

ISP Algorithms Differences Between Hi3516D V300/Hi3516C V500/Hi3516A V300 and Hi3519A V100

HiSilicon HiSP

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About This Document

This document describes the ISP algorithm differences between Hi3516D V300/Hi3516C V500/Hi3516A V300 and Hi3519A V100. It applies to Hi3516D V300/Hi3516C V500/Hi3516A V300.

Change History

NO.	Description	Version	Date
1	ISP algorithm differences between Hi3516D V300/Hi3516C V500 and Hi3519A V100	00B01	2018-06-28
2	The description of Hi3516A V300 is added.	00B02	2019-02-15

Sensor and Lens Differences

1

DPC

2

FPN

3

AF

DPC Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 has fewer defect pixels in the defect pixel table.

Difference	Hi3516D V300/Hi3516C V500	Hi3519A V100
Specification	Defect pixel table size: 2048	Defect pixel table size: 4096
Effect	N/A	N/A

FPN Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 does not support calibration and correction in line mode.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Supports only the frame mode.	Supports both frame and line modes.
Effect	N/A	N/A

AF Differences

Difference Description

The delay compensation for the horizontal IIR filter and ISP-FE AF module is removed from Hi3516D V300/Hi3516C V500.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Supports the obtaining of raw field statistics of the ISP-BE only.	Supports the obtaining of raw field statistics of the ISP-BE and ISP-FE. The delay in offline mode is low.
Effect	N/A	N/A

Definition and Noise Differences

1

3DNR

2

Sharpen

3

2DNR

4

DetailEnhance

3DNR Differences (1/2)

Difference Description

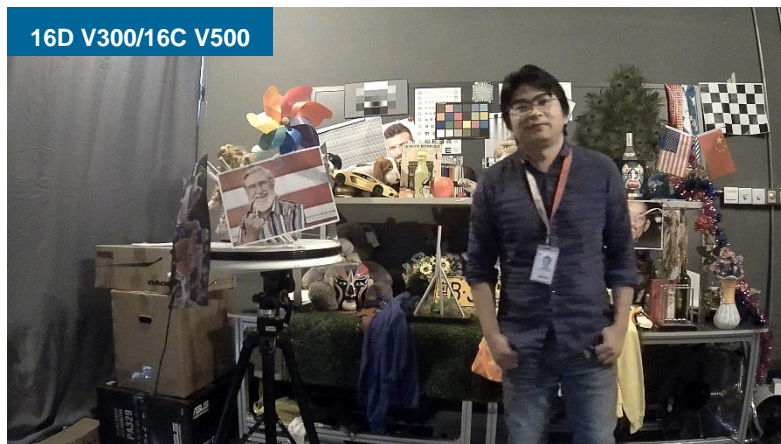
Hi3516D V300/Hi3516C V500 has been modified to improve the definition of moving objects and reduce the noise in low-light conditions.

Its performance in low-light conditions is enhanced, and images in static regions are more smoother.

HiSilicon PQ Tools supports more flexible adjustment. It is capable of adjusting the ratio of filtering strength of the temporal

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Level 0 of the 3DNR has a higher priority than the DetailEnhance. When level 1 of the 3DNR is enabled, the DetailEnhance is disabled by default.	N/A
	For levels 1 and 2 of the 3DNR, the temporal domain is divided into the foreground and background layers. You can configure different temporal and spatial temporal-domain filtering strengths for the layers.	N/A
Effect	Moving objects (including human faces) have a higher definition and less noise.	N/A
	The performance in low-light conditions is enhanced, and images in static regions are more smoother.	N/A
	The ratio of the temporal-domain filtering strength and the spatial-domain filtering strength can be adjusted for both moving and static objects. HiSilicon PQ Tools has more flexible adjustment.	N/A

3DNR Differences (2/2)



Moving objects (including human faces) have a higher definition.

Sharpen Differences

Difference Description

The sharpen function after the 3DNR has been deleted. Because the 3DNR has been optimized to improve the image definition, you can adjust the sharpen before the 3DNR to retain the sharpness of large edges.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	No sharpen module is available after the 3DNR.	A sharpen module is available after the 3DNR.
Effect	N/A	N/A

2DNR Differences (1/2)

Difference Description

In WDR (including fusion) mode, Hi3516D V300/Hi3516C V500 allows separate adjustment of the NR strength for long frames, short frames, and motion regions. This improves the NR accuracy while reducing the noise for short frames and combination regions.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	N/A	N/A
Effect	Supports NR strength adjustment for long frames, short frames, and motion regions.	Supports NR strength adjustment for long frames and short frames.

2DNR Differences (2/2)



The NR strength can be adjusted for long frames, short frames, and combination regions. The definition is slightly reduced during NR.

