CELESTRON®

LABS

DIGITAL

DELUXE

MICRODIRECT™

MICROSCOPE

INSTRUCTION MANUAL

MODEL #44316

1. INTRODUCTION

Thank you for purchasing this Celestron Labs Digital Microscope. Your microscope is a precision optical instrument, made of the highest quality materials to ensure durability and long life. It is designed to give you a lifetime of viewing pleasure with a minimal amount of maintenance.

Before attempting to use your Celestron Labs Digital MicroDirect Microscope, please read through the instructions and reference the diagrams below. Familiarizing yourself with the many features of the microscope will go a long way to making your experience an enjoyable one.

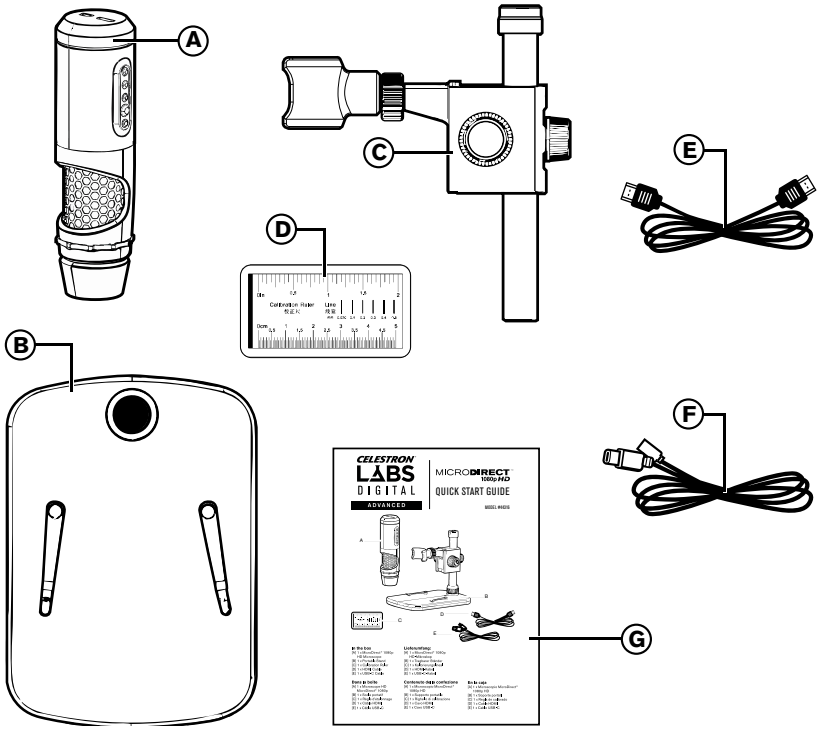
Celestron Labs Digital MicroDirect Microscope is a handheld digital microscope designed to connect, via the included HDMI cable, directly to your TV monitor or projector displaying full 1080p HD streaming video! There is no need for a computer when using the Celestron Labs Digital MicroDirect Microscope.

This microscope is a low magnification power microscope, mainly suited for examining specimens like coins, stamps, rocks, electronics, insects, and other 3D objects. Specimens on slides can be viewed, but this microscope is not ideal for this purpose. You can see a large selection of Celestron Labs high power microscopes better suited to this type of viewing at celestron.com.

Celestron Labs Digital MicroDirect Microscope does not use an eyepiece like a traditional microscope. Instead, an embedded camera sensor replaces the eyepiece. The sensor works with the lens assembly to create a magnified, digital image of the object. The HDMI connection then sends that digital signal out to your monitor or projector for incredibly clear 1080p video streaming. This allows you to view specimens easily and share the large live streaming image with a room full of people. Viewing is more comfortable, reducing eye and neck strain common with traditional microscopes. You can hold the microscope in your hand while observing large surfaces away from a normal lab setting, or use the included adjustable stand for more precise, hands-free viewing. Capture still images directly to your MicroSD card. Record video by connecting the Celestron Labs Digital MicroDirect Microscope directly to your Windows-based PC using the USB cable and you are ready to start capturing 720p HD movies.

WHAT'S IN THE BOX

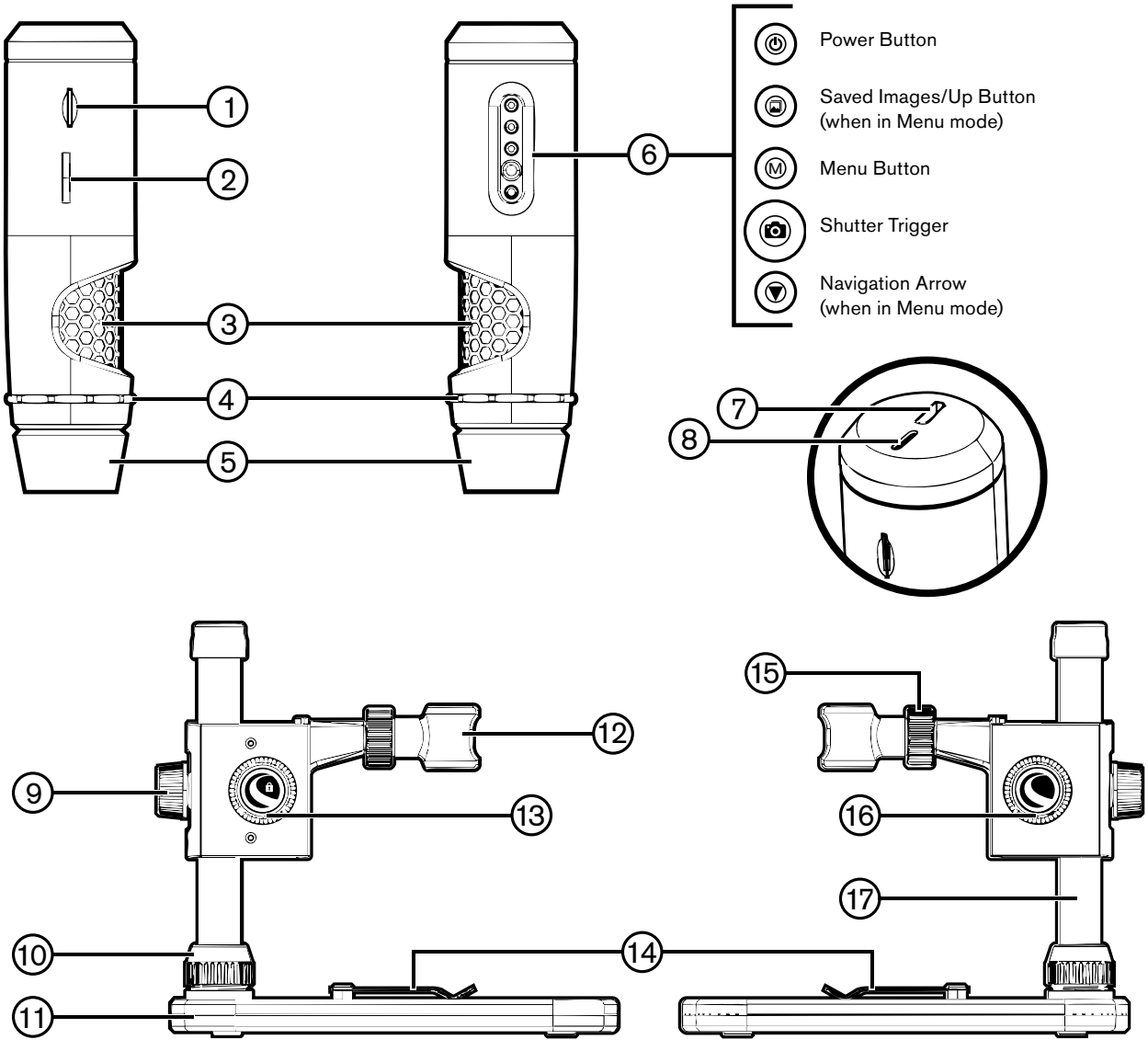
A. Celestron Labs Digital MicroDirect Microscope (1)
B. Stage Base (1)
C. Stand Holder Assembly (1)
D. Calibration Ruler (1)
E. HDMI Cable (1)
F. USB-C Cable (1)
G. Quick Setup Guide (1)



