

tinyMicon MatisseCORE™

RapidScope™ User's Guide

Real-Time Waveform Display Tool

Revision History

Date	Version	Description
2024/02/21	Rev.001	Initial publication

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1 Outline

1.1 Overview

RapidScope™ is a real-time debugging tool visualizing memory data as a waveform without disturbing the firmware running on Matisse(※1).

When using RapidScope™, the debug adapter matiseye™ -adapter pro for Matisse is required.

※1 Matisse is an 8-bit CPU made by ROHM. The official name is “tinyMicon Matisse CORE™”.

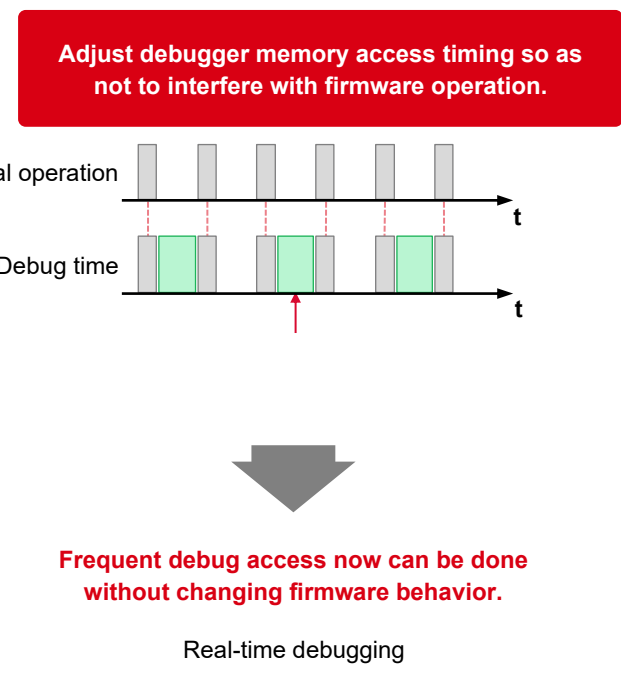
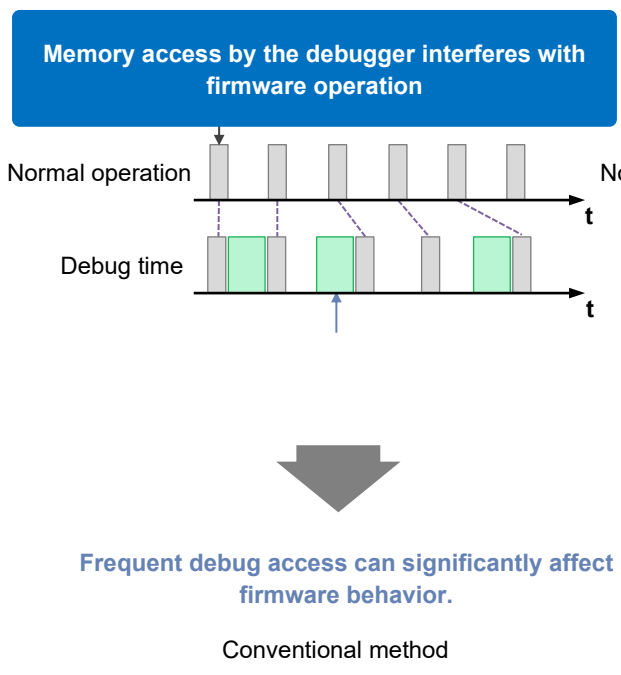
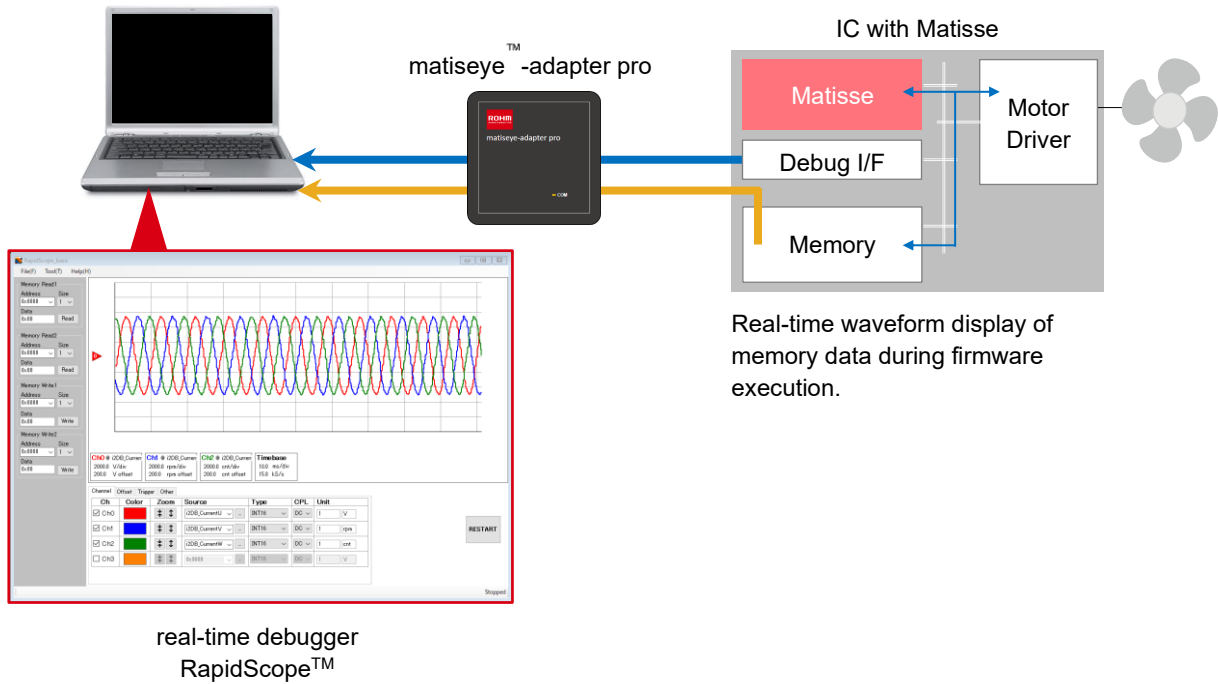


Figure 1. RapidScope™ Overview

1.2 Block diagram

The system block diagram for debugging an IC with Matisse using RapidScope™ is shown below.

When using RapidScope™, it is necessary to have the C language development environment for Matisse, matisseye™-studio, the debug adapter matisseye™-adapter pro, and a target board implemented with Matisse IC.

