

## 1. BS-1008 Series Monocular Microscope



BS-1008

### Introduction

BS-1008 adopts semi-apochromatic parallel optical imaging system, and uses advanced multi-layer coating technology, which perfectly correct the imaging on the edge of field of view, get high-resolution and high contrast images, and naturally restore the true colors of observed objects.

For applications that require different magnification, [Auxiliary Lens](#) or infinity objectives with different magnification can be attached to the front end of the [Middle Zoom Module](#).

For application that require different sensor size, [TV Lens](#) with different magnification can be attached to the back end of the [Middle Zoom Module](#).

The basic module of BS-1008 is BS-1008A (without click stop) and BS-1008B (with click stop at main magnifications), it has 0.7X to 5.6X zoom range and 1:8 zoom ratio. It is a high-quality precision [Monocular Zoom Objective](#) that provides high resolution and large depth of field.

### Features

The main features are shown below:

1. Provide basic zoom objective BS-1008A with 0.7X~5.6X zoom range.
2. Large optical zoom ratio: 1:8.
3. Larger NA: 0.018-0.092 (When using 1X Auxiliary Lens).
4. Higher resolution: 18.6um-3.65um (When using 1X Auxiliary Lens).
5. Larger field of view: 0.99mm-31.74mm (Object plane).
6. Larger sensor size: 2/3" (When using 1x TV Lens).
7. Working distance: 37.5mm-160mm.
8. Parfocal in zoom range.
9. Compatible with infinity objectives (both biological and metallographic).
10. Compact size: 150 mm (length) × 40 mm (diameter) .

11. Auxiliary Lens with 0.50x, 0.75x, 1.00x, 1.50x and 2.00x magnification (Optional).
12. TV Lens with 0.50x, 0.75x, 1.00x, 1.50x and 2.00x magnification (Optional).
13. Intensity adjustable LED Direct Ring Light (Optional).
14. Intensity adjustable LED Direct Ring Polarization Light (Optional).
15. Intensity adjustable LED coaxial illumination (Optional).
16. 50mm Bracket Adapter (Optional).

## Accessories

### 1. How to Configure BS-1008 Monocular Zoom Objective

- (1) Confirm the possible range of 1) FOV and 2) Working Distance in the object space to choose the Auxiliary Lens.
- (2) Choose the M26x0.705 to M20x0.705 Objective Adapter, if the M20x0.705 infinity objective is used.
- (3) Confirm the camera Image Area Size, it can be 1) Sensor Size (1/x in inch), 2) Image Diagonal Length, 3) Image Width or 4) Image Height to choose the TV Lens.
- (4) Choose the 50 mm adapter according to the diameter of the hole in the bracket.
- (5) Choose the LED Direct Ring Light Module for the reflective illumination.
- (6) Choose the Coaxial Light Module if coaxial illumination is required.
- (7) Choose the Transmitted Light Module if Transmitted illumination is required.
- (8) Choose the Camera Module.

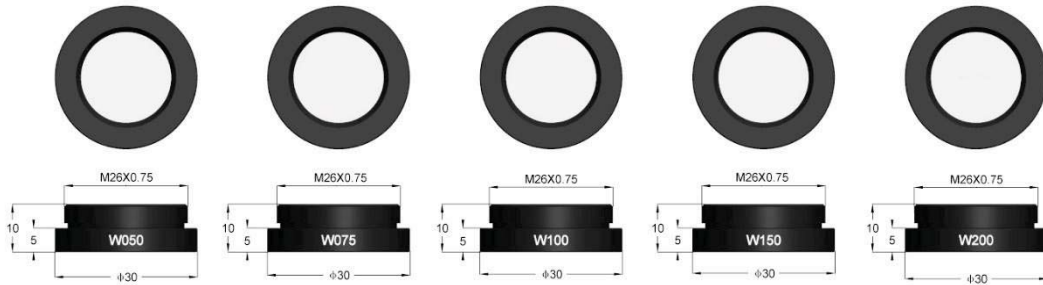
### 2. Configuration of BS-1008

The available components are listed in Table 1, user can choose any part from the table.

