ALTAIR

Altair PollEx 2021

Underfill User Guide

altair.com

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If you are interested in training at your facility, please contact your account manager for more details. If you do not know who your account manager is, please contact your local support office and they will connect you with your account manager.

Telephone and E-mail

If you are unable to contact Altair support via the customer portal, you may reach out to technical support via phone or e-mail. Use the following table as a reference to locate the support office for your region.

When contacting Altair support, please specify the product and version number you are using along with a detailed description of the problem. It is beneficial for the support engineer to know what type of workstation, operating system, RAM, and graphics board you have, so please include that in your communication.

Location	Telephone	E-mail
Australia	+61 649 413 7981	anzsupport@altair.com
Brazil	+55 113 884 0414	br_support@altair.com
Canada	+1 416 447 6463	support@altairengineering.ca
China	+86 400 619 6186	support@altair.com.cn
France	+33 141 33 0992	francesupport@altair.com
Germany	+49 703 162 0822	hwsupport@altair.de
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Location	Telephone	E-mail
India	+91 806 629 4500 +1 800 425 0234 (toll free)	support@india.altair.com
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Italy	+39 800 905 595	support@altairengineering.it
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Mexico	+52 555 658 6808	mx-support@altair.com
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Contents

Conventions Used in this Guide

This guide uses the following conventions:

Bold Italic	All commands from the user interface. Options, menus, buttons, and dialog box names are bolded, but not italicized.
	Example: On the **Welcome** screen, click ***Next***.
Courier	The path of a program or folder; a web address; a file name or component; text that the user is expected to enter.
	Example: The default path is C:\Program Files\Altair\2019\PollEx

Questions regarding the document may be directed to PollEx team at PollEx_support_kr@altair.com.

Underfill

Underfill is a method of filling a thermo-hardening resin (epoxy) between the PCB's top side and the chip's bottom side to produce sound mechanical and thermal properties, and to protect the package chips from physical or thermal shock to ensure reliability. Underfill is widely used to the portable devices which received a lot of physical shock or to the high-speed communication devices which received a lot of thermal shock. In the underfill process, the movement path of the nozzle and applied amount of the thermo-hardening resin can be set by the engineer to the bottom side of the part through the underfill dispenser equipment. Underfill Editor by using the PCB design data can easily produce the coordinate data of the nozzle movement path from the underfill equipment.

1. Run Underfill Editor

Select the menu, **Manufacture – Underfill**.

Manufacture	Red-mark	Help
Make Board Paneling		
Solder Quantity Calculator	▸	
Metal Mask Manager		
Block JIG Generator		
Gerber to PCB	Alt + F12	
Test-Point Location Generator	▸	
Router-Machine JIG Generator	▸	
Mounting Emulator		
Mounting Data Extractor	▸	
Underfill		
Soldering Pallet	▸	

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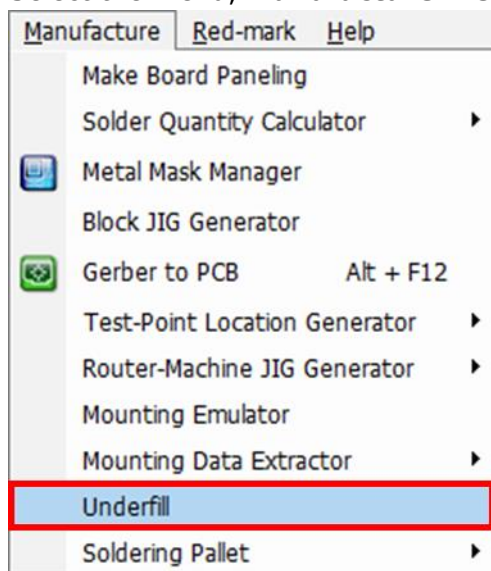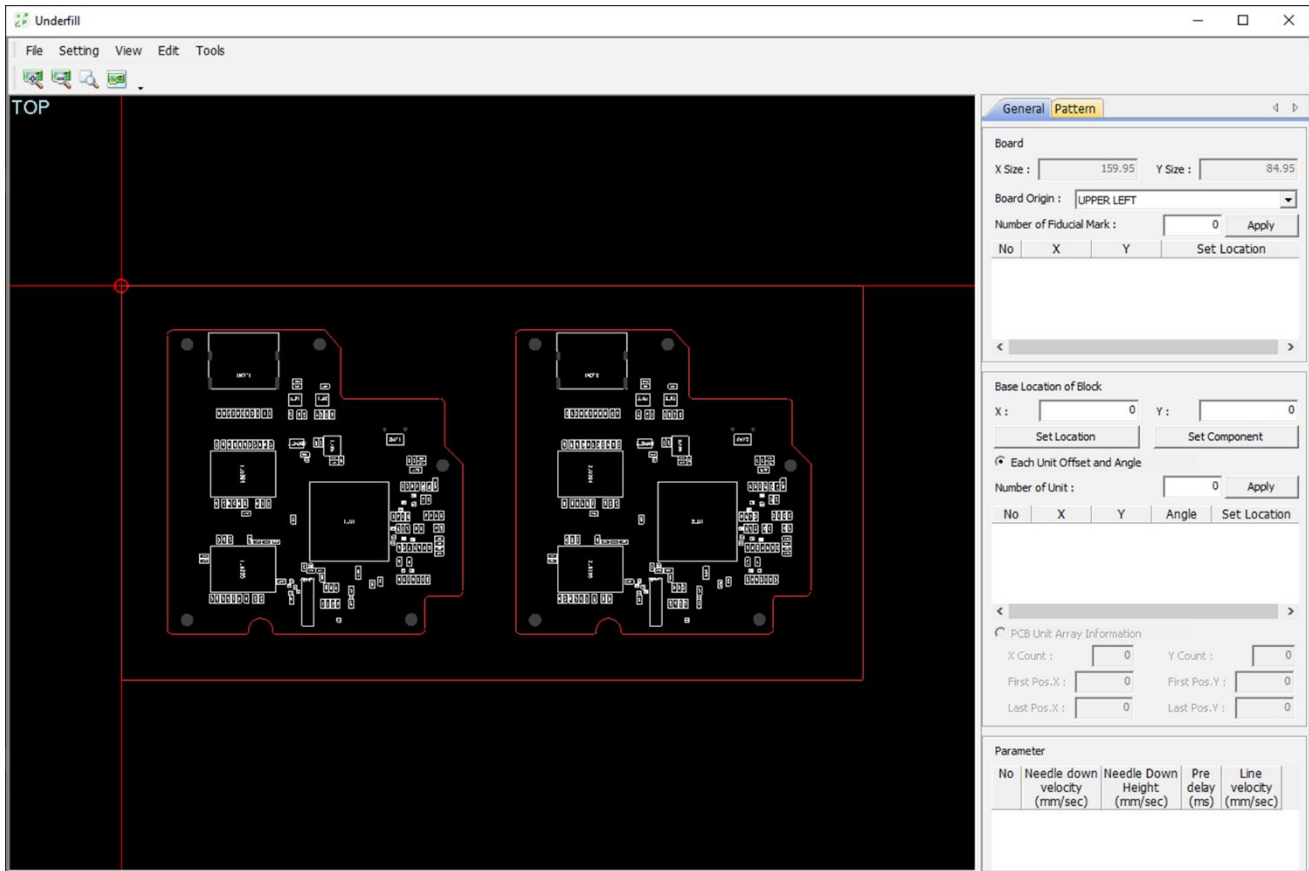
2. File
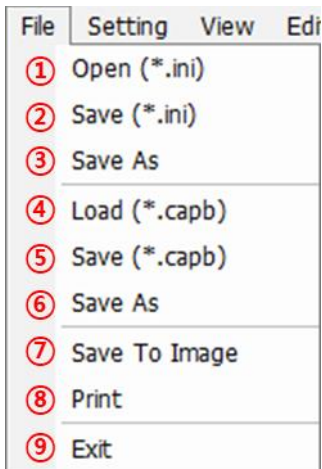
① **Open (*.ini)**: Open the existing underfill coordinate data file, `*.ini`.
② **Save (*.ini)**: Save the current working underfill coordinate data file, `*.ini`.
③ **Save As**: Save the current working underfill coordinate data file with a new name or to a new location with the same name or a different name.
④ **Load (*.capb)**: Load the previously created Component Arrangement Plan work data, `*.capb`.
⑤ **Save (*.capb)**: Save the current working Component Arrangement Plan work data, `*.capb`.
⑥ **Save As**: Save the current working Component Arrangement Plan work data file with a new name or to a new location with the same name or a different name.
⑦ **Save To Image**: Save the work screen area as an image file.
⑧ **Print:** Print the current work screen.
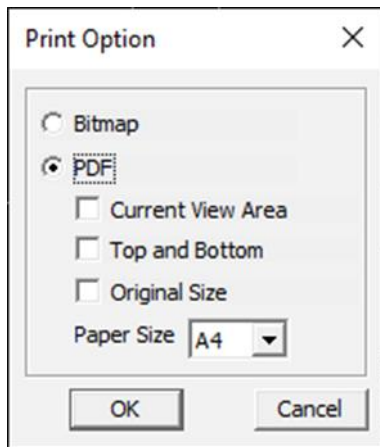
- **Bitmap**: Save the image in bitmap format (`*.bmp`).
- **PDF**: Export to PDF format.
    a. **Current View Area**: Export the current display screen to PDF.
    b. **Top and Bottom**: Export the Top and Bottom sides in one PDF file.
    c. **Original Size**: Export in the same size as the actual one.
    d. **Paper Size**: Set the paper size.
⑨ **Exit**: Exit the Underfill Editor.

3. Setting
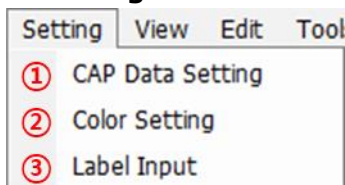
3.1. CAP Data Setting
    3.1.1. Global
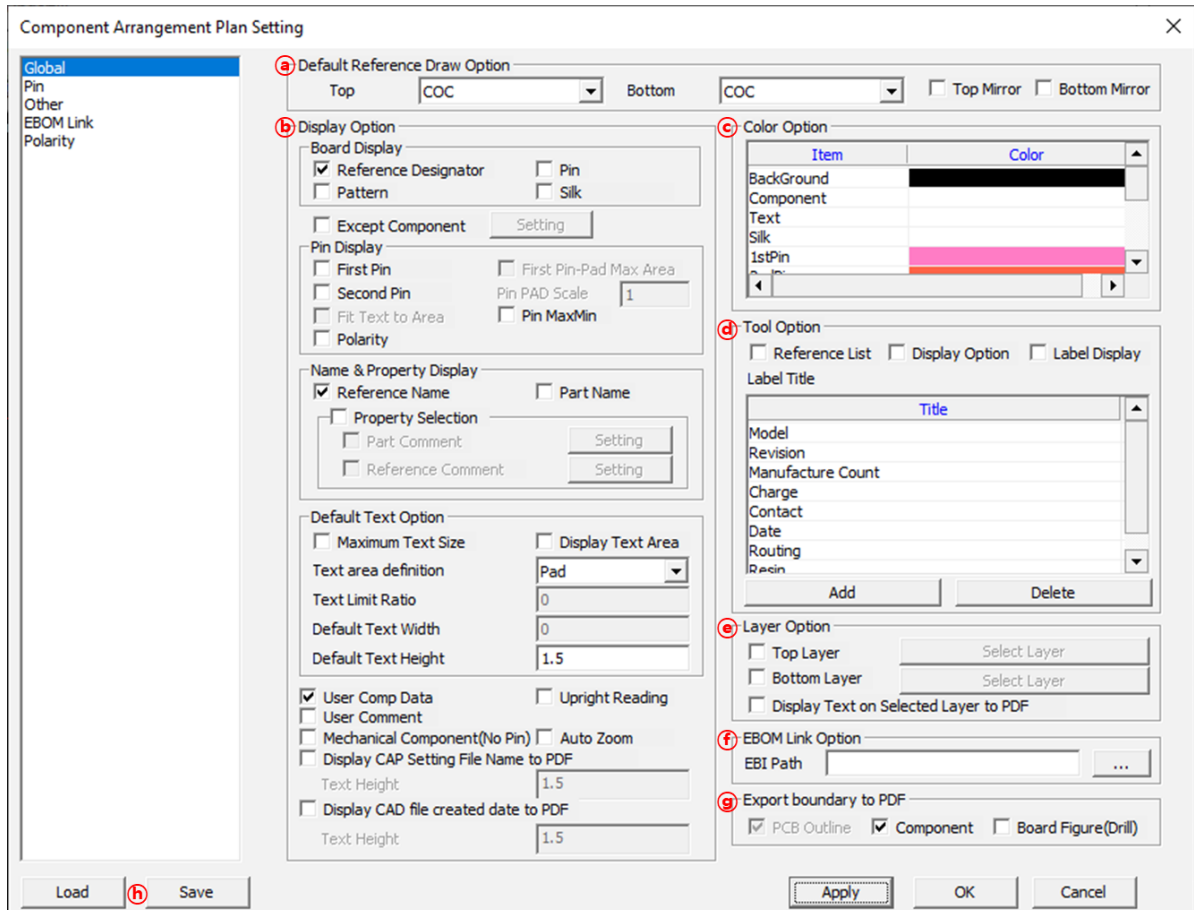
a. **Default Reference Draw Option**: Set the default reference area for the Top and Bottom sides.
b. **Display Option**: Set the detailed settings of the display.
   o **Board Display**
      • **Reference Designator**: Select whether to display the component.
      • **Pin**: Select whether to display the component pin (pad).
      • **Pattern**: Select whether to display the route.
      • **Silk**: Select whether to display the silkscreen.
      • **Except Component**: Set the component which excludes from the display by using the string filter.
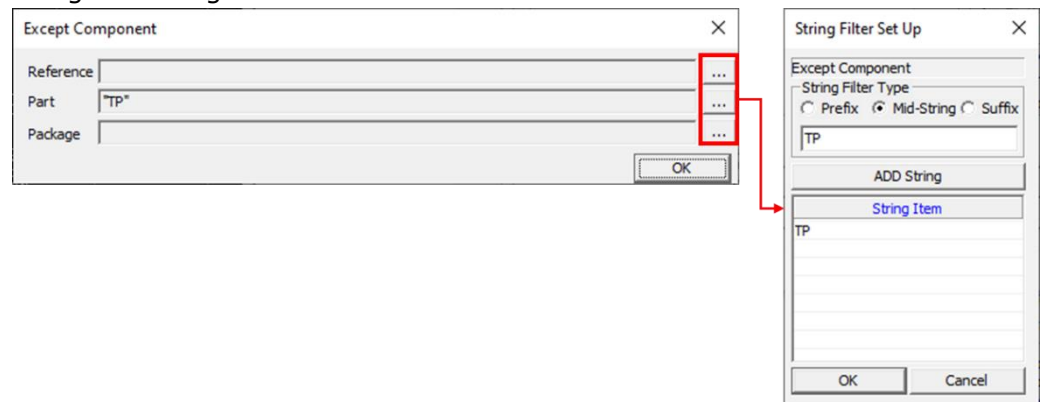
      In the example above, the component which includes TP in the part name is excluded.
   o **Pin Display**:

