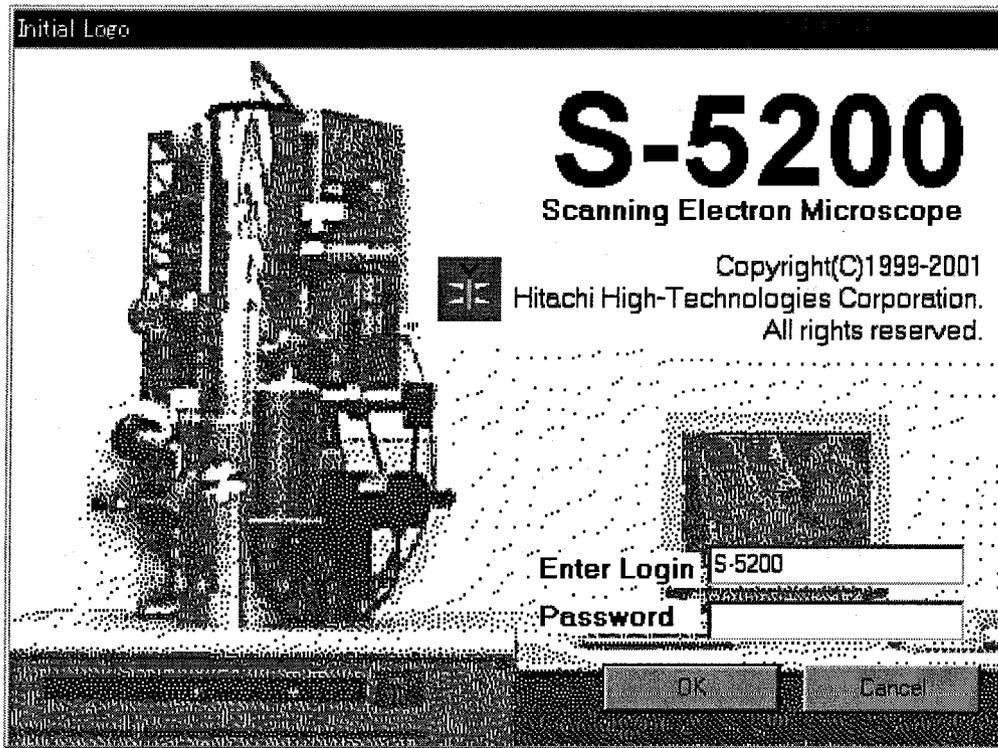


## 2.3 Graphical User Interface (GUI)

The S-5200 login dialog window will open.



**Fig. 2-14 S-5200 Login Dialog Window**

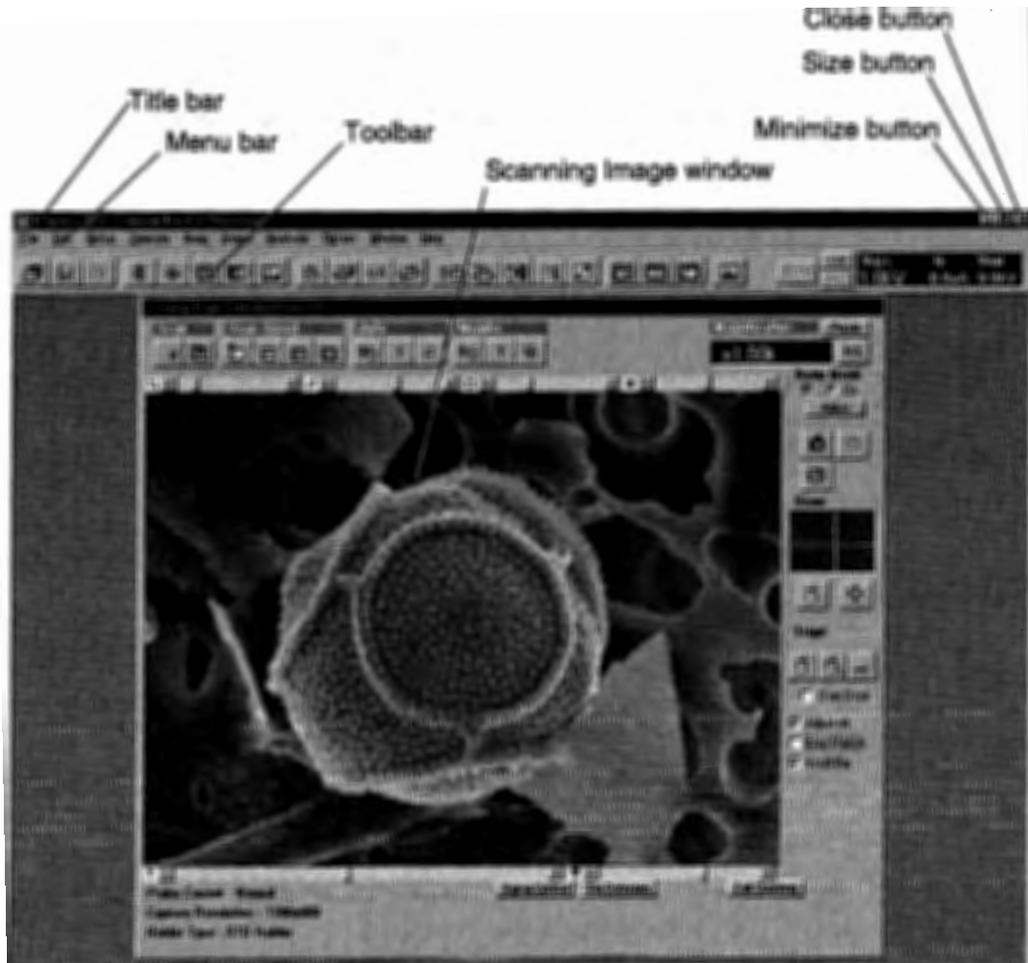
At the first startup after installation of the program, use the log-in name [S-5200] and click the **OK** button. You do not need Password.

After log-in names and passwords for them are set, input the name and the password and then, click the **OK** button.

- NOTICE:**
1. Setting and maintaining log-in names and passwords shall be done by the system supervisor.  
Refer to 2.3.26 Login Setting Dialog window and 3.11.18 Setting Login Name.
  2. Setting or changing password for a log-in name once registered with above operation can be made using the Password Setting dialog window.  
Refer to 2.3.29 Password Setting Dialog Window and 3.11.17 Password Setting.

### 2.3.2 S-5200 SEM Main Window

This window is the main window for operation of the microscope.



**Fig. 2-15 S-5200 Operation Window**

- Title bar.....Shows the window title
  - Minimize button : Minimizes the window. The window is iconized and placed on the Task bar.
  - Size button : The window status becomes Normal type. You can change the window size. This button will be changed to Maximize button.
  - Close button : Terminates the S-5200 operation program and closes the window.
- Menu bar.....Clicking a main menu on the menu bar shows pull-down menus. Click one of commands on the pull-down menu to execute the command.
- Tool bar .....Frequently used commands are placed on the tool bar as tool buttons. Click a button to execute the command.
- Scanning Image window.....The scanning image window displays a scanning image. Control buttons for usual operation are placed on the window.

## 2.3 Graphical User Interface (GUI)

### 2.3.3 Menu

The menu bar and the toolbar include the following menus and commands.

#### (1) File Menu

The **File** menu includes commands for opening and saving files, photo recording, and image printing.

- Open SEM Data Manager**.....Opens the **SEM Data Manager** window.  
Refer to: 2.3.8 SEM Data Manager Window
- Direct Save**.....Opens the **Save Image** dialog window. It is used for saving viewing images to disk. (To save captured images, use the **Save**  button in the **Captured Image** window.)  
Refer to: 2.3.34 Save Image Dialog Window
- Operating Condition**.....Opens the **Operating Condition** dialog window. It is used for saving and loading operating conditions, such as accelerating voltage, lens setting and alignment data.  
Refer to: 2.3.28 Operating Condition Dialog Window
- Direct Photo**.....Executes Direct Photo recording.  
Refer to: 3.6.7 (3) Direct Photo Recording
- Memory Photo**.....Executes Memory Photo Recording.  
Refer to: 3.6.7 (4) Memory Photo Recording
- Video Printer**.....Prepares images for a video printer.  
Refer to: 3.11.10 Video Printer
- Print**.....Opens the **Print Setup** dialog window. It is used for printing viewing images on a Windows-supported printer. (To print out images saved on disk, use the **Print** function in the **SEM Data Manager** window.)  
Refer to: 2.3.31 Print Setup Dialog Window
- Exit**.....Closes SEM operation.

#### (2) Edit Menu

The **Edit** menu includes commands for copying viewing images and attributes to the Windows clipboard.

- Copy Image**.....Copies viewing images to the Windows clipboard.  
Refer to: 3.11.12 Copy Image
- Copy Attribute**.....Copies information of viewing images to the Windows clipboard.  
Refer to: 3.11.13 Copy Attribute

(3) **Setup Menu**

The **Setup** menu includes commands for opening setup dialog windows for operation of HV, column and others.

- HV Control** ..... Opens the **HV Control** dialog window. It is used for applying accelerating voltage, flashing operation or setting emission current.  
Refer to: 2.3.24 HV Control Dialog Window
- Column SetUp** ..... Opens the **Column SetUp** dialog window. It is used to select the optimal electron optical column conditions.  
Refer to: 2.3.16 Column SetUp Dialog Window
- Image SetUp** ..... Opens the **Image Setup** dialog window. It is used for setting the preset magnifications, contrast and brightness of ABCC, capture resolution, capturing speed and screen mode.  
Refer to: 2.3.25 Image Setup Dialog Window
- Signal Select**..... Opens the **Signal Select** dialog window. It is used for signal selection.  
Refer to: 2.3.36 Signal Select Dialog Window  
2.3.37 Signal Select (Color Mixing) Dialog Window
- Photo Condition** ..... Opens the **Photo Condition** dialog window. It is used for selecting scanning speed and other photo recording conditions.  
Refer to: 2.3.30 Photo Condition Dialog Window
- Data Display**..... Opens the **Data Display** dialog window. It is used to turn data display On/Off and select specific information to be printed on image.  
Refer to: 2.3.21 Data Display Dialog Window

(4) **Operate Menu**

The **Operate** menu includes commands for operation of column alignment, raster rotation, motorized stage, auto functions etc.

- Simple Operation** ..... Opens the **Simple Operation** toolbox. Frequently used function buttons are placed on the tool box. When you feel using buttons on the toolbar is confusing, open this tool box and close the toolbar. You can operate almost all functions on this tool box. Also it is useful when using the Full Screen mode upon closing the toolbar and controls on the Scanning Image window to extend image area.  
Refer to: 2.3.38 Simple Operation Dialog Window
- Alignment**..... Opens the **Alignment** dialog window. It is used for column alignment operation.  
Refer to: 2.3.15 Alignment Dialog Window

## 2.3 Graphical User Interface (GUI)

<b>Raster Rotation</b> .....	Opens the <b>Raster Rotation</b> dialog window. It is used for image rotation, dynamic focusing and tilt compensation. Refer to: 2.3.33 Raster Rotation Dialog Window
<b>Stage Control</b> .....	Opens the <b>Stage Control</b> dialog window. It is used for monitoring stage coordinate. Refer to: 2.3.40 Stage Control Dialog Window
<b>ABCC</b> .....	Executes automatic brightness and contrast control. Refer to: 3.5.3 (1) Auto Adjustment (ABCC)
<b>Auto Focus</b> .....	Executes automatic focusing. Refer to: 3.5.4 (2) Auto Focus Function
<b>Auto Stigma</b> .....	Executes automatic astigmatism correction. Refer to: 3.5.4 (4) Auto Stigma Function
<b>BC Monitor</b> .....	Starts BC Monitor mode. Refer to: 3.5.3 (3) BC Monitor Mode
<b>Focus Monitor</b> .....	Starts Focus Monitor mode. Refer to: 3.5.4 (6) Focus Monitor Mode
<b>Mag Mode</b> .....	Selects High Mag or Low Mag modes. Refer to: 3.5.1 Selecting Magnification

### (5) Scan Menu

The **Scan** menu includes commands for scanning control.

<b>Run (Freeze)</b> .....	Runs or Freezes scanning alternately.
<b>Capture</b> .....	Starts image capturing. Refer to: 3.6.4 Image Capturing
<b>Split Dual Mag</b> .....	Activates Split/Dual Mag mode. Refer to: 2.3.39 Split/Dual Mag Controller
<b>Scan Speed</b> .....	Selects scanning speed. Refer to: 3.5.2 Selecting Scanning Speed

### (6) Image Menu

The **Image** menu includes commands for signal or image processing.

<b>Signal Process</b> .....	Opens the <b>Signal Processing</b> dialog window. Refer to: 2.3.35 Signal Processing Dialog Window
<b>Pseudo Color</b> .....	Opens the <b>Pseudo Color</b> dialog window. It is used for coloring images. Refer to: 2.3.32 Pseudo Color Dialog Window

- Color Mixing** ..... Opens the **Signal Select (Color Mixing)** dialog window with Color Mixing setting area. It is used for color mixing of two images with different signal sources. This command is available only in Dual Screen display mode.  
Refer to: 2.3.37 Signal Select (Color Mixing) Dialog Window
- Data Entry** ..... Opens the **Data Entry** toolbox. It is used for characters and graphics overlay on images.  
Refer to: 2.3.22 Data Entry Toolbox
- PCI Transfer** ..... Transfers viewing images to the PCI window.  
This command is available only when PCI software is installed.

#### (7) Analysis Menu

The **Analysis** menu includes commands for analysis modes, measurement and others.

- Analysis Mode** ..... Enables (**On**) or Disables (**Off**) analysis mode buttons on the **Scanning Image** window.  
Refer to: 3.11.4 X-ray Analysis Mode
- Normal** ..... Sets to Normal mode (image observation).
- Line Analysis** ..... Selects Line analysis 1 and 2 mode alternately.  
Refer to: 3.11.4 Line Analysis Mode
- Spot Analysis** ..... Selects Spot 1 and 2 mode alternately.  
Refer to: 3.11.4 Spot Analysis Mode
- Area Analysis** ..... Selects Area analysis 1 and 2 mode alternately.  
Refer to: 3.11.4 Area Analysis
- Oblique** ..... Opens **Oblique Image** window and displays bird's-eye view of viewing images.  
Refer to: 2.3.27 Oblique Dialog Window
- CD Measurement** ..... If the CD-Measurement option is installed, the **CD Measurement** dialog window is brought up. If the option is not installed, measurement cursors appear on the image.

#### (8) Option Menu

The **Option** menu includes commands for optional functions.

- Environment Setting** ..... Opens the **Environment Setting** dialog window. It is used for Data Entry and CD-Measurement font selection, selection of mouse control on the scanning image, and selection of data transfer to PCI.  
Refer to: 2.3.23 Environment Setting Dialog Window
- Login Setting** ..... Opens the **Login Setting** dialog window. It is used for setting login names and passwords for users. The dialog window can be opened only when logged in with the system manager's login name.  
Refer to: 2.3.26 Login Setting Dialog Window

## 2.3 Graphical User Interface (GUI)

- Toolbar Setting**.....Opens the **Toolbar Setting** dialog window. It is used for setting arrangement of tool buttons on the toolbar. The customized toolbar arrangement will be saved for each of current users.  
Refer to: 2.3.41 Toolbar Setting Dialog Window
- Password Setting**.....Opens the **Password Setting** dialog window. It is used for setting or changing the password for the login name of the current user.  
Refer to: 2.3.29 Password Setting Dialog Window
- Comm Port Setting**.....Opens the **Comm Port Setting** dialog window. It is used for setting data necessary for file transfer to and from a network computer.  
Refer to: 2.3.42 Transfer Setting Dialog Window
- Maintenance**.....Opens the **Maintenance** window. It is used for setting the maintenance date of scroll pump.  
Refer to: 4.4 Maintenance of Scroll Pump

### (9) Window Menu

The **Window** menu includes commands for selecting a type of scanning image window, opening the **Captured Image** window, and others.

- Screen Mode**.....Selects Screen Mode (Standard, Dual, or Full Screen).  
Refer to: 3.11.1 Screen Mode
- Scan Image**.....Selects the location of the **Scanning Image** window on the CRT monitor (Left / Center / Right). And closes (disappear) or Opens (appear) the Scanning Image window on the CRT monitor (Close / Open).
- Captured Image**.....Opens the **Captured Image** window.  
Refer to: 2.3.7 Captured Image Window
- Close All**.....Closes all dialog windows except for the **Scanning Image** window.
- Back Color**.....Selects a background color of S-5200 main window from a list of colors.
- Toolbar**.....Displays or removes toolbar. It is used for removing the toolbar to expand image area in the Full Screen display mode.

### (10) Help Menu

Opens **Help** for S-5200 SEM operation.

- Index**.....Shows the index of S-5200 Help.
- Search**.....Shows the key-word search of S-5200 Help.
- About FE-PC SEM**.....Indicates the version of S-5200 PC-SEM.

## 2.3.4 Toolbar

You can select tool buttons placed on the toolbar. The button arrangement is saved independently for each login name. You can use your own toolbar when logged in with your unique login name.

Refer to: 3.11.16 Toolbar Setting Dialog Window

-  SEM Data Manager..... Opens the **SEM Data Manager** window. It operates the same as File-Open SEM Data Manager command.
-  Direct Save..... Opens the **Save Image** dialog window. It is used for saving viewing images to disk. It operates the same as File-Direct Save command.
-  Print Setup..... Opens the **Print Setup** dialog window. It is used for printing viewing images to a Windows-supported printer. It operates the same as File-Print command.
-  Column Setup..... Opens the **Column Setup** dialog window. It is used to select the optimal electron optical column conditions. It operates the same as Setup-Column command.
-  Alignment ..... Opens the **Alignment** dialog window. It is used for column alignment operation. It operates the same as Operate-Alignment command.
-  Image Setup ..... Opens the **Image Setup** dialog window. It is used for selecting preset magnification, contrast and brightness of ABCC, capture resolution, capturing speed and screen mode. It operates the same as Setup-Image command.
-  Photo Condition..... Opens the **Photo Condition** dialog window. It is used for selecting scanning speed and other photo recording conditions. It operates the same as Setup-Photo Condition command.
-  Data Display..... Opens the **Data Display** dialog window. It is used to turn data display On/Off and select specific information to be printed on image. It operates the same as Setup-Data Display command.
-  Simple Operation..... Opens the **Simple Operation** toolbox. Frequently used function buttons are placed on the tool box. When you feel using buttons on the toolbar is confusing, open this tool box and close the toolbar. You can operate almost all functions on this toolbox. It operates the same as Operate-Simple Operation command.
-  Split Dual Mag ..... Activates Split/Dual Mag mode. It operates the same as Scan-Split DM Mode command.
-  CD Measurement ..... If the CD-Measurement option is installed, the **CD Measurement** dialog window is brought up. If the option is not installed, measurement cursors appear on the image. It operates the same as Analysis-Measure command.

