

Tips for Improving Picture Sharpness without Coarsening the Image

Preface

Increasing a camera's DETAIL LEVEL (refer to Issue 01) can effectively sharpen the picture edges of an image.

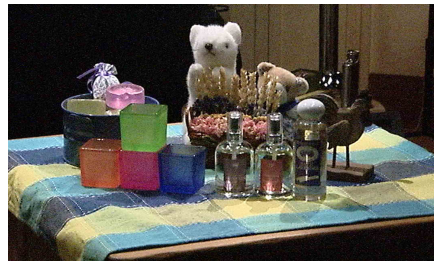
However, as shown in the "Before setting" image, this operation can also coarsen the entire image, even though the picture edges of the perfume bottles and plastic cubes are correctly enhanced. This effect occurs

because the DETAIL process is applied to all areas of the image, including unnecessary noise.

In such situations, adjusting the Crispening level can reduce this effect while picture edges are kept sharp.



Before setting



After setting

Features of Sony Cameras

Sony cameras have a CRISPENING function which can be used to prevent the image from being coarse when detail level is raised. This function can be adjusted so that detail signals are not added to signal level transitions below a selected threshold, such as noise. For example, in the "After setting" image, the picture edges of the perfume bottles and plastic cubes are sharpened, but the entire image including the black background remains smooth. Crispening is also effective for shooting

scenes with busy contrast changes, such as a flower garden, which tend to coarsen by the detail function. Setting the CRISPENING LEVEL to a positive (+) value prevents unnecessary detail from being generated around noise, while maintaining picture contrast and color saturation.

Major Sony cameras with the CRISPENING adjustment function

HDW-900 series, HDW-750/730 series
DVW-970 series, PDW-530/510 series
DSR-450/400 series, MSW-970 series

Camera Settings

To adjust CRISPENING, use the DETAIL 1 page of the PAINT menu.

1 Open DETAIL 1 of the PAINT menu.

```

00●CONTENTS TOP
↓ ↓
01.SW STATUS
02.WHITE
03.BLACK/FLARE
04.GAMMA
05.BLACK GAMMA
06.KNEE
→07.DETAIL 1
08.DETAIL 2
09.DETAIL 3
10.SKIN DETAIL
    
```

2 Set DETAIL to ON (default).

```

P070DETAIL 1
→DETAIL ON
DETAIL LEVEL ON
APERTURE LEVEL 0
APERTURE LEVEL 0
DTL H/V RATIO 0
CRISPENING 0
LEVEL DEPEND ON
LEVEL DEPEND LVL 0
DETAIL FREQUENCY 0
    
```

3 Adjust CRISPENING in the range of -99 to +99.

```

P070DETAIL 1
DETAIL ON
APERTURE ON
DETAIL LEVEL 0
APERTURE LEVEL 0
DTL H/V RATIO 0
→CRISPENING 98
LEVEL DEPEND ON
LEVEL DEPEND LVL 0
DETAIL FREQUENCY 0
    
```

Setting a negative (-) value makes the image sharper, and setting a positive (+) value decreases noise and makes the image smoother. In the case shown in the "After setting" image, the level was set to "+99."

The example shown is with the DSR-450WSL.

The results of this adjustment may differ from the sample image, depending on the camera model and the lighting conditions, even if the same setting value is used.

For additional information, refer to the Operating Instructions for your camera.

Technical Information

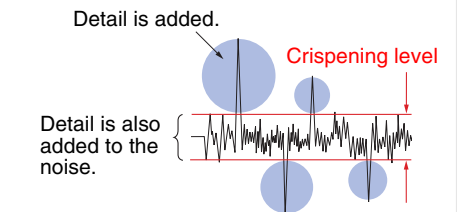
What is CRISPENING?

CRISPENING is a function that prevents detail signals being generated around noise or small picture edge transitions, when the DETAIL function is set to ON. The CRISPENING function allows you to select the threshold (based on transition level) of picture edge transitions to which detail signals should not be added.

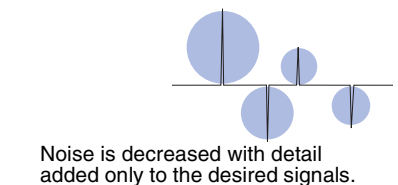
In Sony cameras, the crispening level can be adjusted in the range of -99 to +99. The same setting value may have a different effect on the image, depending on the camera and recording formats used, such as HDCAM, DVCAM, and so on. It is also important to note that raising crispening level can result in details signals not being added around small picture edge transitions. Since this can cause the image to blur, crispening should be adjusted with care, using a high grade picture monitor.

