VTV-9000 Series

Setup Guide

Revision 5.7

Applicable Version: 4.2.0 Build 1

June 16, 2014

ViSCO Technologies Corporation

Table of Contents

1. Introduction

This manual describes the setup procedure for ViSCO Technologies Corporation's VTV-9000 series image processing devices.
The applicable software version is 4.2.0 Build 1.

For the specifications of the chassis and camera connection method see the following hardware guide.

Camera Type	Hardware Guide	Model Number
VT Digital	VTV-9000 Hardware Guide D	MANH9KD_J_2_5
	VTV-9000 ST (6th Generation) Hardware Guide	MANH9KS5-J-1_2
	VTV-9000 ST (7th Generation) Hardware Guide	MANH9KS7-J-1_1
	VTV-9000 mini (4th Generation) Hardware Guide	MANH9KM3-J-1_1
VT Digital E	VTV-9000 Hardware Guide E	MANH9KE_J_1_9
	VTV-9000 U Hardware Guide	MANH9KU1-J-1_0
Analog Digital	VTV-9000 Hardware Guide AN/AC/CL	MANH9K_J_1_8

Table 1: Hardware guide per camera type

Hardware that is common to the VTV-9000 series such as I/O is described in this manual.

For information regarding cameras that can be connected and their specifications, see the "VTV-9000 Series Camera Connection Guide".

Definition of Terms

In this manual, the following terms are defined as follows:

Term	Definition
VTV-9000 Series	All VTV-9000 models
VTV-9000	Means one of the following: Common to the VTV-9000 series VTV-9000 hardware and software VTV-9000 software VTV-9000 hardware
VTV-9000 System	Image processing application (vxVisMgr.exe) in VTV-9000 software

Table 2: Definition of terms

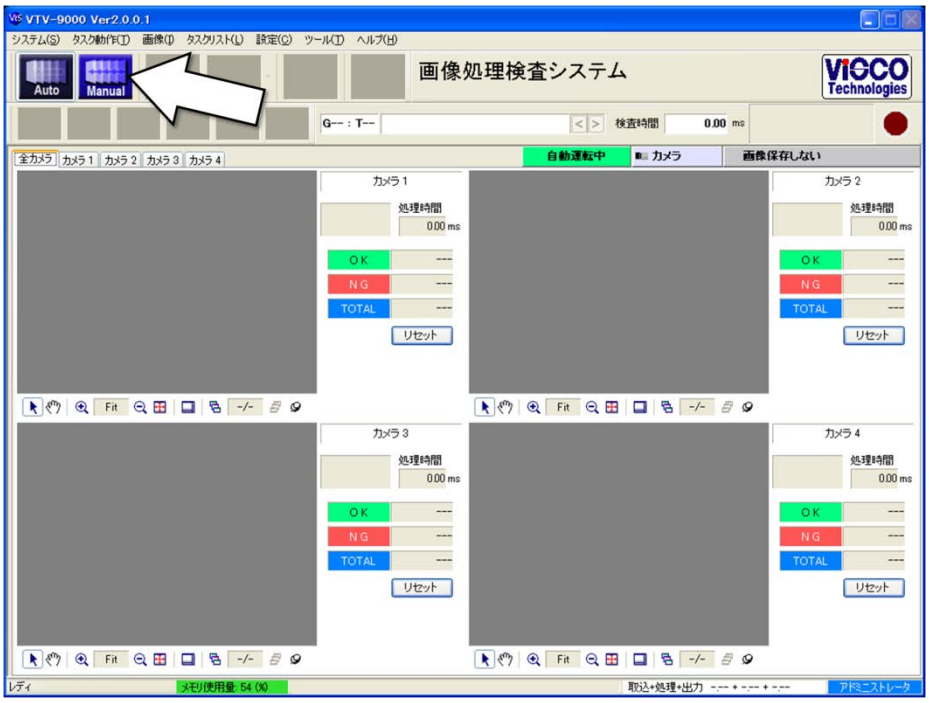
2. Image Acquisition and Display

For information regarding connecting a camera and setting the camera unit, see the Hardware Guide.

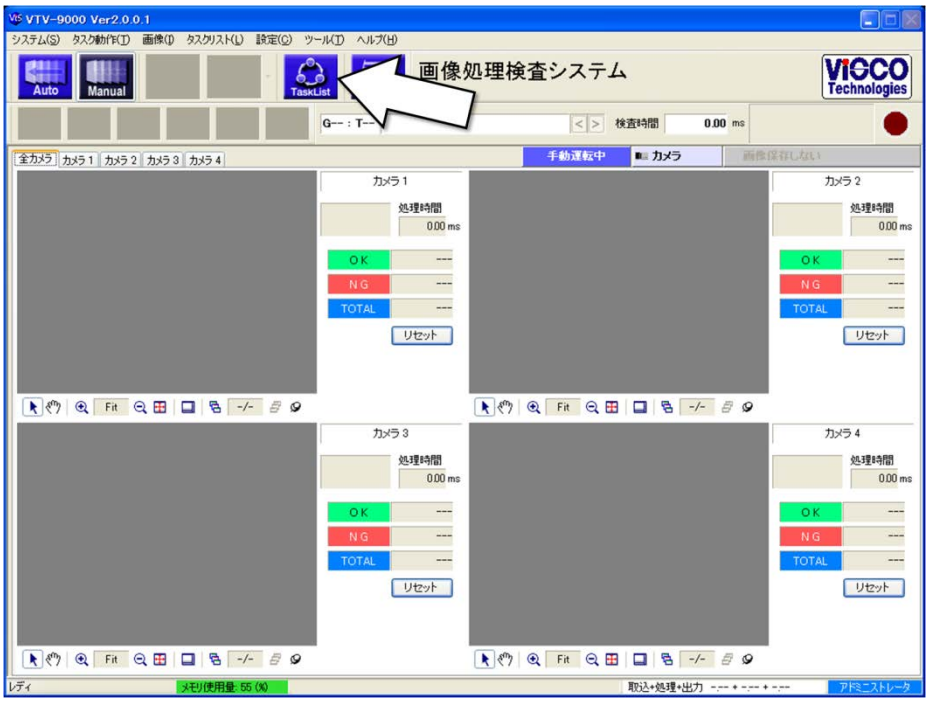
2.1. Task Settings

1. Start VTV-9000.

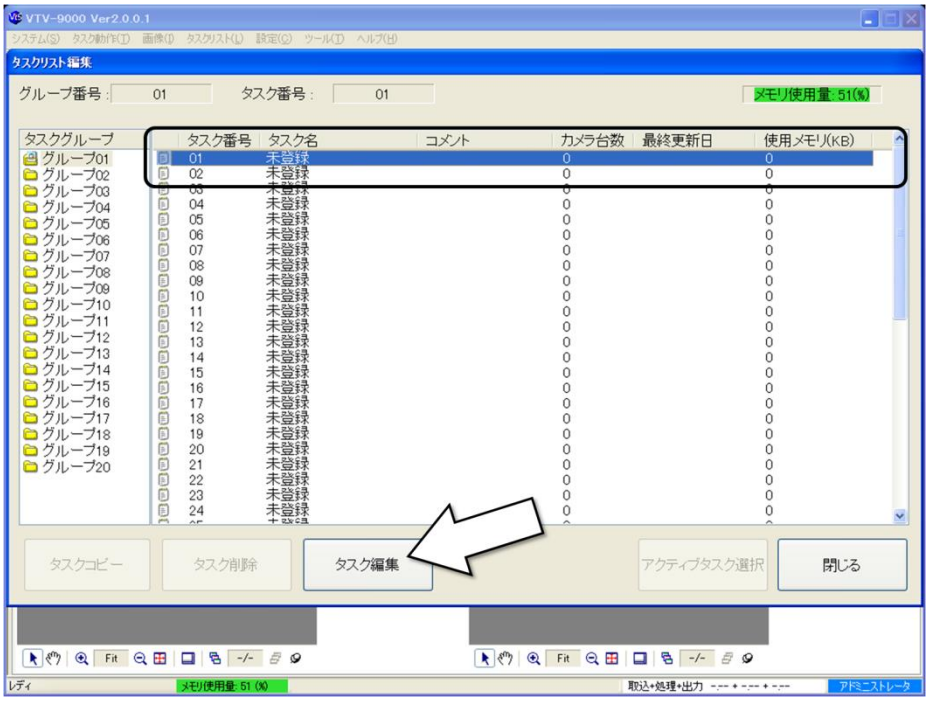
2. When the startup completes and the initial screen is displayed, click the **Manual** button.



3. Click the **TaskList** button and display the **Edit Task List** dialog.

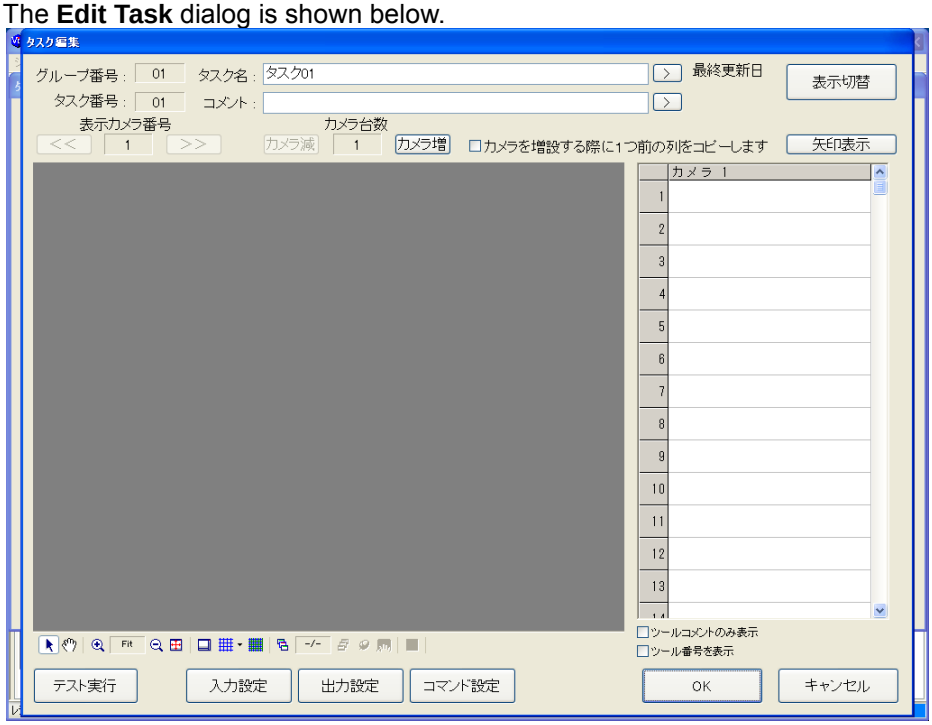


The **Edit Task List** dialog is shown below:

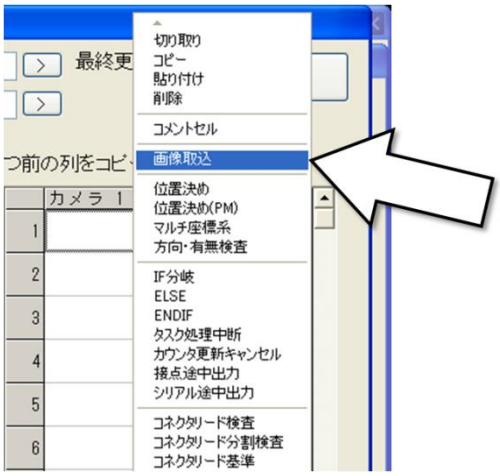


Select a group and task from the list (in this example Group 01, Task 01 is selected) and click on the **Edit Task** button or double click the selected task to display the **Edit Task** dialog.

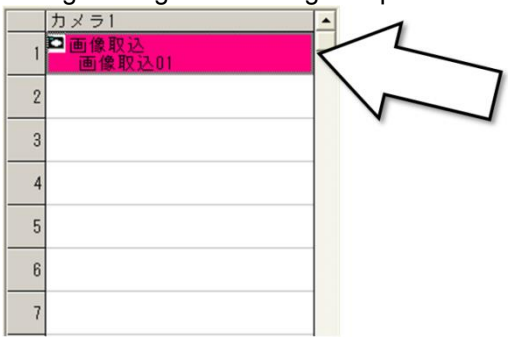
The **Edit Task** dialog is shown below.



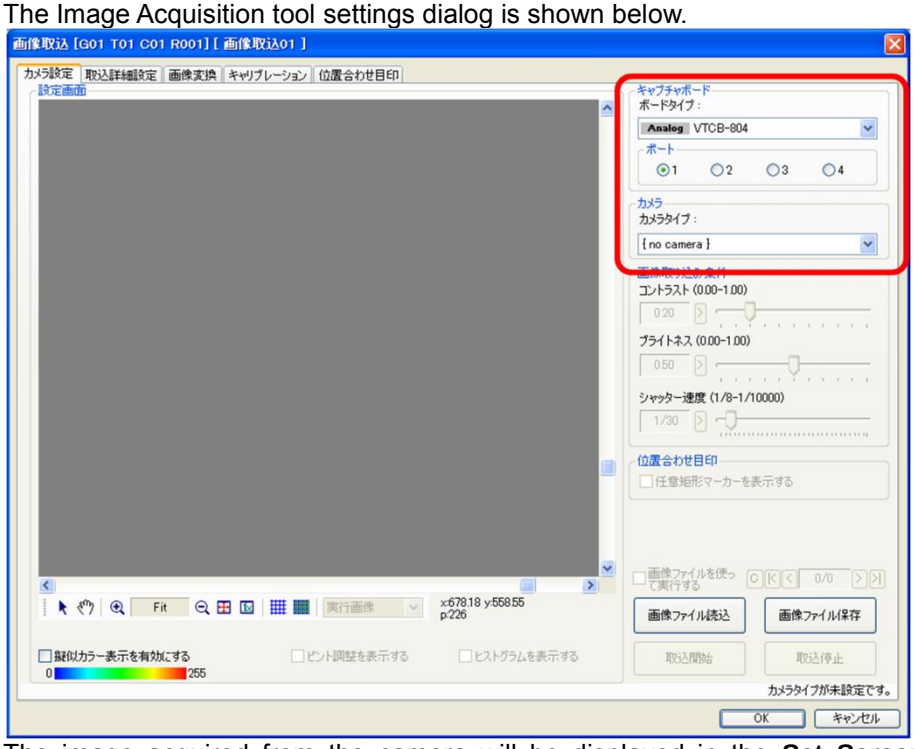
Right click on the first row cell of the Camera 1 column and display the context menu. Click on **Image Acquisition** from the menu to insert the tool.



4. Double click the cell in the first row where the Image Acquisition tool was inserted. The settings dialog for the Image Acquisition tool will be displayed.



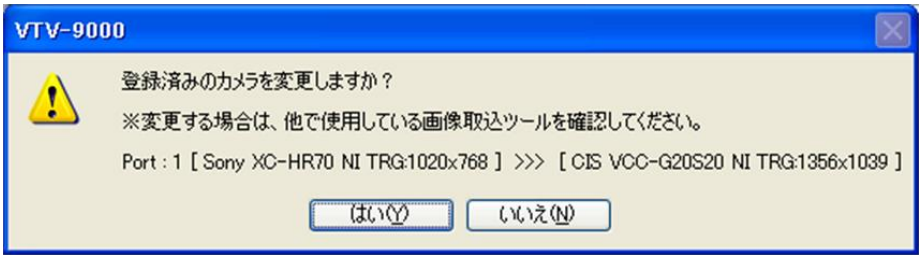
The Image Acquisition tool settings dialog is shown below.



The image acquired from the camera will be displayed in the **Set Screen** pane in the **Camera Settings** tab of the Image Acquisition tool. However, an image cannot be acquired unless the following are set properly.

- Board selection
- Port number settings
- Camera type settings (supported cameras only *Table 3)
- Click on camera initialization button (supported cameras only *Table 3)
- Click on reconnect button (supported cameras only *Table 3)
- Image acquisition conditions
- Lens aperture and focus

When changing the camera type for a port that already has a registered camera type, the following confirmation message will be displayed. Confirm that the correct camera type is selected.



Yes (Y): Resets the port to the selected camera type.
No (N): Cancels the selected camera type.

Supported camera / Item	Analog camera Digital camera VT Digital camera	VT Digital E camera
Camera type	Select the camera type from the camera list.	When a camera is connected, the camera type is automatically displayed.
Camera initialization	After selecting the camera type, press the camera initialization button.	When a camera is connected, it is automatically initialized.
When reconnecting or repowering the camera	Check the camera power and camera cable connection.	If the following operations are performed after starting VTV-9000, press the reconnect button. - Camera is changed - Camera port is changed - Camera is repowered

Table 3: Differences in setting method based on supported camera

The camera connection destination for each board is called a “port”, and the camera connection destination for each chassis is called a “channel.” For information regarding the relationship between a channel, port, and board type for each model, see the Hardware Guide.

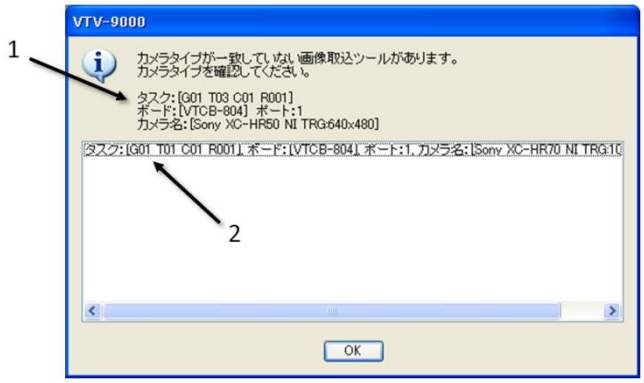
5. Be sure to set the correct camera type, port number, etc. and confirm that the image is properly displayed in Set Screen.

When you click the **Start Acquisition** button, the live image is displayed. Adjust the camera aperture and focus.

6. Press the **OK** button to complete the Image Acquisition tool settings.

When There are Problems in the Camera Settings

Only one camera type can be set for each camera port.
When you complete the Image Acquisition tool settings by pressing **OK** (Step 6 above), the loaded task is searched, and it is verified whether there are any conflicts with the existing camera settings. If there is a problem, a message dialog is displayed.



1. Defined position of the Image Acquisition tool that is set
2. Section defining an Image Acquisition tool with a camera type that does not correspond

By pressing **OK** you can finish the tool settings, but with these settings an image cannot be properly acquired. Use one of the following methods to correct the settings:

- Change the camera type set in the Image Acquisition tool displayed in 2. of the confirmation message. Simply setting the Image Acquisition tool so that it is not executed will not correct the problem.
- After unloading all tasks, load only the tasks set with the appropriate camera type.

After correcting the settings, complete the Image Acquisition tool by pressing OK and confirm that the above message dialog is no longer displayed.

2.2. Acquiring Images from Multiple Cameras

When multiple cameras are connected to VTV-9000, there are two ways for acquiring images that can be selected by setting the Image Acquisition tool. Set the **Detailed Acquisition Settings** tab in the Image Acquisition tool according to the use purpose.

2.2.1. Sequential Acquisition

Sequential acquisition is a method for acquiring camera images into VTV-9000 in the order that the Image Acquisition tools are executed. In the example shown in Figure 1, the Image Acquisition tool for Camera 1 will be executed, followed by the Image Acquisition tool for Camera 2. The process time will be the total of the camera acquisition time (exposure time + acquisition time) for Camera 1 and the camera acquisition time for Camera 2.

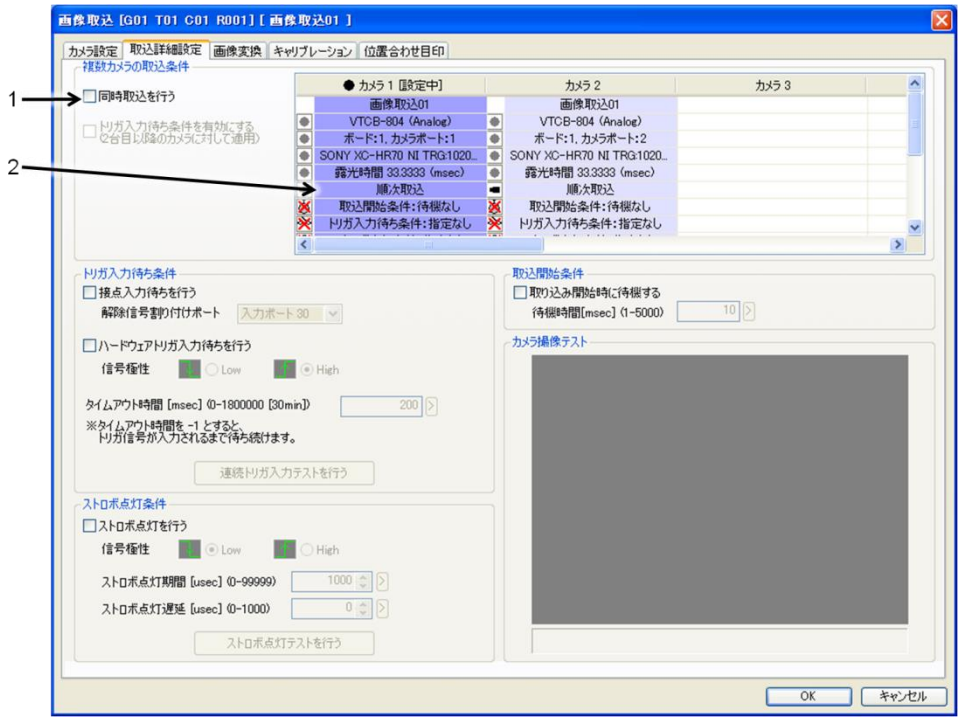


Figure 1: Detailed Acquisition Settings tab - Sequential Acquisition

1. Disable the **Synchronization Acquisition** checkbox.
2. When sequential acquisition is set, the background color is purple.

2.2.2. Synchronization Acquisition

Synchronization acquisition is a method for acquiring images into VTV-9000 from cameras by starting camera exposure for multiple Image Acquisition tools simultaneously. Synchronization acquisition can be used to simultaneously take photos with multiple cameras at once. In the example shown in Figure 2, Camera 1 and Camera 2 are the same camera type and have the same exposure time, resulting in a reduced process time since image acquisition for the two cameras can be completed in the acquisition time (exposure time + acquisition time) necessary for one camera. When using synchronization acquisition, define the Image Acquisition tools in the same row of the Edit Task dialog as shown in Figure 3.

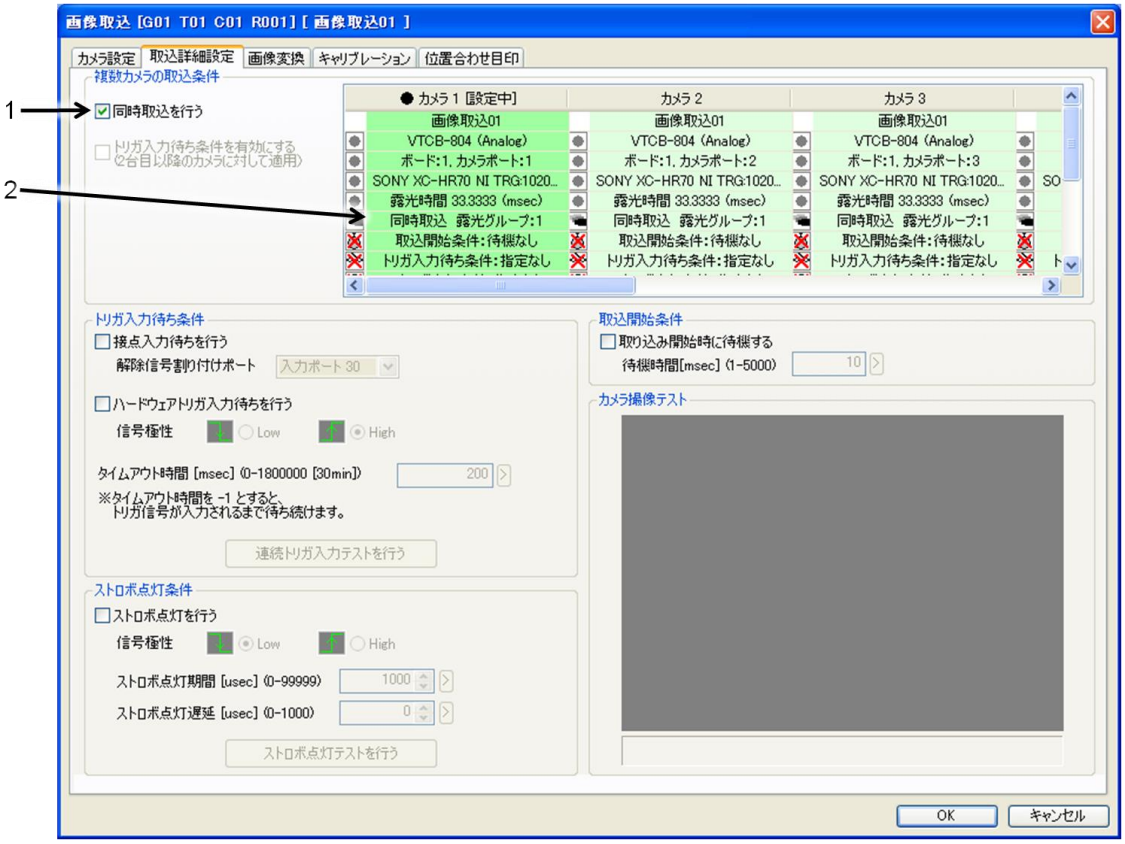


Figure 2: Detailed Acquisition Settings tab - Synchronization Acquisition

1. Enable the **Synchronization Acquisition** checkbox.
2. When synchronization acquisition is set, the background color will become yellow green

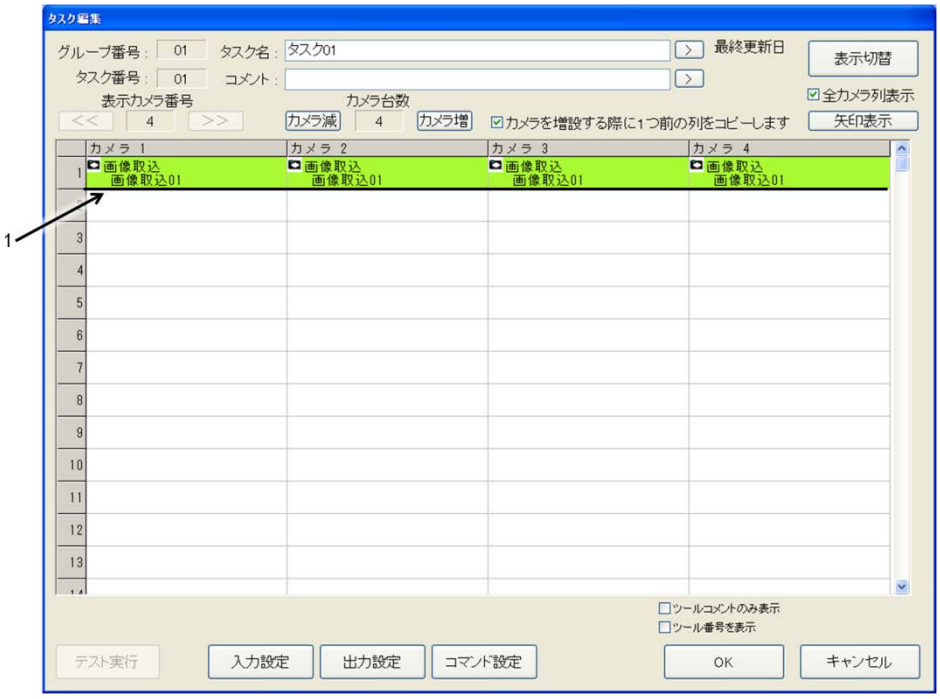


Figure 3: Insertion position of the Image Acquisition tools in the Edit Task screen

1. Insert the Image Acquisition tools in the same row.

2.3. Image Acquisition Using a Distributed System

2.3.1. What is a Distributed System?

A distributed system is a distributed image processing system using 2 or more VTV-9000ST systems installed with a high-speed image transfer board (VTOB-301). By connecting a camera to one VTV-9000ST system, and transferring image data to the other VTV-9000ST system(s) at a high speed, parallel processing can be performed to reduce the process time.
The machine vision system to which a camera is connected is called a **master device**, and the machine vision system to which images are transferred is called a **slave device**.

