

JVC[®]
PROFESSIONAL

HDTV UP CONVERTER

BC-D2300U

SALES MANUAL



Victor Company of Japan, Limited

This document has been compiled in order to describe the product features of the BC-D2300U Upconverter, the actual method of its demonstration, examples of its delivery and FAQs for the sales personnel in charge of the sales of this product. A supplementary explanation of the menu setup (adjustment) and definitions of special terms are also attached. It is intended that sales personnel will confirm technical details related to the product by reading this document before dealing with customers. We also hope that this document will serve as a convenient tool in supporting the introduction of the product.

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1. RELEASE OBJECTIVE OF THE BC-D2300U

- Industrial Trends -

As the real age of digital broadcasting approaches, the need for HD (High Definition) programs increases, as broadcast stations and program producers upgrade their HDTV contents.

Real start of digital broadcasting

Increased need of HDTV content

- Requirements from Broadcast Stations and Program Productions -

We want to produce HDTV programs using our existing NTSC equipment.

We want to convert existing NTSC programs into HDTV programs and broadcast them.

We want to insert NTSC materials into HDTV programs by converting NTSC into HDTV.

However, HDTV equipment is still expensive, making it difficult to produce all of the programs in HDTV. This has resulted in an increase in demand for equipment for use in upconverting the materials produced using the existing NTSC (SD = Standard Definition) equipment for HDTV broadcasting.

Increased demand for format converter equipment

Solution by JVC!

JVC is releasing the

BC-D2300U *HDTV UP CONVERTER*

as a solution for the production of HDTV programs at low costs.

2. SELLING POINTS

2

1 Conversion of a 480i NTSC (SDTV) signal into a 1080i/720p HDTV signal

- The 2-format compatibility meeting the multiformat age converts a 480i, 4:2:2 digital component (D1) signal into a 1080/60i or 720/60p digital high-definition signal.
- The BC-D231U option board is separately available to handle digital composite (D2).
- The output can be switched between 1080i or 720p in a displayed menu.

2 High quality images at the highest level in the class

- JVC's unique, highly accurate motion detection algorithm provides the converted image with a very fine quality. The degree of motion detection can be adjusted with the Motion Sense adjustment to provide high resolution for both still and moving images.
- A two dimensional enhancer is built in, making contour correction in both horizontal and vertical directions to improve the sharpness of the output video.

3 Embedded audio input/output (video delay sync) compatibility

- The embedded audio multiplexed in the video can be output in synchronism with the delay time produced in video signal conversion.
- The video signal delay produced in conversion is equal to 1 frame or 1 frame – 90 [HD] H.
For the video delay, see page 16 of this sales manual.

4 Versatile functions to meet various user needs

- Colorimetry can be switched ON/OFF. (ITU-R BT601 → ITU-R BT709)
For the colorimetry section, see page 35 of this sales manual.
- The cropping function of the two extremities on the effective pixels can mask noise produced in the peripheral areas of video.
- The function for adjusting the upconverted video image (detailed color correction and enhancement settings) can be incorporated by installing optional software.
Available adjustment items: White level, black level, white color, black color, chroma phase, chroma level, enhance level and enhance frequency.
- Compatibility with both the black burst and HD tristate sync signals enables selection according to the environment of the existing equipment.

3. OTHER FEATURES

1 *Compatibility with three NTSC input modes*

- The upconverter accepts the following three types of NTSC video inputs.
 - ① 4:3: Use this mode when the input material is of the 4:3 aspect ratio. The HD output video consists of the original 4:3 video and the side panels on the left and right of it.
 - ② Letter Box: Use this mode when the input material is of the Letter Box type. The HD output video consists of a 16:9 aspect ratio image with the top and bottom areas cut.
 - ③ Squeeze: Use this mode when the input material is of the Squeeze type. The HD output video consists of a 16:9 aspect ratio image obtained by stretching the original 4:3 video to the left and right.

2 *User-friendly operability*

- The functions can be set and controlled from a front panel equipped with an LCD display. Remote control is possible through remote connector.
- Each set can be given a unique 10-character name. The set names are shown in the Top menu to facilitate circuit identification when multiple upconverters are used.
- The Profile function saves frequently used menu-setting values. (Four user-defined memory areas plus a factory default memory are provided.)

3 *Video Cropping*

- This function hides the left and right edges of the video output in the 4:3 mode by adjusting the side panel width. The color of the side panels (back color) can be set as required by the user (using parameters Y, Pb and Pr or Hue, Saturation and Luminance).

4 *Others*

- Color bar output.
- Error display and alarm signal output.
- Compact, power-saving design with a 1U size and 35 W power consumption.

4. COMPARISON WITH COMPETITORS

Manufacturer	JVC	Sony	YEM
Model Name	BC-D2300U	HKPF-1125	HUC-1000
Basic construction	Stand-alone unit	Module board	Stand-alone unit
Feature 1	Embedded audio compatibility	This product consists of a single board, which is to be inserted in a special case for use.	Improved vertical resolution thanks to the motion-adaptive scanning line interpolation and 10-bit RGB processing.
Feature 2	4:3, Letter Box, Squeeze NTSC input mode compatibility. The width, color, position, etc. of the side panels can be adjusted in the 4:3 mode.	Compatibility with 4:3, Letter Box and Squeeze NTSC input modes.	The image frame of the converted video is adjusted in 3 fixed modes plus a variable mode with horizontal/vertical size adjustments.
SDI inputs	SMPTE 259M/270M[bps], x 1	SMPTE 259M/270M[bps], x 1	SMPTE 259M/270M[bps], x 1
SDI outputs	SMPTE 292M, 1.485G[Hz], x 3	SMPTE 292M, 1.485G[Hz], x3	SMPTE 292M, 1.485G[Hz], x 3
SDI active thru output	Yes	No	Yes
Analog video input	Optional	Yes (NTSC analog composite x 1)	No
Analog video output	No	No	No
Video output formats	1080i, 720p	1080i, 1035i	1080i, 1035i
Decoder resolution	10 bits	10 bits	10 bits
Sync signal inputs	HDTV tristate sync or SD black burst, x 1	HDTV tristate sync or SD black burst, x 1	HDTV tristate sync or SD black burst, x 1
Audio functions	Embedded audio input/output (synchronized with video sync)	No	No
Colorimetry conversion	Yes	Data unavailable	Data unavailable
Motion-adaptive conversion	Yes	Data unavailable	Yes
Enhancer	Yes	Yes	Data unavailable
Aspect ratio conversion	Yes	Yes	Yes
Test pattern	Yes	No	Data unavailable
Alarm output	Yes	No	Data unavailable
Power consumption	35 [W]	Data unavailable	100 [W]
Rack size	1U	Minimum 1U (depending on case)	1U
Main video-related options	<ul style="list-style-type: none"> • Video adjustment software (detailed color correction and enhancement settings) • D2 digital/analog video input board 	No	No
Other options	<ul style="list-style-type: none"> • Remote control unit 	<ul style="list-style-type: none"> • Case with power supply (1U, 3U, 7U) • Remote control unit 	No
Reference URL			http://www.yem.co.jp/e_huc-10001.html (English site)
Standard price (yen)	1,500,000	950,000 (Board only)	1,500,000

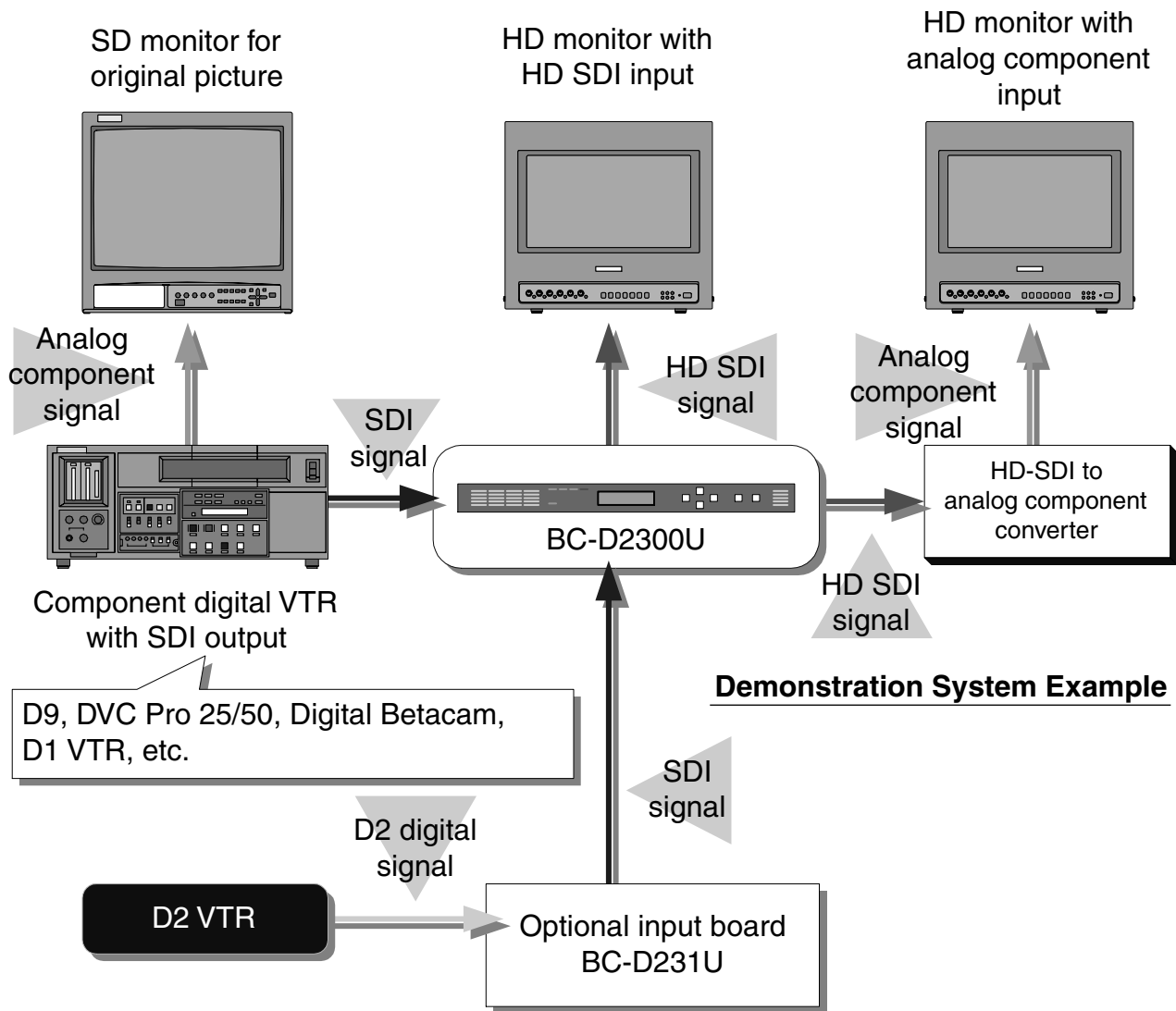
*Prices are in Japanese market. Just for reference.

Manufacturer	Ikegami	Milanda	NEC
Model Name	HVC-555	Aquila	HPG-7197A
Basic construction	Stand-alone unit	Module installing unit	Modular board
Feature 1	Motion-adaptive 3D Y/C separation, motion-adaptive field/frame conversion	Functions extension by installing option modules (max. 12 modules)	This product consists of a single board, which is to be inserted in a special case for use.
Feature 2	Edge canceller which reduces vertical edge signal in the Y component of NTSC video signal	Ethernet connector for external control	Compatibility with 4:3, Letter Box and Squeeze NTSC input modes.
SDI inputs	SMPTE 259M/270M[bps], x 1	SMPTE 259M/270M[bps], x 1	SMPTE 259M, 270M [bps] x 1
SDI outputs	SMPTE 292M, 1.485G[Hz], x 2	SMPTE 292M, 1.485G[Hz], x4	SMPTE 292M, 1.485 G [Hz] x 4
SDI active thru output	Yes	Yes	No
Analog video input	Optional	Optional	No
Analog video output	Optional	Optional	Compatible using an optional board
Video output formats	1080i, 1035i	1080i, 1035i, 1080p, 720p, 480p	1080i
Decoder resolution	Data unavailable	10 bits	10 bits
Sync signal inputs	HDTV tristate sync or SD black burst, x 1	HDTV tristate sync or SD black burst, x 1	HDTV tristate sync
Audio functions	Optional	No	Compatible using an optional board
	Optional	Data unavailable	Data unavailable
Colorimetry conversion	Yes	Yes	Yes
Motion-adaptive conversion	Yes	Yes	Yes
Enhancer	Yes	Yes	Yes
Aspect ratio conversion	No	Data unavailable	Data unavailable
Test pattern	Data unavailable	Yes	Data unavailable
Alarm output	170 [W]	70 [W]	60 [W]
Power consumption	1U	4U	3U
Rack size Main video-related options	<ul style="list-style-type: none"> • Video adjustments (color matrix, etc.) 	Video input boards <ul style="list-style-type: none"> • Composite: (PAL, PAL-M, -N, NTSC) Video output boards <ul style="list-style-type: none"> • Component: (RGB, Y/Pb/Pr) • Optical fiber output 	<ul style="list-style-type: none"> • PC boards (A/D converter, D/A converter, FS, HD process, etc.)
Other options	<ul style="list-style-type: none"> • AES/EBU embedded audio inputs (4 channels) • Audio monitor output 	<ul style="list-style-type: none"> • Remote control unit 	<ul style="list-style-type: none"> • Remote control unit
Reference URL		http://www.miranda.com/en/products/static_pages/aquila.html (US site)	http://networks.nec.co.jp/bv/hoso/e-sc570.html (English site)
Standard price (yen)	1,600,000	???	1,000,000 (Board only)

Manufacturer	Snell & Wilcox	Leitch Technology
Model Name	HD5200D	HDU-3800
Basic construction	Stand-alone unit	Stand-alone unit
Feature 1	Versatile conversion output modes. Compatibility with 525i and 625i SDI inputs.	Functions extension by installing option modules
Feature 2	GPI inputs/outputs (6 circuits), Film Frame input	Film mode (When 2-3 pull down video is input, this function creates the output video frames by using only the associated fields.)
SDI inputs	SMPTE 259M/270M[bps], x 2	SMPTE 259M/270M[bps], x 1
SDI outputs	SMPTE 292M, 1.485G[Hz], x 4	SMPTE 292M, 1.485G[Hz], x 1
SDI active thru output	Yes	No
Analog video input	No	Optional
Analog video output	No	Optional
Video output formats	1080i, 1035i, 1080p, 720p, 576p, 480p	1080i, 720p
Decoder resolution	10 bits	10 bits
Sync signal inputs	HDTV tristate sync or SD black burst, x 2	Yes (Detail data unavailable)
Audio functions	Optional	Optional
Colorimetry conversion	Yes	Data unavailable
Motion-adaptive conversion	Data unavailable	Yes
Enhancer	Yes	Yes
Aspect ratio conversion	Yes	Yes
Test pattern	Yes	Yes
Alarm output	No	No
Power consumption	100 [W]	240 [W]
Rack size	1U	2U
Main video-related options	No	Video input boards · Composite: (PAL, PAL-M, -N, NTSC) · Component: (SMPTE/EBU N10) · SDI input extension
Other options	• AES/EBU embedded audio inputs (8 channels) • Audio monitor output	Video output boards · Component: (RGB, YUV) · Optical fiber output
Reference URL	http://www.snellwilcox.com/productguide/ (US site)	http://www.leitch.com/products/nab/hdtv/hdtvcont.pdf (US site)
Standard price (yen)	5,500,000	25,000,000

*Prices are in Japanese market. Just for reference.

5. EXAMPLE OF PRODUCT DEMONSTRATION SYSTEM



Notes

1. The D1 VTR is most suitable for use as the input source.
2. The SDI output is optional with certain D9 VTRs.
3. The SDI input is optional with certain HD monitors.

Examples of Demonstration Equipment

Video Monitors

Model Name	Manufacturer	Input Format	Note
DT-V2100S	JVC	1080i, 720p, 480i, 480p	Analog HDTV signal compatible.
DT-V1700C		480i, 576i, 1080i, 1035i, 720p, 480p, 1080/24sf	SD-SDI/HD-SDI special input interface available (optionally).
TM-3217HD	Panasonic	1080i, 720p, 480i, 480p	Analog HDTV signal compatible.
TM-1415BT		480i	Special input interface available (optionally).
BVM-D32E1WJ	SONY	1080i, 720p, 480i, 480p, 1080/24psf	Direct input of digital HDTV signal possible.
BVM-D24E1WJ		1080i, 720p, 480i, 480p, 1080/24psf	SD-SDI/HD-SDI special input interface available (optionally).
HTM-2050R	Ikegami	480i, 1080i, 1035i, 720p, 575i	SD-SDI/HD-SDI special input interface available (optionally).
HTM-1050R		480i, 1080i, 1035i, 720p, 575i	SD-SDI/HD-SDI special input interface available (optionally).

HD-SDI to Analog Composite Video

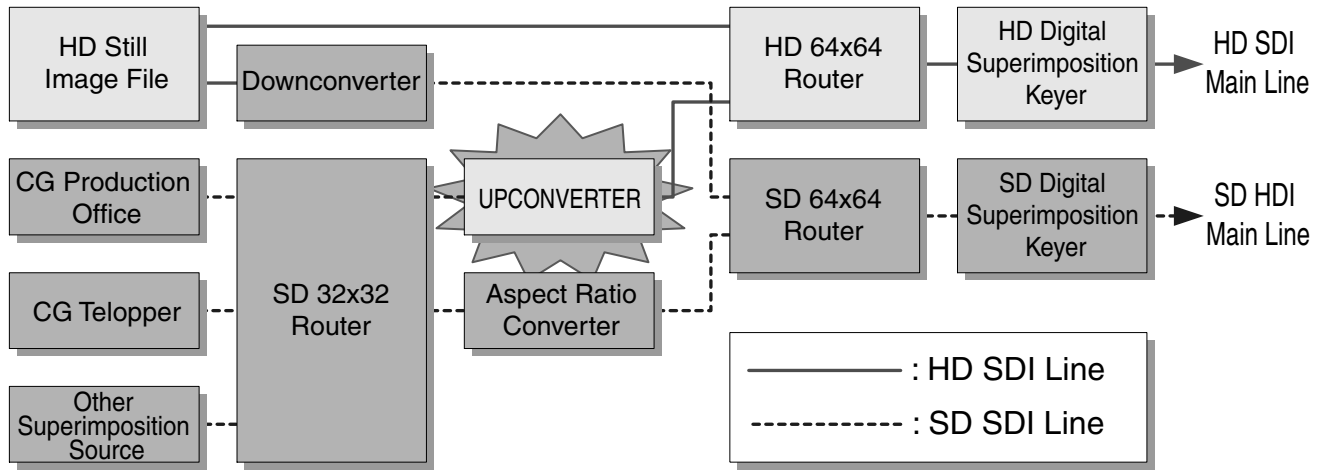
Model Name	Manufacturer	Note
HSD2A	Keisoku Giken Co.,Ltd	Conversion of SMPTE 292M (1080i) input into analog RGB (or Y/Pb/Pr) outputs.
HD10C	AJA Video (Agent: Keisoku Giken Co., Ltd.)	
DA-100H	Asaka	
DA-1643A	Astro Design, Inc.	
DAC-292M	Yamashita Engineering Manufacturer, Inc.	