Status of Detail Signals

Before CRISPENING



After CRISPENING



Tips for Enriching Color Saturation in Dark Areas of an Image

Preface

When shooting a documentary, for example, the color saturation in the dark areas of the picture may sometimes not be properly reproduced. As shown in the “Before setting” image, the dark areas in the background of the room are not fully reproduced, and the color of the picture appears slightly faded.

This occurs because the signals from the dark areas are not output as dark as they should be or with the shades that they should have.

In such situations, by adjusting the signal level of the black areas to better match the entire image, the picture is reproduced with a much richer visual impression.



Before setting



After setting

Features of Sony Cameras

Sony cameras have a BLACK GAMMA adjustment function which can be used to reproduce rich looking pictures. This function applies signal adjustments to the black or near black areas, without influencing mid tone and bright areas of the image.

As shown in the “After Setting” image, by decreasing the BLACK GAMMA level so that the dark areas are reproduced with more color and darkness, the shade across the white cabinet (behind the desk) and the color of the desk lamp are reproduced with

more visual richness.

This function can also be used to increase contrast in the dark picture areas, thus making the entire image look brighter, by increasing the BLACK GAMMA level.

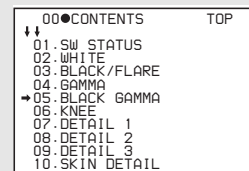
Major Sony cameras with the CRISPENING adjustment function

HDW-900 series, HDW-750/730 series
DVW-970 series, PDW-530/510 series
DSR-450/400 series, MSW-970 series

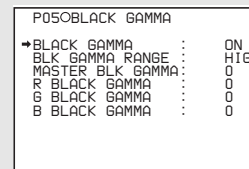
Camera Settings

To adjust BLACK GAMMA, use the BLACK GAMMA page of the PAINT menu.

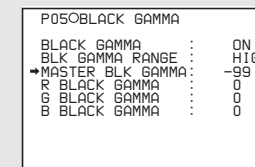
1 Open BLACK GAMMA of the PAINT menu.



2 Set BLACK GAMMA to ON (default).



3 Adjust MASTER BLK GAMMA in the range of -99 to +99.



Setting a negative (-) values darkens the black tone and enriches the color, and setting a positive (+) values brightens the black contrast but fades away the color.

In the case shown in the “After Setting” image, the BLACK GAMMA level was decreased and set to “-99.”

Adjusting BLACK GAMMA to a positive (+) value results in increasing noise. To keep this to a minimum, the combined use of the CRISPENING function is recommended.

Technical Information

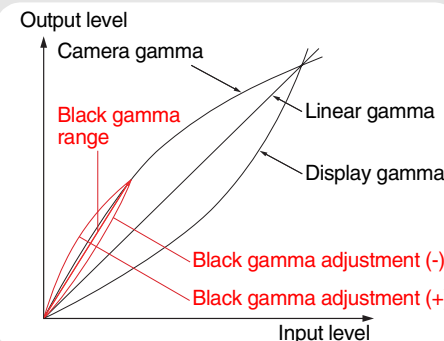
What is GAMMA?

Gamma is a numerical value that indicates the response characteristics between the image brightness of a camera or display device, and its input voltage. In order to obtain faithful picture reproduction, a linear (straight) gamma is required. However, the brightness of a display device and its input voltage retain a relationship with an exponential function, instead of a directly proportional one. This is compensated for in the acquisition camera.

What is BLACK GAMMA?

BLACK GAMMA is a function that allows the gamma curve near black signal levels to be either lowered or boosted with respect to the input level, to achieve the desired picture reproduction in dark areas of the image. Using this function, dark areas of the picture can either be reproduced with deeper darkness and more color saturation, or with higher contrast but less color depth.

In Sony cameras, setting the BLK GAMMA RANGE to either LOW, L.MID, H.MID, or HIGH determines the signal level range to be adjusted, and adjusting the MASTER BLK GAMMA value (-99 to +99) determines the shape of the gamma curve to be applied to that signal range.



As in this example, adjusting MASTER BLK GAMMA applies the same gamma curve to all R/G/B channels. However, Sony cameras also allow BLACK GAMMA to be adjusted individually for each R/G/B channel (R GAMMA/G GAMMA/B GAMMA).

