



IMAGE CLARIFYING UNIT  
**FORTEVISION**  
**FV-2000NT**  
**FV-2000PL**  
INSTRUCTION MANUAL









# Safety Rules











Thank you for purchasing our product, this time.

Before using this unit, be sure to carefully read this instruction manual and understand its contents, and exercise sufficient caution for safety when handling this unit.

In this instruction manual, the signal words, "WARNING" and "CAUTION", are used against prospective hazards according to the hazardous level.

WARNING 	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
CAUTION 	Indicates a hazardous situation which, if not avoided, could result in personal injury or property damage.

 WARNING	
	Do not connect any AC adapter other than the one attached as an accessory.
	Do not touch any internal parts nor modify the product by opening its cover.
	Do not adapt this unit for any applications such as life-related transportation machinery, medical equipment, aerospace equipment and atomic energy-related equipment, which require higher reliability.
	This unit is designed so that safety is secured when used indoors. Therefore, be sure to use it indoors.
	Immediately turn OFF the power supply if smoke or abnormal smell has been generated.
	Do not touch this unit, its power cable, and the video signal cable in the event of thunder. Otherwise, an electric shock may result.
	Do not splash any liquid like water on the product. Do not put any container with some liquid in it on and around the top plate.

 CAUTION	
	Do not use this unit in an environment at low or high temperature extreme.
	Do not change the settings of the operation setting switches by opening the unit case.
	Exercise caution when connecting I/O cables since no warranty is given to any influence on other equipment due to incorrect cable connections at the input/output terminals.
	Set the unit on a flat and stable place.
	Do not use the unit in an environment where magnetic or electric field is intense or waveform distortion or noise of the input power supply is great.
	Do not move the main body of the unit, applying excess force on it with its cables connected.
	Regularly check the power cord against tear of its sheath, open-circuit, etc.
	Gently wipe with a soft cloth wet with a neutral detergent when the panel surface is dirty. Do not use volatile solvent like thinner and benzine.
	Do not play the attached CD on a music CD player as it includes various documents and software.

## Notices on Use

- Though the contrast improvement algorithm built in this unit is designed to successfully process the images in various situations, its performance may not be prominent when a great offset is given to the video input signal or the image adjustment parameters (such as "Brightness") of the target monitor is quite different from the standard.
- The image clarifying function of this unit is designed, targeting the natural (non-artificial) images taken by a camera, etc. Good results may not be obtained or unnatural images may result for artificially created or processed images, such as graphical images on a personal computer.

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# 1. Introduction

This is an image processing unit that improves the visibility of objects by clarifying video images at low contrast. Images whose visibility has lowered due to various factors such as low illuminance, backlight, and fogs are optimized easy on human eyes. Our original real time image clarifying technology "ForteVision" is introduced into the image clarifying processing. The built-in contrast improvement processing and Gaussian noise filter processing have improved contrast and reduced noise at low illuminance. The adopted video signal covers the analog composite signal and can be easily built into the existing video transmission system.

Since image clarifying processing is executed automatically, it is not necessary to change the setting of each parameter even when external light condition has changed.

Normally, no adjustment is necessary for the improvement level, but the image clarifying processing strength level can be switched over in 3 steps while the noise filter strength level is switched over in 2 steps. (However, note that noise and contour may become obvious if the image clarifying processing strength level is raised). This unit can be operated with the buttons on the front panel as well as by the attached serial control software. (Since the items operative with the buttons on the front panel are the same as those operative by the software, the software need not be installed unless the unit is operated from a distance.)

