Adaptation Application Notes

Issue 01

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About This Document

Purpose

The adaptation module can adjust the parameters related to the encoding and picture according to the light variance in the current environment and configured bit rate to optimize the picture display effect.

Related Versions

The following table lists the product versions related to this document.

Product Name	Version
Hi3516A	V100
Hi3516D	V100

Intended Audience

This document is intended for:

- Field application engineers
- Software development engineers

Change History

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made in previous issues.

Issue 01 (2015-01-08)

This issue is the first official release.

Contents

About This Document iii

1 Functions 5

1.1 Start and Stop Control 5

1.2 Configuration of Special Scenarios 5

2 API Reference 6

3 Data Structures 7

4 Configuration File Description 8

4.1 Adaptive Identification of the Highlight Scenario 8

4.2 Module Validity Threshold 8

4.3 Threshold for Identifying the Indoor/Outdoor Scenario 9

4.4 Reduced Luminance Value After DRC Is Enabled 9

4.5 AE Adjustment Parameters 10

4.6 Noise Profile 11

4.7 Demosaic and Sharpening Parameters 11

4.8 DDPC Enable 12

4.9 Gamma 12

4.10 CCM 13

4.11 Encoding and Bit Rate Control 14

4.12 H.264 14

4.13 H.265 15

4.14 3DNR Parameters 18

4.15 Backlight Compensation 20

4.16 Highlight Compensation 20

4.17 Dynamic AE Path 22

4.18 IR 22

4.19 DRC 24

1 Functions

1.1 Start and Stop Control

The adaptation function can be enabled and disabled by calling HI_SRDK_SCENEAUTO_Start and HI_SRDK_SCENEAUTO_Stop respectively. When the adaptation function is enabled, a real-time detection thread is created to cyclically calculate the isolation (ISO) and exposure values in the current environment. Demosaic, sharpening, automatic exposure (AE), macroblock-level encoding, and 3DNR parameters are configured as required according to the calculated exposure value. For details about these parameters, see chapter 5 "Configuration File Description." When the adaptation function is disabled, the detection thread is stopped and the thread resources are released.

1.2 Configuration of Special Scenarios

Special scenarios can be configured as required, including the infrared (IR), highlight, backlight, and rapid motion scenarios. When the parameter values for the special scenarios conflict with those configured by the real-time detection thread, the parameter values for the special scenarios prevail. For details about the parameters for special scenarios, see chapter 5 "Configuration File Description."

2 API Reference

Table 2-1 describes the APIs for the adaptation module.

Table 2-1 APIs for the adaptation module

API	Description	Parameter	Parameter Description
HI_SRDK_SCENEAUTO_Init(const HI_CHAR *pszFileName)	Initializes the adaptation module and loads the parameters in the configuration file.	pszFileName	Name of the configuration file for the adaptation module
HI_SRDK_SCENEAUTO_DeInit()	Deinitializes the adaptation module.	None	None
HI_SRDK_SCENEAUTO_Start()	Enables the adaptation function and creates a real-time detection thread.	None	None
HI_SRDK_SCENEAUTO_Stop()	Disables the adaptation function and stops the detection thread.	None	None
HI_SRDK_SCENEAUTO_SetSpecialMode(const SRDK_SCENEAUTO_SEPCIAL_SCENE_E *peSpecialScene)	Sets a special scenario.	None	None
HI_SRDK_SCENEAUTO_GetSpecialMode(SRDK_SCENEAUTO_SEPCIAL_SCENE_E *peSpecialScene)	Obtains the special scenario.	None	None

