

# DIGITAL CAMERA



# USER MANUAL

### Important safety instructions

#### General safety precautions

- Keep this user manual always at hand. It should remain with the unit if moved to a different place or operated by another user.
- This device has been designed for professional use in laboratories. It should only be operated following these instructions and never have its design adapted or transformed for any other application
- Repairs to this device should be performed by personnel authorized by the manufacturer. Any part or accessory occasionally supplied by the manufacturer should only be used for repairs. Otherwise, the equipment may be damaged or cause other damages or injuries.
- Keep the equipment away from external heat and cold sources. Do not spill fluids on the surface of the unit.

#### General information

This device is intended to be used for the acquisition of digital images from the stereo microscope and biological microscope.

## 1 The Application of the DIGITAL CAMERA

The Digital camera is intended to be used for the acquisition of digital images from the stereo microscope and biological microscope. The basic characteristic is listed as below:

- Sony Starvis back illuminated CMOS sensor
- FHD HDMI video outputs
- SD card for the captured image and video storage
- Embedded Program for the control of the camera
- With strong ISP and other related processing functions

## 2 Available Ports on the Back of the Camera Body

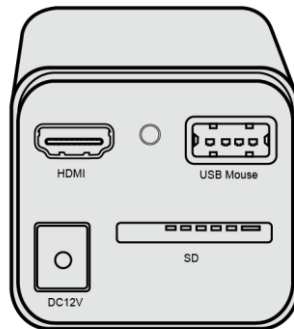


Figure 2-1 Available Ports on the Back Panel of the Camera Body

Interface	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded software
HDMI	Comply with HDMI1.4 standards. 1080P format video output for standard FHD monitor
SD	Comply with SDIO3.0 standard and SD card could be inserted for video and images storage
DC12V	Power adapter connection (12V/1A)
LED	LED status indicator

## 3 Digital Camera Datasheet

Sensor & Size(mm)	Pixel (μm)	G Sensitivity	FPS/Resolution	Binning	Exposure (ms)
Sony IMX307(C) 1/2.8"(5.57x3.13)	2.9x2.9	1300mv with 1/30s	60@1920*1080(HDMI)	1x1	0.01~1000

## 4 Digital Camera Function Description

### 4.1 Video Output

Video Output Interface	Function Description
HDMI Interface	Comply with HDMI1.4 standards 60fps@1080P

### 4.2 Image Capture and Video Saving in SD card

Function Name	Function Description
Video Saving	Video format: 2M (1920*1080) H264 encoded MP4 file; Video saving frame rate: 50~60fps (related with SD card performance);
Image Capture	2M (1920*1080) JPEG image in SD card

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### 4.3 ISP Function

Function Name	Function Description
Exposure / Gain	Automatic / Manual Exposure
White Balance	Manual / Automatic / ROI Mode
Sharpening	Supported
3D Denoise	Supported
Saturation Adjustment	Supported
Contrast Adjustment	Supported
Brightness Adjustment	Supported
Gamma Adjustment	Supported
50HZ/60HZ Anti-flicker Function	Supported

### 4.4 Image Operation Function

Function Name	Function Description
Zoom In/Zoom Out	Up to 10X
Mirror/Flip	Supported
Freeze	Supported
Cross Line	Supported
Embedded Files Browser	Supported
Video Playback	Supported

### 4.5 Other Functions

Function Name	Function Description
Restore Factory Settings	Supported
Multiple Language Support	English / Simplified Chinese / Traditional Chinese / Korean / Thai / French / German / Japanese / Italian / Russian

## 5 Digital Camera Application Configurations

### 5.1 Camera working standalone with built-in software

For this application, apart from the microscope, you only need an HDMI monitor, the supplied USB mouse and the camera embedded software.

