# WAT-2200 Control Software
# Operation Manual

[version 1.00]

Watec Co., Ltd.

2014/11/07

Contents

# 1 Overview

‘WAT-2200 Control Software’ is software for setting and firmware update for WAT-2200 by RS-232 communication.

# 2 Disclaimer

For any damages caused by using the "WAT-2200 Control Software", Watec Co., Ltd. does not guarantee.

# 3 Operating environment

It has been confirmed the operation in the following environment.

**Table 1 System requirements**

| | |
|---|---|
| OS | Windows XP*, Windows Vista, Windows 7, Windows 8, Windows 8.1<br>(*)When using in Windows XP, install the .Net Framework 2.0 at first. |

# 4 Specification of communication

The specification of communication is below.

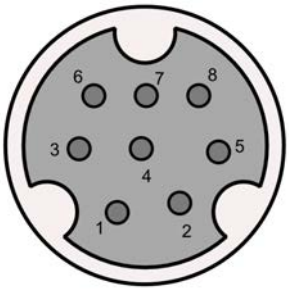
**Table 2 Communication protocol**

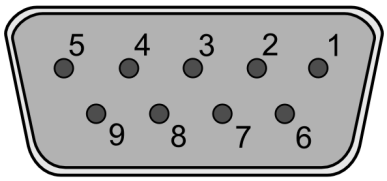
| | |
|---|---|
| COM port | -Data rate : 38400bps<br>-Data bit : 8bits<br>-Parity : none<br>-Stop bit : 1bit<br>-Flow control : none |
| limitation | - Cannot communicate with the camera on starting after about 10 seconds.<br>- At some USB-COMM converter cable, "firmware update" might be fail. Please use the officially supported converter cable at your OS. |

# 5 Communication cable

The pin assign and the connections of the serial communication cable are below.

**Table 3 pin-assignment of the communication cable**




| Mini-Din 8pin | | |
|---|---|---|
| No. | Name | Description |
| 3 | TXD (out) | Transmit Data (from Camera) |
| 5 | RXD (in) | Receive Data (from Host) |
| 4 | GND | Ground |
| 1, 2, 6, 7, 8 | | for RC-02 |

| D-Sub 9pin | | |
|---|---|---|
| No. | Name | Description |
| 2 | RXD (in) | Receive Data (from Camera) |
| 3 | TXD (out) | Transmit Data (from Host) |
| 5 | GND | Ground |
| 1, 4, 6, 7, 8, 9 | NC | No connection |

| Mini-Din 8p | | D-Sub 9p |
|---|---|---|
| TxD | 3 ---------- 2 | RxD |
| RxD | 5 ---------- 3 | TxD |
| GND | 4 ---------- 5 | GND |

# 6 How to Install

1. Start the WAT-2200 Control Software installer by double-clicking the *.msi file in the downloaded file.

*On Windows XP, please install .Net Framework 2.0 before installing this software.