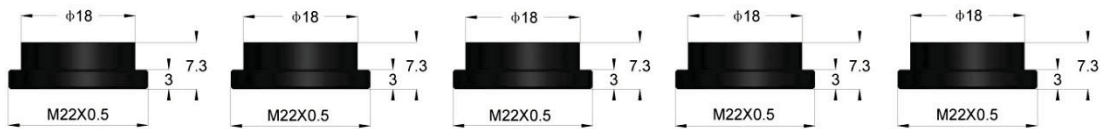
Table 1 BS-1008's Accessories and Its Functions

Module	Order Number	Description
Auxiliary Lens Module	W050	0.50x Object Lens
	W075	0.75x Object Lens
	W100	1.0x Object Lens
	W150	1.5x Object Lens
	W200	2.0x Object Lens
	ON-XX	Biological Objective
	ON-YY	Metallographic Objective
	Objective Adapter	M26x0.706 to M20x0.706
Middle Zoom Module	BS-1008	The main body of BS-1008
TV Lens Module	TV050	0.5XTV Lens
	TV075	0.75X TV Lens
	TV100	1.0XTV Lens
	TV150	1.5X TV Lens
	TV200	2.0XTV Lens
Coaxial Light Module	BCL-1A	Coaxial Light Adapter + LED Spot Light
LED Direct Ring Light Module	BAL3-48A/BAL3-60A	LED Direct Ring Light
	BAL3-48AP	LED Direct Ring Polarization Light
Transmitted Light Module	BTL-37A	LED Transmitted Light

Bracket Adapter		50mm Bracket Adapter (mounting adapter)
Power of light source		POWER-U-12V1A, Power Adapter American Standard
		POWER-E-12V1A, Power Adapter European standard



Auxiliary Lens Module



TV Lens Module



The BS-1008 main body consists of [Auxiliary Lens Module](#), [Middle Zoom Module](#) and [TV Lens Module](#).

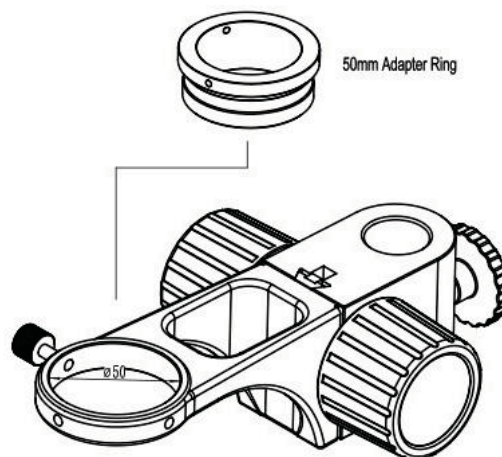
These 3 modules comprise the main [Monocular Zoom Objective](#). User can choose different [Auxiliary Lens](#) and [TV Lens](#) to satisfy the specific requirement.

To get good illumination and ensure the image quality, [LED Direct Ring Light Module](#) (Optional) or [Coaxial Light Module](#) (Optional) should be chosen according to the application.

To get good and stable support, the [Bracket Adapter Module](#) should be carefully chosen.

Finally, to form the [Video Monocular Zoom Objective](#), [Camera Module](#) (Optional) should be chosen.

The [Adapter Rings](#) and their relationship with the [Bracket](#) are shown following.



BS-1008 Adapter Ring for the Bracket

The Direct Ring Light, Direct Ring Polarization Light and the Coaxial Light are shown in following figures respectively.



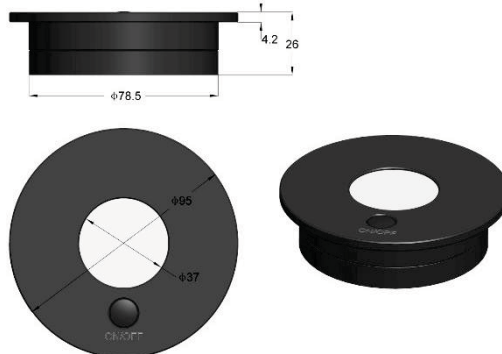
BAL3-48A/BAL3-60A, LED Direct Ring Light. Its interface matches with BS-1008



BAL3-48AP, LED Direct Ring Polarization Light. Its interface matches with BS-1008



BCL-1A: Coaxial Light Adapter + LED Spot Light



BTL-37A, LED Transmitted Light

## Specifications

The specifications of BS-1008 with different Auxiliary Lens and TV Lens are shown in 错误!未找到引用源。 . Auxiliary Lens and TV Lens with 1.0x are listed in the left-up cell. Its data is the basis of the other parameters in the whole table.

