

Osprey[®]

Video

Osprey[®] Analog PCIe Series User Guide
For PCIe Video Capture Cards

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To maintain UL compliance, this product to be used only with UL Listed computers that include instructions for user installed accessories.



FCC Notice:

WARNING: Use shielded cables to connect this device to peripherals in order to maintain compliance with FCC radio emission limits.

WARNING: Modifications to this device not approved by Osprey Video could void the authority granted to the user by the FCC to operate the device.

The Osprey 100e, 210e, 260e and Osprey 460e video capture cards have 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 equipment 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 equipment and 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.

If the above measures are unsuccessful, please consult the dealer or manufacturer of your radio or television receiver, or speak with an experienced radio/TV technician.

Note: 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 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.

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 Video could void the authority granted to the user by the FCC to operate the device.

Note to CATV Installer: Section 820-40 of the NEC provides guidelines for proper grounding and, in particular, specifies the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Product Disposal Information



Dispose of this product in accordance with local and national disposal regulations (if any), including those governing the recovery and recycling of waste electrical and electronic equipment (WEEE).

RoHS Compliant: Osprey Video is committed to compliance with the European directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, Directive 2002/95/EC, the RoHS directive.



For current RoHS statement, visit www.ospreyvideo.com.

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Overview

Thank you for purchasing the Osprey Analog PCIe Series video capture cards. This user guide provides step-by-step instructions for installing and using your new video capture cards. For the latest Osprey product information and news, visit our website at www.ospreyvideo.com.

The instructions are for configuring the Osprey Analog PCIe Series cards using Windows® 7 operating system. Additional notes for Windows XP or Vista or later users are included where appropriate. The Osprey 100e does not support audio and any references to audio should be ignored for this card type.

Product Description

The Osprey Analog PCIe Series cards are powerful, professional-grade video capture cards capable of capturing and streaming multiple independent channels, simultaneously. Ideally suited for high-density encoding applications, the Osprey Analog PCIe Series cards will streamline your workflow as it provides the highest possible video quality for your capture and streaming applications.

The Osprey 460e Analog PCIe capture card provides additional video inputs and four stereo balanced audio inputs to the rear panel connectors when using the A/V option. The optional video inputs include the selection of component or Y/C (S-Video) for each of the 4 channels or 3 additional composite inputs for a total of 16 switchable composite inputs per card.

Audience

The audience for this user guide includes anyone who uses or administers the Osprey Analog PCIe Series cards. Users should have a basic technical understanding of streaming media. This user guide provides information on the Osprey Analog PCIe Series cards only.

Conventions for this guide

Convention	Description	Example
Bold text	Characters to enter when referenced in a procedure. The name of fields or keys to press.	In the example, enter DTMF as the group type. Press Enter to save your changes.
<i>Note:</i>	Provides supplemental information.	<i>Note: The prompt may not display if...</i>
IMPORTANT!	Provides important data that affects how the system or software responds.	IMPORTANT! You must install Niagara SCX prior to configuring SCX options...
CAUTION!	Provides information to help avoid possible damage to hardware or a system crash (without data loss).	CAUTION! Use case sensitive commands to keep from destroying...

WARNING!	Provides information to ensure you avoid potential injury, death, or permanent system damage.	WARNING! Do not touch exposed wires.
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Warranties

For complete warranty details, refer to the specific warranty included with each product. General warranty information includes the following:

Limited Warranty

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Reseller Pass Through of Standard Limited Warranties

Osprey warrants its hardware products against defects in material and workmanship under normal use for the period of two years (24 months) from date of sale. Where specific warranties exist that provide more substantial coverage, notwithstanding the warranty provisions herein, such product warranties control and preempt or supersede the warranty provisions herein.

Resellers pass the Osprey standard limited warranties for the products through to the customer without modification. Any modification of a product voids the Osprey warranties or any other existing or available warranty.

System requirements

The following system requirements relate to your Osprey® video capture card only. The video capture or encoding applications you use will likely require a much more powerful system than that which is listed below. Please consult your software documentation for applicable system requirements.

Minimum system requirements

- Direct Mode: 2 GHz Intel® Pentium® 4 processor or equivalent
- PostProcessing Mode and SimulStream®: 2 GHz Intel® Pentium® 4 processor or equivalent, 3 GHz recommended
- Microsoft® Windows® XP
- Up to 7.5 MB of available hard disk space
- 2 GB of RAM, 4 GB recommended
- One available PCI Express® x1 slot (Video capture requires intense bandwidth across the system bus, CPU, and memory. North Bridge PCIe slots are strongly recommended.)
- PCIe 1.0

Installation Steps

The Osprey installation program installs the drivers and 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.

Osprey recommends this method especially if Osprey software does reside on your host computer. After the install is run, the software detects the card and its drivers initiate automatically.

If you are updating Osprey software, first uninstall the previous software version, reboot your computer, and then install the update.

Installing the driver

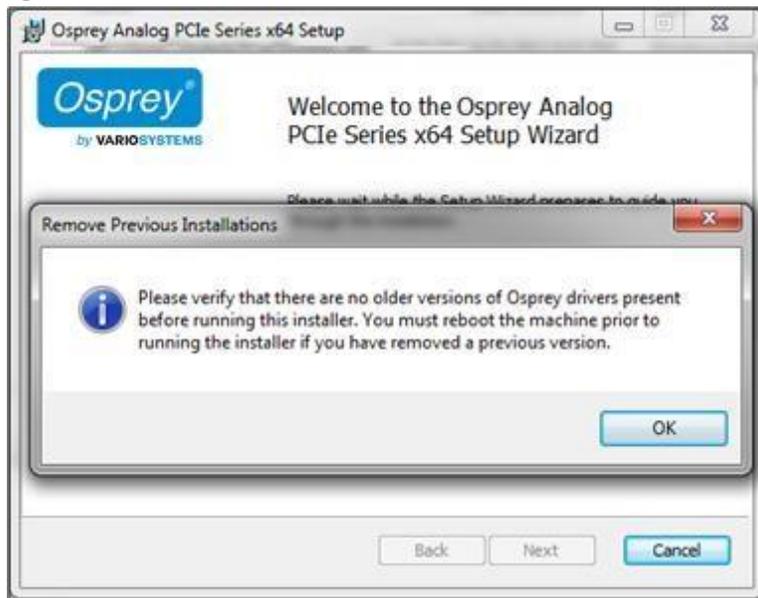
Insert the Osprey software CD into your CD-ROM drive. The main menu for the Osprey software appears if you enable autoplay. If the main menu does not automatically appear, click on the Window's computer icon and select the CD-ROM and the setup.exe icon.

The Osprey A/VStream Setup Wizard (Figure 2) engages and guides you through the installation process.

To install the driver:

1. If you have older versions of Osprey drivers present, you must remove them before running this installer. The Remove Previous Installation dialog box displays (Figure 1).

Figure 1. Remove Previous Installation

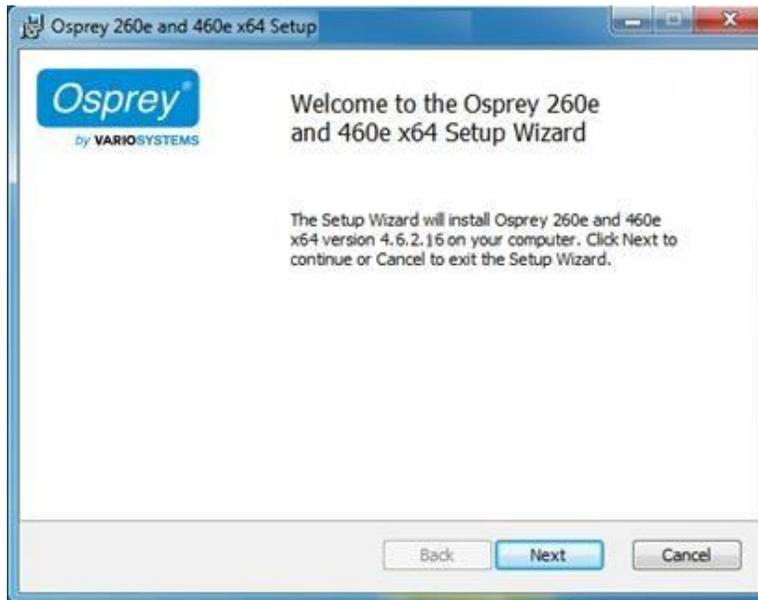


2. Click **OK**. The Welcome to the Setup Wizard window displays (Figure 2).

Note: The version number may be different.

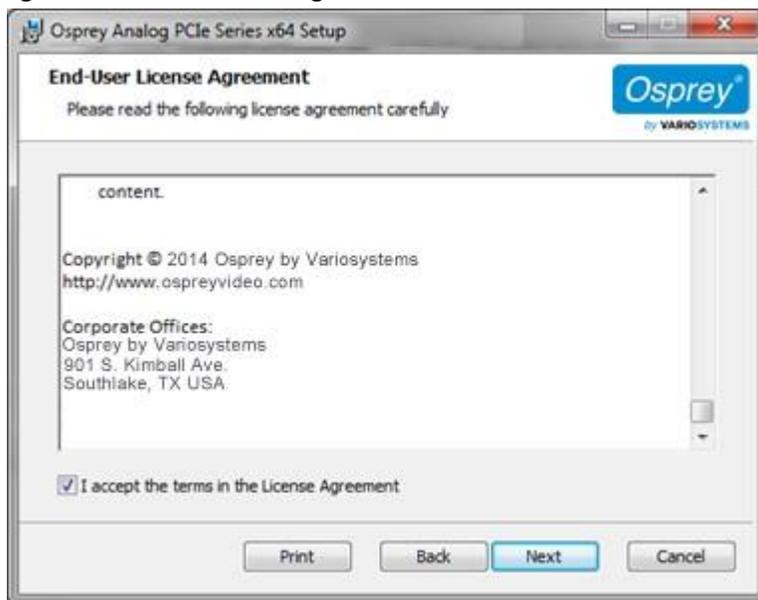
Figure

Figure 2. Welcome to the Setup Wizard



3. Click **Next**. The End-User License Agreement window displays (Figure 3).

Figure 3. End-User License Agreement



4. Read the end-user license agreement. Click **I accept the terms in the license agreement**.
5. Click **Next**. The Video Standard window displays (Figure 4).

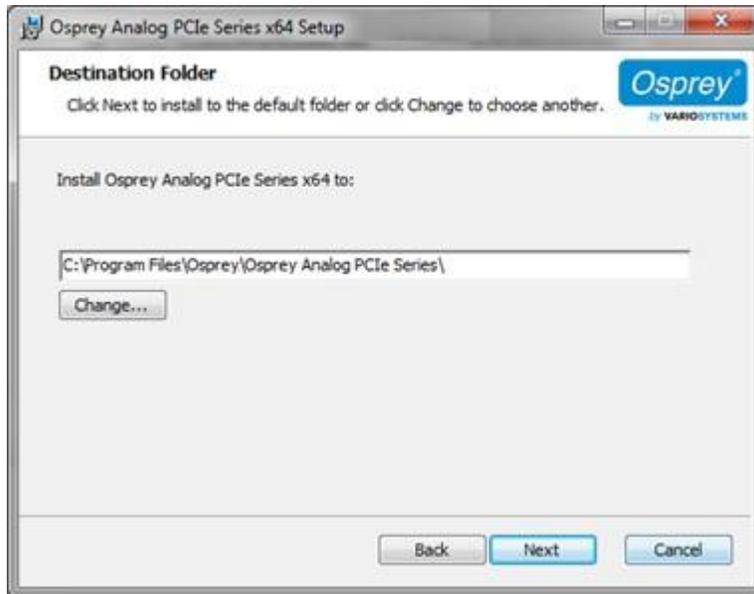
Figure

4. Video Standard window



6. Click a video standard from the drop-down list.
7. Click **Next**. The Destination folder window displays (Figure 5).

Figure 5. Destination Folder window



8. Click **Next**. The Ready to Install window displays (Figure 6).

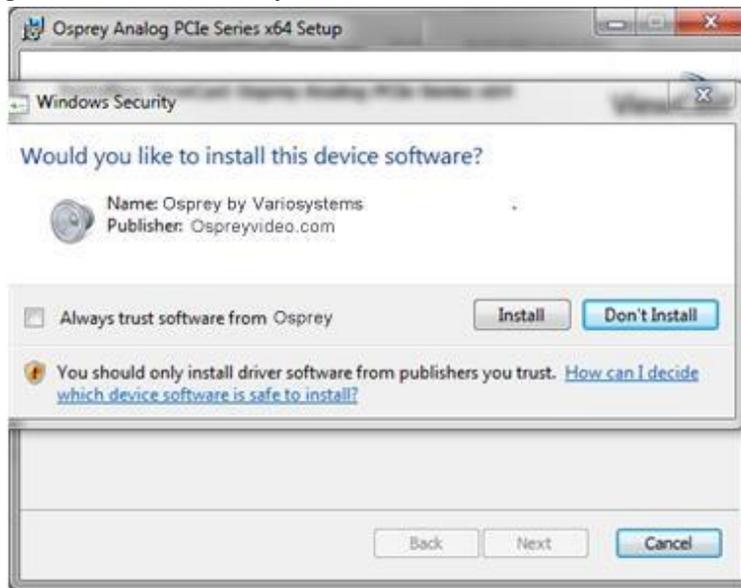
*Note: Click **Change** to change the destination folder.*

6. Ready to install



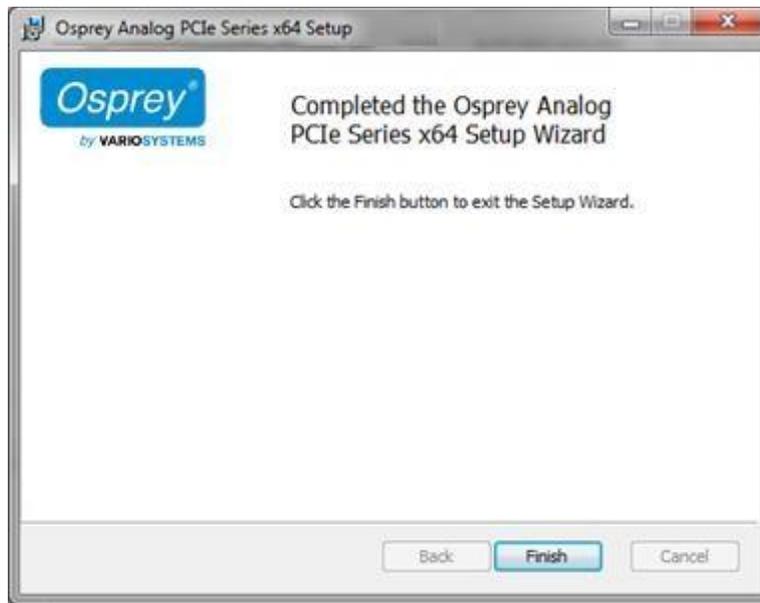
9. Click **Install**. The Windows Security window displays (Figure 7).

Figure 7. Windows Security window



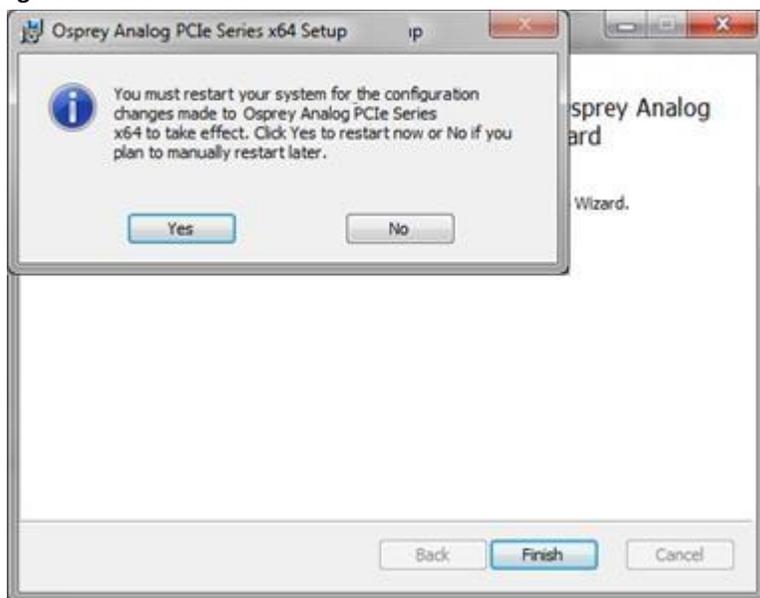
10. Click **Install**. When the installation finishes, the Install Completed window displays (Figure 8).

8. Install Completed



11. Click **Finish**. The restart window displays (Figure 9).

Figure 9. Restart window



12. Click **Yes** to restart your system now.

Installing the video capture card

After you install the Osprey Analog PCIe Series driver, physically install the video capture card into the computer.

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

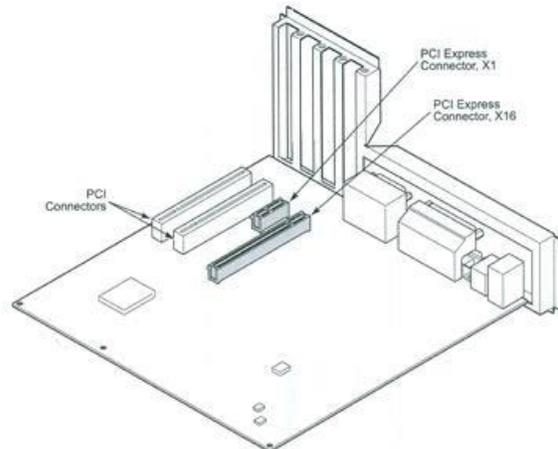
- Handle cards only by the non-conducting edges.
- Do not touch the card components or any other metal parts.
- Wear a grounding strap while handling the cards (especially when located in a high static area).
- Properly ground your computer to avoid static discharge.
- Ensure the workstation is powered off and the power cord is unplugged before installing any components.
- If you are not familiar with how to install a PCI Express bus card, refer to the system's documentation for more complete, step-by-step instructions.
- Install the card only in UL Listed computers that include instructions for user-installed accessories.

To install the video capture card:

1. Power down and unplug your computer.
2. Remove the computer's cover and locate an empty PCI Express slot.

WARNING! Be sure to install the card in the PCI Express slot. This slot is usually black. Refer to the following diagram as a guide. Placing the card in the wrong slot can damage the card.

Figure 10. Typical PCI Express Slot diagram



3. Remove the cover screw from the empty PCI Express slot's cover, set the screw aside.
4. Remove the slot cover. Remove the Osprey card from its anti-static bag.
5. Insert the Osprey card into the desired PCI Express slot and make sure it is seated evenly.
6. Secure the back panel of the card with the slot's cover screw.
7. Replace the computer cover.
8. Plug the power cord into an electrical outlet and turn the computer on.

Installing the hardware

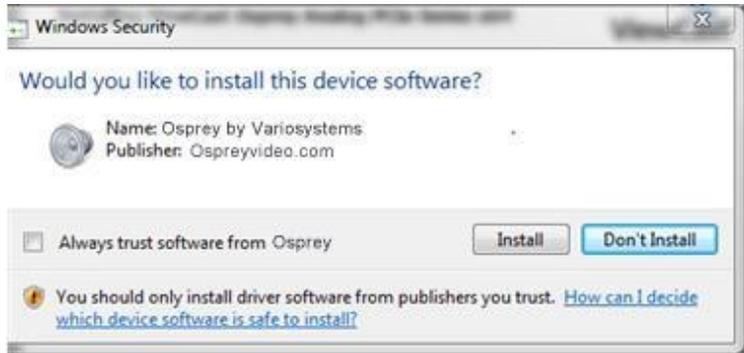
After you install the Osprey Analog PCIe series card and restart the computer, the InstallShield Wizard displays and guides you through the installation process.

To install the hardware:

1. The New Hardware Wizard runs and the Windows Security window (Figure 11) displays.
Click **Install**.

*Note: You can enable **Always trust software from “ospreyvideo.com.”** to eliminate this step in the future.*

Figure 11. Windows Security window



The device software installs. When the installation is complete, the Osprey setup window appears (Figure 12). You must restart your system for the configuration to take effect. Click **Yes**.

Figure 12. System Settings Change Window



Multiple board types

All Osprey video capture cards are designed to co-exist with other Osprey cards within practical limits of slot placement, available power, and the upper limits of system and CPU performance. Each class of Osprey devices requires its own Windows driver.

class 1: o100, o200, o210, o220, o230 class 2:

o300 class 3: o440 class 4: o530, o540, o560

class 5: o700e HD and o710e HD class 6:

o240e, o450e

class 7: o100e, o210e, o260e, o460e class 8:

o820e, o825e, o845e

This user guide applies only to class 7.

For example, if you install an Osprey 530 and an Osprey 460e card in the same computer, you must install separate drivers for each board.

Adding or moving boards

When you add or move boards after you install the Osprey Analog PCI series driver, the following two scenarios exist.

- A. You added a board of a different class to a computer that already contains another board. For example, an Osprey 240e is already installed with its current driver on the computer. You want to add an Osprey 260e/460e card. You must install the driver installation package for the new board to work.
- B. You moved a board from one slot to another, or added another board of the same type. For example, an Osprey 240e card is installed in the computer, and you want to install another Osprey 240e card. In this case, the following sequence takes place.

To add or move boards:

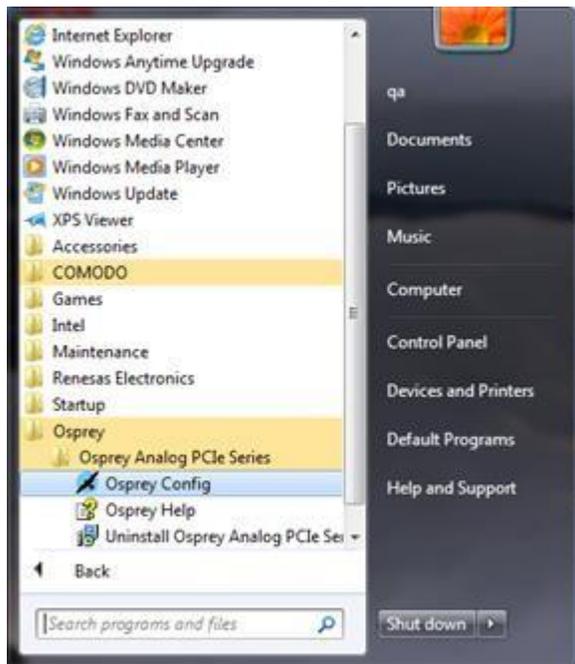
1. The New Hardware Wizard runs and the Found New Hardware window displays followed by the Digital Signature Not Found window.
2. Click **Continue Anyway**. (The Digital Signature Not Found window will only display on drivers that have not been WHQL certified. WHQL-certified drivers skip this step.)
3. The Controller Installing window appears, and the text inside this window changes to Osprey Video Capture Device, Installing ... Then the Digital Signature Not Found window appears.
4. Click **Continue Anyway**. (Again, the Digital Signature Not Found window will only display on drivers that have not been WHQL-certified. WHQL-certified drivers skip this step. The Completing the Found New Hardware window displays.
5. Click **Finish**. The Digital Signature Not Found window appears.
6. The Digital Signature Not Found window appears once for each Osprey board you install.
7. The Systems Setting Change window appears.
8. Click **Finish** to restart the computer.
9. The Osprey Analog PCIe Series card is now ready for use.

Setting Video Driver Properties

After installing the Osprey card and Analog PCIe series driver, you need to access the card's settings and possibly modify them to fit your needs. This manual takes you step-by-step through the card settings. Start by opening the OspreyConfig utility.

You need to use a DirectShow application such as Microsoft Windows Media® Encoder or RealProducer®. We also access card property pages through Osprey Config, the utility bundled with our 4.6 driver suite. Once installed you can see the card's default settings and change them as needed.

To open Osprey Config click **All Programs** in the Start menu of your Windows computer ➤ **Osprey** ➤ **Osprey Analog PCIe Series** ➤ **Osprey Config** (Figure 13). **Figure 13. Accessing the OspreyConfig Utility**



Note: Other DirectShow applications can find the property page too. If you use a third-party application, you will find how to access the card's settings in the third-party application's documentation.

