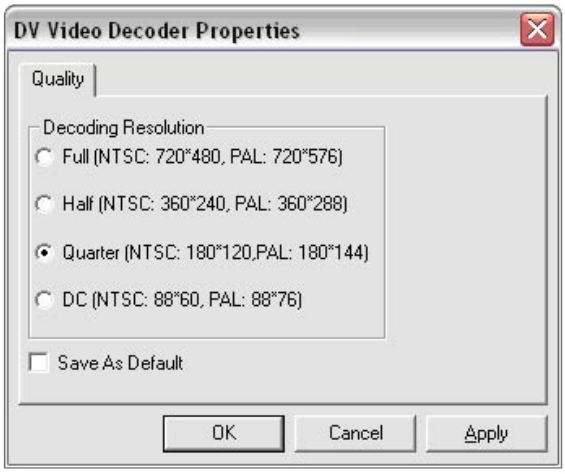


This graph combines video capture with video preview rendering. Here the Smart Tee becomes mandatory to split the single video stream into two.

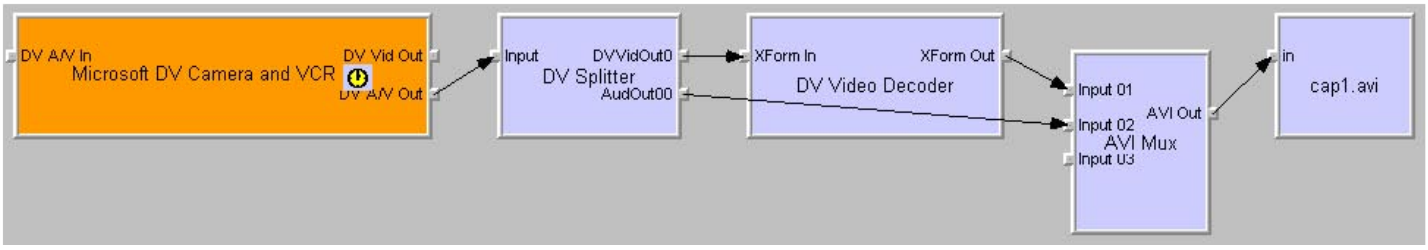


Audio and video, capture with preview. This is the most complex graph that SwiftCap currently supports. It is a combination of elements described in the previous graphs.

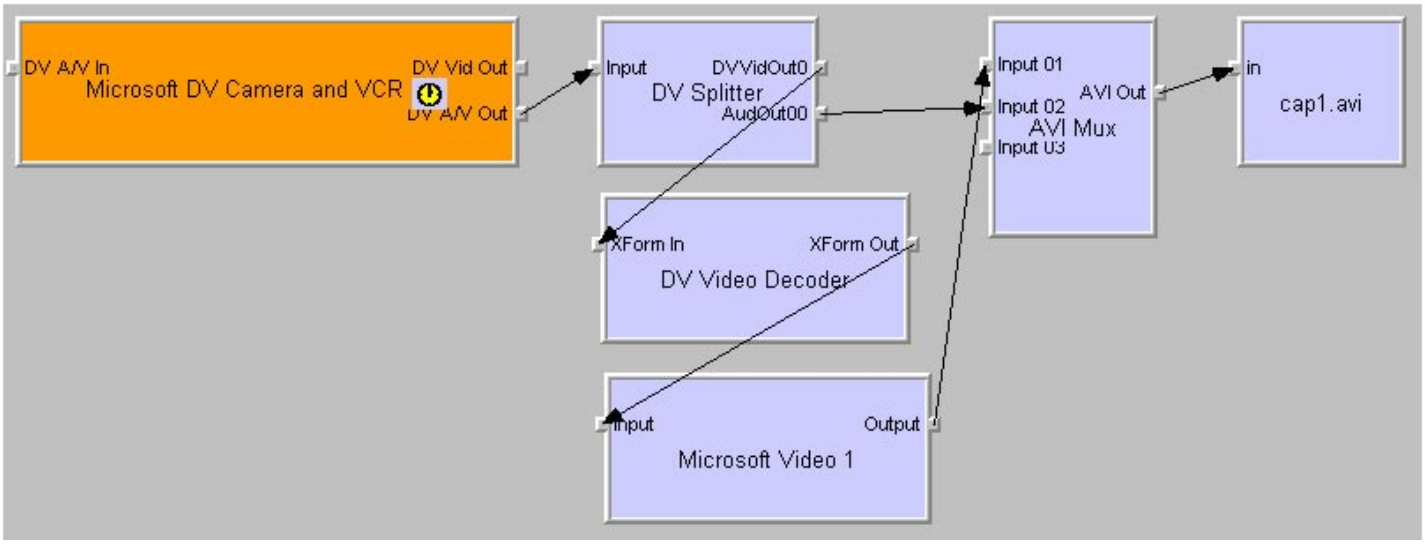




This graph (which SwiftCap currently does not support) shows an A/V capture-only configuration to which a DV Video Decoder Filter has been added. The properties page also shown (at left) belongs to the DV Video Decoder and can be accessed directly from GraphEdit and some other applications. This graph captures the video stream in YUY2 format. As explained previously, the dvsd native DV format is a compressed format, whereas YUY2 is not. A YUY2 stream at 720x480 is much larger than the dvsd version, and the YUY2 stream at 360x240 is somewhat larger; you would probably want to use this graph only for 1/4 or 1/8 size capture.



This graph shows audio + video capture with the Microsoft Video 1 compressor. The compressor requires YUY2 as its input fomat and so the DV Video Decoder precedes it. A compressed graph of this kind substantially compresses the AVI data, at the expense of cpu time and video quality.



CHAPTER 5

Osprey-300 Capture Card

Analog Video Driver Properties

FILTERS, PINS, FILTERGRAPHS, AND PROPERTIES

In DirectShow the words "Filter" and "Pin" are frequently used.

A "Filter" is a component that performs a processing step on an audio or video (or closed caption, or VBI…) stream. A video capture device such as the Osprey AVStream driver is a filter that has associated hardware. Other types of filters such as compressors, mixers, and renderers are software-only – they have no associated hardware.

A filter has input and/or output "Pins" where multimedia streams enter and exit.

A "FilterGraph" is a set of filters connected together with their pins. All DirectShow applications create an implied, invisible filtergraph to carry out their functions. The GraphEdit developers' application takes this a step further by showing the organization of the filtergraph visually (figure 1).

1 ***A common filtergraph based on the Osprey AVStream driver, with a preview window.***

Both filters and pins may have associated "Properties". Properties are control parameters that can be read from or written to the component. As a user, you interact with them as visual "Property Sheets", or "Property Pages", or "Tabs" that are part of a tabbed dialog. If you are a programmer, you might set properties directly from the code of your application.

The block labeled "Osprey-300 Device 1" in the center of the filtergraph is the Osprey capture filter, and the "Filter Properties" about to be described are the properties and controls for that component. On the o300avs cap filter there are four pins. Two of these pins, Capture and Preview, have associated user-settable properties that are described below in the section entitled "Pin Properties".

The block labeled "Osprey Crossbar" performs input selection for the driver. The main Osprey capture filter has an "Input" property sheet that performs the same input selection function.

Osprey Video Capture Device Properties

Selecting the Device

If you have multiple audio/video capture devices installed, the Filter Properties are organized on a per-device basis. The Filter Properties that are displayed are for the currently selected device.

Windows Media Encoder 9:

- In the View menu, select Properties Panel.
- Make sure that under Source from:, the Devices radio button is selected.
- Check Video: Select the device you want from the Video: drop box.
- Check Audio: Select the audio device you want from the Audio drop box.

Helix Producer Plus:

- Click the Devices radio button at the left of the main window.
- Select the desired devices using the drop boxes on the left half of the main window labeled "Audio:" and "Video:".

SwiftCap:

- Pull down the Capture menu, select Settings…
- Select the device from the drop list in the upper left corner of the Capture Settings dialog box.
- Real Producer 8, VidCap32, and other Video for Windows applications:
- Refer to Using the Osprey AVStream Driver with Video for Windows Applications, below.

Accessing the Property Pages

From Windows Media Encoder 9:

1. In the View menu, select Properties Panel.
2. Click the Configure… button to the right of the video device name.

You can select the input to the device directly from the ensuing dialog. For other device settings, click the Video Properties button.

From Helix Producer Plus:

- For audio, click "Settings" to the right of the "Audio:" drop box, and select "Vendor-Provided Controls" from the drop list.
- For video, click "Settings" to the right of the "Video:" drop box. Select "DirectShow Filter Video Capture" from the drop list to set up the Osprey device. Select "DirectShow Pin" to set up the capture pin on the Osprey device.

Set up "DirectShow Filter Video Capture" the way you want it before you set up the capture pin.

From SwiftCap:

Click the Video Properties toolbar icon (figure 2).

From Real Producer 8, VidCap32, and other Video for Windows applications:

Refer to Using the Osprey AVStream Driver with Video for Windows Applications, below.

2 ***The Video Properties Toolbar icon in SwiftCap.***

Common Dialog Features

The Properties are organized as tabs or pages in a dialog box entitled o300avs cap Properties. The tabs are as follows:

Note that these property tabs are not where you set frame size and frame rate. These are part of the "pin properties", and are explained in Pin Properties, below.

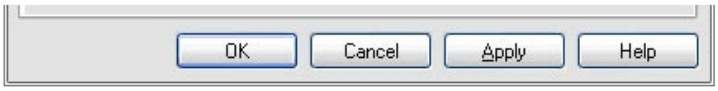
The tabs across the top of the Filter Properties Dialog (figure 3) select the specific "tabs", or "property sheets", or "pages" described below.

- Video Proc Amp: set brightness, contrast, saturation, hue.
- Video Decoder: select the video standard (NTSC, PAL, or SECAM).
- Input: select the video input and NTSC/PAL/SECAM video standard.
- Device: miscellaneous, less frequently used controls.
- RefSize: set the reference size for cropping.
- Size and Crop: set output size, enable cropping, set cropping rectangle.
- Logo: set up on-video logos.
- SimulStream: control the SimulStream option.

On some systems you may see additional tabs besides the six shown above. The additional tabs are system-supplied, for-your-information only, and contain no controls that you can set.

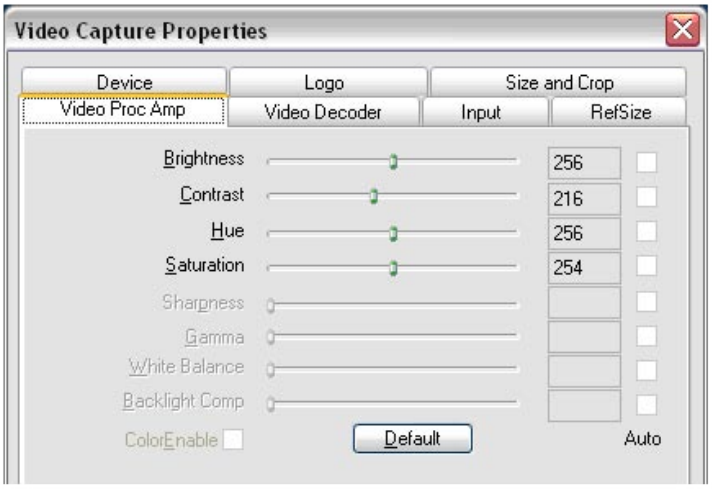
- The OK button (figure 4) commits the changes you have made on the currently displayed page, and exits the dialog.
- The Cancel button exits the dialog without committing the changes you have made on the currently displayed page.
- Changes made before the most recent click of the Apply button are not cancelled.
- The Apply button commits the changes you have made on the currently displayed page, without exiting the dialog.
- The Help button accesses online help.

3 ***Tabs located along the top of the video properties dialog***



4 ***Action buttons located at the bottom of the Properties Dialog***

Note that the OK and Apply buttons commit only the changes on the currently displayed page. To set changes on three different pages you would have to click Apply twice and OK once.



5 ***The Video Proc Amp Tab***

The Video Proc Amp Tab

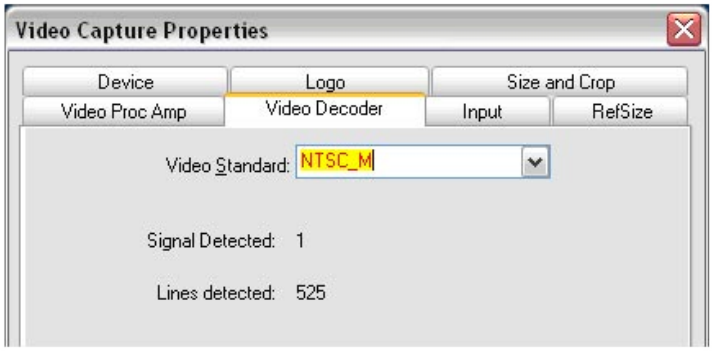
Use the four slider controls to set Brightness, Contrast, Hue, and Saturation (figure 5). If preview video is running when you access this page, you can see your adjustments interactively.

The Hue adjustment does not function for PAL video or when the DV (1394) input is selected. The slider is disabled when any of these modes is in effect.

The Brightness, Contrast, Hue, and Saturation adjustments do not function when the Bypass Color Correction box on the Input page is checked. In this case the slider is disabled.

When you make a change to the video standard, the input, or the Bypass Color Correction control, the sliders on this page may not become correctly enabled or disabled until the properties dialog has been closed and reopened.

Changes made on this page apply to all video preview and capture pins on the currently selected device.



6 ***The Video Decoder Tab***

The Video Decoder Tab

The VideoDecoder Tab (figure 6) is a DirectShow standard control for setting the NTSC/PAL/SECAM video standard. Note that these controls are also on the Input Tab. Most users will find the Input Tab more convenient to use. Refer to the Input Tab description below, and to Video Driver Topics, Video Standards and Sizes.

Changes apply to all video preview and capture pins on the currently selected device. If you have multiple Osprey cards, set the input individually for each of them.

Changes made with this control take effect immediately – the Apply button really has no function on this tab. If video is running and a standard is selected that does not match the incoming signal, the video is likely to freeze or glitch until the signal matches again.

The Input Tab

The Video Input control (figure 7) is a drop list for selecting the video signal source. The inputs shown on the list are tailored to the inputs available on your hardware.

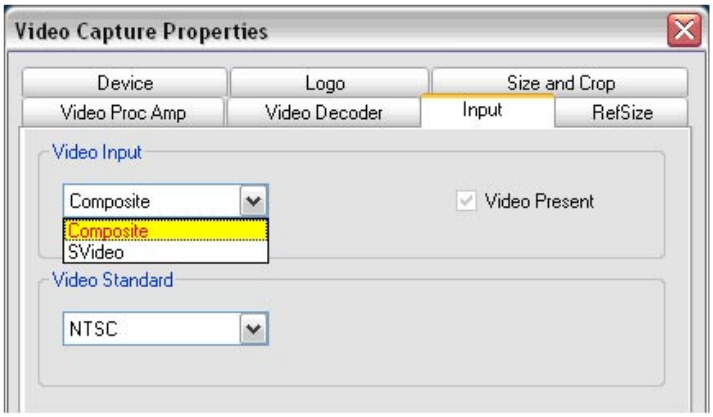
The Video Input control performs about the same function as a crossbar filter attached to the capture filter's Analog Video In pin.

It has one additional control, however, the Bypass Color Correction checkbox that is enabled whenever a digital input is selected. When this box is unchecked, video brightness, contrast, and saturation can be adjusted using the controls on the Video Proc Amp property page. When this box is checked, these controls are bypassed and the driver does not modify the color settings.

The read-only button marked Video Present shows whether the hardware is detecting a video signal on the currently active input. This control is updated only when you make a change to the Video Input or Video Standard and click the Apply button.

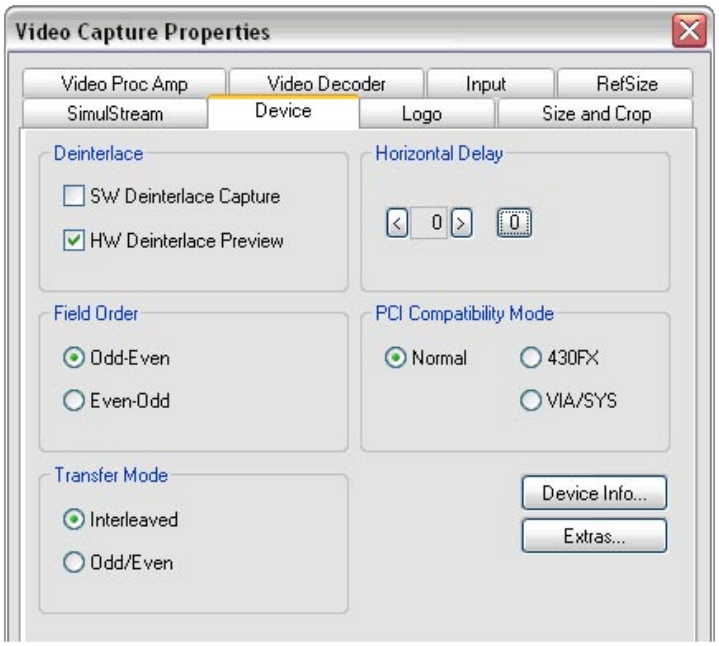
The Video Standard control group is the same as the control on the Video Decoder tab. The North American standard is NTSC. The Japanese standard is NTSC-Japan. The five PAL standards, B, D, G, H, I are almost identical to each other, and are treated the same way by the Osprey driver. The driver also supports SECAM video. Refer to Video Driver Topics, Video Standards and Sizes, for more information.