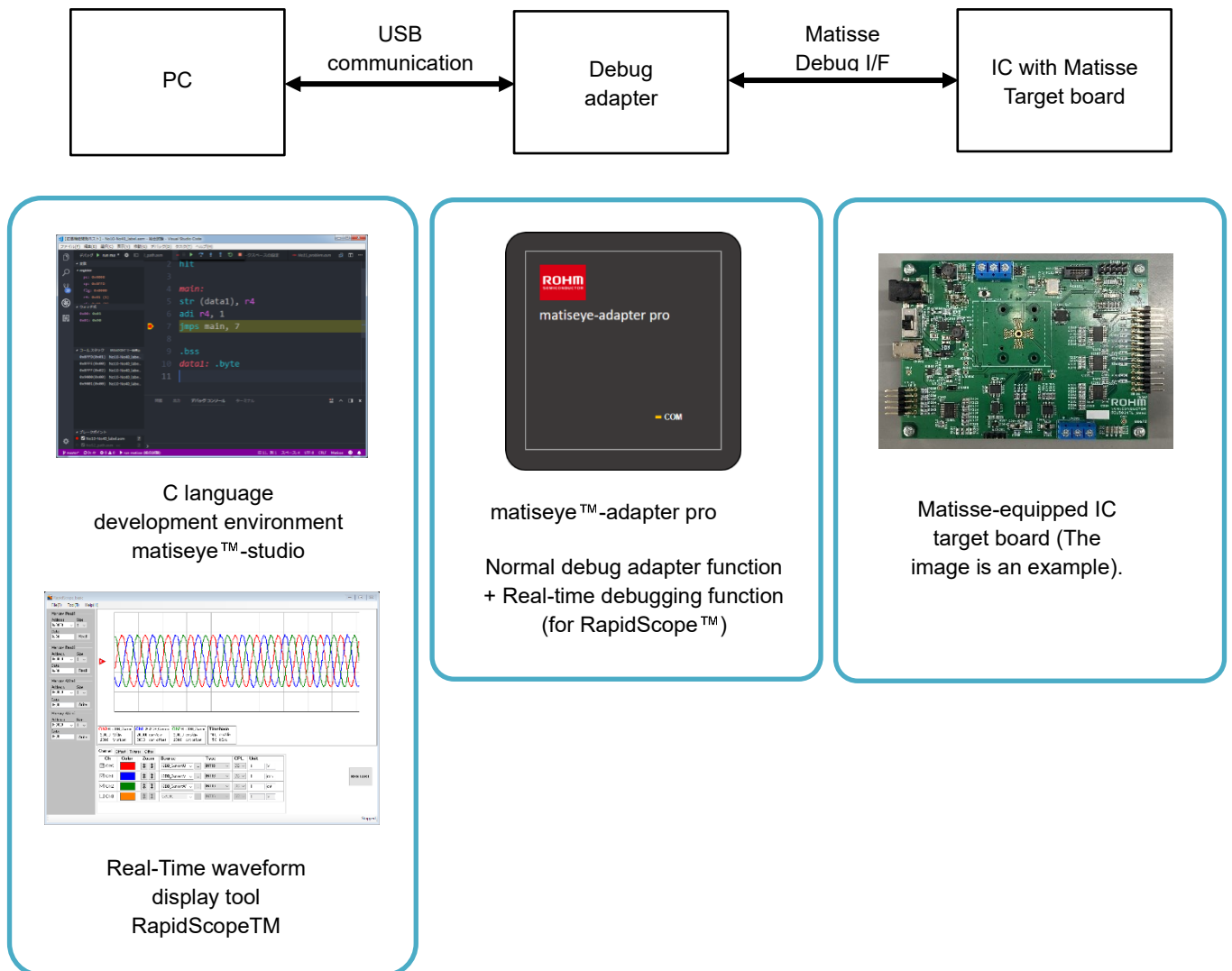


Figure 2. System when using RapidScope™ to debug Matisse-based IC

1.3 Operating environment

The following environment is required to run RapidScope™.

OS: Windows 10 32-bit / Windows 10 64-bit

CPU: Intel Core i series or equivalent processors

Memory: 2GByte or more

HDD: At least 100 MByte of free space

.Net Framework: Version 4.7.2

Display 1280 x 720 resolution or higher

2 Installation procedure

First, install matiseye™-studio according to matiseye-studio users guide.

Then run RapidScopeBasicSetup.exe and follow the wizard instructions to install RapidScope™.

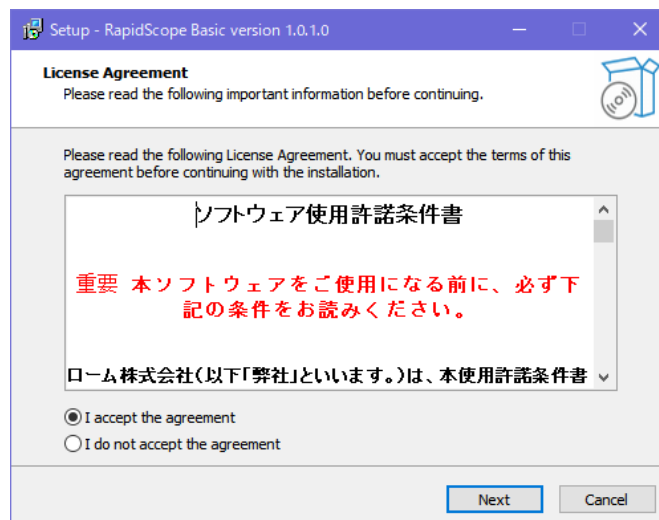


Figure 3. RapidScope™ installation wizard

3 Operation

3.1 Connecting the board to a PC

Before starting RapidScope™, follow the steps below to connect the board and PC through the debug adapter.

- ① Connect the matiseye™-adapter pro and the Matisse-equipped IC target board with a flat cable.
- ② Connect matiseye™-adapter pro and PC with USB cable.
- ③ Connect matiseye™-adapter pro to a board with Matisse ICs.

For connection details, refer to the manual of the target board or the matiseye-adapter™ pro User's Guide

3.2 Start RapidScope™

Start RapidScope™ installed in chapter 2.1 from the start menu, or desktop shortcut.

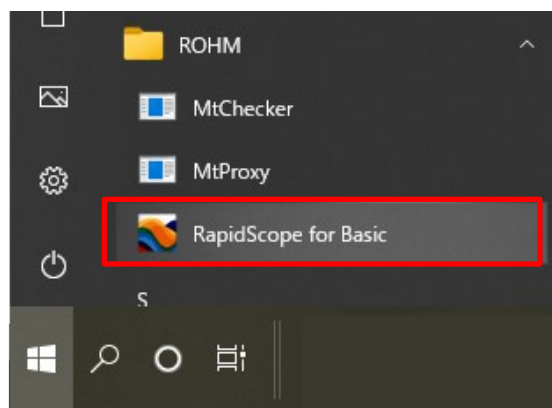


Figure 4. RapidScope™ icon

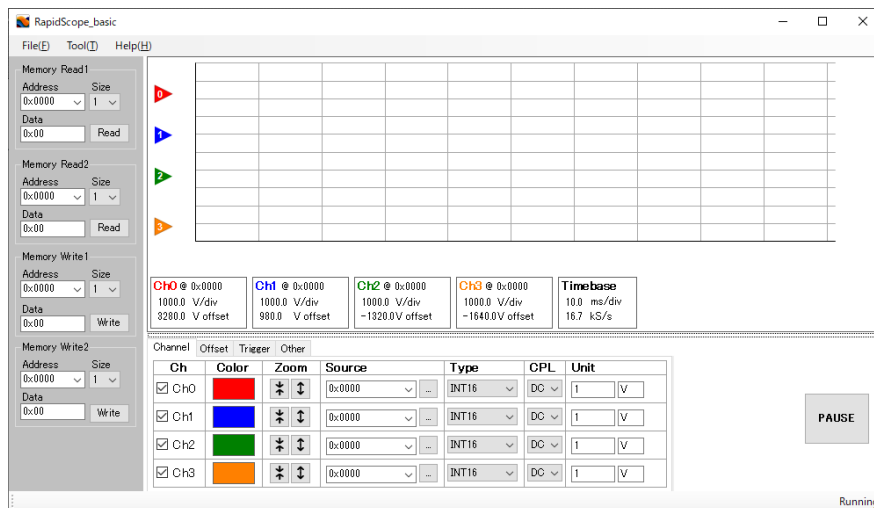


Figure 5. RapidScope™ startup screen

3.3 Waveform Settings

3.3.1 Names of each part

The waveform area and display parameter setting area allow users to adjust waveform settings and review waveform information. The names of each area are shown below. In the graph display area at the top and the graph display area at the bottom, you can adjust the displayed waveforms and check information. In the graph display parameter setting area, you can select the signals to display and the range. In the memory address setting area, you can directly set and change the registers of the Matisse-equipped IC. Please refer to the following sections for details on each area.

