

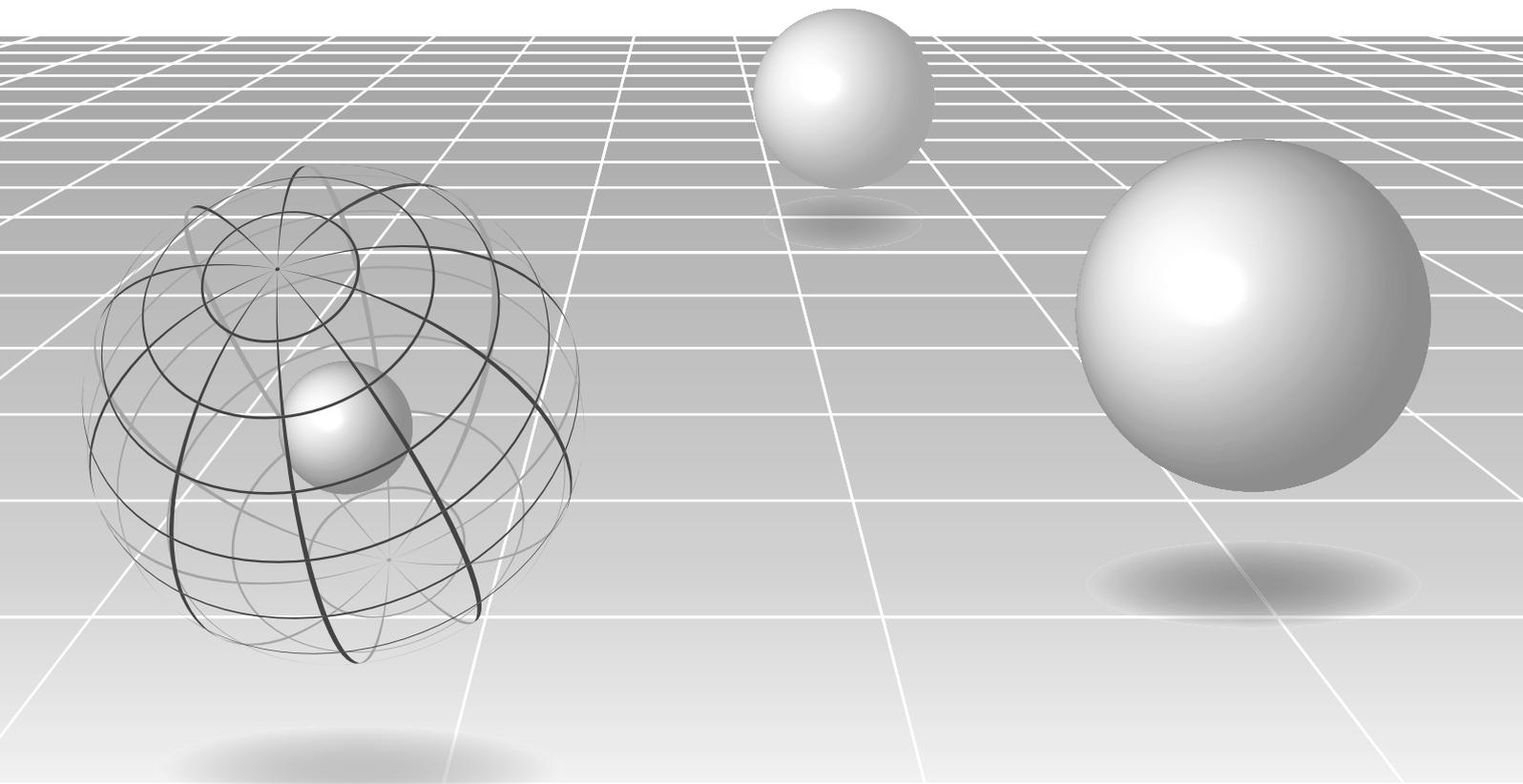
JVC

realD[®] 3D

3 D I M A G E P R O C E S S O R

IF-2D3D1

3D イメージプロセッサ	◆ 取扱説明書
3D IMAGE PROCESSOR	◆ INSTRUCTIONS
3D-BILDPROZESSOR	◆ BEDIENUNGSANLEITUNG
PROCESSEUR D'IMAGE 3D	◆ MANUEL D'INSTRUCTIONS
ELABORATORE D'IMMAGINI 3D	◆ ISTRUZIONI
PROCESADOR DE IMÁGENES 3D	◆ MANUAL DE INSTRUCCIONES
3D 图像处理器	◆ 使用说明书



Major features

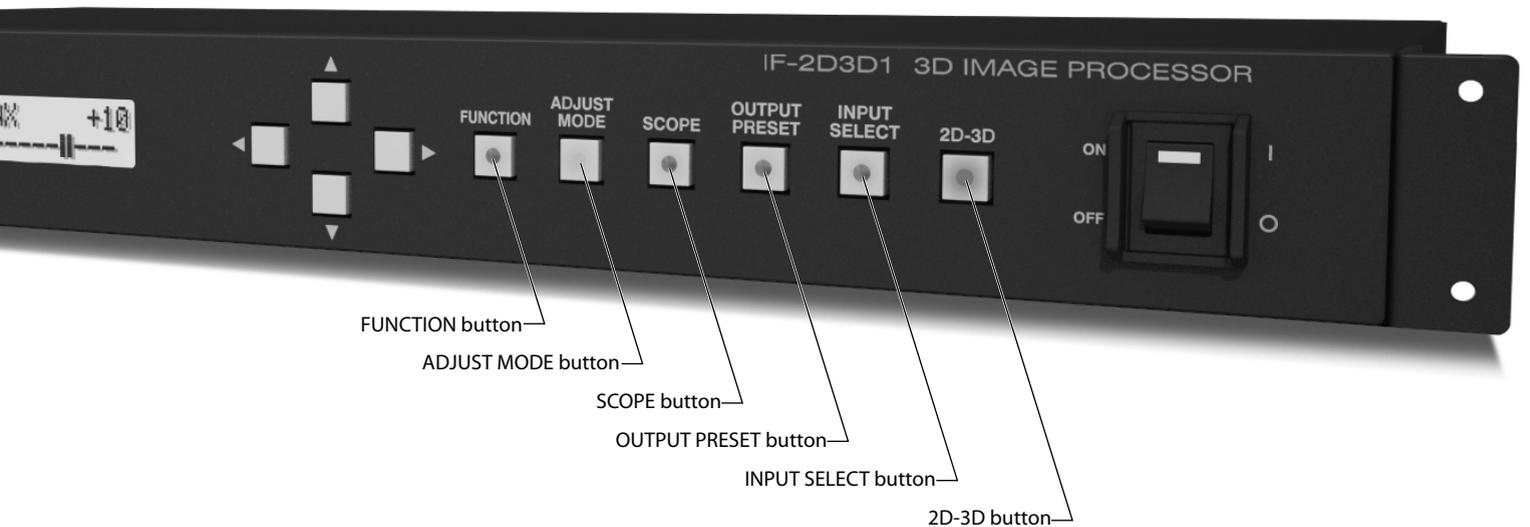
◆ Real-time 2D/3D conversion using unique JVC algorithms

- 2D/3D real-time conversion with four different 3D mixed formats for stereo video output: Can be hooked up with most stereoscopic 3D displays
- Separate L/R HD-SDI outputs: Convenient for rough editing. Compatible with 3D projection systems
- Parallax adjustment and 3D intensity adjustment: Enables optimization of the 3D effect according to the scene

◆ 3D L/R dual signal mixing with L/R image adjustment functions

- Scope feature: Waveform monitoring and vectorscope for L/R video stream comparison
- Split feature: Combines the two video streams on one screen with a movable boundary
- Image Rotation function: Convenient for restricted rig setups
- HD-SDI frame synchronizer: Synchronizing L/R cameras
- Anaglyph and sequential viewing mode: Provides multiple ways of checking the 3D effect

◆ Compatible with a wide range of Input/Output signal formats



3D IMAGE PROCESSOR

IF-2D3D1

INSTRUCTIONS

Main features

2D-3D converter.....	02
Converting a 2D image into a 3D image.....	03
Selecting a 3D mixing format.....	04
Adjusting the stereoscopic effect	05
Storing the stereoscopic effect settings.....	07
LR mixer.....	08
Mixing 2-channel 2D images into one 3D image.....	09
Functions for camera adjustment	10
Checking the stereoscopic effect	12
Configuring the input settings.....	13

Technical information

Compatible formats.....	14
Settings information	15
Input/output specifications	16
Other functions.....	17
External control.....	18

Installation and connection.....	i
Parts identification.....	ii
Troubleshooting	iii
Specifications	iv
Index.....	v

