
DSM711 Digital 3D Microscope Operation Manual



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1 The Basic Characteristic and Application Fields of DSM711

The DSM711 is an all-in-one digital 3D microscopic system newly developed by Touptek Photonics. DSM is the abbreviation for Digital Stereo Microscope. The number 711 stands for: internal development platform No.7, sensor specification No.1 and lens specification No.1. We will continue to develop 3D microscopes built on higher-performance platforms, equipped with sensors and lenses of diverse specifications. The complete system integrates a 4K ultra-high definition imaging module, a continuous zoom optical body, a naked-eye 3D monitor and a microscope stand. It adopts an integrated design combining optical imaging and real-time display.

This product is applicable to fields including microelectronics, industrial quality inspection and research laboratories. It supports the assembly, maintenance and performance testing of micro-components. Meanwhile, it is suitable for precision operations in dentistry, clinical medicine and other disciplines, facilitating scientific observation and modern hands-on practical teaching.

The basic characteristic is listed as below:

- Equipped with a 14-inch 4K naked-eye 3D monitor; supports switchable output of 3D/2D video formats and 4K/1080P resolution switching.
- Parallel optical path objective with 0.8X~5X continuous zoom; standard working distance reaches 186 mm.
- Supports recording of 3D images and 3D videos, as well as local preview and playback of saved 3D pictures and videos.
- Powerful built-in ISP functions delivering outstanding sharpening and noise reduction performance.
- Embedded XCamView software provides a full suite of comprehensive image processing functions.
- Supported module purchasing options are as follows: [complete set](#); [lens + camera module + monitor](#); [lens + camera module](#); [custom-built camera module](#).



Figure 1 Product Image of DSM711

2 Basic Module Parameters of DSM711

2.1 DSM711 Camera Module Datasheet

Mode	Sensor & Size(mm)	Sensor Count	Pixel(μm)	G Sensitivity Dark Signal	Sensor (FPS/Resolution)	Exposure(ms)
2D	IMX678(C) 1/1.8"(7.68x4.32)	1 (Left or Right)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	0.019~1000
3D 1080P	IMX678(C) 1/1.8"(7.68x4.32)	2	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@1920*1080	0.019~1000
3D 4K	IMX678(C) 1/1.8"(7.68x4.32)	2	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	60@3840*2160	0.019~1000

Mode	HDMI2.0 (FPS/Resolution)	Picture (Resolution)	Video Saving (FPS/Resolution)
2D	60@3840*2160 60@1920*1080	3840*2160	60@3840*2160 60@1920*1080 60@1280*720
3D 1080P	60@1920*1080	1920*1080	60@1920*1080
3D 4K	30@3840*2160	3840*2160	30@3840*2160

2.2 DSM711 Lens Module Datasheet

Zoom Method	Objective Lens	Zoom Range	Working Distance(mm)	Max FOV (mm)	Min FOV (mm)
0.8X~5X Continuous Zoom	0.5X Plan Apochromatic Objective	0.021X~0.39X	186	255x145	14.2x8

The camera module and lens module have been assembled as an integrated unit, as shown in the figure below:

