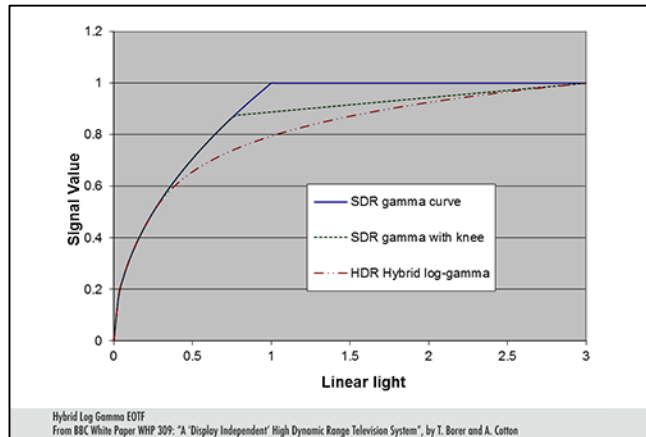




I n s t r u c t i o n | M a n u a l

# Introduction



Hybrid Log Gamma (HLG-HDR) is a high dynamic range standard created with a joint effort by The BBC (British Broadcasting Corporation) and The NHK (Japan Broadcasting Corporation). HLG has also been coined “ARIB STD-B67” by the Association of Radio Industries and Businesses (ARIB). Hybrid Log Gamma is also unique in the sense that it is compatible with both standard and high dynamic range display devices and all without the use of metadata.

Since current UHD/HLG-HDR test patterns are limited, I have created an entire suite of UHD/HLG-HDR test patterns that adhere to industry standards. This project follows the same idea behind my “UltraHD/HDR-10 Pattern Suite”, an attainable solution to calibrate and/or measure your new UHD/HLG-HDR enabled display without having to spend thousands on a new test pattern generator. I have created all new test patterns from the ground up, triplets that utilize precise RGB to YCbCr BT.2020 conversion, and H.265/HEVC encoding. This project was also designed around a familiar layout, “Basic Setup Patterns”, “Advanced Setup Patterns” (which include full 5% and 10% window suites) and a vast “Miscellaneous Patterns” section for reference verification.

These test patterns can be download and stored onto a flash drive and/or an external hard drive for playback on any compatible UHD/HLG-HDR enabled display or UHD Blu-ray player via USB. These test patterns have also been encoded separately into individual files for ease of use and flexibility. Please visit our website at [diversifiedvideosolutions.com](http://diversifiedvideosolutions.com) for other instruction manuals, products, services, support and see what other video calibration solutions we have available. Thank you for your support!

## Quick | Links

[DVS UHD | HDR-10 Test Patterns \(AVS Forum\)](#)

[CalMAN Video Calibration Software](#)

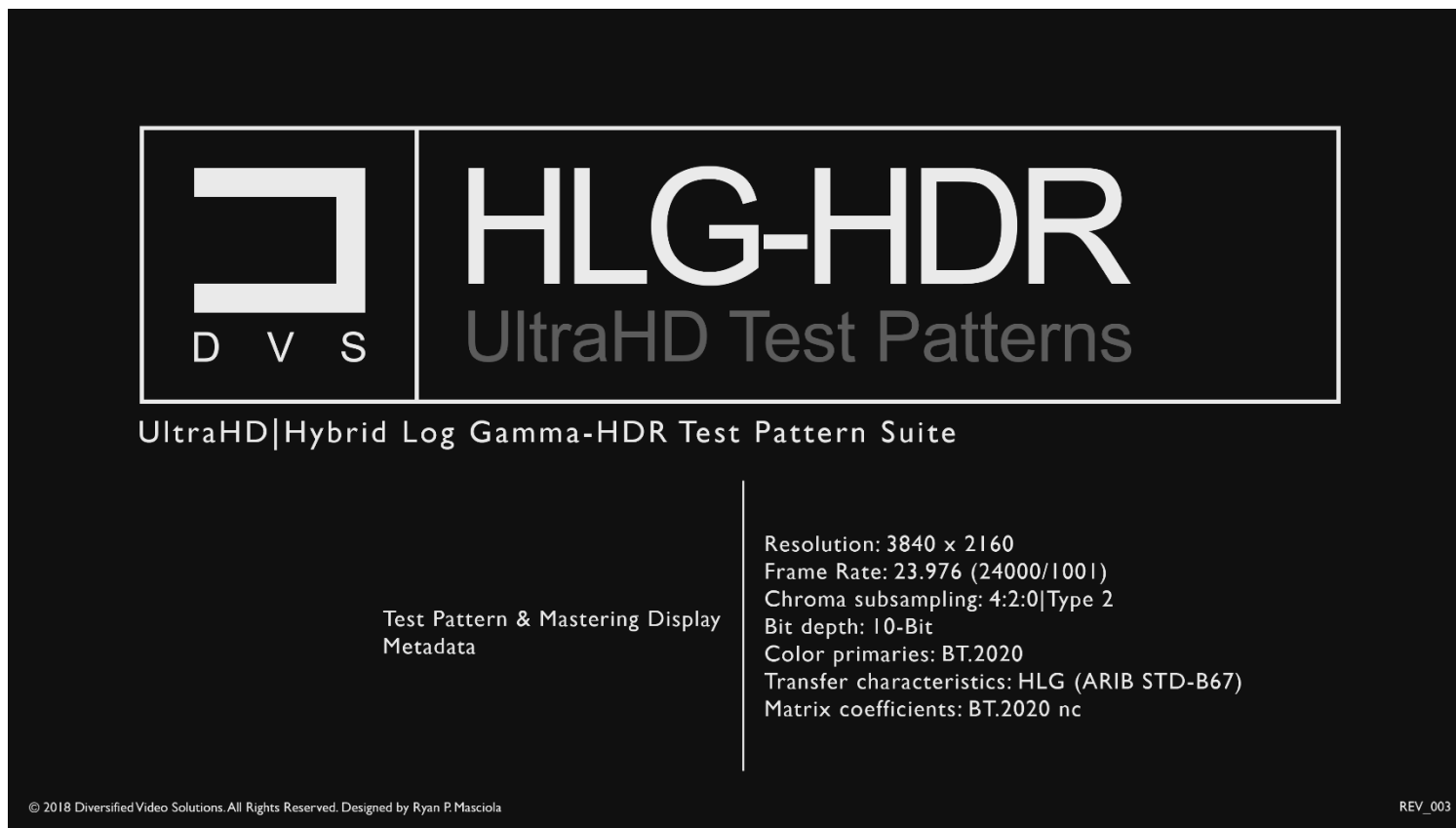
[Color HCFR Calibration Software](#)

