



DM750-2MP Digital-Integrated Microscope

Introduction

This manual applies to the DM750-2MP digital-integrated microscope and accessories. The information in this manual is provided to help you familiarize yourself with the assembly and use of the products. Please read thoroughly before using the products, and keep this manual with the product for reference.

Safety

Before using your AmScope microscope, please read the following safety precautions carefully to avoid causing damage to your AmScope product, or injury to yourself or others.

Turn off power if the instrument exhibits unusual or dangerous behavior such as emitting smoke or unusual odors. These can be indications of electrical problems, in which case the instrument should be disconnected from any power source if safe to do so. Other indicators can be a loud buzzing sound or crackling. Contact AmScope to report such behavior.

Do not use around flammable liquids or gases. Electric instruments can ignite flammable substances which could result in an explosion or fire.

Do not use in a wet environment. Electrical components of the instrument can discharge when exposed to water, potentially resulting in damage to the instrument, or injury to yourself or others.

Only use the provided power adapter or authorized replacement. Incompatible power adapters can cause damage to the instrument. If you should lose the included power adapter, please contact AmScope for information about a replacement.

Do not dismantle. Dismantling can result in damage to the instrument, and potential exposure to dangerous materials or electric current.

Notices

AmScope reserves the right to change specifications of the hardware and software at any time without notice. Continuous efforts are made to improve performance and reliability, which can result in changes to design and compatibility. Please contact AmScope for any concerns regarding such changes.

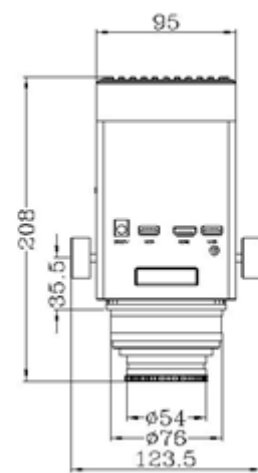
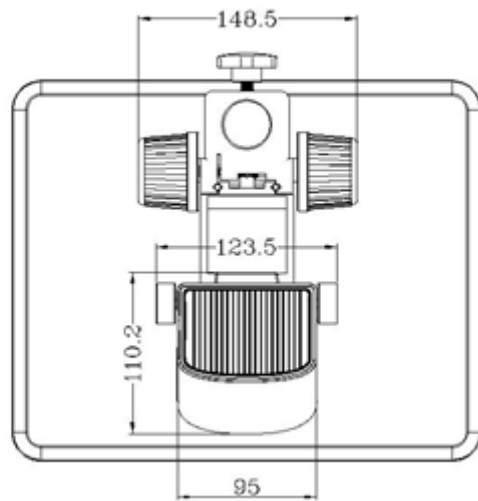
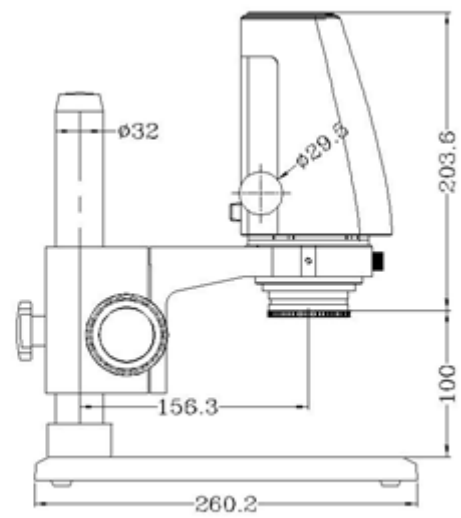
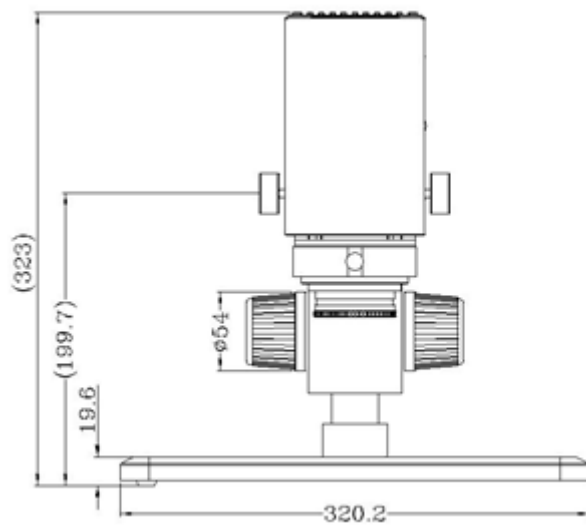


Proposition 65 Notice for California Residents

Cables included with the products described in this manual can expose you to chemicals including lead, which is known by the state of California to cause cancer, birth defects or other reproductive harm. Visit www.P65Warnings.ca.gov for more information.

