QUICK REF CARD

Congratulations on the purchase of your new Phenom™ Microscope - an instant view into the microscopic world.

This fold-out card describes how to prepare, load, navigate, and image a sample. It also includes instructions on how to store and view images, and optimize the Phenom™. By following the enclosed instructions and illustrations, you will be imaging within minutes.

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IMAGE SCREEN

Workspace selection bar

Optical overview window

Main viewing window

Electron Optical overview window

Databar

Create Optical overview
Makes a composite image in the optical overview window

Refresh electron overview
Updates the lowest magnification electron optical image

Save image
Captures the image of the electron optical overview window

Save image – Captures the image from the optical overview window

Help

Eject sample – Brings sample to unload position and allows door to be opened

Toggle image mode – Toggles between light and electron optical imaging mode

Save image (picture)
Captures the image in the main viewing window

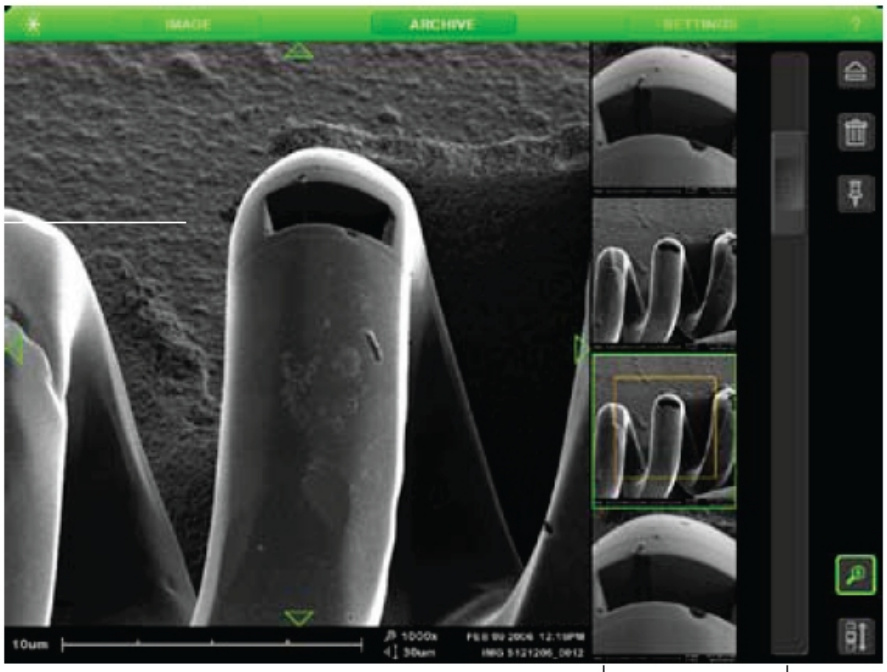
Defines the functionality of the rotary knob:

- Magnification
- Contrast and Brightness
- Focus
- Image rotation

Button bar

Navigation
By touching these arrows the sample moves in the direction selected.

