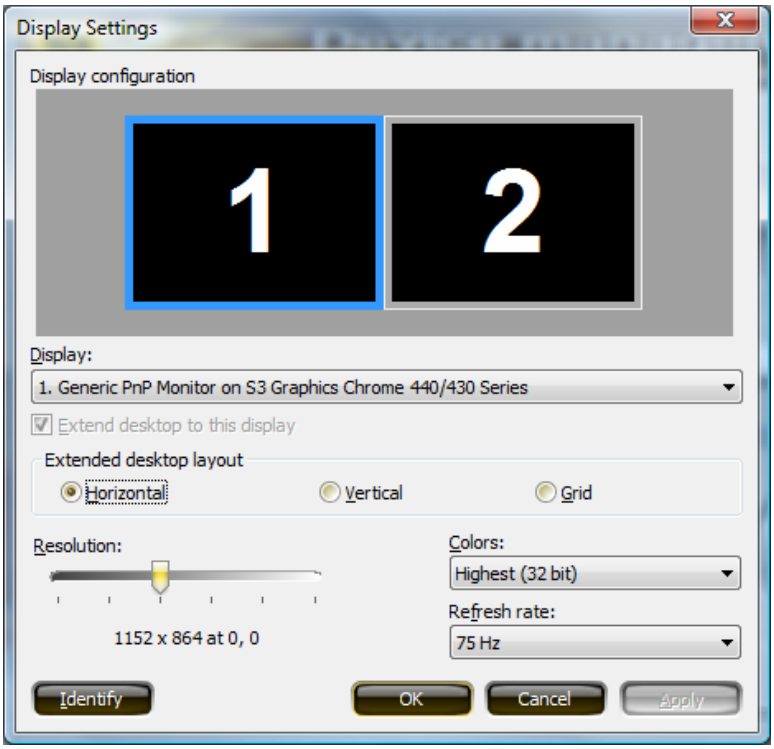
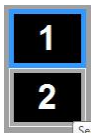
7.2 S3 ScreenToys Device Management Display Settings

ACCESS:
The **Display Settings Display Configuration** page is accessible from the **Options** dropdown list on the right display device area of the **Device Management** page.



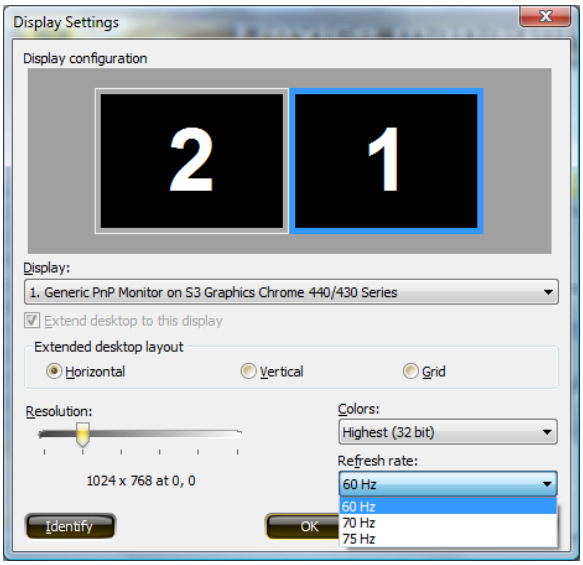
OPTIONS:

Display Settings	This page is similar to the **Display Settings** page provided by the operating system. The following items are the same: • Display dropdown list • Extend desktop checkbox • Resolution slider • Color bit depth selector • Identify button Controls available on the OS page but not available on the S3 page include: • Changing primary and secondary monitors • Dragging monitor icons to change relative position • Advanced settings button

	Discussed below are those controls which are available on the **S3 ScreenToys Display Settings** page but which are not available on the OS **Display Settings** main page are: • Desktop layout radio button • Refresh rate selection dropdown list •
Extend Desktop layout	There are three radio buttons provided as an aid to relative positioning of the multiple displays in an extended desktop configuration: • Select **Horizontal** to arrange the desktop in a horizontal row with the Primary display (1) positioned on the left and the secondary (2) on the right.  • Select **Vertical** to arrange the desktop in a vertical row with the Primary display (1) positioned above the secondary (2).  • Select **Grid** when you have four displays to arrange in a grid pattern. If only two displays are present, selecting Grid will result in a Horizontal arrangement.  • If **Other** appears as a grayed out layout option, then the layout has been previously adjusted through the operating system's Display Settings page, and the layout does not exactly match the other 3 available choices on this dialog. You cannot select this option, it is informative only.

Refresh rate…

From the **Options** dropdown list, select **Display settings…** Near the lower right corner, click the **Refresh rate…** dropdown list to select a refresh rate from the available refresh rates for the display device icon outlined in blue which represents the current output display device. The operating system will test the selected refresh rate and you will have the option to accept or decline the change.



7.3 Fine Tuning CRT

When your display device is detected as a connected and active CRT, you can configure the CRT using the **S3 ScreenToys Device Management** page. Adjustments you make are remembered by the S3 Graphics software even when your system is sleeping or rebooted.

ACCESS: To adjust CRT, right click on the desktop and click from the menu to select **S3 ScreenToys**. In the left menu column, select **Basic, Device Management**. In the **Display Devices** area, click the **CRT** icon. Next check the **Device Status** checkbox underneath the icon. When the selected device icon has a blue outline and checked box, available options for the device can be configured. The lower **Device Settings: CRT** area will show available options for CRT configuration.

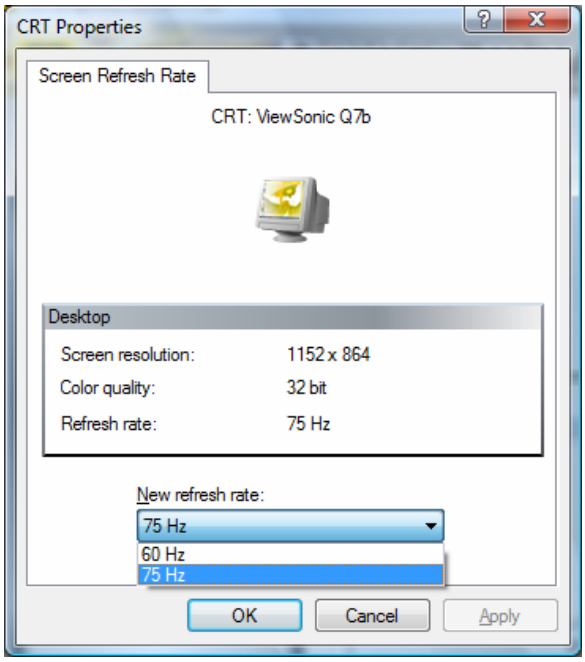
OPTIONS:

Options for CRT adjustment may include:

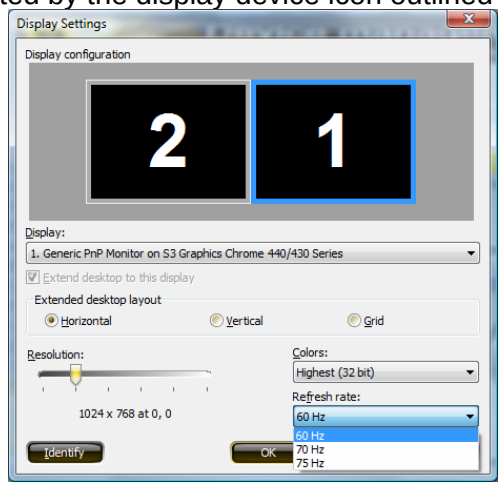
Device Settings: CRT model info & settings area	The Device Settings title row will report the manufacturer name and model detected for the selected display device. The following options may be available for adjustment for the selected CRT. NOTE: If using multiple monitors, you must exit Extended desktop mode for these settings to be available.
Size 	The Size controls allow you to increase and decrease the horizontal and vertical size of the display image. This does not change the actual desktop size, but rather uses the hardware to stretch or shrink the visible image. Click the **plus** signs to increase the horizontal or vertical size. Click the **minus** signs to decrease size. Click the **middle round** button to reset both horizontal and vertical size to the default values. Most monitors have a similar control built in.
Position 	The Position control allows you to move the monitor image position to suit your individual preference and monitor. Click the **plus** signs to move the image position up or to the right on the monitor. Click the **minus** signs to move the image towards the left or the bottom of the monitor. Click the **middle round** button to reset the image position to the default values. Most monitors have similar controls built in.
Test Pattern	If a test pattern button is accessible, you can click the **Test Pattern** button to cycle through various test patterns to help you calibrate and adjust the CRT image. In order, the patterns are: SMPTE color bars, alignment patterns (to help with scaling and aspect ratio adjustments), and red, green, and blue backgrounds. Other CRT features can be adjusted while Test Pattern backgrounds are displayed.

Refresh rate…

Click the **Refresh rate…** button. The **CRT Properties Screen Refresh Rate** window will appear. Select a refresh rate from the dropdown list of available refresh rates for the current output display device. Click **Apply** to apply your change. The operating system will test the selected refresh rate and you will have the option to accept or decline the change.



Alternately, from the **Options** dropdown list, you can select a refresh from the **Display settings Display configuration** window which also has a **Refresh rate…** dropdown list to select a refresh rate from the available refresh rates for the current output display device, as represented by the display device icon outlined in blue.



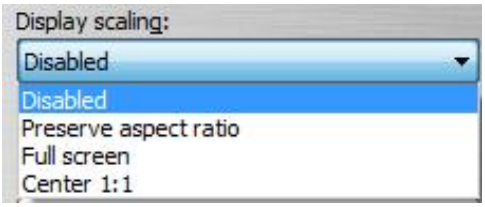
7.4 Fine Tuning DVI

When a DVI is detected as connected and active, you can configure the DVI using **S3 ScreenToys Device Management** page. Adjustments you make are remembered by the S3 Graphics software even when your system is sleeping or rebooted.

ACCESS: To adjust DVI, right click on the desktop and click from the menu to select **S3 ScreenToys**. In the left menu column, select **Basic, Device Management**. In the **Display Devices** area, click the **DVI** icon. Next check the **Device Status** checkbox underneath the icon. When the selected device icon has a blue outline and checked box, available options for the device can be configured. The lower **Device Settings: DVI** area should show options for DVI configuration.

OPTIONS:
Options for DVI adjustment vary with the type of DVI. If your multi-sync DVI reports itself as a CRT, then the CRT options will appear as associated with the device.

Device Settings: DVI model info & settings area	Reports DVI specific information. The **DVI Settings area** title row will report the manufacturer name and model detected for the selected display device. Options described below do not appear in the **DVI Settings** area if the option is not supported for the

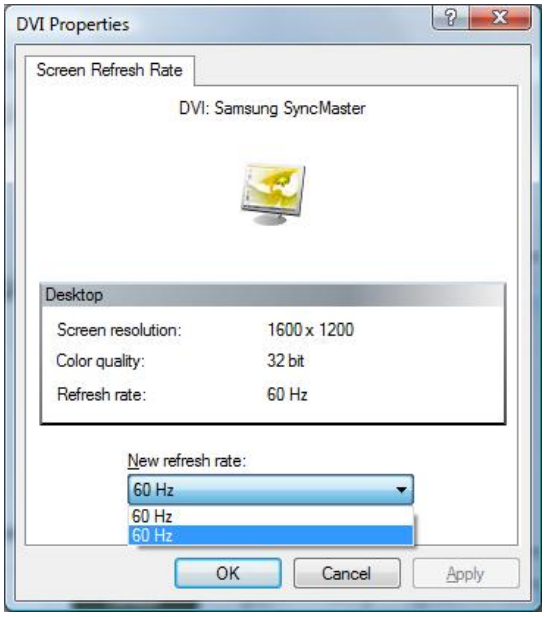
	selected DVI device. For example, if the Expansion options are dimmed or do not appear, then the expansion options listed below are not configurable for this DVI device instance at the current resolution.
Panel Type	Details the physical size (in pixels) and panel type of the device selected.
Display Scaling image icon	The icon shows an example of the currently checked Display scaling option. Change the Display scaling option to observe the change in screen size that results from changing the Display scaling setting.
Display scaling dropdown list	The **Display scaling dropdown list** allows you to let S3 Graphics software help set an optimized mode for your DVI output.  **Preserve aspect ratio** is the default setting. The S3 Graphics software will maintain the aspect ratio and up scale the screen image as large as possible to the device's native resolution. Note: Even if you have enabled the monitor's built-in scaling, the monitor's scaling will not occur. The S3 Graphics driver does the expansion to the native display resolution. Select the **Disabled** list item to have S3 Graphics software use the display resolution and refresh rate requested you specify, without any GPU up scaling. This setting is appropriate when you want to use the monitor's built-in scaling. Select the **Full screen** list item to have S3 Graphics software upscale the screen image to a full screen image which matches the device's native resolution. The aspect ratio may not be maintained. Select the **Center 1:1** list item to have S3 Graphics software use the GPU upscale hardware to center the display but do not do any upscaling.

