

# **OPERATION MANUAL**

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**MV-410RGB**

Multi Viewer

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3<sup>rd</sup> Edition – Rev. 2

## Operation Manuals

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1.	MV-410RGB	• • • • • • • • • •	34 pages
2.	MV-410RGB Command	• • • • • • • • • •	30 pages
3.	MV-410RGB Layout Editor	• • • • • • • • • •	34 pages

# Precautions

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## Important Safety Warnings

### [Power]

 Caution	Operate unit <b>only</b> on the specified supply voltage.
	Disconnect power cord by connector only. <b>Do not</b> pull on cable portion.
 Stop	<b>Do not</b> place or drop heavy or sharp-edged objects on power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check power cord for excessive wear or damage to avoid possible fire / electrical hazards.

### [Grounding]

 Caution	<b>Ensure</b> unit is properly grounded at all times to prevent electrical shock hazard.
 Hazard	<b>Do not</b> ground the unit to gas lines, units, or fixtures of an explosive or dangerous nature.
 Caution	<b>Ensure</b> power cord is firmly plugged into AC outlet.

### [Operation]

 Hazard	<b>Do not</b> operate unit in hazardous or potentially explosive atmospheres. Doing so could result in fire, explosion, or other dangerous results.
 Hazard	<b>Do not</b> allow liquids, metal pieces, or other foreign materials to enter the unit. Doing so could result in fire, other hazards, or unit malfunction.
	If foreign material does enter the unit, turn power off and disconnect power cord <b>immediately</b> . Remove material and contact authorized service representative if damage has occurred.

### [Transportation]

 Caution	<b>Handle</b> with care to avoid shocks in transit. Shocks may cause malfunction. When you need to transport the unit, use the original packing materials or alternate adequate packing.
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## [Circuitry Access]

	<p><b>Do not</b> remove covers, panels, casing, or access circuitry with power applied to the unit! Turn power off and disconnect power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.</p>
 Stop	<p><b>Do not</b> touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after power is disconnected. Capacitors associated with the power supply are especially hazardous. Avoid contact with any capacitors.</p>
 Hazard	<p>Unit <b>should not</b> be operated or stored with cover, panels, and / or casing removed. Operating unit with circuitry exposed could result in electric shock / fire hazards or unit malfunction.</p>

## [Potential Hazards]

 Caution	<p>If abnormal smells or noises are noticed coming from the unit, turn power off immediately and disconnect power cord to avoid potentially hazardous conditions. If problems similar to above occur, contact authorized service representative <b>before</b> attempting to again operate unit.</p>
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## [Consumables]

 Caution	<p>The consumables used in unit must be replaced periodically. For further details on which parts are consumables and when they should be replaced, refer to the specifications at the end of the Operation Manual. Since the service life of the consumables varies greatly depending on the environment in which they are used, they should be replaced at an early date. For details on replacing the consumables, contact your dealer.</p>
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## [Rubber Feet]

 Caution	<p>If this product has come with rubber feet attached by screws, do not insert the screws again without rubber feet after removing the rubber feet and screws. It may cause damage to the internal circuits or components of the unit. To install the rubber feet again to the unit, do not use other than the supplied rubber feet and screws.</p>
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# Upon Receipt

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## Unpacking

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MV-410RGB units and their accessories are fully inspected and adjusted prior to shipment. Operation can be performed immediately upon completing all required connections and operational settings.

Check your received items against the packing lists below.

ITEM	QTY	REMARKS
MV-410RGB	1	
AC Cord	1 set	One AC cord, and one AC cord retaining clip
Rack Mount Brackets	1 set	EIA standard type
CD-ROM	1	Installation disc: Layout Editor (Including operation manuals (PDF))

## Check

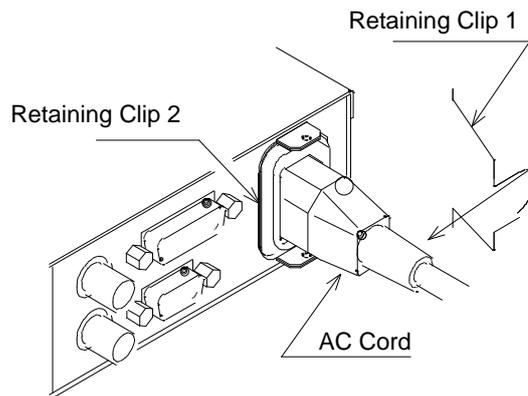
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Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

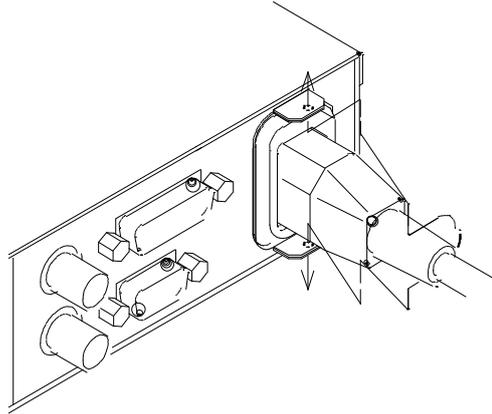
## Installing AC Cord Retaining Clip

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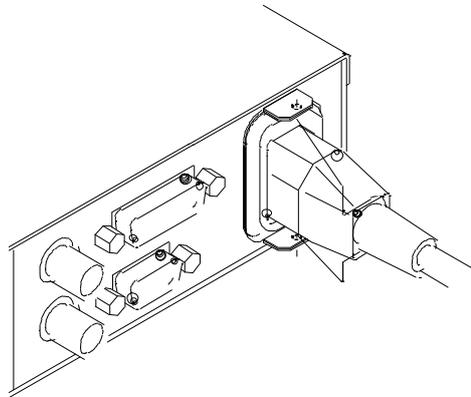
- 1) Securely plug the AC cord into the AC inlet
- 2) Attach Retaining Clip 1 onto the the AC cord.



3) Insert the both ends of Retaining Clip 1 into the holes of Retaining Clip 2.



The installation is now complete.



## Font

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The font used in this product is the Ricoh Vector Font designed by Ricoh Company Limited.

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# 1. Prior to Starting

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## 1-1. Welcome

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Congratulations! By purchasing MV-410RGB Multi Viewer you have entered the world of FOR-A and its many innovative products. Thank you for your patronage and we hope you will turn to FOR-A products again and again to satisfy your video and audio needs.

FOR-A provides a wide range of products, from basic support units to complex system controllers, which have been increasingly joined by products for computer video based systems. Whatever your needs, talk to your FOR-A representative. We will do our best to be of continuing service to you.

## 1-2. About MV-410RGB

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The MV-410RGB Multi Viewer is a four split-screen multi viewer that accepts four inputs (of DVI, Analog RGB, and Analog Composite signals) , resizes the images and displays on a single screen. The MV-410RGB is most suitable for monitoring the system with mixed input of input signals from PC and analog composite signals.

- Support for mixed input of DVI, analog RGB, and analog composite signals
- DVI connector for high definition image output
- Remote control over LAN interface
- Analog clock and Digital clock display
- Title display of up to 16 characters for each input (alphanumeric and symbol)

## 1-3. About This Manual

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This manual is intended to help the user easily operate this product and make full use of its functions during operations. Before connecting or operating your unit, read this operation manual thoroughly to ensure you understand the product. After reading, it is important to keep this manual in a safe place and available for reference.

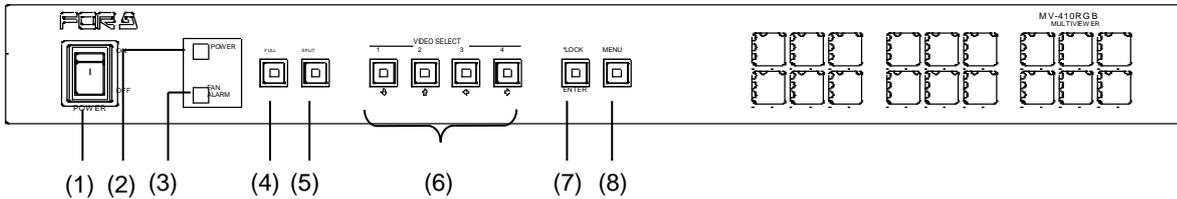
### Font Conventions

The following conventions are used throughout this manual:

- Text enclosed by a square (such as MATT) indicates **buttons on the operation panel**.
- Text enclosed by square brackets (such as [Ctrl]) indicates the **menu items**.

