FUJIFILM

FUJI COMPUTED RADIOGRAPHY

CR Console

BLACKENING PROCESSING SOFTWARE
OPERATION MANUAL

1st Edition

July 2005

MADE IN JAPAN

FUJI PHOTO FILM CO., LTD.

TOKYO 106-8620

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2005. 07

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INTRODUCTION

This Operation Manual explains how to operate the Blackening Processing Software on the CR Console.
For other functions/operations, refer to “CR Console OPERATION MANUAL” and “CR Console OPERATION MANUAL, THE USER UTILITY OPERATIONS”.

OPERATIONS

Blackening Processing is used to blacken the region out of irradiated field (unnecessary white region) on an image with arbitrary density.

There are two processing methods: “Automatic Blackening Processing” and “Manual Blackening Processing”. Automatic Blackening Processing automatically detects/blackens regions outside the irradiated field on read images, requiring thus no user operations for this purpose. Parameters necessary for performing Automatic Blackening Processing can be updated as required at the User Utility.

For details of menus to which Automatic Blackening Processing is applicable, see “3. Menus to Which Automatic Blackening Processing is Applicable”.

When images are subjected to verification on the QA window, Manual Blackening Processing detects/blackens regions outside the irradiated field by user operations for any image you wish. Manual Blackening Processing can be applied to an image displayed being targeted for verification purposes. In addition, it is possible with this processing method to reprocess correct/ redo) an image that has been subjected to Automatic Blackening Processing.

Automatic Blackening Processing and Manual Blackening Processing can be used either individually or simultaneously. Select a proper processing method according to what the target image requires.

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1 Automatic Blackening Processing

Automatically detects and blackens the region out of irradiated field of read images. (Any operation is not required by users.)

The parameters for the Automatic Blackening Processing can be updated at the User Utility. Perform the following operation if necessary.

(Notes for performing exposures → page 8)

Caution to be observed when using Automatic Blackening Processing

Because this processing method uses the pattern recognition technology, an effective image can be lost, though in a minimal way, depending on whether it was recognized successfully or not.

For this reason, make sure when you are using this processing that an image area available on the CR Console is not painted out being retained appropriately. Use Manual Blackening Processing as necessary to correct or redo the image appropriately.

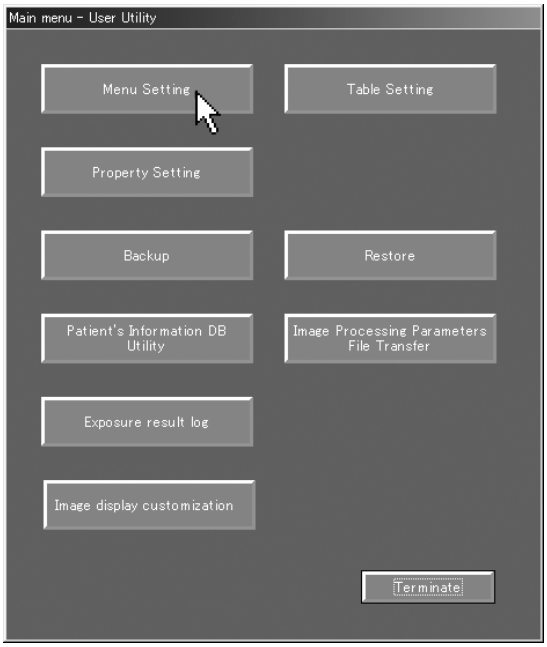
- When an effective image area has been painted out:
  Clear the blackened area and then re-input an area to be painted.
- When an effective image area has not been painted out completely with a certain area remaining unpainted:
  Clear the blackened area and then re-input an area to be painted or re-input an area to be painted black additionally without clearing it off once.

■ Updating the Parameters by Exposure Menu

Updates the Automatic Blackening Processing parameters by each exposure menu.

(1) Starting up the User Utility → Selecting "Menu Setting"

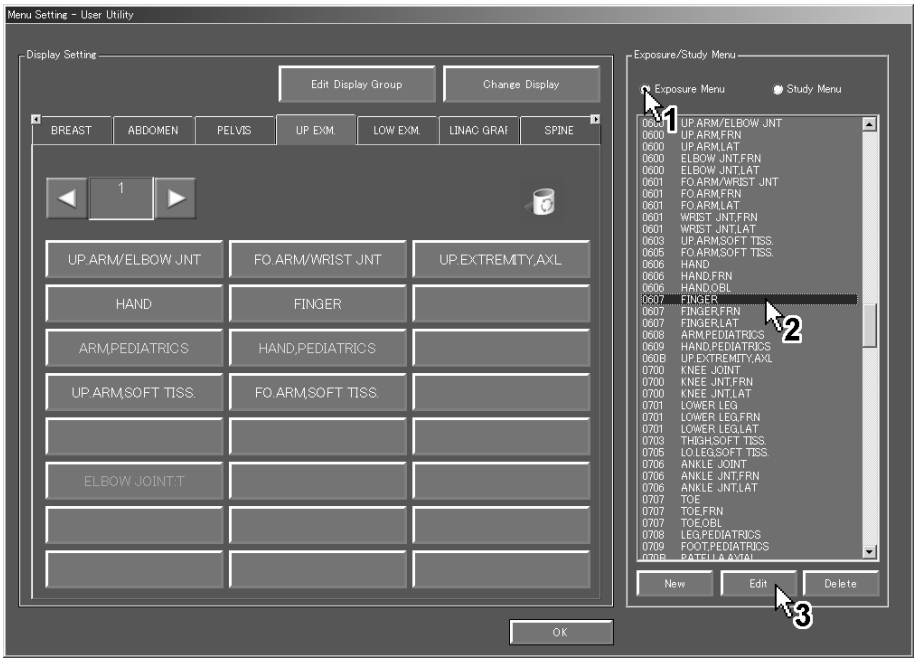
Start up the User Utility and then select "Menu Setting".