## 2. Basic Specifications

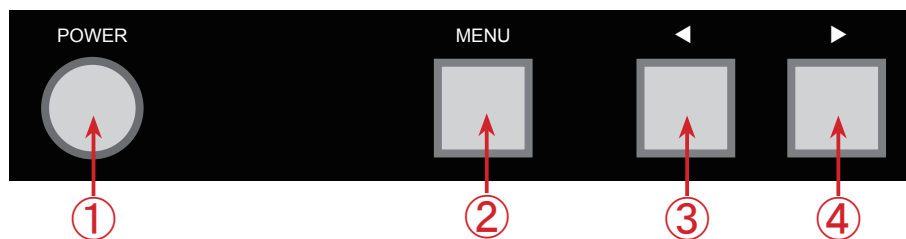
Item	Specifications
Input video signal	NTSC (FV-2000NT) / PAL (FV-2000PL)
Input signal format	Analog composite
Input signal terminal	BNC connector 75 $\Omega$
Output video signal	NTSC (FV-2000NT) / PAL (FV-2000PL)
Output signal format	Analog composite
Output signal terminal	BNC connector 75 $\Omega$
Pass-through function	Input video is output as is when the unit is powered OFF.
Image clarifying processing strength adjustment	3-step switchover of OFF/Normal/Enhance
Noise filter strength adjustment	2-step switchover of Soft/Hard
Black level adjustment	Correct the black level of image (0 - 32).
Brightness adjustment	Brightness adjustment (0 - 100)
Quad (Quad partition image) processing switch over	Quad (Quad partition image) processing OFF/ON
Remote control	Serial communication (RS-232C)
Control unit connector	D-Sub 9 pin
Power supply voltage	100 - 240 V $\pm$ 10% AC 50 / 60 Hz (attached AC adapter)
Power consumption	3 W
Environmental conditions	Temperature: 0 $^{\circ}$ C - 50 $^{\circ}$ C (32 $^{\circ}$ F - 122 $^{\circ}$ F) Humidity: 20 % - 80 % (with no dew deposition)
Mass	1.3 kg (with AC adapter excluded)
Outside dimensions	214 mm (W) $\times$ 143 mm (D) $\times$ 40 mm (H) (Projections excluded.)

## 3. Configurations

- Unit (main body)  $\times$  1 pc
- AC adapter  $\times$  1 pc
- Instruction manual(this paper)  $\times$  1
- CD (Serial control software and instruction manual included)  $\times$  1 pc

## 4. Panel (Operation/Connections)

### 4.1. Front panel



① POWER button

Turns ON/OFF the power supply of this unit. The periphery of the button lights up when pressed ON.

② MENU button

Displays MENU screen and selects an adjustment item. MENU screen will disappear when the button is held pressed for approx. 3 seconds.

③ ◀ button

Switches over the image clarifying processing strength.

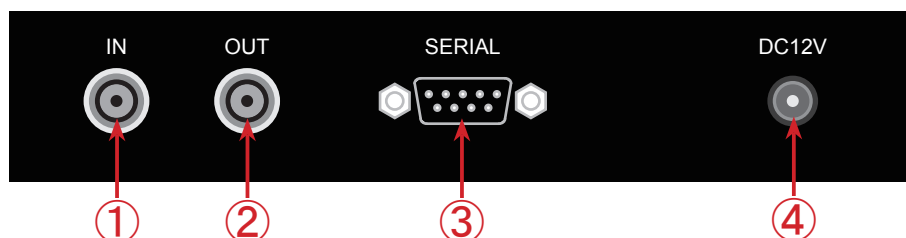
Moves the cursor or lowers a setting value when MENU screen is displayed.

④ ▶ button

Switches over the image clarifying processing strength.

Moves the cursor or raises a setting value when MENU screen is displayed.

### 4.2. Rear panel



① Analog video signal input

This is the input terminal (BNC) of the analog video signal. Video signal that needs image processing is inputted from this terminal.

② Analog video signal output

This is the output terminal (BNC) of the analog video signal. Processed video signal is outputted from this terminal.

(The input video signal is outputted as is when this unit is powered OFF.)

③ Serial control input (RS-232C)

This is a control input terminal conformed with the RS-232C standard. This unit can be remote-operated by connecting with a personal computer, using the attached serial control software.