## 2.3 Graphical User Interface (GUI)

-  Raster Rotation ..... Opens the **Raster Rotation** dialog window. It is used for image rotation, dynamic focusing and tilt compensation. It operates the same as Operate-Raster Rotation command.
-  Stage Control ..... Opens the **Stage Control** dialog window. It is used for monitoring stage coordinate. It operates the same as Operate-Stage Control command.
-  Signal Select ..... Opens the **Signal Select** dialog window. It is used for signal selection. It operates the same as Setup-Signal Select command.
-  Signal Process ..... Opens the **Signal Process** dialog window. It is used for signal processing. It operates the same as Image-Signal Process command.
-  Pseudo Color..... Opens the **Pseudo Color** dialog window. It is used for coloring images. It operates the same as Image-Pseudo Color command.
-  Color Mixing ..... Opens the **Signal Select (Color Mixing)** dialog window with Color Mixing setting area. It is used for color mixing of two images with different signal sources. This command is available only in Dual Screen display mode. It operates the same as Image-Color Mixing command.
-  Data Entry ..... Opens the **Data Entry** toolbox. It is used for characters and graphics overlay on images. It operates the same as Image-Data Entry command.
-  Standard Screen Mode.... Selects Standard Screen display mode. If screen mode is the Standard, move Scanning image window to left, center and right side of the main window alternatively. It operates the same as Window-Screen Mode-Standard Screen command.
-  Dual Screen Mode..... Selects Dual Screen display mode. It operates the same as Window-Screen Mode-Dual Screen command.
-  Full Screen Mode ..... Selects Full Screen display mode. It operates the same as Window-Screen Mode-Full Screen command.
-  Enable Analysis Mode ..... Analysis mode buttons are shown or erased on Scanning Image window alternately. It operates the same as Analysis-Analysis Mode command.
-  Operating Condition..... Opens the **Operating Condition** dialog window. It is used for saving and loading operating conditions, such as accelerating voltage, lens setting and alignment data. It operates the same as File-Operating Condition command.
-  Copy Image ..... Copies the scanning image to the Windows clipboard. It operates the same as Edit-Copy Image command.
-  Copy Attribute..... Copies the information of scanning image to the Windows clipboard. It operates the same as Edit-Copy Attribute command.

-  **Oblique**..... Opens the **Oblique** dialog window and displays bird's-eye views of viewing images. It operates the same as Analysis-Oblique command.
-  **Captured Image**..... Opens the **Captured Image** window. It operates as same as Window-Captured Image command.
-  **PCI Transfer**..... Transfers a selected image to the PCI window. (provided by Quartz Imaging Co.) Available only when PCI software is installed. It operates the same as Image-PCI Transfer command.
-  **Help**..... Opens Help for S-5200 SEM operation.
-  **Home**..... Sets the stage to specimen exchange position. It operates same as **Go to Home** button on the **Stage Control** dialog window.
-  **HV ON**..... Applies high voltage to the electron gun and controls extraction voltage to obtain the emission current. The voltage value to be applied is indicated in the HV display area. The button is changed to **SET** when high voltage is applied, so the emission current values can be adjusted.
-  **HV OFF**..... Shuts down the high voltage.
-  **Vacc**    **Ie**    **Vext**  
**10.0kV**   **10.5uA** **5.2kV** ..... Displays accelerating voltage, emission current and extracting voltage. When accelerating voltage is on, these values are displayed in yellow color. When accelerating voltage is off and the vacuum condition of the gun and the column is good, they are displayed in blue and flicker. The **HV Control** dialog window can be opened by clicking this area.

## 2.3 Graphical User Interface (GUI)

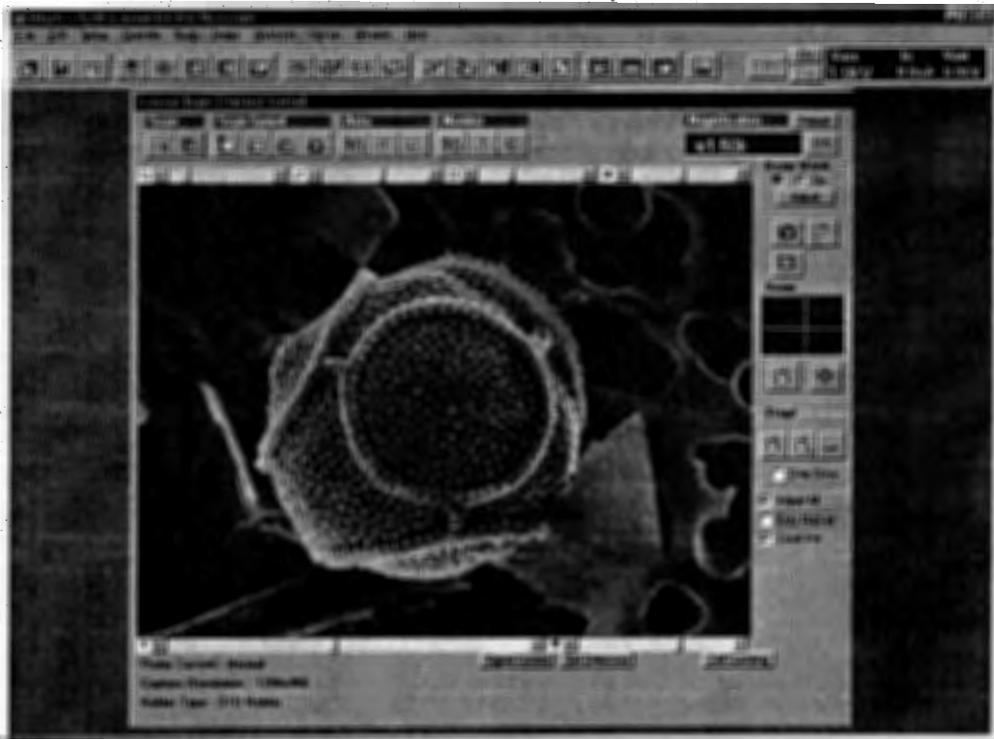
### 2.3.5 Scanning Image Window

The scanning image window (Standard screen mode) displays a scanning image of 640 × 480 pixels. Most functions are available in this mode.

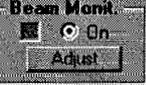
- Standard Screen mode : This mode displays a scanning image of 640 × 480 pixels.
- Dual Screen mode : This mode displays two images using the same or different signals.
- Full Screen mode : On this mode, the SEM image is enlarged to fill a full screen.

These windows have control buttons listed below.

#### (1) Standard Screen Mode



-  Run/Freeze..... Runs or Stops scanning alternately.
-  Capture ..... Starts image capturing.
-  Fast 1/2 ..... Selects scanning speed Fast 1 or Fast 2 alternately.
-  Slow 1/2..... Selects scanning speed Slow 1 or Slow 2 alternately.
-  Slow 3/4..... Selects scanning speed Slow 3 or Slow 4 alternately.
-  Reduce 1/2..... Reduce 1/2 button: Selects scanning speed Reduce 1 or Reduce 2 alternately.
-  ABCC ..... Starts auto brightness/contrast adjustment (ABCC).

-  Auto Focus..... Starts auto focusing (AFC).
-  Auto Stigma..... Starts auto astigmatism correction (AST).
-  BC Monitor..... Sets BC Monitor mode (for manual brightness and contrast adjustment).
-  Focus Monitor ..... Sets Focus Monitor mode (for manual focusing).
-  Wobbler ..... Opens the **Alignment** dialog window.
-  Normal ..... Sets Normal mode.
-  Line..... Selects Line analysis 1 or 2 mode alternately.
-  Spot ..... Selects Spot 1 or Spot 2 mode alternately.
-  Area ..... Selects Area analysis 1 or 2 mode alternately.
- DBC**..... Check this box when acquiring image using Digital Beam Control function which permits the primary beam control from EDX systems.
-  ..... Area for magnification indication and operation.
-  ..... Sets magnification at a preset value.
-  ..... Selects High Mag or Low Mag mode alternately.
-  ..... Starts adjustment, sets On/Off and indicates status of Beam Monitor.
-  Direct Photo (Option) ..... Starts Direct Photo recording.
-  Memory Photo (Option).... Starts Memory Photo recording.
-  Video Printer (Option) ..... Prepares images for a video printer.
-  ..... Indicates the current position of Electrical Image Shift.
-  Image Shift..... Starts (or releases) image shift control with the mouse.
-  Image Shift Reset ..... Resets Image Shift.

### 2.3 Graphical User Interface (GUI)

 Stage..... Starts (or releases) stage operation with the mouse.

 Click-RISM ..... Starts (or releases) RISM operation with the mouse.

 Stage Dialog..... Opens the **Stage Control** dialog window.

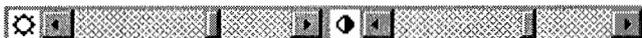
**Adjust All** ..... When this box is checked (ON), all controls for mouse operation, such as focusing, brightness and contrast adjustment, and astigmatism correction are enabled. When this box is not checked (OFF), the controls selected in the **Environment Setting** dialog window are enabled.

**Area Marker** ..... Displays (or erases) the area marker.

**Scroll Bar** ..... Displays (or erases) scroll bars.



Stigma Sliders ..... Slider controls for astigmatism correction.



Brightness and Contrast Sliders..... Slider controls for adjustment of brightness and contrast.



Focus Sliders..... Slider controls for focus (fine and coarse).

**Probe Current : Normal** ..... Displays Probe Current mode.

**Capture Resolution : 640x480** ..... Displays resolution of captured image.

**Holder Type : STD Holder** ..... Displays the Specimen Holder Type which is set in the **Restriction** dialog window.

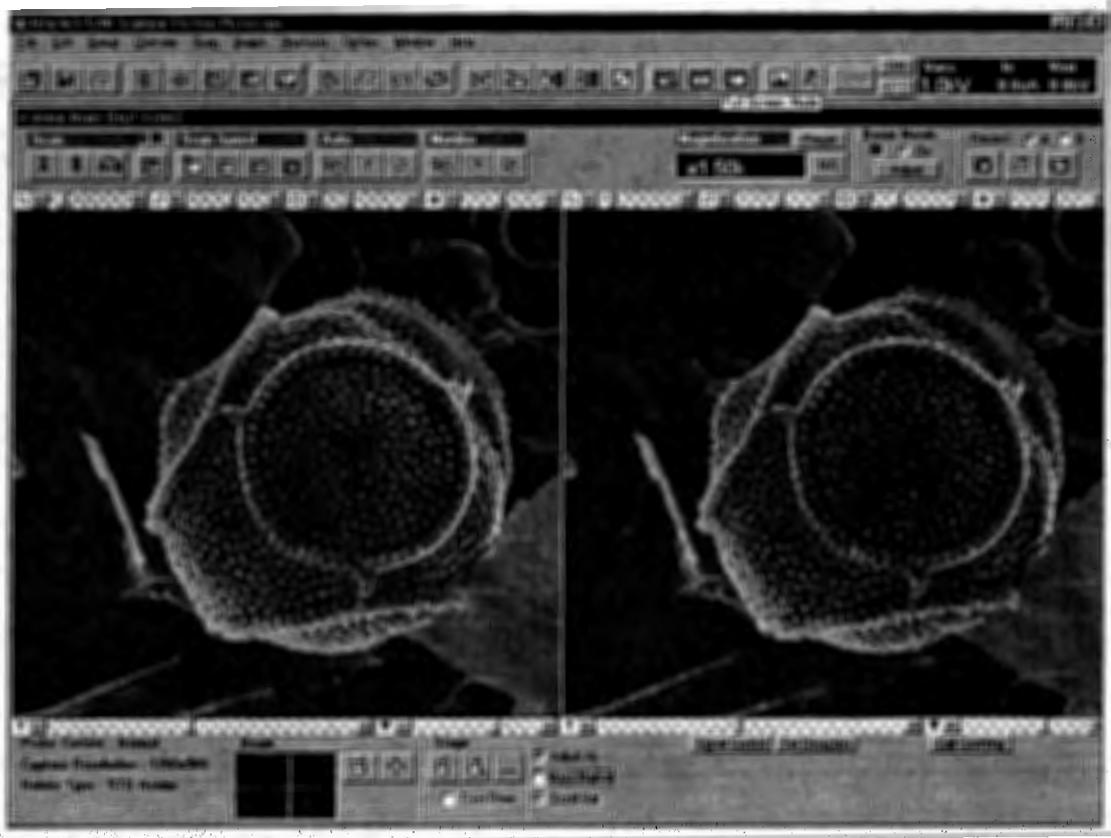
**Signal Control** ..... Opens the **Signal Control** dialog window.

**Set Detectors** (Option) ..... Opens the **SE/BSE Detectors** dialog window.

**Cell Counting** (Option) ..... Opens the **Cell Counting** dialog window.

Refer to: 3.11.1 Screen Mode

(2) Dual Screen Mode



**A** A Run/Freeze.....Runs or stops scanning of the A plane (left side image) alternately.

**B** B Run/Freeze.....Runs or stops scanning of the B plane (right side image) alternately.

**A/B** A/B Run/Freeze .....Runs or stops scanning of both the A and B planes simultaneously.



.....The Record A or B button selects the A (left side) or B (right side) screen image for the source of Direct Photographing, Memory Photographing, Direct Saving, Copying to the clipboard and Transferring to PCI.

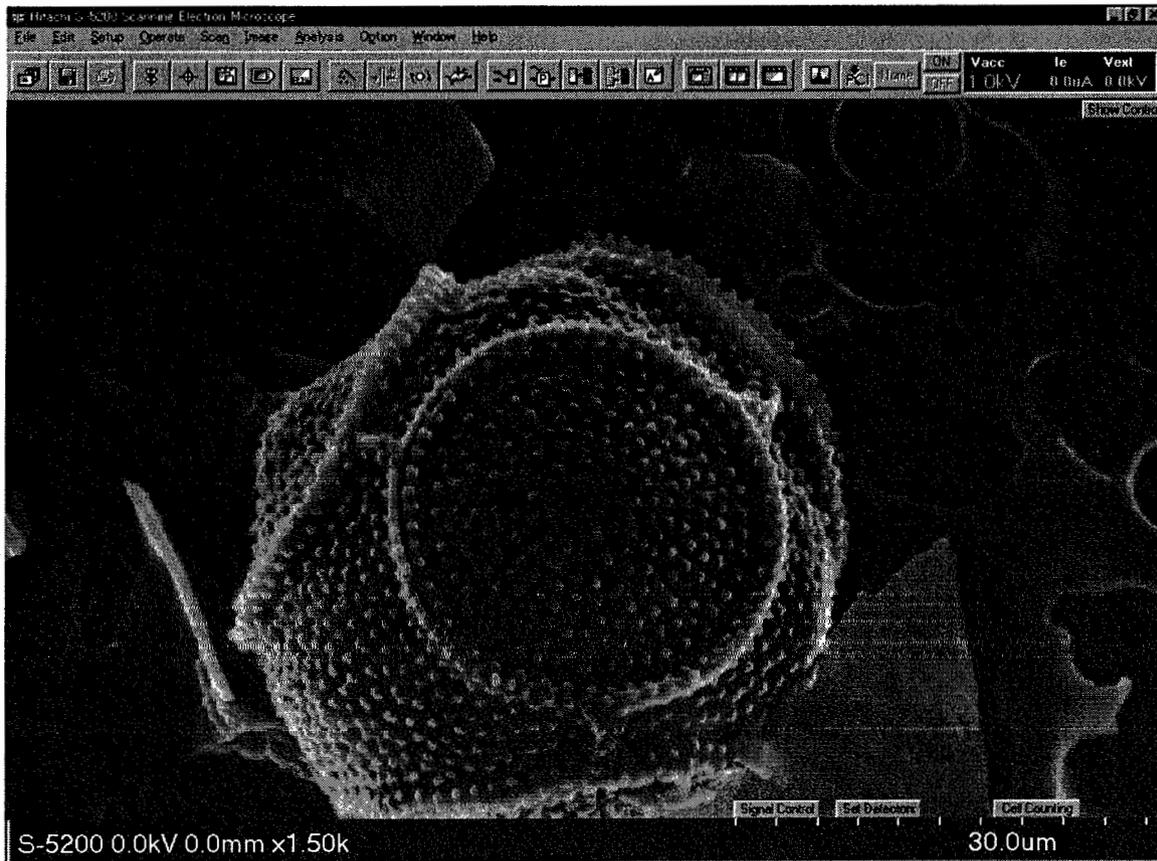


.....Starts image capture of port A and/or B if Run is engaged.

Other functions than shown above are the same as in the Standard Screen mode.

## 2.3 Graphical User Interface (GUI)

### (3) Full Screen Mode



..... Removes control buttons.

Show Control ..... Shows control buttons.

Stage  OD ..... Sets (or releases) Overdrive mode for stage operation with the mouse.

Other functions than shown above are the same as in the Standard Screen mode.

### 2.3.6 Operation Using Mouse on the Image

Focusing, astigmatism correction, image brightness and contrast adjustment, electrical image shift and stage can be operated on the scanning image display using the mouse.

The mark of the mouse pointer changes depending on the position on the image display as shown below. Each mark shows the function of mouse operation available at the position.



at lower half of the image..... Focusing

Move the mouse while holding down the left button for fine focus or the right button for coarse focus.



at the top left quadrant  
of the image .....

Astigmatism correction

Drag the mouse while holding down the left button for X or the right button for Y correction. Repeat X and Y corrections, and focus, for a final result.



at the top right quadrant  
of the image .....

Brightness and Contrast adjustment

Drag the mouse while holding down the left button to adjust brightness; while holding down the right button to adjust contrast. Drag it to the right to increase and to the left to decrease brightness and contrast.

## 2.3 Graphical User Interface (GUI)

 at near the center  
of the image .....

Starting stage or electrical image shift operation.

Double-clicking of the mouse when the mouse cursor is above Hand mark changes its cursor to the Beam-Hand mark.



**Stage-Hand mark: Stage operation**

When the mouse cursor in the Scanning Image area is the Stage-Hand mark, the stage can be driven in two ways.

### 1. Stage Dragging

Place the mouse cursor at a start point on the scanning image. Move the mouse to an end point while holding down the left button (a red line is drawn), and release it.

The stage is then driven so that the image at the start point moves to the end point.

### 2. RISM function

If the end point of the above operation is near the center of the image, the red line is changed to a yellow line and the end point is positioned at the center of the image. When the left mouse button is released, the stage is driven so that the image at the start point moves to the center of the viewing screen.

To cancel the stage operation, click the right button of the mouse, or click the  button in the Stage area of the Scanning Image window.



**Beam-Hand mark: Electrical Image Shift operation**

While the mouse cursor in the Scanning Image area is the Beam-Hand cursor, the electrical image shift can be driven in two ways as follows.

### 1. Mouse Dragging

Place the mouse cursor at a start point on the scanning image. Move the mouse to an end point while holding down the left button of the mouse (a red line is drawn) and release it. The image at the start point moves to the end point.

### 2. RISM function

If the end point of the above operation is near the center of the image, the red line is changed to a yellow line and the end point is positioned at the center of the image. When the left button of the mouse is released, the image at the start point moves to the center of the viewing screen.

To cancel the electrical image shift operation, click the right button of the mouse, or click the  button in the Beam area of the Scanning Image window.