Changes made to these settings apply to all video preview and capture pins on the currently selected device. If you have multiple Osprey cards, set the input individually for each of them.



7 ***The Input Tab***

Changes take effect only when you click the Apply button. If video is running, there may be a brief glitch while the settings take effect.



8 ***The Device Tab***

The Device Tab

These controls (figure 8) set important low-level operating parameters for the driver. Changes made on this page apply to all video preview and capture pins on the currently selected device.

Field Order

This control is useful only if you are capturing video from a digital camera, routed through the Osprey card's analog composite or s-video input. The normal field pairing order for NTSC cameras is Odd-Even. However, some progressive video cameras and video footage that originated on film may have a different field dominance that requires pairing of even/odd fields into frames. If you notice that there are problems with interlaced video such as "comb" effects, see if the Even-Odd setting clears up the problem.

Deinterlace

When you capture interlaced video that has high motion content, you will see horizontal "comb" artifacts that reduce the apparent quality. Deinterlacing will remove the comb effects and produce a better looking high motion image. Deinterlacing has little if any effect on still or low motion images. The Osprey AVStream driver uses two different deinterlace methods for Capture and Preview. For Capture, a software-based deinterlacing function is used. Since the deinterlacing is done in software, it does use CPU bandwidth and thus may have a performance impact on your video processing depending on the speed of your machine.

For Preview, the driver exploits the hardware-based deinterlacing capability that resides in most display adapters. No CPU bandwidth is used; however, our experience so far is that the quality of the deinterlacing is not quite as high as that offered by the software-based capture pin method. When Preview Pin deinterlace is enabled, the only video color formats available for preview are YUY2 and RGB8 greyscale, since hardware deinterlace only works only for YUY2.

The deinterlace controls have no effect when captured video is from a single field only. Video is captured only from a single field if the capture height before cropping is less than or equal to the field height.

For more information about interlacing and deinterlacing, refer to De-Interlacing in the Video Driver Topics chapter.

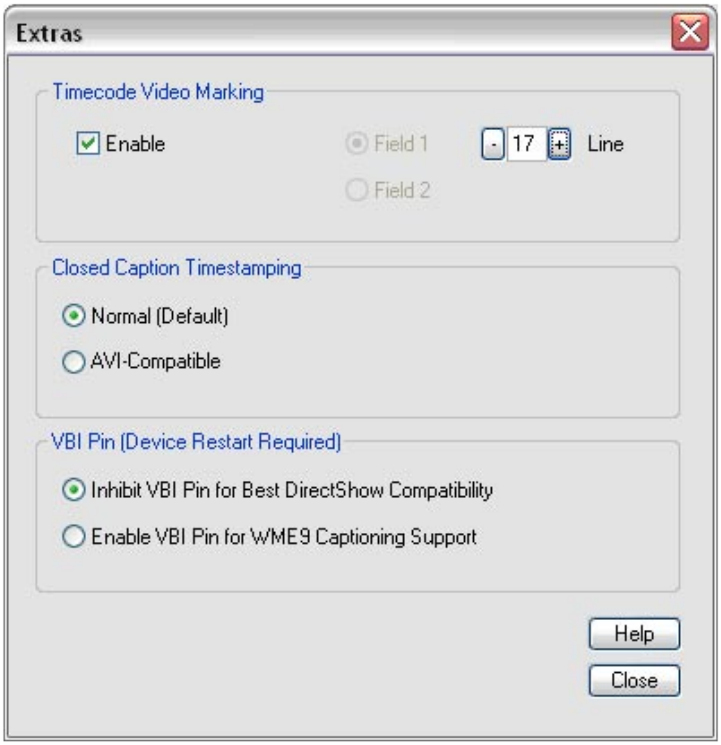
Transfer Mode

This control affects capture of video from a digital camera, routed typically through the Osprey card's DV input. In normal video, including many digital cameras, field 1 containing lines 1, 3, 5… of the video is transmitted in its entirety followed by field 2 containing lines 2, 4, 6…. The capture card interleaves the two fields together, and the Interleaved setting should be used. A digital camera, however, may transfer data in progressive mode, meaning that the data is transferred as a single field of lines 1, 2, 3, 4, 5…. You will know that you need to use the Odd/Even setting if the video displays as two separate compressed fields, one on top of the other.

Horizontal Delay

This control adjusts the left-right position of the image. The horizontal delay from horizontal sync to start of video is different from the standard for some input devices. If this is a problem you may see a vertical black line at the left or right edge of the video.

9 ***The Device Info Dialog***



10 ***The Extras Dialog***

You can use this control to reposition the video. If you start video preview running before you use this control, repositioning will be interactive. Use the arrow buttons to move the video, and the "0" button to reset it to the normal position. With uncropped video, the video will shift only on every second increment 0, 2, 4… . This control affects all inputs on the currently selected device.

PCI Compatibility Mode

Some PCI bridges present compatibility problems for the Osprey hardware, especially systems using the 430FX chipset. The symptom will be dropping of a significant amount of audio and/or video data. Use the "Normal" setting unless you are seeing this symptom, but if you are seeing it, try setting this control to "430FX", or, possibly, to "VIA/SYS". The change will take effect as soon as you click "Apply" or "OK".

SimulStream

The SimulStream group will say "Not installed for this device" until you install either an evaluation version or full version of SimulStream. When SimulStream is installed it will indicate the status of the license. Refer to the SimulStream section of this guide for a description.

Device Info

Device Info displays basic information (figure 9) about an Osprey device – what model it is, its location on the PCI bus, its type code and serial number, and the version of the driver.

Extras

"Extras" (figure 10) are features of the AVStream driver that are new or subject to change. Extras may also include workarounds to apparent DirectShow issues that are expected to be resolved fairly soon. Extras should be expected to change more frequently than other aspects of the driver. The current Extras are the following:

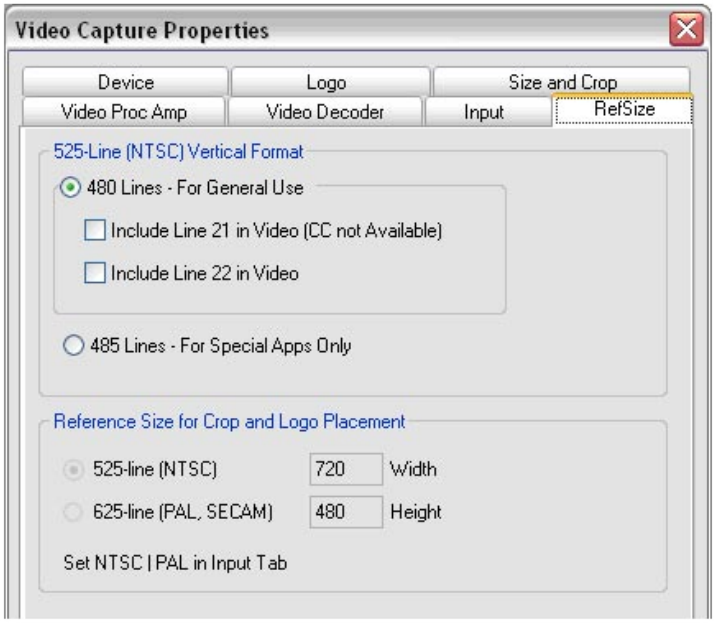
A few users may need to look at the VBI control group at the bottom of this page. For most users the short answer is, leave it in the Inhibit VBI Pin setting.

"VBI" is short for Vertical Blanking Interval, and refers to nonvideo data that may be present in the vertical retrace region of a video signal. The Osprey-300 does not capture full VBI data, although it does deliver decoded Closed Captions (CC) and Vertical Interval Timecode (VITC). Therefore, the VBI Pin control should normally be left on the Inhibit VBI Pin setting.

There is, however, an incompatibility with Windows Media Encoder 9 that arises if the VBI pin is inhibited. Although WME9 accepts closed caption data from a dedicated CC pin such as the Osprey-300 provides, it looks at startup for a VBI pin rather than for a CC pin when trying to determine whether the driver supports CC. To satisfy this requirement, we provide the option of exposing a nonfunctional VBI pin.

If you change this control, the change will not take effect until you restart the video capture device, either by rebooting the system (recommended) or restarting it with the Device Manager (advanced but quicker). The other two control groups are quite specialized. For information about Timecode Video Marking, refer to the Timecode section of the Video Capture Topics chapter.

Normally, the Enable control should be left unchecked. For an explanation of the Closed Caption Time stamping issue, refer to the Closed Captioning section of the Video Capture Topics chapter. Most user should leave this control in the Normal position.



11 ***The RefSize Tab***

The RefSize Tab

The RefSize tab (figure 11) controls features related to the reference size, format, and proportions of the video. These controls are not commonly used. Most users can set up this page once and never refer to it again. Note that this page does not provide everyday control of the final output size of your video. Final output size is controlled either from your application, from the Crop tab, or from the Pin Properties dialog described in the next section.

Changes made on this page apply to all video preview and capture pins on the currently selected device. Note for users familiar with the Osprey-100 and -200 series cards: These cards have a setting for horizontal video sizing – either square pixel or CCIR-601. The Osprey-300 hardware's raw capture horizontal resolution is always the CCIR-601 standard size of 720 pixels for both 525-line (NTSC) and 625-line (PAL/SECAM) formats. You can scale the video down to any final output size, but the original horizontal size is always 720, so there is no horizontal resolution control.

525-Line (NTSC) Vertical Format

This control is only meaningful for NTSC users. It has no effect for PAL and SECAM 625-line video standards.

- Select 480-line video for all normal applications.
- Select 485-line video for specialized applications.

When 480-line video is selected, you have the option of treating the Closed Caption line, Line 21, as video or as Closed Caption data. If you want to capture or display decoded Closed Captions, you must uncheck the box titled Include Line 21 in Video. If you are seeing an unwanted stripe of black and white bands at the top of your video, you will also want to uncheck this box. With this box unchecked, the start and end of the 480-line range of captured video are both bumped down by two lines.

The checkbox titled Include Line 22 in Video controls whether Line 22 is captured and displayed. Some broadcast material encodes data in this line. This checkbox removes that data from your video; however, the driver currently does not support decoding of this data.

Reference Size for Crop and Logo Placement

This part of the dialog is read-only because you do not set it directly – rather, it shows the results of settings made elsewhere in the dialog.

The settings shown by the 525-line / 625-line buttons reflects the video standard selected in the Input or Video Decoder tab. NTSC and PAL-M formats result in 525-line, 29.97 frame per second video. PAL (other than –M) and SECAM formats result in 625-line, 25 frame per second video.

The Height and Width boxes show the reference size of the incoming video based on all the settings you have made.

Refer to Video Driver Topics, Video Standards and Sizes, for more information on how the reference size is determined.

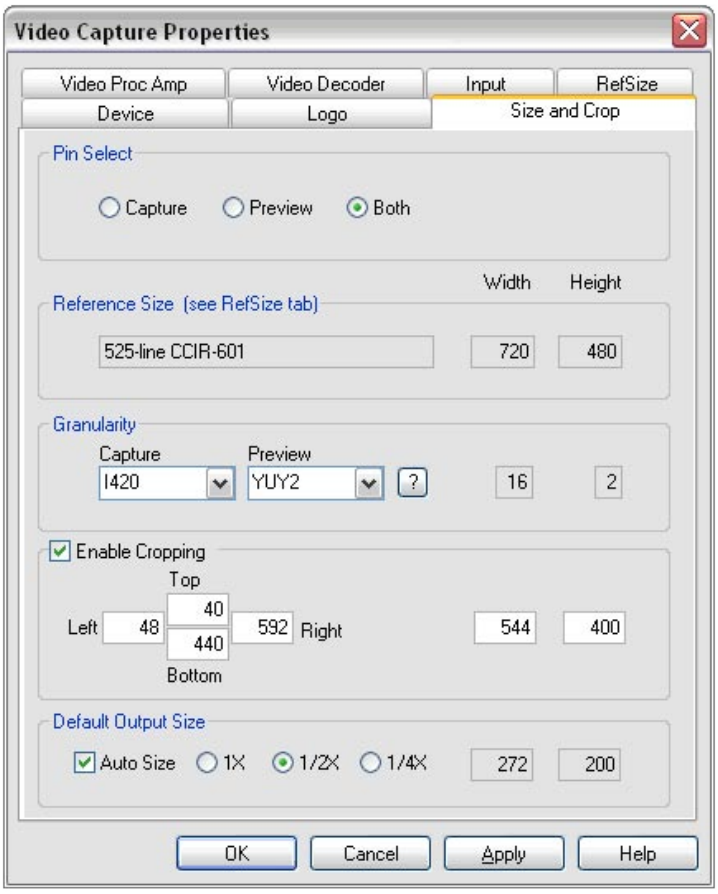
The Size and Crop Tab

This tab has two functions:

- It sets the default output size, whether or not cropping is enabled.
- It enables and disables cropping, and sets the cropping rectangle.

The default output size is the video size that appears in the DirectShow pin properties dialog as the "default" choice. It is a pathway for setting a custom or nonstandard video size in applications that do not have a custom video sizing controls built into them.

"Cropping" means removal of unwanted video around the edges of the incoming image. For example, if the incoming video is letterboxed, with an aspect ratio wider than 4:3, you can crop away the black slivers at the top and bottom of the image and capture just the active portion.



12 ***The Size and Crop Tab***

Pin Select for Size and Crop

When the "Both" radio button is selected, changes you make to the crop setup apply to both the capture and preview pins.

If you like, however, you can have different setups for the two pins. For example, you could enable the cropping on the capture pin but not on the preview pin. When you select the "Capture" radio button, the current crop settings for the capture pin are loaded, and changes you make apply only to the capture pin, not to the preview pin. The "Preview" button works analogously.

Note to SimulStream users: The Pin Select control group is different when SimulStream is enabled. Refer to the SimulStream section of this guide for a description.

Another note: The Osprey SwiftCap capture application greys out the Pin Select choices and forces the "Both" selection. This application expects the Size and Crop settings for Capture and Preview to be locked together. Some other Osprey applications may do this, by intention, as well.

Reference Size

The reference size information is always read-only on this dialog tab. It is determined by settings made on other tabs – specifically, the Input tab, where a 525-line or 625-line standard is selected, and the RefSize tab, where NTSC vertical sizing is selected. The read-only text box describes which of these options is currently governing the reference size.

The reference width and height represent the full uncropped size of the incoming video. Your crop settings are interpreted relative to this reference size. For example, if you are capturing 525-line video, with a reference size of 720x480, and your crop rectangle is (0, 0, 720, 480), then your video is effectively uncropped. But if you are capturing 625-line video, with a reference size of 720x576, the same (0, 0, 720, 480) crop specification will truncate the bottom edge of the video.

Granularity

Most video data capture formats impose restrictions on the possible width and/or height of the video, referred to as "granularity" restrictions. For example, the I420 capture format requires that the capture width be a multiple of 16 and the capture height be a multiple of 2. The Rgb32 format, on the other hand, imposes no restrictions at all.

The granularities of the supported color formats are shown on table 1.

The Granularity controls show you the granularity restrictions for the selected video format, and assist you in choosing crop and output sizes that observe those restrictions.

When the Crop tab is opened, the drop boxes are initialized to the current or most recently used formats for the selected pins.

If Pin Select is set to Capture or Preview, only the corresponding drop box is selected. The two small read-only edit boxes to the right of the group show the horizontal and vertical granularities for that pin's format.

If Pin Select is set to Both, both the capture and preview drop boxes are enabled for editing. The two small read-only edit boxes to the right of the group show the worst-case horizontal and vertical granularities required by both formats.

Values you subsequently enter for crop width, crop height, and default output width and height will be adjusted to these granularities. Adjustments are made when you click on another control.

You can change the video format in the drop box, so that granularities are set for a different format. Note that this does not automatically cause the pin to have this format – you still have to select that format using the Pin Properties dialog or via your application.

1 ***Granularities of Supported Color Formats***

Format	Horizontal	Vertical
YUY2	2	1
UYUV	2	1
I420	16	2
YVU9	16	4
RGB55	2	1
RGB24	4	1
RGB32	1	1
Greyscale	4	1
[none]	1	1
[any]	16	4

If you set up your crops with a less restrictive granularity (for example, YUY2) and then capture with a more restricted granularity (for example, I420), the driver may automatically adjust the video crop and/or output size without notifying you. You may also find that in the Pin Properties dialog the default size you wanted is not listed – because it is not a legal size for this format.

If you select "[none]" as the video format, no granularity adjustments are applied to your crop and size data. In practice, "[none]" is the same as RGB32. Note that the driver may silently adjust your crop or output sizes if the video format actually in use requires it.

If you select "[any]" as the video format, the coarsest granularity required by any of the available formats is applied to your crop and size data. In practice, "[any]" is the same as YVU9. You are guaranteed that your crop and output sizes will never be adjusted, regardless of what video format you select now or in the future.