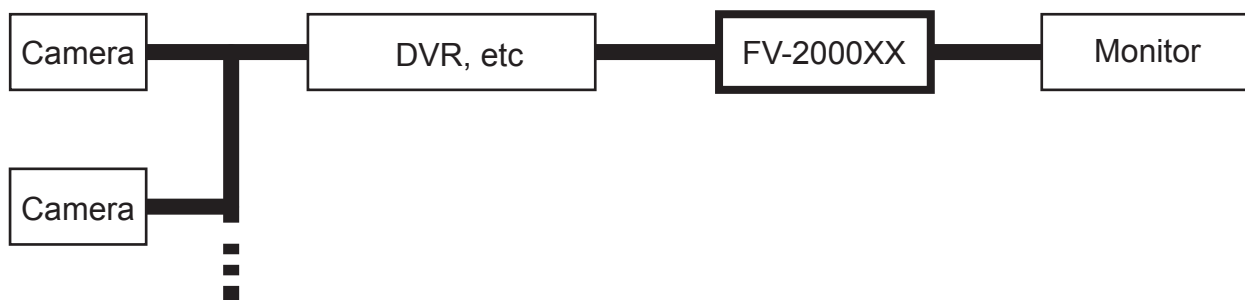
Use a D-Sub 9-pin cross cable for the serial communication.

④ Power supply terminal

Connect the attached AC adapter. Never connect any AC adapter other than the attached.

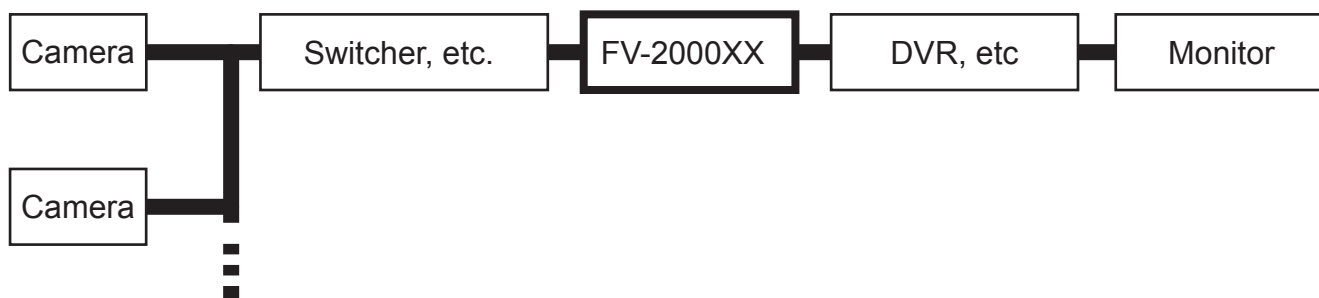
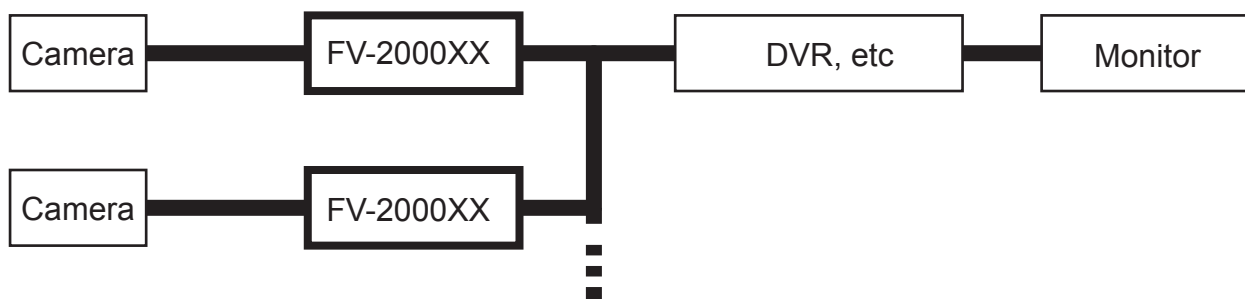
### 4.3. Connection diagram

When the video data from a video recorder is image-clarifying-processed and displayed on a monitor:



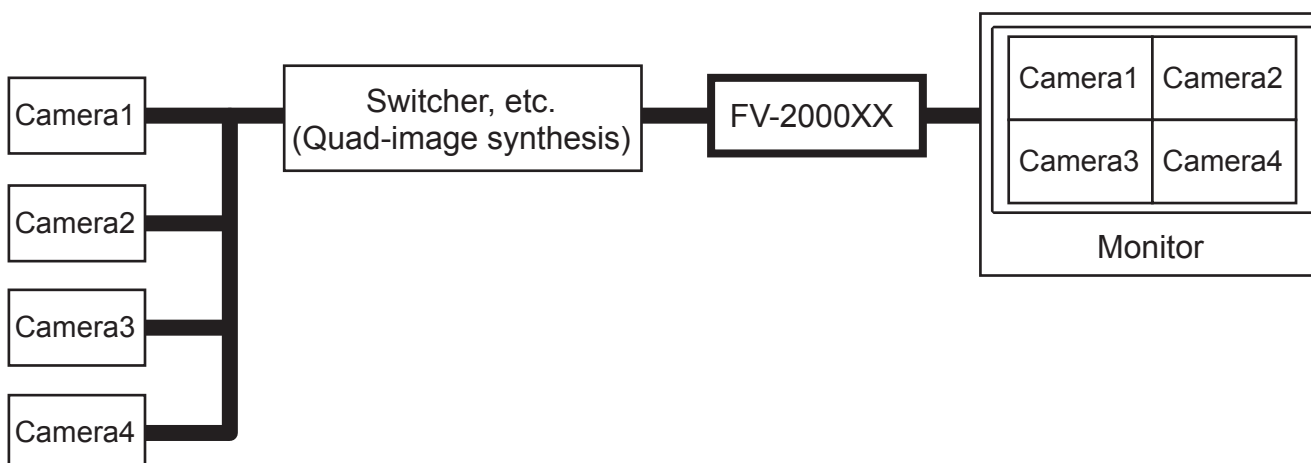
When the image data from a camera is image-optimized and then outputted to a video recorder:

\* The image data from a camera can be optimized in real time.



When performing Quad (Quad partition image) processing:

\* When the images from four cameras are synthesized into one image with an external device such as a switcher, the image clarifying effect may be poor when the difference in illuminance of the images from four cameras is excessively great. In such a case, validate the Quad (Quad partition image) processing function.



## 5. Descriptions of Functions

### 5.1. Image clarifying processing adjust

The strength of image clarifying processing can be set in 3 steps by pushing ◀/▶ buttons. Image clarifying processing improves images hard to see to those easy to see by correcting the image contrast. The images under non-ideal external light conditions at low illuminance, backlight or fogs are corrected suitably.

Button operation	◀ ↔ ▶		
Status	FV OFF	FV ON (1)	FV ON (2)
Processing strength	OFF	Normal	Enhance

\* We normally recommend "Normal" for setting since noise becomes obvious depending on the image when strength is raised.

### 5.2. Operation on MENU screen

The setting of each function can be changed by pressing MENU button to open MENU screen. The effect of the setting change is immediately reflected on the monitor display image, and the changed setting is retained even after MENU screen is closed and the power supply is turned OFF. The effect of each function turns ON (Effective) when the image clarifying processing strength is set ON.

\* Only BLACK/Black level adjustment is ON (Effective) even when the image clarifying processing strength is OFF.

Each function	Image clarifying processing strength		
	OFF	Normal	Enhance
FILTER	OFF	ON	ON
BLACK	ON	ON	ON
BRIGHT	OFF	ON	ON
STATUS	FV OFF	FV ON (1)	FV ON (2)

Monitor Display Image

Status Display

FV ON (1)

Each function	OFF	Normal	Enhance
FILTER	OFF	ON	ON
BLACK	ON	ON	ON
BRIGHT	OFF	ON	ON
STATUS	FV OFF	FV ON (1)	FV ON (2)

Setting at Shipment of Product

Each function	OFF	Normal	Enhance
FILTER	OFF	ON	ON
BLACK	ON	ON	ON
BRIGHT	OFF	ON	ON
STATUS	FV OFF	FV ON (1)	FV ON (2)

MENU screen

Histogram

#### 5.2.1. FILTER / Noise filter strength adjustment

This function reduces noise without damaging detailed portions of image as much as possible. Especially, the effect of this function is obvious in such a case when Gaussian noise is increased in low illuminance portion.

