



# **FL&H Series TUCAM-API Properties & Capabilities**



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## Catalog

1. Before Use .....	5
2. Reference List .....	5
2.1. Capability Reference Table (prefix "TUIDC _") .....	5
2.2. Property Reference Table (prefix "TUIDP _") .....	8
3. Detailed Reference Table .....	9
3.1. Capability Reference Table .....	9
3.1.1. TUIDC_RESOLUTION .....	9
3.1.2. TUIDC_PIXELCLOCK .....	10
3.1.3. TUIDC_BITOFDEPTH .....	11
3.1.4. TUIDC_ATEXPOSURE .....	11
3.1.5. TUIDC_HORIZONTAL .....	11
3.1.6. TUIDC_VERTICAL .....	11
3.1.7. TUIDC_ATWBALANCE .....	11
3.1.8. TUIDC_FAN_GEAR .....	12
3.1.9. TUIDC_ATLEVELS .....	12
3.1.10. TUIDC_SHIFT .....	13
3.1.11. TUIDC_HISTC .....	13
3.1.12. TUIDC_CHANNELS .....	13
3.1.13. TUIDC_FLTCORRECTION .....	14
3.1.14. TUIDC_VERCORRECTION .....	14
3.1.15. TUIDC_MONOCHROME .....	14
3.1.16. TUIDC_BLACKBALANCE .....	14
3.1.17. TUIDC_CAM_MULTIPLE .....	14
3.1.18. TUIDC_ENABLEPOWEEFREQUENCY .....	15
3.1.19. TUIDC_ROTATE_R90 .....	15

3.1.20. TUIDC_ROTATE_L90 .....	15
3.1.21. TUIDC_NEGATIVE .....	16
3.1.22. TUIDC_HDR .....	16
3.1.23. TUIDC_ENABLETIMESTAMP .....	16
3.1.24. TUIDC_ATEXPOSURE_MODE .....	16
3.1.25. TUIDC_BINNING_SUM .....	17
3.1.26. TUIDC_ENABLEOVERLAP .....	17
3.2. Property reference Table .....	18
3.2.1. TUIDP_GLOBALGAIN .....	18
3.2.2. TUIDP_EXPOSURETM .....	19
3.2.3. TUIDP_BRIGHTNESS .....	19
3.2.4. TUIDP_BLACKLEVEL .....	19
3.2.5. TUIDP_TEMPERATURE .....	19
3.2.6. TUIDP_SHARPNESS .....	20
3.2.7. TUIDP_GAMMA .....	20
3.2.8. TUIDP_CONTRAST .....	20
3.2.9. TUIDP_LFTLEVELS .....	20
3.2.10. TUIDP_RGTLEVELS .....	20
3.2.11. TUIDP_CHNLGAIN .....	21
3.2.12. TUIDP_SATURATION .....	21
3.2.13. TUIDP_CLRTEMPERATURE .....	21
3.2.14. TUIDP_DPCLEVEL .....	21
3.2.15. TUIDP_BLACKLEVELHG .....	21
3.2.16. TUIDP_BLACKLEVELLG .....	22
3.2.17. TUIDP_POWEEFREQUENCY .....	22
3.2.18. TUIDP_HUE .....	22
3.2.19. TUIDP_LIGHT .....	22



3.2.20. TUIDP_NOISELEVEL_3D .....	22
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## 1. Before Use

This document explains the supported properties and capabilities of the FL&H series cameras and how to control them through TUCAM-API. Before use them, please understand the basic concepts of the TUCAM-API and SDK.

The FL & H series cameras in the document include:

Camera Model	Versions	Name
FL-20	V1.0	FL-20
FL-20BW	V1.0	FL-20BW
H-695ICE	V1.0	H-695ICE
FL 9BW	V1.0	FL 9BW
FL 26BW	V1.0	FL 26BW

## 2. Reference List

### Note:

- Macro definitions that are not listed indicates that they are not supported.
- : supported, ○: not supported

### 2.1. Capability Reference Table (prefix "TUIDC \_")

Camera Model	RESOLUTION (0x00)	PIXELCLOCK (0x01)	BITOFDEPTH (0x02)	ATEXPOSURE (0x03)	HORIZONTAL (0x04)
FL-20	●	●	●	●	●
FL-20BW	●	●	●	●	●
H-695ICE	●	●	●	●	●
FL 9BW	●	●	●	●	●
FL 26BW	●	●	●	●	●

