

OPERATION MANUAL

SOFTWARE VOLUME 2

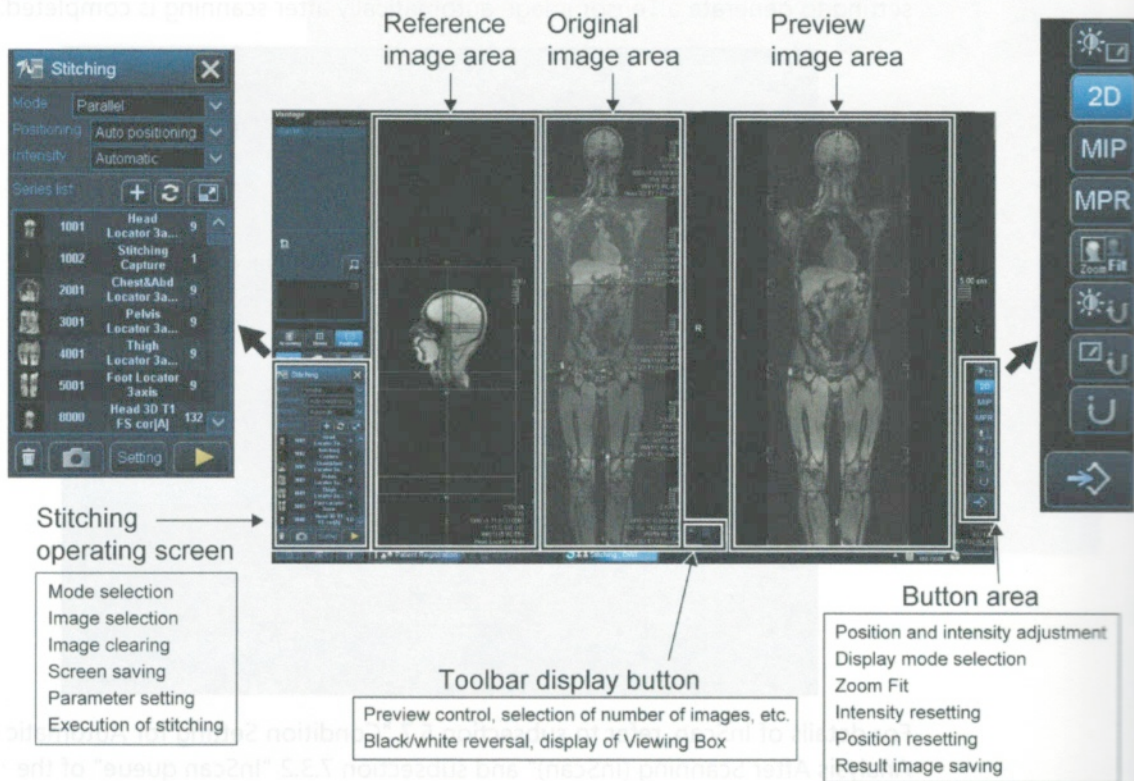
Vantage **Orian** MRT-1550

Read and understand this manual before operating the equipment.
After reading, keep this manual in an easily accessible place.

3.2.16 Stitching



Clicking the [Post Proc.] tab in the command box displays the [Stitching] icon. To start up the Stitching application, click this icon.



Stitching operating screen

System	Phase sequence
Atlas Z system	SE_EPI150 + 0.4
Titan Helios system	
Atlas X system	SE_EPI160 + 0.6
Titan system	