For information on how to configure and connect distributed systems, see the Hardware Guide.

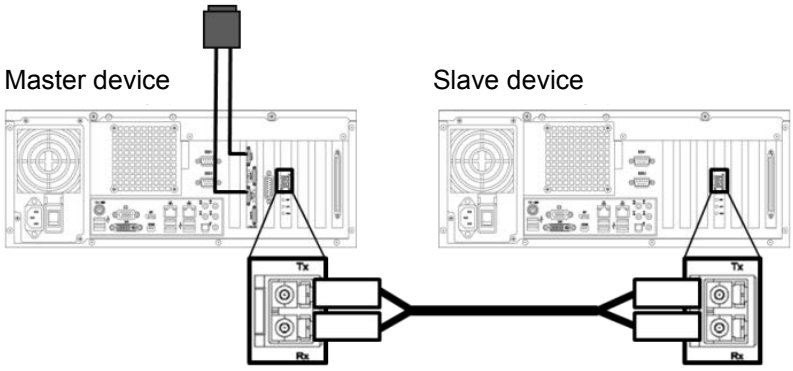


Figure 4: When a process is distributed across 2 devices

2.3.2. Preparing to Use a Distributed System

1. Set the ID on the slave device.

   It can be set from the Image Acquisition tab in the Environment Settings menu.

   Note: Set a unique Slave ID on each system.

- When using 1 slave device:
  Slave ID: 1

- When using 2 slave devices:
  1st slave device Slave ID: 1
  2nd slave device Slave ID: 2

- When using 3 slave devices:
  1st slave device Slave ID: 1
  2nd slave device Slave ID: 2
  3rd slave device Slave ID: 3

2.3.3. Image Acquisition Using a Distributed System

1. Start the master and slave VTV-9000 devices.

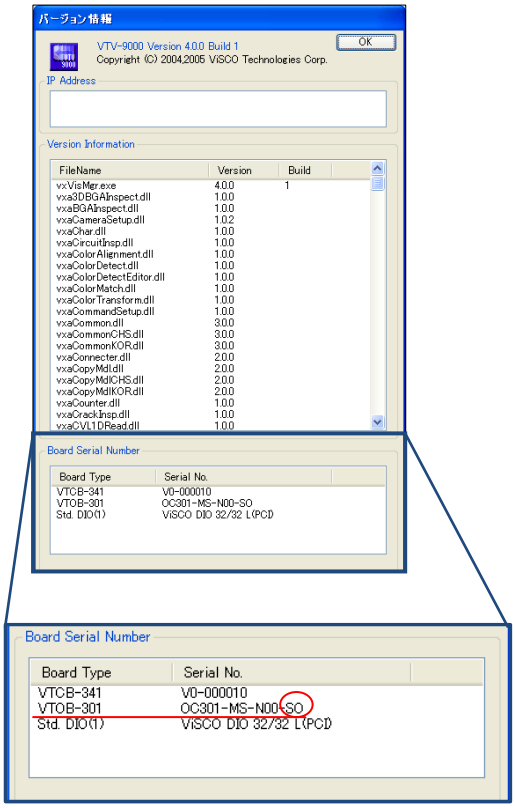
   Be sure to start the master device and slave device(s) at the same time.

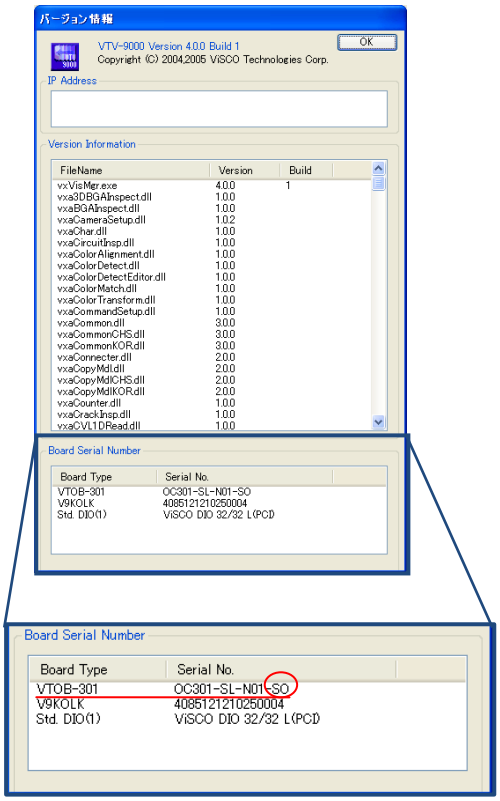
2. After the startup is complete and the initial screen is displayed, click the **Manual** button.

3. Verify the session status.

   The master device and slave device(s) must be able to communicate with each other (i.e. a session needs to be established) in order to transfer images. A session is established when the distributed system is started. On both the master device and slave device, it is possible to verify the session status from Help menu → Version Information.

   [Master device] [Slave device]

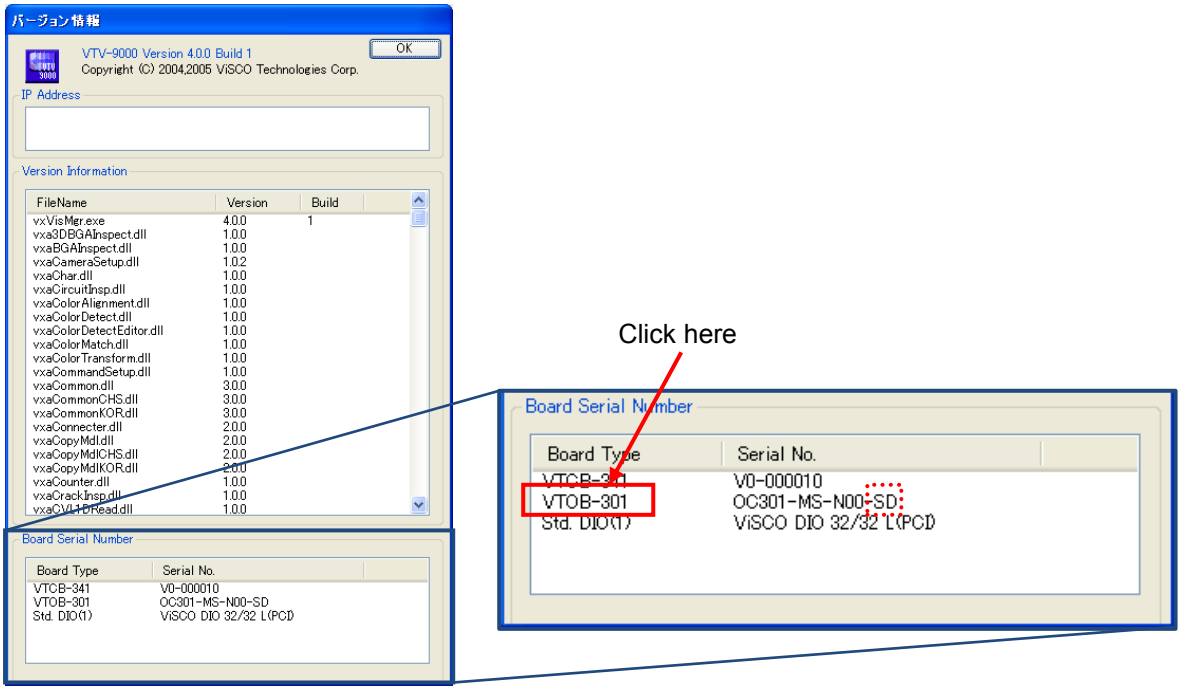




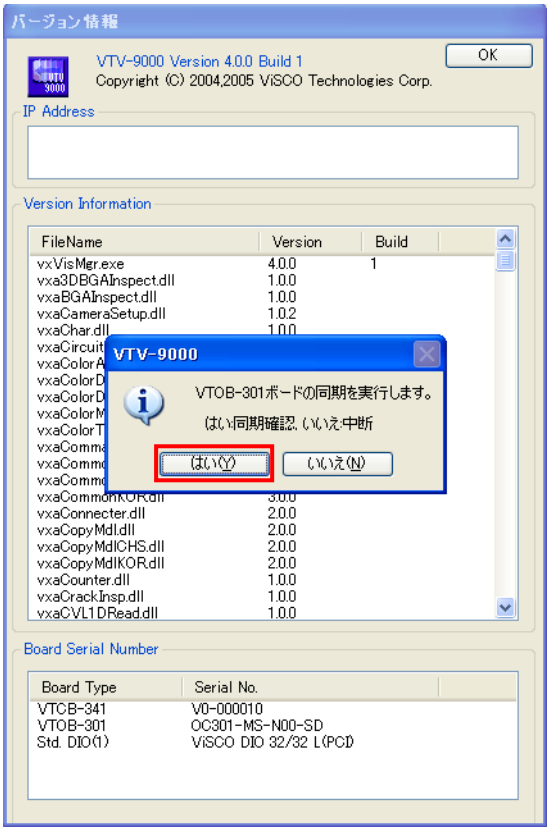
Session status
SO: Session established
SD: Session disconnected

➢ If the session is disconnected:

- Click VTOB-301 to re-establish the session.



- The following message screen will be displayed. Click **Yes**.



4. Set the Task Settings.

   Using “2.1 Task Settings” as a guide, assign and set an Image Acquisition tool.

   *If the session is established and synchronized, when you perform the setting operation on the master device, the setting screen on the slave device side will open similarly, and you can make the settings.

   Note: For both the master device and slave device, use the same task (i.e. with the same task group and same task number).

5. Set the image acquisition settings.

➢ Camera settings

The camera settings are set differently on the master device and slave device.

- Settings on the master device
  After setting the board type and camera type, enable the VTOB Transfer checkbox so that image data can be transferred to the slave device(s).
- Settings on the slave device(s)
  Set the camera type to VTCB-301 Master Camera.

When you click Start Acquisition in the Image Acquisition tool on the master device, the image will be transferred upon image acquisition, and the same image will be displayed on the slave device. This completes the image acquisition settings for a distributed system.

3. Parallel I/O

3.1. Overview

*For VTV-9000C, see “VTV-9000 Hardware Guide E” and for VTV-9000U, see “VTV-9000U Hardware Guide.”
The parallel I/O port (sometimes indicated as DIO) on VTV-9000 can be used for communication with external devices.
As an example, the rear view of the VTV-9000STD-4C is shown in Figure 5 below.

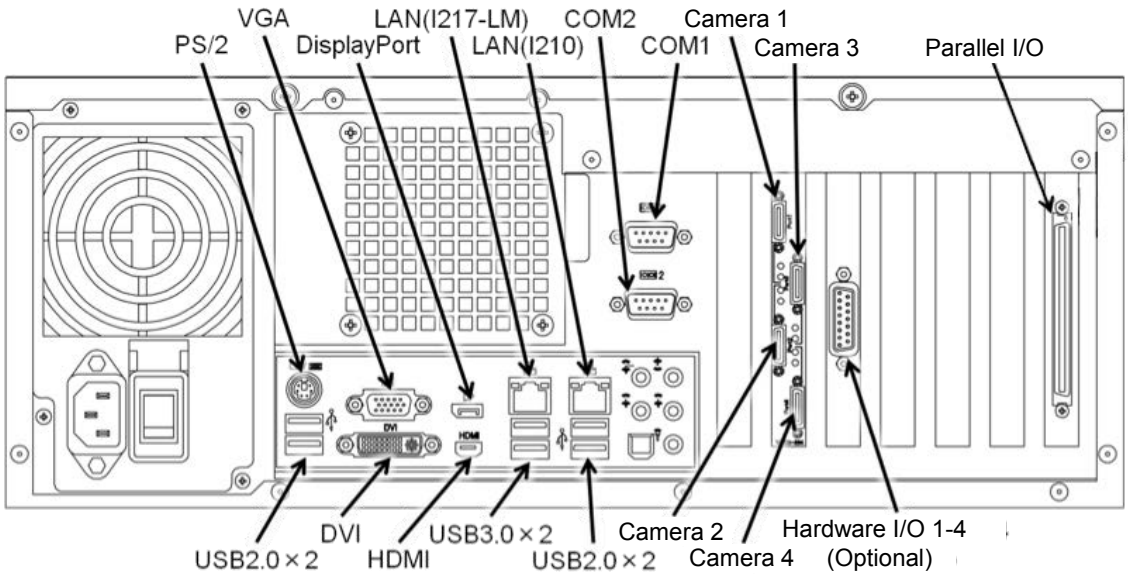


Figure 5: Rear view of VTV-9000STD-4C

The VTV-9000C unit is equipped with 16 DIO input channels and 16 DIO output channels. By connecting a DIO unit, it is possible to select between 16 and 32 input channels, and output can be expanded to a maximum of 80 channels. For details see “3.12. DIO Unit with USB Interface (p.51).”

3.2. Parallel I/O Connector Pinout

*For VTV-9000C, see “VTV-9000 Hardware Guide E” and for VTV-9000U, see “VTV-9000U Hardware Guide.”
The pinout of the parallel I/O connector on VTV-9000 is shown in Figure 6 below.

* The numbers shown are the pin numbers for when an ACA96 series cable is used. The numbers shown in brackets are the pin numbers for when a PCB96 series cable is used.

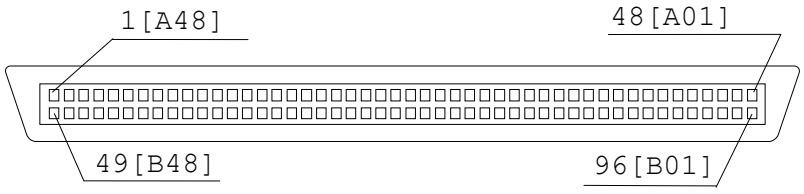


Figure 6: Pinout of the parallel I/O connector on VTV-9000

3.3. Connectors and Cables

*For VTV-9000C, see “VTV-9000 Hardware Guide E” and for VTV-9000U, see “VTV-9000U Hardware Guide.”
For connecting to this port, a PCR-E96FA connector or equivalent should be used, and for the connector cover a PCS-E96LKPA or equivalent should be used (both manufactured by HONDA TSUSHIN KOGYO CO., LTD.). The separately sold cables and connectors are shown below in Table 4.
For details, please contact our sales division.

Product Name	Part Number
96pin Half-Pitch Connector Conversion Shield Cable (96P -> 37P x2)	PCB96WS-1.5P (1.5m), PCB96WS-3P(3m),
96pin Half-Pitch Connector at Each End, Shield Cable (Mold Type)	PCB96PS-0.5P(0.5m), PCB96PS-1.5P(1.5m), PCB96PS-3P(3m), PCB96PS-5P(5m)
96pin Half-Pitch Connector to Open-Ended, Shield Cable	ACA96PS-1.5(1.5m), VTIO-A96SN030E(3m), ACA96PS-5(5m)
Termination Unit	EPD-96 *1
Termination Unit	EPD-37 *2
Signal monitor Accessory for Digital I/O (Checkmate)	CM-64(PC)E *1
Signal monitor Accessory for Digital I/O (Checkmate)	CM-32(PC)E *2
96 pin Half to 37 D-SUB (Female)×2 Conversion Terminal	CCB-96
I/O Cable 96pin-100pin	VTIO-C96SN030E
Terminal Unit 100pin	PLC-100BDS

Table 4: Separately sold cables and connectors

*1 Requires an additional optional cable PCB96PS.
*2 Requires an additional optional cable PCB96WS.

3.4. Connector Pin Numbers and Signal Names

3.4.1. 96-pin Connector

The signal names and pin numbers of VTV-9000's parallel I/O connector are shown below in Table 5.
*For VTV-9000C, see "VTV-9000 Hardware Guide E" and for VTV-9000U, see "VTV-9000U Hardware Guide."

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
01 [A48]	IN2+24V	25 [A24]	NC	49 [B48]	OUT2+24V	73 [B24]	NC
02 [A47]	IN2+24V	26 [A23]	NC	50 [B47]	OUT2+24V	74 [B23]	NC
03 [A46]	IN32	27 [A22]	NC	51 [B46]	OUT32	75 [B22]	NC
04 [A45]	IN31	28 [A21]	NC	52 [B45]	OUT31	76 [B21]	NC
05 [A44]	IN30	29 [A20]	IN1+24V	53 [B44]	OUT30	77 [B20]	OUT1+24V
06 [A43]	IN29	30 [A19]	IN1+24V	54 [B43]	OUT29	78 [B19]	OUT1+24V
07 [A42]	IN28	31 [A18]	IN16	55 [B42]	OUT28	79 [B18]	OUT16
08 [A41]	IN27	32 [A17]	IN15	56 [B41]	OUT27	80 [B17]	OUT15
09 [A40]	IN26	33 [A16]	IN14	57 [B40]	OUT26	81 [B16]	OUT14
10 [A39]	IN25	34 [A15]	IN13	58 [B39]	OUT25	82 [B15]	OUT13
11 [A38]	IN24	35 [A14]	IN12	59 [B38]	OUT24	83 [B14]	OUT12
12 [A37]	IN23	36 [A13]	IN11	60 [B37]	OUT23	84 [B13]	OUT11
13 [A36]	IN22	37 [A12]	IN10	61 [B36]	OUT22	85 [B12]	OUT10
14 [A35]	IN21	38 [A11]	IN9	62 [B35]	OUT21	86 [B11]	OUT9
15 [A34]	IN20	39 [A10]	IN8	63 [B34]	OUT20	87 [B10]	OUT8
16 [A33]	IN19	40 [A09]	IN7	64 [B33]	OUT19	88 [B09]	OUT7
17 [A32]	IN18	41 [A08]	IN6	65 [B32]	OUT18	89 [B08]	OUT6
18 [A31]	IN17	42 [A07]	IN5	66 [B31]	OUT17	90 [B07]	OUT5
19 [A30]	NC	43 [A06]	IN4	67 [B30]	OUT2GND	91 [B06]	OUT4
20 [A29]	NC	44 [A05]	IN3	68 [B29]	OUT2GND	92 [B05]	OUT3
21 [A28]	NC	45 [A04]	IN2	69 [B28]	NC	93 [B04]	OUT2
22 [A27]	NC	46 [A03]	IN1	70 [B27]	NC	94 [B03]	OUT1
23 [A26]	NC	47 [A02]	NC	71 [B26]	NC	95 [B02]	OUT1GND
24 [A25]	NC	48 [A01]	NC	72 [B25]	NC	96 [B01]	OUT1GND

Table 5: Signal names and pin numbers on the 96-pin connector

* The pin numbers indicated are the pin numbers on the VTV-9000 side.
* The numbers in [ ] are the pin numbers for a PCB96 series cable.
* Terminals with the same signal name are connected internally. However, we recommend wiring all terminals.

3.4.2. 100-pin Connector

The signal names and pin numbers when using a 96-pin to 100-pin conversion cable are shown below in Table 6.

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
01	IN2+24V	26	NC	51	OUT32	76	NC
02	IN2+24V	27	NC	52	OUT31	77	OUT1+24V
03	IN32	28	NC	53	OUT30	78	OUT1+24V
04	IN31	29	IN1+24V	54	OUT29	79	OUT16
05	IN30	30	IN1+24V	55	OUT28	80	OUT15
06	IN29	31	IN16	56	OUT27	81	OUT14
07	IN28	32	IN15	57	OUT26	82	OUT13
08	IN27	33	IN14	58	OUT25	83	OUT12
09	IN26	34	IN13	59	OUT24	84	OUT11
10	IN25	35	IN12	60	OUT23	85	OUT10
11	IN24	36	IN11	61	OUT22	86	OUT9
12	IN23	37	IN10	62	OUT21	87	OUT8
13	IN22	38	IN9	63	OUT20	88	OUT7
14	IN21	39	IN8	64	OUT19	89	OUT6
15	IN20	40	IN7	65	OUT18	90	OUT5
16	IN19	41	IN6	66	OUT17	91	OUT4
17	IN18	42	IN5	67	OUT2GND	92	OUT3
18	IN17	43	IN4	68	OUT2GND	93	OUT2
19	NC	44	IN3	69	NC	94	OUT1
20	NC	45	IN2	70	NC	95	OUT1GND
21	NC	46	IN1	71	NC	96	OUT1GND
22	NC	47	NC	72	NC	97	NC
23	NC	48	NC	73	NC	98	NC
24	NC	49	OUT2+24V	74	NC	99	NC
25	NC	50	OUT2+24V	75	NC	100	NC

Table 6: Signal names and pin numbers on the 100-pin connector

* The pin numbers indicated are the pin numbers on the VTV-9000 side. (97-100 are not connected.)

3.5. Input Signals

For parallel input, there are trigger input signals for executing a task, input signals reserved by the system, and input signals used during task execution. There are mainly two types of trigger input signals for executing a task: single contact trigger and code trigger. Either type can be used for executing a task.
*For VTV-9000U, due to a hardware limitation, only a single contact trigger can be used to activate a task.

The types of input signals are described in Table 7 below.

Input signal type	Description
Single Contact Trigger	A single task is assigned to any one signal to activate the task. Up to 32 tasks (2 tasks in the case of VTV-9000C, 4 tasks in the case of VTV-9000U) can be activated.
Code Trigger	A code expressed by a specific bit pattern is input to load or unload a task, or to execute a specific command.
Keep system running signal	Inputs the state of the upper level device managing task activation. When the keep system running signal changes from Hi to Lo, VTV-9000 is automatically shutdown. For details on this signal, see “3.5.3 Keep System Running Signal”.
Input signals during task execution	Used for sending a Release Contact Input Wait signal for contact input wait in the image acquisition tool.

Table 7: Types of input signals

To switch between a single contact trigger and a code trigger, select **Settings → Environment Settings → Trigger**.

3.5.1. Single Contact Trigger

During Auto mode, when an activation signal (Lo → Hi) is input for an input signal, the task assigned to that input signal can be activated. A single task is assigned to a single input signal.
Tasks can be assigned in **Settings → Environment Settings → Single Contact Trigger**.

* When using the keep system running signal, do not assign a task to the reserved input signals described in “3.5.3 Keep System Running Signal (p.33)” in the **Settings → Environment Settings → Single Contact Trigger** menu.

3.5.2. Code Trigger

"Codes" can be input by using multiple input signals simultaneously in order to load, execute, or unload a task, etc. The configuration of the input signals and pin numbers are expressed as 31bit parallel input signals and are shown below in Table 8. (For VTV-9000C, they are expressed as 15bit signals and are shown in Table 9.) For information regarding trigger signals, see "Trigger (p.27)". For information regarding control code, see "Control Code (p.28)". For information regarding options, see "Control Code Options (p.32)".

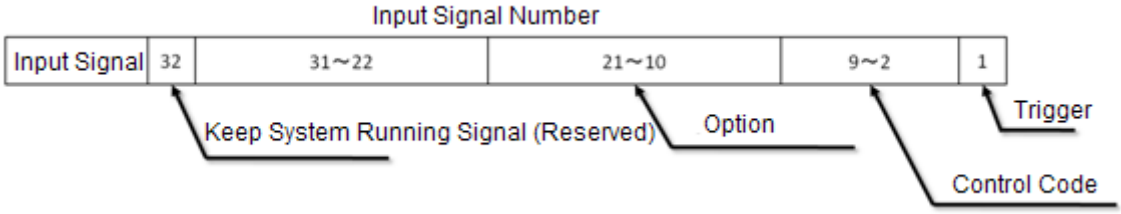


Table 8: Configuration of code trigger input signals

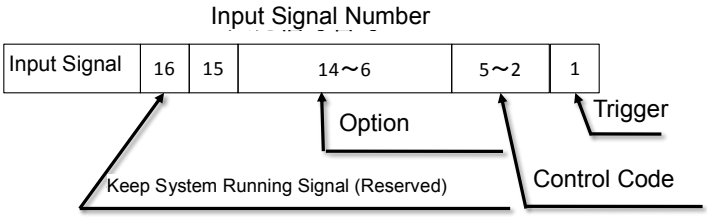


Table 9: Configuration of code trigger input signals (VTV-9000C)

Procedure for executing a code trigger

A code trigger can be executed by the following steps:

1. Set the control code and option.
2. Input a trigger signal (logical sum with item 1 above).

To ensure that the code will be detected, delay the trigger signal input at least 1 ms after setting the control code and option. If a problem occurs, the command error output may be set to Hi. For details, see the description of each command. A command error will be output when a trigger signal is input with an invalid control code.
For details regarding output signals, see "3.6. Output Signals".

Trigger

The trigger signal is used to command execution of the code trigger.
When the control code is set in advance and an activation signal (Lo → Hi) is input as the trigger signal, the code will be executed. If the trigger signal is input using an invalid control code, no code will be executed.

Control Code

Control code is used to control VTV-9000. A list of available control codes is shown in Table 10 below.

Control code		Control code name	Option
Decimal	Binary		
1	00000001	Execute Task	Group No. and Task No. (6-bit for each)
2	00000010	Execute System Command	System Command No. (8-bit)
3	00000011	Switch Active Task	Group No. and Task No. (6-bit for each)
4	00000100	Load Task	Group No. and Task No. (6-bit for each)
5	00000101	Unload Task	Group No. and Task No. (6-bit for each)
9	00001001	Execute Active Task	--
10	00001010	Clear Counter	--
12	00001100	Unload All Tasks	--
34	00100010	Start Lot	--
35	00100011	Finish Lot	--
40	00101000	Edit Lot Settings	--
37	00100101	Start Image Save	--
38	00100110	Finish Image Save	--
39	00100111	Save Image File	--
42	00101010	Shutdown System	--

Table 10: List of control codes

For VTV-9000C, the control codes are 4-bit and are as shown below in Table 11. Note that the group numbers that can be used are limited to 3-bit numbers (1-7).

Control code		Control code name	Option
Decimal	Binary		
1	0001	Execute Task	Group No. (3-bit), Task No. (6-bit)
2	0010	Execute System Command	System Command No. (8-bit)
3	0011	Switch Active Task	Group No. (3-bit), Task No. (6-bit)
4	0100	Load Task	Group No. (3-bit), Task No. (6-bit)
5	0101	Unload Task	Group No. (3-bit), Task No. (6-bit)
9	1001	Execute Active Task	--
10	1010	Clear Counter	--
12	1100	Unload All Tasks	--

Table 11: List of control codes (VTV-9000C)

For some control codes, it is necessary to specify an option. You can specify the group number and the task number, or you can specify the system command number as an option. For details, see “Control Code Options (p.32)”.

