

# **MVIEW User's Manual**

**SP-620**

nac Image Technology Co., Ltd.



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## **MVIEW**

### **SP-620 User's Manual**

**April 2019**

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This manual describes the MVIEW version 3.31.

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## Introduction

Use of MVIEW (this software) display and play back image files (AVI / WMV / MCFF / still picture serial number file) and perform simple analysis using actual size conversion / automatic tracking.

This user's manual provides information on operations such as settings and applications to use the software equipped with these features.

Make sure you understand the contents of this manual and the user's manual for any peripheral devices, and are familiar with the operation before photographing anything important.

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# 1

## Overview

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## 1. Overview

### 1.1 Basic Functions

The following can be performed with the MVIEW.

- Playback of image file (AVI/WMV/MCFF/BMP/JPEG/TIFF)
- Image measurement
- Automatic tracking
- Image overlay
- Display of waveform data
- Report output

This software can zoom and scroll the image.

This software can rotate and flip the image, and adjust the image quality.

This software can perform synchronized display to display multiple file images simultaneously.

This software can play video by specifying the play range, play direction and play speed.

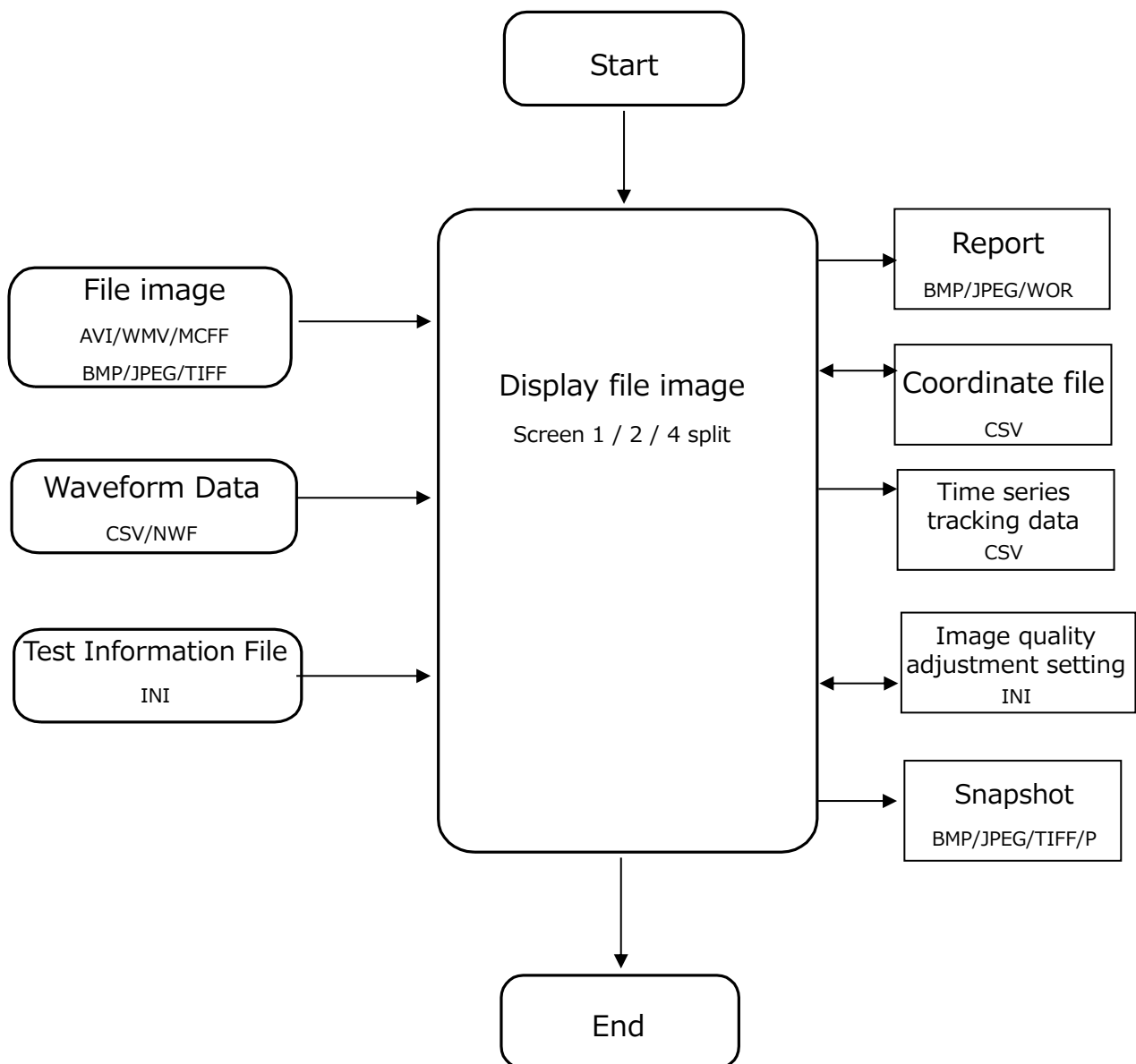
## 1.2 Overview of Operations

Launch MVIEW by double-clicking the shortcut icon on the desktop.



MVIEW shortcut icon

An overview of the flow of MVIEW operations is shown below.



# 2

# Operations

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## 2. Operations

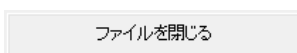
### 2.1 Display file image

#### 2.1.1 Open / Close image file

Specify 1/2/4 split with the button at the upper right of the screen, and specify the folder where the image file is located.



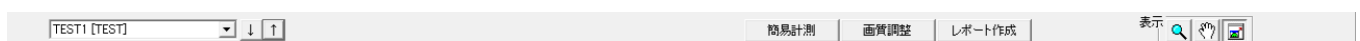
Close the displayed image file with the [Close file] button on the upper right of the screen.



#### 2.1.2 Switch image

Change the image to be displayed in the area with the up and down arrow buttons or the pull-down at the bottom of the screen. The pull-down displays a list of image files in the folder specified when opening the image file. The list shows the file names excluding the extension.

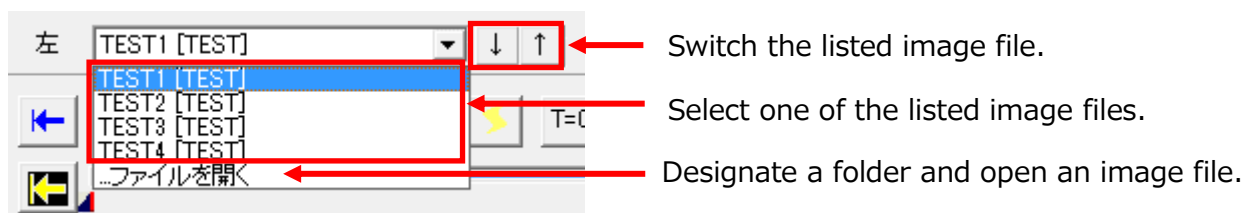
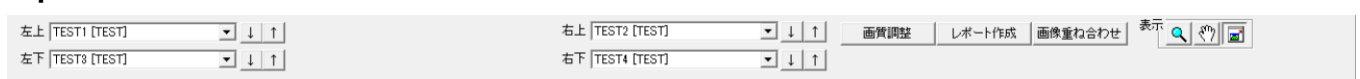
##### 1 split



##### 2 split



##### 4 split



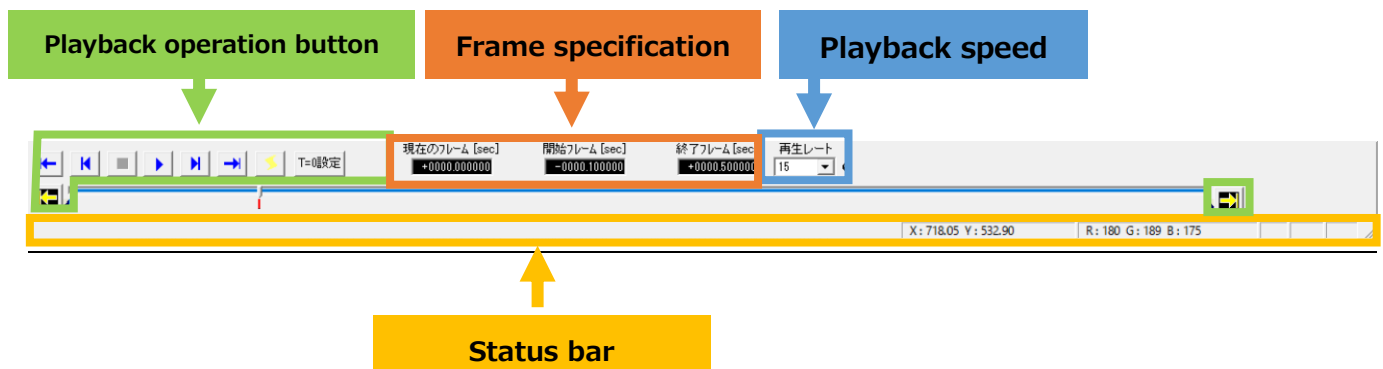
The menu [File]> [Open additional exam] opens images in other folders. Since the images in other folders are opened with the image open, files in the folder opened later are added to the pull-down.

Drag and drop the image file to open the image file.

