# Um Viewer

## Microscope AP Operation Manual

2023/06/28 Update Ver.3.4

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# 1. Application Program Interface Introduction

Double-click the UM Viewer Application Program (AP), the below window Fig 1-1 will show up. The interface is divided into center preview window and four groups, Main Toolbar, Main Function Button, the File List/Folder and Sub Program. The button will show the status if microscope is connected to AP. If connection fails, the button is greyed out, see Fig 1-2.

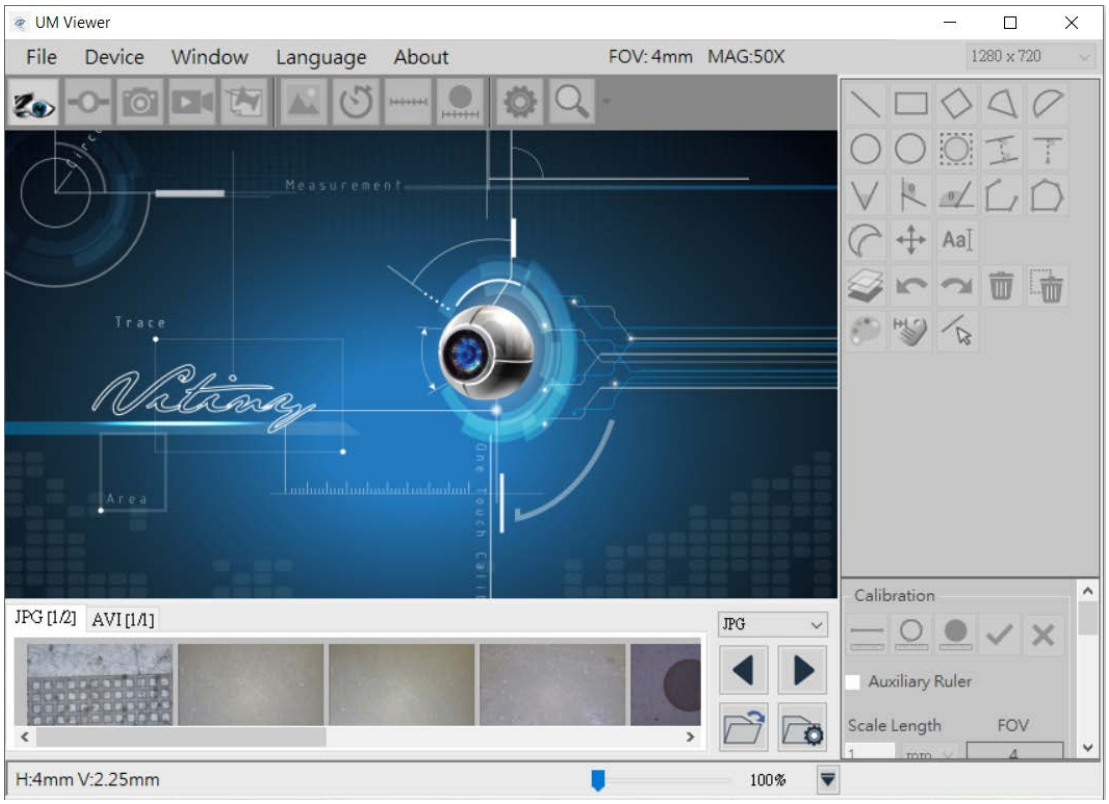



Fig 1-1 AP Interface

Fig 1-2 Connection Button Greyed out

The AP Interface divides into 5 sections, section 1.4 Sub Program will show up when microscope is connected, see Fig 1-6. 5 sections are as following:

## 1.1 Main Toolbar

Main Toolbar includes Files, Device, Window, Language, and About. See Fig 1-3.

Fig 1-3 Main Toolbar

## 1.2 Main Function Button

Main Function buttons includes Connect, Device Control Mode, Capture, Record…etc commonly used functions, see Fig 1-4.

Fig 1-4 Main Function Button

## 1.3 File List/Folder

File List/Folder shows the current saved files in the picture (JPG) and video (AVI) folder. Choose different Tabs to enter folder, see Fig 1-5.

Fig 1-5 File List/Folder

## 1.4 Sub Program

The Sub Program will show up when microsocpe connected to AP. Each area has its own funtion buttons. See Fig 1-6. Press CTRL + F12 to check firmware version. See Fig 1-6.-1

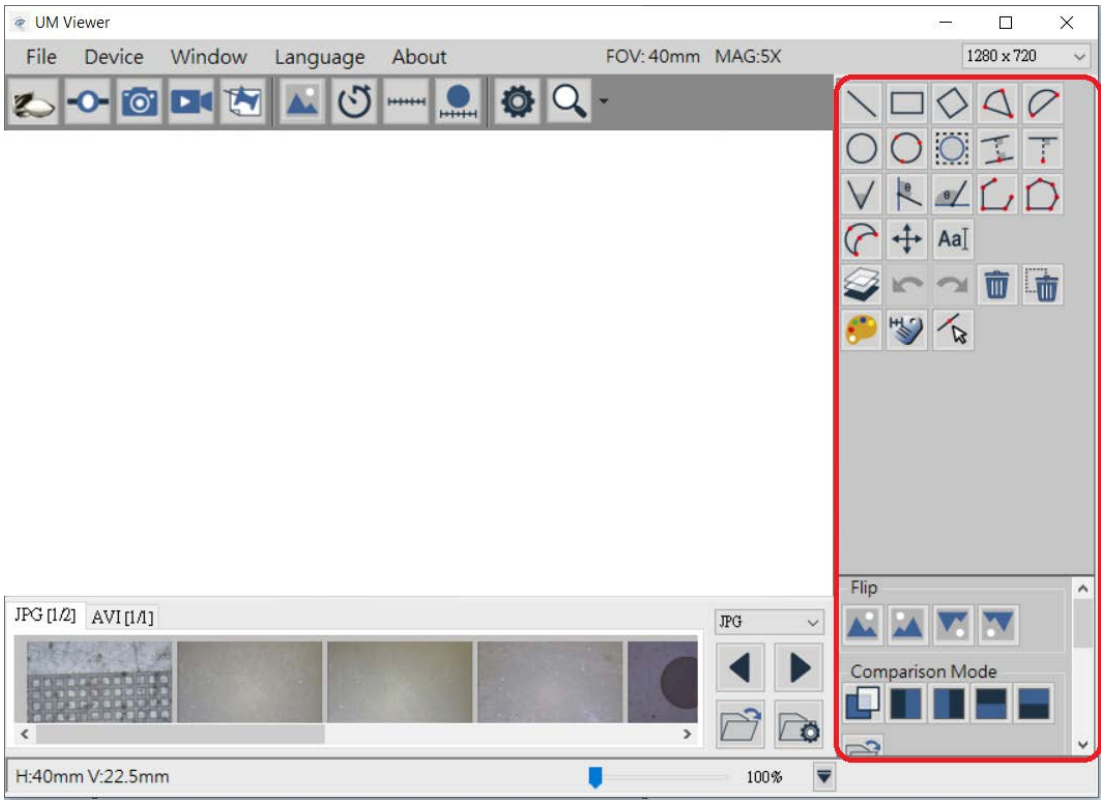



Fig 1-6 Sub Program

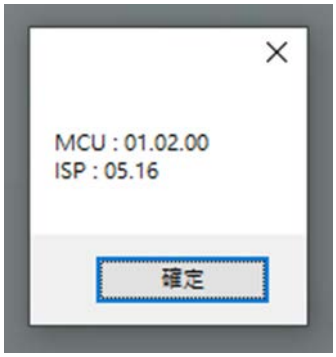



Figure 1-6-1 Device firmware version information

## 1.5 Status

The upper Right Corner shows the current microscope status, such as: Field of View (FOV), Magnification (MAG) and the preview resolution. This status will change whenever microscope change different focus or scale calibrated. The drop-down menu is to switch the preview resolution (Select YUV resolution under USB3.0 ONLY) . See Fig 1-7.

The bottom Red area shows the video record status, the information changes according to the microscope operation. H means Horizontal, V means Vertical of FOV. Additionally, there is pull bar

to enlarge Image, up to Max 400%. Also, hide below data list by icons.

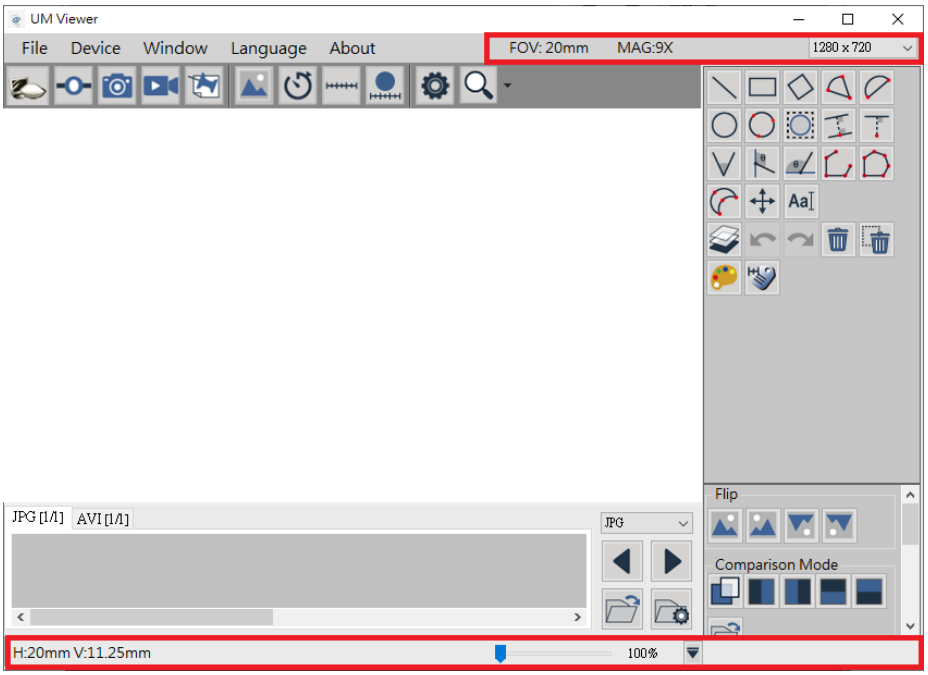



Fig 1-7 Status Information

## 1.6 Lock Function

In avoid of mis-carefully adjust software setting during long term observation or absence from the desk, enable the Lock Function to secure the software settings. Fast key: Ctrl+L Default setting is OFF. See Fig 1-8, See Lock Function “ON” icon on the main toolbar as Fig 1-9.

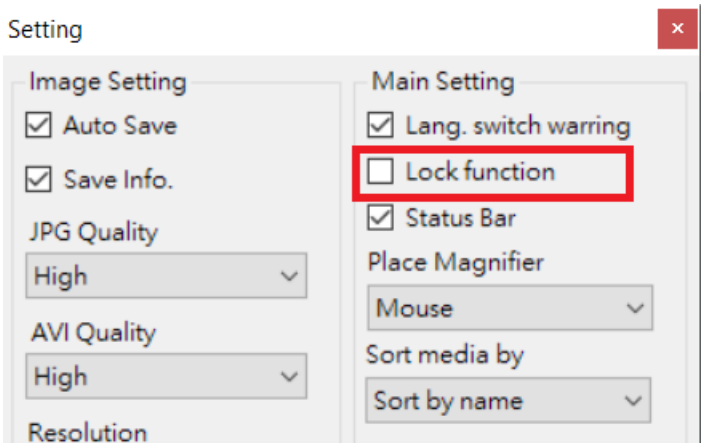



Fig 1-8 Lock Function Setup

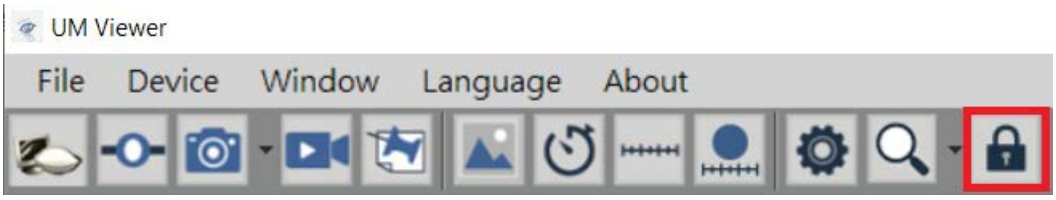



Fig 1-9 Lock Function “ON”

## 1.7 Export Information Settings

Measurement figures can export in CSV or EXCEL file type. See Fig 1-10. Functions from icon left: Return to default path, Open Folder, Change Folder Path. After Setup, click on Export Data icon on Fig 1-11 to export measurement figures to assigned folder. Under Lock Function Setup mode, select Status Bar, the Fig. 1-11-1 will show up the Data while exporting data.

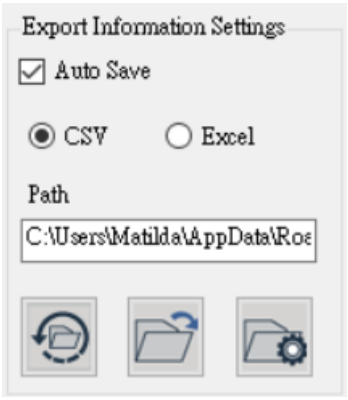



Fig 1-10 Export Information Setup

Fig 1-11 Export Data icon shown on measurement tools.

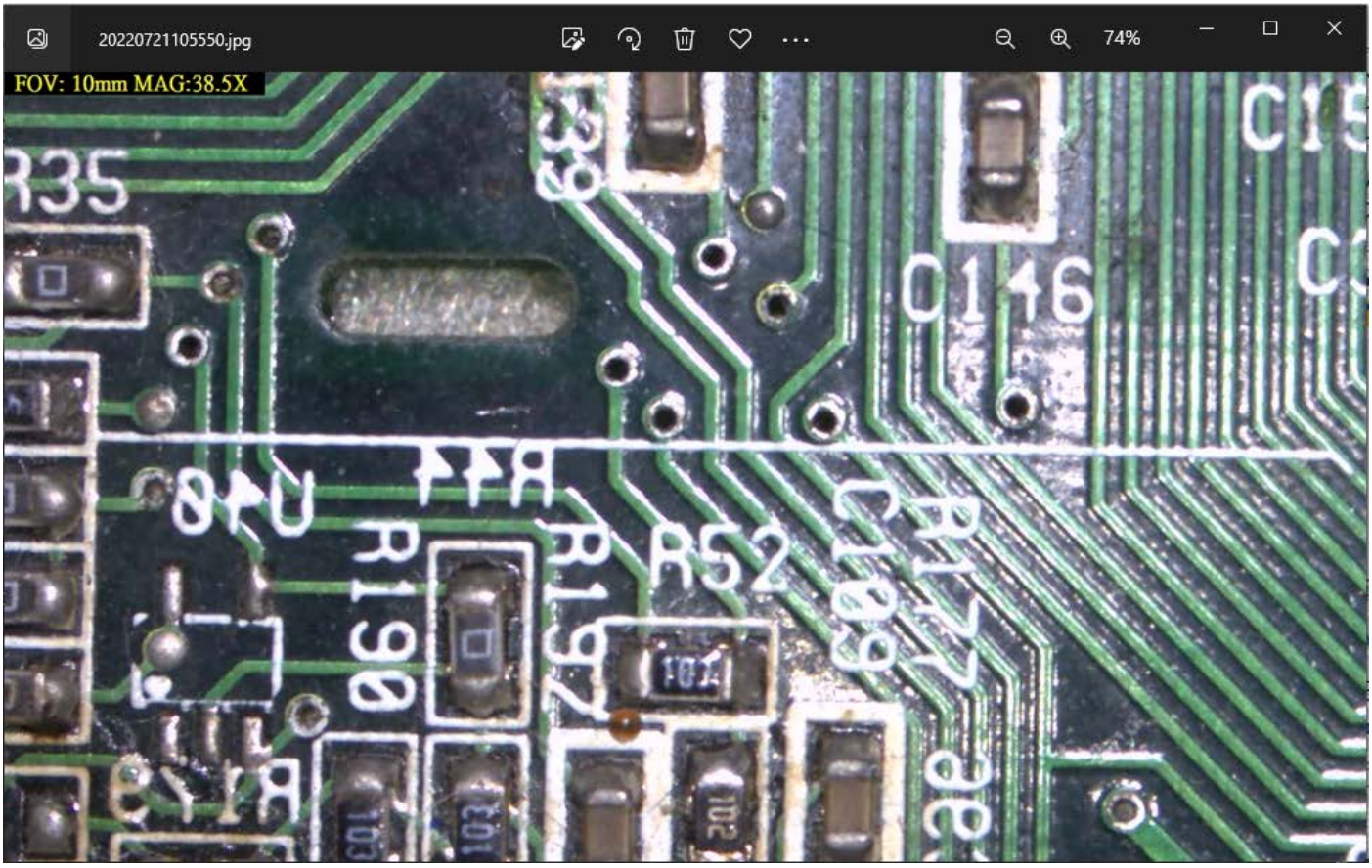



Figure 1-11-1 has the exported picture with the status bar in the upper left corner turned on

# 2. Main Toolbar

Main Toolbar includes File, Device, Window, Language and About.

## 2.1 File

File includes Load Image, Image & Video and its folder location, change folder path. See Fi 2-1. Load Image function is to load the photo taken by microscope to measure or annotate again. If the taken photo already done scale calibration, the software will load the scale, too. When enter Load Image mode, additional icon Fig 2-3 (Save image) or (Leave Load Image) will show on toolbar.

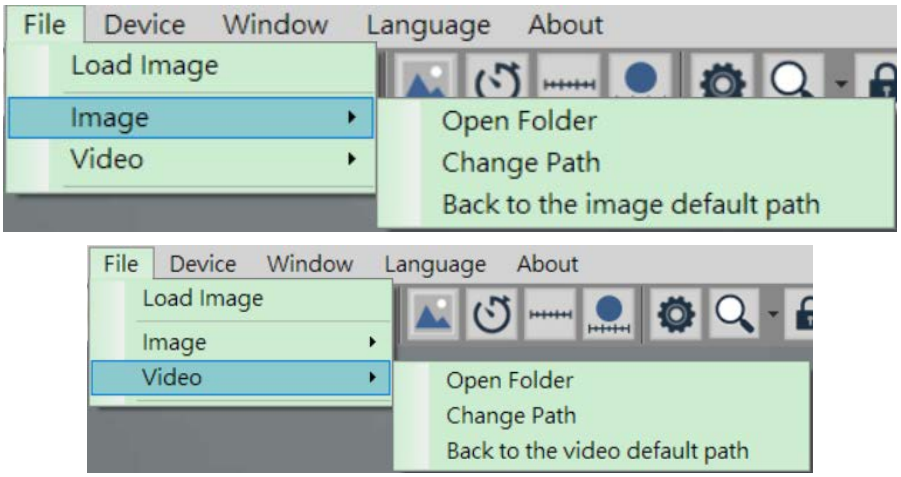



Fig 2-1 Image & Video options

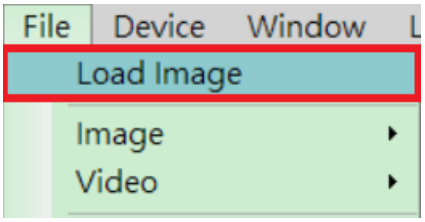



Fig 2-2 Load Image

Fig 2-3 Save Image & Leave button on Toolbar

## 2.2 Device

To choose the microscope model. See Fig 2-4.

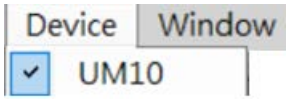



Fig 2-4 Device Option

## 2.3 Window

To Choose the preview window size, the resolution is decided by user's monitor preference setting. If the resolution is 1280x720, the adjustable options is only under 1280x720. (640x360). See Fig 2-5.

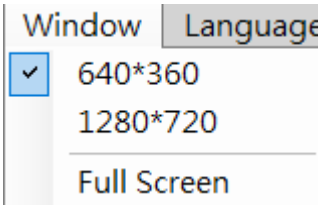



Fig 2-5 Window size

## 2.4 Language

This AP includes multi-languages: English, Chinese, Japanese, Korean…etc. The default language is English, users only need to setup preferable language when first time using this AP. See Fig 2-5.

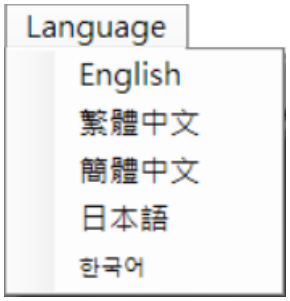



Fig 2-5 Language setup

## 2.5 About

To show the AP information. See Fig. 2-6.

Fig 2-6 About

Show this AP's version and copy right.

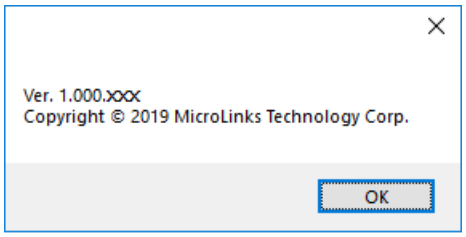



Fig 2-7 Copy Right

# 3. Main Function Button

Main Function Button are commonly used function, which includes Connect, Device Control Mode, Capture, Record… etc functions. Refer to Fig 1-4.

## 3.1 Connect/Disconnect

### 3.1.1 Connect

Click button to start preview. If the connection is failed, please re-plug microscope or change another USB port. See Fig 3-1.

### 3.1.2 Disconnect

Click button to stop preview. See Fig 3-2.

Fig 3-1 Connect

Fig 3-2 Disconnect

## 3.2 Device Control Mode / Disconnect Control Mode

### 3.2.1 Device Control Mode

Click the Device Control Mode button (Fig 3-3) to enable control from PC. If connection is failed, please re-plug the microscope or change another USB port.

### 3.2.2 Disconnect Control Mode

Click to disconnect Device Control Mode. See Fig 3-4.

Fig 3-3 Device Control Mode

Fig 3-4 Disconnect Device Control

### 3.2.3 Device Control Mode

Below Fig 3-5 is the toolbar after enable Deice Control Mode. Fig 3-5 is general toolbar for UM20 Series. Fig 3-5-1 is toolbar for UM22.

Fig 3-5 Enable Device Control Mode for UM20-series

Fig 3-5-1 Enable Device Control Mode for UM22

(1) Focus Menu : There are 3 focus modes and 2 motor reset functions. See Fig 3-6. Focus modes: Manual focus, Single AF, and Continuous AF. Single AF only focus one time, Continuous AF will re-focus when the image is blurry, stop until image is clear. Calibration of initial position is to let motor position return to 0 position, and Motor Reset is to run motor one time and stop at the start position.

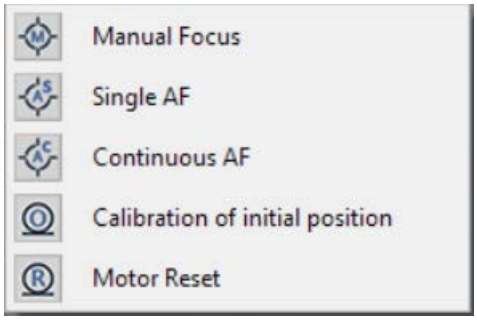
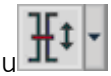



Fig 3-6 Focus Menu

(2) Field of View (FOV) menu  : Below Fig 3-7, 3-7-1 and Fig 3-8 are FOV menu for Object lens 4X /10X & UM22. It shows FOV(Field of View) and WD(Working Distance). Users can select needed FOV or WD to focus. Example 1: In Manual focus mode, select one from needed FOV or WD menu, it will move focus to the chose area but might not clear focus. In this mode, Single AF and Continuous AF focus are both not available. Example 2: In AF mode, in focus mode, select one from needed FOV or WD menu, it will move focus to the chose area and autofocus until image is clear.

- Current Section [AF] ：Search the section based on current position. The focus time is shorter.
- While Area [AF] ：Search focus in whole area. The focus time is longer.

