
ProHawk
See what you're missing...

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1 Introduction

The ProHawk Use Case Conditions Guide provides an overview for ProHawk® product line users on how configure the parameters for a variety of environmental use cases to obtain the desired real-time video enhancements. We have tried to make this overview clear, easy to understand, and informative. We value the relationship that we have with our users, and believe this guide with be valuable in obtaining the desired visual enhancement results.

The typical use procedure of ProHawk solutions entails a multiple step procedure. The typical use procedure outlined will provide a step by step overview of the order in which various parameters should be adjusted.

2 Step 1 – Detailed Enhancement Filter

The first step is to turn the Detailed Enhancement Filter (DEF) *ON*. The front of the ProHawk device allows stepping through various DEF Demo modes. Set the DEMO DEF parameter to *FULL* and set the DEF Value to *128*, which is the middle setting for DEF providing a 50% enhancement effect on the video. To see other DEF Demo modes, scroll through the DEF Demo parameters through the ProHawk device:

FULL – Enhances the entire video image frame

LEFT – Enhances the left half of the display, leaves the right half unenhanced

RIGHT – Enhances the right half of the display, leaves the left half unenhanced

CENTER – Enhances the middle of the display, leaves the surrounding edges unenhanced

OFF – Entire display is unenhanced

DEF can also be turned *ON* using the ProHawk web User Interface. Check the effect of the DEF parameter on the video being enhanced.

The next step is to increase and decrease the DEF Value. The DEF Value range is *0-255*, and increases and decrease in increments of 32. As the DEF Value is adjusted, look at the video to assess the enhancement impact until the best result is seen.

Turn the DEF enhancement setting *ON* to improve images in low contrast situations including rain, snow, Fog Dirt, Sand, or Underwater. Also turn the DEF enhancement setting *ON* to improve extreme contrast situations including Night Time, Low Light, Backlight, Headlights, Direct Sunlight, or Infrared. Once the DEF Value is set, then other parameters in the system can be configured. Once the other parameters have been set, then the DEF Value can be readjusted to fine tune the enhancement.

3 Step 2 - Environmental Conditions

There are a variety of environmental conditions that ProHawk can be applied to for superior real-time video enhancement. The most typical use case conditions and associated parameters to achieve the best possible enhancement are presented in this section.

3.1 Rain & Snow

Rain & Snow provide a unique set of optical challenges. The contrast needs to be weakened to not emphasize the falling rain or snow and make the image natural in appearance. Then the falling rain or snow can be erased from the video image(s) using the systems motion detection capability. The initial reference point for the parameters to be set are:

DEF ON/OFF = ON

When processing with HD or SD videos, the smaller the setting is set to, the clearer the contrast will become for detailed images. This may result in a "painting like" effect due to the algorithm providing enhancements.

DEF Unit HD = (S)mall or (M)edium

DEF Unit SD = (S)mall

The DEF Unit should be set (*S)mall* to emphasize small areas, and set to (*L)arge* if the natural image quality is desired, or when there is too much noise in the video images.

Tone ON/OFF = ON

Turn the Tone parameter *ON* to make local contrast adjustments. The Tone parameter should be set to *ON*, unless there is an exceptional use case situation. The Tone parameter enables higher contrast viewing of video images resulting in sharper viewing clarity.

Tone Gradient = 8 or 12

Under normal use case circumstances such as Rain and Snow, the Tone Gradient Value should be set at either *8* or *12*. The Tone Gradient parameter should be lowered to *4* or *6* if there is visual noise in the video because of turning Tone *ON*. Raise the Tone Gradient parameter to *16* if the contrast is insufficient to clearly view the desired video image.

MD ON/OFF = ON

Turn Motion Detection *ON* when there is movement compensation that is required to reduce residual image reductions. Motion Detection removes noise cause by rapid small objects, such as Rain or Snow, from an image by detecting changing small portions of images.

MD Sensitivity = 64

The initial setting for MD Sensitivity for Rain and Snow should be *64*. If residual images persist, continue to adjust the MD Sensitivity parameter higher until the best clarity is achieved. When the MD Sensitivity parameter value is higher, the system is less sensitive to changes, but eliminates more residual visual noise. When the MD Sensitivity parameter value is lower, the system is more sensitive to changes, but eliminates less residual visual noise.

NOTE: WATER ADHERING TO THE LENS DOES NOT DISAPPEAR.

3.2 Fog, Dirt, & Sand

Fog, Dirt, and Sand in the air creates a lot of noise and makes the tone map very weak. The enhancement process will sharpen the details and the contours of images. The starting point for parameters to handle these conditions are:

DEF ON/OFF = ON

DEF Unit HD = Small or Medium

DEF Unit SD = Small

Turn the Tone parameter *ON* to make local contrast adjustments.

Tone ON/OFF = ON

Tone Gradient = 6, 8, or 12

3.3 Night, Low Light, Back Light, Headlight, Direct Sun Glare, & Infrared

To accommodate for Night, Low Light, Back Light, Headlight, Direct Sun Glare or Infrared enhancement conditions, where the video images are dark, the noise ratio is bad, and the result makes the tone map weak. The starting point for parameters should be set in this way:

DEF ON/OFF = ON

DEF Unit HD = Small or Medium

DEF Unit SD = Small

Turn the Tone parameter *ON* to make local contrast adjustments.

