ASTRO

Video Signal Generator

VG-876

Instruction Manual

Ver.3.60

Contents

BEFORE OPERATING THE GENERATOR

Introduction

Thank you very much for purchasing this model VG-876 video signal generator.

This manual contains details on the operation procedures to be followed when the VG-876 is used, the checkpoints and precautions to be observed, and so on. Improper handling may result in malfunctioning so before using the VG-876, please read through these instructions to ensure that you will operate the generator correctly.

After reading through the manual, keep it in a safe place for future reference.

Safety precautions

⚠ WARNING

Concerning the generator

- **Do not subject the generator to impact or throw it. Doing so may cause the generator to malfunction, explode or generate abnormally high levels of heat, possibly resulting in a fire.**
- **Do not use the generator where there is a danger of ignition or explosions.**
- **Do not place the generator inside a microwave oven or other heating kitchen appliance or inside a high pressure vessel. Doing so may heat up the generator to abnormally high levels, cause smoking, running the risk of the generator's catching fire and/or damaging the circuit components.**
- **This generator contains some high-voltage parts. If you touch them, you may receive an electric shock and burn yourself so do not attempt to disassemble, repair or remodel the generator.**
- **If there is a thunderstorm while the generator is being used outdoors, immediately turn off its power, disconnect the power cable from the main unit, and move the generator to a safe place.**

Concerning the power cord

- **Always take hold of the molded part of the plug when disconnecting the power cord.**
- **Do not use force to bend the power cord or bunch it up for use. Doing so may cause a fire.**
- **Do not place heavy objects on top of the power cord. Doing so may damage the cord, causing a fire or electrical shock.**

Concerning foreign matter

- **Do not spill liquids inside the generator or drop inflammable objects or metal parts into it. Operating the generator under these conditions may cause a fire, electric shocks and/or malfunctioning.**

⚠ CAUTION

Concerning the generator

- **When connecting the generator to a display unit, use the FG cable provided to connect the frame ground (FG) terminal on the generator to the frame ground terminal on the display unit. If these terminals are not connected together, the generator may fail. Take special care when connecting the generator to a display unit which is under development.**
- **When disconnecting the VG-876 from the display unit, first disconnects the connecting cables, and then disconnects the FG cable.**
- **When the generator's power is to be turned ON or OFF, be absolutely sure to use the POWER switch on the front panel. Turning the power on and off by plugging in and unplugging the AC power cable may damage the USB memory.**
- **Do not start using the generator straight away: instead, turn on the power of the VG-876 and allow it to warm up for about 10 to 15 minutes before use so as to ensure that the VG-876 will operate stably.**
- **Never unscrew and open the cover on the side panel of the main unit while the main unit power is turned on. Malfunctioning may result if the cover or the screw should drop into the chassis of the main unit.**

Concerning impact

- **This is a precision instrument and, as such, subjecting it to impact may cause malfunctioning. Take special care when moving the generator.**
- **Do not drop the generator.**

Concerning installation

- **Install the generator in a stable location. Do not stand it on either of its side panels. Doing so may cause the generator's temperature to rise due to heat generation, possibly resulting in malfunctioning.**

When trouble or malfunctioning has occurred

- **In the unlikely event that trouble or malfunctioning should occur, disconnect the generator's power cable, and contact your dealer or an ASTRODESIGN sales representative.**

What is packed with the generator

The generator comes with the following items.

Be absolutely sure to use only the genuine accessories which are supplied with this generator since the use of any non-designated items may cause malfunctioning.

■ Standard accessories

- VG-876 main unit
- CD with VG-876 instruction manual (what you are now reading): 1 disc
- USB Memory: 1 pc
- SP-8870 software installation CD (for Windows): 1 pc
- SP-8870 instruction manual: PDF version (packed with the SP-8870 software installation CD)
- Power cable: 1 pc *1
- FG cable (1.5 meters long): 1 pc *1

*1: These cables are designed to be used exclusively with the VG-876.

■ Optional accessories

- RB-1870:
  Remote control box used exclusively with the VG-876
- RB-1871:
  Simplified remote control box used exclusively with the VG-876
  This remote control box is used exclusively for executing program data, timing data, pattern data and other operations so it cannot be used for setting operations.

1 CONCERNING THE VG-876

1.1. General description

The VG-876 video signal generator supports applications in every field of display test and measuring.
It features a high level of expandability which is achieved by the installing video output interface units.

1.2. Features

■ 16-bit high-speed imaging engine

This generator features a maximum 16-bit × RGB high-gradation imaging engine. It even draws full HD images in an instant.

■ Wide dot clock frequency range

The VG-876 support a maximum dot clock frequency of 340MHz for digital outputs.

■ Windows-compatible editing and registration software (SP-8870) provided as standard accessory

This software can be used to edit and register the program data and exercise control over the signals output from the PC connected to the RS-232C/LAN/USB connector.

■ Full variety of sample data incorporated inside

A total of a thousand types of timing data and a thousand types of pattern data are registered inside the VG-876 as sample data. They are categorized by standard, application and other factors, and it is possible for the data required to be selected easily.

■ Registration of program data on USB memory

A total of a thousand program data can be registered on a USB memory. PC screens or natural images can also be registered. On a PC equipped with a USB port, the data can be copied using Explorer provided with Windows 98SE, Windows 2000, XP, Vista or 7.

■ Creation of user option patterns

In addition to the existing basic patterns (including character, crosshatch, color bar and gray scale) and optional patterns, a function that allows users to create their own optional patterns has been added. This function makes it possible to create the optional patterns which are useful for developing and evaluating the next-generation displays.

1.3. Data configuration

The data output by the VG-876 is managed by the program data.
The program data consists of the pattern data which is used to set the data relating to the output images and the timing data which is used to set the data relating to all other output timing data and output conditions.
The table below gives a breakdown of the data.

Block		Description
Timing data	Program Name	Program name
	Timing	Timing
	Output	Output condition
	Audio	Audio output
Pattern data	Pattern	Pattern
	Action	Pattern action

A number of types of program data, optional patterns and user character patterns are contained as sample data inside the VG-876.

	Number of data
Timing data	1556 (Timing # 1001 to 2556)
Pattern data	1556 (Pattern # 1001 to 2556)
Optional patterns	200(1 to 200)
User character patterns	16 (F0h to FFh)

The various data can be registered in the **internal memory (approx. 60 MB)** of the VG-876 or in USB Memory.

	Number of data	
Program data	1000 (Program # 1 to 1000)	
User option patterns	999 (1 to 999)	
Images (image data)	999 (1 to 999) * Number of data depends on the image data size, memory capacity and card capacity.	
User character patterns	16 (E0H to EFH)	
Number of characters in program names	20 characters * When displayed on the RB-1870. * Only 16 characters can be displayed on the VG-876.	
Number of groups	99 (1 to 99)	* For further details on groups, refer to “2.4 Groups.”
Number of group data	98 (1 to 98)	
Number of characters in group names	20 characters	

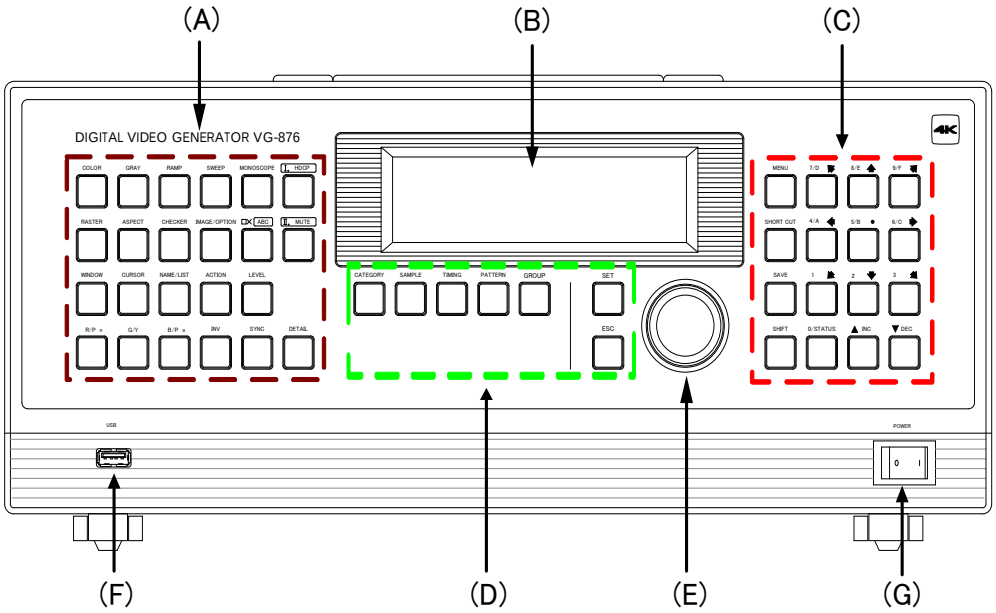
CAUTION

When a USB Memory has been inserted, the data registered on that USB Memory becomes valid, and the data registered in the internal memory becomes invalid.
In the case of image data, both the data on a USB Memory and the data in the internal memory can be made valid. *

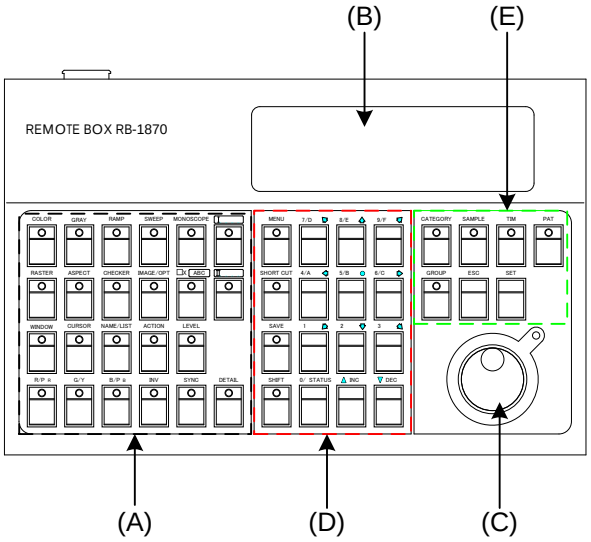
*** For further details, refer to “7.1.11 Image - priority settings.”**

1.4. Panel parts and their functions

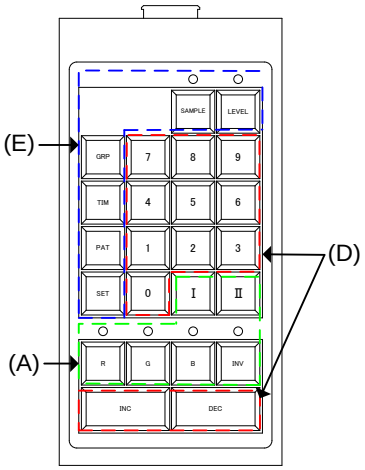
1.4.1 VG-876 front panel



1.4.2 RB-1870/RB-1871 panel



RB-1870



RB-1871

Some restrictions apply to operating the RB-1871. The operable items are described below.

- Selecting and executing programs
- Execution of grouped programs (but group editing is not possible)
- ON/OFF operations of R, G, B and INV keys
- ON/OFF operations of CUSTOM (I, II) keys (default = I: HDCP, II: MUTE)
- Change levels (digital video levels only)

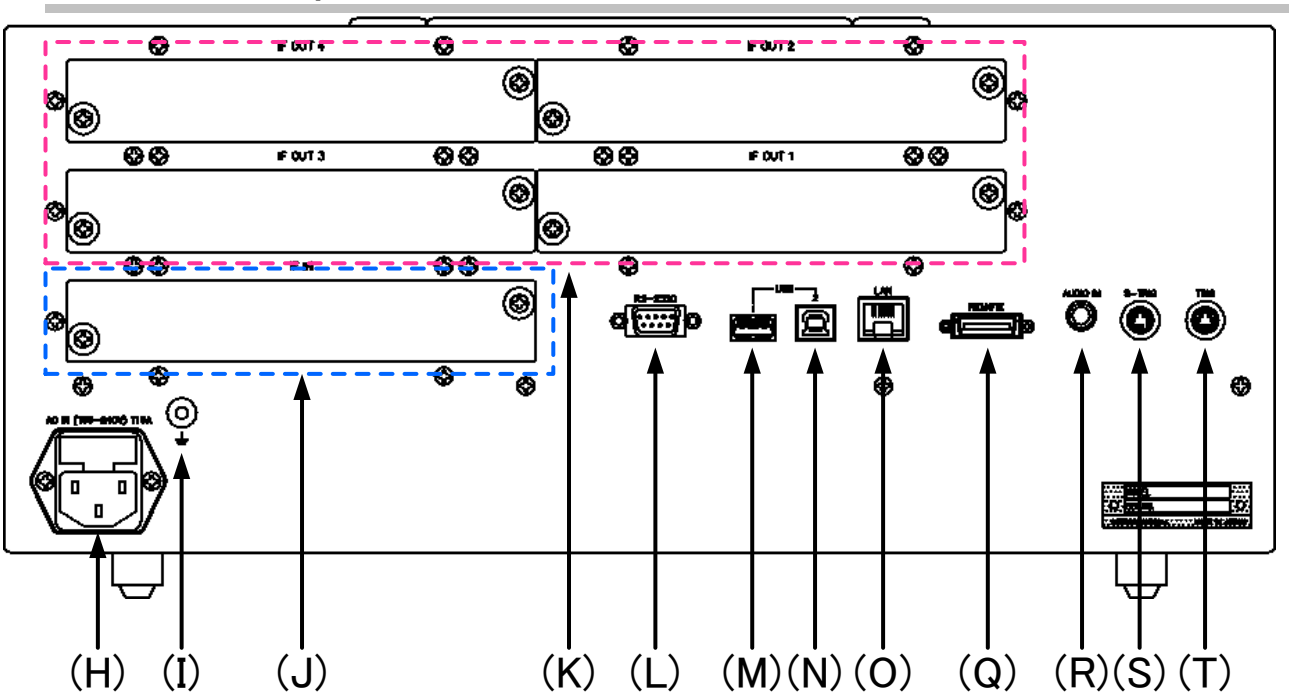
* For further details on the keys, refer to “1.4.3 Names of the keys and their functions.”

1.4.3 Names of the keys and their functions

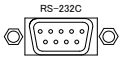
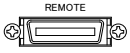
(A)	Pattern keys	COLOR ☐╳ ABC etc.	Used to display and edit the patterns.
	Action key	ACTION	Used when setting the scroll, flicker and other functions.
	Level key	LEVEL	Used to set the digital video levels and audio levels.
	RGB channel on/off	G/Y etc.	Used to set R, G and B on or off.
	INV key	INV	Used to invert the video signals.
	SYNC key	SYNC	Used to set the sync on or off.
	Detail key	DETAIL	Used to perform the detailed settings of the pattern data, timing data, etc.
	HDCP key (custom key)	HDCP	Used to set HDCP on or off. (HDCP is a system for protecting content used by HDMI.)
	MUTE key (custom key)	MUTE	Used to set the audio on or off (muted). * When setting HDMI AV-MUTE This key functions as the HDMI AV-MUTE On/Off setting. (Refer to “7.1.17 CUSTOM Key1, 2, RB-1871 CUSTOM Key”.)
(B)	Menu operation screens		The menu screens are used to set and check the items displayed on the fluorescent display tube.
(C)	Rotary switch		This is turned clockwise or counterclockwise to select the setting items or parameters, change the level settings, etc.
(D)	Number keys	0/STATUS to 9/F	Used to input numerical values, select the menus, etc.
	INC/DEC	▲ INC ▼ DEC	Used to select the setting items or parameters, change the level settings, change the program numbers, etc.
	Menu	MENU	Used to display the menu screens. When it is pressed while a menu screen is already displayed, the initial screen is restored. * When the menu key indicator is lighted It is no longer possible to use any of the other keys.
	Short-cut key	SHORT CUT	Used to move to a user-registered menu screen using minimal key operations.
	Save key	SAVE	Used to save the data which has been set.
	Shift key	SHIFT	Used to input letters of the alphabet with the number keys.

(E)	Category key	CATEGORY 	Used to select the internal sample data by category.
	Sample key	SAMPLE 	Used when the internal sample data is used. * When the sample key indicator is off The data stored in the USB memory or stored in the internal memory can be used.
	Timing key	TIMING 	Used to display changeable lists when only the output timing data is to be changed.
	Pattern key	PATTERN 	Used to display changeable lists when only the output pattern data is to be changed.
	Group key	GROUP 	Used to display user-registered groups, etc. and create groups.
	Escape key	ESC 	This key can be used in the following situations • When canceling parameter selections or numerical value settings • When returning the displayed menu screen to the previous hierarchical level
	Set key	SET 	Used to enter the setting items and parameters which have been set.
(F)	USB		Used for inserting USB Memory or accessing the memory in USB Memory.
(G)	Power switch		Used to turn the power of the VG-876 on and off.

1.4.4 VG-876 rear panel



1.4.5 Names of connectors and their applications

(H)	AC power socket		Connect the power cable here. Any voltage from 100 V to 240 V is supported.
(I)	Frame ground		Connect this frame ground terminal to the frame ground terminal of the unit which is connected to the VG-876.
(J)	Input Interface slot x1		One input interface unit to be installed.
(K)	Output Interface slots x4		Up to four interface units (VM-1876 series) to be installed.
(L)	RS-232C connector		This is used to connect a personal computer using an RS-232C cable.
(M)	USB (1)		This connector supports a regular USB mouse for cursor patterns operation. By using the pointer of the mouse, cursor pattern can be operated.
(N)	USB (2)		This connector is used to connect the generator with a PC to enable the VG-876 to be operated using the SP-8870 software, etc. Refer to the instruction manual of the SP-8870 software for further details.
(O)	LAN port		This port is used for connection to a LAN using the Ethernet cable.
(Q)	Remote connector		This is used to connect the dedicated remote control box (RB-1870 or RB-1871) to operate the generator by remote control.
(R)	AUDIO IN connector		This connector supports input digital audio signals (L-PCM).
(S)	S-TRIG connector		This connector outputs video sync signals.
(T)	TRIG connector		This is the trigger input/output connector.

1.4.6 Tools used to operate the VG-876

The table below lists the operation tools of this generator and the restrictions on the operation of each of these tools.

Operation tool	Restriction on operation	Remarks
VG-876 front panel	These enable all the generator functions to be operated.	The controls can be used only by the VG-876 main unit.
RB-1870	These enable all the generator functions to be operated.	This remote control box makes it possible to perform the same operations as the ones which are performed on the front panel of the VG-876.
RB-1871	Programs can be read only.	This is a simplified remote control box which is intended for use on production lines.
SP-8870	These enable all the generator functions to be operated.	This software program is intended for performing operations and editing using a PC.

1.5 Concerning VM-1876 module slots

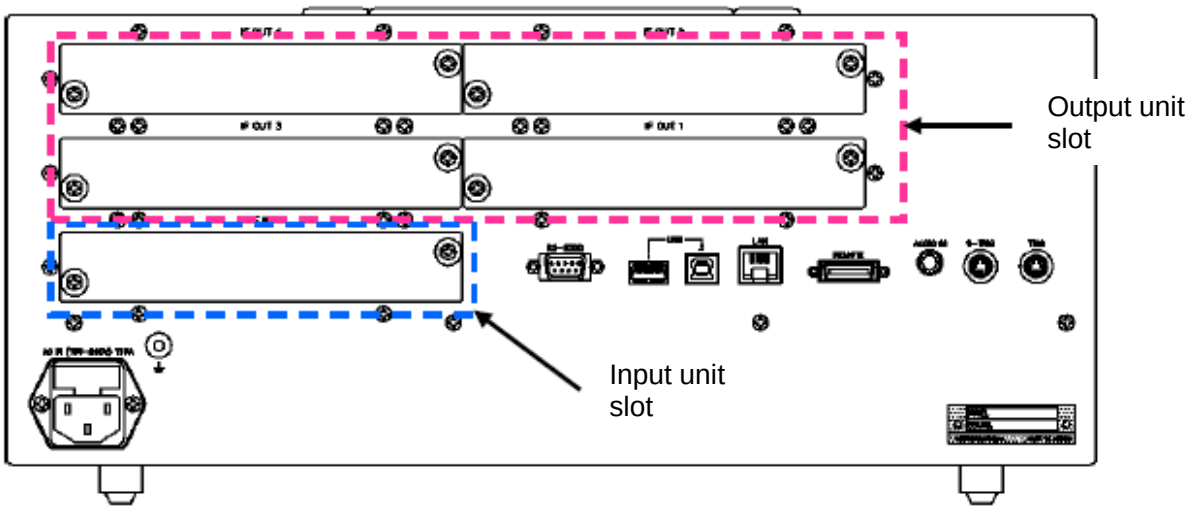
1.5.1 Overview

The VM-1876 series is composed of boards making up the interface section of the VG-876. Different models are available to support each standard. This series will make it possible to adapt quickly to new versions of current standards and to new interfaces.

***For further details on the VM-1876 series, refer to "10.1 VG-876 video units".**

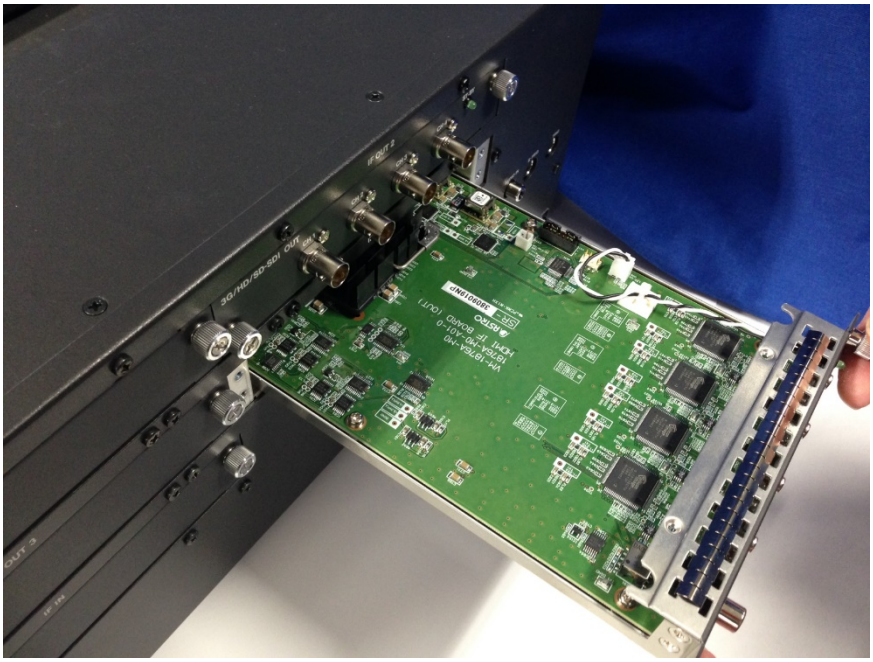
1.5.2 Exchanging modules

Users can exchange VM modules. When you install VM-1876 modules, insert it from IF OUT1. Maximum 4 modules can be installed in IF OUT1 to IF OUT4.
As for VM-1876-MX, install it in IF IN slot.



CAUTION

Insert output units from IF OUT1.
If IF OUT1 is empty, and insert in IF OUT2, VG-876 does not work normally.



CAUTION

Hold 2 screws of rear side and exchange it. Be careful that the components on the VM modules not to touch the main unit of VG-876.

1.5.3 Firmware version up

Firmware version up is necessary when you install new VM-1876 interface units.

Please ask ASTRODESIGN about the latest firmware data.

1.5.4 Checking operation

The LED of ST-BY of the rear of VM-1876 is lit as green when it works normally.
Make sure it is lit as green.

1.6 Menu lists

When [MENU] key is pressed, the menu items are displayed:

Menu	Contents
Program Edit	Program data edit
Group Edit	Group data edit
Auto Edit	Automatic execution edit
DP Analysis	Evaluation of DisplayPort interface
Data Copy/Erase	Data copying/erasing
Configuration	System settings
Audio Flash Data Entry	Audio data file copying (option)
Maintenance	VG maintenance screen

* The menu items in bold indicate directory names, and those not in bold indicate setting items.

1.6.1 Program Edit menu list

Program Edit

- **Program Name**
- **Timing**
  - **H-Timing**
  - **V-Timing**
- **Output**
  - **All Output**
    - **Output OFF/ON**
      - **HDMI**
      - **DP**
      - **V-by-One HS**
      - **SDI**
      - **iTMDS**
      - **Analog**
      - **HDBaseT**
    - **Sync**
    - **HDCP**
    - **Level Mode**
    - **User YPbPr Coefficient**
  - **Analog Output**
    - **Output OFF/ON**
    - **General**
    - **Audio OFF/ON**
  - **Digital Output**
    - **General**
    - **iTMDS**
      - **Output OFF/ON**
    - **HDMI**
      - **Output OFF/ON**
      - **InfoFrame/Packet**
        - **Vendor Specific InfoFrame**
        - **AVI InfoFrame**
        - **SPD InfoFrame**
        - **Audio InfoFrame**
        - **MPEG InfoFrame**
        - **NTSC VBI InfoFrame**
        - **Dynamic Range InfoFrame**

***Only the directory names are displayed in the Program Edit menu list. Note also that some directories may not be displayed as only main directory names are shown.**

- ACP Packet
- ISRC Packet
- Gamut Metadata Packet
- DP
  - Output ON/OFF
  - InfoFrame/Packet
    - Audio InfoFrame
- SDI
  - Output ON/OFF
- V-by-One HS
  - Output ON/OFF
- HDBaseT
  - Output ON/OFF
  - InfoFrame/Packet
    - Vendor Specific InfoFrame
    - AVI InfoFrame
    - SPD InfoFrame
    - Audio InfoFrame
    - MPEG InfoFrame
    - NTSC VBI InfoFrame
    - Dynamic Range InfoFrame
    - ACP Packet
    - ISRC Packet
    - Gamut Metadata Packet
- VBI Function

- Audio
  - Analog Audio
  - Digital Audio
  - Audio Sweep
- Pattern
  - Pattern/RGB/INV Select
  - Color Bar
  - Gray Scale
  - Ramp
  - Sweep
  - Monoscope
  - Raster
  - Aspect
    - AFD
  - Checker
  - Image/OPT
    - 9 Marker
    - 3D Image
    - 3D Pattern
  - □×[ABC]
    - Color
    - Character
    - Cross Hatch
    - Dot
    - Circle
    - Burst
  - Window
  - Cursor
  - Name/List
    - NAME
    - Subtitle
    - HDCP
    - EDID
    - DDC/CI
    - CEC
    - HDMI ARC

- DP
- SCDC

- Action
  - Graphic Plane
  - Character Plane
  - Window
  - Subtitle
  - Motion Blur
  - 0.125dot Scroll （*Option）
  - Scroll Sequence
  - Lip sync
  - Black Insertion

1.6.2 Group Edit menu list

Group Edit

- No
- Name
- Edit Mode
- **Program**
  - TIM
  - PAT
  - Auto Internal Audio Edit menu list

***Only the "Program" directory is shown in the Group Edit menu list.**

1.6.3 Audio Edit menu list

Auto Edit

- Mode
- **Setting *Mode: Program**
  - Interval
  - Program (Start-Stop) 1
  - Program (Start-Stop) 2
  - Program (Start-Stop) 3
- **Setting *Mode: Group**
  - Group No
  - Interval

***Only the "Setting" directory is shown in the Auto Edit menu list. Displayed items vary depending on the Mode setting.**

1.6.4 DP Analysis menu list

DP Analysis

- I/F check
- Training pattern

***The DP Analysis menu list shows only displayed directories.**

1.6.5 Data Copy/Erase menu list

Data Copy/Erase

- COPY : Program
- COPY : USER Character
- COPY : USER OPT Pattern
- COPY : Image
- COPY : Subtitle
- COPY : Group
- COPY : Auto
- COPY : All
- ERASE : Program
- ERASE : USER Character
- ERASE : USER OPT Pattern
- ERASE : Image
- ERASE : Subtitle
- ERASE : Group
- ERASE : Auto
- ERASE : All

***The Data Copy/Erase menu list shows only displayed directories.**

1.6.6 Configuration menu list

Configuration

- General
  - RS-232C
  - LAN
  - Trigger
  - Image Fast Draw Mode
  - Power-On Program
- HDCP
- HDMI
- DP
- SDI
- V-by-One HS
- HDCP/EDID/CEC Check
  - Item Selcet
    - HDCP
    - EDID
    - CEC
- VM-1876-MX

***Only the directory names are displayed in the Configuration menu list.**

1.6.7 Audio Flash Data Entry

- Group No

***The Audio Flash Data Entry menu list shows only displayed directories.**

1.6.8 Maintenance menu list

Maintenance

- Information
- INITIAIZE : Configuration
- INITIAIZE : SHORTCUT
- UNMOUNT : USB
- SAVE USB : CONFIG STAUS
- FORMAT : Internal Memory
- INSTALL : Initial Data
- ADJUST : VGA & YPbPR
- ADJUST : COMPOSITE

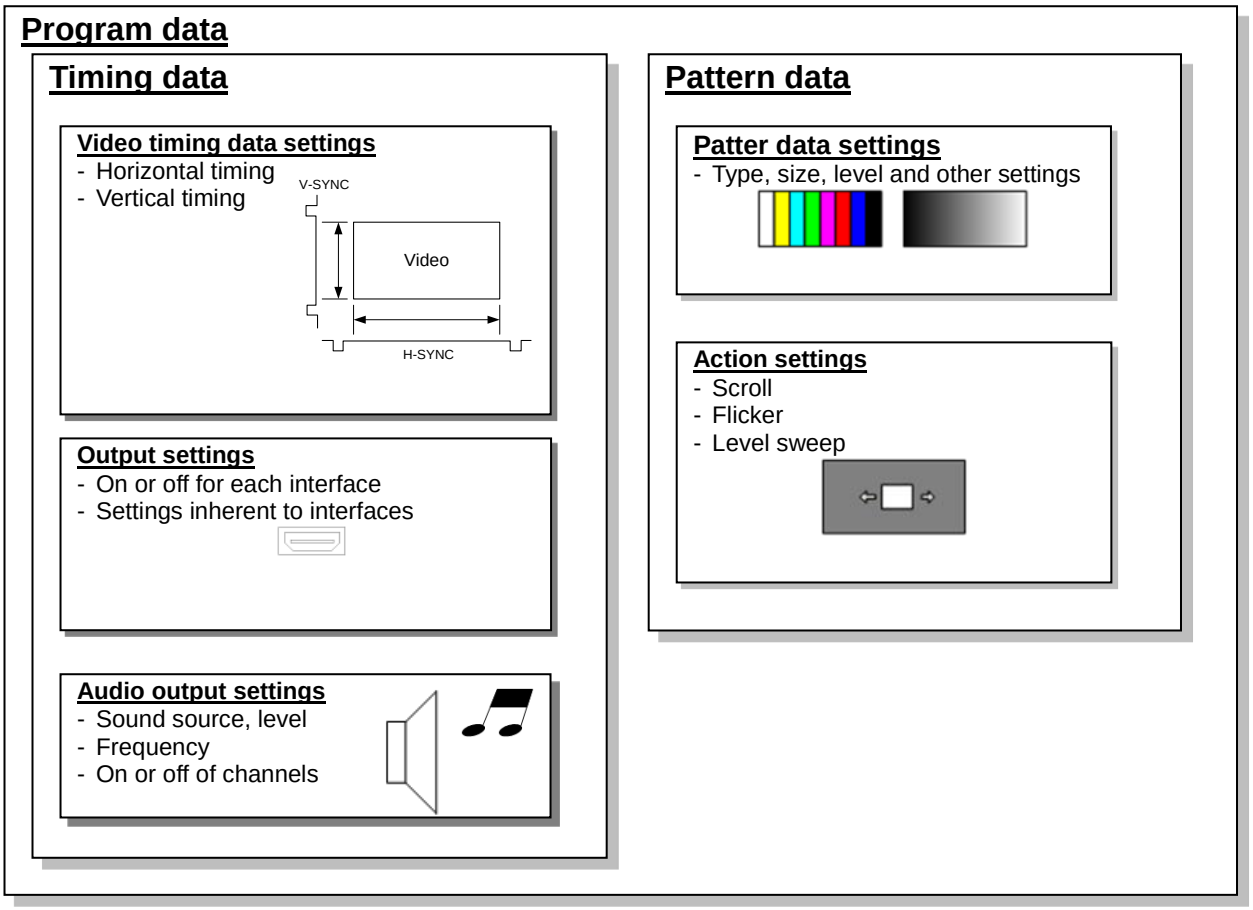
***The Maintenance menu list shows only displayed directories.**

2 OPERATION PROCEDURES

2.1 Flow of basic operations

2.1.1 Settings required for displays

The **timing data** and **pattern data** must be set in order for the test patterns to be displayed from the generator.
The following items are set for these data.
In the case of this generator, the **timing data** and **pattern data** are collectively referred to as the "**program data**."

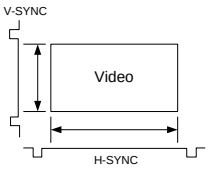


2.1.2 Selecting the timing data

There are two ways to select the timing data.

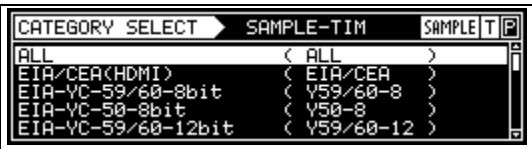
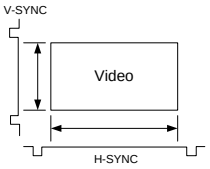
1) Input the timing data numbers directly.
2) Select the timing data from the categories.

1) Input the timing data numbers directly.

(1)	Input the timing data number (1001 to 1999) using SAMPLE → TIMING → number keys (0/STATUS to 9/F).	Video timing data output  **The display patterns are not changed.**

2) Select the timing data from the categories.

The timing data of the internal sample data is classified by category such as EIA or VESA (PC). Select the desired timing data from the category which contains it.

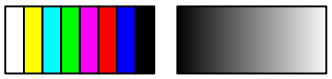
(1)	CATEGORY → SAMPLE → 9/F	
(2)	Select the category using ◯ or ▲ INC ▼ DEC , and then press SET.	
(3)	Select the timing data using ◯ or ▲ INC ▼ DEC , and then press SET.	Video timing data output  **The display patterns are not changed.**

2.1.3 Selecting the pattern data

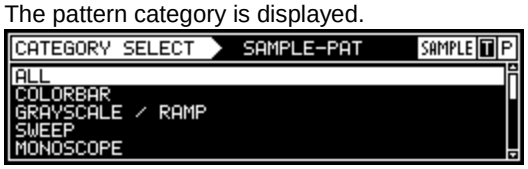
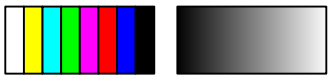
There are four ways to select the pattern data.

1) Input the pattern data numbers directly.
2) Select the pattern data from the categories.
3) Select the pattern data using the pattern keys.
4) Select the patterns for each program data.

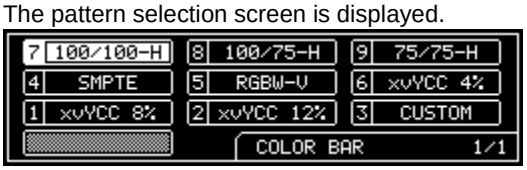
1) Inputting the pattern data numbers directly

(1)	Input the pattern data number (1001 to 1999) using SAMPLE → PATTERN → number keys (0/STATUS to 9/F). (Refer to “1.1.1 Program Data” in the Supplementary Manual.	The corresponding pattern is displayed.  etc.

2) Selecting the pattern data from the categories

(1)	CATEGORY → SAMPLE → PATTERN	The pattern category is displayed. 
(2)	Select the category using ◯ or ▲ INC ▼ DEC, and then press SET.	
(3)	Select the pattern using ◯ or ▲ INC ▼ DEC, and then press SET.	The pattern is displayed.  etc.

3) Selecting the pattern data using the pattern keys

<table>
<tr><td>(1)</td><td>Select the key corresponding to the pattern,
such as COLOR or □× ABC, to be displayed.</td><td>The pattern of the selected type is displayed.
 
Lighted: COLOR selected; off: COLOR deselected.</td></tr>
<tr><td>(2)</td><td>When setting details for the pattern or changing the pattern type.
Press DETAIL.</td><td>The pattern selection screen is displayed.
  </td></tr>
<tr><td rowspan="2">(3)</td><td>Select the pattern using ▲ INC or ▼ DEC, and then press SET.</td><td rowspan="2">The selected pattern is displayed.
  </td></tr>
<tr><td>Select the pattern directly using the number keys (0/STATUS to 9/F).
Press 4/A to select  .</td></tr>
</table>

4) Selecting the patterns for each program data

(1) Select **Program Edit** using MENU, ▲ INC ▼ DEC or SET, and then press SET.

(2) Select **Pattern (PAT)** using ▲ INC or ▼ DEC, and then press SET.

(3) Select **Pattern/RGB/INV Select** using ▲ INC ▼ DEC or SET, and then press SET.

(4) Select the item using ▲ INC ▼ DEC or SET, and then press SET.

→ **Selected or unselected is displayed.**

The selected pattern is indicated by a check mark ☑.

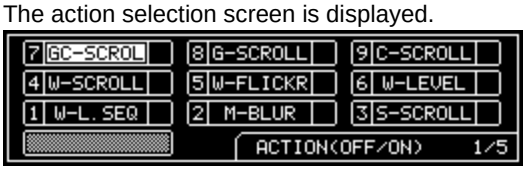
Color Bar	Check this to select the color bar pattern.
Gray Scale	Check this to select the gray scale pattern.
Ramp	Check this to select the ramp pattern.
Sweep	Check this to select the sweep (sine wave) pattern.
Monoscope	Check this to select the monoscope pattern.
Raster	Check this to select the raster pattern.
Aspect	Check this to select the pattern for checking the aspect ratio.
Checker	Check this to select the checkerboard pattern.
Image/OPT	Check this to select the bitmap image, or an optional pattern.
Character	Check this to select the character pattern.
Cross Hatch	Check this to select the crosshatch pattern.
Dot	Check this to select the dot pattern.
☐	Check this to select the frame pattern.
×	Check this to select the cross pattern.
+	Check this to select the center marker pattern.
Circle	Check this to select the circle pattern.
Burst	Check this to select burst (continuous black and white).
Window	Check this to select the window pattern.
Cursor	Check this to select the cursor pattern.
Name/List	Check this to select the name/list function.
R/Pr	Check this to set the pattern R (red) or Pr output on or off. Normally, this is kept checked.
G/Y	Check this to set the pattern G (green) or Y (luminance) output on or off. Normally, this is kept checked.
B/Pb	Check this to set the pattern B (blue) or Pb output on or off. Normally, this is kept checked.
INV	Check this invert the black and white of the video level.

2.1.4 Selecting the actions

There are two ways to select actions.

1) Select the action using the action key.
2) Select and set the action for each program data.

1) Selecting the action using the action key

<table>
<tr><td>(1)</td><td>Press the ACTION key.</td><td>The action selection screen is displayed.
 
</td></tr>
<tr><td>(2)</td><td>Select the action using ▲ INC or ▼ DEC, and then press SET.</td><td>The selected action is indicated by a check mark ☑.
 

To select the window action, the window pattern must be displayed first.
<table>
<tr><td>GC-SCROL</td><td>Check this to scroll the pattern.</td></tr>
<tr><td>G-SCROLL</td><td>Check this to scroll the pattern.</td></tr>
<tr><td>C-SCROLL</td><td>Check this to scroll the pattern.</td></tr>
<tr><td>W-SCROLL</td><td>Check this to scroll the window.</td></tr>
<tr><td>W-FLICKR</td><td>Check this to flicker the window.</td></tr>
<tr><td>W-LEVEL</td><td>Check this to change the window level.</td></tr>
<tr><td>W-L.SEQ</td><td>Check this to execute the window level sequence.</td></tr>
<tr><td>M-BLUR</td><td>Check this to execute motion blur.</td></tr>
<tr><td>S-SCROLL</td><td>Check this to scroll the subtitle pattern.</td></tr>
</table></td></tr>
<tr><td>(3)</td><td>Select the action using ▲ INC or ▼ DEC, and then press SET.</td><td> 

On this screen, the scroll direction and number of steps are set when the GC-SCROL, G-SCROLL or C-SCROLL action has been checked.
<table>
<tr><td>←, →, ↑, ↓</td><td>Select these to scroll in the directions of the arrows.</td></tr>
<tr><td>||</td><td>Select this to stop the scrolling temporarily.</td></tr>
<tr><td>RESET</td><td>Select this to return the pattern to its original position.
(It is displayed only while scrolling is stopped temporarily.)</td></tr>
<tr><td>STEP+1</td><td>Select this to increment the scroll step by 1.</td></tr>
<tr><td>STEP-1</td><td>Select this to decrement the scroll step by 1.</td></tr>
<tr><td>EDIT</td><td>Select this to perform the detailed scroll settings.</td></tr>
</table></td></tr>
</table>

(4)

Select the action using  or 

, and then press 

.

On this screen, the scroll direction and number of steps are set when the **W-SCROLL action** has been checked.

←, →, ↑, ↓	Select these to scroll in the directions of the arrows.
‖	Select this to stop the scrolling temporarily.
RESET	Select this to return the pattern to its original position. (It is displayed only while scrolling is stopped temporarily.)
STEP+1	Select this to increment the scroll step by 1.
STEP-1	Select this to decrement the scroll step by 1.
EDIT	Select this to perform the detailed scroll settings.

(5)

Select the action using  or 

, and then press 

.

On this screen, the level increment/decrement and direction as well as the number of steps are set when the **W-LEVEL action** has been checked.

UP	Select this to increment the level.
DOWN	Select this to decrement the level.
STOP	Select this to temporarily stop the level change.
STEP+1	Select this to increment the level change step by 1.
STEP-1	Select this to decrement the level change step by 1.
EDIT	Select this to perform the detailed level settings.

(6)

Select the action using  or 

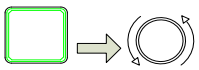
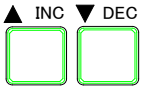
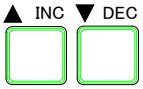
, and then press 

.

On this screen, the scroll direction and number of steps are set when the **S-SCROLL action** has been checked.

←, →, ↑, ↓	Select these to scroll in the directions of the arrows.
‖	Select this to stop the scrolling temporarily.
RESET	Select this to return the pattern to its original position. (It is displayed only while scrolling is stopped temporarily.)
STEP+1	Select this to increment the scroll step by 1.
STEP-1	Select this to decrement the scroll step by 1.
EDIT	Select this to perform the detailed scroll settings.

2) Select and set the action for each program data.

(1)	Select **Program Edit** using MENU  or ▲ INC ▼ DEC  , and then press SET  .	
(2)	Select **Action (PAT)** using  or ▲ INC  ▼ DEC  , and then press SET  .	
(3)	Select the item using  or ▲ INC ▼ DEC  , and then press SET  .	One of the following actions is selected, and the detailed settings are performed. For details on the setting procedure, refer to **"ACTION SETTINGS"** in **Chapter 5**. • Graphic Plane • Character Plane • Window • Subtitle • Motion Blur • 0.25 / 0.125 dot Scroll • Lip Sync • Black Insertion

2.2 Saving the program data

Upon completion of program editing, save the data.

If the power is turned off without saving the data, the status before the changes were made will be restored.

<table>
<tr><td>(1)</td><td>SAVE</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="5">(2)</td><td rowspan="5">Select the item using or ▲ INC ▼ DEC, and then press SET.</td><td>No.</td><td>The program number is set here.
(0001 to 1000)</td></tr>
<tr><td>Media</td><td>The internal memory or USB Memory is selected here.</td></tr>
<tr><td>Program Name</td><td>Any name (containing up to 20 characters) can be allocated as the program name.</td></tr>
<tr><td>Pattern Name</td><td>Any name (containing up to 20 characters) can be allocated as the pattern name.</td></tr>
<tr><td>(3)</td><td>Select > EXECUTE < using or ▲ INC ▼ DEC, and then press SET.</td><td colspan="2">The program data is saved.</td></tr>
</table>

CAUTION

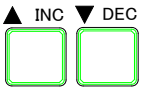
If USB Memory has been inserted, the data registered in the USB Memory will be enabled and the data registered in the internal memory will be disabled.
For the image data, it is possible to enable both the data registered in the USB Memory and the data in the internal memory. *

*** For further details, refer to “7.1.11 Image - priority settings.”**

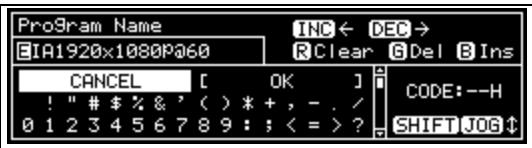
2.3 Setting the names

When timing or pattern data is edited and the edited data is to be saved, the name used for the program can be changed.

<table>
<tr>
<td>(1)</td>
<td> 

Select Name using  or 

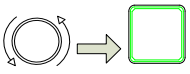
,
and then press 

.</td>
<td> 
</td>
</tr>
<tr>
<td>(2)</td>
<td><u>To decide on the positions where the character changes are to be made:</u>
 

(when moving to the left)
 

(when moving to the right)</td>
<td>The position where the character of the name is to be input changes.
 
</td>
</tr>
<tr>
<td></td>
<td><u>To delete all the characters:</u>
 
</td>
<td>All the characters already input for the name are cleared.
 
</td>
</tr>
<tr>
<td></td>
<td><u>To delete one character:</u>
 
</td>
<td>The character at the cursor position is deleted.
 
</td>
</tr>
<tr>
<td></td>
<td><u>To change character insert/overwrite:</u>
 

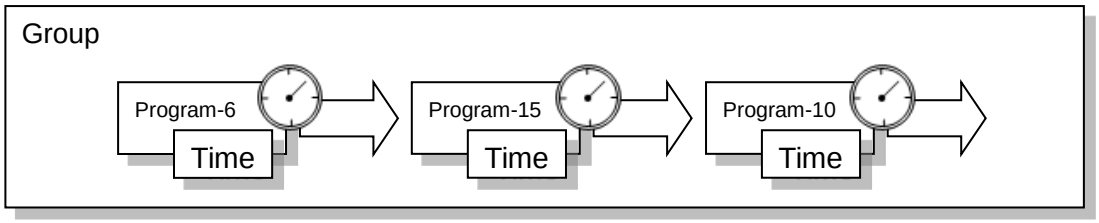
Use this to switch between inserting and overwriting the characters.</td>
<td>Insert is switched to overwrite or vice versa.
 
</td>
</tr>
<tr>
<td></td>
<td><u>To input characters:</u>
Select the characters using  , and enter them using 

.</td>
<td>The characters are input.
 
</td>
</tr>
<tr>
<td>(3)</td>
<td><u>To enter the program name:</u>
Select OK using 

.</td>
<td>The name is changed.</td>
</tr>
</table>

2.4 Groups

Registering programs as “**group**” is useful when specific programs are to be combined and used repeatedly. Examples include times on a TV set inspection process when specific timing and pattern data are combined for repeated use.
It is possible to set not only the timing and pattern data execution sequence but the execution time of each program as well.



Up to 98 programs can be registered in a group. **Up to 99** groups can be registered.

2.4.1 Executing groups

The combinations of programs and patterns which are used with a high frequency and which have been registered by the user can be executed.

(1)	GROUP	
(2)	Select the groups using ◯ or ▲ INC ▼ DEC , and then press SET .	 Only the programs registered as groups can be selected.
(3)	Select the groups using ◯ or ▲ INC ▼ DEC , and then press SET .	**The programs in the group are executed.** When ▲ INC or ▼ DEC is used, the programs are executed in ascending or descending order without pressing SET .

2.4.2 Setting and saving groups

The combinations of programs and patterns which are used with a high frequency can be saved.

(1) MENU

(2) Select **Group Edit** using ◯ or ▲ INC ▼ DEC, and then press SET.

(3) Select the items using ◯ or ▲ INC ▼ DEC, and then press SET.

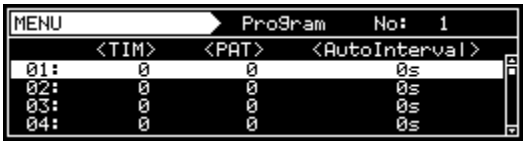
No.	The number of the desired group is set here. (01 to 99)
Name	Any name (consisting of up to 20 characters) can be allocated as the group name.
Edit Mode	**TIM/PAT**: The timing data and pattern data are set separately. **Program**: The number of the program is designated here.
Program	Depending on the Edit Mode setting, the display screen in (4) below will differ.

(4) Select the numbers (01 to 98) of the TIM or PAT programs and AutoInterval using SET ⇨ ◯ or ▲ INC ▼ DEC, and then press SET.

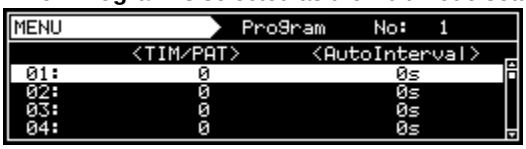
The programs set in the group are executed in sequence from 01 up to 98.
- If 0 is set for both TIM and PAT
- If 0 is set for Program

In both of the above cases, 0 is recognized as the end of the group.

When **TIM/PAT** is selected as the Edit Mode setting



When **Program** is selected as the Edit Mode setting

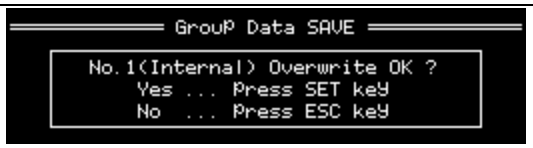


TIM/PAT	The program numbers are set in this column.
TIM	The timing data numbers are listed here.
PAT	The pattern data numbers are listed here.
Auto Interval	The execution times during Auto Display are set here (0 to 999 seconds).

(5) This completes the setting operations.
The group data is now saved.
SAVE

(6) Select the items using ◯ or ▲ INC ▼ DEC, and then press SET.

No.	The number of the group is set here. (01 to 99)
Media	Internal: The group data is saved in the internal memory. USB Memory: The group data is saved in an external USB Memory.
Name	Any name (consisting of up to 20 characters) can be allocated.

(7)	Select [> EXECUTE <] using ◯ or ▲ INC ▼ DEC, and then press SET. If previous data exists, a display appears prompting the user to confirm whether it is acceptable for the existing data to be overwritten.	 This completes the saving of the group data.

2.4.3 Display change when Group execution

When executing Group, this item selects either displaying by Timing or Pattern.

《 Setting Method 》

	MENU	⇒	Configuration		General
MENU ⇒	Group Edit	SET ⇒	**General**	SET ⇒	Power-On Program
	Auto Edit		HDCP		USB PrgFolderNo.
	DP Analysis		HDMI		Startup USB Wait
	Data Copy/Erase		DP		Name Pattern Mode
	Configuration		SDI		**GroupMode NameDisp**
Select items by using ◯ or ▲ INC ▼ DEC .					

The below menu is displayed.

<Selecting the items>

Select the items of GroupMode NameDisp by using [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

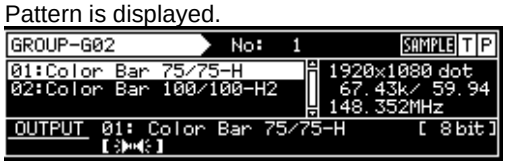
<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

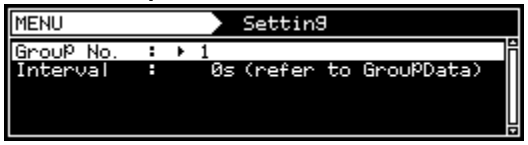
For further details on the settings, refer to **<GroupMode NameDisp setting item>** below.

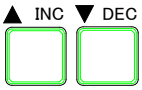
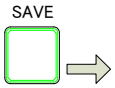
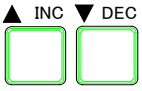
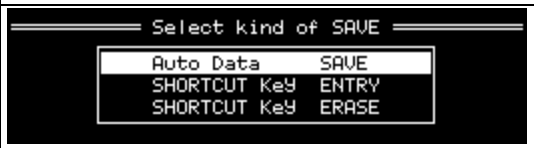
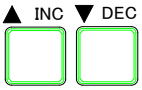
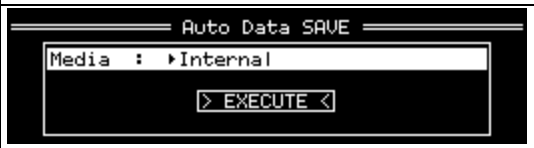
<GroupMode NameDisp setting item>

0	**Timing**	Timing is displayed. 
1	**Pattern**	Pattern is displayed. 

2.5 Automatic execution

The data in the selected groups and program numbers can be automatically output in accordance with the delay time which has been set.

(1)	MENU	
(2)	Select **Auto Edit** using  or ▲ INC  ▼ DEC  , and then press SET  .	
(3)	Selecting the **Mode setting** Select **Program** or **Group** using  or 0/STATUS  1  .	
(4)	Select **Setting** using  or ▲ INC  ▼ DEC  , SET  and then press .	**<When Program has been selected as the Mode setting>**  **Interval:** The time during which each pattern is to be displayed is set here from 0 to 999 seconds. **Program (Start-Stop):** The start and end points of programs to be repeated are set here. The start and end point settings can be designated in three stages. Automatic execution is performed in the following sequence: Start point 1 → end point 1 → start point 2 → end point 2 → start point 3 → end point 3. **<When Group has been selected as the Mode setting>**  **Group No.:** The number of the group to be executed automatically is set here. **Interval** The time during which each pattern is to be displayed is set here from 0 to 999 seconds. When 0 is set, execution accords with the group data setting. If the interval is not set in the group data, 0 seconds will be set.

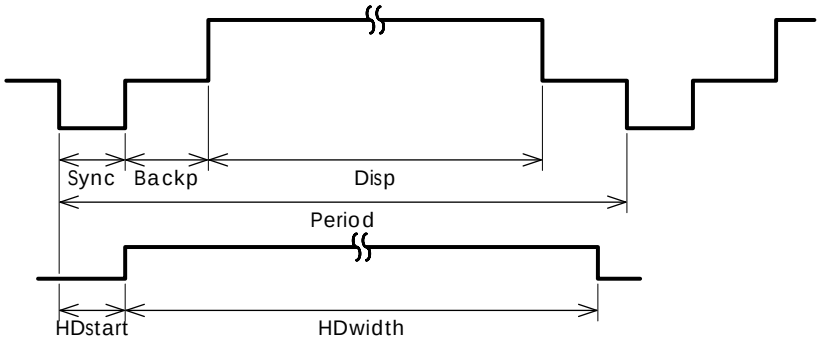
(5)	For automatic execution, select **EXECUTE** using  or  , and then press  . To cancel automatic execution at any time, press  .	
(6)	Select **Auto Data SAVE** using   or  .	
(7)	Select the save destination (*) at **Media** using  or  , and then press  . Select **EXECUTE** using  or   , and then press  .	 * **Internal:** The data is saved on the internal memory. **USB Memory:** The data is saved in the USB Memory.

3 TIMING DATA SETTINGS

3.1 Horizontal timing data editing

3.1.1 Horizontal timing data

When making changes with the horizontal timing data, the parameters which can be set and the names of the parameters are indicated below.



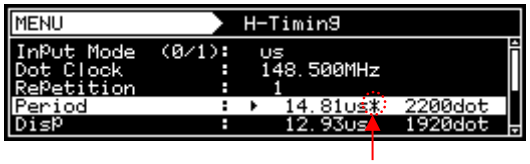
3.1.2 Restrictions on the horizontal timing parameters

The table below shows the restrictions on the parameters which can be changed with the horizontal timing data.

Setting item	Setting range	Parameter fixing function
Dot Clock	0.100 to 1360.000 MHz * Depending on the number of bits which are output, the dot clock frequency is subject to some restrictions. For details, refer to “10.13.1 General specifications.”	
Period	Time display: 0.00 to 999.999 µs Dot display: 128 to 9998 dots	µs setting fixed using SHIFT+2 dot setting fixed using SHIFT+3
Disp	Time display: 0.00 to 999.999 µs Dot display: 48 to 8192 dot	µs setting fixed using SHIFT+0 dot setting fixed using SHIFT+1
Backp, Sync	Time display: 0.00 to 999.999 µs Dot display: 0 to 9998 dot	

* When a parameter is fixed, it is accompanied by an asterisk (*). Even when values other than ones for parameters with an asterisk have been changed, the values of the parameters with the asterisks remain fixed.

Example: When us setting has been fixed using SHIFT+2 for Period



An asterisk is displayed here when the value is fixed.

CAUTION

When items are set in microseconds (µs), restrictions apply to these settings depending on the dot clock frequency and other timing data used for drawing.
The setting unit of Hdisp and Hperiod of VM-1876-M8 are 2-dot unit.

The values for the blanking and frontp items are calculated automatically on the basis of the data presented above.

Item	Calculation formula	Setting range
Blanking	**Blanking = Period - Disp**	Time display: 0.00 to 999.999 µs Dot display: 40 to 8192 dots
Frontp	**Frontp = Period - Disp - Sync - Backp**	Time display: 0.00 to 999.999 µs Dot display: 0 to 8192 dots

CAUTION

Setting units are restricted depending on the Dot Clock operation mode (DotClk Mode). Refer to "10.2.4 Dot Clock Operation Mode Dot Clk Mode" for details.

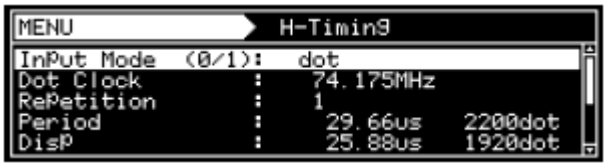
3.1.3 Horizontal timing data setting procedure

Described below is the procedure used to set the parameters which can be changed with the horizontal timing data

<Selecting H-Timing menu>

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**H-Timing**
	GroupEdit		**Timing**		V-Timing
	AutoEdit		Output		
	DP Analysis		Audio		
	Data Copy/Erase		Pattern		
Select item using ◯ or ▲ INC ▼ DEC					

The following screen is displayed:



<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<H-Timing parameters>

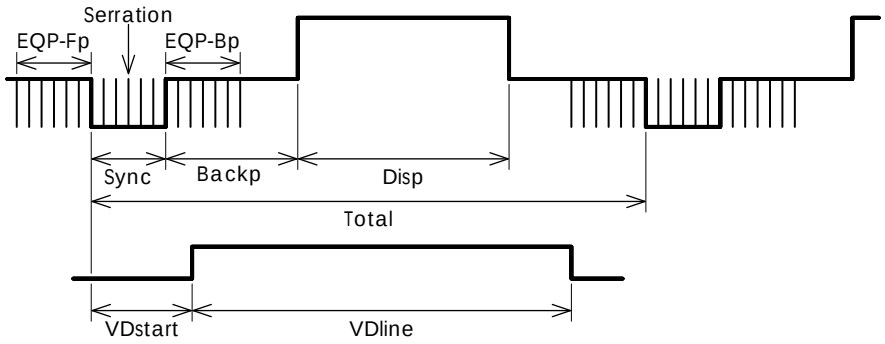
Input Mode	Select the input setting for the H-Timing parameters to µs: time [microseconds] or dot: number of dots [dots].
Dot Clock	The dot clock frequency (MHz) is set here.
Repetition	The number of repetitions is set here. The pixel configuration depends on the number which is set in Repetition. When 2 is set for Repetition and 1440 for Disp, the number of pixels will be 720.
Period	The total number of pixels in the horizontal direction is set here. **<When µs: time (microseconds) has been selected as the Input Mode setting>** It is possible to establish settings using both µs and dot parameters.
Disp	Set the Disp width in the horizontal direction here. **<When µs: time (microseconds) has been selected as the Input Mode setting>** It is possible to establish settings using both µs and dot parameters.
Sync	Set the Sync width in the horizontal direction here.
BackP	Set the BackP width in the horizontal direction here.

3.2 Vertical timing data editing

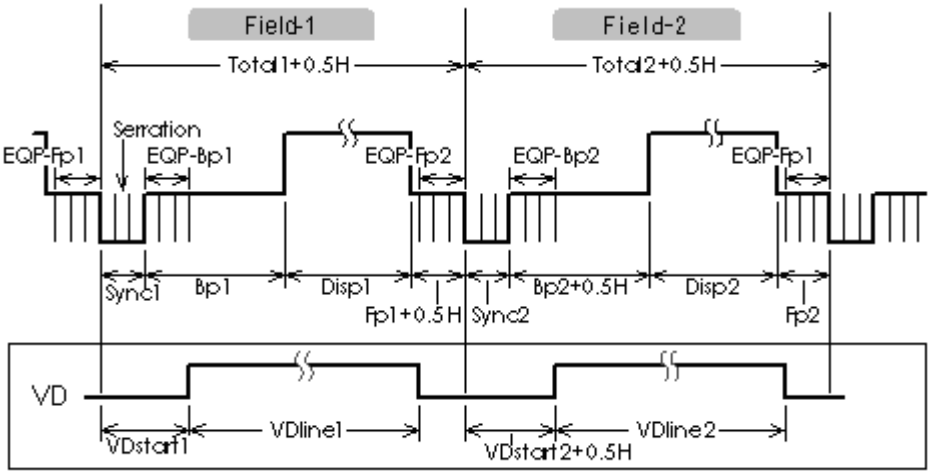
The vertical timing setting locations and names of the settings are indicated below.

3.2.1 Vertical timing data

[For progressive scanning]



[For interlaced scanning]



3.2.2 Restrictions on the vertical timing parameters

The table below shows the restrictions on the parameters which can be changed with the vertical timing data.

<For progressive scanning>

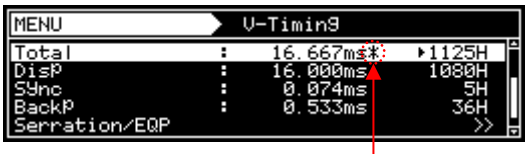
Setting item	Setting range	Parameter fixing function
Total	Time display: 0.00 to 999.999 ms Dot display: 8 to 8192 H	ms setting fixed using SHIFT+2 H setting fixed using SHIFT+3
Disp	Time display: 0.00 to 999.999 ms Dot display: 2 to 5120 H	ms setting fixed using SHIFT+0 H setting fixed using SHIFT+1
Sync	Time display: 0.00 to 999.999 ms Dot display: 1 to 99 H	
Backp	Time display: 0.00 to 999.999 ms Dot display: 1 to 8192 H	

<For interlaced scanning>

Setting item		Setting range	Parameter fixing function
Field-1	**Total1**	Time display: 0.00 to 999.999 ms Dot display: 4.0 to 4096.0 H (in 0.5H increments)	Fixed to ms setting using SHIFT+2 Fixed to H setting using SHIFT+3
	Disp1	Time display: 0.00 to 999.999 ms Dot display: 1 to 2560 H	Fixed to ms setting using SHIFT+0 Fixed to H setting using SHIFT+1
	Sync1	Time display: 0.00 to 999.999 ms Dot display: 1.0 to 99.0 H (in 0.5H increments)	
	Backp1	Time display: 0.00 to 999.999 ms Dot display: 0.0 to 4096.0 H (in 0.5H increments)	
Field-2	**Total2**	Same as **Field-1**	Same as **Field-1**
	Disp2		
	Sync2		
	Backp2		

* When a parameter is fixed, it is accompanied by an asterisk (*). Even when values other than ones for parameters with an asterisk have been changed, the values of the parameters with the asterisks remain fixed.

Example: When an ms setting has been fixed using SHIFT+2 for Total



An asterisk is displayed here when the value is fixed.

CAUTION

The range of time display (ms) is restricted depending on the H-period and other timing data used for drawing.

The values for the blanking and frontp items are calculated automatically on the basis of the data presented above.

<For progressive scanning>

Item	Calculation formula	Setting range
Blanking	Blanking = Total - Disp	Time display: 0.00 to 999.999 ms Dot display: 2 to 8192 H
Frontp	Frontp = Total - Disp - Sync - Backp	Time display: 0.00 to 999.999 ms Dot display: 0 to 8192 H

<For interlaced scanning>

Item	Calculation formula	Setting range
Frontp1 (Frontp2)	Frontp1 = Total2 - Disp2 - Sync2 - Backp2 (Frontp2 = Total1 - Disp1 - Sync1 - Backp1)	Time display: 0.00 to 999.999 ms Dot display: 0.0 to 4096.0 H
Blanking1 (Blanking2)	Blanking1 = Frontp1 + Sync1 + Backp1 (Blanking2 = Frontp2 + Sync2 + Backp2)	Time display: 0.00 to 999.999 ms Dot display: 2.0 to 4096.0 H

CAUTION

Setting units are restricted depending on the Dot Clock Operation Mode (Dot Clk Mode). Refer to “10.2.4 Dot Clock Operation Mode Dot Clk Mode” for details.

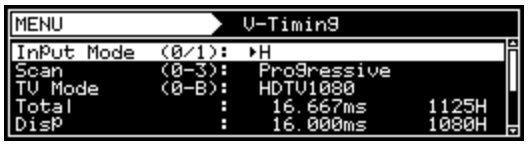
3.2.3 Vertical timing data setting procedure

Described below is the procedure used to set the parameters which can be changed with the vertical timing data.

<Selecting V-Timing menu>

	MENU	⇒	ProgramEdit	⇒	Timing
MENU [ ] ⇒	**ProgramEdit**	SET [ ] ⇒	Program Name	SET [ ] ⇒	H-Timing
	GroupEdit		**Timing**		**V-Timing**
	AutoEdit		Output		
	DP Analysis		Audio		
	Data Copy/Erase		Pattern		
Select item using ◯ or ▲ INC [ ] ▼ DEC [ ]					

The following screen is displayed:



<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

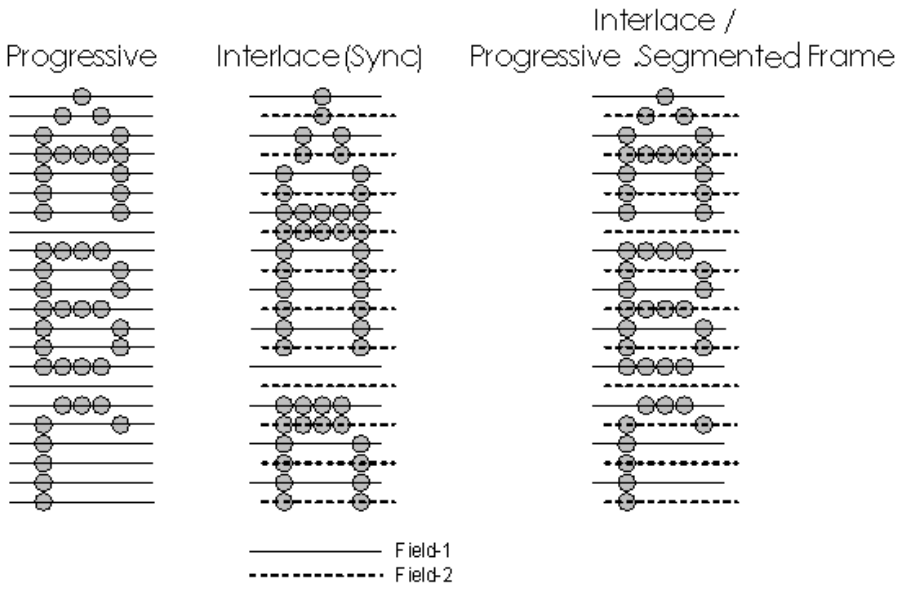
<V-Timing parameters>

Input Mode	Select the input setting for the V-Timing parameters to ms: time [milliseconds] or H: number of lines [H].
Scan	Refer to "**3.2.4 Concerning the scanning modes**."
TV Mode	As a general rule, do not change this setting. For further details, refer to "3.2.5 Concerning the TV modes."
Total	The Total number in the vertical direction is set here.
Disp	The Disp width in the vertical direction is set here.
Sync	The Sync width in the vertical direction is set here.
BackP	The BackP width in the vertical direction is set here.

3.2.4 Concerning the scanning modes

The table below lists the V-Timing scan settings as well as the operations for the scanning methods supported by the settings, imaging methods and action settings.

Scan mode	System	Pixel imaging	Scroll and other actions
Progressive	Progressive scanning	Different pixels are drawn on each line.	Operation is performed for each frame.
Interlace	Interlaced scanning	Different pixels are drawn in the first field and second field.	Operation is performed for each field.
Prog.Segmented Frame	Interlaced scanning	Different pixels are drawn in the first field and second field.	Operation is performed for each frame (2 fields).
Interlace (Sync)	Interlaced scanning	The same image is **repeatedly drawn** in the first field and second field.	Operation is performed for each field.



3.2.5 Concerning the TV modes

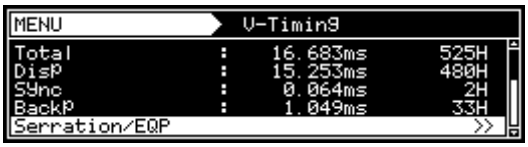
This parameter indicates the output of the TV standard signals (NTSC, NTSC-M, NTSC-443, PAL, PAL-M, PAL-60, PAL-N, PAL-Nc, SECAM, HDTV1080 or HDTV 720).
Even when this parameter is changed, the timing data and other data will not be edited. For this reason, when it is changed, it will no longer be possible for the images to be drawn correctly on the monitor.

* When editing the sample timing data using a TV Mode setting which is not 'Other,' select 'Other' as the TV mode setting.

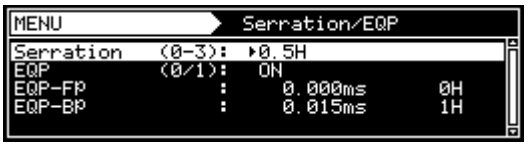
3.2.6 Concerning the Serration/EQP

	MENU	⇒	ProgramEdit	⇒	Timing	⇒	
MENU ⇒	**Program Edit**	SET ⇒	Program Name	SET ⇒	H-Timing	SET ⇒	Total
	Group Edit		**Timing**		**V-Timing**		Disp
	Auto Edit		Output				Sync
	DP Analysis		Audio				Backp
	Data Copy/Erase		Pattern				**Serration/EQP**

Select item using or ▲ INC ▼ DEC.



Serration and EQP can be selected on the V-Timing [MENU] screen, and various parameters can be set. The correspondences between the settings and operations are described using the table below.

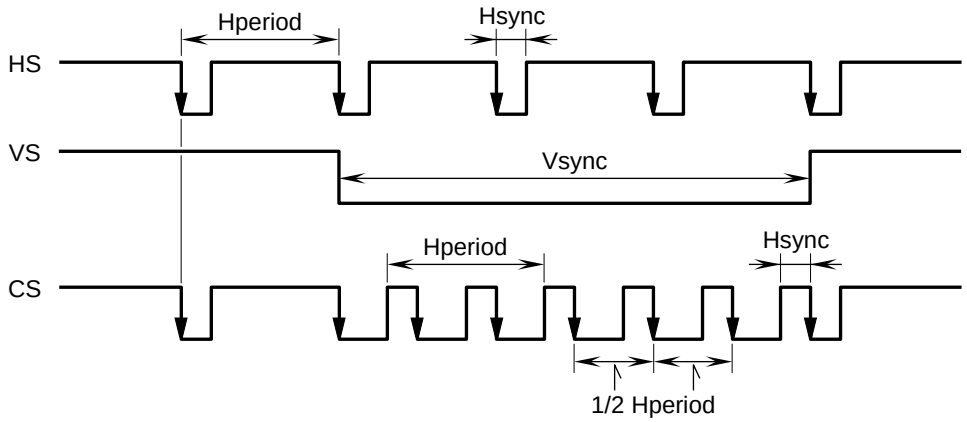


Serration and EQP setting procedure

Setting item	Key	LCD display	Description
Serration	0	OFF	Serrated pulses are not inserted.
	1	0.5H	Serrated pulses are inserted in increments of 0.5H.
	2	1H	Serrated pulses are inserted in increments of 1H.
	3	EXOR	HS and VS EXORs are inserted as serrated pulses.
EQP	0	OFF	Equalizing pulses are not inserted into the EQPfp and EQPbp periods.
	1	ON	Equalizing pulses are inserted into the EQPfp and EQPbp periods.

Shown below as an example is the phase relationship when a setting of 0.5H has been selected for Serration.

● **When a setting of 0.5H has been selected for Serration**

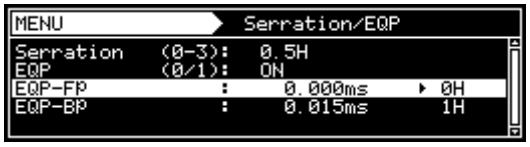


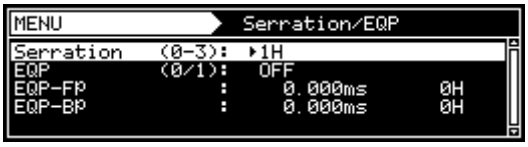
CAUTION

- The serration and EQP item settings are not reflected in the composite, Y/C and SCART signals.
- In the case of HDTV timing data, they are set to OFF when EXOR is selected as the serration setting item.

3.2.7 Concerning EQP-Fp and EQP-Bp

The correspondences between the settings and operations are described using the table below.





EQP-Fp/EQP-Bp setting procedure

<For progressive scanning>

Setting item	Details of setting
EQPfp	This sets the equalizing pulse inside the front porch. Setting range: 0.000 to 999.999 [ms], 0 to 99 [H]
EQPbp	This sets the equalizing pulse inside the back porch. Setting range: 0.000 to 999.999 [ms], 0 to 99 [H]

<For interlaced scanning>

Setting item	Details of setting
EQP-Fp1 (EQP-Fp2)	This sets the equalizing pulse inside the front porch. Setting range: 0.000 to 999.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)
EQP-Bp1 (EQP-Bp2)	This sets the equalizing pulse inside the back porch. Setting range: 0.000 to 999.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)

CAUTION

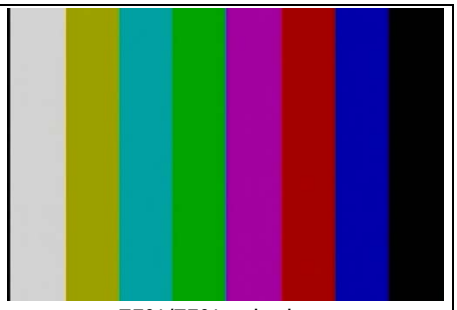
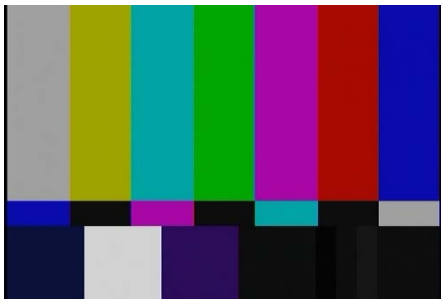
- Set EQP-Fp within the range of [(EQP-Fp +1H) ≤ Hfrontp] for tri-level sync signal outputs in the interlaced scanning mode.

4 PATTERN SETTINGS

4.1 Color bar patterns

4.1.1 Types of color bar patterns

When color bars are selected using the pattern key, for instance, color bar patterns can be selected from the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**CUSTOM**	Customized pattern	 75%/75% color bars  SMPTE color bars
1	**100/100-H**	100%/100% color bars	
2	**100/75-H**	100%/75% color bars	
3	**75/75-H**	75%/75% color bars	
4	**SMPTE**	SMPTE color bars	
5	**RGBW-V**	Horizontal color bars	
6	**xvYCC 4%**	xvYCC 4% color bars	
7	**xvYCC 8%**	xvYCC 8% color bars	
8	**xvYCC 12%**	xvYCC 12% color bars	

4.1.2 Color bar pattern customizing

Before starting the procedure, set the pattern output to [Color Bar], referring to "2.1.3 Selecting the pattern data."

Described below is the procedure for selecting the color bar pattern types and for performing the settings when **CUSTOM** has been selected as the color bar pattern.

(If **CUSTOM** is selected, the color bar patterns can be displayed with any width and color.)

<Selecting Color Bar menu>

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Color Bar
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Pattern/RGB/INV Select	SET ⇒	**Type**
	GroupEdit		Timing		**Color Bar**		CUSTOM
	AutoEdit		Output		Gray Scale		
	DP Analysis		Audio		Ramp		
	Data Copy/Erase		**Pattern**		Sweep		

Select item using or ▲ INC ▼ DEC

The [Color Bar] screen is displayed:

<Selecting the items>

(1) Select [Type].

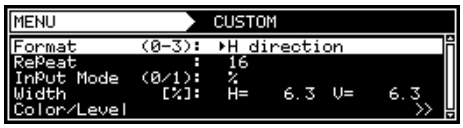
(2) Select the items of Color Bar using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **"4.1.1 Types of color bar patterns."**

<Detailed settings of customized patterns>

(3) Select [CUSTOM] in Step 1 of **<Selecting the items>.**

(4) Select [CUSTOM].

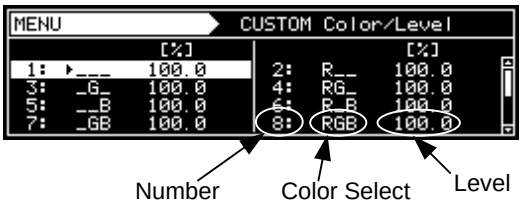


(5) Select the items, and then press [SET] key.

(6) Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of customized color bar pattern setting items>** below.

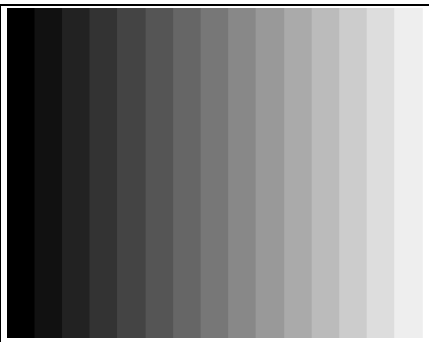
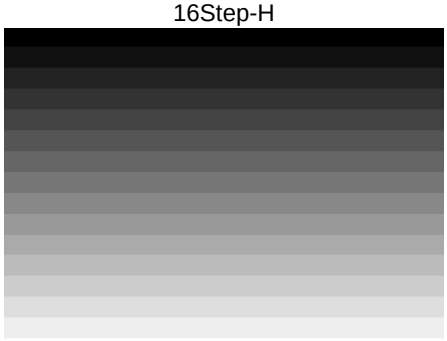
<Table of customized color bar pattern setting items>

(1)	**Format (0-3)**	The drawing direction of the color bars is set here.		
		0	**H Direction**	Horizontal direction
		1	**V Direction**	Vertical direction
		2	**H Direction&div.V**	Horizontal direction (loopback by Repeat)
		3	**V Direction&div.H**	Vertical direction (loopback by Repeat)
(2)	**Repeat**	One or more of the 1 to 16 data set by **Color/Level** are set here. The value set here becomes the number of colors which are displayed. **Range: 1 to 16**		
(3)	**Input Mode (0/1)**	The method of specifying the display size per color is set here.		
		0	**%**	The size is set as a percentage of the entire screen.
		1	**Dot**	The size is set in 1-dot increments.
(4)	**Width [%]** **Width [dot]**	The display size per color is set here.		
		When a percentage is used for Input Mode		Set any width from 0.0% to 100.0%.
		When dots are used for Input Mode		Set the width in 1-dot increments.
(5)	**Color/Level**	The display color and level are set here.  		
		Number		The colors from 1 to the Repeat setting are used for the display.
		Color		The display colors are selected here.
			0	_ _ _ Black
			1	**R** _ _ Red
			2	_ **G** _ Green
			3	**R G** _ Yellow
			4	_ _ **B** Blue
			5	**R** _ **B** Magenta
			6	_ **G B** Cyan
			7	**R G B** White
		Level		The level as a percentage of the peak brightness is set here. **Setting range: 0.0 to 100.0%**

4.2 Gray scale patterns

4.2.1 Types of gray scale patterns

When gray scale has been selected using the pattern key, for instance, gray scale patterns can be selected from among the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**CUSTOM**	Customized pattern	 16Step-H  16Step-V
1	**8Step-H**	8 steps (horizontal)	
2	**16Step-H**	16 steps (horizontal)	
3	**32Step-H**	32 steps (horizontal)	
4	**8Step-V**	8 steps (vertical)	
5	**16Step-V**	16 steps (vertical)	
6	**32Step-V**	32 steps (vertical)	

4.2.2 Gray scale pattern customizing

Before starting the procedure, set the pattern output to [Gray Scale], referring to "2.1.3 Selecting the pattern data."

Described below is the procedure for selecting the types of gray scale patterns and for performing the settings when **CUSTOM** has been selected as the gray scale pattern.

(If **CUSTOM** is selected, the color bar patterns can be displayed with any width and level.)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Gray Scale
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Pattern/RGB/INV Select	SET ⇒	**Type**
	GroupEdit		Timing		Color Bar		CUSTOM
	AutoEdit		Output		**Gray Scale**		
	DP Analysis		Audio		Ramp		
	Data Copy/Erase		**Pattern**		Sweep		

Select item using ◯ or ▲ INC ▼ DEC

The [Gray Scale] screen is displayed:

<Selecting the items>

(1) Select [Type].

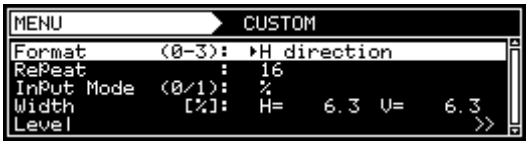
(2) Select the items of Gray Scale using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **"4.2.1 Types of gray scale patterns."**

<Detailed settings of customized patterns>

(3) Select [CUSTOM] in Step 1 of **<Selecting the items>.**

(4) Select [CUSTOM].

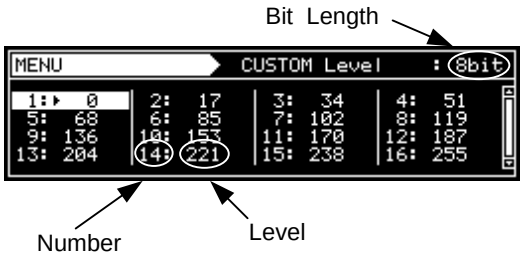


(5) Select the items, and then press [SET] key.

(6) Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of customized gray scale pattern setting items>** below.

<Table of customized gray scale pattern setting items>

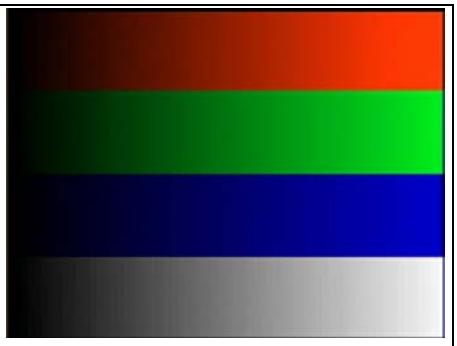
<table>
<tr><td>(1)</td><td>Format (0-3)</td><td colspan="3">The drawing direction of the gray scale is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>H Direction</td><td>Horizontal direction</td></tr>
<tr><td></td><td></td><td>1</td><td>V Direction</td><td>Vertical direction</td></tr>
<tr><td></td><td></td><td>2</td><td>H Direction&div.V</td><td>Horizontal direction (loopback by Repeat)</td></tr>
<tr><td></td><td></td><td>3</td><td>V Direction&div.H</td><td>Vertical direction (loopback by Repeat)</td></tr>
<tr><td>(2)</td><td>Repeat</td><td colspan="3">One or more of the 1 to 16 data set by Level are set here. The value set here becomes the number of steps which are displayed. Range: 1 to 16</td></tr>
<tr><td>(3)</td><td>Input Mode (0/1)</td><td colspan="3">The method of specifying the display size per step is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>%</td><td>The size is set as a percentage of the entire screen.</td></tr>
<tr><td></td><td></td><td>1</td><td>Dot</td><td>The size is set in 1-dot increments.</td></tr>
<tr><td>(4)</td><td>Width[%]
Width[dot]</td><td colspan="3">The display size per step is set here.</td></tr>
<tr><td></td><td></td><td colspan="2">When a percentage is used for Input Mode</td><td>Set any size from 0.0% to 100.0%.</td></tr>
<tr><td></td><td></td><td colspan="2">When dots are used for Input Mode</td><td>Set the size in 1-dot increments.</td></tr>
<tr><td>(5)</td><td>Level</td><td colspan="3">The display level is set here.
 
</td></tr>
<tr><td></td><td></td><td colspan="2">Number</td><td>The steps from 1 to the Repeat setting are used for the display.</td></tr>
<tr><td></td><td></td><td colspan="2">Level</td><td>The level is set here.
The setting range differs depending on the color depth.</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>8 BIT 0 to 255</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>9 BIT 0 to 511</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>10 BIT 0 to 1023</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>11 BIT 0 to 2047</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>12 BIT 0 to 4095</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>13 BIT 0 to 8191</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>14 BIT 0 to 16383</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>15 BIT 0 to 32767</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td>16 BIT 0 to 65535</td></tr>
</table>

4.3 Ramp patterns

4.3.1 Types of ramp patterns

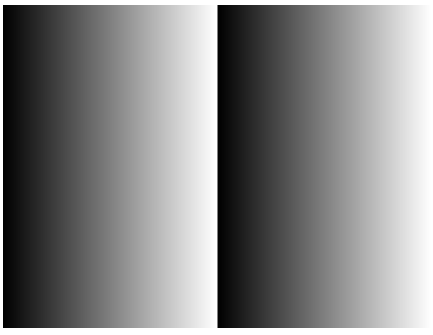
When ramp is selected using the pattern key, for instance, ramp patterns can be selected from the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	CUSTOM
1	Linear-H
2	Linear-V
3	Linear-256
4	RGB1
5	RGB2
6	RGB3
7	Turn-H
8	Linear-GR
9	Linear-BR
A	Linear-BG
B	Linear-RG
C	Linear-RB
D	Linear-GB
E	Linear-HV
F	Limited-H
-	Limited-V
-	H2-UpUp
-	H2-DownUp
-	H2-UpDown
-	H2-DownDwn
-	V2-UpUp
-	V2-DownUp
-	V2-UpDown
-	V2-DownDwn



RGB2

Linear-RG



H2-UpUp

*1 After Limited-V is selectable only by  or 

.

*2 The luminance level of Limited-H/V is 16-232 and color-difference level is 16-240.

*3 The luminance level from H2-UpUp to V2-DownDwn is incremented (Up) from 0 to 255 and decremented (Down) from 255 to 0.

4.3.2 Ramp pattern type settings and customizing

Before starting the procedure, set the pattern output to [Ramp], referring to "2.1.3 Selecting the pattern data."

Described below is the procedure for selecting the types of ramp patterns and for performing the settings when **CUSTOM** has been selected as the ramp pattern type.

(If **CUSTOM** is selected, the ramp patterns can be displayed with any level and steps.)

<Selecting Ramp menu>

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Ramp
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Pattern/RGB/INV Select	SET ⇒	**Type**
	GroupEdit		Timing		Color Bar		CUSTOM
	AutoEdit		Output		Gray Scale		
	DP Analysis		Audio		**Ramp**		
	Data Copy/Erase		**Pattern**		Sweep		

Select item using ◯ or ▲ INC ▼ DEC

The [Ramp] screen is displayed:

<Selecting the items>

(1) Select [Type].

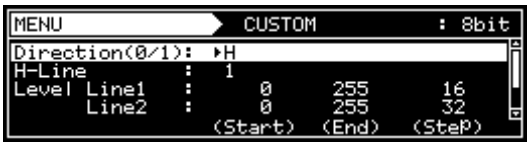
(2) Select the items of Ramp using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **"4.3.1 Types of ramp patterns."**

<Detailed settings of customized patterns>

(3) Select [CUSTOM] in Step 1 of **<Selecting the items>.**

(4) Select [CUSTOM].

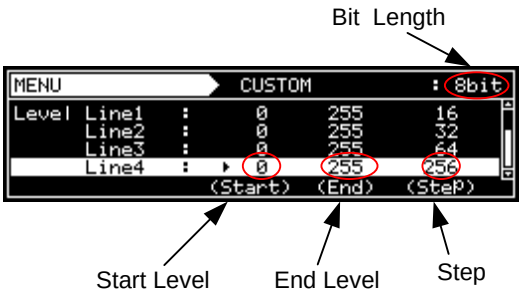


(5) Select the items, and then press [SET] key.

(6) Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of ramp pattern setting items>** below.

<Table of ramp pattern setting items>

<table>
<tr><td>(1)</td><td>Direction (0/1)</td><td colspan="3">The resolution is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>H</td><td>Horizontal ramp</td></tr>
<tr><td></td><td></td><td>1</td><td>V</td><td>Vertical ramp</td></tr>
<tr><td>(2)</td><td>H-Line</td><td colspan="3">Up to four ramp patterns with different levels and steps can be displayed on one screen.
Range: 1 to 4 types. These types are used in sequence from line 1.</td></tr>
<tr><td>(3)</td><td>Line1 to Line4</td><td colspan="3">The start level, end level and step are set here.
 
</td></tr>
<tr><td></td><td></td><td colspan="2">(Start)</td><td>The start level is set here.</td></tr>
<tr><td></td><td></td><td colspan="2">(End)</td><td>The end level is set here.</td></tr>
<tr><td></td><td></td><td colspan="2">(Step)</td><td>The number of display steps from the start level to end level is set here.
Setting range: 1 ≤ setting ≤ (End) - (Start) + 1</td></tr>
<tr><td></td><td></td><td colspan="2" rowspan="9"></td><td>The setting range for the above levels differs depending on the color depth.</td></tr>
<tr><td></td><td></td><td></td><td>8 BIT</td><td>0 to 255</td></tr>
<tr><td></td><td></td><td></td><td>9 BIT</td><td>0 to 511</td></tr>
<tr><td></td><td></td><td></td><td>10 BIT</td><td>0 to 1023</td></tr>
<tr><td></td><td></td><td></td><td>11 BIT</td><td>0 to 2047</td></tr>
<tr><td></td><td></td><td></td><td>12 BIT</td><td>0 to 4095</td></tr>
<tr><td></td><td></td><td></td><td>13 BIT</td><td>0 to 8191</td></tr>
<tr><td></td><td></td><td></td><td>14 BIT</td><td>0 to 16383</td></tr>
<tr><td></td><td></td><td></td><td>15 BIT</td><td>0 to 32767</td></tr>
<tr><td></td><td></td><td></td><td>16 BIT</td><td>0 to 65535</td></tr>
</table>

* Concerning H-Line
This item takes effect only when “0” has been selected as the Direction setting.

* Concerning Direction
When “1” has been selected as the Direction setting, only “1” takes effect as the H-Line setting. (Splitting in the vertical direction is not possible.)

4.4 Sweep patterns

4.4.1 Types of sweep patterns

When sweep is selected using the pattern key, for instance, sweep patterns can be selected from the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**Multi-Burst 100**	Multi-burst	 Multi-burst
1	**Multi-Burst 50**	Multi-burst	
2	**Sweep**	Sweep	

4.4.2 Sweep pattern selection

Before starting the procedure, set the pattern output to [Sweep], referring to "2.1.3 Selecting the pattern data."

The types of sweep patterns can be set using the procedure below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Pattern/RGB/INV Select
	GroupEdit		Timing		Color Bar
	AutoEdit		Output		Gray Scale
	DP Analysis		Audio		Ramp
	Data Copy/Erase		**Pattern**		**Sweep**

Select item using ◯ or ▲ INC ▼ DEC

The [Sweep] screen is displayed:

<Selecting the items>

(1) Select [Type].

(2) Select the items of Sweep using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET]

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

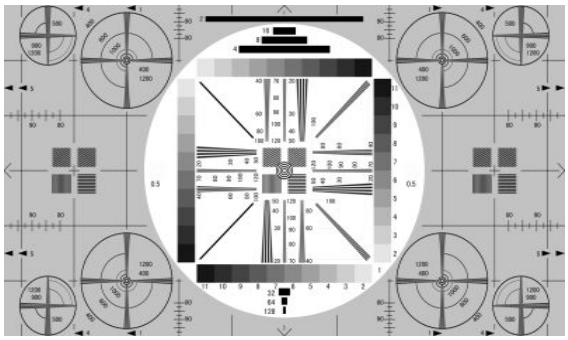
For further details on the patterns, refer to **"4.4.1 Types of sweep patterns."**

4.5 Monoscope patterns

4.5.1 Types of monoscope patterns

When monoscope is selected using the pattern key, for instance, monoscope patterns can be selected from the types listed below.

For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**SMPTE RP-133**		 MONOSCOPE
1	**SMPTE PR-133 Color**		
2	**MONOSCOPE**		
3	**PHILIPS**		
4	**CHINA**		
5	**SDI Check Field**	*2	
6	**Circular Zone Plate**		
7	**APDC1**	*1	
8	**APDC2**	*1	
9	**APDC3**	*1	
A	**APDC4**	*1	
B	**APDC5**	*1	

*1 **APDC1 to APDC5 are used to evaluate movie resolution. These patterns are an option. For further details, contact ASTRODESIGN sales representative or your dealer.**

*2 This is the check pattern which is used only for SDI outputs. It is output only from SDI outputs. The output timing is limited as below.

SDI Check Field supported format	
SD	480/59.94i, 575/50i
HD	1920x1080 YCbCr 4:2:2 10bit 60i,59.94i,50i 30p,29.97p,25p,24p,23.98p 30PsF,29.97PsF,25PsF,24PsF,23.98PsF 2048x1080 YCbCr 4:2:2 10bit 30p,29.97p,25p,24p,23.98p 30PsF,29.97PsF,25PsF,24PsF,23.98PsF 1280 x 720 YCbCr 4:2:2 10bit 60p,59.94p,50p,30p,29.97p,25p,24p,23.98p
3G-A,B	1920 x 1080 YCbCr 4:2:2 10bit 60p,59.94p,50p

4.5.2 Monoscope pattern selection

Before starting the procedure, set the pattern output to [Monoscope], referring to "2.1.3 Selecting the pattern data."

The types of monoscope patterns can be set using the procedure below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Color Bar
	GroupEdit		Timing		Gray Scale
	AutoEdit		Output		Ramp
	DP Analysis		Audio		Sweep
	Data Copy/Erase		**Pattern**		**Monoscope**
Select item using ◯ or ▲ INC ▼ DEC					

The [Monoscope] screen is displayed:

<Selecting the items>

(1) Select [Type].

(2) Select the items of Monoscope using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **"4.5.1 Types of monoscope patterns."**

<When type setting is APDC1 to 5>

The patterns for APDC 4K modes are displayed, but they cannot be edited.

APDC patterns for 4Kx2K timings.	
Mode 1	HD resolution picture is displayed in center when 4Kx2K timing is selected. Internal pattern #1116-1120.
Mode 2	Four HD resolution pictures are displayed when 4Kx2K timing is selected. Internal pattern #1196-1200.

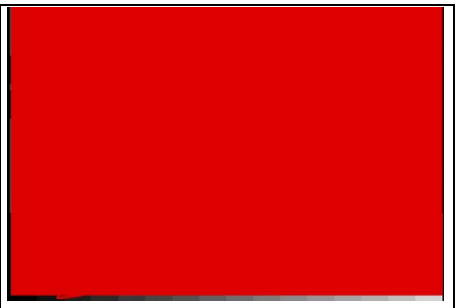
4.6 Raster patterns

4.6.1 Types of raster patterns

When raster is selected using the pattern key, for instance, raster patterns can be selected from the types listed below.

For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	CUSTOM
1	White
2	Red
3	Green
4	Blue
5	Black
6	50%-Gray



Raster pattern

4.6.2 Raster pattern type settings and customizing

Before starting the procedure, set the pattern output to [Raster], referring to “2.1.3 Selecting the pattern data.”

Described below is the procedure for selecting the types of raster patterns and for performing the settings when CUSTOM has been selected as the raster pattern type. (The rasters can be displayed with any level.)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Raster
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Gray Scale	SET ⇒	**Type**
	GroupEdit		Timing		Ramp		CUSTOM
	AutoEdit		Output		Sweep		
	DP Analysis		Audio		Monoscope		
	Data Copy/Erase		**Pattern**		**Raster**		

Select item using ◯ or ▲ INC ▼ DEC

The [Raster] screen is displayed:

<Selecting the items>

(1) Select [Type].

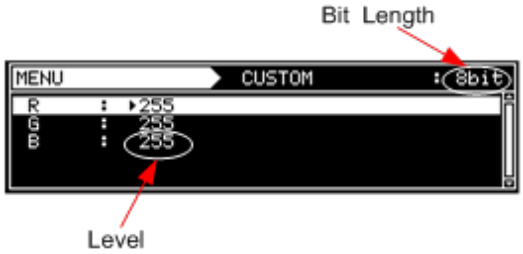
(2) Select the items of Raster using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **“4.6.1 Types of raster patterns.”**

<Detailed settings of customized patterns>

(3) Select [CUSTOM] in Step 1 of **<Selecting the items>.**

(4) Select [CUSTOM].



(5) Select the items, and then press [SET] key.

(6) Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

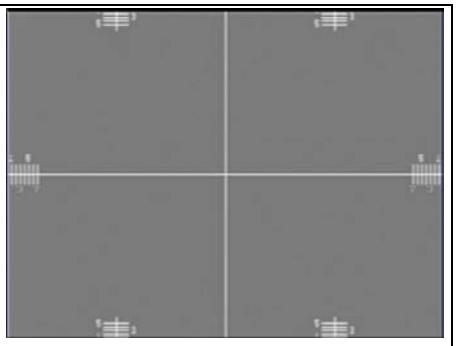
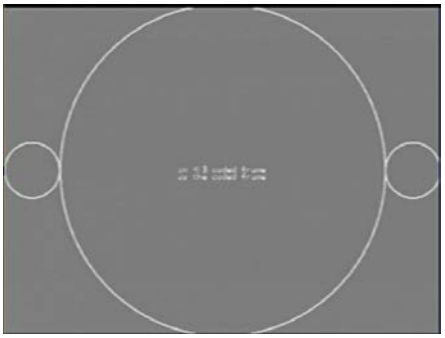
The setting range for the above R, G, B levels differs depending on the color depth.

8 BIT	**0 to 255**
9 BIT	**0 to 511**
10 BIT	**0 to 1023**
11 BIT	**0 to 2047**
12 BIT	**0 to 4095**
13 BIT	**0 to 8191**
14 BIT	**0 to 16383**
15 BIT	**0 to 32767**
16 BIT	**0 to 65535**

4.7 Aspect ratio patterns

4.7.1 Types of aspect ratio patterns

When aspect ratio is selected using the pattern key, for instance, aspect ratio patterns can be selected from types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**Over Scan**		 Over Scan
1	**AFD**		
	0	**As the coded frame**	
	1	**4:3 (center)**	
	2	**16:9 (center)**	
	3	**14:9 (center)**	
	4	**box 16:9 (top)**	
	5	**box 14:9 (top)**	
	6	**box 13:7 (center)**	 AFD pattern
	7	**box 2:1 (center)**	
	8	**box 11:5 (center)**	
	9	**box 12:5 (center)**	
	A	**4:3 (14:9 center)**	
	B	**16:9 (14:9 center)**	
	C	**16:9 (4:3 center)**	

4.7.2 Aspect ratio pattern type settings and customizing

Before starting the procedure, set the pattern output to [Aspect], referring to "2.1.3 Selecting the pattern data."

Described below is the procedure for selecting the types of aspect ratio patterns and for performing the settings when **CUSTOM** has been selected as the aspect ratio pattern type.

(If **CUSTOM** is selected, the aspect ratio patterns can be displayed with any level.)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Aspect
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	**Type**
	GroupEdit		Timing		**Aspect**		AFD
	AutoEdit		Output		Checker		
	DP Analysis		Audio		Image/OPT		
	Data Copy/Erase		**Pattern**		☐X[ABC]		
Select item using ◯ or ▲ INC ▼ DEC							

The [Aspect] screen is displayed:

<Selecting the items>

(1) Select [Type].

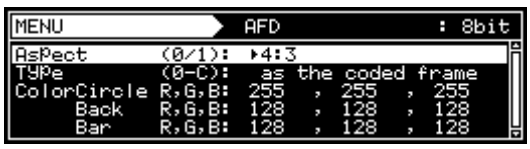
(2) Select the items of Aspect using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the patterns, refer to **"4.71 Types of aspect ratio patterns."**

<Detailed settings of customized patterns>

(3) Select [AFD] in Step 1 of **<Selecting the items>.**

(4) Select [AFD].

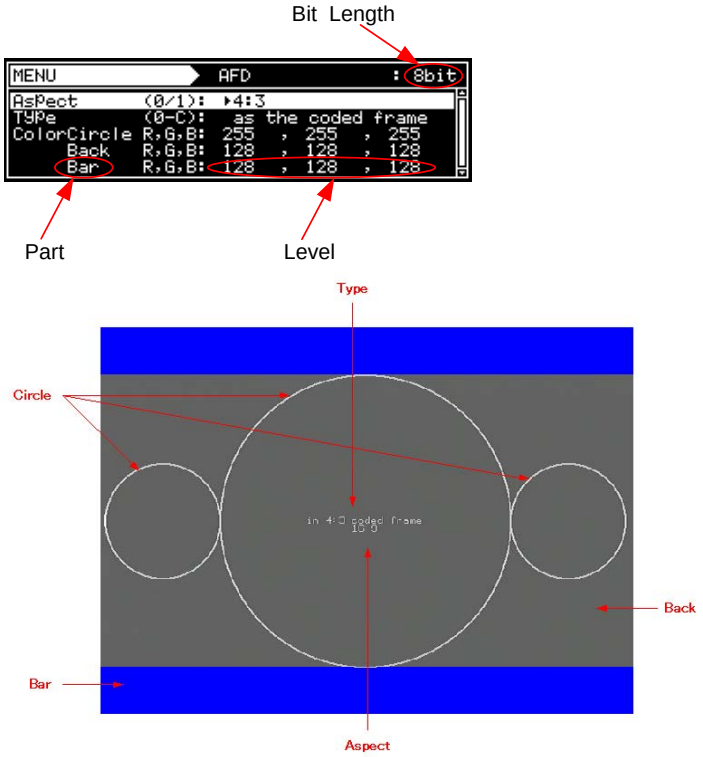


(5) Select the items, and then press [SET] key.

(6) Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of AFD pattern setting items>** below.

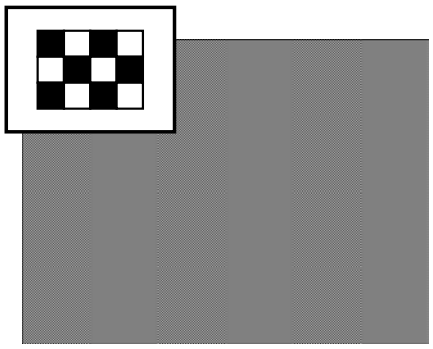
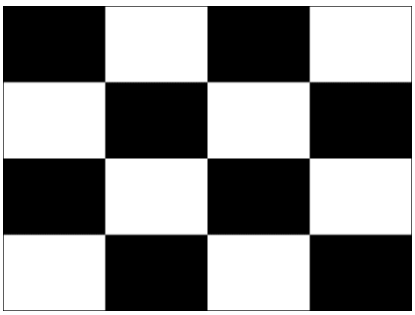
<Table of AFD pattern setting items>

<table>
<tr><td>(1)</td><td>Aspect (0/1)</td><td colspan="3">The aspect ratio of the screen is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>4:3</td><td>The images are displayed on the screen with a 4:3 aspect ratio.</td></tr>
<tr><td></td><td></td><td>1</td><td>16:9</td><td>The images are displayed on the screen with a 16:9 aspect ratio.</td></tr>
<tr><td>(2)</td><td>Type</td><td colspan="3">For details on the types of patterns, refer to “6.7.1 Types of aspect ratio patterns.”</td></tr>
<tr><td>(3)</td><td>Color</td><td colspan="3"> 
</td></tr>
<tr><td></td><td></td><td>Circle</td><td colspan="2">Display the circle level.
The R, G and B levels are displayed in sequence from the left.
The setting range for the above level differs depending on the color depth.</td></tr>
<tr><td></td><td></td><td></td><td>8 BIT</td><td>0 to 255</td></tr>
<tr><td></td><td></td><td></td><td>9 BIT</td><td>0 to 511</td></tr>
<tr><td></td><td></td><td></td><td>10 BIT</td><td>0 to 1023</td></tr>
<tr><td></td><td></td><td></td><td>11 BIT</td><td>0 to 2047</td></tr>
<tr><td></td><td></td><td></td><td>12 BIT</td><td>0 to 4095</td></tr>
<tr><td></td><td></td><td></td><td>13 BIT</td><td>0 to 8191</td></tr>
<tr><td></td><td></td><td></td><td>14 BIT</td><td>0 to 16383</td></tr>
<tr><td></td><td></td><td></td><td>15 BIT</td><td>0 to 32767</td></tr>
<tr><td></td><td></td><td></td><td>16 BIT</td><td>0 to 65535</td></tr>
<tr><td></td><td></td><td>Back</td><td colspan="2">Set the background level.
(Details are the same as for Color Circle.)</td></tr>
<tr><td></td><td></td><td>Bar</td><td colspan="2">Set the bar level.
(Details are the same as for Color Circle.)</td></tr>
</table>

4.8 Checkerboard patterns

4.8.1 Types of checkerboard patterns

When checkerboard is selected using the pattern keys or other keys, any of the following types of patterns can be selected.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**DOT × DOT**	Dot	
1	**BLOCK × BLOCK**	Block	
2	**SubPixel**	Sub-pixel	

4.8.2 Checkerboard pattern customizing

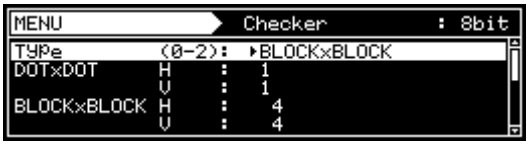
Before starting the procedure, set the pattern output to [Checker], referring to "2.1.3 Selecting the pattern data."

The types of checkerboard patterns are selected and their intervals are set using the procedure below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster
	GroupEdit		Timing		Aspect
	AutoEdit		Output		**Checker**
	DP Analysis		Audio		Image/OPT
	Data Copy/Erase		**Pattern**		☐X[ABC]

Select item using ◯ or ▲ INC ▼ DEC

The [Checker] screen is displayed:



<Selecting the items>

(1) Select [Type].

(2) Select the items of Checker using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

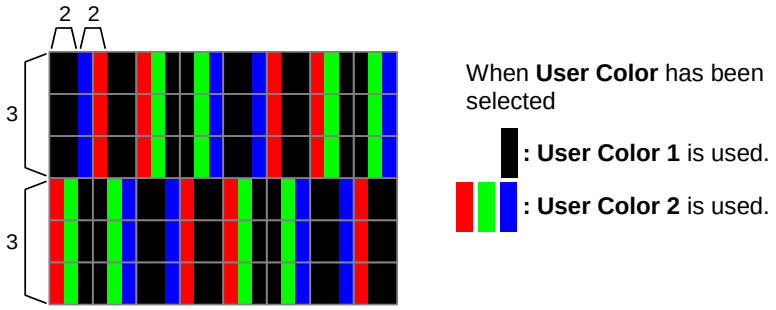
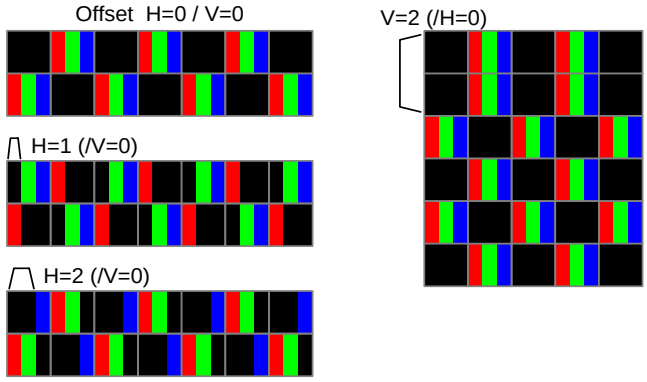
For further details on the patterns, refer to **"4.8.1 Types of checkerboard patterns."**

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Depending on the Type setting, the setting items differ. Refer to the **<Table of checkerboard setting items>**.

<Table of checkerboard setting items>

<table>
<tr><td>(1)</td><td>DOTxDOT H/V</td><td><Valid only when DOT×DOT is selected as the Type setting>
Set the number of horizontal (H) and vertical (V) pixels for one color.
Setting range: 1 to 8</td></tr>
<tr><td>(2)</td><td>BLOCKxBLOCK H/V</td><td><Valid only when BLOCK×BLOCK is selected as the Type setting>
Set the number of horizontal (H) and vertical (V) blocks.
Setting range: 2 to 32</td></tr>
<tr><td rowspan="2">(3)</td><td rowspan="2">Sub Pixel H/V</td><td><Valid only when Sub Pixel is selected as the Type setting>
Set the number of horizontal (H) sub pixels and number of vertical (V) pixels.
Setting range: 0 to 3
* When RGB 0%/100% is selected for Color Select, H=1 and V=1 will be set regardless of the settings.</td></tr>
<tr><td>Setting example: H=2, V=3
 
</td></tr>
<tr><td rowspan="2">(4)</td><td rowspan="2">SubPixel Offset H/V</td><td><Valid only when Sub Pixel is selected as the Type setting>
Set the number of sub pixels at the top left in the horizontal (H) direction and the number of pixels at the very top in the vertical (V) direction. (The Sub Pixel H and V settings subsequently apply.)
Setting range: 0 to 2
* When RGB 0%/100% is selected for Color Select, H=0 and V=0 will be set regardless of the settings.</td></tr>
<tr><td>Setting example: Sub Pixel H=3, V=1, SubPixel Offset H/V = refer to figures.
 
</td></tr>
<tr><td>(5)</td><td>Color Select (0/1)</td><td>This sets the color and level.
<table>
<tr><td>0</td><td>RGB 0%/100%</td><td>0% / 100%</td></tr>
<tr><td>1</td><td>User Color</td><td>The colors selected using User Color 1 and 2 are used.</td></tr>
</table></td></tr>
</table>

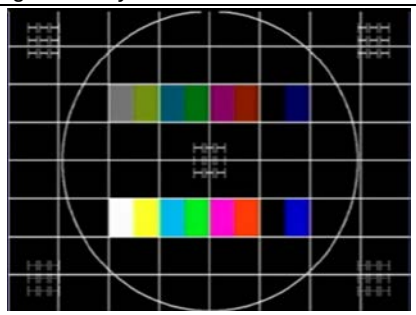
<table>
<tr><td>(6)</td><td>User Color 1 R, G, B</td><td>When RGB 0%/100% has been selected for Color Select, set any color and level to be indicated by “0%.”
In the case of the Sub Pixel item, the same level as the RGB level is set.

The setting range differs depending on the color depth.
Setting ranges by color depth<table><tr><td>8BIT</td><td>0 – 255</td></tr><tr><td>9BIT</td><td>0 – 511</td></tr><tr><td>10BIT</td><td>0 – 1023</td></tr><tr><td>11BIT</td><td>0 – 2047</td></tr><tr><td>12BIT</td><td>0 – 4095</td></tr><tr><td>13BIT</td><td>0 – 8191</td></tr><tr><td>14BIT</td><td>0 - 16383</td></tr><tr><td>15BIT</td><td>0 - 32767</td></tr><tr><td>16BIT</td><td>0 - 65535</td></tr></table></td></tr>
<tr><td>(7)</td><td>User Color 2 R, G, B</td><td colspan="2">When RGB 0%/100% has been selected for Color Select, set any color and level to be indicated by “100%.”
In the case of the Sub Pixel item, the same level as the RGB level is set.
The setting range is the same as for User Color 1.</td></tr>
</table>

4.9 Image/OPT

4.9.1 Types of Image/OPT

When Image/OPT has been selected using the pattern key, for instance, optional and image patterns can be selected from among the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**Image**	Image pattern	 **Image** A still image registered as the default can be used or any still image can be registered by the user and used.
1	**OPT-SAMPLE**	Sample option pattern	 **OPT-SAMPLE**
2	**OPT-USER**	User option pattern	Option pattern registered by the user Any test pattern can be described using a programming language.

4.9.2 Option and image patterns setting

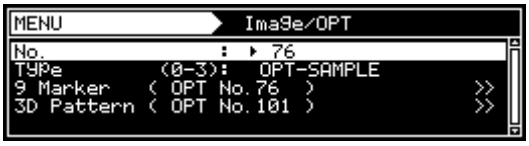
Before starting the procedure, set the pattern output to [Image/OPT], referring to "2.1.3 Selecting the pattern data."