Control Code Details

Execute Task (00000001)

- For VTV-9000C, the control code is 0001.
- Specify a group number and a task number in an option. Specify a 6-bit group number (3-bit for VTV-9000C) and a 6-bit task number.
- The task specified with a group number and a task number is switched to the active task, and the task state is changed to the execution state.
- If the specified task is not loaded, the task is loaded before it is switched to the active task and changed to the execution state.

- Conditions in which a command error will occur:
  - The task specified in the data part is not registered.
  - The loading of the specified task failed (see ”Load Task (00000100)”).

Execute System Command (00000010)

- For VTV-9000C, the control code is 0010.
- The system command assigned to the 8-bit system command number is executed. For details regarding system commands and system command numbers, see “6. System Commands (p.78)”.
- Conditions in which a command error will occur:
  - The specified system command number does not exist.

Switch Active Task (00000011)

- For VTV-9000C, the control code is 0011.
- Specify a group number and a task number in an option. Specify a 6-bit group number (3-bit for VTV-9000C) and a 6-bit task number.
- The task specified with a group number and a task number is switched to the active task.
- If the specified task is not loaded (not found in memory), the task is loaded before it is switched to the active task.
- Conditions in which a command error will occur:
  - The task specified with a group number and a task number is not registered.
  - The loading of the specified task failed (see “Load Task (00000100)”).

Load Task (00000100)

- For VTV-9000C, the control code is 0100.
- Specify a group number and a task number in an option. Specify a 6-bit group number (3-bit for VTV-9000C) and a 6-bit task number.
- The task specified with a group number and a task number is loaded into memory.
- The loaded task is set as the active task.
- Conditions in which a command error will occur:
  - The task specified with a group number and a task number is not registered.
  - The loading of the specified task was attempted but for some reason the task does not exist.
  - The system memory usage rate is 80% or higher (see VTV-9000 Reference S001.1.5).

Unload Task (00000101)

- For VTV-9000C, the control code is 0101.
- Specify a group number and a task number in an option. Specify a 6-bit group number (3-bit for VTV-9000C) and a 6-bit task number.
- The task specified with a group number and a task number is deleted from memory.
- The data on the hard disk will not be deleted.
- A command error will not occur.

Execute Active Task (00001001)

- For VTV-9000C, the control code is 1001.
- The current active task is executed.
- Conditions in which a command error will occur:
  - An active task is not set.

Clear Counter (00001010)

- For VTV-9000C, the control code is 1010.
- The determination value counter for the active task is cleared to zero.
- A command error will not occur.

Unload All Tasks (00001100)

- For VTV-9000C, the control code is 1100.
- All tasks loaded in memory are deleted.
- The data on the hard disk will not be deleted.
- A command error will not occur.

Start Lot (00100010)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- Commands the lot to be started.
- Before executing this command, the **Enable Lot Output** checkbox in **Settings → Environment Settings → Lot Output** must be enabled.
- A command error will not occur.

Finish Lot (00100011)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- Commands the lot to be finished.
- A command error will not occur.

Edit Lot Settings (00101000)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- Opens the **Lot Settings** dialog.
- A command error will not occur.

Start Image Save (00100101)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- Starts the image save process.
- When the image save process is started, the image is saved according to the conditions set in **Settings → Environment Settings → Image Save**.
- A command error will not occur.

Finish Image Save (00100110)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- Finishes the image save process.
- A command error will not occur.

Save Image File (00100111)

- This code is not supported on VTV-9000C. It can be registered as a system command or a serial command can be used to execute this command.
- The image that is currently displayed on the screen is saved to a file.
- A command error will not occur.

Shutdown System (00101010)

- This code is not supported on VTV-9000C. A serial command can be used, or the Keep System Running Signal can be used to execute this command.
- The VTV-9000 application is finished and the OS is shutdown.
- A command error will not occur.

Control Code Options

There are two types of control code options which are specified differently based on the control code.

- Specifying a group number (a 6-bit number, 3-bit for VTV-9000C) and a task number (a 6-bit number)
- Specifying a system command number (an 8-bit number)

If an invalid group number, task number, or system command number is specified, an error will be returned.
The control code option configuration is shown in Table 12 below. The control code option configuration in the case of VTV-9000C is shown in Table 13.

Input Signal Number	21	20	19	18	17	16	15	14	13	12	11	10
Group Number, Task Number	Task Number						Group Number					

Input Signal Number	17	16	15	14	13	12	11	10
System Command Number	System Command Number							

Table 12: Control Code Options

Input Signal Number	14	13	12	11	10	9	8	7	6
Group Number, Task Number	Task Number						Group Number		

Input Signal Number	13	12	11	10	9	8	7	6
System Command Number	System Command Number							

Table 13: Control Code Options (VTV-9000C)

Ex1) Task no. 5 (000101) and group no. 10 (001010) can be specified as follows. This cannot be specified on VTV-9000C.

Input Signal Number	21	20	19	18	17	16	15	14	13	12	11	10
Group Number, Task Number	0	0	0	1	0	1	0	0	1	0	1	0
	Task Number						Group Number					

Ex2) On VTV-9000C, Task no. 20 (010100) and group no. 5 (000110) can be specified as follows.

Input Signal Number	14	13	12	11	10	9	8	7	6
Group Number, Task Number	0	1	0	1	0	0	1	1	0
	Task Number						Group Number		

Ex3) System command no. 42 (101010) can be specified as follows.

Input Signal Number	17	16	15	14	13	12	11	10
Input Signal No. (VTV-9000C)	13	12	11	10	9	8	7	6
System Command Number	0	0	1	0	1	0	1	0

3.5.3. Keep System Running Signal

When using the keep system running signal, the following input signal is reserved and cannot be used for any other purpose. Do not assign a function such as task activation to this signal.

Input Signal Number	Name
32 16 (VTV-9000C) 4 (VTV-9000U)	Keep system running signal

Table 14: Reserved input signal

Monitoring the Keep System Running Signal

When monitoring is enabled, VTV-9000 continuously monitors the signal during both automatic and manual operation. While the VTV-9000 system is running, external devices must continually input a Hi signal to the Keep System Running Signal input port. If for any reason, this signal changes to Lo, the VTV-9000 system will display an **Automatic System Shutdown** dialog. In this dialog, the remaining time until system shutdown is displayed, and the user can select **Immediate Shutdown** or **Notify Me Later**. If no action is taken during this time period, or if **Immediate Shutdown** is clicked, VTV-9000 will shut down and power will turn off. If **Notify Me Later** is clicked, the **Automatic System Shutdown** dialog will change to a blinking title bar, and after the specified time period, the **Automatic System Shutdown** dialog will be redisplayed.

* When dialogs such as **Import/Export**, **Edit Task**, and **Environment Settings** are displayed, the buttons in the **Automatic System Shutdown** dialog are disabled. You must first close these dialogs before you can select an option in the **Automatic System Shutdown** dialog.
* On VTV-9000U, while a BUSY signal is output, monitoring the Keep System Running Signal on VTV-9000U will be interrupted due to a hardware limitation. Use a power supply method that allows sufficient time until VTV-9000U completely shuts down.

To set monitoring of the Keep System Running Signal, select **Settings** → **Environment Settings** from the menu to display the **Environment Settings** dialog, and then select the **Automatic System Shutdown** page. On the settings page, the following settings can be set. For details, see “S001.12.14 Automatic System Shutdown” in VTV-9000 Reference.

Setting	Description
Enable monitoring of Keep System Running Signal	Sets the monitoring of the keep system running system On or Off.
Inactive period (with power failure protection)	Sets the period of time before the **Automatic System Shutdown** dialog is displayed. When the Keep System Running Signal changes to Lo, after the configured time elapses, the state of the Keep System Running Signal is reverified and if the signal is Lo, the **Automatic System Shutdown** dialog is displayed.
Automatic shutdown wait period	After the configured time elapses, the system is automatically shut down. During this period, the time before shutdown is displayed in the **Automatic System Shutdown** dialog. This is also used for the time from when the **Notify Me Later** button is pressed until the **Automatic System Shutdown** dialog is redisplayed.

Table 15: Automatic System Shutdown Settings

3.5.4. Input Signals that Become Enabled After Task Activation

These are input signals that become enabled after task activation. They should be assigned so that they do not conflict with reserved input signals. The input signals that can be assigned are shown in Table 16 below.

Input Signal Number	Description
1 to 31 1 to 15 (VTV-9000C) 1 to 3 (VTV-9000U)	Contact Input Wait. Set in **Release signal port** in the image acquisition tool.

Table 16: Input signals that become enabled after task activation

Contact Input Wait

The Contact Input Wait signal is mainly used to synchronize the acquire beginning timing with the completion of work transfer.
To use Contact Input Wait, the **Contact Input Waiting** checkbox must be enabled in the Image Acquisition tool (Figure 7). The Image Acquisition tool stops system operation until the input signal level of the Release signal port signal waiting for contact input changes from Lo to Hi or until there is a timeout.
If the initial input signal is Hi, the system operation will not be stopped and image acquisition will immediately be executed.
Contact input wait is supported in sequential acquisition (see “2.2.1. Sequential Acquisition (p.15)” and synchronization acquisition (see “2.2.2. Synchronization Acquisition (p.16)”).

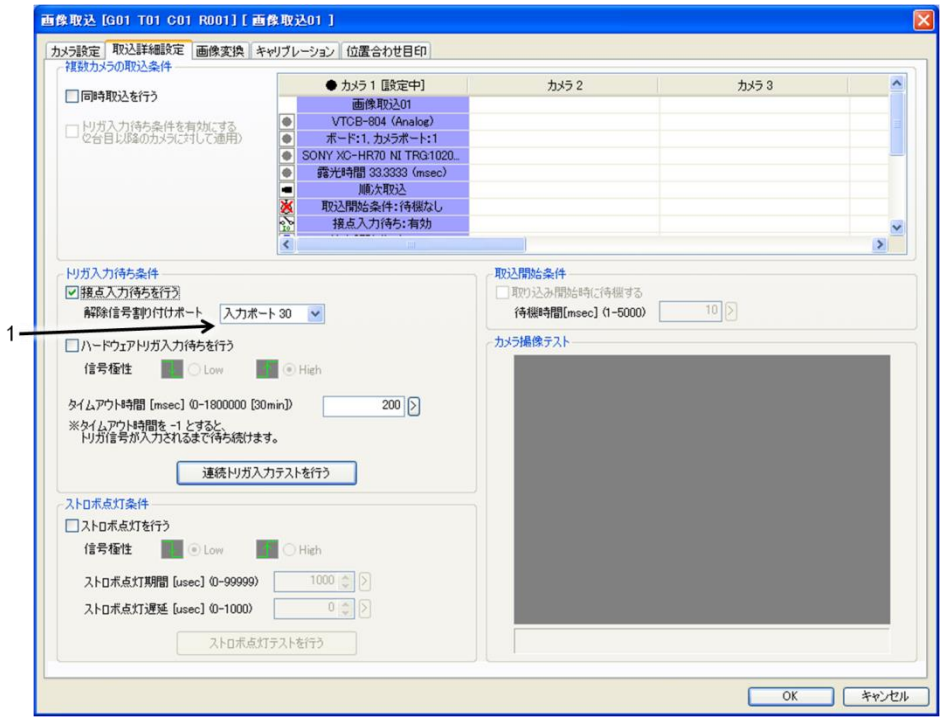
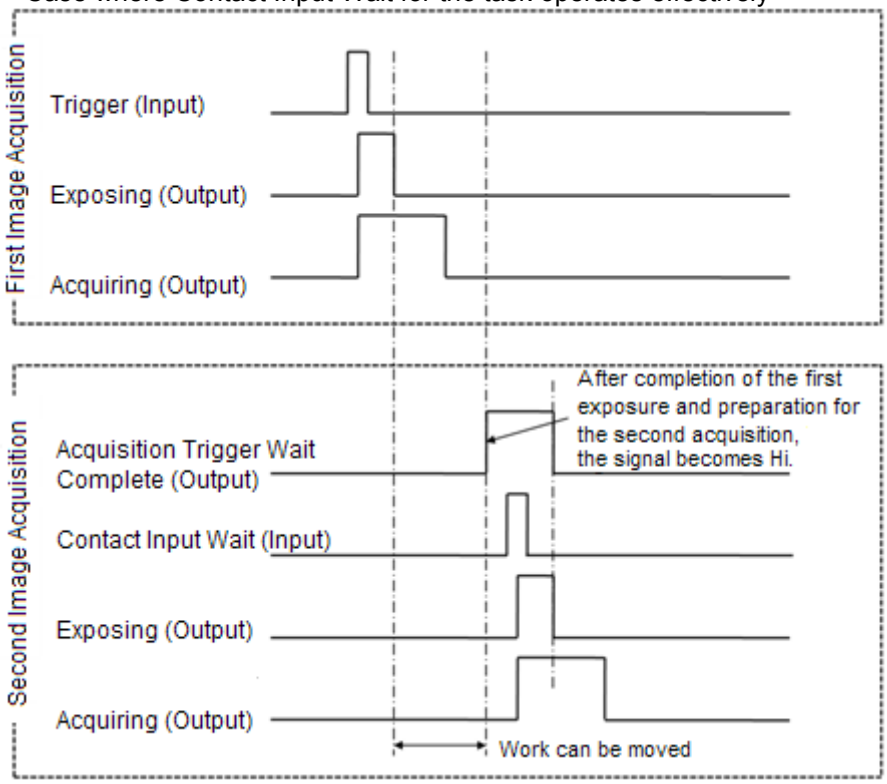


Figure 7: Setting the Release signal port

1. For the Release signal port, any input port from 1 through 31 (port 1 through port 15 for VTV-9000C, port 1 through port 3 for VTV-9000U) can be selected. The default value is Input Port 30 (Input Port 15 for VTV-9000C, Input Port 3 for VTV-9000U).

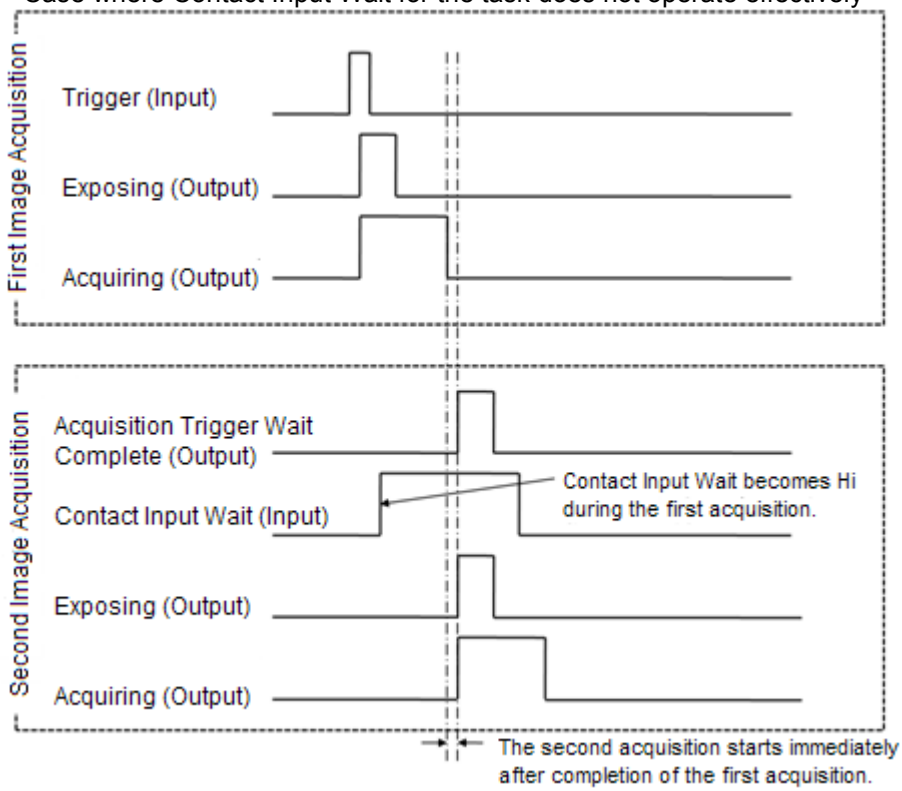
Examples which demonstrate how the task operation changes based on the input method of the Contact Input Wait signal are shown below. See “3.6. Output Signals (p.41)” for additional information.

Ex1) Case where Contact Input Wait for the task operates effectively



* After the first image acquisition is complete, the task operation stops until a Hi signal is input to Contact Input Wait or until a timeout occurs. Work can be moved during this period after the first exposing signal changes from Hi to Lo.
* By monitoring the Acquisition Trigger Wait Complete signal, you can properly determine when exposure for the first image acquisition is complete and the system is in a Contact Input Wait ready state.

Ex2) Case where Contact Input Wait for the task does not operate effectively



* After the first image acquisition is complete, a Hi signal is input for Contact Input Wait. Thus, the second image acquisition is performed immediately after the first image acquisition. The Contact Input Wait is not effective in this example.
* When using Contact Input Wait, it is recommended to perform a handshake using the Acquisition Trigger Wait Complete signal.

When acquiring images from multiple cameras simultaneously, in order to input a trigger signal for acquiring images from individual cameras, set all of the Image Acquisition tools to synchronization acquisition and enable Contact Input Wait in each tool (Figure 8). For example, this can be used for acquiring images from multiple cameras with different lighting requirements.

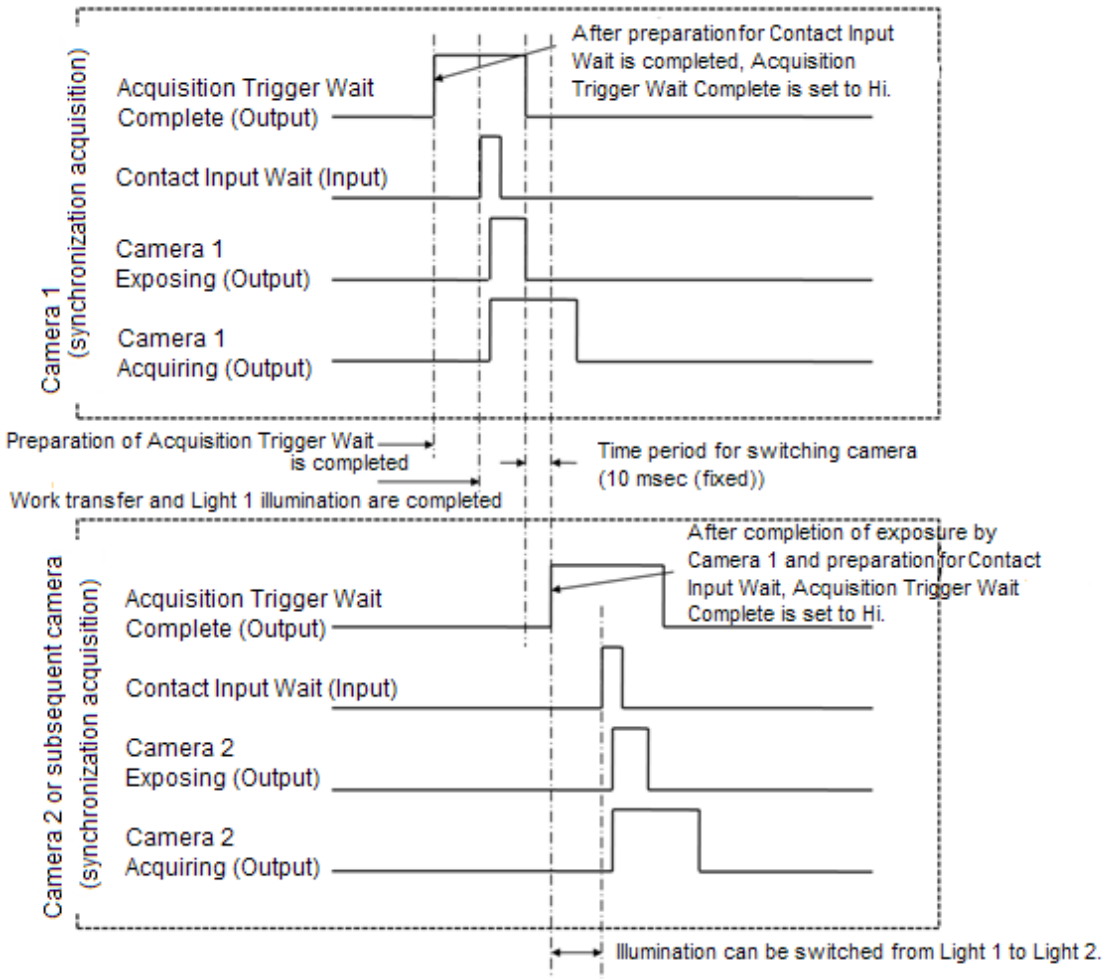


Figure 8: Contact Input Wait timing chart for synchronization acquisition

The Image Acquisition tools can be set as follows:

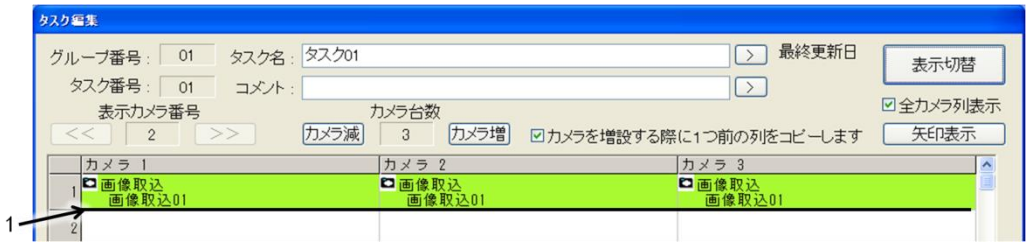


Figure 9: Setting the Image Acquisition tools

1. Insert the Image Acquisition tools in the same row.

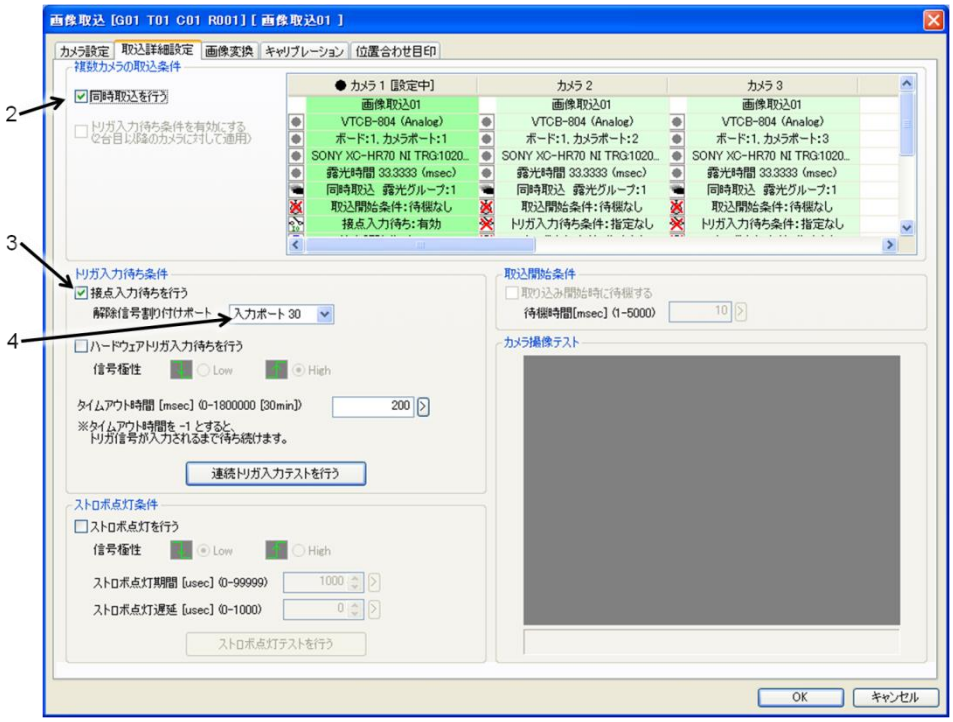


Figure 10: Detailed Acquisition Settings tab for Camera 1 Image Acquisition tool

2. Enable the **Synchronization Acquisition** checkbox.
3. Enable the **Contact Input Waiting** checkbox.
4. In **Release signal port**, select the input port for releasing Contact Input Wait.

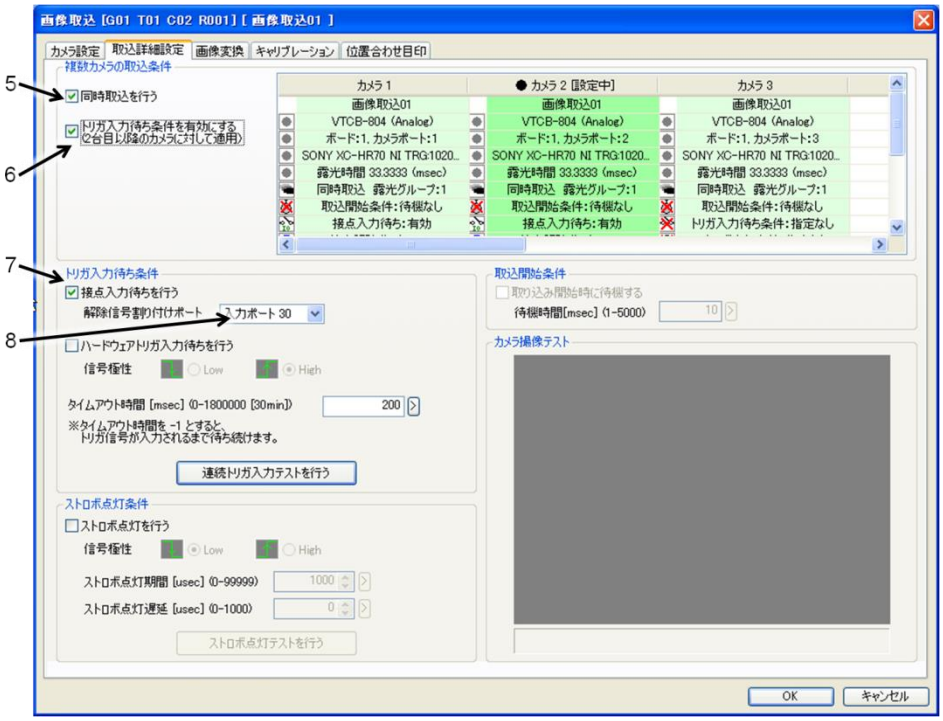


Figure 11: Detailed Acquisition Settings tab for Camera 2 (and subsequent Camera) Image Acquisition tool

5. Enable the **Synchronization Acquisition** checkbox.
6. Enable the **Use Trigger Properties** checkbox.
   For the second camera and subsequent cameras, if this checkbox is not enabled, Contact Input Wait will not be enabled.
7. Enable the **Contact Input Waiting** checkbox.
8. In **Release signal port**, select the input port for releasing Contact Input Wait.
   This can be set to the same input port as Camera 1, but the Contact Input Wait signal level must be changed from Hi to Lo.

* For the input port number specified in Release signal port, make sure that a port used for another signal is not used.

3.5.5. Digital Filter

The digital filter is a function in which if the change in an input signal lasts for a set period of time, it is assumed that the signal state has changed.
This enables you to prevent erroneous operation caused by short period changes in an input signal due to chattering or nose. However, the response to the input signal will be delayed for the set period.
This is set in **Parallel I/O Settings → Digital Filter** in the **Environment Settings → Trigger** tab.

* In VTV-9000U Ver4.2.0 Build 1 or later, a software-controlled digital filter can be used.
Note the following differences between the digital filter for VTV-9000U from the digital filter for VTV-9000ST, VTV-9000mini, and VTV-9000V.

