CANON INDUSTRIAL IMAGING PLATFORM

Vision Edition programming and operation quick reference guide ver1.0

Canon

Introduction

This quick reference guide is aimed to support flowchart programming and operation of Vision Edition software.
Please refer "Work Support Manual-Device Startup" and "Work Support Manual-Code Recognition" first for the initial hardware configuration and basic flowchart program.
For each image processing operation unit settings, there is a image processing quick reference guide and a training kit with sample image files to help understanding of the configuration.
After familiarised with basic operation of Vision Edition, please refer main instruction manual for detailed configuration and operation of the software.

Note : "robot" in this manual is explicitly refers to Denso's COBOTTA collaborative robot.

Canon Europe Ltd - July 2020

Vision Edition setting & programming flow

Below is basic setting & programming flow of Vision Edition.
Both “Work Support Manual-Device Startup” and “Work Support Manual-Code Recognition” are following this basic flow as an easy start up guide.
This quick reference guide provides further assistance for programming and operation while "Image processing quick reference guide" specifically aims to help setting up of each image processing units.

(1) Initial configuration

a) Physically connect cameras and other external devices (if required) to the network.
b) Turn on “Vision Edition” PC, Vision Edition application should automatically start.
c) Configure network and other system setting at Vison Edition System Settings menu.
d) Configure network setting and other initial configurations of camera.
e) Create a new Vision Edition JOB, assign and open.
f) Register cameras.
g) Configure trigger method and external devices communication parameters at External Connection Settings if required.
h) Place target object at target position for a master image with optimum lighting.

(2) Flowchart and operation unit programming

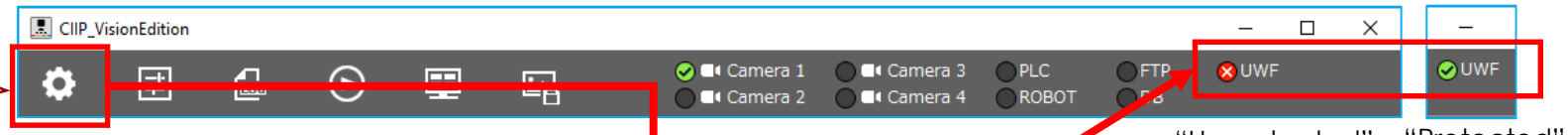
a) Create a flowchart. (Drag & drop operation units and connect them.)
b) Configure Capture unit camera settings - viewing angle, focus, exposure etc.
c) Register a master image for each target object.
d) Create a matching model for pattern matching task if required.
e) Configure each operation unit in the flowchart - image processing unit, branching unit etc.
f) Configure output data at External Connection Settings if required.
g) Configure log settings.
h) Configure Main Screen Settings and Onscreen Info Settings if required.

(3) Debugging and preparation for live operation

a) Trigger manually and debug each operation unit and whole flowchart program in offline mode.
b) Switch to Online mode and carry out test run.
c) Switch back to Offline mode, check the result and log records.
d) Configure JOB assign list, default JOB and Vision Edition start up mode for live operation.

System Settings and protection mode (FBWF/UWF)

Click [System Settings] to carry out system / PC file maintenance and check Vision Edition main application version.



Click [Protect/Unprotect] button to switch protection status.
(=**U**nited **W**rite **F**ilter / **F**ile **B**ased **W**rite **F**ilter on/off)
Each time PC will automatically reboot to take effect.
In "Protected" mode, C drive (OS and Vision Edition application) is write-protected to avoid file corruption from sudden power cut etc. Any system parameter (such as IP address) change or file change on C drive will only be kept temporarily and discarded when PC is rebooted.

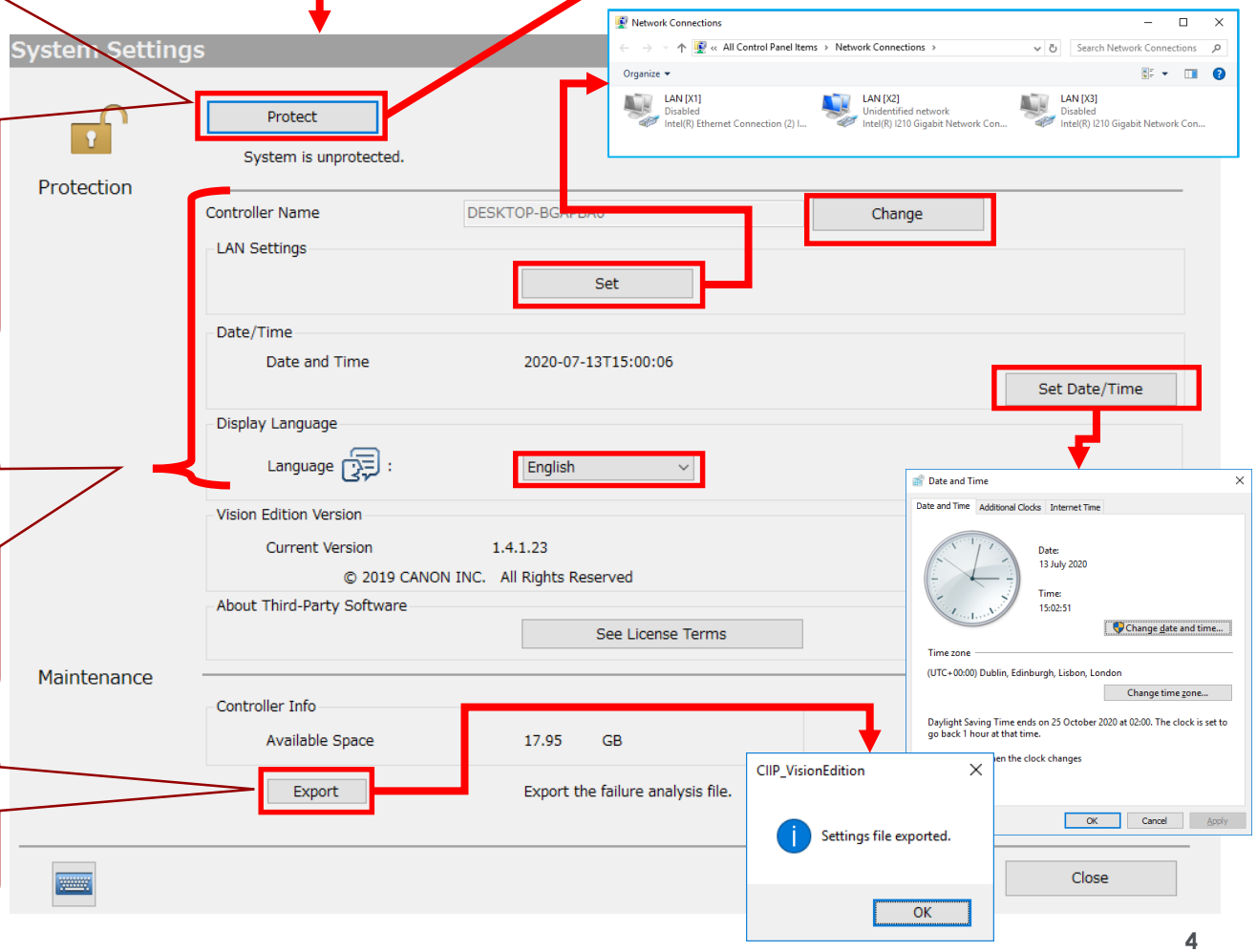
Note : Vision Edition use D drive to keep log and JOB flowchart data including master image/matching model. They will be kept permanently and not discarded when PC is rebooted. Therefore JOB can be programmed and saved under "Protected" mode.

In "Unprotected" mode, below items can be changed from Systems Settings GUI.

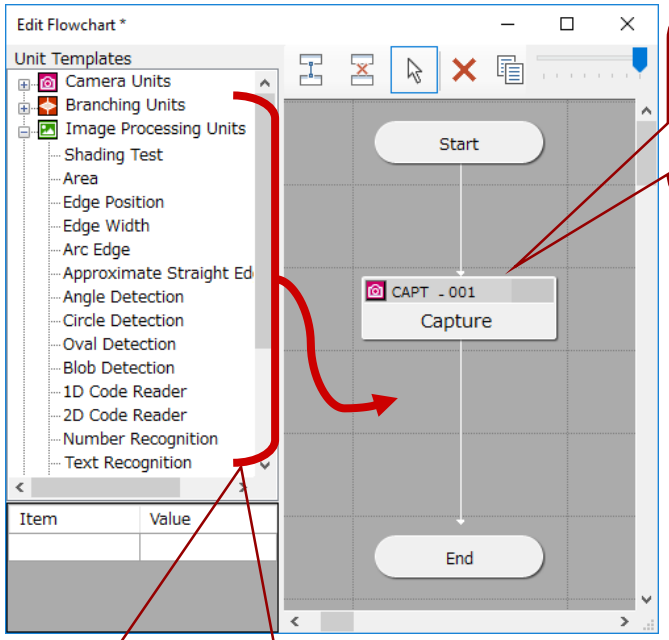
- Controller Name
- LAN (IP address) Settings
- Date / Time
- Display Language

If PC system parameters and C drive files need maintenance, please make sure to switch to "Unprotected" mode.

In case of critical system failure, Failure Analysis Data zip file can be exported to external USB memory. It may take sometime to export and wait until notification appears. The file requires special tool to extract and please send to Canon technical support for analysis.

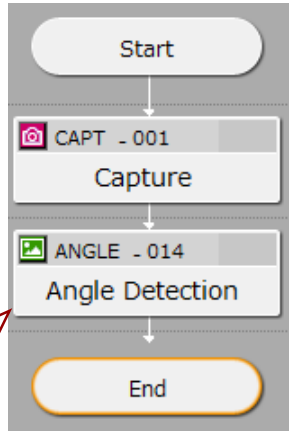


Typical flowchart program



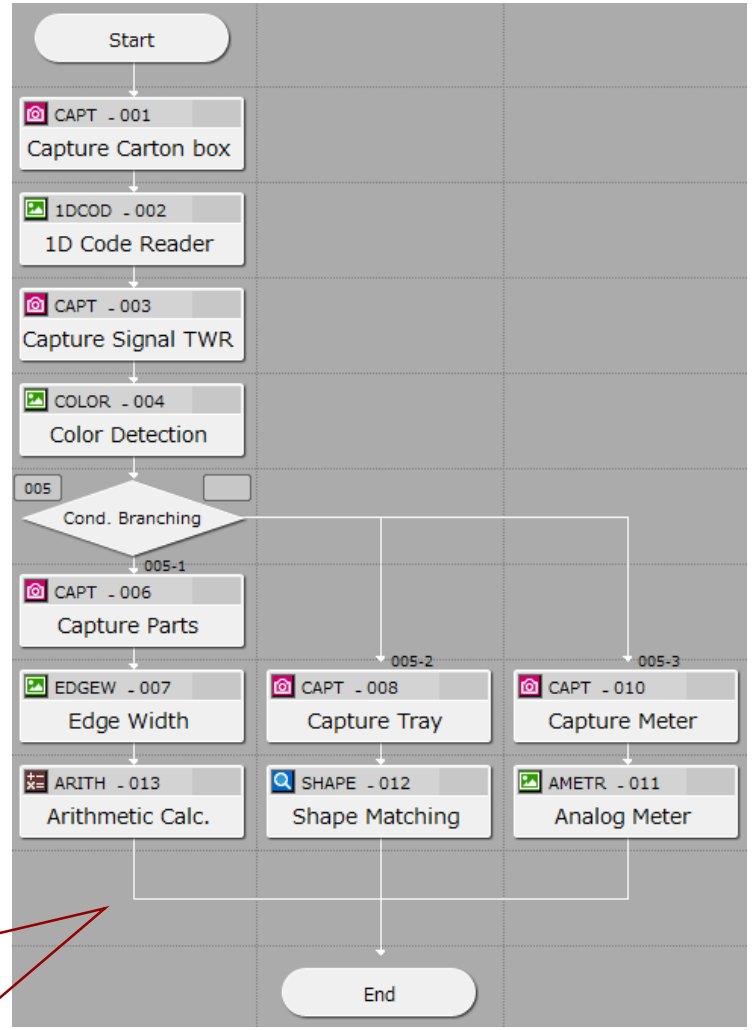
When create and open a new JOB, flowchart has only capture unit.

Drag and drop any of image processing unit and connect them from the [Start] to the [End] to create flowchart program.



Example-1 : [Capture] unit moves PTZ position, sets image capture parameter and takes a still image. [Angle Detection] unit uses this image to carry out angle measurement of workpiece.
This is typical image processing flowchart program.

The result can be output to PLC/Denso COBOTTA robot/UR controller/database/FTP server or used in other operation units such as [Branching] unit or [Arithmetic] unit in the flowchart as shown in Example-2.

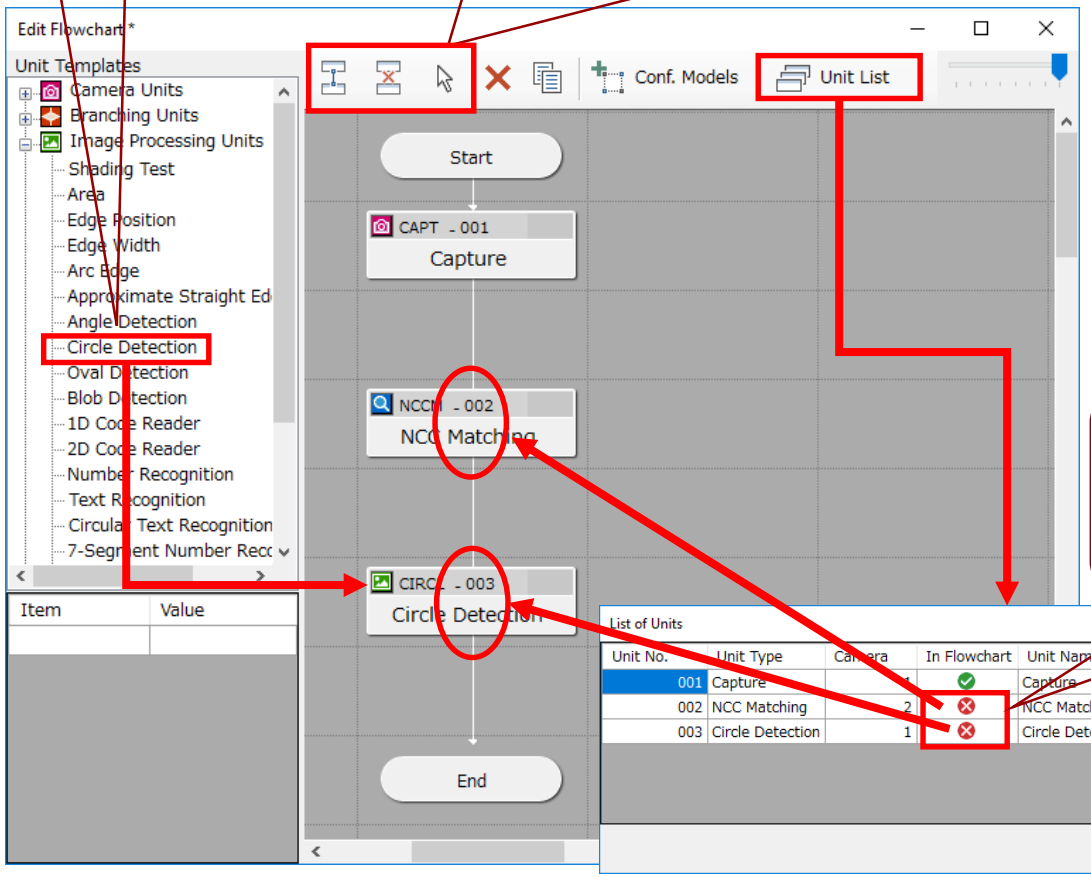


Example-2 : 1st [Capture] unit takes carton box image for [1D Code Reader] unit to read a barcode. 2nd [Capture] unit moves camera to signal tower, captures color image for [Color Detection] unit. [Conditional Branching] unit uses [Color Detection] unit result (=signal tower light status) to decide which path flowchart to take.
1st path for parts width measurement with [Arithmetic Calculation] unit outputs pixel to mm conversion data. 2nd path for detecting a parts at parts tray. 3rd path for reading a pressure meter.

Flowchart programming – 1

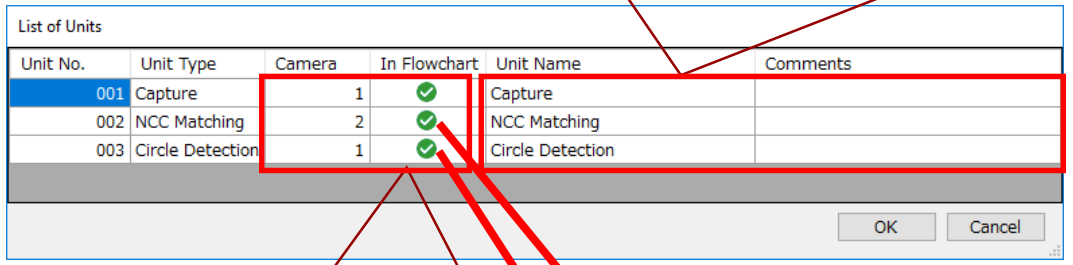
(1) Drag and drop the operation units by mouse.

(2) Connect or disconnect flowchart operation units by selecting these icons and using mouse. When connections are completed, recommend to select "cursor" icon to prevent accidental connection / disconnection of the operation units.

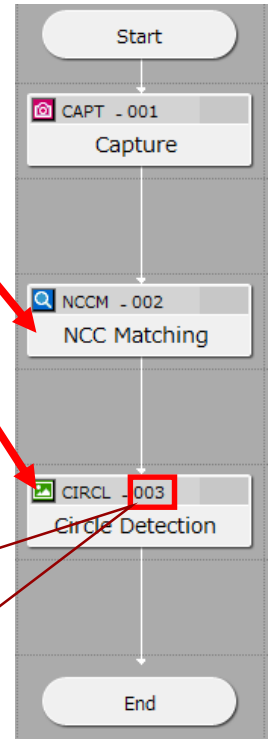


(3) Pay attention that sometimes JOB does not work due to the missed connection as this chart. Open [List of Units] and check "In Flowchart" indicator.

It is possible to change Unit Name and add Comments directly from the [List of Units] table instead of opening each operation units. Double click each Unit Name & Comments cell to change.



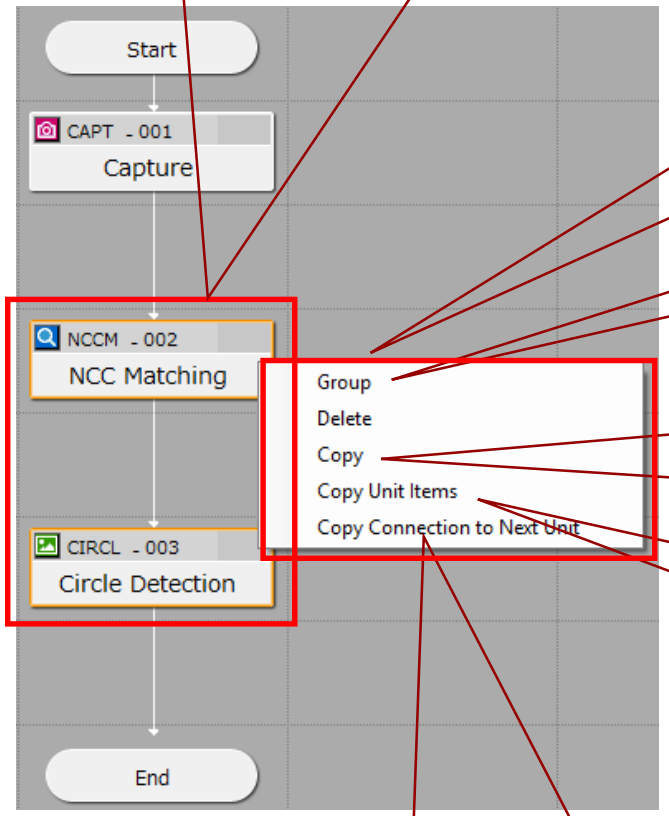
(4) After flowchart is completed, check [List of Units] to make sure all operation units are connected and correct cameras are assigned.



ID number on the each unit is a sequential number assigned every time dragged into the flowchart. It is only used for identification of the unit.

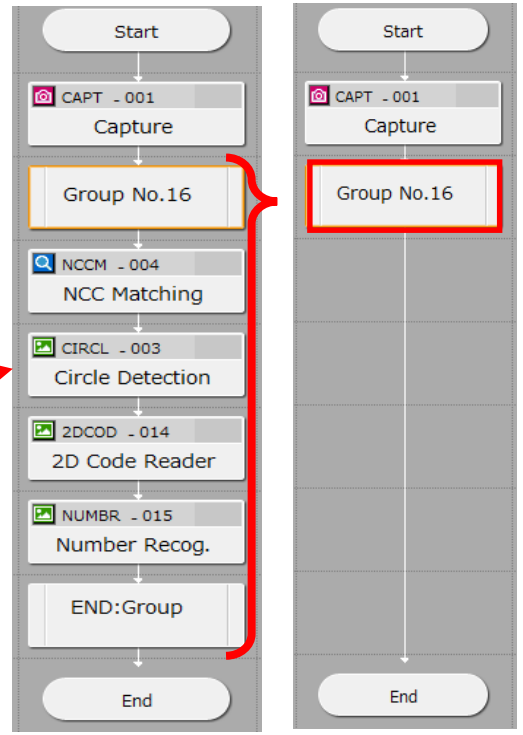
Flowchart programming - 2

Using mouse left button click or draw area to select single or multiple units for move / group / copy / delete operation. (Similarly Ctrl key + mouse left click can select multiple units.)

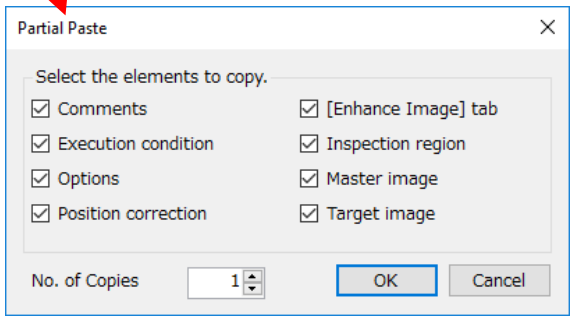


Mouse right click over the selected unit(s) to open context menu.

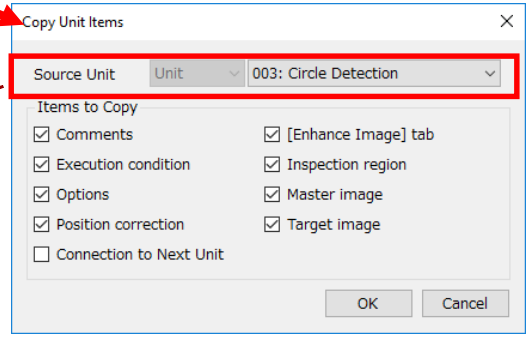
Group: a flow of several operation units can be grouped to one unit for the ease of programming.



Copy: When single unit is selected for copy, [Partial Paste] window appears to choose which parameters to carry to the copied unit and how many copies to create.
If multiple units are selected, one set of whole copied units are pasted.



Copy Unit Items: If there are several same operation units in the flowchart, parameters of one unit can be copied to these selected unit(s).

