

XCamLab Microscope Interactive Teaching Software User Manual

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1 Teacher Side

1.1 Application Scenarios

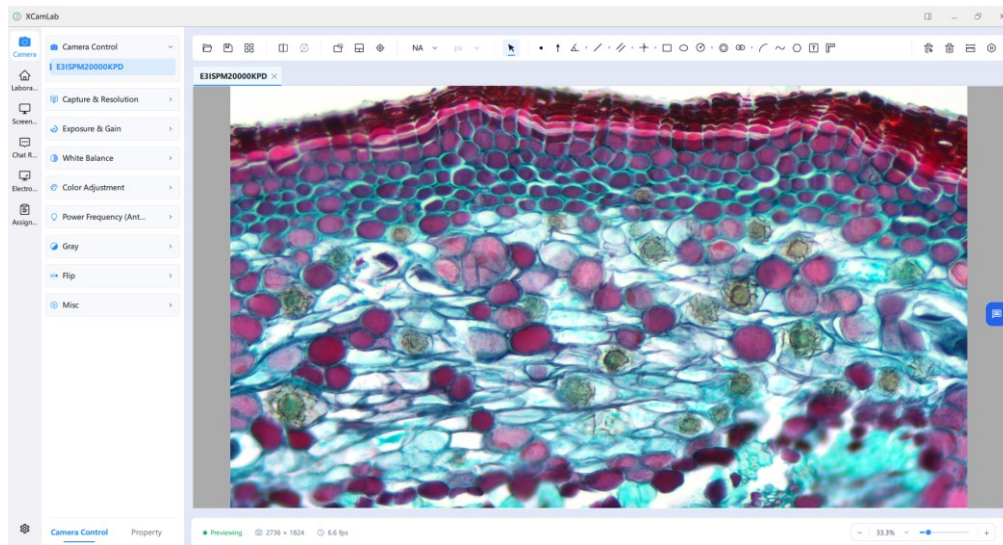


Figure 1 Main Interface

XCamLab is specifically designed for [interactive classroom teaching](#), [microscopy-based laboratory instruction](#), and [centralized management of laboratory or computer-room equipment](#). It is suitable for educational environments such as primary and secondary schools, vocational colleges, universities, microscopy laboratories, and multimedia classrooms.

Key capabilities:

- Real-time acquisition, annotation, and synchronized broadcasting of microscope images
- Screen broadcasting, screen lock (Black Screen), remote startup/shutdown, and centralized classroom control
- Real-time transfer of text messages, files, and images between teachers and students
- Built-in image calibration, measurement tools
- Seamless integration with PCs, tablets, microscope cameras, and student terminals
- Attendance management, assignment distribution, submission collection, and classroom administration
- Remote device maintenance and parameter reset functions

The icons on the left represent the following functions respectively:

Icon	Function
	Camera Control
	Laboratory
	Screen Monitor
	Chat Room
	White Broad
	Assignment

1.2 Software Install & Login

1.2.1 Pre-installation & Pre-launch Preparation

Windows Firewall and third-party antivirus software (360 Security, PC Manager, etc.) may mistakenly block the XCamLab installer and network communication modules, which will lead to installation failure, software crash on launch, or abnormal operation of the account management function. Please adjust firewall settings before installing and launching the software.

1. Turn off Windows Firewall

1) Click Start > Settings > Privacy & security > Windows Security;

2) Open Firewall & network protection, then turn off firewall under Domain network, Private network and Public network respectively.

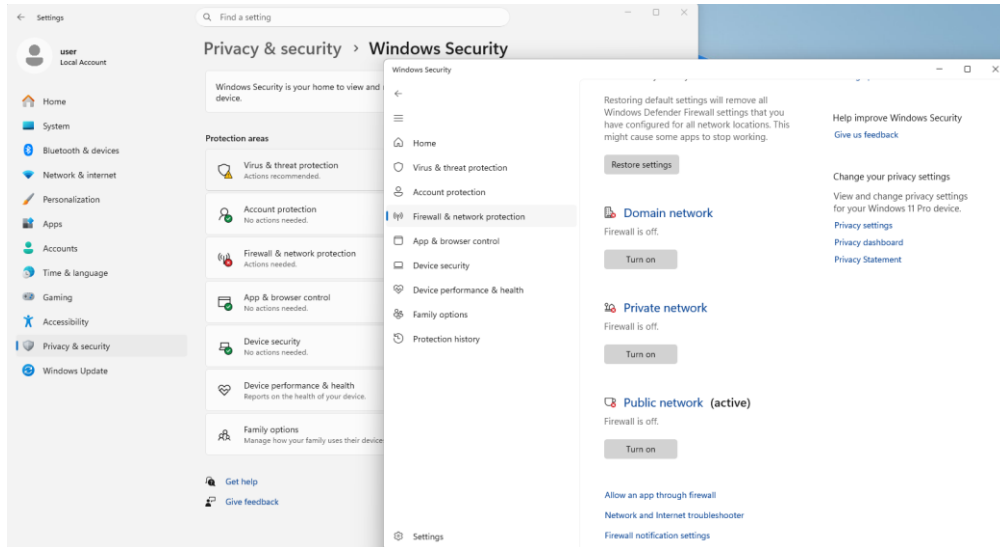


Figure 2 Turn off Windows Firewall

2. Disable protection of third-party security software

Locate the antivirus icon in the system tray at the bottom right of the desktop, right-click and select Exit / Pause real-time protection. Keep it closed until the installation and initial login test are fully completed.

1.2.2 Software Install

Step 1: Run the file "XCamLab_Setup.exe", and click the "Next" button when the following window pops up.

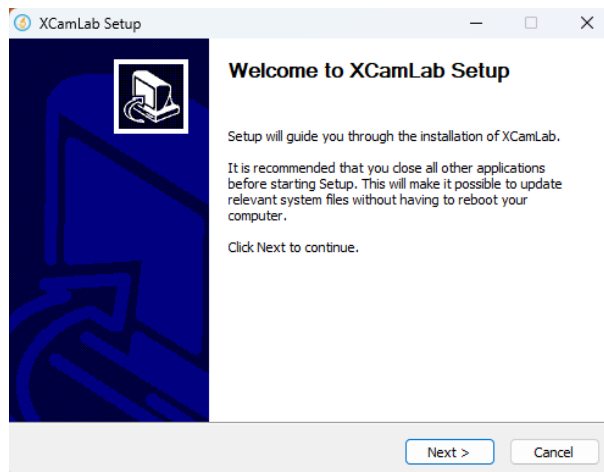


Figure 3 Run the installer

Step 2: When the Select Installation Role window pops up, select Teacher and click the Next button.

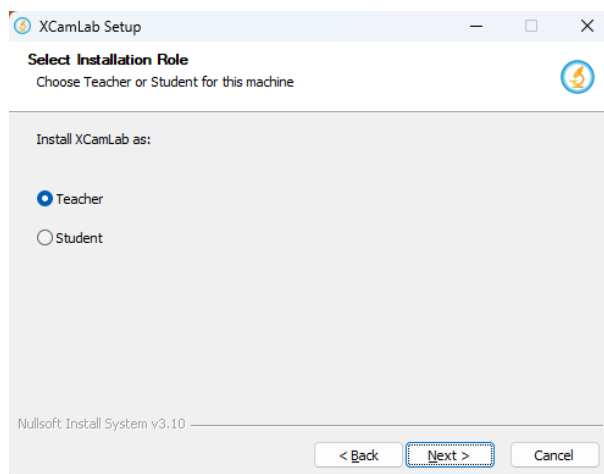


Figure 4 Select Installation Role

Step 3: When the Choose Install Location window appears, click Browse to select your target installation path. No changes are usually required; click Install to start the installation.

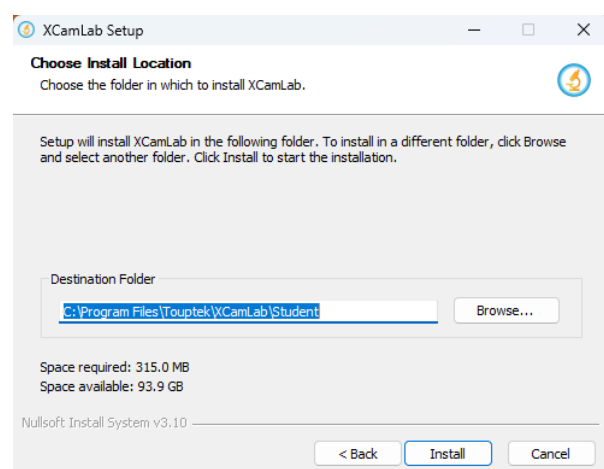


Figure 5 Choose Install Location

Step 4: An installation progress bar will appear during the installation process.

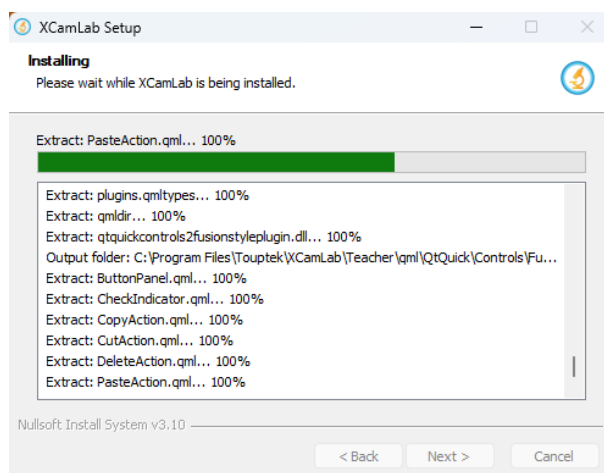


Figure 6 Installing

Step 5: After the progress bar completes and the interface shown below appears, check Create a desktop shortcut. You may select Launch XCamLab Teacher at startup as needed, then click the Finish button.

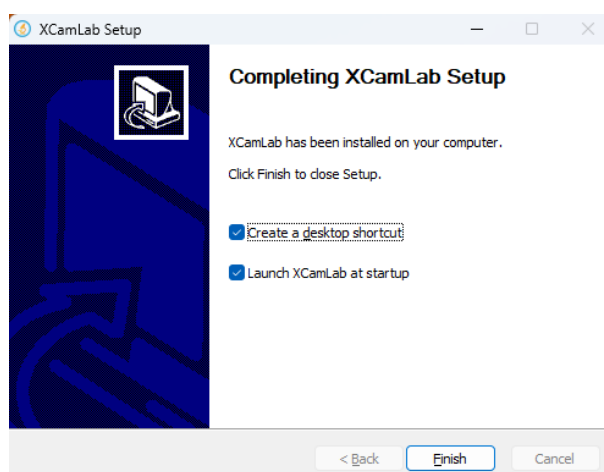


Figure 7 Completing XCamLab Teacher Setup

Step 6: After closing the window, check for the XCamLab icon  on your desktop. The presence of this shortcut indicates a successful installation. If you cannot locate it, search for "XCamLab" via Start > Search.

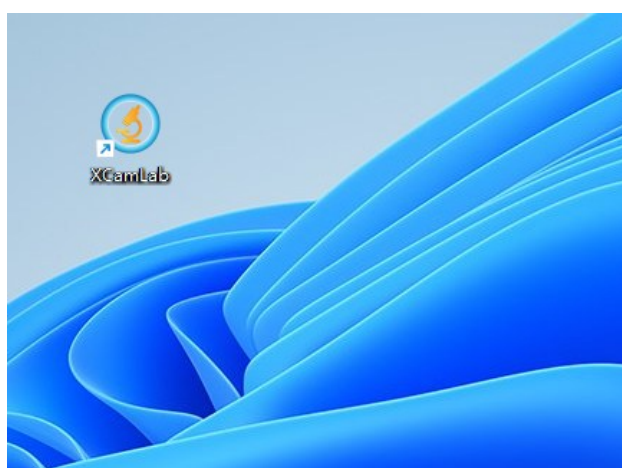


Figure 8 Desktop shortcut

1.2.3 Login

Step 1: Insert the USB License Dongle

The USB license dongle is the [hardware authorization device](#) supplied with XCamLab. It is required for software startup and [license verification](#).

Insert the dongle into a USB port on the teacher's computer and wait for the operating system to recognize the device. After confirming successful detection, proceed with software startup.



Figure 9 USB License Dongle

Step 2: Launch the Software

Launch the application by running "[XCamLab.exe](#)" from the desktop shortcut, Start Menu, or installation directory.

For first-time use, it is recommended to select [Run as Administrator](#) to avoid functionality limitations caused by insufficient permissions.

Step 3: Initial Startup Configuration

When the Windows Firewall dialog appears, select the required network types and click "[Allow Access](#)".

Step 4: Login

Enter the [Username](#) and [Password](#) and click [Login](#) to enter the main interface.



Figure 10 Login Interface

For [image capture and processing](#) without interactive functions, click the lower-right corner [Interactive Mode](#) to switch to [Standalone Mode](#); to access the student information management backend for adding teacher and student information, click the upper-right corner [Administrator](#) option. The interface language can also be manually switched to English, Simplified Chinese, Traditional Chinese and Russian.

1.3 Software Functions

1.3.1 Camera Control

The Camera Control page centrally manages microscopic camera hardware, image collection functions and imaging parameter settings. The interface adopts a layout with a fixed left navigation bar and a right image preview area. The bottom of the left navigation bar can switch between two pages: Camera Control and Property, with corresponding configurations displayed persistently after selection. The right area is the real-time microscopic image preview window. A measurement and annotation toolbar is placed at the top of the page, and the status bar at the bottom synchronously displays image resolution, preview frame rate and zoom ratio.

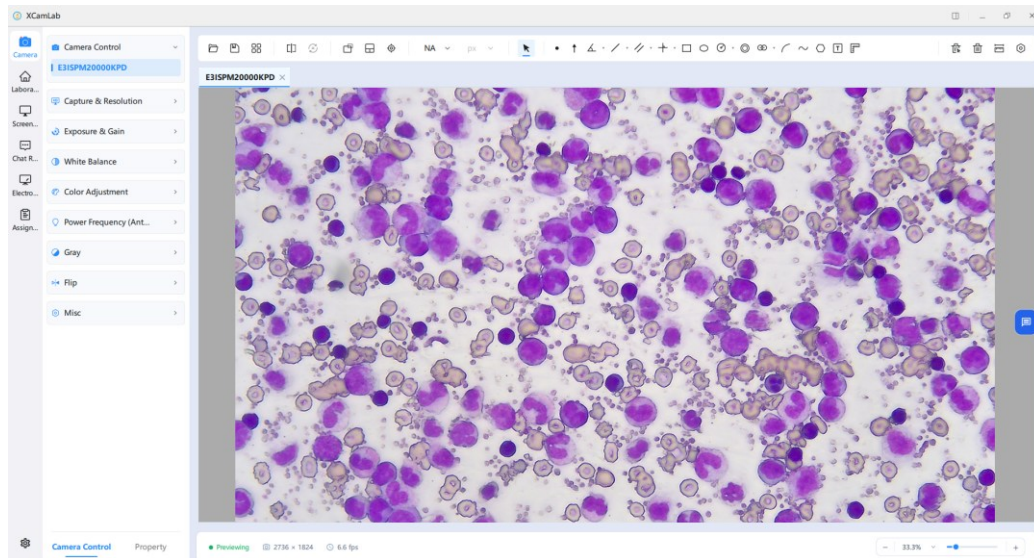


Figure 11 Camera Control Interface

1.3.1.1 Measurement Tools

The Measurement Tools adopts a grouped design consisting of primary icons and expandable sub-tools.

Frequently used tools are displayed directly on the toolbar, while related advanced tools are grouped under expandable menu indicators. Clicking the primary icon displays all available tools within that category.

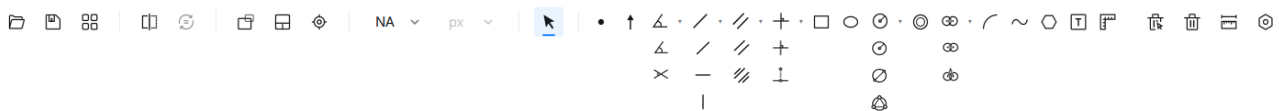


Figure 12 Measurement Tools

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The functions are described below:

Icon	Function
	Open File
	Save File
	Browse
	Split-Screen Comparison
	Sync Zoom and Pan
	EDF
	Stitch
	Auto Edge Find
	Select Magnification for Measurement after Calibration
	Select the desired Measurement Unit
	Object Select
	Point (Point Counter)
	Arrow
	Angle
	4 Points Angle
	Arbitrary Line
	Horizontal Line
	Vertical Line
	Parallel
	Double Parallel Lines
	3 Points Vertical Line
	4 Points Vertical Line
	Rectangle
	Ellipse
	Circle
	2 Points Circle
	3 Points Circle
	Annulus
	Two Circles and its Center Distance
	3 Points Two Circles and its Center Distance
	Arc
	Curve
	Polygon
	Text
	Scale Bar
	Delete selected measurement objects
	Delete all the measurement objects
	Execute Calibration to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer.
	Settings

Dual-pane split-screen synchronous comparison observation interface: the left window displays [the real-time native microscopic preview feed from the camera](#), while the right window loads [saved reference specimen images](#). When using split-screen comparison, users may enable or disable "Sync Zoom and Pan". The two viewports support linked zooming and panning, allowing teachers and students to conveniently compare structural differences of slide samples side by side.

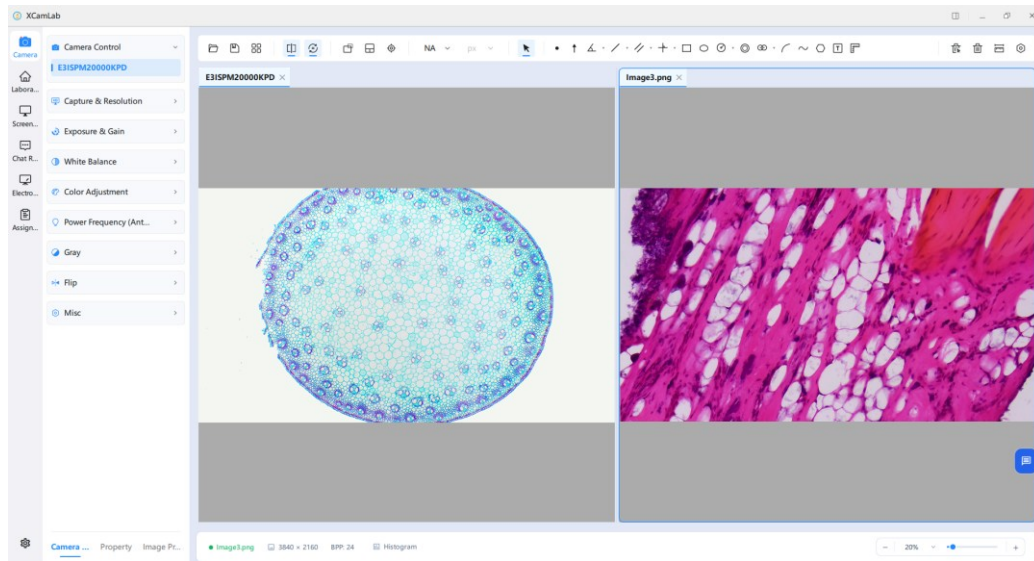


Figure 13 Split-screen Comparison

1.3.1.2 Image Adjustment Tools

The Image Adjustment module is designed to provide professional image optimization for microscope camera output. It enables users to fine-tune image brightness, color reproduction, and image stability, ensuring high-quality microscopic images for measurement, analysis, and classroom presentation.

The Image Adjustment panel consists of nine major functional areas:

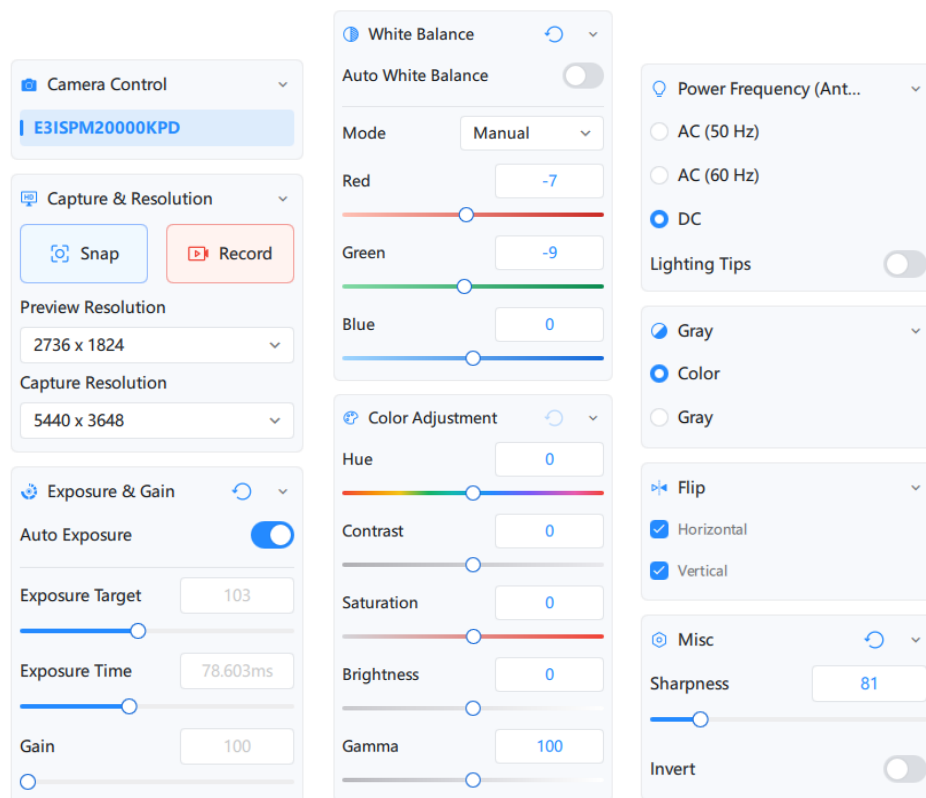


Figure 14 Image Adjustment Panel

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The following table describes all [image adjustment parameters](#) available in the interface:

Function	Description
Camera List	Displays all recognized microscope camera devices
Snap	Capture image and save it to the local disk or USB flash drive
Record	Record video and save it to the local disk or USB flash drive
Preview Resolution	Sets the video Preview Resolution
Snap Resolution	Sets the image Snap Resolution . To improve the frame rate, a lower resolution is usually selected for preview, and a higher resolution for snap
Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
Exposure Target	The reference brightness value of the image in auto exposure mode. The software automatically adjusts the exposure duration and gain to maintain the average brightness of the preview image at the set value
Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
Global Auto	White Balance adjustment according to the window video every time the button is clicked
Manual	Adjust the Red 、 Green or Blue item to set the video White Balance
ROI	Check the ROI item will display a red ROI rectangle on the video window, drag it to the interested area will perform the White Balance according to the area video data
Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
Saturation	Decreases or increases the Saturation of the current image
Gamma	Adjust Gamma level of the video. Slide to the right side to increase Gamma and to the left to decrease Gamma
Contrast	Adjust Contrast level of the video. Slide to the right side to increase Contrast and to the left to decrease Contrast
Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness
Hue	Adjust Hue level of the video. Slide to the right side to increase Hue and to the left to decrease Hue
AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz illumination
AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz illumination
DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
Lighting Tips	Illumination reminder for real-time light-status feedback , helping users avoid poor images from improper lighting.
Color	Select the Color if you want to preview color video
Grayscale	Select the Grayscale if you want to preview grayscale video
Horizontal Flip	Check Horizontal Flip if the horizontal direction of the screen video is opposite to the actual scene
Vertical Flip	Check Vertical Flip if the vertical direction of the screen video is opposite to the actual scene
Sharpness	Adjust Sharpness level of the video
Denoise	Slide left or right to Denoise the video
Negative Film	Can invert the pixels in the video or perform Negative Film processing

Note: Click the button  to restore all parameters on this panel to camera factory defaults.