3 Data Structures

The data structure is as follows:

```
typedef enum hiSRDK_SCENEAUTO_SEPCIAL_SCENE_E
{
    SRDK_SCENEAUTO_SPECIAL_SCENE_NONE = 0,
    SRDK_SCENEAUTO_SPECIAL_SCENE_BLC,
    SRDK_SCENEAUTO_SPECIAL_SCENE_IR,
    SRDK_SCENEAUTO_SPECIAL_SCENE_HLC,
    SRDK_SCENEAUTO_SPECIAL_SCENE_DYNAMIC,
    SRDK_SCENEAUTO_SPECIAL_SCENE_DRC,

    SRDK_SCENEAUTO_SPECIAL_SCENE_BUTT
}SRDK_SCENEAUTO_SEPCIAL_SCENE_E;

SRDK_SCENEAUTO_SPECIAL_SCENE_BLC       /*Backlight compensation
scenario*/
SRDK_SCENEAUTO_SPECIAL_SCENE_IR            /*IR scenario*/
SRDK_SCENEAUTO_SPECIAL_SCENE_HLC           /*Highlight compensation
scenario*/
SRDK_SCENEAUTO_SPECIAL_SCENE_DYNAMIC   /*Rapid motion scenario*/
SRDK_SCENEAUTO_SPECIAL_SCENE_DRC       /*Digital wide dynamic range (WDR)
scenario*/
```

4 Configuration File Description

4.1 Adaptive Identification of the Highlight Scenario

Identify whether a scenario is a highlight scenario according to the luminance histogram. If yes, enable the configuration options for the highlight scenario.

Variable	Description	Value Range
HLC_AutoEnable	This variable is used to enable adaptive highlight scenario identification.	0: disabled 1: enabled
HLC_thr_off	A scenario is considered as a non-highlight scenario if the number of data segments in group 0 of the AE 255-segment histogram statistics is less than **HLC_thr_off**.	0−picture size
HLC_thr_on	A scenario is considered as a highlight scenario if the number of data segments in group 1 of the AE 255-segment histogram statistics is greater than **HLC_thr_on**.	0−picture size
HLC_tolerance	The highlight scenario identification is not implemented if the interval between two frames is greater than **HLC_tolerance**.	0−HLC_expthr
HLC_expthr	The adaptive highlight scenario identification is implemented only when the environment exposure value is less than **HLC_expthr**.	[0, Maximum exposure time (in μs) x Maximum system gain]
HLC_count	The scenario is considered to be switched to the highlight or lowlight scenario only when the number of times that the current scenario is considered as a highlight or lowlight scenario is greater than **HLC_count**.	0−255

4.2 Module Validity Threshold

Variable	Description	Value Range
ave_lum_thresh	Average luminance of the current environment	[0x0, 0xFF]

Variable	Description	Value Range
delta_dis_expthresh	Exposure threshold for enabling the digital image stabilization (DIS) function. When the exposure value is less than the threshold, DIS is automatically disabled.	[0, Maximum exposure time (in μs) x Maximum system gain]
dci_strength_lut	Dynamic contrast improvement (DCI) lookup table	None
fpn_exp_thresh	When the exposure value is greater than **fpn_exp_thresh**, the fixed pattern noise (FPN) removal module is enabled.	[0, Maximum exposure time (in μs) x Maximum system gain]

4.3 Threshold for Identifying the Indoor/Outdoor Scenario

The current scenario is identified as an indoor or outdoor scenario according to the illumination.

Variable	Description	Value Range
exposure_thr_indoor	The current scenario is considered as an indoor scenario when the exposure value is greater than **exposure_thr_indoor**.	[0, Maximum exposure time (in μs) x Maximum system gain]
exposure_thr_outdoor	The current scenario is considered as an outdoor scenario when the exposure value is less than **exposure_thr_outdoor**.	0−exposure_thr_indoor

4.4 Reduced Luminance Value After DRC Is Enabled

After the dynamic range compression (DRC) function is enabled, the display effect of the details in dark regions is improved, noises become more obvious, and the noise strength is improved. In addition, the edge enhancement and denoising policy differ before and after the DRC function is enabled. The reduced luminance value is used to evaluate the effects exerted by DRC.