The dropped file is opened on the split screen where the image file is dropped.










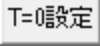
### 2.1.3 Video playback

Perform playback operation with the toolbar at the bottom of the screen.



#### Playback operation button

Click the button to operate the image file.

	Jump to Start Frame	Displays the playback start frame
	1 Frame Reverse	Gose back one frame. Press for a long time to go back quickly. Reduce playback speed during playback.
	Stop	Stop playback.
	Playback/Loop	Playback / loop playback Hold down the "Play" button or click the "Play" button during playback to start loop playback.
	1 Frame Forward	Goes one frame forward. Fast forwards if pressed for a long time. Increase playback speed during playback.
	Jump to End Frame	Displays the playback end frame.
	Trigger	Displays the trigger frame / event frame.
	Set as Start Frame	Sets the current frame to the playback start frame.
	Set as End Frame	Sets the current frame to the playback end frame.
	T=0 Setting	Sets the current frame to the T=0 frame.

### Status bar

既存の画像ファイルを開きます

When the cursor is on the toolbar, the detailed information about the button display is displayed in the left corner.

X : 208.00 Y : 234.00

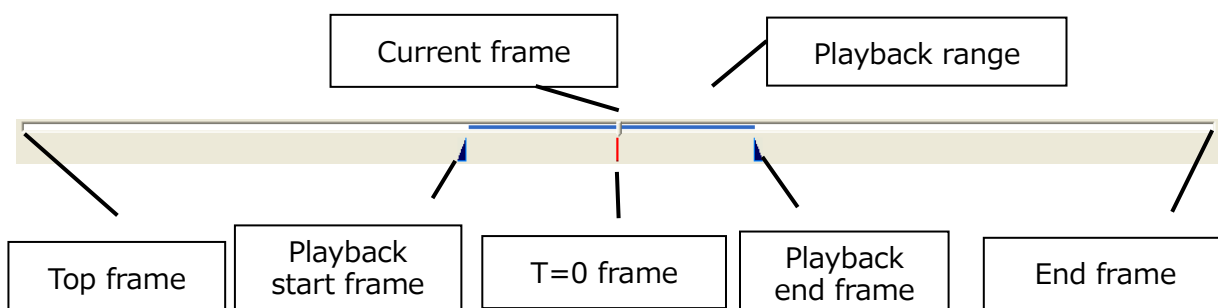
When the cursor is on the image display section, the position of the cursor with the lower left of the image as the origin is displayed.

R : 180 G : 180 B : 180

When the cursor is on the image display section, the RGB value of the image at that position is displayed.

### Playback Slider

Use the playback slider to designate the playback frame or playback range. The current frame.



The current frame, play range start frame and end frame are changed by dragging.

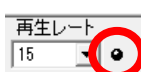
Also, by moving the mouse wheel up and down with the playback slider in place, the current frame moves back and forth.

### Playback speed

Use the frame by frame button to change the frame rate during playback.

-1920,-960,-480,-240,-120,-60,-30,-15,-7.5,-3.7,-1.8,-1,

1,1.8,3.7,7.5,15,30,60,120,240,480,960,1920 Unit:pps



Dropped Frame Verification Indicator

Verifies dropped frames by the color of the indicator.

(green: no dropped frames; yellow: dropped frames; black: disabled)

## - Operations -

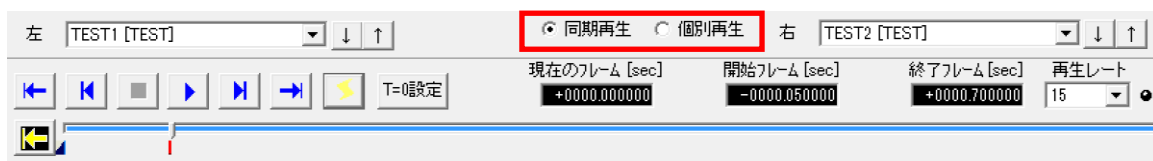
- In “->->->” and “<-<-<-” in the “Playback Rate” pull-down menu  
 “->->->” is the fastest frame rate that does not drop frames and plays in the forward direction.  
 “<-<-<-” is the fastest frame rate that does not drop frames and plays in the reverse direction.
- During separate playback in 2-split mode, if the same file is opened on the left and right, the same playback rate is applied to both images.

Frame specification

The current frame, the start frame and the end frame of the playback range can be specified by numerical input.

Synchronization operation of playback / individual operation of playback

Playback can be switched between synchronous operation and individual operation only when dividing into two.



**Sync Playback** Display the same time frame on 2 screens.



**Async Playback** Two images can be played back independently.

Display tool

The display tool has three tools: [Zoom tool], [Hand tool], and [Show whole image].

- Zoom Tool Zoom in and out of the image with a mouse click.
- Hand Tool Scroll the image by mouse drag.
- Display Entire Image Display the image so that the entire image fits in the screen.

## T=0 Setting

"T=0 Setting" means changing any frame to frame number 0.

At the end of recording, the frame where the trigger signal is input is 0.

The image file frame number verifies the photographed image and sets the T=0 setting so the frame number for the desired frame can be set to 0.

In addition, the frame where the trigger signal is input can be set to the T=0 frame by performing [T = 0 reset] from the "Control" menu.

Both T = 0 set / T = 0 reset apply to all displayed images.

In addition, only in the case of split display and async playback, the [T = 0 set] button on the left image side applies the T = 0 setting to the left image, and the [T = 0 set] button on the right image side applies the T = 0 setting to the right image.

When the same file is opened on the left and right, the [T = 0 setting] button on the right image side can not be pressed. In this case, the same frame is set as T = 0 frame in both left and right images by setting T = 0 with the [T = 0 setting] button on the left image side.

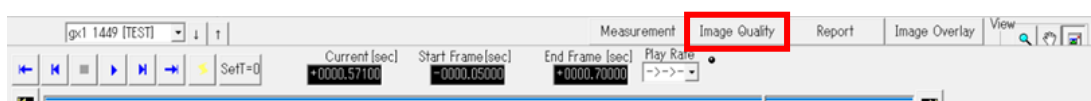
### 2.1.4 Adjust Image Quality

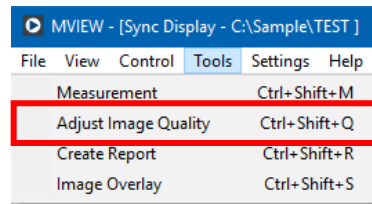
Adjust parameters related to image quality such as brightness characteristics, color balance and saturation for each image.

Automatic tracking, report creation, and image overlay are analyzed and output based on the image quality adjusted here.

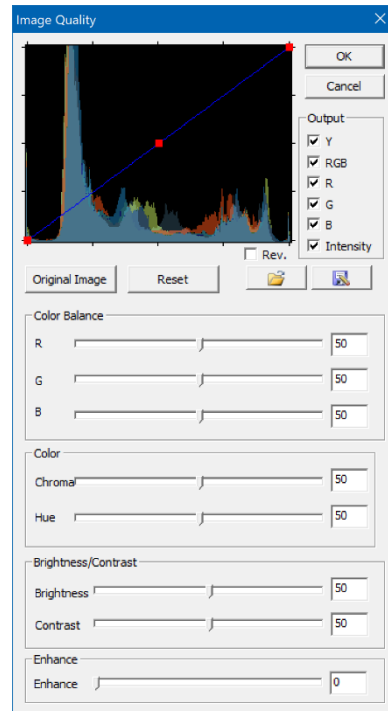
**note**

- The image quality can be adjusted only for 24-bit image files. The image quality can not be adjusted for image files other than 24 bit, such as black and white images and 32 bit color images including alpha channel.
- Image quality adjustment is not possible for MCFF image files that are displayed in reverse (up and down, left and right)
- Image quality adjustment is reset if the image is rotated after image quality adjustment.





The following image quality adjustment screen is displayed in [Image quality].



The result of image quality adjustment is reflected in the image display area and the histogram of the "Image quality" screen.

It is easy to compare images before and after image quality adjustment by turning on / off the "Original Image" button.

The histogram display can be switched on / off for each component of R, G, B, and Y by the "Output" check box.

### □ Image switching for image quality adjustment

When image quality adjustment is performed in 2 or 4 split screen, a red frame is displayed on the image for image quality adjustment. By clicking each divided image with the mouse, the image for image quality adjustment is switched.

When the target is switched, the image quality adjustment is applied to the image selected immediately before the switch. Clicking [OK] on the image quality adjustment screen applies the image quality adjustment change to the currently selected target image and closes the image quality adjustment screen.

Click [Cancel] to cancel the image quality adjustment change to the currently selected target image and close the image quality adjustment screen. The image quality adjustment applied by switching objects is still applied even if it is canceled.

If the same file is opened in multiple split areas at the same time, the image quality adjustment is applied to all the split areas of the same file.