To start the stage or electrical image shift operation, you may also click the  button in the Stage or Beam area of the Scanning Image window.

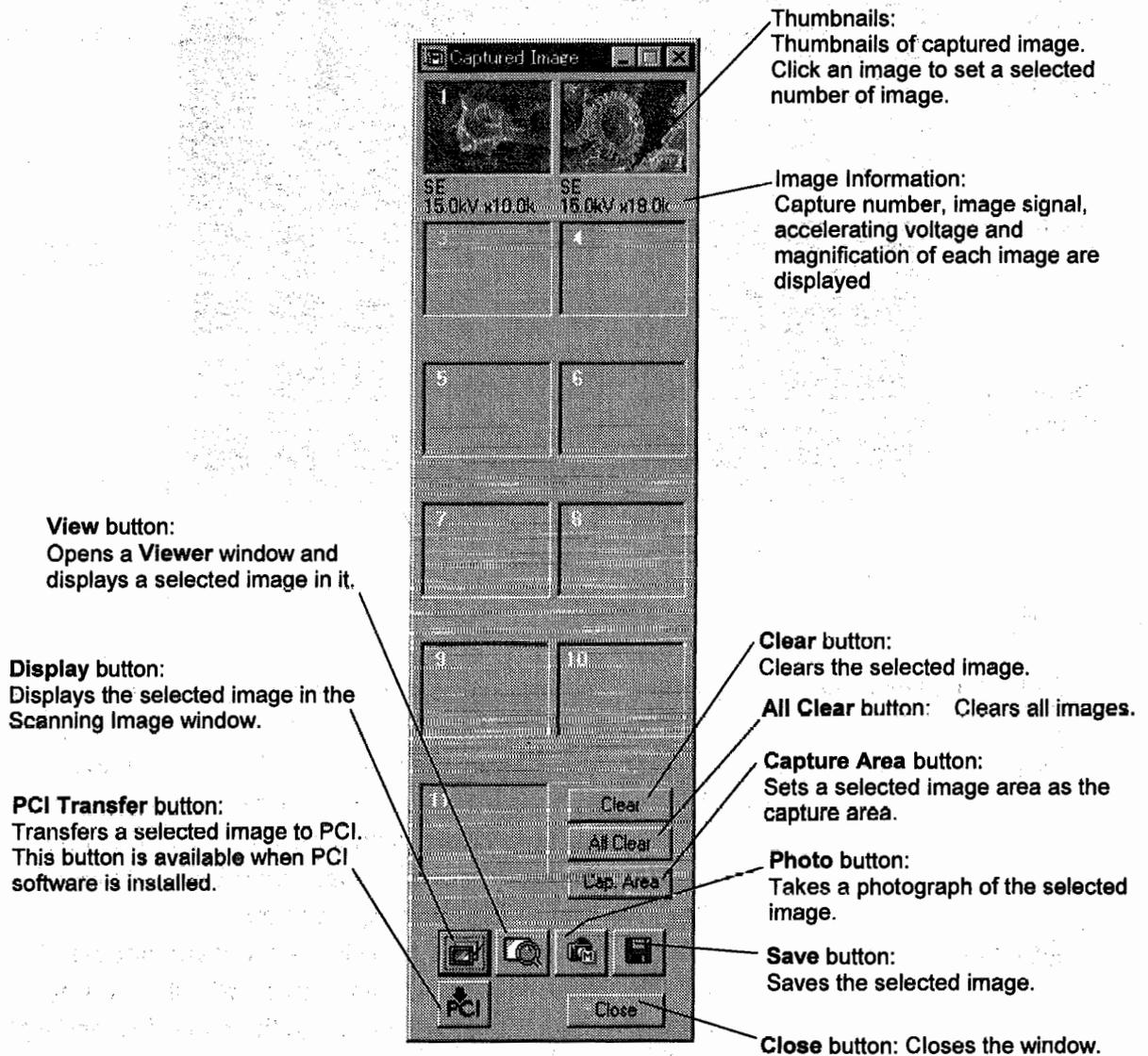
The Stage-Hand mark and Beam-Hand mark appear alternatively by double clicking the mouse.

### 2.3.7 Captured Image Window

On this window a list of captured images is displayed. It opens when you have captured an image. Also it can be opened by selecting **Captured Image** command from **Window** menu or using the short-cut key (Ctrl + L).

The minimize button on the title bar iconizes the window and places it on the task bar.

A red color number indicates the selected image, and a yellow color indicates the next capture number.



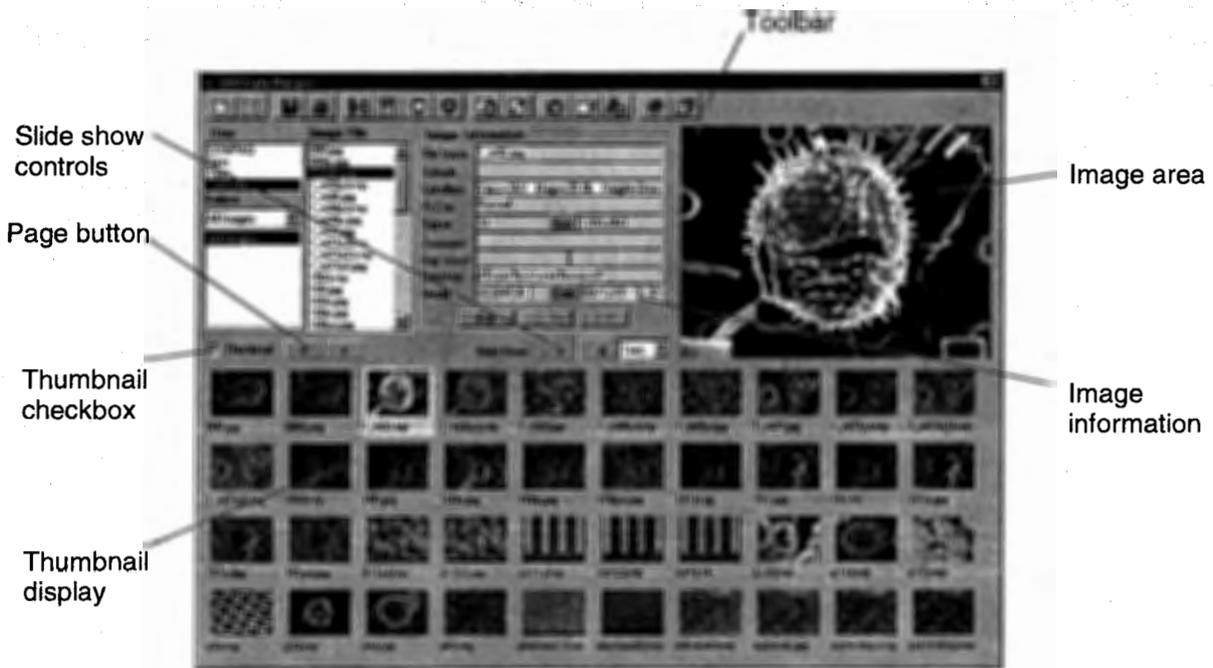
Refer to: 3.6.4 Image Capturing  
2.3.34 Save Image Dialog Window

## 2.3 Graphical User Interface (GUI)

### 2.3.8 SEM Data Manager Window

SEM Data Manager is an image-filing program with an easy-to-operate database function.

To open this window, click the  button on the toolbar or select the **Open SEM Data Manager** command from the **File** menu.



#### (1) Toolbar

-  **Make New User**.....Adds a new user name. A dialog window for entry of a new user name opens.
-  **Delete User** .....Deletes a user name selected from the User list box. A message dialog window confirming deletion will open. Before deleting a User, all images in the User must be removed from the user database using **Batch Process-Remove List** or **Delete Image** command.
-  **Image Save** .....Saves selected images to disk. A message appears-"The file {File name} already exists. Over write it? If **OK** is clicked, the image is overwritten to the same file, and if **No** is clicked, the **Save Image** dialog window opens.  
Refer to: 2.3.34 Save Image Dialog Window
-  **Image Print**.....Prints images using Window-supported printer. The **Print Setup** dialog window opens.  
Refer to: 2.3.31 Print Setup Dialog Window
-  **Batch Process** .....Enables file operations for archived images. The **Batch Process** dialog window opens.  
Refer to: 2.3.13 Batch Process Dialog Window

-  **Add From File**.....Adds image files to database. Opens the **Add from File** dialog window for adding image files to the database.  
Refer to: 2.3.12 Add from File Dialog Window
-  **Copy To Clipboard** .....Copies the selected image to the Windows clipboard.
-  **Copy To Clipboard (640 × 480)**.....Copies the selected image to the Windows clipboard. Image size is reduced to 640 × 480 pixels when the original size is 1280 × 960 or 2560 × 1920 pixels.
-  **Viewer** .....Opens Viewer window and displays a selected image. Image processing and contrast conversions are available through the **Viewer** window.  
Refer to: 2.3.9 Viewer Window
-  **Data Entry** .....Controls overlay writing and editing. The **Viewer** window and **Data Entry** toolbox open.  
Refer to: 2.3.22 Data Entry Toolbox
-  **Image Photo**.....Records a photograph of a selected image. Optional photo recording unit is necessary.
-  **Image Transfer**.....Transfers a selected image to the SEM and displays it in the Scanning Image area.
-  **PCI Transfer**.....Transfers a selected image to the PCI window. (provided by Quartz Imaging Co.) Available only when PCI software is installed.
-  **Help**.....Opens the Help file of SEM Data Manager. The F1 key is also available to open the Help.
-  **About SEM Data Manager**.....Indicates the version of SEM Data Manager.

## 2.3 Graphical User Interface (GUI)

### (2) Image Information

- User list box** ..... User names registered on database are displayed. To select a User, click a **User** name.
- Select query box** ..... Selects search criteria. For example, if "Acc.Voltage" is selected here, images with the specified accelerating voltage are searched for and listed.  
Selection items include: All Images, Sample Name, Keyword 1, Keyword 2, Media, Image Format, Image Directory, Acc. Voltage, Signal, Date, Lens Mode, Data Size.
- Image File list** ..... Image files selected with **User** name and **Select** query are listed here. An image selected from this list is displayed in the Image area and information of the image is displayed in the Image Information area.
- Image Information area** ..... Displays information corresponding to the selected image. To edit information, click the **Edit** button. **Sample**, **Comment** and **Key Word** are available for editing. Input text in these categories and click the **OK** button. The **Cancel** button cancels input.

### (3) Thumbnail

- Thumbnail check box** ..... If checked, thumbnails of image files listed in the **Image File** list are displayed.
- Page button** ..... Displays next or previous page of thumbnails when more than 40 images are included in the current selection.
- Slide Show controls** ..... Starts and stops slide show mode. Interval time is selectable in the selection box.
- Thumbnail display** ..... Up to 40 thumbnails are displayed. Use **Page** button to display next or previous page when more than 40 images are included in the current selection.

### (4) Image Area

Displays a selected image from the **Image File** list. Double-clicking the image opens the **Viewer** window with the image.

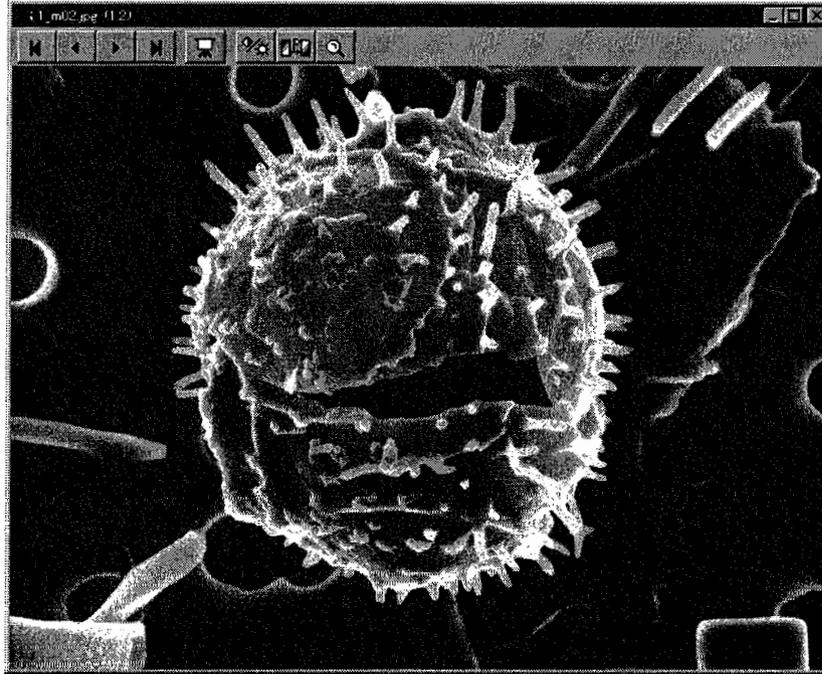
**NOTICE:** Windows color palette is fitted to the selected image. If both color and gray scale images are included in thumbnails, color of unselected image may be disturbed.

### 2.3.9 Viewer Window

The **Viewer** window displays a selected image at the actual size or at half or a quarter of the original image size.

Zooming, image processing and contrast conversions are available in this window.

To open this window, click the **Viewer**  button on the **SEM Data Manager** window or double-click the thumbnail or the image in the image area.



-  **Top**.....Displays the first image in the **Image File** list.
-  **Prev**.....Displays the previous image.
-  **Next**.....Displays the next image.
-  **Last** .....Displays the last image in the **Image File** list.
-  **Slide Show** .....Opens **Slide Show** controller.
-  **Tone**.....Opens **Contrast Conversion** dialog window.  
Refer to: 2.3.10 Contrast Conversion Dialog Window
-  **Process** .....Opens **Image Processing** toolbox.  
Refer to: 2.3.11 Image Processing Toolbox
-  **Zoom**.....Turns ON and OFF the zoom function.

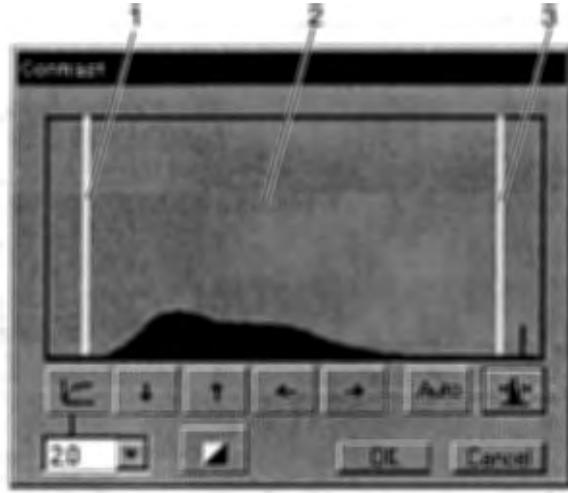
## 2.3 Graphical User Interface (GUI)

### 2.3.10 Contrast Conversion Dialog Window

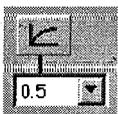
The **Contrast Conversion** dialog window shows a histogram of the image when opened.

Contrast and brightness control is available in this dialog window.

To open the dialog window, click the  button on the **Viewer** window.



1. Min Level marker ..... Sets the gray level to be set at the minimum level with Manual Conversion operation.  
Drag the marker with the mouse.
2. Histogram display ..... A histogram of the image in the **Viewer** window is displayed.
3. Max Level marker ..... Sets the gray level to be set at the maximum level with Manual Conversion operation.  
Drag the marker with the mouse.



**Gamma** ..... Selects a level of gamma correction and applies gamma correction of the specified value.



**Contrast Down** ..... Decreases contrast by 10%.



**Contrast Up** ..... Increases contrast by 10%.



**Brightness Down** ..... Decreases brightness by 5%.



**Brightness Up** ..... Increases brightness by 5%.



**Auto Contrast** ..... Adjusts contrast automatically so that the histogram covers a full range of the gray scale.

 **Manual Conversion**..... Expands contrast so that the two levels specified by Min Level and Max Level markers cover a full range of the gray scale.

 **Invert**..... Inverts the gray scale settings of the image.

**OK** button..... Applies conversion results to the original image and closes this dialog window.

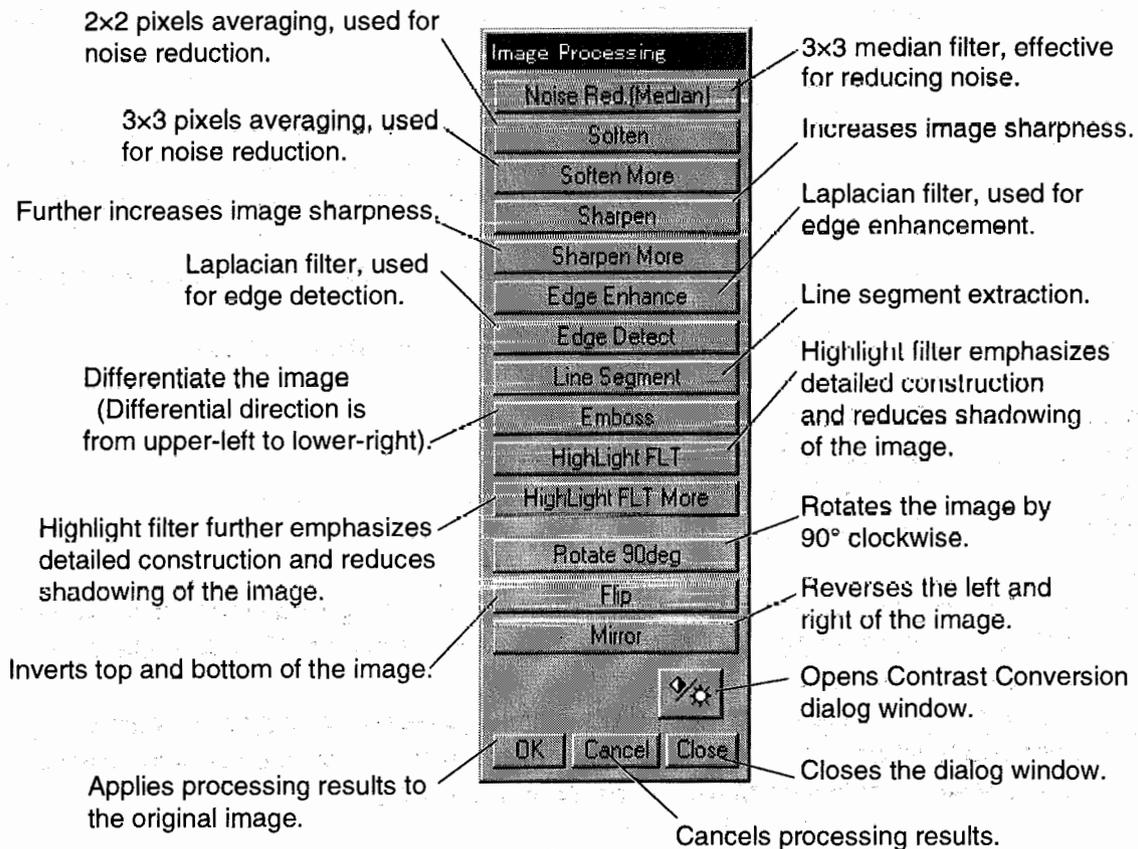
**Cancel** button..... Cancels the conversion results and closes this dialog window.

