R3・confidential

Canon
production engineering headquarters
production apparatus component development center

CRAVIS-mini
Manual for experimenterss

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【 Background 】

This book purchases CRAVIS-mini and becomes the manual for the people that visualization examination is in charge of mainly. I explain it about preparations thing or an operation method to start knowledge, an experiment to want you to know it to a minimum to test it. In addition, for the one where image processing examination is in charge of, I separately prepare "the manual for the script developer".

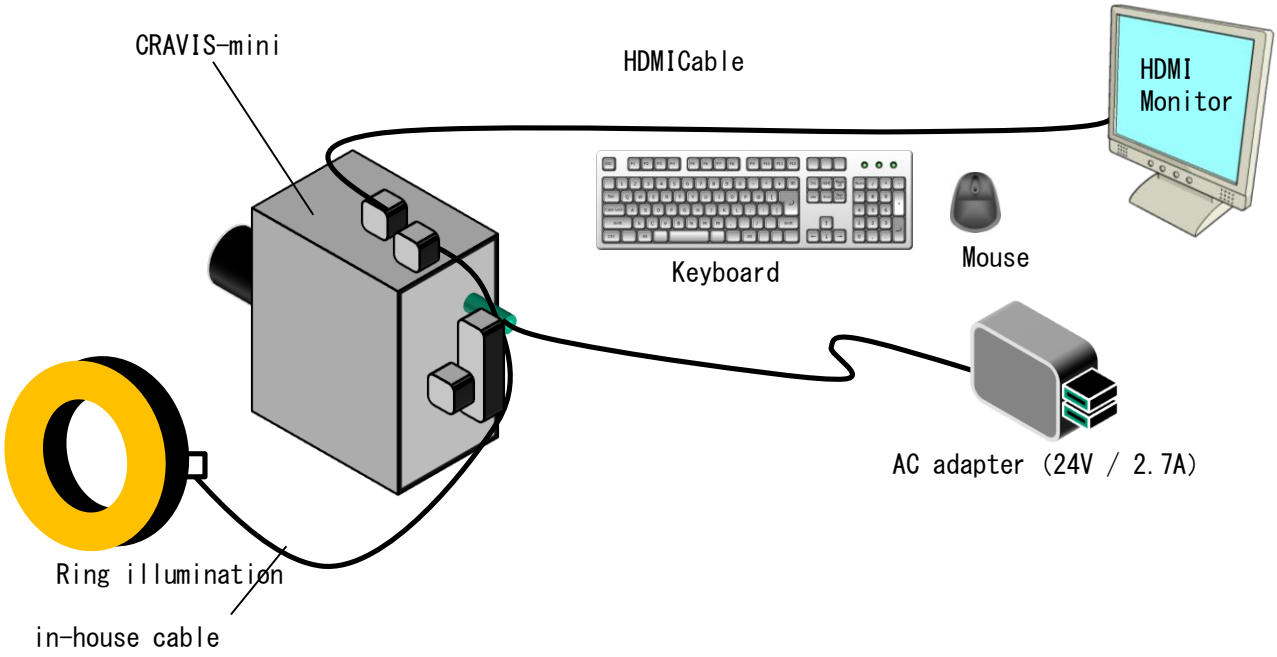
【 Contents 】

1 Before start

1.1 Thing necessary for an experiment

I introduce the article which is necessary when I begin visualization examination using CRAVIS-mini.

Name	Recommendation product	Remarks
AC adapter (24V / 2.7A)		When I use it in embedded connection, it is not necessary. An AC plug, please prepare the thing of 3 cores.
Cable for the in-house production ring illumination		2.5m is attached as standard equipment. Please make the thing of other length in a user.
Keyboard, mouse	MicroSoft Wireless Keyboard 800	Even a cable broadcasting product is possible.
Monitor ・ Monitor cable		In the case of the monitor that there is not it, HDMI input is HDMI-VGA adapter HDMI-DVI cable You prepare for, and please be connected.
Lens		The authentic sample gains a lens of f6mm F2.0. Please set up other thing in a user.
Diagnose-it-yourself kit		This product guarantees only initial defectiveness within 30th after the arrival of the product. I use it for a judgment of the initial poor yes or no. At the time of the purchase, I lend it than this.



1.1.1 About WindowsPC USB HDD

I explain a recommended article about WindowsPC, USB, an HDD to use for application development of CRAVIS-mini.

	Recommendation product
WindowsPC	About environment to use when I develop an application script of CRAVIS-mini in WindowsPC. [recommended environment] The computer body: It is equipped with processors more than 1.6GHz OS:Winsows7 Memory: Memory implementation HDDs more than 1GB (32bit)or2GB(64bit): The graphics that free space more than 4GB needs: The Graphic system (resolution: more than 1,024*768) disk which is compatible with DirectX9: DVD-ROM drive https://www.microsoft.com/ja-jp/atlife/tips/archive/umall/developer/vstudio2010/system.aspx which is based on movement environment of → VisualStudio2010
USB	I use it to input and output a script or the image data from CRAVIS-mini.
HDD	I use it to input and output a script or the image data from CRAVIS-mini.

1.1.2 About a lens

The camera of CRAVIS-mini adopts a lens exchange-type mount called the M12 mount (S mount). A lens of f=6mm is put on by default, but can change it on a different lens to necessary resolution or an object and the distance (WD: Working Distance/ operation distance) of the camera.

If resolution, WD necessary for photography, the photography range of the object are decided, I can choose a lens.

In the case of the photography condition that a lens out of the standard is necessary for, it is necessary to purchase it beforehand. The price of (because there are many things taking time more than one month on delivery date, attention is necessary.) lens out of the standard except some high-performance lenses per nothing is almost 5,000 yen - 10,000 yen.

http://www.axis.com/jp/ja/support/lenses

http://www.edmundoptics.jp/imaging-lenses/micro-video-lenses/

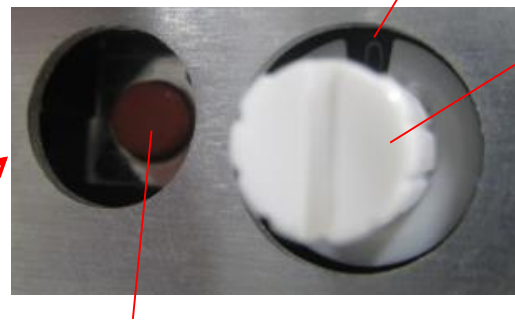
1.2 Movement mode

CRAVIS-mini comprises the following movement modes.
The movement mode is decided by the setting number of the movement mode setting switch (rotary switch) when I started CRAVIS-mini. I change the setting number of the switch and reboot to change a movement mode.

Mode	Setting number	Explanation
Inspection mode	0	It is a mode letting you do public performance movement. I executethe inspection script which I appointed automatically when I start CRAVIS-mini with mode 0. I can appoint the designation of the inspection script with "a script management tool". (cf. 5.3 chapters)
Setting mode	2	A camera, illumination is a mode setting. A camera, a tool (camera setting tool) which I light it up and set starts when I start CRAVIS-mini with mode 2.
Debugging mode	3	It is a mode performing environmental setting, a camera, illumination setting, programing, test practice, debugging. From a short cut in the Desktop, I can start various tools.