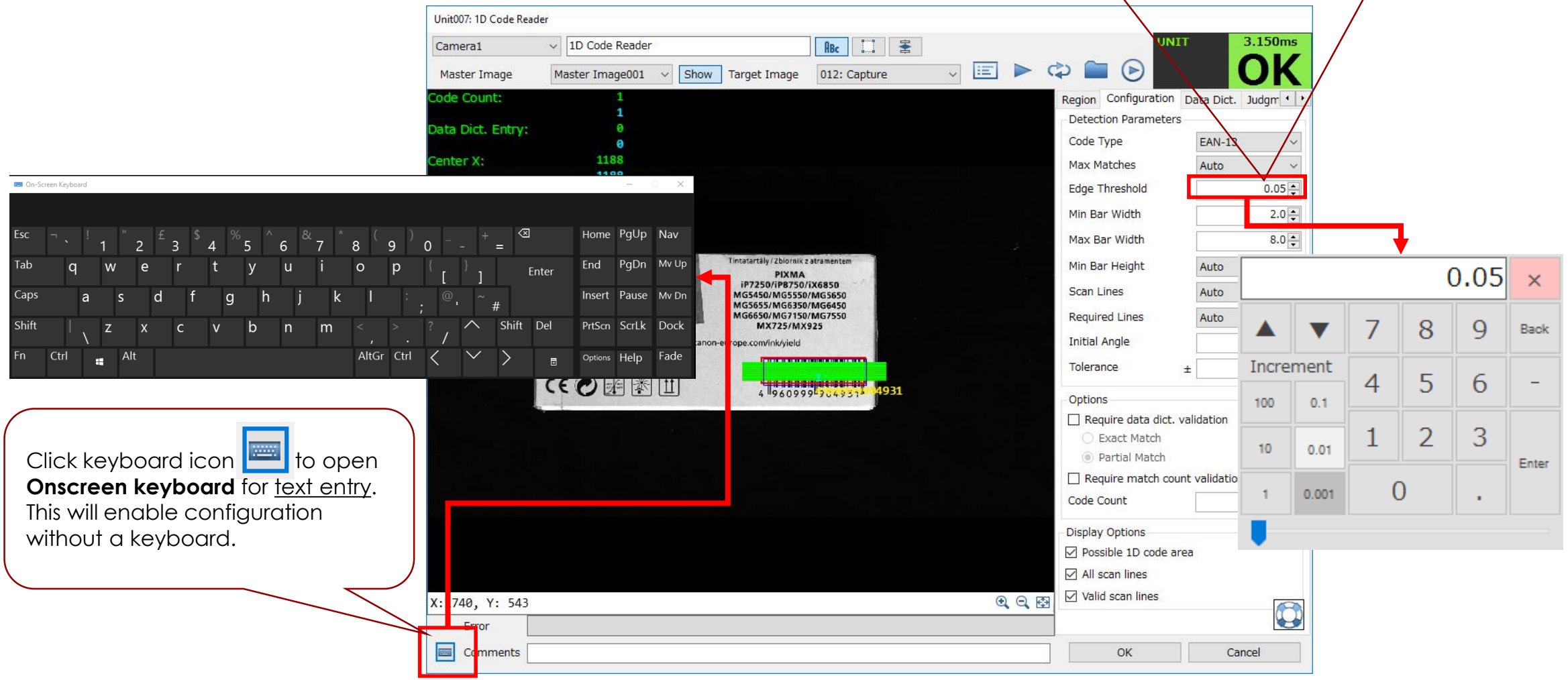


Source unit and selected unit have to be the same kind of operation unit.
e.g. [Circle Detection] to [Circle Detection].

Copy Connection to Next Unit: Outward connection of an operation unit can be copied to these selected unit(s).

Onscreen keyboard and Value Entry Tool

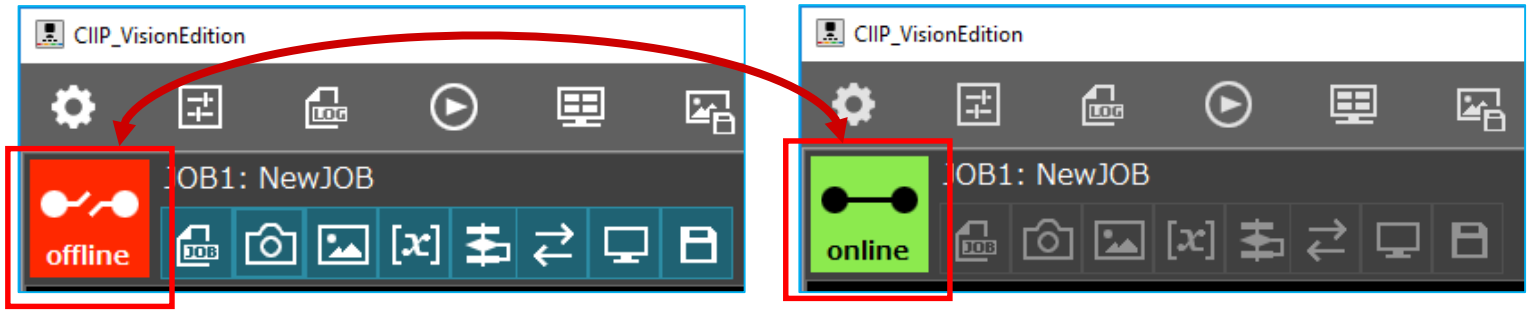
When entering numerical data, double click the entry field and **Value Entry Tool window** will open to assist configuration by mouse.
Directly enter the number, incrementally adjust the value or use slider to change the value.



Click keyboard icon to open **Onscreen keyboard** for text entry. This will enable configuration without a keyboard.

Online and Offline mode

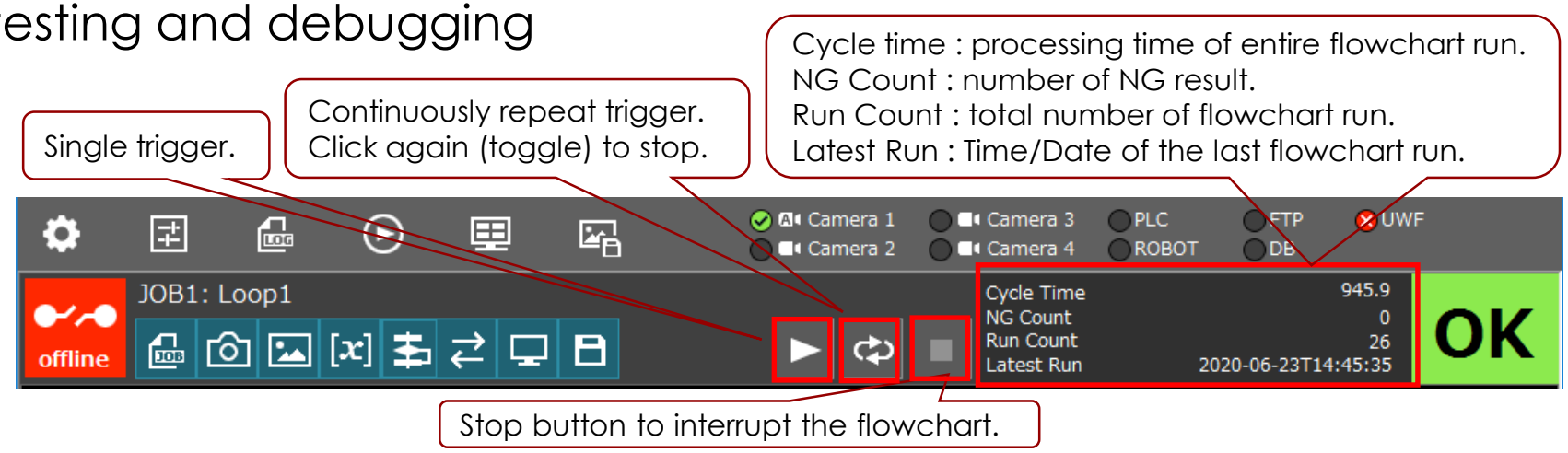
Initially Vision Edition is in Offline mode for configuration, testing and debugging.
Once programming and debugging is completed, click [offline] icon to switch to Online mode for live operation.
To switch back to Offline mode, click [online] icon.



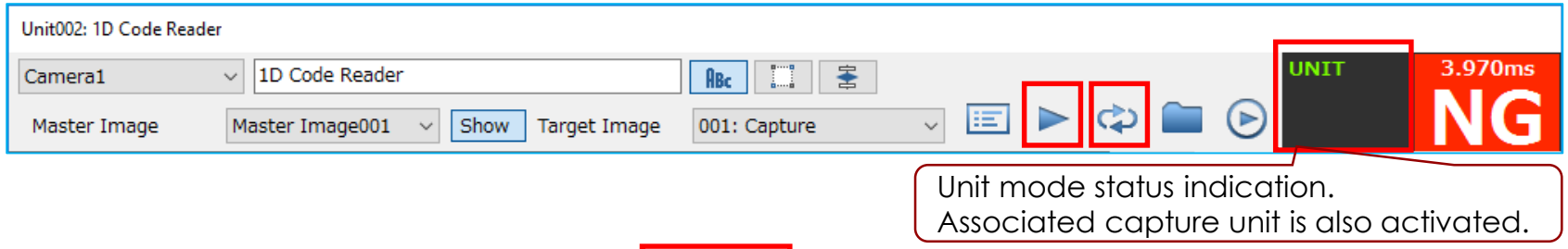
	Offline mode (configuration / set up mode)	**Online mode (live operation mode)**
Operation unit configuration, flowchart programming	Yes	No
JOB trigger	Internal manual trigger only for testing/debugging	Can receive external trigger or internal trigger
External device communication (receiving trigger, outputting result, sending log, loading different JOB)	No	Yes
Controlling Denso COBOTTA robot	Yes	Yes
Saving Log Images/Data/Screenshots	No	Can save
Saving Archive Images	Can save manually	No

Manual trigger mode for testing and debugging

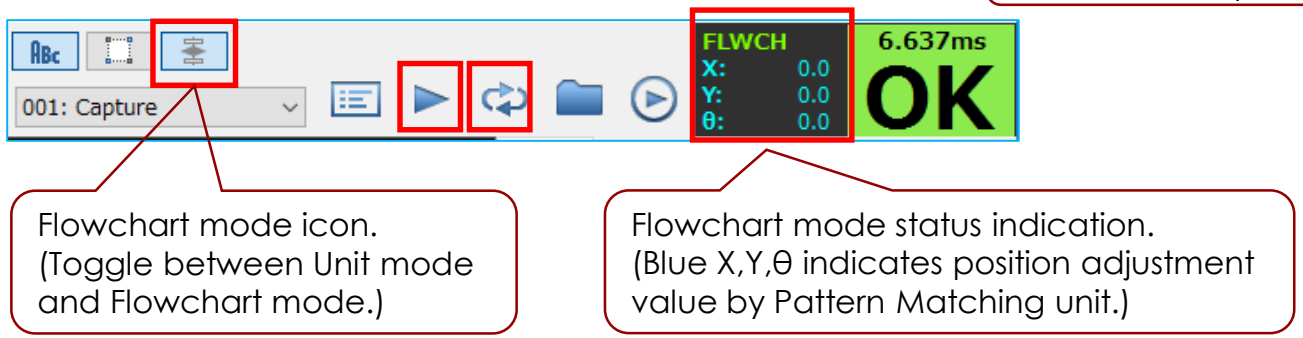
JOB trigger
Manual trigger to run entire flowchart at Offline mode for testing and debugging.



Oparation unit trigger (Unit mode)
Each image operation unit can be manually triggered for individual testing. Associated capture unit is also activated.



Oparation unit trigger (Flowchart mode)
Click [Flowchart mode] icon to toggle from Unit mode to Flowchart mode.
In this mode entire flowchart is run to provide related parameters for individual operation unit result.
For example, if the image processing unit region is adjusted by pattern matching unit result, Flowchart mode helps to assess the configuration.



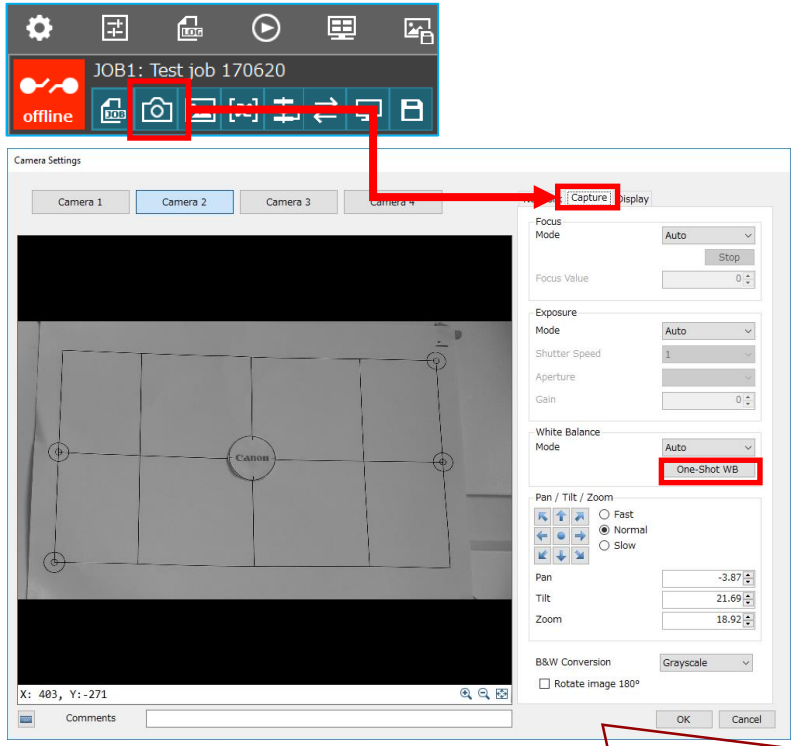
NOTE : Sometime continuous repeat trigger button is accidentally clicked and whole software looks like frozen.
At this status the system does not accept any other operation until continuous repeat trigger button or stop button is clicked.

Capture unit – 1 (global & individual capture setting)

[Camera Settings] menu used for registration has Capture TAB for global setting. However it is recommended to set capture parameter at individual [Capture] unit and create master image at each [Capture] unit with each optimum setting.

Example : [Capture (barcode)] unit is set to view carton box to capture barcode. [Capture (parts)] unit is set to different camera angle and exposure to provide image for [Edge Width] & [Angle Detection] unit. Therefore individual capture settings are required.

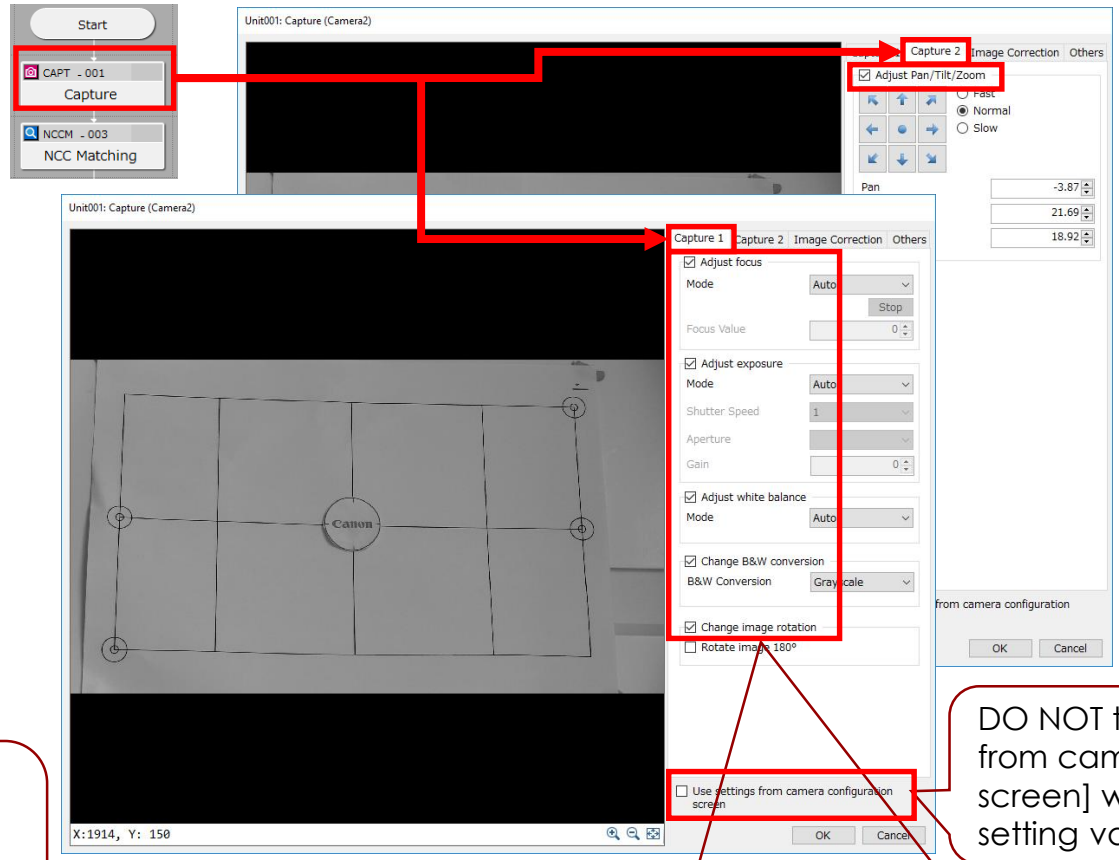
Camera Settings : global setting

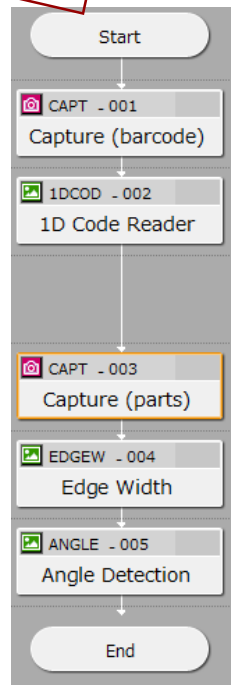


Use this [Camera Settings] menu for camera registration and not to configure global capture parameters at Capture TAB.

Note : One-Shot White Balance adjustment for color detection should be carried out in this menu. (Capture unit do not have this function.)

Capture unit Settings : individual capture setting





DO NOT tick [Use settings from camera configuration screen] which is global setting value.

Tick these items and adjust to force these settings instead of parameters taken from the last capture unit run or global setting.

Capture unit – 2 (PTZ adjustment and settings for Color Detection unit)

Camera Settings : Capture 2 TAB PTZ adjustment

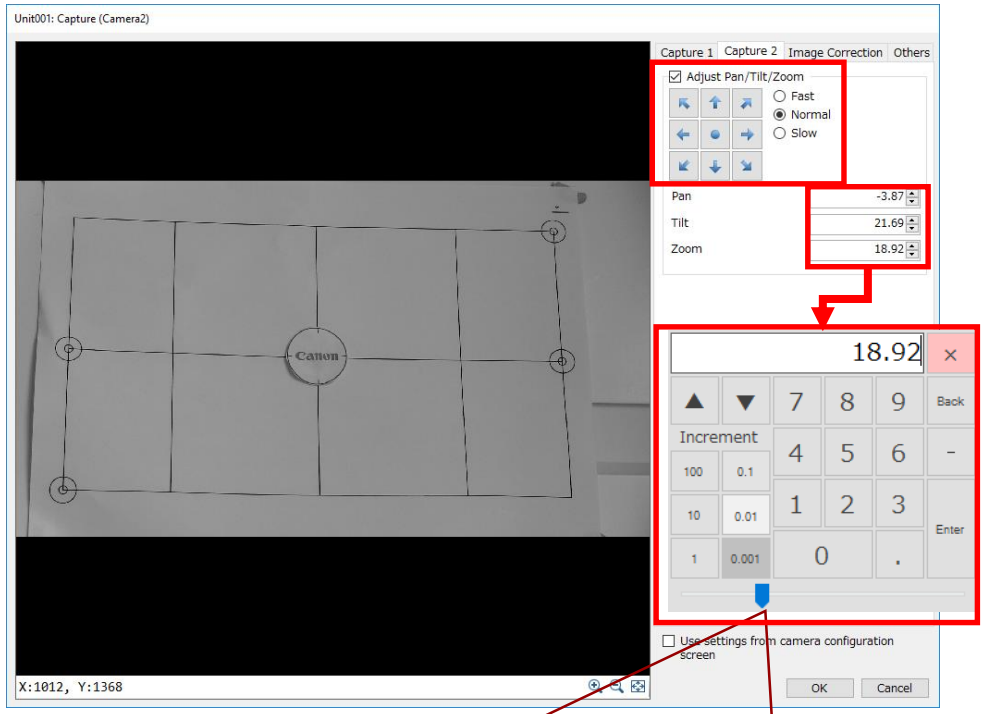
Use arrow button to move camera PTZ position at Capture 2 TAB.

Note 1: Vision Edition uses PTZ position value to recall camera. Make sure when using arrow button, these values are updated. Otherwise camera will not move to the same position when this capture unit is used.
Note 2: If the object is too close (less than 1.5m) and zoomed in, Auto Focus or One-push AF may not work due to mechanical limitation.

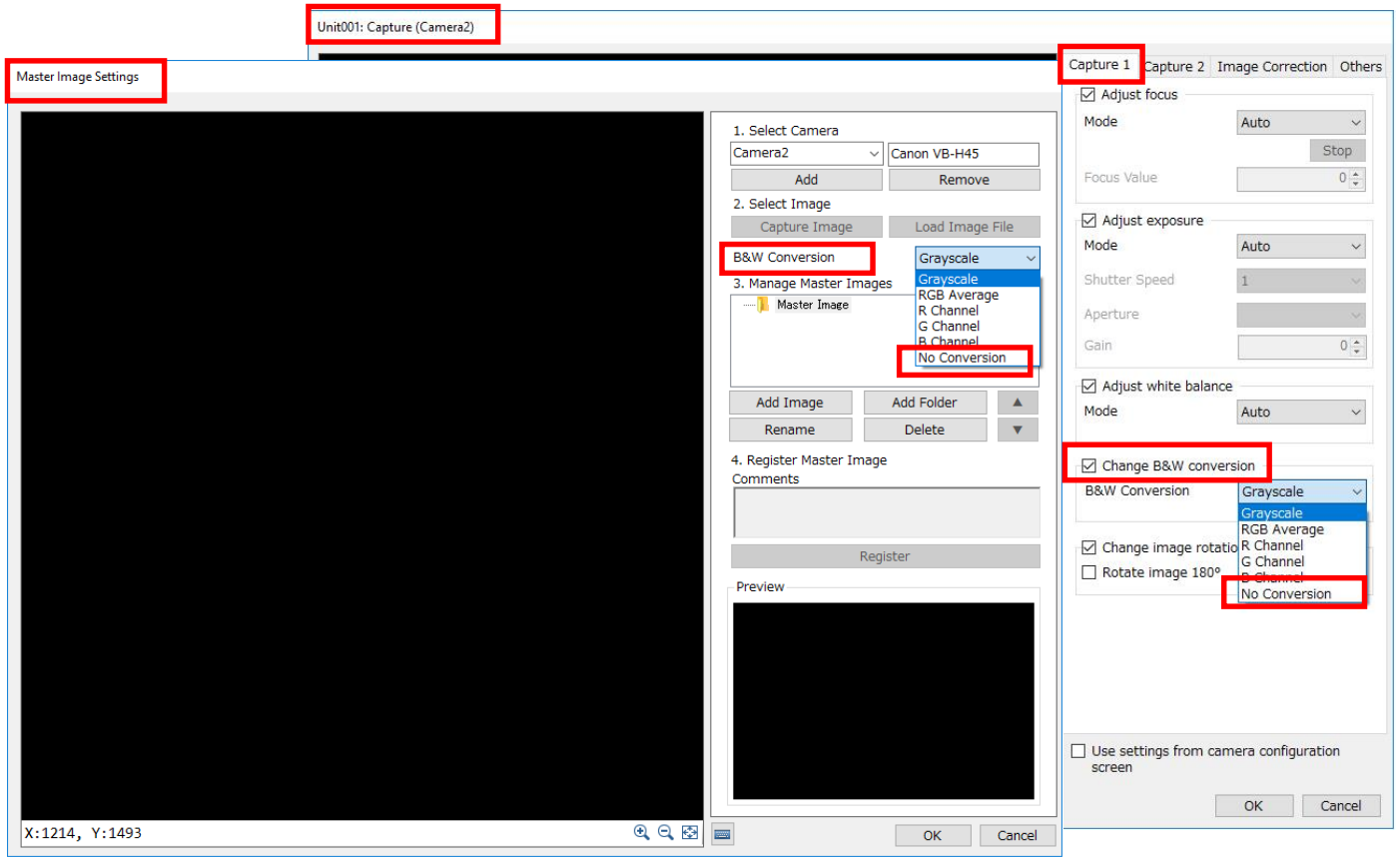
B&W Conversion settings for [Color Detection] unit

If [Color Detection] unit is used, set B&W Conversion settings of [Capture] unit to [No Conversion] (=color mode) and create Master Image with [No Conversion] setting.