Preserve aspect ratio

Select the Preserve aspect ratio checkbox to ensure the desktop image always maintains its original aspect ratio, or relationship between the horizontal and vertical size (in pixels).
For example, if you have a wide screen panel you might choose not to maintain the aspect ratio and thereby allow the S3 Graphics hardware and software to horizontally expand the image to fit the wide panel size.

Refresh rate…

Click **Refresh rate…** to launch the **S3 Graphics Screen Refresh Rate** window. Under Windows Vista and Windows XP you can use the utility to select from a dropdown list of refresh rates for the current output display device.



7.5 Fine Tuning HDMI

When an HDMI display device is detected as connected and active, you can configure HDMI using **S3 ScreenToys Device Management**.

Note: HD Audio must also be configured to ensure a satisfactory sound and video synchronization. See Fine Tuning HD Audio for detail.

ACCESS: To adjust HDMI, right click on the desktop and click from the menu to select **S3 ScreenToys**. In the left menu column, select **Basic, Device Management**. In the **Display Devices** area, click the **HDMI** icon. Next check the **Device Status** checkbox underneath the icon. When the selected device icon has a blue outline and checked box, available options for the device can be configured. The lower **HDMI Settings:** area will show available options for HDMI configuration.

OPTIONS:

The following options may be available for HDMI display output configuration:

Device Settings: HDMI model info & settings area	The **HDMI Settings** area title row will report the manufacturer name and model detected for the selected HDMI display device. The following configuration options are available when the HDMI device is connected and enabled and the HDMI Device icon is selected.

HDMI Mode dropdown list

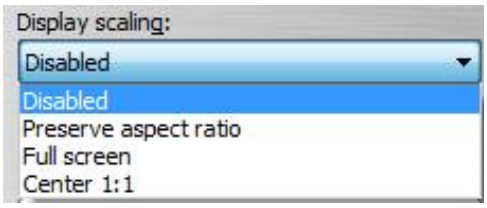
HDMI Mode is a dropdown list of available HDMI Formats.

This list is dynamically generated information processed by the driver from data specified in the HDMI monitor's information. The driver also prunes the list to those formats which do not exceed the graphic board's available digital interface bandwidth.

Note: If you have a 16:9 wide screen device, 4:3 formats will appear on your screen with black areas on the left and the right of the screen. If you have a 4:3 standard screen, 16:9 format types will appear on your screen in letter-box mode, i.e., with black areas on the top and the bottom of the screen.

Display scaling dropdown list

The **Display scaling dropdown list** allows you to let S3 Graphics software help set an optimized mode for your HDMI output.



Preserve aspect ratio is the default setting. The S3 Graphics software will maintain the aspect ratio and up scale the screen image as large as possible to the device's native resolution.
Note: Even if you have enabled the monitor's built-in scaling, the monitor's scaling will not occur. The S3 Graphics driver does the expansion to the native display resolution.

Select the **Disabled** list item to have S3 Graphics software use the display resolution and refresh rate requested you specify, without any GPU up scaling.. This setting is appropriate when you want to use the monitor's built-in scaling.

Select the **Full screen** list item to have S3 Graphics software upscale the screen image to a full screen image which matches the device's native resolution. The aspect ratio may not be maintained.

Select the **Center 1:1** list item to have S3 Graphics software use the GPU upscale hardware to center the display but do not do any upscaling.

Note: If you have set and saved a Custom Mode for this device, the Custom Mode will be used, regardless of the current Display scaling setting.

Auto Mode checkbox (Windows XP only)

The **Auto Mode checkbox** allows you to let S3 Graphics software own the selection of the optimized mode for your HDMI-output.

Select the **Auto Mode** checkbox to have S3 Graphics software automatically determine which HDMI Type is optimized for your configuration.

Clear the **Auto Mode** checkbox if you want to decide which HDMI Type should be selected. (This is the current default setting for Windows XP. For Windows Vista this option is not applicable.)

Mute audio on HDMI device checkbox

The **Mute audio on HDMI device** checkbox allows you direct access to mute the audio portion of the HDMI audio-video stream.

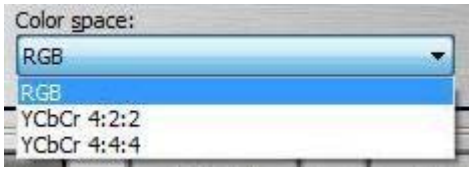
Select the **Mute audio on HDMI device** check box to mute the audio portion of the merged HDMI-formatted audio-video stream.

Clear the **Mute audio on HDMI device** checkbox to allow the audio portion of the stream to play.

Note: For further information on audio controls for HDMI, refer to the following section on Fine Tuning HD Audio.

Color space dropdown list

The **Color space** dropdown list allows you to select between three formats for your HDMI output. Video pixels can be encoded in either RGB, YCbCr 4:4:4 or YCbCr 4:2:2 formats.



Use this option when the output on the screen doesn't appear as expected.
Select:

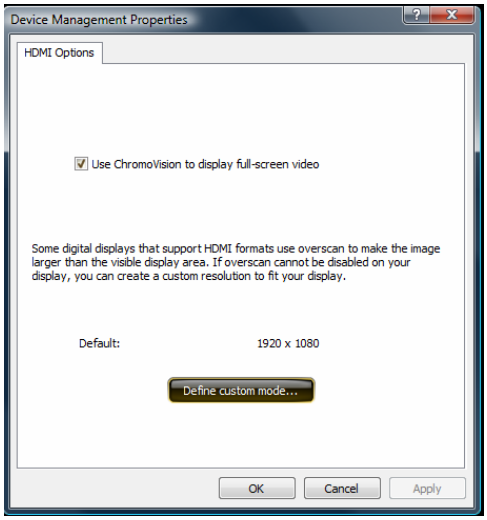
- **RGB**. RGB encoding is the default. It can be used for

color depths of 24-bit and above.

- **YCbCr 4:4:4**. It can be used for color depths of 24-bit and above, and may provide greater color sampling.
- **YCbCr 4:2:2**. This format is not supported for color depths greater than 24-bits.

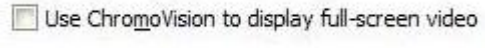
Advanced… Click the **Advanced** button to open the HDMI Options page.

7.5.1 Advanced: HDMI Options



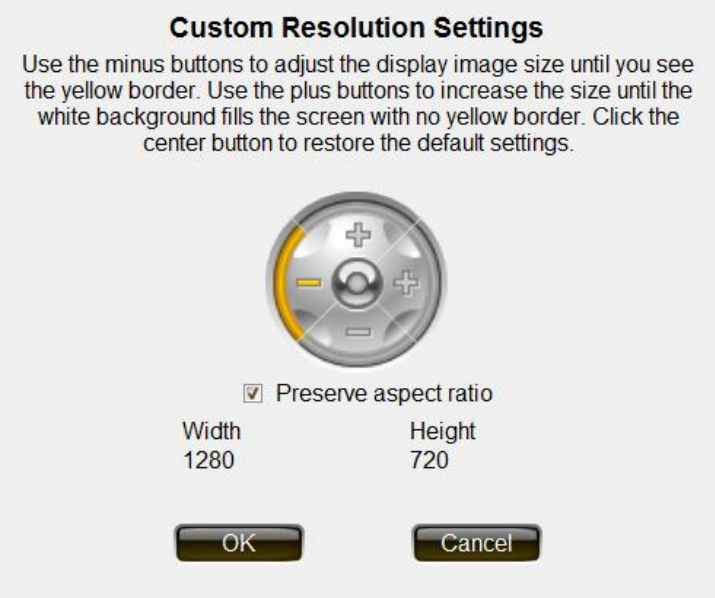
HDMI Options page These additional HDMI configuration options are available for selection through the **HDMI Options** window, accessible from the **Advanced** button located in the HDMI settings area of the **S3 ScreenToys Device Management** window.

Use ChromoVision to display full-screen video Click **Use ChromoVision to display full-screen video)** checkbox to enable ChromoVision.



When you are using Windows Vista or Windows XP, ChromoVision allows full screen playback on your HDMI device while windowed video plays on another display device associated with the Primary View. ChromoVision is not available when there is only one display output device, and is not available when you Extend the desktop. You must be in Clone view.

	Refer to the Video Enthusiast section for additional information about ChromoVision.
Overscan note	The Options page includes text advising the user that they may have the option to set a custom resolution for their display.
Default:	This area provides the default resolution for your HDMI device.
Define custom mode… button	Click the **Define custom mode…** button to open a dialog window which allows you to customize your HDMI desktop size.



HDMI Define custom mode	This control occupies the full area for the device on the desktop
Custom Resolution Settings: Size	The **Custom Resolution Settings** control button allow you to increase and decrease the horizontal and vertical size of the display image. This does not change the actual desktop size, but rather uses the hardware to stretch or shrink the image visible on the HDMI. Click the **plus** signs to increase the horizontal or vertical size. Click the **minus** signs to decrease size. Click the **middle round** button to reset both horizontal and vertical size to the default values. **Note**: If the **Size** control is dimmed, size should be adjusted using the **Display Settings** or **CHROME** menu

desktop resolution adjustments.

Additional video sizing adjustment control is usually available through the video quality controls built into the HDMI itself.

Preserve aspect ratio

Select the **Preserve aspect ratio** check box to ensure the HDMI image always maintains its original aspect ratio (proportional relationship) between horizontal and vertical size.

If the **Preserve aspect ratio** box is checked (default), the aspect ratio is fixed (locked), the horizontal size controls are disabled and you will only be able to adjust the vertical size. Any adjustment made to the vertical size of the display automatically causes an adjustment of the horizontal size necessary to maintain the existing aspect ratio.

If this box is not visible or dimmed, this option is not available for your configuration.

Restore Default

Click the **middle round yellow** button to return to the default HDMI size settings.

OK, Cancel

Click **OK** to apply the changes and exit. Click **Cancel** to exit the dialog without making any changes.

7.5.2 HD Audio

Microsoft Windows Vista includes an HD Audio software driver. After the installation of the S3 video driver, S3 HD Audio will be available for selection as the default audio device. If the video driver is removed, then HD Audio will not be available.

Note: If your video board does not include a connection for HDMI, your board probably does not support HD Audio.

The audio volume control for video is usually adjusted either through the video playback application, or through the audio output device.

You may wish to select your S3 HD Audio device as the default sound device. If you do not, there will be no S3 HD Audio sound. Note that if you want to stop using the S3 HD Audio you need to set another audio device as default.

To select S3 HD Audio device in Windows Vista:

- Open **Control Panel**. Select **Hardware and Sound**.
- Next select **Sound** and on the **Playback** tab you will see the available sound devices.
- Select the desired HD Audio device and Set as Default device.

To select S3 HD Audio device in Windows XP:

- Be sure you have installed Service Pack 3.
- Open **Control Panel**. Select **Sound**.
- On the **Playback** tab you will see the available sound devices.
- Select the desired HD Audio device and Set as Default device.

7.6 Fine Tuning LCD

When the mobile system's LCD panel is detected as connected and active, you can configure the LCD using the **S3 ScreenToys Device Management**. Adjustments you make are remembered by the S3 Graphics software even when your system is sleeping or rebooted.

ACCESS: To adjust LCD, right click on the desktop and click from the menu to select **S3 ScreenToys**. In the left menu column, select **Basic, Device Management**. In the **Display Devices** area, click the **LCD** icon. Next check the **Device Status** checkbox underneath the icon. When the selected device icon has a blue outline and checked box, available options for the device can be configured. The lower **LCD settings** area will show available options for LCD configuration.

OPTIONS:

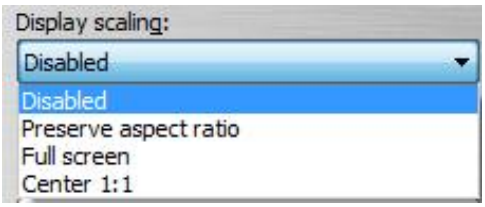
The following options may be available for fine tuning for LCD display output:

Device Settings: LCD model info & settings area	Reports LCD specific information. If the manufacturer and model of the LCD is available, it will be reported in the title row of this area.
Panel Type	Provides the native physical horizontal and vertical size (in pixels) as well as the type of panel device that is currently selected.
Display Scaling image icon	The icon shows an example of the currently checked Display scaling option. Change the Display scaling

option to observe the change in screen size that results from changing the Display scaling setting.

Display scaling dropdown list

The **Display scaling dropdown list** allows you to let S3 Graphics software help set an optimized mode for your LCD output.



Preserve aspect ratio is the default setting. The S3 Graphics software will maintain the aspect ratio and up scale the screen image as large as possible to the device's native resolution.
Note: Even if you have enabled the monitor's built-in scaling, the monitor's scaling will not occur. The S3 Graphics driver does the expansion to the native display resolution.

Select the **Disabled** list item to have S3 Graphics software use the display resolution and refresh rate requested you specify, without any GPU up scaling. This setting is appropriate when you want to use the monitor's built-in scaling.

Select the **Full screen** list item to have S3 Graphics software upscale the screen image to a full screen image which matches the device's native resolution. The aspect ratio may not be maintained.