## 2. Panel Descriptions

### 2-1. Front Panel



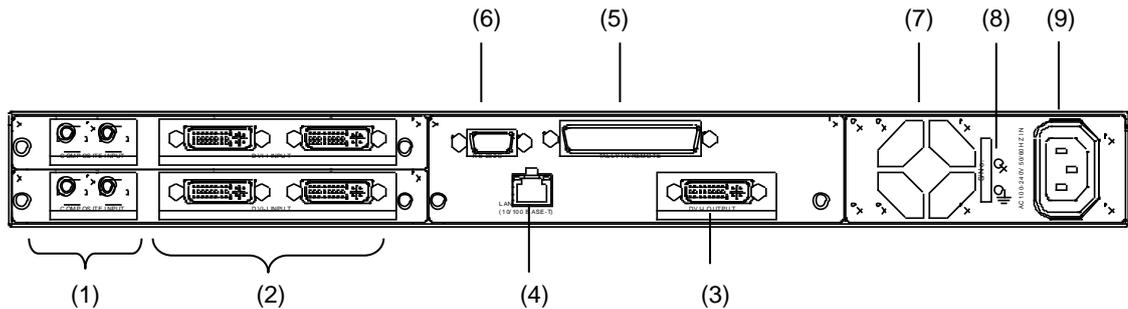
- (1) POWER switch  
Used to turn the power unit On/Off. Pressing " | " side turns power on.
- (2) POWER indicator  
Indicator for the power unit.
- (3) Fan Alarm LED  
Lights in the event of fan failure.

#### IMPORTANT

Illuminating Fan alarm LED is indicating a fan failure. Turn the power off of the unit and contact your dealer immediately.

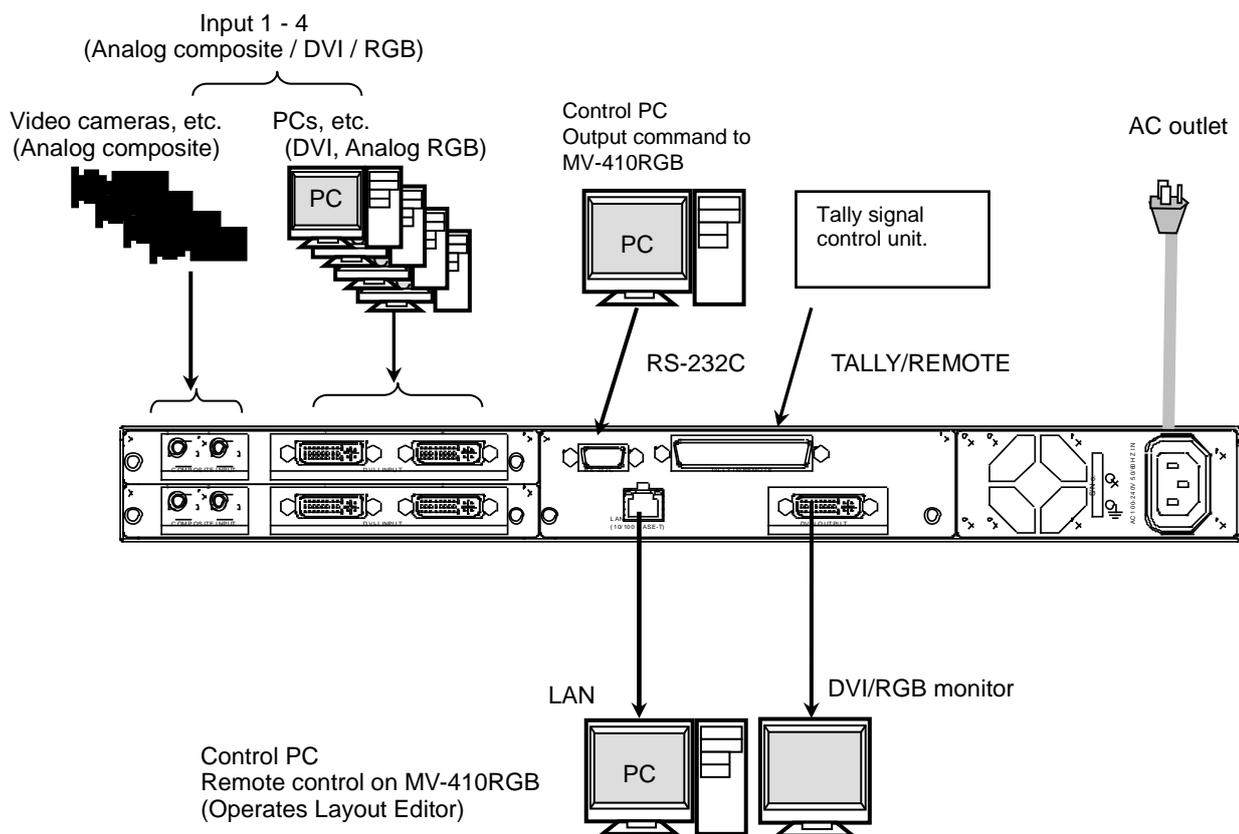
- (4) FULL (Full screen display button)  
Used to set the display in full screen mode.
- (5) SPLIT (Split screen display button)  
Used to set the display in split screen mode.
- (6) VIDEO SELECT 1 - 4 (Input switches)  
In the full screen mode, these buttons are used to select inputs to be displayed.  
In the split screen mode, these buttons are used to select the screen layout designed using the Layout Editor. All four buttons are set to display standard 4-split screen at the factory shipment.  
While displaying menus, these buttons are used to navigate menu screens.
- (7) LOCK (Operation lock button)  
Used to disable or enable the operation from the front panel buttons.  
\* To unlock the operation, press and hold down the button at least 2 seconds.  
While displaying menus, this button is used to confirm the settings for each menu item.
- (8) MENU (Menu button)  
Used to open Main menu. While displaying menus, used to return to Main menu or submenu, or exit Main menu.  
\* To open Main menu, press and hold down the button at least 2 seconds.

## 2-2. Rear Panel



- (1) COMPOSITE INPUT 1 - 4  
Used to input analog composite signals.
- (2) DVI-I INPUT 1 - 4  
Used to input DVI signal or analog RGB signal.  
\* DVI signal display may get disturbed by the connection or disconnection of inputs.
- (3) DVI-I OUTPUT  
Used to connect a DVI monitor. An analog RGB monitor can also be connected with separate purchase of an adaptor.  
\* No frame rate conversion. The frame rate difference between inputs and outputs appears as drop or repeat frame.
- (4) LAN(10/100BASE-T)  
Used to control unit or arrange layouts from a PC over a LAN (Ethernet) interface.
- (5) TALLY/REMOTE  
Used for Tally input to add red or green borders to each channel frame, or for remote control on selecting screen layout by GPI inputs.
- (6) RS-232C  
Used to connect a PC for remote control on menu operation.
- (7) Cooling Fan  
Used to air cool unit to prevent overheating. Do not block the ventilation with other equipment or objects.
- (8) Grounding Terminal  
Used to ground the unit to protect operators against static electricity and electrical shock.
- (9) AC IN (100-240VAC 50/60Hz)  
Used for connecting to an AC power source using the supplied accessory cord.

### 3. Connection



#### IMPORTANT

To directly connect PC and MV-410RGB, use a crossover LAN cable for the connection. To connect PC and MV-410RGB using a hub or such device, use a straight LAN cable.

When the DVI-I input of MV-410RGB is connected to the DVI output of the plug and play device such as PC, the device acknowledges the MV-410RGB as a DVI-D monitor.