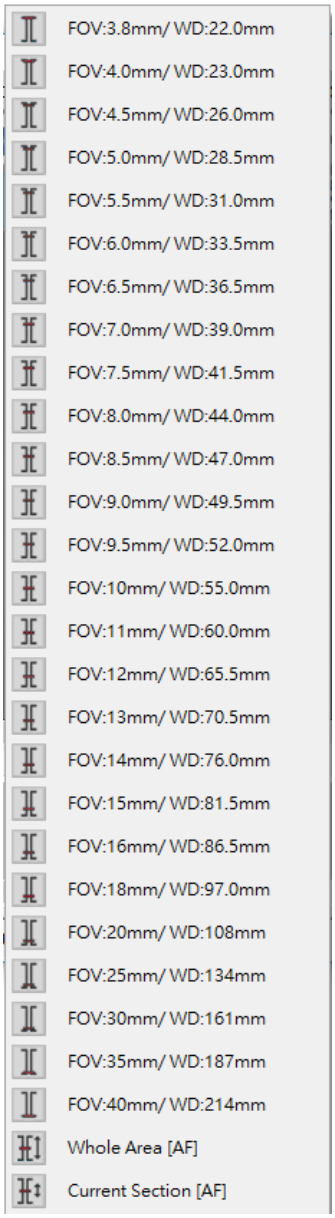



Fig 3-7 4X Lens FOV menu

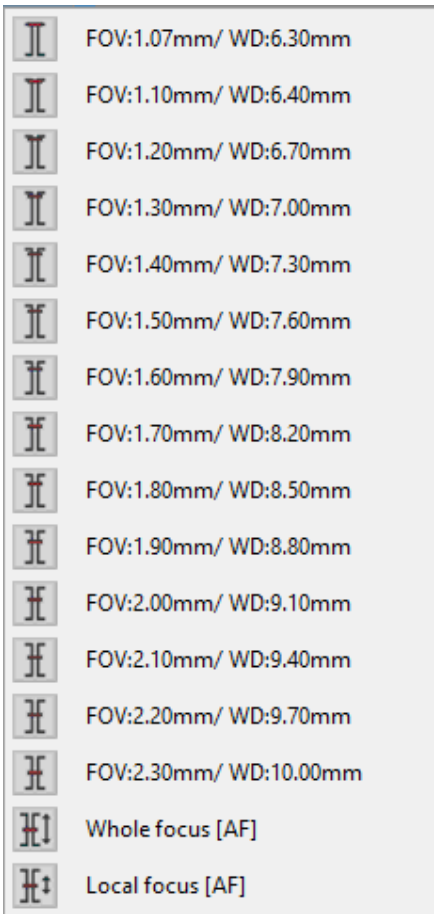



Fig 3-7-1 10X Object Lens FOV menu

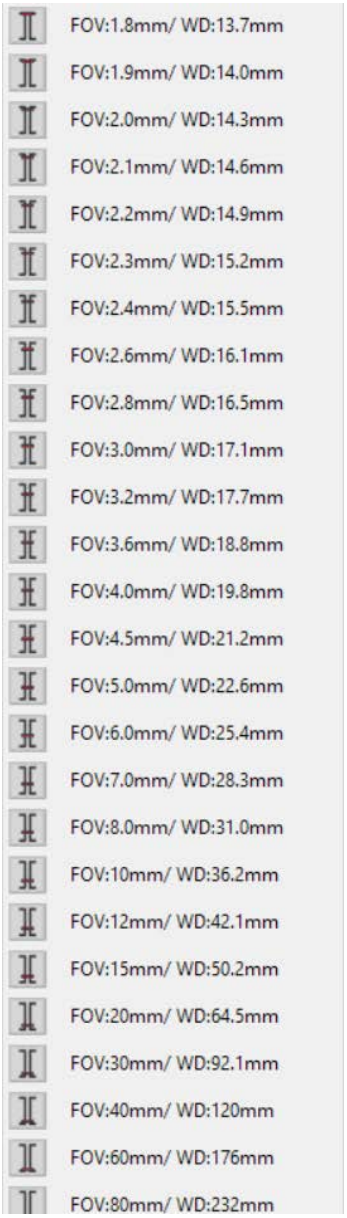



Fig 3-8 UM22 FOV menu

(3) Current Position

：To show the lens position when focus.

(4) Zoom out
：Ascending speed when press zoom out, magnification becomes smaller.

(5) Zoom in
：Ascending speed when press zoom, magnification becomes higher.

(6) Step zoom out
：Step zoom out, magnification becomes smaller.

(7) Step zoom in
：Step zoom in, magnification becomes higher.

(8) LED On
/Off
：When “off”, all LEDs turn off. When “on”, the LED will turn on and the brightness is the same as last time before turn off.

(9) LED Decrease : Decrease the brightness.

(10) LED Level

: Show the current brightness level.

(11) LED Increase : Increase the brightness.

#Function for UM20-Series

(12) EV Decrease : Decrease the brightness.

(13) EV Level

: Show the current exposure level, Fig 3-5 shows current exposure is AUTO.

(14) EV Increase : Increase the brightness.

(15) Remote Control : Click this button to enter Remote Control menu. See Fig 3-9, if the icon is greyed out, means this function does not support this model.

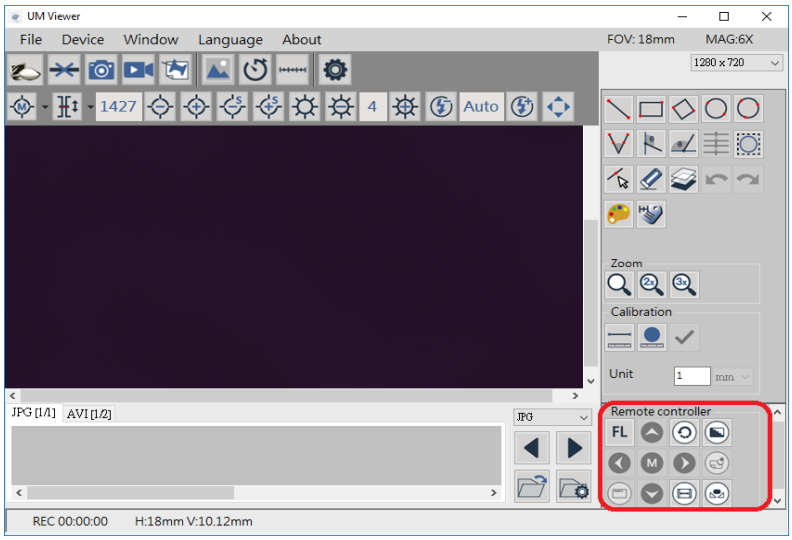



Fig 3-9 Remote Control

#Function for UM22.

(16) LED Mode (UM22): There are 7 segments of LED direction to meet different working distance.

(17) Auto White Balance(UM22) : Calibrate the image color based on the seen white color. Recommend to use the AWB card from package.

## 3.3 Capture

Snapshot icon is as Fig 3-10, image size depends on Video Format source. Captured image will save to default image folder. Users can choose "Auto-Saved" from Capture Setting. Refer to Section 3-9 instruction.

#Function for UM22. Hardware Photo snapshot button. (Fig 3-10-1), is to take 4K resolution (3840*2160p) picture directly and save to default folder.

Fig 3-10 Snapshot

Fig 3-10-1Hardware Photo snapshot (UM22.)

## 3.4 Record

Video Record icon is as Fig 3-11. Video resolution depends on Video Format Source. Recorded Video will save to default video folder.

Fig 3-11 Start and Stop Record

## 3.5 Freeze/Unfreeze

Freeze/Unfreeze icon is as Fig 3-12. Click to freeze the current image, users can do Sub Program or edit image, click again to unfreeze.

Fig 3-12 Freeze/Unfreeze icon

## 3.6 Image Tool

Image Tool toolbar is as Fig 3-13. The toolbar will showed after clicked this button. See Fig 3-14.

Fig 3-13 Image Tool Button

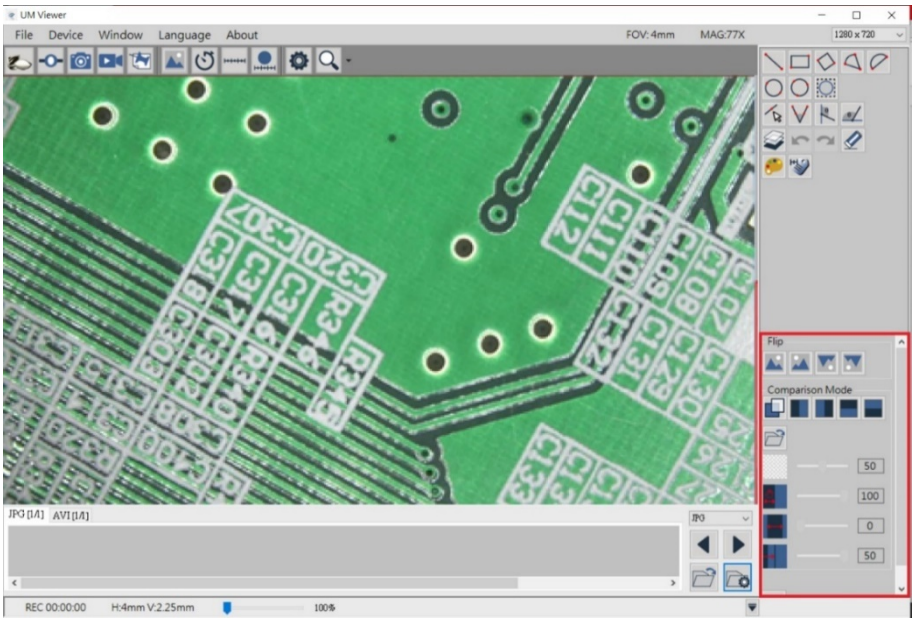



Fig 3-14 Image Tool Function Area

## 3.7 Time Lapse Capture

Time Lapse Capture button is as Fig 3-15. The Time Lapse Function toolbar will show after clicked this button. See Fig 3-16.

Fig 3-15 Time Lapse Capture Button

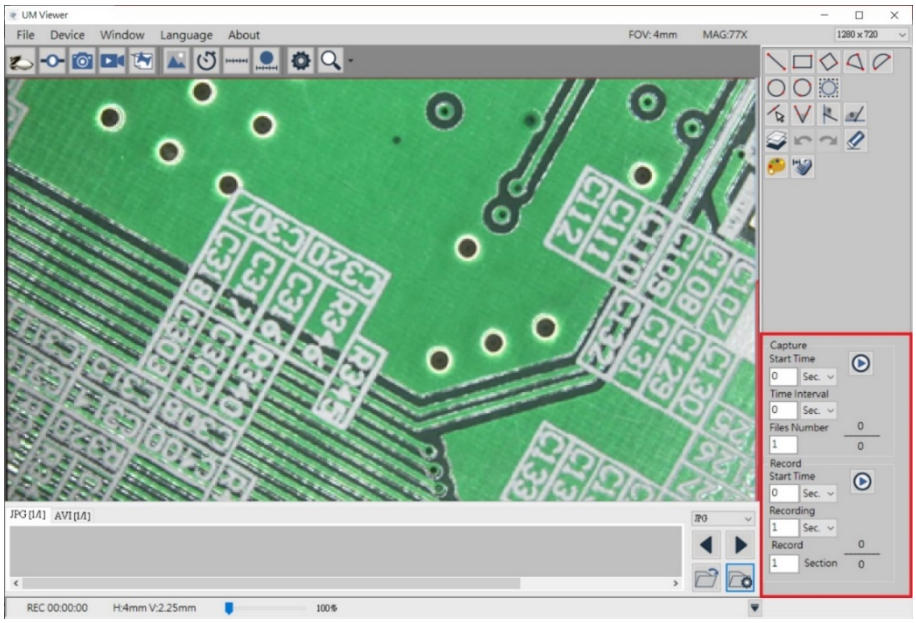



Fig 3-16 Time Lapse Capture Function Area

Figure 3-16-1 The 4K2K of cycle photo only supports UM22

## 3.8 Auxiliary Tool

Auxiliary Tool button is as Fig 3-17. The toolbar will show after clicked this button. See Fig 3-18.

Fig 3-17 Auxiliary Tool Button

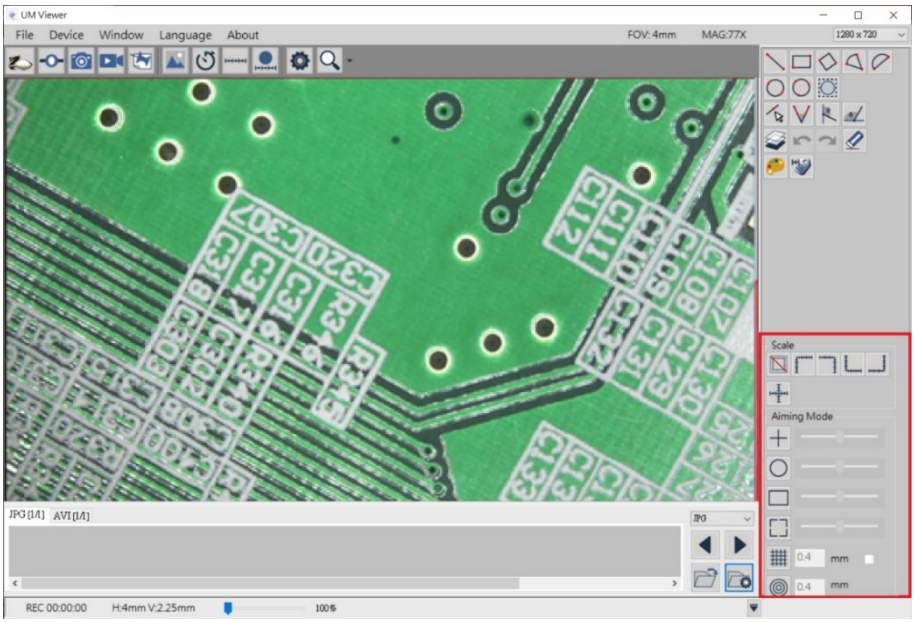



Fig 3-18 Auxiliary Toolbar Function Area

## 3.9 Calibration Tool

Calibration Tool icons as Fig 3-19, click then show calibration icons at right side as Fig. 3-20, 3-21.

Fig. 3-19 Calibration Tool

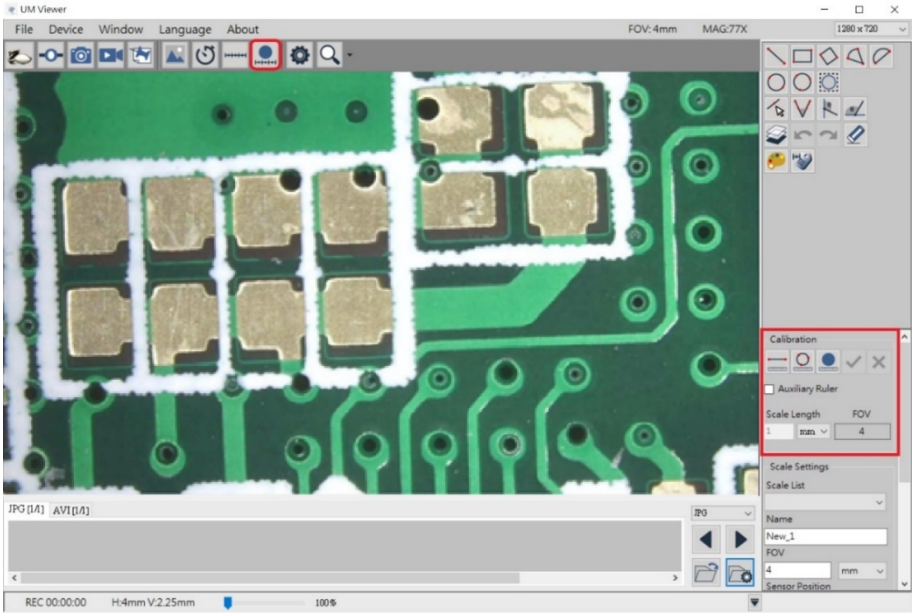



Fig 3-20 Calibration in Calibration Tool

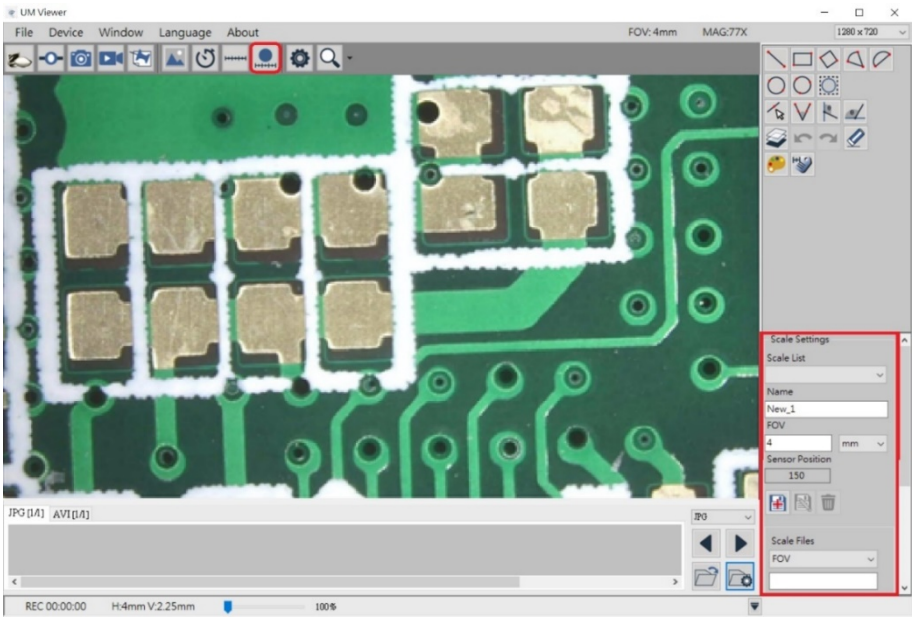
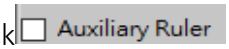



Fig 3-21 Scale Setting in Calibration Tool

(1) Self-Calibration tool ：For precise measurement, it is necessary to do calibration. Firstly click , put the calibration ruler underneath. Draw the same line segment as the actual size, then key the figure in the Scale Length column

(For example: actual size is 5mm, key in 5 only. See Fig. 3-22. The longer line segment is drawn full of the horizontal screen, the more accuracy to the calibration). Finally click to confirm and finish.

In case of cancellation of calibration, click cancel to exit from Scale Length mode.

While calibration, if it requires Auxiliary Ruler, click 

to show auxiliary ruler. In the calibration process, the FOV of Fig. 3-20 will preview the correct FOV accordingly after calibration.

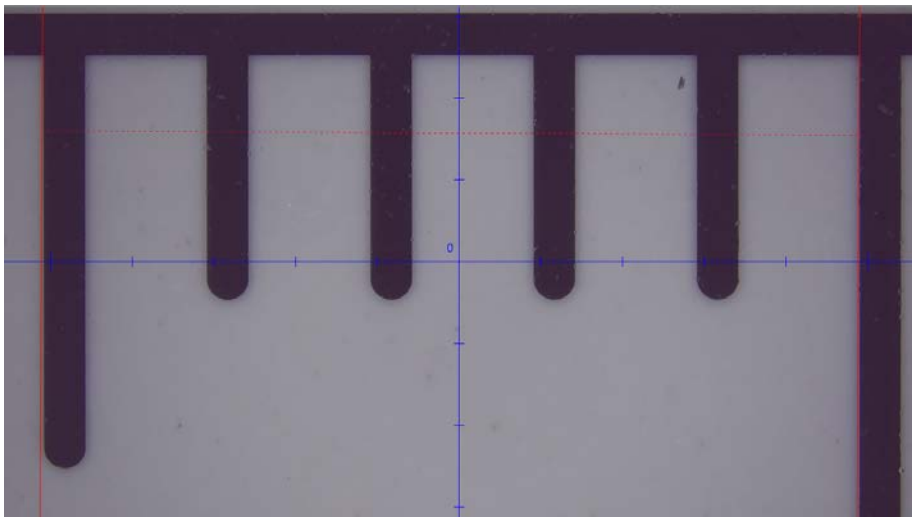


Fig 3-22 Manual Calibration example

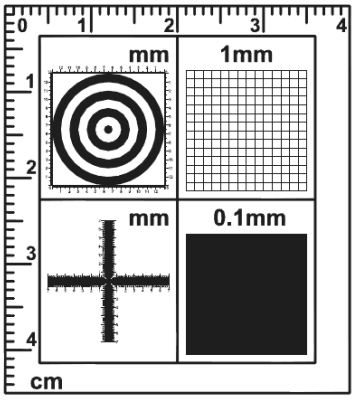



Fig 3-23 Standard Calibrator

Fig 3-23 is the Standard Calibrator. Instruction:

- Left Upper Corner: Concentric Circles, it is to see if the ratio is correct. If Concentric Circles is out of ratio means the screen ratio needs to be corrected. First circle (black dot) diameter is 1 mm, second circle (white space) is 3 mm, third circle (black line) is 5 mm, the forth circle is 7 mm..,etc.
- Right Upper Corner: 1 mm Low Magnification Grid. Low mag Grid is used for calibrate the low magnification, wider field. It can also use to check the ratio, if the square does not form as square means the screen ratio needs to be corrected. The length for each square is 1 mm.
- Left bottom corner: Cross. The main purpose for the Cross is to calibrate the default setting in AP and also to measure. The Cross includes Low & High magnification; it has 3 kinds of units as 0.05 mm, 0.1 mm and 1mm scale. It will measure 0.05 mm, 0.1 mm at high magnification and 0.1 mm, 1 mm at low magnification. The Cross can measure the Length and Width accurately,
- Right bottom corner: 0.1 mm High Magnification Grid. High Magnification grid is used for observing tiny object. The Length of in a square is 0.1 mm.

(2) Auto-Calibration Tool: For precise measurement, it is necessary to do calibration. First, put the calibration ruler underneath (The circle ruler must be inside the preview window. The full size the better). Click to automatically detect the cirecle, see Fig 3-24. Then key in the detected diameter in the Scale Length column

(For example: detected diameter size is 5mm, key in 5 only.) If the detecting line fits the circle ruler, click to confirm and finish, see Fig 3-25. In case of cancellation of calibration, click to exit from Auto-Calibration mode.