If in the Pin Select controls you select "Capture", all of the formats in the table above are listed in the drop box. If you select "Preview", the only format available is YUY2 (as well as " [none]" and "[any]") – because the Osprey AVStream driver delivers all preview video in YUY2 format.

If you select "Both", the horizontal granularity is at least 2, because the Preview YUY2 format has horizontal granularity 2. You would notice this only if you select RGB32.

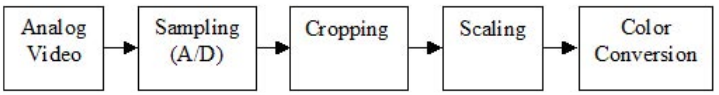
Enable Cropping

If you uncheck the Enable Cropping checkbox, your video will not be cropped regardless of any crop settings you might previously have made. The edit boxes showing the edges, height, and width of your crop will be read-only and will show settings for full-frame, uncropped video.

If you check the Enable Cropping checkbox, your video will be cropped to the indicated boundaries. Previously stored crop settings will be recovered.

Note that the crop width and height are subject to the granularity requirements of the selected video format, as explained in the previous section. For example, if your video format is I420 and you try to set a crop width of 360, it will get adjusted down to 352.

It will be useful to understand when cropping is performed in the hardware. Figure 13 shows an overview of typical video processing.



13 ***Typical Video Processing***

The input to cropping is considered a full resolution frame. Thus, although one may think of video as being composed of fields, the cropping parameters assume operation on a full resolution interlaced frame (composed of two fields) or a full resolution progressive frame. Cropping then sets up a region of interest (ROI) for further scaling and processing.

Once cropped, all other video operations are processed on the cropped resolution. If you check Enable Cropping, the six edit-boxes are enabled. The Top and Left boxes are always used to set the top left corner of the ROI. The Right and Bottom boxes can be used to set the bottom right corner of the ROI. The Right and Bottom boxes implicitly set the width and height of the ROI and modifications to these values are reflected in the Width and Height boxes. Optionally, you may set the Width and Height boxes, which is often more natural anyway, and let the driver implicitly change the Right and Bottom values.

If you enable cropping, key in some custom settings, and then disable cropping, an uncropped specification will be displayed and your settings will disappear from view. However, the driver does remember your custom settings, and if you enable cropping again, they will reappear.

An important note: The Osprey AVStream driver only downscales video; it never up-scales it. That is, the output video must be equal-sized or smaller than the raw size of the incoming video. If your crop specification would result in up-scaling, the driver will ignore it and will capture or display uncropped video.

For example, if your reference size is 720x480, and the left, top, right, and bottom edges of your cropping rectangle are 180, 120, 540, and 360, so that the cropped size is 360x240, then your video cannot be larger than the cropped size, 360x240.

Finally, recall that the cropped ROI is based on a frame. Thus if a cropped ROI is setup defining a 360x240 area, for example, then a capture of video sized at 360x240 will result in video being captured from two fields. If the source was interlaced you may see interlacing artifacts in the captured video. This may be initially confusing since most users typically think of 360x240 video capture only coming from a single field and thus would not have interlaced artifacts.

However, in this case, the source video is only 360x240 in size (i.e. the cropped ROI) and thus any captured video that is greater than the field height within the cropped ROI (equal to ½ cropped ROI height) will result in a scaled capture of multiple fields. Any capture less than or equal to the field height within the cropped ROI will result in a scaled capture of just a single field within the ROI. Thus for this example, video sizes greater than 120 in height to 240 in height results in video from both fields being processed by the scaler. In this example video sizes less than or equal to 120 in height will result in video being captured only from a single field.

Default Size

The standard DirectShow Pin Properties dialog allows you to select the height and width of captured video from a dropdown list. The dropdown list has a particular range of choices that may or may not fit your needs. The dropdown list includes one default size that is provided by the capture driver. The Default Size control allows you to set up what default size will be shown.

If you check the Auto Size checkbox, your default video size will be automatically sized to your crop settings. The three radio buttons, 1X Crop, 1/2X Crop, and 1/4X Crop, determine whether the output size is scaled down from the crop size.

Example 1: If you are running standard 720x480 NTSC video, and the Enable Cropping checkbox is not checked, your crop size is 720x480. With Auto Size checked, and the 1X Crop radio button selected, your default size will be 720x480; with 1/2X Crop, 360x240; and with 1/4X Crop, 180x120.

Example 2: If you have enabled cropping with size 360x240 (one quarter of the full video area), the default Auto Sizes are as follows: 1X, 360x240; 1/2X, 180x120; 1/4X, 90x60.

If you leave Auto Size unchecked the default size radio buttons are disabled and the height and width edit boxes are enabled. You can set any default size with the following three restrictions:

- Since the driver does not upscale video, the default size must be smaller than the crop size. For example, if the crop size is 360x240, you cannot set default size 450x300. If you try to specify an output size that would result in upscaling the video, a warning message appears when you try to exit the Size and Crop page telling you to correct the size before proceeding further.

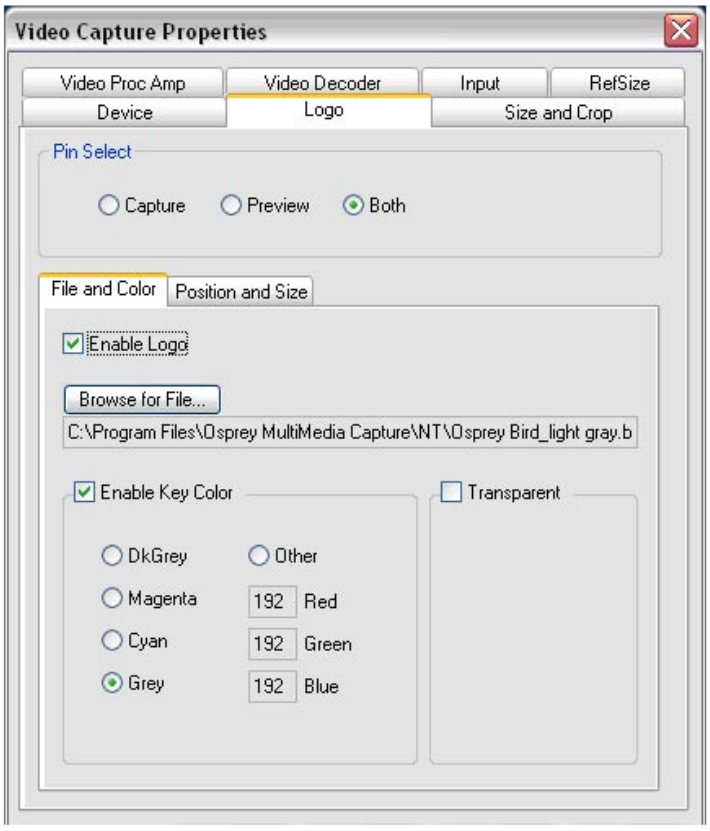
- Sizes are subject to the granularity requirements of the selected video format, as explained in the Granularity section above. For example, if your video format is I420 and you try to set a default width of 360, it will get adjusted down to 352 as soon as you click on another control.

- The driver will not accept sizes below a set minimum. For the Osprey-300 release, the minimum size for captured video is 48 wide by 36 high. The Size and Crop page will not accept output size selections that would make the video smaller than the set minimum size.

The VMR7 video renderer imposes the following further minimum size restriction:

If hardware deinterlace is selected, the minimum size that can be rendered is 88x72. If a smaller default size is set, it will not available for selection for the preview pin. For example, for applications that use the standard Pin Properties pages, the default will not be displayed there as a possible selection in the Output Size list.

Note that Pin Properties dialog default entry does not appear in the default VFW/DirectShow mapper dialog. Thus, unless a VFW application, like Virtual Dub, specifically allows for custom resolutions, the VFW app will only be able to select from the options the VFW/DirectShow mapper lists.



14 ***The Logo Tab***

The Logo Tab

The logo property superimposes a graphic over captured video using the logo property controls (figure 14).

Logos have the following characteristics:

- Any RGB-24 bitmap in .bmp file format can be used.
- A selectable key color can be specified; all parts of the logo graphic with that color are not drawn on the video.
- A transparency control can be used to blend the logo graphic with the background video.
- The logo can be interactively positioned and scaled.
- The logo appears on both captured and previewed video. If the capture and preview video are different sizes, the logo is scaled to look the same on the preview video.

The logo property controls work best when you are already running preview video. With preview video running, you can view your changes interactively. (If your application displays capture video in real time, capture video can be used instead.)

The logo property is organized as three sub-pages – File, Color, and Position. The Pin Select control group and Enable Logo are common to all three. For other controls, click the File, Color, or Position radio button to bring up the right sub-page.

Logo Pin Select

When the "Both" radio button is selected, changes you make to the logo setup apply to both the capture and preview pins.

If you like, however, you can have different setups for the two pins. For example, you could enable the logo on the capture pin but not on the preview pin, and thereby save some cpu time. When you select the "Capture" radio button, the current logo settings for the capture pin are loaded, and changes you make apply only to the capture pin, not to the preview pin. The "Preview" button works analogously.

Note to SimulStream users: The Pin Select control group is different when SimulStream is enabled. Refer to the SimulStream section of this guide for a description.

Another note: The Osprey SwiftCap capture application greys out the Pin Select choices and forces the "Both" selection. This application expects the Logo settings for Capture and Preview to be locked together. Some other Osprey applications may do this, by intention, as well.

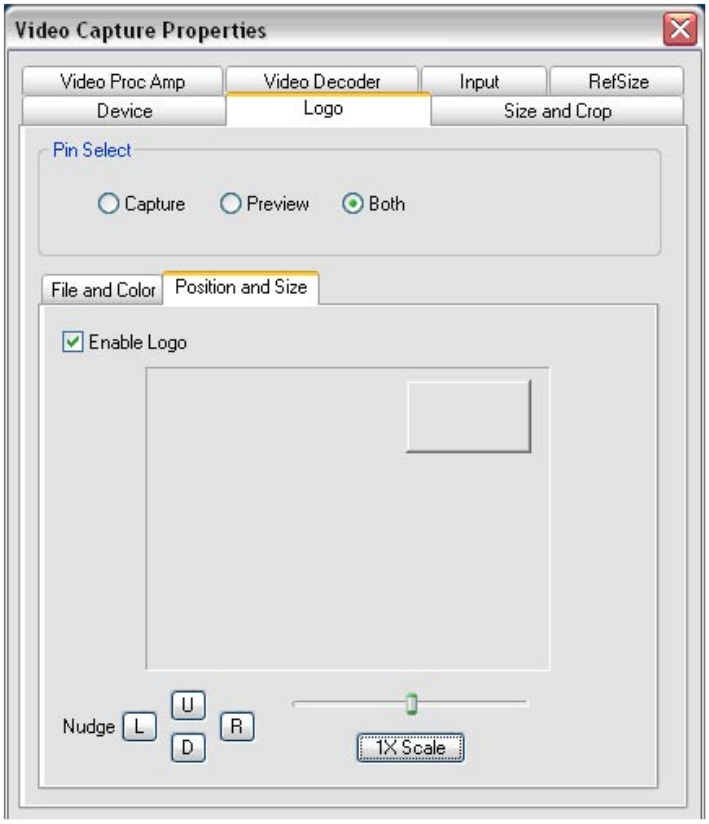
Logo File and Color

The Enable Logo checkbox, which is repeated on both sub-pages, enables or disables logos. If you disable logos, all your other logo settings are retained for when you re-enable logos again.

The [Browse…] button brings up a standard file select dialog. Logo files must be:

- In .bmp format with a .bmp filename extension.
- In RGB-24 format.

If you have a graphic that is in another format, edit it with a drawing or photo edit program such as Windows Paint, and save it as RGB-24.



15 ***The Logo Position and Size sub-page***

You can control the key color and the transparency effect. If preview video is running, you will see your changes interactively.

A "key color" is a color that disappears from the graphic so that the underlying video shows through unchanged. If the Enable Key Color checkbox is unchecked, all colors are displayed.

If the checkbox is checked, key coloring is activated. The five radio buttons are activated. You can select one of four standard colors – dark grey, medium grey, cyan, or magenta – or a custom color. It you select Other, for a custom color, the three edit boxes – Red, Green, Blue – are activated, and you can enter any color value into these boxes.

The key color specification must be exact – visual similarity is not enough. If you have a pre-existing graphic with an unknown background color, you will have to either get the exact RGB value from you draw or photo program, or fill the key-colored regions with a known color of your choosing.

The Transparent checkbox enables a translucency effect in which the color of each pixel of the logo is averaged with the color of the underlying video. This effect can be used in combination with a key color – key coloring is applied first, then the transparency effect is applied to the remaining non-key-colored logo pixels.

Logo Position and Size

The Logo Position and Size sub-page (figure 15) lets you position and scale the logo. It is strongly recommended that you have preview video running when you use these controls.

The large indented rectangular area at the top of this sub-page represents the video area where the logo can be positioned. The smaller rectangle represents the logo. To position the logo, click on the logo rectangle and drag it to the new position.

The four "Nudge" buttons, L, R, U, and D, move the logo left, right, up, or down exactly one pixel at a time on the output video. Since the positioning rectangle may be scaled down from the full video size, the Nudge buttons allow more accurate positioning of the logo.

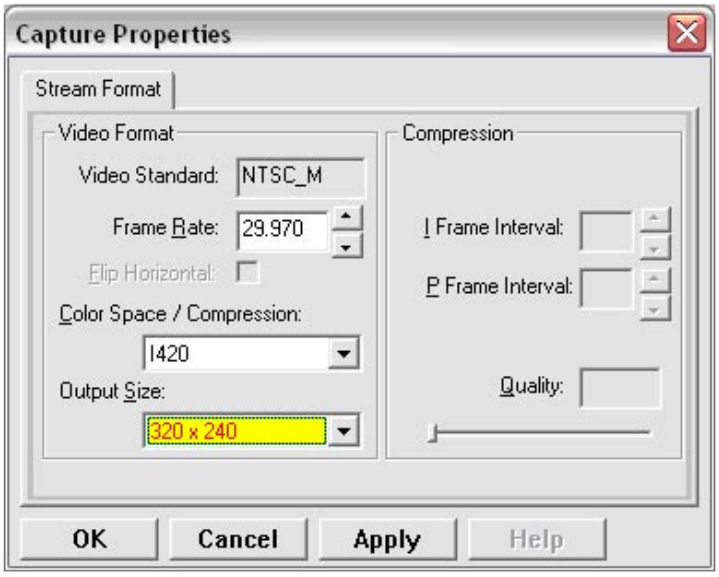
The slide control at the bottom right of this sub-page controls the scaling of the logo. The [1X Scale] button returns the size to the original size of the .bmp graphic. The quality of a scaled image will not be as good as the quality of the 1X

image. We recommend that wherever possible for production work you prepare artwork of the exact size at which it will be used.

Notes on Logos:

- Because the logo properties tab is used to set up a logo interactively on live video, its behavior is different from the behavior of the other tabs. The driver updates the controls on the logo tab immediately, without waiting for you to click [Apply]. You will see that [Apply] enabled only right after you select a different pin spec. As soon as you make any change to any logo control, [Apply] becomes disabled and stays that way until you change to another pin spec.

- If you set up a logo with video set to one size, then resize video, the logo is scaled correspondingly. For example, if the logo is originally set up for 320x240 video, and you change to 640x480 video, the logo displays at twice the size of the original bitmap. Click the [1X Scale] button to restore the logo to its unscaled size.



16 ***Capture and Preview Pin Properties Dialog***

Capture and Preview Pin Properties

This dialog (figure 16) is the default DirectShow way for obtaining a user's settings for the output format of captured video.

Changes made in this dialog apply to the currently selected pin only. The settings for the capture and preview pins are independent; in applications like GraphEdt or AMCap, both must be set before both pins are used.

Access to the Pin Properties dialogs is application-specific. For example, in the AMCap capture application, access is by two entries in the Options menu, Video Capture Pin… and Video Preview Pin…. In GraphEdit, right click on the pin you wish to set the properties for.

Many applications do not use these dialogs; they instead have their own built-in ways of setting these parameters.

The three active fields of the dialog set the Color Space or pixel format of captured video; Output Size of the video, and Frame Rate. The recommended order for setting these parameters is: First, Color Space; second, Output Size; third, Frame Rate. If you set the frame rate before the other two, it may be lost so that you have to reset it.

The Output Size drop box displays a selection of standard size settings plus one additional setting designated as "default" that DirectShow obtains from the capture driver. You can obtain specialized video sizes by a two-step process: First, go to the Filter Properties Crop tab described above and set the Default Size to a custom value. Then, enter the Pin Properties dialog and select the default entry, which will now be set to your custom value.

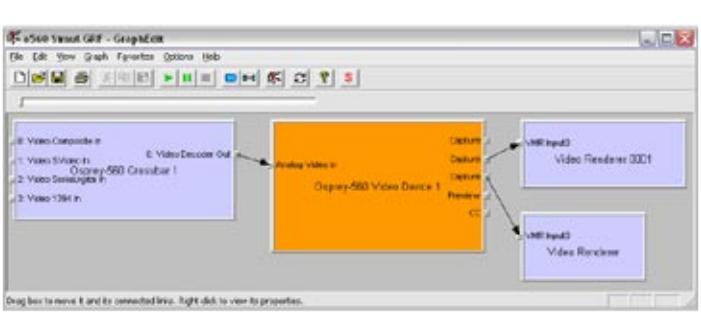
For more information about the supported color formats, refer to Video Driver Topics, Color Formats.