Camera Model	VERTICAL (0x05)	ATWBALANCE (0x06)	FAN_GEAR (0x07)	ATLEVELS (0x08)	SHIFT (0x09)	HISTC (0x0A)
FL-20	●	●	●	●	●	●
FL-20BW	●	○	●	●	○	●
H-695ICE	●	○	●	●	○	●
FL 9BW	●	○	●	●	○	●
FL 26BW	●	○	●	●	○	●

Camera Model	CHANNELS (0x0B)	FLTCORRECTION (0x0F)	VERCORRECTION (0x13)	MONOCHROME (0x14)
FL-20	●	●	●	●
FL-20BW	○	●	●	○
H-695ICE	○	○	●	○
FL 9BW	○	●	●	○
FL 26BW	○	●	●	○

Camera Model	BLACKBALANCE (0x15)	TUIDC_IMGMODESELECT (0x16)	CAM_MULTIPLE (0x17)
FL-20	●	○	●
FL-20BW	○	○	●
H-695ICE	○	○	●
FL 9BW	○	●	●
FL 26BW	○	○	●

Camera Model	ENABLEPOWEEFREQUENCY (0x18)	ROTATE_R90 (0x19)	ROTATE_L90 (0x1A)
FL-20	●	●	●
FL-20BW	●	●	●
H-695ICE	●	●	●
FL 9BW	○	●	●
FL 26BW	○	●	●

Camera Model	NEGATIVE (0x1B)	HDR (0x1C)	TUIDC_ENABLED (0x1E)	ENABLETIMESTAMP (0x1F)
FL-20	●	●	○	○
FL-20BW	●	○	○	●
H-695ICE	○	○	○	○
FL 9BW	○	○	●	○
FL 26BW	○	○	●	○

Camera Model	ENABLETRIOUT (0x35)	TUIDC_SHUTTER (0x46)
FL-20	○	○
FL-20BW	○	○
H-695ICE	○	○
FL 9BW	●	○
FL 26BW	●	●

## 2.2. Property Reference Table (prefix "TUIDP \_")

Camera Model	GLOBALGAIN (0x00)	EXPOSURETM (0x01)	BRIGHTNESS (0x02)	BLACKLEVEL (0x03)
FL-20	●	●	●	●
FL-20BW	●	●	●	●
H-695ICE	●	●	●	●
FL 9BW	●	●	○	●
FL 26BW	●	●	○	●

Camera Model	TEMPERATURE (0x04)	SHARPNESS (0x05)	GAMMA (0x08)	CONTRAST (0x09)	LFTLEVELS (0x0A)
FL-20	●	●	●	●	●
FL-20BW	●	●	●	●	●
H-695ICE	●	●	●	●	●
FL 9BW	●	○	●	●	●
FL 26BW	●	○	●	●	●

Camera Model	RGTLEVELS (0x0B)	CHNLGAIN (0x0C)	SATURATION (0x0D)	CLRTEMPERATURE (0x0E)
FL-20	●	●	●	●
FL-20BW	●	○	○	○
H-695ICE	●	○	○	○
FL 9BW	●	○	○	○
FL 26BW	●	○	○	○



Camera Model	DPCLEVEL (0x10)	BLACKLEVELHG (0x11)	BLACKLEVELLG (0x12)	POWEEFREQUENCY (0x13)
FL-20	●	●	●	●
FL-20BW	●	○	○	●
H-695ICE	●	○	○	●
FL 9BW	●	○	○	○
FL 26BW	●	○	○	○

Camera Model	HUE (0x14)	LIGHT (0x15)	NOISELEVEL_3D (0x17)	ATLEVEL_PERCENTAGE (0x2A)
FL-20	●	●	●	●
FL-20BW	○	○	○	●
H-695ICE	○	○	○	●
FL 9BW	○	○	○	●
FL 26BW	○	○	○	●

## 3. Detailed Reference Table

**Note:** The camera models not listed indicate that the camera is not supported.

### 3.1. Capability Reference Table

#### 3.1.1. TUIDC\_RESOLUTION

Camera Model	Range	Default	Step	Description
FL-20	[0, 4]	0	1	0: "5472x3648" 1: "2736x1824" 2: "1824x1216" 3: "2736x1824(2x2Bin)" 4: "1368x912(4x4Bin)"