OspreyConfig's initial processing sequence

After clicking on the Osprey Config icon, the first screen of the application appears (Figure 14) displaying the cards and devices installed on your computer. The main window (Figure 14) depicts a tree view of Osprey audio and video capture filters installed in the system. They are organized by device – each device has an Audio Filter and Video Filter. If SimulStream is installed, there may be multiple Video Filters listed under each device.

Figure 14. Initial OspreyConfig user interface



In this example, the computer in use has one card and four devices. The card can take a single input and stream the content differently, for example, you can use several bit rates, sizes, and formats.

The OspreyConfig window has the following controls:

+	<p>Click the + icon on the left side of the device you want to configure, to change the properties of that device.</p> <p><i>Note: You can also double-click on the name of a filter to display its properties.</i></p>
Show Properties for Selected Filter	<p>This button becomes active when you choose a device or video filter. The device properties window displays (see <i>Understanding the device properties window</i>).</p>
Place OspreyConfig icon in the Control	<p>Select this check box to place the OspreyConfig icon to appear in the Control Panel that next time the Control Panel is opened.</p>

<p>Panel</p>	<p><i>Note: You need to have administrative rights on the machine to add OspreyConfig to the Control Panel or remove it. A diagnostic message displays if you try this command without administrative rights.</i></p> <p><i>Vista or later Note: If you are running Windows Vista or later, in addition to having administrative rights you need to open OspreyConfig with the Run as Administrator option. If you see a diagnostic message to this effect, exit OspreyConfig: Command ➤ Exit OspreyConfig rather than using the Close button. Right click on the OspreyConfig icon, select Run as Administrator and retry the command.</i></p>
<p>Place OspreyConfig icon in the Taskbar</p>	<p>Select this check box to immediately display the OspreyConfig icon in the notification area at the right end of the Taskbar. The icon reappears each time the current user restarts the user session. Multiple users control this setting individually as they log onto the system.</p>
<p>Help</p>	<p>Click Help to access the Help files.</p>
<p>Close</p>	<p>Click Close to close OspreyConfig’s main application window. If you place OspreyConfig in the taskbar, it is removed and the application remains loaded to respond to clicks on that icon.</p>

Figure 15 shows the user interface that appears when you select a filter. In this example, the Osprey 460e Device 1A is expanded and Video Filter is highlighted. **Figure 15. Selecting a device for configuration**

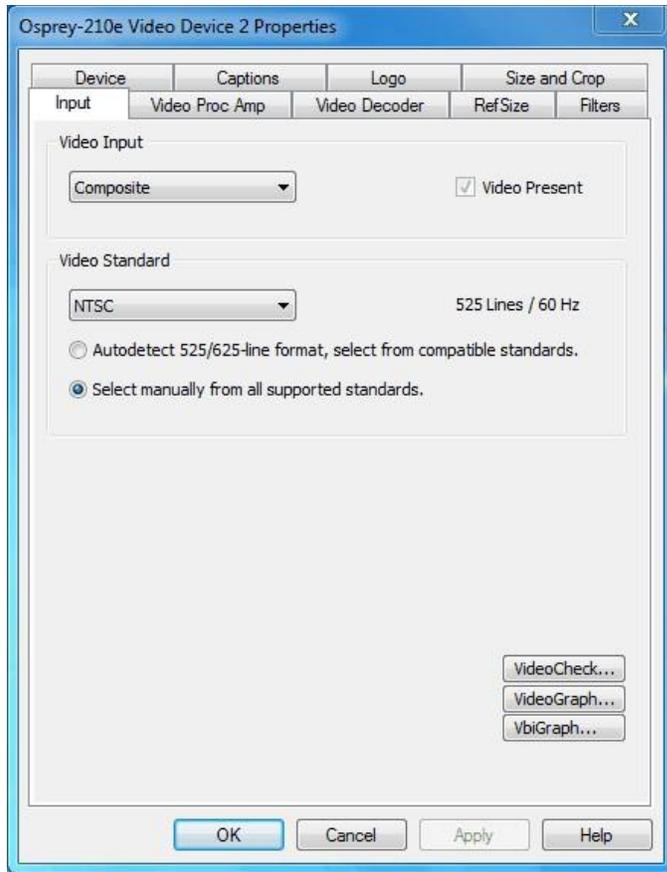


Understanding the device properties window

Osprey's device properties window enables you to view and change the default settings of the driver. Once you are familiar with the video card's properties, you can make changes to get the optimum performance from your card and change settings in real time.

Device properties are visible through tabs to select different controls (Figure 16). **Figure 16. Osprey**

Video Device Properties window tabs



The Osprey Analog PCIe Series cards have the following tabs:

Input tab	Select the video input, NTSC / PAL / SECAM video standard.
Video Proc Amp tab	Set brightness, contrast, saturation, hue, gamma, and sharpness.
Video Decoder tab	Select the video standard – NTSC, PAL, SECAM.
Debug tab	Sets Osprey Analog PCIe series internal test controls. The user should only use these controls when instructed by Osprey support. Doing so without proper instructions may result in system instability or in the system crashing.
RefSize tab	Set the reference size for cropping.
Filters tab	Enable SimulStream®, deinterlace/ detelecine.
Device tab	Use various other specialized controls.
Captions tab	Set up on-video closed caption rendering.
Logo tab	Set up on-video logos.
Size and Crop tab	Set the default size, enable cropping, and set the cropping rectangle.

On some systems you may see additional tabs besides the ones listed. The additional tabs are systemsupplied, for-your-information only, and contain no controls that you can set.

Common buttons

The following information applies to controls that are not interactive.

OK	Commits the changes you have made on the currently displayed page, and exits the dialog.
Cancel	Exits the window without committing the changes you have made on the currently displayed page. Changes made before the most recent click of Apply are not cancelled.
Apply	Commits the changes you have made on the currently displayed page, without exiting the dialog.

Some controls are interactive – changes you make are immediately updated on the video. Examples are the brightness, contrast, hue, saturation, and sharpness controls, the graphical gamma control; and the graphical sizing and positioning controls for logos. **OK**, **Cancel**, and **Apply** have no effect on these controls.

In all cases, **Help** accesses this help module. The button on each tab displays the description for that page.

*Note: **OK** and **Apply** commit only the changes on the currently displayed page. To set changes on three different pages you need to click **Apply** twice and **OK** once.*

Per-device, per-pin, and global controls

Some controls operate on the device as a whole, while other controls operate on individual filters and pins. Controls on the following tabs are per-device. A change to any of the following controls affects all pins and filters on the device:

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

Controls on the following tabs are per-filter and per-pin. Changes on these tabs affect only the filter or pin specified:

- Crop Logo
- Captions

At the top of these three tabs is a control group named Pin Select. The three buttons in this group determine whether changes you make will select both the capture and preview pin associated with the filter, or just the pin – preview or capture – that you have selected.

Figure 17. Pin Select buttons



When you enable **Both**, changes you make to the setup apply to both the capture and preview pins.

You can have different setups for the two pins. For example, you could enable a feature on the capture pin but not on the preview pin. When you enable **Capture**, 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. **Preview** works the same way. The DirectShow Pin Properties that applications may display for **Capture** and **Preview** pins are always separate for each pin.

Some of the controls on the Filters tab and the Device tab are global to all Osprey Analog PCIe Series devices. Global controls are noted as such in their descriptions. The rationale is either that the control is or logically global to all devices; or that it is rarely used, less important control, such that users will prefer the convenience of setting the control just once for all devices. Global controls affect only Osprey Analog PCIe Series devices, not other kinds of Osprey cards that might be in the system.

Input tab

All controls in the Input tab apply to all filters and pins on the currently selected device. If you have multiple Osprey cards, set the input individually for each card.

Figure 18. Input tab



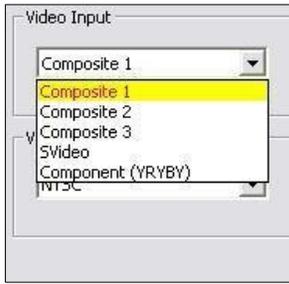
The Input tab has the following controls.

Video Input	Allows you to select the video signal source.
Video Present	This indicator is enabled when video is present.
Video Standard	Select the standard different countries or geographical areas (Figure 18) from the drop-down list. The North American standard is NTSC. The Japanese standard is NTSC-Japan. The five PAL standards, B, D, G, H, and I are similar and treated the same way by the Osprey driver. The driver also supports PAL-M and N and SECAM video.
Utilities	Allows you to launch utilities that are useful for setting up and checking video: <ul style="list-style-type: none"> • VideoCheck • VideoGraph
	<input type="checkbox"/> VbiGraph

Video Input group

The main Video Input control is a drop-down list for selecting the video signal source.

Figure 19. Osprey 460e Video Input group



Osprey 260e

The Osprey 260e is a single channel card. It has multiple video inputs, but you can only select one of them at a time.

Which inputs are actually selectable depends on the type of dongle you use. The Osprey 260e ships with a YPrPb (Component) dongle (Figure 20) and an adapter (Figure 22).

You can use YPrPb dongle three ways. First, you can use it for YPrPb (Component) inputs as shown in Figure 20.

Figure 20. YPrPb (Component)



This dongle also provides three Composite inputs. Only one of these can be selected at a time. The numberings in the selection control correspond to the lines on the dongle as shown in Figure 21.

Figure 21. Selection control numbering



Finally, with an additional adapter, a SVideo source can be connected to this dongle. The SVideo connection replaces Composites 2 and 3, but Composite 1 is still available as shown in Figure 22.

Figure 22. Adapter



You can also use a Composite/SVideo dongle with the Osprey 210e, the connections are shown in Figure 23.

Figure 23. Composite/SVideo dongle



The Composite line is Composite 1 in the selection control. With this dongle, you cannot use the Composite 2, Composite 3, and YPrPb connections.

Osprey 460e

The Osprey 460e has four separate independent video channels that can run simultaneously. Unless you attach an optional auxiliary expansion connector, the only input available is the Composite BNC on the board’s mounting bracket. The four connectors correspond from top to bottom to channels A, B, C, and D. In this case the Video Input control shows just the one input for channel, which will be selected automatically.

The Osprey 460e’s optional auxiliary expansion connector adds five additional inputs, more than three multi-purpose physical connectors, for each of the four channels:

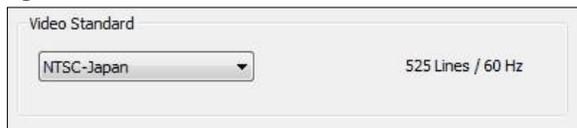
- Component (YPrPb) uses all three of the auxiliary video connectors
- S-Video (Y-C) connects an S-Video connector to two of the connectors via an adapter cable □ Three additional composite inputs

The labeling on the expansion panel shows which connectors to use for each purpose. The inputs for each channel, along with the channel’s bracket connector, can only be used one at a time. The hardware automatically senses at system start whether the expansion connector is plugged in, and if it is then all six inputs appear in the Video Input control.

Changes to the video input take effect as soon as you click **Apply** or **OK**.

Video standard group

Figure 24. Video Standard field

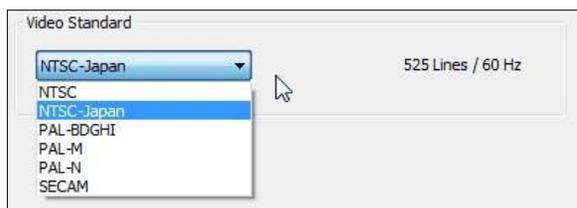


The Video Standard control group is a copy of the controls on the Video Decoder tab.

The North American standard is NTSC. The Japanese standard is NTSC-Japan. The five PAL standards, B, D, G, H, and I are similar, and are treated the same by the Osprey driver. The driver also supports PAL-M, PAL-N, and SECAM video. PAL-N is the Argentine standard with a 3.58 MHz subcarrier. PAL-M is a standard that uses the PAL method of color encoding combined with an NTSC-type 525-line, 29.97 Hz frame format.

Changes to the video standard take effect as soon as you click **Apply** or **OK**. If video is currently streaming you will not see correct video unless the signal format on the input is the same as the video standard you have just selected. If you are changing from a 625-line standard to a 525-line standard and your video is larger than the maximum size for the 525-line format, video will not restart until you adjust the video size to an allowed value.

Figure 25. Video Standard drop-down list



Utilities

The buttons in the lower right corner of the Input property page launch utilities that are useful for setting up and checking video.

These utilities run independently of the property pages. They continue to run after property pages are closed. Each utility also has a device select control, so it can be switched to monitor another board.

VideoCheck utility

VideoCheck opens a simple video monitoring window (Figure 26). You can see the immediate effect of changes to your settings. Most changes show up automatically as soon as you click **Apply**. You will need to click the applet's **Update** button to see a change that alters the output size of the video.

VideoCheck uses one preview stream of video. If you do not have SimulStream installed, you can only view one preview stream at a time from each device (this is in addition to the main capture stream). If VideoCheck does not work, the first thing to check is whether a preview stream is already running on the device. **Figure 26. VideoCheck utility**



VideoGraph utility

The VideoGraph utility (Figure 27) launches a vectorscope/lumascope utility. VideoGraph is intended to be used with a color bar signal from a calibrated signal generator. It shows whether the signal and the card's Video Proc Amp settings are calibrated to the correct luma and chroma levels.

In the picture, the left-hand panel shows the luma levels of standard 75 % NTSC color bars. The grey background shows the expected levels, and the red line shows the actual levels measured. The righthand panel shows the chroma positions of the six colors. The small colored squares show the expected positions, and the points on the red signal pattern should line up with them.

If there are discrepancies, you can use the driver's Brightness, Contrast, Saturation, and Hue controls on the Video Proc Amp property page to adjust the levels.

If you don't have a signal generator available, you can get a general idea of how VideoGraph works by disconnecting the input signal and running it with the 75 % or 100 % no-signal color bar test pattern. The driver's test pattern will line up exactly with the VideoGraph's targets – IF the gamma setting is at the default position. Software-based Video Proc Amp controls alter the test pattern levels; hardware based-controls do not. The gamma control, and in some cases the hue control, are software based.

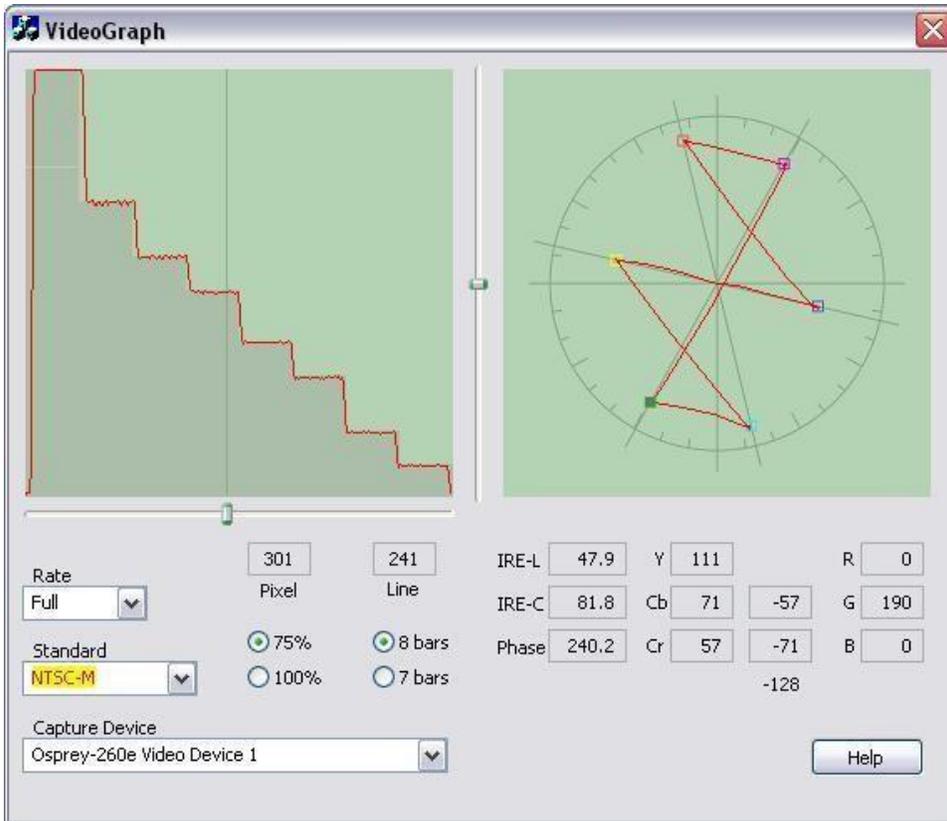
The vertical slider adjusts which video line displays. You may have to move the slider so that a line that has color bar information is selected.

The horizontal slider moves the horizontal cursor – the vertical line on the luma display. The data displayed at the lower right – IRE-L, etc. – is for the pixel selected by the horizontal cursor. Also, on the chroma display, the small solid rectangular cursor corresponds to the luma cursor, that is, if the luma cursor is on the red color bar, the chroma cursor will be at or near the red point in the chroma display.

There are controls to set the background markings for 75 % or 100 % signal levels, and for eight or seven bars – so that the markings correspond to the type of color bars your signal generator is making.

The Help button on the applet brings up a message box with an alternate and slightly more technical description.

Figure 27. VideoGraph utility



VbiGraph utility

The VbiGraph utility (Figure 28) opens an applet that displays the raw waveforms of the video's Vertical Blanking Interval (VBI). The information on these lines may include closed captions (CC), wide screen signaling (WSS), vertical interval timecode (VITC), and teletext. The applet is useful as a diagnostic if the expected data is not being decoded – you can see if the required signal is there at all, whether it is in spec, and which line it is on.

The controls select the field and line to be displayed. The only time you need the **Update** button is when you switch between 525-line and 625-line video standards.

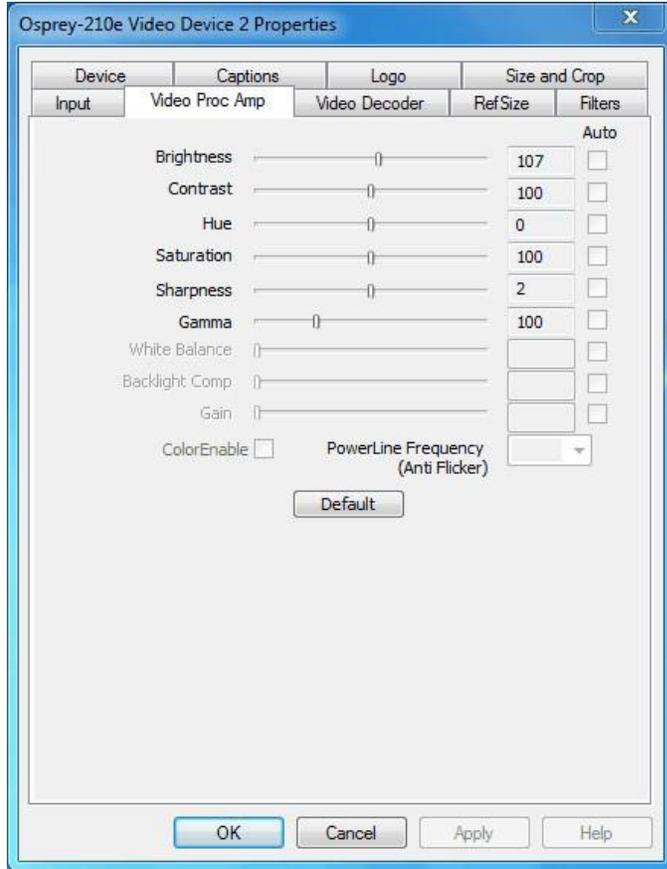
Figure 28. VbiGraph utility



Video Proc Amp tab

Use the slider controls to set Brightness, Contrast, Hue, Saturation, Sharpness, and Gamma (Figure 29). If preview video is running when you access this tab, you can see your adjustments interactively. These controls are implemented in hardware, and work as typically expected.

Figure 29. VideoProc Amp tab



The Video Proc Amp tab has the following controls.

<p>Brightness and Contrast</p>	<p>These are terms for what one would call a contrast ratio. It's a measure of a display system, defined as the ratio of the brightest color (white) to that of the darkest color (black) that the system is capable of producing. A high contrast ratio is a desired aspect of any display, but with the various methods of measurement for a system or its part, different measured values can sometimes produce similar results. The control exists in the event you need to change the ratio of an incoming signal.</p>
<p>Hue</p>	<p>Hue adjustment is calibrated in degrees. It is implemented in hardware for NTSC video. An alternate software implementation is used when PAL or SECAM standards are used.</p>
<p>Saturation</p>	<p>In color theory, saturation or purity refers to the intensity of a specific hue. A highly saturated hue has a vivid, intense color, while a less saturated hue appears more muted and grey. With no saturation at all, the hue becomes a shade of grey. You can adjust the saturation level in the event a video feed alters it.</p>

Sharpness	This slider has a small number of discrete positions corresponding to specific hardware filter settings. Generally, the positions to the left result in smoother video, the positions to the right result in sharper video. If the setting is too sharp, fringes or ghosts appear at vertical boundaries. Because each step engages a different combination of discrete filters, the control may be non-linear in its action. Some steps may result in slight differences while other steps may result in large differences. The effects of different sharpness settings are easier to see when the video is completely still, or is paused.
Gamma	The Gamma adjustment is calibrated at 0.01 times the indicated value – that is, 30 refers to gamma correction of 0.3, 100 to 1.0, and 300 to 3.0. Therefore, the video appears generally brighter when you move the slider to the left.
White Balance	This field is an unused DirectShow feature and is not selectable.
Backlight Comp	This field is an unused DirectShow feature and is not selectable.
Gain	This field is an unused DirectShow feature and is not selectable.
Color Enable	This field is an unused DirectShow feature and is not selectable.
PowerLine Frequency (Anti Flicker)	This field is an unused DirectShow feature and is not selectable.
Default	Click Default to return to the default settings.
Auto	This field is an unused DirectShow feature and is not selectable.

For all of the Video Proc Amp controls the driver maintains one set of setting per Osprey device. It does not maintain individual settings for each input or type of input.

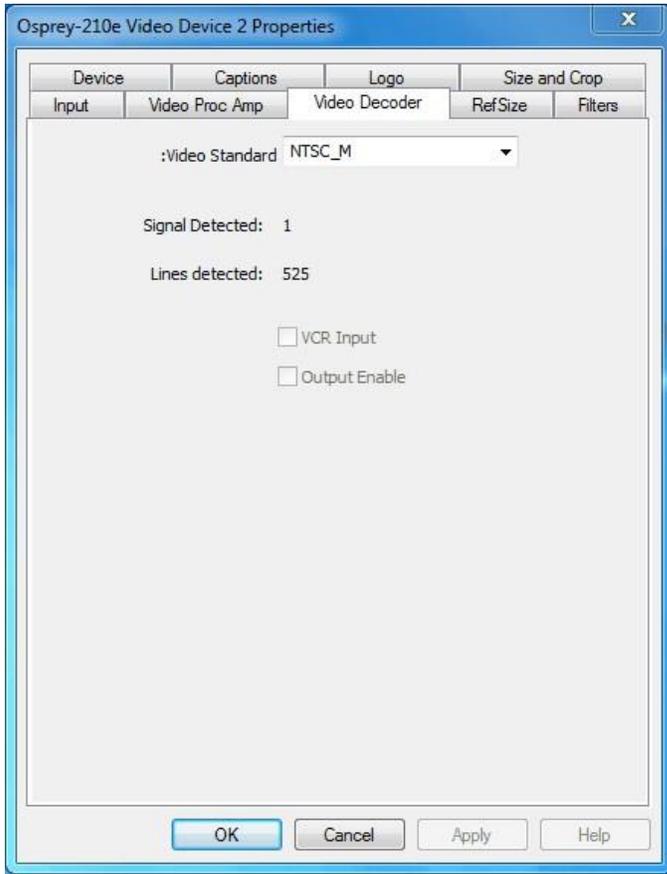
Changes made on this page apply to all video previews and capture pins on the currently selected device.

Video Decoder tab

The Video Decoder tab (Figure 30) is a Microsoft® DirectShow standard control for setting the NTSC/PAL/SECAM video standard.