2D-3D converter

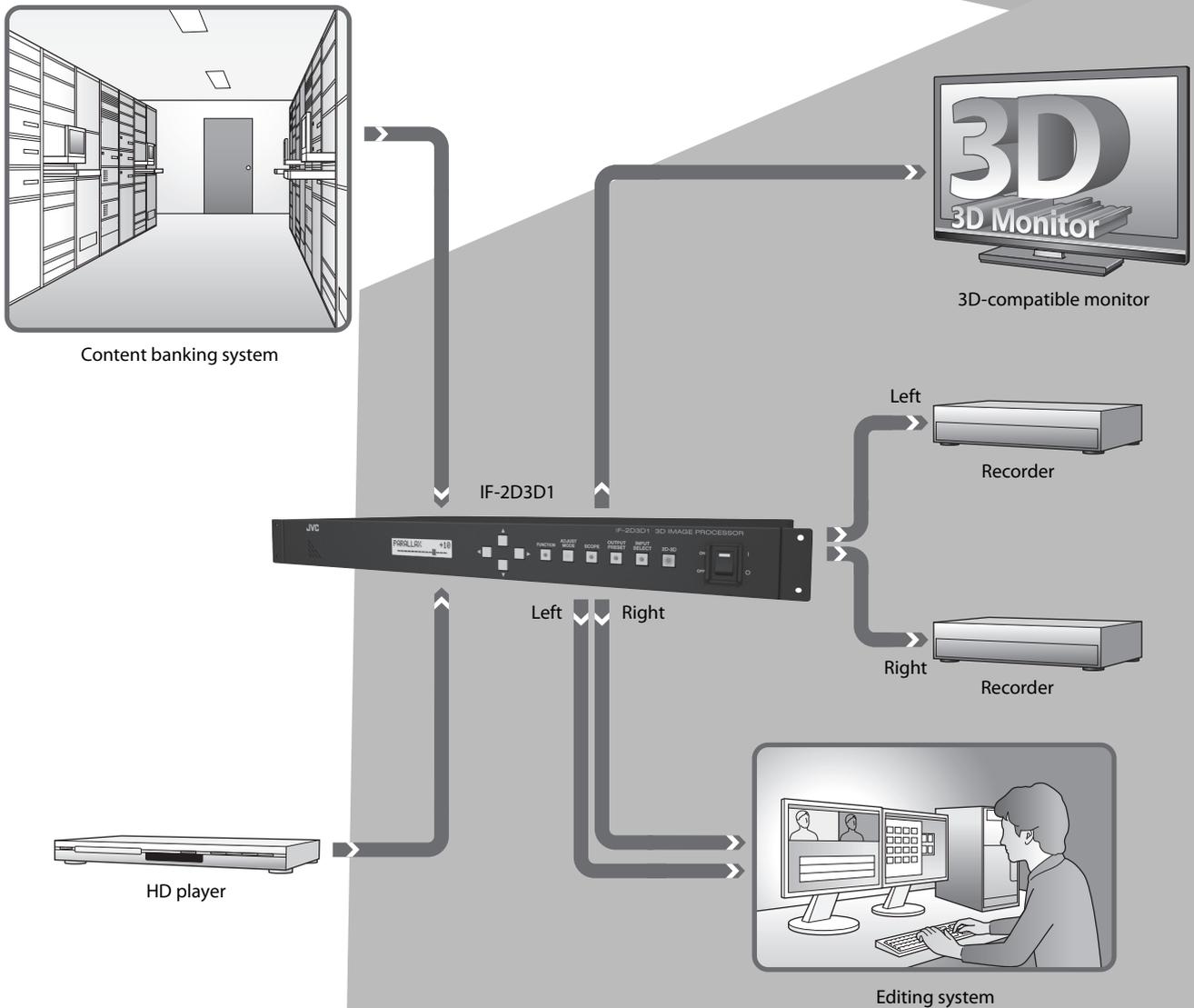
Generating 3D images from 2D images

Many 3D movies have already been shown commercially at movie theaters. The demand for 3D image content will soon reach the mass-market, especially the home consumer market, as 3D-compatible monitors are released for consumers and BD players become more popular.

Much new visual content must be made to be 3D-compatible as 3D-viewing environments become popular and content demand acutely increases. Moreover, it can be expected that the market will demand 3D versions of current 2D content. The conversion will be hard work for content suppliers.

This unit generates 3D images by real-time conversion of 2D images shot and recorded using existing methods and formats using a conversion technology based on an original JVC algorithm.

Below is a system structure example using the unit.



What is a 3D image?

A 3D image is an image which looks as if it has depth though it is displayed on a flat surface; it gives you stereoscopic visual impression which ordinary pictures cannot offer. You see something really come out of the screen or you seem to go actually into it.

On a current standard 3D imaging system, it is required to process two video signals for the left and right eyes and display them on a 3D-compatible special monitor to create 3D images.

Real time 2D-3D image conversion

Video signals of existing 2D content in HD SDI, the standard format for the video industry, or HDMI, the most popular format for video recorder/player connections, are taken in to the unit and converted into 3D images which are then output to a 3D-compatible visual device in HD SDI or HDMI format.

The 3D signals processed by the unit can be output separately as left and right HD SDI signals. It is very convenient for 3D image post production.

Various functions for 3D image adjustment

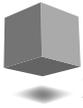
The stereoscopic effect is based on the differences between images the left and right eyes see, so fine adjustment of the left and right image is indispensable for producing quality 3D images.

This unit is equipped with two functions for adjusting the stereoscopic effect – parallax adjustment and intensity adjustment – and you can adjust the two parameters while monitoring images in any of the three display methods: normal, anaglyph and LR sequential.

Converting a 2D image into a 3D image

- See the following pages and page ii for details of the setting procedure.
- See Technical information (page 14 -) for details of the setting items and setting values.

- 1 Connect the input and output devices to the unit.
- 2 Press INPUT SELECT repeatedly to select an input terminal which an input device is connected to.
- 3-1 Press OUTPUT PRESET and select an output terminal which an output device is connected to using ▲ ▼.
- 3-2 Use ◀ ▶ to select MIX or INDIVIDUAL.
- 4 Select a 3D image format.
- 5 Press 2D-3D.



Selecting a 3D mixing format

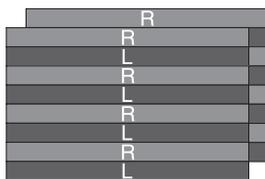
A 3D image is realized by viewing a picture on a 3D-compatible monitor through special glasses with shutters or polarized filters. The monitor displays images for the left and right eyes at the same time. Each lens produces an image for the left or right eye only and the eyes see them as a stereoscopic image.

The unit is compatible with four 3D image formats, LINE BY LINE, SIDE BY SIDE H, ABOVE-BELOW and CHECKER BOARD, that allow for various usage.

The unit executes conversion into any one of the four formats above in real-time.

- Selectable formats vary depending on the type of input signal.
- Selectable formats vary depending on the compatibility of the connected devices. Refer also to the instruction manual or specifications of the connected device to check the compatibility.

LINE BY LINE



Displays image stripes of the left and right images line by line one after another. You can maintain the same horizontal resolution as the source when using a monitor with a polarized filter system.

- It is recommended to use another format if you use compression for recording images.

SIDE BY SIDE H



Shrinks the size of the left and right images by half and displays them side by side. The format is compatible with most recent 3D-compatible displays. This format is very convenient because of its high compatibility with existing recording and transmission systems though the horizontal resolution is reduced to half.

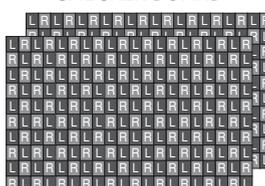
ABOVE-BELOW



Shrinks the left and right images by half vertically and displays them top and bottom. The vertical resolution is reduced to half but the horizontal resolution is free from degradation if you use a monitor with polarized filter system.

- The format is available only when MIX is selected both in SDI OUT SELECT and HDMI OUT SELECT of OUTPUT PRESET.

CHECKER BOARD



Displays image blocks of the left and right images one after another in a grid-like pattern. This is an advanced format, which can reduce the feeling of image deterioration.

- It is recommended to use another format if you use compression for recording images.

Setting

Follow the steps below to select a 3D mixing format.

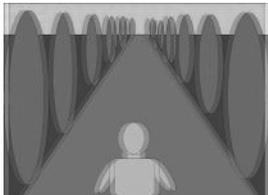
- 1 Press OUTPUT PRESET and select 3D MIX FORMAT using ▲ ▼.
- 2 Select a setting value using ◀ ▶.



Adjusting the stereoscopic effect – Parallax

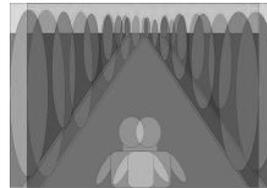
The stereoscopic effect is based on the differences between the view of the left and right eyes (parallax). This unit can adjust degree of parallax to control stereoscopic effect.

Parallax adjustment (Weaker)



Parallax of the left and right image is smaller.

Parallax adjustment (Stronger)



Parallax of the left and right image is larger.

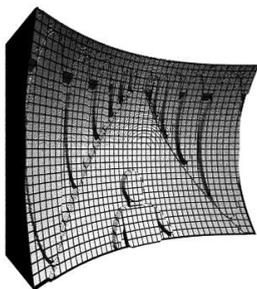
● See page 06 for the detail of the adjustment.