- The margin of error for digital filter time of 128usec or less is approximately 10usec.
- The response timing after the digital filter is different.

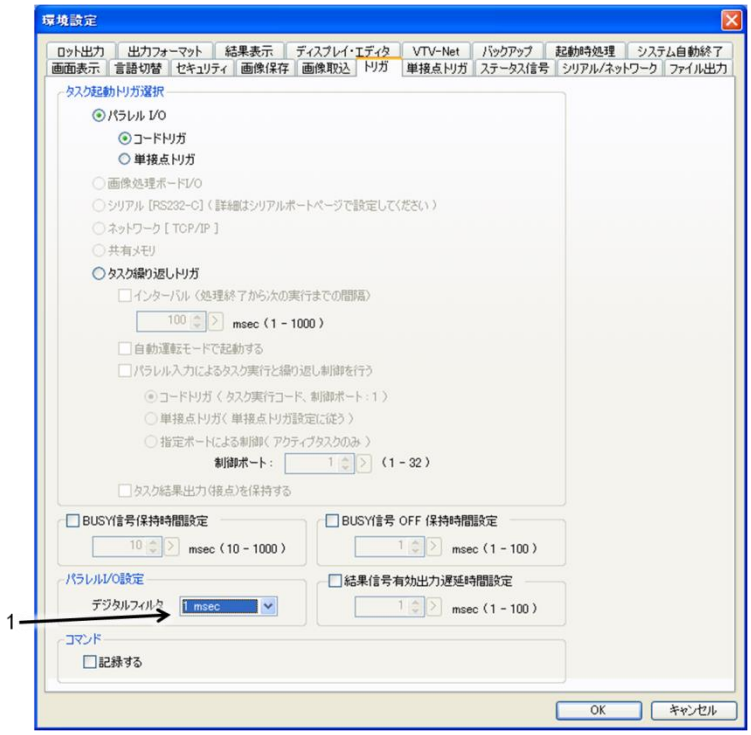


Figure 12: Digital filter settings

1. Set the filtering time.

3.6. Output Signals

3.6.1. Default Values

The default value for each pin and output is shown below. Some of the assigned output signals can be changed on a system level, and others can be changed on a task level. For information regarding the reassignment of output signals, see ”3.6.3. Reassignment of Output Signals (p.44)”.

As an example, the default values for VTV-9000mini-4C, VTV-9000-4C, and VTV-9000U-1C are shown below in Table 17 through Table 19.

VTV-9000mini-4C

Signal Name	Output	Signal Name	Output
OUT1	--	OUT17	--
OUT2	Auto Mode	OUT18	--
OUT3	BUSY	OUT19	--
OUT4	Port 1 Exposing	OUT20	--
OUT5	Port 2 Exposing	OUT21	--
OUT6	Port 3 Exposing	OUT22	--
OUT7	Port 4 Exposing	OUT23	--
OUT8	--	OUT24	--
OUT9	--	OUT25	--
OUT10	--	OUT26	--
OUT11	--	OUT27	--
OUT12	--	OUT28	Exposing Group
OUT13	--	OUT29	Enable Results Signal
OUT14	--	OUT30	Error
OUT15	--	OUT31	Acquisition Trigger Wait Complete
OUT16	--	OUT32	PC Control

Table 17: Default output signals for VTV-9000mini-4C

If the supported number of cameras is 4 or less, the Exposing signals are all automatically assigned to OUT4, OUT5, OUT6 and OUT7. If the supported number of cameras is 5 or more, the user must manually assign the signals for the 5th camera onward.

VTV-9000C-4C

Signal Name	Output	Signal Name	Output
OUT1	--	OUT9	--
OUT2	Auto Mode	OUT10	--
OUT3	BUSY	OUT11	--
OUT4	Port 1 Exposing	OUT12	Exposing Group
OUT5	Port 2 Exposing	OUT13	Enable Results Signal
OUT6	Port 3 Exposing	OUT14	Error
OUT7	Port 4 Exposing	OUT15	Acquisition Trigger Wait Complete
OUT8	--	OUT16	PC Control

Table 18: Default output signals for VTV-9000C

VTV-9000U-1C

Signal Name	Output
OUT1	BUSY
OUT2	Port 1 Exposing
OUT3	Enable Results Signal
OUT4	--

Table 19: Default output signals for VTV-9000U

3.6.2. Output

The available output for the VTV-9000 is described below.

Auto Mode

This signal turns ON while the VTV-9000 is in automatic operation mode. The signal is not output during manual operation.

BUSY

This signal is output while the series of processes including image acquisition and image processing is being performed on VTV-9000.
Note that the BUSY signal will be output until the image updating process is complete. If you would like to immediately use the results after image processing is complete, use the Enable Results Signal (p.43).
There are cases where after trigger input there may be a delay of up to 5 ms (10ms for VTV-9000U) until a BUSY signal is output. Note that depending on the task configuration, after a BUSY signal is output, there may be a delay of several 10 ms before the first Exposing signal and Acquiring signal are output. For details, see “3.11. DIO Monitor Screen (p.50)”. For signal timing, see “3.9. Timing Chart (p.47)”.

Keep BUSY ON Time Setting

If the process time is too short to detect the ON state of the BUSY signal, set the minimum time to keep the BUSY signal ON in **Keep BUSY ON Time Setting** in the **Environment Settings → Trigger** tab.

Keep BUSY OFF Time Setting

If the time from when the BUSY signal turns OFF until the next trigger input turns it ON is too short to detect the OFF state of the BUSY signal, set the time to keep the BUSY signal OFF in **Keep BUSY OFF Time Setting** in the **Environment Settings → Trigger** tab. Note that triggers that are input during the Keep BUSY OFF time period are not effective. Also note that if **Task Repeat Trigger** is selected as the task activation trigger, this function is disabled.

Enable Results Signal

This signal is output when the image processing results (OK, NG (failed), etc.) are ready for viewing. It turns ON before the BUSY signal turns OFF. The BUSY signal turns OFF only after all image processing and image drawing processes are complete. This signal can be used when it is difficult to detect changes in the BUSY signal. It turns OFF when the next trigger is input.

Enable Results Signal Output Delay Setting

Normally, the Enable Results Signal turns ON immediately after the image processing results signal is output. However, on some devices, there are cases where correct results cannot be obtained when the results signal is verified at the time the Enable Results Signal turns ON. In such a case, it is effective to increase the time from when the results signal is output until the Enable Results Signal turns ON in **Enable Results Signal Output Delay Setting** on the **Trigger** tab in Environment Settings. However, note that the process time will increase by the amount of time that is set.

Error

This signal is output if an error occurs during automatic operation. For details, see “3.5.2. Code Trigger (p.27)”. If the Error signal turns ON, the Enable Results Signal will not turn ON. The Error signal will turn OFF when the next trigger is input.

Acquisition Trigger Wait Complete

A notification signal that indicates that the system is ready to acquire images from the camera when contact input wait or hardware trigger is set in the image acquisition tool. If a contact input wait release signal or a hardware trigger release signal is input before this signal turns ON, camera images cannot be acquired properly.
For the general timing chart, see “3.5.4 Contact Input Wait (p.34)”.

PC Control

This signal is output from when the VTV-9000 system is started to when the OS is shutdown. Note that the signal starts being output not after the PC or OS is started but after the VTV-9000 system is started.

Exposing

This signal is output while a camera is exposing. This signal is output for each camera connected to VTV-9000. While the Exposing signal is ON, work should be paused.

Exposing Group

This signal is output when a group of cameras connected to VTV-9000 is exposing. When multiple cameras are used to acquire images simultaneously, this signal can be used so that only one signal line is necessary.

Acquiring

This signal is output from the start to end of acquiring an image from a camera (including exposure). The signal is output for each camera connected to the VTV-9000.
For details regarding signal timing, see “3.9. Timing Chart (p.47)”.

Other

This signal output can be freely assigned by the user for outputting the execution results (OK, NG (failed), etc.) of tools, etc.
It turns OFF when the next trigger is input.

3.6.3. Reassignment of Output Signals

There are output signals that can be reassigned for the overall system and others that can be reassigned on a task basis. The output signals that can be reassigned are shown in Table 20 below.

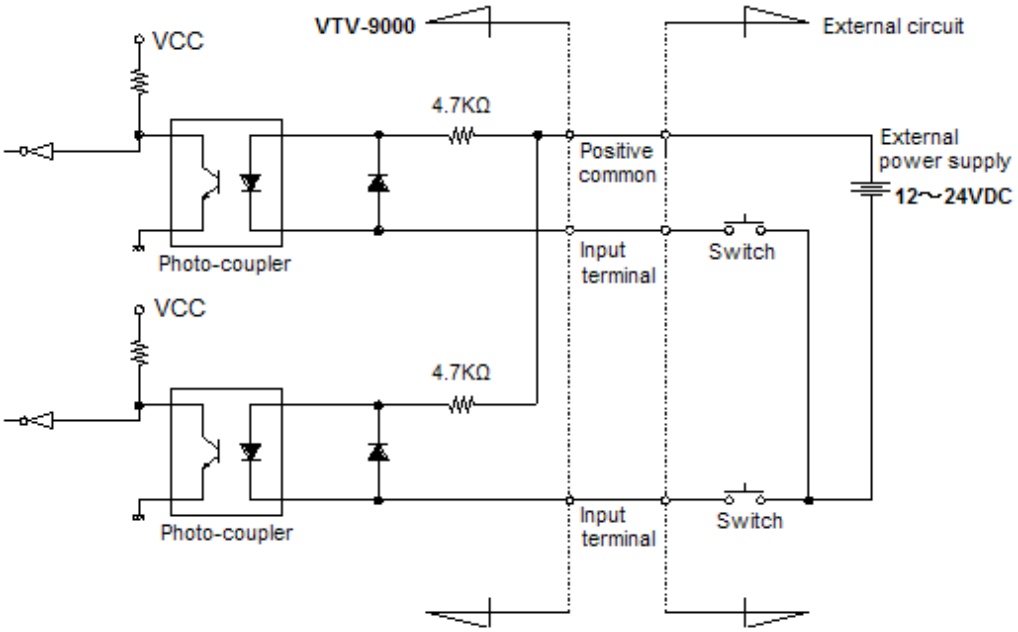
Output	Overall system	Per Task
BUSY	✓	×
Auto Mode	✓	×
Enable Results Signal	✓	×
Error	✓	×
PC Control	✓	×
Acquisition Trigger Wait Complete	✓	×
Acquiring Image	✓	×
Exposing	✓	×
Exposing Group	✓	×
Other (OK, NG, etc.)	×	✓

Table 20: Output signals that can be reassigned

3.7. Circuit Diagrams

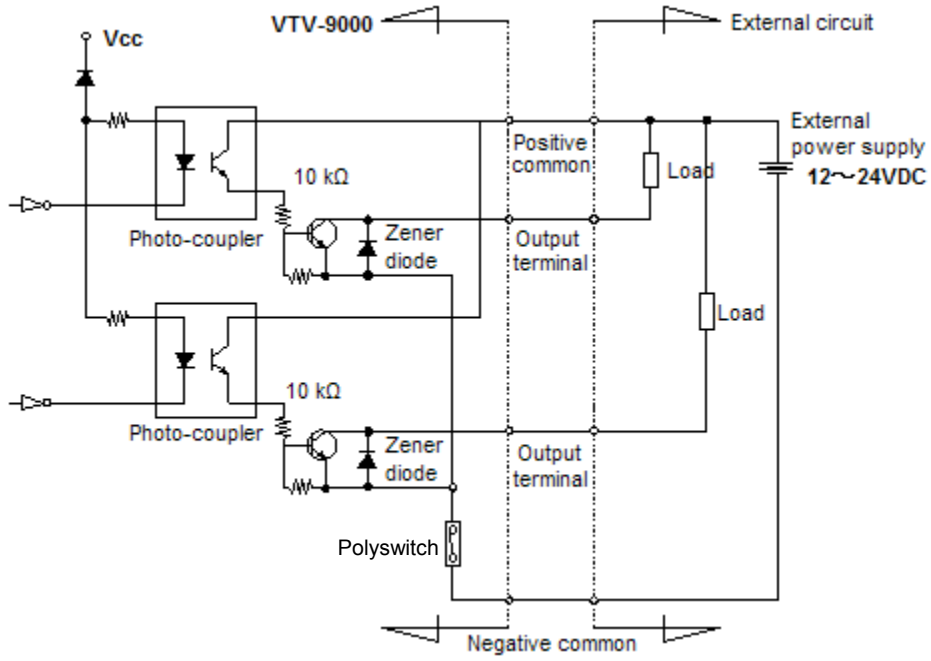
*For VTV-900C, see “VTV-9000 Hardware Guide E”. For VTV-9000U, See” VTV-9000U Hardware Guide”. For VTV-9000mini, see “VTV-9000 Hardware Guide D” and “VTV-9000mini Hardware Guide”.

3.7.1. Example of an Input Circuit



* IN1+24V, IN2+24V terminals are used as positive common terminals.
* IN1+24V corresponds to inputs 1 to 16, and IN2+24V corresponds to inputs 17 to 32.

3.7.2. Example of an Output Circuit



* OUT1+24V/OUT2+24V terminals are used as positive common terminals and OUT1GND/OUT2GND terminals are used as negative common terminals.
* OUT1+24V/OUT1GND corresponds to outputs 1 to 16, and OUT2+24V/OUT2GND corresponds to outputs 17 to 32.

3.8. Specifications

*For VTV-9000C, see “VTV-9000 Hardware Guide E”. For VTV-9000U, See” VTV-9000U Hardware Guide”. For VTV-9000mini, see “VTV-9000 Hardware Guide D” and “VTV-9000mini Hardware Guide”.

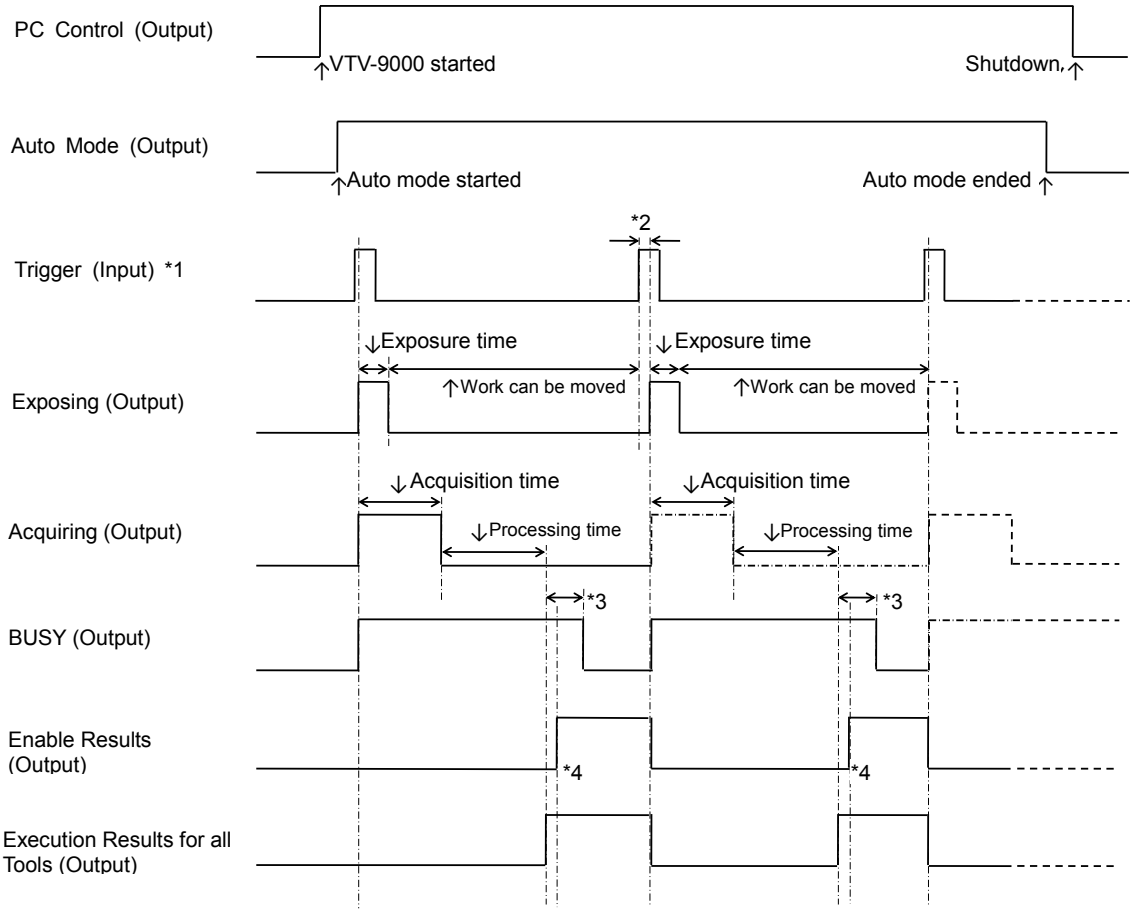
Item	Specification
Input type	Photo-coupler isolated input (negative logic *1)
Number of input signal channels	32 channels
Input resistance	4.7kΩ
Input ON current	2.0mA or more
Input OFF current	0.16mA or less
Interrupt	Generated at the falling (High → Low) edge
Input response time	Within 200 μsec
Output type	Photo-coupler isolated open-collector (current sink) output (negative logic *1)
Number of output signal channels	32 channels
Output withstand voltage (rated output)	Maximum 35VDC
Output current (rated output)	Maximum 100mA (per channel)
Residual voltage with output ON	0.5V or less (when output current is 50mA or less), 1.0V or less (when output current is 100mA or less)
Surge protector	Zener diode RD47FM (NEC) or equivalent
Output response time	Within 200 μsec
External circuit power supply	12 to 24VDC (± 10%)
Power consumption	5VDC 250mA (Max.)

*1 Data “0” corresponds to a Hi level and Data “1” corresponds to a Lo level.

3.9. Timing Chart

3.9.1. Image Acquisition Using a Trigger

The following is a timing chart in the case where a task is executed using a trigger (task activation). If accurate timing is necessary for processing, see “3.9.2. Image Acquisition Using Contact Input Wait (p.48)”.



*1 Trigger used to activate the task. This trigger will vary depending on the type of the input signal selected. For details, see “3.5. Input Signals (p.26)”.

*2 There may be a delay of up to 5 ms (10ms for VTV-9000U) from the time the trigger signal is input until the BUSY signal is output. Note that depending on the task configuration, after a BUSY signal is output, there may be a delay of several 10 ms before the first Exposing signal and Acquiring signal are output. Therefore, it is advisable to monitor the Exposing signal and Acquiring signal output from VTV-9000. In addition, when a task is not loaded in the memory, time to load the task is required.

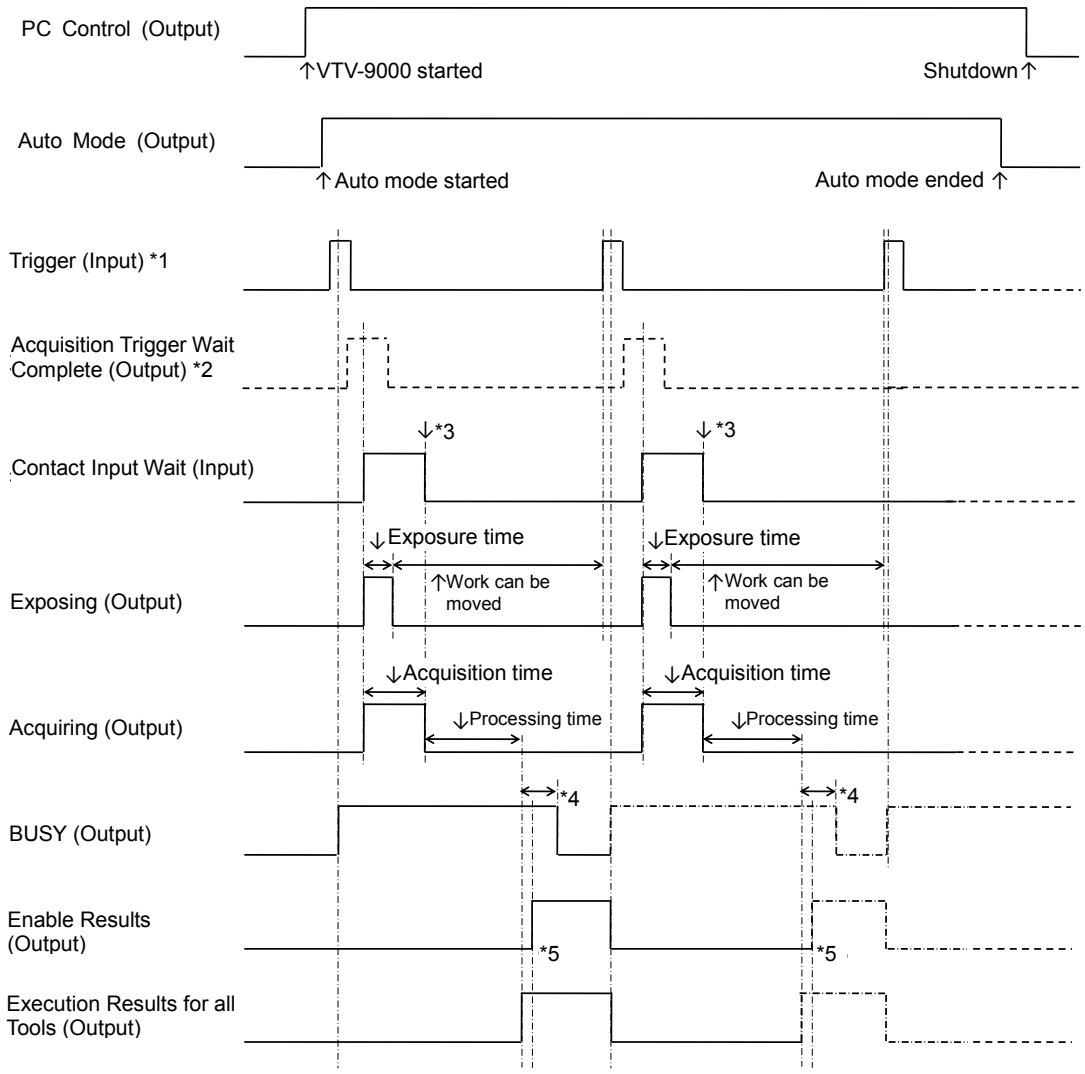
*3 Time for processing the screen update, serial output, and file output.

*4 The sequence of processing is as follows: output of the execution results of all tools → Enable Results Signal ON → BUSY OFF.

*5 When the **DIO Monitor Screen** (see “3.11. DIO Monitor Screen (p.50)”) is used, a significant delay may occur before the BUSY signal is output. For details, see “3.6. Output Signals (p.41)”.

3.9.2. Image Acquisition Using Contact Input Wait

The timing of the image acquisition can be controlled on a millisecond level by using the Contact Input Wait function of the image acquisition tool which uses a trigger (task activation).



*1 A trigger is used to activate the task. The trigger will vary depending on the type of input signal selected. For details, see “3.5. Input Signals (p.26)”.

*2 It is recommended to use the Contact Input Wait signal together with the Acquisition Trigger Wait Complete signal. For details, see “3.5.4 Input Signals that Become Enabled After Task Activation - Contact Input Wait (p.34)” and “3.6.2. Output - Acquisition Trigger Wait Complete (p.43)”. The delay is 1 ms or less from the time the Contact Input Wait signal is input until the Exposing signal and the Acquiring signal are output.

*3 It is recommended to set the timing that the Contact Input Wait signal changes to Lo so that it corresponds with the timing that the Acquiring signal changes to Lo.

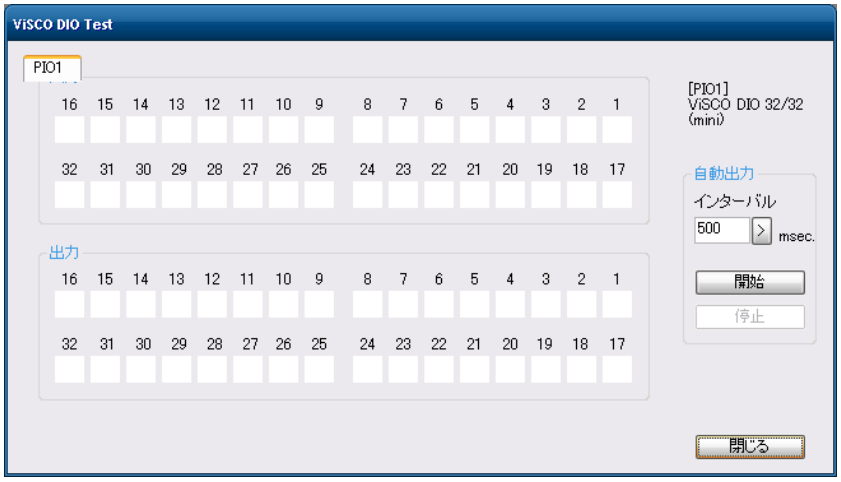
*4 Time for processing the screen update, serial output, and file output.

*5 The sequence of processing is as follows: output of the execution results of all tools → Enable Results Signal ON → BUSY OFF.

3.10. DIO Diagnosis Tool

1. From the **Tools** menu, click on **DIO Diagnosis Tool**.

2. The following dialog will be displayed.



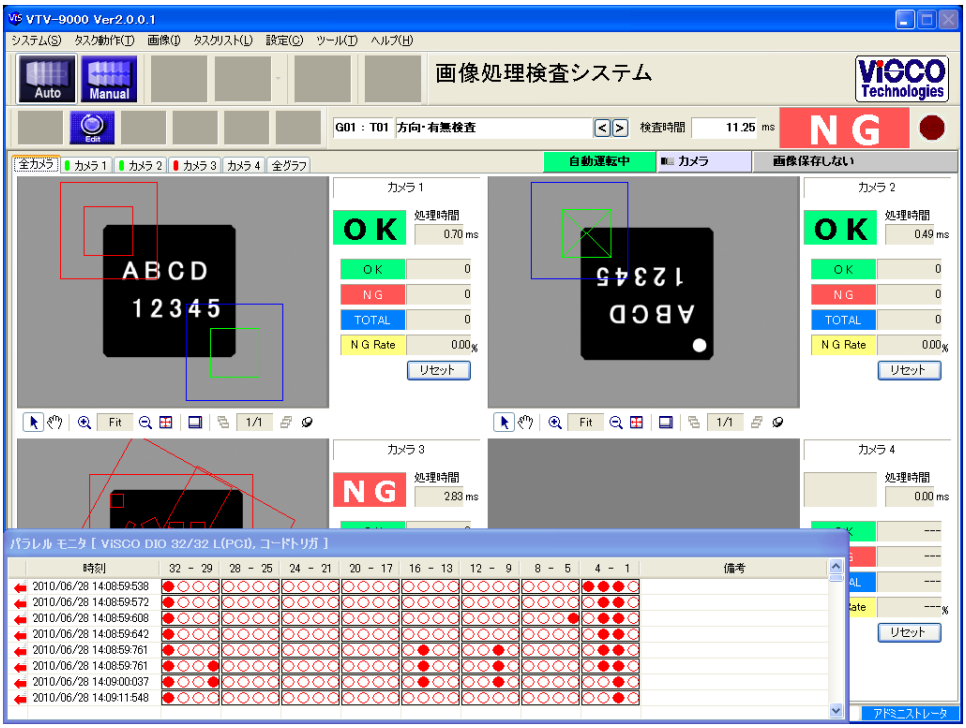
3. Under **Input (→ VTV port)**, the ports receiving external input signals will be displayed in red. Under **Output (VTV port →)**, when you click on any port number, the signals are output to an external device. When you click the **Start Auto-Output** button, the signals will be sequentially output from Port 1 at the interval set in **Interval**. When you click the **Stop Auto-Output** button, the signal output will be stopped.