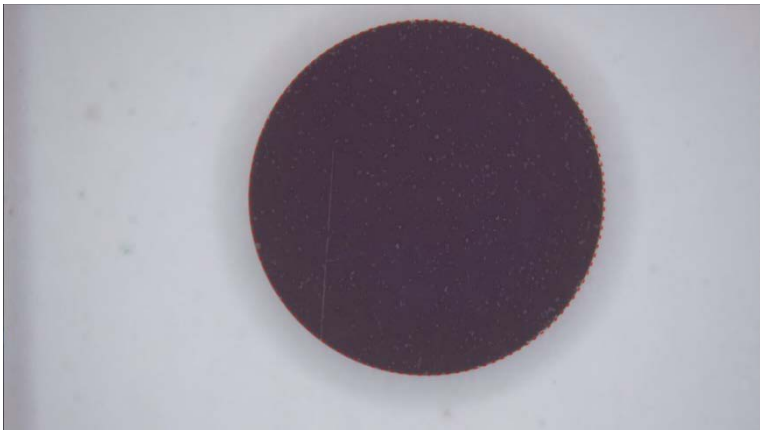


Fig 3-24 Dotted line fits the Solid Circle Edge Example

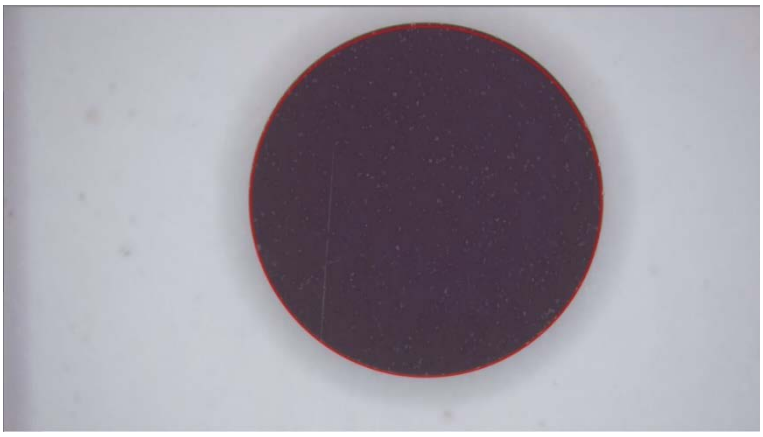


Fig 3-25 Auto- Calibration Done Example

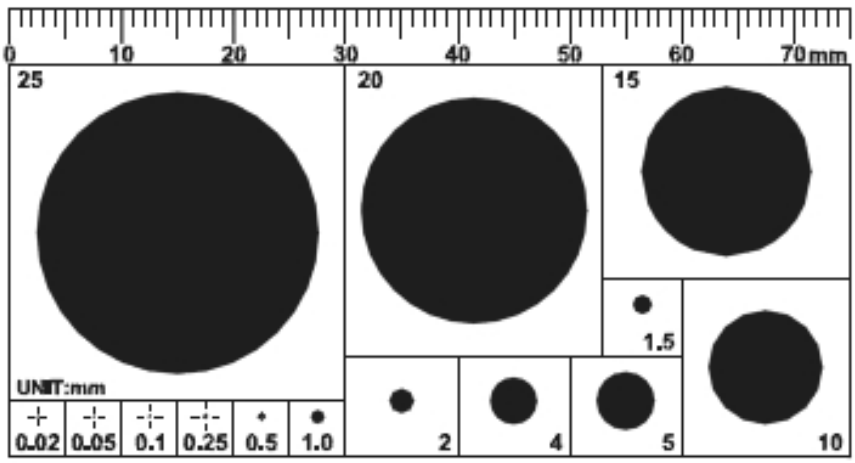



Fig 3-26 Solid Circle Calibrator

Fig 3-26 is the Solid Circle Calibrator (optional accessory). The unit is in mm. The upper Scale can be used for length measurement or manual-calibration. The other size of solid circle is used for auto-calibration. The more full size of solid circle can see on preview window, the higher accuracy it can be.

(3) Scale Setting: See Fig 3-21. The setting and function as following:

- Sales List: Choose from “Scale Files”, the drop down menu will list all files which saved in this PC. If Device Control Mode is enabled, choose any from the saved file, the device will move the sensor to saved position. Manually adjust stand height

until clear image is seen. The measure function can begin.

- Name: Show the current File name. Or the new create file & modification needed file.
- FOV: the FOV data after auto-calibrated or manual-calibrated.
- Sensor Position: Show the current Sensor position.
- Create New Scale : Create new scale file after scale calibrated.
- Edit : Click Edit to change file name of FOV data.
- Delete : Click Delete to delete the chosen FOV File.

(4) Scale Setting: UM Viewer can also connect to different models, or change different lens. In this condition, the default Scale file is not suitable for above situation. User needs to export the original FOV Data Files and import new (correct) FOV Data. Below Fig 3-21 is the function introduction.

- Scale List: Select the Scale file. When file is selected, the FOV data will renew automatically.
- Create New Scale : After click, please key in name and confirm to save file.

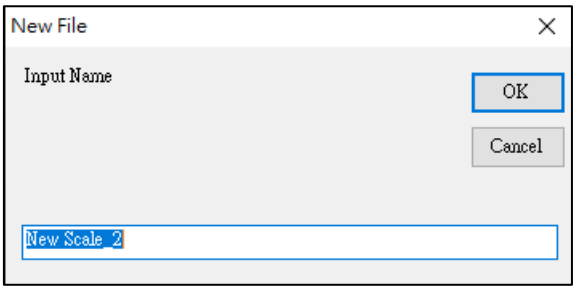



Fig 3-27 Create New Scale

- Import File : Import Scale Files. List will refresh after imported.
- Export File : Export Scale Files.
- Open FOV Folder : Open the Scale File Folder.

## 3.10 Capture Setting

Capture Setting button is as Fig 3-28. Clicked to see Fig 3-29. Users can setup Auto-Saved to save every captured Image. If the Auto-Saved is not checked, AP will require users to choose saving path every time. Users can setup Save Info to save measurement information on the image or video. The image needs compressed to save to Jpg file, JPG Quality is to setup the saved image quality. PNG format is the original image.

Fig 3-28 Capture Setting Button

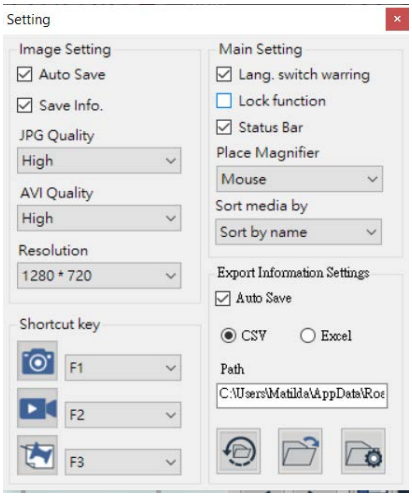



Fig 3-29 Capture Setting

## 3.11 Magnifier:

Help to locate the edge of measuring object including several subsidiary magnifiers.

See Fig 3-30 and 3-31.

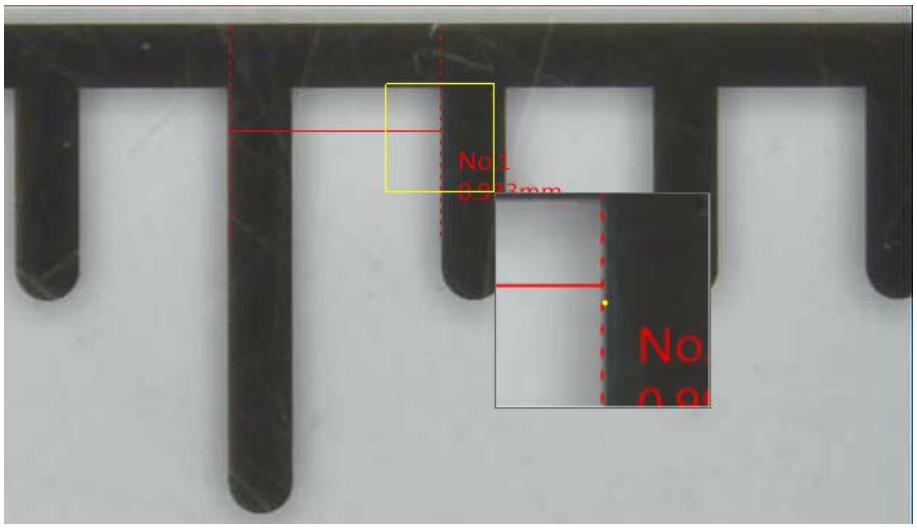



Fig. 3-30 Before applying 3x subsidiary magnify

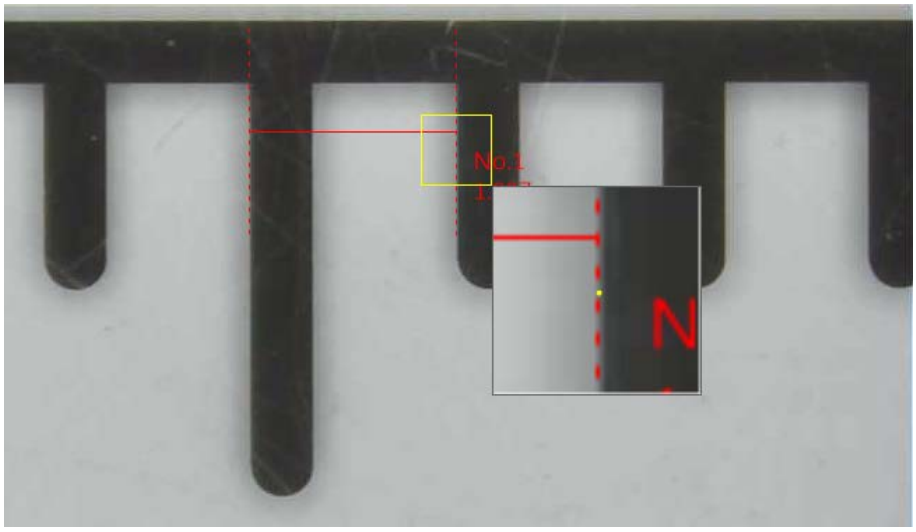



Fig.3-31 After applying 3x subsidiary magnify

# 4. File List/Folder

The File List/Folder Tabs is as Fig 1-5. It shows the current files, select the folder to show the saved files into folder list.

## 4.1 The File List Tab

Fig 4-1 is the tab for the photo and video files. There are 3 photo types : JPG, PNG and BMP. Video is AVI. The tab only show one photo type/ AVI video. Select photo type to see different tabs such as JPG/AVI, PNG/AVI or BMP/AVI. The review photo on the list only show the certain file type, i.e.: JPG file list only show .jpg format photos. Fig 4-4 is to choose shown type. The tables change as fig 4-1-4-3.

Fig 4-1 JPG / AVI file list Tab

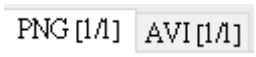



Fig 4-2 PNG / AVI file list Tab

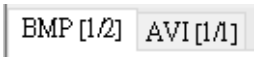



Fig 4-3 BMP/ AVI list Tab

### 4.1.1 Display of pages

Fig 4-1 [1/1] =X/Y, X is sequence and Y is total number of pages. Each page can show 10 files.

## 4.2 Select File type and pages

Fig 4-3 is to select image file type from the drop-down menu. The file type and function are as Fig 4-3. If the file type is AVI, the drop-down menu does not show the JPG/ PNG file. If choose AVI file, no dropdown selection menu.

Fig 4-4 Select File Type

### 4.2.1 Change Page

Fig 4-3, the Left Key and Right Key to change page numbers. Left key is last page, Right key is next page.

### 4.2.2 File Path

Fig 4-3, Open File , is to open the current saving folder. If user want to change the saving path, click Change Path to change to desired folder. Select desired folder from Fig 4-4.

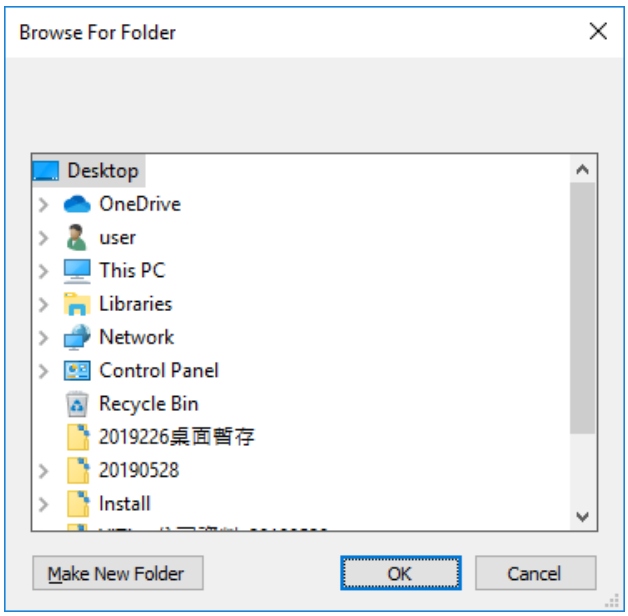



Fig 4-5 Change to other Folder

## 4.3 Quick Click

Double-click the image on the image/video list to open file. Right-click the mouse to show the Fig 4-6 to delete file directly or load image into compare more. Note: only Image file can load into compare mode and Load Image function.

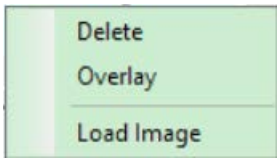



Fig 4-6 Quick Click

# 5. Sub Program

After enable UM Viewer AP, there is Sub Program area shown at right side of Fig. 5-1 i.e. Sub Program category. Measurement tools are fixed at upper as Fig.5-1. The other Sub Programs are variable at underneath area as Fig.5-2, able to switch Image Tool, Time Lapse Capture, Auxiliary Tool.

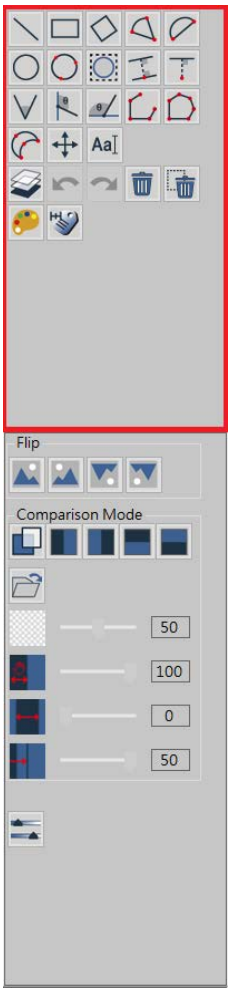



Fig. 5-1 Fixed tool category

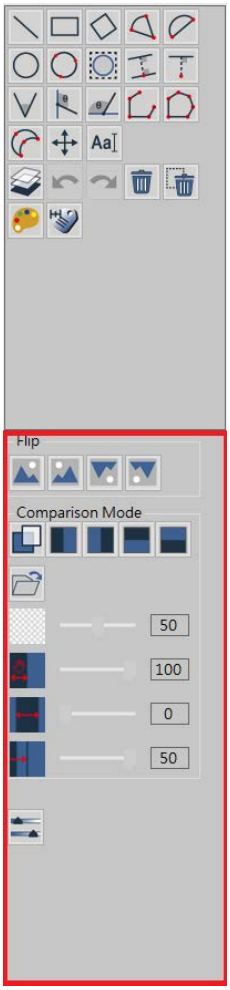



Fig.5-2 Changeable tool category

## 5.1 Measuring mode

After enable UM Viewer AP, it can use measurment tools as Fig. 5-3 shown.

Fig. 5-3 Measurement tools

### 5.1.1 Measurement Tools

Measurement tools include Line, Rectangle, Square, 2 Point Circle, 3 Point Circle, 4 Point Angle, Horizontal Angle, Vertical Angle, Auto Circle Detect, Edge Detect etc., as Fig. 5-4 show

Fig. 5-4 Various Measurement Tools

(1) Line : To simply measure a line who can apply tool. User can choose Line tool and measure length as L=1.00mm (L: Length). See Fig. 5-5 shown.

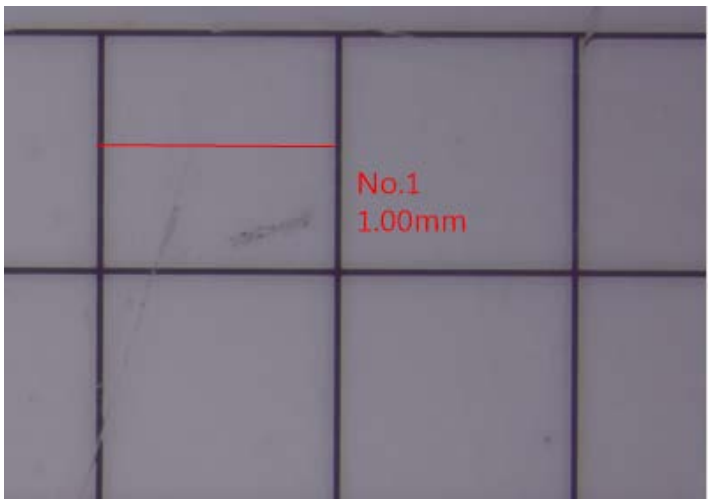



Fig. 5-5 Line Measurement

(2) Rectangle : The object is quadrilateral that can apply tool as Fig. 5-6. The Rectangle tool can measure and show rectangular circumference (P=6.0 mm), Horizontal length (W=2.0mm), Vertical length (H=1.0 mm), Rectangular area (A=2.0 $mm^2$).

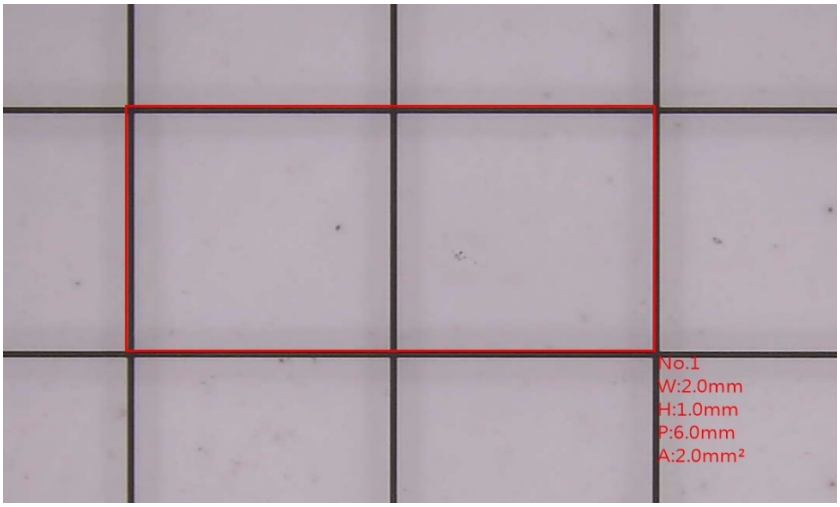



Fig.5-6 Rectangle measurement

(3) Square：The object is regular quadrilateral that can apply tool. Draw from any corner toward Diagonal direction as a square. In the Fig. 5-7, square circumference is P=4.01mm, one side is L=1.00mm and area is A=1.00 $mm^2$.

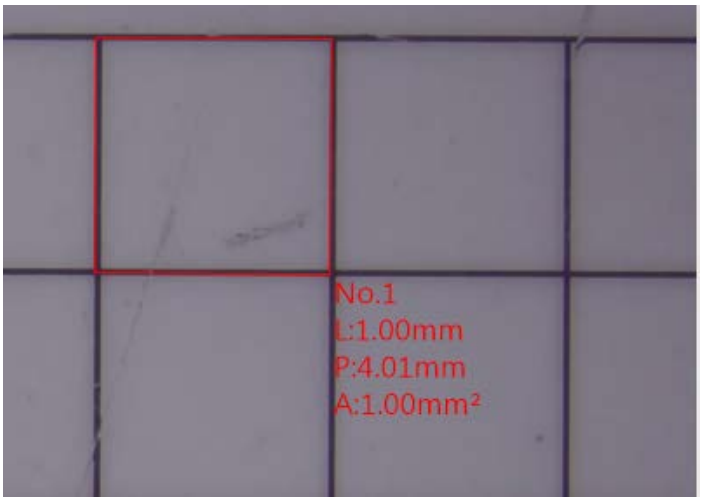



Fig. 5-7 Square measurement

(4) Arc: Apply to measure Arc , see FIG. 5-8. 1st click at the edge of measuring object and then 2nd click on the other side, continue moving mouse till arc area match the measuring object, finalize 3rd click. Below measuring data show Int. angle is 153.7 °), radius is R=0.725mm, area is A=0.705 mm, perimeter is P=3.394mm.

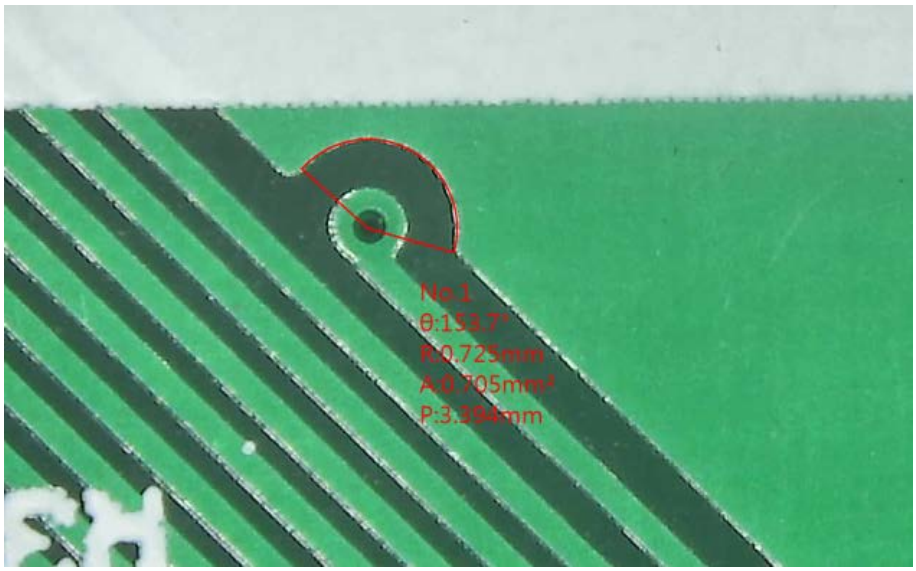



Fig.5-8 Arc area

(5) Arch: Apply to measure Arch, see Fig. 5-9. Arch follow to o'clock direction. Need be careful to 1st click and 2nd click sequence. 1st click at the edge of measuring object and then 2nd click on the other side, continue moving Mouse till Arch area match the measuring object, finalize 3rd click. Below measuring data show radius is R=0.559mm, chord is L=0.948 mm, arch is Arc=2.885mm, perimeter is P=3.832mm.

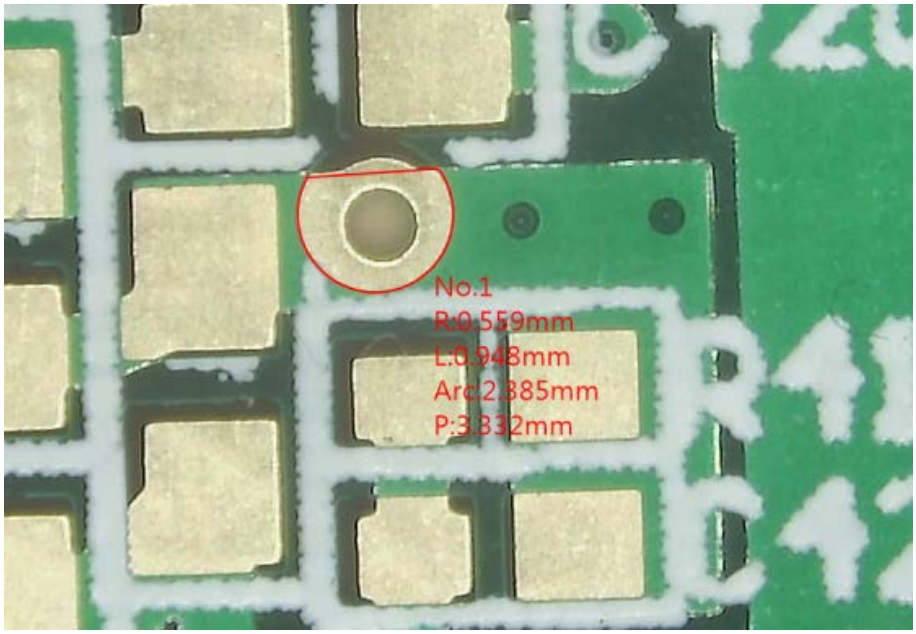



Fig 5-9 Target Arch area

(6) 2 Point Circle：The object is circle that can apply tool. Click the 1st point on the edge of object, press and drag the left key of mouse toward 2nd point on the edge of object that automatically draw a circle. In the Fig. 5-10, Radius is R=0.5mm, Diameter is D=1.00 mm, Perimeter is P=3.14mm and Area is A=0.79mm$^2$.