Note: These controls are also on the Input tab. Most users find the Input tab more convenient to use.

Figure 30. Video Decoder tab



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

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

Osprey cards support the Signal Detect (0 or 1) and Lines Detected (525 or 625) status readouts. They do not support the VCR Input or Output Enabled controls, which are always disabled.

The Video Decoder tab has the following controls.

Video Standard	Select the video standard.
Signal Detected	When the card does <i>not</i> detect the input signal, this field displays a 0. When the card detects the input signal, it displays 1.
Lines detected	This field displays the number of lines the card detects in the input signal.
VCR Input	This field is a DirectShow feature that is not implemented.
Output Enable	This field is a DirectShow feature that is not implemented.

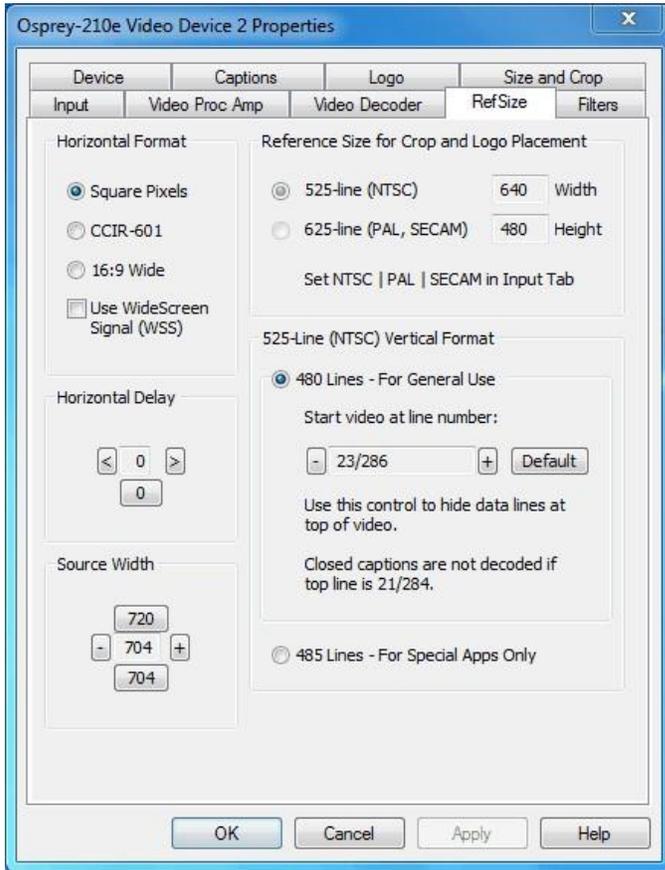
RefSize tab

The RefSize tab (Figure 31) 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: This tab does not provide everyday control of the final output size of your video. Control final output size 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 previews and capture pins on the currently selected device.

Figure 31. RefSize tab



The RefSize tab has the following controls.

Horizontal Format	Sets the horizontal mode for the output. Options include Square Pixels, CCIR-601 setting, 16:9 Wide, and Use WideScreen Signal control.
Horizontal Delay	The horizontal delay control moves the video horizontally in the capture or preview frame.
Source Width	Use the Source Width control to trim the black left and right edges of an image.

Reference Size for Crop and Logo Placement	This part of the dialog box displays the results of more fundamental settings made elsewhere in the dialog box.
525-Line (NTSC) Vertical Format	This control is for NTSC users. It has no effect for PAL and SECAM 625-line video standards.

Horizontal Format

Figure 32. Horizontal Format



The Horizontal Format has the following controls.

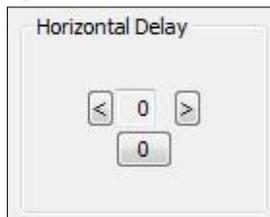
Square Pixels	Use the Square Pixels setting for normal 4:3 video (Figure 32) that is viewed via a computer monitor. This setting results in a square aspect ratio sampling of the source video. It also results in a source image of 640 x 480 for 525-line standards and 768 x 576 for 625-line standards.
CCIR-601	Use the CCIR-601 setting for 4:3 video that is viewed on a dedicated video monitor. This setting results in a CCIR-601 aspect ratio sampling of the source video. It results in a video input horizontal size of 720 pixels for both 525-line and 625-line standards. This sizing is standard for dedicated monitors but the resulting video appears horizontally stretched (525-line) or squeezed (625-line) on a computer monitor. It is more efficient to set the horizontal mode to match the size of the output. For example, if your target video size is 640 x 480 using Square Pixel sizing in PostProcessing Mode, it will avoid an unnecessary software scaling step in the driver.
16:9 Wide	Select 16:9 Wide for 1.85:1 anamorphic video such as DVD content and any PAL widescreen content. The output video size is 852 x 480 for 525-line standards, and 1024 x 576 for 625-line standards. To see output of this size, you have to also select this size in your application.

<p>Use WideScreen Signal (WSS)</p>	<p>The Use WideScreen Signal (WSS) control enables automatic sidebars and letterboxing when the input video aspect ratio does not match the output aspect ratio. If the aspect ratio of your content is subject to change between 16:9 and 4:3, it is useful to enable this control.</p> <p>WSS is a line of the vertical blanking interval (VBI) that encodes the aspect ratio of the video. It is normally line 20 of 525-line video and line 22 of 625-line video. It is generated by newer DVD players, and is present in PAL broadcast content.</p> <p>This control is useful for both 4:3 and 16:9 input formats, and for both 4:3 and 16:9 output formats. When selected, it has the following effects:</p> <ul style="list-style-type: none"> • 4:3 video on a 4:3 window shows without sidebars or letterboxing • 4:3 video on a 16:9 window shows with sidebars • 16:9 video on a 16:9 window shows without sidebars or letterboxing • 16:9 video on a 4:3 window shows with letterboxing
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Changes to this control take effect as soon as you click **Apply** or **OK**. If video is currently streaming, you may not see correct video until you have adjusted the video output size. If your output size is larger than the new reference size, you have to adjust the output size to be not larger than the reference size before the stream can be restarted.

Horizontal Delay

Figure 33. Horizontal Delay



The Horizontal Delay control works in conjunction with the *Source Width* control to adjust the width and borders of the active video field (Figure 33).

The Horizontal Delay control moves the left edge of the video horizontally in the capture or preview frame. Video devices differ in their timing characteristics, so some devices may need different adjustments from other devices. Use the left and right arrow buttons to move the active video to the left or right. Click **0** to restore the default zero setting. The range of adjustment is from -15 to +15.

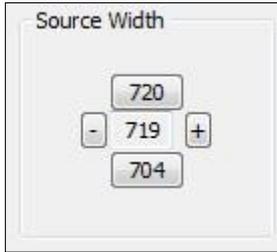
This control is interactive. Use this control while a preview stream is being displayed to see the changes immediately.

If you see a black line to the left of the active video, use the left arrow button to move the active video to the left. The video can be too far to the left, so that several columns of pixels are not visible. In this case, use the left arrow button to move the video leftward until the black line disappears.

This control affects all streams on the selected video channel.

Source Width

Figure 34. Source Width



The Source Width control (Figure 34) works in conjunction with the *Horizontal Delay* control to adjust the width and borders of the active field.

The Source Width control adjusts the width of the portion of the video line that is captured. It moves the right edge of the video horizontally in the capture or preview frame. (This control does not move the left edge – the left edge is affected only by the Horizontal Delay control.) The minus button moves the right edge to the left the plus button moves it to the right. Adjustments are relative to the standard CCIR horizontal size of 720 pixels. The [720] button resets the width to that default. The [704] button sets the width to a useful smaller size. The range of adjustment is from 688 to 720.

To trim an image:

Perform this adjustment in conjunction with the Horizontal Delay adjustment, as follows:

1. Make the adjustment with a live preview stream running, so you can see changes immediately.
2. Use the Horizontal Delay control to set the left edge of the video.
3. Use the Source Width adjustment to set the right edge of the video.

You can get the same results using the cropping control (Size and Crop tab) but there are differences.

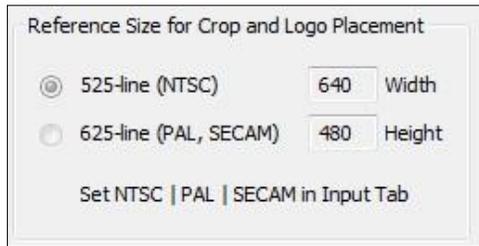
- The Source Width control affects all pins and all filters on the device, whereas the crop control must be set separately for all SimulStream filters.
- Source Width control uses less CPU resources than cropping in the specific case of 525-line (NTSC, PAL-M) video that is uncropped and in square pixel (640 x 480) format.

The driver performs the source width adjustment in hardware if possible; otherwise it performs it in software. The following table summarizes the behavior of the control. The column “Adds CPU” refers to whether setting the control to a value other than 720 increases CPU usage beyond what is required by other aspects of the format.

Video Type	Format	HW or SW	Adds CPU	Granularity
525-line	Square Pixels	HW	No	1
	CCIR	SW	Yes	4
	Widescreen	SW	No	4
625-line	Square Pixels	SW	No	4
	CCIR	SW	Yes	4
	Widescreen	SW	No	4

Reference Size for Crop and Logo Placement

Figure 35. Reference Size for Crop and Logo Placement



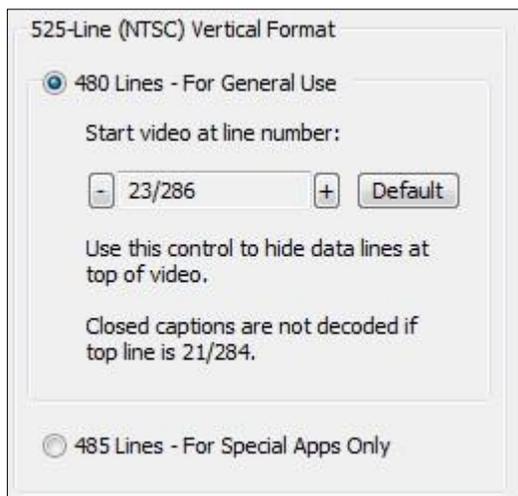
This part of the dialog is read-only because you do not set it directly – rather, it shows the results of settings made elsewhere in the dialog.

The settings shown by the 525-line / 625-line buttons reflect the video standard selected in the Input or Video Decoder tab (Figure 35). 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 frames per second video.

The **Height** and **Width** fields show the size of the incoming video based on all the settings you have made. They reflect the video standard (NTSC, PAL, or SECAM) that you have selected on the Input Property Page, and the setting in the adjacent Horizontal Format group. They are updated when you click **Apply** for these changes.

525-Line (NTSC) Vertical Format

Figure 36. 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 and specialized applications. Select 485-line video for specialized applications.

When you select 480-line video, you can select which video lines should be the top line of displayed or captured video. For non-broadcast applications, all video lines starting with 21 / 284 can be part of the displayed video. In films and analog broadcast video, however, lines 21 and 284 are often used for Closed Caption. In broadcast video, lines 22 and 285 are sometimes used for proprietary ancillary data. If these lines are used for data they will appear as moving bands or streaks across the top lines. Therefore, the most generally useful start lines are 23 / 286.

Some broadcast video also uses additional top line pairs for ancillary data. We are seeing cases where the top line has to be set to lines 26 / 289 to hide all the data lines.

You can set start lines all the way up to 27 / 290. (On the PCI products which have a Direct Mode option, PostProcessing Mode must be set in order to have top lines below 23 / 286.)

When the start lines are below 23 / 286, the bottom of the video frame spills off the bottom of the 485line NTSC-standard frame. In this case the driver adds black lines at the bottom of the frame.

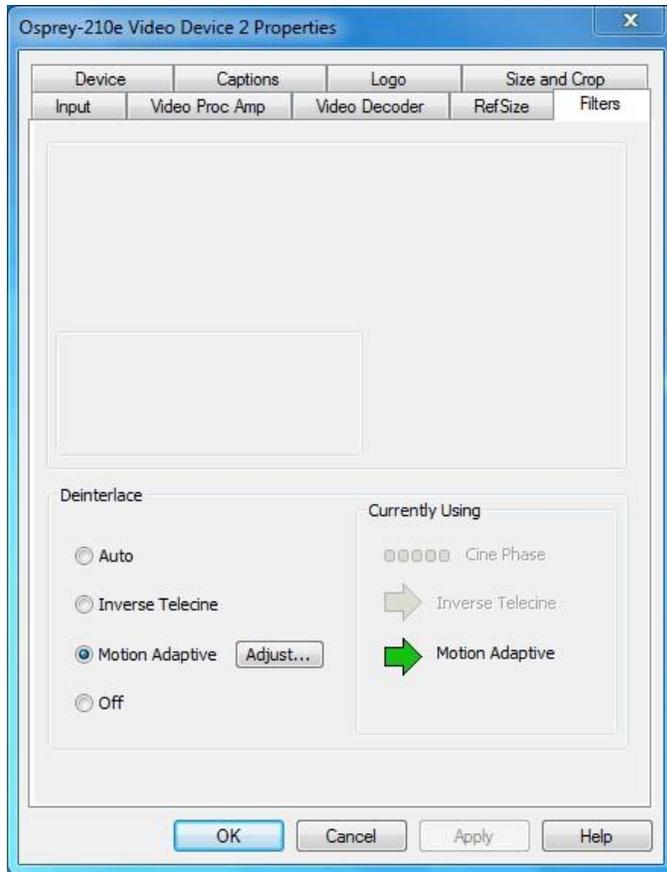
Note: If you select start line 21 / 284, Closed Captions cannot be decoded.

Changes to this control take effect as soon as you click **Apply** or **OK**.

Filters tab

The Filters tab (Figure 37) covers two independent technologies: SimulStream and deinterlacing. Functionality for both technologies exists on this tab.

Figure 37. Filters tab



The RefSize tab has the following controls.

SimulStream	Enable SimulStream or SimulStream evaluation mode, and to specify how many filters will be exposed. (This control group is not applicable to the Osprey 100e.)
Deinterlace	Deinterlace settings are applied and stored per-device and are applied to all filters and pins associated with a device.
Currently Using	The read-only indicators allow you to see the current algorithm.

SimulStream

Use this control group (Figure 38) to enable SimulStream or SimulStream evaluation mode, and to specify how many filters will be exposed.

Note: The Osprey 100e and 210e do not support SimulStream.

SimulStream is a purchased software option. It makes a single hardware device appear as several separate devices capturing the same input stream. Each stream can have different size, color format, frame rate, crop, logo, and captioning. You can have multiple video capture streams in a single application, or multiple applications each with one or more capture streams.

The driver includes an evaluation version for free. Evaluation mode works the same as licensed SimulStream except that an evaluation mode graphic is always displayed on the video. For details about purchasing and installing SimulStream, refer to ospreyvideo.com.

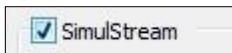
Figure 38. SimulStream



Changes to SimulStream settings take effect only after the system is restarted.

For more background about Devices, Filters, Pins, and their relation to SimulStream, refer to *Filters, Pins, and Properties*.

Figure 39. SimulStream enabled



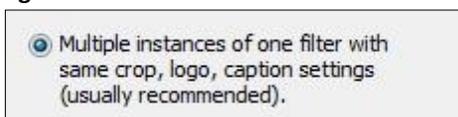
The check box at the top of the group (Figure 38) turns on SimulStream for the currently selected device. The line of text below the check box confirms whether a SimulStream license is installed on the system, whether SimulStream is enabled or disabled, and if enabled, whether it is enabled in licensed or evaluation mode.

SimulStream is enabled individually for each device. When you click **OK** or **Apply**, the driver advises you to restart your application if this is needed. You can use SimulStream in two ways:

- One filter
- Multiple filters

One filter

Figure 40. One filter



You can have as many streams from the device as you want. They can each have a different size, color format, and frame rate. The term *one filter* means all streams have the same Osprey custom properties. Specifically, cropping, logos (watermarks), and NTSC Closed Caption rendering settings must all be the same for all streams on the device.

The advantage of this mode is that it is simpler. If you are not using Osprey custom cropping, logos, or closed captions, or if all streams have the same settings, this mode is recommended.

This setting affects all Osprey Analog PCIe series cards served by the currently accessed driver. When you click **OK** or **Apply**, the driver will advise you to restart the system or your application if needed.

Multiple filters

Use this mode (Figure 41) if you are using Osprey custom cropping, logos (watermarks), and NTSC Closed Caption rendering, and want each stream to have separate settings for these items.

Figure 41. Multiple filters



This mode is definitely more complicated than the one filter option just described – so only use it if you are sure you need it.

Note: You do not have to use the Multiple Filters mode if the only things you want to be different on different streams are the video output size, color format, and/or frame rate. The application stores these settings, not the driver.

The term “multiple filters” refers to the method of saving and accessing these different settings. You can have 2 to 9 different filters, each holding different settings. The number of settings is determined by the edit box in Figure 38 the Show [4] filters per device field.

For example (for the Osprey 260e) if you elect to have 4 filters per device, each with separate crop, logo, and caption settings and the underlying device has had the name Osprey 260e Video Device 1, when you open a list of capture devices with SimulStream enabled, you see Osprey 260e Video Device 1.1, Osprey 260e Video Device 1.2, and ...1.3, and ...1.4.

For example (for the Osprey 460e), the designations would add an A, B, C, or D to indicate the channel number on the board. Therefore, for Osprey 460e Video Device 1A, when SimulStream is enabled, you will see Osprey 460e Video Device 1A.1, osprey 460e Video Device 1A.2, and ...1A.3, and ...1A.4.

To set the custom properties for one of these filters, select it from the device list and open the driver properties dialog. The title at the top of the window confirms you are setting up, for example, Osprey 460e Video Device 1A.2. When you set crop, logo, and caption settings, they are saved separately for Device 1A.2 and do not affect Devices 1A.1, 1A.3, or 1A.4. Settings that are not per-filter – such as Reference Size or the Video Proc Amp settings – affect all filters on the underlying Osprey 460e Video Device 1A.

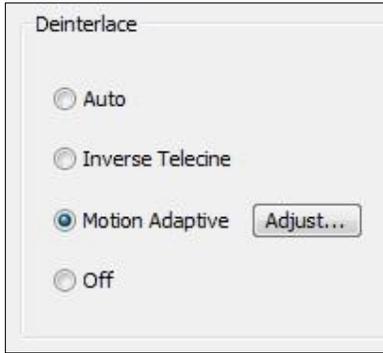
Later, whenever you select one of the four filters as your capture filter, the Osprey custom crop, logo, and caption settings previously set for that filter is enabled automatically.

You can have multiple streams on each filter. For example, you could have four streams consisting of two instances of Osprey 260e Video Device 1.1, and two instances of Osprey 260e Video Device 1.2. The first two instances will have filter 1.1’s settings; the second two instances filter 1.2’s settings.

This setting affects all Osprey 260e and 460e devices in the system. When you click **OK** or **Apply**, the driver prompts you to restart your application if this is needed.

Deinterlace

Figure 42. Deinterlace settings



The deinterlace group has four radio buttons.

Auto	Apply inverse telecine deinterlacing to all telecine video. Apply motion adaptive deinterlacing to all video that is not telecine. Switch dynamically between the two modes as the content changes. Available for 525-line (NTSC) video only.
Inverse Telecine	Apply inverse telecine deinterlacing to all telecine video. Perform no deinterlacing of video that is not telecine. Available for 525-line (NTSC) video only.
Motion Adaptive	Apply motion adaptive deinterlacing to all video.
Adjust...	Click this button to display the Adaptive Deinterlace window. See <i>Adaptive Deinterlace window</i> for information on using this dialog box.
Off	Perform no deinterlacing of any kind. <i>Note: Before using this mode, refer to When to deinterlace.</i>

Deinterlace settings are applied and stored per device and are applied to all filters and pins associated with a device.

Changes to this control take effect as soon as you click **Apply** or **OK**.

When to deinterlace

When in doubt, deinterlace. In some cases, bad artifacts will be seen if you do not deinterlace.

NTSC (29.97 fps)	<p>When in doubt, use motion adaptive deinterlacing rather than Inverse telecine. Motion adaptive deinterlacing is not ideal for all content, but it works at least adequately with all content. Inverse telecine is ideal for telecine content – it completely removes interlacing artifacts – but for nontelecine content, inverse telecine is the same as no deinterlacing at all.</p> <p>When the content is known to be 100 percent progressive, it is advantageous to turn off deinterlacing. Video sharpness will be superior. Refer to background information below.</p>
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PAL/SECAM (25 fps)	When content is 100 percent progressive (shot by film, universal, or progressive camera) it is advantageous to turn off deinterlacing. Video sharpness will be superior.
Vertical scaling	When the driver scales video it uses both fields of the frame as a single progressive frame unit. The frame has to be deinterlaced or progressive. If it is not, and there is motion in the video, the result in scaled video will be large jagged patches on vertical or diagonal edges. If you see these, it is a sign that you definitely need to turn on deinterlacing. (Refer to the notes at the end of this section.)
Auto mode	<p>In Auto mode, when the driver detects telecine sequences, it applies the inverse telecine algorithm; otherwise it falls back to adaptive deinterlace. Auto mode is intended for content in which:</p> <ul style="list-style-type: none"> • There may be both telecine and video segments • The telecine content is substantial and important, and needs to be of highest quality • Boundaries between telecine and video are not too frequent <p>The issue with this mode is that it takes the driver several frames to detect dropout of the telecine sequence, and fall back to adaptive deinterlace. These intervening frames will not be deinterlaced by either algorithm.</p>
External deinterlacers	Encoding and editing clients often offer their own deinterlace and inverse telecine filters. If you want to use these filters, turn the driver's deinterlacing off. <i>You can only do this with video that exits the driver at exact 1:1 vertical scaling, relative to the raw capture format.</i> The downstream deinterlacer will not be able to work with video that is scaled upstream of it. (Refer to the notes at the end of this section.)

Background – telecine and inverse telecine

Telecine video is NTSC video that was originally created on film at 24 frames per second. In the telecine conversion process, certain fields are repeated in a regular, recurring sequence. If a telecined sequence is viewed directly on a progressive screen, interlacing artifacts are visible.

The inverse telecine process is the reverse of telecine; it drops the redundant fields and reassembles the video in a 24 fps progressive format. Interlacing artifacts are 100 percent removed. If the video is viewed at 24 fps, you see the exact timing and sequencing that was on the original film. If the video is viewed at 30 fps, every 5th frame is repeated; however, there are no deinterlacing artifacts.

Telecine and inverse telecine only apply to NTSC video. They are not used for PAL and SECAM video. The Auto and Inverse Telecine buttons are disabled when PAL or SECAM is selected as the video standard.

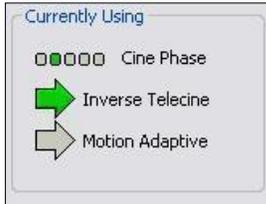
Background – motion adaptive deinterlace

Motion adaptive deinterlace is an algorithm for deinterlacing pure video (non-telecine) content. All deinterlacing inherently causes some loss of detail in the affected areas. It is therefore desirable to detect which portions of the image are still, and which portions are in motion. Deinterlacing is applied only to regions where motion is detected, while full detail is preserved in still areas.

Currently Using group

The Currently Using indicators allow you to see the current algorithm. These are *not* control buttons; they are read-only indicators. They are mainly useful in Auto Mode, to indicate which algorithm – Inverse Telecine or Motion Adaptive – is currently being applied. They are also useful in Inverse Telecine mode to show whether telecine content is present and the Inverse Telecine algorithm is being applied.

The mode currently in use is designated with a green arrow (Figure 43). A mode that is possible under current control settings but not currently in use is marked by a dark grey arrow. A mode that is not available with the current control settings is designated with a pale outline arrow. **Figure 43. Current Using settings**



With inverse telecine enabled, when telecine content is detected, the five Cine Phase dots show whether the 3:2 pull-down sequence is shifting. If it is shifting, the green marker shifts. This happens in mixed telecine/video content, and also in content that was converted to telecine and then post-edited in the video domain. Whenever a shift happens, there are a few frames that are not deinterlaced. If these shifts are frequent, you may have to switch to Motion Adaptive deinterlacing for consistent quality.