### □ Luminance Properties

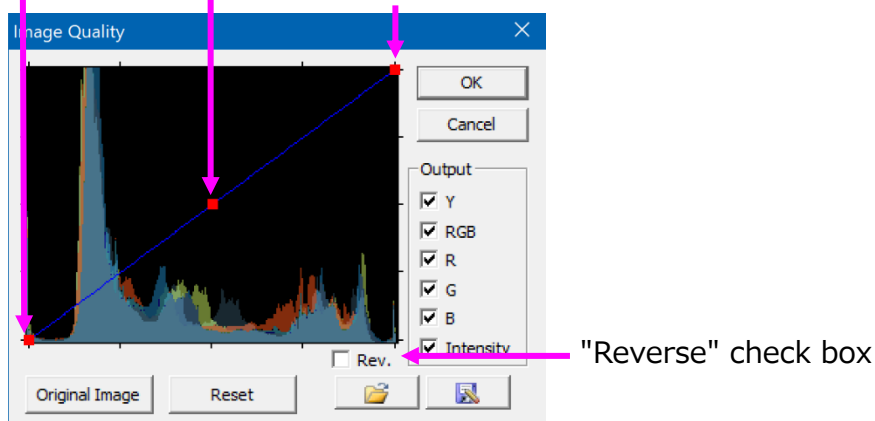
When the [Intensity] check box is turned on, the knob "■" for specifying the luminance characteristics is displayed on the histogram, and dragging with the mouse changes the luminance input / output conversion characteristics.

When the "Rev." check box is turned on, the luminance is displayed inverted.

Specify the minimum intensity input value by dragging the left button.

Adjust the gamma value by dragging the left button.

Specify the maximum luminance input value by dragging the left button.

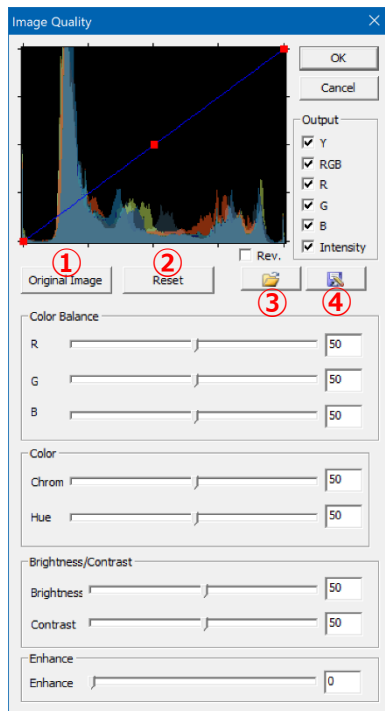


## □ Image Quality

Adjust color balance (RGB gain) and saturation, hue, brightness, contrast, and enhancement.

For adjustment, enter a numerical value or drag the knob.

Fine-tuning is easy by clicking the knob and using the keyboard left and right keys.



① Switch between the original image and the image after image quality adjustment.

② Restore image quality adjustment settings to original.

③ Loads the image quality adjustment settings from the file and reflects them on the image.

④ Save the image quality adjustment settings to a file.

- Color Balance: Specify R, G and B gains as integers of 0 to 100 respectively.
- Chroma: Specify as an integer from 0 to 100.
- Hue: Adjust the color tone with an integer from 0 to 100.
- Brightness: Adjust the brightness with an integer from 0 to 100.
- Contrast: Adjust the contrast with an integer from 0 to 100.
- Enhance: Adjust with an integer from 0 to 3.

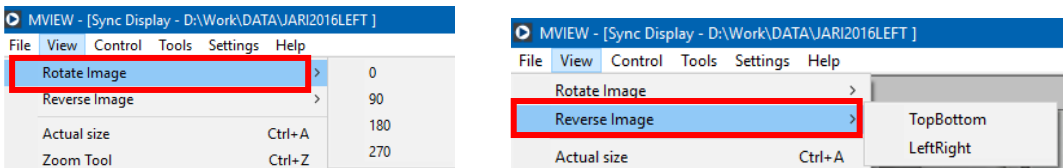
The numbers 0 to 3 are each Indicates  
0: OFF, 1: LOW, 2: NORMAL, 3: HIGH.

Refer to "Appendix C Input / Output Data File Format (p. 59)" for the format of the image adjustment file.

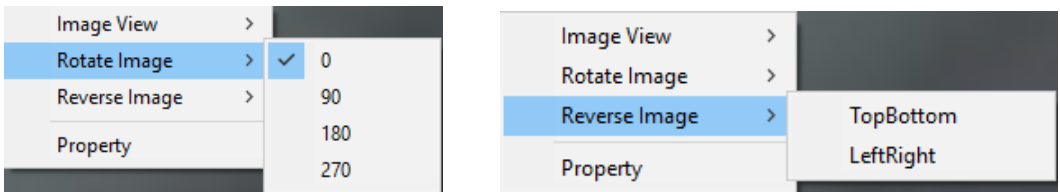
**2.1.5 Rotate Image · Reverse Image**

For each image, rotate the image by 90 degrees, or flip it horizontally and vertically. Automatic tracking, report creation, and image overlay are analyzed and output based on the image rotation and inversion set here.

- Rotate Image : Rotates the image clockwise by 90 degrees relative to the original image.
- Reverse Image : Reverse the image horizontally and vertically with respect to the original image.



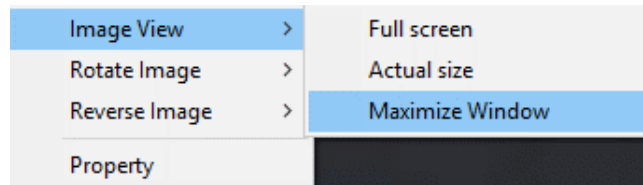
When performing image rotation / reversing from the "View" menu, the specified image rotation / reversing is performed for all currently displayed images.



When image rotation / reversal is executed from the menu displayed by right-clicking an image, image rotation / reversal is performed for one image clicked on right.  
The check mark is displayed for the currently applied image rotation / reversal.

### 2.1.6 Maximize Window

When the image is opened in 2 or 4 split screen, enabling "Maximize Window" allows individual images to be displayed on the entire screen as in 1 split.



If [Image View]> [Maximize Window] is enabled from the menu that is displayed by right-clicking an image, one right-clicked image will be displayed on the entire screen in the same way as when dividing into one.

When "Maximize Window" is activated, simple measurement can not be used in 2 and 4 split screen. Also, if image overlay is applied before window maximization, it will continue to apply after window maximization, so images can be superimposed and displayed on a large screen.

Again, when "Window Maximize" is executed, "Window Maximize" becomes invalid and returns to the original number of divisions.

Simple measurement can not be continued or the result can not be displayed on the screen with the original number of divisions, but since the measurement result is retained, measurement can be resumed by enabling "Window Maximization".

## 2.1.7 Display of waveform data

If there are waveform files (CSV, NWF) in the folder, the graph will be displayed automatically.

### • Correspondence waveform file format

#### CSV file

Comma-delimited text file generated by Microsoft Excel etc. Refer to "Appendix C Input / Output Data File Format (p. 59)" for the format of the CSV file that can be displayed.

#### NWF file

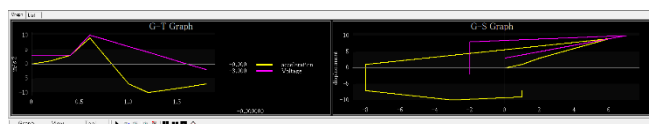
Our application A waveform data file generated by HXLink's optional product "MEMRECAM waveform input software".

### • Graph / List display of waveform data

The graph display and the list display of data are switched from the tab button at the top of the graph screen.

#### CSV file

##### graph



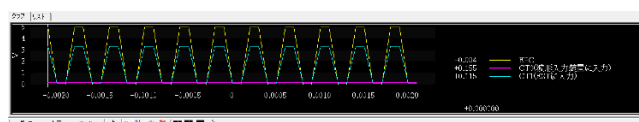
##### List

Graph List					
Sample No.	Time(sec)	strokevalue [mm]	strokevalue [mm]	G-T Graph Value [mm]	G-S Graph Value [mm]
0	0.00000	0.00000	0.00000	0.00000	0.00000
1	0.00000	0.00000	0.00000	0.00000	0.00000
2	0.00000	0.00000	0.00000	0.00000	0.00000
3	0.00000	0.00000	0.00000	0.00000	0.00000
4	0.00000	0.00000	0.00000	0.00000	0.00000
5	0.00000	0.00000	0.00000	0.00000	0.00000
6	0.00000	0.00000	0.00000	0.00000	0.00000
7	0.00000	0.00000	0.00000	0.00000	0.00000
8	0.00000	0.00000	0.00000	0.00000	0.00000
9	0.00000	0.00000	0.00000	0.00000	0.00000

Two graphs of time and stroke are displayed. The horizontal axis of the left G-T graph is time. The horizontal axis of the right-side G-S graph is the stroke from the reference. The vertical axis is the input value of the channel. Stroke data is also output to the list.