Select the **Center 1:1** list item to have S3 Graphics software use the GPU upscale hardware to center the display but do not do any upscaling.

SECTION 8 MORE DISPLAY SPECIFIC PAGES

In addition to the **S3 ScreenToys Device Management** settings page, the **Basic** and **Advanced** menus provide access to general information about the graphics subsystem and pages which provided settings to control Desktop Color and Desktop orientation, Power management controls for power-sensitive systems, Color and Chromotion filter controls for video, and Direct3D and OpenGL controls for 3D. These controls are discussed in the next sections.

This section discusses two additional controls which are device-specific:

- Desktop Color
- Rotation

Later sections will cover those controls which are applied globally and are not affected by the configuration of the attached displays.

8.1 S3 ScreenToys Desktop Color

With **S3 ScreenToys Desktop Color** settings you can adjust the gamma, brightness, and contrast of the GPU output signal to compensate for differences between different DVI, CRT, HDMI and other display output devices. Different display output devices will display the same output at different intensities, or different levels of brightness, contrast and color.

You can make adjustments to **Desktop color** settings and then create and save "profiles" or named collections of settings. Independent **Desktop Color** settings can be applied for each current active display device when you have selected multiple monitor **Extend the Desktop** using both of the GPU's internal graphics engines. If you choose not to configure **Desktop Color** settings yourself, default settings are built into the software and are optimized for typical display devices.

ACCESS: To adjust **Desktop Color** for the active displays, right click on the menu to select **S3 ScreenToys**, and then in the left menu panel, click **Basic**, **Desktop Color**. The **S3 ScreenToys Desktop Color** page is also accessible from the **CHROME®** menu accessible by right click on the **S3** taskbar icon.

OPTIONS:

Select the display for which you want to adjust color from the **Monitors:** dropdown list in the upper left of the **S3 ScreenToys Desktop Color** page. Configuration options include:

Display dropdown list	This dropdown list menu will contain the configurable displays.
Monitors:	If only one display monitor is connected, this list will not be visible. In Clone multiple monitor mode, the list will be grayed and not selectable. If two display monitors are connected, a dropdown monitor list will be available for selection. Click the ▾ arrow to the right of the **Monitors**: dropdown list menu to show all connected display output devices (monitors). The Monitors dropdown list will contain the device name, if detected. Each display device will be further identified shown as "N. Display device name", where N is a number starting from 1. Select the device whose desktop color you wish to configure. (You can test the selection by experimentally moving a slider to detect which monitor is currently configurable.)
Example and Profiles area	This area displays an image to help you during the color adjustment process and configuration profile controls.
Display Device	The Display Device box on the right of this area will report which display is the current configurable device, by device type. You can change the configurable device from the Monitors dropdown list if it is available.

Calibration monitor image

This "monitor" image will display an image you select from the list of calibration images. The visual reference is intended to help you adjust the color.

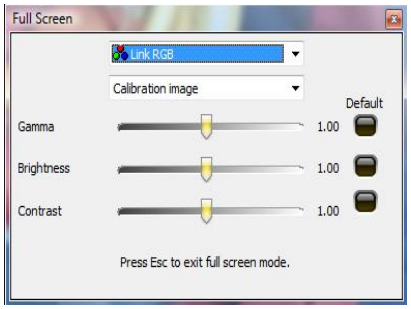
Calibration image list

Click the ▾ arrow to the right of the Calibration image dropdown list to display a menu of calibration pictures available to display in the calibration monitor image. Clicking on the monitor image repeatedly will also cycle through the calibration images. Click on the image you want. Pictures include:

- **Color curves** display the gamma curve(s). This is the default.
- **Calibration image** shows a photographic image with many shades of red, green, and blue. The image gives a good "life-like" reference.
- **RGB color map** shows a grid of colored squares that span a good range of RGB values.
- **RGB color ramp** shows dark to light stripes each of red, green, blue, and white to allow better adjustment of contrast.
- **Color bars 75%** and **100%**
- A number of solid colors at 100% and 75% saturation levels are also available.

Full screen button

Click **Full Screen** to show the current calibration picture in full-screen. A miniature version of the **Desktop color** settings window is shown on top of the full screen calibration image. **Full screen** mode is useful when running displays at high resolutions with small font sizes, where the calibration image area may appear very small in normal mode.



Press **Esc** or click on ✕ to close the Full Screen dialog.

Profiles

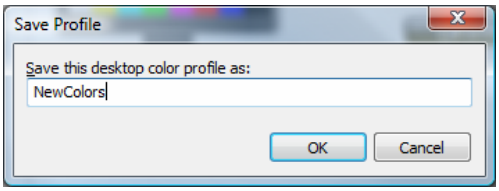
Desktop Color profiles are global in nature, meaning that all schemes created at any time, using any display adapter, can be selected, even though different display adapters will have their own settings.

Click on the arrow to the right of the **Profiles** dropdown

list to see the menu of all Desktop Color **Profiles** available for selection. Click on a profile to select it.

Save as…

Click **Save As…** to save the current settings using the existing Profile name or a new name. Click **OK** to complete the save.



Delete

Click **Delete** to delete the currently selected Desktop Color Profile.

Adjustment list

Click the arrow to the right of the Calibration dropdown menu to show a list of color channel(s) to adjust.

- Select **Red** to make further adjustments only to the red channel.
- Select **Green** to make further adjustments only to the green channel.
- Select **Blue** to make further adjustments only to the blue channel.
- Select **All colors** to make further adjustments to all three channels together. For example, green and blue adjustments will be changed to match the adjustment for red.

Desktop Color sliders

Use the three sliders controls in **Desktop Color** to change gamma, brightness, and contrast.

Gamma slider

Drag the slider thumb along the slider bar to the right to increase the intensity of the color in the display output. Drag the slider bar to the left to decrease the color intensity of the display output.

Brightness slider

Drag the slider thumb along the slider bar to the right to increase the luminance or amount of light in the display output. Drag the slider bar to the left to decrease the brightness and darken the display output.

Contrast slider

Drag the slider thumb along the slider bar to the right to increase the level of difference between the light and dark areas of the display output. Drag the slider bar to the left to decrease the amount of contrast in the display output.

Reset buttons	Click the black Reset button to the right of the slider to Reset the value for the individual slider to its default.
Defaults	Click the **Defaults** button at the bottom of the window to return all gamma, brightness, and contrast settings to the default for the current display Monitor.

8.2 S3 ScreenToys Rotation

Rotation of the desktop screen image is available through the S3 Graphics **S3 ScreenToys Rotation** page.

ACCESS: To rotate your desktop screen image, right click on the desktop and select to open the **S3 ScreenToys** window. In the left menu column, select **Advanced, Rotation**. The **S3 ScreenToys Rotation** orientation options are now available for selection. Rotation control is also accessible from the **S3** taskbar icon menu.

Image Positions

- Portrait images are greater in the vertical direction than the horizontal, and
- Landscape images are greater in the horizontal direction than in the vertical direction.
- Primary refers to the main or normal screen orientation position.
- Secondary orientations are 180 degrees off the Primary.

When the screen is rotated, the cursor also rotates in sync with the screen orientation to maintain the same frame of reference as the desktop.

Monitor orientation options:

OPTIONS:

Each connected and enabled device may be rotated independently. The Display to be changed can be selected through the **Monitors**: dropdown list located in the upper left corner of the **S3 ScreenToys Rotation** page. **S3 ScreenToys Rotation** options are:

Image area	Use this group to step through orientation options and view the result.
Orientation reference image	View this bitmap image of a desktop to see the effects of any proposed screen orientation selection.
 **CW**	Click **CW** once to rotate the sample screen image clockwise 90 degrees.
 **CCW**	Click **CCW** once to rotate the sample screen image counter-clockwise 90 degrees.

Orientation area	This group contains four radio buttons, one for each of the orientations available for selection.
Normal (Primary landscape)	Click the **Normal (Primary landscape)** button to orientate the screen image to the default rotation position. This image has 0 degrees of rotation.
90 degrees (Primary portrait))	Click the **90 degrees (Primary portrait)** button to orientate the screen image to a vertical format as if the image were turned 90 degrees clockwise.
180 degrees (Secondary landscape)	Click the **180 degrees (Secondary landscape)** button to orientate the screen image to a horizontal format as if the image were turned 180 degrees clockwise, or flipped "upside-down."
270 degrees (Secondary portrait))	Click the **270 degrees (Secondary portrait)** button to orientate the screen image to a vertical format as if the image were turned 270 degrees clockwise (or 90 degrees counter-clockwise).

Rotation Resolution

Landscape modes are expressed as **X by Y** for compatibility with 0 or 180 degrees of rotation. Modes with Portrait Orientation are expressed as **Y by X** for 90 or 270 degrees of rotation. The minimum supported Portrait resolution for Windows Vista and Windows XP is 768x1024, since the operating systems avoid providing resolutions with a horizontal size less than 640.

For example, the following sample resolutions might appear in the **List All Modes** box on the **Monitor** tab while in a Landscape Orientation:

800 by 600, High Color (16 bit), 60 Hertz
800 by 600, True Color (32 bit), 60 Hertz
1024 by 768, High Color (16 bit), 60 Hertz
1024 by 768, True Color (32 bit), 60 Hertz

The following are sample modes that would be selectable while you are in a Portrait Orientation:

768 by 1024, High Color (16 bit), 60 Hertz
768 by 1024, True Color (32 bit), 60 Hertz

If you are in an 800x600x32 landscape resolution before a 90 degree rotation, the actual resolution you will have after rotation is a portrait 600x800x32. When you reopen the **Display Settings** window, the lowest resolution available for selection will be 768x1024x8, which is different than the actual resolution. If you select OK, then the resolution will be changed.

SECTION 9 TOOLS FOR THE VIDEO ENTHUSIAST

9.1 Video Requirements

Install up-to-date versions of Microsoft's DirectX and Media Player for your Windows Vista or Windows XP.

DirectX Updates

Your S3 Graphics software is designed to take full advantage of the advanced features available with DirectX. For the best possible performance and visual experience, be sure you have installed DirectX and are using a level compatible with your driver.

http://windowsupdate.microsoft.com/

Or visit the Microsoft download site:

http://www.microsoft.com/downloads/

and click on the Download Category DirectX.

Windows Media Series

Your S3 Graphics software is designed to take full advantage of the advanced features available with Windows Media Series Codec and Player. For the best possible performance and visual experience, get the latest version of the Windows Media Series from the Microsoft Windows Update site:

http://windowsupdate.microsoft.com/

Or visit the Microsoft download site:

http://www.microsoft.com/downloads/

and click on the Download Category Windows Media.

9.2 Video Viewing with Application Software

The advanced high quality ChromotionHD 2.0 programmable video engine of the CHROME 400 Series GPUs is fully compatible with Microsoft DirectX-VA 2.0 media acceleration and supports Protected Video Playback (PVP) of a wide range of video codecs, including Windows Media Video™ 9 HD (WMV9-HD), MPEG-2 HD, VC-1, and H.264 (MPEG-4 AVC). High definition playback of Blu-ray Discs is possible with lower CPU utilization. PVP support for HD Premium content includes PVP-UAB (User-Accessible Bus) and display output protection.

Hardware assisted video playback is available with compatible releases from the following software DVD application vendors:

- Intervideo
- Cyberlink
- Windows Media Player for Windows XP (with a 3rd party DVD codec)
- Windows Vista Home Premium and Ultimate Editions (include Media Center which has a Microsoft DVD codec)

S3 Graphics GPUs can be used with video playback applications on systems with hardware to support advanced playback, such as a DVD or a Blu-ray disc drive.

You can show your video images within a scalable window on any output device connected to your PC: HDMI, DVI, CRT or LCD. Enable ChromoVision and you will be able to display video playback full-screen on HDMI at the same time your playback runs in a scalable window on your CRT, DVI or second HDMI (if your two devices are configured in Clone view to share the desktop's Primary View).

ArtisticLicense Effects, such as Emboss and Neon Edges, can be applied to your video playback images using the S3 ScreenToys Chromotion Video utility.

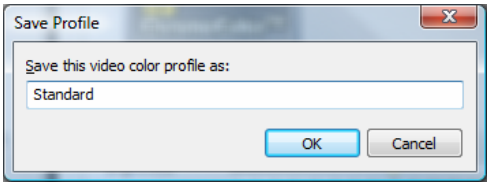
9.3 S3 ScreenToys Video Color Settings

With **S3 ScreenToys Video Color Settings** you can adjust the brightness, contrast, hue and saturation of the display of video. **S3 ScreenToys Video Color Settings** include ChromoColor™ support using the front-end pixel shader for these adjustments.

ACCESS: To adjust video settings, right click on the desktop and click from the menu to select **S3 ScreenToys**. From the left panel **Basic** menu, select **Video Color Settings**. This utility is also accessible from the **CHROME®** menu available on right-click of the S3 taskbar icon menu.

OPTIONS: **S3 ScreenToys Video Color Settings** for color adjustment of video may include the following.

