



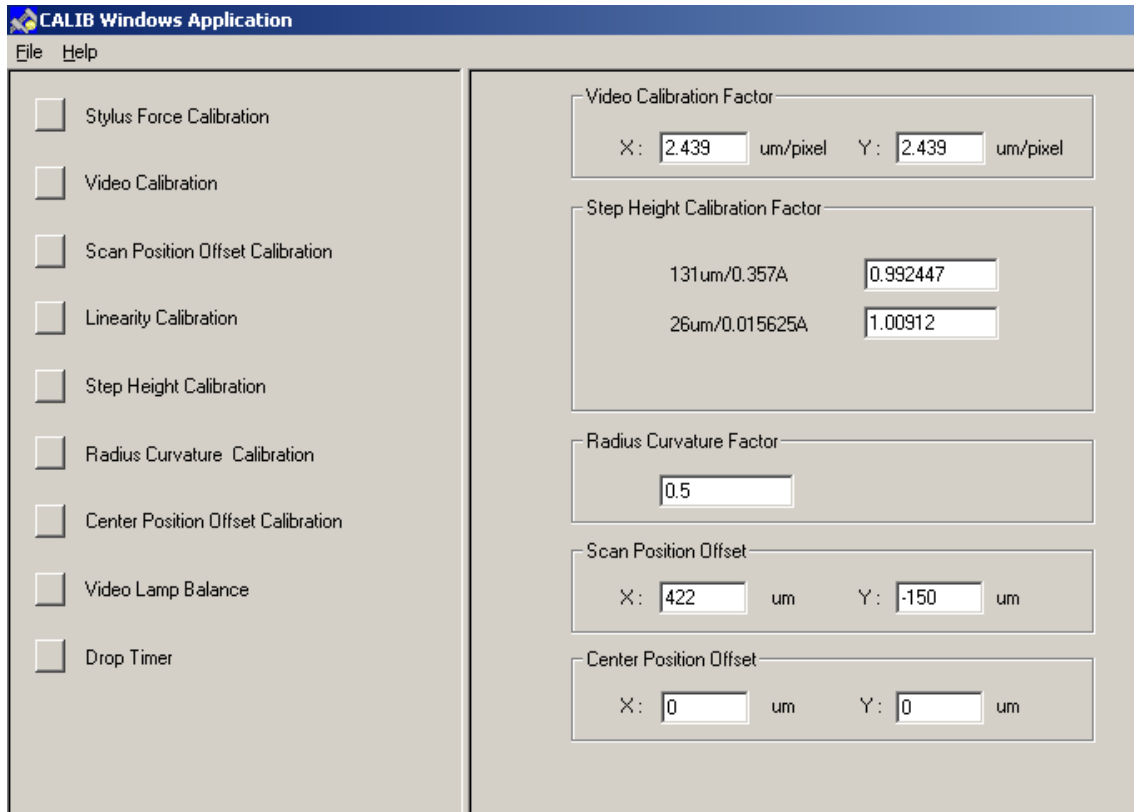
**Toho Technology**

# **Toho FP Series**

## Reference Manual

Toho Technology Corporation.

## 1. Calibration:



- Stylus Force Calibration : Calibration and setting of stylus force
- Video Calibration : Calibration and setting of screen and video image
- Scan Position Offset Calibration : Calibration and setting of start position of measurement
- Step Height Calibration : Calibration of step height by range
- Video Lamp Balance : Adjustment of video lamp
- Drop Timer : Setting of stylus drop motor speed

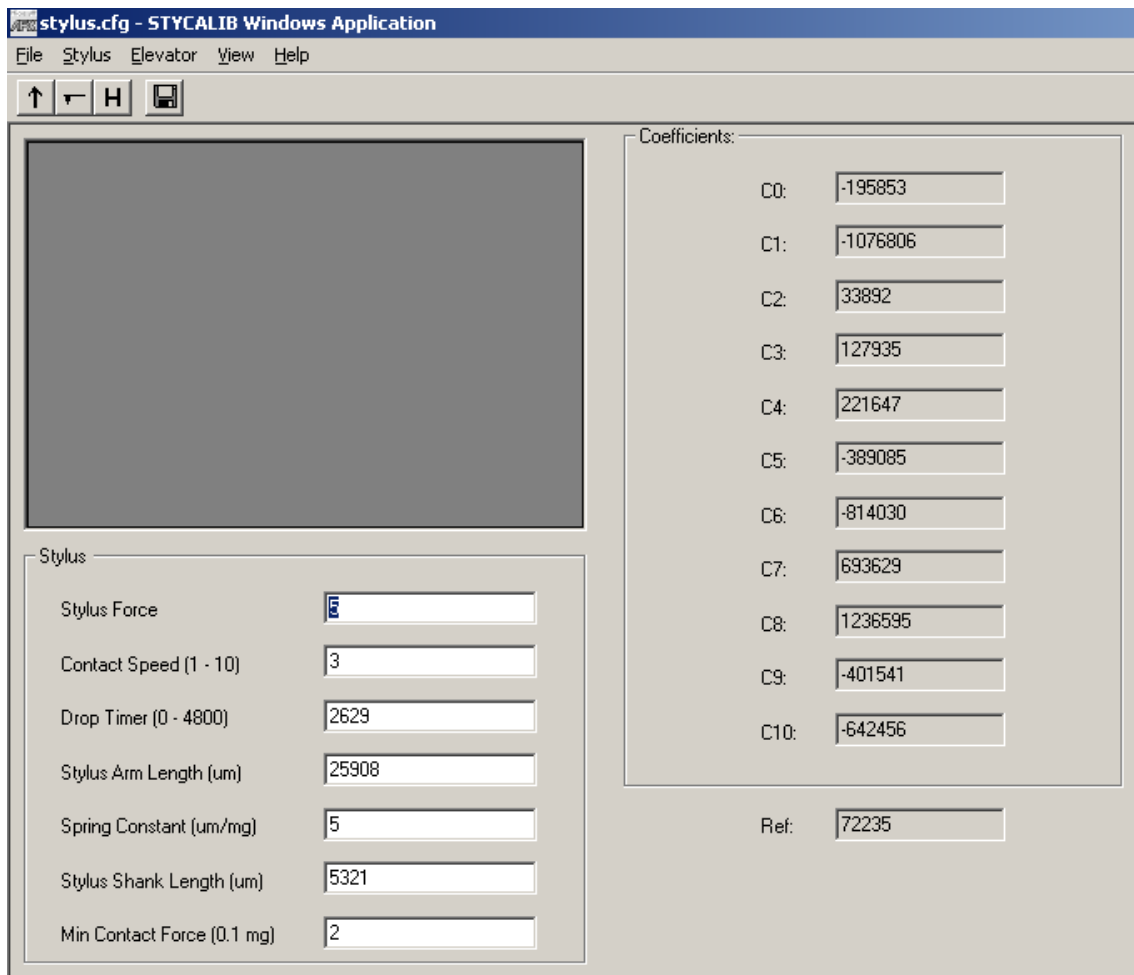
### 1.1. Stylus Force Calibration:

Stylus force is the power that is given to stylus end when a stylus contacts a sample. Mechanical changes of a stylus arm affect each of the calibration.

Note: In case the stylus force is below 10mg, make re-calibration every time styluses are changed.

### Stylus Force Setup Check

1.1.1. Click “Stylus Force Calibration.” If the stylus is close to the sample, choose “Move To Soft Home” from the “Elevator” menu.



1.1.2. Choose “Calibrate Force Coefficients” from “Stylus” in the menu.

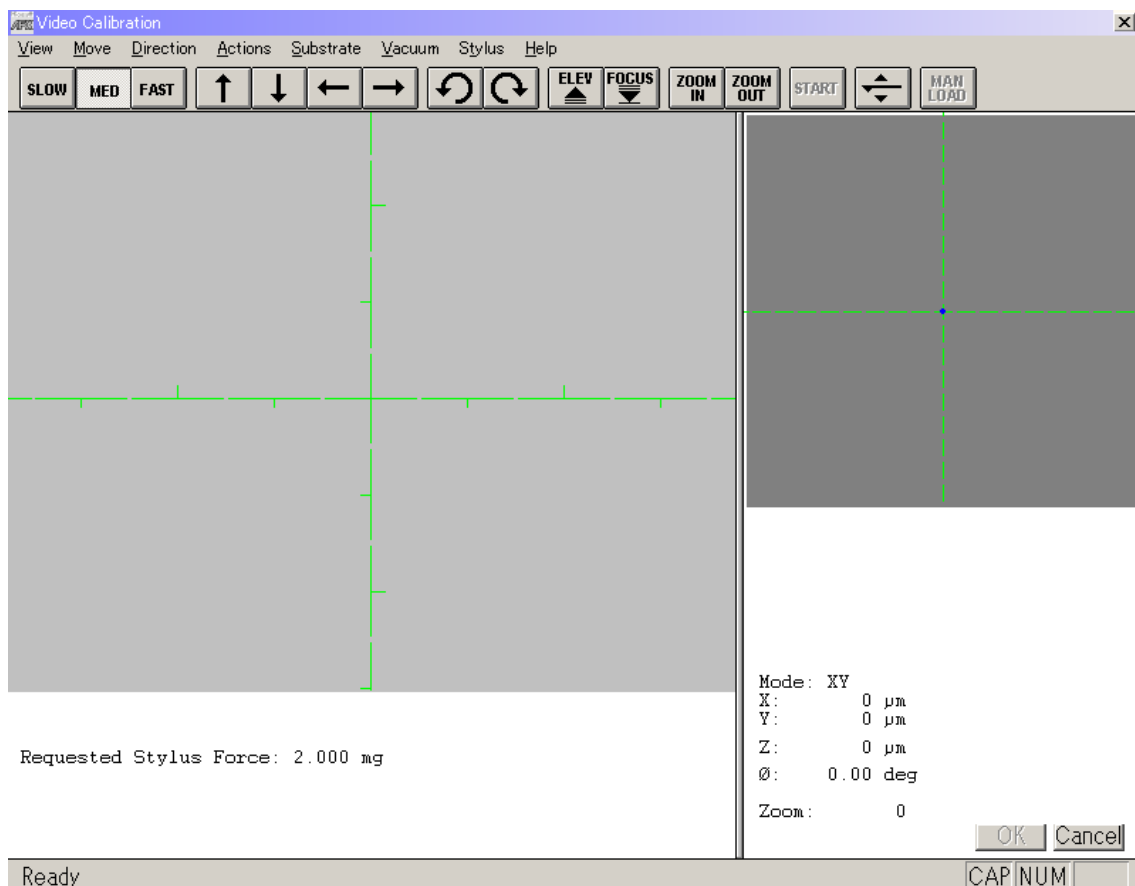
1.1.3. Save the new value by choosing “Save” from the “File” menu.