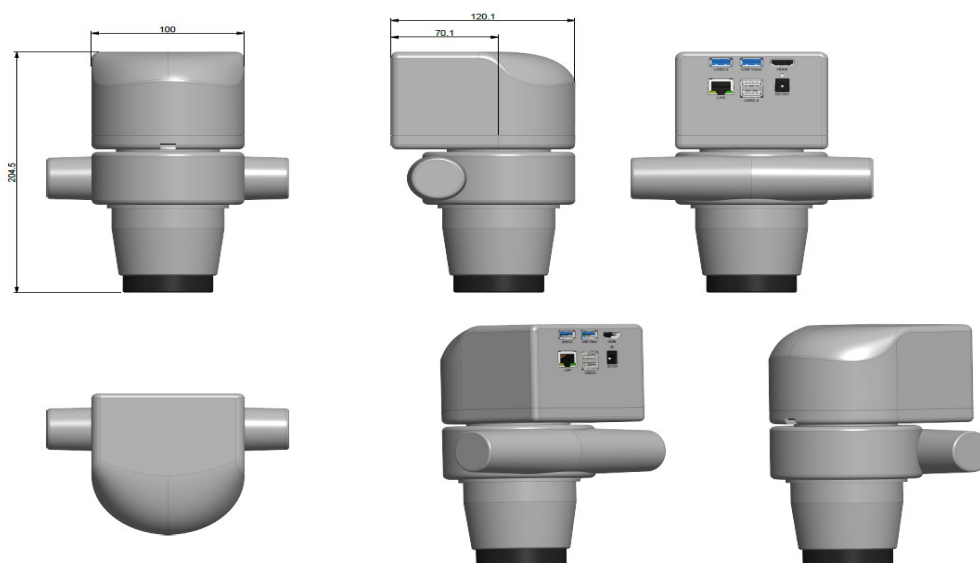


Figure 2 Integrated Diagram of Camera Module and Lens Module

2.3 DSM711 Naked-Eye 3D Monitor Datasheet



Figure 3 Naked-Eye 3D Monitor

Datasheet	Description
Screen Size	14 inches (15.6 inches customizable)
2D Resolution	3840×2160 (4K UHD)
Monocular 3D Resolution	1920×2160
Refresh Rate	60Hz
3D Optical Scheme	Liquid Crystal Lenticular Transmission Grating
Eye Tracking Solution	Structured Light
Optimal Viewing Distance	45 cm
Viewing Angle (3D Effective)	±30°
Lenticular Lens Light Transmittance	93% (Typical)
Crosstalk Ratio	<2.5%
Response Time	25 ms (Max: 30 ms)
Brightness	350 cd/m ²
Contrast Ratio	1500:1
Color Gamut	99% (Typical)
Panel Viewing Angle	178°/178°
Interface Types	1×HDMI 1, 1×Type-C 1.4, 1×3.5mm Audio Output
Power Consumption	Typical: 28W; Standby: <5W
Power Adapter	12V 3A

2.4 DSM711 Microscope Stand Datasheet



Figure 4 Microscope Stand

Stand Model	Base Plate Size	Center Distance(mm)	Fine Adjustment Precision (mm)	Coarse & Fine Adjustment (mm per revolution)	Aperture
TPS-600-CFA76	380x250x10	177	0.002	0.214	76

Note: Bracket with 76 mm aperture is optional for customer selection.

2.5 DSM711 LED Ring Light Source Datasheet (DRL-10065)

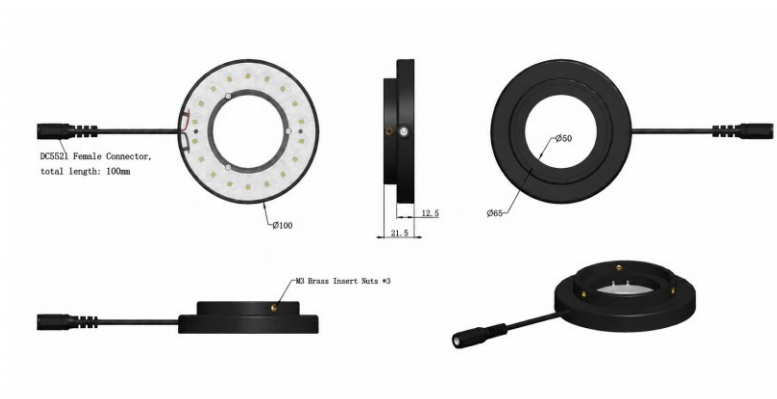
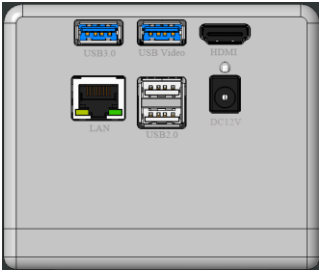


Figure 5 LED Ring Light Source

LED Light Model	Outer Diameter(mm)	Mount Diameter(mm)	Light Configuration	Illumination Range(mm)
DRL-10065	100	65	18 high-brightness LEDs + uniform diffusion lens	80–130 mm