#### NWF ファイル

##### graph



##### List

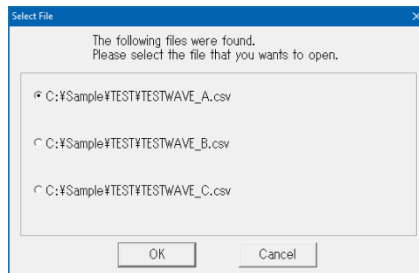
Sample No.	Time(sec)	strokevalue [mm]	strokevalue [mm]	G-T Graph Value [mm]	G-S Graph Value [mm]
0	0.00000	0.00000	0.00000	0.00000	0.00000
1	0.00000	0.00000	0.00000	0.00000	0.00000
2	0.00000	0.00000	0.00000	0.00000	0.00000
3	0.00000	0.00000	0.00000	0.00000	0.00000
4	0.00000	0.00000	0.00000	0.00000	0.00000
5	0.00000	0.00000	0.00000	0.00000	0.00000
6	0.00000	0.00000	0.00000	0.00000	0.00000
7	0.00000	0.00000	0.00000	0.00000	0.00000
8	0.00000	0.00000	0.00000	0.00000	0.00000
9	0.00000	0.00000	0.00000	0.00000	0.00000

Only graphs of time are displayed. There is no graph of strokes, one graph is displayed.

The horizontal axis is time, and the vertical axis is the input value of the channel.

### • Waveform file selection

If there are multiple waveform files in the folder, the following waveform file selection screen is displayed.

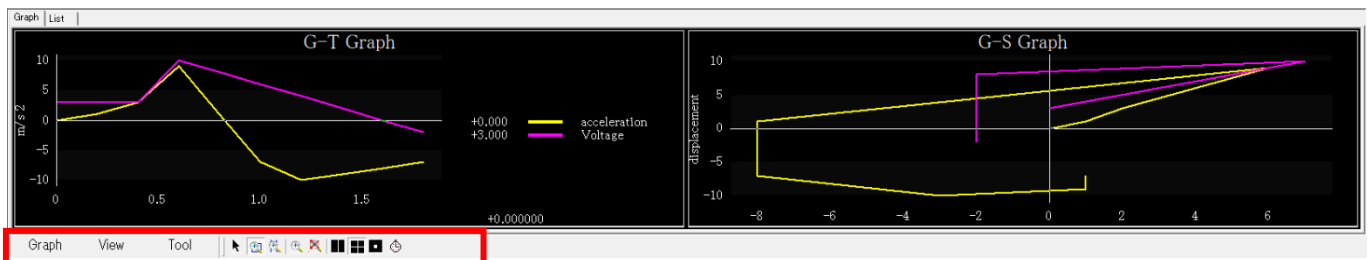


Once a waveform file has been opened, it can not be switched with another waveform file unless the file is closed and the test folder is reopened.

Click [Cancel] to display only the image file without opening the waveform file.

### • Graph Operation

The graph operation is performed using the "waveform data control bar" in the red frame in the figure below.



#### Graph Button

The following menu is displayed by clicking "Graph" on the "Waveform Data Control Bar".

Properties...

Hide/Display Graph

#### • Properties...

Displays the settings for waveform data sampling.

#### • Hide/Display Graph

Switches the graph display ON / OFF.

#### View Button

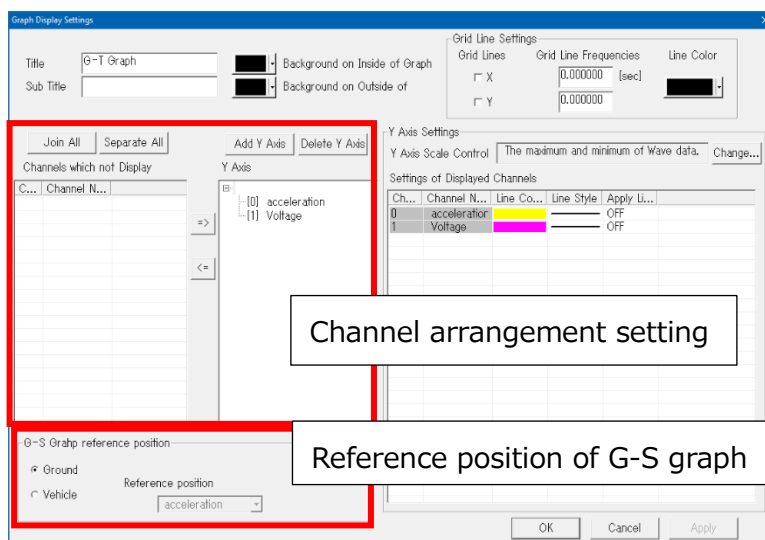
The following menu is displayed by clicking "View" on the "Waveform Data Control Bar".

Display Settings...

Cursor Style

Legend

## • Graph Display Settings



### Channel arrangement setting

- Join All**      Displays all used channels on one Y-axis.
- Separate All**      Display all used channels on separate Y-axis.
- Add Y Axis**      Add Y axis on the graph. The added Y axis is added to "Y Axis". Y-axis name can be changed in "Y Axis".
- Delete Y Axis**      Deletes the Y axis selected in "Y Axis". If a channel is registered on the Y axis, that channel will be moved to "Channels which not Display".
- =>**      The channel selected in "Channels which not Display" is registered to the Y-axis selected in "Y Axis", and the graph is displayed.
- <=**      Move the channel selected in "Y Axis" to "Channels which not Display" and delete it from the graph.

### G-S Graph reference position (Only CSV file can be set)

- Ground**      The channel data is displayed as it is in the GS graph, as it is referenced to the ground.
- Vehicle**      Specify the reference channel from the waveform data. Displays the stroke with the specified channel in the G-S graph.

## • Cursor Style

Select the cursor shape that indicates the current position of the graph from vertical line / cross line / square.

- **Legend**

Turns ON / OFF the numerical value display for each channel displayed in the graph of NWF file and G-T Graph of CSV file.

### Tool Button

The following menu is displayed when you click "Tool" in "Waveform Data Manipulation Bar".

Move current frame

Rectangular zoom

Band zoom

Zoom in on Playback Range

Reset Zoom

Set this Graph as Tick Master

- **Select the mouse operation on the graph.**

Move current frame

Rectangular zoom

Band zoom

- **Zoom of playback range**

Only the waveform data corresponding to the playback range of the image is zoomed and displayed.

- **Cancel zoom**

Unzoom the graph to display all recorded waveform data.

- **Use this graph as a reference for time ticks during playback**

Sets the playback speed reference to the waveform data sampling frequency.

If the image recording speed is 1000 pps and the waveform sampling frequency is 10,000 Hz and the playback speed is 30 fps, the waveform data will be advanced by 30 pieces per second, and the image will be updated three times in one second.

## Tool Buttons

The functions of the "tool button" in the "waveform data control bar" are as follows.



Move current frame.

Drag the mouse on the graph to move the current position of the waveform data.



Rectangular zoom.

The specified range on the graph is enlarged and displayed.



Band zoom.

Displays waveform data in a specified range on the graph.



Zoom of playback range. Only the waveform data corresponding to the playback range of the image is zoomed and displayed.



Cancel zoom.

Cancel zooming and display all recorded waveform data.



Makes the cursor shape a vertical line.



Makes the cursor shape a crosshair.



Make the cursor shape a square.



Sets the playback speed reference to the waveform data sampling frequency.

### 2.1.8 Snapshot

Saves the currently displayed image display screen as a still image file (BMP, JPEG, TIFF, PNG). The contents displayed on the image display screen, such as image zoom, coordinate axes and measurement points of simple measurement, and image superposition, are output as they are to the image file.

Graphs and images can be combined into a single image file and snapshots can be taken. By displaying the graph screen, an image file in which the currently displayed image and the graph are combined into one is saved.

When a snapshot is taken, a file name indicating the snapshot acquisition date is automatically assigned to the save destination folder of the specified snapshot, and is saved in the specified image file format.

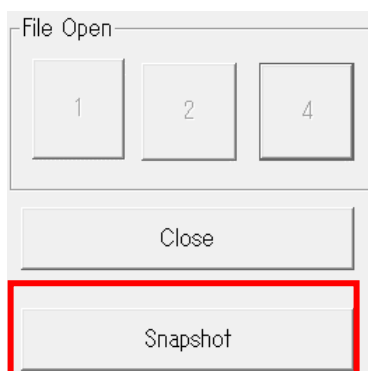
Example) File name when snapshot is acquired in JPEG format at 20:05:40 on September 1, 2018  
201820180901\_20054.jpg

\* If snapshots are taken multiple times at the same time, branch numbers will be added at the end of the date and time.

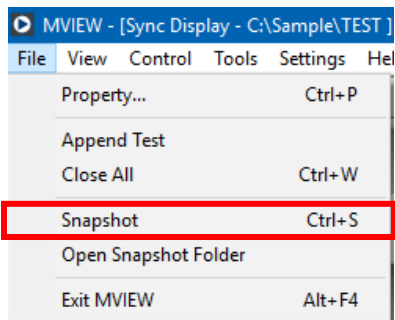
#### ☐ Method of snapshot

There are three ways to take snapshots:

- [Snapshot] button pressed



- Menu [File] >[Snapshot]

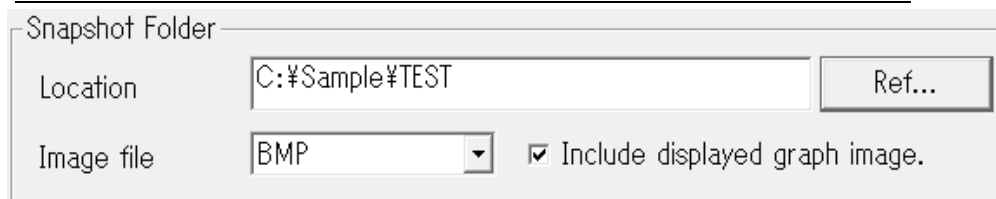


- Keyboard shortcut Ctrl + S

#### ☐ **Open Snapshot Folder**

From the [File]> [Open Snapshot Save Destination] menu, the save destination folder for snapshot images is opened.