## 1.2. Video Calibration:

Video calibration associates the video screen coordinate and the stage coordinate.

1.2.1. Place the sample on the stage to bring it just below the measurement head.

1.2.2. Click “Video Calibration” so that the “Video Calibration” window appears.



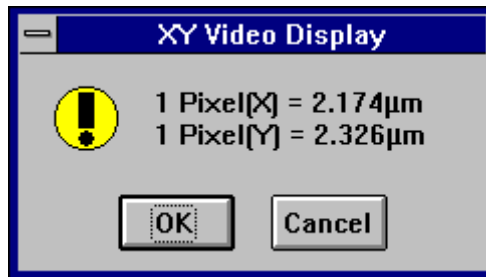
1.2.3. Click  so that the zero point is selected on the sample surface and then the image is focused.

1.2.4. Choose a pattern on the sample to make calibration. The upper-left angle of a rectangle is ideal. If there are exactly the same or similar patterns on the screen, avoid choosing any one of these for calibration.

1.2.5. Move the cross-shaped cursor and click the angle of the pattern chosen in the section 1.2.4. Stage will slightly move in the XY direction and the following message will appear.

“Teach the same feature again.”

1.2.6. Click the same pattern chosen in the section 1.2.5 so that the following message box will appear.



Values in the message box shows one pixel on the screen in the horizontal and vertical direction is equivalent to how many  $\mu\text{m}$  in the X and Y direction on coordinates.

1.2.7. Click “OK.”

### 1.3. Scan Position Offset Calibration:

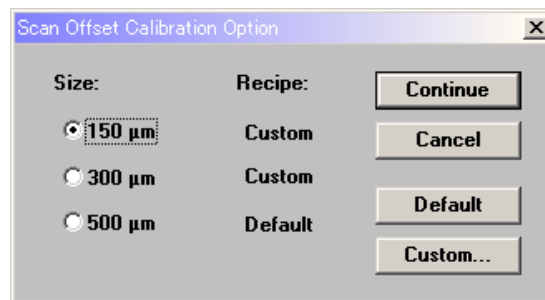
By using the “Stylus Alignment” tool, calibrate the difference between the center of the cross hairs in the “XY View” window and the actual center of the stylus.

Note: In the following cases, calibration should be made.

- Styluses are changed.
- “Zoom-In” is used to measure a fine pattern.

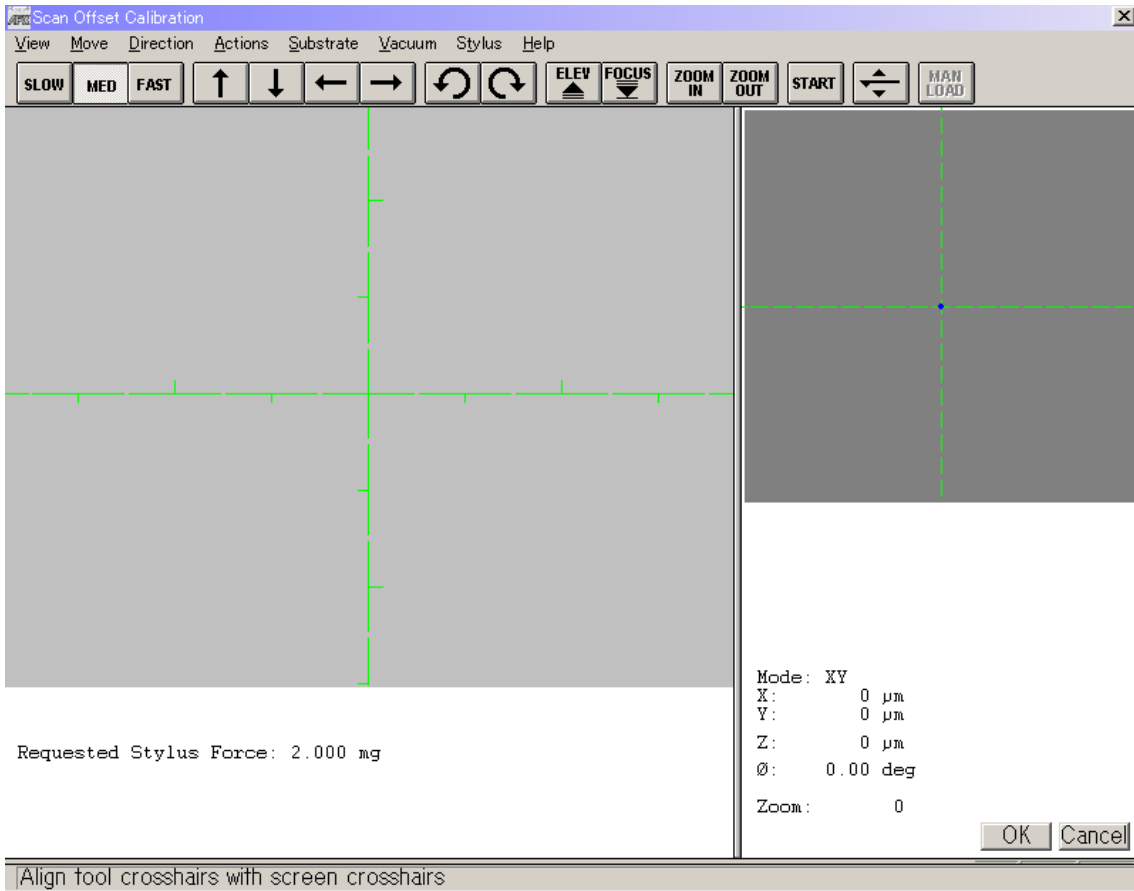
1.3.1. Place the standard sample on the stage to bring it just below the measurement head.


1.3.2. Click the “Scan Position Offset Calibration” button so that the “Video Calibration” window appears.



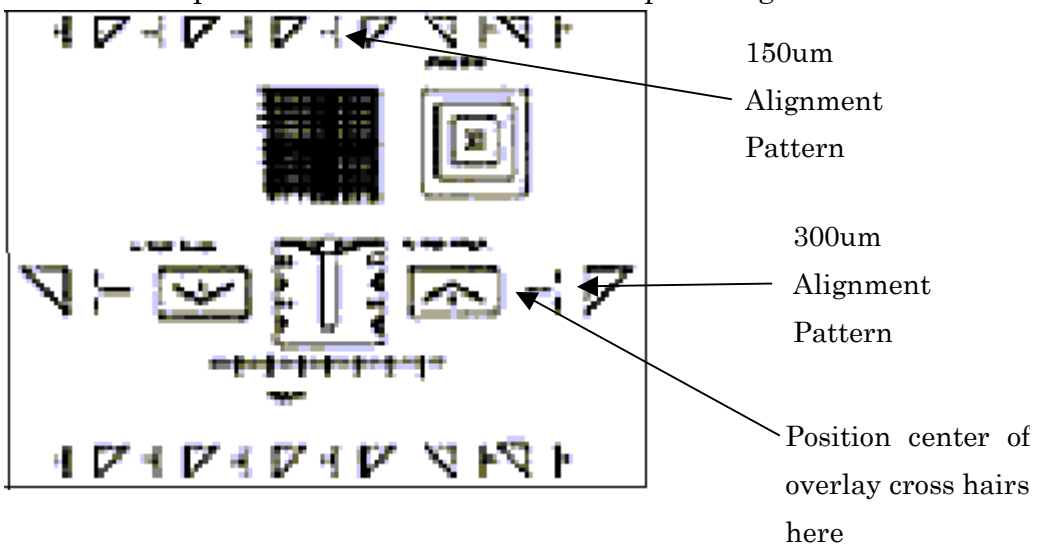
1.3.3. Click the 150μm radio button to select the 300μm calibration option.


1.3.4. Click “Continue” so that the scan position offset calibration window appears.



1.3.5. Click  so that the zero point is selected on the sample surface and then the image is focused.

1.3.6. Match the position to one of the “300μm Alignment Patterns.”



- 1.3.7. Move the cross hairs to the position where they are co-incident with the cross hairs on the video screen.
- 1.3.8. Click , so that the stylus drops to start measuring. The width of the triangle-shaped area to be scanned will be the half of one side. e.g. 75 $\mu\text{m}$  for a 150 $\mu\text{m}$  pattern. 150 $\mu\text{m}$  for a 300 $\mu\text{m}$  pattern.
- 1.3.9. When scanning is completed, the scan data will be shown.
- 1.3.10. If the values of "Distance to Edge" and "Step Width" are within 2 $\mu\text{m}$  of the each "Actual" value, click "Cancel" to keep a present value. If over 2 $\mu\text{m}$ , click "Set" to calculate a new offset value.
- 1.3.11. Continue repeating this process until the values of "Distance to Edge" and "Step Width" are within 2 $\mu\text{m}$  of the each "Actual" value.