[Diversified Video Solutions \(The Official Site\)](#)

[ChromaPure Video Calibration Software](#)

[Kalibrate Limited \(The Official Site\)](#)

# DVS UltraHD/Hybrid Log Gamma Test Pattern Suite



## Overview

This test pattern suite offers a comprehensive set of reference patterns to assist in the calibration of your UHD/HLG-HDR enabled display. This suite is comprised of 1,200+ patterns that adhere to the newly regulated standards created by the UHD Alliance and guaranteed triplet perfection. We have broken down the pattern sets into 3 sections Basic Setup Patterns, Advanced Setup Patterns and Miscellaneous Setup Patterns.

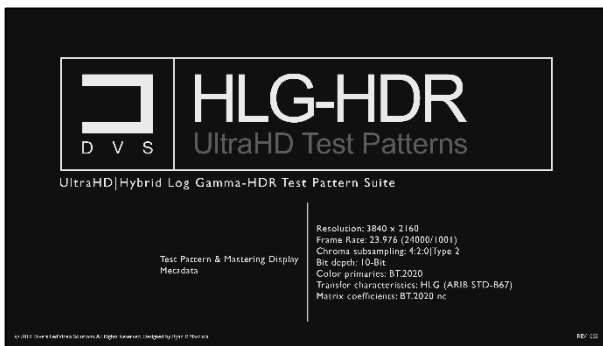
## Calibration software

[Color HCFR \(version 3.5.1.XX\)](#) - A free yet very intuitive calibration software that is compatible with a wide variety of meters. Coined as a Video Projector/Monitor Calibration Software originally developed as ColorHCFR. This code base is based off version 2.1 and will aim for a more open development process and integrates an ArgyllCMS interface for continued support and development.

[ChromaPure \(version 3.1.XX\)](#) - A paid for software built around a very simplistic yet powerful infrastructure. Simply click one of the buttons along the left side of the program window to open one of its modules. Each module performs a different video calibration function and allows the user to quickly bring a any video display with adequate controls into conformity with industry standards.

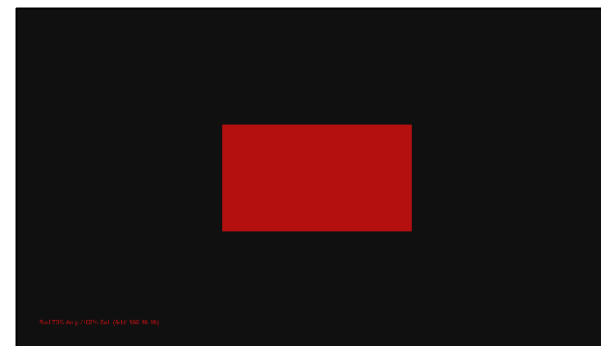
[CalMAN \(version 5.9.XX\)](#) - A paid for software with an extremely powerful engine, customizable workflows, and compatible with almost all available meters, reference pattern generators, and standalone video processors. One of the most comprehensive and flexible calibration software packages available.

# Basic Setup Patterns



## Title

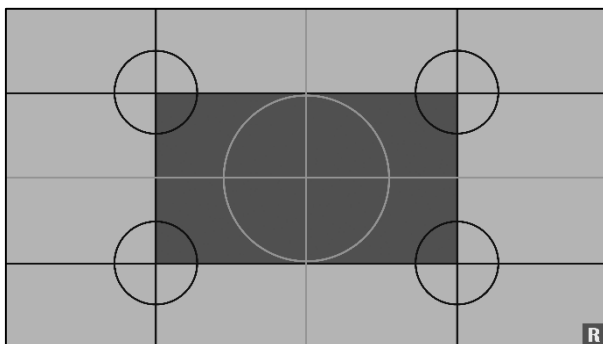
Displaying test pattern information, current revision and copyright. This clip provides pertinent information about the test patterns within the entire suite and will be updated accordingly per revision.