Examples of Demonstration Equipment

Digital VTRs with SDI Output			
Model Name	Manufacturer	Format	SDI Output (SMPTE 259M)
BR-D92U	JVC	D9 (4:2:2 component digital video signal)	Special input interface available (optionally).
BR-D350U			Special input interface available (optionally).
AJ-D960	Panasonic	DVC PRO 50 (4:2:2 component digital video signal)	Special input interface available (optionally).
AJ-D850		DVC PRO (4:1:1 component digital video signal)	Special input interface available (optionally).
AJ-D580/B		D5 (4:2:2 component digital video signal)	Input/output interface provided (as standard).
DSR-1800	SONY	DVCAM (4:1:1 component digital video signal)	Input/output interface provided (as standard).
DSR-2000			

6. EXAMPLES OF SYSTEM CONFIGURATIONS

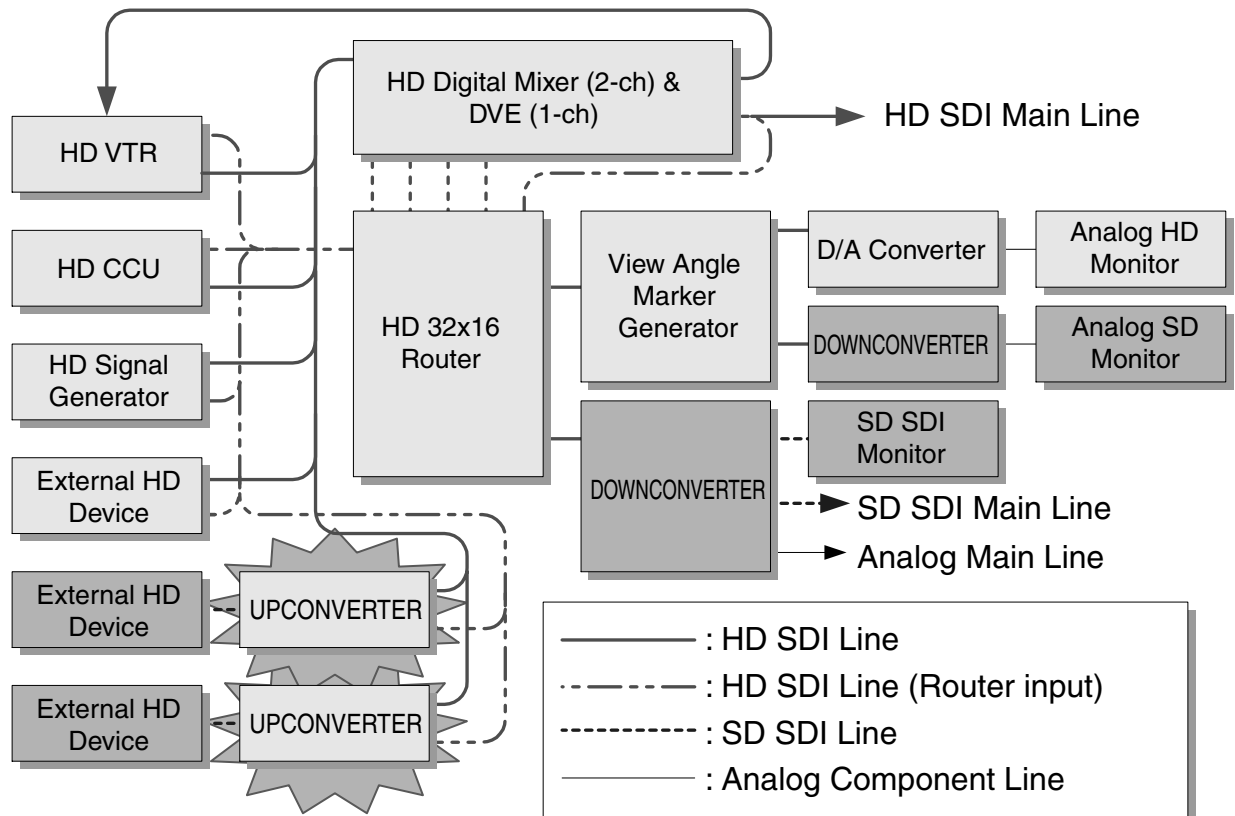
1 Studio A: Scheme of Superimposition System



Notes

- ① To prevent image degradation due to repeated conversions, SD type and HD type materials are handled separately and an independent digital superimposition keyer is prepared for each material type.
- ② The aspect ratio converter is used to handle D1 squeeze signals.
- ③ The upconverter is used to convert SD superimposition/telop materials into HD materials and insert them in the HD video.

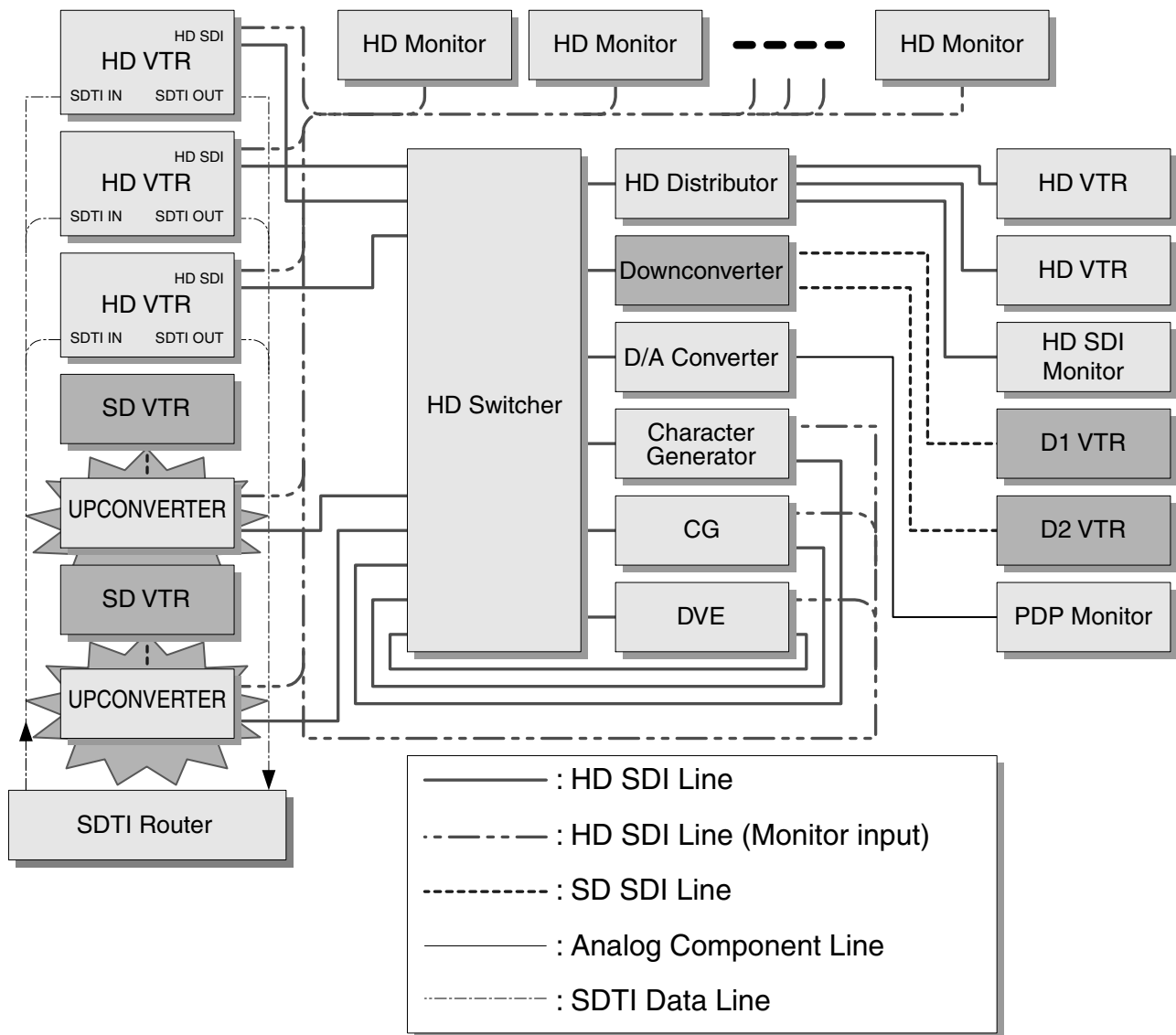
2 Station B: Scheme of Video System in a Drama Production Studio



Notes

- ① The view angle marker generator synthesizes the frames for use in checking the view angle of the HD video obtained by downconversion during broadcasting. Some HD monitors and HD camera viewfinders also have an equivalent marking function. This system provides this function so that the view angle can be checked even when the monitor in use does not incorporate this function.

3 Station C: Scheme of Editing Room System



Notes

- ① While much HD equipment is introduced in program production studios, the use of HD equipment for outdoor coverage is still not perfect. To deal with this situation, this system upconverts SD materials for use in the HD editing system.
- ② The SDTI routers allow the reciprocal transfer of data (video dubbing) between HD VTRs.

7. INSTALLATION EXAMPLES



HD Editing Room

Upconverts SD video materials for supplying to the HD editing system.



Digital Satellite Broadcasting Transmission Room

Upconverts SD video materials for use in digital satellite broadcasting.



Video Transmission System

Installation example of the MPEG2 decoder, which is an associated product in a broadcast station. The decoder decodes the MPEG2 video data stored in the hard disk seen at the front of the picture.

8. FAQ

This section shows typical questions and answers presented in the explanation meetings of the BC-D2300U upconverter.

Q1: What are the principle features of the BC-D2300?

The BC-D2300U provides compatibility with the 1080/60i and 720/60p formats as standard. Other features include a 2D enhancer for the conversion of high quality images and embedded audio input/output compatibility.

The BC-D2300U can also incorporate color corrector and variable enhancer functions by installing optional software BC-D232U.

Q2: Which, are JVC's unique technologies? (Which, are the distinguishing points?)

The motion detection algorithm has been developed independently by JVC. As it performs motion-adaptive scanning line interpolation by referring to the image information of the fields before and after the current field, the upconverted video output can make full use of the quality of the original video. (Many of the upconverters from competitors refer only to the video information in the current field.)

Q3: What is "motion-adaptive interpolation"?

The basic function of an upconverter lies in increasing the number of horizontal pixels and vertical scanning lines in the original image (for example increasing 720 dots x 480 lines to 1,920 dots x 1,080 lines). In doing this, the BC-D2300U distinguishes the moving image part and still image part in each video image and applies intra-field interpolation to the moving image part and inter-field interpolation to the still image part to increase the scanning lines. The technology for distinguishing the moving picture and still image parts and converting them separately is referred to as "motion-adaptive interpolation".

Q4: What is "intra-field interpolation"?

This technique increases the scanning lines by interpolating the mid-point between each pair of scanning lines in a field. It makes it possible to upconvert moving picture without blur but decreases the vertical resolution.

Q5: What is "inter-field interpolation"?

This technique performs interpolation between scanning lines by overlapping two successive fields. It makes it possible to upconvert still picture with high vertical resolution but the moving picture converted with this technique are blurred.

Q6: How does the BC-D2300U convert the boundaries between moving and still images?

It performs interpolation by combining and mixing the “intra-field interpolation” and “inter-field interpolation” optimally.

Q7: What is the function of the menu setting item “Motion Sense”?

This item is used to set the “motion-adaptive” detection sensitivity. Increasing the value of this item increases the detection sensitivity. When “Motion Sense” is set to “0”, the entire video is interpreted as a still picture and inter-field interpolation is applied to the entire video by ignoring motion detection. When “Motion Sense” is set to “15”, the entire video is interpreted as a moving picture and intra-field interpolation is applied to the entire video.

This item can be set according to the material in use or the user’s requirements for the video, but basically it is recommended to use the factory default setting (8).

Q8: Does the enhancer provide H/ V independent adjustments?

The setting is common for H and V. Independent setting is not available.

Q9: Can the video delay be decreased?

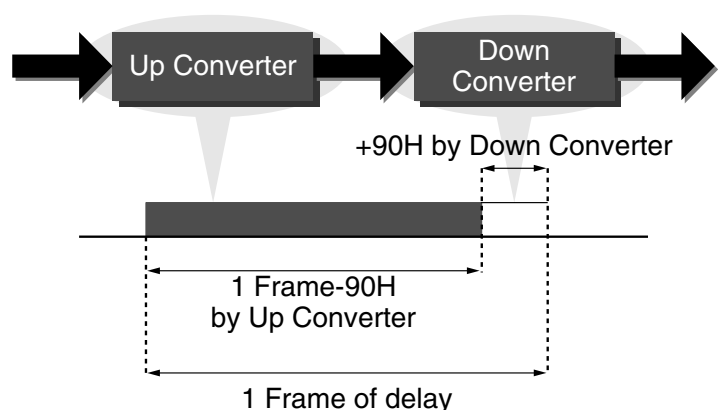
The delay time of the BC-D2300U is either 1 frame or 1 frame – 90 [HD] H.

This delay time results from the JVC method, which refers to the video information of the fields before and after the current field to improve the accuracy of scanning line interpolation.

Q10: What does “1 frame – 90 [HD] H” mean?

It means a delay time value that is shorter by 90 [HD] H lines per frame. “H” stands for the horizontal scanning time. With 1080i, “H” becomes equal to $1/33.716 \text{ sec} \times 29.66 \text{ } [\mu\text{s}]$ (33.716 refers to the number of effective HD scanning lines per second, which is calculated by multiplication 1,125 effective scanning lines x 29.97 frames). As some downconverters use a delay time of 90H (2.67 [ms]), combining the BC-D2300U with such a downconverter makes it possible to build a system with which the total delay time for upconversion plus downconversion is 1 frame.

By the way, with 720p, the time per 1H can be calculated by formula $1/(750 \text{ effective scanning lines} \times 59.94 \text{ frames})$, which is 22.44 [μs].



Q11: What is “H Cropping”?

When a 4:3 original video source is upconverted by this ratio, the 4:3 video is placed on the center of the 16:9 screen so that the video start/end positions are visible on the left and right extremities of the video. Since the video start position is given a certain tolerance by the standard, an error of a few pixels may be produced with some recording equipment. When such a material is edited, the edge of every scene may be deviated horizontally, causing noticeable vertical line noise. The function for masking this noise by extending the side panels is referred to as “H cropping”.

(To be precise, H is “H cropping” stands for “Edge”.)

Q12: What does the “free setting of side panel positions” mean?

When an originally 4:3 original video source is upconverted with this aspect ratio, the 4:3 video is placed on the center of the 16:9 screen so that the areas on the two sides of the image becomes remainders. These areas are referred to as “side panels”, which are usually painted with a black or blue back color (color adjustable), but it is also possible to display information (such as superimposed character information) in them. In this case, displacing the 4:3 image to the left or right to increase the width of one of the side panels can increase the freedom of display.

The BC-D2300U is capable of free setting the 4:3 image position so that it can increase the width of one side panel as described above.

Q13: What is “embedded audio”?

When video broadcast devices exchange digital video signals, they usually use an interface called the SDI (Serial Digital Interface). The SDI features connection through a single coaxial cable and can transmit video and audio data simultaneously. As the audio data looks as if it is embedded in the spaces between a large amounts of video data when both data are transmitted simultaneously, the audio data handled by SDI is called the “embedded audio”.

Q14: Does the upconverted video include more information than the original video?

Since there is no more information than the pixel information in the original video, it cannot be said that information is increased in this context (actually, the resolution is not increased). However, since the actual number of pixels is increased, it can also be said that the information is increased to the amount of HDTV from the physical viewpoint.

9. MENU SETUP

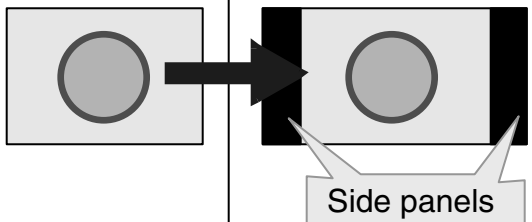
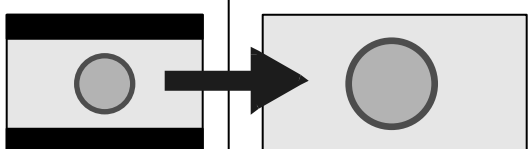
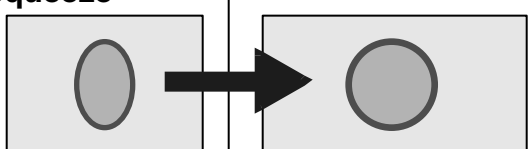
This section describes the purpose and adjustment operation of each item described in “Menu Items” in the instruction manual from the BC-D2300U HDTV upconverter. The explanations of main terms used in the description text are also given in the footnotes at the bottom or on the next page to the page containing the text. Please also refer to these.

1. Output Mode

- ① This item is used to define the HD output signal mode according to the mode of the input NTSC digital video signal (SMPTE 259M compliant → See footnote *1).
- ② Items No. 8 “V Position”, No. 9 “Motion Sense” and No. 10, “Enhance” can be set individually for each of the three output modes set here. In other words, the settings of No. 8, No. 9 and No. 10 may be altered when the “Output Mode” is changed.

After changing the “Output Mode”, be sure to check if these settings are optimum.

9

Setting (Input Signal Mode)	Output Signal Mode (16:9 Aspect Ratio)
4:3 	<p>The HD output obtained from a video signal with a 4:3 aspect ratio has side panels attached on both sides. The widths, positions and colors of the side panels can be adjusted with the following setups.</p> <ul style="list-style-type: none"> • No. 5 “H Position” • No. 6 “H Crop (Left)” • No. 7 “H Crop (Right)” • Nos. 17-23 (Back Color)
Letter Box 	<p>The HD output obtained from a Letter Box video signal having masking edges on the top and bottom (see footnote *2) does not have the masking edges any more. The vertical position of the video in the Letter Box mode can be adjusted with the following setup.</p> <ul style="list-style-type: none"> • No. 8 “V Position”
Squeeze 	<p>The HD output obtained from a Squeeze mode video signal (see footnote *3), which was captured by compressing the horizontal dimension using a special anamorphic lens (see footnote *4), is extended to the original view angle (16:9 aspect ratio).</p>

Footnotes

*1. SMPTE 259M:

Standard on the interfacing of digital SDTV video (serial component) signals. For the relationship with other SMPTE standards, see table on the next page.

*2. Letter Box:

One of the modes for the downconversion of video signals that converts an HDTV signal into an SDTV signal without altering the HDTV aspect ratio by applying compression both horizontally and vertically. This is the most frequently used downconversion mode. Black stripes are usually placed at the top and bottom of the screen.

*3. Squeeze

A lens having a cylinder-shaped surface. When this lens is used on a camera, the wide-angle view can be compressed horizontally to image a distorted image in a standard frame. The images are captured by applying compression and reproduced by applying extension (restoration).

*4. Anamorphic lens:

One of the modes for the downconversion of video signals that converts an HDTV signal into an SDTV signal by applying compression only horizontally while maintaining the vertical size.

In addition to the Letter Box and Squeeze modes, there is another conversion mode called “Edge Cropping”. This converts an HD signal into SD signal by cutting the left and right areas of image to obtain 4:3 aspect ratio while displaying the vertical components of the HD video as they are in the SDTV video. This mode features a higher resolution than the letterbox mode.

Standards Related to Composite Video signal

Signal specification	SMPTE 170M-1999 Defines the specifications of composite analog NTSC signal.
Signal input/output interface	SMPTE 244M-1995 Defines the digitization and parallel interfacing of the signal specified by SMPTE 170M. The sampling frequency is 4 fsc. SMPTE 259M-1997 Defines the serial interfacing of the parallel signal specified by SMPTE 244M.
Digital VTR used in signal recording	D2, D3 (The composite digital NTSC signal is usually called the D2 signal.)

Standards Related to Component Video signal

Signal specification	ITU-R BT.601 Defines the digitization of component analog video signal (525 and 625 scanning line systems). The sampling frequency is 13.5 [MHz] with the Y signal and 6.75 [MHz] with the Cr and Cb signals.
Signal input/output interface	SMPTE 125M-1995 Defines the parallel interfacing of the signal specified by ITU-R BT.601. SMPTE 259M-1997 Defines the serial interfacing of the parallel signal specified by ITU-R BT.601.
Digital VTR used in signal recording	D1, D5, D9 (The 4:2:2 component digital SDTV signal is usually called the D1 signal.)

Video Signals and Related Standards

2. Output

① This item selects the video output format.

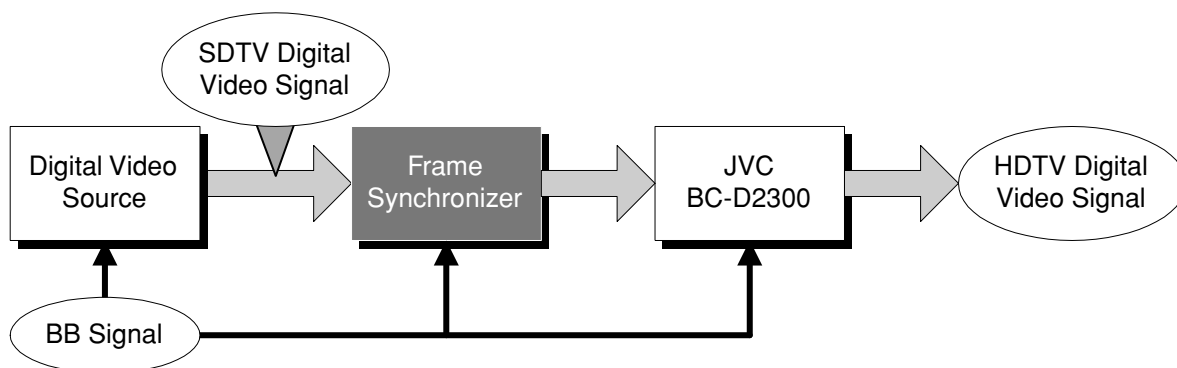
Setting	Output Format
1080I	Outputs the HDTV (1080i) signal.
720P	Outputs the HDTV (720p) signal.

3. Reference

① This item selects the reference sync signal for genlocking.

Setting	Selected Signal
INPUT	The output HD signal is synchronized with the video signal input at the SDI (see footnote *1) IN connector. The upconverter is not genlocked with any other device.
B.B.	The output HD signal is synchronized with the black burst (see footnote *2) signal input at the REF connector. The black burst signal used as the reference signal for the entire system including the upconverter should be used.
HD-SYNC	The output HD signal is synchronized with the tristate sync signal input at the REF connector. It is required to apply a tristate sync signal in the same signal mode as the mode selected in item "Output".

② The NTSC digital signal and REF (Reference) signal (black burst or tristate sync signal) should be synchronized within a vertical sync position error of ± 300 [μ s]. If the signal phase error is noticeable due to the situation of equipment installation or wiring, it is required to eliminate the error by installing an additional frame synchronizer (see footnote *3) or a similar device.



Footnotes

Using a Frame Synchronizer

*1. SDI:

SDI stands for Serial Digital Interface. It is one of the methods of digital data transfer between different devices. It sends bit on/off signal at certain time intervals on a single transmission channel. The data transfer rate is 270 [Mbps]. A simple mechanism makes it suitable for transmission over relatively long distances.