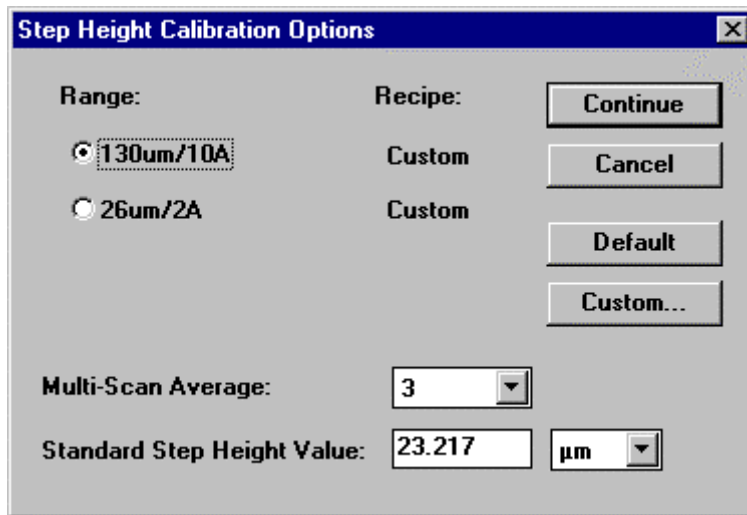
#### 1.4. Step Height Calibration:

A capacitance-type sensor of the Profiler is not a device to measure absolute values. Calibration should be made.

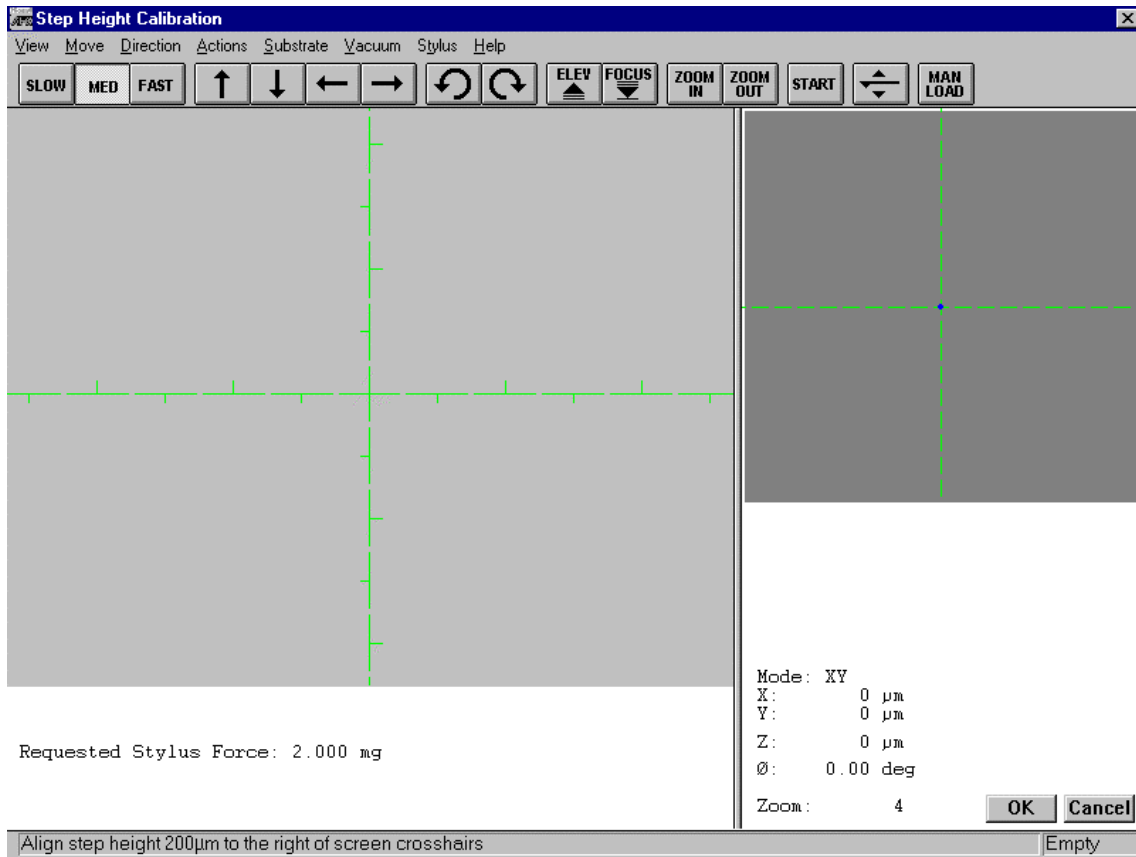
Note: Each vertical range should be calibrated separately.

Step height is calibrated.

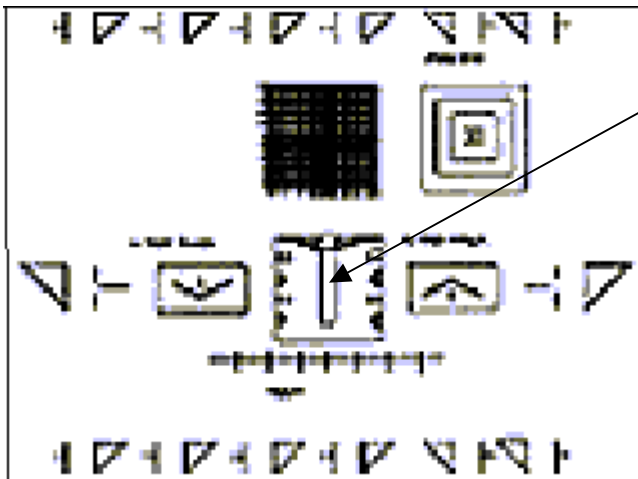
1.4.1. Click the “Step Height Calibration Control” button in the “Scan Calibration” window. The “Step Height Calibration Options” dialogue box will be shown in the center of the window.



- **Range:** Choose a range suitable for the step height standard to use. Click its radio button.
- **Multi Scan Average:** Sets how many scans to take to determine a calibration factor. The result will be the average value of all scans.
- **Standard Step Height Value:** Enter a step height standard value to use. Select an adequate unit from the drop-down list in the right.
- **Recipe:** The profiler can select a default and custom calibration value for each range. Click **Custom...** to open the recipe editor. By using the custom recipe setting, set a condition appropriate for the measurement. Once the recipe is set, click **Continue** to begin calibration. The step height calibration window will appear.

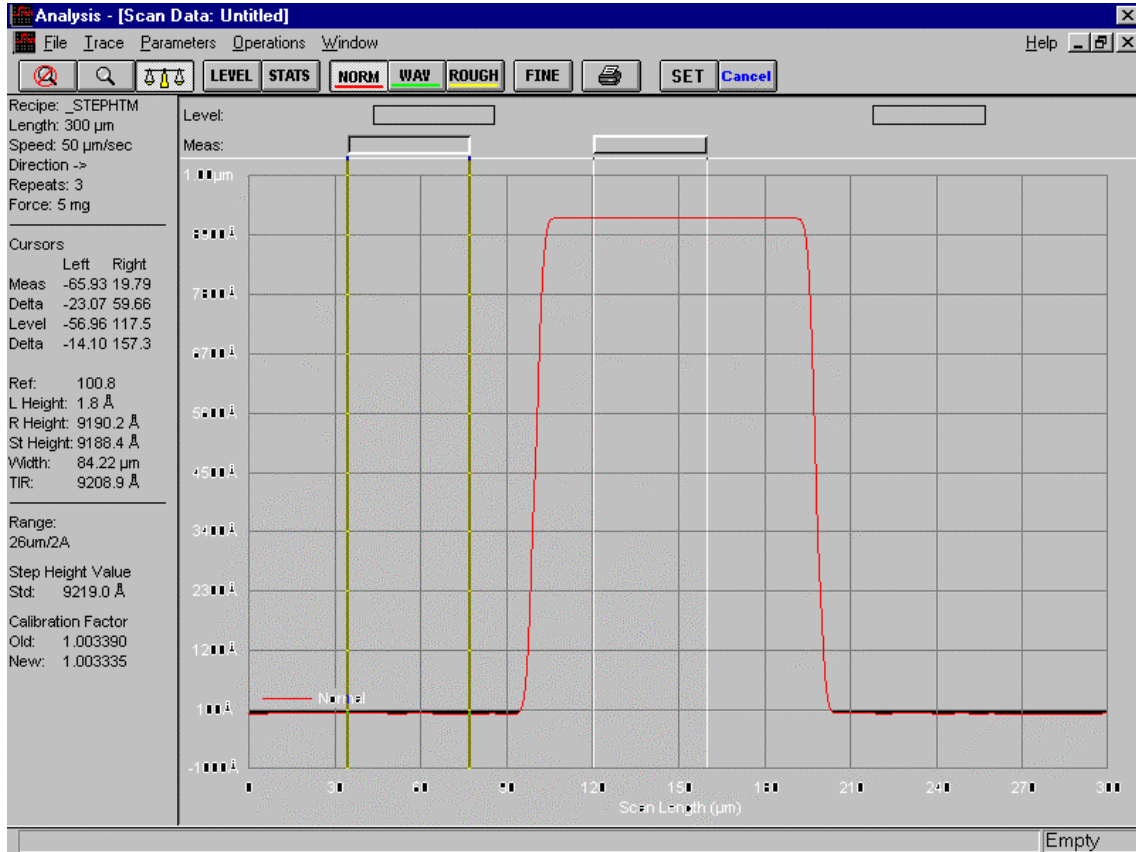


1.4.2. Bring the measurement position to a step height of the step height standard.

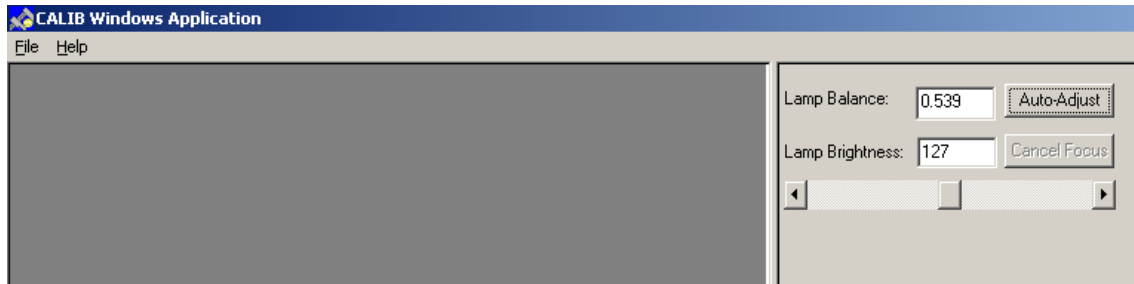


1.4.3. Place the cross hairs approximately 100μm from the left side of the step height. Click either “OK, ” or **START**. Measurement will be made for the times specified in the previous stage. Once the measurement is completed, a calibration factor will be calculated.