The procedure for setting optional and image patterns is described below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster
	GroupEdit		Timing		Aspect
	AutoEdit		Output		Checker
	DP Analysis		Audio		**Image/OPT**
	Data Copy/Erase		**Pattern**		☐X[ABC]

Select item using or ▲ INC ▼ DEC

The [Image/OPT] screen is displayed:



<Selecting the items>

(1) Select [Type].

(2) Select the items of Image/OPT using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

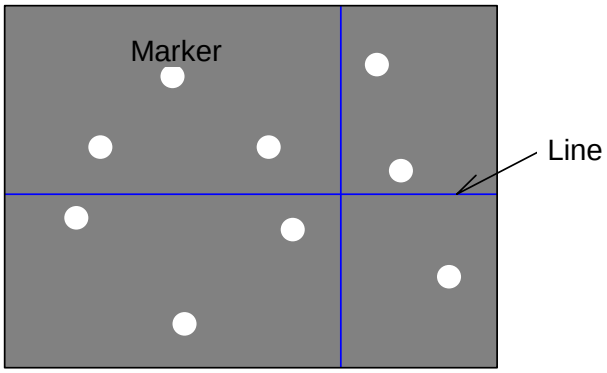
<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

No.	Specific numbers are allocated to the option and image patterns. The number of the pattern to be displayed is set in **No.** Setting range: 1 to 999
Type	For further details on the patterns, refer to "4.9.1 Types of Image/OPT."

4.9.3 9-marker (OPT No.76) settings

Sample optional pattern No.76 is a pattern which displays up to nine markers and lines at the desired positions.



Before starting the procedure, set the pattern output to [Image/OPT], referring to "2.1.3 Selecting the pattern data."

The setting procedure is given below.

For details on how to display the patterns, refer to **"4.9.2 Option and image patterns setting."** (Type = OPT-SAMPLE, No.76 specified)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Image/OPT
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	No.
	GroupEdit		Timing		Aspect		Type
	AutoEdit		Output		Checker		**9 Marker**
	DP Analysis		Audio		**Image/OPT**		3D Image
	Data Copy/Erase		**Pattern**		☐X[ABC]		3D Pattern

Select item using ◯ or ▲ INC ▼ DEC

The [9 Marker] screen is displayed:

<Selecting the items>

Select the items of 9 Marker using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

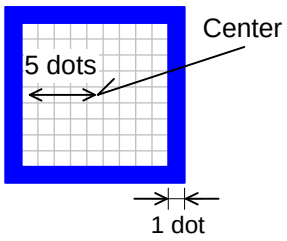
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of 9-marker setting items>** below.

<Table of 9-marker setting items>

(1)	**Mark Shape (0/2)**	The shape of the markers is specified here.		
		0	**Circle**	Circle
		1	**Square**	Square
		2	**Line**	Straight line
(2)	**Mark Fill (0/1)**	Whether to fill to markers is specified here (disabled when straight line has been selected as the Mark Shape setting).		
		0	**OFF (Line)**	Markers not filled ○□
		1	**ON**	Markers filled ●■
(3)	**Mark Line Width**	The width of the marker frame lines is set here. Setting range: 1 to 15 [dot] * When “ON” has been selected as the Mark Fill setting, the width will be 1 dot regardless of the setting.		Setting example: Mark Line Width = 1 Mark Size = 5 
(4)	**Mark Size**	The size of the markers is set here. Setting range: 1 to 9999 [dot]		
(5)	**Mark Number**	The number of the markers is set here. Setting range: 0 to 9		
(6)	**Mark Position H,V**	The center coordinate of the marker position is set here. Setting range: 0 to 4095 [dot]		
(7)	**Mark Direction [H,V]**	The direction of the straight line marker is set here.		
		0	**H**	Horizontal line
		1	**V**	Vertical line
(8)	**Mark Color R,G,B**	The color of the markers is set here. The setting range differs depending on the color depth. * See below.		
(9)	**Line Mode (0-3)**	Whether to display the lines and the shape of the lines when they are displayed are set here.		
		0	**None**	No lines
		1	**V-Line**	Vertical line
		2	**H-Line**	Horizontal line
		3	**HV-Line**	Cross consisting of one horizontal line and one vertical line
(10)	**Line Width**	The width of the lines is set here. Setting range: 1 to 15 [dot]		
(11)	**Line Position H,V**	The positions of the lines are set here. Setting range: 0 to 4095 [dot]		
(12)	**Line Color R,G,B**	The color of the lines is set here. The setting range differs depending on the color depth. * See below.		

* Color setting range.

Color Depth	Setting range
8BIT	**0 - 255**
9BIT	**0 - 511**
10BIT	**0 - 1023**
11BIT	**0 - 2047**
12BIT	**0 - 4095**
13BIT	**0 - 8191**
14BIT	**0 - 16383**
15BIT	**0 - 32767**
16BIT	**0 - 65535**

4.9.4 3D Image Pattern (OPT No.100) setting

Sample Option Pattern No.100 is 3D Image pattern.

Before starting the procedure, set the pattern output to [Image/Opt], referring to "2.1.3 Selecting the pattern data."

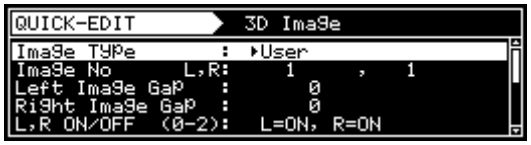
The setting procedure is given below.
Besides below setting, the setting in "HDMI ■ Vendor Specific InfoFrame" is referred.

Refer to **"4.9.2 Image / OPT setting"** about pattern display. (designate Type=OPT-SAMPLE, No.100)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Image/OPT
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	No.
	GroupEdit		Timing		Aspect		Type
	AutoEdit		Output		Checker		9 Marker
	DP Analysis		Audio		**Image/OPT**		**3D Image**
	Data Copy/Erase		**Pattern**		☐X[ABC]		3D Pattern

Select item using ◯ or ▲ INC ▼ DEC

The [3D Image] screen is displayed:



<Selecting the items>

Select the items of 3D Image using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<3D Image Pattern setting item list>** below.

<3D Image Pattern setting item list>

(1)	**Image Type (0-2)**	Select images.			
		0	**User**		
		1	**Monoscope**		
		2	**China**		
(2)	**Image No. L,R**	When Image Type is set as 0(User), the image number (user image) selected here is displayed.			
(3)	**Left Image Gap**	Each image is shift to left direction (minus setting), and right direction (plus setting).			
(4)	**Right Image Gap**	Minus value is input by Shift + number keys.			
(5)	**L,R ON/OFF (0-2)**	Right and Left picture can be set ON/OFF separately. If you set OFF, the color you set by **Off Color** is displayed. *** This menu is displayed when using Non Interlace timing, or 3D format except frame packing.**			
		0	**L=ON , R=ON**		
		1	**L=ON , R=OFF**		
		2	**L=OFF , R=ON**		
(6)	**L,R Field ON/OFF (0/1)**	Right and Left field can be set ON/OFF separately. If you set OFF, the color you set by **Off Color** is displayed in OFF field.. *** This menu is displayed when using Interlace timing and frame packing.**			
		ON/OFF	0	**ON**	Output pattern
			1	**OFF**	Pattern is not output.
(7)	**Level L,R**	Level of Right and Left pattern can be changed. Setting range : 0 - 100 [%]			
(8)	**Off Color R,G,B**	Set a color of OFF-frame or OFF-field when you set OFF in **« L,R ON/OFF »** or **« L,R Field ON/OFF »** Setting range : 0 – 255			
(9)	**Output Mode (0/1)**	Set pattern output mode			
		0	**HDMI 3D Structure** Pattern is output referring to the setting of « HDMI 3D Structure », This setting is commonly used.		
		1	**Frame Sequential** The left and the right pattern are displayed by every one frame. In the Simple animation function in the “Action”, set “H=1, V=2” in the “Repeat”, this frame sequential becomes active. Please refer to 4.15.2 Simple Animation		
(10)	**L,R Text (0-2)**	Set display type of « **LEFT** » and « **RIGHT** » character.			
		0	**OFF**	Not displayed.	
		1	**TOP**	Display on the top.	
		2	**CENTER**	Display in center.	
(11)	**BkBackLRText(0/1)**	Set black background around « **LEFT** » and « **RIGHT** » character.			
		0	**OFF**	Does not set black around « **LEFT** » and « **RIGHT** » character.	
		1	**ON**	Set black around « **LEFT** » and « **RIGHT** » character.	
(12)	**Sub Sampling(0/1)**	In case of « Side by Side » and « Top & Bottom », set it either normal drawing or thin-out drawing. * Refer to p135 “About Sub Sampling”.			
		0	**OFF**	Normal drawing	
		1	**ON**	Sub-sampling drawing	

<3D Image pattern example>

[0] User

Different images are displayed in each right and left picture.

You select Image No. to each picture.

(Image should be saved beforehand.)

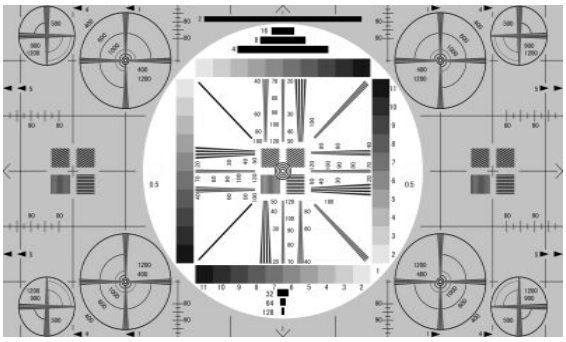
（Example 1080@FramePacking）

Left

Right

[1] Monoscope

Right and left picture display Monoscope (refer to section 4.5) pattern.



[2] China

Right and left picture display China Monoscope (refer to section 4.5) pattern.

4.9.5 Setting the 3D pattern (OPT No.101)

Sample optional pattern No.101 is a 3D pattern.

Before starting the procedure, set the pattern output to [Image/Opt], referring to "2.1.3 Selecting the pattern data."

The setting procedure is given below.

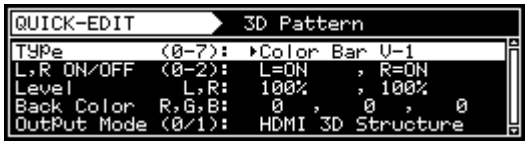
In addition to what is described below, the "HDMI ■ Vendor Specific InfoFrame" setting is referenced.

For details on how to display the pattern, refer to section "4.9.2 Option and image pattern setting." (Type=OPT-SAMPLE, No.101 specified)

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Image/OPT
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	No.
	GroupEdit		Timing		Aspect		Type
	AutoEdit		Output		Checker		9 Marker
	DP Analysis		Audio		**Image/OPT**		3D Image
	Data Copy/Erase		**Pattern**		☐X[ABC]		**3D Pattern**

Select item using ◯ or ▲ INC ▼ DEC

The [3D Pattern] screen is displayed:



<Selecting the items>

Select the items of 3D Pattern using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<List of 3D pattern setting items>** below.

<List of 3D pattern setting items>

(1)	**Type (0-A)**	The type of pattern is selected here.			
		0	**Color Bar V-1**		
		1	**Color Bar V-2**		
		2	**Vertical Bar**		
		3	**Checker DOT**	The checker pattern settings are referenced.	
		4	**Checker BLOCK**		
		5	**Slant Color Bar**		
		6	**Slant Gray Bar**		
		7	**Raster**		
		8	□×+○		
		9	**Window / Circle**		
		A	**Cross Hatch (it will be referred to Cross Hatch setting).**		
(2)	**L,R ON/OFF (0-2)**	On or Off is selected for the left (L) and right (R) pattern outputs. At the Off setting, the color set using **Back Color** is output.			
		0	**L=ON, R=ON**		
		1	**L=ON, R=OFF**		
		2	**L=OFF, R=ON**		
(3)	**L, R Field ON/OFF (0/1)**	On/Off setting of Left and Right patterns by field. The setting color in the **Back Color** is displayed if it is set off. Note) In case of Interlace signal, or except using Frame Packing mode, it will switch to L, R ON/OFF mode.			
		ON/OFF	**0**	**ON**	**Pattern is output**
			1	**OFF**	**Pattern is not output**
(4)	**Level L,R**	The left (L) and right (R) pattern output levels are set here. Setting range: 0 - 100 [%]			
(5)	**Off Color R,G,B**	The output color when Off has been selected as the **L,R ON/OFF or L, R Field ON/OFF** is set here. Setting range: 0 - 255			
(6)	**Output Mode (0/1)**	The pattern output mode is specified here.			
		0	**HDMI 3D Structure** The HDMI 3D Structure setting is reference, and output. Normally, this setting is specified.		
		1	**Frame Sequential** The left (L) and right (R) patterns are drawn in the VRAM using one frame for each. The left (L) and right (R) frames can be output alternately by setting Repeat to H=1 and V=2 using the ACTION simple animation function. For details, refer to section “4.15.2 Simple animation settings.”		
(7)	**L, R Color (0/1)**	**0**	**Not use**	Pattern is drawn by the original value or designated color set by pattern parameter.	
		1	**Use**	Pattern and background is drawn by the value set by **Left/ Right color** in each right and left picture.	
(8)	**L, R Text (0-2)**	Set display type of « **LEFT** » and « **RIGHT** » character.			
		0	**OFF**	Not displayed.	
		1	**TOP**	Display on the top.	
		2	**CENTER**	Display in center.	
(9)	**BkBackLRText (0/1)**	Set black background around « **LEFT** » and « **RIGHT** » character.			
		0	**OFF**	Does not set black around « **LEFT** » and « **RIGHT** » character.	
		1	**ON**	Set black around « **LEFT** » and « **RIGHT** » character.	

(10)	**Sub Sampling (0/1)**	In case of « Side by Side » and « Top & Bottom », set it either normal drawing or thin-out drawing.		
		0	**OFF**	Normal drawing
		1	**ON**	Thin-out drawing
(11)	**Left/Right Color**	If you set « **Use** » in **L, R Color**, set pattern color and back color in each left and right picture.		
		Coor(L) (R) R,G,B		Set pattern color of each Left and Right picture. Setting range : 0-65535 (max value will change by BitMode.)
		Back color L) (R) R,G,B		Set back color. Setting range : 0-65535 (max value will change by BitMode.)
(12)	**V.Bar Width (1-16)**	If you set « **Vertical Bar** » in **Type**, the width of vertical bar can be set. Setting range : 1-16 LANE		
(13)	**Slant Angle (0-B)**	If you set « Slant Color Bar » or « Slant Gray Bar » in Type, set drawing angle here.		
		0	**0 degree**	
		1	**15 degrees**	
		2	**30 degrees**	
		3	**45 degrees**	
		A	**150 degrees**	
		B	**165 degrees**	
(14)	**Checker**	A checkerboard pattern is set when Checker DOT or Checker BLOCK has been specified as **the Type setting**. This is the same setting as the regular checkerboard pattern. (Refer to section “4.8 Checkerboard patterns.”)		
(15)	**Window / Circle**	Set a parameter of Window / Circle that is selected in **Type.**		
		Type (0-3)	Select kinds of pattern	
			0 Window	Draw one Window.
			1 Circle	Draw one Circle.
			2 9 Window	Draw 9 Windows.
			3 9 Circle	Draw 9 Circles.
		Real Circle (0/1)	In Type, if you select Circle or 9 Circle, select if the circle should be true-circle or not.	
			0 OFF	Draw circle based on H and V size.
			1 ON	Draw true-circle.
		Size H, V	Set the drawing size of the pattern. Setting range : 0-100 [%]	
		LPosition RPosition	Set the drawing position of **Window / Circle** in each Left and Right picture. The setting value becomes the center of the pattern. Setting range : 0-100 [%]	
		Position	Set the drawing position of **9 Windows / 9 Circles**. The setting value is regarded as the blank area from the edge of screen. Setting range : 0-100 [%]	
(16)	**Cross Hatch**	If you select **Cross Hatch** in **Type**, set the details of Cross Hatch. This is the same setting as the regular Cross Hatch pattern. (Refer to section “4.10.3 Cross Hatch.”)		

<3D pattern details>

[0] Color Bar V-1

The same vertical color bars are output at the left and right. “LEFT” and “RIGHT” are displayed for left and right, respectively.

LEFT

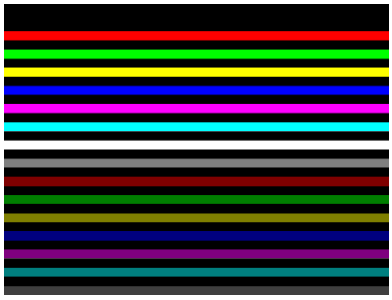
RIGHT

[1] Color Bar V-2

The vertical color bar shown in the figures below are output at the left and right.

LEFT

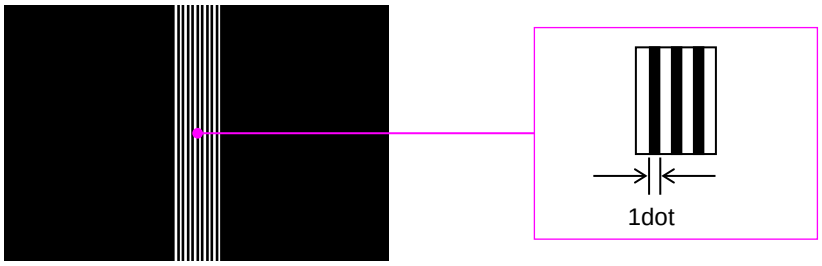
RIGHT



LR combination

[2] Vertical Bar

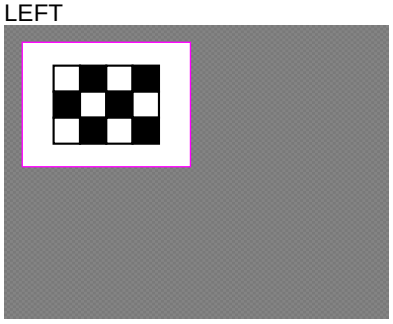
Vertical bars each consisting of one dot are output. The pattern is the same for the left and right.



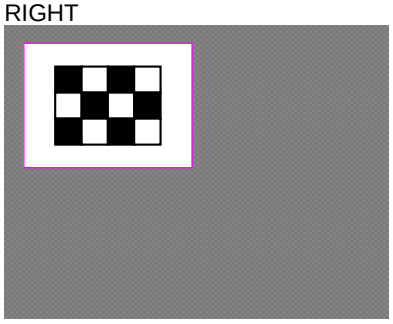
[3] Checker DOT

Checkerboard dot by dot patterns are output. The colors for the pattern on the left are reversed from the colors in the pattern on the right.

LEFT



RIGHT

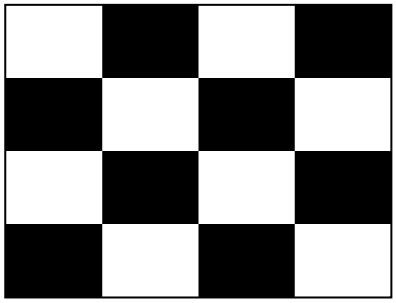


[4] Checker BLOCK

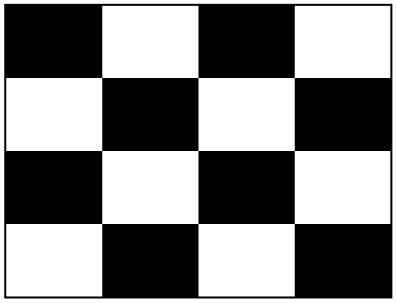
Checkerboard block by block patterns are output. The colors for the pattern on the left are reversed from the colors in the pattern on the right.

The figures below show patterns where the number of blocks is defined as H=4/V=4.

LEFT

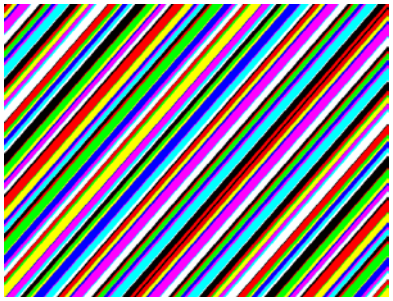


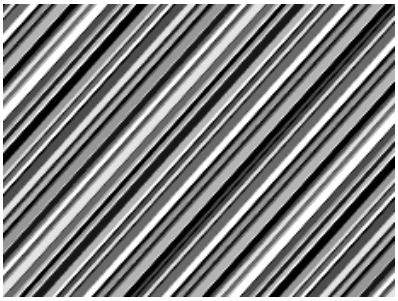
RIGHT



[5] Slant Color Bar, [6] Slant Gray Bar

The different width color bar / gray bar in the slant direction. The right and the left output the same picture. The drawing angle can be changed from 0 – 165 degrees.



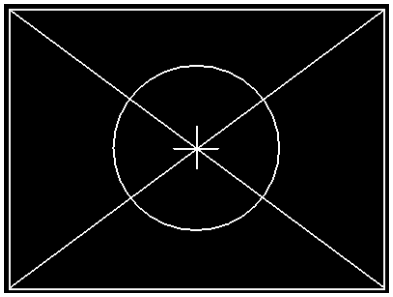


[7] Raster

A raster is output. The pattern is the same for the left and right.

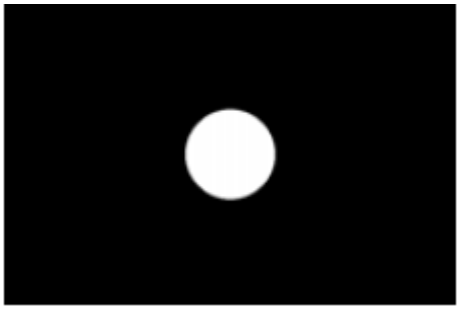
[8] □×＋○

The □, ×, ＋ and ○ of □ × **ABC** pattern are superimposed and output. The pattern is the same for the left and right.



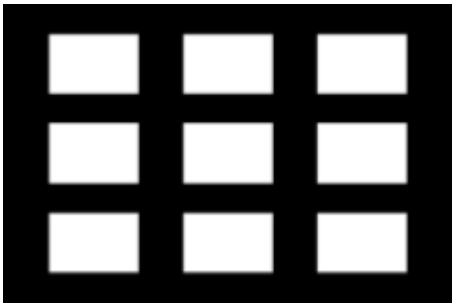
[9-1] Window [9-2] Circle

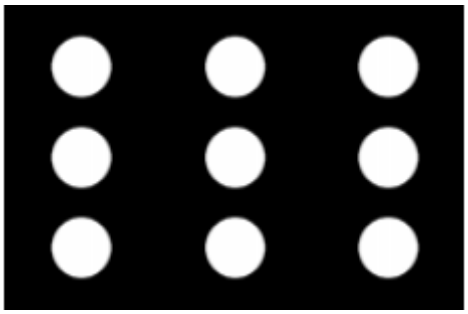
Window / circle pattern is displayed in the designated position. The left and right frame shows the same picture, but color can be set separately.



[9-3] 9 Window [9-4] 9 Circle

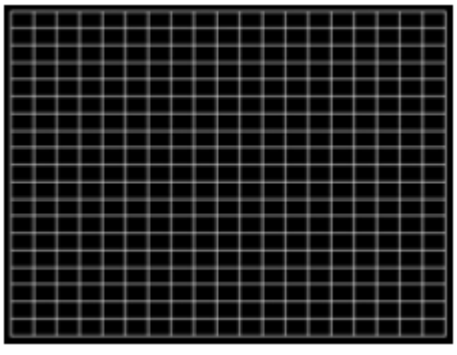
9 Window patterns are displayed in the designated position. The left and right frame shows the same picture, but color can be set separately.





[10] Cross Hatch

Cross hatch is output. The left and right frame shows the same picture, but color can be set separately.

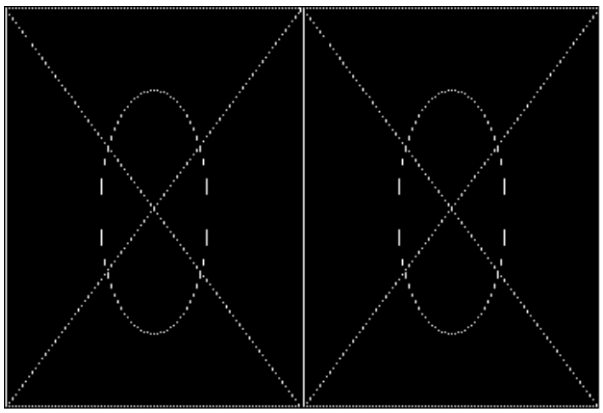


* About Sub Sampling display

In case of Side-by-Side and Top & Bottom, by setting Sub-sampling = OFF, ODD and EVEN line is not taken out and line seems more clear.

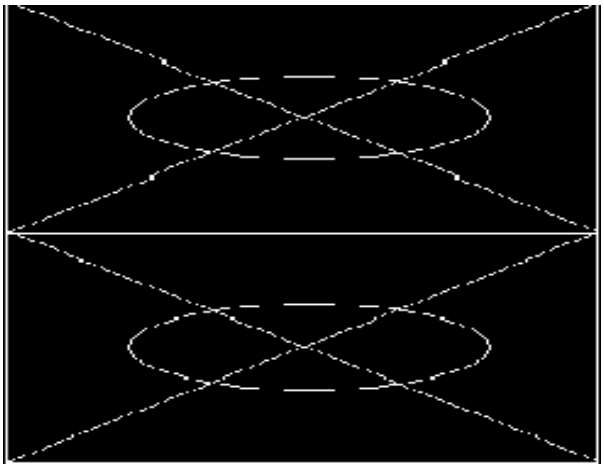
Example : Side-by-Side

If Sub Sampling is ON, the pattern is displayed according to the setting in the « 3D Extension Data » in the Vender Specific Infoframe.（e.g. : Type = □×＋○）

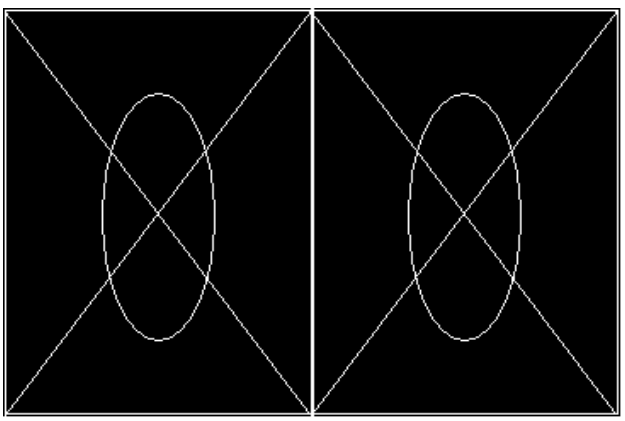


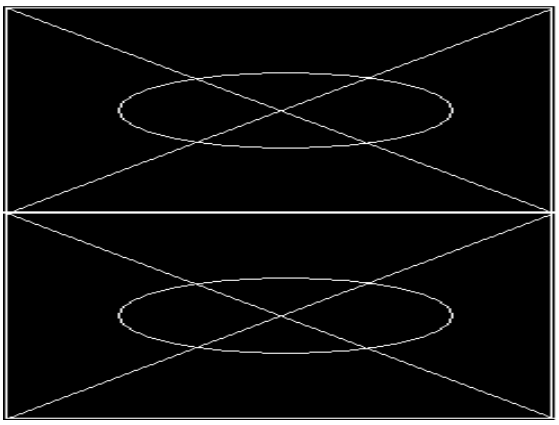
Example : Top & Bottom

If Sub Sampling is ON, only Odd lines are drawn in each left and right picture.
（e.g. : Type = □×＋○）



If Sub Sampling is OFF, all lines are drawn by the size of « Sub Sampling = ON »,
（e.g. Type = □×＋○）





4.9.6 Output setting of BMP files

In the Image Pattern, not only VGD file (original file format of ASTRO VG), Windows BMP files can be output,too. However, there are regulations written below.

(1) 8bit (256 colors) or 24bit (16.77 million colors) image.
(2) The image file that is recorded by bottom-up (writing from left-bottom to right-top).
(biHeight of the header information is positive number.)
(3) Uncompressed file (biCompression of the header infiormation is BI_RGB.)

Caution

・The recordable BMP file resolution is up to 8k x64k.
・64pcs of 4Kx2K BMP pictures can be read.

<File nane>

The file name should be like « bitmap001.bmp » , « bitmap002.bmp ». « 001 » or « 002 » part are designated number from 001 to 999. Then, save it in « bmp4 » folder of USB memory.

USB Memory
- bmp4 (folder)
  - **bitmap001.bmp**
  - **bitmap002.bmp**
  - **bitmap003.bmp** ***1**
  - bitmap003.vgd ***1**
  - bitmap004.vgd
  - **bitmap005(TestImage01_1920x1080_24bit).bmp** ***2**
  - bitmap006(TestImage02_1920x1080_24bit).vgd ***2**
  - bitmapname003.vgd ***3**
  - bitmapname004.vgd ***3**
- prg4 (folder)
- grp4 (folder)
- opt4 (folder)

Caution

***1 If it has same file name of both VGD and BMP extention, the VGD file has priority to output.**

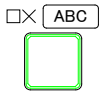
Caution

***2 The filis names can be extended. The first « bitmap » is fixed and 3 numbers from 001 to 999 are followed. After that designated name is added. The maximum 80 characters can be set. 2 bytes characters can not be used.**
If several files has same name starting by « bitmapXXX », the first founded file is output.

Caution

***3 In case of BMP files, bitmapnameXXX.vgd is not required.**

4.10 □ × ABC patterns

The following patterns are available as □ × ABC patterns. Select them using the 

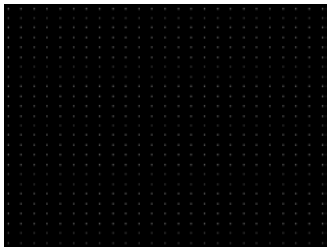
key.

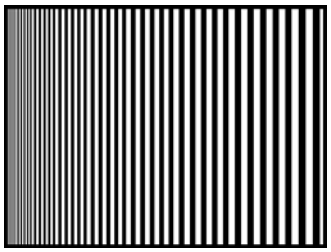
All the patterns can be superimposed onto one another, and displayed.

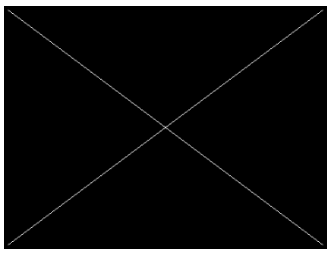
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

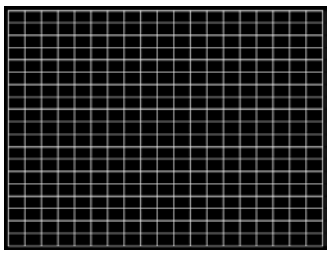
Character	Character
Cross Hatch	Crosshatch
Dot	Dot
Circle	Circle
Burst	Burst
□	
×	
+	

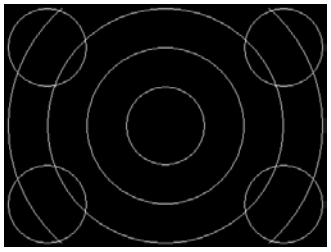

Character

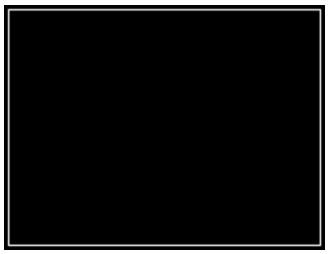

Dot

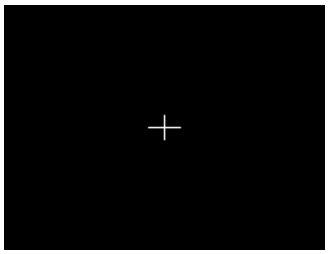

Burst


×


Cross Hatch


Circle


□


+

* There are no items to be set in □, × and + patterns.

4.10.1 Color settings

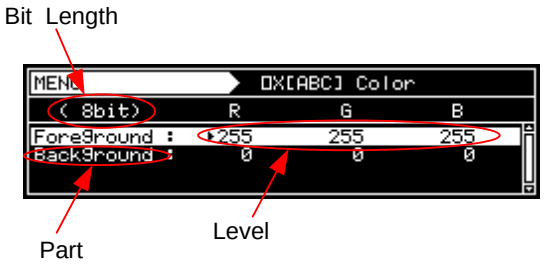
Before starting the procedure, set the pattern output to [☐ × ABC], referring to "2.1.3 Selecting the pattern data."

The colors of the ☐ × ABC patterns themselves and their background colors can be set.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	☐X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	**Color**
	GroupEdit		Timing		Aspect		Character
	AutoEdit		Output		Checker		Cross Hatch
	DP Analysis		Audio		Image/OPT		Dot
	Data Copy/Erase		**Pattern**		**☐X[ABC]**		Circle

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Color using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Foreground	The colors of the □ × **ABC** pattern are set here (in the order of RGB from the left). The setting range differs depending on the color depth.
Background	The background color is set here (in the order of RGB from the left). The setting range differs depending on the color depth.

Setting ranges by color depth

8 BIT	**0 to 255**
9 BIT	**0 to 511**
10 BIT	**0 to 1023**
11 BIT	**0 to 2047**
12 BIT	**0 to 4095**
13 BIT	**0 to 8191**
14 BIT	**0 to 16383**
15 BIT	**0 to 32767**
16 BIT	**0 to 65535**

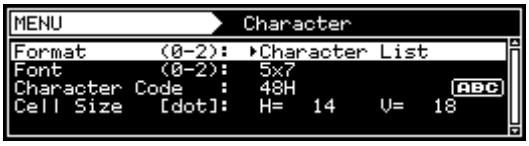
4.10.2 Character patterns

Before starting the procedure, set the pattern output to [Character], referring to "2.1.3 Selecting the pattern data."

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	☐X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	Color
	GroupEdit		Timing		Aspect		**Character**
	AutoEdit		Output		Checker		Cross Hatch
	DP Analysis		Audio		Image/OPT		Dot
	Data Copy/Erase		**Pattern**		**☐X[ABC]**		Circle

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Character using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of character setting items>** below.

<Table of character setting items>

(1)	**Format (0-2)**	The format is selected here.		
		0	**Character List**	
		1	**All 1-Character**	
		2	**Corner&Center**	
(2)	**Font (0-4)**	The font size is set here.		
		0	**5 × 7**	Set by 5 x 7.
		1	**7 × 9**	Set by 7 x 9.
		2	**16 × 16**	Set by 16 x 16.
		3	**32 x 32**	Set by 32 x 32.
		4	**64 x 64**	Set by 64 x 64.
(3)	**Character Code**	The character code is selected here. Setting range: 20h to FFh When characters are selected directly, select ABC. For details on the operation procedure, refer to "2.3 Setting the names."		
(4)	**Cell Size [dot]**	The size of each character is set here.		
		H	Set the size of the character in the horizontal direction.	
		V	Set the size of the character in the vertical direction.	

4.10.3 Crosshatch patterns

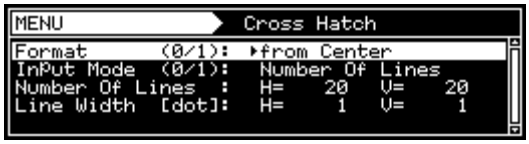
Before starting the procedure, set the pattern output to [Cross Hatch], referring to "2.1.3 Selecting the pattern data."

The crosshatch pattern settings are described below.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	☐X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	Color
	GroupEdit		Timing		Aspect		Character
	AutoEdit		Output		Checker		**Cross Hatch**
	DP Analysis		Audio		Image/OPT		Dot
	Data Copy/Erase		**Pattern**		**☐X[ABC]**		Circle

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Cross Hatch using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of crosshatch setting items>** below.

<Table of crosshatch setting items>

(1)	**Format (0-1)**	The origin point of the pattern drawing is set here.		
		0	**From Center**	The pattern is drawn using the screen center as the origin point.
		1	**From Top-Left**	The pattern is drawn using the top left of the screen as the origin point.
(2)	**InputMode (0/1)**	The input mode is selected here.		
		0	**Number Of Line**	This sets the number of lines to be displayed on the screen.
		1	**Interval (dot)**	This sets the interval between the blocks.
(3)-a	**When Number of Lines is selected as the Input Mode setting**	The number of lines to be displayed on the screen is set here.		
		Number Of Lines: H =		Set the number of lines in the horizontal direction.
		Number Of Lines: V =		Set the number of lines in the vertical direction.
(3)-b	**When Interval (dot) is selected as the Input Mode setting**	The interval between the blocks is set here.		
		Interval [dot]: H =		Set the number of lines in the horizontal direction.
		Interval [dot): V =		Set the number of lines in the vertical direction.
(4)	**Line Width [dot]**	The line width is set here.		
		Line Width [dot]: H =		Set the number of lines in the horizontal direction.
		Line Width [dot]: V =		Set the number of lines in the vertical direction.

4.10.4 Dot patterns

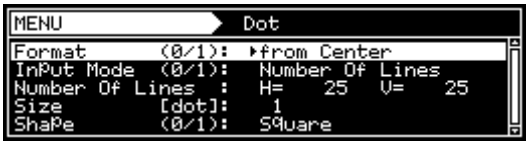
Before starting the procedure, set the pattern output to [Dot], referring to "2.1.3 Selecting the pattern data."

The dot pattern settings are described below.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	☐X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	Color
	GroupEdit		Timing		Aspect		Character
	AutoEdit		Output		Checker		Cross Hatch
	DP Analysis		Audio		Image/OPT		**Dot**
	Data Copy/Erase		**Pattern**		**☐X[ABC]**		Circle

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Dot using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of dot setting items>** below.

<Table of dot setting items>

(1)	**Format (0-1)**	The origin point of the pattern drawing is set here.		
		0	**From Center**	The pattern is drawn using the screen center as the origin point.
		1	**From Top-Left**	The pattern is drawn using the top left of the screen as the origin point.
(2)	**InputMode (0/1)**	The input mode is selected here.		
		0	**Number Of Line**	This sets the number of lines to be displayed on the screen.
		1	**Interval (dot)**	This sets the interval between the dots.
(3)-a	**When Number of Lines is selected as the Input Mode setting**	The number of lines to be displayed on the screen is set here.		
		Number Of Lines: H =		Set the number of lines in the horizontal direction.
		Number Of Lines: V =		Set the number of lines in the vertical direction.
(4)-b	**When Interval (dot) is selected as the Input Mode setting**	The interval between the blocks is set here.		
		Interval [dot]: H =		Set the number of lines in the horizontal direction.
		Interval [dot): V =		Set the number of lines in the vertical direction.
(5)	**Size [dot]**	The size is set here. Setting range: 1 to 15 [Dot]		
(6)	**Shape (0/1)**	The shape is set here.		
		0	**Circle**	The dots are drawn in the form of circles.
		1	**Square**	The dots are drawn in the form of squares.

4.10.5 Circle patterns

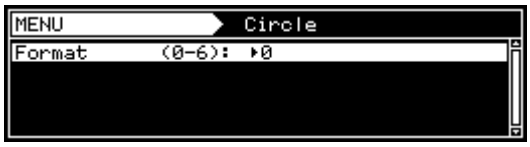
Before starting the procedure, set the pattern output to [Circle], referring to "2.1.3 Selecting the pattern data."

The circle pattern settings are described below.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	□X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	Color
	GroupEdit		Timing		Aspect		Character
	AutoEdit		Output		Checker		Cross Hatch
	DP Analysis		Audio		Image/OPT		Dot
	Data Copy/Erase		**Pattern**		**□X[ABC]**		**Circle**

Select item using  or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Circle using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

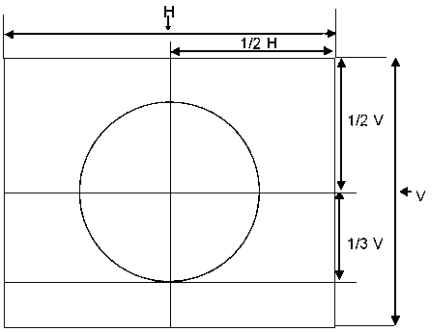
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

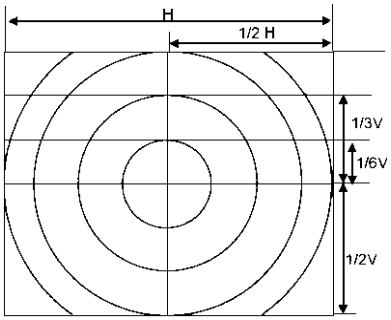
Select the shapes of the circles from the options below.

Format 0	• Single circle • Center: 1/2H, 1/2V • Radius: 1/3V
Format 1	• Concentric circles 1 • Center: 1/2H, 1/2V • Radius (from the center): 1/6V, 1/3V, 1/2V, 1/2H
Format 2	• Format 1 + (circles with radius 1/6V × 4)
Format 3	• Concentric circles 2 • Center: 1/2H, 1/2V • Radius (from the center): One circle added inside the 1/6V, 1/3V and 1/2 circles, 1/2 radius added
Format 4	• Consecutive circles with radius 1/6V • Top/bottom and left/right symmetry with center (1/2H, 1/2V) as the reference
Format 5	• Single filled-in circle • Center: 1/2H, 1/2V • Radius: 1/3V
Format 6	• Filled-in circles with radius 1/6V × 5

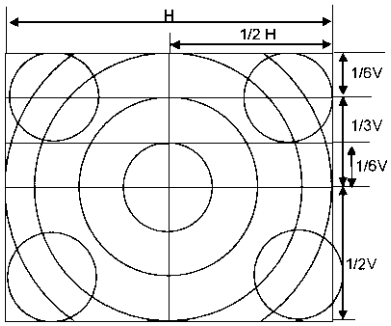
0


H
1/2 H
1/2 V
V
1/3 V

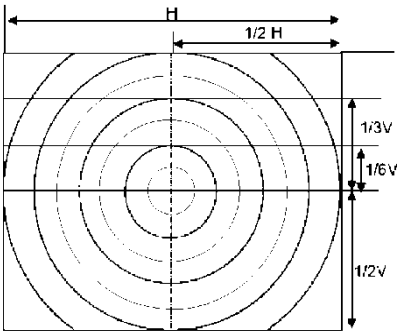
1


H
1/2 H
1/3V
1/6V
1/2V

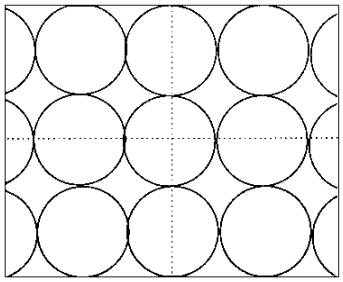
2


H
1/2 H
1/6V
1/3V
1/6V
1/2V

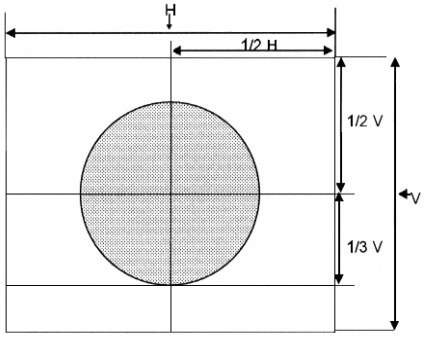
3


H
1/2 H
1/3V
1/6V
1/2V

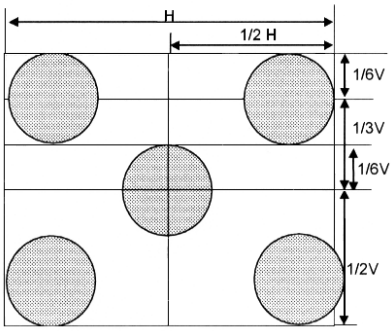
4



5

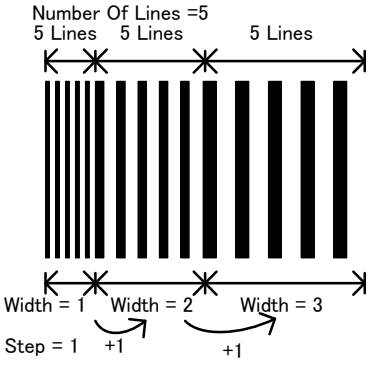

H
1/2 H
1/2 V
V
1/3 V

6


H
1/2 H
1/6V
1/3V
1/6V
1/2V

4.10.6 Burst patterns

In burst patterns, the line width increases gradually.



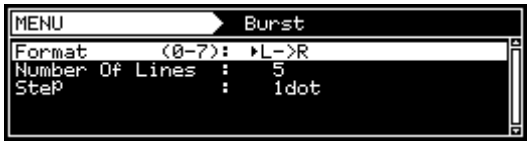
Before starting the procedure, set the pattern output to [Burst], referring to "2.1.3 Selecting the pattern data."

The burst pattern settings are described below.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	□X[ABC]
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	Character
	GroupEdit		Timing		Aspect		Cross Hatch
	AutoEdit		Output		Checker		Dot
	DP Analysis		Audio		Image/OPT		Circle
	Data Copy/Erase		**Pattern**		**☐X[ABC]**		**Burst**

Select item using ◯ or ▲ INC ▼ DEC

The [Burst] screen is displayed:



<Selecting the items>

Select the items of Burst using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **< Table of burst setting items>** below.

<Table of burst setting items>

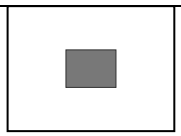
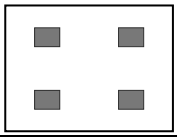
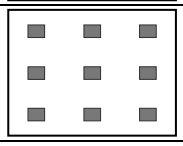
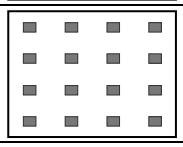
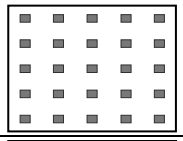
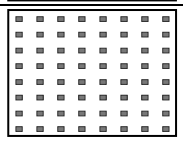
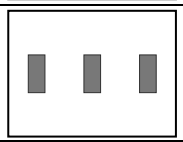
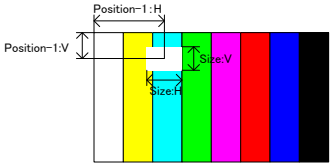
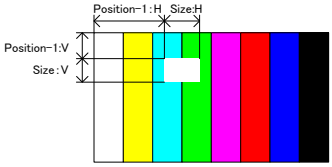
(1)	**Format (0-7)**	The origin point of the pattern drawing is set here.		
		0	**L->R**	The line width increases from left to right.
		1	**L<-R**	The line width increases from right to left.
		2	**L<-C->R**	The line width increases from the center to the left edge and from the center to the right edge.
		3	**L->C<-R**	The line width increases from the left edge to the center and from the right edge to the center.
		4	**T->B**	The line width increases from top to bottom.
		5	**T<-B**	The line width increases from bottom to top.
		6	**T<-C->B**	The line width increases from the center to the top edge and from the center to the bottom edge.
		7	**T->C<-B**	The line width increases from the top edge to the center and from the bottom edge to the center.
(2)	**Number of Line**	The number of lines set here is repeatedly drawn with the same thickness. After the set number of lines has been drawn, the thickness is increased by an amount equivalent to the **Step setting**, and this is repeated. Setting range: 1 to 99		
(3)	**Step**	The step is set here. Setting range: 0 to 99 [dot]		

4.11 Window patterns

Mono-color rectangles can be displayed as the window patterns.
The window patterns can also be used to check moving images using the action function described later (refer to the action settings).

4.11.1 Types of window patterns

When window has been selected using the pattern key, for instance, window patterns can be selected from among the types listed below.
For further details on pattern selection, refer to “2.1.3 Selecting the pattern data.”

0	**1 Window**	1 window displayed	
1	**4 Window**	4 windows displayed	
2	**9 Window**	9 windows displayed	
3	**16 Window**	16 windows displayed	
4	**25 Window**	25 windows displayed	
5	**64 Window**	64 windows displayed	
6	**3 Window In V Row**	3 windows in a vertical row displayed	
7	**3 Window In H Row**	3 windows in a horizontal row displayed	
8	**User Pos Center**	Window displayed at the position of the user’s choice * The coordinates of the window center are specified as the origin point of the display.	
9	**User Pos Corner**	Window displayed at the position of the user’s choice * The coordinates of the top left of the window are specified as the origin point of the display.	

4.11.2 Window pattern settings

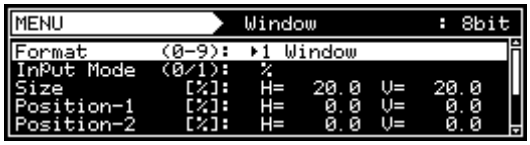
Before starting the procedure, set the pattern output to [Window], referring to "2.1.3 Selecting the pattern data."

The types of window patterns can be selected using the procedure below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Image/OPT
	GroupEdit		Timing		☐X[ABC]
	AutoEdit		Output		**Window**
	DP Analysis		Audio		Cursor
	Data Copy/Erase		**Pattern**		Name/List

Select item using ◯ or ▲ INC ▼ DEC

The [Window] screen is displayed:



<Selecting the items>

Select the items of Window using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

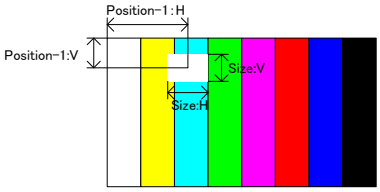
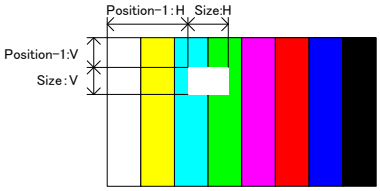
<Setting the parameters>

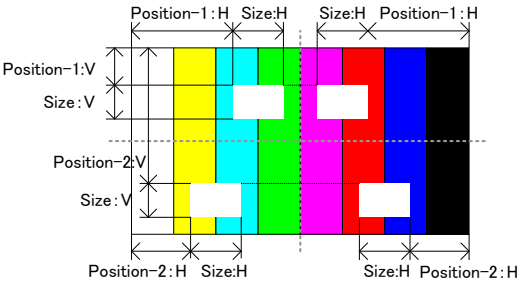
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

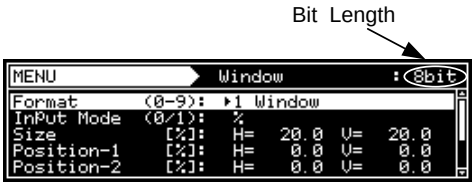
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **< Table of window setting items>** below.

<Table of window setting items>

(1)	**Format (0-9)**	The window display format is set here.		
		0	**1 Window**	One window is displayed at the center of the screen.
		1	**4 Window**	The screen is divided into four areas, and each of the four windows is displayed in the center of its respective area. The window size is set using the area divided into the four areas as 100%.
		2	**9 Window**	The screen is divided into four areas, and each of the nine windows is displayed in the center of its respective area.
		3	**16 Window**	The screen is divided into four areas, and each of the sixteen windows is displayed in the center of its respective area.
		4	**25 Window**	The screen is divided into four areas, and each of the thirty-two windows is displayed in the center of its respective area.
		5	**64 Window**	The screen is divided into four areas, and each of the sixty-four windows is displayed in the center of its respective area.
		6	**3 Window In V Row**	The screen is divided vertically into three areas, and each of the three windows is displayed in the center of its respective area.
		7	**3 Window In H Row**	The screen is divided horizontally into three areas, and each of the three windows is displayed in the center of its respective area.
		8	**User Pos Center**	The window can be displayed at any position. The coordinates of the window center are specified as the origin point of the window display. 
		9	**User Pos Corner**	The window can be displayed at any position. The coordinates of the top left of the window are specified as the origin point of the window display. 
(2)	**Input Mode (0/1)**	The input mode for the window size and display position is specified here.		
		0	**%**	The size and position are set as a percentage of the entire screen.
		1	**dot**	The size and position are set in 1-dot increments.
(3)	**Size**	The window size is set here. The setting procedure differs depending on the **Input Mode setting**.		

<table>
<tr><td>(4)</td><td>Position-1
Position-2</td><td colspan="2">Specify the coordinates of the window when format 8 (User Pos Center) or format 9 (User Pos Corner) has been selected. When Position-2 is set, the window is displayed at the reverse mirror positions of Position-1 and Position-2. In other words, when Position-2 is set, four windows are displayed at the same time.
 

<table>
<tr><td>H =</td><td>The window center position or horizontal direction of its start position is set here.</td></tr>
<tr><td>V =</td><td>The window center position or vertical direction of its start position is set here.</td></tr>
</table></td></tr>
<tr><td>(5)</td><td>Color R G B</td><td>The window colors and level are set here.
 

The setting range differs depending on the color depth.</td><td colspan="2"><table>
<tr><th colspan="2">Setting ranges by color depth</th></tr>
<tr><td>8 BIT</td><td>0 to 255</td></tr>
<tr><td>9 BIT</td><td>0 to 511</td></tr>
<tr><td>10 BIT</td><td>0 to 1023</td></tr>
<tr><td>11 BIT</td><td>0 to 2047</td></tr>
<tr><td>12 BIT</td><td>0 to 4095</td></tr>
<tr><td>13 BIT</td><td>0 to 8191</td></tr>
<tr><td>14 BIT</td><td>0 to 16383</td></tr>
<tr><td>15 BIT</td><td>0 to 32767</td></tr>
<tr><td>16 BIT</td><td>0 to 65535</td></tr>
</table></td></tr>
</table>

4.12 Cursor patterns

A cursor can be displayed on screens which show pattern displays.

The cursor can be moved to any point, and its position on the screen can be displayed.

4.12.1 Cursor settings

Before starting the procedure, set the pattern output to [Cursor], referring to "2.1.3 Selecting the pattern data."

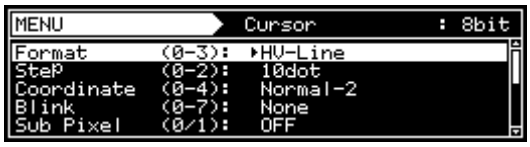
The cursor can be selected by following the operation procedure below.

For further details on pattern selection, refer to "**2.1.3 Selecting the pattern data**."

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Image/OPT
	GroupEdit		Timing		☐X[ABC]
	AutoEdit		Output		Window
	DP Analysis		Audio		**Cursor**
	Data Copy/Erase		**Pattern**		Name/List

Select item using ◯ or ▲ INC ▼ DEC

The [Cursor] screen is displayed:



<Selecting the items>

Select the items of Cursor using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

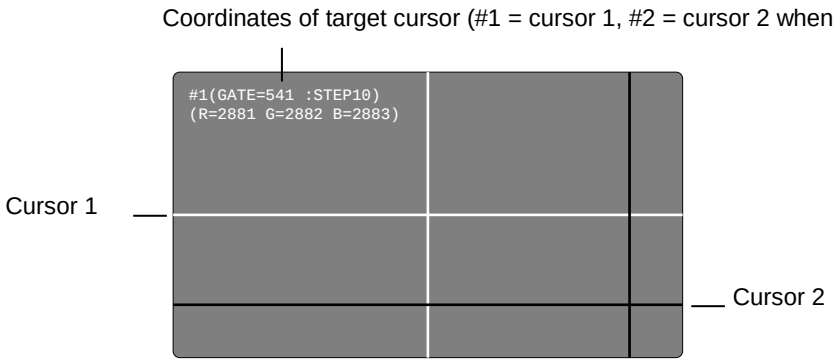
<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

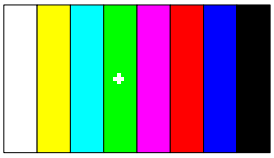
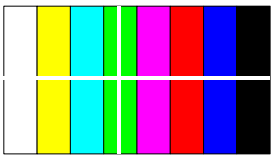
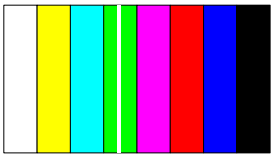
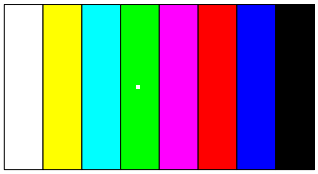
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

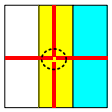
For further details on the settings, refer to **<Table of cursor setting items>** below.

<Example of what is displayed>



<Table of cursor setting items>

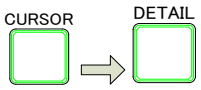
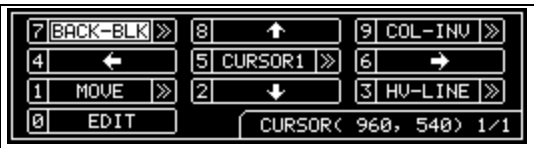
(1)	**Format (0-3)**	The shape of the cursor is set here.		
		0	**5 × 5 Cross**	The cursor is displayed as a 5-pixel × 5-pixel cross. 
		1	**HV-Line**	The cursor is displayed as a cross whose horizontal and vertical dimensions extend to the edges of the screen. 
		2	**V-Line**	The cursor is displayed as a vertical line. 
		3	**Dot**	The cursor is displayed as a 1-pixel × 1-pixel. 
(2)	**Step**	The amount of cursor movement when the cursor is to be moved is set here.		
		0 to 2	**1 dot/10 dot/100 dot**	
(3)	**Coordinate**	The coordinate display method is set here.		
		0	**OFF**	No coordinates are displayed.
		1	**Normal-1**	The horizontal and vertical coordinates and step are displayed in 1-pixel increments.
		2	**Normal-2**	The horizontal and vertical coordinates are displayed in sub-pixel increments, and the step is displayed in 1-pixel increments.
		3	**Reverse-1**	Normal-1 is inverted at the top and bottom, and displayed.
		4	**Reverse-2**	Normal-2 is inverted at the top and bottom, and displayed.

<table>
<tr><td>(4)</td><td>Blink (0-7)</td><td colspan="3">Whether the cursor is to blink and the blink interval are set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>None</td><td>The cursor does not blink.</td></tr>
<tr><td></td><td></td><td>1 to 7</td><td>1 V /2 V /4 V /8 V /16 V /32 V /64 V</td><td>The cursor blinks for each 1 V (vertical sync period) to 64 V and then goes off, and this is repeated.</td></tr>
<tr><td>(5)</td><td>Sub Pixel (0/1)</td><td colspan="3">Whether the cursor is to be moved in 1-pixel increments or sub-pixel increments is set here.
[Operation in sub-pixel increments]
Right → R → G → B → R → G → B → Left</td></tr>
<tr><td></td><td></td><td>0</td><td>OFF</td><td>The cursor is moved in 1-pixel increments.</td></tr>
<tr><td></td><td></td><td>1</td><td>ON</td><td>The cursor is moved in sub-pixel increments.</td></tr>
<tr><td>(6)</td><td>Overlay (0/1)</td><td colspan="3">Whether the cursor is to be displayed on top of the test pattern or on top of the background color set using the Color Back R G B item is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>OFF</td><td>The cursor is displayed on top of the background color set by the Color Back R G B item.</td></tr>
<tr><td></td><td></td><td>1</td><td>ON</td><td>The cursor is displayed on top of the test pattern.</td></tr>
<tr><td>(7)</td><td>Intersection (0/1)</td><td colspan="3">The shape of the intersection is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>Normal</td><td>The intersection is filled in as a cross.</td></tr>
<tr><td></td><td></td><td>1</td><td>Space</td><td>The cursor is not displayed in the pixels of the intersection and sub-pixels below it, but the original background is displayed instead.
  </td></tr>
<tr><td>(8)</td><td>Cursor 2 (0/1)</td><td colspan="3">The display of the second cursor (cursor 2) is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>OFF</td><td>The cursor is not displayed.</td></tr>
<tr><td></td><td></td><td>1</td><td>ON</td><td>The cursor is displayed.</td></tr>
<tr><td>(9)</td><td>Color Cursor 1 R G B</td><td colspan="3">The cursor 1 color and level are set here.
The setting range differs depending on the color depth.</td><td>Setting ranges by color depth</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>8 BIT</td><td>0 to 255</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>9 BIT</td><td>0 to 511</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>10 BIT</td><td>0 to 1023</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>11 BIT</td><td>0 to 2047</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>12 BIT</td><td>0 to 4095</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>13 BIT</td><td>0 to 8191</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>14 BIT</td><td>0 to 16383</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>15 BIT</td><td>0 to 32767</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td>16 BIT</td><td>0 to 65535</td></tr>
<tr><td>(10)</td><td>Color Cursor 2 R, G, B</td><td colspan="4">The cursor 2 color and level are set here.
The setting procedure is the same as for the Color Cursor 1 R G B item.</td></tr>
<tr><td>(11)</td><td>Color Back R G B</td><td colspan="4">The background color and level are set here. However, when On has been selected as the Overlay item setting, the test pattern becomes the background so that this setting is canceled.
The setting procedure is the same as for the Color Cursor 1 R G B item.</td></tr>
</table>

4.12.2 Cursor operations

The cursor operations which can be performed include moving the cursor and changing the cursor level.

Operation screen display

<table>
<tr>
<td> 
</td>
<td> 
</td>
</tr>
</table>

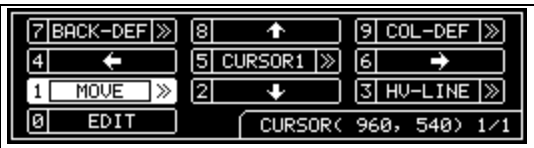
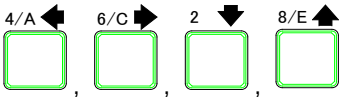
Moving the cursor

<table>
<tr>
<td>(1)</td>
<td>Select MOVE using 

.

(When Cursor 2 is ON)

Select CURSOR1 or CURSOR2 using 

.</td>
<td> 
</td>
</tr>
<tr>
<td>(2)</td>
<td>When the number keys are used
 
</td>
<td>4 The cursor moves toward the left.
6 The cursor moves toward the right.
2 The cursor moves downward.
8 The cursor moves upward.</td>
</tr>
<tr>
<td rowspan="2">(3)</td>
<td rowspan="2">When the jog dial is used
  </td>
<td>When 

or 

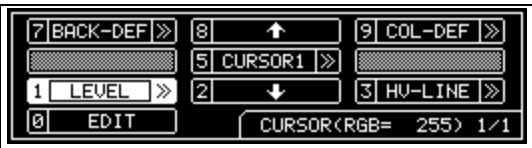
is pressed and the jog dial is turned, the cursor moves to the left or right.</td>
</tr>
<tr>
<td>When 

or 

is pressed and the jog dial is turned, the cursor moves downward or upward.</td>
</tr>
<tr>
<td>(4)</td>
<td>When the USB mouse is used
(Refer to “1.4.5 Names of connectors and their applications.”)</td>
<td>The cursor moves in line with the mouse movements. Use the right button to switch between CURSOR1 and CURSOR2.</td>
</tr>
</table>

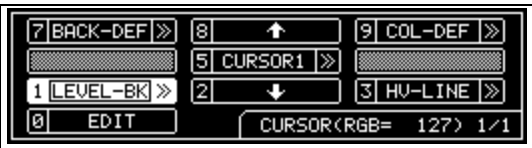
Changing the cursor level

These steps change the **Color Cursor 1 R, G, B** and **Color Cursor 2 R, G, B** settings.

(1)	Select **LEVEL** using 1 . (When Cursor 2 is ON) Select **CURSOR1** or **CURSOR2** using 5/B ● .		
(2)	**(When the number keys are used)** 2 , 8/E	**2**	The level is decremented.
		8	The level is incremented.
(3)	**(When the jog dial is used)**	When the dial is turned counterclockwise	The level is decremented.
		When the dial is turned clockwise	The level is incremented.

Changing the background level

These steps change the **Color Back R, G, B** settings.

(1)	Select **LEVEL-BK** using 1 . Select **BACK-DEF** using 7/D .		
(2)	**(When the number keys are used)** 2 , 8/E	**2**	The level is decremented.
		8	The level is incremented.
(3)	**(When the jog dial is used)**	**When the dial is turned counter-clockwise**	The level is decremented.
		When the dial is turned clockwise	The level is incremented.

Changing the cursor shape

These steps change the **Format** setting.

3	**5x5CROSS**	Cross consisting of 5 × 5 pixels
	HV-LINE	Cross which covers the entire screen
	V-LINE	Vertical line
	DOT	1 × 1 pixel

Changing the background color

BACK-DEF	**Color Back R, G, B** settings
BACK-W	White
BACK-R	Red
BACK-G	Green
BACK-B	Blue
BACK-BLK	Black

Inverting the cursor color

COL-DEF	Normal
COL-INV	Inverted

4.13 Name/List

Information such as the setting data and execution results as well as the images (number of colors restricted) are contained in the Name/List patterns, and they can be superimposed onto other patterns.

<Name/List types>

NAME/LIST 	NAME	Program name display	For details, refer to “4.13.2 Name.”
	EDID	EDID setting data display	For further details, refer to “4.13.3 EDID.”
	DDC/CI	DDC-CI setting data display	For further details, refer to “4.13.4 DDC/CI.”
	HDCP	HDCP authentication screen display.	For further details, refer to“4.13.5 HDCP (High-bandwidth Digital Content Protection).”
	CEC	CEC setting data display	For further details, refer to “10.3.7 CEC function.”
	HDMI	HMDI setting data display	For further details, refer to “4.13.6 HDMI list.”
	DP	DisplayPort setting data and DPCD display.	For further details, refer to “10.4.4 DisplayPort setting information”.
	TIMING	Timing data (parameter, etc.) display	For further details, refer to “4.13.7 Timing data list.”
	IMAGE	Image pattern list display	For further details, refer to “4.13.8 Image pattern list.”
	OPT-USER	User optional pattern list display	For further details, refer to “4.13.9 OPT-USER pattern list.”
	SUBTITLE	Display of images to be used for the subtitles created by the user	For details, refer to “4.13.10 Subtitle.”
	HDMI ARC	Audio Return Channel data display	For details, refer to “10.3.12 Audio Return Channel.”
	SCDC	SCDC setting data display	For further details, refer to “4.13.11 SCDC”.

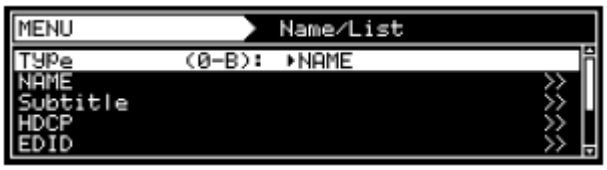
4.13.1 Name/List display

Before starting the procedure, set the pattern output to [Name/List], referring to "2.1.3 Selecting the pattern data."

The Name/List functions can be selected by the operations described below.

	MENU	⇒	ProgramEdit	⇒	Pattern
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Image/OPT
	GroupEdit		Timing		☐X[ABC]
	AutoEdit		Output		Window
	DP Analysis		Audio		Cursor
	Data Copy/Erase		**Pattern**		**Name/List**
Select item using ◯ or ▲ INC ▼ DEC					

The [Name/List] screen is displayed:



<Selecting the items>

Select the items of Name/List using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

The pattern to be displayed by **Type** is specified here.

Some patterns have detailed setting items.

<Type>

0	**NAME**	The names of the program and output bit are displayed.
1	**Subtitle**	The images to be used for the subtitles created by the user are displayed.
2	**EDID**	The EDID is displayed as text.
3	**EDID(HEX)**	The EDID is displayed in the hexadecimal (HEX) format.
4	**DDC/CI**	DDC/CI is used.
5	**HDCP**	The HDCP authentication screen is displayed.
6	**Timing**	A list of the timing data being output is displayed.
7	**Image**	Information of the image patterns registered in the internal memory or in the USB Memory is displayed.
8	**OPT-USER**	The names and sizes of the user optional patterns registered in the internal memory or in the USB Memory is displayed.
9	**CEC**	The CEC execution list is displayed.
A	**HDMI ARC**	Audio Return Channel data is displayed.
B	**HDMI**	A list of the HDMI-related data is displayed.
C	**DP**	Text display of DPCD. The first page displays setting information of DisplayPort (LinkRate/ Lane count, result of Link Training.)
D	**DP(HEX)**	DPCD is displayed in the hexadecimal (HEX) format.
E	**SCDC**	SCDC text is displayed.
F	**SCDC(HEX)**	SCDC is displayed in the hexadecimal (HEX) format.

4.13.2 Name

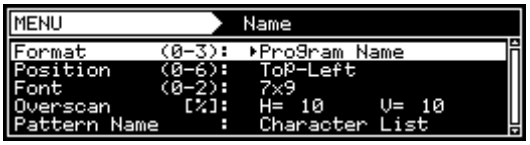
Before starting the procedure, set the pattern output to [Name/List], referring to "2.1.3 Selecting the pattern data."

The display method can be set when Name has been selected as the Type setting.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Name/List
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Image/OPT	SET ⇒	**NAME**
	GroupEdit		Timing		☐X[ABC]		Subtitle
	AutoEdit		Output		Window		HDCP
	DP Analysis		Audio		Cursor		EDID
	Data Copy/Erase		**Pattern**		**Name/List**		DDC/CI

Select item using ◯ or ▲ INC ▼ DEC

The [Name] screen is displayed:



<Selecting the items>

Select the items of Name using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of name setting items>** below.

<Table of name setting items>

(1)	**Format (0-3)**	The display contents of Name are set here.		
		0	**Program Name**	The program names are displayed.
		1	**Pattern Name**	The pattern names are displayed.
		2	**Program & Pattern Name**	The program names and pattern names are displayed at the same time.
		3	**Program Name, Freq**	The program names and video timing signal frequencies are displayed at the same time.
(2)	**Position(0-6)**	The display position of the name is set here.		
		0	**Center**	The name is displayed at the screen center.
		1	**Top-Left**	The name is displayed at the top left of the screen.
		2	**Bottom-Left**	The name is displayed at the bottom left of the screen.
		3	**Top-Right**	The name is displayed at the top right of the screen.
		4	**Bottom-Right**	The name is displayed at the bottom right of the screen.
		5	**Top-Center**	The name is displayed at the upper center of the screen.
		6	**Bottom Center**	The name is displayed at the lower center of the screen.
(3)	**Font(0-2)**	The font size is set here.		
		0	**5 × 7**	5 × 7 is set as the font size.
		1	**7 × 9**	7 × 9 is set as the font size.
		2	**16 × 16**	16 × 16 is set as the font size.
		3	**32 x 32**	32 x 32 is set as the font size.
		4	**64 x 64**	64 x 64 is set as the font size.
(4)	**Overscan [%]**	The display position can be adjusted in such a way that the display is not hidden to simulate an overscanning monitor.		
		H =		Set the horizontal overscanning ratio.
		V =		Set the vertical overscanning ratio.
(5)	**Pattern Name**	The pattern names are edited here. For details on the editing procedure, refer to “2.3 Setting the names.”		

Note) the output bit is displayed as below:
when HDMI/DP/SDI/V-by-One HS interface unit was installed in VG-876:

Color Depth

HDMI I/F:8bit ← Interface unit name (HDMI), output bit
DP I/F:8bit ← Interface unit name (DP), output bit
SDI I/F:8bit ← Interface unit name (SDI), output bit
VbyOne I/F:8bit ← Interface unit name (VbyOne), output bit

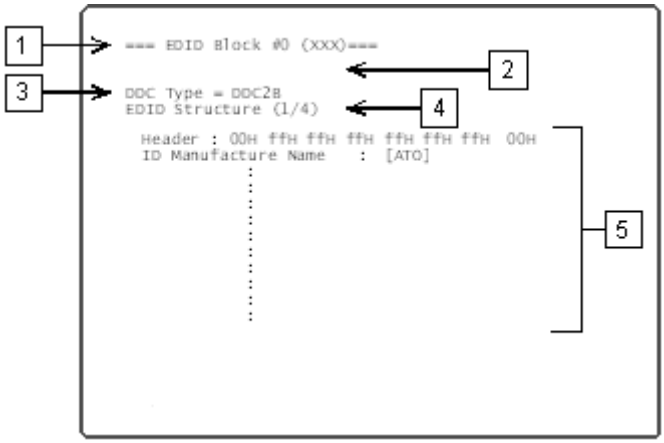
Reference) about output bit
Output bit is decided by below parameter and its priority.
1st priority: setting of Config - Color Depth.
2nd priority: setting of Digital Output - Color Depth (only HDMI / DP / SDI has this setting.)
3rd priority: setting of All Output - Color Depth

4.13.3 EDID

The EDID of the connected display can be displayed on the screen.

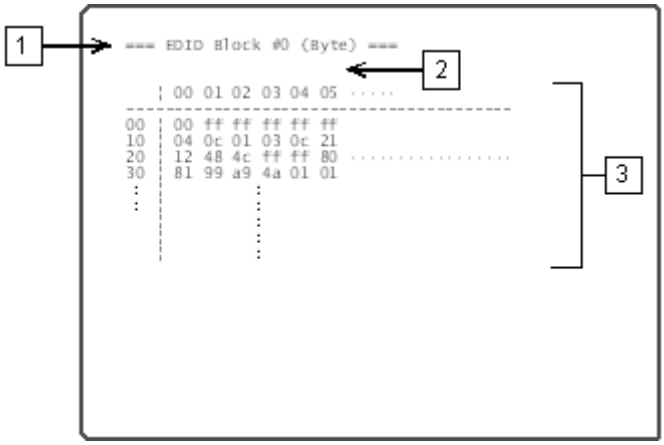
a) EDID display method

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Displaying the EDID>** Select **EDID** using or ▲ INC ▼ DEC, and then press SET. Alternatively, select 4/A for the GUI display format or 5/B ● for the HEX display format.	The EDID is displayed as shown in the figure below. 
(3)	**<Selecting the pages>** Select 2 << (previous page) or 3 >> (next page)using or ▲ INC ▼ DEC, and then press SET. Alternatively, select the page using 2 (previous page) or 3 (next page).	When the display extends over several pages, it is divided up on the fluorescent display tube, and shown. (Switch from one page to another to display all the information.)



With the GUI display format

1) Block number of EDID
2) Error display when an error has occurred
3) DDC type
4) EDID block now displayed
5) Content of EDID



With the HEX display format

1) Block number of EDID
2) Error display when an error has occurred
3) Content of EDID

CAUTION

The maximum number of blocks read for EDID is 8 (one basic block + 7 expanded blocks). (When HDMI is selected)

b) Port selection method

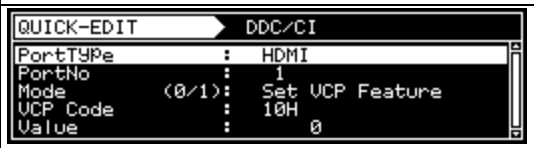
The EDID is displayed by only one video interface at a time, and it is necessary to set the video interface which is to display the EDID.

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL Establish the state in which EDID or EDID (HEX) is selected.		
(2)	Select **EDIT** using ○ or ▲ INC ▼ DEC , and then press SET . Alternatively, select **EDIT** using 0/STATUS .		
(3)	**<Selecting the port>** Select the port using ○ or ▲ INC ▼ DEC , and then press SET .	**PortType** **PortNo**	Select the unit and port whose EDID is displayed. (Some parameters may not be displayed depending on the unit configuration.) HDMI: Setting range : 1-16 DP: Setting range : 1-8 VGA: Setting range : 1-4 iTMDS: Setting range : 1-8 HDBaseT: Setting range : 1-16

4.13.4 DDC/CI

Using the HDMI connector, the DDC/CI commands can be sent and received, and shown on the display.
Two modes are available for DVI/CI: the **Get** (**Get VCP Feature**) mode in which the setting data is loaded from the information set in the display at the connection destination, and the **Set** (**Set VCP Feature**) mode in which the data of the user's choice is set.

<Setting DDC/CI>

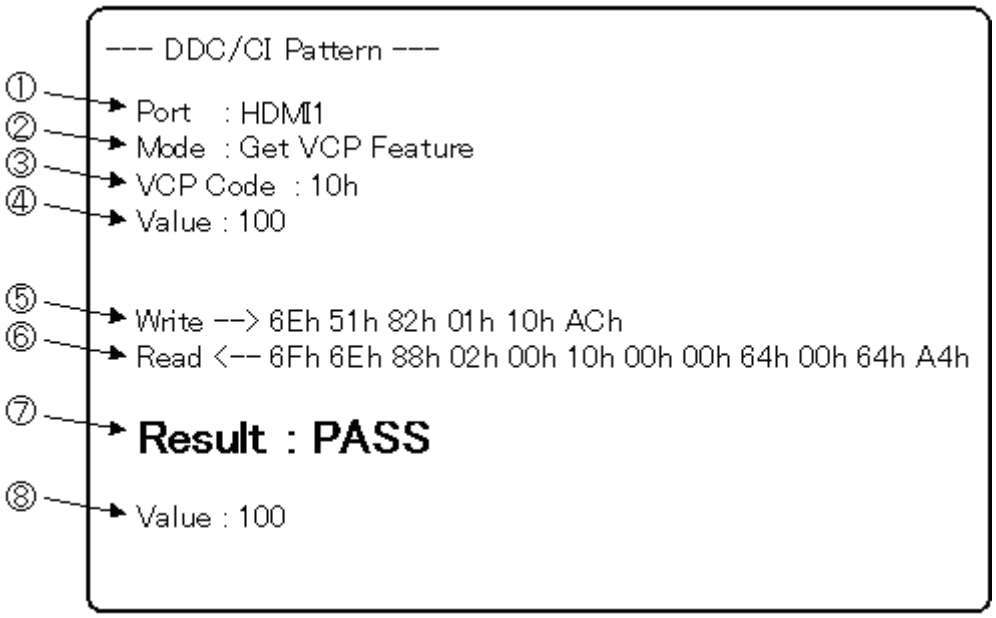
(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Selecting DDC/CI>** Select **DDC/CI** using ○ or ▲ INC ▼ DEC , SET and then press .	
(3)	**<Detailed setting: EDIT>** Select **EDIT** using ○ or ▲ INC ▼ DEC , SET and then press . Alternatively, select EDIT using 0/STATUS .	

< Re-executing DDC/CI>

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	Select **RE-EXECUTE** using ◯ or ▲ INC ▼ DEC, and then press SET. Alternatively, select RE-EXECUTE using 3.	

<Table of DDC/CI setting items>

(1)	**Port No**	Select the port that uses DDC/CI command. (Some parameters may not be displayed depending on the unit configuration.)		
		HDMI	Setting range : 1-16	
		DP	Setting range : 1-8	
		VGA	Setting range : 1-4	
		iTMDS	Setting range : 1-8	
		HDBaseT	Setting range : 1-16	
(2)	**Mode (0/1)**	The operating mode is set here.		
		0	**Get VCP Feature**	The status of the connection destination is checked.
		1	**Set VCP Feature**	The control commands are sent to the connection destination.
(3)	**VCP Code**	00H-FFH	The VCP code is set.	
(4)	**Value**	0-65535	A value is set only when **Set VCP Feature** has been selected as the Mode setting.	



1	Port	Output port from which DDC/CI is transferred DVI or Dsub	Items to be set by the generator
2	Mode	DDC/CI transfer mode Get VCP Feature: The status of the connection destination is received. Set VCP Feature: Control commands are sent to the connection destination.	
3	VCP Code	Transfer command (set using the hexadecimal format)	
4	Value	(Displayed only when Set VCP Feature has been selected as the Mode setting.) Parameter value to be transferred from the generator to the connection destination	
5	Write	Data sent from the generator	Items which display the receiving or sending results
6	Read	Data received by the generator	
7	Result	Transfer result PASS: Data was transferred successfully. NG: Transfer failed.	
8	Value	(Displayed only when Get VCP Feature has been selected as the Mode setting.) Parameter value received by the VG-876 from the connection destination	

4.13.5 HDCP (High-bandwidth Digital Content Protection)

The HDCP authentication results can be shown on the display.

(For details on the HDCP settings and execution refer to "**6. HDCP SETTINGS AND EXECUTION**")

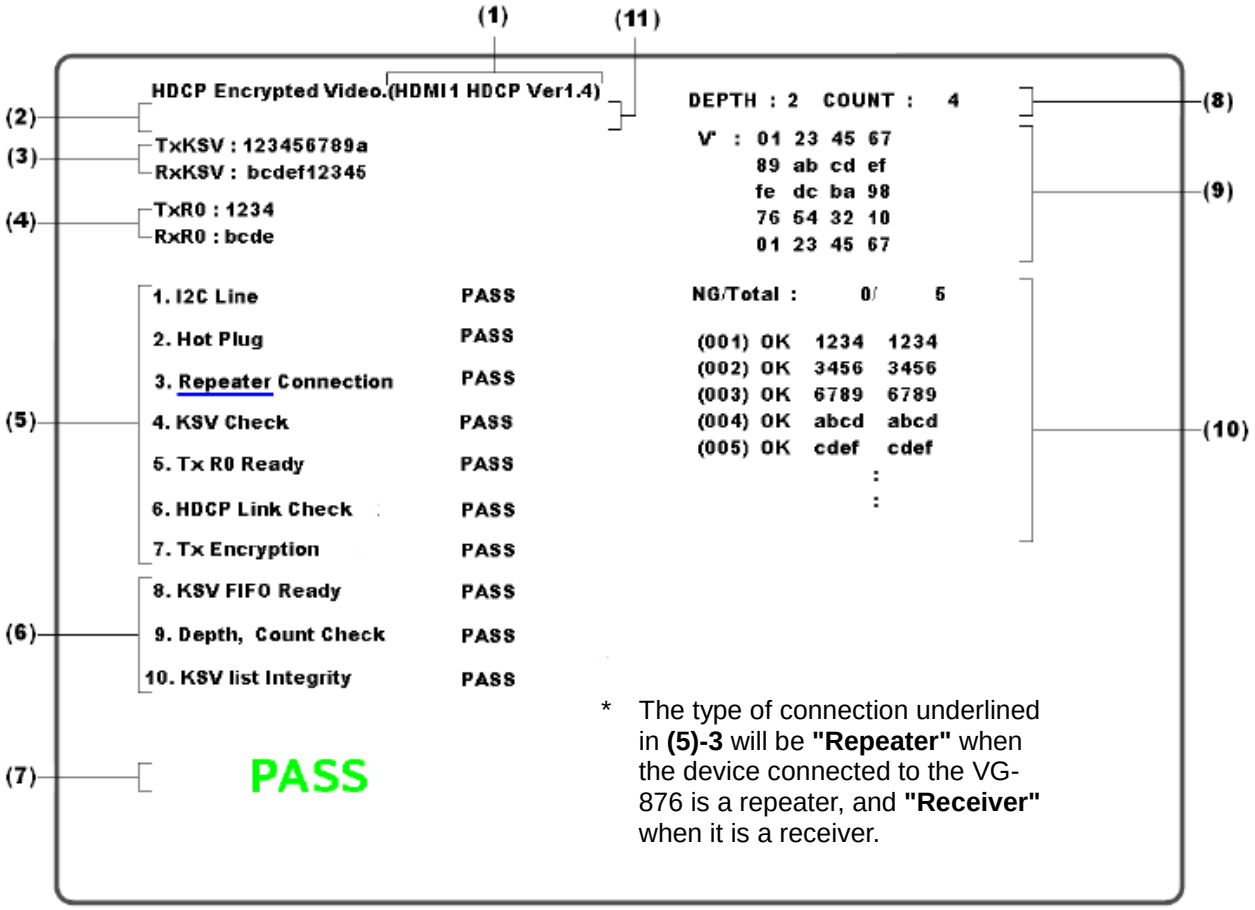
<Displaying the HDCP authentication screen>

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Selecting HDCP>** Select **HDCP** using or ▲ INC ▼ DEC, and then press SET.	
(3)	**<Detailed setting >** For the detailed HDCP settings, Select EDID using or ▲ INC ▼ DEC Then press SET. Or, select it by 0/STATUS.	

<HDCP setting item list>

(1)	PortType	Select interface whose HDCP information to be displayed.	
		0	HDMI
		1	DP
		2	HDBaseT
(2)	PortNo	Select the port whose HDCP information to be displayed. (Some parameters may not be displayed depending on the unit configuration.)	
		HDMI	Setting range : 1-16
		DP	Setting range : 1-8
		HDBaseT	Setting range : 1-16

HDCP1.0, 1.1 or 1.2



Details of the information shown on the screen are given below.

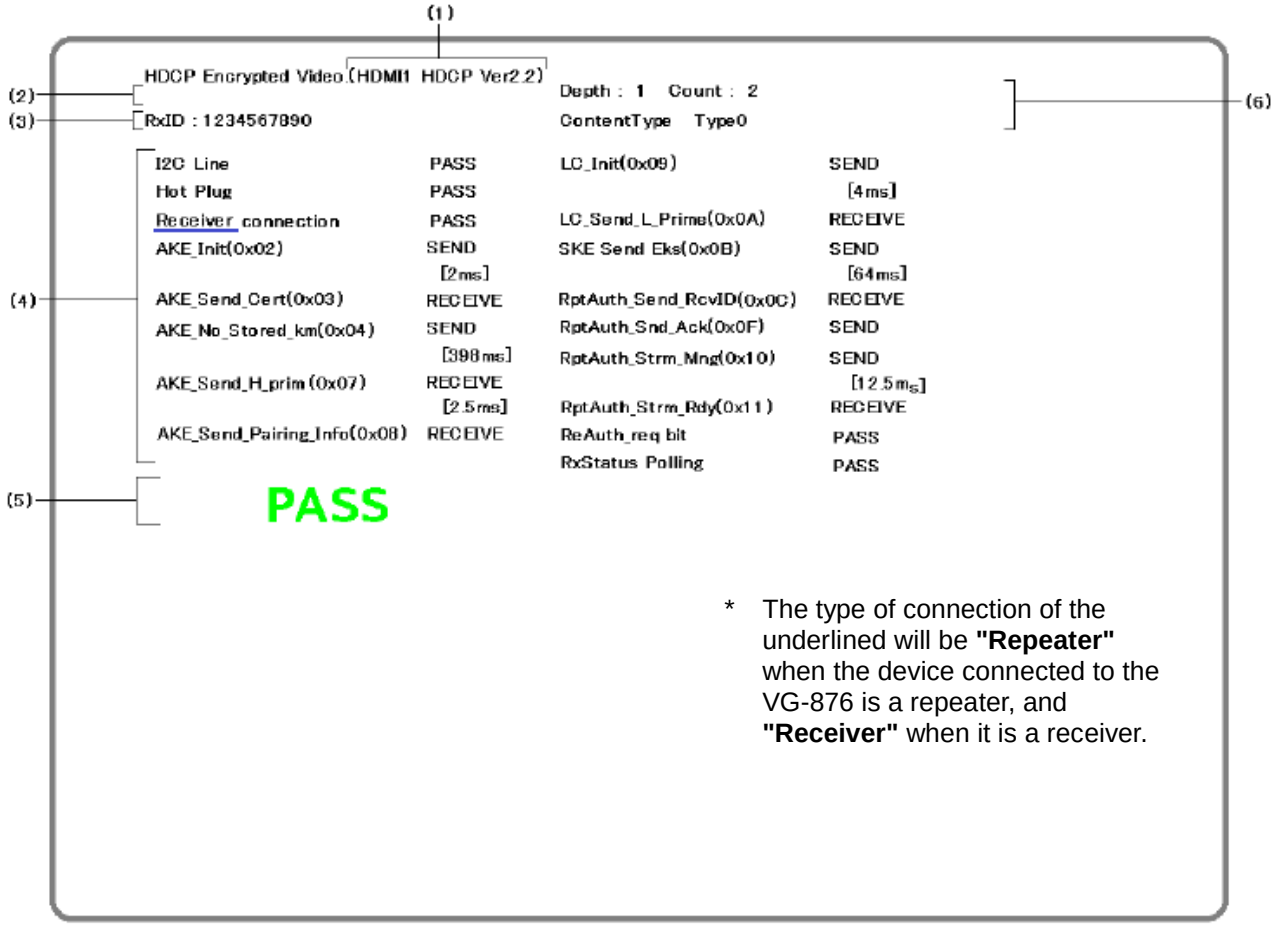
<HDCP authentication screen display data>

(1)	This indicates the port selected in **c) Display Select** of **"6. 2.1 Execution procedure"** (When the HDCP authentication is successful, the HDCP version is displayed beside the port; when it has failed, an error message is displayed beside the port.)
(2)	The EDID reading results are indicated here. (The results are displayed only when **AUTO** has been selected as the **HDMI or DVI** setting in **"10.3.2 HDMI setting procedure"** or when **"EDID Check"** has been selected as the **Version** setting in **"6.1 HDCP settings."**)
(3)	The Key Selection Vectors are displayed here among the HDCP keys. "TxKSV" is the key selection vector of the transmitter; "RxKSV" is the key selection vector of the receiver. *VM-1876-M7 does not display this item.
(4)	The Synchronization Verification Values calculated by the initial authentication are displayed here. "TxR0" is the value calculated for the transmitter; "RxR0" is the value calculated for the receiver. *VM-1876-M7 does not display this item.

(5)	The authentication status of the initial authentication is displayed here. *VM-1876-M7 does not display 5. TxR0Relay and 6. HDCP Link Check.	An item with “PASS” indicates an item that has been successfully authenticated.
(6)*1	The authentication status of the second authentication for a repeater is displayed here. *VM-1876-M7 does not display 10. KSV list Integrity.	
(7)	If all the authentications have been carried out successfully, “PASS (green)” appears; otherwise, “NG (red)” appears.	
(8)*1	The DEPTH (number of stages) and COUNT (total number of connections) of the devices connected beyond the receiver which in turn is connected to the VG-876 are shown here.	
(9)*1	The value (V’) shown here is for verifying the adequacy of the KSV list of the devices connected beyond of the receiver that is connected to the VG-876. *VM-1876-M7 does not display this item.	
(10)	Shown here are the Synchronization Verification Values (Ri, Ri’) for checking the adequacy of the link. Ri is the value calculated for the transmitter; Ri’ is the value calculated for the receiver. “OK” is displayed when the transmitter and receiver values match. (If OK resulted from a retry, “OK2” is displayed instead.) *In VM-1876-M7, only the calculated value of Receiver as RxRi is displayed. OK/NG is not displayed.	
(11)	AV Mute ON/OFF when HDCP is reauthenticated. In the setting of 6.1 HDCP setting, if it is “1.0”, AV Mute Mode OFF” is displayed, if it is “1.1/1.2”, “AV Mute Mode ON” is displayed. *VM-1876-M7 and VM-1876-M8 do not display this item.	

*1 This information is displayed only when the device connected to the VG-876 is a repeater.

HDCP2.2



* The type of connection of the underlined will be **"Repeater"** when the device connected to the VG-876 is a repeater, and **"Receiver"** when it is a receiver.

Details of the information shown on the screen are given below.

<HDCP authentication screen display data>

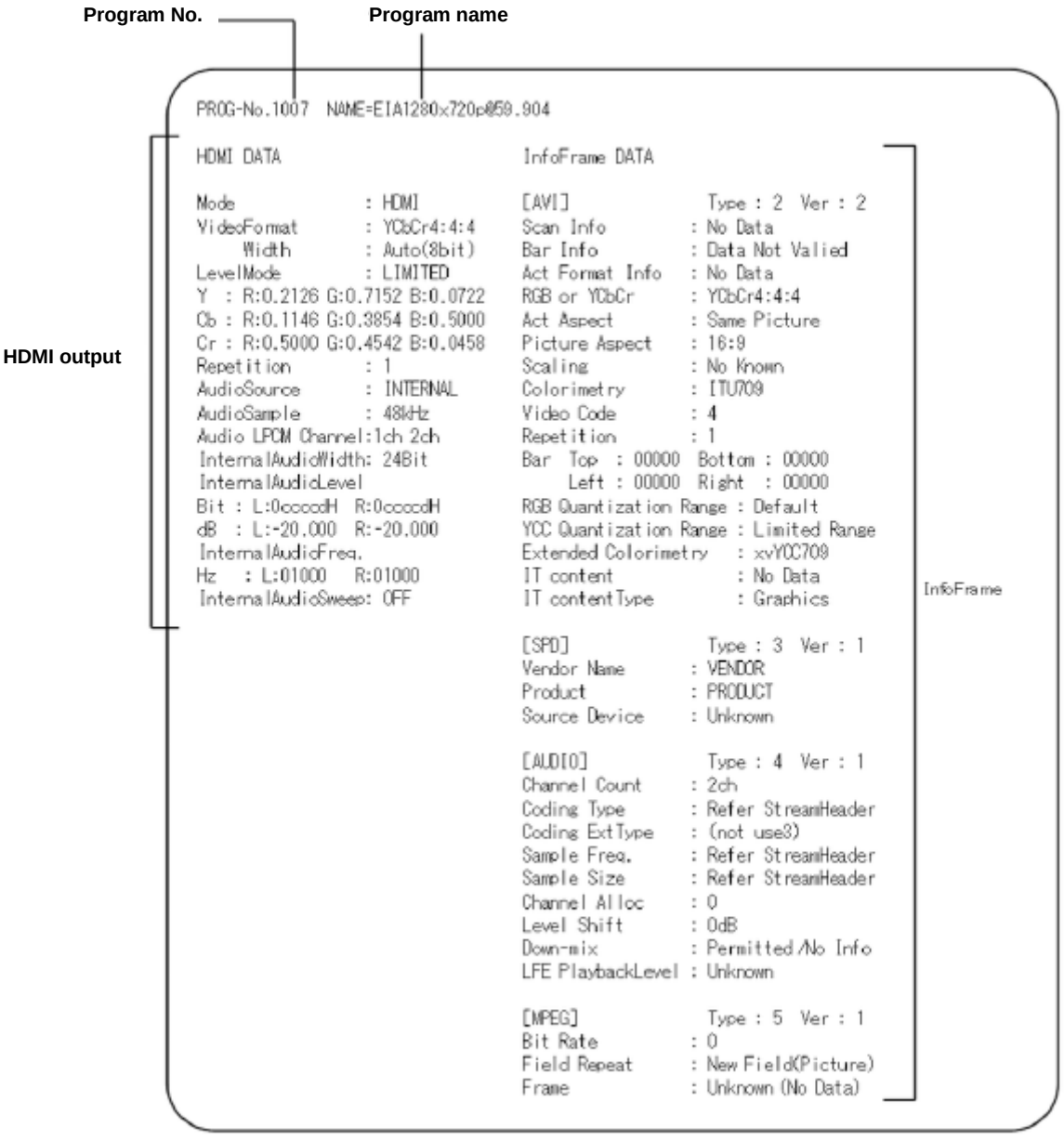
(1)	This indicates the port selected in **c) Display Select** of **"6. 2.1 Execution procedure"** (When the HDCP authentication is successful, the HDCP version is displayed beside the port; when it has failed, an error message is displayed beside the port.)
(2)	The EDID reading results are indicated here. (The results are displayed only when **AUTO** has been selected as the **HDMI or DVI** setting in **"10.3.2 HDMI setting procedure"** or when **"EDID Check"** has been selected as the **Version** setting in **"6.1 HDCP settings."**)
(3)	Receiver ID is displayed.
(4)	The authentication status is displayed here. "PASS" indicates an item that has been successfully authenticated. "SEND" indicates that the command is sent out from VG. "NOT SEND" indicates that the command was not sent out from VG. "RECEIVE" indicates that VG receives command. "NOT RECEIVE" indicates that VG did not receive command. [--ms] between "SEND" and "RECEIVE" indicates the time from the previous command transmission (or receiving) to receiving of next command. Note) "SEND", "RECEIVE" and time [--ms] is displayed for the port you selected in <HDCP Setting Item List>. Please connect cable to the port you selected. If you connect to the different port of VG, it will display "Please Reauthenticate [--ms]". When you change the selecting port, please perform authentication again.
(5)	If all the authentications have been carried out successfully, "PASS (green)" appears; otherwise, "NG (red)" appears. Note) if "Please Reauthenticate [--ms]" is displayed as explained in (4) but shows PASS, the authentication of the connected port is okay.
(6)*	Content Type setting and the DEPTH (number of connecting hierarchy) and COUNT (total number of connections) of the devices connected beyond the receiver that is connected to the VG-876 are shown here.

*This information is displayed only when the device connected to the VG-876 is a repeater.

4.13.6 HDMI list

The HDMI list display can be selected by pressing the NAME/LIST pattern key while the output from the HDMI connector is connected to the display. Information on the signals which are input to the display from the HDMI connector is shown on the display.

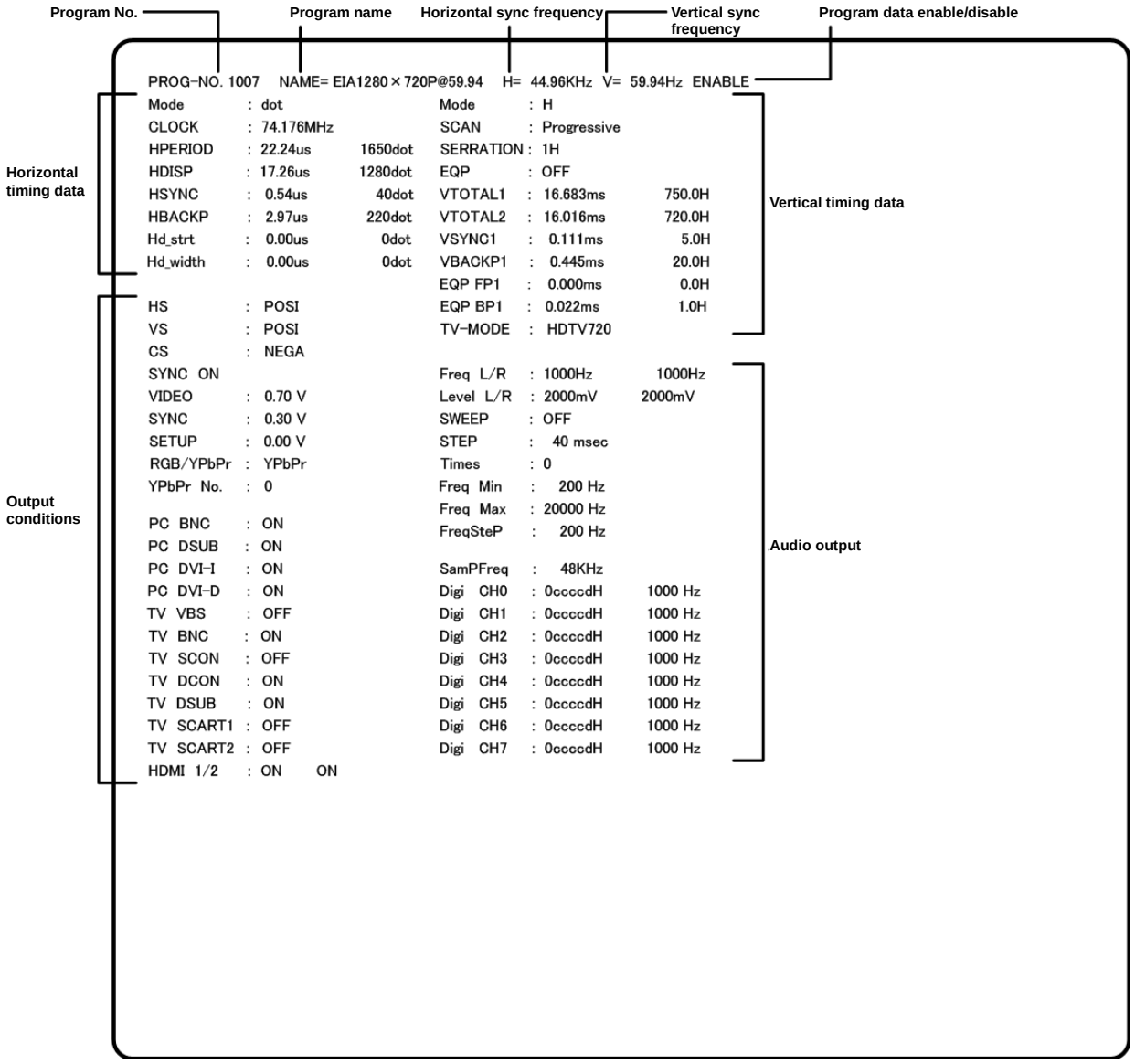
Example: HDMI list when EIA 1280 × 720 and 59.94 Hz output signals are supplied to the display



4.13.7 Timing data list

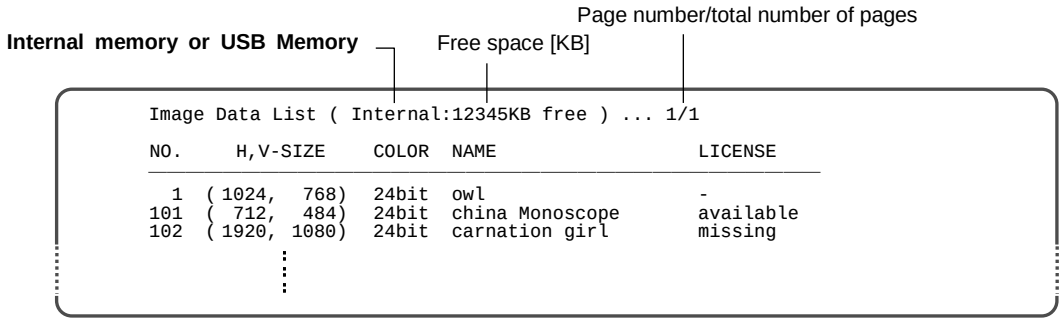
The timing data list display can be selected by pressing the NAME/LIST pattern key while the generator output is connected to the display. The timing data (such as the parameters) of the signals which are input to the display from the output connector is shown on the display.

Example: Timing list when EIA 1280 × 720 and 59.94 Hz output signals are supplied to the display



4.13.8 Image pattern list

When the image list display is selected by pressing the NAME/LIST key while the generator output is connected to the display, the information on the image patterns registered in the internal memory or in the USB Memory is shown on the display.
If the USB Memory has been inserted, the information in the USB Memory is displayed; otherwise, the information in the internal memory is displayed.

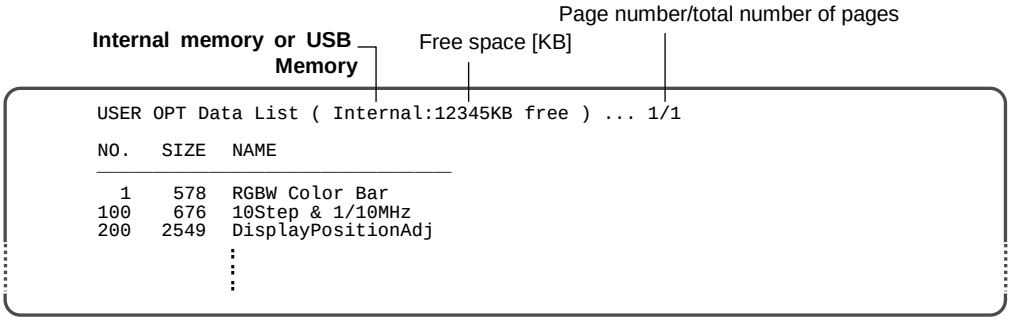


NO.: Image number
H, V-SIZE: Image size (width [dots], height [dots])
COLOR: Number of bits per dot
NAME: Image name
LICENSE:
- No license required (standard)
available The license has been registered so the image list can be used. (option)
missing The license has not been registered so the image list cannot be used by this generator. (option)

If the total number of pages exceeds 2, the pages can be selected using 2 << / 3 >>.

4.13.9 OPT-USER pattern list

When the OPT-USER pattern list display is selected by pressing the NAME/LIST key while the generator output is connected to the display, the names and sizes of the user optional patterns registered in the internal memory or on the USB Memory are shown on the display.
If the USB Memory has been inserted, the names and sizes of the patterns in the USB Memory are displayed; otherwise, the names and sizes of the patterns in the internal memory are displayed.



NO.: Pattern number
SIZE: Pattern size [bytes]
NAME: Pattern name

If the total number of pages exceeds 2, the pages can be selected using 2 << / 3 >>.

4.13.10 Subtitle

The image patterns (*) created by the user are displayed.
Scrolling is possible using the action settings. (Refer to “7.5 Subtitle scrolling.”)

* Unlike the images in “4.9 Image/OPT,” the images which can be displayed here are subject to restrictions on the number of colors and other aspects.
They are created and registered using the Windows software program (SP-8870) which is provided with the VG generator. For details, refer to the operating instructions of the SP-8870.

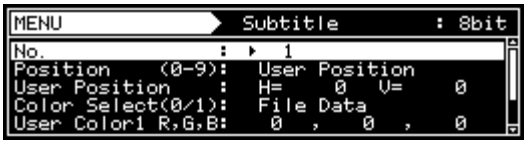
Before starting the procedure, set the pattern output to [Name/List], referring to “2.1.3 Selecting the pattern data.”

The procedure for setting the parameters is outlined below.

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Name/List
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Image/OPT	SET ⇒	NAME
	GroupEdit		Timing		☐X[ABC]		**Subtitle**
	AutoEdit		Output		Window		HDCP
	DP Analysis		Audio		Cursor		EDID
	Data Copy/Erase		**Pattern**		**Name/List**		DDC/CI

Select item using ◯ or ▲ INC ▼ DEC

The [Subtitle] screen is displayed:



<Selecting the items>

Select the items of Subtitle using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of subtitle setting items>** below.

<Table of subtitle setting items>

<table>
<tr><td>(1)</td><td>No.</td><td colspan="3">The number of the image pattern to be displayed is set here.
Setting range: 1 to 200</td></tr>
<tr><td rowspan="10">(2)</td><td rowspan="10">Position (0-9)</td><td colspan="3">The position where the pattern is to be displayed is set here.</td></tr>
<tr><td>0</td><td>User Position</td><td>Setting position of User Position in (3)</td></tr>
<tr><td>1</td><td>Top-Left</td><td>Top left</td></tr>
<tr><td>2</td><td>Middle-Left</td><td>Center left</td></tr>
<tr><td>3</td><td>Bottom-Left</td><td>Bottom left</td></tr>
<tr><td>4</td><td>Top-Center</td><td>Center top</td></tr>
<tr><td>5</td><td>Center</td><td>Center</td></tr>
<tr><td>6</td><td>Bottom-Center</td><td>Center bottom</td></tr>
<tr><td>7</td><td>Top-Right</td><td>Top right</td></tr>
<tr><td>8</td><td>Middle-Right</td><td>Center right</td></tr>
<tr><td>9</td><td>Bottom-Right</td><td>Bottom right</td></tr>
<tr><td>(3)</td><td>User Position</td><td colspan="3">The desired display position (coordinate for the top left of the pattern) is set here.
The setting takes effect when User Position has been selected as the Position setting.
Setting range: 0 to 9999</td></tr>
<tr><td rowspan="3">(4)</td><td rowspan="3">Color Select (0/1)</td><td colspan="3">The display colors are set here.</td></tr>
<tr><td>0</td><td>File Data</td><td>The colors of the image pattern data are displayed in their original form.</td></tr>
<tr><td>1</td><td>User Color</td><td>The settings for User Color1-3 in (5) are used.</td></tr>
<tr><td>(5)</td><td>User Color1 to 3 R,G,B</td><td colspan="3">The desired display colors are set here.
The setting takes effect when User Color has been selected as the Color Select setting.

The setting range differs depending on the color depth.

Color Depth / Setting range
8BIT: 0 - 255
9BIT: 0 - 511
10BIT: 0 - 1023
11BIT: 0 - 2047
12BIT: 0 - 4095
13BIT: 0 - 8191
14BIT: 0 - 16383
15BIT: 0 - 32767
16BIT: 0 - 65535</td></tr>
</table>

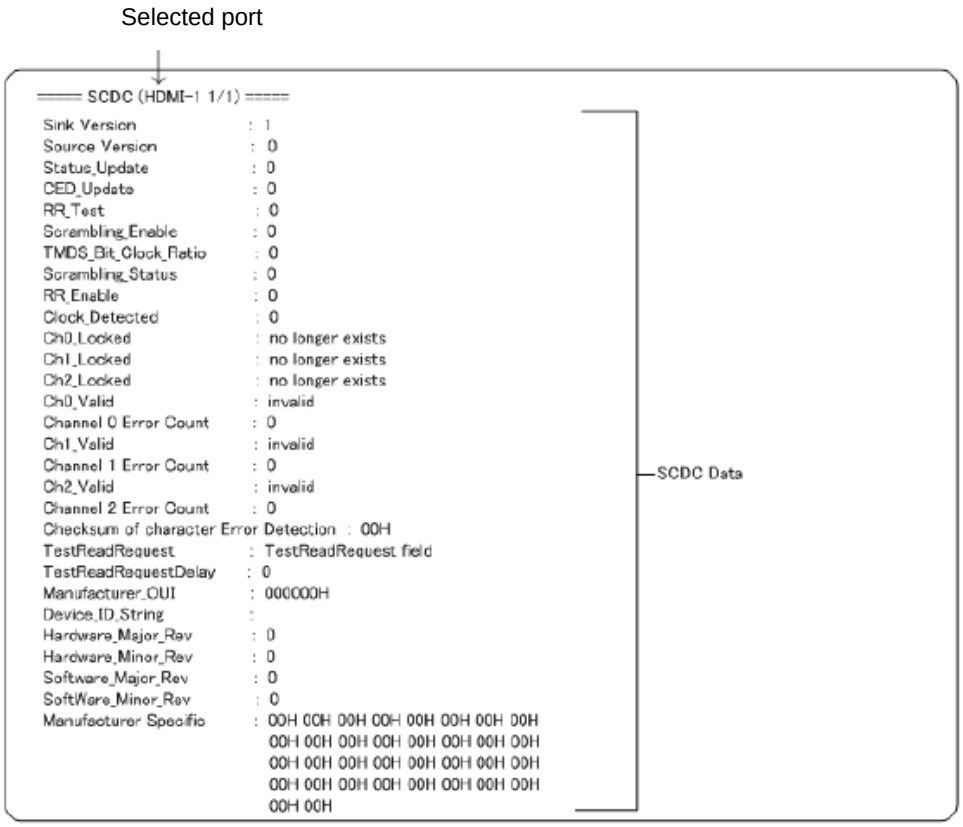
4.13.11 SCDC

The SCDC of the connected display can be shown on the display.

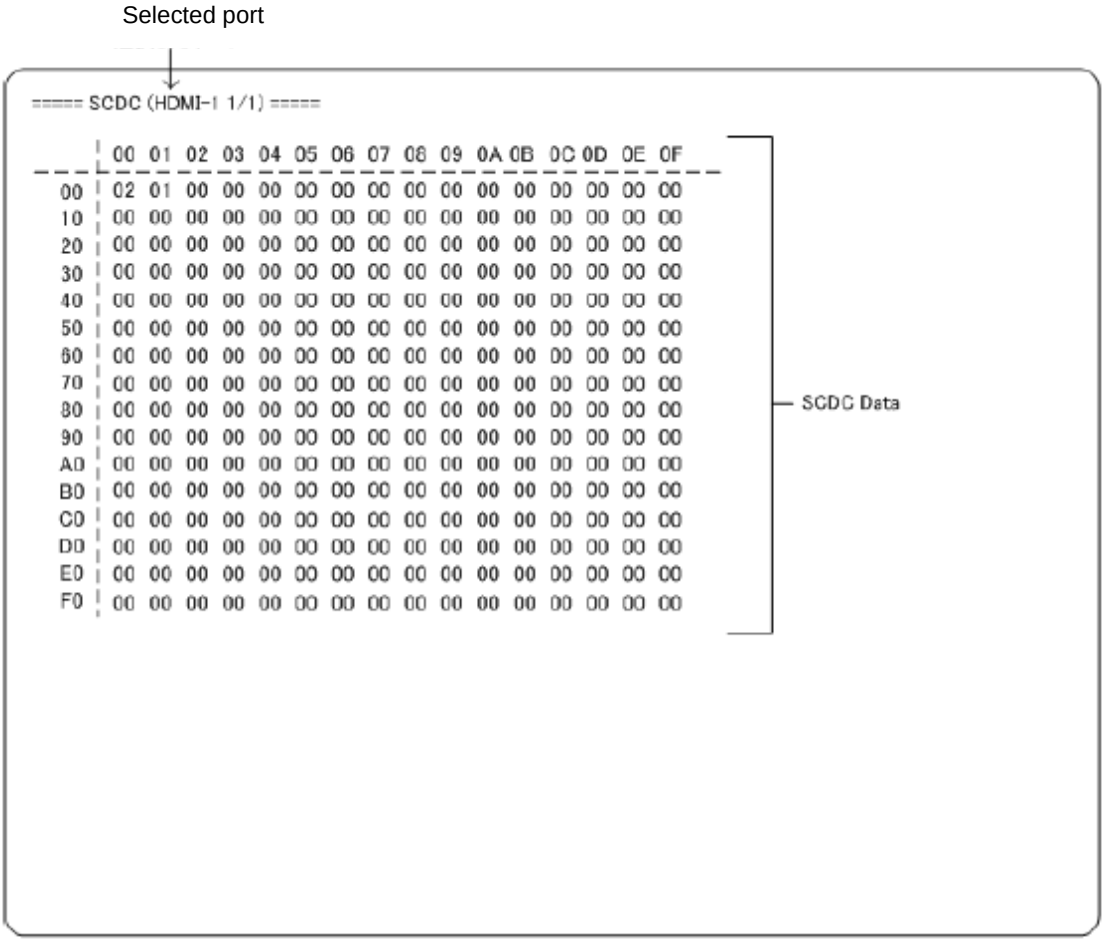
<Displaying SCDC screen>

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Selecting SCDC>** Select SCDC or SCDC(HEX) using or ▲ INC ▼ DEC, and then press SET. Or, press 7/D for GUI display, Press 8/E for HEX display.	
(3)	**<Switching pages >** Using or ▲ INC ▼ DEC, then select by using 2 << (previous page) 3 >> (next page) Then, select SET. Or, select 2 (previous page) or 3 (next page.)	If it has several pages, the display of VG shows pages separately. Pages are switched and displayed.