The steps to start the camera are listed below:

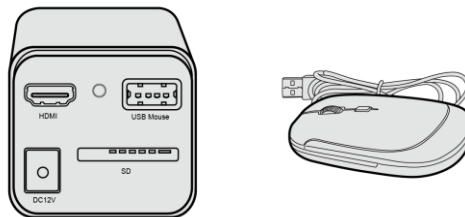


Figure 6-5-1HDMI Camera with the HDMI Monitor

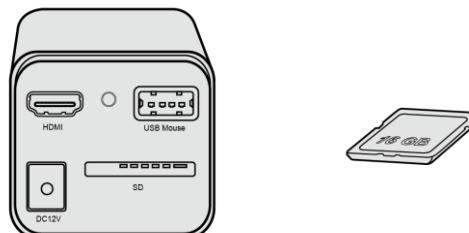
- Connect the camera to a HDMI monitor using the HDMI cable:



- Insert the supplied USB mouse to the camera's USB port:

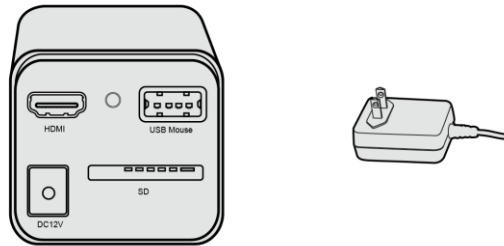


- Insert the supplied SD card into the HDMI camera SD card:



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- Connect the camera to the power adapter and switch it on:



- Turn on the monitor and view the video in the Camera software. Move the mouse to the left or bottom of the Camera UI, different control panel or UI will pop up and users could operate with the mouse at ease.

## 6 Brief Introduction of Application Digital Camera and Its Functions

### 6.1 Digital Camera UI

The Application Digital Camera UI shown in Figure 7-6-1 includes a Camera Control Panel on the left of the video window, and a Synthesis Camera Control Toolbar on the bottom of the video window.