1.3.1.3 Measurement Properties

Configure visual styles for all Measurement Properties, including [line color](#) and [line width](#). The [Geometry section](#) displays [the pixel length of the currently selected measurement shape in real time](#); the [eye icon](#) on the right controls whether measurement values are [shown or hidden](#) on the image. Users can move measurement objects by dragging; data will be updated in real time. Separate style settings are supported for lines, circles, polygons, text , scale bars, etc.

[Auto Edge Find](#) is a software-based edge recognition algorithm. The edge-search pixel range is set by adjusting the edge-finding radius parameter. [A larger value expands the algorithm's search scope, suitable for specimens with blurred edge transitions. A smaller value only identifies pixels close to the contour, ideal for samples with sharp, clear outlines.](#) After drawing the measurement graphic, the software searches for the specimen's actual boundary around the starting point based on this parameter and automatically corrects the measured contour.

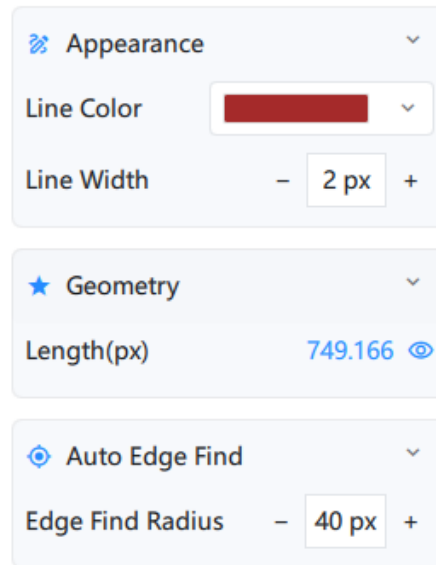


Figure 15 Measurement Properties Panel

1.3.1.4 Image Process

After opening an image file, an **Image Processing** function panel will appear on the left side of the interface. Click to expand it and access various image-editing features. Image Processing consists of five sub-menus: **Mode**, **Process**, **Adjust**, **Rotate**, and **Edit History**, which support in-depth optimization for loaded microscopic slice images. The bottom status bar displays image resolution, color bit depth, **histogram** (showing the distribution of luminance, R, G and B channels within the image), and zoom ratio.

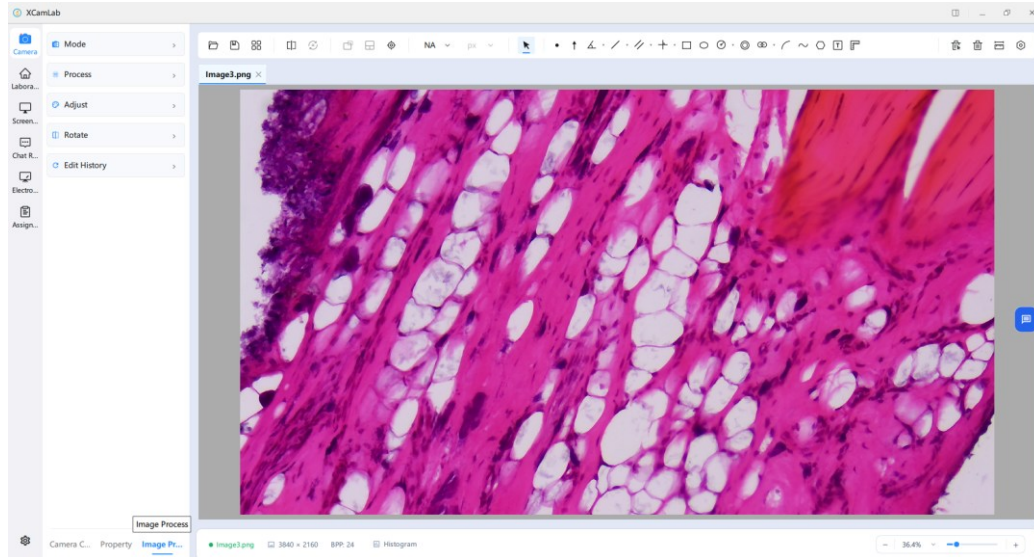


Figure 16 Image Process

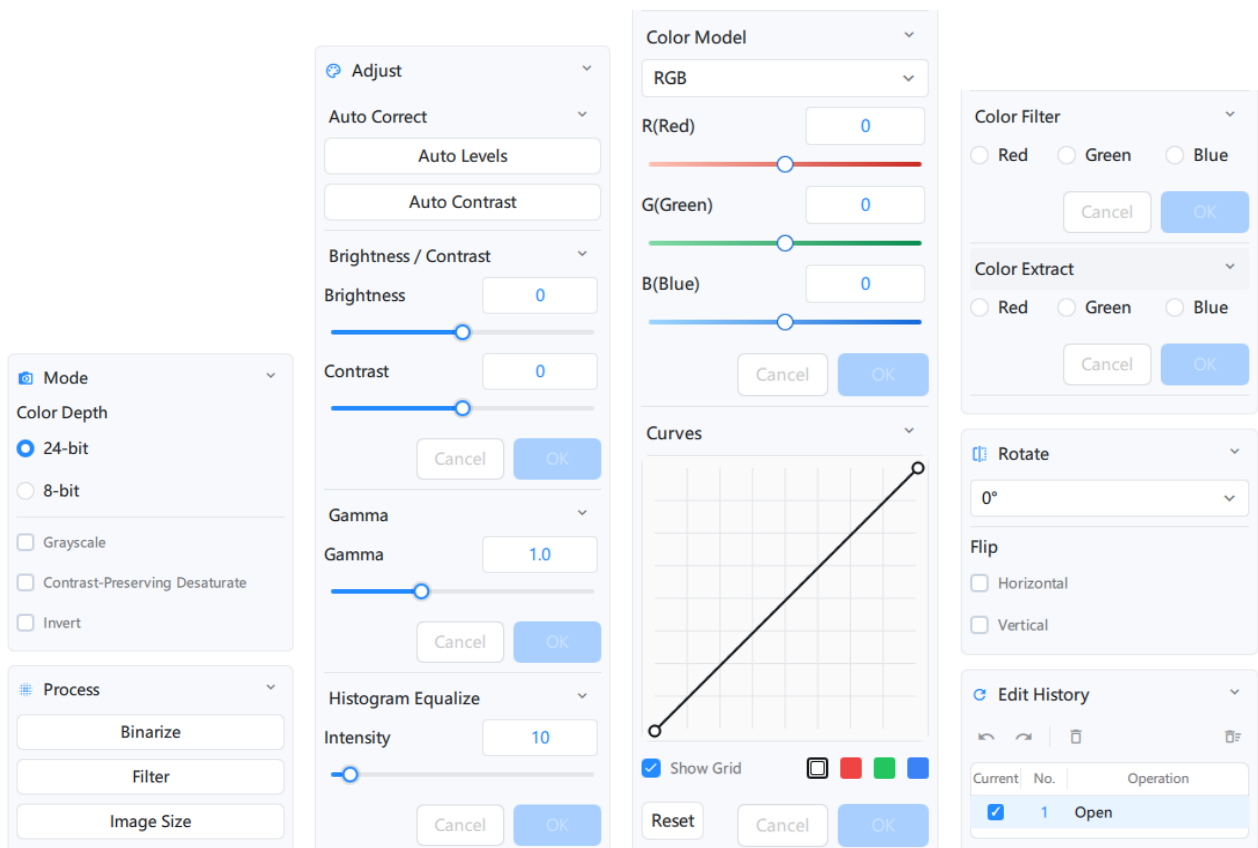


Figure 17 Image Process Panel

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The table below details all image-processing parameter-setting functions on the interface, clearly listing the purpose and operation instructions for each function, helping users quickly master parameter adjustment by referring to the interface.

Function	Description
Color Bit Depth	Switch image between 24-bit and 8-bit color depth
Grayscale	Remove hue and saturation information of pixels, only keep luminance value
Contrast-Preserving Desaturate	Remove color information while retaining the original brightness-contrast of the image
Invert	Perform pixel inversion / negative-film operation on the image
Binarization	Grayscale processing. Pixels above the set threshold turn white, while others turn black
Filter	Multiple filter algorithms for image noise reduction, smoothing and sharpening
Image Size	Reset pixel resolution to adjust image dimensions
Auto-Levels	Automatically set brightness upper and lower limits based on pixel distribution and redistribute pixel values
Auto-Contrast	Automatically adjust image contrast
Brightness	Adjust overall image brightness
Contrast	Adjust image contrast
Gamma	Adjust gamma value to modify mid-tone brightness performance
Histogram Equalization	Improve image contrast and balance pixel grayscale distribution
Color Model	Switch among RGB, CMYK, HSI, HLS, HMS color spaces. Adjust corresponding color-channel parameters after selection
Curve	Precisely tune brightness and color channels via coordinate curve editor
Color Filter	Set selected R/G/B channel value to 0 while keeping the other two channels unchanged
Color Extract	Retain selected R/G/B channel and set the other two channels' values to zero
Rotate	Custom-angle rotation, horizontal flip and vertical flip for images
Edit History	Record every image-processing step; support undo, redo and rollback to previous states

1.3.2 Laboratory

The top of the [Laboratory interface](#) supports [computer room switching and status statistics](#). Use the [drop-down menu](#) in the upper right corner to [switch](#) between different managed computer rooms. Real-time statistics of online and offline devices are displayed to help teachers grasp the status of student terminals quickly. Shortcut buttons including [Refresh](#), [Student List](#) and [Edit Layout](#) are provided to synchronize device status, view student information and customize seat layout.

The main area displays each student terminal in numbered cards. [Cards with blue borders](#) indicate [online devices](#), while [gray icons](#) indicate [offline devices](#). Different running status of online devices can also be identified via labels on the cards.  represents Windows device,  represents Android tablet.

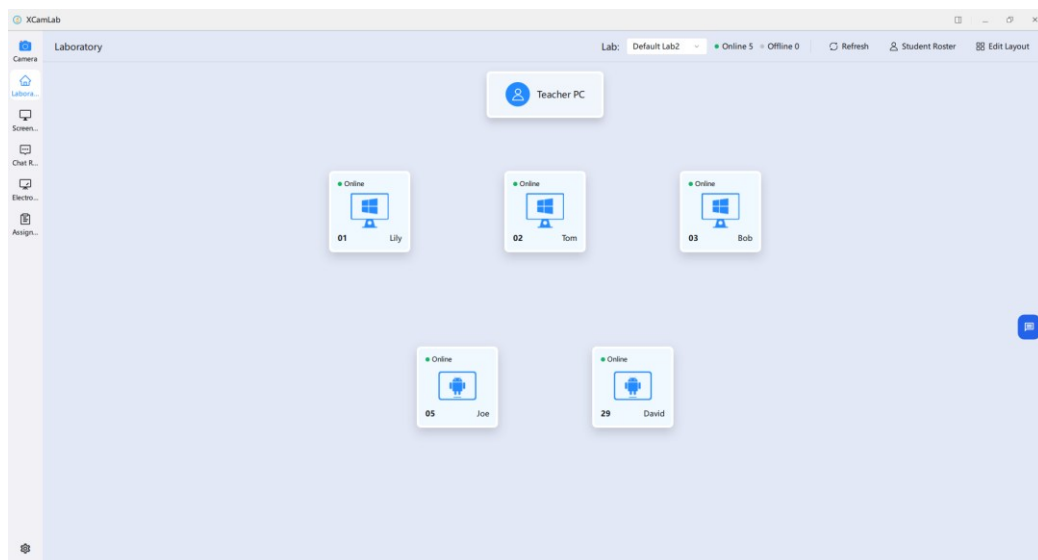


Figure 18 Laboratory Interface

1.3.2.1 Student Roster Function

Data cards at the top show overall class status: total number of [students](#), number of [online devices](#), [attended students](#) and [pending attendance confirmations](#). Teachers can [select target classes](#), search for students by [name](#) or [student ID](#), and filter student lists by attendance status via the drop-down menu.

The list below displays detailed information including [username](#), [student ID](#) and [attendance status](#) for each student. Teachers can manually [set attendance status](#) as [Present](#), [Leave](#), [Late](#), [Absent](#) or [Pending](#). The [Roll Call](#) function sends notifications to all student terminals with [automatic status update](#) after roll call. Attendance data can be exported as CSV files for record keeping.

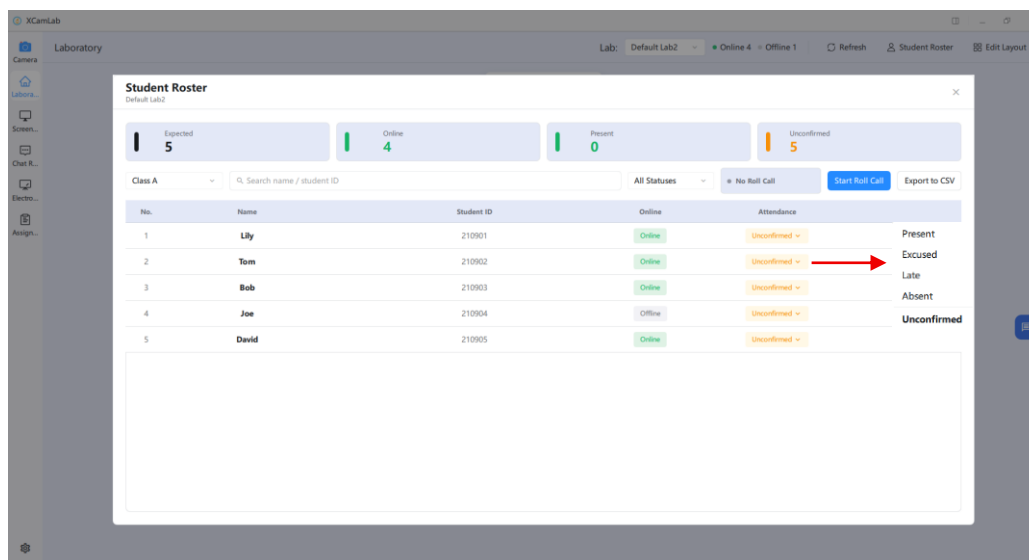


Figure 19 Student Roster Function

1.3.2.2 Layout Editor Function

The Layout Editor interface presents seats in a grid. Users can [customize the number of rows](#), [columns](#) and [total devices](#), [add or remove](#) seats, and [adjust](#) layout specifications. Blank seat cards in the material bar on the right can be [dragged to the grid](#) for seat arrangement. Quick layout operations including arrange by row, arrange by column and reset layout are available. [Right-click a seat to remove it](#).

Click [Save Layout](#) to apply the customized layout to the main laboratory interface, or click [Delete Layout](#) to restore default settings.

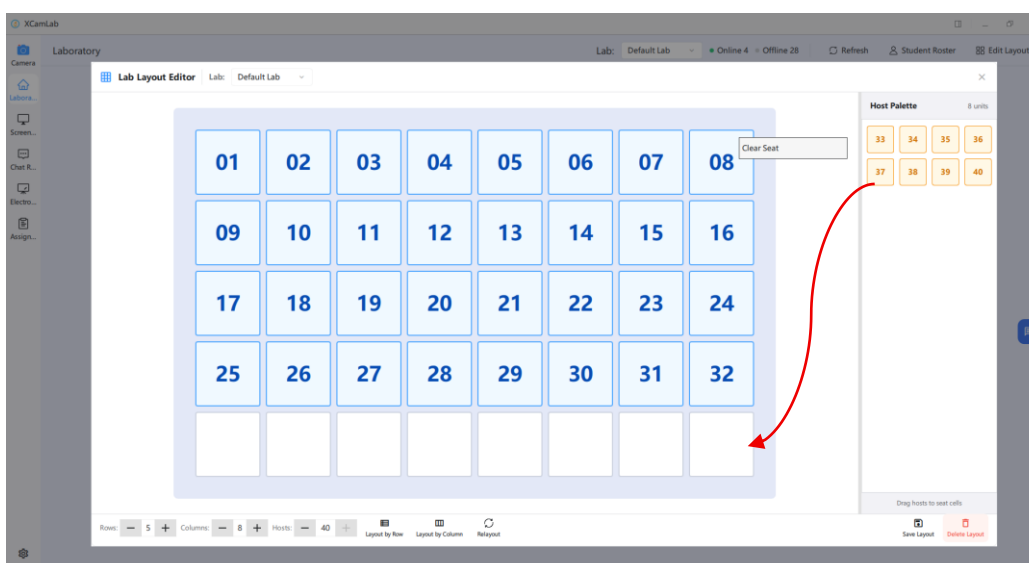


Figure 20 Layout Editor Function

1.3.2.3 Raise Hand Assistance

The Raise Hand Assistance function provides real-time cross-page reminders and two-way processing for student assistance requests. No matter which interfaces the teacher is using, **the online student list will pop up automatically** with a prominent hand-raising icon next to the corresponding student when a student **raises a hand for help**. The corresponding seat icon on the laboratory interface will also be marked synchronously.

Teachers can click the hand-raising icon  in the student list to mark **the request as processed**, and the icon will **disappear**. The processing status will **be synchronized to the student terminal in real time**, ensuring no student requests are missed.

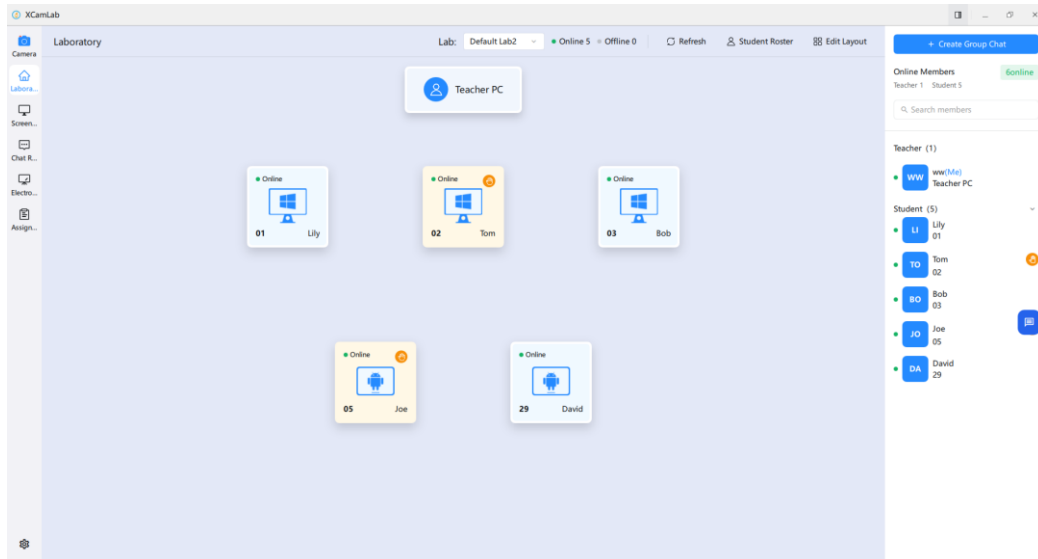


Figure 21 Raise Hand Assistance

1.3.3 Screen Monitor

The Screen Monitor function allows teachers to view student terminal operations in real time and conduct classroom management.

The top toolbar provides view control options: use the **Layout** drop-down menu to switch grid modes from **2×2** to **5×5**. Devices can **be filtered** to show **all devices**, **only online devices**. The **Refresh** button ensures real-time screen updates. Each preview window is labeled with **student ID**, **online status** and **real-time screen content**. Page turning buttons are available when there are more students than the single-page display limit.

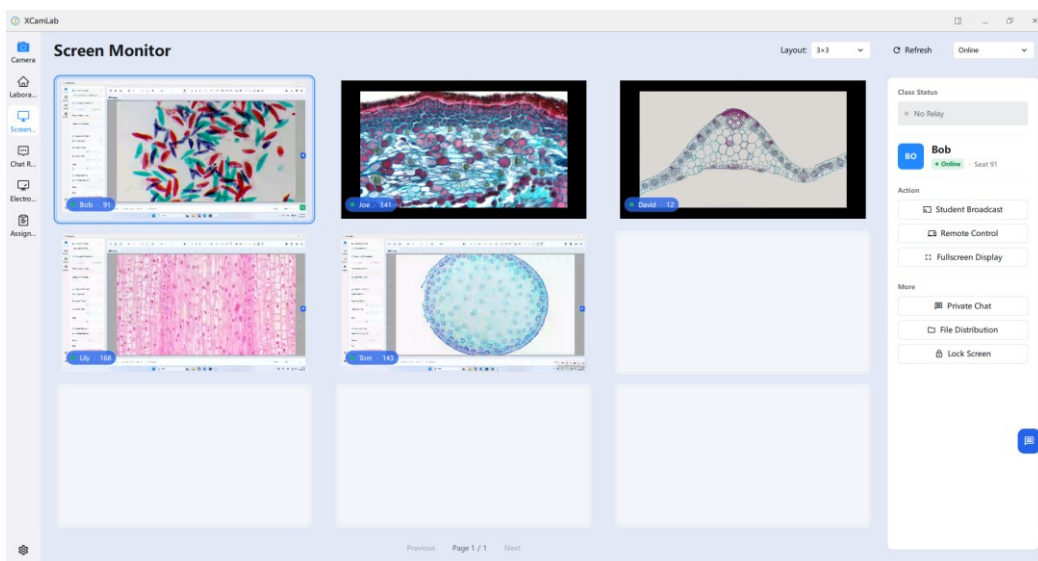


Figure 22 Screen Monitor Interface

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Click any student preview window to open the operation panel on the right. Functions are listed as below:

Function	Description
Student Broadcast	Broadcast the selected student's screen to all terminals for sharing operation examples or problem-solving steps
Remote Control	Remotely operate the student's terminal to assist with operations or correct errors (Supports AIOCAMW Cameras only)
Fullscreen Display	Maximize the preview window to view screen details (Unavailable while teacher broadcast is active)
Private Chat	Conduct one-on-one text communication with the student for individual guidance
File Distribution	Send teaching materials or assignment files to the student's terminal (Supports AIOCAMW Cameras only)
Lock Screen	Lock the student's terminal screen to keep students focused on teaching content

1.3.4 Chat Room

The Chat Room interface has a [session list](#) and [search bar on the left](#). Teachers can [search for students](#) or [switch between group chats and private chats](#). Click the delete icon next to chat cards to [remove](#) records. The main middle area displays [chat history](#) in chronological order. The input area at the bottom supports [text input](#), as well as [image sending](#), [emoji selection](#) and [screenshot tools](#). Teachers can send courseware, documents and screenshots to highlight key teaching points.