Tips for Avoiding “Overexposure” of an Image’s Highlights

Preface

The human eye can capture bright colors of an image, such as a bouquet in a bright environment. This is because the human eye has a very wide dynamic range (the range of light levels that it can handle). However, when the same bouquet is shot with a video camera, the bright areas of the image can be overexposed and “washed out” on the screen. For example, as shown in the “Before Setting” image, the white

petals and down are overexposed. This is because the luminance signal of the petals and down exceeds the camera’s dynamic range. In such situations, the picture can be reproduced without overexposure by compressing the signals of the image’s highlight areas so they fall within the camera’s dynamic range.



Before Setting



After Setting

Features of Sony Cameras

Sony cameras have a KNEE function, which allows you to adjust the threshold (KNEE POINT) from which the video signal should be compressed, and the compression ratio (KNEE SLOPE) which determines how much the signal should be compressed. By adjusting the KNEE function properly, the white petals and down are clearly reproduced without overexposure, as demonstrated in the “After Setting” image. KNEE adjustment is also essential when shooting an object with multiple cameras, such as in a studio. This is because each

camera captures light bounced off from the object from a different angle or distance, making individual KNEE settings required for each camera. By optimizing each camera’s KNEE settings, a natural and consistent look is obtained when switching from camera to camera at the video switcher’s final output.

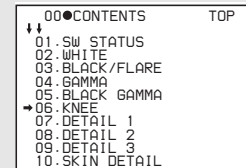
Major Sony cameras with the KNEE adjustment function

HDW-900 series, HDW-750/730 series, DVW-970 series, PDW-530/510 series, DSR-450/400 series, MSW-970 series

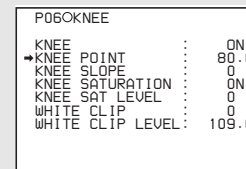
Camera Settings

To adjust KNEE, use the KNEE page of the PAINT menu.

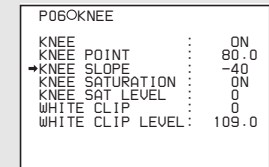
1 Open KNEE of the PAINT menu.



2 Set KNEE to ON, and adjust KNEE POINT in the range of 50.0 to 109.0.



3 Adjust KNEE SLOPE in the range of -99 to +99.



By lowering KNEE POINT and increasing KNEE SLOPE, brighter objects can be reproduced without overexposure. In the case shown in the “After Setting” image, the KNEE POINT was set to 80.0 and KNEE SLOPE was set to “-40.”

The example shown is with the DSR-450WSL. The results of this adjustment may differ from the sample image, depending on the camera model and the lighting conditions.

For additional information, refer to the Operating Instructions of your camera.

Technical Information

What is Dynamic Range?

In general, dynamic range indicates the difference or the ratio of the smallest and largest signal that can be handled by a device. The dynamic range of the video signal is 100-110 percent. In contrast, video cameras with 2/3-inch CCDs, for example, can handle a wide dynamic range of approximately 600 percent. (Dynamic range may decrease depending on the camera setting.)

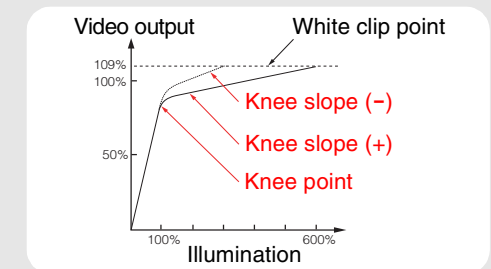
What is KNEE?

KNEE is a function which compresses the signals in the highlight areas so they fall within the video signal’s dynamic range (approximately 109 percent: white clip point). In most cases, KNEE POINT is set between 85.0 to 100.0, which is approximately the luminance level of human skin.

In Sony video cameras, increasing the KNEE SLOPE to a positive value (making the angle of the KNEE SLOPE gradual) increases the compression ratio so a greater range of the

camera’s dynamic range is used. However, it is important to note that the image color of such compressed highlight areas can look pale and “washed out” with a larger KNEE SLOPE value. This is because the color difference (R-Y, B-Y) signals are compressed together with the luminance signal. To avoid this, the combined use of the KNEE function and the KNEE SATURATION function is recommended (refer to Issue 02).

Some Sony cameras have a DCC (Dynamic Contrast Control) function, also called Automatic Knee Control, which adjusts the knee point and knee slope automatically.



Tips for Reproducing Solid Picture Edges of an Image's Highlights

Preface

When shooting a bouquet using a spotlight, the bright areas of the image can be overexposed. This phenomenon can be eliminated using the KNEE function, keeping the brightness level (luminance level) of the image within the video signal's dynamic range (refer to Issue 05).