Upper area	Video settings are applied to the video stream currently being assisted by hardware and are applied irrespectively of the Monitors setting.
Monitors: droplist	If only one display monitor is connected, this list will not be selectable. If two display monitors are connected, a dropdown monitor list will be available for selection. Click the ▾ arrow to the right of the **Monitors**: dropdown list to show a menu of all connected display output devices (monitors). Each display device is shown as "N. Display device name", where N is a number starting from 1.

	Select the device whose video adjustments you wish to configure. (You can test the selection by experimentally moving a slider to detect which monitor is currently configurable.)
ChromoColor image	This image shows a graphic. This is a non-functional user interface element.
Profiles area	Video Color Settings Profiles can be created at any time, and saved for future re-use.
Profiles	Click on the arrow to the right of the **Profiles:** dropdown list which provides a menu of all Video Color Settings schemes available for selection. Click on a profile to select it.
Save as…	Click **Save as…** to save the current settings using the existing profile name or a new name. Click **OK** to finish your save.
	
Delete	Click **Delete** to delete the currently selected profile.
Video Color sliders area	
Sliders	Use the four slider bars in **Video Color Settings** to change brightness, contrast, hue and saturation. Refer to the S3 ScreenToys Basics for general instructions on using a slider.
Brightness slider	Drag the slider thumb along the bar to the right to increase the luminance or amount of light in the display output. Drag the slider bar to the left to decrease the brightness and darken the display output.
Contrast slider	Drag the slider thumb along the bar to the right to increase the level of difference between the light and dark areas of the display output. Drag the slider bar to the left decrease the amount of contrast in the display output.

Hue slider	Drag the slider thumb along the bar to the right to adjust the hue of the display output towards purple. Drag the slider bar to the left to make the hue greener.
Saturation slider	Drag the slider thumb along the bar to the right to increase the intensity of the colors in the display output. Drag the slider thumb along the bar to the left to decrease the color intensity of the display output.
Reset	Click the **Reset** button to the right of each slider to return the corresponding setting to the default.
Tonal Adjustments	Use the Tonal Adjustments sliders to set threshold levels which will change the dynamic ranges for shadows (darks) and highlights (lights) in a video image. The images below show the types of changes in gray scale that can be applied to the highlight and shadow areas of an image by manipulating the Tonal Adjustments slider thumbs. For reference, the original image is: 
Black Point Enhancement slider	The **Black Point Enhancement** control allows you to adjust the range of black values which are displayed in the shadow areas of the whole image. The adjustment lets you expand the value range to make the darks in the image appear more intense (deeper darks) or clip the range to make the shadows lighter (brighter and lower contrast). Move the **Black Point Enhancement** slider thumb along the bar to the left to decrease the **Black Point Enhancement** threshold. This will decrease the darkness of the shadows and thus lighten the shadows in the image. Move the **Black Point Enhancement** slider thumb along the bar to the right to increase the **Black Point Enhancement** threshold. This will increase the darkness of the shadows and thus deepen the shadows in the image. In the example below the Black Point threshold

value has been increased, and the overall image shadows appear darker.

Original: 

Black Point Threshold increased:

White Point Enhancement slider

The **White Point Enhancement** control allows you to adjust the range of white values which are displayed in the highlight areas of the image. The adjustment lets you expand the value range to make the whites in the image appear either more intense (whiter whites) or clip the value range to make the highlights darker (darker with lower contrast).

Move the **White Point Enhancement** slider thumb along the bar to the left to decrease the **White Point Enhancement** threshold. This will decrease the brightness of the highlights and thus darken the highlights in the image.

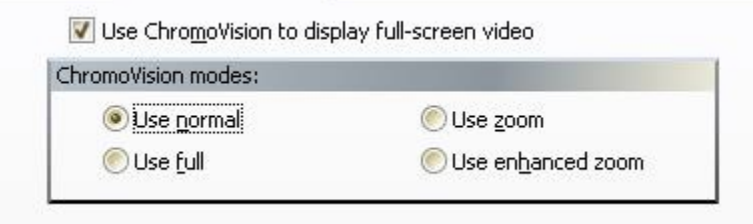
Move the **White Point Enhancement** slider thumb along the bar to the right to increase the **White Point Enhancement** threshold. This will increase the brightness of the highlights in the image. In the example below the White Point threshold value has been increased, and the overall image appears lighter.

Original: 

White Point Threshold increased:

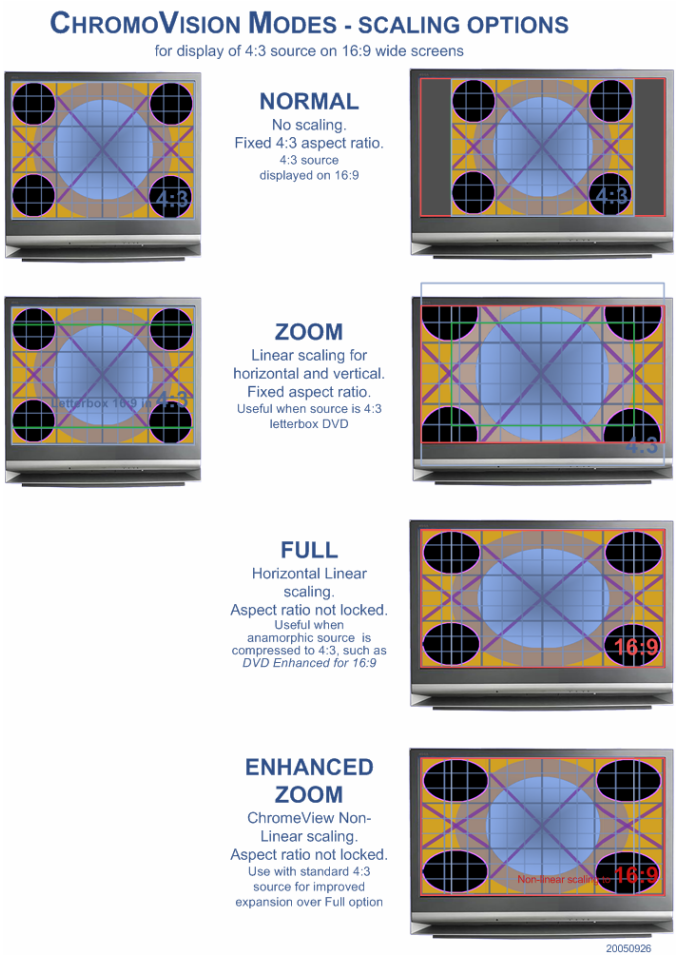
9.4 S3 ScreenToys ChromoVision for HDMI

ACCESS: To enable ChromoVision capabilities for your HDMI device, visit the **Advanced/Options** settings page accessible from the **S3 ScreenToys Device Management** window. In the **Display Devices** area, click the **HDMI** icon. Next check the **Device Status** checkbox underneath the icon. In the lower device settings area, click the **Advanced** button. Locate the **ChromoVision** checkbox.



ChromoVision options	ChromoVision configuration options are usually available for selection through the Options window.
Use ChromoVision to display full-screen video	Click the **Use ChromoVision to display full-screen video** checkbox to enable ChromoVision. When you are using Windows Vista or Windows XP, ChromoVision allows full screen playback on your digital HD device, while windowed video plays on another display device associated with the Primary View. When enabled, you can move and resize a video window on your primary DVI or CRT device, and full screen video will continue on your secondary HDMI, device. You must be in Clone mode. ChromoVision is not available when there is only one display output device, and is not available when you Extend the desktop.
ChromoVision Modes (for wide screen devices)	When **ChromoVision** is enabled (the **ChromoVision (full-screen video)** check box is selected) and the native aspect ratio of your display device is 16:9, then the **ChromoVision Modes** options may be available for optimizing viewing of 4:3 source content on your wide-screen 16:9 display device. These modes will not appear if you are not in Clone mode or if your HDMI display device does not have a native 16:9 aspect ratio.

Normal	Select **Normal** to display 4:3 source on 16:9 wide screen with no scaling and no change to aspect ratio. With **Normal** view, vertical black bars will appear on both sides of the 4:3 image to fill the unused areas of the wide screen.
Zoom	Select **Zoom** to display letterboxed 4:3 source which would otherwise show black bars all around the wide screen image (such as a 4:3 letterbox DVD). **Zoom** uses equal amounts of horizontal and vertical linear scaling to expand the image to fill the wide screen 16:9 area. There is no change to the aspect ratio.
Full	Select **Full** to display source material that has been horizontally compressed during encoding, such as anamorphic DVDs that are *enhanced for 16:9*. **Full** uses linear scaling to horizontally and vertically stretch the 4:3 source to fit the 16:9 wide screen. This option changes the aspect ratio.
Enhanced zoom (ChromeView)	Select **Enhanced zoom** to display standard 4:3 source material that has not been horizontally compressed during encoding. **Enhanced zoom** uses S3 Graphics' customized ChromeView non-linear scaling algorithms to provide optimal horizontal expansion of standard 4:3 source onto the 16:9 wide screen. ChromeView **Enhanced zoom** is designed to provide less expansion in the central image area where viewers usually focus their attention. This option changes the aspect ratio.


CHROMOVISION MODES - SCALING OPTIONS
for display of 4:3 source on 16:9 wide screens
NORMAL
No scaling.
Fixed 4:3 aspect ratio.
4:3 source
displayed on 16:9
4:3
4:3
ZOOM
Linear scaling for
horizontal and vertical.
Fixed aspect ratio.
Useful when source is 4:3
letterbox DVD
4:3
FULL
Horizontal Linear
scaling.
Aspect ratio not locked.
Useful when
anamorphic source is
compressed to 4:3, such as
DVD Enhanced for 16:9
16:9
ENHANCED
ZOOM
ChromeView Non-
Linear scaling.
Aspect ratio not locked.
Use with standard 4:3
source for improved
expansion over Full option
16:9
20050926

9.5 S3 ScreenToys Chromotion Video

S3 Graphics' hardware support for video acceleration is optimized for compatibility with DirectX Video Acceleration (**DXVA**). The Chromotion Video Engine provides IDCT support and post-processing capabilities for de-interlacing, subpicture blending, video scaling, rotation, color conversion and video effects.

S3 ScreenToys Chromotion Video settings window allows you to apply real time Chromotion Video Effects or Chromotion Video Deblocking to video images playing on your desktop.

ACCESS: To use **S3 ScreenToys Chromotion Video**, right click on any unpopulated area of the **Desktop**. Click **S3 ScreenToys**. From the **Advanced** dropdown list menu in the left panel, click **Chromotion Video**. **S3 ScreenToys Chromotion Video** is also accessible from the **CHROME®** menu available on right-click of the **S3** taskbar icon. Once the **S3 ScreenToys Chromotion Video** settings window appears, the Chromotion Video effects and deblocking filters will be available for configuration.

OPTIONS: **S3 ScreenToys Chromotion Video** settings options are:

Upper area

Effects monitor image

This "monitor" image shows a graphic preview image of the artistic effects settings currently selected.

These are static images and change with the effect option but do not reflect all changes in slider steppings.

Effect/Filter dropdown list	Select an effect or filter from this dropdown list. Then use the slider to set a value for the amount of visual effect to be used during display of any video playback. A slider bar allows you to adjust the amount or intensity of the effect. The slider thumb can be moved to the right to increase (**More**) or the left to decrease (**Less**) the amount of the effect. Each filter may have a different number of allowed steps between left (**Less**) and right **(More**).
Disable All	Click **Disable All** to remove any Deblocking filters or Artistic License effects currently applied. The slider bar is unavailable.
Emboss	Click **Emboss** to produce output where most of the image is displayed in (gray) tonal values. Edges retain their original color. This makes the image resemble an engraved stone relief image. (three step)
Neon Edges	Click **Neon Edges** to produce a high-contrast image, similar in effect to that of solarization in a photographic print. Most of the image will have a very dark value (low brightness) except for the edges between areas. The edges are expressed as bands of bright, neon-like colors. (three step)
Soft Focus	Click **Soft Focus** to produce output where sharp edges are removed to blur the image and produce a hazy effect. Soft focus is also sometimes referred to as Gaussian blur. This effect is often used by photographers to soften facial details in portraiture. (two step)
Sharpen	Click **Sharpen** to produce output where the edges of objects appear crisper. This is accomplished through manipulation of the differences in contrast level between the edge components. (multiple stepping)

Complex Picture Smoothing

Click **Complex Picture Smoothing** to use offset deblocking which affects both the block boundaries and the inside of the block. Use this method for flat images. Complex Picture Smoothing should resolve image artifacts propagated from the previous frame.

Move the slider thumb along the bar to the **right** to increase the amount of the applied effect. (seven step).

SECTION 10 TOOLS FOR THE 3D ENTHUSIAST

Use the **S3 ScreenToys 3D settings** configuration tool to configure or toggle 3D-related and capabilities to compensate for differences in the requirements and behaviors of various Direct3D and OpenGL applications.

All 3D configuration page views include the following components:

Upper area	
Monitor image	This "monitor" image shows a graphic image. This is a non-functional user interface element.
API logo or image	Displays the 3D API or option currently configurable.
3D Interface	By selecting from the **3D Interface** list, you can specify which set of available 3D configurations options you wish to select. Current sets include:
Direct3D	Select **Direct3D** to configure adjustments related to Microsoft's Direct3D API.
OpenGL	Select **OpenGL** to configure adjustments related to the OpenGL API for 3D graphics.