(2) Selecting exposure menu → Selecting processing

The “Menu Setting - User Utility” is displayed.

List up the exposure menus, select the desired exposure menu, and then select “Edit”.



This section explains how to update the parameters for the existing exposure menus.

If creating a new exposure menu (selecting “New”), the following operation can be performed as well as the existing exposure menus.

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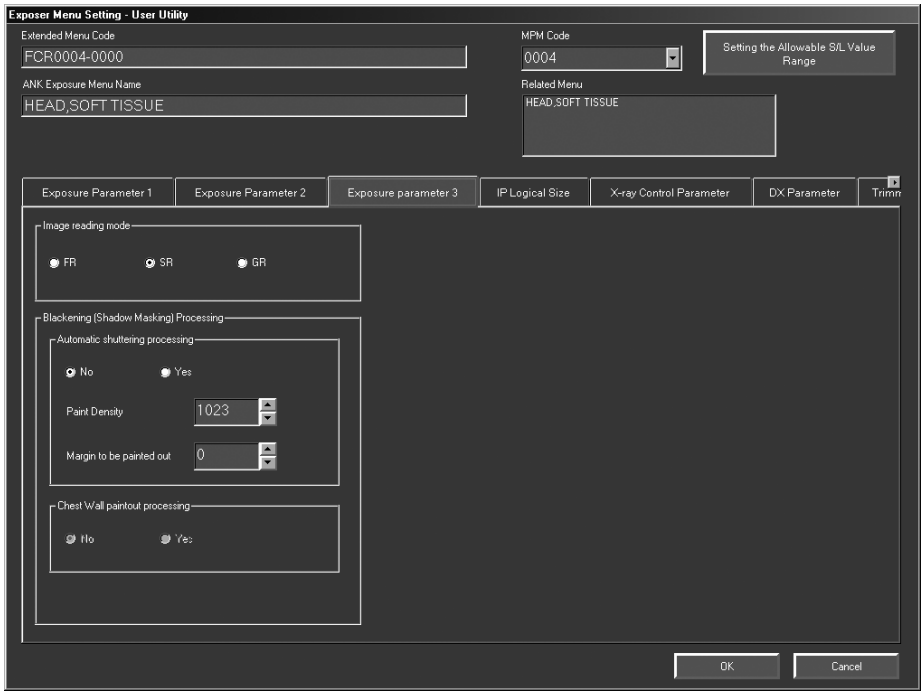
(3) Setting the parameters

"Exposure Menu Setting - User Utility" is displayed.

Set the parameters at the "Blackening (Shadow Masking) Processing" field of "Exposure Parameter 3" folder.



No/Yes : Selecting "No" does not perform the Automatic Blackening Processing. Selecting "Yes" performs it.

Paint Density : Set Paint Density for the Automatic Blackening Processing. The density can be set in 5 steps: 0 (lightest) → 255 → 511 → 767 → 1023 (darkest). The density set here will reflect the Manual Blackening Processing.

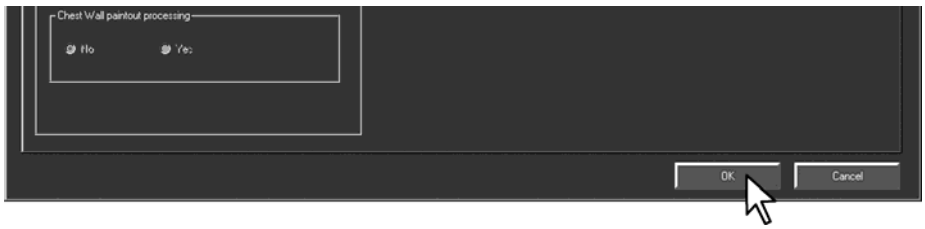
Margin to be painted:

Select an object paint width for the Automatic Blackening process recognition result.
Default value: 0 mm.
Setting range: -20 mm to +20 mm (variable in 1 mm increments).

Chest Wall paintout processing:

If you select "Yes", the system automatically recognizes the white clear portion of a chest wall image at the time of image input and paints it out.

After setting the above parameters, select "OK".
("Cancel" → Cancels operation.)

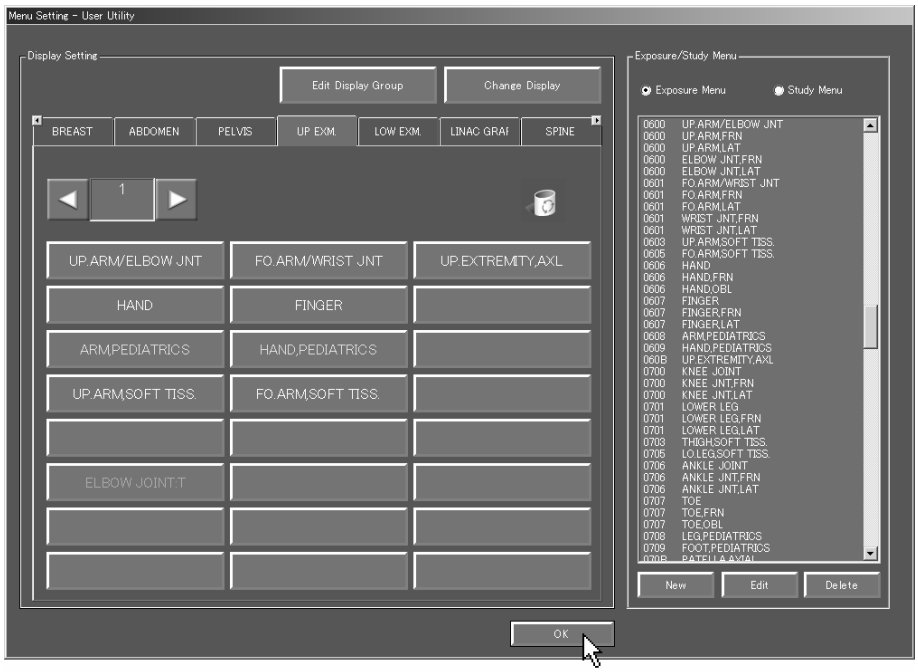


(4) Completing the update

"Menu Setting - User Utility" is redisplayed.