3 DSM711 Camera Module Interface Datasheet

Interface & Button Functions		
	USB3.0	Connect USB flash drive to save pictures and videos Connect 5G WiFi module to transfer video wirelessly in real time
	USB Video	Connect PC or other host device to realize video image transmission with ToupView/ToupLite
	HDMI	Comply with HDMI2.0 standard, For 4K/1080P format video output
	LAN	LAN port to connect router and switch to transfer video with ToupView/ToupLite
	USB Mouse	Connect USB mouse for easy operation with embedded XCamView software Connect to the Type-C port of the naked-eye 3D monitor (the port adjacent to HDMI) via a USB Type-A to Type-C cable to control 2D/3D mode switching
	LED	Power LED indicator
	DC12V	DC12V2A power input
XCamView Software Functioncs (Note: The following functions are supported for dual-channel output.)		
UI Operation	With USB mouse to operate on the embedded XCamView	
Image Capture	8M (3840*2160)/2M(1920*1080) JPEG/TIFF image in USB flash drive	
Video Record	Video format: H264 encoded MP4 file Video saving Resolution & Frame Rate: 30fps@3840×2160, 60fps@1920×1080	
Camera Control Panel	Exposure(Automatic / Manual Exposure) / Gain, White Balance(Manual / Automatic), Sharpening, 3D Denoise, Saturation Adjustment, Gamma Adjustment, Contrast Adjustment, Brightness Adjustment, Hue Adjustment, Color to Gray, 50HZ/60HZ Anti-flicker, Dark Enhance, Clarity Enhance, Purple Reduction, Brightness Enhance Function	
Synthesis Control Toolbar	2D/3D switch, Mirror/Flip, Freeze, Cross Line, Browser(including Picture Browsing , Video Playback)Function	
Software ToupView/ToupLite Environment under NETWORK/USB Video Output (Supported only in single-channel output mod)		
White Balance	Auto White Balance	
Color Technique	Ultra-Fine Color Engine	
Capture/Control SDK	Windows/Linux/macOS/Android Multiple Platform SDK(Native C/C++, C#/VB.NET, Python, Java, DirectShow, Twain, etc)	
Recording System	Still Picture or Movie	
Operating System	Microsoft® Windows 8 / 8.1 /10(32 & 64 bit)/ ToupView OSx(Mac OS X)/ ToupLite Linux/ ToupLite	
PC Requirements	CPU: Equal to Intel i3 12100F or Higher	
	Memory: 16GB or More	
	USB interface: USB 2.0 interface or higher	
	Ethernet Port: RJ45 Ethernet Port	
	Display:19” or Larger	
CD-ROM		
Operating Environment		
Operating Temperature(in Centidegree)	-10~ 50	
Storage Temperature(in Centidegree)	-20~ 60	

Operating Humidity	30~80%RH
Storage Humidity	10~60%RH

4 Packing Information of DSM711

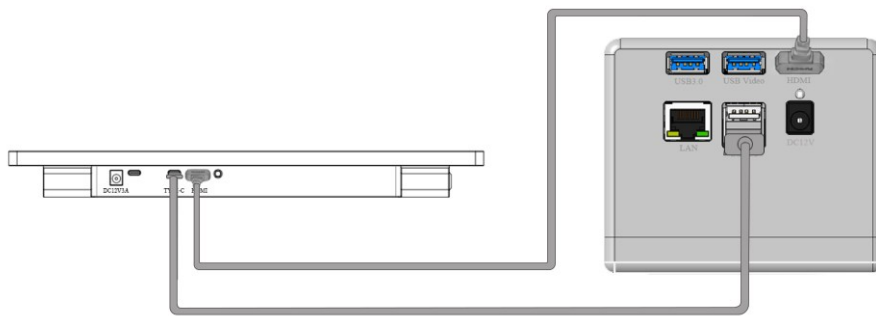
5 DSM711 Configurations

The DSM711 features highly flexible operation. Its main operation modes are as follows:

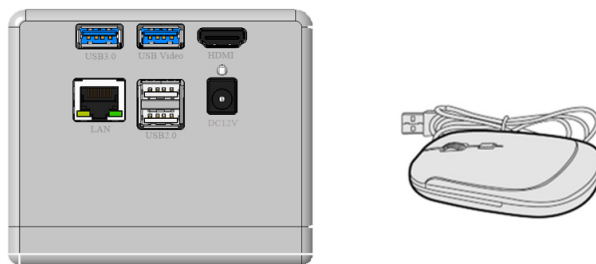
5.1 Built-in XCamView Software of DSM711 for 3D Video Display on Naked-Eye 3D Monitor