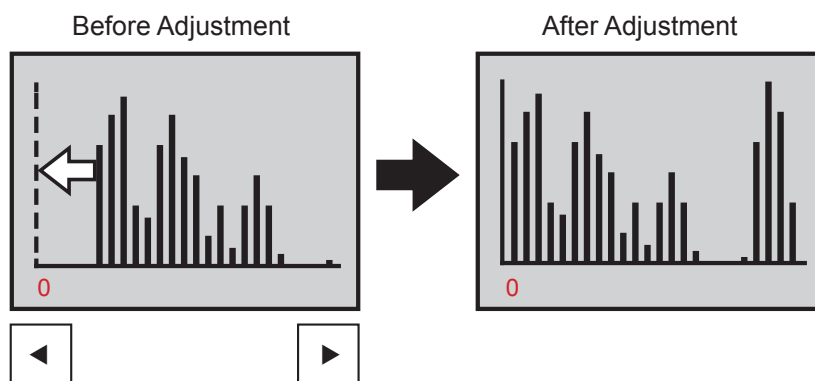
Strength of the correction is set to 2 steps (Soft/Hard).



### 5.2.2. BLACK / Black level adjustment

When black level doesn't drop down to the correct level in the range of input video signal swinging, the effect of image clarifying will be poor. In such a case, better image can be obtained by adjusting the black level. The black level is adjusted while watching a histogram that simply shows the luminance level.

Select "BLACK" in the adjustment menu, and adjust the leftmost bar in the histogram to a position near Level 0 with ◀/▶ buttons.



\* Accurate matching to Level 0 is needless as the histogram is only a guidance.

### 5.2.3. BRIGHT / Brightness adjustment

This function adjusts the brightness of output image. The standard setting is "50".

Low brightness portion becomes easy to see by adjusting this setting in the plus direction when low brightness portion in the image is hard to see. On the other hand, the noise outstanding at low brightness portions can be reduced by adjusting this brightness level in the minus direction.

### 5.2.4. STATUS / Status display switchover

This function switches over the status display of output video image.

When set to "ON", the current status of image clarifying processing strength is displayed at the upper right on the screen.

\* Image clarifying processing strength is selected by the setting described in "5.1. Image clarifying processing".

### 5.2.5. QUAD / Quad (Quad partition image) processing switchover

This function divides input image into quad (Quad. partition) images and provides each partition image with an appropriate image clarifying processing.

When the images from four cameras are synthesized into one image with an external device such as a switcher, the image clarifying effect may be poor when the difference in illuminance of the images from four cameras is great. In such a case, validate the Quad (Quad partition image) processing function. (Refer to "4.3. Connection diagram".)

### 5.2.6. EXIT / MENU screen deletion

This function erases MENU screen.

\* MENU screen will be also erased when this unit is left for approx. 20 seconds without any operation or MENU button is held pressed for approx. 3 seconds.

## 6. Serial Control Functions

### 6.1. Outline

The setting of each function can be remotely switched from a distance when this unit is connected with a personal computer with a RS-232C cable.

Install the attached serial control software to remotely control from a personal computer.

### 6.2. Adaptable OS

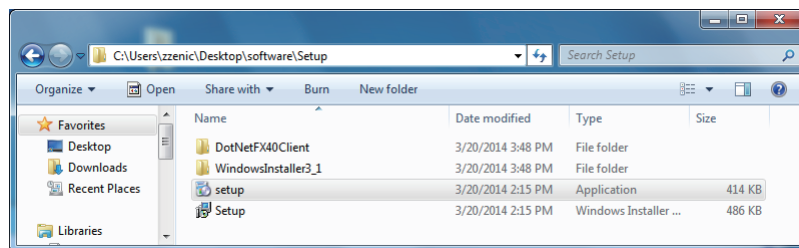
The attached serial control software supports the following OS environment.

- Microsoft Windows Vista (32bit/64bit)
- Microsoft Windows 7 (32bit/64bit)
- Microsoft Windows 8 (32bit/64bit)

### 6.3. Installation of control software

#### 6.3.1. Startup of installer

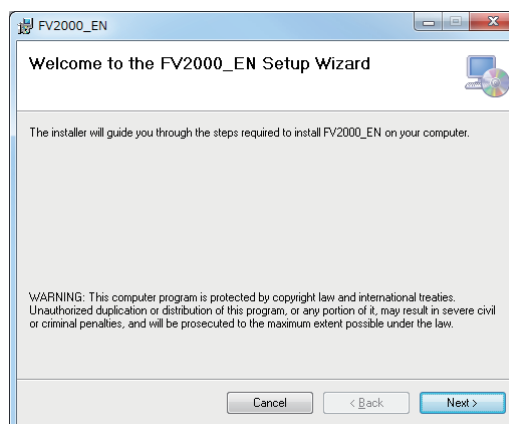
Execute "Software\Setup\Setup.exe" in the attached CD.



