



MIChrome Series TUCAM-API Properties & Capabilities



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1. Before Use

This document explains the supported properties and capabilities of the Dhyana 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 Mlchrome series cameras in the documentation includes:

Camera Model	Versions	Name
Mlchrome 5 Pro	V1.0	Mlchrome 5 Pro
Mlchrome 6	V1.0	Mlchrome 6
Mlchrome 16	V1.0	Mlchrome 16
Mlchrome 20	V1.0	Mlchrome 20
Mlchrome 3BW	V1.0	Mlchrome 3BW
Mlchrome 5BW	V1.0	Mlchrome 5BW
Mlchrome 6BW	V1.0	Mlchrome 6BW
Mlchrome 20BW	V1.0	Mlchrome 20BW

2. Reference Table

Note:

- 1) Macro definitions that are not listed indicates that they are not supported.
- 2) ●: supported, ○: not supported

2.1. Capability reference table (prefixed with "TUIDC_")

Camera Model	RESOLUTION (0x00)	PIXELCLOCK (0x01)	BITOFDEPTH (0x02)	ATEXPOSURE (0x03)	HORIZONTAL (0x04)
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Michrome 5 Pro	●	●	●	●	●
Michrome 6	●	●	●	●	●
Michrome 16	●	●	●	●	●
Michrome 20	●	●	●	●	●
Michrome 3BW	●	●	●	●	●
Michrome 5BW	●	●	●	●	●
Michrome 6BW	●	●	●	●	●
Michrome 20BW	●	●	●	●	●

Camera Model	VERTICAL (0x05)	ATWBALANCE (0x06)	ATLEVELS (0x08)	SHIFT (0x09)	HISTC (0x0A)	CHANNELS (0x0B)
Michrome 5 Pro	●	●	●	●	●	●
Michrome 6	●	●	●	●	●	●
Michrome 16	●	●	●	●	●	●
Michrome 20	●	●	●	●	●	●
Michrome 3BW	●	○	●	●	●	○
Michrome 5BW	●	○	●	●	●	○
Michrome 6BW	●	○	●	●	●	○
Michrome 20BW	●	○	●	●	●	○

Camera Model	ENHANCE (0x0C)	FLTCORRECTION (0x0F)	VERCORRECTION (0x13)	MONOCHROME (0x14)
Michrome 5 Pro	●	●	●	●
Michrome 6	●	●	●	●
Michrome 16	●	●	●	●
Michrome 20	○	●	●	●
Michrome 3BW	○	●	●	○
Michrome 5BW	○	●	●	○
Michrome 6BW	○	●	●	○
Michrome 20BW	○	●	●	○

Camera Model	BLACKBALANCE (0x15)	CAM_MULTIPLE (0x17)	ENABLEPOWEEFREQUENCY (0x18)
Michrome 5 Pro	●	●	●
Michrome 6	●	●	●
Michrome 16	●	●	●
Michrome 20	●	●	●
Michrome 3BW	○	●	●
Michrome 5BW	○	●	●
Michrome 6BW	○	●	●
Michrome 20BW	○	●	●

Camera Model	ROTATE_R9 0 (0x19)	ROTATE_L90 (0x1A)	NEGATIVE (0x1B)	HDR (0x1C)	ENABLETIMES TAMP (0x1F)
Michrome 5 Pro	●	●	●	●	○
Michrome 6	●	●	●	●	○
Michrome 16	●	●	●	●	○
Michrome 20	●	●	●	●	○
Michrome 3BW	●	●	●	○	○
Michrome 5BW	●	●	●	○	○
Michrome 6BW	●	●	●	○	○
Michrome 20BW	●	●	●	○	●

Camera Model	ATEXPOSURE_MODE (0x24)	BINNING_SUM (0x25)	ENABLEISP (0x43)
Michrome 5 Pro	●	●	●
Michrome 6	●	●	○
Michrome 16	●	●	○
Michrome 20	●	●	○
Michrome 3BW	○	○	○
Michrome 5BW	○	○	○
Michrome 6BW	○	○	○
Michrome 20BW	○	○	○