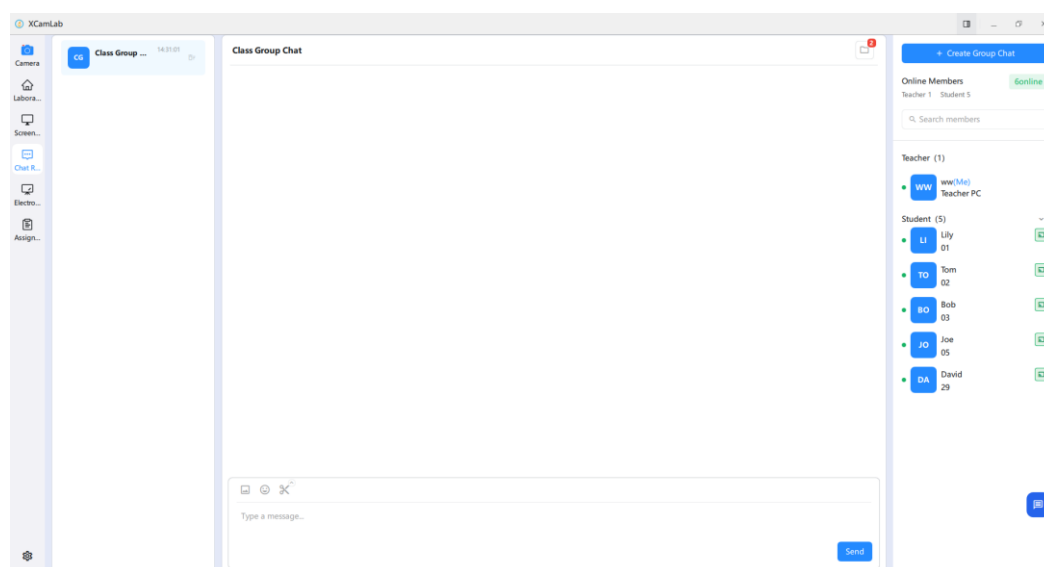


Figure 23 Chat Room Interface

1.3.4.1 Group Files

Click the icon at the top right  to open the class group shared files window. The top search box can [search](#) files within the group, the top right corner supports [refreshing](#) the file list, and all files can be [sorted by upload time](#). The list displays [file name](#), [size](#), [uploader](#) and [upload date](#), with download and delete operation buttons on the right of each file. The bottom of the interface shows [the total number of files](#) and [storage space usage](#). The blue [Upload File](#) button at the bottom right allows you to select courseware, specimen images, spreadsheets and other materials from [local storage](#) to upload to the class group. All students can download and view uploaded files, making it easy for teachers to distribute experimental learning materials uniformly. Teachers have permission to delete all files, while students may only delete files uploaded by themselves.

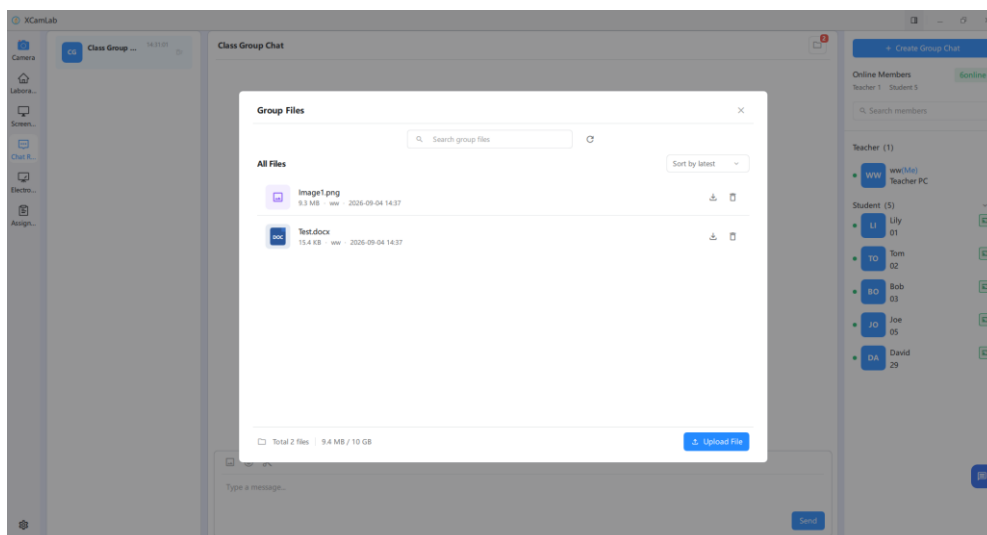


Figure 24 Group Files

1.3.4.2 Online List Function

During broadcast teaching, status icons are displayed next to student entries:

- : The student is [receiving broadcast](#) normally
- : The student has [declined the broadcast](#)
- : The student's broadcast acceptance is [pending confirmation](#)

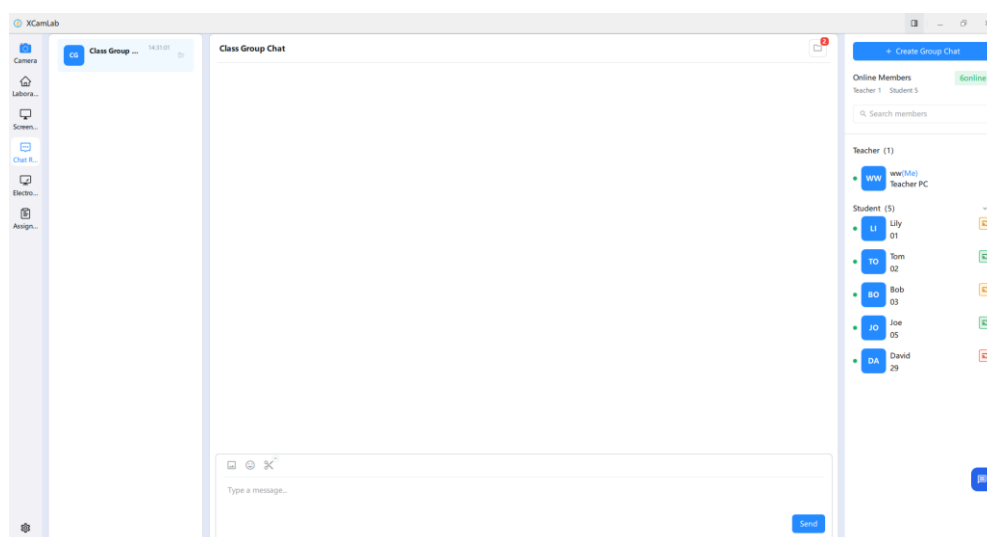


Figure 25 Broadcast Status Feedback

Right-click any student entry in the online list to start a [Private Chat](#), which opens an independent [mini chat window](#). A floating icon at the bottom right of all interfaces can also open the [mini chat window](#) for [one-on-one communication](#).

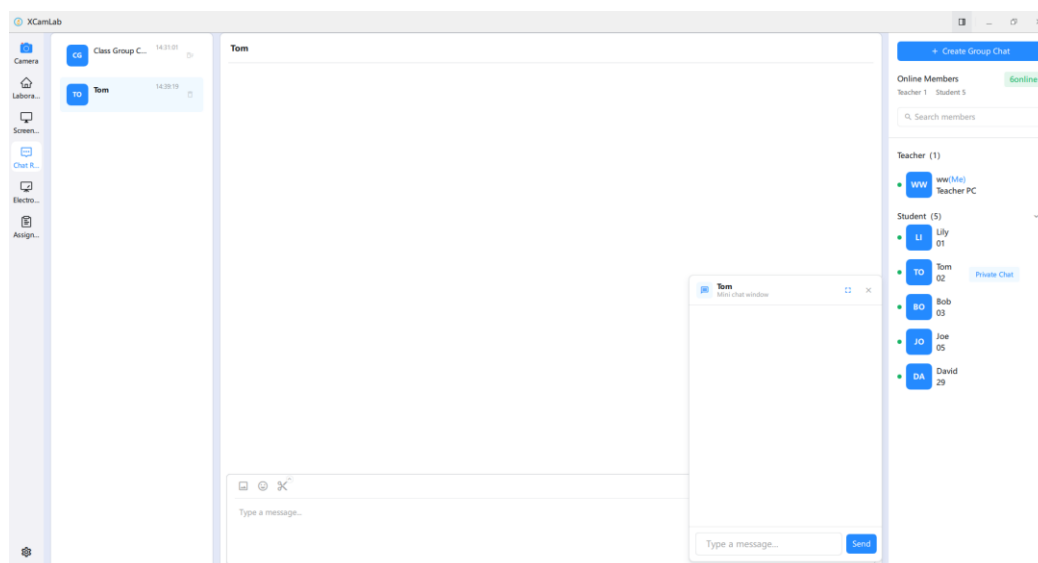


Figure 26 Mini Chat Window

1.3.5 Electronic Whiteboard

The Electronic Whiteboard is a real-time annotation tool for interactive teaching. It can work with screen broadcast function to improve teaching efficiency.

Tools from left to right: [Pen](#), [Highlighter](#), [Arrow](#), [Rectangle](#), [Circle](#), [Text](#), [Eraser](#), [color selector](#), [line width adjuster](#), [line style](#) (available for arrows, rectangles and circles), [Save Drawing](#), [Undo](#), [Redo](#), [Clear](#) and [Cancel](#). Teachers can make annotations on knowledge points, experimental steps and problem-solving ideas, and push the content to all student terminals in real time.

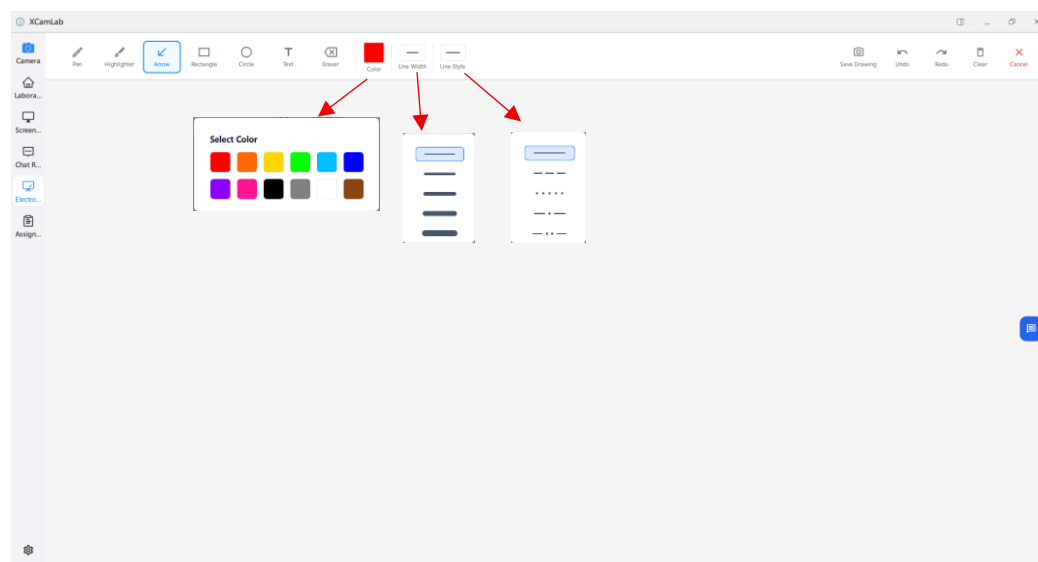


Figure 27 Electronic Whiteboard Interface

1.3.6 Assignment

The assignment management module realizes full digital management of teaching assignments, including [assignment publishing](#), [progress tracking](#), [collection](#), [batch review](#) and [score export](#). It adapts to various scenarios such as experiment reports and exercises, and streamlines teachers' assignment management work.

A class [drop-down selection box](#) is located at the [upper right corner](#) of the page, allowing you to [switch between different teaching classes](#) to view corresponding assignment data. Data cards at the top show the total number of [published assignments](#), [assignments due within 6 hours](#), [completed/expired assignments](#) and [involved classes](#). Users can [search](#) assignments by [title](#), [description](#) or [class](#), and [filter](#) assignments by status ([All](#) / [In Progress](#) / [Expired](#)). Click any assignment card to enter [the details page](#).

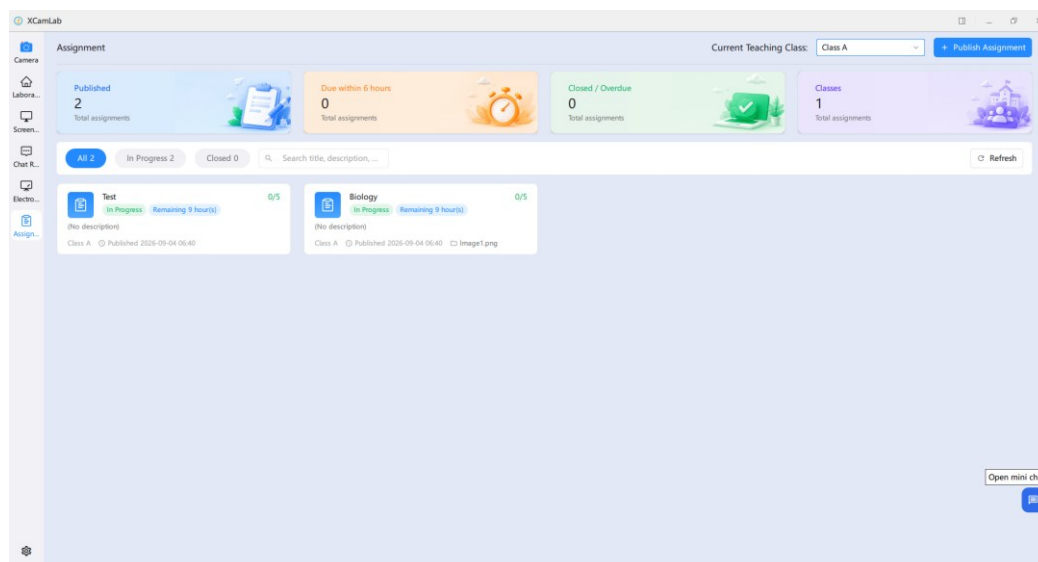


Figure 28 Assignment Interface

1.3.6.1 Publish Assignment Function

To create and publish a new assignment, first [select your target class](#), then [input the assignment title](#) and [fill out the assignment description](#) to specify task requirements. You may [set a deadline](#) for the assignment, or leave this field blank if no deadline is needed, and [uploading attachments](#) is optional. After completing all relevant settings, [click Publish Assignment](#) to [distribute](#) the task to the selected classes, and students will receive relevant notifications on their mobile terminals.

Figure 29 Publish Assignment Panel

1.3.6.2 Assignment Details & Review Interface

The assignment details page displays full assignment information including [Title](#), [Description](#), [Class Size](#), [Deadline](#) and [Attachments](#). Shortcut operations including [Edit](#), [Replace Attachment](#), [Batch Review](#) and [Delete](#) are available.

Statistics cards show overall submission status: [completion rate](#), [number of reviewed](#), [pending review](#), [rejected](#) and [unsubmitted assignments](#). The student list displays submission status of each student, with search and filter functions. Supports [downloading all submissions](#) to the default assignment path. Scores can be [exported](#) as files for record keeping.

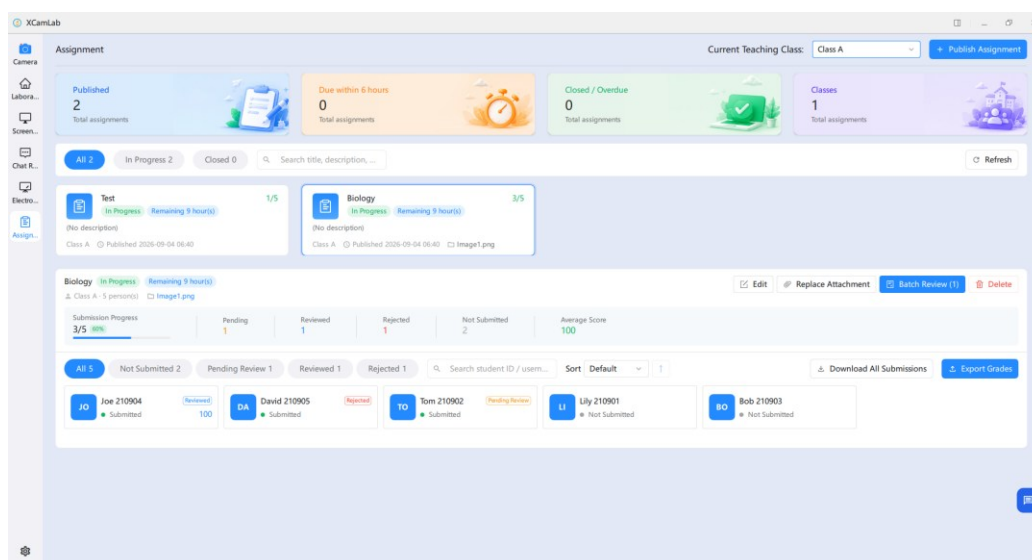


Figure 30 Assignment Details Interface

Click a [pending submission](#) to open the [review window](#). Teachers can [download](#) and view submitted files, [enter scores and comments](#), then click [Review](#) to confirm or [Reject](#) to return the assignment. All results are synchronized to student terminals [in real time](#).

Review - Ethan Carter 200901


0001 (2).jpg
2026-09-07 09:45

Download & View

Enter a score and feedback, then click Review; click Reject to return it.

Score

0-100

A score is required to approve (optional for rejection)

Feedback

Cancel
Reject
Review

Figure 31 Review Panel

1.3.7 Quick Operation Tools

The quick operation bar integrates frequently used classroom control and interaction functions for one-click access without switching interfaces.

The detailed function descriptions are as follows:

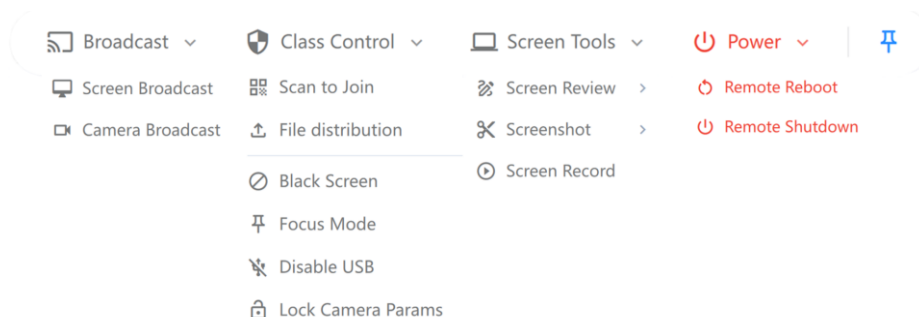


Figure 32 Quick Operation Bar

Function	Description
Screen Broadcast	Push the teacher's screen content including courseware and operation demonstrations to all student terminals in real
Camera Broadcast	Push real-time microscopic images to student terminals to display samples and experimental details
Scan to join	Mobile devices scan QR codes to join class and receive teaching content
File distribution	Send files in batches to selected classes for all students to download
Black Screen	Lock all student terminals with a customized prompt on the screen
Focus Mode	Students cannot switch to other programs and are limited to operations inside XCamLab
Disable USB	Restrict USB access on all student terminals to prevent unauthorized file transfer and virus infection
Lock Camera Params	Lock camera settings on student terminals to keep experimental images consistent
Screen Review	Enable on-screen annotation for highlighting key content during teaching
Screenshot	Capture screenshots of teacher or student screens and save as image files; support capturing windows in hidden state
Screen Record	Record teaching processes and save as video files for later review and sharing
Remote Reboot	Batch reboot student terminals remotely
Remote Shutdown	Batch shut down student terminals remotely after class

The bar pops up automatically when hovering the mouse to the top of the page, and can be switched between [floating](#) and [fixed mode](#) by clicking .

1.3.7.1 Screen Broadcast

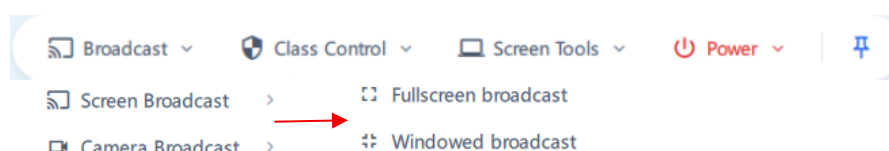


Figure 33 Screen Broadcast Quick Button

Broadcast is divided into two modes: Fullscreen broadcast and Windowed broadcast, which synchronously transmit the teacher's computer screen to all student terminals. When choose [Fullscreen broadcast](#), the teacher's screen covers the entire display of student devices, hiding their original interface, ideal for centralized teaching and key content explanation, and students cannot exit the broadcast. When choose [Windowed broadcast](#), the teacher's screen will not block the students' original operation interface. If students switch to other function pages, the teacher's broadcast feed will float as an independent small window on their screens, allowing students to view the broadcast while independently operating software and observing microscopic images.