GUI Display


Selected port
===== SCDC (HDMI-1 1/1) =====
Sink Version : 1
Source Version : 0
Status_Update : 0
CED_Update : 0
RR_Test : 0
Scrambling_Enable : 0
TMDS_Bit_Clock_Ratio : 0
Scrambling_Status : 0
RR_Enable : 0
Clock_Detected : 0
Ch0_Locked : no longer exists
Ch1_Locked : no longer exists
Ch2_Locked : no longer exists
Ch0_Valid : invalid
Channel 0 Error Count : 0
Ch1_Valid : invalid
Channel 1 Error Count : 0
Ch2_Valid : invalid
Channel 2 Error Count : 0
Checksum of character Error Detection : 00H
TestReadRequest : TestReadRequest field
TestReadRequestDelay : 0
Manufacturer_OUI : 000000H
Device_ID_String :
Hardware_Major_Rev : 0
Hardware_Minor_Rev : 0
Software_Major_Rev : 0
SoftWare_Minor_Rev : 0
Manufacturer Specific : 00H 00H 00H 00H 00H 00H 00H 00H
00H 00H 00H 00H 00H 00H 00H 00H
00H 00H 00H 00H 00H 00H 00H 00H
00H 00H 00H 00H 00H 00H 00H 00H
00H 00H
SCDC Data

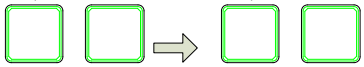
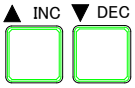
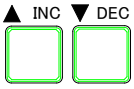
HEX Display



	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	02	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00
10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
90	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

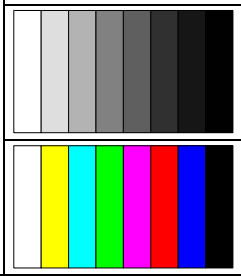
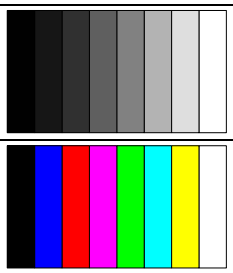
How to select the port.

Only one channels should be selected to display SCDC status.

<table>
<tr>
<td>①</td>
<td>NAME/LIST DETAIL NAME/LIST DETAIL
 
Select SCDC or SCDC(HEX)</td>
<td colspan="2"> 
</td>
</tr>
<tr>
<td>②</td>
<td>▲ INC ▼ DEC
Using  or  ,
SET
Select EDIT 
0/STATUS
Or by using  , select EDIT.</td>
<td colspan="2"> 
</td>
</tr>
<tr>
<td rowspan="2">③</td>
<td rowspan="2"><Port selection>
▲ INC ▼ DEC
Using  or  select it 
SET
  </td>
<td>PorNo</td>
<td>Select Unit and Port that SCDC is displayed.
(depends on unit configuration, all parameter cannot be displayed.)</td>
</tr>
<tr>
<td></td>
<td>Setting range: 1-8</td>
</tr>
</table>

4.14 Video black/white reversal

The video levels can be reversed.

(1)	INV : Not reversed INV : Reversed	Not reversed	Reversed
			

4.15 Simple animation

Simple animation sequences can be displayed by drawing a multiple number of images in the drawing area and moving the display start coordinates. The display method is described here uses an example of a simple animation sequence consisting of 640 × 480 images in nine frames.

4.15.1 Creating and registering the images

(1) Create the images.

The 1024 × 768 images in nine frames are created as a 3072 × 2304 image which is three frames in horizontal and three frames in vertical. (See Fig. 4-15-1.)

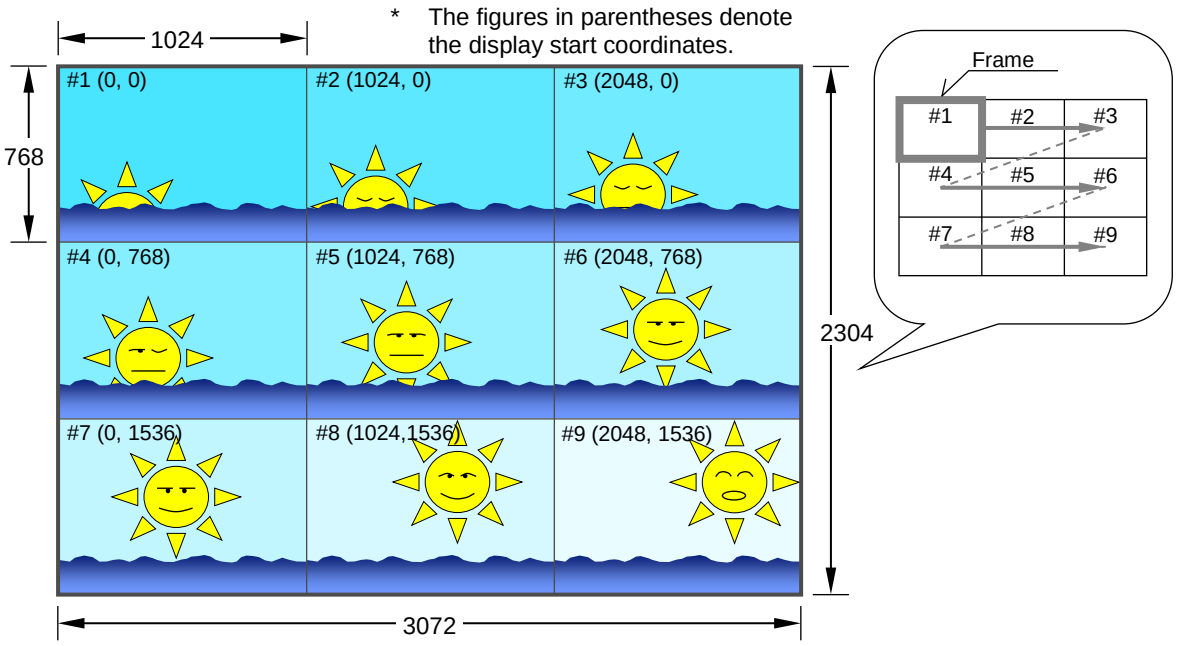


Fig. 4-15-1 Example of the images used for simple animation

* The display shows images #1 to #9 with a 1024 × 768 frame size in the sequence of #1, #2 and so on up to #9.

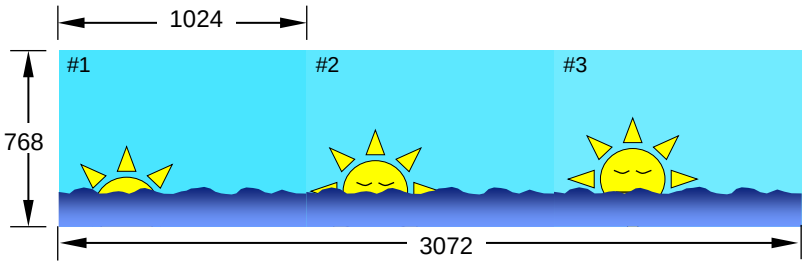
(2) Register the created images as image data (No.1 to 200) on the USB Memory using the Windows software (SP-8870) provided.

CAUTION

When creating simple animation images, create images whose horizontal resolution meets the following conditions. Otherwise, the image is not displayed correctly.

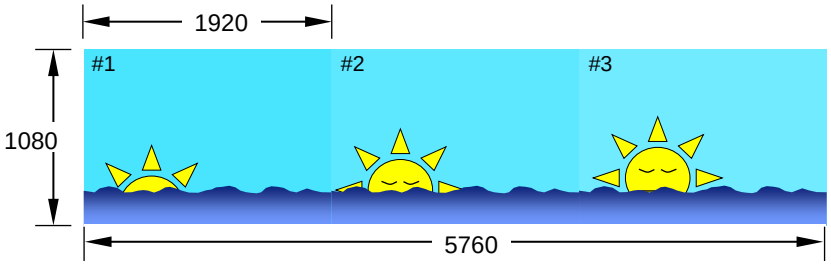
Bit	Boundary
8bit	Multiples of 256dot
10bit	Multiples of 128dot
12bit	

Example 1) 1024x768 8-bit image



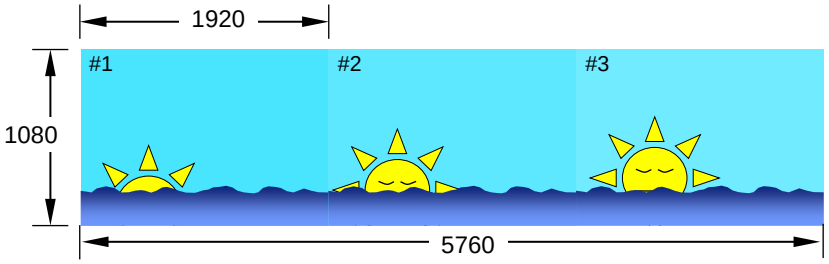
3072/256=12
Since the resolution can be divided by 256, the images with this resolution are output correctly.

Example 2) 1920x1080 8-bit image



5760 / 256 = 22.5
Since the resolution cannot be divided by 256, images with this resolution are not output correctly.

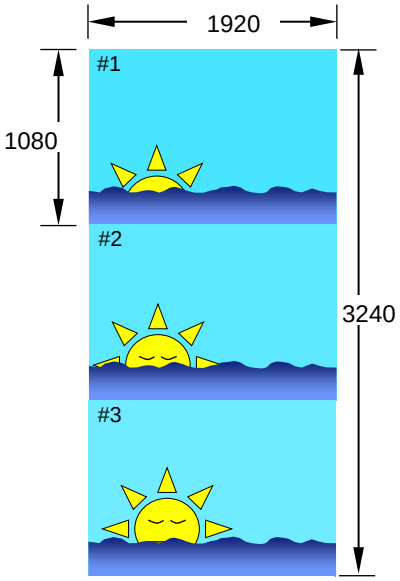
Example 3) 1920x1080 10-bit image



5760/127=45
In case of 10-bit, the images are output correctly.

Example 4)

Images which have been pasted one on top of the other—even images which cannot be divided by 256 dots—are output correctly.



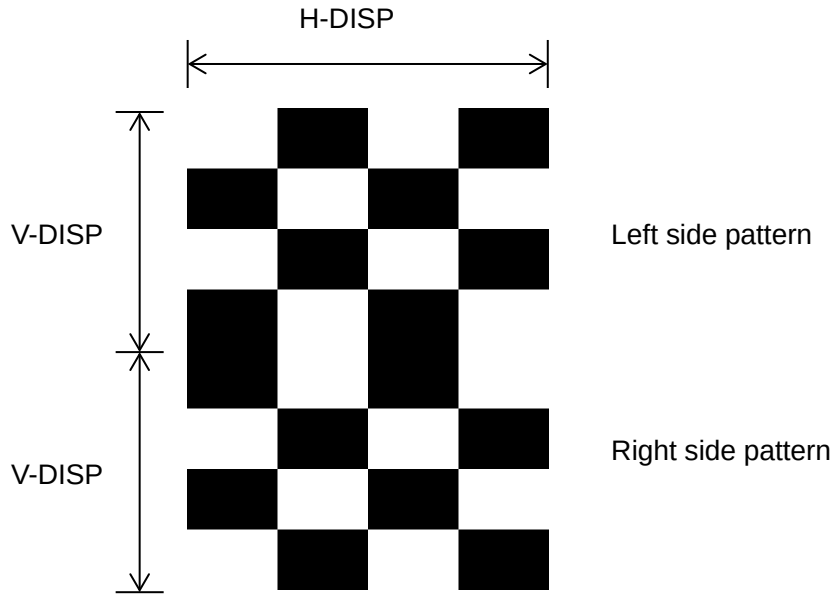
These images are not pasted horizontally, so they are output correctly.

<Frame Sequential 3D patterns>

Patterns are drawn as shown in the figure below when **Frame Sequential** has been selected as **the Output Mode setting** among the 3D pattern (OPT No.101) settings in section 4.9.5.

This pattern is displayed at the left and right alternatively, and the **Frame Sequential** operation is performed by setting H=1 and V=2 as the values for the “Repeat” parameter among the simple animation settings in section 4.15.2.

The Interval1 parameter also takes effect at this time.



<Dotclk Mode = Dual or Quad>

When setting DotClk Mode as Dual or Quad in **10.2.4 Dot Clock Operation Mode,** make the image by the same size of output timing. If image size is smaller than the output timing, fill black around the image.
Here, it explains how to make 8 images of 1920x1080 resolution in 3840x2160 timing for simple animation.

* The number in ( ) indicates starting pixel.

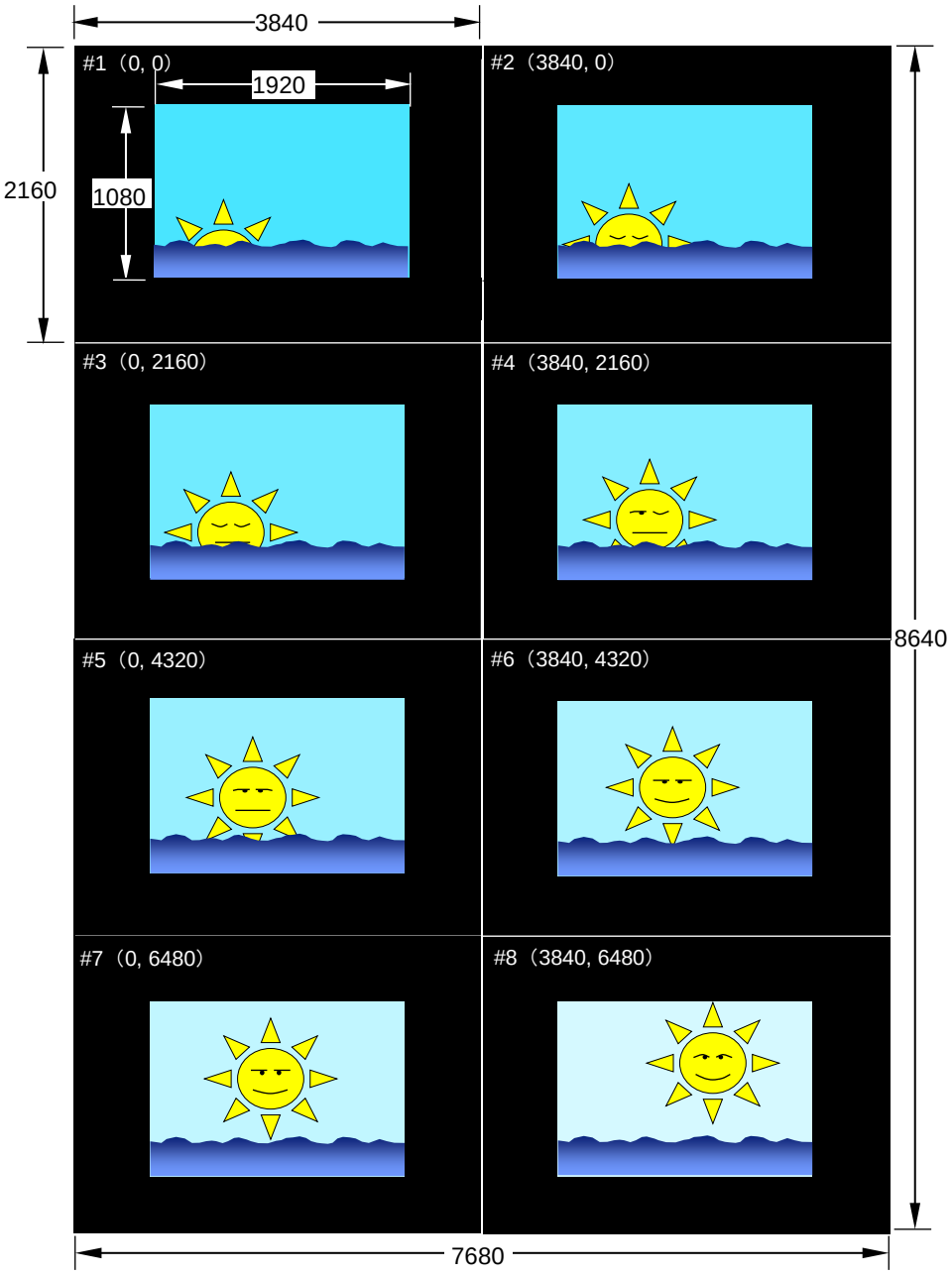


Fig. Example of simple animation when Dotclk Mode　Dual or Quad

4.15.2 Simple animation settings

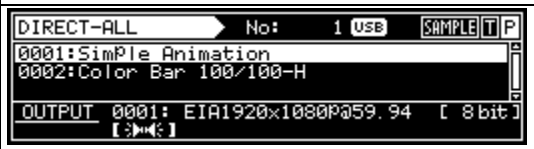
(1) Insert the USB Memory containing the registered images.

SAMPLE

* At this point, check that has not been pressed.

(2) Select the **program No.** using or

▲ INC ▼ DEC , and then press SET.



(3) **<Setting Action>**

Select **G-SCROLL** using ACTION and 8/E ▲, and then select **EDIT** using 0/STATUS.

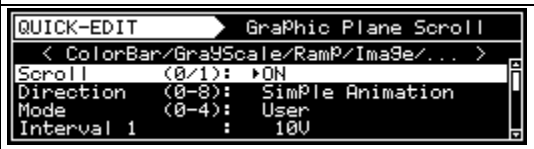
(4) Select **Graphic Plane** using or ▲ INC

▼ DEC , and then press SET.

(5) **<Selecting the items>**

Select the items using or ▲ INC

▼ DEC , and then press SET.



Set only the items below.

Scroll	ON (1)
Direction	Simple Animation (8)
Interval1	1 V to 255 V
Repeat	H = 3, V = 3 * This setting is for a 3 × 3 9-frame animation

* For details of the parameter settings, refer to **"5.3 Graphic plane scrolling actions."**

* Do not change any parameters not listed in the above table from their initial values.

<Setting the parameters>

Select the parameters using or ▲ INC

▼ DEC , and then press SET.

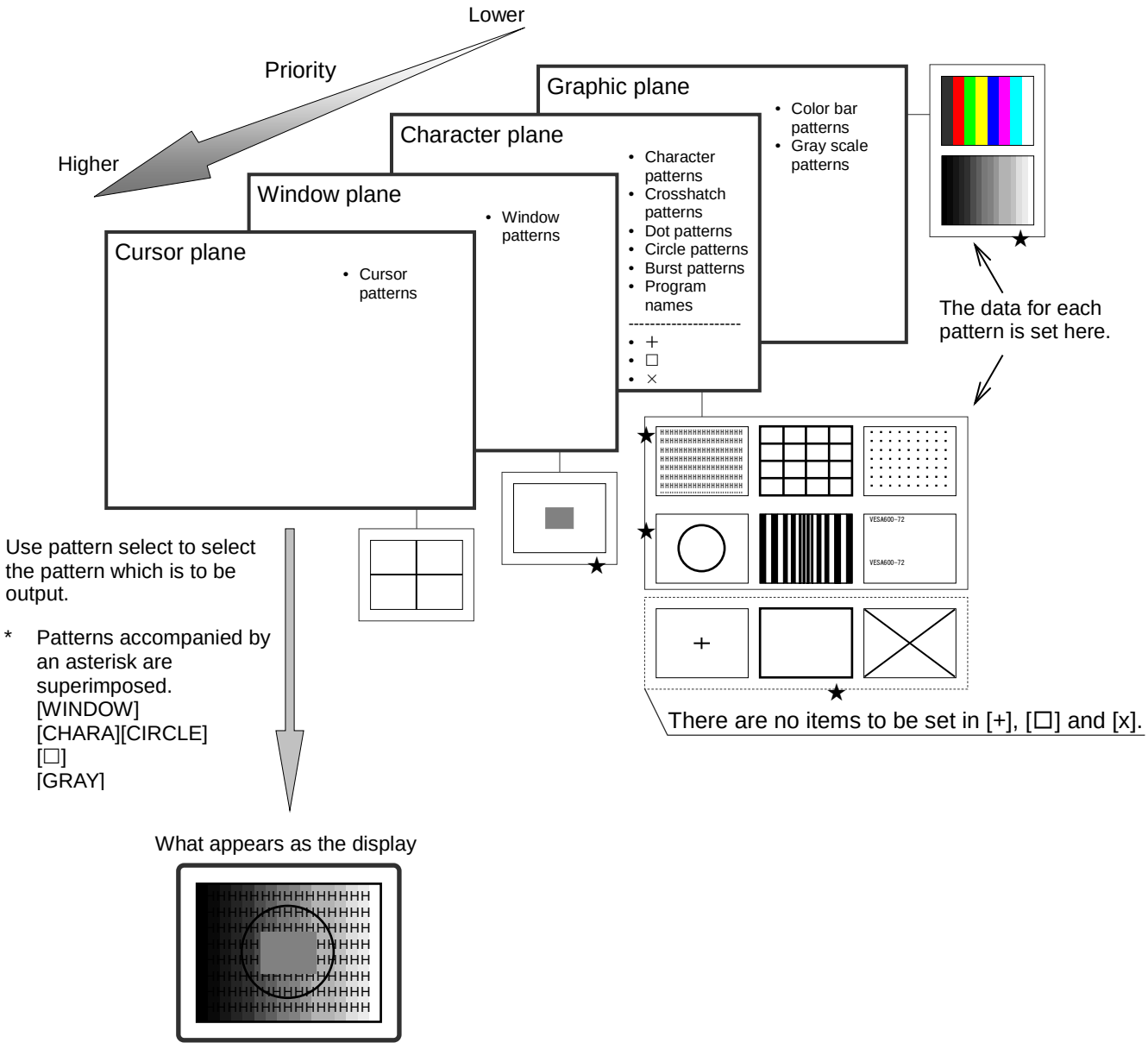
Alternatively:

Select the parameters using the number keys

(0/STATUS to 9/F), and then press SET.

5 ACTION SETTINGS

5.1 Concerning the planes



5.2 Window actions

5.2.1 Scrolling

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action	⇒	Window
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Graphic Plane	SET ⇒	**Scroll**
	GroupEdit		Output		Character Plane		Flicker
	AutoEdit		Audio		**Window**		Level Up/Down
	DP Analysis		Pattern		Subtitle		Level Sequence
	Data Copy/Erase		**Action**		Motion Blur		
Select item using or ▲ INC ▼ DEC							

The [Scroll] screen is displayed:

<Selecting the items>

Select the items of Scroll using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of scroll setting items>** below.

<Table of scroll setting items>

(1)	**OFF/ON (0/1)**	On or Off is set for window scrolling here.		
		0	**OFF**	Window scrolling is set to Off.
		1	**ON**	Window scrolling is set to On.
(2)	**Direction (0-A)**	The direction of scrolling is set here.		
		0	**Left**	The window is scrolled toward the left.
		1	**Right**	The window is scrolled toward the right.
		2	**Up**	The window is scrolled upward.
		3	**Down**	The window is scrolled downward.
		4	**Left Up**	The window is scrolled toward the top left.
		5	**Left Down**	The window is scrolled toward the bottom left.
		6	**Right Up**	The window is scrolled toward the top right.
		7	**Right Down**	The window is scrolled toward the bottom right.
		8	**Left<->Right**	The window is scrolled toward the left and right.
		9	**Up<->Down**	The window is scrolled toward the top and bottom.
		A	**Random**	The window is scrolled at random.
(3)	**Mode (0-4)**	The interval (execution interval) mode for window scrolling is set here.		
		0	**User**	The window is scrolled as per the **Interval 1-4 setting**.
		1	**60i->60i**	The interval (execution interval) is set to 1V.
		2	**24p-> 60i 2-3PullDown**	The interval (execution interval) is set to 2V and 3V, and repeated.
		3	**25p->50i**	The interval (execution interval) is set to 2V.
		4	**30p->60i**	The interval (execution interval) is set to 2V.
(4)	**Interval (Interval 1)**	The interval (execution interval) is set here. Setting range: 1V to 255V This setting takes effect only when **User** has been selected as the **Mode setting**.		
(5)	**Step (Step 1)**	The amount of movement per interval (execution interval) is set here.		
		H	Setting range: 1 dot to 255 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 1H to 255H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	
The following items are selected only when **User** has been selected as the **Mode setting**.				
(6)	**Interval 2 to 4**	The interval (execution interval) is set here. Setting range: 0 V to 255 V When a setting other than “0” has been selected, the conditions which have been set are repeated in sequence starting with **Interval 1**. Example: **Interval 1** → **Interval 2** → **Interval 3** → **Interval 1** → •••		
(7)	**Step 2 to 4**	The amount of movement per interval (execution interval) is set here. The amount of movement corresponding to the **Interval 2-4** setting is set.		
		H	Setting range: 0 dot to 255 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 0H to 255H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	

5.2.2 Flickering

For details on the action selection procedure, refer to “2.1.4 Selecting the actions”

	MENU	⇒	ProgramEdit	⇒	Action	⇒	Window
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Graphic Plane	SET ⇒	Scroll
	GroupEdit		Output		Character Plane		**Flicker**
	AutoEdit		Audio		**Window**		Level Up/Down
	DP Analysis		Pattern		Subtitle		Level Sequence
	Data Copy/Erase		**Action**		Motion Blur		
Select item using ◯ or ▲ INC ▼ DEC							

The [Flicker] screen is displayed:

<Selecting the items>

Select the items of Flicker using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of Flicker setting items>** below.

<Table of Flicker setting items>

(1)	**OFF/ON (0/1)**	On or Off is set for window flicker		
		0	**OFF**	Flicker is set to OFF
		1	**ON**	Flicker is set to ON
(2)	**Interval**	The interval (execution interval) is set here. Setting range: 1 V to 255 V		

5.2.3 Level up/down actions

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action	⇒	Window
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Graphic Plane	SET ⇒	Scroll
	GroupEdit		Output		Character Plane		Flicker
	AutoEdit		Audio		**Window**		**Level Up/Down**
	DP Analysis		Pattern		Subtitle		Level Sequence
	Data Copy/Erase		**Action**		Motion Blur		

Select item using  or ▲ INC ▼ DEC

The [Level Up/Down] screen is displayed:

<Selecting the items>

Select the items of Level Up/Down using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of level up/down setting items>** below.

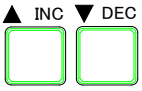
<Table of level up/down setting items>

(1)	**OFF/ON (0/1)**	On or Off is set for level up/down here.		
		0	**OFF**	Level up/down is set to Off.
		1	**ON**	Level up/down is set to On.
(2)	**Direction (0/1)**	Whether the level is to be increased or reduced is set here.		
		0	**Up**	The level is increased.
		1	**Down**	The level is reduced.
(3)	**Interval**	The interval (execution interval) is set here. Setting range: 1 V to 255 V		
(4)	**Step**	The amount of increase or reduction per interval (execution interval) is set here. Setting range: 1 to 255		

5.2.4 Level sequence action

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action	⇒	Window
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Graphic Plane	SET ⇒	Scroll
	GroupEdit		Output		Character Plane		Flicker
	AutoEdit		Audio		**Window**		Level Up/Down
	DP Analysis		Pattern		Subtitle		**Level Sequence**
	Data Copy/Erase		**Action**		Motion Blur		

Select item using  or ▲ INC ▼ DEC 

The [Level Sequence] screen is displayed:

<Selecting the items>

Select the items of Level Sequence using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of level sequence setting items>** below.

<Table of level sequence setting items>

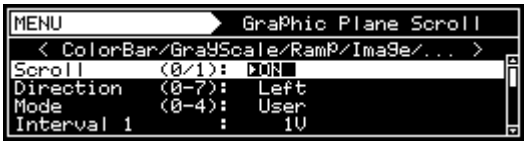
<table>
<tr><td rowspan="3">(1)</td><td rowspan="3">OFF/ON (0/1)</td><td colspan="3">On or Off is set for level sequence here.</td></tr>
<tr><td>0</td><td>OFF</td><td>Level sequence is set to Off.</td></tr>
<tr><td>1</td><td>ON</td><td>Level sequence is set to On.</td></tr>
<tr><td>(2)</td><td>Number</td><td colspan="3">The number of level sequences is set here. Setting range: 1 to 16
The sequences are repeated in order for the number of times set here.</td></tr>
<tr><td rowspan="5">(3)</td><td rowspan="5">1 to 16</td><td colspan="3">The RGB levels and interval (execution interval) in each sequence are set here.</td></tr>
<tr><td colspan="2">(R)</td><td rowspan="3">Set the R, G and B levels.
8-bit setting range:0 to 255
9-bit setting range:0 to 511
10-bit setting range:0 to 1023
11-bit setting range:0 to 2047
12-bit setting range:0 to 4095
13-bit setting range:0 to 8191
14-bit setting range:0 to 16383
15-bit setting range:0 to 32767
16-bit setting range:0 to 65535</td></tr>
<tr><td colspan="2">(G)</td></tr>
<tr><td colspan="2">(B)</td></tr>
<tr><td colspan="2">(Time)</td><td>The interval (execution interval) is set here.
Setting range: 1 V to 9999 V</td></tr>
</table>

5.3 Graphic plane scrolling actions

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	**Graphic Plane**
	GroupEdit		Output		Character Plane
	AutoEdit		Audio		Window
	DP Analysis		Pattern		Subtitle
	Data Copy/Erase		**Action**		Motion Blur
Select item using or ▲ INC ▼ DEC					

The [Graphic Plane] screen is displayed:



<Selecting the items>

Select the items of Graphic Plane using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of graphic plane setting items>** below.

<Table of graphic plane setting items>

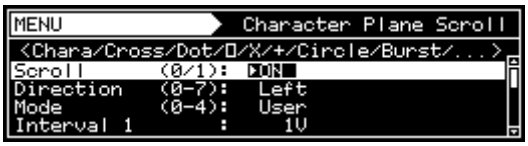
(1)	**Scroll (0/1)**	On or Off is set for scrolling here.		
		0	**OFF**	Scrolling is set to Off.
		1	**ON**	Scrolling is set to On.
(2)	**Direction (0-8)**	The direction of scrolling is set here.		
		0	**Left**	The window is scrolled toward the left.
		1	**Right**	The window is scrolled toward the right.
		2	**Up**	The window is scrolled upward.
		3	**Down**	The window is scrolled downward.
		4	**Left Up**	The window is scrolled toward the top left.
		5	**Left Down**	The window is scrolled toward the bottom left.
		6	**Right Up**	The window is scrolled toward the top right.
		7	**Right Down**	The window is scrolled toward the bottom right.
		8	**Simple Animation**	Simple animation For details, refer to “4.15.2 Simple animation settings.”
(3)	**Mode (0-4)**	The interval (execution interval) mode for scrolling is set here.		
		0	**User**	The window is scrolled as per the **Interval 1-4 setting**.
		1	**60i->60i**	The interval (execution interval) is set to 1 V.
		2	**24p->60i 2-3PullDown**	The interval (execution interval) is set to 2 V and 3 V, and repeated.
		3	**25p->50i**	The interval (execution interval) is set to 2 V.
		4	**30p->60i**	The interval (execution interval) is set to 2 V.
(4)	**Interval (Interval 1)**	The interval (execution interval) is set here. Setting range: 1 V to 255 V This setting takes effect only when **User** has been selected as the **Mode setting**.		
(5)	**Step (Step 1)**	The amount of movement per interval (execution interval) is set here.		
		H	Setting range: 1 dot to 4095 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 1H to 4095H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	
The following items are selected only when **User** has been selected as the **Mode setting**.				
(6)	**Interval 2 to 4**	The interval (execution interval) is set here. Setting range: 0 V to 255 V When a setting other than “0” has been selected, the conditions which have been set are repeated in sequence starting with **Interval 1**. Example: **Interval 1 → Interval 2 → Interval 3 → Interval 1 → •••**		
(7)	**Step 2 to 4**	The amount of movement per interval (execution interval) is set here. The amount of movement corresponding to the **Interval 2-4** setting is set.		
		H	Setting range: 0 dot to 4095 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 0H to 4095H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	
(8)	**Repeat**	The number of images in the width and height dimensions to be used for the simple animation is specified here. For details, refer to “4.15.2 Simple animation settings.”		
		H	Setting range: 1 to 16 The number of images arranged horizontally is specified here.	
		V	Setting range: 1 to 64 The number of images arranged vertically is specified here.	

5.4 Character plane scrolling actions

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Graphic Plane
	GroupEdit		Output		**Character Plane**
	AutoEdit		Audio		Window
	DP Analysis		Pattern		Subtitle
	Data Copy/Erase		**Action**		Motion Blur
Select item using ◯ or ▲ INC ▼ DEC					

The [Character Plane] screen is displayed:



<Selecting the items>

Select the items of Character Plane using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of character plane setting items>** below.

<Table of character plane setting items>

(1)	**Scroll (0/1)**	On or Off is set for scrolling here.		
		0	**OFF**	Scrolling is set to Off.
		1	**ON**	Scrolling is set to On.
(2)	**Direction (0-7)**	The direction of scrolling is set here.		
		0	**Left**	The window is scrolled toward the left.
		1	**Right**	The window is scrolled toward the right.
		2	**Up**	The window is scrolled upward.
		3	**Down**	The window is scrolled downward.
		4	**Left Up**	The window is scrolled toward the top left.
		5	**Left Down**	The window is scrolled toward the bottom left.
		6	**Right Up**	The window is scrolled toward the top right.
		7	**Right Down**	The window is scrolled toward the bottom right.
(3)	**Mode (0-4)**	The interval (execution interval) mode for scrolling is set here.		
		0	**User**	The window is scrolled as per the **Interval 1-4 setting**.
		1	**60i->60i**	The interval (execution interval) is set to 1 V.
		2	**24p-> 60i 2-3PullDown**	The interval (execution interval) is set to 2 V and 3 V, and repeated.
		3	**25p->50i**	The interval (execution interval) is set to 2 V.
		4	**30p->60i**	The interval (execution interval) is set to 2 V.
(4)	**Interval (Interval 1)**	The interval (execution interval) is set here. Setting range: 1 V to 255 V This setting takes effect only when **User** has been selected as the **Mode setting**.		
(5)	**Step (Step 1)**	The amount of movement per interval (execution interval) is set here.		
		H	Setting range: 1 dot to 4095 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 1H to 4095H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	
The following items are selected only when **User** has been selected as the **Mode setting**.				
(6)	**Interval 2 to 4**	The interval (execution interval) is set here. Setting range: 0 V to 255 V When a setting other than “0” has been selected, the conditions which have been set are repeated in sequence starting with **Interval 1**. Example: **Interval 1** → **Interval 2** → **Interval 3** → **Interval 1** → •••		
(7)	**Step 2 to 4**	The amount of movement per interval (execution interval) is set here. The amount of movement corresponding to the **Interval 2-4** setting is set.		
		H	Setting range: 0 dot to 4095 dots This setting takes effect only when **Left** or **Right** has been selected as the **Direction setting**.	
		V	Setting range: 0H to 4095H This setting takes effect only when **Up** or **Down** has been selected as the **Direction setting**.	

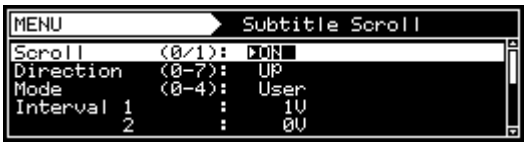
5.5 Subtitle scrolling

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU	**ProgramEdit**	SET	Timing	SET	Graphic Plane
	GroupEdit		Output		Character Plane
	AutoEdit		Audio		Window
⇒	DP Analysis	⇒	Pattern	⇒	**Subtitle**
	Data Copy/Erase		**Action**		Motion Blur

Select item using  or ▲ INC ▼ DEC

The [Subtitle] screen is displayed:



<Selecting the items>

Select the items of Subtitle using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of subtitle scroll setting items>** below.

<Table of subtitle scroll setting items>

(1)	**Scroll(0/1)**	Scrolling is set to On or Off here.		
		0	**OFF**	Scrolling is set to Off.
		1	**ON**	Scrolling is set to On.
(2)	**Direction(0-7)**	The scrolling direction is set here.		
		0	**Left**	The subtitles are scrolled to the left.
		1	**Right**	The subtitles are scrolled to the right.
		2	**Up**	The subtitles are scrolled to the top.
		3	**Down**	The subtitles are scrolled to the bottom.
		4	**Left Up**	The subtitles are scrolled to the top left.
		5	**Left Down**	The subtitles are scrolled to the bottom left.
		6	**Right Up**	The subtitles are scrolled to the top right.
		7	**Right Down**	The subtitles are scrolled to the bottom right.
(3)	**Mode(0-4)**	The scrolling interval (execution interval) mode is specified here.		
		0	**User**	Scrolling is executed in compliance with the **Interval 1, 2, 3 or 4** setting.
		1	**60i->60i**	1V serves as the interval (execution interval).
		2	**24p->60i 2-3PullDown**	2V and 3V are repeated as the interval (execution interval).
		3	**25p->50i**	2V serves as the interval (execution interval).
		4	**30p->60i**	2V serves as the interval (execution interval).
(4)	**Interval(Interval 1)**	The interval (execution interval) is set here. Setting range: 1 V to 255 V This item can be set only when **User** has been selected as the **Mode** setting. In all other modes, a fixed value is displayed.		
(5)	**Step(Step 1)**	The amount of movement per interval (execution interval) is set here.		
		H	Setting range: 1 dot to 4095 dots This item takes effect only when **Left** or **Right** has been selected as the **Direction** setting.	
		V	Setting range: 1 H to 4095 H This item takes effect only when **Up** or **Down** has been selected as the **Direction** setting.	
The items listed below are set only when **User** has been selected as the **Mode** setting.				
(6)	**Interval 2 - 4**	The interval (execution interval) is set here. Setting range: 0 V to 255 V When a setting other than “0” has been set, the set conditions are repeated in sequence starting from **Interval 1**. Example: **Interval 1** → **Interval 2** → **Interval 3** → **Interval 1** → ...		
(7)	**Step 2 - 4**	The amount of movement per interval (execution interval) is set here. This is the amount of movement (step) which corresponds to the **Interval 2-4** settings.		
		H	Setting range: 0 dot to 255 dots This item takes effect only when **Left** or **Right** has been selected as the **Direction** setting.	
		V	Setting range: 0 H to 255 H This item takes effect only when **Up** or **Down** has been selected as the **Direction** setting.	

5.6 0.25- and 0.125-dot scrolling actions (option)

0.25-dot and 0.125-dot scrolling can be set.

This function is optional. (The 0.25 dot and 0.125 dot are separate options.)

For further details, contact your dealer or an ASTRODESIGN sales representative.

- Concerning 0.25- and 0.125-dot scrolling

  The setting increments used by the regular scrolling function are interval 1 V increments (frames for progressive scanning and fields for interlaced scanning), and 1-dot increments are used for the movement amounts.

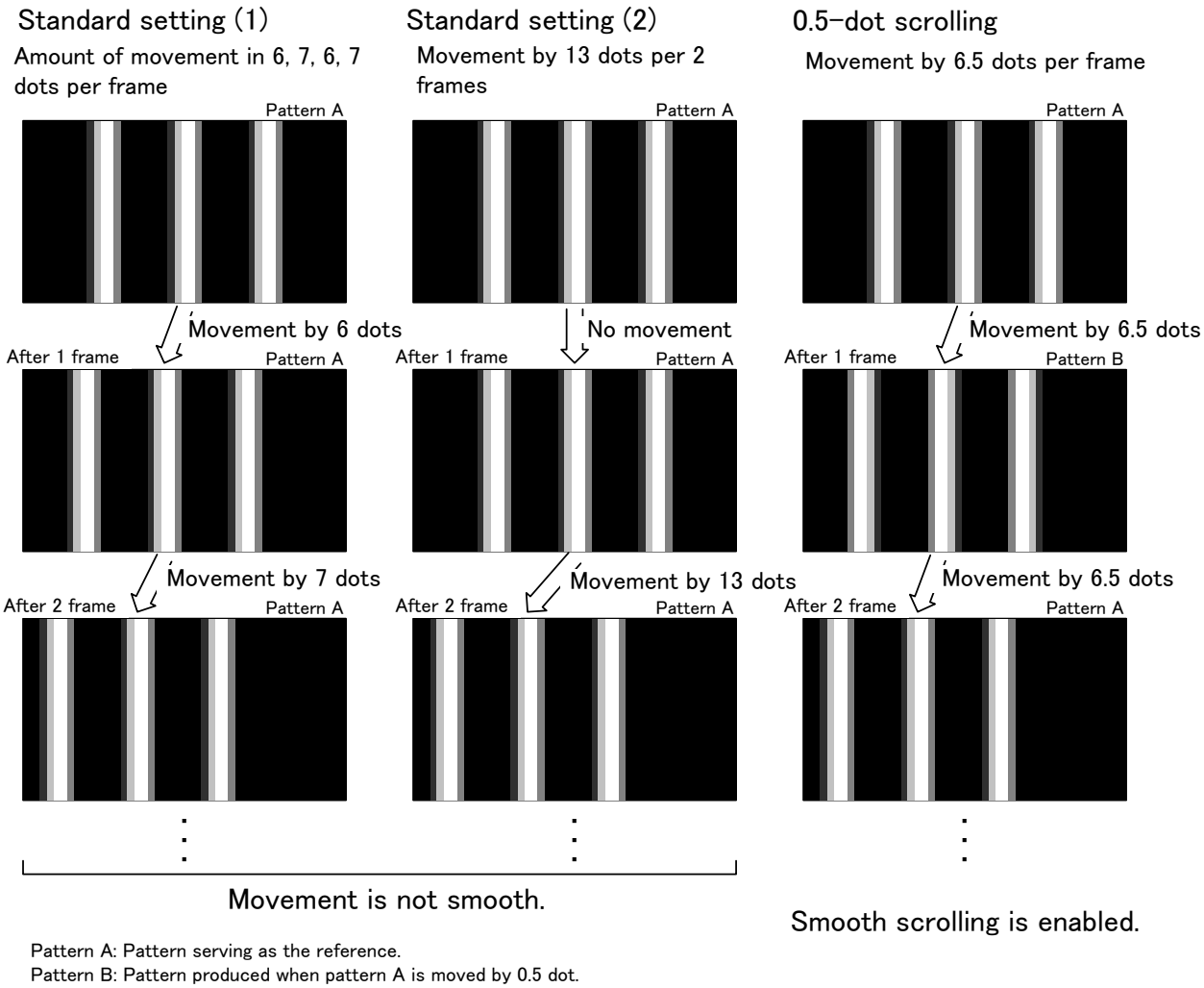
  In the case of the VG-876 smoother scrolling can be achieved by providing four patterns with a 0.25-dot shift in between (or two patterns with a 0.5-dot shift and 8 patterns with a 0.125-dot shift).

  <Example>

  When scrolling horizontally for one round at a 1920 × 1080p @ 60p timing of approximately 5 seconds

  About 13 dots are required per 2 V and about 6.5 dots (*1) per 1 V.

  *1: Amount of movement per 1 V = 1920/ (60*5) = 6.4 ≈ 6.5 [dot]



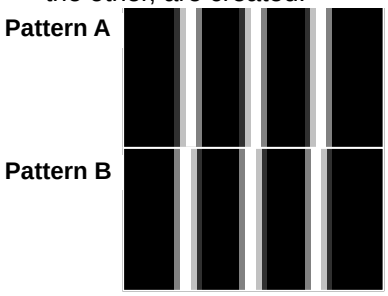
Pattern A: Pattern serving as the reference.
Pattern B: Pattern produced when pattern A is moved by 0.5 dot.

CAUTION

The 0.25-/0.125-dot scrolling function takes effect only for the image data created by the user.

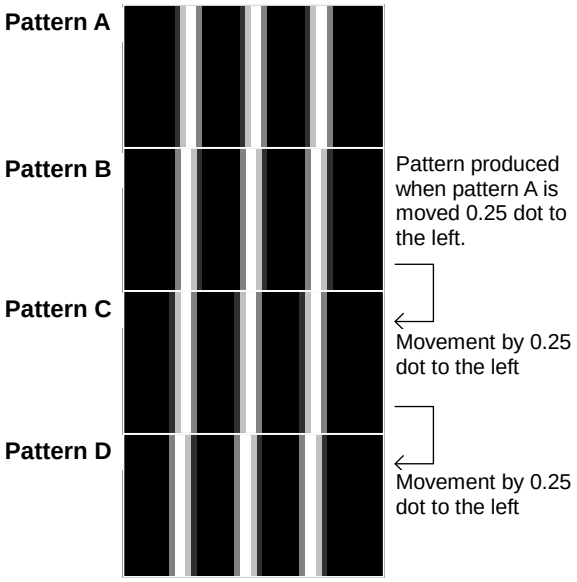
With 0.5-dot scrolling

Two patterns, with one offset by 0.5 dot from the other, are created.



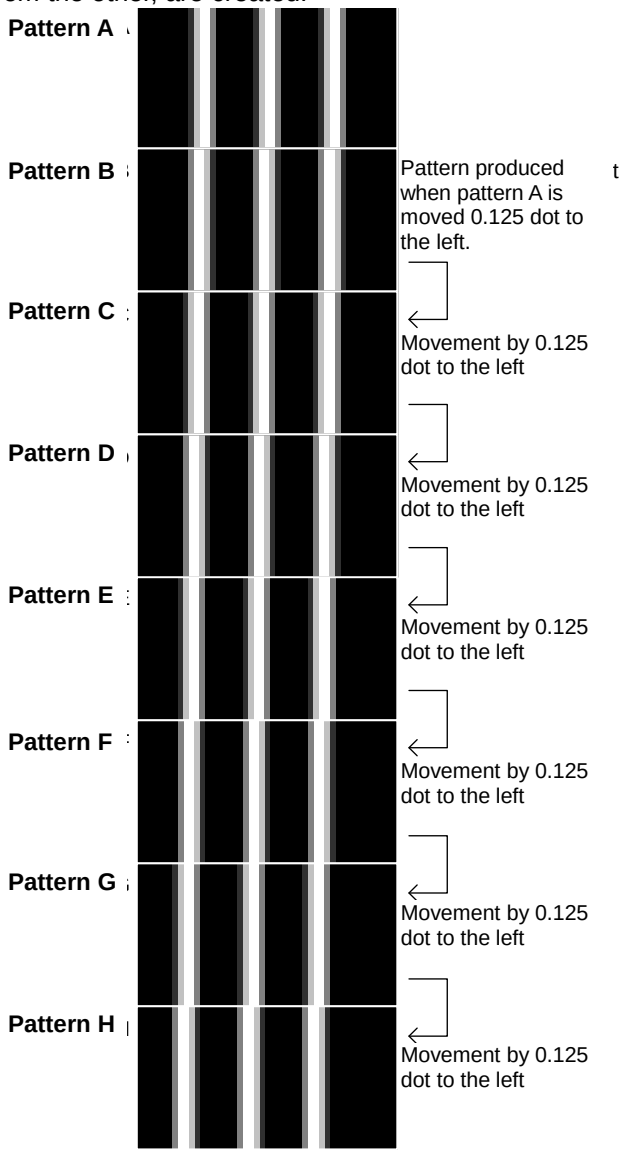
With 0.25-dot scrolling

Four patterns, each offset by 0.25 dot from the others, are created.



With 0.125-dot scrolling

Eight patterns, with one offset by 0.125 dot from the other, are created.

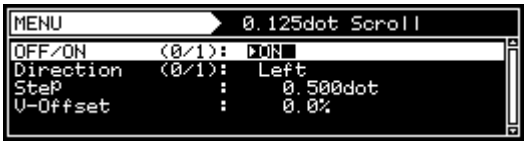


● 0.25-/0.125-dot scrolling settings

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Motion Blur
	GroupEdit		Output		**0.25dot Scroll** or **0.125dot Scroll**
	AutoEdit		Audio		Scroll Sequence
	DP Analysis		Pattern		Lip sync
	Data Copy/Erase		**Action**		Black Insertion
Select item using ◯ or ▲ INC ▼ DEC					

The [0.125dot Scroll] screen is displayed:



<Selecting the items>

Select the items of 0.25dot Scroll or 0.125dot Scroll using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of 0.25-/0.125-dot scrolling setting items>** below.

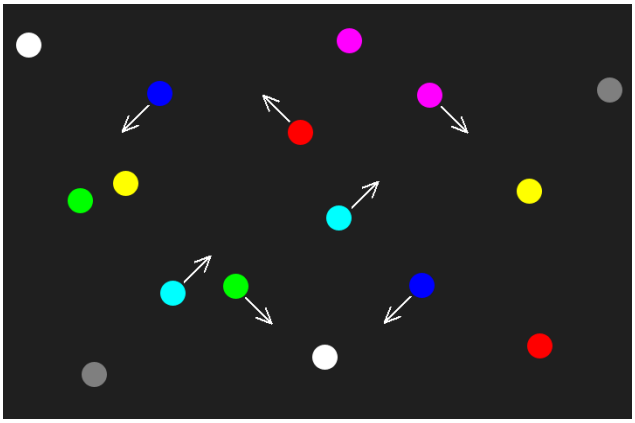
<Table of 0.25-dot and 0.125-dot scroll setting items>

(1)	**OFF/ON (0/1)**	On or Off for 0.25-/0.125-dot scrolling is set here.		
		0	**OFF**	0.25-/0.125-dot scrolling is set to Off.
		1	**ON**	0.25-/0.125-dot scrolling is set to On.
(2)	**Direction (0/1)**	The direction of 0.25-/0.125-dot scrolling is set here.		
		0	**Left**	Scrolling moves to the left.
		1	**Right**	Scrolling moves to the right.
(3)	**Step**	The amount of movement per 1 V is set here. 0.25-dot scroll setting range: 0.00 dot to 254.75 dots (0.25 dot Step) 0.125-dot scroll setting range: 0.000 dot to 254.750 dot (0.125 dot Step)		
(4)	**V-offset**	The value of V-offset is set here. Setting range: 0.0 to 100.0% (0.1% Step)		

5.7 Motion blur

Motion blur is a function for displaying up to 16 of the specified patterns described later, and moving them.
The patterns to be displayed using this function can be combined with other patterns (excluding the cursor), and displayed.

<Display example: Random movement direction>

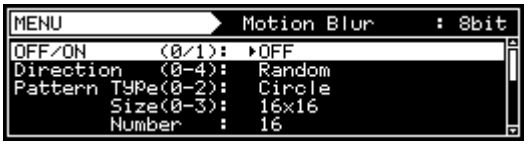


The setting procedure is described below.

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	**Motion Blur**
	GroupEdit		Output		0.25dot Scroll or 0.125dot Scroll
	AutoEdit		Audio		Scroll Sequence
	DP Analysis		Pattern		Lip sync
	Data Copy/Erase		**Action**		Black Insertion
Select item using ◯ or ▲ INC ▼ DEC					

The [Motion Blur] screen is displayed:



<Selecting the items>

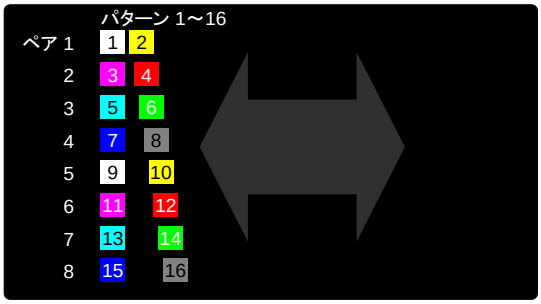
Select the items of Motion Blur using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of motion blur setting items>** below.

<Table of motion blur setting items>

(1)	**OFF/ON (0/1)**	This is used to set the motion blur function to ON or OFF.		
		0	**OFF**	
		1	**ON**	
(2)	**Direction (0-4)**	The direction of the pattern movement is specified here.		
		0	**Top-L<->Bottom-R**	Top left ⇔ bottom right
		1	**Left<->Right**	Left ⇔ right
		2	**2:Up<->Down**	Up ⇔ down
		3	**Random**	Random
		4	**Left<->Right Pair**	Left ⇔ right pair
				
(3)	**Pattern Type (0-2)**	The shape of the pattern is specified here.		
		0	**Circle**	Circle
		1	**Square**	Square
		2	**USER Character**	User character Setting range: **E0h - FFh**
(4)	**Pattern Size (0-3)**	The size of the pattern is specified here. (dot)		
		0	**8 × 8**	
		1	**16 × 16**	
		2	**32 × 32**	
		3	**64 × 64**	
(5)	**Pattern Number**	The number of patterns to be displayed is set here. Setting range: **1 - 16** * The Direction >Left<->Right Pair setting is available only when 2, 4, 8, or 16 is specified as the number of patterns. Even if a number other than 2, 4, 8, or 16 is specified, the number of patterns will be 2, 4, 8, or 16.		
(6)	**Distance**	When the Direction >Left<->Right Pair setting is selected, the pattern interval for each pair is specified here. Setting range: **0 to 255 [dot]** 		
(7)	**Step InpMode (0/1)**	The **step** setting method is specified here.		
		0	**All**	All the patterns are set together.
		1	**Separate**	The patterns are set individually.
(8)	**Step (/1 V)**	The amount of pattern movement per 1 V (progressive scanning: frame; interlaced scanning: field) is set here. Setting range: **1 - 255 [dot]** * When the Direction >Left<->Right Pair setting is selected, the amount of movement is specified for each pair (pair 1 to 8).		

<table>
<tr><td>(9)</td><td>Color InpMode (0/1)</td><td>The color setting method is specified here.
<table>
<tr><td>0</td><td>All</td><td>All the patterns are set together.</td></tr>
<tr><td>1</td><td>Separate</td><td>The patterns are set individually.</td></tr>
</table></td></tr>
<tr><td>(10)</td><td>Color</td><td>The pattern colors (R/G/B levels) are set here.
The colors for patterns 9 to 16 are the same as for patterns 1 to 8.
The setting range differs depending on the pattern drawing bit length (Color Depth).
<u>Color Depth</u> <u>Setting range</u>
8bit : 0 - 255
9bit : 0 - 511
10bit : 0 - 1023
11bit : 0 - 2047
12bit : 0 - 4095
13bit : 0 - 8191
14bit : 0 - 16383
15bit : 0 - 32767
16bit : 0 - 65535</td></tr>
<tr><td>(11)</td><td>OPT Back R,G,B</td><td>The background color (R/G/B levels) is specified here when the internal optional pattern No.71 (Motion Blur Line) has been selected.
The setting range is the same as for the Color setting item.</td></tr>
<tr><td>(12)</td><td>Area H/V</td><td>The pattern movement range is set as a percentage of H/V-Timing Disp.
Setting range: 0 - 100 [%]</td></tr>
</table>

<Concerning the internal optional pattern No.71>

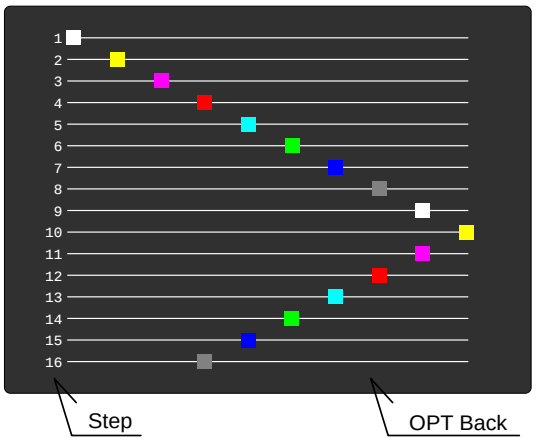
Internal optional pattern No.71 (Motion Blur Line) is the pattern which displays the aspects of the Motion Blur>Step setting and other setting items.

What is displayed depends on the Direction setting.

The background color can be set using OPT Back.

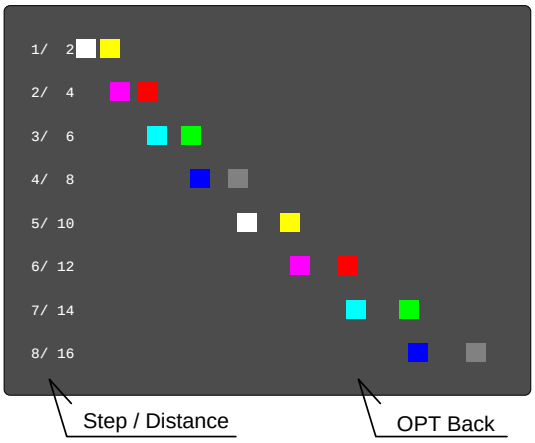
(1) When the Direction>Top-L<->Bottom-R, Left<->Right, or Up<->Down setting is selected

The Step and its path line are displayed in white.



(2) When the Direction>Left<->Right setting is selected

The Step and Distance are displayed in white.



(3) When the Direction>Random setting is selected

The frames are displayed in white.

5.8 Scroll Sequence

Sequence numbers for each plane can set up to 16 by scroll sequence setting.

	MENU	⇒	ProgramEdit	⇒	Action
MENU	**ProgramEdit**	SET	Timing	SET	Motion Blur
	GroupEdit		Output		0.25dot Scroll or 0.125dot Scroll
	AutoEdit		Audio		**Scroll Sequence**
⇒	DP Analysis	⇒	Pattern	⇒	Lip sync
	Data Copy/Erase		**Action**		Black Insertion

Select item using  or ▲ INC ▼ DEC

The [Scroll Sequence] screen is displayed:

<Selecting the items>

Select the items of Scroll Sequence using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of Scroll Sequence setting items>** below.

<The table of Scroll Sequence setting items>

(1)	**OFF/ON (0/1)**	On or Off is set for graphic/character/window plane here.		
		0	**OFF**	
		1	**ON**	
(2)	**Return Mode (0/2)**	The mode to restore the scroll position is set here.		
		0	**One Sequence**	Restore per sequence scroll position
		1	**All Sequence**	Restore entire sequence scroll positions.
		2	**Random**	The scroll position is not restored. In this mode, **the Parameter settings** (scroll direction, execution interval, movement amount and execution time) are changed at random for each sequence regardless of the values which have been set. However, with the exception of Direction, the set values are used as the upper limits.
(3)	**Number**	Set the number of sequence Setting range: **1-16**		
Parameter				
(1)	**Direction**	The direction of scrolling is set here		
		0	**L**	The window is scrolled toward the left.
		1	**R**	The window is scrolled toward the right.
		2	**U**	The window is scrolled upward.
		3	**D**	The window is scrolled downward.
		4	**L-U**	The window is scrolled toward the top left.
		5	**L-D**	The window is scrolled toward the bottom left.
		6	**R-U**	The window is scrolled toward the top right.
		7	**R-D**	The window is scrolled toward the bottom right.
(2)	**Interval**	The interval (execution interval) is set here. Setting range: **1 - 255 V**		
(3)	**H Step**	The amount of horizontal movement per interval (execution interval)movement is set here. Setting range: **1 - 255 dot**		
(4)	**V Step**	The amount of vertical movement per interval (execution interval) movement is set here. Setting range: **1 - 255 H**		
(5)	**Time**	Execution time per sequence is set here. Setting range: **1 - 999 V**		

5.9 LipSync

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

The lip sync function can be used to set a difference between the audio phase and video phase.

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Motion Blur
	GroupEdit		Output		0.25dot Scroll or 0.125dot Scroll
	AutoEdit		Audio		Scroll Sequence
	DP Analysis		Pattern		**Lip sync**
	Data Copy/Erase		**Action**		Black Insertion
Select item using or ▲ INC ▼ DEC					

The [Lip sync] screen is displayed:

<Selecting the items>

Select the items of Lip sync using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

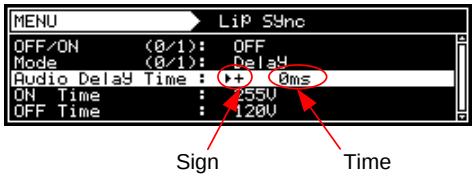
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of lip sync setting items>** below.

CAUTION

VM-1876A-M6 and VM-1876-M8 do not support this function.

<Table of LipSync setting items>

<table>
<tr><td>(1)</td><td>OFF/ON(0/1)</td><td colspan="3">Whether to set the lip sync function on or off is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>OFF</td><td>Disabled</td></tr>
<tr><td></td><td></td><td>1</td><td>ON</td><td>Enabled</td></tr>
<tr><td>(2)</td><td>Mode(0/1)</td><td colspan="3">The method used to set the delay amount (time) is set here.</td></tr>
<tr><td></td><td></td><td>0</td><td>Delay</td><td>The delay amount of the user’s choice is set.</td></tr>
<tr><td></td><td></td><td>1</td><td>EDID</td><td>The delay amount accords with the EDID of the connection destination. (Automatically set)</td></tr>
<tr><td>(3)</td><td>When the Mode =Delay, Audio Delay Time (0/1)</td><td colspan="3">The delay amount is set here as a time.
 
</td></tr>
<tr><td></td><td></td><td colspan="3">Sign: Indicates behind or ahead.</td></tr>
<tr><td></td><td></td><td>0</td><td>+</td><td>The audio is behind the video.</td></tr>
<tr><td></td><td></td><td>1</td><td>-</td><td>The audio is ahead of the video.</td></tr>
<tr><td></td><td></td><td colspan="3">Time: The time is set here.</td></tr>
<tr><td></td><td>When the Mode=EDID, EDID Port (0-F)</td><td colspan="3">The port used to read the EDID is set here.
Operation is initiated using the amount of delay defined in the EDID concerned.
 
</td></tr>
<tr><td></td><td></td><td>Port Type</td><td colspan="2">The EDID is read from the interface set here.</td></tr>
<tr><td></td><td></td><td></td><td>0</td><td>HDMI</td></tr>
<tr><td></td><td></td><td></td><td>1</td><td>HDBaseT</td></tr>
<tr><td></td><td></td><td>PortNo</td><td colspan="2">The EDID is read from the port set here.</td></tr>
<tr><td></td><td></td><td></td><td>HDMI</td><td>Setting range: 1-16</td></tr>
<tr><td></td><td></td><td></td><td>HDBaseT</td><td>Setting range: 1-16</td></tr>
<tr><td>(4)</td><td>On Time</td><td colspan="3">The audio output time and raster (white) display time are set using the vertical sync signal (in 1-frame increments). Setting range: 1 V to 255 V</td></tr>
<tr><td>(5)</td><td>OFF Time</td><td colspan="3">The audio no output time and display OFF (black) time are set using the vertical sync signal (in 1-frame increments). Setting range: 1 V to 255 V</td></tr>
</table>

5.10 Black insertion

For details on the action selection procedure, refer to “2.1.4 Selecting the actions.”

	MENU	⇒	ProgramEdit	⇒	Action
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	Motion Blur
	GroupEdit		Output		0.25dot Scroll or 0.125dot Scroll
	AutoEdit		Audio		Scroll Sequence
	DP Analysis		Pattern		Lip sync
	Data Copy/Erase		**Action**		**Black Insertion**
Select item using or ▲ INC ▼ DEC					

The [Black Insertion] screen is displayed:

<Selecting the items>

Select the items of Black Insertion using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of black insertion setting items>** below.

<Table of black insertion setting items>

(1)	**Insertion (0/1)**	On or Off for black insertion is set here.		
		0	**OFF**	Black insertion is set to Off.
		1	**ON**	Black insertion is set to On.
(2)	**Position (0-2)**	The black insertion position is set here.		
		0	**All**	The entire screen is subject to the black insertion.
		1	**Left Half**	The left half of the screen is subject to the black insertion.
		2	**Right Half**	The right half of the screen is subject to the black insertion.
(3)	**Pattern Display Time**	The time during which the pattern is to be displayed is set here. Setting range: 0 V to 255 V		
(4)	**Black Insertion Time**	The time during which black insertion is to take effect is set here. Setting range: 0 V to 255 V		

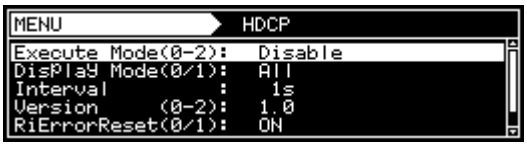
6 HDCP SETTINGS AND EXECUTION

6.1 HDCP settings

<HDCP setting procedure>

	MENU	⇒	Configuration
MENU [ ] ⇒	GroupEdit	SET [ ] ⇒	General
	AutoEdit		**HDCP**
	DP Analysis		HDMI
	Data Copy/Erase		DP
	Configuration		SDI
Select item using ◯ or ▲ INC [ ] ▼ DEC [ ]			

The [HDCP] screen is displayed:



<Selecting the items>

Select the items of HDCP using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<List of HDCP setting items>** below.

<List of HDCP setting items>

(1)	**Execute Mode (0-2)**	The HDCP execution mode is set here.		
		0	**Disable**	HDCP execution is disabled.
		1	**Enable**	HDCP execution is enabled.
		2	**Program**	HDCP execution enable/disable is set for each program.
(2)	**Display Mode (0-1)**	The HDCP authentication screen display mode is set here.		
		0	**All**	All the authentication values are displayed.
		1	**NG Only**	The authentication values are displayed only with an NG result.
(3)	**Interval**	The interval for performing the authentication is set here.		
		1s-10s		An interval from 1 second to 10 seconds is set.
(4)	**Auth Version (0-3)**	The HDCP authentication version is set here. * Only VM-1876-M8 is valid for this setting.		
		0	**Refer Program**	The version is followed by the setting of Program- Auth Version.
		1	**Auto**	Authentication version is decided automatically.
		3	**HDCP1.4**	It is authenticated by HDCP1.4.
		2	**HDCP2.2**	It is authenticated by HDCP2.2.
(5)	**AV-Mute Mode(0-2)**	Set the existence of AV-Mute during authentication. * VM-1876-M7, M8 do not support this item.		
		0	**OFF**	AV-Mute is OFF during HDCP authentication.
		1	**ON**	AV-Mute is ON during HDCP authentication.
		2	**EDID Check**	AV-Mute ON/OFF is decided by confirming EDID setting.
(6)	**RiErrorReset (0/1)**	Whether to proceed with re-authentication when errors have occurred in HDCP authentication is set here. * VM-1876-M7 does not support this item.		
		0	**OFF**	Re-authentication is not undertaken when errors have occurred.
		1	**ON**	Re-authentication is undertaken when errors have occurred.
(7)	**FIFO Ready (0-8)**	The limit on the time to wait until “FIFO Ready” is returned when the connected device is a repeater is set here. * VM-1876-M7 does not support this item.		
		0	**OFF**	30 seconds
		1-7	**600 ms to 4,200 ms**	Increased in increments of 600 msec
		8	**5,000 ms**	5 seconds
(8)	**Error VideoOut (0/1)**	The video output status when HDCP recognition errors occur is set here.		
		0	**OFF**	The video output is stopped and a black screen is output.
		1	**ON**	The current video continues to be output.
(9)	**HDMI Start Wait**	Delay the time to start first HDCP recognition.		
		0ms-3000ms		Set delay time by 1msec unit.
(10)	**HDMI Restart Wait**	The time to start the HDCP recognition again is set here.		
		0ms - 3000ms		Set the time for additional recognition in unit of 100 msec.
(11)	**Content Type (0/1)**	Set Content Type here. *This item is available only by VM-1876-M7, M8.		
		0		Type 0
		1		Type 1
(12)	**Ake Init Reset(0/1)**	Set Ake Init reset. *This item is available only by VM-1876-M8.		
		0		OFF
		1		ON

(13)	**Ake Init Interval**	Set the interval for resetting Ake Init. *This item is available only by VM-1876-M8.	
		1000ms - 10000ms	When Ake Init Reset is set to ON, reset is performed at set intervals. Set it in units of 500 msec.

***1** “Advance Cipher/Enhanced Link Verification” is not supported.

VM-1876-M1(DisplayPort) does not support (2) to (10) items.

6.2 HDCP execution

6.2.1 Execution procedure

One of the following three steps can be taken for HDCP execution.

a) Set enable or disable using the On/Off customize key.
b) Set enable or disable using Configuration.
c) Set enable or disable for each program.

a) Setting enable or disable using the On/Off customize key

This setting is canceled when the program is changed, and **b) Setting enable or disable always using Configuration** and **c) Setting enable or disable for each program** take effect.

(1)	HDCP	HDCP is executed, and the authentication results screen appears above the test pattern.

Caution

When HDCP2.2 is executed as Repeater in VM-1876-M7, the following symptom occasionally appears. We are now investigating it. Please ask ASTRODESIGN about details.

RepeaterAuth_Stream_Manage(0x10) is written 3 times, and

RepeaterAuth_Stream_Ready(0x11) is ready 3 times.

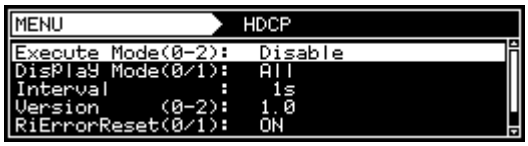
The value of Seq Num M of RepeaterAuth_Stream_Manage becomes except 0x00 0x00.

b) Setting enable or disable using Configuration

	MENU	⇒	Configuration	⇒	HDCP
MENU ⇒	GroupEdit	SET ⇒	General	SET ⇒	**Execute Mode**
	AutoEdit		**HDCP**		Display Mode
	DP analysis		HDMI		Interval
	Data Copy/Erase		DP		Version
	Configuration		SDI		RiErrorReset

Select item using ◯ or ▲ INC ▼ DEC

The [HDCP] screen is displayed:



<Setting the HDCP execution mode>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	Disable	HDCP execution is disabled.
1	Enable	HDCP execution is enabled.
2	Program	HDCP execution enable/disable is set for each program.

c) Setting enable or disable for each program

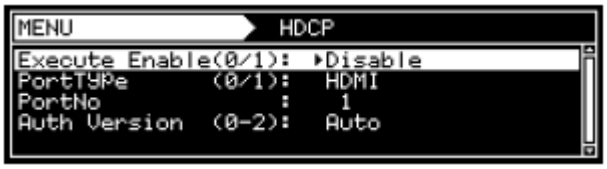
This setting takes effect when **"Program"** was selected as the HDCP mode setting in **b) Setting enable or disable using Configuration**.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	Output ON/OFF
	GroupEdit		Timing		Digital Output		Sync
	AutoEdit		**Output**				**HDCP**
	DP Analysis		Audio				Level Mode
	Data Copy/Erase		Pattern				DotClk Mode

Select item using ◯ or ▲ INC ▼ DEC

The [HDCP] screen is displayed:

<Selecting the items>



Select HDCP, and then select the items of HDCP using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Execute Enable (0/1):
This selects whether HDCP is to be executed.

It covers all the video interfaces capable of executing HDCP. HDCP is executed at the same time.

0	**Disable**	HDCP is not executed.
1	**Enable**	HDCP is executed.

PortType: The HDCP recognition status can be displayed via HDMI ports.

0	**HDMI**	Display status of HDMI unit.
1	**DP**	Display status of DisplayPort Unit
2	**HDBaseT**	Display status of HDBaseT Unit

PortNo: The HDMI port used to display the HDCP recognition status is set here.

HDMI: 1 to 16 **DP: 1 to 8** **HDBaseT: 1 to 16**	The status is displayed from the port set here.

Auth version: The HDCP authentication version is set here.

0	**Auto**	HDCP authentication version is automatically decided.
1	**HDCP1.4**	It is authenticated by HDCP1.4.
2	**HDCP2.2**	It is authenticated by HDCP2.2.

6.2.2 Screen displays during HDCP execution

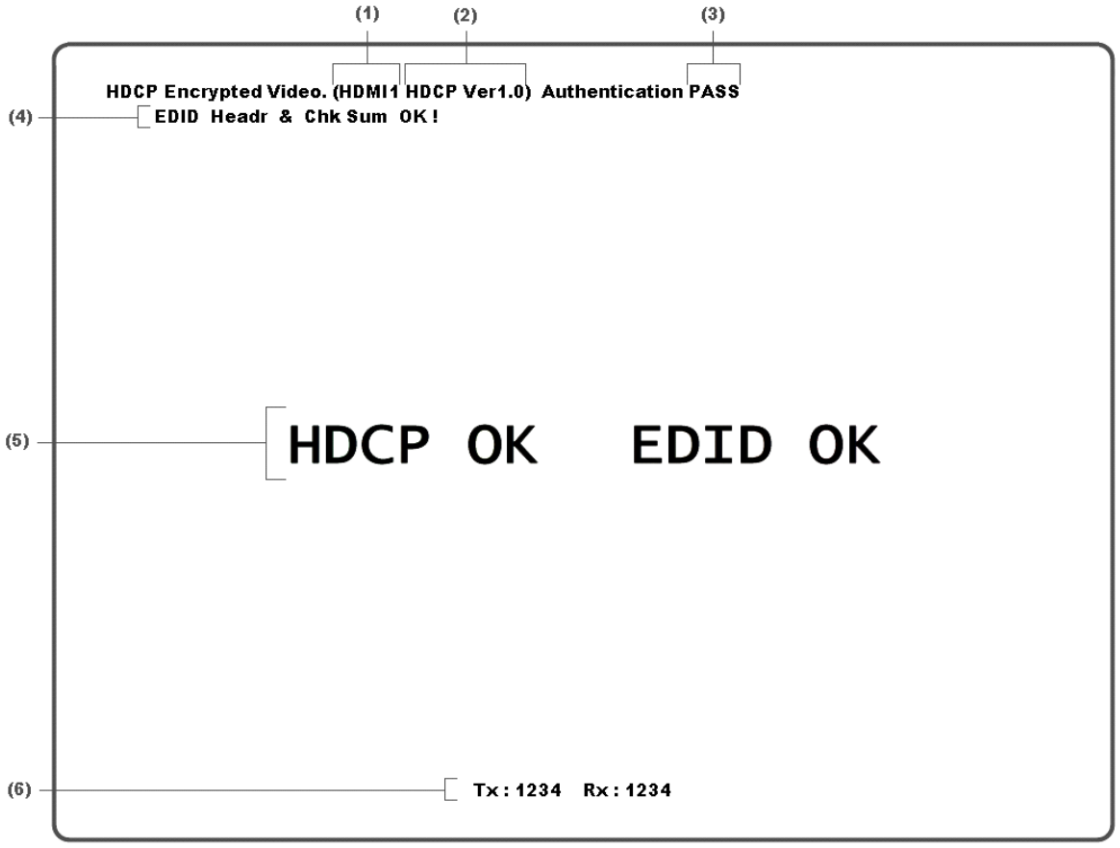
The authentication results and other information are displayed on the screen during HDCP execution.
(If other patterns are already displayed, the information will be displayed on top of the patterns.)

(1) When HDCP is selected as the Name/List pattern.

For details on the screen and what is displayed on the screen, refer to “4.13.5 HDCP (High-bandwidth Digital Content Protection).”

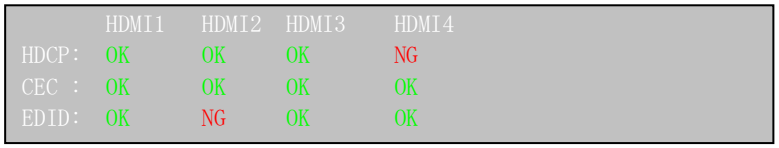
(2) At all other times

A screen such as the one shown below is displayed.



Details of the information shown on the screen are given below.

<HDCP authentication screen (simplified version) display data>

(1)	This indicates the port selected in **c) Display Select** of **"6.2.1 Execution procedure."**
(2)	The HDCP version is displayed here. (When the HDCP authentication has failed, an error message is displayed.)
(3)	The HDCP authentication results are displayed here. (If authentication is successful, "PASS" appears; it is has failed, "NG" appears.)
(4)	The check results for the EDID header and checksum are indicated here. (These results are displayed only when **"AUTO"** has been selected as the **HDMI or DVI** setting in **"10.3.2 HDMI setting procedure"** or when **"EDID Check"** has been selected as the **Version** setting in **"6.1 HDCP settings."**)
(5)	The HDCP authentication status (OK or NG) as well as the check result (OK or NG) for the EDID header and checksum are indicated here. (These results are displayed only when **"AUTO"** has been selected as the **HDMI** or **DVI** setting in **"10.3.2 HDMI setting procedure"** or when **"EDID Check"** has been selected as the **Version** setting in **"6.1 HDCP settings."**)
(6)	The Synchronization Verification Values for checking the adequacy of the link are displayed here. "Tx" is the value calculated for the transmitter; "Rx" is the value calculated for the receiver. The display is updated each time HDCP authentication and encryption are completed. * When the HDCP display is DisplayPort, this item is not displayed. In the HDCP/EDID/CEC collective display mode, the following check results are displayed in addition to the above displays.  Display example For details of the HDCP/EDID/CEC collective display mode settings, refer to section "6.2.3 HDCP/EDID/CEC collective display."

6.2.3 HDCP/EDID/CEC collective display

When OFF has been selected as the List display setting, the results of the HDCP/EDID/CEC check can be displayed together with HDCP ON.

■ OK/NG Display Mode settings

	MENU	⇒	Configuration	⇒	HDCP/EDID/CEC Check
MENU ⇒	GroupEdit	SET ⇒	HDCP	SET ⇒	**OK/NG Display Mode**
	AutoEdit		HDMI		
	DP Analysis		DP		
	Data Copy/Erase		SDI		
	Configuration		**HDCP/EDID/CEC Check**		

Select item using ◯ or ▲ INC ▼ DEC

The [OK/NG Display] screen is displayed:

<Selecting the items>

Select the items of OK/NG Display using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of customized color bar pattern setting items>** below.

0	Standard	This is the standard display.
1	Collective	This is the collective display. The results of the checks of the items selected by Item Select are displayed collectively.

■ Item Select settings

Select [Item Select] in **<Selecting the items>** above.

. When Collective is selected as the OK/NG Display Mode setting, the Item Select item appears on the next line.

Select Item Select.

Select the items to be collectively displayed

* The item differs depending on the optional board installed.

(1) HDCP

(2) EDID

(3) CEC

<OK or NG judgment>

(1) HDCP

With HDCP ON, it is checked that HDCP authentication is performed correctly.

(2) EDID

The EDID is read at specific intervals, and an “OK” verdict is given when:

- The EDID can be read correctly.
- The EDID header and checksum are correct.

(3) CEC

An OK verdict is given if the CEC commands are sent in succession to the HDMI ports and ACK responses are given correctly when the program is run.

For the CEC send data and parameters, refer to the CEC List data among the program data.

The CEC check is performed if the following conditions are met:

- Transmission must be established as the Mode setting.
- The Tx Destination must be other than Fh.

If the above conditions are not met, the CEC check is not performed. (No displays will be shown.)

<Items which can be displayed collectively>

The items listed in the table below can be displayed collectively.

Output unit	HDCP	EDID	CEC
VM-1876A-M0 VM-1876A-M6 VM-1876A-M7 VM-1876A-M8	HDMI01 to 04 HDMI05 to 08 HDMI09 to 12 HDMI13 to 16	HDMI01 to 04 HDMI05 to 08 HDMI09 to 12 HDMI13 to 16	HDMI01 to 04 HDMI05 to 08 HDMI09 to 12 HDMI13 to 16
VM-1876A-M1		DP01 to 02 DP03 to 04 DP05 to 06 DP07 to 08	
VM-1876-MC	HDBT 01 to 04 HDBT 05 to 08 HDBT 09 to 12 HDBT 13 to 16	HDBT 01 to 04 HDBT 05 to 08 HDBT 09 to 12 HDBT 13 to 16	HDBT 01 to 04 HDBT 05 to 08 HDBT 09 to 12 HDBT 13 to 16

* In each column, the second, third, and forth items corresponds to the second, third, and forth boards.

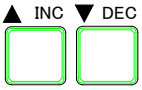
7 VG-876 SYSTEM SETTINGS (Config)

7.1 System settings

7.1.1 Beep setting

The buzzer which sounds when any of the keys on the front panel of the VG-876 (or on the RB-1870 or RB-1871) are pressed can be turned on or off.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	**Beep**
	AutoEdit		HDCP		Key Lock
	DP Analysis		HDMI		RS-232C
	Data Copy/Erase		DP		LAN
	Configuration		SDI		INC/DEC Continuity

Select item using  or ▲ INC ▼ DEC 

The [Beep] screen is displayed:

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	OFF	The buzzer is turned off.
1	ON	The buzzer is turned on.

7.1.2 Key lock setting

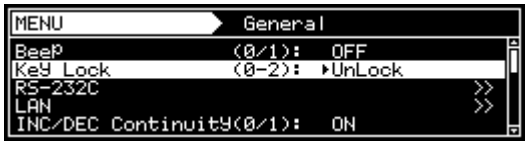
The keys on the VG-876 main unit can be locked.

<Key lock setting>

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Beep
	AutoEdit		HDCP		**Key Lock**
	DP Analysis		HDMI		RS-232C
	Data Copy/Erase		DP		LAN
	Configuration		SDI		INC/DEC Continuity

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Selecting the items>

Select the items of Key Lock using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

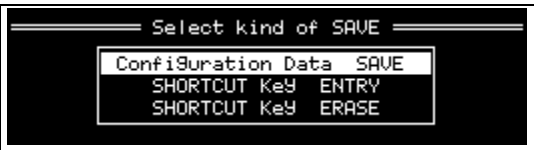
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

UnLock: Key lock is not set.
Lock: The keys set by the SP-8870 are locked.
* For details on the settings, refer to the instruction manual of the SP-8870 software.
ALL Lock: All the keys are locked.

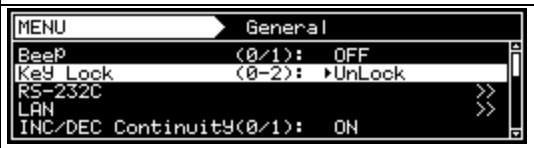
Call the SAVE menu using SAVE.

Select **Configuration Data SAVE** using ◯ or ▲ INC ▼ DEC, and then press SET.

After saving the data, the key lock setting takes effect when the power is turned off and then turned back on.



<Key lock release and unlock settings>

(1)	After performing the key lock setting, the setting takes effect when the power of the generator is turned on. To release the key lock setting: Press MENU for about 5 seconds. Key lock is released, and MENU is opened.	
(2)	Save the Unlock setting by following steps (1) to (4) for the key lock setting.	

*** Unless the Unlock setting is saved, the key lock setting will take effect when the generator is turned on.**

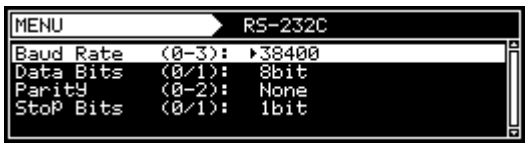
7.1.3 RS-232C settings

These settings are performed when connection to the terminal is to be established from the RS-232C port.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Beep
	AutoEdit		HDCP		Key Lock
	DP Analysis		HDMI		**RS-232C**
	Data Copy/Erase		DP		LAN
	Configuration		SDI		INC/DEC Continuity

Select item using ◯ or ▲ INC ▼ DEC

The following screen is displayed:



<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Baud rate setting		
0	9600	The baud rate is set to 9600 bps.
1	19200	The baud rate is set to 19200 bps.
2	38400	The baud rate is set to 38400 bps.
3	57600	The baud rate is set to 57600 bps.
Number of data bits setting		
0	7bit	7 data bits are set
1	8bit	8 data bits are set
Parity setting		
0	None	Parity is set to none.
1	Even	Parity is set to even.
2	Odd	Parity is set to odd.
Number of stop bits setting		
0	1bit	1 stop bit is set.
1	2bit	2 stop bits are set.

CAUTION

- When you use terminal commands for VG-876 series, please set “Data Bits” as 8-bit. If you use old VG series (e.g. VG-848, VG-859C), some commands works okay with Data Bits as 7-bit.
- When you change setting here, please re-boot VG unit. The setting change is activated after re-booting.

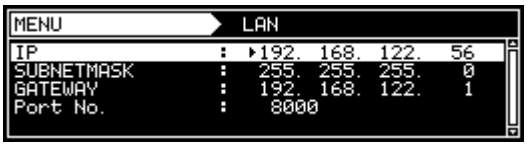
7.1.4 LAN settings

These settings are performed when connection to the terminal is to be established from the LAN port.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Beep
	AutoEdit		HDCP		Key Lock
	DP Analysis		HDMI		RS-232C
	Data Copy/Erase		DP		**LAN**
	Configuration		SDI		INC/DEC Continuity

Select item using  or ▲ INC ▼ DEC

The following screen is displayed:



<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

IP is setting	
xxx.xxx.xxx.xxx	Set the IP address. The factory setting is 192.168.0.2.
SUBNETMASK setting	
xxx.xxx.xxx.xxx	Set the subnetmask address. The factory setting is 255. 255. 255.0.
GATEWAY setting	
xxx.xxx.xxx.xxx	Set the gateway address. The factory setting is 192. 168. 122.1.
Port No. setting	
Xxxx	Set the number of the port to be used by the terminal commands. The factory setting is 8000.

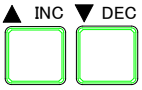
CAUTION

- When you change setting here, please re-boot VG unit. The setting change is activated after re-booting.

7.1.5 INC/DEC continuity setting

The INC/DEC key continuity function enables the holding down of the INC and DEC keys to be enabled or disabled.

It works only when programs are selected and executed.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	LAN
	AutoEdit		HDCP		**INC/DEC Continuity**
	DP Analysis		HDMI		INC/DEC Interval
	Data Copy/Erase		DP		Color Depth
	Configuration		SDI		SAMPLE RGB/YPbPr
Select item using  or ▲ INC ▼ DEC 					

The [INC/DEC Continuity] screen is displayed:

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

ON: Programs continue to be switched while the INC or DEC key is held down.

OFF: The number of programs switched corresponds to the number of times the INC or DEC key is pressed. Whether the keys are tapped or held down makes no difference.

* For the switching intervals, refer to “7.1.6 INC/DEC interval setting.”

7.1.6 INC/DEC interval setting

This function enables the minimum interval for switching programs to be set using the INC and DEC key.

It works only when programs are selected and executed.

	MENU	⇒	Configuration	⇒	General
MENU [ ] ⇒	GroupEdit	SET [ ] ⇒	**General**	SET [ ] ⇒	LAN
	AutoEdit		HDCP		INC/DEC Continuity
	DP Analysis		HDMI		**INC/DEC Interval**
	Data Copy/Erase		DP		Color Depth
	Configuration		SDI		SAMPLE RGB/YPbPr
Select item using ◯ or ▲ INC [ ] ▼ DEC [ ]					

The [INC/DEC Interval] screen is displayed:

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Set using a value from **0s** to **10s**.

The lower the value, the faster the switching speed.

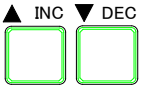
7.1.7 Color depth setting

This setting makes it possible to specify whether the number of color gray scale bits for the output images is to accord with the program data or whether it is to be fixed.

For details, refer to **“10.2.6 Setting the color depth (tone) for pattern drawing.”**

7.1.8 SAMPLE RGB/YPbPr setting

This setting makes it possible to specify whether the color space of the output images is to accord with the sample program data or whether it is to be fixed to RGB.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	LAN
	AutoEdit		HDCP		INC/DEC Continuity
	DP Analysis		HDMI		INC/DEC Interval
	Data Copy/Erase		DP		Color Depth
	Configuration		SDI		**SAMPLE RGB/YPbPr**
Select item using  or ▲ INC ▼ DEC 					

<Selecting the items>

Select the items of SAMPLE RGB/YPbPr using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

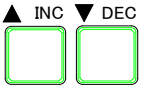
Default: Default: RGB/YPbPr is changed in accordance with the color space registered in the sample program data.

RGB: The color space is fixed to RGB.

Due to the stipulations of the DVI and other standards, the color difference signals are output at the “Default” setting in the event that the EIA timing or other such data of the sample program has been selected for outputs with no color difference signals. However, by selecting “RGB” to fix the color space to RGB, the RGB output can be selected without having to edit the program.

7.1.9 DDC clock setting

The DDC clock can be set.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	INC/DEC Continuity
	AutoEdit		HDCP		INC/DEC Interval
	DP Analysis		HDMI		Color Depth
	Data Copy/Erase		DP		SAMPLE RGB/YPbPr
	Configuration		SDI		**DDC Clock**
Select item using  or ▲ INC ▼ DEC 					

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select **20, 40, 60, 80** or **100 kHz**.

The factory setting is 100 kHz.

7.1.10 Trigger mode settings

●Concerning the trigger function

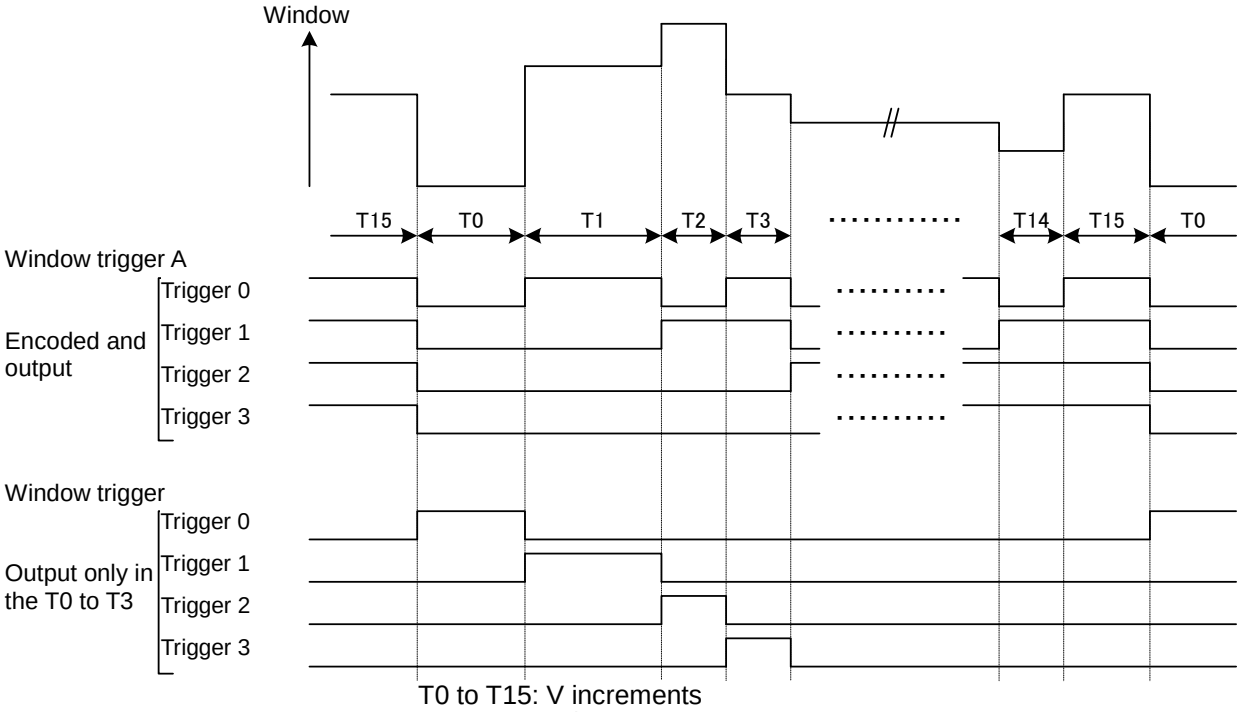
The trigger function outputs trigger in accordance with the patterns in order to evaluate the moving picture response speed and other factors.

The following kinds of triggers are provided.

(1) Window triggers (TriggerA/TriggerB)
(2) VSync trigger
(3) Scroll triggers (optional)
(4) Simple moving image frame trigger (optional)

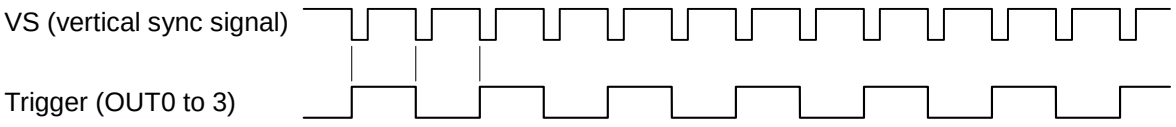
(1) Window triggers (TriggerA/TriggerB)

When, on the window patterns, 4 or 16 levels are set and displayed for the format, these triggers are output in accordance with the level sequence.



(2) VSync trigger

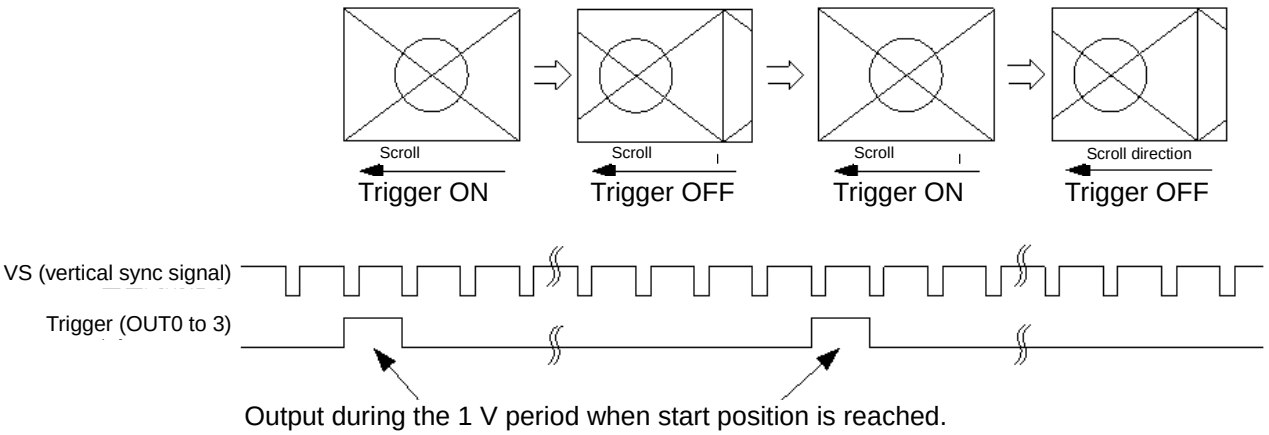
High and low levels are output alternately in line with VSync.



(3) Scroll triggers (optional)

When a pattern is being scrolled, the trigger is output when the pattern has reached the start position.

When scrolling toward the left

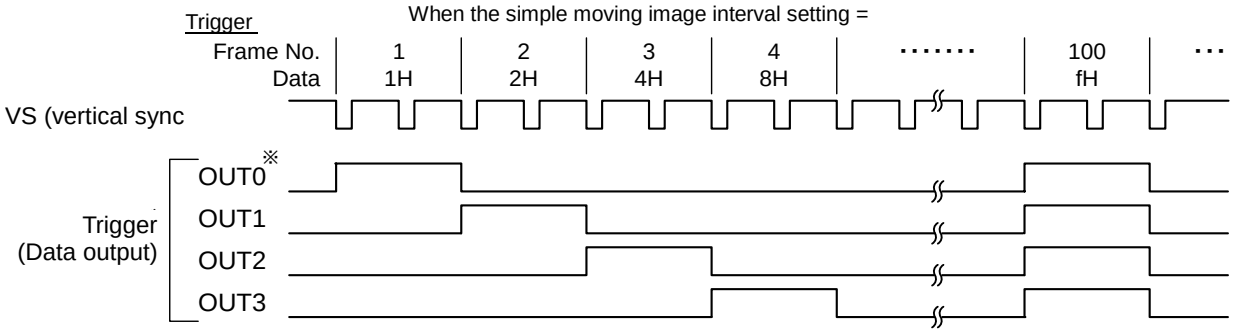


CAUTION

- When there is a multiple number of scroll ON planes (graphic, character and window planes), trigger ON is not output when the scroll settings (step and direction) differ.
- When there is one scroll ON plane, the trigger ON is output in accordance with the settings of that plane.
- Trigger ON can be output with both horizontal direction (left/right) scrolling and vertical direction (up/down) scrolling, but when scrolling in both of these directions (top right, for instance), it is output in accordance with the horizontal direction.

(4) Simple moving image frame trigger (optional)

The trigger is output at the specified frames while simple moving images are displayed.



* The VSync trigger is output for OUT0 when Frame + VSync Trigger has been set as the mode.

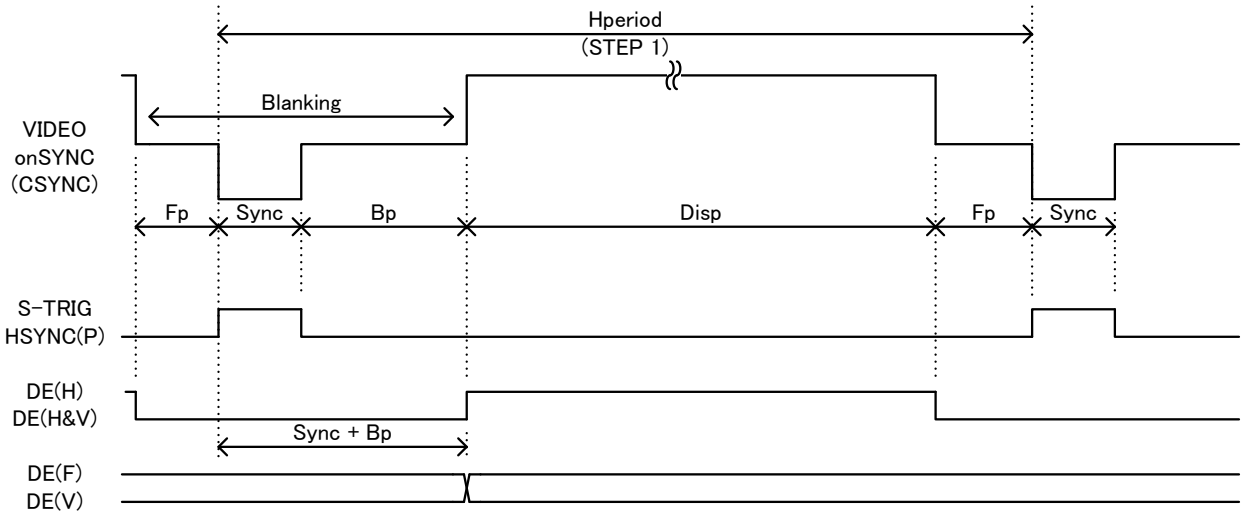
● About sync trigger

Sync trigger function outputs sync signal that is equivalent to the output timing.
There are following sync triggers.
(1) Video trigger (DataEnable(F), DataEnable(H), DataEnable(V), DataEnable(H&V))
(2) Horizontal Timing trigger (HSync(P), HSync(N))
(3) Vertical Timing trigger (VSync(P), VSync(N))

(1) Video trigger
It outputs DataEnable (video active signal) that is equivalent to the output timing.
It can be selected either Horizontal video active period or (and) Vertical video active period.
In case of interlace timing, it can be output as field signal.

（2）Horizontal Timing trigger
It outputs Hsync (horizontal sync signal) that is equivalent to the output timing.
It can be selected either positive or negative.

< Horizontal Timing trigger >



Caution

There is possibility that waveform will be distorted if the timing that has narrow pulse width such as Hsync from S-trigger.

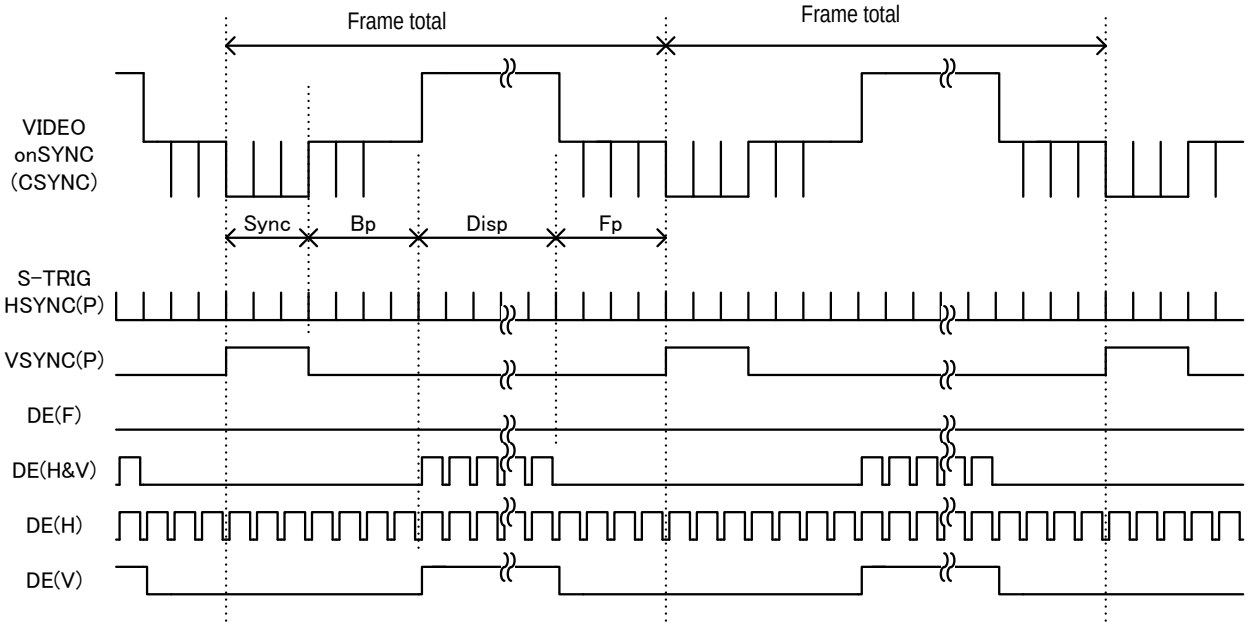
(3) Vertical Timing trigger

It outputs Vsync (vertical sync signal) that is equivalent to the output timing.

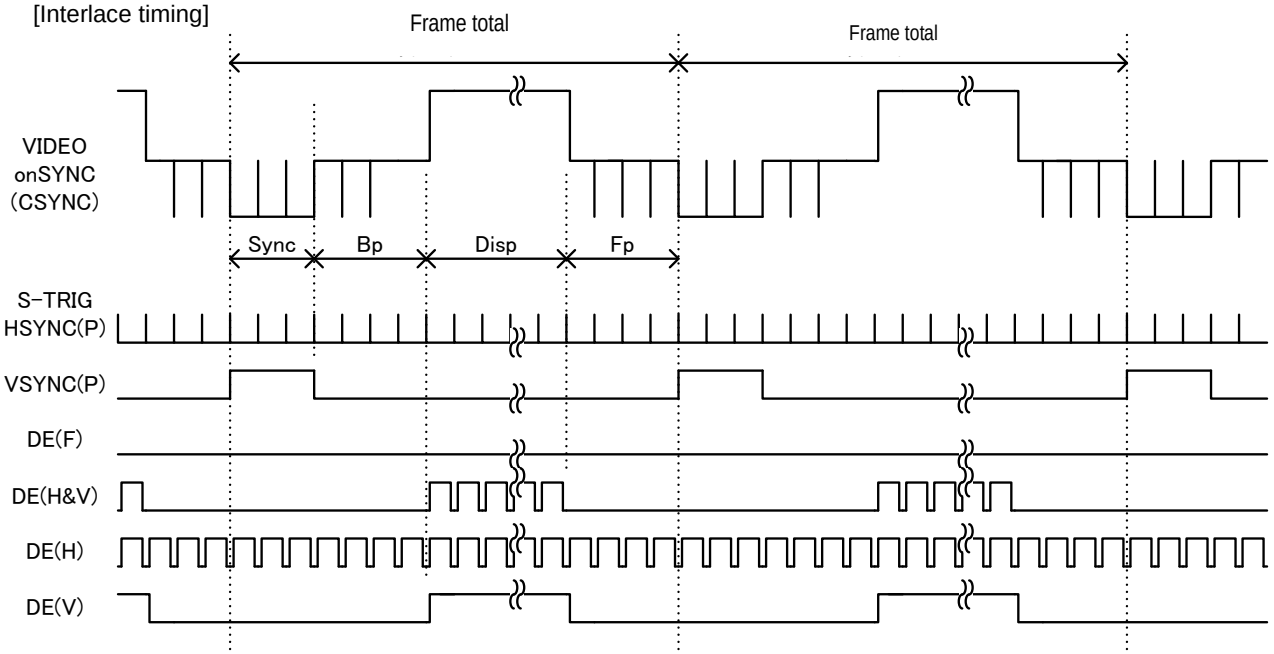
It can be selected either positive or negative.

< Vertical Timing trigger >

[Progressive timing]



[Interlace timing]



Caution

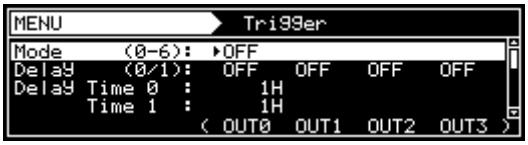
The timing signal such as HS, VS and DE that is output from VM-1876 interface units and S-trigger output are synchronized. However, phase gap exists.

<Setting procedure>

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	**Trigger**
	AutoEdit		HDCP		Image Priority
	DP Analysis		HDMI		Image Fast Draw Mode
	Data Copy/Erase		DP		Image Position
	Configuration		SDI		

Select item using ◯ or ▲ INC ▼ DEC

The [Trigger] screen is displayed:



<Selecting the items>

Select the items of Trigger using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

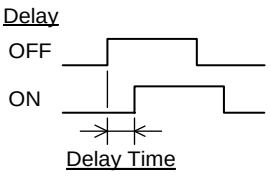
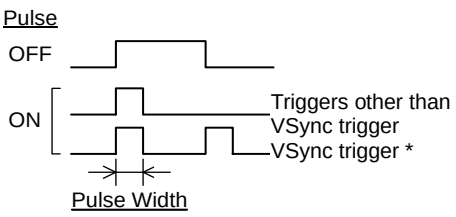
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Table of common trigger setting items>** and **<Table of simple moving image frame trigger setting items>** below.

<Table of common trigger setting items>

Mode (0-6)	The trigger functions are selected here. * Frame Trigger and Frame+VSync Trigger are optional functions. For further details, contact your dealer or an ASTRODESIGN sales representative.		
	0	OFF	At this setting, the trigger output is set to OFF.
	1	TriggerA	Window trigger A is output. The trigger is encoded in line with the set time, and output.
	2	TriggerB	Window trigger B is output. The trigger is output in line with the set time only for the T0-T3 duration.
	3	VSync Trigger	The VSync trigger is output. The trigger is encoded in line with the VSync signal, and output.
	4	Frame Trigger *	The simple moving image frame triggers are output. The triggers are output at the specified frames.
	5	Frame+VSync Trigger *	The simple moving image frame triggers (OUT1-3) and VSync trigger (OUT0) are output.
	6	Scroll Trigger *	The scroll trigger is output. The trigger is output in line with the scroll setting.

Delay (0/1)	ON or OFF for the trigger delay function is selected for each output (OUT0-3).		
	0	OFF	The triggers are not delayed.
	1	ON	The trigger outputs are delayed in accordance with the **Delay Time**.
Delay Time 0, 1	The delay time is set here. Setting range: 1 to 4096 [H]		
Time Sel (0/1)	The delay time settings (**Delay Time 0 and 1**) are selected here for each output (OUT0 to 3).		
	0	Delay Time 0	
	1	Delay Time 1	
Pulse (0/1)	ON or OFF for the pulse function is selected for each output (OUT0-3).		
	0	OFF	The triggers are output using a width in V increments. (Refer to “Concerning the trigger function” described previously.)
	1	ON	The triggers are output using the designated width (in H increments) of the **Pulse Width**.
Pulse Width 0, 1	The pulse width is set here. Setting range: 0 to 4095 [H]		* When the pulse function is OFF, high-level and low-level VSync triggers are output alternately in line with VSync; when it is ON, they are output with each VSync signal.
Width Sel (0/1)	The pulse width settings (**Pulse Width 0 and 1**) are selected here for each output (OUT0 to 3).		
	0	Pulse Width 0	
	1	Pulse Width 1	
Polarity (0/1)	The polarity of the trigger output is selected for each output (OUT0-3).		
	0	Nega	Reversed
	1	Posi	Positive (high)

< Table of sync trigger common setting>

S-TRIG0	Select sync trigger function that is output to S-TRIG0 terminal.		
	0	OFF	Output is OFF.
	1	HSync(P)	Output positive polarity HSync.
	2	HSync(N)	Output negative polarity HSync.
	3	VSync(P)	Output positive polarity VSync.
	4	VSync(N)	Output negative polarity VSync.
	5	Data Enable(F)	In case of Interlace, output the second field video. In case of Progressive, it is always set as Low.
	6	Data Enable(H&V)	Output video active signal.
	7	Data Enable(H)	Output horizontal active signal.
	8	Data Enable(V)	Output vertical active signal.
S-TRIG1	Select sync trigger function that is output to S-TRIG1 terminal.		
	0	OFF	Output is OFF.
	1	HSync(P)	Output positive polarity HSync.

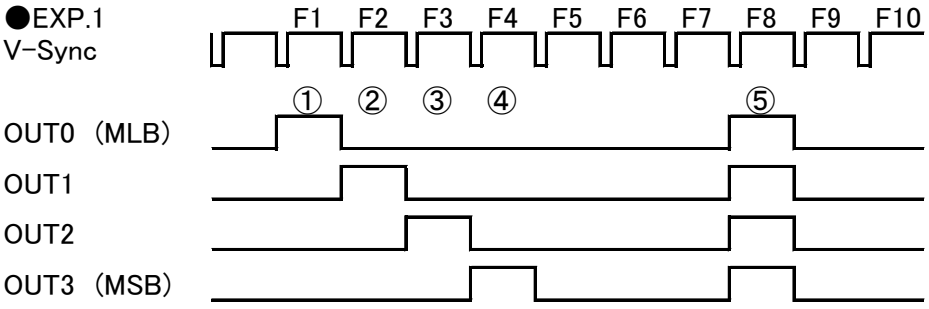
	2	HSync(N)	Output negative polarity HSync.
	3	VSync(P)	Output positive polarity VSync.
	4	VSync(N)	Output negative polarity VSync.
	5	Data Enable(F)	In case of Interlace, output the second field video. In case of Progressive, it is always set as Low.
	6	Data Enable(H&V)	Output video active signal.
	7	Data Enable(H)	Output horizontal active signal.
	8	Data Enable(V)	Output vertical active signal.
S-TRIG2	Select sync trigger function that is output to S-TRIG2 terminal.		
	0	OFF	Output is OFF.
	1	HSync(P)	Output positive polarity HSync.
	2	HSync(N)	Output negative polarity HSync.
	3	VSync(P)	Output positive polarity VSync.
	4	VSync(N)	Output negative polarity VSync.
	5	Data Enable(F)	In case of Interlace, output the second field video. In case of Progressive, it is always set as Low.
	6	Data Enable(H&V)	Output video active signal.
	7	Data Enable(H)	Output horizontal active signal.
	8	Data Enable(V)	Output vertical active signal.
S-TRIG3	Select sync trigger function that is output to S-TRIG3 terminal		
	0	OFF	Output is OFF.
	1	HSync(P)	Output positive polarity HSync.
	2	HSync(N)	Output negative polarity HSync.
	3	VSync(P)	Output positive polarity VSync.
	4	VSync(N)	Output negative polarity VSync.
	5	Data Enable(F)	In case of Interlace, output the second field video. In case of Progressive, it is always set as Low.
	6	Data Enable(H&V)	Output video active signal.
	7	Data Enable(H)	Output horizontal active signal.
	8	Data Enable(V)	Output vertical active signal.

<Table of simple moving image frame trigger setting items>

* The simple moving image frame trigger is an option so it will not be displayed unless the license has been registered.