FL-20BW	[0, 8]	0	1	0: "5472x3648" 1: "2736x1824(2x2Bin_High Speed)" 2: "1824x1216(3x3Bin_High Speed)" 3: "2736x1824(2x2Bin_Aver)" 4: "1368x912(4x4Bin_Aver)" 5: "684x456(8x8Bin_Aver)" 6: "2736x1824(2x2Bin_Sum)" 7: "1368x912(4x4Bin_Sum)" 8: "684x456(8x8Bin_Sum)"
H-695ICE	[0, 7]	0	1	0: "2688x2200" 1: "1344x1100(2x2Bin)" 2: "672x552(4x4Bin)" 3: "448x368(6x6Bin)" 4: "336x276(8x8Bin)" 5: "224x184(12x12Bin)" 6: "168x136(16x16Bin)" 7: "112x92(24x24Bin)"
FL 9BW	[0, 0]	0	0	0: "3000x3000"
FL 26BW	[0, 1]	0	1	0: "6244x4168" 1: "3120x2084(SenBin)"

### 3.1.2. TUIDC\_PIXELCLOCK

Camera Model	Range	Default	Step	Description
FL-20	[0, 0]	0	0	0: "High" 72MHZ
FL-20BW				
H-695ICE				
FL 9BW				
FL 26BW				

### 3.1.3. TUIDC\_BITOFDEPTH

Camera Model	Range	Default	Step	Description
FL 9BW & FL 26BW	[16, 16]	16	0	16: 16 Bit data bits
The other FL & H series	[8, 16]	8	8	8:8Bit data bits 16:16 Bit data bits

### 3.1.4. TUIDC\_ATEXPOSURE

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	1	1	0: Manual exposure mode 1: Automatic exposure mode

### 3.1.5. TUIDC\_HORIZONTAL

Camera Model	Range	Default	Step	Description
FL & H series	[0, 1]	0	1	0: Non-horizontal mirror state 1: Horizontal mirror state

### 3.1.6. TUIDC\_VERTICAL

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	0	1	0: Non-vertical mirror state 1: Vertical mirror state

### 3.1.7. TUIDC\_ATWBALANCE

Camera Model	Range	Default	Step	Description
FL-20	[0, 2]	1	1	0:Manual white balance state 1:Automatic white balance state 2:Single white balance state (reserved)

### 3.1.8. TUIDC\_FAN\_GEAR

Camera Model	Range	Default	Step	Description
FL-20	[0, 5]	2	1	0: "Fan 1" 1: "Fan 2" 2: "Fan 3" 3: "Fan 4" 4: "Fan 5" 5: "Fan 6"
FL-20BW	[0, 2]	0	1	0: "High" 1: "Medium" 2: "Low"
H-695ICE				
FL 9BW				
FL 26BW				

### 3.1.9. TUIDC\_ATLEVELS

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 3]	0	1	0: Manual color scale status 1: Automatic left color order state (histogram statistics must be turned on) 2: Automatic right color order state (histogram statistics must be turned on) 3: Auto left and right color order status (histogram statistics must be turned on)

### 3.1.10. TUIDC\_SHIFT

Camera Model	Range	Default	Step	Description
FL-20	[0, 8]	0	1	0: Display the 8 Bit data, [8,15] 1: Display 8 Bit data [7,14] 2: Display 8 Bit data [6,13] 3: Display the 8 Bit data, [5,12] 4: Display 8 Bit data [4,11] 5: Display the 8 Bit data, [3,10] 6: Display the 8 Bit data, [2,9] 7: Display the 8 Bit data, [1,8] 8: Display the 8 Bit data, [0,7]

### 3.1.11. TUIDC\_HISTC

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	0	1	0: Close the histogram data statistics (the automatic color scale is invalid) 1: Open the histogram data statistics (the automatic color scale is valid)

### 3.1.12. TUIDC\_CHANNELS

Camera Model	Range	Default	Step	Description
FL-20	[0, 3]	0	1	0: Shared channel (RGB or Gray) 1: Red channel 2: Green channel 3: Blue channel

### 3.1.13. TUIDC\_FLTCORRECTION

Camera Model	Range	Default	Step	Description
FL series	[0, 3]	0	1	0: Close the flat-field correction 1: Grab the frame data 2: Calculate the flat-field correction 3: Open flat- field correction

### 3.1.14. TUIDC\_VERCORRECTION

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	1	1	0: Close the vertical mirror correction 1: Open the vertical mirror correction (Windows system Default)

### 3.1.15. TUIDC\_MONOCHROME

Camera Model	Range	Default	Step	Description
FL-20	[0, 1]	0	1	0: Close the monochrome state 1: Open the monochrome state