The area of the dialog marked Compression is not relevant for the Osprey AVStream driver.

The Video Standard setting is read-only in this dialog. To set the video standard, go to the Video Decoder tab of the filter property pages.

CHAPTER 6

Osprey-300 Capture Card
Video Driver Topics



1 *The Simulstream application window*

SIMULSTREAM

SimulStream (figure 1) is a separately priced software option to the Osprey AVStream driver that enables capture of multiple streams from a single device. Specifically, you can have multiple video capture streams in a single application, or multiple applications each with one or more capture streams. You can have just one preview stream per application, but multiple applications can each have their own preview stream. Each stream can have its own color format, size, frame rate, crop, and logo specifications. For details about purchasing and installing SimulStream, refer to www.viewcast.com. When you first install this driver, a 10-day evaluation is installed as part of it.

This section describes the capabilities of SimulStream, and explains additions and changes to the filter properties interface.

The SimulStream Tab

The global SimulStream controls are grouped on a separate property page. This page will say "Not installed for this device" (figure 2) until you install either an evaluation version or full version of SimulStream.

When SimulStream is installed it will indicate the status of the license. With both the full and evaluation versions you have the option to enable or disable SimulStream. When it is disabled, the only control on the property page is the following:

When you enable SimulStream, the property page changes to appear as shown in figure 3.

SimulStream Mode

This control determines how the driver performs scaled copying of video frames. Some SimulStream scenarios involve software-based copying of video. There is a tradeoff to be made between maximizing video quality and minimizing the cpu bandwidth used by the copy process.

Most users using machines with gigahertz and higher clock rates can select Maximum Video Quality, which is the default setting. With the high-quality setting the driver performs interpolated scaling, which results in smoother edges and features.

If you are working with many streams, large formats, or a slower machine, you may need to select Minimum CPU Utilization in order to achieve your throughput target.

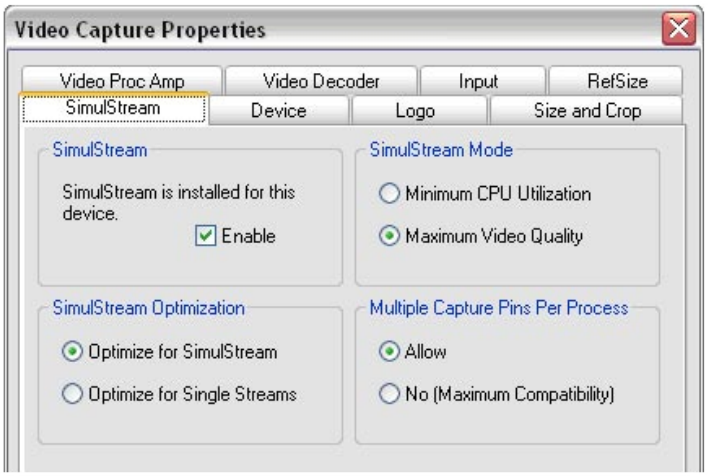
The differences in quality between the two modes are most evident when software deinterlace is turned off. There are subtle improvements from the high-quality setting even with software deinterlace enabled.

If the horizontal and vertical scaling factors between the captured raw video and the scaled output are exactly integral (2:1, 3:1, 4:1 …), the driver does not interpolate and this setting has no effect.

SimulStream Optimization

This control affects the way the driver enters SimulStream mode when multiple streams are run.

2 ***The Simulstream Properties Page before (top) and after (bottom) you have installed Simulstream***



3 ***The Simulstream Properties Page***

When "Optimize for Single Streams" is selected, the Osprey driver is configured for minimum cpu usage and bus bandwidth utilization when possible. It switches to more cpu-intensive SimulStream processing only when additional pins start running.

When it does make this switch, there could be a slight transition in the appearance of the video. In this mode you have the option to run with Software Deinterlace either enabled or disabled.

When "Optimize for SimulStream" is selected, the driver always runs in SimulStream mode, and will use more system bandwidth to do so if necessary. With this setting, Software Deinterlace is always turned on, and the Software Deinterlace control is disabled.

It is recommended that you use the Optimize for SimulStream setting only when you are actually running multiple video capture pins. There is no quality advantage, and some system bandwidth penalty, when you are running just one stream.

Changes to this control take effect when you restart the application.

Multiple Capture Pins Per Process

A few applications do not work correctly when they see multiple capture pins on the same device. Specifically, RealNetworks Helix Producer Plus 9.0 has a known problem.

When you select the "No" setting, only one capture pin is visible to each application instance. You can have multiple applications, each with one capture pin, including multiple instances of the same application. But a single instance of an application is not allowed to use more than one capture pin.

When you select "Allow", each instance of each application can have multiple capture pins.

This control does not affect the preview pin. Applications can always use one preview pin in conjunction with one or more capture pins.

Changes take effect when you restart the application.

Per-Device Controls and Per-Pin Controls

Some controls operate on the device as a whole, while other controls operate on individual pins. Specifically, controls on the following tabs are per-device:

- Video Proc Amp
- Video Decoder
- Input
- Device
- RefSize.

Controls on the following tabs are per-pin:

- Size and Crop
- Logo

The DirectShow Capture and Preview Pin Properties are also per-pin. With SimulStream not enabled, the per-pin controls are per-pin only in the sense that the single capture pin and single preview pin can have different settings.

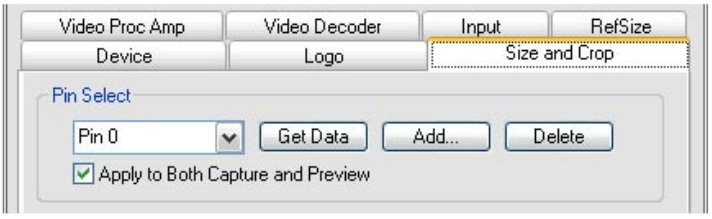
With SimulStream enabled, it is possible for each of multiple capture and preview pins to have a different cropping specification, a different logo with its own placement and color keying, and a different color format, video size, and frame rate.

Defining and Selecting Pins

When SimulStream is enabled, the Pin Select control group at the top of the Crop and Logo property tab changes as shown in figure 4.

The following three general points are important about this control group:

- When you are working with a per-pin control, changes you make apply only to the currently selected pin. It is easy to copy changes from one pin to another (as explained below), but doing so does require a separate operation. If you have checked "Apply to Both Capture and Preview", changes you make apply only to the currently select Capture and Preview pin pair.



4 ***The Pin Select Control Group on the Crop and Logo Properties Tab after Simulstream has been enabled***

5 ***The Add Pin Dialog***

- When you define a pin, you give it a number, so it is "Capture Pin 0", "Capture Pin 1", etc. These numbered pin specifications do not map absolutely to particular pins belonging to a particular application. They map only to the startup order of the pins. If you always start application "A" first, then application "B", you will get consistent results. But if you reverse that order, the applications will pick up one another's pins and pin specifications. This problem exists because DirectShow and the AVStream programming model do not provide a concept of persistent pin identities – software pin objects are dynamically created as needed – and about the only way they can be identified is by the order in which they are created.

- Throughout this section the terms "pin specification" ("pin spec" for short), and "pin" will be used. They are not the same. A "pin specification" is a static or persistent group of per-pin settings that you can define using the driver's property pages. A "pin" is a transient instantiation of a DirectShow capture or preview stream. When a "pin" is created, the driver will look for a "pin spec" defining the settings to apply to the "pin".

Adding a Pin Specification ("Add...")

When you enable SimulStream and open the Cropping or Logo property tab for the first time, you will see that two default pins are created for you – "Capture Pin 0" and "Preview Pin 0". To add definitions for other pins, click the Add... button to bring up the Add Pin Dialog (figure 5).

Click Capture or Preview to determine which type of pin you want to define, and provide an instance number for the pin.

If you had checked the "Apply to Both Capture and Preview" button before entering this dialog, "Both" will be selected, and all three radio buttons will be grayed out. You will be in this case be creating a numbered capture / preview pin pair rather than an individual pin.

Although you can enter any pin number, you will probably want to provide the next unused instance number in sequence – for example, if you already have Capture Pins 0 and 1 defined, the next capture pin should be 2. When applications are opened (or multiple pins are started in a single application), they will each take on the next available sequential pin number 0, 1, 2… – regardless of whether you have provided a numbered definition for that pin. If the driver doesn't find in the registry a specification for a new pin it is creating, it will create the pin with default settings. It will also create a new pin definition in the registry initialized to that data. Thus, if you explicitly define capture pins 0, 1, and 3 - but not 2 – a default definition for pin 2 will soon appear anyway, as soon as an application creates a capture pin 2.

If you try to define a new pin for which a specification already exists, the new definition will be ignored, and the existing data will not be altered.

When you click OK to exit this dialog, the data for the pin that was selected before you entered the Add Pin dialog will apply to the new pin definition. If you click the GetData button (see below) before any data has been saved for the new pin, you will get the driver's defaults for this pin.

The new pin definition is not actually saved in the registry until you click Apply or OK.

Deleting a Pin Specification ("Delete")

Use the drop box to select the pin specification you want to delete, and click Delete. The data for this pin specification will be removed from the registry.

As noted above, however, if you delete a pin specification – let's say, Capture Pin 1 – and then start an application that has two capture pins and will therefore be looking for the Capture Pin 1 data, the driver will recreate the registry data with default values. The main purpose of Delete therefore is to get rid of high-numbered pin specs that you do not expect ever to use.

Get Data

Select a pin specification using the drop box, then click Get Data to read that pin spec's data from the registry.

If the "Apply to Both Capture and Preview" box is checked, the data for the capture pin will be read and applied to both pins. If the data for the preview pin is different, that data will be replaced by the capture pin's data as soon as you apply changes.

NOTE: It is not enough just to select the pin specification in the drop box. If you do not also click Get Data you will be applying the previous data on the property tab to the newly selected pin spec. It is helpful to pay attention to the Apply button at the bottom of the property tab. When you select a new pin spec, the Apply button is turned on. If you click Get Data, the Apply button is turned off again.

The interface is designed this way so that you easily and flexibly copy settings from one pin spec to another. For example suppose you have four pin specs defined – for two capture pins and two preview pins, and you want to copy the crop settings from Preview Pin 0 to the two capture pins (but not the other preview pin). The sequence of operations is:

1. Select Preview Pin 0 in the Pin Select drop box.
2. Click Get Data.
3. Select Capture Pin 0 in the Pin Select drop box.
4. Click Apply.
5. Select Capture Pin 1 in the Pin Select drop box.
6. Click Apply.

If you do this while on the crop property tab, these operations will propagate the crop settings only. To propagate logo settings as well, go to the logo tab and repeat this sequence.

Osprey AVStream Driver and Video for Windows

Video for Windows applications control the driver's most important functions via compatibility mode dialog boxes. You cannot access the complete Osprey AVStream Filter Properties directly from these older applications. The compatibility mode dialogs do not have all the controls that are accessible from DirectShow applications.

We therefore recommend that, before first use of a Video for Windows application, you set up and check out the driver using AMCap or a similar DirectShow application.

Selecting the Capture Device

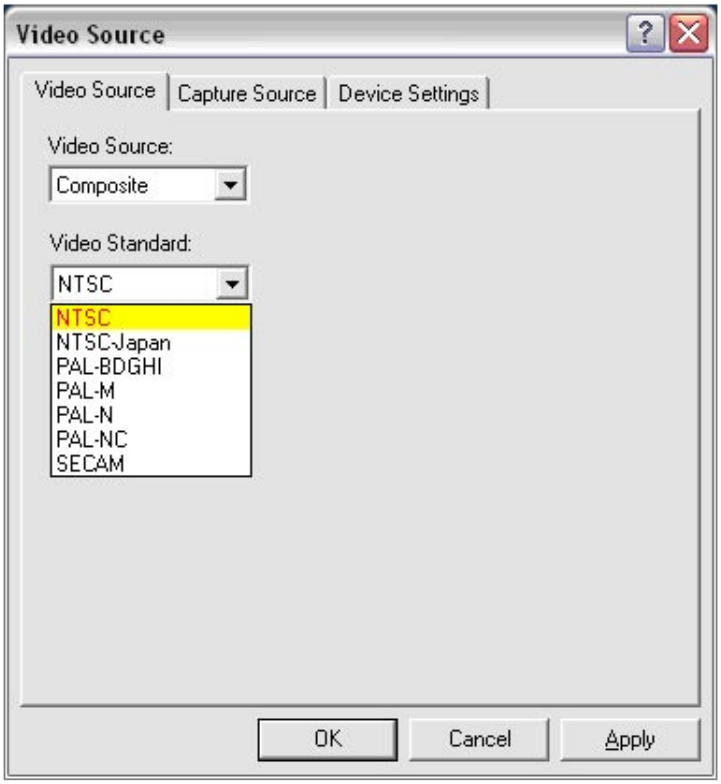
If you have multiple DirectShow video capture devices on the system, selecting the capture device may be a two-step process. The details will differ slightly with different applications. With VidCap32:

1. Pull down the Options menu and select from the list of devices at the bottom. The Osprey AVStream device will be listed as "Microsoft WDM Image Capture".
2. Pull down the Options menu again, and select Video Source. The Video Source Dialog will appear (figure 6).
3. Select the Capture Source tab.
4. Select the device from the drop list.
5. Click Apply or OK.

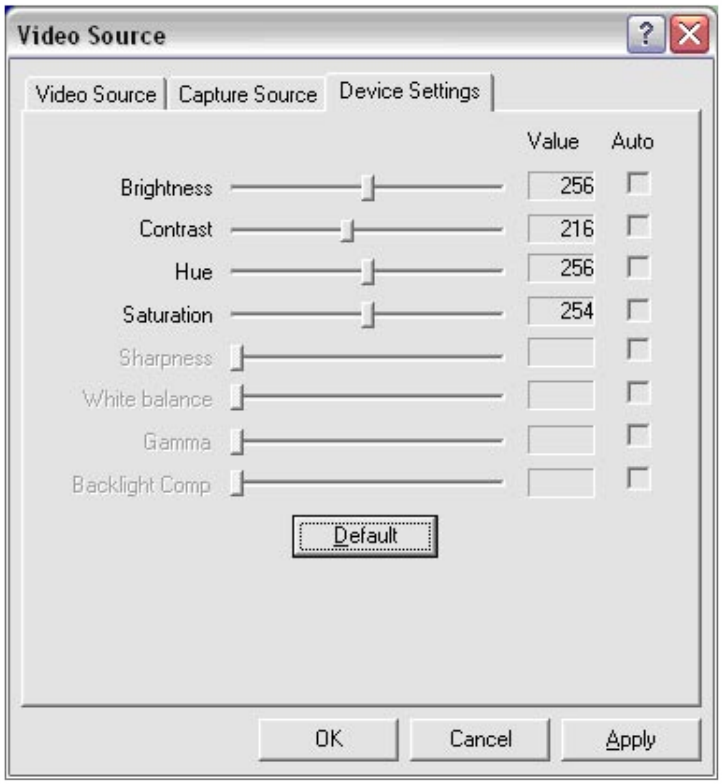
Selecting the Video Source and Standard

In the same Video Source dialog, select the Video Source tab (figure 7). The upper drop list shows the list of inputs for the card. The lower drop list shows the supported video formats. Select these two items and click Apply or OK.

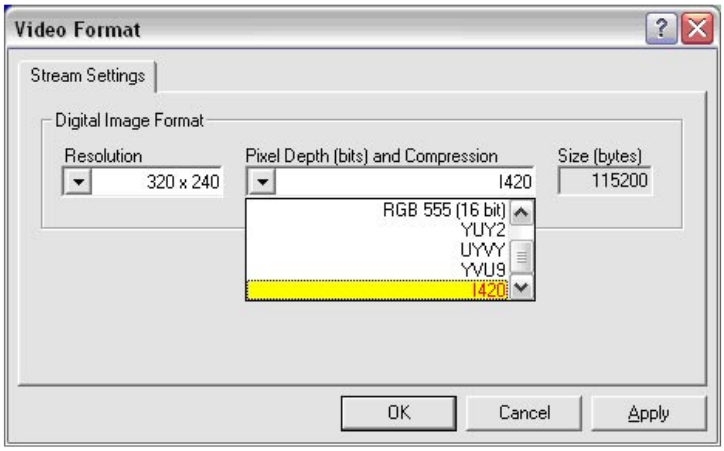
6 ***The Video Source Dialog***



7 ***The Video Source Options in the Video source Dialog***



8 ***Device Settings in the Video Source Dialog***



9 ***The Video Format Dialog***

Brightness, Contrast, Hue, Saturation

In the Video Source dialog, select Device Settings (figure 8). If you have preview or overlay video already running, you can see the effects of the four sliders interactively. For PAL video, keep Hue at its default value.

Video Format

The Video Format dialog (figure 9) is separate from the dialog pages shown previously. Access it from a menu entry or button titled Video Format… or Format…, depending on the application.