■The state of the movement mode setting switch is checked at the time of start in the setting timing of the movement mode setting switch, and a mode is replaced. A movement mode cannot be replaced until I reboot even if I change it after start. Please set it before before start or reboot.
■About the IO output
Because a script is not carried out with the mode except the inspection mode automatically, as for OUT0 - 3, it may not be in ON unless I carry out a script by manual operation. On the other hand, I perform appointed movement because PMON, the ERR output do not depend on the script without depending on a mode.

The CRAVIS-mini back side



1.3 Start method

Start from a non-electricity state

When I connect an AC adapter and cast a power supply into DC Jack of CRAVIS-mini spending a power supply from DC Jack, CRAVIS-mini starts.

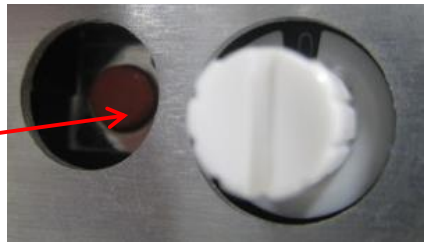
Please do not spend a power supply from both DC Jack and expansion interface connector.

CRAVIS-mini starts when I spend DC24V from an expansion interface connector of CRAVIS-mini spending a power supply from an expansion interface connector.
A power supply terminal, the tenth pin are GND terminals the first pin of the D-SUB26 pin connector.

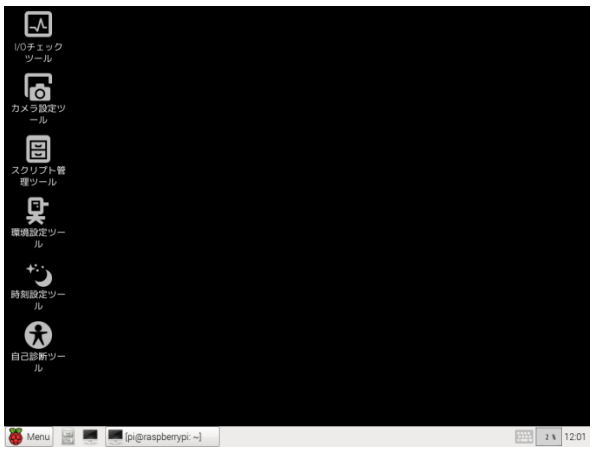
Please do not spend a power supply from both DC Jack and expansion interface connector.

Start from an electricity state (shut down is in a state)

I push the power switch
CRAVIS-mini starts when I push the power switch of the CRAVIS-mini back.



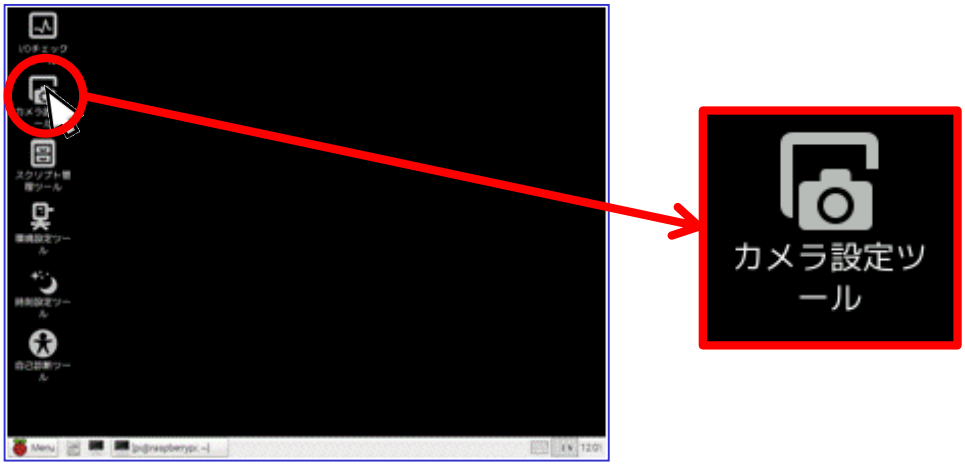
When start is completed, the following screens are displayed (in the case of a debugging mode).



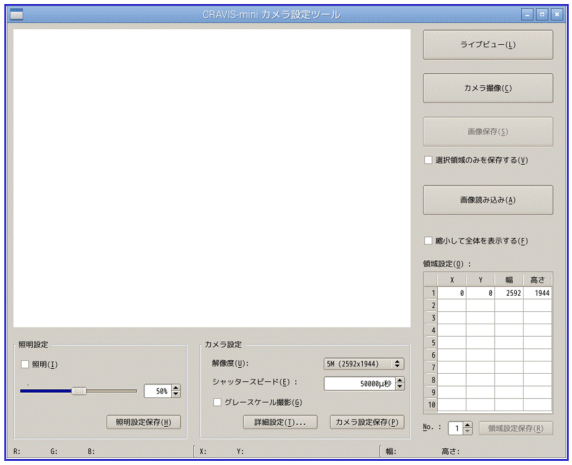
2 Explanation of the camera setting tool

2.1 Start of the camera setting tool

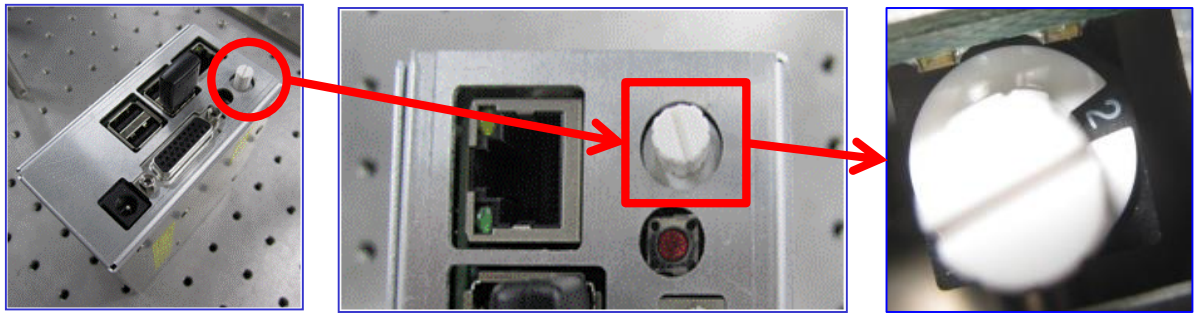
"A camera setting tool" starts when I choose a chart below icon than a TOP screen after having started CRAVIS-mini.



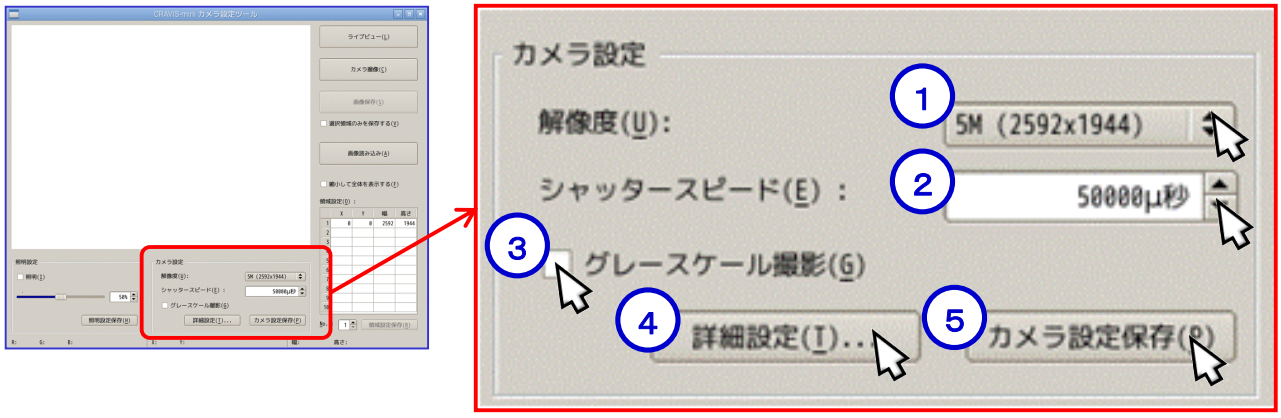
The following screens (camera setting tool) are displayed when I start CRAVIS-mini.