**2.3.11 Image Processing Toolbox**

Processing of an image in the **Viewer** window is performed by commands on this toolbox.

To open the toolbox, click the  button on the **Viewer** window.

In the **Viewer** window, the result of any processing is applied to the original image by clicking the **OK** button, or canceled by clicking the **Cancel** button. The **Contrast Conversion** dialog window can be opened from this dialog window as well. The available processing features are listed below.

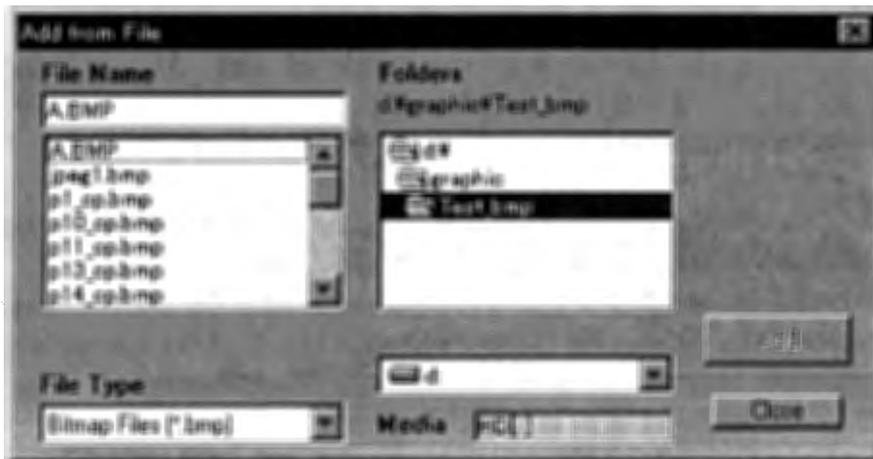


## 2.3 Graphical User Interface (GUI)

### 2.3.12 Add from File Dialog Window

Adds image files to the SEM Data Manager database.

To open the dialog window, click the  button on the **SEM Data Manager** window.



**File Name** ..... Select files to be added to the database. Multiple selection using Shift or Ctrl key is available.

For multiple files selection,

- (1) Press the left button of the mouse at the first file to be selected, and move the mouse while holding down the button to the last file to be selected, and then, release the button. Selected files are shown in reverse color.
- (2) Click the first selected file and then, click the last selected file while holding down the Shift key.
- (3) Click selected files while holding down the Ctrl key.

**Folders** ..... Select a folder.

**File Type** ..... Select a file type.

**Add** button ..... Adds selected files to the database.

**Close** button ..... Closes the dialog window.

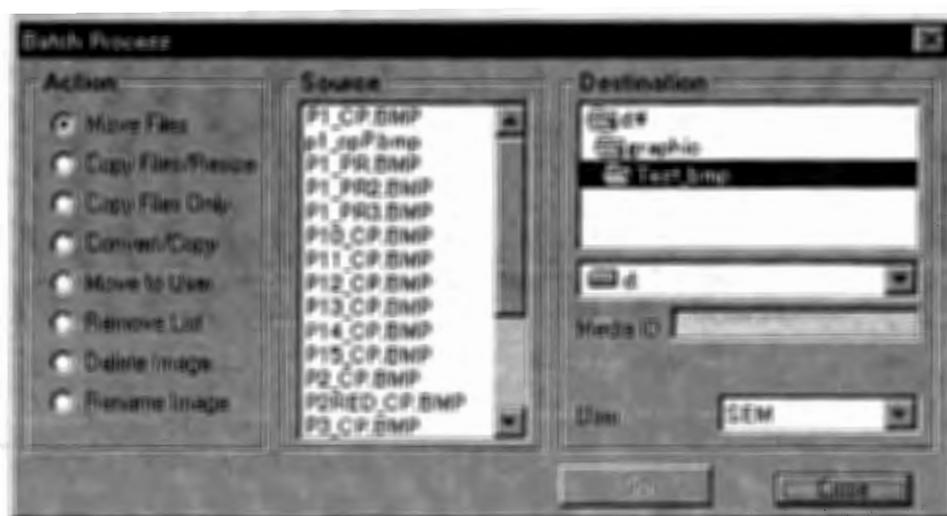
**NOTICE:** Only file information is registered to the database. Image files themselves are not copied. To open image files in removable media using the SEM Data Manager, the medium must be correctly set to the drive.

It is recommended to attach an individual volume label to removable media using Windows function. You can select image files in the medium by clicking the volume label shown by selecting **Media** in the **Select** query box.

### 2.3.13 Batch Process Dialog Window

The **Batch Process** dialog window is used for file operations. Use this dialog window for file operations such as copy, move or delete for maintaining the correct information in the database of SEM Data Manager. Use of Windows explorer or File Manager for such operations may cause troubles with the SEM Data Manager operation.

To open the dialog window, click the  button on the **SEM Data Manager** window.



#### Action buttons

- Move Files** : Moves image files selected from the **Source** list to other folders specified in the destination area. Image files in the source directory are deleted.
- Copy Files/Resize** : Copies images files selected from the **Source** list to other folders specified in the destination area.
- Copy Files Only** : Copies images files selected from the **Source** list to other folders specified in the destination area. Files in target folders are not registered in the database. Use this command to copy image files to floppy disks for carrying data to other PCs.
- Convert/Copy** : Converts image format of files selected from the **Source** list and then copies to other folders specified in the destination area.
- Move to User** : Moves images selected from the **Source** list to another User database. Moved images are removed from the source **User** database. The image files are not moved.
- Remove List** : Image files selected from the **Source** list are removed from the present **User** database. Image files are not deleted.
- Delete Image** : Deletes image files selected from the **Source** list and removes them from the present **User** database. Image files are deleted.
- Rename Image** : Renames an image file selected from the **Source** list.

## 2.3 Graphical User Interface (GUI)

**Source list**.....Image file names included in the selected User with the selected item (query) are listed here. Files can be selected from this list for one of the above actions. Multiple selection using the Shift or Ctrl key is supported.

For multiple files selection,

- (1) Press the left button of the mouse on the first selected file, and move the mouse while holding down the button to the last selected file, and then, release the button. Selected files are shown in reverse color.
- (2) Click the first selected file and then, click the last selected file while holding down the Shift key.
- (3) Click selected files while holding down the Ctrl key.

**Destination drive and**

**folder list box**.....These are enabled when **Move Files, Copy Files, Copy Files Only** or **Convert/Copy** actions are selected. Select a target folder. The Media ID indicates the volume label of the selected drive.

**NOTICE:** It is recommended to put independent volume labels on removable disks such as MO and ZIP disks. The volume label is shown in the **Media ID** area.

To put a volume label on a disk, right-click the drive name in the Windows Explorer. Select Property (R) on the pop-up menu. You can check or set a volume label in the Information tab.

**User box**.....This list is enabled when **Move Files, Copy Files, Convert/Copy** and **Move to User** actions are selected. With the exception of the current User, all other Users are listed. Select a User for selected **Action**.

### 2.3.14 Slide Show Controller

Use the **Slide Show** controller for viewing images in continuous slide motion on the **Viewer** window.

To open the **Slide Show** controller, click the  button on the **Viewer** window.



 ..... Starts slide show mode.

 ..... Stops slide show mode.

**Interval**..... Selects interval time.

**Close** button..... Closes this controller.

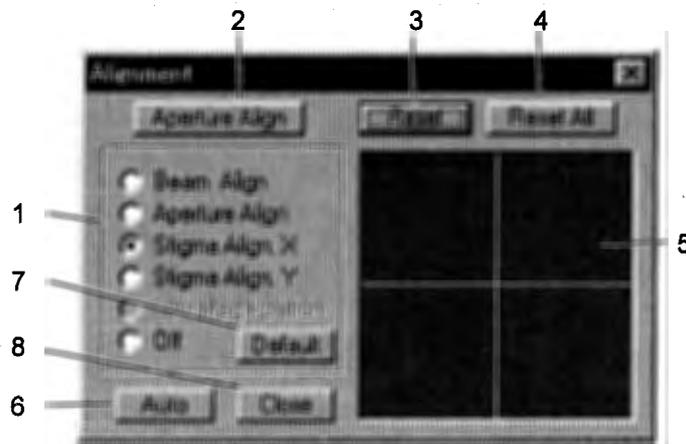
## 2.3 Graphical User Interface (GUI)

### 2.3.15 Alignment Dialog Window

The **Alignment** dialog window is used for alignment operations.

To open the dialog window, click the Wobbler  button in the Scanning Image window or the Column Alignment  button on the toolbar. Or select the **Alignment** command from the **Operate** menu. When the dialog window is opened with the Wobbler button, Aperture Alignment (when the magnification mode is High Mag) or Low Mag Position (when the magnification mode is Low Mag) starts as the default setting.

Refer to: 3.4.2 Column Alignment Operation

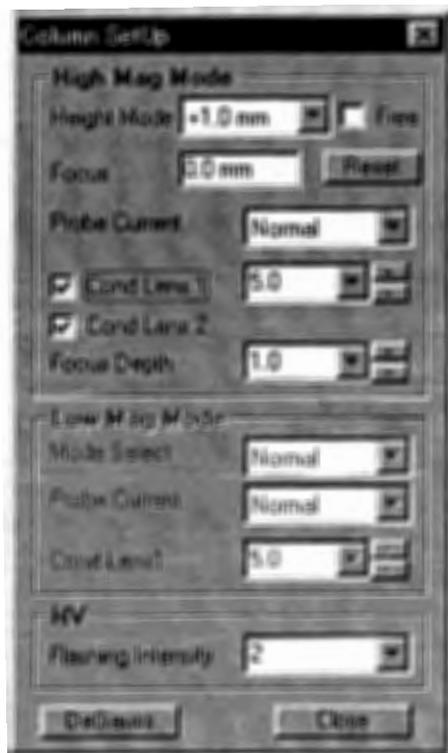


1. Function select buttons..... Starts each alignment function. **Off** stops functions.
2. **Aperture Align** button..... Starts Aperture Alignment function. It is the same as the **Aperture Align** select button. But it is an independent button since it is used frequently.
3. **Reset** button..... Resets alignment of the selected function.
4. **Reset All** button..... Resets alignment of all functions.
5. Alignment operation area..... This area is used for adjustment operation. When the mouse pointer is , you can make adjustment both in X and Y directions by moving the mouse while pressing the left button. When the mouse pointer is  or,  adjustment direction is restricted in X or Y direction.
6. **Auto** button..... Executes auto axial alignment in the Aperture Align or Stigma Align mode that was selected at 1.
7. **Default** button..... Click this button when the deviation in Stigma Align mode is particularly large.
8. **Close** button..... Stops the alignment operation and closes the dialog window.

### 2.3.16 Column SetUp Dialog Window

The Column SetUp dialog window is used for setting conditions of the Electron Optical Column. To open the dialog window, click the Column Setup  button on the toolbar or select the **Column SetUp** command from the **Setup** menu.

Refer to: 3.4.1 Selecting Electron Optical Column Condition



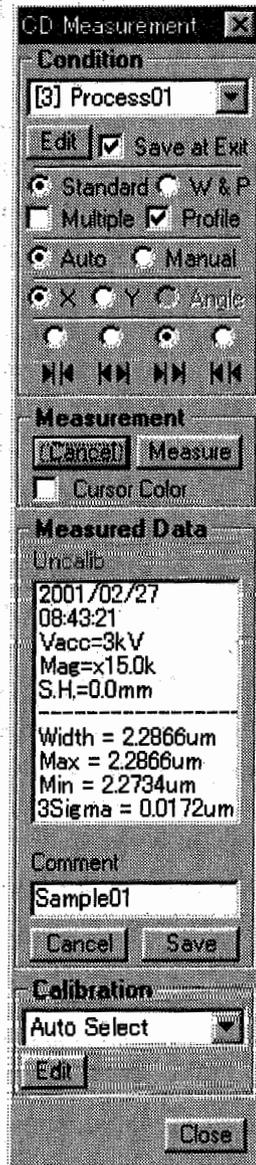
- Height Mode** list box..... Selects a sample height condition. The sample height selected in this mode allows optimum electron optical lens condition.
- Focus** indicator ..... Indicates the present focus position relative to the sample height condition.
- Free** check box..... By checking this box, focusing range is expanded up to full range determined by the accelerating voltage. After focusing a primary beam on a sample surface, un-check this box. Then the appropriate **Height Mode** value is selected automatically.
- Reset** button..... Resets the focus position at the specified sample height.
- Probe Current** list box ..... Selects a range of the probe current adjusted by Cond Lens1. For high resolution observation with small probe current, select **normal mode**. And when a large probe current is necessary such as for X-ray analysis, select **analysis mode**.

## 2.3 Graphical User Interface (GUI)

- Cond Lens 1** check box and listbox ..... When the box is checked, the 1st condenser lens is excited to the value selected in the list box.
- Cond Lens 2** check box ..... When the box is checked, the 2nd condenser lens is excited.
- Focus Depth** list box ..... It is possible to change depth of field by setting a value in this list box. Usually set a number 1.0 in this list box for normal operation.
- Mode Select** list box (for Low Mag Mode) ..... Selects three different conditions in Low Mag mode. (Normal / Wide / X-ray)
- Probe Current** list box (for Low Mag Mode) ..... Selects a range of the probe current adjusted by Cond Lens1. This condition is effective only in Low Mag Mode and is independent of High Mag Mode.
- Flashing Intensity** list box ..... Selects flashing intensity.
- DeGauss** button ..... Resets the objective lens current for degaussing the objective lens. This is effective to improve the magnification accuracy especially when focus is manually adjusted in the wide range.

### 2.3.17 CD Measurement Dialog Window (Option)

To open this dialog window, click **CD Measurement** button  on the toolbar or select the **Measure** command from the **Analysis** menu. When the optional auto CD measurement function is not installed, cursors for manual measurement appear on the image.



- Condition box** .....Used to call out registered CD measurement conditions. Upon clicking the selector button, the No. of the registered CD measurement conditions and a header will appear.
- Edit button** .....Opens the **Condition** window for editing and registering the CD measurement conditions.
- Save at Exit button** .....Saves the CD measurement conditions that are set when exiting the CD measurement function. Note that setting cannot be made when the condition registration is locked.

## 2.3 Graphical User Interface (GUI)

- Type**.....Specify the type of CD measurement.
- **Standard** button : Selects standard CD measurement (other than width & pitch simultaneous measurement).
  - **W & P** button : Selects width & pitch simultaneous measurement.
  - **Multiple** button : Selects successive CD measurements. This can be set when **Standard** has been selected.
  - **Profile** button : Selects a line profile display. This can be set when measurement mode is **Auto**.
- Mode**.....Specify a CD measurement mode.
- **Auto** button : Selects auto CD measurement.
  - **Manual** button : Selects manual CD measurement.
- Direction**.....Select a measurement direction.
- **X** button : Selects measurement in X direction.
  - **Y** button : Selects measurement in Y direction.
  - **Angle** button : Selects an angle measurement. This can be set when the measurement mode is **Manual**.
- Edge Detect**
- Direction**.....Select the edge detecting direction of the cursor box used to specify the position including the edge to be detected, when X or Y has been selected for the measurement direction. This is settable when the measurement mode is **Auto**. The icon varies with the measurement type and mode. When Angle measurement has been selected, select a circle cursor for the measurement side.
- Set** button.....Displays a measurement cursor. The shape of the cursor varies with the measurement type and mode.
- Measure** button.....Executes CD measurement.
- Cursor Color** button .....Specify the color of measurement cursor. Color changes in the order of [white], [red], [green], [yellow], [blue], [violet], [light blue] at each click of the button.
- Done/Uncalib** display....Shows the applied result of calibration. When calibration has been applied, **Done** plus a calibration No. will be indicated. And if calibration has not been applied, **Uncalib** will be indicated.
- Measured Data** box .....Displays the SEM conditions at measurement and the measurement result.
- Comment** box .....A comment can be entered here. The entered comment is displayed and saved together with the measurement result.
- Cancel** button.....Cancels the measurement result display. In the case of successive measurements, the final measurement result is canceled.
- Save** button.....Saves the measurement result in a text file. Upon clicking the button, the **File Save** window appears.
- Calibration** box.....Select the type of calibration. By selecting **Auto Select**, a suitable type of calibration is applied automatically.

**Edit button** .....Displays the **Calibration** window for registering the calibration.  
**Close button**.....Terminates the CD measurement. If the measurement result has not been saved, the **File Save** window will appear.

### 2.3.18 Measurement Condition Window

This window is used for setting the various parameters for auto CD measurement. It appears by clicking the **Edit** button in the **Condition** area of the **CD Measurement** window.