Variable	Description	Value Range
u32DRCStrengthThresh	The value obtained after the DRC strength is divided by **u32DRCStrengthThresh** is considered as the extra exposure gain after DRC is enabled, which is used to configure the denoising and sharpening parameters after the environment is determined.	[0, 255]

4.5 AE Adjustment Parameters

The requirements on the AE vary according to the scenario. For example, when the bit rate is low, the AE parameters can be adjusted to reduce the effect on the luminance exerted by rapid large-area motion, which reduces the side effects exerted by encoding. When the illumination is low, the AE parameters can be adjusted to slightly lower the luminance of the entire picture, which suppresses noises. The AE in bright regions can be restricted to reduce the halo sizes of illuminant points in the illuminant point scenario.

Variable	Description	Value Range
aeBitrateCount	Number of AE parameter groups. The value varies according to the bit rate.	1−12
aeBitrateThresh	A group of values. When the current bit rate is less than or equal to value *K* in this group, the AE parameters in group *K* are used.	256−40960, in kbit/s
u8Speed_K	AE adjustment speed of group *K*	[0x0, 0xFF]. For details, see the *HiISP Development Reference*.
u8Tolerance_K	AE adjustment tolerance of group *K*	[0x0, 0xFF]. For details, see the *HiISP Development Reference*.
u16BlackDelayFrame_K	Number of delayed frames before AE adjustment for group *K* when the picture is adjusted from bright to dark	For details, see the *HiISP Development Reference*.
u16WhiteDelayFrame_K	Number of delayed frames before AE adjustment for group *K* when the picture is adjusted from dark to bright	For details, see the *HiISP Development Reference*.
u32SysGainMax_K	Maximum gain of group *K*. As the value becomes smaller, the entire picture becomes black and noises disappear in the low illumination scenario.	[0, Maximum system gain x 100]
aeExpCount	Number of parameter groups. These parameters are used to adjust the luminance according to the illumination.	1−12
aeExpDtoLThresh	Threshold for exposure levels (from dark to bright) when the picture is adjusted from dark to bright	[0, Maximum exposure time (in μs) x Maximum system gain]
aeExpLtoDThresh	Threshold for exposure levels (from bright to dark) when the picture is adjusted from bright to dark	[0, Maximum exposure time (in μs) x Maximum system gain]
aeCompesation	Picture luminance within the corresponding illumination range	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
aeHistOffset	Maximum influence on the average statistics exerted by regions of interest (ROIs)	[0x0, 0xFF] For details, see the *HiISP Development Reference*.

4.6 Noise Profile

The filtering strength of the illumination varies according to the luminance to achieve excellent visual effect.

Variable	Description	Value Range
nplut_default_K	Default value of **nplut_K** when the exposure value falls within the range of [0, explow] or [exphigh, MaxExp]	[0, 255]
nplut_K	A group of filtering coefficients when the exposure value falls within the range of [explow, exphigh]	[0, 255]
explow	Lower limit of the exposure value for the configuration of **nplut_K** to take effect	[0, Maximum exposure time (in µs) x Maximum system gain]
exphigh	Upper limit of the exposure value for the configuration of **nplut_K** to take effect	[0, Maximum exposure time (in µs) x Maximum system gain]

4.7 Demosaic and Sharpening Parameters

The details and edge effect of an object vary according to the illumination. Therefore, the parameters need to be adjusted according to the illumination to ensure visual reality and detail effect. The encoding pressure is high at a low bit rate. In this case, the edge strength and detail display effect of the object can be lowered to ensure the encoding effect in motion scenarios.

Variable	Description	Value Range
BitrateCount	Number of demosaic parameter groups. The parameter group is selected according to the bit rate.	[1, 12]
BitrateThresh	Bit rate threshold for determining which demosaic parameter group is used	[256, 40960], in kbit/s
ExpCount	Number of illuminations	[1, 12]
ExpThresh	Threshold for grading illuminations	[0, Maximum exposure time (in µs) x Maximum system gain]
UuSlpoe_K	Slope of the threshold of all edges	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
AaSlope_K	Threshold for 45° and 135° edges	[0x0, 0xFFF] For details, see the *HiISP Development Reference*.
VaSlope_K	Slope of the threshold of the vertical, horizontal,	[0x0, 0xFF]