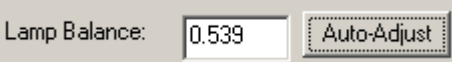
1.4.4. Click “SET” to save the new value, or click “Cancel” to go back to the “Scan Calibration” window keeping the original value.



### 1.5. Video Lamp Balance:



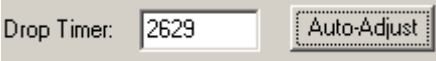
Lamp is automatically adjusted. Place the standard below the stylus.

Click "Auto-Adjust" of  to start an automated adjustment. Select "Save" from the "File Menu" to finish. "Lamp Brightness" adjusts brightness of the Lamp.

### 1.6. Drop Timer:



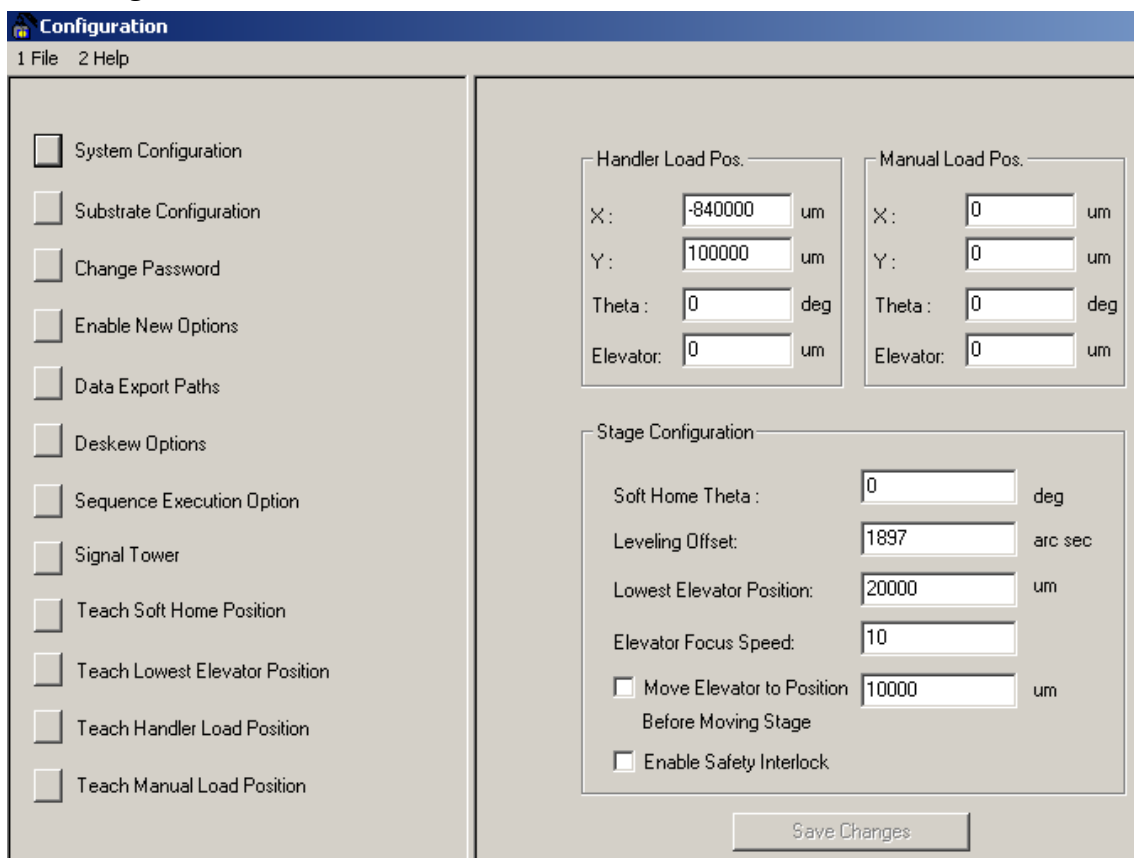
Drop Motor speed is automatically adjusted. Place the standard below the stylus.

Click "Auto-Adjust" of  so that the stylus automatically drops to start adjustment. Select "Save" from the "File Menu" to finish.

## 2. Configuration:

The “Configuration File” inside the machine should be appropriately set to operate the machine correctly.

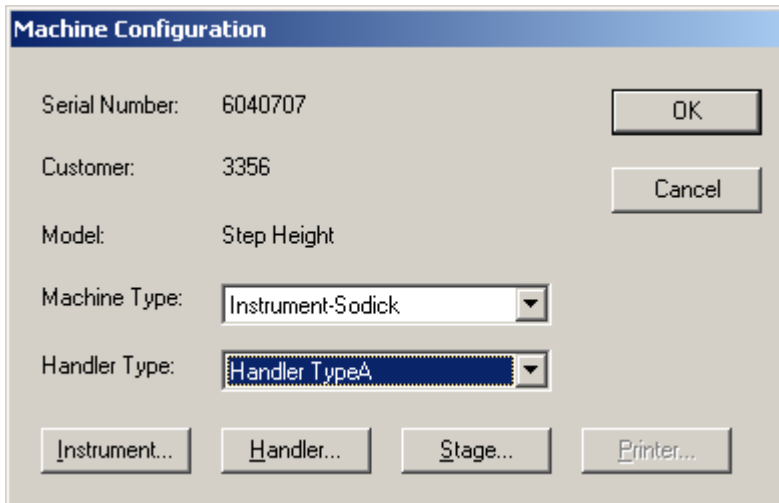
Double-click the “Configuration” icon in the top menu. In the window, there are a series of control buttons in the left, and the present settings are shown in the right.



## 2.1. System Configuration:

This contains hardware settings of the machine. The setting of the handler and stage limit can be made here. Normally, these settings need not to be changed.

Click the “System Configuration” button.

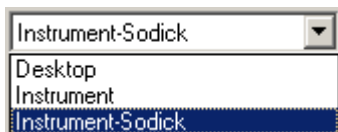


2.1.1. Serial Number: Serial number of the machine.

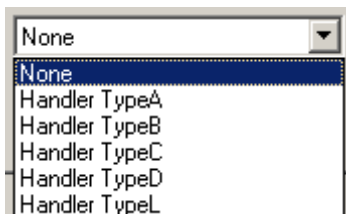
2.1.2. Customer Number: Customer number of the machine

2.1.3. Model: Model of the machine

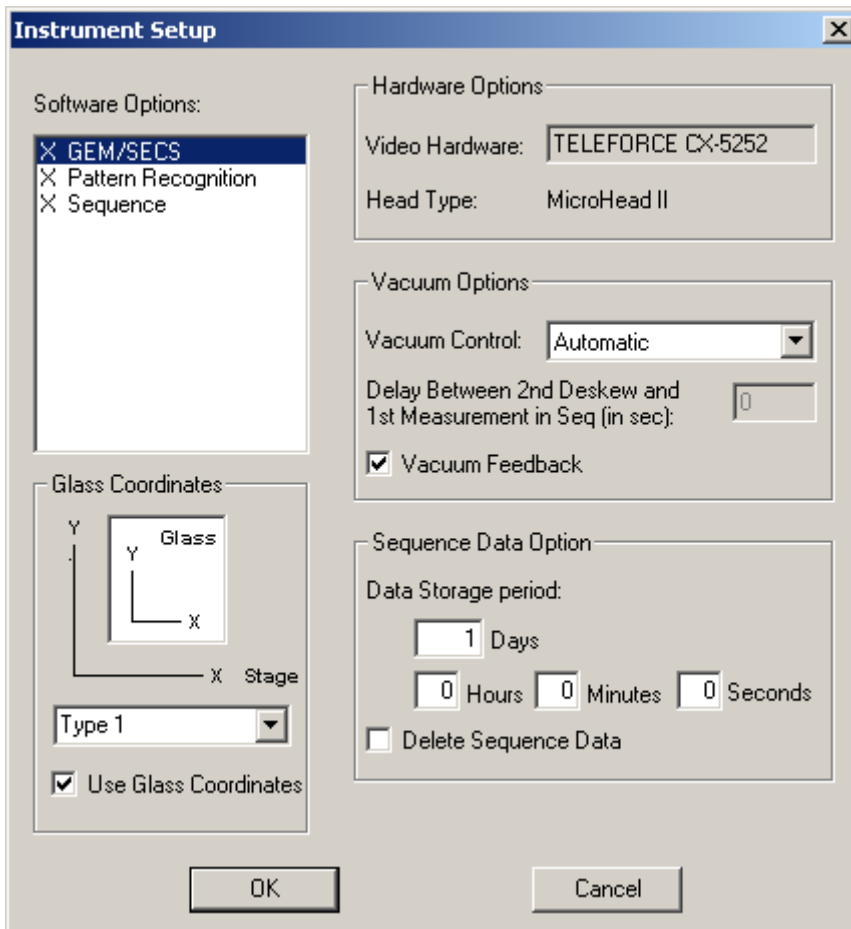
2.1.4. Machine Type: Type of the machine (Unchangeable)



2.1.5. Handler Type: Type of the handler being used (Unchangeable)



### 2.1.6. Instrument: Display of options, etc



- **Software Option:**  
Click each option to change “enable” or “unable” of the option.
- **Glass Coordinates:**  
Set this to send measurement position data to the host with the XY coordinates converted.
- **Hardware Option:**  
A video board type and micro head type are shown here.
- **Vacuum Option.**  
Vacuum options are set here.
- **Sequence Data Option:**  
Set this to delete sequence data automatically. Also, a data storage period is set her.