#### ☐ **Change the snapshot save destination and image file format**



From the menu [Settings]> [Options], the destination folder for snapshot images and the file format of snapshot images are changed.

#### ☐ **Snapshot images and graphs at the same time**

When a snapshot is taken with the graph screen displayed, the image and graph are saved as a snapshot image consisting of one image file.

When the numerical value list is displayed or the graph is zoomed, the numerical value list or the zoomed graph is output as it is to the snapshot image.

If the graph screen is hidden, the graph or number list is not output to the snapshot image.

Also, if [Include graph screen currently displayed in image] in [Option] is unchecked, the graph or numerical list will not be output as a snapshot image even if the graph screen is displayed.

MVIEW has the following measurement functions.

- |                 |  |
|-----------------|--|
| ■ Measurement   | Manually specify the measurement point on the image and measure the movement distance of the measurement point.  |
| ■ Auto tracking | By specifying tracking points of up to 5 points and automatically tracking markers and feature points, it is possible to measure changes in movement trajectory and position, etc. |

Simple measurement can be performed in the 1-split display mode by splitting the image into 1 or by maximizing the window.



The main steps of measurement are as follows.

- 1) Set the coordinate system on the screen.
- 2) Specify reference segment and actual length on the screen.
- 3) Specify measurement points (fixed points or tracking points) on the image.
- 4) Automatically track the tracking point.

Below is a description of each step.

### 1) Set the coordinate system on the screen.

Select [Set coord syst.] And press the left mouse button on the screen to set the origin. Moving the mouse while holding down the left button tilts the coordinate system.

The coordinate system origin is input numerically with the lower left of the image as the origin. The angle is input counterclockwise as a plus.

The X axis is displayed in red and the Y axis is displayed in green.

Checking [Visible] turns on / off the display of the coordinate system.

### 2) Specify reference segment and actual length on the screen.

Select [Set ref length] and press the start point of the reference line with the mouse on the screen. Drag and release the mouse at the end of the line.

Next, enter the length (actual length) of the reference line. As the unit, select mm / cm / m or enter an arbitrary unit from the keyboard.

The start / end point of the reference line can also be input numerically with the lower left of the image as the origin.

Check [Visible] to turn on / off the display of the reference line.

### 3) Specify measurement points on the image

Select [Add points] and click on the screen to add measurement points.

When [Fixed] is selected from [Point type], the added measurement points become fixed points.

If [Tracking] is selected and tracking points are added, [Tracking control] allows tracking of tracking points and deletion of tracking results. For details, refer to "2.2.2 Auto Tracking (p. 27)".

Checking [Visible] turns on / off the display of all measurement points.

When [Show selected point] is selected, only the measurement points selected in the list will be displayed on the screen.

When [Show only '+' mark] is selected, the number (No.) of the measurement point is not displayed on the screen.

When [Show tracks] is selected, the locus of the tracking result of the tracking point is displayed on the screen.

In [Color], specify the display color of the locus of measurement point / tracking point.

Visible	No.	Name	X [mm]	Y [mm]	Angle [deg]	Relative time [sec]	Type	Track status
<input checked="" type="checkbox"/>	1	Point1	87.13	165.64	62.25	0.571000	Fixed	-
<input checked="" type="checkbox"/>	2	Track2	698.04	362.54	27.45	0.573000	Track	Done

When the [Display] check in the list is switched ON / OFF, it is possible to switch between displaying / not displaying any measurement point on the screen.

Select the measurement point by selecting the measurement point from the measurement point list or clicking the number part of the measurement point on the screen. However, if [Show only '+' mark] is enabled, the measurement point number can not be displayed, so it is not possible to select the measurement point by clicking on the screen.



The measurement results X and Y are the actual distances from the coordinate system origin. The angle is the angle [°] with the X axis of the coordinate system. The counterclockwise is positive.

**Change**

Change the position and color of the measurement point selected in the list.  
When the position of the tracking point is changed, only the current frame is changed. The name and type of measurement point can not be changed.

**Delete**

Deletes the measurement point selected in the list.

**Delete all**

Delete all measurement points.

**Import**

Import coordinate system, reference line, measurement result from exported CSV file. All coordinate systems, reference lines, and measurement points set before import are deleted. Also, measurement points that were tracking points at the time of export are imported as fixed points.

**Export**

Output the coordinate system, reference segment, and measurement point list to a CSV file. In the measurement point list, the values of X, Y, angle, and relative time of all measurement points are output as displayed on the measurement point list screen. For the tracking point, the measurement result displayed on the measurement point list screen is output.

**Save as timeline**

The tracking results are output to a CSV file as time series data.

Refer to "Appendix C Input / Output Data File Format (p.59)" for information on import / export and time series data file formats.

☐ **Move to selected point's rel-time frame.**

When the measurement point is selected in the list, it moves to the frame of measured relative time.

## 2.2.2 Auto Tracking

Detects the position of the specified marker or feature point on the image and performs automatic tracking. The main steps of automatic tracking are as follows.

- 1) Specify tracking point on image
- 2) Adjust tracking parameters.
- 3) Execute tracking.
- 4) Check tracking results

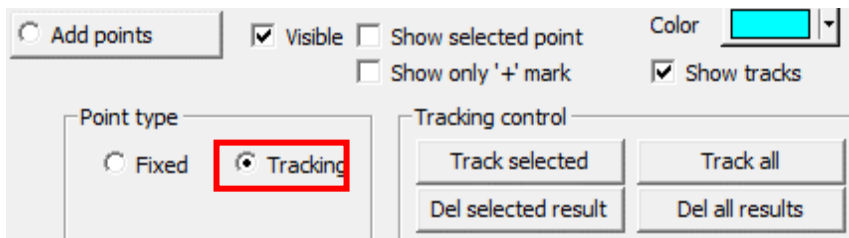
Also, perform "2.1.4 Image Quality Adjustment (p.11) " as necessary.

Below is a description of each step.

### 1) Specify tracking point on image

To add a tracking point, select [Tracking point] from [Point type].

Click on the screen to add a tracking point. Up to 5 tracking points can be added.



A template area in purple and a rectangle indicating a search area in light blue are displayed around the selected tracking point.

### 2) Adjust tracking parameters

Adjust the tracking parameters so that tracking is performed correctly.

Refer to "Tracking Parameters (p. 30)" for details.

### 3) Execute tracking

Automatic tracking is performed only within the playback frame range.

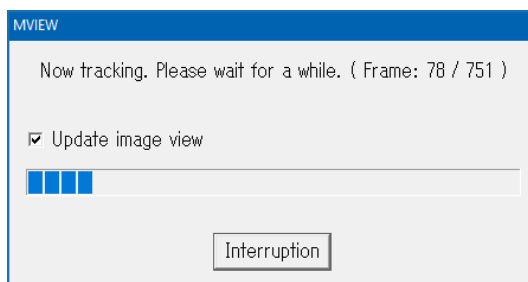
By changing the playback frame range before tracking execution, it is possible to automatically track only any frame range.

Click [Track selected] to track only the tracking point selected in the list.

Click [Track all] to track all tracking points.

Click [Del selected result] to delete the tracking result of the tracking point selected in the list.

Click [Del all results] to delete the tracking results of all tracking points.



When tracking is executed, the tracking progress screen shown above is displayed.

Screen operation on MVIEW is not possible during tracking.

When tracking is complete, the tracking progress screen is closed automatically.

Interruption in progress is interrupted with the [Interruption] button. The analyzed tracking results before the interruption remain.

Select [Update image view] to update the image display according to the frame being tracked.

In addition, it takes a long time to complete tracking because of image update processing.

To give priority to tracking speed, uncheck this setting.

#### 4) Check tracking results

Angle [deg]	Relative time [sec]	Type	Track status
177.44	0.571000	Fixed	-
174.36	0.690000	Track	Done
178.25	0.690000	Track	Not tracked
-177.73	0.690000	Track	Not tracked

The tracking status of each tracking point can be checked from [Track status] of the measurement point list.

The "Not tracked" tracking point indicates that tracking has never been performed or the tracking result has been deleted.

The "Done" tracking point indicates that tracking has been performed even once and tracking has been completed, or tracking has been interrupted but there is a tracking result.

The tracking point of "Failure" indicates that automatic tracking has failed.

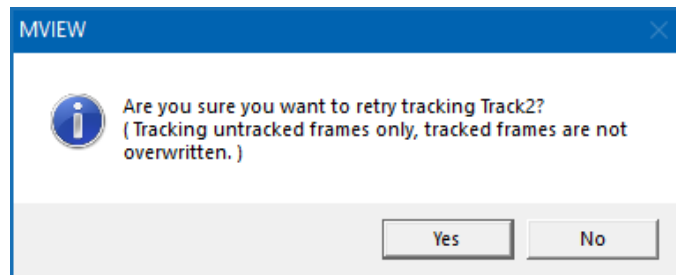
The tracking result of the current frame is displayed in the X, Y coordinate values and angle of the tracking point. If there is no tracking result in the current frame, "-" is displayed.