ARCHIVE SCREEN



Active image

Help

Eject sample
Brings sample to unload position and allows door to be opened

Delete image

Image hold
Holds selected image to compare with other images

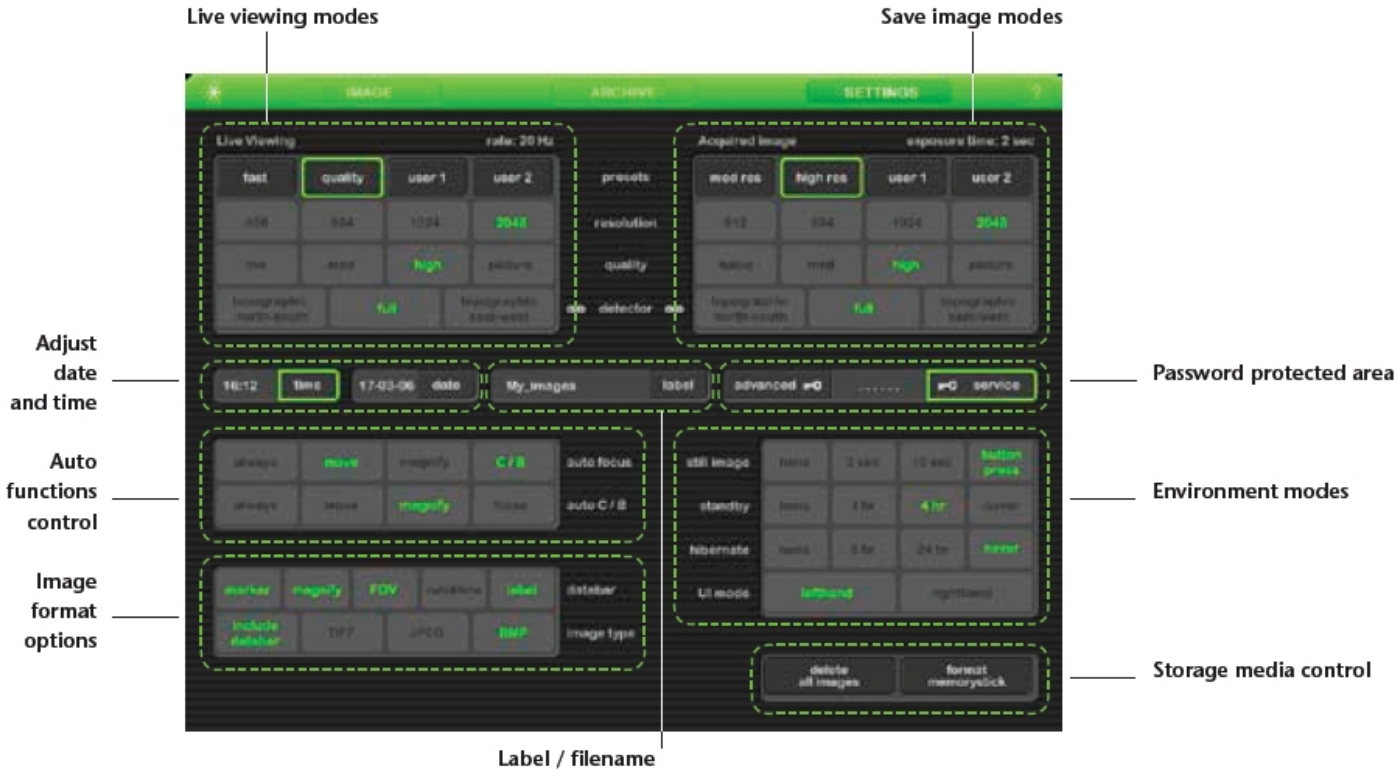
Digital zoom

Browse
Browse through the image gallery

Tumbnail gallery

Scroll bar

SETTINGS SCREEN



QUICK REFERENCE

SAMPLE

Sample preparation

- Sample needs to be mounted onto a stub.
  - Use a SEM specific adhesive.
  - Strong out-gassing adhesives for mounting samples should not be used.
- Conductive samples require no preparation.
- Partially conductive samples can usually be imaged with no preparation.
- If a partially conductive sample images poorly a conductive coating may be required.
- Wet or strongly out-gassing samples are not to be imaged in the Phenom.
- When powders are mounted onto a stub, ensure they are fixed by blowing gently over the sample.
- Airborne powders inside the system can cause serious damage to the tool.

Sample size

- The samples mounted onto the stub must fit within a 25mm diameter and 35mm height envelope.
- Do not force the sample into the sample cup.