However, in certain cases, the KNEE process can also cause the picture edges of objects to appear blurred. This is because the contrast of highlight areas is reduced as a result of compressing the luminance sig-

nal. The "Before setting" image demonstrates how the KNEE function eliminates highlight "washed-outs," but also shows that the picture edges of bright objects such as the flower petals and plastic cubes get blurred.

In such situations, the picture edges of the highlight areas can be reproduced with more contrast by applying image enhancement only to the signals compressed by the KNEE function.



Before Setting



After Setting

Features of Sony Cameras

Sony cameras have a KNEE APERTURE function, which effectively reproduces solid picture edges in the highlight areas of an image. This function reproduces the picture edges that originally existed but were compressed due to using the KNEE function. Increasing the KNEE APERTURE level sharpens the edges of bright objects, such as the yellow petals and plastic cubes as shown in the "After Setting" image. De-

creasing the KNEE APERTURE level makes the image look soft and fuzzy. This function is also effective for shooting a bright and solid object, such as a wedding gown, a snow scene, or a cloud.

Major Sony cameras with the KNEE APERTURE adjustment function
 HDW-900 series, HDW-750/730 series
 DVW-970 series, PDW-530/510 series
 DSR-450/400 series, MSW-970 series

Camera Settings

To adjust KNEE APERTURE, use the DETAIL 2 page of the PAINT menu.

1 Open DETAIL 2 of the PAINT menu.

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01.SW STATUS	
02.WHITE	
03.BLACK/FLARE	
04.GAMMA	
05.BLACK GAMMA	
06.KNEE	
07.DETAIL 1	
→08.DETAIL 2	
09.DETAIL 3	
10.SKIN DETAIL	

2 Set KNEE APERTURE to ON.

POBODETAIL 2	
→KNEE APERTURE	ON
KNEE APT LVL	0
DETAIL COMB	0
CROSS COLOR	OFF
CROSS COLOR LVL	43
DETAIL LIMIT	0
DTL WHT LMT	0
DTL BLK LMT	0
DTL V-BLK LMT	0

3 Adjust KNEE APT LVL in the range of -99 to +99.

POBODETAIL 2	
KNEE APERTURE	ON
→KNEE APT LVL	90
DETAIL COMB	0
CROSS COLOR	OFF
CROSS COLOR LVL	43
DETAIL LIMIT	0
DTL WHT LMT	0
DTL BLK LMT	0
DTL V-BLK LMT	0

Setting the KNEE APT LVL to a positive (+) value sharpens the image with a solid appearance enhanced, and setting it to a negative (-) value softens the bright areas of the image. In the case shown in the "After Setting" image, the level was set to "+90."

The example shown is with the DSR-450WSL. The results of this adjustment may differ from the sample image, depending on the camera model and the lighting conditions.

For additional information, refer to the Operating Instructions for your camera.

Technical Information

What is KNEE APERTURE?

When the KNEE function is set to ON, the bright areas of the image are compressed so that the signal level falls within the video signal's dynamic range (Fig. 1). In this process, the luminance of the image is compressed, which can cause the contrast of the image to drop, and accordingly the solid appearance of the image to decrease.

In such situations, KNEE APERTURE reproduces the sharpness and solid appearance

of the image, enhancing only the signals compressed by the KNEE function (Fig 2). Although this function may seem similar to the DETAIL function (refer to Issue 01), the two differ in that DETAIL emphasizes the entire luminance range of the signal, while KNEE APERTURE emphasizes signals only in the highlight areas that were compressed by the KNEE function.

The KNEE APERTURE function enhances signals in the highlight areas

Fig. 1. Signals in the highlight areas that were compressed by the KNEE function

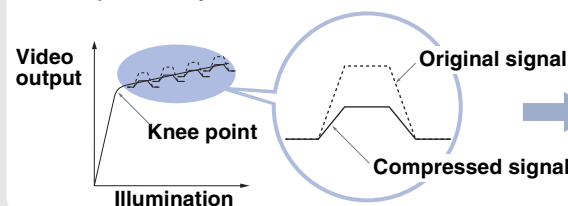
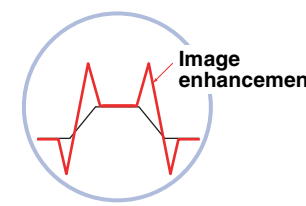


Fig. 2. Compressed signals enhanced by the KNEE APERTURE function



Tips for Shooting Without Coarsening Dark Areas of an Image

Preface

To reproduce sharp images, the DETAIL function (refer to Issue 01) is used. However, DETAIL can also cause black or dark areas of an image to coarsen. For example, as shown in the “Before Setting” image, the cockles of the leather and the texture of the metal are reproduced sharply, but the dark areas of the background and the bottom of the image look coarsened. This phenomenon occurs because

noise in dark areas of the image is also emphasized by the DETAIL function. In such situations, adjusting the camera so the DETAIL process is not applied to low luminance signal levels, reduces the coarseness in the black or dark areas of the image.