Or, with rotary SW in the back of CRAVIS-mini as "2" (setting mode), it can start "a camera setting tool" even to start CRAVIS-mini.



2.2 Camera setting



①Resolution choice of the camera

I choose the resolution of the camera among the following inside.

・5M (2,592*1,944): I use the screenful of the camera

・3M (2,048*1,536): I begin to talk about 2,048*1,536 pixel of the central part of the camera and use it

・2M (1,600*1,200): I begin to talk about 1,600*1,200 pixel of the central part of the camera and use it

・XGA (1,024*768) : I begin to talk about 1,024*768 pixel of the central part of the camera and use it

・VGA (640*480) : I begin to talk about 640*480 pixel of the central part of the camera and use it

The script is carried out with the resolution that I set here.

②Choice of the shutter speed

I can regulate the brightness by the shutter speed at (100 μ second distance) during "1 μ second - 70000 μ second".

In this case I do not set it at the end of a limit, and please make 80% of upper limit levels an aim.

It becomes the purpose to secure a buffer when I want to raise a price by an environmental change.

③I grab a choice collar of empty - / gray scale photography or select whether you photograph gray scale (black and white).

It becomes empty - photography if I do not put gray if I classify a check into check box.

In the case of gray scale photography, photography time becomes higher-speed around 2.5 times than color photography.

④Setting of the details

I can set the central location of the camera at the time of the photography by manual operation.

I explain the way of the detailed operation in the next page.

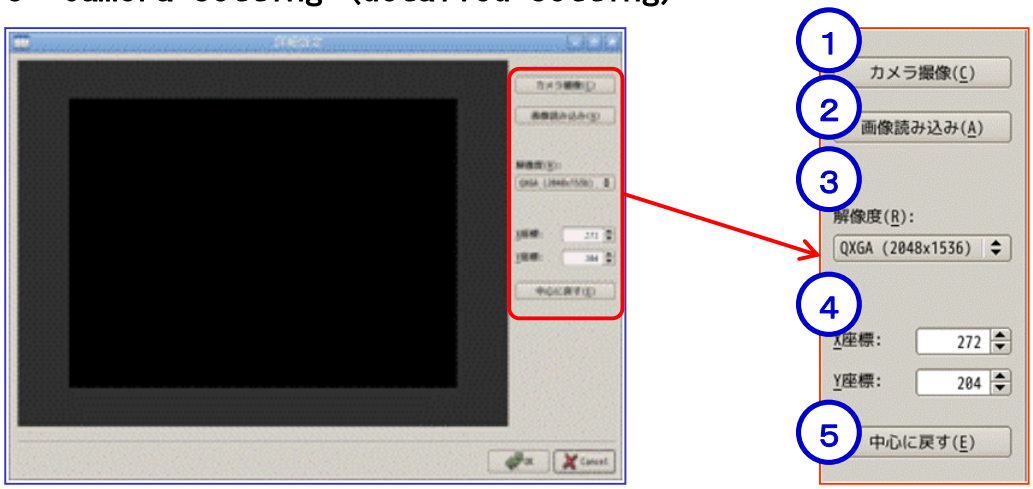
⑤Preservation of the setting

I click a "camera setting preservation" button if I finish choosing all.

Resolution and color / gray, setting of the shutter speed are stored.

It can retrieve the setting that I stored here on a script for the fixed number.

2.3 Camera setting (detailed setting)



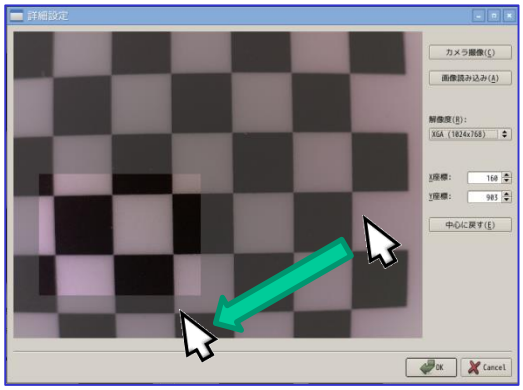
I introduce "details setting" in accord with a foregoing paragraph here.
Set the camera center at the time of the imaging optionally when this function chose resolution less than 5M; is functioned.

①Indication of the photography screen
I project the still image which a camera catches at that point when I push the "camera imaging" button.

②Reading of the existing preservation image
An SD card and an HDD can already retrieve a stored image on the screen.

③Resolution choice of the camera
I choose a thing using resolution from 3M, 2M, XGA, VGA.
As a domain was dug out by a screen of 5M, to the resolution that I chose, I am displayed by a screen.

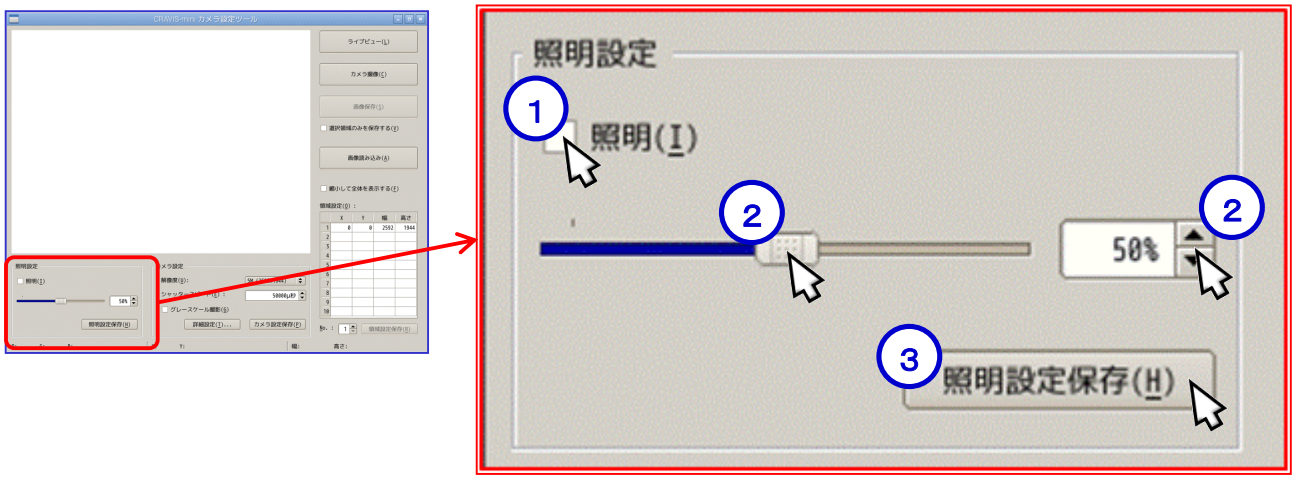
④Setting of the central location of the camera
I can set X, Y coordinate with numerical value input or a top and bottom button. I set the camera center by this setting.
In addition, I can appoint a coordinate by performing drag & drop of a domain part dug out.