### 2.1.7. Handler:

The “Handler Setup” window, number of slots, number of cassettes (up to four), cassette name, and timeout of the handler can be set. These settings are available only if there are handler options.

**Handler Setup**

General Information

Handler Type:

Wafer ID Type:

Number of Slots:

Slot No.1 from the Top.

Glass Information

Glass Name

Glass #1:

Glass #2:

Glass #3:

Glass #4:

Glass #5:

Cassette Information

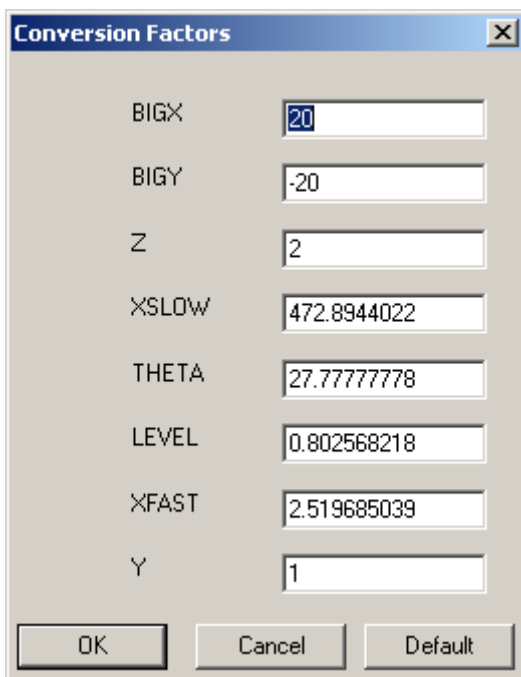
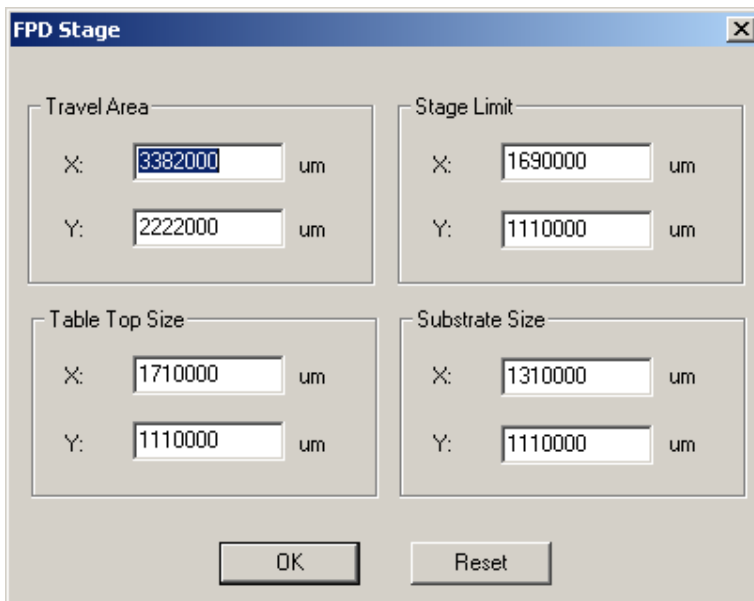
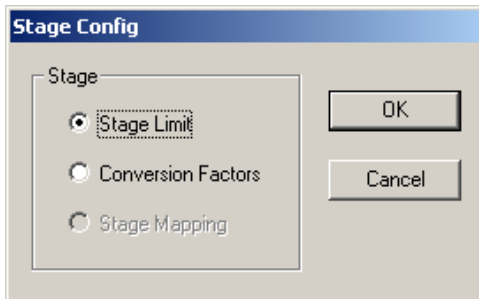
Place	Cassette Name
<input checked="" type="checkbox"/> Cassette #1	<input type="text" value="Cassette #1"/>
<input checked="" type="checkbox"/> Cassette #2	<input type="text" value="Cassette #2"/>
<input type="checkbox"/> Cassette #3	<input type="text"/>
<input type="checkbox"/> Cassette #4	<input type="text" value="Cassette #4"/>

**Handler Timeout Setup**

Operations	Timeout (Seconds)
Handler Initialization:	<input type="text" value="90"/>
Cassette Start:	<input type="text" value="20"/>
Pick Glass from Slot:	<input type="text" value="45"/>
Put Glass to Slot:	<input type="text" value="45"/>
Pick Glass from Stage:	<input type="text" value="45"/>
Put Glass on Stage:	<input type="text" value="45"/>



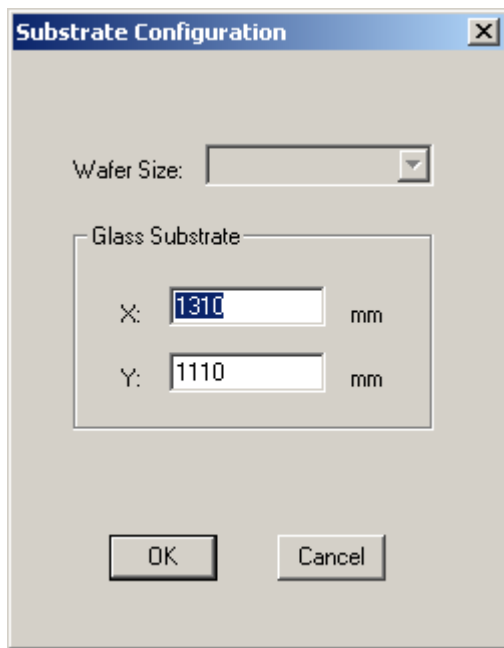
2.1.8. Stage: Factors of the stage limit and motor axes are set.



## 2.2. Substrate Configuration:

The size of the sample to measure is set. By setting it, the moving ranges of the X-axis and Y-axis will be automatically set and the information in the scan window and data analysis window will be modified.

Click the “Substrate Configuration” button and enter glass substrate size. Click “OK” to save or “Cancel.”



### 2.3. Change Password:

Setting of a user password limits access to data files and the setting screen. If the password is activated, access to database, change of default configuration, change of calibrated values, and change of zoom factor ask to enter the password.

Click “Change Password.”



Click “Enable Password Protection” to set a password.

A password is selected within 12 letters. Click “OK” to enable the password protection.

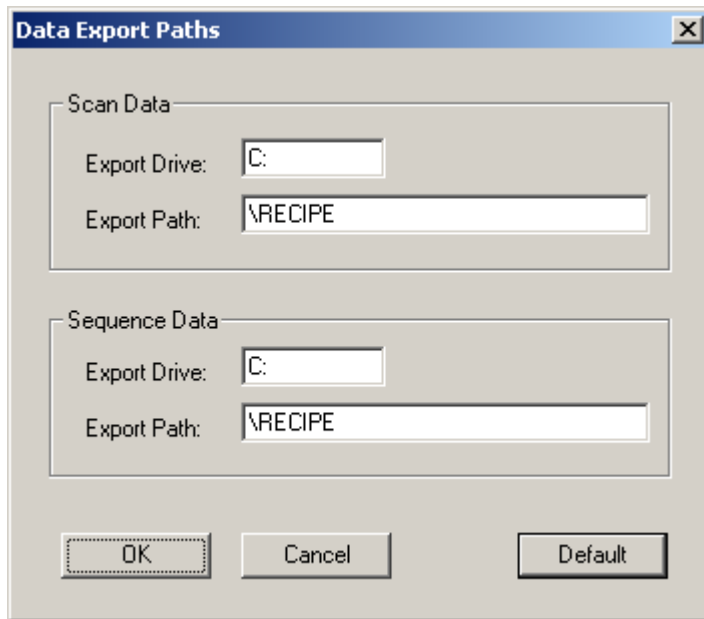
#### 2.4. Enable New Option:

New options are added to an existing machine.

#### 2.5. Data Export Paths:

Export paths for scan data and sequent data are set.

Click “Data Export Paths.”

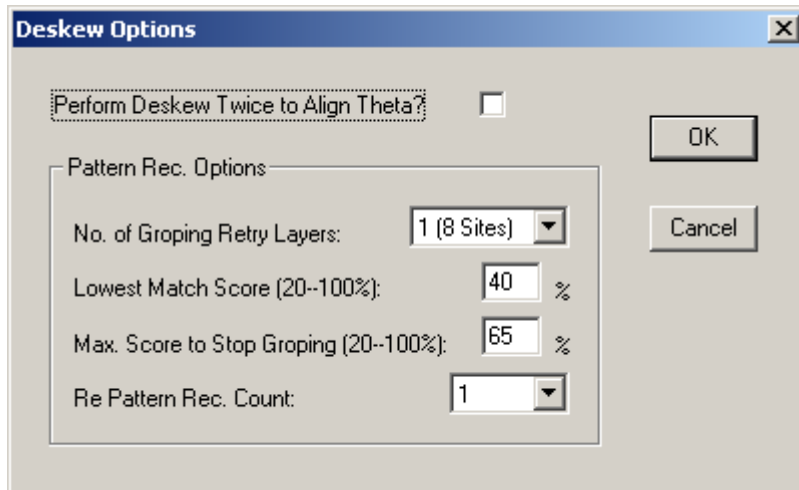


Enter an appropriate drive into the “Export Drive” box, and directory path in the “Export Path” box. Click “OK” to save a new value or “Cancel” to go back without change. Click “Default” to set the default value.

## 2.6. Deskew Options:

Deskew options are configured.

Click “Deskew Options.”



### 2.6.1. Perform Deskew Twice to Align Theta:

If this is checked, Theta is aligned. If this is not checked, only the X-axis and Y-axis are aligned.

### 2.6.2. No. of Groping Retry Layers:

This parameter specifies the search area around the deskew position. The more “Sights” are, the larger the area is.