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Microscope Specifications	
Model	DM750-2MP
Zoom Magnification	0.7X-5X
Working Distance	100mm
Camera Specifications	
Sensor	IMX307 (color)
Sensor Type	CMOS
Sensor Optical Format	1/2.8"
Integrated Reduction	0.35X
Active Pixels	2M (1920 x 1080)
Pixel Size	2.9μm x 2.9μm
Active Sensor Area	5.57mm x 3.13mm
Shutter	electronic rolling shutter
Monitor Specifications	
Display Size	11.6"
Monitor Magnification	46X
Displayed Magnification	12.9X-92X
Native Resolution	1920 x 1080
Aspect Ratio	16:9

What's In The Box

The DM750-2MP standard outfit includes:

- One microscope
- One USB wireless mouse
- One ring light adapter
- One ring light
- One AC power adapter
- One base plate for table stand
- One pillar for table stand
- One focusing block

The DM750-2MP-HDM11 outfit also includes:

- One monitor
- One arm bracket for monitor
- Two thumb screws
- One AC adapter for monitor
- One HDMI cable

Assembly

Attaching the Monitor



DM750-2MP-HDM11 models include a monitor which can be attached to the microscope's stand. An arm is included which should be attached to the stand's 1.25" pillar. Secure the arm in place by using the locking knob before attaching the monitor. The monitor's rear panel has 4 threaded holes designed for VESA mounts. The arm's mounting bracket only uses the lower 2 holes. Use the included thumb screws to secure the monitor in place.

Attach one end of the included HDMI cable to the microscope's HDMI port, and the other end to the monitor's HDMI port. Attach DC plug of the the monitor's AC power adapter to the monitor's power port, then plug the AC adapter into a compatible AC outlet. The monitor's power button is located on the lower portion of the bezel's right side. Then the monitor is powered on, the red LED on the lower-right corner of the front bezel will light up.

The Rear Panel



USB Ports

The microscope has two USB ports on its rear panel. These can be used to attach USB devices such as the included mouse, a keyboard, and storage devices.

Wireless Mouse

The included mouse is required to navigate the microscope's software. A USB dongle will be inserted into a dummy slot on the underside of the mouse. Remove the dongle, and insert it into an available USB port on the microscope. Locate the power switch on the underside of the mouse, and move it to the "ON" position.

Storage Devices

An external storage device is required to save photos and other files. This microscope is compatible with various devices including thumb drives and card readers. Compatible storage devices will be automatically detected when attached.

HDMI Port

The HDMI port can be used to display video on compatible monitors and televisions.

Power Port

Attach the DC plug of the microscope's AC adapter into the power port. Plug the AC adapter into a compatible AC outlet. The microscope does not have a power switch, so unplug the AC adapter when the microscope is not in use.

The 3D Attachment



The optional 3D attachment is designed to mount to the objective lens' housing. The 3D attachment's mounting ring has female threads which will screw onto the objective housing's male threads. Guide the 3D attachment's mounting ring upward onto the objective housing, then rotate to the right using the knurled portion of the ring. Continue rotating until the ring is fully mounted. Do not apply excessive pressure, otherwise the attachment will be difficult to remove. When securely mounted, the attachment's slider should rotate freely.

The 3D attachment can be used to alter the angle-of-view, allowing you to view an object from oblique angles without moving the object. The 3D attachment consists of a mounting ring and a slider. The slider can be positioned for normal viewing or 3D viewing. The open position removes the slider's mirrors from the optical path allowing you to view normally. The engaged position places a mirror directly under the microscope's objective lens, relaying an oblique image from the second mirror. When changing the position of the slider, use the metal positioning rod to avoid contaminating the mirrors. When engaged, the attachment can be rotated 270° without obstruction. Use the positioning rod or an outer edge of the slider when rotating to avoid contaminating the mirrors.