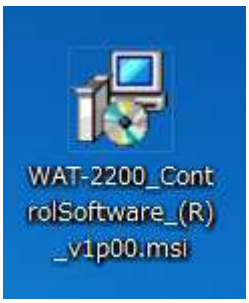



**Fig. 1 installer icon**

2. Click Next.

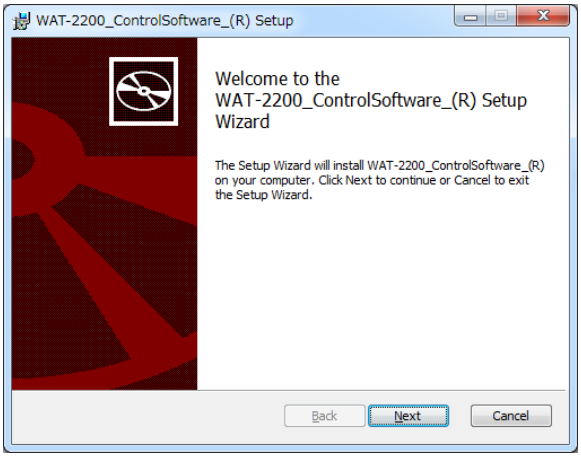



**Fig. 2 installer(1)**

3. Click Next. (In this window, the install folder can be chosen manually.)

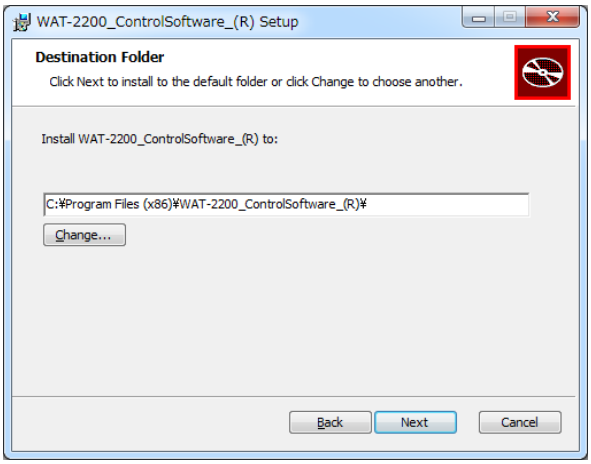



**Fig. 3 installer(2)**

4. Click Install button and then installation will be started.

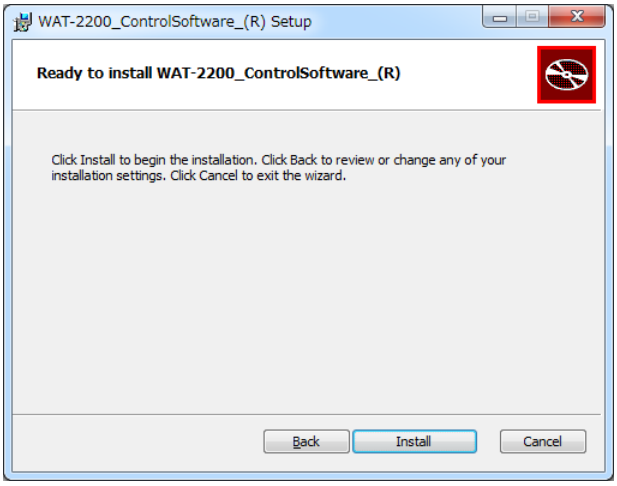



**Fig. 4 installer (3)**

5. At install process, the User Access Control (UAC) window may pop-up.
Then please click the Yes button.

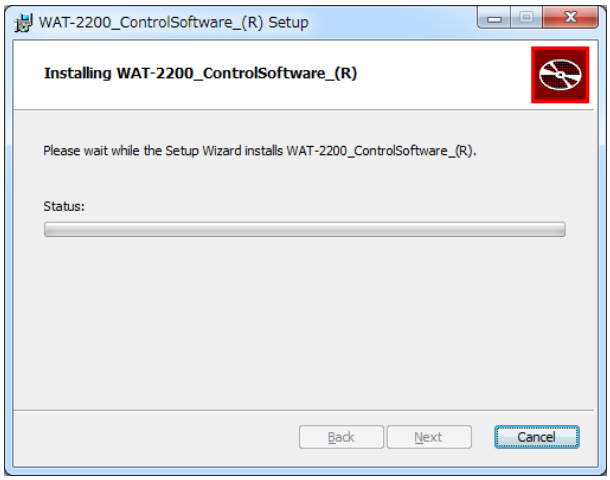



**Fig. 5 installer (4)**

6. After a few moments, the installer will complete the installation.
Click the Finish button to exit the setup wizard.

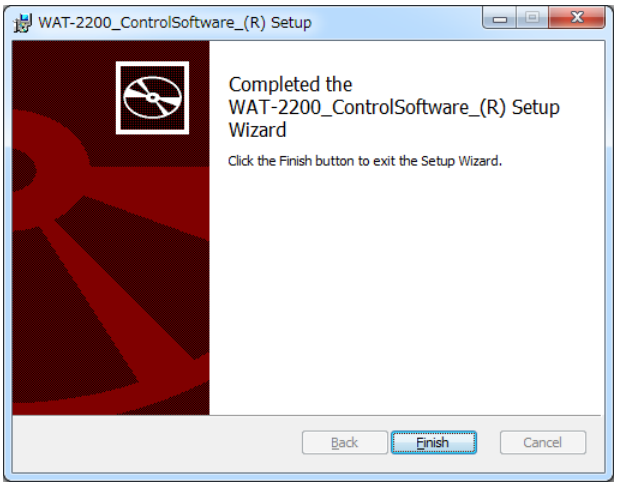



**Fig. 6 installer (5)**

# 7 How to Start

-Double click the application’s icon in the desktop.


**Fig. 7 application’s icon**

Or, Click the application’s icon in the “start menu -> all programs -> Watec -> WAT-2200_ControlSoftware_(R)”.

