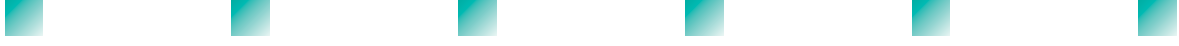




VIDEO COMMUNICATION SYSTEM-TECHNICAL DOCUMENTATION



BrightFace Technology



Introduction

The Sony PCSA-CXG80 HD camera unit is a 1/3 type CMOS HD camera designed for exclusive use with the PCS-XG80S visual communication system. Equipped with newly developed BrightFace technology as a standard feature, the camera performs real-time processing with HD picture quality.

To improve visibility in scenes with high-contrast lighting, BrightFace technology produces the following effects:

- Increases brightness in underexposed black areas to improve contrast
- Reduces brightness in overexposed white areas to improve contrast

This document describes the BrightFace technology.

Comparison With Camera's Built-in Brightness Adjustment

Cameras generally use lens aperture and AGC (auto gain control) to adjust the brightness of the output image in response to the lighting conditions of the shooting environment. However, sometimes these brightness adjustment methods alone are unable to properly handle poor lighting conditions in meeting rooms. Examples of poor lighting conditions include environments that produce extremely high-contrast subjects on the screen, such as bright meeting rooms with windows that produce unfavorable backlighting conditions or dimly lit meeting rooms where projectors are being used.

Under these conditions, if the brightness is adjusted to accommodate the bright areas, detail is lost in the underexposed dark areas that become black, and if the brightness is adjusted to accommodate the dark areas, detail is lost in the overexposed bright areas that become white (Figure 1).

Fig.1: Comparison Between Brightness Adjustments



Input signal



Brightness adjusted to accommodate bright areas

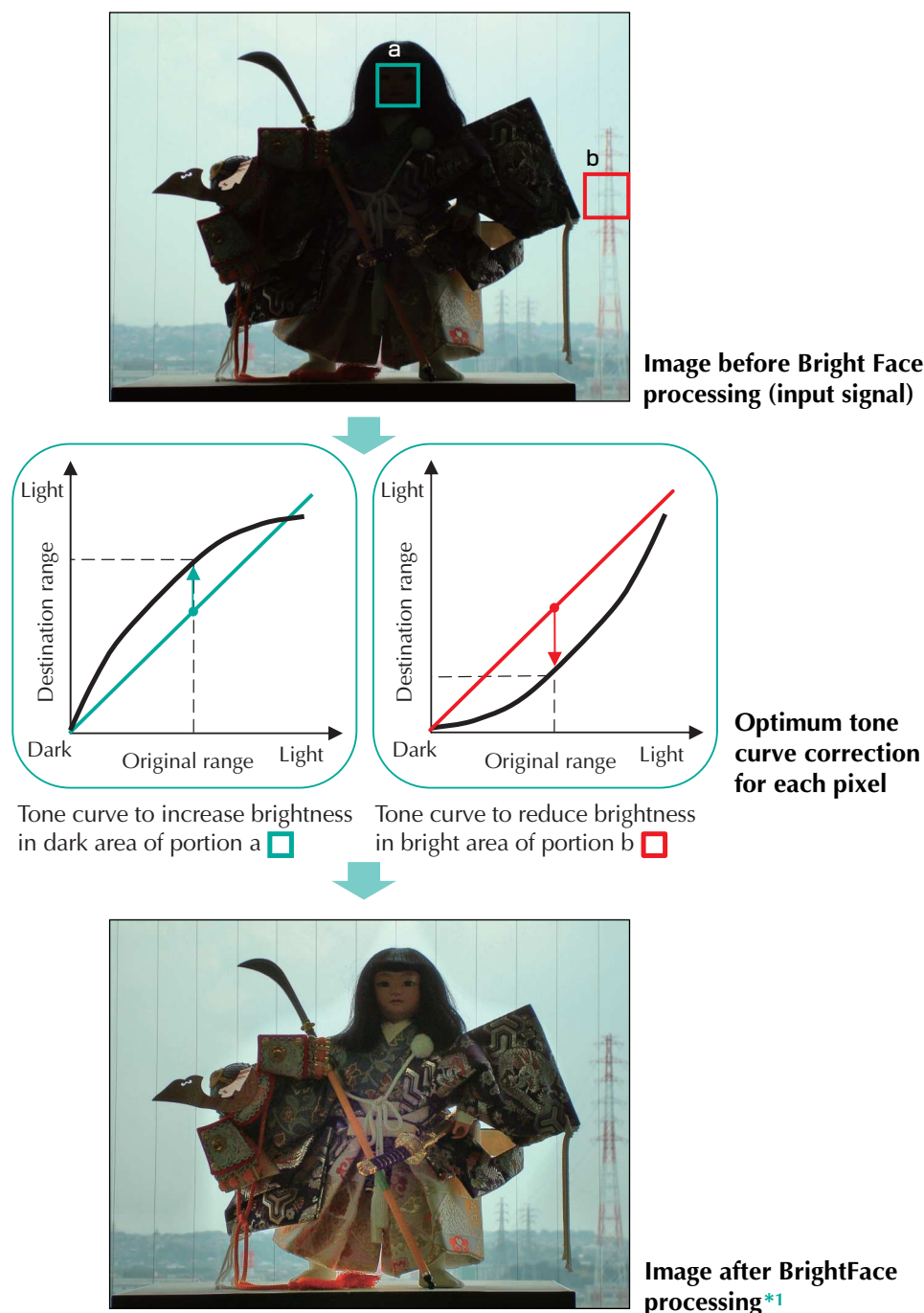


Brightness adjusted to accommodate dark areas

BrightFace Processing

The nonlinear signal processing module in the PCSA-CXG80 analyzes the previous frame's input signal and generates an individual tone curve with optimum brightness for every pixel in the image frame. To suppress the amplification of noise, the noise component of the actual subject is analyzed and BrightFace processing is performed for the subject area only. The optimum luminance is provided to each pixel regardless of the contrast differences in the captured image, resulting in a highly visible overall image (Figure 2).