## Color Profiling

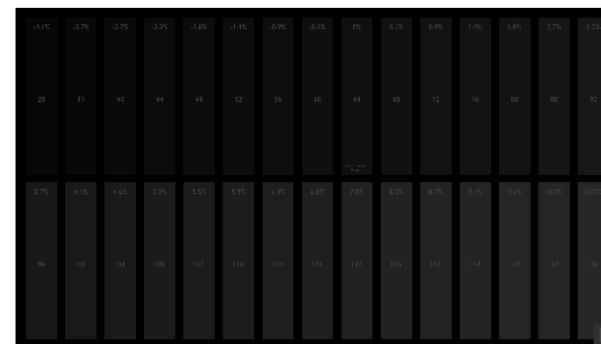
These patterns were designed to improve the accuracy of a filter-based colorimeter by creating a calibration profile with a reference spectrophotometer. This profile, applied against your colorimeter measurements, corrects the inaccuracies of the filter-based meter. This makes the colorimeter mimic the accuracy of your

spectrophotometer for this specific display.



## Meter Position

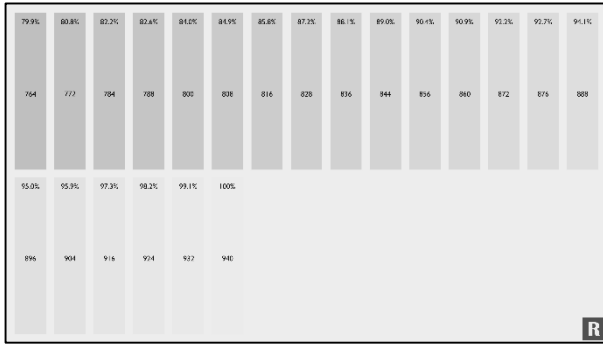
Designed to assist with the centering of your video calibration meter.



## Black Clipping

Demonstrates how well tone mapping is applied on the lower end of the digital range. With triplet code value 64 as your reference point. A properly adjusted display should show bar 64 barely flashing, with bar 64 blending completely into the background. However, depending on how well the tone mapping is implemented, a code value of 72 or 76 may be acceptable. Representing .001 and .004 nit respectively.

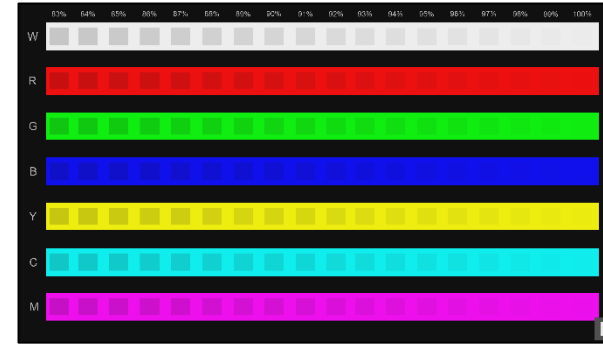
# Basic Setup Patterns continued



## White Clipping

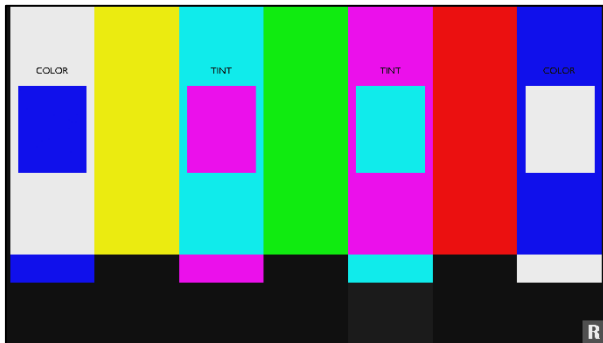
This pattern demonstrates how well your display implements the HLG-HDR gamma curve. The low end patches utilize a typical gamma approach. Whereas the higher end utilizes a logarithmic curve, which expands to a wider range of peak brightness. You should see a neutral shade of gray across the entire range with

flashing bars up to 100%. This mark represent the peak nit output of your display.



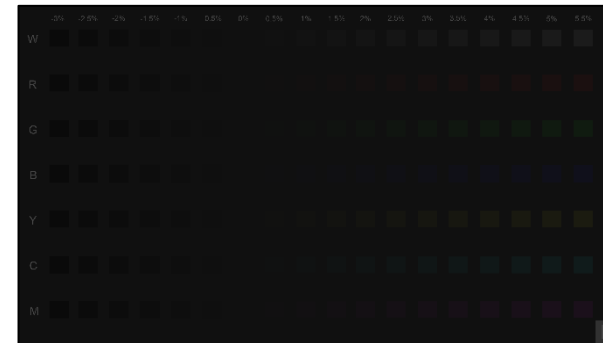
## Color Clipping High

Similar to the white clipping test pattern. This demonstrates how well your display implements the HLG-HDR gamma curve. The low end patches utilize a typical gamma approach. Whereas the higher end utilizes a logarithmic curve, which expands to a wider range of peak brightness.



## Flashing Color Bars

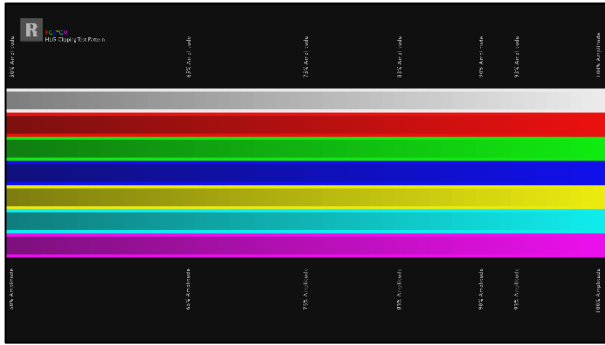
You can use this pattern to reference the color and tint accuracy of your display. If your display is one of the few that includes a color only mode, it can be used to adjust color and tint independently, within each color.