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- **First Pin**: Mark the first pin position.
  -. **First Pin-Pad Max Area**: When selected this option, the first pin pad is marked with a pink solid rectangle. If not selected, it will be shown as the left picture of the below.
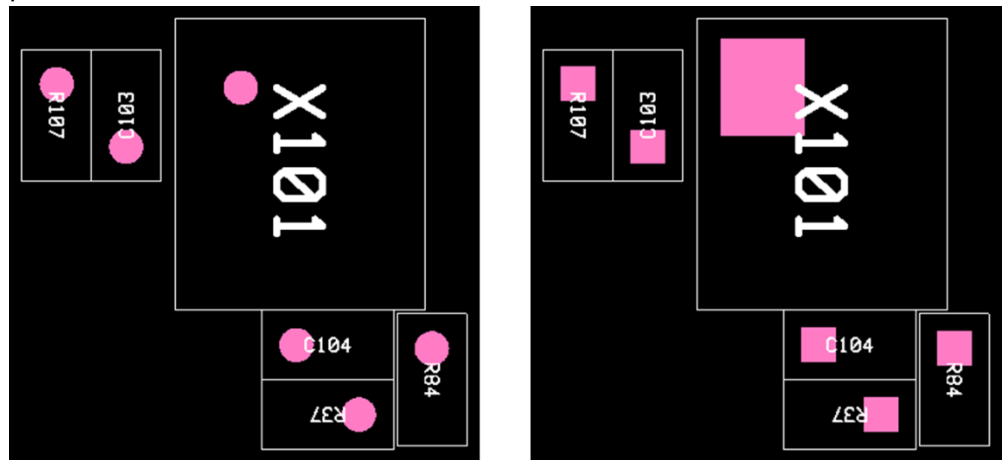
- **Second Pin**: Mark the second pin location.
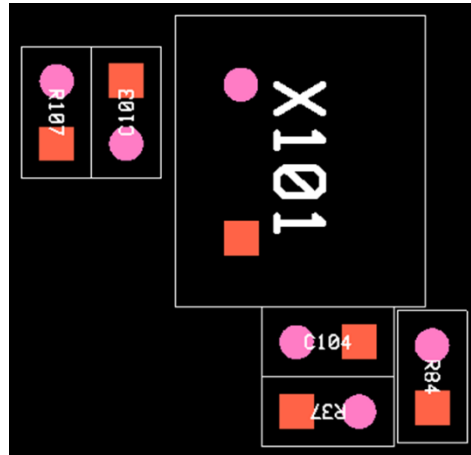
- **Pin PAD Scale**: Set the marking size of the first and second pins.
- **Fit Text to Area**: Option to display the positions of the pin number one and two inside of the text area. This option only works for the two-pin part.
- **Pin MaxMin**: Display the pad area as a rectangle shape.
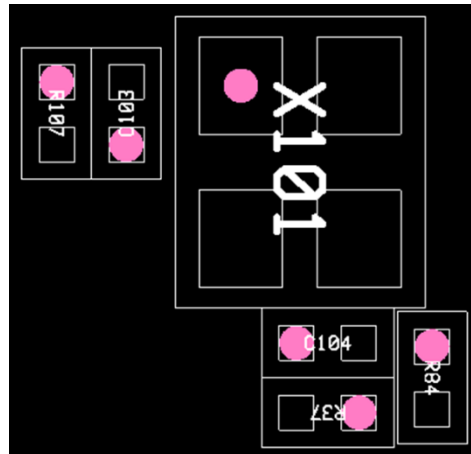
Polarity: Display the polarity mark for the polarized parts which can be set in the **Polarity** item (refer to 3.1.5. Polarity section).
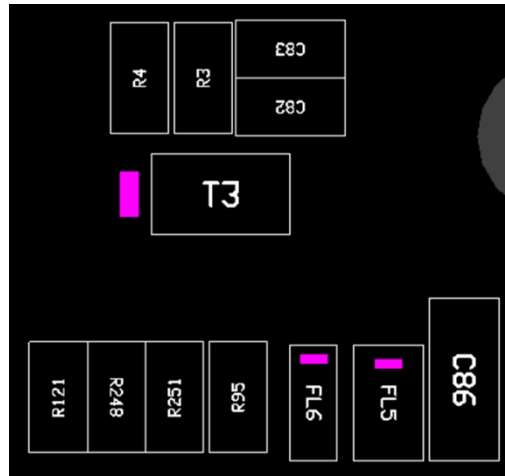
- o **Name & Property Display**
  - **Reference Name**: Select whether to display the reference name.
  - **Part Name**: Select whether to display the part name.
  - **Property Selection**: Select whether to display the property information.
    - **Part Comment**: Select a part property to display.
    - **Reference Comment**: Select a reference property to display.
- o **Default Text Option**
  - **Maximum Text Size**: Display at the maximum size in the test area.
  - **Display Text Area**: Display the text area as a rectangle shape.
  - **Text area definition**: Define the text area as a pad or COC area.
  - **Default Text Height**: Set the text size but it will not exceed the text area.
- o **User Comp Data**: Select whether to display the user comp data set in **Other** menu.
- o **User Comment**: Select whether to display the user comment setting in **Other** menu.
  Upright Reading: Display the text direction according to the ratio of the text area. If the proportion of the text area is larger in the horizontal direction, the text is displayed in the left to right direction. In case of a large vertical direction, the text is displayed from bottom to top.
- o **Mechanical Component (No Pin)**: Select whether to display the parts without a pin information such as a fiducial mark or a screw hole.
- o **Auto Zoom**: Automatic zoom-in on the target part when selected a part in the reference list.
- o **Display CAP Setting File Name to PDF**: Option to export the Component Arrangement Plan setting file name when printing a PDF file.
- o **Display CAD file created date to PDF**: Option to export the current ECAD design file creation date when printing a PDF file.
- c. **Color Option**: Option to define the color of each item.
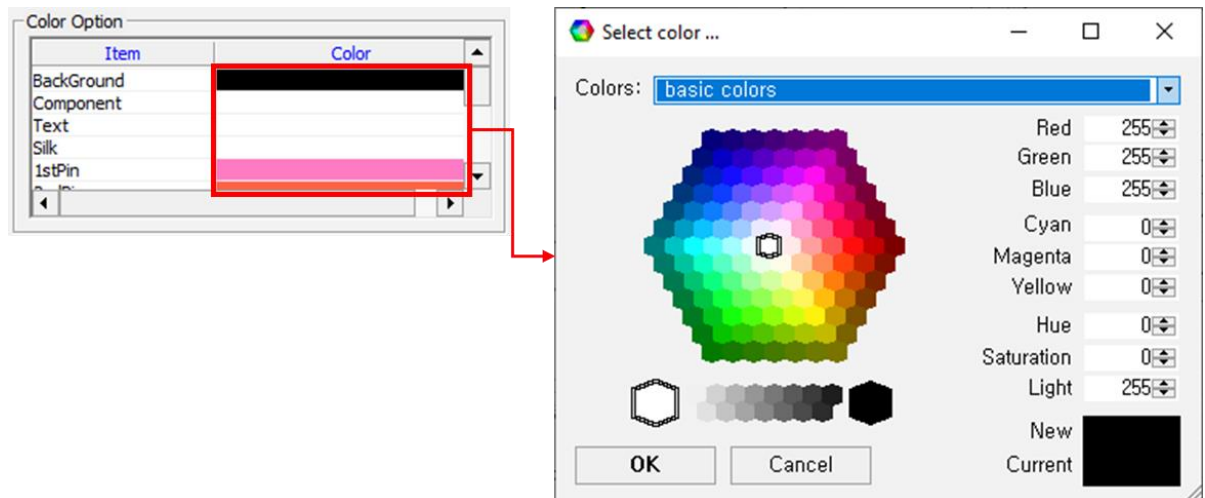
d. **Tool Option**
  o **Reference List**: Select whether to display the reference list dialog on the right side of the screen.
  o **Display Option**: Select whether to display the display option dialog on the right side of the screen.
  o **Label Display**: Select whether to display the label on upper right side of the screen.
  o **Label Title**: A list of labels that appear on the label. Users can edit the title by clicking the add or delete button.
e. **Layer Option**
  o Top Layer: When displaying the top side, select the artwork layer to be displayed.
  o Bottom Layer: When displaying the bottom side, select the artwork layer to be displayed.
  o Display Text on Selected Layer to PDF: Option to include the part's text of the selected artwork layer when printing a PDF.
f. **EBOM Link Option**: Specify the `*.ebi` file set in the PollEx BOM. Please refer to the PollEx BOM manual for how to create the `*.ebi` file.
g. **Export boundary to PDF**: Option to specify the PDF export area.
  o PCB Outline: Export based on the PCB outline area.
  o Component: Export including the part area placed on the PCB.
  o Board Figure (Drill): Export including the figure object area placed on the PCB.
h. **Load / Save**: Load or Save the setting parameters.
3.1.2. Pin