To update the parameters for another exposure menu, repeat the operation steps from (2).

To complete the update of parameters, select "OK" and then end the User Utility.



– Notes for performing exposures –

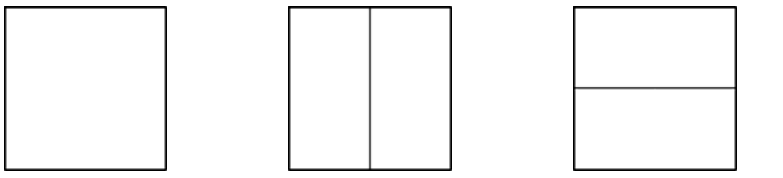
Be cautious for the following points when performing exposures to take the target images for the Automatic Blackening Processing:

○ General notes

- When performing exposures, refer to notes described in the Operation Manual (Chapter Z) of the FCR Image Reader.
- This processing does not apply to an exposure menu that involves energy subtraction or image stitching.

○ Note for split exposure

- Automatic Blackening Processing provides support to split exposure in the following patterns.



No splits　　Two vertical splits　　Two horizontal splits

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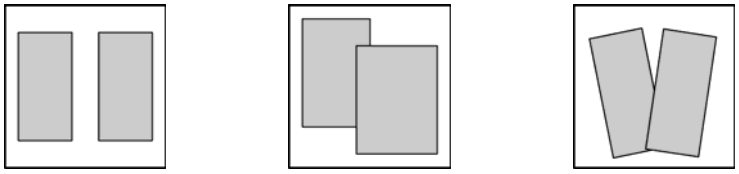
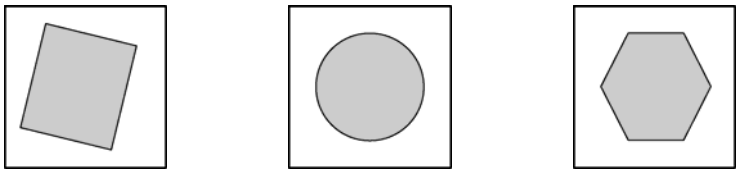
○ Notes on the irradiated field

- When performing split exposures, separate irradiated fields appropriately so that they do not overlap with each other.



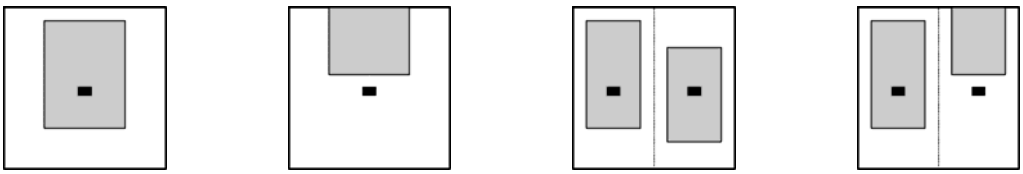
(Good) (Not good) (Not good)

- Collimation applies only to rectangles. Therefore, do not set collimation to irradiated field other than rectangles, such as circle, ellipse, semi-circle, polygon and others.



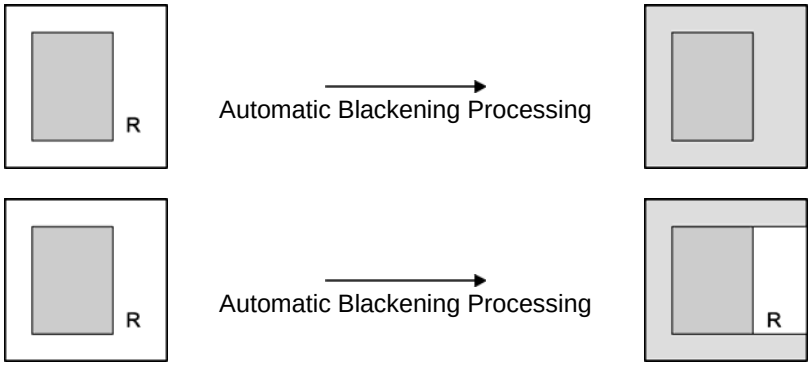
(Good) (Not good) (Not good)

- Make sure that the IP center is inside the irradiated field. For split exposures, make sure that the center of each split area is inside the irradiated field.



(Good) (Not good) (Good) (Not good)

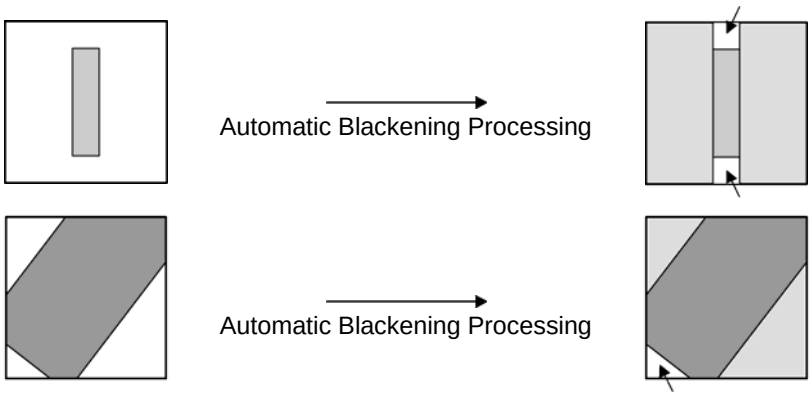
- A lead character or marker should be located within the irradiated field. If a lead character or marker is outside the irradiated field, it will be painted out by this processing or will not be recognized appropriately or will be recognized incorrectly.