XCamLab Microscope Interactive Teaching Software User Manual

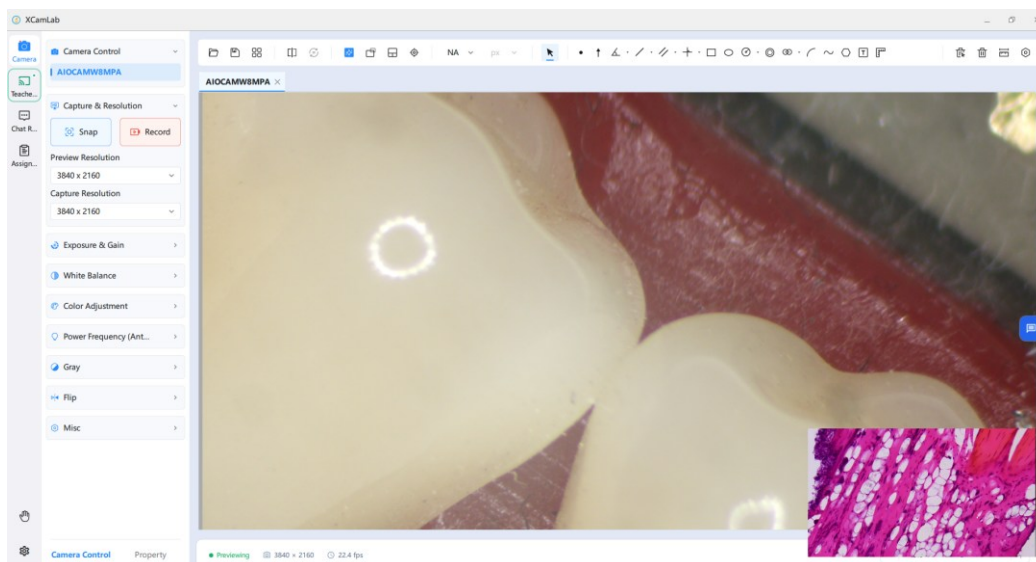


Figure 34 Windowed broadcast > Student side independent small window

This pop-up window is Select Display for broadcast. When multiple monitors are connected to the teacher PC, this window will pop up and show real-time previews of **Display 1** and **Display 2**. You may select one monitor as the broadcast source. After picking the target display preview, click **OK** to push its screen content to all student devices, or click **Cancel** to exit broadcasting.

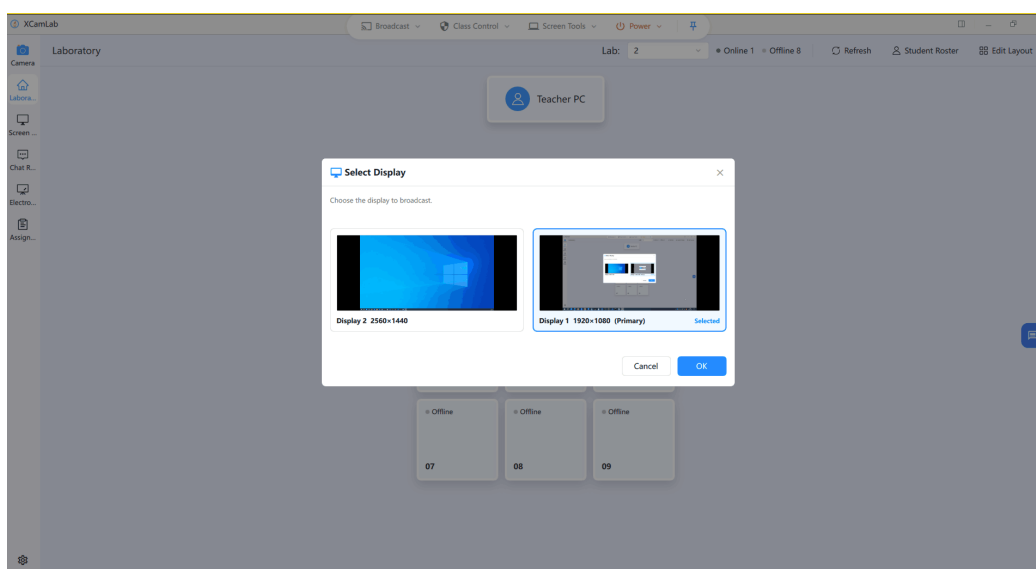


Figure 35 Select Display for Broadcast

1.3.7.2 Scan to join

The teacher terminal can generate a unique classroom QR code with one click. Mobile tablets and smartphones shall first connect to the [classroom local Wi-Fi network](#), then scan the [QR code](#) to redirect to the [web-based interactive classroom](#), and log in rapidly by entering student ID and password. After accessing via mobile devices, users can fully utilize all interactive teaching features including [Teacher broadcast](#), [Chatroom](#) and [Assignment](#). This function enables flexible in-class experimental learning on mobile devices and fits mixed multi-terminal teaching scenarios.

Teachers may print out the generated classroom QR code and post it for students to scan and log into the web-based classroom conveniently.

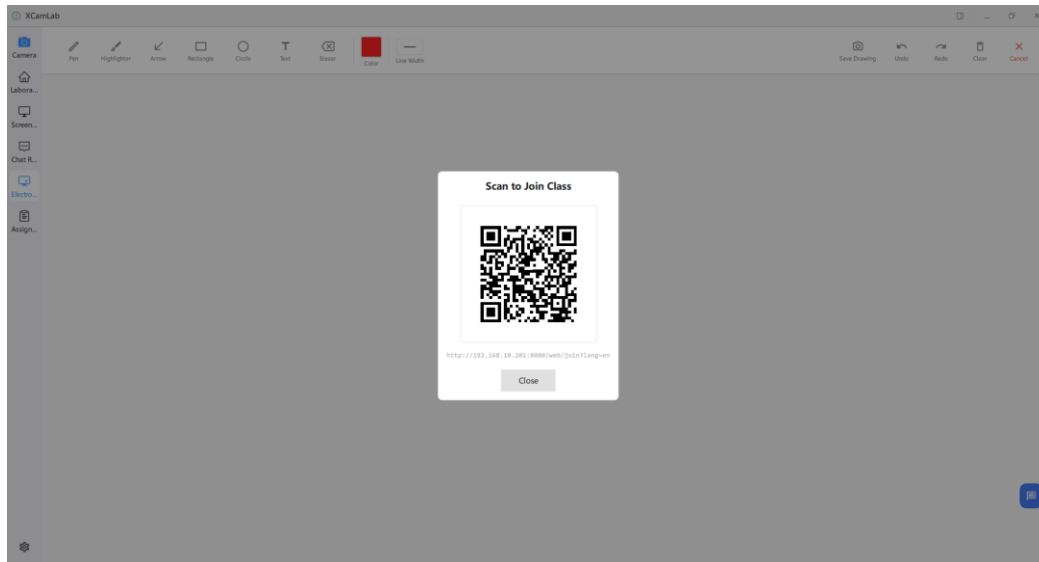
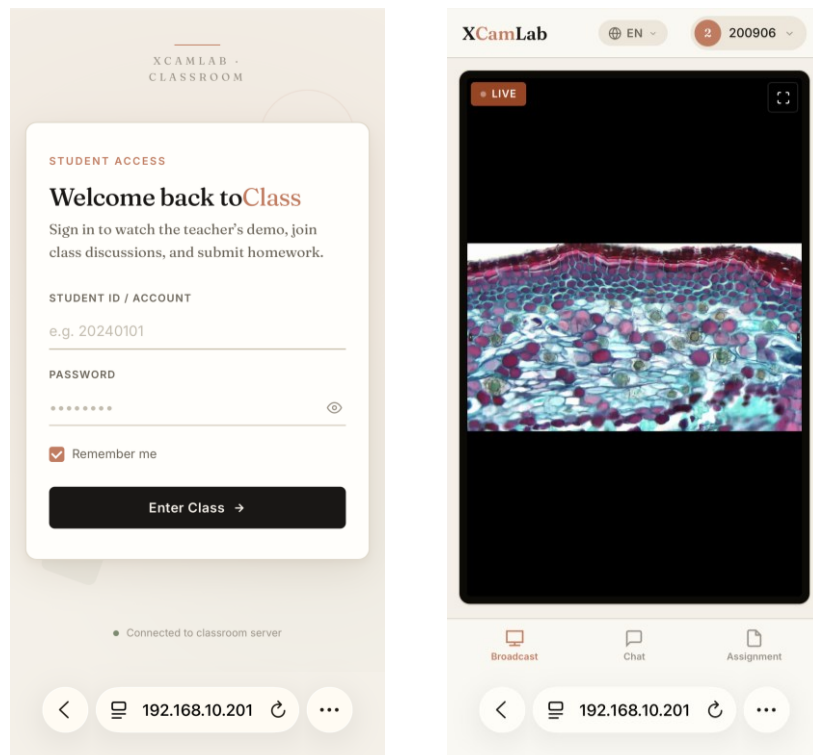


Figure 36 Scan to join Panel

The following shows the web XCamLab interactive classroom with [iOS phones](#) as an example.



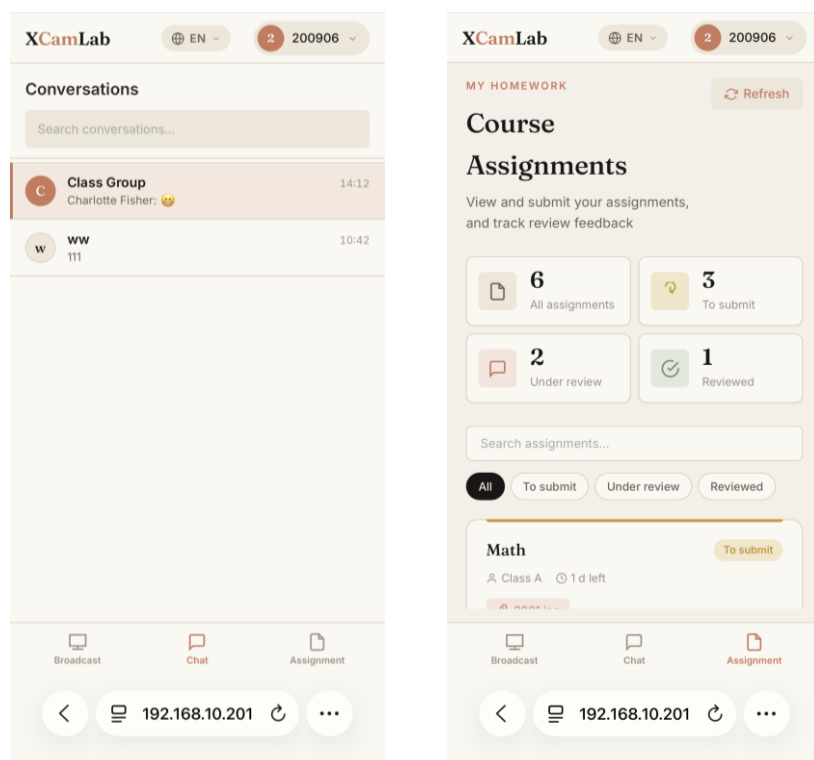


Figure 37 Demonstration of Web-based Interactive Classroom on iOS Mobile Phones

1.3.7.3 File distribution

The file distribution function supports batch delivery of large-volume experimental files. Teachers can [select target class](#), add local large files and customize [transmission speed](#) (up to 300 Mbps). The interface displays a list of all online students receiving files. This feature [only supports distribution to AIOCAMW all-in-one devices for now](#).

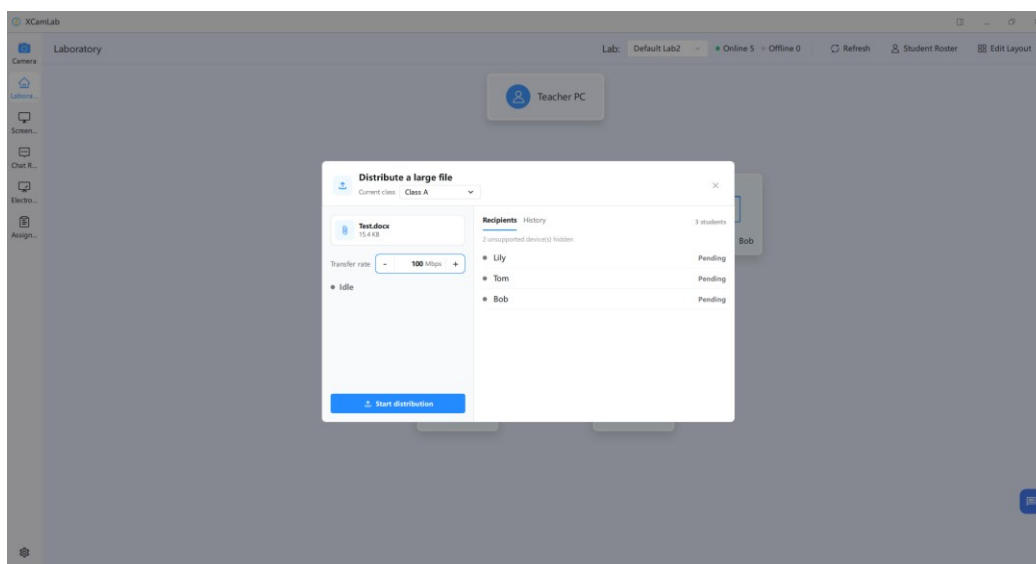


Figure 38 File distribution Panel

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After clicking Start Distribution, the real-time transmission status will be displayed, with synchronized statistics of the number of **ready**, **fully done** and **failed recipients**. The ongoing distribution task can be cancelled at any time during transmission.

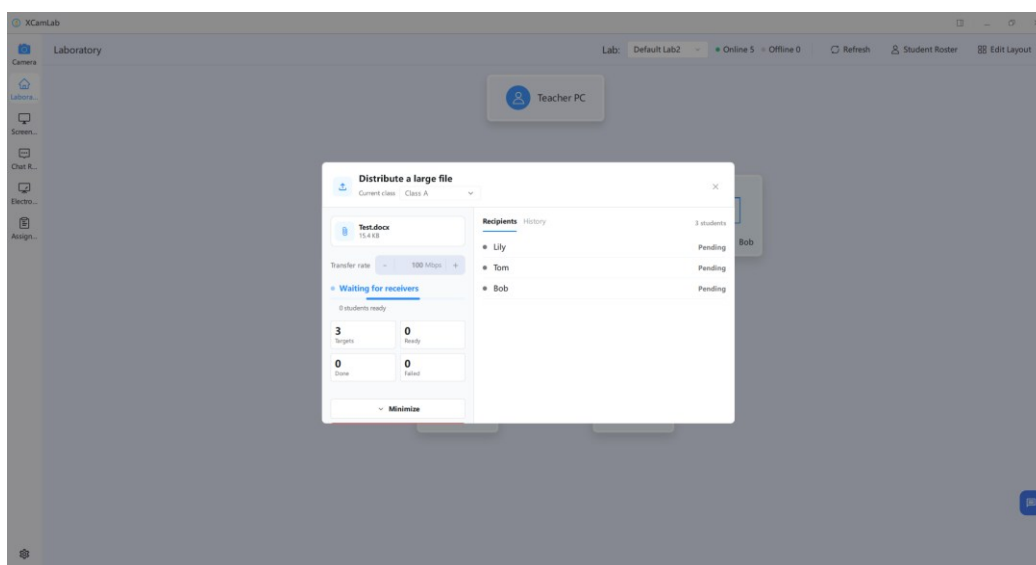


Figure 39 File distribution Panel > Receiving

Once all students finish receiving the files, the interface will notify that all transmissions are successful. After receiving the files, a **pop-up reminder** will appear on each student terminal. The files are **automatically saved to the designated local folder**, and users can open the storage directory with one click to quickly access experimental materials.

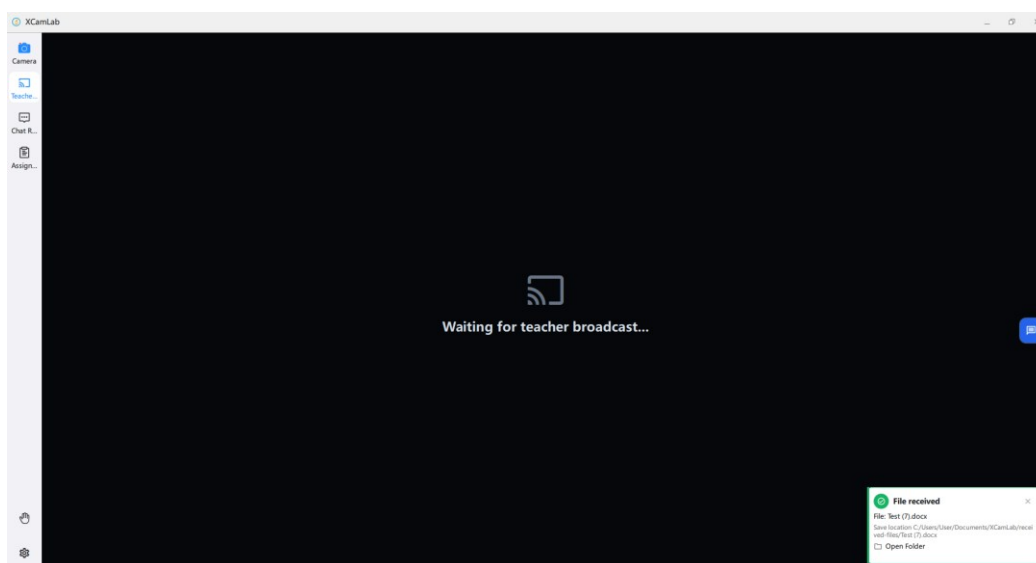


Figure 40 Student-side Pop-up Reminder

1.3.7.4 Focus Mode

After **Focus Mode** is enabled, the system locks the interface of student terminals. A yellow notification banner pops up at the top of the page to inform students that the teacher has activated Focus Mode. All terminal operation permissions are **restricted**: students cannot minimize the software or switch to other applications and desktops. They may only view microsection images and conduct experiment-related operations **within XCamLab**, which effectively eliminates distractions in class. It currently works only for AIOCAMW all-in-one devices.

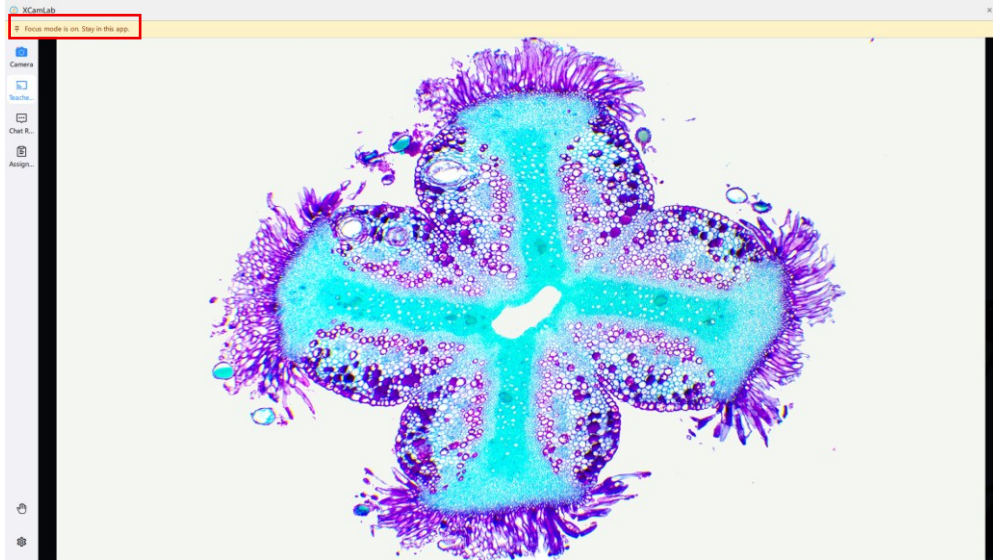


Figure 41 Focus Mode > Student-side Interface

1.3.7.5 Screen Review

The annotation toolset includes **Pen**, **Highlighter**, **Arrow**, **Rectangle**, **Circle**, **Text**, **Eraser**, **color selector**, **line width adjuster**, **font size adjuster** and **line style**. **Save**, **Undo**, **Redo**, **Clear** and **Cancel** buttons are also provided.

After enabling the screen review mode, the mouse penetration function will be activated by default. You may directly **click and operate** the underlying teaching software without closing the annotation layer.

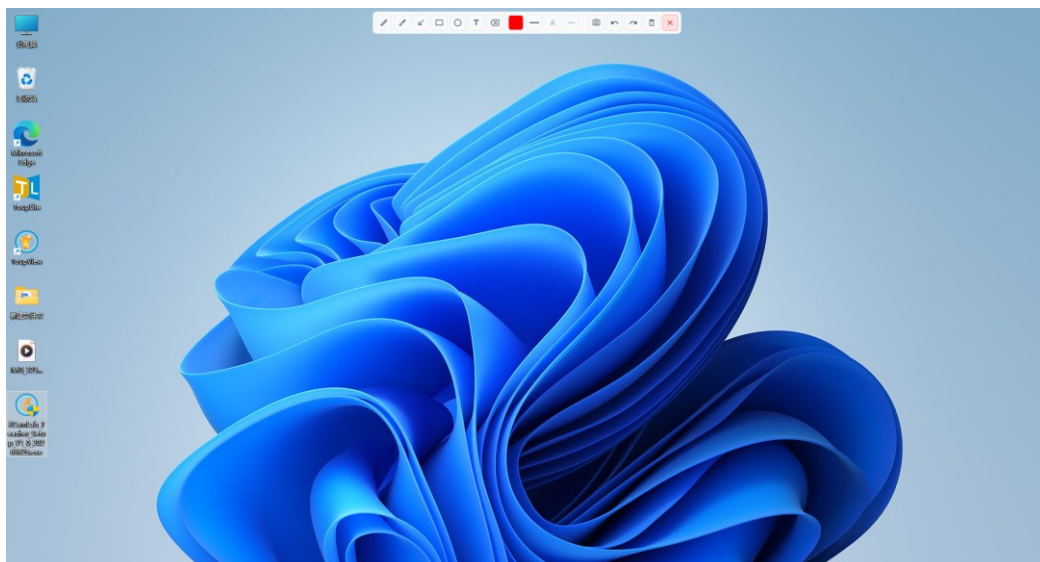


Figure 42 Screen Review Interface

1.3.7.6 Screen Record

The screen recording function is located in the Screen Tools menu. It fully captures the teacher's desktop, real-time microscope camera footage and all operation steps, with a [live recording timer](#) displayed on the interface. Three control commands are available during recording: [Pause Recording](#) temporarily suspends image capture and resumes seamlessly without splitting the video; [End Recording](#) finalizes the task and automatically saves the complete video file; [Cancel Recording](#) aborts the whole session with no footage saved. All other classroom control buttons remain accessible, allowing teachers to use screen broadcast, camera broadcast, black screen and other features while recording.

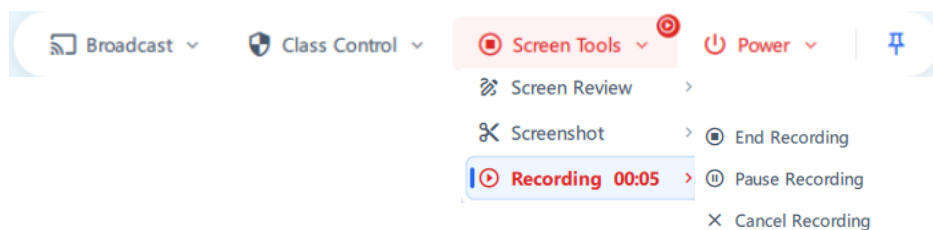


Figure 43 Quick Operation Bar After Screen Record Starts

1.4 System Settings

1.4.1 Teaching Settings

This module configures classroom teaching parameters, containing **Display Mode** and **Black Screen**.