a. **First Pin**: User can set whether to display the first pin and set the parts to display in the string filter dialog based on the reference, part, and package names.
    Example) When selecting the **Prefix** and entering **FL** in the string filter dialog, all first pins of the reference name starting with the string **FL** are selected in the reference list as shown below.
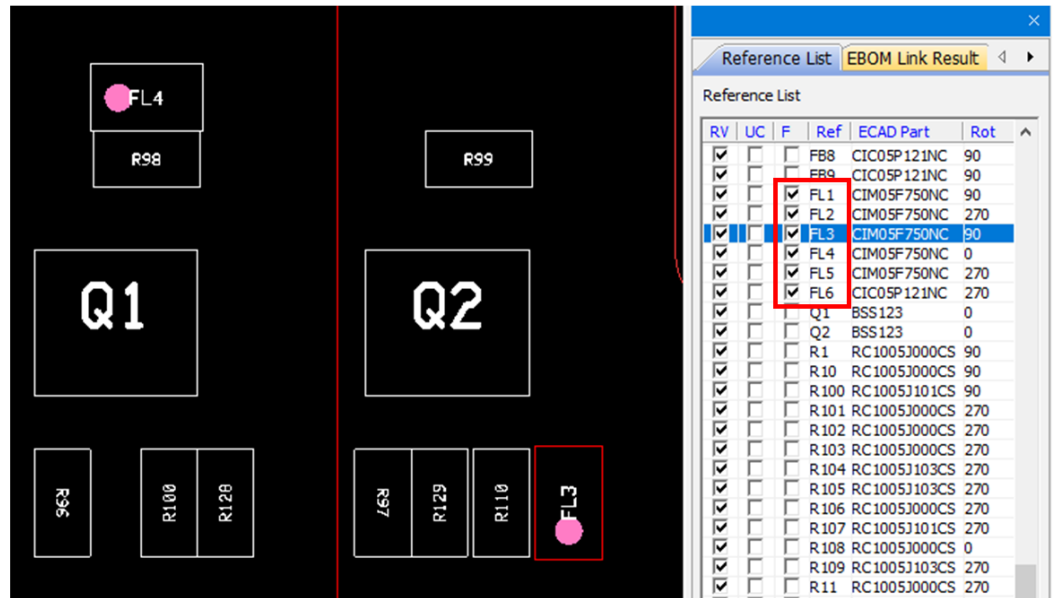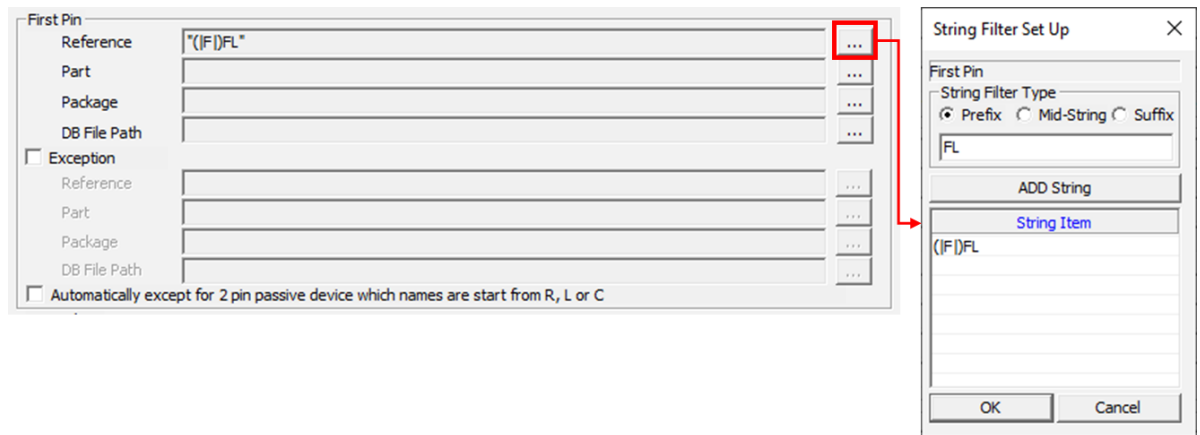
- o **Exception**: Option to select a part that excludes the first pin marking.
- o **Automatically except for 2pin passive device which names are start from R, L or C**: Option to exclude the two-pin passive device automatically which starts with R, L, and C.
- b. **Second Pin**: User can set whether to display the second pin and setting is the same as the first pin.
- c. **User Defined Pin**: This menu is used when directly specifying the marking position of the first pin.
  - o **Table**:
    - **Filter Type**: Specify the filter type either DB file or part name.
    - **Filter/DB File Path**: Specify the filter condition or part DB file path by double clicking the column.
    - **Pin Name**: Specify the pin name to display as the first pin.
  - o **Add**: Add a new item to the table.
  - o **Delete**: Delete a selected item from the table.
    Edit DB: Edit a selected DB file by running the **Edit Component DB**. Please refer to the **[Appendix] Edit Component DB** in this manual.

3.1.3. Other

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a. **Property**: Users can set whether to check the comment (Cmt) column in the reference list according to the criteria of the width, height, and component bound.

Example 1) Check parts with size (width and height) over one.

Example 2) Check parts with size (width and height) less than one.

b. **User Comp Data**: This function highlights and displays the part to user defined color that matches with the entered property information and the value.

Example) If a part with a value of 0.1uF is displayed in green, enter a value for the **Title** (case insensitive), 0.1uF for the **Comment**, set the color in green, and click the **Apply** button.

c. **Component Group Color**: A component group can be specified to user defined color through the information of the reference name and part name. In addition, part information and user defined comments can be displayed.
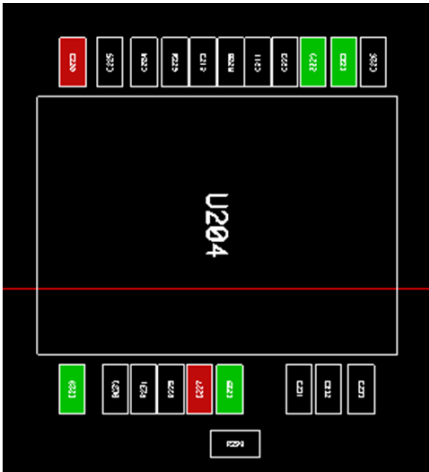
- o **Select Type of Component Group**: Select a type to define a component group among **Reference Name**, **Part Name**, **Package Name**, and **Component DB**.
- o **Component Group Content**: Set the string filter for defining the component group.

In the above example, parts starting the reference name with **C** are in a component group.

When selected the **Select Type of Component Group** as **DB**, users can use the pre-defined component DB file.
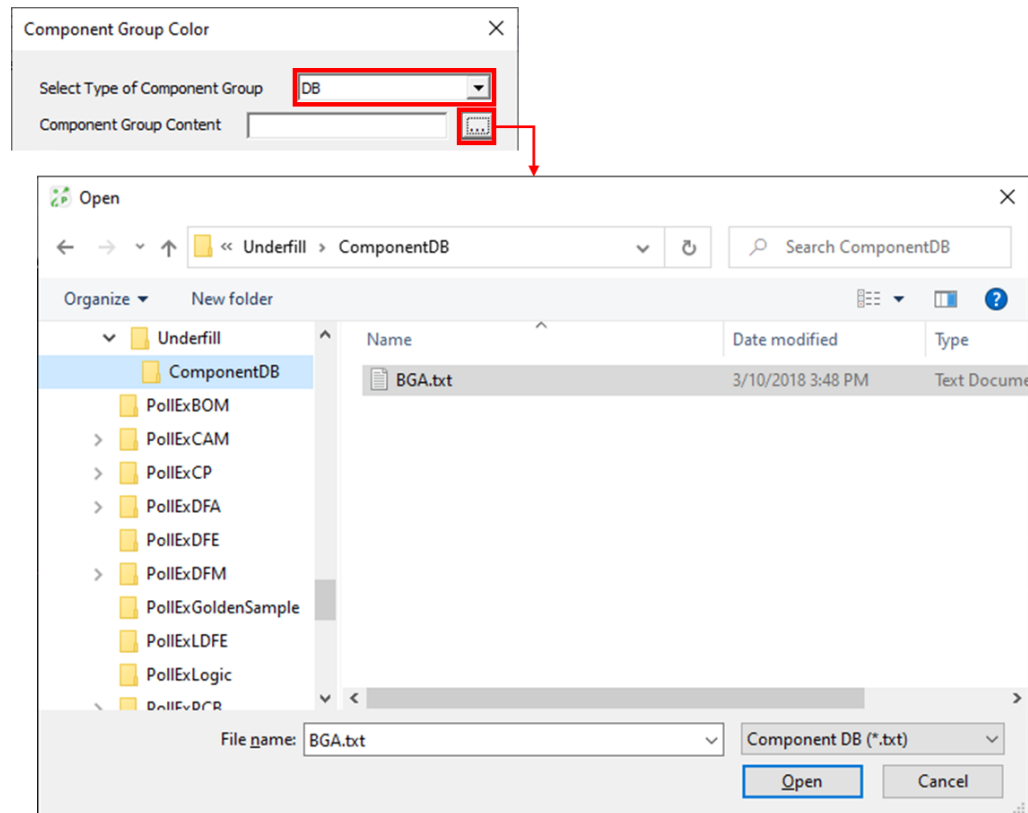
For more detailed information how to create or edit a DB file, please refer to [Appendix] Edit Component DB in this manual.
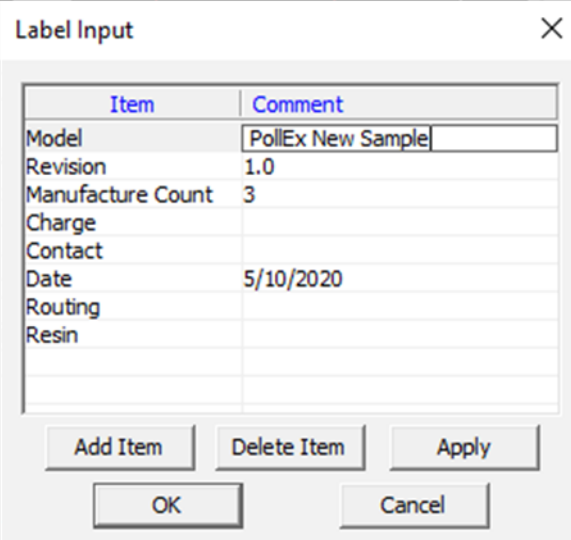
- o **Property**: Option to display the property information of the selected component group.
    - **Default Comment**: Enter the title of the property information to be displayed.
    - **Alternative Comment**: To display the alternative component information, select the title of the property.
    - **Display Component List from User Selected Property**: Option to create a list based on the property value and directly select whether to highlight the component.
    - **Visible Property in Component**: Option to display the property value specified in the component area.
- o **Fill**: Define the highlight color of the component.
- o **Display User Comment**: Select whether to display the comment for the specified component group.

3.1.4. EBOM Link
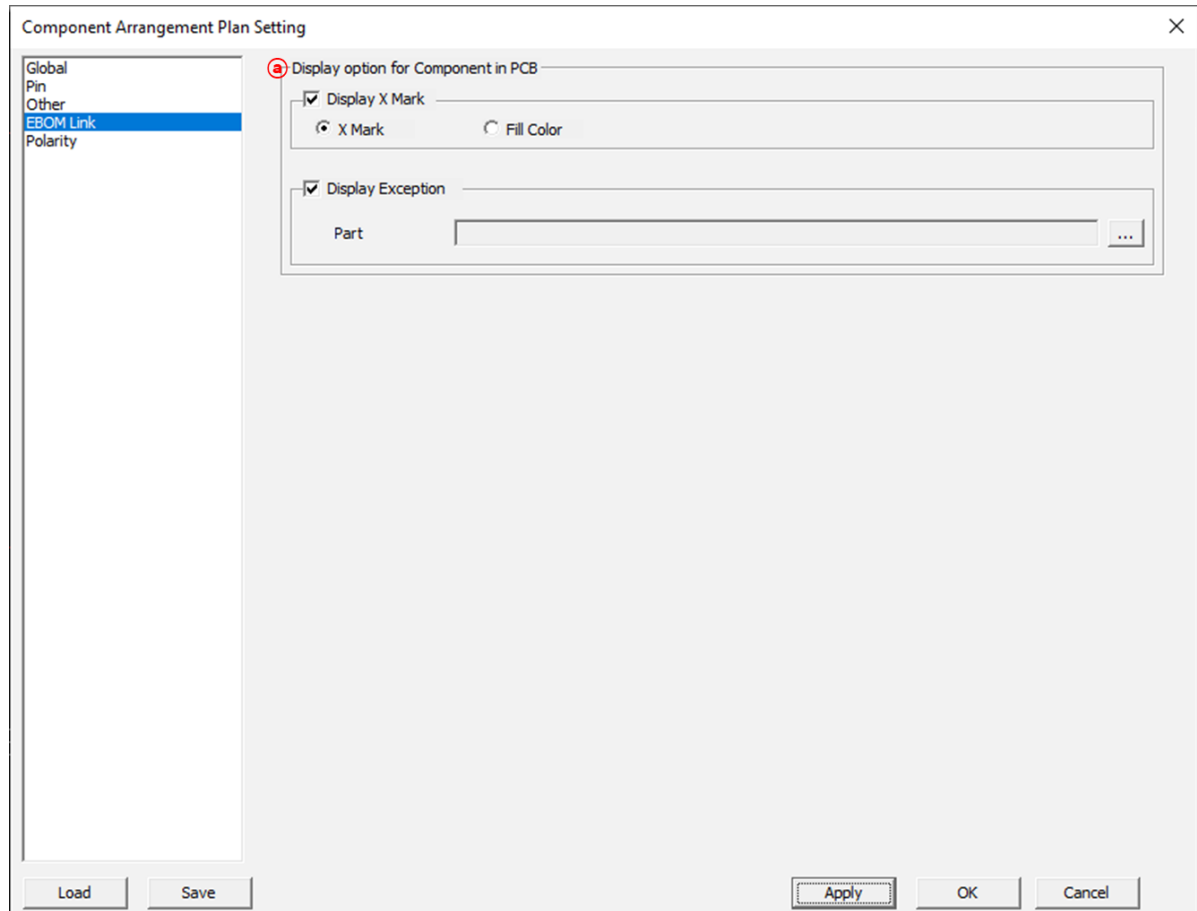
a. **Display Option for Component in PCB**
   o **Display X Mark**: Option to display the X mark for the parts that exist only in the PCB data in the Display Value Properties. When the **Fill Color** option is checked, users can control the On/Off of the X mark in the list.
   o **Display Exception**: Option to exclude the component to display the X mark by using the string filter.