PARTS

MICROSCOPE

1. MicroSD card slot
2. Illuminator adjustment wheel
3. Focus wheel
4. Polarizer adjustment filter wheel
5. Clear plastic objective end
6. Controls (HDMI connected directly)
7. HDMI OUT port
8. USB-C port



STAND

9. Main adjustment knob
10. Stage coupler with setscrew
11. Main base/stage
12. Microscope holder clip
13. Locking knob
14. Specimen clips
15. Locking nut for holder
16. Fine height adjustment knob
17. Metal post

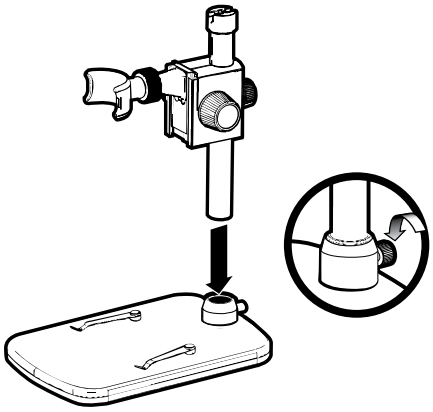
SPECIFICATIONS

Description	Celestron Labs Digital MicroDirect Microscope
Type of Microscope	Handheld Digital
Nosepiece	Clear plastic
Objective Type	Single adjustable internal objective
Focus Type(s)	Coarse and fine focus with barrel adjustment knob
Magnification Range	10x to 200x (determined by display size)
Illumination Type	Adjustable ring illuminator at nose with 8 LEDs
Illumination Position(s)	Upper, at nose
Illumination Adjustability Mechanism	Adjustable wheel on barrel
Sensor Type	3.4 MP CMOS
Sensor Size	1/ 3" Aptina ARO330CS
Resolution	2304 x 1536
Pixel Size	2.2 x 2.2 µm
Eyepiece Type	CMOS sensor in lieu of eyepiece
Focus Range	10mm to 10 feet
Screen Type	• HDMI: Monitor or Projector • USB-C: Windows PC only
Still Image Capture Resolution	HDMI (MicroSD card): • TRUE: 640 x 480, 1280 x 960, 1920 x 1080, 2048 x 1536 • INTERPOLATED: 2048 x 1536, 2592 x 1944, 3264 x 2448, 3648 x 2736, 4032 x 3024, 4640 x 3480, 5200 x 3900 USB-C (Windows PC only): • 640 x 480, 800 x 480, 800 x 600, 1024 x 576, 1024 x 768, 1280 x 720, 1920 x 1080
Video Capture Resolution	Up to 1920 x 1080 (Windows PC only, max 30 fps; not supported on Mac)
Streaming Video Format	MJPEG HDMI (Direct to monitor or projector): • TRUE: 640 x 480, 1280 x 960, 1920 x 1080, 2048 x 1536 • INTERPOLATED: 2048 x 1536, 2592 x 1944, 3264 x 2448, 3648 x 2736, 4032 x 3024, 4640 x 3480, 5200 x 3900 PC (Windows only): • TRUE: 1920 x 1080, 1280 x 720, 1024 x 768, 1024 x 576, 800 x 600, 800 x 480, 640 x 480
Photo Format	MJPEG
Memory Type	Micro SD card not included - Supports up to 128GB
Power Source	USB-C (5V)
Shutter Trigger	On body
Software	Celestron Labs Digital Imaging Software HD (Windows PC only)
Software Compatibility	Windows 7.1 to Windows 11
Languages supported	English, German, Spanish, Russian, Italian, French, Portuguese, Dutch, Polish, Japanese, Korean, Chinese
Accessories	• Adjustable stand with 1/4"-20 thread clip • Calibration ruler • Built-in adjustable polarizing filter • HDMI Cable • USB-C cable
Weight	1.3 lb (590g) (including stand)
Dimensions	Microscope: 155.6mm x 38mm x 38mm (6.125" x 1.5" x 1.5") Stand: 119mm x 171.4mm x 482.6mm (4.68" x 6.75" x 6.19")

**Interpolation is a software process that adds pixels to an image to increase its apparent resolution, which can be helpful for larger print formats.

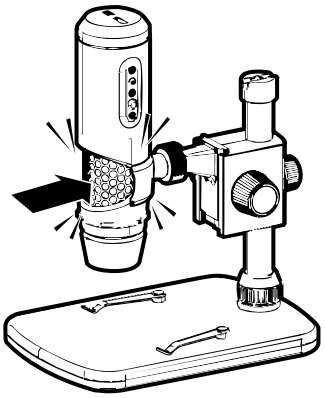
2. SETUP

ASSEMBLE THE MICROSCOPE STAND



+ Carefully remove all components from the box.
+ The microscope holder assembly should be connected to the metal post (17) in the box. If it is not, connect it now.
+ Attach the complete assembly to the stage coupler (10) and tighten the setscrew to lock it in place.

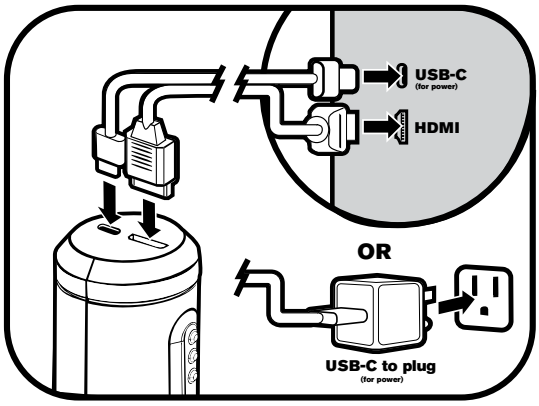
ATTACH MICROSCOPE TO THE STAND

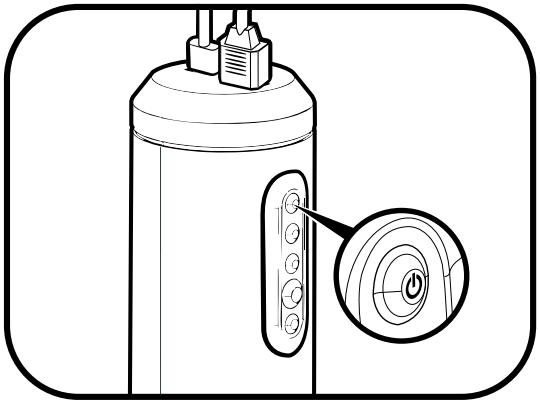


+ Align the microscope body with the holder on the stand. Push to snap it into place.

3. USING YOUR MICROSCOPE

CONNECT TO A DISPLAY OR PROJECTOR



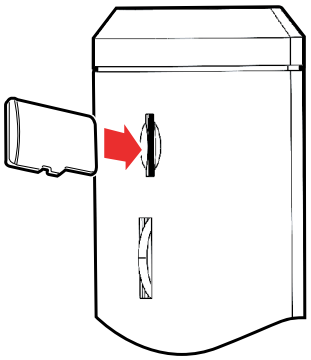


+ Plug one end of the included HDMI cable into the microscope's Mini HDMI port and the other end into your display's standard HDMI port.
+ Plug the USB-C cable into the microscope and then into an open USB-C port on a power source. This could be a power bank, wall plug, or USB-C port on the display.
+ Do not connect the USB-C cable directly to a desktop or laptop computer. The computer may misinterpret the signal as a storage device, which can result in a blank blue screen.
+ Power up the microscope by pressing the ON/OFF button.

NOTE: The included USB-C cable works with standard 5V USB-C wall plugs that come with many of today's electronics such as smartphones and tablets.