The results of auto tracking can be output to a CSV file from [Save as timeline].

The time, and the X coordinate, Y coordinate, and angle of each measurement point are output to the CSV file. In the case of fixed point, the same coordinate value and angle are output at all time. In the case of a tracking point, coordinate values and angles obtained by automatic tracking are output only for tracked frames.

☐ **Retry Tracking**

When performing automatic tracking, if there is a tracking point that has already been tracked, the confirmation screen is displayed asking whether to retrack each tracked point.



When [Yes] is selected, only untracked frames are tracked, and tracked frames are not overwritten but remain. If [No] is selected, re-tracking will not be performed. The tracked frame remains as it is.

☐ **Automatic tracking of image quality adjusted, rotated and inverted**

Automatic tracking is performed on an image to which "2.1.4 Image Quality Adjustment (p.11)" and "2.1.5 Image Rotation / Reversal (p.15)" have been applied.

If the result is not correct in tracking, automatic tracking results are expected to be improved not only by adjusting the tracking parameters on the next page, but also by adjusting the image quality to display clearly the markers and feature points of the tracking target.

☐ **Tracking parameter**

From the [Tracking params] tab, set the default and tracking parameters for each tracking point. There are four tracking parameters: "Template size", "Update template", "Search area", and "Under threshold".

- **Track point**

Select the tracking point for parameter change.

The parameters set in [Default] are applied to the tracking parameters of the newly added tracking point.

When [Default] is selected and the tracking parameter is changed, the tracking parameter of the tracking point to be added next time is also changed. It does not affect the tracking parameters of existing tracking points or tracking results.

If tracking parameters are changed by selecting each tracking point other than [Default], the tracking parameters of the selected tracking point will be changed. It does not affect the tracking results already tracked.

- **Template size**

A template is an original image that is used as a reference for correlation.

Sets the size of the template in pixels.

Find the image with the highest correlation with this template among the images.

The size of the template affects the tracking speed.

- **Update template**

Set whether to update the template frame by frame.

If the target rotates or deforms, the template needs to be updated, so make the minimum necessary update.

However, as the template is updated, the center point detection accuracy decreases, so it is recommended to not update, especially when there is no rotation or deformation.

- **Search area**

The search area is the area where high correlations are sought. In the search area, move the template image little by little to find a high correlation part.

The size of the search area is set as a percentage based on the size of the template.

If the movement speed of the tracking target is high, enlarge the search area.

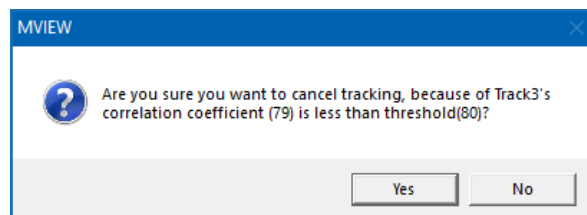
If an image similar to the template image of the tracking target exists around the tracking target, make the search area smaller to avoid false recognition.

The size of the search area affects the tracking speed.

- **Under threshold**

The under threshold of the correlation coefficient is the value of the degree of correlation expressed as a number from 0 to 100. When the under threshold of the correlation coefficient is 100, the two images match perfectly, and the smaller the numerical value, the lower the degree of correlation.

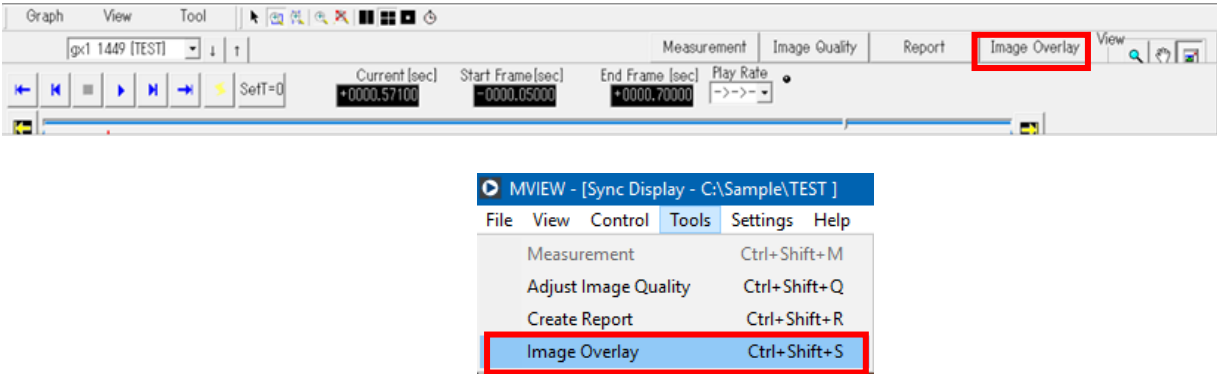
When [Confirm stop, when less than threshold.] Is ON and the correlation coefficient falls below the threshold during automatic tracking, the dialog is displayed to confirm the suspension of tracking. If it is OFF, tracking is continued with low correlation even if the correlation coefficient falls below this threshold during automatic tracking.



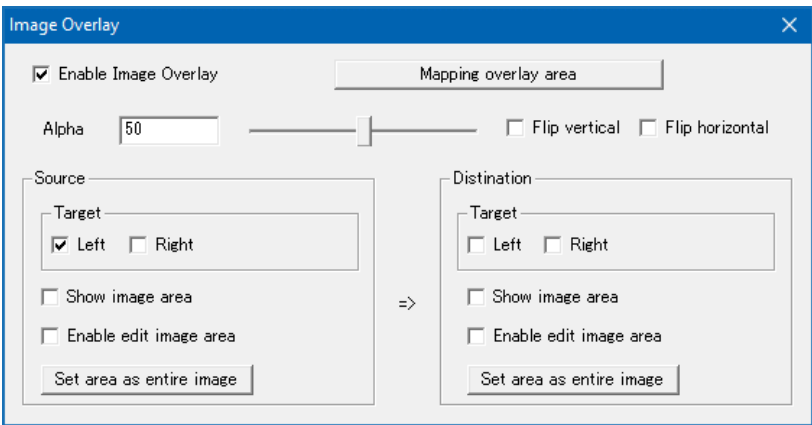
When [Yes] is selected in the tracking suspension confirmation dialog, automatic tracking is suspended. The tracking results before the interruption remain. If [No] is selected, automatic tracking will continue.

2.3 Image Overlay

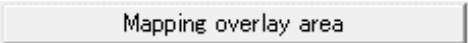
The images displayed on the screen are superimposed and displayed in 2/4 split display.



Apply transparency and up / down / left / right inversion to the original image and overlay it on the target image. The image quality adjustment and image rotation / reversal applied to the original image are also applied to the image superimposed on the target image.



Turn on / off overlay display.



When the button is clicked, it will become "Determine overlay area mapping". Specify a line segment where to overlay on both the source screen and the target image. After specifying the line segment, click the "Determine overlay area mapping" button to display the image in a superimposed state.


 A control bar for transparency. On the left, the word "Alpha" is followed by a text input field containing the number "50". To the right of the input field is a horizontal slider with a vertical handle positioned at the 50 mark. Further right are two checkboxes: "Flip vertical" and "Flip horizontal", both of which are currently unchecked.

Specify transparency, up / down, left / right reverse of original image.

At 0 transparency, only the target image is completely transparent to the original image.

With a transparency of 100, only the original image is displayed with the original image displayed on the front.

## 2 split


 The interface for a 2-way split operation. It consists of two main panels: "Source" on the left and "Distination" (sic) on the right. Each panel has a "Target" sub-panel. In the Source Target panel, the "Left" checkbox is checked, and the "Right" checkbox is unchecked. In the Distination Target panel, both "Left" and "Right" checkboxes are unchecked.

## 4 split


 The interface for a 4-way split operation. It consists of two main panels: "Source" on the left and "Distination" (sic) on the right. Each panel has a "Target" sub-panel. In the Source Target panel, the "TL" (Top Left) checkbox is checked, while "TR", "BL", and "BR" are unchecked. In the Distination Target panel, all four checkboxes ("TL", "TR", "BL", "BR") are unchecked.

Specify the original image and the target image. When dividing into four, select from upper left / upper right / lower left / lower right.

☐ Show image area

Color the area to overlap.

☐ Enable edit image area

The size, position and rotation of the area can be manually adjusted using the displayed markers.

Clears the settings of the manually adjusted area and makes the entire image a superimposed area.

It can not be used when window maximization is enabled.



displaying an image.

#### □ **How to add a frame**

- Add current frame  
Pressing "Add current frame" adds one frame displayed. The frame type is relative time.
- Batch frame export settings  
Specify "Begin" frame, frame "Interval", "Num of output" and press "Add frames".  
Pressing "Set current frame to begin" sets "Begin" to the current frame.

When "Follow play range" is pressed, the playback range on the image side is reflected in "Begin" and "Interval". Changes in the playback range made with the playback slider are reflected. Specify "Interval" in "Batch frame export settings".