10.1 S3 ScreenToys 3D settings for Direct3D

Use the **S3 ScreenToys 3D settings** page with the 3D Interface option set to Direct3D to configure or toggle Direct3D-related capabilities to compensate for differences in the requirements and behaviors of various Direct3D applications.

ACCESS: To adjust **3D settings** for Direct3D, right click on the desktop and select **S3 ScreenToys** from the menu. From the **Advanced** dropdown list menu in the left panel, select **3D settings**. This utility is also accessible from the **CHROME®** menu available on right-click of the **S3** taskbar icon. Once the **S3 ScreenToys 3D settings** window appears, select **Direct3D** from the **3D Interface** list and options for Direct3D configuration will be available.

Note: After you have completed your changes, please close and reopen your 3D application. Different applications behave differently and some feature settings may be initialized by the application on at launch time.

OPTIONS:

S3 ScreenToys 3D settings options for Direct3D include:

Upper area

Monitor image — This "monitor" image shows a graphic image. This is a non-functional user interface element.

3D Interface — Select **Direct3D** from the list of 3D APIs and options. This makes the Direct3D adjustments configurable.

Direct 3D bitmap — Displays the 3D API to which the adjustments configurable on this utility page will be applied.

Direct3D general area	Options in this area allow you to restore default settings, and to select an expertise level for option visibility.
Show dropdown button 	Click **Show** button to display a dropdown list of user expert levels. Click Advanced to display the settings associated with these expert levels. When a check precedes the Advanced level name in the Show menu, that level's features and settings will be listed as available for adjustment through the **Features and Settings** table on this utility page.
Feature and Settings detail area	Selected features and associated settings are saved automatically and maintained by the driver. If a new driver is installed, custom setting values must be re-established. Settings are not affected by changes in resolution, refresh or display output device changes.
Feature column	The Feature list contains options available for adjustment. The visible list can be expanded or reduced using the Show button described above. Feature Expert Levels include: • **Standard** settings are preceded by a green circular-shaped icon ● and are always available and cannot be filtered from the Setting list. • **Advanced** settings are preceded by a red cross-shaped icon + in the Settings Table. The red color warns you that manipulating these settings should be done with great care, as risk of creating an unstable graphics environment increases when manipulating these settings.
Setting column	The Setting column reports the values you have currently selected. These are not active values until after you have clicked Apply to set your new parameters, and re-launched your Direct3D application.
Setting Adjustment area	
Setting value dropdown list	When an item is highlighted in the **Feature** list, the area below the **Feature** list will display the name of the highlighted feature.  Click on the ▼ down arrow to the right of the dropdown list to display a menu of available setting values that can

	be set for the selected feature. Click on your choice to change a value. Your new value will appear in the **Setting** column, but will not become the active value until you click **Apply** and re-launch your Direct3D application.
Features - Standard	These Standard Features and associated settings are available for adjustment.
Wait for monitor sync	Sometimes called Wait for Vsync, this feature option controls whether or not buffer swaps and other activities should be synchronized to the display's Vertical Synchronization or Vertical Retrace Signal and blanking period, during which the display blanks as it retraces its way from the bottom right to the upper left corner of the screen. Setting options include: • **By App (default)** – Select **By App** if you want the **Wait for monitor sync** setting to change on application requests. If Vsync OFF is requested, the back buffer is flipped without waiting for vertical retrace. If the application requests VSync ON, then the back buffer is flipped while in vertical retrace. • **ON** – Select **ON** to always force a wait for monitor sync. This option will reduce "tearing" artifacts. Synchronizing with the vertical retrace constrains the frame rate so that it does not exceed the refresh rate. • **OFF** – Select **OFF** to allow buffer swaps to be processed without waiting for vertical synchronization. When a buffer flip occurs at a different time than during the vertical blanking period, visual artifacts, often described as "tearing" or "shearing" may be apparent. Note that while visual artifacts will probably occur with this setting, the frame rate may increase.
Anti-aliasing	Anti-aliasing is a technique to reduce jagged edges ("jaggies") of polygons and lines. Pixels on either side of edges are sampled and then rendered as a blend of the adjoining colors to smooth the appearance of the edge. When anti-aliasing is enabled, images are less likely to display "staircase" edges and broken lines. Sampling results can be downscaled to the original size, producing sub-samples of high quality. Setting options include: • **By App (default)** – Select **By App** to allow the

application to specify which level of super-sampling should be applied. Otherwise, the driver selects an optimized value. This is the default.

- **OFF** – Select **OFF** to disable anti-aliasing. Image quality usually suffers, but performance may increase because less pixel processing occurs.
- **2X, 4X, 8X** – **Select a level** to enable optimized super-sampled anti-aliasing. This will provide optimized anti-aliasing and still have only a minimal impact on performance speed.

Anisotropic filtering

Anisotropic (which means non-uniform shape) filtering is a filtering technique more advanced than trilinear and is a technique which is useful for quadrilateral shaped and angled areas of a texture image. A shaper image is accomplished by interpolating and filtering multiple samples from one or more MIP maps to better approximate very distorted textures. Anisotropic can be used in conjunction with bilinear or trilinear filtering as well as MIP map filtering. While trilinear filtering is capable of producing fine visuals, it only samples from a square area, which is not the ideal sampling area for all cases. Anisotropic filtering averages sixteen texture samples, or taps, in a non-square, rectangular or parallelogram shaped texture sampling pattern whose length varies in proportion to the orientation of the stretch effect. This sampling rate is four times the sampling level of bilinear filtering and twice the sampling level of trilinear filtering.
Textures applied to a sloped surface will not look fuzzy, which is especially useful when rendering shapes with a high degree of surface tilting in the X-Y-Z planes. Full use of the anisotropic filtering capabilities may impact performance.

Setting options include:

- **By App (default)** – Select **By App** if you want S3 Graphics software to use the anisotropic filtering level requested by the application. Not all applications request anisotropic filtering, and S3 Graphics software does not perform anisotropic filtering unless requested. This is the default.
- **OFF** – Select **OFF** to force anisotropic filtering to be always off.
- **2X** – Select **2X** to enable anisotropic filtering at its lowest level. With this setting, 16 texture samples (taps) selected from a non-square pattern will be averaged to generate one texture element (texel)

	that is then applied to a single pixel. • **3X,4X**,…– Select intermediate sampling levels to match your preferred balance between quality and performance. The higher the sampling level, the greater the degree of filtering. Visual quality will improve at the expense of performance. • **16X** – Select **16X** to force use of classic anisotropic sampling using 128 taps in a non-square sampling pattern. This level of filtering will produce very high quality visual output, usually with a decrease in rendering speed.
Features: Advanced	Warning: Configuration of the following fetaures should be done **only by experienced users, as unexpected behaviors or appearance may result.**
Fast destination clear	Outputs from texture filtering and pixel shading activities are sent to rendering target destination buffers. S3 Graphics hardware can quickly respond to a DirectX application's request to clear a destination buffer by providing a hardware-assisted fast clear mechanism for the clearing operation. Efficient clearing of the destination buffers helps speed target rendering. Setting options include: • **Auto (default)** – Select **Auto** if you want S3 Graphics software to own the decision whether it is appropriate to use hardware assisted fast clear of the destination buffer. Hardware assist is usually enabled (ON). • **ON** – Select **ON** to force use of Fast Destination Clear for optimum performance. All requests to clear the destination buffer are done through hardware. This will usually speed rendering, and is the preferred setting. If an application has display issues with the fast clear, then you may wish to disable this feature to improve visual quality for that specific application. • **OFF** – Select **OFF** to disable Fast Destination Clear. Requests will use a traditional method and clear the whole destination buffer. This will result in a slower clearing cycle, but may resolve unexpected visual quality issues.
Fast Z + Stencil clear	This option can be used to enable or disable the use of S3 Graphics' hardware-assisted fast clearing mechanism for the Z and Stencil buffers. The Z buffer is an area of video memory which stores a

3D object's value on the Z (depth) axis. S3 Graphics software decides whether to make certain components of an image visible or hidden to the viewer, based on values in the Z-buffer.

The stencil buffer holds additional information for each pixel about whether or not to draw it. Stencils can be of any shape and can be thought of as a mask with cutouts that allow an image to be seen through the cutout. Stenciling is particularly useful in creating special volumetric effects such as shadow volumes from multiple light sources. The stencil buffer must interact closely with the Z buffer.

Hardware assist speeds the clearing of the Z and Stencil buffers for more efficient rendering.

Setting options include:

- **Auto (default)** – Select **Auto** to allow S3 Graphics software to own the decision whether it is appropriate to use hardware assisted fast clearing of the Z and/or Stencil buffers. Usually Fast Z clear is enabled (ON).
- **ON** – Select **ON** to force Fast Z clear to always ON, so that all requests to clear the Z and Stencil buffers will always be processed through hardware. This will usually speed rendering, and is the preferred setting.
- **OFF** – Select **OFF** to disable hardware Fast Z clear and to force clearing of the Z and Stencil buffers using traditional methods. This will result in a slower clearing cycle, but may resolve unexpected visual quality issues. If you suspect an application has quality issues with Fast Clear, then you may try disabling this feature to see if it improves visual quality for that specific application.

Detail level adjust

The number of levels or steps available for use between the largest and the smallest MIP map image can be specified by applications and driver software. Called the MIP map Level of Detail (LOD) bias, settings are selectable and can produce results ranging from high speed performance to high visual quality.

"MIP mapping" is actually an abbreviation for the Latin phrase Multum im Parvum, which means "many in less." MIP mapping textures will increase quality and detail by generating and storing scaled versions of a texture image. When the texture is rendered in a 3D scene, MIP

map levels computed by trilinear texturing are available for use by the Direct3D application.

High quality images will be sharper and more aliased and will result from the use of a higher number of MIP map levels. Blurrier images result from using a smaller number of intermediary MIP map levels. Because less texture data is used, higher performance is associated with fewer MIP map levels.

Setting options include:

- **Auto (default)** – Select **Auto** to let S3 Graphics software provide optimized control of adjustments for Level of Detail bias.
- **0 (Quality)** – Select **0 (Quality)** to use the highest available visual quality, using the maximum Level of Detail bias. This number tells S3 Graphics software to use the highest number of MIP map levels possible. This setting will produce the greatest level of visual quality and detail, but will often have a significant impact on rendering speed, as much texture data is processed.
- **1**, **2**, **3**, **4**, **5**, **6**, **7**…– Select any intermediate level to achieve your optimal balance between quality and performance.
- **8 (Performance)** – Select **8 (Performance)** to tell S3 Graphics software to use the smallest number of MIP map levels available. This setting will produce higher speed performance at the expense of visual quality.

Max depth buffer size

Use this setting to control the maximum precision available for the Depth Buffer (Z buffer). Visual quality increases with the greater precision available when using higher bit buffers. There may be a slight corresponding decrease in rendering speed.

Setting options include:

- **By App (default)** – Select **By App** if you want S3 Graphics software to provide the depth buffer size requested by the application. This is the default.
- **16-bit** – Select **16** for force a 16 bit depth buffer. Applications may request a 16 bit depth buffer. This depth will provide the fastest rendering speed. Because this is the least precise format, it has the potential for decreased visual quality, especially by creating surface artifacts in distant objects.
- **24-bit** – Select **24** to force a 24 bit depth buffer, which would be a buffer with single precision floating

point without a low byte for the mantissa.

- **32-bit** – Select **32** to force a 32 bit depth buffer. The 32 bit depth buffer will provide the greatest level of precision possible, using a standard single precision floating point format. While this buffer precision will provide high visual quality, rendering speed will be slower.

Note: Forcing a buffer depth may produce noticeable artifacts. For example, if precision is degraded by substituting a 16 bit depth buffer, artifacts would be visible in the resulting images.

10.2 S3 ScreenToys 3D Settings for OpenGL

Use the **S3 ScreenToys 3D Settings** page with the 3D Interface dropdown list set to OpenGL to configure or toggle OpenGL-related capabilities to compensate for differences in the requirements and behaviors of various OpenGL applications.

ACCESS: To adjust OpenGL configuration settings, right click on the desktop and select **S3 ScreenToys** from the menu. In the **Advanced** dropdown list in the left panel, click **3D settings**. This utility is also accessible from the **CHROME®** menu accessible on right-click of the S3 taskbar icon. Once the **S3 ScreenToys 3D settings** window appears, from the **3D Interface** list, select **OpenGL** and feature options for OpenGL configuration will be available.

Note: After you have completed your changes, please close and reopen your 3D application. Different applications behave differently and some feature settings may be initialized by the application on at launch time.

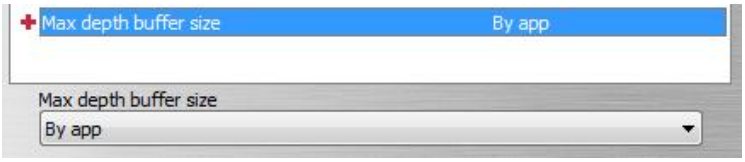
OPTIONS:
S3 ScreenToys 3D settings for OpenGL include:

Upper area

Monitor image This "monitor" image shows a graphic image. This is a non-functional user interface element.