## Color Clipping Low

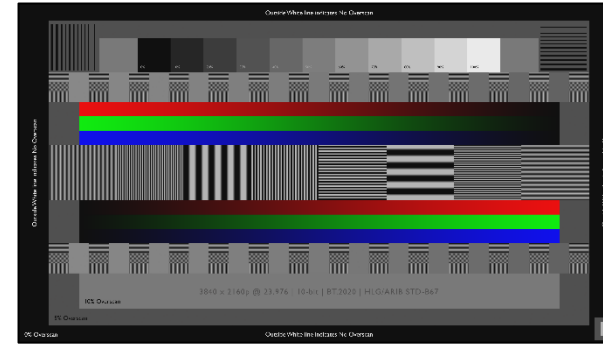
This pattern displays colors clipping on the low end of the spectrum. It's Not Vital that all colors flash near the 0% mark, so long as none of the colors flash past mark 0% mark or further. This would imply an elevated black floor or lifted brightness.

# Basic Setup Patterns continued



## HDR Clipping Mix

Similar to the Color Clipping High test pattern. This demonstrates how well your display implements the HLG-HDR gamma curve. The low end patches utilize a typical gamma approach. Whereas the higher end utilizes a logarithmic curve, which expands to a wider range of peak brightness.

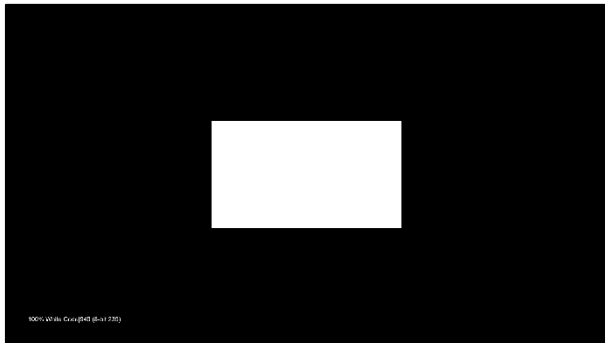


## Sharpness & Overscan

You can use this pattern to properly adjust your display's sharpness and overscan in order to fill the entire screen properly. Typically, lower sharpness values are recommended. However, if the image looks soft, raise the value until you see ringing or noise around any of the black bars or lines within the pattern, then make adjustments accordingly until the ringing goes away. Overscan can be adjusted utilizing the 3 available overscan marks within the pattern. For absolutely no overscan, select your display's setting that exposes the entire white border outlining the pattern.

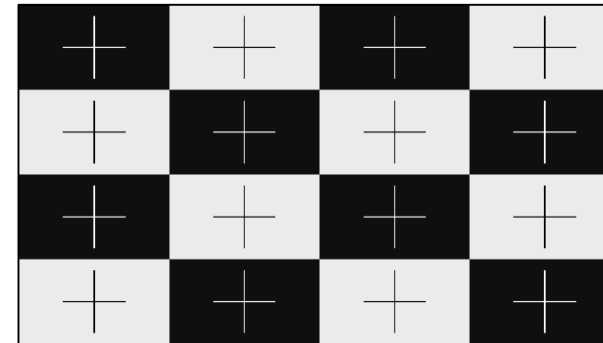
then make adjustments accordingly until the ringing goes away. Overscan can be adjusted utilizing the 3 available overscan marks within the pattern. For absolutely no overscan, select your display's setting that exposes the entire white border outlining the pattern.

# Miscellaneous Patterns



## Contrast Ratio

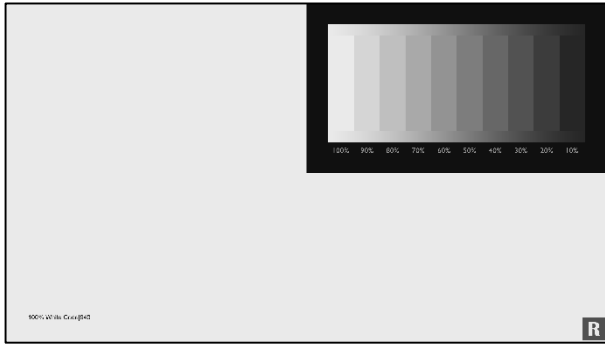
Utilizing a meter. Measure the absolute peak luminance and black level of your display. These measurements will provide you with your display's dynamic contrast ratio.



## ANSI Contrast

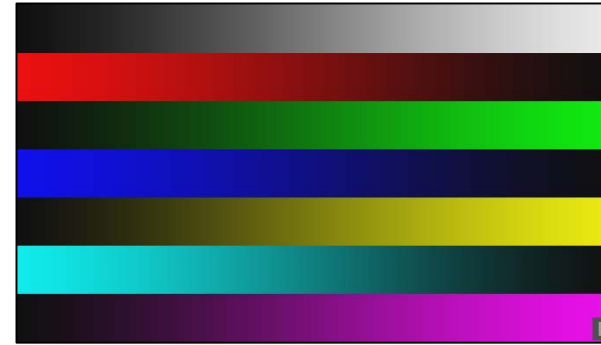
Utilizing a meter. Take individual ANSI contrast measurements of your display. This will provide a true representation of your display's native contrast ratio.