### 3.1.16. TUIDC\_BLACKBALANCE

Camera Model	Range	Default	Step	Description
FL-20	[0, 1]	0	1	0: reserved, the effect is the same as 1 1: execute the black balance parameter

### 3.1.17. TUIDC\_IMGMODESELECT

Camera Model	Range	Default	Step	Description
FL 9BW	[0, 2]	0	1	0: standard 1: low noise (14Bit) 2: low noise (16Bit)

FL 26BW	[0, 1]	0	1	0: standard 1: low noise
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### 3.1.18. TUIDC\_CAM\_MULTIPLE

Camera Model	Range	Default	Step	Description
The FL & H series	[1, 4]	1	1	Set the number of cameras to capture data and equally divide the USB bandwidth

### 3.1.19. TUIDC\_ENABLEPOWEEFREQUENCY

Camera Model	Range	Default	Step	Description
FL-20	[0, 1]	0	1	0:Close the power frequency and is enabled 1:Open the power frequency and is enabled
FL-20BW				
H-695ICE				

### 3.1.20. TUIDC\_ROTATE\_R90

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	0	1	0:Image original state 1:rotate the image by 90 degrees to the right

### 3.1.21. TUIDC\_ROTATE\_L90

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 1]	0	1	0:Image original state 1:rotate the image by 90 degrees to the left

### 3.1.22. TUIDC\_NEGATIVE

Camera Model	Range	Default	Step	Description
FL series	[0, 1]	0	1	0:Close the negative chip mode 1:Open the negative chip mode

### 3.1.23. TUIDC\_HDR

Camera Model	Range	Default	Step	Description
FL-20	[0, 1]	0	1	0: Close the HDR mode 1: Open the HDR mode

### 3.1.24. TUIDC\_ENABLEDLED

Camera Model	Range	Default	Step	Description
FL 9BW	[0, 1]	1	1	0:Close the LED
FL 26BW				1:Open the LED

### 3.1.25. TUIDC\_ENABLETIMESTAMP

Camera Model	Range	Default	Step	Description
H-695ICE	[0, 1]	0	1	0:Close the timestamp statistics 1:Open the timestamp statistics

### 3.1.26. TUIDC\_ATEXPOSURE\_MODE

Camera Model	Range	Default	Step	Description
FL-20	[0, 3]	0	3	0:Central exposure mode 3:the right exposure mode (support target value)



### 3.1.27. TUIDC\_BINNING\_SUM

Camera Model	Range	Default	Step	Description
FL-20	[1, 4]	1	1	Software Binning, pixel sum mode
FL 9BW	[0, 5]	0	1	0: "1x1Normal" 1: "2x2Bin_Sum" 2: "3x3Bin_Sum" 3: "4x4Bin_Sum" 4: "6x6Bin_Sum" 5: "8x8Bin_Sum"
FL 26BW	[0, 6]	0	1	0: "1x1Normal" 1: "2x2Bin_Sum" 2: "3x3Bin_Sum" 3: "4x4Bin_Sum" 4: "6x6Bin_Sum" 5: "8x8Bin_Sum" 6: "16x16Bin_Sum"

### 3.1.28. TUIDC\_ENABLEOVERLAP

Camera Model	Range	Default	Step	Description
H-695ICE	[0, 1]	0	1	0:Close the overlapping exposure mode 1:Open the overlapping exposure mode

### 3.1.29. TUIDC\_ENABLETRIOUT

Camera Model	Range	Default	Step	Description
FL 9BW	[0, 1]	1	1	0:Close the trigger out signal
FL 26BW				1:Open the trigger out signal

### 3.1.30. TUIDC\_SHUTTER

Camera Model	Range	Default	Step	Description
FL 26BW	[0, 1]	0	1	0:Rolling Shutter 1:Rolling Shutter (Global Reset)

## 3.2. Property Reference Table

### 3.2.1. TUIDP\_GLOBALGAIN

Camera Model	Range	Default	Step	Description
FL-20	[0, 255]	30	1	The larger the value, the higher the brightness, but the noise increases accordingly
FL-20BW	[0, 257]	1	1	
H-695ICE	[0, 255]	1	1	
FL 9BW	[0, 3]	1	1	0: "Gain 0(3.0e-/ADU)" 1: "Gain 1(1.0e-/ADU)" 2: "Gain 2(0.2e-/ADU)" 3: "Gain 3(0.5e-/ADU)",
FL 26BW	[0, 3]	1	1	0: "Gain 0" 1: "Gain 1" 2: "Gain 2" 3: "Gain 3"

### 3.2.2. TUIDP\_EXPOSURETM

Camera Model	Range	Default	Step	Description
The FL & H series	[0, -]	-	-	The range and step of the exposure time is related to the resolution and minimum exposure time, and the range is obtained through the interface.