**Measurement Condition**

Entry No.   Lock

Caption

Type  
 Standard  W&P  
 Multiple  Line Profile

Mode  
 Auto  Manual

Direction  
 X  Y  Z

Edge Detect Direction

Parameters

Measurement Port	<input type="text" value="0"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Measurement Pitch	<input type="text" value="1"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Summing Line	<input type="text" value="0"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Multi Pitch	<input type="text" value="16"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Smoothing	<input type="text" value="3"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Design Value	<input type="text" value="2.3um"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Design Pitch	<input type="text" value="1.0um"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Search Area	<input type="text" value="10"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>

Edge Detection

Linear Approximation

Threshold Level	<input type="text" value="50"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Differential Size	<input type="text" value="5"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Base Line Start	<input type="text" value="2"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
Base Line Area	<input type="text" value="0"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>

Threshold

Threshold Level	<input type="text" value="25"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>
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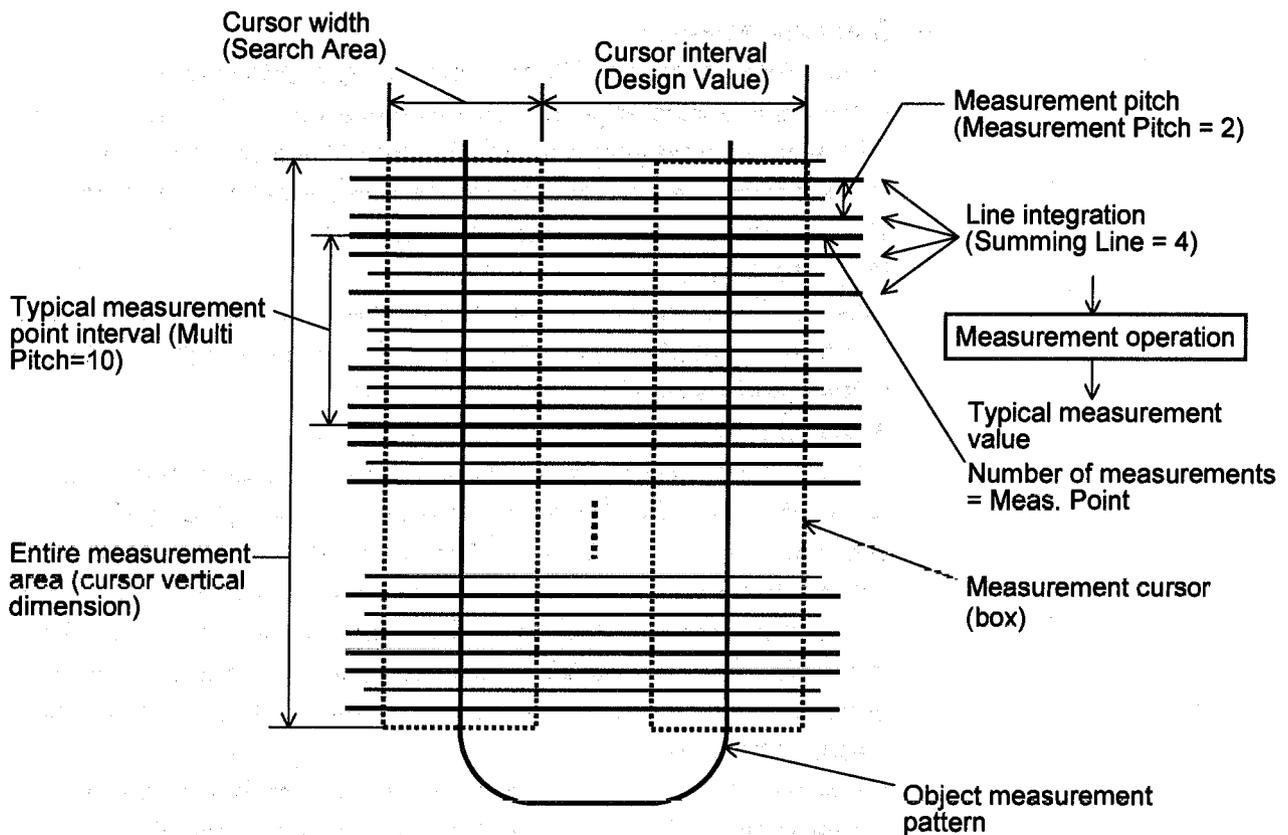
## 2.3 Graphical User Interface (GUI)

- Entry No. box**..... Select the registration No. of the measurement conditions.  
A maximum of 16 measurement conditions can be registered.  
An asterisk (\*) appears at the upper right of a No. that is already registered.
- Lock button**..... Prevents changing the measurement conditions.
- Caption box**..... Enter a header for the registration No. Up to 16 half-size characters can be entered for the header.
- Type**..... Specify the type of CD measurement.
- **Standard button** : Selects standard CD measurement (other than width & pitch simultaneous measurement).
  - **W & P button** : Selects width & pitch simultaneous measurement.
  - **Multiple button** : Selects successive CD measurements. This can be set when **Standard** has been selected.
  - **Line Profile button** : Selects a line profile display. This can be set when measurement mode is **Auto**.
- Mode**..... Specify a CD measurement mode.
- **Auto button** : Selects auto CD measurement.
  - **Manual button** : Selects manual CD measurement.
- Direction**..... Select a measurement direction.
- **X button** : Selects measurement in X direction.
  - **Y button** : Selects measurement in Y direction.
  - **Angle button** : Selects an angle measurement. This can be set when the measurement mode is **Manual**.
- Edge Detect**
- Direction**..... Select the edge detecting direction of the cursor box used to specify the position including the edge to be detected, when X or Y has been selected for the measurement direction. This is settable when the measurement mode is **Auto**. The icon varies with the measurement type and mode. When Angle measurement has been selected, select a circle cursor for the measurement side.
- Parameters**..... Set the parameters for auto CD measurement.
- **Measurement Point box**:  
Enter a numeric for the number of measurement points. If the set value is 2 or more, measurement is made for only the specified number of points while shifting by the Multi Pitch value (scanning lines), and the average value (Width), maximum value (Max.), minimum value (Min.) and standard deviation (3 Sigma) are indicated.
  - **Measurement Pitch box**:  
Set a scanning line interval (pitch) for integration of the signal profile (line profile) corresponding to the scanning lines. For instance, by setting "2", a line profile is formed by integrating the number of lines specified at **Summing Line** below while skipping one scanning line, and edge detection is carried out. Setting range is from 1 to 64.

- **Summing Line box:**  
A line profile is integrated using only the specified number of scanning lines and edge detection is carried out. By specifying "8", for instance, averaging is conducted for a line profile corresponding to 8 scanning lines. The greater the number of lines, the lesser the effect of noise. Setting range is from 1 to 64.
- **Multi Pitch box:**  
Specify a measurement point interval when 2 or more has been set for **Measurement Point**. Unit is number of scanning lines, and setting range is from 2 to 64.
- **Smoothing box:**  
Indicate the parameter for averaging the line profile according to scanning lines. Unit is number of pixels for averaging, and is selectable from 1, 3, 5 and 7. This averaging serves to reduce noise in the SEM image signal (line profile). By utilizing the signal profile averaged by means of both the aforementioned line profile integration and **Smoothing**, edge detection is conducted according to the specified method (linear approximation or threshold method).
- **Design Value box:**  
Specify an interval between cursors (two boxes) used to specify measurement. Unit is  $\mu\text{m}$ , and the input range is from 0.1 to 200  $\mu\text{m}$ .
- **Design Pitch box:**  
Specify a pitch for width & pitch (W & P) simultaneous measurement. Input range is from 0.1 to 200  $\mu\text{m}$ .
- **Search Area box:**  
Specify a width (edge detection area) for the cursor box. Unit is number of pixels, and the range is from 16 to 160.

**NOTICE:** In auto CD measurement, the length in measuring direction of the cursor box indicates the measuring range, and it varies with the parameters set in the above. This length is equivalent to  $(\text{Measurement Point}-1) \times (\text{Multi Pitch}) + [(\text{Summing Line}) \times (\text{Measurement Pitch})]$  (unit is number of scanning lines), and an input exceeding 480 lines is not permitted. Therefore, even if the value is within the limits of the entered numerics indicated in the parentheses above, an input may be inhibited. Number of measurement points is input via a numeric. If the setting is 2 or more, measurement is made for only the specified points while shifting the Multi Pitch interval (scanning lines), and the average value (Width), maximum value (Max.), minimum value (Min.) and standard deviation (3 Sigma) are indicated.

## 2.3 Graphical User Interface (GUI)



**Edge Detection** ..... Set parameters specific to each edge detection method.

- **Linear Approximation** button:  
Selects linear approximation for the edge detection method in auto CD measurement.
- **Threshold Level** box:  
Set a threshold level for the linear approximation. Input range is from 5 to 95. If a standing wave or the like is included in the pattern, for example, a number of steps will appear at the edge part, and this may cause an inappropriate edge detection. In such cases, try changing the threshold setting to obtain a suitable edge detection. In the linear approximation method, a slope line is detected upon finding a local peak (of maximum size) of the signal gradient in the direction of edge detection. If two or more slope peaks (local slope peaks) exist at this time, then assuming the maximum value of signal gradient of the edge part is 100, a slope line is determined from the first local slope peak that is larger than the entered threshold value. Therefore, if the signal gradient peak is a single monotonous signal waveform (line profile), the detected edge is not dependent on the threshold value.

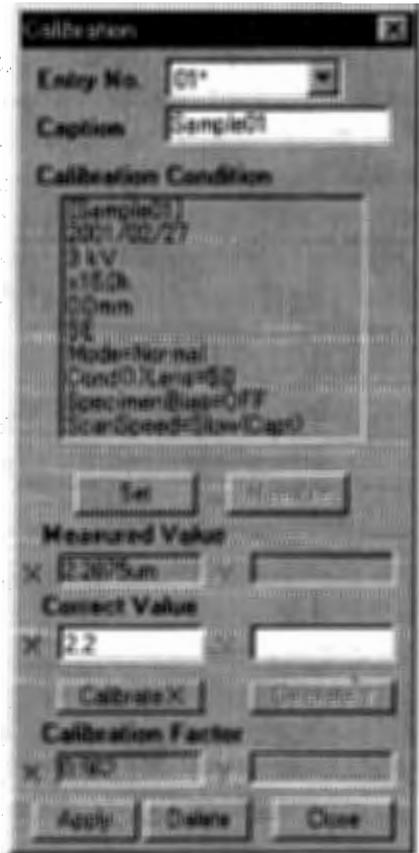
- **Differential Size box:**  
This is a parameter for calculating the signal gradient (differential coefficient of signal) in the linear approximation method.  
The normal setting is 5. Set it at 7 if measurement is unstable due to much noise on images. Select a value from 3, 5 and 7.
- **Base Line Start box:**  
This parameter determines the starting point for reading the signal baseline in the linear approximation method. The baseline is decided by the average signal level in the range specified at **Base Line Area** below, from the position determined at **Base Line Start**. **Base Line Start** is selectable from 1, 2, 4 and 8. The lower this value is, the nearer the starting point for reading the baseline is to the maximum gradient position of the signal, and the baseline will shift upward.
- **Base Line Area box:**  
Specify a range for baseline reading in the linear approximation method. This is selectable from 4, 8, 16 and 32 (unit is number of pixels).
- **Threshold button:**  
Selects the threshold method for edge detection in auto CD measurement.
- **Threshold Level box:**  
Set a threshold level for the threshold method. Enter a numeric on the assumption that the difference between minimum and maximum signal variation at the edge part is 100. If 50 is set, for example, cutoff will be made at an intermediate level. Input range is from 5 to 95.

- Apply button**..... Sets the cursor shape under display according to the setting.  
Also saves the measurement parameters in the registered No.
- Save button**..... Saves the present settings in a different registration No. A window for specifying the registration No. of the save destination is displayed.
- Del button**..... Deletes the registration.
- Close button**..... Closes the **Measurement Condition** window. If measurement conditions are being edited, a save confirmation message will appear.

## 2.3 Graphical User Interface (GUI)

### 2.3.19 Calibration Window

Used to calibrate the measured values. This window appears by clicking the **Calibration** button on the **CD Measurement** window.



- Entry No. box**..... Specify a No. for registering the calibration. An asterisk (\*) appears at the upper right of a No. that is already registered.
- Caption box** ..... Enter a header for the calibration. Up to 16 half-size characters can be entered for the header.
- Calibration Condition box** ..... Display the SEM conditions at calibration.
- Set button**..... Displays the measurement cursor for calibration according to the measurement conditions. Color of the cursor follows the **Cursor Color** specification on the **CD Measurement** window. For calibration in manual measurement, align the measurement cursor (both X & Y directions) with a position of known dimensions on the window. For calibration in auto measurement, adjust so that the edge part of the measurement pattern is included in the cursor box.
- Measure button**..... Executes measurement over the distance specified by the measurement cursor.
- Measured Value boxes**..... Display the measured results prior to calibration.

- Correct Value** boxes..... Enter the calibrated values.
- Calibrate X/Y** buttons..... Calculate the calibration factors.
- Calibration Factor** boxes ..... Display the calculated calibration factors. Assuming the measured value (**Measured Value** indication) is  $L_m$  and the value to be calibrated (**Correct Value** entry) is  $L_t$ , the calibration factor  $C$  is obtained by the following equation.
- $$C = L_t/L_m$$
- Apply** button..... Registers the calibration.
- Delete** button..... Deletes the calibration registration.
- Close** button..... Closes the Calibration window.

### 2.3.20 Comm Port Setting Dialog Window

Set parameters for the RS-232C communication ports. Use this command only when change of the parameters is required. Unexpected change of the default parameters may cause troubles.

It opens by selecting **Comm Port Setting** command from the **Option** menu.

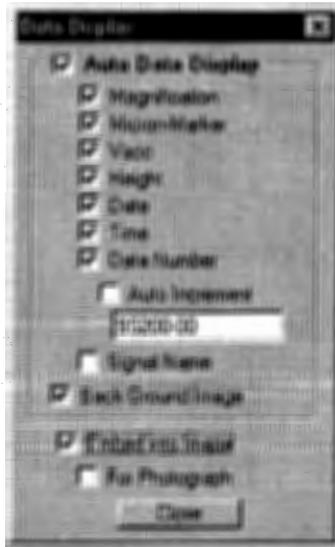


- Comm Port**..... Selects one of communication ports.
- Speed** ..... Selects communication speed in baud rate.
- Character Length**..... Selects character length.
- Parity** ..... Selects parity bit status.
- Stop Bit** ..... Selects stop bit status.
- Hand Shaking** ..... Selects hand shaking method.
- Retry** ..... Selects retry times.

## 2.3 Graphical User Interface (GUI)

### 2.3.21 Data Display Dialog Window

The Data Display dialog window is used for setting conditions related to the auto data display function. To open this dialog window, click the Data Display  button on the toolbar or select the **Data Display** command from the **Setup** menu.



**Auto Data Display** checkbox..... Auto data display is engaged when this box is checked.

**Magnification, Micron-Marker, Vacc, Height, Date, Time, Data Number, Signal Name**

checkbox..... These items are included in data display if checked.

**Auto Increment** checkbox..... When the Data Number has "-nn" at its end (n: numerals, for example "Hitachi-00" ), Data Number is incremented with each successive photograph. Maximum count is determined by the number of digits from "-" and subsequent.

**Data Number** input box..... Input data number into this box. Up to ten characters may be keyed in. Do not use "," (comma) and " " (space).

**Back Ground Image**

checkbox..... When this box is checked, the data display is overlaid on the scanning image. If it is not checked, the background of the data display area is black.

**Embed into Image**

checkbox..... When this box is checked, the auto data display is embedded into the image data when the image is saved to disk. If it is not checked, only the image data is saved. This setting is also applied for Print, Copy and PCI Transfer commands.

**For Photograph check box.....** Selects the position of the auto data display to be printed on images. If this box is checked, the position of the auto data display in the saved image is shifted slightly upward to ensure that it is properly framed in photographs. It is recommended to not check the box if the saved image data will be used on the computer only.

**NOTE:** The Embed into Image option is effective also for printing, copying to clipboard and PCI transfer. For photo recording, the auto data display is recorded whenever it is shown on the image, irrelevant to the option setting.

### 2.3.22 Data Entry Toolbox

Data Entry toolbox controls graphics and text overlay on images. To open this toolbox, click the Data Entry  button on the toolbar or select the **Data Entry** command from the **Image** menu.



**NOTICE:** 1. Overlaid graphics and texts are put on photographs or image files when photo recording, direct saving, printing, copying to the clipboard or PCI transfer is done while these are shown on the image.

Note that when above operations are done with buttons on the Captured Image window, graphics and texts are not applied on images. To put data on a captured image, copy a captured image to the scanning image window by clicking the Display button and then make above operations.

2. Dimensions put to Measure Inner/outer Dimension marks are re-calculated and re-displayed when freezing or recording operation (direct photographing, printing, copying to clipboard) is done to keep them correct on recorded images. On scanning image, they may not be correct if magnification is changed after drawing these marks.

**A** button ..... Overlays text on the image. Click this button and then, click the starting point on the image. A text input area is shown with black background. Input text and terminate with the Enter key. While this button is pressed, text input can be repeated on the image. When a text is written in the Text box, this text is placed at the top of the text input area. The font of text can be selected by double clicking the Text box, which opens the Font Select dialog window. The font of text can also be selected in the **Environment Setting** dialog window.

## 2.3 Graphical User Interface (GUI)

-  button ..... Overlays lines on the image. Click this button, and press the left button of the mouse to create the starting point of the line on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat a line drawing.
-  button ..... Overlays single-head arrow marks on the image. Click this button and press the left button of the mouse to create the starting point of the arrow on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat an arrow drawing.
-  button ..... Overlays double-head arrow marks on the image. Click this button and press the left button of the mouse to create a starting point of the arrow on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat an arrow drawing.
-  button ..... Overlays an inner dimension mark on the image. Click this button and press the left button of the mouse to create a starting point on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat the drawing of an inner dimension mark.
-  button ..... Overlays an outer dimension mark on the image. Click this button and press the left button of the mouse to create a starting point on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat drawing of an outer dimension mark.
-  button ..... Overlays an outer dimension mark with a measurement on the image. Click this button and press the left button of the mouse to create a starting point on the image. Move the mouse to an end point and then release the button of the mouse. While this button is depressed, you can repeat drawing of an outer dimension mark.
-  button ..... Overlays a circle or oval shape on the image. Click this button and press the left button of the mouse to create a starting point on the image. Draw a shape by moving the mouse and then releasing the mouse button. While this button is depressed, you can repeat drawing of a shape.
-  button ..... Overlays a rectangle on the image. Click this button and press the left button of the mouse to create a starting point on the image. Draw a shape by moving the mouse and then releasing the mouse button. While this button is depressed, you can repeat drawing of a shape.
- Shadow button**..... If the **Shadow** box is checked, texts and graphics are overlaid with a shadow.
- Text box** ..... Input text in this box when, for example, the same text is required for many text overlays. The text in the box is placed at the top of the text input area. Double-clicking this box opens Font Select dialog window.

**All**  .....  or  button selects graphics or text on the image in order.  
 A selected graphics is indicated with red color and a surrounding dotted line box. A selected text is indicated with red color and black background. They can be moved and re-positioned by mouse dragging. A selected text can be edited by double-clicking on it. The text line is prolonged and editing becomes possible.  
 **All** button selects all graphics and text.

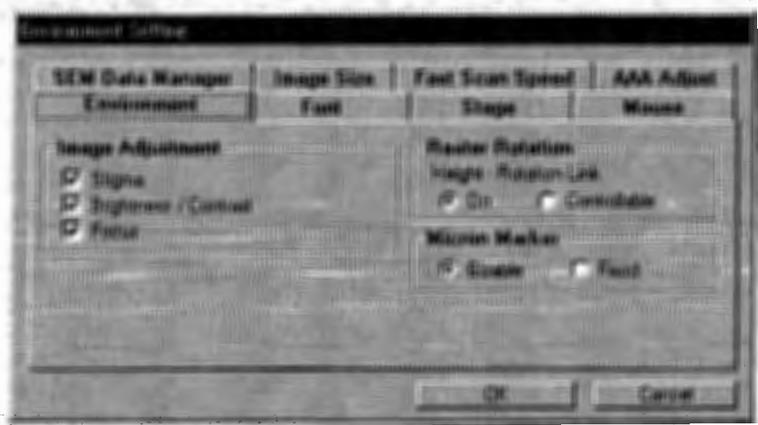
- Clear** button ..... Clears selected graphics or text.
- Display** check box ..... Shows (checked) or hides (unchecked) text and graphics.
- Combine** button ..... This button will be shown only when opened on the SEM Data Manager. It embeds overlaid text and graphics into the image.
- Close** button ..... Erases overlay and closes this toolbox.

### 2.3.23 Environment Setting Dialog Window

The **Environment Setting** dialog window has seven tabs. To open this dialog window, select the **Environment Setting** command from the **Option** menu.

#### (1) Environment Tab Strip

The **Environment** tab is used to select the controls for mouse operation on the scanning image, and the data transfer to and from the PCI software, and to set the automatic rotation correction linked with sample height.



**Image Adjustment** area ..... Mouse operation functions (focus, astigmatism correction, and brightness and contrast adjustment) are all available when the **Adjust All** box (in the **Scanning Image** window) is checked. When the **Adjust All** box is not checked, only the functions checked will be active.