# Miscellaneous Patterns continued



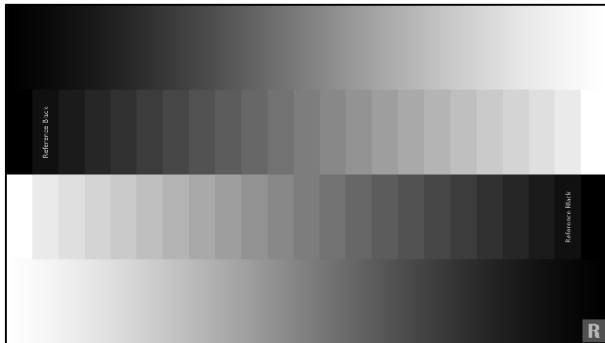
## Dynamic Contrast

Primarily utilized for quick observations. Check for any possible changes that might occur as the APL varies. As the full field pattern cycles, watch for any changes within the grayscale window. If the grayscale changes with the cycle, your display is dynamically adjusting picture levels.



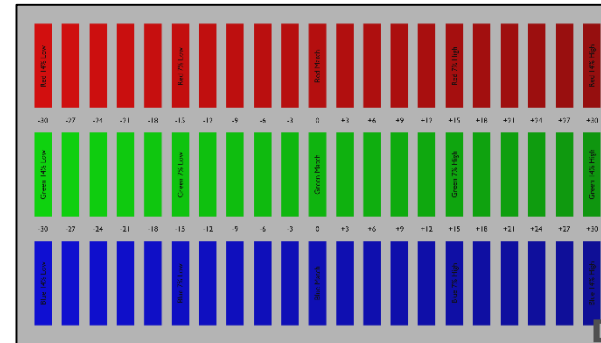
## Color Ramps

This pattern set provides a multitude of 10-bit gradients and steps for both primary and secondary colors. These patterns range from 0% to 100% (10-bit digital range 64 – 940).



## Grayscale Ramps

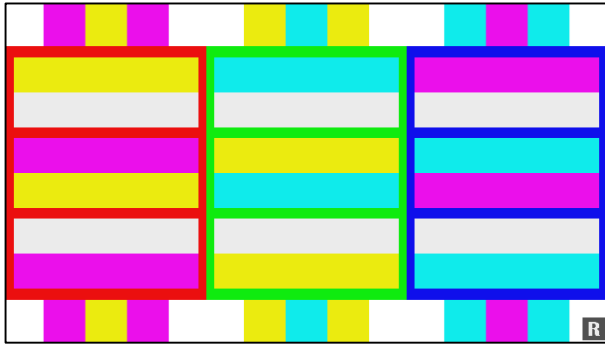
This pattern set provides a multitude of 10-bit gradients and steps for grayscale. These patterns range from 0% to 100% (10-bit digital range 64 – 940).



## Color Decoding

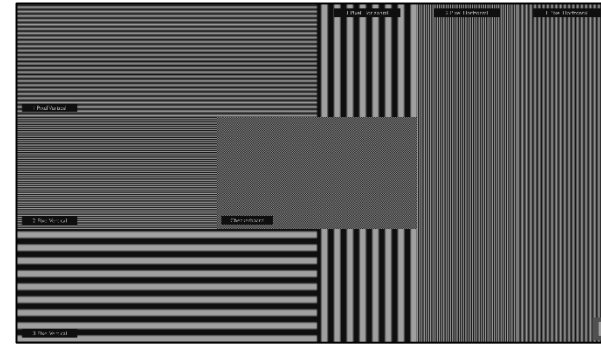
This pattern can be used to observe how the primary colors (red, green and blue) relate to gray. In order to take full advantage of this test pattern, a display device with a color only mode is necessary.

# Miscellaneous Patterns continued



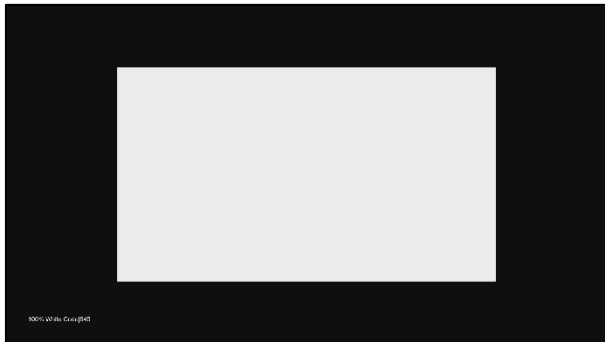
## Flashing Color Primary

This pattern shows red, green, and blue bars (primary colors) and the three related secondary colors (yellow, cyan, magenta) flashing on top. Above and below each primary color the two secondary colors related to the primary color also flash in between.



## Resolution Patterns

This pattern file folder encompasses nine different 10-bit/UltraHD resolution test patterns. Testing your display's native ability to resolve fine detail within a 3840 x 2160 pixel space. These patterns have been divided into horizontal & vertical patterns, with a 1, 2, or 3 pixel count in width, checkered board, mixed resolution



## Grayscale Sweeps

This pattern file folder is comprised of ten subsection that include 11 step grayscale sweeps at different patch sizes. The patches range from 2% all the way up to Full Field. Utilizing a meter, you can observe any change within measurements based on the onscreen APL between patch sizes.