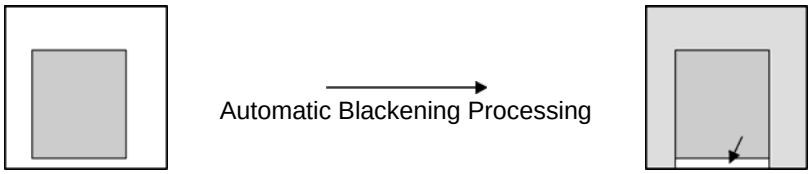
○ Other notes

In the cases shown below, an image area may not be painted out as it is not recognized correctly or it is recognized incorrectly by Automatic Blackening Processing. In such an instance, devise a proper exposure method as necessary or correct the image appropriately by using Manual Blackening Processing.

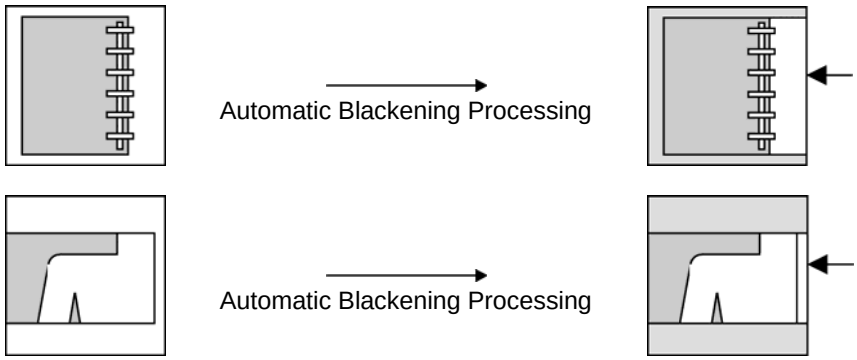
- Do not set the side of the irradiated field too short, otherwise it is highly probable that the excessively short side may not be recognized properly remaining then unpainted. (White portions marked with arrows in the illustration below represent those that were recognized erroneously or those that might not be recognized properly remaining then unpainted.)



- Do not approximate the side of the irradiated field too close to one end of the IP. It is highly probable that the side of the irradiated field positioned too close to one end of the IP will not be recognized remaining unpainted. (The white portion marked with an arrow in the illustration below represents a portion that might not be recognized remaining then unpainted.)



- Position the side of the irradiated field so that it does not overlap with an artificial object, such as a protector, or any thick subject. It is highly possible that the side of the irradiated field that appears unclear, as it overlaps with an artificial object, such as a protector, or any thick subject, will not be recognized remaining then unpainted. (The white portion marked with an arrow in the illustration below represents a portion that might not be recognized remaining then unpainted.)



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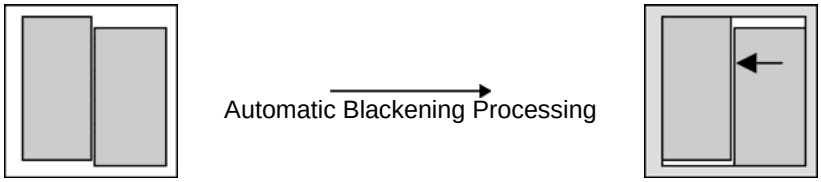
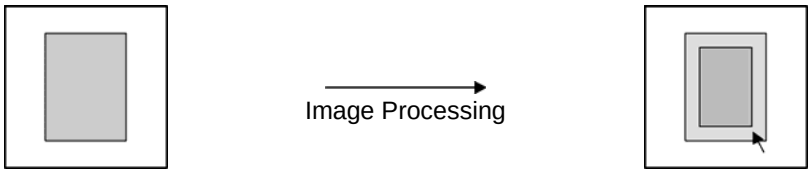
- When performing split exposures, be sure to keep sufficient space between irradiated fields. If not, probability of occurrence of failure may increase when recognizing split processing.

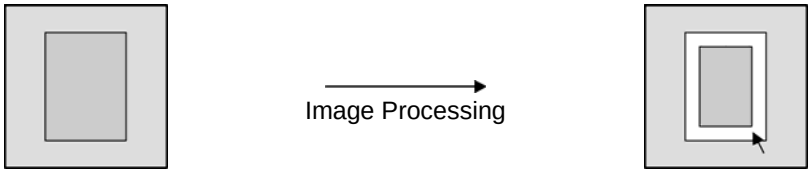


Depending on whether Blackening Processing was applied or not, image processing, such as DR compression and others, performed around the irradiated field will result in different outputs. Use Manual Blackening Processing as necessary to change the frame to be painted out slightly larger than the irradiated field.

- When no Blackening Processing was applied:



- When Blackening Processing was applied:

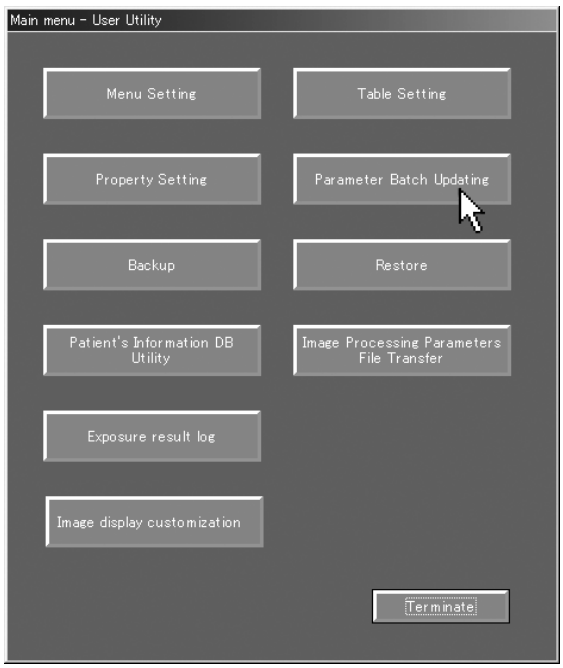


■ Updating the Parameters for All Exposure Menu

Updates the Automatic Blackening Processing parameters for all exposure menus at once. This function is only for super users, so that general users can not operate it.