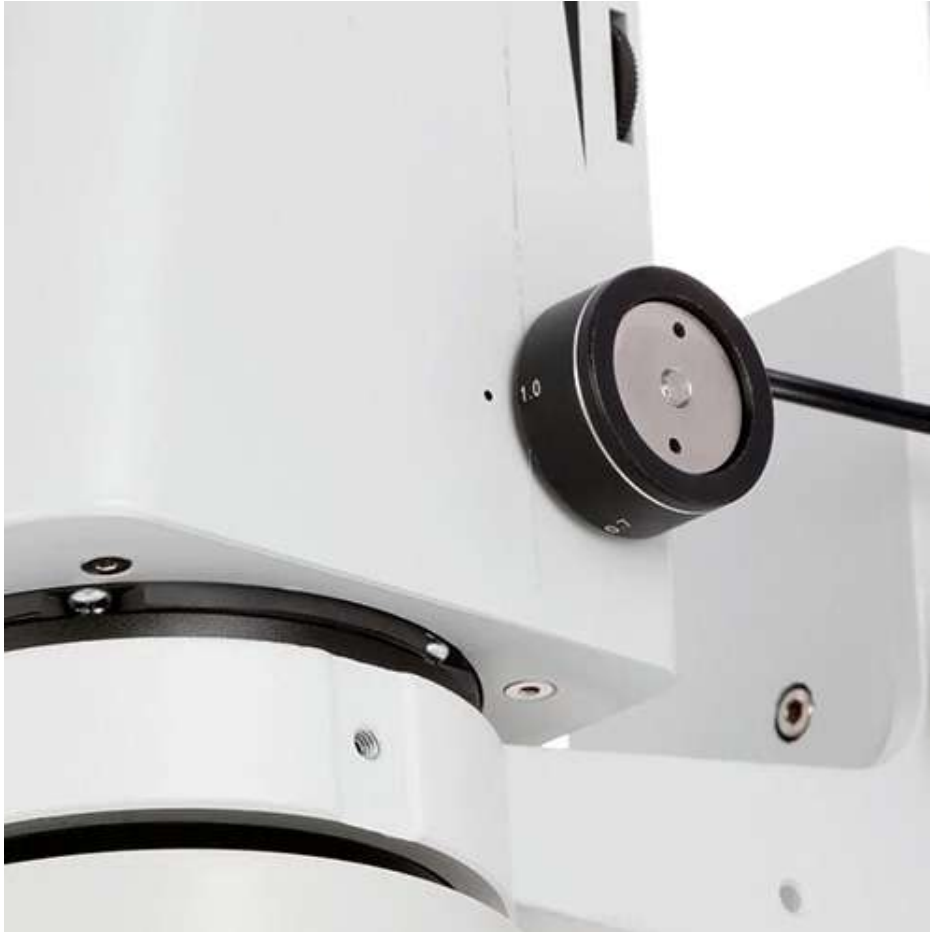
Operation

Focusing

Each side of the microscope's focusing block is equipped with a focusing knob. Rotating either knob will raise or lower the microscope's head.

Tension can be adjusted for the knobs by securing one in place, then rotating the other. Rotating clockwise will increase tension, and counter-clockwise will decrease tension.

Magnification



Zoom Dial

The zoom dial controls the magnification of the microscope by adjusting the internal zoom mechanism. The dial can be rotated in a continuous movement from the 0.7X setting to the 5X setting. Key magnifications have detents (mechanical catches) which allow the dial to “click” into place. This allows you to set magnifications more precisely when performing measurements. Rotating the dial clockwise will decrease the magnification, and rotating the dial counter-clockwise will increase the magnification.

Optical Magnification

This microscope uses a combination of a fixed-magnification 1X objective lens and zoom optics to provide its 0.7X-5X magnification range. This is the optical magnification range which is typically listed. An additional 0.4X magnification stage is used to compensate for the format of the digital image sensor. This document refers to this stage as integrated reduction, since the purpose is to reduce the size of the image to better fit the specific image sensor. While this reduction stage modifies the overall magnification prior to being imaged, it is typically not referenced in listed magnifications due to its association with the image sensor. However, it should be used when calculating total system magnification as described in the following section about monitor magnification.

Monitor Magnification

Since the image displayed on the monitor is larger than the camera's sensor, the monitor is considered to have its own magnification referred to as monitor magnification. The magnification factor is calculated by dividing the diagonal of the on-screen image by the diagonal of the camera's sensor.

$$294\text{mm}/6.39\text{mm} = 46$$

Total system magnification includes all of these factors, and can be calculated using the formula:

$$M_{\text{OBJ}} \times M_{\text{RED}} \times M_{\text{MON}} = M_{\text{TOT}}$$

where M_{OBJ} is objective magnification, M_{RED} is integrated reduction, M_{MON} is monitor magnification, and M_{TOT} is total magnification. The low and high magnifications would be as follow:

$$0.7 \times 0.4 \times 46 = 12.88$$

$$5 \times 0.4 \times 46 = 92.0$$

Illumination

This microscope is equipped with an LED ring light to provide illumination. The ring light can be removed to expose the objective lens housing by simultaneously pulling downward on the left and right sides. When reattaching, be sure to align the two electrical contact on the top of the ring light with the pins on the underside of the microscope head.