## 4. Operations

### 4-1. Operation at Startup

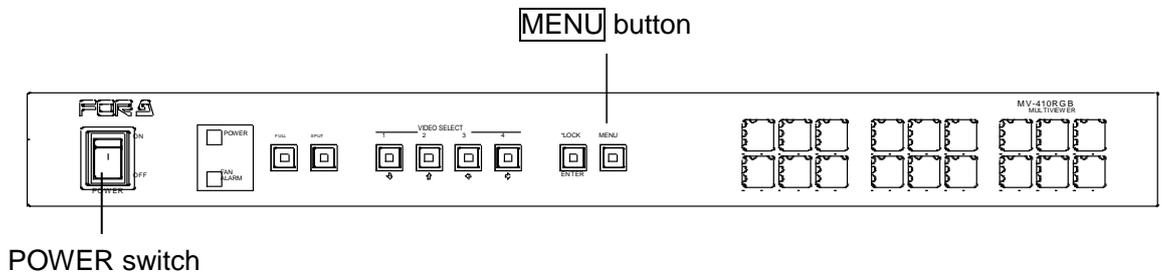
After the power is turned on, operation resumes from the last screen before the power was turned off. If a menu screen was displayed when the unit was turned off, operation resumes from the status before the menu screen.

#### IMPORTANT

It may take around 20 seconds after powering on for the output display to become stable.

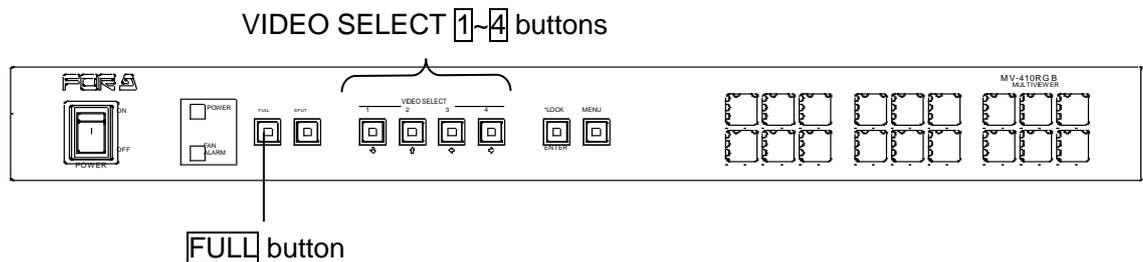
### 4-2. Data Initialization

Although initialization is normally not required, you can restore the MV-410RGB factory settings by the data initialization when the previous data is no longer needed such as after relocation or system modification. Turn on the power while holding down the **MENU** button. "MEMORY CLEAR" appears on the monitor screen and the setting data will be initialized.



### 4-3. Displaying Full Screen

To display your desired channel in full screen, press the **FULL** button and then press the VIDEO SELECT **1** to **4** buttons. For instance, to view channel 3 in full screen, press the **FULL** button and then press the SELECT **3** button.



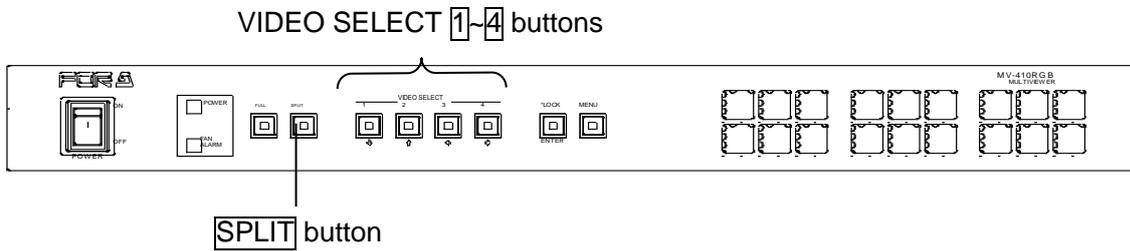
#### IMPORTANT

The image distortion occurs while switching layouts. A black screen is shown for channels with no input signals.

## 4-4. Displaying Split Screens

To display split screens, press the **SPLIT** button.

Pressing a VIDEO SELECT button while displaying split screen will change the displayed split screen layout to another layout.



### IMPORTANT

The image distortion occurs while switching layouts. A black screen is shown for channels with no input signals.

# 5. Screen Display

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## 5-1. Full Screen

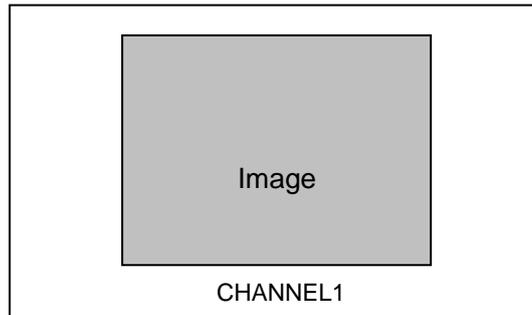
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The display mode can be selected from three options as below. You can select the mode by using supplied software Layout Editor, or by sending commands from a PC.

### MODE1

Displays the title without overlapping on the video image. The aspect ratio of the input signal is retained.

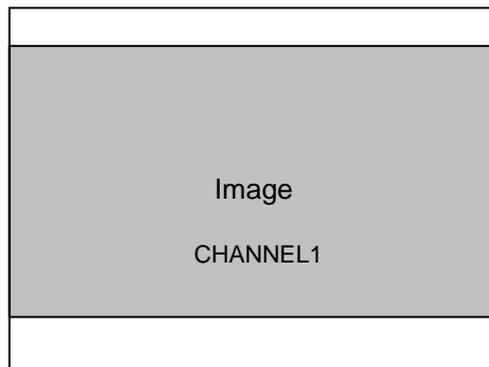
The example below is displaying 4:3 material in 16:9 display mode.



### MODE2

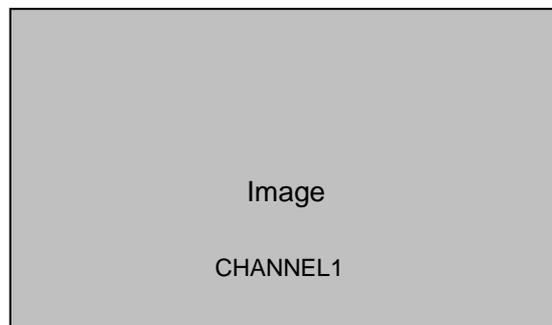
Overlaps the title on the video image. The aspect ratio of the input signal is retained.

The example below is displaying 16:9 material in 4:3 display mode.