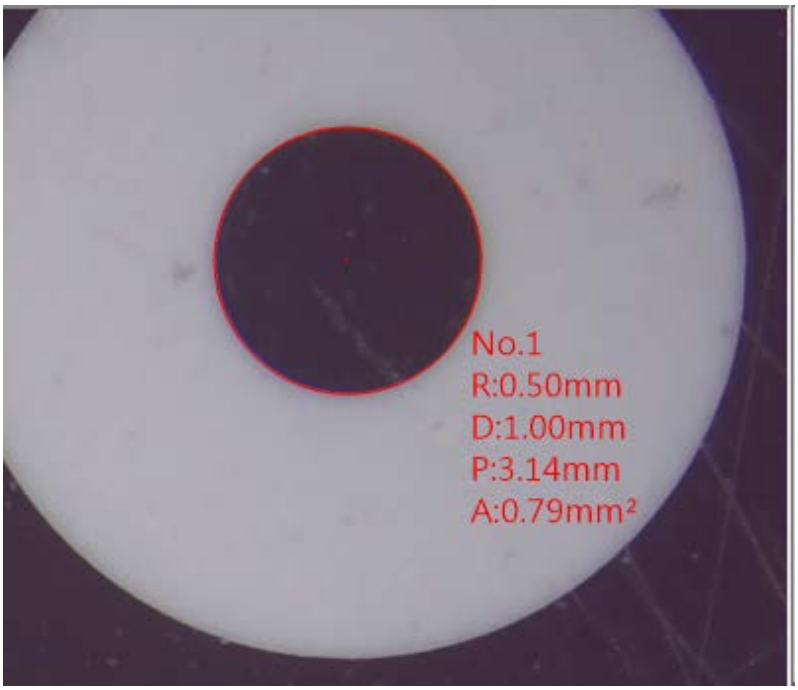



Fig 5-10 2 Point Circle

(7) 3 Point Circle：When the object is Circle or just a Arc that can apply tool. Point 1st point on the edge of object, then point 2nd point, again drag toward 3rd point, that automatically draw a circle. In the Fig. 5-11, Radius is R=0.50 mm, Diameter is D=1.00 mm, Perimeter is P=3.14 mm and Area is A=0.79 $mm^2$.

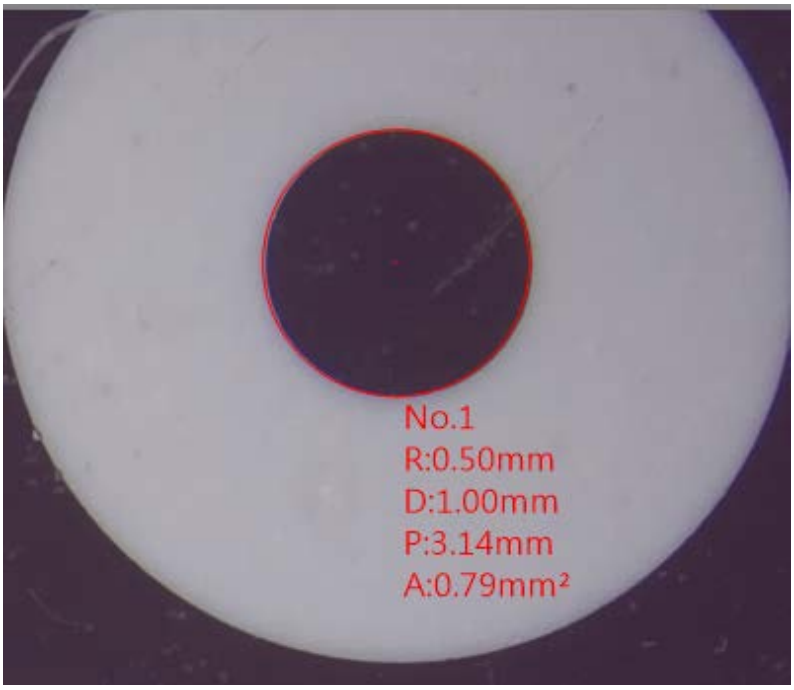



Fig. 5-11 3 Point Circle measurement

(8) Center Distance: This function is only enabled after using Two Point Circle or Three Point Circle. There are three measure functions for Center Distance. See Fig 5-12.

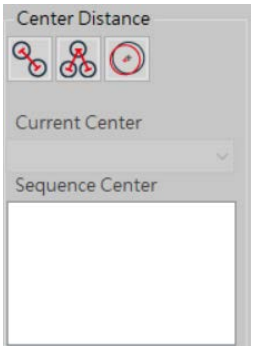



Fig 5-12 Center Distance

- Two Center Distance : This function will auto-calculate the distance from two circle's center. Two Circles is required to draw on same page. See Fig 5-13.

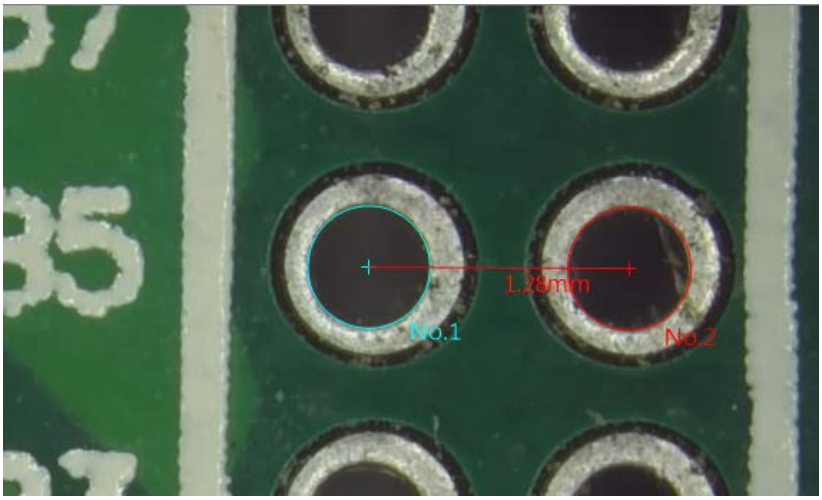



Fig 5-13 Two Center Distance

- Optional Two Center Distance : This function is auto-calculate the chosen two circles. Refer to Fig 5-14, example, 4 circles are drawn, choose "Current Center" as golden sample, then choose "Sequence Center" to measure the distance between Current Center to Number (No) of Circles. The measurement result will show on left upper corner.

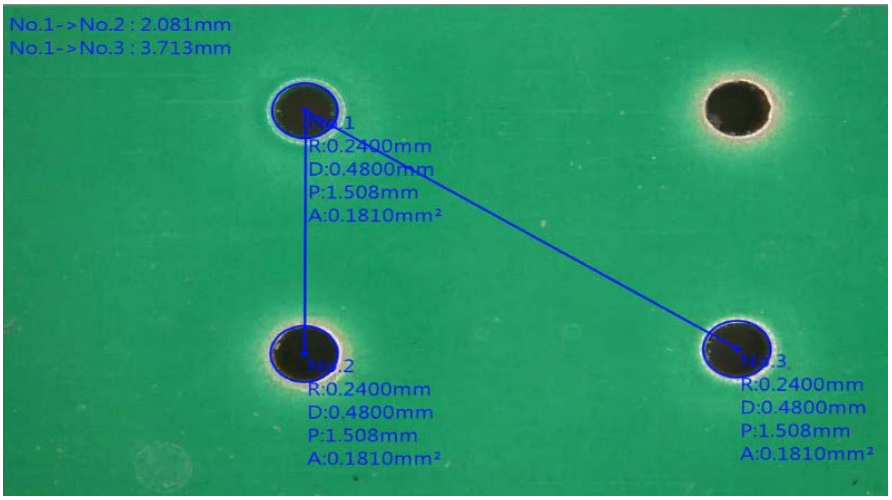



Fig 5-14 Optional Two Center Distance

- Offset Center : This drawing method is same as Two Center Distance. This function is to calculate the Offset distance between two circle center. See Fig 5-15.

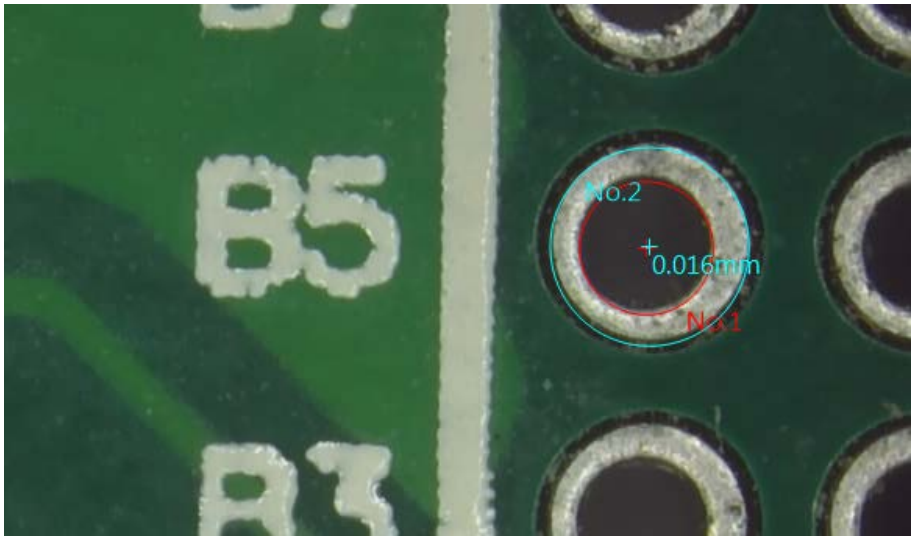



Fig 5-15 Offset Center

(9) Auto Circle Detect： Automatically lock and measure Circle that can apply tool. On the target Circle, draw an area to fully cover it, it will automatically measure the circle as Fig. 5-16, 5-17 shown.

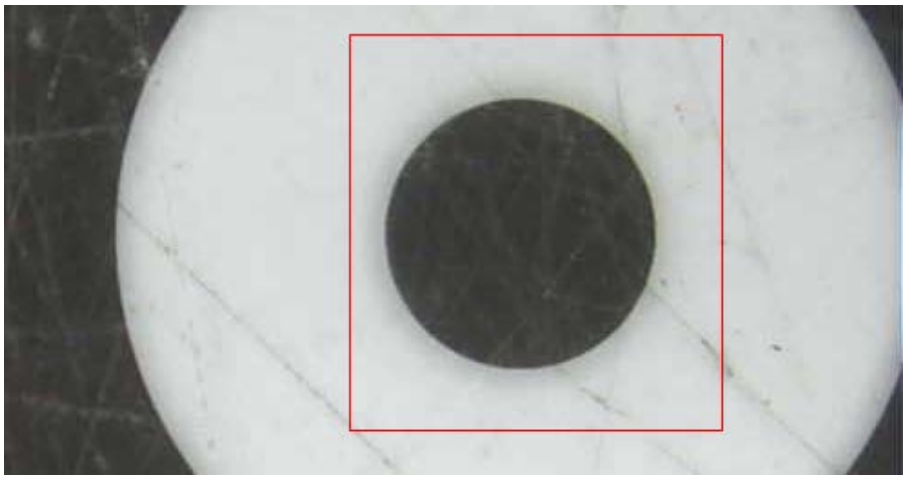


Fig. 5-16 Lock Circle

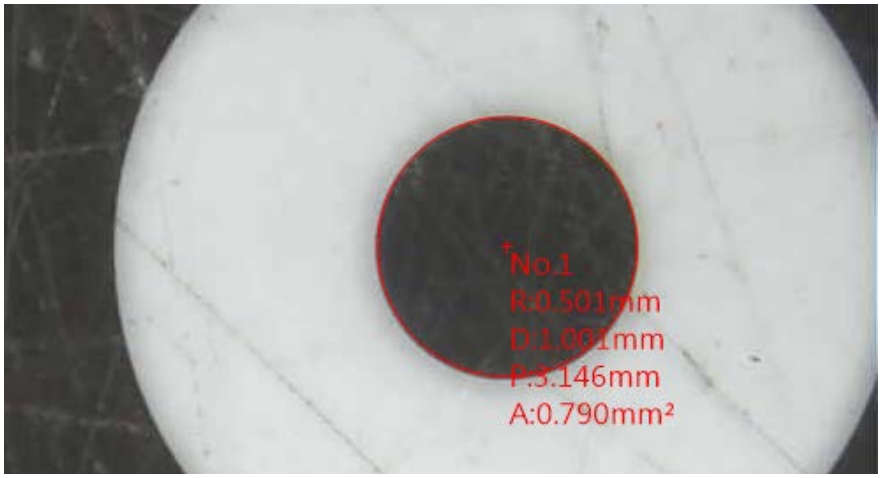



Fig.5-17 Auto measuring Circle

(10) Parallel Line: Apply to measure “Distance” between parallel lines, see Fig. 5-18. Draw the 1st start line on the measuring object, auto show up a preview parallel line from the Mouse point to the start line. Click the mouse left button to draw multi-points for measuring their distances to the start line. Optionally, for continuously distance measuring, click “Sequence Line” to measure distance from the previous line. See Fig. 5-19.

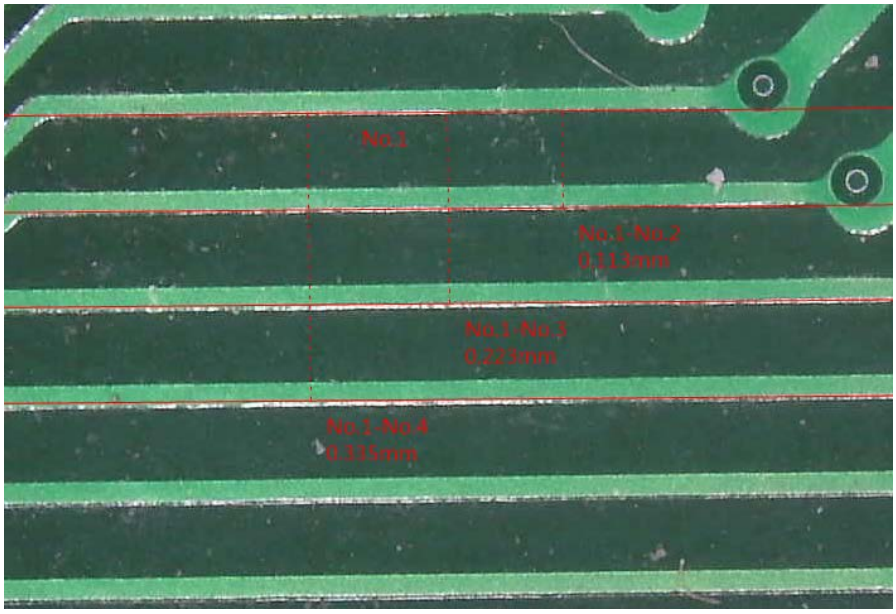



Fig. 5-18 Measure distance between parallel lines

Fig. 5-19 Click for continuous distance measurement

(11) Perpendicular Line: Apply to measure perpendicular, see Fig 5-20. Draw the 1st start line on the measuring object, then click mouse left button to draw perpendicular lines till the bottom of depth. Click Mouse right button for completion.

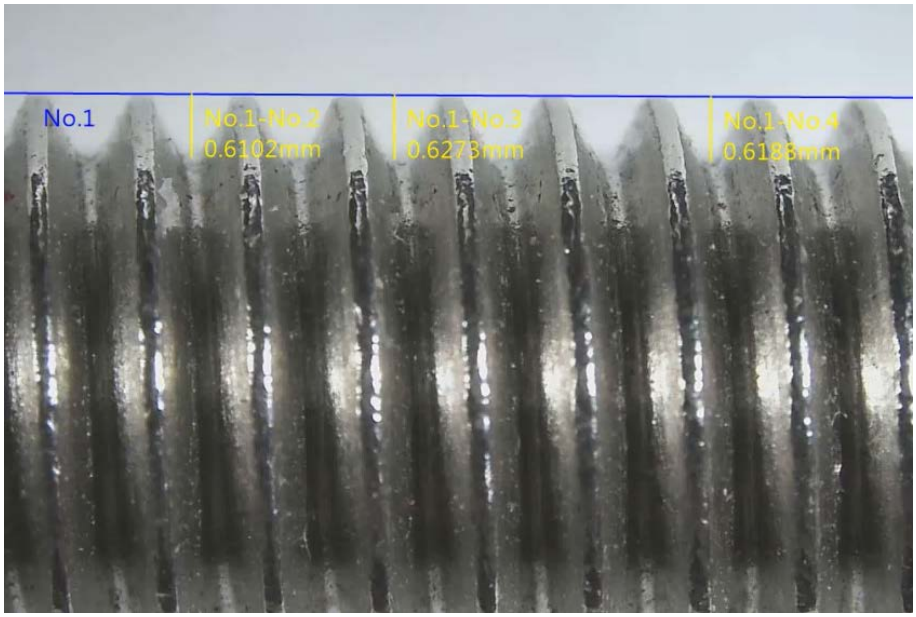



Fig.5-20 Measure the wave depth

(12) 4 Point Angle：When measuring the angle that can apply tool. As Fig. 5-21 shown, firstly draw a line segment on one side of Angle, then draw 2nd line segment on the other side of Angle, that can know the angle. The inner angle is Int.135 °, the external angle is Ext.45 °, the dotted Arc is the measured angle. Can also choose to show Reflex Angle or Supplementary Angle . See Fig 5-22 & 5-23.

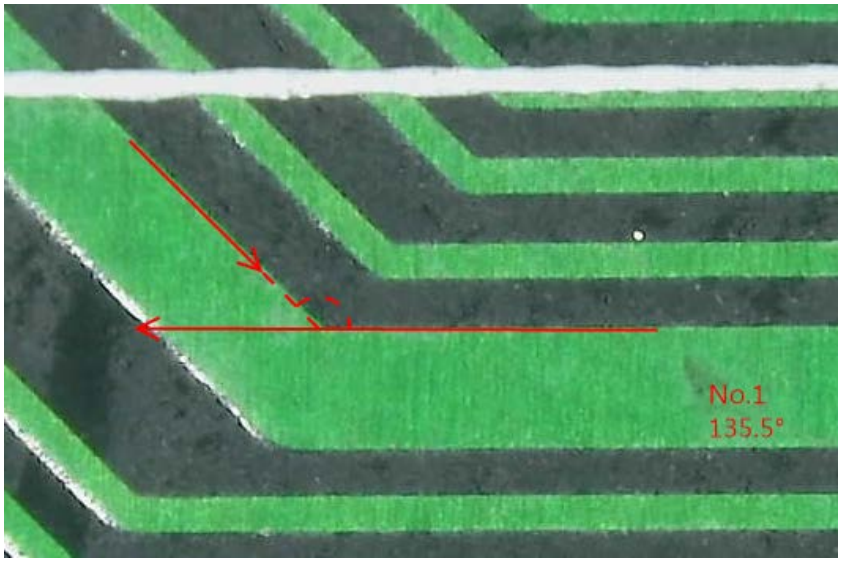



Fig 5-21 Measure 4 Point Angle

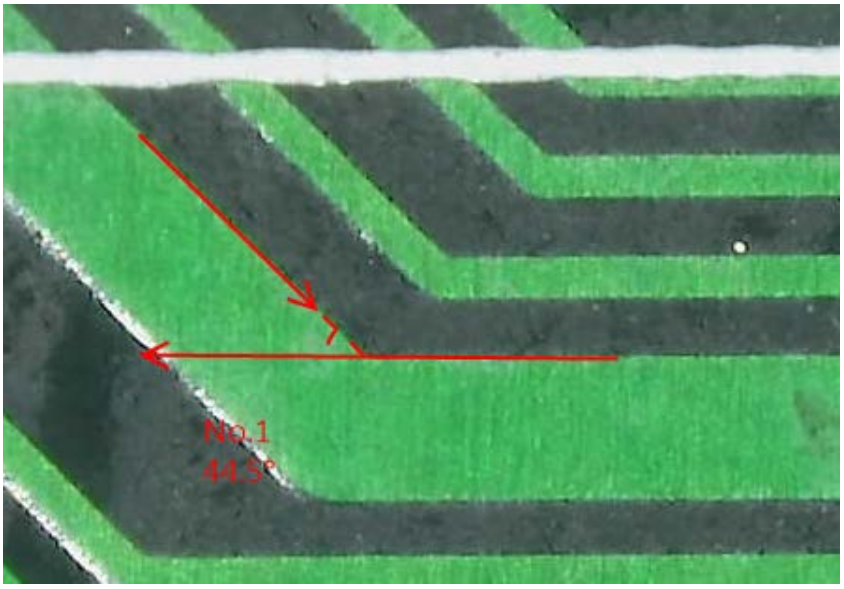



Fig 5-22 Measure Supplementary Angle

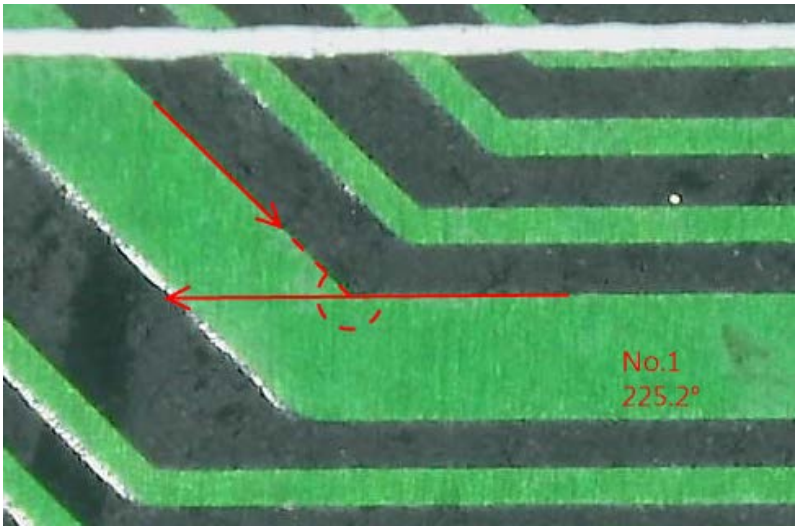



Fig 5-23 Measure Reflex Angle

(13) Vertical Angle：Measure any Vertical Angle by a vertical line that can apply tool. Draw a vertical line, auto pop up the other oblique line to the vertical line, then auto measure the inner Angle/ external Angle as Fig. 5-24 shown.

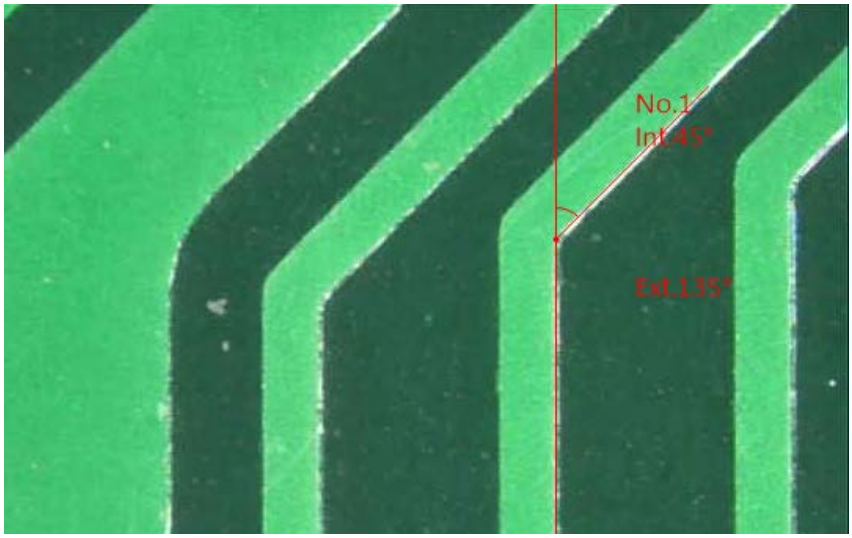



Fig. 5-24 Assisted measurement of Vertical Angle

(14) Horizontal Angle：Measure any Horizontal Angle by a Horizontal line that can apply tool. Draw a Horizontal line, auto pop up the other oblique line to the Horizontal line, then auto measure the inner Angle/ external Angle as Fig. 5-25 shown.