Table 1 BS-1008A/B and Its Extensions

Auxiliary Lens	Specs	TV Lens									
		1.0X(For 2/3" Sensors) TV100		0.5X(For 1/3" Sensors) TV050		0.75X(For 1/1.8" Sensors) TV075		1.5X(For 1" Sensors) TV150		2.0X(For 4/3" Sensors) TV200	
		Low	High	Low	High	Low	High	Low	High	Low	High
1.0X (80mm WD) W100	PMAG	0.70X~5.60X		0.35X~2.80X		0.53X~4.20X		1.05X~8.40X		1.40X~11.20X	
	FOV	15.8m m	1.96m m	15.8m m	1.96m m	15.8m m	1.96m m	15.8m m	1.96m m	15.8m m	1.96m m
	NA	0.018	0.092	0.018	0.092	0.018	0.092	0.018	0.092	0.018	0.092
0.5X (160mm WD) W050	PMAG	0.35X~2.80X		0.18X~1.40X		0.26X~2.10X		0.53X~4.20X		0.70X~5.60X	
	FOV	31.74 mm	3.93m m	31.74 mm	3.93m m	31.74 mm	3.93m m	31.74 mm	3.93m m	31.74 mm	3.93m m
	NA	0.009	0.046	0.009	0.046	0.009	0.046	0.009	0.046	0.009	0.046
0.75X (105mm WD) W075	PMAG	0.53X~4.20X		0.26X~2.10X		0.40X~3.15X		0.79X~6.30X		1.05X~8.40X	
	FOV	20.99 mm	2.61m m	20.99 mm	2.61m m	20.99 mm	2.61m m	20.99 mm	2.61m m	20.99 mm	2.61m m
	NA	0.013	0.069	0.013	0.069	0.013	0.069	0.013	0.069	0.013	0.069
1.5X (51.5mm WD) W150	PMAG	1.05X~8.40X		0.53X~4.20X		0.79X~6.30X		1.58X~12.60X		2.10X~16.80X	
	FOV	10.46 mm	1.31m m	10.46 mm	1.31m m	10.46 mm	1.31m m	10.46 mm	1.31m m	10.46 mm	1.31m m
	NA	0.026	0.138	0.026	0.138	0.026	0.138	0.026	0.138	0.026	0.138
2.0X (37.5mm WD) W200	PMAG	1.40X~11.20X		0.70X~5.60X		1.05X~8.40X		2.10X~16.80X		2.80X~22.40X	
	FOV	7.90m m	1.00m m	7.90m m	0.99m m	7.90m m	0.99m m	7.90m m	0.99m m	7.90m m	0.99m m
	NA	0.035	0.182	0.035	0.182	0.035	0.182	0.035	0.182	0.035	0.182
Remarks	When using coaxial lighting, low magnification may produce vignetting. When using infinity objectives as Auxiliary Lens Module (adapter available), the PMAG, FOV and NA of the BS-1008 depends on the parameters of the objectives.										

WD: Working Distance.

PMAG: Primary Magnification.

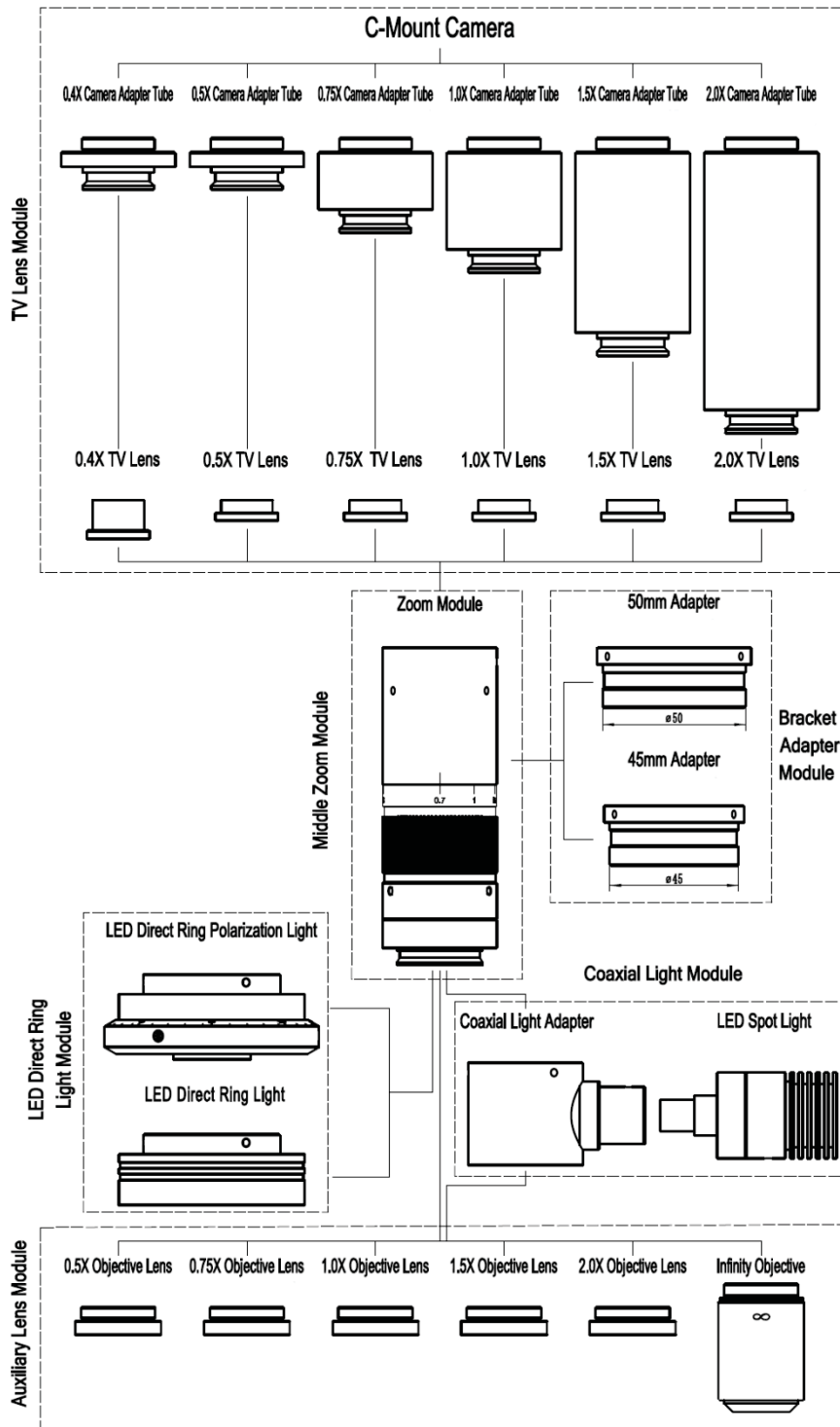
FOV: Field of View in the Object side.