On the other hand, the parallel digital interface sends multiple bit signals simultaneously at certain intervals on multiple transmission channels (since a byte is composed of 8 bits, the number of channels should be 8 or a multiple of 8).

*2. Black Burst (B.B.)

A composite video signal that exclusively contains the black video part.

*3. Frame synchronizer

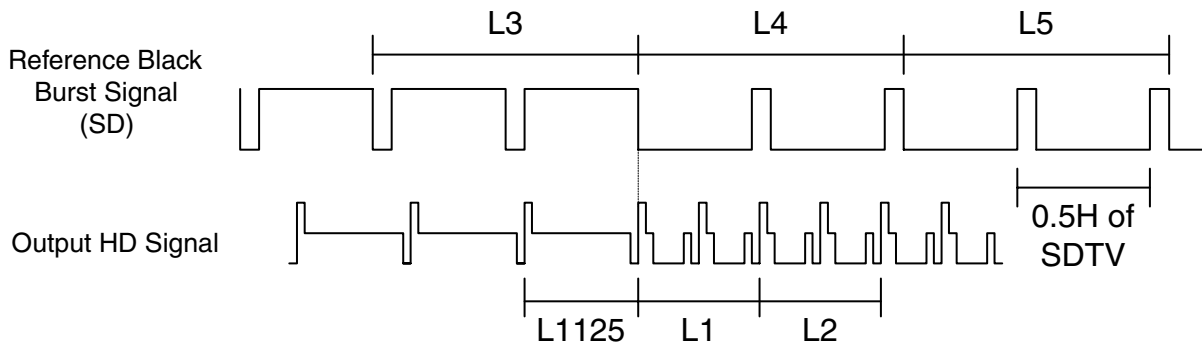
A buffer device, which compares the sync phase error between the video signal and REF signal (B.B. in the above case) and outputs the error-corrected signal.

4. System Phase

- ① The phase of the REF signal becomes the standard of all the video signals handled by the system. This item is performed to match the phase of the HD signal output from the converter with that of the reference signal (the signal selected as the reference signal in item No. 3, "Reference").
- ② In case there is a phase error between the HD video signal output from the converter and the REF signal, phase error will also occur with respect to the HD video signals output by other HD devices. Occurrences of phase errors between multiple HD video signals hinder operations such as editing.

Setting	Setup Details
-300 to [0] to 300	The setup value can be varied between -300 and 300. The factory default is 0.

* As shown in the figure below, when the REF signal is B.B., the phase error is regarded as being 0 when the start of the vertical sync component in the B.B. signal (the start point of Line 4) coincides with the start of Line 1 of the output HD signal. Note that the following figure employs an image of an analog signal to facilitate explanation on the phases of the B.B. and output HD signals (which are both digital). The signal level and time axis data in the following figure are not correct from a strict viewpoint.

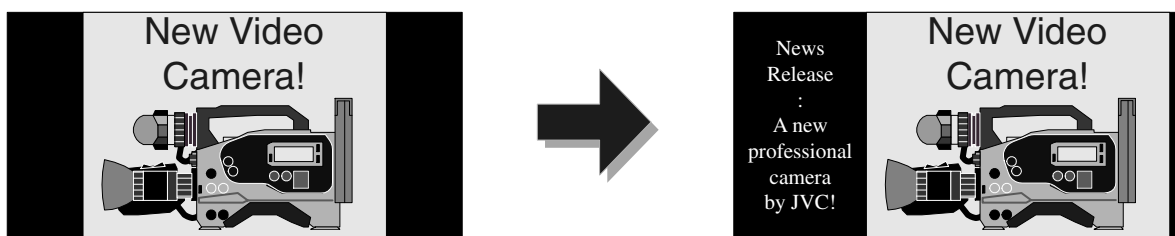


Phase Error Between SD Signal and HD Signal

5. H Position

- ① When item No. 1, "Output Mode" is set to "4:3", the present setup adjusts the horizontal position of the 4:3 image. When item No. 1 is set to Letter Box or Squeeze, the horizontal position cannot be varied.
- ② Adjusting the horizontal position of the 4:3 image in the screen makes it possible to use effects such as a "dual screen display" which superimposes character information, etc. on a side panel.

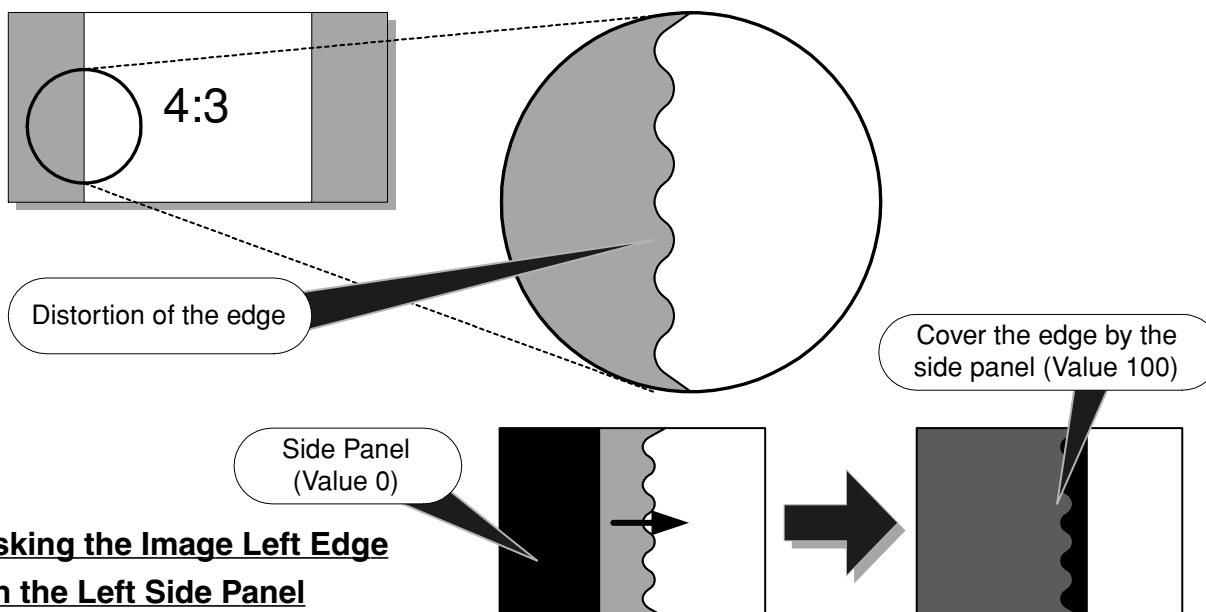
Setting	Setup Details
1080i output: -120 to [0] to 120 720p output: -80 to [0] to 80	With the 1080i output, the setup can be varied between -120 and 120. With the 720p output, it can be varied between -80 and +80. As the horizontal position of the output HD video varies according to the setup, check the position visually. The factory default is 0.



6. H Crop (Left)

- ① When item No. 1, "Output Mode" is set to "4:3", the present setup varies the width of the left side panel in the HD output video. Adjust this so that the "distortion of the edge" on the left extremity of the 4:3 image can be masked.

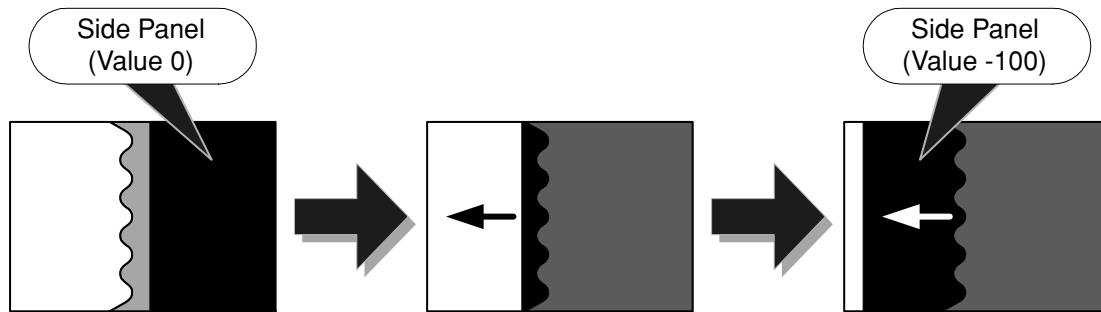
Setting	Setup Details
[0] to 100	The setup can be started from 0. As the set value increases, the width of the left side panel increases toward the right. The color of the left side panel can be set using the following setup: • Nos. 17 to 23 "Back Color"



7. H Crop (Right)

- ① When item No. 1, “Output Mode” is set to “4:3”, the present setup varies the width of the right side panel in the HD output video. Adjust this so that the “distortion of the edge” on the right extremity of the 4:3 image is masked.

Setting	Setup Details
-100 to [0]	The setup can be started from 0. As the set value decreases, the width of the right side panel increases toward the right. The color of the right side panel can be set with the following setup: • Nos. 17 to 23 “Back Color”



Masking the Image Right Edge with the Right Side Panel

8. V Position

- ① When item No. 1, “Output Mode” is set to “Letter Box”, the present setup enables visual adjustment of the vertical position of the HD output video so that it comes in an optimum position in the screen.
- ② When item No. 1 is set to “4:3” or “Squeeze”, the set value can be varied by ± 63 lines but note that the actual position movement range is limited to ± 3 lines.

Setting	Setup Details
-63 to [0] to 63	Shift the vertical position within ± 63 lines up and down.

9. Motion Sense

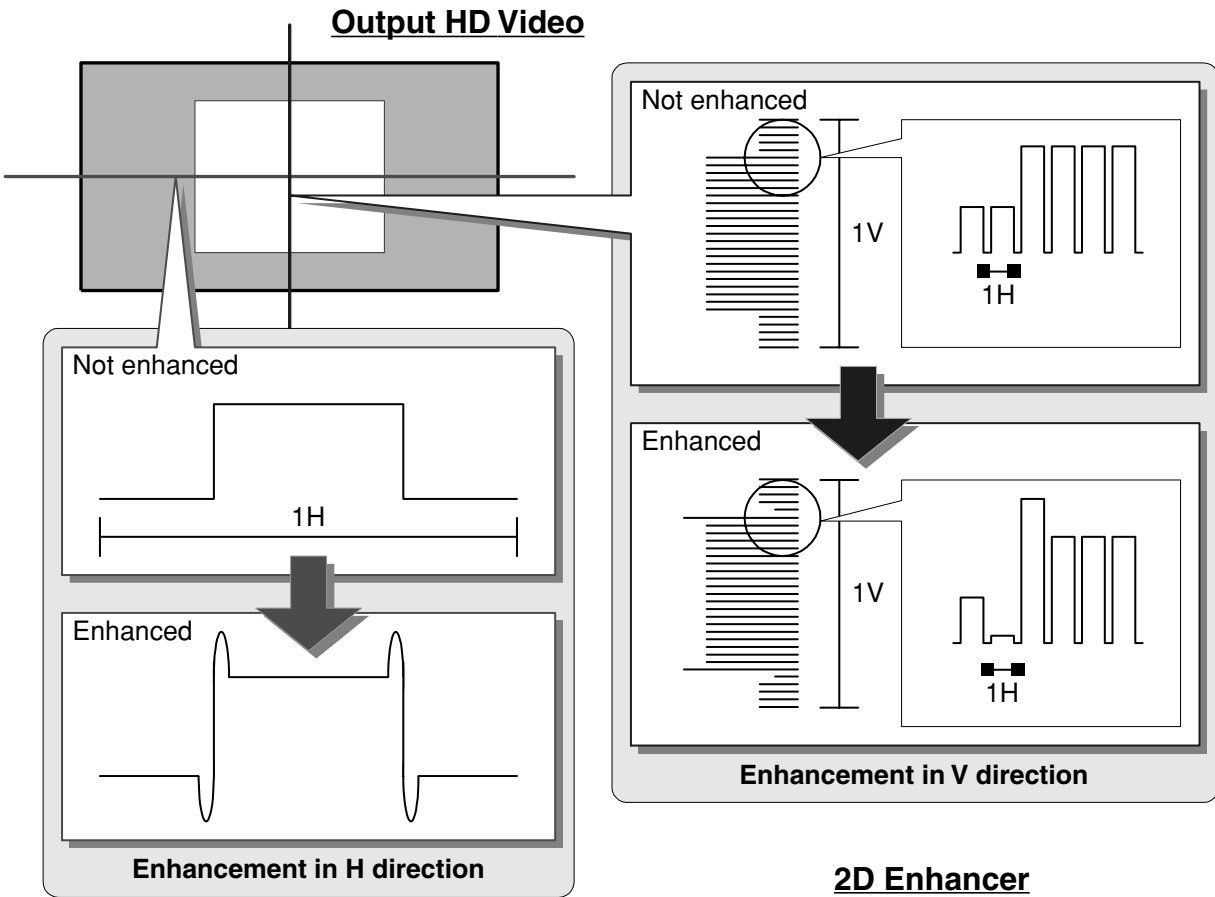
- ① Usually set this item to the factory default, which is 8. The image may sometimes be improved by setting it to 6 or 7 when the video material contains many still images, or to 9 or 10 when the video material contains many moving images.

Setting	Setup Details
0 to [8] to 15	Usually set this item to the factory default, which is 8.

10. Enhancement

- ① This item adds a contour enhancement signal in the horizontal and vertical directions of the video (2D enhancement). Adjust the setup value as required.
- ② When the optional variable enhancer function is activated, use the “Variable Enhancer” setup, which is the next setup item to this item.

Setting	Setup Details
-5 to [0] to 5	Increasing this value makes the image, particularly the contour, sharper. However, this may also make the noise more noticeable. The factory default is 0 (no enhancement).



11. Variable Enhancer

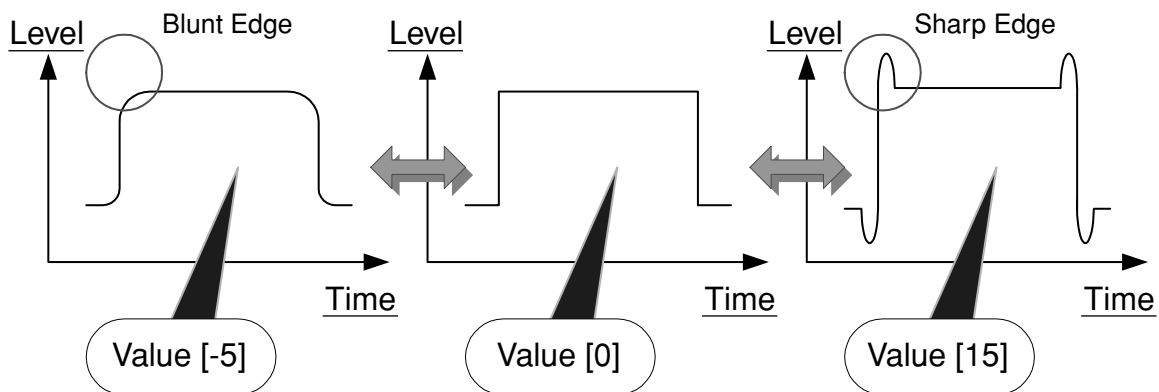
- ① This item switches the variable enhancer ON and OFF. Setting it OFF deactivates the variable enhancer function.
- ② When this item is set to ON and the ENTER button is pressed, a submenu containing five variable enhancer setup items will open. If the ENTER button is not pressed, the submenu will not open; simply pressing the ▼ button moves to setup item No. 17, “Back Color Mode”.
- ③ After completing the setups in the submenu, press the ESC button to return to the setup menu from the submenu.

Setting	Setup Details
OFF	The variable enhancer is deactivated.
ON	The following five setup items are activated. <ul style="list-style-type: none"> • No. 12 “Enhance Level” • No. 13 “Enhance Freq” • No. 14 “Cut Off Freq” • No. 15 “Threshold” • No. 16 “Noise Reduction”

12. Enhancement Level

- ① This item is optional. To perform this item, set item No. 11, “Variable Enhancer” to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item adjusts the level of contour enhancement to an optimum level.

Setting	Setup Details
-5 to [0] to 5	Increasing the set value (in the plus direction) increases the video contour enhancement level. Decreasing the value (in the minus direction) decreases the level. The factory default is 0.

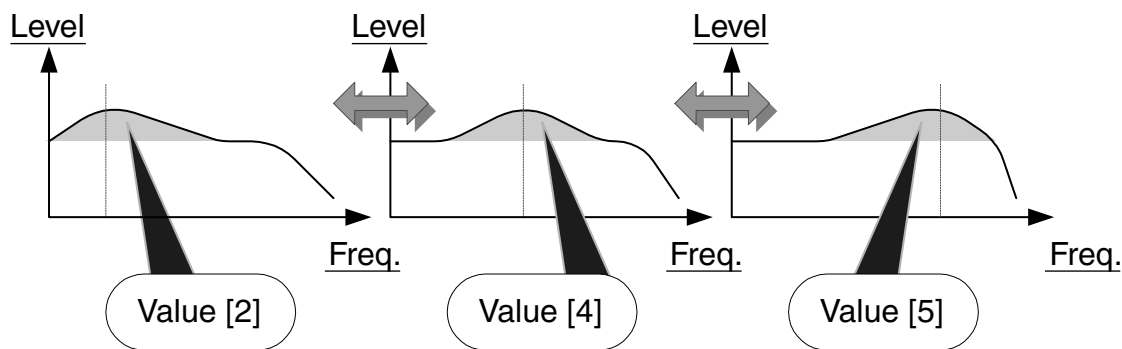


Variation of the Video Signal Waveform by the Enhance Level Setup

13. Enhance Freq.

- ① This item is optional. To perform this item, set item No. 11, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item adjusts the frequency band to which the contour enhancement is applied (frequency characteristics adjustment).

Setting	Setup Details
2 to [4], 5	This item adjusts the frequency characteristics of the input video signal. The set value represents the approximate frequency value (in [MHz]). The factory default is 4.

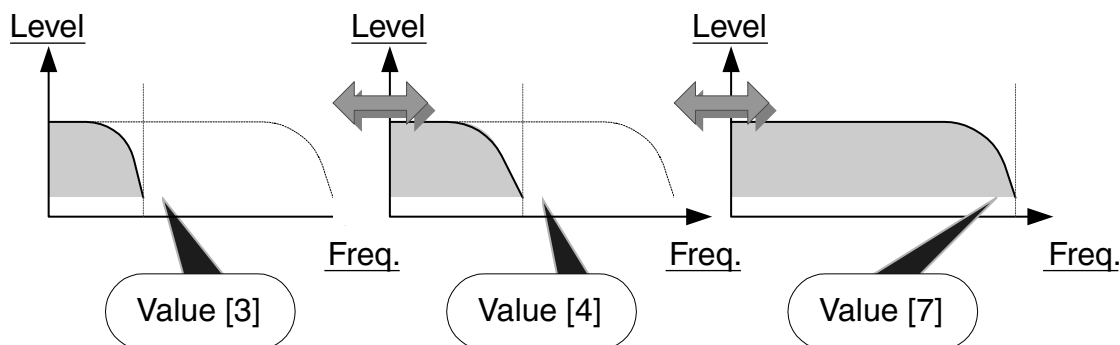


Variation of Video Signal Frequency Characteristics by the Enhance Freq. Setup

14. Cut Off Freq.

- ① This item is optional. To perform this item, set item No. 11, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item adjusts the frequency limiting the bandwidth of the input video signal. The bandwidth is not limited when this item is set to the factory default (7 [MHz]) (through condition).
- ③ When the value set in this item is smaller than the value set in No. 13, "Enhance Freq." the contour enhancement is deactivated because the Cut Off Freq. setup is given priority.

Setting	Setup Details
3 to [7]	This item adjusts the frequency limiting the bandwidth of the input video signal. The set value represents the approximate frequency value (in [MHz]). The factory default is 7.