### 2.6.3. Lowest Match Score:

This parameter sets a threshold whether the pattern recognition system detects a deskew pattern. If the scores are higher than the “Lowest Match Score”, the pattern recognition system judges the point with the highest score to be the correct deskew point. Its tolerance is between 20-100%.

### 2.6.4. Max. Score to Stop Groping:

If the scores become equal to, or lower than the “Max. Score to Stop Groping,” the search stops so that position matching of the deskew point begins. Its tolerance is between 20-100%.

### 2.6.5. Re Pattern Rec. Count:

The number of position matching of the deskew point is set. Normally it is

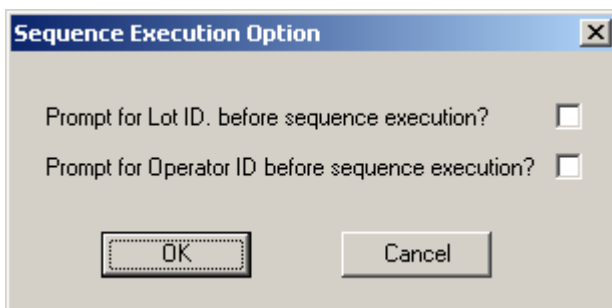
one time.

### 2.7. Sequence Execution Option:

In order to save automatically sequence data with Lot ID or Operator ID entered, open the entry screen from the machine side before sequence execution.

Click “Sequence Execution Option.”

Check the check buttons shown. Click “OK” to save new setting or “Cancel” to keep old setting.



### 2.8. Signal Tower: Not available.

### 2.9. Teach Soft Home Position:

This sets the position of the  $\theta$ -axis in case of return to the home position.

### 2.10. Teach Lowest Elevator Position:

Setting of this parameter limits the vertical moving range of the measurement head.

### 2.11. Teach Handler Load Position:

The load position of the handler is configured by teaching its position. Once the setting is configured, do not change the value.

### 2.12. Teach Manual Load Position:

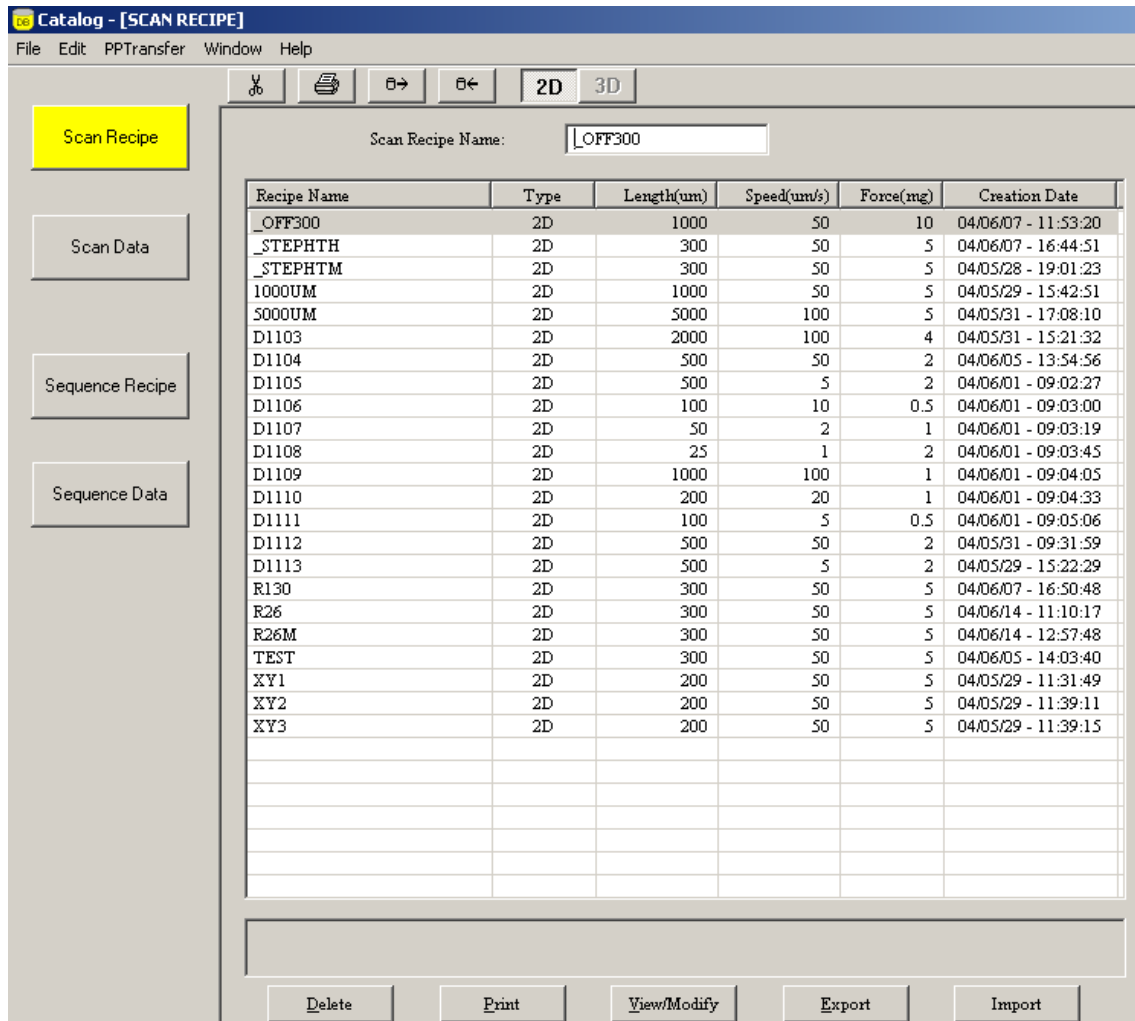
The load position of the manual is configured by teaching its position.

### 3. Database File Manager

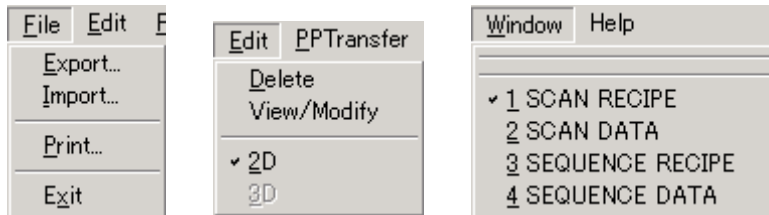
In the “Database File Manager,” the following functions are available.

- Call a catalog
- Delete a file
- Print a file
- Export a file (Backup)
- Import a file (Retrieve)

Click “Database File Manager” to execute commands from the database window menu so that various functions become accessible via the four sub-windows.



### 3.1. Menu Bar, Tool Bar




- Export: 

Store selected scan recipe, scan data, sequence recipe or sequence data in the outside.

- Import: 

Retrieve stored scan recipe, scan data, sequence recipe or sequence data.

- Print: 

Print selected scan recipe, scan data, sequence recipe or sequence data.

- Delete: 

Delete selected scan recipe, scan data, sequence recipe or sequence data. Once-deleted recipe or data will not be restored.

Select recipe or data to delete.


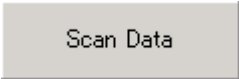
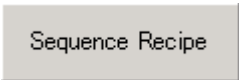
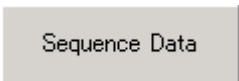


Click "OK" to delete.



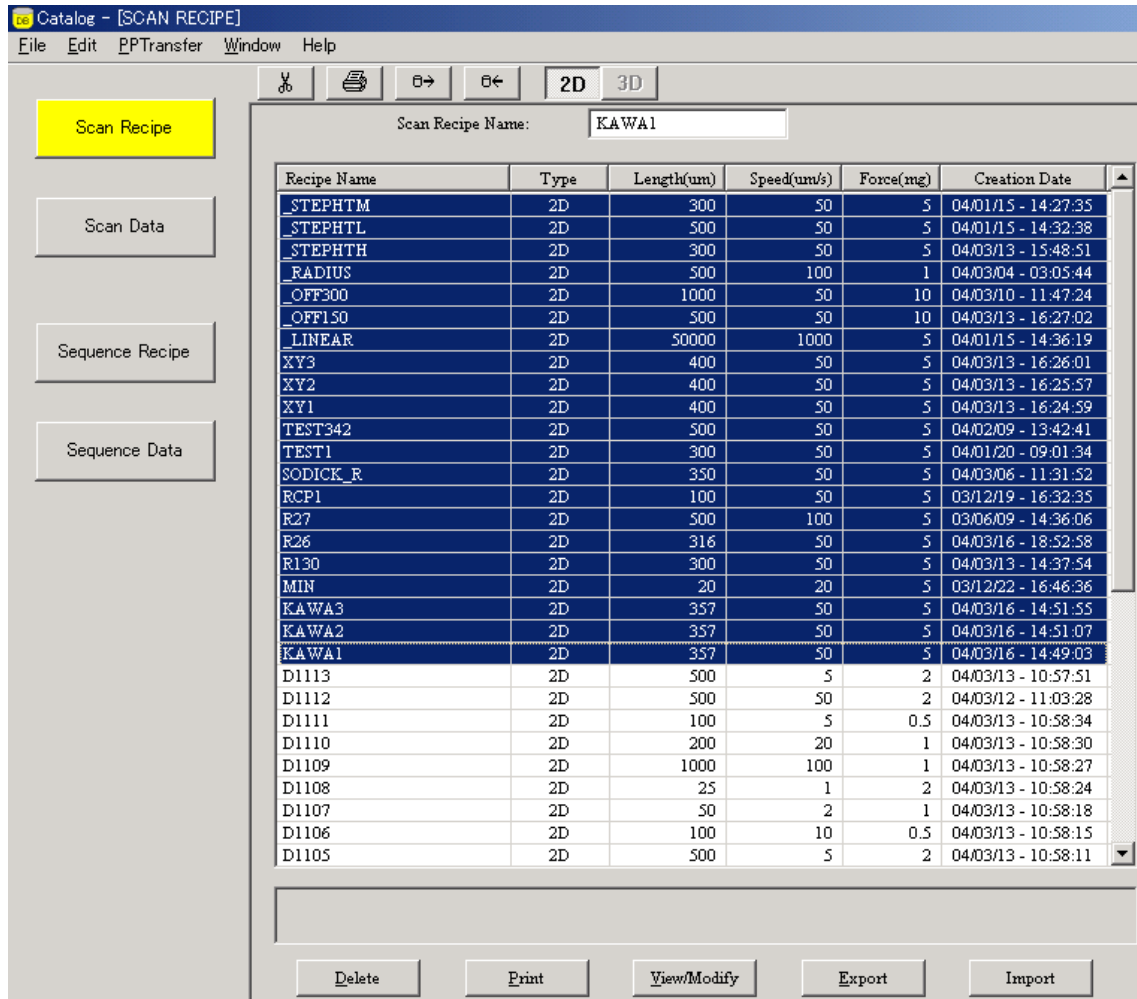
### 3.2. Command Buttons

From the four command buttons in the left of the window, select a database catalog.