Loading samples into the Phenom

- Inserting the stub into the sample cup.
  - Rotate the height adjustment ring on the sample cup until the mounting surface is in the highest position.
  - Insert the pin of the stub into the hole on the mounting surface using tweezers if necessary.
  - Ensure the stub is inserted so that the flat of the stub is seated on the mounting surface.
- Positioning the sample.
  - Lower the sample by turning the height adjustment ring of the sample cup.
  - The sample is correctly positioned when it is at least below the top surface of the holder.
  - It is critically important that the top of the sample is below the top of the cup. **The sample will be destroyed if inserted into the tool while positioned above the top of the sample cup.**
  - A simple test is to run a straight edge, such as a ruler, across the top of the sample cup prior to insertion into the microscope. If the ruler does not hit the sample, the sample is positioned correctly.
- Push  on the IMAGE UI (user interface) screen.
- When the LED on the front panel indicates the door is unlocked, it is safe to open the door.
  - Hold the handle and raise the door to its fullest extent.
  - Insert the sample cup into the slot below the door.
  - When properly inserted the cup will snap into place. If the door is not fully open the sample cup will not insert.
  - The sample container is inserted correctly when the "Sample" LED on the front cover is lighted.
  - Close the door by sliding it down (some initial force is required).
  - When the door is closed the sample will automatically move to the optical imaging position.
  - The door will automatically be locked as indicated by the LED on the front cover.
  - The sample is loaded and ready for operation.

USER INTERFACE CONTROLS

- In general, all of the controls work in the same way.
  - Touching an icon on the touch screen will activate that control.
  - Moving the rotary knob adjusts that particular function.

OPTICAL IMAGING

- After the sample is loaded and the door is closed the sample moves automatically to the optical imaging position.
- The optical camera is activated and the image is displayed in the main viewing window.
- Optimizing the image:
  - Touching  then rotating the knob allows the focus of the optical image to be adjusted.
- Either pressing the focus icon on the UI or pressing the rotary knob will cause the focus to toggle between coarse and fine adjustment.
  - An 'F' displayed on  indicates fine focus.
- The illumination can be optimized by selecting .

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- Direct and indirect lighting can be selected by further pressing the same button.

Navigation

- An optical overview of the entire sample can be obtained by pressing .
  - The overview image is displayed in the overview window.
  - If overview is not chosen the overview will be compiled through successive, operator controlled movements of the sample.
- There are two ways to move the sample.
  - Touching a feature of interest on the main image window will move the feature to the center of the field of view.
  - Touching one of the directional arrows on the screen will move the sample in the direction selected.
- Touching a feature of interest in the overview window will also cause the feature of interest to be centered in the field of view of the main image window.

Storing Images

- Images can only be stored if a USB 2.0 flash drive (USB stick) has been inserted into the USB port on the front of the system. This can be inserted at any time.
- All images in the main viewing area on the IMAGE screen can be stored onto the USB stick by selecting on the button bar.
- Parameters for settings associated with storing images can be selected on the SETTINGS screen.
- Images in the overview windows can be stored by selecting next to the overview window.

ELECTRON IMAGING

- After the feature of interest has been centered in the optical image the sample can be positioned for high resolution imaging.
- This is done by selecting the image mode .
  - The large circle on the icon represents the larger magnification of the electron image.
  - The small circle on the icon represents the smaller magnification of the optical image.
  - The appropriate circle is colored green to show the active image mode.
  - The arrow indicates the mode that will become active the next time the icon is touched.
- After transferring the sample from the optical to an electron imaging position, an overview picture is displayed in the lower overview window. An image of the sample at the current magnification is also displayed in the main image window.
- The image in the lower overview window is the lowest magnification electron picture.
- A colored square superimposed on the electron overview image indicates the area of the sample being imaged in the main window.
- A colored cross in the optical overview window also represents the region of the sample being imaged in the main window.
- If the sample is moved such that the region of interest is outside of the current electron overview image, the overview image window will appear black. Selecting will reestablish this image.
- Optimizing the electron image.
  - As with Optical Imaging above, touching activates the focus control of the rotary knob.
  - Coarse and fine focus are also activated as discussed in the section on optimizing the optical image.
  - Magnification is controlled by touching .
  - Coarse and fine magnification are activated in the same way as coarse and fine focus.
  - Contrast and brightness will be automatically adjusted if the ACB function is activated in the SETTINGS screen.
  - If the automatic function is not selected then contrast and brightness can be adjusted manually by touching the appropriate icon.
  - Toggling will switch between contrast and brightness.
  - Touching continiously for 2s will apply the ACB function to the image.
- Image rotation.
  - The image can be rotated by touching . Coarse and fine rotation is selectable in the same way as the other functions.