3.11. DIO Monitor Screen

In the DIO Monitor Screen, the parallel I/O can be monitored in Auto mode. For information regarding parallel input control code, see 3.5.2. Code Trigger (p.27).

(1) From the **Tools** menu, click on **DIO Monitor Screen**.

(2) When switched to Auto mode, the **Parallel Monitor** screen will be displayed as the DIO Monitor Screen.



Note: The time displayed in the DIO Monitor Screen is not accurate. Use this information only as a guideline. If accurate timing is necessary, you must measure the signal timing using an oscilloscope or similar device.

3.12. DIO Unit with USB Interface

The number of DIO ports can be increased by using a DIO unit with USB interface ("USB-DIO" below).
*Only the VTV-9000C supports a USB-DIO connection.
VTV-9000C has 16 DIO input channels and 16 DIO output channels. By connecting a USB-DIO, you can select between 16 input channels and 32 input channels, and expand output channels to a maximum of 80 channels. When 32 input channels is selected, the settings for 32 channels are used for code triggers and the Keep System Running signal.

Only the following USB-DIO models designated by our company are supported.

Supported devices

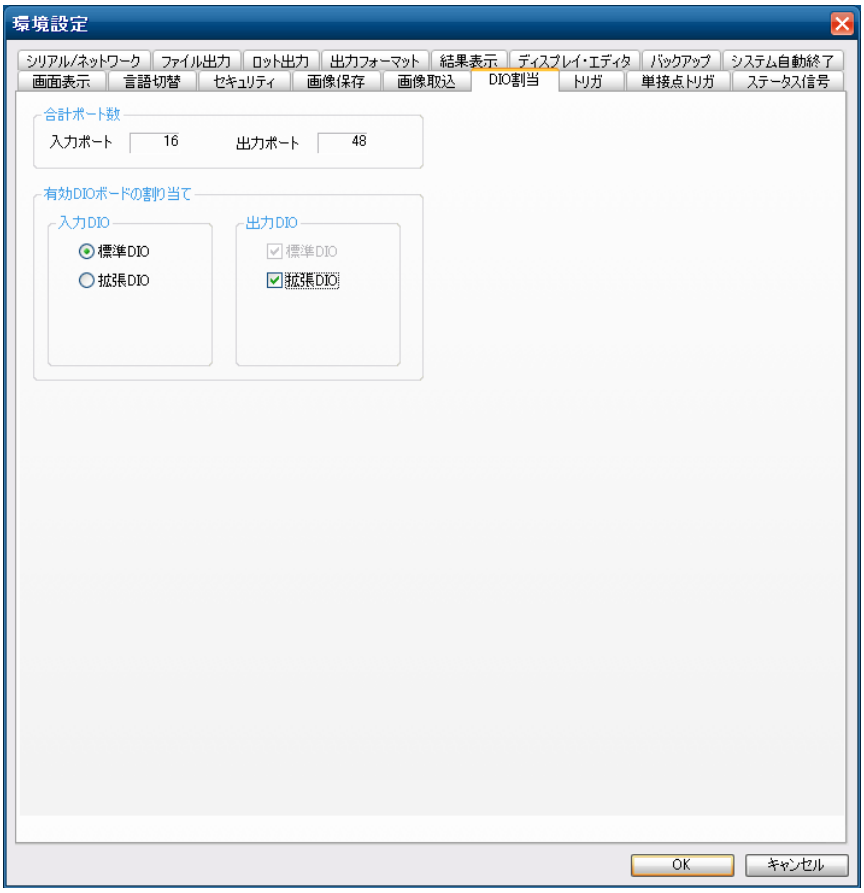
Manufacturer	Product Name
Contec	USB I/O Unit X-series Isolated Digital I/O Unit DIO-3232LX-USB

Main Specifications of USB-DIO	Description
Number of contacts per device	32 input channels, 32 output channels
Maximum number that can be connected	2 units
Connection method	Method 1 Connect a single USB-DIO to the USB port on the VTV-9000C unit (A maximum of 2 ports can be used).
	Method 2 Connect the first USB-DIO to a USB port on the VTV-9000C unit and the second USB-DIO to the A connector (USB hub function) on the first USB-DIO. * When connecting two USB-DIOs using method 2, an external power source for the USB-DIOs is necessary.

*The USB-DIO interface connector is compatible with parallel I/O (32 input channels and 32 output channels) external to the VTV-9000C unit. For information regarding the pinout, connectors, cables, and I/O circuits, see "3. Parallel I/O (p.22)".
*For the detailed connection method and use method, see the manual that comes with USB-DIO.
*When connecting the unit, it is not necessary to run the setup on the CD that comes with the unit. VTV-9000C is setup with the drivers that are on the CD and the USB-DIO can be used simply by connecting the cables.

3.12.1. DIO Assignment Function

After connecting a USB-DIO, use this function to enable the DIO board so that it can be used. When a USB-DIO is connected, the Environment Settings → DIO Assignment tab will be displayed.



DIO that is equipped on VTV-9000 is displayed on the screen as follows:

Standard DIO	DIO that is standard equipped on VTV-9000
Enhanced DIO	First USB-DIO
Enhanced DIO2	Second USB-DIO

Use the following steps to select an enabled DIO board.
For **Assignment of enabled DIO board**
(1) First select the input DIO. The selectable output DIO will change based on the selected input DIO.
(2) Select the output DIO.

The combinations of DIO that can be selected are as follows (For each input DIO selection, the selectable output DIO is shown).

Output DIO / Input DIO	Standard DIO	Enhanced DIO	Enhanced DIO2
Standard DIO is selected	◎	○	△
Enhanced DIO is selected	×	◎	○

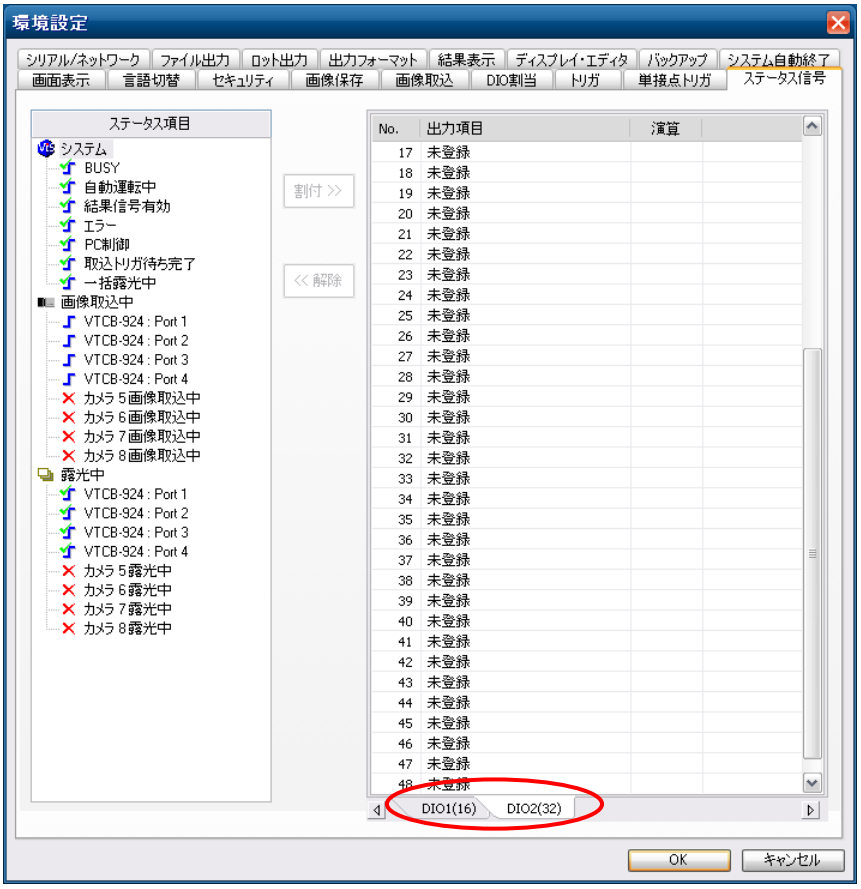
◎ Always selected (selection cannot be disabled)
○ Selectable
△ Selectable when enhanced DIO is selected
× Not selectable

When multiple DIO are set as an enabled DIO board, for all ports that can be used, a port number is assigned sequentially from port 1. The sequence of port numbering is as follows: Standard DIO → Enhanced DIO → Enhanced DIO2.

*Only the first USB-DIO can be selected as the enhanced DIO for input DIO.
*When you click the OK button on the Environment Settings dialog, the changes made to the DIO assignment will be reflected onto the system. However, for other related functions in Environment Settings (single contact trigger and status signal), the DIO assignment changes will be reflected when you switch the tab.
*The DIO Assignment page is not displayed when a USB-DIO is not connected.

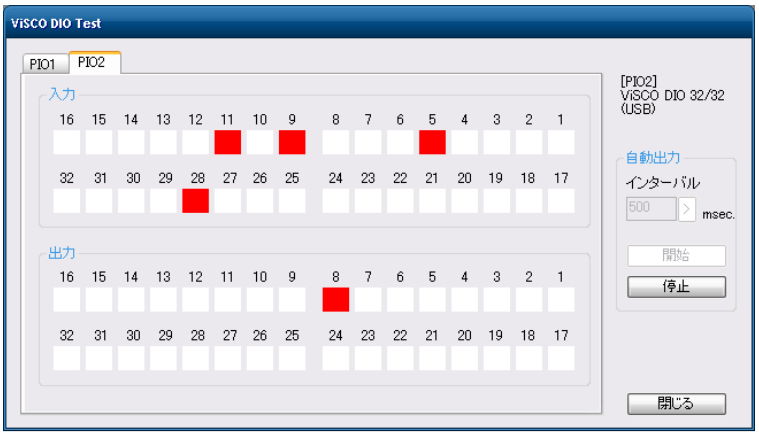
3.12.2. Output Port List

A tab will be displayed for each DIO board. When you click a tab, the first port of the corresponding DIO board will be displayed at the top of the list. Even if a USB-DIO is connected, if multiple DIO boards are not enabled in DIO assignment, the tabs will not appear.



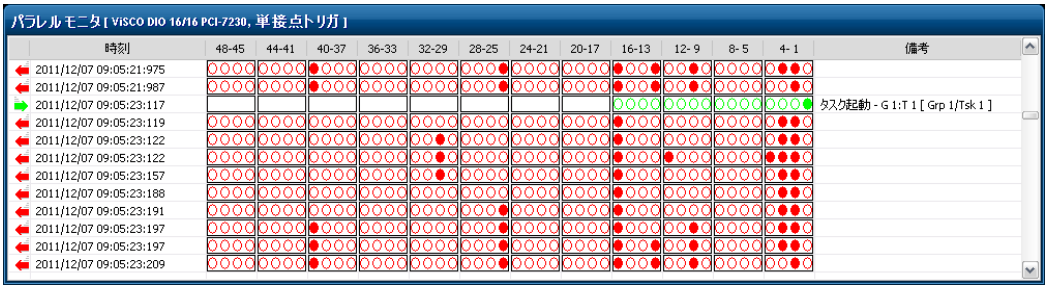
3.12.3. DIO Diagnosis Tool

When multiple DIO boards are connected, a tab is displayed for each DIO board. Diagnosis can be performed on the selected DIO board.



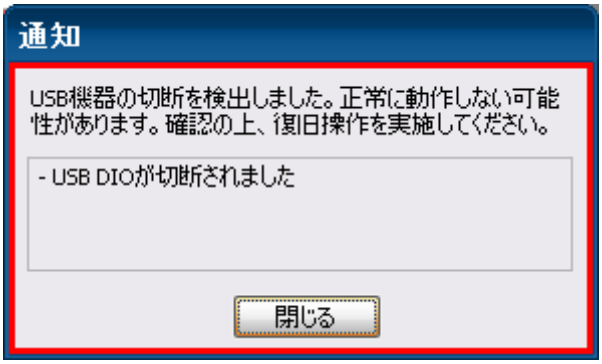
3.12.4. DIO Monitor Screen

A list of the status of all ports that are used can be displayed. However, when there are many ports, the DIO Monitor window needs to be expanded or scrolled horizontally to view all of the ports.

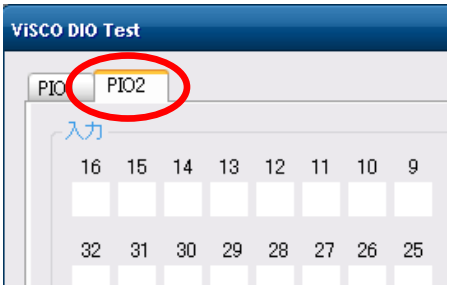


3.12.5. Reconnecting a USB-DIO (Recovery Method when USB Connection is Lost)

If a USB-DIO becomes disconnected due to a faulty USB cable or unplugged cable, a dialog notifying the USB device disconnection will be displayed. If this dialog is displayed, use the following steps for recovery.



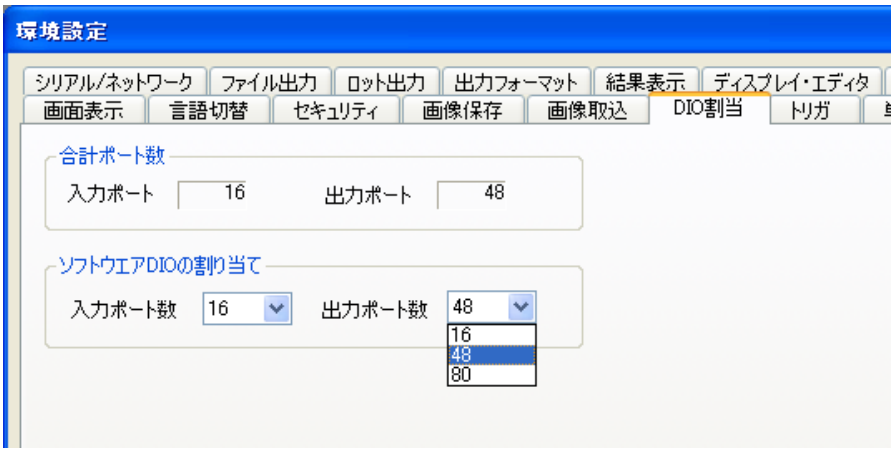
(1) Click the **Close** button to close the above notification dialog.
(2) If the system is in automatic operation (Auto mode), change it back to Manual mode.
(3) Reconnect the USB-DIO to the USB port of the VTV-9000 unit.
(4) From the menu, select Tools - DIO Diagnosis Tool.
(5) When the DIO Diagnosis dialog is displayed, the connected DIO board will be initialized. If a tab that corresponds to the reconnected USB-DIO is displayed, the reconnection is complete.



Cautionary Notes Regarding Reconnection
If the VTV-9000 application finishes abnormally when a USB-DIO is connected, you must shutdown VTV-9000 and power it OFF before restarting. Simply restarting the application software may not allow you to use the USB-DIO.

3.12.6. DIO Assignment Function During Offline Operation

With an offline license, when executed on a PC with no DIO hardware, it is possible to set the number of DIO ports from Environment Settings → DIO Assignment.



4. Hardware Triggers and Strobe Lighting

Hardware triggers and strobe lighting are used to perform high-speed camera imaging for work that cannot be fed intermittently (i.e. stopping the work movement at regular intervals for feeding). The same equipment is used for both, and it is possible to use either one separately.

Hardware Triggers

The process of signal input up to camera imaging is performed using only hardware. This signal input is called hardware trigger input.
Compared to trigger input for task activation, since there is no software operation involved, the time from hardware trigger input up to camera imaging is shorter and there is less variance. Using this method, for example, it is possible to use a photoelectric sensor to coordinate camera imaging with the timing that the work passes through the camera field of view.

Strobe Lighting

A signal is output to coordinate strobe lighting with the camera imaging timing. For work moving at a high speed, it is possible to acquire more stable images.

4.1. Necessary Equipment

Since instead of a regular DIO port, a dedicated I/O (hardware I/O) port is used for hardware triggers and strobe lighting, the following equipment is necessary.

1. VTV-9000 with a hardware I/O port
2. Dedicated trigger cable
3. Flash Light Controller VTVFC-V Series
   Or
4. Hardware trigger terminal block

For details regarding purchase, please contact our sales division.
For 1 and 2, there are several possible combinations based on the image acquisition board installed in VTV-9000 and the shape of the chassis.
3 and 4 can be selected based on your needs.
3 is a flash light controller designed specifically for the VTV-9000 series and manufactured by our company. For details, please contact our sales division.
4 should be used if only hardware triggers will be used or if you already own strobe equipment. The power supply method will vary based on the image acquisition board. For details, see the Hardware Guide.

Hardware Trigger Terminal Block Part Number	Product Name
VTVIO-OP-44-00	Opto-Isolated Terminal Block 4/4CH
800-5712-3R*	Opto-Isolated Terminal Block

Table 21: Hardware Trigger Terminal Block Part Number

* 800-5712-3R is no longer supported. Only limited VTV-9000 models support this hardware. Detailed information is not available in the setup guide or hardware guide.
The main differences with the currently supported VTVIO-OP-44-00 are as follows:
1) There are 8 input and 8 output terminals (No.0 to 7). 4 to 7 should be used.
2) The dedicated trigger cable and the shape of the connector for connecting the cable are different.

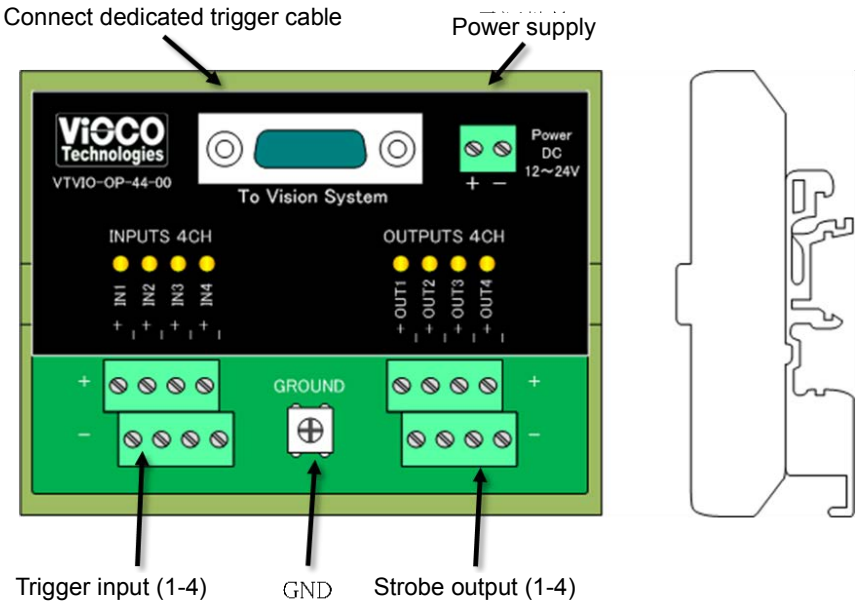


Figure 13: Hardware Trigger Terminal Block VTVIO-OP-44-00

4.2. Configuration of Equipment

For hardware trigger input, make the connections as shown in Figure 14, and for strobe output, make the connections as shown in Figure 15.
The supported number of trigger inputs, number of strobe outputs, the dedicated trigger cable part number, and use/non-use of the power supply terminal will vary depending on the type of image acquisition board used. For details, see the Hardware Guide.

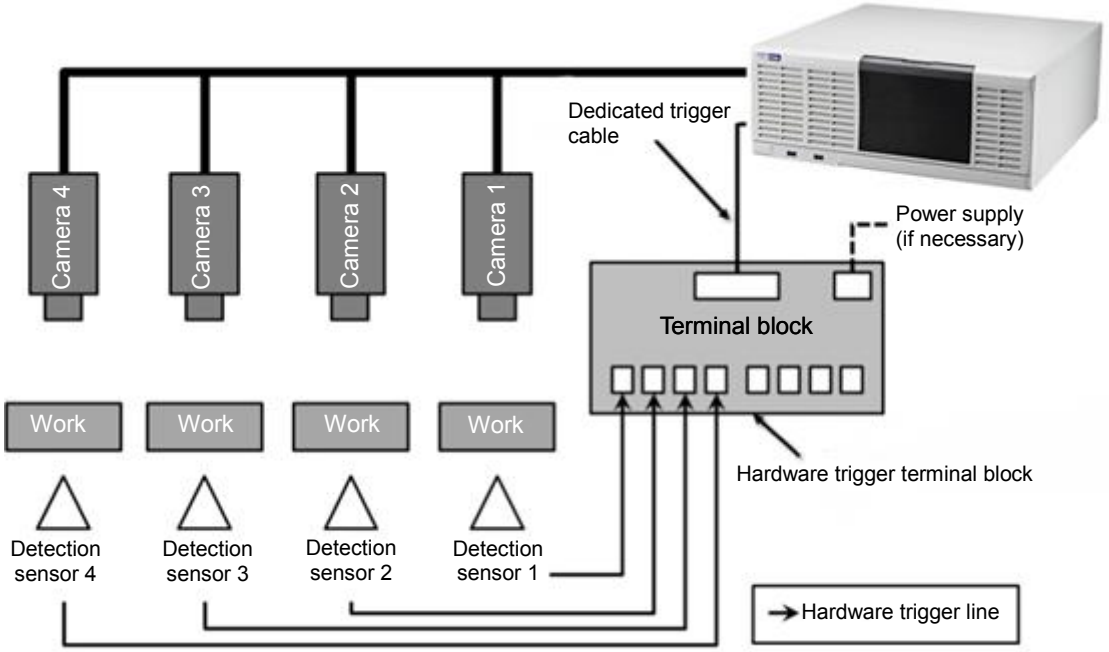


Figure 14: Hardware Trigger Input System Configuration Diagram

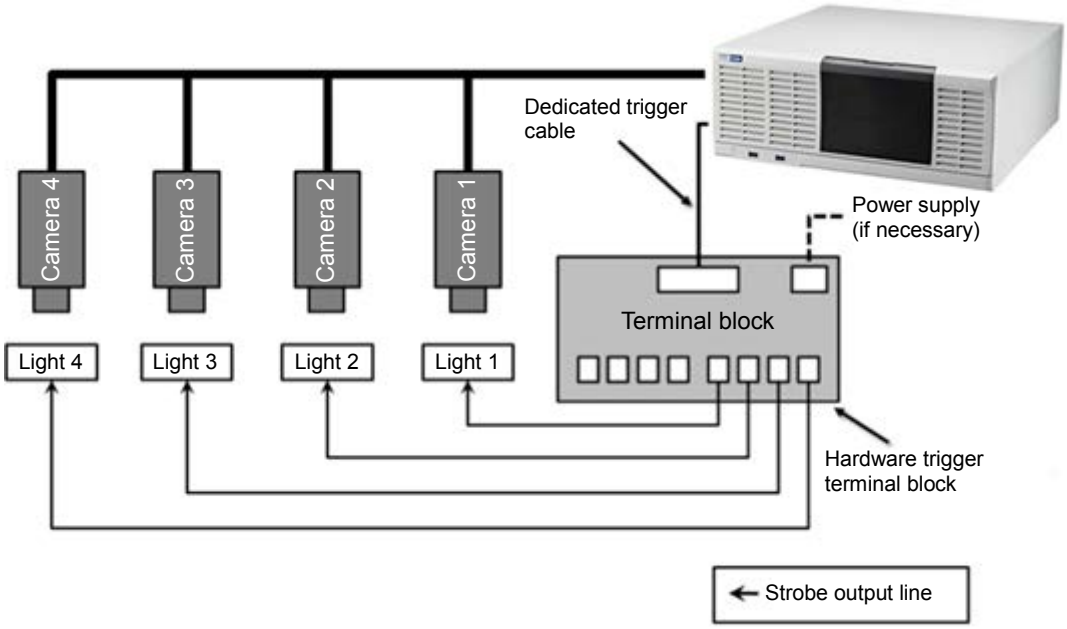


Figure 15: Strobe Output System Configuration Diagram

4.3. Hardware Trigger Terminal Block Circuit Diagram

Wire the hardware trigger terminal block, trigger input, and strobe output as in Figure 16. For both input and output signal lines, connect the signal supply side to the positive terminal and connect the draw side to the negative terminal.