NA: Numerical Aperture.

Note: Infinity corrected objectives limit system's usable zoom range due to uneven illumination. Max sensor format is 2/3".

System Diagram

System Decomposition Diagram



The Basic and Optional Modules of the Monocular Zoom Objective

## Application

BS-1008 is an ideal choice for most applications that require multiple magnifications or for those that prohibit continual manual refocusing. The applications of the BS-1008 are machine vision, small details inspection, industrial inspection especially electronic components, scientific research, medical industry and education industry.



BS-1008A+BAL3-48A (LED Direct Ring Light Module) +HDMI Camera + Stand



BS-1008A+BAL3-48A (LED Direct Ring Polarization Light) +HDMI Camera + Stand



BS-1008A+BCL-1A (Coaxial Light Module) +HDMI Camera + Stand



BS-1008A+BAL3-48A (LED Direct Ring Light) +USB CMOS Camera + Stand



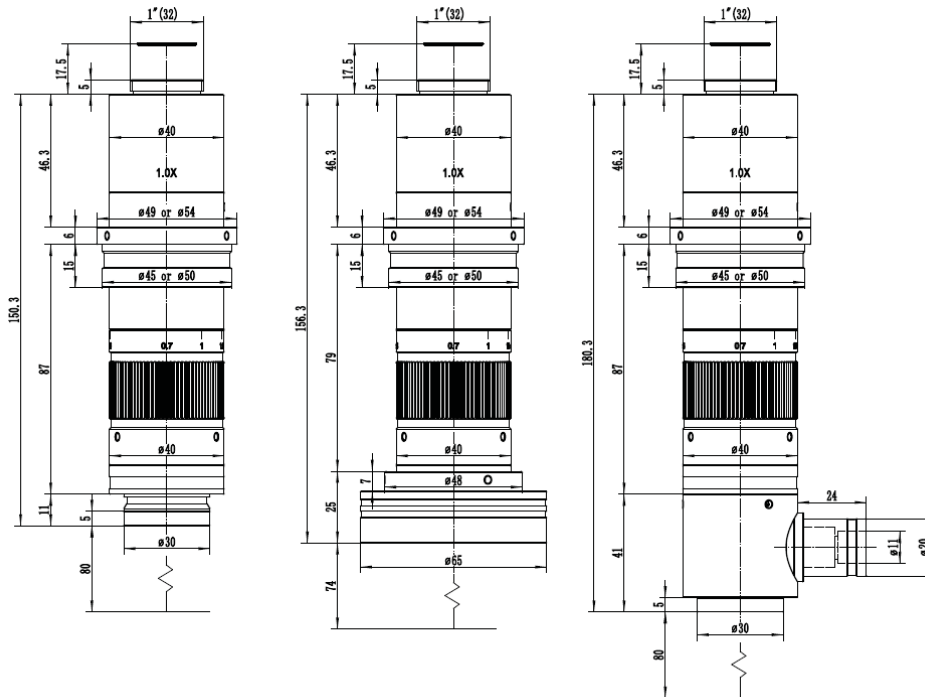
BS-1008A+ BAL3-48AP (LED Direct Ring Polarization Light) +USB CMOS Camera + Stand



BS-1008A+BCL-1A (Coaxial Light Module) +USB CMOS Camera + Stand

## Dimension

The dimensions of BS-1008A with different light a) BS-1008A without light module; b) BS-1008A equipped with Direct Ring Light Module, c) BS-1008A equipped with Coaxial Light Module are shown as follows. The length of BS-1008A is 150.3mm. It is much shorter than most of the Monocular Zoom Objective in the market.