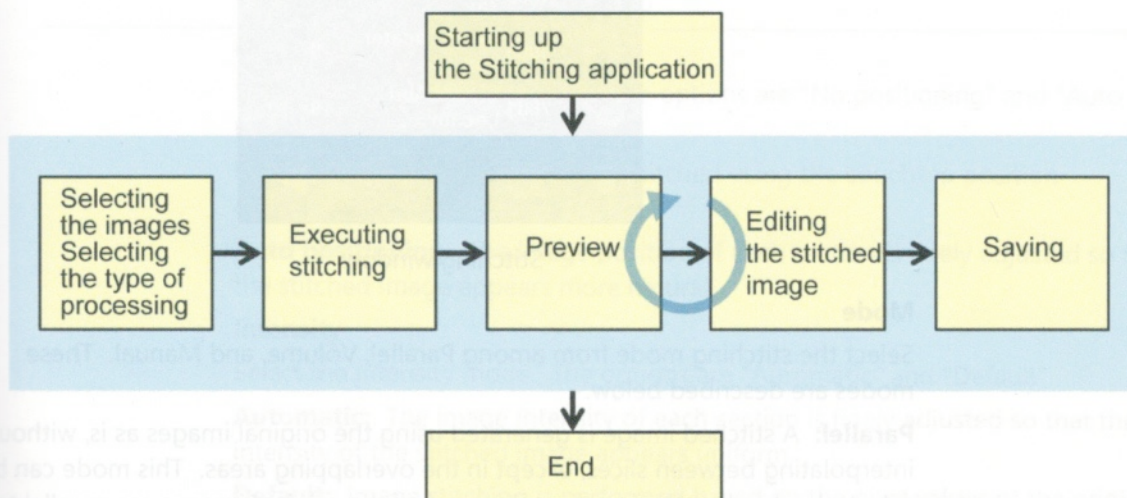
Outline of the stitching procedures

Click  on the [PostProc.] tab. The Stitching application is started up with the series containing the image displayed in frame 4 selected as the original image.

Select a set of series containing the original images to be stitched from the series list. The reference image to be used for displaying the position information for the original images can also be selected from the series list.

After selecting multiple sections of the original images to be stitched, generate a preview image by clicking . Check the preview image, adjust conditions such as the image position, intensity, and zoom ratio if necessary, and then save the stitched image by clicking . The preview image can also be used to specify the type of stitched image (2D, MIP, or MPR) and the range for generating the stitched image.

The total number of images that can be handled in stitching is limited. Refer to "General restrictions related to stitching" towards the end of this subsection.



Operations in the Stitching window



Stitching window

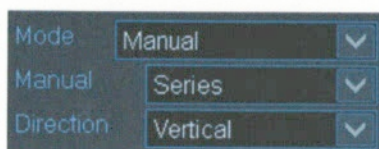
Mode

Select the stitching mode from among Parallel, Volume, and Manual. These modes are described below.

Parallel: A stitched image is generated using the original images as is, without interpolating between slices, except in the overlapping areas. This mode can be selected only when the imaging planes of all the original images are parallel to each other. Note that this mode cannot be selected when the slice direction and section progression direction are similar (axial images, for example). When MIP images are selected as the original images, Parallel mode is selected automatically.

Volume: A stitched image is generated after interpolating between slices. This mode can be selected even when the imaging planes of the original images are not parallel to each other.

Manual: Images are stitched together by the user in their display status (after panning, zooming, and/or intensity adjustment) in the original image area. When Manual mode is selected, the Manual menu is displayed in the Stitching window.



Manual menu

Manual

Select "Series" or "Image".

Series: Stitching is performed for all images in the selected series.

Image: Stitching is performed for the currently displayed images only.

Direction

Select the stitching direction. The options are "Vertical" and "Horizontal".

Vertical: The original images are stitched in the vertical direction.

Horizontal: The original images are stitched in the horizontal direction.

NOTE When the original images to be stitched are selected, the mode is selected automatically depending on the selected images. If there are gaps between original images, "Parallel" is selected. If there are no gaps between original images, "Volume" is selected. When MIP images are selected as the original images, "Parallel" is selected automatically. "Volume" cannot be selected. When the mode is changed from "Manual" to "Parallel" or "Volume", the original image area is cleared.

Positioning

Select the positioning method. The options are "No positioning" and "Auto positioning".

No positioning: The images are stitched using the couchtop position information as is.

Auto positioning: The image position of each section is finely adjusted so that the stitched image appears more natural.