For all other image processing units, B&W Conversion settings of [Capture] unit must be set in B&W mode (=other than [No Conversion]). Also for NCC pattern matching, master image and model must be made in B&W mode.



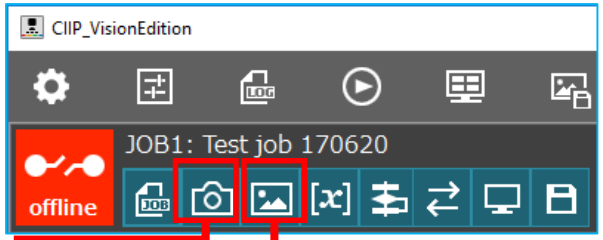
Double click PTZ entry field to open Value Entry Tool. Fine movement (incremental adjust) and slide bar operation helps especially Zoom adjustment.

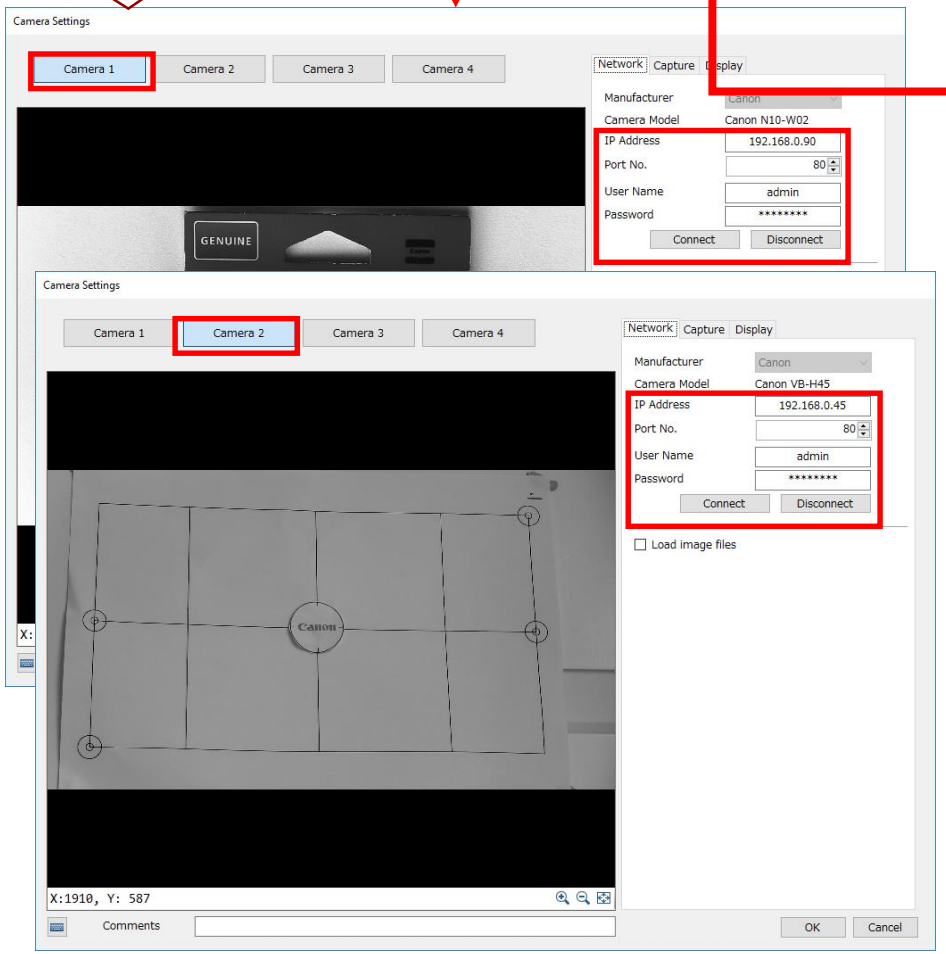


Capture unit – 3 (multiple camera use)

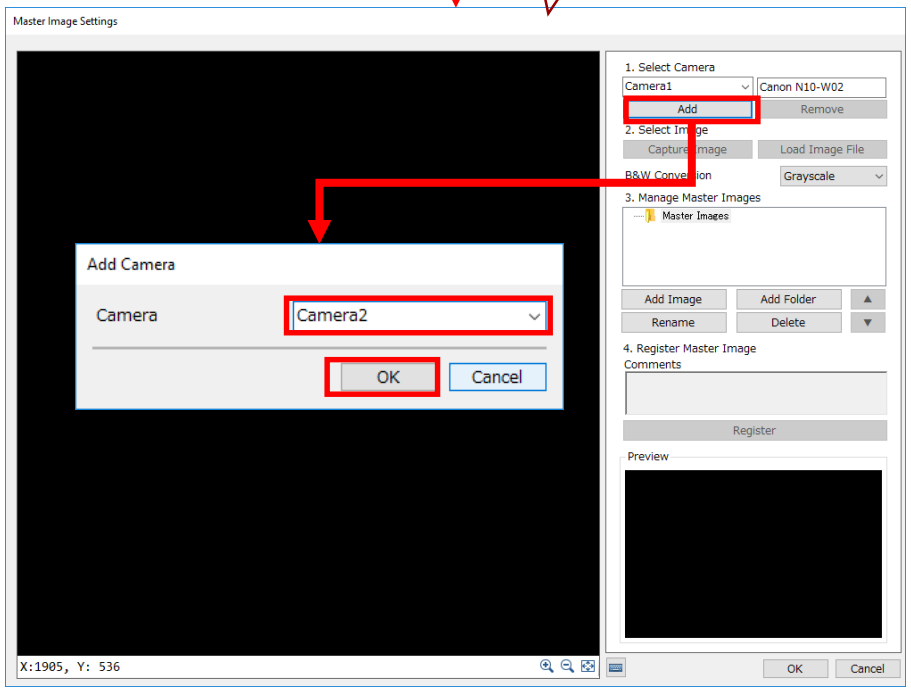
If using two or more cameras follow below steps;
(1) Click [Camera Settings] and register cameras.
(2) Click [Master Image Settings] at the main screen and add 2nd - 4th cameras.
(3) Capture unit's camera selection tick boxes become active and able to select.

(1) Open [Camera Settings] menu and register all cameras.

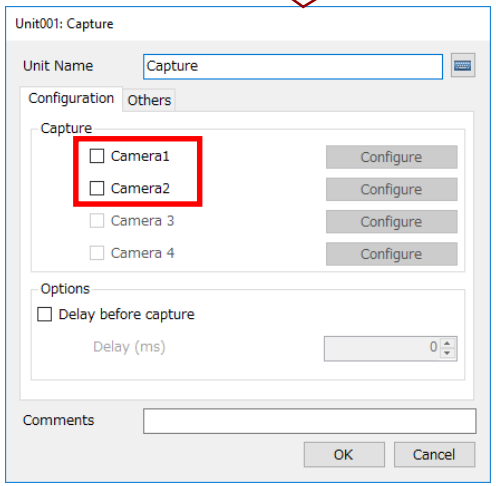




(2) Open [Master Image Settings] window and add 2nd - 4th cameras.



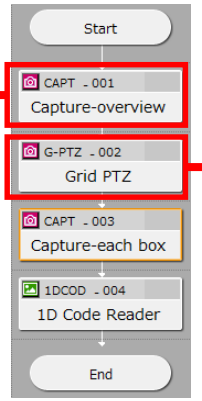
If (1) & (2) process is not completed, [Capture] unit Camera selection tick box will be greyed out and not be able to select.

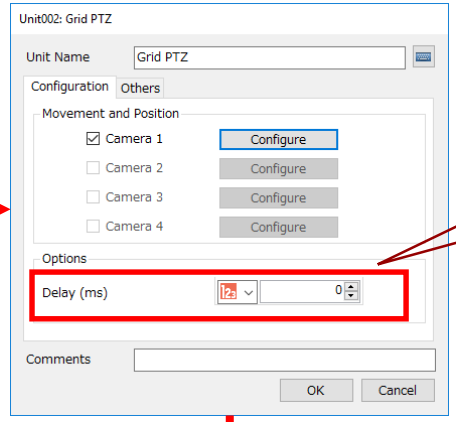


Grid PTZ unit – 1

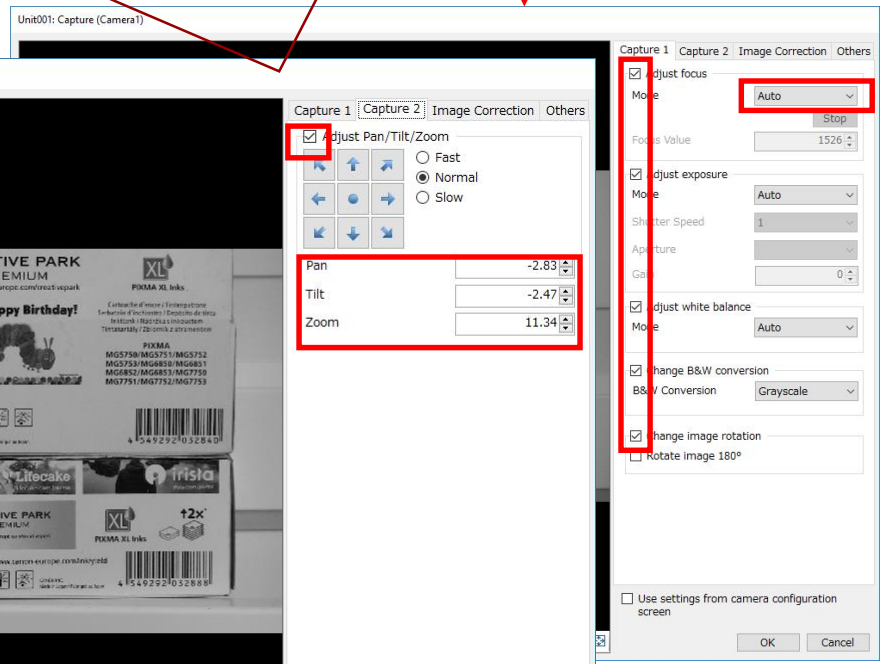
[Grid PTZ] unit moves PTZ camera to the next grid cell position at every Run Count increment. It requires Overview [Capture] unit and individual [Capture] unit as example flowchart.

(1) Configure "Overview [Capture] unit". Make sure the same PTZ position coordinate is entered into [Grid PTZ] unit configuration later. Set Auto Focus at this stage to make settings easier.

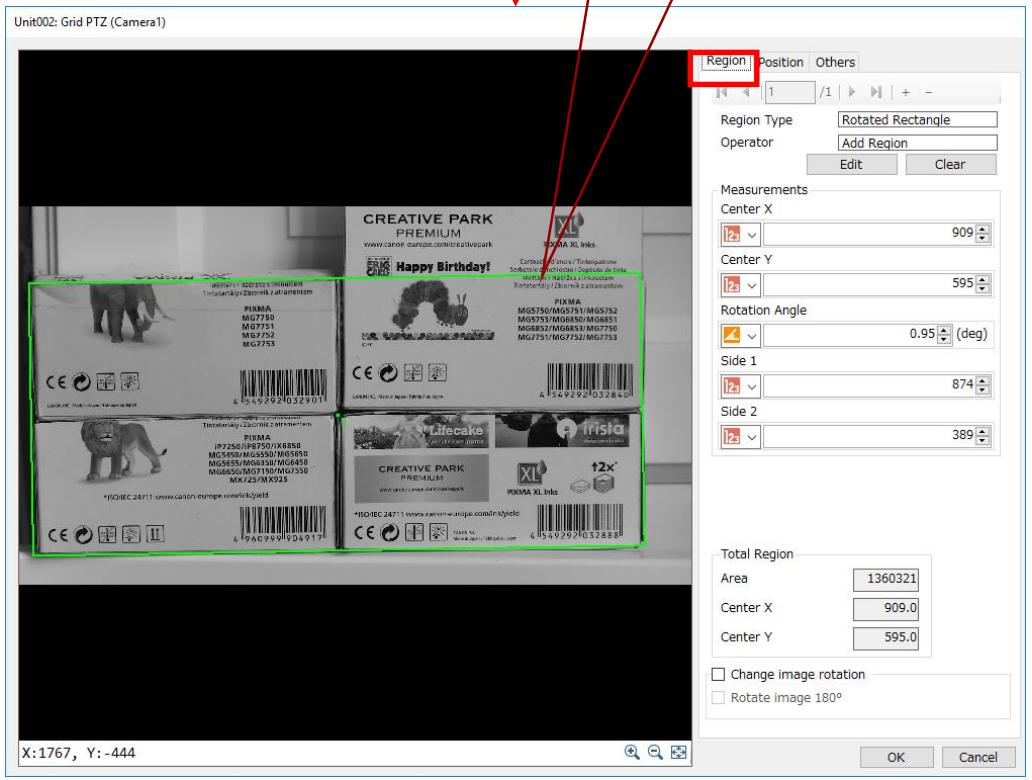




(2) Open [Grid PTZ] unit. Delay time will be added after the Grid PTZ movement.



(3) Set region of grid.

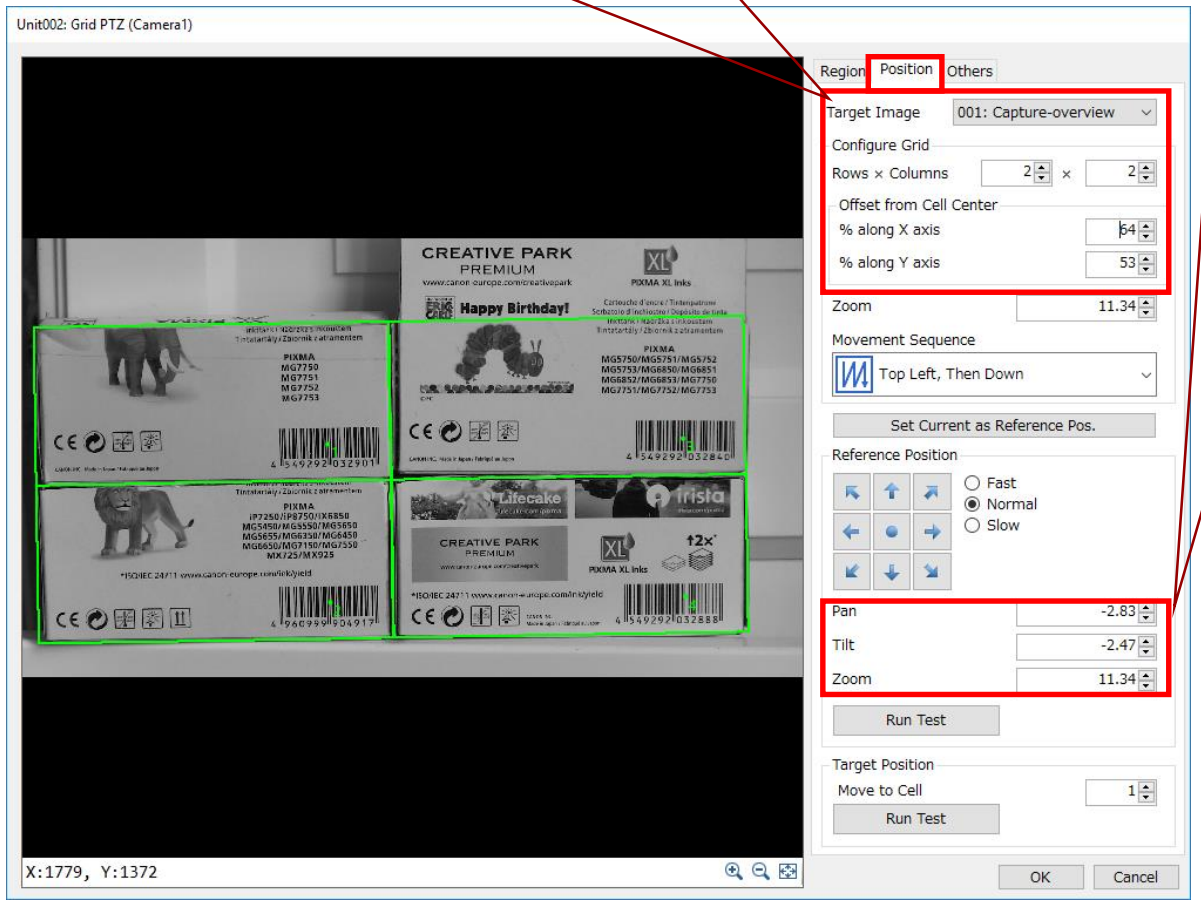


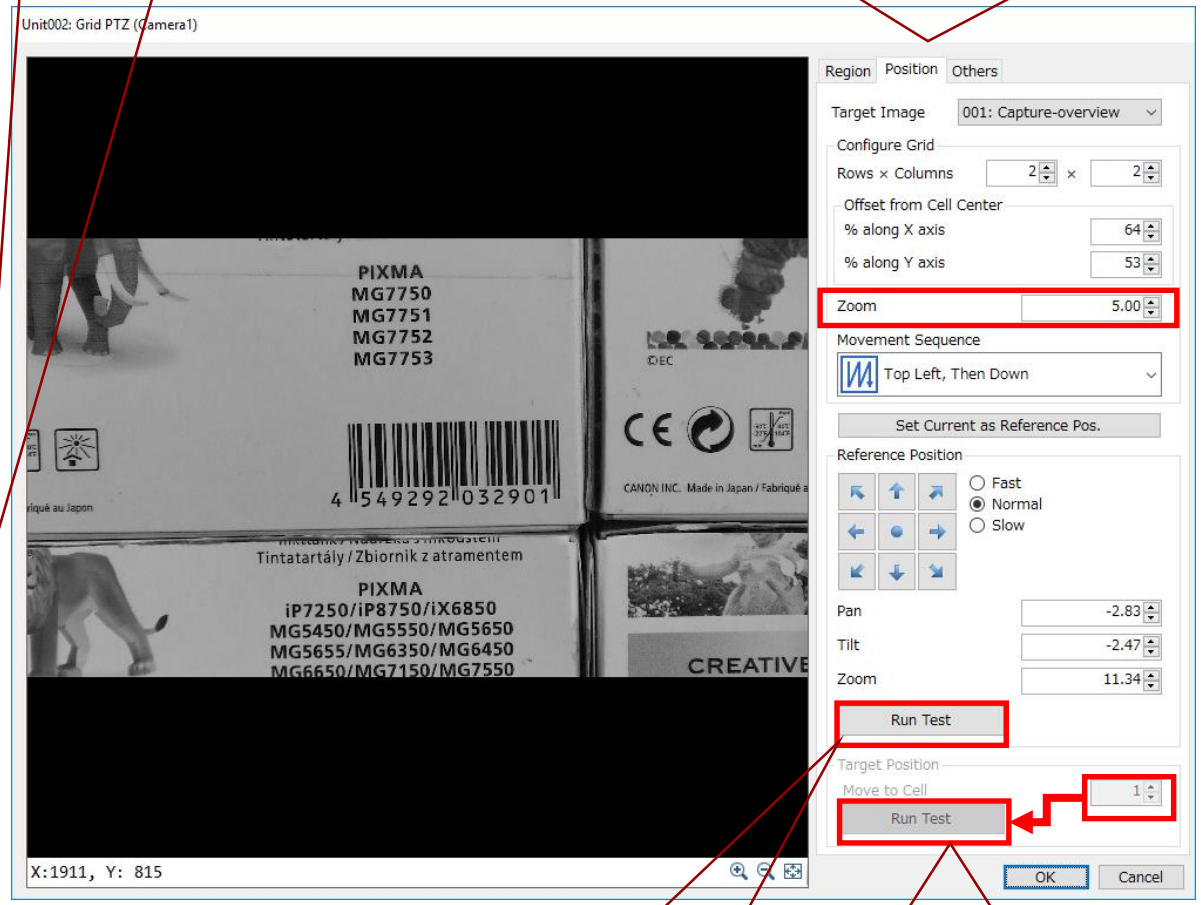
Grid PTZ unit – 2

(4) Select "Overview [Capture] unit" for [Target Image] and configure grid size.
Set offset % from the centre if required.

(5) Make sure overview PTZ position is entered as [Reference Position] PTZ values.

(6) Click Target Position [Run Test] of Cell [1] to move grid cell 1 and Reference Position [Run Test] to return. Enter adequate grid zoom value.





Return to overview.

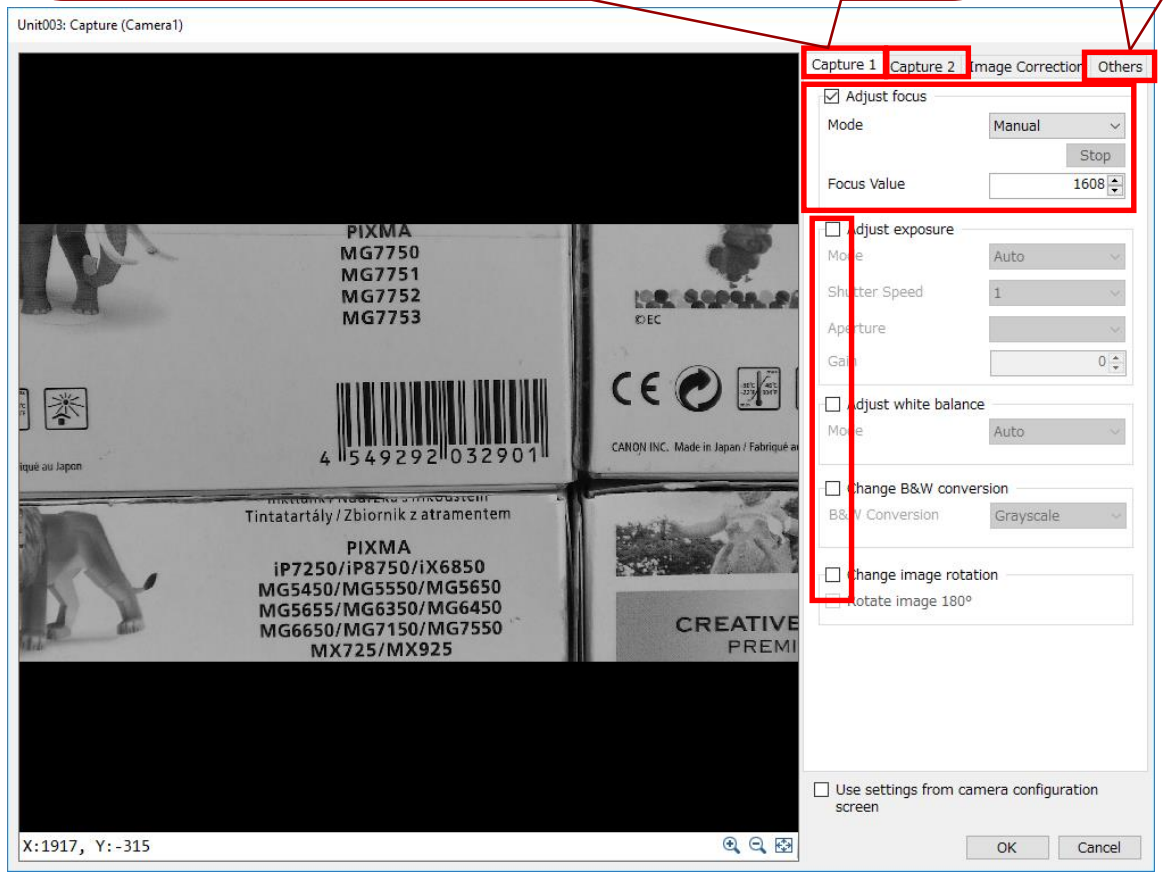
Move to each cell.