3.1.5. Polarity
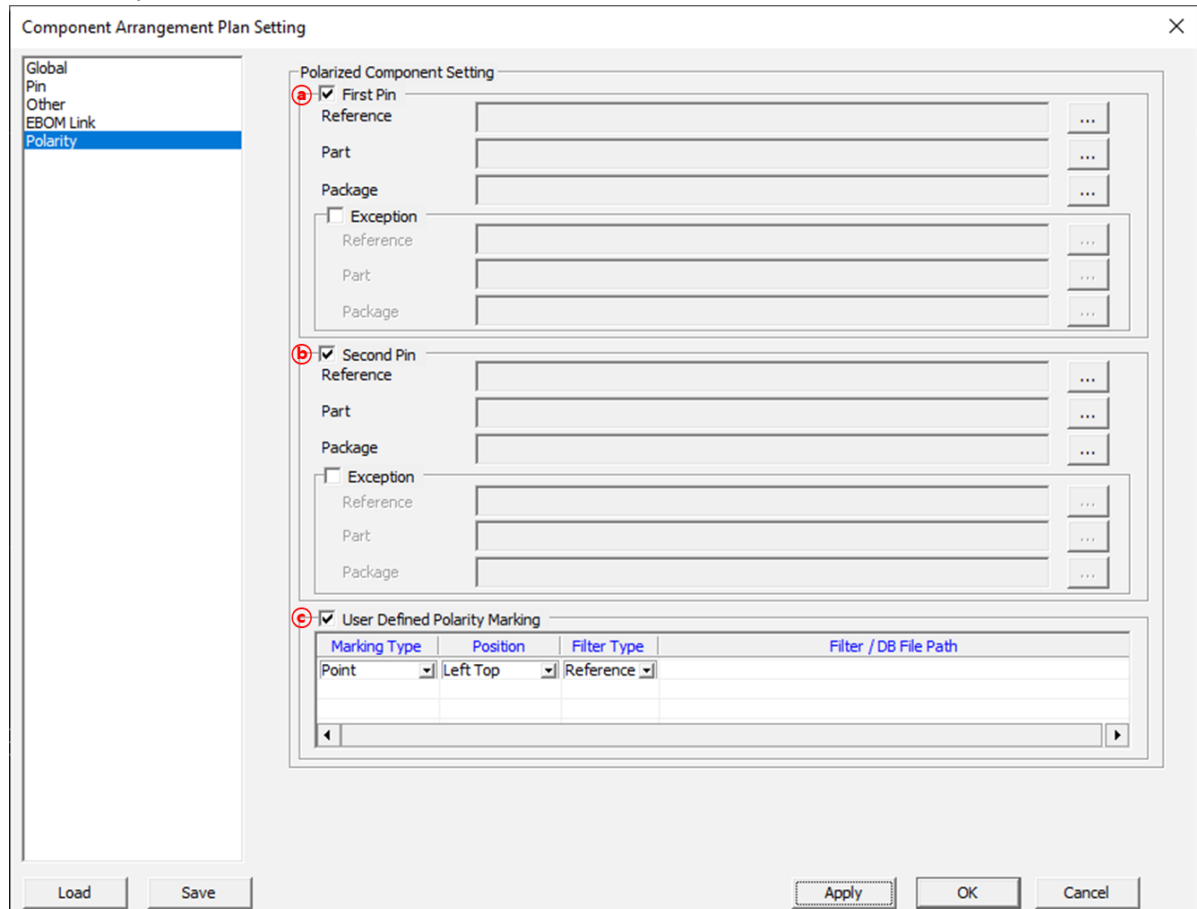
a. **First Pin**: Display the polarity mark by designating the part that shows the polarity at the first pin. Users can set the parts to display in the string filter dialog based on the reference, part, and package names.

Example) When entering **FL** after selecting **Prefix** in the string filter dialog, the polarity mark is displayed at the first pin of the reference name that starts with **FL** (case insensitive).

b. **Second Pin**: Display the polarity mark by designating the part that shows the polarity at the second pin. Users can set the parts to display in the string filter dialog based on the reference, part, and package names.

c. **User Defined Polarity Marking**: For the parts marked with polarity at the specific location, the marking shape, location, and target components can be set directly.

- o **Marking Type**: Select the shape of the polarity mark.
  - **Point**: Display the polarity mark in dot. Marking position is selected among Left Top, Left Bottom, Right Top, Right Bottom, Top, Bottom, Left, Right, First Pin, or Second Pin.
  - **Bar**: Display the polarity mark in bold lines. Marking position is selected among Top, Bottom, Left, Right, First Pin, or Second Pin.
  - **Arrow**: Display the polarity mark in arrows. Marking position is selected either Left or Right.
- o **Position**: Select where the polarity mark is placed. Marking position varies depending on the marking type.
- o **Filter Type**: Set the filter type to designate the component group to display the polarity mark, which is selected among reference, part, package, or DB file.
  Filter/DB File Path: If the filter type is reference, part, or package, users can select the part having the specified string through the string filter function.
  If the filter type is DB file, users can select the pre-defined component DB file. For more detailed information how to create or edit a DB file, please refer to [Appendix] Edit Component DB in this manual.

3.2. Color Setting
Display colors for the background, component, text, and pins can be set.
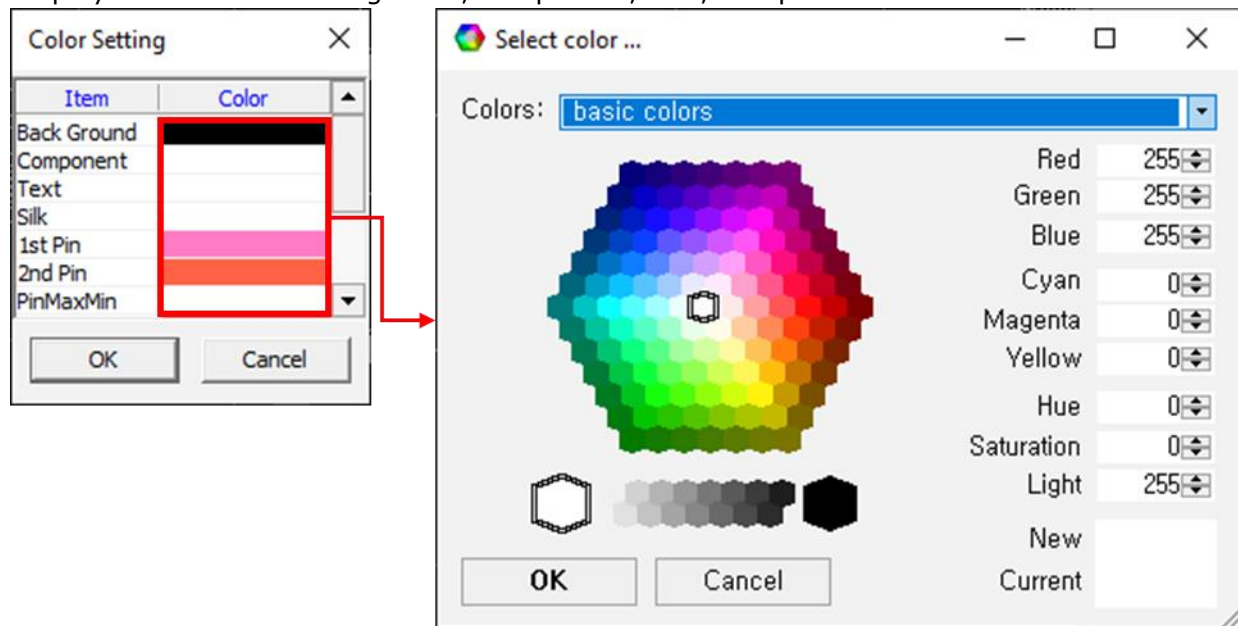
3.3. Label Input
This function is to modify the displayed label information which is displayed upper-right corner of the main screen. Users can edit the list by clicking the **Add Item**, **Delete Item**, or **Apply** button.

4. View

① **Zoom In**: Enlarges the work screen.
② **Zoom Out**: Reduces the work screen.
③ **Zoom Window**: Enlarges the work screen by designating area.
④ **Zoom 1:1**: Display at the initial display ratio.
⑤ **Mirror**: Mirror display of the design data.
⑥ **Reference List**: Display the reference list dialog on the right-side of the window.

- **RV**: Acronym of Reference Name View. Select whether to display the reference name in the component area.
- **PV**: Acronym of Part Name View. Select whether to display the part name in the component area.
- **UC**: Acronym of User Defined Color. Display the selected component area filled with the color.
- **B**: Select whether to display the X mark.
- **F**: Select whether to display the first pin mark.
- **S**: Select whether to display the second pin mark.
- **Ref**: Display the reference name.
- **Part**: Display the part name.
- **Rot**: Display the component's angle.
- **L**: Display the component placed layer.

⑦ **Display Option**: Display the **Display Option** dialog on the right side of the main window. Users can set the displayed items, text size, and user comment.
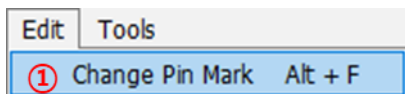
⑧ **Label Display**: Display the label on the upper-right side of the main window.
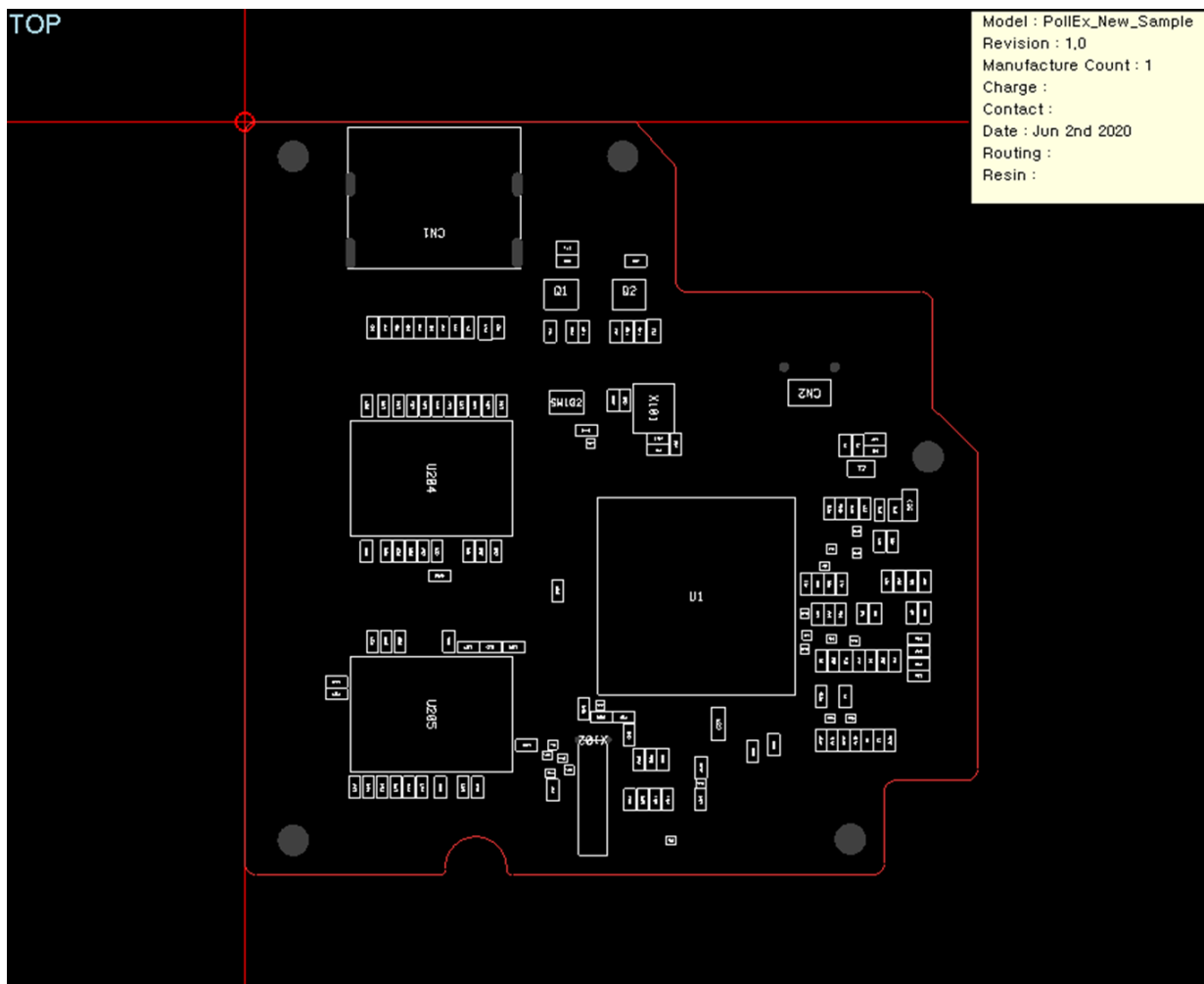
5. Edit