1. Select from a list of standard resolutions and video formats.
2. Click Apply or OK to save the selections.

Video for Windows Issues

The mapper from Video for Windows applications to DirectShow drivers presents several problems that are beyond the control of driver implementers. The following comments are derived from tests with VidCap32, but should apply by and large for other Video for Windows applications as well.

- "Overlay" video (in DirectShow this is called "preview" video) always runs when VidCap32 is loaded – even if overlay video is turned off.

- There is no way to set the size of overlay video from the application. It is sized to the default size that is set for the DirectShow preview pin by a DirectShow application such as AMCap or GraphEdt. The size setting in the Video Format dialog shown above has no effect on the size of overlay video.

  If overlay video is sized to 640x480 because that is the DirectShow default setting, and the capture video is sized by VidCap32 to 160x120, then overlay will be captured at 640x480 and scaled down 4:1 in software to the 160x120 size of the VidCap32 overlay window – wasting substantial system bandwidth in the process.

On the other hand, if overlay video is sized to 160x120 because that is the DirectShow default setting, and the capture video is sized by VidCap32 to 640x480, then overlay will be captured at 160x120 and scaled up 1:4 in software to the 640x480 size of the VidCap32 overlay window – resulting in a very grainy image with 4x4 cells.

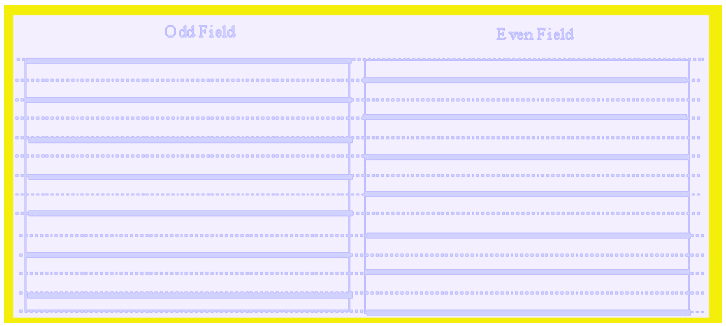
- With VidCap32, video capture runs all the time, even when no video is being previewed or captured. The reason is perhaps so that the mapper can support Video for Windows "preview", which is derived from the DirectShow capture stream.

- A Video for Windows application running over a DirectShow driver may consume 25 to 50 percent of system bandwidth even when it is doing nothing.

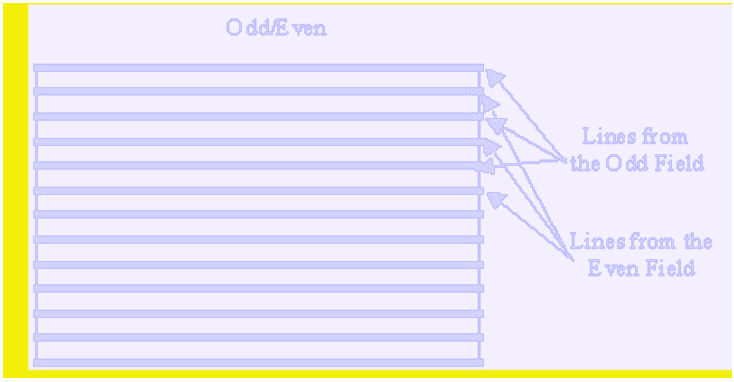
- If you are going to extensively use a Video for Windows application with a DirectShow driver, make sure that the DirectShow preview pin's default size is correctly set. As explained, you have to use a native DirectShow application to do this. Open the driver's filter dialog, go to the Crop tab, and set Default Size there. Most often, you would want to set the preview pin to the capture size you plan to use. But if you aren't going to use Video for Windows overlay, or are not concerned about its quality, then set the preview pin to a very small size such as 160x120.

De-Interlacing

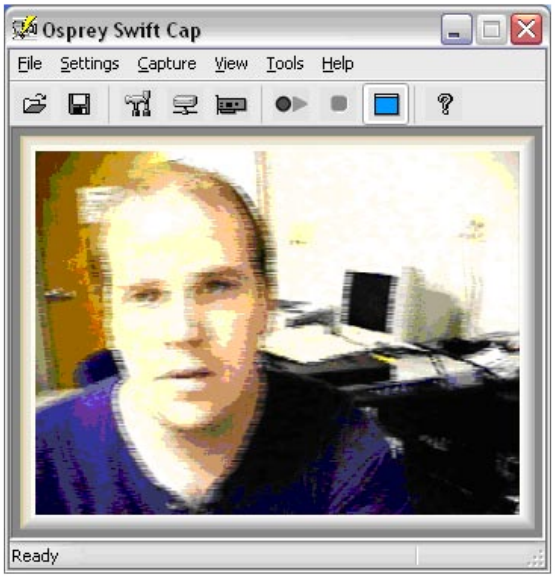
Most video is provided for viewing in an interlaced format. For simplicity, NTSC is used in the following explanation of an interlaced format. NTSC video is basically composed of images taken 60 times a second. Each image is called a field, and there are odd and even fields. While these odd and even fields are temporarily adjacent to each other in time, the horizontal lines that make up these fields are spatially different.



10 ***Interlaced Video on odd and even fields***



11 ***Video on a progressive display device (computer monitor)***



12 ***Streaking/feathering on a progressive display device***

Figure 10 is a simplistic view of interlaced video and fields. The two fields are taken 1/60th of a second apart, and the lines of each field are not aligned, but staggered. Most televisions are interlace display devices, where the 60 fields are displayed individually and the viewer sees only one field at a time. However, most computer monitors are progressive and not interlaced display devices. On a computer monitor where video is viewed at its full resolution, viewers see both the odd and even fields at once (figure 11).

The problem with progressive display devices is that if an object is moving, its position is not the same in both the odd and even fields. When odd and even fields are merged together, interlaced artifacts occurs. The artifacts are seen and commonly described as streaking or feathering.

Figure 12 illustrates the streaking or feathering problem that occurred when the interlaced odd and even fields in this video were captured. Only a slight amount of motion took place, yet streaking is obvious in the overall result. Note the prominent horizontal lines outlining all the objects on this screen.

When feeding such images to an encoder, the encoder has a significantly harder time processing and compressing such interlaced video. The result is loss of overall quality and perhaps a loss of frame rate as well. While the encoding process may smooth out some of these artifacts, the resultant compressed video may still display somewhat streaked or feathered and may not play back smoothly.

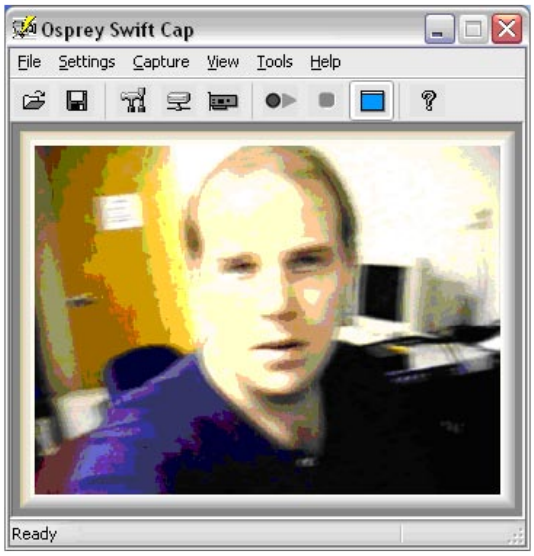
The Osprey AVStream driver provides two separate approaches to deinterlacing:

- For capture pins, there is a software de-interlacing motion filter built into the driver.
- For preview pins, the driver supports the hardware deinterlacing that is built into many display adapters.

The Osprey-300's software de-interlacing can be applied to any video capture stream to eliminate streaking or feathering and maintain motion content. In the screen in figure 13, where the Osprey-300's de-interlace motion filter has been turned on, note that the strong horizontal streaking or feathering around the subject's head have been smoothed to a slight blur. While the blur is noticeable in a single screen snapshot, the human eye perceives only natural motion when the video is played back at normal frame rates.

Feeding the de-interlaced image in the screen in figure 13 to an encoder significantly improves output of the encoder in terms of overall quality and smoothness. The encoder has an easier time compressing the de-interlaced video and thus can expend saved bits and CPU cycles to produce higher quality streams.

The hardware deinterlacing provided for preview pins resides in the display adapter. The availability and quality of this function depends on the display adapter and its driver. The implementations we are familiar with are cruder than the software-based capture de-interlace, but are nonetheless quite helpful with high-motion content.



13 ***Video with Osprey-300's Deinterlace motion filter applied***

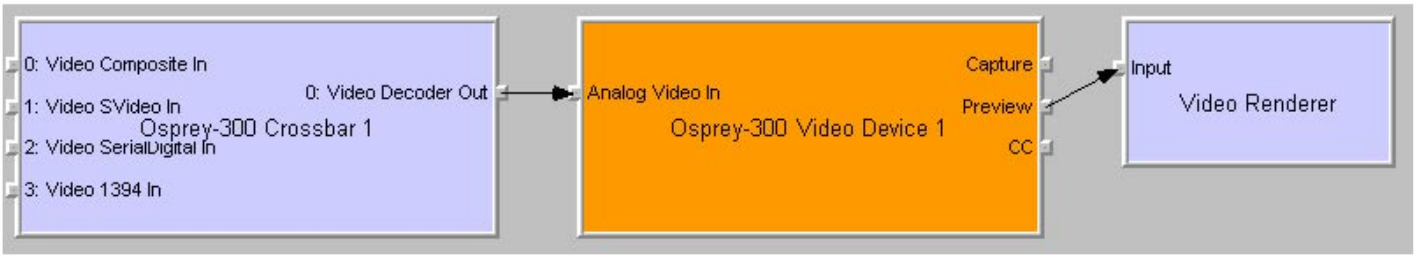
Efficient Video Rendering

The following information is primarily useful to developers, but may also be helpful for those who want to fine-tune existing applications. If you are seeing poor rendering performance, in terms of either excessive cpu utilization or jerky, stuttering video, read this section.

There are at least four basic ways to render video from the capture driver onto the screen. They vary greatly in their efficiency, and applications do not always make the best choice of renderer.

In these descriptions it is assumed that the AVStream driver's Preview Pin is being used. The results would be the same if the Capture Pin were used instead.

Preview Pin to Video Renderer



This is the oldest, simplest, and usually least efficient way of rendering video. It does not use DirectDraw in the rendering process. It is the default rendering pathway that will be chosen when an application says "Render" without specifying a preferred pathway. For this reason, many applications, especially older ones, deliver unnecessarily poor rendering performance.

The fastest video format to use with this pathway is whatever RGB format corresponds to your screen depth – RGB32 for a 32-bit screen, or RGB555 for a 16-bit screen. But it is even better to avoid using this pathway altogether.

Preview Pin to Overlay Mixer to Video Renderer

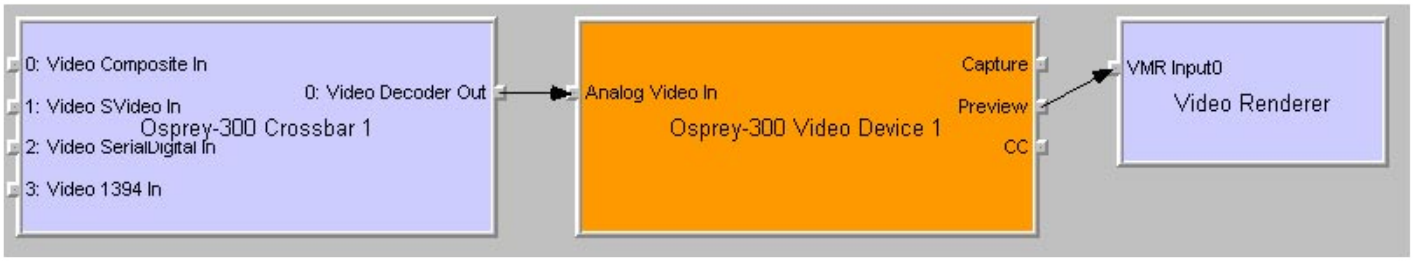
The combination of Overlay Mixer plus Video Renderer provides much better performance than a direct connection of Preview Pin to Video Renderer.

At present this is the only pathway that renders closed captioning correctly. For CC rendering, the output of the Line 21 filter connects to an input of the Overlay Mixer.

A curious illustration of the effect of the Overlay Mixer is seen with AMCap, a Microsoft DirectShow reference application that is available in object and source form. If the application is configured to preview at a full 720x480, with closed captioning turned off, the cpu will be swamped and on a slow machine the video will be jerky. In this case it uses the direct Preview Pin to Video Renderer pathway. If closed captioning is turned on, AMCap adds Overlay Mixer to the rendering pathway, and cpu utilization drops to 25 percent of what it was, and the video is perfectly smooth.

The best video format to use with Overlay Mixer is YUY2.

Preview Pin to VMR7



VMR7 is short for "Video Mixing Renderer 7". VMR7 is a newer renderer that is generally much faster than the old Video Renderer. It uses an efficient DirectDraw configuration to render with almost no cpu overhead, so long as the correct video format is used.

Unfortunately, VMR7 is not the default video renderer in building a filtergraph – an application must explicitly ask for VMR7 in its graph in order for it to be used. This causes many older or quick-and-dirty applications to render video much less efficiently than they might.

VMR7 will work about equally well with either the YUY2 video format, or with the RGB format – RGB32, or RGB555 – that matches the current screen depth. Since YUY2 uses less PCI bandwidth (2 bytes per pixel) than RGB24 or RGB32 (3 or 4 bytes per pixel), it is the best choice. We recommend, though, letting DirectShow choose the video format. It will generally make the correct choice. Also, if two video frames are to be rendered with VMR7 at the same time, only one can be YUY2; other(s) will be RGB.

We do not provide an RGB24 option for use with 24-bit screens because on at least some display adapters the rendering of RGB24 to VMR7 is incorrect.

It is important to note that VMR7 cannot be used when closed captions must be rendered – use the Overlay Mixer to Video Renderer pathway instead.

Preview Pin to VMR9

Video Mixing Renderer 9 is the newest video rendering method and the one on which Microsoft will base its future development. The intent is to combine the functionality of the Overlay Mixer plus Video Renderer in one module that takes advantage of the latest developments in DirectShow. We are finding that at its present stage of development, with our hardware, VMR9 does not achieve the very high efficiency of YUY2-to-VMR7, but its overall performance is consistently quite good.

One specific problem: VMR9 at present does not currently render closed captioning correctly, at least on our particular test machines. Although it is possible to connect the output of the Line 21 Decoder to a VMR9 input, the captions will not be positioned or displayed correctly.

Some Data Points: The following measurements are cpu percent utilization on a fairly old, 600 MHz machine – the relative performances of the pathways are more important than the absolute percents. The video size is 640x480. The screen depth is 32 bits, so that RGB32 renders more than RGB555 in this case. The following abbreviations are used:

VR = Video Renderer
VMR7 = Video Mixing Renderer 7
VMR9 = Video Mixing Renderer 9
AVI = AVI Decompressor
CSC = Color Space Converter

	Rendering Pathway	CPU Usage
Video Renderer	YUY2 -> AVI -> VR	100%
	RGB32 -> VR	22%
	RGB555 -> VR	unable to render at 30fps
Overlay Mixer + Video Renderer	YUY2 -> OVL -> VR	20%
	RGB32 -> OVL -> VR	29%
	RGB555 -> CSC -> OVL -> VR	24%
VMR7	YUY2 -> VMR7	2%
	RGB32 -> VMR7	2%
	RGB555 -> CSC -> VMR7 Format changed to RGB32	20%
VMR9	YUY2 -> VMR7	10%
	RGB32 -> VMR7	15%
	RGB555 -> CSC -> VMR7 format changed to RGB32	25%

Video Standards and Sizes

Video Standard refers to whether the video signal format is NTSC, PAL, or SECAM. Depending on the exact product version you have, some or all of the following standards will be available:

525-line formats:

* NTSC-M – North America
* NTSC-J – Japan
* PAL-M – Brazil

625-line formats:

* PAL-B, D, G, H, I – many countries in Europe and elsewhere. B, D, G, H, and I refer to five nearly identical subformats.
* PAL-N, NC – Argentina, Paraguay, Uruguay
* SECAM – France and some other countries.

Full-sized NTSC-M, NTSC-J, and PAL-M have 525 lines total, 480 lines visible, per frame and a display rate of 59.94 fields per second, or 29.97 interlaced frames per second. Although capture-to-PC applications normally use only 480 video lines, the full NTSC frame actually contains 485 video lines, and the AVStream driver provides a control to capture all 485 lines. The control is located on the RefSize property tab.

Full-sized PAL (other than PAL-M) and SECAM have 625 lines total, 576 lines visible, per frame and a display rate of 50 fields per second, or 25 interlaced frames per second.

The standard frame sizes are different for NTSC and PAL. For example, the half-frame size in pixels is 360x240 for NTSC, and 360x288 for PAL. The driver automatically adjusts the reference size and default size for the video standard you are using.

Note that the Osprey-300 always uses CCIR-601 horizontal proportioning, which is based on a 720-pixel full line width.

Color Formats

The Color Format is the arrangement of data bits representing the colors of each pixel. For example, in the RGB555 format, each pixel of data is stored as 5 bits of red, 5 bits of green, and 5 bits of blue color information.