# 8 How to uninstall

1. Open Control Panel.
   (Start -> Control Panel -> Programs -> Uninstall a program)

2. Select “WAT-2200_ControlSoftware_(R)” from the list, right-click and click Uninstall.

3. Click “YES” in the confirmation window.
   (The UAC window will be pop-up. Then click the “Yes” button.)

# 9 Operation Description

## 9-1 Setting the port number

After software start-up, select the serial port which connected the camera.
The port number can be showed with device manager.

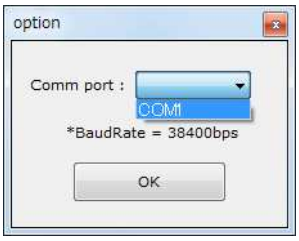



**Fig. 8 port option**

## 9-2 Function in the menu bar

### 9-2-1 “File” menu

#### 9-2-1-1 “File -> load file...” function

The camera settings saved to csv file can be retrieved on “load file...” function. (This csv file is created by the “save file...” function.)

Click “File (F) – load file...”, then file open dialog will be displayed.

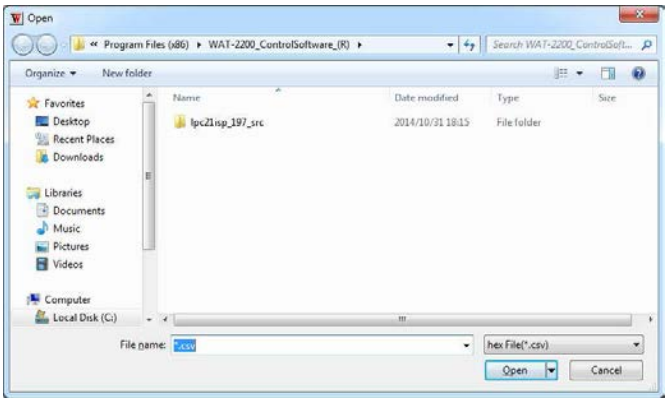



**Fig. 9 open dialog**

Select the exported file and click the “open” button, then the camera settings will load.

#### 9-2-1-2 “File -> save file...” function

The current state of user-interfaces (such as selections of buttons) can be saved to csv file.

Click “File (F) – save file...”, then file save dialog will be displayed.

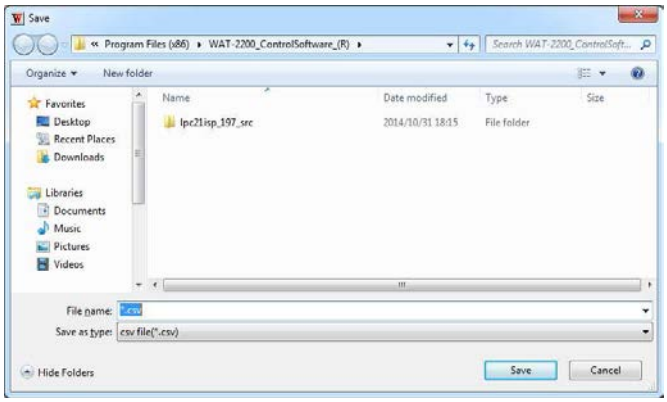



**Fig. 10 save dialog**

Choose the storage place of the file in save dialog. Click the “save” button to save the current user-interface state to csv file.

## 9-2-2 **“Camera” menu**

### 9-2-2-1 **“Camera -> get settings (from camera)” function**

It is possible to get the current camera parameters from the camera on “get settings (from camera)” function.

The current camera parameters obtained from the camera will be displayed in the user-interfaces (such as selections of buttons) of the software.

### 9-2-2-2 **“Camera -> send all settings (to camera)” function**

It is possible to send the current state of the user-interfaces (such as selections of buttons) to the camera on “send all settings (to camera)” function.

The camera parameters will be changed to the same state as the current state of the user-interfaces.

### 9-2-2-3 **Firmware update**

Update the firmware for additional functions or bug fixes.

Update procedure is following.

1. Plug the RC-02 to the camera.
2. Keep pushing the button of the UP and the DOWN.
3. Reboot the camera.
4. Unplug the RC-02 and plug the communication cable.
5. Click the ‘Camera->Firmware Update’.
6. Click ‘OK’, when the new window is pop-up.

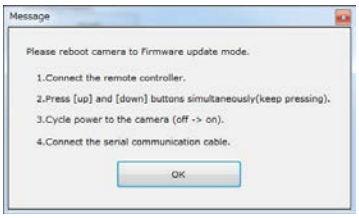



**Fig. 11 Firmware Update (confirm)**

7. Select the firmware file (.hex), and click OPEN.
8. The firmware update will start.
9. When finished, click OK and reboot the camera.


