Disney

WOW

WORLD OF WONDER

DISCOVER, OPTIMIZE AND EXPERIENCE
HD
HOME THEATER

Makes Calibration Doggone Easy & Fun!

Disney
Blu-ray Disc
MAGIC IN HIGH DEFINITION

GET READY TO EXPERIENCE
THE WORLD OF HIGH DEFINITION AT ITS VERY BEST!

You'll learn all about HD Home Theater along with Goofy and get guidance from the pros on how to fine-tune your system for maximum performance. Then, sit back, relax, and experience all the excitement of Disney WOW World of Wonder — the ultimate fun and easy guide to getting the most from your HD Home Theater.

IT'S EASY!

This handbook will explain how to use the WOW A/V Tools. You will find both beginner and advanced sections to choose from along with simple step-by-step instructions. A/V Tools in the Beginner section are designed for ease of use in the proper alignment of your Home Theater Equipment. The Advanced section contains A/V Tools that address professional evaluation and calibration tasks for specific monitors, displays, and projectors.

GETTING STARTED

When calibrating your system, it is recommended that you make the adjustments in the same type of viewing environment in which you typically watch TV. Some televisions feature settings that might affect the proper calibration of your television. If you encounter difficulties in calibrating your TV, try changing these settings first and then re-calibrate using the on-screen guide.

The labels for controls used in this booklet may be different from the names used in the menus on your television. Please refer to your owner's manual if you have any questions about how your controls are labeled.

Throughout this booklet, you will see Test Patterns marked with an Asterisk (*). These are Digital Reference Standard (DRS) images. These DRS images are a basic representation of how the correct or optimal settings should appear on your TV. Please note that the images in this booklet are for reference only. Printing limitations prevent Test Pattern images from being an exact representation of how they appear on your TV.

GENERAL INFORMATION

VIDEO

CONNECTIONS First, you need to know how your display is connected to your system. For High Definition systems, you may be digitally connected with HDMI or DVI. This will provide the most accurate signal to your display.

For analog systems, you may be connected with VGA or Component cables. These are capable of HD resolutions but will not provide the best HD image accuracy or experience. If you are unsure of your connection, please consult your owner's manual.

AUDIO

Audio connections from your playback equipment may be either digital or analog. Digital audio connections include HDMI, Fiber cable or S/PDIF copper cables. Analog connections are typically copper cables utilizing RCA Phono Pin connectors. If you are unsure about your audio connections, please consult your owner's manual.

CALIBRATION The A/V Tools on this WOW disc will allow you to calibrate your system in order to get the best possible picture and sound. The Video test patterns can be used to calibrate CRT based TV sets, flat-panel displays and projection equipment. Audio test signals are selectable for a variety of sound formats from Stereo to 7.1 Channel Surround.[†]

The calibration test signals will enable you to adjust controls on your equipment to achieve optimal settings. Other tests are designed for evaluation only, intended to measure general system performance. This will allow you to identify whether or not your system needs attention from a qualified technician.

[†] For 7.1 Demo clips, access *The Nightmare Before Christmas*

BRIGHTNESS
BLACK LEVEL

The Brightness PLUGE (Picture Line Up GEnerator) pattern contains two groups of vertical strips. The left group of strips are three steps slightly darker than ideal black and the right group are three steps slightly brighter than ideal black. These strips will assist in the adjustment of the Brightness control. Room lighting and type of display will affect where this control is adjusted. Use lighting representative of your viewing situation to adjust the monitor.

OVERVIEW

The top sample on the right *(figure 1)* shows the Brightness control set too high. Notice the black area is slightly grey instead of jet black and all of the vertical test strips are also visible. Lower the Brightness control until only the brighter right hand steps are visible.

Too High. *(figure 1)*

The middle sample on the right *(figure 2)* shows the Brightness control adjusted too low. All of the test strips are extinguished; this condition is called "black clipping." Clipped blacks will display shadow areas as solid black where there should be subtle detail. The Brightness control should be raised until the brighter test strips on the right side come into view.

Too Low. *(figure 2)*

The bottom sample on the right *(figure 3)* shows a properly adjusted Brightness control. Only the right hand vertical steps are visible while the left hand steps are not. The black area in between is ideal black.

Correct. *(figure 3)**

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The visibility of the brighter steps indicates that subtle detail in shadow areas will be visible while the absence of the darker steps shows the monitor's ability to display true black is being fully utilized.

A monitor adjusted in a dark room will appear too dark when the room is lit. A monitor adjusted in a lit room may appear too bright in a darkened room. Perform these adjustments in lighting conditions typical of the normal viewing environment.

CONTRAST
WHITE LEVEL/PICTURE

OVERVIEW The center area of the white box represents ideal video white with two groups of vertical strips. Set the Contrast control so the center area appears as a fully white object would, like a white shirt, white clouds or piece of white paper. On either side of center, you'll see vertical strips that are three steps brighter on the right and three steps darker on the left *(figure 6)*.

The top sample on the right *(figure 4)* shows the Contrast control adjusted too high. The white strips on the right are washed out, called "white clipping." The video signal has exceeded the capability of the monitor to show detail in the brightest whites. Lower the Contrast control until you see at least one of the three lighter vertical strips on the right.

The middle sample on the right *(figure 5)* shows the Contrast control adjusted too low. The whites are dull and all the vertical test strips are visible. At this point, the monitor is not showing all the detail it can in the brightest areas. Raise the Contrast until the

center of the white box appears as a fully white object with at least one of the right hand vertical strips still showing. At this setting, the monitor is showing whites near the maximum performance capability of the display.

The bottom sample on the right *(figure 6)* shows a proper maximum contrast setting with two of the brightest vertical strips blending together. This means the upper limits of light output from the monitor have been reached.

Brightness and Contrast adjustments are affected by room lighting in the viewing area. If your room lighting is relatively dark such that these settings create an image that's too bright, you may reduce the Contrast setting to create a more comfortable picture. The Contrast control actually sets how white the whitest object is on the screen and may be adjusted downward to prevent an overly bright image. You may need to touch up the Brightness control after setting the white level to ensure shadow details are not lost.

Too High. *(figure 4)*

Too Low. *(figure 5)*

Correct. *(figure 6)**

ASPECT RATIO

Native television aspect ratio is set to 4:3 for older SD (Standard Definition) displays and 16:9 for common HD (High Definition) systems. This means that no matter what the screen size, the display area will be 4 units wide by 3 units tall for SD monitors and 16 units wide by 9 units tall for HD monitors. The units can be anything: feet, inches or meters. The relationship between height and width will remain constant no matter what the screen size *(figure 7)*.
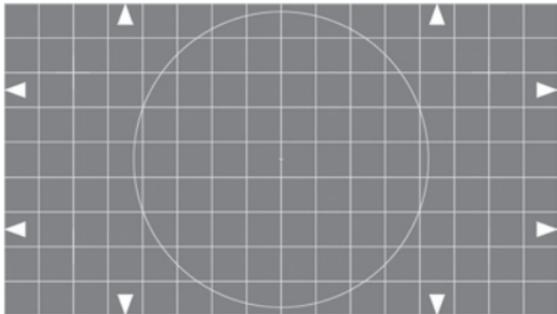
(figure 7)*

LETTERBOX AND SIDE BARS All widescreen video material destined for Blu-ray™ distribution assumes a 16:9 display system. Modern players and displays connected with an HDMI cable have the ability to communicate with each other and perform preliminary setups. However, monitors, Blu-ray players and DVD players allow these settings to be overridden, allowing for mismatched video components.
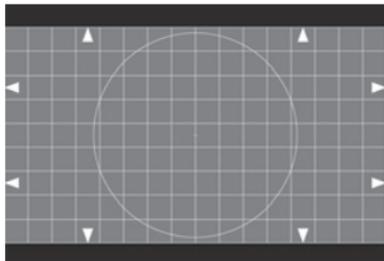
For example, if you connect your Blu-ray player to a 4:3 television receiver with analog cables, the Blu-ray player will continue to output 16:9 aspect video because it has no way of knowing that a 4:3 display is connected. The images will be squeezed sideways by the television and the pictures will look tall and skinny. To remedy this, you will need to set the Blu-ray player's output to format the delivered video for a 4:3 display. With 16:9 video content, it is likely that the Blu-ray player will squeeze the image vertically and apply

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black bars to the top and bottom of the image, creating a 16:9 image within a 4:3 display area. This is the "letterbox" method of preserving a 16:9 image on a 4:3 display *(figure 8)*.
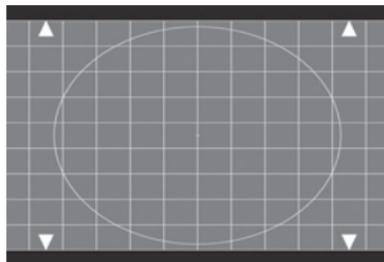
Conversely, connecting a standard definition DVD player with analog cables to a 16:9 monitor may induce the opposite problem. The DVD player may be delivering letterbox images or full 4:3 images to a display not formatted to

Letterbox 16:9 video on 4:3 display.
(figure 8)*

either, creating short, fat pictures. To remedy this condition, either the player or the monitor (or both) need to be set to agree on the type of video to be displayed. In the case of 4:3 programs on a 16:9 display, the player (or the monitor) will add black vertical bars on either side of the image, allowing the 4:3 image to be displayed at the proper aspect ratio in the center of the screen.