Variable	Description	Value Range
	45°, and 135° edges	For details, see the *HiISP Development Reference*.
VhSlope_K	Threshold for vertical and horizontal edges	[0x0, 0xFFF] For details, see the *HiISP Development Reference*.
sharpenBitrateCount	Number of sharpening parameter groups. The parameter group is selected according to the bit rate.	[1, 12]
sharpenBitrateThresh	Bit rate threshold for determining which sharpening parameter group is used	[256, 40960], in kbit/s
SharpenD_K	Sharpness of large edges in a picture	For details, see the *HiISP Development Reference*.
SharpenRGB_K	Sharpness of the entire picture	For details, see the *HiISP Development Reference*.
SharpenUd_K	Sharpness of small textures in a picture	For details, see the *HiISP Development Reference*.

4.8 DDPC Enable

In normal illuminations, some edges flicker after the dynamic defect pixel correction (DDPC) function is enabled. In low illuminations, the color noises can be effectively suppressed after the DDPC function is enabled. Therefore, the DDPC function needs to be configured according to the illumination.

Variable	Description	Value Range
ExpCount	Number of exposure levels	[1, 12]
ExpThresh	Threshold for the exposure level	[0, Maximum exposure time (in μs) x Maximum system gain]
u16Slop	DDPC slope corresponding to an exposure level	[0, 0xFFF] For details, see the *HiISP Development Reference*.

4.9 Gamma

The requirements on the contrast vary according to the scenario. The contrast can be adjusted by configuring the gamma value according to the illumination.

Variable	Description	Value Range
ExpCount	Number of exposure levels	[1, 12]

Variable	Description	Value Range
ExpThresh	Threshold for the exposure level	[0, Maximum exposure time (in μs) x Maximum system gain]
gamma.0_K	The first data segment in gamma group *K*	[1, 4095]
gamma.1_K	The second data segment in gamma group *K*	[1, 4095]
gamma.2_K	The third data segment in gamma group *K*	[1, 4095]

4.10 CCM

The color correction matrix (CCM) can be configured by using adaptive color management (ACM) to optimize the color effect.

Variable	Description	Value Range
ExpCount	Number of exposure levels	[1, 12]
AcmEnable	ACM enable	HI_FALSE: disabled HI_TRUE: enabled
u16HighColorTempAcmOn	Color temperature of illuminant for the high-color-temperature CCM when the ACM is enabled	[2000, 10000]
u16MidColorTempAcmOn	Color temperature of the illuminant for the medium-color-temperature CCM when the ACM is enabled	[2000, 10000]
u16LowColorTempAcmOn	Color temperature of the illuminant for the low-color-temperature CCM when the ACM is enabled	[2000, 10000]
au16HighCCMAcmOn	CCM value at a high color temperature when the ACM is enabled	[0, 0xFFFF]
au16MidCCMAcmOn	CCM value at a medium color temperature when the ACM is enabled	[0, 0xFFFF]
au16LowCCMAcmOn	CCM value at a low color temperature when the ACM is enabled	[0, 0xFFFF]
u16HighColorTempAcmOff	Color temperature of the illuminant for the high-color-temperature CCM when the ACM is disabled	[2000, 10000]
u16MidColorTempAcmOff	Color temperature of the illuminant for the medium-color-temperature CCM when the ACM is disabled	[2000, 10000]

Variable	Description	Value Range
u16LowColorTempAcmOff	Color temperature of the illuminant for the low-color-temperature CCM when the ACM is disabled	[2000, 10000]
au16HighCCMAcmOff	CCM value at a high color temperature when the ACM is disabled	[0, 0xFFFF]
au16MidCCMAcmOff	CCM value at a medium color temperature when the ACM is disabled	[0, 0xFFFF]
au16LowCCMAcmOff	CCM value at a low color temperature when the ACM is disabled	[0, 0xFFFF]

4.11 Encoding and Bit Rate Control

Different encoding and bit rate control policies need to be adopted according to the bit rate and scenario to ensure the final encoding effect.