Dimensions of BS-1008A with different light

## Packing List

The package information of BS-1008 is as follows:



BS-1008 Main Body, including Auxiliary Lens Module, Middle Zoom Module, TV Lens, Camera Adapter Tube and Bracket Adapter

The package information of [BAL3-48A/BAL3-60A](#) is as follows:



BAL3-48A/BAL3-60A, including LED Direct Ring Light and Power Adapter

The package information of [BAL3-48AP](#) is as follows:



BAL3-48AP, including LED Direct Ring Polarization Light and Power Adapter

The package information of [Coaxial Light Module](#) is as follows:



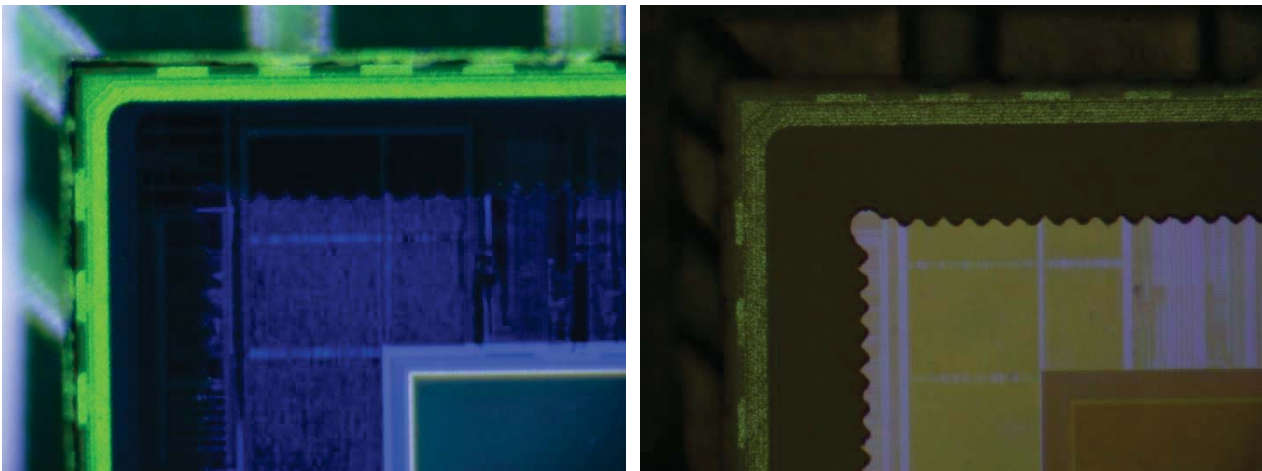
BS-1008 Coaxial Light Module BCL-1A, including Coaxial Light Adapter, LED Spot Light and Power Adapter

## Sample Images

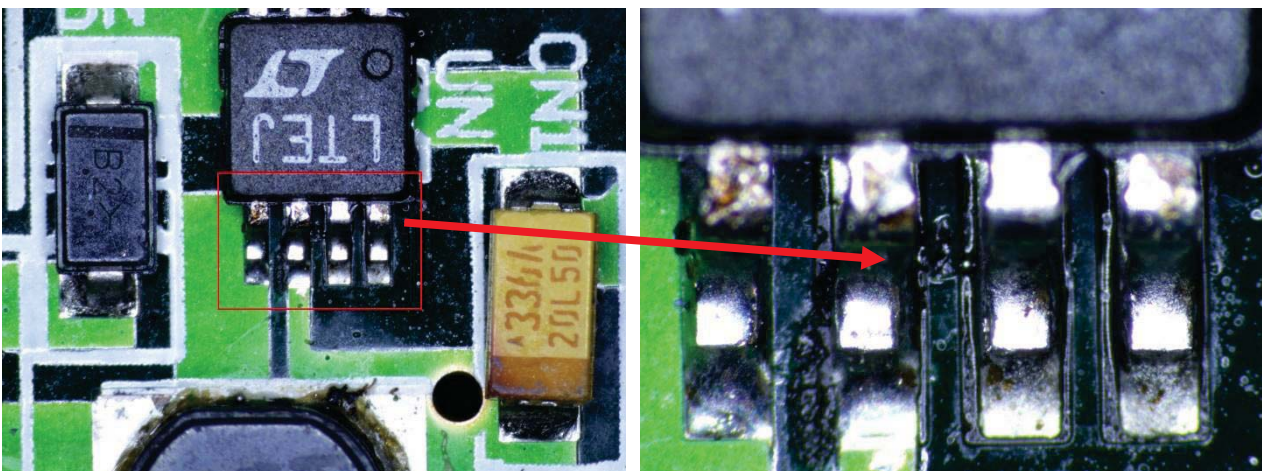
Below pictures of coins taken by BS-1008 with W100 & TV05 with different illumination. From left to right, left: LED Direct Ring Light Illumination; middle: LED Direct Ring Polarization Light Illumination; right: Coaxial Light Illumination.