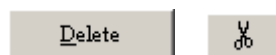
-  : Display a scan recipe catalog.
-  : Display a scan data catalog.
-  : Display a sequence recipe catalog.
-  : Display a sequence data catalog.



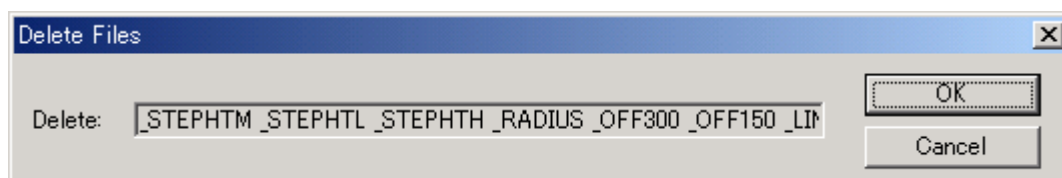
3.3.2. Click entry(s) or scroll the array key to select entry(s) to delete.



3.3.3. Click the “Delete” button in the bottom of the catalog or delete icon in the tool bar.



3.3.4. Click “OK” to delete or “Cancel” to quit.



### 3.4. Recipe or Data Backup

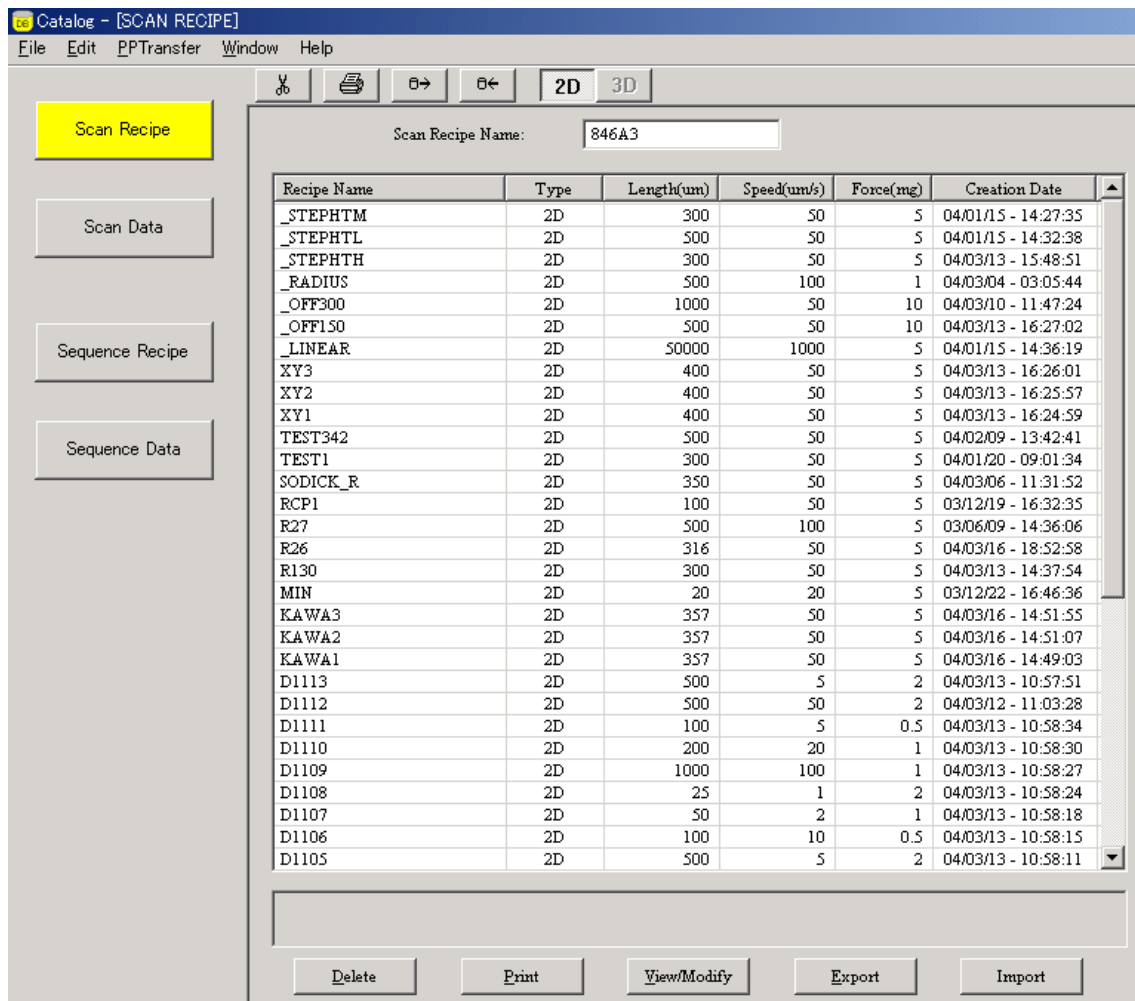
Selected scan recipe, scan data, sequence recipe or sequence data is stored in the outside.

Data export is available by either form in the below.

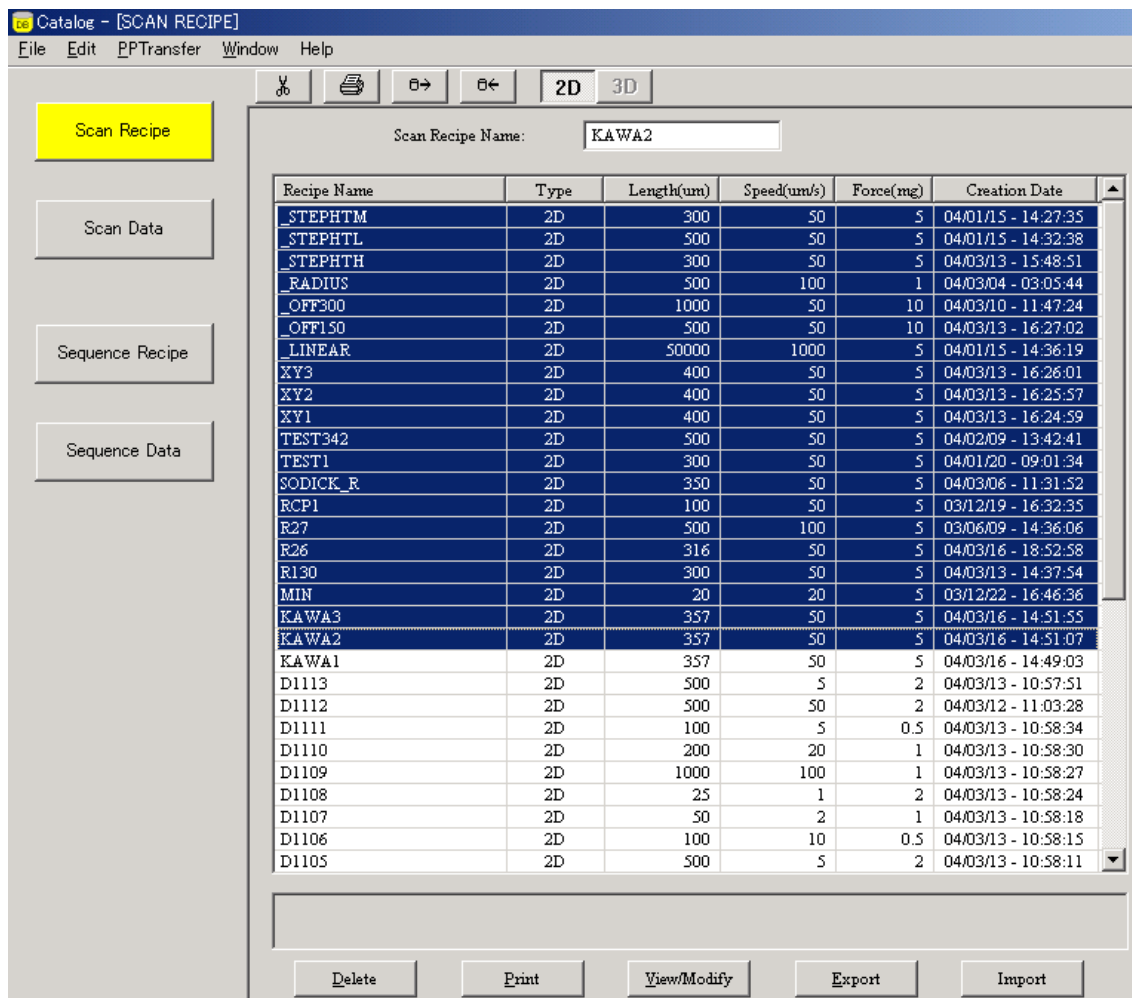
- ASCII: Text file
- Binary: Backup file

Export of database.

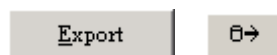
3.4.1. Click an appropriate command button in the left of the window to display a catalog to export.