As you might guess, these settings can become confusing, particularly when both the player and the monitor have the ability to battle each other for proper display formats. The aspect ratio test chart will assist you with this setup. The following examples show several states of improper aspect ratio settings.

The appearance of the aspect ratio chart is considered "normal" when played from a Blu-ray™ player through an HDMI cable to a 16:9 digital display *(figure 7)*. The circles should appear round instead of oval in any direction.
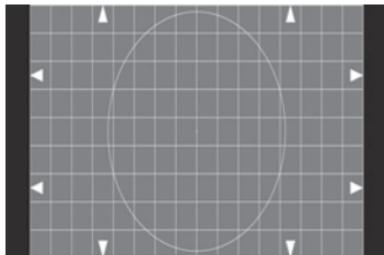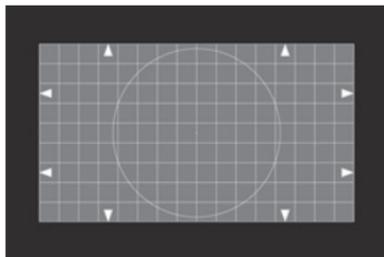
Incorrect Aspect Ratio Settings.
(figure 9)

PLAYER SETUP The arrows on the sides should be uniformly visible and there should be no black bars on either side of the chart nor on the top and bottom *(figures 9, 10, 11)*. If this is not the case, find the controls on your Blu-ray™ player that affect the display type. Set this control to match the connected display, in this case 16:9 *(figure 7)*.

Incorrect Aspect Ratio Settings.
(figure 10)

DISPLAY SETUP If the display still appears improper, find the controls on your monitor that affect display sizing. Many flat panel displays provide easy access to settings that allow

Incorrect Aspect Ratio Settings.
(figure 11)

for several basic aspect ratio compensations, intended for use when 4:3 SD video is present. All of these compensations should be disabled to bring the test chart into compliance. Check that your monitor is set to accept a 16:9 video source as opposed to a 4:3 source. The most important use of these settings is to make both the player and display system agree on the native format of the display.

MISMATCHED EQUIPMENT Manufacturers of players and televisions generally provide settings to allow for a variety of equipment to be connected with mismatched native aspect ratios. Using these same aspect ratio controls, it's possible to connect your Blu-ray player to a 4:3 display.

Set your Blu-ray™ player's aspect controls to output a 4:3 image instead of 16:9. The Blu-ray player will likely apply a "letterbox" correction to the images. Similarly, a DVD player may have aspect ratio controls as the DVD format was introduced just as widescreen televisions were becoming available.

If your primary video source is 4:3 and there are no aspect controls on the player, set your 16:9 monitor to expect 4:3 video. The monitor will apply aspect ratio corrections that avoid fat or skinny pictures. The inverse of a "letterbox" correction is the "windowbox" or "side panel" that allows a 4:3 image to rest in the center of a 16:9 display. The source image is narrower than 16:9, so the extra screen real estate on the sides is unused. The unused area may be filled with black or some shade of grey.

COLOR
SATURATION

The images in the Beginning Color & Hue Test have been specifically selected for color and tone. These pictures can be used as a reference for adjusting your monitor. Please adjust the controls affecting color and tint so the images appear accurate on your monitor. For more precise adjustment of color and tone, please use the Chroma and Hue calibration tools in the advanced section of the disc.

Beginning with the first image shown on the right, adjust the color until the flesh tones appear slightly saturated or artificially high, then reduce the color level until flesh tones appear normal and lifelike *(figure 12)*.

(figure 12)*
*Digital Reference Standard

9

In the image below *(figure 13)*, the blue sky should appear deep and natural. If it appears to be washed out, bring the color level up slightly.

This image should be colorful and lifelike. If the color and tone are set properly, then the variety of colors should be clearly different and complementary *(figure 14)*.

You may wish to move between these images making small adjustments to color until you are satisfied with the picture's accuracy.
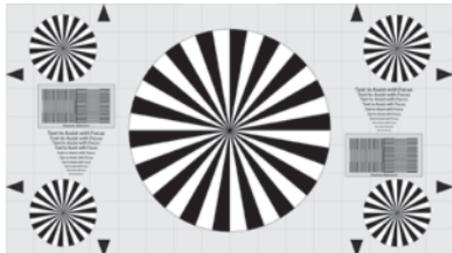

(figure 13)*

(figure 14)*

SHARPNESS
## ARTIFICIAL EDGE ENHANCEMENT

SHARPNESS ADJUSTMENT If your equipment has an electronic adjustment for "sharpness," use the black and white box patterns and the text to assist with this setting *(figure 15a)*. The sharpness adjustment is not a substitute for incorrect optical focus. Sharpness adds a white line around dark areas to artificially define object edges. This creates the perception of additional resolution. If used improperly, it can severely impair the image quality. Observe the chart's sharpness blocks and the text while adjusting the sharpness control. The samples below show

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some of the effects of adjustments. The left sample is uncompensated as seen on the chart. Adding a slight amount of sharpness will add some desirable definition to the image as shown in the center sample. Adding too much sharpness will begin to add undesirable edging artifacts as seen below in the sample on the right *(figure 15b)*.

(figure 15a)
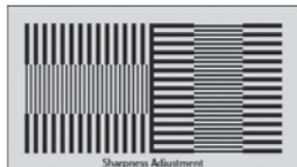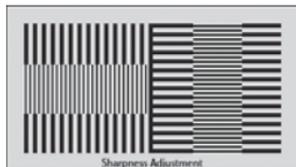
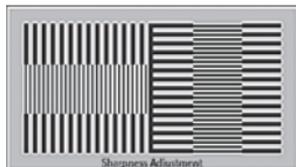| Uncompensated | Mild Sharpness | Too Much Sharpness |

(figure 15b)

VIEWING ANGLE TEST

This pattern *(figure 16)* should appear as a solid color. The pattern is intended for use with flat panel displays and may not be useful for front projection equipment. On direct view CRT equipment, this pattern will also be useful for detecting magnetic interference.

(figure 16)*

*Digital Reference Standard

VIEWING ANGLE Observe the screen for color purity deviations. The entire screen should be a solid magenta color that is mixed from pure red and pure blue. Change your viewing angle to see whether looking straight at the screen, sitting off axis, standing or changing the viewing distance affects the appearance of the pattern. Ideally, there will be no change in hue or intensity within reasonable viewing angles. On displays with viewing angle deficiencies, you may see parts of the screen turning red and other parts of the screen turning blue as you move around the viewing area. Below is an example of what a color change may look like *(figure 17)*. A slight change in color is common on some consumer monitors. A large change within the reasonable viewing area indicates viewing angle deficiencies. You may need to modify what is considered an acceptable viewing
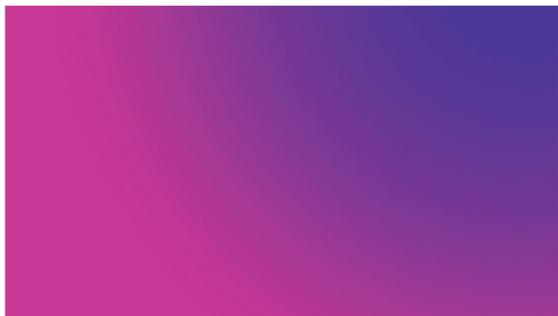
(figure 17)

position. If the pattern shows stationary deficiencies that do not change as you move around the viewing area, it may indicate a defective display or improper mounting. Check the mounting system on flat panel displays to ensure the cabinet is not being twisted or subjected to pressures that distort the display system.

CRT PURITY Direct view CRT systems are sensitive to magnetic interference. If you see areas of this pattern that favor a different color *(figure 17)*, check the electronic equipment or other objects around your monitor for a possible source of magnetic interference. Alter the position of the monitor to see if the pattern changes. If nothing seems to help, consider calling a service technician in order to

improve the color purity. Do not attempt to open the monitor as CRT systems contain high voltage components that will injure you, even after the power is disconnected.

SPEAKER IDENTIFICATION

The Channel ID test allows you to ensure that your speakers are connected to your system correctly. This section is invaluable for multiple source systems.

The Channel ID test consists of an announcer identifying the left speaker as left, and the center speaker as center, and so on. If the announcements do not match the correct speaker, first check the connections between the receiver and speakers. If they are connected correctly, check the connections between the Blu-ray™ player and receiver for proper channel assignment.

If the Blu-ray player is connected to your receiver or monitor via a digital optical, digital coaxial or HDMI cable, it is not possible to change the channel assignment from the player.

POLARITY TEST

A Polarity test allows you to determine if your speakers are connected correctly. Each speaker has a positive and negative wire connector as does the receiver. The positive and negative connections on each speaker should be wired to the corresponding connection on the receiver.

The Polarity test will begin using the left front and right front speakers only. It will advance around the system in a clockwise pattern. Each test will involve two speakers only. The test will end with the left front and center speakers.

A test signal will emanate from each pair of speakers. The signal uses a broadband energy that covers the entire audible frequency spectrum. This type of signal is called pink noise and will be used on most of the tests on this disc.