Adjusting the stereoscopic effect – Intensity, Sub-intensity

You can control the engraving-like effect and the feeling of depth of an image by adjusting two types of intensity: the curvature using scene detection, and the concavity and convexity using color detection. You can adjust the image in total using the intensity adjustment, then you can adjust it partially using the sub-intensity adjustment.

Intensity adjustment (Weaker)

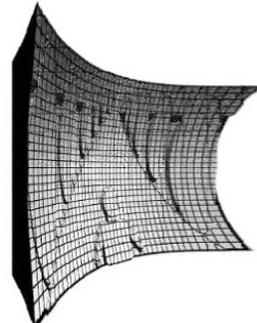


[Feeling of depth]
The degree of curvature of a whole image is small and the feeling of depth is moderate.

[Engraving effect]
Less emphasis of concavity and convexity

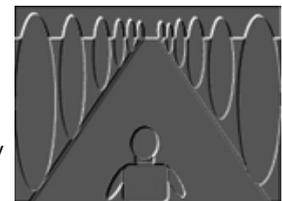


Intensity adjustment (Stronger)



[Feeling of depth]
The degree of curvature of the whole image is relatively high and the feeling of depth is emphasized.

[Engraving effect]
More emphasis of concavity and convexity



Sub-intensity adjustment (Stronger)

[Engraving effect]
Partially stronger emphasis of concavity and convexity



Sub-intensity adjustment (Weaker)

[Engraving effect]
Partially weaker emphasis of concavity and convexity



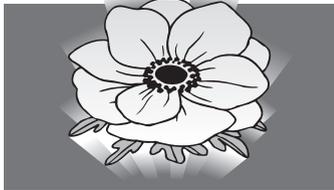
● See page 06 for the detail of the adjustment.



Adjusting the stereoscopic effect – monitoring method

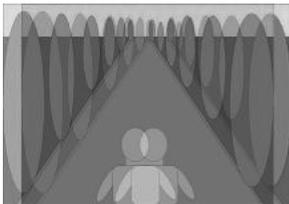
You can select a monitoring method when adjusting the stereoscopic effect of a 3D image. In addition to ordinary 3D representation, anaglyph (the left and right images are colored differently) and LR sequential (the left and right images are displayed alternately) are available for monitoring and adjusting parallax and intensity.

Normal



Normal 3D images are output as they are. You can adjust images while viewing them as natural 3D ones by using a 3D-compatible monitor.

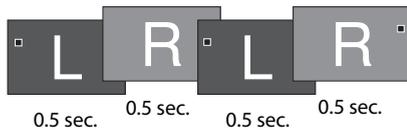
Anaglyph



Images for the left and right eyes are colored in red and blue respectively and displayed on one screen in layers. You can check parallax adjustment by viewing the gap between the left and right images even on a 2D (conventional) monitor or without 3D glasses.

- Be aware that it is difficult to see the colors and stereoscopic effect correctly in anaglyphic representation.

LR sequential



Images for the left and right eyes are displayed alternately at 0.5-second interval. You can view images in this method on a conventional 2D monitor but it requires training to see them as 3D images.

Setting

Follow the steps below to select a monitoring method.

- 1 Press ADJUST MODE and select a setting value using ▲ ▼.

Monitoring method	Setting value	Content
Normal	PARALLAX	Parallax and intensity are adjusted using an image displayed in the format selected in 3D MIX FORMAT.
	INTENSITY	
	SUB INT.	
Anaglyph (ANAGLYPH MODE)	PARALLAX ANA	Parallax and intensity are adjusted using an image displayed in anaglyph.
	INTENSITY ANA	
	SUB INT. ANA	
LR sequential (LR-SEQ. MODE)	PARALLAX LRS	Parallax and intensity are adjusted using an image displayed in LR sequential.
	INTENSITY LRS	
	SUB INT. LRS	

- 2 Adjust a setting value using ◀ ▶. (0 - +60)



Storing the stereoscopic effect settings

● Configuration memory

You can save the setting values of parallax, intensity and sub-intensity.

The stored setting values can be loaded for adjustment of other images. The values can be stored in MEMORY-1 or MEMORY-2.

Saving

- 1 Press FUNCTION and select MEMORY-1 or MEMORY-2 using ▲ ▼.
- 2 Select SAVE using ◀.
- 3 Select OK using ◀.

The setting values are saved.

Loading

- 1 Press FUNCTION and select MEMORY-1 or MEMORY-2 using ▲ ▼.
- 2 Select LOAD using ▶.
- 3 Select OK using ◀.

The stored setting values are loaded.

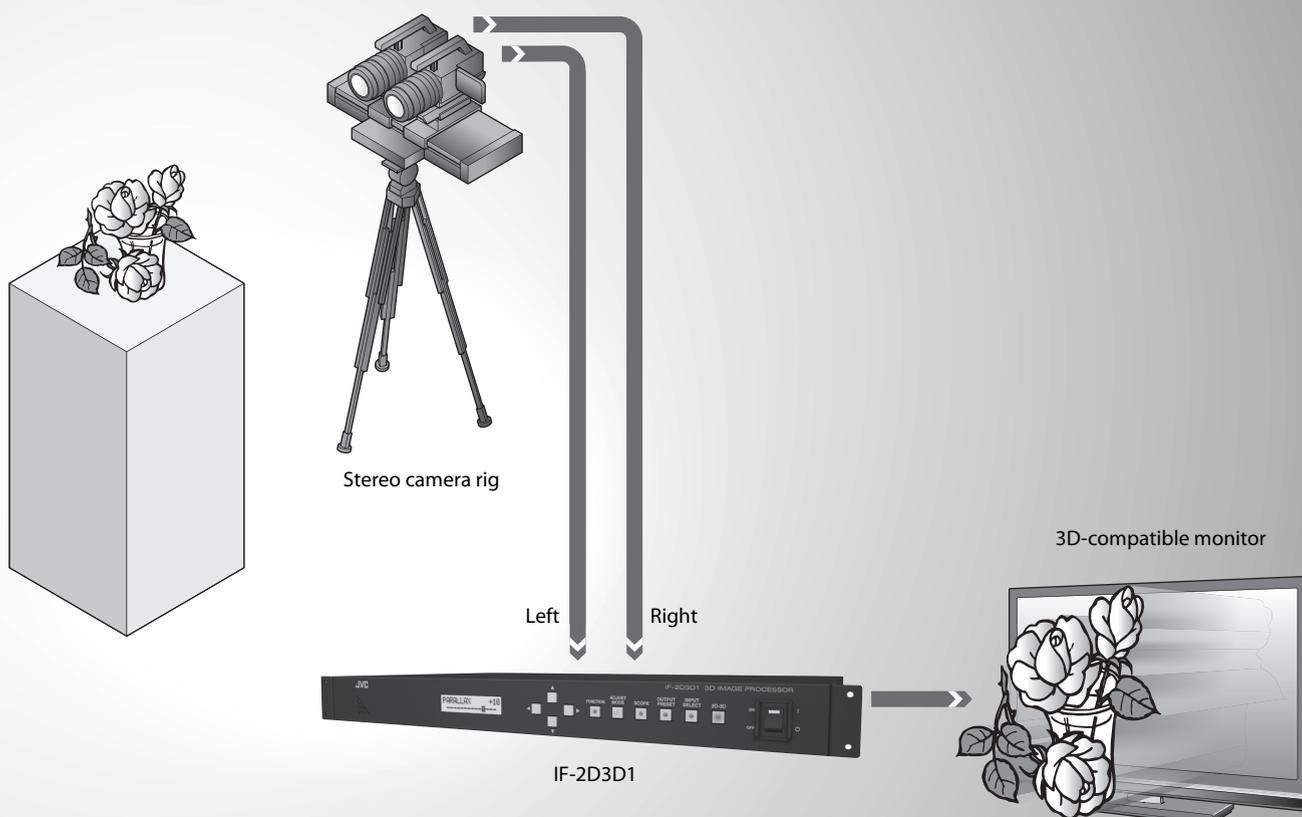
LR mixer

Mixing 2-channel 2D images into one 3D image

Recently 3D-compatible monitors have been released, and in consequence the demand for 3D compatibility of video content is increasing.

This unit is equipped with a 3D image mixing function, which is indispensable for checking 3D images. The unit's real time 3D image composition from 2-channel 2D images makes checking images easier and its flexible monitoring methods and scopes greatly assist you with the adjustment of cameras and other devices.

Below is a system structure example using the unit.



What is LR mixing?

3D mixing is generating 3D video signals for a 3D-compatible monitor by combining two 2D video signals from two cameras, which are prepared for shooting images for the left and right eyes.

Real time 3D image mixing

2-channel 2D video signals in HD SDI, the standard format for the video industry, are mixed to produce a 3D image which is output to a 3D-compatible monitor in HD SDI or HDMI format.

Rich functions for 3D image adjustment

Fine adjustment of cameras and other shooting devices is indispensable for composing quality 3D video signals.