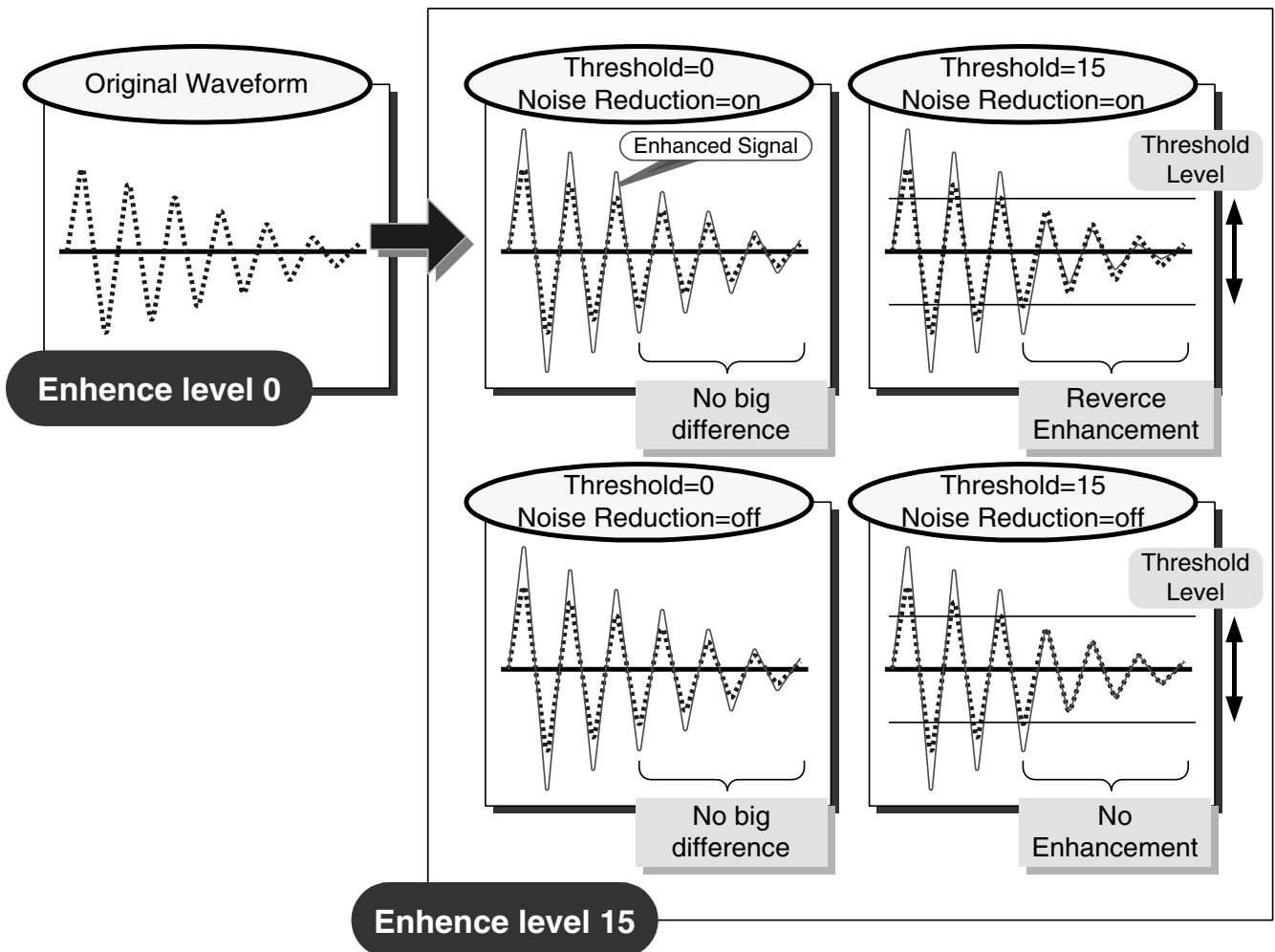
Variation in Video Signal Frequency Characteristics by the Cut Off Freq. Setup

15. Threshold

- ① This item is optional. To perform this item, set item No. 11, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This adjustment item sets the Threshold level for the enhancement effect. When the threshold is 0, the same enhancement effect is applied regardless of the amplitude level of the signals. When the Threshold value is increased, enhancement will not be applied to signals with amplitude levels below the level corresponding to the threshold level.

When original video containing low noise is enhanced, the noise components will usually be enhanced also. However, by setting the threshold level, it will be possible to enhance only the contour components with high amplitude levels without enhancing the low-amplitude signals such as noise.

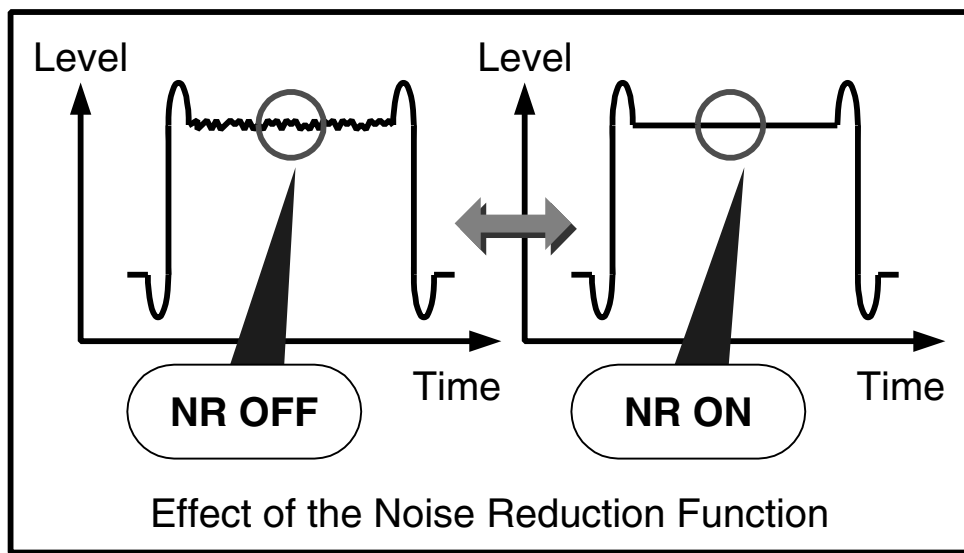
Setting	Setup Details
[0] to 15	Set this item to obtain optimum images. The factory default is 0.



16. Noise Reduction

- ① This item is optional. To perform this item, set item No. 11, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② When Noise Reduction items are set to ON, signals with amplitude levels below the level corresponding to the threshold level will be reverse-enhanced. This is the function that attenuates the signals with very low amplitude levels. However, this effect not only attenuates noise but also attenuates the original video signals with low amplitude levels. Therefore, it is recommended to set the Noise Reduction by also reviewing the settings of Enhance Level, Enhance Freq., Cut Off Freq. and Threshold so that optimum output video can be obtained. (The effect of Noise Reduction is dependent on the settings of Enhance Level, Enhance Freq., Cut Off Freq., Threshold, etc.)

Setting	Setup Details
OFF	The Noise Reduction function is deactivated.
ON	The Noise Reduction function is activated.



Reduction of Low Level Signal Components by the Noise Reduction Function

17. Back Color Mode

- ① When item No. 1, “Output Mode” is set to “4:3”, this item makes it possible to change the color of the side panels displayed in the screen. This item provides a selection of two color setting methods described below. The actual color adjustments are to be performed in items No. 18 and after.
- ② Changing the color setting method may sometimes alter the screen color. Be sure to also check the screen color.

Setting	Setup Details
Y/Cb/Cr method	Adjust the color by using the three components of the HD video signal, which are the Y (luminance), Cr (color difference signal with red component) and Cb (color difference signal with blue component), as the parameters.
H/S/L method	Adjust the color by using the three attributes of color, which are the Hue, Saturation and Lightness, as the parameters. This adjustment is identical to the color adjustment of color TVs.

18. Back Color (Y)

- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when Back Color Mode is set to “Y Cb Cr”. It is not displayed when Back Color Mode is “H S L”.
- ② Vary the setting value and check the colors visually.

Setting	Setup Details
[64] to 940	Set this item to adjust the luminance (Y) of the side panel color. The factory default is 64.

19. Back Color (Cb)

- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when the Back Color Mode is set to “Y Cb Cr”. It is not displayed when the Back Color Mode is “H S L”.
- ② Vary the setting values and check the colors visually.

Setting	Setup Details
64 to [512] to 960	Set this item to adjust the blueness (Cb) of the side panel color. The factory default is 512.

20. Back Color (Cr)

- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when the Back Color Mode is set to “Y Cb Cr”. It is not displayed when the Back Color Mode is “H S L”.
- ② Vary the setting value and check the colors visually.

Setting	Setup Details
64 to [512] to 960	Set this item to adjust the redness (Cr) of the side panel color. The factory default is 512.

21. Back Color (L)

- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when the Back Color Mode is set to “H S L”. It is not displayed when the Back Color Mode is “Y Cb Cr”.
- ② Vary the setting value and check the colors visually.

Setting	Setup Details
[0] to 100	Set this item to adjust the lightness (L) of the side panel color. The factory default is 0.

22. Back Color (S)

- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when the Back Color Mode is set to “H S L”. It is not displayed when the Back Color Mode is “Y Cb Cr”.
- ② Vary the setting value and check the color visually. Note that the actual color saturation is affected by the setting of item No. 21, “Back Color (L)”. When the Back Color (L) setup is close to 0 or 100, the side panels become colorless even when the Back Color (S) is set to 100.

Setting	Setup Details
[0] to 100	Set this item to adjust the saturation (S) of the side panel color. The factory default is 0.

23. Back Color (H)

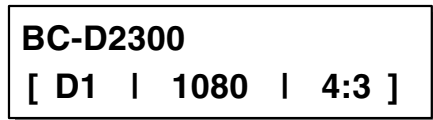
- ① When item No. 1, “Output Mode” is set to “4:3”, this item adjusts the color of the side panels. This item is displayed when the Back Color Mode is set to “H S L”. It is not displayed when the Back Color Mode is “Y Cb Cr”.
- ② Vary the setting value and check the color visually.

Setting	Setup Details
[0] to 359	Set this item to adjust the hue (H) of the side panel color. The factory default is 0. Setting 0 sets a reddish hue, 120 sets a greenish hue and 240 sets a bluish hue.

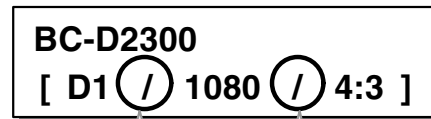
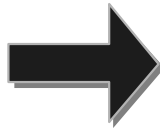
24. Color Correction

- ① This item is optional.
- ② This item switches the color correction function ON and OFF. Color correction is not applied when it is set to OFF.
- ③ When this item is set to ON and the ENTER button is pressed, a submenu containing eight color setup items will open. If the ENTER button is not pressed, the submenu will not open; simply pressing the ▼ button moves to setup item No. 33, “Colorimetry”.
- ④ After completing the setups in the submenu, press the ESC button to return to the setup menu from the submenu.
- ⑤ When this item is ON, the display changes as shown below.

Setting	Setup Details
OFF	The Color Correction function is deactivated.
ON	The following eight setup items are activated. <ul style="list-style-type: none"> • No. 25 “White Level” • No. 26 “Black Level” • No. 27 “White Color (B)” • No. 28 “White Color (R)” • No. 29 “Back Color (B)” • No. 30 “Back Color (R)” • No. 31 “Phase” • No. 32 “Chroma”



When the Color Correction is OFF



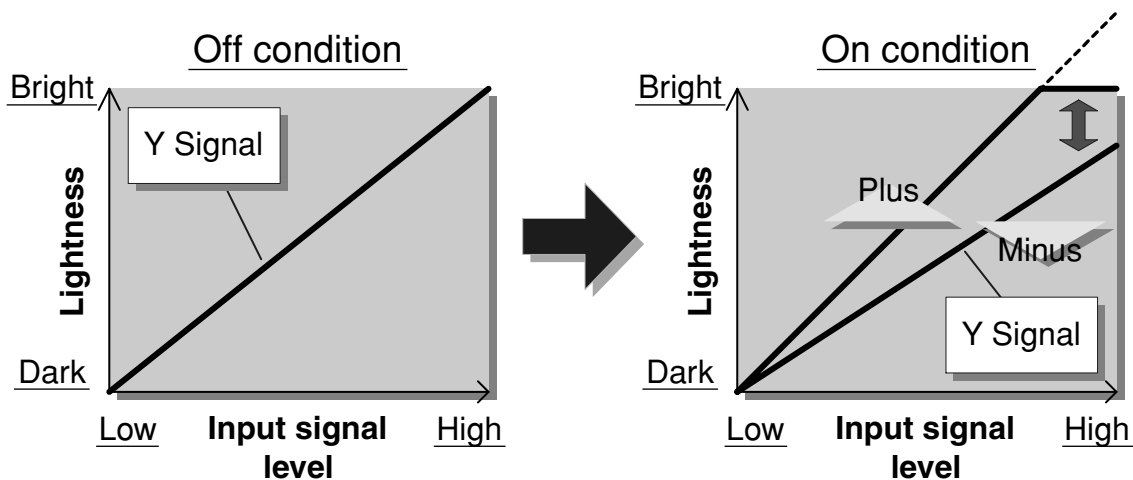
When the Color Correction is ON

The display changes here.

25. White Level

- ① This item is optional. To perform this item, set item No. 24, “Variable Enhancer” to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the contrast of the high-luminance areas in the displayed video. Increasing the set value (in the plus direction) enhances the contrast of the high-luminance areas. Decreasing the value (in the minus direction) decreases the contrast, but this causes the luminance to be saturated.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the contrast of the high-luminance areas. The factory default is 0.

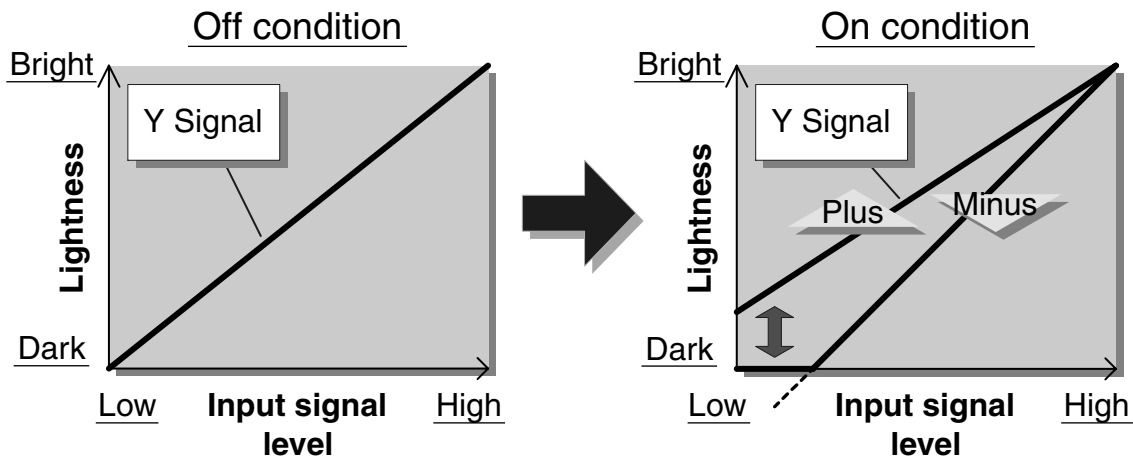


White Level Adjustment

26. Black Level

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the contrast of the low-luminance areas in the displayed video. Increasing the set value (in the plus direction) enhances the contrast of the low-luminance areas. Decreasing the value (in the minus direction) decreases the contrast, but this makes the low-luminance areas dark.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the contrast of the low-luminance areas. The factory default is 0.

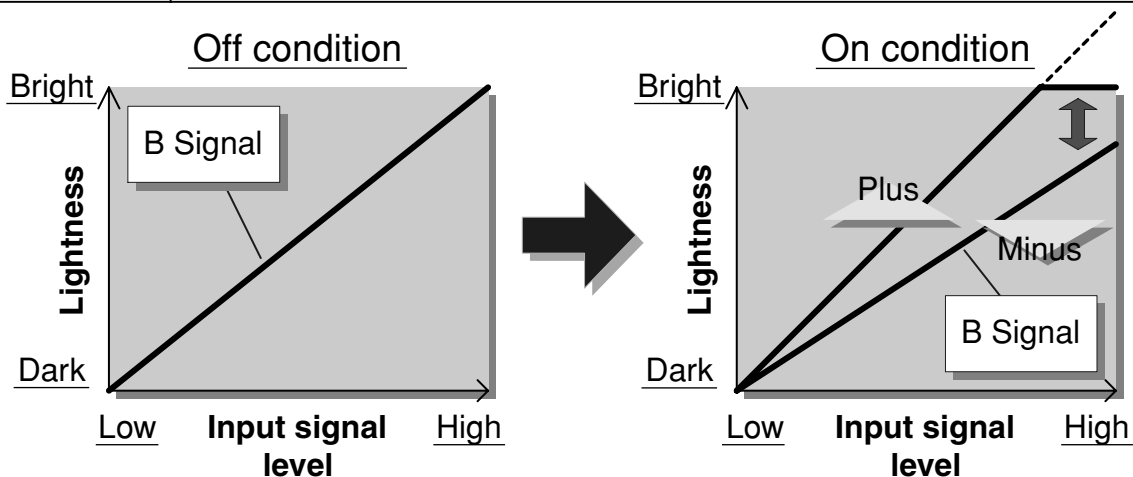


Black Level Adjustment

27. White Color (B)

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the blueness of the high-luminance areas in the video.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the blueness of the high-luminance areas. The factory default is 0.

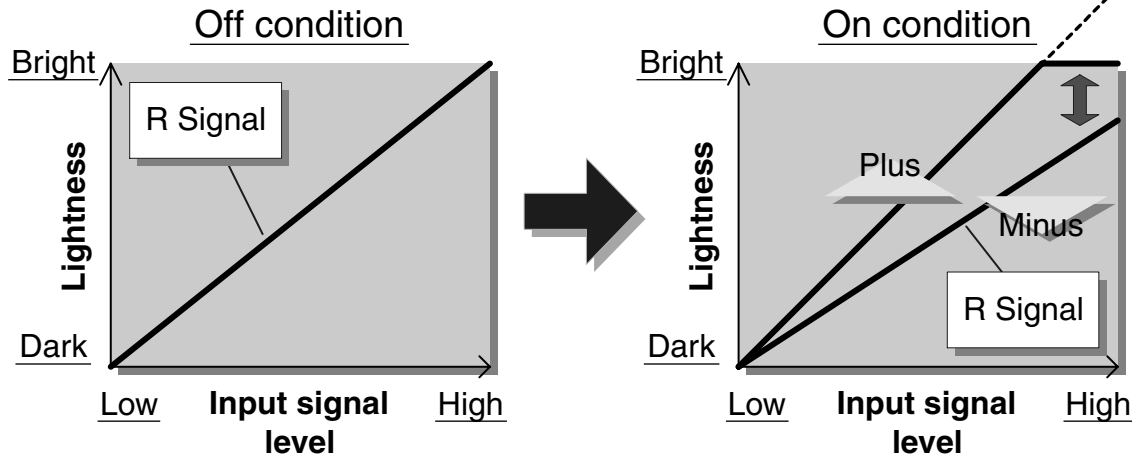


White Color (B) Adjustment

28. White Color (R)

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the redness of the high-luminance areas in the video.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the redness of the high-luminance areas. The factory default is 0.

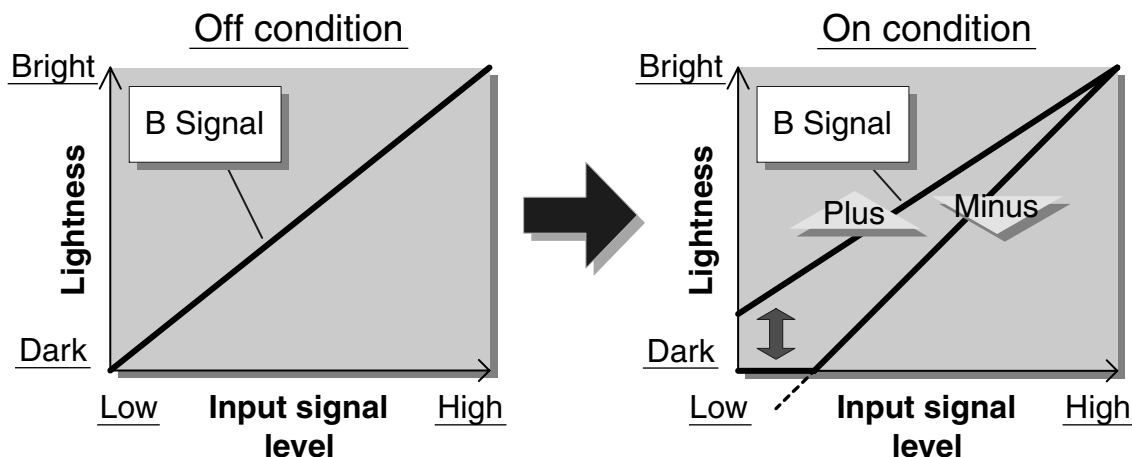


White Color (R) Adjustment

29. Black Color (B)

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the blueness of the low-luminance areas in the video.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the blueness of the low-luminance areas. The factory default is 0.

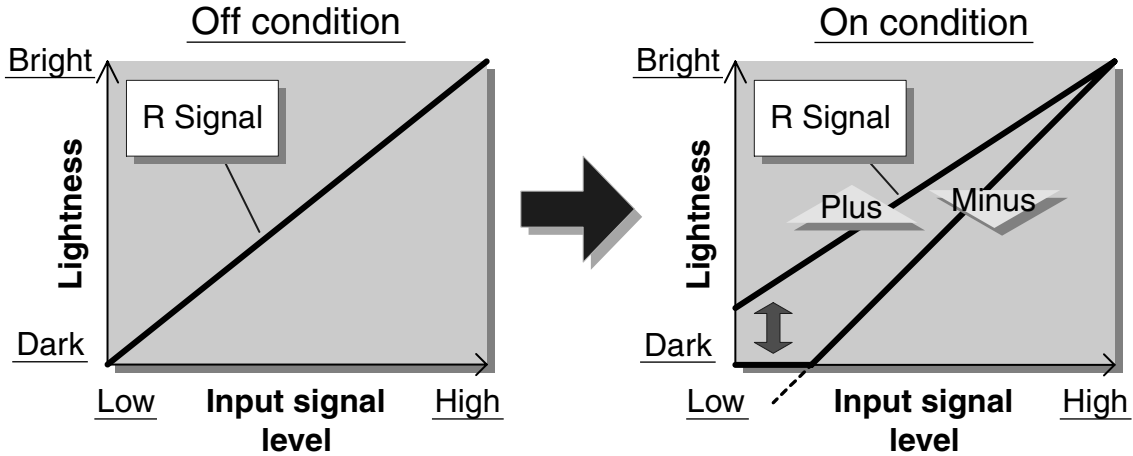


Black Color (B) Adjustment

30. Black Color (R)

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the redness of the low-luminance areas in the video.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the redness of the low-luminance areas. The factory default is 0.