#### 6.3.2. Setup wizard

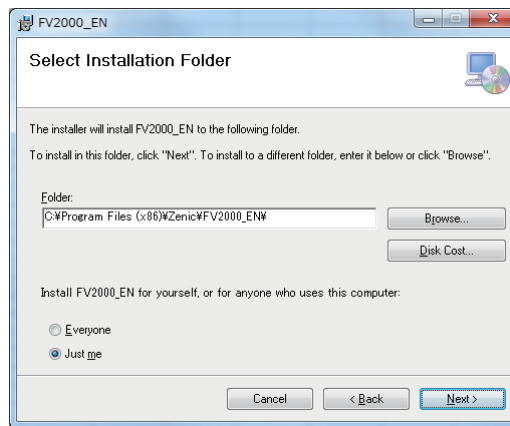
The installer starts. Then, click on "Next>".

\* The setup screen ".NET Framework 4.0" is displayed when ".NET Framework 4.0" is not installed in the personal computer. In this case, install it according to the instruction.



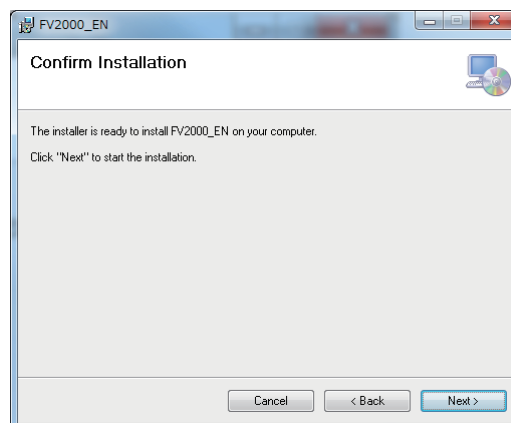
### 6.3.3. Selection of installation folder and user

Select an intended destination folder for installation and a user type ("Everyone" or "Just me"), and then click on "Next>".



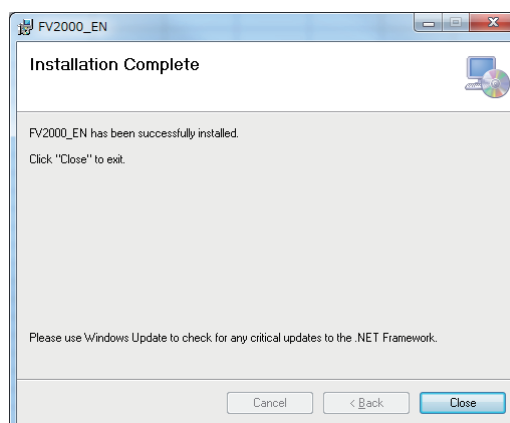
### 6.3.4. Confirmation of installation

The installation confirmation screen is displayed. Then, click on "Next>".



### 6.3.5. Completion of installation

Installation will automatically proceed and complete with the following screen displayed. Then, click on "Close".

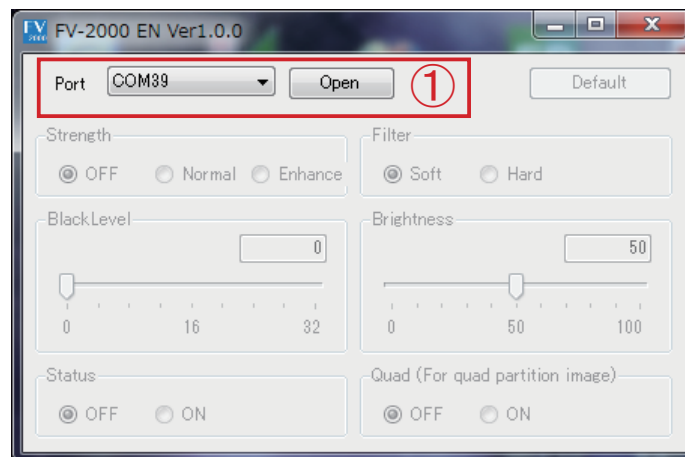


### 6.3.6. Startup of control software

The following short cut icon appears on the desktop as soon as the installation is complete. Double-click on this icon to start the software.