When the telecine detector locks the first time in a streaming session, the leftmost Cine Phase button is green. If the telecine sequence is perfectly coherent, the phase never shifts. Once it does shift, the absolute phase of the Cine Phase display (which of buttons 1 through 5 is green) is not significant – the only significant fact is that phase shifts are occurring. When the sequence relocks, all phase buttons are equally correct.

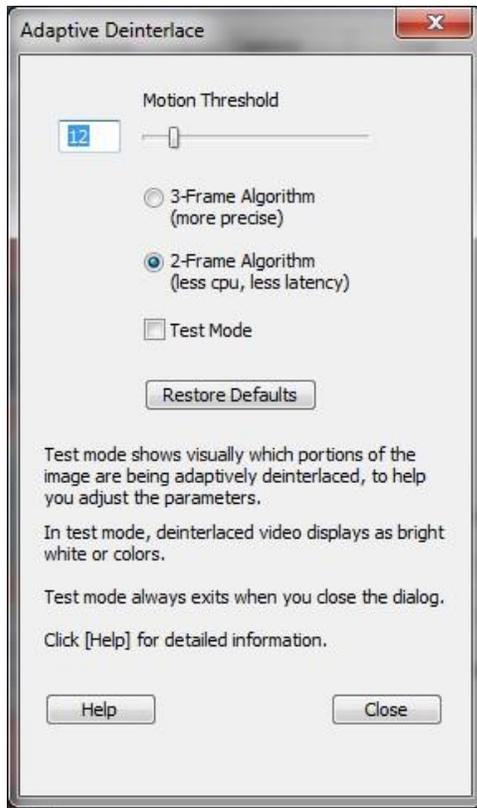
Adaptive Deinterlace window

Click **Adjust** (Figure 44) to access the Adaptive Deinterlace window (Figure 45) in order to adjust the parameters that control motion adaptive deinterlacing.

Note: When the driver is using the Inverse Telecine algorithm, either in Telecine mode or Auto mode, the Adjust settings have no effect at all, and Test Mode is inoperative. **Figure 44. Adjust button**



Figure 45. Adaptive Deinterlace window



The Adaptive Deinterlace window has the following controls.

<p>Motion Threshold</p>	<p>The Motion Threshold slider and edit box adjust the threshold of change of pixels that is judged to be motion. If you enter Test Mode and move the slider to the right, the number of pixels that are considered in motion is greatly reduced. As you move the slider to the left, the number of motion pixels greatly increases until nearly the entire screen is considered in motion. The recommended default is 12.</p>
<p>3-Frame Algorithm</p>	<p>The 3-frame algorithm detects areas of motion and synthesized adaptive pixels for those areas by looking at three frames of video – the current frame, the frame before it, and the frame after it (the video is pipelines so that the next frame can be examined before the current frame is released).</p>
<p>2-Frame Algorithm (less CPU)</p>	<p>The 2-frame algorithm refers to just two frames. The 3-frame algorithm results in slightly more accurate deinterlacing but uses slightly more processing power. The 2-frame algorithm is the default because the quality difference is not easy to see. The 3-frame and 2-frame algorithms treat non-motion areas (areas that are not green in Test Mode) the same way, and there should be no loss of detail in still areas.</p>

Test Mode	When you select Test Mode, the motion adaptive algorithm displays motion pixels as bright white or colored dots in place of the actual pixels of the image. The dots will mainly be along edges that are in motion. If the motion threshold is set too low, there may also be a random distribution of bright altered dots caused by pixel jitter and instability of the video signal. If the motion threshold is set too high, there will be few or no altered dots, and deinterlacing will be insufficient. Test mode is always automatically exited when you close the Adjust window.
Restore Defaults	Click Restore Defaults to restore the default settings.

Notes:

- When you enable Auto mode, some kinds of content cause the driver to frequently switch between Inverse Telecine and Motion Adaptive processing. Content such as title sequences and commercials are often telecine, but cuts between scenes generally break the telecine sequence, forcing the driver to resynchronize. It takes it a number of frames to lock on to the new sequence. The driver drops back to the Motion Adaptive algorithm as soon as it becomes aware that telecine sync has been lost. However, it may take it several frames to discover that this has happened; these frames are not correctly deinterlaced.
- You should decide whether to use Auto, Inverse Telecine, or Motion Adaptive mode depending on the type of content you expect.
 - If the content is consistently telecine (pure movie content), then either Auto or Inverse Telecine is recommended for perfect recovery of the original progressive format.*
 - If the content is telecine with post-detelecine video-based editing, Auto mode results in the best overall quality – but several frames may not be deinterlaced every time the pull down phase sequence has to be relocked.*
 - If the content format is a rapidly changing mix of telecine and video, or is all video, or is of unknown type, the Motion Adaptive setting gives the most consistent results. (Most broadcast video is of this kind.) The quality of telecine sequences is not the best possible, but there are no instances of frames not deinterlaced at all due to telecine re-locking.*

Effects on video latency

Some deinterlacing modes introduce one frame time of latency to the processing of captured video frames. That is, the processing adds 33 msec (525-line, NTSC), or 40 msec (625-line, PAL/SECAM) or delay to the time between end of frame capture, and return to the client. In all cases, this latency is in addition to the time for processing after capture – which is typically 1 to 5 msec. The one frame of latency is inserted or not inserted as follows:

- If deinterlace mode is **Off**, there are zero frames of latency.
- If the mode requested is **Motion Adaptive**, and the algorithm selected in the Adjust subdialog is 2-frame, there is one frame of latency.
- If the mode requested is **Motion Adaptive** and the algorithm selected in the Adjust subdialog is 3-frame, there is one frame of latency.
- If the mode requested is **Inverse Telecine** or **Auto**, there is one frame of latency. In Auto mode, there is one frame of latency regardless of whether the 2-frame or 3-frame algorithm is selected for Motion Adaptive fallback.

Video processing latency does not affect most applications. For applications where it is important to reduce latency, the single most important step is to set deinterlacing mode wither to **Off** or to **Motion Adaptive – 2 frame**. Other factors to reduce processing time are the following:

- Set Deinterlacing to **Off** rather than **Motion Adaptive – 2-frame** – for absolute minimum processing time.
- Set gamma correction to the default, **100**.
- For SECAM video, set the hue adjustment to the default, **zero**.
- For 525-line (NTSC) video, either:
 - set Square Pixel (640 x 480) reference size, and capture full sized, 640 x 480 video; or
 - set CCIR (720 x 480) reference size, set Source Width to 720, and capture full sized, 720 x 480 video
- For 625-line (PAL/SECAM) video, set CCIR (720 x 576) reference size, set Source Width to 720, and capture full sized, 720 x 576 video.
- Set the client application for YUY2 color format.
- Turn off logos and on-video caption rendering.

When all these steps are taken, latency will be 1 msec or less if the capture destination buffers are in system memory (they will be in system memory except in some direct-render-to-screen applications).

When diagnostics are enabled, the latency is shown in a line of the form, “latency per frame msec = 0.8554164,” meaning that video frame delay from capture to return to client is 0.85 msec.

Notes:

When you select Auto mode, some kinds of content will cause the driver to frequently switch between Inverse Telecine and Motion Adaptive processing. Content such as title sequences and commercials is often telecine, but cuts between scenes generally break the telecine sequence, forcing the driver to resynchronize. It takes it a number of frames to lock on to the new sequence. The driver will drop back to the Motion Adaptive algorithm as soon as it becomes aware that telecine sync has been lost. However, it may take it several frames to discover that this has happened; these frames will not be correctly deinterlaced.

If the content is consistently telecine, that is, pure movie content, then either Auto or Inverse Telecine is recommended for perfect recovery of the original progressive format.

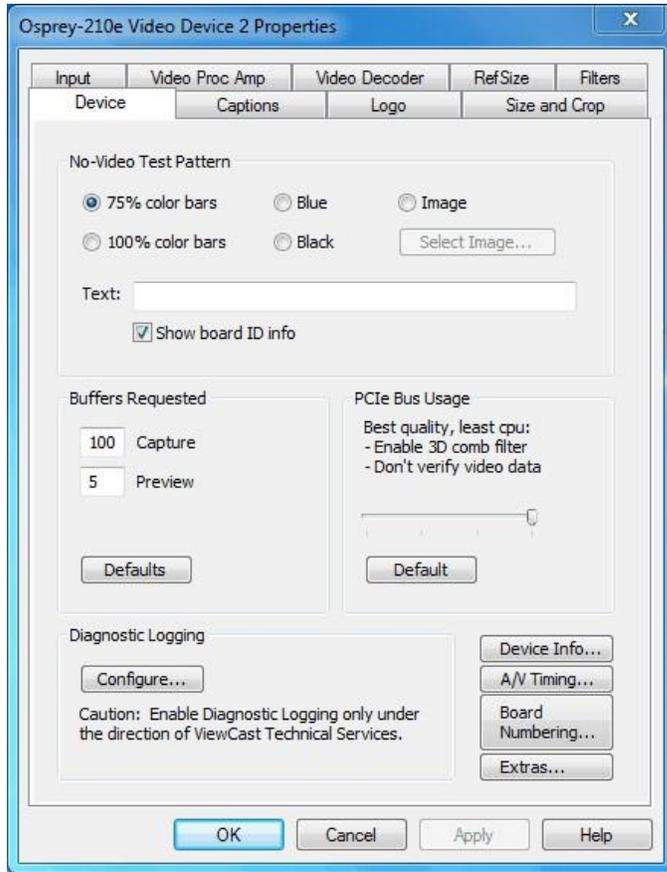
If the content is telecine with occasional post-detelecine video-based editing, Auto mode will result in the best overall quality – but there may be several frames that are not deinterlaced every time the pulldown phase sequence has to be relocked.

If the content format is a rapidly changing mix of telecine and video, or is all video, or is of unknown type, the Motion Adaptive setting will give the most consistent results. Most broadcast video is of this kind. The quality of telecine sequences will not be the best possible, but there will be no instances of frames not deinterlaced at all due to telecine re-locking.

Device tab

Device controls (Figure 46) are more specialized items. Unless specifically noted, changes made on this page apply to all filters and all video previews and capture pins on the currently selected device. Unless noted, different settings may be set and stored for different devices.

Changes to these controls take effect as soon as you click **Apply** or **OK**. **Figure 46. Device tab**



The Device tab has the following controls.

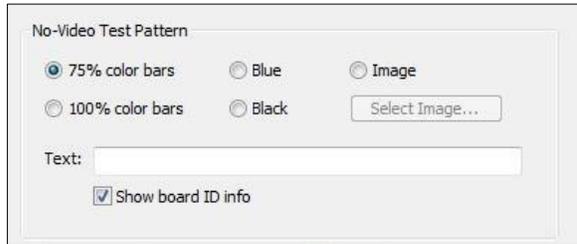
No-Video Test Pattern	This control enables you to select a pattern to display when no video signal is present.
Buffers Requested	The driver indicates the minimum number of video capture buffers needed to allocate for proper operation.
PCIe Bus Usage	The driver has adjustments to ensure that the board does not try to capture more video than the system's PCIe bus can absorb.
Diagnostic Logging	For use by Osprey Technical Support Only.
Device Info ...	Click this button to display the Device Info dialog box (see <i>Device Info</i>).
A/V Timing	Click this button to display the Audio/Video Timing dialog box (see <i>A/V Timing</i>).

Board Numbering	Click this button to open a dialog box for renumbering the boards (see <i>Board numbering</i>).
Extras ...	Click this button to display the Extras dialog box (see <i>Extras</i>).

No-Video Test Pattern

The No-Video Test Pattern (Figure 47) controls what to display when no video signal is present.

Figure 47. No-Video Test Pattern



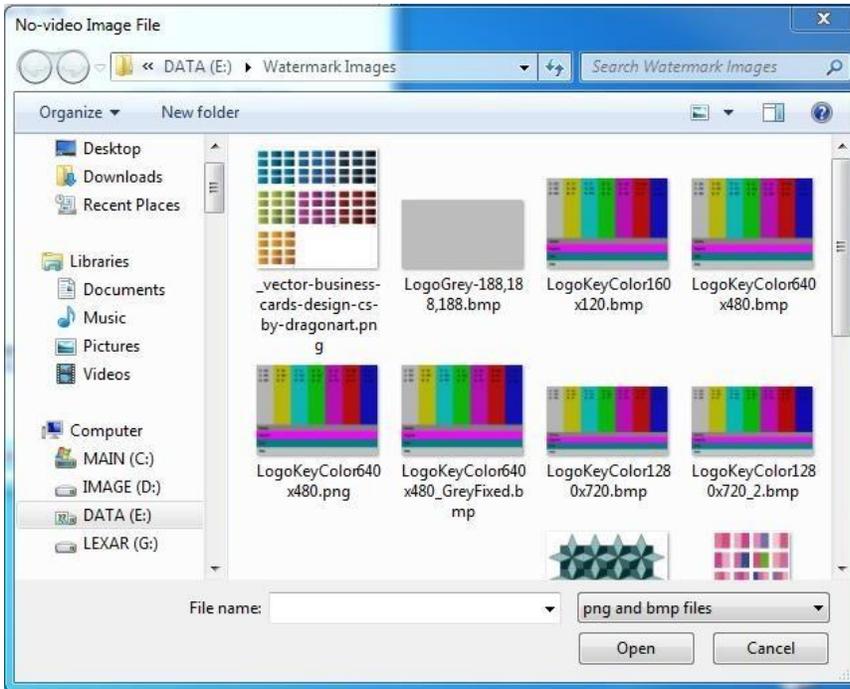
You can select one of the following patterns:

- 75 % color bars
- 100 % color bars
- Solid black
- Solid blue
- Image

The 75 % color bars are calibrated to show correct luma and chroma test patterns on a vector scope. The calibrations are slightly different for NTSC, NTSC-J, and PAL/SECAM.

You can also display a PNG or 24-bit BMP image when there is not video signal. The image will stretch or shrink to fit the size of the full video reference frame. If you are cropping the video, the crop is applied to the no-video image as well as to the video. Clicking **Select Image** displays a standard Windows file select sub-dialog box (Figure 48) to select the image. It is customary for BMP files to have a file name extension .bmp and for PNG files to have the extension .png. However, the driver determines the file type by reading the file header.

Figure 48. Selected Image



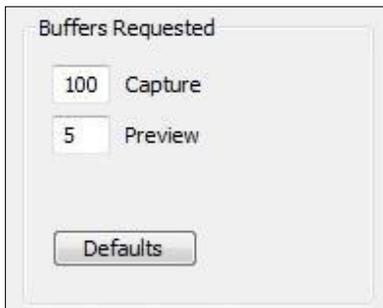
You can place a text line on the test pattern. If the Text edit box is empty - *no* spaces and *no* text characters – then no text will exist. Otherwise, whatever you type here, up to 32 characters, displays on the test pattern.

Click **Show board ID info** to display the device name, the currently selected video input, the PCI Express bus and slot number, and the board serial number. This display is useful for determining which physical board in the system corresponds to each device name.

Buffers Requested

The driver can tell DirectShow the minimum number of video capture buffers it needs to have allocated for proper operation (Figure 49). The client application may ask for a different number of buffers; in general DirectShow honors the larger of the requests.

Figure 49. Buffers Requested



Buffers are used in a round-robin style. The driver fills a buffer; the client then consumes the buffer, and releases it when it is done. The buffer then circulates to the driver to be filled with video again. If the client holds on to a large number of buffers at once, there may be no empty buffers available to the driver and frames may be dropped. The solution is to allocate a larger number of buffers.

Capture and encoding applications generally need a large number of buffers so they can deeply pipeline the downstream processing without danger of buffer starvation at the driver. If buffer starvation is evident, in the form of dropped frames, you can try increasing the number of buffers allocated for the Capture pin.

Preview video that is directly rendered on the screen does not use deep pipelining and cannot benefit from it. There has been some evidence that too many buffers for direct rendering can harm performance.

- On the Capture pin, increase the number of buffers from the default 100 for deeper pipelining and more resistance to dropped frames.
- On the Capture pin, reduce the number of buffers to around 5 if the video is going to be used only for direct rendering. Remember to put the number back to 50 or more for capture or encoding to avoid dropped frames.
- On the Preview pin, increase the number of buffers to about 7 to 10 if preview video is jerky or irregular.

Click **Defaults** to return to the default settings.

PCIe Bus Usage

PCIe system bus implementations vary in quality and performance. The Osprey Analog PCIe series driver has adjustments (Figure 50 and Figure 51) to ensure the board does not try to capture more video than the system’s PCIe bus can absorb.

Figure 50. Osprey 260e PCIe Bus Usage

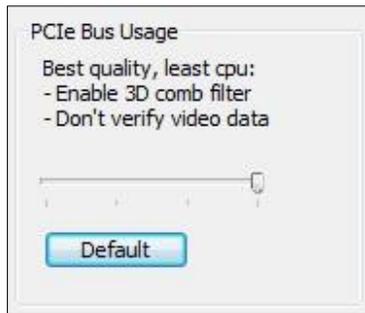
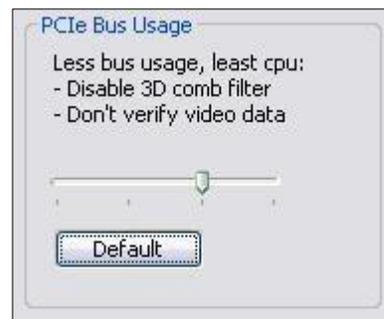


Figure 51. Osprey 460e PCIe Bus Usage



The Osprey Analog PCIe series driver uses three methods to ensure adequate PCIe bandwidth and prevent video data errors:

- Disabling 3D comb filtering
- Verification of video data
- EaseStream reduced DMA

Disabling 3D comb filtering

Disabling 3D comb filtering is the most important method to ensure adequate PCIe bandwidth and prevent video data errors.

One of the special features of the Osprey 260e/460e is 3D comb filtering, which improves color separation and video quality on Composite NTSC and PAL video input, compared to the more common 2D comb filtering. The implementation is hardware based and uses system memory to store frame data needed for the 3D method. This data is both written from the card to system memory and then read back into the card; both these steps consume significant PCIe bandwidth.

Osprey 260e

Each device occupies a separate PCIe X1 lane. It is not likely that you will have any problems using 3D comb filtering all the time, even when multiple cards are installed in the system. Therefore the default setting for the Osprey 260e is for 3D comb filtering to be turned on (Figure 50).

Osprey 460e

All four channels on one board use the same PCIe X1 lane. While it is possible to run two of three video streams on a PCIe 1.X system with 3D comb filtering turned on, the PCIe bus may be overloaded by three or four streams on these systems.

The default setting for the Osprey 460e (Figure 51) is for 3D comb filtering to be disabled. If the bus is overloaded by 3D comb filtering, the effects on the video are severe – the video will be streaked and torn, and it will be obvious that something is wrong. However, systems vary and it is worth trying the 3D comb filter to see if it will work reliably in your scenario.

PCIe 2.0 systems now entering the market have twice the PCIe bandwidth per lane of the older PCIe versions. It is hoped that PCIe 2.0 will make 3D comb filtering much more widely usable on the Osprey 460e card.

Note: When 3D comb filtering is disabled, 2D comb filtering is enabled, so the video continues to be good quality. The difference between 2D and 3D comb filtering is subtle – to see the difference clearly you may have to capture individual freeze frames and look at them side by side.

Comb filtering is only meaningful for Composite NTSC and PAL inputs. It has no function for SECAM video. It has no function for Component (YPrPb) video or for S-Video. In these cases it is turned off automatically. You can therefore leave 3D comb filtering enabled while using SECAM, YPrPb, or S-Video, without incurring an unnecessary PCIe bus usage penalty.

Verification of video data

Verification of video data is less likely to be needed than the comb filter control. When this facility is enabled, the driver detects and corrects certain types of PCIe errors in the video. Turning on this facility increases the amount of CPU time used by the driver. The amount of the increase would only be a problem on slower or heavily loaded systems. Because the impact varies from system to system, we suggest you use the system Task Manager’s Performance Meter to see the effect on your specific system.

EaseStream

EaseStream is not normally needed. EaseStream reduces horizontal video capture resolution by half, which may solve extreme PCIe bandwidth problems. If the output capture size is CIF (half-sized) the reduction in quality is not noticeable. But with full sized video output, you would notice a significant loss of video quality.

Settings details

The bus usage control options are organized into four steps controlled by the slider in this control group.

Figure 50 and Figure 51 shows the default setting. At this setting, 3D comb filtering is disabled and video data verification and EaseStream are turned off. The default button returns the setting to this position at any time.

The leftmost position (Figure 52 and Figure 53) combines all three PCIe quality strategies: 3D comb filtering is disabled and video data verification and EaseStream are turned on. You should rarely, if ever, need this setting. It results in acceptable half-frame (CIF) capture but should be avoided for full-frame capture.

Figure 52. Osprey 260e Leftmost position

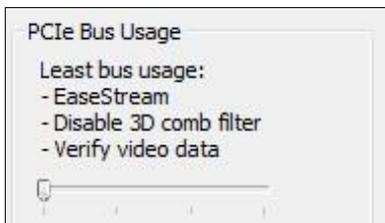


Figure 53. Osprey 460e Leftmost position



The third position (Figure 54 and Figure 55) disables 3D comb filtering and turns on video data verification, but turns off EaseStream. We have not seen any need for this setting yet in the systems we have tested so far. Use this setting when intermittent horizontal streaks appear in the video, especially when a lot of video streams are running.

Figure 54. Osprey 260e Third position

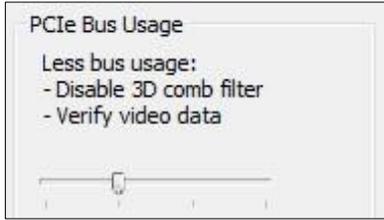


Figure 55. Osprey 460e Third position



The rightmost position (Figure 56 and Figure 57) is for systems with high PCIe bandwidth, and especially for PCIe 2.0 systems. It disables video data verification and EaseStream and turns on 3D filtering. The warning message only appears for Osprey 260e/460e boards and should not discourage you from trying this setting, but ensures you understand that problems are likely on PCIe 1.X systems when multiple video streams are run.

This control is global – changing the setting in the property page of any channel changes the settings for all Osprey Analog PCIe series cards and channels.

Figure 56. Osprey 260e Rightmost position

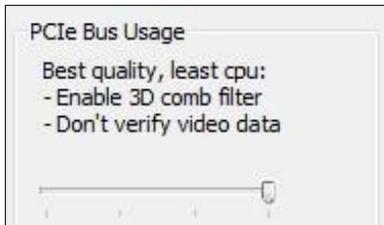
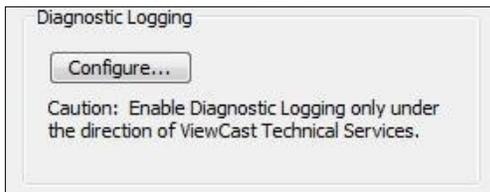


Figure 57. Osprey 460e Rightmost position



Diagnostic logging

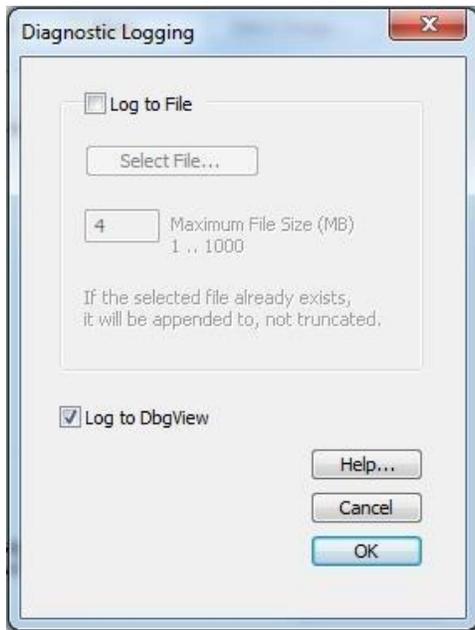
Figure 58. Diagnostic Logging



If you contact Osprey Support about a problem, they may request that you provide a diagnostic log from the system that is showing the problem. This control group sets up logging. Diagnostics logs can be written directly to a file you specify, as well as to the standard kernel driver debug stream. The direct to file option is usually more convenient.