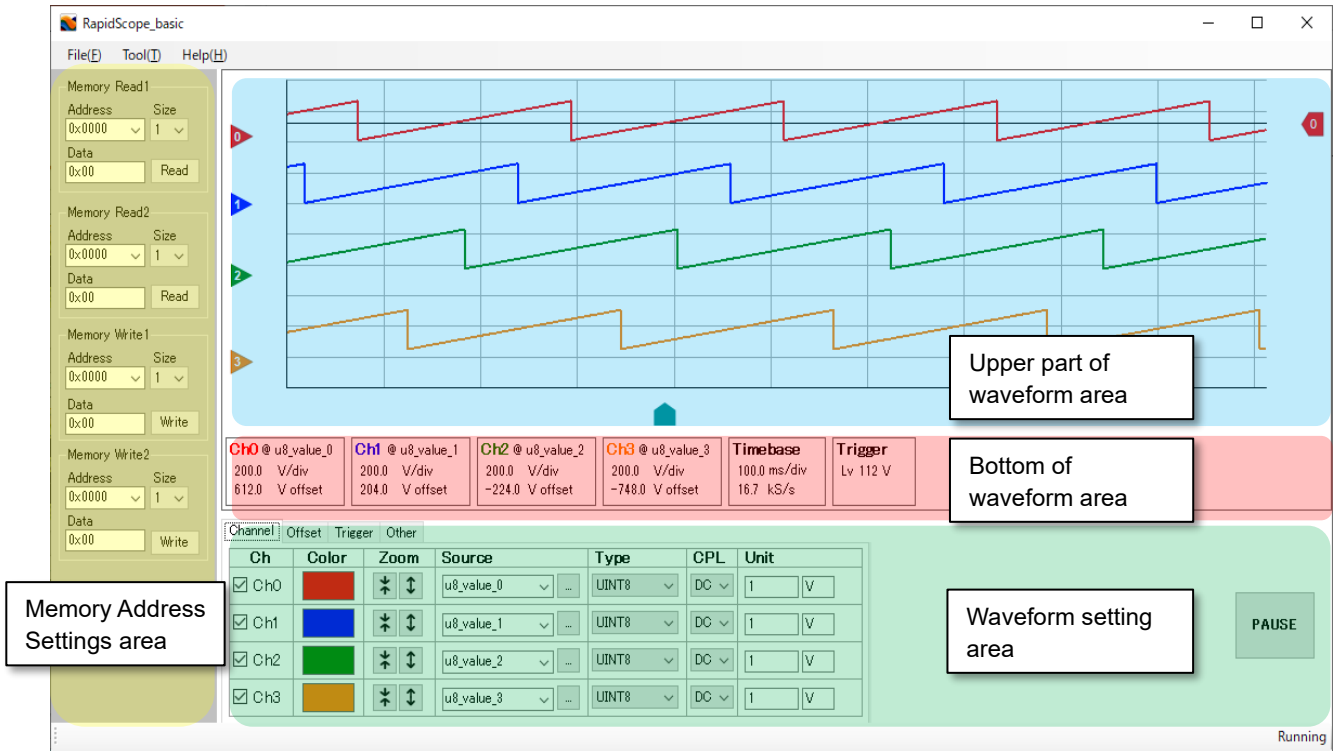


Figure 6. Name of the graph area

3.3.2 Upper part of waveform area

Waveforms can be displayed and manipulated at the upper part of the waveform area. The detailed functions of each part are shown below.

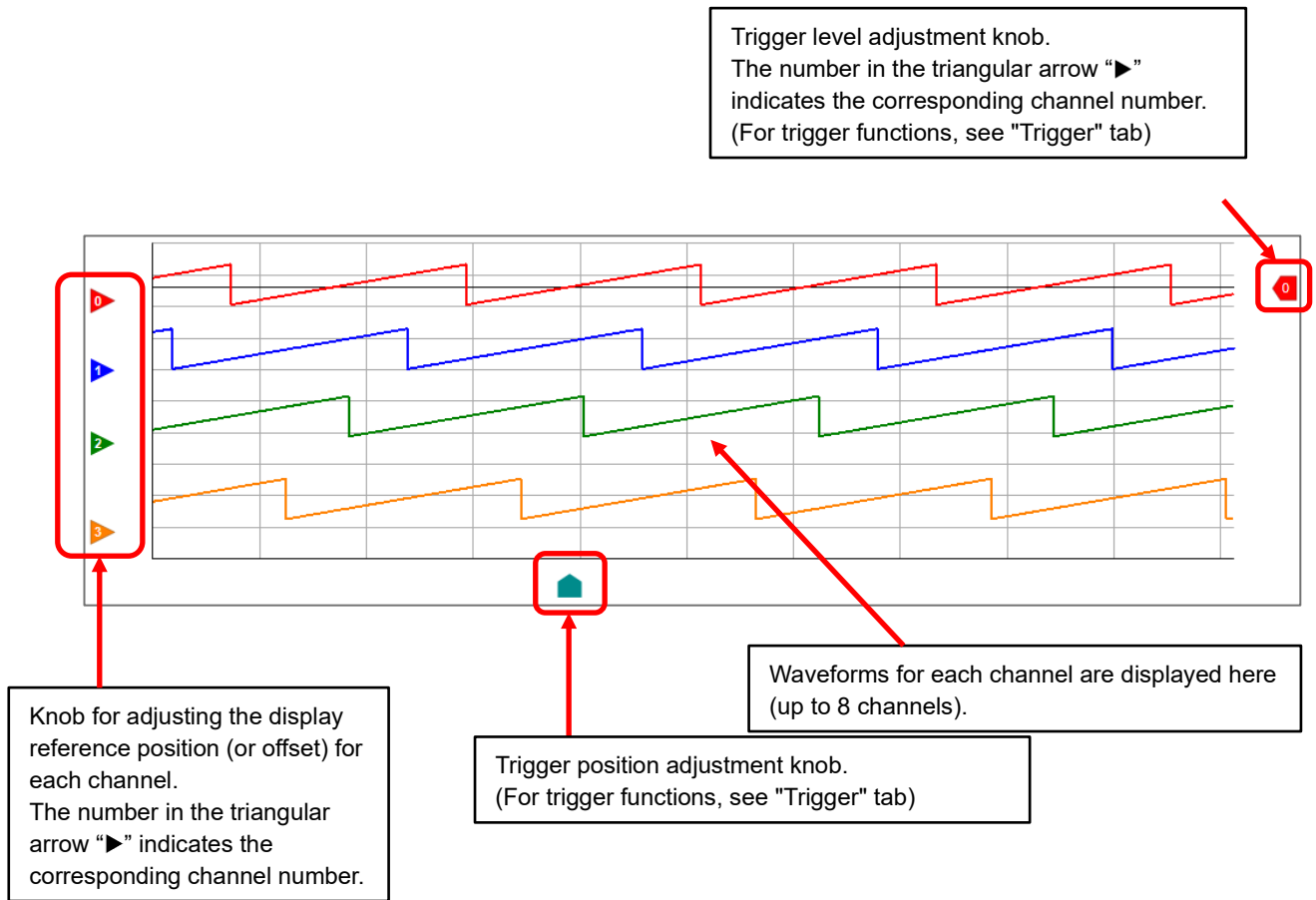


Figure 7. Upper part of waveform area function

3.3.3 Bottom of waveform area

Waveform information is displayed at the bottom of waveform area.