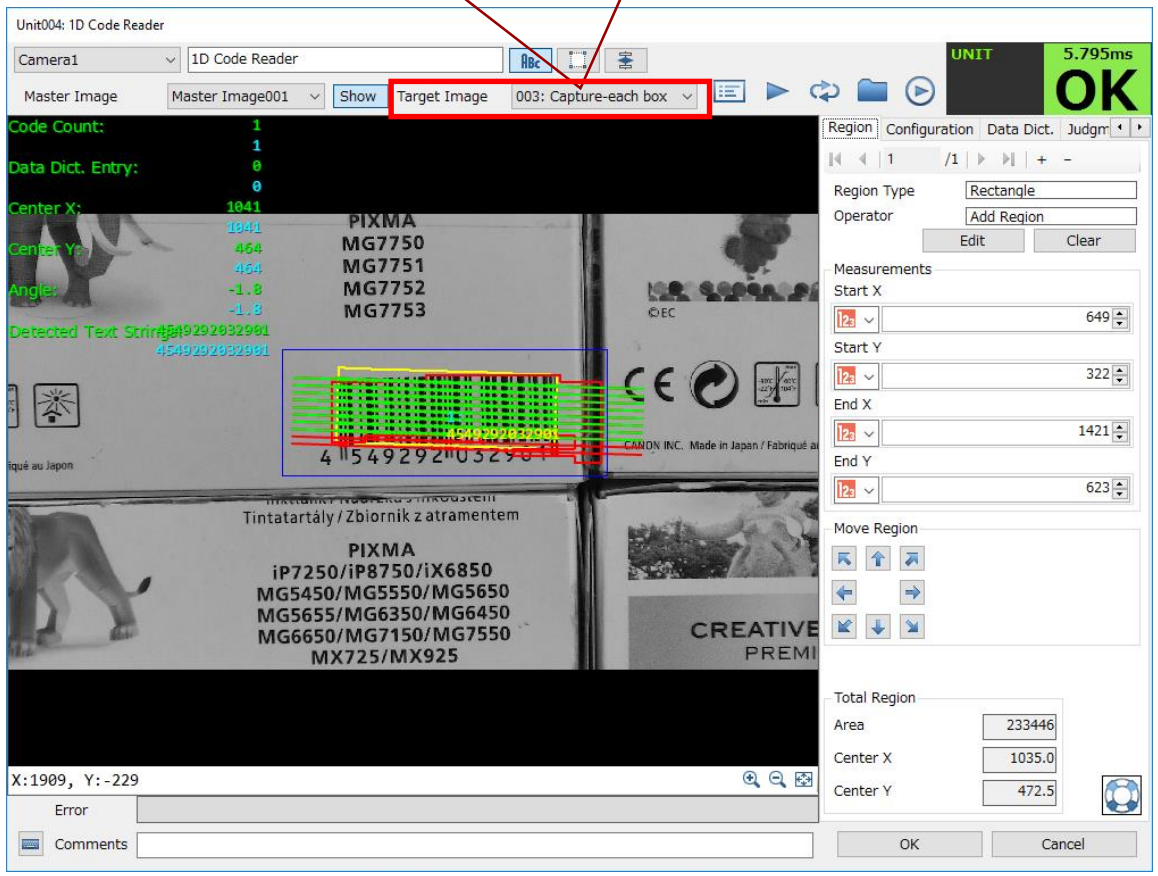
Grid PTZ unit – 3

(7) Open [Capture] unit for individual cell capture.
Do not tick Capture 1 TAB & Capture 2 TAB adjustment boxes. Overview [Capture] unit parameter + [Grid PTZ] PTZ parameter will be used for exposure and PTZ position.
Focus is set to Auto Focus at this stage. Manual focus will ensure to keep the focus always the same and tick [Adjust focus] and configure Manual Focus at this unit. Move to other grid cells and check viewing angle and focus.

(8) Create master image from Others TAB of this [Capture] unit.

(9) Configure image processing unit to read information from each grid cell.
Select "Individual [Capture] unit" for [Target Image].
Every time JOB is triggered, [Grid PTZ] unit move PTZ camera to the next grid cell position.

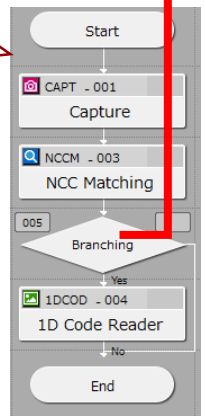


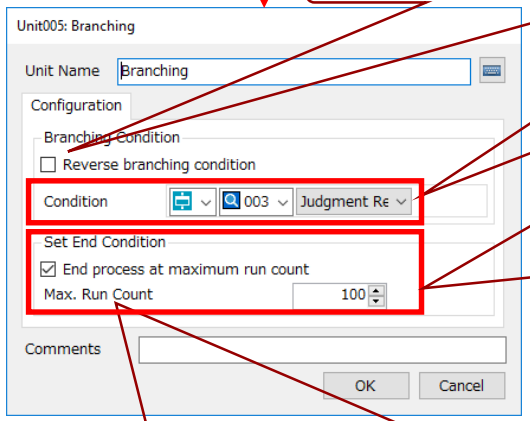


Branching unit

When connecting to other operation unit, 1st outward connection become "Yes" branch and 2nd connection become "No" branch.

Note : If [Judgement Result] is selected for Yes/No condition, it follows **operation unit's overall OK/NG judgement result**.
If other result (for example [Items Detected]) is selected, it follows **each result's judgement criteria.**
If [Items Detected] is selected on the right example, though NCC Matching unit's overall result shows NG because nothing is detected, it takes Yes branch because default [Items Detected] judgement condition range is Min 0 to Max 10,000,000.
Change range as Min 1 to Max 10,000,000 then "1 or more detected" will take Yes branch and "Nothing detected" will take No branch.





Tick if NG result should be judged as "Yes".

Specify operation unit and result for the condition of Yes/No branching.

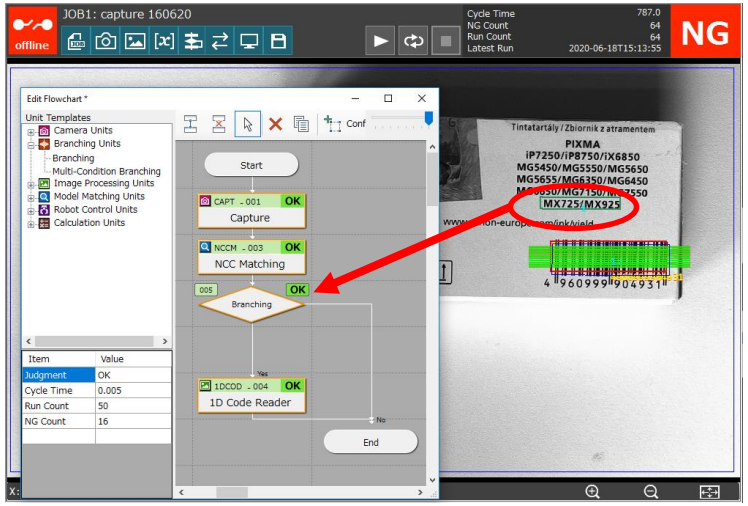
If the [Branching] unit is a part of a loop, after Max. Run Count (=100 runs in this example), jumps to [End] to exit the JOB to avoid trapped in the loop.

Note : This particular counter resets when the JOB ends. Other "Run Count" counter is cumulative and does not reset after the JOB ends.

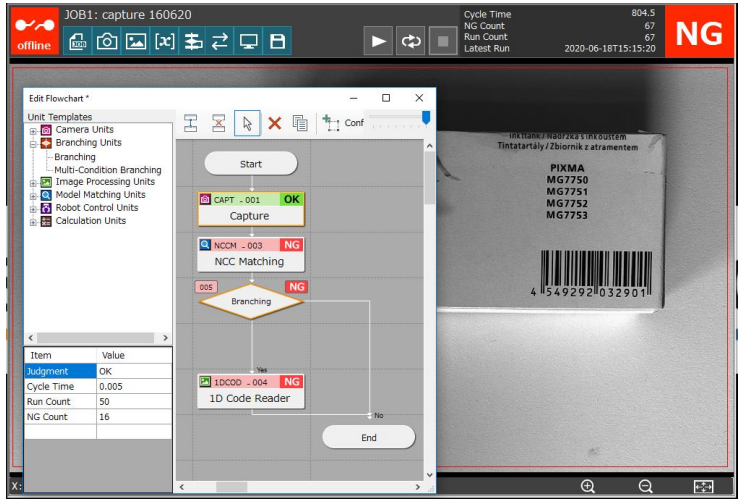
Example : [NCC Matching] unit searches "MX725/MX925" mark on the box and if detected, read the barcode.
If the pattern is not detected, goes to "No" branch and the process ends.
[Branching] unit uses condition of [003 NCC Matching] unit's [Judgement result] to take Yes/No path.

*If connect "No" branch to [Capture] unit as the third example, JOB will loop until this pattern is detected.

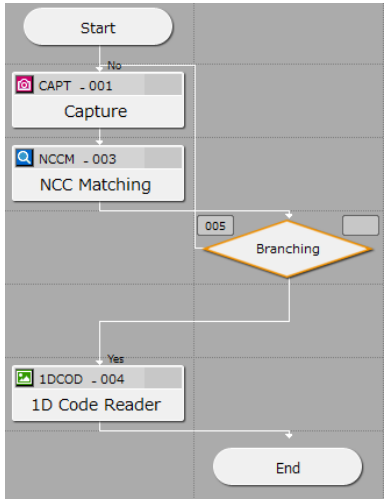
Pattern detection OK and follows "Yes" branch



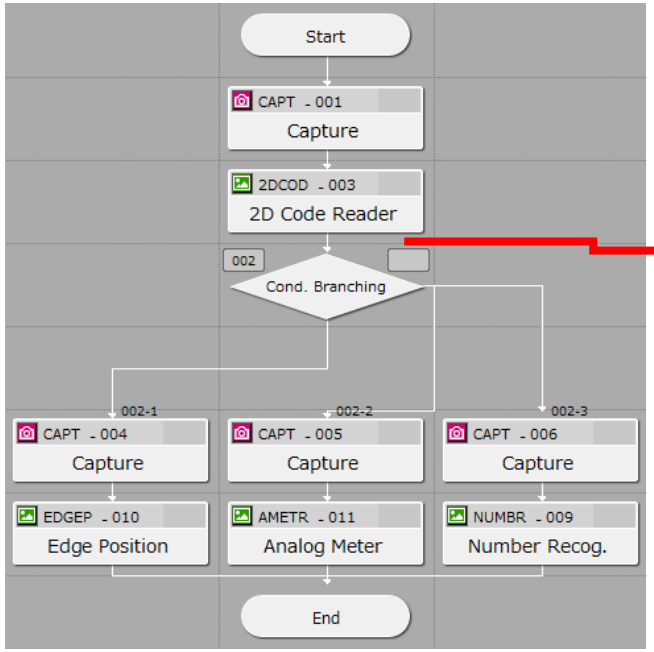
Pattern detection NG and follows "No" branch



*Loop until pattern detected, then read barcode



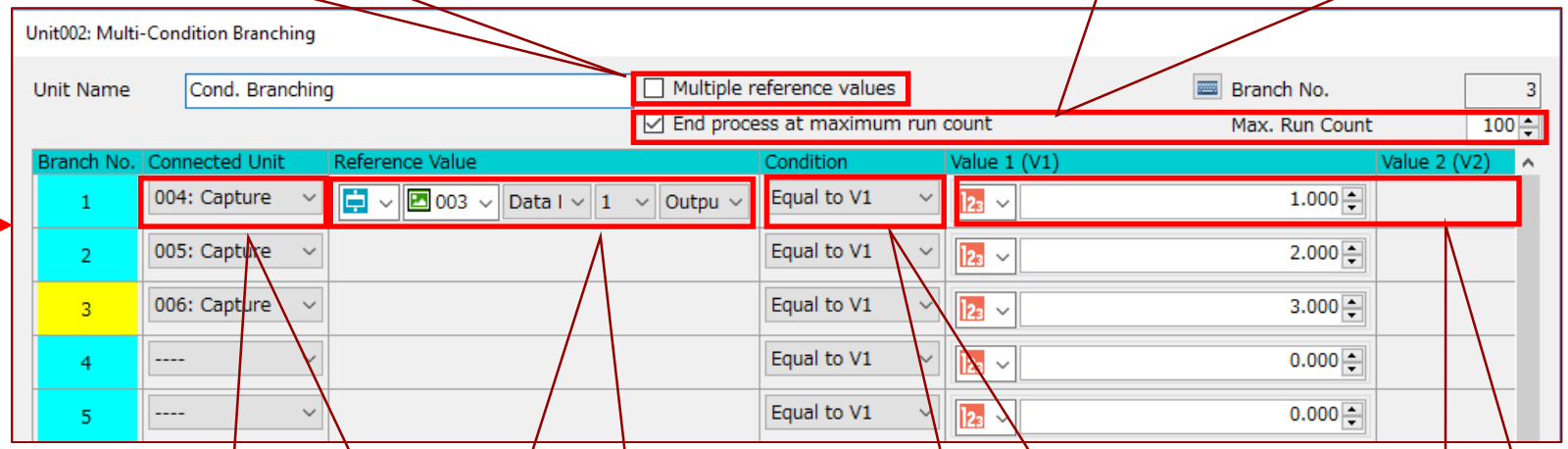
Multi-Condition Branching unit - 1



If using different reference values on each branch, tick this box and configure each line.

If the [Branching] unit is a part of a loop, after Max. Run Count (=100 runs in this example), jumps to [End] to exit the JOB.

Note : this particular counter resets when the JOB ends. Other "Run Count" counter is cumulative and does not reset after the JOB ends.



Select outward connection unit from dropdown and automatically flowchart connection will be made.

Select what reference value to use for the routing. (e.g. Data Dictionary ID number.)

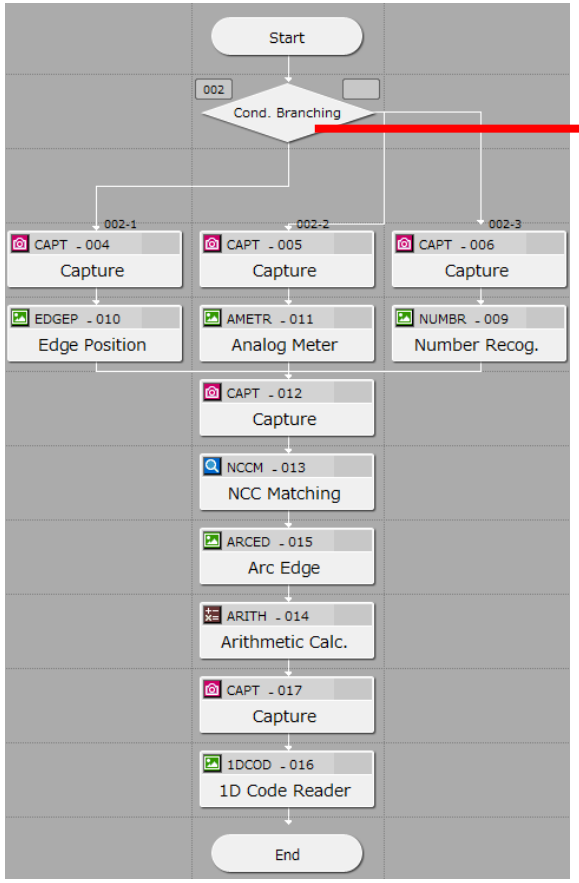
Select Condition such as [Equal to V1] or [Between V1-V2].

Set Value 1 (and Vaue 2 if necessary).

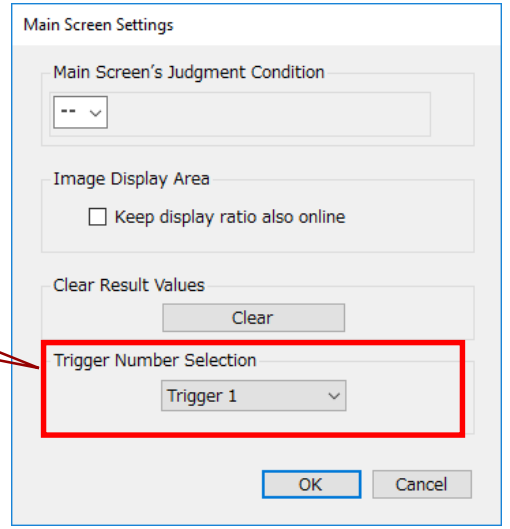
Example : in above example flowchart, three QR code instructions such as "Parts inspection", "Pressure meter" and "Weight read" are already registered to Data Dictionary as ID1, ID2 and ID3 at [003 2D Code Reader] unit.
Depends on the QR code detected (=according to dictionary ID number), different flowchart path will be taken and Vision Edition moves network camera to different viewing angle to obtain images, carries out image processing tasks such as parts width inspection, pressure meter monitor or reading weight from scale display.

Note 1 : Conditions are compared one by one from the top of the list and first condition to meet criteria is taken as a path.
Note 2 : Once JOB is run, branch condition met the criteria is indicated in yellow at Branch No. and also shown at the top right corner.

Multi-Condition Branching unit – 2 (using Trigger Number)



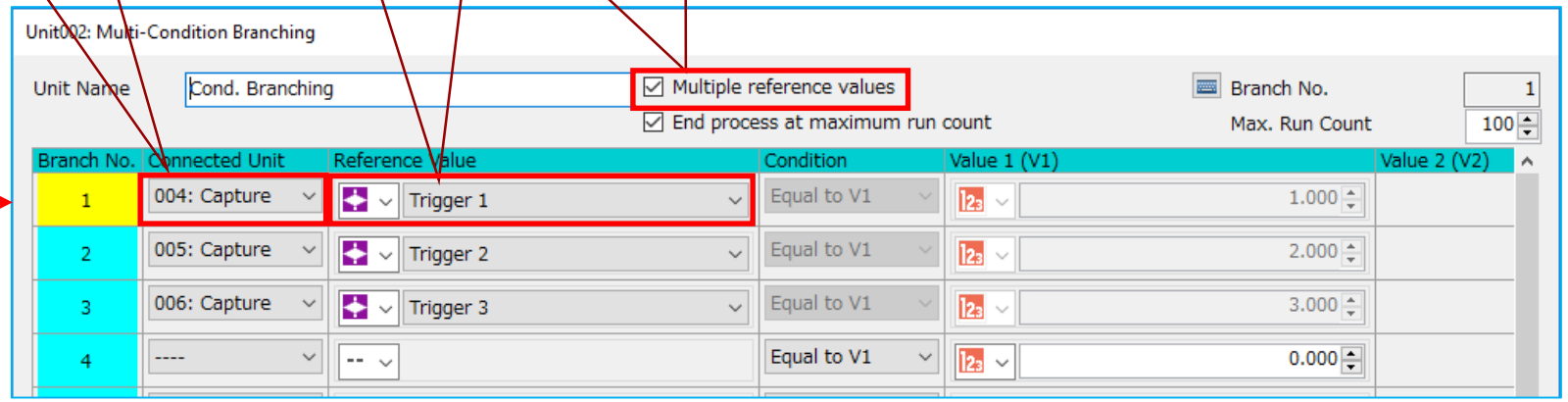
At [Main Screen Settings] menu, select from [Trigger 1] to [Trigger 4]. This will be the predetermined path of [Multi-Condition Branching] unit if Trigger Number is used as reference value.



Select outward connection unit.

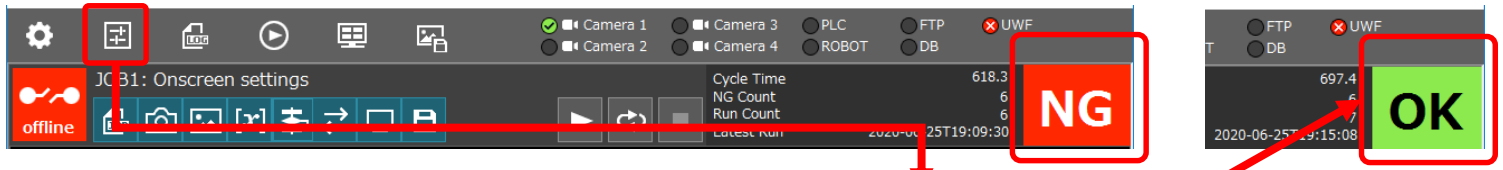
Set Trigger Number for each path.

Tick this box and configure reference value on each line.

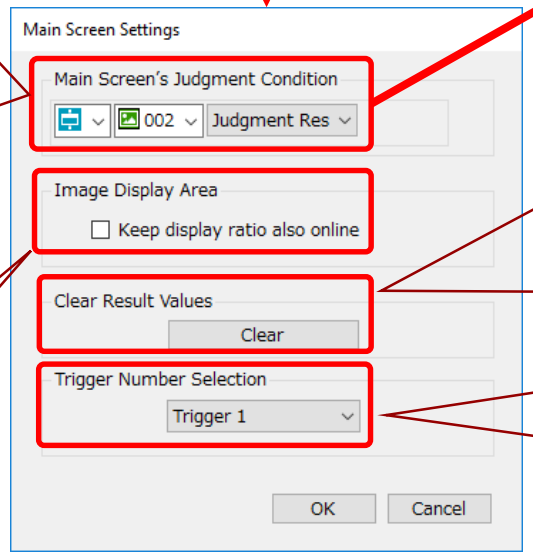


Example : in above example, three different image processing tasks (Edge Position, Analog Meter Readout, Number Recognition) are variation of the part of long complex flowchart.
Depends on the application operator will choose which path to take by selecting [Trigger Number Selection] at [Main Screen Settings] menu.
When this JOB is run either in Online or Offline mode, flowchart always take one of the predetermined path.
There is an alternative method to create three different JOBs and selecting to assign to JOB1.
However if the flowchart is long complex program and variations are only small part as above example, this method makes future maintenance and update of common part of flowchart much easier than three separate JOBs.