When you click **Configure**, the Diagnostic dialog box displays (Figure 59).

Figure 59. Diagnostic Logging



The **Log to File** check box enables writing diagnostics directly to a file.

Select a directory and file name to complete the setup. For this purpose, when you click **Select File** a standard Windows select sub-dialog box displays. If you do not select a file, the default is `c:\dialog8881.log`. If you select a file that already exists, that file will be appended.

You can specify the maximum size that this file is allowed to grow to. The number in the dialog is this size in megabytes. The allowed range is 1 MB to 1000 MB (1 GB). If the file increases to the size you have specified, data already written is retained, but no new data will be written.

The **Log to DbgView** check box enables writing diagnostics to the standard kernel driver debug stream, which can be captured and displayed by utilities such as DbgView. DbgView is a Microsoft utility that you can download from MSDN (search for DbgView download). Direct-to-file logging is usually easier, so you will probably not need this option.

The data collected includes the stream configuration of each Osprey Analog PCIe series audio and video stream, each stream's statistics at the end of the run, and all run state changes of all streams. A typical section of data is depicted in (Figure 60).

Figure 60. Data collection sample

```

v- -----
v- 2011/04/27 14:35:14.765: o260 video channel 3 filter 1 preview pin 1: pause->run video cap,pre running = 1,1
v- 2011/04/27 14:35:14.765: o260 video channel 3 filter 1 cc pin 1: pause->run video cap,pre running = 1,1
a- 2011/04/27 14:35:23.343: o260 audio channel 3 pin 1: run->pause audio cap running = 0
v- -----
v- 2011/04/27 14:35:23.343: o260 video channel 3 filter 1 capture pin 1:
v-
v- device level configuration:
v- OS = W7 64-bit
v- driver version = 4.6.2.0 board type = 51 (33h)
v- input line: type = composite instance = 0
v- video standard = NTSC-M
v- reference size: mode = square pixel process wss = no
v- ntsc lines: top = 23 number of lines = 480
v- simulstream: enabled, licensed mode, number of filters = 1
v- deinterlace mode = adaptive
v- proc amp:
v- brightness = 100 contrast = 100
v- saturation = 100 hue = 0
v- gamma = 80 sharpness = 2
v- dma control: easestream = no underrun = no 2Dcomb = no
v- registry settings:
v- driver 'Config' dword = 084A4000h
v- device 'Config' dword = 01000348h
v-
v- pin level configuration:
v- color format = rgb32 inverted
v- output height = 240 output width = 320 output stride = 320
v- crop top = 0 bottom = 480 left = 0 right = 640
v- frame rate requested = 29.97 frame interval requested 10M = 333667
v- 24 fps locked = no
v- clock type = avstream master
v- number of buffers requested = 100
v-
v- pin level stats:
v- duration of capture session 10M = 81749682
v- actual minus expected duration 10M = 1267
v- actual frame rate fps = 29.9695]
v- actual frame interval 10M = 333672.171
v- avg cpu per frame 10M = 75093.869
v- client buffer type = fast
v-
v- frame count current = 243 cumulative = 825
v- drop count current = 2 cumulative = 2
v- no video signal current = 66 cumulative = 66
v- processing overruns current = 0 cumulative = 0
v- client no buffers current = 0 cumulative = 0
v- audio restarts current = 0 cumulative = 0
v-
v- device level stats:
v- number of dmAs = 244
v- dma interval, average 10M = 336411.716
v- -----

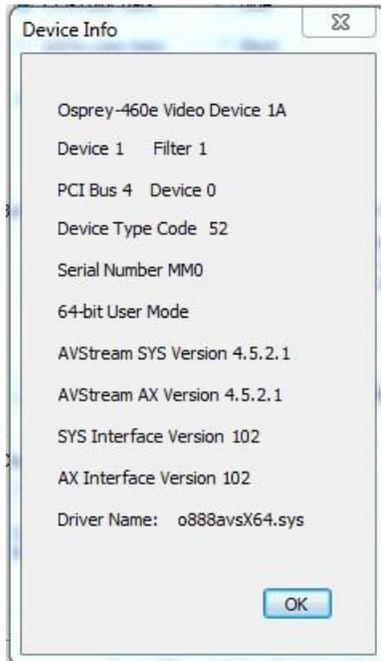
```

A detailed explanation of how to interpret this data is beyond the scope of this document. Osprey normally supports interpretation of diagnostic logs only in reference to specific issues raised with Osprey support. The meaning of many of the log entries will be evident to an experienced user, though.

This control is global to all Osprey Analog PCIe series audio and video devices and streams.

Device Info

Figure 61. Device Info



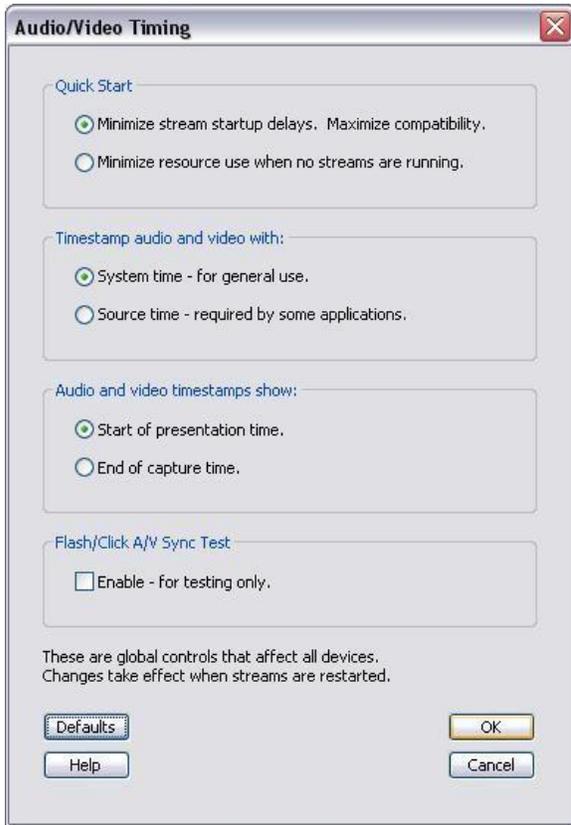
The Device Info window (Figure 61) displays useful information about the capture card and the driver:

- DirectShow name of the device
- Device and filter number
- PCI bus and slot numbers of the device
- Device type code
- Serial number of the device
- Whether the application is 32-bit or 64-bit
- Versions of the kernel driver and user mode DLL (AX)
- Versions of the interfaces between the kernel driver and user mode DLL
- File name of the kernel driver binary Click **OK** to close the window.

A/V Timing

The Audio/Video Timing dialog box (Figure 62) controls audio/video (A/V) synchronization and timestamps. (Osprey 100e: Flash/Click A/V Sync Test control does not display and Audio references do not display.) Changes take effect on a given device after all audio and video streams on that device have been stopped.

Figure 62. Audio/Video Timing



Quick Start

In the absence of Quick Start, video capture on the Osprey Analog PCIe series cards takes about 350 to 400 msec to start up when a channel’s first stream is started. When you enable the Quick Start option (Figure 63), the startup delay is reduced to between 5 to 50 msec. Audio startup is reduced from about 100 msec to the same range – 5 to 50 msec.

Figure 63. Quick Start



The Quick Start option also causes the first audio buffer and video frame to be delivered at close to the same time. This fact is important to some applications. Most mainstream applications determine correct sync from timestamps, and are therefore immune to differences between audio and video startup times. But some applications do not do this correctly, and for correct initial A/V sync the Quick Start option must be enabled.

Another advantage of Quick Start is relevant for SimulStream users. If Quick Start is disabled, the startup timing for the first A/V stream pair to start is different from the timing for subsequent stream pairs. When Quick Start is enabled, the startup timing of all A/V stream pairs is about the same.

The Quick Start option avoids startup delays by running video and audio capture in the background at all times, and discarding the results when they are not needed. This option consumes some system resources – in particular, PCIe to system memory bandwidth. The driver avoids processing the captured audio and video, so processor utilization remains low.

When Quick Start is enabled, audio and video internal capture has to be restarted when some settings change. Audio must be internally restarted when the audio capture sampling rate (32 K, 44.1 K, or 48 K) is changed. Video must be internally restarted

when the NTSC/PAL video standard is changed, or when any of several frame geometry parameters is changed. The driver performs these restarts as soon as it can, but in some cases the first startup after a settings change may not be a Quick Start.

Timestamp audio and video width

Figure 64. Timestamp audio and video width



Capture drivers mark audio buffers and video frames with timestamps that the client application uses to align the audio and video streams for correct A/V sync. Timestamps are most commonly derived from the system's time base.

The system time base used for timestamps does not exactly correspond to the incoming video rate. The incoming video rate will be close to 33.3666666... msec per frame for 525-line video (see *Note* below), and 40.0000 msec per frame for 625-line video. But the system clock will never be exactly at this rate. Furthermore, PC system clocks usually are not accurate – and usually are less accurate than the timing of the video signal.

These discrepancies do not cause problems for most encoders and players – they maintain correct A/V sync regardless of how the time base is scaled.

Some clients, however, require that both the audio and video streams be marked with the exact timestamps implicit in the audio and video sources. That is, audio, which the driver returns in 10-msec blocks, must be marked with successive timestamps that increment in exact 10.0000 msec increments. Video frames must be marked with successive timestamps that increment at exact 33.3666666... or 40.0000 msec increments. This marking is referred to as source-driven timestamping. The **Source time** field enables source-driven timestamping (Figure 64).

Source-driven timestamps require audio and video rates to be locked together in an exact ratio. The Osprey Analog PCIe series cards provide hardware rate locking that ensures this locking is done.

Source-driven timestamps are enabled only when the audio filter is a WDM Streaming Capture Filter.

Source-driven timestamps cannot be used with legacy Audio Source Filters, because the system sets their timestamps, and the system always uses system timing. The driver automatically disables sourcedriven timestamps for both audio and video when it detects an Audio Source Filter in the filter graph. Since this disabling is automatic, you can set **Source time** even if you are not sure what kind of audio filter will be used – the worst that can happen is that timestamping will fall back to system time.

All applications that normally use system timestamps will run correctly with source-driven timestamps. Therefore, if you are running multiple simultaneous streams, and some but not all of these require source-driven timestamps, then the global control should be set for source-driven timestamps.

Notes for 525-line (NTSC, PAL-M) video users:

The exact definition of the frame rate for 525-line video is (30 / 1.001) frames per second. This works out to a frame interval that is not exactly 33.3667msec – the nominal value commonly used by Microsoft convention – but is really 33.3666666... msec, with the trailing '6' infinitely repeating. The discrepancy between these two numbers is about 2.5 video frames per day. The Osprey Analog PCIe series hardware rate locking converges audio and video to the correct and exact 33.3666666... msec rate. The driver's source-driven timestamps increment in a sequence (33.3666 – 33.3667 – 33.3667 msec) such that the cumulative time also converges correctly to the exact 33.3666666... msec rate. Currently, no application specifically requires the nominal 33.3667 msec rate rather than the exact 33.3666666... msec rate, but the driver has a registry control to enable the nominal rate – contact Osprey Support if you encounter this issue.

The exact frame intervals – such as 33.3666666... msec rather than 33.3667msec – are used only when the client application specifies a frame rate at or close to one of the following: 30 or 29.97, 24 or 23.976, 15 or 14.985, or 10 or 9.99. When (and only when) source-driven timestamps are enabled, the driver will snap any of these rates to the closest exact rate. When the client application specifies any other video frame rate, the driver will not perform a snap-to function and will deliver frames at the exact rate specified by the client.

None of these issues arise with 625-line (PAL, SECAM) video. The full-rate frame interval is always exactly 40.0000 msec and no snap-to function is required.

Presentation Time Adjustment

Figure 65. Audio and video timestamps show



Multimedia capture drivers most often mark each frame and buffer with the time of the *end* of its capture. Encoders and players, on the other hand, work in terms of the “presentation time” of media samples, which is the *beginning* of the interval when each media sample should be played. Since audio and video samples are of different lengths (10 msec for audio, versus 33 or 40 msec for full-rate video), the way timestamps are interpreted affects the A/V sync relationship of the two streams. Although encoders and players could in theory assume that the capture driver is marking the ends of capture intervals, and translate the timestamps to presentation time format, it appears that they do not generally do so.

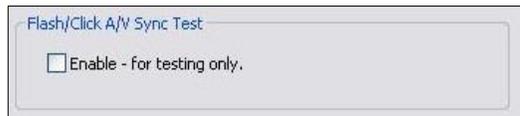
The **Start of presentation time** option tells the driver to perform this translation. Windows Media Encoder provides a tighter A/V sync with this option, especially in conjunction with the Silverlight Player.

The **End of capture time** option tells the driver to not perform any translation, and to return timestamps that mark the ends of media samples.

The adjustment consists of shifting video slightly earlier relative to audio. The shift is small – ranging from 23 msec for full rate NTSC to 50 msec for half rate PAL. It is noticeable to many video professionals, but for typical end users it is at most a subliminal experience enhancer. Use the **Start of presentation time** option unless a specific reason is found not to.

Flash/Click A/V Sync Test

Figure 66. Flash/Click A/V Sync Test



Selecting **Flash/Click A/V Sync Test** (Figure 66) enables a test mode in which the driver marks audio and video samples at approximately 1.5 second intervals. (This control is not applicable to the Osprey 100e.) The marks are placed on audio buffers and video frames captured at exactly the same time, and are used to verify a correct A/V sync. The video mark is a bright red frame; the audio mark is a 1 kHz tone of the same duration as one video frame interval. When video is captured at half-rate, the video marking interval is 3 seconds rather than 1.5 seconds.

This control is immediate in its effect – sync marks will show up in running streams as soon as the check box is selected. Flash/click test mode remains enabled only as long as the A/V Timing dialog box is opened. It is automatically cancelled when the dialog is closed or you click **Default**. This setting is not saved from session to session – the dialog box always opens with the flash/click test disabled.

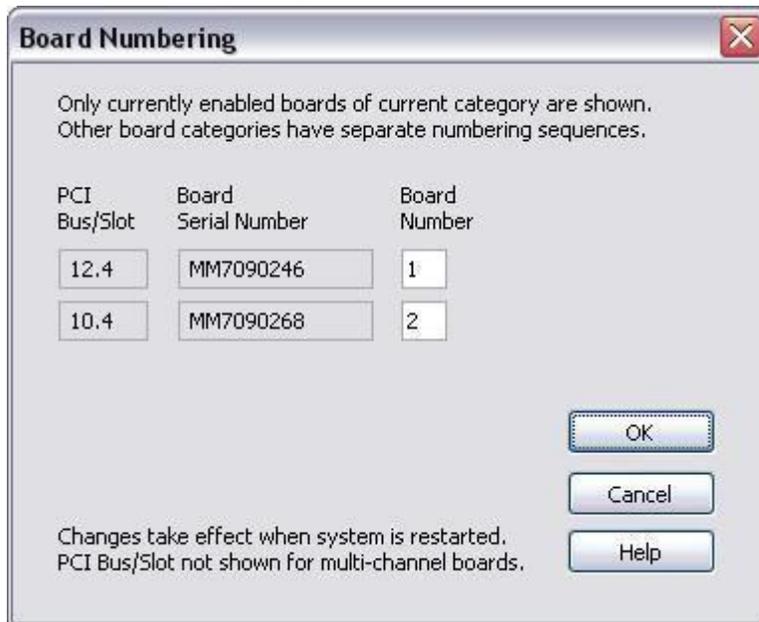
Board numbering

When a system with multiple Osprey boards is first set up, the device numbers reflect the order that the system identified and initialized the boards. The driver associates each device number with the PCI address of the board to which it is initially assigned, and saves that information. Each time you restart the system the same associations are preserved.

This initial ordering might not be the order you want. For example, in a system with four boards you may want the boards ordered 1-2-3-4 from left to right or top to bottom of the chassis.

Click **Board Numbering** on the Device tab to display the Board Numbering window (Figure 67) for renumbering the boards.

Figure 67. Board Numbering



Each line represents the information for one Osprey board. Only boards that are currently installed and enabled appear. Also, only boards of one type at a time appear. For example, in a system with two Osprey 260e and two Osprey 460e boards, the two board types are numbered separately. There is a board 1 and a board 2 of each kind. Which listing is shown depends on the context in which you open the property pages. If you open them from an Osprey 260e context, you see the two Osprey 260e boards. If you open them from an Osprey 460e context, you see the two Osprey 460e boards.

The information for each board includes the PCI bus and device address on the left, the serial number in the middle, and the current device number on the right. For boards such as the Osprey 460e which span multiple PCI addresses, the PCI Bus/Slot information does not display.

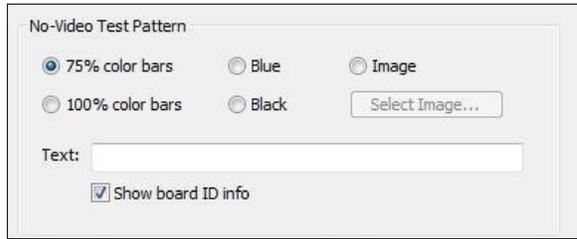
You can edit the device numbers. You can assign each board any number from 1 to 10. All boards in the current list must have different numbers. The numbers do not have to be in a packed sequence 1, 2, 3...

The easiest way to identify boards is to start all boards streaming, and remove the video sources so that test patterns like those in Figure 68 display.

Figure 68. Test patterns



To set up the test patterns, enable the board ID information display by enabling **Show board ID** info on the Device tab (Figure 69).

Figure 69. Show board ID info field

The information shown includes the PCI bus and slot for the board, and the board's serial number, in the same format as the Board Numbering dialog.

When you have set the new board numbers and want to save them, click **OK**. The dialog warns you if the numbers are not in the allowed range 1 to 64, or if there are duplicates – you must correct these issues before saving the numbers and exiting. However, click **Cancel** at any time to exit, and your changes are discarded.

The new numbering takes effect when you restart the system.

Note: Board settings, especially video custom properties such as Crop, Logo, and Captions settings, are linked to board PCI addresses rather than to board numbers.

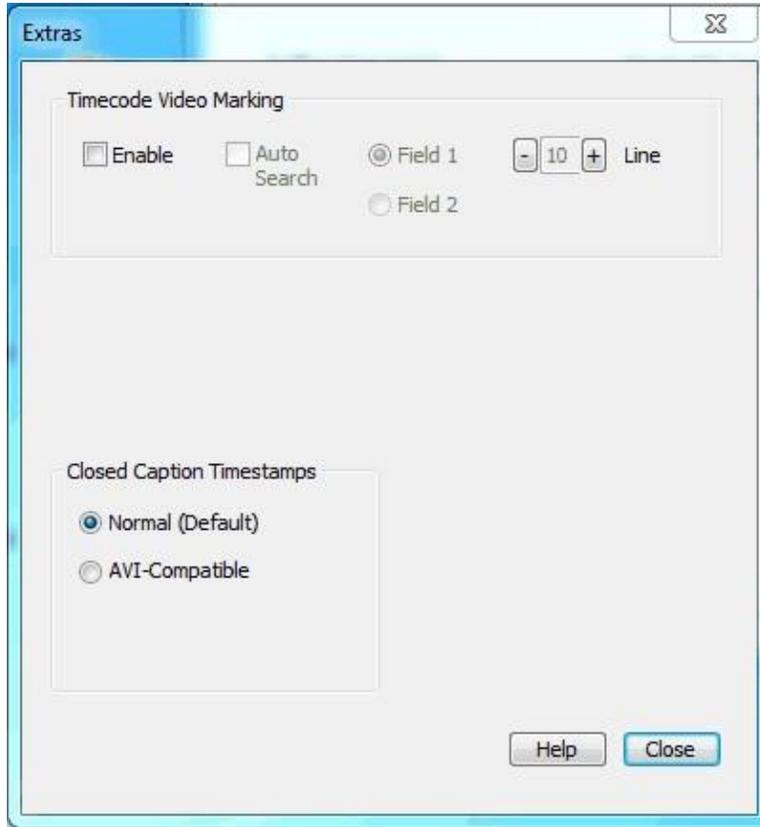
After you renumber boards, you may have to re-set your volume levels. On Microsoft Windows XP platforms, you may also have to re-select your audio inputs.

When you add a new board, especially a board with complex PCIe topology such as an Osprey 460e, the PCI addresses of boards already in the system may be altered. This may cause the driver to renumber boards already in the system. Use the Board Numbering window to set numbers the way you want. You may have to manually adjust board settings such as video custom properties when boards are added or removed.

Extras

Extras (Figure 70) are features of the AVStream driver that are new, not fully defined, or subject to change. Extras may also include workarounds to apparent DirectShow issues that may be resolved at a future time. Extras should be expected to change more frequently than other aspects of the driver, and may not be shown for all versions of the drivers.

Figure 70. Extras



There are currently just two Extras for the Osprey Analog PCIe series cards.

Timecode Video Marking	Refer to the User Guide for more information.
Closed Caption Timestamps	This control is a workaround to an apparent problem in DirectShow with capture of CC to AVI files. Always use the Normal setting.

Captions tab

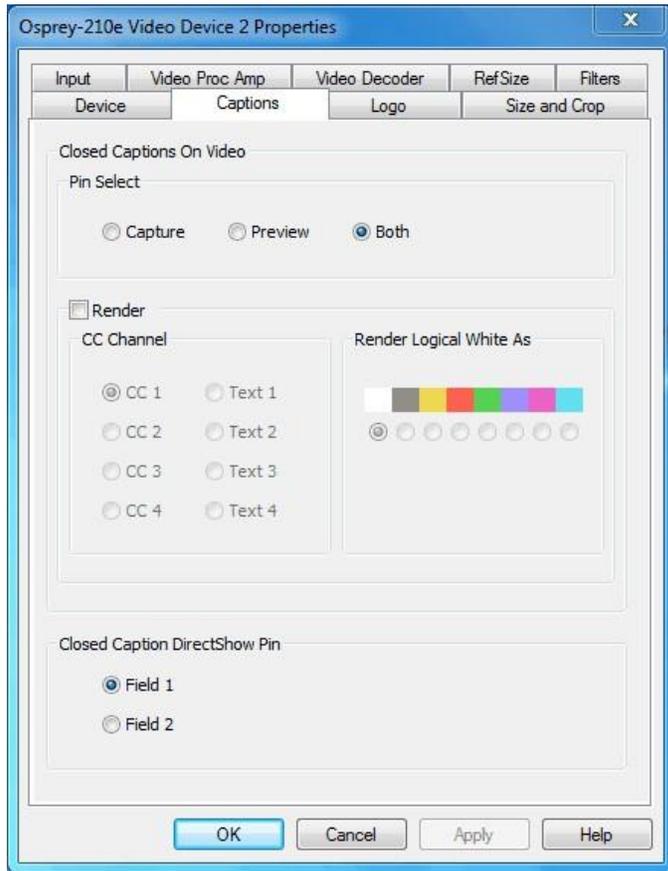
The Osprey Analog PCIe series driver has four ways of delivering NTSC closed caption (CC) data:

- Renders captions directly on to the video before it leaves the driver
- Sends decoded caption data to a DirectShow-compliant CC pin
- Sends the raw, undecoded Line 21 caption waveform to a DirectShow-compliant VBI pin
- Delivers decoded caption data to a proprietary interface than can be used by C++ developers

The controls on this page pertain mostly to closed captions on video. One control affects closed caption DirectShow pin.

Changes to the controls on the Captions tab (Figure 71) take effect only when you click **Apply** or **OK**.

Figure 71. Captions tab



The Captions tab has the following controls.

<p>Pin Select</p>	<p>The drop-down list has three choices:</p> <ul style="list-style-type: none"> • Capture <input type="checkbox"/> Preview <input type="checkbox"/> • Both <input checked="" type="radio"/>
<p>Render</p>	<p>The driver can internally render closed captions onto captured video when the video standard is NTSC.</p>

Render Logical White as	This control group maps white captions to a color other than white.
Closed Caption DirectShow Pin	This group controls whether the closed caption character pairs emitted by the DirectShow CC pin are from Field 1 or Field 2 of the video.