① **Change Pin Mark**: This is to edit the position of pins when the first and second pins are incorrectly specified in the component.
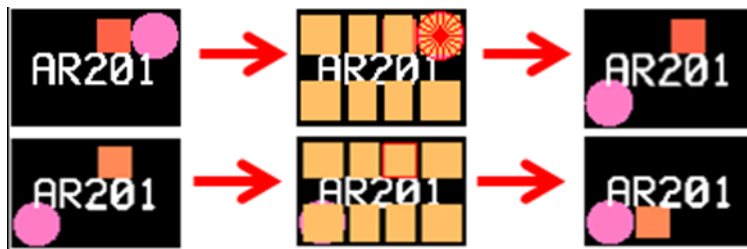
- **Change Pin Mark** When this menu is activated, the mouse cursor is changed as shown below.
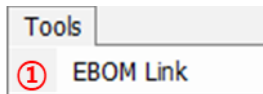

- For the component with two pins, the positions of the first and second pins are changed.
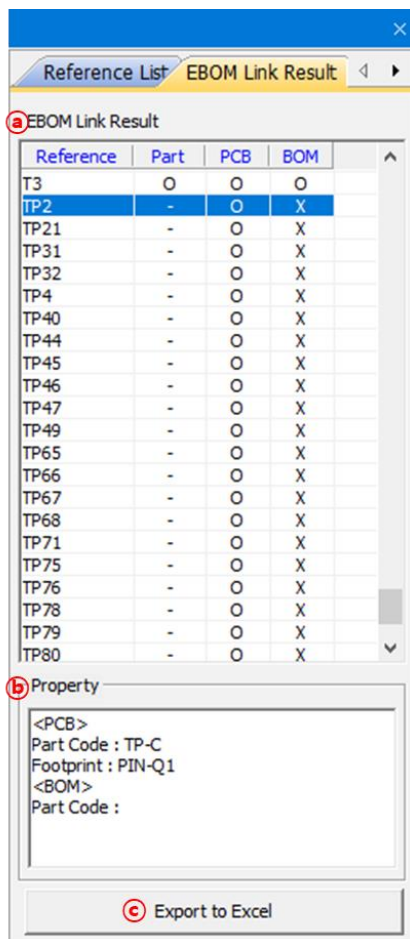

- For the component with more than two pins, select the pin to be moved and click the pin at the position to be changed.

6. Tools

① **EBOM Link**: This function is to check the component information matching by comparing the part information on the BOM and PCB data.

a. **EBOM Link Result**:
- o **Reference**: Display the component reference name.
- o **Part**: Display whether the part name on the BOM and PCB data is matched based on the reference name.
- o **PCB**: Display whether the comparison part name exists in the PCB data.
- o **BOM**: Display whether the comparison part name exists in the BOM data.

b. **Property**: Display the property information in the PCB and BOM data of the selected reference.
- o **PCB**: Display the part code and footprint name.
- o **BOM**: Display the part code.

c. **Export to Excel**: Export the comparison result to Excel.

	A	B	C	D	E	F
1	Part Code	Reference Name	Part	PCB	EBOM	Property
2	CL05C150JB5NNND	C103	O	O	O	\<PCB\> Part Code : CL05C150JB5NNND Footprint : CL1005-2PCB \<BOM\> Part Code : CL05C150JB5NNND
3	CL05C150JB5NNND	C104	O	O	O	\<PCB\> Part Code : CL05C150JB5NNND Footprint : CL1005-2PCB \<BOM\> Part Code : CL05C150JB5NNND
4	CL05C150JB5NNND	C105	O	O	O	\<PCB\> Part Code : CL05C150JB5NNND Footprint : CL1005-2PCB \<BOM\> Part Code : CL05C150JB5NNND
						\<PCB\> Part Code : CL05C150JB5NNND Footprint : CL1005-2PCB

7. Underfill Editor

When the Underfill editor is launched, a dialog for creating underfill coordinate data is displayed on the right-side of the main window.
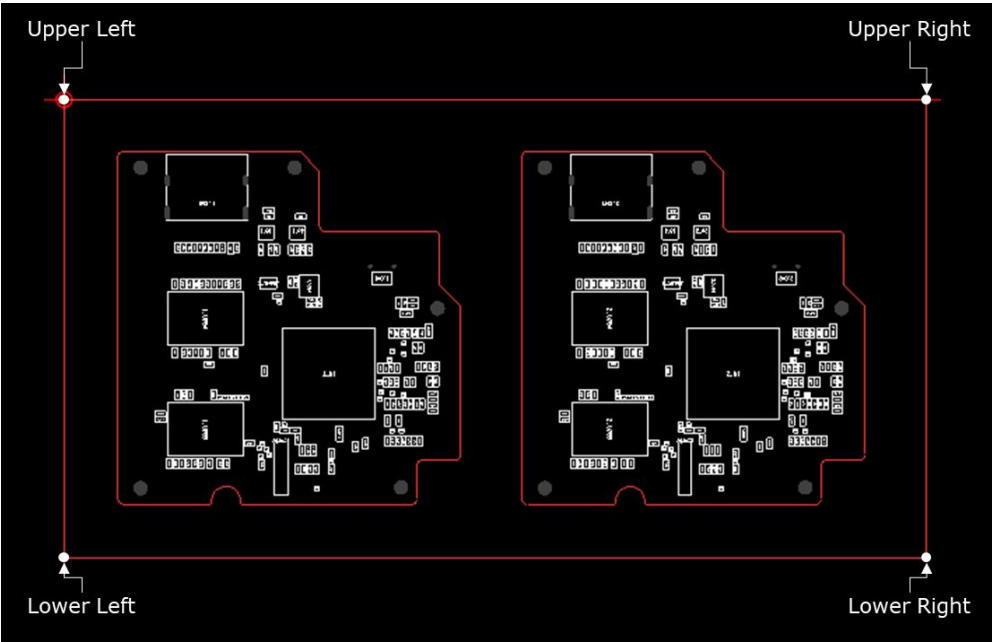
7.1. General

In the **General** tab, set the board information, fiducial mark coordinates, and reference coordinates.

△ ALTAIR

7.1.1. Board
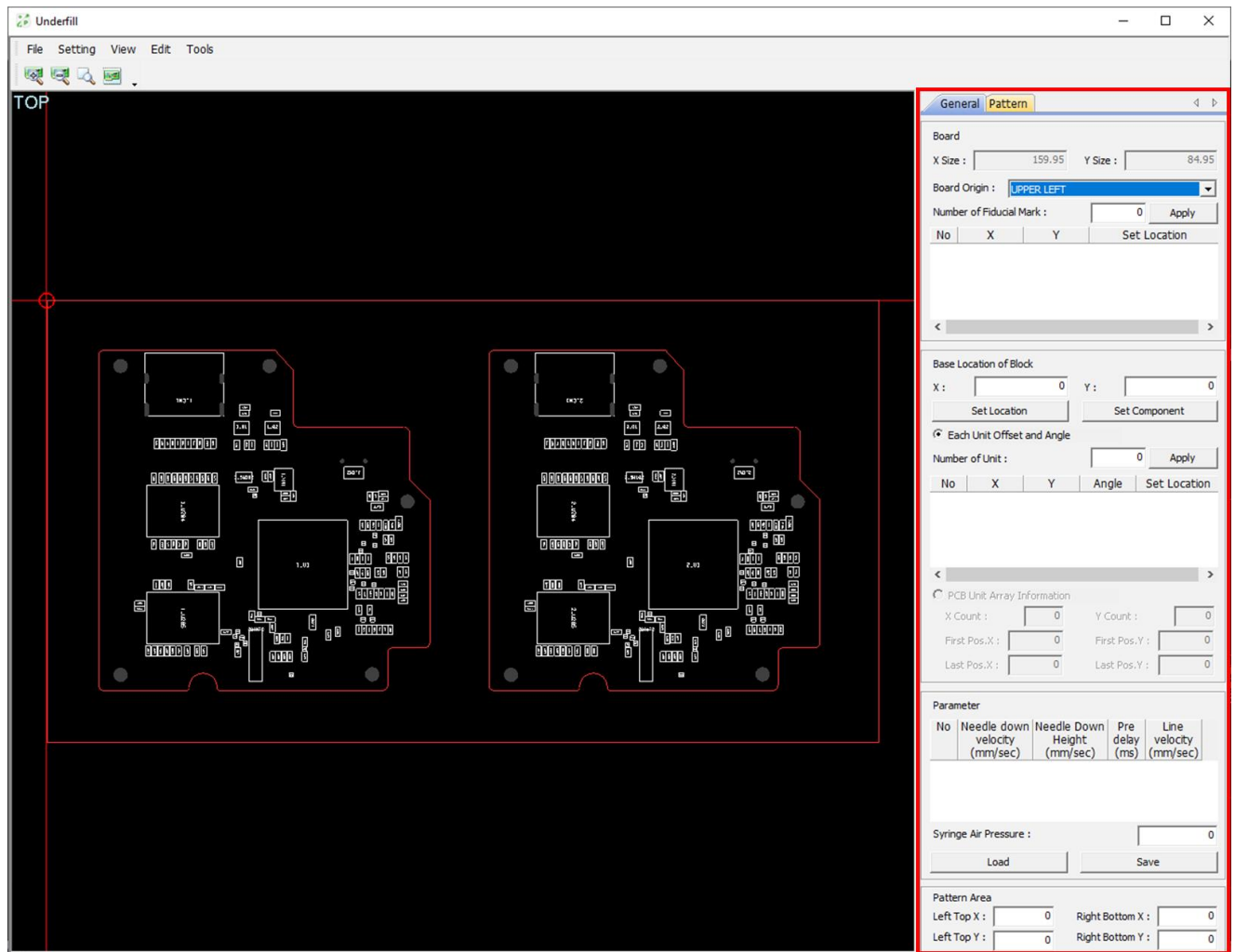
- **X/Y Size**: The board size is automatically detected.
- **Board Origin**: Set the origin position of the underfill coordinates selecting from Upper Left, Upper Right, Lower Left, or Lower Right.

Number of Fiducial Mark: A fiducial mark list is created after entering the fiducial mark quantity and clicking the **Apply** button. When click the **Set Location** button and click the fiducial mark location in the design, the X and Y coordinates are entered.
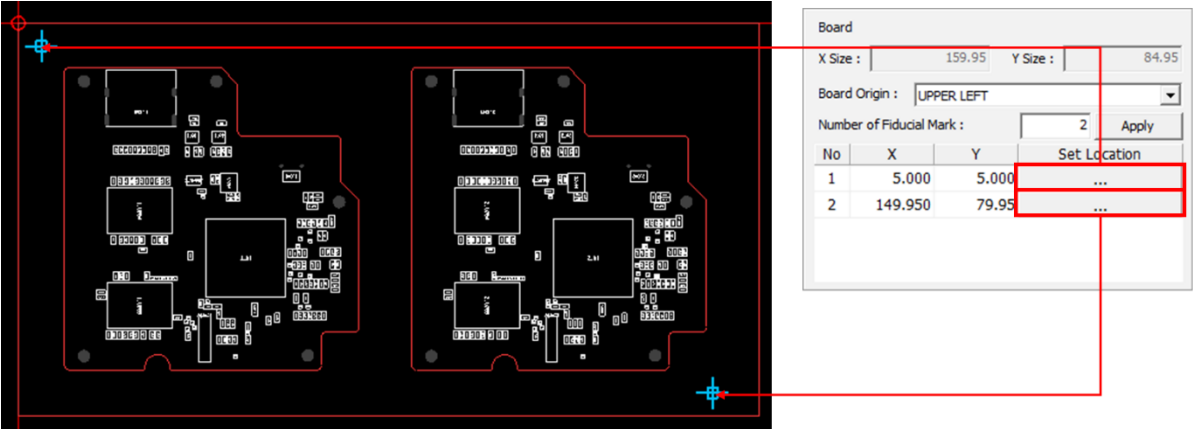
7.1.2. Base Location of Block
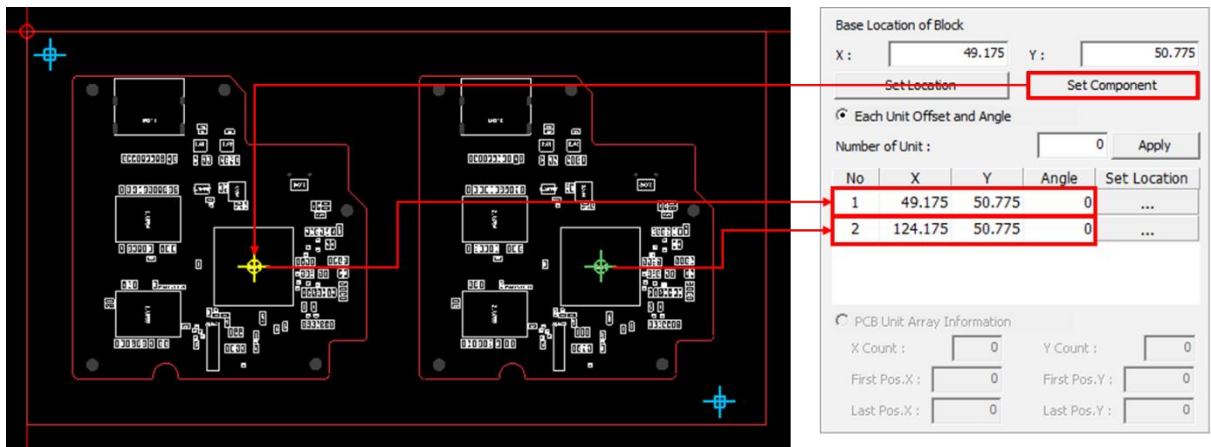
- **X/Y**: Set the base location of the unit PCB among the arranged unit PCBs.
- **Set Location**: This menu is used when directly set the base location. After clicked the button, click the position to be the base location in the design.
- **Set Component**: This menu is used when setting the base location by selecting a part in the design data. When a part to be a reference is selected, the center position of the same parts placed on each unit PCB is registered as the reference coordinates. The component coordinates of the first unit are as the base location.