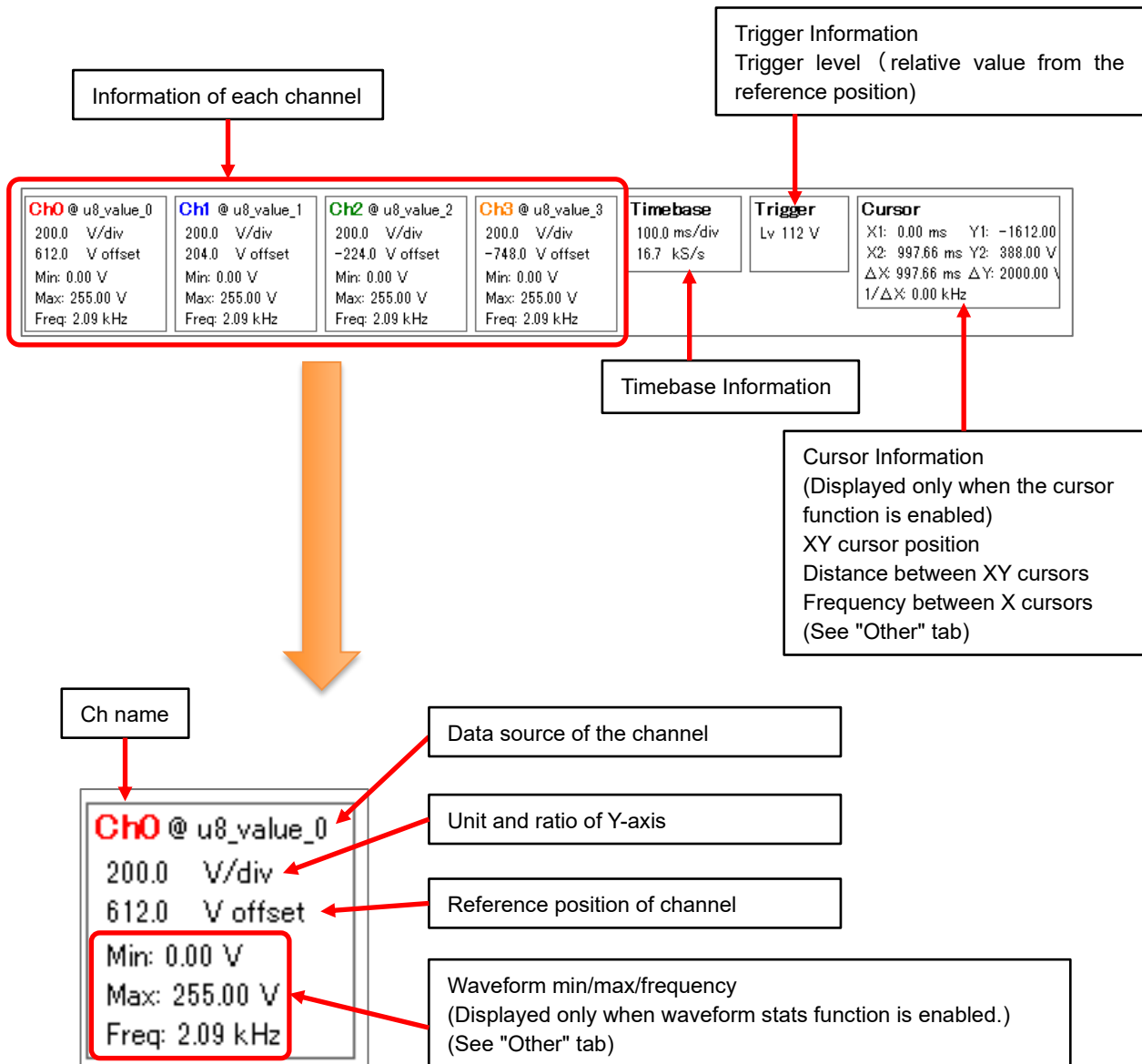


Figure 8. Bottom of waveform area function

3.3.4 Waveform setting area

The waveform setting area can be switched by clicking the "Channel", "Offset", "Trigger", and "Other" tabs.

Details of each tabs are as following pages.

"Channel" tab
Set display contents for each channel

Pause / Resume button
Waveforms can be zoomed in/out and offset changes can be made on any timing.
Always displayed regardless of tab switching.

Ch	Color	Zoom	Source	Type	CPL	Unit
<input checked="" type="checkbox"/> Ch0	■	⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️	u8_value_0	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch1	■	⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️	u8_value_1	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch2	■	⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️	u8_value_2	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch3	■	⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️	u8_value_3	UINT8	DC	1 V

PAUSE

Running

Waveform display state
Stopped: Display is stopped.
Running: Being displayed.
Single: Waiting for trigger hit.
Always displayed regardless of tab switching.

Offset

Ch0 600
Ch1 200
Ch2 -200
Ch3 -600

"Offset" tab
Set waveform offset for each channel

Trigger Option

Trigger Ch0
Mode Auto
Type Positive
Timing First

"Trigger" tab
Set trigger function

Other Option

Timebase Zoom ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️
Average Off
Envelope Off
Cursor Ch0

"Other" tab
Other function settings

Figure 9. Waveform setting area

3.3.5 "Channel" tab

The "Channel" tab allows users to configure each channel settings as shown below.

The screenshot shows the 'Channel' tab interface with the following callout boxes:

- Enable / Disable check box for each channel:** Points to the checkboxes for Ch0, Ch1, Ch2, and Ch3.
- Click to change waveform color of each channel:** Points to the color selection buttons for each channel.
- Y-axis zoom in/out buttons for each channel:** Points to the zoom in/out buttons for each channel.
- Input coupling:** AC: Set with respect to the center of the AC wave. DC: Display the waveform as it is. Points to the coupling dropdown menu.
- Unit name and ratio:** For example, to display a parameter value of 800 as 1V, the ratio should be 0.00125 (= 1/800)" and "V" for the unit name. Points to the unit ratio and name input fields.
- CSV file load buttons:** (See Save waveform CSV data) Points to the load buttons in the Source column.
- Data sources:** When specifying a hexadecimal number (e.g. 0xABCD), it is interpreted as memory address to be monitored. Once the firmware map file is loaded, the variable names can be selected from the combo box. (See Save waveform CSV data) Points to the Source column.
- Data type:**
 - INT8/UINT8: Signed/unsigned 8-bit integer
 - INT16/UINT16: Signed/unsigned 16-bit integer
 - INT32/UINT32: Signed/unsigned 32-bit integer
 - BFLOAT16: 16-bit precision floating point data.
 - FLOAT32: IEEE 754 compliant 32-bit single precision floating point data.
 - DIGITAL8/DIGITAL16/DIGITAL32: Binary data, all non-zero values are interpreted as 1.

Ch	Color	Zoom	Source	Type	GPL	Unit
<input checked="" type="checkbox"/> Ch0	[Red]	[Zoom In/Out]	u8_value_0	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch1	[Blue]	[Zoom In/Out]	u8_value_1	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch2	[Green]	[Zoom In/Out]	u8_value_2	UINT8	DC	1 V
<input checked="" type="checkbox"/> Ch3	[Orange]	[Zoom In/Out]	u8_value_3	UINT8	DC	1 V

PAUSE

Running

Figure 10. "Channel" tab

3.3.6 "Offset" tab

The "Offset" tab allows you to specify the offset value of the waveform for each channel by entering a numerical value.

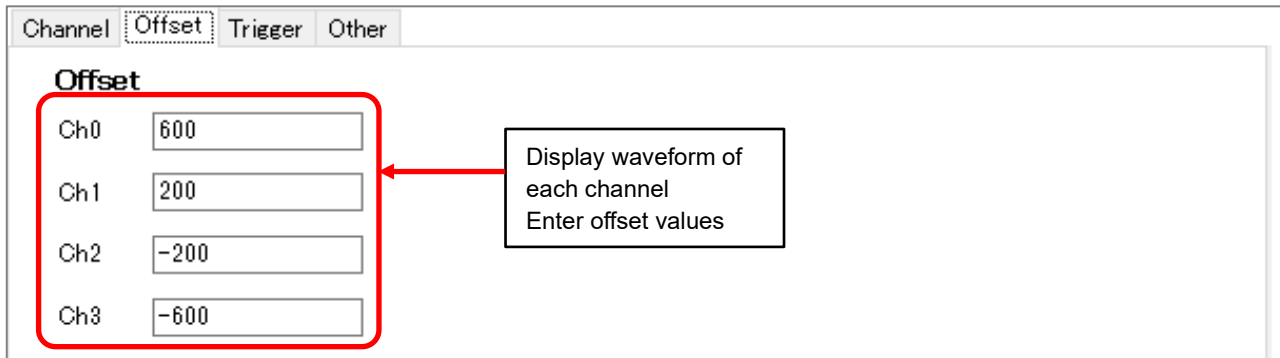


Figure 11. "Offset" tab

3.3.7 "Trigger" tab

The "Trigger" tab can set the trigger function.