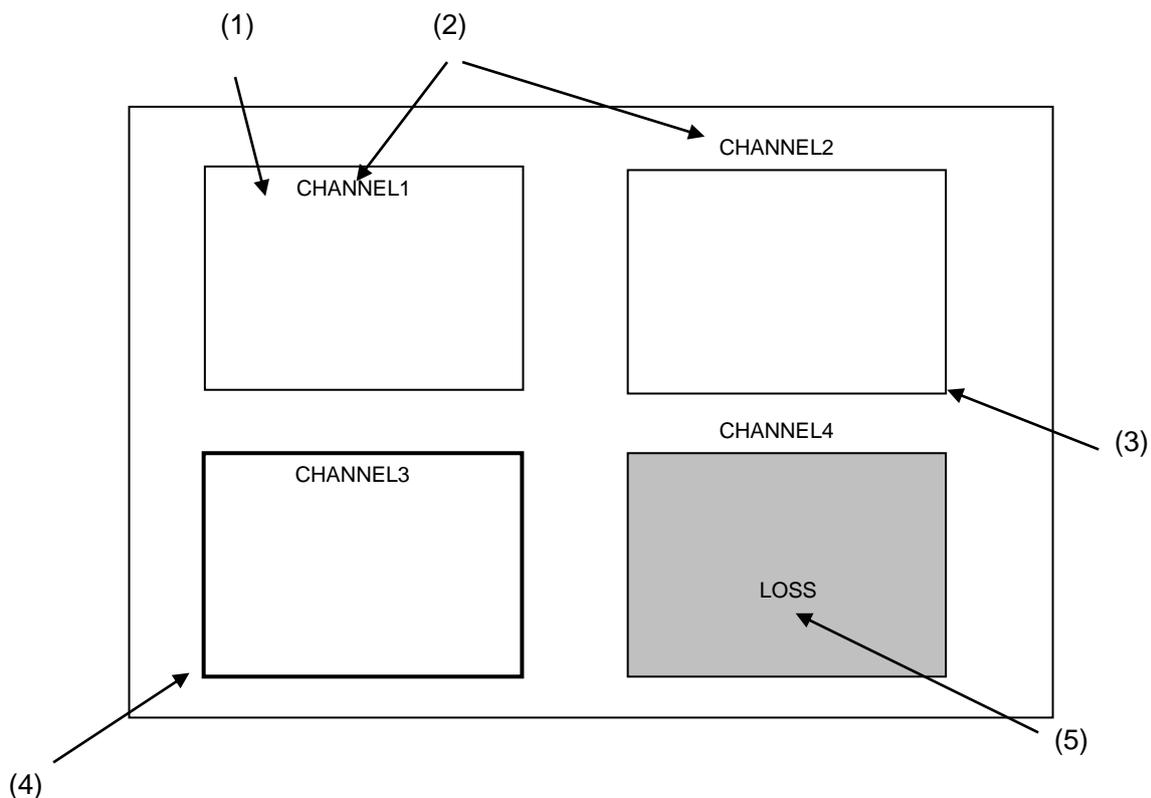
### MODE3

Overlaps the title on the video image. The aspect ratio of the input signal is not retained, and the image is displayed to best fit the output format.



## 5-2. Split Screen

The split screen layout can be freely arranged using the supplied Layout Editor.



(1) Image Display Window

Windows to display each channel input.

(2) Title display

Titles of each channel input. Titles can be displayed either within or outside the windows.

(3) Border display

Border display is available on each window frame. Line width of border can be changed using Layout Editor.

(4) Tally display

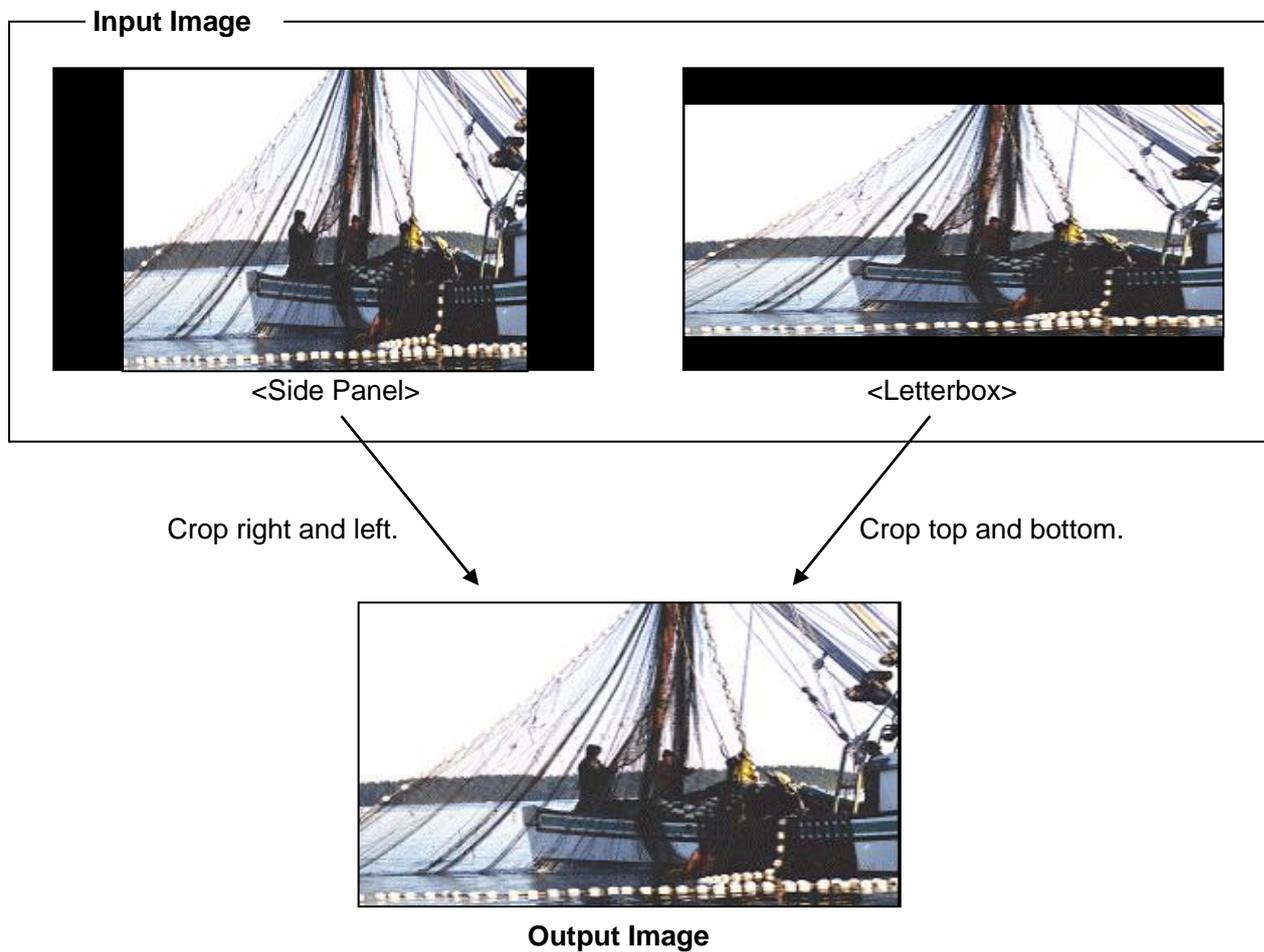
Two tally inputs (red and green) are available for each channel input. Tally is displayed outside the border. Tally display color for simultaneous inputs of red tally and green tally can be selected from red or orange. Those settings can be made using Layout Editor.

(5) Video loss display

The video loss alarm is displayed when video signal is lost. The display time length for the alarm can be changed using Layout Editor.

## 5-3. Crop

The effective pixel area (where picture exists) of the input display can be set. The black area produced by converting images to 4:3 or 16:9 can be reduced or eliminated, and the images can be enlarged and displayed to best fit the output screen. You can use Layout Editor, or send commands from a PC to change the Crop settings.

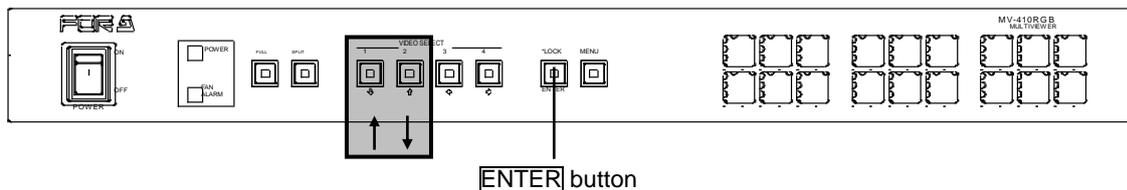
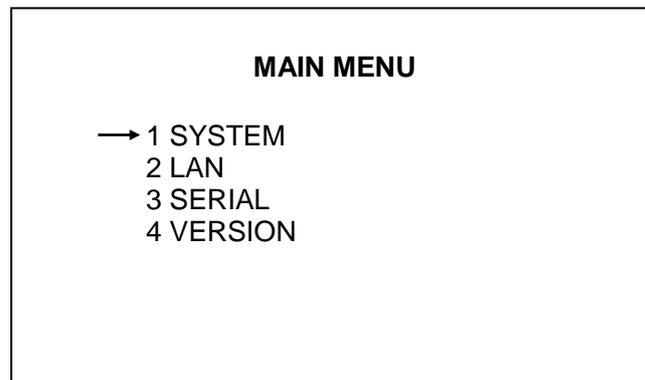


## 6. Menu Operations

Submenus can be accessed from the main menu for completing various settings.