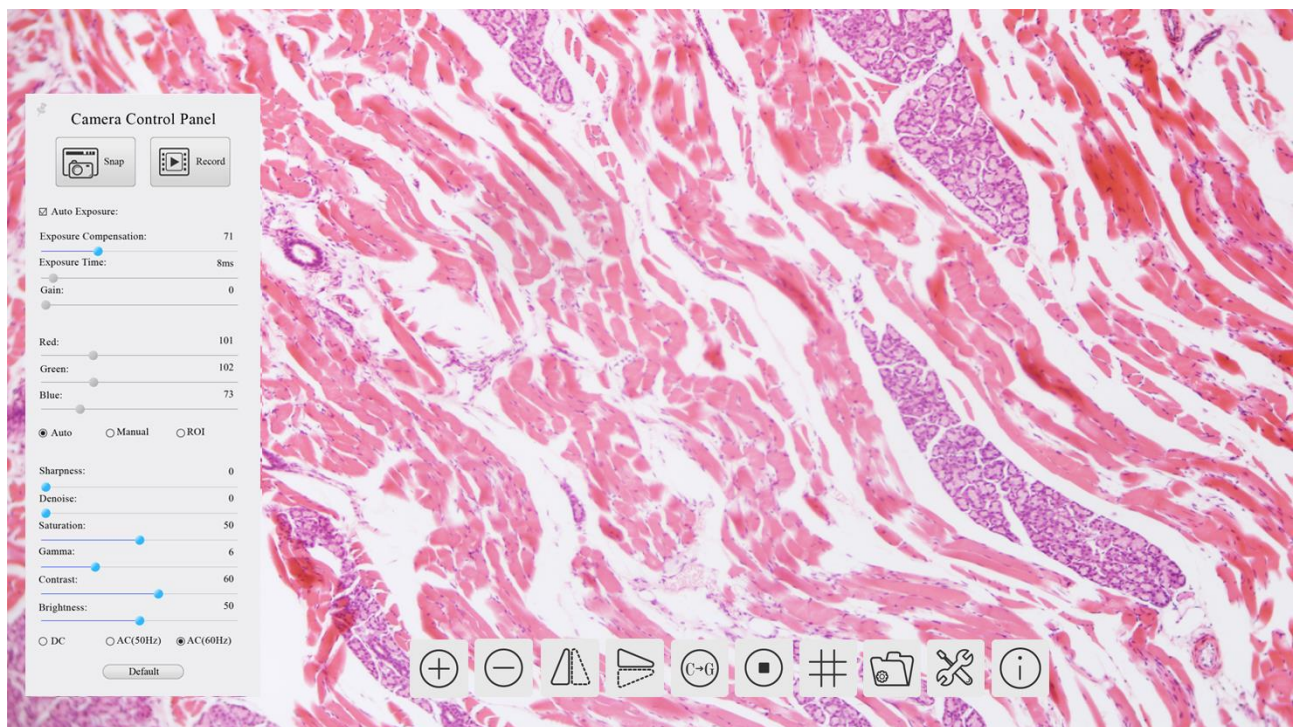


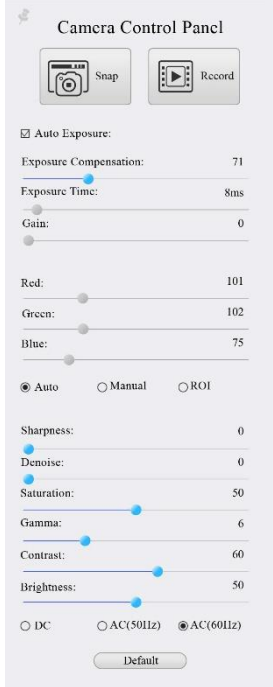


Figure 7-6-1 The HDMI Camera Control GUI

Notes	
1	To show the Camera Control Panel, move your mouse to the left of the video window. See Sec.6.2 for details
2	When users move mouse cursor to the bottom of the video window, the Synthesis Camera Control Toolbar will pop up automatically.  . See Sec.6.3 for details.

## 6.2 The camera control panel on the left side of the video window

The Camera Control Panel controls the camera to achieve the best video or image quality according to the specific applications; It will pop up automatically when the mouse cursor is moved to the left side of the video window. Left-clicking  button to archive Display/Auto Hide switch of the Camera Control Panel.

Camera Control Panel	Function	Function Description
 <p>The screenshot shows the Camera Control Panel interface with the following settings: Snap and Record buttons; Auto Exposure checked; Exposure Compensation at 71; Exposure Time at 8ms; Gain at 0; Red, Green, and Blue sliders at 101, 102, and 75 respectively; Auto, Manual, and ROI radio buttons with Auto selected; Sharpness, Denoise, Saturation, Gamma, Contrast, and Brightness sliders; and DC, AC(50Hz), and AC(60Hz) radio buttons with AC(60Hz) selected. A Default button is also present.</p>	Snap	Capture image and save it to the SD card
	Record	Record video and save it to the SD card
	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 the current video brightness to achieve proper brightness value
	Exposure Time	Available when Auto Exposure is not checked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	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	White Balance adjustment according to the video continuously
	Manual White Balance	Adjust the Red or Blue item to set the video White Balance.
	ROI White Balance	White Balance could be adjusted when the ROI region is changed according to content inside the ROI region.
	Sharpness	Adjust Sharpness level of the video
	Denoise	Slide left or right to denoise the video
	Saturation	Adjust Saturation level of the video
	Gamma	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma.
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast.
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz light source
	AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz light source
Default	Restore all the settings in the Camera Control Panel to default values	

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## 6.3 Icons and functions of the Synthesis Camera Control Toolbar at the bottom of the video window



Icon	Function	Icon	Function
	Zoom In the Video Window		Zoom Out the Video Window
	Horizontal Flip		Vertical Flip
	Color/Gray		Video Freeze
	Display Cross Line		Browse Images and Videos in the SD Card
	Settings		Check the Software Version

The Setting is relatively more complicated than the other functions. Here there is more information about it:

### 6.3.1 Settings>Video

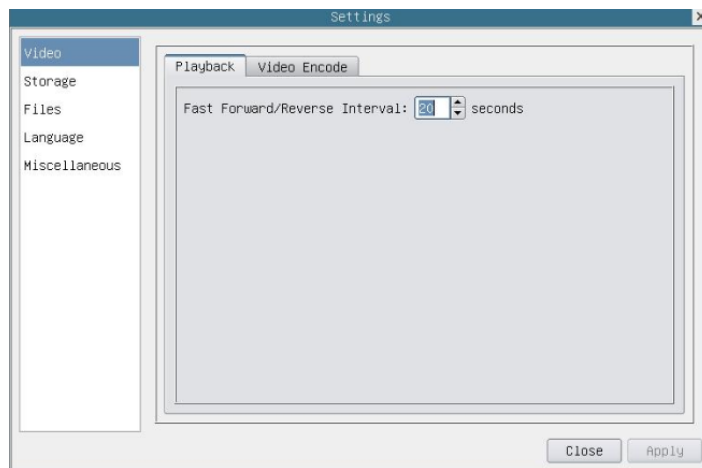


Figure 7-2 Comprehensive Setting of Video Settings Page-Playback

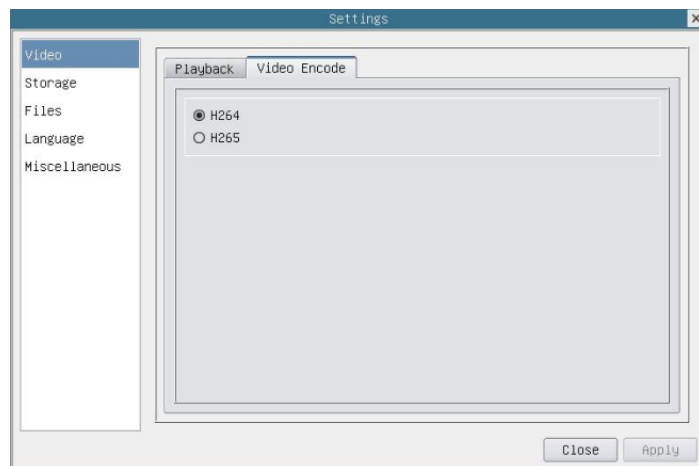


Figure 7-3 Comprehensive Setting of Video Settings Page-Video Encode



Fast Forward/Reverse Interval	The time interval of the playback of video files.
Video Encode	H264: The encoding format of the video files is H264 format. H265: The encoding format of the video files is H265 format.

### 6.3.2 Setting>Storage

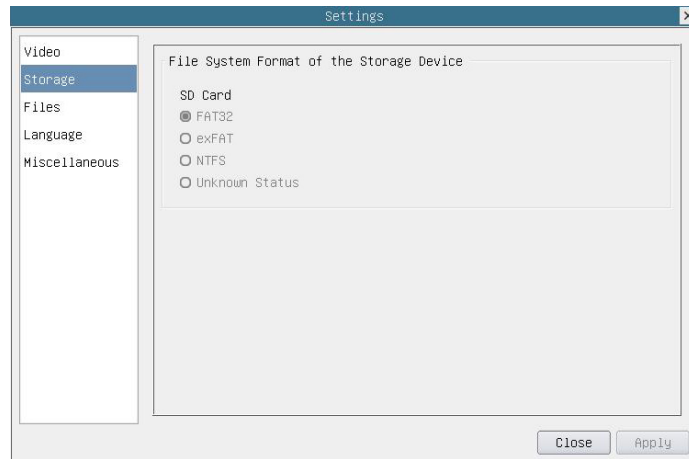


Figure 7-4 Comprehensive Setting of SD Card Setting Page

Storage Device	SD Card: SD Card is only supported as the storage device.
File System Format of the Storage Device	List the file system format of the current storage device FAT32: The file system of SD card is FAT32. The maximum video file size of single file is 4G Bytes; exFAT: The file system of SD card is exFAT. The maximum video file size of single file is 4G Bytes; NTFS: The file system of SD card is NTFS. The maximum video file size of single file is 4G Bytes. Use PC to format the SD cards and switch between FAT32, exFAT and NTFS. Unknown Status: SD card not detected or the file system is not identified;