2.2. Property reference Table (prefixed with "TUIDP_")

Camera Model	GLOBALGAIN (0x00)	EXPOSURETM (0x01)	BRIGHTNESS (0x02)	BLACKLEVEL (0x03)
Michrome 5 Pro	●	●	●	○
Michrome 6	●	●	●	○
Michrome 16	●	●	●	○
Michrome 20	●	●	●	○
Michrome 3BW	●	●	○	●
Michrome 5BW	●	●	○	○
Michrome 6BW	●	●	○	○
Michrome 20BW	●	●	●	●

Camera Model	SHARPNESS (0x05)	GAMMA (0x08)	CONTRAST (0x09)	LFTLEVELS (0x0A)	RGTLEVELS (0x0B)
Michrome 5 Pro	●	●	●	●	●
Michrome 6	●	●	●	●	●
Michrome 16	●	●	●	●	●
Michrome 20	●	●	●	●	●
Michrome 3BW	●	●	●	●	●
Michrome 5BW	●	●	●	●	●
Michrome 6BW	●	●	●	●	●
Michrome 20BW	●	●	●	●	●

Camera Model	CHNLGAIN (0x0C)	SATURATION (0x0D)	CLRTEMPERATURE (0x0E)	DPCLEVEL (0x10)
Michrome 5 Pro	●	●	●	●
Michrome 6	●	●	●	●
Michrome 16	●	●	●	●
Michrome 20	●	●	●	●

Michrome 3BW	○	○	○	●
Michrome 5BW	○	○	○	●
Michrome 6BW	○	○	○	●
Michrome 20BW	○	○	○	●

Camera Model	BLACKLEVELHG (0x11)	BLACKLEVELLG (0x12)	POWEEFREQUENCY (0x13)
Michrome 5 Pro	●	●	●
Michrome 6	●	●	●
Michrome 16	●	●	●
Michrome 20	●	●	●
Michrome 3BW	○	○	●
Michrome 5BW	○	○	●
Michrome 6BW	○	○	●
Michrome 20BW	○	○	●

Camera Model	HUE (0x14)	LIGHT (0x15)	ENHANCE_STRENGTH (0x16)
Michrome 5 Pro	●	●	●
Michrome 6	●	●	●
Michrome 16	●	●	●
Michrome 20	●	●	○
Michrome 3BW	○	○	○
Michrome 5BW	○	○	○
Michrome 6BW	○	○	○
Michrome 20BW	○	○	○

3. Detailed Reference Table

Note: 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
MIchrome 5 Pro	[0, 2]	0	1	0: "2448x2048" 1: "1224x1024" 2: "1224x1024(2x2Bin)"
MIchrome 6	[0, 1]	0	1	0: "3072x2048" 1: "1536x1024(2x2Bin)"
MIchrome 16	[0, 4]	0	1	0: "4608x3456" 1: "4608x2736" 2: "3648x2736" 3: "2304x1296(2x2Bin)" 4: "1536x1152(3x3Bin)"
MIchrome 20	[0, 2]	0	1	0: "5472x3648" 1: "2736x1824" 2: "1824x1216"
MIchrome 3BW	[0, 1]	0	1	0: "2048x1536" 1: "1024x768 (2x2Bin)"
MIchrome 5BW	[0, 1]	0	1	0: "2448x2048" 1: "1224x1024(2x2Bin)"
MIchrome 6BW	[0, 1]	0	1	0: "3072x2048" 1: "1536x1024(2x2Bin)"
MIchrome 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)"

3.1.2. TUIDC_PIXELCLOCK

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 0]	0	0	0: "High" 37MHZ
Michrome 3BW				
Michrome 5BW				
Michrome 6	[0, 0]	0	0	0: "High" 54MHZ
Michrome 6BW				
Michrome 16	[0, 0]	0	0	0: "High" 72MHZ
Michrome 20				
Michrome 20BW				

3.1.3. TUIDC_BITOFDEPTH

Camera Model	Range	Default	Step	Description
Michrome series	[8, 16]	8	8	8:8Bit data bits 16:16Bit data bits

3.1.4. TUIDC_ATEXPOSURE

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	1	1	0:Manual exposure mode 1:Automatic exposure mode

3.1.5. TUIDC_HORIZONTAL

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

3.1.7. TUIDC_ATWBALANCE

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 2]	1	1	0:Manual white balance state 1:Automatic white balance state 2:Single white balance state (reserved)
Michrome 6				
Michrome 16				
Michrome 20				