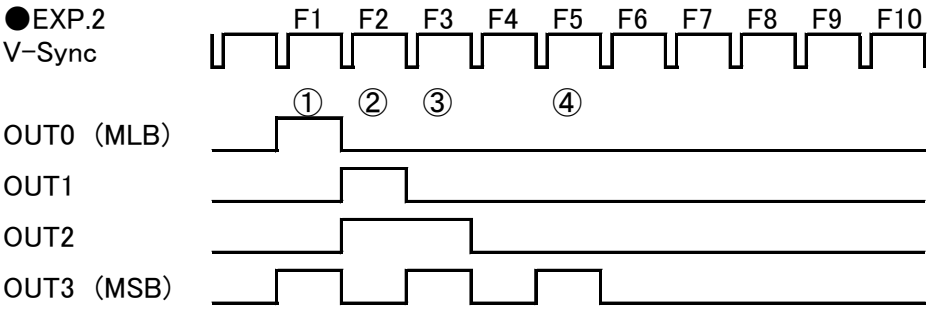
Number Of Frames	The number of frames for outputting the trigger is set here. Setting range: 0 to 16
Frame No.	The numbers of the frames (max. 16) for outputting the trigger are set here. Any number which exceeds the number of simple moving image being displayed will be ignored. Setting range: 1 to 1024
Data	The data to be output to the specified frames is set here. (Data bits 0-3: OUT0-3) Setting range: 0x0 to 0xF

<Example of simple animation frame trigger settings>



Number Of Frame: 5

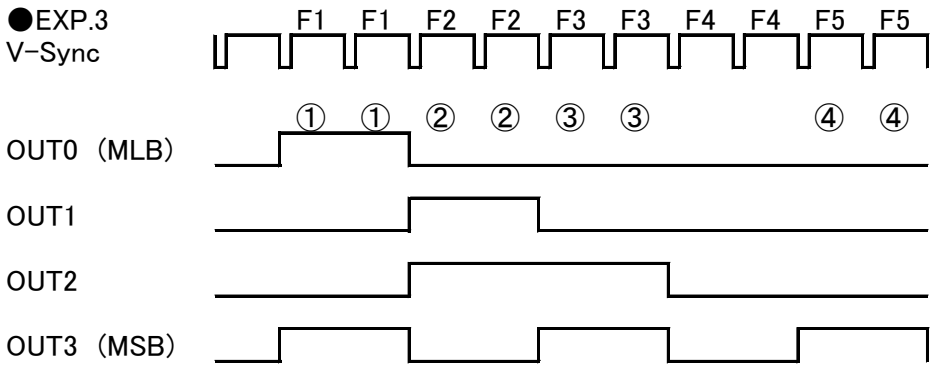
		Frame No.	Data
①	1 :	1	1H
②	2 :	2	2H
③	3 :	3	4H
④	4 :	4	8H
⑤	5 :	8	fH



Number Of Frame: 4

		Frame No.	Data
①	1 :	1	9H
②	2 :	2	6H
③	3 :	3	cH
④	4 :	5	8H

●EXP.3

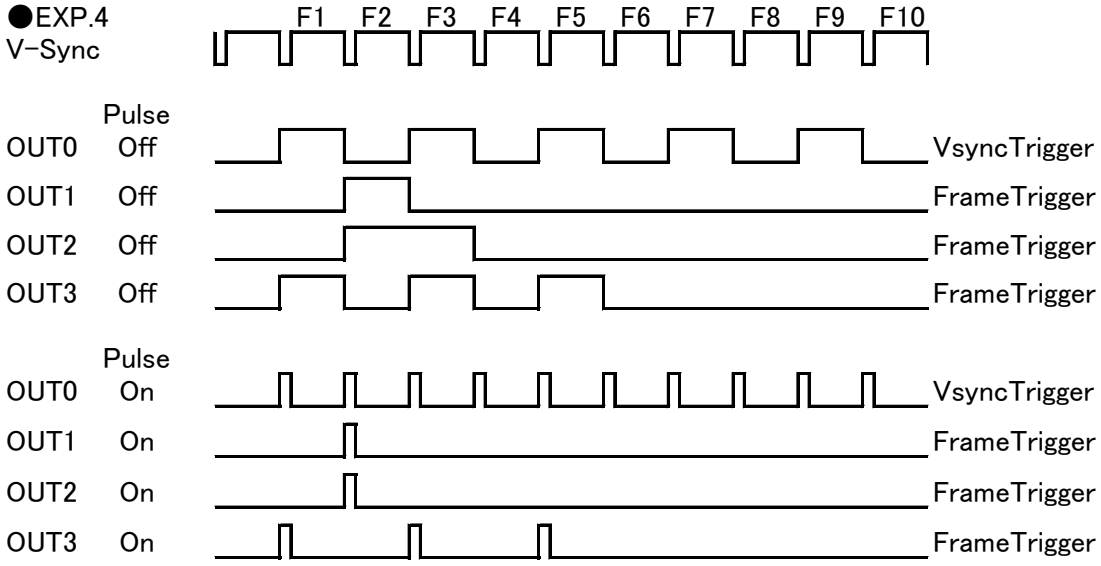


Number Of Fram: 4

		Frame No.	Data
①	1 :	1	9H
②	2 :	2	6H
③	3 :	3	cH
④	4 :	5	8H

○When “2” has been selected as the setting for the interval parameter of simple animation below
GraphicPlaneScr: Direction : SimpleAnimation
: Interval1 : 2 (A value of 1 applies for EXP.1 and EXP.2.)

●EXP.4



○Under the settings below, VsyncTrigger is output to OUT1 and FrameTrigger to the other ports.
Mode : Frame+Vsync Trigger
○When Pulse has been set to On, VsyncTrigger pulses are output at both the rising and falling edges.
○When Pulse has been set to On, FrameTrigger pulses are output at the rising edges only.
○A pulse is output only to the initial edge when it spans a multiple number of frames as with OUT2.

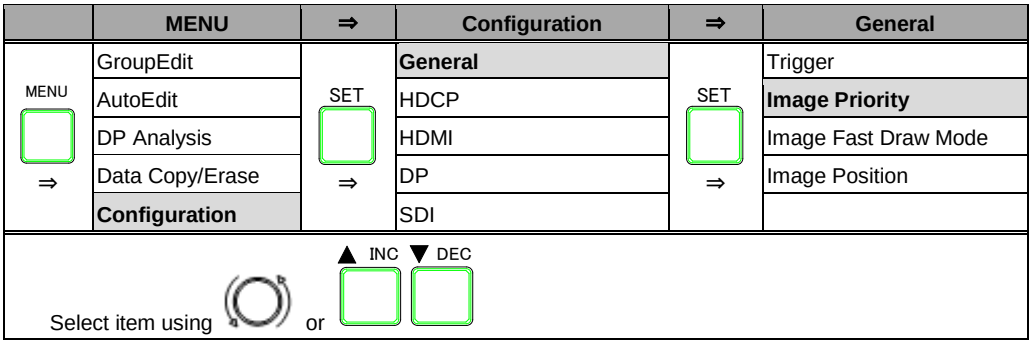
7.1.11 Image - priority settings

Image priority settings can be performed.

Data can be saved both in the internal memory of the VG-876 or in USB memory.

This setting is used to set the priority when both sets of image data have been made valid.

Utilizing it brings some advantages such as increasing the drawing speed and dispersing the data to the internal memory and USB memory and then calling the saved data.



<Selecting the items>

Select the items of Image Priority using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

OFF:

When USB Memory is inserted, only the image data in the USB Memory is valid. The image data in the internal memory is invalid.

Internal > USB:

The image data both in the internal memory and in the USB Memory are valid. In this mode, reading of the image data in the internal memory takes priority. An increase in the drawing speed can be expected.

USB > Internal:

The image data both in the internal memory and in the USB Memory are valid. In this mode, reading of the image data on the USB Memory takes priority.

7.1.12 Image Position Setting

Image Position setting can change Bitmap's display position.

*** Bitmap resolution can be set only when its resolution is lower than display resolution.**

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Trigger
	AutoEdit		HDCP		Image Priority
	DP Analysis		HDMI		Image Fast Draw Mode
	Data Copy/Erase		DP		**Image Position**
	Configuration		SDI		
Select item using ◯ or ▲ INC ▼ DEC					

<Selecting the items>

Select the items of Image Position using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.
For further details on the settings, refer to the table below.

Key	LCD display	Description
0	Center	The image is displayed at the center of the screen.
1	Top-Left	The image is displayed at the top left of the screen
2	Bottom-Left	The image is displayed at the bottom left of the screen
3	Top-Right	The image is displayed at the top right of the screen
4	Bottom-Right	The image is displayed at the bottom right of the screen

7.1.13 Cursor coordinate setting

The position for displaying the cursor coordinates can be set.
For details on the On or Off setting procedure for the coordinate display, refer to “4.12.1 Cursor settings.”

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Image Priority
	AutoEdit		HDCP		Image Fast Draw Mode
	DP Analysis		HDMI		Image Position
	Data Copy/Erase		DP		**Cursor Coordinate**
	Configuration		SDI		Mouse Speed

Select item using  or ▲ INC ▼ DEC 

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the table below.

Key	LCD display	Description
0	Normal	The coordinates are displayed at the top left or top right of the display.
1	Move with Curs	The display appears near the actual cursor coordinates and moves as the cursor moves.

7.1.14 Mouse speed setting

The movement speed at which to move the cursor using the USB mouse can be set.
For details on the On or Off setting procedure for the coordinate display, refer to “4.12.1 Cursor settings.”

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Image Priority
	AutoEdit		HDCP		Image Fast Draw Mode
	DP Analysis		HDMI		Image Position
	Data Copy/Erase		DP		Cursor Coordinate
	Configuration		SDI		**Mouse Speed**

Select item using  or ▲ INC ▼ DEC 

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Setting range: 0 (fastest) to 9 (slowest)
The factory default setting is “1.”

7.1.15 Digital Video Level Step setting

By performing operations to change the digital level of the video signals (refer to section “10.2.7 Setting the digital level”), the number of steps to be taken when the setting speed is increased by pressing the SHIFT key simultaneously is set.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	Image Fast Draw Mode
	AutoEdit		HDCP		Image Position
	DP Analysis		HDMI		Cursor Coordinate
	Data Copy/Erase		DP		Mouse Speed
	Configuration		SDI		**DV Level Step**
Select item using ◯ or ▲ INC ▼ DEC					

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Setting range: 0 (factory default), 1 - 32767

When “0” has been set, the default number of steps which differs depending on the bit length (gray scale) is used.

When a value from 1 to 32767 has been set, the number of steps set regardless of the bit length (gray scale) is used.

7.1.16 High-speed drawing mode setting

This function allows high-speed drawing to be set.

With the VG-876, the high-speed drawing mode in which the specified patterns are selected at high speed can be executed.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	**Image Fast Draw Mode**
	AutoEdit		HDCP		Image Position
	DP Analysis		HDMI		Cursor Coordinate
	Data Copy/Erase		DP		Mouse Speed
	Configuration		SDI		DV Level Step
Select item using ◯ or ▲ INC ▼ DEC					

The [Image Fast Draw Mode] screen is displayed:

<Selecting the items>

Select the items of Image Fast Draw Mode using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select either ON or OFF.		
0	**OFF**	The high-speed drawing mode is not executed.
1	**ON**	The high-speed drawing mode is executed.

Specify the data numbers of the points at which high-speed drawing is to start and end.	
Start point	Specify a data number from 1 to 999.
End point	* If a number higher than the end point is set for the start point, the start point value will be also applied to the end point.

CAUTION

- Video memory capacity restrictions
  The total volume of data which can be developed in the high-speed pattern selection mode in the image files of the video memory is approximately 174 MB although this figure differs slightly depending on the image data size and other factors. In the high-speed pattern selection mode, it is not possible to load image data exceeding this total.
- When the USB Memory is ejected
  When the high-speed pattern selection mode has been set to ON and image data has been developed from the USB Memory into the video memory, all the image data developed from the USB Memory will be cleared if the USB Memory is ejected.

7.1.17 CUSTOM Key1, 2, RB-1871 CUSTOM Key 1, 2

Custom Key2/RB-1871CustomKey2

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	**CUSTOM KEY 1**
	AutoEdit		HDCP		**2**
	DP Analysis		HDMI		**RB-1871 CUSTOMKey 1**
	Data Copy/Erase		DP		**2**
	Configuration		SDI		Power-On Program

Select item using  or ▲ INC ▼ DEC 

The following screen is displayed:

<Selecting the items>

Select the items of CUSTOM Key 1, CUSTOM Key 2, RB-1871 CUSTOM Key 1, RB-1871 CUSTOM Key 2 using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Custom key setting item list>** below.

<Custom key setting item list>

Custom Key1	Set Custom Key1		
	0	**HDCP**	Operates HDCP Enable/Disable.
Custom Key2 (0-3)	Set Custom Key2		
	0	**MUTE**	Audio Mute
	1	**HDMI AV-MUTE**	HDMI AV-Mute If you change program, it becomes OFF. Note) if you change setting value, MUTE/HDMI AV-MUTE becomes OFF.

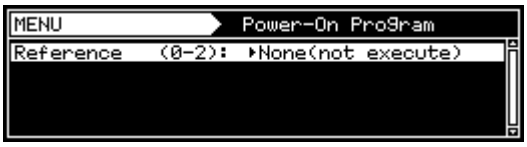
	2	**GCP Set AV-MUTE**	HDMI AV-Mute General Control Packet is set as below. Key ON → Set_AVMUTE ON / Clear_AVMUTE ON Key OFF → Set_AVMUTE OFF / Clear_AVMUTE ON Note) this is available only for VM-1876-M8.
	3	**GCP Clear AV-MUTE**	HDMI AV-Mute General Control Packet is set as below. Key ON → Set_AVMUTE OFF / Clear_AVMUTE OFF Key OFF -→ Set_AVMUTE OFF / Clear_AVMUTE ON Note) this is available only for VM-1876-M8.

7.1.18 Operation mode at power-on

The program to be executed immediately after turning on the power of the VG-876 can be set.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	CUSTOM KEY 1
	AutoEdit		HDCP		2
	DP Analysis		HDMI		RB-1871 CUSTOMKey 1
	Data Copy/Erase		DP		2
	Configuration		SDI		**Power-On Program**
Select item using ◯ or ▲ INC ▼ DEC					

The [Power-On Program] screen is displayed:



<Selecting the items>

Select the items of Power-On Program using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

None (not execute): The program is not executed when the generator's power is turned on.

Configuration: The program which was set in "When Configuration is selected" is executed.

Last Memory: The Last Memory operation (the program which was executed just before the generator's power was turned off) is executed.

However, some restrictions apply. Refer to * below.

<When Configuration is selected above>

Select data type in "Type".

SAMPLE TIM/PAT: Internal sample data (Timing/Pattern)

USER Program: Program data registered by the user

Group: Group data created and registered by the user

*** Last Memory restrictions**

1. The user program will be executed in cases where the data types differ such as when internal sample data is selected as the timing data and a user program is selected as the pattern data. (Example: When TIM=1001 and PAT=1, TIM=PAT=1 is executed.)
2. The timing data number will be executed in cases where user programs are selected as both the timing data and pattern data but their numbers differs. (Example: When TIM=5 and PAT=1, TIM=PAT=5 is executed.)
3. When Last Memory is executed using a group, the data at the head of the group will be executed.

7.1.19 USB Prg FolderNo. setting

Folders for the program data in the USB Memory can be set.

When program data is read and registered, the folders set here are used.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	GroupEdit	SET ⇒	**General**	SET ⇒	CUSTOM KEY 1
	AutoEdit		HDCP		2
	DP Analysis		HDMI		RB-1871 CUSTOMKey
	Data Copy/Erase		DP		Power-On Program
	Configuration		SDI		**USB Prg FolderNo.**

Select item using or ▲ INC ▼ DEC

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Setting range: 0 (factory default), 1 – 999

7.1.20 Bit depth display in Name Pattern setting

The current bit depth can be displayed in NamePattern setting.

< Setting >

	MENU	⇒	Configuration		General
MENU ⇒	Group Edit	SET ⇒	**General**	SET ⇒	Power-On Program
	Auto Edit		HDCP		USB PrgFolderNo.
	DP Analysis		HDMI		Startup USB Wait
	Data Copy/Erase		DP		**Name Pattern Mode**
	Configuration		SDI		
Select item using or ▲ INC ▼ DEC .					

The “General” setting menu is displayed.

<Selecting the items>

Select the items of Name Pattern Mode using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For details, refer to the below setting of <**Name Pattern Mode>.**

<Setting items of Name Pattern Mode>

Select display or not-display output bit depth.		
0	**Show bit Mode**	Output Bit depth is displayed.
1	**Hide bit Mode**	Output Bit depth is not displayed.

8 DATA COPY/Delete

8.1 Copy and delete data

The data stored on the media (internal memory or USB Memory) can be copied or erased.

CAUTION

Refrain from ejecting the USB Memory or turning off the power while data is being copied or erased.
Otherwise the USB Memory and its data may be damaged.

8.1.1 Copying programs

Various methods can be used to copy the program data.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	**COPY : Program**
	AutoEdit		COPY : USER Character
	DP Analysis		COPY : USER OPT Pattern
	Data Copy/Erase		COPY : Image
	Configuration		COPY : Subtitle

Select item using ◯ or ▲ INC ▼ DEC

The [COPY: Program] screen is displayed:

<Selecting the items>

Select the items of COPY: Program using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Type: Select the type of data copying to be used here.
Source: Select the copy source number and media here.
Destination: Select the copy destination number and media here.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

<Program categories for Type>	**<Differences in the settings from one type of data to another>**
1-Program: Select this when copying stored programs in their original form.	**1-Program** Select the source and destination program numbers and the media.
1-SAMPLE TIM&PAT->Program: When combining the timing data and pattern data among the internal sample data to create a program	**1-SAMPLE TIM&PAT->Program** Select the timing or pattern data number among the internal sample data to serve as the source, and select the program number and media to serve as the destination.
1-TIM (Timing/Output/Audio): When the timing data of the source program is to be combined with the pattern data of the destination program and the existing program is to be overwritten by the program thus created * This setting cannot be used when the program does not exist at the destination end.	**1-TIM(Timing/Output/Audio)** Select the program number and media for the timing data to be used as the source, and select the program number and media for the pattern data to be used as the destination.
1-PAT (Pattern/Action): When the pattern data of the source program is to be combined with the timing data of the destination program and the existing program is to be overwritten by the program thus created * This setting cannot be used when the program does not exist at the destination end.	**1-PAT(Pattern/Action)** Select the program number and media for the pattern data to be used as the source, and select the program number and media for the timing data to be used as the destination.
Multiple-Program: Select this when copying a multiple number of programs.	**1-Multiple-Program** Select the range of the source and destination program numbers and the media.

8.1.2 Copying user characters

User character pattern data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Program
	AutoEdit		**COPY : USER Character**
	DP Analysis		COPY : USER OPT Pattern
	Data Copy/Erase		COPY : Image
	Configuration		COPY : Subtitle
Select item using ◯ or ▲ INC ▼ DEC			

The [COPY : USER Character] screen is displayed:

<Selecting the items>

Select the items of COPY : USER Character using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source character code (such as e0H) and the media.
Destination: Select the copy destination character code (such as e0H) and the media.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.3 Copying user optional patterns

User optional pattern data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Program
	AutoEdit		COPY : USER Character
	DP Analysis		**COPY : USER OPT Pattern**
	Data Copy/Erase		COPY : Image
	Configuration		COPY : Subtitle
Select item using or ▲ INC ▼ DEC			

The [COPY : USER OPT Pattern] screen is displayed:

<Selecting the items>

Select the items of COPY : USER OPT Pattern using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source pattern number and the media.
Destination: Select the copy destination pattern number and the media.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.4 Copying images

Image pattern data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Program
	AutoEdit		COPY : USER Character
	DP Analysis		COPY : USER OPT Pattern
	Data Copy/Erase		**COPY : Image**
	Configuration		COPY : Subtitle
Select item using ◎ or ▲ INC ▼ DEC			

The [COPY : Image] screen is displayed:

<Selecting the items>

Select the items of COPY : Image using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source pattern number and the media.
Destination: Select the copy destination pattern number and the media.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.5 Copying subtitle

Subtitle pattern data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Program
	AutoEdit		COPY : USER Character
	DP Analysis		COPY : USER OPT Pattern
	Data Copy/Erase		COPY : Image
	Configuration		**COPY : Subtitle**
Select item using or		▲ INC ▼ DEC	

The [COPY : Subtitle] screen is displayed:

<Selecting the items>

Select the items of COPY : Subtitle using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source pattern number and the media.
Destination: Select the copy destination pattern number and the media.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.6 Copying groups

Group data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Image
	AutoEdit		COPY : Subtitle
	DP Analysis		**COPY : Group**
	Data Copy/Erase		COPY : Auto
	Configuration		COPY : All
Select item using or ▲ INC ▼ DEC			

The [COPY : Group] screen is displayed:

<Selecting the items>

Select the items of COPY : Group using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source group number and the media.
Destination: Select the copy destination group number and the media.

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.7 Copying auto executions

Auto execution data can be copied.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	COPY : Image
	AutoEdit		COPY : Subtitle
	DP Analysis		COPY : Group
	Data Copy/Erase		**COPY : Auto**
	Configuration		COPY : All
Select item using or ▲ INC ▼ DEC			

The [COPY : Auto] screen is displayed:

<Selecting the items>

Select the items of COPY : Auto using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source media.
Destination: Display the copy destination media. (When Source is selected, the media is selected automatically.)

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.8 Copying all data

All the data can be copied together.

The time taken to copy the data differs according to how much data is to be copied. It is not possible to cancel copying once it has been initiated.

	MENU	⇒	Data Copy/Erase
MENU [ ] ⇒	GroupEdit	SET [ ] ⇒	COPY : Image
	AutoEdit		COPY : Subtitle
	DP Analysis		COPY : Group
	Data Copy/Erase		COPY : Auto
	Configuration		**COPY : All**
Select item using ◯ or ▲ INC ▼ DEC [ ] [ ]			

The [COPY : All] screen is displayed:

<Selecting the items>

Select the items of COPY : All using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Source: Select the copy source media.
Destination: Display the copy destination media. (When Source is selected, the media is selected automatically.)

<Completing the copying>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

CAUTION

Refrain from ejecting the USB Memory or turning off the power while data is being copied.
Otherwise the USB Memory and its data may be damaged.

8.1.9 Erasing programs

Program data can be erased. At the same time, multiple numbers of programs can be erased.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	**ERASE : Program**
	AutoEdit		ERASE : USER Character
	DP Analysis		ERASE : USER OPT Pattern
	Data Copy/Erase		ERASE : Image
	Configuration		ERASE : Subtitle
Select item using or ▲ INC ▼ DEC			

The [ERASE : Program] screen is displayed:

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the range of the numbers of the programs to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.10 Erasing user characters

User character pattern data can be erased.

	MENU	⇒	Data Copy/Erase
MENU [ ] ⇒	GroupEdit	SET [ ] ⇒	ERASE : Program
	AutoEdit		**ERASE : USER Character**
	DP Analysis		ERASE : USER OPT Pattern
	Data Copy/Erase		ERASE : Image
	Configuration		ERASE : Subtitle
Select item using ◯ or ▲ INC ▼ DEC [ ] [ ]			

The [ERASE : USER Character] screen is displayed:

<Selecting the items>

Select the items of ERASE : USER Character using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the character code (such as e0H) to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.11 Erasing user optional patterns

User optional pattern data can be erased.

	MENU	⇒	Data Copy/Erase
MENU	GroupEdit	SET	ERASE : Program
	AutoEdit		ERASE : USER Character
	DP Analysis		**ERASE : USER OPT Pattern**
⇒	**Data Copy/Erase**	⇒	ERASE : Image
	Configuration		ERASE : Subtitle
Select item using		▲ INC ▼ DEC	

The [ERASE : USER OPT Pattern] screen is displayed:

<Selecting the items>

Select the items of ERASE : USER OPT Pattern using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the number of the pattern to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.12 Erasing images

Image pattern data can be erased.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	ERASE : Program
	AutoEdit		ERASE : USER Character
	DP Analysis		ERASE : USER OPT Pattern
	Data Copy/Erase		**ERASE : Image**
	Configuration		ERASE : Subtitle
Select item using  or ▲ INC ▼ DEC 			

The [ERASE : Image] screen is displayed:

<Selecting the items>

Select the items of ERASE : Image using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the number of the pattern to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.13 Erasing subtitle

Subtitle pattern data can be erased. At the same time, multiple numbers of programs can be erased.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	ERASE : Program
	AutoEdit		ERASE : USER Character
	DP Analysis		ERASE : USER OPT Pattern
	Data Copy/Erase		ERASE : Image
	Configuration		**ERASE : Subtitle**
Select item using or ▲ INC ▼ DEC			

The [ERASE : Subtitle] screen is displayed:

<Selecting the items>

Select the items of ERASE : Subtitle using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the range of the numbers of the patterns to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.14 Erasing groups

Group pattern data can be erased. At the same time, multiple numbers of programs can be erased.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	ERASE : Image
	AutoEdit		ERASE : Subtitle
	DP Analysis		**ERASE : Group**
	Data Copy/Erase		ERASE : Auto
	Configuration		ERASE : All
Select item using or ▲ INC ▼ DEC			

The [ERASE : Group] screen is displayed:

<Selecting the items>

Select the items of ERASE : Group using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the range of the numbers of the groups to be erased and the media.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.15 Erasing automatic executions

Automatic execution data can be erased.

	MENU	⇒	Data Copy/Erase
MENU	GroupEdit	SET	ERASE : Image
	AutoEdit		ERASE : Subtitle
	DP Analysis		ERASE : Group
⇒	**Data Copy/Erase**	⇒	**ERASE : Auto**
	Configuration		ERASE : All
Select item using		or ▲ INC ▼ DEC	

The [ERASE : Auto] screen is displayed:

<Selecting the items>

Select the items of ERASE : Auto using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the media whose data is to be erased.

<Completing the erasing>

After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

8.1.16 Erasing all data

All the data can be erased together.

	MENU	⇒	Data Copy/Erase
MENU ⇒	GroupEdit	SET ⇒	ERASE : Image
	AutoEdit		ERASE : Subtitle
	DP Analysis		ERASE : Group
	Data Copy/Erase		ERASE : Auto
	Configuration		**ERASE : All**
Select item using or ▲ INC ▼ DEC			

The [ERASE : All] screen is displayed:

<Selecting the items>

Select the items of ERASE : All using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Select the media whose data is to be erased.

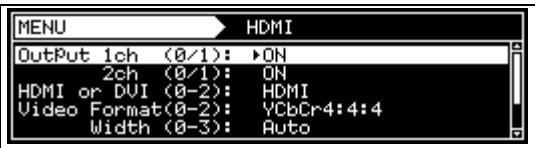
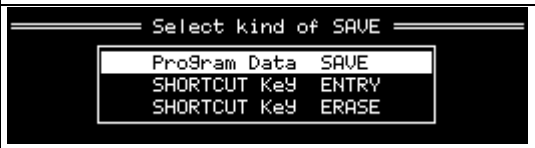
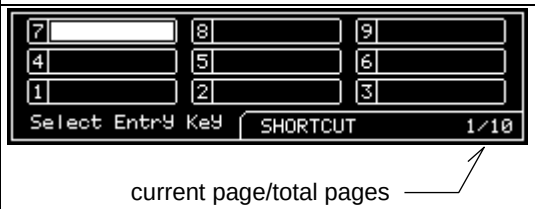
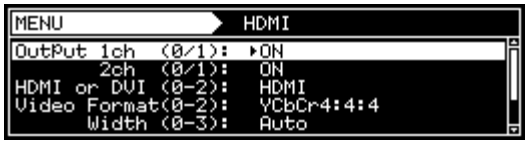
<Completing the erasing>

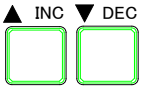
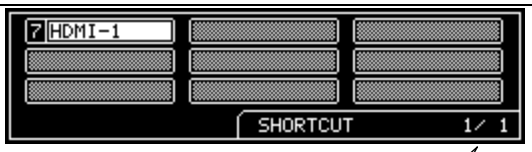
After selecting the items above, select the Execute using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

9 USEFUL FUNCTIONS

9.1 Short-cut keys

It is possible to set up to any of 90 frequently used screens so that they can be called by pressing the short-cut keys.

(1)	Display the screen which is to be registered as a short-cut, and then press SAVE. In the example given here, the HDMI setting screen is registered.	
(2)	Select **ShortCUT Key ENTRY** using ◯ or ▲ INC ▼ DEC, and then press SET. To erase the selection, select **SHORTCUT Key ERASE**, and then press SET.	
(3)	Select the position where the screen is to be registered using ◯ or ▲ INC ▼ DEC, and then press SET. In this example, the screen is saved in 7 in the first page. * The selected positions 1 to 9 correspond to 1 to 9/F.	
(4)	Set the name of the screen registered. If the name already displayed is acceptable, select **OK**, and then press SET. To change the name: Change the name using ◯ SHIFT ▲ INC ▼ DEC, and then press SET. The new name in this example is HDMI-1. When the setting is saved, “Save Completed” is displayed and the registered screen is returned to the display in step (1) above.	 

(5)	**<Calling a menu screen with SHORTCUT>** SHORT CUT When  is pressed, the SHORTCUT screen is displayed. HDMI-1, which is the registered screen, is now registered in shortcut 7 in the first page. 7/D Use  , or alternatively use  or ▲ INC ▼ DEC  (for page selection) and then SET press  to display the HDMI setting screen,	 current page/total registered pages

* The shortcut key function may be disabled on some display screens. Use ESC to return to the previous screen, and press the keys again.

9.2 Information

The main unit's version, serial number and other information can be displayed.

	MENU	⇒	Maintenance
MENU ⇒	AutoEdit	SET ⇒	**Information**
	DP Analysis		INITIALIZE : Configuration
	Data Copy/Erase		INITIALIZE : SHORTCUT
	Configuration		UNMOUNT : USB
	Maintenance		FORMAT : Internal Memory

Select item using ◯ or ▲ INC ▼ DEC

The [Information] screen is displayed:

<Table of items displays>

Example of display	Description
TYPE: VG-876 (0000)	Product name
SERIAL: 1234567 (0000000)	Serial number
MAC: 00 02 de 00 00 00	MAC address
LICENSE: 0.25dot Scroll Macrovision	Usable option functions
H/W Ver.: 02 S00-00 FPGA M01.00/S01.00/R01.00	Hardware version
F/W Ver.: 01.00 (0000)	Firmware version
- UNIT ---------- SLOT0) TYPE: VM-1876-M0 SERIAL: 0000000 H/W Ver.: 01(V) S00-00 FPGA01.00 F/W Ver.: 01.00 USER ADJUSTMENT VALUE: R/G/B = +0/+0/+0	(Listed below is the output unit information.) Unit type Serial number Hardware version Firmware version User adjustment values (dependent on type of unit) * The 'SLOT' number is given in the sequence (0 → 1 → 2) counting from the lowest slot on the rear panel of the main unit. The 'INT' number is given for the internal moving image module
- DISK SPACE ---------- FSystem Used Available Mounted rom0a 13360 (12%) 96998 c:	(Listed below is the amount of the device's memory which has been used.) Mounted c: Internal memory d: USB Memory

9.3 Data initialization

Initialization restores the system settings and short-cut data to the factory settings.

CAUTION

- Performing this operation initialized all the data stored in the internal memory.
- The generator must be re-started after initialization.

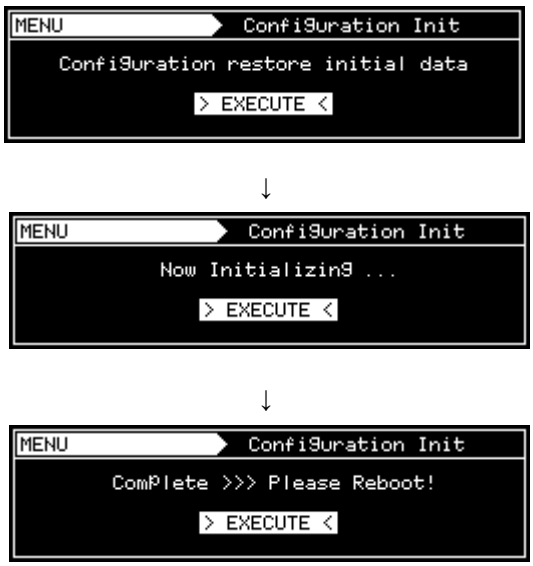
9.3.1 Initializing the system settings

This operation restores the system settings to the factory settings.

	MENU	⇒	Maintenance
MENU ⇒	AutoEdit	SET ⇒	Information
	DP Analysis		**INITIALIZE : Configuration**
	Data Copy/Erase		INITIALIZE : SHORTCUT
	Configuration		UNMOUNT : USB
	Maintenance		FORMAT : Internal Memory

Select item using or ▲ INC ▼ DEC

Press [SET] key to execute initialization.



Initialization is completed.

Turn off the generator's power, and restart the generator.

9.3.2 Initializing the short-cut data

This operation restores the short-cut data to the factory settings.

	MENU	⇒	Maintenance
MENU [ ] ⇒	AutoEdit	SET [ ] ⇒	Information
	DP Analysis		INITIALIZE : Configuration
	Data Copy/Erase		**INITIALIZE : SHORTCUT**
	Configuration		UNMOUNT : USB
	Maintenance		FORMAT : Internal Memory
Select item using ◯ or ▲ INC [ ] ▼ DEC [ ]			

Press [SET] key to execute initialization.

Initialization is completed.

Turn off the generator's power, and restart the generator.

9.4 USB Unmount

The procedure to remove (unmount) the USB memory is described below.

	MENU	⇒	Maintenance
MENU	AutoEdit		Information
	DP Analysis	SET	INITIALIZE : Configuration
	Data Copy/Erase		INITIALIZE : SHORTCUT
⇒	Configuration	⇒	**UNMOUNT : USB**
	Maintenance		FORMAT : Internal Memory
Select item using  or ▲ INC ▼ DEC			

Press the [SET] key to execute Unmount.

A confirmation message is displayed.

To continue the Unmount operation, press the [SET] key; to cancel the operation, select [ESC].

When you press the [SET] key to continue the Unmount operation, the screen changes as follows:

Now Unmount ...

↓

USB Unmount Completed

↓

The Unmount operation is complete.

9.5 Formatting

9.5.1 Internal memory formatting and data installation

The procedure for formatting the internal memory is described below.

CAUTION

Formatting the internal memory will delete the data required for the generator's operation so the steps for data installation and firmware version updating must be taken after the memory has been formatted.

<Procedure>

1. Have the required data ready.
2. Format the internal memory. ..... Refer to **<Formatting procedure>**.
3. Turn the power on from the off status.
4. Install the data. ..... Refer to **<Data installation procedure>**.
5. Turn off the power.
6. Update the firmware version. ..... Refer to **<Firmware version updating procedure>**.
7. Power off the power, and then turn it back on.

<Required data>

- The required data is the data in the **InitialData** folder on the SP-8870 software installation disk which is provided with the VG generator so copy it into the USB Memory.
- If the firmware version has been updated at some point after the generator was purchased, the data of the updated version will be required.

Further action must be taken in either of the following events.
Make inquiries with your dealer or an ASTRODESIGN sales representative.

- When APDC patterns (optional) are being used
  APDC patterns are not included in the data provided with the SP-8870 software.
- When the VG generator is not a standard model
  The data provided with the SP-8870 software is for a standard model.

<Formatting procedure>

	MENU	⇒	Maintenance
MENU ⇒	AutoEdit	SET ⇒	INITIALIZE : Configuration
	DP Analysis		INITIALIZE : SHORTCUT
	Data Copy/Erase		UNMOUNT : USB
	Configuration		**FORMAT : Internal Memory**
	Maintenance		INSTALL : Initial Data

Select item using  or ▲ INC ▼ DEC

The following screen is displayed:

Press [SET] key.

Press [SET] key to perform formatting.

.

A confirmation message is displayed.

To continue the formatting, press [SET] key; to cancel the formatting, select [ESC].

When you press [SET] key to continue the formatting, the screen changes as follows:

Now Formatting ...

↓

Complete >>> Please Reboot!

Formatting is completed.

Turn off the generator's power, and restart the generator.

<Data installation procedure>

Preparing the data

Copy the data on the SP-8870 software installation disk (in drive A:) which is provided with the VG generator into a USB Memory (in drive B:).

There is a multiple number of files on this disk.

A:¥InitialData¥VG870¥ *.* → B:¥ *.*

Operations performed using the generator's controls

Insert the USB Memory containing the copied data into the generator.

	MENU	⇒	Maintenance
MENU ⇒	AutoEdit	SET ⇒	INITIALIZE : Configuration
	DP Analysis		INITIALIZE : SHORTCUT
	Data Copy/Erase		UNMOUNT : USB
	Configuration		FORMAT : Internal Memory
	Maintenance		**INSTALL : Initial Data**

Select item using ◯ or ▲ INC ▼ DEC

Press [SET] key to perform installation.

↓

Now Installing ...

↓

Complete

↓

Original display (EXECUTE)

Installation is completed.

Turn off the generator's power, and restart the generator.

<Firmware version updating procedure>

Use the data which was prepared at the data installation stage.

If the firmware version has been updated at some point after the generator was purchased, copy the data of the updated version into a USB Memory.

(1) Insert the USB Memory into the generator.

(2) While holding down 

, turn on the power.

(3) The ‘FPGA/Firmware Version Up’ message appears. Wait a few moments.

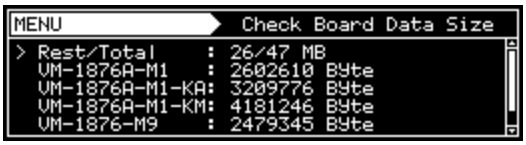
(4) When the ‘End. Please reboot!!’ message has appeared, and the buzzer has sounded, turn off the power and reboot.

9.6 Delete the data of output interface unit and select version-up

9.6.1 Confirm data size of each interface unit

	MENU	⇒	Maintenance	⇒	Entry/Delete Board
MENU ⇒	Auto Edit	SET ⇒	UNMOUNT : USB	SET ⇒	**Check Board Data Size**
	DP Analysis		SAVE USB : CONFIG STATUS		Delete Board Data
	Data Copy/Erase		FORMAT : Internal Memory		Select VersionUp Board
	Configuration		INSTALL : Initial Data		
	Maintenance		**SET UP : Entry/Delete Board**		
Select item by using or ▲ INC ▼ DEC .					

The “Check Board Data Size” of each interface unit is displayed.



9.6.2 Delete the data of output interface unit.

	MENU	⇒	Maintenance	⇒	Entry/Delete Board
MENU ⇒	Auto Edit	SET ⇒	UNMOUNT : USB	SET ⇒	Check Board Data Size
	DP Analysis		SAVE USB : CONFIG STATUS		**Delete Board Data**
	Data Copy/Erase		FORMAT : Internal Memory		Select VersionUp Board
	Configuration		INSTALL : Initial Data		
	Maintenance		**SET UP : Entry/Delete Board**		
Select item by using or ▲ INC ▼ DEC .					

By above operation, the “Delete Board Data” menu is displayed.

< How to Delete>

Select the interface unit to delete, press [SET]. Check mark appears.

Check all interface units that want to be deleted, press [SAVE] button.
When executing delete process, a message “Now Delete…” appears.

When a message “Delete Completed” appears, it finishes processing.

9.6.3 Select the interface unit to version-up

	MENU	⇒	Maintenance	⇒	Entry/Delete Board
MENU [ ] ⇒	Auto Edit	SET [ ] ⇒	UNMOUNT : USB	SET [ ] ⇒	Check Board Data Size
	DP Analysis		SAVE USB : CONFIG STATUS		Delete Board Data
	Data Copy/Erase		FORMAT : Internal Memory		**Select VersionUp Board**
	Configuration		INSTALL : Initial Data		
	Maintenance		**SET UP : Entry/Delete Board**		
Select item by using ◯ or ▲ INC ▼ DEC [ ] [ ].					

By above operation, the “Delete Board Data” menu is displayed.

<Setting Method>

Select the interface unit to version-up, press [SET]. Check mark appears.

Check all interface units that want to version-up, press [SAVE] button.
While processing, a message “Now Save…” appears.

When a message “Delete Completed” appears, it finishes processing.
After above operation, when you version-up firmware, only the selected interface units are version-up.

Refer to **<How to version-up firmware>** for details.

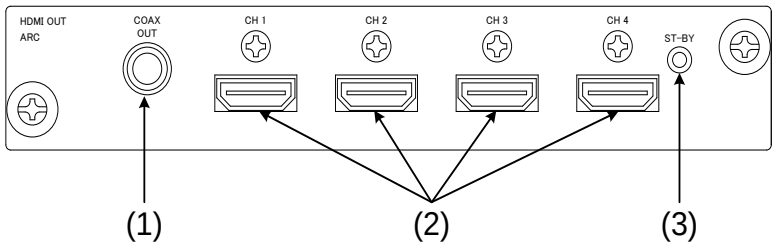
10 INTERFACE SETTINGS

10.1 VG-876 interface units

The VG-876 is constructed to allow video interface units to be installed. Video interface signals are output from these units. Up to four units can be installed.

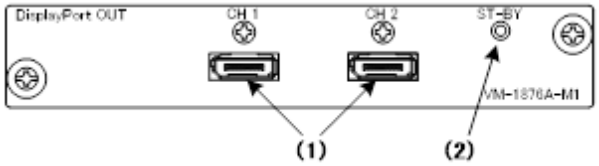
* When one or more video units are to be replaced, please contact ASTRODESIGN.

10.1.1 HDMI unit (VM-1876A-M0)



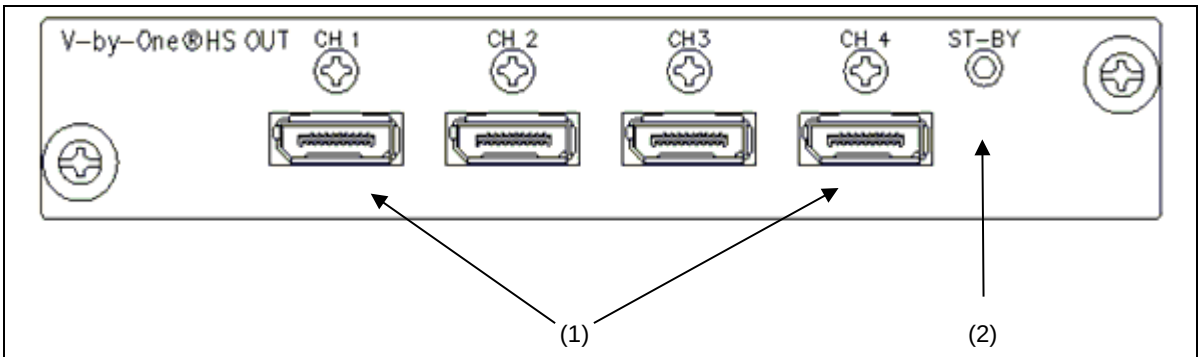
(1)	COAX digital audio output connector	Outputs the signal from the selected port when the ARC signal is received in port 1 to 4.
(2)	HDMI output connectors	The same images are output simultaneously from four channels. (HDMI connectors)
(3)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.2 DisplayPort Unit (VM-1876A-M1)



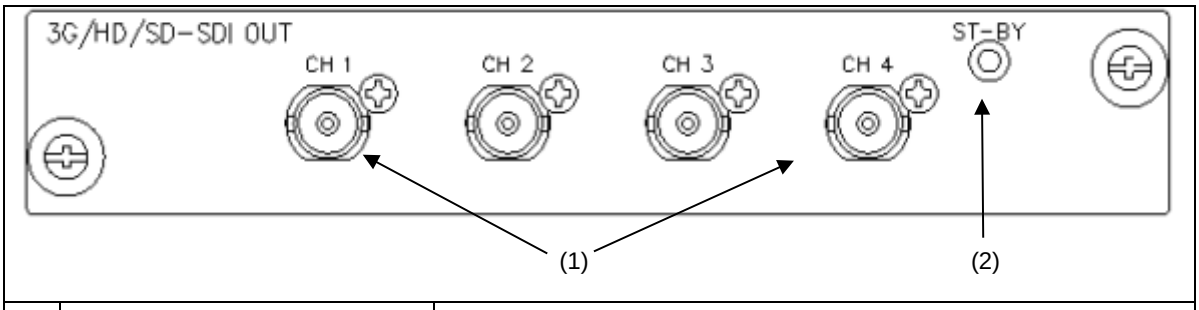
(1)	DisplayPort output	The same images are output simultaneously from two channels. In addition, one image is displayed by the combination of CH1 and CH2. By using MST(Multi Stream Transport) mode, multiple stream (max. 2 streams) can be output from one connector.
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.3 V-by-One®HS unit (VM-1876-M2)



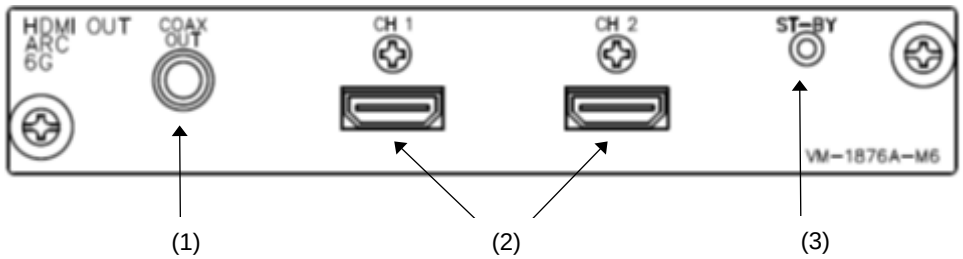
(1)	V-By-One®HS output	4 lanes per connector are output.
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.4 SDI IF BOARD(OUT)（VM-1876-M5）



(1)	SDI output	The designated format signal is output from 4 channels.
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.5 HDMI 6G Unit (VM-1876A-M6)



(1)	COAX digital audio output	When ARC signal is received from either CH1 or 2, audio of either CH1 or 2 is output from this COAX connector.
(2)	HDMI output	The same images are output simultaneously from 2 channels. (HDMI connectors)
(3)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

Caution

● When data transmission speed (TMDS clock) is under 3G, edit timing can be output. If TMDS clock is over 3G, only the fixed timing of Video Identification Code (VIC) 93 to 107 of CEA-861-F can be output.
The timing over 3G TMDS clock cannot be edit by user.
The timing of VIC91 and VIC92 are not supported.
VIC91 : 2560x1080p Field Rate100Hz Pixel Frequency 371.25MHz
VIC92 : 2560x1080p Field Rate119.88/120Hz Pixel Frequency 495MHz

● In the timing over TMDS clock 3G, it supports up to the following bit depth.
Color format YPbPr4:2:2 up to 12-bit
Other color format up to 8-bit

● In the timing over TMDS clock 3G, only the 3D format of "Top and Bottom" and "Side by Side (Half)" are supported.

(How to calculate TMDS clock)
Coefficient number of output color format
RGB=1.0, YPbPr4:4:4=1.0, YPbPr4:2:2=0.666(2/3), YPbPr4:2:0=0.5(1/2)

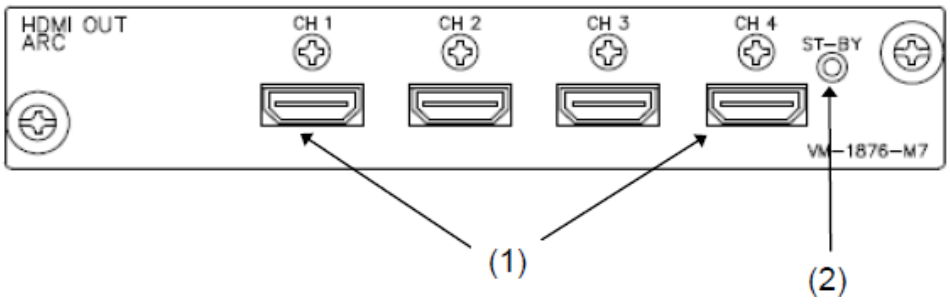
Coefficient number of output bit depth
8-bit=1.0, 10-bit=1.25, 12-bit=1.5, 16-bit=2.0

TMDS clock = Dot Clock x Coefficient number of Output color format x Coefficient number of output bit depth

e.g. Dot clock : 148.5MHz (1.485G)
Output color format: YPbPr4:2:2 (coefficient number of output color format 0.666(2/3))
Coefficient number of output bit depth: 10-bit (coefficient number of output bit depth 1.25)

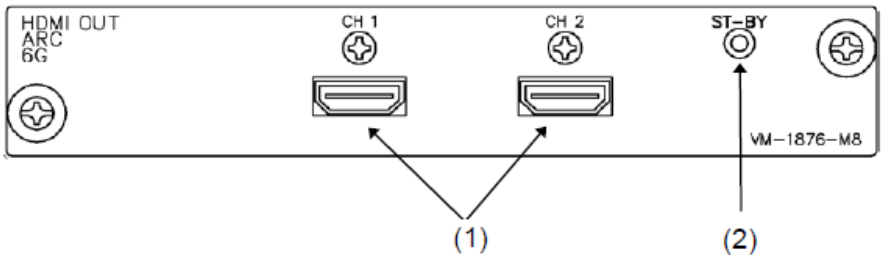
TMDS clock = 1.485G x 0.666(2/3) x 1.25
TMDS clock = 1.2375G

10.1.6 HDMI HDCP2.2 Unit (VM-1876-M7)



(1)	HDMI output	The same images are output simultaneously from 4 channels. (HDMI connectors)
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.7 HDMI 6G HDCP2.2 Unit (VM-1876-M8)

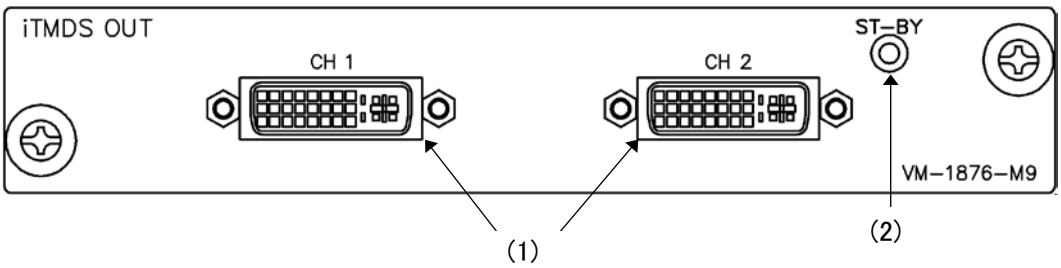


(1)	HDMI output	The same images are output simultaneously from 2 channels. (HDMI connectors)
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

Caution

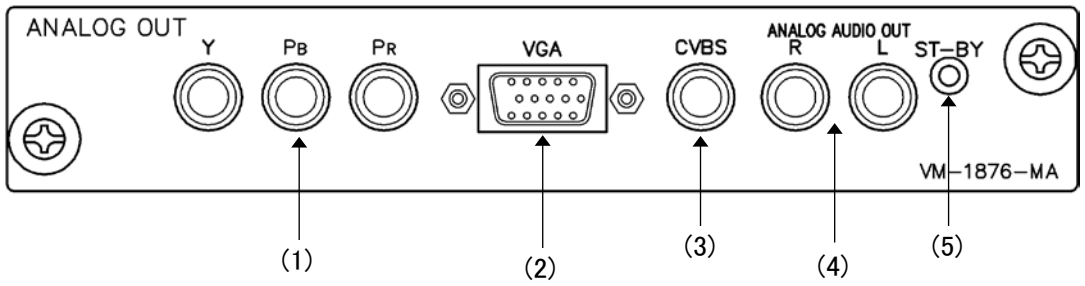
- As for TMDS Clock, only the timing of VIC (Video Identification Code) 1 to 90 and 93 to 108 in the CEA-861-F and [Supported VESA Format] described in “10.12.9 HDMI 6G HDCP 2.2 Unit” can be output.
- Only Top and Bottom and Side by Side (Half) of 3D format is supported.

10.1.8 iTMDS Unit (VM-1876-M9)



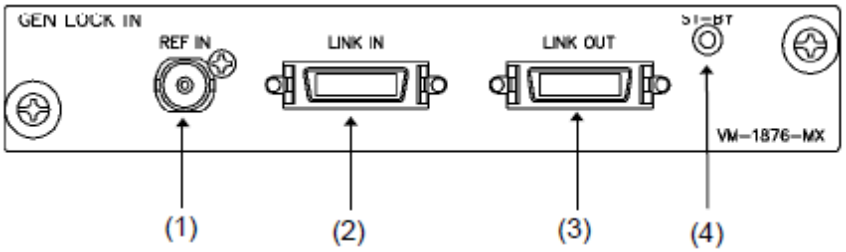
(1)	iTMDS output	Only digital signal is output. (iTMDS connector) Dual-Link supported.
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.1.9 Analog Unit (VM-1876-MA)



(1)	Component Output	YPbPr Analog Component signal is output. (RCA connector)
(2)	VGA Output	Analog Component signal (RGB) and H/V separate sync are output. (DSUB connector, Shrink D-sub 15 pin)
(3)	CVBS Output	NTSC/PAL Composite (VBS) signal is output. (RCA connector)
(4)	Analog Audio output	Analog Audio (L/R) signal is output. (RCA connector)
(5)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

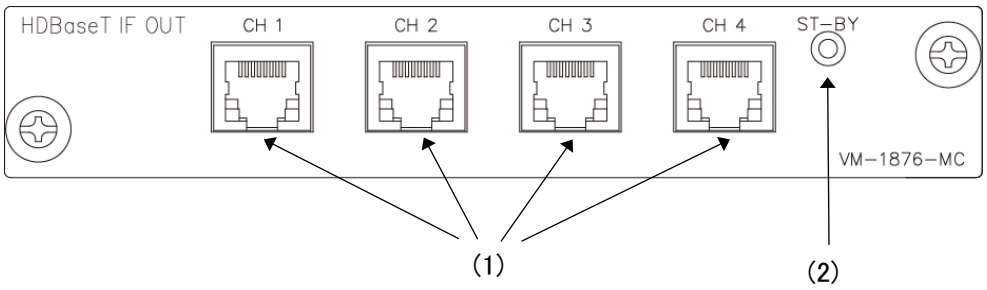
10.1.10 Synchronizing Unit (VM-1876-MX)



(1)	External Sync signal input	To be supported in future.
(2)	Multi-link input	Connecting to other VG-876 for synchronization. Connecting to the output of the upper unit. (MDR 26 pin connector).
(3)	Multi-link output	Connecting to other VG-876 for synchronization. Connecting to the input of the lower unit. (MDR 26 pin connector).
(4)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

Refer to “10.11 Synchronization by several units operation” about connection of Multi-link.

10.1.11 HDBaseT Unit（VM-1876-MC）



(1)	HDBaseT output	The same video signal is output from CH1 to 4 simultaneously. (RJ45 connector)
(2)	Standby LED	Lights up when the unit is ready to output the signal. Lit: Normal Off: Error (module damage, wrong slot, etc.)

10.2 Output settings

The following items are set as settings common to multiple video and audio output interfaces.

- Output interface on/off setting
- Sync signal on/off and polarity setting
- Level mode setting
- Aspect ratio setting
- Pattern drawing bit length (gray scale) setting
- RGB/YPbPr selection and color difference coefficient setting
- Digital level setting
- Audio sweep setting
- Audio level setting (temporary settings)
- 3D Pattern digital level setting

10.2.1 Setting the output interfaces to ON or OFF

"Output" (ON) or "not output" (OFF) can be selected for each output interface whether video or audio interface. It is set to ON for the internal sample timing data unless the ratings or specifications of the generator prevent this.

Example: In the case of EIA 1920 × 1080i@59.94, the COMPOSITE and Y/C signals are set to OFF, but the HDMI signal is set to ON.

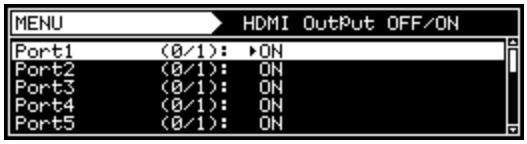
	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	**Output OFF/ON**
	GroupEdit		Timing		Digital Output		Sync
	AutoEdit		**Output**				HDCP
	DP Analysis		Audio				Level Mode
	Data Copy/Erase		Pattern				DotClk Mode

Select item using ◯ or ▲ INC ▼ DEC

	Output OFF/ON
SET ⇒	**HDMI**
	DP
	V-by-One
	SDI
	iTMDS

Select item using ◯ or ▲ INC ▼ DEC

The [Output OFF/ON] screen is displayed:



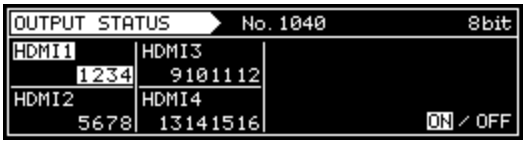
PC, TV, etc. are types of interfaces.

<Selecting the items>
Select the items of Output OFF/ON using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<How to check the interfaces whose signals are output>

On the initial screen, select [0/STATUS] key while holding down [SHIFT] key.



Select [0/STATUS] key again while holding down [SHIFT] key to exit from the OUTPUT STASUS screen.

10.2.2 Setting the sync signals to ON or OFF and setting the sync signal polarities

In this section, the sync signals are set to ON or OFF and the sync signal polarities are set for each output connector.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	Output OFF/ON
	GroupEdit		Timing		Digital Output		**Sync**
	AutoEdit		**Output**				HDCP
	DP Analysis		Audio				Level Mode
	Data Copy/Erase		Pattern				DotClk Mode

Select item using ◯ or ▲ INC ▼ DEC

The [Sync] screen is displayed:

<Selecting the items>
Select the items of Sync using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Set HS and VS.

For further details on the settings, refer to **<Sync setting parameters>** below.

When [MENU] key is pressed after the setting is completed, the display returns to the initial screen.

<Sync setting parameters>

HS	Used to set the HS connector output.		
	0	**Off**	No output
	1	**Nega**	The signal is output with a negative polarity.
	2	**Posi**	The signal is output with a positive polarity.
VS	Used to set the VS connector output.		
	0	**Off**	No output
	1	**Nega**	The signal is output with a negative polarity.
	2	**Posi**	The signal is output with a positive polarity.
CV	Video-On-Sync imposing set for analog component signal.		
	0	**Off**	On-sync is not imposed.
	1	**R**	On-sync is imposed on R.
	2	**G**	On-sync is imposed on G.
	3	**RG**	On-sync is imposed on RG.
	4	**B**	On-sync is imposed on B.
	5	**RB**	On-sync is imposed on RB.
	6	**GB**	On-sync is imposed on GB.
	7	**RGB**	On-sync is imposed on RGB.

10.2.3 Setting the level mode

Images can be output in the “limited” range of the HDMI standard. The output image range can be set for each unit.

The same level setting can also be established using an interface which is not HDMI (such as DVI, LVDS, parallel or analog).

* With the analog interface, the gray scale of the video parts will change, but neither the pedestal level nor peak level will change from when the “full” range applies.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	Output OFF/ON
	GroupEdit		Timing		Digital Output		Sync
	AutoEdit		**Output**				HDCP
	DP Analysis		Audio				**Level Mode**
	Data Copy/Erase		Pattern				DotClk Mode
Select item using ◯ or ▲ INC ▼ DEC							

The [Level Mode] screen is displayed:

<Selecting the items>
Select the unit using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the unit using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select Limited/Full using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select Limited/Full using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the table below.

Video range when “full” is selected

	8 BIT	10BIT	12BIT	16BIT
R/G/B/Y/Cb/Cr	0-255	0-1023	0-4095	0-65535

Video range when “Limited” is selected

	8BIT	10BIT	12BIT	16BIT
R/G/B/Y	16-235	64-940	256-3760	4096-60160
Cb/Cr	16-240	64-960	256-3840	4096-61440

10.2.4 Setting the Dot clock operation mode(Dot Clock Mode)

The procedure to set the dividing mode to split the 4k or 2k screen is described below.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	Output OFF/ON
	GroupEdit		Timing		Digital Output		Sync
	AutoEdit		**Output**				HDCP
	DP Analysis		Audio				Level Mode
	Data Copy/Erase		Pattern				**DotClk Mode**

Select item using ◯ or ▲ INC ▼ DEC

Execute the operations described in the table above in the same order to enter the [DotClk Mode] screen shown below.

<Setting the items >

Select [Split Count] using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

<Setting the parameters>

Select the parameters using the [Rotary switch] or the [INC]/[DEC] key and then press the [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press the [SET] key.

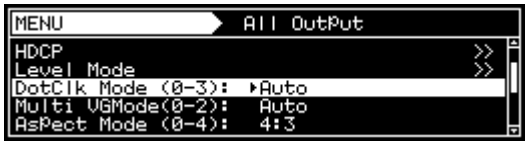
0	Auto	The clock mode is set automatically depending on the DotClock.
1	Single	Operated by Single clock mode.
2	Dual	Operated by Dual clock mode (double speed)
3	Quad	Operated by Quad clock mode (quad speed)

Caution

- If you select **“Auto”**, single/dual/quad is automatically selected depends on the dot clock. There is no screen split (No Div). *
- In case of **V-by-One®HS unit**, if you select “Auto”, number of data lanes are automatically changed depends on clock mode of single/dual/quad.

* For details, refer to “10.18 Relationships between the pattern drawing bit length, the dividing mode and the dot clock frequency.”

When dual clock mode or quad clock mode is set, the following split modes are displayed.



〈Parameter setting〉

When dual clock mode, the following split modes are displayed.		
0	**MODE0 (HDiv)**	The output is divided horizontally in 2.
1	**MODE1 (VDiv)**	The output is divided vertically in 2.
2	**MODE2 (HDiv)**	The output is divided horizontally in 2.
3	**MODE3 (VDiv)**	The output is divided vertically in 2.
4	**MODE4 (NoDiv)**	The output is not divided.
5	**MODE5 (NoDiv)**	The output is not divided.
6	**MODE6 (NoDiv)**	The output is not divided.
7	**MODE7 (NoDiv)**	The output is not divided.
8	**MODE8 (VDiv)**	The output is divided vertically in 2.
9	**MODE9 (VDiv)**	The output is divided vertically in 2.
When quad clock mode is set, the following split modes are displayed.		
0	**MODE0 (H2/V2Div)**	The output is divided in 4 equal parts in a square.
1	**MODE1 (V4Div)**	The output is divided vertically in 4.
2	**MODE2 (H2/V2Div)**	The output is divided in 4 equal parts in a square.
3	**MODE3 (V4Div)**	The output is divided vertically in 4.
4	**MODE4 (V2Div)**	The output is divided vertically in 2.
5	**MODE5 (V2Div)**	The output is divided vertically in 2.
6	**MODE6 (V2Div)**	The output is divided vertically in 2.
7	**MODE7 (V4Div)**	The output is divided vertically in 4.
8	**MODE8 (V4Div)**	The output is divided vertically in 4.
9	**MODE9 (No Div)**	No division
A	**MODE10 (2SI)**	2-sample interleave division

* For details of each mode, refer to “10.18 Relationships between the pattern drawing bit length, the dividing mode and the dot clock frequency.”
For details of split mode, refer to “13 Screen Split Image List”.

Caution

In case of V-by-One HS unit, split over 4 parts are possible by Split Mode setting. *

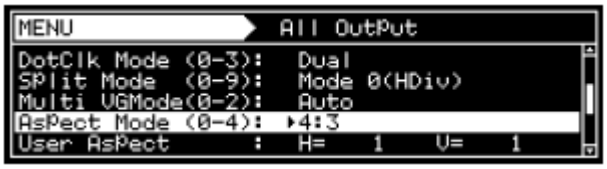
* For details, refer to 10.5.2 V-by-One ® HS setting.

10.2.5 Setting the aspect ratio

In this section, the aspect ratio of the video signals is set.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	Sync
	GroupEdit		Timing		Digital Output		HDCP
	AutoEdit		**Output**				Level Mode
	DP Analysis		Audio				DotClk Mode
	Data Copy/Erase		Pattern				**Aspect Mode**
Select item using ◯ or ▲ INC ▼ DEC							

Select [Aspect Mode] in the [All Output] screen.



<Setting Parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key

0	4:3	The aspect ratio is set to 4:3.
1	4:3 Letter Box	The aspect ratio is set to 4:3 letter box.
2	16:9	The aspect ratio is set to 16:9.
3	Resolution	The aspect ratio is set to the same ratio as the screen resolution.
4	User	The aspect ratio of the user's choice is set.

* The 4:3 letter box setting takes effect only with SDTV timing signals.

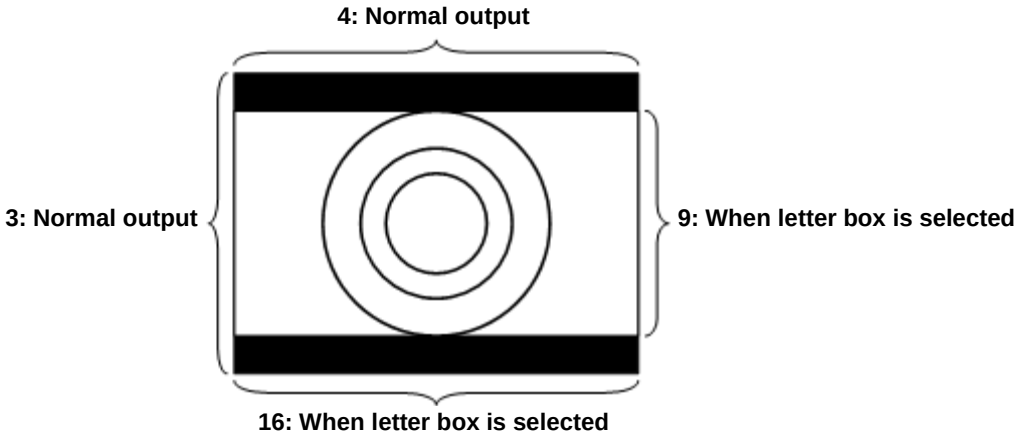
If User was selected above, users can set the aspect ratio of their choice.
* If you want to output by **21:9** aspect ratio, Set "User" in **Aspect Mode**, and set H=21, V=9.

Select User using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

<Setting the parameters>
Select the items H and V using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

H	The aspect ratio is set in the horizontal direction. Setting range: 0 to 255
V	The aspect ratio is set in the vertical direction. Setting range: 0 to 255

***Although images are normally output with the 4:3 aspect ratio, the images which are output when 4:3 letter box has been selected will be in the 16:9 aspect ratio. For this reason, the top and bottom of the images are filled in with black and output.**
When 4:3 letter box has been selected as the aspect ratio, the images output will appear as shown below.



10.2.6 Setting the color depth (bit) for pattern drawing

The color depth (bit) applying when drawing test patterns can be set.

It can either be set either separately for each program or it can be fixed irrespective of the programs.

a) The same specific color depth is designated.
b) The color depth is set for each program.

a) Designating the same specific bit length

	MENU	⇒	Configuration	⇒	General
MENU [ ] ⇒	GroupEdit	SET [ ] ⇒	**General**	SET [ ] ⇒	LAN
	AutoEdit		HDCP		INC/DEC Continuity
	DP Analysis		HDMI		INC/DEC Interval
	Data Copy/Erase		DP		**Color Depth**
	Configuration		SDI		SAMPLE RGB/YPbPr

Select item using  or ▲ INC [ ] ▼ DEC [ ]

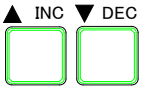
<Setting the parameters>
Select the items of Color Depth using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	Refer to Program	
1	8 Bit	The patterns are drawn by 8 bits.
2	9 Bit	The patterns are drawn by 9 bits.
3	10 Bit	The patterns are drawn by 10 bits.
4	11 Bit	The patterns are drawn by 11 bits.
5	12 Bit	The patterns are drawn by 12 bits.
6	13 Bit	The patterns are drawn by 13 bits.
7	14 Bit	The patterns are drawn by 14 bits.
8	15 Bit	The patterns are drawn by 15 bits.
9	16 Bit	The patterns are drawn by 16 bits.

b) Setting the color depth for each program

This setting takes effect when **"Refer to Program"** has been selected for Color Depth setting in **"Designating the same specific color depth"** in **a)** above.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	**All Output**	SET ⇒	Aspect Mode
	GroupEdit		**Output**		Digital Output		User Aspect
	AutoEdit		Audio				**Color Depth**
	DP Analysis		Pattern				RGB/YPbPr
	Data Copy/Erase		Action				YPbPr Select

Select item using  or ▲ INC ▼ DEC 

Set the parameters of color depth in the same procedure in **"Designating the same specific color depth"** in **a)** above.

10.2.7 Selecting RGB or YPbPr and setting the color difference coefficients

<Selecting RGB/YPbPr>

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	**All Output**	SET ⇒	User Aspect
	GroupEdit		**Output**		Digital Output		Color Depth
	AutoEdit		Audio				**RGB/YPbPr**
	DP Analysis		Pattern				YPbPr Select
	Data Copy/Erase		Action				User YPbPr Coefficient

Select item using ◯ or ▲ INC ▼ DEC

<Setting the parameters>
Select the items of RGB/YPbPr using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	RGB	The signals are output as RGB signals.
1	YPbPr	The signals are output as YPbPr signals.

* The RGB or YPbPr signals of the HDMI unit cannot be changed using this menu. For further details on how to change these signals, refer to “10.3.2 HDMI setting procedure”.

<Selecting color difference coefficients>

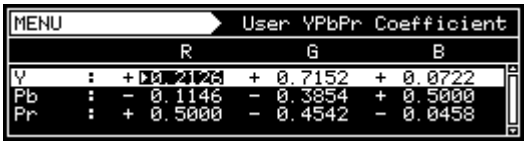
When YPbPr was selected above, select the color difference coefficients.
Select YPbPr Select using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Then, set the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

0	SMPTE274M/296M/RP-177	The color difference coefficients of one of the standards on the left are set.
1	SMPTE240M	
2	SMPTE293M	
3	SMPTE125M	
4	User	The coefficients of the user’s choice are set.
5	ITU-R BT.2020	The color difference coefficients of this standard is set.

<Selecting color difference coefficients of users' own choice>
If YPbPr was selected in **<Selecting RGB/YPbPr>** and User in**<Selecting color difference coefficients>**, users can set the coefficient of their own choice.

(1) Select the items of User YPbPr Coefficient using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.



(2) Select the color matrix coefficients.

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Caution for setting the coefficients
• The Y line must total 1.0000.
• The sum of the coefficient for Pb and Pr respectively must be 0.

When [MENU] key is pressed after the setting is completed, the display returns to the initial screen.

10.2.8 Setting the digital level

In this section, the digital level of the video signals is set.

For further details on setting the gray scale, refer to “10.2.6 Setting the color depth (tone) for pattern drawing.”

There are two ways to set the digital input level: One uses the LEVEL key screen, and the other is from Program Edit.

<How to set the digital input level on the LEVEL key screen>

Press [LEVEL] key to display DIGITAL VIDEO LEVEL setting screen.

Select the items of the digital video level using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Bit length (gray scale)	Setting range
8BIT	**0 - 255**
9BIT	**0 - 511**
10BIT	**0 - 1023**
11BIT	**0 - 2047**
12BIT	**0 - 4095**
13BIT	**0 - 8191**
14BIT	**0 - 16383**
15BIT	**0 - 32767**
16BIT	**0 - 65535**

<When increasing the setting speed>
While holding [SHIFT] key pressed, press [Rotary switch] or [INC]/[DEC] key
* The number of steps when increasing the setting speed can be set by the operations described in section “7.1.15 Digital Video Level Step setting.”

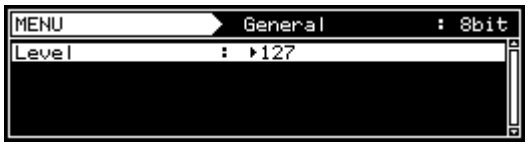
When [LEVEL] key or [ESC] key is pressed, the display returns to the initial screen.

<How to set the digital input level from Program Edit>

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	**General**
	GroupEdit		**Output**		**Digital Output**		HDMI
	AutoEdit		Audio				DP
	DP Analysis		Pattern				SDI
	Data Copy/Erase		Action				V-by-One HS

Select item using or ▲ INC ▼ DEC

The [General] screen is displayed:



<Selecting the items>
Select the Level using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

The setting ranges are the same as in the section <How to set the digital input level on the LEVEL key screen.>

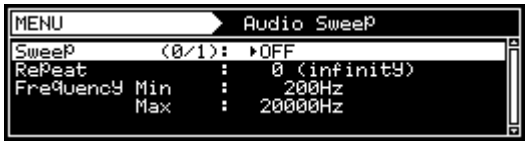
10.2.9 Audio sweep settings

The audio output frequency can be raised or lowered at the set interval.

	MENU	⇒	ProgramEdit	⇒	Audio
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Digital Audio
	GroupEdit		Timing		**Audio Sweep**
	AutoEdit		Output		
	DP Analysis		**Audio**		
	Data Copy/Erase		Pattern		

Select item using ◯ or ▲ INC ▼ DEC

The [Audio Sweep] screen is displayed:



<Selecting the items>
Select the items of Audio Sweep using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **<Audio sweep setting parameters>** below.

<Audio sweep setting parameters>

(1)	**Sweep (0/1)**	Used to enable or disable the sweep function.		
		0	**OFF**	Disable
		1	**ON**	Enable
(2)	**Repeat (0-15)**	Used to set the number of repeats.		
		0	**Infinity**	Repeated indefinitely.
		1-15		Repeated for the set number of times only.
(3)	**Frequency Min**	Used to set the minimum frequency. **Setting range: 200 Hz to 20000 Hz**		
(4)	**Frequency Max**	Used to set the maximum frequency. **Setting range: 200 Hz to 20000 Hz**		

CAUTION

- When using the function with HDMI, select **Internal PCM** as the **Digital Audio > Source** setting.

10.2.10 Setting the audio level (temporary settings)

In this section, the audio output level is set.

The level which was set in “10.2.9 Setting the audio level (temporary settings)” for analog audio or which was set using <Internal PCM setting parameters> in “10.3.5 Embedded audio, high bit rate audio (option)” for HDMI is 0 dB.

Press [LEVEL] → [3] → [3]. (PAGE: 3/3)

Set the audio level using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, set the audio level using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<When increasing the setting speed>
While holding [SHIFT] key pressed, press [Rotary switch] or [INC]/[DEC] key.

When [LEVEL] key or [ESC] key is pressed, the display returns to the initial screen.

CAUTION

- The values set here are not saved as program data.
- When they are used with HDMI, select **Internal PCM** as the **Digital Audio > Source** setting.

10.2.11 Digital level setting of 3D pattern

Digital level of 3D pattern is set by each left and right picture.
Refer to “10.2.6 Color depth setting for pattern drawing” about level setting.

There are 2 setting method; LEVEL key screen and Program Edit.

<LEVEL key screen>

Press [LEVEL] key to display 3D LEFT VIDEO LEVEL setting screen.

Set the items of digital video level using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, set the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

BIT length	**Setting range**
8BIT	**0 – 255**
9BIT	**0 – 511**
10BIT	**0 – 1023**
11BIT	**0 – 2047**
12BIT	**0 – 4095**
13BIT	**0 – 8191**
14BIT	**0 – 16383**
15BIT	**0 – 32767**
16BIT	**0 – 65535**

<When increasing the setting speed>
While holding [SHIFT] key pressed, press [Rotary switch] or [INC]/[DEC] key
* The number of steps when increasing the setting speed can be set by the operations described in section “7.1.15 Digital Video Level Step setting.”

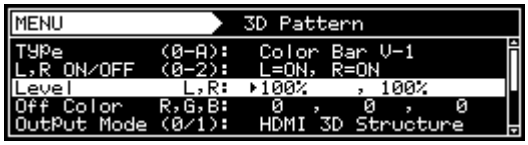
Switch LEFT or RIGHT by pressing [2] or [3] key.
When [LEVEL] key is pressed, the display changes to DIGITAL LEVEL SETTING screen, and then return to the initial screen.
When [ESC] key is pressed, the display returns to the initial screen.

<Setting by Program Edit>

	MENU	⇒	ProgramEdit	⇒	Pattern	⇒	Image/OPT
MENU ⇒	**ProgramEdit**	SET ⇒	Program Name	SET ⇒	Raster	SET ⇒	9 Marker
	GroupEdit		Timing		Aspect		3D Image
	AutoEdit		Output		Checker		**3D Pattern**
	DP Analysis		Audio		**Image/OPT**		SMD Pattern
	Data Copy/Erase		**Pattern**		☐X[ABC]		

Select item using ◯ or ▲ INC ▼ DEC

The [3D Pattern] screen is displayed:



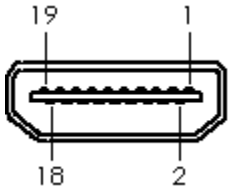
<Selecting the items>
Select the items of 3D Pattern using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.
Setting range is 0 - 100 [%]

10.3 HDMI

10.3.1 Connectors and pin assignments

■ HDMI



Pin no.	Signal
1	TMDS DATA2+
2	TMDS DATA2 SHIELD
3	TMDS DATA2-
4	TMDS DATA1+
5	TMDS DATA1 SHIELD
6	TMDS DATA1-
7	TMDS DATA0+
8	TMDS DATA0 SHIELD
9	TMDS DATA0-
10	TMDS CLK+
11	TMDS CLK SHIELD
12	TMDS CLK-
13	CEC
14	RESERVE / HEAC+
15	DDC CLK
16	DDC DATA
17	GROUND (for +5 V)
18	+5 V (DDC power supply *1)
19	HOT PLUG DETECT / HEAC-
Shell	FG

*1: Restrictions apply to the supply current of the DDC power supply. Refer to "**10.13 Concerning the maximum current consumption of the DDC power supply**."

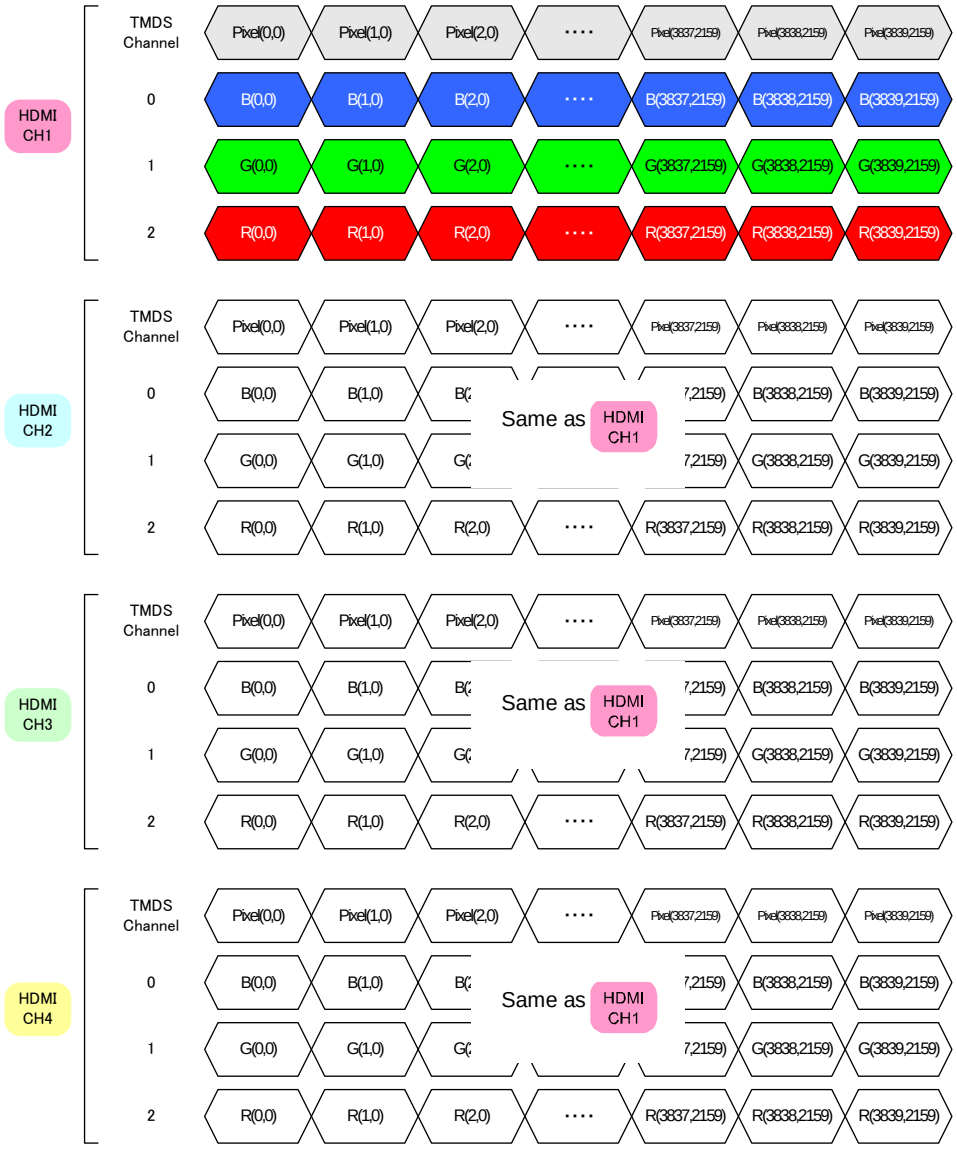
10.3.2 HDMI data transfer methods

This section describes the transfer methods for the data output by HDMI units.

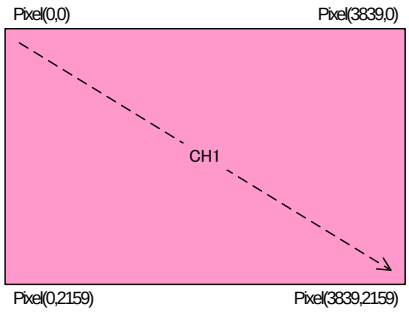
The data transfer methods vary depending on the Dot Clock Operation mode (DotClk Mode). For more details about dividing mode setting, refer to "10.2.4 Setting the Dot Clock operation mode (DotClk Mode)"

<Single Clock mode>

Mode that outputs the signal from one HDMI connector. The data transfer mode and image are as follows.



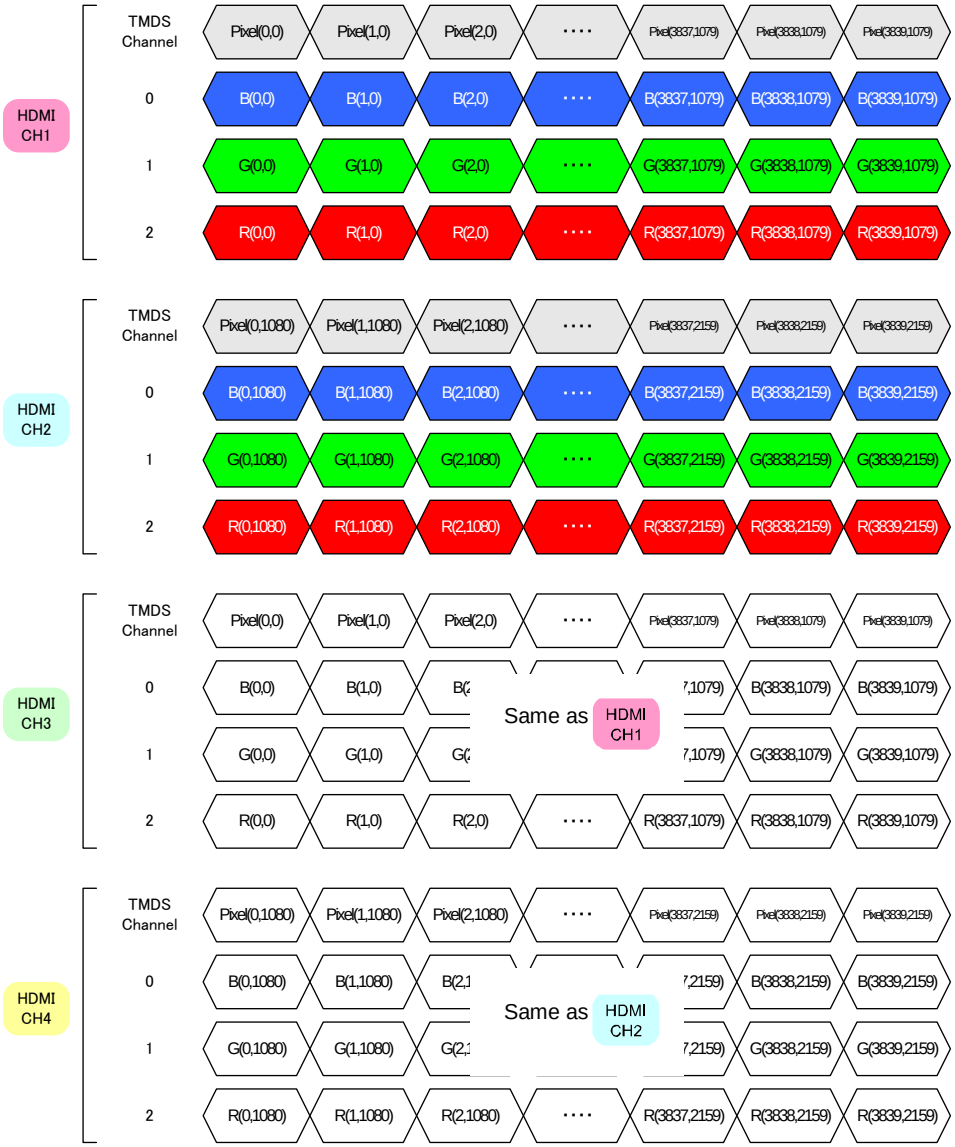
Data transfer method



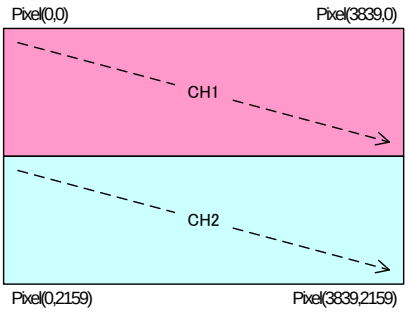
Screen division

<Dual Clock mode / Mode 0 or Mode 2 (divided horizontally in 2)>

Mode that outputs the signal from two HDMI connectors. The data transfer mode and image are as follows.



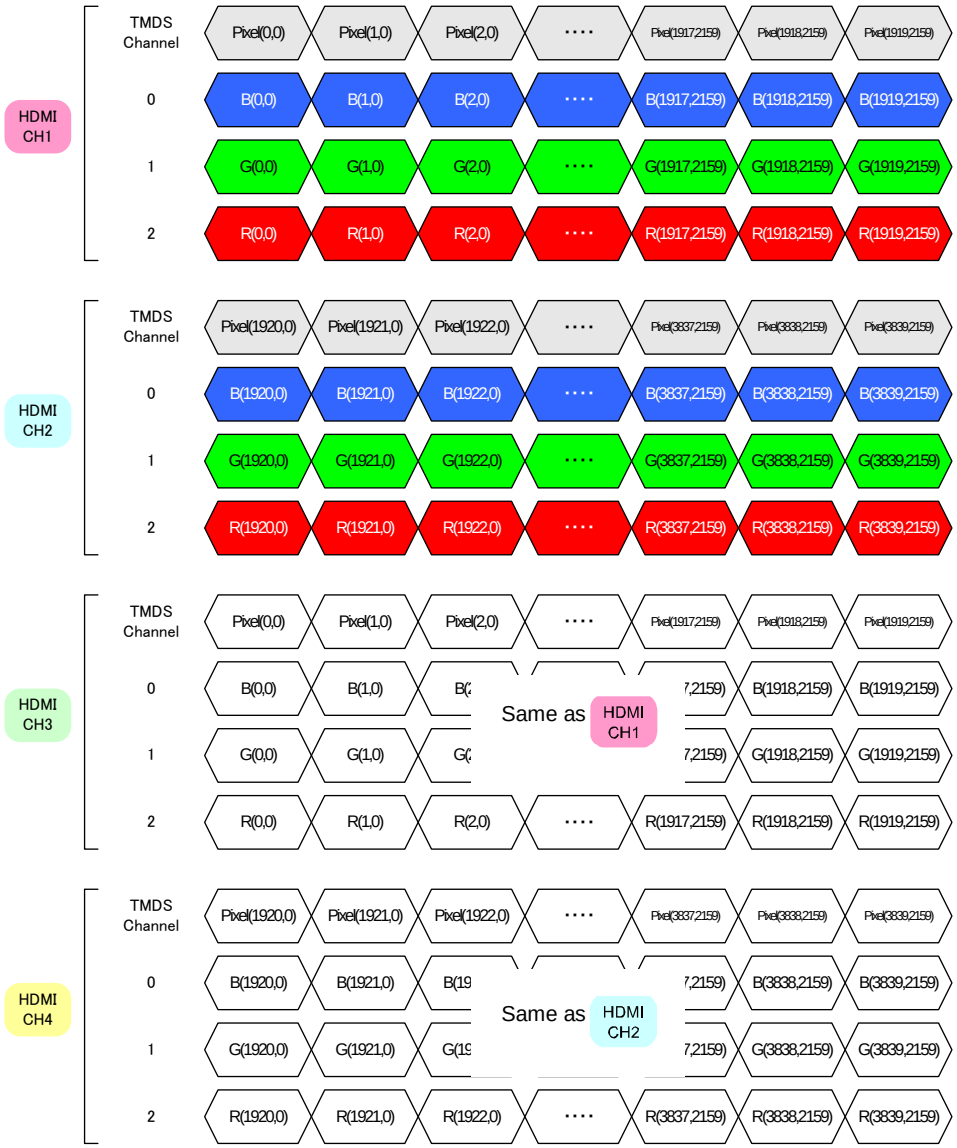
Data transfer method



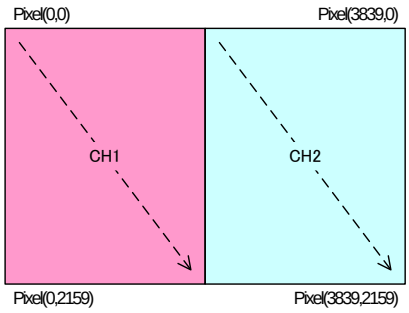
Screen division

<Dual clock mode / Mode 1, Mode 3, Mode 8, or Mode 9 (divided vertically in 2)>

Mode that outputs the signal from two HDMI connectors. The data transfer mode and image are as follows.



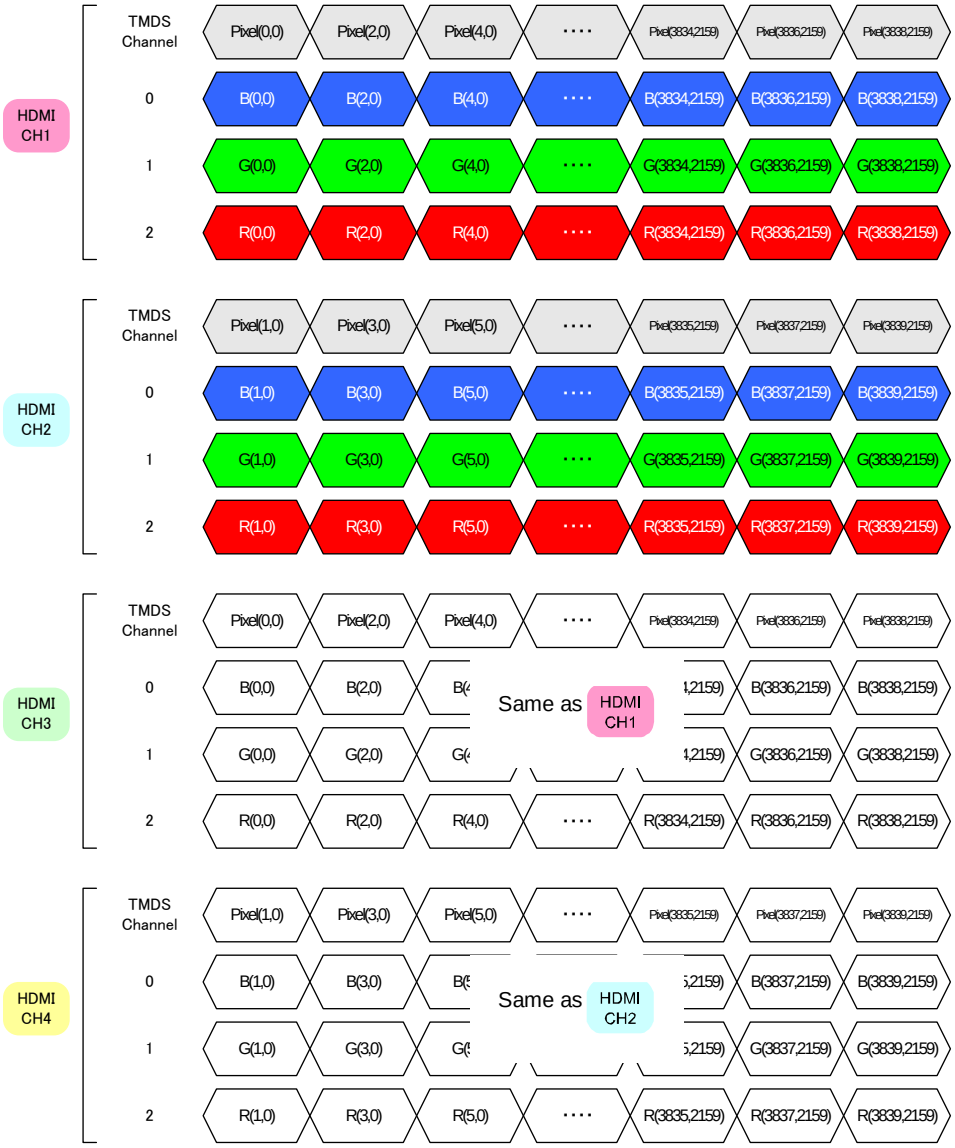
Data transfer method



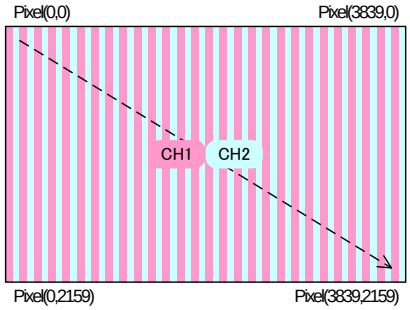
Screen division

<Dual clock mode / Mode 4, Mode 5, Mode 6, or Mode 7 (no split)>

Mode that outputs the signal from two HDMI connectors. The data transfer mode and image are as follows.



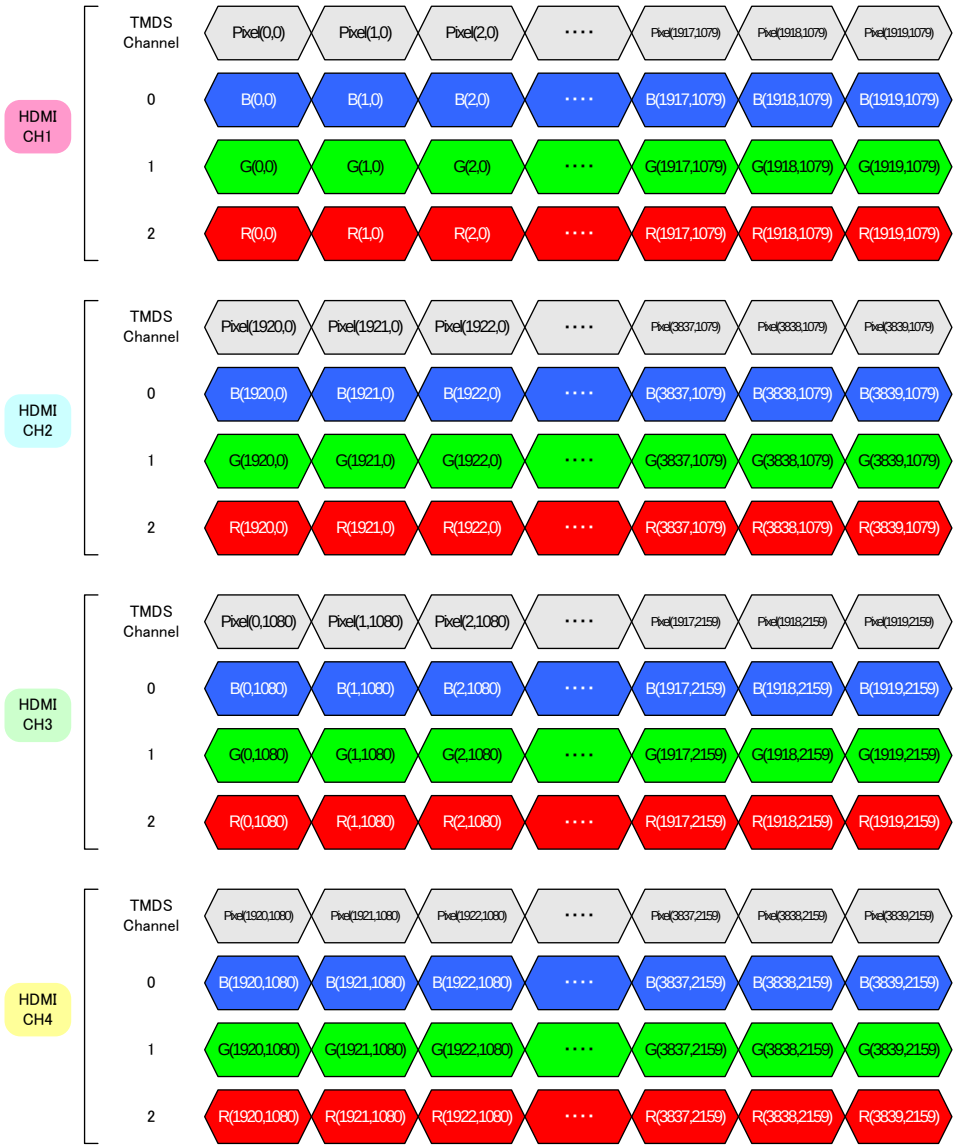
Data transfer method



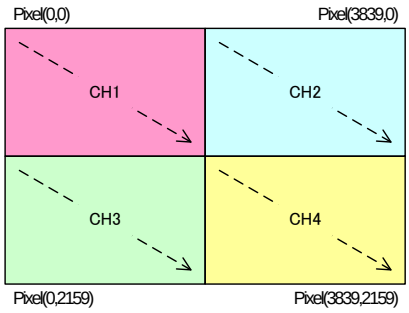
Screen division

<Quad clock mode / Mode 0, or Mode 2 (divided in 4 equal parts in a square)>

Mode that outputs the signal via four HDMI connectors. The data transfer mode and screen are as follows.



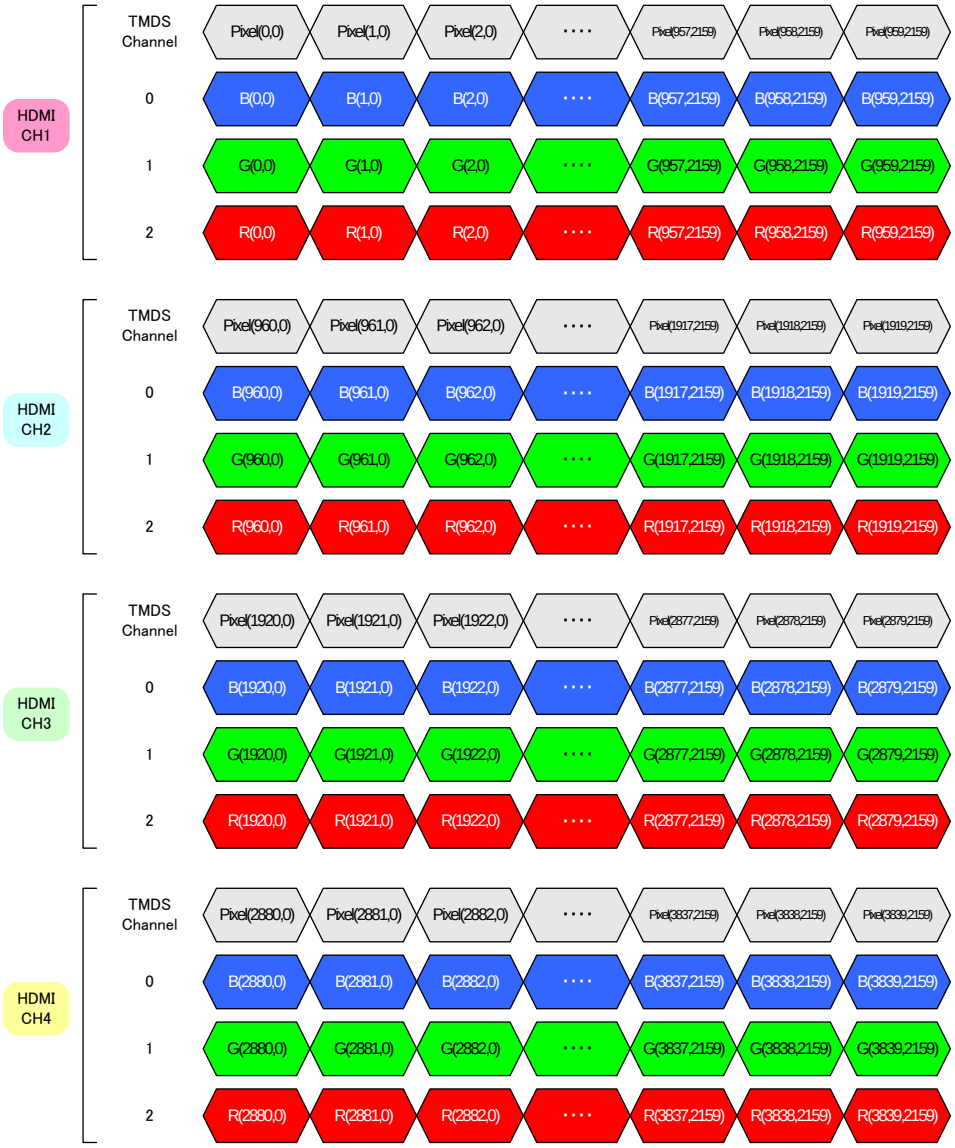
Data transfer method



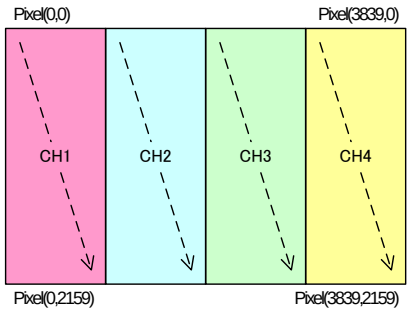
Screen division

<Quad clock mode / Mode 1, Mode 3, Mode 7, or Mode 8 (divided vertically in 4)>

Mode that outputs the signal via four HDMI connectors. The data transfer mode and screen are as follows.



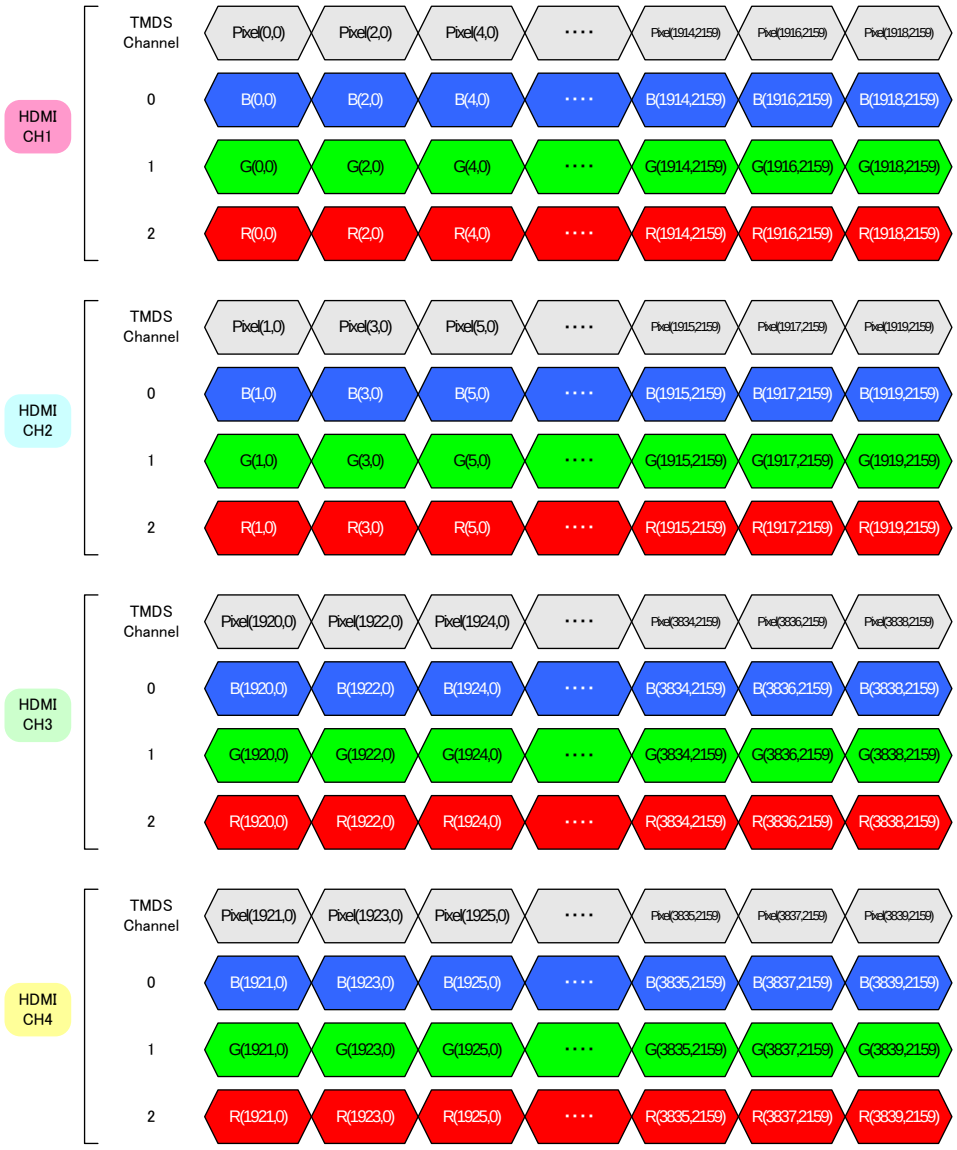
Data transfer method



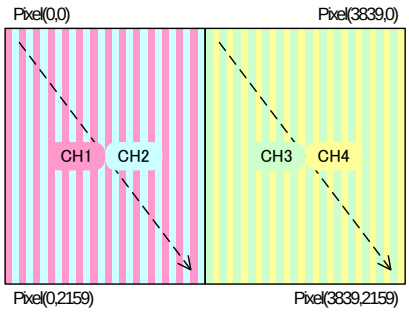
Screen division

<Quad clock mode / Mode 4, Mode 5, or Mode 6 (divided vertically in 2)>

Mode that outputs the signal from four HDMI connectors. The data transfer mode and image are as follows.



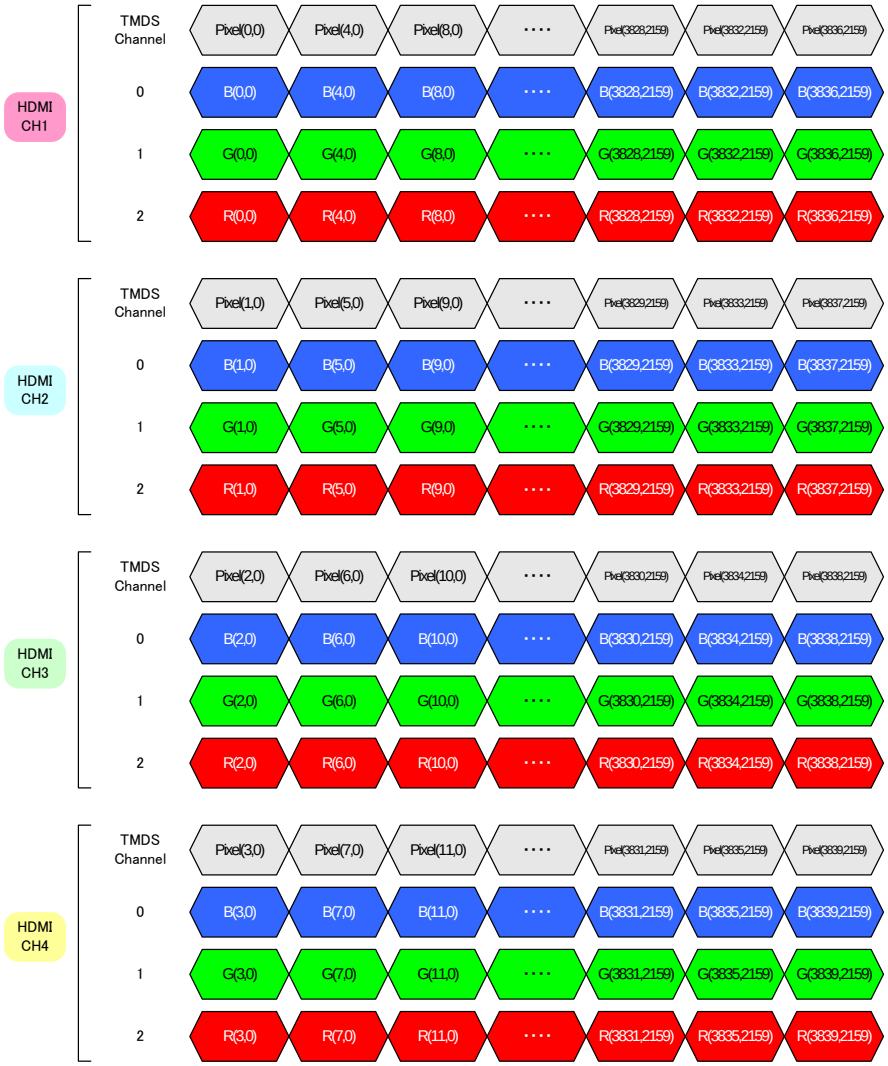
Data transfer method



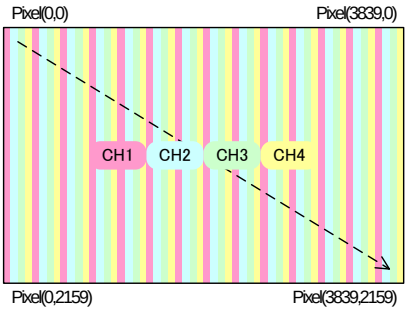
Screen division

<Quad clock mode / Mode 9 (no split)>

Mode that outputs the signal via four HDMI connectors. The data transfer mode and screen are as follows.



Data transfer method

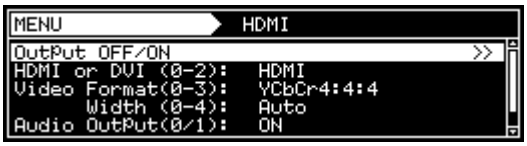


Screen division

10.3.3 HDMI setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	GroupEdit		**Output**		Analog Output		iTMDS
	AutoEdit		Audio		**Digital Output**		**HDMI**
	DP Analysis		Pattern		VBI Function		**DP**
	Data Copy/Erase		Action				SDI
Select item using or ▲ INC ▼ DEC							

The [HDMI] screen is displayed:



<Selecting the items>
Select the items of HDMI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to **< HDMI unit setting parameters>** below.

<HDMI unit setting parameters>

(1)	**Output OFF/ON Port1 to16 (0/1)**	Set ON or OFF for each port here. The same settings as the ones described in “10.2.1 Setting the output interfaces to ON or OFF” can also be established.		
		0	**Off**	No signal output
		1	**On**	Signal output
(2)	**HDMI or DVI (0-2)**	HDMI connection can be made by DVI cable conversion. Set the operations at this time here.		
		0	**HDMI**	The full functions of HDMI can be used.
		1	**DVI**	This setting differs from HDMI in the following ways. Info Frame and Packet are not sent. Audio is not supported. Up to 8 bits are supported. Deep Color is not supported.
		2	**Auto**	EDID of the connected monitor is checked, and the DVI and HDMI modes are set.
(3)	**Video Format (0-3)**	The color space of the images output from HDMI is set here.		
		0	**RGB**	The images are output using RGB signals.
		1	**YCbCr4:4:4**	The images are output using YCbCr4:4:4 signals.
		2	**YCbCr4:2:2**	The images are output using YCbCr4:2:2 signals.
		3	**YCbCr4:2:0**	The images are output using YCbCr4:2:0 signals.
(4)	**Width (0-4)**	The bit length of the images output from HDMI is set here. A setting independent of the bit length for pattern drawing can be selected or the same bit length can be selected automatically. * The portion by which the bit length for pattern drawing exceeds the bit length which has been set here is discarded. A deficient portion is filled with zeros. Refer to **“10.2.6 Setting the color depth (tone) for pattern drawing.”**		
		0	**Auto**	**8, 10, 12 or 16 bits** are selected here automatically depending on the bit length for pattern drawing.
		1	**8 bit**	8-bit output
		2	**10 bit**	10-bit output
		3	**12 bit**	12-bit output
		4	**16 bit**	16-bit output
(5)	**Audio Output (0/1)**	The embedded audio output is set here. * For the embedded audio settings, refer to **“10.7 Digital audio.”**		
		0	**Off**	No embedded audio output
		1	**On**	Embedded audio output
(6)	**Scramble (0/3)** * Only for VM-1876A-M6 and VM-1876-M8.	Scrambled HDMI signal is output.		
		0	**ON (3.4G over)**	When TMDS clock is over 3.4G, scrambled HDMI signal is output. Note) if TMDS clock is below 3.4G, scramble is not applied.
		1	**OFF**	HDMI signal is output without scramble.
		2	**ON**	Scrambled HDMI signal is output for any TMDS clock. *** Available only for VM-1876-M8.** *** In VM-1876-M6, Scramble processing is not performed under 3.4G of TMDS clock.**
		3	**Refer EDID**	Check EDID setting and decide to output Scrambled HDMI signal. *** Available only for VM-1876-M8.** *** VM-1876-M6 does not perform Scramble processing.**
(7)	**InfoFrame/Packet**	When sending InfoFrame automatically in line with the color space and other settings, refer to **“10.3.4 InfoFrame/Packet”** When sending InfoFrame with the data of the user’s choice, refer to **“10.3.4 InfoFrame/Packet.”**		

10.3.4 InfoFrame/Packet

InfoFrame can send the values which are optimal for the video and audio output conditions.