**Fig. 12 Firmware Update (finish)**

## 9-2-3 **About..**

This menu will display version information for this program.

## 9-3 Change the camera settings

### 9-3-1 Exposure

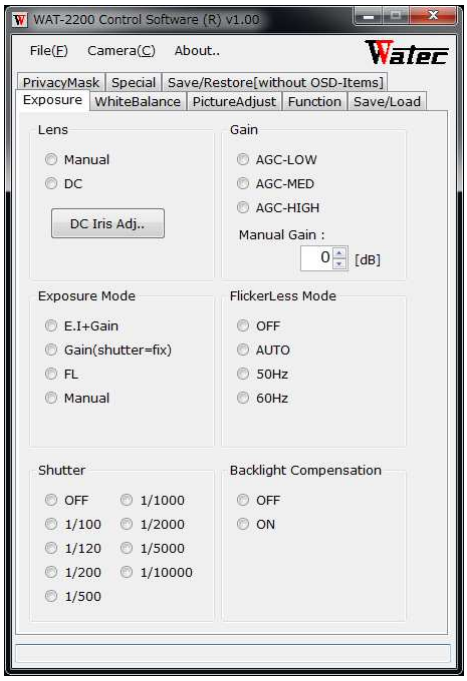



**Fig. 13 exposure tab**

#### 9-3-1-1 Lens

Select the lens type.

**Table 4 Selection of lens type**

| MODE | FUNCTION |
|---|---|
| Manual | For manual iris lens. |
| DC | For DC-drive iris lens.<br>Need to make the automatic adjustment. |

When the DC iris lens is attached, iris will be open if you select the “Manual”.
When the Manual iris lens is attached, “DC” cannot be selected.

[Automatic adjustment]

The aperture amount and speed of iris automatically adjusts and optimizes the performance of the lens.

1. Attach the DC iris lens.
2. Shoot a bright subject (E.g. Light boxes and light bulbs, etc.) in full screen.
3. Click the [DC Iris Adj..] button and click the [start] on adjustment window.
4. Adjustment is success, if the message window with "dc iris adj completed." is pop-up.

(*) If the "error" message is pop-up, please make sure the DC iris lens cable is connected correctly, or a subject is brightly enough.

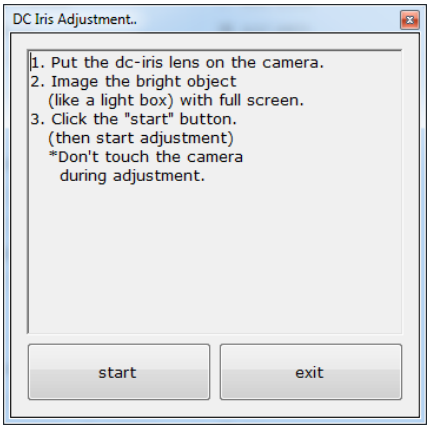



**Fig. 14 Dc Iris Adjustment Window**

## 9-3-1-2 **Exposure Mode**

Select the EXPOSURE MODE.
Each modes function by the combination of the shutter and gain as the following.
If the manual iris lens attached to the camera (DC iris lens cable is not connected), FL cannot be selected.

**Table 5 Selection of exposure modes**

| MODE | Shutter | Gain |
|---|---|---|
| E.I+GAIN | Auto | Auto |
| GAIN | Arbitrary | Auto |
| FL | Auto※ | Auto |
| MANUAL | Arbitrary | Arbitrary |

*1/100(1/120)s or OFF

[E.I+GAIN]
The exposure is adjusted automatically by the electronic Iris and the automatic gain control.

[GAIN]
The exposure is adjusted by the automatic gain control. Electronic shutter control is fixed, and speed is arbitrary. According to photographic subject's brightness, image of camera may be overexposed by choosing a slow-side shutter speed. Then use the dc iris lens together.

[FL]
The exposure is adjusted automatically by the electronic iris and the automatic gain control.
Basically, the electronic iris will be fixed in the shutter speed of flickerless(1/100 or 1/120).
At that time, image of camera will be overexposed. Therefore, the dc iris lens is required.

[MANUAL]
The electronic iris control and the gain control are fixed. Shutter speed and gain can be chosen arbitrarily.

### 9-3-1-3 **Shutter**

In EXPOSURE MODE, when choosing the GAIN or MANUAL, you can choose the shutter speed by your preference.

**Table 6 electronic shutter speed**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1/10000s | 1/5000s | 1/2000s | 1/1000s | 1/500s | 1/200s | 1/120s | 1/100s | OFF |

### 9-3-1-4 **Gain**

In EXPOSURE MODE, when choosing the MANUAL, you can choose the gain by your preference. At other modes, need to select the operating range of AGC.