(1) Starting up the User Utility → Selecting “Parameter Batch Updating”

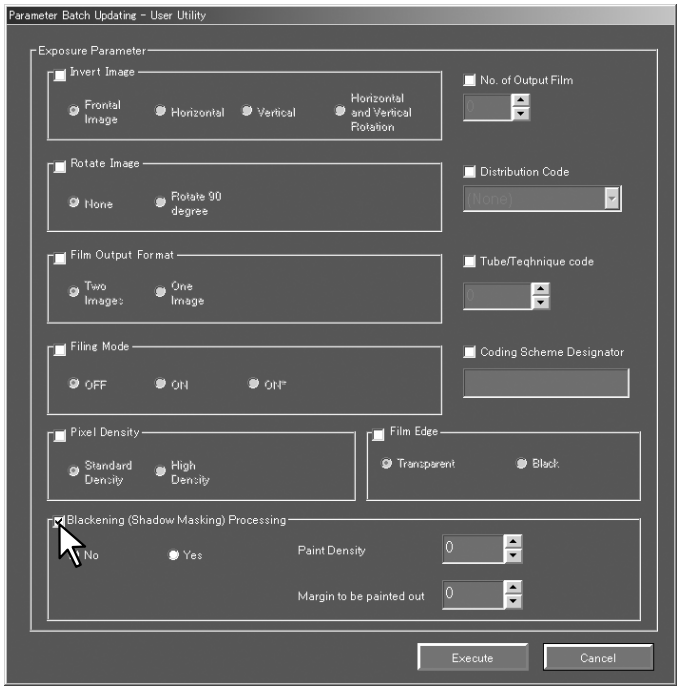
Start up the User Utility for super users, and then select “Parameter Batch Updating”.



(2) Selecting parameter

“Parameter Batch Updating - User Utility” is displayed.

Put a checkmark in the checkbox of the “Blackening (Shadow Masking) Processing” field.



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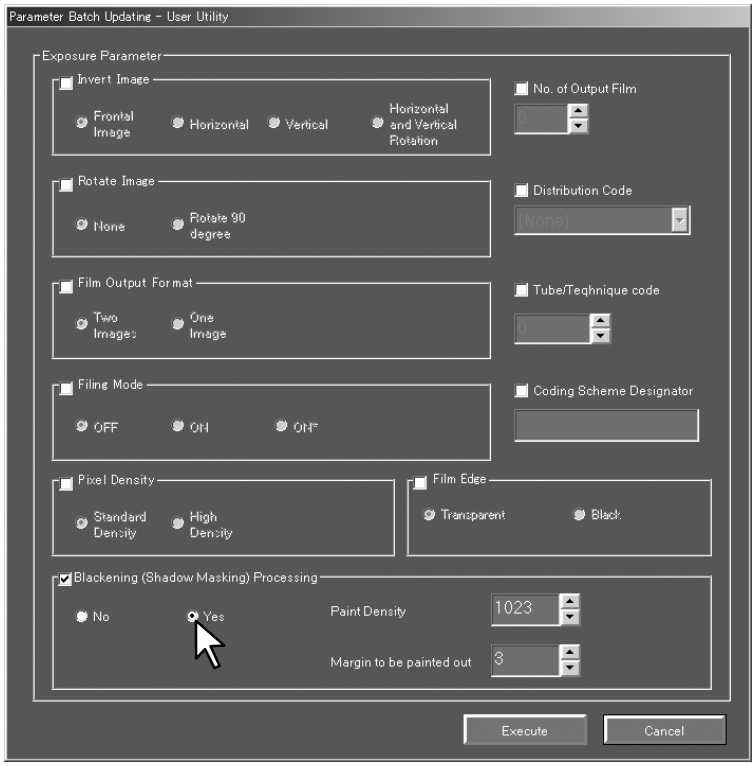
(3) Executing the update

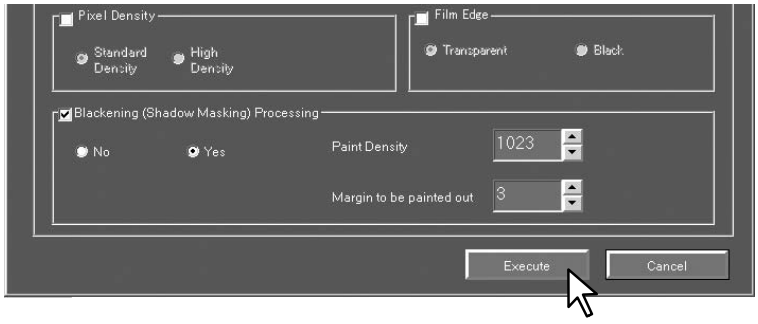
Set the parameters.

(Details of parameters → page 7)



Select “Execute” after the above parameter setting.

(“Cancel” → Cancels operation.)



2 Manual Blackening Processing

Performs differentiation/blackening of the region out of irradiated field on the specific image through operation by users. It is also possible to reprocess (correct or redo) the image to which the Automatic Blackening Processing has been performed.

(1) Displaying screen → Switching processing mode

Select the target image to be processed, display the Image Edit Screen (by image/by study), and then select “Palette 1” folder tab.

Select  . The processing mode is switched.

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When the processing mode is switched, the objects for the Blackening Processing are displayed.