In addition, it is possible to send InfoFrame using values differing from the output conditions to reproduce illegal operation conditions.

Use one of the following operations to send InfoFrame:

a) Send the optimal values automatically.
b) Set separate InfoFrame values, and send them.

a) Sending the optimal values automatically

	MENU	⇒	Configuration	⇒	HDMI
MENU ⇒	GroupEdit	SET ⇒	General	SET ⇒	**Auto Select**
	AutoEdit		HDCP		Packet Changing
	DP Analysis		**HDMI**		Scramble
	Data Copy/Erase		DP		SCDC send
	Configuration		SDI		

Select item using ◯ or ▲ INC ▼ DEC

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**OFF**	The optimal value is not sent.
1	**ON**	The optimal value is sent.

<List of automatically selected items>

- If program data has been saved when Auto Select is set to ON, the values which were set by automatic selection will be saved.
- A dash (“-”) denotes that the value of the original setting is used.

<table>
<tr><th>Item</th><th colspan="4">Setting/reference section</th></tr>
<tr><td colspan="5">AVI InfoFrame</td></tr>
<tr><td></td><td colspan="3">AFD pattern (see “4.7 Aspect ratio patterns”) now displayed</td><td>Setting other than the one given on the left</td></tr>
<tr><td>Active Format Information</td><td colspan="3">Valid</td><td>-</td></tr>
<tr><td>Active Format Aspect</td><td colspan="3">The setting accords with the AFD > Type setting.</td><td>-</td></tr>
<tr><td>Top Bar</td><td colspan="3" rowspan="4">Value calculated from AFD, Timing setting</td><td rowspan="4">-</td></tr>
<tr><td>Bottom Bar</td></tr>
<tr><td>Left Bar</td></tr>
<tr><td>Right Bar</td></tr>
<tr><td>RGB or YCbCr</td><td colspan="4">The setting accords with the HDMI > Video Format setting.</td></tr>
<tr><td>Picture Aspect</td><td colspan="4">The setting accords with the HDMI > AVI InfoFrame > Video Code setting. (EIA/CEA-861 standard met)</td></tr>
<tr><td>Repetition</td><td colspan="4">The setting accords with the H-Timing > Repetition setting.</td></tr>
<tr><td colspan="5">Audio InfoFrame</td></tr>
<tr><td></td><td colspan="4">The setting accords with the Digital Audio > Source setting.</td></tr>
<tr><td></td><td>Ext.ANALOG to L-PCM
Int.L-PCM

Ext.I2S L-PCM (Option)</td><td>Ext.ANALOG to DSD</td><td>Int.DSD (Option)</td><td>Setting other than the one given on the left</td></tr>
<tr><td>Sampling Frequency</td><td>-</td><td>44.1 kHz</td><td>The DSD File information is used.</td><td>-</td></tr>
<tr><td>Channel Count</td><td colspan="3">The setting accords with the number of channels set to ON by Digital Audio > Output Channel.
<table>
<tr><td>0</td><td>1</td><td>2 to 8</td></tr>
<tr><td>Refer StreamHeader</td><td>2ch</td><td>2 to 8ch</td></tr>
</table></td><td>-</td></tr>
<tr><td colspan="5">ACP Packet</td></tr>
<tr><td></td><td colspan="4">The setting accords with the ACP Packet > ACP_Type setting.</td></tr>
<tr><td></td><td colspan="3">DVD-Audio</td><td>Setting other than the one given on the left</td></tr>
<tr><td>DVD-Audio_Type</td><td colspan="3">1</td><td>0</td></tr>
<tr><td>Copy_Permission</td><td colspan="3">-</td><td>0 (Copy Freely)</td></tr>
<tr><td>Copy_Number</td><td colspan="3">-</td><td>0 (1 copies)</td></tr>
<tr><td>Quality</td><td colspan="3">-</td><td>0</td></tr>
<tr><td>Transaction</td><td colspan="3">-</td><td>0 (Not Present)</td></tr>
<tr><td colspan="5">ISRC Packet</td></tr>
<tr><td></td><td colspan="4">A The setting accords with the ACP Packet > ACP_Type setting.</td></tr>
<tr><td></td><td colspan="3">DVD-Audio</td><td>Setting other than the one given on the left</td></tr>
<tr><td>OFF/ON ISRC1</td><td colspan="3">-</td><td>OFF</td></tr>
<tr><td>ISRC2</td><td colspan="3">The setting accords with the ISRC Packet > ISRC_Cont setting.
<table>
<tr><td>0</td><td>1</td></tr>
<tr><td>OFF</td><td>-</td></tr>
</table></td><td>OFF</td></tr>
</table>

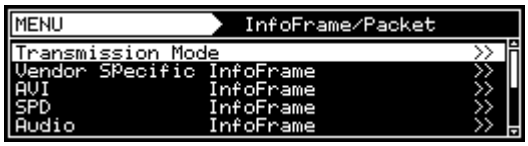
b) Setting separate InfoFrame and Packet values and sending them

This setting can be performed when **"OFF"** is selected for Auto Select in **a) Sending the optimal values automatically**.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	GroupEdit		**Output**		Analog Output		iTMDS
	AutoEdit		Audio		**Digital Output**		**HDMI**
	DP Analysis		Pattern		VBI Function		**DP**
	Data Copy/Erase		Action				SDI
Select item using ◯ or ▲ INC ▼ DEC							

⇒	HDMI
SET ⇒	Video Format(0-3)
	Width(0-4)
	Audio Output(0/1)
	Scramble (0/3)
	InfoFrame/Packet
Select item using ◯ or ▲ INC ▼ DEC	

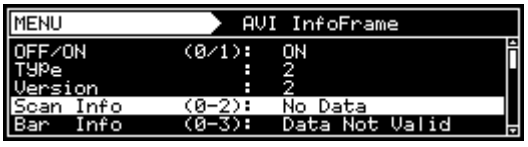
The [InfoFrame/Packet] screen is displayed:



<Selecting the items>
Select the items of InfoFrame/Packet using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Example: When AVI-Info Frame is selected:



For further details on the settings, refer to **<InfoFrame and Packet setting parameters>** below.

<Setting the HDMI output when making changes to InfoFrame/Packet>

When making changes to InfoFrame/Packet, users can select either to turn off the synchronization of the HDMI output or establish the settings or change only the packets without turning off the synchronization.

	MENU	⇒	Configuration	⇒	HDMI
MENU ⇒	GroupEdit	SET ⇒	General	SET ⇒	Auto Select
	AutoEdit		HDCP		**Packet Changing**
	DP Analysis		**HDMI**		Scramble
	Data Copy/Erase		DP		SCDC send
	Configuration		SDI		
Select item using ◯ or ▲ INC ▼ DEC					

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**Normal Mode**	The HDMI output synchronization is turned off, and the InfoFrame/Packet changes are made.
1	**Game Mode**	Changes are made to Packet only (the synchronization is not turned off).

<InfoFrame and Packet setting parameters>

Listed below are the 9 InfoFrame and Packet setting parameters.

- Vendor Specific1, 2
- AVI InfoFrame
- SPD InfoFrame
- Audio InfoFrame
- MPEG InfoFrame
- NTSC VBI InfoFrame
- ACP Packet
- ISRC Packet
- Gamut Metadata Packet

CAUTION

Due to the limitations by the installed chips, the maximum number of packets which can be sent simultaneously is limited.

VG can send **maximum 7 packets** at a time except AVI InfoFrame.
However, the below packets cannot be sent together.

(1) ACP Packet and SPD InfoFrame
(2) ISRC2 Packet and NTSC VBI InfoFrame
(3) ISRC1 Packet and Vendor Specific InfoFrame1

In case the output of combination is “ON”, priority is shows below.

(1) ACP Packet has priority to be sent.
(2) ISRC2 Packet has priority to be sent.
(3) ISRC1 Packet has priority to be sent.

Note) VM-1876-M8 does not have these restrictions.

■ Vendor Specific InfoFrame1, 2

The vendor specific information is stored in Vendor Specific InfoFrame, and sent.

Note) Vendor Specific InfoFrame 1 and 2 have the same setting menu. It is possible to set them differently.

(1)	**OFF/ON (0/1)**	This setting determines whether Vendor Specific InfoFrame is to be sent.		
		0	**OFF**	The Vendor Specific InfoFrame is not sent.
		1	**ON**	The Vendor Specific InfoFrame is sent.
Listed below are the Vendor Specific InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the Vendor Specific InfoFrame type setting.		
		1	* "Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the Vendor Specific InfoFrame version setting.		
		1	* "Version" is displayed only. It cannot be changed.	
(4)	**IEEE RegID Sel (0-2)**	This selects the format setting for the IEEE Registration ID and the items after it.		
		0	**Other**	Any IEEE Registration ID can be selected. The Payload is set after the IEEE Registration ID.
		1	**H14b**	The IEEE Registration ID is set to 000C03. After the IEEE Registration ID, the setting is established using the format that supports HDMI 1.4.
		2	**HF-VSIF**	The IEEE Registration ID is set to C45DD8h. After the IEEE Registration ID, the setting is established using the format that supports HDMI 2.0.
1. IEEE RegID Sel: Other				
1-(1)	**IEEE Regist. ID**	This is the IEEE Registration ID setting.		
		000000h – FFFFFFh		
1-(2)	**Payload Length**	This is the Payload length setting.		
		0 – 24		
1-(3)	**Payload 1-24**	This is the Payload data setting.		
		00h – FFh		
2. IEEE RegID Sel: H14b				
2-(1)	**IEEE Regist. ID**	This indicates the IEEE Registration ID. (It cannot be changed.)		
		000C03h		
2-(2)	**Video Format (0-2)**	This is the HDMI Video Format setting.		
		0	**None**	No additional HDMI video format is presented in this packet.
		1	**Ext. Resolution**	Extended resolution format present.
		2	**3D**	3D format indication present.
2-1. Video Format: Ext. Resolution				
2-1-(1)	**HDMI VIC (0-3)**	This is the HDMI VIC setting.		
		0	**4K×2K 29.97/30 Hz**	
		1	**4K×2K 25 Hz**	
		2	**4K×2K 23.98/24 Hz**	
		3	**4K×2K 24 Hz (SMPTE)**	

2-2. Video Format: 3D (Option)				
2-2-(1)	**3D Structure (0-7)**	this is the 3D Structure setting.		
		0	**Frame Packing**	
		1	**Field Alternative *1**	
		2	**Line Alternative**	
		3	**Side-by-Side (Full)**	
		4	**L + depth**	
		5	**L + d + G + G-d** (L + depth + graphics + graphics-depth)	
		6	**Side-by-Side (Half)**	
		7	**Top & Bottom**	
2-2-(2)	**3D Ext Data (0-7)**	this is the 3D Ext Data setting.		
		0 ***2**	**Horizontal O/L,O/R**	Horizontal sub-sampling Odd/Left picture, Odd/Right picture
		1 ***2**	**Horizontal O/L,E/R**	Horizontal sub-sampling Odd/Left picture, Even/Right picture
		2 ***2**	**Horizontal E/L,O/R**	Horizontal sub-sampling Even/Left picture, Odd/Right picture
		3 ***2**	**Horizontal E/L,E/R**	Horizontal sub-sampling Even/Left picture, Even/Right picture
		4	**Quincunx O/L,O/R**	Quincunx matrix Odd/Left picture, Odd/Right picture
		5	**Quincunx O/L,E/R**	Quincunx matrix Odd/Left picture, Even/Right picture
		6	**Quincunx E/L,O/R**	Quincunx matrix Even/Left picture, Odd/Right picture
		7	**Quincunx E/L,E/R**	Quincunx matrix Even/Left picture, Even/Right picture
2-2-(3)	**3DMeta Present (0/1)**	this is the 3D Meta present (whether the following 3D metadata is present or not) setting.		
		0	**0 (Not Present)**	3D metadata not present
		1	**1**	3D metadata present
2-2-(4)	**Metadata Type**	this indicates the 3D Metadata type. (it cannot be changed.)		
		0		
2-2-(5)	**Metadata Length**	this is the 3D Metadata Length setting.		
		0 – 21 *3		
2-2-(6)	**Metadata 1-21 *3**	this is the 3D Metadata data setting.		
		00h – FFh		

3. IEEE RegID Sel: **HF-VSIF**			
IEEE Regist. ID	This shows the IEEE Registration ID (it cannot be changed).		
	C45DD8h		
Version	This is the HF-VSIF version.		
	1		* The version is only displayed. It cannot be changed.
3D Valid (0/1)	This is the 3D Valid setting.		
	0	**0**	Disables 3D data
	1	**1**	Enables 3D data

3-1. 3D Valid: Enabled				
3-2-(1)	**3D F Structure (0-7)**	This is the 3D F Structure setting.		
		0	**Frame Packing**	
		1	**Field Alternative *1**	
		2	**Line Alternative**	
		3	**Side-by-Side (Full)**	
		4	**L + depth**	
		5	**L + d + G + G-d** (L + depth + graphics + graphics-depth)	
		6	**Side-by-Side (Half)**	
		7	**Top & Bottom**	
3-2-(2)	**3D F Ext Data (0-7)**	This is the 3D F Ext Data.		
		0 ***2**	**Horizontal O/L,O/R**	Horizontal sub-sampling Odd/Left picture, Odd/Right picture
		1 ***2**	**Horizontal O/L,E/R**	Horizontal sub-sampling Odd/Left picture, Even/Right picture
		2 ***2**	**Horizontal E/L,O/R**	Horizontal sub-sampling Even/Left picture, Odd/Right picture
		3 ***2**	**Horizontal E/L,E/R**	Horizontal sub-sampling Even/Left picture, Even/Right picture
		4	**Quincunx O/L,O/R**	Quincunx matrix Odd/Left picture, Odd/Right picture
		5	**Quincunx O/L,E/R**	Quincunx matrix Odd/Left picture, Even/Right picture
		6	**Quincunx E/L,O/R**	Quincunx matrix Even/Left picture, Odd/Right picture
		7	**Quincunx E/L,E/R**	Quincunx matrix Even/Left picture, Even/Right picture
3-2-(3)	**Additionalinfo Pre (0/1)**	This is the Additional info Present (enables or disables the Dual View, View Dependency, and Preferred 2D View settings below) setting.		
		0	**0 (Not Present)**	Disabled
		1	**1**	Enabled
3-2-(4)	**Dual View (0/1)**	This is the Dual View setting.		
		0	**0 (Normal 3D)**	Normal 3D setting
		1	1 (Dual View)	Enables the Dual View setting
3-2-(5)	**View Dependency (0-3)**	This is the View Dependency settings.		
		0	**No Indication**	
		1	**Right Originate**	
		2	**Left Originate**	
		3	**Both**	
3-2-(6)	**Preferred 2D View (0-2)**	This is the Preferred 2D View setting.		
		0	**No Indication**	
		1	**Right View**	
		2	**Left View**	

3-2-(7)	**Disparity Present (0/1)**	This is the Disparity Present (enables or disables Disparity data below) setting.		
		0	**0 (Not Present)**	Disables Disparity data
		1	**1**	Enables Disparity data
3-2-(8)	**Disparity Version**	This is the Disparity Version setting.		
		0 to 3		
3-2-(9)	**Disparity Length**	This is the Disparity Length (length of Disparity data) setting. Changes depending on the Disparity Version and Disparity data first bytes.		
		Disparity Version : 0		
		0		
		Disparity Version : 1		
		3		
		Disparity Version : 2		
		Disparitydata[0] : 2	**3**	
		Disparitydata[0] : 3	**4**	
		Disparitydata[0] : 4	**5**	
		Disparitydata[0] : 5	**6**	
		Disparitydata[0] : 10	**11**	
		Disparitydata[0] : 17	**18**	
		Disparitydata[0] : Others	**1**	
		Disparity Version : 3		
		Disparitydata[0] : 0	**4**	
		Disparitydata[0] : 2	**6**	
		Disparitydata[0] : 3	**7**	
		Disparitydata[0] : 4	**8**	
		Disparitydata[0] : 5	**9**	
		Disparitydata[0] : 10	**14**	
		Disparitydata[0] : Others	**4**	
3-2-(10)	**Disparity data 1 to 20 *3**	This is the Disparity data setting.		
		00h to **FFh**		
3-2-(11)	**Meta Present (0/1)**	This is the 3D Meta Present (enables or disables 3D metadata below) setting.		
		0	**0 (Not Present)**	Disables 3D metadata
		1	**1**	Enables 3D metadata
3-2-(12)	**Metadata Type**	This shows the 3D Metadata type (it cannot be changed).		
		0		
3-2-(13)	**Metadata Length**	This is the 3D Metadata Length (length of 3D Metadata) setting.		
		0 to **20 *3**		
3-2-(14)	**Metadata 1 to 20 *3**	This is the 3D Metadata setting.		
		00h to **FFh**		

CAUTION

***1:**
The output signals differ from the ones in the standards. Currently, the DE signal is high for Vblank3 periods of the Field Alternative.

CAUTION

***2:**
The 3D Ext Data values of 0 to 3 have all been made consistent with "Horizontal sub-sampling" in HDMI Ver.1.4a standard.
With this generator, the old expressions are used to differentiate the drawing method used with optional pattern 101 and to provide compatibility.

CAUTION

***3**

If the setting value of 3D Structure is "Side-by-site (Half)", the maximum data of 3D Metadata is 20 bytes.
If you set "21" in Metadata Length, the last data (21st byte) is not sent.
Please refer to the below list.

Packet Byte#	7	6	5	4	3	2	1	0
PB 0	Checksum							
PB 1	24bit IEEE Registration Identifier (000C03h) (least significant byte first)							
PB 2								
PB 3								
PB 4	HDMI_Video_Format (010b(3D))			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 5	3D_Structure				3D_Metadata_ Present	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 6	3D_Metadata_Type			3D_Metadata_Length				
PB 7	3D_Metadata_1							
PB 8	3D_Metadata_2							
PB 9	3D_Metadata_3							
:	:							
PB 26	3D_Metadata_20							
PB 27	3D_Metadata_21							

Example 1: Packet data mapping except Side-by-Side(Half).

Packet Byte#	7	6	5	4	3	2	1	0
PB 0	Checksum							
PB 1	24bit IEEE Registration Identifier (000C03h) (least significant byte first)							
PB 2								
PB 3								
PB 4	HDMI_Video_Format (010b(3D))			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 5	3D_Structure (1000b(Side-by-Side(Half)))				3D_Metadata_ Present	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 6	3D_Ext_Data				Reserved (0)			
PB 7	3D_Metadata_Type			3D_Metadata_Length				
PB 8	3D_Metadata_1							
PB 9	3D_Metadata_2							
PB 10	3D_Metadata_3							
:	:							
PB 26	3D_Metadata_19							
PB 27	3D_Metadata_20							

Example 2: Packet data mapping of Side-by-Side(Half).

■ AVI InfoFrame

"AVI InfoFrame" stands for Auxiliary Video Information InfoFrame. The information (including the color space and aspect ratio) of the transmission images is stored in it, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the AVI InfoFrame is to be sent.		
		0	**OFF**	The AVI InfoFrame is not sent.
		1	**ON**	The AVI InfoFrame is sent.
Listed below are the AVI InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the AVI InfoFrame type setting.		
		2	* "Type" is displayed only. It cannot be changed.	
(3)	**Version (0-3)**	This is the AVI InfoFrame version setting.		
		1	**Version 1**	
		2	**Version 2**	
		3	**Version 3**	
(4)	**Scan Info (0-2)**	This sets the Scan Information. (It sets whether processing is required for the transmitted images.)		
		0	**No Data**	No Data
		1	**Overscanned**	Composed for an overscanned display.
		2	**Underscanned**	Composed for an underscanned display.
(5)	**Bar Info (0-3)**	This sets the Bar Info (valid/invalid for the Bar Information described later).		
		0	**Data Not Valid**	Bar Data not valid
		1	**Vertical Valid**	Vert.Bar info valid
		2	**Horizontal Valid**	Horiz.Bar info Valid
		3	**Vert. & Horiz. Valid**	Vert. And Horiz. Bar Info valid
(6)	**ActiveF Info (0/1)**	This is the Active Format Information Present setting (valid/invalid for the Active Format Aspect Ratio described later).		
		0	**No Data**	No Data
		1	**Valid**	Active Format Information Valid
(7)	**RGB or YCbCr (0-7)**	This is the RGB or YCbCr (color space of transmitted images) setting.		
		0	**RGB**	
		1	**YCbCr 4:2:2**	
		2	**YCbCr 4:4:4**	
		3	**YCbCr 4:2:0**	
		4	**(reserved1)**	
		5	**(reserved2)**	
		6	**(reserved3)**	
		7	**IDO-Define**	

(8)	**AvtiveF Aspect (0-9)**	This is the Active Format Aspect Ratio (aspect ratio of the video parts (excluding Bar of letter box, etc.)) setting.		
		0	**Same Picture**	
		1	**4:3 (center)**	
		2	**16:9 (center)**	
		3	**14:9 (center)**	
		4	**Box 16:9 (top)**	
		5	**Box 14:9 (top)**	
		6	**Box > 16:9 (center)**	
		7	**4:3 (14:9 center)**	
		8	**16:9 (14:9 center)**	
		9	**16:9 (4:3 center)**	
(9)	**Picture Aspect (0-2)**	This is the Picture Aspect Ratio (aspect ratio of the video parts including Bar of letter box, etc.) setting.		
		0	**No Data**	No Data
		1	**4:3**	4:3
		2	**16:9**	16:9
(10)	**Scaling (0-3)**	This is the Non-Uniform Picture Scaling (direction in which transmitted images have been scaled) setting.		
		0	**No Known**	No Known non-uniform Scaling
		1	**Horizontal**	Picture has been scaled horizontally
		2	**Vertical**	Picture has been scaled vertically
		3	**Horiz. & Vert.**	Picture has been scaled horizontally and vertically
(11)	**Colorimetry (0-3)**	This is the Colorimetry (the standard whose coefficients were used for conversion into color difference signals) setting.		
		0	**No Data**	No Data
		1	**SMPTE170M ITU601**	SMPTE170M/ITU601
		2	**ITU709**	ITU709
		3	**Extended Valid**	Extended Colorimetry Information Valid
(12)	**Video Code**	This is the Video Format Identification Code setting.		
		0 - 107	For further details on the timings indicated by Code, refer to CEA-861-F.	
(13)	**Repetition**	**1 - 10**	This is the Pixel Repetition Factor setting.	
(14)	**Top Bar**	**0 - 65535**	This is the Line Number of End of Top Bar setting (letter box top bar size setting).	
(15)	**Bottom Bar**	**0 - 65535**	This is the Line Number of Start of Bottom Bar setting (letter box bottom bar size setting).	
(16)	**Left Bar**	**0 - 65535**	This is the Pixel Number of End of Left Bar setting (pillar box left bar size setting).	
(17)	**Right Bar**	**0 - 65535**	This is the Pixel Number of Start of Right Bar setting (pillar box right bar size setting).	
(18)	**RGB Quan.Range (0-2)**	This is the RGB Quantization Range setting (quantization range when RGB images apply for Colorimetry).		
		0	**Default**	
		1	**Limited Range**	
		2	**Full Range**	

(19)	**YCC Quan.Range (0/1)**	This is the YCC Quantization Range setting (quantization range when YCC images apply for Colorimetry).	
		0	**Limited Range**
		1	**Full Range**
(20)	**Extended Colo. (0-6)**	This is the Extended Colorimetry setting. (This is referenced when Extended Valid has been set as the Colorimetry setting.)	
		0	**XvYCC601**
		1	**XvYCC709**
		2	**sYCC601**
		3	**AdobeYCC601**
		4	**AdobeRGB**
		5	**BT2020 YcCbcCrc**
		6	**BT2020 RGBorYCbCr**
(21)	**IT content (0/1)**	This is the IT Content (whether the transmitted images are IT content) setting.	
		0	No data
		1	IT Content

(22)	**IT content Type (0-3)**	This is the IT Content Type setting.	
		0	**Graphics**
		1	**Photo**
		2	**Cinema**
		3	**Game**

■ SPD InfoFrame

"SPD InfoFrame" stands for Source Product Description InfoFrame. The information of the transmission device is stored in it, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the SPD InfoFrame is to be sent.		
		0	**OFF**	The SPD InfoFrame is not sent.
		1	**ON**	The SPD InfoFrame is sent.
Listed below are the SPD InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the SPD InfoFrame type setting.		
		3	* "Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the SPD InfoFrame version setting.		
		1	Version1	* "Version" is displayed only. It cannot be changed.
(4)	**Vendor Name**	This is the Vendor Name (name of the transmission device vendor) setting.		
		Maximum 8 characters		For further details on the input method, refer to steps (2) and following in section "2.3 Setting the names"
(5)	**Product Description**	This the Product Description (name of the transmission device (model name, etc.)) setting.		
		Maximum 16 characters		For further details on the input method, refer to steps (2) and following in section "2.3 Setting the names"
(6)	**Source Device (0-D)**	This is the Source Device Information (the type of transmission device) setting.		
		0	**Unknown**	
		1	**Digital STB**	
		2	**DVD Player**	
		3	**D-VHS**	
		4	**HDD Video recorder**	
		5	**DVC**	
		6	**DSC**	
		7	**Video CD**	
		8	**Game**	
		9	**PC general**	
		A	**Blue-Ray Disc**	
		B	**Super Audio CD**	
		C	**HD DVD**	
		D	**PMP**	

■ Audio InfoFrame

The transmission audio information is stored in the Audio InfoFrame, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the Audio InfoFrame is to be sent.		
		0	**OFF**	The Audio InfoFrame is not sent.
		1	**ON**	The Audio InfoFrame is sent.
Listed below are the Audio InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the AVI Audio InfoFrame type setting.		
		4	* "Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the Audio InfoFrame version setting.		
		1	* "Version" is displayed only. It cannot be changed.	
(4)	**Coding Type (0-F)**	This is the Audio Coding Type setting.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**IEC60958 PCM**	
		2	**AC-3**	
		3	**MPEG1 (Layers 1&2)**	
		4	**MP3 (MPEG1 Layer 3)**	
		5	**MPEG2 (multi ch.)**	
		6	**AAC**	
		7	**DTS**	
		8	**ATRAC**	
		9	**One Bit Audio**	
		A	**Dolby Digital +**	
		B	**DTS-HD**	
		C	**MLP**	
		D	**DST**	
		E	**WMA Pro**	
		F	**Refer Extension**	
(5)	**Coding Ext Type (0-9)**	This is the Audio Coding Ext Type setting.		
		0	**(not use1)**	
		1	**(not use2)**	
		2	**(not use3)**	
		3	**HE-AAC**	
		4	**HE-AACv2**	
		5	**AAC LC**	
		6	**DRA**	
		7	**HE-AAC Surround**	
		8	**(reserve)**	
		9	**AAC-LC Surround**	
(6)	**Channel Count (0-7)**	This is the Audio Channel Count setting.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**2 ch**	
		↓	↓	
		7	**8 ch**	
(7)	**Sampling Freq (0-7)**	This is the Sampling Frequency setting.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**32 kHz**	
		2	**44.1 kHz**	
		3	**48 kHz**	
		4	**88.2 kHz**	
		5	**96 kHz**	
		6	**176.4 kHz**	
		7	**192 kHz**	

(8)	**Sample Size (0-3)**	This is the Sample Size setting.							
		0	**Refer StreamHeader**	Refer to Stream Header					
		1	**16 bit**						
		2	**20 bit**						
		3	**24 bit**						
(9)	**Speaker Placement (0-50)**	This is the Channel/Speaker Allocation setting.							
			8ch	7ch	6ch	5ch	4ch	3ch	2ch	1ch
		0		-	-	-	-	-	FR	FL
		1		-	-	-	-	LFE	FR	FL
		2		-	-	-	FC	-	FR	FL
		3		-	-	-	FC	LFE	FR	FL
		4		-	-	RC	-	-	FR	FL
		5		-	-	RC	-	LFE	FR	FL
		6		-	-	RC	FC	-	FR	FL
		7		-	-	RC	FC	LFE	FR	FL
		8		-	RR	RL	-	-	FR	FL
		9		-	RR	RL	-	LFE	FR	FL
		10		-	RR	RL	FC	-	FR	FL
		11		-	RR	RL	FC	LFE	FR	FL
		12		RC	RR	RL	-	-	FR	FL
		13		RC	RR	RL	-	LFE	FR	FL
		14		RC	RR	RL	FC	-	FR	FL
		15		RC	RR	RL	FC	LFE	FR	FL
		16	RRC	RLC	RR	RL	-	-	FR	FL
		17	RRC	RLC	RR	RL	-	LFE	FR	FL
		18	RRC	RLC	RR	RL	FC	-	FR	FL
		19	RRC	RLC	RR	RL	FC	LFE	FR	FL
		20	FRC	FLC	-	-	-	-	FR	FL
		21	FRC	FLC	-	-	-	LFE	FR	FL
		22	FRC	FLC	-	-	FC	-	FR	FL
		23	FRC	FLC	-	-	FC	LFE	FR	FL
		24	FRC	FLC	-	RC	-	-	FR	FL
		25	FRC	FLC	-	RC	-	LFE	FR	FL
		26	FRC	FLC	-	RC	FC	-	FR	FL
		27	FRC	FLC	-	RC	FC	LFE	FR	FL
		28	FRC	FLC	RR	RL	-	-	FR	FL
		29	FRC	FLC	RR	RL	-	LFE	FR	FL
		30	FRC	FLC	RR	RL	FC	-	FR	FL
		31	FRC	FLC	RR	RL	FC	LFE	FR	FL
		32	-	FCH	RR	RL	FC	-	FR	FL
		33	-	FCH	RR	RL	FC	LFE	FR	FL
		34	TC	-	RR	RL	FC	-	FR	FL
		35	TC	-	RR	RL	FC	LFE	FR	FL
		36	FRH	FLH	RR	RL	-	-	FR	FL
		37	FRH	FLH	RR	RL	-	LFE	FR	FL
		38	FRW	FLW	RR	RL	-	-	FR	FL
		39	FRW	FLW	RR	RL	-	LFE	FR	FL
		40	TC	RC	RR	RL	FC	-	FR	FL
		41	TC	RC	RR	RL	FC	LFE	FR	FL
		42	FCH	RC	RR	RL	FC	-	FR	FL
		43	FCH	RC	RR	RL	FC	LFE	FR	FL
		44	TC	FCH	RR	RL	FC	-	FR	FL
		45	TC	FCH	RR	RL	FC	LFE	FR	FL

		46	FRH	FLH	RR	RL	FC	-	FR	FL
		47	FRH	FLH	RR	RL	FC	LFE	FR	FL
		48	FRW	FLW	RR	RL	FC	-	FR	FL
		49	FRW	FLW	RR	RL	FC	LFE	FR	FL
		50	Reserved							
(10)	**Level Shift Value**	This is the Level Shift Value setting.								
		0 - 15	The decibel (dB) level is set here.							
(11)	**Down-mix (0/1)**	This is the Down –mix Inhibit Flag setting.								
		0	**Permitted / No Info**		Permitted or no information about any assertion of this					
		1	**Prohibited**		Prohibited					
(12)	**LEF PB Level (0-2)**	This is the LEF Playback Level setting.								
		0	**Unknown**							
		1	**0 dB Playback**							
		2	**+10 dB Playback**							

■ MPEG InfoFrame

If the original source of the data prior to its conversion to HDMI is MPEG data, its information is stored in MPEG InfoFrame, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the MPEG InfoFrame is to be sent.		
		0	**OFF**	The MPEG InfoFrame is not sent.
		1	**ON**	The MPEG InfoFrame is sent.
Listed below are the MPEG InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the MPEG InfoFrame type setting.		
		5	* "Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the MPEG InfoFrame version setting.		
		1	* "Version" is displayed only. It cannot be changed.	
(4)	**Bit Rate**	**0 - 4294** M **967** k **295** Hz		This is the MPEG bit rate setting.
(5)	**Field Repeat (0/1)**	This is the Field Repeat setting.		
		0	**New Field(picture)**	
		1	**Repeated Field**	
(6)	**Frame (0-3)**	This is the MPEG Frame setting.		
		0	**Unknown(No Data)**	
		1	**I Picture**	
		2	**B Picture**	
		3	**P Picture**	

■ NTSC VBI InfoFrame

The vertical blanking interval (VBI) information is stored in NTSC VBI InfoFrame, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the NTSC VBI InfoFrame is to be sent.		
		0	**OFF**	The NTSC VBI InfoFrame is not sent.
		1	**ON**	The NTSC VBI InfoFrame is sent.
Listed below are the NTSC VBI InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the NTSC VBI InfoFrame type setting.		
		6	* "Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the NTSC VBI InfoFrame version setting.		
		1	* "Version" is displayed only. It cannot be changed.	
(4)	**PES Length**	0 - 27		This sets the PES length.
(5)	**PES 1-5/6-10/11-15/16-20/ 21-25/26-27**	00h - FFh		This sets the PES data.

■ Dynamic Range and Mastering InfoFrame

Dynamic Range and Maserting InfoFrame contains the information that is related to the Dynamic Range of video は、stream, and send it out.

(1)	**OFF/ON(0/1)**	The setting determines whether HDR Metadata InfoFrame is sent or not.		
		0	**OFF**	HDR Metadata InfoFrame is not sent.
		1	**ON**	HDR Metadata InfoFrame is sent.
(2)	**Type**	The setting determines the type of HDR Metadata InfoFrame.		
		7	* display only. Cannot be changed.	
(3)	**Version**	Set version of HDR Metadata InfoFrame.		
		1	Version1	* display only. Cannot be changed.
(4)	**EOTF(0-3)**	Set EOTF.		
		0	SDR Range	
		1	HDR Range	
		2	SMPTE ST2084	
		3	Future EOTF	
(5)	**Metadata ID**	Set Static Metadata Descriptor ID.		
		0	Metadata Type1 * display only. Cannot be changed.	
(6)	**Disp Primaries x0**	Set display_primaries_x[0].		
		0 .00000~ 1.00000 (0.00002 Step)		
(7)	**Disp Primaries y0**	Set display_primaries_y[0].		
		0 .00000~ 1.00000 (0.00002 Step)		
(8)	**Disp Primaries x1**	Set display_primaries_x[1].		
		0 .00000~ 1.00000 (0.00002 Step)		
(9)	**Disp Primaries y1**	Set display_primaries_y[1].		
		0 .00000~ 1.00000 (0.00002 Step)		
(10)	**Disp Primaries x2**	Set display_primaries_x[2].		
		0 .00000~ 1.00000 (0.00002 Step)		
(11)	**Disp Primaries y2**	Set display_primaries_y[2].		
		0 .00000~ 1.00000 (0.00002 Step)		
(12)	**White Point x**	Set White_point_x,		
		0 .00000~ 1.00000 (0.00002 Step)		
(13)	**White Point y**	Set White_point _y,		
		0 .00000~ 1.00000 (0.00002 Step)		
(14)	**Max Disp Mastering**	Set max_display_mastering_luminance.		
		1~ 65535		
(15)	**Min Disp Mastering**	Set min_display_mastering_luminance.		
		0 .0001~ 6.5535		
(16)	**Content Light LV**	Set Maximum Content Light Level.		
		1~ 65535		
(17)	**Frame-ave Light LV**	Set Maximum Frame-average Light Level.		
		1~ 65535		

■ ACP Packet

"ACP Packet" stands for Audio Content Protection Packet. The copyright protection information added to DVD-Audio and Super Audio CD contents is stored in it, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the ACP Packet is to be sent.		
		0	**OFF**	The ACP Packet is not sent.
		1	**ON**	The ACP Packet is sent.
Listed below are the ACP Packet settings. * These settings are not related to the video and audio output settings.				
(2)	**ACP_Type (0-3)**	This is the ACP Type setting.		
		0	**Generic Audio**	
		1	**IEC60958 Audio**	
		2	**DVD-Audio**	
		3	**Super Audio CD**	
(3)	**DVD-Audio Type (0/1)**	This is the DVD-Audio_Type_Dependent_Generation setting.		
		0 **1**	* This must be set to 1 when "DVD-Audio" has been selected as the ACP_Type setting.	
(4)	**CopyPermission (0-3)**	Audio_Copy_permission (the information concerning the permission to copy DVD-Audio content) is set here.		
		0	**Copy Freely**	
		1	**(reserved)**	
		2	**Specify CopyNumber**	
		3	**No More Copies**	
(5)	**Copy_Number (0-7)**	Audio_copy_number (the number of times DVD-Audio content may be copied) is set here.		
		0	**1 copies**	
		1	**2 copies**	
		2	**4 copies**	
		3	**6 copies**	
		4	**8 copies**	
		5	**10 copies**	
		6	**3 copies**	
		7	**Copy OneGeneration**	
(6)	**Quality (0-3)**	Audio_Quality (the quality in which DVD-Audio content is to be copied) is set here.		
			No. of channels	Sampling frequency / Bit width
		0	2 channels or less	Lower than 48 kHz / 16 bits or less
		1	2 channels or less	No restrictions / No restrictions
		2	No restrictions	No restrictions / No restrictions
		3	No restrictions	Lower than 48 kHz / 16 bits or less
(7)	**Transaction (0/1)**	Audio_Transaction (whether the status of optional access control is contained in the DVD-Audio data) is set here.		
		0	**Not Present**	not present
		1	**(reserved)**	Reserved for copyright management system use

(8)	**Count_A**	Count_A (the number of times the Super Audio CD contents can be copied by an approved secure recorder) is set here.	
		0	Prohibited
		1 - 254	Allowed from 1 to 254 times
		255	No restrictions
(9)	**Count_S**	Count_S (the number of times the Super Audio CD contents can be copied by a secure recorder) is set here.	
		0	Prohibited
		1 - 254	Allowed from 1 to 254 times
		255	No restrictions
(10)	**Count_U**	Count_U (the number of times the Super Audio CD contents can be copied by an unlisted recorder) is set here.	
		0	Prohibited
		1 - 254	Allowed from 1 to 254 times
		255	No restrictions
(11)	**CCI_Flags_Q_A (0/1)**	CCI_Flags_Q_A (the quality in which Super Audio content is to be copied by an approved secure recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(12)	**CCI_Flags_Q_S (0/1)**	CCI_Flags_Q_S (the quality in which Super Audio content is to be copied by a secure recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(13)	**CCI_Flags_Q_U (0/1)**	CCI_Flags_Q_U (the quality in which Super Audio content is to be copied by an unlisted recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(14)	**CCI_Flags_Move_A (0/1)**	CCI_Flags_Move_A (whether copying of Super Audio content by individual track onto an approved secure recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**
(15)	**CCI_Flags_Move_S (0/1)**	CCI_Flags_Move_S (whether copying of Super Audio content by individual track onto a secure recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**
(16)	**CCI_Flags_Move_U (0/1)**	CCI_Flags_Move_U (whether copying of Super Audio content by individual track onto an unlisted recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**

■ ISRC Packet

"ISRC Packet" stands for International Standard Recording Code Packet. The sound source identification codes and other information are stored in it, and sent.

(1)	**OFF/ON ISRC1 (0/1)**	Whether to send the ISRC1 Packet is set here.		
		0	**OFF**	The ISRC1 Packet is not sent.
		1	**ON**	The ISRC1 Packet is sent.
(2)	**OFF/ON ISRC2 (0/1)**	Whether to send the ISRC2 Packet is set here.		
		0	**OFF**	The ISRC2 Packet is not sent.
		1	**ON**	The ISRC2 Packet is sent.
Listed below are the ISRC Packet settings. * These settings are not related to the video and audio output settings.				
(3)	**ISRC_Cont (0/1)**	This is the ISRC Continued setting.		
		0	ISRC2 is not sent.	
		1	ISRC2 is sent.	
(4)	**ISRC_Valid (0/1)**	This is the ISRC Valid setting. (ISRC Valid indicates whether data has been set to the ISRC_Status in the ISRC Packet and whether the UPC_EAN_ISRC_XX field is valid.)		
		0	Invalid	
		1	Valid	
(5)	**ISRC_Status (0-2)**	This is the ISRC_Status setting. (ISRC_Status indicates the position on the current track.)		
		0	**Starting**	
		1	**Intermediate**	
		2	**Ending**	
(6)	**Validity Info (0-3)**	This is the Validity information setting. (This indicates whether the ISRC and UPC/EAN data is valid or invalid.)		
		0	**No Validity**	
		1	**ISRC**	
		2	**UPC/EAN**	
		3	**UPC/EAN and ISRC**	
(7)	**Catalogue Code**	This is the Catalogue Code (UPC/EAN #1 - 13) setting.		
		Number consisting of 13 digits		
(8)	**Country Code**	This is the Country Code (ISRC #1 - 2) setting.		
		Character string consisting of 2 letters		
(9)	**First Owner Code**	This is the First Owner Code (ISRC #3 - 5) setting.		
		Character string consisting of 3 alphanumeric		
(10)	**Year of Rec. Code**	This is the Year-of-recording code (ISRC #6 - 7) setting.		
		Number consisting of 2 digits		
(11)	**Recording-item Code**	This is the Recording code / Recording-item code (ISRC #8 -12) setting.		
		Number consisting of 5 digits		

■ Gamut Metadata Packet

If the transmission images have been sent by xvYCC, their color space information (range, etc.) is stored in the Gamut Metadata Packet, and sent.

(1)	**OFF/ON (0/1)**	This setting determines whether the Gamut Metadata Packet is to be sent.		
		0	**OFF**	The Gamut Metadata Packet is not sent.
		1	**ON**	The Gamut Metadata Packet is sent.
Listed below are the Gamut Metadata Packet settings. * These settings are not related to the video and audio output settings.				
(2)	**Next-Field (0/1)**	This is the Next_Field setting. (This indicates whether GBD (Gamut Boundary Description) sent in this Gamut Metadata Packet is applicable to the next video field.)		
		0	Not applicable	
		1	Applicable	
(3)	**No_Current_GBD (0/1)**	This is the No_Current_GBD setting. (This indicates whether GBD sent in this Gamut Metadata Packet is valid or invalid.)		
		0	Invalid	
		1	Valid	
(4)	**GBD_Profile (0-3)**	This is the GBD_Profile setting.		
		0	P0	
		1	P1	
		2	P2	
		3	P3	
(5)	**AffectedGamutSeqNum**	**0 - 15**	This is the Affected_Gamut_Seq_Num setting. (This indicates the number of GBD (Gamut boundary description) sent in this Gamut Metadata Packet.)	
(6)	**Current_GamutSeqNum**	**0 - 15**	This is the Current_Gamut_Seq_Num setting. (This indicates the number of the GBD that applies to the current video field.)	
(7)	**Packet_Seq (0-3)**	This is the Packet_Seq setting. (This identifies what this Gamut Metadata Packet is in the Gamut Metadata Packet Sequence.)		
		0	**Intermediate**	Intermediate packet in sequence
		1	**First**	First packet in sequence
		2	**Last**	Last packet in sequence
		3	**Only**	Only packet in sequence
(8)	**Format_Flag (0/1)**	This is the Format_Flag setting. (This indicates the format of the GBD sent.)		
		0	**Vertices/Facets**	Vertices/Facets description
		1	**Range**	Range description
(9)	**Colorprecision (0-2)**	This is the GBD_Color_Precision setting. (This indicates the precision (bit width) of the vertex and range data in GBD.)		
		0	**8 bit**	
		1	**10 bit**	
		2	**12 bit**	

<table>
<tr><td>(10)</td><td>Color_Space</td><td colspan="3">This is the GBD_Color_Space setting.
■ When Vertices/facets (0) has been selected as the Format_Flag setting</td></tr>
<tr><td></td><td></td><td>0</td><td>ITU-R BT.709</td><td>ITU-R BT.709 (using RGB)</td></tr>
<tr><td></td><td></td><td>1</td><td>xvYCC601</td><td>xvYCC601 (IEC61966-2-4-SD) (using YCbCr)</td></tr>
<tr><td></td><td></td><td>2</td><td>xvYCC709</td><td>xvYCC709 (IEC61966-2-4-HD) (using YCbCr)</td></tr>
<tr><td></td><td></td><td>3</td><td>XYZ</td><td>XYZ</td></tr>
<tr><td></td><td></td><td colspan="3">■ When Range (1) has been selected as the Format_Flag setting</td></tr>
<tr><td></td><td></td><td>0</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td></td><td></td><td>1</td><td>xvYCC601</td><td>RGB expression of xvYCC601 coordinates</td></tr>
<tr><td></td><td></td><td>2</td><td>xvYCC709</td><td>RGB expression of xvYCC709 coordinates</td></tr>
<tr><td></td><td></td><td>3</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>(11)</td><td>Number_Vertices</td><td colspan="3">This is the Number_Vertices setting.
* This is displayed only when Vertices/facets (0) has been selected as the Format_Flag setting.</td></tr>
<tr><td></td><td></td><td colspan="3">Colorprecision =
8 bit: 4 - 8
10 bit: 4 - 6
12 bit: 4 – 5</td></tr>
<tr><td>(12)</td><td>Packed_GBD_Vertices_Data</td><td colspan="3">This is the Packed_GBD_Vertices_Data setting.
* This is displayed only when Vertices/facets (0) has been selected as the Format_Flag setting.</td></tr>
<tr><td></td><td>Data1</td><td rowspan="4">Colorprecision =
8 bit: 0 - 255
10 bit: 0 - 1023
12 bit: 0 – 4095</td><td colspan="2" rowspan="4">The Y, Cb and Cr values of the colors (Data) are set here.</td></tr>
<tr><td></td><td>Data2</td></tr>
<tr><td></td><td>Data3</td></tr>
<tr><td></td><td>Data4</td></tr>
<tr><td>(13)</td><td>Packed_Range_Data</td><td colspan="3">This is the Packed_Range_Data setting.
* This is displayed only when Range (1) has been selected as the Format_Flag setting.</td></tr>
<tr><td></td><td>Min_Red</td><td rowspan="6" colspan="2">Colorprecision =
8 bit: -3.96875 - +3.96875
10 bit: -3.9921875 - +3.9921875
12 bit: -3.998046875 - +3.998046875</td><td rowspan="6">The Range Data of the colors (Red, Green and Blue) are set here.</td></tr>
<tr><td></td><td>Max_Red</td></tr>
<tr><td></td><td>Min_Green</td></tr>
<tr><td></td><td>Max_Green</td></tr>
<tr><td></td><td>Min_Blue</td></tr>
<tr><td></td><td>Max_Blue</td></tr>
</table>

10.3.5 Scramble

This item can send Scramble-processed HDMI signal.

	MENU	⇒	Configuration	⇒	HDMI
MENU ⇒	GroupEdit	SET ⇒	General	SET ⇒	Auto Select
	AutoEdit		HDCP		Packet Changing
	DP Analysis		**HDMI**		**Scramble**
	Data Copy/Erase		DP		SCDC Send
	Configuration		SDI		HPD Negate
Select item using or ▲ INC ▼ DEC.					

«Set parameters»
Set Scramble setting.
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**Refer Program**	Follow the setting of “Program” – “Scramble” setting.
1	**OFF**	Send HDMI signal without Scramble-processing.
2	**ON（3.4G over）**	If the TMDS clock is over 3.4G, Scramble-processed HDMI signal is output. **Note) if the TMDS clock is under 3.4G, Scramble is not processed.**
3	**ON**	Scramble-processed HDMI signal is output from any TMDS clock. *** Available only for VM-1876-M8.** *** In VM-1876-M6, Scramble processing is not performed under 3.4G of TMDS clock.**
4	**Refer EDID**	Confirm EDID and decide if scramble is processed or not. *** Available only for VM-1876-M8.** *** VM-1876-M6 does not perform Scramble processing.**

Caution

Scramble function is available only for VM-1876A-M6 and VM-1876-M8.

10.3.6 Send SCDC (Status and Control Data Channel)

This item can set to send SCDC data. It is available when HDMI timing is changed.

Note) SCDC transmission data is TMDS_Config.

	MENU	⇒	Configuration	⇒	HDMI
MENU ⇒	GroupEdit	SET ⇒	General	SET ⇒	Auto Select
	AutoEdit		HDCP		Packet Changing
	DP Analysis		**HDMI**		Scramble
	Data Copy/Erase		DP		**SCDC Send**
	Configuration		SDI		HPD Negate

Select items by using  or ▲ INC ▼ DEC.

«Set parameters»

This item sets SCDC transmission automatic sending.

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.

Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**ON**	Send SCDC data.
1	**OFF**	SCDC data is not sent.
2	**Refer EDID**	Refer to EDID data. When it is SCDC_Present=1 of HF-VSDB, SCDC data is sent. (If HF-VSDB is not present or it is SCDC_Present=0, SCDC data is not sent.)

Note) Refer to HDMI standard about HF-VSDB (HDMI Forum Vendor Specific Data Block) and SCDC_Present.

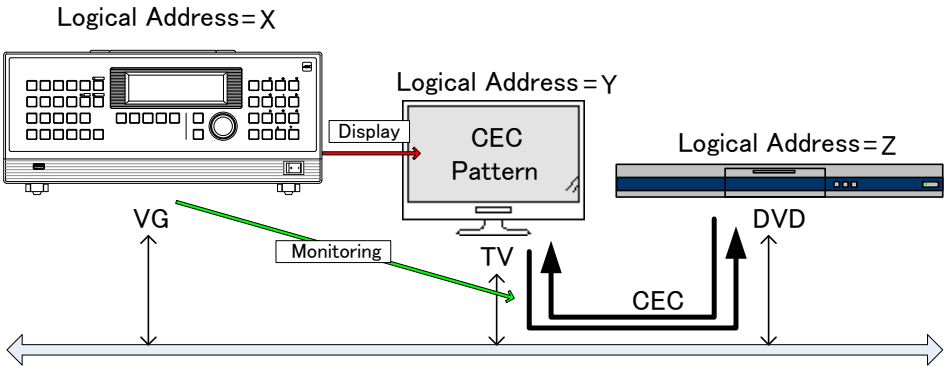
Caution **SCDC function is available only for VM-1876A-M6 and VM-1876-M8.**

10.3.7 CEC function

HDMI can send and receive the CEC commands, and display them on the screen. The CEC function has three operation modes.

a) Monitor mode (Monitor)

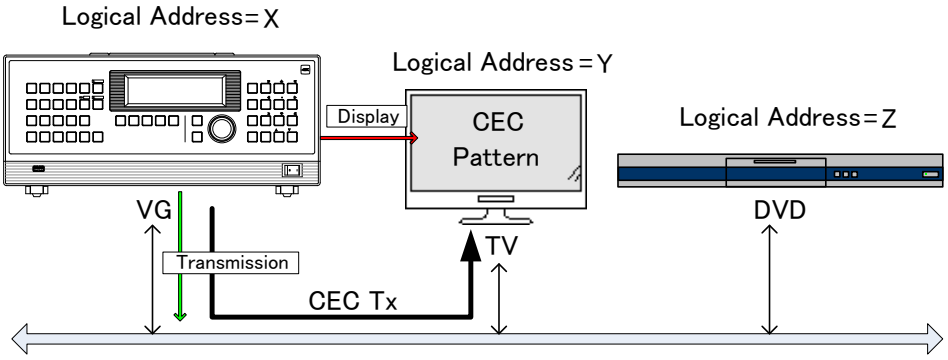
In this mode, the sending and receiving of the commands generated between the equipment connected to CEC are displayed on the screen.



Monitor Mode

b) Transmission mode (Transmission)

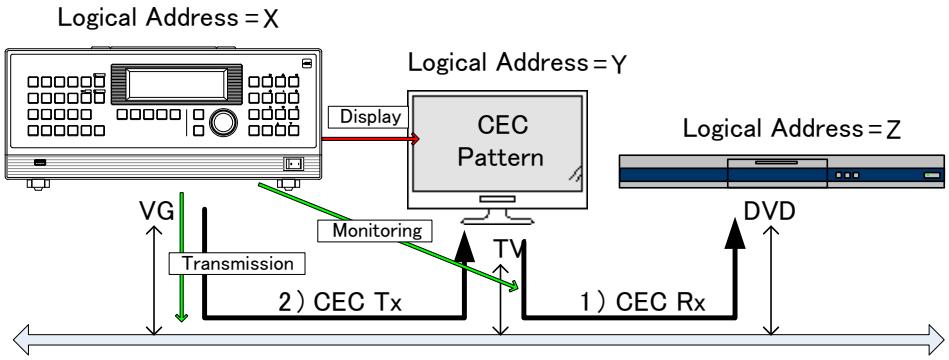
In this mode, the commands are sent from the generator to the designated logical address.



Transmission Mode

c) Response mode (Response)

In this mode, the commands are sent as responses when the designated commands have been transmitted.



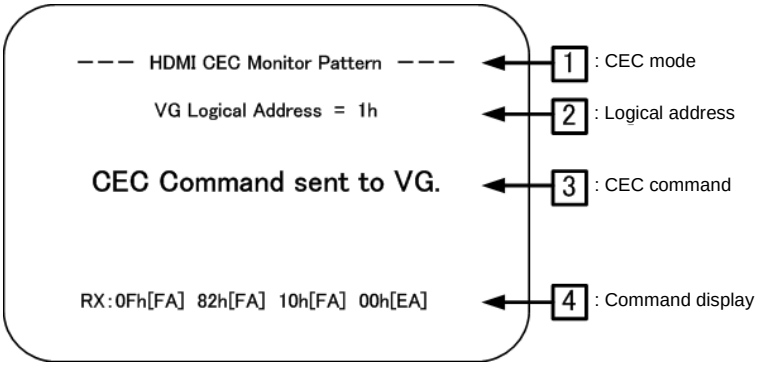
Response Mode

<CEC display procedure>

(1)	NAME/LIST DETAIL NAME/LIST DETAIL	
(2)	**<Selecting the CEC>** Select the **CEC** using or ▲ INC ▼ DEC, and then press SET.	
(3)	**<Detailed setting: Selecting EDIT>** Select **EDIT** using or ▲ INC ▼ DEC, and then press SET. Alternatively, select EDIT using 0/STATUS. After the setting items have been edited, select EXECUTE, and press the SET key to enable the settings.	

<Table of CEC setting items>

<table>
<tr><td>(1)</td><td>VG Logical Address</td><td colspan="3">This sets the logical address of the VG generator. (0 to F)</td></tr>
<tr><td rowspan="2">(2)</td><td rowspan="2">Port (0-F)</td><td colspan="3">This sets the port used for Audio Return Channel execution.</td></tr>
<tr><td>0 to F</td><td>HDMI 1 to 16</td><td>CEC is executed using the HDMI port that has been set.</td></tr>
<tr><td rowspan="4">(3)</td><td rowspan="4">Mode (0-2)</td><td colspan="3">This sets the operation mode.</td></tr>
<tr><td>0</td><td>Monitor</td><td>The CEC commands are monitored.</td></tr>
<tr><td>1</td><td>Transmission</td><td>The CEC commands set using items (4) to (7) are transmitted.</td></tr>
<tr><td>2</td><td>Response</td><td>When commands have been received under conditions (8) to (12), the CEC commands set using items (4) to (7) are transmitted.</td></tr>
<tr><td colspan="5">Set here the CEC commands to be sent from the VG-876.
The following items are set when Transmission or Response has been selected as the Mode setting.</td></tr>
<tr><td>(4)</td><td>Tx | Destination</td><td>-</td><td colspan="2">This sets the address of the destination (transmission destination of CEC commands).</td></tr>
<tr><td>(5)</td><td>Tx | Opcode</td><td>-</td><td colspan="2">This sets the OPCode.</td></tr>
<tr><td>(6)</td><td>Tx | Data Length</td><td>0 to 14</td><td colspan="2">This sets the length of the Tx | data.</td></tr>
<tr><td>(7)</td><td>Tx | Data [H] 1-6/7-12/13-14</td><td>-</td><td colspan="2">This sets the CEC command data.</td></tr>
<tr><td colspan="5">Set here the CEC commands to be received from the VG-876.
The following items are set when Response has been selected as the Mode setting.</td></tr>
<tr><td>(8)</td><td>Rx | Initiator</td><td>0h to Eh</td><td colspan="2">This sets the address of the initiator.</td></tr>
<tr><td>(9)</td><td>Rx | Destination</td><td>0h to Fh</td><td colspan="2">This sets the address of the destination.
This can also be set using a logical address other than the one set using item (1).</td></tr>
<tr><td>(10)</td><td>Rx | Opcode</td><td>-</td><td colspan="2">This sets the OPCode.</td></tr>
<tr><td>(11)</td><td>Rx | Data Length</td><td>0 to 14</td><td colspan="2">This sets the length of the Rx | data.</td></tr>
<tr><td>(12)</td><td>Rx | Data [H] 1-6/7-12/13-14</td><td>-</td><td colspan="2">This sets the CEC command data.</td></tr>
</table>



(1)	CEC mode	"HDMI CEC Monitor Pattern": Monitor mode "HDMI CEC Transmission Pattern": Command transmission mode "HDMI CEC Response Pattern": Command response mode
(2)	Logical Address	VG logical address which has been set
(3)	Display of CEC command transmission/reception status	"CEC Command send to Device Xh" : The command has been transmitted to the unit (Destination Logical Address Xh) which has been set. "CEC Command sent to VG" : The generator has received a command. (Command destined to the VG logical address which has been set.) "CEC Command sent to Other Devices" : A command has been transferred to a unit other than the generator. (A command to a VG logical address other than the one which has been set) "Waiting Command …" : Command wait status (which is established when a command is not transmitted or received for 5 or more seconds)
(4)	Command display	When the corresponding command has been transmitted or received, it is displayed. **XXh[FA] XXh[FA] XXh[FA] XXh[EA]** Acknowledge A: Provided N: Not provided End of Message E: Yes F: No Data portion TX is a command which is transmitted by the generator; RX is a command which is received by the generator. * Commands sent to the destination address of Fh are judged to be broadcast messages and indicated using the polarity which is the reverse of regular ACK polarity.

10.3.8 EDID

For further details on the setting procedure, refer to **“4.13.3 EDID.”**

10.3.9 HDCP

For further details on the setting procedure, refer to **“6.1 HDCP settings.”**

10.3.10 DDC/CI

For further details on the setting procedure, refer to **“4.13.4 DDC/CI.”**

10.3.11 LipSync

For further details on the setting procedure, refer to **“5.9 LipSync.”**

10.3.12 ARC

On this screen, the ARC function is executed, and the patterns of the related data are displayed.

The sound received is output from the COAX digital audio output connector.

<ARC display procedure>

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Selecting the HDMI ARC>** Select the **HDMI ARC** using ◯ or ▲ INC ▼ DEC, and then press SET.	
(3)	**<Detailed setting: Selecting EDIT>** Select **EDIT** using ◯ or ▲ INC ▼ DEC, and then press SET. Alternatively, select EDIT using 0/STATUS. After the setting items have been edited, select **EXECUTE**, and press the SET key to enable the settings.	

<Table of Audio Return Channel setting items>

(1)	**VG Logical Address**	This sets the logical address of the VG generator. (0 to F)		
(2)	**Port (0-F)**	This sets the port used for Audio Return Channel execution.		
		0 toF	HDMI1 to 16	ARC is executed using the selected HDMI port.
(3)	**Mode (0/1)**	This sets the operation mode.		
		0	**Use CEC**	ARC start and end are controlled using the CEC commands.
		1	**Audio Monitor**	The sound acquisition is started without using the CEC commands.
(4)	**CEC Command (0-2)**	These set the operation to be performed when **CEC (0) has been selected as the Mode setting.**		
		0	**Wait Request**	Operation which accords with the ARC start and end requests from ARC TX is performed.
		1	**Initiate**	ARC is started from ARC RX (VG). (The “Initiate ARC” command is sent.)
		2	**Terminate**	ARC is ended from ARC RX (VG). (The “Terminate ARC” command is sent.)
(5)	**Follower: Mode (0/1)**	This sets the send destination of the CEC commands.		
		0	**Auto**	The commands are sent to the adjoining device of the generator. *
		1	**Manual**	A logical address is specified, and the commands are sent to this address.
(6)	**Follower: LogicalAddr**	This sets the logical address where the commands are to be sent when **Manual (1) has been selected as the Follower: Mode setting**. (0h-Fh)		

CAUTION

<Concerning operations when Auto (0) has been selected as the Follower: Mode setting>

- In order to define the adjoining device of the generator, the connection location of the generator is checked by reading the physical address of the EDID connected to the generator. An error results if it has been determined that this physical address cannot be obtained (because the EDID of the connection destination cannot be read or because the EDID is not the HDMI EDID, for instance). In a case like this, **EXECUTE** must be selected again.

- In order to define the adjoining device of the generator, a CED command is sent from the generator. An error results if the response to this command is illegal and the generator cannot define the adjoining device. In a case like this, **EXECUTE** must be selected again.

- If, based on the response to the command sent, it has been determined that two or more devices adjoin the generator (because their physical addresses are identical, for instance), the adjoining device is identified with the lower or lowest logical address is identified to be the adjoining device.

<Concerning the CEC response commands>

A response is given to the following reception commands while the ARC pattern is selected.

When **Auto (0) has been selected as the Follower: Mode setting**

Reception command		Response command	
Command	Send source	Command	Send destination
Give Physical Address	All sources	Report Physical Address * Only when it has been possible to obtain the physical address from the EDID * The Device Type of the address set by VG Logical Address is used as the Device Type among the parameters. However, other Device types are used for the addresses listed below. Ch: Reserved Dh: Reserved Eh: Video Processor Fh: No response	Broadcasts
Request ARC Initiation	Adjoining device	Initiate ARC	Adjoining device
Request ARC Termination	Adjoining device	Terminate ARC	Adjoining device

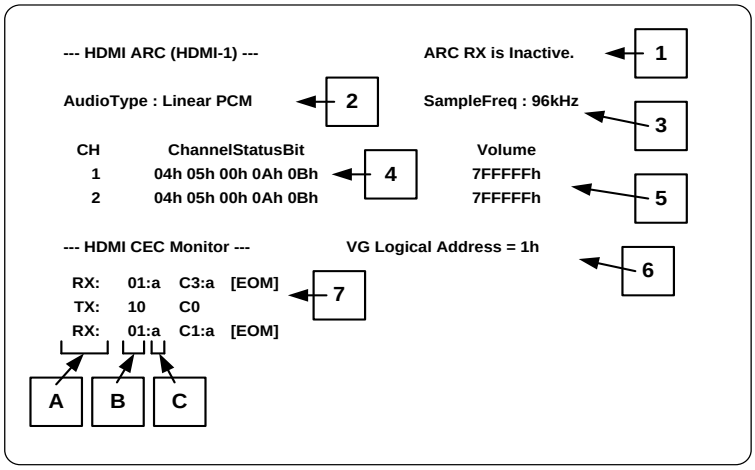
When **Manual (1) has been selected as the Follower: Mode setting**

Reception command		Response command	
Command	Send source	Command	Send destination
Request ARC Initiation	Follower: LogicalAddr setting	Initiate ARC	Follower: LogicalAddr setting
Request ARC Termination	Follower: LogicalAddr setting	Terminate ARC	Follower: LogicalAddr setting

CAUTION

Commands common to **the Manual and Auto Follower: Mode settings**

Reception command	Response command
Give Device Vendor ID	Device Vendor ID
Give System Audio Mode Status	System Audio Mode Status
Request Short Audio Descriptor	Report Short Audio Descriptor



On the Audio Return Channel screen, the Audio data is displayed in the top part of the screen and the CEC send/receive data is displayed in the bottom part of the screen.

Only the Audio data is displayed when **Audio Monitor (1) has been selected as the Mode setting.**

<List of Audio data display area items>

(1)	Status display	The execution status of the generator's ARC function is displayed here.
	ARC RX is Inactive.	The ARC receive function has not been executed.
	ARC RX is Active.	The ARC receive function has been executed.
(2)	AudioType	The type of audio is displayed here.
(3)	SampleFreq	The sampling frequency is displayed here.
(4)	ChannelStatusBit	The channel status are displayed here.
(5)	Volume	The volume (peak) levels are displayed here. (Linear PCM only)

* When **Use CEC (0) has been selected as the Mode setting**, the Audio data will not be displayed unless the CEC command has been communicated properly.

<List of CEC data display area items>

(6)	VG Logical Address	The logical address of the generator is displayed here.
(7)	CEC send/receive data	The CEC command data sent from the generator or other devices is displayed here.
	(A) RX/TX	RX: These are the commands which have been received by the generator; TX: these are the commands which the generator has sent.
	(B) Data area	The block data is displayed here (00 to FF).
	(C) ACK area	The ACK data of the block is displayed here. (a: ACK present, n: ACK not present) * Only the commands received are displayed.

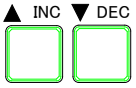
The following information is displayed in [ ] for (7):

[E_BUS]	When an attempt was made to send a command from the generator, the bus was not released so the command would not be sent.
[E_ACK]	ACK was not present in the command sent from the generator.
[E_ARB]	When a command was sent from the generator, another command came into conflict, and the transmission was not completed.
[EOM]	EOM of the block has been set. * This is displayed only for commands which have been received.

10.3.13 HPD Negate

The setting determines the status when Receiver (or Repeater) ‘s HotPlug is Negate.

	MENU	⇒	Configuration	⇒	HDMI
MENU ⇒	Group Edit	SET ⇒	General	SET ⇒	Auto Select
	Auto Edit		HDCP		Packet Changing
	DP Analysis		**HDMI**		Scramble
	Data Copy/Erase		DP		SCDC Send
	Configuration		SDI		**HPD Negate**

Select item by using  or ▲ INC ▼ DEC  .

<Setting the parameters>
Select the items by using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

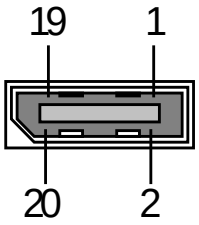
0	**Output OFF**	Output stops when HotPlug is Negate.
1	**Output ON**	Output remains when HotPlug is Negate.

Caution **This function is available only for VM-1876A-M6 and VM-1876-M8.**

10.4 DisplayPort

10.4.1 Connector and pin assignment

● Connector : Hosiden TCX3250-111387



Pin #	Signal
1	MainLink Lane0(p)
2	GND
3	MainLink Lane0(n)
4	MainLink Lane1(p)
5	GND
6	MainLink Lane1(n)
7	MainLink Lane2(p)
8	GND
9	MainLink Lane2(n)
10	MainLink Lane3(p)
11	GND
12	MainLink Lane3(n)
13	GND
14	GND
15	AUX CH(p)
16	GND
17	AUX CH(n)
18	Hot Plug Detect
19	PWR_Return (not used, OPEN)
20	DP_PWR(+3.3V)

10.4.2 Split setting

Output from DisplayPort IF BOARD is switched depending on the setting value in the DisplayPort Output Mode (Trans Mode, Dot Clk Range (Stream Count), Output Mode).
The supported split settings are as follows.

* The setting item "DotClk Range (Stream Count)" in DisplayPort output mode follows the setting of DotClk Mode in "10.2.4 Setting of the Dot Clock Operation Mode."

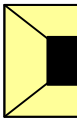
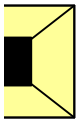
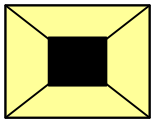
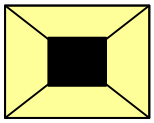
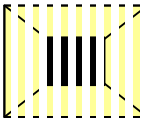
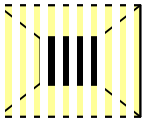
* The setting item "Output Mode" in DisplayPort output mode follows the setting of Split Mode in "10.2.4 Setting of the Dot Clock Operation Mode".

* For details on DotClk Mode and Split Mode setting, refer to "10.2.4 Setting of the Dot Clock Operation Mode".

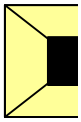
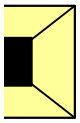
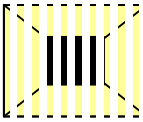
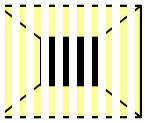
《Trans Mode=SST 1Board / DotClk Range=Under 340MHz》

No split

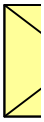
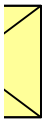
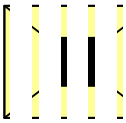
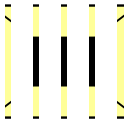
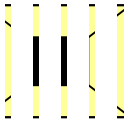
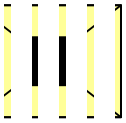
《Trans Mode=SST 1Board / DotClk Range=Under 680MHz》

Output Mode	CH 1	CH 2
Top/Bottom		
	Upper half	Lower half
Left/Right		
	Left half	Right half
NoSplit		
	No split	No split
Even/Odd		
	Even number pixel data (Pixel 0, 2, 4…)	Odd number pixel data (Pixel 1, 3, 5…)

《Trans Mode=SST 1Board / DotClk Range=Over 680MHz》

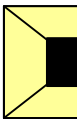
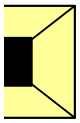
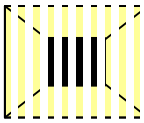
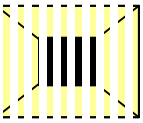
Output Mode	CH 1	CH 2
Top/Bottom		
	Upper half	Lower half
Left/Right		
	Left half	Right half
Even/Odd		
	Even number pixel data (Pixel 0, 2, 4…)	Odd number pixel data (Pixel 1, 3, 5…)

《Trans Mode=SST 2Boards / DotClk Range=Over 680MHz》

Output Mode	SLOT 1		SLOT 2	
	CH 1	CH 2	CH 1	CH 2
Square				
	Top left	Top right	Bottom left	Bottom right
4V Stripe				
	Block 1	Block 2	Block 3	Block 4
No Split				
	Pixel 0, 4, 8…	Pixel 1, 5, 9…	Pixel 2, 6, 10…	Pixel 3, 7, 11…

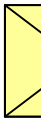
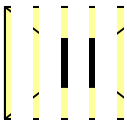
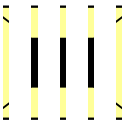
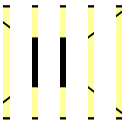
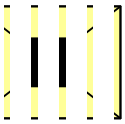
《Trans Mode=MST 1Board / Stream Count=2 Streams》

- The same stream is output from both CH 1 and CH 2.

Output Mode	Stream 1	Stream 2
Top/Bottom		
	Upper half	Lower half
Left/Right		
	Left half	Right half
Even/Odd		
	Even number pixel data (Pixel 0, 2, 4…)	Odd number pixel data (Pixel 1, 3, 5…)

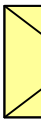
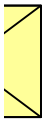
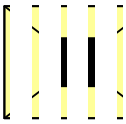
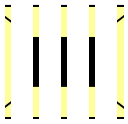
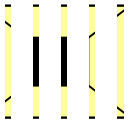
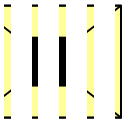
《Trans Mode=MST 1Board / Stream Count=4 Streams》

- The same stream is output from both CH 1 and CH 2.

Output Mode	Stream 1	Stream 2	Stream 3	Stream 4
Square				
	Top left	Top right	Bottom left	Bottom right
4V Stripe				
	Block 1	Block 2	Block 3	Block 4
No Split				
	Pixel 0, 4, 8…	Pixel 1, 5, 9…	Pixel 2, 6, 10…	Pixel 3, 7, 11…

《Trans Mode=MST 2Boards(4s) / DotClk Range=Over 680MHz》

- The same stream is output from both CH 1 and CH 2 in each slot.

Output Mode	SLOT 1		SLOT 2	
	Stream 1	Stream 2	Stream 1	Stream 2
Square				
	Top left	Top right	Bottom left	Bottom right
4V Stripe				
	Block 1	Block 2	Block 3	Block 4
No Split				
	Pixel 0, 4, 8…	Pixel 1, 5, 9…	Pixel 2, 6, 10…	Pixel 3, 7, 11…

《Trans Mode=MST 2Boards(8s) / DotClk Range=Over 680MHz》

- The same stream is output from both CH 1 and CH 2 in each slot.

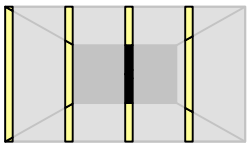
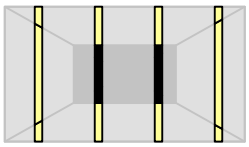
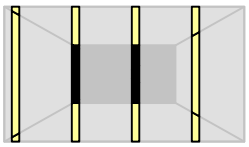
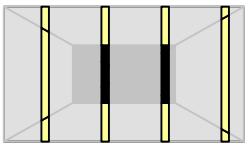
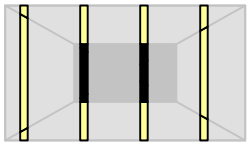
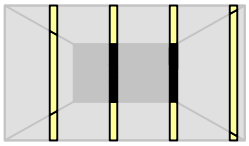
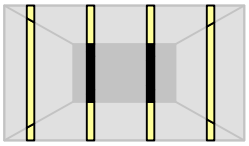
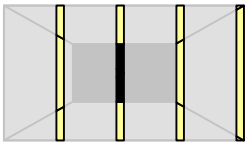
Output Mode=Square

SLOT	Stream 1	Stream 2	Stream 3	Stream 4
SLOT 1				
	Top left (Even number pixel data)	Top left (Odd number pixel data)	Top right (Even number pixel data)	Top right (Odd number pixel data)
SLOT 2				
	Bottom left (Even number pixel data)	Bottom left (Odd number pixel data)	Bottom right (Even number pixel data)	Bottom right (Odd number pixel data)

Output Mode=4V Stripe

SLOT	Stream 1	Stream 2	Stream 3	Stream 4
SLOT 1				
	Block 1 (Even number pixel data)	Block 1 (Odd number pixel data)	Block 2 (Even number pixel data)	Block 2 (Odd number pixel data)
SLOT 2				
	Block 3 (Even number pixel data)	Block 3 (Odd number pixel data)	Block 4 (Even number pixel data)	Block 4 (Odd number pixel data)

Output Mode=No Split

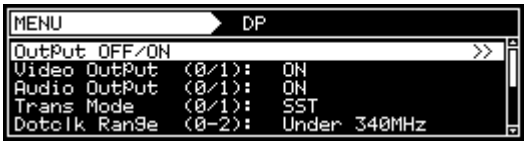
SLOT	Stream 1	Stream 2	Stream 3	Stream 4
SLOT 1				
	Pixel 0,8,16….	Pixel 4,12,20…	Pixel 1,9,17…	Pixel 5,13,21…
SLOT 2				
	Pixel 2,10,18….	Pixel 6,14,22…	Pixel 3,11,19…	Pixel 7,15,23…

Yellow and black part indicate pixel data.

10.4.3 DisplayPort setting

	MENU	⇒	Program Edit	⇒	Output	⇒	Digital Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	Group Edit		**Output**		Analog Output		iTMDS
	Auto Edit		Audio		**Digital output**		HDMI
	DP Analysis		Pattern		VBI Function		**DP**
	Data Copy/Erase		Action				SDI
Select items by using or ▲ INC ▼ DEC.							

Execute the operations described in the table above in the same order to enter the [DP] screen shown below.



<Selecting the items>
Select the items by using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to <DisplayPort unit setting parameters> shown below for details.

<DisplayPort unit setting parameters>

(1)	**Output OFF/ON Port1 to 8 (0/1)**	This sets On or Off for each channel. The same settings as the ones described in “10.2.1 Setting the output interfaces to ON or OFF” can also be established.		
		0	**OFF**	No output.
		1	**ON**	Output.
(2)	**Video Output (0/1)**	Set Video output.		
		0	**OFF**	Video signal (Video Stream) is not output.
		1	**ON**	Video signal (Video Stream) is output.
(3)	**Audio Output (0/1)**	Set Embedded Audio output. * Refer to “10.4.6 Embedded Audio” about its setting.		
		0	**OFF**	Embedded audio is not output.
		1	**ON**	Embedded audio is output.
(4)	**Trans Mode (0/4)**	Set transmission mode of video stream. When selecting MST, set Configuration→DP→ Select function → MST, too. For details, refer to “10.4.10 Select executing function”.		
		0	**SST 1 board**	Single Streams Transport.
		1	**MST 1 board**	Multi Streams Transport.
		2	**SST 2 boards**	
		3	**MST 2 boards (4S)**	
		4	**MST 2 boards (8S)**	
(4) When Trans Mode = 0(SST 1 Board), the below setting items appear.				
(5)	**DotClk Range (0-2)**	* This setting follows the setting of DotClk Mode of “10.2.4 Setting of Dot Clock Operation Mode”.		
		0	**Under 340MHz**	
		1	**Under 680MHz**	
		2	**Over 680MHz**	
(6)	**Output Mode (0-x)**	Set screen split mode. * This setting follows the setting of Split Mode of “10.2.4 Setting of Dot Clock Operation Mode”.		
		(5) When DotClk Mode is set as “Under 680MHz”, the below setting is applied. Parameter setting range: 0-9		
		0	**Top/Bottom**	
		1	**Left/Right**	
		2	**Top/Bottom**	
		3	**Left/Right**	
		4	**No Split**	
		5	**Even/Odd**	
		6	**No Split**	
		7	**Even/Odd**	
		8	**Left/Right**	
		9	**Left/Right**	
		(5) When DotClk Mode is set as “Over 680MHz”, the below setting is applied. Parameter setting range: 0-A		
		0	**Top/Bottom**	
		1	**No Output**	
		2	**Top/Bottom**	
		3	**No Output**	

		4	**Left/Right**	
		5	**Left/Right**	
		6	**Left/Right**	
		7	**No Output**	
		8	**No Output**	
		9	**Even/Odd**	
		A	**No Output**	
(4) When Trans Mode =1(MST 1 Board), the below setting items appear.				
(5)	**Stream Count (0-2)**	Select stream number to be sent out. * This setting follows the setting of DotClk Mode of “10.2.4 Setting of Dot Clock Operation Mode”.		
		0	**No Output**	DisplayPort Output OFF
		1	**2 Streams**	Stream number: 2
		2	**4 Streams**	Stream number: 4
(6)	**Output Mode (0-9)**	Set Stream output mode. * This setting follows the setting of Split Mode of “10.2.4 Setting of Dot Clock Operation Mode”.		
		When (5) Stream count is set as “2 Streams”, the below setting is applied.		
		0	**Top/Bottom**	
		1	**Left/Right**	
		2	**Top/Bottom**	
		3	**Left/Right**	
		4	**No Split**	
		5	**Even/Odd**	
		6	**No Split**	
		7	**Even/Odd**	
		8	**Left/Right**	
		9	**Left/Right**	
		When (5) Stream count is set as “4 Streams”, the below setting is applied.		
		0	**Square**	
		1	**4V Stripe**	
		2	**Square**	
		3	**4V Stripe**	
		4	**No Output**	
		5	**No Output**	
		6	**No Output**	
		7	**4V Stripe**	
		8	**4V Stripe**	
		9	**No Split**	
		10	**No Output**	
(4) When Trans Mode =2(SST 2 Boards), the below setting items appear.				
(5)	**DotClk Range (0-2)**	* This setting follows the setting of DotClk Mode of “10.2.4 Setting of Dot Clock Operation Mode”.		
		0	**No Output**	
		1	**No Output**	
		2	**Over 680MHz**	

(6)	**Output Mode (0-A)**	Set screen split mode. * This setting follows the setting of Split Mode of “10.2.4 Setting of Dot Clock Operation Mode”.	
		(5) When DotClk Mode is set as “Over 680MHz”, the below setting is applied. Parameter setting range: 0-A	
		0	**Square**
		1	**4V Stripe**
		2	**Square**
		3	**4V Stripe**
		4	**No Output**
		5	**No Output**
		6	**No Output**
		7	**4V Stripe**
		8	**4V Stripe**
		9	**No Split**
		A	**No Output**
(4) When Trans Mode =2(MST 2 Boards (4S)), the below setting items appear.			
(5)	**DotClk Range (0-2)**	* This setting follows the setting of DotClk Mode of “10.2.4 Setting of Dot Clock Operation Mode”.	
		0	**No Output**
		1	**No Output**
		2	**Over 680MHz**
(6)	Output Mode (0-A)	Set screen split mode. * This setting follows the setting of Split Mode of “10.2.4 Setting of Dot Clock Operation Mode”.	
		(5) When DotClk Mode is set as “Over 680MHz”, the below setting is applied. Parameter setting range: 0-A	
		0	**Square**
		1	**4V Stripe**
		2	**Square**
		3	**4V Stripe**
		4	**No Output**
		5	**No Output**
		6	**No Output**
		7	**4V Stripe**
		8	**4V Stripe**
		9	**No Split**
		A	**No Output**
(4) When Trans Mode =2(MST 2 Boards (8S)), the below setting items appear.			
(5)	**DotClk Range (0-2)**	* This setting follows the setting of DotClk Mode of “10.2.4 Setting of Dot Clock Operation Mode”.	
		0	**No Output**
		1	**No Output**
		2	**Over 680MHz**
(6)	Output Mode (0-A)	Set screen split mode. * This setting follows the setting of Split Mode of “10.2.4 Setting of Dot Clock Operation Mode”.	

		(5) When DotClk Mode is set as “Over 680MHz”, the below setting is applied. Parameter setting range: 0-A		
		0	**Square**	
		1	**No Output**	
		2	**Square**	
		3	**4V Stripe**	
		4	**No Output**	
		5	**No Output**	
		6	**No Output**	
		7	**No Output**	
		8	**4V Stripe**	
		9	**No Split**	
		A	**No Output**	
(7)	**Video Format (0-2)**	This sets the color space of the video output from DisplayPort. ***When the YCbCr4:2:2 format has been selected, it is not possible to display the image which has been set. Use this parameter to check the Main Stream Attribute parameters only.**		
		0	**RGB**	The video is output using RGB signals.
		1	**YCbCr4:4:4**	The video is output using YCbCr4:4:4 signals.
		2	**YCbCr4:2:2**	The video is output using YCbCr4:2:2 signals.
(8)	**Width(0-4)**	This sets the bit length of the output video. A setting independent of the bit length for pattern drawing can be selected, or the same bit length can be selected automatically. * The portion of the bit length for pattern drawing exceeds the bit length set here is discarded. Any deficient portion is filled with zeros. * The bit length setting differs according to the video format. For further details, refer to “b) Concerning the bit length setting” in this section. * For further details on the bit length to be output, refer to “b) Concerning the bit length setting” in this section.		
		0	**Auto**	6, 8, 10 or 12 bits are selected here automatically depending on the bit length for pattern drawing.
		1	**6bit**	6-bit output
		2	**8bit**	8-bit output
		3	**10bit**	10-bit output
		4	**12bit**	12-bit output Note: this item can be selected in case of Video Format = 2 (YCbCr4:2:2). Refer to “B) Concerning the bit length setting” for details.
(9)	**Colorimetry(0/1)**	This selects the Main Stream Attribute “YCbCr Colorimetry”. *This sets only the Main Stream Attribute. To change the color difference coefficient setting, refer to “10.2.7 Selecting RGB or YPbPr and setting the color difference coefficients”.		
		0	**ITU601**	This sets ITU-R BT601.
		1	**ITU709**	This sets ITU-R BT709.
(10)	**Link Set Mode(0/1)**	This selects the Link Rate and Number of Lane setting method.		
		0	**Auto**	Output accords with the DPCD of the sink component.
		1	**Manual**	Output accords with the settings of items (11) and (12).
(11)	**Link Rate(0/2)**	*** This parameter can be set when Link Set Mode is “Manual”.** This sets the link rate.		
		0	**RBR(1.62Gbps)**	Output at the link rate “RBR(1.62Gbps)”.

		1	**HBR(2.7Gbps)**	Output at the link rate “HBR (2.7 Gbps)”
		2	**HBR2(5.4Gbps)**	Output at the link rate “HBR2 (5.4 Gbps)”
(12)	**Lane Count(0-2)**	*** This parameter can be set when the Link Set Mode is “Manual”.** This sets the number of output lanes.		
		0	**1 lane**	Output on 1 lane
		1	**2 lanes**	Output on 2 lanes
		2	**4 lanes**	Output on 4 lanes
(13)	**InfoFrame/Packet**	Refer to “10.3.4 InfoFrame/ Packet” for more details.		

a) Concerning the all program fixed setting

This Configuration setting has priority to the “program setting”.

Parameters which can be fixed setting

Item	Remarks
Width	Refer to “10.2.6 Setting the Color depth (gray scale) for pattern drawing.”
Link Set Mode	See below.

	MENU	⇒	Configuration
MENU ⇒	Group Edit	SET ⇒	General
	Auto Edit		HDCP
	DP Analysis		HDMI
	Data Copy/Erase		**DP**
	Configuration		SDI
Select items by using or .		▲ INC ▼ DEC	

Execute the operations described in the table above in the same order to enter the [DP] screen shown below.

<Selecting the items>
Select the items by using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<**Link Set Mode setting parameter>**

(1)	**refer Program**	The setting follows the program setting.
(2)	**Auto**	Output always follows the DPCD of the sink component.
(3)	**Manual**	Output always follows the Link Rate and Number of Lane set by the program.

b) Concerning the Bit length setting

BIT length setting is available only for the below setting of Video Format.

Video Format	bit Width			
	6bit	8bit	10bit	12bit
RGB	Yes	Yes	Yes	N/A
YCbCr4:2:2	Yes	Yes	Yes	Yes
YCbCr4:4:4	Yes	Yes	Yes	N/A

c) Concerning the Main Stream Attribute settings

The Main Stream Attributes used for DisplayPort transfer are reflected by the following settings.

Item		Setting location
M and N for stream clock recovery	Mvid	This is automatically calculated from the Nvid setting value and the dot clock. (The VG-876 is fixed to asynchronous mode, so the Mvid value varies.)
	Nvid (VM-1876A-M1 does not support Nvid.)	The setting is followed by the DisplayPort setting “Nvid”. Refer to “<DP unit setting parameters>” in this section.
Horizontal/Vertical Timing	Total Active start Active video width Sync width	This is calculated from the value set by the Timing setting.
	polarity	The setting is followed by the sync signal polarity set by the Output setting.
Miscellaneous0	Synchronous Clock	The VG-876 is fixed to asynchronous mode.
	Component format	The setting is followed by the DisplayPort setting “Video Format”. Refer to “<DP unit setting parameters>” in this section.
	Dynamic range	The setting is followed by the level mode setting of the output setting. Full: VESA range Limited: CEA range
	YCbCr Colorimetry	The setting is followed by the DisplayPort setting “Colorimetry”. Refer to “<DP unit setting parameters>” in this section.
	Bit depth per color component	The setting is followed by the DisplayPort setting “Width”. Refer to “<DP unit setting parameters>” in this section.
Others		Settings except above are not supported by the VG-876.

10.4.4 InfoFrame / Packet

DisplayPort unit supports transmission of Audio InfoFrame Packet only.

■ Audio InfoFrame

Audio InfoFrame is sent including information of transmission audio.

(1)	**OFF/ON(0/1)**	Set send/not send of Audio InfoFrame.		
		0	**OFF**	Not send.
		1	**ON**	Send.
Setting of Audio InfoFrame is described in below. Note) these settings do not affect actual video and audio output.				
(2)	**Type**	Type of Audio InfoFrame.		
		4	Type is displayed only. It cannot be changed.	
(3)	**Version**	Set the version of Audio InfoFrame.		
		1	Version is displayed only. It cannot be changed.	
(4)	**Coding Type(0-F)**	Set the Audio Coding Type.		
		0	**Refer StremHeader**	Refer to Stream Header
		1	**IEC60958 PCM**	
		2	**AC-3**	
		3	**MPEG1(Layers 1&2)**	
		4	**MP3(MPEG1 Layer 3)**	
		5	**MPEG2(multi ch.)**	
		6	**AAC**	
		7	**DTS**	
		8	**ATRAC**	
		9	**One Bit Audio**	
		A	**Dolby Digital +**	
		B	**DTS-HD**	
		C	**MLP**	
		D	**DST**	
		E	**WMA Pro**	
		F	**Refer Extension**	
(5)	**Coding Ext Type(0-9)**	Set the Audio Coding Ext Type.		
		0	**(not use1)**	
		1	**(not use2)**	
		2	**(not use3)**	
		3	**HE-AAC**	
		4	**HE-AACv2**	
		5	**AAC LC**	
		6	**DRA**	
		7	**HE-AAC Surround**	
		8	**(reserved)**	
		9	**AAC-LC Surround**	
(6)	**Channel Count(0-7)**	Set the Audio Channel Count.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**2ch**	
		↓	↓	
		7	**8ch**	

(7)	**Sampling Freq(0-7)**	Set the Sampling Frequency.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**32kHz**	
		2	**44.1kHz**	
		3	**48kHz**	
		4	**88.2kHz**	
		5	**96kHz**	
		6	**176.4kHz**	
		7	**192kHz**	
(8)	**Sample Size(0-3)**	Set the Sample Size.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**16bit**	
		2	**20bit**	
		3	**24bit**	

(9) **Speaker Placement (0-50)**

Set the Channel / Speaker Allocation.

	8ch	7ch	6ch	5ch	4ch	3ch	2ch	1ch
0		-	-	-	-	-	FR	FL
1		-	-	-	-	LFE	FR	FL
2		-	-	-	FC	-	FR	FL
3		-	-	-	FC	LFE	FR	FL
4		-	-	RC	-	-	FR	FL
5		-	-	RC	-	LFE	FR	FL
6		-	-	RC	FC	-	FR	FL
7		-	-	RC	FC	LFE	FR	FL
8		-	RR	RL	-	-	FR	FL
9		-	RR	RL	-	LFE	FR	FL
10		-	RR	RL	FC	-	FR	FL
11		-	RR	RL	FC	LFE	FR	FL
12		RC	RR	RL	-	-	FR	FL
13		RC	RR	RL	-	LFE	FR	FL
14		RC	RR	RL	FC	-	FR	FL
15		RC	RR	RL	FC	LFE	FR	FL
16	RRC	RLC	RR	RL	-	-	FR	FL
17	RRC	RLC	RR	RL	-	LFE	FR	FL
18	RRC	RLC	RR	RL	FC	-	FR	FL
19	RRC	RLC	RR	RL	FC	LFE	FR	FL
20	FRC	FLC	-	-	-	-	FR	FL
21	FRC	FLC	-	-	-	LFE	FR	FL
22	FRC	FLC	-	-	FC	-	FR	FL
23	FRC	FLC	-	-	FC	LFE	FR	FL
24	FRC	FLC	-	RC	-	-	FR	FL
25	FRC	FLC	-	RC	-	LFE	FR	FL
26	FRC	FLC	-	RC	FC	-	FR	FL
27	FRC	FLC	-	RC	FC	LFE	FR	FL
28	FRC	FLC	RR	RL	-	-	FR	FL
29	FRC	FLC	RR	RL	-	LFE	FR	FL
30	FRC	FLC	RR	RL	FC	-	FR	FL
31	FRC	FLC	RR	RL	FC	LFE	FR	FL

		32	-	FCH	RR	RL	FC	-	FR	FL
		33	-	FCH	RR	RL	FC	LFE	FR	FL
		34	TC	-	RR	RL	FC	-	FR	FL
		35	TC	-	RR	RL	FC	LFE	FR	FL
		36	FRH	FLH	RR	RL	-	-	FR	FL
		37	FRH	FLH	RR	RL	-	LFE	FR	FL
		38	FRW	FLW	RR	RL	-	-	FR	FL
		39	FRW	FLW	RR	RL	-	LFE	FR	FL
		40	TC	RC	RR	RL	FC	-	FR	FL
		41	TC	RC	RR	RL	FC	LFE	FR	FL
		42	FCH	RC	RR	RL	FC	-	FR	FL
		43	FCH	RC	RR	RL	FC	LFE	FR	FL
		44	TC	FCH	RR	RL	FC	-	FR	FL
		45	TC	FCH	RR	RL	FC	LFE	FR	FL
		46	FRH	FLH	RR	RL	FC	-	FR	FL
		47	FRH	FLH	RR	RL	FC	LFE	FR	FL
		48	FRW	FLW	RR	RL	FC	-	FR	FL
		49	FRW	FLW	RR	RL	FC	LFE	FR	FL
		50	Reserved							

(10)	**Level Shift Value**	Set the Level Shift Value.		
		0 to15	Set the DB value.	
(11)	**Down-mix(0/1)**	Set the Down –mix Inhibit Flag.		
		0	**Permitted / No Info**	Permitted or no information about any assertion of this
		1	**Prohibited**	Prohibited
(12)	**LFE PB Level(0-2)**	Set the LFE Playback Level.		
		0	Unknown	
		1	0dB Playback	
		2	+10dB Playback	

10.4.5 Displaying the DisplayPort setting information

The DisplayPort setting information (Link Rate, Number of Lane, Link training results, DPCD) can be displayed.

a) DisplayPort setting display procedure

(1)	NAME/LIST DETAIL → NAME/LIST DETAIL	
(2)	**<Display "DP">** By using or INC DEC , **Select DP, DP(HEX) in the 2nd page** SET . Or select 4/A : GUI display or 5/B : HEX display.	DP is displayed as shown in the figure below.  DP: Setting display information, DPCD (GUI display format) DP(HEX): DPCD (HEX display format) For further details, refer to "c) Display contents."
(3)	**<Switch pages>** By using or INC DEC , select 2 << (previous page) or 3 >> (next page) SET Or select items by using 2 (previous page) or 3 (next page).	When the display extends over multiple pages, it is divided up and shown on the fluorescent display tube. (Switch the page to display all the information.)

b) Selecting the port whose result is displayed

Select the port for which the setting information is to be displayed.

<table>
<tr>
<td>(1)</td>
<td>NAME/LIST DETAIL → NAME/LIST DETAIL

Select either DP or DP(HEX).</td>
<td> 
</td>
</tr>
<tr>
<td>(2)</td>
<td>By using or ▲INC ▼DEC ,

Select DP SET .

Or, by using 0/STATUS , select EDIT.</td>
<td> 
</td>
</tr>
<tr>
<td>(3)</td>
<td><select port>

By using or ▲INC ▼DEC ,

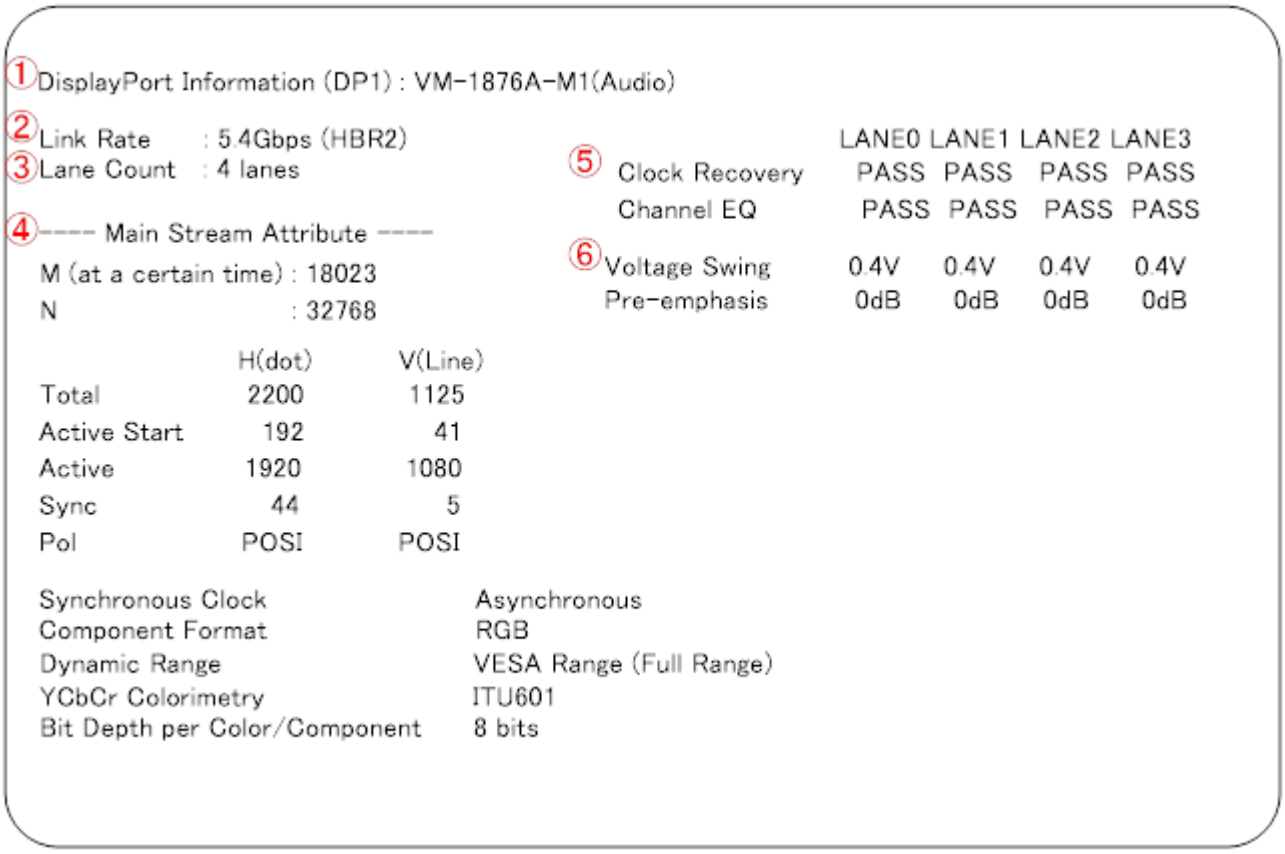
select the port SET</td>
<td>This selects the port for which the DisplayPort setting information is to be displayed.
Port Setting range: 0 to 7(DP1 to DP8)</td>
</tr>
</table>

c) Displayed information

Setting contents are displayed as below.

(1) Setting display information (GUI page 1)

This page displays the DisplayPort interface settings (Link Rate, Number of Lane, Main Stream Attribute) and the link training results.



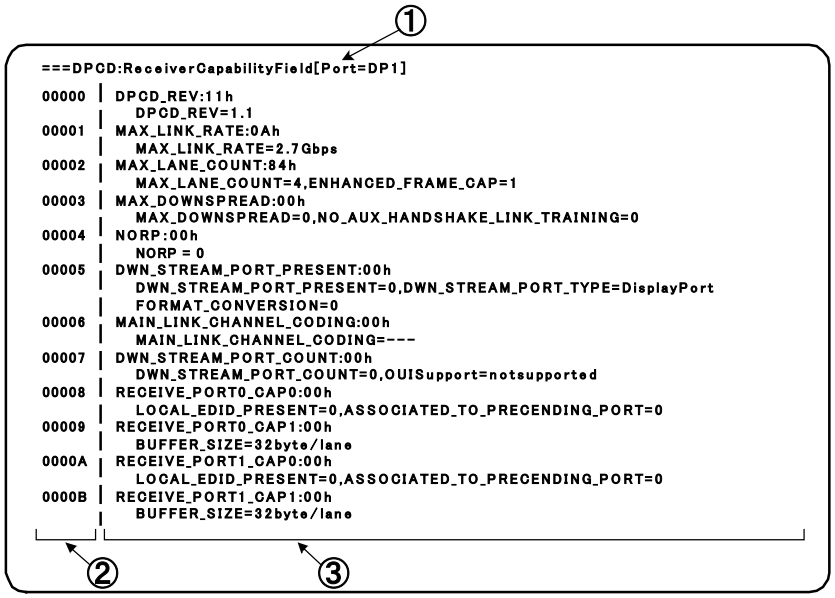
Details of the displayed information are as follows.

(1)	DPx	This is the port for which the setting status is displayed. (DP1-DP8)
	Function	This is the executing function (Audio/MST) of VM-1876A-M1.
(2)	Link Rate	Link Rate setting value.
(3)	Lane Count	Number of lanes.
(4)	Main Stream Attribute	
	M (at a certain time)	Mvid value that is calculated from Nvid and Dot Clock is displayed. * Mvid value originally is changeable. The value when the calculation is executed is displayed. * VG-1876A-M1 does not show this item.
	N	Nvid value that is being output.
	Total, Active Start, Active Sync, Pol	MSA timing parameter that is being output.
	Synchronous Clock	The value of MSA MISC0 bit0 that is being output.
	Component Format	The value of MSA MISC0 bit7:1 that is output.
	Dynamic Range	
	YCbCr Colorimetry	

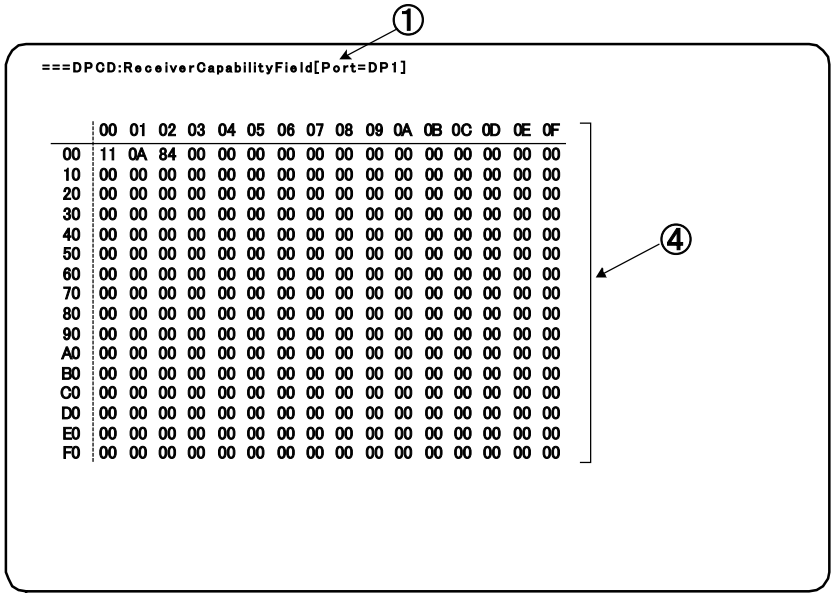
	Bit Depth per Color	
(5)	Result of Link Training of each lane	
	Clock Recovery	The below values of DPCD Link Status Field are displayed. 00202h Bit0(LANE0_CR_DONE) 00202h Bit4(LANE1_CR_DONE) 00203h Bit0(LANE2_CR_DONE) 00203h Bit4(LANE3_CR_DONE)
	Channel EQ	The below values of DPCD Link Status Field are displayed. 00202h Bit1(LANE0_CHANNEL_EQ_DONE) 00202h Bit5(LANE1_CHANNEL_EQ_DONE) 00203h Bit1(LANE2_CHANNEL_EQ_DONE) 00203h Bit5(LANE3_CHANNEL_EQ_DONE)
(6)	Voltage Swing, Pre-emphasis of each lane	
	Voltage Swing	The below values of DPCD Link Configuration Field are displayed. 00103h(TRAINING_LANE0_SET) Bit1:0(VOLTAGE_SWING_SET) 00104h(TRAINING_LANE1_SET) Bit1:0(VOLTAGE_SWING_SET) 00105h(TRAINING_LANE2_SET) Bit1:0(VOLTAGE_SWING_SET) 00106h(TRAINING_LANE3_SET) Bit1:0(VOLTAGE_SWING_SET)
	Pre-emphasis	The below values of DPCD Link Configuration Field are displayed. 00103h(TRAINING_LANE0_SET) Bit4:3(PRE-EMPHASIS_SET) 00104h(TRAINING_LANE1_SET) Bit4:3(PRE-EMPHASIS_SET) 00105h(TRAINING_LANE2_SET) Bit4:3(PRE-EMPHASIS_SET) 00106h(TRAINING_LANE3_SET) Bit4:3(PRE-EMPHASIS_SET)

(2) DPCD display (GUI page 2 and onward, HEX is DPCD display only

These pages display the DPCD (DisplayPort Configuration Data). The data for different addresses can be displayed by switching the page.



DPCD display (GUI)



DPCD display (HEX)

Details of the displayed information are as follows.

(1)	Port and DPCD field for which the setting status is displayed.
(2)	DPCD address
(3)	Setting values for each parameter
(4)	HEX display

10.4.6 DP Analysis

The DP Analysis mode is used to perform the evaluation of the DisplayPort interface.

a) Setting the port to be used

Select the port to be used by DP Analysis with the device settings.

	MENU	⇒	Configuration	⇒	DP
MENU ⇒	Group Edit	SET ⇒	General	SET ⇒	Select Function
	Auto Edit		HDCP		**Analysis Port**
	DP Analysis		HDMI		Link Set Mode
	Data Copy/Erase		**DP**		
	Configuration		SDI		

Select items by using ◯ or ▲ INC ▼ DEC.

Analysis Port	Setting range: 0 to 7(DP1 to DP8)

b) I/F Check

This mode performs a simple check on the DisplayPort interface. This makes it possible to check link training, Hotplug detection (cable connection/disconnection) and other behavior without making a program.

	MENU	⇒	DP Analysis
MENU ⇒	Group Edit	SET ⇒	**I/F Check**
	Auto Edit		Training Pattern
	DP Analysis		
	Data Copy/Erase		
	Configuration		

Select items by using ◯ or ▲ INC ▼ DEC.

By operating above procedures, the below display appears.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to <I/F Check mode setting parameters> for details as below.

<I/F Check mode setting parameters>

The following functions are available in Interface Check mode.

Page	Number key	Item	Description
1/2	7	**LT**	Link training is performed each time this key is pressed. Link Rate and Lane Count of Link Training execution follow the setting of “DisplayPort output setting menu”.
	8	**PW SAVE**	This makes the power save mode setting for the connected component. *1
	4	**AUD_MUTE**	This sets Audio MUTE to On or Off. *2
	0	**EDIT**	This enters the DisplayPort output setting menu. *3
2/2	7	**DEFAULT**	This returns to the currently selected program pattern.
	8	**LIST**	This displays the DisplayPort display screen GUI (refer to “10.4.4 Displaying the DisplayPort setting information”).
	9	**EDID**	This reads the EDID of the connected device. This is the same operation as the normal EDID Read operation.
	0	**EDIT**	This enters the DisplayPort output setting menu. *3

∗1 Concerning the PW_SAVE

When PW_SAVE is set, VG-876 will process as below.

<PW_SAVE=ON>
VG writes “0x02” in the DPCD 0x00600 Bits1:0(SET_POWER) of the connected sink device, and make Main Link and AUX CH power down.

<PW_SAVE=OFF>
VG makes Main Link and AUXCH Wake Up. Then, VG writes “0x01” in the DPCD 0x00600 Bits1:0(SET_POWER) of the connected sink device. At this time, Link Training is not performed. If you need Link Training. Press LT.

*2 Concerning the EDIT setting

When setting item in menu (e.g. Link Rate), the setting is reflected to other output port as well as designated port (Analysis Port).

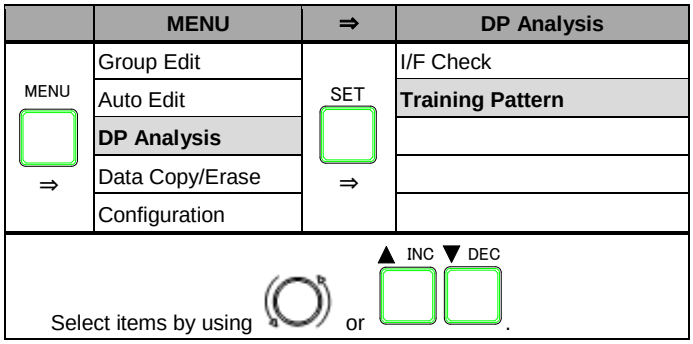
c) Training Pattern

This mode optionally outputs the “D10.2 pattern”, “PRBS-7 pattern” and other training patterns used to check DisplayPort interface conformance during link training, etc.

* These patterns are not video patterns, and are instead patterns used for evaluation on the DisplayPort interface. Therefore, non-DisplayPort output and DisplayPort output that is not selected by “a) Setting the port to be used” remain as the video output displayed thus far.

* After establishing link between VG-876 and the Sink device, perform this menu. If link is not established, Training Patter is not output.

* After selecting items in this menu, change the parameter of the below setting. Otherwise, the Training Pattern is not output.



By operating above procedures, the below display appears.

<Selecting the items>
Select the items by using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to <Training Pattern mode setting parameters> for details as below.

<Training Pattern mode setting parameters>

The following settings can be made in Training Pattern mode.

(1)	**Pattern Select (0-5)**	This sets the pattern.		
		0	**TPS1 (D10.2)**	Training Pattern Sequence (D10.2 test pattern) is output.
		1	**TPS2**	Training Pattern Sequence 2 is output.
		2	**Symbol Error Rate**	The Symbol Error Rate Measurement Pattern is output. (This pattern is output only, and the error rate is not measured.)
		3	**TPS3**	Training Pattern Sequence 2 is output.
		4	**80bit Custom**	80bit custom pattern is output.
		5	**CP2520**	HBR2 Compliance EYE pattern(CP2520) is output.
(2)	**Link Rate (0-2)**	This sets the link rate.		
		0	**RBR (1.62Gbps)**	Output at the link rate “RBR (1.62 Gbps)”.
		1	**HBR (2.7Gbps)**	Output at the link rate “HBR (2.7 Gbps)”.
		2	**HBR2(5.4Gbps)**	Output at the link rate “HBR2 (5.4 Gbps)”.
(3)	**Lane Count (0-2)**	This sets the number of output lanes.		
		0	**1lane**	Output on 1 lane.
		1	**2lanes**	Output on 2 lanes.
		2	**4lanes**	Output on 4 lanes.
(4)	**Voltage Swing (0-3)**	This sets the voltage swing level (differential level).		
		0	**0.4V**	Output at 0.4 V
		1	**0.6V**	Output at 0.6 V
		2	**0.8V**	Output at 0.8 V
		3	**1.2V**	Output at 1.2 V
(5)	**Pre-emphasis (0-3)**	This sets the pre-emphasis level.		
		0	**0dB**	Output at 0 dB
		1	**3.5dB**	Output at 3.5 dB
		2	**6.0dB**	Output at 6.0 dB
		3	**9.5dB**	Output at 9.5 dB

* The Training Pattern mode settings can be made only for the Main Link output. DPCD and other settings in accordance with each pattern and level are not made.
* When returning from Training Pattern mode to normal output, the settings return to the program settings selected thus far.
* The valid voltage swing level setting and pre-emphasis setting combinations are as follows.

Voltage Swing	Pre-emphasis			
	0dB	3.5dB	6dB	9.5dB
0.4V	OK	OK	OK	OK
0.6V	OK	OK	OK	N/A
0.8V	OK	OK	N/A	N/A
1.2V	OK	N/A	N/A	N/A

10.4.7 Embedded audio

Embedded audio signals can be output from the DisplayPort.

a) Set embedded audio to be imposed on DisplayPort enable.
b) Set audio source, frequency and level.

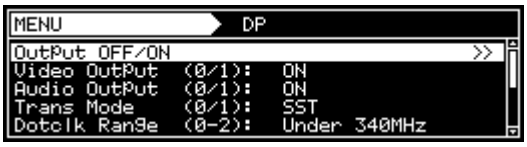
When using embedded audio by VM-1876A-M1, select Configuration→DP→Select Function → Audio. For details, refer to “10.4.10 Select execute functions”.

a) Set embedded audio to be imposed on DisplayPort enable.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	Group Edit		**Output**		Analog Output		iTMDS
	Auto Edit		Audio		**Digital Output**		HDMI
	DP Analysis		Pattern		VBI Function		**DP**
	Data Copy/Erase		Action				SDI

Select items by using or ▲ INC ▼ DEC .

By operating above procedures, the below display “DisplayPort” menu appears.
Select “Audio Output”.



<Selecting the items>
Select the items by using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

b) Set audio source, frequency and levels.

Refer to “10.10 Digital Audio” about setting procedure.

10.4.8 EDID

For further details on the setting procedure, refer to “4.13.3 EDID”.