- Simplified Mode switch **hides the lab page** to streamline UI when enabled.
- Two broadcast modes are available. **Optional** Broadcast pops a **confirmation prompt** on student devices for them to **accept or decline** screen sharing, taking effect on the next broadcast. **Forced** Broadcast automatically pushes the teacher's screen to all student terminals **without student consent**, suitable for unified centralized teaching.
- Setting the Broadcast Audio Source: transmit **only System Audio**, capture **only Microphone** voice input, or deliver **both System Audio and Microphone** narration simultaneously to suit different classroom audio collection scenarios. The configuration will take effect when the next broadcast starts. (**Audio broadcast is only supported for AIOCAMW all-in-one cameras**)
- **Custom Black Screen Silence prompt text** for student terminals; edit in input box and click Save to apply.

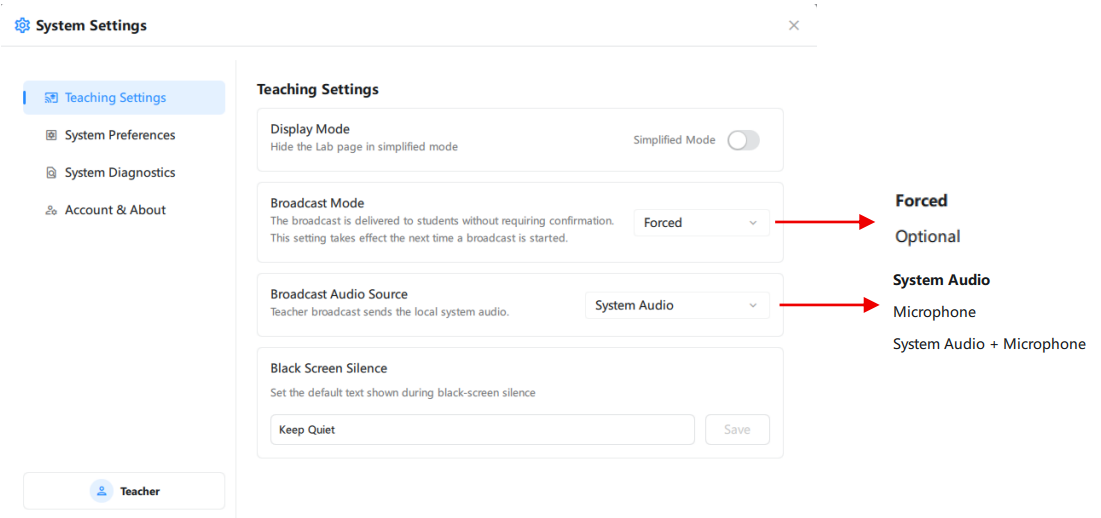


Figure 44 Teaching Settings

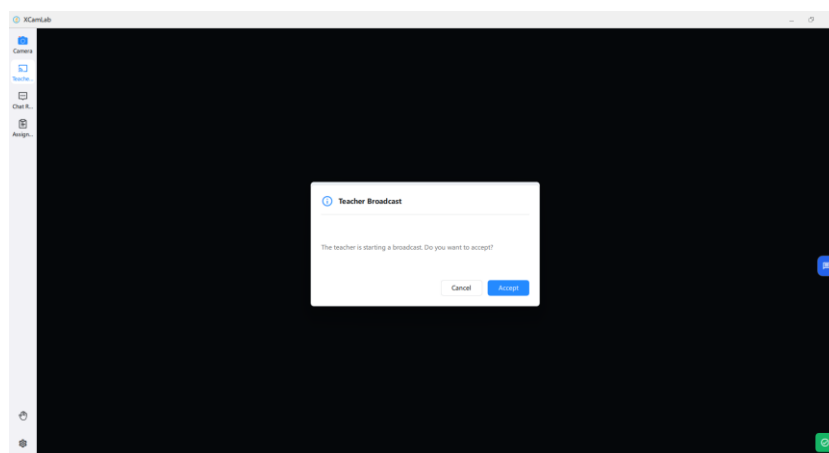


Figure 45 Optional Broadcast > Confirmation Prompt

1.4.1.1 Normal Mode

In Normal Mode, [lab functions are available with classroom layout editing supported](#). Student devices can be bound to position numbers (e.g., 01, 02, 03) as shown in the figure below, [which requires static IP configuration via the Router](#). Teachers can view device distribution as well as online/offline status on the lab interface. This mode applies to fixed classrooms and formal teaching scenarios. Refer to the document *XCamLab Network Instructions* for complete configuration information.

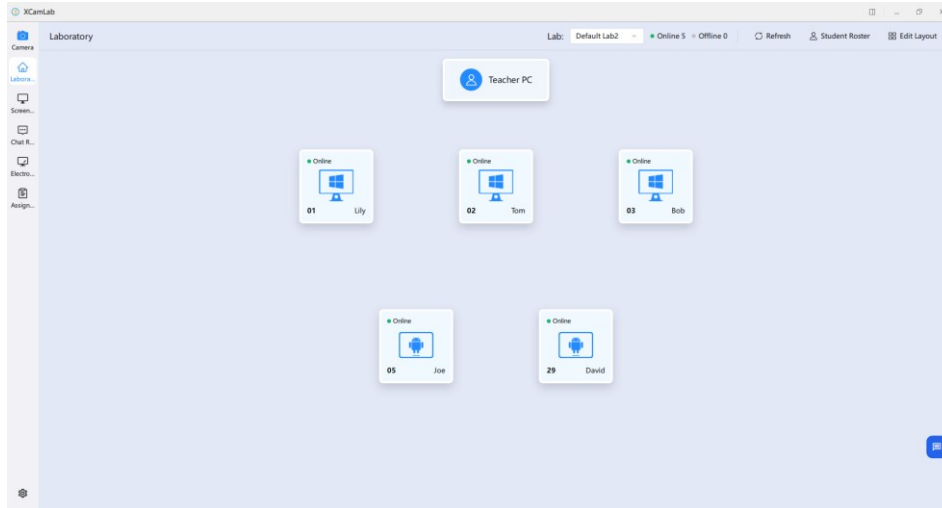


Figure 46 Normal Mode

1.4.1.2 Simplified Mode

In Simplified Mode, [lab functions are not supported](#) (see figure below). Classroom layout and student position numbers are hidden. Student devices do not need to be bound to fixed position numbers, [and IP addresses are obtained automatically via DHCP](#). Suitable for non-fixed classroom scenarios. Refer to the document *XCamLab Network Instructions* for complete configuration information.

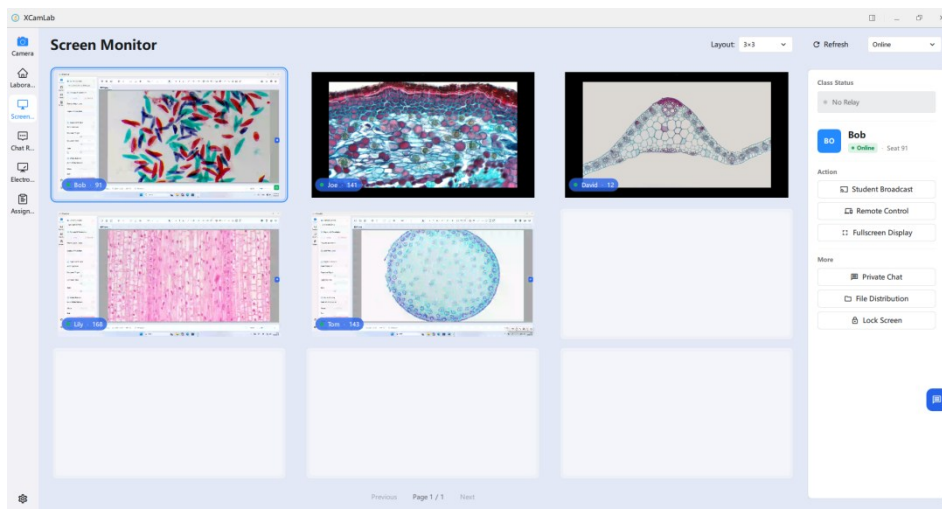


Figure 47 Simplified Mode

1.4.2 System Preferences

Adjust core software runtime settings: [language switch](#) & [file save path](#).

- Dropdown supports **Default**(Change with system language), **Simplified Chinese**, **Traditional Chinese**, **English**, **Russian** for full UI text switching.
- **Video codec mode**: The **hardware** mode prioritizes the computer's GPU to handle image encoding and decoding, while the **software** decoding mode is compatible with a wider range of devices and driver environments for improved compatibility and stability. You may switch between the two modes via the dropdown menu as needed.
- Enabling "Launch XCamLab at startup", the software will **run automatically when the computer powers on**, eliminating the need to open it manually. If disabled, the program will not launch automatically upon startup.
- Root directory for recordings, attendance/config exports: recordings auto-save to **/recording**, attendance files to **/attendance**. Input path manually or **use Browse**; blank = default folder. Files auto-classified for easy access.

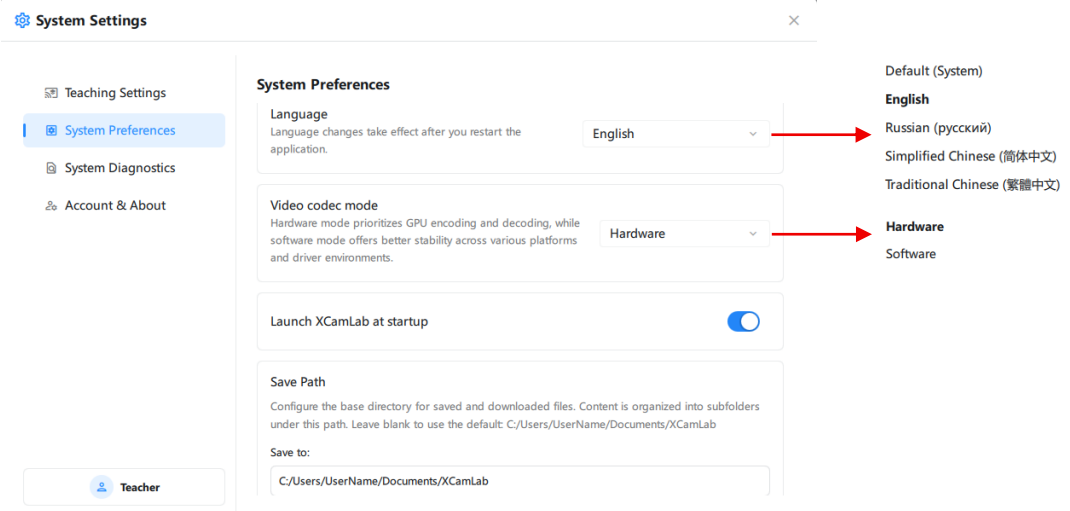


Figure 48 System Preferences

1.4.3 System Diagnostics

System diagnosis is used to detect computer system information, GPU parameters and available H.264 encoders, so as to judge the video and image processing capability of the local machine. Simply click the Start Detection button on the page, and the software will automatically complete the overall video performance test, which helps troubleshoot software and hardware compatibility issues such as picture stuttering and decoding errors. After detection, view the generated diagnostic results and adjust the video encoding and decoding mode according to the feedback data.

Multi-stream decoding stress test is used to simulate concurrent decoding of multiple student video streams with gradual load increase (25/36/49/64 channels), to test the maximum monitor window capacity supported by the local device. Do not run video tasks such as broadcast, stream pushing or monitoring during the test.

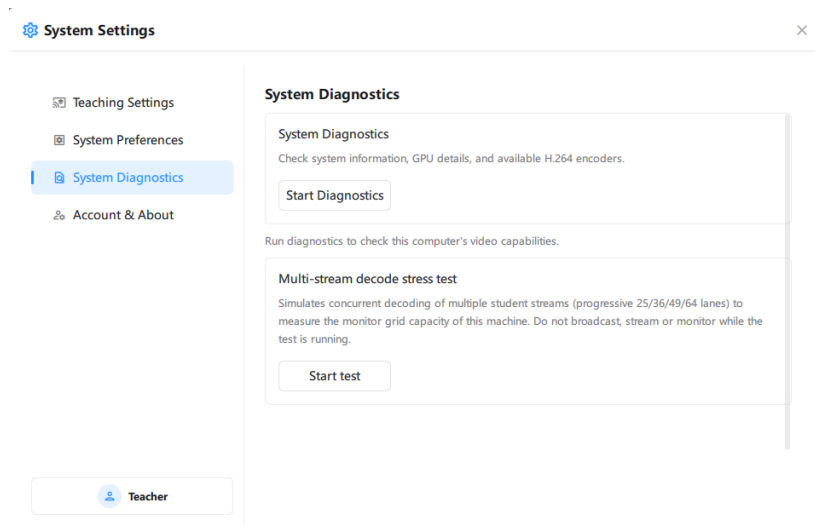


Figure 49 System Diagnostics

1.4.4 Account & About

Shows logged-in teacher account info, visually display the **maximum student connections** with **Logout** button to return to login page.

Bottom About panel displays **software version** for troubleshooting and update management.

The About section presents the software name, copyright period and official website.

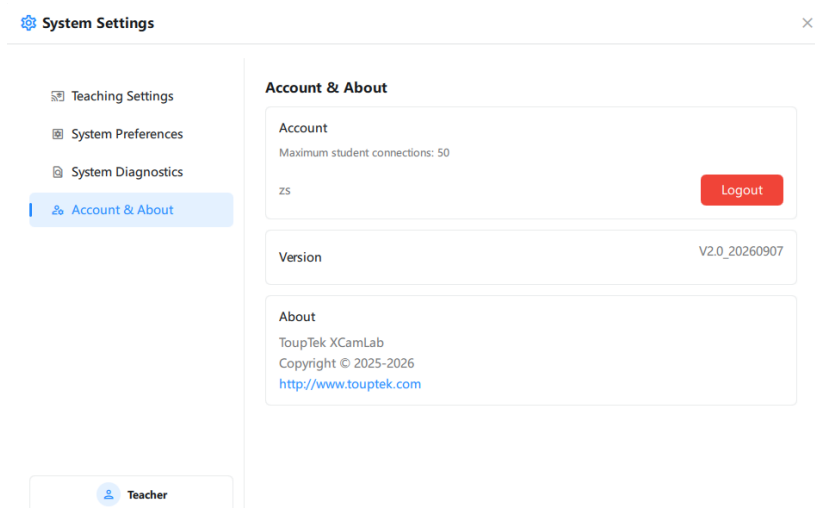


Figure 50 Account & About

2 Student Side>AIOCAMW All-in-One Camera

2.1 Software Install & Login

2.1.1 Pre-installation & Pre-launch Preparation

Windows Firewall and third-party antivirus software (360 Security, PC Manager, etc.) may mistakenly block the XCamLab installer and network communication modules, which will lead to installation failure, software crash on launch, or abnormal operation of the account management function. Please adjust firewall settings before installing and launching the software.

1. Turn off Windows Firewall

1) Click Start > Settings > Privacy & security > Windows Security;

2) Open Firewall & network protection, then turn off firewall under Domain network, Private network and Public network respectively.

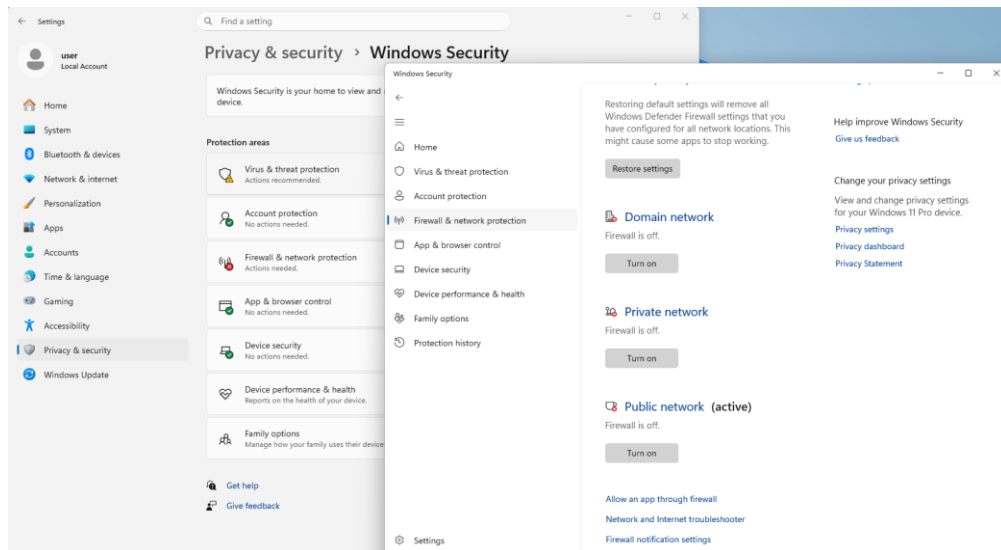


Figure 51 Turn off Windows Firewall

2. Disable protection of third-party security software

Locate the antivirus icon in the system tray at the bottom right of the desktop, right-click and select Exit / Pause real-time protection. Keep it closed until the installation and initial login test are fully completed.

2.1.2 Software Install

Step 1: Run the file "[XCamLab_Setup.exe](#)", and click the "Next" button when the following window pops up.

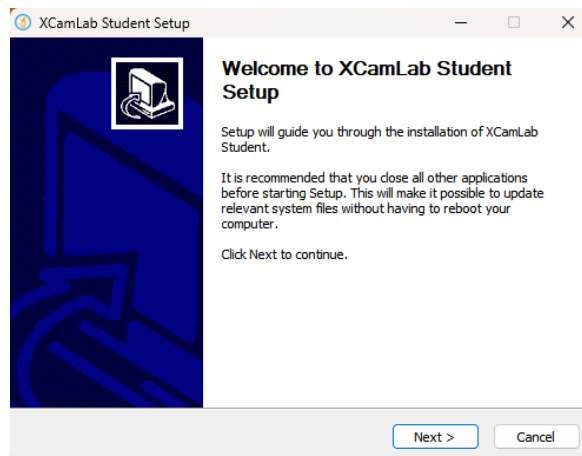


Figure 52 Run the installer

Step 2: When the [Select Installation Role](#) window pops up, select [Student](#) and click the [Next](#) button.

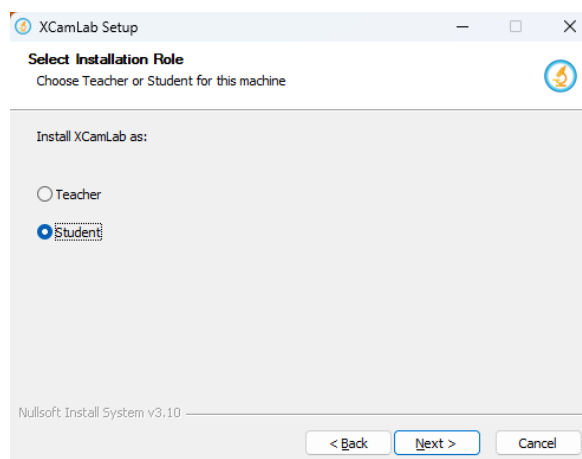


Figure 53 Select Installation Role

Step 3: When the [Choose Install Location](#) window appears, click [Browse](#) to select your target installation path. No changes are usually required; click [Install](#) to start the installation.

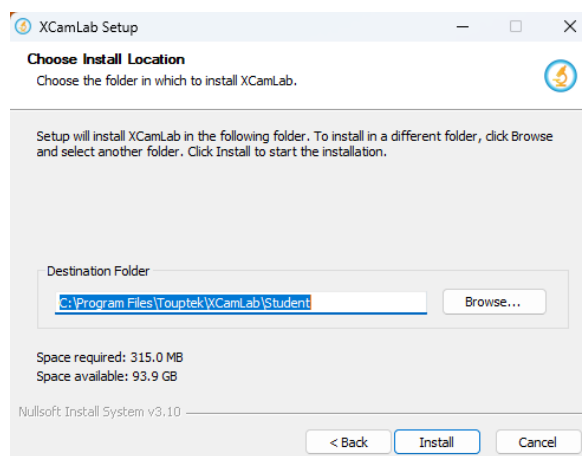


Figure 54 Choose Install Location

Step 4: An installation progress bar will appear during the installation process.

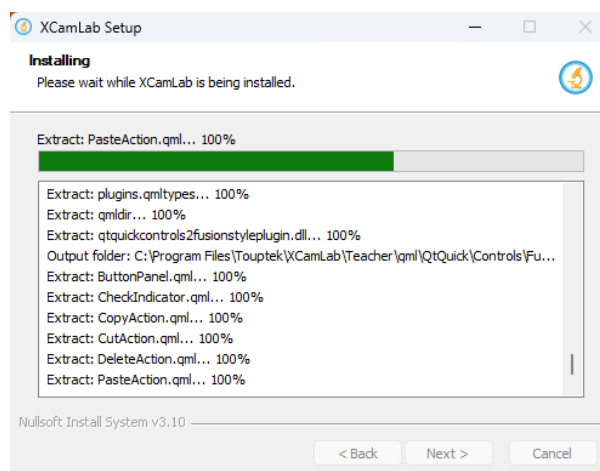


Figure 55 Installing

Step 5: After the progress bar completes and the interface shown below appears, check [Create a desktop shortcut](#). You may select [Launch XCamLab Student at startup](#) as needed, then click the [Finish](#) button.

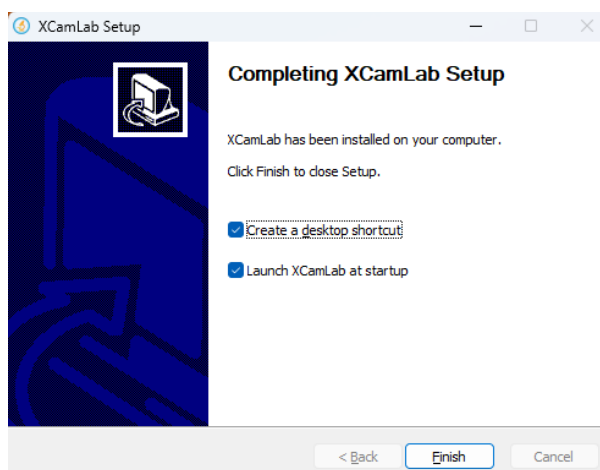


Figure 56 Completing XCamLab Teacher Setup

Step 6: After closing the window, check for the XCamLab icon  on your desktop. The presence of this shortcut indicates a successful installation. If you cannot locate it, search for "XCamLab" via Start > Search.