 : Inputs polygon region. (page *16*)

 : Inputs rectangle region. (page *18*)

 : Deletes an input point. (page *16*, *18*)

 : Inverts the blackened region. (page *20*)

 : Switches the preview display. (page *20*)

 : Deletes all input points. (page *16*, *18*)

 : Clears the blackened region. (page *21*)

 : Reduces the image region. (page *16*)

 : Restore previous status for the operation to change the polygon region and rectangle region. (page *17*, *19*)

Status display field : When selecting as a target the image to which the Automatic Blackening Processing has been performed, “ON” is displayed at this field. (When no Automatic Blackening Processing has been performed, “OFF” is displayed here.)
When performing the Manual Blackening Processing with the result of the Automatic Blackening Processing, move to the next section’s operation.
When performing the Manual Blackening Processing after clearing the result of the Automatic Blackening Processing, clear the blackened region first (page *21*) and then move to the next section’s operation. (performing this operation clears the status display.)

(2) Inputting region

To differentiate the blackening region from other region, input polygon region or rectangle region. Perform the following operations.

The number of regions that can be input for one image are maximum eight totaling polygon regions and rectangle regions.

- Reducing an image -

Select  when you wish to reduce the image region so that one end of an image is easily specified. Selecting  with an image reduced accordingly will restore the original size.

Polygon region :

Select  and then select vertexes of the polygon (maximum 64 points) in order on the image. Selecting  during this operation deletes the prior input point, and selecting the starting point at last determines the polygon region. (Points cannot be input outside of the image region.)

To input more than one polygon, select  again and repeat the operation.

To delete all input points of this operation, select  . (The region that has been blackened is not deleted.)

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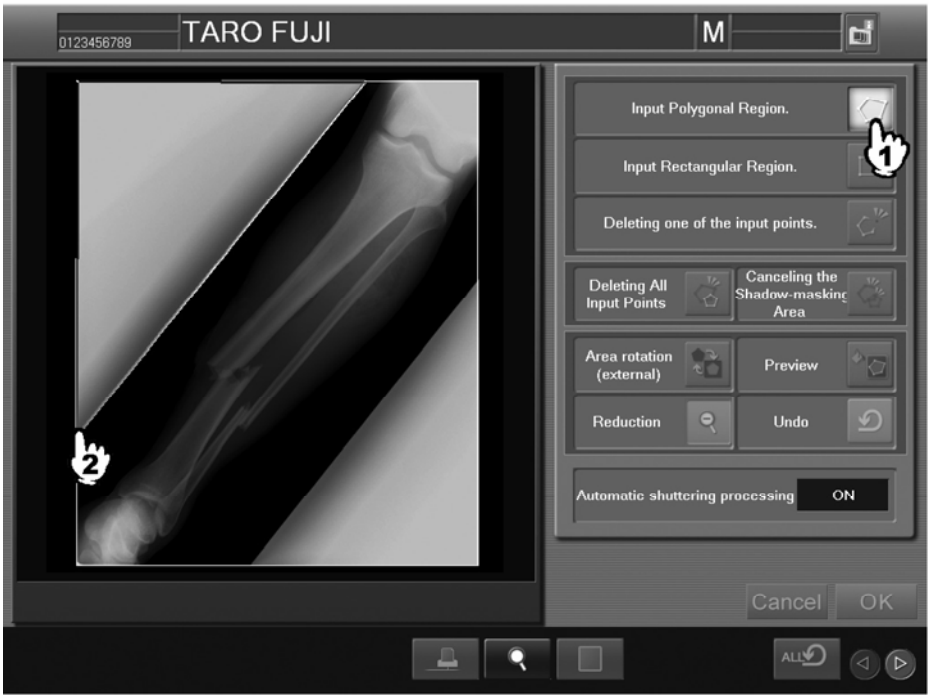
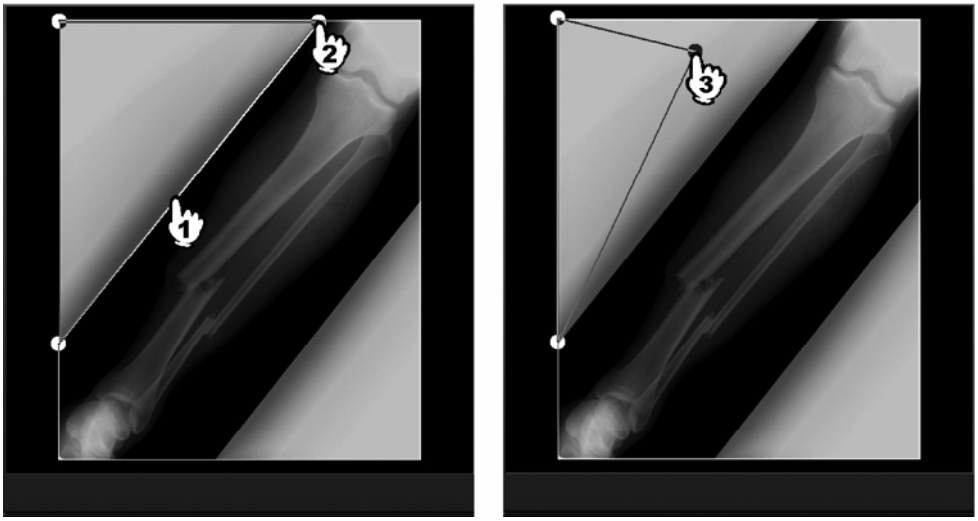


Changing the polygon region :

Select the polygon region you wish to change. Select any vertex and then move it so that the selected polygon region is changed to form a different shape.