10.4.9 DDC/CI

For further details on the setting procedure, refer to “4.13.4 DDC/CI”.

10.4.10 Select executing function

Select executing function of VM-1876A-M1.

	MENU	⇒	Configuration	⇒	DP
MENU ⇒	Group Edit	SET ⇒	General	SET ⇒	**Select Function**
	Auto Edit		HDCP		Analysis Port
	DP Analysis		HDMI		Link Set Mode
	Data Copy/Erase		**DP**		
	Configuration		SDI		

Select items by using or ▲ INC ▼ DEC .

By doing above operation , the below figure [Select Function] appears.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

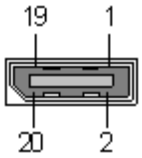
Function	0	Audio
		Use audio output function. When using this function, MST function is not supported.
	1	MST
		Use MST(Multi-Stream Transport) function. When using this function, Audio function is not supported.

Note) After selecting the function, press SAVE key. Then, reboot VG-876.
After rebooting, selected function becomes available.

10.5 V-By-One®HS

10.5.1 Connector and pin assignment

● Connector : TCX3250-111387 made by Hosiden Corp.



Pin Number	Signal
1	TX Lane0(p)
2	GND
3	TX Lane0(n)
4	TX Lane1(p)
5	GND
6	TX Lane1(n)
7	TX Lane2(p)
8	GND
9	TX Lane2(n)
10	TX Lane3(p)
11	GND
12	TX Lane3(n)
13	GND
14	GND
15	SCL
16	GND
17	SDA
18	HTPDN
19	LOCKN
20	NC

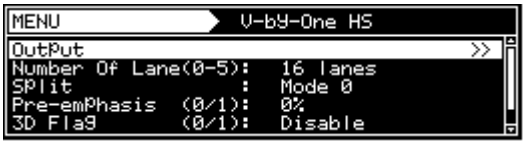
(Common spec for 1-4 connector)

10.5.2 V-by-One ®HS setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	GroupEdit		**Output**		**Digital Output**		HDMI
	AutoEdit		Audio				**V-by-One HS**
	Data Copy/Erase		Pattern				SDI
	Configuration		Action				

Select items by using or ▲ INC ▼ DEC .

By operating above procedures, the below “V-by-One” menu appears.



<Selecting the items>
Select the items of InfoFrame/Packet using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to **<V-by-One®HS setting parameters>** written below about each setting item.

<V-by-One HS setting parameters>

(1)	**Output OFF/ON Port1 to 16 (0/1)**	This sets On or Off for each channel. This setting is common with “10.2.1 Output interface ON/OFF setting”. You can use either setting menu with same result.		
		0	**OFF**	No output.
		1	**ON**	Output.
(2)	**Number Of Lanes (0-5)**	This sets the number of data lanes to be output from V-by-One® HS. Note) this setting follows the Dotclk Mode that is set in “10.2.4 Dot Clock operation Mode setting.”		
		0	**Auto**	The number of data lanes is changed automatically in line with the dot clock frequency. * Only lanes 1 to 4 are supported.
				20M to 75 MHz: 1 Lane 75M to 150 MHz: 2 Lanes 150M to 300 MHz: 4 Lanes
		1	**1 lane**	The image is output by one lane. The same image is output from output channels 1 and 2.
		2	**2 lanes**	The image is output by 2 lanes. The same image is output from output channels 1 and 2.
		3	**4 lanes**	The image is output using 4 lanes. The same image is output from output channels 1 and 2.
		4	**8 lanes**	The image is output by 8 lanes.
		5	**16 lanes**	The image is output by 16 lanes.
(3)	**Split(0-9)**	This selects the screen splitting type in the ×4 mode or 4K×2K mode which uses the frame memory on the board. Note) this setting follows the Split Mode that is set in “10.2.4 Dot Clock operation Mode setting.”		
		When (2) Number of lane is set as 8 Lane:		
		0	**Mode 0**	Split-into-4 output of a square divided into 4 equal parts (Cross split)
		1	**Mode 1**	Vertically split-into-4 output
		2	**Mode 2**	Horizontally split-into-2 output
		3	**Mode 3**	Vertically split-into-2 output
		4	**Mode 4**	No split
		5	**Mode 5**	Non Dividing Mode（**Mode 0 x4mode**）
		6	**Mode 6**	Normal Mode（**Mode 1 x4mode**）
		7	**Mode 7**	Cross Mode（**Mode 2 x4mode**）
		8	**Mode 8**	Dividing Normal Mode（**Mode 3 x4mode**）
		9	**Mode 9**	Dividing Cross Mode（**Mode 4 x4mode**）
		When (2) Number of Lane is set as 16 Lane:		
		0	**Mode 0**	Cross split to 4 + vertically split to 2
		1	**Mode 1**	Vertically split to 4 + vertically split to 2
		2	**Mode 2**	Horizontally split to 2 + vertically split to 2
		3	**Mode 3**	Vertically split to 2 + vertically split to 2
		4	**Mode 4**	Vertically split to 2 + No split (1) (Non dividing Mode)
		5	**Mode 5**	Vertically split to 2 + No split (2) (Normal Mode)

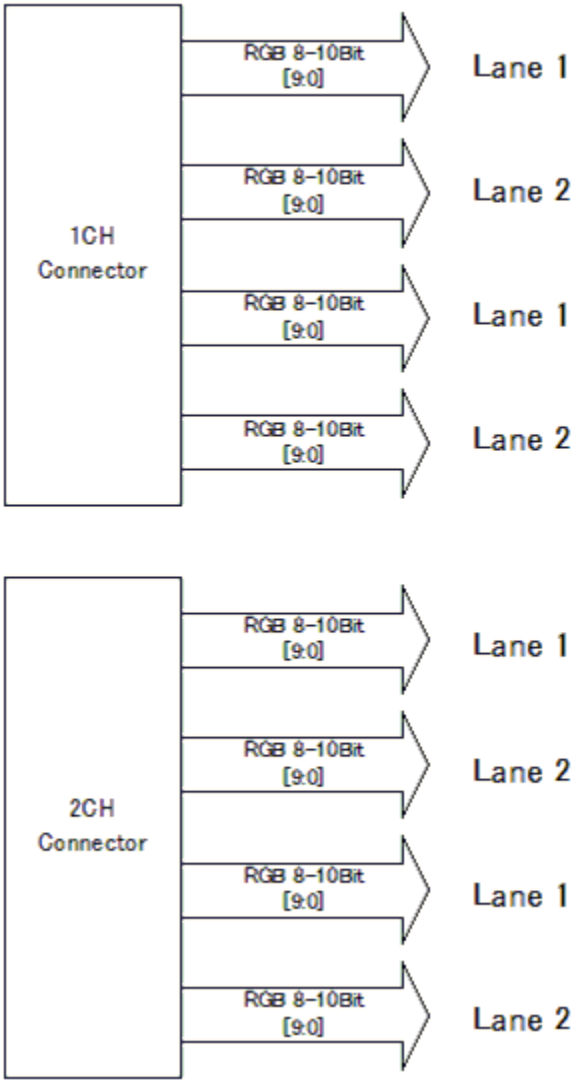
		6	**Mode 6**	Vertically split to 2 + No split (3) (Cross Mode)
		7	**Mode 7**	Vertically split to 2 + split (1) (Dividing Normal Mode)
		8	**Mode 8**	Vertically split to 2 + split (2) (Dividing Cross Mode)
		9	**Mode 9**	No split
		A	**Mode 10**	V-by-One ® HS does not output.
(4)	**Pre-Emphasis (0/1)**	This sets the pre-emphasis.		
		0	**0%**	The pre-emphasis is set to 0%.
		1	**100%**	The pre-emphasis is set to 100%.
(5)	**3D Flag (0/1)**	This sets 3D flag. It is compliant with “3D flag on DE active period” of the V-by-One® HS Standard Ver. 1.3. Our product does not support “3D flag on blanking period.”		
		0	**Disable**	3D Flag is set as Disable.
		1	**Enable**	3D Flag is set as Enable.
(6)	**Field BET Mode(0/1)**	This sets the Field BET Mode.		
		0	**Disable**	The Field BET Mode is set to Disable.
		1	**Enable**	The Field BET Mode is set to Enable.
(7)	**Control Mode (0/1)**	Set control mode of HTPDN and LOCKN.		
		0	**Separate**	Set 1ch, 2ch, 3ch and 4ch individually.
		1	**1->234**	Set same setting of 1ch to other channels.
(8)	**HTPDN Ctrl 1,2,3,4** **LOCKN Ctrl 1,2,3,4** **(0-2)**	Control 1ch, 2ch, 3ch and 4ch.		
		0	**Through**	The signal from receiver goes through.
		1	**Low**	Forcibly sets Low.
		2	**High**	Forcibly sets High.

Caution

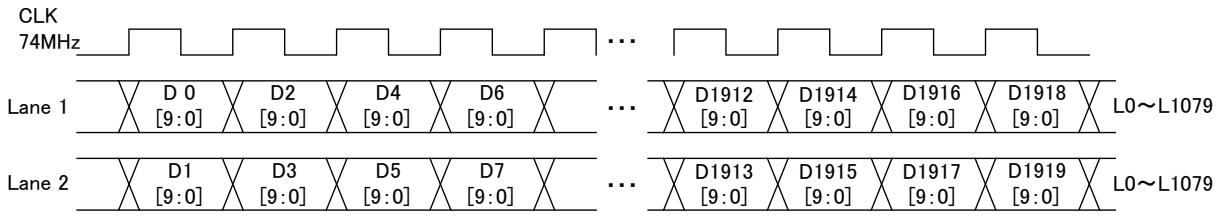
When dot clock operation mode (DotClk Mode) is set as “Auto”, number of data lanes change automatically depends on dot clock.
For details, refer to “10.2.4 Setting of Dot clock operation mode DotClk Mode”

10.5.3 Data transfer method

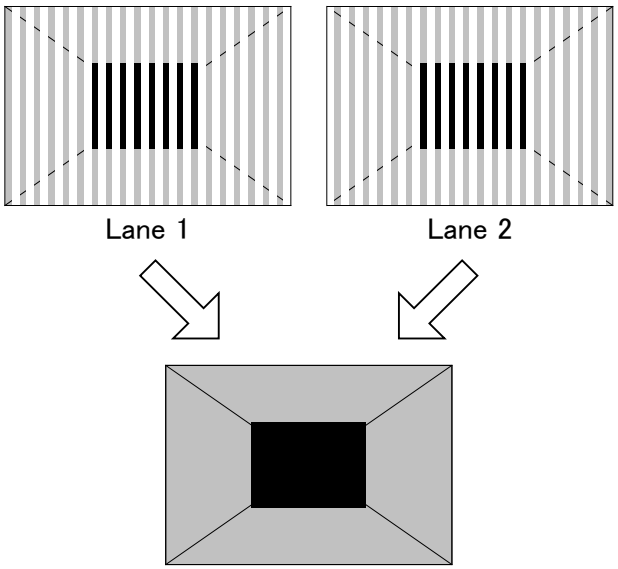
<Normal MODE： 2Lane output>



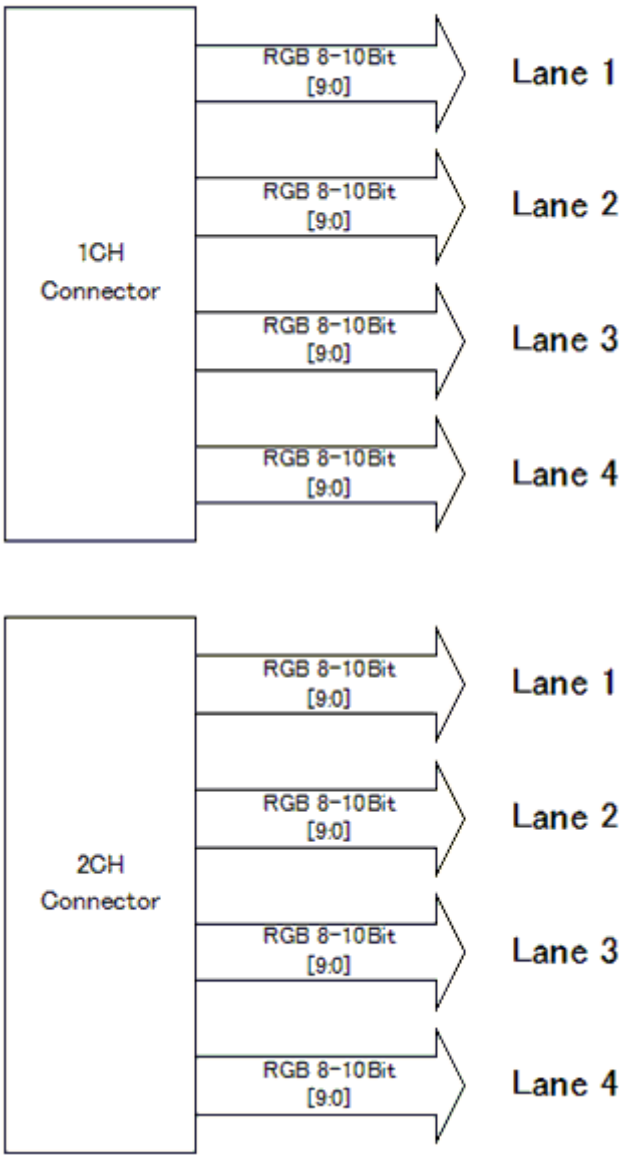
Given here as an example where the resolution is 1920 × 1080@60Hz, the dot clock frequency is 148 MHz and the output bit depth is 10 bits.



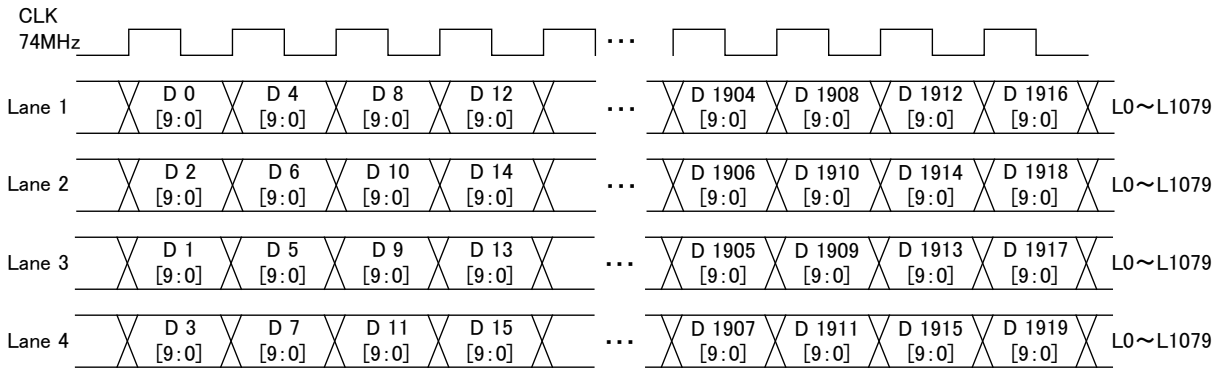
[Assignment of each lane]



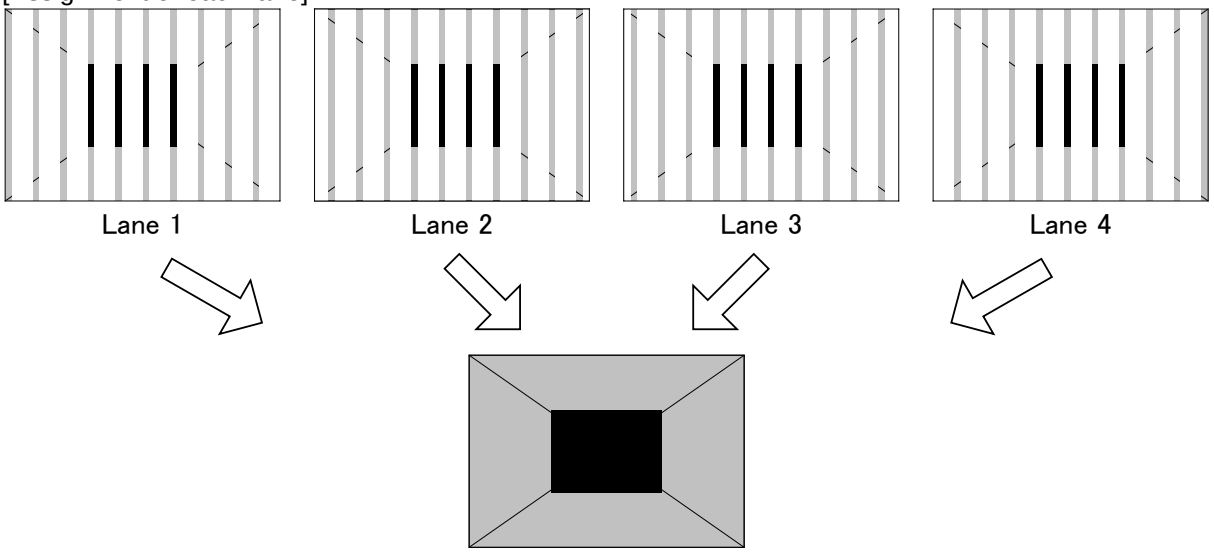
<Normal MODE： 4Lane output>



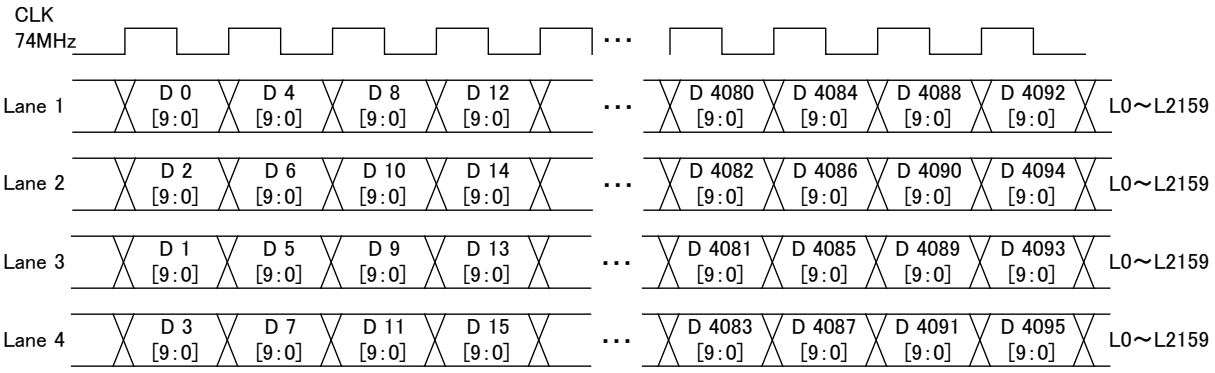
Given here as an example where the resolution is 1920 × 1080@120Hz, the dot clock frequency is 297 MHz and the output bit depth is 10 bits.



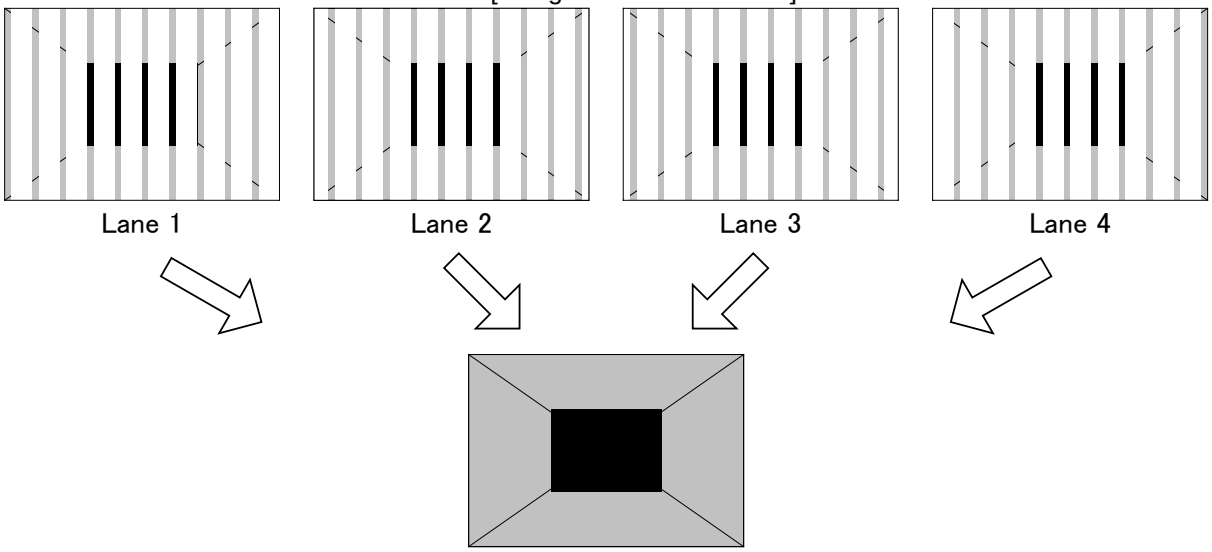
[Assignment of each lane]



Given here as an example where the resolution is 4096 × 2160@30Hz, the dot clock frequency is 297 MHz and the output bit depth is 10 bits.



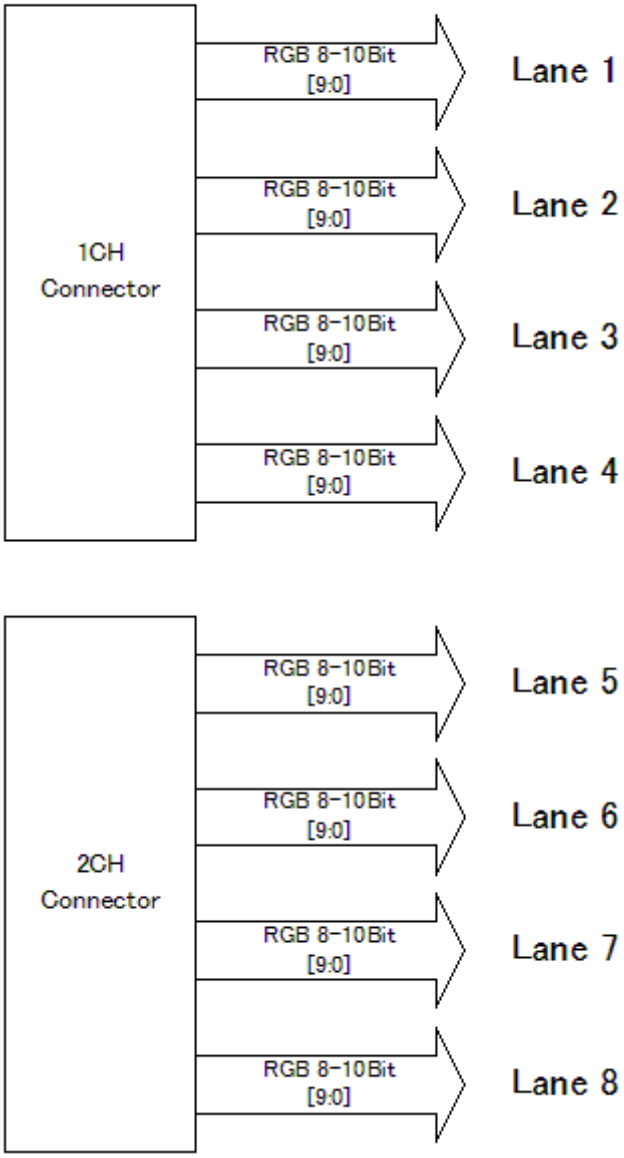
[Assignment of each lane]



<Specifications of x4 (240Hz) mode output>

In case “FullHD 240Hz Mode”, one image is output by combination of 8 lanes.
Basically, it is same transmission method as 4K/60p.
Here it explains from Mode0 (x4mode) to Mode4（x4mode）.

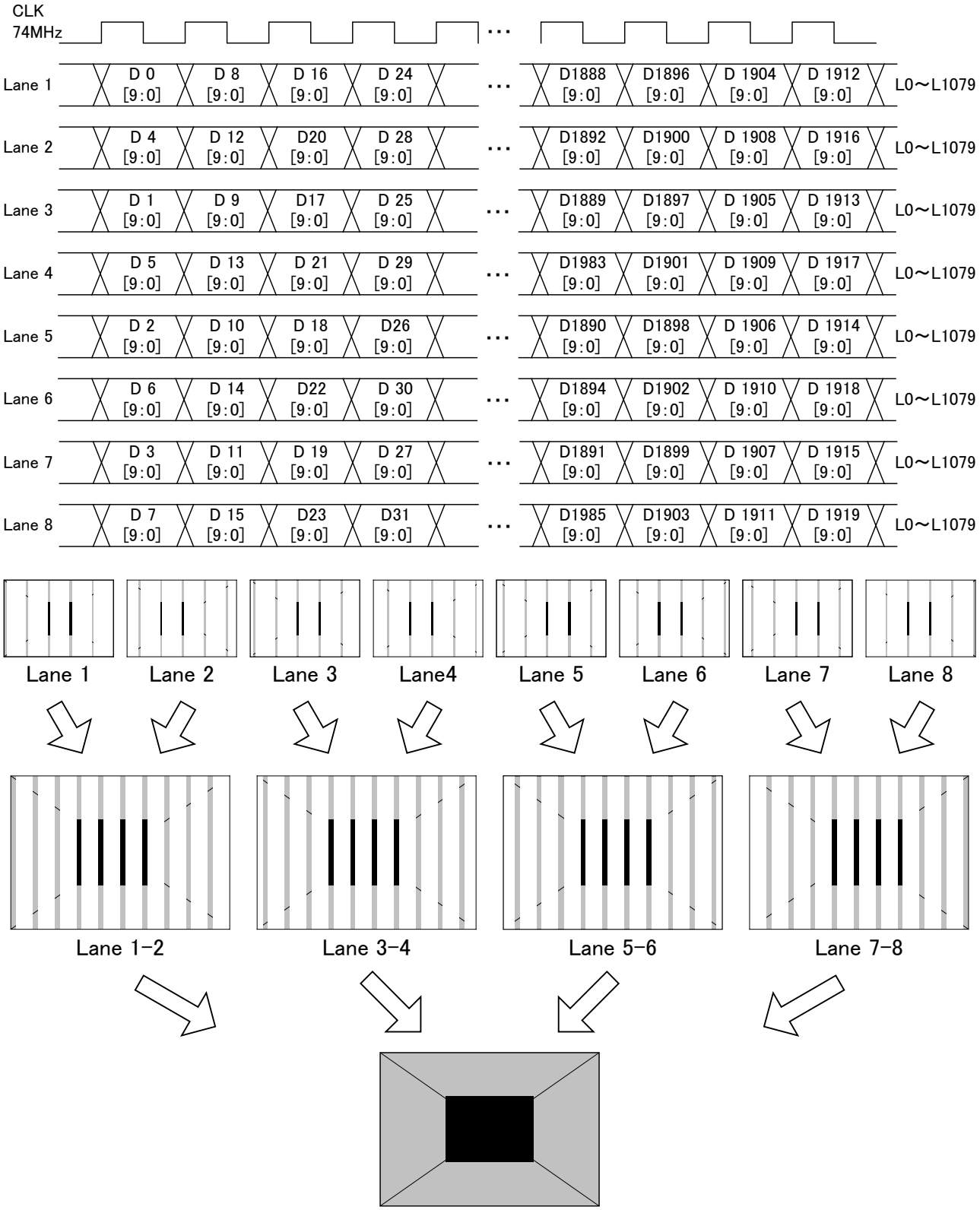
[**Full HD 240Hz 8 lanes output]**



(1) Mode 0 (x4 mode) (8 lanes) - Mode0 x4 mode (Non Dividing Mode)

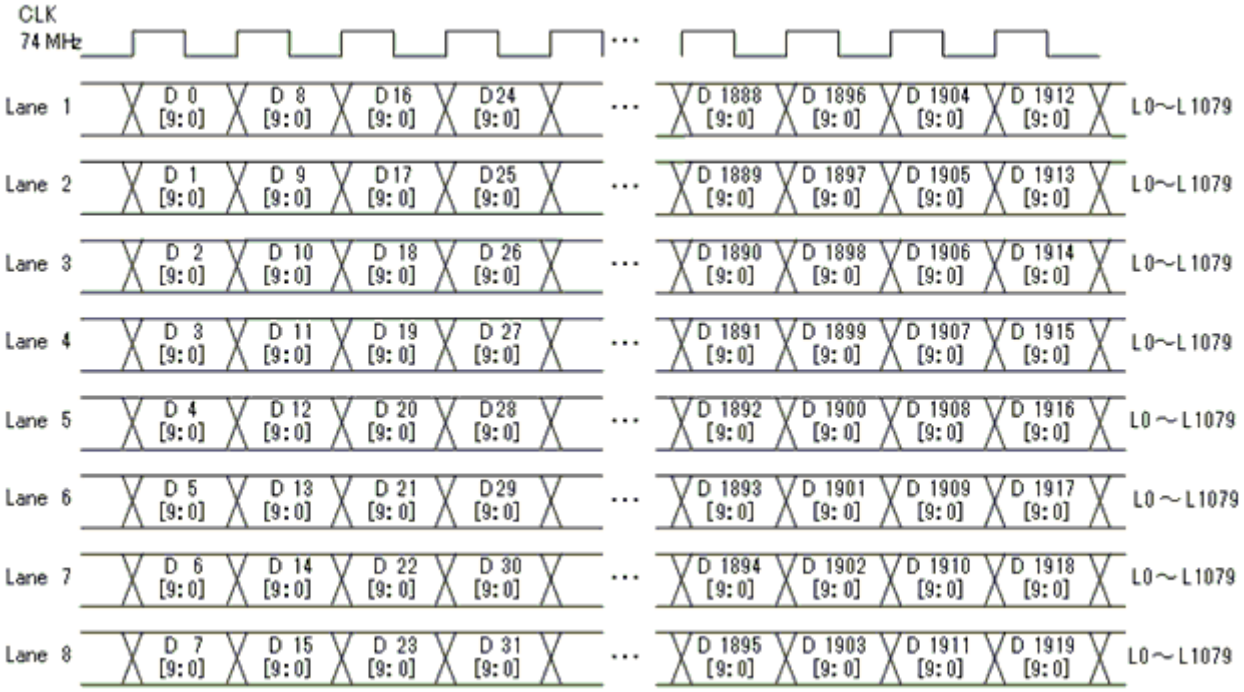
By using Lane 1 to 8, the image is output by pixel assignment described below.

Given here as an example where the resolution is 1920 × 1080/240Hz, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.

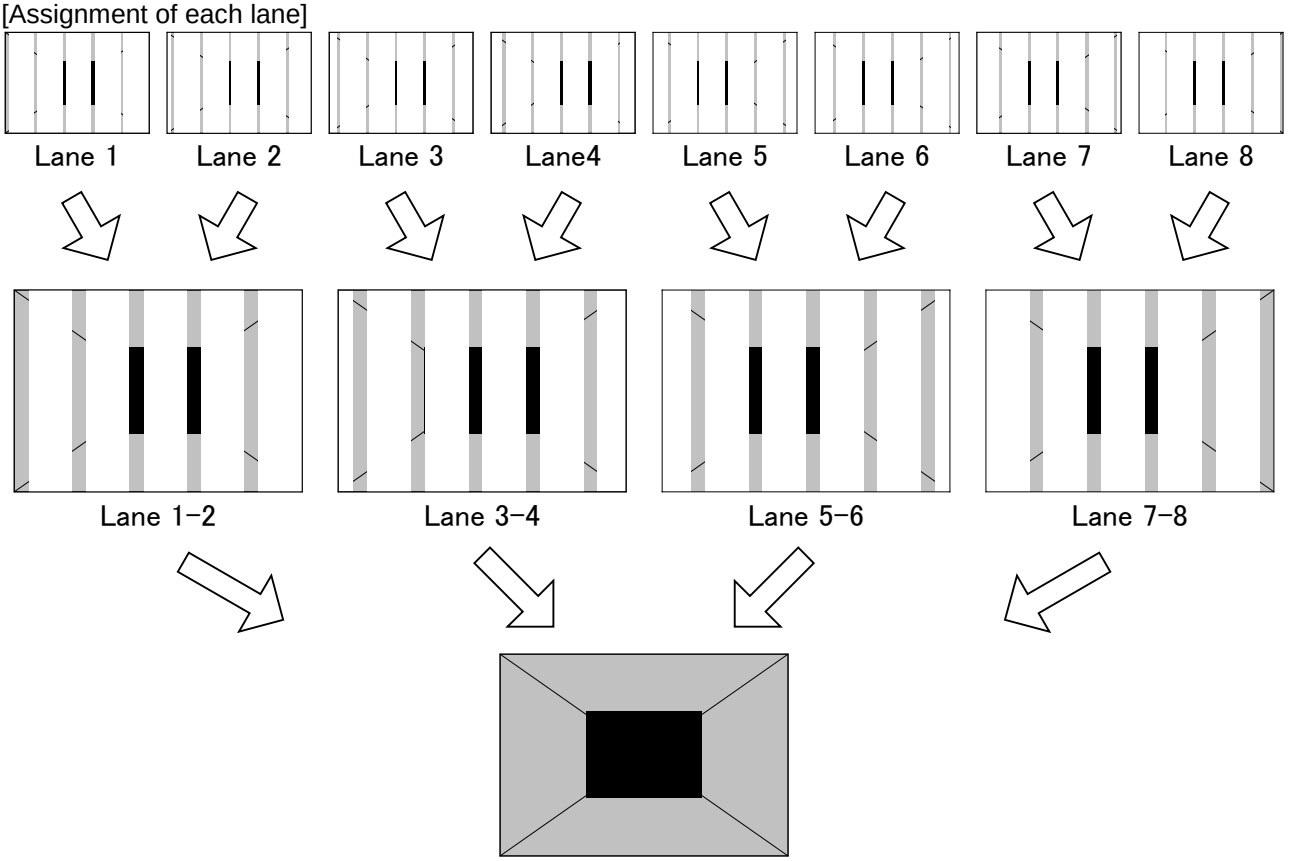


(2) Mode 1 (x4 mode) (8 lanes) - Normal Mode

By using Lane 1 to 8, the image is output by pixel assignment described below.
Given here as an example where the resolution is 1920 × 1080/240Hz, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.

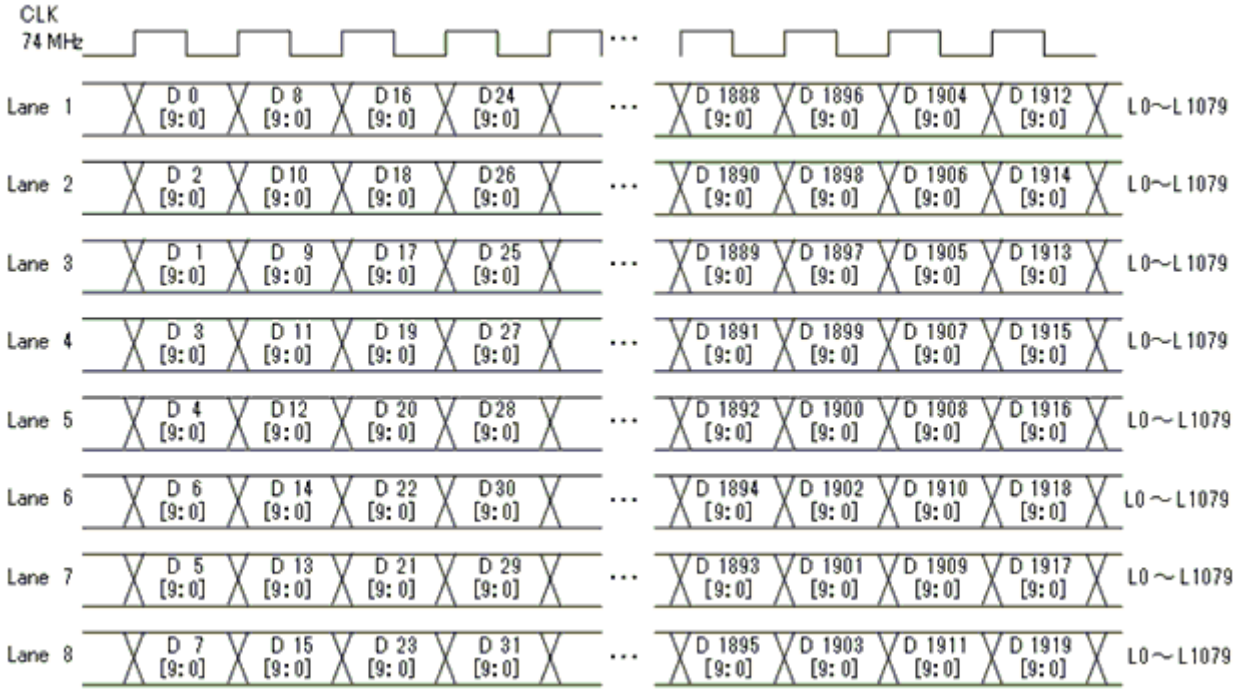


[Assignment of each lane]

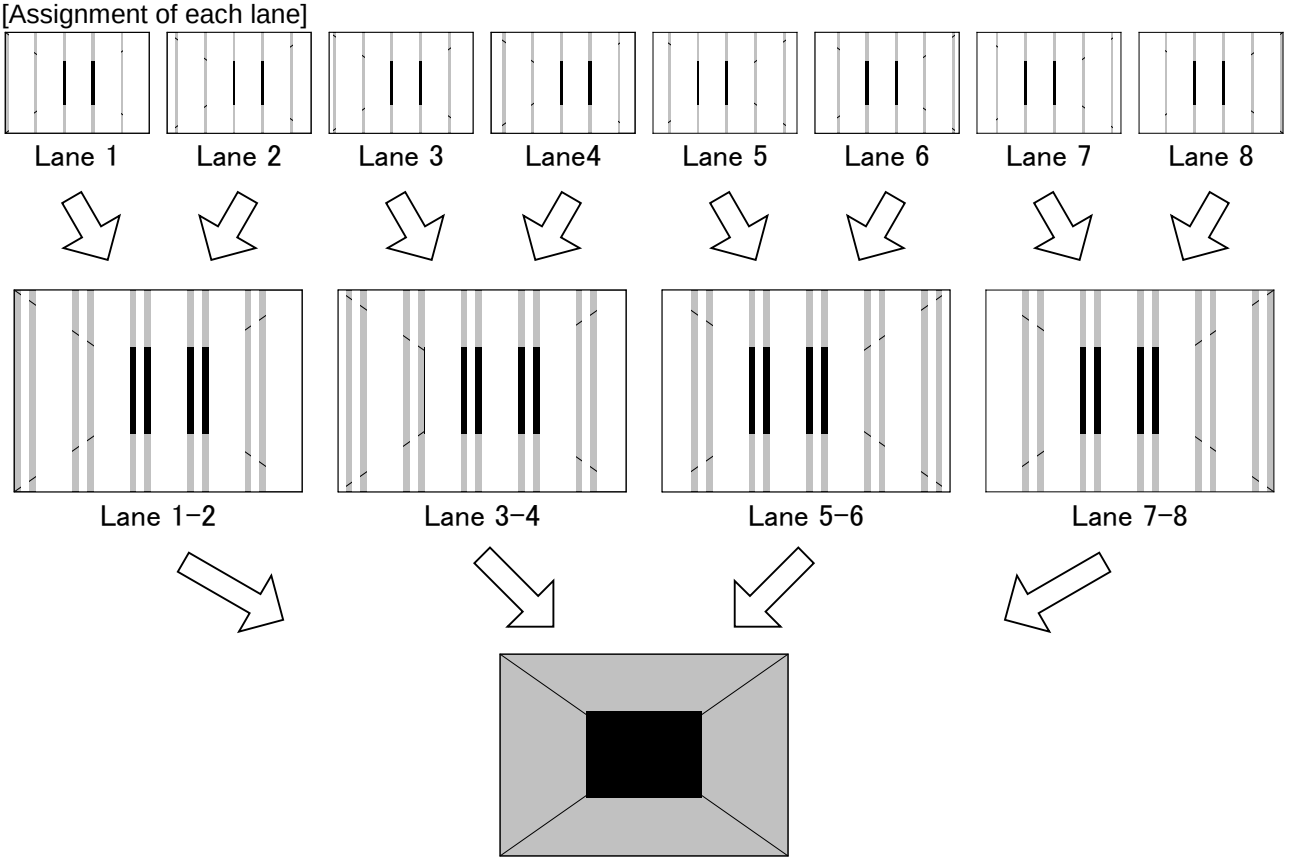


(3) Mode 2 (x4 mode) (8 lanes) - Cross Mode

By using Lane 1 to 8, the image is output by pixel assignment described below.
Given here as an example where the resolution is 1920 × 1080/240Hz, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



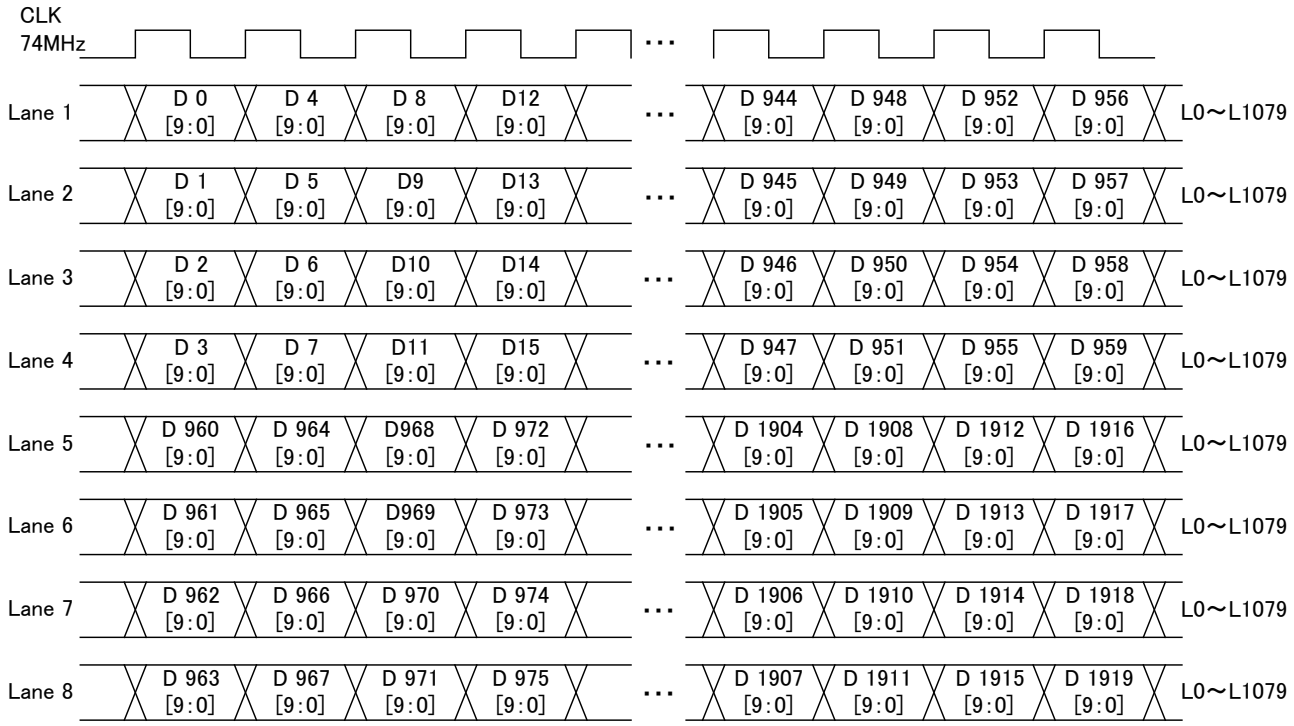
[Assignment of each lane]



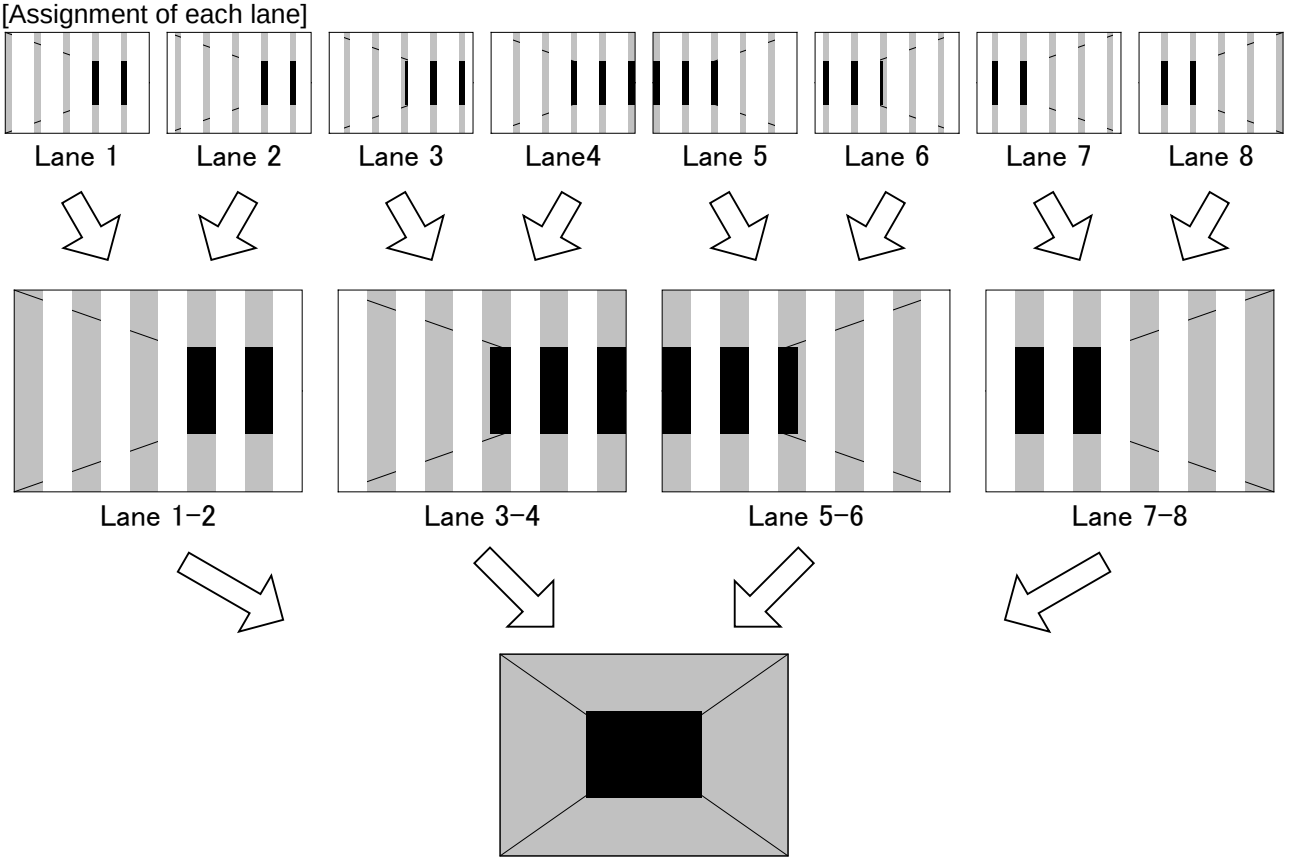
(4) Mode 3 (x4 mode) (8 lanes) - Dividing Normal Mode

Using lanes 1 and 2 and lanes 3 and 4, the left half of the image is output in the even and odd numbers; similarly, using lanes 5 and 6 and lanes 7 and 8, the right half of the image is output in the even and odd numbers.

Given here as an example where the resolution is 1920 × 1080, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



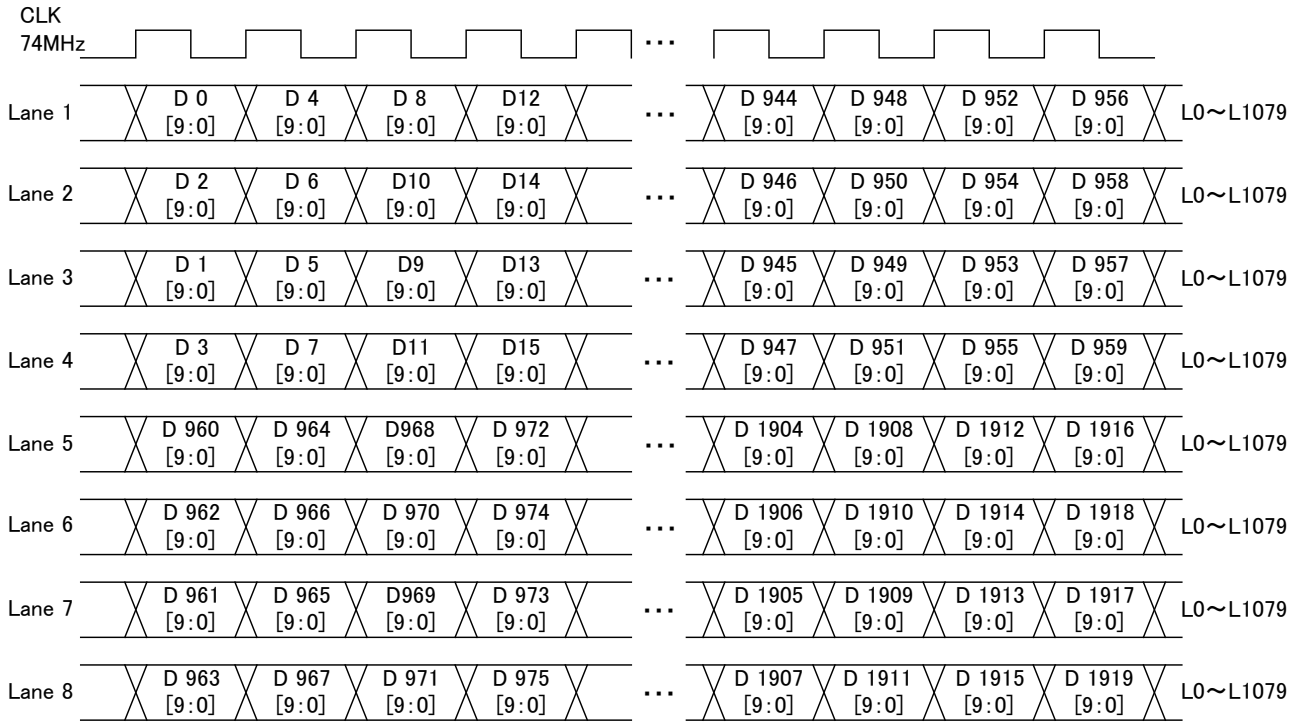
[Assignment of each lane]



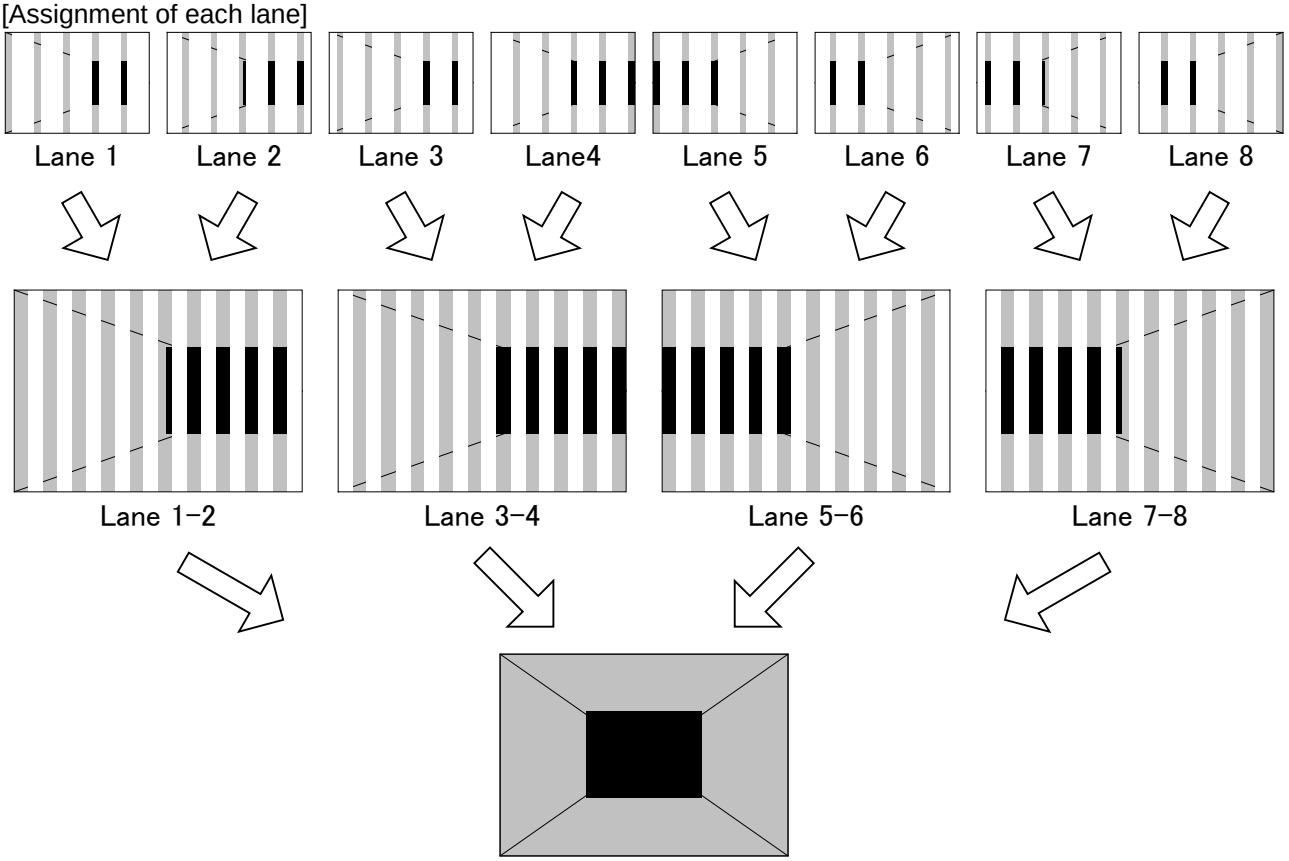
(5) Mode 4 (x4 mode) (8 lanes) - Dividing Cross Mode

Using lanes 1 and 3 and lanes 2 and 4, the left half of the image is output in the even and odd numbers; similarly, using lanes 5 and 7 and lanes 6 and 8, the right half of the image is output in the even and odd numbers.

Given here as an example where the resolution is 1920 × 1080, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



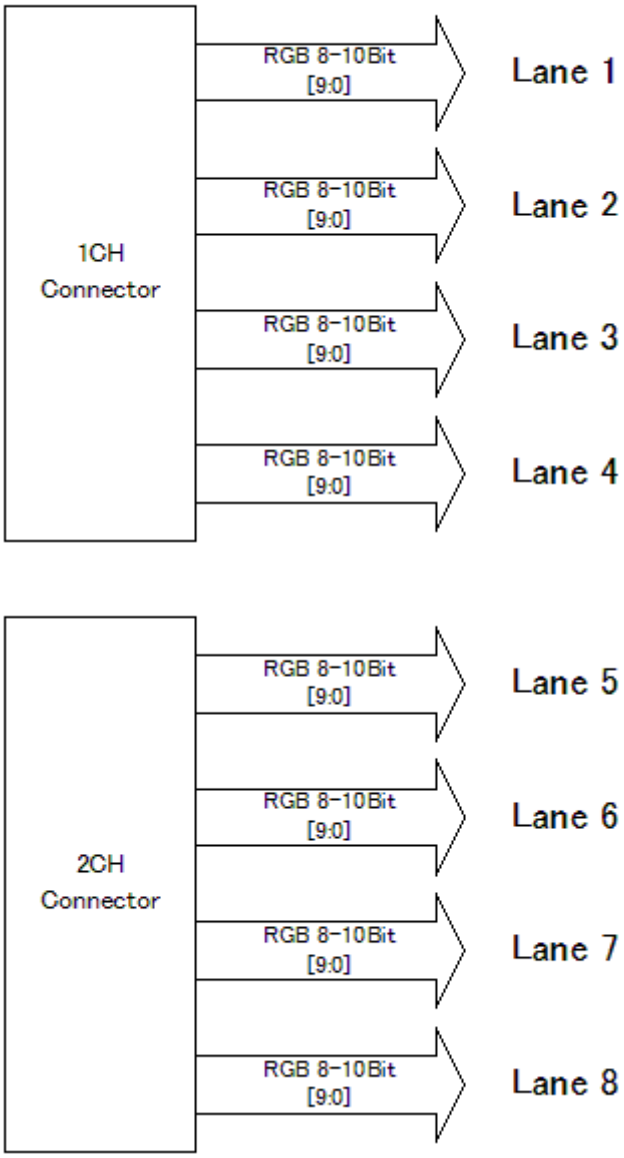
[Assignment of each lane]



<Specifications of 4K×2K mode>

In case of 4Kx2K MODE, one image is output by combination of 8 lanes.

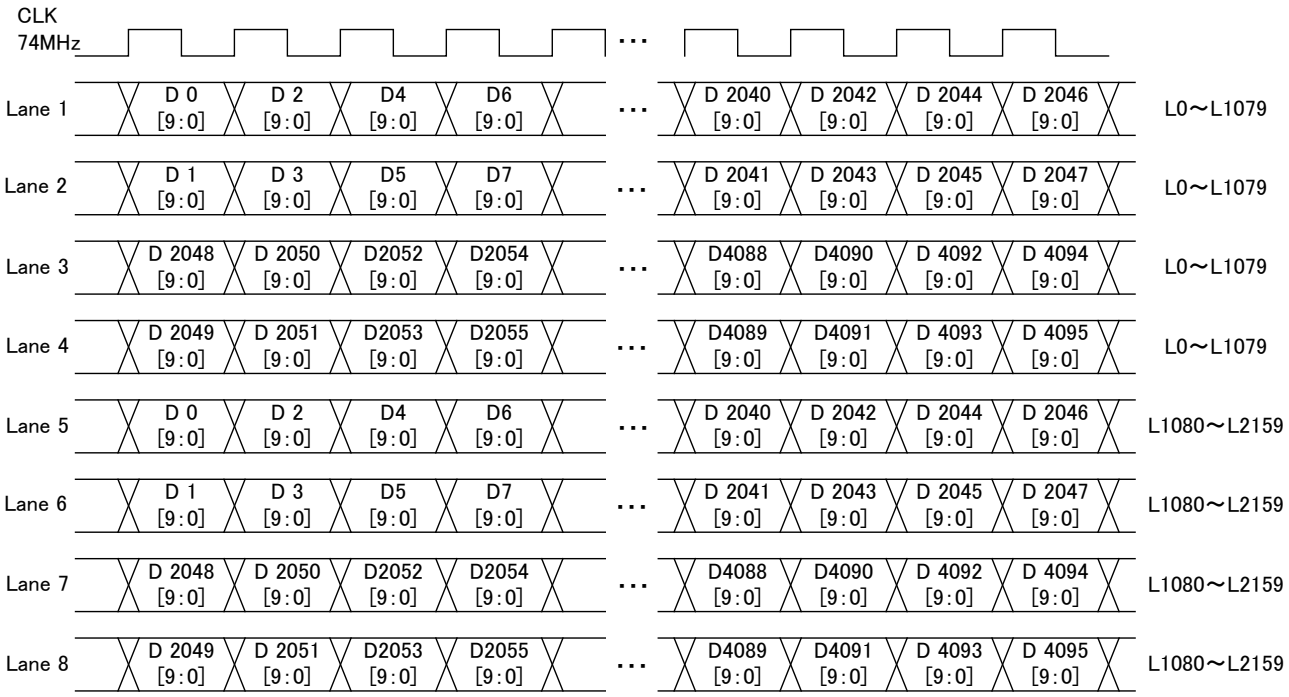
[4k x2k 60Hz －8 lanes output]



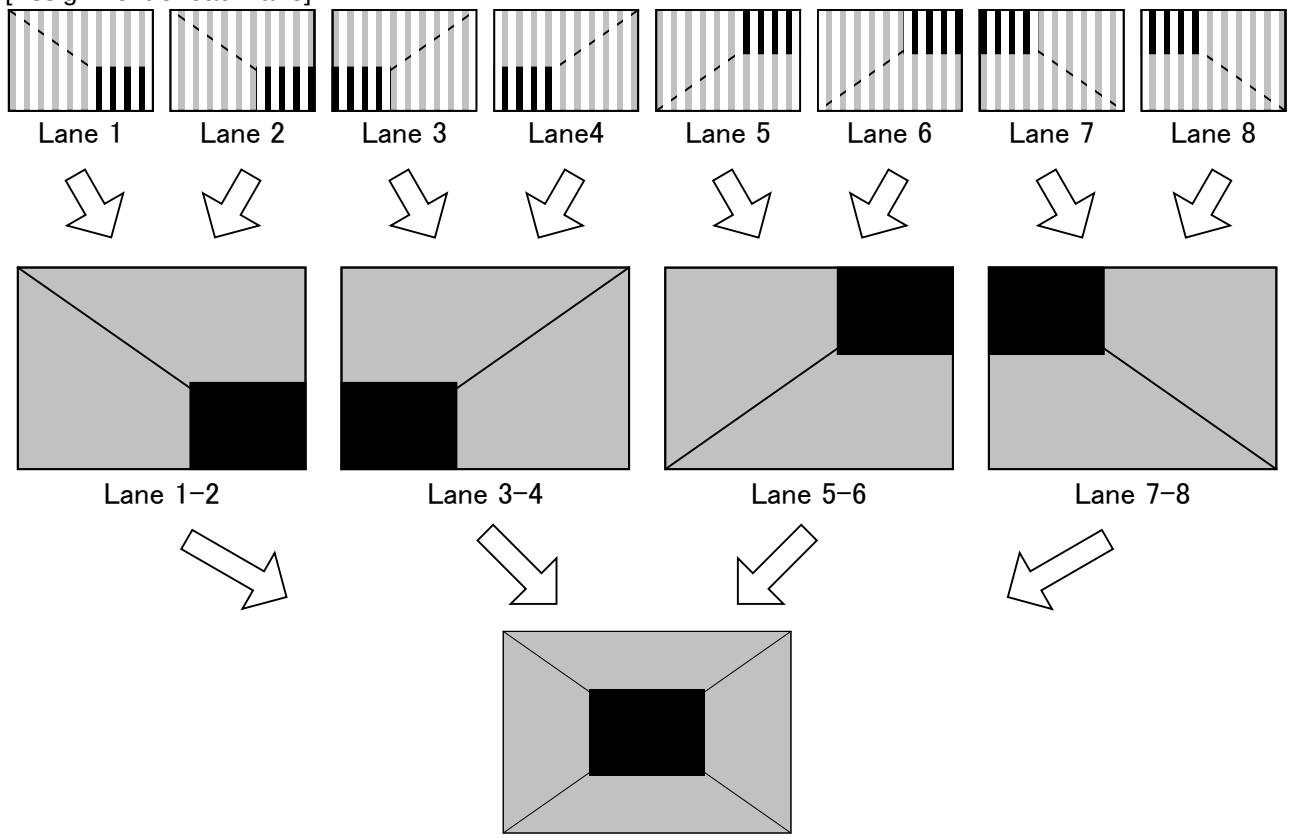
(1) Mode 0 (8 lanes) - Normal

The image is split into 4 in the form of a square divided into 4 equal parts and assigned in sequence using lanes 1 and 2 for the top left part, lanes 3 and 4 for the top right part, lanes 5 and 6 for the bottom left part and lanes 7 and 8 for the bottom right part.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



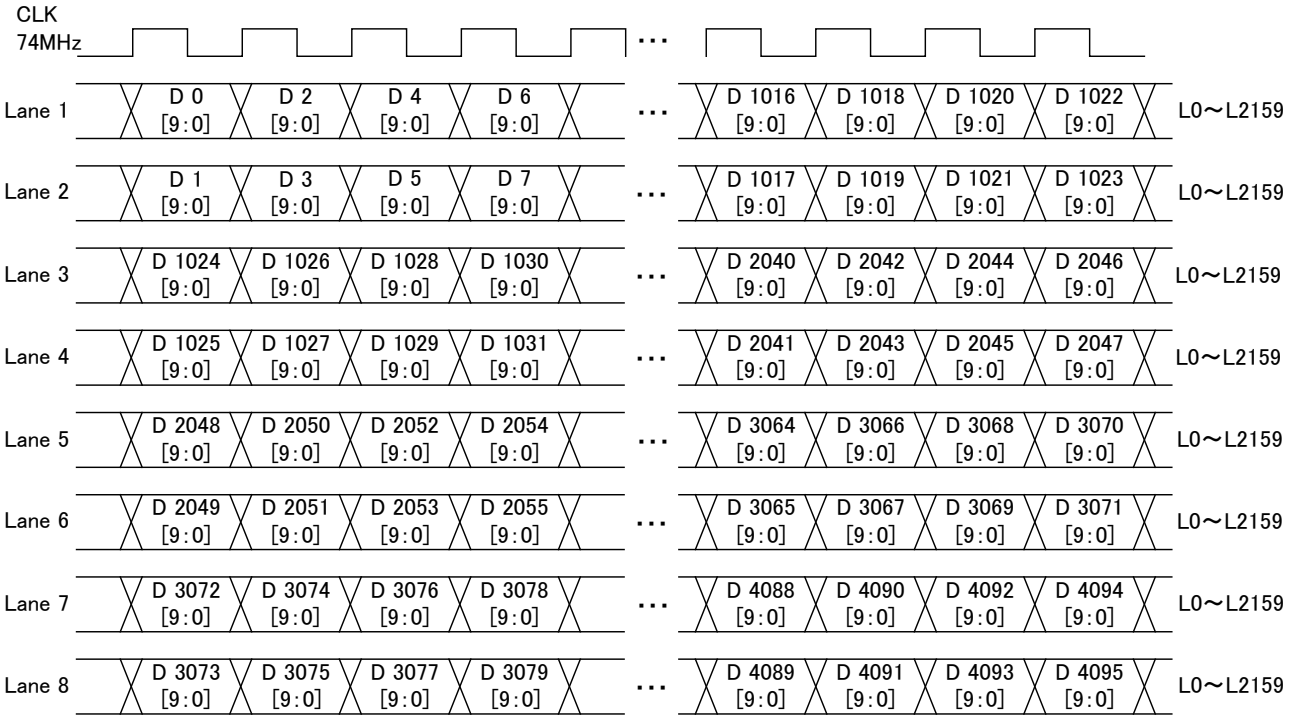
[Assignment of each lane]



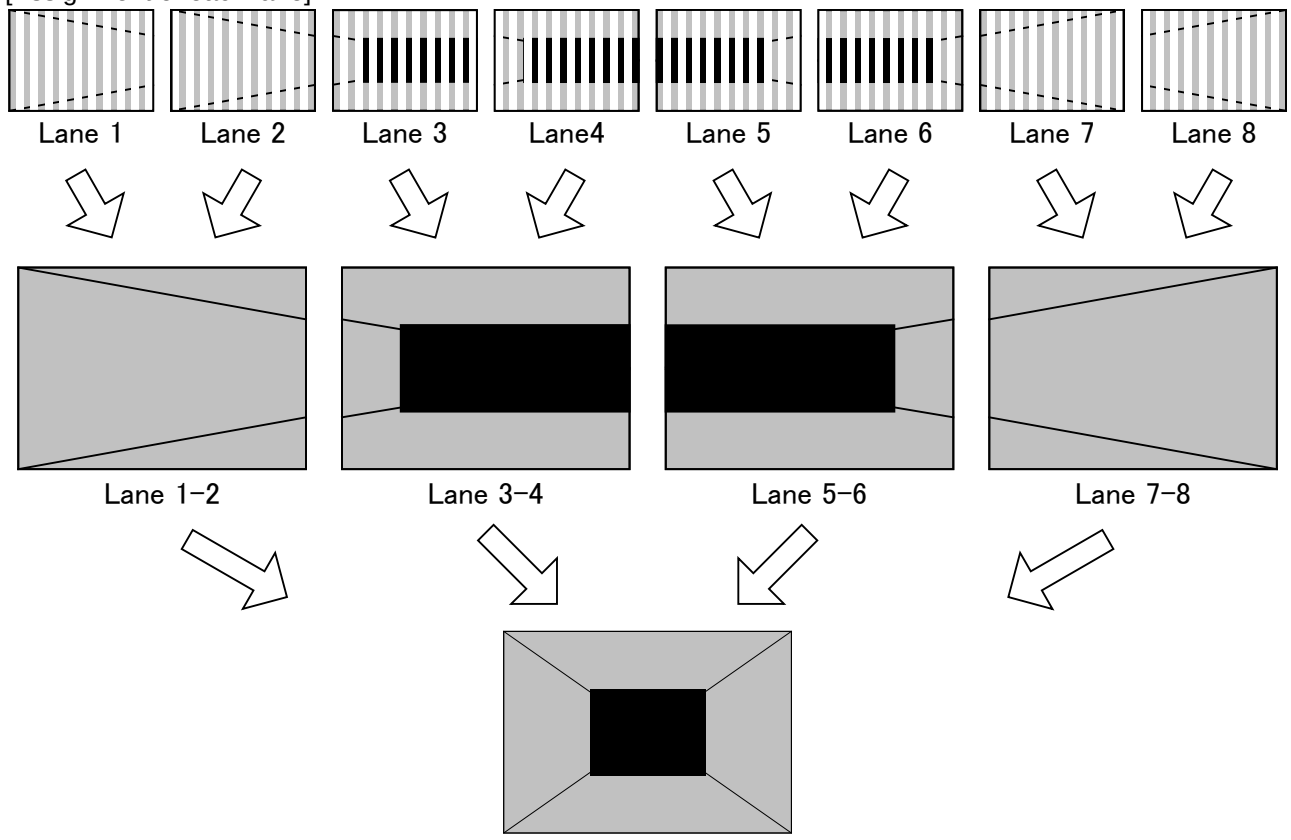
(2) Mode 1 (8 lanes) - 4Split

The image is split horizontally into four parts and assigned in sequence from the left using lanes 1 and 2, lanes 3 and 4, lanes 5 and 6 and lanes 7 and 8.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



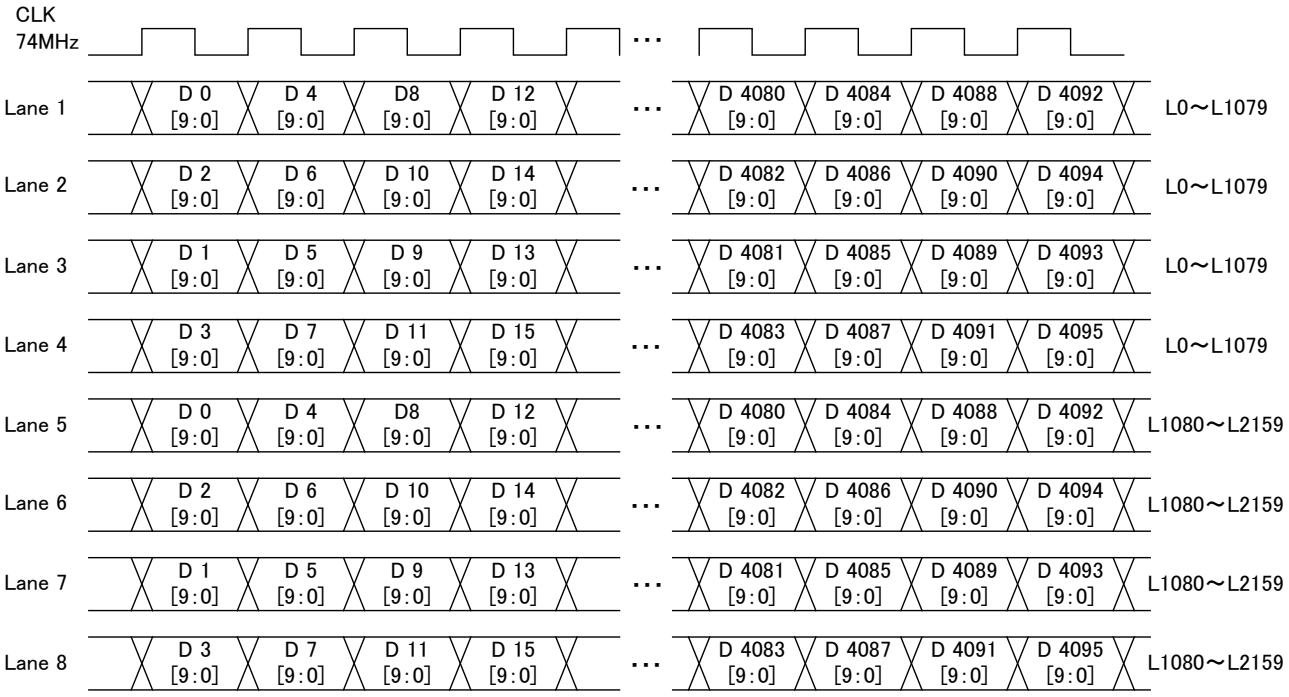
[Assignment of each lane]



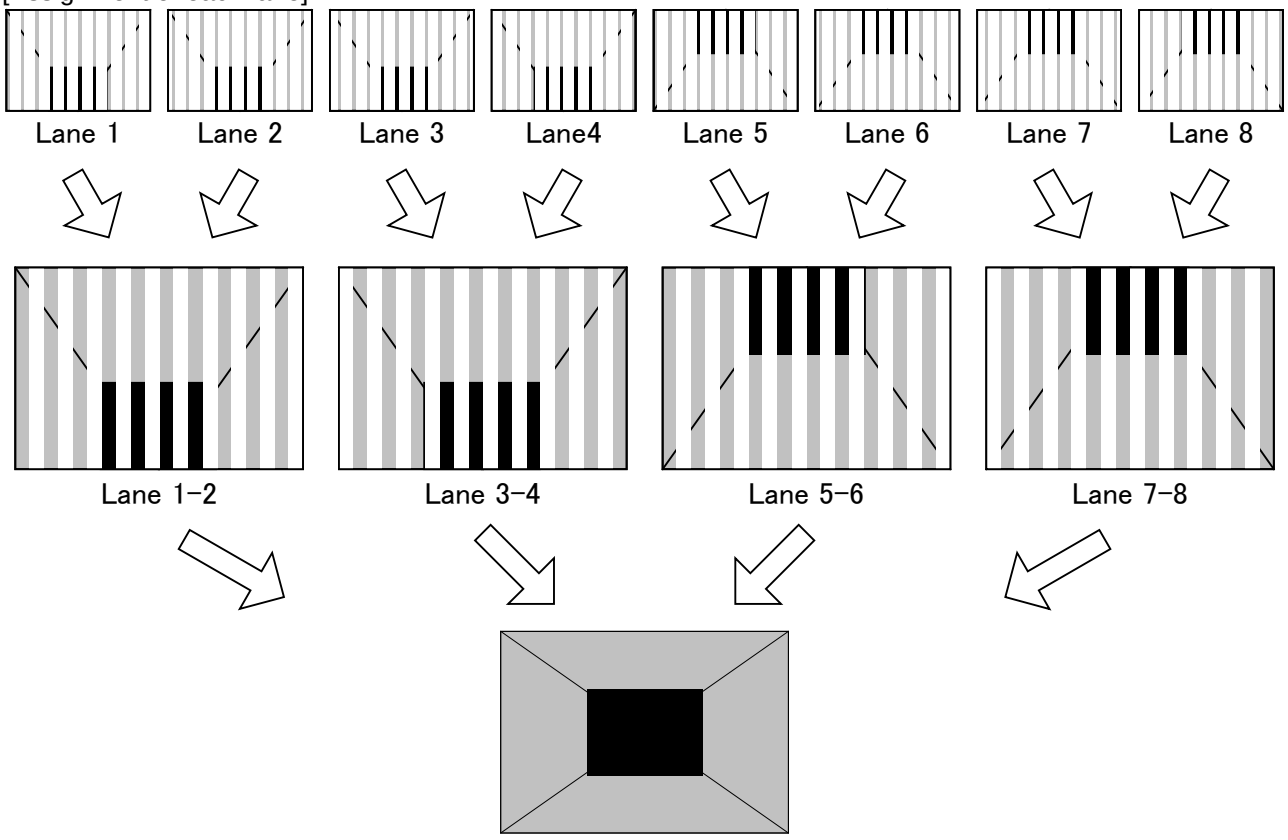
(3) Mode 2 (8 lanes) (split horizontally into 2)

Using lanes 1 and 2 and lanes 3 and 4, the top half of the image is output in the even and odd numbers; similarly, using lanes 5 and 6 and lanes 7 and 8, the bottom half of the image is output in the even and odd numbers.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



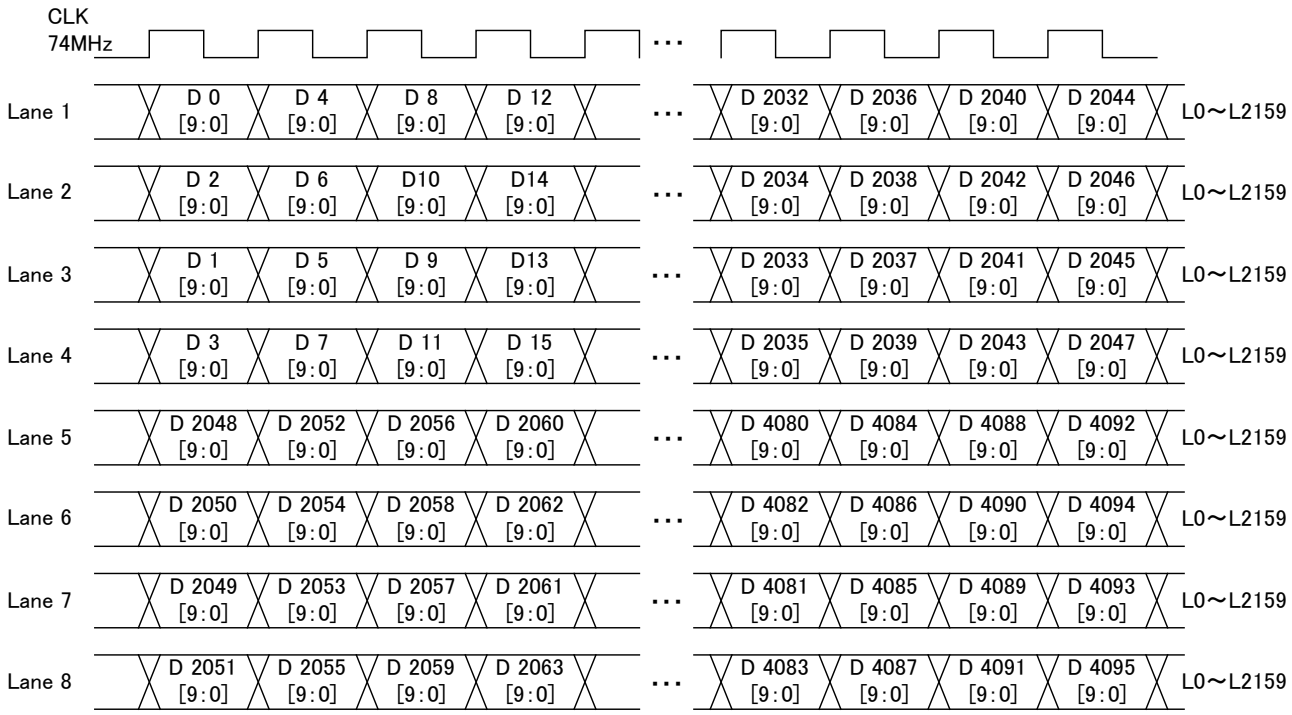
[Assignment of each lane]



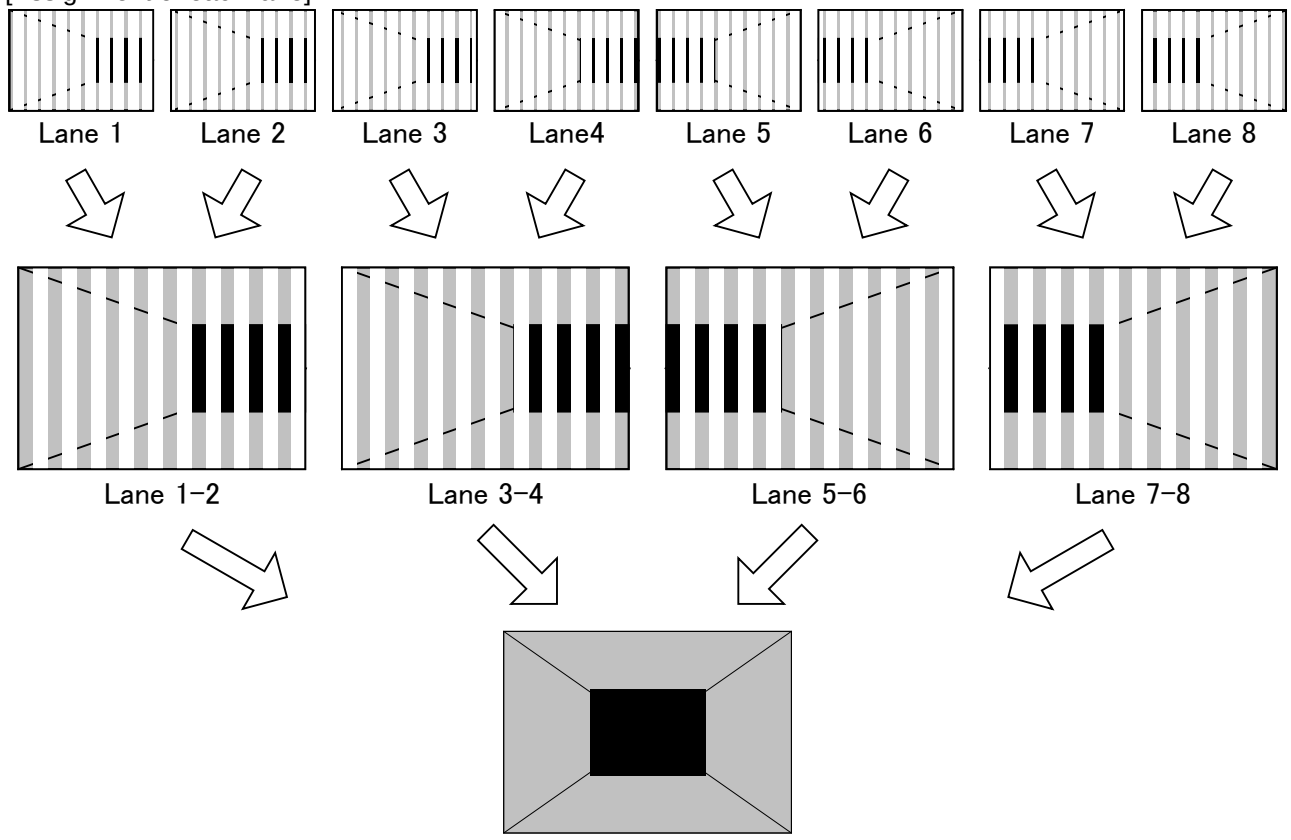
(4) Mode 3 (8 lane) - (split vertically into 2)

Using lanes 1 and 2 and lanes 3 and 4, the left half of the image is output in the even and odd numbers; similarly, using lanes 5 and 6 and lanes 7 and 8, the right half of the image is output in the even and odd numbers.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



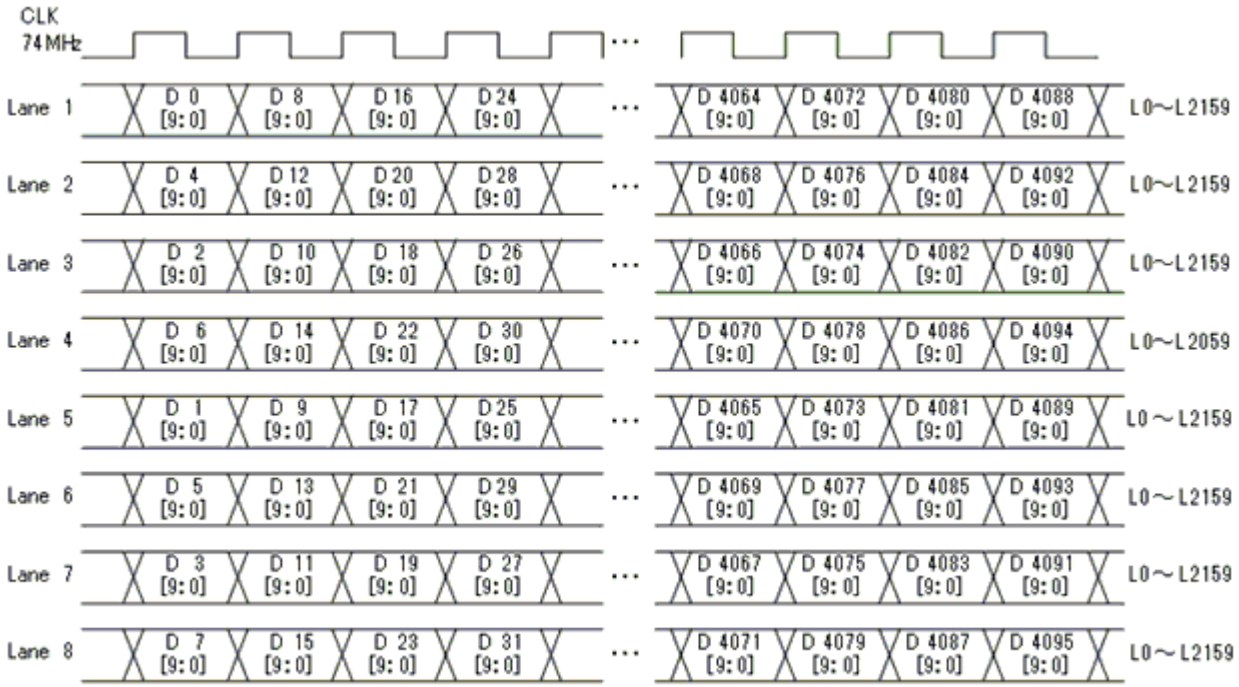
[Assignment of each lane]



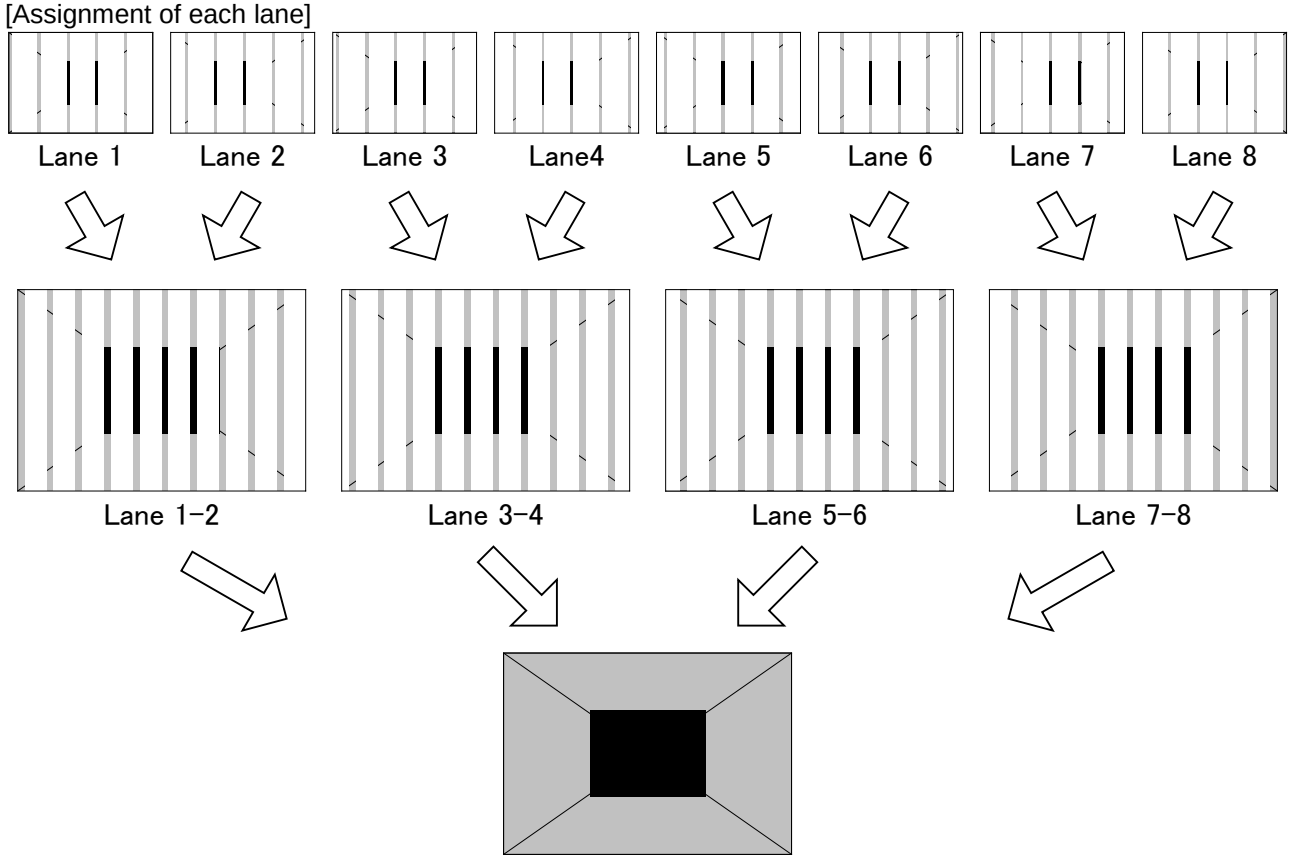
(5) Mode 4 (8 lanes) – No split

Using lanes 1 to 4, the EVEN pixels are output, and using lanes 5 to 8, the ODD pixels are output.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



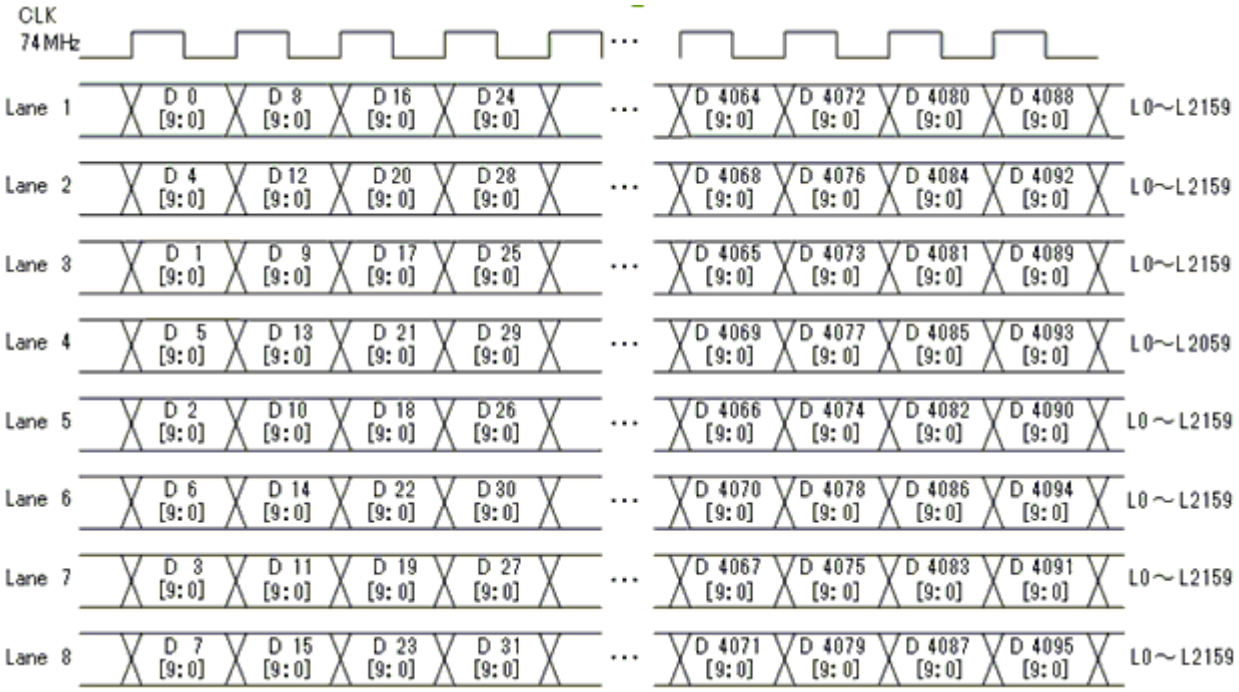
[Assignment of each lane]



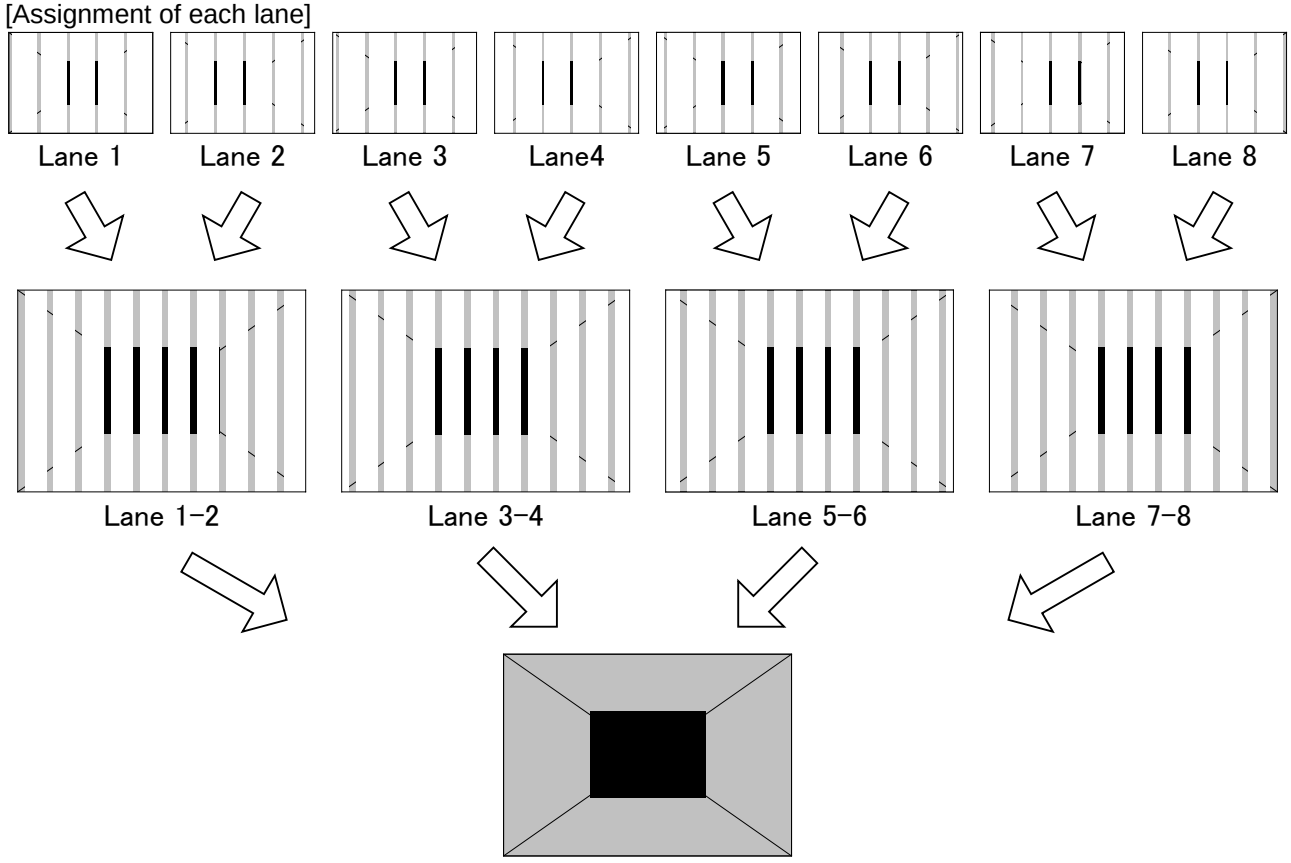
(6) Mode 0 (x4 mode) (8 lanes) - Mode0 x4 mode (Non Dividing Mode)

Using 1-8 lanes, the image is output with the pixel assignment as below without splitting.

Given here as an example where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



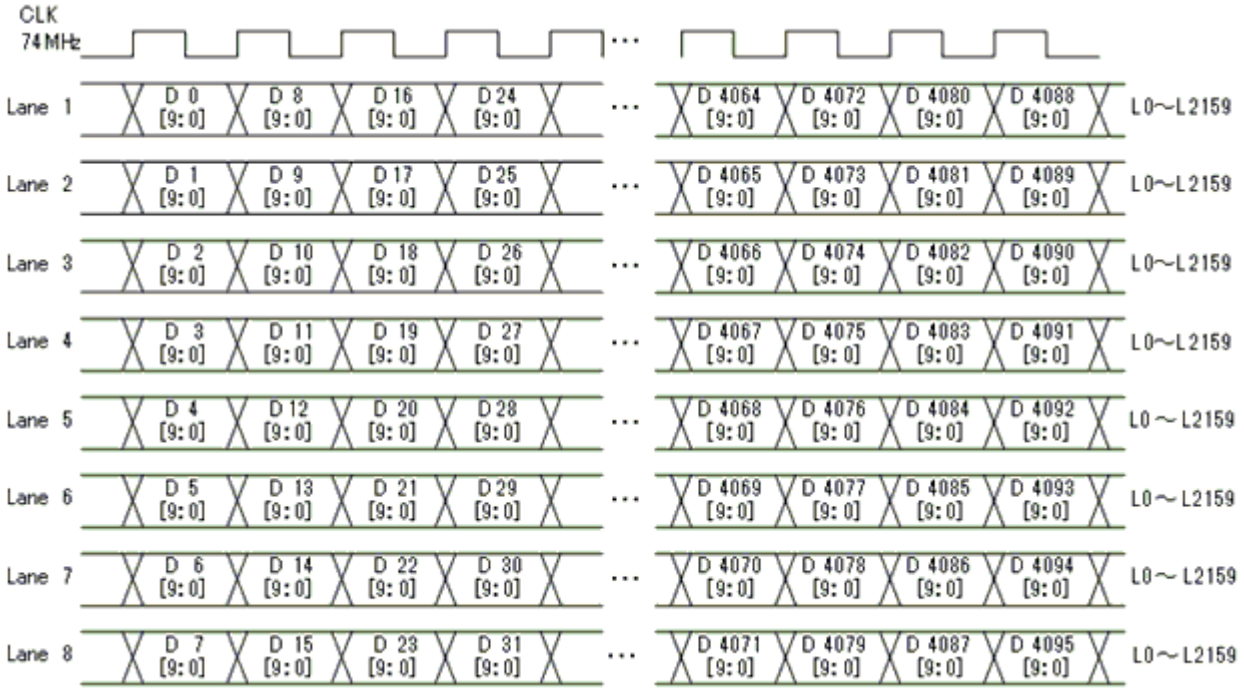
[Assignment of each lane]



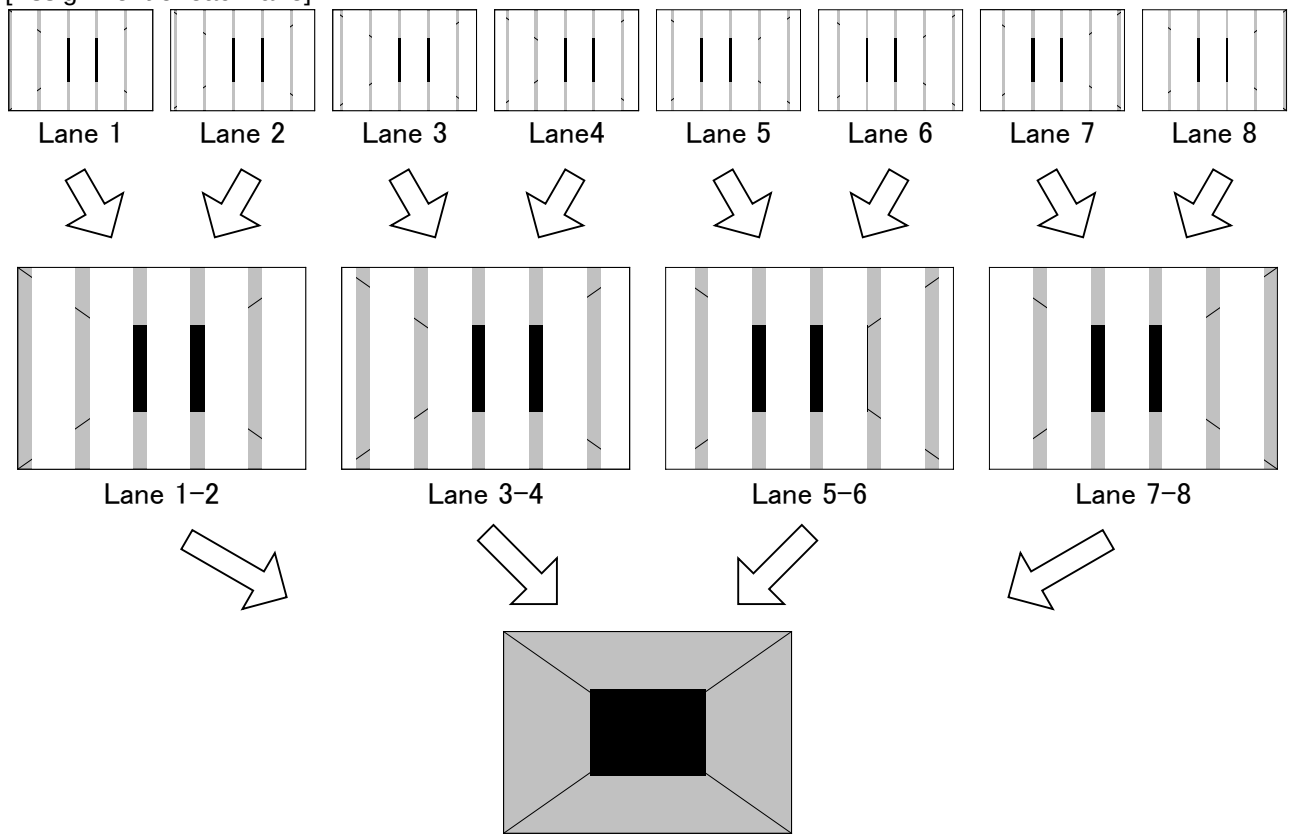
(7) Mode 1 (x4 mode) (8 lanes) - Normal Mode

Using 1-8 lanes, the image is output with the pixel assignment as below without splitting the screen.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



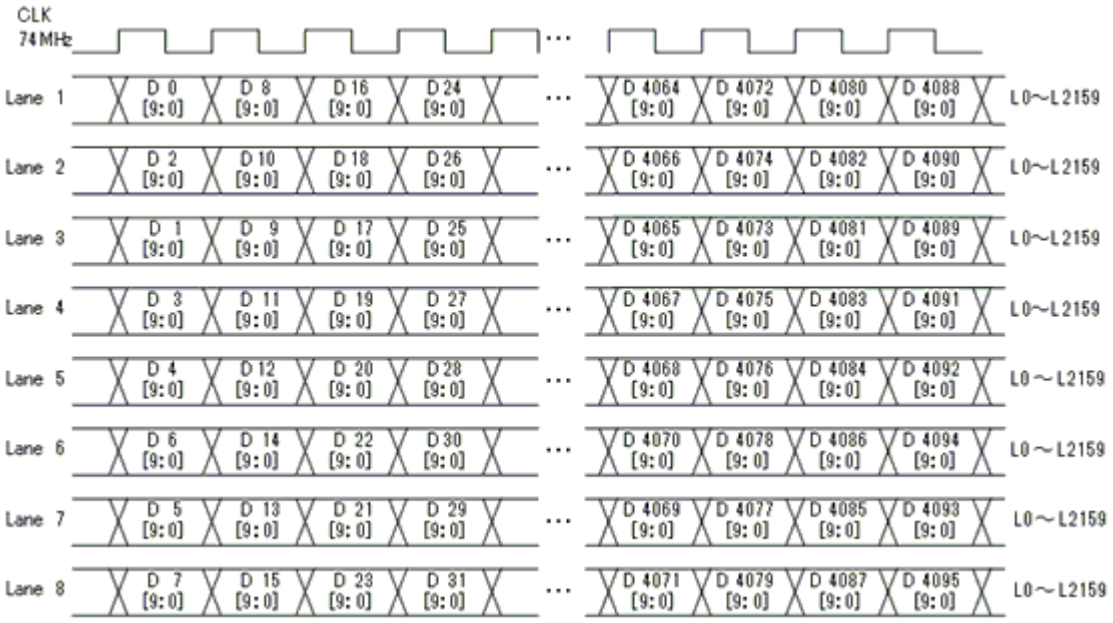
[Assignment of each lane]



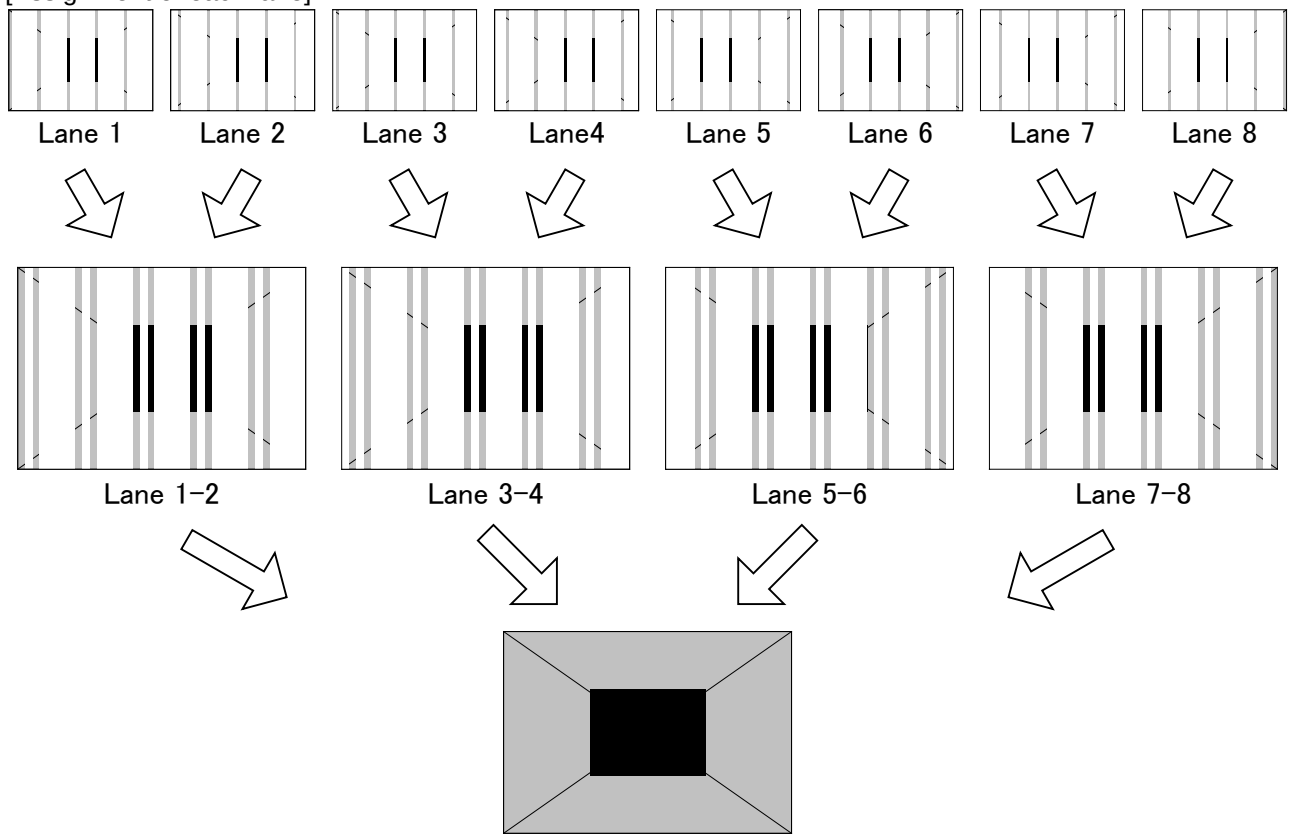
(8) Mode 2 (x4 mode) (8 lanes) - Cross Mode

Using 1-8 lanes, the image is output with the pixel assignment as below without splitting the screen.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



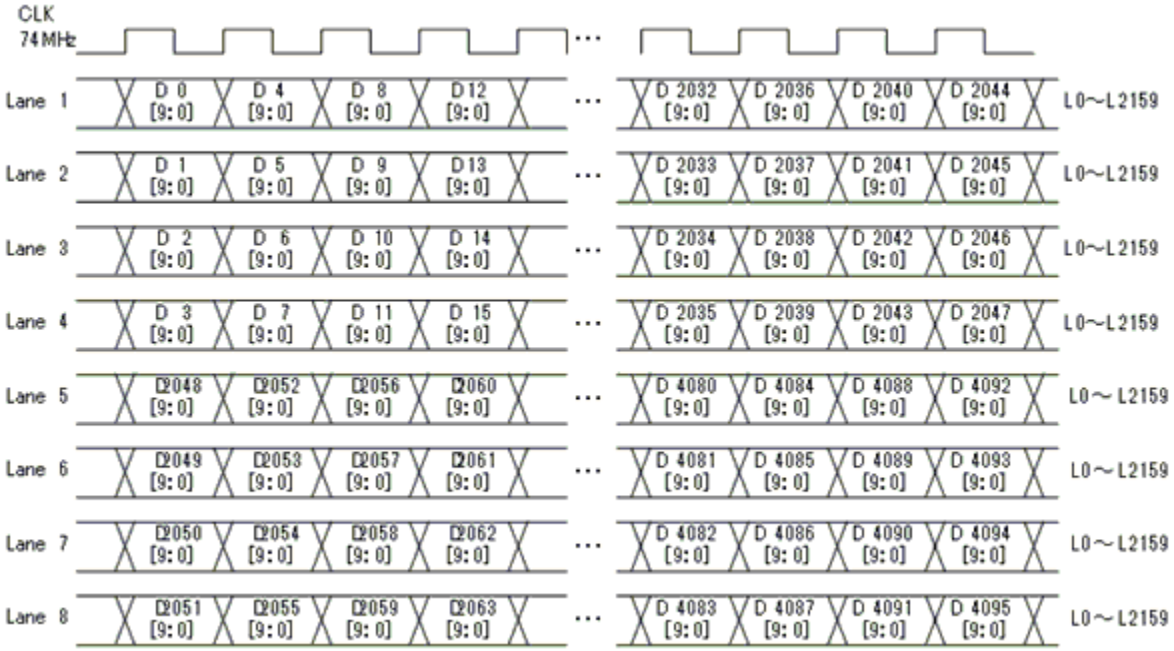
[Assignment of each lane]



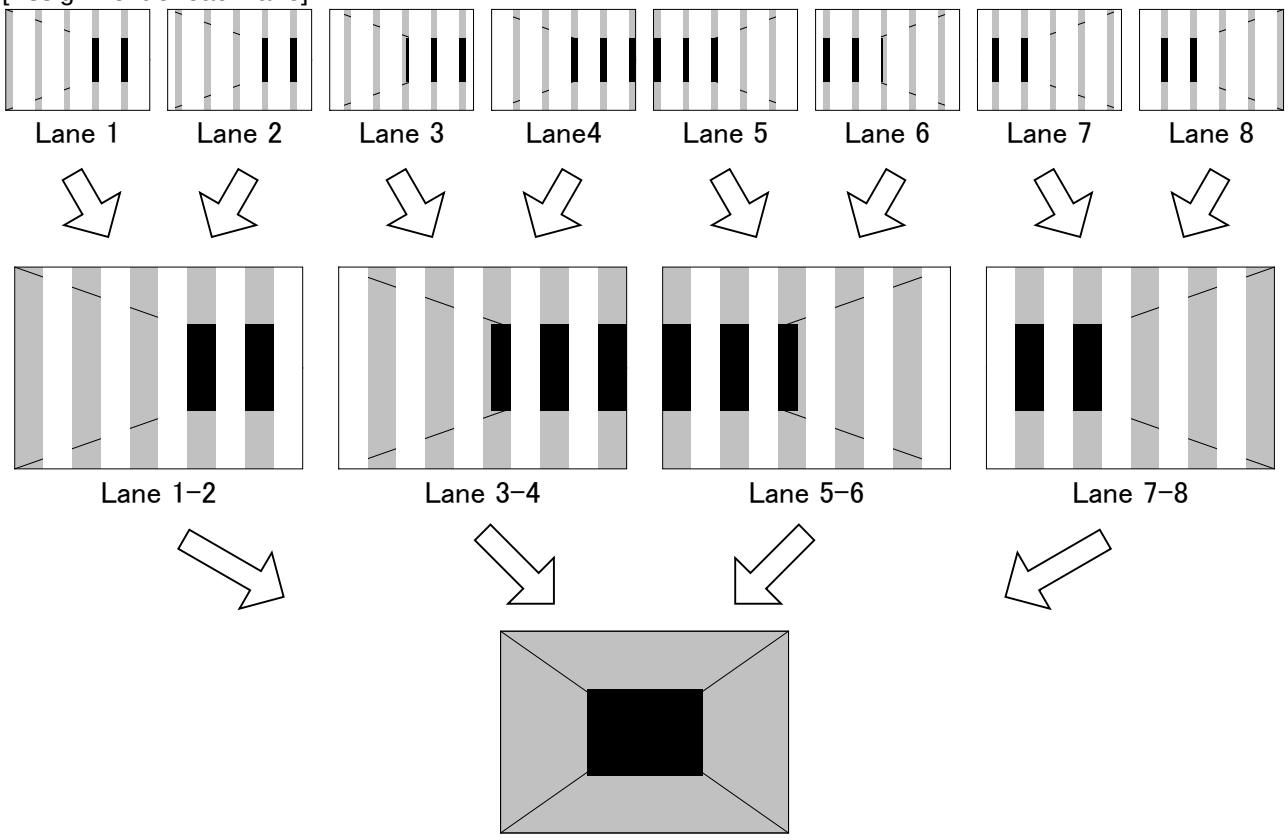
(9) Mode 3 (x4 mode) (8 lanes) - Dividing Normal Mode

Using lanes 1 - 2 lanes and 3- 4 lanes, the left half of the image is output in the even and odd numbers; similarly, using 5-6 lanes and 7- 8 lanes, the right half of the image is output in the even and odd numbers.