3.1.8. TUIDC_ATLEVELS

Camera Model	Range	Default	Step	Description
Michrome series	[0, 3]	0	1	0: Manual color gradation state 1:Automatic left color scale state (must open histogram statistics) 2:Automatic right color scale state (must open histogram statistics) 3:Automatic left and right color scale state (must open histogram statistics)

3.1.9. TUIDC_SHIFT

Camera Model	Range	Default	Step	Description
Michrome series	[0, 8]	0	1	0:Display 8Bit data [8, 15] 1:Display 8Bit data [7, 14] 2:Display 8Bit data [6, 13] 3:Display 8Bit data [5, 12]

				4:Display 8Bit data [4, 11] 5:Display 8Bit data [3, 10] 6:Display 8Bit data [2, 9] 7:Display 8Bit data [1, 8] 8:Display 8Bit data [0, 7]
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3.1.10. TUIDC_HISTC

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	0	1	0:Close histogram statistics (auto color level is invalid) 1:Open histogram data statistics (auto color level is effective)

3.1.11. TUIDC_CHANNELS

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 3]	0	1	0:Shared channel (RGB or Gray)
Michrome 6				1:Red channel
Michrome 16				2:Green channel
Michrome 20				3:Blue channel

3.1.12. TUIDC_ENHANCE

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 1]	0	1	0:Close enhancement
Michrome 6				1:Open enhancement
Michrome 16				

3.1.13. TUIDC_FLTCORRECTION

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

3.1.14. TUIDC_VERCORRECTION

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	1	1	0:Close vertical mirror correction 1:Open vertical mirror correction (Windows system default)

3.1.15. TUIDC_MONOCHROME

Camera Model	Range	Default	Step	Description
Michrome 5Pro	[0, 1]	0	1	0:Close the monochrome state 1:Open the monochrome state
Michrome 6				
Michrome 16				
Michrome 20				

3.1.16. TUIDC_BLACKBALANCE

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 1]	0	1	0:Reserved, same effect as 1 1:Execution of black balance parameters
Michrome 6				
Michrome 16				
Michrome 20				

3.1.17. TUIDC_CAM_MULTIPLE

Camera Model	Range	Default	Step	Description
Michrome full series	[1, 4]	1	1	Set the number of cameras capturing data simultaneously and divide the USB bandwidth equally

3.1.18. TUIDC_ENABLEPOWEEFREQUENCY

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 1]	0	1	0:Close the industrial frequency enable 1:Open the industrial frequency enable
Michrome 6				
Michrome 16				
Michrome 20				

3.1.19. TUIDC_ROTATE_R90

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	0	1	0:The original state of the image 1:Rotate the image 90 degrees to the right

3.1.20. TUIDC_ROTATE_L90

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	0	1	0:The original state of the image 1:Rotate the image 90 degrees to the left

3.1.21. TUIDC_NEGATIVE

Camera Model	Range	Default	Step	Description
Michrome series	[0, 1]	0	1	0:Close negative mode

				1:Open negative mode
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3.1.22. TUIDC_HDR

Camera Model	Range	Default	Step	Description
MIchrome series	[0, 1]	0	1	0:Close HDR mode 1:Open HDR mode

3.1.23. TUIDC_ENABLETIMESTAMP

Camera Model	Range	Default	Step	Description
MIchrome 20BW	[0, 1]	0	1	0:Close timestamp statistics 1:Open timestamp statistics

3.1.24. TUIDC_ATEXPOSURE_MODE

Camera Model	Range	Default	Step	Description
MIchrome 5 Pro	[0, 3]	0	3	0:Centered exposure mode 3:Right-centered exposure mode (supports target grayscale values)
MIchrome 6				
MIchrome 16				
MIchrome 20				

3.1.25. TUIDC_BINNING_SUM

Camera Model	Range	Default	Step	Description
MIchrome 5 Pro	[1, 4]	1	1	Software Binning, pixel summation mode
MIchrome 6				
MIchrome 16				
MIchrome 20				

3.1.26. TUIDC_ENABLEISP

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 1]	1	1	0:Close the camera ISP 1:Open the camera ISP