Intensity

Select the intensity mode. The options are "Automatic" and "Default".

Automatic: The image intensity of each section is finely adjusted so that the intensity of the stitched image appears uniform.

Default: Image stitching is performed based on the pixel values of the original image data without adjusting the intensity.

Reference image

A series selected in the Series list of the Stitching window can be registered as the reference image by dragging and dropping it into the reference image area on the screen.

On the reference image, the position information of the original image for stitching is displayed.

NOTE A reference image cannot be displayed in Manual mode. In addition, when "Manual" is selected for Mode, the reference image area is cleared automatically.

Selecting the original images to be stitched

A series selected in the Series list of the Stitching window can be registered as an original image for stitching by dragging and dropping it into the original image area on the screen. A series can also be registered as an original image for stitching by selecting the series in the Series list and then clicking  (Add button). If original images for stitching are registered with no image displayed in the reference image area, the reference image for the selected series is automatically displayed in the reference image area.

NOTE

1. If images acquired with multiple slabs are included in a single series, such as in the case of FBI images, only the slab that includes the image currently displayed in the original image area is used for stitching. In such cases, it is necessary to display an image in the slab to be used for stitching after registering the series in the original image area.
2. To create an MIP image using Key Frame Movie in the 3D application and use it for stitching, create the images for all sections with the same conditions (rotation direction, rotation angle, number of images, volume angle, etc.) and with "Oblique Correct" set to Off. Refer to subsection 3.2.13.12 for details of Key Frame Movie. For details of Oblique Correct, refer to subsection 3.2.13.27.

Adding a scan ID keyword

By adding [*] (where * represents a specific character string) to the scan IDs of multiple series, the corresponding series can be loaded at one time. For example, when [A] is included in the scan IDs for series 8000, 11000, and 15000, display the image in series 8000 in frame 4 and then click  on the [PostProc.] tab to start the Stitching application. Alternatively, drag and drop series 8000 from the Series list into the original image area while nothing is registered to the original image area. By doing so, series 8000, 11000, and 15000 are registered at one time as the original images and displayed in the original image area. However, although the series of acquired images and the series of postprocessed images generated based on the acquired images share the same scan ID, they are not registered at one time because they are not series of the same image type. Only series of the same image type are registered at one time.

Example of [*]	Scan ID
3D TOF	[3D TOF] Head, [3D TOF] Neck
A	1st 3D TOF [A], 2nd 3D TOF [A]
1	T1w sg Head [1], T1w sg Chest [1]
T1w sg	Head [T1w sg], Chest [T1w sg]

If there are two images acquired at positions within 5 cm of each other in the series selected at one time, the image with the later series number is selected. Therefore, if the same protocol was run again at the same position, only the images acquired in the second run are selected.