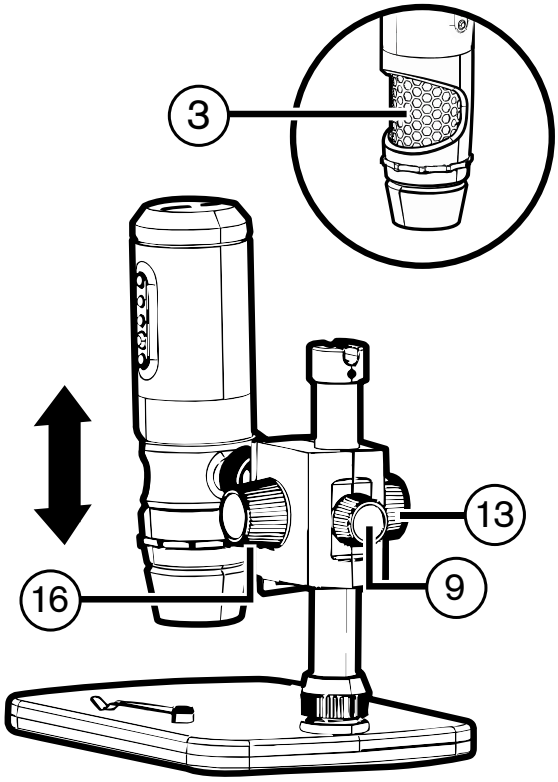
CAPTURE A STILL IMAGE

+ Insert your MicroSD card in the MicroSD slot on the microscope body.

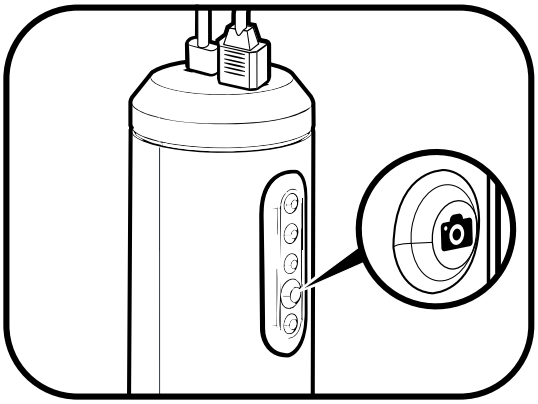


+ Loosen the Main Adjustment Knob (9) and raise or lower the assembly to the desired height.
+ Tighten the Main Adjustment Knob (9) to hold the position.
+ Loosen the Locking Knob (13) and rotate the Fine Height Adjustment Knob (16) to fine-tune the height.
+ Tighten the Locking Knob (13) to set the position.
+ Rotate the Focus Wheel (3) to bring the image into focus.

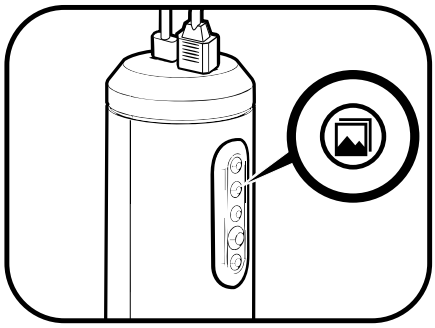
NOTE: MicroSD card not included. The MicroSD card slot supports cards up to 128 GB.



+ Press the Shutter Trigger button and the captured image will be saved on the MicroSD card.

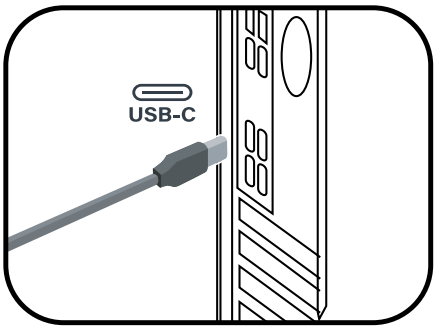


REVIEW YOUR RECORDED IMAGES



+ With MicroSD card in place in the MicroSD card slot, press the Saved Images review button
+ Press the Navigation button to view the previously captured image.
+ Press the Saved Images review button again to return to the streaming image.

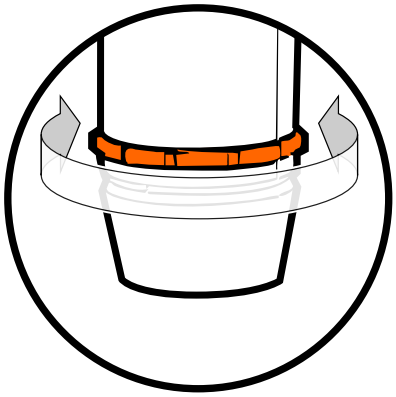
DOWNLOADING IMAGES TO PC



+ With the MicroSD card in MicroSD card slot, connect the microscope to your PC via the included USB-C Cable.
+ Your computer should recognize the device as a storage device.
+ Download the images as you would with any digital camera.

NOTE: This microscope is only compatible with Windows OS

POLARIZING FILTER



+ Your Celestron Labs MicroDirect 1080p Handheld Digital Microscope is equipped with a polarizing filter, which can help reduce glare
+ To use the filter, simply rotate the Polarizer filter adjustment wheel

CONTROLS

+ Familiarize yourself with the control buttons on the side of the microscope.
+ When connected directly via HDMI, these buttons serve as the input controls.

Power Button: Turns the unit on or off

Saved Images Review Button:

- When streaming, press to open the saved images folder on the MicroSD card.
- In Menu mode, acts as the navigation/back button.

Menu Button:

- Opens the firmware settings menu (see page 8 for details).

Shutter Trigger:

- Captures an image.

Navigation Arrow:

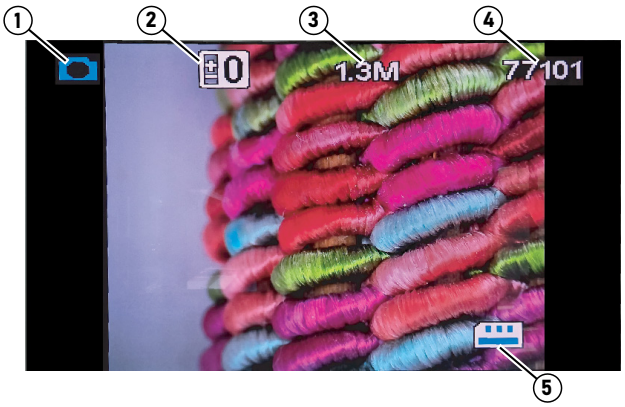
- In Menu mode, acts as the navigation/forward button

4. NAVIGATING THE FIRMWARE

MAIN SCREEN INTERFACE

+ Once connected and powered on, the device will begin streaming. The screen will appear similar to the image shown below.
+ Familiarize yourself with the on-screen interface:

1. Camera mode
2. Exposure setting (+ / –)
3. Resolution setting
4. Image counter
5. MicroSD card status



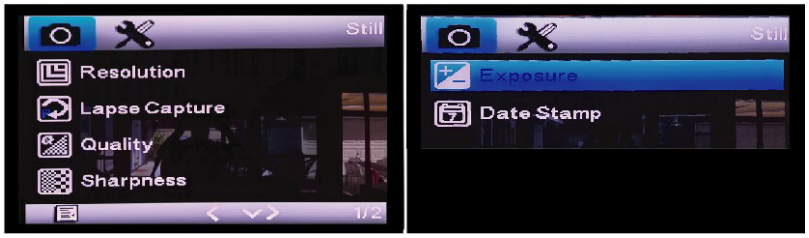
FIRMWARE MENU

+ Press the Menu button to enter the Main Menu.
+ Use the menu to adjust image settings and other options.

NOTE: The Main Menu consists of two windows. To view Menu Window 2, press the Menu button again.