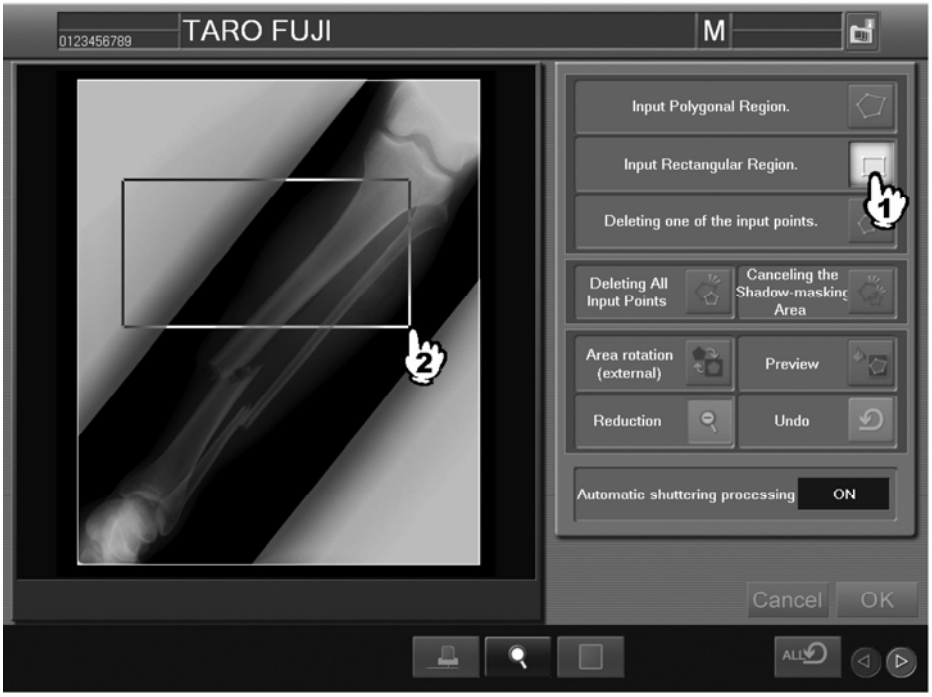
Select  to restore previous status for the operation to change the polygon region.

Rectangle region :

Select and then select the starting and ending points of the rectangle diagonal on the image. After the starting point input is done, selecting deletes the starting point, and selecting the ending point determines the rectangle region. (Points cannot be input outside of the image region.)

To input more than one rectangle, select again and repeat the operation.

To delete all input points of this operation, select . (The region that has been blackened is not deleted.)



Changing the rectangle region :

Select the rectangle region you wish to change. Select any vertex and then move it so that the selected rectangle region is changed to form a different shape.

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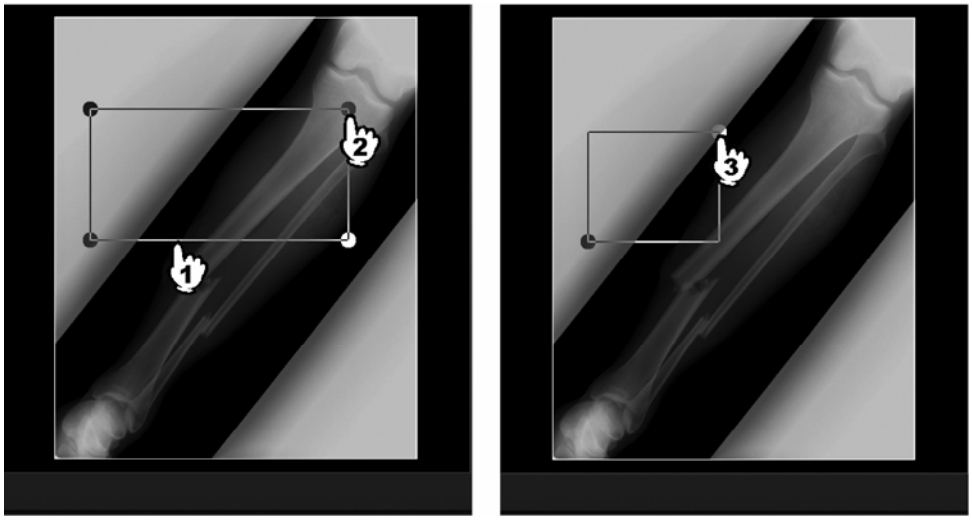


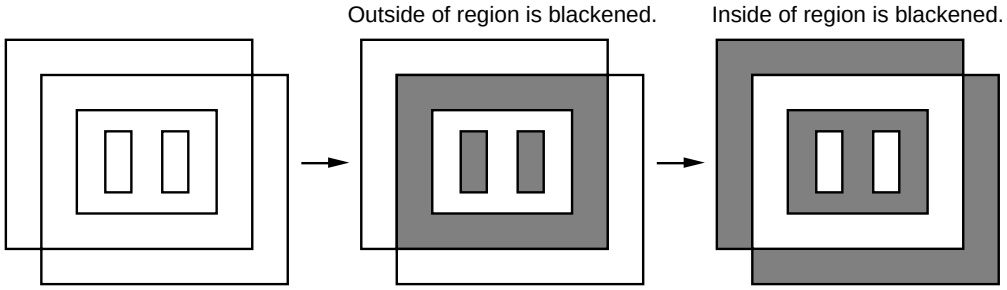
Select  to restore previous status for the operation to change the rectangle region.

(3) Displaying preview

Select . The outside of input region is blackened with the default setting. To invert the region to be blackened (outside/inside of the input region), select .

To redo the region input, select again to release the preview display and then repeat the operation steps from (2).

When polygons overlap with each other, the processing result will become as shown in the example below:



NOTE

- The paint density is reflected by the density setting (page 7) with which the image is read. Although the paint density setting is changed, this new setting does not affect read images before change. Therefore, the paint density for the same exposure menu may differ depending on the timing of image reading.