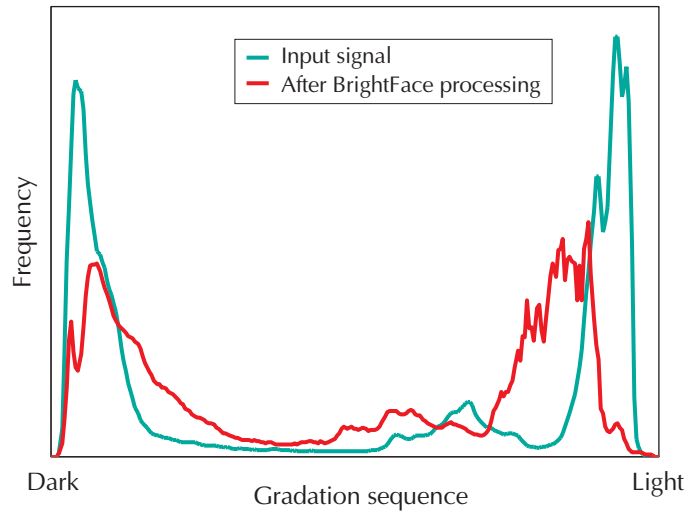
Fig.2: BrightFace Structure



*1 This photograph shows a digital camera image that has undergone the equivalent of BrightFace processing.

Figure 3 shows the histograms for the luminance signal from before and after the processing shown in Figure 2. The figure shows that the pre-processed image exhibits strong gradation deviation and low contrast in the bright and dark areas, but the deviation is reduced and gradation is increased after processing, resulting in an image with good luminous efficacy and contrast over a wide gradation range.

Fig.3: Luminance Signal Histogram



Figures 4-1 and 4-2 show enlarged views of the bright areas and dark areas. Contrast and visibility are improved.

Fig.4-1: Enlarged view of dark area

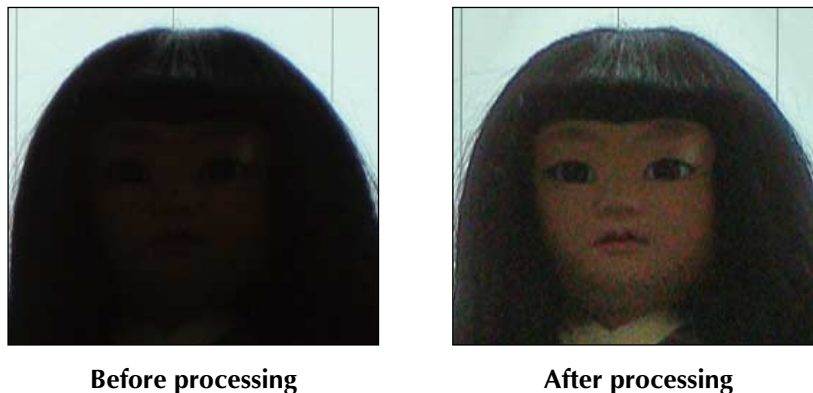
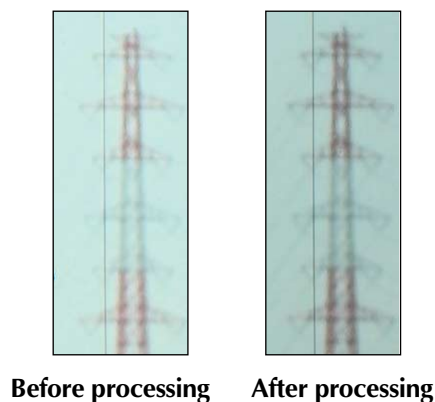


Fig.4-2: Enlarged view of bright area



BrightFace Parameters

The correction strength can be set to High, Medium, Low or Off in the PCS-XG80S main unit's "Camera Setup" menu. (The default setting is Medium).

Insufficient light in settings such as dim meeting rooms may cause the sensor to generate noise, and in some cases BrightFace may amplify this noise. If you are concerned about noise, set the correction strength to a lower level. If you are not concerned about noise and want to see dark areas more clearly, set the correction strength to a higher level.

Noise Reduction Filter

For dimly lit environments, BrightFace may produce noise in dark areas when the brightness has been corrected. In the PCS-XG80S, a noise reduction filter is included to reduce noise in this situation. The correction strength of the noise reduction filter can be set to High, Medium, Low or Off in the "Camera Setup" menu. (The default setting is Medium).

With these features, the PCSA-CXG80's built-in BrightFace technology automatically adjusts the brightness and contrast in real-time by identifying the dark and bright areas in the captured image, increasing the brightness in dark areas and reducing the brightness in overexposed white areas. The correction strength can also be changed in the menu, so the adjustment can be optimized for each environment. In addition, there is virtually no delay.

In other words, BrightFace technology enables clear and pleasant visual communication with no delay and can brightly display the faces of your counterparts, even when they are in rooms with poor light, such as unfavorable backlighting from bright windows or when using projectors in a dimly lit room.

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