⑤It goes back up to initial setting
The camera center returns to an initial value when I push the button "returning to the center".

If setting is over, I return to the window of the camera setting of the foregoing paragraph when I push the "OK" button.

2.4 Illumination setting



①Lighting of the illumination
I choose check box of "the illumination".
(it becomes "illumination OFF" at the time of the start.)

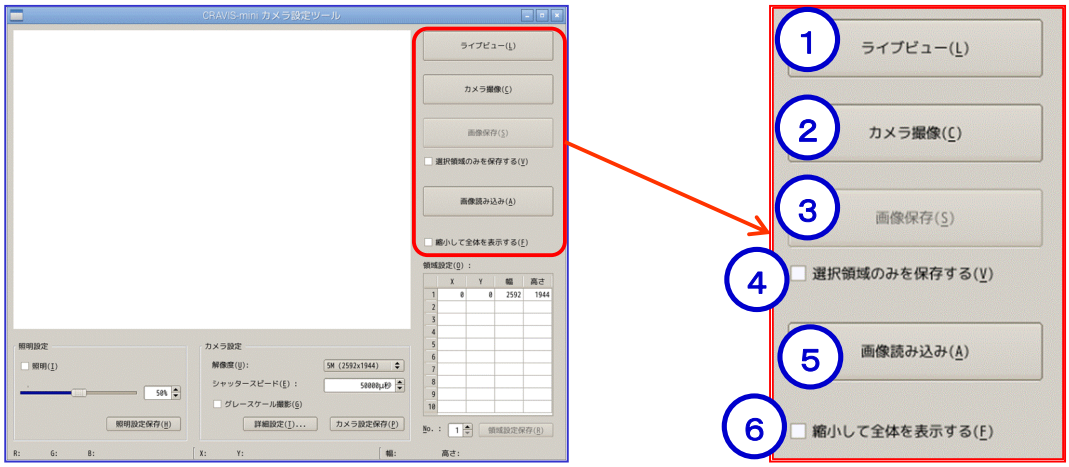
②Adjustment of the brightness of the illumination
I slide snacks in right and left, or brightness changes when I click a top and bottom button.
The brightness of the illumination is displayed at a percentage to the right of slide snacks by the left of the top and bottom button.

When I set brightness, I recommend the setting between "0-80%".
It is so to control deterioration of the LED which is a source of light, but this is because it has a buffer to cope on the illumination side when it needs the brightness including the environmental change more.

③Setting preservation of the illumination
I click a "wise setting preservation" button if I finish setting.
Setting of the brightness is stored when I had "illumination ON".

It can retrieve the setting that I stored here on a script for the fixed number.

2.5 Live view



①Indication 1 of the photography screen

The picture which a camera catches is projected as an animation now when I push the "live view" button.

When I carry out a live view, a button becomes "the live view end" and projects the picture which a camera arrests with a still image at that point by pushing this button.

②Indication 2 of the photography screen

It can project the still image which a camera catches at that point even to push the "camera imaging" button during the stop of "the live view".

③Preservation 1 of the photography image

I name any directory and can store an image by pushing the "image preservation" button with the state that a live view finishes.

(the destination of the default: /home/pi/CravisMini/python_proc/, a form: png)

④Preservation 2 of the photography image

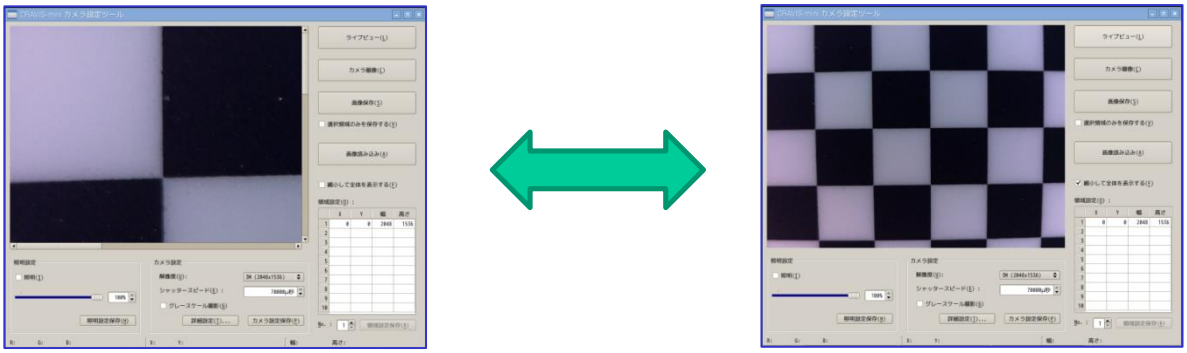
Only the range that performed domain setting to introduce in next clause 2.1.5 can save an image when I classify a check into this check box.

(I cut a pattern of the pattern matching processing and use it.)

⑤Reading of the existing preservation image

An SD card and an HDD can already retrieve a stored image on the live view screen.

(able to say the setting of the domain and confirmation of a coordinate, the brightness.)

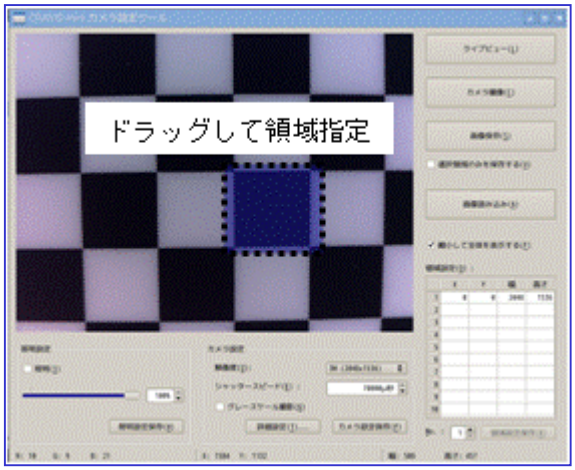


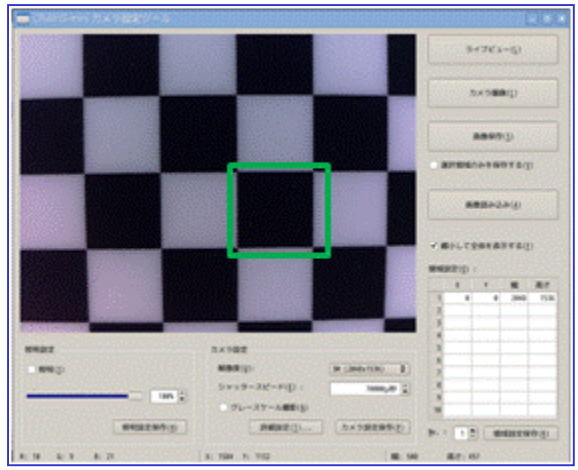
⑥Indication of the whole photography domain

Scroll bar disappears when I check "I reduce and display the whole" when I make resolution (XGA, 2M, 3M, 5M) other than VGA, and the whole image is displayed.

2.6 Domain setting of the inspection

I drag a domain to use for inspection in an image in the state that displayed a still image.
The domain that I chose is displayed with the rectangle of the green line when I drag it.