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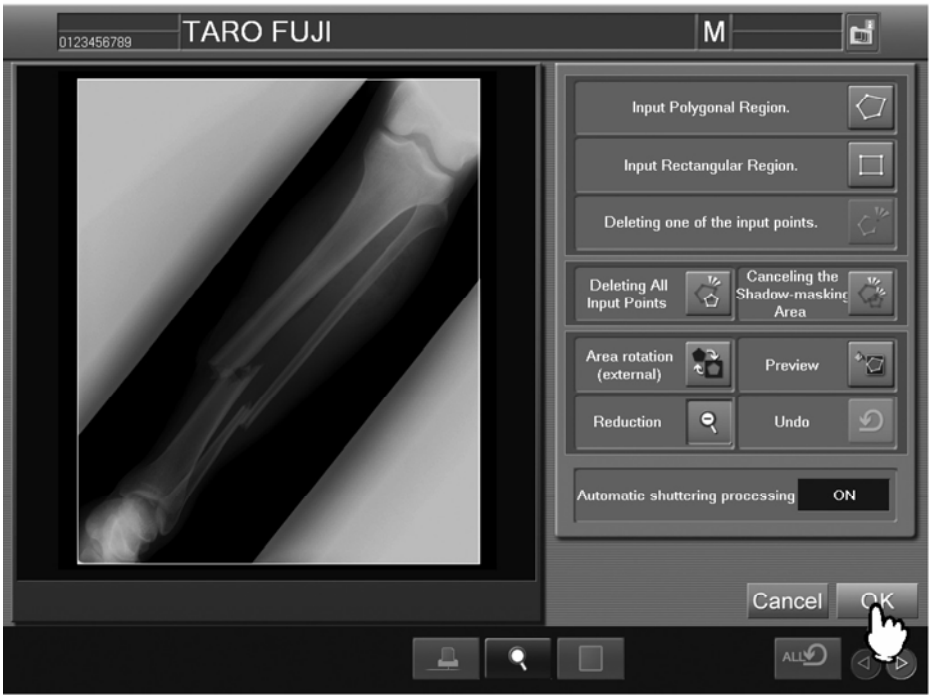
– Clearing blackened region –

When reprocessing images to which the Blackening Processing has been performed, the blackened region can be cleared and restored to the original image.

Select  .

(4) Completing processing

Select OK. The result of the processing is saved and the processing mode is returned to the previous mode.



Cancel **:** Cancels operation.

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3 Menus to Which Automatic Blackening Processing is Applicable

Automatic Blackening Processing can be applied to various menus. The table below presents menus on which the Automatic Blackening Processing can be executed, being available for providing support to the split exposure processing.

MPM	MENU
0001	SINUS, WATER'S/CALD
000B	MASTOIDS
0011	SINUS, LATERAL
0021	FACIAL BONES
0031	FACIAL BONES, LAT.
0041	PRE-MRI ORBITS
0204	CLAVICLE/AC JNTS
0600	HUMERUS
0601	FOREARM
0606	HAND
0607	FINGER
0610	ELBOW
0611	WRIST
0616	HAND, LATERAL
0620	UPPER EXT. CAST
0700	FEMUR, DISTAL
0701	TIB/FIB
0706	FOOT
0710	KNEE, AP/OBL
0711	ANKLE
0716	FOOT, LATERAL
0720	KNEE, LATERAL
0730	LOWER EXT. CAST
0731	CALCANEOUS, AXIAL

The table below presents menus on which the Automatic Blackening Processing can be executed. Note, however, that these menus do not provide support to split exposure processing.

MPM	MENU
0000	SKULL, AP/PA
0002	MANDIBLE, OBLIQUE
0003	ORBIT
0006	SKULL, PEDIATRICS
000C	SKULL, S.M.V.
000D	CEPHALOGRAPHY
000E	ZYGOMATIC ARCHES
0010	SKULL, LATERAL
0016	SKULL, PED.-1
001E	NASAL BONES, LAT.
0020	SKULL,TOWNES
0101	C-SPINE, AP/OBL
0111	C-SPINE, LAT.
0121	C-SPINE LAT.FIXED
0131	SWIMMERS FIXED
0200	CHEST, PA
0201	T-SPINE, AP

0207	CHEST,PED(0-3YRS)
0209	T-SPINE,LAT.
020B	SHOULDER
020E	CHEST, GENERAL-2
0210	CHEST, SPECIAL-1
0211	SHOULDER, “Y” VIEW
0217	CHEST, PED.-1
0220	CHEST, SPECIAL-2
0227	CHEST, NEONATE
0230	CHEST, LATERAL
0237	CHEST, PED PORT.
0240	CHEST, AP NON-GRID
0250	CHEST, PORTABLE
0260	CHEST, DECUB.
0270	CHEST, PED(4-10YRS)
0280	CHEST, AP(GRID)
02A0	CHEST, PA X-WISE
02B0	CHEST PORT X-WISE
0400	ABDOMEN, GENERAL
0402	ABDOMEN, PEDS
0410	ABDOMEN, UPRIGHT
0412	ABDOM., PED.-1
0420	ABDOMEN,DECUB.
0422	ABDOMEN,PED. PORT
0430	ABDOMEN, PORTABLE
0432	ABDOMEN, NEONATE
0440	U.G.I.
0442	PEDIATRIC G.I.
0450	B.E.
0460	S.B.F.T.
0501	L-SPINE AP/OBL
0508	HIP JOINT
050A	HIP J., PEDIATRICS
050C	HIP, X-TABLE LAT.
0511	LUMBAR, LATERAL
0518	FEMUR,PROXIMAL
051A	HIP J., PED.-1
0521	SWIMMERS
0528	HIP X-TABLE FIXED
0531	L-SPINE LAT. FIXED
070B	KNEE, SUNRISE
071B	PATL.AXL.,ARTHRO:C
1403	I.V.P.
1404	G.B./PANCREATIC DUCT

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