## 2.4.2 Output settings

Output the frame set in "Output target frame" tab to still image (BMP / JPG) or Word document.

Output target frame | Output settings

**Common settings**

Export format: Word | Color format: ☒ Color ☐ Mono

**Grid**

Visible: ☒ ON ☐ OFF | Grid color: [grey] | Interval: ☒ By pixel interval ☐ By num of grid 50 px

**Word export**

Image layout: Vertical 2 X Horizontal 1

Wrap direction: ☒ [Diagram 1] ☐ [Diagram 2]

**Image export**

Scale: ☒ Original ☐ 50% ☐ 25% ☐ Custom

Width 640 px Height 480 px ☒ Keeps aspect ratio

#### Export format

Select from BMP / JPEG / Word document.

#### Color format

Select the color of the image after output.

#### Grid

Set the grid to be superimposed on the image.

#### Word export

It is a specification when outputting to Word document.

Specify the frame to be output in one page.

The wrap direction specifies the direction in which the time advances.

Image export

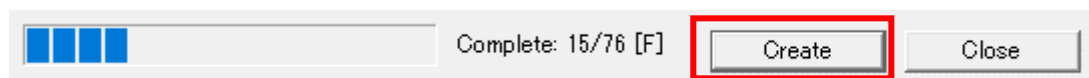
It is a specification when outputting to BMP / JPEG.

The original size of the magnification / 50% / 25% is the magnification relative to the original size of the image.

Custom specifies the combined width and height. An area obtained by dividing the specified width and height is assigned to one image.

### 2.4.3 Create Report

After a series of frame additions and settings, create a report with the [Create] button.



The progress of the report creation is displayed in the progress bar.

When report output is complete, the save destination is opened in Explorer.

In the report, an image with image quality adjustment and image rotation / reversal applied is output.

☐ Report output of simple measurement and image superposition

Simple measurement and image superposition are effective. If the coordinate system, measurement points of simple measurement or the superimposed image is displayed on the screen, the image as it is displayed on the screen is output as it is to the report image.

**note**

If report output is performed with the MVIEW application screen size small and simple measurement and image overlay enabled, the report image will be output in a small size, or the image may not be output because the image size is too small. There is a case. In this case, maximize the application screen and then execute report output again.

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# 3

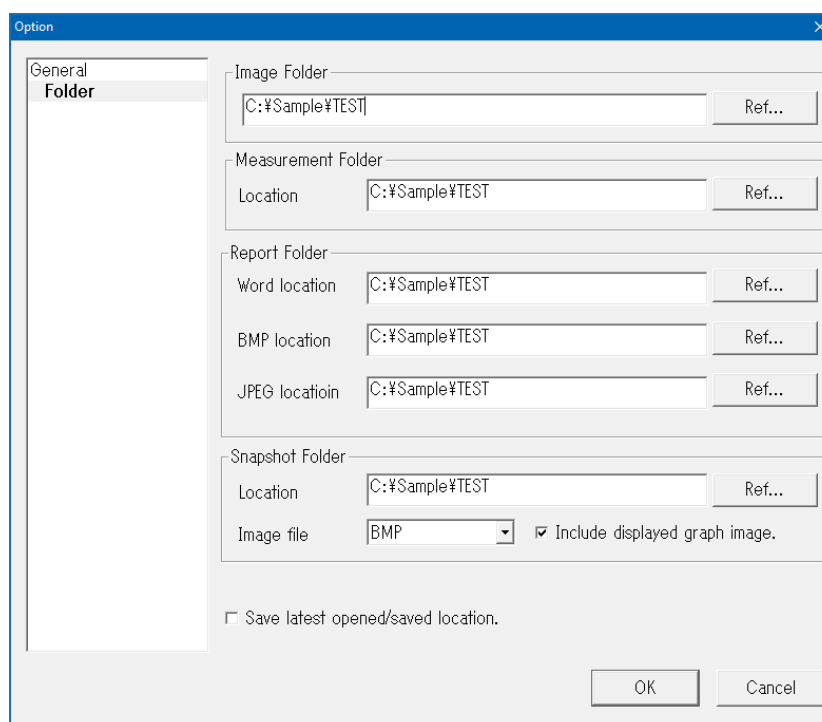
## Settings

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## 3. Settings

Configure MVIEW settings in "Options" of the "Settings" menu.

### 3.1 Folder



#### Image Folder

Specify the first folder to open when opening the image.

#### Measurement Folder

Specify the folder to export the simplified measurement result.

#### Report Folder

Specify the folder for report output.

Save destination can be specified for each report save format.

#### Snapshot Folder

Specify the save destination folder of snapshot image.

It is also possible to specify the image file format at the time of saving and whether to include the graph screen in the image.

#### Save latest opened/saved location.

If checked, the above settings will be automatically changed when the operation is performed.



# 4

# Specifications

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## 4. Specifications

### 4.1 Computer Requirements

OS	Windows 10 Pro (32 / 64bit) (※Only the latest update of Windows 10 performs operation check.)
Memory	4GB or greater   【8GB8GB or greater recommended】
Display	Full color, screen size of 1920×1080 or greater, screen DIP setting of 96dpi
Disc drive	300MB for program
Other	Microsoft Word 2016 (Required for report output function specification)

4.2 Supported file format

The types of files that can be played back with this software are as follows:

MCFF	.mcf	MCFF stands for MEMRECAM Camera File Format, and is an image file of one scene recorded by a MEMRECAM series camera.
AVI (Monochrome)	.avi	Monochrome 8bit AVI
AVI	.avi	Color 24bit AVI
Windows Media Video	.wmv	Color 24bit WMV
TIFF (Monochrome 8bit)	.tif	Monochrome 8bit TIFF
TIFF (24bit)	.tif	Color 24bit TIFF
BMP (Monochrome 8bit)	.bmp	Monochrome 8bit ビットマップ
BMP (24bit)	.bmp	Color 24bit ビットマップ
JPEG	.jpg	Color 24bit JPEG

# Appendix A

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## Appendix A

### List of Shortcut Keys

#### ☐ GUI representation

Result	Shortcut Key
Show / Hide main toolbar	F7
Show / Hide Camera Information Bar	F8
Show / Hide Item Toolbar	F9
Show / hide status bar	F10
Display of property screen	Ctrl + P
Display option screen	Ctrl + Shift + O

#### ☐ Application control

Result	Shortcut Key
Close the application	Alt + F4
Snapshot shooting	Ctrl + S
Simple measurement	Ctrl + Shift + M
Image quality adjustment	Ctrl + Shift + Q
Report creation	Ctrl + Shift + R
Image superposition	Ctrl + Shift + S
Open the manual	F1

#### ☐ Open and close files

Result	Shortcut Key
Open file in 1 split view	Ctrl + 1
Open file in 2 split view	Ctrl + 2
Open file in 4 split view	Ctrl + 4
Close file	Ctrl + W

☐ **File playback control**

Result	Shortcut Key
Regeneration / stop	Ctrl + Space
Loop play / stop	Ctrl + Shift + Space
"Stop by 1 frame" while stopped, increase playback rate during playback	Ctrl + →
"Stop 1 frame" while stopped, lower playback rate during playback	Ctrl + ←
Jump to trigger frame (T0 frame)	Ctrl + T
Jump to start frame of playback range	Ctrl + Home
Jump to end frame of playback range	Ctrl + End
Jump to first frame	Ctrl + Shift + Home
Jump to final frame	Ctrl + Shift + End

☐ **Image display**

Result	Shortcut Key
Full size view	Ctrl + A
Zoom tool	Ctrl + Z
Display entire image	Ctrl + F
Hand tools	Ctrl + H

# Appendix B

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## Appendix B

### Test information file format

By creating a test information file and placing it in the test folder, it is possible to display test additional information such as test name, date / time, comments, camera information, etc. in the MVIEW screen. In addition, for image files that do not have recording speed and recording frame range information, recording speed and recording frame range can be assigned for playback.

The test information file is in INI file format.

Create and edit test information files using an editor that can edit text files.

If there are multiple test information files in the test folder, the test information file detected by the MVIEW application first is applied.

#### ☐ File extension of test information file

The test information file is in INI file format.

Create a file with the file extension ".ini".

#### ☐ File name of test information file

If the file extension is ".ini", there is no restriction on the test information file name.

#### ☐ Test information file format

Write in the following format. When the exam folder is opened in MVIEW, the INI file described in this format is automatically read.

```
[TestInformation]
TestName=Test
Date=2018/9/1
TestNo=AA201
TestType=AA3
Project=KFP
Comments=There is no longer...
Camera_Num=3
[Cam_0]
Name=Camera1
Frames=301
FrameRate=1000
T0=100
[Cam_1]
Name=Camera2
```

Test Info.

Camera Info.

Test Info.	
Test Name	Test
Test Date	2018/09/01
Test No.	AA201
Test Type	AA3
Project	KFP
Comment	There is no longer...