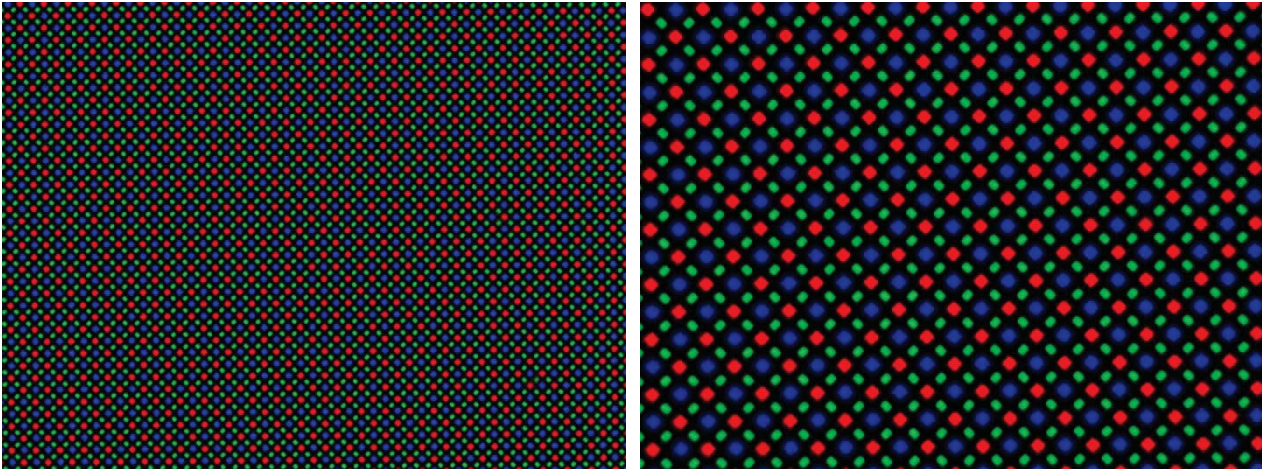
Pictures of CMOS image sensor taken with BS-1008 under LED Direct Ring Light Illumination and Coaxial Light Illumination (5.6X PMAG)



Pictures of circuit board taken by BS-1008 with LED Direct Ring Light Illumination, when shooting the left picture, the magnification of BS-1008 is 0.7X, when shooting the right picture, the magnification of BS-1008 is 2.5X.



Mobile phone pixels taken by BS-1008, under 2.5X PMAG and 5.6X PMAG



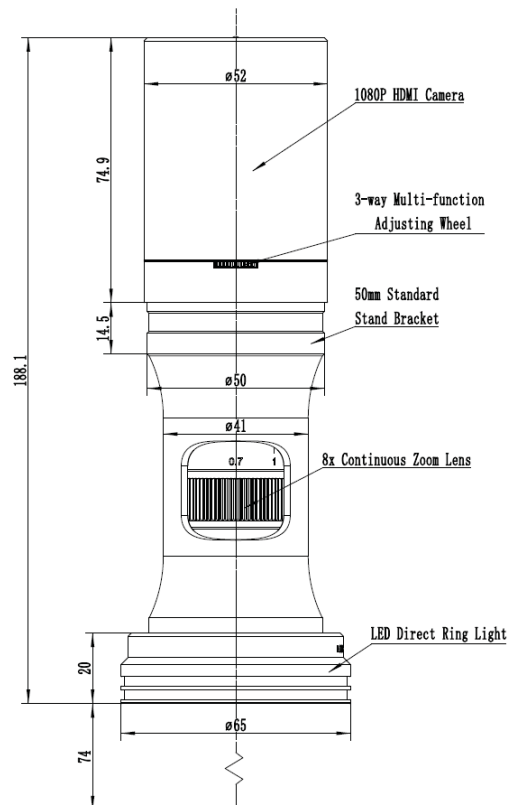
## 2. BS-1008D Series HDMI Digital Zoom Microscope



### Introduction

BS-1008D series all-in-one zoom digital microscope is shown as follows. It has 8x continuous zoom lens BS-1008-WXXX-TV050, 1080p HDMI camera H1080PA and LED ring light source.