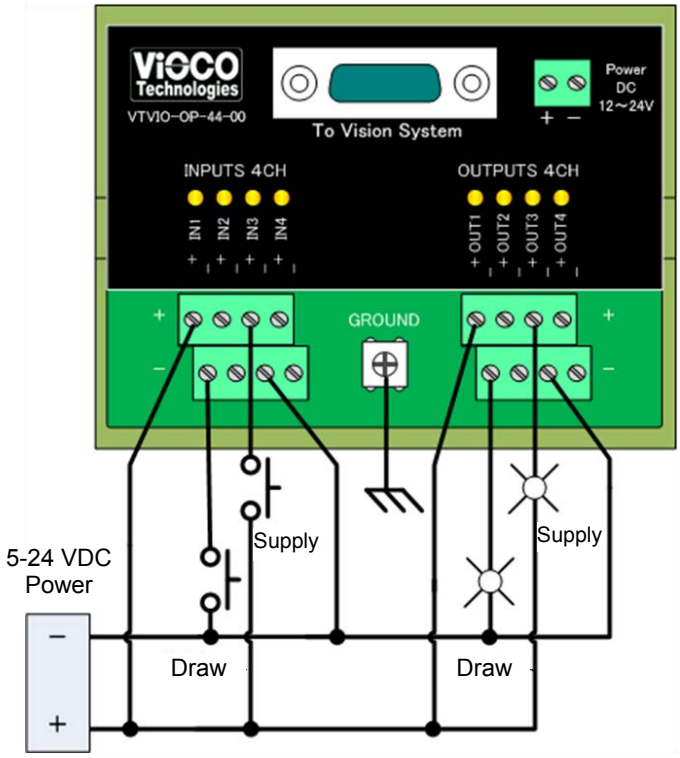
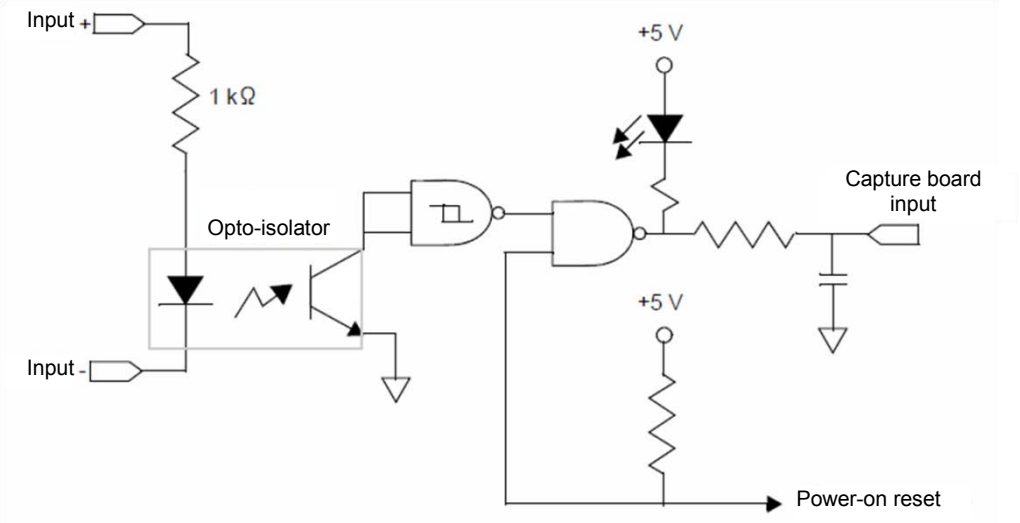
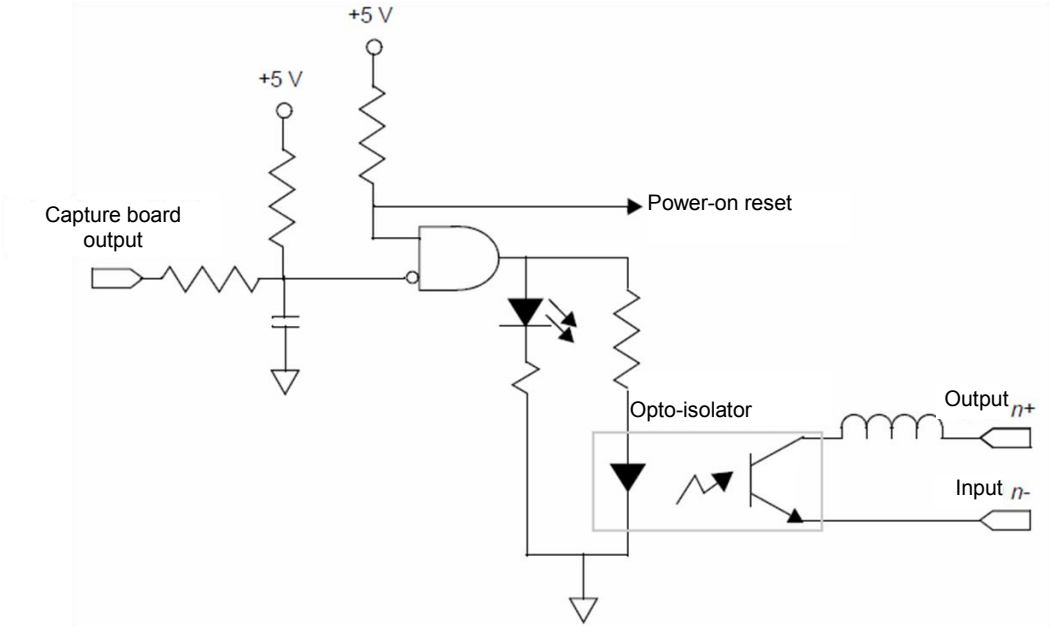


Figure 16: Example of connection to a hardware trigger terminal block

4.3.1. Example of Input Circuit (Hardware Trigger Input)



4.3.2. Example of Output Circuit (Strobe Output)



4.4. Hardware Trigger Terminal Block Specifications

Item	Specifications
Dimensions	10.1 cm (W) x 7.7 cm (D) x 4.5 cm (H)
Mounting	35mm DIN rail
Operating Voltage	5 - 24VDC
Power Supply*	Dsub15 connector 9 Pin terminal: 5VDC Power supply terminal: 12 - 24VDC
Maximum Output Current	24mA (draw or supply)
Voltage drop with output ON	0.8VDC @10mA, 2.6VDC @ 24mA
Leakage current with output OFF	100uA (maximum value at 15VDC)
Output Delay	ON: 6usec OFF: 130usec@5mA; 95usec@10mA, 85usec@15mA
Input resistance	Maximum 1000Ω
Input Current	ON: 3.5 – 24mA OFF: 500uA
Input Delay	ON: 30usec@3.5mA; 8usec@15mA OFF: 45usec@3.5mA; 80usec@15mA
Wire diameter	I/O part: AWG14 - 30 Power supply part: AWG16 - 26
Operating conditions	Operating temperature: 0-50℃ Storage temperature: -10 - 85℃ Relative humidity: 5 – 95% (non-condensing)

Table 22: Hardware trigger terminal block specifications

* Use whichever one is suitable for the VTV-9000 series image acquisition board. For details see the Hardware Guide.

4.5. Hardware Trigger Input Wait Settings

To use hardware trigger input, set the parameters related to hardware input wait in the Image Acquisition tool (Figure 17).
To use hardware trigger input for multiple cameras, set the image acquisition tool to synchronization acquisition. For details on how to set it to synchronization acquisition, see “2.2.2. Synchronization Acquisition”.

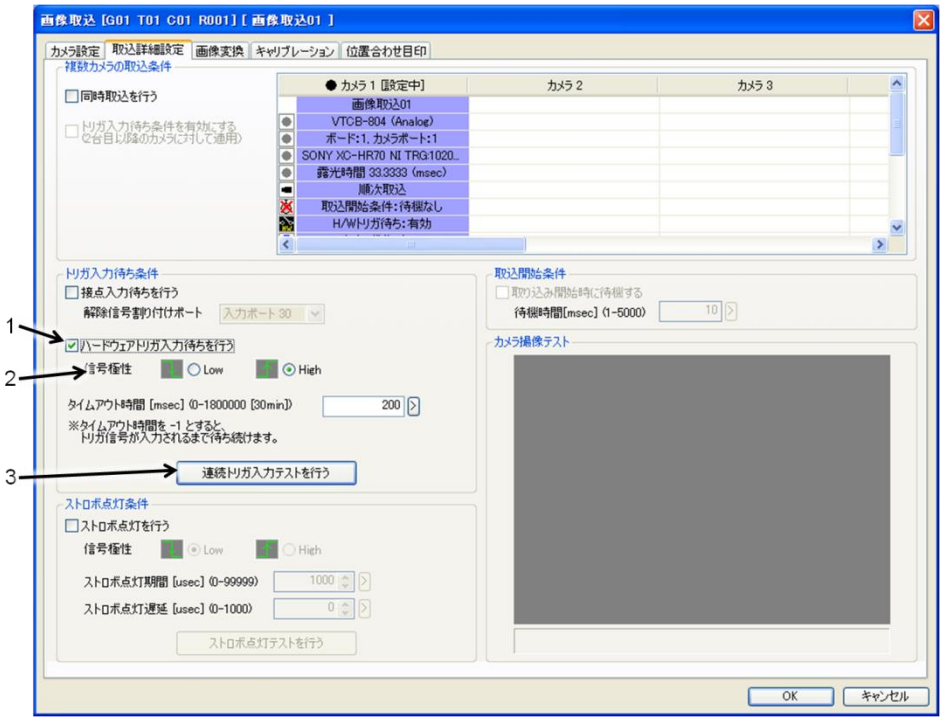


Figure 17: Hardware Trigger Input Settings

1. Enable the **Use H/W Trigger** checkbox.
2. Select the signal polarity of the hardware trigger signal.
3. Execute a hardware trigger input test and make sure that the image can be properly acquired from the camera.

For hardware trigger input wait, there is a method which uses a task activation trigger through DIO signal input (indicated as “trigger” below) and a method which does not use a trigger. You can select the method based on the number of tasks that need to be switched and executed, and the task execution timing.

Task	Timing	Trigger
Multiple	Any	Yes
Single	Simple continuous execution	No

Table 23: Trigger use requirements

To execute without a trigger, select **Task Repeat Trigger** in the **Environment Settings** dialog **Trigger** tab.

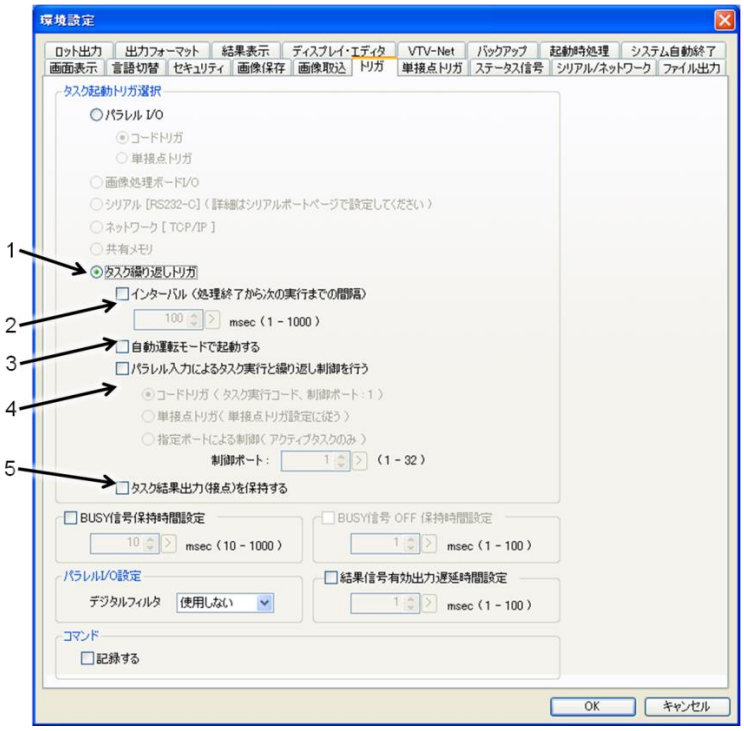


Figure 18: Task activation trigger selection settings

1. Select **Task Repeat Trigger**.

2. If an interval needs to be set between the end of task execution and the start of the next task execution (i.e. the timing that the BUSY signal changes to Lo), enable the **Interval** checkbox and set an interval time period.
   If an interval is not specified, since the BUSY signal changes to Lo for a short period of time, it may be difficult for the DIO connected device to detect when the Busy signal becomes Lo.

3. For **Task Repeat Trigger**, the application will start in Manual mode, and when it is changed to Auto mode, the repeated task execution will start. If you set **Start in Auto Mode** to ON, the application will start in Auto mode and immediately start the repeated task execution.

4. The repeated task execution can be controlled using parallel input.

   - Code trigger
     If you set code trigger task execution or active task execution and turn the trigger port (port No.1) ON, the specified task can be repeatedly executed while the port is ON. When the port is turned OFF, the repeated execution will end.
   - Single contact trigger
     If you turn a parallel input port ON, you can repeatedly execute a task assigned to that parallel port in the single contact trigger settings while the port is ON. When the port is turned OFF, the repeated execution will end.

- Control through a specified port
  If you turn a specified control port ON, the active task will be repeatedly executed while the port is ON. When the port is turned OFF, the repeated execution will end.

5. When repeatedly executing a task, the next task is immediately executed after the results signal is output, and the results signal will turn OFF, so there may be cases where it cannot be read by an external device. In such a case, by setting **Keep Task Result Output (Contact)** to ON, the results signal will not turn OFF even after the start of execution of the next task, and it will be possible to read the previous results signal during the execution of the next task.

4.6. Hardware Trigger Input Wait Timing Chart

Hardware trigger input wait is only enabled in Auto mode. In Manual mode, images are acquired without waiting for a hardware trigger.
When using hardware trigger input wait, the process is executed as follows.

1. A trigger is input.
   If triggers are not used, the interval period from the end of the previous process expires.
2. The Busy signal changes to Hi.
3. On the applicable camera, after the preparation for receiving hardware trigger input is complete, the Exposing signal and Acquiring signal change to Hi.
4. After the preparation of all cameras are complete, set the Acquisition Trigger Wait Complete signal to Hi and wait for hardware trigger signal input.
5. A hardware trigger signal is input. Or, the specified timeout period expires.
   *Even in the case where a timeout occurs, continue with the image acquisition process.
6. On the camera, start the exposure and acquisition processes.
   *The actual exposure and acquisition processes do not correspond with the status of the Exposing and Acquiring signals.
7. After the camera exposure process is complete, set the Exposing signal to Lo.
8. After the exposure process is complete on all cameras, set the Acquisition Trigger Wait Complete signal to Lo.
9. After the image acquisition process on the camera is complete, set the Acquiring signal to Lo.
10. After the task process is complete, set the Busy signal to Lo.

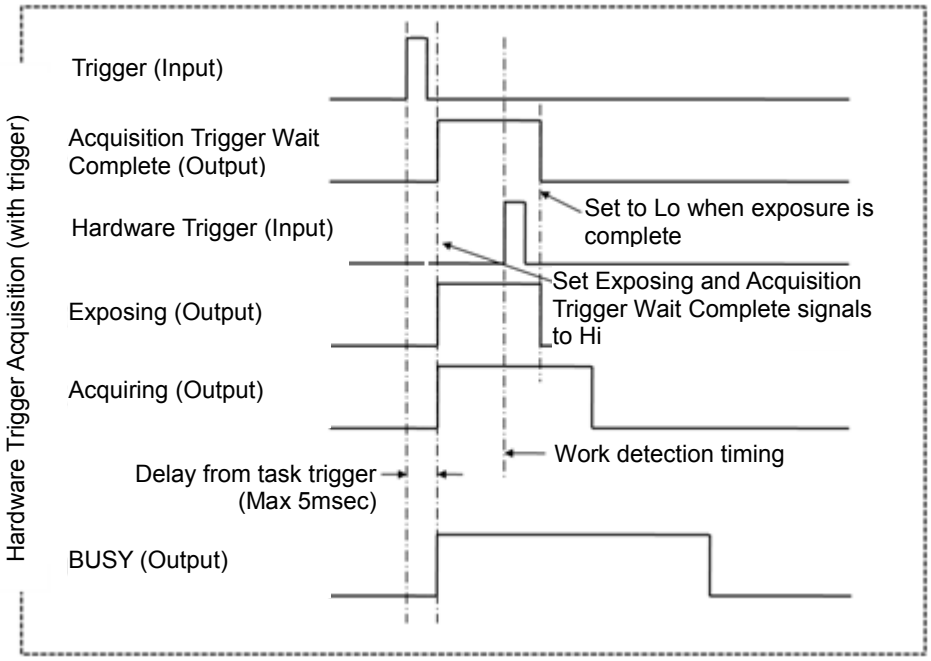


Figure 19: Hardware trigger acquisition with trigger

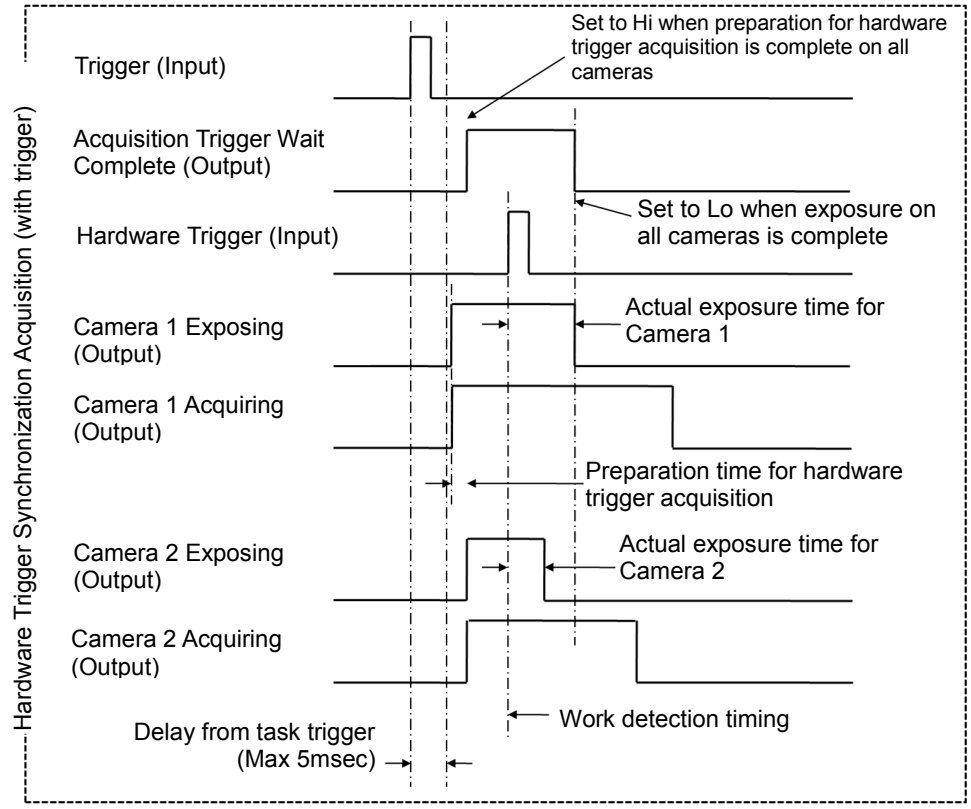


Figure 20: Hardware trigger synchronization acquisition using a trigger

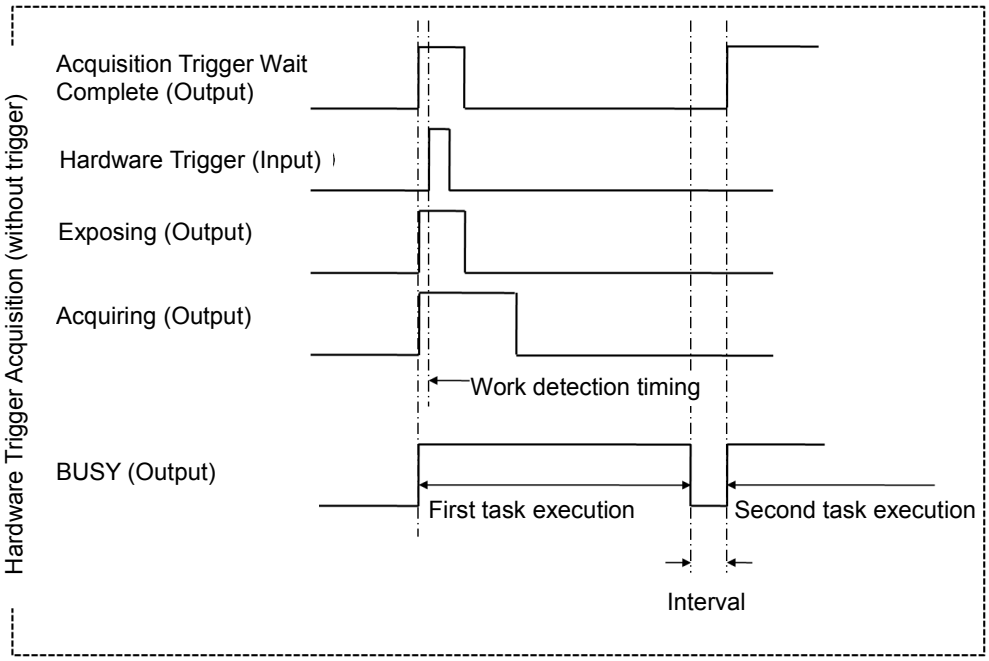


Figure 21: Hardware trigger acquisition without task trigger

Note: To stop the process when a trigger is not used, follow these steps:

1. Change to Manual mode to stop the task repeat trigger.
2. In Manual mode, execute a task to cancel the input wait status.

4.7. Hardware Trigger Input Wait Limitations

The limitations for hardware trigger input wait are as follows.
Be sure to take these into consideration when setting a task.

Board	Limitation	Description
All boards	It is not possible to mix contact input wait and hardware trigger input wait in Synchronization Acquisition settings	Since Hardware Trigger Input Wait is a trigger-based imaging method that does not use any software functions, it cannot be combined with Contact Input Wait which uses software for detection.
VTCB-804	When switching between image acquisition using hardware trigger input wait and standard image acquisition, a delay occurs.	When switching the mode from hardware trigger to standard or standard to hardware trigger, a maximum of 1 frame delay per camera will occur. Ex1: When image acquisition using a hardware trigger and standard image acquisition are placed in the same column within a task. Ex2: When a task that includes image acquisition using a hardware trigger is switched to another task that includes standard image acquisition.
VTCB-332 VTCB-332A VTCB-334 VTCB-341 VTCB-342 VTCB-721 VTCB-924	Hardware trigger input wait and strobe output are fixed as negative logic.	Due to a hardware limitation it is not possible to change the logic.

4.8. Strobe Output Settings

To use strobe output, first set the **Use Strobe** option in the Image Acquisition Tool (Figure 22). The Image Acquisition tool will coordinate the strobe output timing with the start of camera exposure.

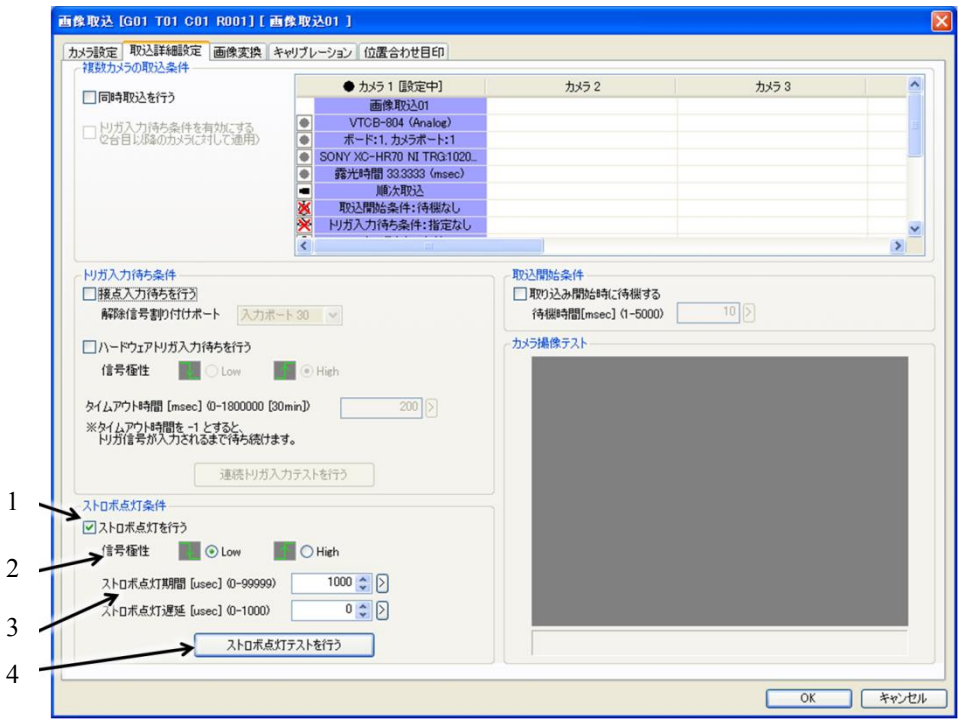


Figure 22: Strobe output settings

1. Enable the **Use Strobe** checkbox.
2. Select the signal polarity of the strobe output signal.
3. Set the strobe pulse and strobe delay in microseconds.
   When using the STU-3000 manufactured by CCS, set the strobe pulse and strobe delay on the STU-3000 side.
4. Execute a strobe test and make sure that the image can be properly acquired from the camera.

5. Serial/Network I/O

5.1. Serial/Network Port

The serial port and the network port on VTV-9000 can be used for communication with external devices. As an example, the rear view of VTV-9000STD-4C is shown in Figure 23 below.

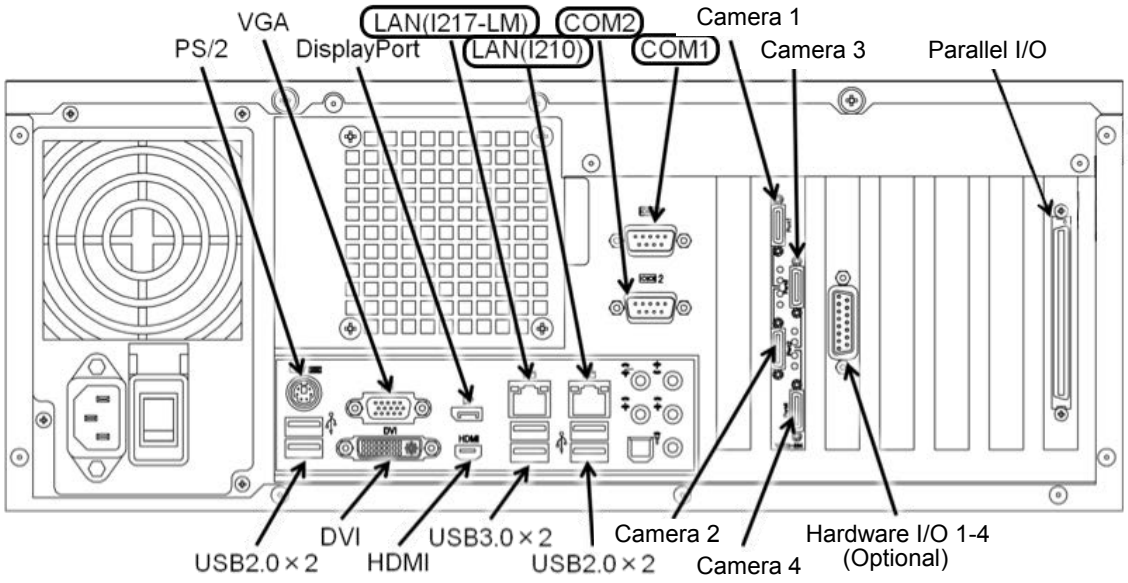


Figure 23: Rear view of VTV-9000STD-4C

5.2. Serial Pinout

The serial port on the VTV-9000 series is RS-232 (ANSI/EIA/TIA-232-E) compliant and supports a maximum serial data rate of 115,200 bps. The serial port supports hardware handshaking. The pin numbers on the serial port are shown in Figure 24 below. The connector on VTV-9000 is a D-SUB 9 pin male connector.

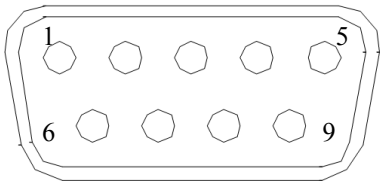


Figure 24: Serial port pin numbers

The pinout of the serial port is shown in Table 24 below.

Pin No.	Signal Name	IN/OUT	Description
1	DCD	IN	Data Carrier Detect
2	RXD	IN	Receive Data
3	TXD	OUT	Transmit Data
4	DTR	OUT	Data Terminal Ready
5	GND	-	Ground
6	DSR	IN	Data Set Ready
7	RTS	OUT	Request To Send
8	CTS	IN	Clear To Send
9	RI	IN	Ring Indicator

Table 24: Serial port pinout

5.3. Communication Parameters

The communication parameters for the serial port and network port can be set in the Serial/Network tab in Environment Settings.

5.3.1. Serial Communication Parameters

The serial communication parameters are listed in Table 25.

Parameter	Selections
Port number	COM1, COM2, COM3, COM4(*1)
Data speed (bps)	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Data length	7 bits, 8 bits
Parity	Even, Odd, None
Stop bits	1 bit, 1.5 bits, 2 bits
Flow control	XOn/XOff, Hardware, None
Termination string	CR, CR/LF
Separator character	Space, Comma, Tab, Underscore, Hyphen
Checksum	Add, Do not add
Acknowledgement (AK/NK/ER)	Output, Do not output

Table 25: List of serial communication parameters

*1 The number of ports varies based on the chassis. Select a port that exists on the chassis.

5.3.2. Network Communication Parameters

The network communication parameters are listed in Table 26.

Parameter	Selections
Port number	55555 (Default value) Input range: 0 – 65535 However some port numbers are reserved by the OS and various protocols. If there are no problems with communication, do not change this port. Consult with the system administrator when changing this port.
Termination string	CR, CR/LF
Checksum	Add, Do not add
Acknowledgement (AK/NK/ER)	Output, Do not output

Table 26: List of network communication parameters

5.3.3. Checksum

A checksum can be added to the output string in order to confirm the accuracy of the string output by VTV-9000.
For the checksum, the output string is broken down into single characters (1 byte) and a XOR (exclusive logical sum) operation is performed on each byte. The calculated checksum value is divided into upper bits and lower bits, converted to ASCII, and added as a 2 byte value to the end of the data or in front of the termination string.
On the receiving side, an XOR operation is similarly performed on the string that is received, and if the result of the XOR operation with the checksum value is 0, it can be determined that the data was correctly received.