The menu choices are as follows:

- Resolution
- Lapse Capture
- Quality
- Sharpness
- Exposure
- Date Stamp



Main Menu 1

- Date/Time
- Auto Power Off
- Language
- Frequency
- Format
- Default Setting
- Version

Main Menu 2

+ Use the Navigation button to scroll through the menu choices.
+ Press the Shutter Trigger to select. Press the Menu button to return to the Main Screen Interface.

RESOLUTION

+ Select a resolution setting for the still images you capture.

+ Your choices are:

▪ TRUE: 640 x 480, 1280 x 960, 1920 x 1080, 2048 x 1536

▪ INTERPOLATED: 2048 x 1536, 2592 x 1944, 3264 x 2448, 3648 x 2736, 4032 x 3024, 4640 x 3480, 5200 x 3900

TIME-LAPSE CAPTURE

+ Your MicroDirect allows you to capture images over a defined time period. This is referred to as Time-Lapse.

+ You will first select the number of still images or **Lapse Num** you want your device to take. This can range from 2 to 999 images.

+ Use the Navigation button to scroll through the numbers from 0 to 9. When satisfied with the first digit, press the Shutter Trigger to jump to the next digit.

+ Again, using the Navigation button, set that digit.

+ Once you've chosen how many images to capture, press the Shutter Trigger to move to the **Lapse Time** setting.

+ The Lapse Time determines the amount of time that will pass between each still image capture.

+ Set these numbers using the same method as above for the Lapse Num.

+ The choices are in seconds and range from 1 second to 999 seconds.

+ This, along with the number of images, will determine your overall length of time for your time lapse.

+ For example: If you choose to take 999 total images and the interval between each is 999 seconds you will have 277 hours documented. 999 seconds = 16.65 minutes. Multiply that by 999 (images) = 16,633.35 minutes. 16,633.35 / 60 (minutes per hour) = 277 hours or 11.55 days of documentation.

+ Once you have set your number of images and interval, press the Shutter Trigger/OK button to confirm.

+ Press the Menu button to return to the streaming image.

+ Press the Shutter trigger button to start the time lapse.

+ Once all frames have been taken in Time Lapse mode, the microscope will revert back to the normal preview mode.

NOTE: The AUTO POWER OFF time needs to be set to a number higher than the set Time Lapse time. See the section on AUTO POWER OFF and make sure to do your calculations correctly.

QUALITY

+ Once in the Image Quality section of the Settings menu, scroll using the Down button and select: Fine, Normal or Economy.
+ The Image Quality will determine the compression ratio of the image.
+ Once you are satisfied with your Image Quality selection, press the Shutter Trigger to confirm.

SHARPNESS

+ Use this setting to adjust image sharpness. Available options are Strong, Normal, and Soft.

EXPOSURE (BRIGHTNESS)

+ Select the target value by pressing the Navigation button.
+ Confirm your choice by pressing the Shutter Trigger.

DATE STAMP

+ Choose to have the date stamp display.
  1. Off
  2. Date only
  3. Date/Time

DATE/TIME (MAIN MENU 2)

+ Select the target value by pressing the Navigation button.
+ Confirm your choice by pressing the Shutter Trigger.

AUTO POWER OFF

+ Set the unit to turn off automatically after a period of inactivity.

1. OFF (Default): The device remains on until turned off manually.
2. 3 minutes: Turns off after 3 minutes of inactivity.
3. 5 minutes: Turns off after 5 minutes of inactivity.
4. 10 minutes: Turns off after 10 minutes of inactivity.

LANGUAGE

+ Choose your preferred language.

The choices are:

1. English
2. German
3. Spanish
4. Russian
5. Italian
6. French
7. Portuguese
8. Dutch
9. Polish
10. Japanese
11. Korean
12. Chinese

FREQUENCY

+ Set the refresh rate to match local electrical standards and reduce image flicker.

  1. 50 Hz (Default): Used in the United States.

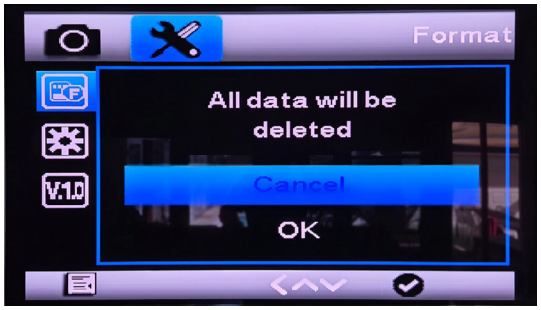
  2. 60 Hz: Used in many other countries.

NOTE: Select the setting that matches your country's electrical frequency to ensure proper image performance.

FORMAT

+ Use this option to reformat the MicroSD card.

WARNING: Reformatting erases all files and data stored on the MicroSD card.



DEFAULT SETTING

+ Reset all the system settings back to default.

VERSION

+ Here you will see the latest version information for your firmware. You will not need this information unless it is requested by our Technical Support team.

5. USING THE PC SOFTWARE

+ The Celestron Labs Digital MicroDirect Microscope is optimized for use directly with a display or projector, but it can also be used with a Windows-based PC.

NOTE: The 44316 Celestron Labs MicroDirect 1080p Handheld Microscope is not compatible with Mac systems.

DOWNLOAD THE SOFTWARE

A. Visit the product page at **celestron.com**. Under **Support & Downloads**, download the Celestron Labs Digital Imaging Software.

B. After the software finishes downloading, connect your MicroDirect microscope to your PC using the USB-C cable only.

C. Launch the software.

D. The software should begin streaming an image from the microscope and display a screen similar to the image shown.

6. USING THE SOFTWARE

1. DEVICE

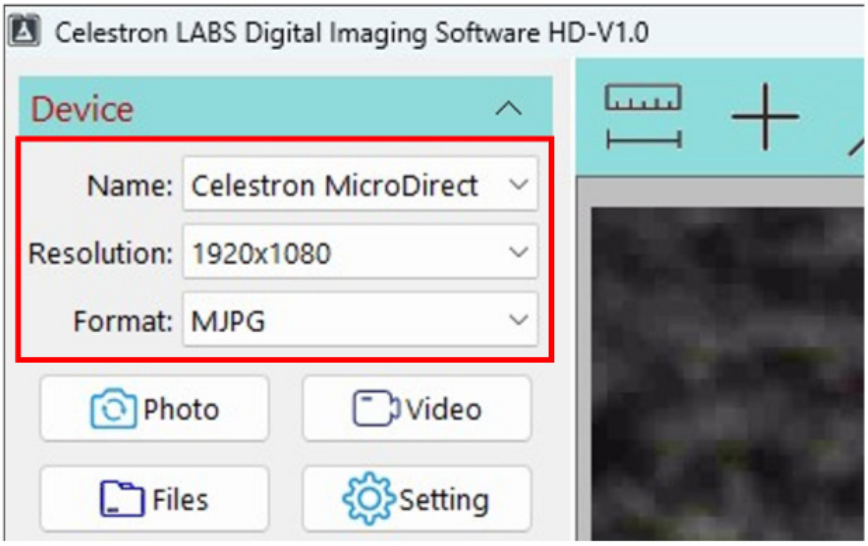
In the upper-left corner of the software interface, you'll find the Device panel. Under this section, you'll see:

A. Name: This indicates which digital microscope is currently connected and streaming. You should see "Celestron MicroDirect Microscope."