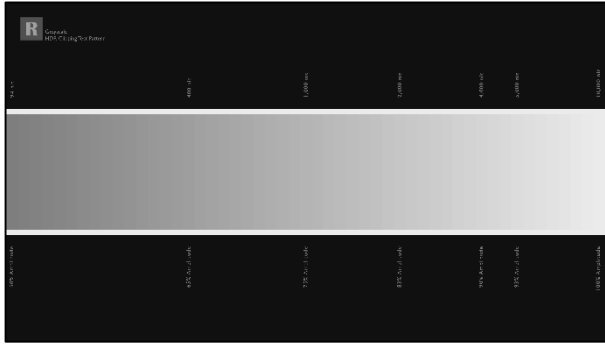


## Resolution Patterns

This Test Footage file folder includes eight separate reference HLG-HDR test clips. Landscape, Nature, Skin Tone, City Sunset which is displayed in a 1.85:1 aspect ratio, Oceanside which is displayed in a 2.40:1 aspect ratio, Pantone SkinTone, Restaurant Scene and Indian Market. Each of the eight test clips can act as a reference point for before and after calibration observations.



# Miscellaneous Patterns continued



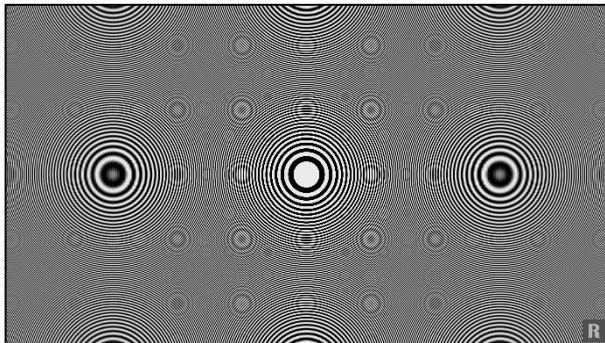
## HDR Clipping Test Patterns

Similar to the white clipping test pattern. This demonstrates how well your display implements the HLG-HDR gamma curve. The low end patches utilize a typical gamma approach. Whereas the higher end utilizes a logarithmic curve, which expands to a wider range of peak brightness.



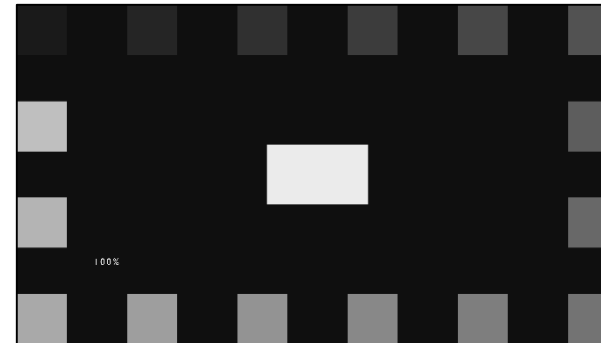
## Convergence Patterns

Designed to assist in front projection alignment, convergence, focus and projected image geometry. These types of convergence test patterns typically aren't needed for fixed pixel type displays like LCD or OLED.



## Digital Zone Plate Patterns

Designed to expose any anomalies within your display's ability to resolve certain resolution frequencies. Available in both primary and secondary colors, along with white.

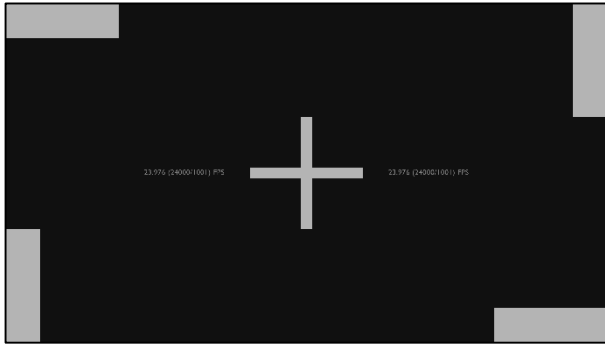


## 4% APL Window Patterns

These patterns were designed to help with calibration on displays with ABL by providing a constant APL throughout the entire sweep. The constant luminance provides a more consistency measurement, especially when compared to actual content. This file folder contains three separate subfolders for each software

manufacturer's Independent workflow.

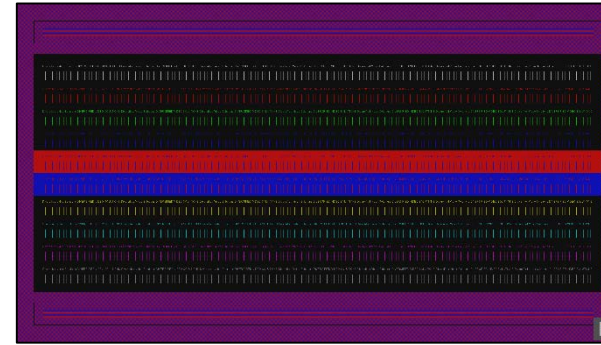
# Miscellaneous Patterns continued



## Frame Rate & Judder Patterns

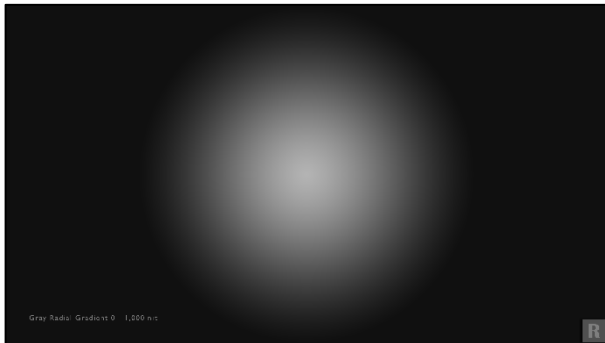
Available in both 23.976 (24000/1001) and 59.940 (60000/1001) frame rates/Hz. These patterns are primarily utilized for quick observations regarding improper frame rate handling, unintentional film judder and other associated frame rate artifacts. Also, designed to expose any negative side effects brought on by frame

interpolation.