4.12 H.264

Variable	Description	Value Range
vencBitrateCount	Number of parameter groups. The parameter group is selected according to the bit rate	[1, 12]
vencBitrateThresh	Bit rate threshold for H.264 encoding	[256, 40960], in kbit/s
chroma_qp_index_offset_K	Color quantization coefficient offset for reducing color smearing at medium or low bit rates	[−12, 12]
disable_deblocking_filter_idc_K	In-loop block filtering enable for reducing the blocking artifact at a low bit rate	0 or 2: The in-loop block filtering function is enabled. 1: The in-loop block filtering function is disabled.
slice_alpha_c0_offset_div2_K	Block filtering strength	[−6, 6]
slice_beta_offset_div2_K	Block filtering strength	[−6, 6]
u32DeltaQP_K	Macroblock-line-level bit rate control for reducing bit rate fluctuations	[0, 10]
s32IPQPDelta_K	QP difference between I frames and P frames for balancing the picture quality of the I frames and P frames	[0, 10]
ThreshI_K	Macroblock-level bit rate control table for I frames	[0, 255], an array consisting of 12 numbers

Variable	Description	Value Range
ThreshP_K	Macroblock-level bit rate control table for P frames	[0, 255], an array consisting of 12 numbers

4.13 H.265

Variable	Description	Value Range
vencBitrateCount	Number of parameter groups. The parameter group is selected according to the bit rate	[1, 12]
vencBitrateThresh	Bit rate threshold for H.265 encoding	[256, 40960], in kbit/s
ThreshI_K	Macroblock-level bit rate control table for I frames	[0, 255], an array consisting of 12 numbers
ThreshP_K	Macroblock-level bit rate control table for P frames	[0, 255], an array consisting of 12 numbers
u32RowQpDelta_K	Macroblock-line-level bit rate control for reducing bit rate fluctuations	[0, 10]
s32IPQPDelta_K	QP difference between I frames and P frames for balancing the picture quality of the I frames and P frames	[0, 10]
ExpCount	Number of exposure levels	[1, 12]
ExpThresh	Threshold for the exposure level	[0, Maximum exposure time (in μs) x Maximum system gain]
u8NormIntra4RdCost_I_K	These parameters are related to the blocking, quantized allocation, and mode identification of the H.265 encoder. You are advised not to modify these parameters.	None
u8NormIntra8RdCost_I_K		None
u8NormIntra16RdCost_I_K		None
u8NormIntra32RdCost_I_K		None
u8SkinIntra4RdCost_I_K		None
u8SkinIntra8RdCost_I_K		None
u8SkinIntra16RdCost_I_K		None
u8SkinIntra32RdCost_I_K		None
u8HedgeIntra4RdCost_I_K		None
u8HedgeIntra8RdCost_I_K		None
u8HedgeIntra16RdCost_I_K		None
u8HedgeIntra32RdCost_I_K		None

Variable	Description	Value Range
u8NormIntra4RdCost_P_K		None
u8NormIntra8RdCost_P_K		None
u8NormIntra16RdCost_P_K		None
u8NormIntra32RdCost_P_K		None
u8SkinIntra4RdCost_P_K		None
u8SkinIntra8RdCost_P_K		None
u8SkinIntra16RdCost_P_K		None
u8SkinIntra32RdCost_P_K		None
u8HedgeIntra4RdCost_P_K		None
u8HedgeIntra8RdCost_P_K		None
u8HedgeIntra16RdCost_P_K		None
u8HedgeIntra32RdCost_P_K		None
u8NormFme8RdCost_P_K		None
u8NormFme16RdCost_P_K		None
u8NormFme32RdCost_P_K		None
u8NormFme64RdCost_P_K		None
u8SkinFme8RdCost_P_K		None
u8SkinFme16RdCost_P_K		None
u8SkinFme32RdCost_P_K		None
u8SkinFme64RdCost_P_K		None
u8HedgeFme8RdCost_P_K		None
u8HedgeFme16RdCost_P_K		None
u8HedgeFme32RdCost_P_K		None
u8HedgeFme64RdCost_P_K		None
u8NormMerg8RdCost_P_K		None
u8NormMerg16RdCost_P_K		None
u8NormMerg32RdCost_P_K		None
u8NormMerg64RdCost_P_K		None
u8SkinMerg8RdCost_P_K		None
u8SkinMerg16RdCost_P_K		None
u8SkinMerg32RdCost_P_K		None