Video delivered by the Osprey board to the system is in uncompressed format. It is possible to compress the video at a subsequent stage of processing. However, this dialog field refers specifically to the uncompressed raw video that the board delivers to the system.

The Osprey AVStream driver supports the following capture pin formats.

* YUY2 and UYVY - Each pixel is represented with a total of 2 bytes (16 bits) of data. The data is encoded as separate data for luminance (intensity) and chrominance (color). This mode is mainly used as an input to software compressors. See YUV Format Details below.

* YUV12 planar - Also known as I420. This is a complex format in which there are in the aggregate 12 bits of data per pixel. Each pixel has 8 bits of luminance data. Each group of 4 adjacent pixels arranged in a 2x2 square shares two bytes of chrominance data. See YUV Format Details.

Standard Video Sizes (WidthxHeight)		
	525 Line (CCIR601)	625 Line (CCIR601)
Full	720x480	720x576
1/2 CIF	360x240	360x288
3/8	270x180	270x216
1/4 CIF	180x120	180x144

* YVU9 planar - Similar to YUV12 planar, except that there are in the aggregate 9 bits of data per pixel, and each byte pair of chrominance data is shared by 16 adjacent pixels arranged in

a 4x4 square. See YUV Format Details.

* RGB32 - Each pixel has four bytes (32 bits) of data - one each for red, green, and blue, plus one byte that is unused. The pixel has 256 shades of each of the three colors, for a total of 16.7 million colors.

* RGB24 - Each pixel has three bytes (24 bits) of data - one each for red, green, and blue. This is another "true color" mode with 16.7 million colors.

* RGB555 - Each pixel has two bytes (16 bits) of data. There are 5 bits each of red, green, and blue data; the sixteenth bit is unused. This is a "high color" mode, also known as "5:5:5."

* RGB8 (Greyscale) – The Osprey AVStream driver uses the RGB8 format for greyscale video. RGB8 is a palletized format. Each pixel is represented by one byte, which indexes one of 256 colors in a color palette specified by the driver. The Osprey driver sets the color palette to greyscale entries, and captures "Y8" luminance-only data.

YUV Format Details

YUY2, UYVY, YVU9, and YUV12 are YUV formats. In these formats, each pixel is defined by an intensity or luminance component, Y, and two-color or chrominance components, U and V. Since the human eye is less sensitive to color information than to intensity information, many video formats save storage space by having one luminance byte per pixel while sharing the chrominance byte among two or more pixels. YUV is also very similar to the color encoding used for analog color television broadcast signals.

YUY2 mode, sometimes referred to as 4:2:2 packed mode, consists of a single array of mixed Y, U, and V data. Each pixel has one Y (intensity) byte. Each pixel shares its U and V bytes with one of the pixels horizontally next to it:

YUY2 uses the same number of aggregate bytes per pixel as RGB15, which is two. However, YUY2 is more efficient than RGB15 because it stores relatively more of the intensity information to which that the human eye is most sensitive.

UYVY mode is very similar to YUY2 except that the bytes are swapped as follows:

YVU9 and YVU12 are "planar" modes - the Y, U, and V components are in three separate arrays. It is easiest to explain the format with an example: Let's say you have a 320x240 YVU9 format. The buffer has 320x240 bytes of Y data, followed by 80x60 bytes of V data, followed by 80x60 bytes of U data. So each U and each V byte together contain the color information for a 4x4 block of pixels.

Similarly, a 320x240 YUV12 format has a 320x240 Y array, followed by a 160x120 U array, and then a 160x120 V array.

Note that in the I420 format used by Osprey, the order of the U and V arrays is reversed from the order in the YVU9 format.

Pixels 1&2	Byte 1= y1	Byte 1 Intensity
	Byte 2= u1/2	shared U color information for bytes 1 and 2
	Byte 3= y2	Byte 2 Intensity
	Byte 4= v1/2	shared V color information for bytes 1 and 2
Pixels 3&4	Byte 5= y3	
	Byte 6= u3/4	
	Byte 7= y4	
	Byte 8= v3/4	

Pixels 1&2	Byte 1= u1/2	Byte 1 Intensity
	Byte 2= y1	shared U color information for bytes 1 and 2
	Byte 3= v1/2	Byte 2 Intensity
	Byte 4= y2	shared V color information for bytes 1 and 2
Pixels 3&4	Byte 5= u3/4	
	Byte 6= y3	
	Byte 7= v3/4	
	Byte 8= y4	

Closed Captioning (CC)

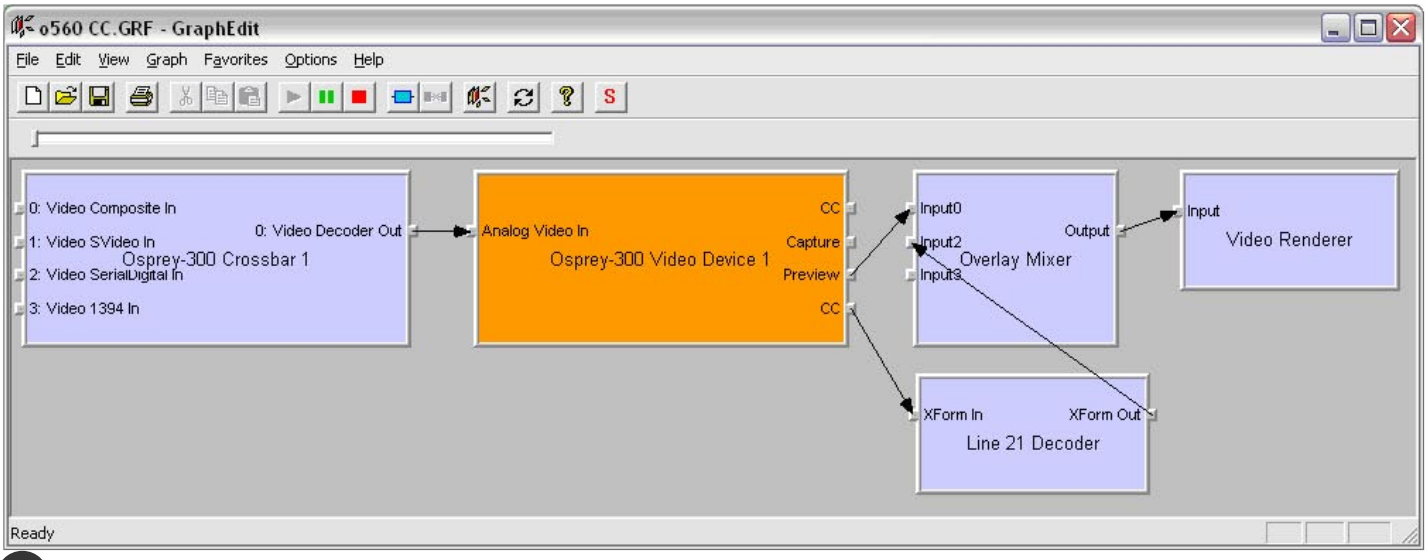
The Osprey AVStream driver performs raw capture of NTSC closed caption (CC) character pairs. The character pairs are emitted as a raw, uninterpreted, DirectShow-standard CC Category stream. Downstream filters can capture this data or render it onto video. "CCApp", shown in figure 14, is included with the driver as a simple example of CC functionality, and its source code is provided in the Osprey AVStream SDK. Osprey CC pins work with Windows Media Encoder 9.

14 ***CCApp display***

The driver also provides PAL/SECAM closed caption data in raw form via the VBI pin (not through the CC pin). Refer to the next section on Vertical Blanking Interval (VBI) Capture for more information. The rest of this section is specific for NTSC captioning only.

The GraphEdit filtergraph shown in figure 15 displays CC on preview video. The Line 21 Decoder downstream of the Osprey-300 capture filter interprets the CC pairs and renders an overlay of the characters. The Overlay Mixer combines the CC overlay with the preview video, which is then rendered onscreen. It is also possible to capture the character pair stream as a standard stream of an avi file; or, to directly manipulate the CC stream in a standard way with a custom application.

Our testing with the current version of DirectX 9 indicates that closed captions do not render properly with the VMR9 renderer in place of the Overlay Mixer / Video Renderer combination. They appear on a horizontal stripe across the middle of the video rather than in a block at the correct location. Therefore, the default Video Renderer in combination with Overlay Mixer should be used.



15 ***Graphedit filtergraph with CC on preview video***

When SimulStream is not installed, the driver supports two CC pin instances. One could be associated with the video capture stream, the other with the preview stream. In practice, a DirectShow Smart Tee Filter can be inserted into the graph to make any number of VBI pins. When SimulStream is installed, any number of CC pins are allowed.

There are two user-accessible controls built into the driver that affect Closed Captioning.

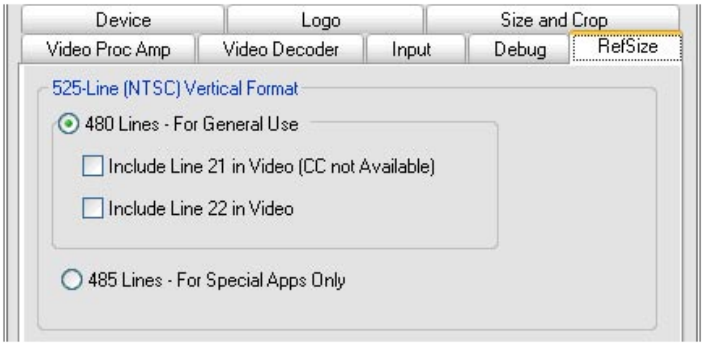
On the RefSize property page, in the control group shown in figure 16, 480-line video must be selected and the checkbox "Include Line 21 in Video" must be unchecked.

On the Device -> Extras… property page, you have the choice to set with "Normal" or "AVI-Compatible" timestamping of Closed Caption samples (figure 17).

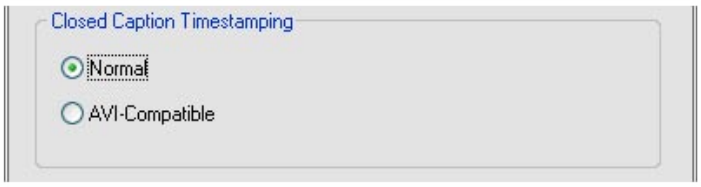
This control is a workaround to what we currently believe to be a problem in DirectShow – if you attempt to capture a CC character pair stream to an AVI file with "Normal" timestamping, the file will become extremely large and the capture will fail within a few seconds. The "AVI-Compatible" mode allows capture of CC to AVI.

Unfortunately, the problems with timestamping mean that time synchronization between the video and CC streams depends on their physical interleaving in the file, so that time synchronization will be quite poor. If the AVI file is set up to be "non-interleaved", synchronization is not very good. If the AVI file is set up to be "interleaved", synchronization is very poor.

For all applications other than capture to AVI, this control should be set to "Normal". WME9 among others requires the "Normal" setting if CC is used.

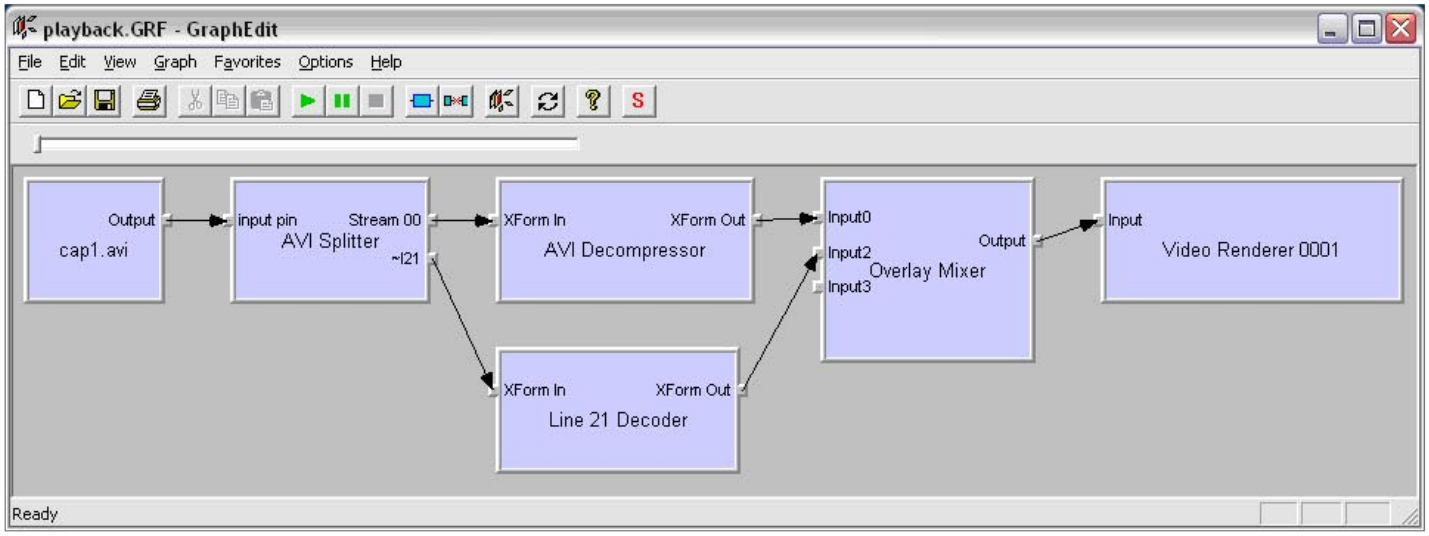


16 ***The RefSize Property page with 480-line video selected***



17 ***Timestamping options on the Extras page***

Application notes



Windows Media Player will not play back an AVI file with an embedded CC stream. The above GraphEdit filtergraph will play back an AVI file containing a video stream plus a CC stream, with the CC rendered on the video.

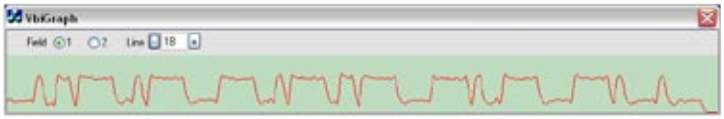
AMCap, the DirectShow sample capture app, will render closed captions in its preview window. It will also capture them to AVI (But, remember, Windows Media Player will not play back the CCs.). There is a "Closed Captioning" item in the Capture menu. There are two restrictions:

You have to turn off Preview in the AMCap Options menu before starting capture; otherwise, AMCap will say, "Cannot start graph".

AMCap does not capture audio and CC at the same time – although from the points of view of DirectShow and the driver, this is perfectly possible. You have to turn off "Capture Audio" in AMCap's Capture menu.

Vertical Interval Timecode (VITC)

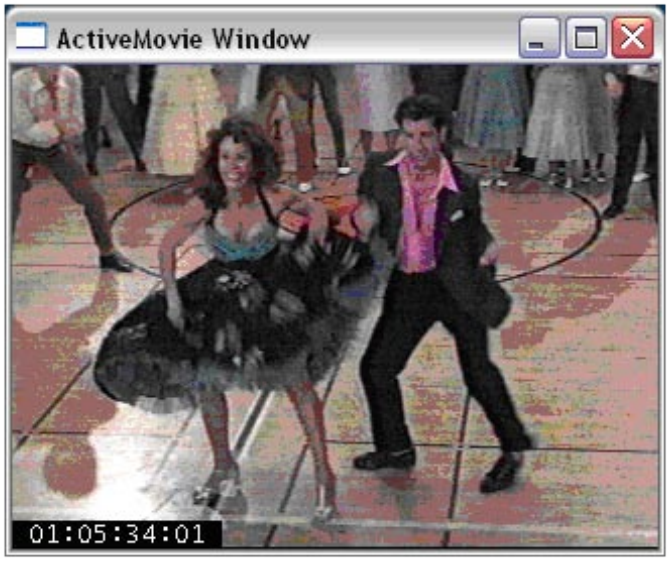
Vertical interval timecode (VITC) data is embedded in the Vertical Blanking Intervals (VBIs) of some video content. Timecodes mark each frame with an hour / minute / second / framenumber marking that can be use for frame-precise editing. Figure 18 shows a VITC waveform.



18 *A VITC Waveform*

The current Osprey VITC implementation is preliminary in nature. The features and method of implementation are subject to change. We invite comments on the timecode-related capabilities that you need for your application.

Osprey's approach to VITC is to invisibly watermark the video bits of each outgoing video frame with its timestamp data. The illustration shows a timecode extracted from a watermarked frame and rendered as text on the video. Four elements are used to produce it:



19 *Timecode rendered as text on video*

- The device extracts timecode data from the vertical blanking interval (VBI) waveform.
- The driver watermarks timecode into the video preview or capture pin's output data.
- A custom filter decodes the watermark from the video and renders it.
- A GraphEdit graph combines the required filters. The filtergraph is shown below:

The Osprey Timecode Filter resides in the module TCOverlay.ax and is installed and registered as part of the standard driver installation. The source code for this filter is included in the Osprey AVStream SDK.

20 ***The Timecode Video Marking Controls***

The Osprey Timecode Filter also exposes to applications a custom property and callback function that allows it to return the VITC data for each frame along with the frame's timestamp to the application. Since use of this capability requires custom programming it will not be further discussed here. Refer instead to the Osprey AVStream SDK Users' Guide. A sample SDK applet named TCApp illustrates the interface.