Pin Select

Figure 72. Pin Select



The driver can internally render closed captions onto captured video when the video standard is NTSC. The driver supports the complete EIA-608 closed captioning standard. The 64 additional characters in the EIA-608-B extended character set are also supported.

The Pin Select control (Figure 72) at the top of this control group determines whether changes you make will apply to the capture pin, to the preview pin, or to both:

Capture	When you click Capture , settings are shown for the capture pin, and your changes apply to the capture pin.
Preview	When you click Preview , settings are shown for the preview pin, and your changes apply to the preview pin.
Both	When you click Both , settings are shown for the capture pin, but your changes apply to both the capture and preview pins.

To create different settings for the capture and preview pins:

1. Click **Capture**.
2. Configure the capture pin the way you want.
3. Click **Preview**.
4. Configure the preview pin the way you want.
5. Click **Apply** or **OK**.

*Note: Click **Apply** or **OK** once to apply the settings you have made for both pins.*

Render

The Render check box (Figure 73) controls whether or not rendering of closed captions on video is enabled.

Figure 73. Render



CC Channel

When rendering is enabled, the CC Channel control selects which channel to render.

Figure 74. CC Channel



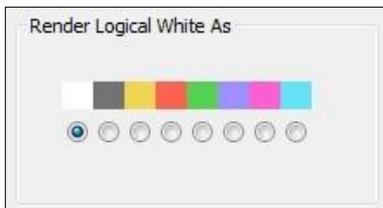
The details of Closed Caption channels are beyond the scope of this description – refer to the EIA-608 standards document. But CC 1 is by far the most commonly used channel. Select CC 1 unless you have specific knowledge that you want to render another channel.

Render Logical White As

When rendering is enabled, the control group **Render Logical White As** (Figure 75) maps white captions to a color other than white.

When rendering is enabled, the control group Render Logical White As can map white captions to a color other than white.

Figure 75. Render Logical White As



This feature is a proprietary extension by Osprey to the Closed Captioning standard. Nearly all captioning content uses only the default color white. This control causes white captions to appear in the selected color. Captions in other colors are not affected.

Closed Caption DirectShow Pin

Figure 76. CC Pin

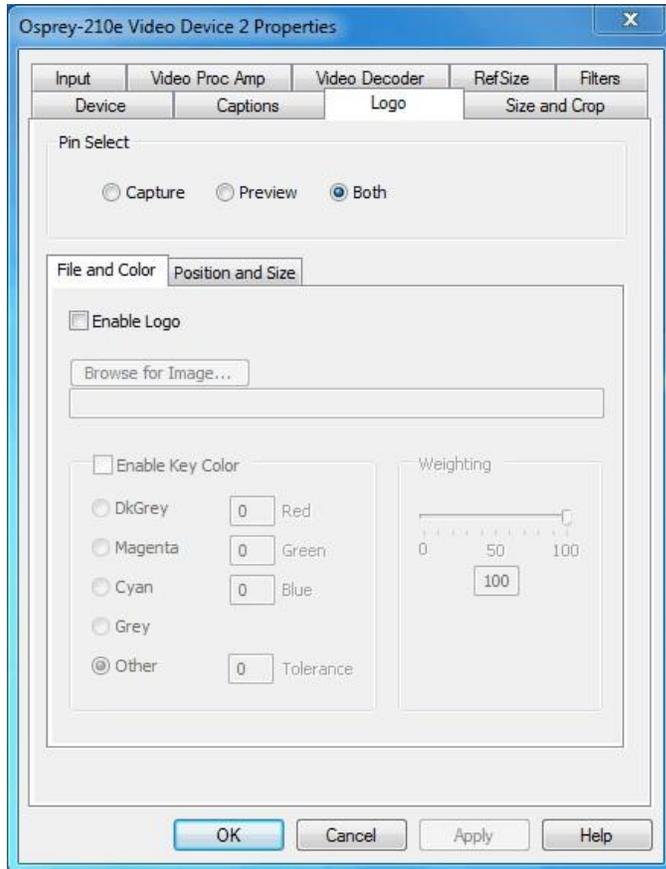


The Closed Caption DirectShow Pin (Figure 76) controls whether the closed caption character pairs emitted by the DirectShow CC pin are from **Field 1** or **Field 2** of the video. The DirectShow specification is that CC on a CC pin is always from Field 1; however, this extension allows application developers to access Field 2 data such as XDS data (including V-chip) via a standard DirectShow CC pin.

Logo tab

The logo property superimposes a graphic over captured video using the logo property controls (Figure 77).

Figure 77. Logo tab



The Logo tab has the following controls.

Pin Select	The drop-down list has three choices: <ul style="list-style-type: none"> • Capture <input type="checkbox"/> • Preview <input type="checkbox"/> • Both <input checked="" type="radio"/>
Enable Logo on File and Color sub tab	From this control, enable or disable the logo.
Enable Key Color on File and Color sub tab	Control the key color and efficiency effect.
Weighting on File and Color sub tab	Set the degree of transparency of the logo.

Position and Size sub tab	Set the position of the logo and the scale.
----------------------------------	---

Logos have the following characteristics:

- Use any RGB-24 bitmap in .bmp file format.
- Use any PNG file.
- For BMP files, and for PNG files without alpha (transparency) data, specify a selectable key color; all parts of the logo graphic with that color are not drawn on the video.
- For PNG files with alpha data, the alpha data determines transparency on a per-pixel basis.
- Use a transparency or weighting control to blend the logo graphic with the background video. You can use this control in combination with the alpha data in a PNG file.
- Interactively position and scale the logo.
- Configure a logo to appear on either or both captured and previewed video.
- The capture and preview streams can have the same or different logos. The settings (key color, transparency, size, and position) of the two logos can be independent or linked. If video sizes of the two streams are different, you will usually want to set the size and position differently for each logo.

The logo property controls work best when you are already running video that you can directly view, so you can view your changes interactively.

The logo property is organized as two sub-tabs:

- File and Color Position and Size

Pin Select

You can have different setups for the two pins. You can enable the logo on the capture pin but not on the preview pin, and thereby save some CPU time.

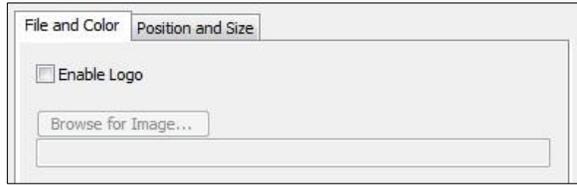
Figure 78. Pin Select



Capture	When you click Capture , 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.
Preview	The Preview button works analogously.
Both	When you click Both , changes you make to the logo setup apply to both the capture and preview pins.

File and Color

Figure 79. File and Color



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

In Figure 79, clicking **Browse for File** displays a standard file select dialog. Logo files must be either:

- In BMP 24-bit format
- In PNG format (all commonly used PNG formats are accepted)

If you have a graphic in another format, edit it with a drawing or photo edit program such as Windows Paint, and save it as PNG file. The PNG format is recommended instead of the BMP format because it is both compressed lossless – so the image file is smaller, but with no sacrifice of quality. Also, if you use a suitable image editor, you can create transparency effects that are not possible with the BMP format.

Enable Key Color

Figure 80. Enable Key Color



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

You can use these controls with both BMP and PNG images. You can use key colors with PNG images that contain embedded alpha channels, but alpha keying is a superior solution. If your image editor supports alpha keying, use alpha keying and leave the key color controls disabled. The key color disappears from the graphic so the underlying video shows through unchanged.

If you select **Enable Key Color**, all colors display.

If you select the check box, key coloring is enabled. The five radio buttons are enabled. You can select one of four standard colors – dark gray, medium gray, cyan, or magenta – or a custom color. If you select **Other** for a custom color, the three edit boxes – Red, Green, Blue – are enabled, and you can enter any color value in the range 0 to 255 into these boxes. **Figure 81. Tolerance control**



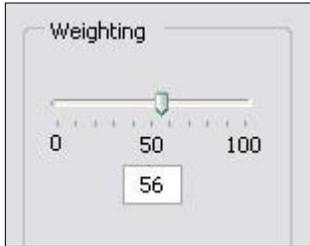
Key colors to identify transparent portions of logos can be exact or inexact. The Tolerance control (Figure 81) determines this. If Tolerance is 0, then all key colors have to exactly match the Red / Green / Blue values shown in the key color control group. If Tolerance is nonzero, then the Red / Green / Blue values can deviate from the key color by the

tolerance value and still be treated as being equal to the key color. For example, if Tolerance is set to 5, and the key color is set to grey (192, 192, 192), then pixels in the bitmap with value (187, 187, 187) are also transparent.

Weighting

The degree of weighting of the logo is variable through 100 steps. If the setting is 100, the logo is 100 percent opaque. If the setting is 0, the logo is completely transparent and invisible. If you have set a key color, the weighting or transparency value is applied only to pixels that do not match the key color; key colored pixels are always completely transparent. You can set the weighting either with the slider or by editing the number in the text box (Figure 82).

Figure 82. Weighting

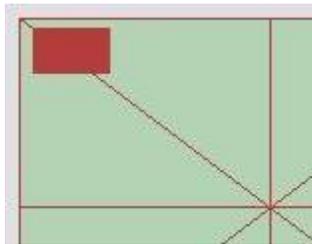


For PNG images with embedded alpha data, the weighting control is combined with the alpha data. For example, if a pixel is weighted 50 percent according to the alpha data, and the weighting control is also set to 50 percent, the pixel displays as 25 percent opaque.

Position and Size

The Position and Size sub-tab lets you position and scale the logo. It is strongly recommended that you have video running when you use these controls, so you can see results interactively.

Figure 83. Logo position

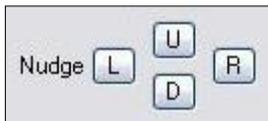


The large green rectangle on this sub-tab represents the video area where the logo can be positioned. The smaller red rectangle represents the logo. To position the logo, click on the logo rectangle and drag it to the new position.

If you enable logos, but the red rectangle is not visible, it means that the driver could not find the logo file, or it was in a format other than PNG or 24-bit BMP. Go back to the File and Color page and correct this first.

The four Nudge buttons, (Figure 84) 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 is scaled down from the full video size, the Nudge buttons allow more accurate positioning of the logo.

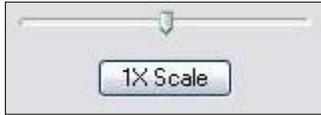
Figure 84. Nudge buttons



The slide control at the bottom right of this sub-tab controls the scaling of the logo. The 1X Scale button (Figure 85) returns the size to the original size of the .bmp graphic.

If your capture and preview streams have different video sizes, you need to view both streams and set the size and position separately for each.

Figure 85. 1X Scale



*Note: Because the Logo tab is used to set up a logo interactively on live video, it behaves differently from other tabs. The driver updates the controls on the Logo tab immediately, without waiting for you to click **Apply**.*

Size and Crop tab

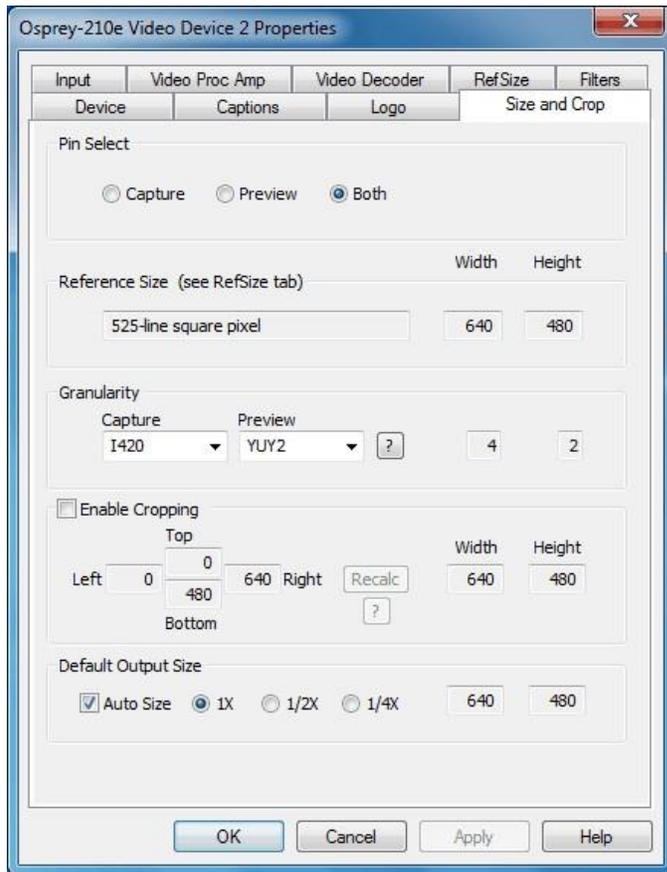
This tab (Figure 86) has two functions:

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

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 built-in custom video sizing controls.

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 the black slivers at the top and bottom of the image and capture just the active portion.

Figure 86. Size and Crop tab



The Size and Crop tab has the following controls.

<p>Pin Select</p>	<p>This field has three choices:</p> <ul style="list-style-type: none"> • Capture <input type="checkbox"/> Preview <input type="checkbox"/> • Both <input checked="" type="radio"/>
--------------------------	--

Reference Size	Displays the full uncropped size of the incoming video. This read-only information is determined by settings made on the Input tab and the RefSize tab.
Granularity	This control helps you choose crop and output sizes that observe those restrictions
Enable Cropping	When enabled, your video is cropped to the indicated boundaries. When disabled, your video is not cropped regardless of any crop settings you may have made previously.
Default Output Size	Select the height and width of captured video.

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

Pin Select

You can have different setups for the two pins. For example, you could enable cropping on the capture pin but not on the preview pin.

Capture	When you click Capture , 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.
Preview	The Preview button works analogously.
Both	When you click Both , changes you make to the crop setup apply to both the capture and preview pins. This setting is the default.

Reference Size

The reference size information is always read-only on this 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 Square Pixel or CCIR proportioning 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 640 x 480, and your crop rectangle is (0, 0, 640, 480), then your video is effectively uncropped. But if you are capturing 625-line video, with a reference size of 768 x 576, the same (0, 0, 640, 480) crop specification truncates the right and bottom edges 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 4 and the capture height be a multiple of 2.

The granularities for all products in Post Processing Mode are as follows:

Format	Horizontal	Vertical
RGB32	4	1
RGB24	4	1
RGB555	4	1
Greyscale	4	1
YUY2	4	1
UYVY	4	1
I420	4	2
YVU9	4	4
[none]	4	1
[any]	4	4

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

Because the preview and capture pins may be set to different color formats, they may have different granularities. When the Crop tab is opened, the Capture and Preview fields are initialized to the current or most recently used format for the selected pin.

If your Pin Select setting is **Capture**, only the Capture granularity box is enabled; similarly for Preview. The two small read-only edit boxes to the right of the group show the horizontal and vertical granularities for the selected color format for the selected pin type.

If your Pin Select setting is **Both**, both the Capture and Preview fields are enabled, and the two fields to the right of the group show the worst-case granularity that works for both the Capture and Preview color formats. For example, if the Capture color format is I420 and the Preview color format is YUY2, the resultant granularity is I420’s more stringent 4 x 2 requirement.

The granularity settings affect values you subsequently enter for crop width, crop height, and default output width and height – they are adjusted to these granularities. Adjustments are made when you click on another control.

You can change the video format in the drop-down list, so that granularities are set for a different format.

Note: This action does not automatically cause the pin to have this format – you still have to select that format using the Pin Properties window or via your application. It just ensures the sizes you select work correctly when you do select this color format in the application.

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. Or, the capture may fail. You may also find that in the Pin Properties window the default size you wanted is not listed – because it is not a legal size for this format.

If you select **None** as the color format(s), no granularity adjustments are applied to your crop and size data. In practice, **None** is the same as the packed RGB and YUV modes.

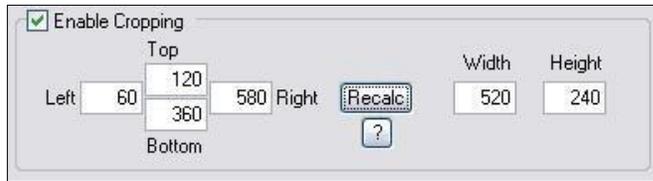
If you select **Any** as the video format, the coarsest granularity required by any of the available formats is applied to your crop and size data. In practice, **Any** is the same as YVU9, that is, 4 x 4. You are guaranteed your crop and output sizes will never be adjusted, regardless of what video format you select now or in the future.

There is also a restriction on horizontal placement of a cropping window – the placement must be on an even pixel boundary, 0, 2, 4 ...

Enable Cropping

If you clear **Enable Cropping**, your video is not cropped regardless of any crop settings you may previously have made. The edit boxes showing the edges, height, and width of your crop is read-only and shows settings for full-frame, uncropped video.

Figure 87. Enable Cropping



If you select **Enable Cropping**, your video is cropped to the indicated boundaries. The edit-boxes are initially set for the full uncropped video frame. The **Top** and **Left** boxes set the top left corner of the cropping rectangle. The **Right** and **Bottom** boxes set the bottom right. The **Width** and **Height** boxes set the size of the rectangle.

Recalc button

The **Recalc** button recalculates whichever of the crop edit boxes you have not filled in. For example, if you set **Top**, **Left**, **Width**, and **Height**, **Recalc** calculates **Right** and **Bottom**. If you set **Top**, **Left**, **Right**, and **Bottom**, **Recalc** calculates **Width** and **Height**. Whichever of the vertical group was least recently touched, is the item that is recalculated; similarly with the horizontal group. If you have only changed one box of the group, you can force the order of recalculation by clicking one of the other two boxes. For example: If you changed **Left**, and you want to preserve **Width** (but alter **Right**), then click on **Width** before **Recalc**. If you have changed **Left**, and want to preserve **Right** (but alter **Width**), then click on **Right** before **Recalc**.

If your specification results in a crop rectangle that is too large or too small, **Recalc** adjusts it appropriately. If it can't set up an allowed size by changing just the third most recently clicked setting, then it tries to change the second most recently clicked setting instead or as well. If it has to, it changes your most recently changed setting.

Recalc also factors in granularity and positioning requirements. The left edge, height, or width value of a crop rectangle may be lowered to the next smaller granularity threshold. This approach is the likely reason why small adjustments may not take after **Recalc** – they are rounded down, so nothing changes. You have to use a value that is larger than the next granularity threshold. See *Granularity* for the value of the granularity parameters.

In the **Default Output Size** group, **Recalc** changes the default output size if **Auto Size** is enabled. If **Auto Size** is not enabled, **Recalc** leaves the output size alone.

Note: 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 gets adjusted down to 352.

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

The driver can upscale cropped video, up to the reference size.

Cropping rectangles are frame-based rather than field-based. Thus if a crop rectangle is set up defining a 320 x 240 area, then a capture of video sized at 320 x 240 results in video being captured from two fields. You may therefore see interlacing artifacts in the captured video, unless a deinterlacing filter is applied. This may be initially confusing since most users typically think of 320 x 240 video captures only coming from a single field and

thus would not have interlaced artifacts. However, in this case, the source video is only 320 x 240 in size (i.e. the crop rectangle) and thus any captured video that is greater than the field height within the crop rectangle (equal to ½ cropped ROI height) results in a scaled capture of multiple fields. Also, the driver uses both fields whenever they are needed to interpolatively scale the output with best possible accuracy.

Default Output Size

Figure 88. Default Output Size



The standard DirectShow Pin Properties dialog allows you to select the height and width of captured video from a drop-down list. The drop-down list has a particular range of choices that may or may not fit your needs. The drop-down list includes one default size that the capture driver provides. The Default Size control allows you to set up what default size appears.

If you select **Auto Size**, (Figure 88) your default video size is sized automatically to your crop settings. The three radio buttons, **1X**, **1/2X**, and **1/4X**, determine whether the output size is scaled down from the crop size.

Example 1: If you are running standard 640 x 480 NTSC video, and **Enable Cropping** is not enabled, your crop size is 640 x 480. With **Auto Size** enabled, and the **1X** radio button enabled, your default size is 640 x 480; with **1/2X**, 320 x 240; and with **1/4X**, 160 x 120.

Example 2: If you have enabled cropping with size 320 x 240 (one quarter of the full video area), the default Auto Sizes are as follows: 1X, 320 x 240; 1/2X, 160 x 120; 1/4X, 80 x 60.

If you clear **Auto Size**, 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 two restrictions:

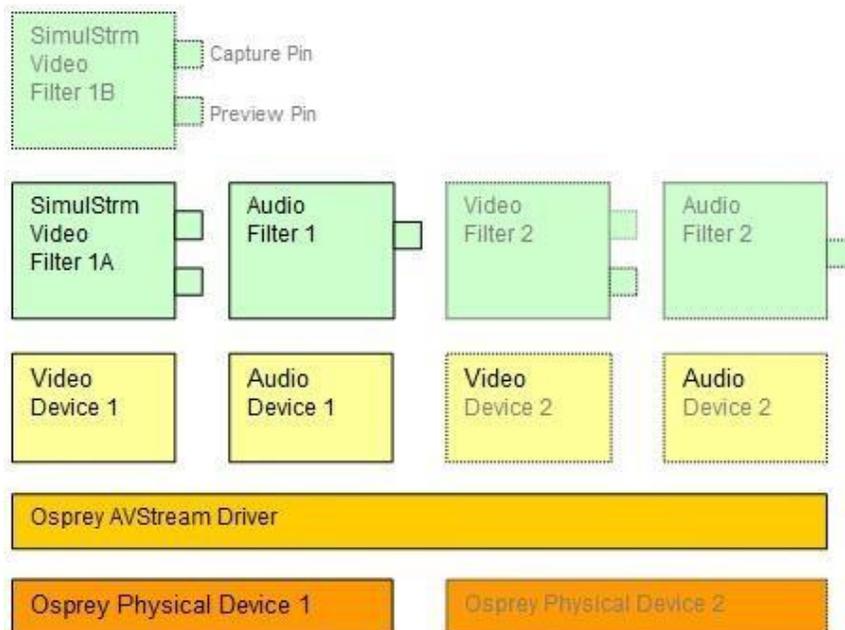
- Since the driver does not upscale video, the default size must be smaller than the crop size. For example, if the crop size is 320 x 240, you cannot set default output size 400 x 300.
- Sizes are subject to the granularity requirements of the selected video format, as explained in the Granularity section above. For example, if your video format is I420 and you try to set a default width of 360, it gets adjusted down to 352 as soon as you click on another control.

Note: The 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 is only able to select from the options the VFW/DirectShow mapper lists.

Filters, Pins, and Properties

DirectShow technology uses terms with specific meanings. For example, filter, pin, driver and device appear frequently when discussing DirectShow media standards. Figure 89 depicts the relationship of DirectShow terms as they apply to Osprey hardware and drivers.

Figure 89. DirectShow



At the bottom of this diagram are one or more physical Osprey hardware devices. For each physical device the AVStream driver creates one logical Video Device and one logical Audio Device.

On top of each Osprey logical Video Device, one or more Video Filters is created. If the SimulStream option is not installed, each Video Device has a single Video Filter. If SimulStream is installed, each Video Device can have multiple Video Filters. The SimulStream option is not available for the Osprey 100e.

The distinction between Device and Filter is important mainly to SimulStream users. For nonSimulStream users, Device and Filter effectively mean about the same thing. For SimulStream users, each SimulStream Filter acts as a virtual device that can have its own independent control settings.

When you enable SimulStream, some functions and capabilities are device-level, and others are filterlevel. Examples of device-level functions are input select, and the controls for brightness, contrast, hue, saturation, and sharpness. These are closely tied to the underlying hardware of the device, which inherently allows only one input to be selected at a time, and one set of hardware control settings to be applied. Examples of filter-level functions are crop, logo, and caption settings, which can be different for each video filter, and in fact for each pin of each filter. Some other capabilities such as deinterlace and software gamma correction could logically be either device-level or filter-level, but are treated as device-level for practical reasons.