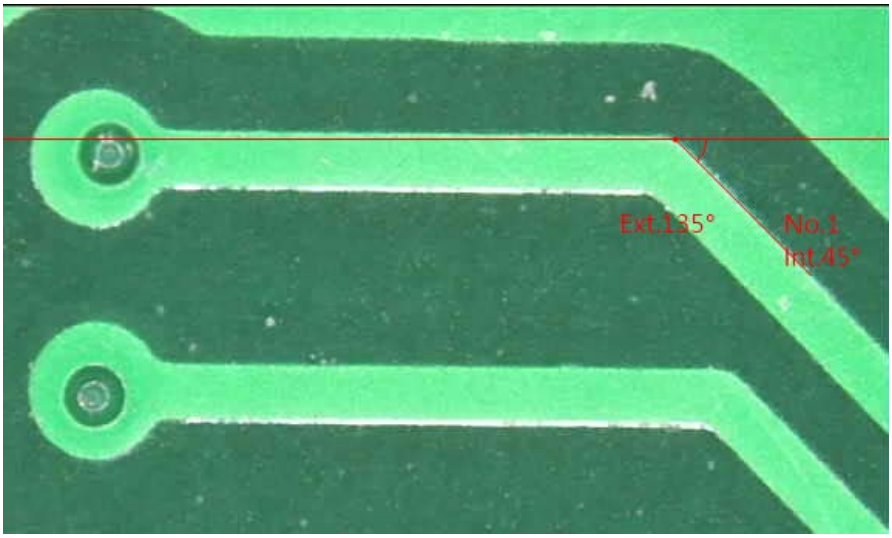



Fig 5-25 Horizontal Angle

(15) Edge Detect：Whenever do measurement that can apply tool to easily locate the edge, it is used to subsidiary help the other measuring tools. Click a dot close to the edge of object for quick and accurate measurement. See Fig. 5-26 shown.

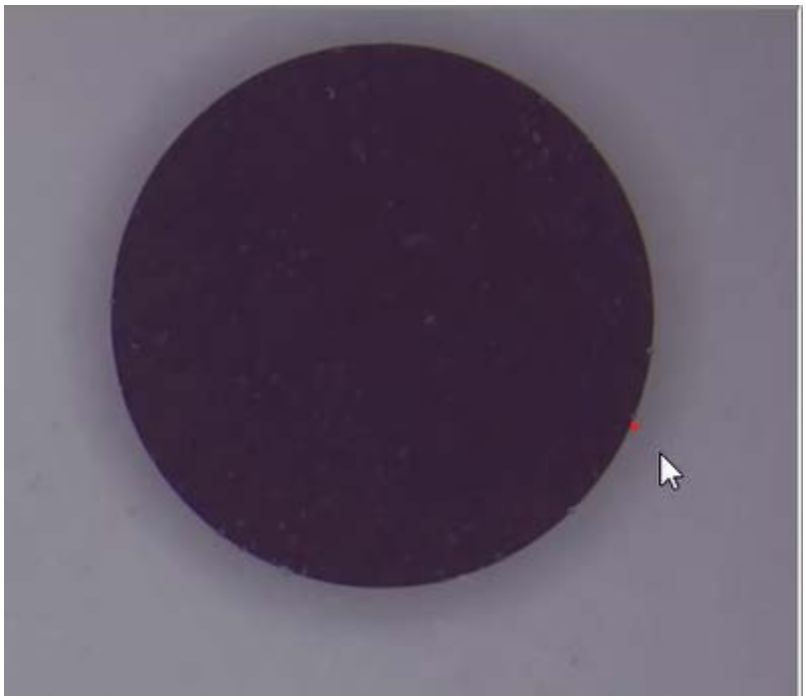


Fig 5-26 Edge Detect

(16) Polyline：Measure lengths from lines. Measure total lengths by using Polylines . Each left click to stop at a point and continue measure, right click until the end of the point. See Fig 5-27.

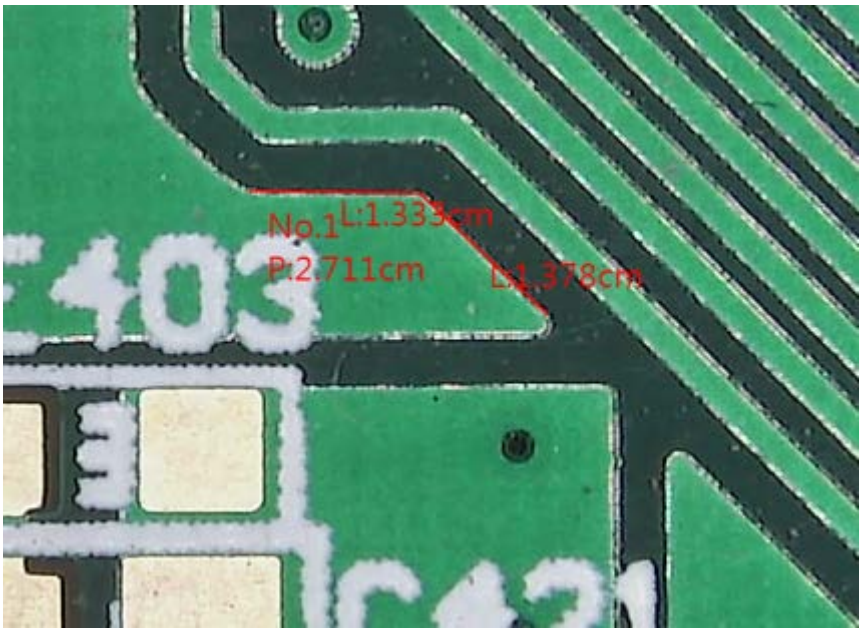



Fig 5-27 Measure Polylines

(17) Polygon：A polygon is a shape that is made up of many sides and has only line segment. See Fig 5-28, follow the shape and left click on each angle, right click on the last point; the last point will link to first point to make a polygon.

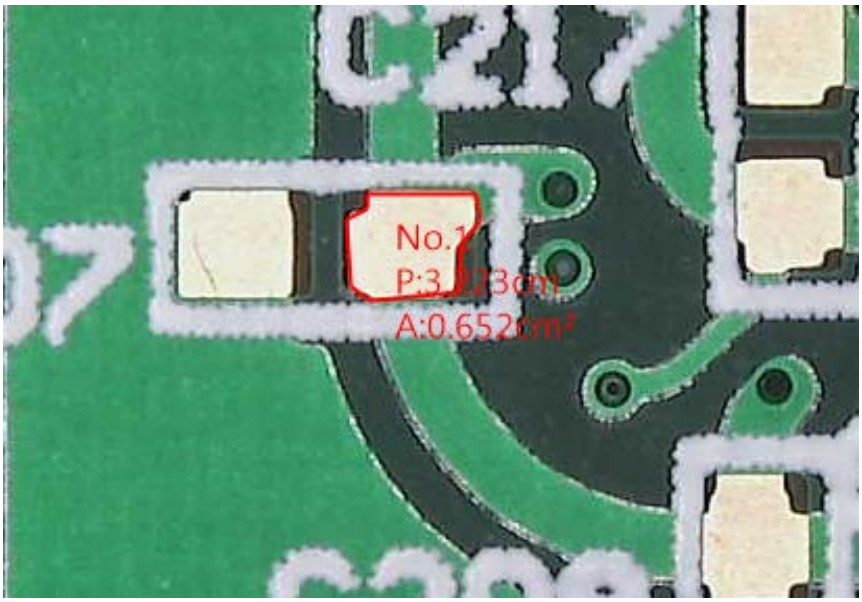



Fig 5-28 Measure Polygon

(18) Lune Curve: Measure Lune shape, such as the area of solder amount on components, first two clicks on the left and right point of lune shape, thirdly click on the outer shape of lune shape, then the last click on the inner curve of lune shape. 4 clicks to make a Lune shape. See Fig 5-29.

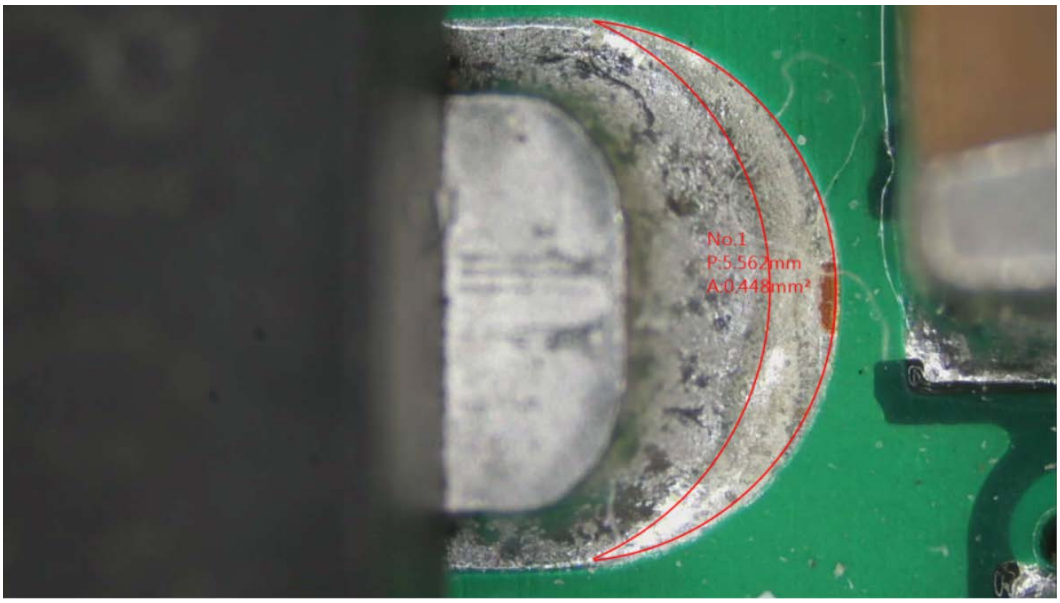



Fig 5-29 Measure Lune Shape

(19) Move: If wanted to move or adjust the measured object, choose MOVE to adjust. Mouse Fast Key: Scroll wheel to enable/disable MOVE function. Keyboard Fast Key: ESC button to enable/disable MOVE function. See Fig 5-30, when click on the object, the chosen one will show in opposite color Fig 5-31. Click on other position to cancel selection. When drag or adjust the object, the related information will move together. See Fig 5-32. If wanted to delete the chosen object, click "Delete Selection". to delete object. Or press "Delete" button on Keyboard to delete.

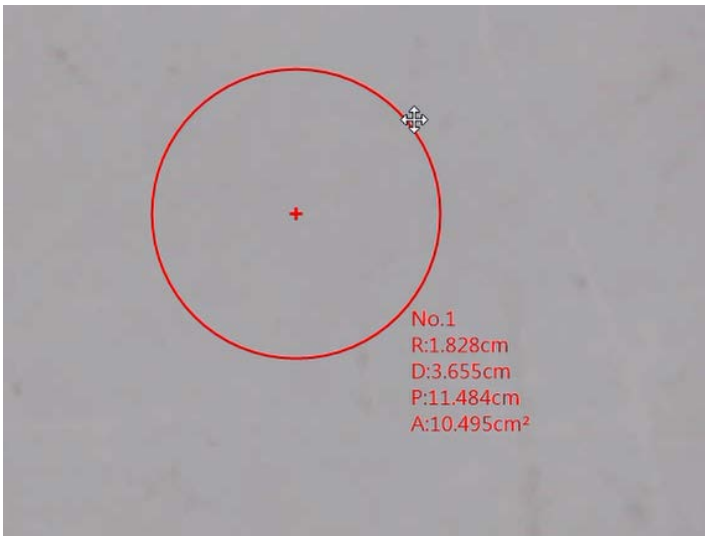



Fig 5-30 Example of Move **Object**

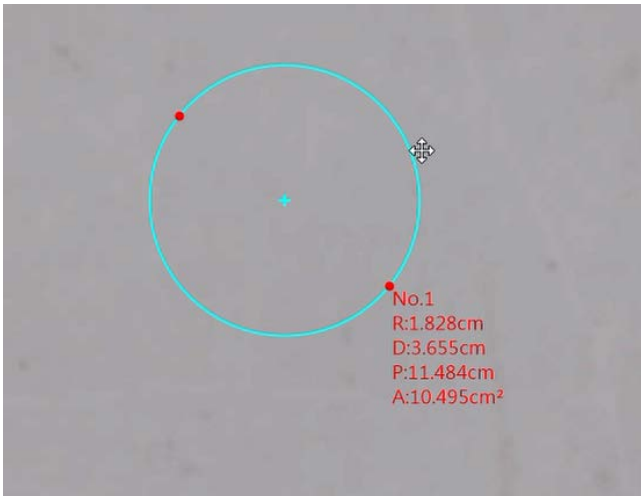



Fig 5-31 Move Chosen Object

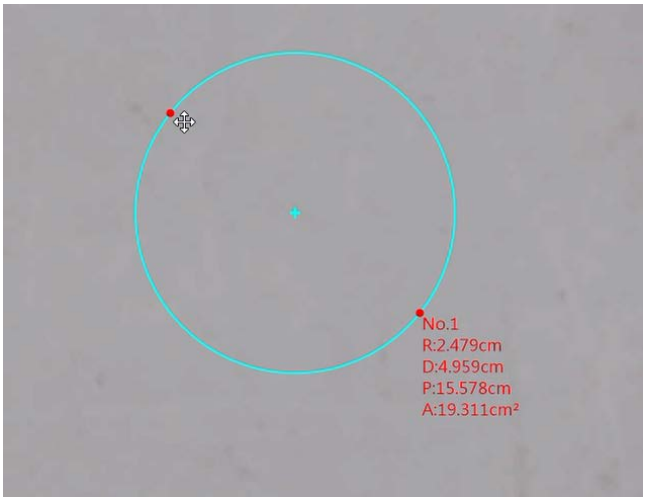



Fig 5-32 Move and Adjust object

(20) Insert Text: Use Insert Test function to insert footnote on picture. When Insert Text function is activate, the mouse type will change to Input Text, see Fig 5-33 Double-Click to insert text, see Fig 5-34. If wanted to re-edit content or position, choose MOVE function to make adjustment, see Fig 5-35. Adjust position with arrow sign mark, see Fig 5-36. Numbering is follow the sequence of footnote, see Fig 5-37.

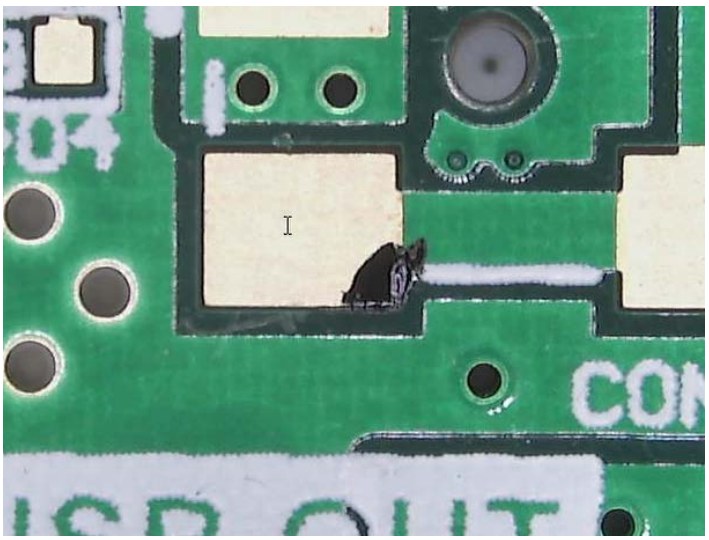


Fig 5-33 Insert Text

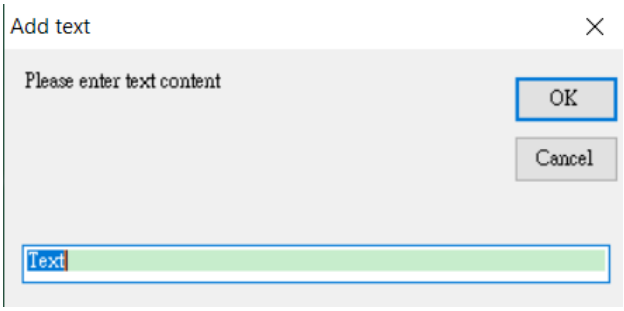



Fig 5-34 Input Text

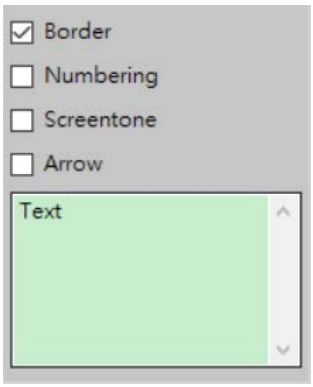



Fig 5-35 Advanced setting for Insert Text

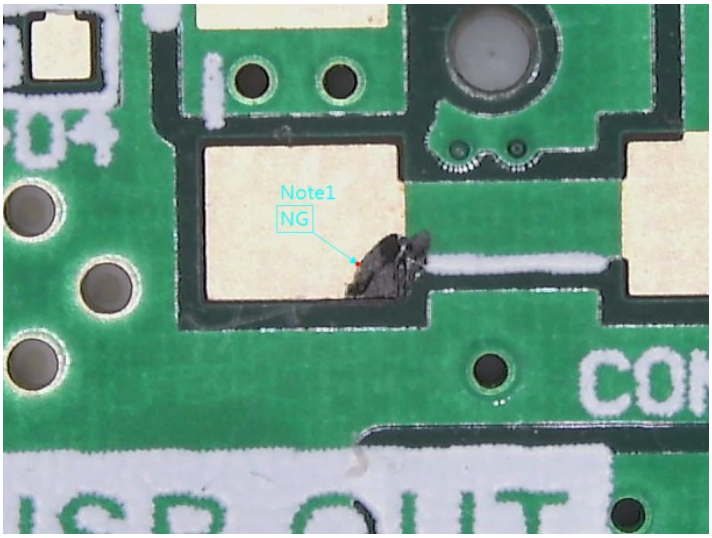



Fig 5-36 footnote with Arrow

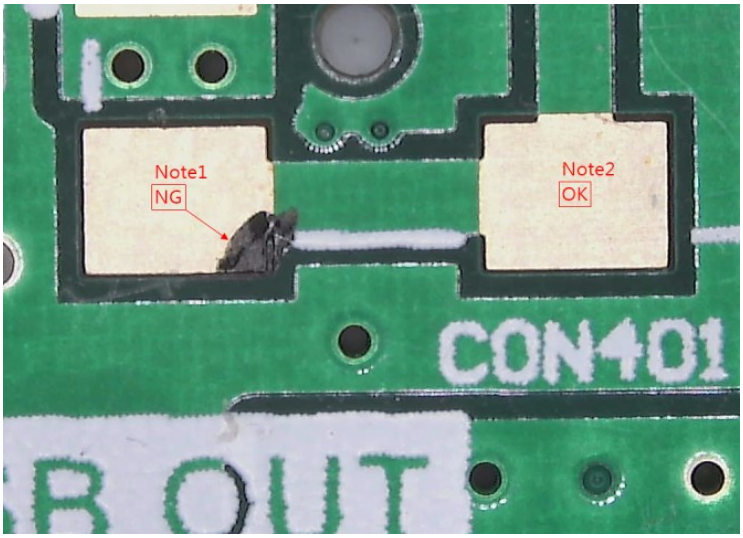



Fig 5-37 Numbering of footnotes

(21) Erase All：Whenever to delete all of measuring data at one time, that can apply tool.

(22) Multi-Line：Whenever to multiple measuring that can apply tool, i.e. measure several items on one picture. See Fig. 5-38 shown

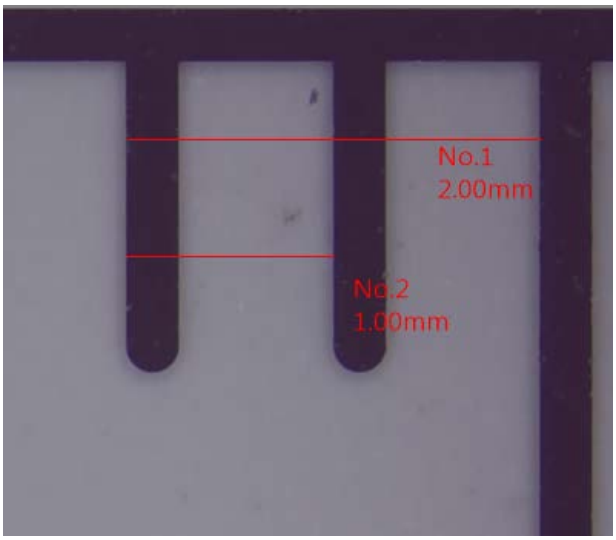



Fig. 5-38 Multi-Line measurement

(23) Undo/Redo：When multi-Line measurement, if the measurement error need return to previous action or to next action, that can apply tool for Undo/Redo action.

(24) Change Measurement Color：When object is similar color to measuring line that can apply tool for changing color of tool line as Fig. 5-39 shown.

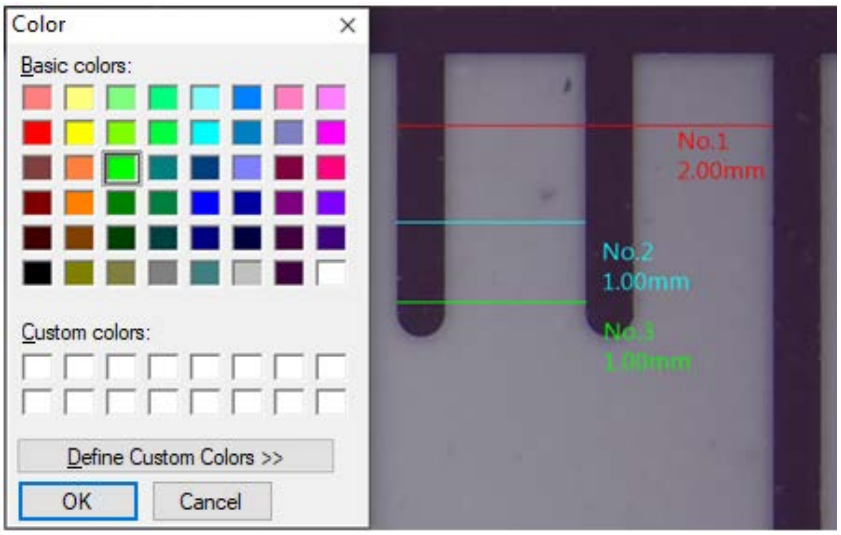



Fig.5-39 Changing measuring line

(25) Measurement Setting：When object doesn't require to show all measuring data that can apply tool to select the necessary data as Fig. 5-40 (before setting), Fig. 5-41 (after setting).

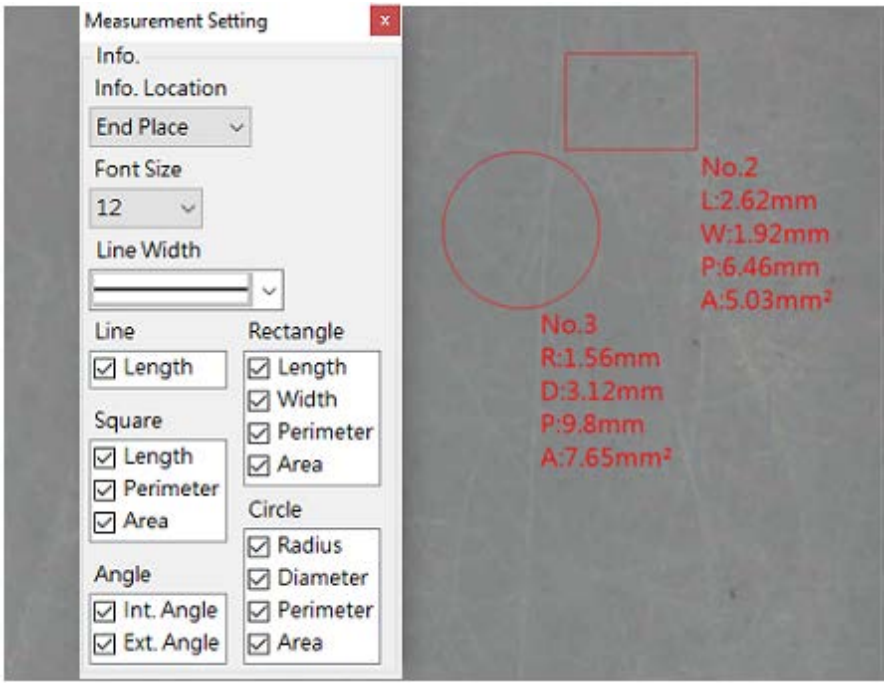



Fig. 5-40 Before setting

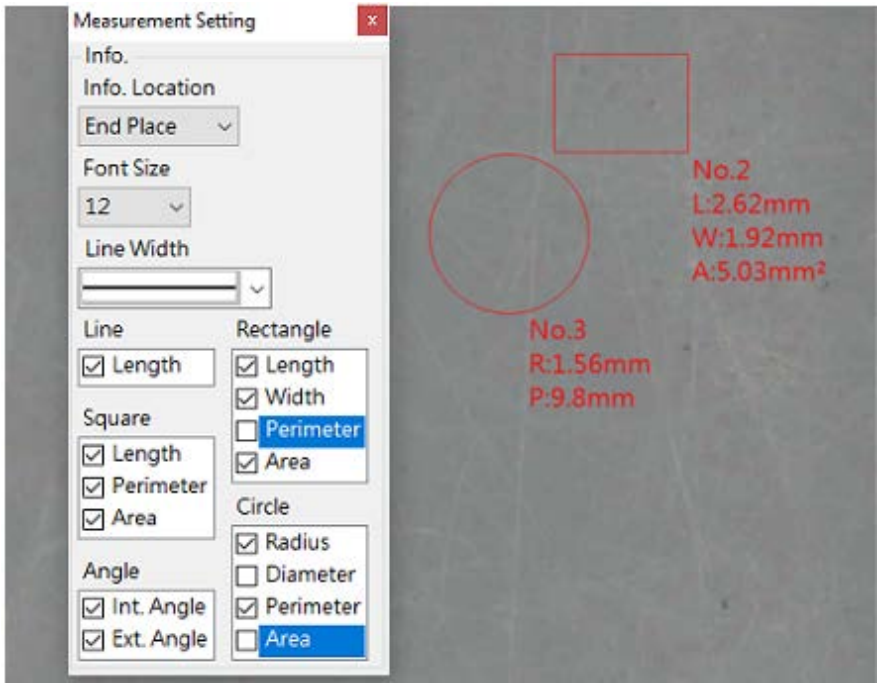



Fig. 5-41 After setting

## 5.2 Image Tool

Click the Image Tool button in the Sub Program to call out the Image toolbar. See Fig 5-40.