ARCHIVE SCREEN

Images saved on the USB stick can be viewed on the ARCHIVE screen. This will include all images on the USB stick even from prior sessions.

- The default mode shows a 5 x 4 array of images.
- It is possible to scroll through all the available images using the rotary knob.
- The highlighted image can be displayed at full size by pressing the rotary knob.
- When the image is displayed at full size, digital zoom is available by selecting .
- Selecting allows the user to continue to review the stored images.
- Comparing two images can be achieved by use of the hold button.
  - To compare images the full size displayed image can be put on hold by selecting .
  - The displayed image will stay on display while scrolling through the other images with the rotary knob.
  - Toggling the rotary knob will switch between the currently displayed and the currently selected images for comparison.
- Deleting an image.
  - The selected image can be deleted by selecting .
- For deleting or formatting the USB stick see the SETTINGS screen.
- From the ARCHIVE screen it is also possible to unload the sample and open the door .

SETTINGS SREEN

Live viewing mode

- Fast (preset)
  - Fast image refresh times.
  - Images appear noisier and pixel resolution is lower.
- Quality (preset)
  - Slower image refresh times.
  - Good general purpose imaging condition.
- User 1 and 2
  - User selected settings can be stored by holding the button for 4 seconds.

Detector

- The detector settings are not linked to the preset selections.
- Detector modes.
  - Topographic
    - This mode accentuates contrast resulting from changes in sample topography. Orientation is selectable. (North-South or East-West).
  - Full
    - This mode maximizes the signal in the image and accentuates contrast due to differences in sample composition.

Acquired image

- These are set in the same way as for the Live viewing mode but applied to the saved images.
- For example, one can view the live images in “Fast” mode while saving images in “Quality” mode.

Time

- Sets the current time.

Date

- Sets the current date.

Label

- A user specified label can be created.
- The label is displayed in the image Databar.
- The label forms the root file name for saved images.
- Saved images are automatically numbered using the user specified label as the root. (Sample B_000X.tiff)

Advanced and service
- These are protected login modes for experienced users and service personnel.

Auto focus
The auto focus can be set to act in different modes.
- Always
  - The system will have a continuous auto focus.
- Move
  - The auto focus will be activated after every stage move.
- Magnify
  - The auto focus will be activated after every magnification change.
- C/B
  - The auto focus will be activated after every contrast and brightness change.

Auto contrast and brightness (ACB)
The auto contrast and brightness can be set in different modes
- Always
  - The system will have a continuous ACB.
- Move
  - The ACB will be activated after every stage move.
- Magnify
  - The ACB will be activated after every magnification change.
- ACB
  - The ACB will be activated after every focus change.

Databar
The items selected here will be displayed in the main viewing window and if selected in the saved images.
- Marker
  - Displays the micron bar marker.
- Magnify
  - Displays the magnification.
- FOV (Field of view)
  - Displays the field of view of the image.
- Label
  - Displays the specified label.

Image type
Settings for the stored images.
- TIFF: Stores images in the TIFF file format.
- JPEG: Stores images in the JPEG file format.

Still image
- Sets a time to hold the image visible on the screen after storage.

Standby and hibernate
- These are advanced functions that extend the interval between routine maintenance procedures of the microscope.
- See the user manual for details.

UI mode
- The UI can be optimized for left or right handed operation.

Delete all images
- Deletes all images on USB stick.

Format USB stick
- Formats the USB stick.

Only operations explained within this document should be performed. All other servicing should be referred to authorized service personnel.

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