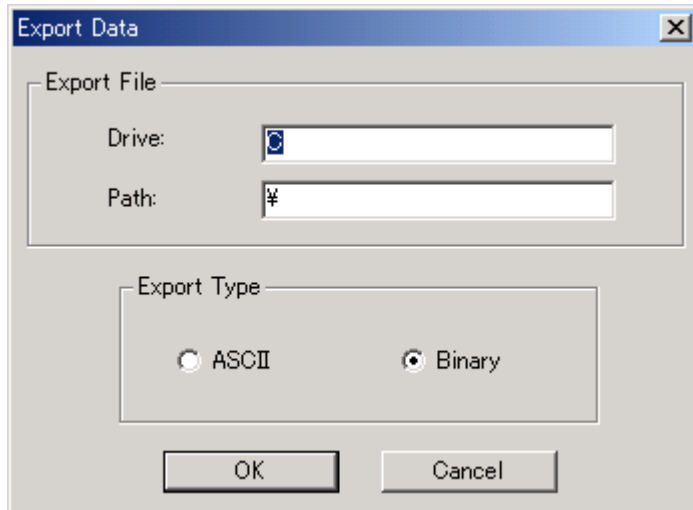
3.4.2. Click entry(s) or scroll the array key to select entry(s) to export.



3.4.3. Click the “Export” button in the bottom of the catalog or export icon in the tool bar.



- 3.4.4. Enter into the “Drive” field “A” for floppy disk or “C” for hard disk. Enter a directory path into the “Path” field. Enter a new file name into the "Filename" field to change file names. Select “ASCII” or “Binary.” Click “OK” to export or “Cancel” to quit.



### 3.5. Recipe or Data Import

Scan recipe, sequence recipe or sequence data saved as Binary is imported.

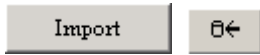
Import of database.

3.5.1. Click an appropriate command button in the left of the window to display a catalog to import.

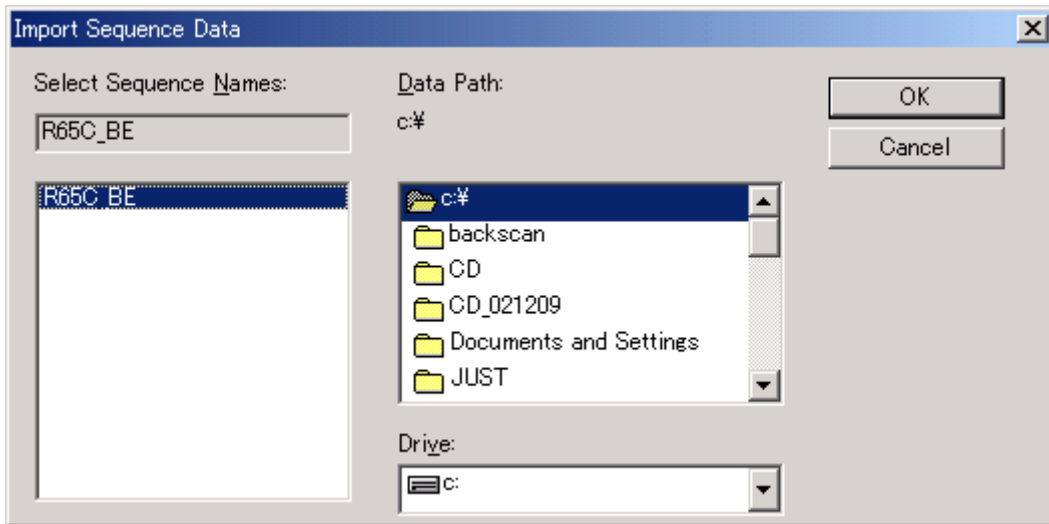
Scan Recipe Name: 846A3

Recipe Name	Type	Length(um)	Speed(um/s)	Force(mg)	Creation Date
_STEPHTM	2D	300	50	5	04/01/15 - 14:27:35
_STEPHTL	2D	500	50	5	04/01/15 - 14:32:38
_STEPHTH	2D	300	50	5	04/03/13 - 15:48:51
_RADIUS	2D	500	100	1	04/03/04 - 03:05:44
_OFF300	2D	1000	50	10	04/03/10 - 11:47:24
_OFF150	2D	500	50	10	04/03/13 - 16:27:02
_LINEAR	2D	50000	1000	5	04/01/15 - 14:36:19
XY3	2D	400	50	5	04/03/13 - 16:26:01
XY2	2D	400	50	5	04/03/13 - 16:25:57
XY1	2D	400	50	5	04/03/13 - 16:24:59
TEST342	2D	500	50	5	04/02/09 - 13:42:41
TEST1	2D	300	50	5	04/01/20 - 09:01:34
SODICK_R	2D	350	50	5	04/03/06 - 11:31:52
RCP1	2D	100	50	5	03/12/19 - 16:32:35
R27	2D	500	100	5	03/06/09 - 14:36:06
R26	2D	316	50	5	04/03/16 - 18:52:58
R130	2D	300	50	5	04/03/13 - 14:37:54
MIN	2D	20	20	5	03/12/22 - 16:46:36
KAWA3	2D	357	50	5	04/03/16 - 14:51:55
KAWA2	2D	357	50	5	04/03/16 - 14:51:07
KAWA1	2D	357	50	5	04/03/16 - 14:49:03
D1113	2D	500	5	2	04/03/13 - 10:57:51
D1112	2D	500	50	2	04/03/12 - 11:03:28
D1111	2D	100	5	0.5	04/03/13 - 10:58:34
D1110	2D	200	20	1	04/03/13 - 10:58:30
D1109	2D	1000	100	1	04/03/13 - 10:58:27
D1108	2D	25	1	2	04/03/13 - 10:58:24
D1107	2D	50	2	1	04/03/13 - 10:58:18
D1106	2D	100	10	0.5	04/03/13 - 10:58:15
D1105	2D	500	5	2	04/03/13 - 10:58:11

3.5.2. Click the “Import” button in the bottom of the catalog or import icon in the tool bar.



3.5.3. Select a drive from the “Drive” list in the right of the window and choose a file to import. Click “OK” to import a file.



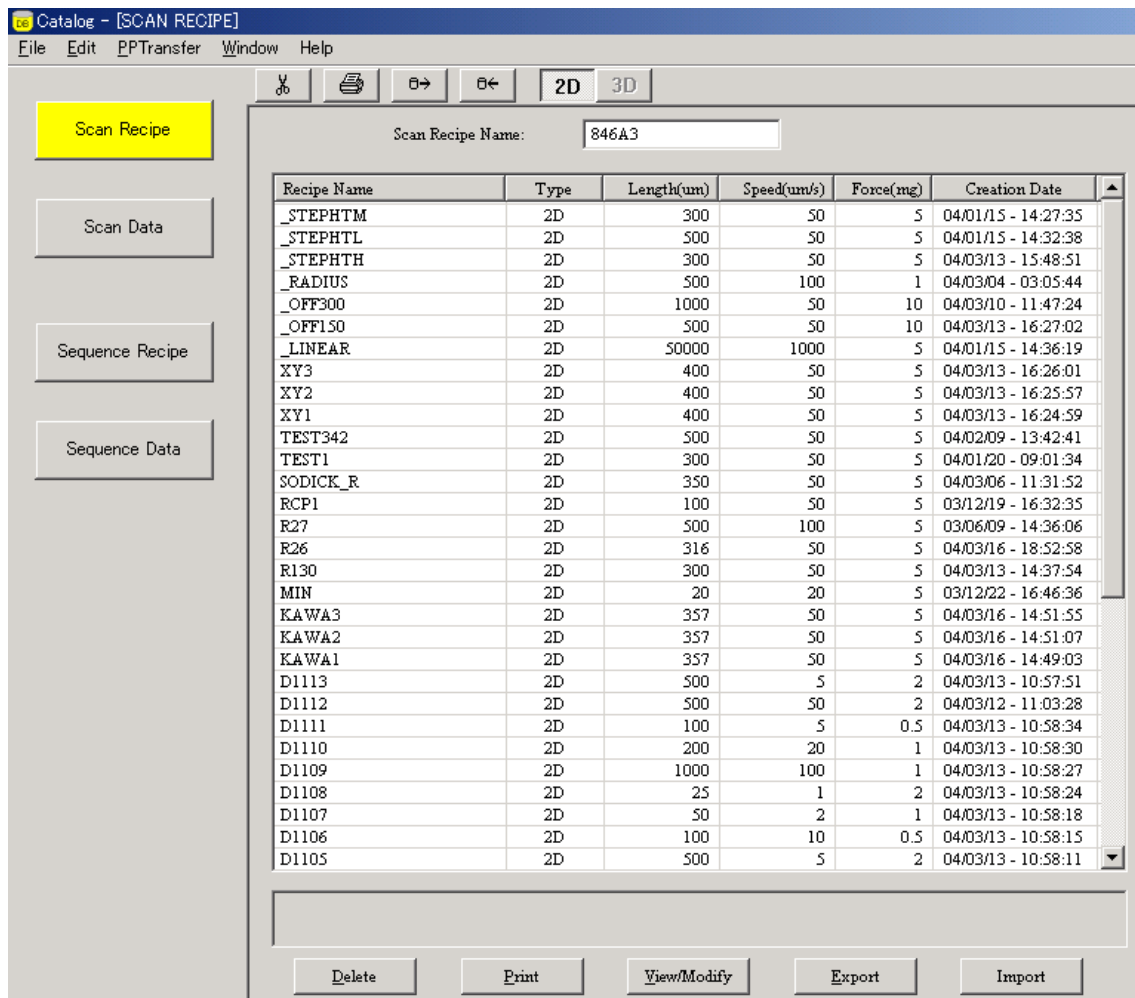


### 3.6. Print of Database Entry

Scan recipe, sequence recipe, scan data or sequence data is printed.

Print of database.

3.6.1. Click an appropriate command button in the left of the window to display a catalog to print.



3.6.2. Select entry(s) to print and click “View/Modify.” Open the data to print scan data, etc.

3.6.3. Click the “Print” button in the bottom of the catalog or print icon in the tool bar.