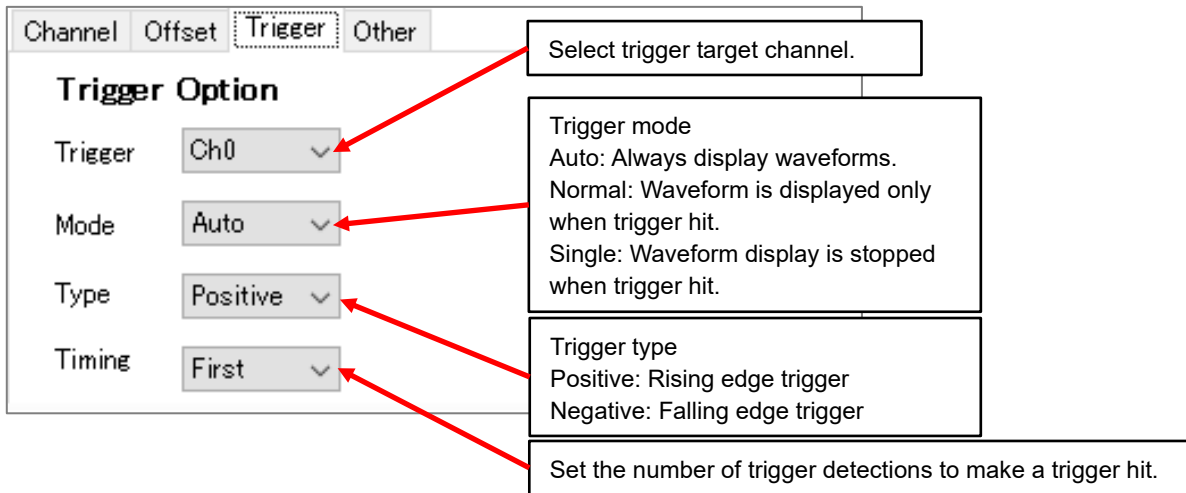


Figure 12. "Trigger" tab

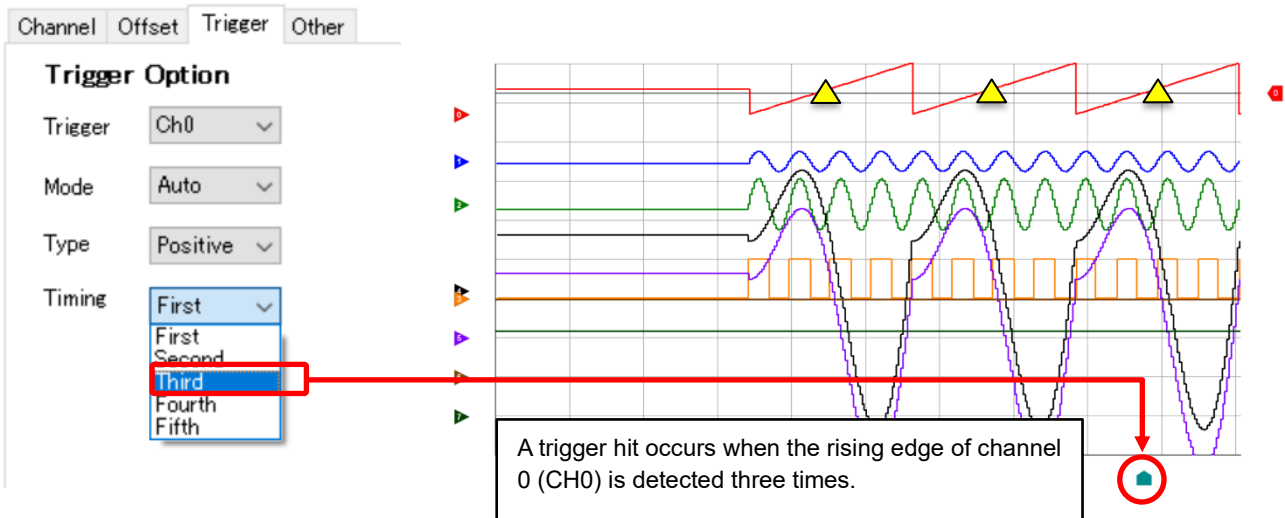


Figure 13. Timing Example of setting

3.3.8 "Other" tab

The "Other" tab allows you to configure various functionality.

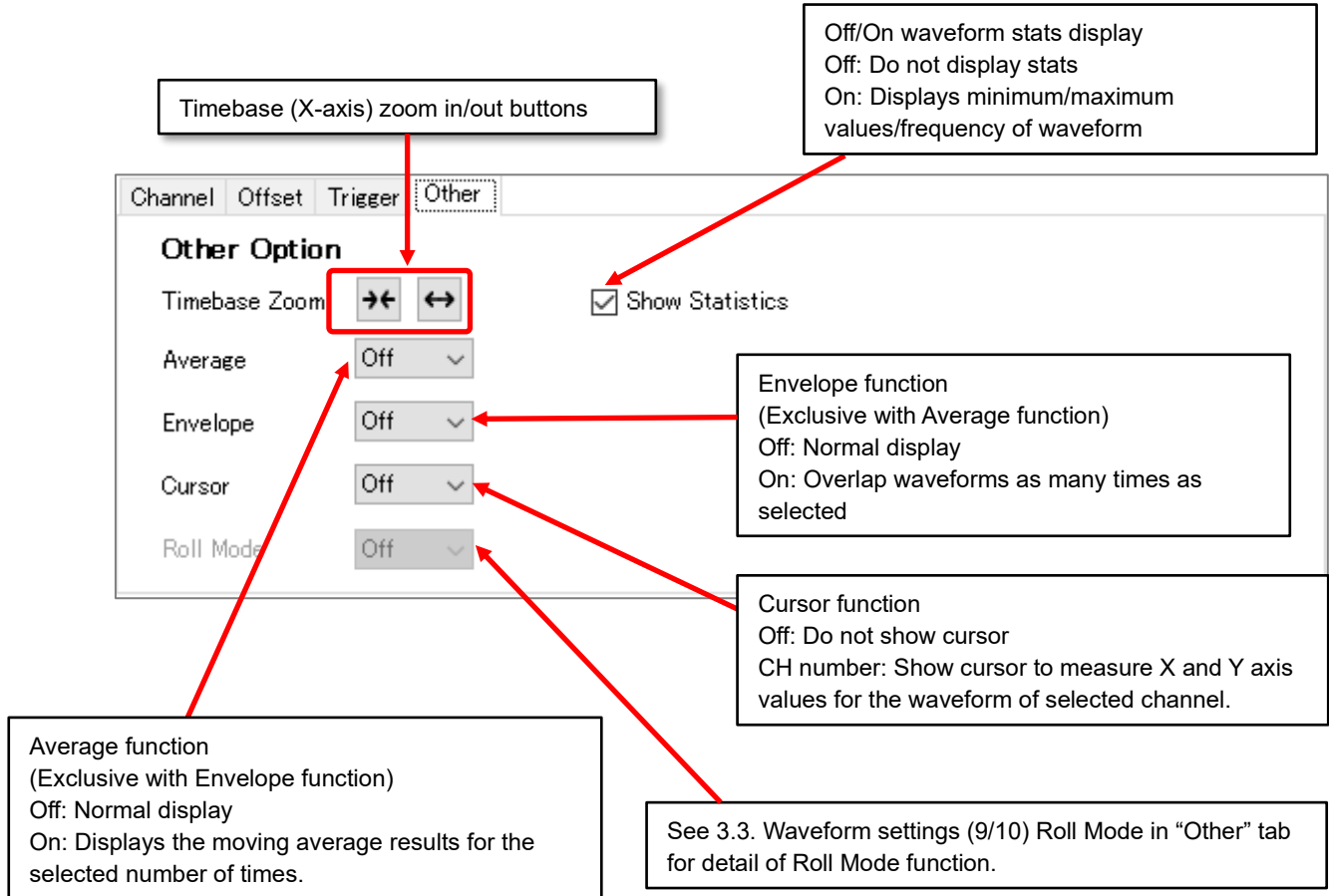
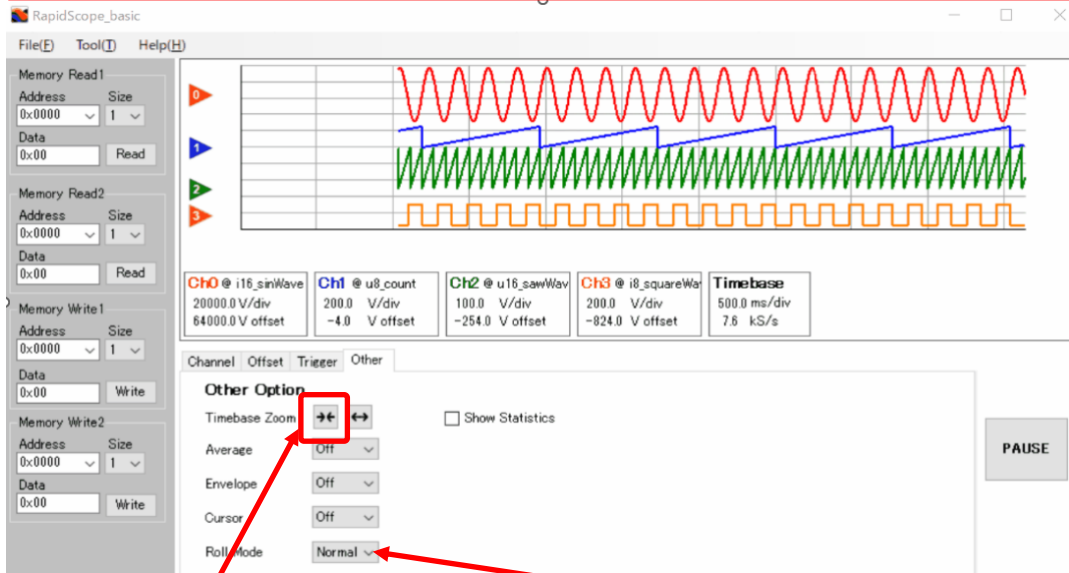