Main Screen Settings



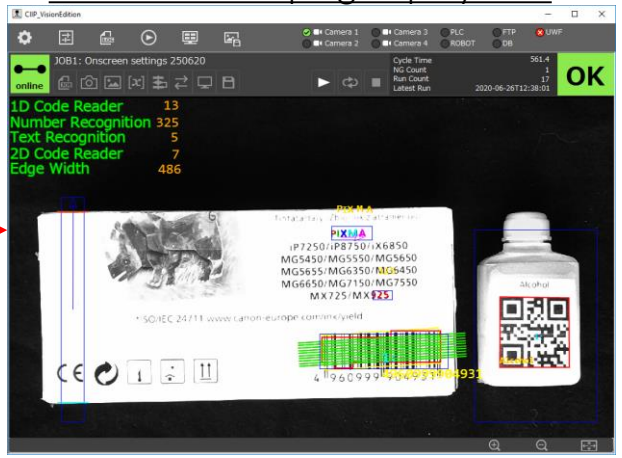
Default status for main screen OK/NG condition is blank with NG indication. Click [Main Screen Settings] and configure so that key image processing unit OK/NG result will be reflected to the main screen display.



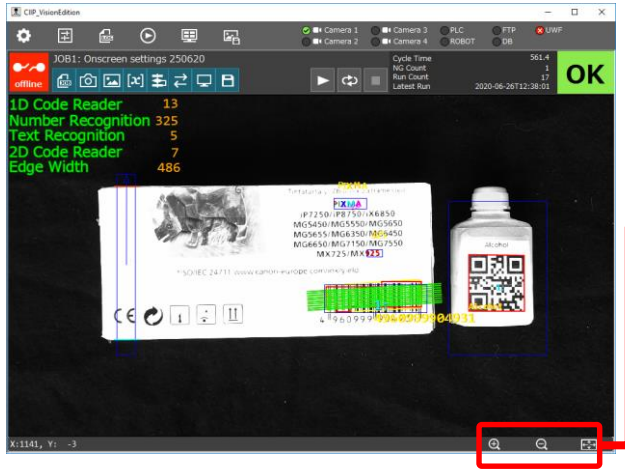
In order to trigger single operation unit or entire JOB flowchart with clean states (delete previous result data / reset counter data including "Run Count"), click [Clear] then apply trigger.

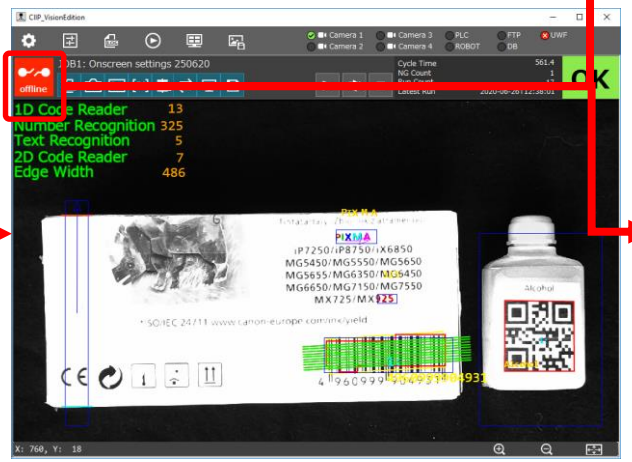
[Trigger Number Selection] determines [Multi-Condition Branching] unit path if used as reference value.

Online with keeping display ratio

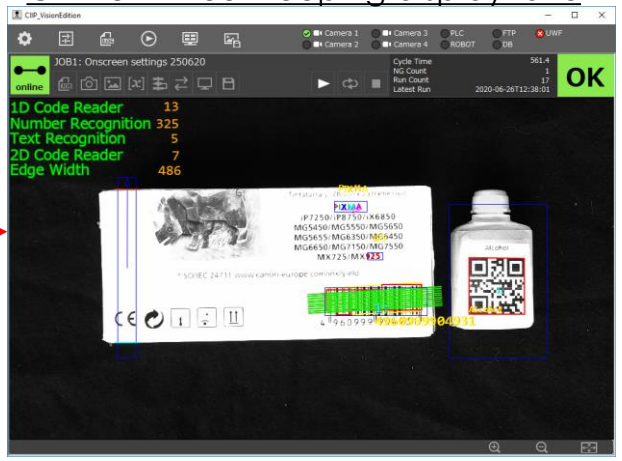


If zooming up the main screen display at Offline mode, once switch to Online mode, it will revert back to the original ratio. Tick [Keep display ratio also online] to keep the same digital zoom view.



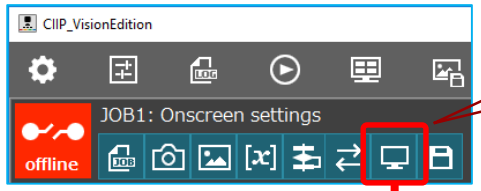


Online without keeping display ratio



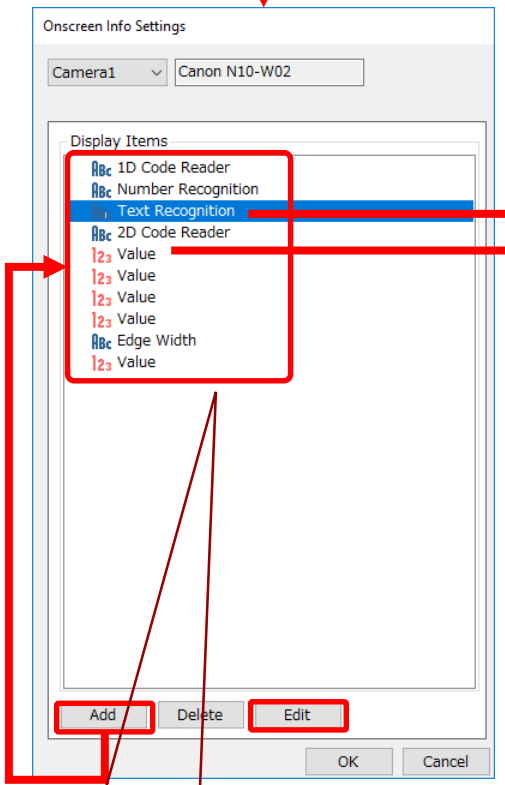
Onscreen Info Settings

(1) Click [Onscreen Info Settings] at main screen.

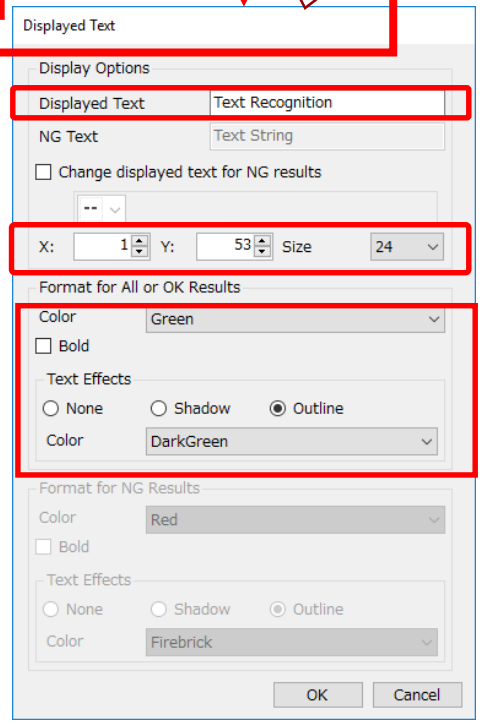


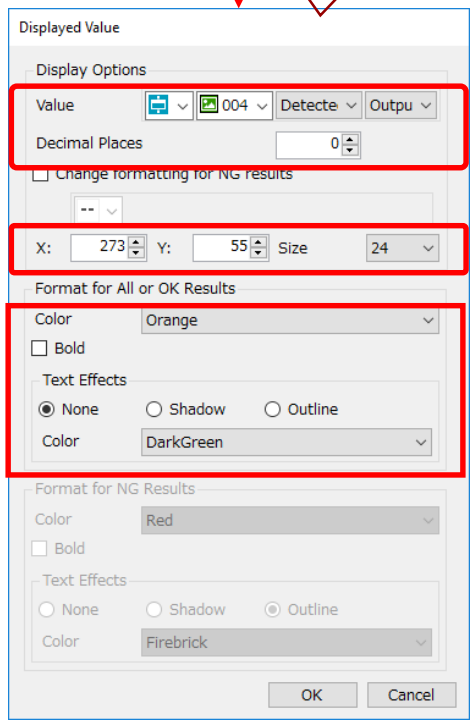
(3) Enter text, location on the screen, size and color. If required, change different text and appearance by OK/NG judgement results of reference operation unit.

(4) Enter operation unit result value, location on the screen, size and color. If required, change appearance by OK/NG judgement results of reference operation unit.

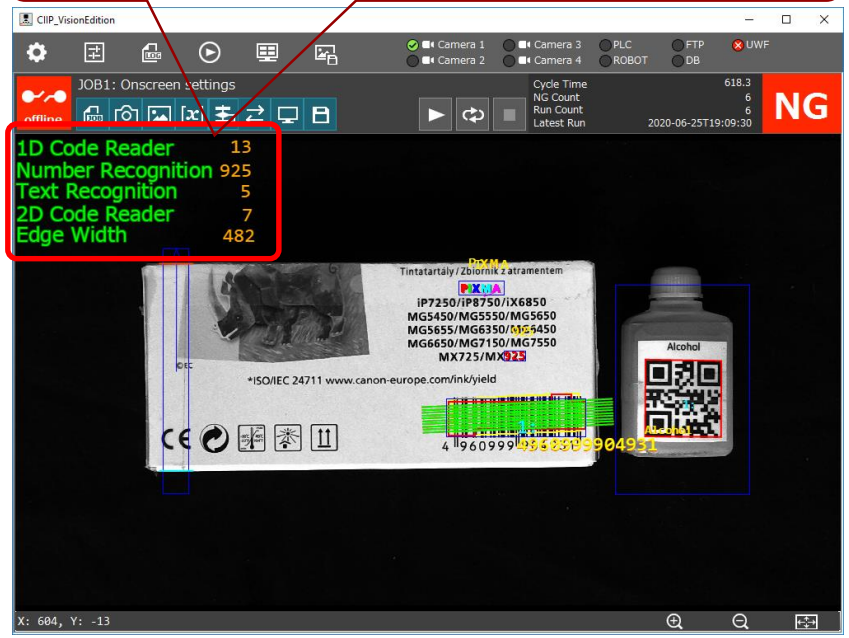


(2) Add Text String or Value and click [Edit].





Example : After JOB run, each selected result is displayed on the screen.



Note 1 : Only when the JOB is end, the result is updated to show the latest result.

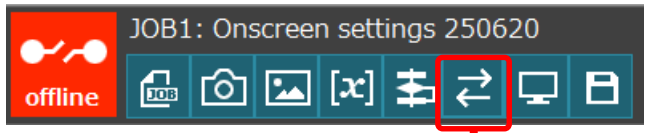
Note 2 : If the image processing unit runs multiple times (for example in a loop) only the last result is kept and displayed after the JOB ends.

Note 3 : Below unit's result is displayed as number of letters/digits as shown in the example.

- 1D / 2D Code Reader's Detected Text Strings
- Text / Circular Text Recognition's Detected Text

This is the same restriction as External Connection Settings.

External Connection Settings – 1 (trigger and devices)



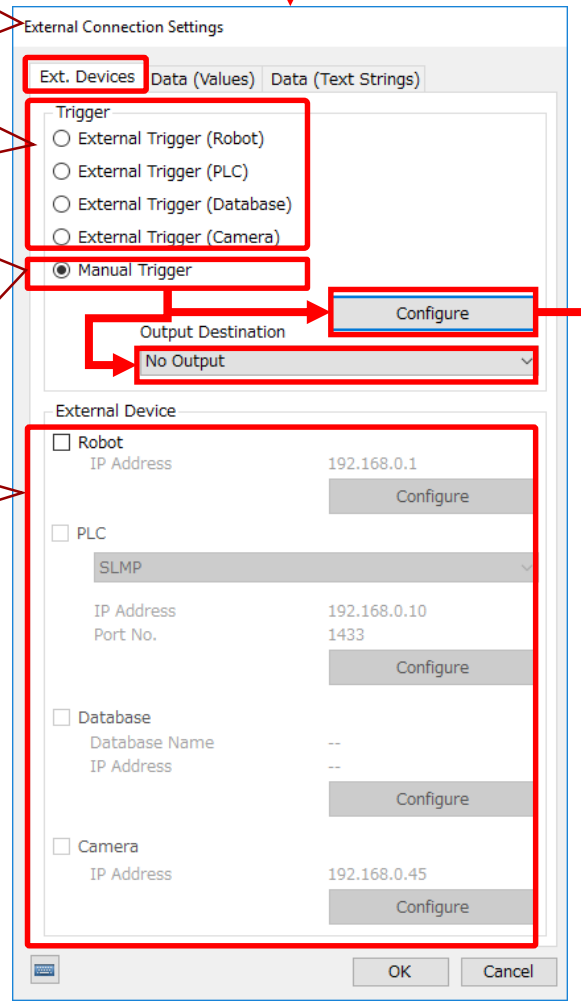
[Single job] triggers current JOB in specified number at set interval.
[Multiple job] triggers set of JOB sequence in specified number at set interval.
Delay (idle time between the end of last JOB and the start of next JOB) can be configured.

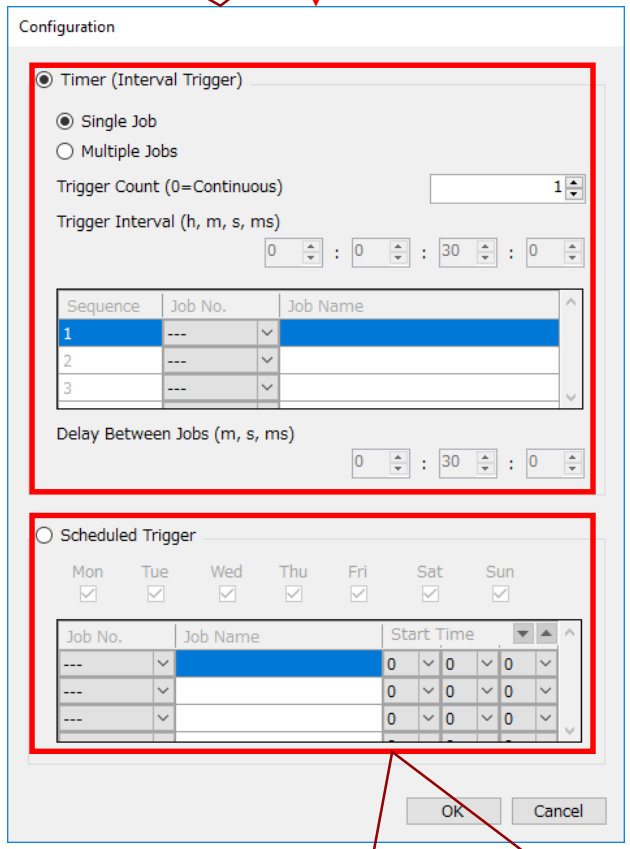
External Connection Settings menu defines how to trigger Vision Edition JOB and how to output JOB results to external devices.

If trigger Vision Edition JOB from external device, tick appropriate device and configure the connection.

For Vision Edition internal trigger, tick [Manual Trigger] and configure interval of single or multiple JOB repeat run. Scheduled Trigger can run specific JOB at specific time/day in a week. JOB results can be output to Denso COBOTTA robot or PLC.

Configure the connection of external devices according to the trigger type and JOB results destination.





[Scheduled Trigger] can trigger particular set of JOB routine weekly.

List of trigger types on the 1st column and result output destinations on the 2nd - 4th column.
Note : JOB results can be also output as Log Data (CSV file) to FTP server or database as shown on 4th column.

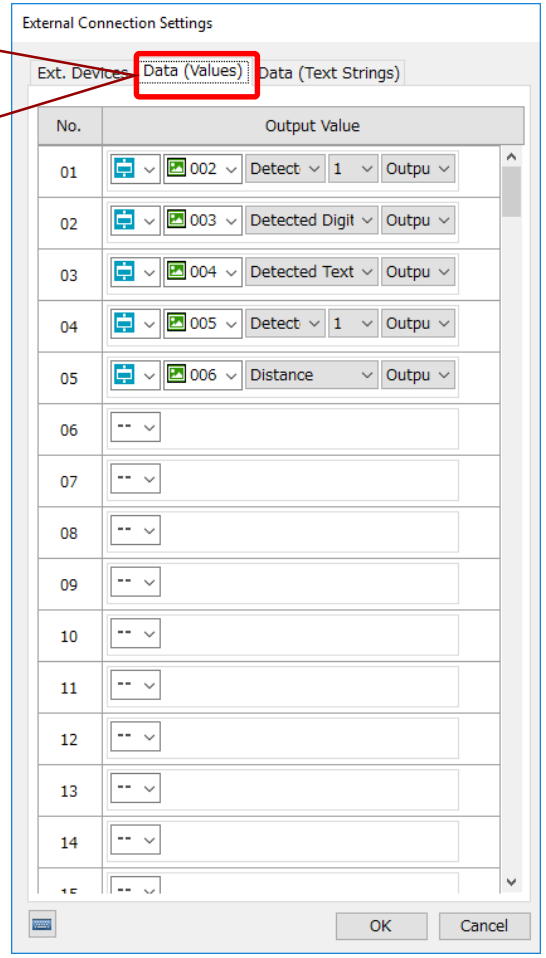
Trigger		External device		Log output (local folder/FTP server/database)
		Robot	PLC	
External trigger	Robot	●	—	●
	PLC	—	●	●
	Database	—	—	●
	Camera	—	—	●
Manual trigger		●	●	●

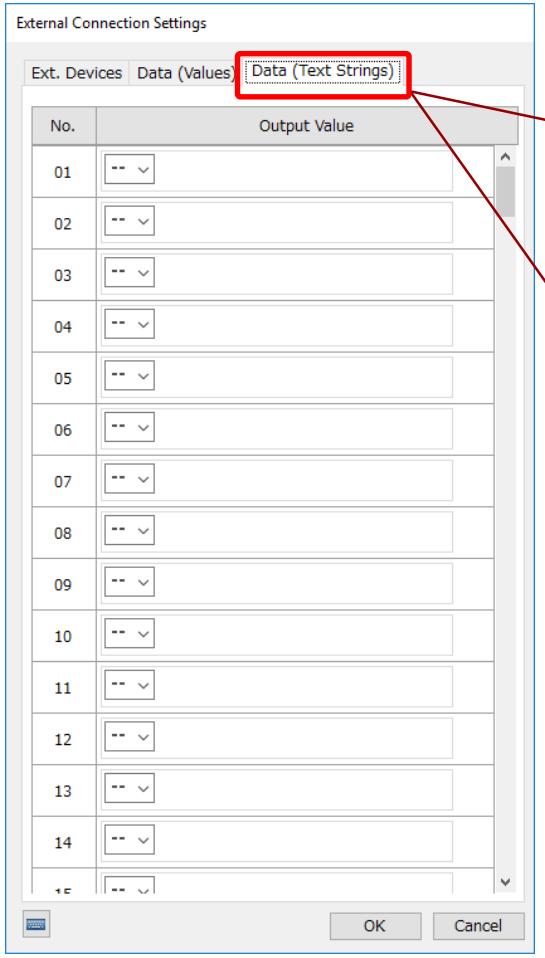
External Connection Settings – 2 (output data)

External Connection Settings menu defines how to trigger Vision Edition JOB and how to output JOB results to external devices such as PLC/Denso COBOTTA robot / UR controller.

Note : JOB results can be also output as Log Data (CSV file) to FTP server or Database.

Use Data (Values) TAB to output results of "number" data to PLC / Denso COBOTTA robot / UR controller.





Use Data (Text Strings) TAB to output results of "text strings" as ASCII data to PLC.

They are specifically below 4 result data.

- 1D Code Reader [Detected Text Strings]
- 2D Code Reader [Detected Text Strings]
- Text Recognition [Detected Texts]
- Circular Text Recognition[Detected Texts]

Note 1 : These "text strings" data cannot be sent to Denso COBOTTA robot nor UR controller.

Note 2 : if 1D/2D Code Reader [Detected Text Strings] result is specified on Data (Values) TAB, it will output number of characters instead of actual codes.

Log Records – 1 (Log Images)

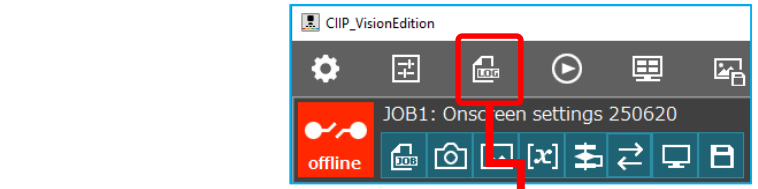
Set Log Images (=each capture unit's last image) saving condition and format.
Note : Log Images are saved at Online mode.

Set Screenshots (= snapshot of main screen at the JOB end) saving condition.
Note : Screenshots are saved at Online mode as JPEG format.

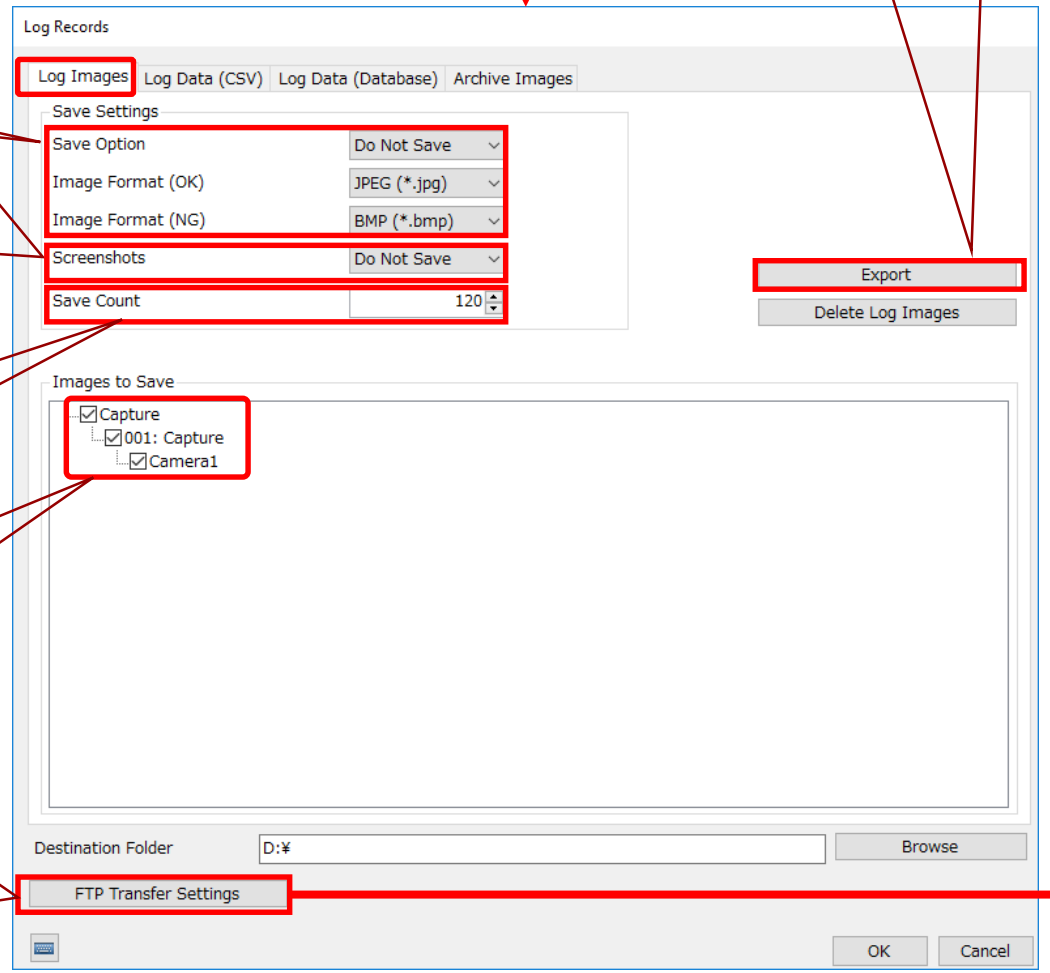
Set how many days to keep Log Images and Screenshots.