- **Number of Unit**: When entering base location and base location of unit PCBs directly, enter the number of unit PCBs are click the **Apply** button.
- **Table**:
    o **X/Y**: Display the X/Y coordinates of each unit board's reference point.
    o **Angle**: Display the placed angle of each unit board.
    o **Set Location**: After clicking the button, users can directly select a location in the design.
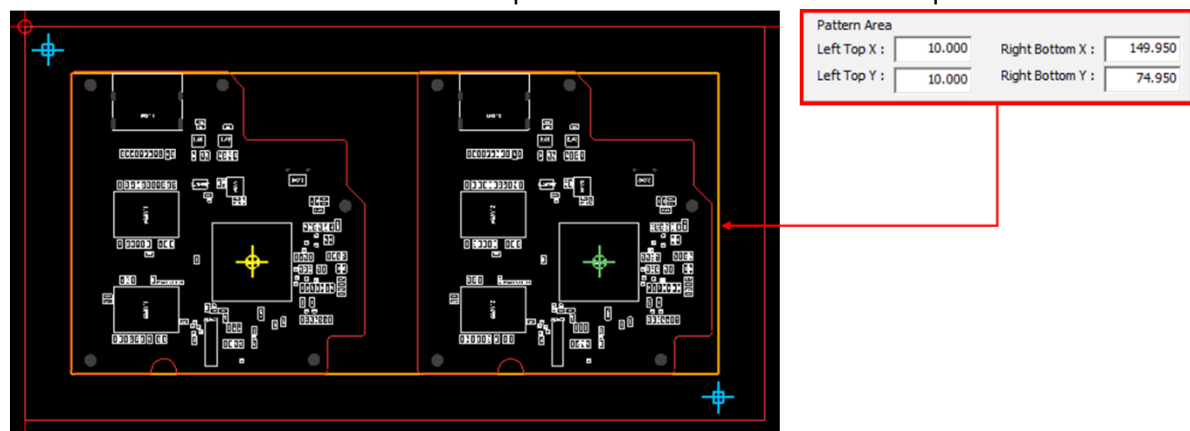
7.1.3. Parameter

Import parameters used when creating the nozzle movement coordinate pattern of the underfill dispenser.
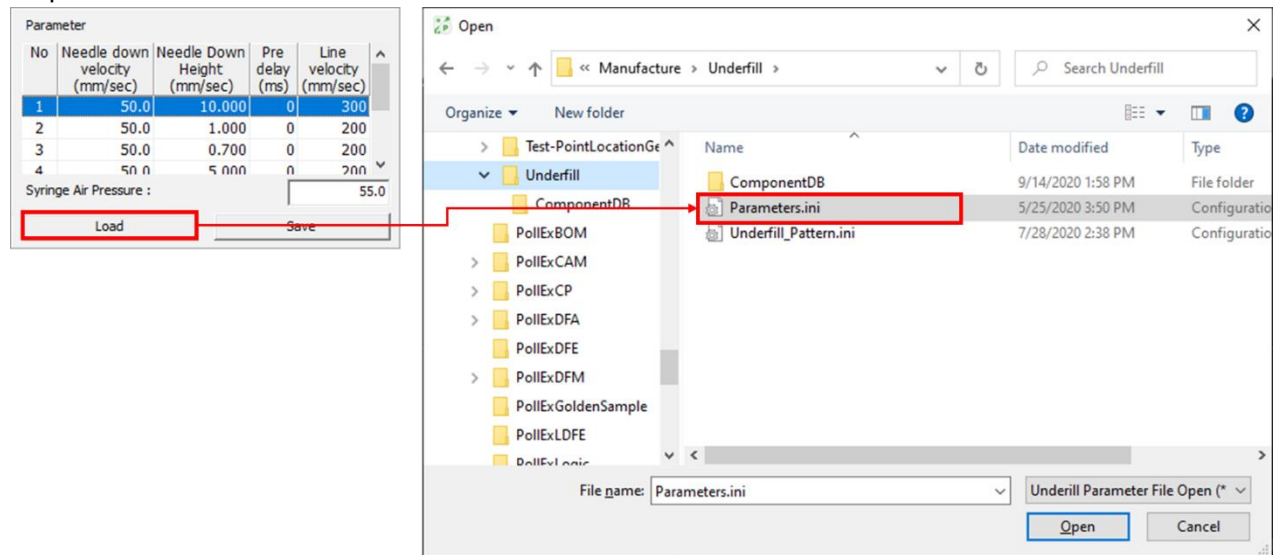
7.1.4. Pattern Area

Set the nozzle movement coordinate pattern area of the underfill dispenser.

7.2. Pattern

In the **Pattern** tab, add the **Sub Call** and set the patterns of each **Sub Call**.
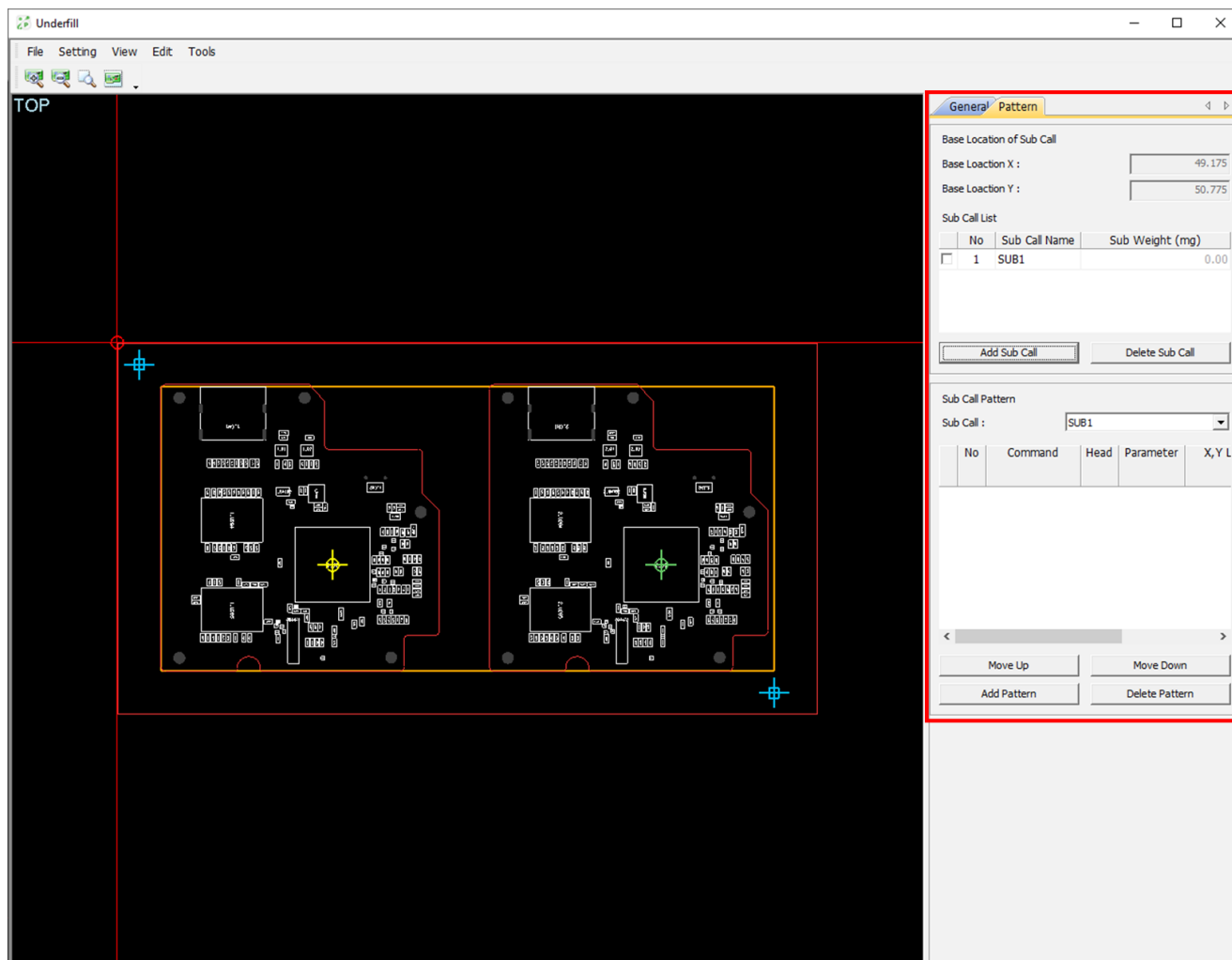
7.2.1. Base Location of Sub Call

The nozzle movement coordinate pattern can be managed with multiple sub calls.

For example, if the underfill needs to be applied twice with intervals, the sub call should be registered into two separately.

- **Base Location X/Y**: Indicate the coordinates of the base location set in the **General** tab.

- **Sub Call List**: Display the list of registered sub calls.
  - o **Sub Call Name**: Enter the name of the sub call.
  - o **Sub Weight(mg)**: Display the amount of the underfill applied in the corresponding sub call. When setting the nozzle coordinate data, it is displayed by automatically summing the applied weight.
- **Add Sub Call**: When clicked the button, new sub call is created in the table.
- **Delete Sub Call**: Delete the selected sub call.

7.2.2. Sub Call Pattern
Set the coordinate pattern to move the nozzle of the underfill dispenser in the sub call.

- **Sub Call**: Select the sub call to register the pattern.
- **Table:**
  - o **No**: Display the pattern number.
  - o **Command**: Set the nozzle movement command.

    - **MOVE**: This command is to move the nozzle and moving speed and height of the nozzle is set through parament selection which is displayed as a dotted line.
    - **DOWN MOVE**: This command is to move the nozzle down to the specified height and moves to the height of the selected parameter.
    - **UP MOVE**: This command is to move the nozzle up to the specified height and moves to the height of the selected parameter.
    - **W LINE**: This command is to apply the underfill solution to the specified weight while moving the nozzle which is displayed as a solid line.

- **LINE**: This command is to apply the underfill solution while moving the nozzle, which is displayed as a solid line.
- **BAD MARK**: The entered coordinates are registered as the bad mark.
  - o **Head**: Display the head information of the underfill dispenser.
  - o **Parameter**: Specify the parameter for the current pattern command.
    This is the setting value for the moving speed and height of the nozzle.

|	No	Needle down velocity (mm/sec)	Needle Down Height	Pre delay (ms)	Line velocity (mm/sec)	
☐	1	50.0	10.000	0	300	
☐	2	50.0	1.000	0	200	
☐	3	50.0	0.700	0	200	

OK   Cancel

  - o **X,Y Location**: Display the X/Y coordinated of the nozzle to be moved.
  - o **Set Location**: Users can set the coordinates of the nozzle directly to be moved.
  - o **Weight(mg)**: When the command is set to the **W Line**, enter the amount of underfill solution.
- **Move Up**: Move up the selected pattern position in the list.
- **Move Down**: Move down the selected pattern position in the list.
- **Add Pattern**: Add a new pattern in the list.
- **Delete Pattern**: Delete the selected pattern in the list.