## 2.3 Graphical User Interface (GUI)

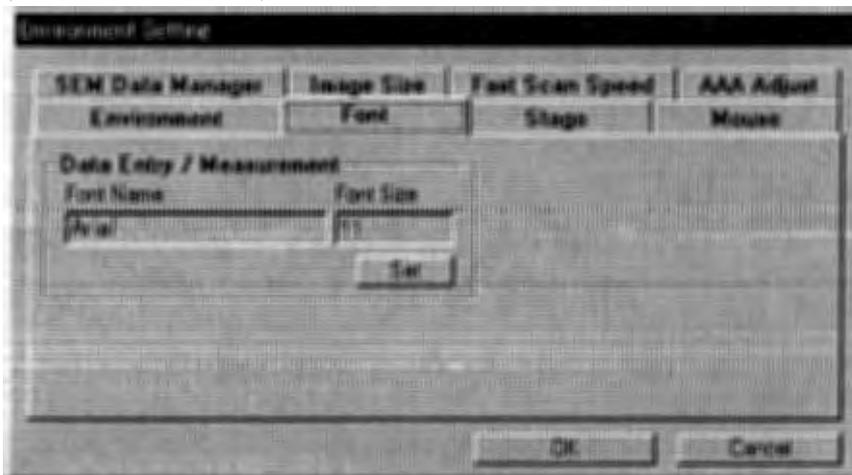
**Raster Rotation area** ..... When the **On** button is selected for **Height-Rotation Link**, image rotation caused in the objective lens is compensated automatically and the scanning direction is kept to coincide with the direction of stage movement. If the **Controllable** button is selected, the automatic compensation function is enabled or disabled with controls in the **Raster Rotation** dialog window. For normal operation, it is strongly recommended to select the **On** button.

**Micron Marker area** ..... Select the method of marker display on the **Scanning Image** window. At **Sizable**, the marker length varies according to the magnification, to the extent that a fraction doesn't appear in the indicated value. At **Fixed**, the marker length is fixed, and only the value indicating the length varies with the magnification. In this case a fraction will be indicated with the length in accordance with the magnification.

**OK button, Cancel button** ..... Click **OK** button to make selections available or the **Cancel** button to cancel selections.

### (2) Font Tab Strip

The **Font** tab is used to select the type and size of the font used in the Data Entry and CD Measurement functions.



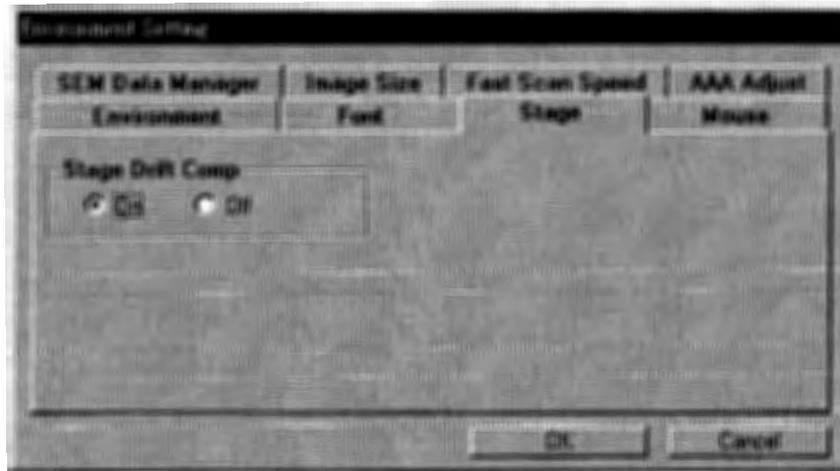
### **Data Entry/**

**Measurement** check box ..... The name and size of the present font is indicated. To select a font, open the Font dialog window by clicking the **Set** button .

**OK button, Cancel button** ..... Click **OK** button to make the selection available or **Cancel** button to cancel the selection.

## (3) Stage Tab Strip

The **Stage** tab is used to set function of specimen stage.

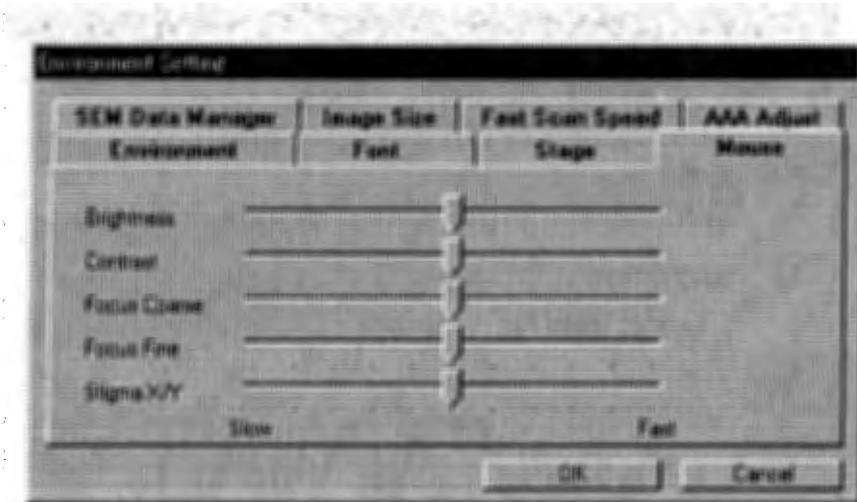


**Stage Drift Comp** ..... This function minimizes the stage drift just after the stage is moved by using RISM function or by specific coordinate. When clicking the "On", the stage (X,Y) will move past the target position by the drift comp. amount (approx.  $0.2 \mu\text{m}$  to  $1 \mu\text{m}$ ) and then return to the proper target position. This action reduces the stage drift. Note that the stage operation will be ignored if the stage traverse is less than 1/2 of the drift comp. amount. If this setting is set to "Off", the minimum traverse range of  $0.1 \mu\text{m}$  is effective.

## 2.3 Graphical User Interface (GUI)

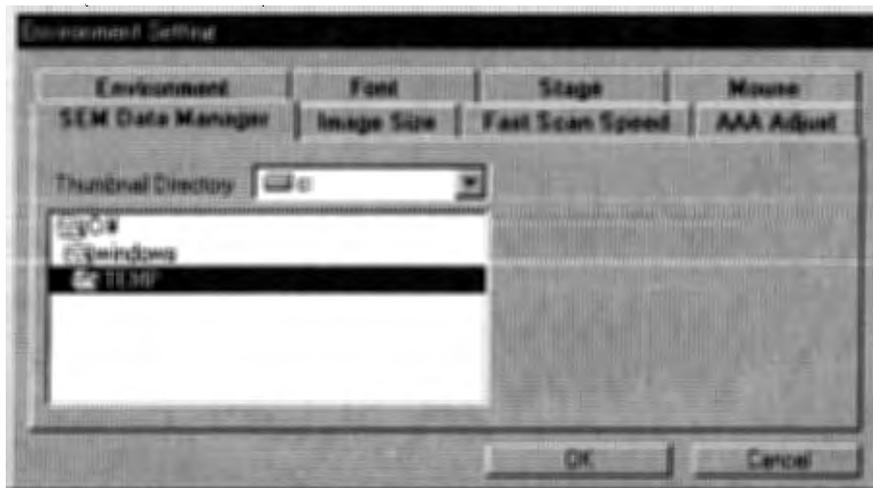
### (4) Mouse Tab Strip

The **Mouse** tab is used to set the sensitivity of mouse operation (focus, stigma, brightness and contrast adjustment) in the scanning image.



Set the sensitivity of mouse operation (focus, stigma, brightness and contrast adjustment) in the scanning image. Set a slider control at the **Slow** side for lower sensitivity or at the **Fast** side for higher sensitivity. Adjustable range is a half to 1.5 times the default sensitivity.

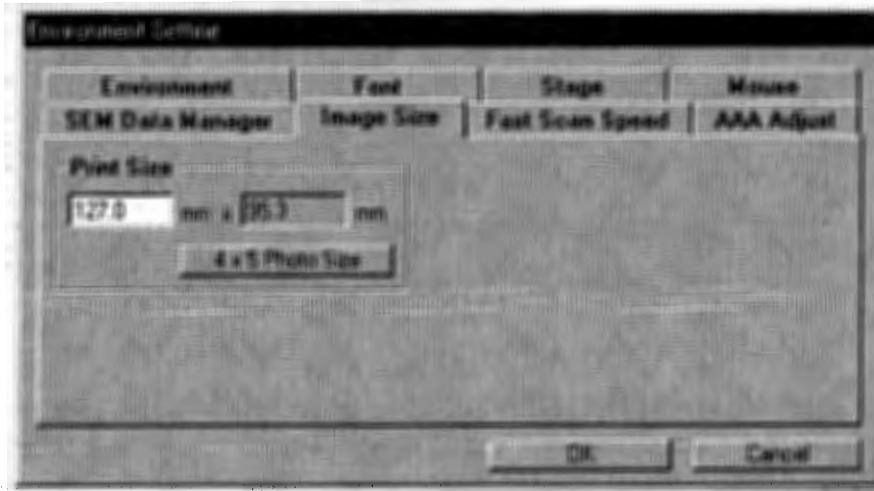
### (5) SEM Data Manager Tab Strip



**Thumbnail Directory** ..... Set the directory where the thumbnail data for the SEM Data Manager is stored.

(6) Image Size Tab Strip

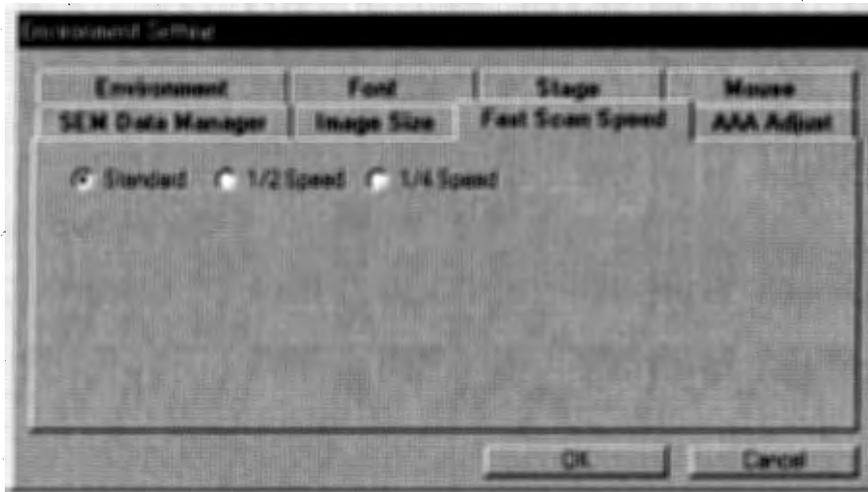
The **Image Size** tab is used to set size of images placed on a page using the Layout command of DTP applications such as Aldus Page Maker. The setting is effective only on application programs that support the X and Y-Resolution tags of Tiff files. The Aldus Page Maker supports, and many of word processor applications do not support these tags.



- Print Size X/Y** ..... Set the size of images when placed on a page using above mentioned DTP application programs. Input a horizontal size in the left side box.
- 4" x 5" Photo Size** button..... Sets the Print Size to the value by which the magnification of images placed on a page using above application programs is about equal to the magnification of images taken with 4" x 5" Polaroid films. The size of image is a little larger than the effective area of the Polaroid film.

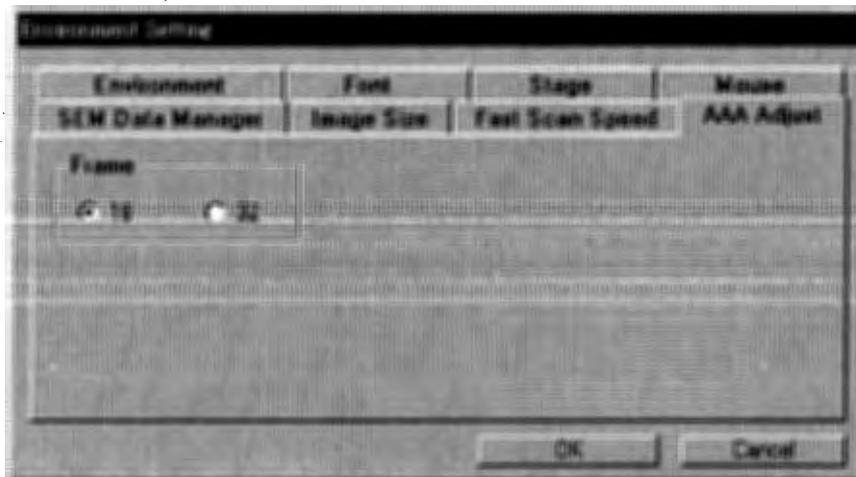
## 2.3 Graphical User Interface (GUI)

### (7) Fast Scan Speed Tab Strip



Horizontal scanning speed of FAST1, FAST2 scan and FAST scan capturing can be set slower by selecting 1/2 speed or 1/4 speed button. Use this function to reduce image distortion in horizontal direction, or to obtain better image resolution. Note that slower horizontal scanning speeds result in slower frame speed and longer capturing time.

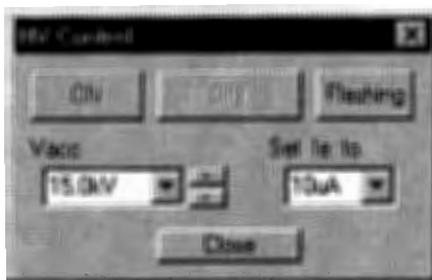
### (8) AAA Adjust Tab Strip



**Frame** ..... Select a number of image frames (integrated number of frames at alignment image acquisition) to be used in auto axial alignment. The normal setting is 16. If an image of very poor S/N ratio is used in the auto axial alignment, the alignment accuracy would likely be degraded. If the auto alignment fails due to poor S/N of the image, set **Frame** to 32.

### 2.3.24 HV Control Dialog Window

The HV Control dialog window is used for setup, application or shutdown of the electron gun high voltage. To open this dialog window, click the mouse in the HV Display area or select the **HV** command from the **Setup** menu.



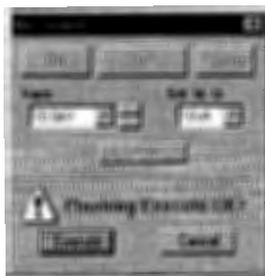
**ON** button ..... Applies high voltage to the electron gun and controls extraction voltage to obtain the emission current selected in the **Set Ie** box.

The name of the button is changed to **SET** when high voltage is applied, so the emission current values can be adjusted.

**OFF** button ..... Shuts down the high voltage.

**NOTE:** You can turn On and Off HV using **ON** and **OFF** buttons on the toolbar when you do not need to change high voltage value.

**Flashing** button ..... Opens a sub dialog for the flashing operation. Flashing is carried out when the **Execute** button in the dialog window is clicked.



**Vacc** list box and

up and down button .... Sets high voltage. Select a voltage from the pull-down list, or by using the up or down buttons. At the top of the voltage list, four recently used voltages are placed.

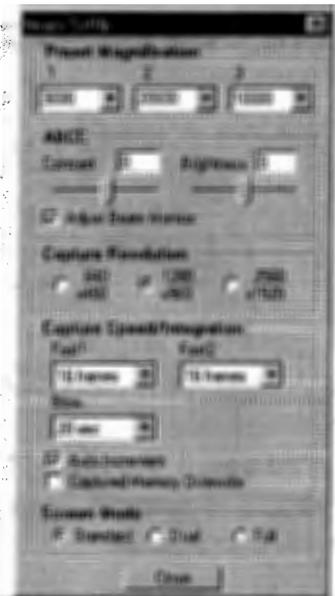
**Set Ie to** list box ..... Sets emission current. Select the desired current from the pull-down list.

**Close** button ..... Closes the dialog window.

## 2.3 Graphical User Interface (GUI)

### 2.3.25 Image Setup Dialog Window

The **Image Setup** dialog window is used for selecting conditions related to the scanning image. To open this dialog window, click the Image setup button  on the toolbar or select the **Image** command from the **Setup** menu.



#### Preset Magnification

List boxes ..... Selects magnifications for the **Preset** button in the **Scanning Image** window. Three magnifications can be set using the Preset Mag. button. Magnifications can also be entered using the keyboard followed by the Enter key.

**Contrast/Brightness** slider ..... Contrast and brightness level can be adjusted for ABCC with the sliders, if the results of ABCC are not suitable for observing specimens.

**Adjust Beam Monitor** slider ..... If this box is checked, Beam Monitor adjustment is activated automatically at the start of ABCC.

#### Capture Resolution

select buttons ..... Selects the image resolution of captured images.

#### Capture Speed/

**Integration** list boxes ..... Selects the number of frames to be integrated for capturing at Fast1 and Fast2 speeds. Also selects a scanning speed for capturing at slow speed.

**Auto Increment** check box ..... If this box is checked, the number of the captured area is incremented after each capture.

#### Captured Memory Overwrite

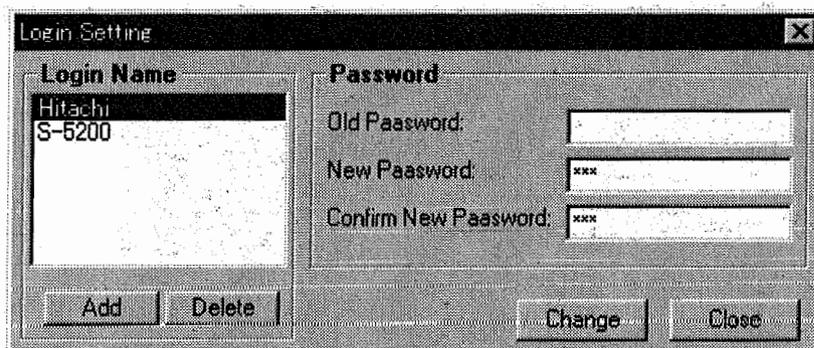
check box ..... If this box is checked, a captured image is overwritten without a warning message.

**Screen Mode** select buttons ..... Selects one of the screen modes.

### 2.3.26 Login Setting Dialog Window

It opens by setting **Login Setting** command from **Option** menu. It is possible only when logged in with the login name [S-5200].

You can create or change login names and their password for each user.



- Login Name list** ..... All login names are listed here. You can select one by clicking it.
- Add button** ..... Opens a dialog window for inputting a new login name.
- Delete button** ..... Removes the login name selected on the **Login Name** list. The name [S-5200] is not removed.
- Old Password box**..... Input present password here to change the password.
- New Password box** ..... Input new password for changing the password.
- Confirm New Password box** ..... Input the new password once more for confirmation.
- Change button** ..... The password of the selected login name will be changed to new password. When you input only the present password and click the button without entering new password, the password is deleted and the user can login without password.
- Close button**..... Closes the dialog window.