This example is a case where the resolution is 1920 × 1080, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.



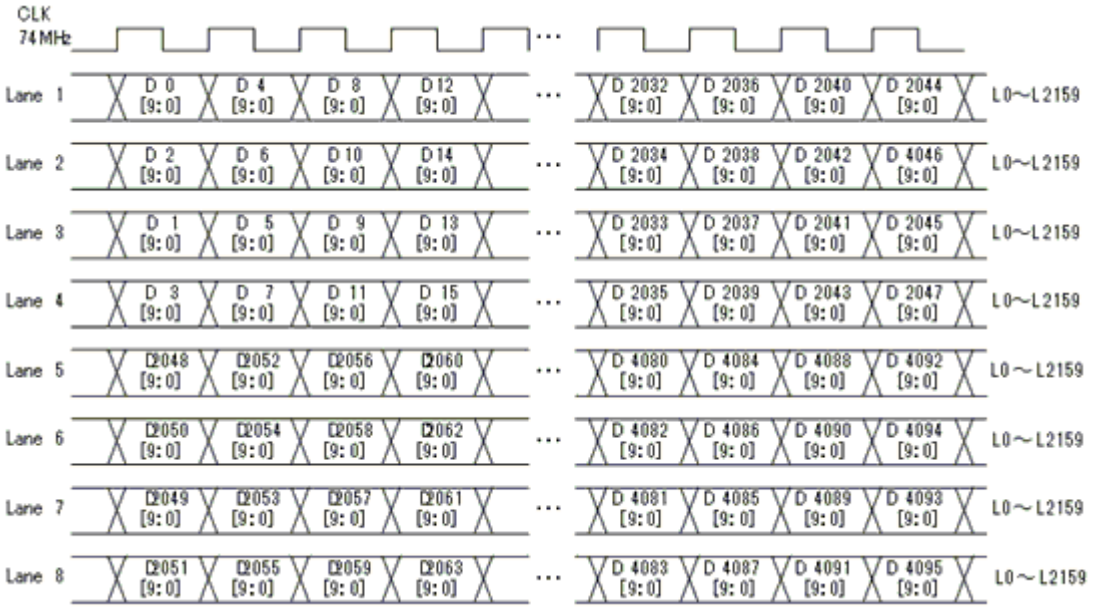
[Assignment of each lane]



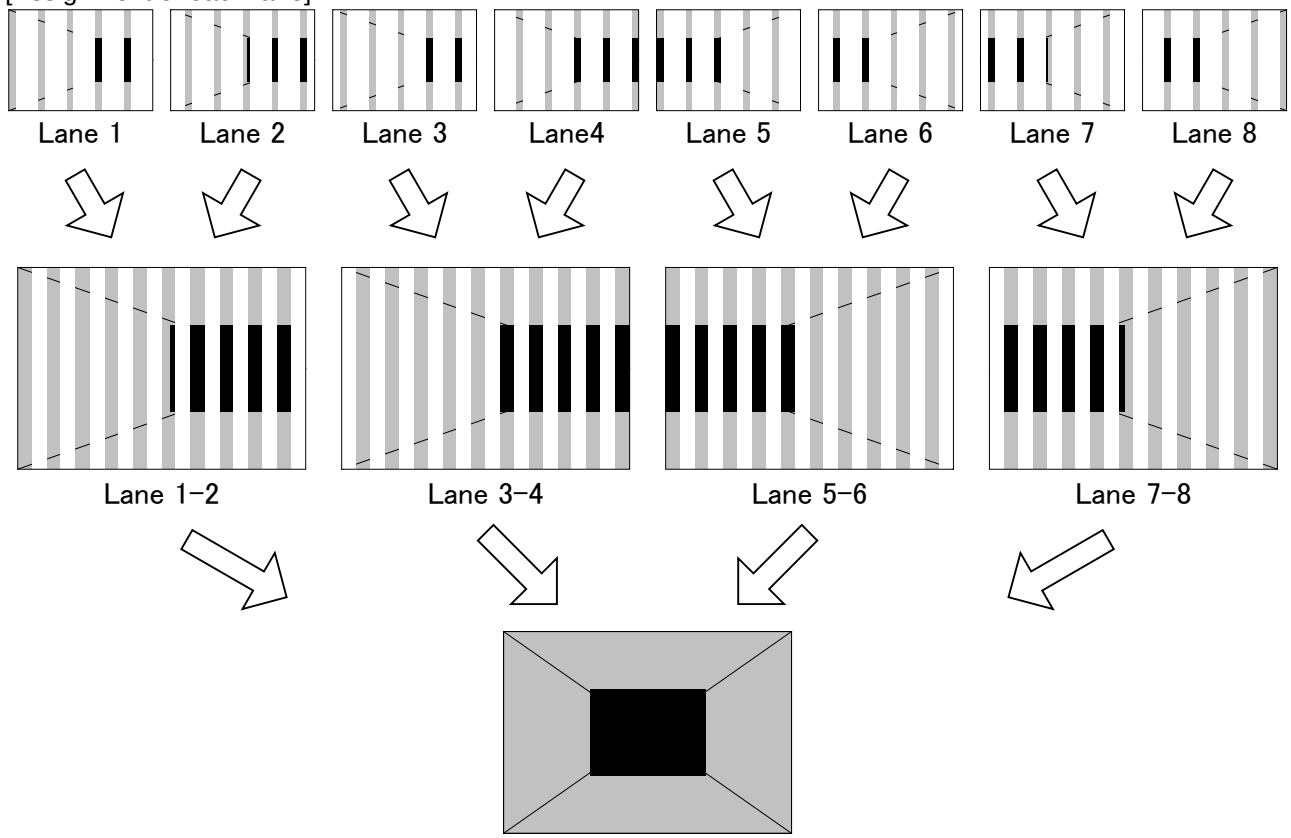
(10) Mode 4 (x4 mode) (8 lanes) - Dividing Cross Mode

Using lanes 1 -3 lanes and 2- 4 lanes, the left half of the image is output in the even and odd numbers; similarly, using 5-7 lanes and 6-8 lanes, the right half of the image is output in the even and odd numbers.

This example is a case where the resolution is 1920 × 1080, the dot clock frequency is 594 MHz and the output bit depth is 10 bits.

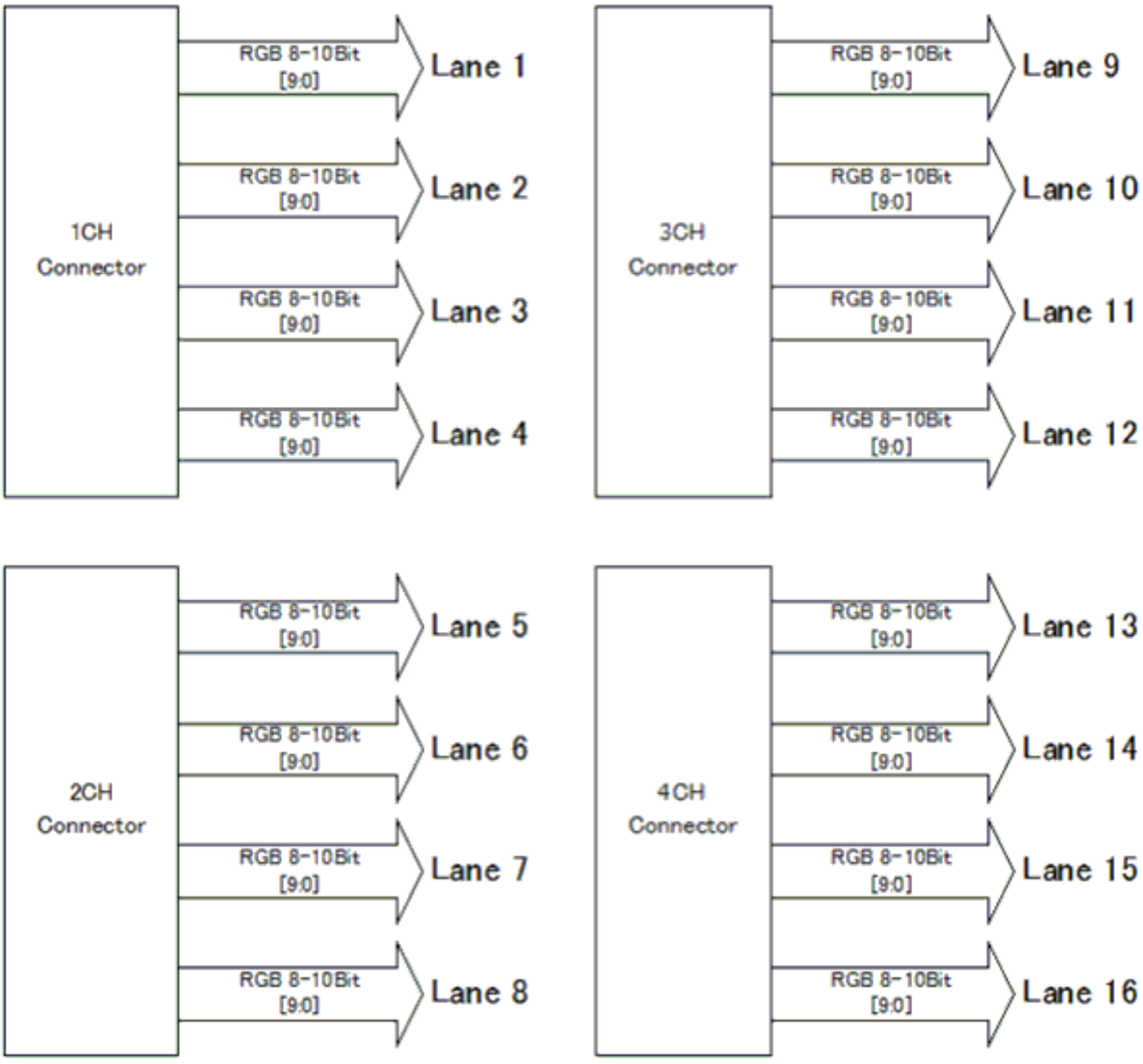


[Assignment of each lane]



This mode is an output mode for 4K×2K 120 Hz testing.
In the 4K×2K 120Hz Mode, 16 lanes are combined by using 4 connectors to output one image.

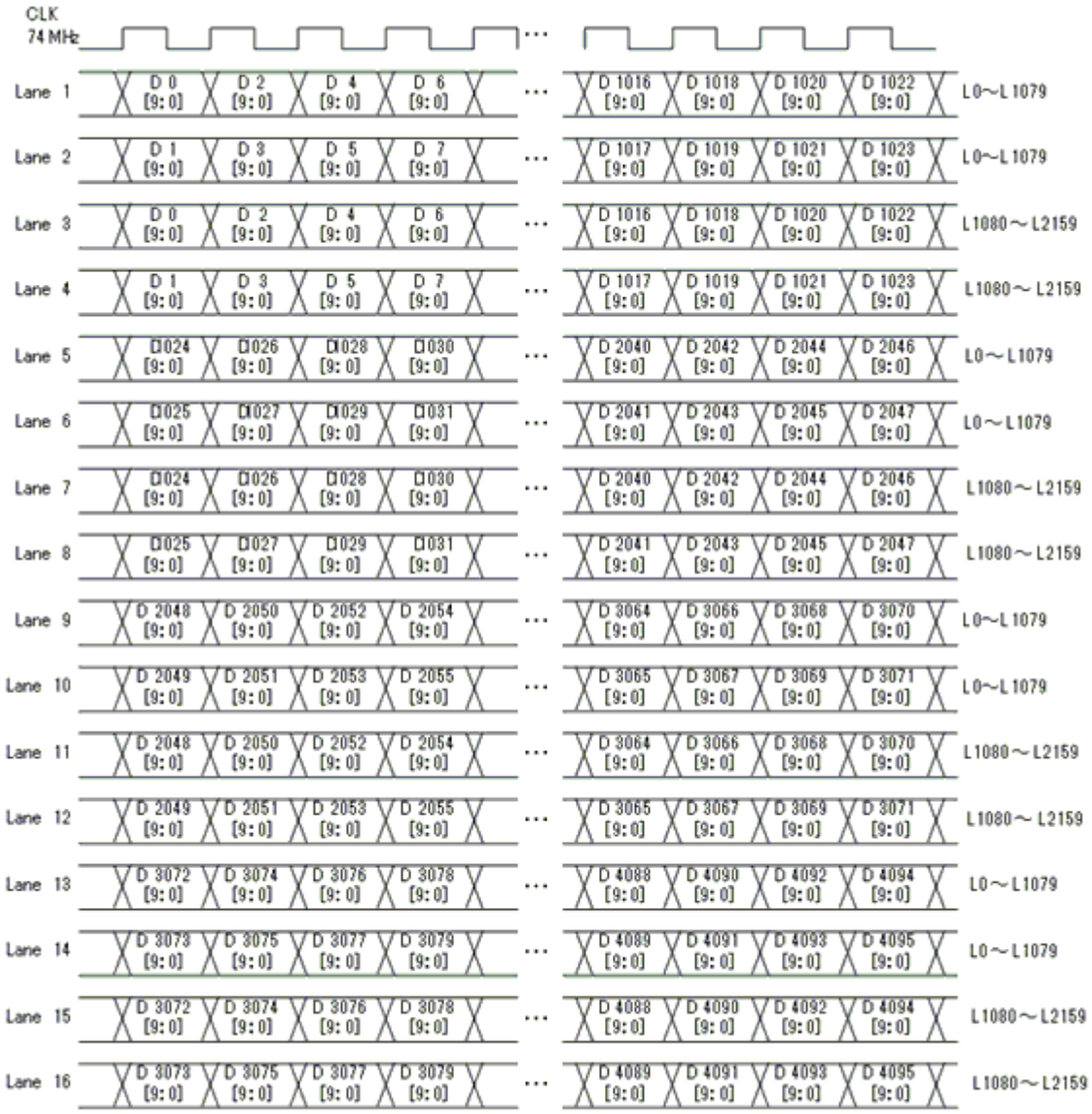
[4K x 2K 120Hz － 16 lanes output]



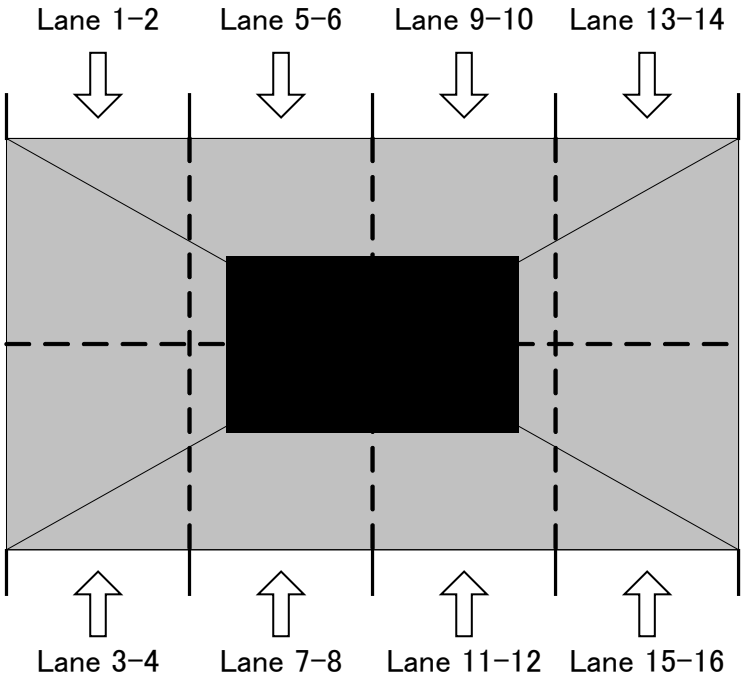
(1) Mode 0 (16 lanes) - Cross split into 4 + vertically split into 2

The screen is split it into 4 by square. Lane 1,2,5,6 are output to top-left, lane 9,10,13,14 are output to top-right, lane 3,4,7,8 are output to , and split vertically bottom-right and lane 11,12,15,16 are output to bottom-left..

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



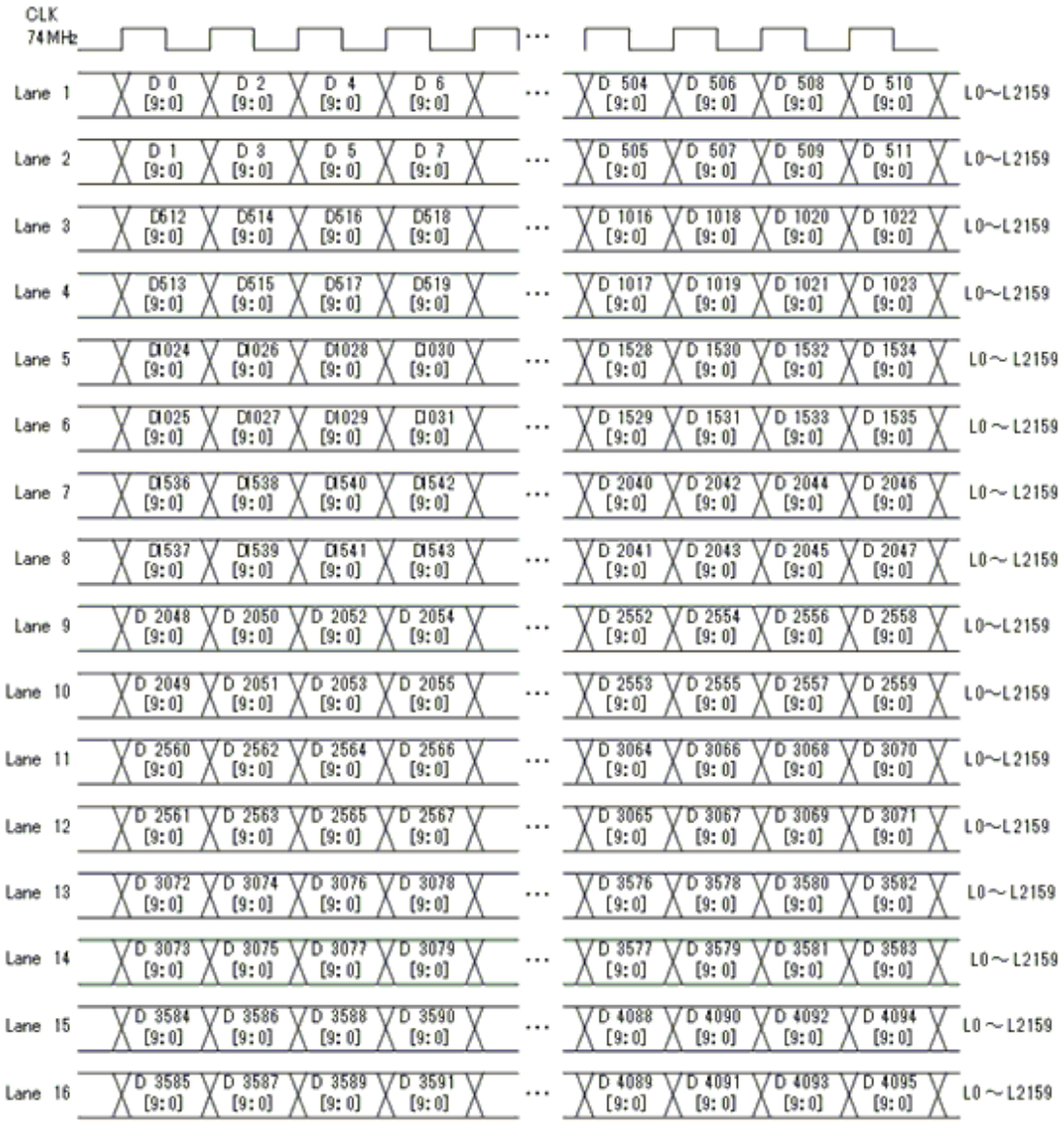
[Assignment of each lane]



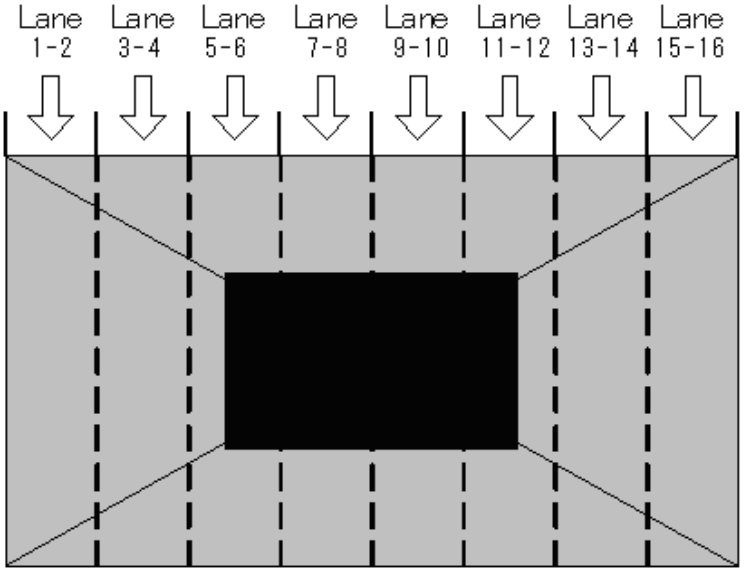
(2) Mode 1 (16 lanes) - vertically split into 4 + vertically split into 2

The screen is vertically split into 8. By using 2 lanes as one set, Lane1,2, Lane3,4, Lane5,6, Lane7,8, Lane 9,10, Lane 11,12, Lane13,14 and Lane15,16 are assigned from the left.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



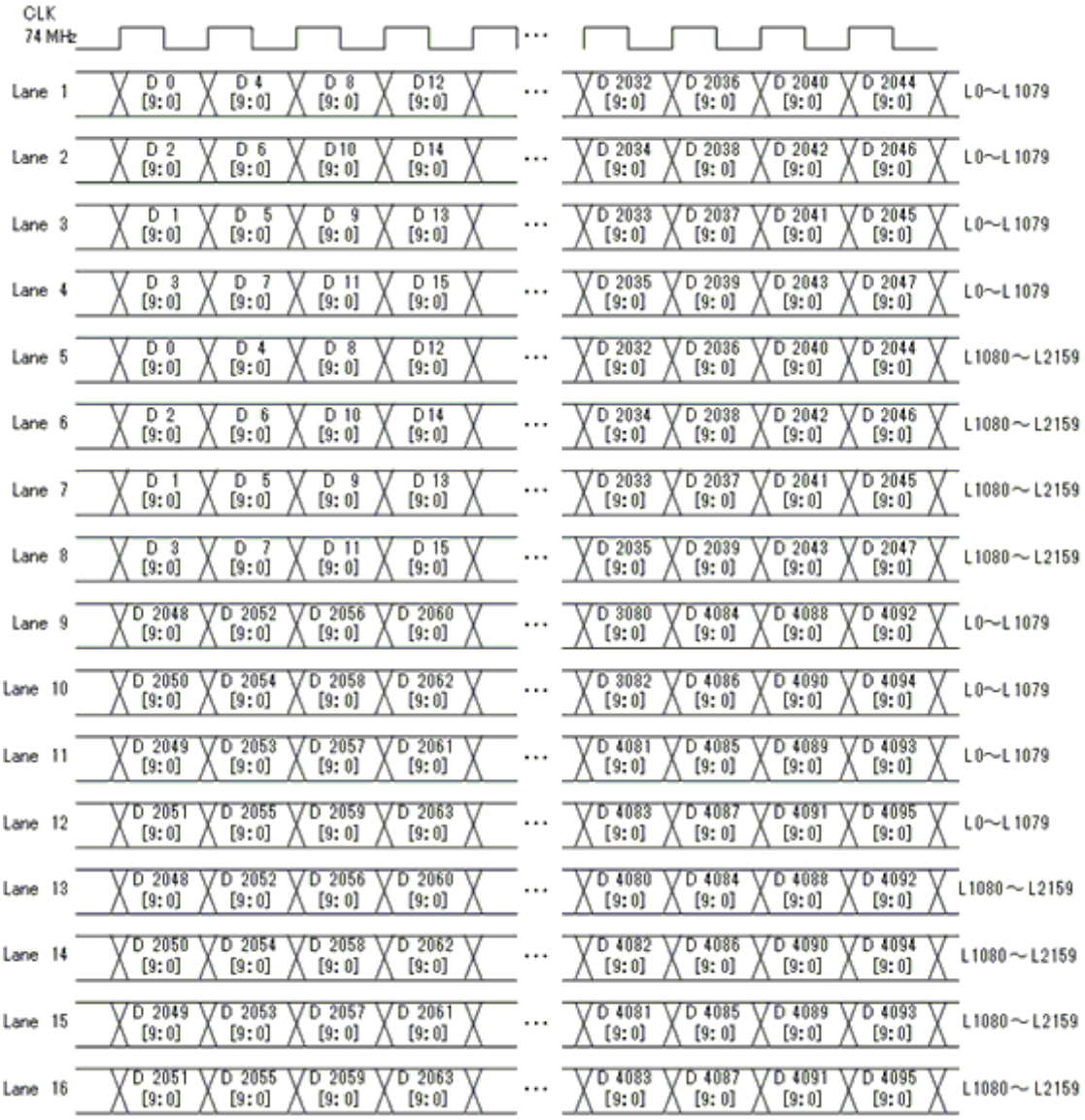
[Assignment of each lane]



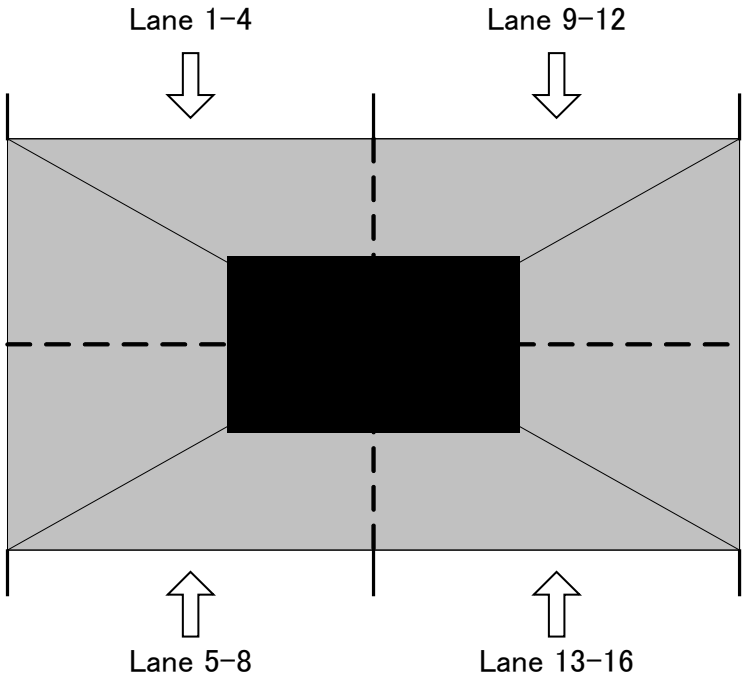
(3) Mode 2 (16 lanes) horizontally split into 2 + vertically split into 2

Using lanes 1 -4 lanes, the top-left of the image is output in the even and odd numbers; similarly, using 5-8 lanes, bottom-left image is output. 13-16Using 9-12 lanes, the top-right image is output. Using 13-16 lanes, bottom-right image is output.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



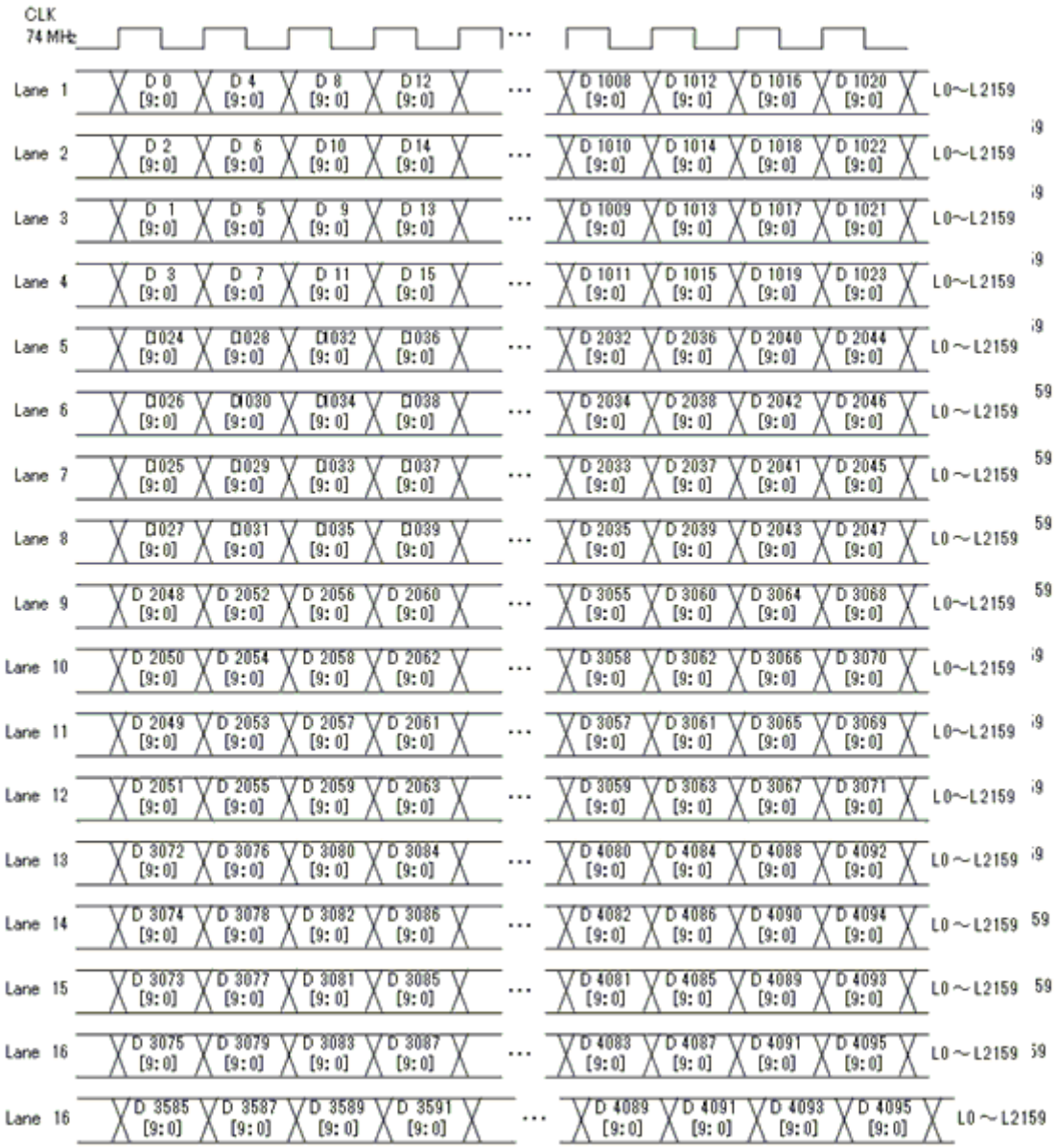
[Assignment of each lane]



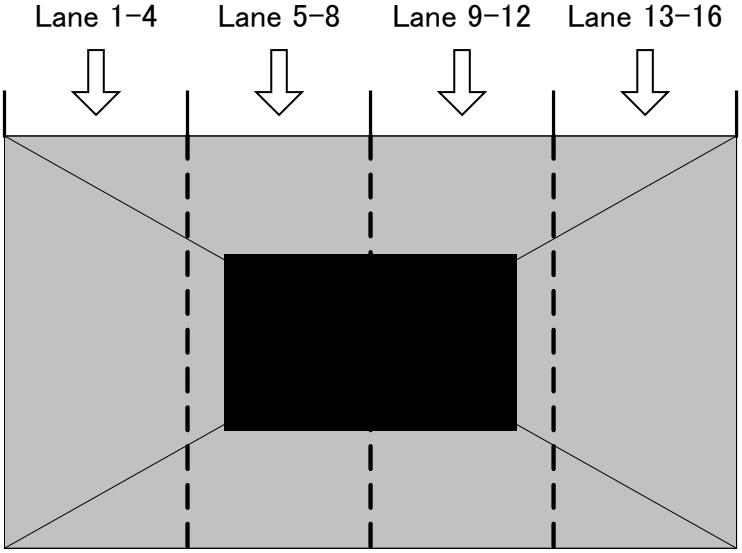
(4) Mode 3 (16 lanes) - (vertically split into 2 + vertically split into 2)

Using lanes 1 -4 lanes and 5-8 lanes, the left half of the image is output in the even and odd numbers; similarly, using 9-12 lanes and 13-16 lanes, right half of the image is output in the even and odd numbers.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



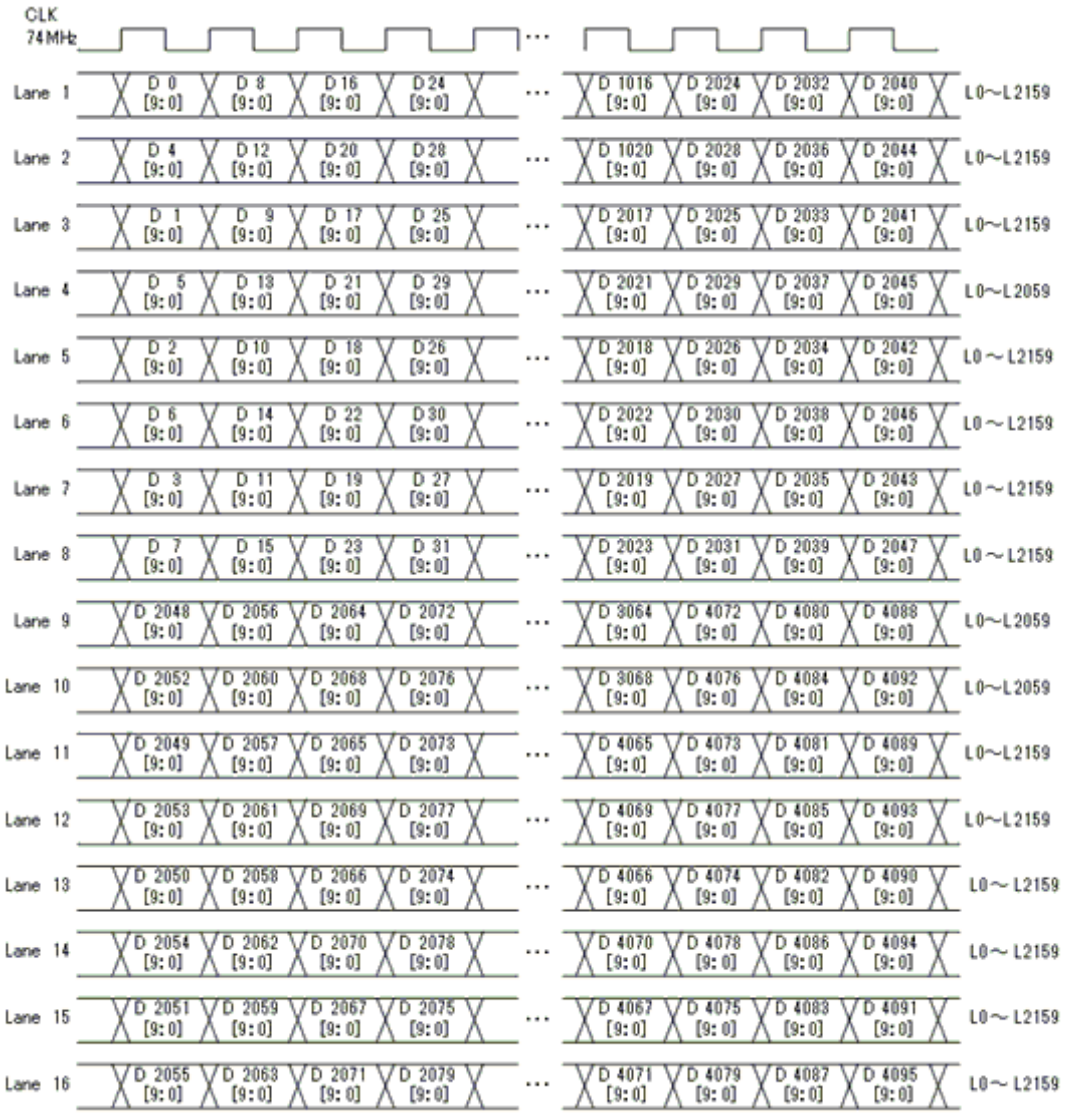
[Assignment of each lane]



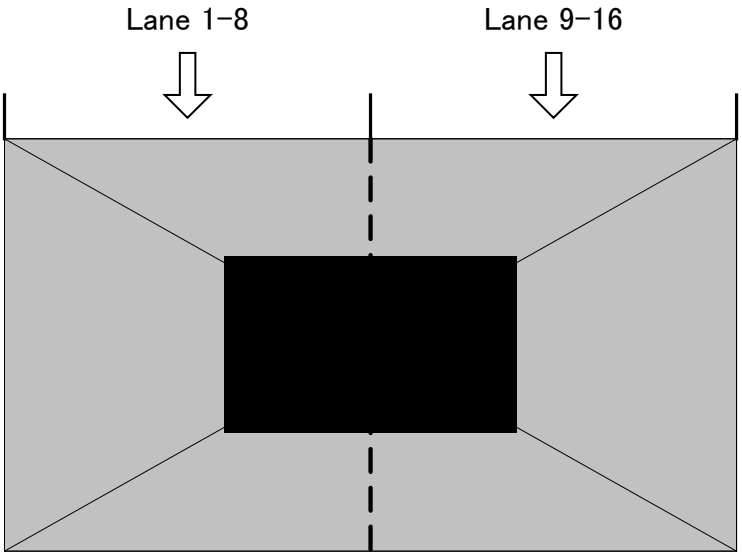
(5) Mode 4 (16 lanes) - vertically split into 2 + No split (1)

By using Lane 1-8, the image is output in even and odd numbers. Similarly, by using Lane 9-16, the image is output in even and odd numbers. Each lane mapping is shown in [Assignment of each lane.]

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



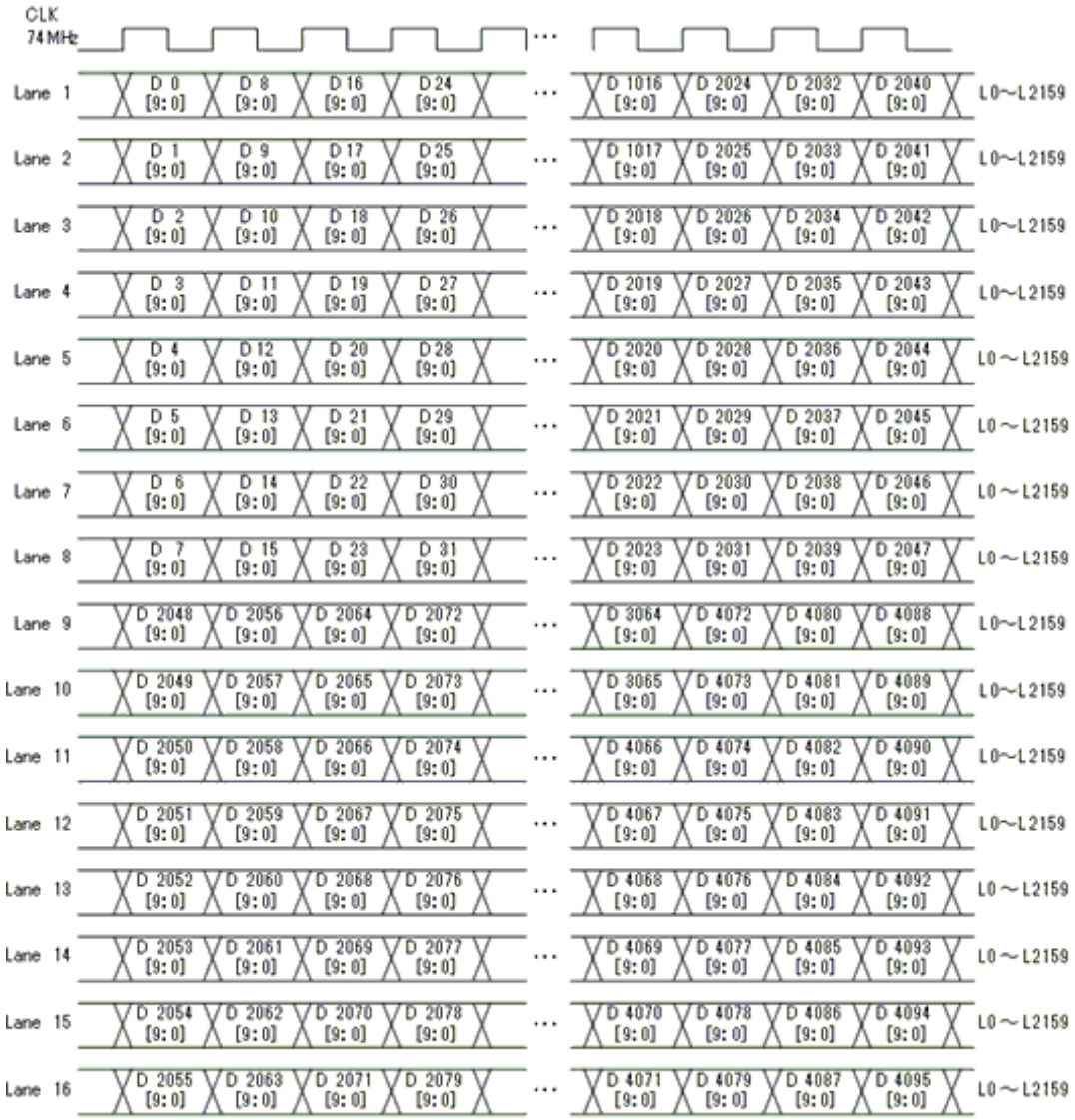
[Assignment of each lane]



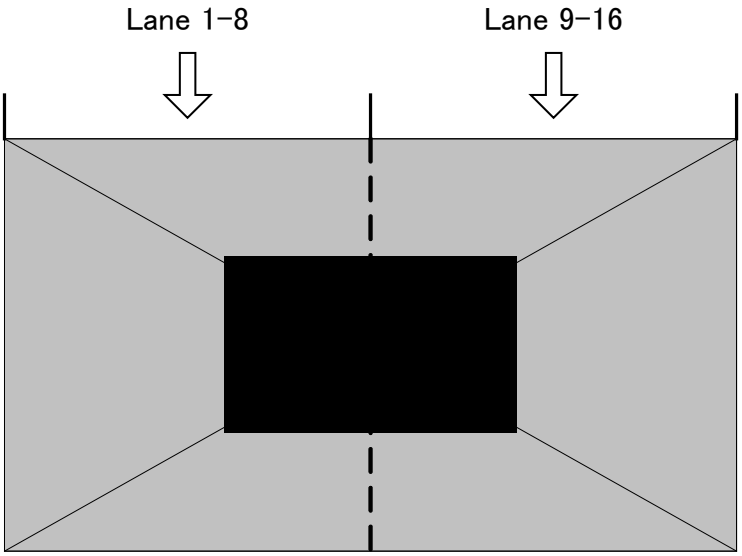
(6) Mode 5 (16 lanes) - vertically split into 2 + No split (2)

By using Lane 1-8, the image is output in even and odd numbers. Similarly, by using Lane 9-16, the image is output in even and odd numbers. Each lane mapping is shown in [Assignment of each lane.]

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



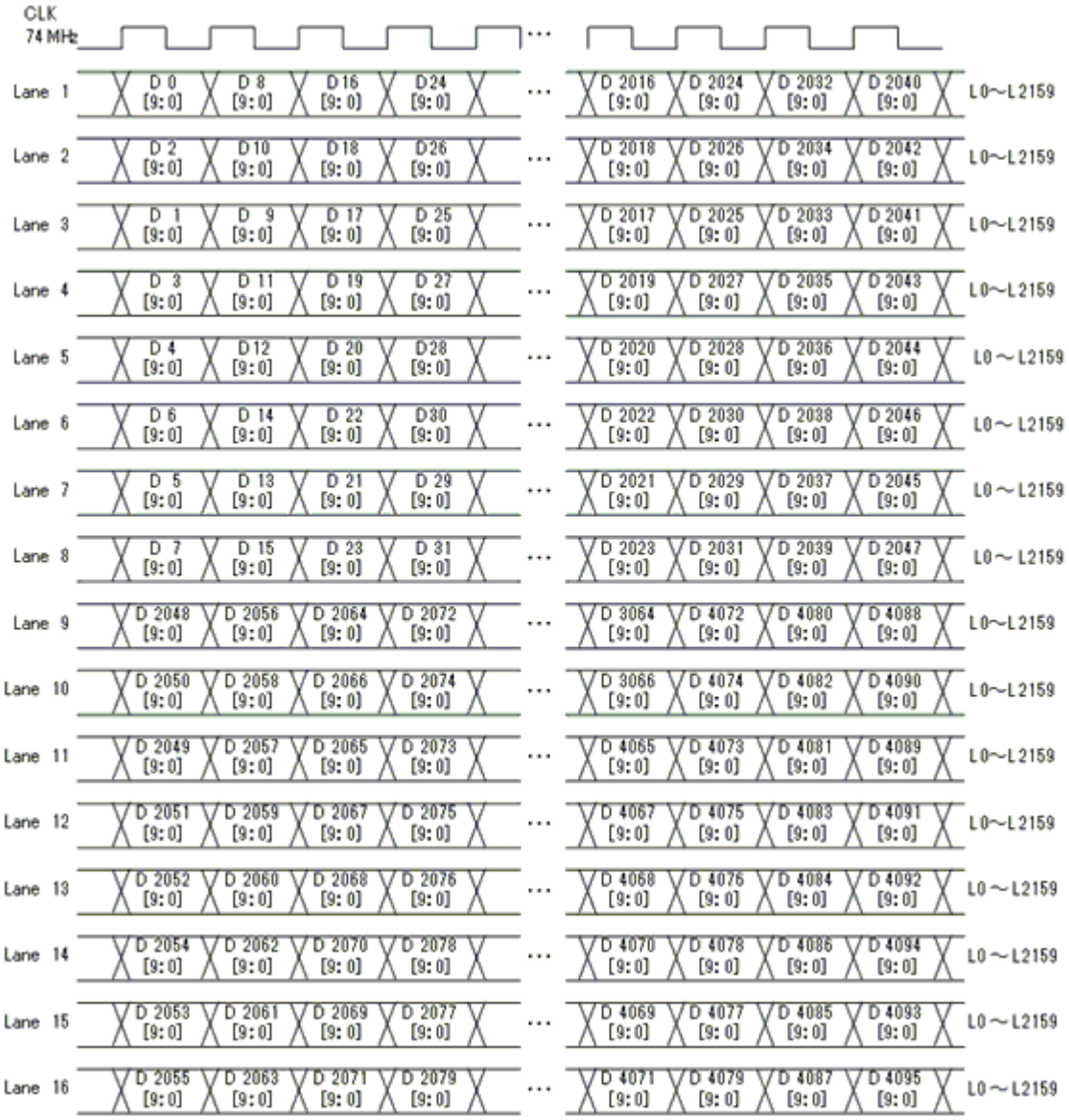
[Assignment of each lane]



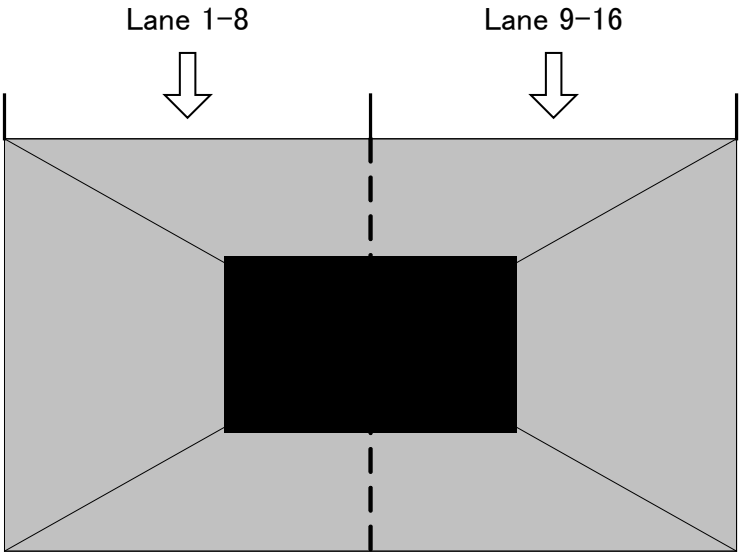
(7) Mode 6 (16 lanes) - vertically split into 2 + No split (3)

By using Lane 1-8, the image is output in even and odd numbers. Similarly, by using Lane 9-16, the image is output in even and odd numbers. Each lane mapping is shown in [Assignment of each lane.]

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



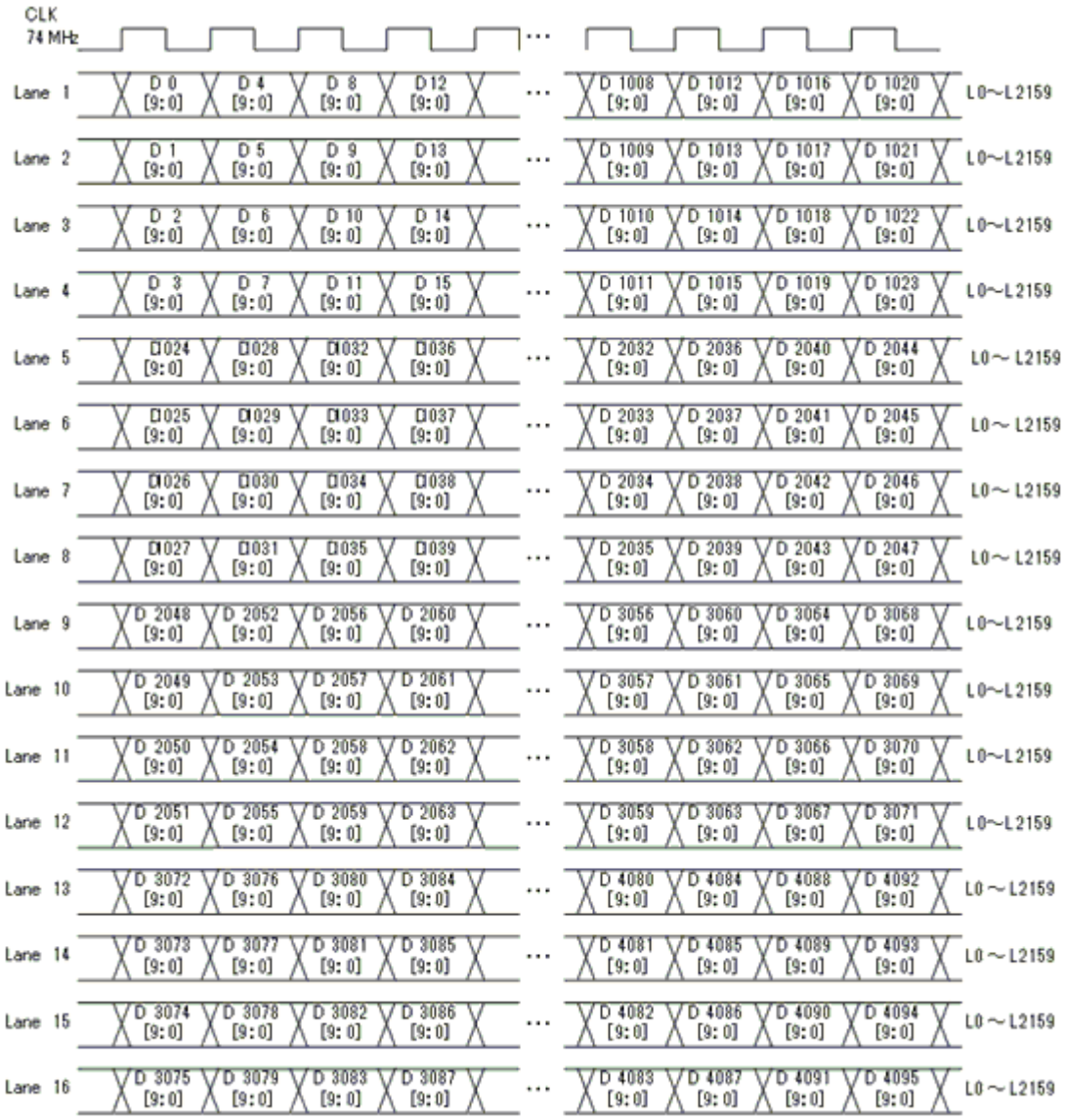
[Assignment of each lane]



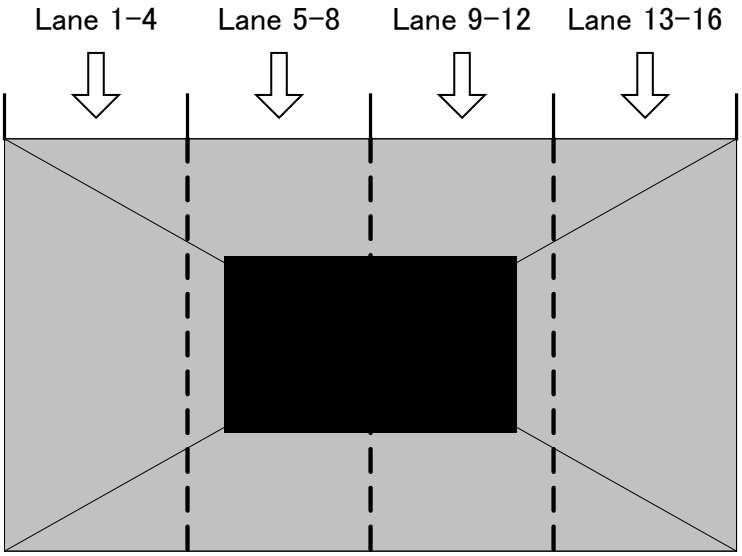
(8) Mode 7 (16 lanes) (vertically split into 2 + Split (1) Dividing Normal Mode)

The screen is vertically divided into 2 as pixel assignment shown below.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



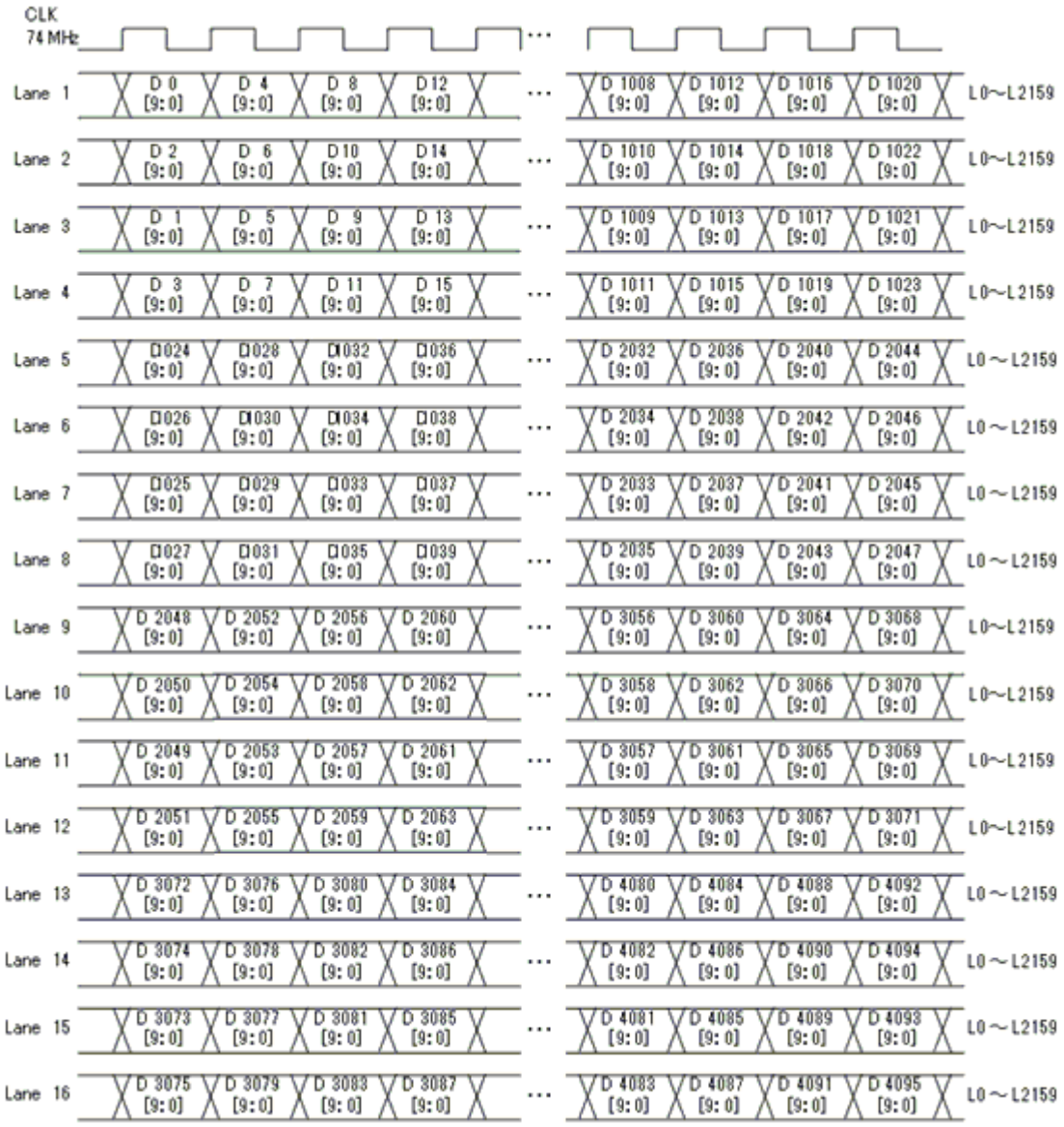
[Assignment of each lane]



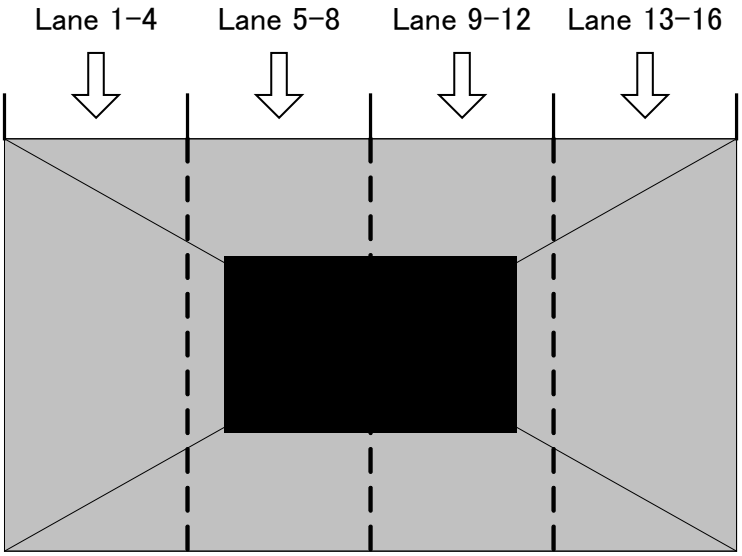
(9) Mode 8 (16 lanes) （vertically split into 2 + Split (2) Dividing Cross Mode）

The screen is vertically divided into 2 as pixel assignment shown below.

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



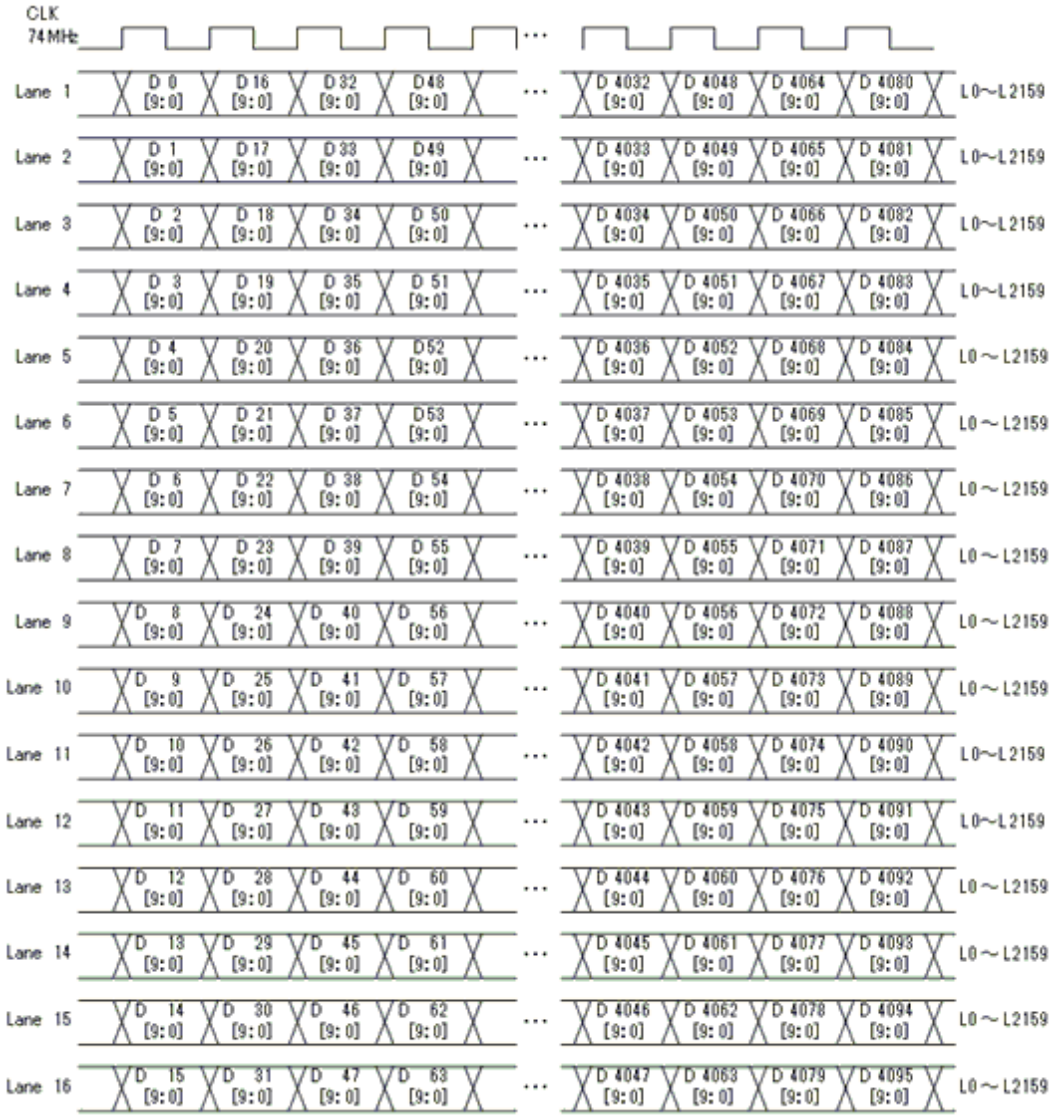
[Assignment of each lane]



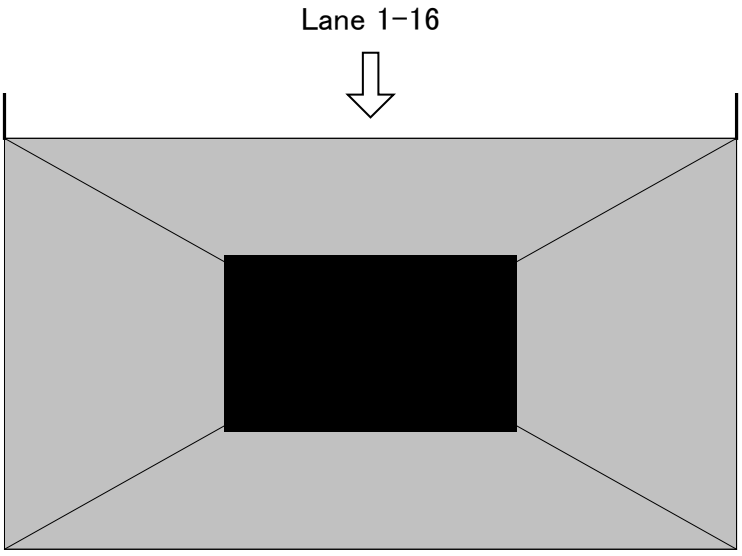
(10) Mode 9 (16 lanes) (No split)

Without splitting the screen, the image is output

This example is a case where the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz and the output bit depth is 10 bits.



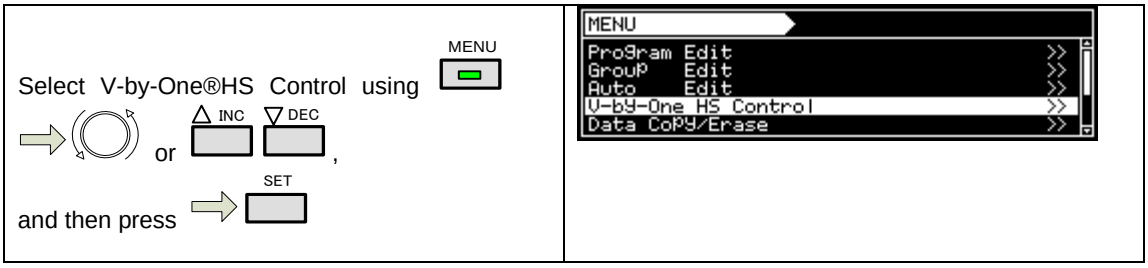
[Assignment of each lane]

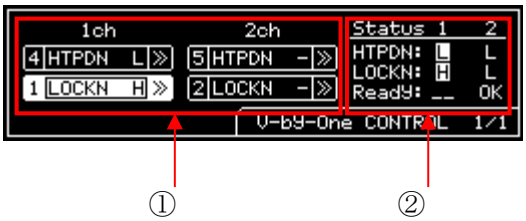


10.5.4 V-by-One®HS Control

The VM-1876-M2 makes it possible to control the V-by-One® HS control signals (HTPDN and LOCKN).

<Operating procedure>

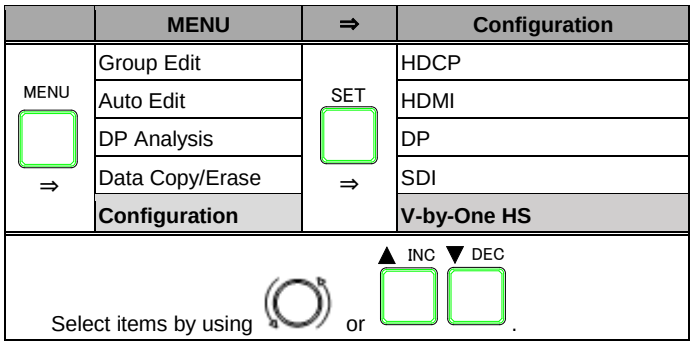




<Control parameters>

(1)	These parameters are used for channel 1 to 4 channel control.		
	-	**Through**	The signals from the receiver are passed straight through.
	L	**Forced Low**	The signal is forcibly set to low.
	H	**Forced High**	The signal is forcibly set to high.
(2)	The current statuses of channel 1 and channel 2 are indicated here. The statuses are displayed in solid white lettering against a black background if the signals have been forcibly set to low or high.		

10.5.5 V-by-One®HS Config setting



<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to below <**V-by-One®HS Config setting parameter> for details.**

<V-by-One®HS Config setting parameter>

(0)	**Control Mode(0/1)**	Set control method of HTPDN and LOCKN.		
		0	**Separate**	Set 1ch, 2ch, 3ch and 4ch individually.
		1	**1->234**	Set same setting as1ch.
(1)	**HTPDN Ctrl 1,2,3,4 LOCKN Ctrl 1,2,3,4 (0-2)**	Control 1CH, 2CH, 3C and 4CH.		
		0	**Through**	The signal from receiver goes through.
		1	**Low**	Forcibly sets Low.
		2	**High**	Forcibly sets High.
(2)	**Wait Progexec time**	**1 – 1000 ms**		Sets wait time of program transmission time to slave.
(3)	**Wait HS Ctrl time**	**1 – 30000 us**		Sets waiting time of HsControl transmission time to slave.。

10.6 SDI

10.6.1 SDI output

SDI outputs the timing that is compliant with SMPTE standard. Refer to “10.5.3 SDI transmission” for details.

10.6.2 SDI setting

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	General
	GroupEdit		**Output**		Analog Output		HDMI
	AutoEdit		Audio		**Digital Output**		DP
	Data Copy/Erase		Pattern		VBI Function		**SDI**
	Configuration		Action				V-by-One HS

Select items by using or ▲ INC ▼ DEC.

By operating like above, SDI setting menu is displayed.

<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to <SDI unit parameter setting> written below for details.

<SDI unit parameter setting.>

(1)	**Output OFF/ON Port1 to 16 (0/1)**	This sets On or Off for each channel. These are the same settings as in "10.2.1 **Output interface ON/OFF setting".**		
		0	**OFF**	No output
		1	**ON**	Output
Below setting is available only for the setting "Refer Program" in SDI Payload setting- Mode.				
(2)	**SDI Format (0-4)**	This sets the SDI format.		
		0	**SD**	SD-SDI
		1	**HD**	HD-SDI
		2	**3G-A**	3G-SDI. Level.A
		3	**3G-B**	3G-SDI. Level.B
		4	**HD Dual**	HD Dual-Link
(3)	**Video Format (0-2)**	This sets the color space of the images which are output from SDI.		
		0	**RGB**	RGB
		1	**YcbCr4:4:4**	YcbCr4:4:4
		2	**YcbCr4:2:2**	YcbCr4:2:2
(4)	**Width(0-2)**	This sets the output image bit length. A setting which is the independent of the pattern drawing bit length can be selected or the same bit length as the pattern drawing bit length can be selected automatically. Note) the portion of the pattern drawing bit length which exceeds the bit length set here is discarded. A deficient portion is filled with zeros.		
		0	**Auto**	Either 10 bits or 12 bits are selected automatically in accordance with the pattern drawing bit length.
		1	**10bit**	10-bit output
		2	**12bit**	12-biy output
(5)	**Split Count(0-2)**	This sets how many splits are applied. **Note) it follows the setting of Dotclk Mode that was set in "10.2.4 Dot Clock operation mode".**		
		0	**No Split**	No split
		1	**2 Split (not used)**	2 split (not supported by SDI)
		2	**4 Split**	4 split
(6)	**Split Mode(0-A)**	Set split mode **Note) It follows the setting of Split Mode that is set in "10.2.4 Dot clock operation mode – DotClk Mode setting" This is displayed only for 4 split.**		
		0	**4Square**	Square division split
		1	**reserved1**	This is not supported by SDI.
		2	**reserved2**	This is not supported by SDI.
		3	**reserved3**	This is not supported by SDI.
		4	**reserved4**	This is not supported by SDI.
		5	**reserved5**	This is not supported by SDI.
		6	**reserved6**	This is not supported by SDI.
		7	**reserved7**	This is not supported by SDI.
		8	**reserved8**	This is not supported by SDI.
		9	**reserved9**	This is not supported by SDI.

		A	**2SI**	2-sample interleave division
(7)	**Audio Output(0/1)**	This sets embedded audio output.		
		0	**OFF**	The embedded audio is not output.
		1	**ON**	The embedded audio is output.
(8)	**Audio Copy Ch2(0/1)** **Audio Copy Ch3(0/1)** **Audio Copy Ch4(0/1)**	This set whether Audio after Ch2 of 3G-SDI is copied from Link1 or not.		
		0	**No Copy**	Audio is over imposed on Link1(Ch1) only.
		1	**Copy Ch1**	Audio that is same as Link1 (Ch1) is over imposed on Ch2, 3 and 4.
(9)	**Payload**	This sets the payload ID data. For further details, refer to <SDI payload ID data setting parameters>.		

<SDI payload ID data setting parameters>

These settings are for the payload ID data only. For details of the setting which directly affect the transfer signals, refer to the respective items.
Payload cannot be set in SD output.

(1)	**OFF/ON (0/1)**	This sets the payload ID data ON or OFF. Note) If it is set as OFF, under Mode (0/2) items are not displayed.		
		0	**OFF**	The payload ID is not inserted.
		1	**ON**	The payload ID is inserted.
(2)	**Mode (0/2)**	This is the setting for Byte1, Channel Assignment.		
		0	**Refer Program**	According to each data setting of SDI output, the payload setting is followed. **Note) The value under (3) Byte 1 is not displayed.**
		1	**Manual**	The payload of below items are set by manually. Note1) the setting except Payload is not reflected. Note2) SDI setting cannot be executed.
		2	**Hex**	Byte1 to 4 of payload is set by Hexadecimal mode. Note) SDI setting cannot be executed.
(3)	**Byte 1**	Set Byte1.		
		00h - **FFh**		
The below (4) to (13) items are displayed when Mode=1 (manual) is selected.				
(4)	**Transport (0/1)**	This sets the transport scanning mode.		
		0	**Interlace**	Interlace
		1	**Progressive**	Progressive
(5)	**Picture (0/1)**	This sets the image scanning mode.		
		0	**Interlace**	Interlace
		1	**Progressive**	Progressive
(6)	**Picture Rate(0-9)**	This sets frame rate.		
		0	**23.98Hz**	Each value is applied.
		1	**24Hz**	
		2	**25Hz**	
		3	**29.97Hz**	
		4	**30Hz**	
		5	**50Hz**	

		6	**59.94Hz**	
		7	**60Hz**	
		8	**47.95Hz**	
		9	**48Hz**	
(7)	**Aspect Ratio(0/1)**	This sets aspect ratio. Depends on Byte1 setting, setting Bit changes accordingly.		
		0	**4:3**	Aspect ratio 4:3
		1	**16:9**	Aspect ratio 16:9
(8)	**H Y-Sampling (0/1)**	This sets the H or Y sampling value.		
		0	**0**	
		1	**1**	
(9)	**Sampling Struc(0-A)**	This sets the sampling structure (video format).		
		0	**4:2:2(YCbCr)**	Each video format is applied.
		1	**4:4:4(YCbCr)**	
		2	**4:4:4(RGB)**	
		3	**4:4:4:4(YCbCr+A)**	
		4	**4:4:4:4(RGB+A)**	
		5	**4:4:4(XYZ)**	
		6	**4:2:0**	
		7	**4:2:2:4(YCbCr+A)**	
		8	**4:2:2:4(YCbCr+D)**	
		9	**4:4:4:4(YCbCr+D)**	
		A	**4:4:4:4(RGB+D)**	
(10)	**Ch1 Link A (0-7)** **Link B (0-7)** **Ch2 Link A (0-7)** **Link B (0-7)** **Ch3 Link A (0-7)** **Link B (0-7)** **Ch4 Link A (0-7)** **Link B (0-7)**	This sets channel setting of data stream.		
		0	Stream (0h)	* This is set in bit 5 to 7 of Byte4, in spite of the value of Byte1.
		1	Stream (2h)	
		2	Stream (4h)	
		3	Stream (6h)	
		4	Stream (8h)	
		5	Stream (Ah)	
		6	Stream (Ch)	
		7	Stream (Eh)	
(11)	**Audio Copy Ch1(0/1)** **Audio Copy Ch2(0/1)** **Audio Copy Ch3(0/1)** **Audio Copy Ch4(0/1)**	This set whether Audio after Ch2 of 3G-SDI is copied from Link1 or not.		
		0	**No Copy**	Audio is over imposed on Link1(Ch1) only.
		1	**Copy Ch1**	Audio that is same as Link1 (Ch1) is over imposed on Ch2, 3 and 4.
(12)	**Dynamic Range(0-2)**	This sets dynamic range.		
		0	**100%**	Each value is applied.
		1	**200%**	
		2	**400%**	
(13)	**Bit Depth(0-2)**	This sets bit length.		
		0	**8bit**	Each value is applied.
		1	**10bit**	
		2	**12bit**	

The below item is shown if Mode=2: HEX was selected.		
(14)	**Byte2**	This sets Byte2.
		00h to FFh
(15)	**Byte3**	This sets Byte3.
		00h to FFh
(16)	**Byte4 Ch1 LinkA**	This sets Byte4 Ch1 LinkA.
		00h to FFh
(17)	**Byte4 Ch1 LinkB**	This sets Byte4 Ch1 LinkB.
		00h to FFh
(18)	**Byte4 Ch2 LinkA**	This sets Byte4 Ch2 LinkA.
		00h to FFh
(19)	**Byte4 Ch2 LinkB**	This sets Byte4 Ch2 LinkB.
		00h to FFh
(20)	**Byte4 Ch3 LinkA**	This sets Byte4 Ch3 LinkA.
		00h to FFh
(21)	**Byte4 Ch3 LinkB**	This sets Byte4 Ch3 LinkB.
		00h to FFh
(22)	**Byte4 Ch4 LinkA**	This sets Byte4 Ch4 LinkA.
		00h to FFh
(23)	**Byte4 Ch4 LinkB**	This sets Byte4 Ch4 LinkB.
		00h to FFh

10.6.3 SDI transfer method

SD-SDI and HD-SDI signal
Output from BNC connector without split.

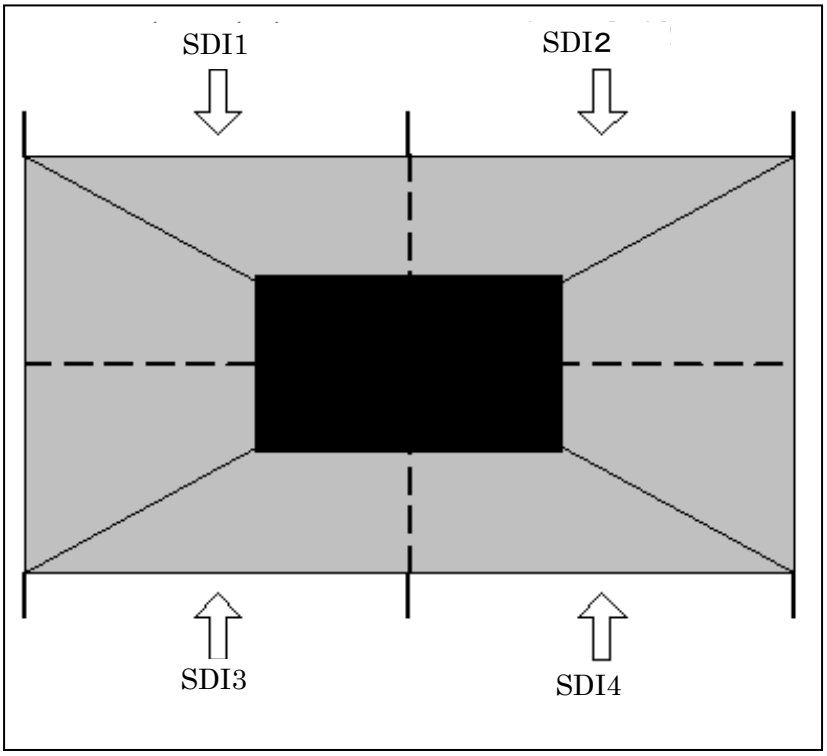
SMPTE372M（DUAL LINK）
From the slot of smaller number, output 1, 2 (, 3, 4) are assigned.

BNC connector	Signal
CH 1	Output 1 (3) LINK A
CH 2	Output 1 (3) LINK B
CH 3	Output 2 (4) LINK A
CH 4	Output 2 (4) LINK B

3G-SDI signal
Output from BNC connector without split.

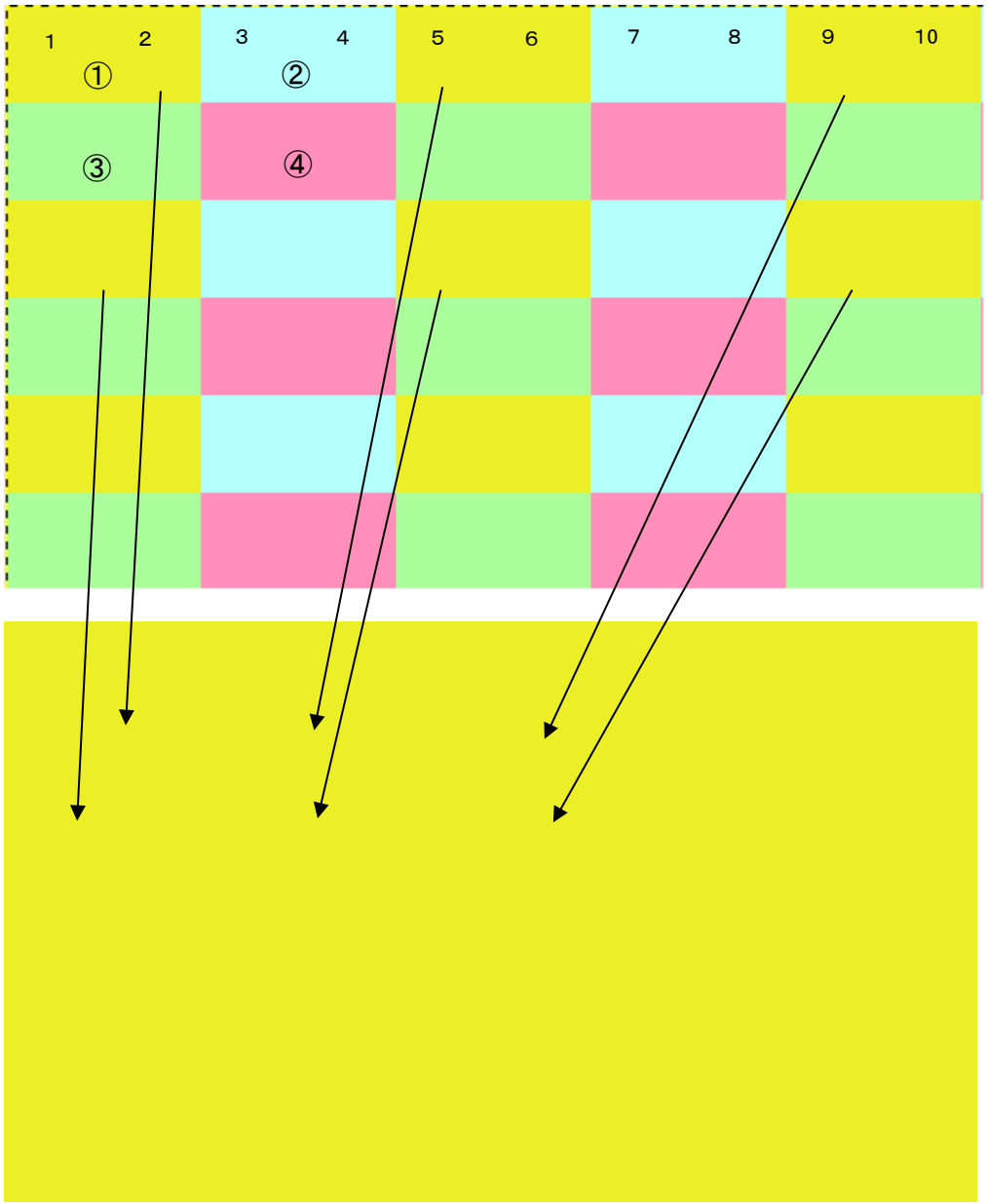
4K 3840 x2160 (4096x2160) signal
Mapping on 3G-SDI or SMPTE372M (DUAL LINK) and output.
Mapping method is written below.

Mode 0　4Square Division
3840x2160 format that cannot be displayed by HD-SDI resolution is displayed in square division.



Mode A 2-sample interleave division (2SI)

3840x2160 format that cannot be displayed by HD-SDI resolution is displayed as below.



e.g. CH1 output

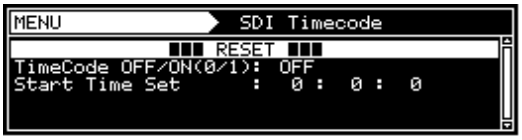
The group that is consist of 2 pixels and 2 lines (see each color area in above picture) are picked up and output.
CH1 to CH4 sends the each color area.
For example in above picture, CH1 displays yellow. CH2 displays light blue. CH3 displays green. CH4 displays pink.
These split picture is output by 3G-SDI.

10.6.4 SDI TimeCode setting

	MENU	⇒	Configuration		SDI
MENU ⇒	ProgramEdit	SET ⇒	General	SET ⇒	**TimeCode**
	GroupEdit		HDCP		ClockDelay
	AutoEdit		HDMI		
	Data Copy/Erase		DP		
	Configuration		**SDI**		

Select items by ◯ or ▲ INC ▼ DEC.

By operating as above, the below menu [SDI Timecode] appears.



<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to **<SDI Time code setting parameters>** for further details.

<SDI Time code setting parameters>

(1)	**Reset**	Counter reset to the time that is set in the Start Time.		
(2)	**OFF/ON (0/1)**	0	**OFF**	Time code is not inserted.
		1	**ON**	Time code is inserted.
(3)	**Start Time**	Set Time Code H (0 to 23) : m (0 to 59) : s (0 to 59)		

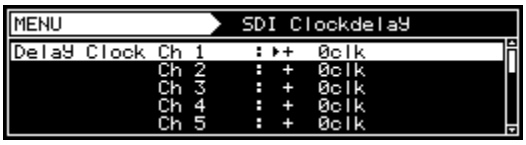
* Time code is not output by SD output.
* Time code is embedded by LTC.

10.6.5 SDI ClockDelay setting

	MENU	⇒	Configuration		SDI
MENU ⇒	ProgramEdit	SET ⇒	General	SET ⇒	TimeCode
	GroupEdit		HDCP		**ClockDelay**
	AutoEdit		HDMI		
	Data Copy/Erase		DP		
	Configuration		**SDI**		

Select items by or ▲ INC ▼ DEC .

By operating as above, the below menu [SDI ClockDelay] appears.



<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to **<SDI clock delay setting parameters>** for further details.

<SDI clock delay setting parameters>

(1)	**Delay Clock1 to 8**	This sets delay time of SDI signal by clock unit. When SD timing is selected, this item cannot be used.		
		Sign: code (delay/ahead)		
		0	**+**	It is ahead by the clock that is set in Time.
		1	**-**	It delays by the clock that is set in Time.
		Time: set within 0 to half of H period.		

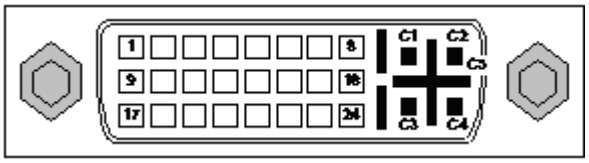
10.6.6 Embedded audio

Embedded audio (Internal L-PCM, 48KHz only) is output by SDI.

Phase between channels are not guaranteed.
Refer to “10.10 Digital Audio” for further details.

10.7 iTMDS

10.7.1 Connector and pin assignment



Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	TMDS DATA2－	9	TMDS DATA1－	17	TMDS DATA0－
2	TMDS DATA2＋	10	TMDS DATA1＋	18	TMDS DATA0＋
3	TMDS DATA2/4 G	11	TMDS DATA1/3 G	19	TMDS DATA0/5 G
4	TMDS DATA4－	12	TMDS DATA3－	20	TMDS DATA5－
5	TMDS DATA4＋	13	TMDS DATA3＋	21	TMDS DATA5＋
6	DDC CLK	14	+5V(DDC Power *1)	22	TMDS CLK G
7	DDC DATA	15	GND	23	TMDS CLK＋
8	Analog Vsync	16	SENSE	24	TMDS CLK－
C1	Analog Red				
C2	Analog Green				
C3	Analog Blue				
C4	Analog Hsync				
C5	Analog Ground				

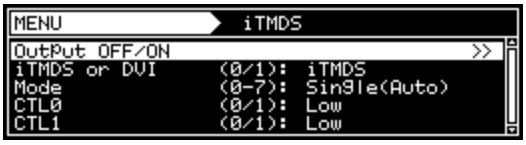
*1 Restrictions apply to the supply current of the DDC power supply. Refer to “10.17 **Concerning the maximum current consumption of the DDC power supply**.”

10.7.2 iTMDS setting method

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	**iTMDS**
	Group Edit		**Output**		Analog Output		HDMI
	Auto Edit		Audio		**Digital Output**		DP
	DP Analysis		Pattern		VBI Function		SDI
	Data Copy/Erase		Action				V-by-One HS

Select items by using or ▲ INC ▼ DEC.

By doing above operation, the below screen appears.



<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to **<iTMDS unit setting parameters>** for further details.

<iTMDS unit setting parameters>

(1)	**Output OFF/ON Port1 to 8 (0/1)**	This sets On or Off for each channel. The same settings as the ones described in “10.2.1 Setting the output interfaces to ON or OFF” can also be established.		
		0	**OFF**	No output.
		1	**ON**	Output.
(2)	**iTMDS or DVI(0/1)**	This sets signal type of output.		
		0	**DVI**	DVI compatible signal is output. 1 link is up to 8-bit.
		1	**iTMDS**	iTMDS signal is output. 1link is up to 12-bit.

<table>
<tr><td>(3)</td><td>Mode(0-7)</td><td colspan="3">This sets the bit length and link format of the images to be output from iTMDS. A setting which is independent of the bit length for pattern drawing can be selected. It is also possible to select the bit length automatically. The portion by which the bit length for pattern drawing exceeds the bit length which has been set here is discarded. A deficient portion is filled with zeros.
● When the dot clock frequency is in the range of 25 MHz to 165 MHz, Single Link can be selected, and the data can be distributed to and output from output channels 1 and 2.
● When the dot clock frequency is in the range of 50 MHz to 330 MHz, Dual Link can be selected, and the data can be distributed to and output from output channels 1 and 2.
● When the dot clock frequency is in the range of 297 MHz to 660 MHz, Quad Link can be selected, and the data can be output using output channels 1 and 2.
● When the dot clock frequency is in the range of 594 MHz to 1320 MHz, by selecting Octal Link and by using two output boards, the data can be output by combining the data of board #1 output channels 1 and 2 and the data of board #2 output channels 1 and 2.</td></tr>
<tr><td></td><td></td><td>0</td><td>Single (8bit)</td><td>The data is output by Single Link from output channels 1 and 2. The portion by which the bit length exceeds 8 bits is discarded. (Max. 12 bits with the iTMDS format)</td></tr>
<tr><td></td><td></td><td>1</td><td>Dual (8bit)</td><td>The data is output by Dual Link from output channels 1 and 2. The portion by which the bit length exceeds 8 bits is discarded. (Max. 12 bits with the iTMDS format)</td></tr>
<tr><td></td><td></td><td>2</td><td>Single (16bit)</td><td>The data is output by one connector using Master and Slave links. It outputs max. 16-bit signal.
The portion by which the bit length for pattern drawing is deficient from the bit length which has been set here is filled with zeros. Master outputs upper bits. Slave outputs lower bits.</td></tr>
<tr><td></td><td></td><td>3</td><td>Dual (16bit)</td><td>Up to 16 bits can be output by Dual Link using two connectors. The portion by which the bit length for pattern drawing is deficient from the bit length which has been set here is filled with zeros.</td></tr>
<tr><td></td><td></td><td>4</td><td>Single (Auto)</td><td>The data is output by Single Link from output channels 1 and 2. Single (8 bits) or Single (16 bits) is automatically selected depending on the bit length for pattern drawing.</td></tr>
<tr><td></td><td></td><td>5</td><td>Dual (Auto)</td><td>The data is output by Single Link from output channels 1 and 2. Single (8 bits) or Single (16 bits) is automatically selected depending on the bit length for pattern drawing.</td></tr>
<tr><td></td><td></td><td>6</td><td>Quad (8bit)</td><td>The data is output by Quad Link using output channels 1 and 2. The portion by which the bit length for pattern drawing exceeds 8 bits is discarded. (Max. 12 bits with the iTMDS)
For details on the screen splitting method, refer to “Split” in the next section.</td></tr>
<tr><td></td><td></td><td>7</td><td>Octal (8bit)</td><td>By using two output boards, the data is output by Octal Link by combining the data of board #1 output channels 1 and 2 and the data of board #2 output channels 1 and 2. The portion by which the bit length for pattern drawing exceeds 8 bits is discarded. (Max. 12 bits with the iTMDS format)
For details on the screen splitting method, refer to “Split” in the next section.</td></tr>
</table>

(4)	**Split(0-9)**	Use frame memory of the interface unit.		
		When “Quad” is set in (3)Mode, the below setting can be selected.		
		0	**MODE0**	Screen split-into-4 output in the form of a square divided into 4 equal parts. (tile split or cross split)
		1	**MODE1**	Screen vertically split-into-4 output
		2	**MODE2**	Screen horizontally split-into-2 output
		3	**MODE3**	Screen vertically split-into-2 output
		4	**MODE4**	No split
		5	**MODE0** **(x4 Mode)**	No screen splitting(1) (Non Dividing Mode)
		6	**MODE1** **(x4 Mode)**	No Screen splitting (2) (Normal Mode)
		7	**MODE2** **(x4 Mode)**	No Screen splitting (3) (Cross Mode)
		8	**MODE3** **(x4 Mode)**	Screen splitting (1) (Dividing Normal Mode)
		9	**MODE4** **(x4 Mode)**	Screen splitting (2) (Dividing Cross Mode)
	Split(0-A)	When “Octal” is set in (3)Mode, the below setting can be selected.		
		0	**MODE0**	Cross-split-into-4 + Vertically split-into-2 output
		1	**MODE1**	Vertically split-into-4 + vertically split-into-2 output
		2	**MODE2**	Horizontally split-into-2 + screen vertically split-into-2 output
		3	**MODE3**	Vertically split-into-2 + vertically split-into-2 output
		4	**MODE4**	Vertically split-into-2 + Non-dividing(1) (Non dividing mode)
		5	**MODE5**	Vertically split-into-2 + Non-dividing(2) (Normal mode)
		6	**MODE6**	Vertically split-into-2 + Non-dividing (3) (Cross mode)
		7	**MODE7**	Vertically split-into-2 + dividing (1) (Dividing Normal mode)
		8	**MODE8**	Screen vertically split-into-2 + dividing (2) (Dividing Cross mode)
		9	**MODE9**	No dividing
		A	**MODE10**	* This is not using in iTMDS.
(5)	**CTL0/CTL1**	This is not used. Set as “Low”.		

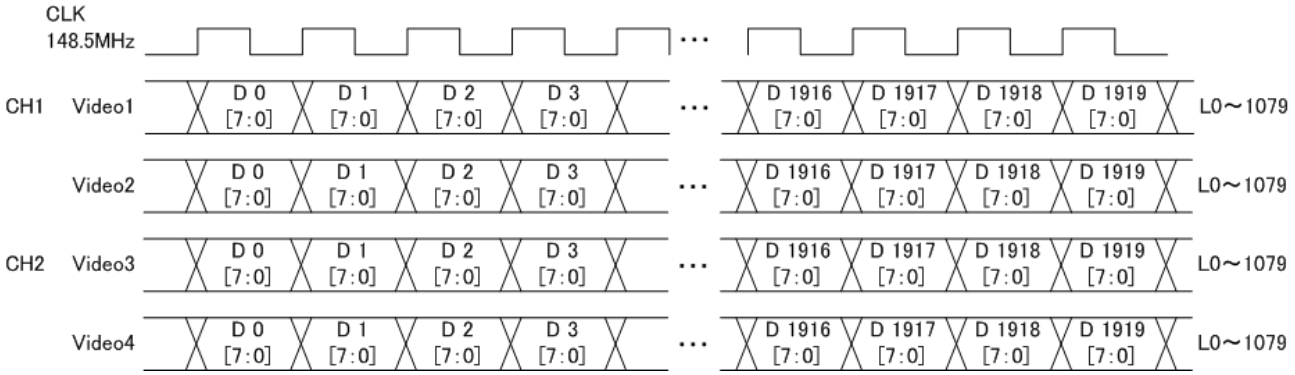
10.7.3 Data transfer systems

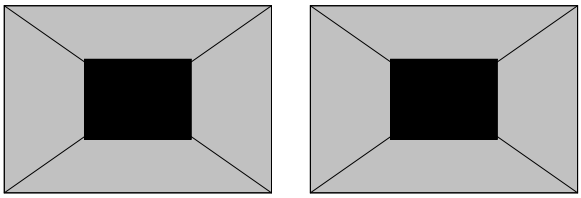
<DVI MODE>

[Single (8 bit)]

The same images are output to all channels 1 and 2. The output level is 8 bits.

Given here as an example for explanatory purposes is a case where the resolution is 1920 × 1080p60, the dot clock frequency is 148.5 MHz with 8 bits level.



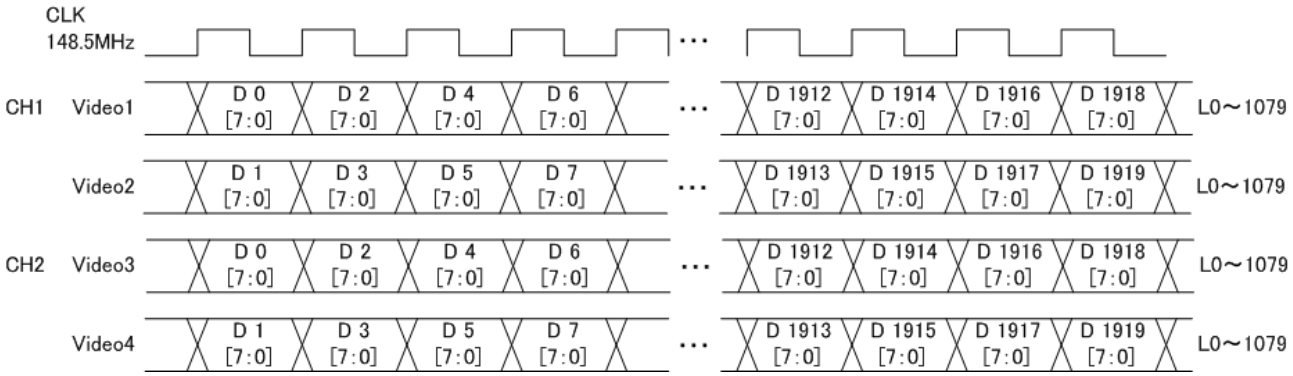


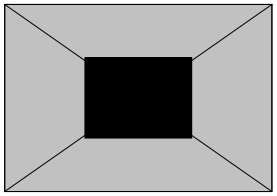
CH1 CH2
(Video1 and 2 are same picture.) (Video3 and 4 are same picture)

[Dual (8 bit)]

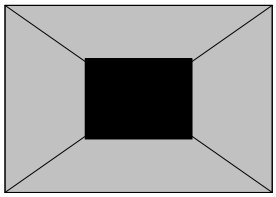
The same images are output by a pair of EVEN and ODD. The output level is 8 bits.

Given here as an example for explanatory purposes is a case where the resolution is 1920 × 1080p120, the dot clock frequency is 297 MHz with 8 bits level. CH1 and 2 output same picture.





CH1
（Video1-EVEN / Video2-ODD）

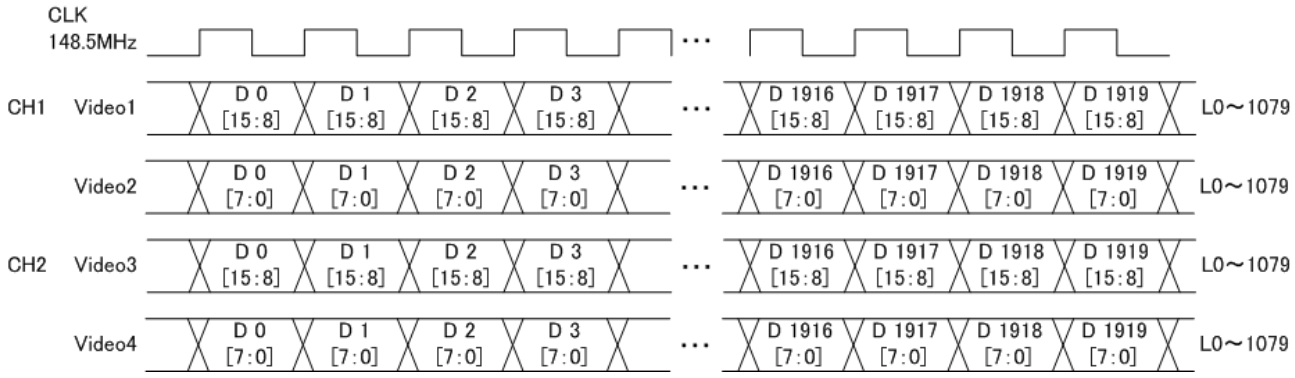


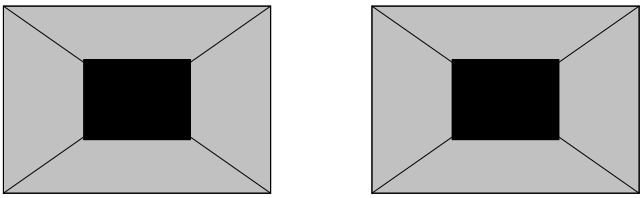
CH2
（Video3-EVEN / Video4-ODD）

[Single (16bit)]

The image is output by a pair of upper 8-bit and lower 8-bit. The output level is 16 bits.

Given here as an example for explanatory purposes is a case where the resolution is 1920 × 1080p60, the dot clock frequency is 148.8 MHz with 16 bits level. CH1 and 2 output same picture.
First channel outputs 8-bit and second channel outputs 8-bit.





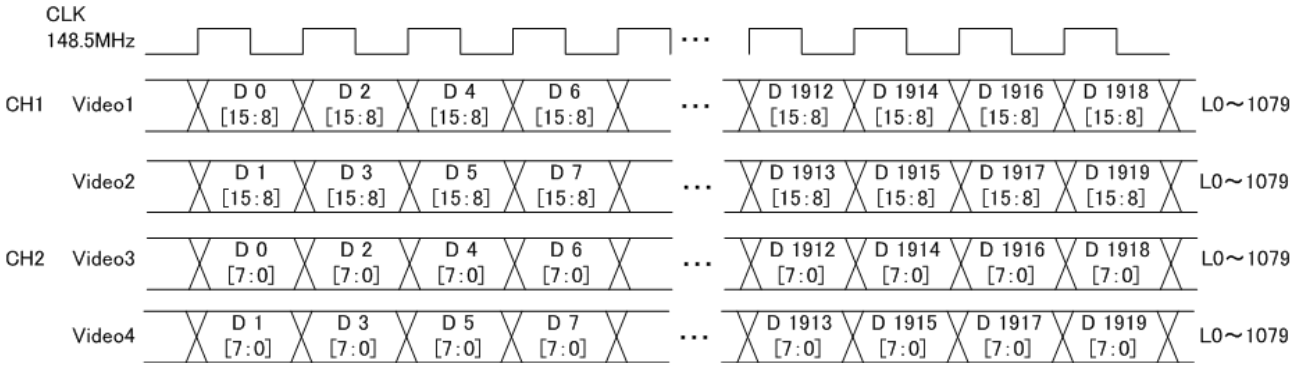
1CH
Video1 outputs upper8bit[15:8]
Video2 outputs lower8bit[7:0]

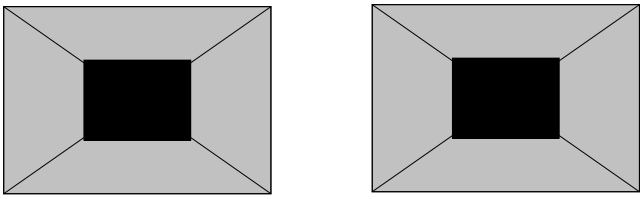
2CH
Video3 outputs upper8bit[15:8]
Video4 outputs lower8bit[7:0]

[Dual (16bit) DVI Mode]

Upper 8-bit image is output from CH1 and lower 8-bit image is output from CH2. The output level is 16 bits.

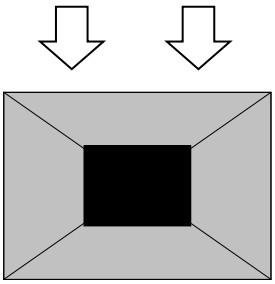
Given here as an example for explanatory purposes is a case where the resolution is 1920 × 1080p120, the dot clock frequency is 297MHz with 16 bits level. CH1 and 2 outputs each 8-bit.





1CH　　2CH

Video1 outputs EVEN of upper8bit[15:8].　Video3 outputs EVEN of lower8bit[7:0].
Video2 outputs ODD of upper8bit[15:8].　Video4 outputs ODD of lower8bit[7:0].

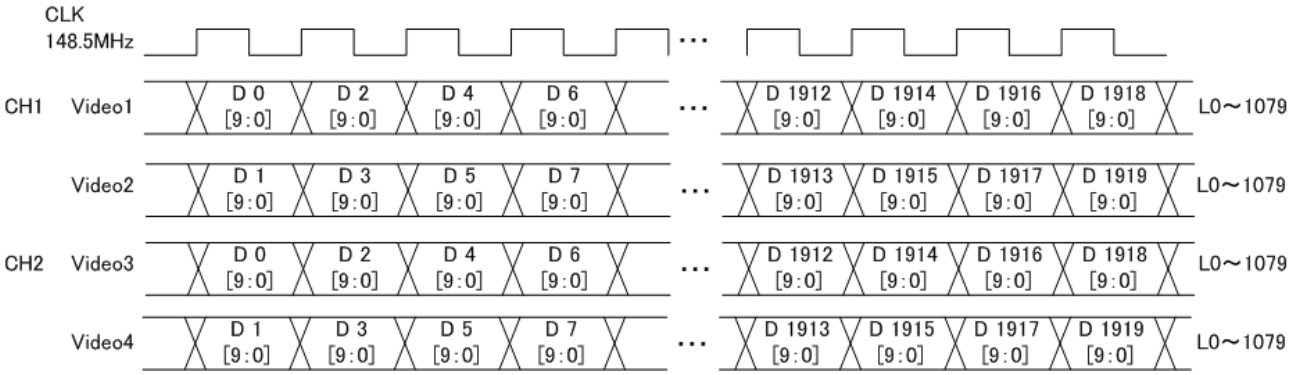


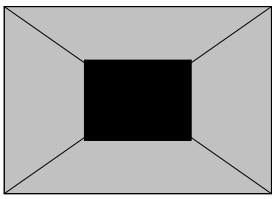
<iTMDS MODE>

[Dual (16bit) iTMDS Mode]

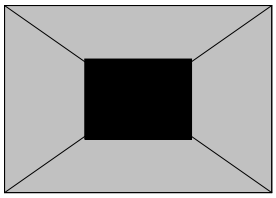
The image is output by a pair of EVEN and ODD. Video 1 and 3 output EVEN signal. Video 2 and 4 output ODD signal.

Given here as an example for explanatory purposes is a case where the resolution is 1920 × 1080p120, the dot clock frequency is 297 MHz with 10 bits level.





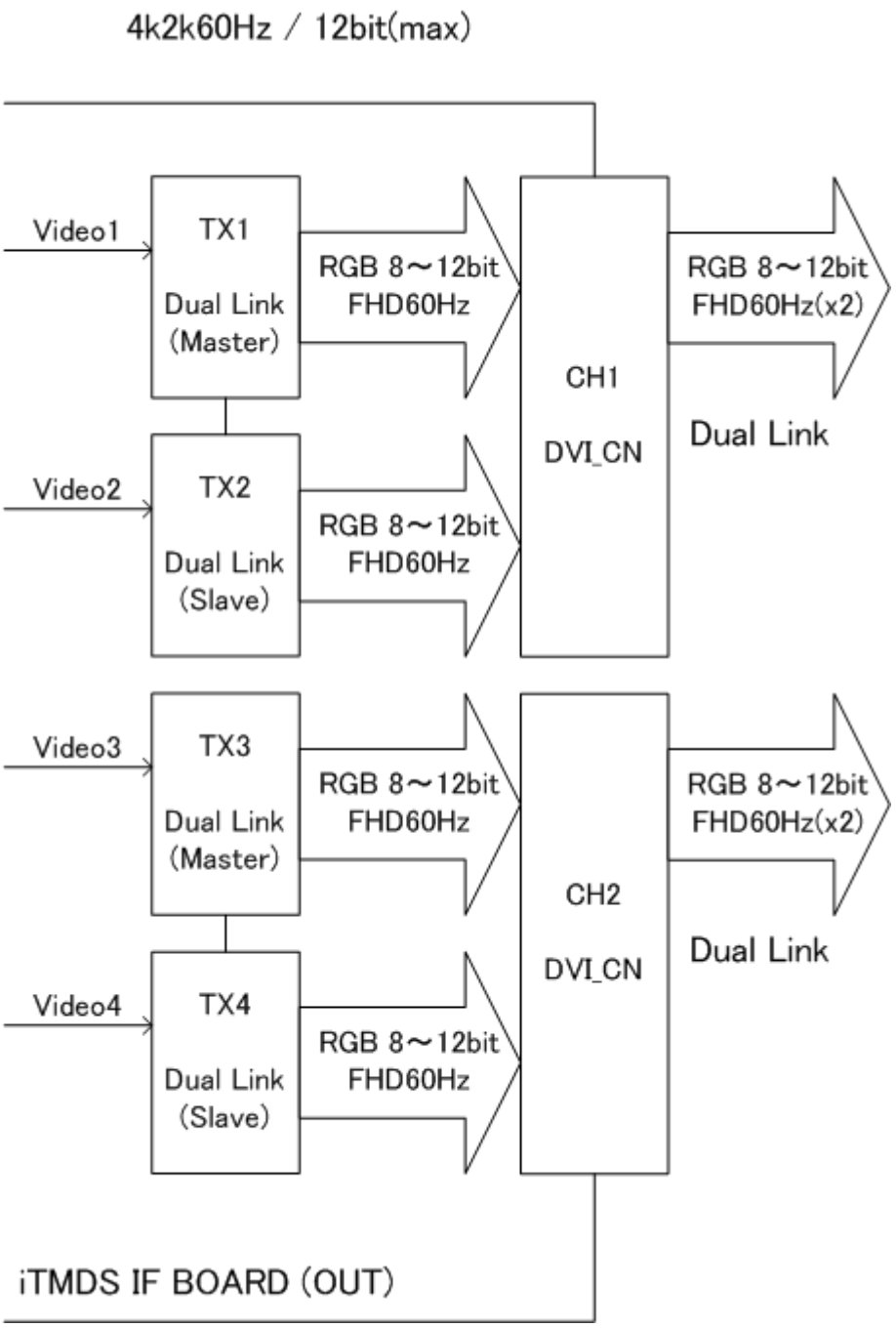
CH1
(Video1-EVEN / Video2-ODD)



CH2
(Video3-EVEN / Video4-ODD)

Each mode of Quad Link

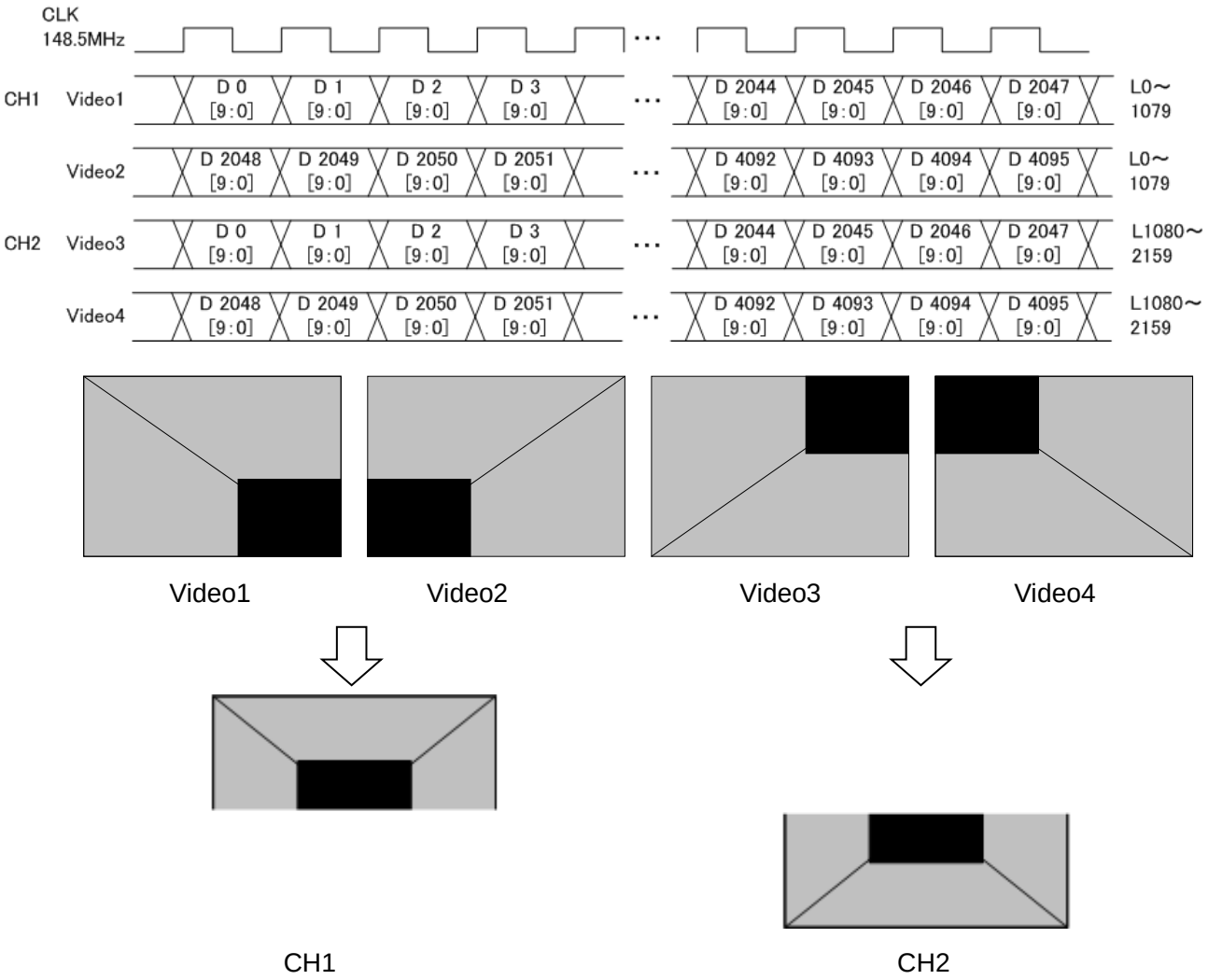
By using CH1 (Dual Link) and CH2 (Dual Link), maximum 4k2k60Hz 12bit signal is output.