### 6-1. Main Menu Screen

Press and hold down the **MENU** button for at least two seconds to display the MAIN MENU.



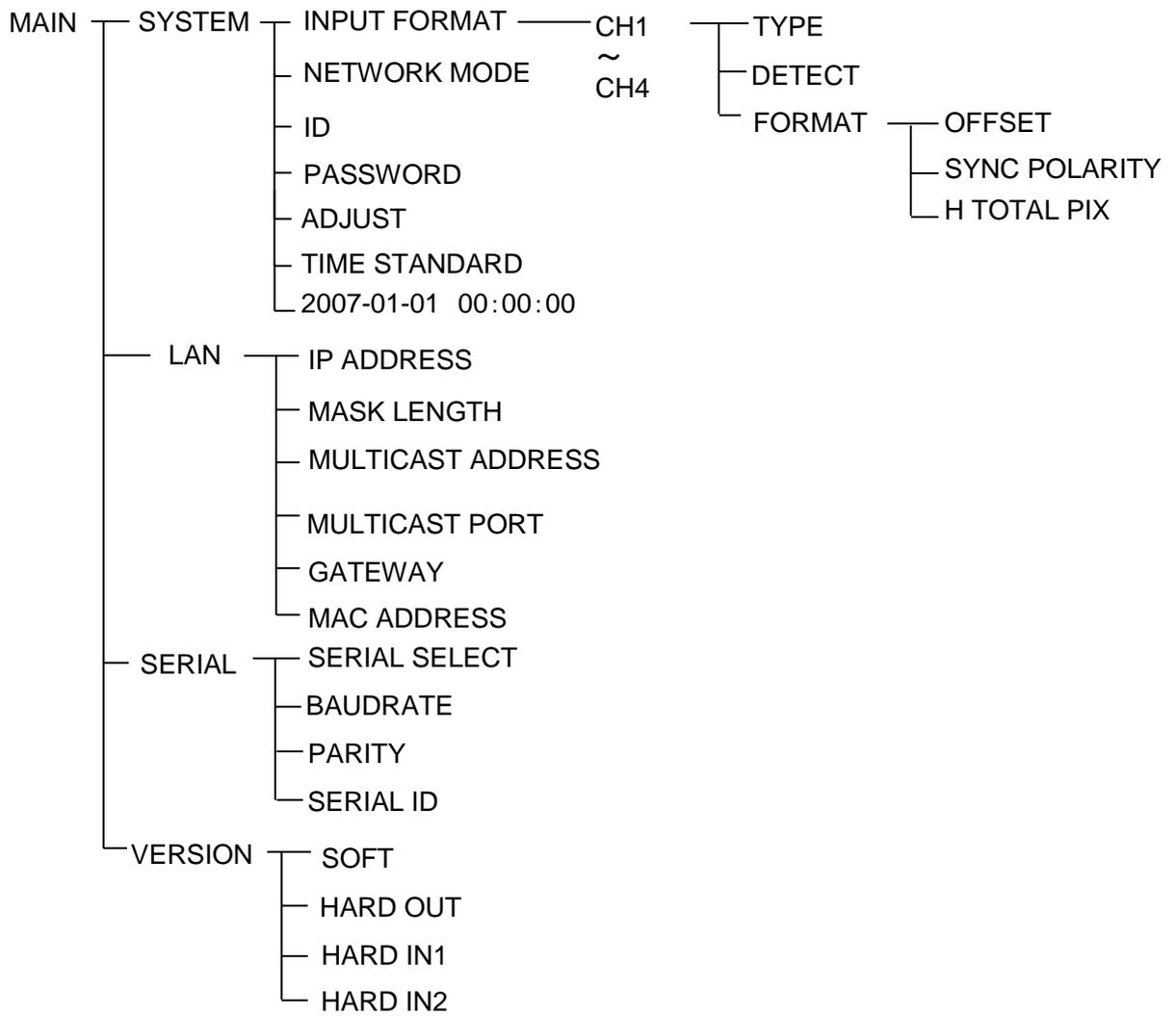
#### Operating Procedure

Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
ENTER	Accesses the submenu of the selected item.

#### Setting items

Item	Setting details	Reference
1 SYSTEM	Input signal format settings	6-2.SYSTEM
	ID and Password settings	
	Date and time settings	
2 LAN	Network settings	6-3.LAN
3 SERIAL	Serial interface settings	6-4.SERIAL
4 VERSION	Version display	6-5.VERSION

## Menu Diagram



## 6-2. SYSTEM

On the MAIN MENU, move the cursor to [SYSTEM] and press the **ENTER** button. The SYSTEM screen is displayed as shown below.

<b>SYSTEM</b>	
→ INPUT FORMAT	
NETWORK MODE	UNICAST
ID	ROOT
PASSWORD	00000
ADJUST	1/MINUTE
TIME STANDARD	INTERNAL
2007-01-01	00:00:00

\*The settings in the figure above are the factory defaults.

### Operating Procedure

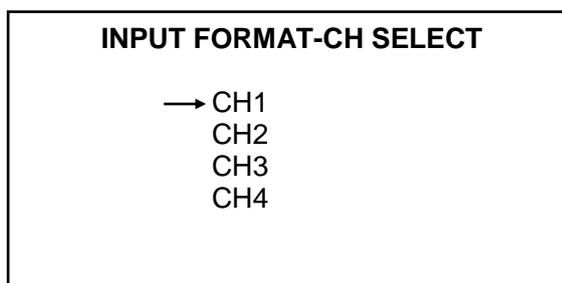
Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
←	Changes the setting item value. (Reverse)
→	Changes the setting item value. (Forward)
MENU	Returns from SYSTEM menu to MAIN MENU, or from ID, PASSWORD, or Time setting mode to SYSTEM menu.
ENTER	Accesses INPUT FORMAT submenu or enter input mode for ID, PASSWORD, or Time when the cursor is on those items. Returns from ID, PASSWORD, or Time input mode to SYSTEM menu.

### Settin Items

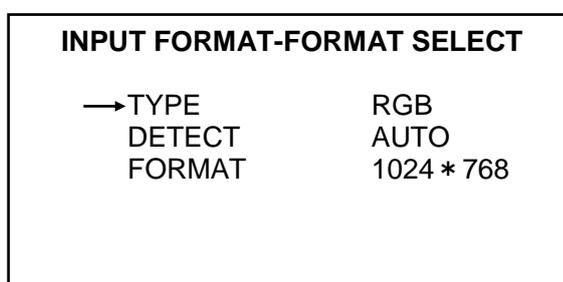
Item	Setting range	Setting details
INPUT FORMAT		Select and press <b>ENTER</b> button to access submenus.
NETWORK MODE	UNICAST	Displays network mode. Fixed to UNICAST mode In MV-410RGB.
ID	8 alphanumeric characters	Used to set ID for the connection with PC over a LAN. ID of 8 space characters is not authenticated.
PASSWORD	00000 - 99999	Used to set Password for the connection with PC over a LAN.
ADJUST	MINUTE/HOUR/DAY	Sets the interval of time adjustment pulse output that is output from TALLY/REMOTE connector. (every minute/hour/day)
TIME STANDARD	INTERNAL	Displays the type of time source. MV-410RGB is fixed to use the internal clock as a time source.
Date and Time	Year: 2000 - 2099 Month: 01 - 12 Day: 01 - 31 Time: 00 - 23 Minute: 00 - 59 Second: 00 - 59	Used to set the current time for the internal clock.

## 6-2-1. INPUT FORMAT

On the SYSTEM screen, move the cursor to [INPUT FORMAT] and press the **ENTER** button. The INPUT FORMAT - CH SELECT screen is displayed as shown below.