This application requires the DSM711, an HDMI cable, a USB flash drive, as well as the supplied USB mouse and power adapter. The steps to start the camera are listed as below:

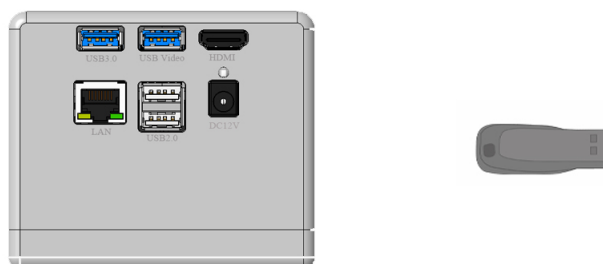
- Connect the DSM711 camera to the HDMI port of the naked-eye 3D monitor using the supplied HDMI cable.
- Use the supplied USB Type-A to Type-C cable to connect the Type-C port at the bottom of the naked-eye 3D monitor (adjacent to the HDMI port) to the USB 2.0 port on the DSM711 camera.



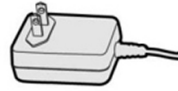
- Insert the supplied USB mouse to the DSM711 camera's USB2.0 port;



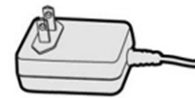
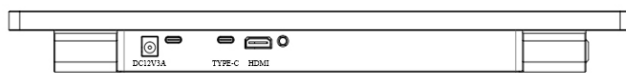
- Insert the supplied USB flash drive into the DSM711 camera's USB3.0 slot;



- Plug the supplied 12V 2A power adapter into the DC12V power port of the DSM711 camera; the camera will power on automatically;



- Plug the supplied 12V 3A power adapter into the DC12V 3A power port on the bottom of the naked-eye 3D monitor, and the monitor will power on automatically;



- After powering on, click the  2D→3D switching button on the comprehensive control toolbar below to view real-time 3D images, as shown in Figure 6

6 Introduction of XCamView UI and Functions

6.1 Control UI

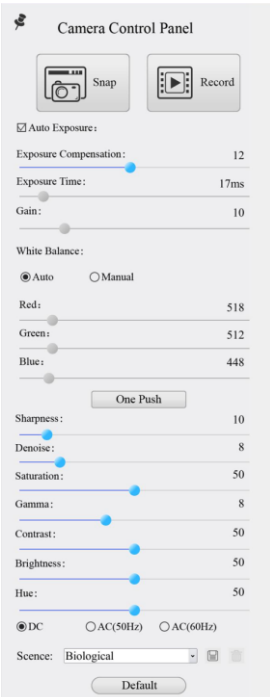


Figure 6 XCamView and Its Control UI

XCamView software operation UI is shown in Figure 6. It includes [Camera Control Panel](#) on the left side of the video window, [Synthesis Camera Control Toolbar](#) on the bottom of the video window.

Software Toolbar / Control Bar / Control Panel	
1	Move the mouse to the left side of the video window, the Camera Control Panel will pop up automatically;
2	Move the mouse to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically;

6.2 The Camera Control Panel on the Left Side of the Video Window

Camera Control Panel	Function	Function Description
 The screenshot shows the Camera Control Panel with the following settings: Snap and Record buttons; Auto Exposure checked; Exposure Compensation at 12; Exposure Time at 17ms; Gain at 10; White Balance set to Auto with Red (518), Green (512), and Blue (448) sliders; Sharpness at 10; Denoise at 8; Saturation at 50; Gamma at 8; Contrast at 50; Brightness at 50; Hue at 50; DC selected for illumination; and Scence set to Biological.	Snap	Capture image and save it to the USB flash drive
	Record	Record video and save it to the USB flash drive
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to current video brightness to achieve proper video brightness
	Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to decrease or increase the exposure time to adjust the video brightness
	Gain	Adjust Gain to reduce or increase brightness of video. The noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	Auto	White Balance adjustment according to the window video every time the button is clicked
	Manual	Adjust the Red, Green or Blue item to set the video White Balance
	Sharpness	Adjust Sharpness level of the video window
	Denoise	Adjust Denoise level of the video window
	Saturation	Adjust Saturation level of the video window
	Gamma	Adjust Gamma level of the video. Slide to the right to increase the gamma value and to the left to decrease the gamma value.
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase and to the left to decrease video contrast
	Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness.
	DC	For DC illumination, there will be no fluctuation under the light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering "strap" caused by 50Hz illumination
	AC(60HZ)	Check AC(60HZ) to eliminate flickering "strap" caused by 60Hz illumination
	Scence	Select different default parameters according to the type of microscope
	Default	Set all the settings in the Camera Control Panel to the default values.