Variable	Description	Value Range
u8SkinMerg64RdCost_P_K		None
u8HedgeMerg8RdCost_P_K		None
u8HedgeMerg16RdCost_P_K		None
u8HedgeMerg32RdCost_P_K		None
u8HedgeMerg64RdCost_P_K		None
bSkinEn_I_K		None
u32SkinQpDelta_I_K		None
u8SkinUMax_I_K		None
u8SkinUMin_I_K		None
u8SkinVMax_I_K		None
u8SkinVMin_I_K		None
u32SkinNum_I_K		None
bSkinEn_P_K		None
u32SkinQpDelta_P_K		None
u8SkinUMax_P_K		None
u8SkinUMin_P_K		None
u8SkinVMax_P_K		None
u8SkinVMin_P_K		None
u32SkinNum_P_K		None
u8HedgeThr_I_K		None
u8HedgeCnt_I_K		None
bStroEdgeEn_I_K		None
u32StroEdgeQpDelta_I_K		None
u8HedgeThr_P_K		None
u8HedgeCnt_P_K		None
bStroEdgeEn_P_K		None
u32StroEdgeQpDelta_P_K		None
bImproveEn_I_K		None
bImproveEn_P_K		None
u32Norm32MaxNum_P_K		None
u32Norm16MaxNum_P_K		None

Variable	Description	Value Range
u32Norm32ProtectNum_P_K		None
u32Norm16ProtectNum_P_K		None
u32Skin32MaxNum_P_K		None
u32Skin16MaxNum_P_K		None
u32Skin32ProtectNum_P_K		None
u32Skin16ProtectNum_P_K		None
u32Still32MaxNum_P_K		None
u32Still16MaxNum_P_K		None
u32Still32ProtectNum_P_K		None
u32Still16ProtectNum_P_K		None
u32Hedge32MaxNum_P_K		None
u32Hedge16MaxNum_P_K		None
u32Hedge32ProtectNum_P_K		None
u32Hedge16ProtectNum_P_K		None

4.14 3DNR Parameters

Variable	Description	Value Range
SBS	Strength of Y component spatial-domain filtering for bright regions	[0, 255]
SDS	Strength of Y component spatial-domain filtering for dark regions	[0, 255]
SBF	Frequency of Y component spatial-domain filtering	The values 0−3 indicate the lowest frequency, second lowest frequency, intermediate frequency, and high frequency respectively.
MiBaTFP	Level of Y component weak time-domain filtering for bright regions	[0, 255]
MiDaTFP	Level of Y component weak time-domain filtering for dark regions	[0, 255]
HiBaTFP	Level of Y component strong time-domain filtering for bright regions	[0, 255]
HiDaTFP	Level of Y component strong time-domain filtering for dark regions	[0, 255]

Variable	Description	Value Range
MDDZ	Threshold for pixel-level motion detection	[0, 127]
TFP	Time-domain filtering level	[0, 63]
MaTFP	Time-domain filtering level of motion pixels	If **MaTFP** is **0**, neither the weak time-domain filtering nor the strong time-domain filtering has effect on motion pixels. If **MaTFP** is **1**, only the weak time-domain filtering has effect on motion pixels. If **MaTFP** is **2**, both the weak time-domain filtering and the strong time-domain filtering have effect on motion pixels.
TFR	Time-domain filtering weight of static pixels	[0, 31]
TFS	Time-domain filtering strength of static pixels	[0, 15]
SHP	Sharpness of static pixels	[0, 127]
MaTFR	Time-domain filtering weight of motion pixels	[0, 31]
MaTFS	Time-domain filtering strength of motion pixels	[0, 15]
MaSHP	Sharpness of motion pixels	[0, 64]
SFC	Spatial-domain filtering strength of chromatism components Cb and Cr	[0, 255]
PostSBS	Strength of Y component spatial-domain filtering for bright regions during post-processing	[0, 255]
PostSDS	Strength of Y component spatial-domain filtering for dark regions during post-processing	[0, 255]
PostSHP	Post-processing sharpness of Y component	[0, 127]
PostROW	Weight of Y component spatial-domain filtering during post-processing	[0, 31]
PostSFS	Strength of Y component denoising during post-processing	[0, 8]
MATW	A smaller value indicates a higher probability that the pixels in the neighboring zone of the current pixel are considered as static pixels.	[0, 5]
MATH	Motion detection threshold for the neighboring zone If the difference of the neighboring	[0, 511]