The ring light's intensity is controlled by a wheel on the right side of the microscope. Rotating the wheel upward will increase the intensity, and rotating downward will decrease intensity.

Software

The DM750-2MP uses internal software to manage camera and display settings, as well as to perform image-capture and measuring functions. All of these functions are accessed from the on-screen console.

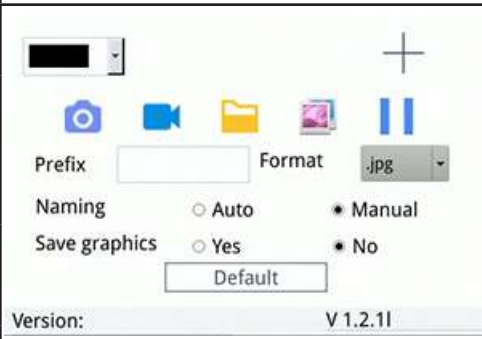
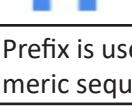
Virtual Keyboard

Double-clicking on text fields will display a virtual keyboard which can be used to enter text and numbers.

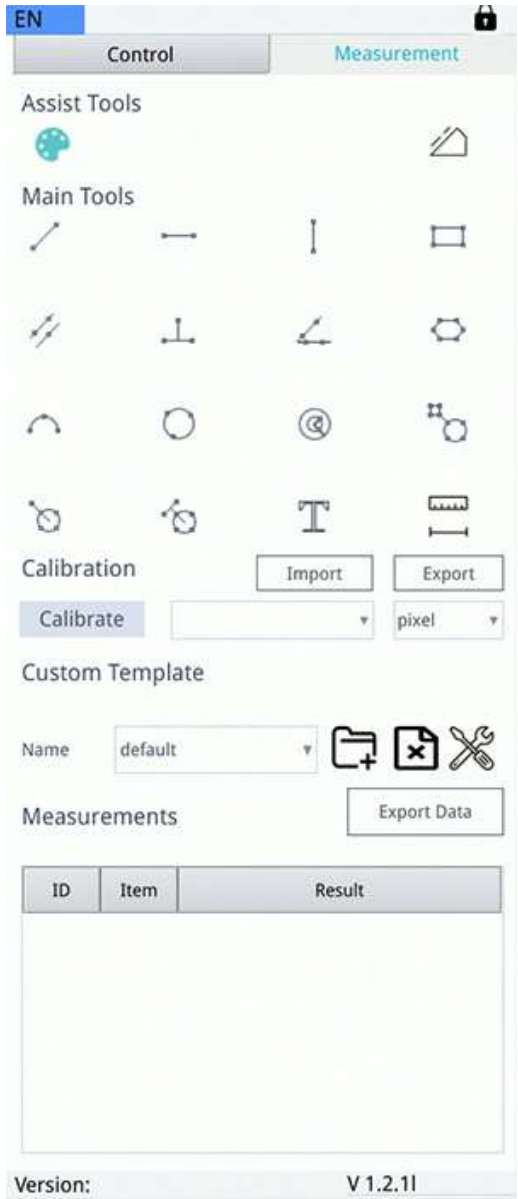
The Control Panel

The Control panel provides controls for manipulating camera settings and for capturing and saving images.

Panel	Function Description
	Exposure can be set to automatic or manual modes. When Auto Exposure is active, the Brightness control is available. When Manual Exposure is active, Gain and Exposure Time controls are available.
	Brightness is used to increase or decrease the image's overall brightness as set by the automatic exposure function.
	Gain is used to increase or decrease the image brightness by adjusting the camera's sensitivity.
	Exposure time is used to increase or decrease the image brightness by adjusting the duration over which the image is captured
AE	Enable Auto Exposure for automated control of exposure settings
ME	Enable Manual Exposure to manually adjust exposure settings
	Color settings are used to manually adjust the proportional Red, Green, and Blue levels of the RGB image.
AWB	Enable Auto White Balance for automated control of color settings
MWB	Enable Manual White Balance to manually adjust color settings
	Contrast: use the slider to adjust the image's contrast
	Sharp: use the slider to adjust the image's sharpness
	Saturation: use the slider to adjust the image's color saturation
	Zoom: use the slider increase or decrease the microscope's digital zoom
	Flip: invert image vertically
	Mirror: invert image horizontally
	WDR: adjust the compression level of colors to improve detail in overexposed or underexposed areas.
	Gamma: use the slider to adjust the image's Gamma level
	50 Hz / 60 Hz: This setting should match the AC power source to prevent flicker.
	B&W: Use this setting to convert the image to grayscale.