### 5.2.1 Image Tool Toolbar

The toolbar for Image Tool after clicked. See Fig5-43.

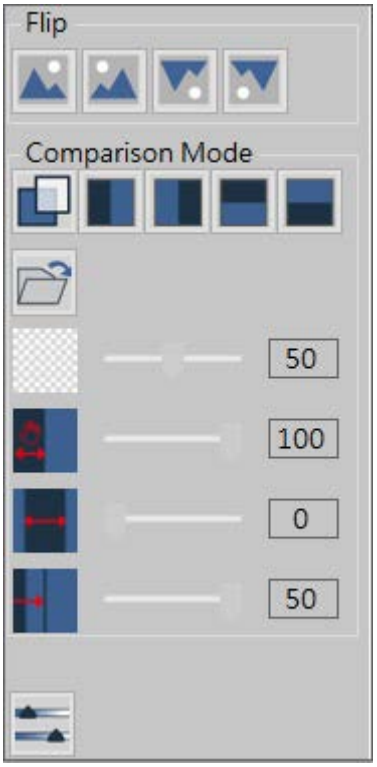



Fig 5-43 Image Tool Toolbar

(1) Flip Image: 4 types of image flip function.

- No Flip :

Fig 5-44 No Flip

- Horizontal Flip :

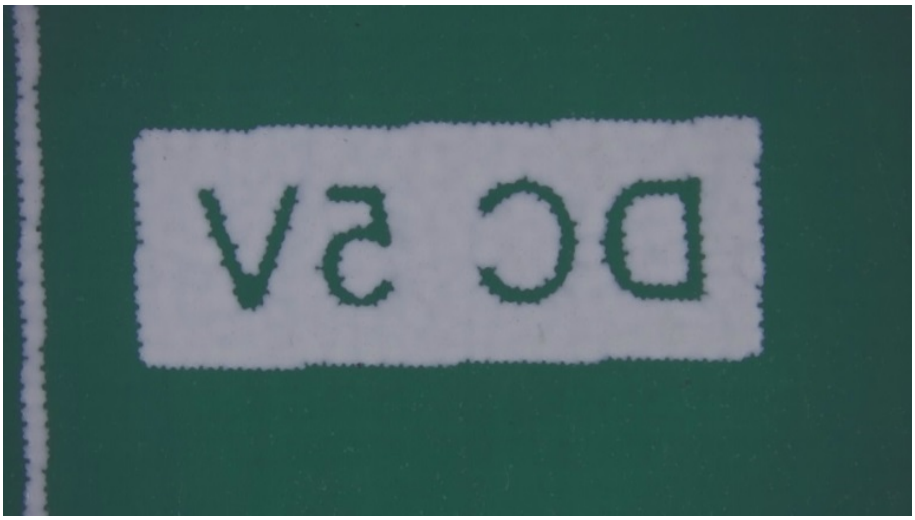



Fig 5-45 Horizontal Flip

- Vertical Flip :

Fig 5-46 Vertical Flip

- Horizontal & Vertical Flip :

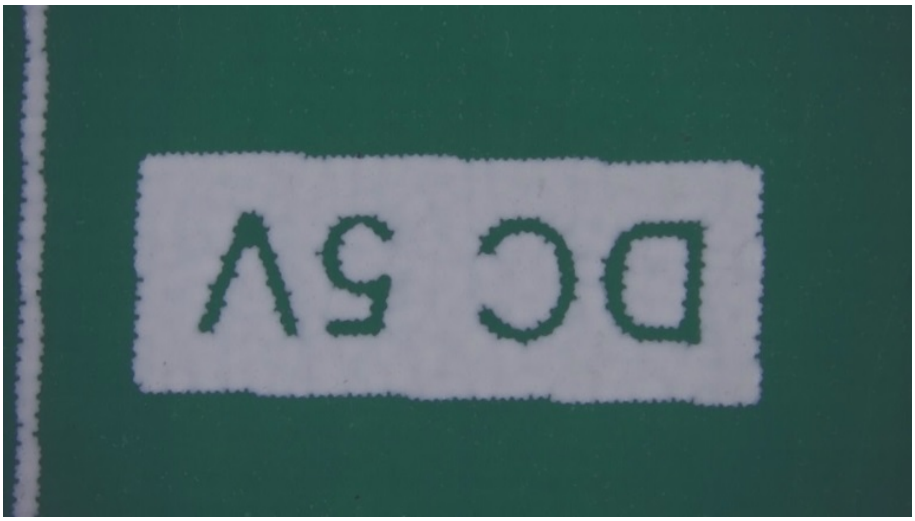



Fig 5-47 Horizontal & Vertical Flip

(2) Comparison Mode：

- Overlay ：Click on time to turn ON or OFF the Overlay Compare function, when overlay function is on, the default loading image is the last saved image.

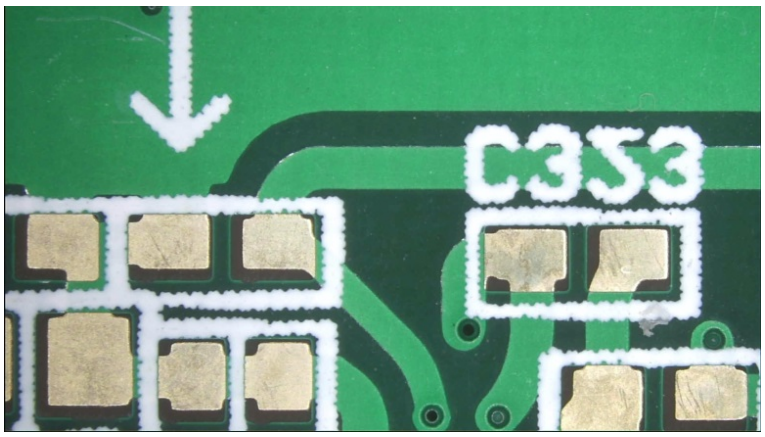



Fig 5-48 Overlay function OFF

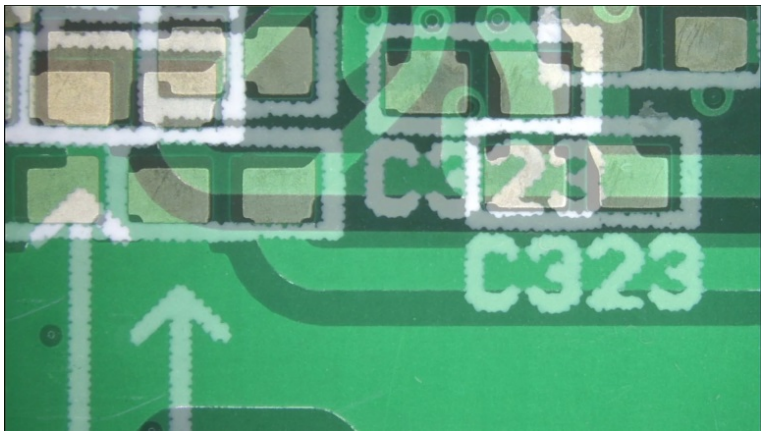



Fig 5-49 Overlay function ON

- Left Side Comparison : Enable/Disable the Left Side Compare mode. The loaded image is on left side. Right side image is live preview image. Below Fig 5-50: Transparency: 100%, Image Location: 100%, Offset Ratio: 0%, Image Ratio: 50%.

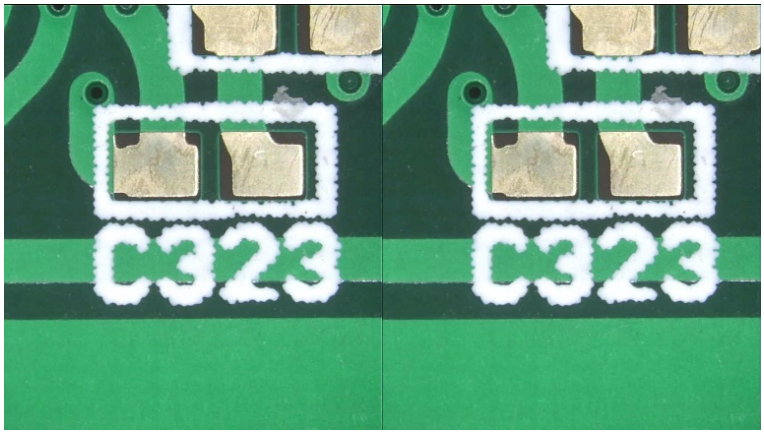



Fig 5-50 Left Side Comparison mode

- Right Side Comparison : Enable/Disable the Right Side Compare mode. The loaded image is on Right side. Left side image is live preview image. Below Fig 5-51 Transparency: 100%, Image Location: 100%, Offset Ratio: 0%, Image Ratio: 50%.

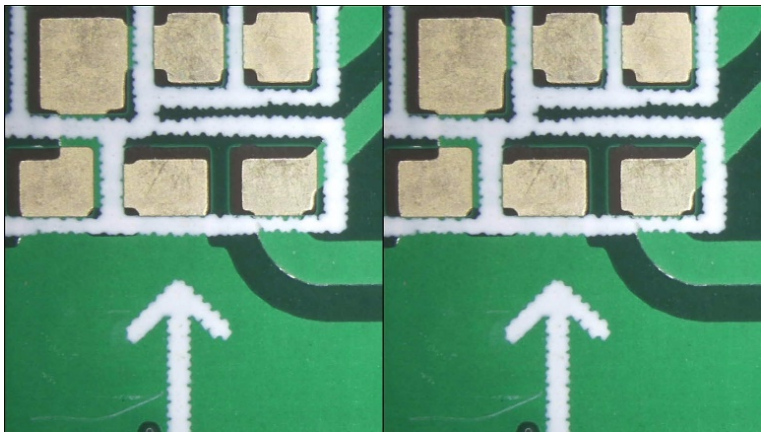


Fig 5-51 Right Side Compare mode

- Top Side Comparison : Enable/Disable the Top Side Compare mode. The loaded image is on Top side. Bottom side image is live preview image.

  Fig 5-52 Transparency: 100%, Image Location: 100%, Offset Ratio: 0%, Image Ratio: 50%.

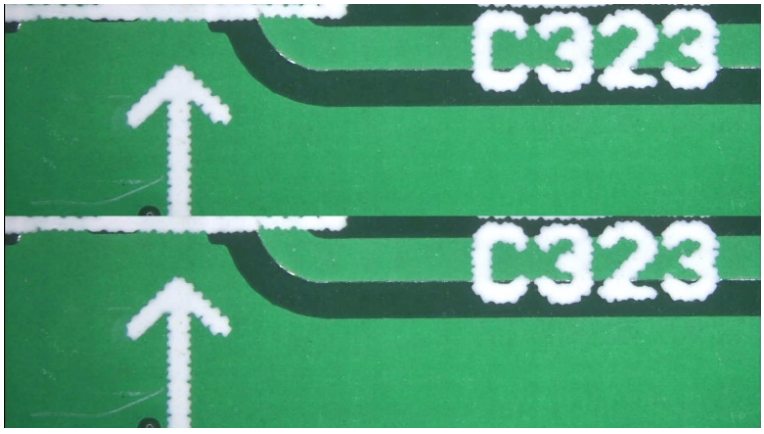



Fig 5-52 Top Side Compare mode

- Bottom Side Comparison : Enable/Disable the Bottom Side Compare mode. The loaded image is on Bottom side. Top side image is live preview image.

  Fig 5-53 Transparency: 100%, Image Location: 100%, Offset Ratio: 0%, Image Ratio: 50%.

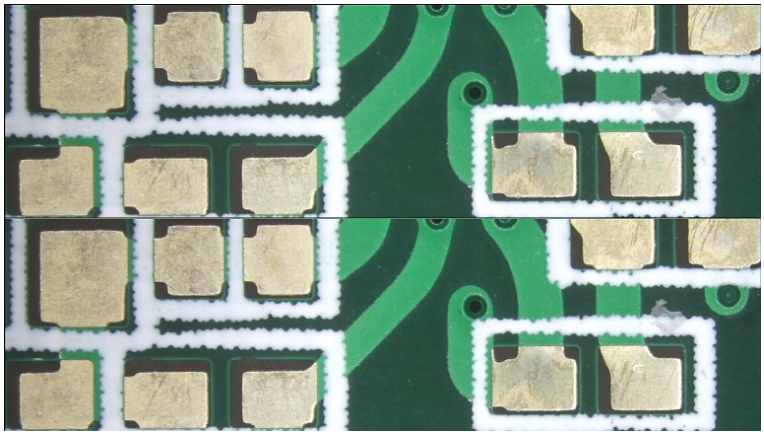


Fig 5-53 Bottom Side Compare mode

- Load Image : Load image from other location.
- Transparency

: Adjust the transparent level when in comparison mode. The Default level is 50%, drag the bar to adjust level. Fig 5-54 is the transparency in 15%, Fig 5-55 is in 75%.

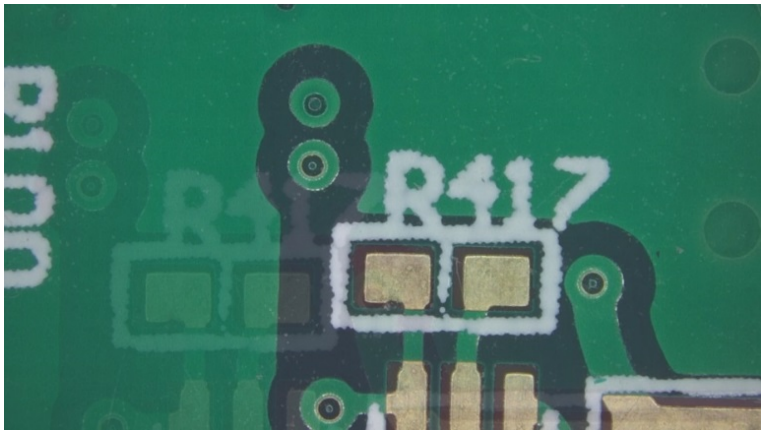


Fig 5-54 Transparency in 15%

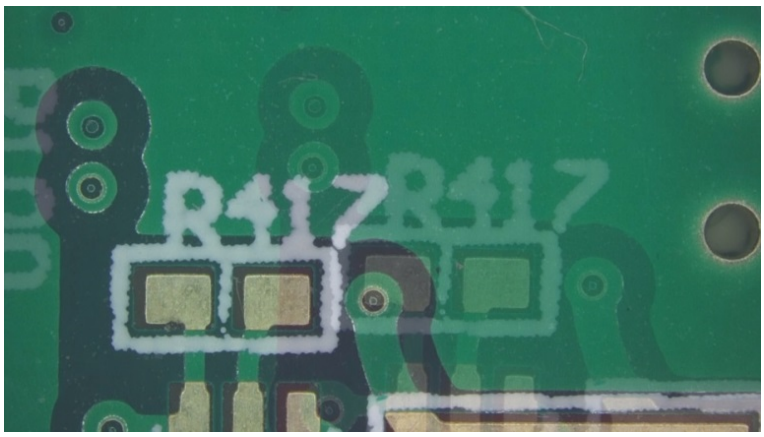


Fig 5-55 Transparency in 75%

- Photo Rolling : Adjust the loaded-in photo position in comparison mode. Drag the bar to roll the loaded-in photo.
- Photo Moving : Adjust the loaded-in photo window in comparison mode. Drag the bar to move photo, so that to easily compare the loaded-in photo with the preview image.
- Photo Size : Adjust the loaded-in photo size in comparison mode. Drag the bar to adjust photo ratio. Max. photo size is 50%.

(3) Setting： Setup the video properties, users can adjust the parameter for the preview video. See Fig 5-56, the parameter for setup video properties. Fig 5-57 is the parameter to setup camera control.

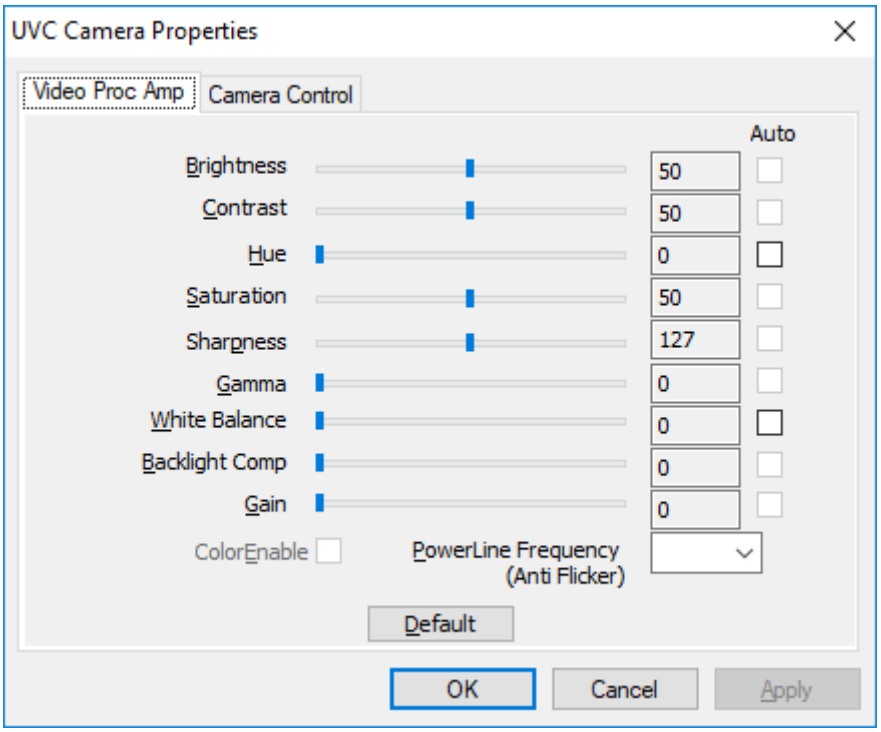



Fig 5-56 Video Properties Parameter Setting

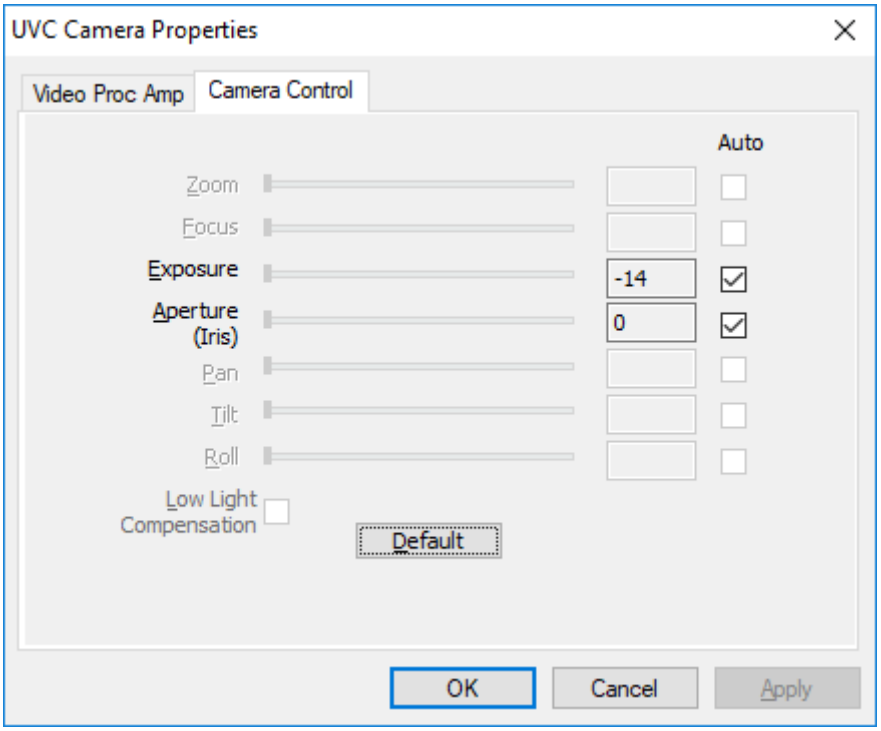



Fig 5-57 Camera Control in Properties

5.2.2 Time Lapse Capture

Click the Time Lapse Capture button from Main Function Button, the Time Lapse Capture function toolbar will show on the right side. See Fig 5-58.

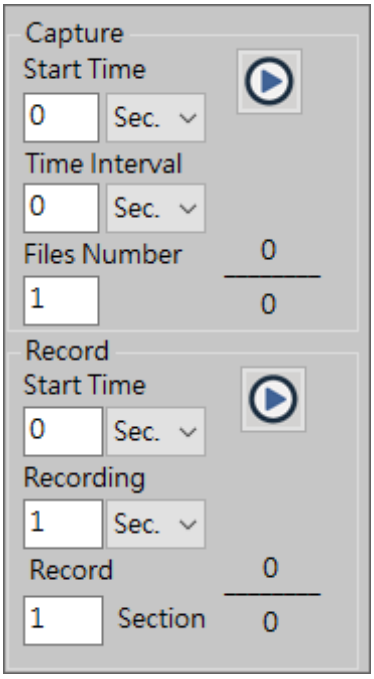



Fig 5-58 Time Lapse Capture

(1) Capture: Setup Start time, Time Interval, and Files number to active Time lapse function, see Fig 5-59. The actual action refer to Fig 5-60.

- Start Time：To set the start time to enable the function. The unit can be second, minute and hour.
- Time Interval：To set time to capture image or video. The unit can be second, minute or hour.
- Files Number：To decide how many image/video needs to be captured.
- Start / Stop ：Start / Stop Time Lapse Capture function. When function meet the setup files number, the capture will stop.

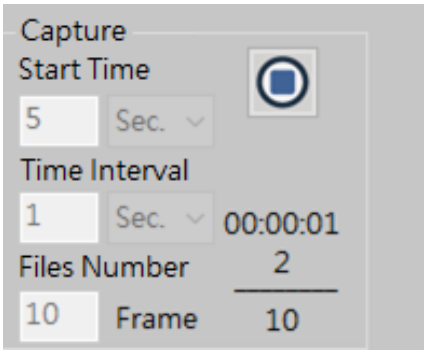



Fig 5-59 Time Lapse- Image

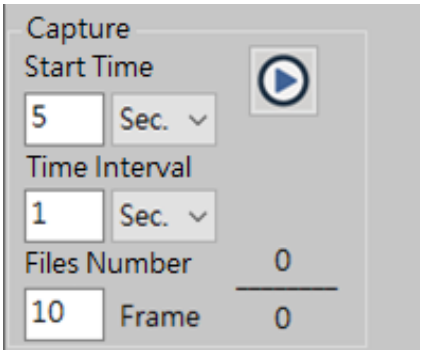



Fig5-60 Time Lapse – Image Capturing

(2) Record：Setup Start time, Time Interval, and Files number to active Time lapse function, see Fig 5-61. The actual action refer to Fig 5-62.