Move the cursor to the channel you want to change or check the settings of and press the **ENTER** button. The INPUT FORMAT - FORMAT SELECT screen as shown below is displayed.



\*The settings in the figure above are the factory defaults.

On the FORMAT SELECT screen, formats of input signals can be seen and set.

### Operating Procedure

Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
←	Changes the setting item value. (Reverse)
→	Changes the setting item value. (Forward)
MENU	Returns to CH SELECT menu.
ENTER	Displays OFFSET menu when cursor is on the FORMAT, only if the TYPE is set to DVI or RGB and the DETECT is set to MANUAL.

## Setting Items

Item	Setting range	Setting details
TYPE	COMPOSITE, DVI, RGB	Used to select a type of input signal.
DETECT	AUTO, MANUAL	Used to select how to specify the input signal format from automatic detection or manual setting.
FORMAT	[COMPOSITE] NTSC, PAL [DVI / RGB] 1920x1200, 1600x1200, 1360x768, 1280x1024, 1024x768, 640x480, 1440x900, 1680x1050, 1920x1080, 1280x720, 1366x768	If DETECT is set to AUTO; Displays the format of the input signal or LOSS for the absence of input signal . If DETECT is set to MANUAL; Used to select a format for the input signal. Also used to display the menu screen to set the horizontal and vertical start points of display. To do so, set TYPE to DVI or RGB and press the <b>ENTER</b> button.

The OFFSET setting screen is displayed, if the **ENTER** button is pressed, while TYPE is set to DVI or RGB, DETECT is set to MANUAL, and the cursor is on FORMAT.

This screen is used to set the start point for the screen display, if the video is not displayed in the proper position.

INPUT FORMAT-OFFSET	
1024*768	
H OFFSET	160
V OFFSET	029

## Operating Procedure

Button	Action
	Increases the value of the vertical offset.
	Reduces the value of the vertical offset.
	Increases the value of the horizontal offset.
	Reduces the value of the horizontal offset.
ENTER	Displays SYNC POLARITY menu.
MENU	Returns to FORMAT SELECT menu.

Pressing the **ENTER** button while displaying OFFSET screen displays the SYNC POLARITY screen if TYPE is set to RGB. On the SYNC POLARITY screen, sync polarity can be adjusted. It is used when the image is not properly displayed such as jittering.

INPUT FORMAT-SYNC POLARITY		
→	H SYNC	NORMAL
	V SYNC	NORMAL

#### Operating Procedure

Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
←	Changes the setting item value. (Reverse)
→	Changes the setting item value. (Forward)
ENTER	Displays H TOTAL PIXEL menu.
MENU	Returns to FORMAT SELECT menu.

Pressing the **ENTER** button while displaying SYNC POLARITY screen displays H TOTAL PIXEL screen as shown below. On H TOTAL PIXEL screen, the number of pixels in between horizontal sync signals for RGB signal input. It is used to correct the image display when the horizontal size of the displayed image is too wide to display whole image or too narrow so as black area appears at the both sides.

INPUT FORMAT-H TOTAL PIXEL		
	H PIXEL	1344

#### Operating Procedure

Button	Action
←	Reduces the number of pixels.
→	Increases the number of pixels.
ENTER	Displays OFFSET menu.
MENU	Returns to FORMAT SELECT menu.

## 6-3. LAN

On the MAIN MENU screen, move the cursor to [LAN] and press the **ENTER** button. The LAN screen is displayed as shown below. On the LAN screen network setting can be seen and changed.

LAN	
IP ADDRESS	192.168.0.1
MASK LENGTH	24BIT
MULTICAST ADDRESS	239.255.0.0
MULTICAST PORT	2100
GATEWAY	0.0.0.0
MAC ADDRESS	00-10-B1-02-7x-xx

\*The settings in the figure above are the factory defaults.

### Operating Procedure

Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
←	Changes the setting item value. (Reverse)
→	Changes the setting item value. (Forward)
ENTER	Entering value while pressing down ENTER will change the value of the 10 digit.(Except MASK LENGTH)
MENU	Returns to MAIN menu.

### IMPORTANT

If the MENU button is pressed when the entered value is invalid, an error message will be displayed. Press ↓ or ↑ button to clear the error and correct the invalid value.

### Setting Items

Item	Setting range	Setting details
IP ADDRESS	0.0.0.0 - 255.255.255.255 (except 0.0.0.0, and 1.0.0.0)	Used to set IP ADDRESS. This setting is necessary for the communication over a LAN interface. Please consult with your system administrator if using in your existing network.
MASK LENGTH	0 - 31	Used to set subnet mask length for the device.
MULTICAST ADDRESS	239.255.0.0	Displays multicast address to use in multicast mode. Not used in MV-410RGB.
MULTICAST PORT	2100	Used to set multicast port for the connection with the devices in multicast mode. Not used in MV-410RGB.
GATEWAY	0.0.0.0 - 255.255.255.255	If your network does not have a gateway, this setting is not required.
MAC ADDRESS	Do not change	Displays the MAC addresses of the device. The value cannot be changed.

### IMPORTANT

If you change the value for the items other than MULTICAST ADDRESS and MULTICAST PORT, a warning message appears to require the restart of the unit. Whenever you have changed these settings, power off the MV-410RGB once and power on again.

## 6-4. SERIAL

On the MAIN MENU screen, move the cursor to [SERIAL] and press the **ENTER** button. The SERIAL screen is displayed as shown below.

<b>SERIAL</b>	
SERIAL SELECT	RS-232C
BAUDRATE	9600
PARITY	NONE
SERIAL ID	00

### Operating Procedure

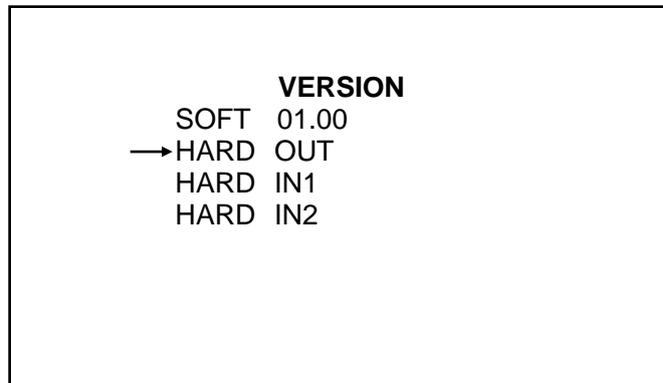
Button	Action
MENU	Returns to MAIN menu.

### Setting Items

Item	Setting range	Setting details
SERIAL SELECT	RS-232C	Displays the interface that can be used.
BAUDRATE	9600	Displays the baud rate.
PARITY	NONE	Displays the parity.
SERIAL ID	00	Displays the serial ID for the device.

## 6-5. VERSION

On the MAIN MENU screen, move the cursor to [VERSION] and press the **ENTER** button. The VERSION screen is displayed as shown below. On the VERSION screen, the version information of MV-410RGB can be seen.



### Operating Procedure

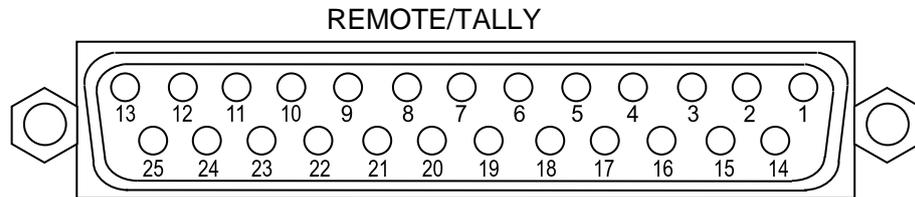
Button	Action
↑	Moves the cursor up.
↓	Moves the cursor down.
ENTER	Pressing the <b>ENTER</b> button while the cursor is on HARD OUT, HARD IN1, or HARD IN2 displays the menu.
MENU	Returns to MAIN menu.