The signal will be in-phase for the first ten seconds for each pair of speakers being tested and then switch to being out-of-phase for 6 seconds. When the signal switches to out-of-phase there should be an audible drop in level and the sonic image or noise will shift to an undetermined location in the room instead of centered between the speakers. If the audio level decreases when the signal is out-of-phase, your speakers are in-phase and you may advance to the next set of speakers.

Remember that all speakers in the system must work together so you have to check the connections on every speaker to determine if any are out-of-phase.

For best results, before you begin the Polarity test adjust the volume of each speaker so they are approximately equal in level.

NOISE FLOOR TEST

Dynamic range is the difference between the loudest undistorted signal and lowest audible signal of your home theater system. This test will help determine the noise floor of your listening environment.

The test signal consists of several different bands of pink noise recorded at successively lower volumes. The test signal starts at minus 20 dB full scale and decreases in 5 dB steps with the last signal recorded at minus 60 dB full scale. The noise floor for a particular frequency band is the point at which you can no longer hear the test signal.

This test can help you identify how the noise generated by household systems and appliances, such as air conditioners and refrigerators, affects your listening experience. For instance, try turning off the heater or air conditioner to see if you can hear a lower volume test signal in one of the low frequency bands.

BUZZ & RATTLE TEST

The Rattle test is intended to trigger sympathetic vibrations in objects such as lamps, tables and windows that will vibrate in response to the audio emanating from your speakers and subwoofer. The sweep tones in the rattle test are also used to check for speaker resonances.

The first tone of the test covers the entire audible frequency spectrum. Each subsequent tone is set to a particular frequency range, which will help you identify which objects are affected at certain frequencies.

If objects do vibrate, you should either move these objects or alter them so they do not interfere with your listening experience.

Each tone will repeat until you advance the test by selecting the on-screen menu button to proceed to the next sweep tone.

Caution – you should be aware that sweep tones, especially at higher frequencies, can cause hearing damage. Extreme care should be used with these tests, especially when small children or animals who are more sensitive to high frequencies, are present. In addition, playing back the test tones at excessively high volumes may cause speaker damage as well.

ADVANCED BRIGHTNESS TEST

BLACK CHECKERBOARD
This moving test pattern *(figure 18)* is designed to fine tune the residual brightness level of a display system. It consists of a super black background with a barely visible graduated overlay of geometric shapes. The darkest of the shapes are marked as

(figure 18)*

"invisible" and should be adjusted so they blend into the background. The remaining shapes are "visible" along with an "ideal" target. With Brightness properly set, true black in a video image will completely extinguish light coming from the monitor while preserving shadow detail only a few percent brighter.
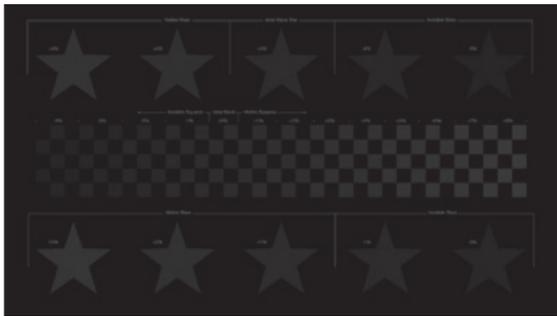
ADJUSTMENT The adjustment procedure is basically the same as using the PLUGE signal found on the Color Bar pattern, except these elements are

*Digital Reference Standard

full screen and graduated with many more brightness levels. The sample illustration to the right *(figure 19)* is the same pattern with the background lightened in order to reveal the elements you'll be looking for.

(figure 19)

Adjusting the brightness setting is done with visual observation which can fatigue the eye and lead to a setting that is less than optimum. To aid in identifying the foreground patterns from the background, the geometric elements will shift position during the adjustment cycle and will briefly brighten to reveal their position. This will prevent false observations caused by image retention in the human eye.
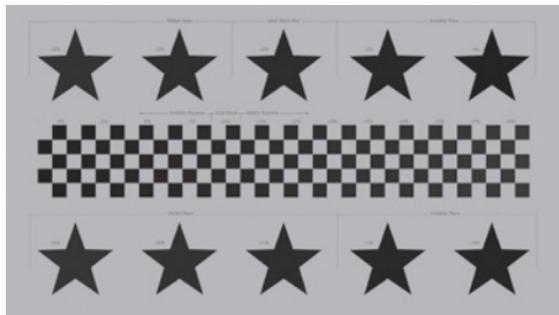
Adjust the Brightness control of the display so the "invisible" test pattern elements are extinguished against the background. Only the elements marked "visible" should be seen. There is also a set of "ideal" elements that should be on the verge of being visible. This is a very dark pattern suitable for setting up a monitor in a darkened room. No bright elements are present to create lighting backscatter. The Brightness adjustment will interact with the Contrast adjustment as set with the White Checkerboard pattern found in the next test on this disc. You will need to return to both test patterns several times in order to satisfy both the Contrast and Brightness settings.

BRIGHTNESS

ADVANCED CONTRAST TEST

WHITE CHECKERBOARD

This moving test pattern *(figure 20)* is designed to fine tune the contrast level of a display system that affects the maximum light output from the display. It consists of a super white background with an overlay of geometric shapes of different brightness levels.
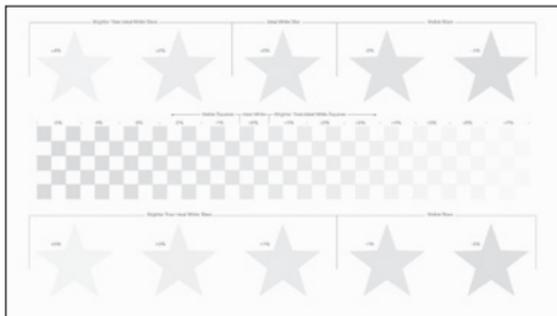
The test will identify the capacity of your monitor to produce the required light level for a true white object without loss of detail in the brightest areas. To aid in identifying fine bright object details, the geometric shapes will darken to reveal themselves initially and then move slightly during the adjustment phase for easy recognition.

(figure 20)*

The adjustment procedure is basically the same as using the PLUGE signal found on the Color Bar pattern except these elements are graduated with many more brightness levels. The illustration to the right *(figure 21)* is the same pattern with the background darkened revealing the elements you'll be looking for.

Adjust the Contrast control of the display so the elements labeled "ideal white" have a light output equivalent to white snow, bright clouds or a brightly lit white shirt. Elements brighter than ideal white are expected to disappear into the background. The last visible element is an indicator of how much additional light output, or "headroom," your monitor can deliver. The display's full dynamic range is utilized when the "Ideal White" elements just become fully

*Digital Reference Standard

visible during Contrast adjustment. Your display is expected to show ideal white elements distinct from the background. If the geometric elements darker than ideal white begin blending into the background before proper light output is reached, your monitor is "clipping," or losing detail in the brightest whites of video. Reducing Contrast may remedy this at the expense of a dimmer image. You may expect "white clipping" behavior in older CRT monitors, projectors with modest light output expectations or other aging display systems that may be getting worn out.
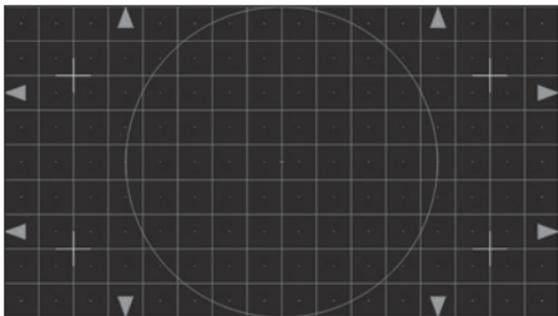
(figure 21)

Please be aware the Contrast adjustment will interact with the Brightness control as set with the Black Checkerboard pattern found in the previous test on this disc. You will need to return to both test patterns several times in order to optimize both the Contrast and Brightness settings.

CONVERGENCE TEST

(figure 22)*

CROSSHATCH DISPLAY

This test pattern *(figure 22)* is a regular grid of squares. There are 16 squares horizontally and 9 squares vertically, corresponding to the aspect ratio of current HDTV equipment. This pattern is most useful for direct view CRT monitors or projection systems that require the registration of multiple image sources.

DIRECT VIEW CRTS

The mechanics of a CRT dictate a separate source for red, green and blue image elements. These three color sources must be "registered" so they fit together on the screen. Many modern CRTs have no controls for registration as the alignment is part of the device's construction. However, some systems have adjustments to precisely align the individual "guns" so they coincide on the display. Do not attempt to adjust registration yourself if it involves opening the monitor as dangerous high voltage is present inside the cabinet. If external controls do exist, be advised that this adjustment is reserved for the most skillful and patient of people.