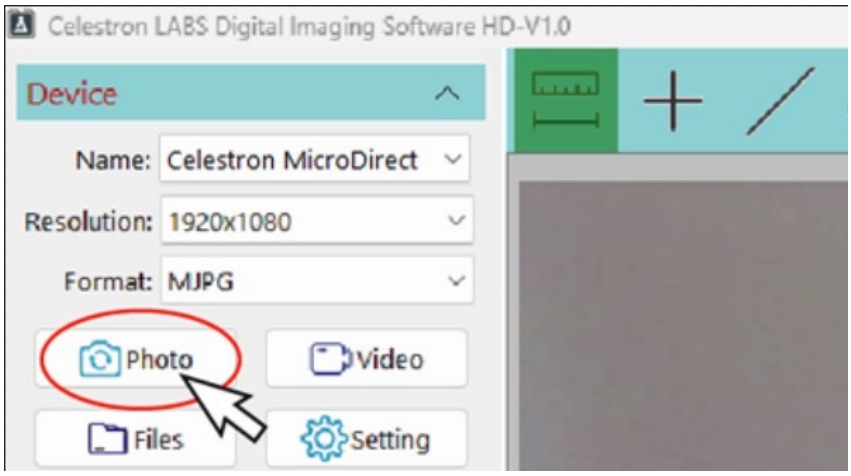
B. Resolution: Here you can change the resolution of your digital microscope (in pixels). The choices are:

1920 x 1080	1280 x 720	800 x 600	640 x 480
1280 x 800	1024 x 768	848 x 480	

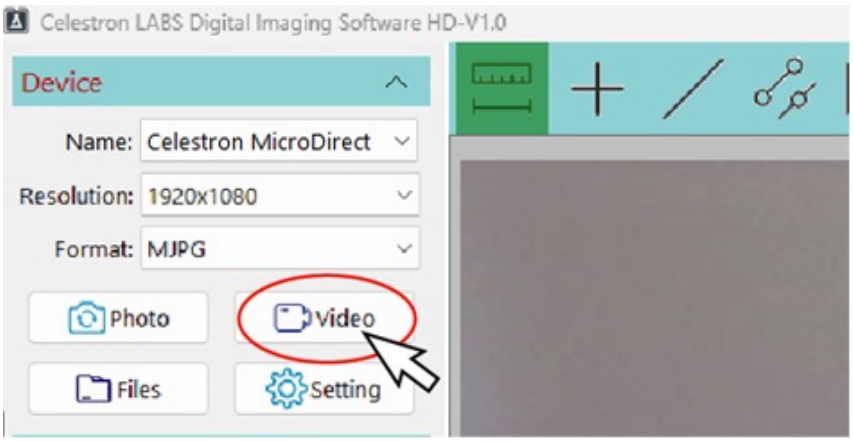
C. Format: Choose from MJPEG or YUYZ format.



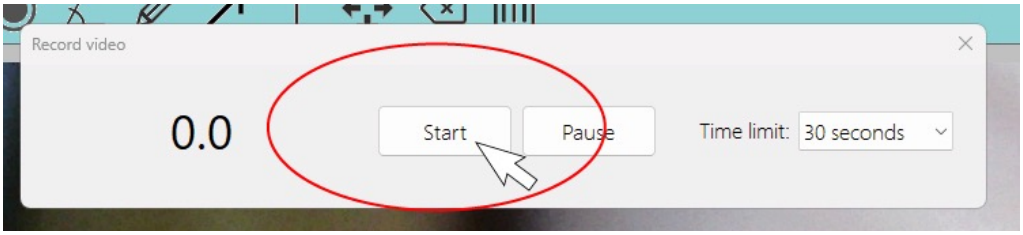
D. Press the **photo icon** to capture a still image.



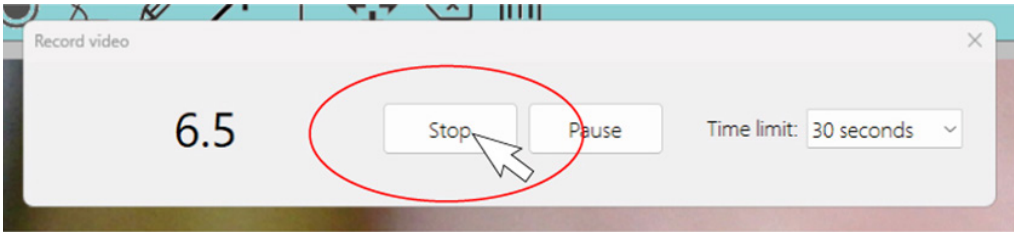
E. Press the **video icon** to open a new window to record video



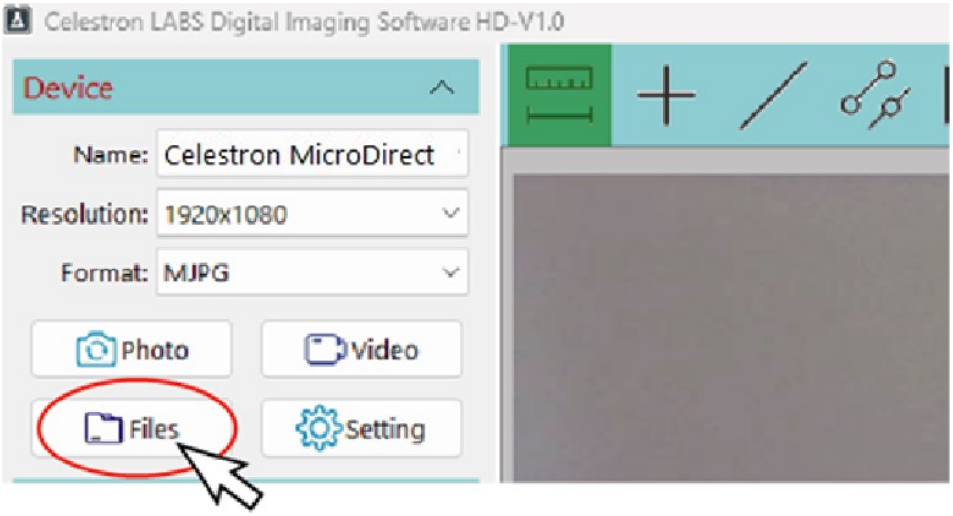
Click “Start” to begin recording.



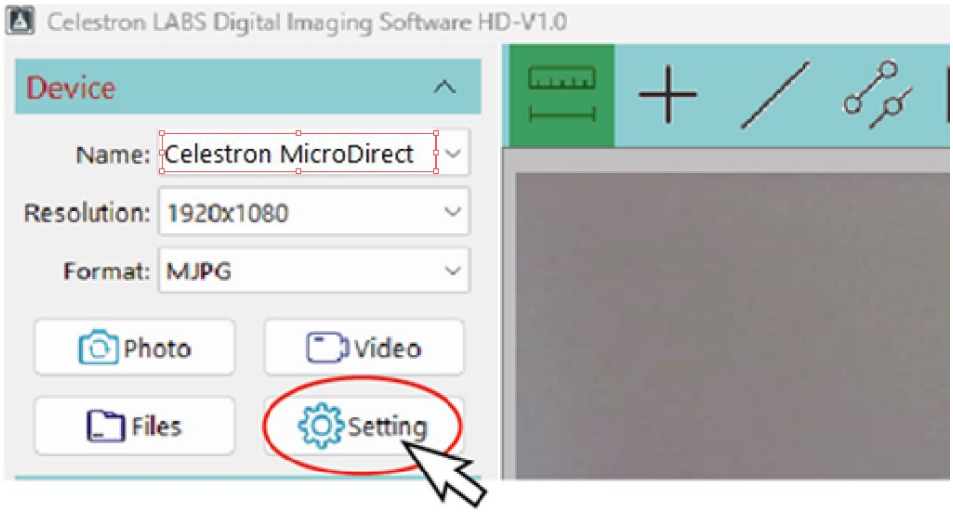
Click “Stop” to stop recording.