Tone ON/OFF = ON

Tone Gradient = 6, 8, or 12

A dark video will general require adjusting the Tone Gradient parameter low. If raising the Tone Gradient parameter lower or higher does not provide clarity, try adjusting the brightness of the video with the Tone Brightness manually while turning Tone Auto Brightness *OFF*.

Tone Brightness = 128

The Tone Brightness parameter should be set to *128* as a default. For darker video to make them brighter, adjust the Tone Brightness parameter higher to *160*, *192*, *224*, or *255*. The darker the video, the higher the parameter should be adjusted. To obtain less difference between varying contrast areas in an image frame, such as land and sky, adjust the Tone Brightness parameter down. For lighter video to make them darker, adjust the Tone Brightness parameter lower to *96*, *64*, *32*, or *0*. The brighter the video, the lower Tone Brightness should be set.

Tone Auto Brightness = OFF

The Tone Auto Brightness parameter should typically be set to *OFF* when the images contrast is insufficient. In these situations, try readjusting the DEF Value down to a smaller value to reduce the noise in an image. The Tone Auto Brightness parameter should be set to *ON* when the video images are too dark.

Noise Reduction (NR) = ON

The Noise Reduction (NR) parameter should be set to *OFF* initially. If there appears to still be "noise" in the image, try to reduce the noise in the image by adjusting the Noise Reduction parameter. "Noise" means static, such as an old bad TV signal. In these cases, turn the NR parameter *ON* when environmental conditions are causing noise in the image.

Noise Reduction (NR) Intensity = 128

It is recommended to set the NR Intensity parameter to *128*. Adjust the NR Intensity parameter until the residual noise has been eliminated from the image. Adjust the NR Intensity parameter higher until the residual images have been eliminated.

MD ON/OFF = ON

Turn the MD parameter *ON.*

MD Sensitivity = 12

The default value for the MD Sensitivity parameter is *12*. Typically, best results are achieved with the MD Sensitivity parameter value set between *8-12*.

3.4 Underwater

Underwater environmental conditions need to compensate for the lack of contrast. The baseline settings for parameters to enhance underwater conditions, should be set as follows:

DEF ON/OFF = ON

DEF Unit HD = Medium or Large

DEF Unit SD = Large

Turn the Tone parameter *ON* to make local contrast adjustments.

Tone ON/OFF = ON

Tone Gradient = 12, 16, or 24

4 Step 3 – Color Adjustment

When there is a reasonable level of color contrast in the video stream and images, it may be appropriate to adjust the Color Value parameter. To adjust the Color Value, press the Color <- button to turn the Color parameter *ON*. This provides slight color correction enhancements. This should be turned *OFF* in circumstances where it is difficult to see the images due to similar color across the image, such as an Underwater or Night Time

Color ON/OFF = ON

To adjust the Color Value, press the Mode button until the Color / Contrast mode is displayed. Once the Color / Contrast mode is active, press the (Color <-) or (Color ->) buttons to increase or decrease the Color Value parameter.

Color Value = 16

The default Color Value is *16*. Underwater use cases will set the Color Value to *16*. Night and Low Light use cases should set the Color Value to *24*. Fog use cases where most of the color is removed, can set the Color Value higher to *32*. The Color Value can be set at *16, 20, 24, 28, 32, 36, or 40.*

In low contrast use cases, the higher the Color Value is set may result in a greenish or bluish hue in the resulting image. In these situations, try turning the Color ON/OFF to *OFF*. If Noise increases with Color Value adjustments, try reducing the Tone Gradient parameter value down as low as possible.

5 Step 4 – Video Format Setup

5.1 SDI Setup

When connecting a normal Standard Definition Input, set the IN-Range parameter to *Limited*. If dark parts of the image look extremely black, set the IN-Range parameter to *Full*. There are a small number of SDI devices that require the *Full* IN-Range parameter setting.

The ITU-R BT.601 standard for encoding interlaced analog video signals in digital video form is supported with the SDI IN-Range parameter. Most cameras support the In-Range Limited color spectrum support. BlueRay and Military devices are examples of requiring the IN-Range Full parameter setting due to the wider variety of the color spectrum.

To send the video stream to normal SDI equipment, set the Out Range to *Limited*.

5.2 HDMI Setup

When sending the video stream to HDMI equipment, if the black parts appear to wave and float, set the Out Range to *Full*.

6 ProHawk Technology

ProHawk Technology is central to high quality video analytics. *ProHawk* technology is powered by its patented Detail Enhancement Filter (DEF) to provide clarity for enhanced decision making. ProHawk Technology's unique enhancement methodology delivers a system that requires minimal operator intervention in changing conditions, a feature marketed by the Company as **Adaptive Enhancement**. This feature is attractive to end-users in most vertical markets and especially so in the security and surveillance sectors.

Example