Figure 14. "Other" tab

3.3.9 Roll Mode in “Other” tab

The roll mode function in the “Other” tab is available only when the display range of timebase (X-axis) is at its maximum value.

Note
 If the X-axis display range is changed while in roll mode, roll mode is automatically canceled.
 If the trigger function is activated while the roll mode is in use, the roll mode is automatically deactivated.
 If the roll mode is activated while the trigger function is in use, the trigger function will be automatically deactivated.



1. Click the zoom-out button to maximize the display range of the X-axis.

2. Then the roll mode function is available
 Off: Normal display (waveform display after data acquisition for all screens)
 Auto: Gradual waveform display
 Normal: When the waveform reaches the left edge, it is drawn again from the right side.
 Single: Stops drawing when the waveform reaches the left edge.

Figure 15. Roll Mode in “Other” tab

3.3.10 Resizing the setting area

You can resize the graph display area and the graph setting area by dragging the boundary with the mouse. If the graph setting area is too narrow to see everything, you can adjust the display range with the scrollbar.



Figure 16. Resizing the setting area

3.4 Reading/Writing Memory (Parameter setting area)

The parameter setting area allows you to read and write memory data of running firmware of Matisse IC.

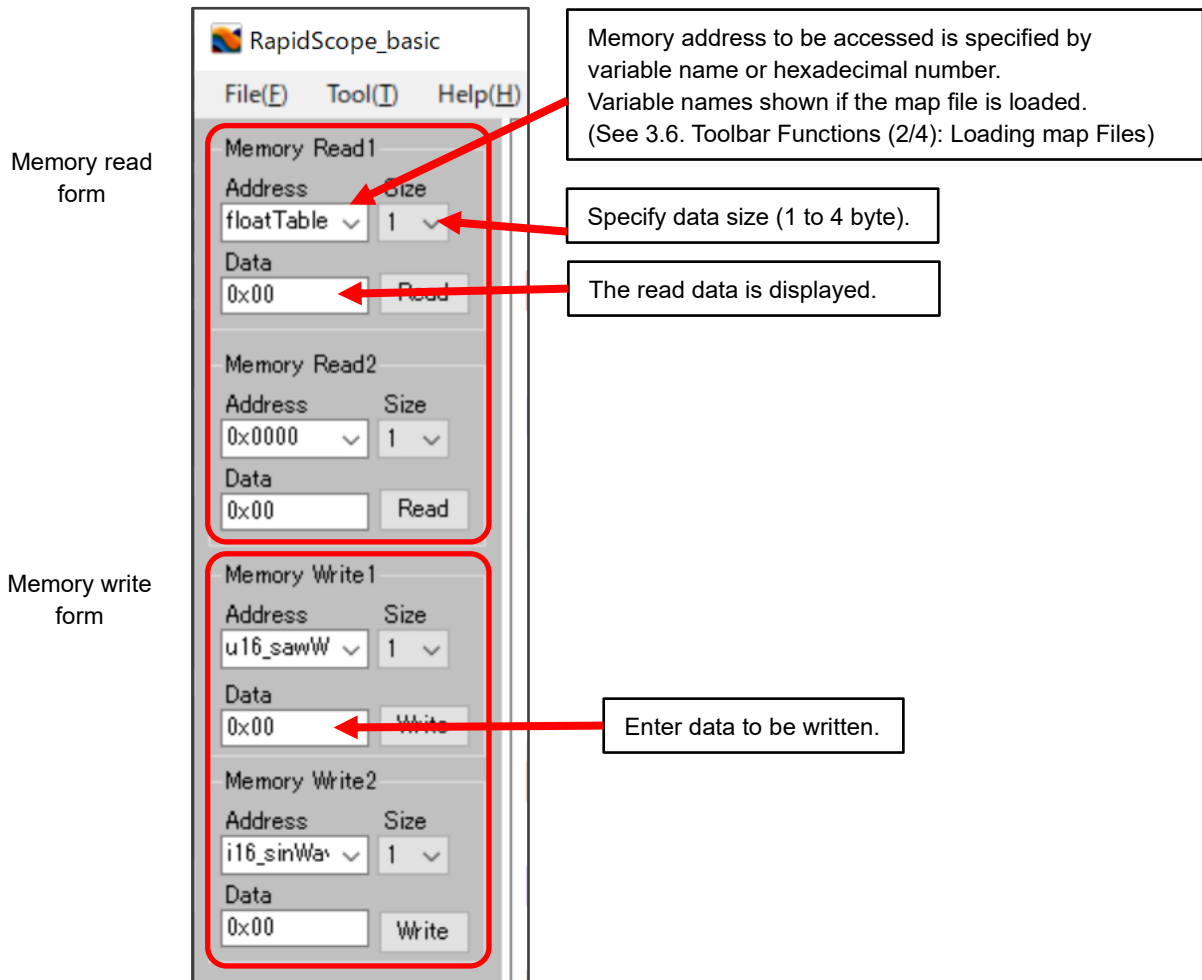


Figure 17. Reading/Writing Memory

3.5 Saving/Loading settings

The parameter settings are automatically saved when the RapidScope™ exits. And they are automatically loaded when RapidScope™ is started.

(The file location is C:\Users\[UserName]\AppData\Roaming\ROHM\RapidScop\Basic\settings.config)

Click "Tool(T)" on the toolbar and select "Open Setting Folder" to open the setting file folder.

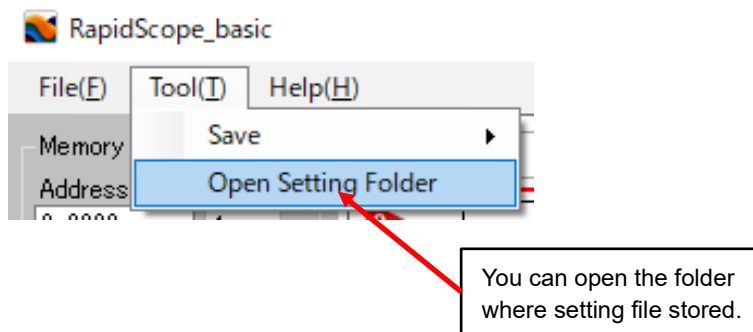
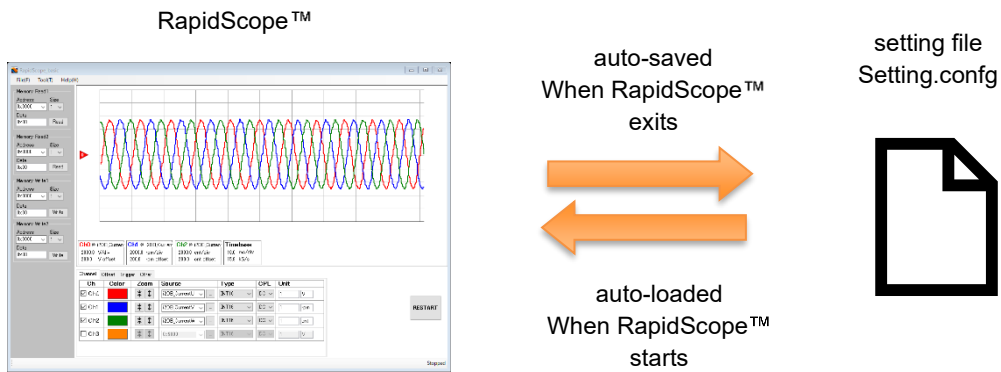


Figure 18. Saving/Loading settings

3.5.1 Saving / Loading setting files

To save the current parameter settings into the specified file, click File(F) on the toolbar and select Export.