Refreshing the series list

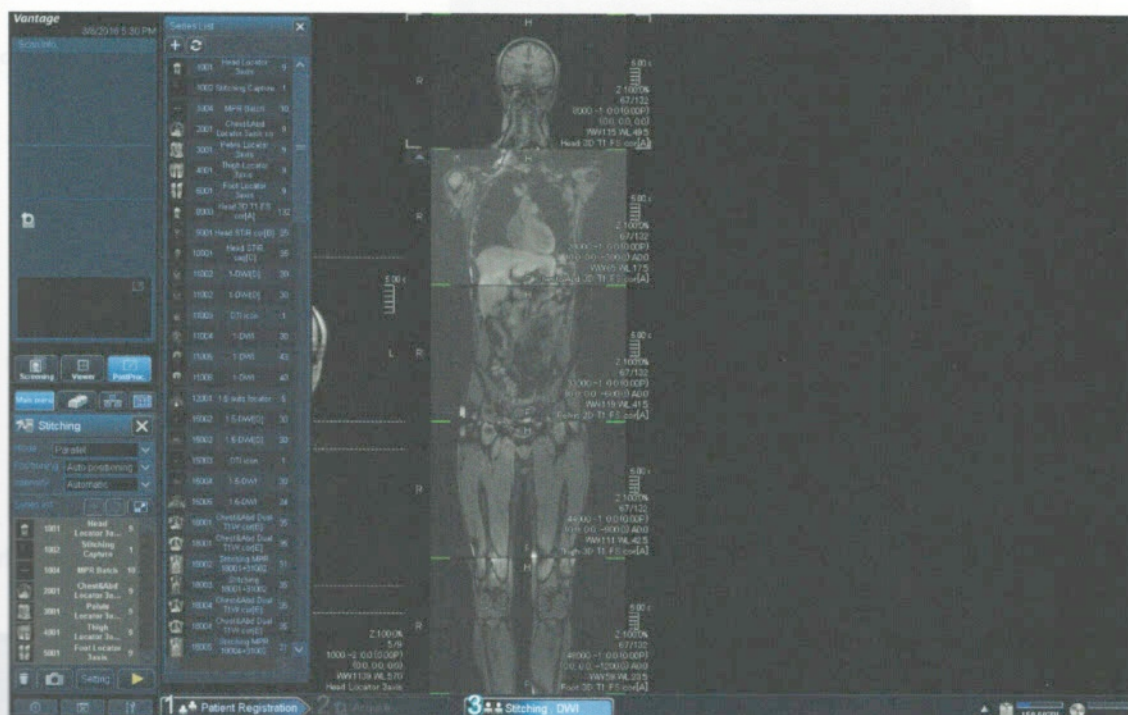
The series list can be refreshed by clicking  in the series list area.

NOTE

The series list is not updated automatically. Refresh it as required.

Expanding the series list

The expanded series list can be displayed in a separate window by clicking



Expanded series list

To close the expanded series list window, click  in the window.

Clearing the images

The images in the reference image area, original image area, or preview image area can be cleared by selecting a frame in the desired area and clicking  (Clear button). The [Delete] key on the keyboard can also be used to clear the images.

Screen save

Clicking  (Screen Save button) saves the reference image area, original image area, and preview image area as a single image. The saved image is registered as the top image in the original image area. Screen save is also possible by pressing the [Alt] + [S] keys on the keyboard. Note, however, that if the original image is not selected, screen save using this button or the [Alt] + [S] keys is not possible.

Displaying the Parameter Setting dialog

Clicking  displays the Parameter Setting dialog. However, when the preview image area is in MIP or MPR mode, this button is disabled.

Generating the preview image

When original images for several sections are registered in the original image area and  (Run button) is then clicked, the preview image is displayed in the preview image area and the Save button becomes enabled.

However, this button is disabled when the preview image area is in MIP or MPR mode.

Terminating the Stitching application

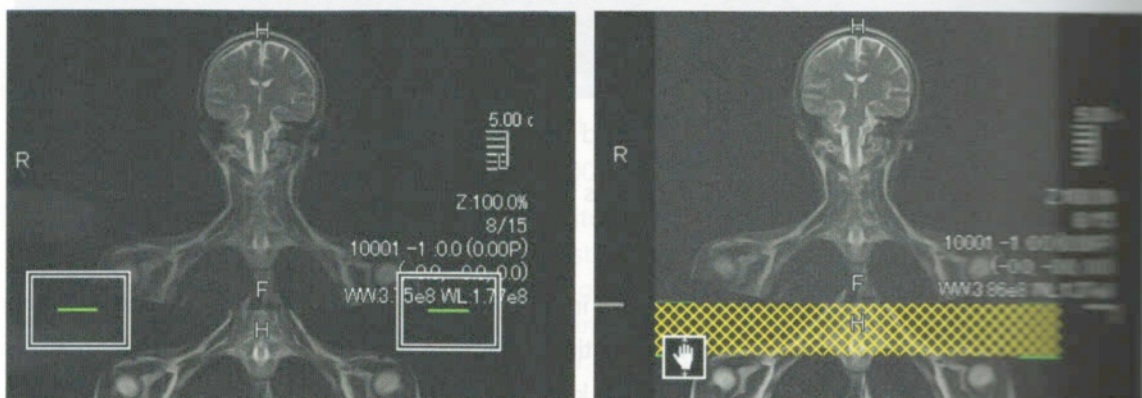
Click  at the top right corner of the Stitching window to terminate the Stitching application.