Example of Checksum Output

The checksum calculation for when the output string is the following string is shown in Table 27 below.

`GRP01□TSK01□OK` (□ is a separator character 0x20 (a space))

	G	R	P	0	1	□	T	S	K	0	1	□	O	K	□
Hex	47	52	50	30	31	20	54	53	4B	30	31	20	4F	4B	20
XOR	47	15	45	75	44	64	30	63	28	18	29	09	46	0D	2D

Table 27: Checksum Calculation

The calculated checksum value “2D” is broken down into “2” and “D”, converted to ASCII, and then appended to the end of the output data.
The string that will be output is as follows:

`GRP01□TSK01□OK□2D (CR/CRLF)`

5.3.4. Acknowledgement

When a serial command is sent from an external device to VTV-9000, VTV-9000 will return the string “AK” if the command was successfully received and the string “NK” if the command was not successfully received. In addition, for commands supported by the tool, if the command execution fails, the string “ER” will be returned.
For details regarding serial commands, see “5.5. Serial Commands (p.74)”.

Acknowledgement	Command	Description
AK	System	Output when the command string and arguments can be correctly read. The command is executed after “AK” is returned.
	Tool	Output when the command string and arguments can be correctly read and the command execution is successful. However, for commands that display a menu (MMA, DMA, etc.) “AK” will be output before command execution.
NK	System/Tool	“NK” is output in the following cases: - The command string is incorrect. - The arguments are incorrect. - The specified task does not exist. - The tool with the specified camera and row number does not exist. - The specified port number does not exist. - The command was received during a BUSY state.
ER	System	ER is not output by the system.
	Tool	Output when the command string and arguments were correctly read but the command execution failed.

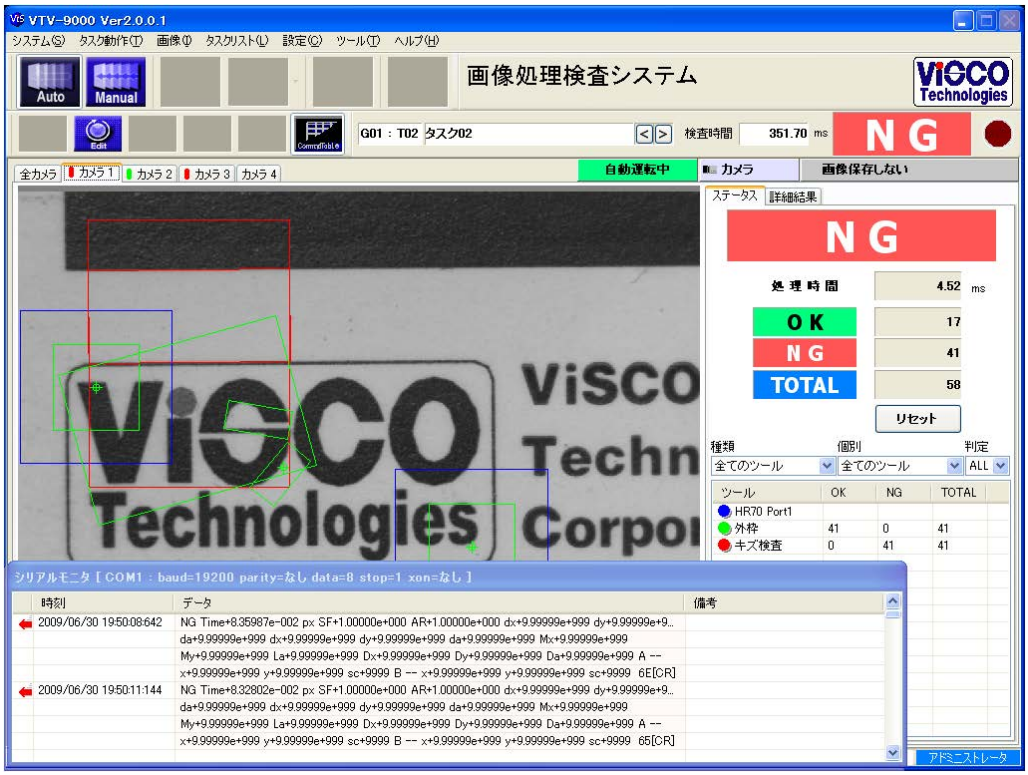
In addition to an acknowledgement, for commands that execute a task (RRT, RRA, etc.), if the command is successfully received, the task execution results will be output after outputting “AK”.
For information on task output, see “S003.5 Output Settings” in VTV-9000 Reference.

5.4. Serial Monitor Screen

In **Serial Monitor Screen**, the serial port and network port I/O can be monitored in Auto mode.
To use the **Serial Monitor Screen**, the serial I/O settings need to be set in advance.

1. From the **Tools** menu, click on **Serial Monitor Screen**.

2. When switched to Auto mode, the **Serial Monitor** screen will be displayed.



5.5. Serial Commands

The serial commands that can be used to control VTV-9000 are shown in Table 28 below.
All commands shown in Table 28 can also be used when the network port is selected instead of the serial port.

Command	Command Name	Arguments	Description
RRT (System)	Execute Task	2-digit group number (01-20) + 2-digit task number (01-50)	Executes the task specified with arguments.
SRP (System)	Execute System Command	4-digit system command number (0000-0200)	Executes the system command specified with arguments.
RCA (System)	Switch Active Task	2-digit group number (01-20) + 2-digit task number (01-50)	Switches the specified task to the active task.
RLA (System)	Load Task	2-digit group number (01-20) + 2-digit task number (01-50)	For the task specified with arguments, loads the data from the hard disk to the memory.
RUT (System)	Unload Task	2-digit group number (01-20) + 2-digit task number (01-50)	Unloads the data for the task specified with arguments. The data on the hard disk will not be deleted.

RRA (System)	Execute Active Task	None	Executes the active task.
RCC (System)	Clear Counter	None	Resets the active task counter to 0.
RAU (System)	Unload All Tasks	None	Unloads all tasks.
SSD (System)	Shutdown System	None	Finishes the VTV-9000 application and shuts down the OS.
SSA (System)	Set Active Task Single Contact Trigger	2-digit port number (01-32)	Sets single contact point startup for the active task.
SST (System)	Set Single Contact Trigger	2-digit group number (01-20) + 2-digit task number (01-50) + 2-digit port number (01-32)	Sets single contact point startup for the task specified with arguments.
SFB (System)	Start Image Save	None	Starts the image save process.
SFE (System)	Stop Image Save	None	Stops the image save process.
SGI (System)	Save Image File	None	Saves the image currently displayed on the screen to a file.
SLM (System)	Edit Lot Settings	None	Displays the **Lot Settings** dialog.
SLP (System)	Set Lot	1 to 8-digit lot number can be specified. Example of 4-digit: 0001-9999	Sets the lot number and changes the state of the lot to the configured state.
SLS (System)	Start Lot	None	Starts the lot.
SLE (System)	Finish Lot	None	Finishes the lot.
SLH (System)	Interrupt Lot	None	Finishes the lot and writes data stored in the memory to a file.(*1)
SLR (System)	Restart Lot	None	Restarts the lot.(*1)
SLI (System)	Increase Lot Number	Number of lot number increase depends on the number of digits set in the lot settings. Example of 4-digit: 0001-9999	Adds the value specified in the argument to the lot number.
RWC (System)	Write Counter Data	None	Writes the counter value of the active task to the end of the log and lot file.

WAS (OCV)	Reset Active Task String (*2)	2-digit camera number (01-08) + 2-digit OCV tool row number (01-99)	Resets the font, number of characters, and string used in the specified block of the OCV tool specified with arguments in the active task.
WAA (OCV)	Replace Active Task String (*2)	2-digit camera number (01-08) + 2-digit OCV tool row number (01-99)	Replaces the font and string used in the specified block of the OCV tool specified with arguments in the active task.
WAC (OCV)	Replace Specified Character In Active Task (*2)	2-digit camera number (01-08) + 2-digit OCV tool row number (01-99)	Replaces the character set in the specified position in the specified block of the OCV tool specified with arguments in the active task.
WMS (OCV)	Reset String In Specified Task (*2)	2-digit group number (01-20) + 2-digit task number (01-50) + 2-digit camera number (01-08) + 2-digit OCV row number (01-99)	Resets the font, number of characters, and string used in the specified block of the OCV tool specified with arguments in the task specified with arguments.
WMA (OCV)	Replace String In Specified Task (*2)	2-digit group number (01-20) + 2-digit task number (01-50) + 2-digit camera number (01-08) + 2-digit OCV row number (01-99)	Replaces the font and string used in the specified block of the OCV tool specified with arguments in the task specified with arguments.
WMC (OCV)	Replace Specified Character In Specified Task (*2)	2-digit group number (01-20) + 2-digit task number (01-50) + 2-digit camera number (01-08) + 2-digit OCV row number (01-99)	Replaces the character set in the specified position in the specified block of the OCV tool specified with arguments in the task specified with arguments.
MAA (Character)	Active Task Automatic Character Training (*3)	2-digit camera number (01-08) + 2-digit character tool row number (01-99)	Automatically performs cropping without opening the configuration dialog of character tool specified with arguments in the active task.
MMA (Character)	Active Task Manual Character Training (*3)	2-digit camera number (01-08) + 2-digit character tool row number (01-99)	Displays the Training dialog of the character tool specified with arguments in the active task and allows you to manually perform cropping.
MAC (Character)	Delete All Models In Active Task (*3)	2-digit camera number (01-08) + 2-digit character tool row number (01-99)	Deletes all character models and alignment models trained in the character tool specified with arguments in the active task.

DAA (DefFinder)	Active Task Automatic Reference Image Training (*4)	2-digit camera number (01-08) + 2-digit DefFinder tool row number (01-99)	Trains a reference image in addition to the existing reference images without opening the configuration screen of the DefFinder/DefFinder Blob tool specified with arguments in the active task.
DMA (DefFinder)	Active Task Manual Reference Image Training (*4)	2-digit camera number (01-08) + 2-digit DefFinder tool row number (01-99)	Displays the Reference Image Settings tab of the DefFinder/DefFinder Blob tool specified with arguments in the active task and allows you to manually train an additional reference image.
DLA (DefFinder)	Delete Single Reference Image In Active Task (*4)	2-digit camera number (01-08) + 2-digit DefFinder tool row number (01-99)	Deletes the last trained reference image in the DefFinder/DefFinder Blob tool specified with arguments in the active task.
DDA (DefFinder)	Delete All Reference Images In Active Task (*4)	2-digit camera number (01-08) + 2-digit DefFinder tool row number (01-99)	Deletes all reference images in the DefFinder/DefFinder Blob tool specified with arguments in the active task.

Table 28: List of serial commands

*1 Even if the **Insert Mark and Timestamp** option is enabled in the lot output settings, nothing will be added to the end of the file.
*2 For details on how to specify a block, etc., see “T034.9 OCV Serial Commands” in VTV-9000 Reference.
*3 For details, see “T016.12. Character Tool Serial Commands” in VTV-9000 Reference.
*4 For details, see T018.9. DefFinder Serial Commands in VTV-9000 Reference.

6. System Commands

System commands are common commands defined for the entire system. First assign the execution of one system command or the continuous execution of multiple system commands to any number (system command number) 1 through 200 in **Settings → System Command Settings**.
The system command can be executed by specifying the Execute System Command (00000010) control code and the system command number, the serial command "SRP" and the system command number.

6.1. Commands

A list of available system commands is shown in Table 29 below.

	Command Name	Description
System	Execute Specified Task	Executes the task specified with a group number and a task number. The task specified with a group number and a task number is changed to the active task.
	Execute Active Task	Executes the current active task.
	Load Task	Loads the task specified with a group number and a task number.
	Unload Task	Unloads the task specified with a group number and a task number.
	Unload All Tasks	Unloads all tasks that are loaded in memory.
	Start Image Save	Starts the image save process. The image is saved according to conditions set in **Settings → Environment Settings → Image Save**.
	Stop Image Save	Stops the image save process.
	Save Image File	Saves the image currently displayed on the screen to a file.
	Delete Image File	Deletes the image file from the active task.
	Release Image From Memory	Releases the image stored in memory by the active task.
	Release Log From Memory	The file output data stored in memory is output to a log file. If a lot is being used, data is not output to the lot file. Use the Finish Lot command.
	Reset Counter	Clears the determination counter of the active task to zero.
	Write Counter Data	Writes the counter value (OK/NG/Total) of the active task to the end of the log and lot file.
	Display/Hide Counter Monitor Screen	Displays/hides the counter monitor screen each time a command is received.

	Display/Hide Data Monitor Screen	Displays/hides the counter monitor screen each time a command is received.
	Display Result Graphics	Displays the graphics of the execution results.
	Hide Result Graphics	Hides the graphics of the execution results.
	Edit Lot Settings	Opens the **Lot Settings** dialog.
	Set Lot	Sets the lot number and changes the lot to the configured state.
	Start Lot	Commands the lot to be started.
	Finish Lot	Commands the lot to be finished.
	Interrupt Lot	Finishes the lot and writes the data stored in memory to a file. Even if the **Insert Mark and Timestamp** option is enabled in the lot output settings, nothing will be added to the end of the file.
	Restart Lot	Restarts the lot. Even if the **Insert Mark and Timestamp** option is enabled in the lot output settings, nothing will be added to the end of the file.
	Increase Lot Number	Commands the lot number to be increased.
	Set Single Contact Trigger	Sets the activation of the specified group and task to the specified port number.
Character	Active Task Automatic Character Training	Automatically trains a character model for the active task without opening the set screen.
	Active Task Manual Character Training	Displays the set screen for the active task and allows you to manually train a character model.
	Delete All Models In Active Task	Deletes all character models and alignment models trained in the active task.
DefFinder	Active Task Automatic Reference Image Training	Automatically trains a reference image for the active task without opening the set screen.
	Active Task Manual Reference Image Training	Displays the set screen for the active task allowing you to manually train/delete a reference image.
	Delete Single Reference Image In Active Task	Deletes the last trained reference image from the active task.
	Delete All Reference Images In Active Task	Deletes all trained reference images from the active task.

Table 29: List of system commands

7. Export and Import

VTV-9000 allows you to write (export) and load (import) task data, calibration data, mask data, etc. to and from the hard disk in the unit and external media such as USB memory, etc. This feature can be used for backing up or moving data.

7.1. Overview of Export and Import Features

The methods that can be used for exporting and importing data are shown in Table 30 below.

Method	Description	Extension
Full	Full export/import of all system configuration items. It is also possible to select specific data to be imported.	zia
Mask Data	VTV-9000 maintains a mask template list containing 10 mask templates within the system. This method allows you to export/import the entire mask template list.	zim
Calibration Data	VTV-9000 maintains a calibration list containing 20 calibration data items within the system. This method allows you to export/import the entire calibration list.	zic
Task Group	In VTV-9000, tasks are managed in groups. A group of tasks is called a “task group”, and 20 task groups can be stored in a system. This method allows you to export/import all of the task data for a specified task group.	zig
Specific Task	In VTV-9000, the processing unit is called a “task” and up to 1000 tasks can be managed within a system. This method allows you to export/import task data for an individual task.	zit
Shared Data Full	Full export/import of shared data.	zis
Font Data	Full export/import of font data.	zif
Inquiry E-mail	Exports/imports a specific task and all related data. It is also possible to select and import specific data.	ziq

Table 30: Overview of Export/Import Methods

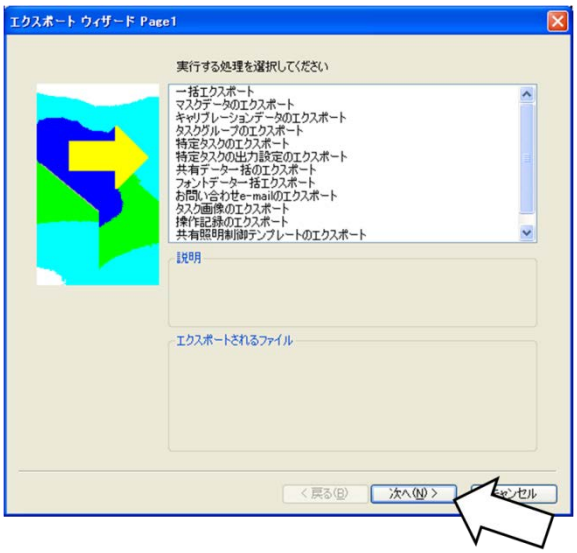
Data can be imported only in the format in which it was exported. For example, a file exported using the **Task Group** method cannot be imported using the **Specific Task** method.

7.2. Export Procedure

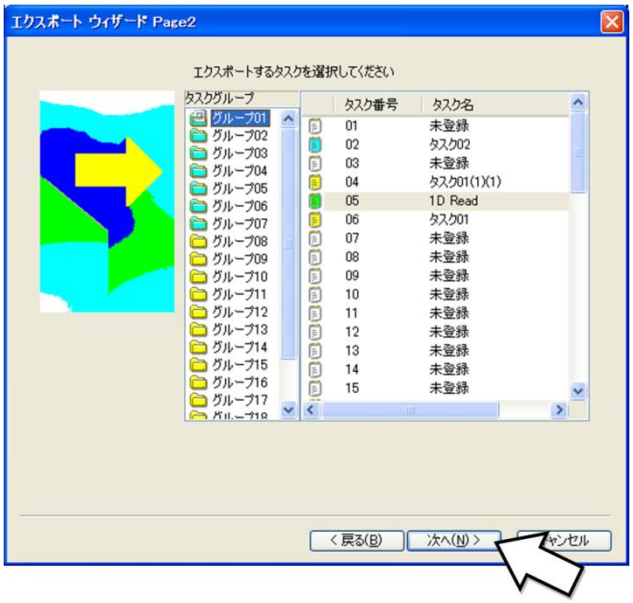
The export procedure is described below using the **Inquiry E-mail** method as an example. If you are in Auto mode, click the **Manual** button and change to Manual mode before performing this procedure.

1. From the **System** menu, select **Export**.

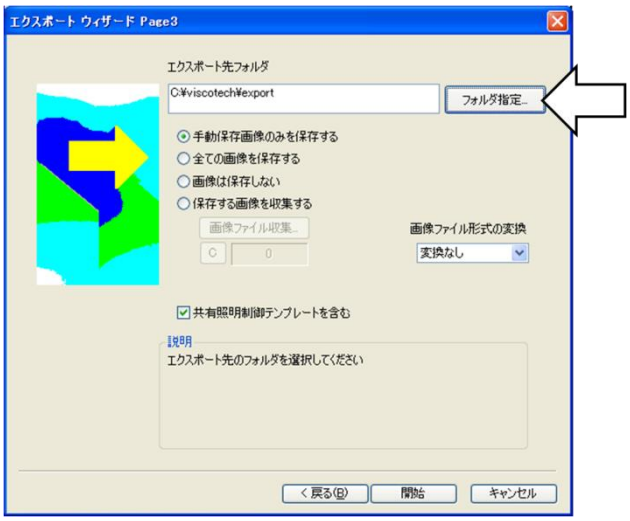
2. The Export Wizard will be displayed. Select **Inquiry E-mail Export** and click the **Next** button.



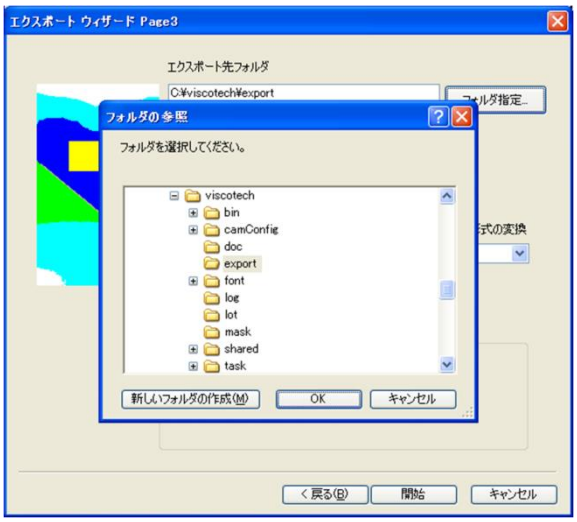
3. The following page will be displayed. Select a task you want to export and Click **Next** to continue.



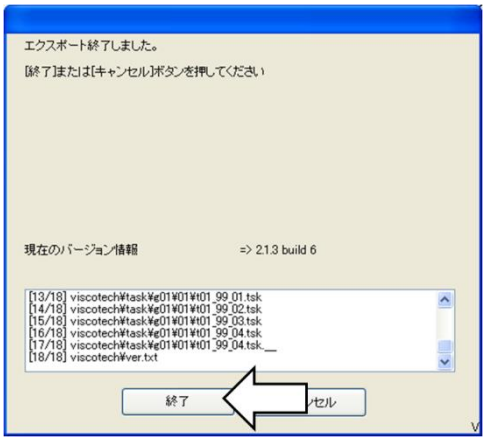
4. Click the **Specify Folder** button to select the folder to which the data will be exported. Also specify the image saving method.



The default export folder is `C:\viscotech\export`.
The following is the dialog that is displayed when you click on the **Specify Folder** button. After selecting the folder, click the **OK** button.



5. A window with a message notifying you that the export is complete will be displayed. Click the **Finish** button to end the wizard.



A file with the following name will be created in the folder specified in Step 4.

```
tYYMMDD_hhmmss_g01t05.ziq
```

For example, If Group 01 Task05 is exported at 5:30:04 PM on December 10, 2007, the following file will be created:

```
t071210_173004_g01t05.ziq
```

If a full export is performed, the following file will be created:

```
t071210_173004_ BackUP.zia
```

For details regarding the file extension, see “7.1. Overview of Export and Import Features (p.80)”.

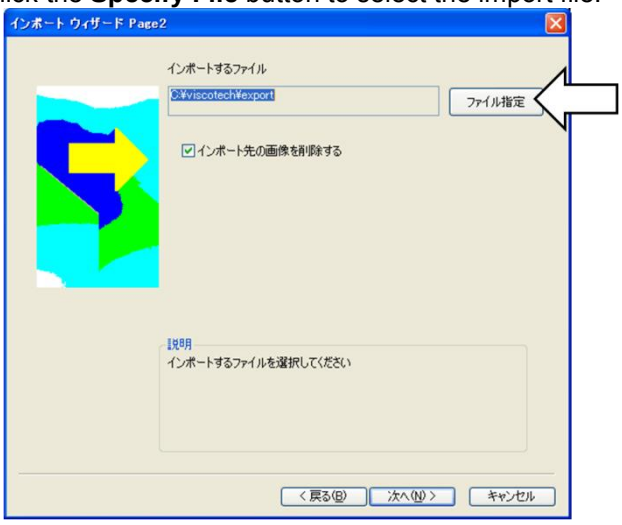
7.3. Import Procedure

The import procedure is described below using the **Inquiry E-mail** method as an example. If you are in Auto mode, click the **Manual** button and change to Manual mode before performing this procedure.
Note: If you perform an **Inquiry E-mail** import, some system data such as calibration list and mask list data will be overwritten.

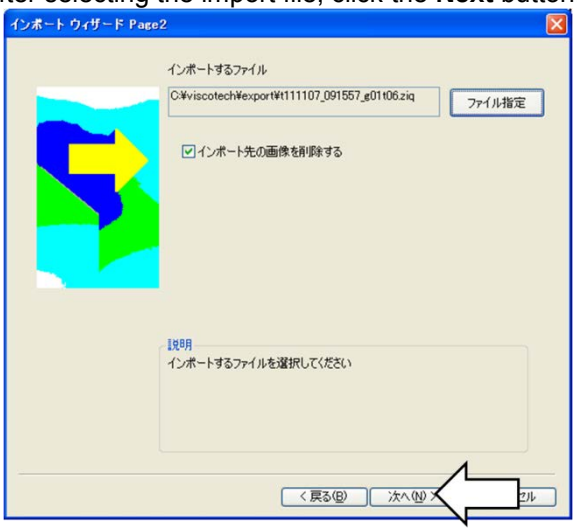
1. From the **System** menu, select **Import**.

2. The Import Wizard will be displayed. Select **Inquiry E-mail Import** and click the **Next** button.

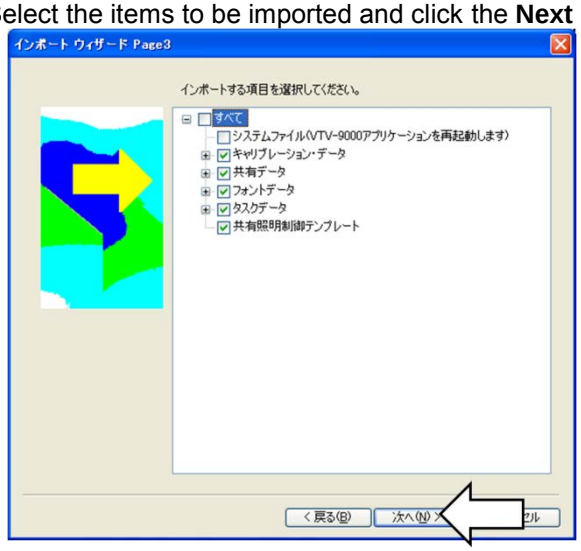
3. Click the **Specify File** button to select the import file.



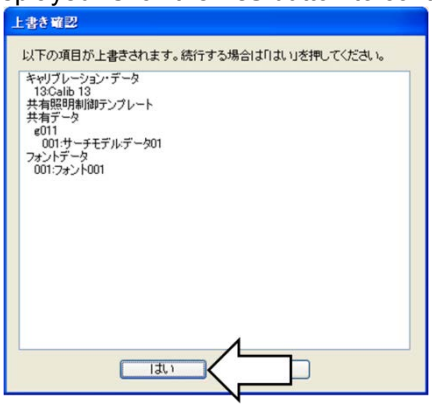
4. After selecting the import file, click the **Next** button.



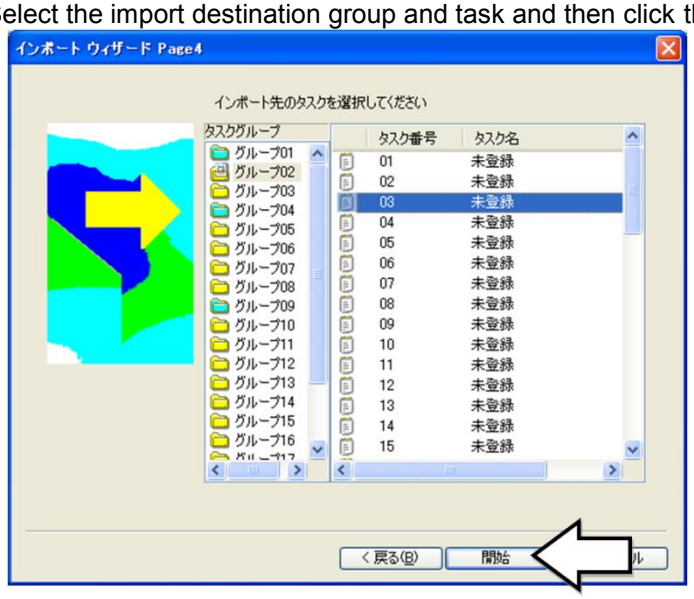
5. Select the items to be imported and click the **Next** button.