To load the parameter setting file, click File(F) on the toolbar and select "Import".

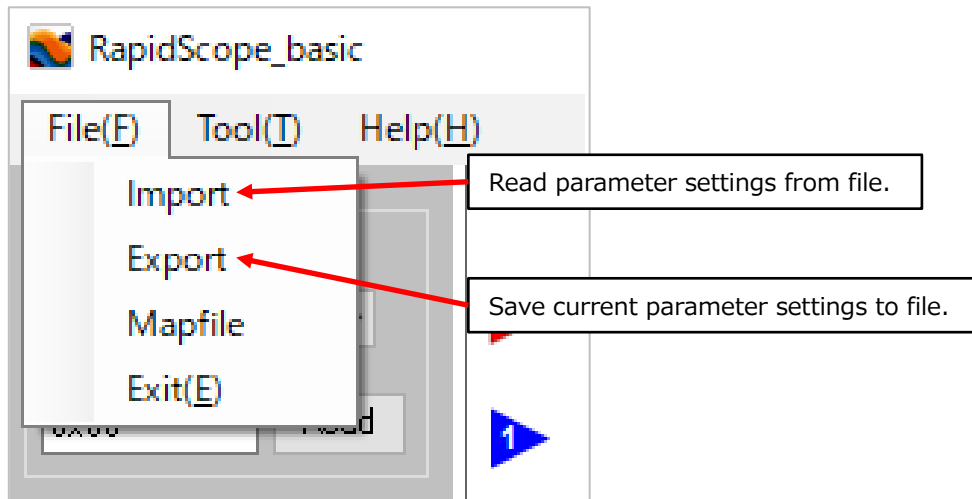


Figure 19. Saving / Loading setting files

3.5.2 Loading map files

To check global variables of firmware, you should load map file into RapidScope™.

The map file, generated by matiseye™-studio, describes the global variables and their addresses.

Click "File(F)" on the toolbar and select "Mapfile", then select the map file (program.map).

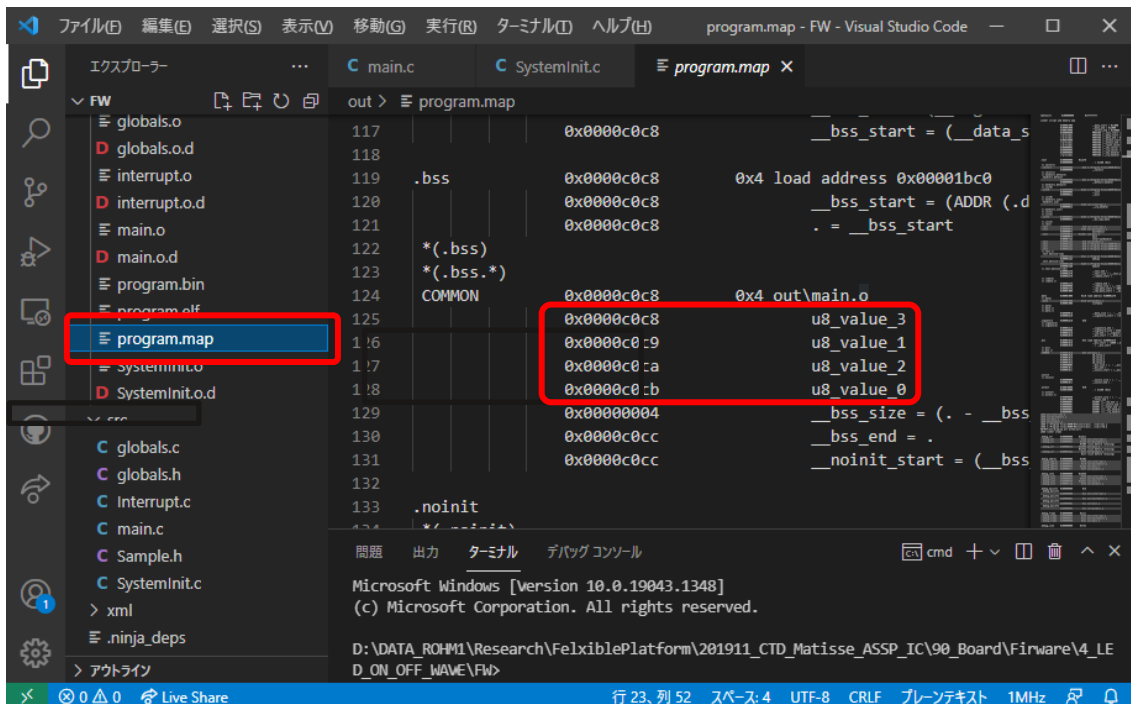
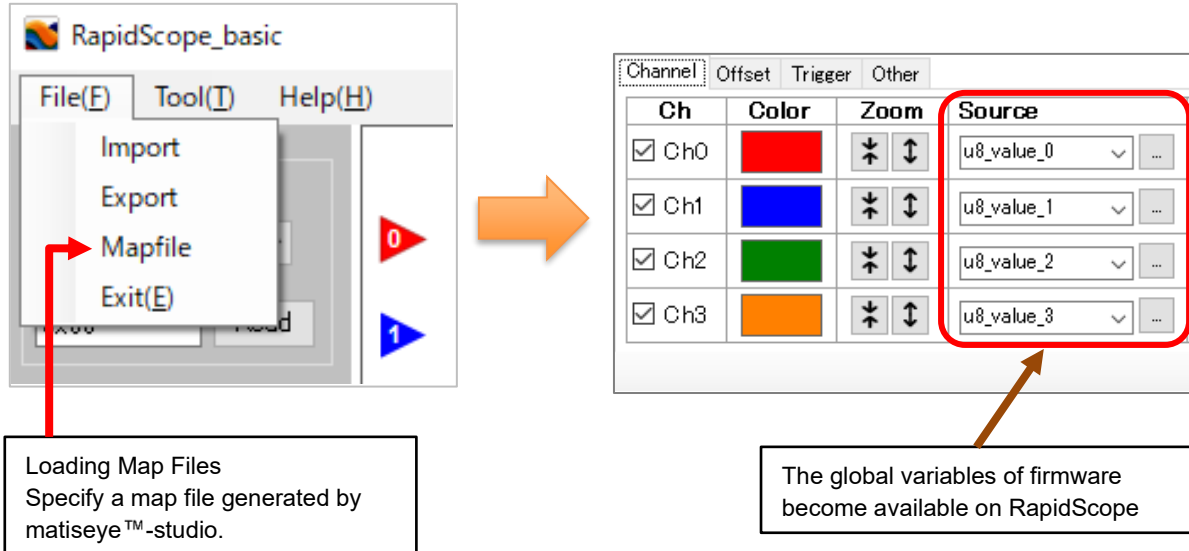


Figure 20. Display the map file in matiseye-studio.

3.5.3 Save waveform as image file

To save the waveform image currently displayed on the screen, click "Tool(T)" on the toolbar and select "Save" -> "Screenshot". Pressing Alt + PrintScreen key also saves the screenshot image to the clipboard.