Black Color (R) Adjustment

31. Phase

- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the phase of the displayed video.

Setting	Setup Details
-179 to [0] to 180	Set this item to adjust the phase of the video being displayed. The factory default is 0.

32. Chroma

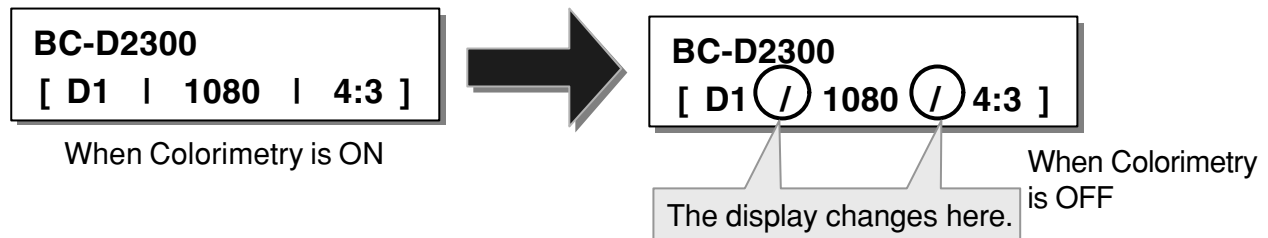
- ① This item is optional. To perform this item, set item No. 24, "Variable Enhancer" to ON and press the ENTER button to open the setup submenu. After setting up the items in the submenu, press the ESC button to return to the original menu.
- ② This item varies the color saturation of the displayed video. The video becomes black and white when this item is set to -100.

Setting	Setup Details
-100 to [0] to 100	Set this item to adjust the saturation of the HD output video. The factory default is 0.

33. Colorimetry (See footnote *1)

- ① Usually set this item to ON.
- ② Set this item to OFF to change the metering parameter from SD (ITU-R BT.601 → See footnote *2) to HD (ITU-R BT.708 → See footnote *3). The display will change as shown below.

Setting	Setup Details
ON	Usually set this item to ON.
OFF	Setting this item to OFF changes the display.



34. Out Delay

- ① This item sets the delay from the input to output. Select the optimum value for the peripheral devices in use.

Setting	Setup Details
1FRAME	The HD signal is output with a delay of 1 frame (33.37 [ms]).
1FRAME-90H	The HD signal is output with a delay of 1 frame – 90H (2.67 [ms]) with 1080i or a delay of 1 frame – 90H (2.00 [ms]) with 720p.

Footnotes

*1. Colorimetry:

This refers to metering of the color of a light source or object. If there is a difference in the colorimetric characteristics between the video signal and video device, the color tones of the output video signal will be altered.

Since the upconverter acts as a bridge between SD and HD, it is equipped with a function for conversion from ITU-R601 to ITU-R709.

*2. ITU-R BT.601

Before the CCIR (International Radio Consultative Committee) was absorbed by the ITU and standardized it, this standard was previously called CCIR 601

This standard defines the encoding of the SDTV digital component video signals in studios. It includes the specifications of the data sampling method, number of quantization bits and a matrix for the generation of color difference signals, etc. It is also referred to as ITU-R BT.601-2.

*3. ITU-R BT.709:

This is the standard for the component digital video signal (1920 dots x 1080 lines), standardized by ITU in June 1999.

35. Audio Group

- ① This item selects one of the audio signal groups (Nos. 1 to 4) multiplexed in the D1 SDI input signal. Set it to NO USE when audio is not required.
- ② The SMPTE 272M standard allows four audio signal groups, each containing up to 4 monaural audio channels, to be multiplexed in an SDI signal. The sampling clock of the audio signals is synchronized with that of the video signal (synchronized audio).

Setting	Setup Details
NO USE	Select this when no audio is required.
[1] to 4	Select the audio group containing multiplexed audio. The factory default is 1.

36. Audio Delay

- ① This item sets the delay of the audio signal multiplexed in the D1 SDI signal.
- ② The delay can be adjusted by ± 30 [msec] with respect to the delay time set in item No. 34, "Out Delay".

Setting	Setup Details
-30 to [0] to 31	Set to an optimum delay. The factory default is 0.

37. Profile Save

- ① The BC-D2300 incorporates four independent memory blocks and can save different menu setups in each of them. This item selects the memory number to save a setup.
- ② The following three setup items are common to all MEMORY numbers 1 to 4. Only one value can be set for each item and it is not permitted to set different values in MEMORY 1 to 4.
 - No. 41: Remote ID
 - No. 42: Remote Speed
 - No. 43: Remote Port

Setting	Setup Details
MEMORY 1 MEMORY 2 MEMORY 3 MEMORY 4	Select the desired memory number by pressing the + or – button, then press the ENTER/MENU button on the upconverter. When the confirmation message "Save OK?" is displayed, press the ENTER/MENU button again to save the current setup. The display shows "Saved" to indicate completion of the save operation. Press the ENTER/MENU or ESC button to return to the setup menu.

38. Profile Load

- ① This item recalls a menu setup previously saved in the memory of the upconverter by specifying the memory number.
- ② Select DEFAULT to recall the factory-set default setup.

Setting	Setup Details
MEMORY 1 MEMORY 2 MEMORY 3 MEMORY 4 DEFAULT	Select the desired memory number by pressing the + or – button, then press the ENTER/MENU button on the upconverter. When the confirmation message “Load OK?” is displayed, press the ENTER/MENU button again to recall the desired setup. The display shows “Loaded” to indicate completion of the load operation. Press the ENTER/MENU or ESC button to return to the setup menu.

39. Color Bar

- ① When this item is set to ON, the HD output signal is switched to the built-in color bar signal (seven bars). The HD output signal is switched back to the original signal whenever another setup item is selected.
- ② The color bars output here are not affected by the color setups made in other setup items.

Setting	Setup Details
OFF	Usually set this item to OFF.
ON	Setting this item to OFF outputs the color bar signal.

40. Administration

- ① When this item is selected and the ENTER button is pressed, a submenu containing nine administration setup items will open. If the ENTER button is not pressed, the submenu will not open; simply pressing the ▼ button moves to setup item No. 50, “Running Time”.
- ② After completing the setups in the submenu, press the ESC button to return to the setup menu from the submenu.

Setting	Setup Details
Pressing ENTER button	The following nine administration setup items are activated. <ul style="list-style-type: none">• No. 41 “Remote ID”• No. 42 “Remote Speed”• No. 43 “Remote Port”• No. 44 “Active Line”• No. 45 “Alarm”• No. 46 “Name”• No. 47 “Version”• No. 48 “Serial No.”• No. 49 “License Key”

41. Remote ID

- ① When the system including the upconverter is remote controlled by a host, this item selects a unique ID for use in identification of individual devices by the host. For the remote control of the BC-D2300 (using the exclusive controller or a control system), please consult your dealer or our representative in your area.

Setting	Setup Details
[1] to 31	Set a unique ID. The factory default is 1.

42. Remote Speed

- ① This item selects the remote control signal communication speed (bits/sec).
- ② When a control system is built separately, this item makes it possible to select the optimum speed for the system.

Setting	Setup Details
9600, 19200, [38400]	Set the optimum speed. The factory default is 38400.

43. Remote Port

- ① This item selects the connection port for use in the remote control of the upconverter.

Setting	Setup Details
[REMOTE-IN]	RS-485 connection to the REMOTE-IN port.
ALARM	RS-232C connection to the ALARM port.

44. Active Line

- ① This item is required when item No. 2, "Output" is set to 1080i. The setup is fixed when it is set to 720p.
- ② This item which selects the number of effective scanning lines in an input SD video signal, is assumed in the upconversion of an SD video signal into an HD video signal. Usually select the factory default setting.

Setting	Setup Details
480	It is assumed that the SD video signal has 480 effective scanning lines. The 1080i HD video signal is created based on 480 scanning lines.
[486]	It is assumed that the SD video signal has 486 effective scanning lines. The 1080i HD video signal is created based on 486 scanning lines.

45. Alarm

① This item switches the function of the alarm output terminal on the rear panel ON or OFF.

Setting	Setup Details
[ON]	The alarm terminal outputs a signal according to the error status.
OFF	The alarm terminal is Closed only when the power supply is off. It is permanently Open in other cases.

46. Name

① This item selects the device name to be displayed in the normal display mode.

Setting	Setup Details
[BC-D2300]	Press the ENTER/MENU button on the upconverter to enter the character editing mode, in which the cursor starts to blink. Move the cursor (using the + or – button), select a character string (using the ▲ or ▼ button) and press the ENTER/MENU button again to save the character string. After this, press the ESC button to return to the Name menu display. If the ENTER/MENU button is not pressed but the ESC button is pressed instead, the character string is not saved and the display returns to the Name menu.

9

47. Version

① This item displays the firmware version of the upconverter.

48. Serial No.

① This item displays the serial number of the upconverter.

49. License Key

① This item sets the license key number for use in enabling optional functions (Variable Enhancer and Color Correction functions).

② Press the ENTER/MENU button on the upconverter to enter the character editing mode, in which the cursor starts to blink. Move the cursor (using the + or – button), select a character string (using the ▲ or ▼ button) and press the ENTER/MENU button again to save the character string. After this, press the ESC button to return to the Name menu display.

50. Running Time

① This item displays the approximate operating days of the upconverter.

② The running time can be cleared to 0 by pressing the ENTER/MENU button twice. Use the running time data as a reference for identifying the fan replacement timing.

Reference Material: Menu Detail List

The following table shows the details on the settings of the menus.

No.	Item (Ref. Page)	Available Settings	Factory Default	Setup Details
1	Output Mode (P. 18)	4:3 Letter Box Squeeze	4:3	Selection of the HD conversion mode according to the input SD signal.
2	Output (P. 20)	1080i 720p	1080i	Setting of the video output format.
3	Reference (P. 20)	INPUT B.B. HD-SYNC	INPUT	Selection of the sync reference signal.
4	System Phase (P. 21)	-300 to 300	0	Adjustment of the HD output signal phase with respect to the sync reference signal.
5	H Position (P. 22)	-120 to 120	0	Adjustment of the horizontal position of image in 4:3 mode.
6	H Crop (Left) (P. 22)	0 to 100	0	Adjustment of the left side panel width in 4:3 mode.
7	H. Crop (Right) (P. 22)	-100 to 0	0	Adjustment of the right side panel width in 4:3 mode.
8	V Position (P. 23)	-63 to 63	0	Adjustment of the vertical position of image in Letter Box mode. (Fine adjustment possible in 4:3 and Squeeze modes.)
9	Motion Sense (P. 23)	0 to 15	8	Adjustment of the motion detection sensitivity.
10	Enhance (P. 24)	-5 to 15	0	Adjustment of the contour enhancement level.
11	Variable Enhancer (P. 25)	ON OFF	OFF	ON/OFF selection of the variable enhancer function.
12	Enhance Level (P. 25)	-5 to 15	0	Adjustment of the enhancement level.
13	Enhance Freq. (P. 26)	2 to 5	4	Selection of the frequency band to be enhanced.
14	Cut Off Freq. (P. 26)	3 to 7	7	Selection of the frequency for limiting the input signal bandwidth.
15	Threshold (P. 27)	0 to 15	0	Selection of the input signal level at which the enhancement effect is switched on or off.
16	Noise Reduction (P. 28)	ON OFF	OFF	ON/OFF selection of the noise reduction function.
17	Back Color Mode (P. 29)	Y Cb Cr H S L	Y Cb Cr	Selection of the side panel color adjustment method.
18	Back Color (Y) (P. 29)	64 to 940	64	Adjustment of the side panel luminance in Y/Cb/Cr mode.
19	Back Color (Cb) (P. 29)	64 to 960	512	Adjustment of the side panel blueness in Y/Cb/Cr mode.
20	Back Color (Cr) (P. 29)	64 to 960	512	Adjustment of the side panel redness in Y/Cb/Cr mode.
21	Back Color (L) (P. 30)	0 to 100	0	Adjustment of the side panel luminance in H/S/L mode.
22	Back Color (S) (P. 30)	0 to 100	0	Adjustment of the side panel color saturation in H/S/L mode.
23	Back Color (H) (P. 30)	0 to 359	0	Adjustment of the side panel hue in H/S/L mode.
24	Color Correction (P. 30)	ON OFF	OFF	ON/OFF selection of the color correction function.

No.	Item (Ref. Page)	Available Settings	Factory Default	Setup Details
25	White Level (P. 31)	-100 to 100	0	Adjustment of the level of high-luminance areas in the output HD video.
26	Black Level (P. 32)	-100 to 100	0	Adjustment of the level of low-luminance areas in the output HD video.
27	White Color (B) (P. 32)	-100 to 100	0	Adjustment of the blueness of high-luminance areas in the output HD video.
28	White Color (R) (P. 33)	-100 to 100	0	Adjustment of the redness of high-luminance areas in the output HD video.
29	Black Color (B) (P. 33)	-100 to 100	0	Adjustment of the blueness of low-luminance areas in the output HD video.
30	Black Color (R) (P. 34)	-100 to 100	0	Adjustment of the redness of low-luminance areas in the output HD video.
31	Phase (P. 34)	-179 to 180	0	Adjustment of the hue of the output HD video.
32	Chroma (P. 34)	-100 to 100	0	Adjustment of the color saturation of the output HD video.
33	Colorimetry (P. 35)	ON OFF	ON	ON/OFF selection of the colorimetry parameter switching function.
34	Out Delay (P. 35)	1FRAME 1FRAME-90H	1FRAME	Selection of the video delay time.
35	Audio Group (P. 36)	NO USE 1 to 4	1	Selection of the audio signal group multiplexed in D1 SDI input signals.
36	Audio Delay (P. 36)	-30 to 30	0	Selection of the delay of audio signals multiplexed in D1 SDI input signals.
37	Profile Save (P. 36)	MEMORY 1 to 4	----	Selection of the memory number to save the current setup.
38	Profile Load (P. 37)	MEMORY 1 to 4, DEFAULT	----	Selection of the memory number to recall the saved setup value.
39	Color Bar (P. 37)	ON OFF	OFF	Color bar output.
40	Administration (P. 37)			Display of the administration submenu.
41	Remote ID (P. 38)	1 to 31	1	Selection of the ID number for use in external control.
42	Remote Speed (P. 38)	9600 19200 38400	38400	Selection of the communication speed for use in external control.
43	Remote Port (P. 38)	REMOTE-IN ALARM	REMOTE-IN	Selection of the connection port for use in external control.
44	Active Line (P. 38)	480 486	486	Selection of the number of effective scanning lines in input SD video.
45	Alarm (P. 39)	ON OFF	ON	ON/OFF selection of the alarm function.
46	Name (P. 39)	Up to 10 characters	BC-D2300	Editing of the device name to be displayed.
47	Version (P. 39)			Display of the firmware version.
48	Serial No. (P. 39)			Display of the serial number.
49	License Key (P. 39)			Input of the license key for use in activating the optional functions.
50	Running Time (P. 39)			Display of the approximate operating days.



10. CATALOGUE

JVC[®]
PROFESSIONAL

PRELIMINARY

BC-D2300U

HDTV UP CONVERTER

New Product News

10



Seamless Conversion of 4:2:2 Digital Component Signals for HDTV ATSC Broadcasting

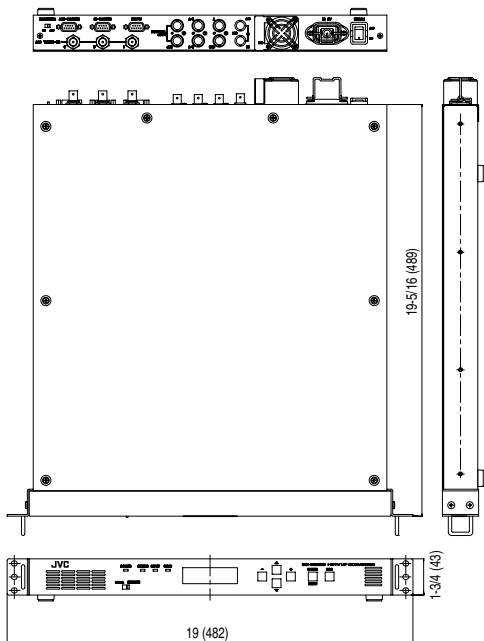
JVC's BC-D2300U is a powerful new solution for broadcasters entering the era of 16:9 digital TV. The BC-D2300U smoothly converts 480i/4:2:2 digital component signals into 720p or high-quality 1080i HDTV signals. Compact and consuming little power (35 W), the rack-mountable unit incorporates the full range of features, flexibility, and total reliability digital broadcasters need.

Features

- JVC's BC-D2300U HDTV UP Converter comes with a range of powerful features including Enhance level adjustment, Motion detection sensitivity adjustment, Back color adjustment, Colorimetry (On/Off), Horizontal/Vertical screen adjustment, and System phase adjustment.
- A built-in Two-dimensional Enhancer delivers living, crystal sharp pictures.
- Embedded Audio Input and Output are fully synchronized by the video processing delay function.
- An ID with up to 10 characters can be designated for individual converter units.
- The BC-D2300U comes equipped with four event memories.
- Users can operate the converter through either front control panel or remote control unit (via 9-pin connector: RS-485 or RS-232C).
- The unit features error indication and alarm signal output functions.
- Compact design for easy installation (rack mountable).
- Low power consumption of just 35W.

Dimensions

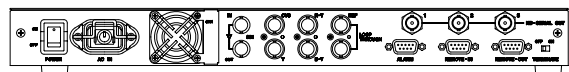
Unit: inches (mm)



Specifications

Input	
Video	Digital serial video signal (NTSC: 480i), SMPTE 259M x1, 75 ohms unbalanced, with active through output (In order to input a D2 signal or an analog signal, an optional board "BC-D231U" is required.)
Audio	Digital serial audio signal, SMPTE 272M x1, 4ch, Sampling frequency 48kHz, Common input with video signal
Reference Signal	NTSC black burst or HD sync x1, 75 ohms unbalanced, with bridge output
Output	
Video	Digital serial video signal, SMPTE 292M x3, Colorimetry (On: ITU-R BT.601 → ITU-R BT.709/Off: through), 75 ohms unbalanced
Audio	Digital serial audio signal, SMPTE 272M x3, 4ch, Sampling frequency 48kHz, Common output with video signal
Quantization	10 bit
Conversion Mode	3 mode (4:3/Letter box/Squeeze)
Video/Audio Delay	1 frame/1 frame - 90 HD lines
Position Adjustment	Vertical: ±60 HD lines Horizontal: ±120 pixels (Resolution: 2 pixels)
Event Memory	4 memories
Power Input	AC 120V, ±10%, 50/60Hz
Power Consumption	Approx. 35W
Dimensions (W×H×D)	482×43×489mm/ 19×1-3/4×19-5/16 inches 1U rack mounting
Weight	Approx. 14 lbs. (6.2 kg)
Accessory	One set of rack mounting metal fittings

Rear Panel



Options

Optional Board

- D2/Analog Input Optional Board "BC-D231U"
Input Specification: D2 SDI
Analog Component
Analog Composite

Optional Software

- Complete Color Corrector
White Level, Black Level
White Color (B), White Color (R)
Black Color (B), Black Color (R)
Video Phase, Chroma Level

Design and specifications subject to change without notice.



JVC PROFESSIONAL PRODUCTS COMPANY
DIVISION OF JVC AMERICAS CORP.
1700 Valley Road, Wayne, N.J. 07470
TEL: (973) 315-5000, (800) 582-5825
FAX: (973) 315-5030
E-mail: proinfo@jvc.com

JVC CANADA INC.
21 Finchdene Square, Scarborough, Ontario M1X 1A7
TEL: (416) 293-1311 FAX: (416) 293-8208
Internet Web Site <http://www.jvcpro.com>



Certificate No. EC96J1049



ISO9001/No. FM26586

■ The Hachioji Plant of Victor Company of Japan, Ltd., has received ISO14001 Certification under the global standard for environmental management.

11. INSTRUCTION MANUAL

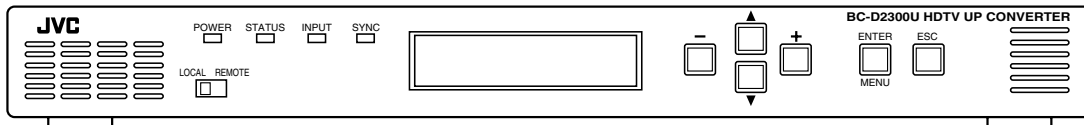
JVC[®]

HDTV UPCONVERTER

BC-D2300U

INSTRUCTIONS

11



Thank you for purchasing this JVC product. Before operating this unit, please read the instructions carefully to ensure the best possible performance.

For Customer Use:

Enter below the Serial No. which is located on the top cover.
Retain this information for future reference.

Model No. BC-D2300U _____

Serial No. _____

This instruction book is made from
100% recycled paper.