Camera Info.	
[Camera1]	FrameRate : 1000[pps] Recorded Range : ~100 To 2
[Camera2]	FrameRate : 1000[pps] Recorded Range : ~100 To 2
[Camera3]	FrameRate : 1000[pps] Recorded Range : ~100 To 2
[JAR12016RIGHT_WMV]	FrameRate : 2000[pps] Recorded Range : ~10 To 89

Frames=301	
FrameRate=1000	
T0=100	
[Cam_2]	
Name=Camera3	
Frames=301	
FrameRate=1000	
T0=100	

**Test Information Format**

"Test information" described in the test information file is described using the following sections and keys. There is no limit to the parameter value.

Section	TestInformation	Test Information Section
Key	TestName	Display the name of the test.
	Date	Display the test date.
	TestNo	Display the test number.
	TestType	Display the test type.
	Project	Display project name.
	Comments	Display the comment.

## Camera information format

The "camera information" described in the test information file is described using the following sections and keys.

Only "Name (Camera Name)" has no limit on the parameter value. Parameters other than "Name (camera name)" can only be written numerically.

Section	TestInformation	<b>Test Information Section</b>
Key	Camera_Num	<b>Number of cameras</b>

Section	Cam_** e.g.) Cam_0	<b>Camera information section</b> "**" is a number from "0" to "Camera_Num - 1". Write a section for each camera, and for each sectionDescribe the necessary parameters.
Key	Name	<b>Camera name</b> Specify a file name or camera name string.
	Frames	<b>Number of frames</b> Specifies the total number of frames as an integer.
	FrameRate	<b>Frame Rate [pps]</b> Specify the frame rate for recording as an integer.
	T0	<b>Trigger frame [Frame]</b> Specify the frame number from the top as a trigger frame as an integer.

The operation changes as follows according to the specification of Name.

### 1. When "Name" is the file name

By specifying the file name excluding the extension in the key "Name (camera name)", the frame range and frame rate are assigned to the image file such as WMV file that does not have the information of frame range and frame rate.

**note** Camera information can not be assigned to sequential image files (BMP, JPEG, TIFF) and MCFF files.

The following information is assigned to the frame range and frame rate.

**Recording range** : The frame range obtained from the key "T0" and the total number of frames included in the image file

**Frame rate** : Value of key "FrameRate"

If there are multiple files that match "Name", the specified frame range and frame rate will be assigned to all files.

The number of frames specified in "Frames" is ignored, and the number of frames the file has is applied as it is.

In the camera information screen, the frame range obtained from the values specified for the keys "Frames" and "T0" is displayed as "Recoded range".

## 2. When "Name" is not a file name

The camera name specified in the key "Name", the frame range obtained from the keys "Frames" and "T0", and the recording speed specified in the key "FrameRate" are displayed on the camera information screen.

# Appendix C

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## Appendix C

### I / O data file format

#### ☐ Waveform data (CSV file format)

The waveform data file is configured in the following format.

Files are described by separating them with commas.

The first column describes the item name and time (or sample number) of time series data.

The second and subsequent columns describe waveform data information and output data values. Describe the data of each channel with one column as one channel. Channel numbers start from "0" on MVIEW.

Write the following information one by one in any of the 1st to 57th lines. Use either English or Japanese item names. There is no restriction on the lines and order to be described.

As MVIEW acquires each data from the item name, if the item name is different, it is not read correctly as waveform data.

In addition, **please write "arbitrary character string + comma (,)" in the line which is not used.** (e.g.: **Dummy,**) If there are blank lines or lines containing only commas, the data start position will be shifted and waveform data can not be displayed correctly.

Item	Contents
TestName Test number	Describes the input device name of waveform data of each channel. Only the test number of channel 0 is displayed in the graph property.
ChannelName Part name	Describe the channel name of each channel.
SamplingRate Sampling (Hz)	Describes sampling frequency at waveform input of each channel. A space is inserted immediately before "(Hz)".
DataCount The number of data	Describes the number of sampling data for each channel.
Unit Characteristic value name 10	Describes the unit of each channel.

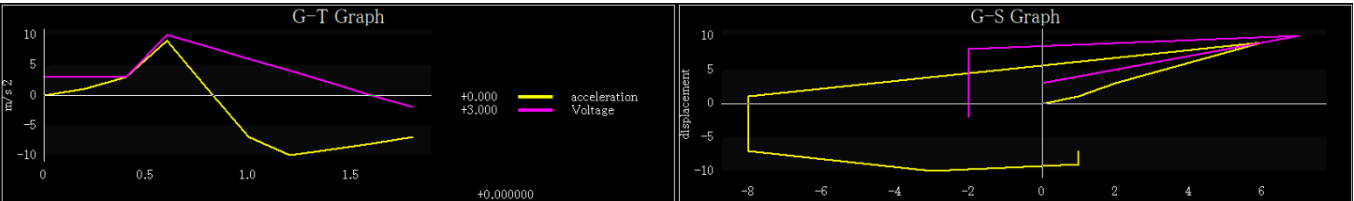
The 58th and subsequent lines are time series data of each channel.

The first column describes the time or sample number.

In MVIEW, the time or sample number specified in the first column is ignored, and the time determined from the sample number with the 58th row set to 0 and the sampling frequency is automatically applied.

The following is an example of a waveform data CSV file.

Line number	File content
1	TestName,Input device A,Input device A
2	ChannelName, acceleration, Voltage
3	SamplingRate,5,5
4	DataCount,10,10
5	Unit,m/s^2,V
6~57	Dummy,
58	0,0,3
59	1,1,3
60	2,3,3
61	3,9,10
62	4,1,8
63	5,-7,6
64	6,-10,4
65	7,-9,2
66	8,-8,0
67	9,-7,-2



## □ Simple measurement import / export file (CSV file format)

The simplified measurement import / export file consists of a header indicating the item name of each column, and data of all configured measurement points.

The header is displayed on the first line of the file, and the data of the measurement points is output on the second and subsequent lines, as many as the number of measurement points.

The header format is as follows, with items of measurement point, coordinate system, and reference line separated by commas. The header is all printed on the first line of the file.

### • Japanese environment

No.,名称,X["基準線分単位"],Y["基準線分単位"],角度[deg],相対時刻[sec],試験名,カラーグループ,原点 X,原点 Y, 原点角度[deg],基準線分 始点 X,基準線分 始点 Y,基準線分 終点 X,基準線分 終点 Y,基準線分実長,基準線分単位
--

### • English environment

No.,Name,X["Unit"],Y["Unit"],Angle[deg],RelativeTime[sec],TestName,Color Group, Origin X,Origin Y,Origin Angle[deg],StdStart X,StdStart Y,StdEnd X,StdEnd Y,StdActualLength,StdUnit
--

The test name is the "test name" of the test information. It is ignored when importing and the test information file name is used as it is.

Color group is a numerical value that indicates the color of the measurement point. The color of each measurement point at import is determined based on this value.

Coordinate system and reference line information is output in pixel units with the lower left corner of the image as the origin. This information is output to all measurement points. At the time of import, for each measurement point, the position of the measurement point is evaluated from the coordinate system and reference line segment that each measurement point has.

The setting screen of the simplified measurement is set with the values of the coordinate system and reference line of the last measurement point.

Regardless of the language setting of your PC, you can import Japanese / English export files.

### □ Simple measurement time series data (CSV file format)

Simple measurement time series data consists of a header indicating the item name of each column and numerical data of each item. The header of the first line of the file, the time and the measurement results of each measurement point are output to the second and subsequent lines.

The output range of time series data is from the first frame to the last frame.

The format of the header is as follows, with the time at the left end followed by the X, Y, and angle values of each measurement point separated by commas. Only the number of measurement points is output. The name of each measurement point is output to "measurement point name".

```
Time[sec], "Name 1"(X)["Unit"], " Name 1"(Y)[ Unit], " Name 1"(Angle)[deg], ... ,
" Name N"(Angle)[deg]
```

The fixed point time series data does not change in position between frames, so the same measurement results are output for all frames.

As the time-series data of the tracking point, measurement results are output only for the tracking frame range. Untracked frames will be blank.

□ **Image quality adjustment setting (INI file format)**

[DIBIC]	Section name for image quality adjustment	
RGain=1.000	Color balance: Red gain factor value	(0.0 ~ 2.0) [initial value:1.0]
GGain=1.000	Color balance: Green gain factor value	(0.0 ~ 2.0) [initial value:1.0]
BGain=1.000	Color balance: Blue gain factor value	(0.0 ~ 2.0) [initial value:1.0]
B-YGain=1.000	Saturation: B-Y gain coefficient value	(0.0 ~ 2.0) [initial value:1.0]
R-YGain=1.000	Saturation: R-Y gain coefficient value	(0.0 ~ 2.0) [initial value:1.0]
Hue=0.000	Hue rotation value	(-45.0 ~ 45.0) [initial value:0.0]
Brightness=0	Brightness value	(-127 ~ 127) [initial value:0]
Contrast=1.000	Contrast value	(0.0 ~ 2.0) [initial value:1.0]
GamMin=0	Minimum value of gamma	(0 ~ 254) [initial value:0]
GamMax=255	Maximum value of gamma	(1 ~ 255) [initial value:255]
GamCoef=1.000	Gamma correlation value	(0.01 ~ 2.10) [initial value:1.0]
EnhSel=0	Enhanced value	(0 ~ 3) [initial value:0] ※ 0:OFF, 1:LOW, 2:NORMAL, 3:HIGH

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