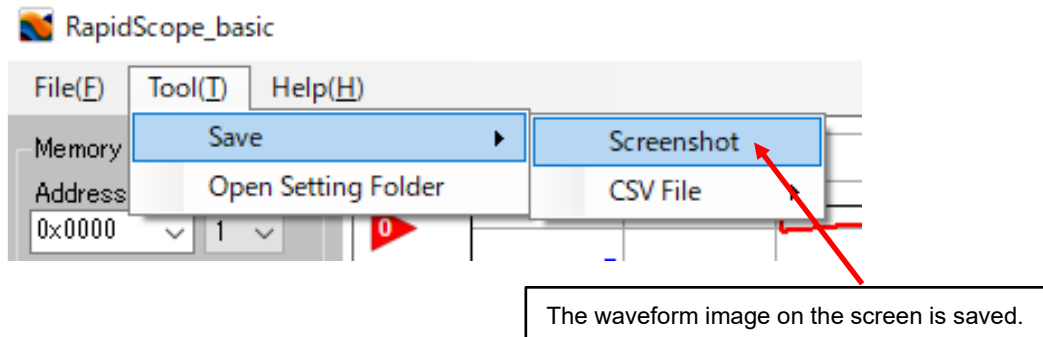


Figure 21. Save waveform as image file

3.5.4 Save waveform CSV data

To save the waveform data on the screen as a CSV file, click "Tool(T)" on the toolbar and select "Save" -> "CSV File". Then select the channel number to be saved.

The generated CSV file can be read from the CSV file import button on the "Channel" tab in the waveform setting area. Then the CSV data will be displayed as waveforms.

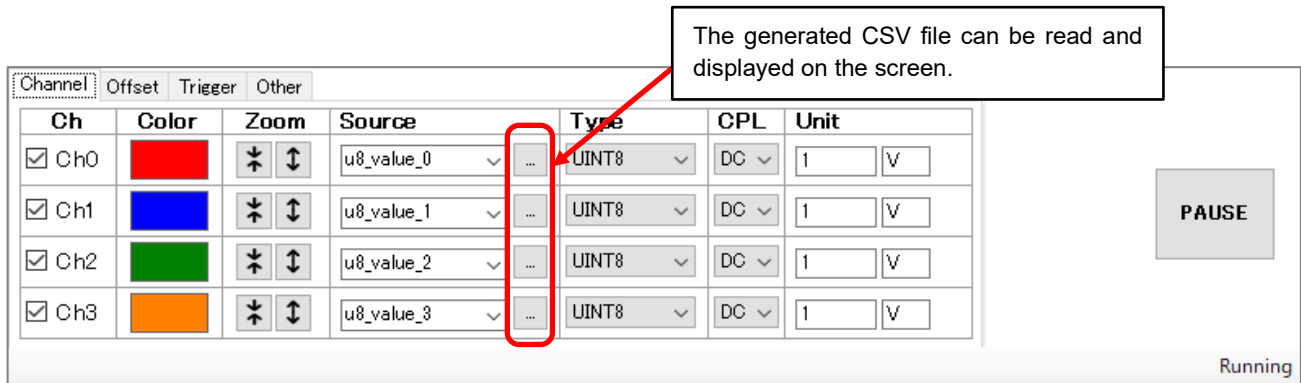
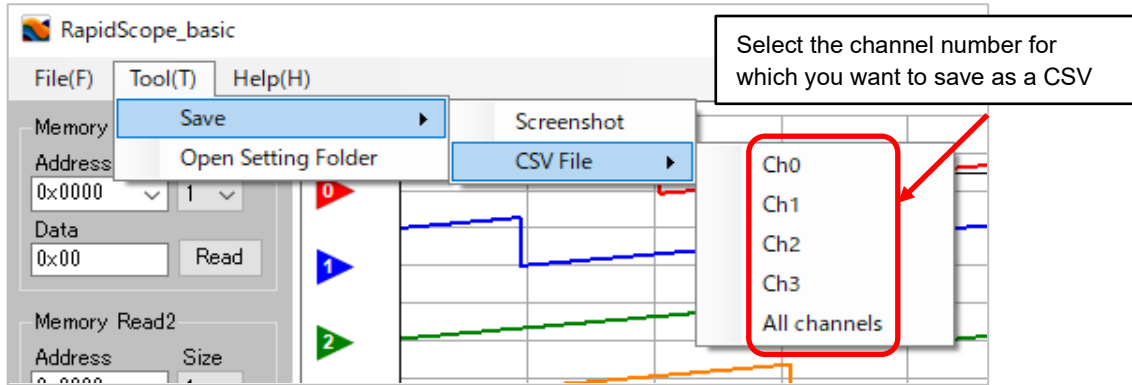


Figure 22. Save waveform CSV data

3.5.5 Changing the number of channels displayed

You can select the number of channels to display on RapidScope™ from 4 to 8 channels.

Change NumChannels in the [Channel] section of the settings file v).

(See 3.5. [Saving/Loading Settings.](#))

Note that changes to settings.config file must be made after closing RapidScope™.



Figure 23. Change the number of channels displayed

3.5.6 Changing the zoom scaling table

You can define a table of X- and Y-axis scaling factors for the waveforms.

Change XScaleTable or YScaleTable in the [Chart] section of the settings file (settings.config).

(See 3.5. [Saving/Loading Settings.](#))

Note that changes to settings.config file must be made after closing RapidScope™.

```
[Chart]
XScaleTable=0.02, 0.05, 0.1, 0.2, 0.5, 0.8, 1, 2, 5, 10, 20, 50, 100, 200, 500
YScaleTable=0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20
MaxPoints=3000
```


X-axis and Y-axis zoom scaling tables.
The values must be larger than zero and be separated by commas.

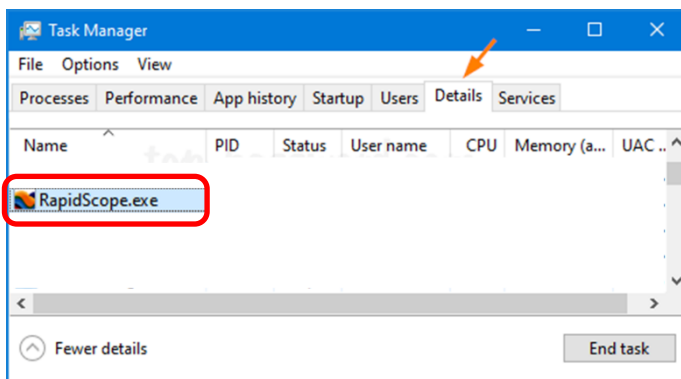
Figure 24. Change the zoom scaling table

4 Q & A

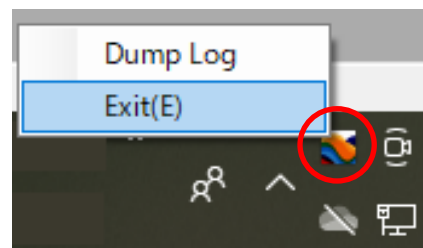
Q. RapidScope™ does not start. Also, RapidScope™ does not display waveforms.

A. The communication between the debug adapter and Matisse may be broken. Please try the following procedure.

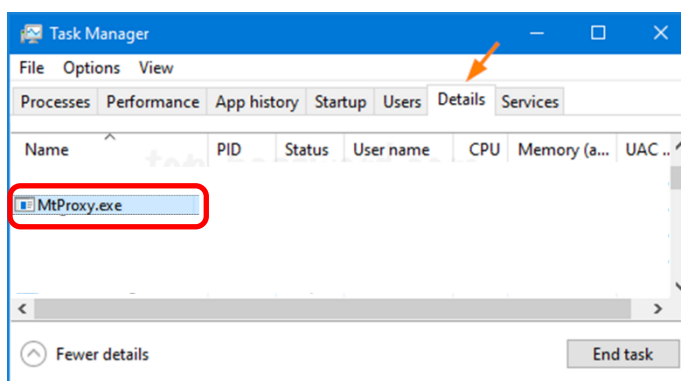
- (1) If you are running debugging in matiseye™-studio, exit debugging.
 - (2) If RapidScope™ is running, exit it.
 - (3) If RapidScope.exe is still running in the Task Manager, terminate the task.
 - (4) Right-click the MtProxy icon  in the task tray and select "Exit".
 - (5) If MtProxy remains on the Task Manager, terminate the task from the Task Manager.
 - (6) Reset or power cycle the IC with Matisse to which the matiseye™-adapter pro is connected.
- After following these steps, re-start RapidScope™.



③ Task Manager



④ Task Tray



⑤ Task Manager

Figure 25. If RapidScope™ does not launch or does not display waveforms in RapidScope™

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