F. Files: Click the **files icon** to create folder on your PC to save your images.



G. Click the **settings icon** to open the settings menu.



Under **Settings** you can choose:

i. **Ruler:** Change the ruler's color and line thickness

ii. **Line:** Change color and thickness

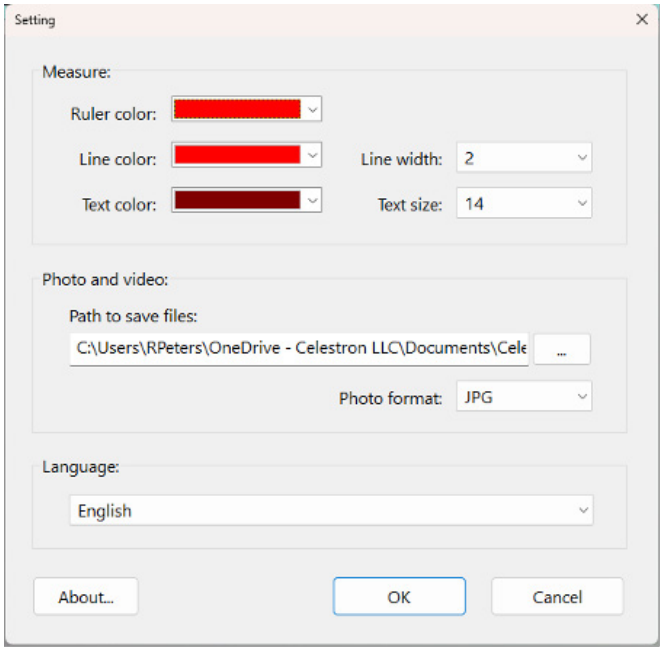
iii. **Text:** Change color and point size

iv. **Path:** Indicate where photos and videos will be saved on your PC

v. **Photo format:** Choose JPEG or PNG

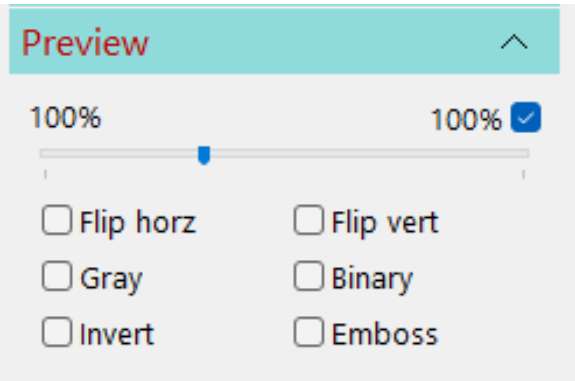
vi. **Language:** Choose from 10 languages: English, French, German, Spanish, Italian, Korean, Russian, Portuguese, Chinese (traditional), Shinese (Mandarin)

vii. **About:** Get information on software version



2. PREVIEW

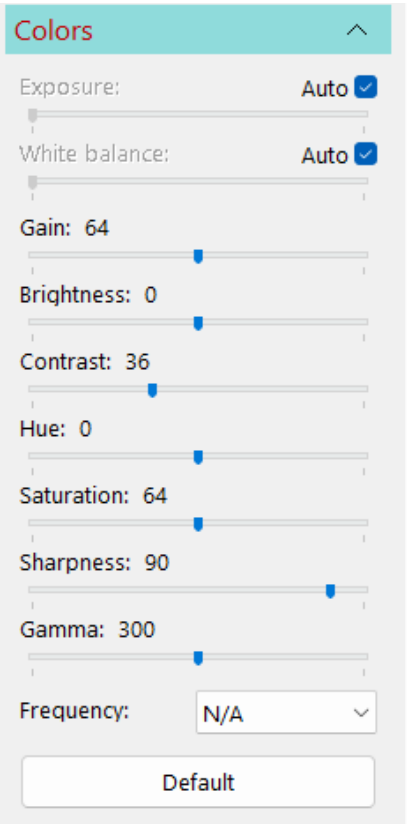
Under the Preview section you can adjust the streaming image size percentage from 50% to 200% and change your streaming image by selecting a filter.



- **Flip horz:** This filter will flip the image horizontally, or left to right.
- **Flip vert:** This filter will flip the image vertically, or top to bottom.
- **Gray:** This filter will remove color and convert the image to grayscale.
- **Binary:** This filter will convert the image to black and white only.
- **Invert:** This filter will create a negative of your streaming image.
- **Emboss:** This filter will create the illusion of 3D.

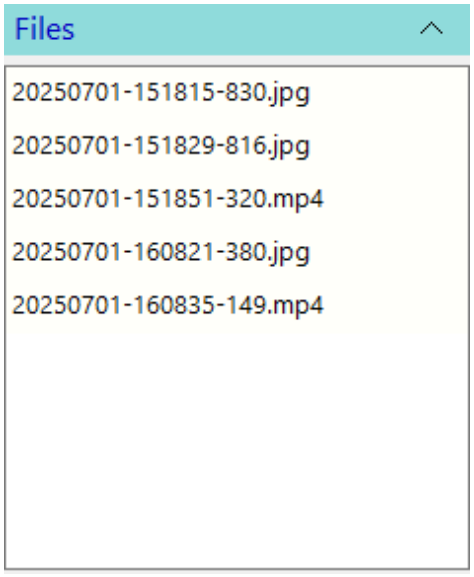
3. COLORS

In the Colors section, you can adjust your camera settings.



4. FILES

The Files section displays the most recently taken images.



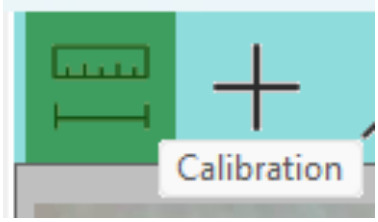
5. TOOLS

The Tools section allow for measuring, marking and note taking. The available tools are:

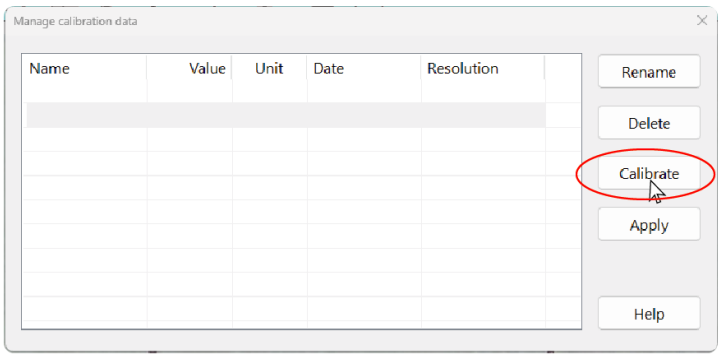
A. Calibration Tool
B. Reticle add or remove
C. Draw a line
D. Draw parallel lines
E. Draw a square or rectangle
F. Draw a circle
G. Draw concentric circles
H. Measure an angle
I. Draw
J. Arrow
K. Text
L. Move
M. Back Button
N. Delete All

A. CALIBRATION

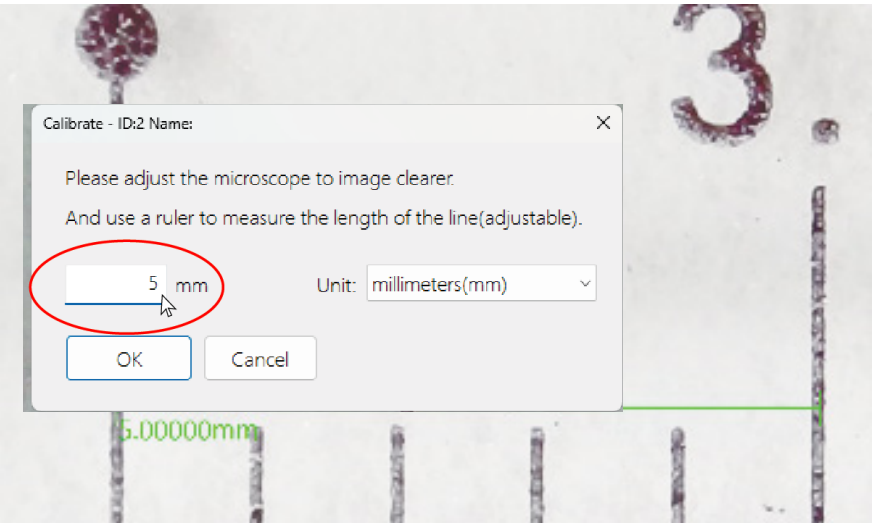
Before you can take accurate measurements, you'll need to calibrate your device. Calibration only works when the microscope stays in a fixed focus position. Using the included calibration ruler, bring the ruler into sharp focus, then follow the steps below.