Variable	Description	Value Range
	zones is less than or equal to the threshold, the pixels in the neighboring zone of the current pixel are considered as static pixels. Otherwise, the pixels in the neighboring zone of the current pixel are considered as motion pixels.	
MABW	Motion detection for the neighboring zone	If **MABW** is **0**, the area used for neighboring zone motion detection is small, and there is a low probability that the pixels in the neighboring zone of the current pixel are considered as static pixels. If **MABW** is **1**, the area used for neighboring zone motion detection is large, and there is a high probability that the pixels in the neighboring zone of the current pixel are considered as static pixels.
TFC	Time-domain filtering strength of chromatism components Cb and Cr	[0, 32]

4.15 Backlight Compensation

Variable	Description	Value Range
AEStrategyMode	AE policy	The highlight takes priority, or the lowlight takes priority. For details, see the *HiISP Development Reference*.
HistRatioSlope	ROI weight	[0x0, 0xFFFF] For details, see the *HiISP Development Reference*.
MaxHistOffset	Maximum influence on the average statistics exerted by ROIs	[0x0, 0xFF]

4.16 Highlight Compensation

Variable	Description	Value Range
DCIEnable	DCI enable	HI_FALSE: disabled HI_TRUE: enabled
DCIBlackGain	Darkness gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media*

Variable	Description	Value Range
		Processing Software Development Reference.
DCIContrastGain	Contrast gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media Processing Software Development Reference*.
DCILightGain	Brightness gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media Processing Software Development Reference*.
DRCEnable	DRC enable	HI_FALSE: disabled HI_TRUE: enabled
DRCManulEnable	Manual DRC enable	HI_FALSE: disabled HI_TRUE: enabled
DRCStrengthTarget	Target value of the DRC strength	[0, 0xFF] For details, see the *HiISP Development Reference*.
ExpCompensation	Exposure compensation value	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
WhiteDelayFrame	Number of delayed frames during AE adjustment when the picture luminance is higher than the target luminance	For details, see the *HiISP Development Reference*.
BlackDelayFrame	Number of delayed frames during AE adjustment when the picture luminance is lower than the target luminance	For details, see the *HiISP Development Reference*.
u8Speed	AE adjustment speed	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
HistRatioSlope	ROI weight	[0x0, 0xFFFF] For details, see the *HiISP Development Reference*.
MaxHistOffset	Maximum influence on the average statistics exerted by ROIs	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
u8Tolerance	Luminance tolerance during AE adjustment	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
Saturation	Color saturation	[0x0,0xFF] For details, see the *HiISP Development Reference*.
gamma_0	First part in the gamma table	For details, see the *HiISP Development Reference*.
gamma_1	Second part in the gamma	For details, see the *HiISP Development Reference*.

Variable	Description	Value Range
	table	
gamma_2	Third part in the gamma table	For details, see the *HiISP Development Reference*.