- Start Time：To set the start time to enable the function. The unit can be second, minute and hour.
- Time Interval：To set time to capture image or video. The unit can be second, minute or hour.
- Files Number：To decide how many image/video needs to be captured.
- Start / Stop ：Start / Stop Time Lapse Capture function. When function meet the setup files number, the capture will stop.

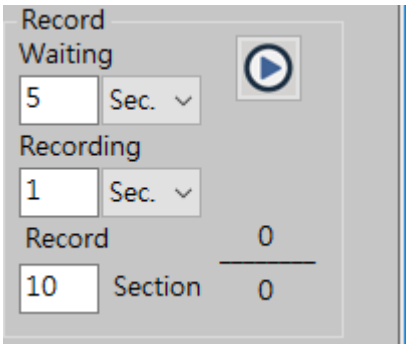



Fig 5-61 Time Lapse –Video Record

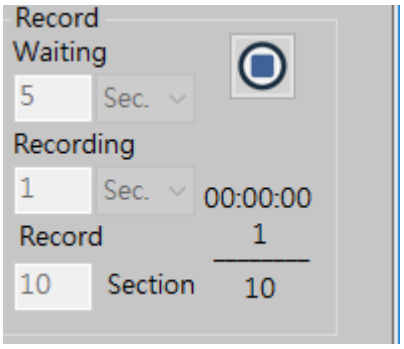



Fig 5-62 Time Lapse – Video Recording

5.2.3 Auxiliary Tool

Click Auxiliary Tool button in Main Function Button, the Scale toolbar will show on the right side. See Fig 5-63.

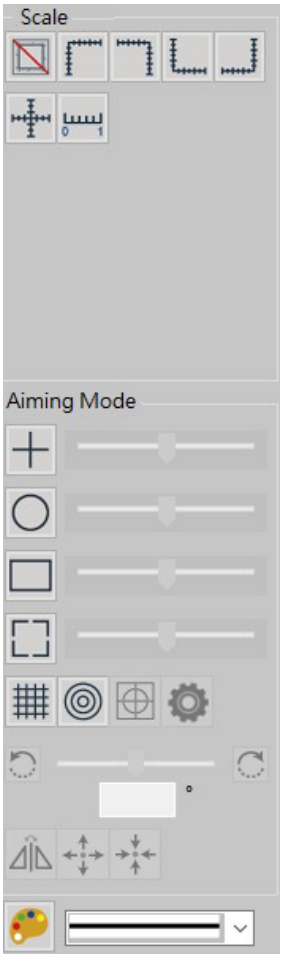



Fig. 5-63 Auxiliary tools

(1) Scale：There are 7 scales type as following:

- No Scale ：

Fig 5-64 No Scale

- Left Upper Scale :

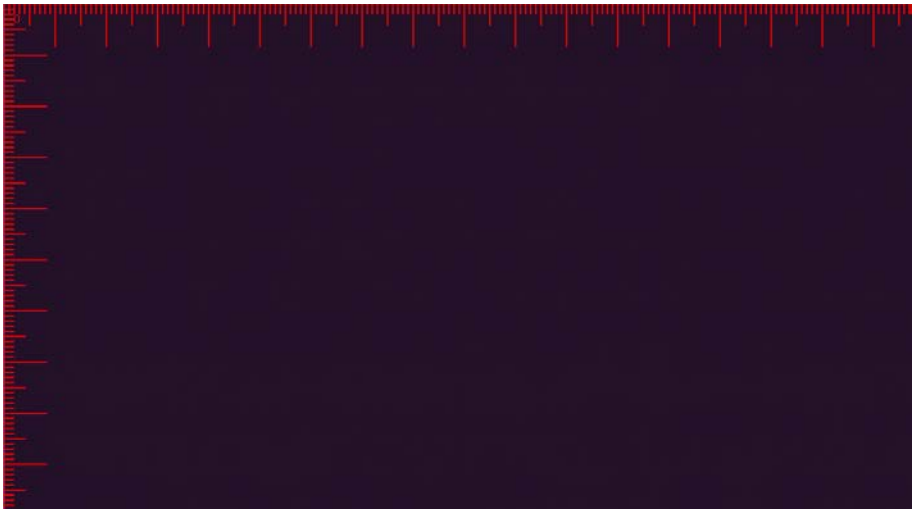


Fig 5-65 Left Upper Scale

- Right Upper Scale :

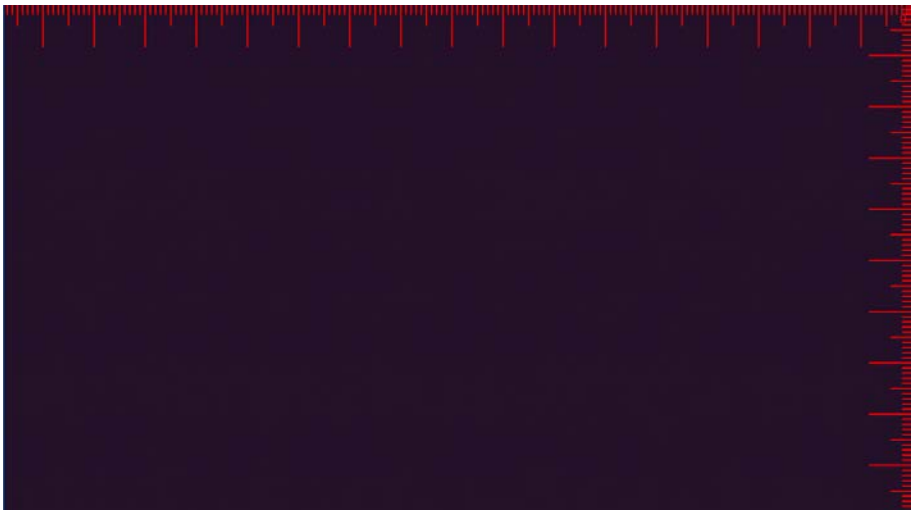


Fig 5-66 Right Upper Scale

- Left Bottom Scale :

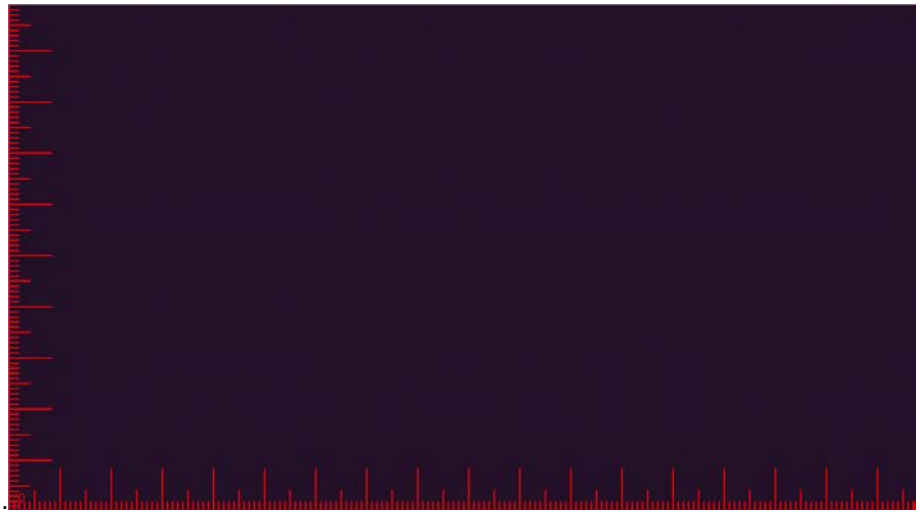


Fig 5-67 Left Bottom Scale

- Right Bottom Scale :

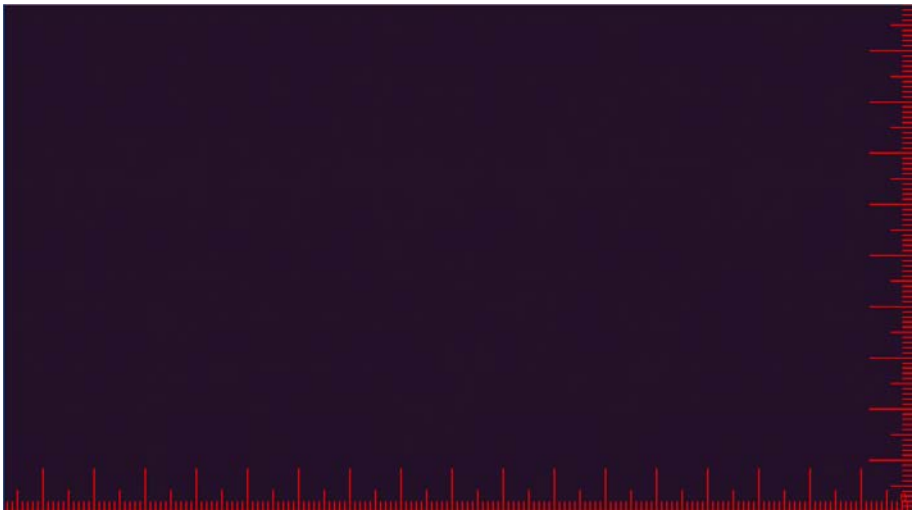


Fig 5-68 Right Bottom Scale

- Center Scale :

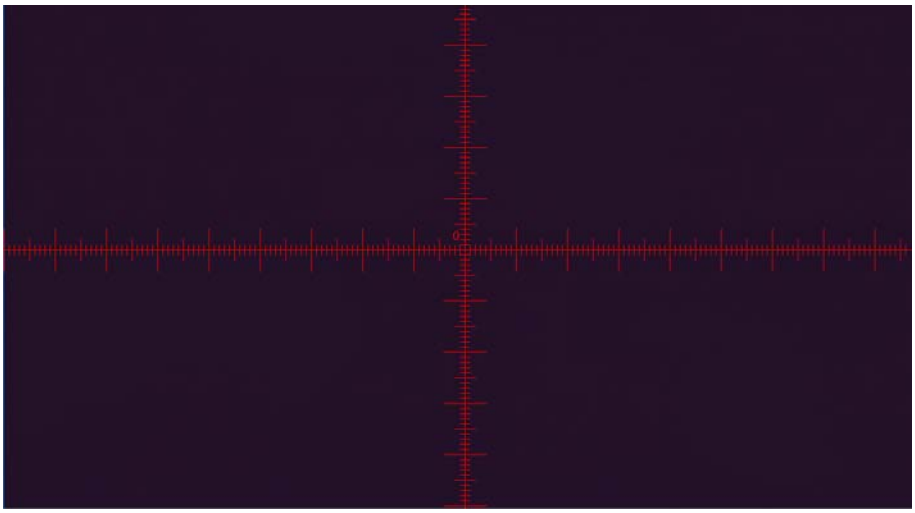


Fig 5-69 Center Scale

- Scale :

Fig 5-70 Scale

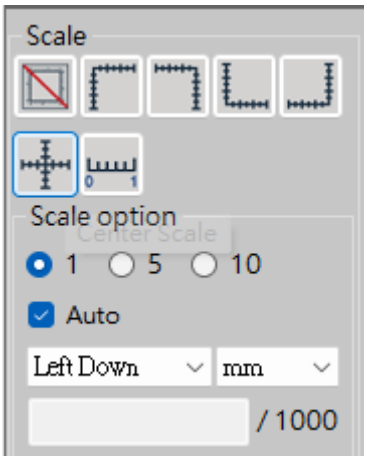



Fig 5-70-1 Scale

-

Select numbers of equal segments of scale
- Default unit of scale: 1mm Untick " Auto" to change the other unit.
- Position of scale: Top left/ Bottom left/ Top right/Bottom right
- Scale can together use with the other ruler like Cross ruler/Top left ruler ……
- The input value must be divided by 1000 to get the correct value.
  .For example: Input "1000" to get 1 ( There will be red text below when typing.)
- After changing "unit", it can select the suitable

again.
- While adjusting Focus and FOV, the scale will automatically adjust its display length to match correct 1mm unit.

(2) Aiming Mode：There are 4 types of aiming mode. Each type begins drawing from center position.

- Center Crosshair :

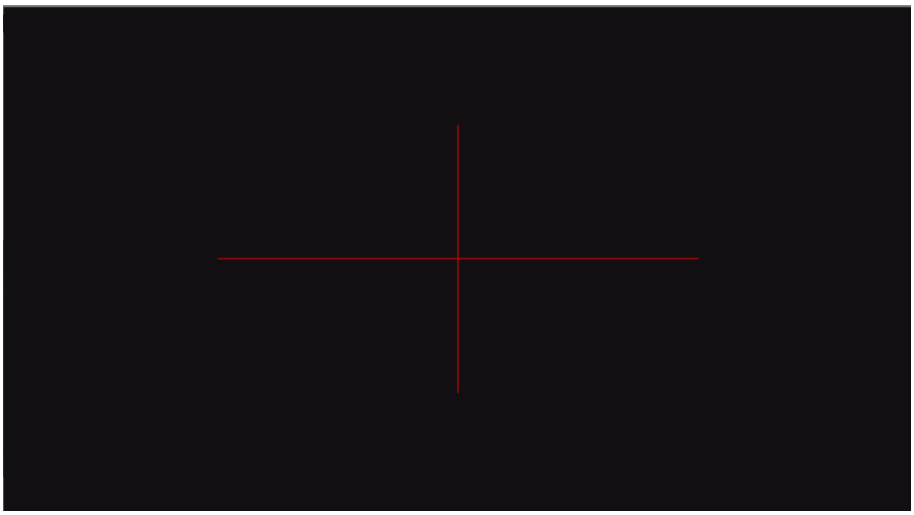


Fig 5-71Center Crosshair Aiming Mode

● Center Circle

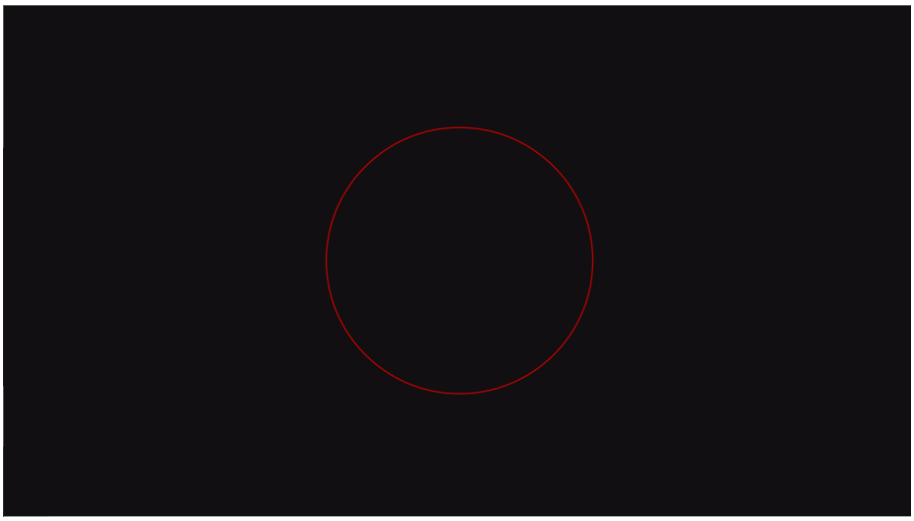


Fig 5-72 Center Circle Aiming Mode

● Center Rectangle

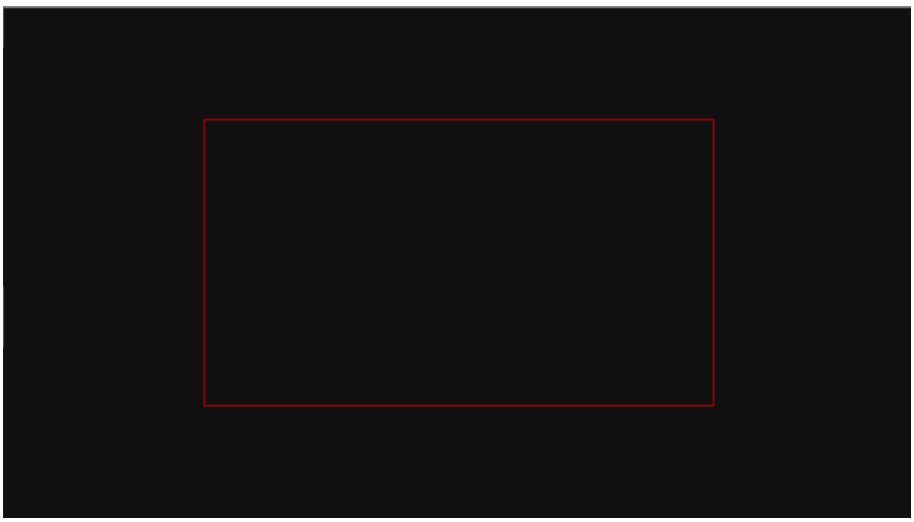


Fig 5-73 Center Rectangle Aiming Mode

● Center Square

Fig 5-74 Center Square Aiming Mode

(3) Choose Color : Choose the Auxiliary Line color. Fig 5-75 is to change the line color.

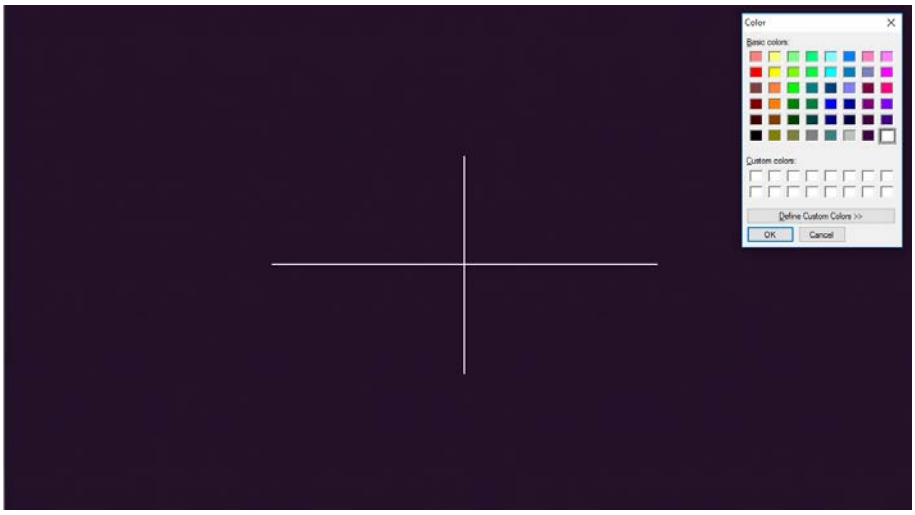



Fig 5-75 Change Line color to White

(4) Line Width : Choose the Auxiliary Line width. Fig 5-76 shows the optional line width, and Fig 5-77 shows a wider line width.

Fig 5-76 Line Width Options

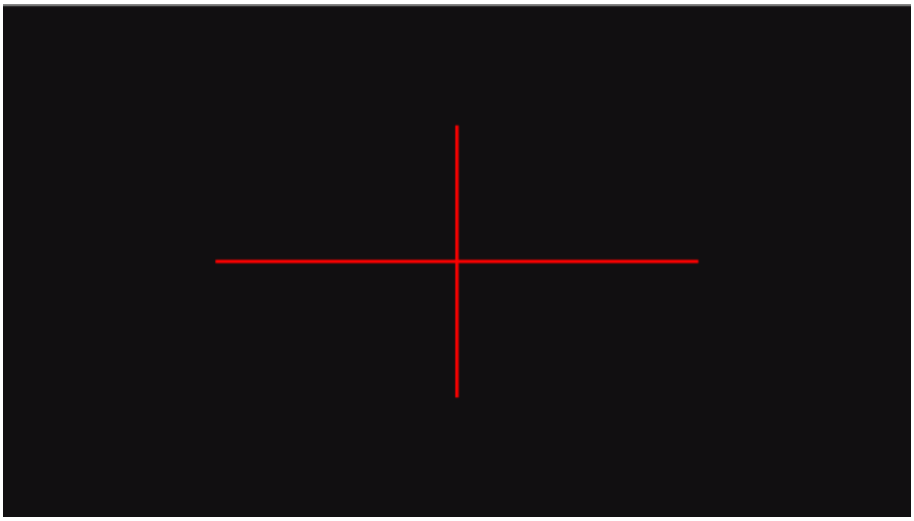


Fig 5-77 Wider Line Width

(5) Crosshair ruler : Self key in unit of gap and display square ruler, see Fig. 5-78.

Additionally, click

to show cross line in the center, see Fig. 5-79.

Fig. 5-78 Crosshair ruler

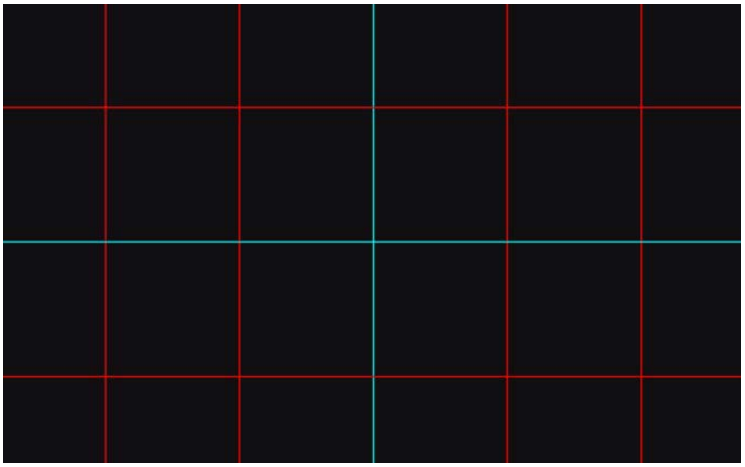


Fig. 5-79 Crosshair ruler with cross line in center

(6) Circle ruler : Self-Key in unit of gap and display same gap's concentric circles, see Fig. 5-80.

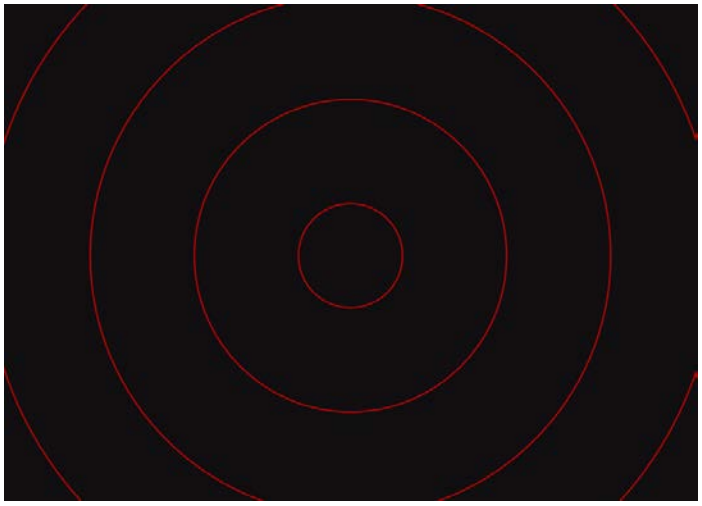


Fig. 5-80 Circle ruler

(7) Auxiliary line setting : individually setup the mesh or concentric circle spacing and cell size. See Fig 5-81

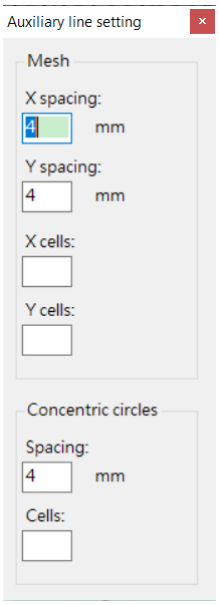



Fig 5-81 Spacing and Cell setup for mesh and Concentric circles.