The Camera Control Panel controls the camera to achieve the best image quality according to the specific applications; Left-clicking  button to achieve Display/ Auto Hide switch of the Camera Control Panel;

6.3 Synthesis Camera Control Toolbar at the Bottom of the Video Window



Icon	Function	Icon	Function
	2D/3D interface switch, Serial cable connection allows control of 2D/3D switching on the 3D screen		Horizontal Flip
	Vertical Flip		Color/gray

	Video Freeze		Display Cross Line
	Browse Images Videos		Settings
	Check the Version of XCamView		

The  Setting function, for detailed introduction, please refer to Sections 6.3.1~6.3.8

6.3.1 Settings>Image Format

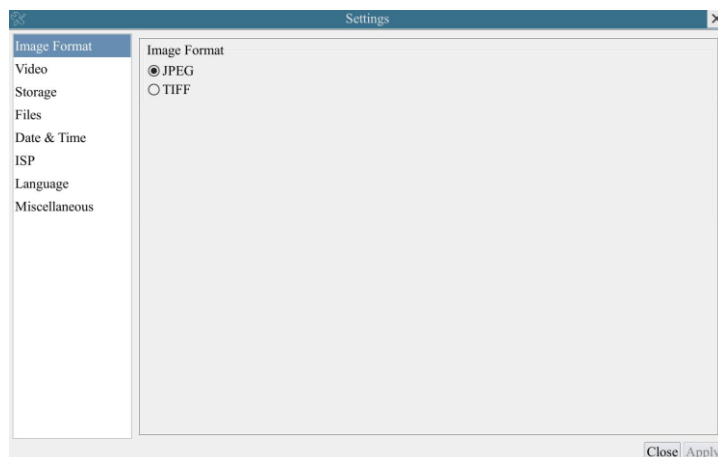


Figure 7 Comprehensive Image Format Settings Page

Image Format	JPEG: The extension of JPEG file can get very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, it can get better image quality with the least disk space. TIFF: TIFF is a flexible bitmap format mainly used to store images including photos and artistic images.
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6.3.2 Settings>Video

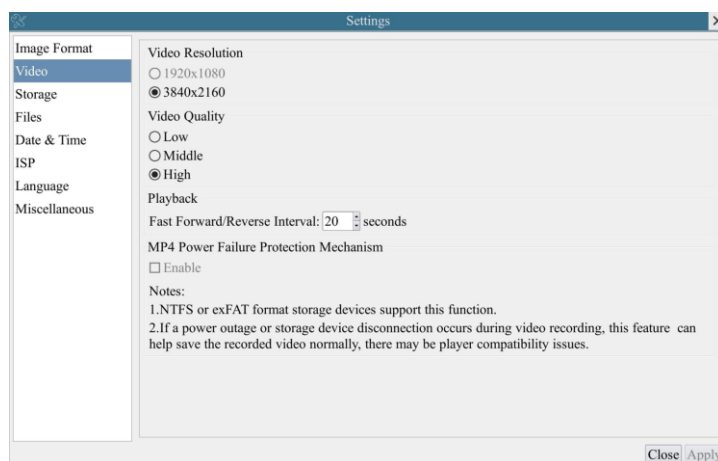


Figure 8 Comprehensive Setting of Video page

Video Resolution	Select a Video Resolution of 1920x1080 or 3840x2160;
Video Quality	Select Video Quality as low, medium, or high;
Video Playback	Fast Forward/Reverse interval in second unite for Video Playback
MP4 Power Failure Protection Mechanism	1.NTFS or exFAT format storage devices support this function. 2. If a power outage or storage device disconnection occurs during video recording, this feature can help save the recorded video normally, there may be player compatibility issues;