4.17 Dynamic AE Path

Variable	Description	Value Range
TotalNum_normal	Number of AE path nodes in common mode	[1, 12]
IntTime_normal	Exposure time of the AE path node in common mode	[0, Maximum exposure time (in μs)]
SysGain_normal	System gain of the AE path node in common mode	(1 to Maximum system gain) x 1024
TotalNum_fast	Number of AE path nodes in fast mode	[1, 12]
IntTime_fast	Exposure time of the AE path node in fast mode	[0, Maximum exposure time (in μs)]
SysGain_fast	System gain of the AE path node in fast mode	(1 to Maximum system gain) x 1024

4.18 IR

Variable	Description	Value Range
ExpCompensation	Exposure compensation value	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
u16HistRatioSlope	ROI weight	[0x0, 0xFFFF] For details, see the *HiISP Development Reference*.
BlackDelayFrame	Number of delayed frames during AE adjustment when the picture luminance is lower than the target luminance	For details, see the *HiISP Development Reference*.
WhiteDelayFrame	Number of delayed frames during AE adjustment when the picture luminance is higher than the target luminance	For details, see the *HiISP Development Reference*.
MaxHistOffset	Maximum influence on the average	[0x0, 0xFF]

Variable	Description	Value Range
	statistics exerted by ROIs	
u8Tolerance	Luminance tolerance during AE adjustment	[0x0, 0xFF]
u8Speed	AE adjustment speed	[0x0, 0xFF] For details, see the *HiISP Development Reference*.
DCIEnable	DCI enable	HI_FALSE: disabled HI_TRUE: enabled
DCIBlackGain	Darkness gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media Processing Software Development Reference*.
DCIContrastGain	Contrast gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media Processing Software Development Reference*.
DCILightGain	Brightness gain	[0, 63] For details, see the *Hi3516A HiMPP V2.0 Media Processing Software Development Reference*.
IRu16Slope	Strength of dynamic defect pixel correction	[0, 0xFFF] For details, see the *HiISP Development Reference*.
au8LumThresh	Threshold for all edges. Increasing the parameter value decreases the false colors, noises, resolution, and sharpness.	[0,0xFF] For details, see the *HiISP Development Reference*.
au8SharpenD	Sharpness of large edges in a picture	[0, 0xFF] For details, see the *HiISP Development Reference*.
au8SharpenRGB	Sharpness of the entire picture	[0, 0xFF] For details, see the *HiISP Development Reference*.
au8SharpenUd	Sharpness of small textures in a picture	[0, 0xFF] For details, see the *HiISP Development Reference*.
gamma_0	First part in the gamma table	[0, 0xFF] For details, see the *HiISP Development Reference*.
gamma_1	Second part in the gamma table	[0, 0xFF] For details, see the *HiISP Development*

Variable	Description	Value Range
		Reference.
gamma_2	Third part in the gamma table	[0, 0xFF] For details, see the *HiISP Development Reference*.

4.19 DRC

Variable	Description	Value Range
DRCEnable	DRC enable	HI_FALSE: disabled HI_TRUE: enabled
DRCManulEnable	Manual DRC enable	HI_FALSE: disabled HI_TRUE: enabled
DRCStrengthTarget	DRC strength	[0, 0xFF] For details, see the *HiISP Development Reference*.
DRCu32SlopeMax	Control parameter for DRC tone curves, which is used to limit the maximum slope (gain) for the dark regions on the DRC curves	[0, 0xFF] For details, see the *HiISP Development Reference*.
DRCu32SlopeMin	Control parameter for DRC tone curves, which is used to limit the minimum slope (gain) for the bright regions on the DRC curves	[0, 0xFF] For details, see the *HiISP Development Reference*.
DRCu32VarianceSpace	Space sensitivity of the DRC algorithm. A larger value indicates that more surrounding pixels are referenced when tone_curve is generated.	[0x0, 0xF] For details, see the *HiISP Development Reference*.
DRCu32VarianceIntensity	Luminance sensitivity of the DRC algorithm. A larger value indicates a smaller difference between the tone_curve of each pixel and that of its surrounding pixels.	[0x0, 0xF] For details, see the *HiISP Development Reference*.
DRCu32WhiteLevel	Upper limit of the DRC algorithm. Pixels with values greater than **u32Whitelevel** are not involved in the DRC calculation.	[0, 0xFFF] For details, see the *HiISP Development Reference*.
DRCu32BlackLevel	Lower limit of the DRC algorithm. Pixels with values less than **u32Blacklevel** are not involved in the DRC calculation.	[0, 0xFFF] For details, see the *HiISP Development Reference*.