Each Video Filter has one Capture Pin and one Preview Pin. A pin is the source or destination of a video or audio stream. A video capture pin is a general purpose pin used for capture to a file, an encoder, an on-screen renderer, or any other destination. A video preview pin is mainly intended for on-screen rendering. Each Osprey Video Filter also has a Closed Caption pin and a Vertical Blanking Interval (VBI) pin for capture of specialized ancillary data.

On top of each Osprey logical Audio Device, one Audio Filter is created, with one or more pins capable of sourcing one or more audio streams. There is not much practical distinction between an Audio Device and an Audio Filter in either the SimulStream or non-SimulStream cases.

Both devices, filters, and pins may have associated Properties. Properties are control parameters that can be read from or written to the component. Some Property Pages are standard Windows DirectShow pages. For example, the Property Page for an individual pin is a standard DirectShow page. The Video Proc Amp and Video Decoder Pages are also DirectShow-standard. The rest are proprietary to the Osprey driver.

As a user, you interact with Property through visual Property Sheets, Property Pages, or Property Tabs that are part of a tabbed dialog. As a programmer, you can set properties directly from within the code of your application, using either the standard DirectShow API or the custom Osprey extension API that is available from Osprey in a software development kit (SDK).

Post-Processing mode

The Osprey Analog PCIe series driver does more than move video data from the hardware to the system. Its Post-Processing facility includes a variety of filters, transforms, and renderers within the driver, and supports the SimulStream option.

Figure 90. Post-Processing mode

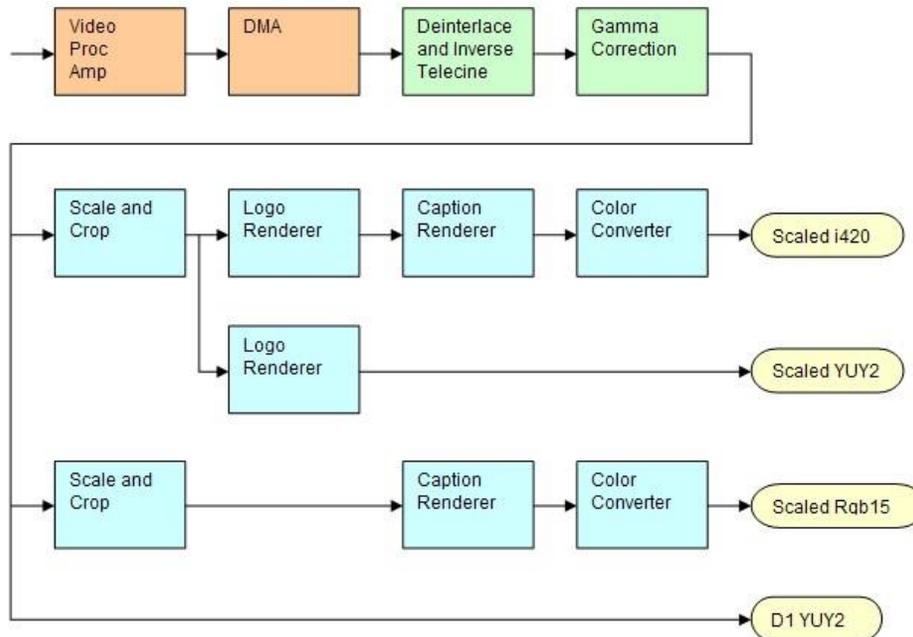


Figure 90 assumes that SimulStream is activated (SimulStream is not available for the Osprey 100e) so that more than two video pins are possible. In this case, there are four video output pins, represented by the rounded rectangles:

- The upper pin produces scaled and/or cropped i420 video, with a logo (watermark) and NTSC Closed Captions rendered on the video.
- The second pin produces scaled and/or cropped YUY2 video with a logo but no captioning. In this particular graph, the upper two pins are scaled and cropping identically, so a single scaling operation can service both pins.
- The third pin has a different scale/crop specification, so its video runs through a separate scaler/cropper. The video is captioned and converted to Rgb15.
- The lower pin produces unscaled, uncropped D1 YUY2 video with no logo or captioning.

The video routed to all pins is in this example deinterlaced and gamma-corrected. Deinterlace or inverse telecine if used are always applied globally to all pins, as is gamma correction. Scaling, cropping, logoing, captioning, and color format conversion are performed separately for each pin.

Post-processing mode has the following capabilities:

- With SimulStream disabled, there is still a maximum of one capture pin and one preview pin on the device at a time. However, there are no restrictions on combinations of video size and rate, color formats, or crop settings. The driver color converts and copies video as required to deliver up to 25 or 29.97 frames per second in any format to the two pins.

- With SimulStream enabled, there can be multiple capture pins and multiple preview pins. Each capture and preview pin pair is placed on a separate filter. The maximum number of each type of pin is the same as the maximum number of filters you have elected to expose in the SimulStream control group. Any pin can produce video at any size, rate, color format, and crop setting. Of course, practical limits are imposed by the bandwidth of the machine.

- The following post-processing filters can be applied, with or without SimulStream enabled:
 - *Motion adaptive deinterlacing and inverse telecine*
 - *Gamma correction*
 - *Logos*
 - *On-video caption rendering*

Some of these filters operate globally on all filters and pins of a device, and some operate on a per-filter or per-pin basis:

- The Video Proc Amp controls – brightness, contrast, hue, saturation, and sharpness – are applied globally in hardware to the incoming video.
- The basic reference size – CCIR–601 or square pixel – is established in hardware. Horizontal delay and the 720/704 width select are also performed in hardware.
- Deinterlace / inverse telecine and gamma correction are applied to all filters and pins on the device and have the same settings for all filters and pins.
- Crop, logo, and caption settings can be different for each pin of each filter, and the driver maintains separate settings for each filter and pin.
- Video size, color format, and frame rate can also be different for each pin. It is the responsibility of the application to maintain these settings.

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. The figures in this section are examples only.

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

Figure 91. Video Renderer



Video Renderer is the oldest and simplest DirectShow renderer. It does not use DirectDraw in the rendering process, which makes it substantially slower than VMR7 described below. It is the default rendering pathway that is chosen when an application says Render without specifying a preferred pathway. For this reason, many applications deliver unnecessarily slow rendering performance.

Video Renderer works best when your output format is RGB rather than YUV, with the RGB format matched to your screen depth. On most modern systems that means RGB32 is the preferred format. If a YUV format is used, an extra filter, AVI Decompressor, will be inserted into the graph to convert the YUV to RGB. The driver can do this conversion faster internally.

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

Preview Pin to VMR7

Figure 92. Video Mixing Renderer 7



VMR7 is short for Video Mixing Renderer 7. VMR7 is a newer renderer that is generally much faster than the old Video Renderer. When the driver is running in Direct Mode, VMR7 uses an efficient DirectDraw configuration to render with almost no CPU overhead, especially when YUY2 video is used. When the driver is running in PostProcessing Mode, DirectDraw is not used but it is still the fastest renderer.

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

VMR7 works best with YUY2 video and there is usually little reason to use any other format. It will, however, work fairly well with the RGB format – usually RGB32 – that matches the current screen depth. We recommend letting DirectShow choose the video format. It generally makes the correct choice. In particular, on some (usually older) systems, if two video frames are to be rendered with VMR7 at the same time, only one can be YUY2; other(s) are RGB, with a conversion filter inserted into the graph if necessary.

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

Note: VMR7 cannot be used when closed captions are to be rendered from the driver’s DShowstandard CC or VBI pin – use the Overlay Mixer to Video Renderer pathway instead. If the driver’s internal rendering is used, the VMR7 works and is recommended.

Preview Pin to VMR9

Figure 93. Video Mixing Renderer 9



Video Mixing Renderer 9 is the newest video rendering method and the one on which Microsoft supposedly is basing 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 high efficiency of YUY2-to-VMR7. Also, although VMR9 is supposed to function as an overlay mixer for rendering captioning from the driver’s DShow CC or VBI pin, we have never seen it function correctly.

Some Data Points

The following measurements are CPU percent on two machines – a fairly old P4, and a dual Opteron 244. The video size is 640 x 480. The screen depth is 32 bits. The following abbreviations are used:

YUY2	the Osprey driver’s preview pin in YUY2 format
------	--

RGB15	the Osprey driver's preview pin in RGB15 format
RGB32	the Osprey driver's preview pin in RGB32 format
VR	old Video Renderer
VMR7	Video Mixing Renderer 7
VMR9	Video Mixing Renderer 9
AVI	AVI Decompressor
OVL	Overlay Mixer

The PostProc results are shown in two modes: with all post processing filters turned off, and with the adaptive deinterlace filter turned on.

Generally these results show the following:

- The great desirability of newer machines for video processing. This has to do with system architecture more than raw CPU speed.
- VMR7 is generally fastest. If you don't need the driver's PostProcessing, then Direct Mode with VMR7 is especially fast.
- Results for specific pathways can be inconsistent across different machines. For example, on the P4, YUV to VR is faster than RGB to VR; on the Opteron, RGB is faster.

In evaluating these benchmarks, remember that all of them involve video rendering to the screen. Depending on the exact pathway, video rendering can result in CPU utilization that is a lot higher than for other capture scenarios. Specifically, writes to display adapter memory that are performed by the CPU rather than with direct memory access (DMA) operations may be inordinately slow. If you are streaming video or capturing to file you do not see numbers this high. If you are encoding video, you may see high CPU utilization, but much or most of it is from the encoder rather than the driver.

Dual Opteron 244, 1.8 GHz, 3GB, NVIDIA GeForce 6600 PCIe x16

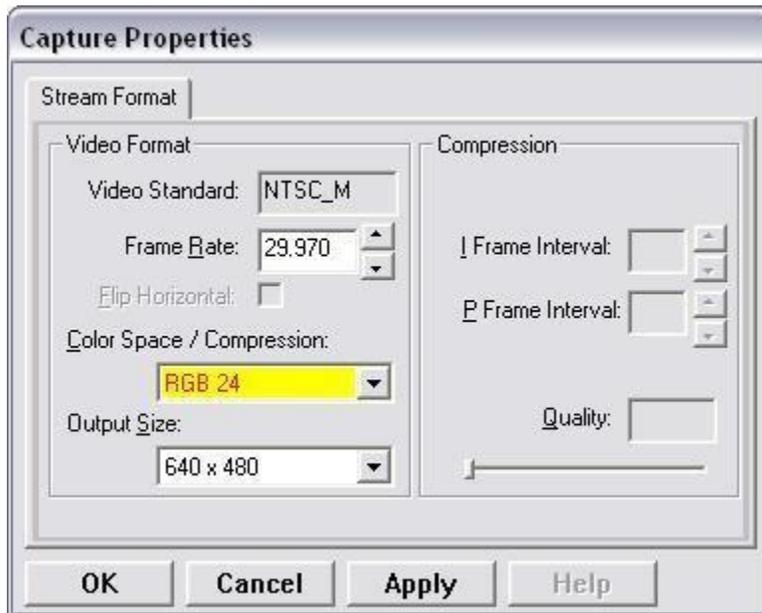
Rendering Pathway	PostProc w/o Deilace	PostProc w/ Deilace
Video Renderer		
RGB15 -> VR	13%	16%
RGB32 -> VR	10%	13%
YUY2 -> AVI -> VR	12%	13%
YUY2 -> OVL -> VR	18%	20%
VMR7		
RGB32 -> VMR7	25%	26%
YUY2 -> VMR7	8%	10%
VMR9		
YUY2 -> VMR9	13%	15%

P4, 2.0 GHz, 512MB, Rage Fury Pro/Xpert 2000

Rendering Pathway	PostProc w/o Deilace	PostProc w/ Deilace
Video Renderer		
RGB15 -> VR	44%	52%
RGB32 -> VR	44%	50%
YUY2 -> AVI -> VR	49%	56%
YUY2 -> OVL -> VR	55%	62%
VMR7		
RGB32 -> VMR7	54%	61%
YUY2 -> VMR7	39%	43%
VMR9		
YUY2 -> VMR9	47%	52%

Capture Properties

Figure 94. Capture Properties



The information in this section applies to DirectShow's standard Pin Properties dialog that many DirectShow applications use for setting the video color format, output size, and frame rate for each pin.

This window is the default DirectShow method for obtaining a user's settings for the output format of captured video.

Changes you make to this window only apply to the currently selected pin. The settings for the capture and preview pins are independent; in applications like GraphEdit, you must set both pins before you use them.

The way to access the Pin Properties window is different for each application. In GraphEdit, for example, right click on the pin you wish to set the properties.

Many applications do not enable these windows. Instead, they have 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:

1. Color Space
2. Output Size
3. 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-down list 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:

1. Go to the Filter Properties Crop tab described above and set the Default Size to a custom value.
2. Enter the Pin Properties dialog and select the default entry, which will now be set to your custom value.

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

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

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 are available:

525-line formats:

- NTSC-M – North America
- NTSC-J – Japan
- 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.

Full-sized NTSC-M and NTSC-J 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 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 360 x 240 for NTSC, and 360 x 288 for PAL. The driver automatically adjusts the reference size and default size for the video standard you are using.

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*.

- 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 2 x 2 square shares two bytes of chrominance data. See *YUV format details*.
- 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 mode is “high color”, 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 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 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 are 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 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 320 x 240 YVU9 format. The buffer has 320 x 240 bytes of Y data, followed by 80 x 60 bytes of V data, followed by 80 x 60 bytes of U data. So each U and each V byte together contain the color information for a 4 x 4 block of pixels.
- Similarly, a 320 x 240 YUV12 format has a 320 x 240 Y array, followed by a 160 x 120 U array, and then a 160 x 120 V array.

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

Closed captioning (CC)

The Osprey AVStream driver supports NTSC closed captions in three separate ways.

- Through standard DirectShow CC and VBI pin.
- By rendering captions directly onto video on the capture or preview pin. The captioned video can be streamed, written to file, or rendered directly.
- Through an Osprey custom property.

On products other than the Osprey 530/540/560, the driver also provides PAL/SECAM captions as well as teletext 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.

Captioning via CC or VBI pins

The driver supports the standard DirectShow CC and VBI pins on Windows XP; additional files may be required for other Windows operating systems. The CC character pair data can be streamed to applications such as Windows Media Encoder 9, or rendered directly to the screen using the DShow Overlay Mixer filter. The 4.6 driver can be set to output CC field 2 character pairs on the CC pin, instead of the standard CC field 1 data. XDS (vchip) data is embedded in the field 2 stream.

The GraphEdit filtergraph shown here displays CC rendered onto preview video. 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, (although there will be problems with timestamping and synchronization); 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. Therefore, the default Video Renderer in combination with Overlay Mixer should be used.

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, you can have two CC pin instances per SimulStream filter.

The driver has three built-in user-accessible controls that affect Closed Captioning.

- On the RefSize property page, in the control group shown below, 480-line video must be selected and the radio button to start video at either Lines 23/286 or Lines 22/285 must be selected.
- On the Captions property page, most of the controls relate to the driver's internal direct rendering on video. The following control selects field 1 or field 2 as the field to be streamed through the CC pin. This control is per-filter; both available pins on the filter are set the same way. For SimulStream users, the pins on different filters can have different settings.
- On the Device -> Extras... property page, you have the choice to set with Normal or AVICompatible timestamping of Closed Caption samples.

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

Unfortunately, the problem with timestamping means that time synchronization between the video and CC streams depend on their physical interleaving in the file, so that time synchronization is poor. If the AVI file is set up to be non-interleaved, synchronization is not good. If the AVI file is set up to be interleaved, synchronization is 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.

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

Direct CC rendering on video

The driver can render closed captions directly onto capture or preview video. The captioned video can be encoded, written to file, or rendered directly to the screen.

CC streaming interface

The driver supports an Osprey custom property which provides the closed caption character stream for use by custom applications. The Osprey filter named CCLineInterp.ax, supplied with the driver package, provides user-mode support for this captioning mode. The Osprey sample applet named CCChannels.exe, also supplied with the driver package, demos a CC line interpreter and XDS (vchip) extraction and display. Both the filter and the applet are provided in source code form in the SDK.

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 / frame number marking that can be used for frame-precise editing.

Figure 95. ActiveMovie Window



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:

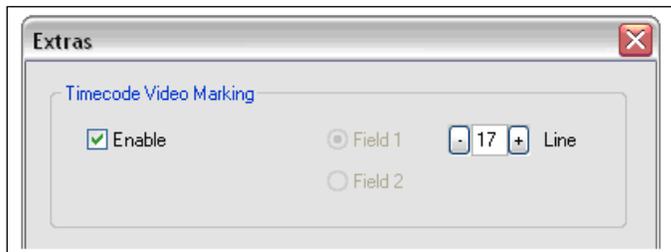
- The device extracts timecode data from the vertical blanking interval (VBI) waveform.
- The driver watermarks timecode into the video preview or capture pin's output data.
- A custom filter decodes the watermark from the video and renders it.
- A GraphEdit graph combines the required filters.

The 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.

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.

This capability requires custom programming. Refer to the *Osprey AVStream SDK Users' Guide*. A sample SDK applet named TCAApp illustrates the interface.

Figure 96. Timecode Video Marking



Timecode stamping must be enabled in the driver before it can be used, and the field and line number correctly set. To access the controls, go to the Device property tab and click Extras...

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: 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 AVStream driver provides DirectShow-compatible VBI pins. VBI data includes Vertical Interval Timecode (VITC) in both the NTSC and PAL worlds. In NTSC, line 21 Closed Captioning (although it is part of the video interval rather than true VBI data), is commonly treated as VBI data. In PAL, World Standard Teletext (WST) is encoded in the VBI data region.

The driver delivers VBI data as raw waveforms, which are then decoded by external DirectShow filters. DirectShow provides three filters under the classification “WDM Streaming VBI Codecs” that will decode data from VBI pins:

- CC Decoder
- NABTS/FEC VBI Codec
- WST Codec

With the Osprey AVStream driver, either the CC pin or the VBI pin can be used to obtain closed caption data. If the VBI pin is used, an extra filter is required to turn the raw waveform into CC character pairs.

When SimulStream is not installed, the driver supports two VBI pin instances. In practice, a DirectShow Smart Tee Filter can be inserted into the graph to make any number of VBI pins. When SimulStream is installed, multiple VBI pins are allowed.

Setting audio driver properties

Setup and control for audio are much simpler than for video.

Setting the audio source and input volume

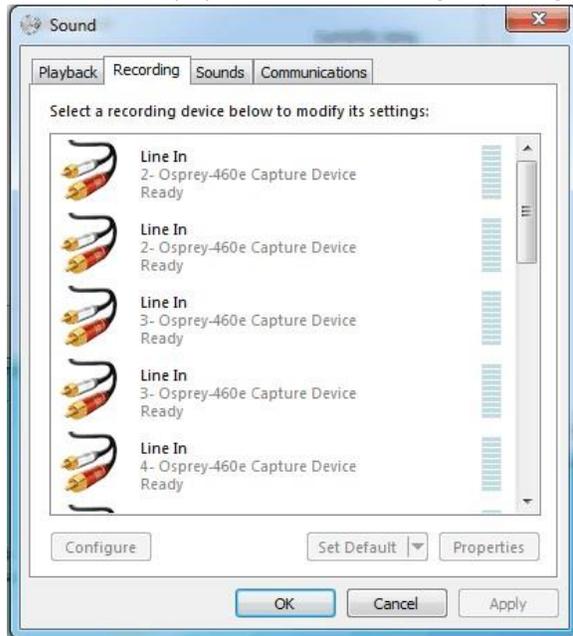
The audio source is set using the Osprey mixer driver interface. Most applications, including the Windows Media Encoder applications, interface to the mixer driver directly and expose the look and feel specific to that application. However, the default Windows interface to the mixer driver can also be used.

To set the audio source and input volume:

1. Right click the speaker symbol on your taskbar (typically on the bottom right-hand side of your screen).
2. Click **Playback devices** (Figure 97). **Figure 97. Open Playback devices**



The Sound window displays with a list of recording devices (Figure 98). **Figure 98. Sound window**



Windows XP specifics

To get to the Osprey audio capture (recording) device, select **Properties** under Recording Control options menu. This opens the Properties window. Click on the **Mixer device** drop-down list at the top to see the list of audio input and output devices, including one or more Osprey cards. When you have chosen the device, click **OK**, and you will be returned to the Recording Control display (Figure 98).

The Osprey 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** check box at the bottom of each source sets which source is being used.

Osprey cards have 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 all the way up (in default driver settings).

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 > Properties > Recording**.

Audio properties window

OspreyConfig's audio properties window enables you to access:

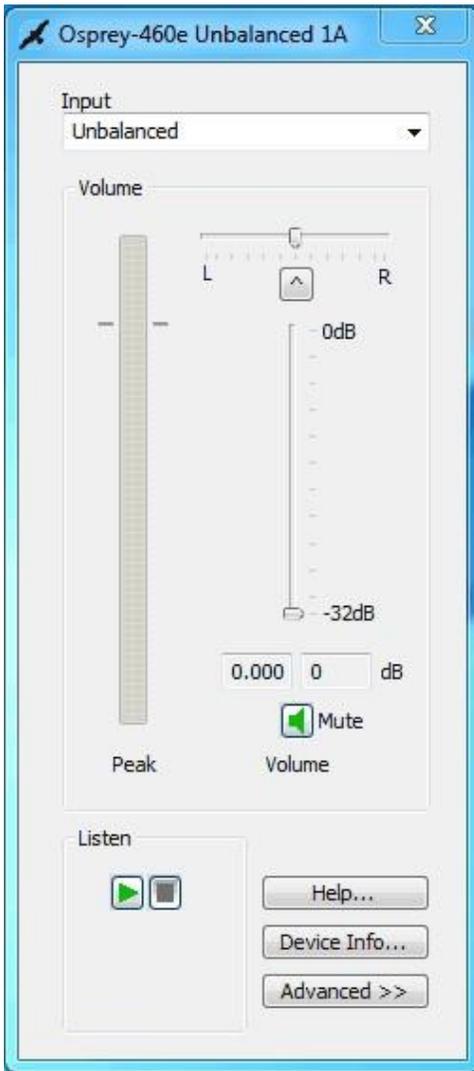
- Standard volume controls – input select, volume, mute, and peak meter for Osprey audio filters (also referred to as the Recording Controls)
- Custom audio controls

It also has a sound check listening or monitoring function.

OspreyConfig runs from an icon in the Notification Area at the far right of the system Start Bar. To display OspreyConfig, right-click on the icon and select a device from the menu. The OspreyConfig audio properties window displays in basic mode (Figure 99).

Basic mode

Figure 99. Audio properties window – Basic mode



The basic mode has the following controls:

Input	Select which input line is active.
Volume	<p>The mixer control group includes several controls:</p> <ul style="list-style-type: none"> • The volume slider controls both stereo channels at once. • The balance control attenuates the left or right channel. The left channel is attenuated when the slider is moved right of center, otherwise is unattenuated; the right channel is attenuated when the slider is moved left of center, otherwise is unattenuated. At the center position both channels are unattenuated. • The balance control button  centers the control. • Mute always mutes both stereo channels. • The peak meter shows the current audio level on both channels. The level shown is the final output from the driver conditioned by the Volume and Balance sliders in the mixer group as well as the Preamp sliders in the Advanced group. The peak meter works only when the device is actively capturing audio, either using OspreyConfig's built-in monitor, or under the control of another application.
Listen	<p>The listen function provides a basic sound check through the system default sound renderer. You can instead monitor sound through your main application at the same time you are making adjustments in OspreyConfig. Click the green triangle to play and the red square to stop.</p>
Help	Click to access the user help files.
Device Info	Click to access information about the hardware device and its driver.
Advanced/Basic	<p>Click Advanced to open a second pane showing advanced mode custom audio controls (see <i>Advanced mode</i>).</p> <p>Click Basic to collapse the second pane back to basic mode.</p>
Preamp	Adjust the analog prescale and software boost. Click Default to return the settings to the default levels.
Mono Source Mode	<p>Choose the source mode:</p> <ul style="list-style-type: none"> • Use Left Channel • Use Right Channel • Use Left + Right Average
Dual Mono	Click this button to access the Dual Mono window (see <i>Dual Mono</i>).
Test Signals	Access the Test Signals window to set the test signal mode and test signal frequency (see <i>Test Signals</i>).