THREE GUN PROJECTORS

Use this test pattern to align a projection system using three individual optical color sources. Typically, the registration controls are easily accessible in these systems as they need touch-up after moving the equipment. Set the green channel to be correct in sizing, geometry, focus etc. Then, adjust the red and blue controls to match the green, so the entire test chart appears as a uniform

*Digital Reference Standard

white grid without color fringes. Below are examples of incorrect alignment and correct final alignment *(figure 23)*.
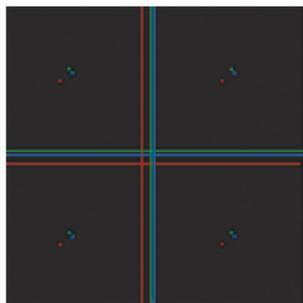
(figure 23)*

Misaligned   Aligned

MULTIPLE PROJECTORS
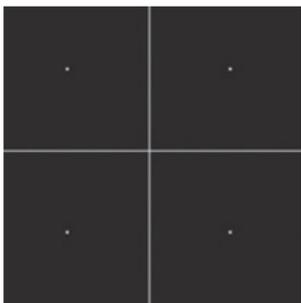
Occasionally, several projectors are "stacked" together to achieve a higher screen brightness than is otherwise available. Use the focus chart found elsewhere on this disc to set up the individual projectors first. Use this test pattern to perform the aiming and sizing alignments of all projectors together. Test your alignment with live images to confirm successful registration.

GEOMETRIC DISTORTIONS

On CRT based systems, you may encounter adjustments useful for correcting geometric distortions other than sizing. This crosshatch chart and others containing uniform geometric shapes will be useful for making these adjustments. The following illustrations show some of these deficiencies. Adjust the appropriate controls to achieve uniform squares in the crosshatch and a round circle in the center. Note that three gun CRT systems may have these controls for each gun, which requires patience for successful adjustment *(figure 24, see next page)*.
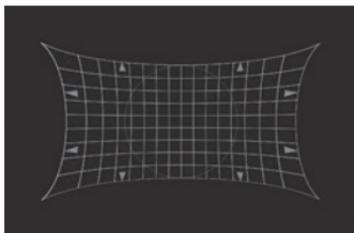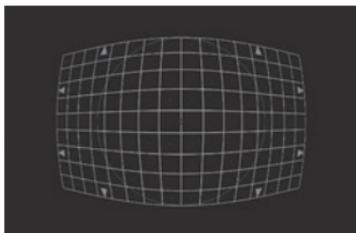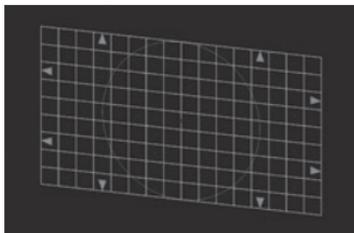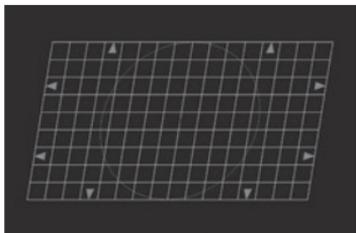
KEYSTONE
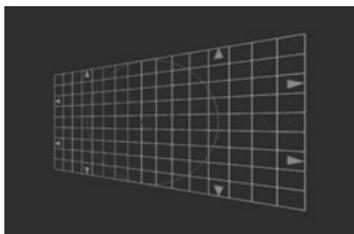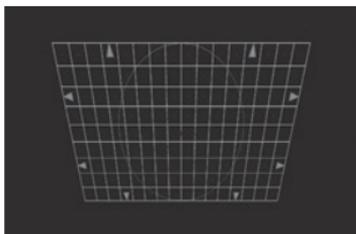
LINEARITY
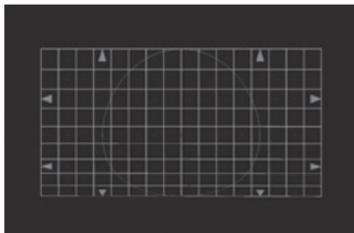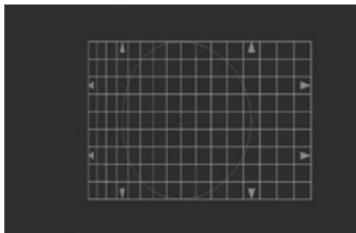
PINCUSHION

SKEW

(figure 24)

CHROMA & HUE

This modified industry standard test pattern *(figure 25)* contains examples of the three primary colors, the three secondary colors, 75% white as mixed from the primaries, ideal black and ideal white. A PLUGE signal (Picture Line Up GEnerator) integrated into the pattern also contains super black and super white signals for monitor setup. The pattern also contains a row of reversed color bars used to perform chroma and hue setup when used in conjunction with a blue optical filter.

OVERVIEW

(figure 25)*

Establish the location of display controls affecting "chroma" or "color." Hold the blue filter packaged with this disc up to your eyes and observe the color bar pattern *(figure 26, next page)*. This will filter out all colors except those with a blue component. You will see a series of vertical blue bars containing elements of (from left to right) white, cyan, magenta and blue separated by black bars. When the chroma level is properly set, the white vertical bar on the left should have the same amount of blue as the pure blue bar on the right. To facilitate this observation, the reverse color bar strip just below the main color bars will allow direct comparison of the white bar against the blue bar. Set the color level of your monitor so the boundary between white and blue disappears on both ends of the pattern. One should not be brighter than the other.

CHROMA

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HUE OR TINT ADJUSTMENT

Locate the display controls affecting "hue" or "tint." Using the blue filter, observe the main color bar samples of cyan and magenta. Directly beneath those are reversed samples of magenta and cyan. Adjust the hue or tint control to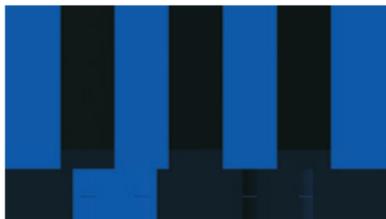 balance the levels of the main color bars with the samples on the reverse strip. The hue or tint is now properly adjusted. Please keep in mind the chroma level will interact with the hue control, one placing the other slightly out of balance. Go back and forth between adjusting the color and hue a few times until both settings are optimal *(figure 27)*.
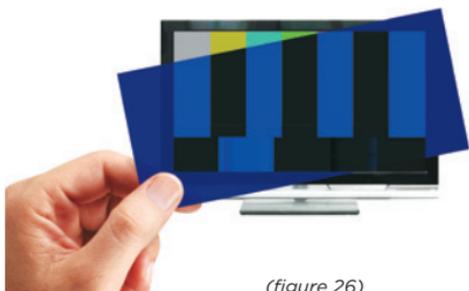
(figure 26)

COLOR ADJUSTMENTS

The color bar pattern on the left is properly adjusted *(figure 27)*. Notice that all visible bars are the same shade when seen through the blue filter. It is likely that your television will either match this condition or will be very close right out of the box. You may test for proper adjustment by moving the controls slightly to observe the changes. To the right are examples of what you will see when the controls are misadjusted. Adjust the controls to match the example shown here on the left.

(figure 27)*

The most critical adjustment is the "hue" or "tint" control. This adjustment will have a dramatic impact on flesh tones if misadjusted. While looking through the blue filter, adjust the control in either direction until you see the two center bars change shade. The narrow strip of reverse color bars under the main bars will assist in precise adjustment of hue or tint. Adjust the control until the transition between the main center bars and the reverse bars below disappears. The next example on the right shows what

*Digital Reference Standard

the hue looks like when misadjusted *(figure 28)*.

The "chroma" or "color" control will interact slightly with the "hue" or "tint" control. While looking through the blue filter, adjust the control until the shades of the far left and far right main color bars diverge from the narrow strip of reverse color bars below *(figure 29)*. The adjustment is correct when the transition between the main bars and the reverse bars on the far left and right sides disappears as in the reference image *(figure 27)*. You may need to alternate between the "color" and "hue" control to achieve perfection. The example on the right shows what chroma or color looks like when misadjusted. This concludes the use of the blue filter gel.
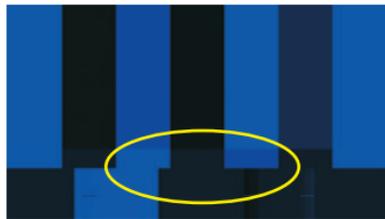
(figure 28)

(figure 29)

The bottom quarter of the color bar pattern has a full width solid bar of ideal digital black containing two test signal areas. On the next page is a strip *(figure 30)* containing a box of ideal digital white along with vertical strips showing three steps slightly lighter and darker than ideal white. On the right side of the strip is a similar arrangement with ideal digital black as the background along with vertical strips slightly lighter and darker than ideal black. These are "PLUGE" signals, which stands for "Picture Line Up GEnerator." The PLUGE signal aids the adjustment of proper black and white displayed by a monitor. The PLUGE signals, which may be difficult to spot, are marked with short horizontal grey bars.

LUMINANCE ADJUSTMENTS

Any monitor has a maximum range of light output for both black and white, called "contrast ratio." The Contrast control adjusts the

difference between ideal white and ideal black contained in this test pattern to match the display capability of the monitor. Contrast mostly affects the white parts of a video image but will also affect the dark areas. The Brightness adjustment sounds like it should set how bright things are on the screen. Instead, Brightness is set to remove residual light output when true black is present in the video. The Brightness and Contrast controls interact considerably, so you will need to switch back and forth between the two controls to satisfy both settings.

(figure 30)*

BRIGHTNESS The right hand portion of the black background contains two groups of vertical strips *(figure 30)*. The left group are three steps slightly darker than ideal black and the right group are three steps slightly brighter than ideal black. These strips will assist in the adjustment of the Brightness control. Room lighting and type of display will affect how this control is adjusted. Use lighting representative of your viewing situation to adjust the monitor.