IMPORTANT SAFEGUARDS


1. Read all of these instructions.
2. Save these instructions for later use.
3. All warnings on the product and in the operating instructions should be adhered to.
4. Unplug this appliance system from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
5. Do not use attachments not recommended by the appliance manufacturer as they may cause hazards.
6. Do not use this appliance near water – for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.
7. Do not place this appliance on an unstable cart, stand, or table. The appliance may fall, causing serious injury to a child or adult, and serious damage to the appliance.
Use only with a cart or stand recommended by the manufacturer, or sold with the appliance. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.
An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
8. Slots and openings in the cabinet and the back or bottom are provided for ventilation, and to insure reliable operation of the appliance and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the appliance on a bed, sofa, rug, or other similar surface. This appliance should never be placed near or over a radiator or heat register. This appliance should not be placed in a built-in installation such as a bookcase unless proper ventilation is provided.
9. This appliance should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your dealer or local power company. For appliance designed to operate from battery power, refer to the operating instructions.
10. This appliance system is equipped with a 3-wire grounding type plug (a plug having a third (grounding) pin). This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding plug.
11. For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
12. Do not allow anything to rest on the power cord. Do not locate this appliance where the cord will be abused by persons walking on it.
13. Follow all warnings and instructions marked on the appliance.
14. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
15. Never push objects of any kind into this appliance through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the appliance.
16. Do not attempt to service this appliance yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
17. Unplug this appliance from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power cord or plug is damaged or frayed.
 - b. If liquid has been spilled into the appliance.
 - c. If the appliance has been exposed to rain or water.
 - d. If the appliance does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the appliance to normal operation.
 - e. If the appliance has been dropped or the cabinet has been damaged.
 - f. When the appliance exhibits a distinct change in performance – this indicates a need for service.
18. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
19. Upon completion of any service or repairs to this appliance, ask the service technician to perform routine safety checks to determine that the appliance is in safe operating condition.

PORTABLE CART WARNING
(symbol provided by RETAC)




S3126A

SAFETY PRECAUTIONS



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL



ATTENTION

RISQUE D'ELECTROCUTION
NE PAS OUVRIR



ATTENTION: POUR EVITER TOUT RISQUE D'ELECTROCUTION
NE PAS OUVRIR LE BOITIER.
AUCUNE PIECE INTERIEURE N'EST
A REGLER PAR L'UTILISATEUR.
SE REFERER A UN AGENT QUALIFIE EN CAS DE PROBLEME.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



Le symbole de l'éclair à l'intérieur d'un triangle équilatéral est destiné à alerter l'utilisateur sur la présence d'une "tension dangereuse" non isolée dans le boîtier du produit. Cette tension est suffisante pour provoquer l'électrocution de personnes.



Le point d'exclamation à l'intérieur d'un triangle équilatéral est destiné à alerter l'utilisateur sur la présence d'opérations d'entretien importantes au sujet desquelles des renseignements se trouvent dans le manuel d'instructions.

*Ces symboles ne sont utilisés qu'aux Etats-Unis.

WARNING:
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This unit should be used with 120 V AC only.

CAUTION:
To prevent electric shocks and fire hazards, do NOT use any other power source.

AVERTISSEMENT:
POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A L'HUMIDITE OU A LA PLUIE.

Ce magnétoscope ne doit être utilisé que sur du courant alternatif en 120 V.

ATTENTION:
Afin d'éviter tout risque d'incendie ou d'électrocution, ne pas utiliser d'autres sources d'alimentation électrique.

NOTE:

The rating plate (serial number plate) is on the top cover.

REMARQUE:

La plaque d'identification (numéro de série) se trouve sur le panneau arrière de l'appareil.

INFORMATION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the 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.

CAUTION
CHANGES OR MODIFICATIONS NOT APPROVED BY JVC COULD VOID USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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Optional software

For optional software, consult your JVC dealer. Using it without formal procedures is illegal.

MAJOR FEATURES

- This unit converts SMPTE259M-standard SD digital serial signal input to the SMPTE292M-standard (1080i or 720P) HD digital serial signal for output.
- Conversion modes are provided for input NTSC video signals with an aspect ratio of 4:3 (standard), in the letter box format or squeezed.
- The delay time for video conversion is added to the embedded audio to synchronize audio and video for output.
- Input signal can be cropped (in the 4:3 mode, independently for the left and right sides)
- Background color can be set with hue, saturation and lightness.
- It is possible to set or show the model name (up to 10 characters).
- Each function can be set on the front panel with the LCD. The unit can also be remote-controlled via the 9-pin connector on the rear panel (RS-485 or RS-232C).
- Menu settings can be saved in memory and loaded from memory. Four independent memories are provided to store menu settings. Stored menu settings can be recalled as required.
- Compact design allows this unit to be installed in a 1U EIA rack.
- Color bar output possible.
- External reference sync signal input connector
- Three video/audio output connectors
- Enhancer (contour correction), motion sensitivity, background color, screen horizontal/vertical position and system phase can be adjusted.
- Error indication and alarm signal output function
- Color correction function (option)
- Variable enhancer (option)

NOTES ON SETTINGS AND USE

- When the menu item <Reference> is set to [INPUT] and there is no SD input signal, output video signals may be distorted. In this case, input external sync signals and set <Reference> to [BB] or [HD-SYNC]. (☞ p. 10).
- When the menu item <Reference> is set to [BB] or [HD-SYNC] and these external sync signals are not input or are incorrect, output video signals may be distorted. In this case, system phase cannot be assured. (☞ p.10)

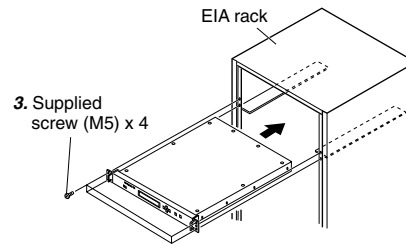
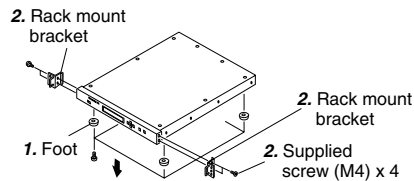
HANDLING PRECAUTIONS

- Avoid using this unit in places subject to the following conditions:
 - direct sunlight
 - high humidity and dust
 - vibrations
 - extreme heatThese conditions can cause problems and may damage the unit.
- Influence of strong electric waves and magnetism
Noise may appear on the screen when used in places close to a transmission antenna, or in places near transformers and motors where strong magnetism can occur.
- This equipment is meant for use exclusively in commercial and industrial applications. If used at home, it may cause interference with radio and television reception.
- To save electricity, shut off the power when the unit is not in use.
- Use the supplied power cable for this unit.
- Do not place heavy objects such as a television monitor on top of the unit. Doing so could cause damage or adversely affect performance.
- Do not put any foreign objects into the unit.
- Do not disassemble the unit or try to modify it.
- Do not block the ventilation openings.
- Change the cooling fan about three years after installation of the unit.
- When cleaning the cabinet, wipe it with soft cloth. Do not use benzene or thinner as these may deform or discolor the cabinet surface. To remove excessive dirt, clean the unit with a mild detergent diluted with water, then wipe it with dry cloth.
- Do not use the unit in an environment exposed to gases generated by chemicals or organic solvents.

INSTALLATION IN A RACK

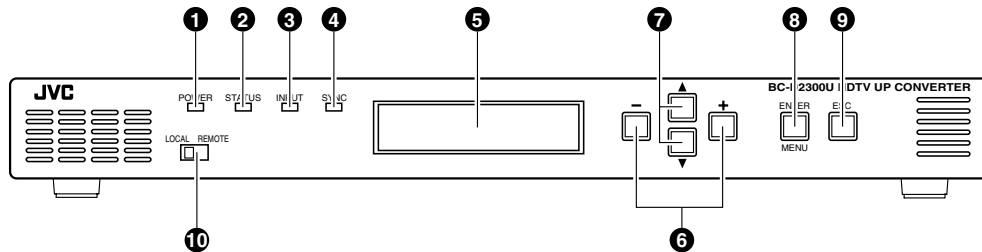
This unit can be installed in EIA standard rack. Ensure sufficient rack strength by attaching L-metal supports on both sides of the rack on which you will place the unit.

1. Detach the four feet on the base of the unit.
2. Install the supplied rack mount brackets on both sides of front panel using the four supplied screws (M4).
3. Set this unit on the rack, and fix the rack mount brackets onto the rack using the four supplied screws (M5).



CONTROLS, INDICATORS AND CONNECTORS

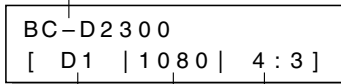
Front panel



- **[POWER] indicator**
Lights green when power is supplied to this unit.
- **[STATUS] indicator**
Normally lights green. Lights orange in the menu setting mode, when the set value is changed or the set data is transmitted to this unit. When the transmission is complete, this indicator lights green again. When errors occur in hardware, etc., this indicator lights red.
- **[INPUT] indicator**
Normally lights green. When no signal is input, this indicator lights orange. If there is an error in the input signals, this indicator lights red.
- **[SYNC] indicator**
Normally lights green. If a sync system-related error occurs, this indicator lights red.
 - For details on error indicators, see page 17.
- **Display**
 - When power is applied, the input/output or screen display mode is shown. (Normal display mode)

Model name:

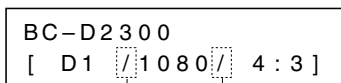
The model name can be set with the menu (up to 10 characters). In the remote mode, the remote ID number (1 - 31) is shown following the model name.
(e.g.) BC-D2300 ID: □□



Input form Output form Screen conversion mode

Memoranda:

- The screen conversion mode can be selected with menu <Output Mode>. [p. 10.](#)
- Output form can be selected with menu <Output>. [p. 10.](#)
- When menu <Color Correction> is set to "ON" or <Colorimetry> is set to "OFF", the normal display changes as follows.

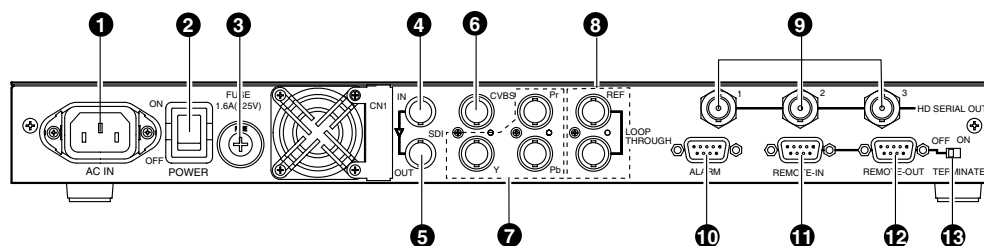


- Press the **8** [ENTER/MENU] button to display the item in the menu setting mode.
- If an error occurs in the normal display mode, a description of the error is shown. [p. 17.](#)

- **[+/-] button**
Press this button to change the set value for a menu item in the menu setting mode.
- **[▲/▼] button**
Press this button to select the menu item in the menu setting mode.
- **[ENTER/MENU] button**
 - In the normal display mode, press this button to engage the menu setting mode.
 - In the menu setting mode, press this button to enter the set value for the following menu items. (? is shown.)
Output Mode item
Output item
Profile Save item
Profile Load item
 - Use to enter the sub menu. ([ENTER] is shown.)
- **[ESC] button**
In the menu setting mode, press this button to restore the normal display mode.
Memorandum:
 - To use the menu setting, refer to pages 7 to 9.
- **[LOCAL/REMOTE] switch**
Use to select LOCAL or REMOTE to operate this unit.
LOCAL : Set to this position to operate this unit with the operation buttons on this unit.
REMOTE : Set to this position to remote-control this unit via the [REMOTE IN] connector or [ALARM] connector on the rear panel. Also, set to this position to lock the front panel's operation buttons.
 - The factory preset is LOCAL.

CONTROLS, INDICATORS AND CONNECTORS

Rear panel



- 1 [AC IN] power input connector**
Connect to an AC 120 V, 50 Hz/60 Hz power outlet with the provided power cable. Attach the provided hook beforehand. [p. 18.](#)
- 2 [POWER] switch**
Use to turn the power on/off. When the power is turned on, the indicators and display on the front panel light up.
- 3 Fuse holder**
The fuse is built in. For fuse replacement, consult your nearest JVC dealer.
- 4 [SDI IN] connector**
Input a SMPTE259M standard SD digital serial signal (NTSC). Compatible with embedded audio signals as well. Embedded 20-bit digital audio with 48 kHz sampling frequency can be input with 4 channels.
- 5 [SDI OUT] connector**
Active through output of digital serial video/audio signals input to the **4** [SDI IN] connector is possible.
- 6 [CVBS] connector**
Input analog composite signals (NTSC). The optional BC-D231 (D2/analog optional board) is required.
- 7 [Y/Pr/Pb] connectors**
Input analog component signals (NTSC) to each connector. The optional BC-D231 (D2/analog optional board) is required.
Note:

 - The [CVBS] and [Y/Pr/Pb] connectors are enabled only when the BC-D231 optional board is installed.
 - For details, refer to the BC-D231 instruction manual.
- 8 [REF] external reference sync signal input connectors (loop-through)**
Input external reference sync signal. As these connectors use a loop-through system, signals input to one connector can be distributed from another connector to the other equipment.
Memoranda:

 - When signal distribution is not required or this unit is a terminating device, terminate this unit with the external 75-ohm terminator.
 - When the signals input to these connectors are used as a reference sync signal, set the menu switch <Reference> to "B.B" or "HD SYNC". [p. 10.](#)
 - When the signals input to these connectors are used as a reference sync signal, synchronize the input signal with the reference sync signal so that the V sync is within $\pm 300 \mu\text{s}$.
- 9 [HD SERIAL OUT] HD digital serial output connectors (3 lines)**
Output SMPTE292M standard HD digital serial signals. Output embedded digital audio signals with 20-bit 48 kHz sampling frequency as 4-channel signals.
- 10 [ALARM] connector ... D-sub 9-pin (male)**

 - This connector is an alarm output (relay contact) connector. When a problem occurs with this unit, an alarm signal is output.
 - When menu switch <Remote Port> is set to "ALARM", remote operation via the RS-232C is possible. To remote-control this unit via this connector, set the [LOCAL/REMOTE] switch on the front panel to "REMOTE".
- 11 [REMOTE-IN] connector ... D-sub 9-pin (female)**
This connector is the input connector for remote-control device. Connect this connector to a device conforming to the RS-485 serial interface standard.
Memoranda:

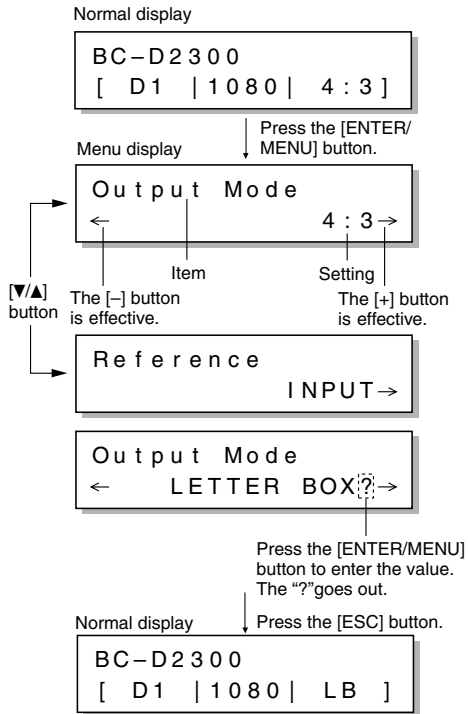
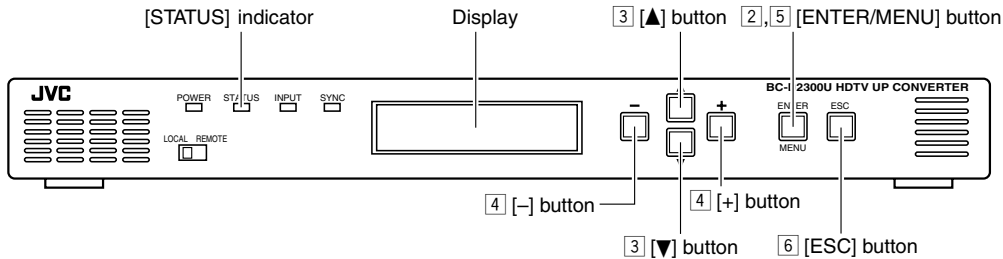
 - To use this connector, set menu switch <Remote Port> to "REMOTE-IN".
 - Set the remote ID and remote transmission speed with the menu switches.
 - To remote-control this unit, set the [LOCAL/REMOTE] switch on the front panel to "REMOTE".
- 12 [REMOTE-OUT] connector ... D-sub 9-pin (female)**
Outputs the control signals input to the **11** [REMOTE-IN] connector or **10** [ALARM] connector as signals conforming to the RS-485 serial interface. Connect this connector to the [REMOTE IN] connector of another device. Up to 31 devices can be connected in series with this connection.
- 13 [TERMINATE] switch**
This is the terminating switch for remote control signals. With a series connection, set this switch to "ON" when this unit is terminated or control signals from the [ALARM] connector are received.

 - The factory preset is "OFF".

MENU SETTINGS

You can set various functions on the menu. Settings are stored and automatically activated whenever you turn on the power. Up to four independent menu settings can be stored in the unit's memory and recalled at any time. You can also restore the default factory settings at any time. The menu is shown on the display.

Setting the menu



- 1 Turn the power of this unit ON.
The model name, input/output and screen display mode are shown on the display (normal mode).
- 2 Press the [ENTER/MENU] button to engage menu setting mode.
• The display shows the menu. The current setting is shown.
- 3 Press the [▼] or [▲] button to select the menu item.
- 4 Press the [+] or [-] button to change the setting.

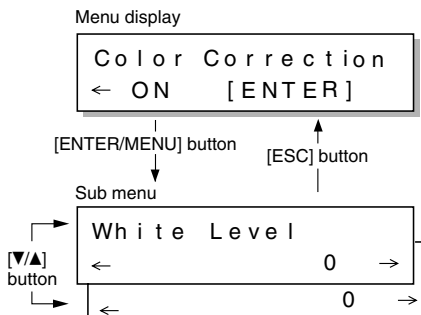
Memoranda:

- When "→" is shown at the right of the display, press the [+] button to change the setting. When "←" is shown at the left of the display, press the [-] button.
- When "?" appears after the value you want to set, press the [ENTER/MENU] button to enter the setting.
- When the setting is changed, the [STATUS] indicator lights orange while the set data is transmitted to this unit. When the transmission is complete, this indicator lights green.

■ Refer to the next page for details on how to store menu setting contents in memory.

- 5 Press the [ESC] button to end menu setting.
• Your changes are stored in memory and the display returns to normal.
Note:
If power is turned OFF without pressing the [ESC] button, setting changes are not saved.

Sub menu

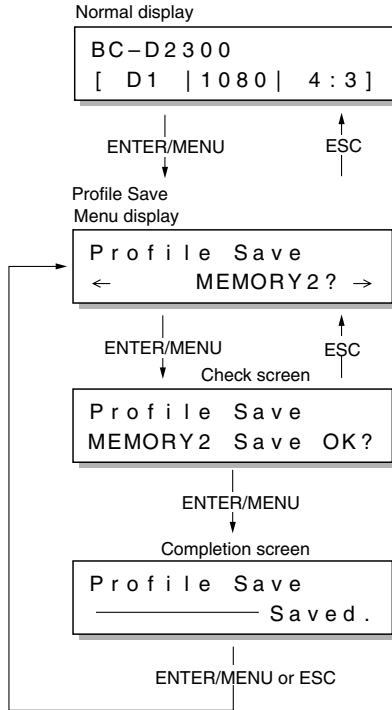


Exact settings for variable enhancer (option), color correction (option) and administration can be done on the sub menu.

1. When setting the variable enhancer or color correction to ON, or selecting administration, [ENTER] is shown on the display. To enter the sub menu, press the [ENTER/MENU] button.
2. Set each menu item in the same way as with the ordinary menu.
3. Press the [ESC] button to go to the upper menu by one.

MENU SETTINGS

Storing menu settings in memory of this unit



- 1 Press the [ENTER/MENU] button to engage the Menu Display mode.
- 2 Select Profile Save with the [▼] or [▲] button.
- 3 Select the memory number where you want to store the menu settings with the [+] or [-] button (one of MEMORY 1 to 4).
 - The "?" is added to the end of the selected memory number.
- 4 Press the [ENTER/MENU] button.
 - The check screen is shown for confirmation.
- 5 Press the [ENTER/MENU] button again to confirm the setting.
 - The menu settings are stored in the selected memory. Once the settings have been stored, the completion screen is shown.
- 6 Press the [ENTER/MENU] button or [ESC] button.
 - Menu setting display is restored.
- 7 Press the [ESC] button to restore the normal display.

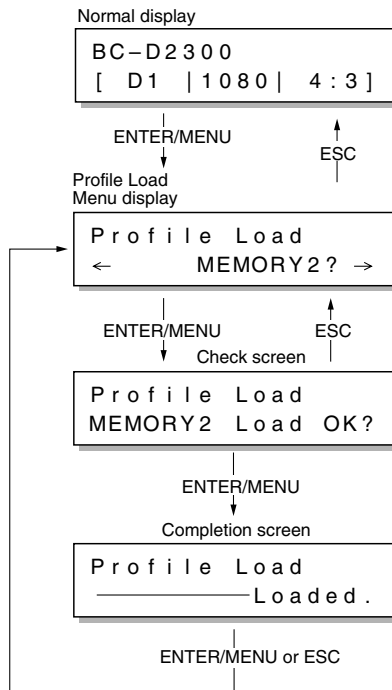
Memorandum:

- When the check screen is shown, press the [ESC] button to cancel it. The previous Profile Save menu setting display is restored.