3D Interface Select **OpenGL** from the dropdown list of 3D APIs and

	options. This makes the OpenGL adjustments configurable.
OpenGL	Displays the 3D API to which the adjustments configurable on this utility page will be applied.
OpenGL general area	Options in this area allow you to restore default settings, and to select an expertise level for option visibility.
Show dropdown button 	Click **Show** button to display a dropdown list of user expert levels. Click Advanced to display the settings associated with these expert levels. When a check precedes the Advanced level name in the Show menu, that level's features and settings will be listed as available for adjustment through the **Features and Settings** table on this utility page.
Feature and Settings detail area	Selected features and associated settings are saved automatically and maintained by the driver. If a new driver is installed, custom setting values must be re-established. Settings are not affected by changes in resolution, refresh or display output device changes.
Feature column	The Feature list contains options available for adjustment. The visible list can be expanded or reduced using the Show button described above. Feature Expert Levels include: • **Standard** settings are preceded by a green circular-shaped icon ● and are always available and cannot be filtered from the Setting list. • **Advanced** settings are preceded by a red cross-shaped icon **+** in the Settings Table. The red color warns you that manipulating these settings should be done with great care, as risk of creating an unstable graphics environment increases when manipulating these settings.
Setting column	The Setting column reports the values you have currently selected. These are not active values until after you have clicked Apply to set your new parameters, and re-launched your Direct3D application.
Setting Adjustment area	
Setting value dropdown list	When an item is highlighted in the **Feature** list, the area below the **Feature** list will display the name of the highlighted feature.



Click on the ▼ down arrow to the right of the dropdown list to display a menu of available setting values that can be set for the selected feature. Click on your choice to change a value. Your new value will appear in the **Setting** column, but will not become the active value until you click **Apply** and re-launch your Direct3D application.

Features - Standard	These Standard Features and associated settings are available for adjustment.
Wait for monitor sync	Sometimes called Wait for Vsync, this option controls whether or not buffer swaps and other activities should be synchronized to the display's Vertical Synchronization or Vertical Retrace Signal and blanking period, during which the display blanks as it retraces its way from the bottom right to the upper left corner of the screen. Setting options include: • **By App (default)** – Select **By App** if you want the **Wait for monitor sync** setting to change on application requests. If Vsync OFF is requested, the back buffer is flipped without waiting for vertical retrace. If the application requests VSync ON, then the back buffer is flipped while in vertical retrace. • **ON** – Select **ON** to always force a wait for monitor sync. This option will reduce "tearing" artifacts. Synchronizing with the vertical retrace constrains the frame rate so that it does not exceed the refresh rate. • **OFF** – Select **OFF** to allow buffer swaps to be processed without waiting for vertical synchronization. When a buffer flip occurs at a different time than during the vertical blanking period, visual artifacts, often described as "tearing" or "shearing" may be apparent. Note that while visual artifacts will probably occur with this setting, the frame rate may increase.
Anisotropic filtering	Anisotropic (which means non-uniform shape) filtering is a filtering technique more advanced than trilinear, which is useful for quadrilateral shaped and angled areas of a texture image. A shaper image is accomplished by interpolating and filtering multiple samples from one or

more MIP maps to better approximate very distorted textures. Anisotropic can be used in conjunction with bilinear or trilinear filtering as well as MIP map filtering. While trilinear filtering is capable of producing fine visuals, it only samples from a square area, which is not the ideal sampling area for all cases. Anisotropic filtering averages sixteen texture samples, or taps, in a non-square, rectangular or parallelogram shaped texture sampling pattern whose length varies in proportion to the orientation of the stretch effect. This sampling rate is four times the sampling level of bilinear filtering and twice the sampling level of trilinear filtering.

Textures applied to a sloped surface will not look fuzzy, which is especially useful when rendering shapes with a high degree of surface tilting in the X-Y-Z planes. Full use of the anisotropic filtering capabilities may impact performance.

Setting options include:

- **By App (default)** – Select **By App** if you want S3 Graphics software to use the anisotropic filtering level requested by the application. Not all applications request anisotropic filtering, and S3 Graphics software does not perform anisotropic filtering unless requested. This is the default.
- **OFF** – Select **OFF** to force anisotropic filtering to be always off.
- **2X** – Select **2X** to enable anisotropic filtering at its lowest level. With this setting, 16 texture samples (taps) selected from a non-square pattern will be averaged to generate one texture element (texel) that is then applied to a single pixel.
- **3X**, **4X**, …, **15X** – Select intermediate sampling levels to match your preferred balance between quality and performance. The higher the sampling level, the greater the degree of filtering. Visual quality will improve at the expense of performance.
- **16X** – Select **16X** to force use of classic anisotropic sampling using 128 taps in a non-square sampling pattern. This level of filtering will produce very high quality visual output, usually with a decrease in rendering speed.

Features: Advanced	Warning: Configuration of the following features should be done **only by experienced users, as unexpected behaviors or appearance may result.**
Detail level adjust	The number of levels or steps available for use between the largest and the smallest MIP map image can be specified by applications and driver software. Called the MIP map Level of Detail (LOD) bias, settings are selectable and can produce results ranging from high speed performance to high visual quality. Also known as “MIP mapping” is actually an abbreviation for the Latin phrase Multum im Parvum, which means “many in few.” MIP mapping textures increases quality and detail by generating and storing scaled versions of a texture image. When the texture is rendered in a 3D scene, MIP map levels computed by trilinear texturing are available for use by the OpenGL application. High quality images will be sharper and more aliased and will result from the use of a higher number of MIP map levels. Blurrier images result from using a smaller number of intermediary MIP map levels. Because less texture data is used, higher performance is associated with fewer MIP map levels. Setting options include: • **Auto (default)** – Select **Auto** to let S3 Graphics software provide optimized control of adjustments for Level of Detail bias. • **0 (Quality)** – Select **0 (Quality)** to use the highest available visual quality, using the maximum Level of Detail bias. This number tells S3 Graphics software to use the highest number of MIP map levels possible. This setting will produce the greatest level of visual quality and detail, but will often have a significant impact on rendering speed, as much texture data is processed. • **1**, **2**, **3**, **4**, **5**, **6**, **7**…– Select any intermediate level to achieve your optimal balance between quality and performance. • **8 (Performance)** – Select **8 (Performance)** to tell S3 Graphics software to use the smallest number of MIP map levels available. This setting will produce higher speed performance at the expense of visual quality.

10.3 S3 ScreenToys MultiChrome

If two identical S3 Graphics display adapters are detected as installed in your system, the MultiChrome option may be available for selection from the S3 ScreenToys and CHROME menus. Refer to SG195 MultiChrome User Guide for details on this enhanced 3D rendering feature available with a dual adapter configruation.

SECTION 11 POWER MANAGEMENT CONTROLS

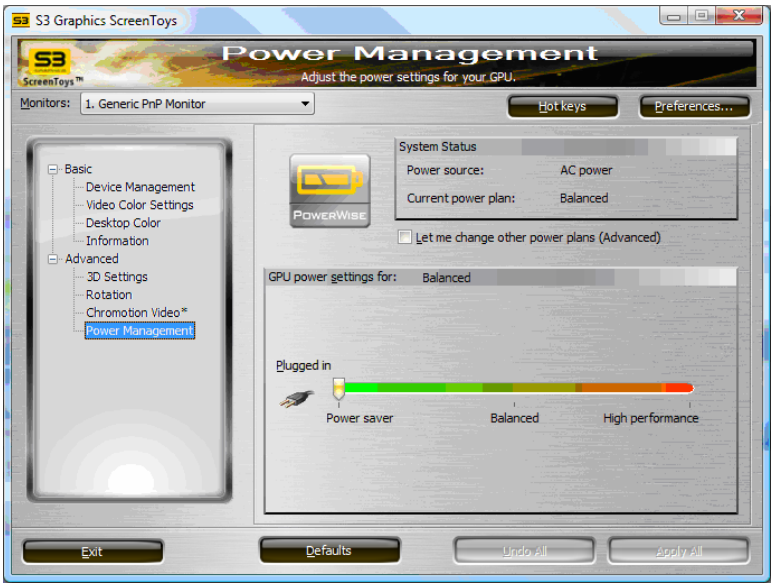
The **S3 ScreenToys Power Management** controls provide an aid for conserving power on notebook (laptop) and other power-sensitive systems. It is available on selected systems running Windows Vista and Windows XP.

11.1 S3 ScreenToys Power Management

S3 ScreenToys Power Management has two basic modes for controlling the level of power conservation:

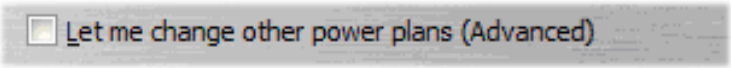
- **Automatic Power Conservation Mode** (Default setting) which lets the S3 Graphics software decide the optimal setting for you.
- **Manual Power Conservation Mode** which allows you to use a slider bar to change between settings that conserve power (but reduce speed) or increase speed (but use more power).

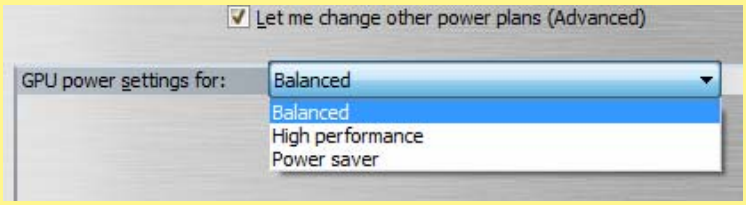
ACCESS: If your configuration supports power management through **S3 ScreenToys Power Management**, a menu option will be available through the **CHROME** menu accessible by right click on the S3 taskbar icon, or from the **Advanced** menu on the **S3 ScreenToys** window.



OPTIONS:

S3 ScreenToys Power Management options are applied globally, regardless of display configuration. You cannot adjust settings unless you have selected the **Let me change other power plans (Advanced)** checkbox.

System Status	This area shows the current graphics power management status.
Power Source	The power source may be reported as: • AC power • Battery, or • Unknown. If the power source is not Battery, then the Battery and hours remaining options are blank and disabled.
Battery remaining	If the power source is Battery, then the battery life remaining (as a percentage) is shown.
Hours remaining	If the power source is Battery, then the time remaining for the available battery power is shown. The time will be shown in hours. If the operating system reports both minutes and hours, then minutes will also be displayed.
Current Power Plan	This shows the currently selected Power Plan. See below for detail description of the available power plans.
Let me change…	Click the checkbox **Let me change other power plans (Advanced)** to disable the Automatic (default) power setting and enable Manual power setting.  If power management options are not configurable on this system, this option will be dimmed and not available. Uncheck this option to use the default Automatic settings optimized for your system. When this option is unchecked or when it is dimmed and not available, the slider is not available for adjustment. S3 Graphics software will automatically: • provide maximum speed when the graphics engines are active, or • conserve power when engines are idle. If your system supports automatic power management, and you have not previously manually specified a preferred **S3 ScreenToys Power management** power savings setting, automatic power management will be enabled by default.

GPU Power Settings area	When the **Let me change…** checkbox is checked, you are in **Advanced manual mode** and the slider bar will be available to adjust and change power settings. A dropdown list will appear along the area's title bar, which will contain a menu of the available power options. 
Power source bitmap	A bitmap to the left of the slider bar represents the current power source. 
Power setting slider (Advanced manual mode)	In **Advanced Manual Power Management Mode**, the slider bar is available and allows you to manually change conservation levels. One end of the slider bar is associated with high power conservation and the other end of the slider scale is associated with high performance/speed. Move the slider bar to the **left** towards the **green Power Saver (**left) side to conserve power (reduces speed). Move the slider bar to the **right** towards the **red High Performance (**right) side to increase performance and speed (and power consumption). When you select a power setting via the slider bar and apply it, S3 Graphics software will remember and restore the specified power setting during normal operation and at re-boot and resume. This setting is applied regardless of your current power source (AC or battery).

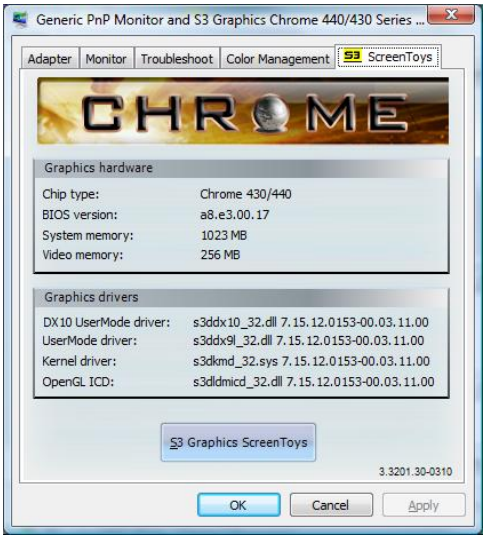
Power Plans	Below are the power plans which may be available.
Power Saver setting	Use the **Power Saver** setting to reduce power consumption. This setting will reduce speed and may lower performance.
Balanced setting	The **Balanced** setting provided the default setting provided by the driver to provide an optimal balance between power consumption and high performance.
High Performance setting	Increase the **High Performance** setting by moving the slider bar to the right. Selecting maximum speed will provide maximum speed, regardless of the current power source. When the power source is battery and you have selected the maximum speed setting, you will have maximum drain on the battery. This will significantly shorten the time you will be able to run the system before the battery needs recharging.