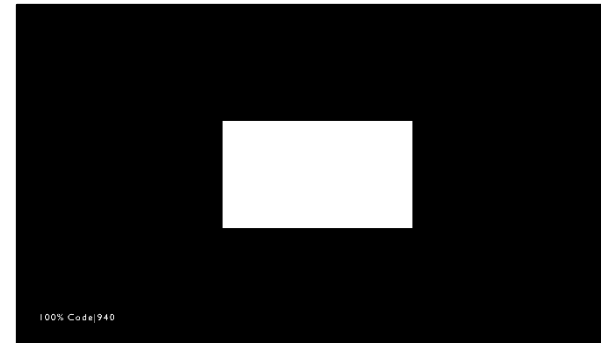
## Chroma Subsampling Patterns

Since chroma subsampling is essentially a type of color compression. These test patterns were designed to show how well your display processes native 4:2:0 sub sampled content when resampled to either 4:2:2 or 4:4:4.



## Radial Gradient Patterns

Designed to expose banding artifact. This 10-bit gradient pattern is offered in both primary and secondary colors, along with grayscale. These patterns range from 100% peak nit from center down to 0% nit, in 1% increments.



## True 10-bit 10% Patch 21 Step Grayscale Sweep

These test patterns offer true 10-bit precision. Unlike the rest of the pattern suite (which utilizes an 8-bit to 10-bit scaled triplet methodology), these patterns are coded using true 10-bit triplet values. Unfortunately, current video calibration software still works within 8-bit. So currently, there is no added value in the utilization of true 10-bit test patches at the moment.

# DVS UltraHD/Hybrid Log Gamma Test Pattern Suite

## Basic Setup

- **Title**
- **Meter Placement**
- **Meter Profile** (10% Window Patterns Red, Green, & Blue)
- **Black Clipping** (1 & 2)
- **White Clipping** (1, 2, & 3)
- **Color Bars**
- **Color Clipping** (Color Clipping Mix, Low, & High)
- **Sharpness & Overscan**

## Advanced Setup Patterns

### 5% Window Patterns

- **11 Step Grayscale**
- **21 Step Grayscale**
- **10 Step Gamma**
- **20 Step Gamma**
- **100% Amplitude/100% Saturation Color**
- **75% Amplitude/100% Saturation Color**
- **50% Amplitude/100% Saturation Color**
- **25% Amplitude/100% Saturation Color**
- **Near White**
- **Near Black**
- **Contrast**

## Advanced Setup Patterns

### 10% Window Patterns

- **11 Step Grayscale**
- **21 Step Grayscale**
- **10 Step Gamma**
- **20 Step Gamma**
- **100% Amplitude/100% Saturation Color**
- **75% Amplitude/100% Saturation Color**
- **50% Amplitude/100% Saturation Color**
- **25% Amplitude/100% Saturation Color**
- **Near White**
- **Near Black**
- **Contrast**

## Miscellaneous Setup Patterns

- **Contrast Ratio** (2%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40% & Full Field)
- **ANSI Contrast** (ANSI Meter Placement & ANSI Contrast)
- **Dynamic Contrast**
- **Grayscale Ramps** (Grayscale Steps, Grayscale Ramp, & Grayscale Ramp Mix)
- **Color Ramps** (Color Steps, Color Ramps, & RGBYCM Single Color Ramps)
- **Color Decoding** (Color Decoding & Color Decoding 50% Amp)

## Miscellaneous Setup Patterns

- **Color Flashing Primary**
- **Grayscale Sweeps** (2% Window Patterns, 5% Window Patterns, 10% Window Patterns, 15% Window Patterns, 20% Window Patterns, 25% Window Patterns, 30% Window Patterns, 35% Window Patterns, 40% Window Patterns & Full Field Patterns)
- **Resolution Patterns** (Resolution Mix Pattern, Resolution Vertical Pattern 1 Pixel, Resolution Vertical Pattern 2 Pixel, Resolution Vertical Pattern 3 Pixel, Resolution Horizontal Pattern 1 Pixel, Resolution Horizontal Pattern 2 Pixel, Resolution Horizontal Pattern 3 Pixel, & Resolution Black Pixels Single)
- **Test Footage** (Landscape, Nature, Skin Tone, City Sunset 1.85:1, Oceanside 2.40:1, Pantone Skin Tone, Restaurant Scene, & Indian Market)
- **HDR Clipping Test Patterns**
- **Digital Zone Plate Patterns**
- **Convergence Patterns**
- **4% APL Window Patterns** (21 Step Grayscale)
- **Frame Rate & Judder Patterns** (Judder Test 24 FPS, Judder Test 60 FPS, & Multi-Bar Judder Test 24 FPS)
- **Radial Gradient Patterns** (WRGBYCM)
- **Chroma Subsampling Pattern**
- **True 10-bit 10% Patch 21 Step Grayscale Sweep**