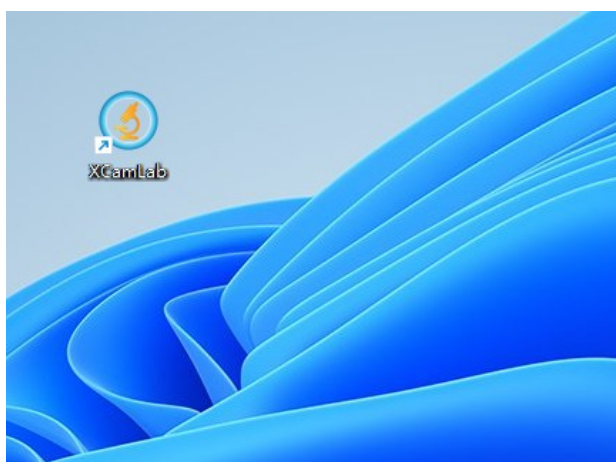


Figure 57 Desktop shortcut

2.1.3 Login

Step 1: Launch the Software

Run [XCamLab.exe](#) via desktop shortcut, Start Menu or installation folder. Right-click the program and select [Run as administrator](#) on the first launch to avoid malfunctions caused by insufficient permissions.

Step 2: Initial Startup Configuration

When the Windows Firewall pop-up appears upon startup, tick the required network types and click Allow access.

Step 3: Login

Enter the [Username](#) and [Password](#), and click [Login](#) to enter the main interface



Figure 58 Login Interface

For [image capture and processing](#) without interactive functions, click the lower-right gear to switch to [Standalone Mode](#). The interface language can also be manually switched to English, Simplified Chinese, Traditional Chinese and Russian.

2.2 Software Functions

2.2.1 Camera Control

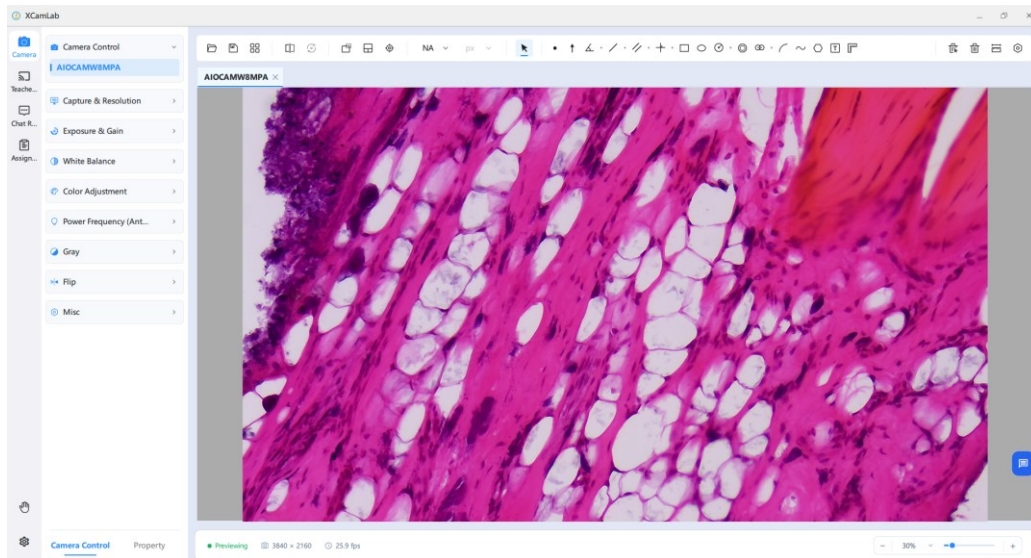


Figure 59 Camera Control Interface

2.2.1.1 Measurement Tools

The Measurement Tools adopts a grouped design consisting of [primary icons](#) and [expandable sub-tools](#).

[Frequently used tools](#) are displayed directly on the toolbar, while related advanced tools are grouped under expandable menu indicators. [Clicking the primary icon](#) displays [all available tools](#) within that category.

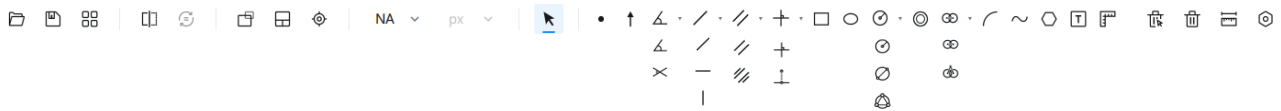


Figure 60 Measurement Tools

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The functions are described below:

Icon	Function
	Open File
	Save File
	Browse
	Split-Screen Comparison
	Sync Zoom and Pan
	EDF
	Stitch
	Auto Edge Find
	Select Magnification for Measurement after Calibration
	Select the desired Measurement Unit
	Object Select
	Point (Point Counter)
	Arrow
	Angle
	4 Points Angle
	Arbitrary Line
	Horizontal Line
	Vertical Line
	Parallel
	Double Parallel Lines
	3 Points Vertical Line
	4 Points Vertical Line
	Rectangle
	Ellipse
	Circle
	2 Points Circle
	3 Points Circle
	Annulus
	Two Circles and its Center Distance
	3 Points Two Circles and its Center Distance
	Arc
	Curve
	Polygon
	Text
	Scale Bar
	Delete selected measurement objects
	Delete all the measurement objects
	Execute Calibration to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer.
	Settings

Dual-pane split-screen synchronous comparison observation interface: the left window displays [the real-time native microscopic preview feed from the camera](#), while the right window loads [saved reference specimen images](#). When using split-screen comparison, users may enable or disable "Sync Zoom and Pan". The two viewports support linked zooming and panning, allowing teachers and students to conveniently compare structural differences of slide samples side by side.

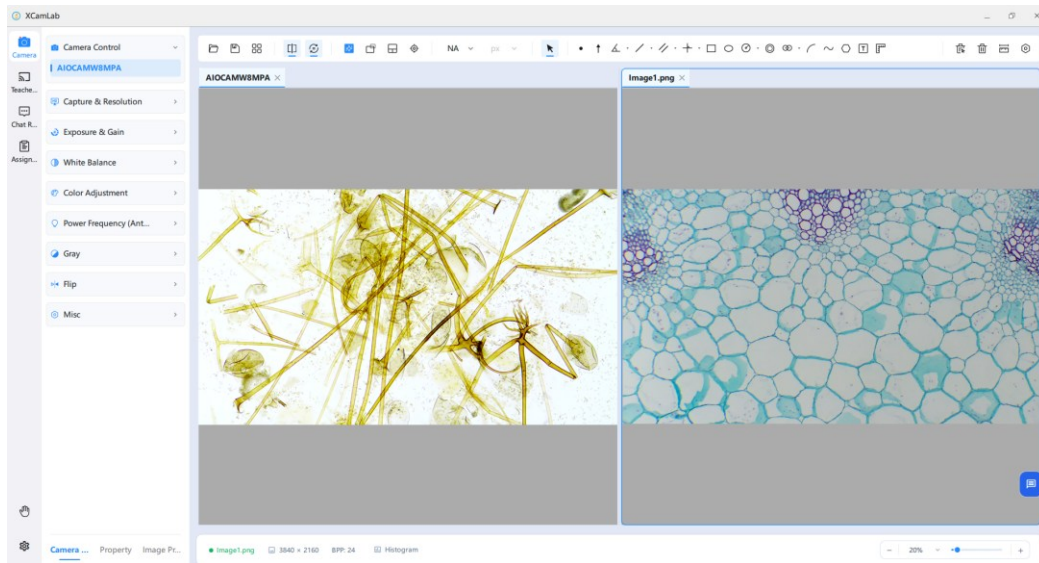


Figure 61 Split-Screen Comparison

2.2.1.2 Image Adjustment Tools

The Image Adjustment module is designed to provide professional image optimization for microscope camera output. It enables users to fine-tune image brightness, color reproduction, and image stability, ensuring high-quality microscopic images for measurement, analysis, and classroom presentation.

The Image Adjustment panel consists of nine major functional areas:

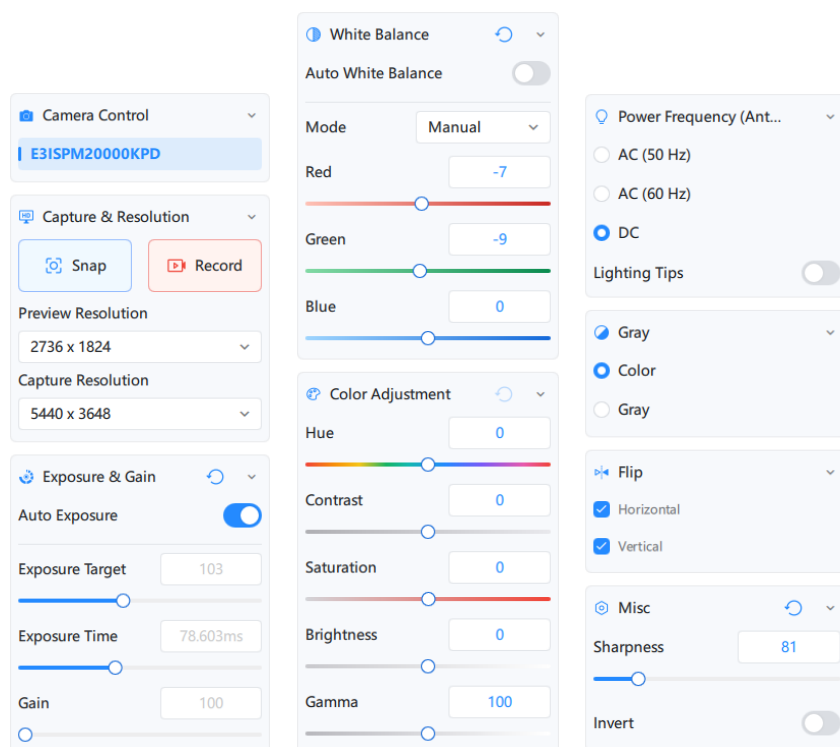


Figure 62 Image Adjustment Panel

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The following table describes all [image adjustment parameters](#) available in the interface:

Function	Description
Camera List	Displays all recognized microscope camera devices
Snap	Capture image and save it to the SD card or USB flash drive
Record	Record video and save it to the SD card or USB flash drive
Preview Resolution	Sets the video Preview Resolution
Snap Resolution	Sets the image Snap Resolution . To improve the frame rate, a lower resolution is usually selected for preview, and a higher resolution for snap
Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
Exposure Target	The reference brightness value of the image in auto exposure mode. The software automatically adjusts the exposure duration and gain to maintain the average brightness of the preview image at the set value
Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
Global Auto	White Balance adjustment according to the window video every time the button is clicked
Manual	Adjust the Red 、 Green or Blue item to set the video White Balance
ROI	Check the ROI item will display a red ROI rectangle on the video window, drag it to the interested area will perform the White Balance according to the area video data
Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
Saturation	Decreases or increases the Saturation of the current image
Gamma	Adjust Gamma level of the video. Slide to the right side to increase Gamma and to the left to decrease Gamma
Contrast	Adjust Contrast level of the video. Slide to the right side to increase Contrast and to the left to decrease Contrast
Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness
Hue	Adjust Hue level of the video. Slide to the right side to increase Hue and to the left to decrease Hue
AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz illumination
AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz illumination
DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
Lighting Tips	Illumination reminder for real-time light-status feedback , helping users avoid poor images from improper lighting.
Color	Select the Color if you want to preview color video
Grayscale	Select the Grayscale if you want to preview grayscale video
Horizontal Flip	Check Horizontal Flip if the horizontal direction of the screen video is opposite to the actual scene
Vertical Flip	Check Vertical Flip if the vertical direction of the screen video is opposite to the actual scene
Sharpness	Adjust Sharpness level of the video
Denoise	Slide left or right to Denoise the video
Negative Film	Can invert the pixels in the video or perform Negative Film processing

Note: Click the button  to restore all parameters on this panel to camera factory defaults.

2.2.1.3 Measurement Properties

Configure visual styles for all Measurement Properties, including [line color](#) and [line width](#). The [Geometry section](#) displays [the pixel length of the currently selected measurement shape in real time](#); the [eye icon](#) on the right controls whether measurement values are [shown or hidden](#) on the image. Users can move measurement objects by dragging; data will be updated in real time. Separate style settings are supported for lines, circles, polygons, text, scale bars, etc.

[Auto Edge Find](#) is a software-based edge recognition algorithm. The edge-search pixel range is set by adjusting the edge-finding radius parameter. [A larger value expands the algorithm's search scope, suitable for specimens with blurred edge transitions. A smaller value only identifies pixels close to the contour, ideal for samples with sharp, clear outlines.](#) After drawing the measurement graphic, the software searches for the specimen's actual boundary around the starting point based on this parameter and automatically corrects the measured contour.

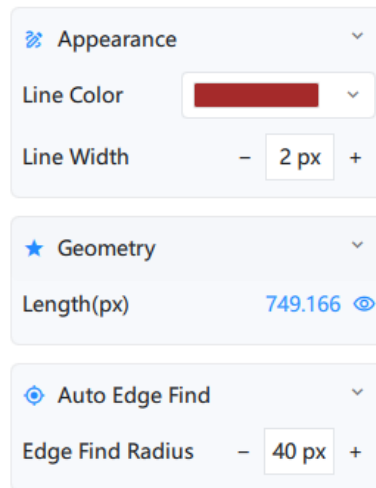


Figure 63 Measurement Properties Panel

2.2.1.4 Image Process

After opening an image file, an [Image Processing](#) function panel will appear on the left side of the interface. Click to expand it and access various image-editing features. Image Processing consists of five sub-menus: [Mode](#), [Process](#), [Adjust](#), [Rotate](#), and [Edit History](#), which support in-depth optimization for loaded microscopic slice images. The bottom status bar displays image resolution, color bit depth, [histogram](#) ([showing the distribution of luminance, R, G and B channels within the image](#)), and zoom ratio.

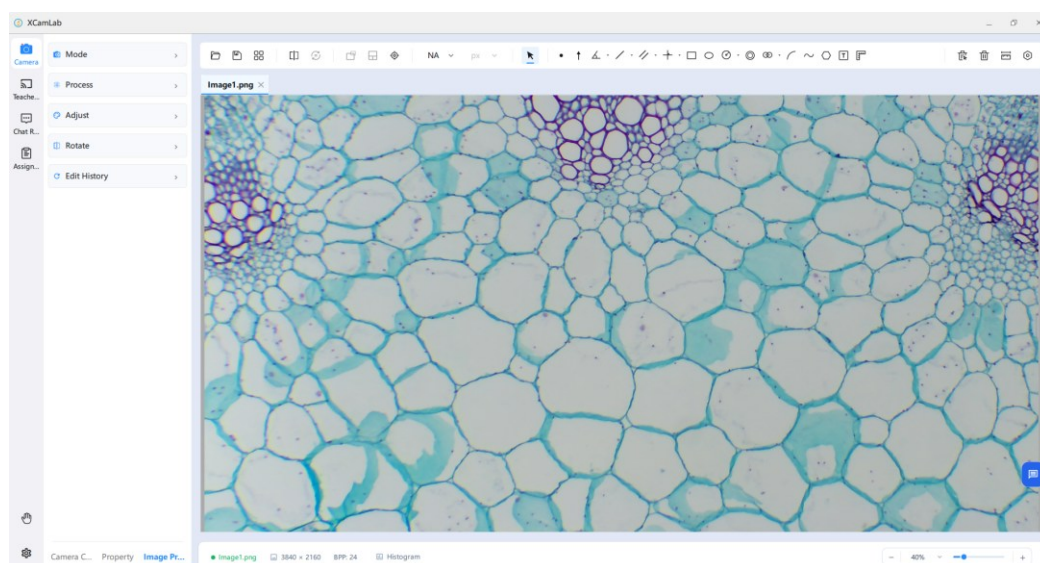


Figure 64 Image Process

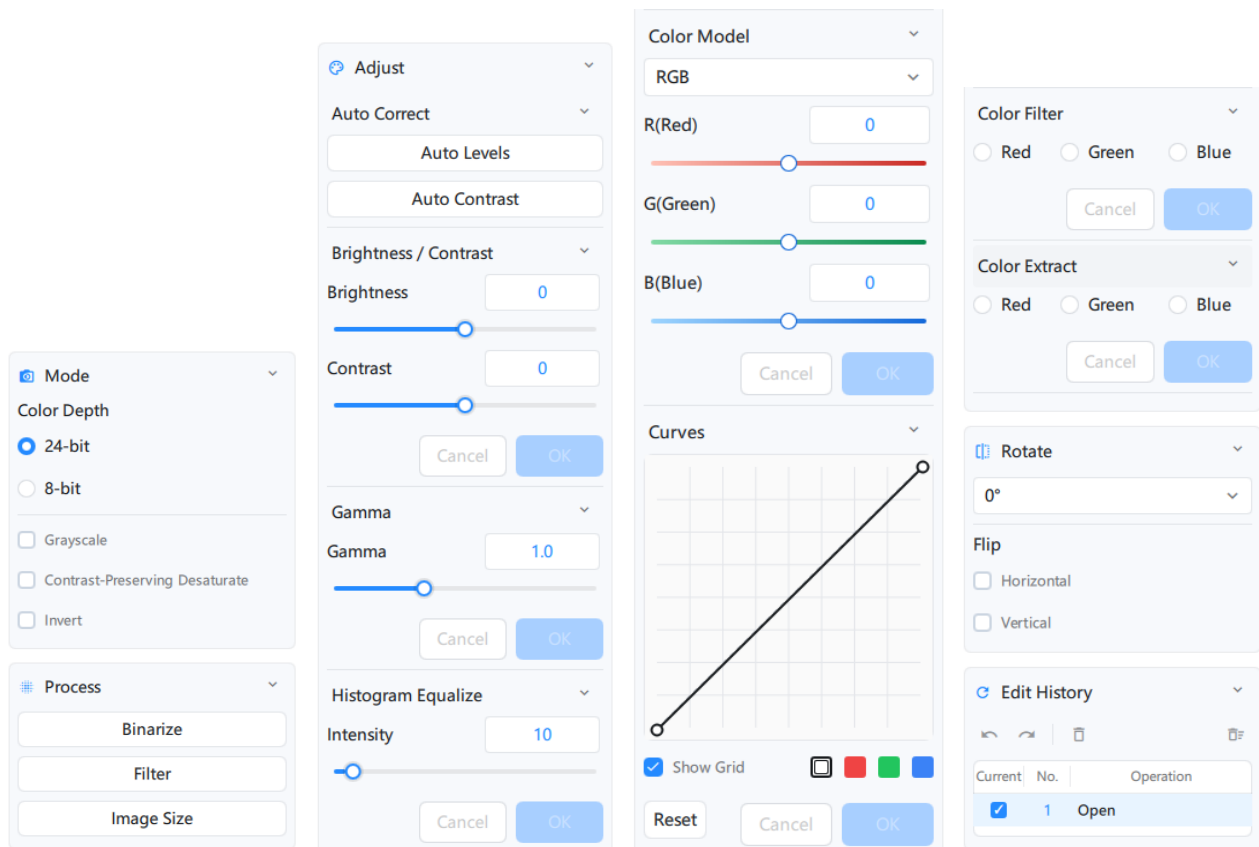


Figure 65 Image Process Panel

The table below details all image-processing parameter-setting functions on the interface, clearly listing the purpose and operation instructions for each function, helping users quickly master parameter adjustment by referring to the interface.

Function	Description
Color Bit Depth	Switch image between 24-bit and 8-bit color depth
Grayscale	Remove hue and saturation information of pixels, only keep luminance value
Contrast-Preserving Desaturate	Remove color information while retaining the original brightness-contrast of the image
Invert	Perform pixel inversion / negative-film operation on the image
Binarization	Grayscale processing. Pixels above the set threshold turn white, while others turn black
Filter	Multiple filter algorithms for image noise reduction, smoothing and sharpening
Image Size	Reset pixel resolution to adjust image dimensions
Auto-Levels	Automatically set brightness upper and lower limits based on pixel distribution and redistribute pixel values
Auto-Contrast	Automatically adjust image contrast
Brightness	Adjust overall image brightness
Contrast	Adjust image contrast
Gamma	Adjust gamma value to modify mid-tone brightness performance
Histogram Equalization	Improve image contrast and balance pixel grayscale distribution
Color Model	Switch among RGB, CMYK, HSI, HLS, HMS color spaces. Adjust corresponding color-channel parameters after selection
Curve	Precisely tune brightness and color channels via coordinate curve editor
Color Filter	Set selected R/G/B channel value to 0 while keeping the other two channels unchanged
Color Extract	Retain selected R/G/B channel and set the other two channels' values to zero
Rotate	Custom-angle rotation, horizontal flip and vertical flip for images
Edit History	Record every image-processing step; support undo, redo and rollback to previous states

2.2.2 Teacher Broadcast

Teacher Broadcast is the [live classroom viewing](#) portal for students to receive real-time teaching feeds pushed by teachers and follow class progress. Once [the teacher starts streaming](#), [lecture footage loads automatically on this page](#).

- Click the [full screen](#) icon at the top-right or [double-click the video window](#) to [maximize playback](#).
- A [shortcut entry for the Chat Room](#) is placed at the bottom-right for instant communication during class.
- Tap the back arrow at the top-left to exit broadcast and return to other functional pages.

All streaming is centrally controlled by the teacher terminal; students only need stable network access for smooth playback.

Click the [Raise Hand icon](#) at the bottom-left to send assistance requests to instructors when encountering problems.

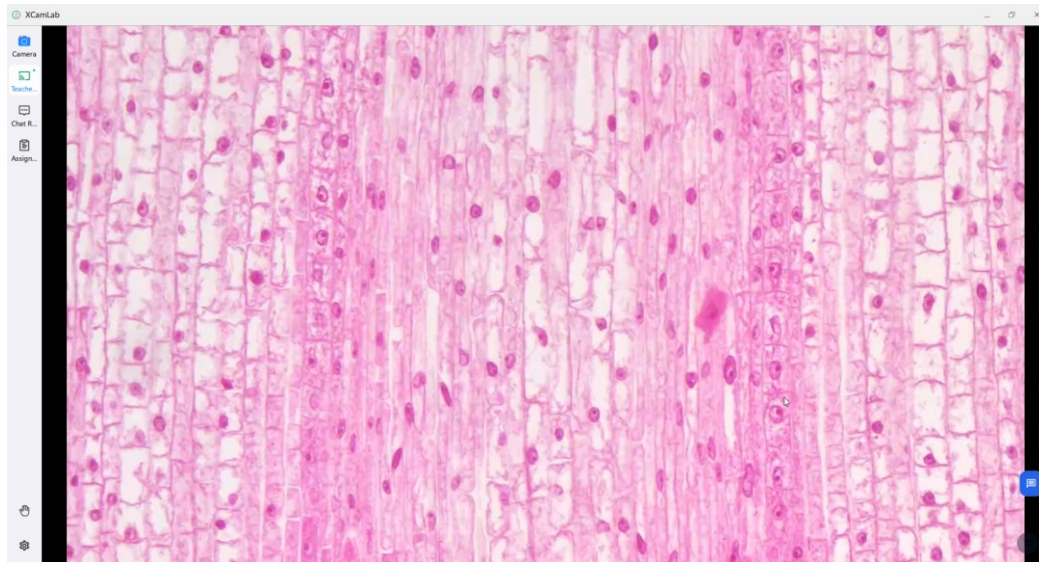


Figure 66 Teacher Broadcast Interface

2.2.3 Chat Room

The Chat Room acts as a unified communication hub for the whole class, with a default public group chat accessible to all teachers and students for raising questions, conducting group discussions and exchanging learning materials. The list prioritizes the universal classroom group where all public messages appear in chronological order with clear timestamps for complete [historical record review](#).