(8) Anticlockwise Rotation

: To adjust the Mesh angle size to fit sample direction. The rotation is +/- 90degrees.

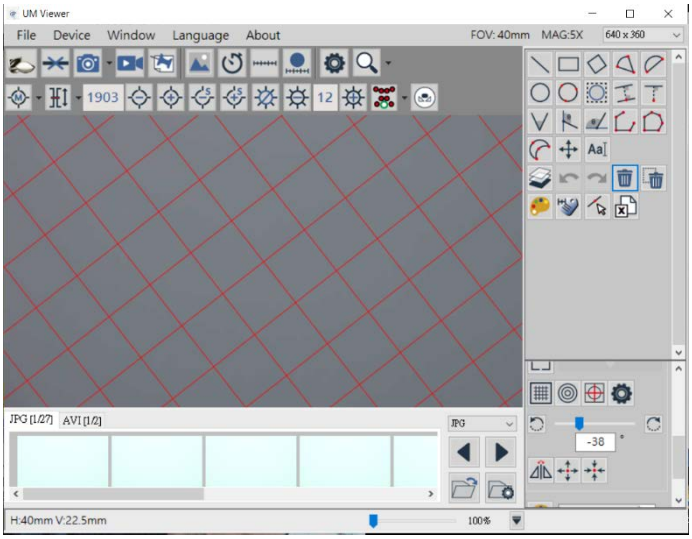



Fig 5-82 Mesh angle shift to-16 degrees

(9) Mirror Angle : switch the shift angle degrees in opposite way.

(10) Release Center position : use mouse to align the Mesh or Concentric Circle to center position directly. Click again to release alignment.

(11) Back to Center position : Return to the center position.

# 6. EDOF Function (Extended Depth of Field)

When there is a height difference in the observed object, some parts of the micro image may appear clear but partially blurred. This is caused by different depths of field.

Through the EDOF function, different depth of field photos can be combined into a single photo where all parts are clear. (When using this function, it is recommended not to exceed a resolution of 1920x1080, as exceeding 1080P may consume more computer resources and potentially cause computer lag.)

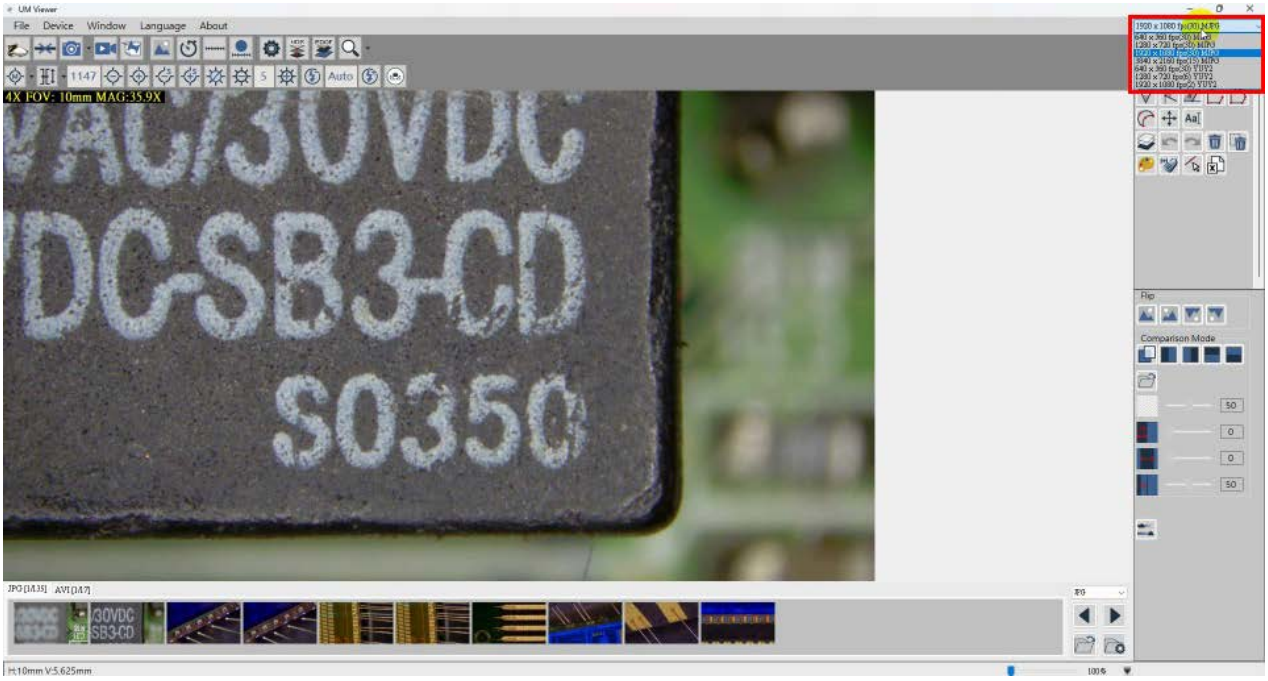



Figure 6-1: Adjust the image resolution at the Upper Right Corner

## 6.1 Function Interface

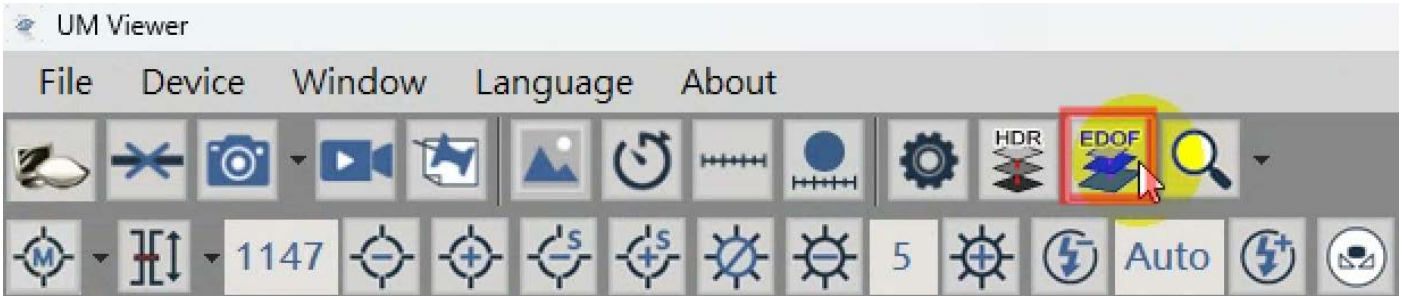



Figure 6-2: Enabling EDOF Function

After enabling remote control, click on the EDOF icon (Figure 6-2), and you will then see the following interface (Figure 6-3).

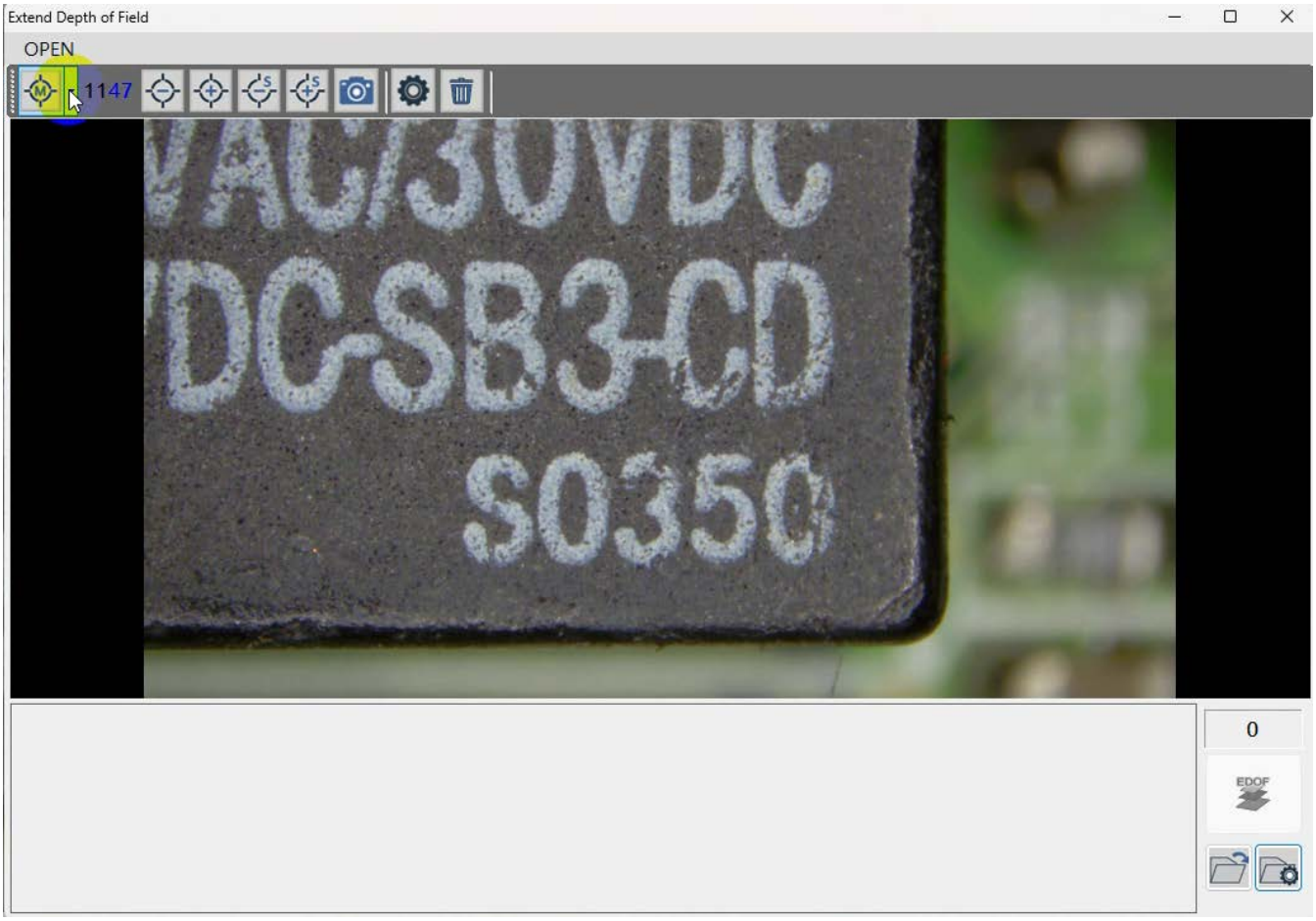



Figure 6-3: EDOF Interface

## 6.2 Function Introduction

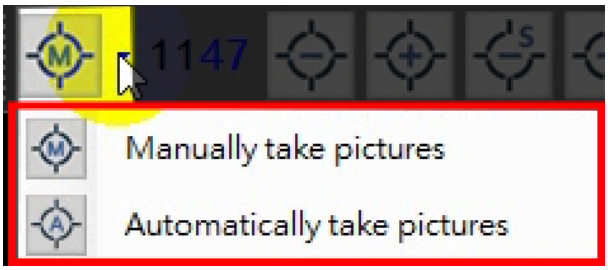



Figure 6-4: Function Selection

The photo mode is divided into two modes: "Manual Capture" and "Auto Capture," each with its own set of operation menus.

Figure 6-5: Manual Capture Menu

Figure 6-6: Auto Capture Menu

- Manual Capture: In this mode, you need to use the manually focusing to adjust the motor position and capture photos one by one from the lowest point to the highest point of the observed object.
  It is recommended to take one photo every 25 to 30 motor steps in high magnification (the actual interval may vary depending on the observed object).

  After capturing the photos, click on the "Merge Images" button

to generate a composite image that support various lenses in different magnifications).

- Auto Capture: In this mode, you need to manually focusing to set the motor's starting position (lowest point of the observed object) by clicking on it

, and then set the end position (highest point of the observed object) by clicking on it

.

  Once the starting and end positions are set, press

the system will automatically capture a series of photos as it moves from the starting position to the end position. This mode eliminates the need to manually adjust the motor position for each photo.

- By clicking on the "Set" button
, you can specify the folder location where the captured images will be stored for output.

- By clicking on the "Open" button
, you can directly open the designated folder where the captured images are being stored for output.

- By clicking on the "Delete" button
, all process files from the current capture session will be deleted.

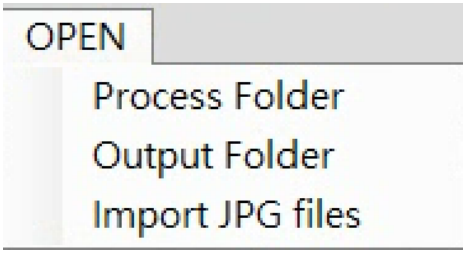


Figure 6-7: Open Menu

- Process Folder: Opening this folder will reveal the location where all the photos taken

at different motor positions are stored before image merged.

- Output Folder: Opening the designated output folder will display the location where the captured images are being saved.
- Import JPG files: This function allows you to import all JPG photos from the folder of Output photos. After importing, you can click on "Merge Directly" to initiate the image synthesis process. (For example, if the output photos are lost but you have retained the process folder, you can use this function to import the process files and perform image merger again.) Clicking on "Settings" will display the following menu (Figure 6-8).

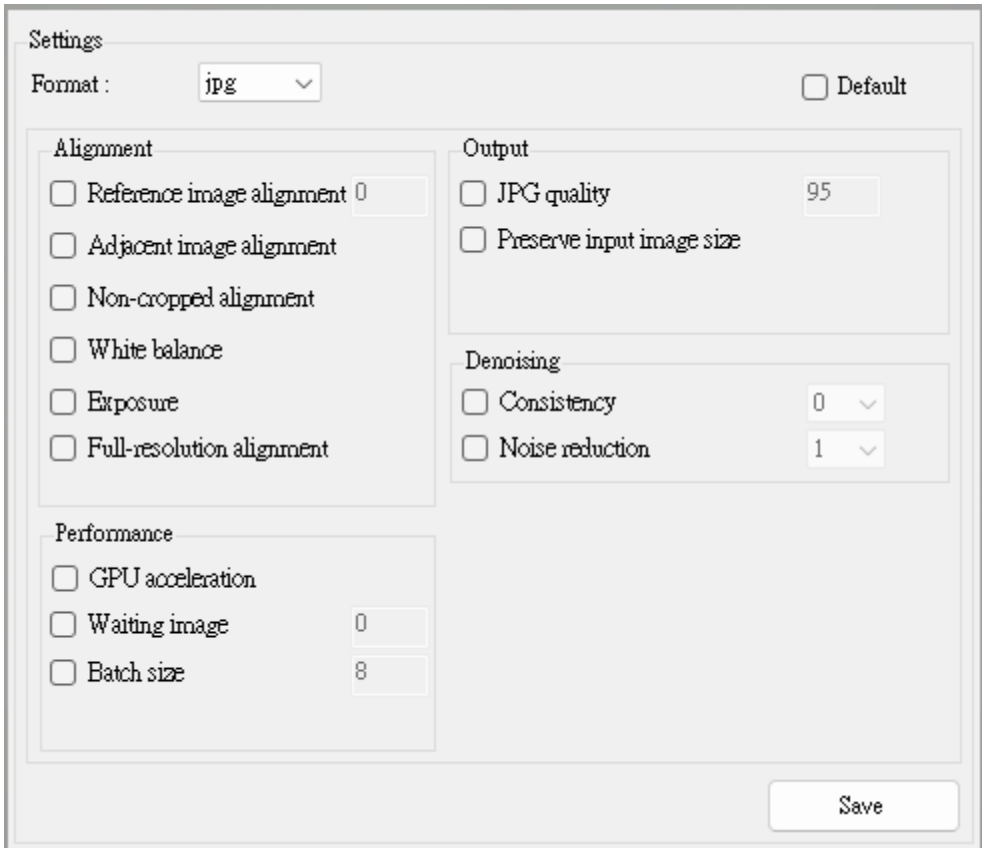



Figure 6-8: Settings Menu

In general, the default settings are automatically selected for image merger. If you are not satisfied with the default mode, you can deselect the default option and select the desired settings (multiple options can be selected). After that, click on "Save" to use the customized settings for image merger.

- Format: You can set the output format to JPG, PNG, or BMP.
- Reference Image Alignment: Specify which image in the process images to use as the alignment reference (e.g., enter 0 for the first image, 1 for the second image, and so on).
- Adjacent Image Alignment: Align each image with its adjacent image.

- Non-cropped Alignment: Maintain the original size of the image during alignment without cropping the edges.
- White Balance compensation: Automatically adjust the white balance of the images.
- Exposure: Automatically adjust the exposure level of the images.
- Full-Resolution Alignment: By default, the resolution is limited to 2048x2048 pixels. This option enforces alignment using the full resolution.
- GPU Acceleration: Utilize GPU acceleration of OpenCL (if available).
- Waiting Image: Set the waiting time (in seconds) before processing begins. This option allows processing to start before all images are fully loaded.
- Batch Size: Set the batch size for merging images, with a default of 8 and a maximum of 32. A larger value consumes more memory.
- JPG Quality: Set the quality level of JPG images from 0 to 100, with a default of 95.
- Preserve Input Image Size: Preserve the original size of the input images, which may result in distortion at the edges.
- Consistency: Set the range from 0 to 2 to reduce noise in the images. A higher value reduces noise but may remove some fine background textures.
- Noise Reduction: Set the range from 1 to 8, with a default of 1, to eliminate noise of approximately +/- 1 pixel value.

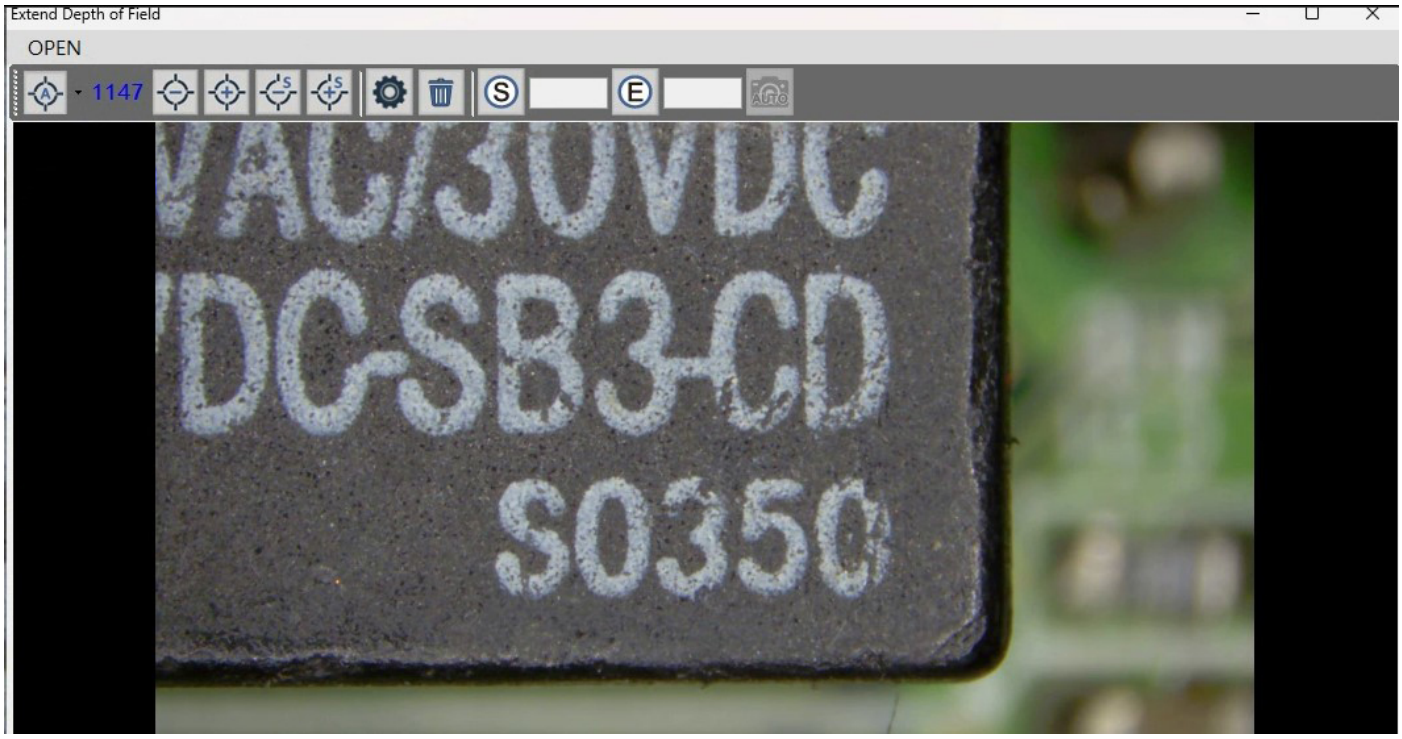



Figure 6-9: Pre-Merged Images

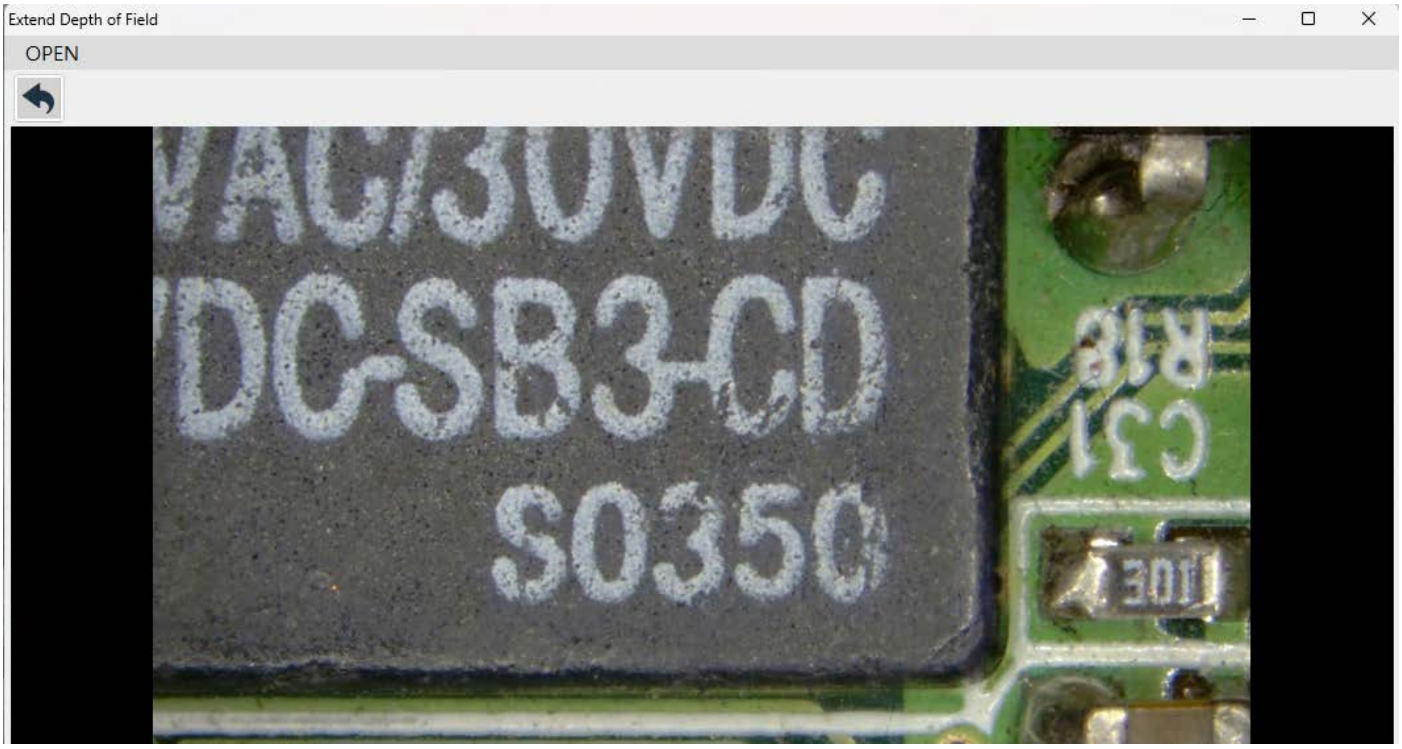



Figure 6-10: Post-Merged Images