The bottom sample *(figure 3, page 3)* shows a properly adjusted Brightness control. Only the right hand vertical steps are visible while the left hand strips are not. The black area in between is ideal black and the monitor is now set to show this to be the darkest object on display.

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Refer back to the section on Brightness earlier in this manual *(pgs 3-4)* for complete instructions on making these adjustments.

The center area of the white box *(figure 30)* represents ideal video white. Set the Contrast control so this area appears as a fully white object would, like a white shirt, white clouds or piece of white paper. On either side of center, you'll find vertical strips that are three steps brighter on the right and three steps darker on the left. The strips on the right will blend into the white background if you have adjusted Contrast beyond the capability of the monitor to display it.

CONTRAST

Refer back to the Contrast section earlier in the manual *(page 5)* for detailed instructions on properly setting the Contrast. The bottom sample *(figure 6, page 5)* shows the proper maximum Contrast setting with two of the brightest vertical strips blending together. This means the upper levels of light output from the monitor have been reached.

Remember, Brightness and Contrast adjustments are affected by room lighting in the viewing area. A monitor adjusted in a dark room will appear too dark when the room is lit. A monitor adjusted in a lit room may appear too bright in a darkened room. Perform these adjustments in lighting conditions typical of the normal viewing environment.

If your room lighting is relatively dark such that these settings create an image that's too bright, you may reduce the Contrast setting to create a more comfortable picture. The Contrast control actually sets how white the whitest object is on the screen and may be adjusted downward to prevent an overly bright image. You may need to touch up the Brightness control after setting the white level to ensure shadow details are not lost.

SHARPNESS & FOCUS CHART

This chart on the right *(figure 31)* provides a target suitable for optically focusing projection equipment. Please note that direct view CRT or flat panel displays do not have optical focus adjustments. The chart also contains elements to assist in adjusting electronic image enhancement, usually called "sharpness," found in most display systems of any kind.

Set up the framing and centering of your projection equipment using the "Overscan" chart found elsewhere on this disc. Once the basic setup of your projector is satisfactory, use this focus chart to set fine optical focus. The major starburst pattern on the chart is designed to visually indicate the best focus adjustment. Adjust the optical focus so the center of the chart shows the highest detail level. Optical focus may interact with projector sizing. You may need to touch up the basic setup so the points of the arrows on the chart's edges just touch the margins of the screen area. Text is shown on the chart to assist in setting focus for best readability.
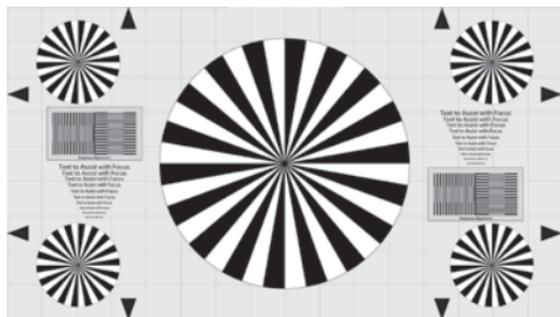
(figure 31)*

SHARPNESS ADJUSTMENT

If your equipment has an electronic adjustment for "sharpness," use the black and white box patterns and the text to assist with this setting. The sharpness adjustment is not a substitute for incorrect optical focus. Sharpness is used to artificially define object edges to create the perception of additional resolution. If used improperly, it can severely impair the image quality. Observe the chart's sharpness blocks and the text while adjusting the sharpness control. The samples on the preceding page *(figure 32),* show some of the effects of adjustments. The left sample is uncompensated as seen on the chart. Adding a slight
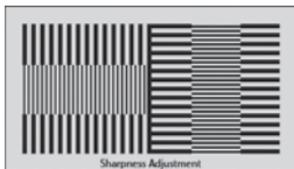
Uncompensated
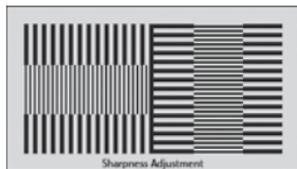
Mild Sharpness

Too Much Sharpness

(figure 32)

amount of sharpness will add some desirable definition to the image as shown in the center sample. Adding too much sharpness will begin to add undesirable edging artifacts as seen on the right hand sample.

OVERSCAN TEST

(figure 33)*
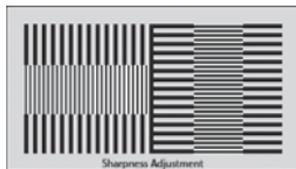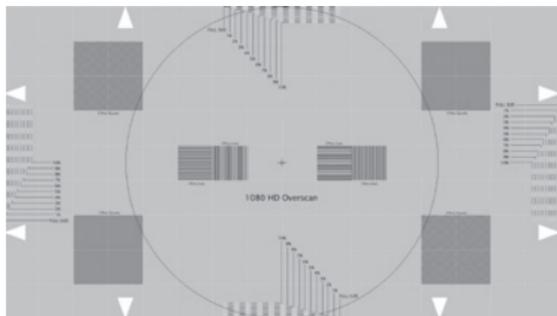
The extreme edges of a video image are generally hidden from view by either physically masking the borders with a bezel or by scaling the image up electronically to push the edge of the image off screen. Electronic enlargement of the video image is called "overscan." This chart (figure 33) will reveal whether electronic overscan is present and how much of the screen margins, if any, are missing.

The highest resolution digital displays rely on having a pixel count exactly matching an HDTV or Blu-ray™ signal, namely 1920 horizontal pixels by 1080 vertical pixels. The pixels in the video should precisely overlay the physical display elements on the monitor. Electronic overscan on digital displays will degrade the image slightly by resizing the video so it is no longer pixel accurate against the physical structure of the display. If possible, disable electronic overscan for the best image results.

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Observe the darker square areas on the chart. They should appear to be a flat grey when viewed from a distance. Viewed closely, the pixels in both the 1 Pixel checkerboard and 1 Pixel line patterns should line up exactly with the physical pixels on the display. If they don't you may see a pattern within the squares indicating the image is scaled. Scaling does not allow a pixel for pixel match between the video source and the display, degrading overall resolution. Below are examples *(figure 34)* of what some of the grey squares should look like when unscaled (top row) and scaled with electronic overscan (bottom row). These tests will only work properly with a native 1920x1080 pixel monitor.

DIGITAL DISPLAYS

2 Pixel Squares   1 Pixel Squares   1 Pixel H Lines   1 Pixel V Lines

UNSCALED

SCALED
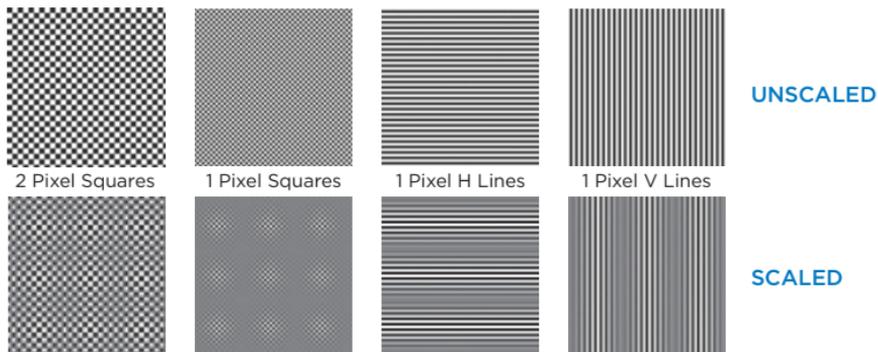
(figure 34)

On the next page, look at the top, bottom and both sides of the chart. Ideally, the white arrows should be touching all four edges of the screen without the tips cut off. There should also be no space between the tips of the arrows and the screen edge. This is usually not the case as most digital displays are oversized or masked by a few percent.

IMAGE MASKING PERCENTAGE

Read the percentage of overscan directly from the edge markings by determining which percentage line is the first one unmasked *(figure 35)*. The readings should be uniform on all four sides. If the readings are not uniform, the image is not centered on the display area.

DIRECT VIEW CRT DISPLAYS

Most direct view CRTs will exhibit some form of overscan. The percentage of overscan may be read in the same way as a digital display. Since there is no expectation that pixels in video will precisely correlate with the CRT's physical structure, you may ignore the tests using the grey squares.

(figure 35)

PROJECTION DISPLAYS

This chart *(figure 36)* may be used to set up projectors so they are square with the screen. Observing the white arrows on all the edges, use the sizing options on the projector to make the tips

*(figure 36)**

*Digital Reference Standard
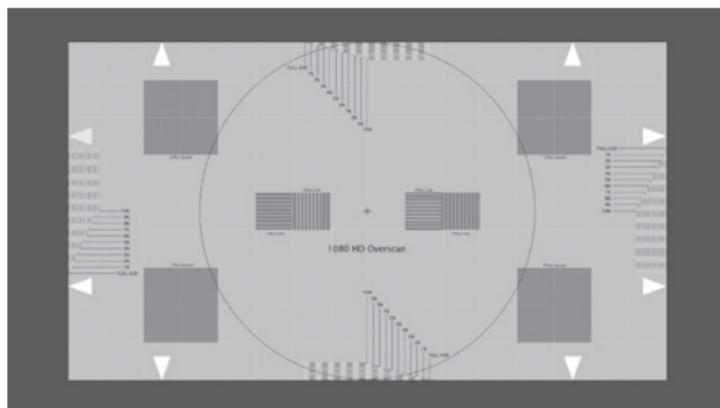
of the arrows just touch the margins of the screen. Preferably, an optical zoom on the lens should be used instead of electronic sizing controls. The circle on the test pattern will reveal whether the projector is set to the correct aspect ratio. If necessary, use the horizontal and vertical sizing controls to make the circle true. The white grid pattern on the grey background and the arrows will assist in leveling the image and detecting keystone effects. The horizontal lines should be level and the vertical lines should be uniformly perpendicular to the floor. The white lines will assist in registering older 3-CRT projectors. The single pixel squares and text on the chart will assist in focusing the projector. Test patterns specific to setting up projection equipment are available elsewhere on this disc.