### Setting Items

Item	Setting details
SOFT	Displays the software version.
HARD OUT	Displays the screen on which the hardware version is displayed.
HARD IN1	Displays the screen on which the hardware version is displayed.
HARD IN2	Displays the screen on which the hardware version is displayed.

## 7. REMOTE/TALLY

MV-410RGB can be remotely controlled using contact inputs to the TALLY IN/REMOTE connector on the rear panel. The connector is also provided with pins for external tally inputs that enables to display two color borders (red and green) on video frames.



Connector pin assignments (50-pin, D-sub female) Inch screws

Pin no.	Function	Description
1	IN1 TALLY (Red)	INPUT1 TALLY border (Red) display
2	IN2 TALLY (Red)	INPUT2 TALLY border (Red) display
3	IN3 TALLY (Red)	INPUT3 TALLY border (Red) display
4	IN4 TALLY (Red)	INPUT4 TALLY border (Red) display
5	FULL 1	INPUT1 Full screen display
6	FULL 2	INPUT2 Full screen display
7	FULL 3	INPUT3 Full screen display
8	FULL 4	INPUT4 Full screen display
9	USER1	Preset layout 1
10	USER2	Preset layout 2
11	USER3	Preset layout 3
12	USER4	Preset layout 4
13 - 16	NC	Do not use.
17	GND	GND
18	IN1 TALLY (Green)	INPUT1 TALLY border (Green) display
19	IN2 TALLY (Green)	INPUT2 TALLY border (Green) display
20	IN3 TALLY (Green)	INPUT3 TALLY border (Green) display
21	IN4 TALLY (Green)	INPUT4 TALLY border (Green) display
22 - 33	NC	Do not use.
34	ADJ_IN	Time adjustment input
35 - 36	NC	Do not use.
37	ADJ_OUT	Time adjustment output
38	FAN_ALARM	Fan alarm output
39	+5V	+5V output (maximum 200mA DC)
40 - 50	NC	Do not use.

Compatible connector: DD-50P-N(JAE)

Cover: DD-C1-J17-S6(JAE)

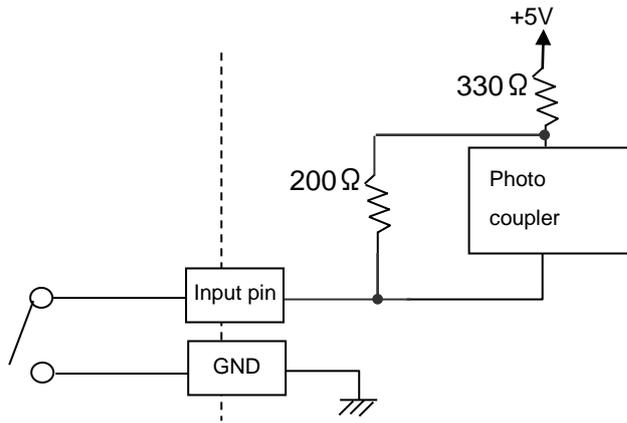
Signal standard: Make contact, or TTL level negative logic pulse

### IMPORTANT

The input signal pulse width should be 100ms or more. The input that is received while the screen layout is being changed is not effective. If you change the screen layout, wait for the change on the screen to be completed before inputting signals.

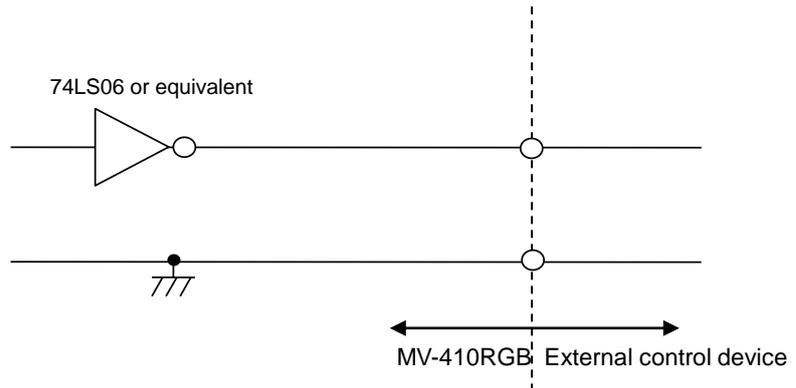
**[Input Connector]**

The figure at right depicts the MV-410RGB circuit for each input pin.



**[Output Connector]**

The figure at right depicts the MV-410RGB circuit for each output pin. Outputs 5V TTL level alarm signal.



### 7-1. Control using REMOTE Connector

Control via REMOTE connector operates the same as control from front panel buttons. Commands from both REMOTE connector and front panel buttons are accepted at the same time.

### 7-2. ADJ\_IN (External Time Adjustment Input)

Time adjustment made by the falling edge of the external pulse input (pulse width 100ms or more) is shown below.

- 1) When second digit displays 1 to 29 → Correct to 0 second
- 2) When second digit displays 30 to 59 → Correct to 0 second and add 1 minute

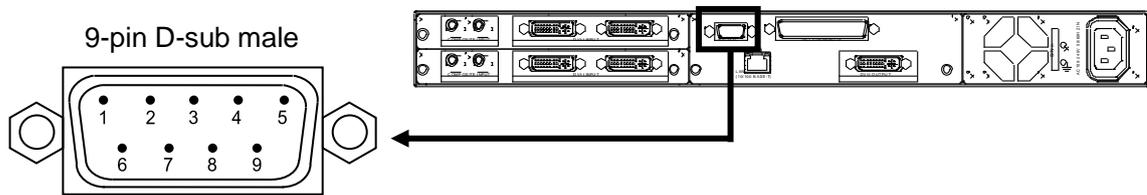
### 7-3. ADJ\_OUT (External Time Adjustment Output)

Outputs a pulse signal (500ms) at the interval set at the ADJUST in the [SYSTEM].

<b>IMPORTANT</b>
ADJ_OUT pin outputs a pulse signal at the set interval triggered by the internal clock.
ADJ_IN pin does not supply buffered output.

## 8. RS-232C Interface

### 8-1. RS-232C Connector



#### RS-232C Connector pin assignments (9-pin, D-sub male)

Pin no.	Signal name	I/O	Description
1	-		Unassigned
2	TxD	Output	Transmitted Data
3	RxD	Input	Received Data
4	DSR	Input	Data Set Ready
5	SG		Signal Ground
6	DTR	Output	Data Terminal Ready
7	CTS	Input	Clear To Send
8	RTS	Output	Request To Send
9	-		Unassigned

#### Serial communication standard

Transmission mode	Asynchronous, Full-duplex
Baud rate	9600[bps]
Data length	8 [bit]
Stop bit	1 [bit]
Parity	None
Flow control	None

#### IMPORTANT

DSR/DTR and RTS/CTS are looped back in the MV-410RGB. Use an RS-232C connector conversion straight cable to connect another device such as a PC.



## 9. Troubleshooting

If any of the following problems occur during operation of the MV-410RGB, before assuming a unit malfunction has occurred, follow the troubleshooting procedures below to see if the problem can be corrected.

### IMPORTANT

If the problem is not corrected by performing the procedures below, turn the unit off and then on again. If this still does not correct the problem, contact your dealer.

Problem	Check	Action
Front panel FAN ALARM indicator is lit or flashing.	Check that no object is blocking the fan vent on the rear panel.	Remove any objects blocking the fan vent. If there are no objects in the way, the fan may need to be replaced. Contact your dealer for assistance.
Unable to operate front panel buttons.	Is the <b>LOCK</b> button flashing?	Front panel operation is locked. Cancel the switch lock by pressing the <b>LOCK</b> button for at least 2 seconds.
I want to restore the default settings.		Turn the unit power on while pressing and holding down the <b>MENU</b> button.
Image is not properly displayed.	Is the used monitor compatible with the format set on the MV-410RGB?	If not, change the format of the MV-410RGB output.
Image noise appears.	Does the noise appear only on DVI-D output?	The low performance DVI cable may cause image noise. Change the cable to the one with high performance.