The H1080PA module can directly complete the video and image acquisition without a computer, and the LED ring light source module is directly connected to the H1080PA module through the main body of the optical continuous zoom lens with no need of the external power supply.



The main body of BS-1008D

## Specification

The main parameters of BS-1008D are as follows:

<b>Optical Parameters</b>	
Zoom Lens	BS-1008-W100-TV050 zoom lens, 0.7X-5.6X zoom range
Working Distance	37.5mm-160mm (Determined by the auxiliary objective)
NA	0.018-0.092 (With W100, 1x auxiliary objective)
Resolution	18.6um-3.65um (With W100, 1x auxiliary objective)
Field	0.99mm-34.28mm
Optional Objective	0.50x, 0.75x, 1.00x, 1.50x, 2.00x (Optional)
Other Optional Objective	Infinite microscope objective (Both biological microscope objective and metallographic microscope objective can be used)
Dimensions	188mm x 52mm
Bracket Interface	Standard 50mm
<b>HDMI Digital Camera Module</b>	
HDMI 1080P Camera	H1080PA, Integrated with zoom lens
Sensor	Sony IMX307(C), 1/2.8"(5.57x3.13), Pixel size 2.9x2.9um
G Sensitivity /Dark Signal/ Dynamic Range /SNR	1300mv with 1/30s/NA/NA/NA
FPS/Resolution	60@1920*1080(HDMI)
Exposure	0.01~1000ms
Output Mode	HDMI output
Image Saving	Use SD card to save the captured image or video
Software	Use the built-in XCamView software to control the camera
ISP	Having powerful ISP and other related processing functions
<b>Lighting Module</b>	
LED Ring Light	LED direct ring light with adjustable brightness (No power cable) (BS-1008DRL-NPC)
LED Ring Polarization Light	LED direct ring polarization light with adjustable brightness (No power cable), (BS-1008DRPL-NPC)
Coaxial Light Module	LED Coaxial Light Module with adjustable brightness (No power cable), (BS-1008CL_NPC)
Power Supply	Integrated power supply, no power cable winding trouble, sample observation more freely
Installation Method	Express second-level suction type installation, convenient and simple
Brightness Control	Through the 3-way multi-function adjusting wheel or software GUI, both the hardware and software can adjust the light intensity synchronously with no hassle

## Optical Specification



The BS-1080D and LED ring light source

Auxiliary Objective	Specification	TV Lens TV050 for 1/3" Sensor	
		Low	High
W100, 1.0X(80mm WD)	PMAG	0.35X~2.80X	
	FOV	17.14mm	2.14mm
	NA	0.018	0.092
W050, 0.5X(160mm WD)	PMAG	0.18X~1.40X	
	FOV	34.28mm	4.28mm
	NA	0.009	0.046
W075, 0.75X(105mm WD)	PMAG	0.26X~2.10X	
	FOV	20.81mm	2.86mm
	NA	0.013	0.069
W150, 1.5X(51.5mm WD)	PMAG	0.53X~4.20X	
	FOV	11.43mm	1.43mm
	NA	0.026	0.138
W200, 2.0X(37.5mm WD)	PMAG	0.70X~5.60X	
	FOV	8.57mm	1.07mm
	NA	0.035	0.182
Remarks	When using coaxial lighting, low magnification may produce vignetting. When using infinity objectives as <a href="#">Auxiliary Lens Module</a> (adapter available), the <b>PMAG</b> , <b>FOV</b> and <b>NA</b> of the <b>BS-1008</b> depends on the parameters of the objectives.		

WD: Working Distance.

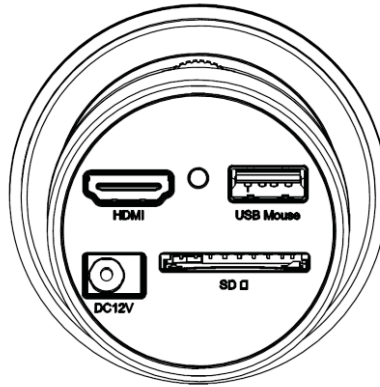
PMAG: Primary Magnification.

FOV: Field of View in the object side.

NA: Numerical Aperture.

**Note:** Infinity corrected objectives limit system's usable zoom range due to uneven illumination. The maximum sensor format is 2/3".