AUDIO/VIDEO SYNC TEST

This moving test pattern will indicate whether audio events are in sync with video events. There are adjustments in some digital audio systems that will affect audio sync against video.
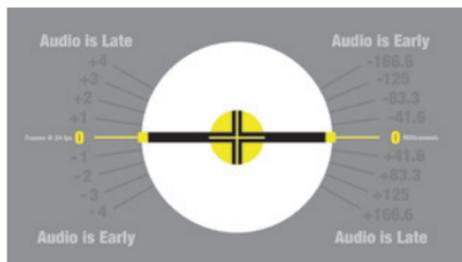
(figure 37)*

The center of this test pattern *(figure 37)* rotates once every two seconds. Accompanying the video is a continuous audio tone interrupted by a louder tone when the rotating marker coin-

INDICATORS

cides with the "zero" marks. Watch the markers (calibrated for both television frames and milliseconds) and listen for the tone to emphasize exactly when the zero markings light up yellow.

ADJUSTMENT   If the emphasized tone and zero markings appear to coincide, your audio delay is probably in good alignment. You can double check by watching the markings before and after the zero markings. If the emphasized tone seems to hit on one of the marks before or after zero, use the numbers shown to adjust your audio delay to bring the events into complete synchronization with the video.

PURITY TEST

(figure 38)*

This set of patterns are flat field pure colors; Red, Blue, Green, Black and White. The purpose is to place the monitor in a number of situations that might point out dead pixels in individual colors and reveal non-uniform brightness across the surface of the display. Step through each of the colors and examine the screen carefully, edge to edge and top to bottom.

DEFECTIVE   In the case of digital displays, such as LCD, OLED, DLP, Plasma
PIXELS   and others, look for individual pixels that do not appear to be functioning. Depending upon the display type, the reasons for a defective pixel will vary. A defective pixel may cause no light to be emitted (black) or the defect may cause light to always be emitted (white or single color). This condition may be the result of a stuck pixel *(figure 39)*.

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Check your display with each of the flat field images for purity or uniformity issues. Is the entire screen evenly lit with each of the colors? Are there "hot spots" or dark areas? Are the solid primary colors contaminated with other colors? The example on the previous page shows a flat green field with no pixel or purity defects *(figure 38)*. The example below on the right shows a flat red field with uniformity issues *(figure 40)*. With flat panel displays, non-uniform brightness may be an indication of defective backlight sources, twisted display panels or irregular pressure on the monitor cabinet due to improperly installed mounting brackets. Call a service technician if the defect is serious. Do not attempt to disassemble or repair the monitor yourself.

DEFECTIVE PURITY
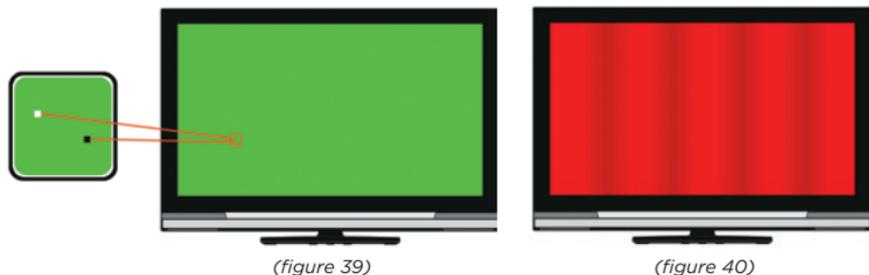
(figure 39)

(figure 40)

SCALING TEST

ONE PIXEL CHECKERBOARD

The sharpness and clarity of a High Definition video source depends upon accurate pixel for pixel reproduction of the source material on the monitor. This test pattern is a black and white checkerboard with one pixel spacing. The monitor is expected to display individual black and white pixels without blending against neighboring pixels or creating artifacts. This pattern is intended for observation only as few controls are available to affect the outcome.
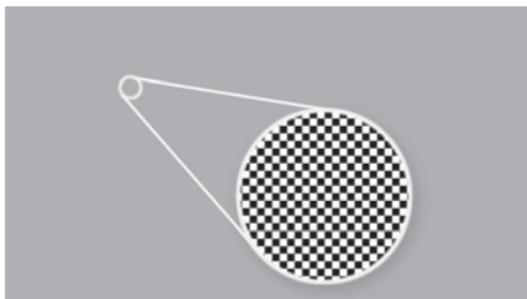
(figure 41)*

From a distance, the monitor may appear to be flat grey. Looking closely, however, you should see the individual checkerboard squares as shown in the inset. This condition is only possible in systems that are digitally connected and do not scale the image *(figure 41)*.

ARTIFACTS If the display system is scaling the image, artifacts will appear in this test pattern that represent the impairment of a full resolution image. Below is an example of what these artifacts may look like *(figures 42 & 43)*. They are created when the pixels of the test pattern do not exactly overlay the pixels of the display causing an "alias" pattern to appear. Check your system for opportunities to disable monitor overscan or other resizing functions.

BLURRING If your connection to the monitor is analog, you may also experience additional blurring. For best results, use digital connections throughout your entire video system.

(figure 42)

(figure 43)

*Digital Reference Standard

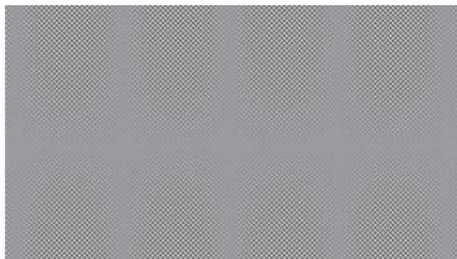## ADVANCED SCALING TEST 1

ALTERNATING HORIZONTAL PIXELS

The sharpness and clarity of a High Definition video source depends upon accurate pixel for pixel reproduction of the source material on the monitor. This test pattern is uniform black and white pixels alternating across the width of the display. The monitor is expected to display individual black and white pixels without blending against neighboring pixels or creating artifacts. This pattern is intended for observation only as few controls are available to affect the outcome *(figure 44)*.
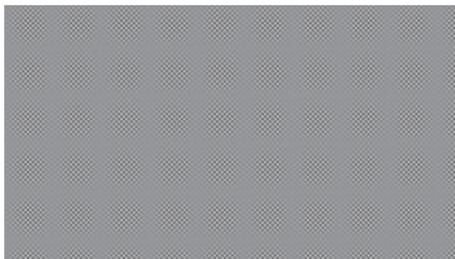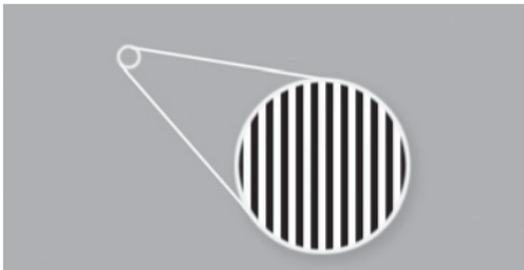

(figure 44)*

OBSERVATION

From a distance, the monitor may appear to be flat grey. Looking closely, however, you should see the individual vertical lines as shown in the inset. This condition is only possible in systems that are digitally connected and do not scale the image.

ARTIFACTS

If the display system is scaling the image, artifacts will appear in this test pattern that represent the impairment of a full resolution image. On the right is an example of what these artifacts may look like *(figure 45)*. They are created when the pixels of the test pattern do not exactly overlay the pixels of the display causing an "alias" pattern to appear. Check your system for opportunities to disable monitor overscan or other resizing functions.

(figure 45)

If your connection to the monitor is analog, you may also experience additional blurring. For best results, use digital connections throughout your entire video system.

ADVANCED SCALING TEST 2

ALTERNATING VERTICAL PIXELS
This pattern is a variation of the One Pixel Checkerboard using only the alternating vertical pixel component *(figure 46)*. The purpose is to single out system timing and artifact creation in the vertical dimension of the image.

From a distance, the monitor may appear to be flat grey with

(figure 46)*

OBSERVATION individual horizontal lines visible on close observation as shown in the inset. Proper display of this pattern is generally possible in analog or digital systems that do not scale the image vertically.