This unit is equipped with rich functions for monitoring 3D images and adjusting cameras and other devices, such as waveform monitors, vectorscopes for comparing and checking characteristics of input signals, and various monitoring methods: Split for comparing the left and right images, Anaglyph and LR sequential for checking the stereoscopic effect.

Mixing 2-channel 2D images into one 3D image

- See the following pages and page ii for details of the setting procedure.
- See Technical information (page 14 -) for details of the setting items and setting values.

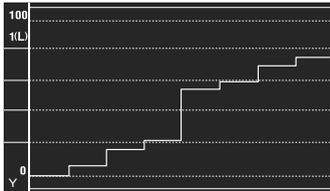
- 1** Connect the input and output devices to the unit.
- 2** Press INPUT SELECT repeatedly to select input terminals which input devices are connected to.
- 3-1** Press OUTPUT PRESET and select an output terminal which an output device is connected to using ▲ ▼.
- 3-2** Use ◀ ▶ to select MIX or INDIVIDUAL.
- 4** Select a 3D image format.



Functions for camera adjustment – Waveform monitor and vectorscope

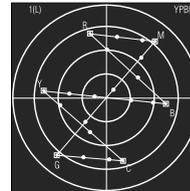
This unit is equipped with a waveform monitor and vectorscope to check input signals from the 2 channels for assisting with the adjustment of cameras and other devices. You can select one of three indication types and four display positions for each scope.

Waveform monitor
(W.F.M.)



It displays the characteristics of input signals on a waveform chart.

Vectorscope
(V.S.)



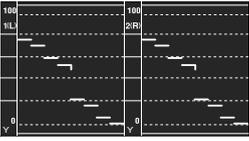
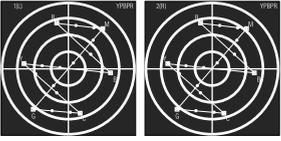
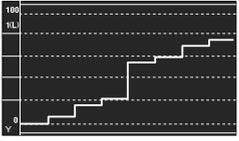
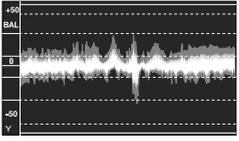
It displays the characteristics of input signals on a vectorscope.

Select the scope and indication type you want.

Setting

Follow the steps below to select a monitoring method and its indication type.

- 1 Press SCOPE and select a scope using ▲ ▼.

Setting value	Indication type	Content
PARA_W.F.M.		Select this to display the waveform monitors/vectorscopes of the images from the HD/SDI IN 1(L) and HD/SDI IN 2(R) terminals side by side.
PARA_V.S.		Adjust the settings of the cameras so as to make the forms of the signals as similar as possible.
IN1_W.F.M.		Select this to display the waveform monitor/vectorscope of the image from the HD/SDI IN 1(L) terminal.
IN1_V.S.		Select this to display the waveform monitor/vectorscope of the image from the HD/SDI IN 2(R) terminal.
BAL_W.F.M.		Select this to display the differential of the signals from the HD/SDI IN 1(L) and HD/SDI IN 2(R) terminals in waveform monitor/vectorscope.
BAL_V.S.		No signal differential (flat line on the waveform monitor and center dot on the vectorscope) is ideal. Adjust the settings of the cameras so as to make the differential as small as possible.

The three functions below are available as options of the scope function while it is activated.

● Gain adjustment

You can adjust the gain of the waveform monitor/vectorscope.

- 1 Adjust the setting value using ◀ ▶ while displaying the waveform monitor or vectorscope. (-30 - 0 - +30)

● Scope filter

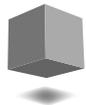
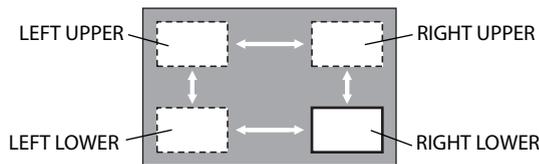
Use it to activate a lowpass filter to limit the frequency band of the scope.

- 1 Press FUNCTION while using the scope function and select SCOPE FILTER using ▲ ▼.
- 2 Select LOWPASS using ◀ ▶.

● Scope position

You can change the display position of waveform monitor/vectorscope.

- 1 Press FUNCTION while using the scope function and select SCOPE POSITION using ▲ ▼.
- 2 Select a position using ◀ ▶.



Functions for camera adjustment – Rotation

You can turn an input image upside-down. This is useful when you must set a camera upside-down. The frames of the left and right images are automatically synchronized when using this function.



Example camera setting

OFF



One camera is set upside-down.

SDI 1(L) ROTATE (inversion of the left image)
SDI 2(R) ROTATE (inversion of the right image)

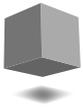


The image from HD/SD SDI IN 1(L) or HD/SD SDI IN 2(R) is inverted.

- One-frame delay is required for image rotation. The unit also delays the non-rotated image by one frame in order to synchronize them.

Setting

- 1 Press FUNCTION and select ROTATE using ▲ ▼.
- 2 Select a setting value using ◀ ▶.



Functions for camera adjustment – Split

The unit can divide the screen and display the left side of the left image and the right side of the right. This is useful for checking the left and right images.

Image from HD/SD SDI IN 1(L)

Image from HD/SD SDI IN 2(R)



Example of mismatch of iris adjustment



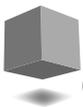
Example of vertical shift of shooting position



Example of mismatch of white balance adjustment

Setting

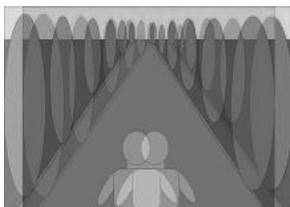
- 1 Press ADJUST MODE and select SPLIT MODE using ▲ ▼.
- 2 Adjust the position of the dividing line using ◀ ▶. (-60 - 0 - +60)



Checking the stereoscopic effect – monitoring method

You can select a monitoring method other than normal 3D display when checking the stereoscopic effect of a 3D image. Anaglyph (the left and right images are colored differently) and LR sequential (the left and right images are displayed alternately) are available for checking.

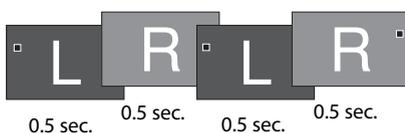
Anaglyph



Images for the left and right eyes are colored in red and blue respectively and displayed on one screen in layers. You can check parallax adjustment by viewing the gap between the left and right images even on a 2D (conventional) monitor or without 3D glasses.

- Be aware that it is difficult to see the colors and stereoscopic effect correctly in anaglyphic representation.

LR sequential



Images for the left and right eyes are displayed alternately at 0.5-second intervals. You can view images in this method on a conventional 2D monitor but it requires training to see them as 3D images.

Setting

- 1 Press ADJUST MODE and select a setting value using ▲ ▼.



Configuring the input settings

● Frame synchronizer

You can synchronize the left and right input signals by locking the right input signal based on the synchronizing signal of the left input.

- 1 Press FUNCTION and select FRAME SYNCHRO. using ▲ ▼.
 - 2 Select a setting value using ◀ ▶.
- The signals cannot be synchronized if the formats of the signals input to HD/SD SDI 1(L) and HD/SD SDI 2 (R) are different.
 - You cannot adjust frame synchronization on a timeline basis. If high-precision 3D images are required, turn off the function and use generator lock on the cameras for frame synchronization.

● LR inversion

You can switch the left and right of the input signals and output to the opposite channels.

- 1 Press INPUT SELECT repeatedly to select SDI-LR.
- 2 Select INVERT using ◀ ▶.

Setting value	Content
SDI-LR: NORMAL	Normal output (no inversion of the left and right channel)
SDI-LR: INVERT	Outputting the signals from HD/SD SDI IN 1(L) through HD/SD SDI OUT 2(R), and those from HD/SD SDI IN 2(R) through HD/SD SDI OUT 1(L).