8. [Appendix] Edit Component DB

This menu helps user to create or edit database file. Once DB files are created, users can update database for new components.

① **Component DB List**: Show DB files' list.
- **File Name**: Component DB files' name.
- **File Path For Save**: Component DB files' path.
- **Class**: Component DB class name.
② **Add**: Add new component DB file(`*.txt`) into list or create new DB file. To add new DB file, input non-existing file name.
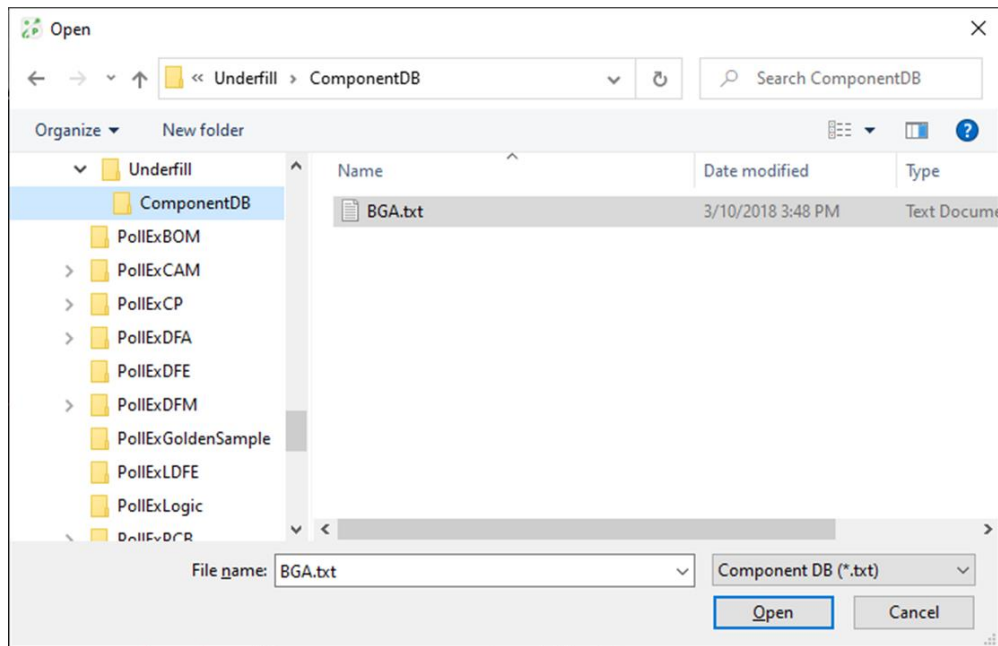
③ **Delete**: Delete selected list from component DB list.

④ **Save**: Save current setting into `*.pccls` file.

⑤ **Save As**: Save current setting into `*.pccls` file as different name.

⑥ **Load**: Load saved setting file.

⑦ **Component DB Setting Window**: Check or edit information for selected component DB list.

- **Naming**: Create DB with name.
- **Filter**: Create DB file with string
- **Comment**: create DB file with properties in component.

8.1. Naming

Using component name, users can make classification. Name matching components will be added into component database.
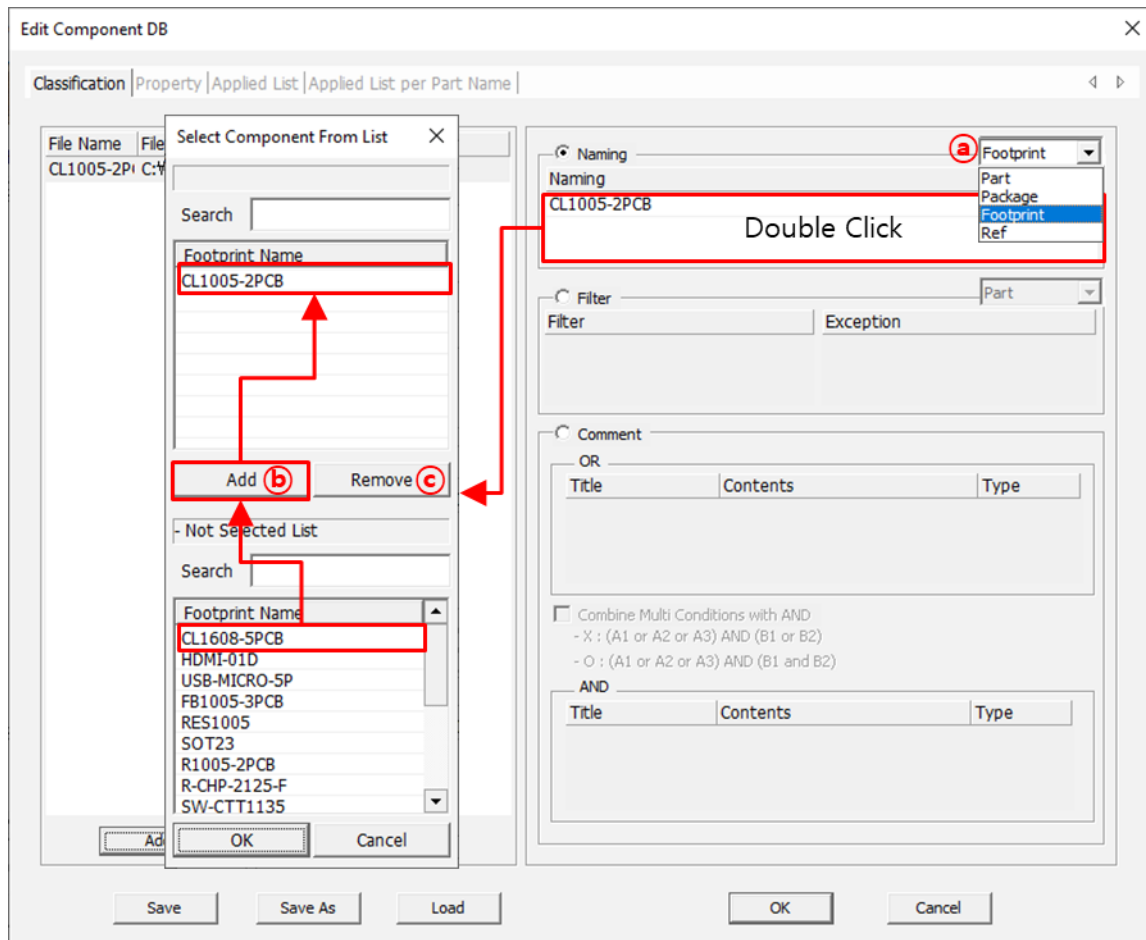
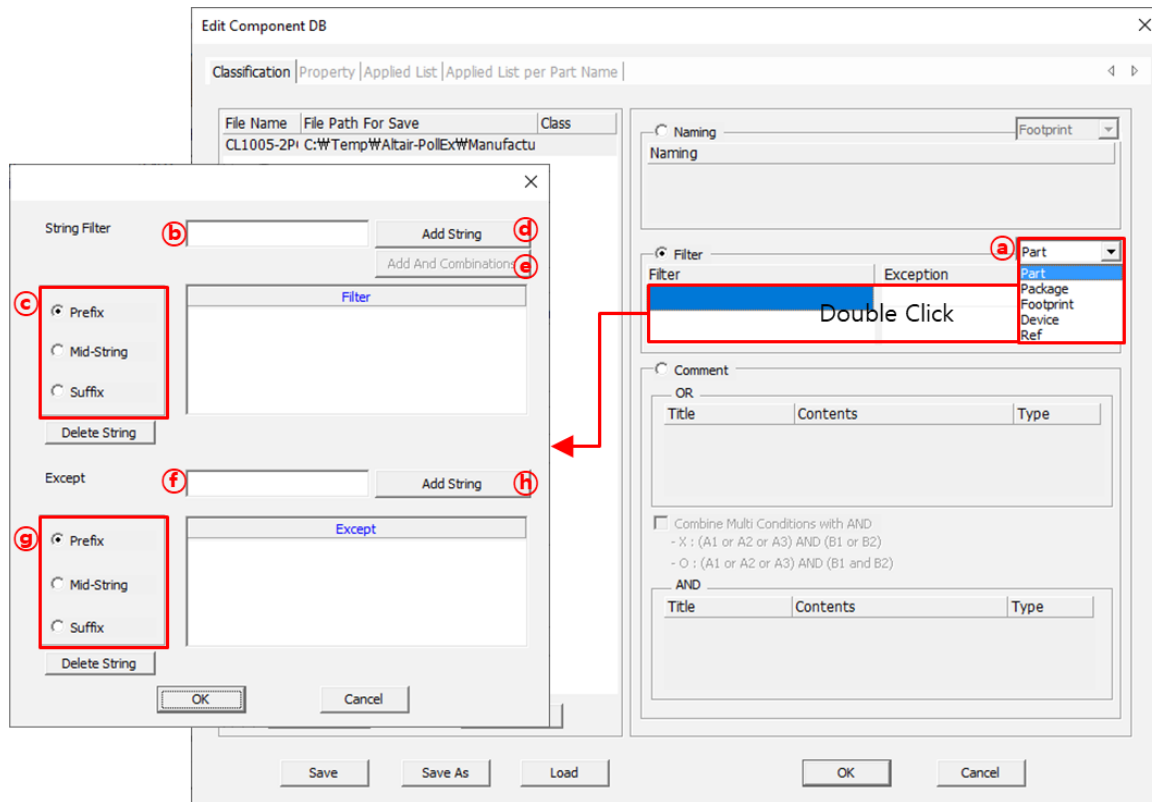a. **Component Name Selection Filter**: Using this filter, users can set the filter type to be used to select components among part name, package name, footprint name or reference name.

b. **Add**: Upon double-clicking naming field, tool shows the Select Component From List window. From the list in Not Selected List, select components and add components into upper list as selected component list.

c. **Remove**: After selecting components in selected component list, use Remove button to remove item from the list. Removed item will be moved to Not Selected List.

8.2. Filter

For the purpose to classify component using special characters, users can use the filter. Upon searching certain characters in component name, matched name components will be added into certain component database.

Upon selecting Filter section, users can see the filter setup dialog box. In filter setup dialog box, there are two sections, for string filter setup and for exception string setup.

a. **Component Filter**: Users can set the filter type to be used to select components among part name, package name, footprint name, device name and reference name.

b. **String Filter**: Add string to be included into component classification database.

c. **Affix Filter**: For string added in ⓑ column, select its usage type among prefix string, middle string or suffix string in component name.
   o **Prefix**: Component name should be started with given string.
   o **Mid-String**: Given strings are should be in component name.
   o **Suffix**: Component name should be ended with given string.

d. **Add String**: With conditions in ⓑ and ⓒ, make a filter and add it into list.

e. **Add And Combination**: For set filtering conditions, add conditions combination for ⓑ and ⓒ, with And combination. For example, if users want to select components which name starts with SMD character string and end with IC character string, use the following ways. After input SMD in string filter, select Prefix and press Add String button. Then, input IC in string filter, select Suffix for affix filter and press Add And Combination button.

f. **Except String Filter**: For the filer conditions generated by ⓑ~ⓔ sections, input character string which users want to exclude.

g. **Affix Filter**: For character string in ⓕ, select its usage among Prefix, Mid-String or Suffix.
   o **Prefix**: Component name should be started with given string.
   o **Mid-String**: Given strings are should be in component name.
   o **Suffix**: Component name should be ended with given string.

h. **Add String**: Add filer conditions into list for filtering condition, set in ⓕ and ⓖ.