Before setting



After setting

Features of Sony Cameras

Sony video cameras have a LEVEL DEPEND function, which effectively reduces the coarseness in black or dark areas of an image. This function prevents signals below a certain video level, including noise, from being enhanced. For example, as shown in the “After Setting” image, the background and the bottom of the image do not look coarse, while the cockles of the leather and the texture of the metal are reproduced sharply by the DETAIL function.

The LEVEL DEPEND function is also effective for preventing noise in dark areas of an image from being emphasized when camera gain is raised to shoot at night or in low-light conditions.

Major Sony cameras with the LEVEL DEPEND adjustment function

HDW-900 series, HDW-750/730 series
DVW-970 series, PDW-530/510 series
DSR-450/400 series, MSW-970 series

Camera Settings

To adjust LEVEL DEPEND, use the DETAIL 1 page of the PAINT menu.

1 Open DETAIL 1 of the PAINT menu.

```

00●CONTENTS TOP
↑↓
01.SW STATUS
02.WHITE
03.BLACK/FLARE
04.GAMMA
05.BLACK GAMMA
06.KNEE
→07.DETAIL 1
08.DETAIL 2
09.DETAIL 3
10.SKIN DETAIL
    
```

2 Set LEVEL DEPEND to ON (default).

```

P070DETAIL 1
DETAIL : ON
APERTURE : ON
DETAIL LEVEL : 0
APERTURE LEVEL : 0
DTL H/V RATIO : 0
CRISPENING : 0
→LEVEL DEPEND : ON
LEVEL DEPEND LVL : 0
DETAIL FREQUENCY : 0
    
```

3 Adjust LEVEL DEPEND LVL in the range of -99 to +99.

```

P070DETAIL 1
DETAIL : ON
APERTURE : ON
DETAIL LEVEL : 0
APERTURE LEVEL : 0
DTL H/V RATIO : 0
CRISPENING : 0
LEVEL DEPEND : ON
→LEVEL DEPEND LVL : 99
DETAIL FREQUENCY : 0
    
```

Setting the LEVEL DEPEND LVL to a positive (+) value widens the luminance range in which the coarseness of the image is reduced, and setting it to a negative (-) value narrows the range.

In the case shown in the “After setting” image, the level was set to “+99.”

The example shown is with the DSR-450WSL.

The results of this adjustment may differ from the sample image, depending on the camera model and the lighting conditions, even if the same setting value is used.

For additional information, refer to the Operating Instructions for your camera.

Technical Information

What is LEVEL DEPEND?

The LEVEL DEPEND function reduces the coarseness of black or dark areas of an image by preventing the noise in such areas from being emphasized by the DETAIL process.

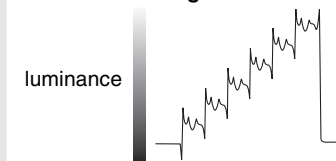
While the CRISPENING function prevents the entire image from being coarsened (refer to Issue 03), the LEVEL DEPEND function prevents this for signals only below a certain video level.

Adjusting LEVEL DEPEND LVL allows you to select the video level threshold for which detail signals should not be added to the image. Setting LEVEL DEPEND LVL to a positive (+) value widens the range in which the coarseness of dark image areas is reduced. However, it must be noted that selecting a value too high can also cause picture edges of the entire image to blur. For this reason, LEVEL DEPEND LVL should be adjusted with care using a video monitor.

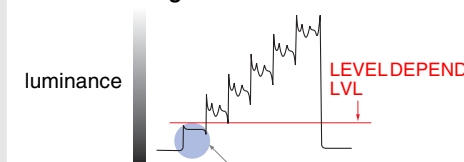
In summary, LEVEL DEPEND is an effective function when noise in dark image areas is

Status of Detail Signals

Before Setting LEVEL DEPEND



After Setting LEVEL DEPEND



The LEVEL DEPEND function prevents the signal, including noise, from being enhanced.

emphasized by the DETAIL process, when noise increases due to camera gain-up, and so on.