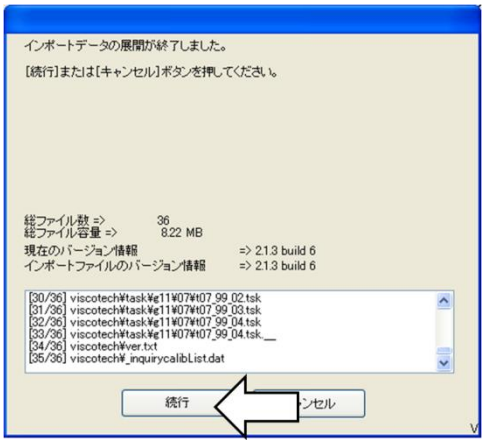
6. A message notifying you of the items other than the task data that will be overwritten will be displayed. Click the **Yes** button to continue.



7. Select the import destination group and task and then click the **Start** button.



8. When the import data has been extracted, a confirmation message will be displayed. Click **Continue**.



9. Check that the tasks and other data have been restored.

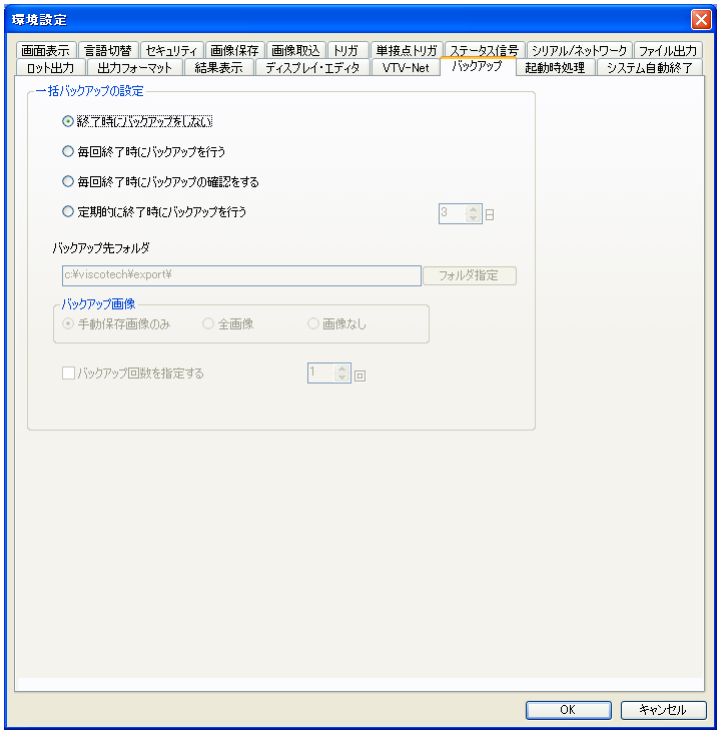
8. Backup

VTV-9000 provides a data backup function which allows you to automatically backup data. Using the Full Export function, you can periodically back up the entire system, confirm with the operator whether or not to back up the data before the shutdown, etc.

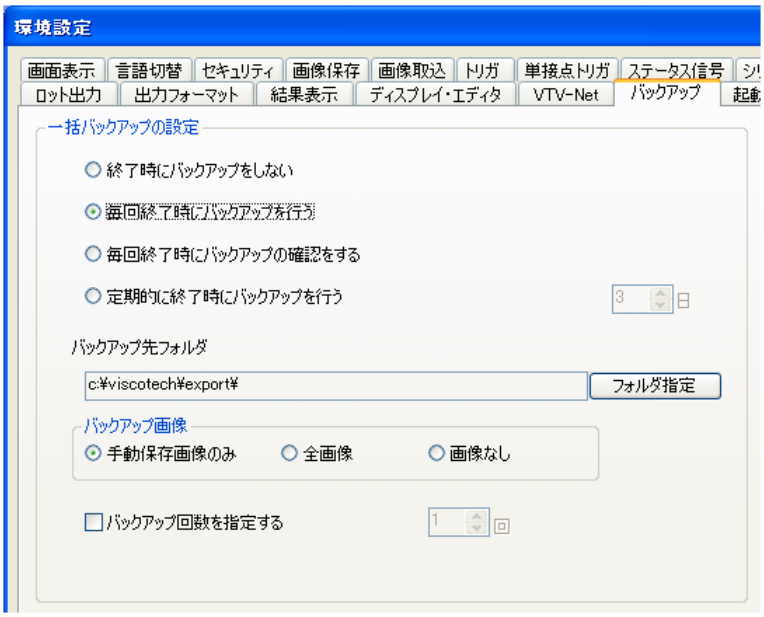
8.1. Full Backup Settings

1. Click the **Conf** button to open the **Environment Settings** dialog.

2. Open the **Backup** tab.



3. Set the full backup settings.



An external device such as a USB memory can be specified as the backup data folder.
Specify the images you wish to save.
When the number of backups is specified, the latest backup data for the specified number of backups is stored. (The previous data will be discarded.)
The full backup data can be restored by using the full import function.

9. Reinstalling the Software

The method for reinstalling the VTV-9000 software is described below. The VTV-9000 system software, drivers, and manuals will be installed.
Please note that the method for reinstalling the Windows OS is not included in this guide. If you need to reinstall the Windows OS, please contact our support hotline.

Important:
In order to reinstall the software, please follow these steps in the order shown:

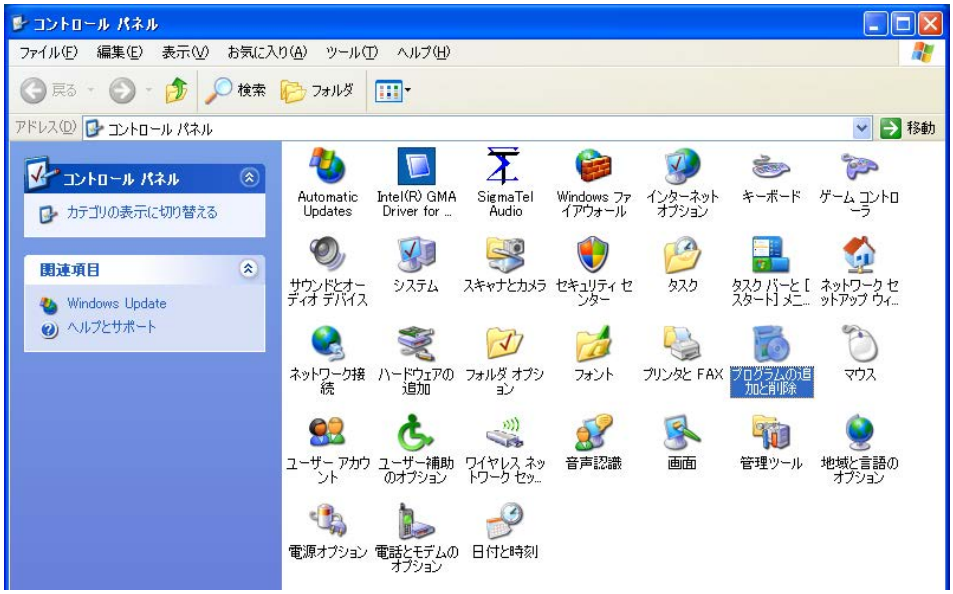
1. Export the data (See “7.2. Export Procedure (p.81)”
2. Uninstall the VTV-9000 software
3. Install the VTV-9000 software

9.1. Uninstalling the Software

1. Finish the VTV-9000 system. Click **System** → **Exit Options** from the menu.

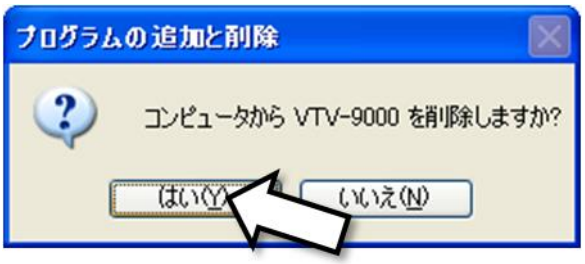
2. The **Exit VTV-9000** dialog will be displayed. Click on the **Exit Application** button.

3. Delete the program.
   Click **Start → Settings → Control Panel** and click on **Add or Remove Programs**.

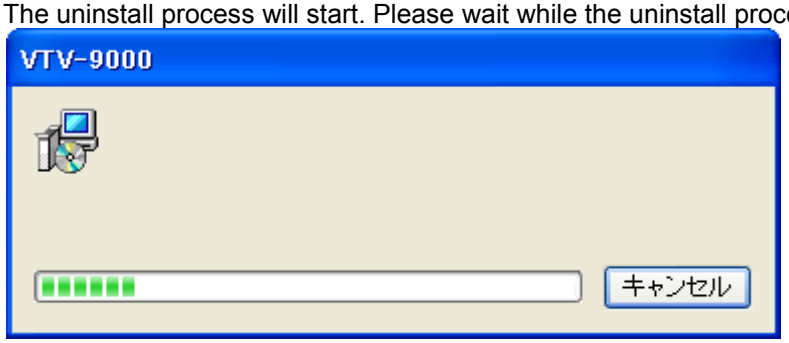


4. Delete the VTV-9000 program.
   Select VTV-9000 from the list of programs, and click on **Remove** to delete the program.

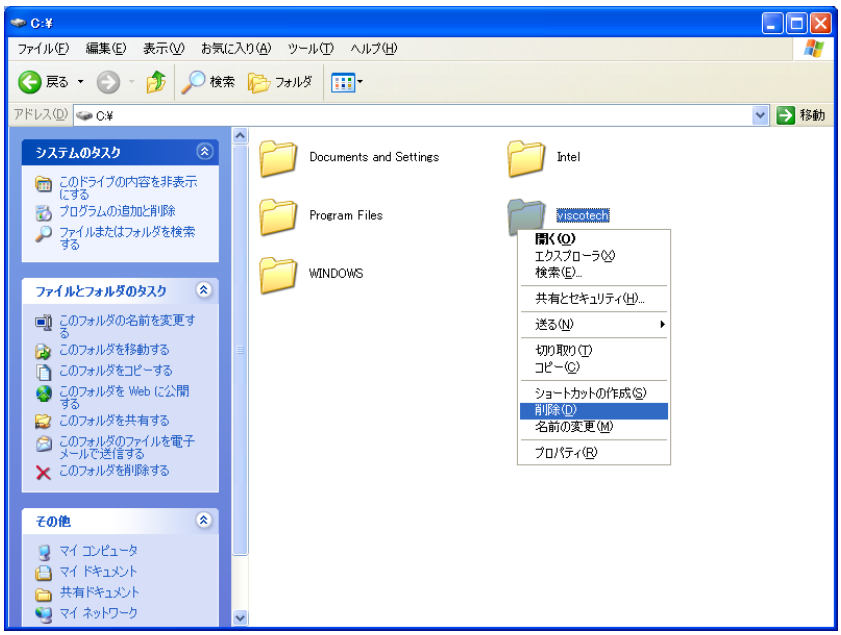
5. Delete the program.
The following dialog will be displayed. Click on the **Yes** button.



The uninstall process will start. Please wait while the uninstall process completes.



6. Delete the folder.
Delete the `viscotech` folder from the `C` drive (`D` drive in the case of the VTV-9000mini series). *If the exported data is stored in `c:\viscotech\export`, move it to a different folder.

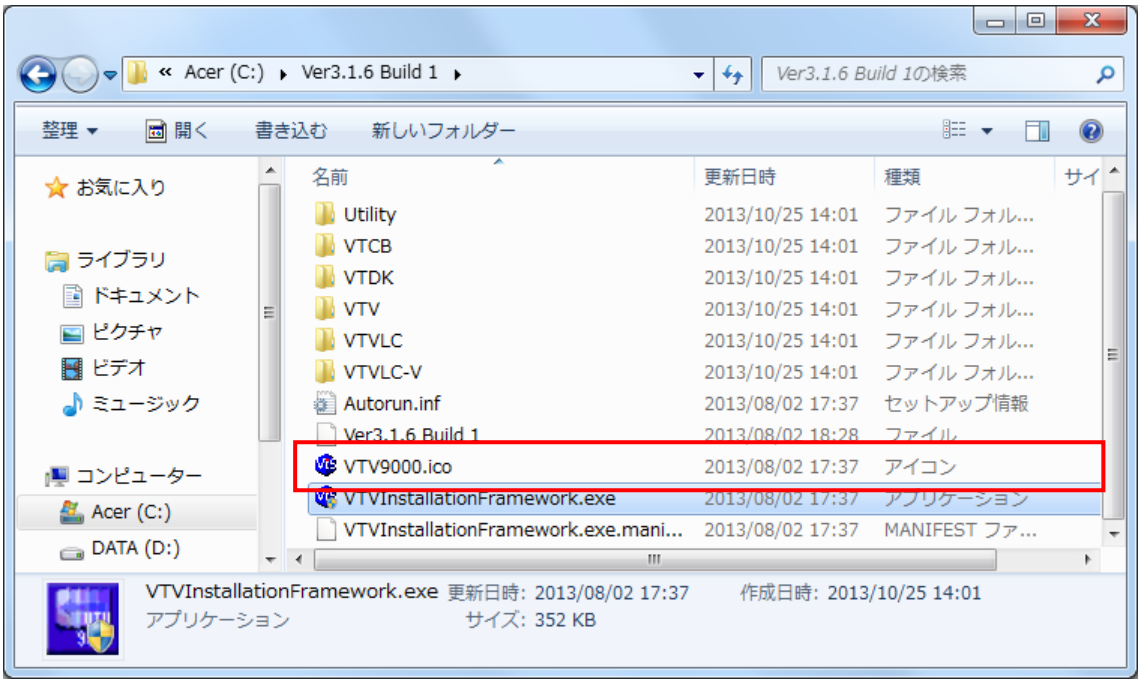


9.2. Installing the Software

The installer will install the following items:
- Setup Guide (VTV-9000 Setup Guide)
- Hardware Guide (VTV-9000 Hardware Guide)
- Reference Manual (VTV-9000 Reference)
- Parallel board driver
- Image acquisition board driver
- ViSCO Light Controller Unit driver (VTVLC-V)
- ViSCO license security key driver
- Required Windows components (VC++ Runtime Library/Windows Installer 3.1)
- VTV-9000 system (including Release Notes)

1. When installing from the VTV-9000 software setup CD, once the CD-ROM is inserted into the drive, the **VTV Installation Framework** application will automatically start.

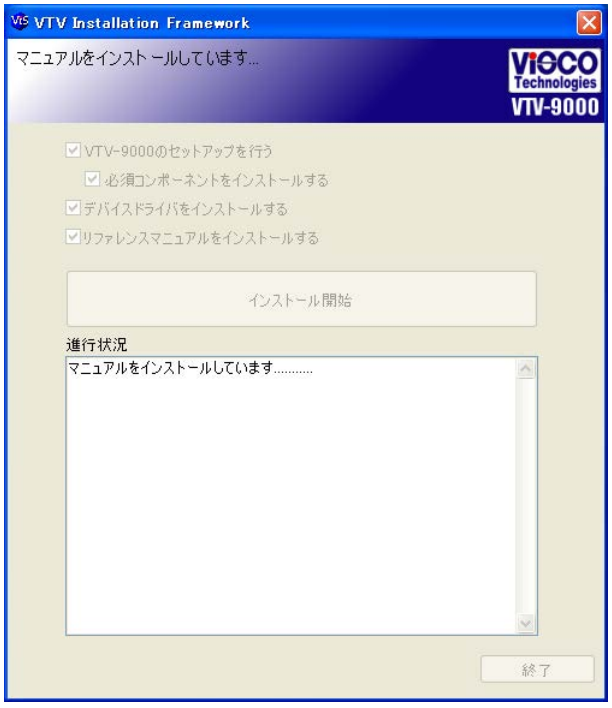
   When installing from media other than the setup CD-ROM, such as from data downloaded from our support page, manually start `VTV Installation Framework.exe` and perform the installation.



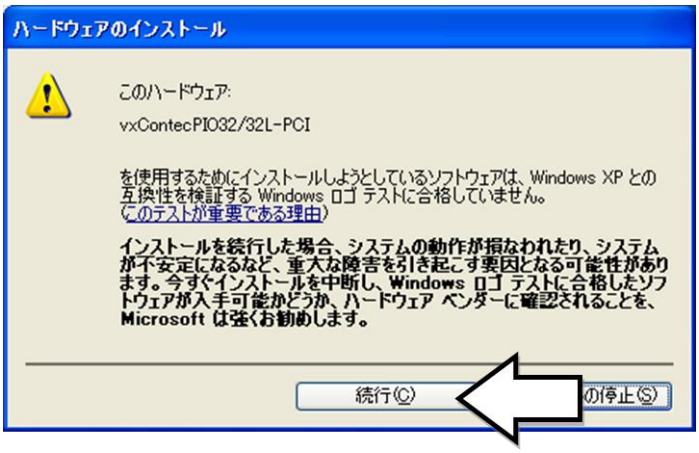
Note: If the file path of the installation exe file is too long, it may not be possible to properly install the software. In such a case, move the folder that includes the `VTV Installation Framework.exe` file to the `C` drive or an upper level folder before performing the installation.

2. When the installer is started, the following screen will be displayed.

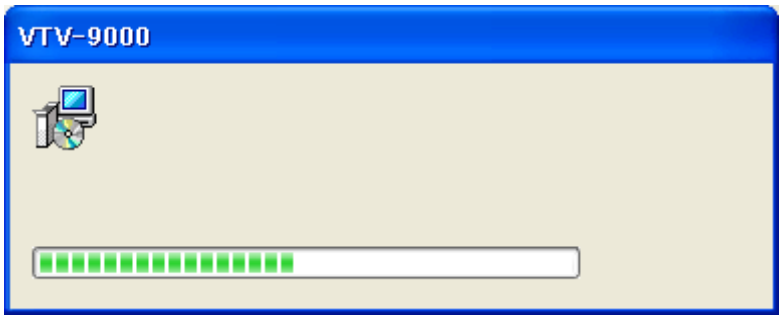
Click the **Start Installation** button.
During the install process, the program that is currently being installed will be displayed as shown below.



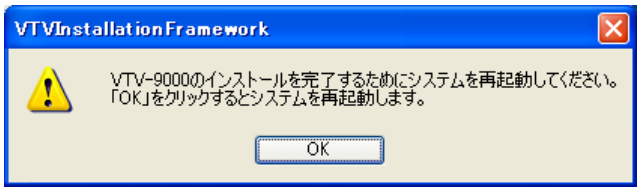
3. The **Hardware Installation** dialog for the parallel board driver will be displayed. Please confirm the message and click **Continue Anyway**.



4. The install process will start.

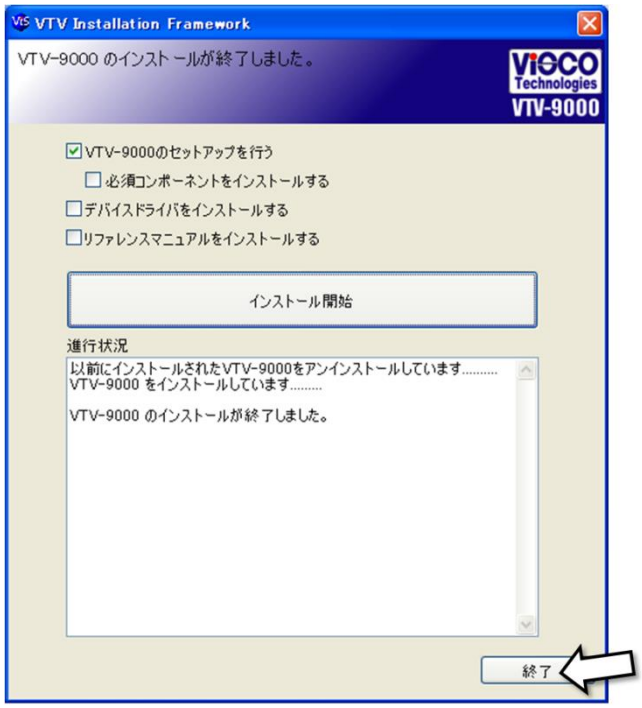


5. When the installation is complete, the following message will be displayed. Click **OK** to restart VTV-9000.
   Note: After installing the software, be sure to restart VTV-9000.

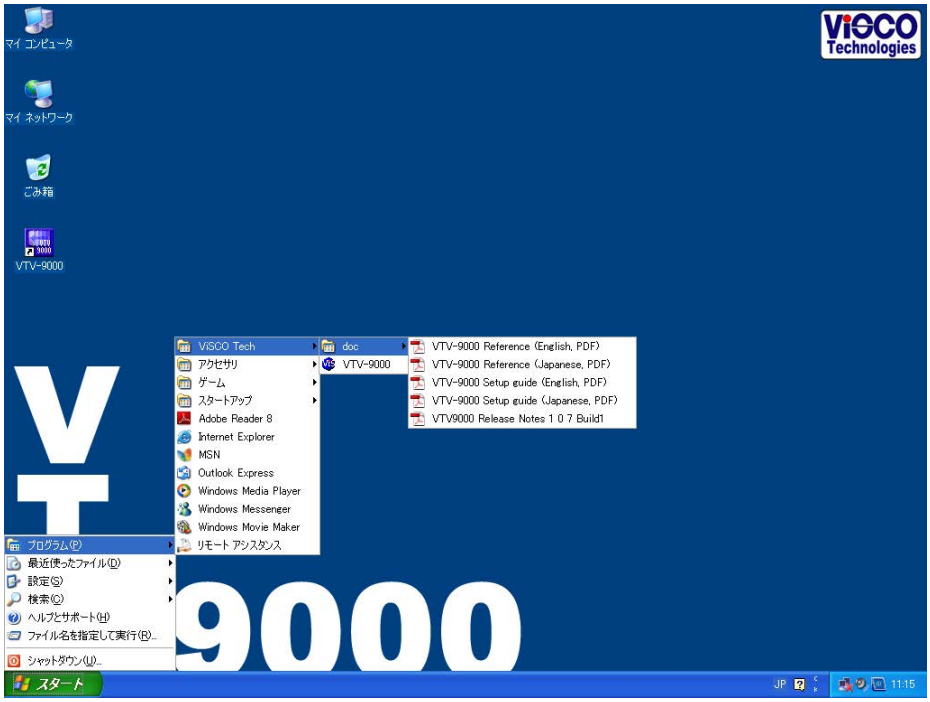


This completes the setup of VTV-9000.

If you are only running the VTV-9000 software setup, the following dialog will be displayed. Click the **Finish** button.



After the installation is complete, a shortcut to the VTV-9000 application will be automatically created on the desktop, and a `ViSCO Tech` folder will be automatically created in the `Programs` folder.
Shortcuts to the setup guide, reference manual, and release notes will be created inside the `doc` folder in the `ViSCO Tech` folder.



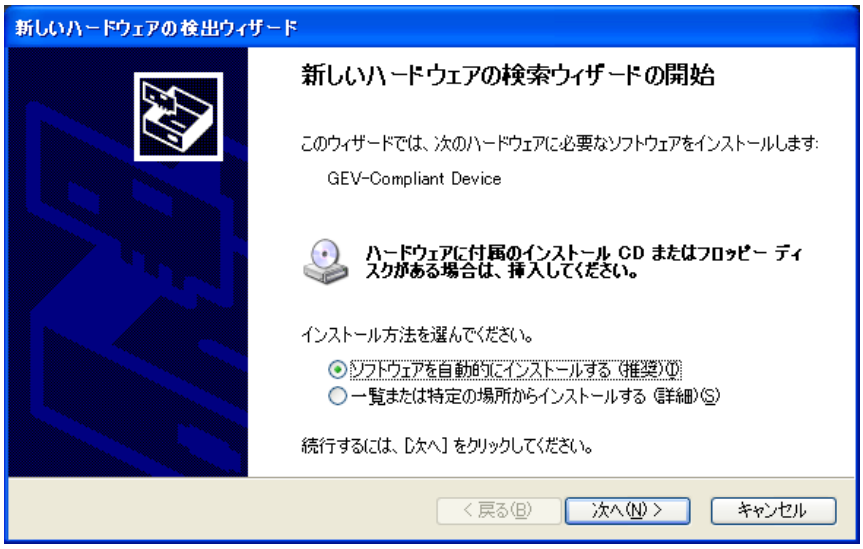
10. Cautionary Notes

10.1. Cautionary Notes Regarding the Connection of a VT-Digital E Camera

When a VT-Digital E camera is connected, the **Found New Hardware Wizard** may be displayed. Conditions in which it will be displayed are as follows:

- When the camera is connected for the first time after installing the VTV-9000 release pack.
- After connecting the camera, it is connected on a different port for the first time.
- After connecting a camera to a port, a different camera is connected to that port (Even if it is the same model, if it is a different camera the wizard will be displayed).

The **Found New Hardware Wizard** may be displayed for each camera that is connected. Do not perform any operations and simply wait until the dialog disappears.



Found New Hardware Wizard dialog

A Restart Windows message dialog may be displayed. You do not need to restart Windows.

In addition, when a camera is connected, on the bottom right of the Windows screen, a hardware problem icon will be displayed. This icon can be ignored.

11. User Support

11.1. Product Warranty Policy

1. The warranty of this product is 1 year after product shipment.
2. In the case of a product failure resulting from the normal use of the product according to the instructions manual, etc. provided by our company, we will repair the product or replace it with an equivalent product free of charge for a 1 year period based on the Product Warranty Policy. In the case that the product is replaced, the replacement will be warranted only for the period remaining under the initial warranty. The damaged unit or part that is repaired or replaced will not be returned to the customer.
3. The following will not be covered by the product warranty even if it is during the period set forth above.
   (1) Any failure due to improper use of the product (performing invalid operations that are not described in the instructions manual, or the like).
   (2) In the case that someone other than our company or a company specified by our company repairs, modifies, disassembles, or performs a similar task on the product.
   (3) Any failure due to a fire, natural or terrestrial disaster, lightning, abnormal voltage, or the like.
   (4) Any failure due to flooding, dropping, mud, sand, or the like.
   (5) Any failure due to poor installation/storage conditions or poor maintenance.
   (6) Any failure caused by a failure of a part or device that is not a part of the product (power supply, etc.).
   (7) The cost of replacing consumable parts or replacement parts due to wear-and -tear.
   (8) Any failure due to battery drain or the like.
4. The warranty covers only the main unit, and does not cover the data recorded in the product, or consumable parts (batteries). In addition, please note that when a product is repaired or replaced, the data recorded on the product may be erased.
5. We will not be liable for any direct or indirect damages resulting from the use or failure of the product.

Note:

* This Warranty Policy is provided for the purpose of guaranteeing repairs and replacements free of charge based on the above provisions, and is not provided to limit the legal rights of the customer.
* For repairs, etc. after the expiration of the warranty period, please contact our company.
* This policy is effective only within Japan.
* The hardware warranty is void if someone other than our company or a company specified by our company opens the unit case. In the case of a hardware abnormality, contact our support line.
* Memory-resident software such as virus detection software (generally called a “Service” in Windows XP) may have an adverse effect on VTV-9000 software.

11.2. Training Services

We provide VTV-9000 training services.
For details regarding the training programs and pricing, please contact our sales division.

VTV-9000 Setup Guide MANS9KE_5_7

June 16, 2014 Revision 5.7 Supporting 4.2.0 Build 1 (Added VTV-9000U)

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