## Available Ports on the Back of the Camera Body



The top panel of BS-1008D

Interface	Function Description
USB Mouse	Connect USB mouse for easy operation with embedded XCamView software
HDMI	Comply with HDMI1.4 standard. 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

## BS-1008D's Camera H1080PA Function

### Video Output

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

### 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
Measurement Saving	Measurement information saved in different layer with image content; Measurement information is saved together with image content in burn in mode.

### 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

## 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
Measurement Function	Supported

## 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

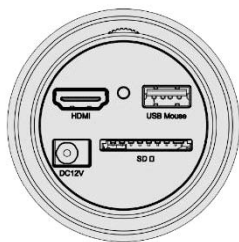
## Installation Procedure of BS-1008D

Apart from the BS-1008D, you only need an HDMI monitor, the supplied HDMI cable, USB mouse, SD card and power adapter(12V/1A). The steps to start the BS-1008D are listed as below:

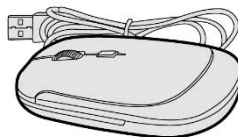
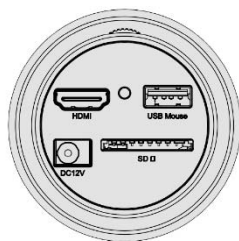


BS-1008D and other accessories

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



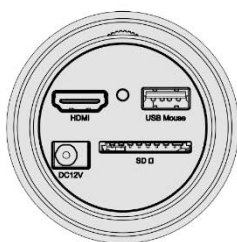
- Insert the supplied USB mouse to the camera's USB port;



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



- Connect the camera to the power adapter(12V/1A) and switch it on;



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

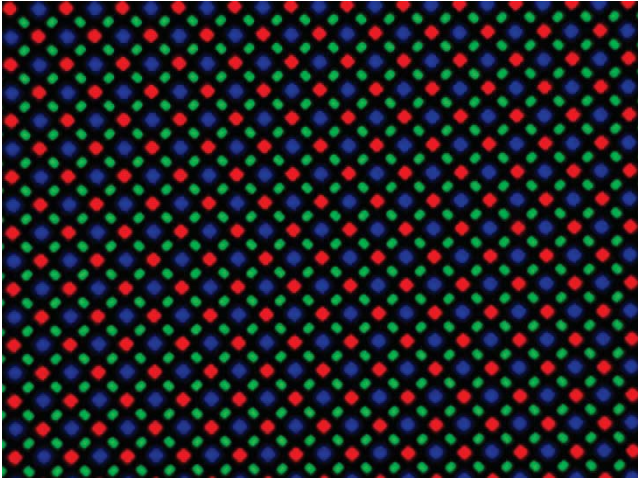
## Packing Information



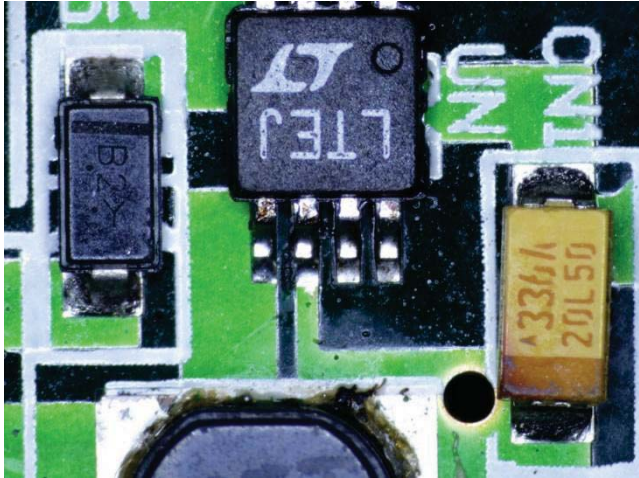
BS-1008D's packing Information

Standard Packing List	
<b>A</b>	Gift box: L:17.5cm W:17.5cm H:8.5cm (1pcs, 0.85kg/ box)
<b>B</b>	The BS-1008D main body
<b>C</b>	HDMI cable
<b>D</b>	Power adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 1A
	<p><b>American standard:</b> Model: POWER-U-12V1A(MSA-C1000IC12.0-12W-US): UL/CE/FCC EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6</p> <p><b>European standard:</b> Model: POWER-E-12V1A(MSA-C10001C12.0-12W-DE): UL/CE/FCC EMI standard: FCC Part 15 Subpart B EMS standard: EN61000-4-2,3,4,5,6</p>
<b>E</b>	USB mouse/USB wireless mouse
Optional Accessory	
<b>F</b>	SD card (16G)
<b>G</b>	Coaxial light module
<b>H</b>	The other auxiliary lens (not shown)
<b>I</b>	The other LED light source (shown)

Sample Images



LCD pixel array captured with BS-1008D



Circuit board captured with BS-1008D