ARTIFACTS If the display system is scaling the image, artifacts will appear in this test pattern that represent the impairment of a full resolution image. On the left *(figure 47)* is an example of what these artifacts may look like. They are created when the pixels of the test pattern do not exactly overlay the pixels of the display causing an "alias" pattern to appear. Check your system for opportunities to disable monitor overscan or other resizing functions.
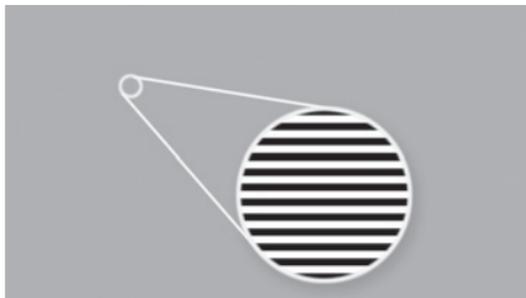

(figure 47)

*Digital Reference Standard

Blurring in the vertical dimension is not expected unless your system is scaling the video. It's also possible that some video signal processing to enhance vertical resolution may be at work in your system. While this enhancement may be subjectively pleasing on lesser quality video, such as up-scaled Standard Definition video, it will actually degrade vertical resolution on high quality native High Definition material. Disabling artificial enhancement on native HD programs is recommended.

ZONE PLATES

Zone Plates are multi-dimensional test signals that show the interaction between video elements in a range of packing densities and the electronic systems processing them. Two zone plates are provided on this disc *(figure 48)*.

This test signal is a compound frequency sweep in both the horizontal and vertical directions. The resulting test pattern will theoretically cross most of the sensitive areas where signal processing and display technologies are likely to create artifacts. The most common artifacts are called "aliasing," which refers to secondary patterns not present in the original signal. These secondary patterns may come from scaling the image, video filtering or some other transformation affecting the original
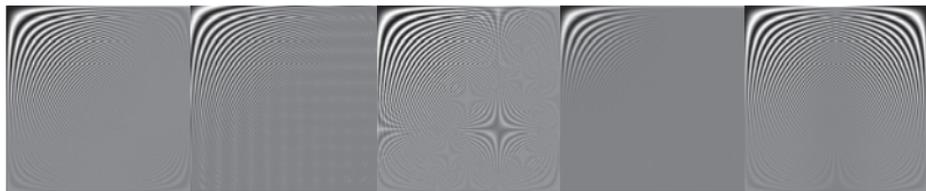

(figure 48)*

*Digital Reference Standard

test signal. Some amount of aliasing is normal due to the limitations of video systems. However, irregularities in signal processing or display technology will show themselves using this pattern.

Below are several examples of what the hyperbolic zone plate may show *(figure 49)*. The first box on the left is a section of the original test signal without impairments. In a perfect system, the test signal will be displayed unaltered. The second example shows scaling artifacts indicated by regular horizontal and vertical aliases. The third example shows filtering artifacts from applying too much sharpness, causing adjacent video elements to interact with each other. The fourth example shows a lack of high detail. There are many other variations of these artifacts, which may require more thorough analysis by professionals.

*(figure 49)**

SINUSOIDAL ZONE PLATE This test signal consists of concentric rings with increasing packing density as they move away from the focal point. This test pattern contains elements that cross many boundaries within a video

system, possibly revealing aliases caused by scaling, interlacing, filtering or poor alignment *(figure 50)*.

To the right are two examples *(figure 51)* of possible artifacts that stem from filtering and scaling the original test pattern. If the test pattern on your monitor displays fairly

*(figure 50)**

*Digital Reference Standard

extreme artifacts or aliases, you may also see other impairments on program video. Consult a service technician to diagnose and find a possible solution to the problem.

On interlaced display systems, this test pattern may show artifacts due to interlace "twitter." The impairments found in interlaced video are inherent in the format. Attempts to remedy the artifacts may solve the impairments but may well introduce others. If your equipment has settings and adjustments that relate to smoothing or filtering, test the settings with the zone plates to gauge their effects on program video.
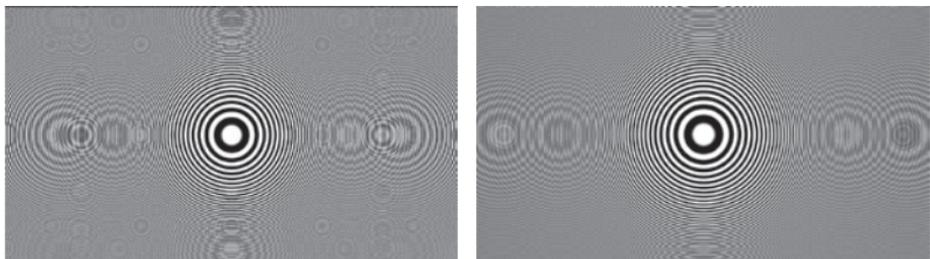
(figure 51)

WHITE-BLACK CLIPPING TEST

COMPOUND CHECKERBOARD
This is a moving test chart that embodies many elements of the individual white and black checkerboard charts. It also contains a test area to determine the actual black and white clip points for your display *(figure 52, see next page)*.

The middle dark band of the test pattern is used to adjust the residual brightness on the monitor so that the darkest geometric shapes on
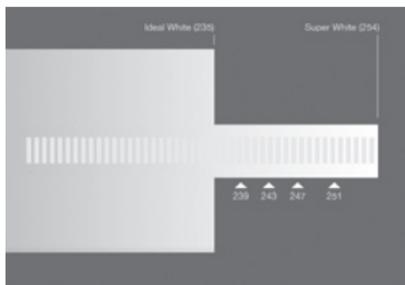
BRIGHTNESS

(figure 52)*

the left below "Ideal Black" begin to blend into the background. The residual brightness is most easily set in a darkened room but should be adjusted in room lighting typical of the viewing environment.

The top band of the test pattern is used to adjust contrast to achieve the desired white levels relative to room lighting. Adjust the Contrast

CONTRAST control of your monitor until the "Ideal White" elements are fully visible, allowing the brightest geometric shapes on the right side above ideal white to be barely visible against the background. This utilizes the maximum Contrast capability of your monitor. You may wish to reduce this setting if the screen appears too bright in a darkened room. Brightness and Contrast interact and will require several iterations of both adjustments for proper setup.

CLIP POINTS The bottom strip of the test chart contains a continuous grey scale ramp, which runs from ideal black on the left to ideal white on the right. On either end of the ramp are extensions that continue the

(figure 53)

ramp beyond the ideal levels into Super Black and Super White. Within these extensions are vertical hash marks set to ideal black on the left and ideal white on the right. When Brightness is properly set, you will not see hash marks darker than ideal black on the left portion of the chart. The right side *(figure 53)* tests for the amount of white "headroom" available by observing where the background stops getting brighter against the ideal white hash marks. All hash marks

move occasionally to make themselves more visible. Read the numeric markings along the bottom edge where the brightness stops changing for the digital value of white headroom.

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GAMMA RESPONSE

Gamma correction was introduced into television signals to compensate for the non-linear brightness response of CRT displays. An original image on a CRT without gamma compensation would appear darker with too much contrast. The blacks would appear muddy while slightly brighter parts of the image would appear too bright. In the early days of television, it was decided that this deficiency in the CRT display should be compensated at the camera, boosting mid range grey while leaving blacks and whites undisturbed. Although display technologies have changed and the CRT has become rare, images are created and stored today with gamma compensation to remain compatible with historical images and all display systems. Television and monitor manufacturers apply gamma compensation for their unique display technologies to create a standardized image. This chart *(figure 54)* will reveal what the gamma number of your display device is.

(figure 54)*

*Digital Reference Standard
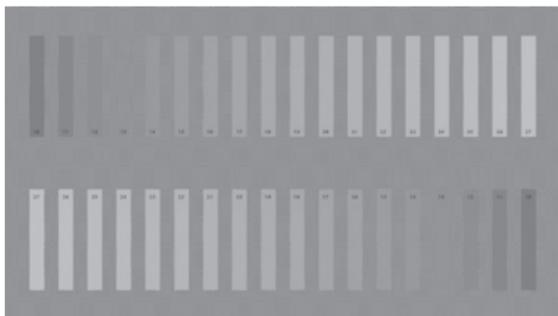
This test chart *(figure 54)* consists of a fine grain black and white checkered background, which should appear flat grey from a distance. Our eyes will average the black and white elements together to approximate 50% grey. If you are using a digitally connected flat panel display, this chart will only work well if the display presents a pixel accurate 1920x1080 image without overscan. Disable the overscan setting on your monitor if possible or the results are likely to be invalid.

CLIP POINTS The vertical bars are 50% grey with varying degrees of gamma compensation. The darkest vertical bar is 50% grey with no gamma compensation, marked "1.0." The vertical bars appear incrementally brighter across the chart as the gamma compensation number increases. While standing back from the display, notice which vertical bar seems to blend best into the checkered background. The standard gamma target is "2.2." If your monitor has gamma settings, it should be left in the "normal" position for the most accurate image reproduction.

GRAYSCALE

The Grayscale test pattern *(figure 55)* may take many forms but the elements are always examples of full black, full white and shades of grey in between. This pattern will run the Red, Green and Blue channels of the display system through the entire available brightness range. A truly accurate rendition of the test pattern will not contain color shifts at any point. A color shift indicates one or more of the color channels' failure to track the grayscale properly.

SERVICE ADJUSTMENTS If a monitor presents color shifts along the path of the grayscale, it will require qualified service personnel with specialized instruments to repair the issue. Do not attempt to open the monitor and perform these adjustments yourself.