Note:

- Settings for Remote ID, Remote Speed and Remote Port are not stored in memory for each Profile. One value is used for all profiles.

Recalling stored menu settings or factory default settings



- 1 Press the [ENTER/MENU] button to engage the Menu Display mode.
- 2 Select Profile Load with the [▼] or [▲] button.
- 3 Select the memory to be recalled (MEMORY 1 to 4, DEFAULT) with the [+] or [-] button. When DEFAULT is selected, the factory setting is recalled.
- 4 Press the [ENTER/MENU] button.
 - Display the check screen for confirmation.
- 5 Press the [ENTER/MENU] button again to confirm.
 - The selected settings are recalled. When completed, the completion display is shown.
- 6 Press the [ENTER/MENU] button or [ESC] button.
 - Menu setting display is restored and the recalled menu settings are activated.
- 7 Press the [ESC] button to restore the normal display.
 - The factory default settings are stored in MEMORY 1 to 4.

Memorandum:

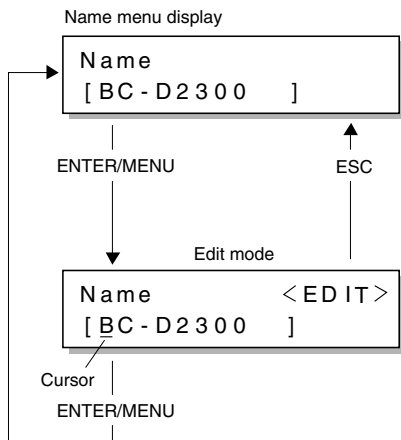
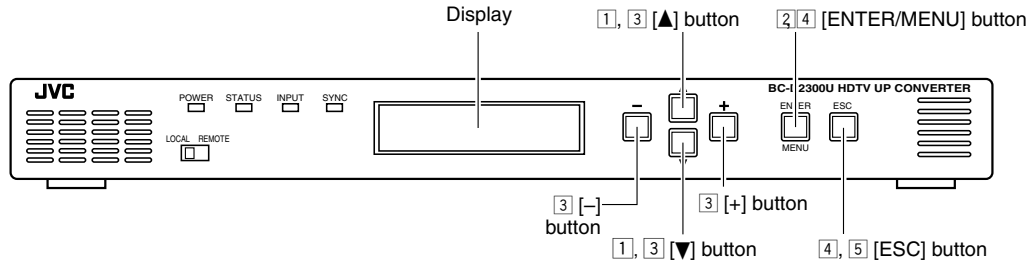
- When the check screen is shown, press the [ESC] button to cancel it. The previous Profile Load menu setting display is restored.

Memorandum:

- The factory default settings are stored in MEMORY 1 to 4.

Entering characters

Enter characters to set the model name and the [License key].



An example of model name setting is shown below.

- 1 **Select [Name] in the sub menu for administration.**
 - The currently-set device name is shown.
- 2 **Press the [ENTER/MENU] button.**
 - The Edit mode is engaged and the cursor appears.
- 3 **Move the cursor with the [+] or [-] button. Change the characters with [▼] or [▲] button (up to 10 characters).**
- 4 **Press the [ENTER/MENU] button to store the device name in memory.**
 - The setting is refreshed and the name menu display is restored.
- Press the [ESC] button to interrupt editing and restore the previous setting.
 - The changed setting is canceled and the name menu is restored.
- 5 **To restore the normal display, press the [ESC] button.**

MENU SETTINGS

Menu contents

[]: Factory Setting

Items	Settings	Contents
Output Mode <div style="border: 1px solid black; padding: 5px;"> <p>Note:</p> <ul style="list-style-type: none"> The following menu item values can be saved for each setting mode. <ul style="list-style-type: none"> V Position Motion Sense Enhance Level Variable Enhancer and 5-related item (option) <p>When the setting for Output Mode is changed, check the setting of the above menu items.</p> </div>	[4:3] LETTER BOX SQUEEZE	<p>Sets the HD Conversion mode according to the NTSC video source.</p> <p>4 : 3 : When the input video has an aspect ratio of 4:3, it is converted to HD pictures without changing the aspect ratio for output. In this case, the side panels appear on the screen.</p> <p>LETTER BOX : When the input video is in the LETTER BOX format, it is converted to HD pictures with an aspect ratio of 16:9 for output.</p> <p>SQUEEZE : When the input video has been "squeezed" for display on 4:3 screens, it is converted to HD pictures with an aspect ratio of 16:9 for output.</p> <div style="text-align: center;"> </div>
Output	[1080I] 720P	<p>Sets the output video format.</p> <p>1080I : Effective 1080 scanning lines, interlace.</p> <p>720P : Effective 720 scanning lines, progressive.</p>
Reference <div style="border: 1px solid black; padding: 5px;"> <p>Note:</p> <ul style="list-style-type: none"> System Phase settings can be saved for each of these item settings. </div>	[INPUT] BB HD-SYNC	<p>Selects the reference sync signal.</p> <p>INPUT : Synchronizes with the video signal input to the [SDI IN] connector of this unit.</p> <p>BB : Synchronizes with the black burst signal input to the [REF] connector of this unit.</p> <p>HD-SYNC : Synchronizes with the tri-sync input to the [REF] connector of this unit. Tri-sync must be input in the same signal form as the output setting.</p> <p>Note:</p> <ul style="list-style-type: none"> When this is set to "BB" or "HD-SYNC", the V sync position of these external signals and video input signals must synchronize within $\pm 300 \mu\text{s}$.
System Phase	-300 ∴ [0] ∴ ∴ 300	<p>Sets the HD output signal phase for the reference sync signal selected with <Reference>.</p> <p>(Variation for ± 300 is equivalent to about $\pm 4 \mu\text{s}$.)</p>
H Position	-120 ∴ [0] ∴ ∴ 120	<p>Adjusts the picture's horizontal display position (varies in $\pm 120 \times 2$ pixels).</p> <ul style="list-style-type: none"> This item is enabled only when the Output Mode is set to 4:3. When the <Output> item is set to "720P", the actual display position area is $\pm 80 \times 2$ pixels. Keep in mind that this is different from the value set with the menu.
H Crop (Left)	[0] ∴ 100	<p>Sets the crop width at the left of the input picture.</p> <ul style="list-style-type: none"> This item is enabled only when the Output Mode is set to 4:3. For the part cropped, the background color is shown.
H Crop (Right)	-100 ∴ [0]	<p>Sets the crop width at the right of the input picture.</p> <ul style="list-style-type: none"> This item is enabled only when the Output Mode is set to 4:3. For the part cropped, the background color is shown.

Menu contents (contd.)

■ The items in the shaded area are shown when the optional software is installed.

[]: Factory Setting

Items	Settings	Contents
V Position	-63 ⋮ [0] ⋮ 63	Adjusts the picture's vertical position (varies in ±63 lines). Note: ● When <Output Mode> is set to "4:3" or "SQUEEZE", the actual variable range is ±3 lines. Keep in mind that this is different from the value set with the menu.
Motion Sense	0 ⋮ [8] ⋮ 15	Motion detection sensitivity adjustment Sets the optimum conversion sensitivity according to the input material. Normally use the factory setting.
Enhance Level	-5 ⋮ [0] ⋮ 15	Adjusts the enhancer (contour compensation) of the video output signal. Varies in 20 steps. Use this 2-dimensionally (horizontal and vertical). When the optional variable enhancer function is enabled, the variable enhancer menu is shown instead of this item.
Variable Enhancer	OFF [ON]	Sets ON/OFF of the variable enhancer function. When set to "OFF", the enhancer is disabled. When set to "ON", the variable enhancer functions based on the values of the following five items. The following five parameters can be displayed and set on the sub menu by pressing the [ENTER/MENU] button. (☞ p. 7 for sub menu) ● This item is shown only when the optional variable enhancer function is enabled.
Enhance Level	-5 ⋮ [0] ⋮ 15	Sets the enhancement level. ● This item is shown when the optional variable enhancer function is enabled and <Variable Enhancer> is set to "ON".
Enhance Freq	2 ⋮ [4] 5	Sets the frequency of the input signal to be enhanced. ● This item is shown when the optional variable enhancer function is enabled and <Variable Enhancer> is set to "ON".
Cut Off Freq	3 ⋮ [7]	Sets the band limit frequency of the input signal. When set to 7 (MHz), band limitation is not performed. Note: When the <Cut Off Freq> setting is smaller than the <Enhance Freq> setting, the enhancement function is disabled. ● This item is shown when the optional variable enhancer function is enabled and <Variable Enhancer> is set to "ON".
Threshold	[0] ⋮ 15	Sets the threshold of the enhancement effect. If the enhancement effect is applied excessively, even low-level noise contained in the original picture will be emphasized. With this setting, the enhancement of a small amount of noise can be suppressed to emphasize only the contour. ● This item is shown when the optional variable enhancer function is enabled and <Variable Enhancer> is set to "ON".
Noise Reduction	[OFF] ON	When this item is set to "ON", a small amount of noise lower than the threshold level can be suppressed. The larger the threshold setting, the larger the effect to suppress noise. Note: This function has no effect unless <Enhance Level> is set to the larger value. ● This item is shown when the optional variable enhancer function is enabled and <Variable Enhancer> is set to "ON".

MENU SETTINGS

Menu contents (contd.)

[]: Factory Setting

Items	Settings	Contents
Back Color Mode	[YCbCr] HSL	Sets the method to specify the background color. YCbCr : Sets the output value of the background color. HSL : Sets the background color with the Hue, Saturation and Lightness values. Note: ● When this setting is changed, the following three menu settings also change. In this case, the set value and color may be changed. If this setting is changed, check the color on the screen again.
Back Color (Y)	[64] : 940	Varies the background color brightness. With 4:3 aspect ratio picture input, this adjustment is applied to the side panels of the picture output. Set this by checking the screen. ● This item is shown only when the Back Color Mode is set to YCbCr.
Back Color (Cb)	64 : [512] : 960	Varies the blue of the background color. With 4:3 aspect ratio picture input, this adjustment is applied to the side panels of the picture output. Set this by checking the screen. ● This item is shown only when the Back Color Mode is set to YCbCr.
Back Color (Cr)	64 : [512] : 960	Varies the red of the background color. With 4:3 aspect ratio picture input, this adjustment is applied to the side panels of the picture output. Set this by checking the screen. ● This item is shown only when the Back Color Mode is set to YCbCr.
Back Color (L)	[0] : 100	Sets the background color lightness. With 4:3 aspect ratio picture input, this adjustment is applied to the side panels of the picture output. Set this by checking the screen. ● This item is shown only when the Back Color Mode is set to HSL.
Back Color (S)	[0] : 100	Sets the background color saturation. With 0, monochrome is shown. The larger the number, the higher the saturation. Note: ● The saturation actually output is limited by the setting of the Back Color (L). Even though the Back Color (S) is set to 100, the picture will be monochrome if the Back Color (L) is set to 0 (black) or 100 (white). ● This item is shown only when the Back Color Mode is set to HSL.
Back Color (H)	[0] : 359	Sets the background color hue. In most cases, the following colors can be obtained. 0: Red, 120: Green, 240: Blue ● This item is shown only when the Back Color Mode is set to HSL.

Menu contents (contd.)

■ The items in the shaded area are shown when the optional software is installed.

[]: Factory Setting

Items	Settings	Contents
Color Correction	[OFF] ON	<ul style="list-style-type: none"> This menu is shown when the optional color correction function is enabled. Sets the color correction function ON/OFF. With OFF, the color correction function is disabled. With ON, the color is corrected based on the following 8 parameters (items). When this function is set to ON, the normal display format changes. (p. 5) The following eight parameters are shown and set on the sub menu when <Color Correction> is set to "ON" and the [ENTER/MENU] button is pressed.
White Level	-100 ⋮ [0] ⋮ 100	<p>Adjusts the high brightness level of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
Black Level	-100 ⋮ [0] ⋮ 100	<p>Adjusts the low brightness level of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
White Color (B)	-100 ⋮ [0] ⋮ 100	<p>Adjusts the blue of the high brightness section of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
White Color (R)	-100 ⋮ [0] ⋮ 100	<p>Adjusts the red of the high brightness section of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
Back Color (B)	-100 ⋮ [0] ⋮ 100	<p>Adjusts the blue of the low brightness section of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
Back Color (R)	-100 ⋮ [0] ⋮ 100	<p>Adjusts the red of the low brightness section of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
Phase	-179 ⋮ [0] ⋮ 180	<p>Adjusts the phase of the input picture.</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.
Chroma	-100 ⋮ [0] ⋮ 100	<p>Adjusts the chroma of the input picture.</p> <p>With -100, the picture becomes black-and-white (monochrome).</p> <ul style="list-style-type: none"> Can be set when the Color Correction is set to ON.

MENU SETTINGS

Menu contents (contd.)

[]: Factory Setting

Items	Settings	Contents
Colorimetry	OFF [ON]	Turns the colorimetry parameter conversion function ON/OFF. This function allows SD (ITU-R601) to be converted to HD (ITU-R709). Normally, set to ON. When this function is set to OFF, the normal display format changes. (p. 5)
Out Delay	[1FRAME] 1FRAME-90H	Sets the delay time from the input to the output. 1FRAME : Delays by 1 frame (33.37 ms). 1FRAME-90H : Delays by 1 frame -2.67 ms for 1080i. Delays by 1 frame -2.00 ms for 720P.
Audio Group	NO USE [1] 2 3 4	Selects the audio signal group (groups 1 to 4) multiplexed on the SD digital serial input signal. If audio is not used, select No Use.
Audio Delay	-30 : [0] : 30	Sets the delay for the audio signal multiplexed on the SD digital serial input signal. Adjustment of ± 30 (msec.) is possible with respect to the delay time set with <Out Delay>.
Profile Save	MEMORY 1 MEMORY 2 MEMORY 3 MEMORY 4	Four independent memories are provided to store menu settings. Selects the memory to be used to store the set menu contents. * Items in the administration sub menu are not stored in memory.
Profile Load	MEMORY 1 MEMORY 2 MEMORY 3 MEMORY 4 DEFAULT	Recalls menu setting stored in memory. When set to DEFAULT, menu setting set before shipment is recalled.
Color Bar	[OFF] ON	When set to ON, the built-in color bar (7-line color bar) is output regardless of the input. The color bar output turns off automatically when you quit this menu.

Menu contents (contd.)

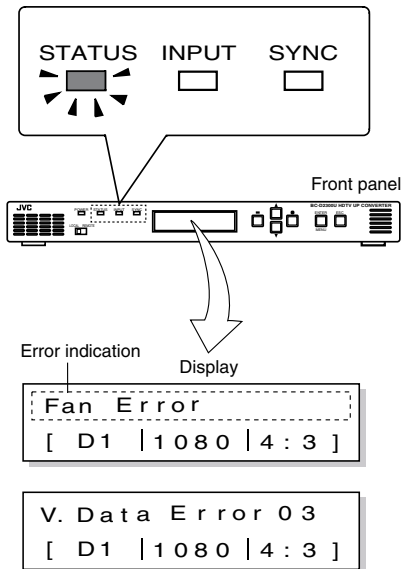
[]: Factory Setting

Items	Settings	Contents
Administration		Press the [ENTER/MENU] button to enter the administration sub menu. The following nine items can be set on the administration sub menu.
Remote ID	[1] ⋮ 31	Sets the remote ID of this unit to remote-control this unit from the Host.
Remote Speed	9600 19200 [38400]	Sets the transmission speed (bit/s) of the remote control signal.
Remote Port	[REMOTE-IN] ALARM	Selects the connection port for the host when this unit is remote-controlled. REMOTE-IN : Connects RS-485 to the [REMOTE-IN] port. Set to this position to remote-control this unit via the [REMOTE-IN] connector. ALARM : Connect the RS-232C to the [ALARM] port. Set to this position to remote-control this unit via the [ALARM] connector.
Active Line	480 [486]	Sets the number of effective lines of the input signal when <Output> is set to "1080I". With <Output> set to "720P", the number is fixed at 480 lines (on the menu, --- is shown).
Alarm	OFF [ON]	When set to "OFF", the output from the rear panel's [ALARM] connector stops (always open except when power is turned off).
Name	[BC-D2300]	Sets the device name that will be shown in the normal display. For setting, refer to page 9.
Version		Shows the firmware version of this unit.
Serial No.		Shows the serial number of this unit.
License key		Sets the license key to enable optional features such as the variable enhancer and color compensation function. For setting, refer to page 9. To obtain the license key, consult your JVC dealer.
Running Time		Shows the approx. number of operating days of this unit. Press the [ENTER/MENU] button twice to clear this number to 0. Use this as a guide for determining when to replace the fan.

OTHERS

When an abnormality is detected, error notification is provided by LED illumination, error indication on the display and error output to the [ALARM] connector.

Error output



1. LED lighting

The [STATUS], [INPUT] or [SYNC] indicator on the front panel lights orange (warning) or red (error), depending on the type of error.

2. Display indication

The first line of the display shows a description of the error. When the menu is displayed, errors are not shown.

Memoranda:

- With LOCAL, the error indication is shown when the error is detected and goes out when the error is no longer detected. With REMOTE, once an error is detected, the indication remains (goes out when the switch is set to LOCAL).
- Error codes with 2 to 6 digits may be shown at the same time. In this case, report the error codes to your JVC dealer.

3. [Alarm] connector output

2-line alarm output terminals are provided for the rear panel's [ALARM] connector. Terminals A and B are short-circuited (relay contact) when an error occurs or the power is turned off. Normally, these terminals are open. (For open and short-circuited conditions, refer to the table on the next page.)

The maximum rated value is 30 V 0.5 A for AC/DC with non-inductive load.

Pin assignment of the [ALARM] connector

Pin number	Name	Contents
1	NC	Unconnected
2	(RD)	(Reception data for maintenance)
3	(SD)	(Transmission data for maintenance)
4	ALARM2-B	Alarm output 2 B terminal
5	GND	Signal ground
6	ALARM2-A	Alarm output 2 A terminal
7	ALARM1-A	Alarm output 1 A terminal
8	ALARM1-B	Alarm output 1 B terminal
9	NC	Unconnected

Error output (contd.)

Error indications and output contents

Error indications	Error contents	LED	ALARM 1	ALARM 2
Power Error	Abnormality in the power unit	STATUS: Red	Short-circuited	Open
Fan Error	Abnormality in the fan motor			
Data No-input (warning)	No video and audio signal is input.	INPUT: Orange	Open	Open
V. Format Error	Format error of the SDI input signals	INPUT: Red	Open	Short-circuited
V. Data Error	Error of video data in the SDI input signal			
A. Data Error	Error of audio data in the SDI input signal			
REF No-input	No external sync signal is input (note)	SYNC: Red	Short-circuited	Open
SD Unlock	Synchronization is not possible due to incorrect video input signals			
Ref Unlock	Synchronization is not possible due to incorrect external sync signal input			
Comm Error	Abnormal remote communication	STATUS: Red	Short-circuited	Open
Device Error	Abnormality in the internal device			
—	Power is turned off.	—	Short-circuited	Short-circuited

Note: When an incorrect external sync signal is input, the REF No-input error indication may be shown.

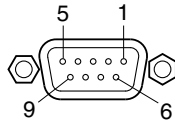
- When an error indication is shown, check the input signal and connections according to type of error indicated. When this unit malfunctions, consult your nearest JVC authorized service agent.

OTHERS

Rear panel connectors

Names	Functions	Types	Remarks
SDI IN	SD digital serial signal input	BNC	
SDI OUT	Active through output	BNC	
REF	External sync input	BNC	
REF	Loop-through	BNC	
HD SERIAL OUT 1	HD digital serial signal output	BNC	
HD SERIAL OUT 2	Same as above	BNC	
HD SERIAL OUT 3	Same as above	BNC	
CVBS	Analog composite input	BNC	The optional BC-D231 is required.
Y	Analog component Y input	BNC	
Pr	Analog component Pr input	BNC	
Pb	Analog component Pb input	BNC	
ALARM	[ALARM] connector/RS-232C	D-SUB	9-pin male, inch screw
REMOTE-IN	Remote control input	D-SUB	9-pin female, mm screw
REMOTE-OUT	Remote control bridge	D-SUB	9-pin female, mm screw

■ REMOTE-IN, REMOTE-OUT terminal pin assignment

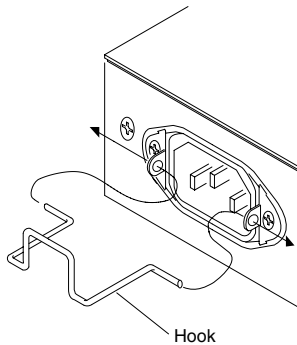


Note:

- For the REMOTE connection, use a straight cable which contains twisted paired lines for the signals of TxA and TxB, RxA and RxB.

Pin number	Signal name	I/O	Contents	Remarks
1	NC	—	Unconnected	
2	TxA	O	Transmission A	RS-485
3	RxB	I	Reception B	RS-485
4	SG	—	Signal ground	
5	NC	—	Unconnected	
6	SG	—	Signal ground	
7	TxB	O	Transmission B	RS-485
8	RxA	I	Reception A	RS-485
9	NC	—	Unconnected	

Installing the power cable hook



- Before connecting the power cable, install the supplied hook as shown on the left.
- After connecting the power cable, lower the hook to secure the power cable in place.