1. Select the calibration icon in the software.
2. The "Manage calibration data" window will open. In this window, select "calibrate."
3. A line will appear on the streaming window with a small pop-up box. Use your cursor to position the line across a known set of measurement units. In the example below, we are going to use a centimeter ruler and lock in to a distance of 10mm.
4. Once you have set the line, go into the small pop-up menu and enter the exact distance of the line. In the example below, that is 10mm.
5. Click OK, and you will be directed to a new pop-up menu. In this menu, select APPLY to

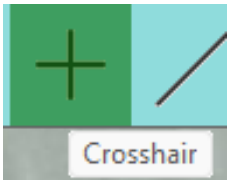


set the calibration. The system is now calibrated. All of the measuring tools will now give measurements based on this calibration setting.

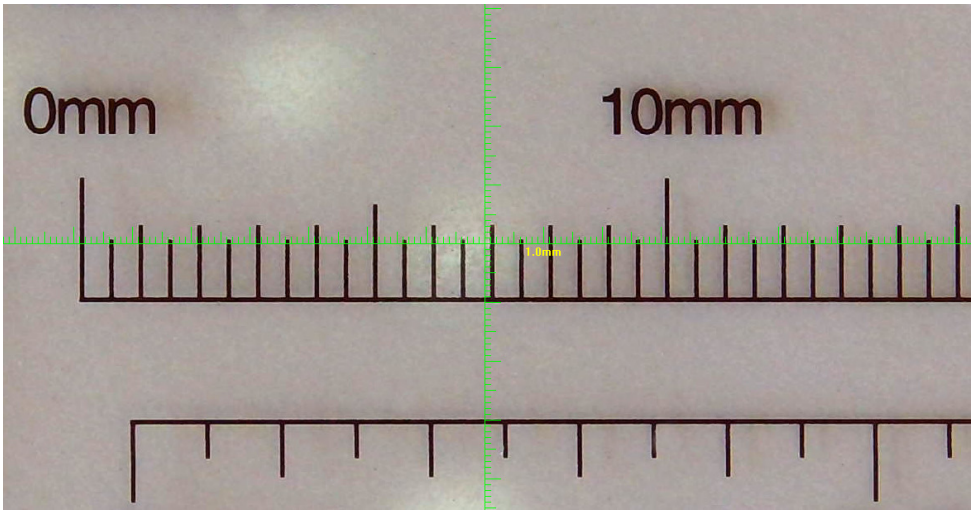


NOTE: If you move the microscope after calibration, your measurements will no longer be accurate. To continue measuring correctly, you'll need to repeat the calibration process.)

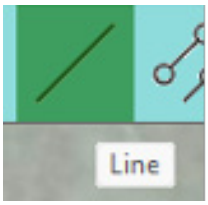
B. RETICLE OR CROSSHAIRS



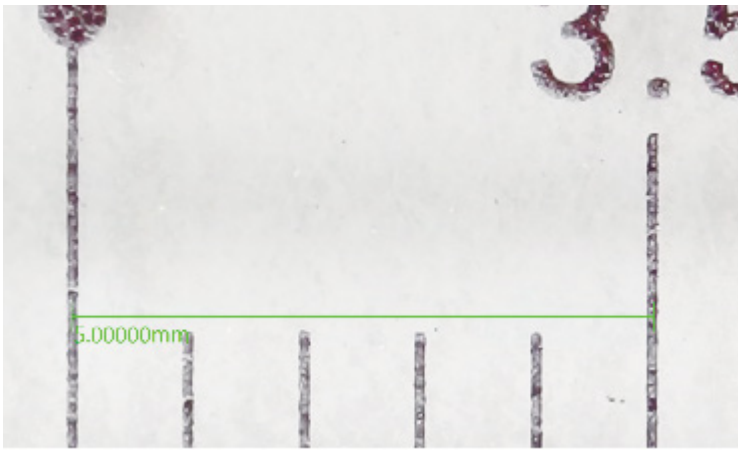
After calibration, a reticle (crosshair) will appear on the screen. Click the Crosshair icon to turn it off, and click it again to turn it back on.



C. DRAW A LINE

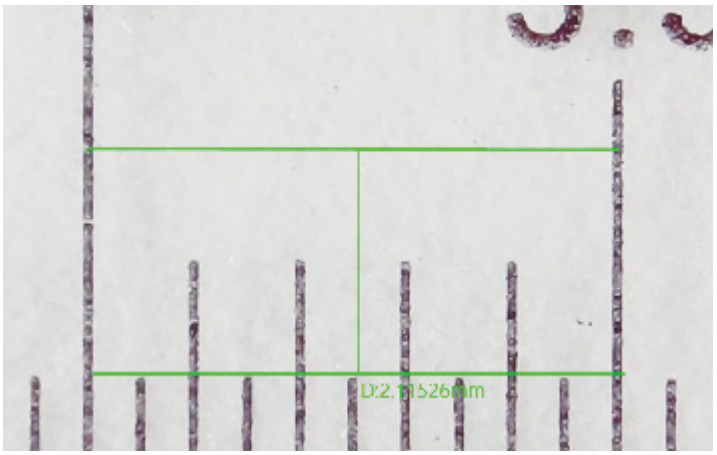


Click this line, then using your cursor, click and hold a point in the streaming image window. Drag to another point and release the cursor. A line will appear with a measurement. If calibration was performed correctly, this should be accurate.

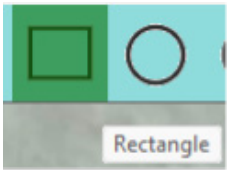


D. DRAW PARALLEL LINES

Similar to the line tool, click, hold, drag, release, and then you will see another line appear. Drag that line to another point on the image. Your display should match the example below. The measurement shown represents the distance between the two parallel lines.

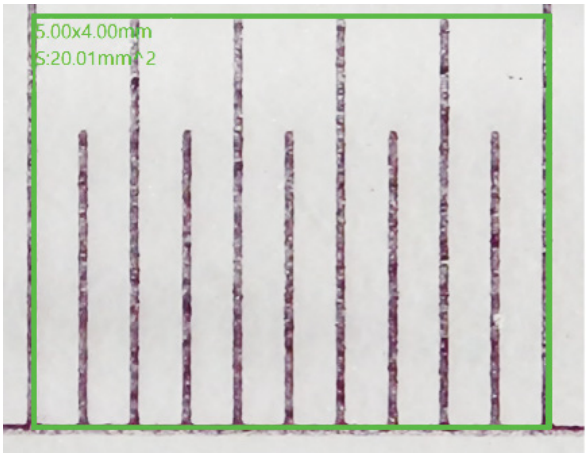


E. DRAW A SQUARE OR RECTANGLE

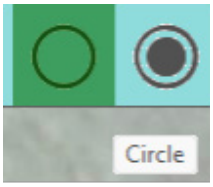


Similar to the previous tools, click, hold drag, and release to create a four-sided shape (rectangle or square). The dimensions displayed will be the width, height, and area—displayed in the unit of measure you chose. In this example, it is mm. (5mm x 4mm=20mm2).