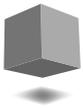
Settings information

● 2D-3D converter

Button	Item	Setting value	Initial value
2D-3D	—	ON/OFF	OFF
SCOPE	×	×	×
ADJUST MODE	PARALLAX	0 - +60	+13
	INTENSITY	0 - +60	+23
	SUB INT.	0 - +60	+40
	PARALLAX ANA	0 - +60	+13
	INTENSITY ANA	0 - +60	+23
	SUB INT. ANA	0 - +60	+40
	PARALLAX LRS	0 - +60	+13
	INTENSITY LRS	0 - +60	+23
	SUB INT. LRS	0 - +60	+40
FUNCTION	—	ON/OFF	OFF
	1 ROTATE	OFF/SDI-1(L) ROTATE/SDI-2(R) ROTATE	OFF
	2 FRAME SYNCHRO.	ON/OFF	OFF
	3 SCOPE POSITION	RIGHT LOWER LEFT LOWER LEFT UPPER RIGHT UPPER	RIGHT LOWER
	4 SCOPE FILTER	FLAT/LOWPASS	FLAT
	5 BEEP	ON/OFF	ON
	6 BACK LIGHT	-30 - 0 - +30	0
	7 MEMORY-1	SAVE/LOAD	
	8 MEMORY-2	SAVE/LOAD	
INPUT SELECT	—	SDI-1(L)/SDI-2(R)/HDMI/SDI-LR:NORMAL	SDI-LR:NORMAL
OUTPUT PRESET	SDI OUT SELECT	MIX/INDIVIDUAL	MIX
	HDMI OUT SELECT	MIX/INDIVIDUAL	MIX
	3D MIX FORMAT	LINE BY LINE SIDE BY SIDE H ABOVE-BELOW CHECKER BOARD	LINE BY LINE

● LR mixer

Button	Item	Setting value	Initial value
2D-3D	—	ON/OFF	OFF
SCOPE	—	ON/OFF	OFF
	PARA_ W.F.M.	-30 - 0 - +30	0
	PARA_ V.S.	-30 - 0 - +30	0
	IN1_ W.F.M.	-30 - 0 - +30	0
	IN1_ V.S.	-30 - 0 - +30	0
	IN2_ W.F.M.	-30 - 0 - +30	0
	IN2_ V.S.	-30 - 0 - +30	0
	BAL_ W.F.M.	-30 - 0 - +30	0
	BAL_ V.S.	-30 - 0 - +30	0
ADJUST MODE	SPLIT MODE	-60 - 0 - +60	0
	ANAGRYPH MODE	—	—
	LR-SEQ. MODE	—	—
FUNCTION	—	ON/OFF	OFF
	1 ROTATE	OFF/SDI-1(L) ROTATE/SDI-2(R) ROTATE	OFF
	2 FRAME SYNCHRO.	ON/OFF	OFF
	3 SCOPE POSITION	RIGHT LOWER LEFT LOWER LEFT UPPER RIGHT UPPER	RIGHT LOWER
	4 SCOPE FILTER	FLAT/LOWPASS	FLAT
	5 BEEP	ON/OFF	ON
	6 BACK LIGHT	-30 - 0 - +30	0
	7 MEMORY-1	SAVE/LOAD	
	8 MEMORY-2	SAVE/LOAD	
INPUT SELECT	—	SDI-1(L)/SDI-2(R)/HDMI/SDI-LR:NORMAL SDI-LR:INVERT	SDI-LR:NORMAL
OUTPUT PRESET	SDI OUT SELECT	MIX/INDIVIDUAL	MIX
	HDMI OUT SELECT	MIX/INDIVIDUAL	MIX
	3D MIX FORMAT	LINE BY LINE SIDE BY SIDE H ABOVE-BELOW CHECKER BOARD	LINE BY LINE



Input/output specifications

Video input/output

	INPUT SELECT			OUTPUT PRESET		Output terminal (video)			
	LR INVERT	2D-3D	SDI OUT SELECT	HDMI OUT SELECT	HD/SD SDI 1(L)	HD/SD SDI 2(R)	HDMI		
When using 2D-3D converter	HD/SD SDI IN 1(L)	—	OFF	—	—	HD/SD SDI IN 1(L) throughout			
			ON	INDIVIDUAL	INDIVIDUAL	HD/SD SDI IN 1(L) 3D-converted left-channel signal	HD/SD SDI IN 1(L) 3D-converted right-channel signal	*HD/SD SDI IN 1(L) 3D-converted left-channel signal	
		MIX		MIX	HD/SD SDI IN 1(L) 3D-converted mixed signal	HD/SD SDI IN 1(L) 3D-converted mixed signal	HD/SD SDI IN 1(L) 3D-converted mixed signal		
		HD/SD SDI IN 2(R)	—	OFF	—	—	HD/SD SDI IN 2(R) throughout		
	ON			INDIVIDUAL	INDIVIDUAL	HD/SD SDI IN 2(R) 3D-converted left-channel signal	HD/SD SDI IN 2(R) 3D-converted right-channel signal	*HD/SD SDI IN 2(R) 3D-converted left-channel signal	
			MIX	MIX	HD/SD SDI IN 2(R) 3D-converted mixed signal	HD/SD SDI IN 2(R) 3D-converted mixed signal	HD/SD SDI IN 2(R) 3D-converted mixed signal		
	HDMI IN		—	OFF	—	—	HDMI IN throughout		
		ON		INDIVIDUAL	INDIVIDUAL	HDMI IN 3D-converted left-channel signal	HDMI IN 3D-converted right-channel signal	*HDMI IN 3D-converted left-channel signal	
			MIX	MIX	HDMI IN 3D-converted mixed signal	HDMI IN 3D-converted mixed signal	HDMI IN 3D-converted mixed signal		
		When using LR mixer	HD/SD SDI IN 1(L)	NORMAL	—	INDIVIDUAL	INDIVIDUAL	HD/SD SDI IN 1(L)	HD/SD SDI IN 2(R)
	INVERT			HD/SD SDI IN 2(R)				HD/SD SDI IN 1(L)	**HD/SD SDI IN 2(R)
	HD/SD SDI IN 2(R)		NORMAL	—	MIX	MIX	MIX		MIX
INVERT			MIX-INVERT				MIX-INVERT		

* A 3D-converted video signal from the HD/SD SDI IN L(1) terminal comes out of the HDMI OUT terminal when OUTPUT PRESET is set to INDIVIDUAL during 2D-3D conversion.

** A video signal from the HD/SD SDI IN 1(L) or HD/SD SDI IN 2(R) terminal comes out of the HDMI OUT terminal when OUTPUT PRESET is set to INDIVIDUAL during LR mixing.

Audio signals

Audio signal input/output

	INPUT SELECT			OUTPUT PRESET		Output terminal (audio)		
	LR INVERT	2D-3D	SDI OUT SELECT	HDMI OUT SELECT	HD/SD SDI 1(L)	HD/SD SDI 2(R)	HDMI	
When using 2D-3D converter	HD/SD SDI 1(L) HD/SD SDI 2(R) HDMI (When selected one of the above)	—	OFF	MIX/INDIVIDUAL	MIX/INDIVIDUAL	Throughout		
			ON	INDIVIDUAL	INDIVIDUAL			
				MIX	MIX			
When using LR mixer	HD/SD SDI (L) HD/SD SDI (R)	NORMAL	—	INDIVIDUAL	INDIVIDUAL	HD/SD SDI 1(L)	HD/SD SDI 2(R)	HD/SD SDI 1(L)
		INVERT				HD/SD SDI 2(R)	HD/SD SDI 1(L)	HD/SD SDI 2(R)
		NORMAL		MIX	MIX	HD/SD SDI 1(L)	HD/SD SDI 2(R)	HD/SD SDI 1(L)
		INVERT				HD/SD SDI 2(R)	HD/SD SDI 1(L)	HD/SD SDI 2(R)

Input/output formats of audio signals

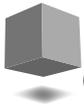
Input format of embedded audio signal

HD/SD SDI IN	IEC60958 PCM 48 kHz 8ch	▶
HDMI IN	IEC60958 PCM 48 kHz 8ch	▶
	Dolby Digital (AC3) 5.1ch compatible DTS 5.1ch MPEG2-AAC stereo 2ch	▶

Output format of embedded audio signal

HD/SD SDI OUT	IEC60958 PCM 48 kHz 8ch
HDMI OUT	IEC60958 PCM 48 kHz 2ch
HD/SD SDI OUT	IEC60958 PCM 48 kHz 2-8ch
HDMI OUT	IEC60958 PCM 48 kHz 2ch
HD/SD SDI OUT	No output available
HDMI OUT	Dolby Digital (AC3) 5.1ch compatible* DTS 5.1ch* MPEG2-AAC stereo 2ch*

* Throughout output



Other functions

You can configure the settings below to suit the unit to your operation environment.

● Operation tone

The unit's beeps for confirming operations can be activated/deactivated.

- 1 Press FUNCTION and select BEEP using ▲ ▼.



- 2 Select a setting value using ◀ ▶.

● Backlight

You can adjust the brightness of the information display.

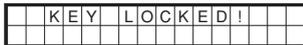
- 1 Press FUNCTION and select BACK LIGHT using ▲ ▼.
- 2 Adjust the setting value using ◀ ▶.

● Control key lock

You can deactivate the buttons on the front of the unit.

- 1 Press and hold ◀ and ▶ simultaneously when the information display indicates the current input (e.g.: SDI-1(L)).

KEY LOCKED! appears on the information display and the buttons on the front of the unit are deactivated.



To release the lock, press and hold ◀ and ▶ simultaneously again.



External control

You can control the unit using a PC or the special control unit connected to the RS-232C terminal on the rear of the unit.

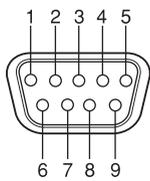
- Connect the RS-232C straight-through cable (purchased separately) to the RS-232C terminal on the rear of the unit. (See page ii.)

Control specifications

Communication specifications

- Baud rate: 9600bps
- Data bits: 8 bits
- Parity: Odd parity
- Stop bits: 1 bits
- Flow control: None
- Communication code: ASCII code

Terminal specifications



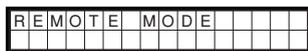
This is a male terminal.