3.2. Property Reference Table

3.2.1. TUIDP_GLOBALGAIN

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 480]	30	1	The larger the value, the higher the brightness, but the noise increases
Michrome 6				
Michrome 3BW				
Michrome 5BW				
Michrome 6BW				
Michrome 16	[0, 190]	30	1	
Michrome 20	[0, 240]	30	1	

3.2.2. TUIDP_EXPOSURETM

Camera Model	Range	Default	Step	Description
Michrome 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
Michrome 5 Pro	[10, 245]	128	1	Valid in auto exposure state

Michrome 6				
Michrome 16				
Michrome 20				
Michrome 20BW	[20, 104]	104	1	

3.2.4. TUIDP_BLACKLEVEL

Camera Model	Range	Default	Step	Description
Michrome 3BW	[0, 4095]	240	1	Camera black level value
Michrome 20BW	[0, 255]	12	1	

3.2.5. TUIDP_SHARPNESS

Camera Model	Range	Default	Step	Description
MIchrome 5 Pro	[0, 160]	25	1	Sharpening level, the larger the value, the greater the sharpening intensity
MIchrome 6				
MIchrome 16				
MIchrome 20				
MIchrome 3BW	[0, 255]	4	1	
MIchrome 5BW				
MIchrome 6BW	[0, 160]	60	1	

3.2.6. TUIDP_GAMMA

Camera Model	Range	Default	Step	Description
Michrome 20BW	[1, 255]	100	1	Gamma value
Michrome Series Others	[64, 255]	210	1	

3.2.7. TUIDP_CONTRAST

Camera Model	Range	Default	Step	Description
MIchrome 5 Pro	[0, 63]	33	1	Contrast value
MIchrome 6				
MIchrome 16				
MIchrome 20				
MIchrome 3BW	[0, 63]	32	1	
MIchrome 5BW				
MIchrome 6BW				
MIchrome 20BW	[0, 255]	128	1	

3.2.8. TUIDP_LFTLEVELS

Camera Model	Range	Default	Step	Description
Michrome series	[0, 254]	0	1	8Bit Data Correspondence Range
	[0, 65534]	0	1	16Bit Data Correspondence Range

3.2.9. TUIDP_RGTLEVELS

Camera Model	Range	Default	Step	Description
Michrome series	[1, 255]	255	1	8Bit Data Correspondence Range
	[1, 65535]	65535	1	16Bit Data Correspondence Range

3.2.10. TUIDP_CHNLGAIN

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0,1366]	256	1	Gain value of the corresponding channel
Michrome 6				
Michrome 16				

Michrome 20				
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3.2.11. TUIDP_SATURATION

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 255]	64	1	Saturation value
Michrome 6				
Michrome 16				
Michrome 20				

3.2.12. TUIDP_CLRTEMPERATURE

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 130]	0	1	Confirm the color temperature value according to the RGB gain value
Michrome 6				
Michrome 16				
Michrome 20				

3.2.13. TUIDP_DPCLEVEL

Camera Model	Range	Default	Step	Description
Michrome series	[0, 3]	0	1	Bad point correction, the larger the value, the greater the correction intensity

3.2.14. TUIDP_BLACKLEVELHG

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 65535]	0	1	Manufacturer reserved, not recommended to set by yourself
Michrome 6				

Michrome 16				
Michrome 20				

3.2.15. TUIDP_BLACKLEVELLG

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 65535]	0	1	Manufacturer reserved, not recommended to set by yourself
Michrome 6				
Michrome 16				
Michrome 20				

3.2.16. TUIDP_POWEEFREQUENCY

Camera Model	Range	Default	Step	Description
Michrome series	[50, 60]	50	10	0: Power frequency: 50 MHZ 1: Power frequency: 60 MHZ

3.2.17. TUIDP_HUE

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 360]	180	1	Hue
Michrome 6				
Michrome 16				
Michrome 20				

3.2.18. TUIDP_LIGHT

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 255]	64	1	Lightness

Michrome 6				
Michrome 16				
Michrome 20				

3.2.19. TUIDP_ENHANCE_STRENGTH

Camera Model	Range	Default	Step	Description
Michrome 5 Pro	[0, 48]	16	1	Enhancement (permeability)
Michrome 6				
Michrome 16				