### 3.2.3. TUIDP\_BRIGHTNESS

Camera Model	Range	Default	Step	Description
FL-20	[10, 245]	128	1	Valid in auto exposure state
FL-20BW	[20, 200]	200	1	
H-695ICE				

### 3.2.4. TUIDP\_BLACKLEVEL

Camera Model	Range	Default	Step	Description
FL-20	[0, 8191]	240	1	Camera black level value
FL-20BW	[0, 255]	12	1	
H-695ICE				
FL 9BW		2	1	
FL 26BW		10	1	

### 3.2.5. TUIDP\_TEMPERATURE

Camera Model	Range	Default	Step	Description
FL-20	[0, 100]	0	1	Camera (Sensor) temperature, Actual temperature of-50
FL-20BW				
H-695ICE	[0, 100]	38	1	Camera (Sensor) temperature,Actual
FL 9BW	[0, 1000]	250	1	

FL 26BW				temperature of (value - 500)/10 ,min 0.1℃
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### 3.2.6. TUIDP\_SHARPNESS

Camera Model	Range	Default	Step	Description
The FL & H series	[0,128]	0	1	Sharpening level, the larger the value, the greater the sharpening intensity

### 3.2.7. TUIDP\_GAMMA

Camera Model	Range	Default	Step	Description
The FL & H series	[1, 255]	100	1	Gamma value

### 3.2.8. TUIDP\_CONTRAST

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 255]	128	1	Contrast value

### 3.2.9. TUIDP\_LFTLEVELS

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 254]	0	1	8 Bit data
	[0, 65534]	0	1	16 Bit data

### 3.2.10. TUIDP\_RGTLEVELS

Camera Model	Range	Default	Step	Description
The FL & H series	[1, 255]	255	1	8 Bit data
	[1, 65535]	65535	1	16 Bit data

### 3.2.11. TUIDP\_CHNLGAIN

Camera Model	Range	Default	Step	Description
FL-20	[0,1366]	256	1	Gain values of the corresponding channel

### 3.2.12. TUIDP\_SATURATION

Camera Model	Range	Default	Step	Description
FL-20	[0, 255]	64	1	Saturation value

### 3.2.13. TUIDP\_CLRTEMPERATURE

Camera Model	Range	Default	Step	Description
FL-20	[0, 130]	0	1	The color temperature value is confirmed according to the gain value of the RGB

### 3.2.14. TUIDP\_DPCLEVEL

Camera Model	Range	Default	Step	Description
FL 9BW & FL 26BW	[0, 3]	1	1	Bad point correction, the greater the value, the greater the correction intensity
The other FL & H series	[0, 3]	0	1	

### 3.2.15. TUIDP\_BLACKLEVELHG

Camera Model	Range	Default	Step	Description
FL-20	[0, 65535]	0	1	Manufacturers reserved, not recommended to set by yourself

### 3.2.16. TUIDP\_BLACKLEVELLG

Camera Model	Range	Default	Step	Description
FL-20	[0, 65535]	0	1	Manufacturers reserved, not recommended to set by yourself

### 3.2.17. TUIDP\_POWEEFREQUENCY

Camera Model	Range	Default	Step	Description
H series	[50, 60]	50	10	50:Power frequency: 50 MHZ
FL-20 & FL-20BW				60:Power frequency: 60 MHZ

### 3.2.18. TUIDP\_HUE

Camera Model	Range	Default	Step	Description
FL-20	[0, 360]	180	1	hue

### 3.2.19. TUIDP\_LIGHT

Camera Model	Range	Default	Step	Description
FL-20	[0, 255]	64	1	lightness

### 3.2.20. TUIDP\_NOISELEVEL\_3D

Camera Model	Range	Default	Step	Description
FL-20	[0, 5]	3	1	3D noise reduction intensity

### 3.2.21. TUIDP\_ATLEVEL\_PERCENTAGE

Camera Model	Range	Default	Step	Description
The FL & H series	[0, 4990]	10	10	Automatic levels ignore percentage Actual percentage of /100



				0.01%,0.02%,0.05%,0.1%,0.2%.....49.8%,49.9%
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