Select which Capture unit and Camera Log Images should be saved.

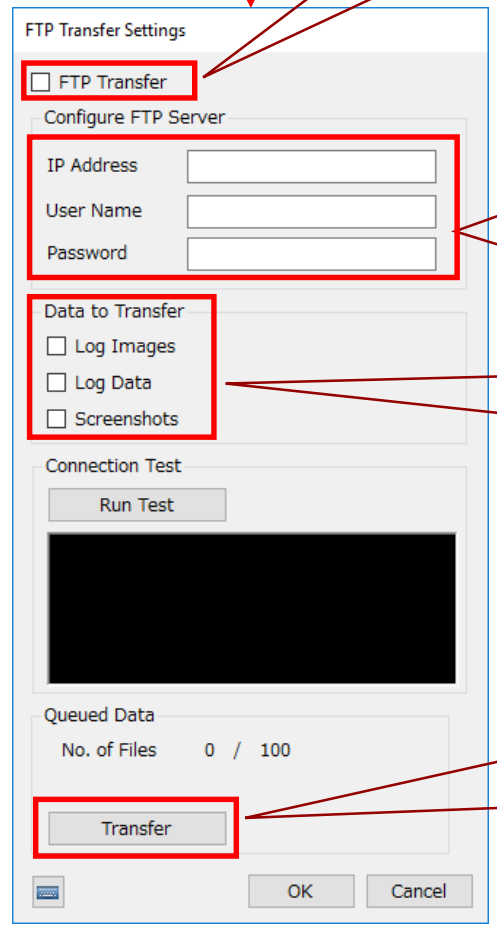
Click [FTP Transfer Settings] to configure transmission of Log Images and Screenshots.



Log Images and Screenshots can be exported in zip file.



Tick to receive transfer request.



Enter FTP server access detail.

Choose data to be transferred.

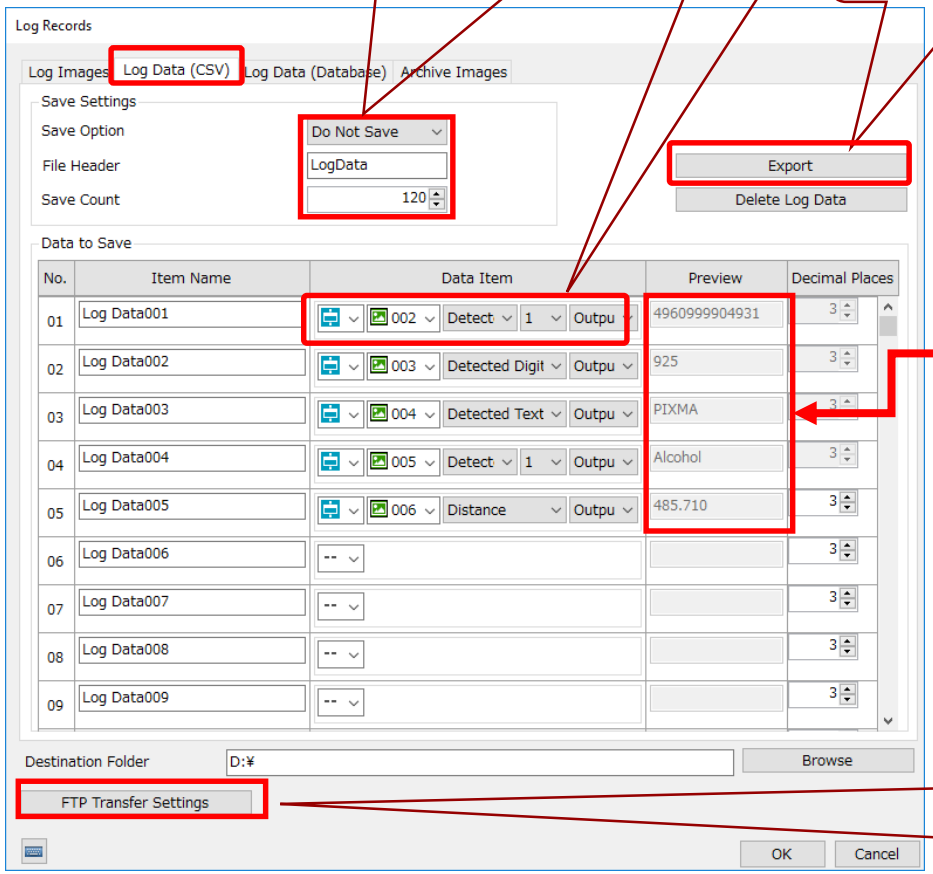
Click [Transfer] for manual transmission

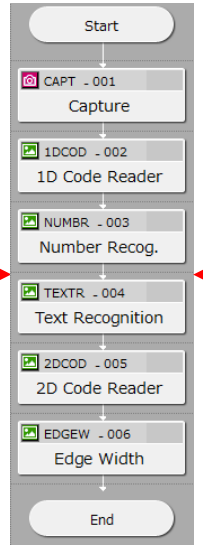
Log Records – 2 (Log Data (CSV))

Set Log Data (CSV) (=each operation unit's last results) saving condition, file header and how many days to keep.
Note : Log Data is saved at Online mode.

Specify which result data to be saved.

Log Data can be exported in zip file.



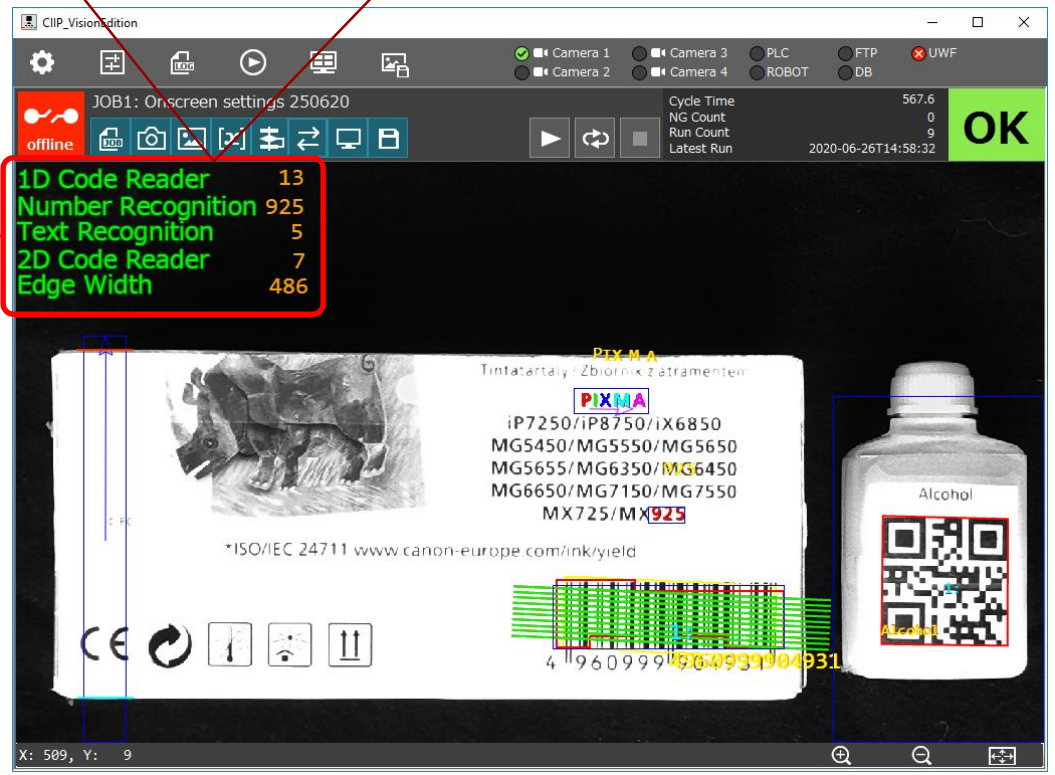


Click [FTP Transfer Settings] to configure transmission of Log data.

Between **(a) Log Data (CSV)** and **(b) External Connection output data / Onscreen Info display data** gives different output as below example.

<(a) Log Data (CSV)>
1D Code Reader [Detected Text Strings] : actual barcode number
2D Code Reader [Detected Text Strings] : actual barcode number
Text Recognition [Detected Texts] : actual barcode number

<(b) Data>
1D Code Reader [Detected Text Strings] : number of digits
2D Code Reader [Detected Text Strings] : number of characters
Text Recognition [Detected Texts] : number of characters



Log Records - 3 (Log Data (Database))

Preparation of database
Setup database server and create a database.
Also create a Control Table and Control Records.

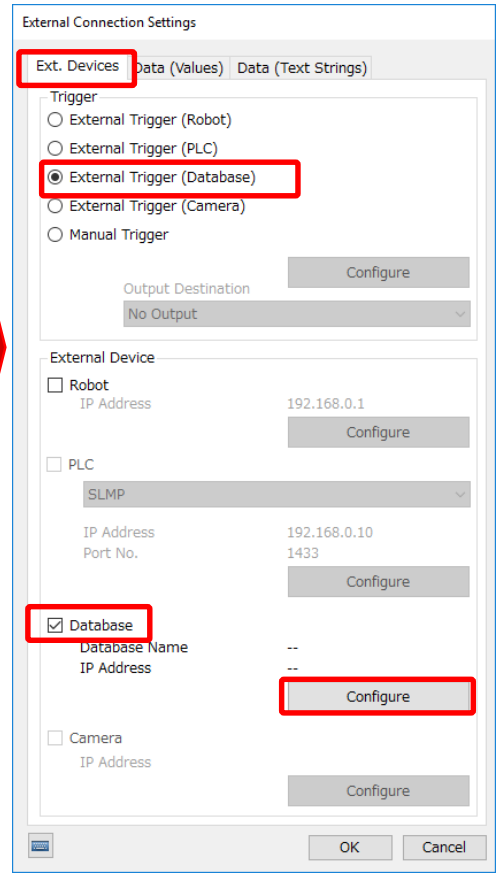
Database settings

Setting	Value
IP address	Any, as long as it is on the same network as the image processing controller and it does not create an IP address conflict.
Port number	Any, as long as it is on the same network as the image processing controller and it does not create a port no. conflict.
Database name	Any, as long as it conforms to the naming rules of the database type used.
User name	Any, as long as it conforms to the rules of the database type used.
Password	Any, as long as it conforms to the rules of the database type used.

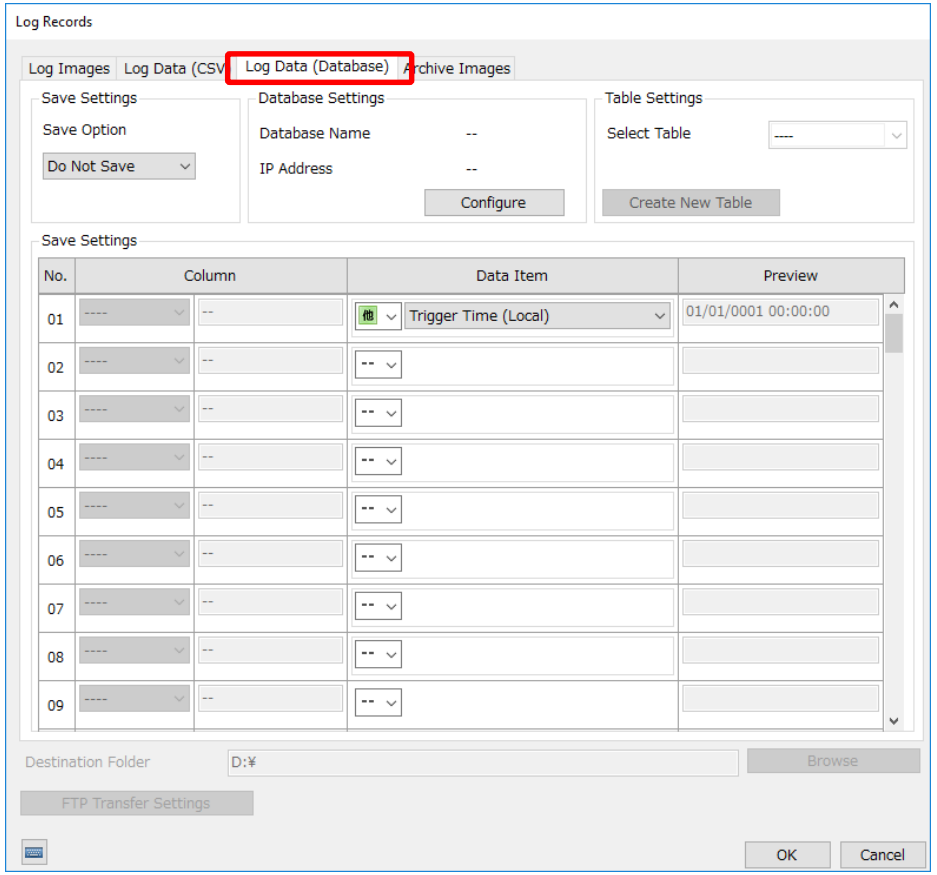
Control table structure

Item	Column name	Column type	Function
Primary key	Number	Integer	Primary key of the control table. The record with a value of 1 for this column is used as the control record.
Command execution	CommandExecute	Integer	Executes the relevant process according to the command code set. The command is set to 0 when completed.
Command code	CommandCode	Integer	Set a number according to the process you want to execute. 101 = Trigger 1 102 = Trigger 2 103 = Trigger 3 104 = Trigger 4 1 to 40 = Switch to the respective job (JOB01 to JOB40)
Command response	CommandResponse	Integer	When the image processing controller receives a command code, the same data as the command code is written to this column as response. If the image processing controller cannot process the command due to an error, the following error codes are written instead. 91 = Camera connection error 92 = Job switching error 93 = Connection configuration error 94 = Command error 99 = Unexpected error The command is set to 0 when completed.
Command status	CommandStatus	Integer	Indicates that Vision Edition is processing a command. 1 = Command being processed The command is set to 0 when completed.
Command completed	CommandComplete	Integer	Indicates that Vision Edition finished processing a command. 1 = Command completed The command is set to 0 after the time set for command response elapses.
Command argument 1	CommandArgument1	Float	Values used as arguments when executing the command.
Command argument 2	CommandArgument2		
Command argument 3	CommandArgument3		
Command argument 4	CommandArgument4		
Command argument 5	CommandArgument5		

External Connection Settings
Configure connection to database.
Data setting is done at Log Records menu.

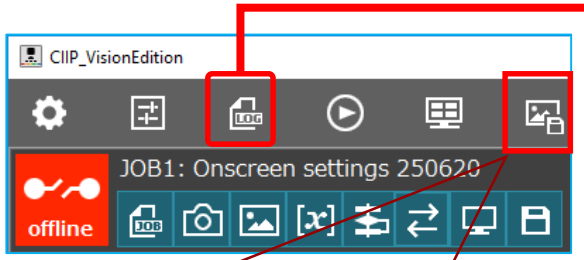


Log Records, Log Data (Database) TAB
Configure data to be sent to database.

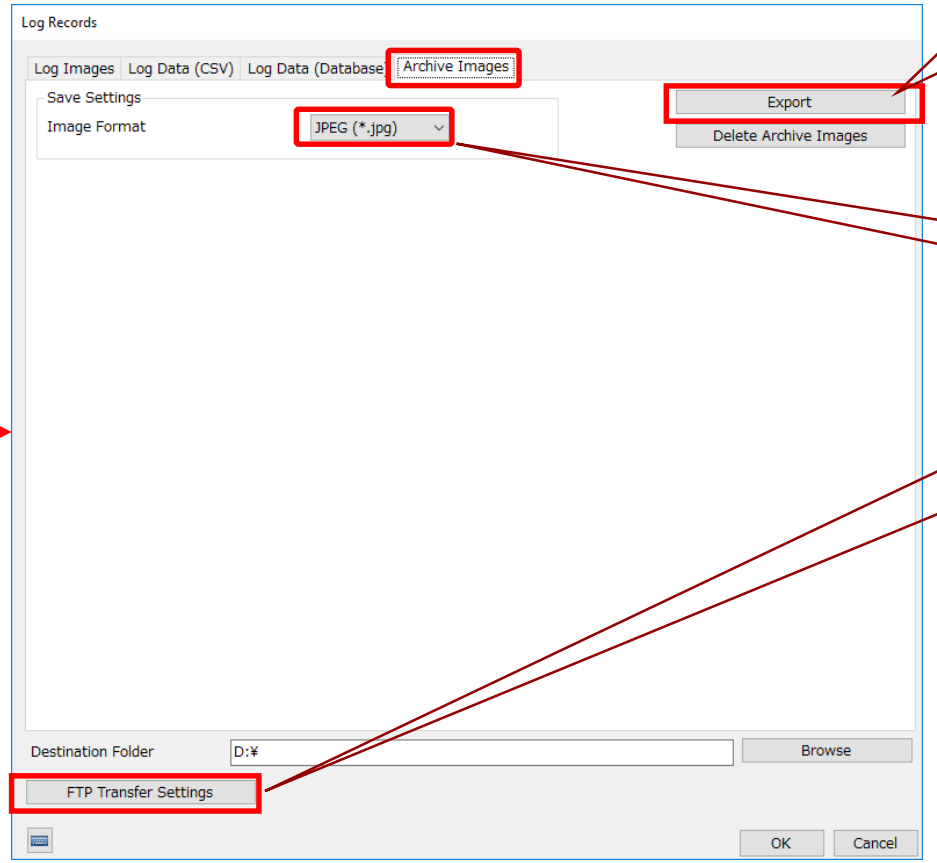


Note : please refer main instruction manual for database preparation and communication settings.

Log Records – 4 (Archive Images and summary of log records type)



After JOB completed at Offline mode, last image kept at each capture unit can be permanently archived by clicking [Archive latest images] button on the main screen. This is useful feature to configure image processing unit and carry out simulation using archived image instead of live image feed.
Note : only Offline mode image capture can be permanently archived in this method.



Archive Images can be exported in zip file.

Set Image Format at Log Records menu.

Click [FTP Transfer Settings] to configure transmission of Archive Images.

Summary of log records available at Vision Edition

Type	Saving environment	Log contents	Log save condition (OK/NG : Flowchart judgement)	FTP server transmission	Vision Edition default folder
Log Images	Online mode	Capture unit's last image	Do Not Save, Save All, Save Only OK, Save Only NG	Yes	D:\HistoryCenter\LogImage
Screenshots	Online mode	Main screen image at the JOB end	Do Not Save, Save	Yes	D:\HistoryCenter\PrintScreen
Log Data (CSV)	Online mode	Operation unit's last results	Do Not Save, Save All, Save Only NG	Yes	D:\HistoryCenter\LogData
Log Data (Database)	Online mode	Operation unit's last results	Do Not Save, Save All, Save Only NG	No	Not applicable
Archive Images	Offline mode	Capture unit's last image	Manual operation	Yes	D:\HistoryCenter\RecordImage

Output data type summary

Please pay attention when output below 4 image processing unit result as handling of number data and text strings data is different depends on the destination devices.
2nd table is reference example of all other image processing units output data.

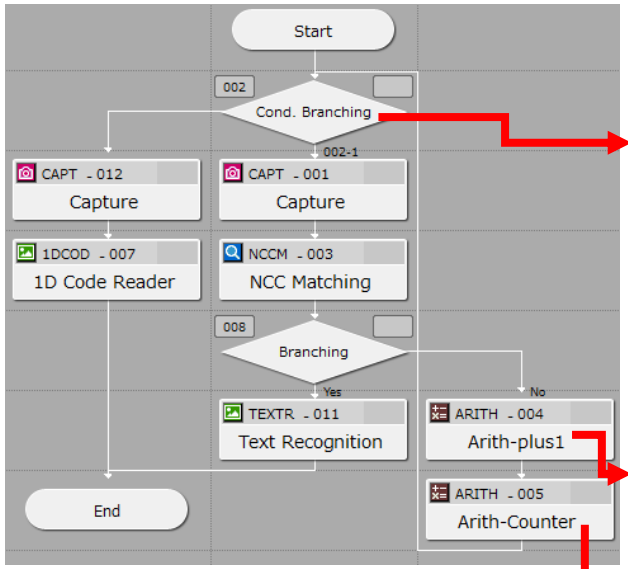
Operation unit	Result item	Log Data (CSV) TO: FTP server / Database	Onscreen Info display TO: Vision Edition screen	External Connection Settings Data [Data (Values) TAB] TO: PLC/Denso Cobotta robot/UR controller	External Connection Settings Data [Data (Text Strings) TAB] TO: PLC as ASCII code
1D Code Reader	[Detected Text Strings]	actual code (e.g. 4960999904931)	number of characters (e.g. 13)	number of characters (e.g. 13)	actual code in ASCII code (e.g. 4960999904931)
2D Code Reader	[Detected Text Strings]	actual code (e.g. Canon123)	number of characters (e.g. 8)	number of characters (e.g. 8)	actual code in ASCII code (e.g. Canon123)
Text Recognition	[Detected Texts]	actual text (e.g. Canon123)	number of characters (e.g. 8)	not to use	actual text (e.g. Canon123)
	[No. of Digits]	number of characters (e.g. 8)	number of characters (e.g. 8)	number of characters (e.g. 8)	not to use
Circular Text Recognition	[Detected Texts]	actual text (e.g. Canon123)	number of characters (e.g. 8)	not to use	actual text (e.g. Canon123)
	[No. of Digits]	number of characters (e.g. 8)	number of characters (e.g. 8)	number of characters (e.g. 8)	not to use

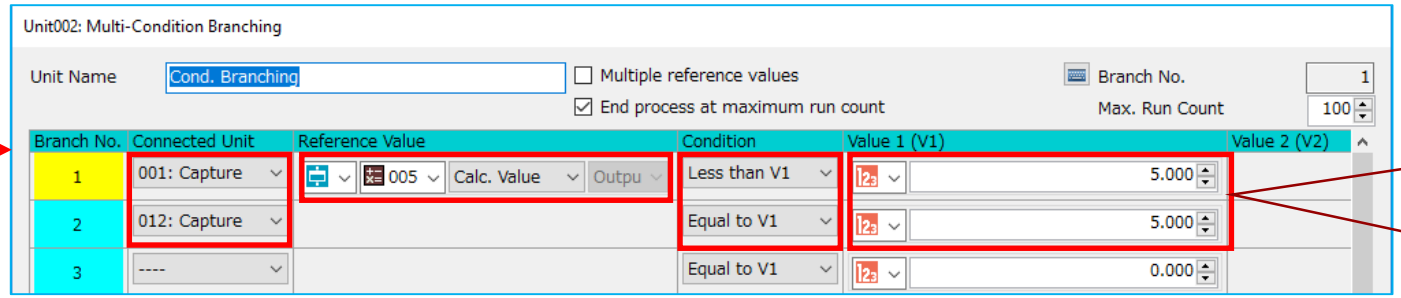
All other image processing units (reference example)