# 10. Specifications and Dimensions

## 10-1. Specifications

**Video Input**                    4 inputs of signals below (mixed use of different types, and asynchronous inputs are possible.)  
 <Analog Composite>  
 NTSC or PAL  
 1.0V(p-p) 75Ω BNC  
 <Analog RGB / DVI>  
 Resolution: 1920x1200@60Hz, 1600x1200@60Hz,  
 1280x1024@60Hz, 1360x768@60Hz, 1024x768@60Hz,  
 640x480@60Hz, 1440x900@60Hz, 1680x1050@60Hz,  
 1920x1080@60Hz, 1280x720@60Hz, 1366x768@60Hz  
 \* 1920x1200 formats support only Reduced Blanking signals.

DVI-I connector

As for digital inputs, DVI signal display may get disturbed by the connection or disconnection of inputs. When the DVI-I input of MV-410RGB is connected to the DVI output of the plug and play device such as PC, the device acknowledges the MV-410RGB as a DVI-D monitor.

**Video Output**                    DVI output (Outputs Digital and Analog outputs at the same time.)  
 DVI-I connector 1 output  
 Resolution: 1920x1200, 1600x1200, 1280x1024, 1360x768  
 1440x900, 1680x1050, 1920x1080, 1280x720  
 \*No input/output frame rate converter. Frame rate difference between input and output results the repeat frame or drop frame.

### DVI output supported frequencies

	1920 x 1200			1600 x 1200			1280 x 1024			1360 x 768		
Mode (Hz)	60	59.94	50	60	59.94	50	60	59.94	50	60	59.94	50
H frequency (kHz)	74.06	74.05	61.90	75	74.93	61.91	63.98	63.91	52.87	47.71	47.66	39.66
V frequency (Hz)	59.96	59.95	50.00	60	59.94	50.01	60.02	59.95	50.02	60.02	59.95	50.01

	1440 x 900			1680 x 1050			1920 x 1080			1280 x 720		
Mode (Hz)	60	59.94	50	60	59.94	50	60	59.94	50	60	59.94	50
H frequency (kHz)	55.96	56.02	46.47	65.26	65.26	54.15	67.5	67.44	56.25	45	44.95	37.5
V frequency (Hz)	59.91	59.97	50.03	59.93	59.93	50.01	60	59.95	50	60	59.93	50

\* VESA frequencies are approximately the same with the frequencies of 60Hz.

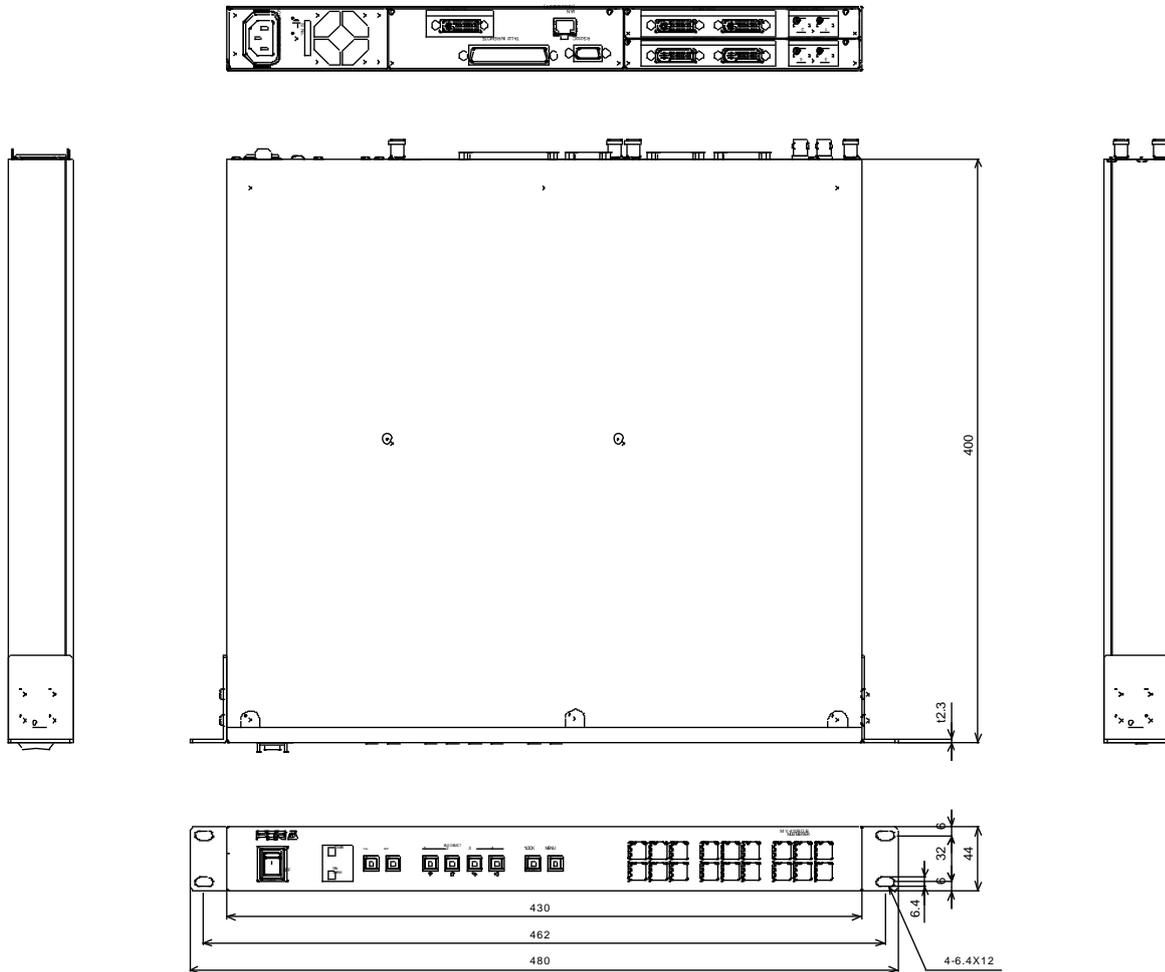
**Quantization**                    Y: 8 bit, C: 8 bit  
**I/O Delay**                        1 - 3 frames  
**Screen Display**                Full screen, User customized layout  
**Title display**                    Character capacity: Max. 16 characters x 1 line for each input channel  
 Character types: Alphanumeric characters and symbols  
 \*Characters are double-space.  
**Time display**                    Real-time display (provided with the internal clock )  
 \*Accuracy within ±10 seconds per month (at 25°C)

**Interface**                        RS-232C: 9-pin D-sub male, 1 port  
 Baud rate: 9,600, data length 8bit, stop bit 1bit, parity NONE

	TALLY IN: 50-pin D-sub female *Shared use with REMOTE IN 4 inputs x 2colors (red or green border display) TTL negative logic pulse level or Make contact
	REMOTE IN: 50-pin D-sub female *Shared use with TALLY IN Control over switching channels or display modes of full screen or split screen TTL negative logic pulse level or Make contact
	LAN: 10Base-T/100Base-TX, RJ-45 (Category 5), 1 port
Layout Editor	Edit size and position of windows in split screen
Data Backup	Stores the setting data to the memory (Rewrite capacity: approx. one hundred thousand times) *Frequent changes of display settings may result in being unable to retain data.
Temperature/Humidity	0°C - 40°C, 30% - 90% (no condensation)
Backup battery	Internal lithium battery (to maintain time)
Consumption	52VA (51W) (at 100VAC), 67VA (50W) (at 200VAC)
Power	100VAC - 240VAC ±10%, 50Hz/60Hz
Dimensions	430 (W) x 44 (H) x 400 (D)mm, EIA1RU
Accessories	Operation Manual, AC cord, Rack mount brackets, CD-R (Layout Editor)
Consumables	Fan: P-1401 Replace every 4 years (at room temperature) Power unit: Replace every 8 years (at room temperature) Backup battery: CR-2450 Replace every 7 years (at room temperature)

## 10-2. Dimensions

(All dimensions in mm)



## **Warning**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



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