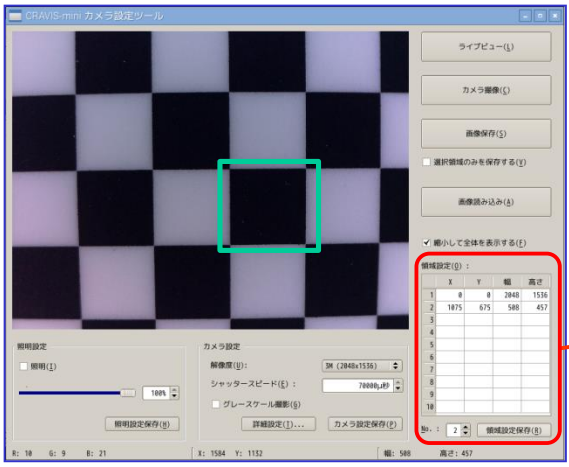


If the domain that I appointed is appropriate, I choose a value of ,①" No. and push the ,
②" domain setting preservation button.
③A set point is displayed in the domain of the number that I appointed, and a set point is stored.

I can call the set point stored here on a script.

If the domain that I appointed is not appropriate, I can start it again once again.
It enables overwrite preservation to appoint same "No.".

I can appoint the domain from 1 to 10.

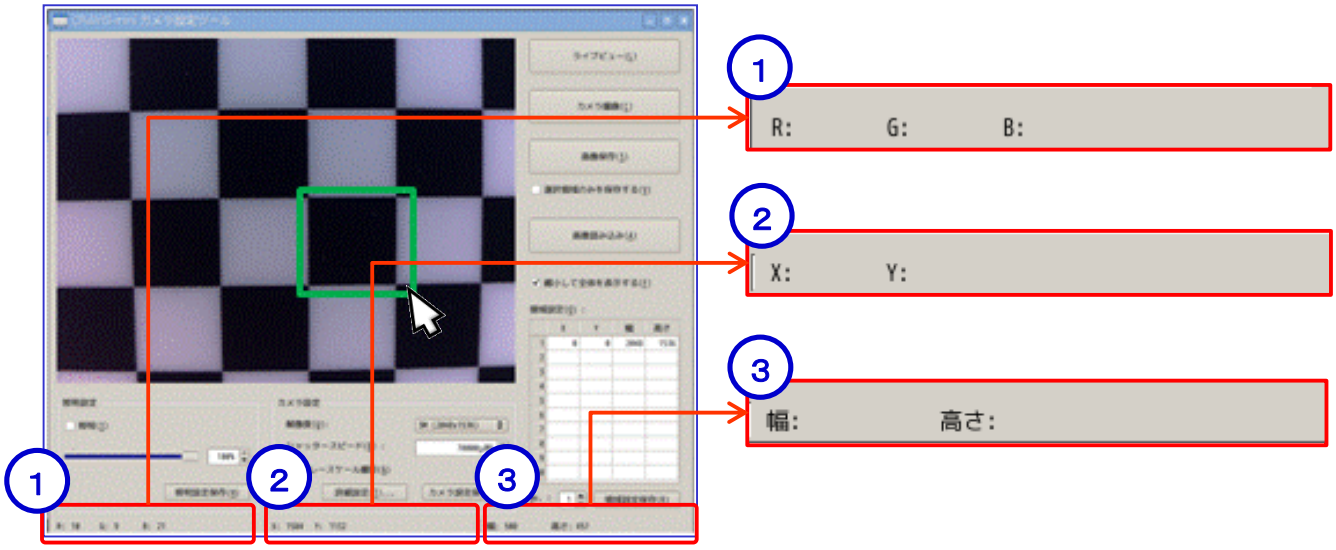


2.7 Other functions

A ,① brightness level (R, G, B) and a ② coordinate level (X, Y) are displayed when I click it at any point of the image when an image is displayed.

The width and height of the ,③ rectangle is displayed when I drag it on an image.

The displayed place becomes the part which I showed in a red frame.



①The information of the brightness level (R, G, B) becomes the reference information to set the threshold necessary for (processing to convert into a black-and-white image) to binalize to extract the characteristic of the image.

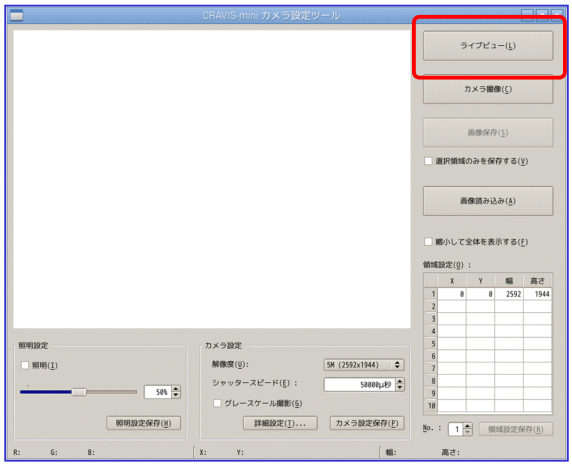
Because it is more likely to be passing over and the perdetection if the difference of a brightness level and the brightness level of the part with the characteristic that I want to extract of other parts is low when it processes it, measures such as changing a visualization condition such as illumination and the working distance are necessary.

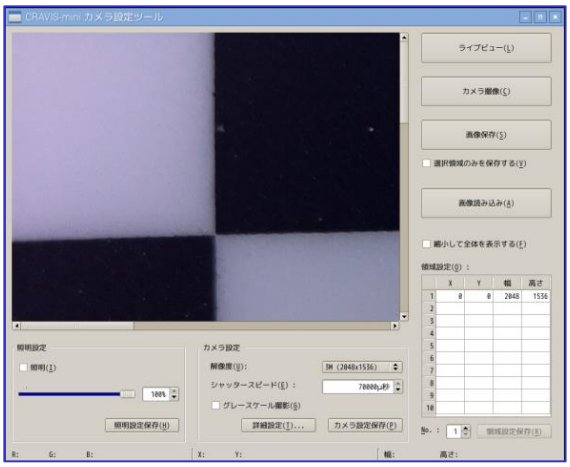
3 Grab

3.1 Procedure of the grabbing

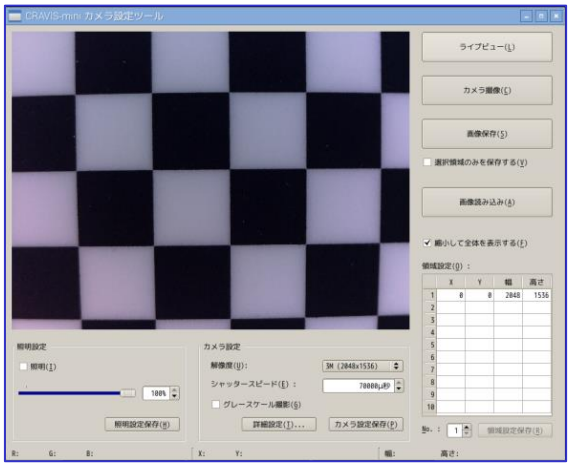
I grab an image using "the camera setting tool" which I explained so far.

At first we start "a camera setting tool", and let's push the "live view" button.



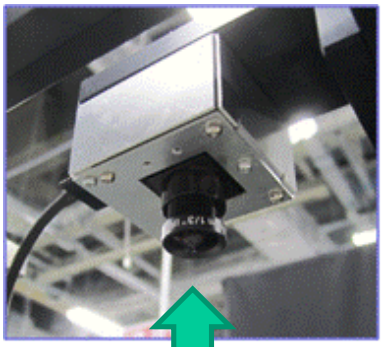


When I make resolution (XGA, 2M, 3M, 5M) other than VGA, I check "I reduce and display the whole", if necessary, and let you display the whole image.