**Table 7 fixed gain**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 dB | 2 dB | 4 dB | 6 dB | 8 dB | 10 dB | 12 dB | 14 dB |
| 16 dB | 18 dB | 20 dB | 22 dB | 24 dB | 26 dB | 28 dB | 30 dB |

**Table 8 AGC range**

| MODE | GAIN RANGE |
|---|---|
| AGC LOW | 0～32 dB |
| AGC MED | 0～42 dB |
| AGC HIGH | 0～66 dB |

### 9-3-1-5 **Flickerless Mode**

When FL is chosen in EXPOSURE MODE, need to choose the frequency commercial power supply considering the FLICKERLES. By setting the AUTO, 50/60Hz is automatically detected. Other than the FL mode, OFF setting is fixed.

**Table 9 Flickerless mode**

| MODE | FUNCTION |
|---|---|
| OFF | This mode is chosen when EXPOSURE MODE is other than FL. |
| AUTO | The frequency of a flicker is detected from a camera image and 50 Hz or 60 Hz are set up automatically. |
| 50Hz | This mode is chosen when it is an area whose commercial frequency is 50 Hz. |
| 60Hz | This mode is chosen when it is an area whose commercial frequency is 60 Hz. |

## 9-3-1-6 **Backlight Compensation**

BACKLIGHT COMPENSATION is performed by center-weighted exposure. When choosing the
MANUAL in EXPOSURE MODE, BACKLIGHT COMPENSATION fixed OFF.

## 9-3-2 **White Balance**

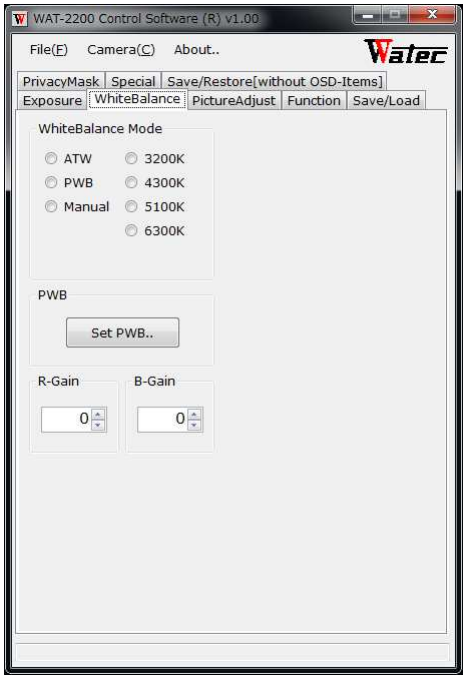



**Fig. 15 White Balance tab**

## 9-3-2-1 **White Balance Mode**

Switch the white balance mode.

**Table 10 White Balance mode**

| MODE | FUNCTION |
|---|---|
| ATW | Automatically follows and adjusts to the changing color temperature of the illumination of the object. |
| PWB | Set the corrected value following the actual color temperature of the illumination of the object. Imaging the object that color is achromatic at the full screen, and press the [Set PWB]. The corrected value is set. |
| 3200K | (Bulb mode)<br>Corrects the white balance based on the white under the incandescent bulb. |
| 4300K | (Fluorescent light mode1)<br>Corrects the white balance based on the white under the reddish fluorescent light. |
| 5100K | (Fluorescent light mode2)<br>Corrects the white balance based on the white under the bluish fluorescent light. |
| 6300K | (Sun light mode)<br>Corrects the white balance based on the white under the sun light. |
| Manual | Set the R-Gain and the B-Gain by manually. |

## 9-3-3 **PictureAdjust**

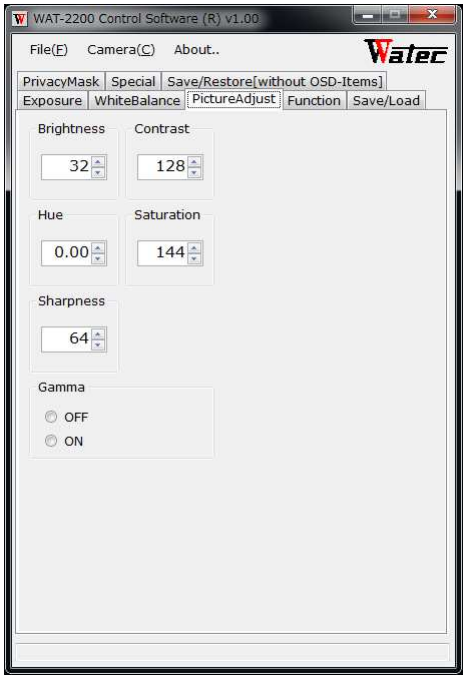



**Fig. 16 Picture Adjust tab**

## 9-3-3-1 **Brightness**

Adjust the brightness of image.