### 6.3.3 Setting>Files

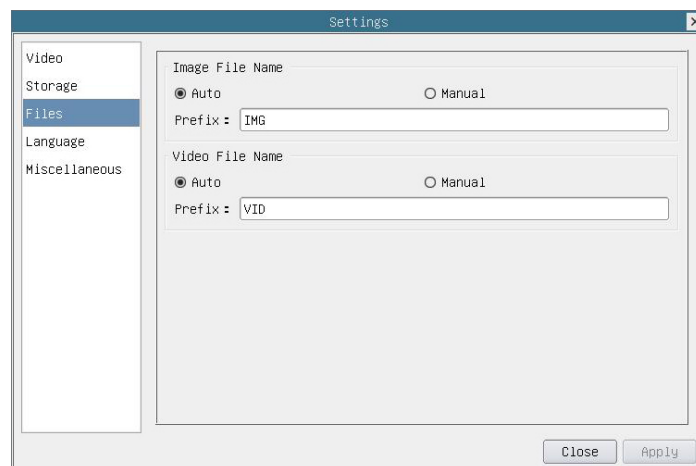


Figure 7-5 Comprehensive Setting of Files Settings Page

Image File Name	Auto: The image files will be saved automatically with the specified prefix. Manual: Users has to specify the file name before image saving.
Video File Name	Auto: The video file will be saved automatically with the specified prefix. Manual: Users has to specify the video file name before video recording.
Note: The maximum video file size is 4G Bytes. Multiple video files may be generated automatically during long time video recording.	

## 6.3.4 Setting>Language

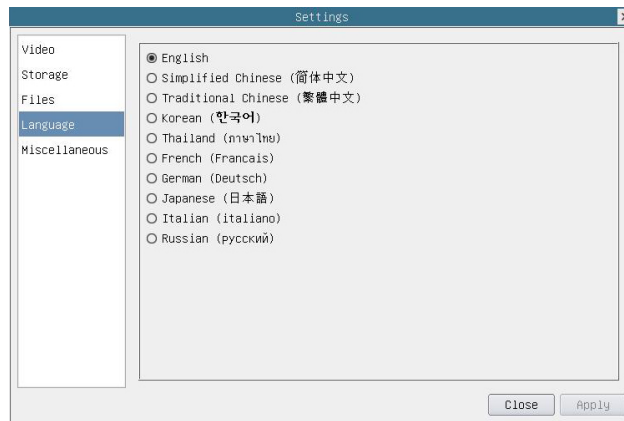


Figure 7-6 Comprehensive Setting of Language Selection Setting Page

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

## 6.3.5 Setting>Miscellaneous

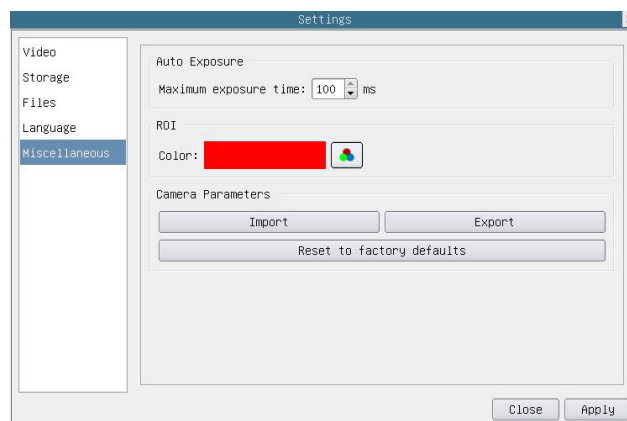


Figure 7-7 Comprehensive Miscellaneous Settings Page

Auto Exposure	The maximum exposure time during auto exposure process could be specified. Setting this item to a lower value could guarantee a faster frame rate during auto exposure
ROI Color	Choosing the ROI rectangle line color
Camera Parameters Import	Import the Camera Parameters from the SD card to use the previously exported Camera Parameters
Camera Parameters Export	Export the Camera Parameters to the SD card to use the previously exported Camera Parameters
Reset to factory defaults	Restore camera parameters to its factory status





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