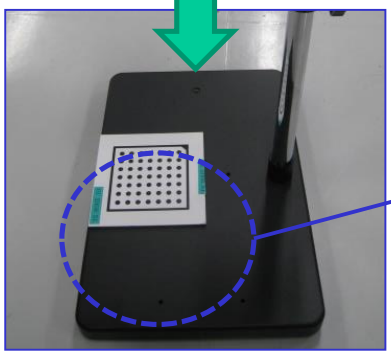
3.2 Focus adjustment

A fault coordinates focus as follows.

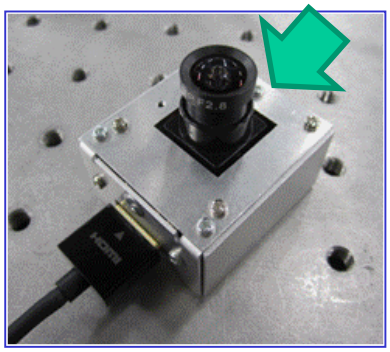


I locate a camera and the dot chart such as the chart below to become the distance (working distance) to a cover photography object by the considered inspection.

※Because this dot chart is for focus adjustment, it is enough with the thing which had you make it by PowerPoint.



Using the live view screen which I introduced in 2.1.4, I turn a lens like the following arrow while looking at the chart reflected in the screen and adjust it so that focus is correct.



I tighten a screen of the lens mount if I can regulate a fault and fix a lens position.

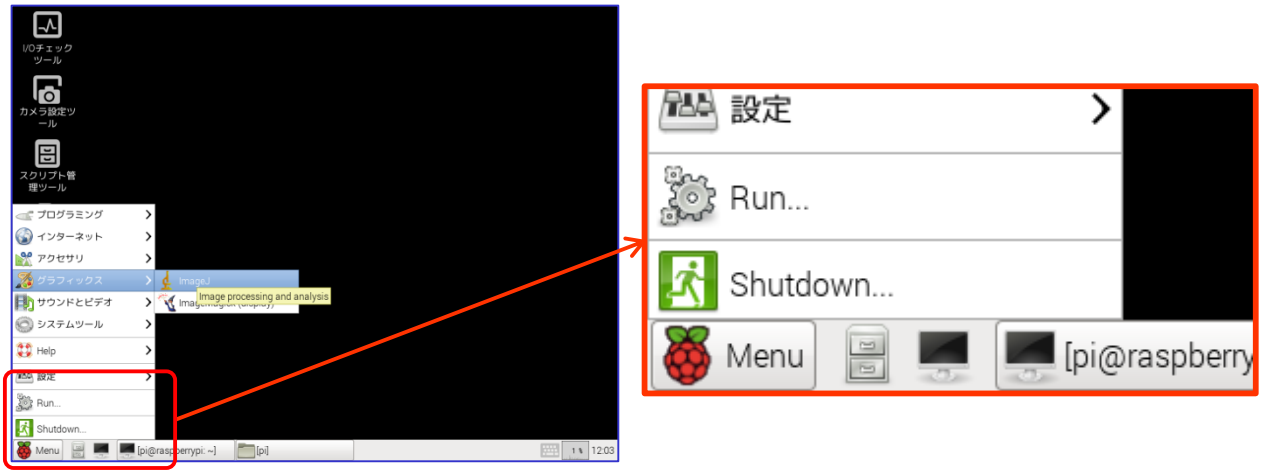
※There is the screw in the direction of the arrow.

By adjustment mechanism of the height, I fine-tune focus as needed.

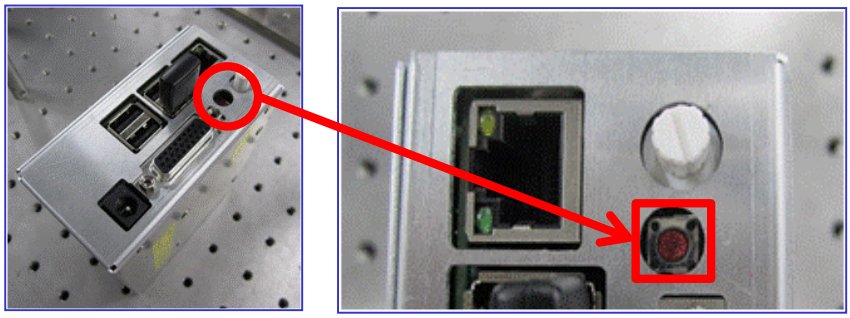
4 Shut down

I speak a method of the shut down of CRAVIS-mini here.

From "Menu" in the task bar under the screen "Shutdown...I choose "and choose "OK".
Shut down is started and, after several seconds, is completely finished.



In addition, a method except this includes the method that continues pushing the power button in the back of the main body more than two seconds.
When blue light-emitting diode begins to flash on and off, shut down becomes the signal carried out.



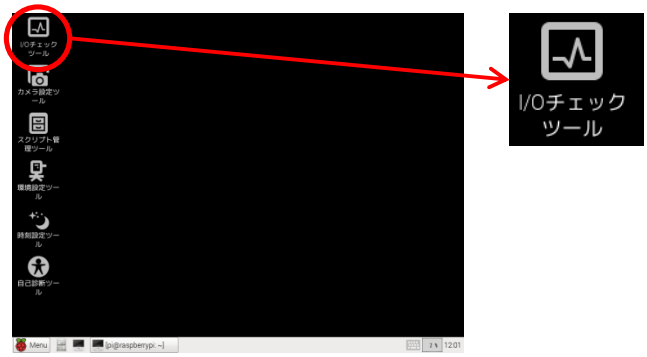
5 Other CRAVIS-mini original tools

I introduce an original tool of the original development that is convenient for an experiment and system setting, adjustment.

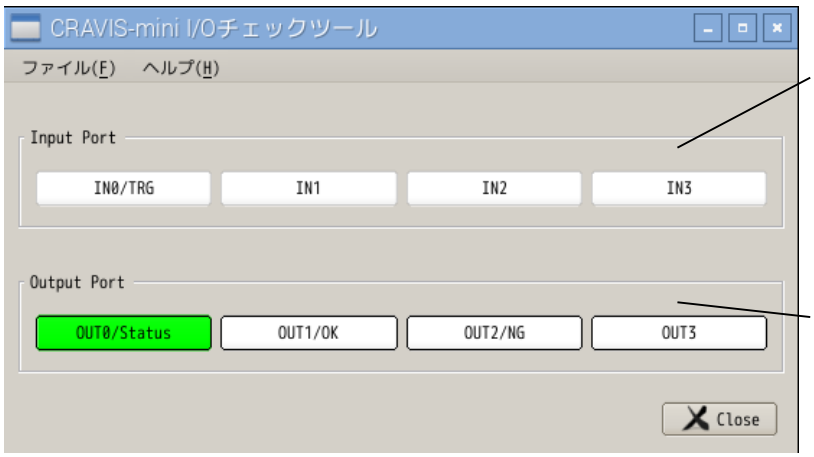
5.1 I/O check tool

When I connected I/O to external equipment, I can confirm connection and the movement by using the I/O check tool.

Start method
I double-click an "I/O check tool" icon in the Desktop. An I/O check tool starts.



Operation method



When change ON/OFF of the input signal; the area color of each signal name
ON: Green, OFF: I am displayed with white.