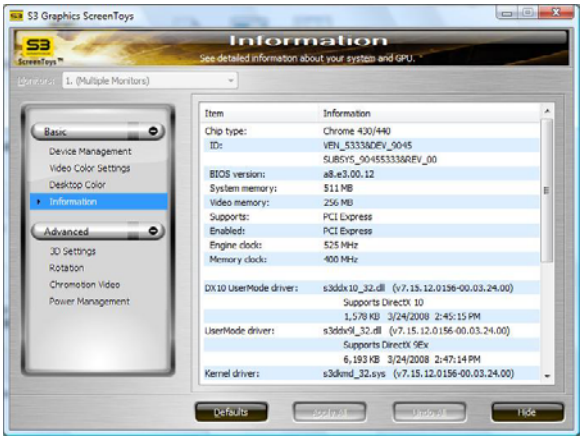
SECTION 12 DISPLAY IDENTIFICATION & INFORMATION

Use **S3 ScreenToys Information**, Control Panel System tools or **WinS3ID** to identify your Display Adapter. This information is useful when troubleshooting or locating compatible driver updates.

12.1 S3 ScreenToys Information

S3 ScreenToys Information page and tab both tell you information about the S3 Graphics adapter and associated software. The S3 ScreenToys tab has been discussed previously, see **Display Settings Advanced S3 ScreenToys** tab. The **Information** page contains additional information.



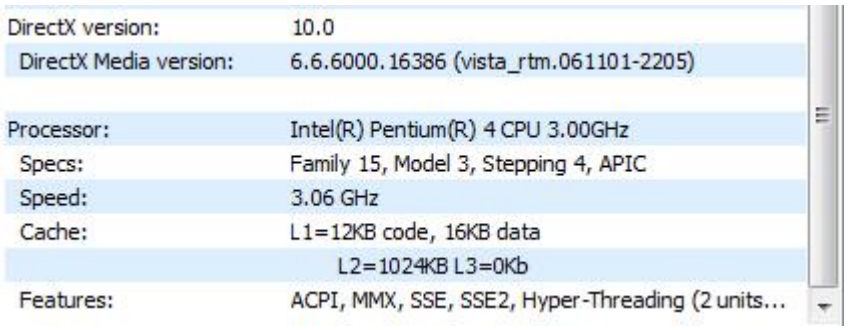


ACCESS: To use the **S3 ScreenToys Information** page, right click on any unpopulated area of the **Desktop**. Click **S3 ScreenToys**. From the left panel Basic menu select **Information**. This utility is also accessible from the **CHROME®** menu available on right-click of the S3 taskbar icon menu. The **Information** settings panel will now be available for viewing.

OPTIONS: The **S3 ScreenToys Information** page settings area includes the following items which are also reported on the Display Settings Advanced S3 ScreenToys tab. Additional detail is provided, such as Memory Clock and Engine Clock.

System Configuration area	This area includes information related to the system and BIOS configuration.
Chip type	Shows the S3 Graphics chip type name.
ID string	Shows the PCI Vendor ID, Device ID, Subsystem ID and Subsystem Vendor ID for the graphics hardware.
BIOS version	Shows the S3 Graphics video BIOS version.
System memory	Shows the amount of detected system memory.
Video memory	Shows the amount of detected video memory.
Bus information	Shows the bus interface standard for this Hardware (for example, PCI Express x16), and the current enabled capability.
Engine clock	Shows the graphics engine clock setting and the clock setting for the graphics memory.
Memory clock	
S3 Driver area	This area includes information about the display drivers. File data is provided, such as the file size and date/time. (XP: names will be different)
DirectX 10 UserMode and UserMode driver	Shows the S3 Graphics Windows Vista User Mode display driver filename, version number and DirectX level. Driver version numbers are divided into two portions separated by a hyphen. The first portion is the version number following Microsoft's conventional format. The portion after the hyphen is S3 Graphics internal version number.
Kernel driver	Shows the S3 Graphics Windows Vista Kernel Mode driver filename and version number.
OpenGL ICD	Shows the S3 Graphics Installable Client Driver for OpenGL filename and version number.

The following additional items are found on the **S3 ScreenToys Information** settings area. (These are not found on the Display Settings Advanced S3 ScreenToys tab, but many may be found using system reporting tools provided with the operating system, such as are accessible from Control Panel.)



Additional Info:

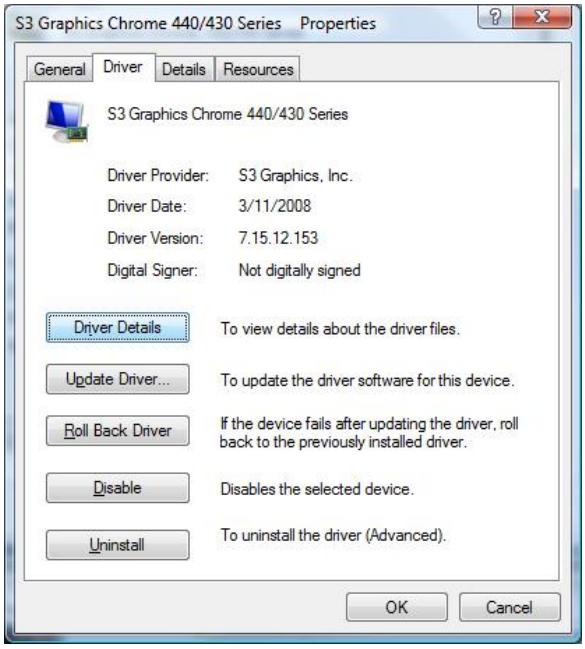
Direct X version	Reports the version of Direct X installed in the system.
Direct X Media version	Display the current version number of the installed Direct X Media files.
Processor information	These lines contain detailed information about the system processor, including manufacturer, speed, cache detail and key features.

12.2 Information from Control Panel System

To use Windows Vista or Windows XP Control Panel System information to identify your graphics device:

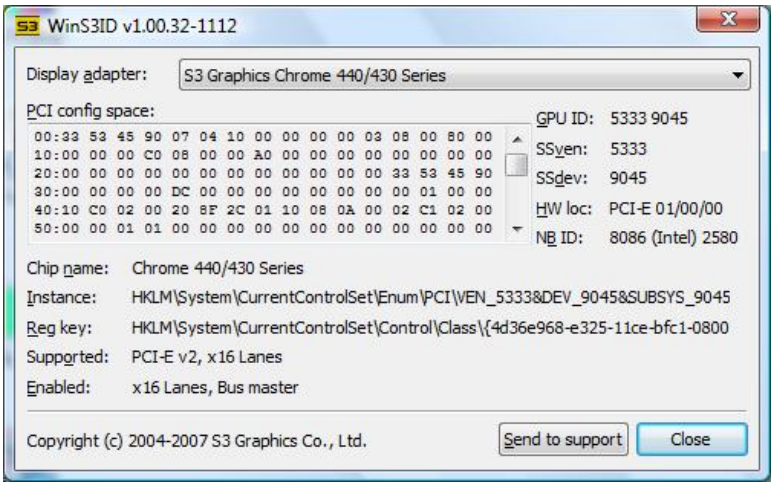
- In Windows Vista, click **Start**. Right click on **Computer**, click **Manage**. In the left panel, select **Device Manager**, or
- In Windows Vista, click **Start**, click **System & Maintenance**, then click **System**. In the left panel Tasks list, select **Device Manager**, or
- In Windows XP, click **Start**, click **Control Panel**, double-click the **System** icon. This opens the **System Properties** window. Click **Hardware** tab, then click **Device Manager** button.

Click the plus sign in the box preceding **Display adapters**. Double-click **S3 Graphics CHROME 440/430 Series** (or specific product name). Information regarding your adapter is now accessible through the General, Driver and Resources tabs.



12.3 WinS3ID for Chip Identification

WinS3ID is a Windows-compatible utility that you can run to identify the S3 Graphics product installed in your system, even when no S3 Graphics software drivers are installed. This tool is not included in driver packages, but is available for download from the www.s3graphics.com drivers download access page.



SECTION 13 MAINTENANCE GUIDE

13.1 Finding Driver Updates

Periodic software updates may be issued by your vendor as new features or bug fixes become available.

Places to check for driver updates available for installation with your hardware might include:

- Your OEM (Original Equipment Manufacturer) board vendor's website. This is often the only location where drivers customized for specific OEM hardware are available.

- Microsoft **Windows Update** is an online extension to Windows that delivers driver updates to Windows XP, Windows Vista and related operating systems. http://update.microsoft.com/microsoftupdate/v6/default.aspx?ln=en-us
  To look specifically for updates compatible with your graphics board, follow the on-screen directions to scan or review available drivers. Follow the online directions to complete your update.

- Your chipset adapter manufacturer's website: www.s3graphics.com. S3 Graphics provides standard drivers which may not be customized to your specific hardware.

13.2 Installing Driver Updates

Driver update packages from S3 Graphics include a compatible set of display drivers and multi-language utility applets as well as an install tool for easy installation.

A software driver update can be performed by running **SETUP.EXE** from the S3 Graphics software package. Rebooting the system ensures that you have fully initialized the update.

Step 1. Copy a S3 Graphics Driver Update package that is compatible with your hardware to a CD or to a folder on your hard disk. Driver packages are often compressed. If you do not see SETUP, double click on the executable file to expand the package prior to installation.

Step 2. Click **Start**, **Run**, and **Browse** to the location of **SETUP.EXE.** Click **Open**.

Step 3. Follow the install tool's direction. Steps for this install are similar to those outlined for initial installation using your vendor supplied CD, except that the hardware is already in use.

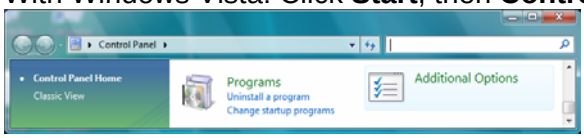
Step 4. Click **Start**, **Shutdown**, **Restart** to fully initialize your update.

13.3 Software Removal

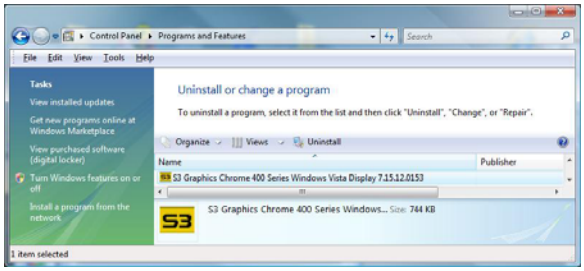
Use one of the following procedures if you want to remove your S3 Graphics software.

13.3.1 Software Removal with Vista Uninstall

Step 1. With Windows Vista: Click **Start**, then **Control Panel.**



Step 2. Click **Programs/Uninstall a program** to open the **Uninstall or change a program** window.



Step 3. Scroll through the list of programs available for automatic removal and click **S3 Graphics CHROME 400 Series Windows Vista Display** follow by version number. **Note**: the Display driver title may vary.

Step 4. Click **Uninstall** This launches the uninstall program for the **S3 Graphics CHROME 400 Series Windows Vista Display**.

Step 5. Follow the instructions. Once the wizard has finished, the driver and utility removal will be complete only after a system restart. Review the following step before selecting restart.

Step 6. For the changes to take full effect, you must now reboot.

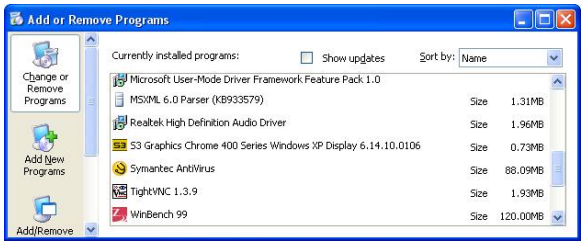
- If you are going to physically remove your S3 Graphics hardware: Click **Start**, **Shutdown, Shutdown**. Remove the board from your system now before rebooting the computer.
- If you will keep your current S3 Graphics hardware in the computer: Click **Start**, **Shutdown, Restart**. Your computer will restart.

Caution: Windows will not physically delete the S3Graphics Driver and Utilities files. After reboot, Windows may be able to identify your hardware and will try to reinstall the drivers.

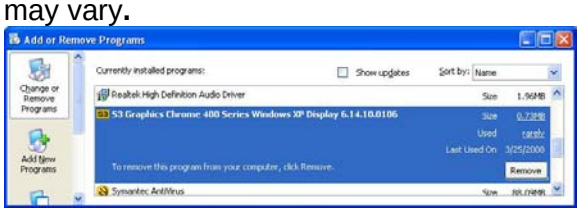
13.3.2 Software Removal with XP Add/Remove Programs

Step 7. With Windows XP: Click **Start**, then **Settings**, **Control Panel.**

Step 8. Double-click **Add or Remove Programs** to open the **Add or Remove Programs** window.