Pin number	Signal
1	—
2	RXD
3	TXD
4	—
5	GND
6	—
7	—
8	—
9	—

Connection

- 1 Connect the PC to the RS-232C terminal on the rear of the unit using an RS-232C extension cable (purchased separately).
- 2 Send the log in command from the PC to log into the unit.

REMOTE MODE appears on the information display and the unit becomes operatable from the PC. You cannot operate the unit using the buttons while the PC is logged into it.



When the operation has finished, send the log off command to the unit from the PC to log off.

- If you cannot log off the unit from the PC, press and hold ◀ and ▶. Communication is forcibly terminated. The buttons on the unit remain locked after the forcible shutting down. Press and hold ◀ and ▶ again to release the lock. (See page 17.)
- Communication is automatically terminated if the unit is turned off during communication. Log in from the PC again to restart external control.

Command outline

You can control the unit by sending commands from an external device.

Communication example



Command structure

! 00BCN1000Cr
 a b c d e

a:	Header	!: Control command from an external device ?: Reference command from an external device @: Response command from the unit
b:	Device ID	00 (Fixed)
c:	Command	Command list (see page 19)
d:	Data	
e:	Exit code	Cr (0Dh)

● Command list

- Assign parameters on the left column at "**".
- Make the order of commands the same as that of the button operation on the unit. The commands sent in a wrong order will be ignored.

Function	Command	Parameter
Logging in (starting communication)	!00BCN1000Cr	—
Logging off (quitting communication)	!00BCN0000Cr	—
Starting operation of INPUT SELECT	!00INPUT00Cr	—
Selecting an input terminal	!00INPSE0*Cr	0x00: SDI-LR/ 0x01: SDI-1(L) 0x02: SDI-2(R)/ 0x03: HDMI
Turning LR inversion on/off	!00BOTHPO*Cr	0x00: NORMAL/ 0x01: INVERT
Starting operation of OUTPUT PRESET	!00OUTPU00Cr	—
Selecting an SDI output type	!00SDIMX0*Cr	0x00: MIX/ 0x01: INDIVIDUAL
Selecting an HDMI output type	!00HDMIM0*Cr	0x00: MIX/ 0x01: INDIVIDUAL
Selecting a 3D mixing format	!003DFOR0*Cr	0x00: LINE BY LINE/ 0x01: SIDE BY SIDE H 0x02: ABOVE-BELOW/ 0x03: CHECKER BOARD
Starting operation of FUNCTION	!00MMENU00Cr	—
Turning the rotation function on/off	!00SDIRT0*Cr	0x00: OFF/ 0x01: SDI-1(L)ROTATE 0x02: SDI-2(R)ROTATE
Turning the frame synchronizer on/off	!00FRASY0*Cr	0x00: OFF/ 0x01: ON
Turning the operation tones on/off	!00BEEPA0*Cr	0x00: ON/ 0x01: OFF
Adjusting the brightness of the information display	!00BACKL+*Cr !00BACKL-*Cr	0x00 - 0x1E: 0 - +30 0xFF - 0xE2: -1 - -30
Storing settings into memory	!00MEMSV0*Cr	0x00: MEMORY-1/ 0x01: MEMORY-2
Loading settings from memory	!00MEMLD0*Cr	0x00: MEMORY-1/ 0x01: MEMORY-2
Starting operation of the scope function	!00SCOPE00Cr	—
Displaying the waveform monitor or vectorscope	!00SCMOD0*Cr	0x00: OFF 0x01: Waveform monitor 0x02: Vectorscope
Assigning an input source for a scope	!00SCSIG0*Cr	0x00: PARA. (SDI-LR)/ 0x01: BAL. (SDI-LR) 0x02: SDI-IN 1(L)/ 0x03: SDI-IN 2(R)
Selecting a scope position	!00SCPOS0*Cr	0x00: RIGHT LOWER/ 0x01: LEFT LOWER 0x02: LEFT UPPER/ 0x03: RIGHT UPPER
Turning the lowpass filter on/off	!00SCPFIO*Cr	0x00: OFF/ 0x01: ON
Adjusting the gain of the waveform monitor	!00SCWFG+*Cr !00SCWFG-*Cr	0x00 - 0x1E: 0 - +30 0xFF - 0xE2: -1 - -30
Adjusting the gain of the vectorscope	!00SCVEG+*Cr !00SCVEG-*Cr	0x00 - 0x1E: 0 - +30 0xFF - 0xE2: -1 - -30
Starting operation of ADJUST MODE	!00ADJUS00Cr	—
Selecting the display format of ADJUST MODE	!00ADJMD0*Cr	0x00: OFF 0x01: SPLIT MODE 0x02: ANAGLYPH 0x03: LR-SEQ. MODE 0x04: PARALLAX 0x05: INTENSITY 0x06: PARALLAX ANA 0x07: INTENSITY ANA 0x08: PARALLAX LRS 0x09: INTENSITY LRS 0x0a: SUB INT. 0x0b: SUB INT. ANA 0x0c: SUB INT. LRS
Moving the dividing line of split	!00ADJOS+*Cr !00ADJOS-*Cr	0x00 - 0x3C: 0 - +60 0xFF - 0xC4: -1 - -60
Adjusting parallax	!00ADJPX0*Cr	0x00 - 0x3C: 0 - +60
Adjusting intensity	!00ADJIY0*Cr	0x00 - 0x3C: 0 - +60
Adjusting sub-intensity	!00ADJSI0*Cr	0x00 - 0x3C: 0 - +60
Starting operation of 2D-3D	!002D/3D00Cr	—
Turning the 2D-3D converter on/off	!00CONVE0*Cr	0x00: OFF/ 0x01: ON
Normal status	@00BOK.000Cr	—
Abnormal status	@00BNgn***Cr	n=0: illegal command/ n=1: illegal setting value n=2: unexecutable in the current mode

Installation and connection

Accessories

- Main unit
- Power cord
- Power cord holder/tapping screws x 2 (4 mm)
- EIA rack mounting adapters x 2/tapping screws x 8 (3 mm)

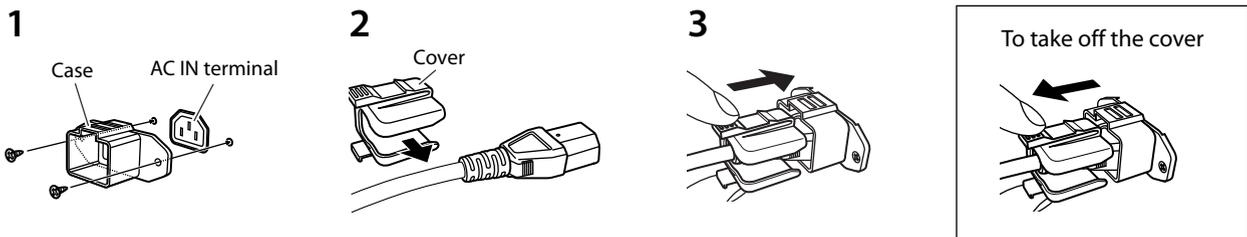
Installation

Read the safety precautions (separate sheet) carefully and install the device properly.

Connecting the power cord and attaching the power cord holder

Attach the power cord holder to the back of the unit to prevent accidental disconnection of the cord.

- Ground the earth plug of the power cable to the earth terminal of the AC outlet.
- The holder consists of two parts: the cord case and the case cover.

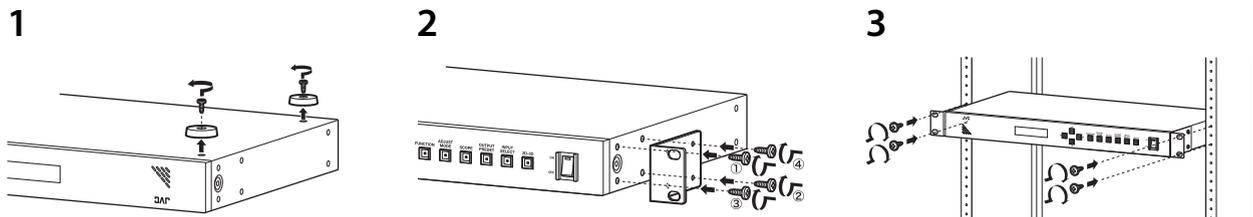


Cautions

- Do not use any screws other than those supplied.
- Push the cover into the case and check that the power plug is connected firmly.

Mounting the unit in to an EIA rack

Read the safety precautions (separate sheet) carefully before installing this unit in an EIA rack.



Take off the feet on the bottom of the unit.

Attach the EIA rack mounting adapters with the supplied screws.