8.3. Comment
Function to classify components with components' properties (attributes).
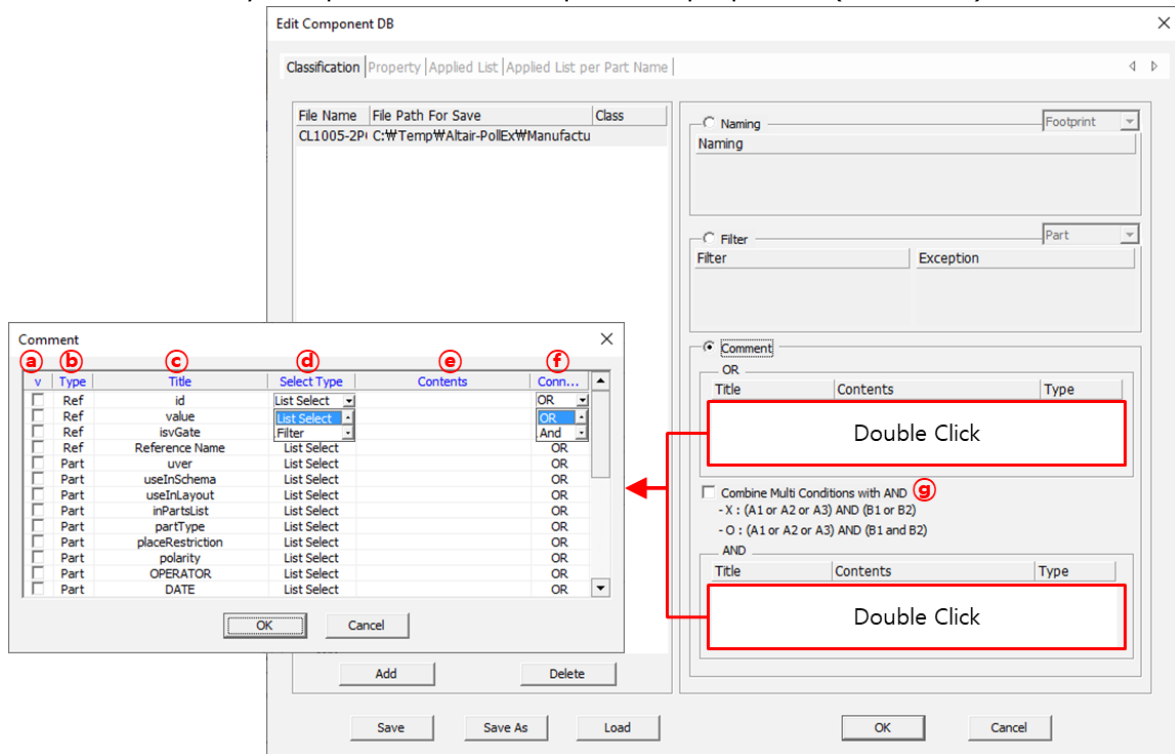
At comment sections, launch properties selection window with mouse double-clicking.

a. **v**: Column for checking component properties will be used.
b. **Type**: Show component property type.
c. **Title**: Show property title.
d. **Select Type**: Select component property setting method.
    o **List Select**: Setting method by selecting properties list defined in design.
    o **Filter**: Setting method by using string filter to set components which have matched properties.
    o **Range**: Setting method by specifying the range when the property value is numeric.
e. **Contents**: Upon double-clicking contents column, depending on selection type in ⓓ column, tool will launch **Comment Select**, **String Filter**, or **Range Setting** window.
    o **List Select**: Users can set design's component properties in Select Comment window. Using method is same as ②, Select from List in naming section.
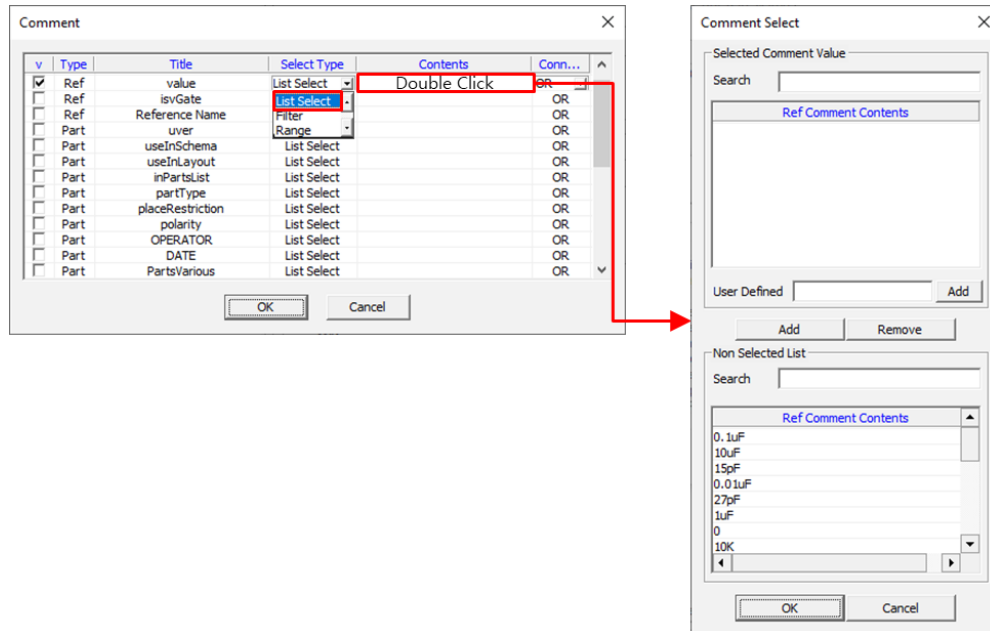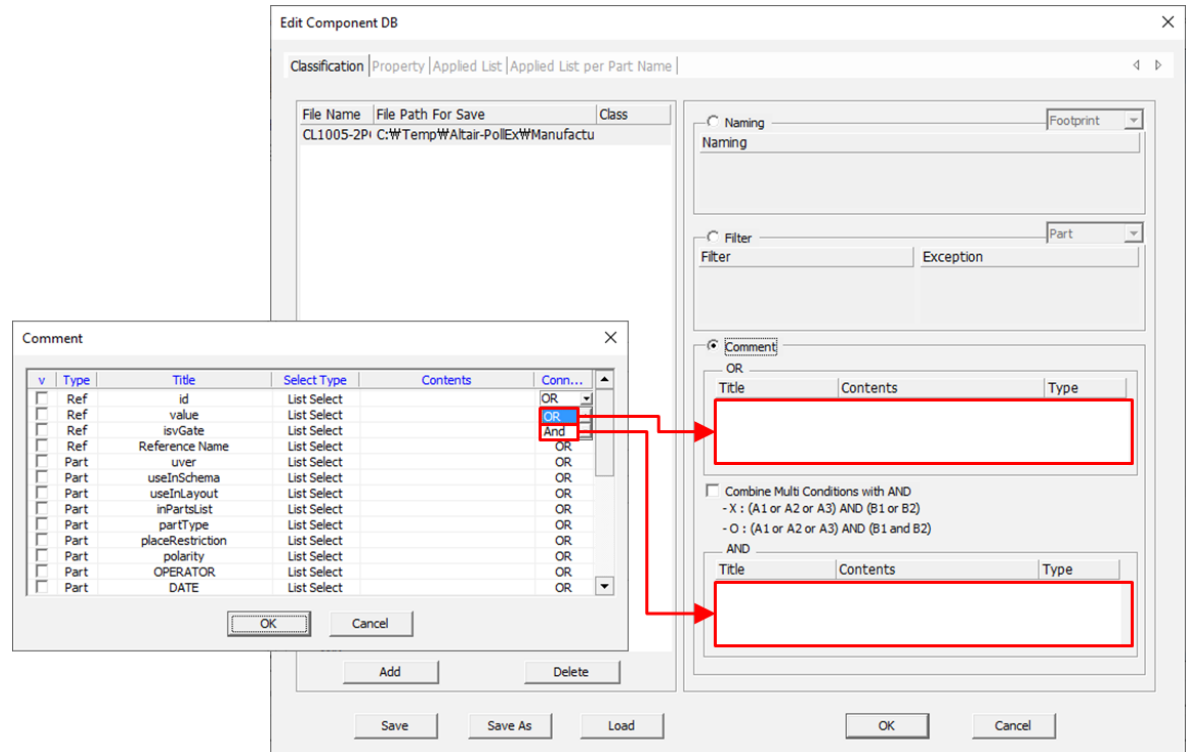
- o **Filter**: Method to set component group with components' property value. Using method is same as ③, filter setting window in **Filter** section.
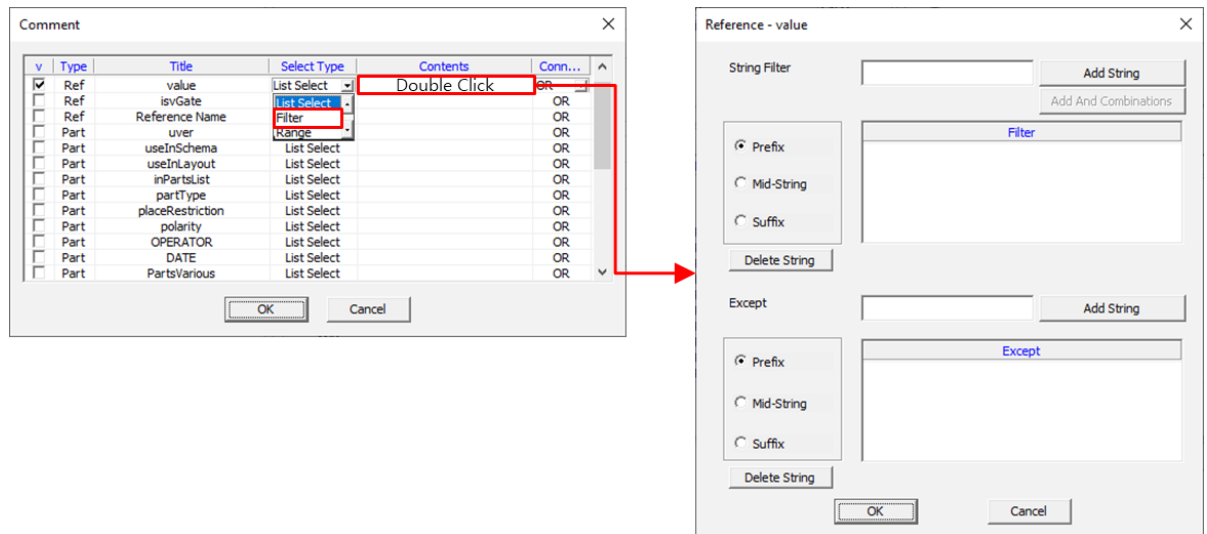
- o **Range**: Users can specify the parts within the numerical range when the property value is numeric.
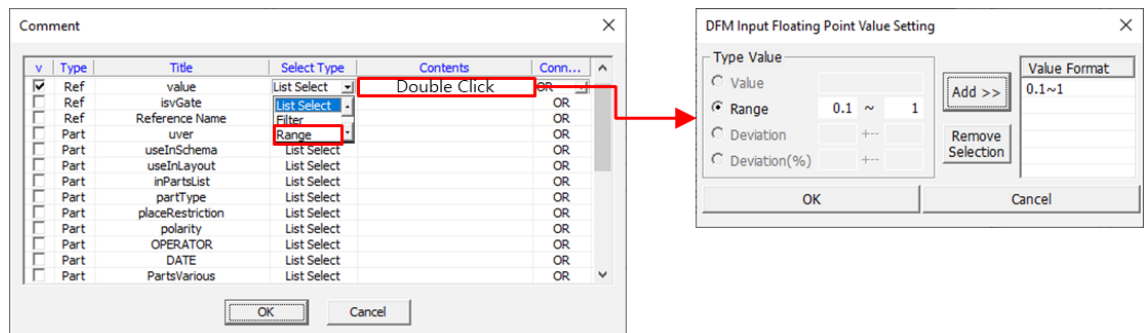

f. **Connected**: Field to set condition is **OR** or **AND** combination.

- o **OR**: In case of set property is matching with one of component properties.
- o **AND**: In case of set property is matching with component properties in OR field and with component properties in **AND** field. For example, **OR(A1, A2, A3), OR(B1, B2)** means **(A1 ∪ A2 ∪ A3) ∩ (B1 ∪ B2)**.

8.4. DB file setting with ASCII Text Editor

Basically, DB file is constructed with ASCII text string. So users can easily make or edit it using notepad or simple text editor.
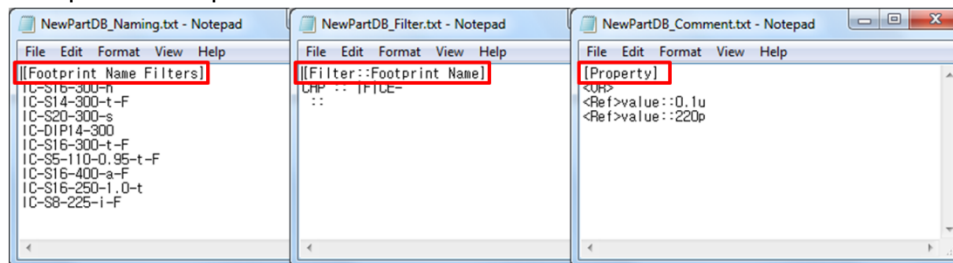
The first line in component DB file is classification filter types.

- **Naming**

    [Part Name Filters]: Classification filter type is part name.

    [Package Name Filters]: Classification filter type is package name.

    [Footprint Name Filters]: Classification filter type is footprint name.

    [Reference Name Filters]: Classification filter type is reference name.

- **Filter**

    [Filter::Part Name]: Classification filter type is part name.

    [Filter::Package Name]: Classification filter type is package name.

    [Filter::Footprint Name]: Classification filter type is footprint name.

    [Filter::Ref Name]: Classification filter type is reference name.

- **Comment**
  [Property]