**Table 11 brightness**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 32 | 64 | 96 | 128 | 160 | 192 | 224 | 255 |

## 9-3-3-2 **Contrast**

Adjust the contrast of the image.

**Table 12 contrast**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 |
| 144 | 160 | 176 | 192 | 208 | 224 | 240 | 255 | |

## 9-3-3-3 **Hue**

Adjust the hue.

**Table 13 hue**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| -2.00 | -1.75 | -1.50 | -1.25 | -1.00 | -0.75 | -0.50 | -0.25 | 0.00 |
| 0.25 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | |

## 9-3-3-4 **Saturation**

Adjust the color strength.

**Table 14 saturation**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 |
| 144 | 160 | 176 | 192 | 208 | 224 | 240 | 255 | |

## 9-3-3-5 **Sharpness**

By emphasizing the contoured part, resolution is improved.

**Table 15 sharpness**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 32 | 64 | 96 | 128 | 160 | 192 | 224 | 255 |

## 9-3-3-6 **Gamma**

Switch the GAMMA correction.
The correction coefficient is ON ≒ 0.45.

## 9-3-4 **Function**

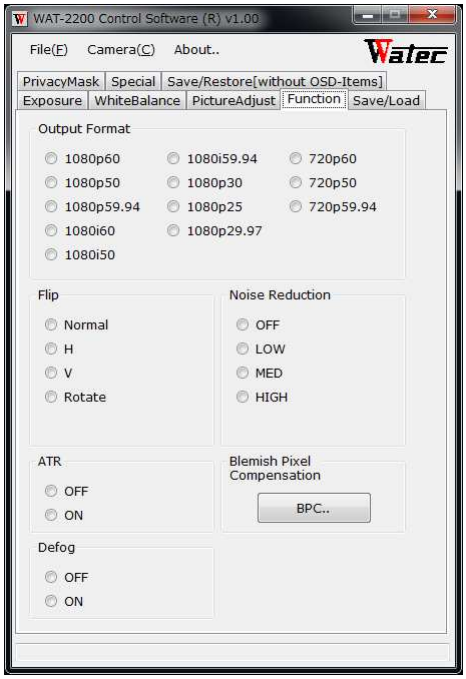



**Fig. 17 Function tab**

## 9-3-4-1 **Output Format**

Select the format supported by the connected monitor (Receiver equipment).
If the output format is changed, after a camera reboot, it is enabled.

**Table 16 Details of the Output Format**

| Mode | Resolution | | FRAME RATE [fps] | Interlace / Progressive | SDI |
|---|---|---|---|---|---|
| | H | V | | | |
| 1080p60 | 1920 | 1080 | 60 | P | 3G-SDI |
| 1080p50 | | | 50 | | |
| 1080p59.94 | | | 59.94 | | |
| 1080i60 | | | 30 | I | HD-SDI |
| 1080i50 | | | 25 | | |
| 1080i59.94 | | | 29.97 | | |
| 1080p30 | | | 30 | P | |
| 1080p25 | | | 25 | | |
| 1080p29.97 | | | 29.97 | | |
| 720p60 | 1280 | 720 | 60 | | |
| 720p50 | | | 50 | | |
| 720p59.94 | | | 59.94 | | |

### 9-3-4-2 **Flip**

Flip the image at left/right (H), up/down (V) and Rotate (left/right/up/down).

### 9-3-4-3 **ATR**

Correct the contrast, and reduce the whitening-out/ black defects.

### 9-3-4-4 **Defog**

Correct the image that the contrast is not clear by fog. In parallel, the ATR is ON.

### 9-3-4-5 **Noise Reduction**

By image processing, noise under the dark site is reduced.

### 9-3-4-6 **Blemish Pixel Correction**

By automatically detection, blemish pixel is corrected.
Press the [start] at the light-shielding state (by closing the lens iris). When using DC IRIS LENS, the iris is full closed automatically.