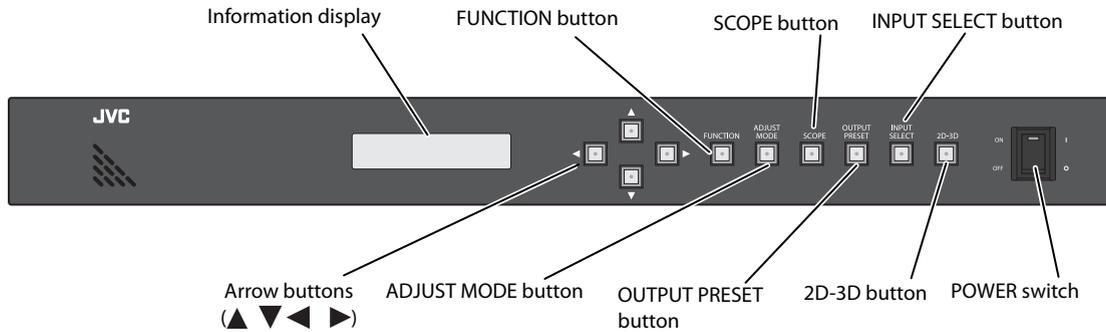
- Fit the screws in order shown.

Install the unit to an EIA rack.

- Screws for mounting are not supplied. Use the special screws for EIA racks (purchased separately).

Parts identification

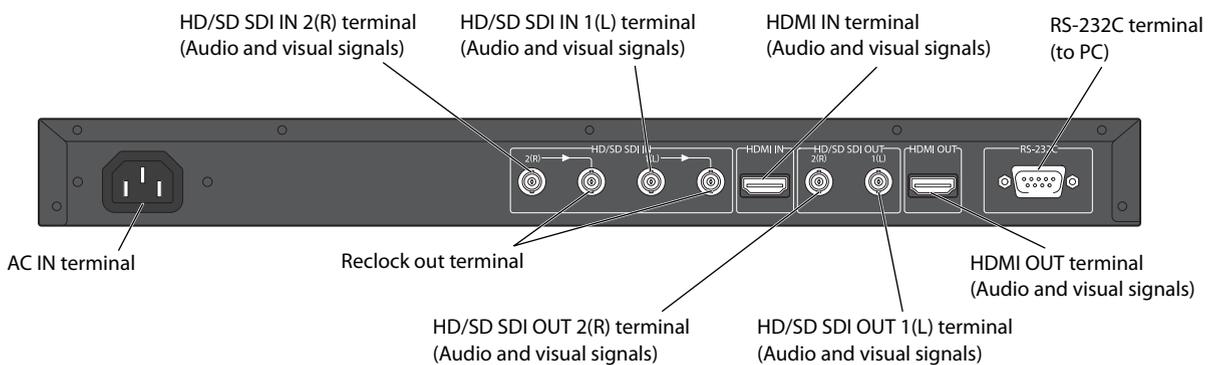
Front



POWER*	Use it to turn on/off the power.
2D-3D*	Press it to turn on/off the 2D-3D converter. (page 03)
INPUT SELECT*	Press it to select an input terminal. (pages 03, 09, 13)
OUTPUT PRESET*	Press it to select an output terminal and output type. (pages 03, 04, 09)
SCOPE*	Press it to turn on/off the scope function. Setting items of the scope function are indicated on the information display when the function is turned on. (pages 10, 11)
ADJUST MODE*	Press it to turn on/off ADJUST MODE. Setting items of the functions of ADJUST MODE are indicated on the information display when turned on. (pages 06, 12)
FUNCTION*	Press it to use functions for camera adjustment (see page 11) and other functions (see pages 07, 13, 17).
 (Arrow buttons)	 (Up and down buttons) Use them to select an item.
	 (Left and right buttons) Use them to adjust a value.
Information display	Indicates information such as menu items and their settings.

* Lights up while activated.

Rear



Troubleshooting

After turning the unit off and on

If you turn the unit off during setting, the unit will use the previous settings next time it is turned on.

- The last selected item appears highlighted as the unit turns on if you turned the unit off during setting the 2D-3D or scope function last time.
- The last selected item appears as ADJUST is pressed.
- The initial value appears as FUNCTION, INPUT SELECT or OUTPUT PRESET is pressed.

General

Cannot turn on the unit.

- Connect the power cord properly. (See page i.)

Cannot operate the unit properly.

- Turn off the POWER switch on the front of the unit and turn it on again. If the problem is not solved, consult your dealer.

The buttons on the front of the unit do not work.

- Deactivate the lock. (page 17)

No operation tone comes out when pressing a button.

- Turn on the operation tone. (page 17)

No indication on the information display.

- Nothing is indicated on the information display while controlling the unit from an external device. Log off the external device. (page 18)

The information display is too bright.

- Adjust the brightness of the backlight. (page 17)

Input and output

No picture is displayed.

- Select the appropriate input/output settings.
- Connect external devices properly.
- Turn on the external devices and start playback.

No picture from an HDMI device.

- Use a cable marked with the HDMI logo. (Please use a High Speed HDMI™ cable, which is tested to carry an HD signal of 1080p and higher.)

No 3D image is displayed.

- Press 2D-3D.
- Input the same resolution signals to both the HD/SD SDI IN 1(L) and HD/SD SDI IN 2(R) terminals.
- Input a signal compatible with the unit.

A signal input to the HDMI IN terminal does not come out of the HD/SD SDI OUT terminals.

- The HD/SD SDI OUT terminals cannot be used for output when the input signal is formatted for PCs or is HDCP-encrypted. Use the HDMI OUT terminal for output.

A signal input to the HD/SD SDI IN terminal does not come out of the HDMI OUT terminal.

- The format of the signal is incompatible with the HDMI OUT terminal. See Compatible formats (page 14) for details.

Signal format

An SDI embedded audio signal does not come out of the HD/SD SDI OUT terminal.

- The format of the input audio signal is not compatible with embedding. See Input/output specifications (page 16) for details.

An audio signal does not come out of the HDMI OUT terminal/The number of audio channels decreases when using the HDMI OUT terminal.

- The format of the input audio signal is not compatible with HDMI output/has a limited number of channels when using HDMI output. See Input/output specifications (page 16) for details.

To check the format of the input signal...

- Press INPUT SELECT. The signal format of the current input appears on the information display.

To check the output setting...

- Press OUTPUT PRESET. The current output setting appears on the information display.

2D-3D conversion

Images are not converted into 3D after pressing 2D-3D.

- Images are not converted into 3D when INPUT SELECT is set to SDI-LR. Select another input to make 2D-3D conversion effective.

Some functions such as 2D-3D conversion do not work.

- Some functions do not work depending on the format of the input signal and/or settings selected. See Compatible formats (page 14) for available functions of each input signal format.

The 2D-3D button flashes and images are not converted into 3D after pressing it.

- The format of the video signal is not compatible with conversion or the selected 3D mixing format. See Compatible formats (page 14) for details.

The stereoscopic effect is hard to see.

- The conversion generates virtual 3D images using an image-recognition algorithm. The conversion may be less effective depending on the type of the source image.

LR mixing

The LR mixing function does not work.

- The 2D signals are not mixed when OUTPUT PRESET is set to INDIVIDUAL. Select MIX in OUTPUT PRESET to mix the signals and generate a 3D image.
- The format of the video signal is not compatible with the selected 3D mixing format. See Compatible formats (page 14) for details.

The image blurs when mixing.

- Turn the frame synchronizer on. (page 13)

Input images are not synchronized.

- Turn the frame synchronizer on or off. (page 13)
- This unit cannot correct the time base difference between two video signals. Synchronize them using a time base corrector or another device or use generator lock on video output devices before using the unit.
- Frame rates of the video signals are different (e.g.: 60 Hz and 59.94 Hz). Check the frame rate on the video output devices.

Waveform monitor/vectorscope is not displayed by pressing SCOPE.

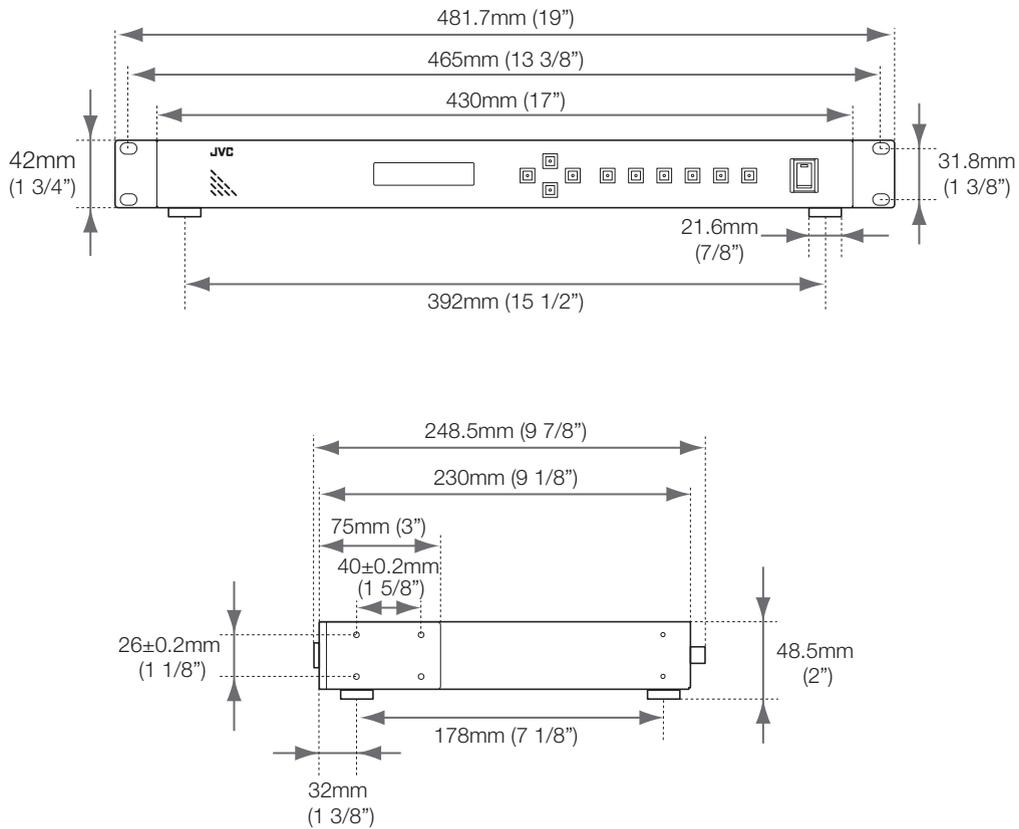
- The waveform monitor/vectorscope is not displayed when INPUT SELECT is set to SDI-1(L), SDI-2(R) or HDMI. Select SDI-LR to use the waveform monitor or vectorscope.