ON/OFF of the output signal which supports when I push the button of each signal name is reshuffling ります.
The area color of each signal name
ON: Green, OFF: I am displayed with white.

5.2 Environmental setting tool

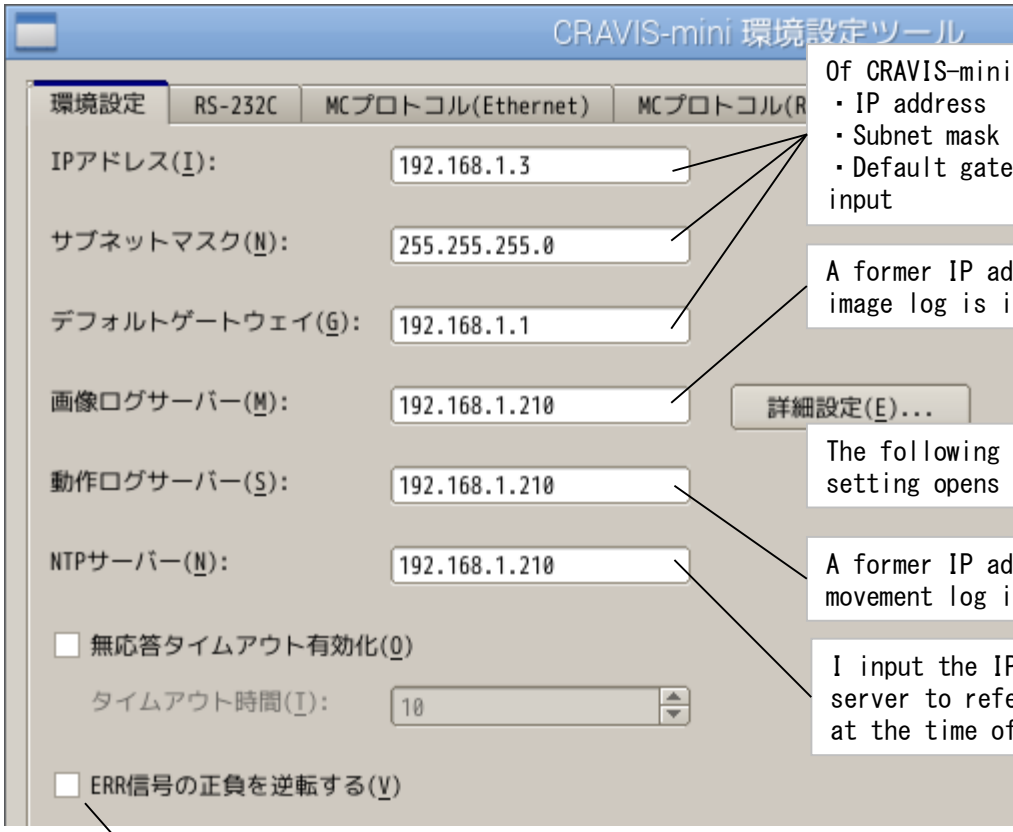
When I change communication setting with an IP address and the external equipment of CRAVIS-mini, I change setting with an environmental setting tool.

Start method
I double-click an "environmental setting tool" icon in the Desktop. An environmental setting tool starts.

Operation method

I input each set point shown below, and setting is stored when I push "OK" and is reflected.
If a message promoting reboot is displayed, setting is reflected when I shut down CRAVIS-mini and reboot.

①Environmental setting tab



Of CRAVIS-mini
・IP address
・Subnet mask
・Default gateway
input

A former IP address to transfer image log is input by CRAVIS-mini

The following image log server setting opens

A former IP address to transfer movement log is input by CRAVIS-mini

I input the IP address of the NTP server to refer to to do laying upon at the time of CRAVIS-mini

I set it whether you reverse the logic of the ERR signal
ERR signal of checkless time: ERR signal of time when there are normal time OFF, abnormal time ON check: Normal time ON, abnormal time OFF

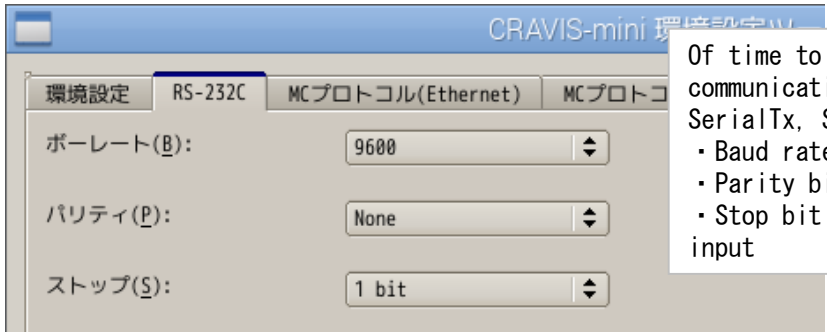
Image log server setting window

When there is an input hierarchy, I input a joint ownership folder name of the forwarding address like "image_log/aaa"

I input a user name and the password of the joint ownership folder of the forwarding address

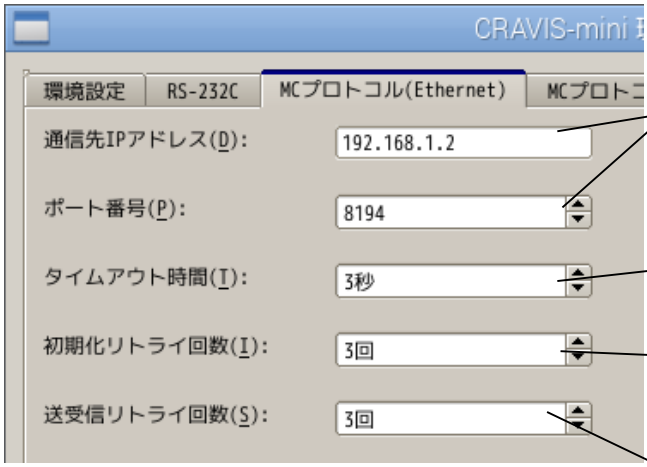
I confirm whether it is connected to the image log server in the information that I set (displayed a dialogue whether it is success or failure)

②RS-232C tab



Of time to perform RS-232C communication using SerialInit, SerialTx, SerialRx
・Baud rate
・Parity bit
・Stop bit
input

③MCプロトコル（Ethernet）タブ



Of time to perform MC protocol (Ethernet) communication using McpEtherInit, McpEtherTx, McpEtherRx
・IP address of the communication
・Port number of the communication
input

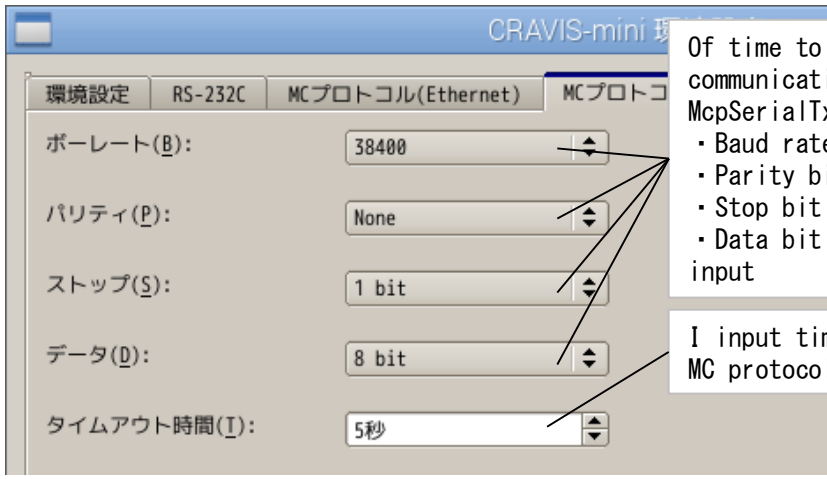
I input time-out time at the time of the MC protocol communication

I input time-out time at the time of the MC protocol communication

I input the re-try number of times at the time of McpEtherTx, the McpEtherRx practice

For example, I will wait for time-out time for up to 3*3 = nine seconds when I set the re-try number of times with three times for three seconds.