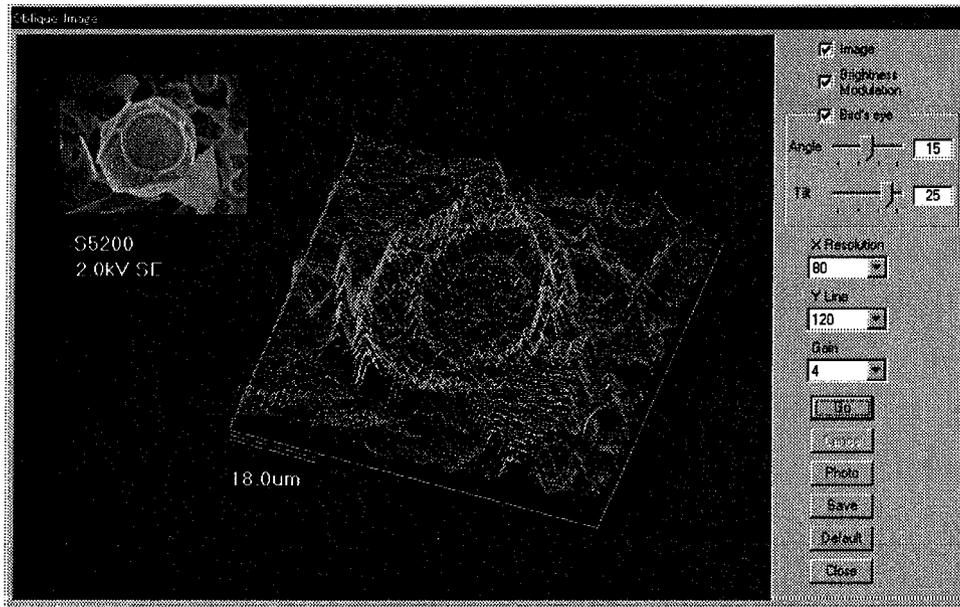
Refer to: 3.11.17 Password Setting  
3.11.18 Setting Login Name

**NOTICE:** Up to eight characters are allowed for login names and passwords.

## 2.3 Graphical User Interface (GUI)

### 2.3.27 Oblique Dialog Window

The **Oblique** dialog window is used to display an oblique image. To open the dialog window, select the **Oblique** command from the **Analysis** menu or click the Oblique button  on the toolbar.



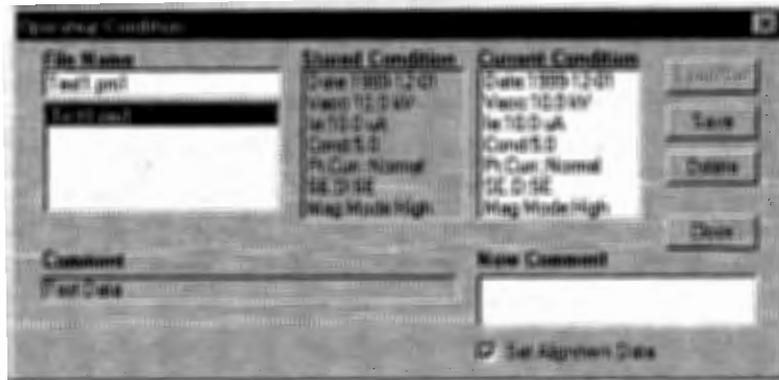
- Image** check box..... When the box is checked, the original image is displayed in the window in a reduced size.
- Brightness Modulation** check box ..... When the box is checked, the brightness of the profile lines, in the oblique image, are modulated using the image brightness of the corresponding pixels.
- Bird's Eye** check box..... If the box is checked, the oblique image is shown as a bird's eye view.
- Angle, Tilt slider and** indication box ..... Sets the viewing and tilting angles. A higher resolution shows finer detail but takes a longer time to draw. If the image is noisy, a lower resolution will present a smoother image.
- X Resolution** list box ..... Selects a resolution of the horizontal axis. A higher resolution shows finer detail but takes a longer time to draw. If the image is noisy, a lower resolution will present a smoother image.
- Y Line** list box ..... Selects a number of drawing lines of vertical axis.
- Gain** list box ..... Selects a modulation gain.
- Go** button ..... Starts drawing an oblique image.
- Cancel** button..... If clicked, the oblique image will stop being drawn.
- Photo** button ..... Click this button to take a photograph of an oblique image.

- Save button** ..... Click this button to save an oblique image to disk.  
Saved images are not registered in the SEM Data Manager database, but can be registered as image files in the SEM Data Manager using the Add From File function.
- Default button** ..... Sets conditions, **X Resolution**, **Y Line** and **Gain**, at default values.
- Close button**..... Closes the dialog window.

**2.3.28 Operating Condition Dialog Window**

The **Operating Condition** dialog window is used for saving, loading or deletion of conditions of the electron optical column.

To open this dialog window, select the **Operating Condition** command from the **File** menu or click the Operating Condition button  on the toolbar.



- File Name** box and list box.....Input a file name in this box, or select a file name in the list box by clicking a name.
- Stored Condition** box.....The condition data written in the condition file selected in the **File Name** list box is indicated in this box. Use this data to confirm the condition before loading.
- Current Condition** box .....Current conditions are shown in this box.
- Comment** box .....Comments in the condition file selected in the **File Name** list box are shown in this box.
- New Comment** input box .....Input new comments for saving.
- Load/Set** button .....Loads conditions in the selected condition file, and sets these conditions to the instrument.
- Save** button .....Saves current conditions to a condition file.
- Delete** button.....Deletes a file selected in the **File Name** list box.
- Set Alignment Data** check box.....If the box is checked, alignment data are set on the instrument.
- Close** button.....Closes the dialog window.

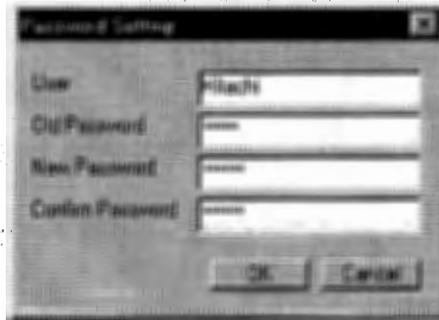
Refer to: 3.11.6 Condition Memory Function (Operating Condition)

## 2.3 Graphical User Interface (GUI)

### 2.3.29 Password Setting Dialog Window

Use the **Password Setting** Dialog Window for setting or changing the password of the login name for current user.

To open this dialog window, select the **Password Setting** command from the **Option** menu.



- User** box..... The login name of current user is indicated.
- Old Password** box..... Input present password here to change the password.
- New Password** box ..... Input new password for changing the password.
- Confirm Password** box ..... Input the new password once more for confirmation.
- OK** button..... Changes the password and closes the window. When you input only the present password and click the button without entering new password, the password is deleted and the user can login without password.
- Cancel** button..... Cancels input and closes the window.

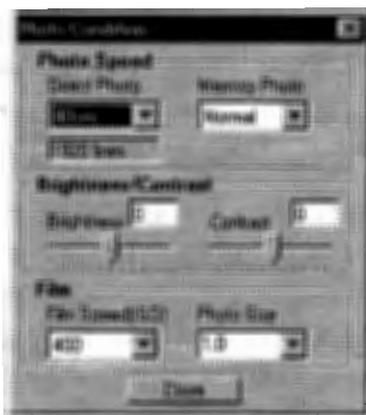
Refer to: 3.11.17 Password Setting

**NOTICE:** Up to eight characters are accepted as password. Capital and small letters are distinguished.

Setting login name is possible using the **Login Setting** dialog window. It is only accessible when logged in with the superintendent login name.

### 2.3.30 Photo Condition Dialog Window

To open the dialog window, click the Photo Condition  button on the toolbar or select the **Photo Condition** command from the **Setup** menu.



#### Photo Speed-Direct Photo

list box ..... Used for selecting a scan speed in Direct Photo execution. The number of scanning lines is indicated. In common practice, specify a scan speed of 80 sec. For a specimen which is liable to be damaged, it is recommended to specify a scan speed of 40 sec. For X-ray image photographing, it is advisable to specify a scan speed of 160 to 320 sec.

#### Photo Speed-Memory Photo

list box ..... Used for selecting a photographing method (scan speed, number of scanning lines) in Memory Photo execution. Selection of **Normal** performs 960-line photographing if the number of image data lines is 960 or less. Note that the photograph resolution is 2000 lines or higher. Therefore, inter-line parts may become dark if 960-line photographing is performed. Selection of **Enhance** performs 1920-line photographing even if the number of image data lines is 960 or less. Therefore, inter-line parts will not become dark. Note that the same data as that on each preceding line is used on each increased line. Select **X ray Map** for photographing an X-ray analysis map image. Selection of this item automatically increases brightness and contrast in photographing so that a clear map image will be recorded. The number of scanning lines and the scanning time (at a power frequency of 60/50 Hz) in each photographing mode are as follows:

### 2.3 Graphical User Interface (GUI)

Normal	: Data of 640 × 480 pixels	→ 960 lines (17/20 s)
	: Data of 1280 × 960 pixels	→ 960 lines (17/20 s)
	: Data of 2560 × 1920 pixels	→ 1920 lines (34/40 s)
Enhance	: Data of 640 × 480 pixels	→ 1920 lines (34/40 s)
	: Data of 1280 × 960 pixels	→ 1920 lines (34/40 s)
	: Data of 2560 × 1920 pixels	→ 1920 lines (34/40 s)
X ray MAP	: Data of 640 × 480 pixels	→ 960 lines (17/20 s)
	: Data of 1280 × 960 pixels	→ 960 lines (17/20 s)
	: Data of 2560 × 1920 pixels	→ 1920 lines (34/40 s)

**Brightness/Contrast sliders**.....Sets brightness and contrast for photo recording. These are compensation factors for brightness and contrast adjusted in the scanning image. Adjust these values if a photograph does not have adequate brightness or contrast.

**Film-Film Speed list box**.....Selects a film speed (sensitivity) of the film. The brightness setting is changed internally according to the selected film speed.

**Film-Photo Size list box** .....Selects a size of the film. The magnification is adjusted internally according to the selected size.

×1.0: For 4 × 5 inch instant film

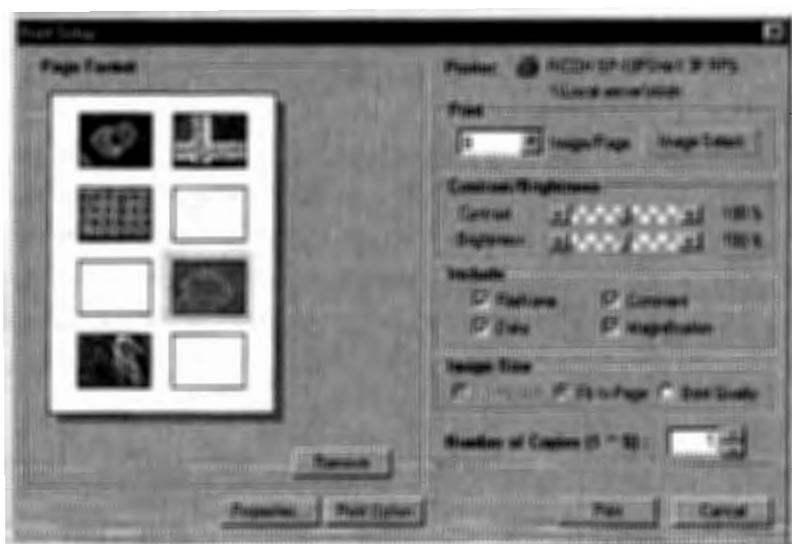
×0.8: For type 107 or 105 instant film

×0.6: For type 120 negative film.

Also you can input any desired value other than above using the keyboard.

### 2.3.31 Print Setup Dialog Window

The **Print Setup** dialog window is used to print images using a Windows supported printer. When opened by the **Print** command in the **File** menu, the viewing image is printed. In this case, only one image per page can be printed. When opened by the **Print**  button in the **SEM Data Manager** window, up to eight images can be printed per page.



- Page Format**.....Displays preview of the printed image. When two or more is selected in the **Image/Page** selection box, selected number of areas for image preview are displayed. The area surrounded by yellow box shows the selected preview area. You can select an area by clicking a preview area.
- Printer** indication.....Indicates the type of the default printer. To change the printer, use the Printer command of Windows.
- Image/Page** selection button.....Selects the number of images printed per page (1 to 8). Fixed at 1 when opened by **Print** command in **File** menu.
- Image Select** button.....Opens **Image Select** dialog window. Select file names to be printed in the dialog window. The Image Select button is disabled when opened by the **Print** command in **File** menu.
- Contrast / Brightness** control.....Adjusts contrast and brightness of the printed images. The adjustment applies to all selected images.
- Include** area.....Selects text printed with the images. Text of checked items is then printed.

**NOTICE:** For small paper such as A6 size, excluding these texts may allow bigger image size. When the **Photo Size** button is disabled or when selecting the **Best Quality** results in too small a print size, uncheck these and try selecting Image Size option.

## 2.3 Graphical User Interface (GUI)

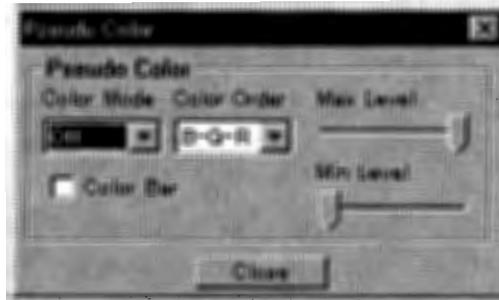
- Image Size area**..... Selects size of printed image. If **Photo Size** is selected, the image size is set to the same size as 4" x 5" Polaroid film. If **Fit to Page** is selected, the image size is adjusted to fit the paper size. When the **Best Quality** is selected, printed image size is set so as the number of dots of the printer includes image area and the number of pixels of the image data is integer ratio. It will result in the best print quality for the thermal or dye-sublimation type printers. It is not effective for laser or ink jet type printer using dithering method.
- Number of Copies**  
selection box ..... Selects the number of copies to be printed (1 to 5).
- Remove button** ..... A preview image in the selected area is removed by clicking this button. Click a preview area and then, click the **Remove** button to remove the image.  
The **Remove** button is disabled when opened by the **Print** command in **File** menu.
- Print button** ..... Starts printing.
- Cancel button**..... Closes the dialog window.
- Properties button**..... Opens Printer set up dialog window provided with the printer driver.

**NOTICE:** Use the Setting-Printer command of Windows for setting detailed properties of the printer.

### 2.3.32 Pseudo Color Dialog Window

The **Pseudo Color** dialog window is used for displaying a pseudo color image.

To open the dialog window, click the Pseudo Color button  on the toolbar or select the **Pseudo Color** command from the **Image** menu.



**Color Mode** list box..... Selects a coloring mode.

**Color Order** list box..... Selects a color order.

**Max Level** slider..... Sets the maximum value of the signal assigned to color the image. Adjustable range is from 75 to 100% of the full scale.

**Min Level** slider..... Sets the minimum value of the signal assigned to color the image. Adjustable range is from 0 to 25% of a scale.

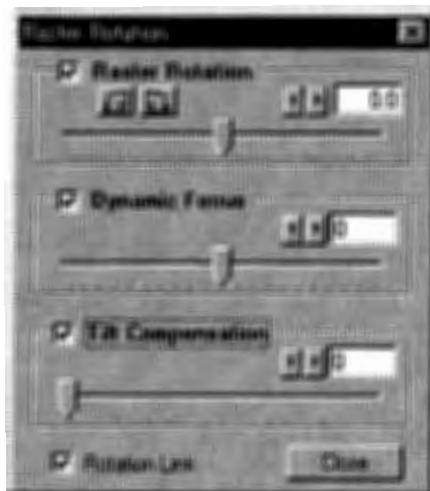
**Color Bar** check box..... Displays color bar at the right side of image.

Refer to: 3.11.7 Pseudo Color Display

### 2.3.33 Raster Rotation Dialog Window

The **Raster Rotation** dialog window is used for raster rotation, dynamic focus and tilt compensation functions.

To open this dialog window, click the Raster Rotation button  on the toolbar or select the **Raster Rotation** command from the **Operate** menu.



## 2.3 Graphical User Interface (GUI)

- Raster Rotation check box**..... When the box is checked, the raster rotation function is active.  
Refer to: 3.11.9 (1) Raster Rotation
- Raster Rotation slider and up/down buttons** ..... Sets the rotation angle. The rotation angle is indicated in the box beside the buttons. It is possible to enter rotation angles into the box using the keyboard followed by the Enter key.
- 90° Rotation buttons**  ..... These buttons allow image rotation in steps of 90° from the present visual field.
- Dynamic Focus check box**..... When the box is checked, the dynamic focus function is active.  
Refer to: 3.11.9 (2) Dynamic Focus
- Dynamic Focus slider and up/down buttons** ..... Adjusts the level of dynamic focusing. The level is indicated in a percent value in the box beside the buttons.
- Tilt Compensation** ..... When this box is checked, the tilt compensation function is active.  
Refer to: 3.11.9 (3) Tilt Compensation
- Tilt Compensation slider and up/down buttons** ..... Sets the tilt angle. The tilt angle is indicated in the box beside the buttons. It is possible to enter a tilt angle into the box using the keyboard followed by the Enter key.
- Rotation Link check box** ..... This box is shown only when the **Rotation Link** is set at Controllable in the **Environment** tab of the **Environment Setting** dialog window.  
When it is checked, image rotation caused in the objective lens is compensated automatically and the scanning direction is kept to coincide with the direction of stage movement.  
When it is not checked, the automatic compensation function is disabled and the circuitry for raster rotation is passed through if the **Raster Rotation** is set to Off.  
For normal operation, it is strongly recommended to enable the automatic compensation function.
- Close button**..... Closes the dialog window.

### 2.3.34 Save Image Dialog Window

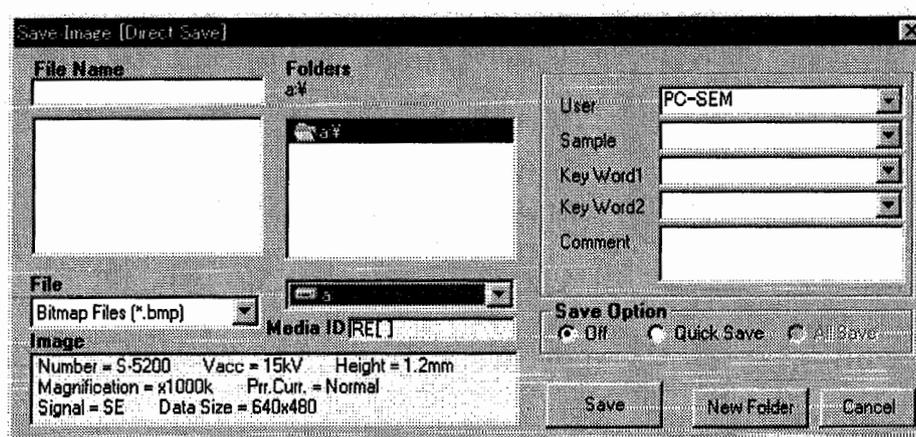
The Save Image dialog window is used for saving viewing images, captured images and processed images in the SEM Data Manager.

To save the image from the **Scanning Image** window, click the Direct Save button  on the toolbar or select the **Direct Save** command in **File** menu, after freezing the frame.

To save captured images, click the Save button  in the **Captured Image** window.

Simply frozen images are saved with 640 × 480 (or 1024 × 768 in **Full Screen** mode) pixels resolution. Captured images are saved with capture resolution.