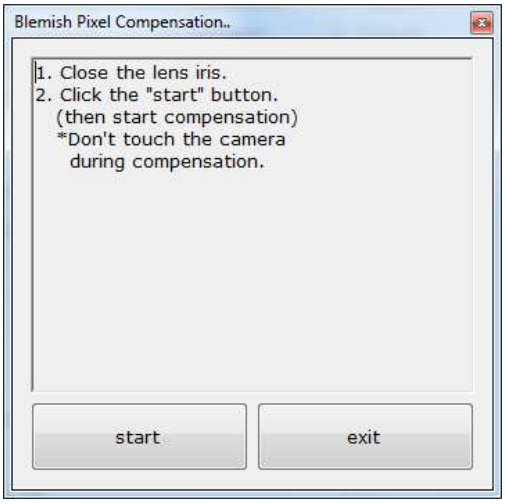



**Fig. 18 Blemish Pixel Adjustment window**

## 9-3-5 **Save/Load**


**Fig. 19 Save/Load tab**

### 9-3-5-1 **Save User Settings**

Save the current settings of the setting window to the camera. When the power is ON at next time, the camera will be started on saved settings.

### 9-3-5-2 **Load User Settings**

The above saved setting is read out.

### 9-3-5-3 **Restore Factory Settings**

Back to the factory default settings.

## 9-3-6 **Privacy Mask**

Show the privacy mask. The basic setting procedure is as follows.

1.Click on the top of the button to select the number of the privacy mask to be set. (Mask 0-15 to be set individually)

2.Put a check to show.

3.Set the opaque. (Above 0.5)

4.Set the ‘start X’, ‘end X’, ‘start Y’ and ‘end Y’.

5.Set the ‘color Y’, ‘color Cb’, ‘color Cr’ and ‘outline width’.

The mask color also can be select from the preset.

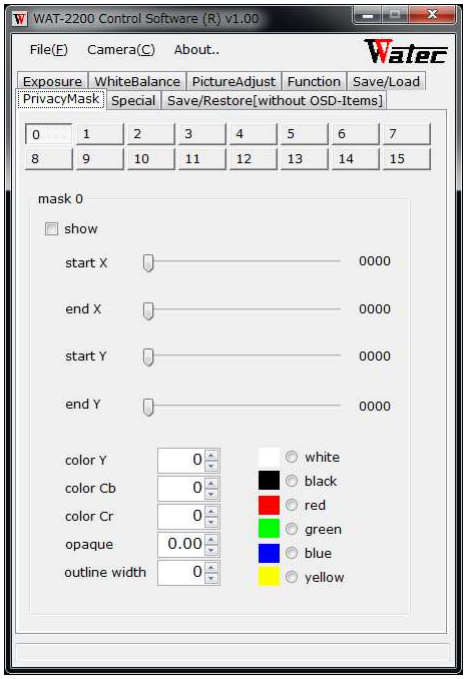



**Fig. 20 Privacy Mask tab**

[Application of privacy mask]

The privacy mask function, not only hide the specific part of the subject, you can be the following of such applications.

ex1) Inverted mask

Mask the entire screen. Then open the window to the viewing area.

* When set the multiple privacy masks, mask 0 is visible on top. In this example, set mask 0 and mask 1 as a window, set mask 2 as the entire mask.

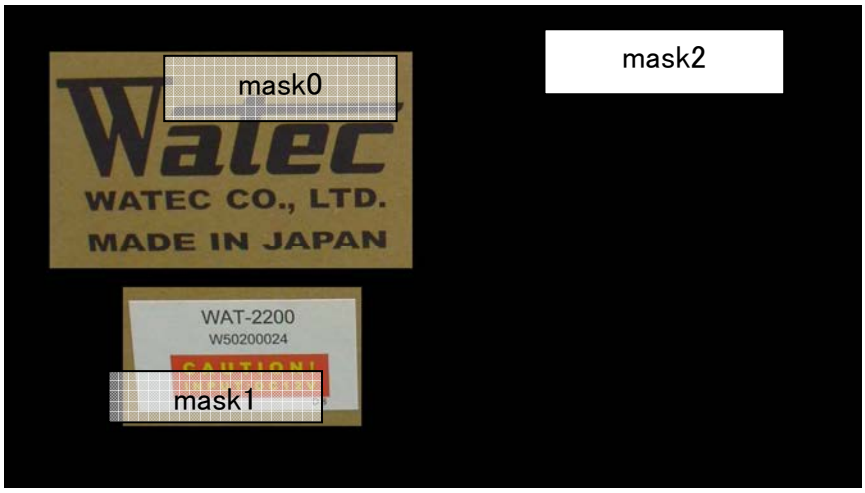



**Fig. 21 Inverted mask**

Setting example of the inverted masks is below.