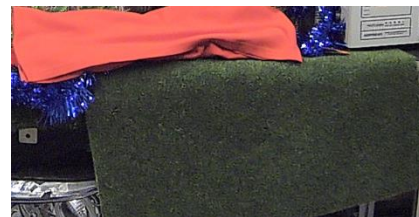
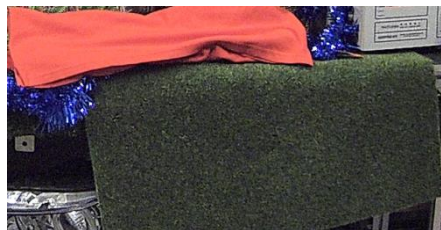
DetailEnhance Differences (1/2)

Difference Description

Hi3516D V300/Hi3516C V500 improves the noise form by implementing the even distribution of noise and therefore delivers smoother edges.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	DetailEnhance is a new module.	N/A
	Level 1 of the 3DNR has a higher priority than the DetailEnhance. When level 1 of the 3DNR is enabled, the DetailEnhance is disabled by default.	N/A
Effect	The noise form is optimized so that the noise is evenly distributed.	N/A
	The edge noise is reduced to implement smoother edges.	N/A

DetailEnhance Differences (2/2)



The details and weak textures are added.

Differences in the Color Domain

1

AWB

2

CA

AWB Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 statistics do not support luminance

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Statistics do not support luminance groups.	Statistics support up to four luminance groups.
Effect	N/A	N/A

CA Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 does not support color palette (CP) for images generated using thermal imaging.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	CP for images generated using thermal imaging is not supported.	CP for images generated using thermal imaging is supported.
Effect	N/A	N/A

Dynamic Range

1

AE

2

WDR

3

DRC

4

PreGamma

5

WDRSplit

AE Differences

Difference Description

For Hi3516D V300/Hi3516C V500, the long frame statistics in WDR mode do not contain the average value of blocks.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	The long frame statistics in WDR mode do not contain the average value of blocks.	The long frame statistics in WDR mode contain the average value of blocks.
Effect	N/A	N/A

WDR Differences (1/3)

Difference Description

The NR method in WDR mode has been optimized for Hi3516D V300/Hi3516C V500. The NR effects in motion regions are improved and the false colors on the image edges are reduced when the NR strength is high.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	N/A	N/A
Effect	The NR algorithm is optimized, the NR effects in motion regions are improved, and the false colors on the image edges are reduced when the NR strength is high.	N/A

WDR Differences (2/3)



The NR effects in WDR mode are better (including combination regions). During NR, the definition is slightly reduced, and false colors are greatly reduced.

WDR Differences (3/3)



In fusion mode, the false colors on image edges are reduced.

DRC Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 improves the sampling density in dark regions for the adjustment of the tone mapping curve. It does not support adjustment of the filter scale, which does not impact the effect.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	N/A	The filter scale can be adjusted by calling the FltScaleFine or Coarse interface.
	On the Tone Mapping curve, there are 86 sampling points between the minimum luminance and 1/16 of the maximum luminance.	On the Tone Mapping curve, there are 21 sampling points between the minimum luminance and 1/16 of the maximum luminance.
Effect	N/A	N/A

PreGamma Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 uses the uneven distribution of sampling points. This improves not only the sampling density in dark regions but also the adjustability of the

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Sampling points are unevenly distributed, with the minimal interval of 256@20 bits.	Sampling points are evenly distributed, with the minimal interval of 4096@20 bits.
Effect	N/A	N/A

WDR Split Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 uses the Expander module instead of the WDR split function in Sensor-Build-in mode.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	The Expander module is used to decompress data in Sensor-Build-in mode.	The WDR split function is used to decompress data in Sensor-Build-in mode.
Effect	N/A	N/A

Offline Algorithms

1

DIS

2

GDC

3

AVSP

DIS Differences

Difference Description

Compared with Hi3519A V100, the DIS algorithm of Hi3516D V300/Hi3516C V500 supports up to 2688 x 1520@30 fps.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Supports up to 2688 x 1520@30 fps.	Supports up to 3840 x 2160@60 fps.
Effect	N/A	N/A

GDC Differences

Difference Description

Compared with Hi3519A V100, the GDC of Hi3516D V300/Hi3516C V500 supports up to 2688 x 1520@30 fps and does not support configuration of the LMF mapping parameter table.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	Supports up to 2688 x 1520@30 fps.	Supports up to 4K@60 fps.
	The LMF mapping parameter table cannot be configured.	The LMF mapping parameter table can be configured.
Effect	N/A	N/A

AVSP Differences

Difference Description

Compared with Hi3519A V100, Hi3516D V300/Hi3516C V500 does not support AVSP.

Difference	Hi3516D V300V300/Hi3516C V500	Hi3519A V100
Specification	AVSP is not supported.	AVSP is supported.
Effect	N/A	N/A

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