Number Recognition	[Detected Digits]	actual number (e.g. 258)	actual number (e.g. 258)	actual number (e.g. 258)	not to use
	[No. of Digits]	number of digits (e.g. 3)	number of digits (e.g. 3)	number of digits (e.g. 3)	not to use
7-Segment Number Recognition	[Detected Digits]	actual number (e.g. 258)	actual number (e.g. 258)	actual number (e.g. 258)	not to use
	[No. of Digits]	number of digits (e.g. 3)	number of digits (e.g. 3)	number of digits (e.g. 3)	not to use
Analog Meter Readout	[Meter Value]	actual number (e.g. 150)	actual number (e.g. 150)	actual number (e.g. 150)	not to use
NCC Matching	[Judgement Result]	actual number (e.g. 0 or 1)	actual number (e.g. 0 or 1)	actual number (e.g. 0 or 1)	not to use

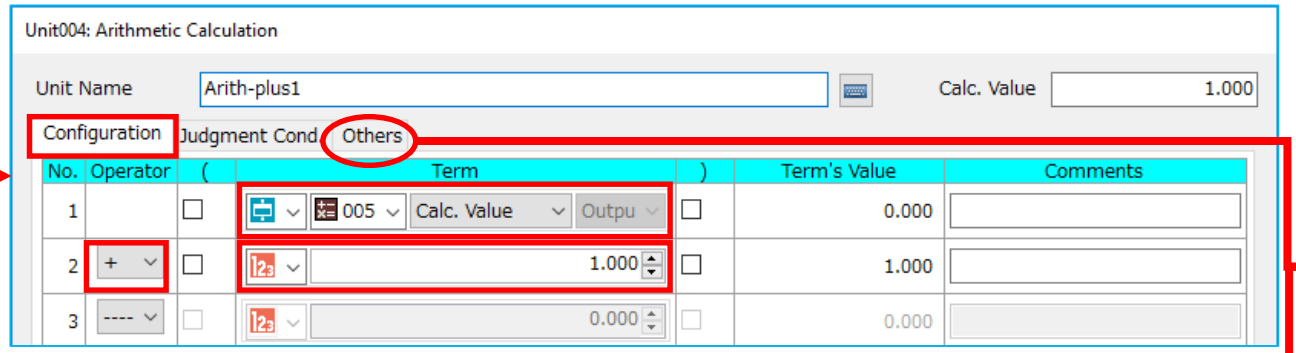
Repeat a routine predetermined times (use n+1 counter)

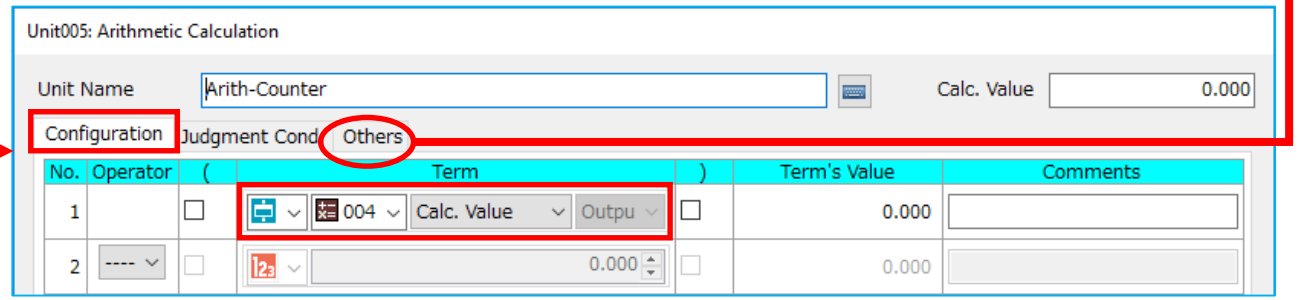
Example : Capture (with 1sec delay) and carry out NCC matching 5 times by multi-condition branching. If the target parts is detected within 5 cycles, come out of the loop at the 2nd branching unit and read text of the parts. If it is not detected after 5 cycles, capture different target's 1D code.
[Multi-Condition Branching] unit is configured to repeat the loop if [005 Arith-Counter] value is less than 5 and when it reaches to 5, go to 1D code read routine. (Initial value of [005 Arith-Counter] is zero and count up to 5 when come out of the loop.)
[004 Arith-plus1] unit and [005 Arith-Counter] unit works as n+1 counter. (Calc unit cannot refer and increment own value, therefore need two units.)

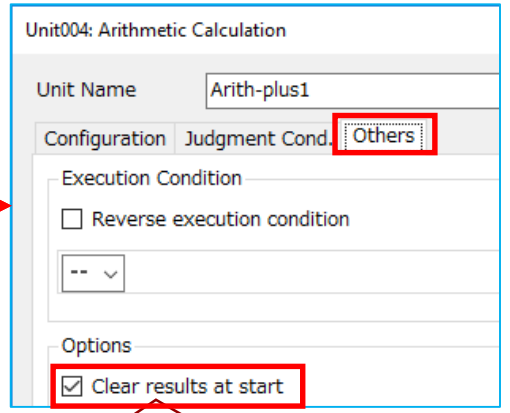




Enter the number for the loop to repeat. Also [Constant] can be used instead of [Real Number] for ease of programming.

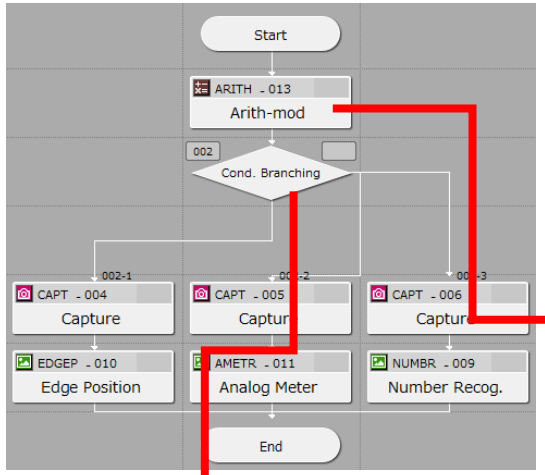




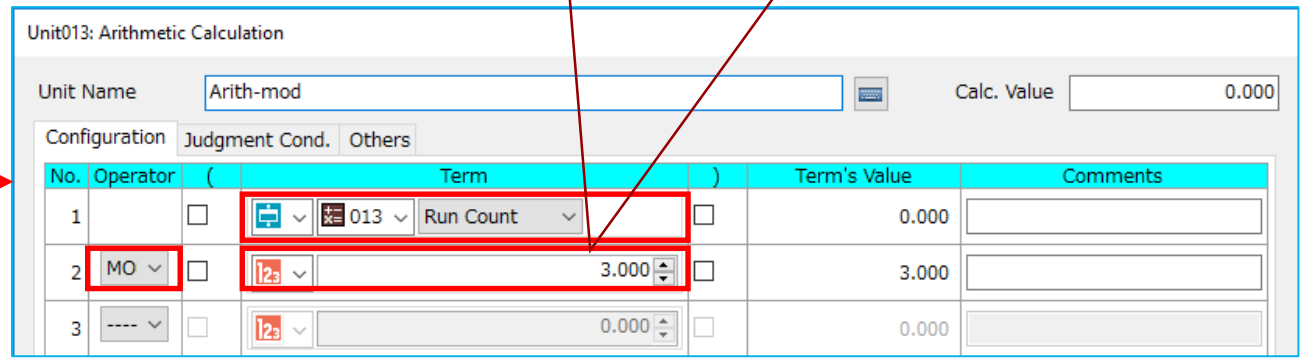


For both [Arithmetic Calculation] units, make sure to tick [Clear results at start] box on Others TAB.

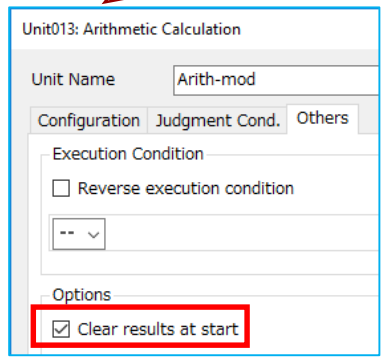
Perform different routine at each JOB run and cycles (use Run Count and MOD)

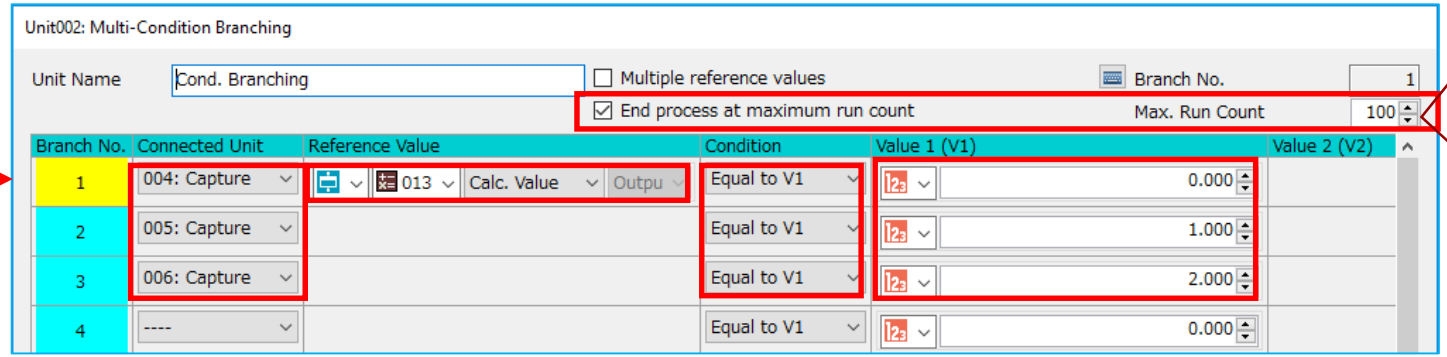


Enter the Modulo number to sequentially increase and repeat.
"[Run Count] mod 3" will repeat "0,1,2,0,1,2,0,1,2…" sequence.



[Clear results at start] setting does not affect as "Run Count" is cumulative counter not cleared by ticking this box.

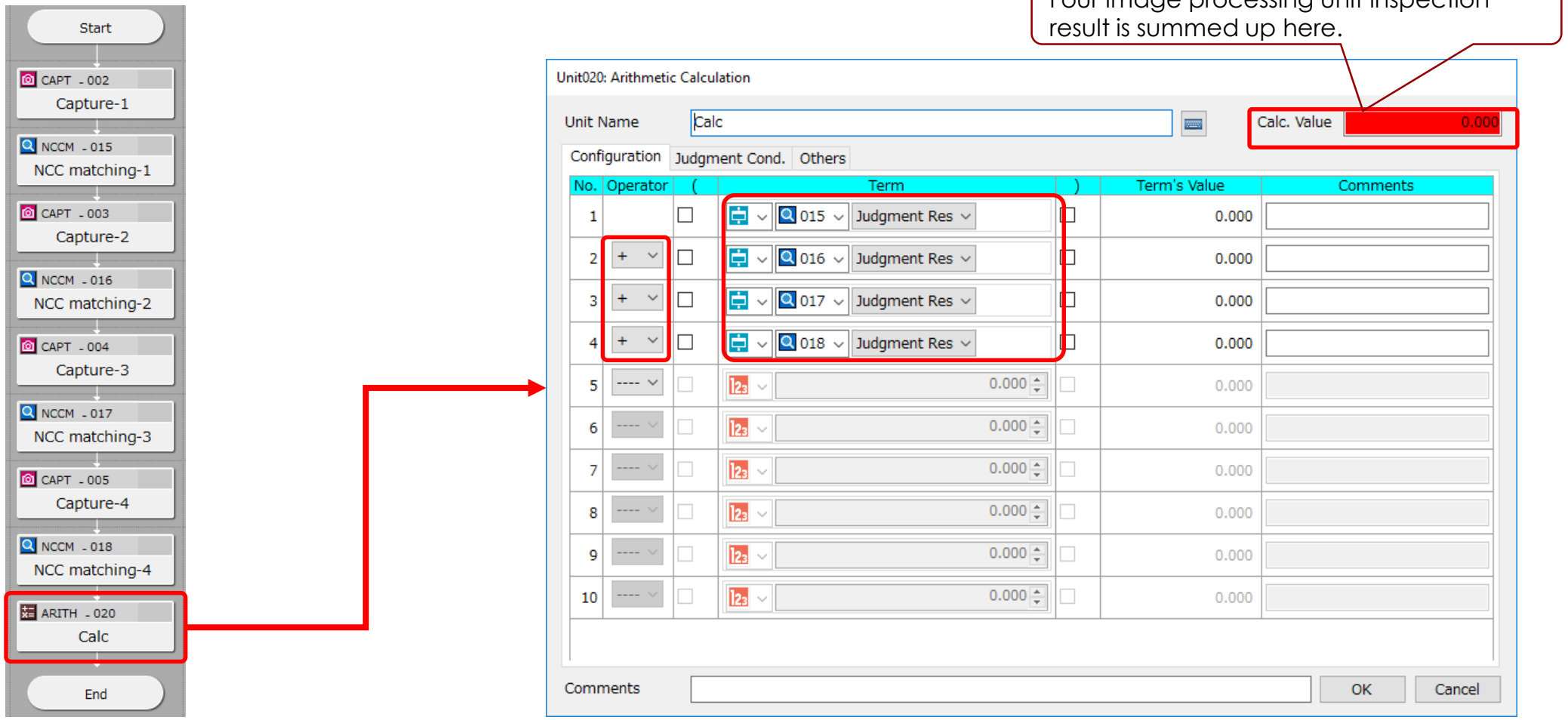




This particular counter resets when the JOB ends, therefore this settings can be kept as default.
Operation unit's "Run Count" (used on [013 Arith-mod] term as example) is cumulative counter and does not reset after the JOB ends. It only resets to zero when the JOB is loaded.

Example : One image processing task is carried out at the first JOB run, then one of the other image processing task is carried out at the next JOB run. All three image processing tasks are sequentially run in the same order and repeat at the every third JOB trigger.
[013 Arith-mod] calculates mod 3 of its "Run Count" value. When the JOB loaded and run repeatedly, this calculation value would repeat 0,1,2,0,1,2,0,1,2,,, and so on.
[Multi-Condition Branching] unit is configured to take path referring to this calculated value.

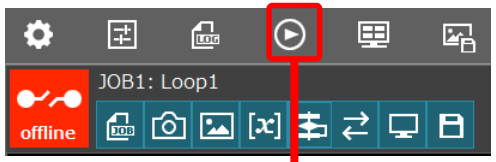
Perform multiple inspections and sum up as one value



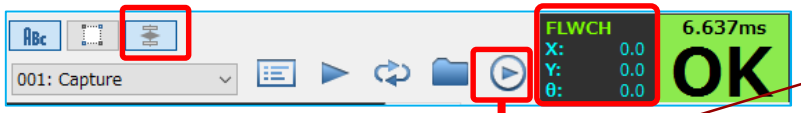
Example : A PTZ camera inspects parts fitting using NCC matching at 4 different positions.
If any of the four parts are missing or incorrectly fitted, pattern matching unit returns NG Judgement Result.
[020 Calc] unit sums up all results and returns as one calculated value.
Since each OK result=1 and NG result=0, system can judge as 4=all inspection passed, less than 4=some of the inspection failed.

Simulation mode – 1 (using selected images)

Main screen GUI



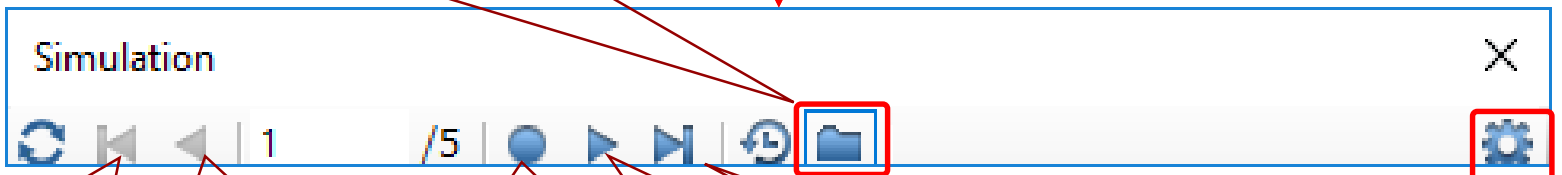
Operation unit GUI



(1) Click [Simulation] at main screen or operation unit GUI to open Simulation window.

Note : when open at operation unit to run the simulation, it runs as flowchart mode to trigger entire flowchart process.

(4) Click [Use selected images] and run the simulation using below buttons.



First image run

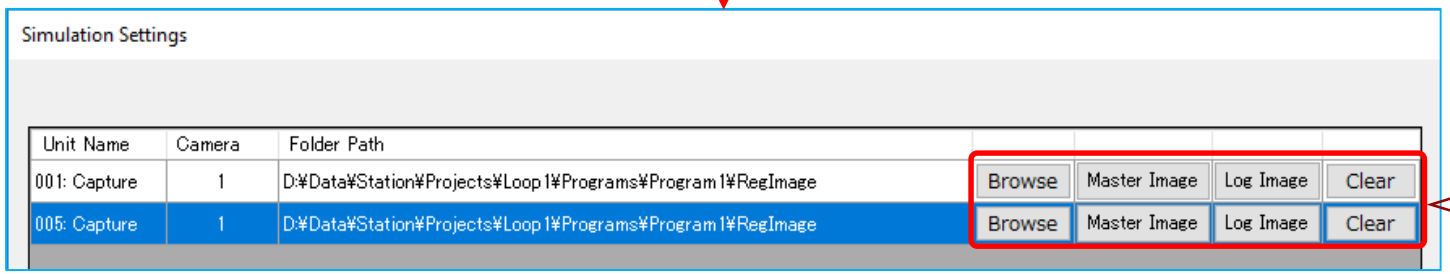
Previous image run

Current image run

Next image run

Last Image run

(2) Click [Select images for simulation] to open Simulation Settings window.



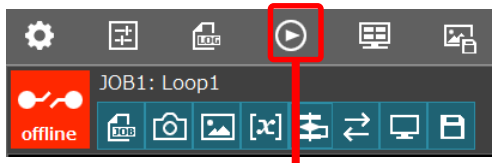
(3) Select [Browse] to specify image file folder as simulation source or select [Master Image], [Log Image] folder and clock [OK] to close.
In this example, there are two [Capture] units in the flowchart and choose appropriate image folders for each [Capture] unit.

Note : prior to select [Log Images], Log Records menu need to be configured and JOB need to be run in Online mode.

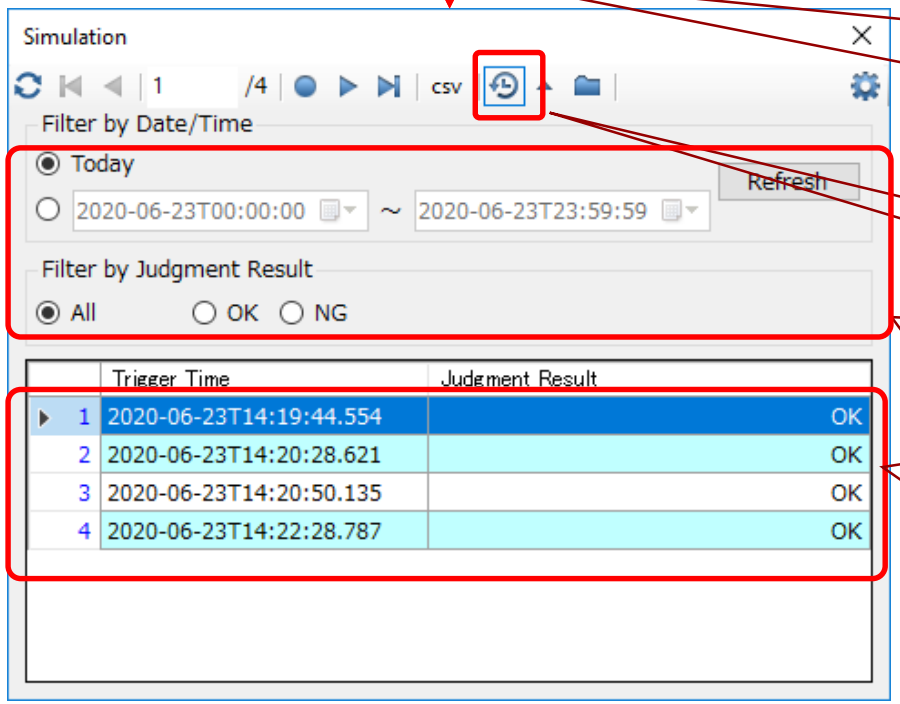
This [Use selected images] feature is useful for training, demonstration, evaluation of image processing function and testing of JOB program when live image capture is not a practical option. Although live image capture is not happening, camera still needs to be registered and [Capture] unit has to be assigned to each image processing unit.

Simulation mode – 2 (using previously recorded images)

Main screen GUI



Operation unit GUI



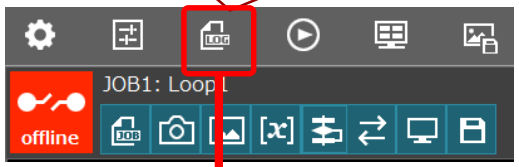
(1) Click [Simulation] at main screen or operation unit GUI to open Simulation window.

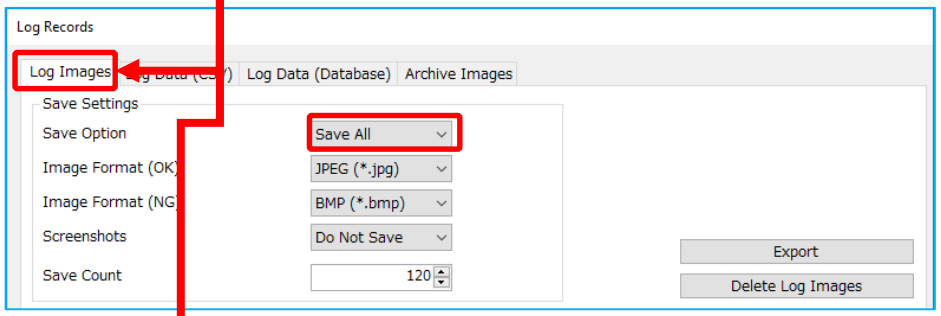
(2) Click [Use previously recorded images].

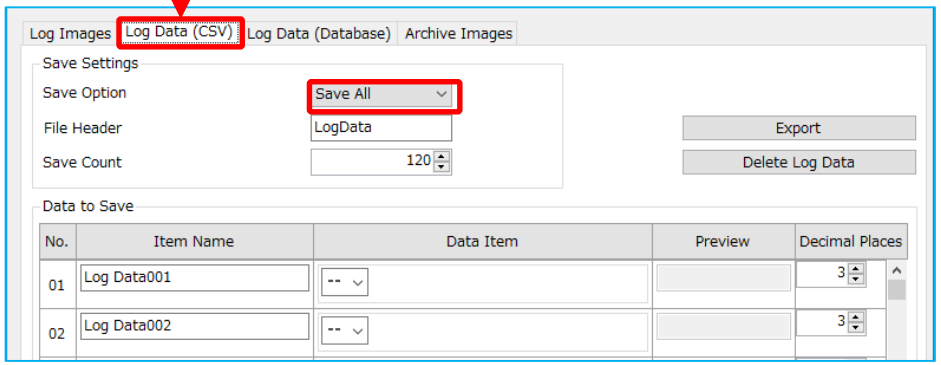
(3) Set the filter to select the simulation image input (=log image).

(4) Select JOB run and carry out the simulation.

Note : Both log image and log data need to be set to "save" at Log Records menu.
Log data do not need to specify particular data item to save. (Still JOB date/time data and flowchart OK/NG judgement will be saved.)