To save a processed image in the SEM Data Manager, click the Save button  in the **SEM Data Manager** window.



**File Name** input box ..... Specifies a file name. Input a file name for a new file or select one from the list of files.

**File Type** box ..... Specifies an image format (Windows bitmap, Tiff or JPEG).

**Image** area ..... Displays observation conditions of the image to be saved.

**Folders** list box ..... Lists folders of the selected drive. Select a folder on the list.

**Drive** list box ..... Lists existing drives. Select a drive in this box.

**Media ID** ..... Indicates the volume label of the selected drive.

**Database** area ..... Specifies items concerning the database.

**User** list box : Specifies User name where the saved image is to be registered. Select a User name from the registered User names, or input a name to create a new User.

#### Sample/Keyword

input box : Specifies Sample name and Keywords to be registered in the database.

Select one from the registered names and words, or input new ones.

**Comment** input box : Input a comment.

### 2.3 Graphical User Interface (GUI)

**Save Option area** ..... Specifies a saving option. This option is disabled when opened from the SEM Data Manager.

**Off** : Saves one image only.

**Quick Save** : File names are automatically generated for successive saving operations.

Input of a file name is required once. Generated file names are {Input file name} + q + n (n = 1, 2,.....)

**All Save** : Saves all images in the **Captured Image** window. File names [{Input File name} + n (n: capture number)] are automatically generated. This option is available only when opened from the **Captured Image** window.

**Save button** ..... Executes image saving.

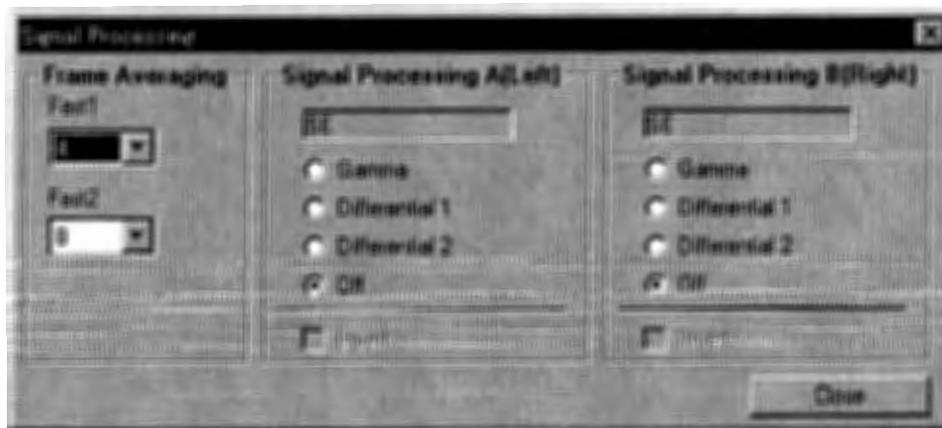
**Cancel button** ..... Closes this dialog window.

**New Folder button** ..... Opens an input dialog window for creating a new folder.

### 2.3.35 Signal Processing Dialog Window

The **Signal Processing** dialog window is used to select the number of frames to be averaged at Fast scanning speeds, and to apply signal processing.

To open the dialog window, click the Signal Processing button  on the toolbar or select the **Signal Processing** command in **Image** menu.



**Frame Averaging** list boxes..... Selects the number of frames to be averaged at **Fast1** and **Fast2** scanning speeds. The recommended number of frames is 4 at **Fast1** and 8 or 16 at **Fast2**.

**Signal Processing A (Left) and B (Right)** area ..... Selects processing for the scanning image displayed on the A and B screens. **B (Right)** is available only when the Dual Screen Display mode is selected.

**Signal name indication** : Indicates the name of the signal selected in the **Signal Select** dialog window.

**Gamma, Differential 1, Differential 2** and **Off** select buttons

: When clicked the selected processing is applied. To cancel, click **Off**.

**Invert** check box

: Inverts the contrast of the scanning image. The box is shown when the amplifier for the selected signal has a signal inversion function.

**Close** button

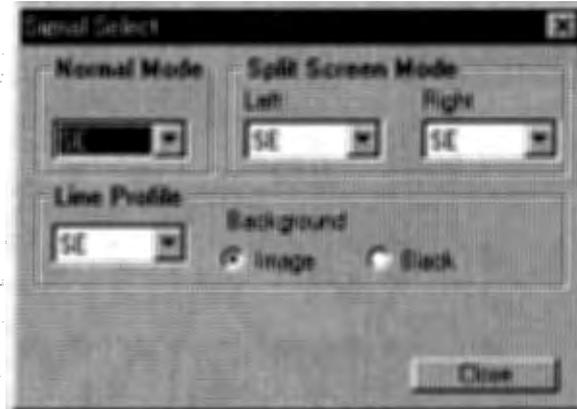
: Closes the dialog window.

## 2.3 Graphical User Interface (GUI)

### 2.3.36 Signal Select Dialog Window (Standard and Full Screen Display Mode)

The Signal Select dialog window is used for selecting an image signal for display.

To open the dialog window, click the Signal Select button  on the toolbar or select the **Signal Select** command in the **Setup** menu.



- Normal Mode** list box..... Selects a signal used for scanning image display except for Split Screen mode.
- Split Screen Mode** list box ..... Selects signals for the Left and Right half areas in the Split Screen mode.
- Line Profile** list box..... Selects the signal to be used for the Line Analysis mode. It can be set independently of signals for Normal mode.
- Background** select buttons..... Selects the background of the line profile in the Line Analysis mode. If **Image** is selected, the line profile is overlaid on the scanning image. If **Black** is selected, only the line profile is displayed.

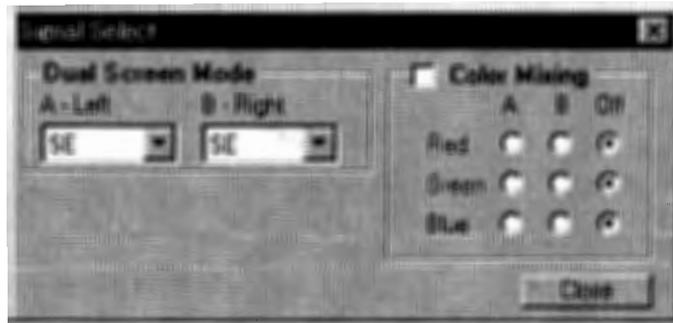
Refer to: 3.11.3 Signal Selection and Color Mixing

### 2.3.37 Signal Select (Color Mixing) Dialog Window (Dual Screen Display Mode)

The **Signal Select** dialog window is used for selecting image signals and for displaying an RGB Color Mixed image.

To open the dialog window, click the Signal Select button  or the Color Mixing button  on the toolbar.

Selecting the **Signal Select** command in the **Setup** menu or the **Color Mixing** command in the **Image** menu can also open the dialog window.



#### Dual Screen Mode-A-Left

list box ..... Selects the signal to be used for the (Left side) scanning image.

#### Dual Screen Mode-B-Right

list box ..... Selects the signal to be used for the (Right side) scanning image.

#### Color Mixing check box and select buttons

..... Sets conditions for the RGB Color Mixing mode.

To display a color composite image, assign the **A** or **B** signal for each of the three colors by clicking the select buttons, then check the **Color Mixing** box to On.

For example, **A** signal is SE and the **B** signal is BSE, and **A** is assigned to **Blue** and **B** to both **Red** and **Green**.

A color composite image of yellow BSE and blue SE is then displayed.

To return to the B/W image display mode, uncheck the **Color Mixing** box.

Refer to: 3.11.3 Signal Selection and Color Mixing

## 2.3 Graphical User Interface (GUI)

### 2.3.38 Simple Operation Toolbox

Frequently used function buttons are placed on the toolbox. When you feel using buttons on the toolbar is confusing, open this toolbox and close the toolbar. You can operate almost all functions on this toolbox.

Also it is useful when using the Full Screen mode upon closing the toolbar and controls on the **Scanning Image** window to extend image area.

To open the toolbox, click the Simple Operation button  on the toolbar or select the **Simple Operation** command in the **Operate** menu.

Applies high voltage to the electron gun and controls extracting voltage. The name of the button is changed to **SET** when high voltage is applied, so the emission current values can be adjusted.

Displays the operation mode for the electron optical column.

Opens the **Image Setup** dialog window.

Opens the **Image Setup** dialog window.

Drives the stage to the specimen exchange position. The indicator above the button turns green when the stage reaches the specimen exchange position.

Displays accelerating voltage, emission current.

Shuts down the high voltage.

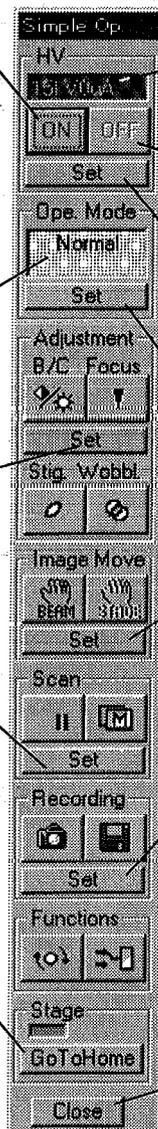
Opens the **HV Control** dialog window.

Opens the **Column Setup** dialog window.

Opens the **Stage Control** dialog window.

Opens the **Photo Condition** dialog window. The button is enabled when Direct Photo or Memory Photo is selected for **Recording** buttons.

Closes this toolbox.



**Adjustment area**

**B/C button** : Right button click changes the button into  button for ABCC (Auto Brightness and Contrast adjustment) and  button for BC Monitor mode. Left button click executes each function.

Refer to: 3.5.3 (1) Auto Adjustment (ABCC)  
3.5.3 (3) BC Monitor Mode

**Focus button** : Right button click changes the button into  button for Auto Focusing, and  button for Focus Monitor mode. Left button click executes each function.

Refer to: 3.5.4 (2) Auto Focus Function  
3.5.4 (6) Focus Monitor Mode

**Stig. button** : Starts auto astigmatism correction.

Refer to: 3.5.4 (4) Auto Stigma Function

**Wobbl. button** : Opens the Alignment dialog window and starts aperture alignment (wobbler) mode.

Refer to: 3.4.2 (2) Aperture Alignment

**Image Move area**

**button** : Enables Image Shift control by mouse operation. Click the button again or right-click on the image to terminate Image Shift operation.

Refer to: 3.5.5.10 Operation of Electrical Image Shift

**Scan area**

**button** : Runs or Stops scanning alternately.



**button** : Starts image capturing.

Refer to: 3.6.4 Image Capturing

**Recording area** ..... Right button click changes the buttons into  for Direct Photographing,  for Memory Photographing,  for Direct Save,  for Copy Image,  for Copy Attribute,  for Printing images,  for Video Printer and  for PCI Transfer in order. Select two buttons you most frequently use.

Refer to: 3.6.7 (3) Direct Photo Recording  
3.6.7 (4) Memory Photo Recording  
3.6.5 Direct Save  
3.11.11 Print  
3.11.10 Video Printer

## 2.3 Graphical User Interface (GUI)

**Functions area** ..... Right button click changes the buttons into  for Raster Rotation,  for Signal Selection,  for Data Entry,  for CD Measurement,  for Split/Dual Mag mode,  for Signal Processing,  for Pseudo-Color display and  for Data Display setup in order. Select two buttons you most frequently use.

Refer to: 2.3.33 Raster Rotation Dialog Window  
2.3.36 Signal Select Dialog Window  
2.3.37 Signal Select (Color Mixing) Dialog Window  
2.3.22 Data Entry Toolbox  
2.3.35 Signal Processing Dialog Window  
2.3.32 Pseudo Color Dialog Window  
2.3.21 Data Display Dialog Window

**NOTE:** Some buttons are disabled when these are not available in present screen mode or mode of operation.

### 2.3.39 Split/Dual Mag Controller

Split Screen mode displays two images in the viewing area, and allows images to be displayed for different signals and at different magnifications. The Split Screen mode is available in Standard Screen mode. To open this controller, click the Split Image button  on the toolbar or select the **Split DM** command from the **Scan** menu.



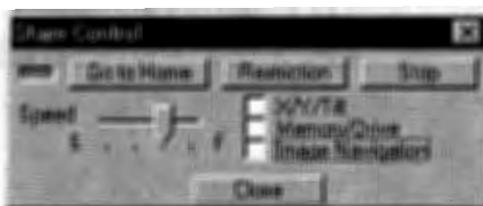
- x1** button ..... Image area is divided into two images with same magnification. Image signals for two images are independently selectable using **Signal Select** dialog window.
- x5** button ..... The area in the box cursor of the left side image is magnified 5 times and displayed on the right side area. The box cursor can be moved by mouse dragging.
- x10** button ..... The area in the box cursor of the left side image is magnified 10 times and displayed on the right side area. The box cursor can be moved by mouse dragging.
- Off** button ..... Disables the Split Screen mode.
- Exit** button ..... Disables the Split Screen mode and closes the controller.
- B/C Control Left/Right** ..... Selects to which image signal the B/C control by mouse operation is applied. Use this selection when different image signals are assigned for the two images.

Refer to: 3.11.2 Split Screen and Dual Mag Mode

### 2.3.40 Stage Control Dialog Window

The **Stage Control** dialog window is used to operate the specimen stage.

To open the dialog window, click the Stage Control button  on the toolbar or click the Stage Control button  on Stage area in **Scanning Image** window. Selecting the **Stage Control** command from the **Operate** menu can also open the dialog window.



**Go to Home** button .... Drives the stage to the specimen exchange position.

The indicator above the button turns green when the stage reaches the specimen exchange position.

**Restriction** button..... Opens the **Restriction** dialog window to set the specimen holder and traverse range in tilt (T) direction. Note that the **Restriction** button is effective only when the stage is at the home position.

**Speed** slider ..... Selects driving speed. The speed setting is effective for X, Y drive using trackball operation.

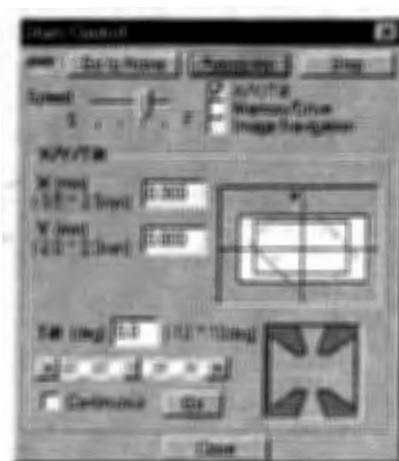
**Stop** button ..... Stops stage motion. Use when you wish to stop stage while it is moving by **Go** operation.

The following check boxes open control areas for each stage axis and operation.

#### (1) X/Y/Tilt Check Box

Opens **X/Y/Tilt** area. Use these controls to operate the X, Y and Tilt (T) axes of the stage.

Refer to: 3.5.5.6 X, Y Operation  
3.5.5.7 Tilt Operation

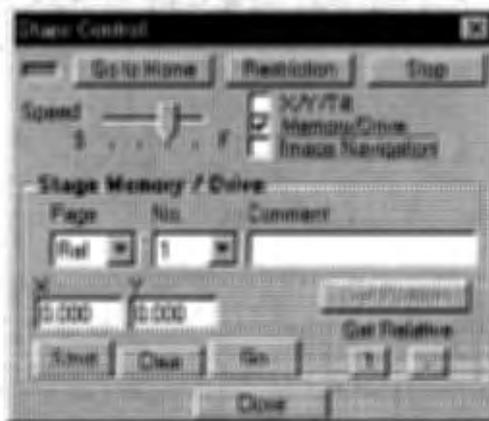


## 2.3 Graphical User Interface (GUI)

### (2) Memory/Drive Check Box

Opens **Stage Memory/Drive** area. Use this area to store stage coordinates and to move the stage to the previously stored positions.

Refer to: 3.5.5.8 Position Memory Function



### (3) Image Navigation Check Box

Opens **Image Navigation** area. Use this area for the Image Navigation function.

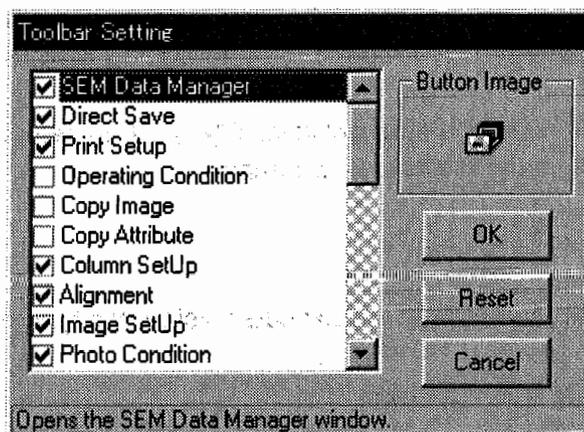
Refer to: 3.5.5.9 Using Image Navigation Function



### 2.3.41 Toolbar Setting Dialog Window

You can select tool buttons placed on the toolbar. The button arrangement is saved independently for each login name. You can use your own toolbar when logged in with your unique login name.

To open this dialog window, select the **Toolbar Setting** command from the **Option** menu.



- Tool button area** ..... All available tool buttons are listed here. Check boxes at the left of button names to place and uncheck to remove the button. Buttons for optional functions are selectable only when the functions are installed.
- Button Image** ..... Indicates the button of the selected button name in the Tool button area.
- Reset button**..... Sets toolbar to default arrangement.
- OK button**..... Closes the dialog window.
- Cancel button**..... Cancels input and closes the dialog window.

**NOTICE:** It is not possible to place all provided tool buttons on the toolbar. Choose only the important buttons so they will not drop out at the right hand side of the toolbar. The button arrangement is refreshed each time you change check/uncheck of boxes. If you click the **OK** button while too many buttons are selected, a warning message will be opened.

## 2.3 Graphical User Interface (GUI)

### 2.3.42 Using Short-Cut Keys

Short-cut keys are available for execution of many commands.

#### (1) Using Short-cut Keys

Input of **Alt** + [character which has underline in a main menu command] opens the pull-down menu. And then, [character which has underline in a pull-down menu] executes the command. For example, **Alt + F** opens the **File** menu and **S** key executes the **Direct Save** command.

While a pull-down menu is open, **arrow** keys **↑ (←)** **↓ (→)** select commands in order. The **Enter** key executes the selected command.

#### (2) Using Ctrl + ~ Keys or Functions Keys

Some frequently used commands are executed using this type of short-cut keys.

They are;

Ctrl + O: Open SEM Data Manager

Ctrl + S: Direct Save

Ctrl + P: Print

Ctrl + C: Copy Image

Ctrl + L: Open **Captured Image** window

F1 : Help can be opened

F5 : Runs or stops scanning alternately

#### (3) Use of Tab and Arrow Keys

In an active window, the Tab key activates command buttons, selection boxes, input boxes in order. When a selection box, where numeral values are to be chosen, selection buttons, or slider controls are selected, these can be controlled using arrow keys.

Shift + Tab selects controls in reverse order.

#### (4) Selection of Alignment Operations

Using arrow keys, you can activate alignment functions in order. It is useful as alignment operations are to be done in order of buttons, **Beam Align to Low Mag Position**.