6.3.3 Settings>Storage



Figure 9 Comprehensive Setting of Storage Page

Preferred Storage Page	USB Flash Drive: Select it to save the video and image to the USB Flash Drive. Custom Storage Location: Select it to save the video and image to the Custom Storage Location.
File System Format of the Storage Device	List the file system format of the current storage device FAT32: The file system of USB Flash Drive is FAT32. The maximum video file size of single file in FAT32 file system is 4G Bytes; exFAT: The file system of USB Flash Drive is exFAT. The maximum video file size of single file in FAT32 file system is 16E Bytes; NTFS: The file system of USB Flash Drive is NTFS. The maximum video file size of single file is 2T Bytes. Unknown Status: USB Flash Drive not detected or the file system is not identified;
Note: For USB Flash Drive, USB 3.0 interface is preferred.	

6.3.4 Settings>Files

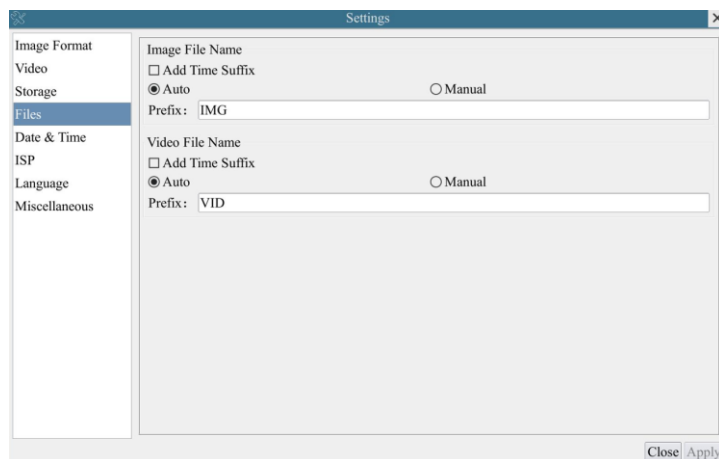


Figure 10 Comprehensive Setting of Files Name

Image/Video File Name	Provide Auto or Manual naming paradigm for Image or Video file;
Auto	With specified name as the Prefix and XCamView will add digital after the Prefix for the Image or Video file;
Manual	A file dialog will pop up to enter the Image or Video file name for the captured Image or Video .

6.3.5 Settings>Time

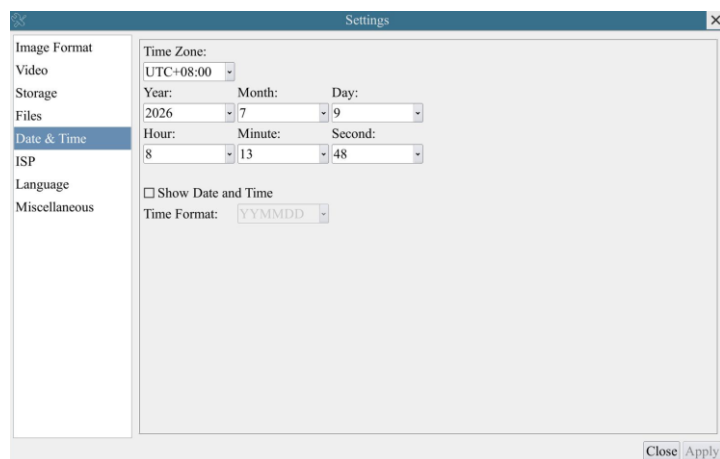


Figure 11 Time Setting

Time	User can set Year, Month, Day, Hour, Minute and Second in this page.
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6.3.6 Settings>ISP