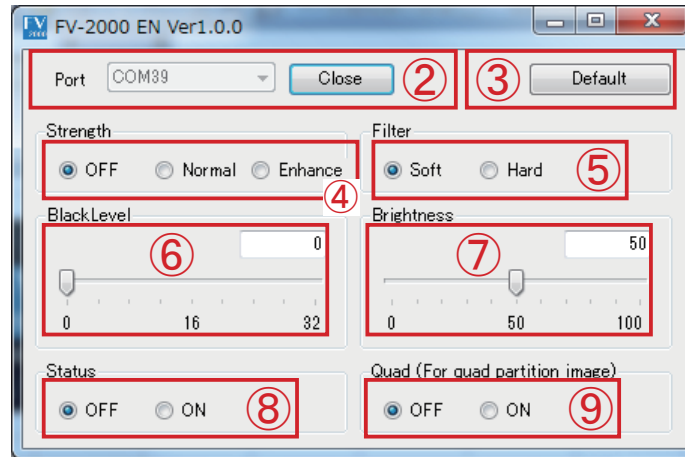


### 6.4. Operation on control software screen



#### ① Port opening

By double-clicking the short cut, first of all, the port selection screen as shown above will appear. Then, select a serial port through which this unit is connected from the pull down port selection menu. Open the serial port of this unit by clicking on "Open" button. The control screen as shown on the next page will appear when the port selection is successful. If the screen is not displayed, confirm that this unit is powered ON and the serial cable is correctly connected.



## ② Port close

When completing the software, click on "Close" button to close the serial port through which this unit is connected.

The port selection screen as shown on the previous page will appear again when the port close operation is successful. In the screen, click on ☐ icon to close the software.

If the screen is not displayed, confirm that this unit is powered ON and the serial cable is correctly connected.

## ③ "Default" button

When this button is clicked on, all the settings of this unit return to those at the product shipment.

## ④ Image clarifying processing strength adjustment

OFF (Default at shipment) /Normal/Enhance

## ⑤ Noise filter strength adjustment

Soft (Default at shipment)/Hard

## ⑥ Black level adjustment

Setting range: 0 – 32 (0: Default at shipment)

## ⑦ Brightness adjustment

Setting range: 0 – 100 (50: Default at shipment)

## ⑧ Status display

OFF (Default at shipment)/ON

## ⑨ Quad (For quad partition image) processing switch over

OFF (Default at shipment)/ON

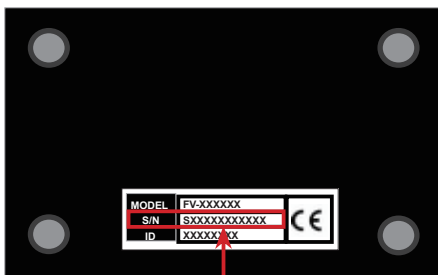
\* Setting items and setting options are the same as those operative by the buttons on the unit. Refer to "5.Descriptions of Functions" for details.

## 7. Troubleshooting

Trouble	Possible cause	Remedy
The unit does not power ON.	The power plug is off the outlet.	Firmly insert the AC adapter to the outlet.
	The power connector is disconnected.	Firmly insert the connector to this unit.
Image does not appear.	BNC connector is disconnected.	Firmly insert the connector to this unit.
	There is no input signal.	Check the input device.
Clarifying does not work.	Setting is at "FV OFF".	Confirm the setting, set to "FV ON".
	Much noise is in the input video.	Adjust setting items and enter the settings.
Clarifying does not work or image is not seemed to be clarified.	Input image is a natural image in daylight.	As for a good natural image in daylight, even if clarifying is turned on, drastic changes may not occur and clarifying just doesn't seem to work(it is not malfunction).

\* Contact our office if a trouble cannot be corrected even after the remedies above are taken or other additional trouble has been generated.

bottom



SerialNo.

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- (2) The contents described in this material neither guarantees the execution of the industrial property rights and other rights nor permits its license.
- (3) The specifications of this unit may be changed without prior notice for the improvement of its performance. The contents in this material may also be revised according to the specification change of this unit.

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