④MC protocol (RS-232C) tab



Of time to perform MC protocol (RS-232C) communication using McpSerialInit, McpSerialTx, McpSerialRx
・Baud rate
・Parity bit
・Stop bit
・Data bit
input

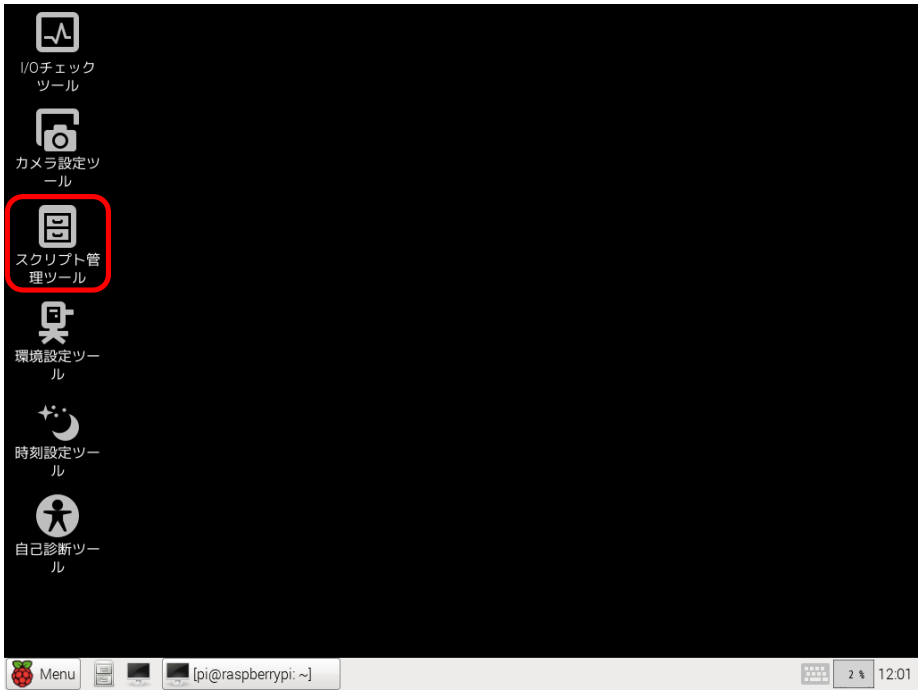
I input time-out time at the time of the MC protocol communication

5.3 Script management tool

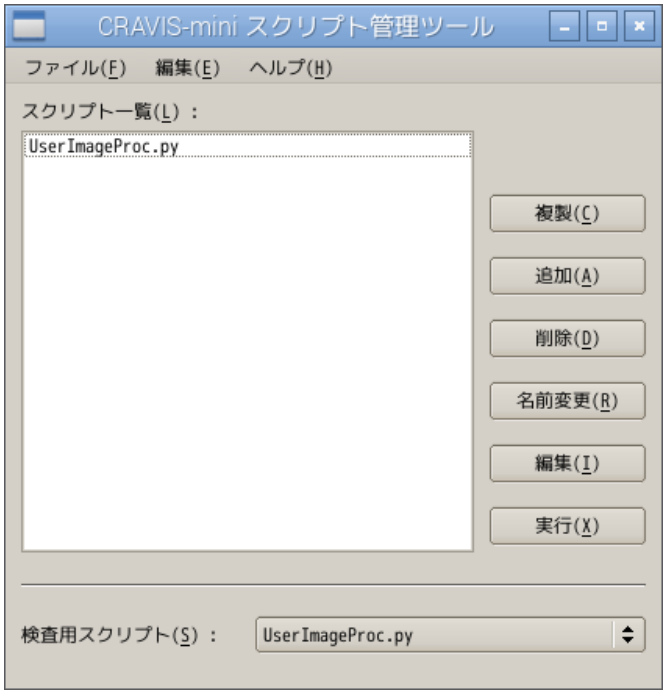
When I perform the new making, copy, deletion of the inspection script, a name change and the editing of the inspection script, test practice and appoint a public performance script, I use a script management tool.

Start of the script management tool

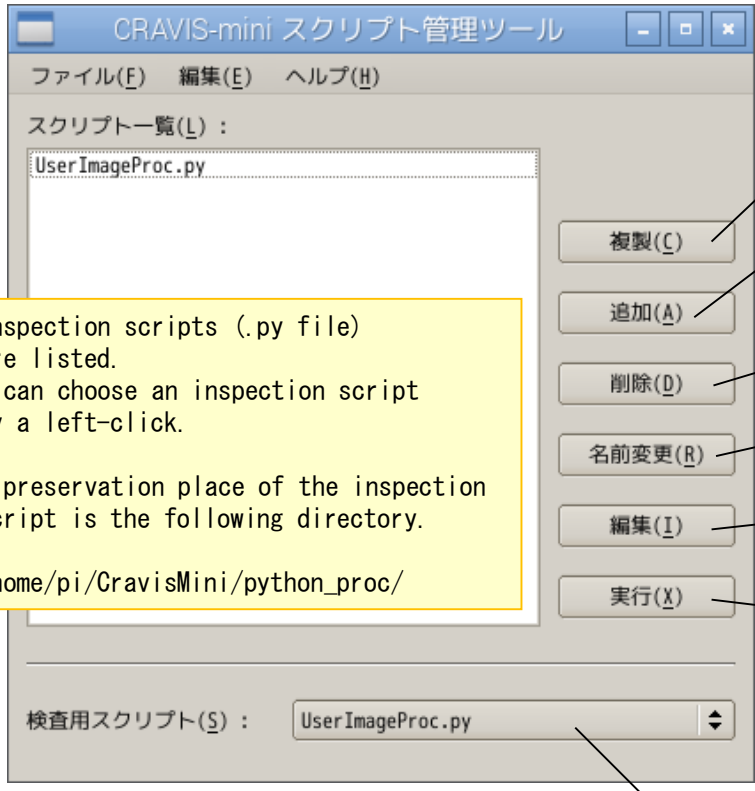
I double-click a "script management tool" icon in the Desktop.



A script management tool starts.



Operation method



Inspection scripts (.py file) are listed.
I can choose an inspection script by a left-click.

A preservation place of the inspection script is the following directory.

/home/pi/CravisMini/python_proc/

I reproduce the inspection script which I chose as the other file.

I make an empty inspection script.

I delete the inspection script which I chose.

I change the name of the inspection script which I chose.

I edit the inspection script which I chose by an editor.

I execute the inspection script which I chose experimentally.

I choose an inspection script to carry out with an inspection mode (a mode number: 0) automatically.

Editor choice method

I click "editing" "setting" of the menu.

Because an editor choice screen is displayed,

I choose an editor from "geany" "gedit" "spyder" "idle".

I push down an "OK" button.