Step 9. Scroll through the list of programs available for automatic removal and click **S3 Graphics CHROME 400 Series Windows XP Display** follow by version number. **Note**: the Display driver title may vary**.**



Step 10. Click **Change/Remove**. This launches the uninstall program for the **S3 Graphics CHROME 400 Series Windows XP Display**.

Step 11. Follow the instructions. Once the wizard has finished and the system is restarted, the driver and utility removal is complete.

Step 12. For the changes to take full effect, you must now reboot.

- If you are going to physically remove your S3 Graphics hardware: Click **Start**, **Shutdown, Shutdown**. Remove the board from your system now before rebooting the computer.
- If you will keep your current S3 Graphics hardware in the computer: Click **Start**, **Shutdown, Restart**. Your computer will restart.

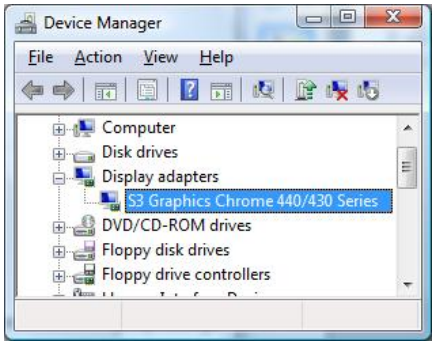
Caution: Windows will not physically delete the S3Graphics Driver and Utilities files. After reboot, Windows may be able to identify your hardware and will try to reinstall the drivers.

13.3.3 Software Removal Using Device Manager

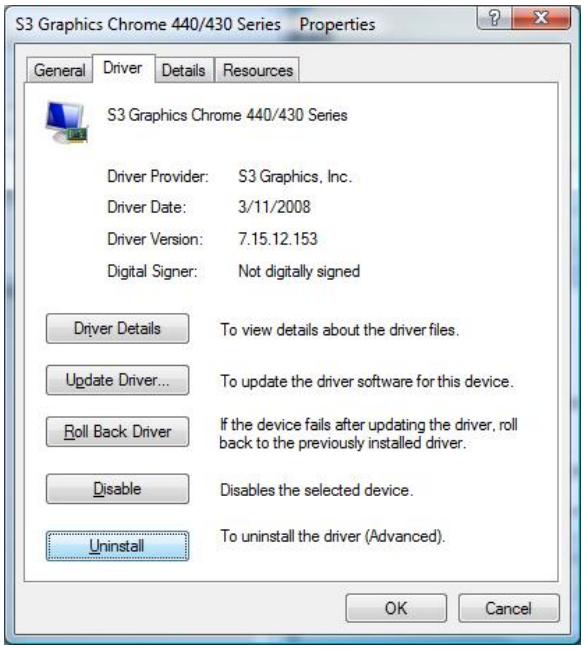
Step 1. Vista: Click Start. Right click **Computer**. Click **Manage**.
XP: Right click **My Computer**. Click **Manage**.

Step 2. The **Computer Management** window will appear. In the left panel, click **Device Manager**.

Step 3. The right panel of the window will display a list of devices.



Step 4. Click the plus sign in the box preceding **Display adapters**. Double-click **S3 Graphics CHROME 440/430 Series** (or other device you wish to remove). Click **Driver** tab. Click **Uninstall.**



Step 5. The **Confirm Device Removal** window will appear. Click **OK**.

Step 6. The **System Settings Change** window will appear, asking "**Do you want to restart your computer now?**" Select **No**.

Step 7. For the changes to take full effect, you must now reboot.

- If you are going to physically remove your S3 Graphics hardware: Click **Start**, **Shutdown, Shutdown**. Remove the board from your system now before rebooting the system.
- If you will keep your current S3 Graphics hardware in the computer. Click **Start**, **Shutdown, Restart**. Your computer will restart.

Caution: Windows will not physically delete the S3 Graphics Driver and Utilities files. After reboot, Windows may be able to identify your hardware and will try to reinstall the drivers.

SECTION 14 TROUBLESHOOTING

Below are some of the common answers and solutions available for questions and problems that can occur with display driver installation and use.

No Display on System Boot

Verify that your graphics card is properly seated in its slot.
Verify that all display cables are properly connected to your card.
Verify that connected displays are plugged-in and receiving power.

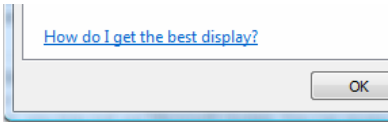
Lost Monitor Information

If you are using an older model monitor, a BNC cable, a dongle, or a switch box, important data from your CRT, DVI or HDMI monitor may not be transmitted to your S3 Graphics adapter.

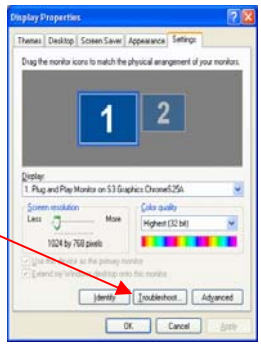
WORKAROUND: Use standard cables and DDC compatible display devices which are capable of transmitting information to the adapter.

Use Video Display Help

The **How do I get the best display?** hyperlink on the Windows Vista Display Settings page provides a link to **Windows Help and Support** information provided by Microsoft.



For Windows XP the similar link is **Troubleshoot** button for Windows XP: To launch the Video Display Troubleshooter in Windows XP, right click on any unpopulated area of the **Desktop**. Click **Properties**. The **Display Properties** window appears. Click **Troubleshoot** to launch the **Help and Support Center** window for the **Video Display Troubleshooter** provided by the operating system.



HOW TO References

Many answers to common Windows questions are provided in the searchable Microsoft Knowledge Base.
http://support.microsoft.com/ then click on Search Knowledge Base

Windows Driver Roll Back feature

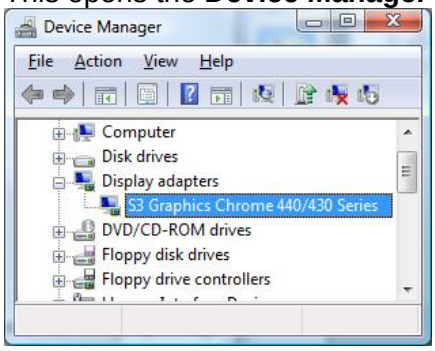
If you encounter problems after updating your drivers under Windows Vista or XP, you may use the *Driver Roll Back* feature to reinstall the previous "good" driver and restore any driver settings that were changed when the new driver was added.

To roll back to the previous version of a driver

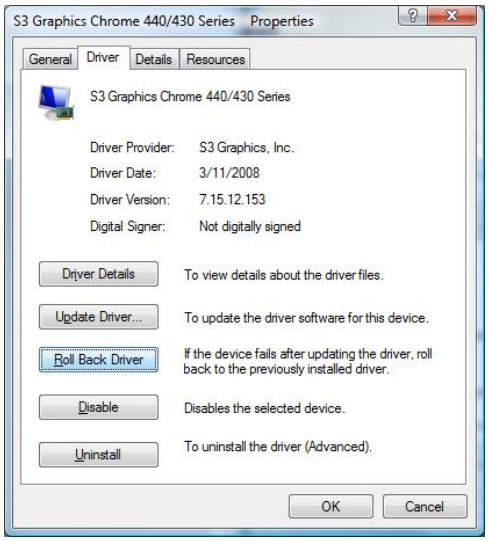
Step 1. In Windows Vista or Windows XP, click **Start**, then **Control Panel.**

Step 2. In Windows Vista, click **System & Maintenance**, then click **System**. In the left panel Tasks list, select **Device Manager**. In Windows XP, double-click the **System** icon. This opens the **System Properties** window. Click **Hardware** tab, then click **Device Manager** button.

This opens the **Device Manager** window.



Step 3. Click the plus sign in the box preceding **Display adapters**. Double-click **S3 Graphics CHROME 440/430 Series** (or other name that matches your board or chip). Click **Driver** tab. Click **Roll Back Driver**.
Note that the Driver Roll Back feature will be dimmed and will not be available if this is the first driver installed for the device.



Step 4. You will be prompted to confirm that you would like to roll back to the previous driver. Click **Yes**.

Step 5. Windows will then restore the files and settings for the previously installed display driver. Once the previous driver is restored, click **Close**. You will then be prompted to restart your computer to complete the driver roll back.

Software Updates

Windows Updates

Your S3 Graphics software has been tested with versions of the Windows operating systems available at the time of the software's release. Operating system updates are available periodically from the Microsoft Windows Update site:

http://windowsupdate.microsoft.com/

See also the additional updates discussed in the Tools for the Video Enthusiast Section.

DirectX Diagnostic Tool

You can test the functionality of DirectX and view information about your system and display hardware using the DirectX Diagnostic Tool.

Step 1. Windows Vista: Click the **Start** button.
In the search box that appears just above the Start button (for Windows XP, click **Run),** and type **dxdiag**.
This opens the **DirectX Diagnostic Tool** window.

Step 2. Click **Display** tab. (If you are using Multi-Monitor, then there may be more than one **Display** tab.) On each **Display** page you can view information about the currently installed hardware and drivers for that device.

Step 3. With Windows XP only, you can click on the **Test DirectDraw** and/or **Test Direct3D** buttons to verify that DirectX features are working properly for that particular display. If you suspect that there is a problem with a particular DirectX feature on your system, you can temporarily disable hardware acceleration for DirectDraw, Direct3D, or AGP Textures independently.

SECTION 15 GLOSSARY

This glossary includes definitions for only a few of the terms used in the S3 Graphics User Manuals. Numerous on-line glossaries are available if the graphics term you are looking for is not listed below.

Brightness - Visually, brightness reflects the intensity (or luminance) of the image going from darker to lighter. In **S3 ScreenToys Desktop color**, brightness represents the lowering or raising of the gamma curve. Brightness adjustments cause all values on the gamma curve to move down or up by the same amount.

Contrast - Visually, contrast reflects the ratio between the lightest and darkest elements in the image going from low contrast to high contrast. In **S3 ScreenToys Desktop color**, contrast represents the angle of the gamma curve. Contrast adjustments decrease or increase the angle of the gamma curve while keeping the (x, y) point on the curve fixed at (0, 0).

CRT – Cathode **R**ay **T**ube**.** Used in reference to an external analog display device, the CRT has the 15-pin VGA connector as its standard interface.

DualView -- Microsoft's term for extended desktop mode in Windows. Microsoft's definition for DualView is available online at

http://support.microsoft.com/default.aspx?scid=kb;en-us;283674

DVI - Digital **V**ideo **I**nterface, is a high-speed digital connection for visual data types that is display technology independent. DVI provides digital and analog support in a single connector and allows for plug and play through hot plug detection, EDID and DDC2b. DVI is often used to describe a detachable flat panel display device.

Gamma -- Gamma is the brightness of a display adapter's output. In practice, gamma is differentiated from brightness and contrast by the way it affects the adjusted output. Gamma adjustments do not change the bottom left point and the top right point of the gamma curve. In the **S3 ScreenToys Desktop color**, the Gamma slider allows you to adjust the gamma within a pre-determined range. The value reported on the slider is relative and does not report an actual gamma value.

HDMI – **H**igh-**D**efinition **M**ultimedia **I**nterface is an uncompressed, all-digital audio/video interface between any audio/video source, such as a set-top box, PC, DVD player, or A/V receiver and an audio and/or video monitor, such as a digital television. HDMI transmits all ATSC DTV standards and supports 8-channel digital audio.

Multi-Monitor – A Windows feature that allows multiple video cards to be active, each one displaying a portion of the entire desktop. Support for two monitors can be accomplished through the use of either two separate or one dual head adapter. With two separate display adapters, there are two separate drivers driving the separate displays, with each one displaying a portion of an extended desktop. Dual Head adapters, such as S3 Graphics GPUs, simulate the presence of two video cards with a single chip.

Primary View, Primary Monitor, Primary Display -- The Primary View display is the display that holds the logon dialog box when you start the computer. This is the display used for prompts and pop-up windows. Most programs will display windows on the Primary Display when you open them. DirectX, Direct3D and current DVD applications typically run full screen on the Primary Display. In SingleView Clone mode all active display output devices are associated with this Primary View.

Secondary View, Secondary Monitor, Secondary Display – A secondary display may be any display monitor that is not the Primary View in a dual display Multiple Monitor configuration. Once you select "**Extend my Windows desktop onto this monitor**", the Windows desktop is enlarged and extended onto the secondary display.

Once in extended desktop configuration, the Control Panel "Display Properties" application allows you to select separate screen resolution and color quality settings for the secondary display.

YUV – A color encoding format used to transmit color video images. YUV uses less bandwidth than the three separate video signals in an RGB video transmission. The two major components of YUV are:

- Luminance (Y), or the brightness of an image pixel.
- Chrominance (UV or CrCb), or the color of an image pixel.

THE END OF SG192