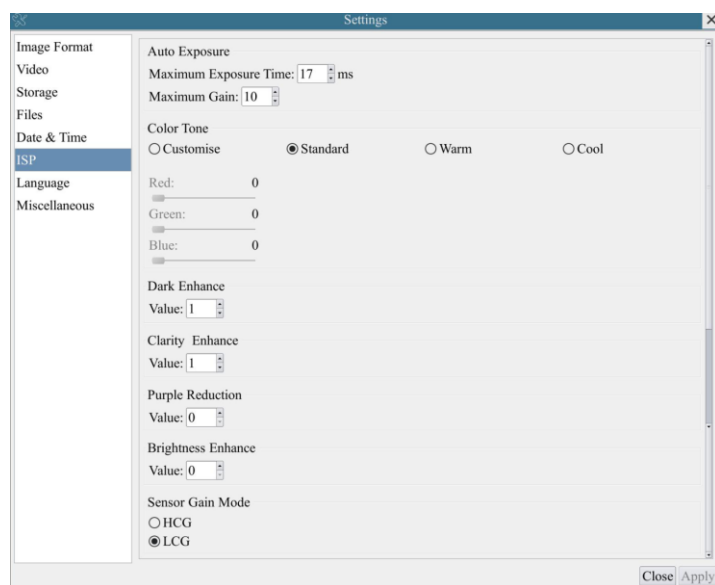


Figure 12 Comprehensive Settings of ISP Page

Auto Exposure	Define the maximum automatic exposure time;
	Define the maximum gain;
Color Tone	Select color styles as custom, standard, warm, or cool;
Dark Enhance	Define the intensity value of Dark Enhance;
Clarity Enhance	Define the intensity value of Clarity Enhance;
Purple Reduction	Define the intensity value of Purple Reduction edges;
Brightness Enhance	Define the intensity value of Brightness Enhance;
Sensor Gain Mode	Select to HCG (High Conversion Gain) or LCG (Low Conversion Gain) mode;

6.3.7 Settings>Language



Figure 13 Comprehensive Setting of Language Selection Setting Page

English	Set language of the whole software into English;
Simplified Chinese	Set language of the whole software into Simplified Chinese;
Traditional Chinese	Set language of the whole software into Traditional Chinese;
Korean:	Set language of the whole software into Korean;
Thailand	Set language of the whole software into Thailand;
French	Set language of the whole software into French;
German	Set language of the whole software into German;
Japanese	Set language of the whole software into Japanese;
Italian	Set language of the whole software into Italian;
Russian	Set language of the whole software into Russian;
Dutch	Set language of the whole software into Dutch;
Portuguese	Set language of the whole software into Portuguese;

6.3.8 Settings>Miscellaneous

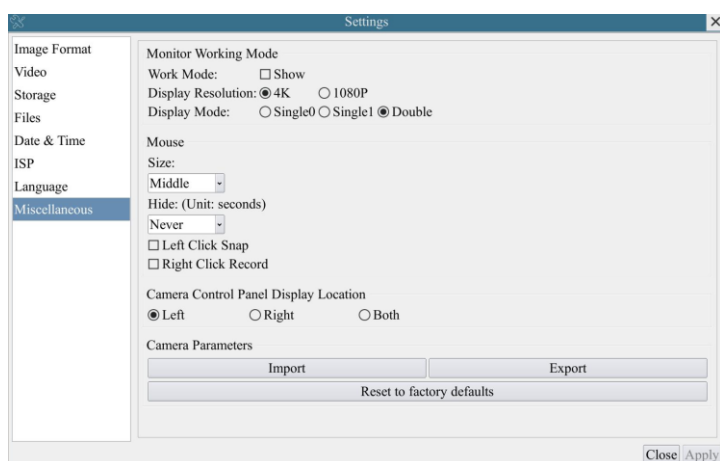


Figure 14 Comprehensive Miscellaneous Settings Page

Monitor Working Mode	Select to display the Monitor Working Mode in the video window, otherwise the Monitor Working Mode will not be displayed;
	Select display resolution: 4K / 1080P;
	Select output mode: Single Device 0 Output / Single Device 1 Output / Double Output;
Mouse	Select the Mouse size and hide time; Select to capture the video with the left button and the

	right button. If not selected, the video will not be captured with the left button or the right button;
Camera Control Panel Display Location	Select the camera control panel to display on the left, right, or both sides of the HDMI interface;
Camera Parameters Import	Import the Camera Parameters from the USB flash drive to use the previously exported Camera Parameters
Camera Parameters Export	Export the Camera Parameters to the USB flash drive to use the previously exported Camera Parameters
Reset to factory defaults	Restore camera parameters to its factory status;

7 DSM711 Promotional Picture



Figure 15 Promotional image of teeth captured by the DSM711



Figure 16 Promotional image of lavender captured by the DSM711



Figure 17 Promotional image of metal components captured by the DSM711

8 ToupTek®-- Contact Information

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