Clipping the original image

The range of overlap between the images can be adjusted by clipping the original image. It is likely that discontinuity at the image joints resulting from excessive overlap or the inclusion of unnecessary parts in the images can be reduced by clipping the original image.

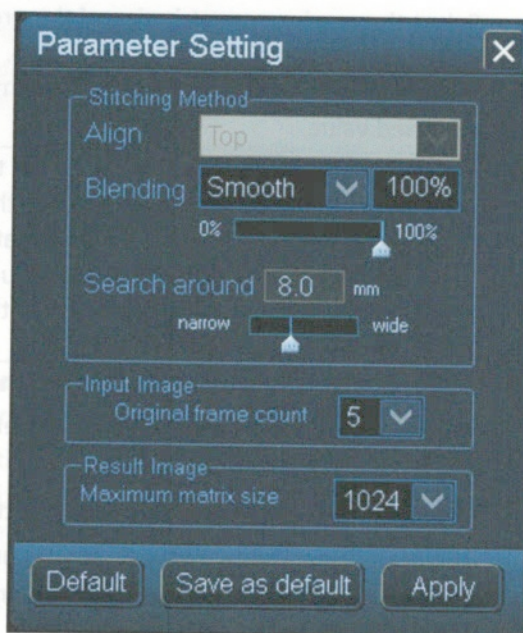
Position the mouse cursor on the green clipping line displayed on the border between frames in the original image area so that the cursor changes to .

Drag the clipping line to the desired position to specify the clipping range. The specified range (yellow hatched part) is excluded from stitching.



When the original image is an MIP image, the clipping line is set automatically at the position where the image margin is the largest in the series. Manual setting is also possible. This function reduces discontinuity at the image joints.

Operations in the Parameter Setting dialog



Parameter Setting dialog

Stitching Method: Align

The Align settings cannot be changed in this version of the software.

Stitching Method: Blending

Select the Blending mode from among Smooth, Center, Upper, and Lower.

Smooth: Images are stitched so that the image boundaries do not stand out.

Center: The overlapped section is cut at the center and then stitched.

Upper: Only the upper image is displayed in the overlapped section.

Lower: Only lower image is displayed in the overlapped section.

NOTE When the Blending mode is set to "Smooth", the blending ratio can be specified. As the blending ratio is increased, the boundaries become more indistinct.

Stitching Method: Search around

Specify the range in which searching is to be performed for the joining position. Use the slider to set this range.

This function is not effective when Mode is set to "Manual" or Positioning is set to "No positioning".

Input Image: Original frame count

Set the number of frames in the original image area in the range from 2 to 7. The default setting is 5.

Result Image: Maximum matrix size

Select the maximum matrix size of the preview image and the stitching result image from among 512, 1024, and 2048. The default setting is 1024. The images are generated so that neither dimension of the matrix size exceeds the specified value.

NOTE

When Maximum matrix size is set to 2048, the matrix size of the stitched image may be large. As a result, the number of images that can be accepted for other stitching operations or other postprocessing (3D processing etc.) operations is reduced. In addition, the load related to image transfer and processing at the transfer destination increases and the operation may be restricted.

Resetting the parameter settings to the default values

All the parameter settings in the Parameter Setting dialog can be reset to the default values by clicking **Default**.

Registering the current parameter settings as the default values

The current parameter settings in the Parameter Setting dialog can be registered as the default values by clicking **Save as Default**.

Applying the parameter settings to a preview image

When **Apply** is clicked, a preview image is generated using the current parameter settings in the Parameter Setting dialog.

Operations in the button area



Button area