**Table 17** Setting example of the inverted mask

| Number of mask | show | start X | end X | start Y | end Y | color Y | color Cb | color Cr | opaque | outline width |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | checked | 0080 | 0862 | 0120 | 0560 | 0 | 0 | 0 | 0.00 | 0 |
| 1 | checked | 0226 | 0791 | 0606 | 0913 | 0 | 0 | 0 | 0.00 | 0 |
| 2 | checked | 0000 | 1920 | 0000 | 1080 | 0 | 0 | 0 | 1.00 | 0 |

ex.2) Cross line

Display some lines for measuring or positioning.

*The start X and the end X are valid only even.

*Mask width is 2 pixels minimum.


**Fig. 22 Cross line**

Setting example of the cross lines is below

**Table 18 Setting example of the cross lines**

| Number of mask | show | start X | end X | start Y | end Y | color Y | color Cb | color Cr | opaque | outline width |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | checked | 0640 | 0642 | 0000 | 1080 | 8 | 8 | 8 | 1.00 | 0 |
| 1 | checked | 1280 | 1282 | 0000 | 1080 | 8 | 8 | 8 | 1.00 | 0 |
| 2 | checked | 0000 | 1920 | 360 | 362 | 8 | 8 | 8 | 1.00 | 0 |
| 3 | checked | 0000 | 1920 | 720 | 722 | 8 | 8 | 8 | 1.00 | 0 |

## 9-3-7 **Special**

Adjust the correction level of the contrast and defog.

・ATR-Level

Select the correction strength of the ATR. (Low, Medium, High)

* If the 'high' is selected, an artificial noise might visible.

・Defog-Level

Select the correction strength of the compensation level of the defog. (Low, Medium, High)

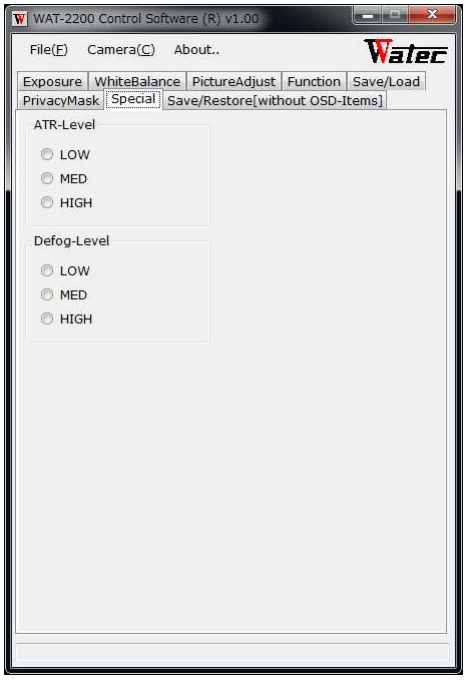



**Fig. 23 Special tab**

## 9-3-8 **Save/Restore[PrivacyMask/Special] tab**

Save the settings of the privacy mask and the special. Can also delete and restore.
The saved settings are automatically loaded at the camera boot process.

・Save Settings[PrivacyMask/Special]
・Delete Settings[PrivacyMask]
・Restore Factory Settings：ATR-Level/Defog-Level (not save in the camera)

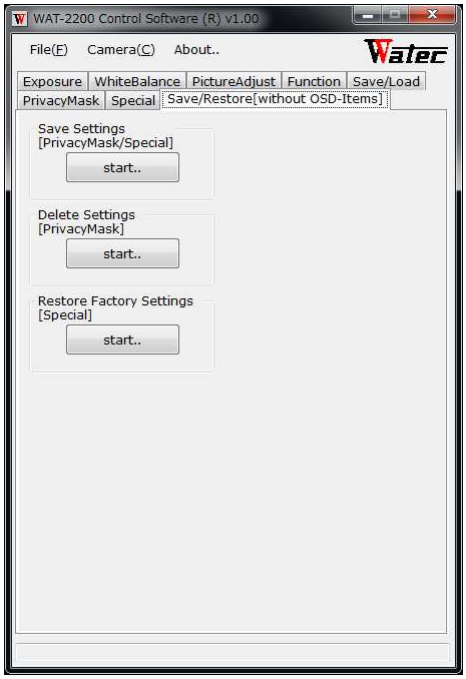



**Fig. 24 Save/Restore tab[without OSD-Items]**

# 10 Change history

- 2014/11/07 [version 1.00] Add change the camera settings.
- 2014/10/31 [version 0.91] Add install procedure, Save/Load function.
- 2014/10/7 [version 0.90] Add new functions.
- 2014/9/29 [version 0.10] 1st release.