The central area holds the full message display panel, and the text input field at the bottom supports text entry alongside auxiliary tools for emojis and screenshots to enrich communication forms.

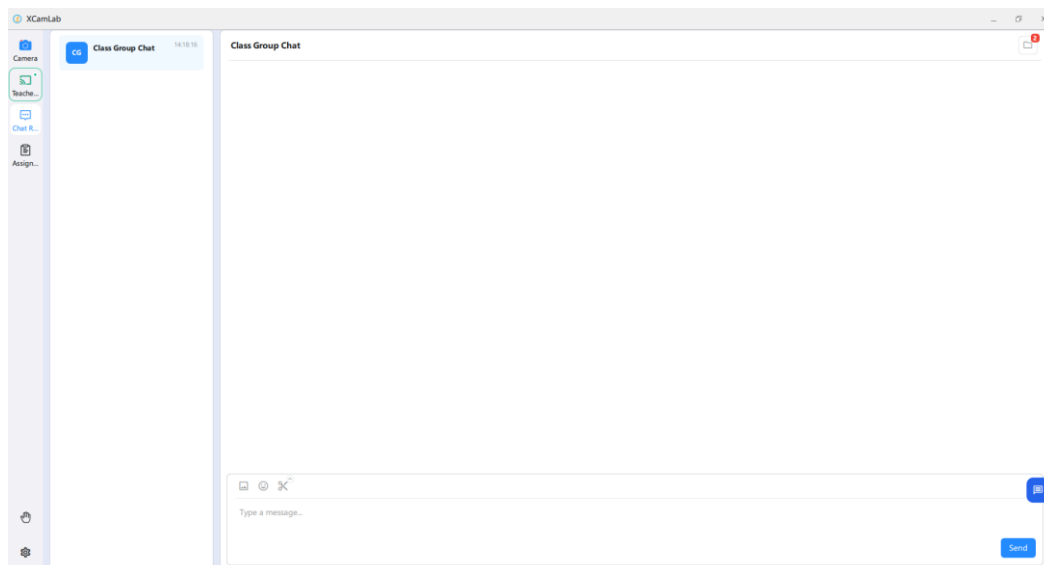


Figure 67 Chat Room Interface

XCamLab Microscope Interactive Teaching Software User Manual

Click the icon at the top right  to open the class group shared files window. The top search box can [search](#) files within the group, the top right corner supports [refreshing](#) the file list, and all files can be [sorted by upload time](#). The list displays [file name](#), [size](#), [uploader](#) and [upload date](#), with download and delete operation buttons on the right of each file. The bottom of the interface shows [the total number of files](#) and [storage space usage](#). The blue [Upload File](#) button at the bottom right allows you to select courseware, specimen images, spreadsheets and other materials from [local storage](#) to upload to the class group. All students can download and view uploaded files, making it easy for teachers to distribute experimental learning materials uniformly. Teachers have permission to delete all files, while students may only delete files uploaded by themselves.

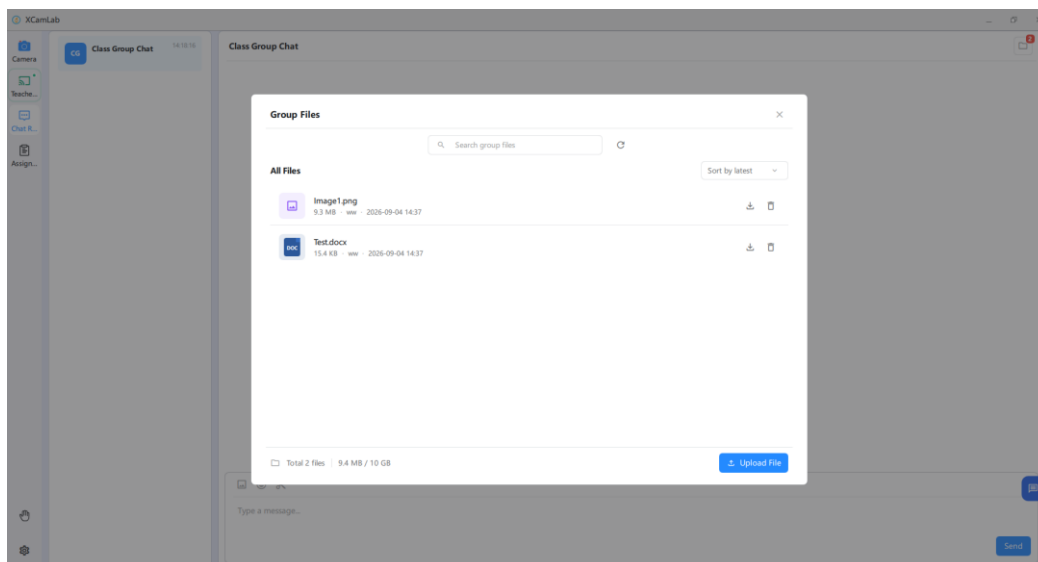


Figure 68 Group Files

2.2.4 My Assignments

My Assignments is an exclusive functional page for students to receive, submit coursework and check feedback from teachers, clearly distinguishing tasks by different submission statuses and supporting independent file uploading and review result viewing.

Four statistical cards at the top present real-time counts of [all assignments](#), [pending submissions](#), [pending reviews](#) and reviewed tasks to deliver a clear overview of overall assignment progress, and the [refresh button](#) in the top-right corner synchronizes [newly released coursework](#) issued by teachers. Beneath the statistics lies a [search bar](#) and [status filter tabs](#), allowing users to quickly target specific assignments by [title](#), [description](#) or [class keywords](#), or sort tasks by [all](#), [pending submission](#), [pending review](#) and [reviewed](#) states.

The assignment list below displays core information of each task including [title](#), [text description](#), [affiliated class](#) and [submission deadline](#) together with real-time submission status labels; unsubmitted entries feature a blue [Submit File](#) button at the bottom right for uploading local documents, and the page [automatically updates](#) task status after successful upload, with teacher comments and evaluation results accessible inside each assignment upon completion of instructor review.

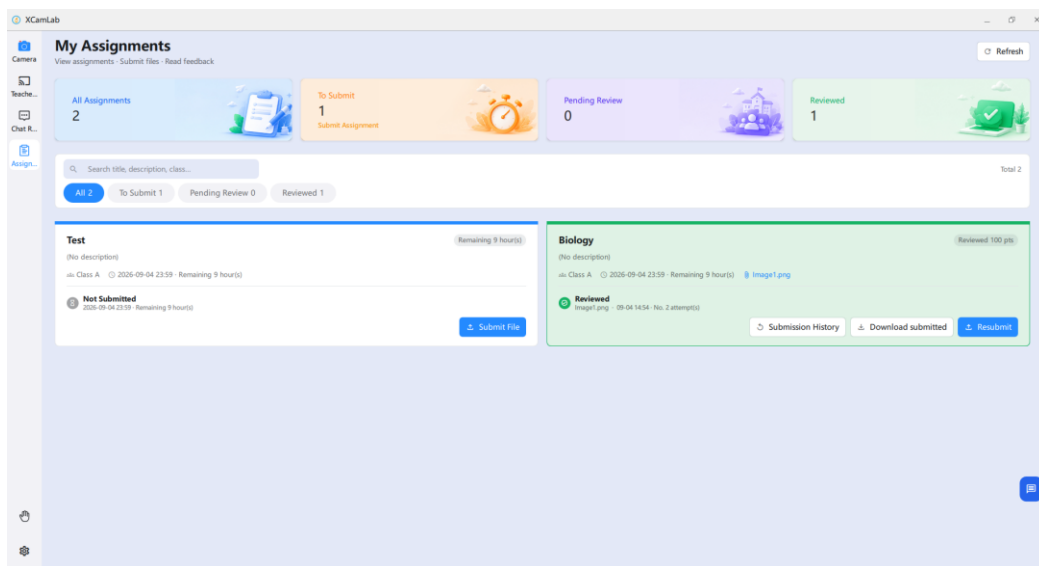


Figure 69 My Assignments Interface

2.3 System Settings

2.3.1 System Preferences

This panel configures software UI language and local file storage directory, the language dropdown supports [Default](#) (Change with system language), [Simplified Chinese](#), [Traditional Chinese](#) and [English](#); all interface text updates instantly after switching.

Enabling "[Launch XCamLab at startup](#)", the software will [run automatically when the computer powers on](#), eliminating the need to open it manually. If disabled, the program will not launch automatically upon startup.

The save path acts as the root directory for exported files. Click [Browse](#) to [change the storage folder](#), or [Open](#) to [jump directly to the current save directory](#). Leave the path [blank](#) to use the [default Documents folder](#).

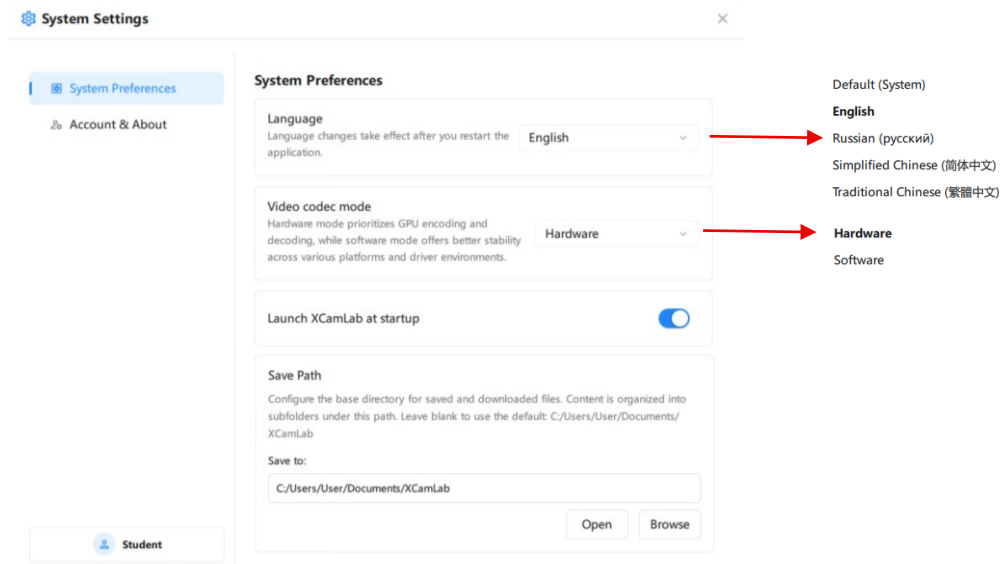


Figure 70 System Preferences

2.3.2 Account & About

The Account section at the top displays the [logged-in student ID](#); click [Log Out to exit and return to the login screen](#).

The Version section below shows the full software build number, which can be provided to instructors or technical staff for troubleshooting software faults.

The About section presents the software name, copyright period and official website.

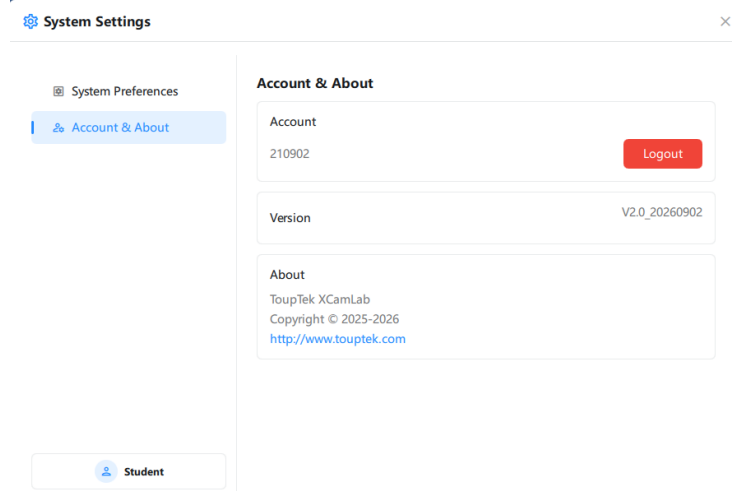


Figure 71 Account & About

3 Student Side>Pad Mobile Terminal

3.1 Software Launch & Login

3.1.1 Software Install

Step 1: First, connect the tablet to a [Wi-Fi network with normal internet access](#).

Step 2: Connect your tablet to PC via USB cable. On the tablet pop-up window of USB connection mode, select [Transfer files](#).

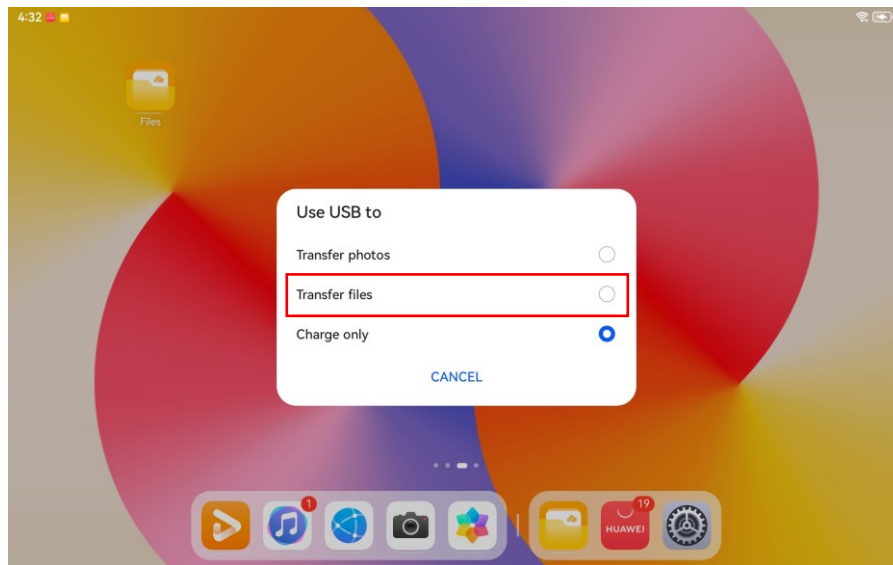


Figure 72 Pop-up Window of USB Connection Mode

Step 3: On your computer, open the USB drive folder containing the installation package [XCamLab.apk](#). Split the window to open the tablet's [Internal Storage](#), then drag and drop the APK file into the tablet's root storage folder.

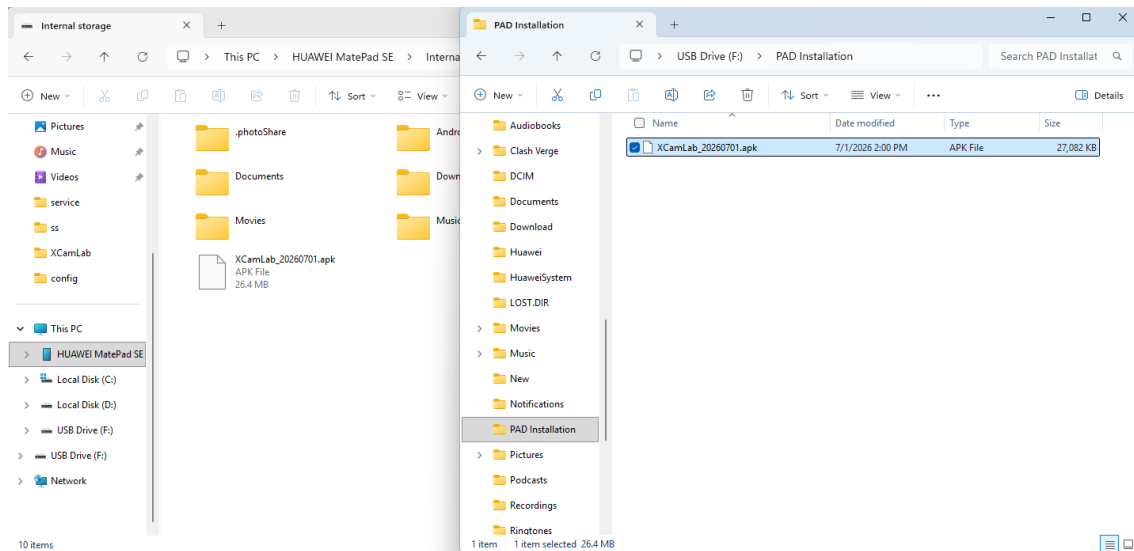


Figure 73 File Transfer

Step 4: Back to the tablet home screen and open the [Files](#) app. Tap [Internal Storage](#) on the left sidebar to locate the transferred [XCamLab.apk](#) file.

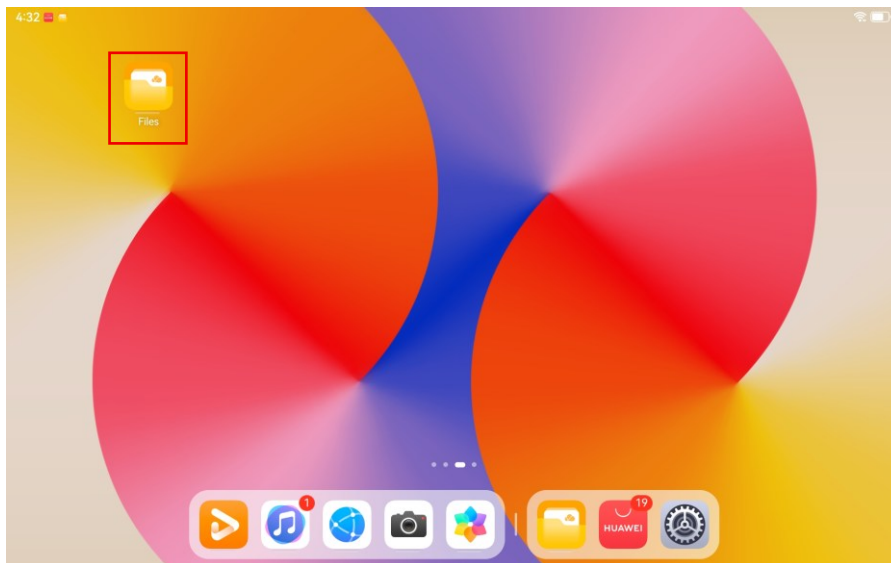


Figure 74 Open the Files app

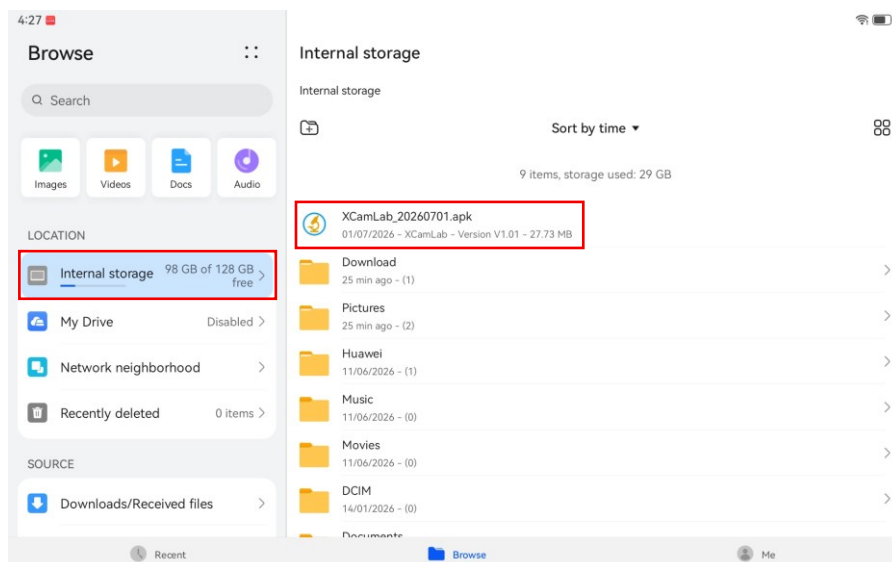


Figure 75 Tap the XCamLab.apk installation package

Step 5: Enter the XCamLab installation verification page. A prompt about unknown application filing status will pop up on the page. Check the box "[I understand that this app hasn't been verified and may pose a risk](#)", then click "[Install](#)".

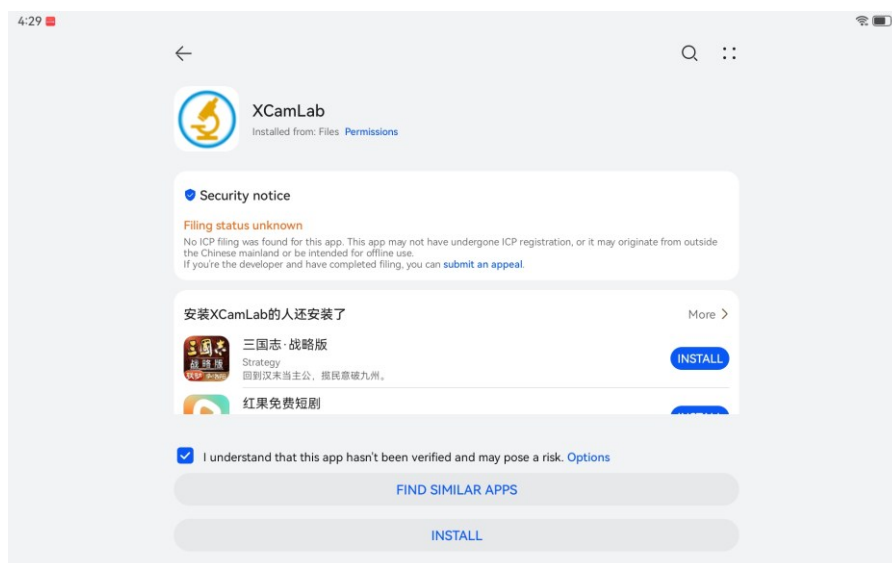


Figure 76 Unknown Application Filing Status Prompt

Step 7: Wait for the installation to finish. The installation is complete once the XCamLab icon appears on the tablet home screen.