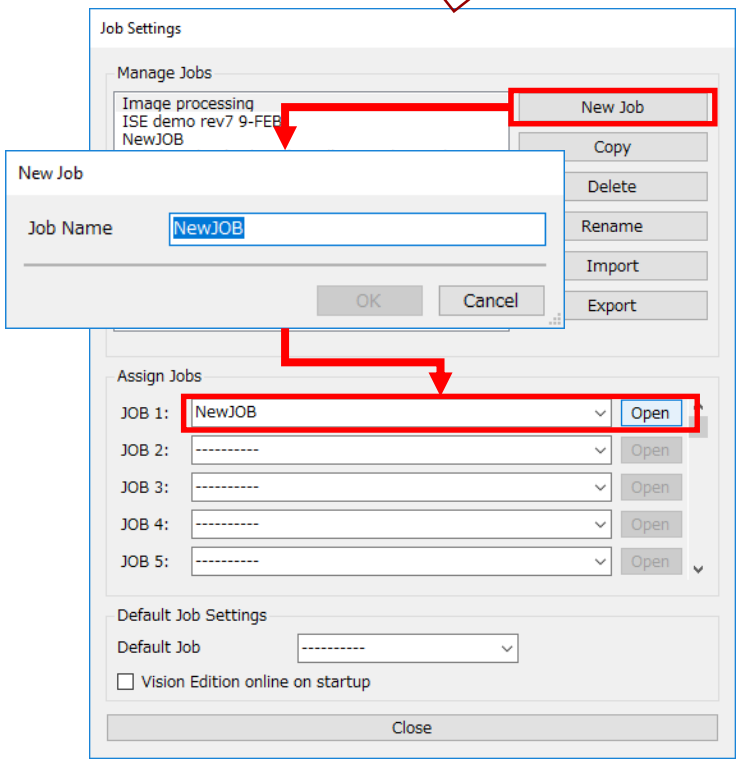


This [Use previously recorded images] feature is useful for verifying Online mode image processing result with image input log of live system. User can carry out simulation of actual image to investigate any configuration / programming issue.

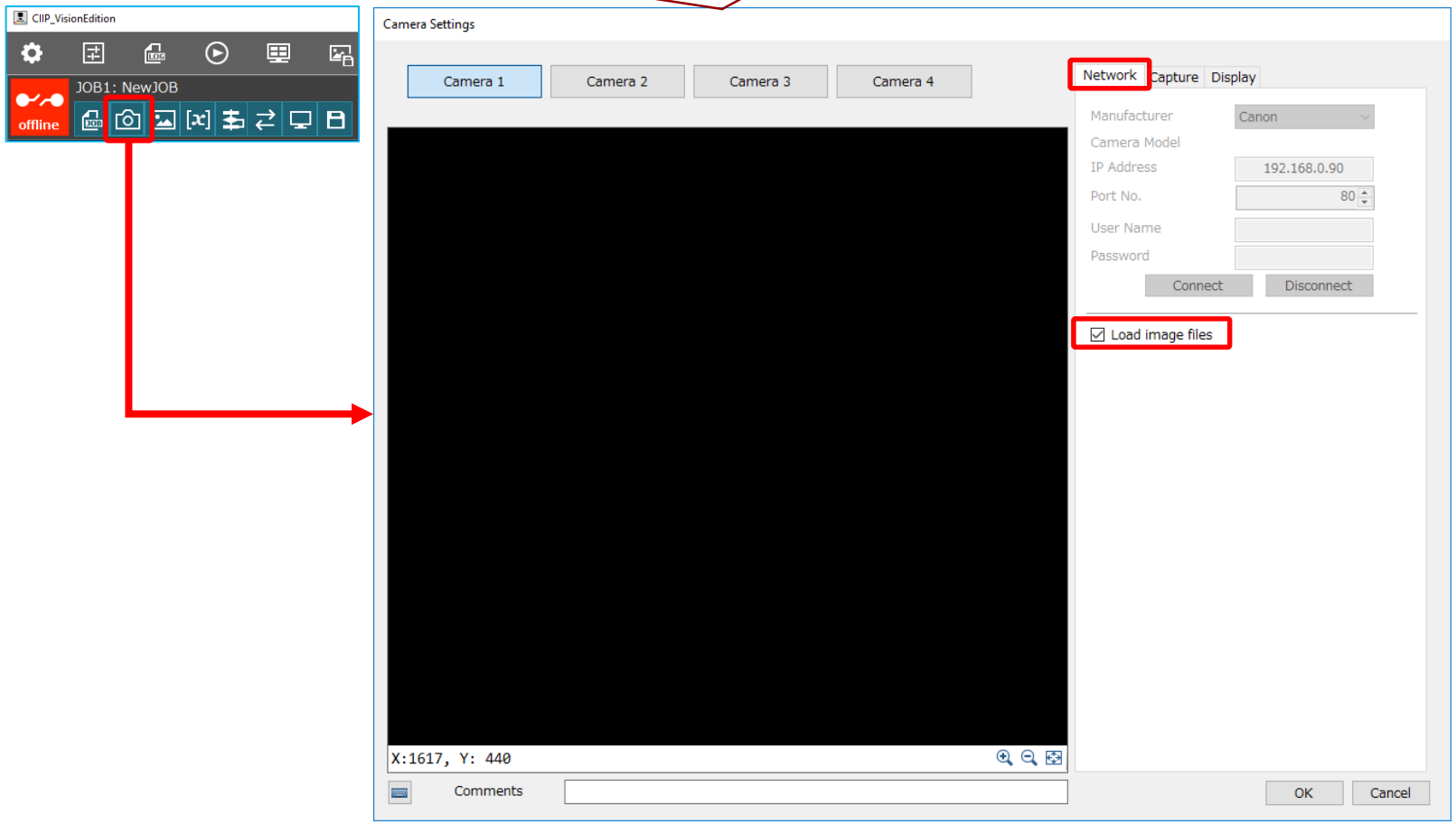
How to use Vision Edition as an image processing file server-1

Vision Edition can be used as an image processing server application where image files are fed to a source folder.
Vision Edition carries out image processing task on these files without connecting to a physical camera for live image feed.

(1) Create a New JOB, assign to JOB1 and open.



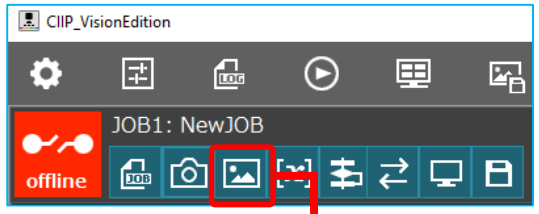
(2) Open [Camera Settings] and tick [Load image files] box.

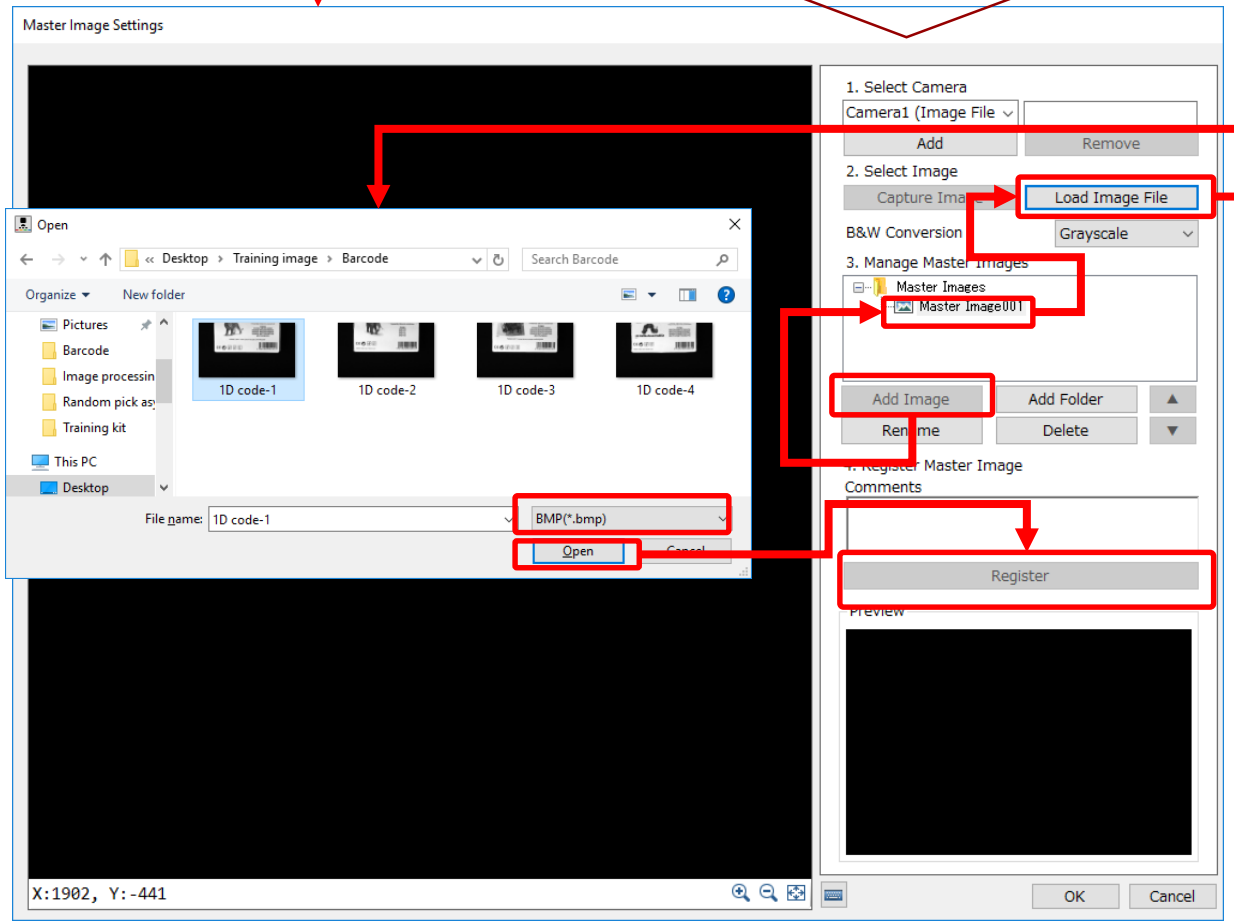


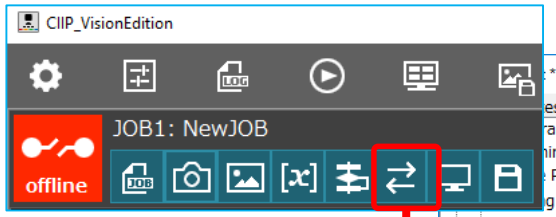
How to use Vision Edition as an image processing file server-2

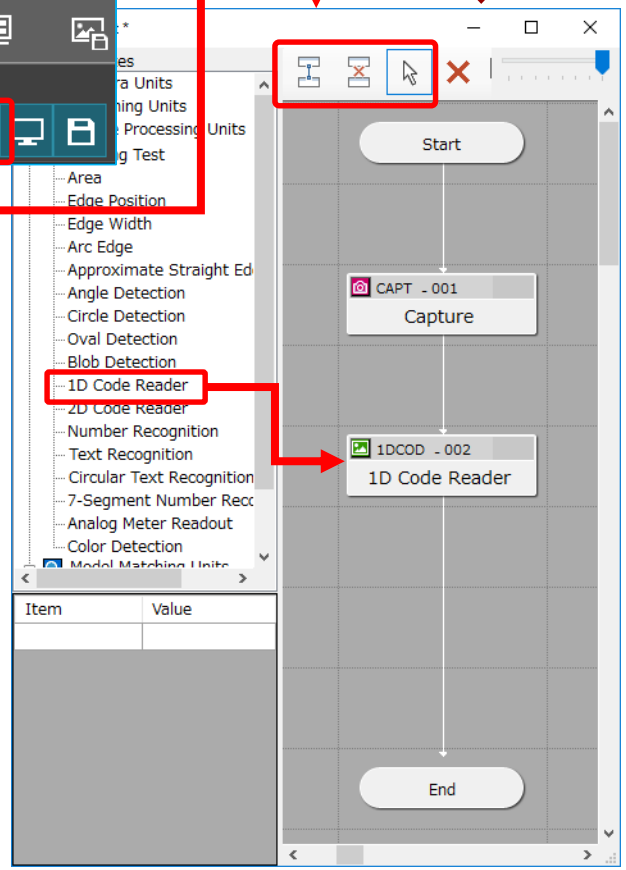
(3) Click [Master Image Settings] from the main screen.
Highlight Master Images folder, then click [Add Image].
Highlight added image file and click [Load Image File].
Browse file folder, choose file type, select image file and click [Register].
Note : master image cannot be registered from individual [Capture] unit.

(4) Click [Edit Flowchart].
Drag image processing unit ([1D Code Reader] unit in this example) and connect.



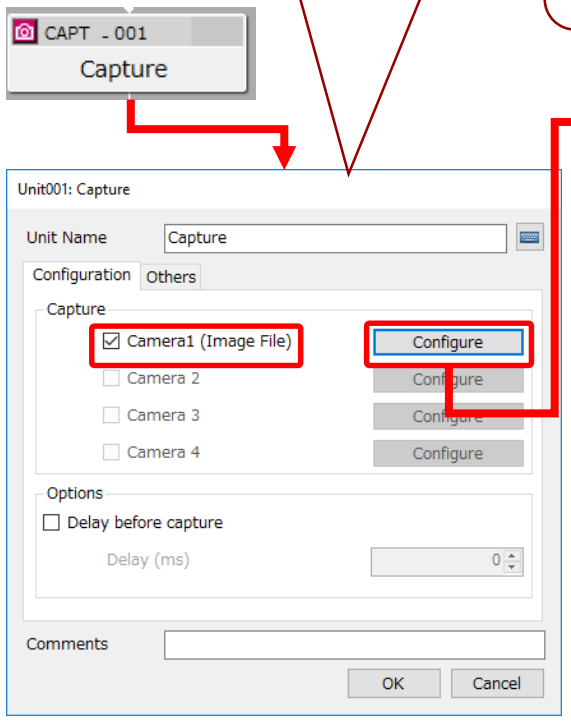




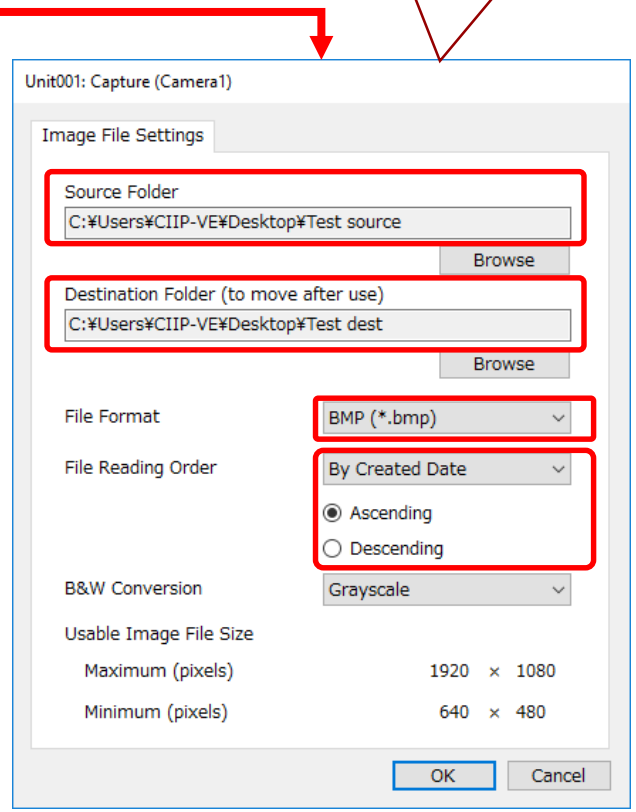


How to use Vision Edition as an image processing file server-3

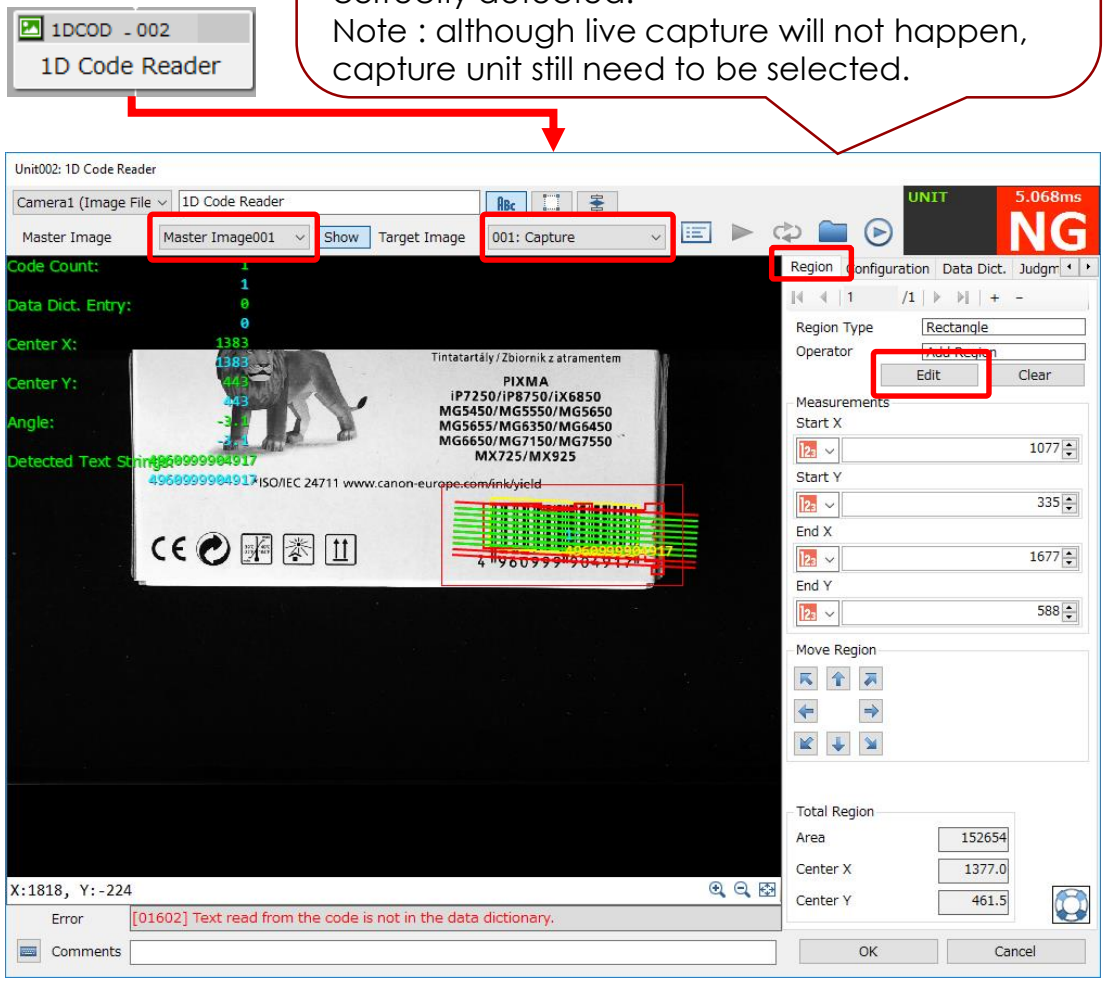
(5) Open [Capture] unit.
Tick Camera1(Image File) and click [Configure].



(6) At the Image File Settings TAB, specify [Source Folder] (which contains image files to process) and [Destination Folder].
Select [File Format] and [Reading Order].

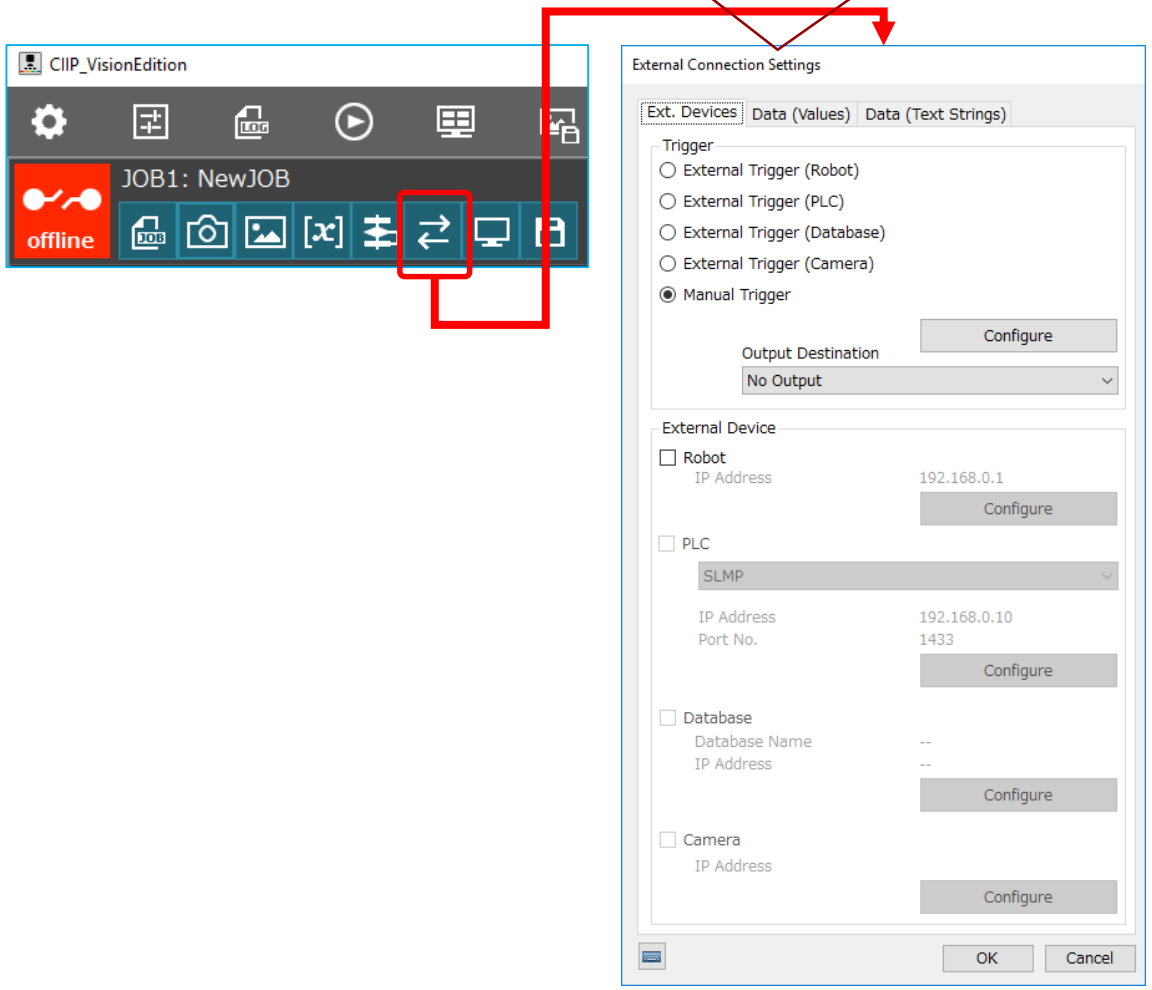


(7) Open [1D Code Reader] unit, select master image and capture unit.
At [Region] TAB, click [Edit] and set region by mouse left & right click.
Confirm that master image's barcode is correctly detected.
Note : although live capture will not happen, capture unit still need to be selected.



How to use Vision Edition as an image processing file server-4

(8) Click [External Connection Settings].
Set trigger, external device and output data as required.



(9) Switch to online mode for live operation.

As Vision Edition receives trigger, it performs image processing on the image files at source folder and outputs the result to external device as configured.
Processed files are transferred to the destination folder.