Both the continuous grayscale and the 10 step grayscale present ideal black, ideal white and shades of grey in between. The continuous grayscale strips on the top and bottom are bisected by a special grayscale, labeled the "High Scale Ramp," *(figure 56)* which exceeds the contrast performance expectation of most monitors. The extreme ends of the High Scale Ramp are absolute digital white and black. Near the ends of the High Scale Ramp are reference dots that indicate the points where the ramp is expected to clip or stop changing brightness. The example on the right shows the High Scale Ramp continuing to brighten compared to the Ideal Ramp as it nears the right edge of the pattern. The example on the left shows the expected High Scale Ramp blending into the Ideal Ramp as it approaches the end.

USER ADJUSTMENTS

If there are questions about the accuracy of Brightness and Contrast settings, return to the Color Bar pattern to adjust these parameters.
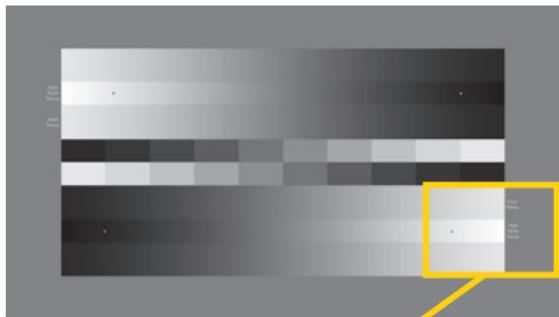
(figure 55)*
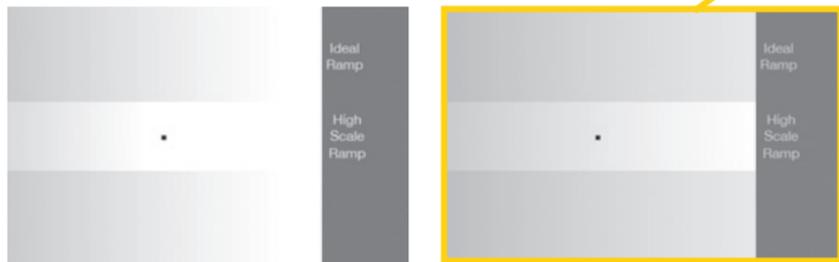
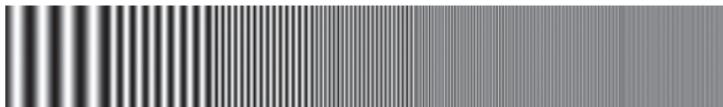*(figure 56)*

COMPOUND TEST CHART

(figure 57)*

As a quick reference, this chart *(figure 57)* embodies many of the patterns found elsewhere on this disc. It also contains unique patterns used for checking display response and alignment. It is not intended to be used as an ultimate setup tool, rather as a "status at a glance" to quickly check a display device for proper operation.

COMPONENTS The background of this chart embodies the crosshatch pattern and edge marking arrows found elsewhere on this disc. Use these elements to gauge the basic sizing and geometry of your display system. A centered circle assists in determining whether proper aspect ratio is present. Also present are Action Safe and Title Safe boundaries representing commonly used margins for screen content.

A Multiburst signal *(figure 58)* indicates basic frequency response of your display system. If your display uses analog connections, the portions of this test strip with higher packing density may begin to degrade into a flat grey field instead of showing the high details within. The markings on individual chips on this chart will help quantify the limits of your display system.

(figure 58)*

*Digital Reference Standard

A PLUGE strip with ideal black and ideal white labeled with a "0" (zero) mark, along with several shades on either side, may be used to check the brightness and contrast adjustments of your display *(figure 59)*. The black +1 chip should be visible while the -1 and -2 chips should not with proper brightness settings. Similarly, the white +1 chip should be visible to confirm proper contrast settings. Use the appropriate full screen PLUGE patterns, located elsewhere in this disc, if adjustment is necessary.
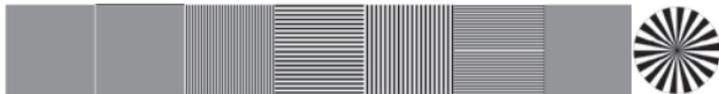

(figure 59)*

A Color Bar strip displays the basic accuracy of hue and color levels *(figure 60)*. Use the blue filter provided to check this setting if necessary. Use the full screen color bar signal found elsewhere on this disc to confirm proper color alignment.
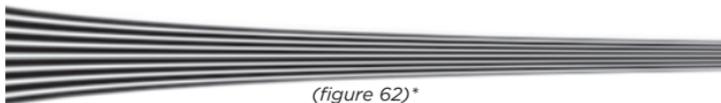

(figure 60)*

Elements testing for resolution performance and scaling artifacts are seen in multiple pixel count chips including one, two and three pixel patterns on a single strip *(figure 61)*. Several of these patterns are found as full screen charts elsewhere on this disc. Also present in this compound test chart is a basic focus wedge to assist with setting up projection equipment.

(figure 61)*

Vertical and horizontal wedge patterns will quickly determine the amount of degradation present in high resolution elements. The vertical wedge *(right side, figure 57)* is calibrated in MHz while

the horizontal wedge *(figure 62)* is calibrated in TV Lines. These indicators are intended for analog connected devices. While the readings are subjective, they are useful in quantifying basic system performance.

(figure 62)*

(figure 63)*

Sharpness setup blocks are included to assist in adjusting aperture correction or sharpness found in most display systems *(figure 63)*. Use these blocks in conjunction with other high resolution elements of this chart, including text, to sharpen the image without over exaggerating high detail.

If any of these parameters appear to be out of adjustment, confirm them using the test signals dedicated to the specific adjustments, located elsewhere on this disc.

ADVANCED AUDIO SET UP TOOLS
SPL METER NOT REQUIRED

▶ **Speaker ID, Polarity Test, Noise Floor, Buzz & Rattle Test**

▶ **A/V Sync**

SPEAKER LEVEL ADJUSTMENT
SPL METER REQUIRED

LEVEL ADJUSTMENT TEST This test will allow you to adjust the level of each speaker to ensure that your system is balanced from left to right and from front to rear. When properly adjusted, the speakers will produce the most

*Digital Reference Standard

lifelike sonic presentation and allow a soundtrack to be heard as the producer and recording engineer intended.

The test signal used will be band-limited pink noise. If you have remote control capability for level adjustment on your system, use the remote to begin the test, seated in your normal viewing position. Adjust the individual channels for equal volume at that position.

For best results, use a sound pressure level meter to adjust channel levels. A comfortable volume is usually between 78 dB and 85 dB as measured on a Radio Shack or equivalent sound level meter set for C weighting and slow response.

It is important to keep in mind that music and sound tracks are dynamic, that is they have loud and soft passages. Properly setting the levels should allow the loudest passages to have impact without distorting the sound.

As you set your levels, do not try to set them at maximum volume.

SUBWOOFER LEVEL ADJUSTMENT
SPL METER REQUIRED

This portion of the audio test is specifically for subwoofer setup. If you do not have a subwoofer or it is not connected to your receiver, please proceed to the next audio test.

TEST DESCRIPTION

Just like the other speakers in your system, the subwoofer should not be set for maximum output. Because this is a very demanding test, prior to commencing, be sure to reduce the level of the subwoofer to no more than 50% of its maximum output.

The band of pink noise generated by this test is specifically directed to the LFE Channel (low frequency effects) and will help you position your subwoofer to the most desirable location in your listening environment that will allow you to get the maximum volume without distortion. Once this position is located, often in or near a corner, select the phase setting (if one is available) for maximum volume without distortion.

You will now need to adjust the subwoofer level control to 3 dB higher than the sound pressure level used during the speaker level adjustment section on this disc. If you find that the subwoofer volume control is set for maximum, you will need to reduce the sound pressure level used during the level adjustment test in the previous section by approximately 3 dB. Then, repeat both tests. A properly calibrated subwoofer will reduce the potential for distortion or premature failure.

HD SHOOTOUT

In this section, we provide a comparison of both Picture and Sound Quality between Standard Definition DVD and High Definition Blu-ray™ Disc formats. In addition, we have included both Stereo and Surround versions of the same sound track so you can directly compare Multi-Channel Audio experiences.

ENCODER STRESS TEST

The Video Encoder Stress Test is specifically designed to push the limits of your professional video encoding system. In this test, you will encounter the most difficult possible video encoding challenges all running simultaneously on one screen.

We invite you to access the original files for this test in the ENCODER STRESS TEST folder of this disc. With these files, you can test and measure your own video encoder and compare your results to our Benchmark Reference Video Encoder, produced using the best available professional equipment and the industry's most talented compression artists and engineers. Press ENTER on your remote to proceed.

A/V TOOLS DIRECT ACCESS

This control allows you to bypass the regular menus and go to a list of all A/V Tools where you can access the tool of your choice directly.

PIXEL FLIPPER

The Pixel Flipper is a tool that will exercise all of the pixels on your screen. Each and every pixel will be turned on and off between 24 and 29 times per second. The Pixel Flipper attempts to fix plasma burn-in and repair stuck LCD pixels. Please note that not all pixel issues can be corrected by this process. At a minimum, it is rec-ommended that you run the Pixel Flipper for at least 1 hour. If this does not correct the problem you are having, you may want to try running the Pixel Flipper overnight. When ready, please press the "Enter" key on your remote to begin running the Pixel Flipper. You may press "Enter" again to stop the tool.

BD-LIVE™ EXPERIENCE

Access the Disney BD-Live network – for a sneak peek at upcoming Disney Movies.

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