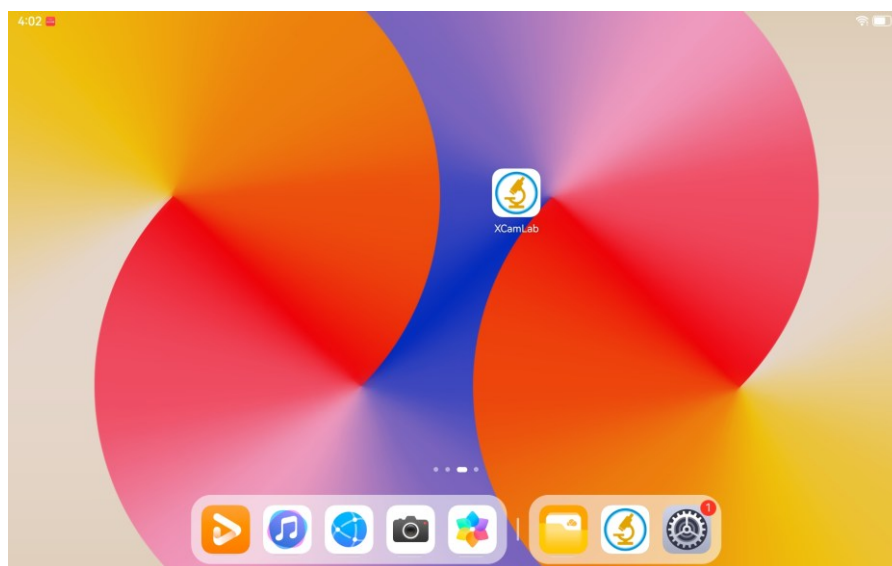


Figure 77 Installation Completed

3.1.2 Login

Step 1: Launch the Software

Tap the App icon to launch the program. [Complete permission setup](#) (network, storage) on first startup as prompted to avoid functional restrictions.

Step 2: Login

On the login page, enter the [Username](#) and [Password](#) provided by your teacher, and click Sign in to enter the main interface.

For [image capture and processing](#) without interactive functions, click the bottom-left button to switch to [Standalone Mode](#).

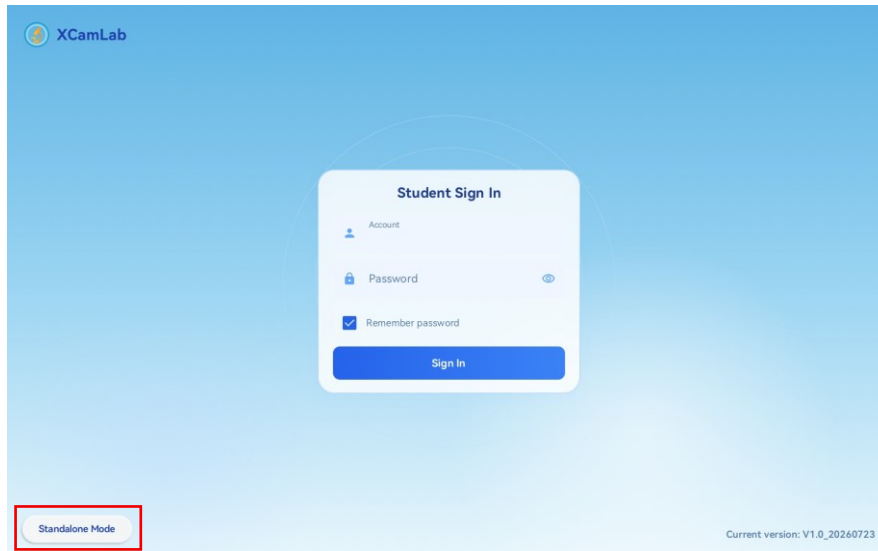


Figure 78 Login Interface

3.2 Software Functions

3.2.1 Camera

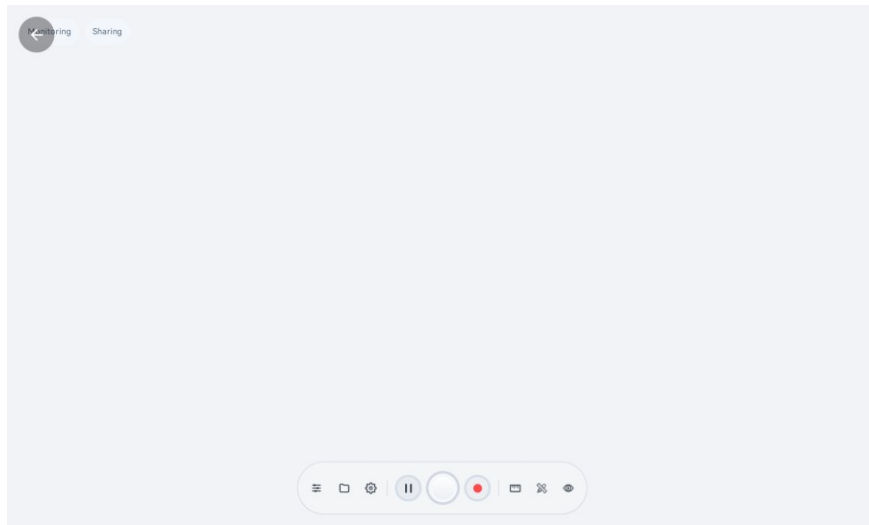


Figure 79 Camera Interface

Horizontal function buttons are arranged at the bottom of the page, with functions listed left to right as follows:

Icon	Function	Description
	Parameter List Button	Open the camera parameter shortcut panel to view and switch resolution, frame rate and image formats
	Gallery	Open local asset library to view saved snapshots and recordings
	Settings	Enter detailed measurement tools setup page to customize line color and line width
	Pause Preview	Freeze the live preview frame temporarily and stop real-time refresh
	Capture Image	Take a snapshot of the current preview and auto-save to local album
	Record Video	Start/stop video recording to capture full microscope experiment processes
	Measurement Tools	Activate length, angle and area measurement annotations for preview footage
	Calibration	Execute Calibration to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer
	Measuring Tool Visibility	Check whether various measuring tools are displayed on the toolbar. Uncheck to hide the corresponding tools

3.2.1.1 Image Adjustment Tools

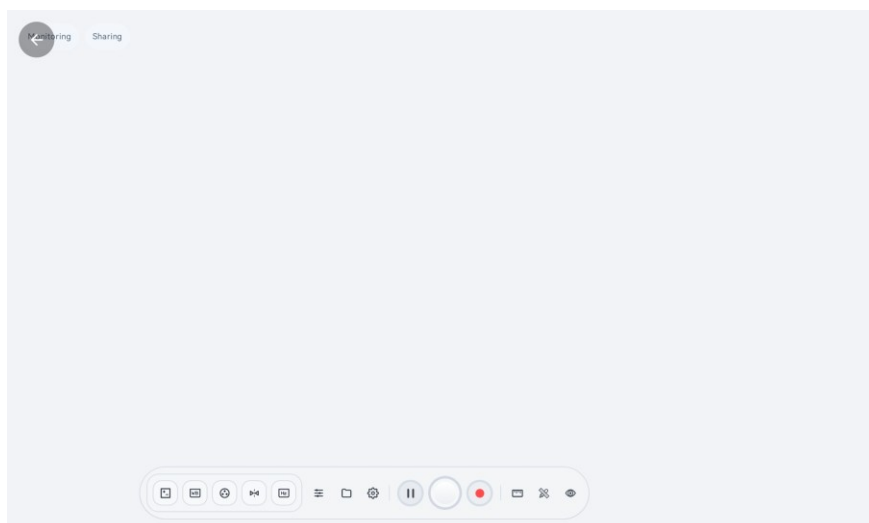


Figure 80 Image Adjustment Interface

Tap the Parameter List button to expand 5 shortcut parameter icons (left to right): [Exposure](#), [White Balance](#), [Image Processing](#), [Flip](#), [Power Frequency](#).

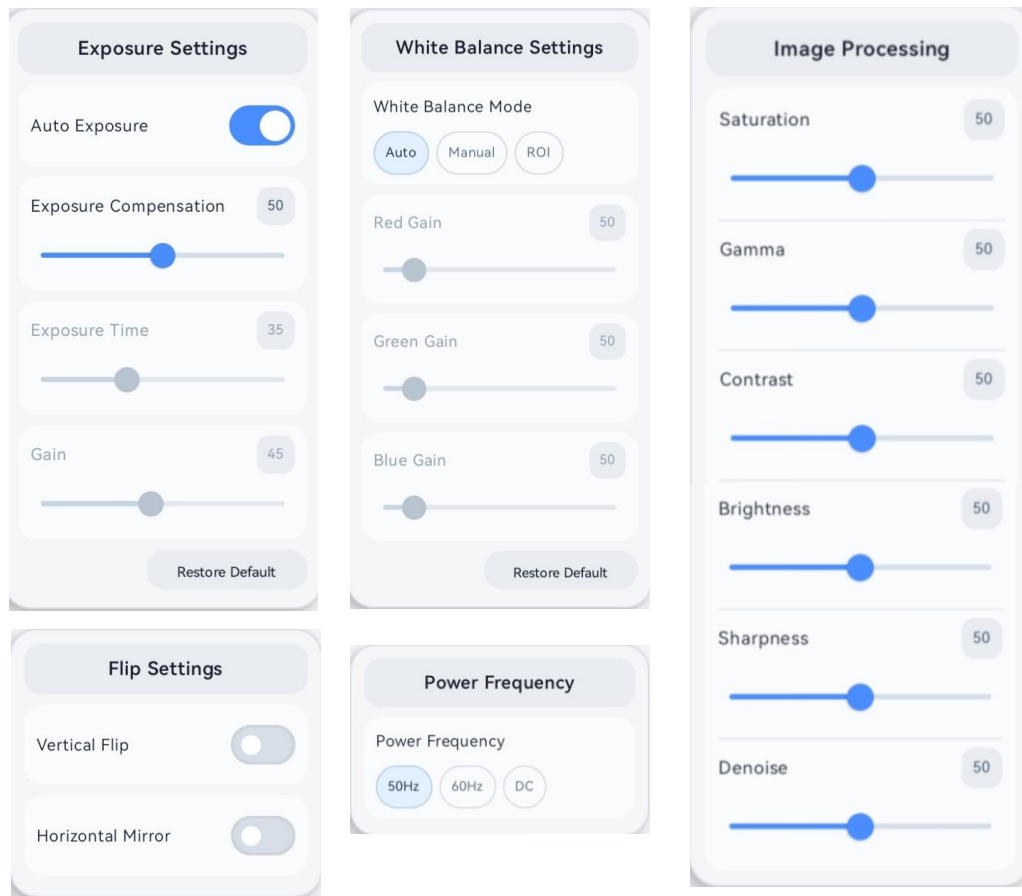


Figure 81 Image Adjustment Panel

Function	Description
Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time and gain according to the value of exposure compensation
Exposure Compensation	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to the current video brightness to achieve proper brightness value
Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
Auto	White Balance adjustment according to the window video every time the button is clicked
Manual	Adjust the Red 、 Green or Blue item to set the video White Balance
ROI	Check the ROI item will display a ROI rectangle on the video window, drag it to the interested area will perform the White Balance according to the area video data
Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
Green	Slide to left or right to decrease or increase the proportion of Green in RGB on video
Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
Saturation	Decreases or increases the Saturation of the current image
Gamma	Adjust Gamma level of the video. Slide to the right side to increase Gamma and to the left to decrease Gamma
Contrast	Adjust Contrast level of the video. Slide to the right side to increase Contrast and to the left to decrease Contrast
Brightness	Adjust Brightness level of the video. Slide to the right side to increase Brightness and to the left to decrease Brightness
Sharpness	Adjust Sharpness level of the video
Denoise	Slide left or right to Denoise the video
Vertical Flip	Check Vertical Flip if the vertical direction of the screen video is opposite to the actual scene
Horizontal Flip	Check Horizontal Flip if the horizontal direction of the screen video is opposite to the actual scene
AC(50HZ)	Check AC(50HZ) to eliminate flickering caused by 50Hz illumination
AC(60HZ)	Check AC(60HZ) to eliminate flickering caused by 60Hz illumination
DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering

3.2.1.2 Measurement Tools

Tapping **Measurement Tools** displays a tool bar [at the top center](#) of the video window. Tool descriptions are listed below:



Icon	Function
	Select Magnification for Measurement after Calibration
	Angle
	4 Points Angle
	Point (Point Counter)
	Arbitrary Line
	3 Points Line
	Horizontal Line
	Vertical Line
	Parallel
	3 Points Vertical Line
	Rectangle
	3 Points Rectangle
	Ellipse
	5 Points Ellipse
	Circle
	3 Points Circle
	Annulus
	3 Points Annulus
	Two Circles and its Center Distance
	3 Points Two Circles and its Center Distance
	Polygon
	Arc
	Text
	Arrow
	Scale Bar
	Line Color Line Width
	Undo
	Settings
	Delete all the measurement objects
	Exit from Measurement mode
	Auto Measurement: Two Points Parallel, Circle Detect, Annulus Detect, Rectangle Detect, Polygon

3.2.2 Broadcast

Upon entering Broadcast, the software [auto-receives and full screens the teacher's desktop stream](#). The right main area syncs the instructor's screen in real time, covering courseware, lab demos and video lectures. In this mode, students can focus on watching teaching content to complete classroom learning simultaneously.

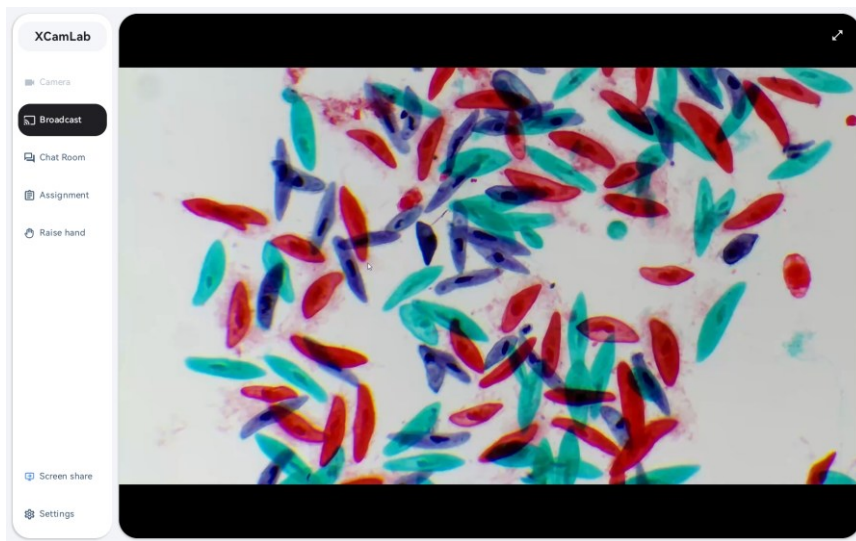


Figure 82 Broadcast Interface

3.2.3 Chat Room

On the interactive teaching page, the central window displays the [class group chat](#) with group name at the top. The bottom input bar supports [images](#) and [emojis](#) for message sending. The right section displays [chat groups](#), including the main [class group](#), [teacher private conversations](#) and [custom groups created by teachers](#). Students can communicate with the whole class in the main group chat.

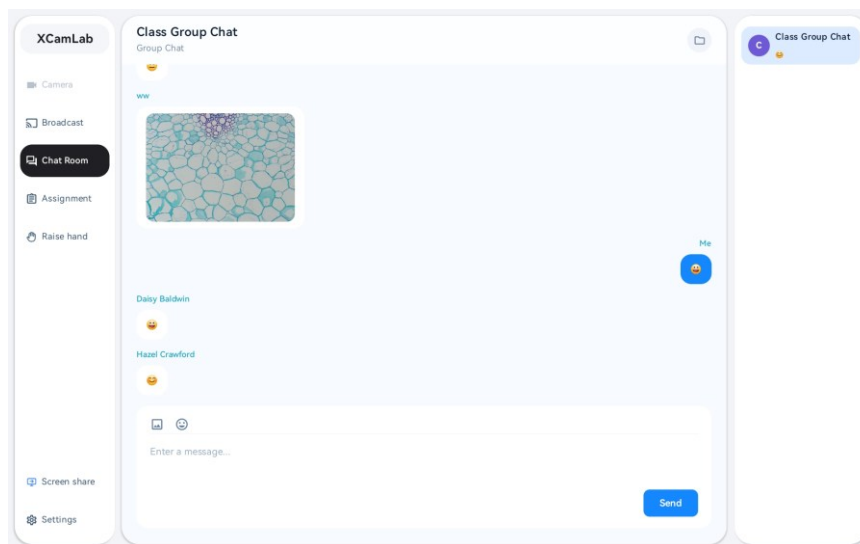


Figure 83 Chat Room Interface

Click the icon at the top right  to open the class group shared files window. The top of the window features buttons to [open storage](#), [refresh](#) and [close](#). The file list displays various shared materials including documents and images. Each entry clearly shows the [file name](#), [file size](#), [uploader](#) and [upload date](#), with a [Download](#) button on the right of each file. Students can download learning materials such as experimental courseware and slice images shared by teachers at any time, which facilitates unified access to study resources during class.

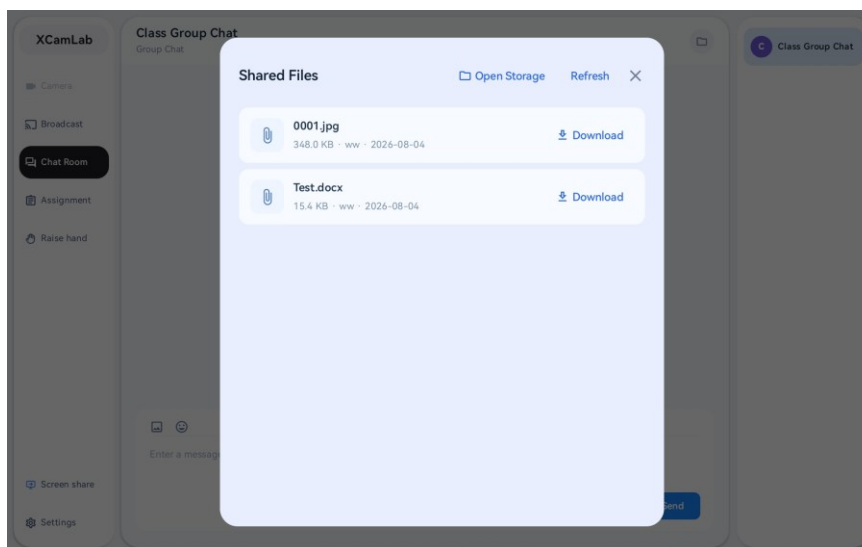


Figure 84 Shared Files

3.2.4 Assignment

My Assignments page manages all teacher-assigned tasks. You can view homework, upload files and check feedback.

Top cards show counts of [All](#), [to submit](#), [pending review](#) and [Reviewed](#); [Refresh](#) on top-right [updates data](#). Search by [title](#), [description](#) or [class](#), [filter](#) via tabs. List displays [title](#), [class](#), [deadline](#), [attachment](#) and [status](#). Tap [Submit File](#) on [unfinished tasks](#) to upload images/videos.

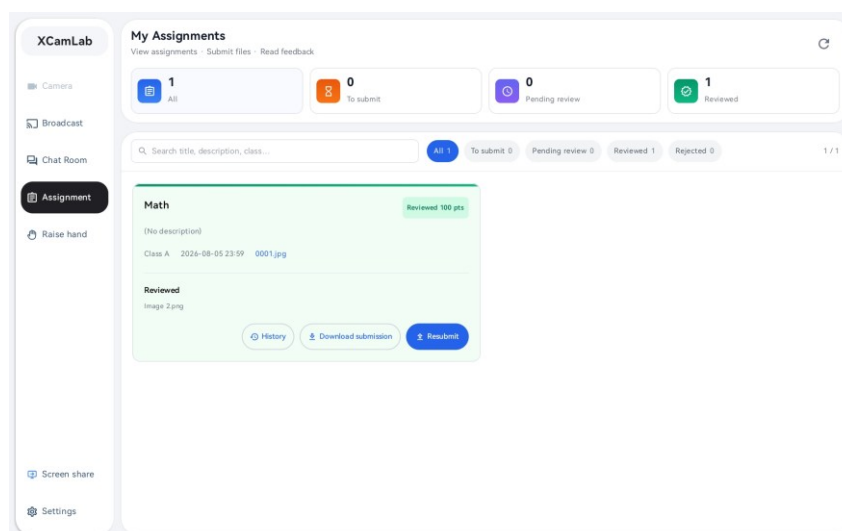


Figure 85 Assignment Interface

3.2.5 Other Functions

3.2.5.1 Raise Hand

Click the  **Raise Hand** button on the left sidebar to [send a reminder to your teacher](#) when you have questions or want to speak in class. The teacher will receive your request and invite you to talk or answer your questions.

3.2.5.2 Screen Share

Tap  **Screen Share** to [stream your screen to the teacher in real time](#). You can submit lab footage or show homework for the teacher to view your operations and guide you online instantly.

3.3 System Settings

At the top of the page lies the [language bar](#). Click the dropdown to switch the UI between [Default](#) (Change with system language), [Simplified Chinese](#), [Traditional Chinese](#), [English](#) and [Russian](#) for diverse user habits. Below it, the update section shows the current software version; tap Check Updates to auto-search official online releases and install upgrades as needed. The Log Out button at the bottom right signs out your student account and redirects it to the login page.

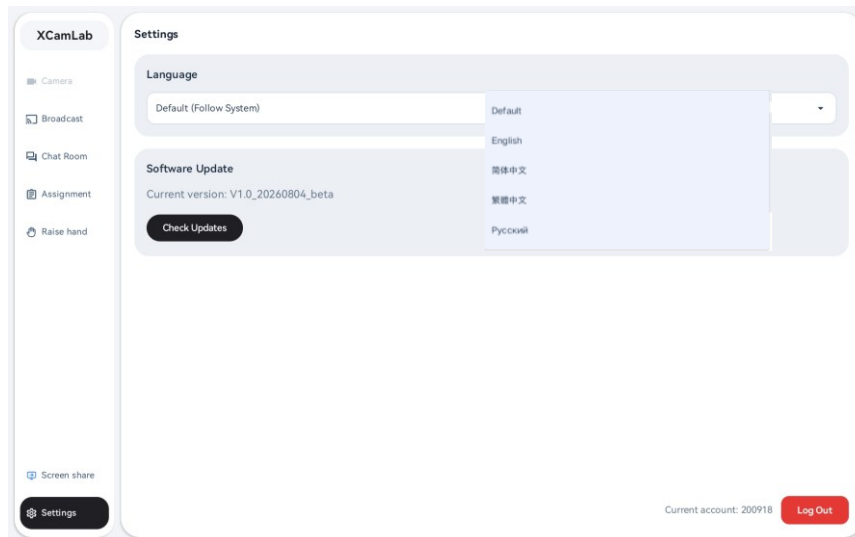


Figure 86 Setting Interface

4 Customer Service Contact

If you have any questions about this product, please contact your dealer for technical support.