# Pattern Metadata

## Video

**ID:**.....256(0x100)  
**Menu ID:**.....1 (0x1)  
**Format:**.....HEVC  
**Format/Info:** .....High Efficiency Video Coding  
**Format profile:**.....Main 10@L5.1@Main  
**Codec ID:**.....36  
**Duration:**.....1mn 0s  
**Width:**.....3840 pixels  
**Height:**.....2160 pixels  
**Display aspect ratio:**.....16:9  
**Frame rate:**.....23.976 (24000/1001)fps  
**Color space:**.....YUV  
**Chroma subsampling:**.....4:2:0 (Type 2)  
**Bit depth:**.....10 bits  
**Writing library:**..... x265 2.6+13-6b079854e56e:[Windows]  
[GCC 7.2.0][64 bit] 10bit  
**Encoding settings:** cpuid=1173503 / frame-threads=3 / numa-pools=8 /  
wpp / no-pmode / no-pme / no-psnr / no-ssim / log-level=2 / input-csp=1 /  
input-res=3840x2160 / interlace=0 / total-frames=1439 / level-idc=51 /  
high-tier=1 / uhd-bd=1 / ref=4 / no-allow-non-conformance / repeat-  
headers / annexb / aud / hrd / info / hash=0 / no-temporal-layers / no-  
open-gop / min-keyint=1 / keyint=24 / bframes=4 / b-adapt=2 / b-pyramid  
/ bframe-bias=0 / rc-lookahead=25 / lookahead-slices=4 / scenecut=40 /  
no-intra-refresh / ctu=64 / min-cu-size=8 / rect / no-amp / max-tu-size=32  
/ tu-inter-depth=1 / tu-intra-depth=1 / limit-tu=0 / rdoq-level=2 / dynamic-  
rd=0.00 / no-ssim-rd / signhide / no-tskip / nr-intra=0 / nr-inter=0 / no-  
constrained-intra / no-strong-intra-smoothing / max-merge=3 / limit-refs=3  
/ limit-modes / me=3 / subme=3 / merange=57 / temporal-mvp / weightp  
/ no-weightb / no-analyze-src-pics / deblock=0:0 / sao / no-sao-non-  
cpuid=1173503 / frame-threads=3 / numa-pools=8 / wpp / no-pmode / no-  
pme / no-psnr / no-ssim / log-level=2 / input-csp=1 / input-res=3840x2160

/ interlace=0 / total-frames=1440 / level-idc=51 / high-tier=1 / uhd-bd=0  
/ ref=4 / no-allow-non-conformance / repeat-headers / annexb / no-aud  
/ no-hrd / info / hash=0 / no-temporal-layers / no-open-gop / min-  
keyint=1 / keyint=24 / gop-lookahead=0 / bframes=4 / b-adapt=2 / b-  
pyramid / bframe-bias=0 / rc-lookahead=25 / lookahead-slices=4 /  
scenecut=40 / no-intra-refresh / ctu=64 / min-cu-size=8 / rect / no-amp /  
max-tu-size=32 / tu-inter-depth=1 / tu-intra-depth=1 / limit-tu=0 / rdoq-  
level=2 / dynamic-rd=0.00 / no-ssim-rd / signhide / no-tskip / nr-intra=0 /  
nr-inter=0 / no-constrained-intra / no-strong-intra-smoothing / max-  
merge=3 / limit-refs=3 / limit-modes / me=3 / subme=3 / merange=57 /  
temporal-mvp / weightp / no-weightb / no-analyze-src-pics /  
deblock=0:0 / sao / no-sao-non-deblock / rd=4 / no-early-skip / rskip /  
no-fast-intra / no-tskip-fast / no-cu-lossless / no-b-intra / no-splitrd-skip /  
rdpenalty=0 / psy-rd=2.00 / psy-rdoq=1.00 / no-rd-refine / analysis-  
reuse-mode=0 / no-lossless / cbqpoffs=0 / crqpoffs=0 / rc=abr /  
bitrate=50000 / qcomp=0.60 / qpstep=4 / stats-write=0 / stats-read=0 /  
vbv-maxrate=70000 / vbv-bufsize=50000 / vbv-init=0.9 / ipratio=1.40 /  
pbratio=1.30 / aq-mode=1 / aq-strength=1.00 / cutree / zone-count=0 /  
no-strict-cbr / qg-size=32 / no-rc-grain / qpmax=69 / qpmin=0 / no-  
const-vbv / sar=1 / overscan=0 / videoformat=0 / range=0 / colorprim=9  
/ transfer=18 / colormatrix=9 / chromaloc=0 / display-window=0 / max-  
ccl=0,0 / min-luma=0 / max-luma=1023 / log2-max-poc-lsb=8 / vui-  
timing-info / vui-hrd-info / slices=1 / no-opt-qp-pps / no-opt-ref-list-  
length-pps / no-multi-pass-opt-rps / scenecut-bias=0.05 / no-opt-cu-  
delta-qp / no-aq-motion / no-hdr / no-hdr-opt / no-dhdr10-opt /  
analysis-reuse-level=5 / scale-factor=0 / refine-intra=0 / refine-inter=0 /  
refine-mv=0 / no-limit-sao / ctu-info=0 / no-lowpass-dct / refine-mv-  
type=0 / copy-pic=1deblock / rd=4 / no-early-skip / rskip / no-fast-intra /  
no-tskip-fast /

# Pattern Metadata

## Video

Color range:.....Limited  
Color primaries:.....BT.2020  
Transfer characteristics:.....HLG  
Matrix coefficients:.....BT.2020 non-constant

## Audio

ID:.....257 (0x101)  
Menu ID:.....1 (0x1)  
Format:.....AAC  
Format/Info:.....Advanced Audio Codec  
Format version:.....Version 2  
Format profile:.....LC  
Muxing mode:.....ADTS  
Codec ID:.....15  
Duration:.....1mn 2s  
Channel(s):.....2 channels  
Channel positions:.....Front: L R  
Sampling rate:.....48.0 KHz  
Frame rate:.....46.875 fps (1024 spf)  
Compression mode:.....Lossy