Specifications

Specifications

General	Model name	IF-2D3D1	
	Power requirements	AC 120 V - 240 V, 50 Hz/60 Hz	
	Rated current	0.2 A	
	Power consumption	10 W (approx.)	
	Dimensions	430 mm × 48.5 mm × 248.5 mm (17" × 2" × 9 7/8") (W×H×D)	
	Mass	2.5 kg (5.5 lbs) (excluding accessories)	
	Input/Output	Input terminals	HD/SD SDI
HDMI			1 (version 1.3 compliant)
Output terminals		HD/SD SDI	BNC terminals 0.8 V (p-p) x 2
			BNC terminals 0.8 V (p-p) x 2 (Reclock out)
		HDMI	1 (version 1.3 compliant)
Audio		HD/SD SDI	HD/SD embedded audio 1-2G 8 channels (48 kHz)
		HDMI	linear PCM 8 channels (48 kHz)
External control	RS-232C terminal (D-sub 9 pin) x 1		
Others	Operation environment	Temperature: 5°C - 35°C, humidity 20% - 80% (No condensation) (Operatable environment may vary depending on the condition of the installation place.)	

Dimensions



Index

Numbers

- 2D-3D..... 03, 15, ii, iii
- 2D-3D converter.....02, 16, 19
- 3D mixing format..... 04, 06, 09, 19

Alphabet

A

- ABOVE-BELOW 04, 14
- ADJUST MODE06, 12, 15, ii
- Anaglyph.....03, 06, 09, 12, 19

B

- Backlight.....17

C

- CHECKER BOARD 04, 14
- Control key lock17

F

- Frame synchronizer.....13
- FUNCTION 07, 11, 13, 15, ii

H

- HD/SD SDI IN 1(L)..... 11 - 16, ii
- HD/SD SDI IN 2(R)..... 11 - 16, ii
- HD/SD SDI OUT 1(L) 14 - 16, ii
- HD/SD SDI OUT 2(R) 14 - 16, ii
- HDMI IN..... 14 - 16, ii
- HDMI OUT..... 14 - 16, ii

I

- Information display..... ii
- INPUT SELECT13, 15, 16
- INTENSITY..... 05 - 07, 14, 15, 19

L

- LINE BY LINE.....04, 14, 15
- LR inversion13
- LR sequential.....03, 06, 09, 12, 19
- LR mixer..... 08, 16

O

- Operation tone17
- OUTPUT PRESET04, 15, 16

P

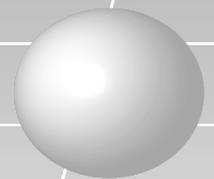
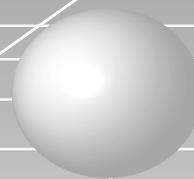
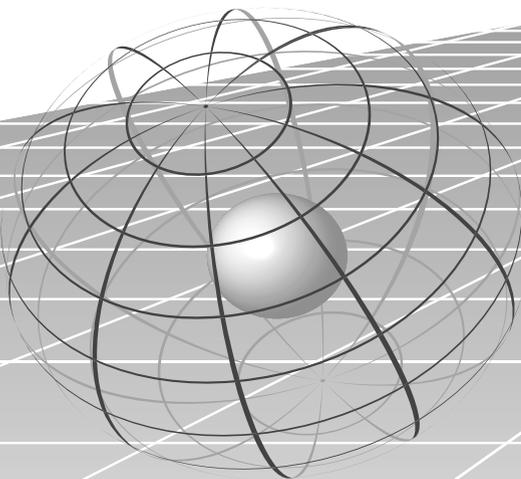
- PARALLAX..... 05 - 07, 14, 15, 19
- POWER..... ii

R

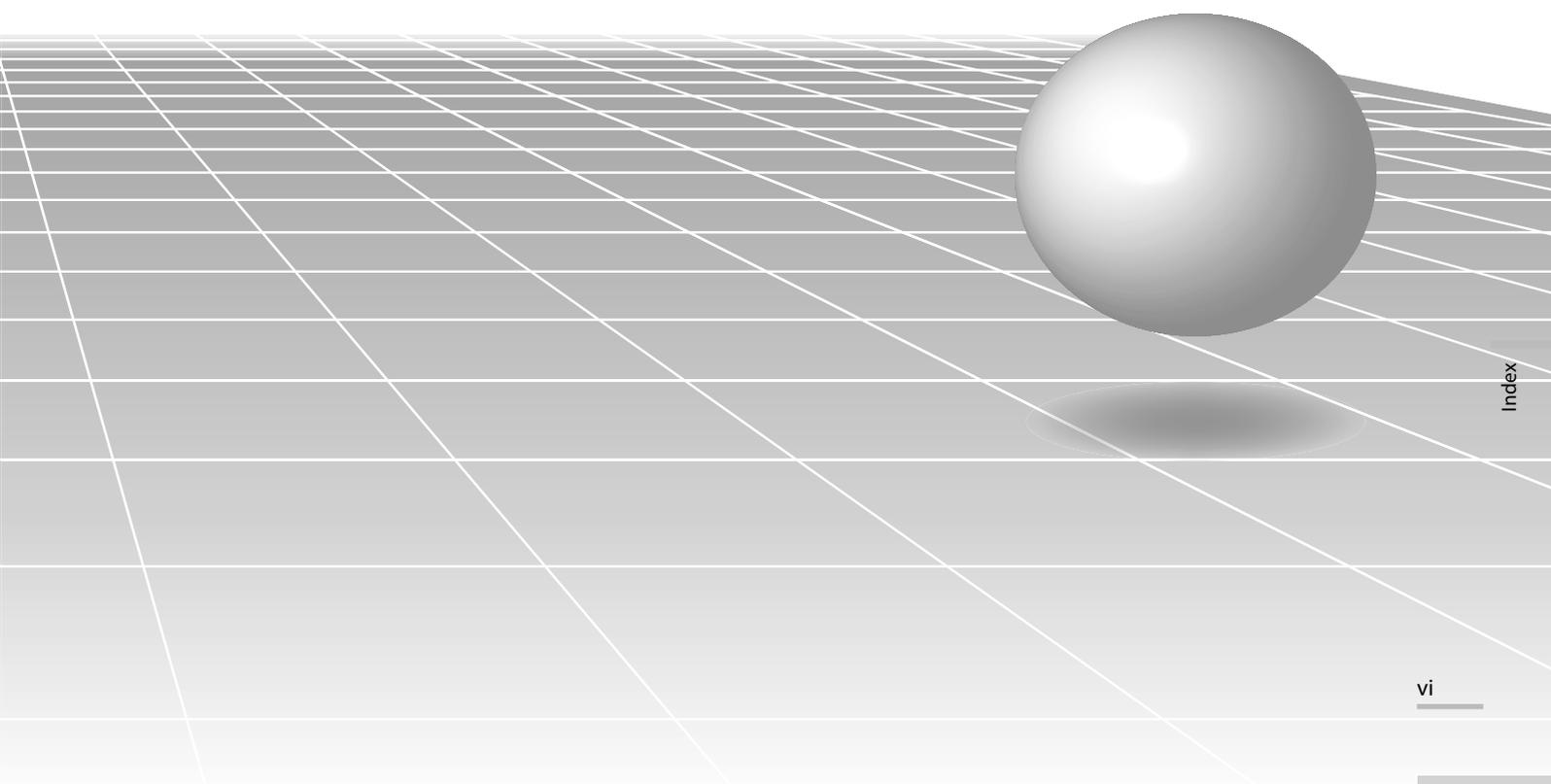
- Rotation.....11
- RS-232C18, ii

S

- Scope10
- Scope filter11
- Scope position11
- SIDE BY SIDE H04, 14, 15
- Split.....09, 12, 19



V
 Vectorscope10
W
 Waveform monitor10



JVC