Specifications

■ Input signal

Video and audio	: SD digital serial signal (SMPTE259M) 1 line 0.8 Vp-p, 75 ohms unbalanced, active-through Bit rate: 270 Mbps Embedded audio signal: 4 ch, sampling frequency of 48 kHz
Sync signals	: Sync signal, 75 ohms unbalanced, loop through 1 line B.B: 0.45 Vp-p (NTSC) HD-SYNC: Positive and negative bipolarity tri-sync signal of 600 mVp-p ± 300 mVp-p

■ Output signal

Video and audio	: HD digital serial signal (SMPTE292M) 3 lines 0.8 Vp-p, 75 ohms unbalanced Bit rate: 1.485/1.001 (1.483516) Gbps, 59.94 Hz Effective scanning lines: 1080 lines (1080I), 720 line (720P) Embedded audio signal: 4 ch, sampling frequency of 48 kHz
------------------------	--

■ Quantization

Video resolution	: 10 bits
Audio resolution	: 20 bits

■ Signal delay amount

Video system	: 1 frame or 1 frame - 90H, the shortest delay setting not available
Audio system	: The same delay as the video delay time, can be adjusted by ±30 msec.

■ Conversion mode

: Three types (4:3 material, letter box material, squeezed material)

■ Power supply

: AC 120 V, 50 Hz/60 Hz

■ Power consumption

: 35 W

■ External dimensions (WHD)

: 430 mm x 489 mm x 50 mm
(16-15/16" x 19-5/16" x 2") (excluding fan motor and connectors)

■ Weight

: 6.2 kg (13.7 lbs.)

■ Using environment

Installation place	: In a room (install on a table or a rack)
Allowable operating temperature	: 10°C to 40°C (50°F to 104°F)
Allowable operating humidity	: 30%RH to 80%RH (with no condensation)
Allowable storage temperature	: -20°C to 60°C (-4°F to 140°F)

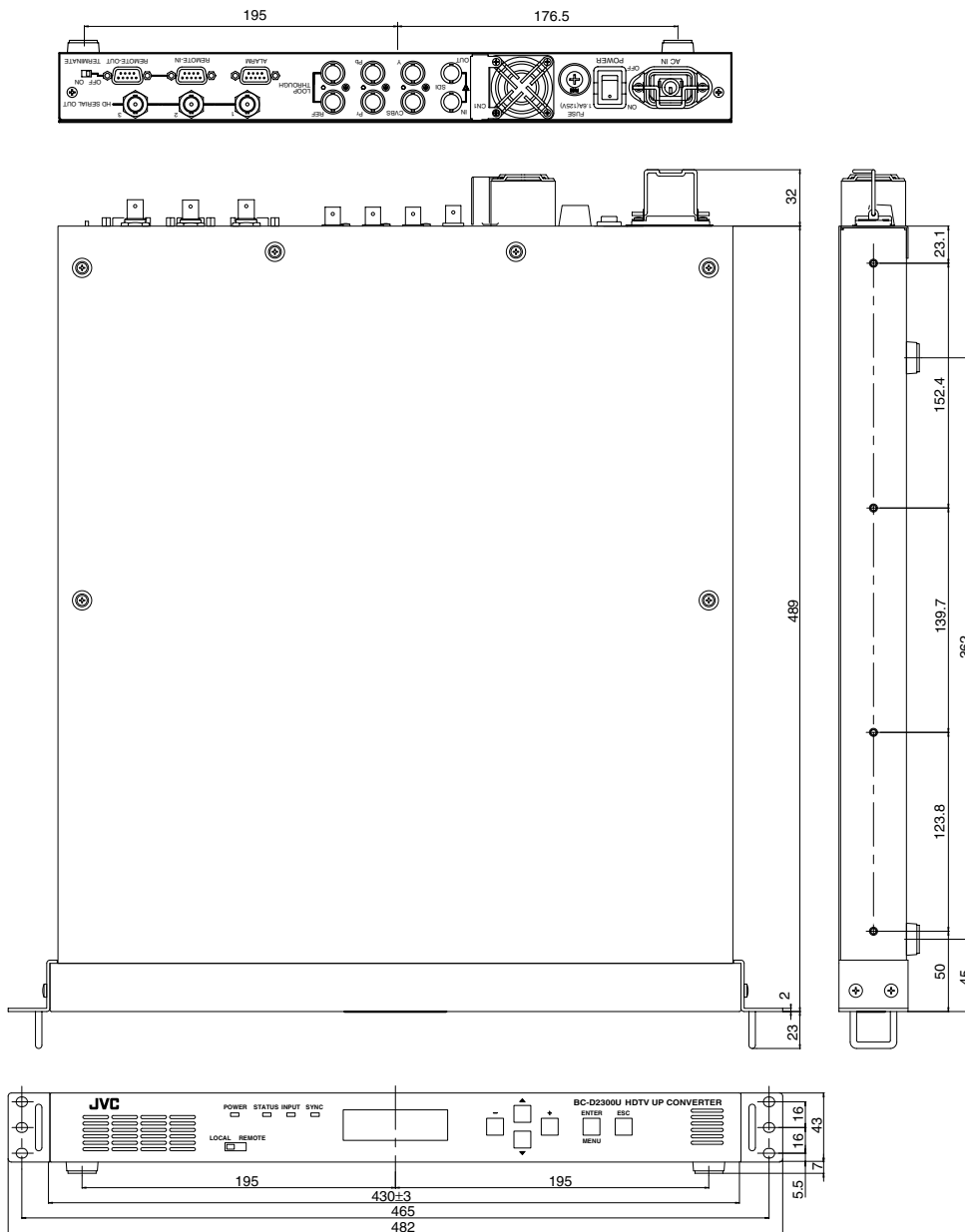
■ Provided accessories and options

Warranty card	x 1
Instruction manual	x 1
Service center list	x 1
Power cable (2.5 m)	x 1
Rack mount bracket	x 2
Screw (M4)	x 4
Screw (M5)	x 4
Hook (for power cable)	x 1

OTHERS

Specifications (contd.)


External dimensions (unit: mm)



Design and specifications subject to change without notice.



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12. GLOSSARY

13.5 [MHz]:

This is the sampling frequency used in digitization of video signals. This value was determined according to the horizontal frequencies of NTSC and PAL.

2-3 Pull Down:

Films for movies are usually shot by taking 24 frames per second (fps), while the NTSC video signal is shot by taking about 30 frames per second (which becomes about 60 fields by interlacing). When converting 24 fps movie film into NTSC video signal, it is required to arrange the difference in the number of frames (6 excessive frames per second) using a technique called the 2-3 pull down method (see figure below).

The 2-3 pull down method handles 5 fields (2-1/2 frames) of video signal as a cycle and accommodates the images of 2 film frames. This results in coincidence of the time axes from the mathematical viewpoint. Specifically, it converts the image of the first film frame into 2 video fields (1 frame) then converts the image

of the second film frame into 3 video fields (1-1/2 frame). By repeating these conversions, it permits the retrieval of 5 video frames from 4 film frames, or 30 video frames from 24 film frames.

Tristate sync signal:

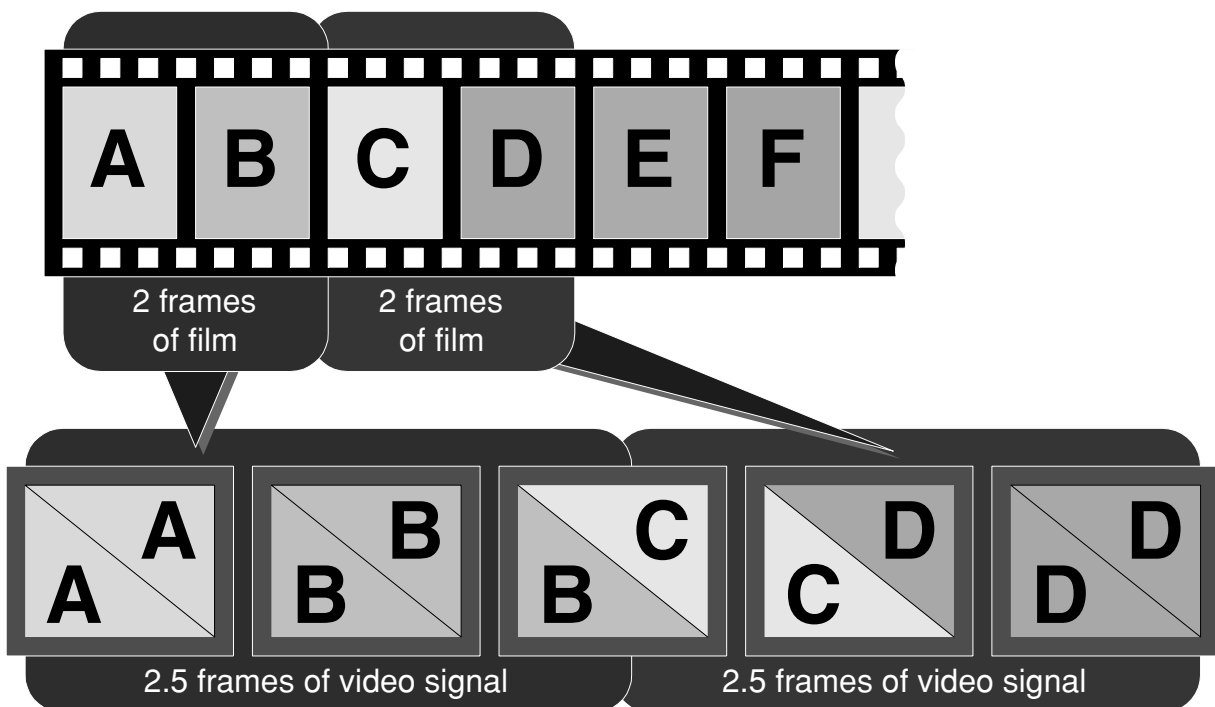
This is the format of the sync signal used by HDTV. See the waveform diagram on the next page.

4:2:2, 4:4:4, 4:1:1, 4:2:0 :

These ratios represent those between the sampling rates used in the digitization of the component video signals (Y, R-Y, B-Y). The 4:2:2 ratio assumes that the Y sampling rate (13.5 [MHz]) is "4" and the R-Y and B-Y sampling rate (which is half that of the Y component, i.e. 6.75 [MHz]) is "2" (see figure on page 68).

Although the ideal ratio is 4:4:4, since the human sense has low sensitivity to chroma information, the sampling rate of the chroma signals is halved to reduce the data quantity (data compression).

The video signal system based on DV compression



employs the ratio of 4:1:1. In this case, the amount of information in the two color difference signals is equal to 1/4 the amount of information in the Y signal (1 color difference pixel per 4 Y signal pixels).

With the 4:2:0 ratio used by MPEG1, etc., the 4:2:2 line and 4:0:0 line appears alternately because the color difference signals are sampled every other time in both the horizontal and vertical directions. For the sampling method, see figure on page 68.

AES/EBU:

These refer to the digital audio standards of the AES (Audio Engineering Society) and the EBU (European Broadcasting Union).

ATSC (Advanced Television Systems Committee):

The ATSC is a U.S. organization for the standardization of next generation TV systems specifications such as for digital HDTV. The ATSC has standardized 18 kinds of recommended video formats, which are referred to as Table 3 standards.

Digital TV broadcasting in the US adopts the MPEG3 video and AC-3 surround audio.

CVBS:

This signal is also known simply as VBS. It refers to a Composite video signal composed of the Video, Burst and Sync signals.

GPI (General Purpose Interface):

This interface is in use in communications between various video devices. It features timing controls based on pulse signals, but it is incapable of transmitting parameters and other data.

HDTV (High Definition Television):

A generic name given to the TV standards providing improved image definition and viewing angle compared to the current television standards (Standard Definition Television, or SDTV). There are several HDTV standards depending on the countries where they were developed, but most of them employ an image aspect ratio of 16:9, about 1000 scanning lines and video frequency bands around 30 MHz. The mainstream ones are the progressive scanning standards with 1125, 1080 or 1035 scanning lines and the interlaced scanning standards with 1080 or 720 scanning lines.

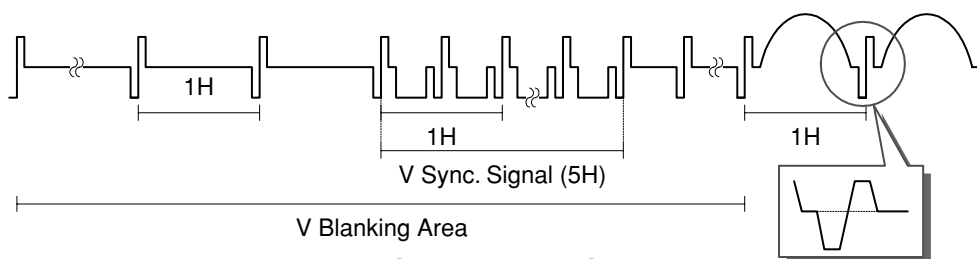
In February 1998, ITU (International Telecommunication Union) recommended the BT.709-3 standard. As a result, Japan, the USA and Europe determined a unified standard based on this.

ITU-R BT.656:

This standard was previously called the CCIR 656 standard. It is intended to enable the mutual connection of digital video signals defined by ITU-R BT.601-2 (CCIR 601) through a serial or parallel interface.

SDTI (Serial Digital Transport Interface):

This interface is used to transfer digital data at high speeds. Featuring a transfer rate of 200 [Mbps] or more, it can transfer video data at a higher rate than real-time data.



Tristate sync signal:

SMPTE (Society of Motion Picture and Television Engineers):

An American organization that defines the TV broadcasting standards in the US. The SMPTE standards related to digital broadcasting include the following.

SMPTE 272M: Standard on embedding of AES/EBU audio data and additional data in digital video data.

SMPTE 292M: Standard on serial digital data in HDTV systems.

SMPTE 294M: Standard on the method of transmitting 4:2:2/P (Progressive) digital video data through two SMPTE 259M links and that of transmitting 4:2:0/P

digital video data through a single SMPTE 259M link.

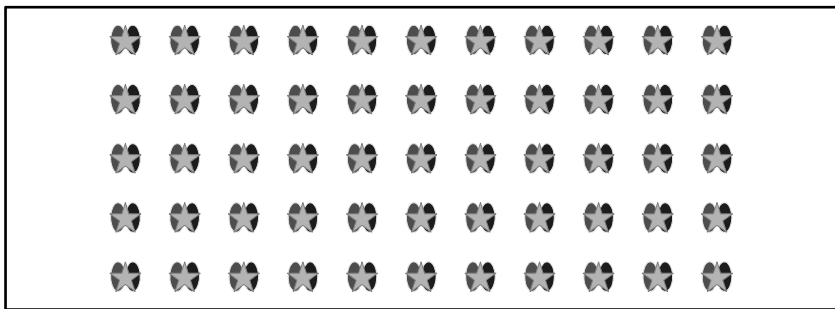
SMPTE 299M: Standard on the method of transmitting 24-bit digital audio data through an HDTV digital serial interface. Eight pairs of AES/EBU audio channels can be embedded in the digital audio data.

SMPTE 305M: Standard on the SDTI (Serial Digital Transport Interface).

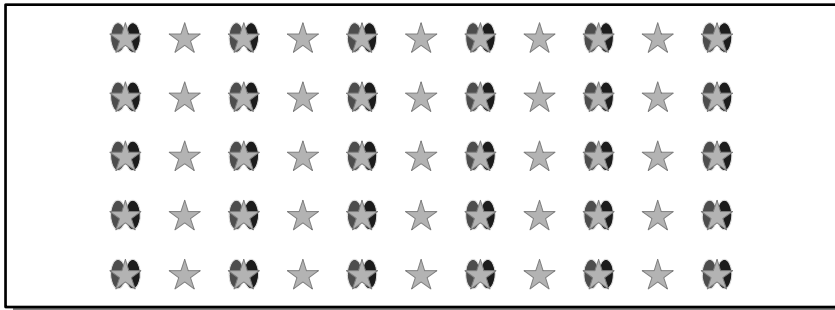
Y Pb Pr:

These are the color difference signals used most commonly in HDTV standards. The level of each signal component is calculated based on the RGB primary color signal levels. Another set of color difference

12



4:4:4



4:2:2



4:1:1



4:1:0

☞ = Y, Pb, Pr ★ = Y only

Sampling of Digital Component Signal

signals, which is standardized by the ITU-R601 and used in digital video devices is the Y Cb Cr signals. As these two modes use different formulas for the output level calculation, the levels of the color difference signals output by them are different even when the same RGB signals are input.

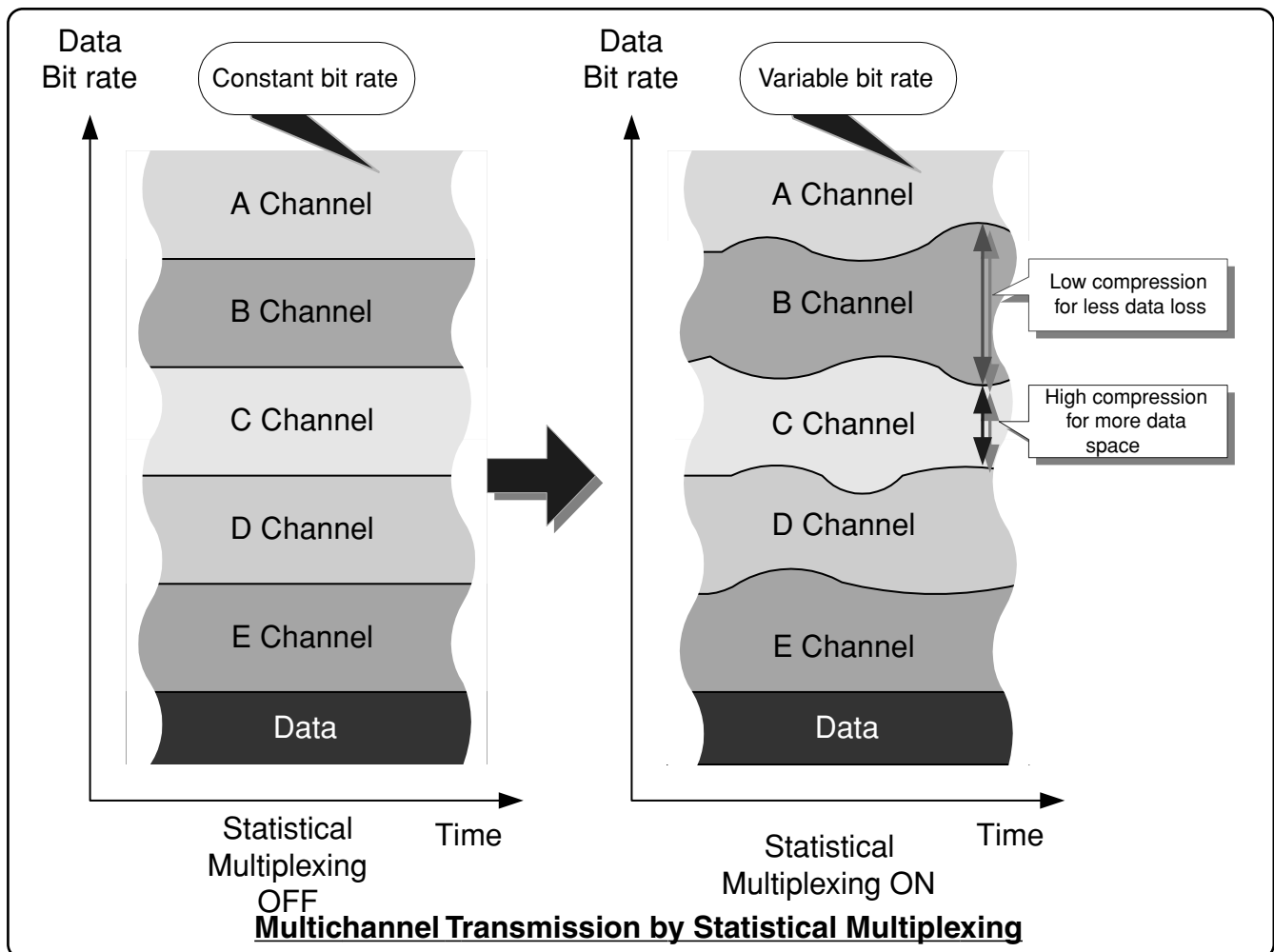
Keying:

One of video composing techniques used in video processing and digital video processing. It superimposes one image onto another one by cutting the shape of the image based on the signal used in the video-switching signal called the “keying signal”. The methods used to extract a keying signal include chrominance keying (usually called chroma keying) which makes use of differences in hue between the video signals and the luminance keying which makes use of differences in luminance. Video devices also execute other composing effects such as wiping using the key signals (key patterns) built into them.

Statistical Multiplexing:

The quantities of information such as video, audio and data usually vary at every moment. Communication methods that segment and multiplex information, such as packet and ATM communications, can send signals only when information occurs. As a result, when the amount of information in a channel is small, they offer a margin for sending data of other channels through the same transmission path.

The maximum amount of information transmitted by a multiplexed transmission path is determined. However, statistical multiplexing can improve the transmission efficiency by controlling the data transmission amounts of multiple channels in the range of the provided maximum data amount (i.e. providing a broader band to the channels that require much data, and narrower bands to those that do not require much data). (see figure below) .



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