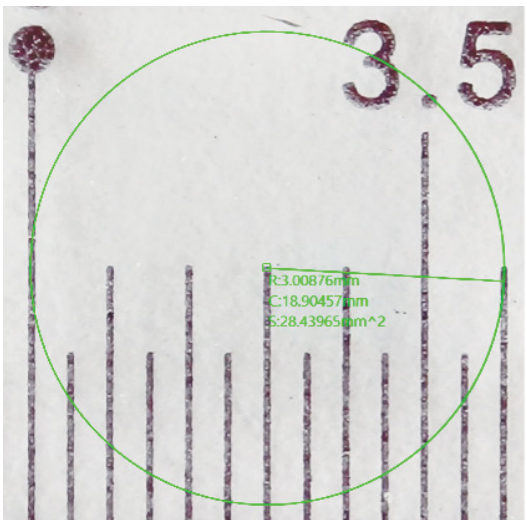
NOTE: When drawing a square or rectangle, you always start with the upper corner and then drag down to the left or right.



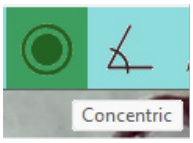
F. DRAW A CIRCLE



Using your cursor, click and hold on the screen, then drag to the left or downward to set the size of the circle. When using the circle tool, remember that your first click marks the center of the circle. The software will then display the circle's radius, circumference, and area.

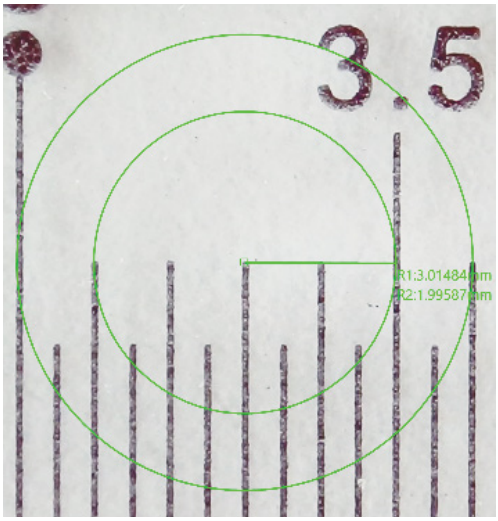


G. DRAW CONCENTRIC CIRCLES

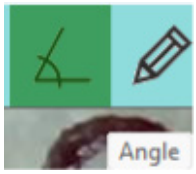


This tool works the same way as the Circle tool but lets you measure the radii of two concentric circles. Click to set the center, drag and release for the first circle, then drag and click again to set the second.

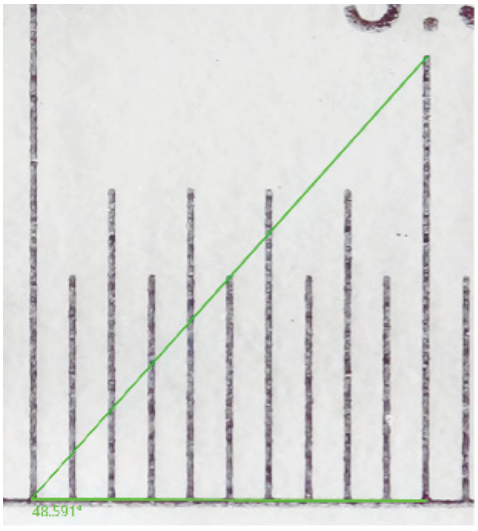
NOTE: This tool reports only the radius of each circle. It does not calculate circumference or area.



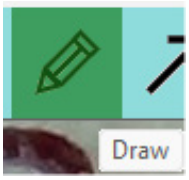
H. MEASURE AN ANGLE



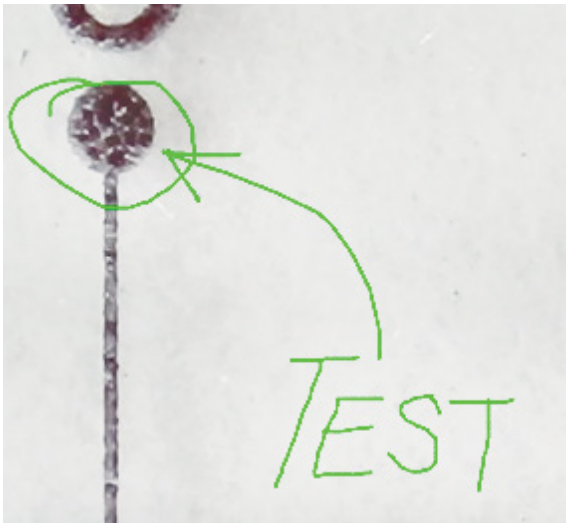
Click, hold, and drag from the vertex of the angle you want to measure. Release once you've drawn the first side. When you let go, the second side of the angle appears and follows your cursor. Move your cursor to align this side with the image, then click to set it. The displayed value is the angle in degrees.



I. DRAW

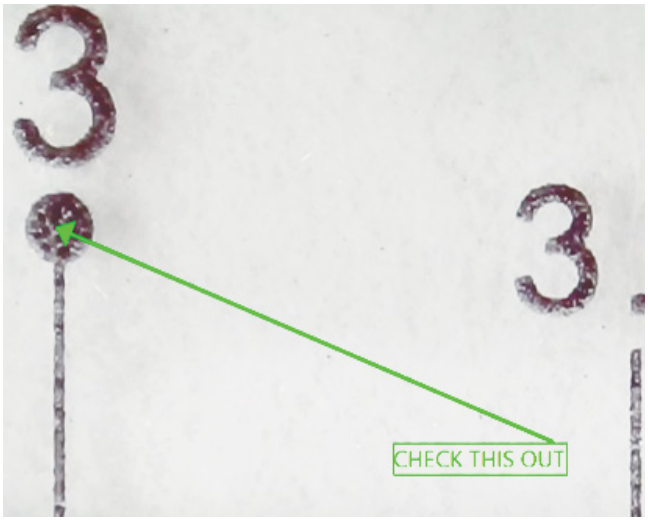


Click and hold to draw with your cursor. Take notes or freehand draw anything on the streaming image.



J. ARROW

Like the line tool, the arrow tool lets you point out features in your image. Just click, hold, and drag with your cursor to place the arrow.



K. TEXT

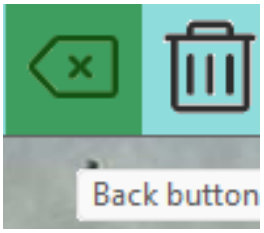
Click anywhere on the screen with your cursor and a text box will appear in a pop-up window. Type your note, then click the text box that appears on your image to select it. You can drag it anywhere you like on the screen.

L.. MOVE

This tool allows you to move the streaming image up and down or side to side.

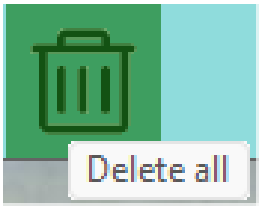
M. BACK BUTTON

The back button will delete your last action.



N. DELETE ALL

Clicking this button removes all marks, text, measurements, etc., from the streaming screen.



7. CARE AND MAINTENANCE

Your Celestron Labs Digital MicroDirect Microscope is a precision optical instrument and should be handled with care. Follow these guidelines to keep it performing well for years:

+ Store the microscope in a clean, dry place.
+ Never use the microscope in locations where electronic devices are restricted. Improper use may lead to serious accidents.
+ Operate the microscope only within the 23° to 120°F (-5° to 50°C) temperature range. Avoid sudden temperature changes, which can cause moisture to form inside the housing.
+ Do not attempt to access or modify the internal components. Maintenance and repairs should only be performed by authorized technicians.
+ Keep the microscope away from water and other liquids. Do not use it in rain or snow, as moisture can cause fire hazards or electric shock.
+ To clean the exterior, wipe it gently with a slightly damp cloth.

8. WARRANTY

Your Celestron Labs Digital MicroDirect Microscope has a two-year limited warranty. Please visit **celestron.com** for more details.

WARRANTY 2 YEAR

www.celestron.com/pages/warranty

FCC NOTICE: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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NEED ASSISTANCE? Contact Celestron Technical Support
celestron.com/pages/technical-support

CELESTRON

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Made in China | 03-26

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22 PAP Carta

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