Panel	Function Description	
 Prefix Format .jpg Naming ☐ Auto ☒ Manual Save graphics ☐ Yes ☒ No Default Version: V 1.2.11		Select the color of the on-screen guides.
		Display or hide on-screen guides. Options include Cross Line which creates a grid using a user-defined number of horizontal and vertical lines, and Cross Mark which displays a reticle with horizontal and vertical rulers.
		Captures a photo
		Starts and stops video recording
		Browse and open saved photos and videos.
		Opens a saved image into a split screen for the purpose of comparing with the live image. Click and hold the comparison image to adjust its position.
		Freezes the live image
	Prefix is used for automatic file naming. The prefix will be followed by a numeric sequence.	
	Format selects the file type to be used when saving images. Available options are JPG and BMP.	
	Naming determines whether file names will be generated automatically using the user-defined prefix, or manually. If manual is selected, you will be prompted for a file name after each image is captured.	
	Save Graphics determines whether on-screen graphics including measurements will be saved in image files.	
	Default	Resets the values to factory defaults

Measurement Tools

Panel	Tool	Description
		Arbitrary Line: draw a line with an arbitrary angle
		Horizontal Line: draw a horizontal line
		Vertical Line: draw a vertical line
		Rectangle: draw a rectangle
		Parallel Lines: draw a pair of lines, and the second will be parallel to the first
		Perpendicular Lines: draw perpendicular lines
		Angle: measure an angle
		Polygon: draw a polygon
		3-Point Arc: draw an arc
		3-Point Circle: draw a circle
		Concentric Circles: draw concentric circles
		Circle to Circle: measure the distance between the centers of two circles
		Circle to Point: measure the distance from the center of a circle to an arbitrary point
		Circle to Line: measure the distance from the center of a circle to a line
		Text: add text
		Scale Bar: display a scale bar

Calibration

The calibration section is used to create magnification profiles. A magnification profile defines the relationship between camera pixels and real units of measure such as millimeters. Once this relationship is defined, any shape drawn on the screen will provide accurate measurements by translating the number of pixels into the desired unit of measure.

Calibration Tool

The calibration tool has three options: Line Calibration, H Calibration, and Circle Calibration.

Profiles

Profiles are saved after the calibration process, and can be selected for use with the corresponding magnifications to perform accurate measurement functions.

Units

Units defines the measurement unit to be displayed when performing measuring functions.

Line and H Calibration

Both the Line Calibration and H Calibration tools function in the same manner. The H Calibration tool adds perpendicular lines to each end of the drawn line. To perform the calibration process, a ruler will be needed for reference. For low magnifications, a ruler with millimeter graduations is usually adequate. For high magnifications, a ruler with finer graduations may be needed, such as a micrometer slide. Place the ruler under the microscope's lens so it can be viewed on the screen. The ruler needs to be in clear focus with multiple, clearly-distinguishable graduations visible on the screen.

Click on the ruler icon in the main panel's calibration section. Using this tool, a line will be drawn over the image of the ruler. Click the left mouse button to create the first anchor point. As the cursor is moved, a line will be displayed. The line should span as many readable graduations as possible, and should be parallel to the ruler's edge to improve the precision. Move the cursor along the image of the ruler until it has spanned an adequate number of graduations, then click the left mouse button again to create the second anchor point. A popup window will be displayed. Enter a name for the profile, the length of the measurement, and the current magnification. If you are not using a keyboard, double-click on each appropriate field to enable the on-screen keyboard. Once finished with the calibration, click on any measurement tool to use the profile.

Once saved, the profile will be listed in the main panel's drop-down selector. With the profile selected, you can select the desired unit of measure to display on-screen measurements in that unit.

Calibration by Circle

This calibration is similar to line calibration, except it uses a circle which can be useful when referencing premeasured diameters. Click the left mouse button to create the first anchor point on the edge of the reference circle. As the cursor is moved, a line will be displayed. Move the cursor to the opposite side of the circle, then click the left mouse button again to create the second anchor point. A circle will now be displayed. Move the cursor to enlarge or reduce the size of the circle. Once the circle is properly sized, click the left mouse button. A popup window will be displayed. Enter a name for the profile, the length of the measurement, and the current magnification. If you are not using a keyboard, double-click on each appropriate field to enable the on-screen keyboard. Once finished with the calibration, click on any measurement tool to use the profile.

Once saved, the profile will be listed in the main panel's drop-down selector. With the profile selected, you can select the desired unit of measure to display on-screen measurements in that unit.