Timecode stamping must be enabled in the driver before it can be used, and the field and line number correctly set. The Osprey-300, unlike the Osprey-100 and 200 series devices, does not implement an autosearch function to find the VITC line. To access the controls, go to the Device property tab and click the Extras… button (figure 20).

It is recommended that timecode marking be disabled when not in use, especially the auto search feature – on a slow machine it uses several percent of cpu bandwidth - especially if timecodes are not present.

Note that VITC and LTC – Longitudinal Timecode – are two distinct encoding systems, and this driver supports only VITC.

A suggested reference on timecode is Timecode: a user's guide – 3rd ed., John Ratcliff, Focal Press, 1999.

Vertical Blanking Interval (VBI) Capture

The Osprey-300 does not support VBI raw capture. It only supports decoded capture of the two special streams, Closed Caption (CC) and vertical interval timecode (VITC). If your application requires VBI capture for WST teletext decoding or other purposes, and you are using analog inputs, you can use an Osprey-100 or 200 series device instead.

CHAPTER 7

Osprey-300 Capture Card

The Analog Audio Driver

Setup and control for audio are much simpler than for video. The basic steps are covered in the following topics:

- Select the Audio Source and Input Volume
- Audio Formats
- Audio Playback
- Audio Configuration

Selecting the Audio Source and Input Volume

The audio source is set using the Osprey-300's mixer driver interface. Most applications, including the Windows Media Encoder applications, interface to the mixer driver directly and expose the look and feel specific to that application. However, the default Windows interface to the mixer driver can also be used. There are two simple methods for getting to the mixer source and volume control dialog box.

- The easiest method for accessing this interface is to right click the speaker symbol on your taskbar (typically on the bottom right-hand side of your screen). Then select the Open Volume Controls option (figure 1). (There is a checkbox in Control Panel -> Sounds and Audio Devices to make this icon appear.)

- If you do not see the speaker symbol, click the Start button on the Start Menu, select Start -> All Programs -> Accessories -> Entertainment -> Volume Control.

Either of these two methods brings up the audio mixer interface for the audio playback device, as shown in figure 2.

To get to the Osprey-300 audio capture (recording) device, select Properties under Recording Control's Options menu. This pops up the Properties dialog. Click on the Mixer device list at the top to see the list of audio input and output devices, including one or more Osprey-300(s). When you have chosen the device, click OK, and you will be returned to the Recording Control display.

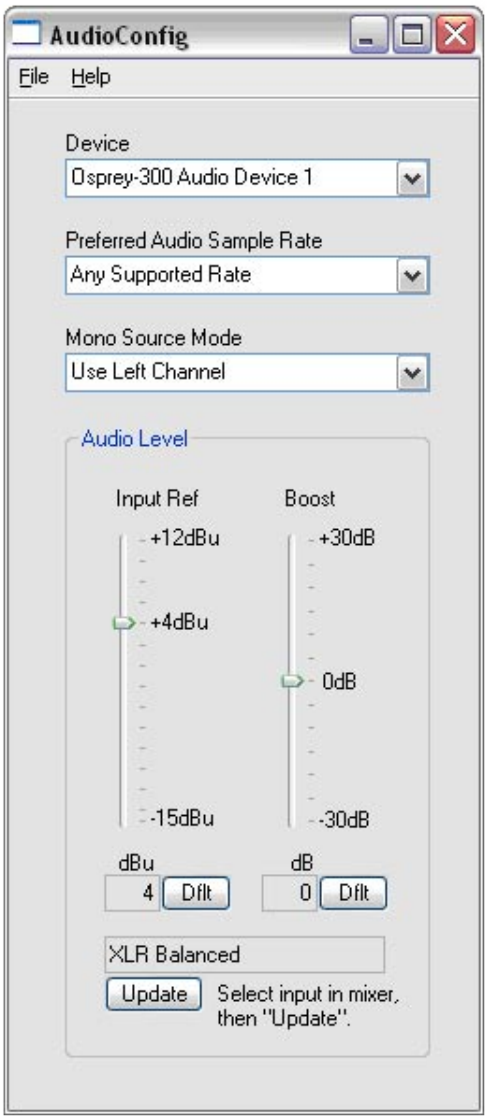
The Osprey-300 device is not a mixer in that it does not allow for mixing the various audio sources. Therefore, when one audio input is selected, any other input previously selected becomes unselected. The Select checkbox at the bottom of each source sets which source is actually being used.

The Osprey-300 has hardware gain control. To control hardware gain use the volume slider in the mixer applet. The unity gain setting is when the volume slider is in approximately the middle of the range.

The quick-access volume control (left click on the speaker symbol) on the task bar controls recording volume and playback volume. To change record levels, go to Options, then Properties, and select Recording.

1 ***Selecting Volume controls on your windows taskbar***

2 ***The Recording Control window (Audio Mixer Interface)***



3 *The Audio Configuration Applet*

Audio Formats

The Osprey-300 hardware supports sampling of analog audio at 32, 44.1 and 48 kHz in 16-bit PCM format. Captured audio data is down-sampled and reformatted if necessary by Microsoft system audio components, allowing an application to capture audio data in 8-bit and 16-bit mono or stereo formats at any of the following data rates:

- 8 kHz
- 11.025 kHz
- 16 kHz
- 22.05 kHz
- 32 kHz
- 44.1 kHz
- 48 kHz

Audio Playback

The Osprey-300 provides audio capture only, not audio playback. Continue to play back captured audio using your system soundcard.

Audio Configuration

The AudioConfig applet is included as part of the Osprey AVStream driver package. It is also provided in source form in the Osprey AVStream SDK. It provides supplementary controls that are not available via the standard system properties.

AudioConfig's controls are device-specific and apply only to Osprey audio capture devices. Use the Device menu list at the top of the applet's window to select which device you are controlling.

Preferred Audio Sample Rate

The audio sample rate is the rate at which the hardware samples the incoming audio, which may differ from the sample rate delivered to the client application.

The choice are to allow "Any Supported Rate", or to force the sampling rate to be 32 kHz, 44.1 kHz, or 48 kHz. If "Any Supported Rate" is selected, all three rates, 32, 44.1, and 48 kHz, are available for selection by the Microsoft kmixer driver. Kmixer, however, does not necessarily select the optimum hardware rate for a given software rate. It may specify a 44.1 kHz hardware rate when a supplying 16 kHz software rate to the application, for example. In this case it would be better to set the Preferred Audio Sample Rate 32 kHz, so that downsampling is exactly 2:1.

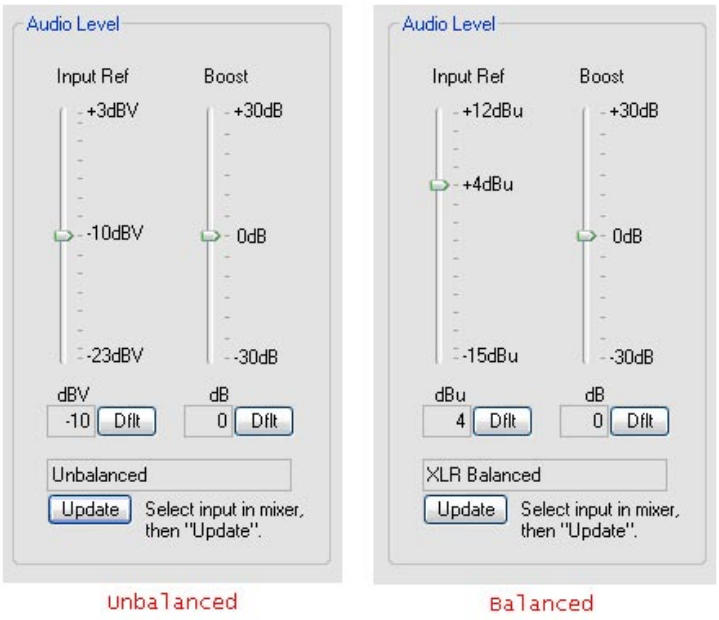
When the audio input is SDI, the only sample rate that the Osprey hardware supports is 48 kHz. The driver will override your setting here.

When the audio input is DV1394, you have to use this control to match your audio sample rate to the actual rate of the incoming data. The two most common formats are 48 kHz / 16-bit, and 32 kHz / 12-bit. You may have to listen to a captured sample of your audio to determine whether the sample rate is set correctly – if the pitch is incorrect, try the other setting.

Mono Source Mode

This control determines which audio channel will be the source when monaural audio is selected.

- If set to Use Left Channel, the mono channel contains audio from the left input.
- If set to Use Right Channel, the mono channel contains audio from the right input.
- If set to Average Left and Right, the mono channel contains the average of the two inputs.



4 ***Balanced and Unbalanced Audio***

Note that in order to get mono audio you have to select mono mode in your application. For example, in SwiftCap you have to select mono 8-bit or mono 16-bit in the Capture Settings -> Audio -> Format control group.

Because of the way DirectShow chooses audio modes, mono mode only works correctly when the sample rate you select is an exact match for an available hardware sample rate. That is, the sample rate must be 32, 44.1, or 48 kHz in most cases, and may be further restricted when SDI or DV1394 is selected (Refer to the explanation of Preferred Audio Sample Rate, above).

Audio Level

This control sets the hardware Input Reference level and software-based Boost factor. The settings are separate for each input of each device, and are applied to whichever input is selected in the current application or in the system mixer. The settings displayed do NOT automatically update when you change inputs in the application or mixer – click the "update" button to refresh the settings.

The Input Reference level is meaningful only on the analog unbalanced and balanced inputs; when a digital input is selected this control is disabled. The default level is chosen such that the expected amplitude of a full volume input signal will have adequate headroom without clipping. If you do experience clipping, or are working with very low-level signals, you can adjust this level. On this control, a higher reference level results in lower gain, so the quietest setting is at the top of the scale.

The units, default value and range are different for unbalanced and balanced signals (figure 4).

Click the "Dflt" button to restore the default value. The Boost setting can be set individually for each input. It supplements the system mixer volume controls by providing a very wide adjustment range. You can use it to calibrate or normalize input levels across multiple inputs; or to accomodate microphones or other non-line inputs that have nonstandard signal levels.

CHAPTER 8

Osprey-300 Capture Card Applications

SwiftCap

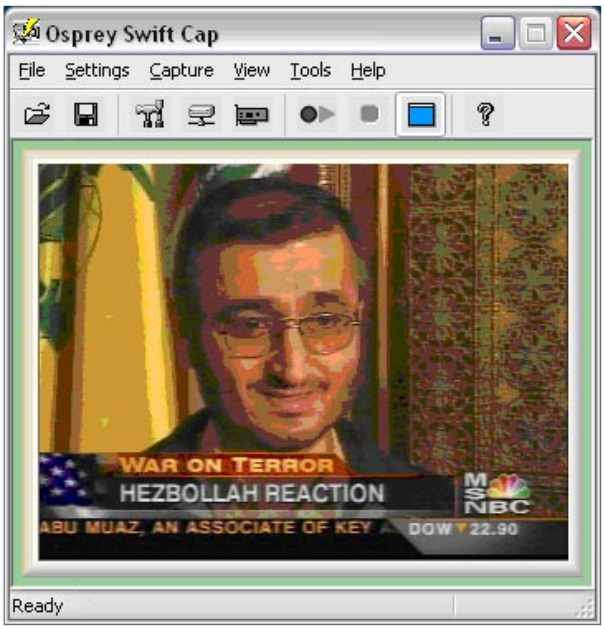
SwiftCap is a video capture application that is included with the Osprey AVStream package. It is included in source form in the Osprey AVStream SDK. SwiftCap is useful for general purpose capture and viewing of video, as well as for testing the installation. The following instructions take you through some basic scenarios for using this application.

Preview

Click the Preview button for a quick basic test of your video setup, or for basic video viewing. If you do not see motion video right away, make sure...

* The correct device is selected
* An input to that device with a live video feed is selected
* The right NTSC, PAL, or SECAM video standard is set.

The descriptions below include instructions to correct these items if necessary. The steps below will also show how to adjust the size of the video display.



1 *The SwiftCap application window*

Setup Sequence

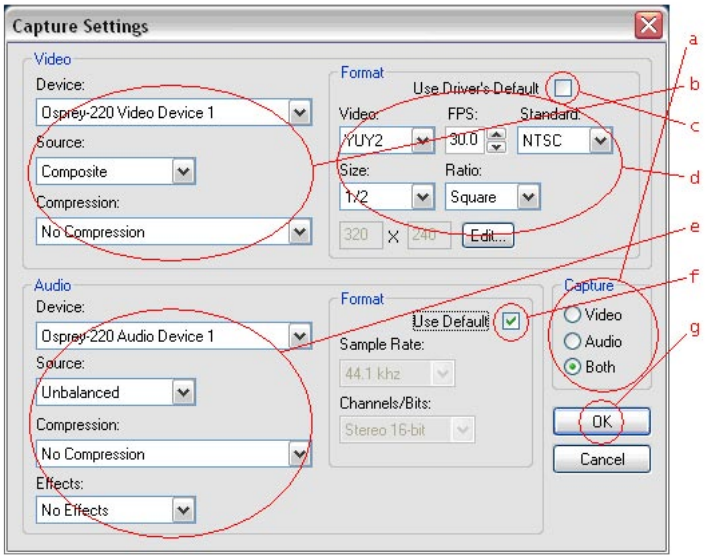
SwiftCap has many possible scenarios and pathways. The following steps illustrate a few of the most useful possibilities.

1. Click the "Tools" button to open the capture settings dialog (figure 2).
2. First decide whether you want to capture video only, audio only, or both; unselected controls will be disabled – the following assumes you have selected "Both" (2a).
3. Select your video device and source. Select "No Compression" (2b).
4. In the Video Format group, uncheck "Use Driver's Default" (2c).
5. Select the video standard, color format, frame rate, and video size you want to use (2d).
6. Select your audio device and source. Select "No Compression" (2e).
7. In the Audio Format group, check "Use Default" for this experiment (2f).
8. Click OK (2g).

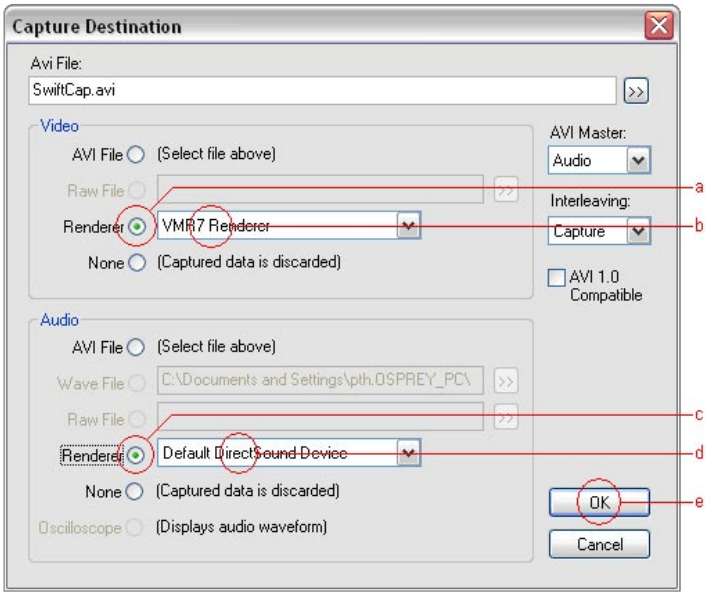
Next, click the Destination button to open the Capture Destination dialog (figure 3):

1. In the video section, select "Renderer" (3a).
2. Select "VMR7 Renderer" (3b). Note that there is a discussion of renderers in the Video Capture Topics chapter.
3. In the audio section, select "Renderer" (3c).
4. Select your sound card as the rendering device (3d).
5. Click OK (3e) .

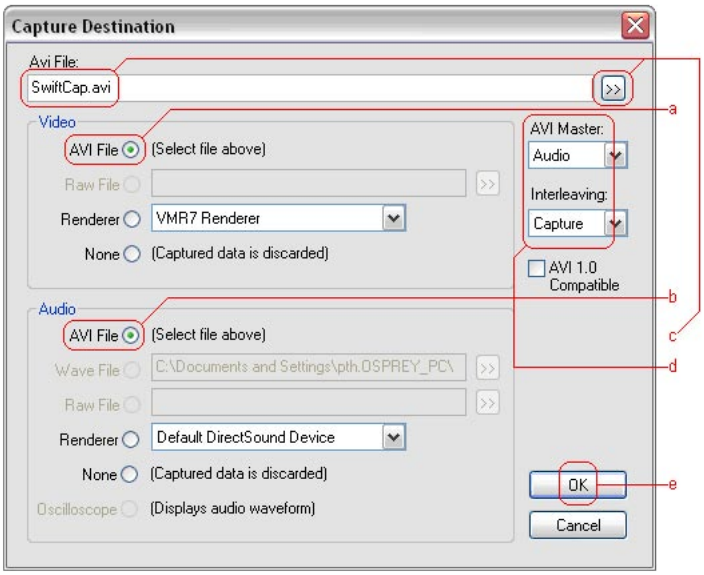
Next, click the Capture or Start button. An "Active Movie" video window will open on your screen, and your will hear audio from the capture source, until you click Stop.