Vista or later specifics

OspreyConfig running under Windows 7 generally follows the Windows 7 Core Audio Point to Point model. Each Osprey input is a separate audio Point or Filter.

For example, an Osprey 530 has five audio inputs – unbalanced, balanced, AES/EBU, SDI ½ and SDI ¾ - which appear in Vista or later device lists as five separate source Points or Filters. When you select one of these filters, you not only select the Osprey 530, but you also implicitly switch the boards internal input selector to the input associated to the filter you have chosen. To put it another way, the two steps under XP – (1) select the board; (2) select the input – are condensed into one – select the filter for the desired board and input.

The Vista or later version of the OspreyConfig Basic property page looks similar to the XP version with some important functional differences. Most of the difference is in how the Input selection box at the top of the panel works.

- **XP** – When you select an input, the Osprey board’s internal selector immediately switches the board to that input. If another application is using this board as its audio source, the application’s selection is overridden without warning.
- **Vista or later** – When an application is running with a particular input selected, the application *owns* the device and that input selection. Neither OspreyConfig nor any other application except the owner can change the input selection. Only the owning application can do that, by releasing its current Filter selection, and selecting a new Filter for the desired input.

When OspreyConfig selects a line on a device that is currently in use by another application, the Input control shows the name of that line followed by the designation Active. OspreyConfig’s Listen function can monitor that audio on the currently active line.

If no application is currently streaming audio through the device, no line is marked as Active. If OspreyConfig starts to monitor a line via the **Listen** button, that line becomes marked Active. OspreyConfig in this case becomes the owning application, and no other application is able to change the input selection until OspreyConfig stops listening.

OspreyConfig’s peak meter only works when the Active line is selected and sound is on the line.

When OspreyConfig selects the Active line, the volume, balance, and mute controls operate on the active audio stream, including the audio going to the application that owns the input.

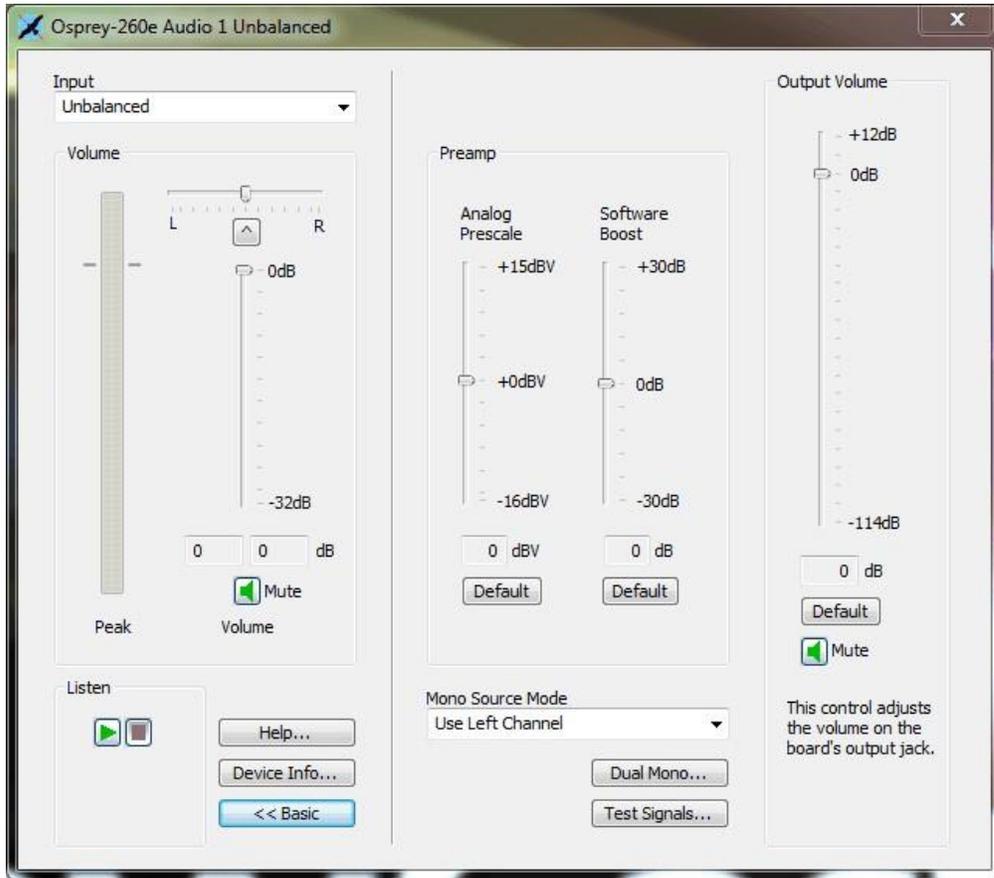
The **Mute** button always affects the Active line. The driver does not store this setting separately for each audio line.

Advanced mode

Click **Advanced** to open up the advanced custom Config controls.

Vista or later Note: The controls on this page work the same on XP and Vista, except Preferred Audio Sample Rate is not on Vista. The windows in this user guide are on a Windows 7 64-bit operating system.

Figure 100. Audio properties window – Advanced mode



Note: This window is for the Osprey 260e video card. The **Mute** button on the Input section does not display on the Osprey 210e. Also, the Output Volume section on the far right of the window only displays on the Osprey 260e.

The Advanced mode has the following controls:

<p>Preferred Audio Sample Rate (XP only)</p>	<p>This control is not provided, or needed for Vista or later. The system sound control has a default rate control that has about the same effect. The system control is in Sounds (the speaker icon in the notification area or in the Control Panel). Right click on the notification area Sounds icon and select Recording Devices. Or, click Sounds in the Control Panel and select the Recording tab. Highlight a capture filter and click Properties. Go to the Advanced tab and select the Default form desired.</p>
<p>Preamp</p>	<p>The Preamp controls set the hardware Analog Prescale level and a Software Boost factor.</p>
<p>Mono Source Mode</p>	<p>This control tells the driver what to do when the audio capture client connects to the driver via a monaural channel. It has no effect in the usual case the connection is via stereo channels.</p>
<p>Dual Mono</p>	<p>The Dual Mono window enables a special mode of the driver in which the left and right stereo pair inputs to a device are used as two separate mono channels serving two separate audio capture filters.</p>
<p>Test Signals</p>	<p>The driver emits a test signal in place of the normal incoming audio.</p>

Preferred audio sample rate (XP only)

At the top of the advanced mode panel (for XP only) is a control for Preferred Audio Sample Rate. Osprey hardware can deliver audio at a hardware sample rate of 32.0 kHz, 44.1 kHz, or 48.0 kHz. With this control you can force just one of these rates. The control tells the driver to tell applications that it only supports the selected rate rather than all three rates.

Most often you want to let the audio application control which sampling rate will be used; however, there are cases where you may want to force a particular rate. If you use software sample rate conversion, the system does not necessarily select the optimum hardware rate for a given software rate. For example it may specify a 44.1 kHz hardware rate when supplying 16 kHz software rate to the application. In this case, it would be better to set the Preferred Audio Sample Rate 32 kHz, so that downsampling is exactly 2:1.

This control takes effect when the device's audio streams are restarted – you may have to restart the application to pick up the change.

In general, Osprey hardware can deliver audio at a hardware sampling rate of 32.0 kHz, 44.1 kHz, or 48.0 kHz, with the following exceptions:

- The Osprey 200 always delivers audio at 44.1 kHz. (This card is older and no longer sold. The new Osprey 210, 230, 300, and 440 do not have this restriction.)
- The Osprey 5xx series (Osprey 530, 540, and 560) have an SDI input that only supports 48.0 kHz audio sampling. The driver overrides any other Preferred Audio Sample Rate.
- The Osprey 540 and Osprey 560 have a DV1394 input. When the audio input is DV1394, you may have to use the Preferred Audio Sample Rate control to match your audio sample rate to the actual rate of the incoming data. The usual formats are 48 kHz/16-bit, and 32 kHz/12bit, 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 or there are discontinuities, try the other setting.

Preamp

The Preamp controls set the hardware Analog Prescale level and a Software 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.

It is recommended that you use the system Volume control in the Basic pane of the dialog (or in the system mixer) for general purpose volume setting. Use the preamp controls to optimize and normalize signals:

- The Analog Prescale setting is meaningful only for the analog unbalanced and balanced inputs, and is calibrated differently for each. When a digital input is selected this control is disabled. The Osprey 200 does not have this setting.

Analog Prescale is an analog hardware gain control with the default level 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 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. Click **Default** to restore the default value.

- The Software Boost setting is a software gain adjustment that applies to both analog and digital inputs. Boost can be set individually for each input. It supplements the system volume control by providing a wide adjustment range. You can use it to calibrate or normalize input levels across multiple inputs; or to accommodate microphones or other non-line inputs that have nonstandard signal levels. Click **Default** to restore the default levels.

Mono source mode

This control tells the driver what to do when the audio capture client connects to the driver via a monaural channel. It has no effect in the usual case the connection is via stereo channels.

The control signals the driver whether the audio for the mono connection should come from the left physical channel, the right physical channel, or an average of both.

- If Mono Source Mode is set to **Use Left Channel**, the audio from the left physical channel is copied to the mono destination buffer.
- If Mono Source Mode is set to **Use Right Channel**, then audio from the right physical channel is copied to the mono destination buffer.
- If Mono Source Mode is set to **Average Left and Right**, audio from the left and right physical channels is averaged, and the result is put in the mono destination buffer.

When Dual Mono mode is in effect, the Mono Source Mode control has no function and is disabled. In Dual Mono mode there is only one physical source channel, and therefore you do not need to choose which channel to use.

Dual Mono

The Dual Mono window enables a special mode of the driver in which the left and right stereo pair inputs to a device are used as two separate mono channels serving two separate audio capture filters. A typical use for this mode is audio-only applications where stereo is not needed and maximum density of inputs per system is the driving factor.

In Dual Mono mode, each audio device enumerates as two separate filters, respectively for the left and right physical inputs. The filters' names will have L and R suffixes, for example, Osprey 230 Audio Device 1L.

These filters behave for the most part like normal audio filters. When you use AudioConfig, or most other applications, you connect with either the L or R filter, one at a time, not both. The user volume, balance, and mute (Basic mode of AudioConfig) are independent for the L and R filters. Each has two quasi-stereo outputs. The audio is identical on each quasi-channel, except that the user balance control can be used to reduce the volume on one channel.

However, the underlying hardware requires:

- Both filters of the pair must be set to the same audio input – unbalanced, XLR balanced, etc.
- Both must have the same hardware prescale and software boost settings.
- The Mono Source Mode control has no meaning in Dual Mono mode, and is disabled.

This control globally affects all audio devices of the category that the dialog is accessing (that is, all Osprey 2X0s as a group, or all Osprey 5X0s as a group). When the setting is changed, you have to restart the system for the change to take effect.

Figure 101. Dual Mono



Test Signals

Using the Test Signals window (Figure 102), you can have the driver emit a test signal in place of the normal incoming audio. The raw test signal is a sine wave with full 16-bit amplitude (range -32767 to +32767).

The test signal can be injected at either of two points in the driver's processing. In both cases, the signal is a software-generated waveform that is injected downstream of the hardware.

- The first option is to inject the signal into the earliest possible point in audio processing. That means it is placed in the driver's Direct Memory Access (DMA) buffer, overwriting the normal capture data. This form of the test signal will be modified by all user controls except the analog input hardware prescaler. Volume, mute, and balance controls will all affect the signal. If A/V Active Sync is used, or if rate conversion occurs, these operations will be performed on the test wave. The peak meter reading will show all modifications of the signal level. The signal will be converted to 8-bit format or to mono if either is specified. If the device is sourcing multiple audio streams, the test signal will appear on all these streams.
- The second option is to inject the signal at the last possible point in the driver's audio processing. The raw sine wave is copied into the outgoing client buffer in place of the normal received waveform. This signal is not modified by the driver's volume, balance, or mute controls. The peak meter will show the level of the incoming signal, not of the test wave. The output format must be 16-bit stereo, or the test signal will not be injected.

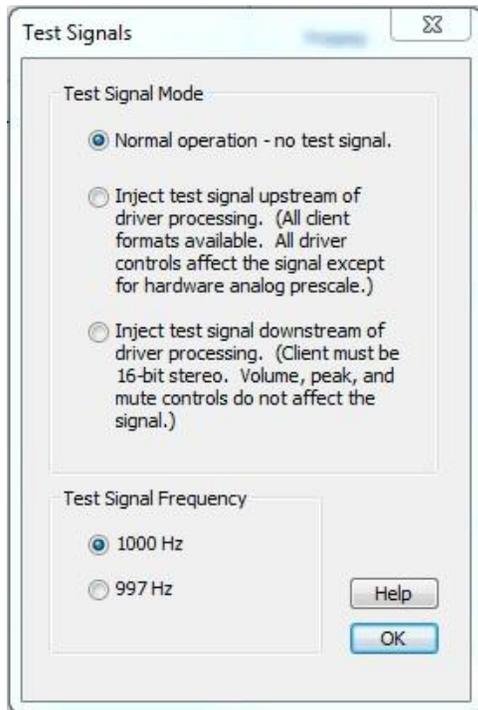
There is also the choice to emit an exact 1 kHz waveform, or a 997 Hz waveform. The 997 Hz option may be useful for some kinds of troubleshooting since the periodicity of the waveform will not coincide with buffer packet boundaries.

In all cases, the sample rate of the test wave will be the same as the rate of the incoming audio. For analog inputs, the on-board sample clock determines the rate. For Osprey 5X0 digital inputs (AES-EBU), SDI, or DV1394) the clock embedded in the incoming signal is used.

This control affects the one specific Osprey audio device currently being accessed; to switch all devices to a test signal you would have to repeat the operation for each individually.

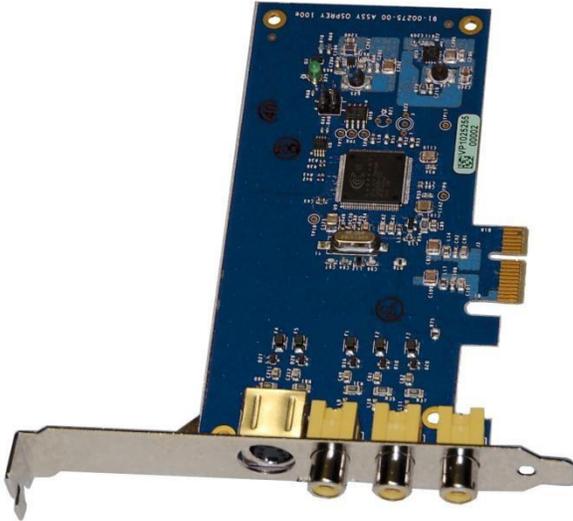
As soon as you click the button, this control is effective immediately.

Figure 102. Test Signals



Appendix A: Osprey hardware specifications

Osprey 100e

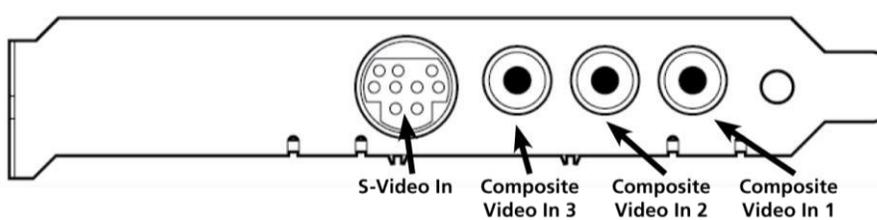


Environmental specifications

Operating temperature range	0° to 40° C
Non-operating temperature range	-40° to +75° C
Operating humidity range	Between 5 % and 80 % (non-condensing) @ 40° 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)

- PCI Express Bus compliant
- Approximate card weight = 42 grams

Figure 103. Osprey 100e backplate



Osprey 210e



Environmental specifications

- PCI Express Bus compliant
- Approximate card weight = 42 grams

Figure 104. Osprey 210e backplate

Operating temperature range 0° to 40° C

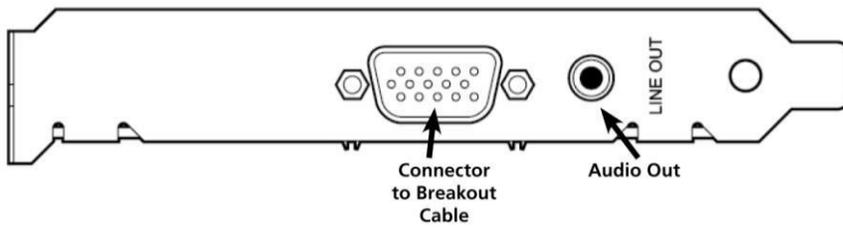
Non-operating temperature range -40° to +75° C

Operating humidity range Between 5 % and 80 % (non-condensing) @ 40° 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)



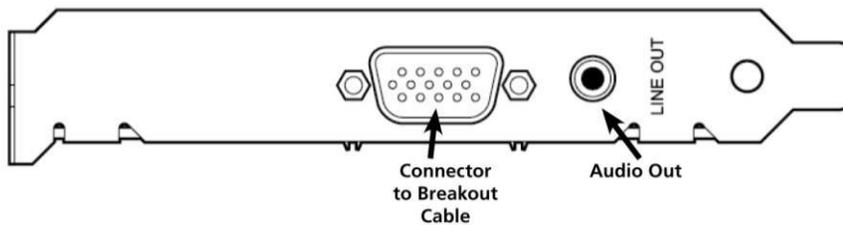
Osprey 260e



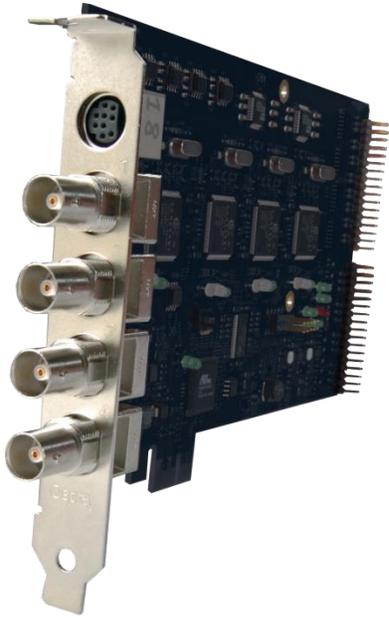
Environmental specifications

- PCI Express Bus compliant
- Operating temperature range 0°C to 40°C
- on-operating temperature range -40°C to +75°C
- Operating humidity range Between 5 % and 80 % (non-condensing) @ 40°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)
- Approximate card weight = 65 grams

Figure 105. Osprey 260e backplate



Osprey 460e

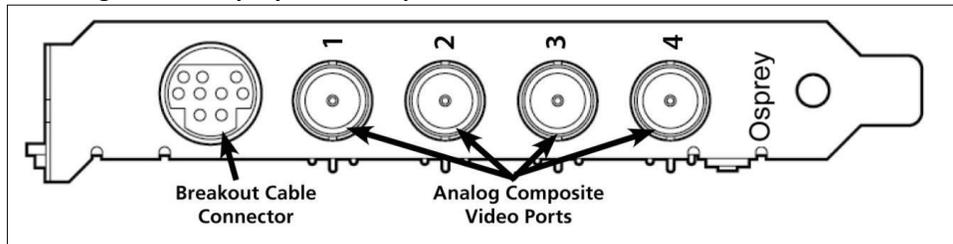


Environmental specifications

Operating temperature range	0° to 40° C
Non-operating temperature range	-40° to +75° C
Operating humidity range	Between 5 % and 80 % (non-condensing) @ 40° 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)

- PCI Express Bus compliant
- Approximate card weight = 227 grams

Figure 106. Osprey 460e backplate

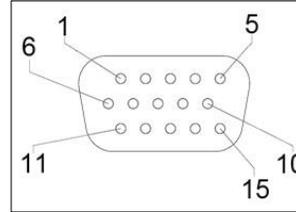


Appendix B: Osprey Breakout Cables

Osprey 210e breakout cable

Figure 107 shows the Osprey 210e connector on the bracket.

Figure 107. 15 pin mini-DIN male on Osprey bracket

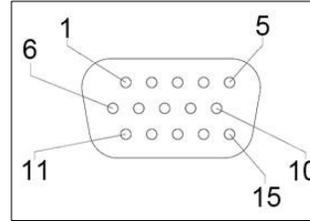


Pin	Function
1	Unbalanced left audio in, Tip for 3.5mm audio
2	Unbalanced right audio in, Ring for 3.5mm audio
3	Ground for 3.5mm audio
4	
5	
6	S-Video Luma (to mini-DIN 3)
7	Ground for R & L unbalanced audio
8	
9	Composite video ground
10	S-Video Luma and Chroma ground (to mini-DIN 1 & 2)
11	
12	
13	
14	S-Video Chroma (to mini-DIN 4)
15	Composite video

Osprey 260e breakout cable

Figure 108 shows the Osprey 260e connector on the bracket.

Figure 108. 15 pin mini-DIN male on Osprey bracket

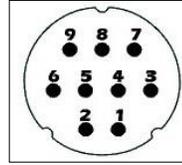


Pin	Function
1	Unbalanced left audio in
2	Unbalanced right audio in
3	Shield for R & L balanced audio (to XLR pin 1)
4	Balanced Audio Left + (to XLR pin 2)
5	Balanced Audio Right - (to XLR pin 3)
6	Y / S-Video Luma
7	Ground for right unbalanced audio
8	Ground for left unbalanced audio
9	Pb / Composite video ground
10	S-Video Luma Ground
11	Balanced Audio Left - (to XLR pin 3)
12	Pr / S-Video Chroma ground
13	Balanced Audio Right + (to XLR pin 2)
14	Pr / S-Video Chroma
15	Pb / Composite Video

Osprey 460e breakout cable

Figure 109 shows the Osprey 460e connector on the bracket.

Figure 109. 9 pin mini-DIN on Osprey bracket



Mini-DIN	Signal	RCA Connectors
1	Channel A Left	Channel A Left Center
2	Channel A Right	Channel A Right Center
3	Channel B Left	Channel B Left Center
4	Channel B Right	Channel B Right Center
5	Channel C Left	Channel C Left Center
6	Channel C Right	Channel C Right Center
7	Channel D Left	Channel D Left Center
8	Channel D Right	Channel D Right Center
9	Shield	Channel A Left Shield
9	Shield	Channel A Right Shield
9	Shield	Channel B Left Shield
9	Shield	Channel B Right Shield
9	Shield	Channel C Left Shield
9	Shield	Channel C Right Shield
9	Shield	Channel D Left Shield
9	Shield	Channel D Right Shield

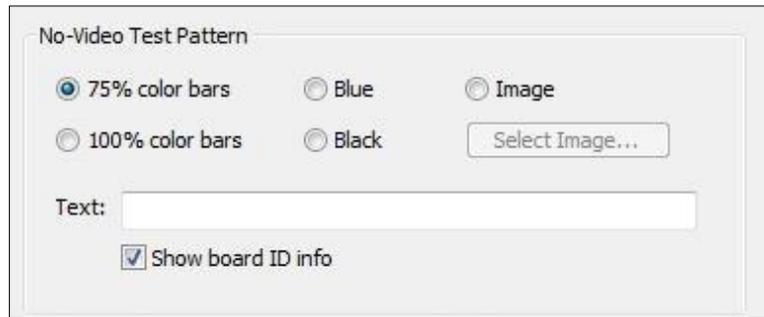
Appendix C: Troubleshooting

Color bars on video screen

The Osprey 460e AVStream driver has a built-in color bar generator. If color bars appear in your video preview window, it is an indication that video is not present on the selected video input (Figure 110).

The color bar display can be adjusted or changed in the Device Properties tab, including the text overlay on the screen.

Figure 110. No-Video Test Pattern



To solve this problem, check the following:

- 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-BDGH1 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.

Appendix C: Troubleshooting

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' 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 (480 x 320 or less).
- Use a shallower color format (RGB15 or RGB24 instead of RGB32).
- Try a YUV format instead of an RGB 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 image

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.

There are other brands of copy-protection besides Macrovision. Some of these employ similar methods (resulting in the above) and others do not. This is a good example of Macrovision effects but you should find a good way if possible to briefly note that there are other forms of copy protection and that they may have different effects on the picture.

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. 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.

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 a 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
```



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