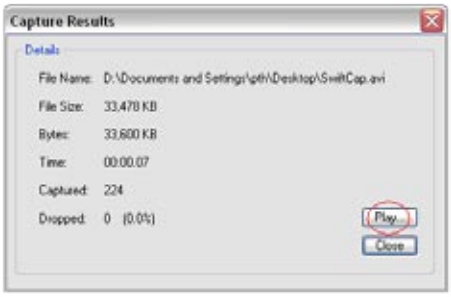
2 ***The Capture Setting Dialog***



3 ***The Capture Destination Dialog***



4 ***The Capture Destination Dialog***



5 ***The Capture Results Dialog***

A Capture-to-File Scenario

No changes are mandatory from the previous setup the Capture Settings dialog. However, you may want to select a video and/or audio compressor to obtain a much more compact capture file.

In the Capture Destination dialog (figure 4), make the following changes:

1. In the video section, click the AVI File button (4a).
2. In the audio section, click the AVI File button (4b).
3. Select an AVI file. Click the >> button on the right to browse for a file. (4c)
4. Select Audio as the AVI Master, and Capture as the Interleaving Mode (4d). If you are capturing video only or audio only, these settings are not used and the controls are greyed.
5. Click OK (4e).

After you are finished changing the settings, click Start, then Stop after a few seconds. The Capture Results dialog (figure 5) shows capture statistics, including bytes captured, number of seconds of capture, and number of frames captured and dropped. It also has a Play button. Click this to play back the AVI file with your default media player.

Cropping

The crop settings obtained in SwiftCap are compatible with the settings obtainable from the driver property pages. Once set up in SwiftCap, they can be applied to other applications as well.

The menu item Settings -> Crop Settings… brings up the Crop Setting Dialog (figure 6):

1. Click Enable Crop to enable or disable cropping (6a). There is also a direct menu item Settings -> Crop Enable to turn cropping on using the current crop, or to turn cropping off.
2. Drag the edges or corners of the cropping rectangle to resize it, or drag its center to move it (6b).
3. The top / bottom / left / right edit boxes give a readout of the current crop boundaries (6c). You can also edit these boxes directly to obtain a precise size or position.

4. The output size, which is the final size of the captured video, can be 1X, 1/2X, or 1/4X the crop size (6d). There is also an entry in this drop box by which you can set a custom size.
5. The sizing grid sets the granularity of your crop width settings (6e). For example, if you are capturing in YVU9 format, crop width must divide evenly by 16 and crop height must divide evenly by 4. Setting the sizing grid to 16x4 ensures that your crop settings will be correct for the capture format. The text line below the drop list shows which color formats your selected granularity applies to.
6. Click Refresh to update the image from the video source (6f).
7. Save As… and Load… allow you to save multiple crop specifications for future reference (6g). Note that there are minimum values for crop size and output size; SwiftCap will reject smaller values. Also, you cannot specify an output size that is larger than the crop size.

6 ***The Crop Settings dialog***

Other Features

Logo setup: SwiftCap has the menu item Settings -> Logo Settings… . This selection directly accesses the driver's logo property page; for details, refer to the driver properties description. There is also a Settings -> Logo Enable control to directly turn the logo on or off.

Accessing driver properties: Click the circuit board icon on the toolbar.

NOTE: If you use the driver's "Size and Crop" or "Logo" property pages, you will not have the option of saving different settings for capture and preview. The Pin Select radio buttons will be greyed out and forced to the "Both" position.

Cpu meter: Turn on via the menu item View -> CPU Meter.

Load and save configuration: These two buttons enable you to save SwiftCap settings for future use.

Limitations and Peculiarities of SwiftCap

- The current version of SwiftCap does not capture or display closed captions.

- If you select RGB8 greyscale as your color format, SwiftCap captures in greyscale, but continues to preview in color. Also, if you capture to the VMR7 Renderer or VMR9 Renderer, you will get color video; you will only see greyscale video with the "Video Renderer" selection.

- The current version of SwiftCap does not handle Video for Windows devices very well. The buttons to access the driver's Source and Format dialogs do not work.

7 ***The CCApp Device Properties window***

CCApp

The Osprey AVStream driver performs raw capture of NTSC closed caption character pairs. The character pairs are emitted as a raw, uninterpreted, DirectShow-standard CC Category stream.

CCApp (figure 7) renders Closed Captioning on video, and also displays it as line mode text in a separate text box. The View options permit viewing of no video, video without captions, or video with captions; and allow the text box to be shown or removed.

CCApp requires that the filter CCFilter.ax be present on the system. The driver setup program installs this filter.

CropApp

CropApp (figure 8) sets up crops visually and interactively. Its functionality is similar to the driver's Size and Crop property page, but it has the added dimension of graphical placement of the cropping rectangle on live video. It has about the same functionality as SwiftCap's crop setup dialog.

The functions of the controls on the left hand side of the video are as follows:

* If multiple Osprey devices are in the system, you can select the device of interest from the dropdown list at the top of the control groups. Click "Device Properties…" to access controls that are not explicitly addressed by CropApp.

* All operations affect both the Capture and Preview pin on the device. The driver's Size and Crop property page is capable of setting the Capture and Preview pins differently. If SimulStream is enabled, CropApp is hardwired to set up pin pair 0 only – to set up other pins you will have to go to the driver's Size and Crop property page.

* The Reference Image group shows the video height and width that are the reference size for cropping operations. For example, if the reference size is 720x480 and the cropping spec is 720x480, then the video is effectively uncropped. This group also states the basis for this reference size – that is, whether the video standard is NTSC (720x480) or PAL/SECAM (720x576).

* The Cropping Parameters group is where the current cropping parameters are shown. When the Enable button is Off, the entire video field is shown, with the crop as an overlayed rectangle. You can modify the crop in three ways:

  By editing the X, Y, Width, and Height boxes.
  With the two sets of arrows adjacent to these boxes.

8 ***The CropApp Application window***

By dragging the center, edges, or corners of the crop rectangle on the video.

When the Enable button is On, only the crop field is shown, and the crop settings are not editable.

CropApp will not let you set crops that are smaller than a minimum width and/or height. The minimum size in the Osprey-300 driver is 48 wide by 36 high.

The Default Output Size group sets a default size that applications may choose. Use the slider to set the approximate size you want, and then if necessary use the [<] and [>] buttons to fine tune the setting.

The sizes available in CropApp will always retain a 1:1 height:width proportion. If you want to stretch the video to other proportions, use the driver's Size and Crop property page, or SwiftCap's crop dialog.

Not all applications use the driver's default output size or present it as a choice; you may have to manually enter the settings calculated by CroppApp into the application.

CropApp will not let you set an output size that is smaller than a minimum width and/or height. The minimum size in the Osprey-300 driver is 48 wide by 36 high.

The Granularity group allows you to determine the allowed sizing increments for the selected video format. For example, if you select YVU9 in the drop list, you will see that the video widths allowed in this format are modulo-16, that is, 320, 336, 352, etc., and the video heights allowed are modulo-4 – 240, 244, 248, etc. All editing of the crop size will snap to the nearest allowed size.

There are no restrictions on placement of the left and top of the video – for example, in YVU9 the width must be 320, 336, etc, but the left side can be 0, 1, 2, etc.

Selecting a format here causes CropApp to use that format for its own rendering, but it does not cause that same color format to be selected in your application. In only ensures that your crop size will work with that color format when it is used.

We are finding that the default I420 codec will not render many output sizes, so when I420 granularity is selected, CropApp will observe the I420 granularity rule but render the video as YUY2. Since you may see this problem in other applications, CropApp puts up a reminder message when it encounters this situation.

If you exit CropApp with the crop Enabled, that is, the center checkbox checked, the crop parameters will be set in the driver for any other application to use. If you exit CropApp with the crop disabled, the crop parameters will be set for other applications to use, but cropping will not be enabled until it is turned on as a separate step.

CropApp requires that the filter OverlayRect.ax be present on the system. The driver setup program installs this filter.

LogoApp

LogoApp (figure 9) interactively positions and resizes a logo on live video. The functionality is similar to that of the driver's Logo property page, but you can place and size the logo by dragging its center, sides, or corners directly on live video.

The control bar across the top allows you to Enable/Disable logo display and select the 24-bit .BMP logo file. You can size and place the logo graphically on the video, or you can directly edit the top/left/height/width boxes. Use the Size 1X button to snap the logo to its original size. The Colors… button brings up a dialog to enable color keying, select the key color, and enable translucent mode.

The Size menu allows you to select full or half-size video. The Device menu displays a list of enabled devices and provides access to the selected device's property pages.

9 ***The LogoApp Application window***

LogoApp sets the same logo spec for both the Capture and Preview pin. If SimulStream is enabled, LogoApp will set only Pin Pair 0. To set up other pin instances, or to set the capture and preview pins differently, use the driver's Logo property page.

10 ***The VidControl Application Window***

VidControl

VidControl (figure 10) controls the video source, standard, and settings of Osprey AVStream Capture Devices. It is useful for initial setup of devices. Use the Devices menu to select among multiple devices.

CHAPTER 9

Osprey-300 Capture Card
Troubleshooting

- Blue/Pink/Black/Orange Video Screen
- Scrambled Video Image
- Poor Video Quality at Large Frame Sizes
- Multiple Horizontal Lines Across Video Image
- Cannot Play Back Audio Recorded by the Osprey Card
- Audio Recording Control Comes Up With Wrong Device and Wrong Inputs
- Interrupt Conflicts

BLUE/PINK/BLACK/ORANGE VIDEO SCREEN

The currently selected video input is not receiving an active video signal. Different inputs may provide a different symptom when a video source is not supplied.

* Check that the camera, VCR, or other video source is powered and that its output is connected to the Osprey card's input.
* Check that the correct video input is selected in the Control Dialog's Source page.

Scrambled Video Image

You may have set the wrong video signal format for the signal input you are using. For example, you may have told the driver to look for NTSC-M video but are using a PAL-BDGHI video source. Make sure you know what signal format your video source is generating. Go into the Video Standard field of the Control Dialog's Source page, and click the button for that signal format.

Poor Video Quality at Large Frame Sizes

Large frame sizes with the deep pixel depth (24- or 32-bit), or complex format (YVU9 or YUV12 planar), impose heavy demands on the PCI bus's data transfer capacity. Our experience is that some systems cannot handle these formats at full frame sizes.

Systems vary in their data transfer limits. The characteristics of the PCI bridge are often more important than processor speed. If you are having problems, we recommend that you:

* Use a smaller frame size (480x320 or less).
* Use a shallower color format (RGB15 or RGB24 instead of RGB32).
* Try an RGB format instead of a YVU format, and a packed format instead of a planar format.
* If you have a choice of PCs for video capture, try using another system with a different system board chipset.

Multiple Horizontal Lines Across Video

If there are multiple, regularly spaced, horizontal lines across your video image and your source material is copyrighted and copy-protected, you are seeing Macrovision™ copy protection.

The lines can vary in color from yellow to blue to green. These lines are not present in every frame of video. There may also be a black band at the top of the frame.

The Osprey 300 cannot eliminate these video artifacts. These artifacts will only be present when you are using a copy-protected source, such as a high-quality DVD for testing a card.

Cannot Play Back Recorded Audio

If you have a sound card installed, you should be able to hear audio when you play back recorded audio.

* Verify that the volume control for your playback device is not muted.
* Verify that the selected playback device is your sound card, and not the Osprey-300

Placeholder device. The Placeholder device exists in order to handle the situation where there is an Osprey-300 present without a sound card. Some Windows applications cannot use a recording device unless a playback device is also installed. The Placeholder device cannot play back recorded audio. You can use the same method to select playback device that you use when selecting the audio source.

DV Audio Is Too Slow/Low-Pitched or Fast/ High-Pitched

When the audio input is DV1394, you have to use the AudioConfig applet's Preferred Audio Sample Rate control to match your audio sample rate to the actual rate of the incoming data. The two most common formats are 48 kHz / 16-bit, and 32 kHz / 12-bit. You may have to listen to a sample of your captured audio to determine whether the sample rate is set correctly – if the pitch is incorrect, try the other setting.

Audio Recording Control Comes Up With Wrong Device and Wrong Inputs

The cause of this problem may be that you currently have or have had previously, a Video for Windows audio capture driver installed in the system. The Osprey AVStream install process normally removes a previous Video for Windows driver, but if you have multiple Osprey cards installed you do have the option of running the Video for Windows driver on some cards and the AVStream driver on others.

Unfortunately the Recording Control does not work smoothly in this situation. The Video for Windows device will always try to act like it is the selected device even if it is not. You have to manually enter Recording Control's Options -> Properties dialog to select your device.

If you no longer have need for the Video for Windows driver, you can uninstall it using instructions obtainable from Osprey technical support. If you are comfortable using RegEdit to edit your registry, you can instead go to the following location:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Drivers32

Delete all REG_SZ entries named "mixer" or "mixer1" .. "mixer9" that have the name of an Osprey mixer as their data. These names will be o2ca_mix.dll, o5ca_mix.dll, or o300_mix.dll.

Interrupt Conflicts

Failed network connections, failure of a device drive to initialize during start-up, or failure of the Osprey card and driver to operate properly are often traced to interrupt (IRQ) conflicts. In our experience, IRQ conflicts are most commonly seen when a PCI SCSI adapter, or possibly a PCI network adapter, is present in the system.

Conflicts Between PCI Cards

PCI cards and drivers do not choose which IRQs they use; rather, the operating system assigns IRQ lines to PCI cards. The IRQ configuration for the Osprey card or cards is determined by Windows XP and the Osprey driver cannot change this configuration. However, you can cause the operating system to assign IRQs differently by rearranging cards or changing BIOS settings.

Multiple PCI cards are supposed to be able to share the same IRQ line. In practice, occasionally you may encounter a device driver that is not implemented correctly for interrupt sharing. If this problem arises, you have to rearrange the PCI cards so that the non-compliant card does not share its IRQ line with any other device. Another problem is that some PCI device drivers expect to use a particular IRQ line.

When a new card is added, it causes the system to assign IRQs differently. If the IRQ assignment for a particular card is changed and its device driver does not detect the change, this causes the system to work incorrectly.

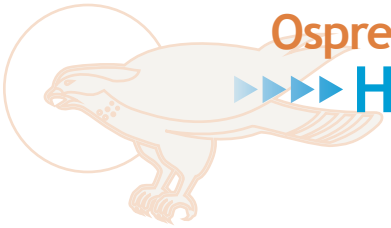
The simple answer to this problem is it can sometimes be solved by physically rearranging the PCI cards such that their arrangement in the PCI slots is different. When doing this, keep careful notes of the arrangements you have tried.

Another approach to PCI card conflicts is at the BIOS level. Depending on what kind of system BIOS you have, you may be able to change which IRQ lines are allocated to PCI devices versus ISA devices. You may be able to allocate more IRQ lines for PCI devices and thereby solve a PCI conflict.

If these approaches do not work, see Getting Help in Chapter 1.

Conflicts of PCI Cards with ISA Cards

A PCI card and an older-style ISA card can never share IRQ lines. Unfortunately, if a device driver for an ISA card has failed to initialize because of an IRQ conflict, the card's IRQ does not appear in the list. To find the conflict, you have to examine all your ISA cards with the Control Panel to find out what IRQs they are trying to use.



Osprey-300 Capture Card
Hardware Specifications

APPENDIX A

Table A-1 Physical Dimensions	
Length	167 mm
Width	18 mm
Height	106 mm
Weight	78 grams

Table A-2 Environmental Specifications	
Operating Temperature Range	0º to 40º C
Non-Operating Temperature Range	-40º to +75º C (RH)
Operating Humidity Range	5% to 80% (non-condensing) @ 40º C
Non-Operating Humidity Range	95% RH (non-condensing); gradient 30% per hour
Operating Altitude Range	0 to 3,048 meters (10,000 feet)
Non-Operating Altitude Range	0 to 15,240 meters (50,000 feet)

Osprey-300 Capture Card
Adding/Moving Boards & Developer Support

APPENDIX B

Adding/Moving Boards

When the Osprey Capture driver has been installed and another Osprey board is put into a slot that has not previously contained a board, the following sequence is initiated. This can happen because an Osprey board has been moved to a different PCI slot or when a board is being added to the machine. It occurs because of the manner in which Windows XP enumerates devices.

The New Hardware Wizard runs and displays the Found New Hardware window followed by the Digital Signature Not Found window.

1. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step)

   The Controller installing window (not shown) displays, and the text inside this window changes to "Osprey Video Capture Device, Installing ..." . Then the Digital Signature Not Found window appears on top of it.
2. Click Continue Anyway. (This window will only be displayed on drivers that have not been WHQL Certified; WHQL Certified drivers will skip this step). The Completing the Found New Hardware window displays.
3. Click Finish. The Digital Signature Not Found window displays.
4. This window displays once for each Osprey board you are installing. The Systems Setting Change window displays.
5. Click Finish to restart the computer. You must restart your computer to complete the installation. Do not attempt to use your Osprey card until after restarting the system.

Developer Support

The Osprey Technologies group has a software developers' kit (SDK) that provides a programming interface to the Osprey AVStream driver's custom properties. Inquire at http://www.viewcast.com for further information. This kit is different from the Osprey SDK for Video for Windows – so make sure you obtain the correct one.