(1) MODE0 (Quad Link) (screen cross-split-into-4 output)

The screen is split into 4 equal parts using channels 1, 2, 3 and 4.

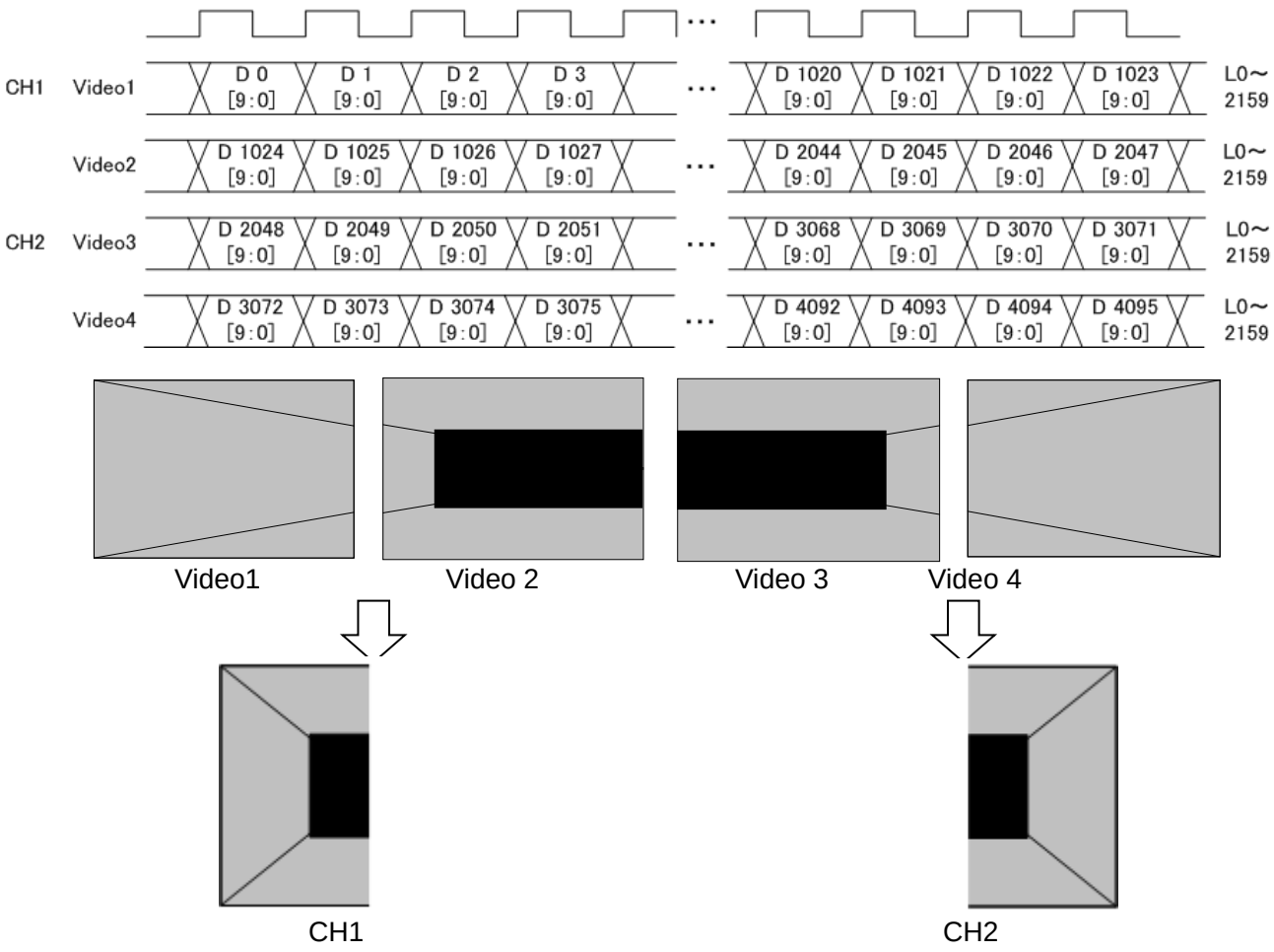
Given here as an example of the resolution is 4096 × 2160, the dot clock frequency is 594 MHz with the 10 bits output.



(2) MODE1 (QuadLink) (screen vertically split into 4)

The screen is split vertically into for parts and allocated from the left in the sequence of Video 1, Video 2, Video 3 and Video 4.

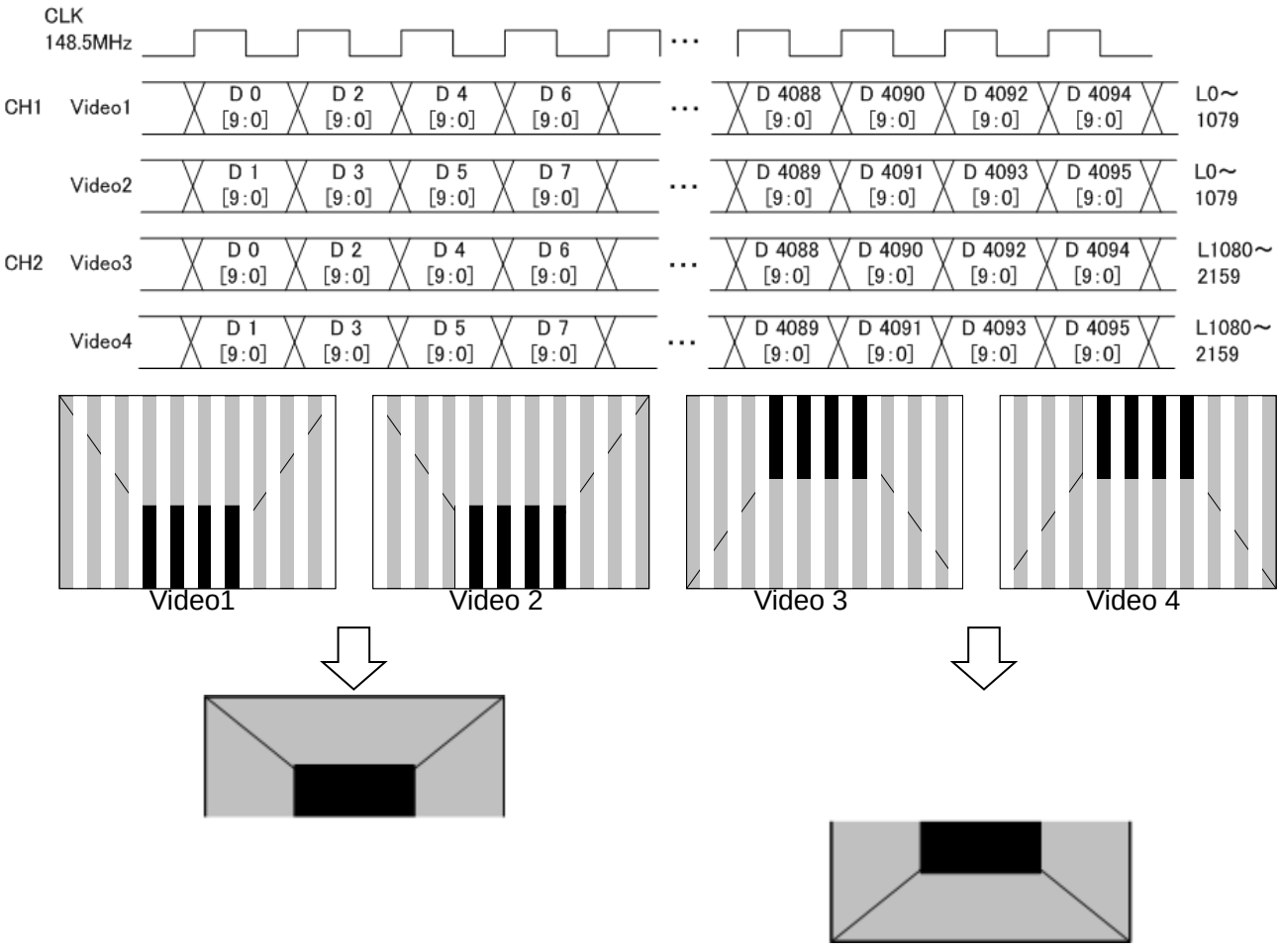
Given here as an example of the resolution is 4096 × 2160, the dot clock frequency is 594 MHz with the 10bits output.



(3) MODE2 (Quad Link) (screen horizontally split into 2)

Using video 1 and 2, the top half of the image is output in the odd and even numbers; similarly, using video 3 and 4, the bottom half of the image is output in the odd and even numbers.

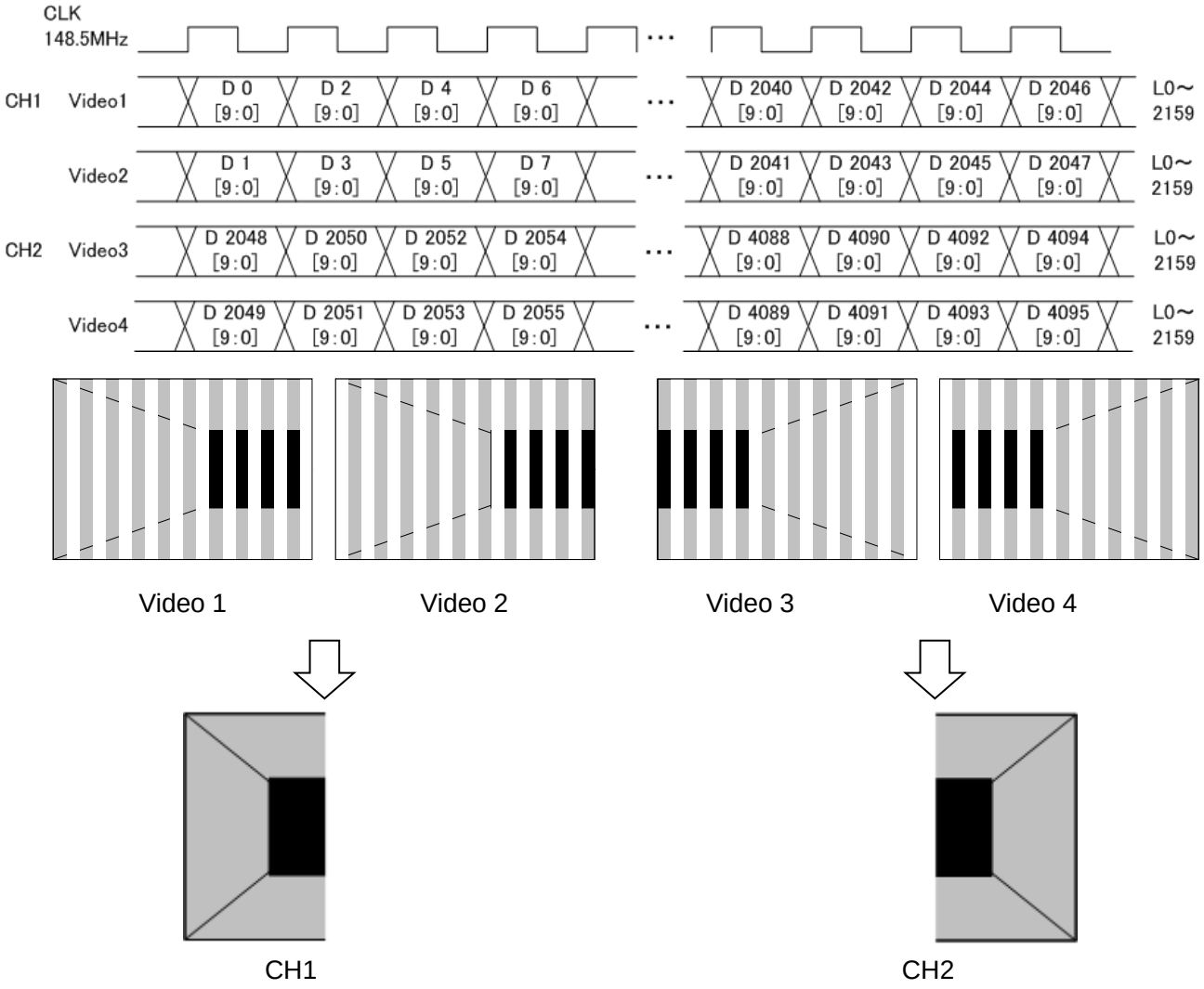
Given here as an example of the resolution is 4096 × 2160, the dot clock frequency is 594 MHz with 10bits output.



(4) MODE3 (Quad Link) (screen vertically split into 2)

Using video 1 and 2, the left half of the image is output in the odd and even numbers; similarly, using video 3 and 4, the right half of the image is output in the odd and even numbers.

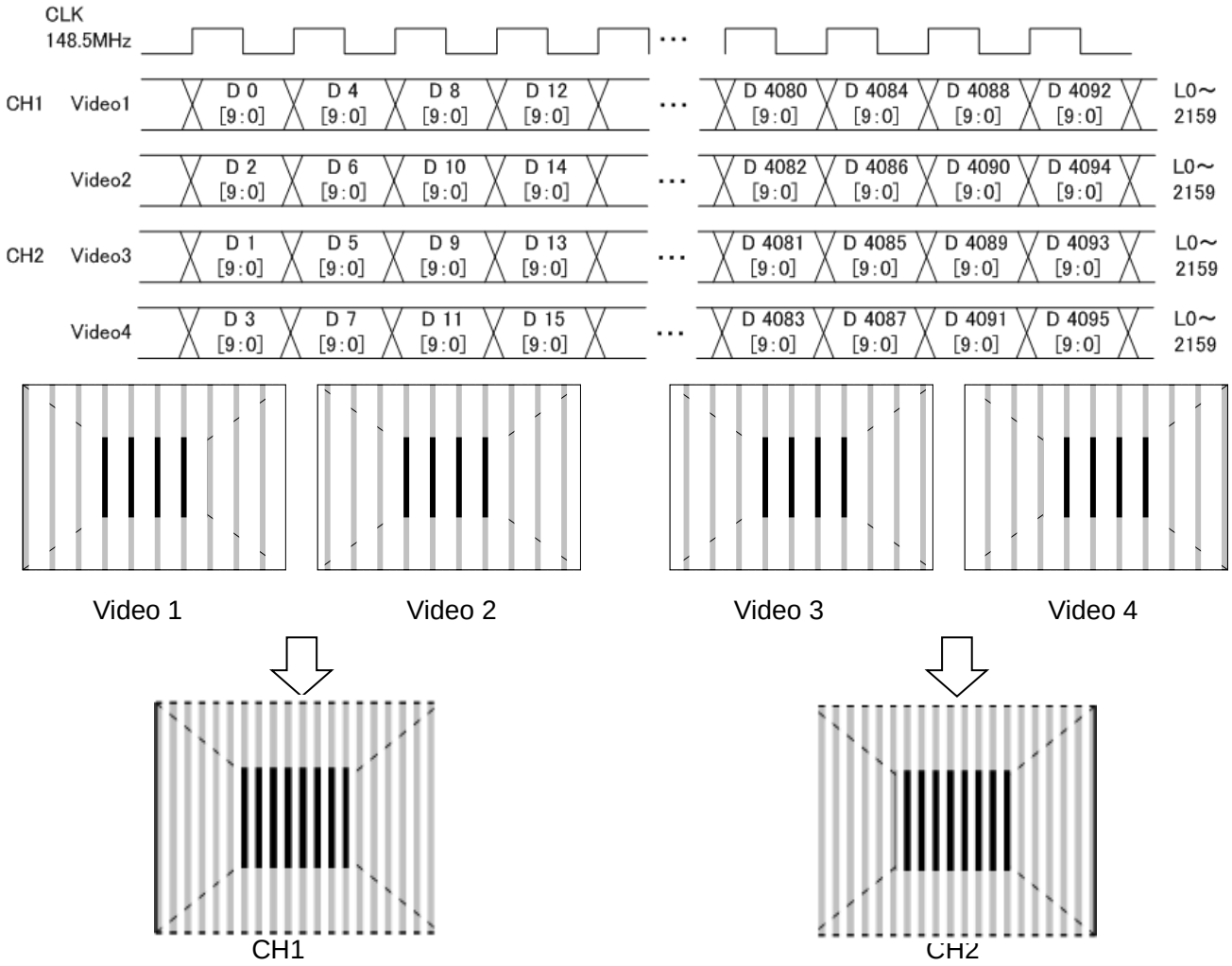
Given here as an example of the resolution is 4096 × 2160, the dot clock frequency is 594 MHz with 10bits output.



(5) MODE4 (Quad Link) (No Dividing)

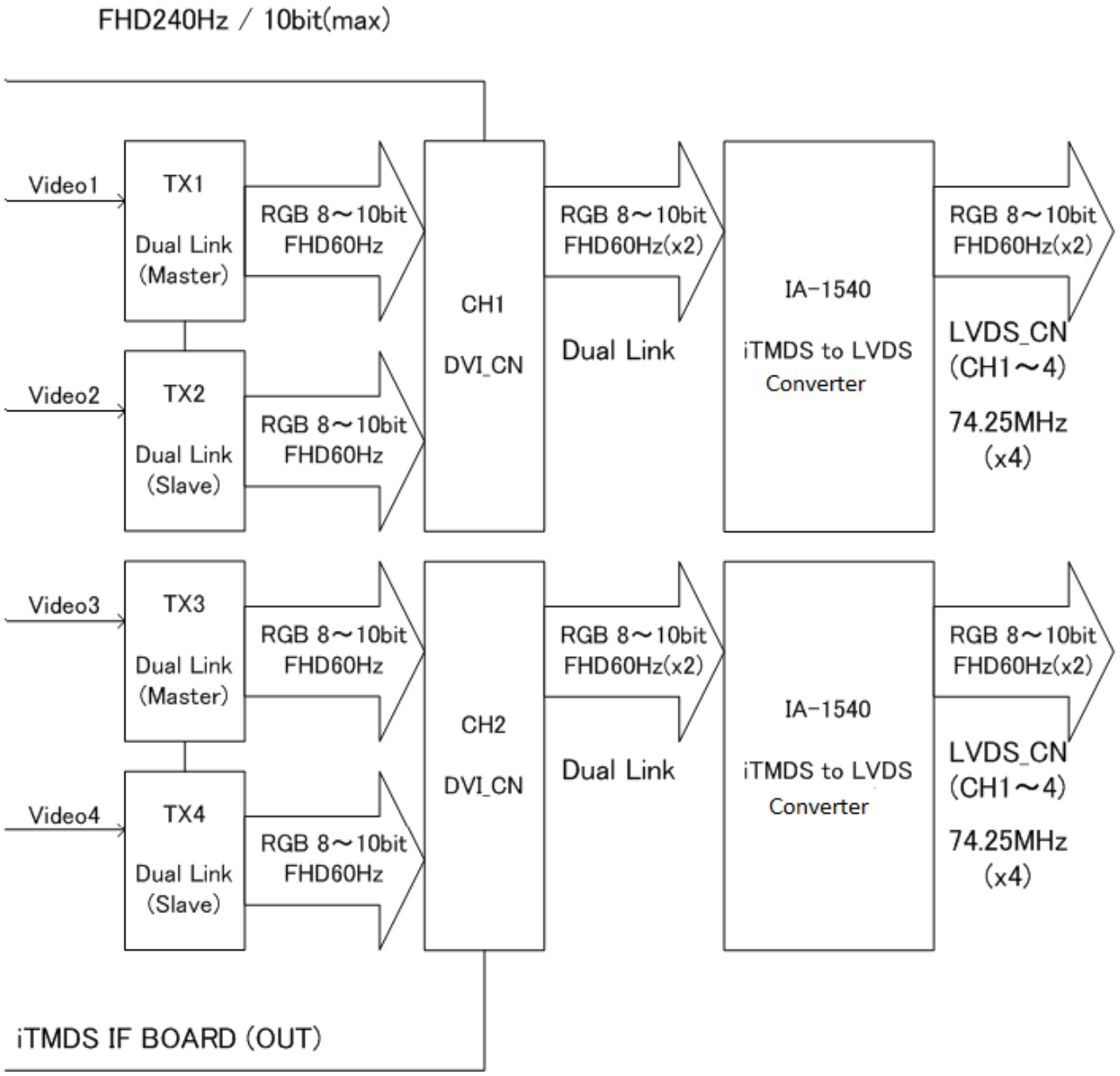
Using Video 1 and 2, EVEN pixels are output. Using Video 3 and 4, ODD pixels are output.

Given here as an example of the resolution is 4096 × 2160, the dot clock frequency is 594 MHz with 10bits output.



Specifications for modes during ×4 mode output

The X4 mode is an output mode designed for the inspection of the Full HD 240Hz 10-bit output by connecting the IA-1540 (iTMDS-LVDS converter box). The signal becomes LVDS x8 channels. Depends on the data allocation of Video 1 to 4, it still has MODE 0 to 4 settings.



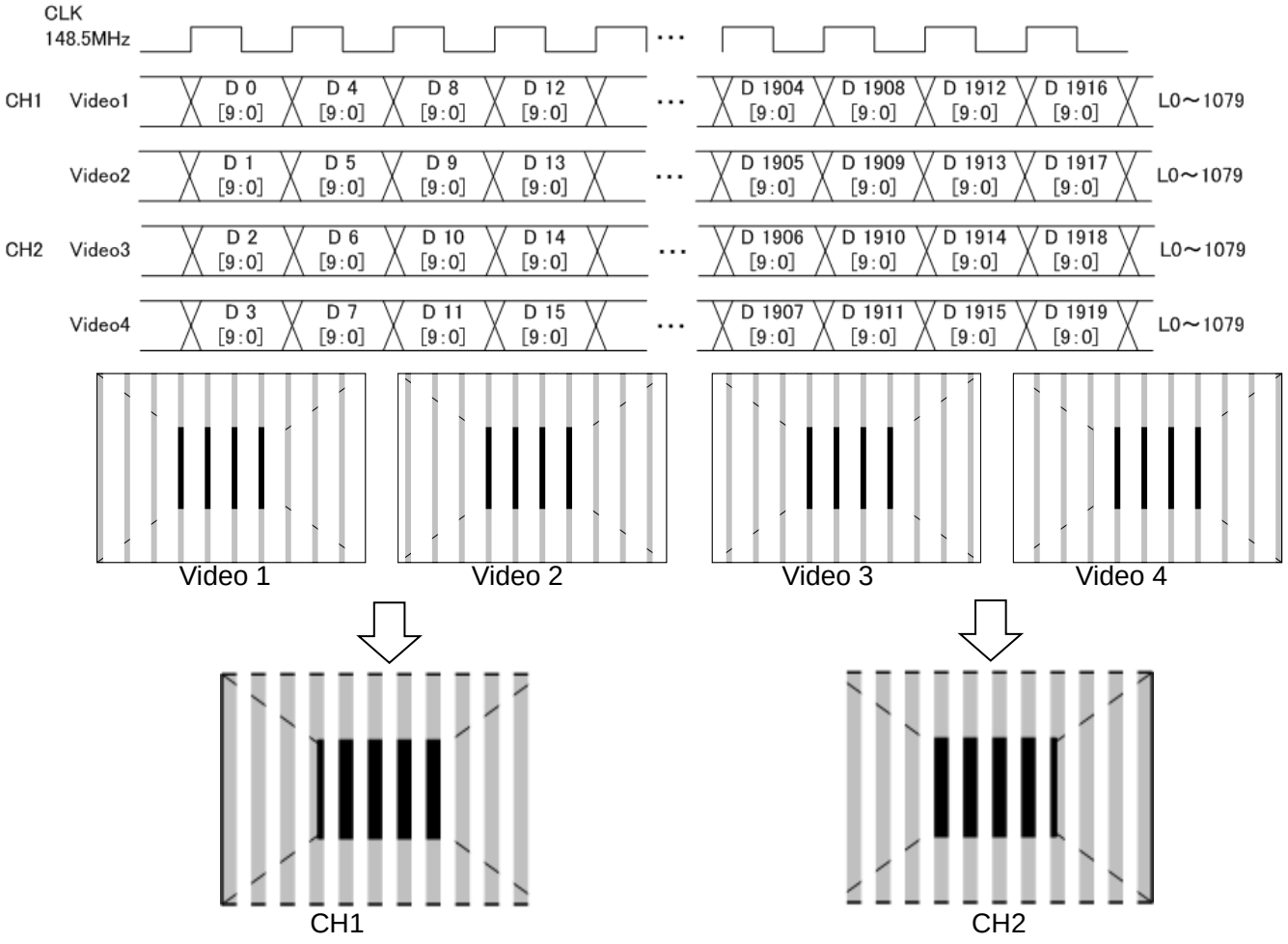
(1) MODE0 x4 Mode (Quad Link) (Non Dividing Mode)

Using Video 1, 2, 3 and 4, the image is output under the pixel assignment given below without splitting the screen.

Given here as an example of the resolution is 1920 × 1080, the dot clock frequency is 594 MHz with the 10 bits output.

The ×4 mode is an output mode designed for the inspection of FPD which support the Full HD 240 Hz output. By connecting the output of the VG generator to the IA-1540 (iTMDS-LVDS converter box) and by halving the output in the converter box,

The explanation concerns the signals of the four channels output from the VG generator. For an explanation concerning an 8-channel output from LVDS, refer to section “10.5.3 Data transfer systems (V-By-One HS).”



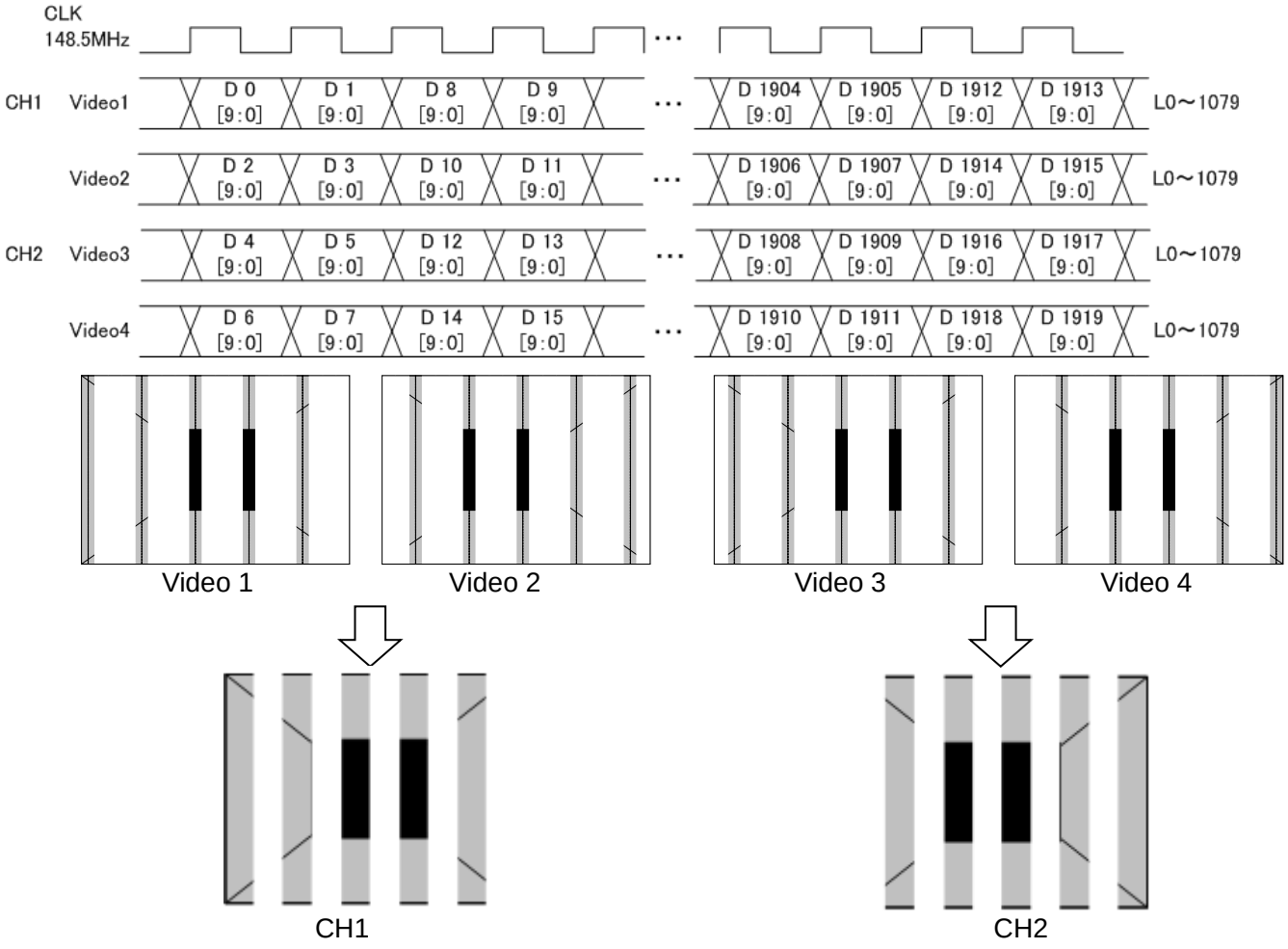
(2) MODE1 x4 Mode (Quad Link) (Normal Mode)

Using Video 1, 2, 3 and 4, the image is output under the pixel assignment given below without splitting the screen.

Given here as an example of the resolution is 1920 × 1080, the dot clock frequency is 594 MHz with the 10 bits output.

The ×4 mode is an output mode designed for the inspection of FPD which support the Full HD 240 Hz output. By connecting the output of the VG generator to the IA-1540 (iTMDS-LVDS converter box) and by halving the output in the converter box,

The explanation concerns the signals of the four channels output from the VG generator. For an explanation concerning an 8-channel output from LVDS, refer to section “10.5.3 Data transfer systems (V-By-One HS).”



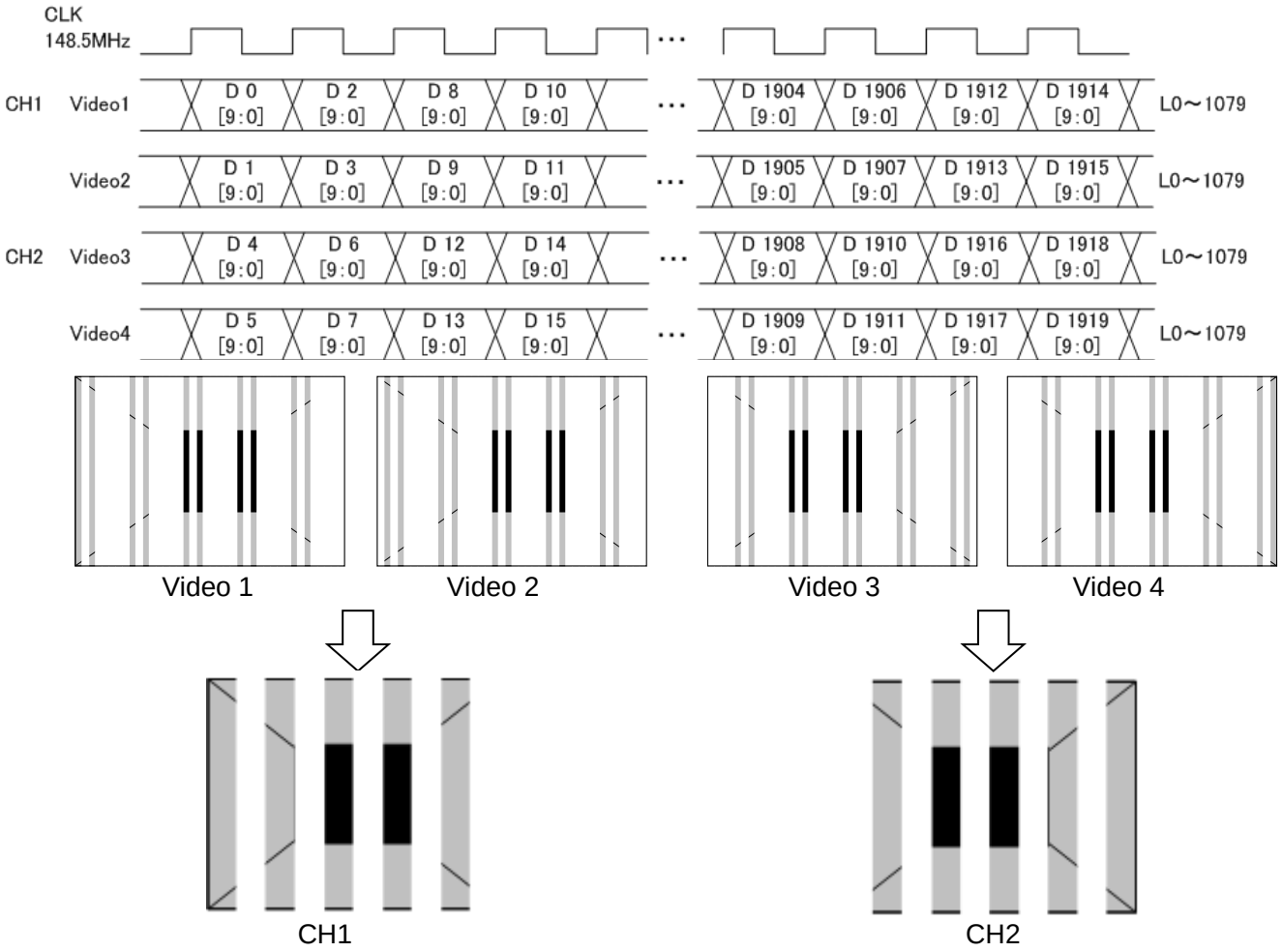
(3) MODE2 x4 Mode (Quad Link) (Cross Mode)

Using Video 1, 2, 3 and 4, the image is output under the pixel assignment given below without splitting the screen.

Given here as an example of the resolution is 1920 × 1080, the dot clock frequency is 594 MHz with the 10 bits output.

The ×4 mode is an output mode designed for the inspection of FPD which support the Full HD 240 Hz output. By connecting the output of the VG generator to the IA-1540 (iTMDS-LVDS converter box) and by halving the output in the converter box,

The explanation concerns the signals of the four channels output from the VG generator. For an explanation concerning an 8-channel output from LVDS, refer to section “10.5.3 Data transfer systems (V-By-One HS).”



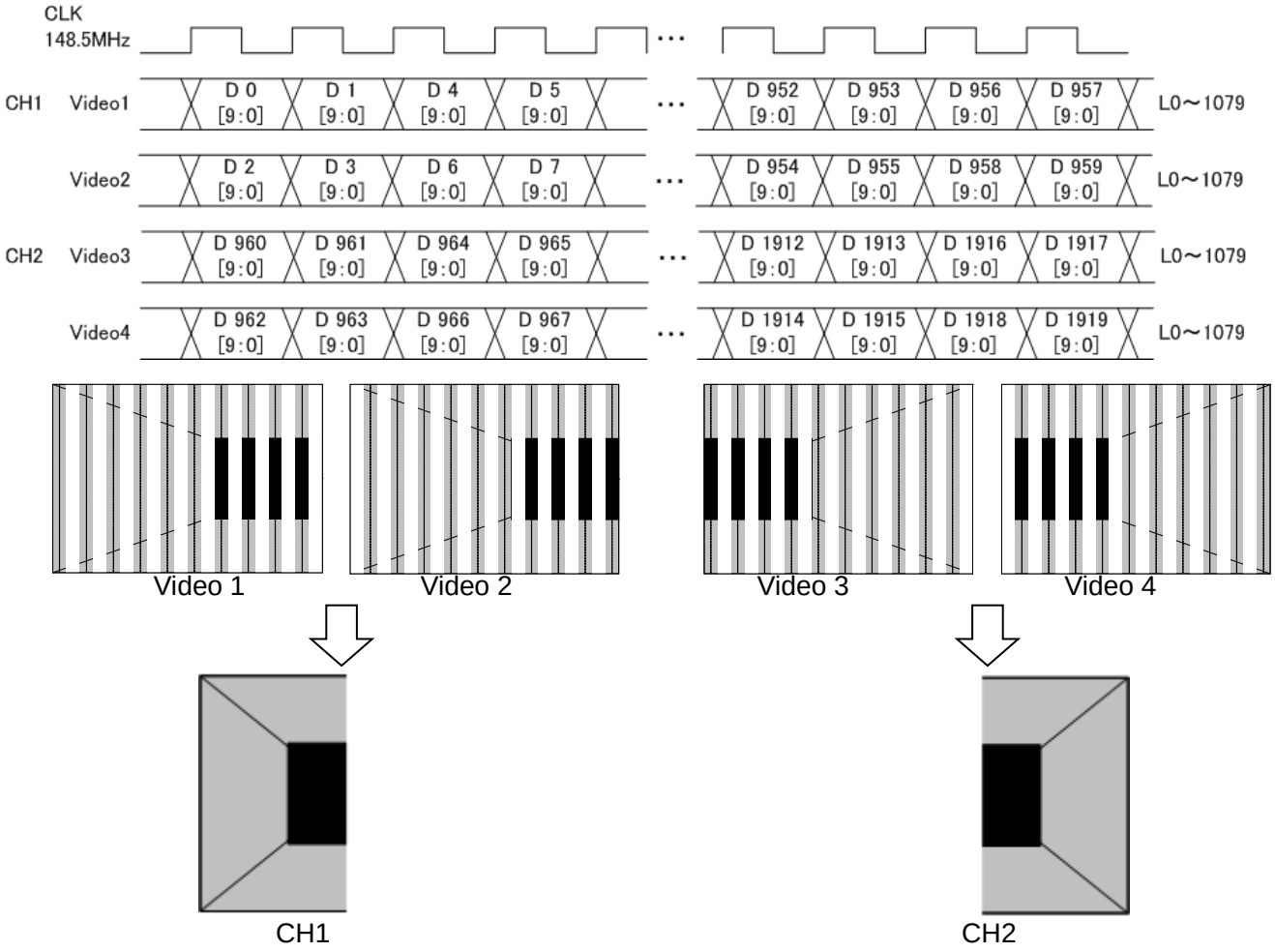
(4) MODE3 x4 Mode (Quad Link) (Dividing Normal Mode)

Using Video 1 and 2, the right half of the image is output; similarly, using Video 3 and 4, the left half of the image is output. The pixel assignment is given below.

Given here as an example of the resolution is 1920 × 1080, the dot clock frequency is 594 MHz with the 10 bits output.

The ×4 mode is an output mode designed for the inspection of FPD which support the Full HD 240 Hz output. By connecting the output of the VG generator to the IA-1540 (iTMDS-LVDS converter box) and by halving the output in the converter box,

The explanation concerns the signals of the four channels output from the VG generator. For an explanation concerning an 8-channel output from LVDS, refer to section “10.5.3 Data transfer systems (V-By-One HS).”



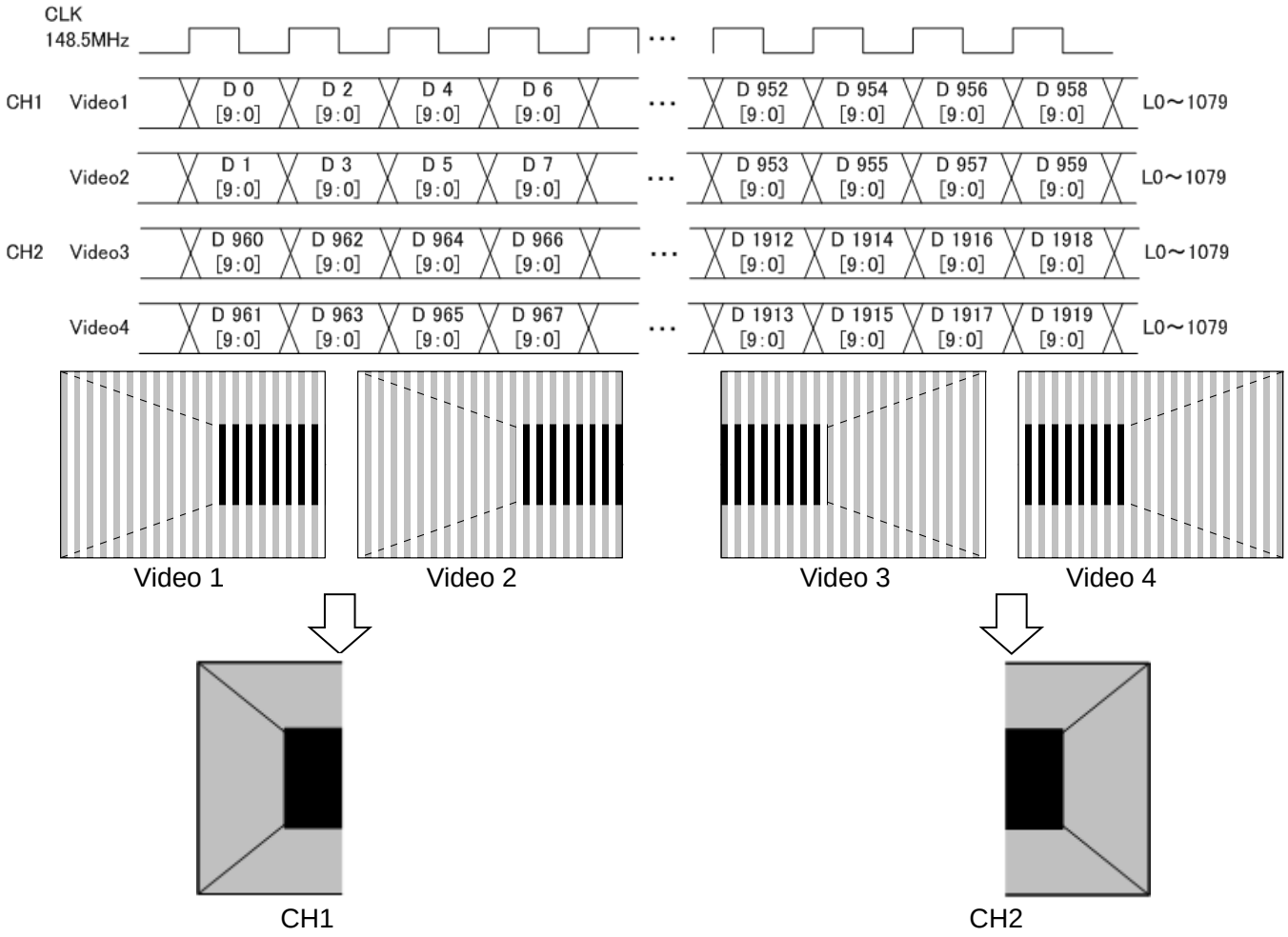
⑤ MODE4 x4 Mode (Quad Link) (Dividing Cross Mode)

Using Video 1 and 2, the right half of the image is output; similarly, using Video 3 and 4, the left half of the image is output. The pixel assignment is given below.

Given here as an example of the resolution is 1920 × 1080, the dot clock frequency is 594 MHz with the 10 bits output.

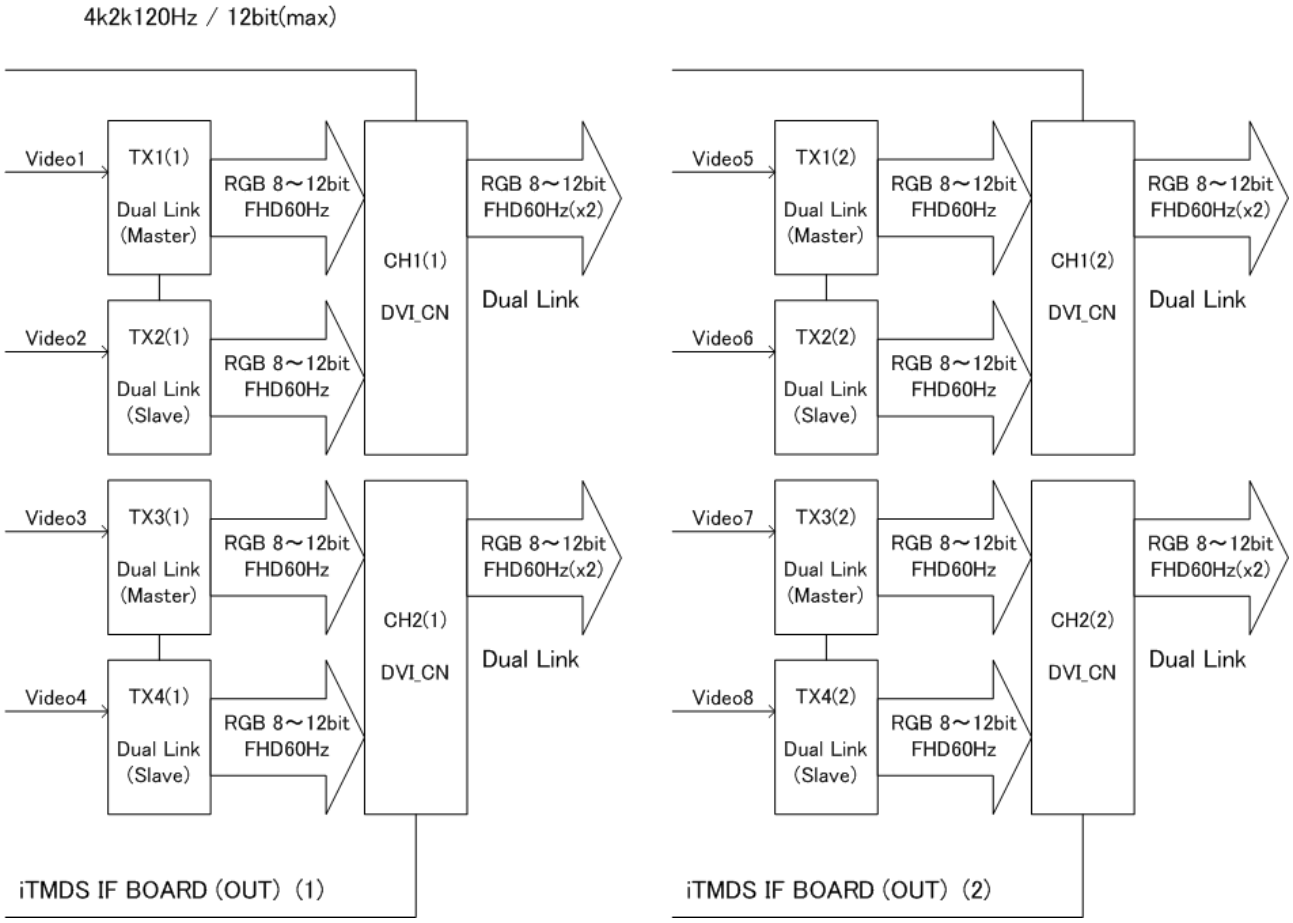
The ×4 mode is an output mode designed for the inspection of FPD which support the Full HD 240 Hz output. By connecting the output of the VG generator to the IA-1540 (iTMDS-LVDS converter box) and by halving the output in the converter box,

The explanation concerns the signals of the four channels output from the VG generator. For an explanation concerning an 8-channel output from LVDS, refer to section “10.5.3 Data transfer systems (V-By-One HS).”



Specifications for Octal Link modes

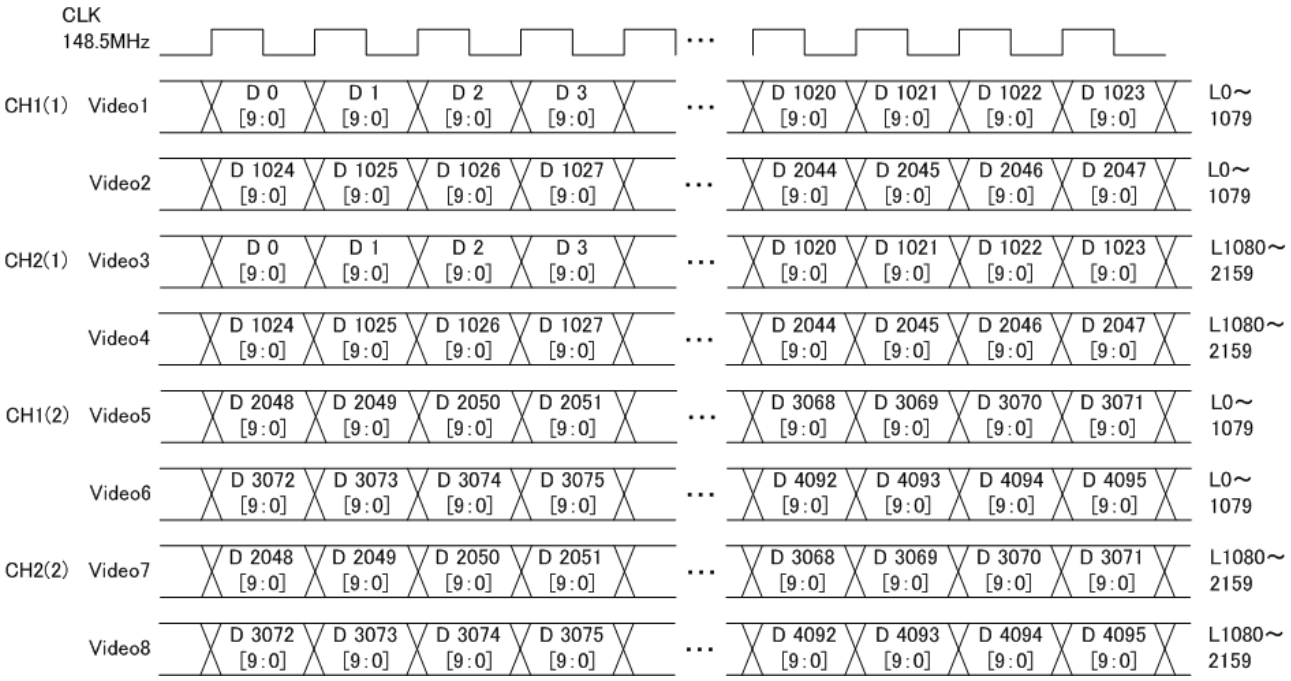
By using 2 interface units of iTMDS, maximum 4K2K 120Hz by 12-bit signal is output.
Depends on the data allocation of Video 1 to 8, it still has MODE 0 to 9 settings.

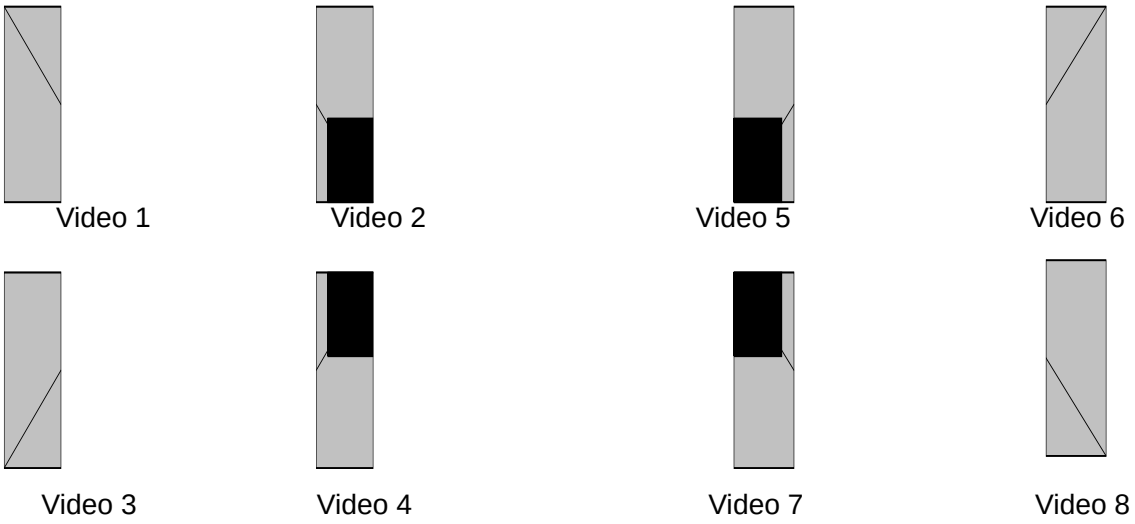


(1) MODE0 (Octal Link) (split into cross-split to 4 + split vertically into 2)

Video 1 to 8 are used. The screen is split into 4 in the form of a square divided into 4 equal parts and output from each of the interface units, and then it is split vertically into two at each interface unit, and output.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

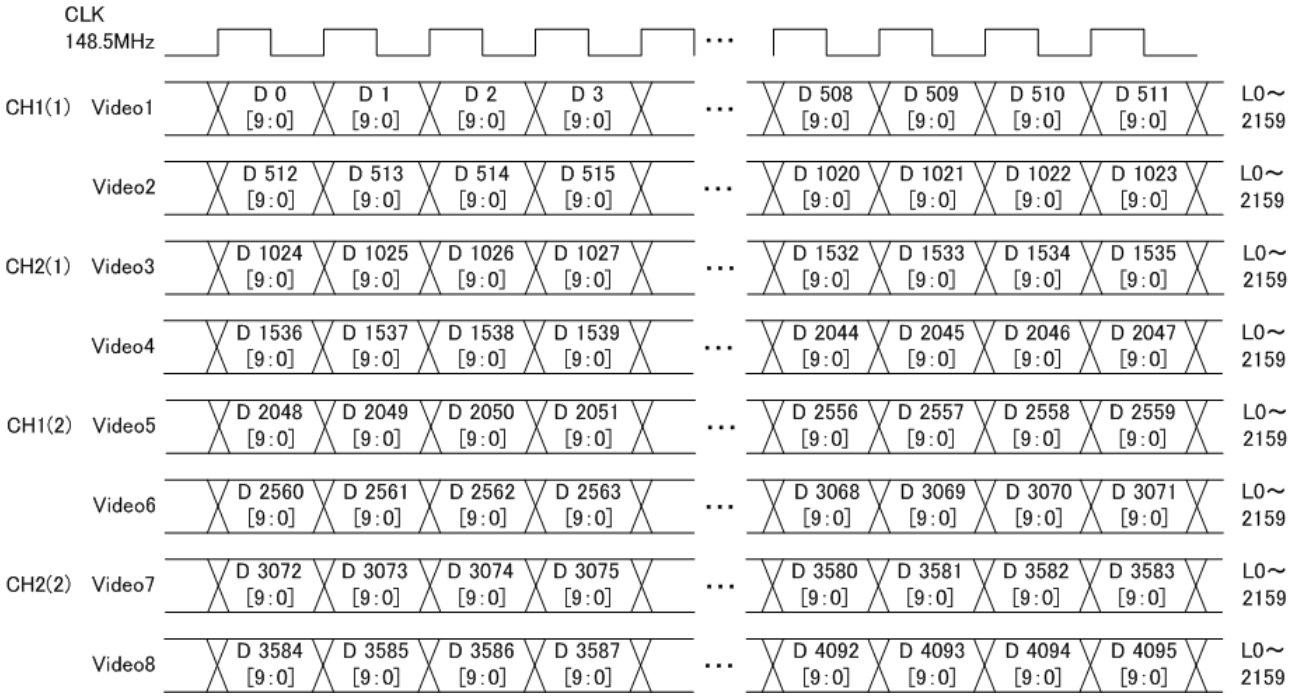


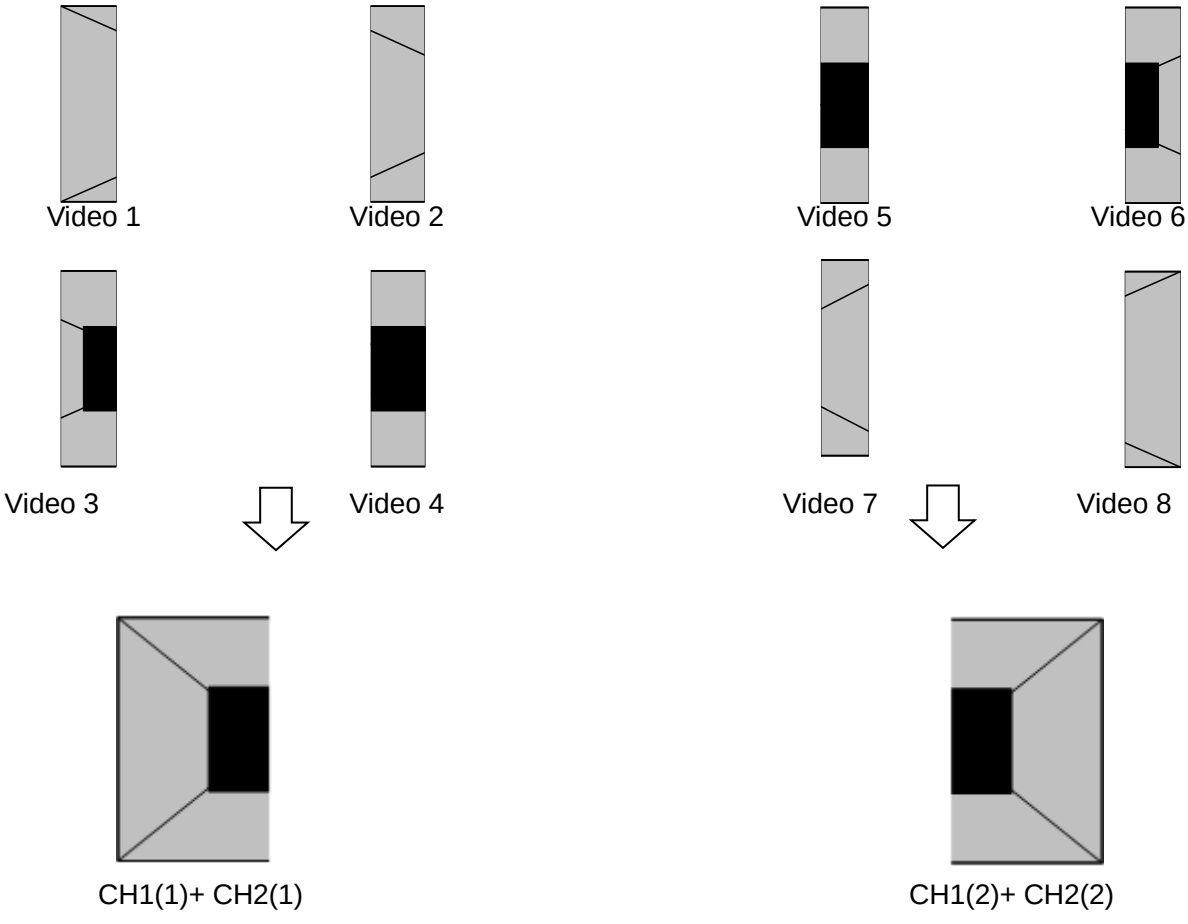


(2) MODE1 (Octal Link) (split vertically into 4 + split vertically into 2)

Video 1 to 8 are used. The screen is split vertically into 4 and output from each output, and then it is split vertically into two at each interface unit and output.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

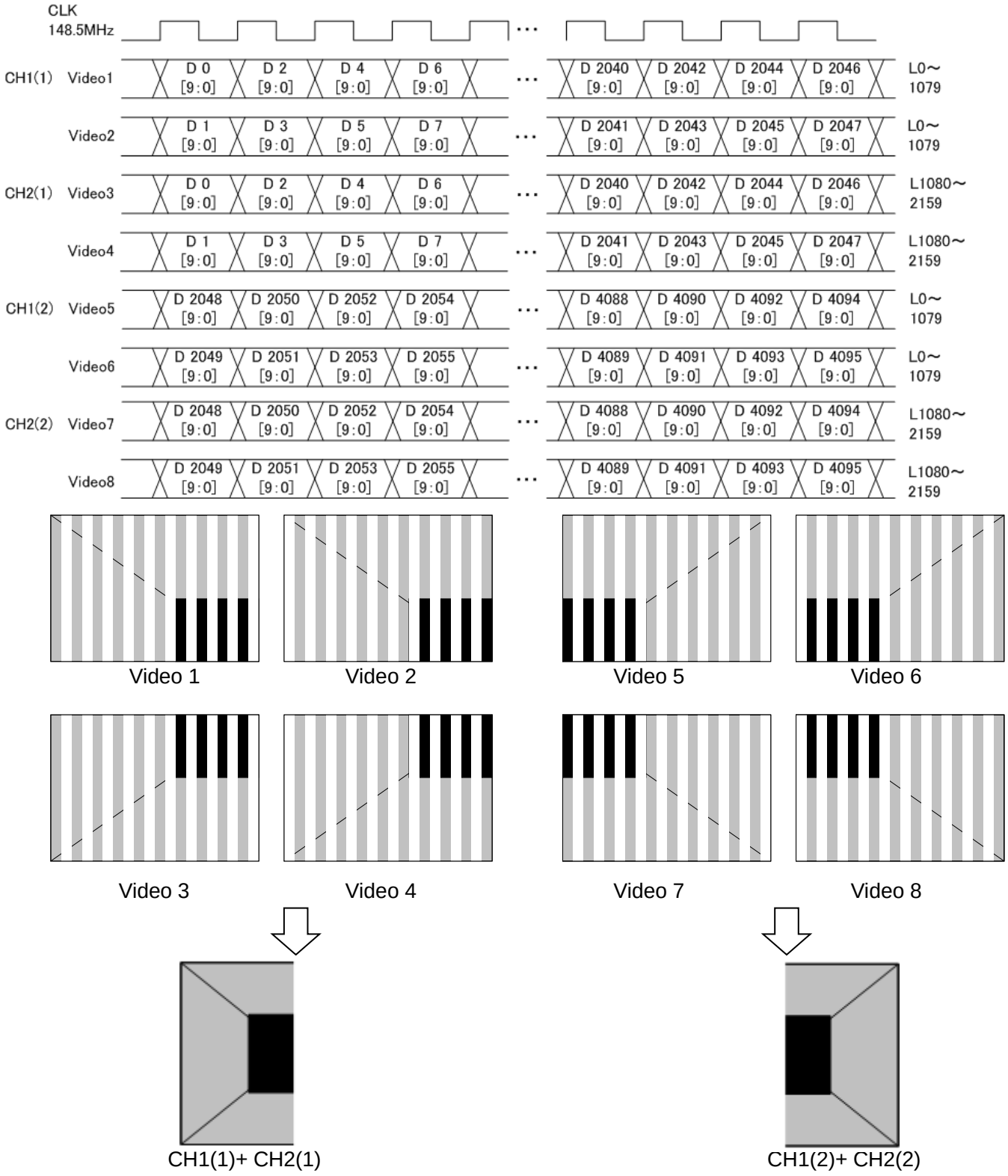




(3) MODE2 (Octal Link) (split horizontally into 2 + split vertically into 2)

Video 1 to 8 are used. The screen is split horizontally into 2 and output from each output, and then it is split vertically into two at each interface unit, and output.

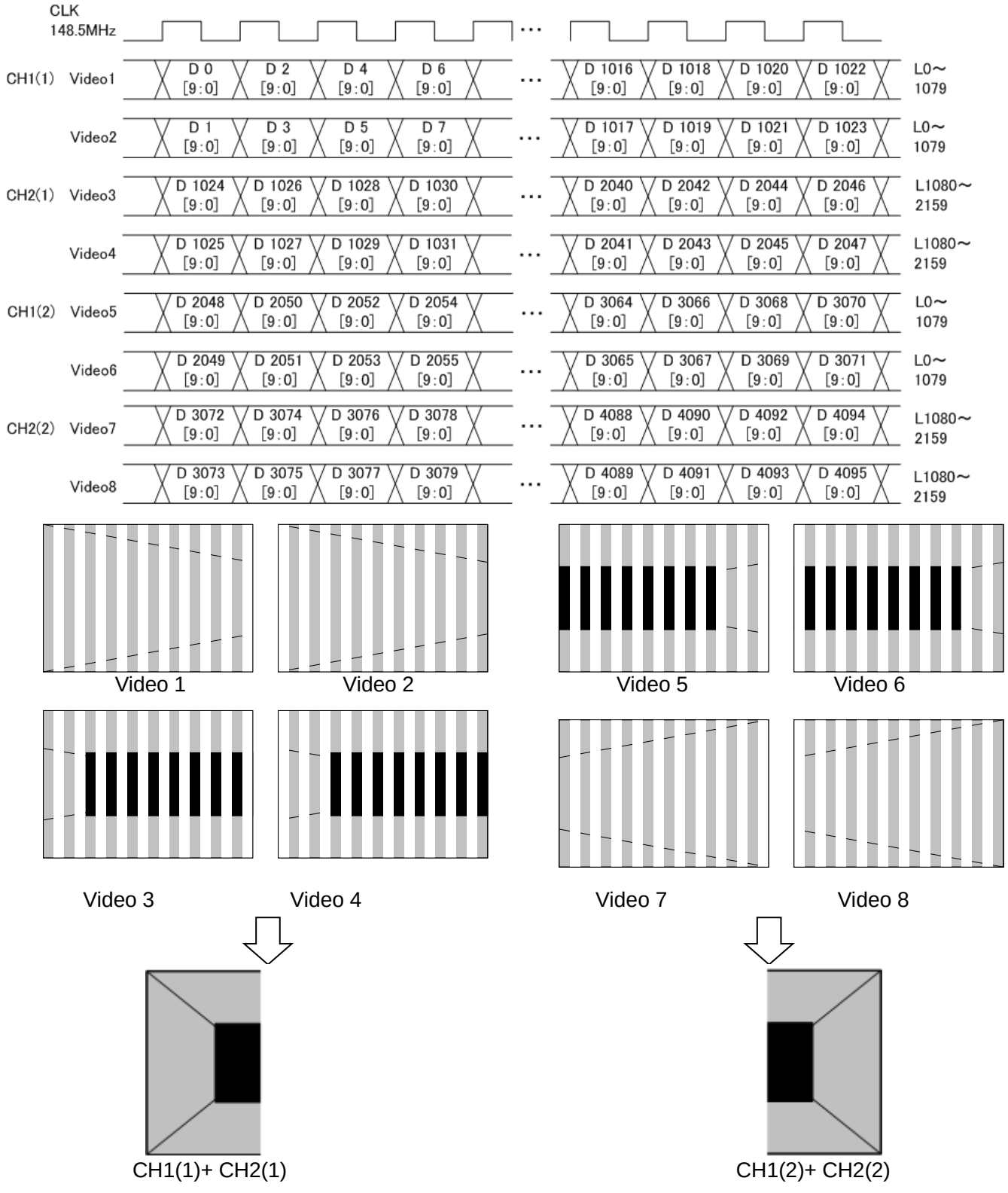
Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.



(4) MODE3 (Octal Link) (split vertically into 2 + split vertically into 2)

Video 1 to 8 are used. The screen is split vertically into 2 and output from each output, and then it is split vertically into two at each interface unit, and output.

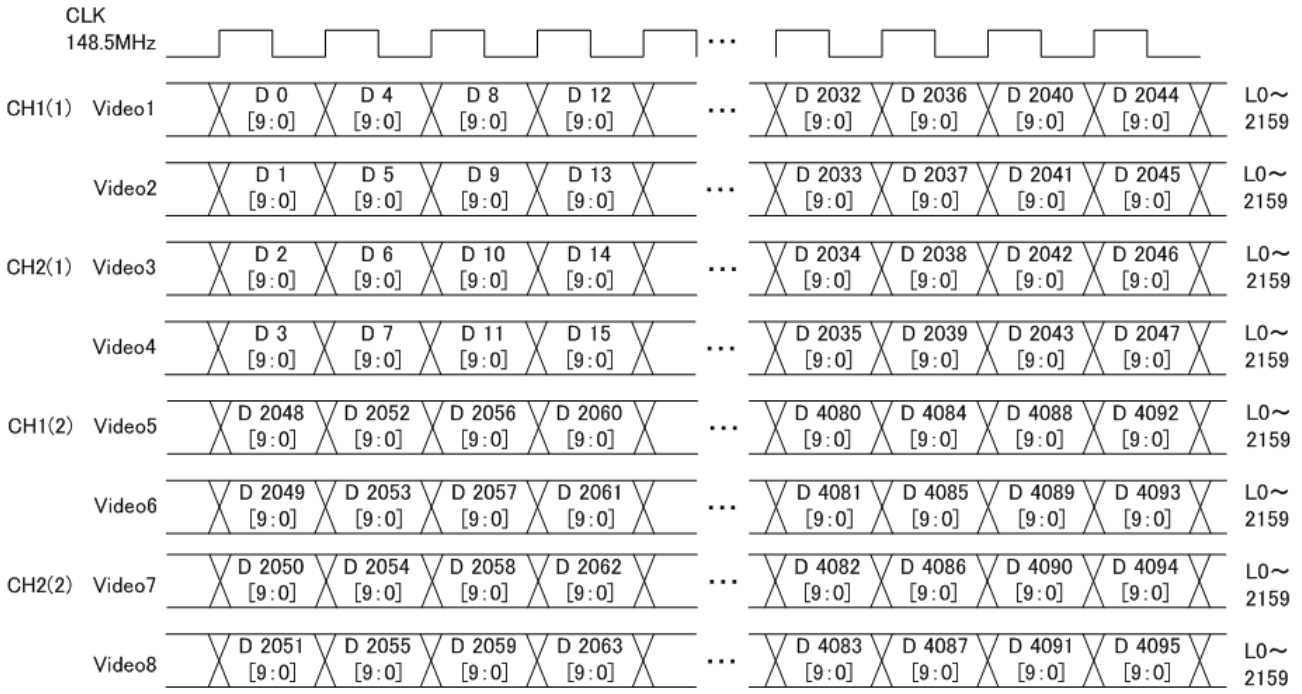
Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

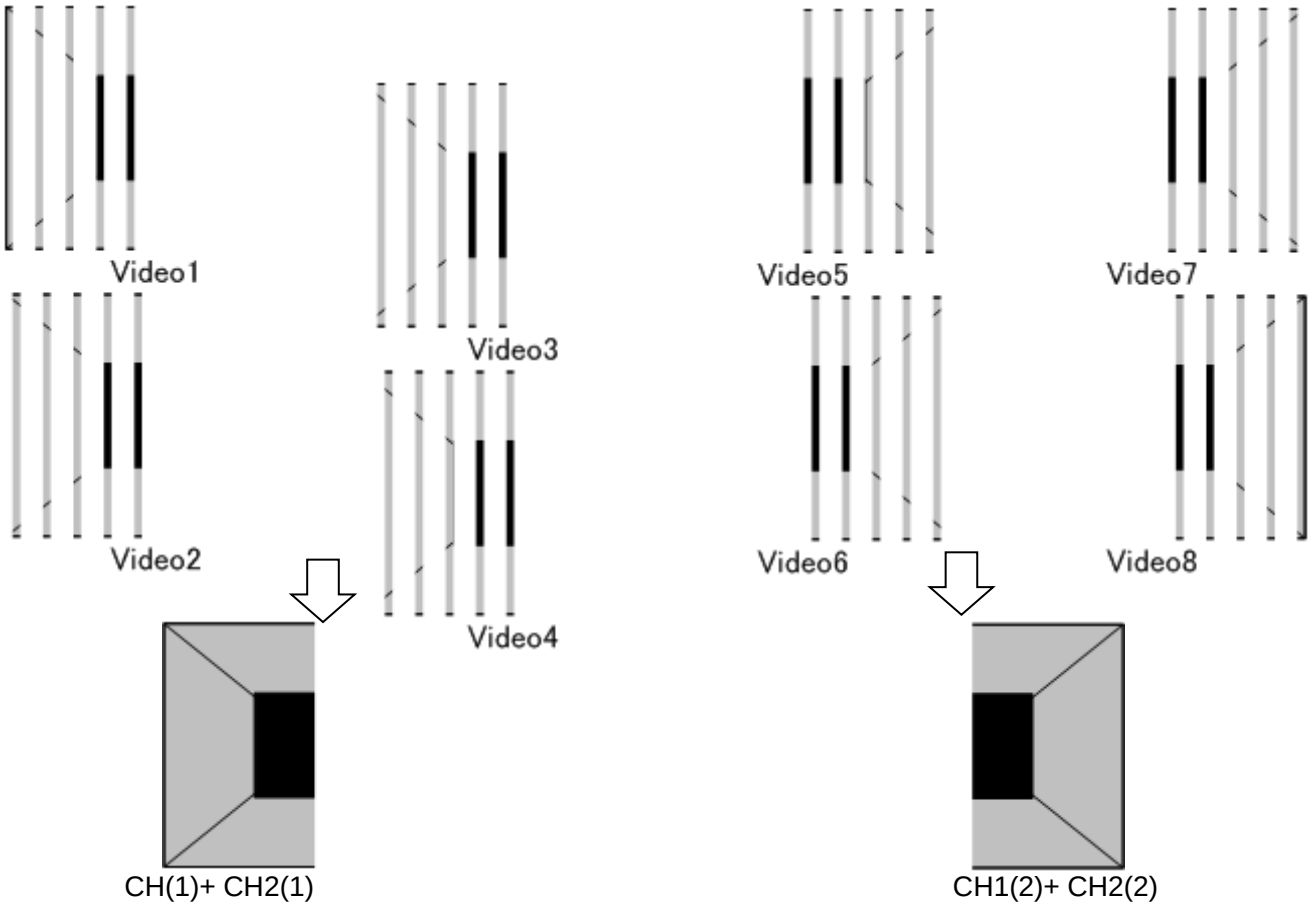


(5) MODE4 (Octal Link) (split vertically into 2 + no dividing in each board <1>) (Non Dividing Mode)

Video 1 to 8 are used. The screen is split vertically into 2 from each output. Video1-4 outputs the left half. Video5-8 outputs the right half with the below pixel assignment.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

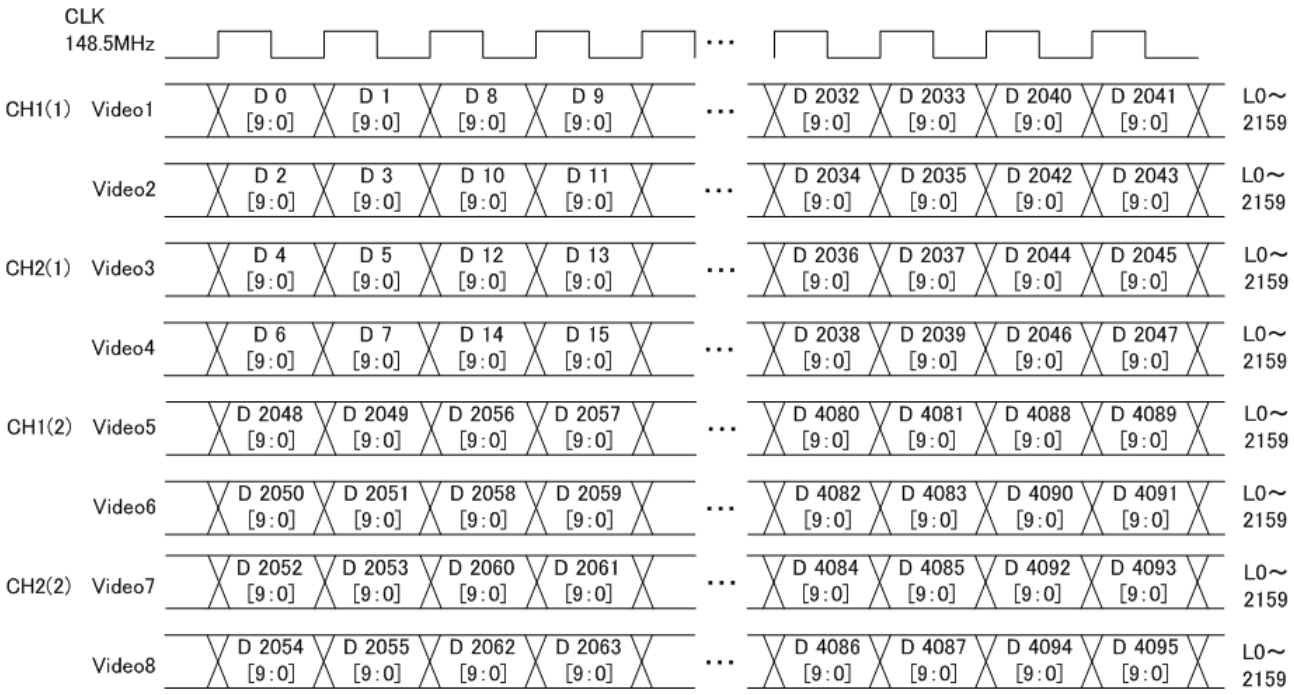


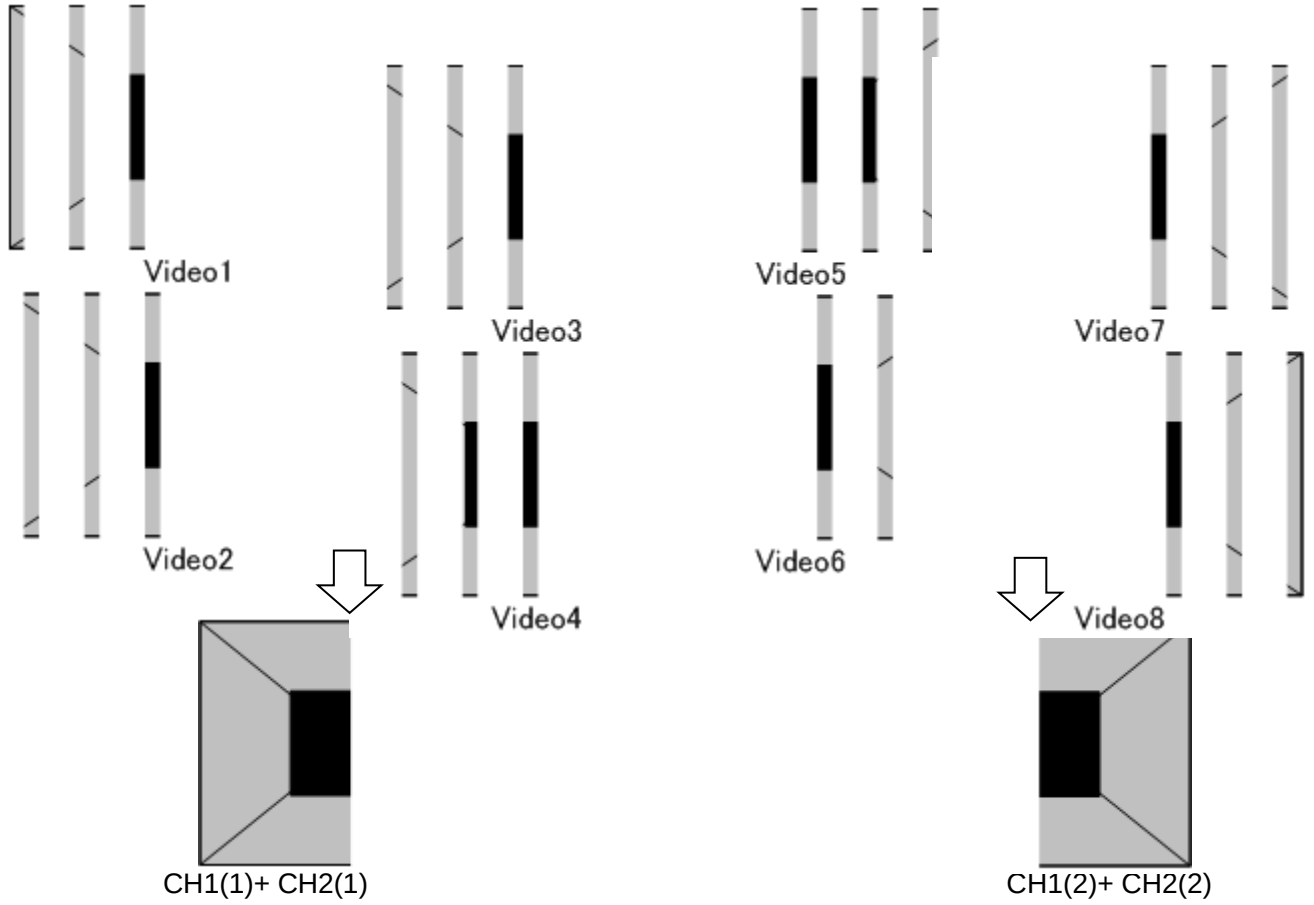


(6) MODE5 (Octal Link) (split vertically into 2 + no dividing in each board <2>) (Normal Mode)

Video 1 to 8 are used. The screen is split vertically into 2 from each output. Video1-4 outputs the left half. Video 5-8 outputs the right half with the below pixel assignment.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

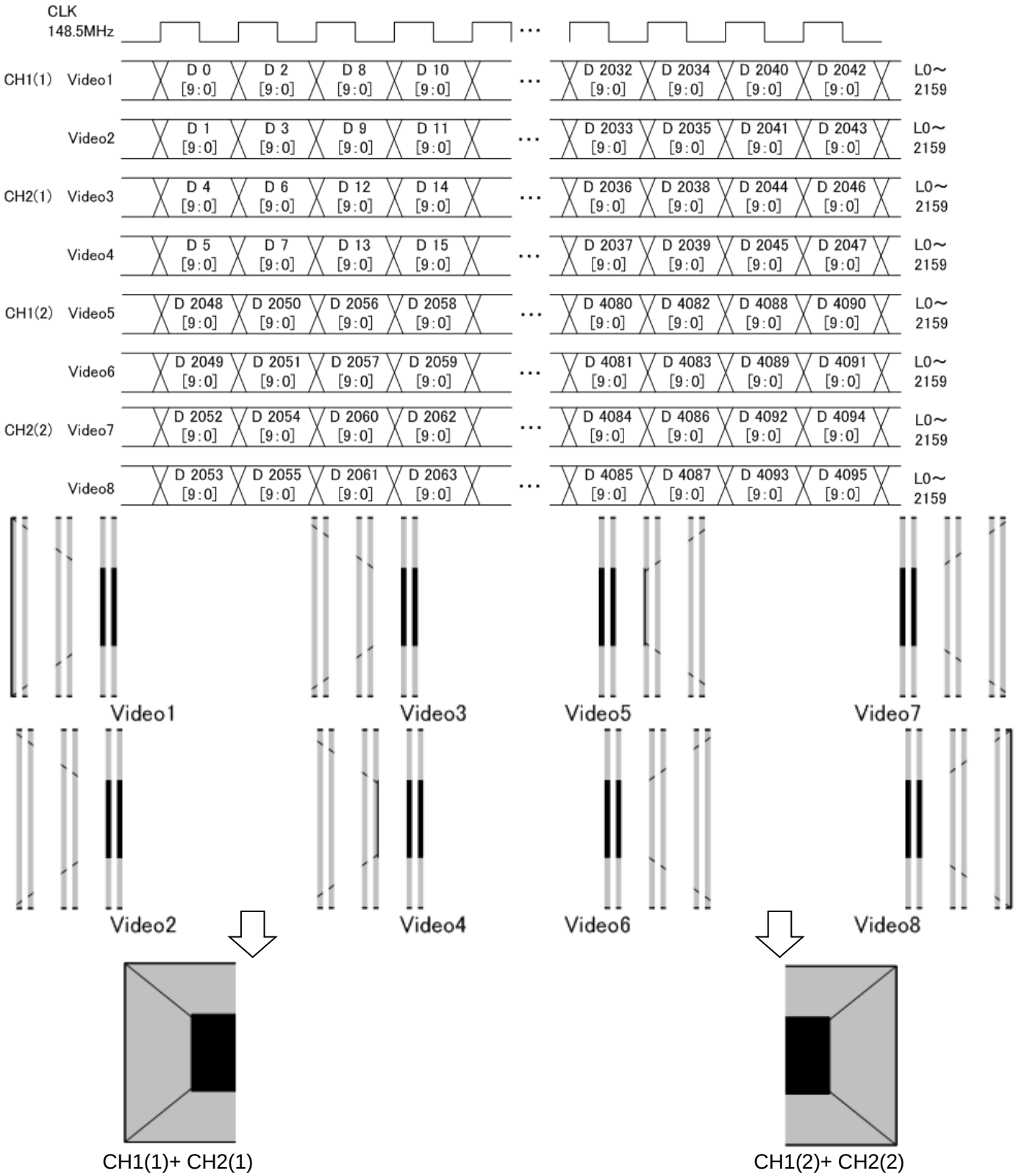




(7) MODE6 (Octal Link) (split vertically into 2 + no dividing <3>) (Cross Mode)

Video 1 to 8 are used. The screen is split vertically into 2 from each output. Video1-4 outputs the left half. Video5-8 outputs the right half with the below pixel assignment.

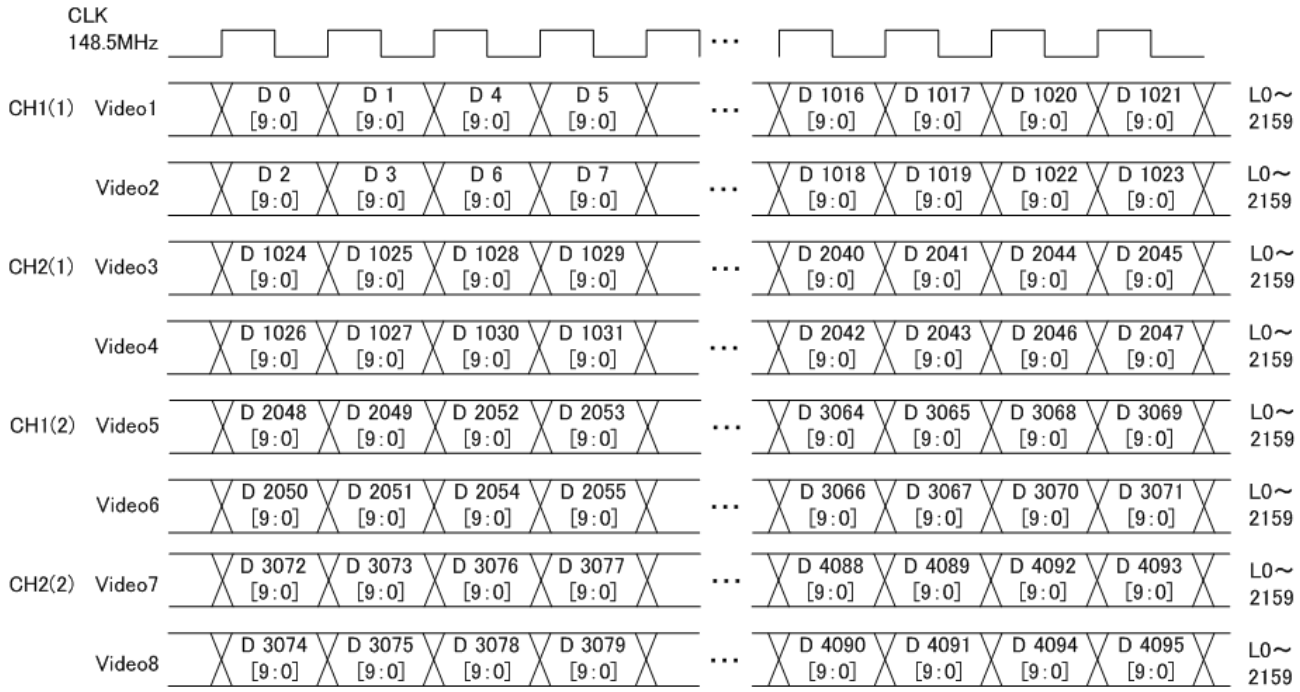
Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.

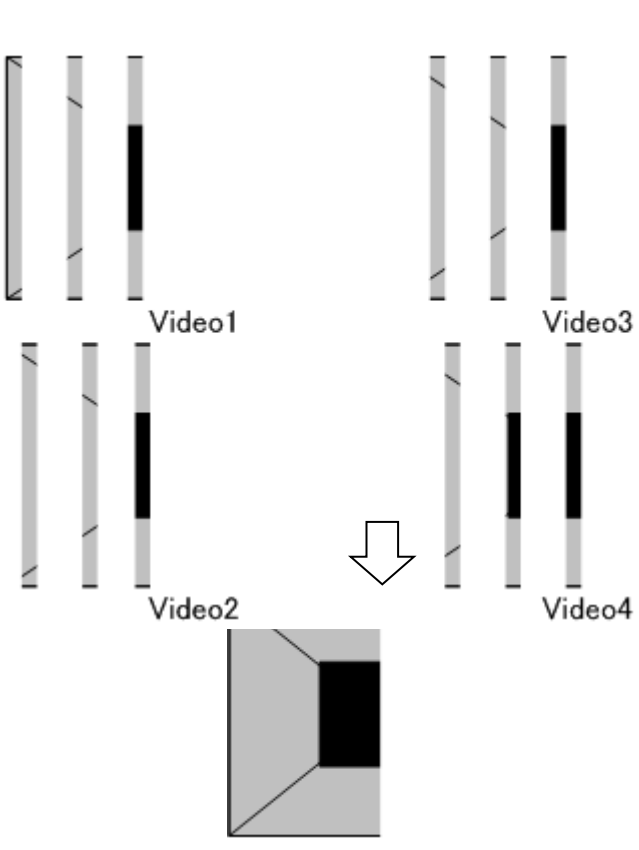


(8) MODE7 (Octal Link) (split vertically into 2 + dividing <1>) (Dividing Normal Mode)

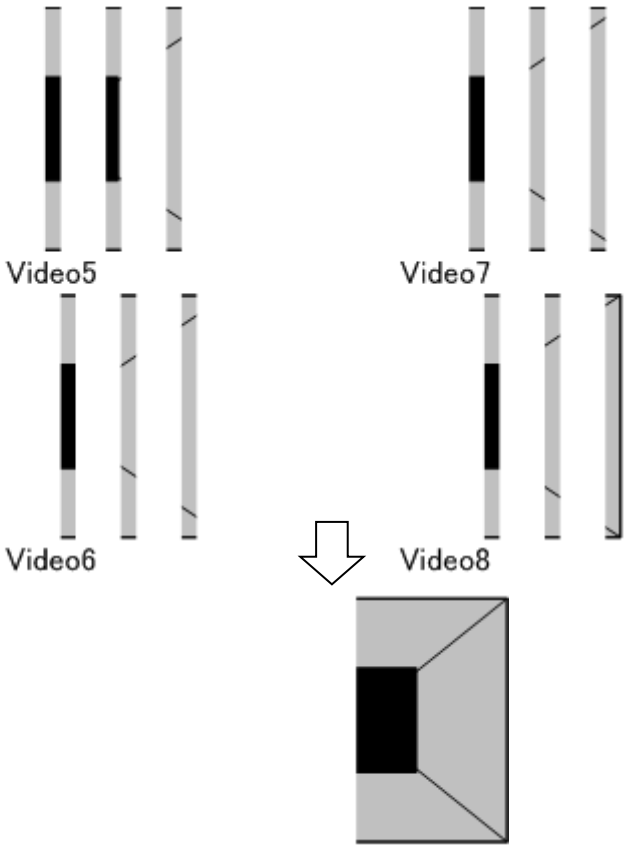
Video 1 to 8 are used. The screen is split vertically into 2 from each output. Video1-4 outputs the left half. Video 5-8 outputs the right half with the below pixel assignment.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.





CH1(1)+ CH2(1)

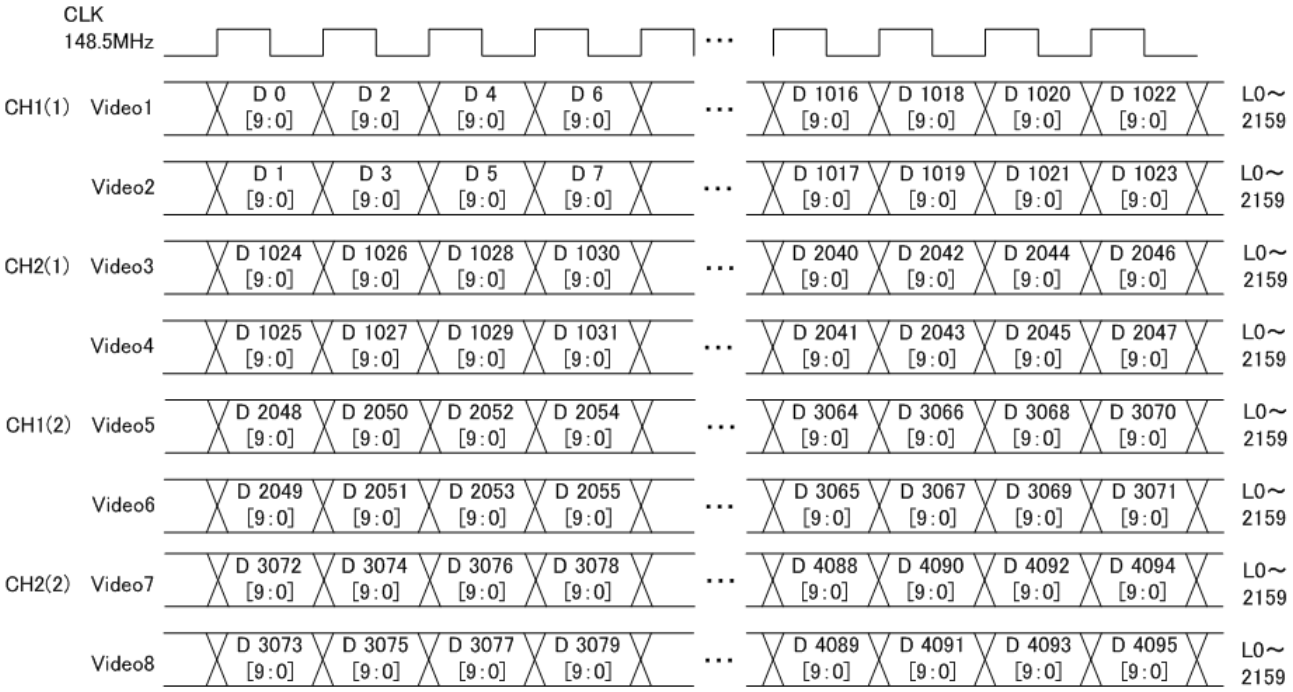


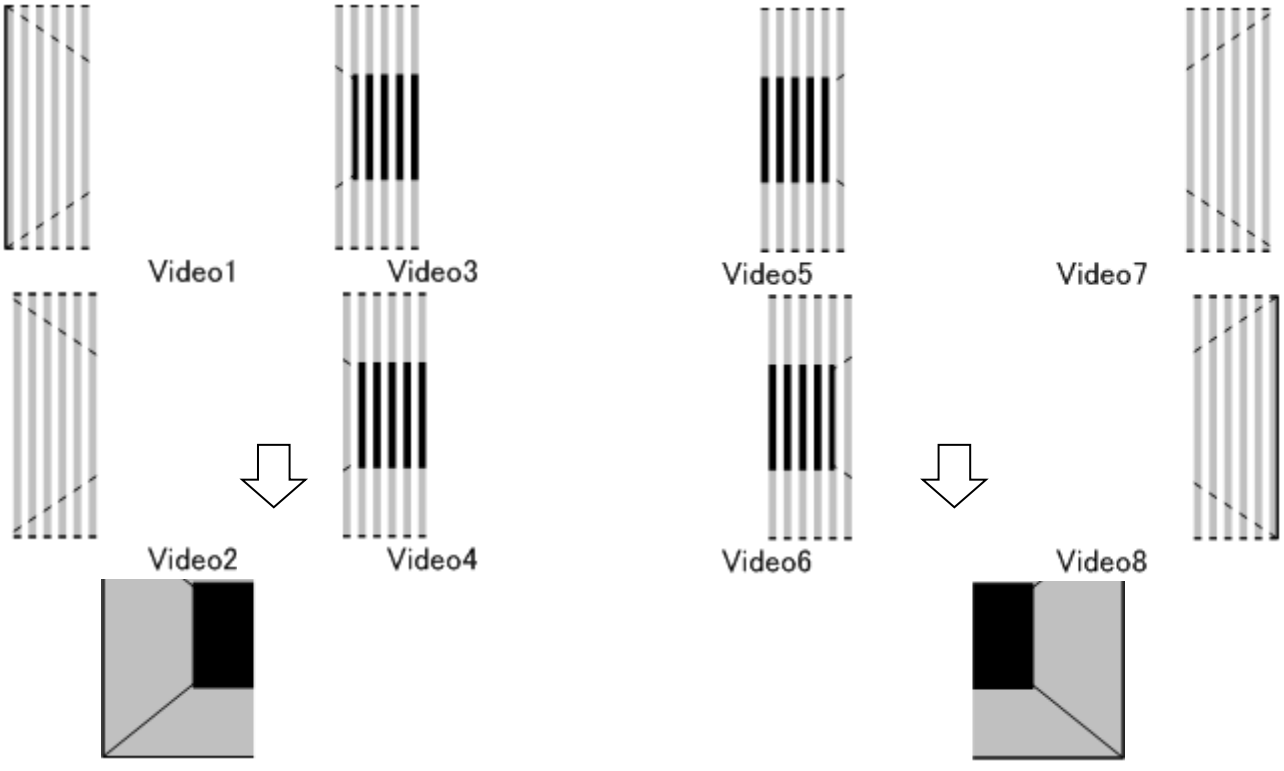
CH1(2)+ CH2(2)

(9) MODE8 (Octal Link) (split vertically into 2 + dividing <2>) (Dividing Cross Mode)

Video 1 to 8 are used. The screen is split vertically into 2 from each output. Video1-4 outputs the left half. Video 5-8 outputs the right half with the below pixel assignment.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.





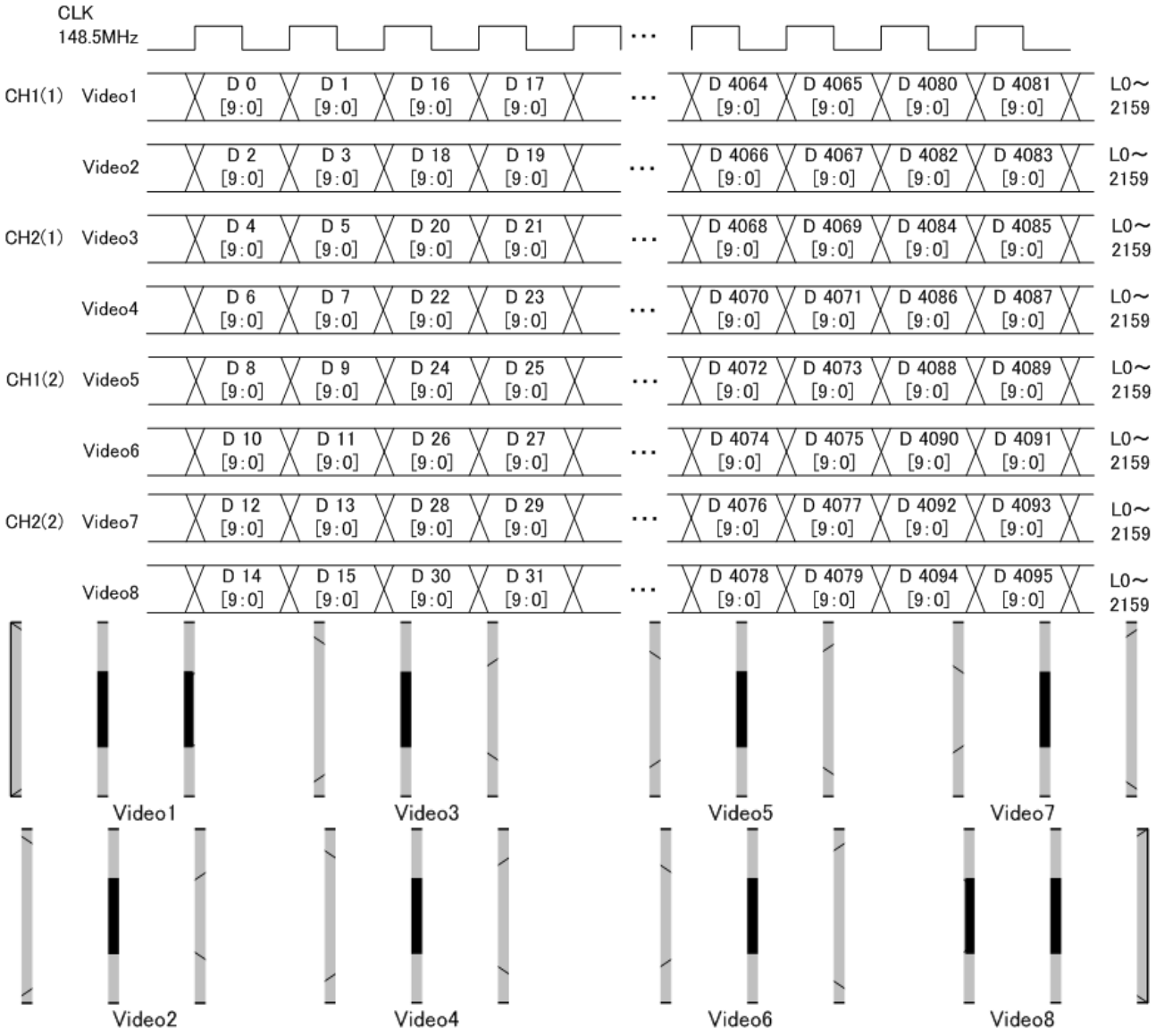
CH1(1)+ CH2(1)

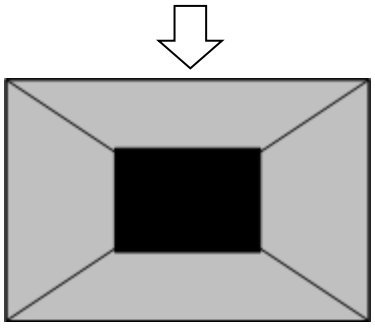
CH1(2)+ CH2(2)

(10) MODE9 (Octal Link) (No Dividing)

Video 1 to 8 are used. The screen is not divided, and output by the below pixel assignment.

Given here as an example of the resolution is 4096 × 2048, the dot clock frequency is 1188 MHz with the 10 bits output.





[CH1(1)+ CH2(1)]+ [CH1(2)+ CH2(2)]

10.7.4 EDID

For further details on the setting procedure, refer to “4.13.3 EDID”.

10.7.5 HDCP

For further details on the setting procedure, refer to “6.1 HDCP”.

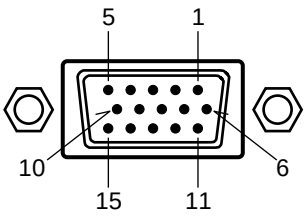
10.7.6 DDC/CI

For further details on the setting procedure, refer to “4.13.4 DDC/CI”.

10.8 Analog Output

10.8.1 Connectors and output signals

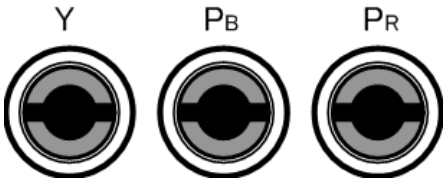
●VGA(D-SUB) Output



Pin no.	Signal	Pin no.	Signal
1	R	9	+5 V (DDC power supply *1)
2	G	10	GND
3	B	11	GND
4	NC	12	DDC DATA
5	NC	13	HS
6	GND (R)	14	VS
7	GND (G)	15	DDC CLK
8	GND (B)		

*1:Restrictions apply to the supply current of the DDC power supply. Refer to “10.17 **Concerning the maximum current consumption of the DDC (DP_PWR) power supply**.”

●YPbPr Output



Connector	Signal
Y	Y
PB	Pb
PR	Pr

●CVBS Output

	Signal
CVBS	Composite Video

10.8.2 Analog output setting method

	MENU	⇒	ProgramEdit	⇒	Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output
	Group Edit		**Output**		**Analog Output**
	Auto Edit		Audio		Digital Output
	DP Analysis		Pattern		VBI Function
	Data Copy/Erase		Action		
Select items by using or ▲ INC ▼ DEC .					

The [Analog Output] screen is displayed:

<Selecting the items>
Select the items using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

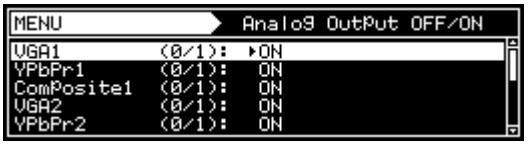
<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Analog Unit setting parameter>

(1)	**Output OFF/ON**	Set ON/OFF of each port. **Refer to "10.8.3Analog Output ON/OFF**
(2)	**General**	Set output level of each output from Analog Component Signal, HS and CS connectors. **Refer to "10.8.4General setting".**
(3)	**Audio OFF/ON**	Set ON/OFF of analog audio output. **Refer to "10.8.5Audio OFF/ON.**

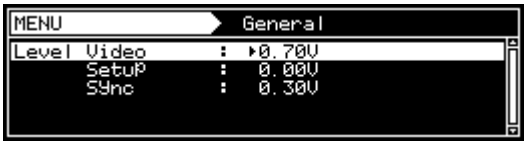
10.8.3 Analog Output ON/OFF setting



(1)	**Output OFF/ON** **VGA1(0/1)** **YPbPr1(0/1)** **Composite1(0/1)** **VGA2(0/1)** **YPbPr2(0/1)** **Composite2(0/1)** **VGA3(0/1)** **YPbPr3(0/1)** **Composite3(0/1)** **VGA4(0/1)** **YPbPr4(0/1)** **Composite4(0/1)**	Set ON/OFF of each port. The setting with common with **"10.2.1 Setting the output interfaces to ON or OFF", both menu can be used for setting.**		
		0	**OFF**	No output.
		1	**ON**	Output.

10.8.4 General Setting

Set output level of each analog output.



Set output level parameter		
Video	Set video level.	
	0.05-1.20V	Video-On-Sync is in the off state.
	0.30-1.20V	Video-On-Sync is in the on state.
Setup	0.00-0.25V	The setup level is set here.
Sync	0.00-0.60V	Sync signal（Video-On-Sync）

Note) this setting is available only for VGA and YPbPr.

10.8.5 Audio OFF/ON setting

This sets ON/OFF of analog audio.

Sets ON/OFF of analog audio.		
0	OFF	Audio is off.
1	ON	Audio is on.

10.8.6 Composite signal filter settings

Filter is set to Composite signal.
This setting is processed before the chrominance is added to the video signals so that the color burst is not affected.

	MENU	⇒	Configuration	⇒	General
MENU ⇒	Group Edit	SET ⇒	**General**	SET ⇒	INC/DEC Interval
	Auto Edit		HDCP		Color Depth
	DP Analysis		HDMI		SAMPLE RGB/YPbPr
	Data Copy/Erase		HDP		DDC Clock
	Configuration		SDI		**TV-COMPOSITE Filter**

Select items by using or ▲ INC ▼ DEC .

<Setting Method>

The edges are enhanced or smoothed by the **TV-COMPOSITE Filter** setting.		
0	**3.5dB gain**	The edges are enhanced.
1	**1.0dB gain**	See above.
2	**-1.0dB**	The edges are smoothed.
3	**-3.0dB**	-ditto-
4	**-7.0dB**	-ditto- (Factory setting)
5	**-7.0dB** *1	3 pixels are smoothed in addition to the setting of 4.

*** The filter settings works in CVBS output.**

10.8.7 Adjustment of Video Level of Component Output

This setting adjusts video level of component output. Data should be saved after adjustment.

	MENU	⇒	Maintenance
MENU ⇒	Auto Edit	SET ⇒	UNMOUNT : USB
	DP Analysis		FORMAT : Internal Memory
	Data Copy/Erase		INSTALL : Initial Data
	Configuration		**ADJUST : VGA & YPbPr**
	Maintenance		ADJUST : Composite

Select items by using or ▲ INC ▼ DEC .

・Select any timing format and display “White” pattern (No.1121).
・Check the digital level is maximum. (Refer to “10.2.8 Setting the Digital Level”)
・Set Analog Level. （Refer to “10.8.4 General setting”）

By using , select item

confirm the current level by oscilloscope,
by using these 2 buttons,
▲ INC (level up) ▼ DEC (level down),

adjust values.

* Adjust value for each R/G/B.
* VGA and YPbPr can by adjusted independently.

10.8.8 Adjustment of Video Level of Composite Output.

This setting adjusts video level of composite output. Data should be saved after adjustment.

	MENU	⇒	Maintenance
MENU ⇒	Auto Edit	SET ⇒	UNMOUNT : USB
	DP Analysis		FORMAT : Internal Memory
	Data Copy/Erase		INSTALL : Initial Data
	Configuration		ADJUST : VGA & YPbPr
	Maintenance		**ADJUST : Composite**
Select items by using or ▲ INC ▼ DEC .			

・Select any timing format and display “White” pattern (No.1121).
・Check the digital level is maximum. (Refer to “10.2.8 Setting the Digital Level”)
・Set Analog Level. （Refer to “10.8.4 General setting”）

By using , select item ⇨

confirm the current level by oscilloscope,
by using these 2 buttons,

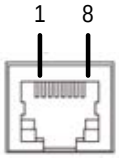
▲ INC (level up) ▼ DEC (level down),

Adjust values.

10.9 HDBaseT

10.9.1 Connector and Pin Assignment

● Connector : RJ45



Pin No.	Signal
1	TX0+
2	TX0-
3	TX1+
4	TX2+
5	TX2-
6	TX1-
7	TX3+
8	TX3-

PoE is not supported.

10.9.2 Data Transfer Method of HDBaseT

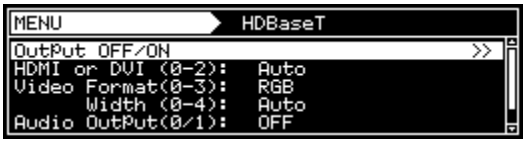
For the data transfer method of the HDMI signal output from the HDBaseT unit, see “10.3.2 HDMI DataTransfer Method.”

10.9.3 Setting of HDBaseT

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	HDMI
	Group Edit		**Output**		Analog Output		DP
	Auto Edit		Audio		**Digital Output**		SDI
	DP Analysis		Pattern		VBI Function		V-by-One HS
	Data Copy/Erase		Action				**HDBaseT**

By using or ▲ INC ▼ DEC, select the item.

The screen of [HDBaseT] is displayed.



<Selecting the items>
Select the items using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

《Setting Parameters of HDBaseT Unit》

(1)	**Output OFF/ON Port1 to 16 (0/1)**	ON/OFF setting of each port. **This is common with the setting in the "10.2.1 Setting the output interfaces to ON or OFF".** If either one is set, its setting is reflected in another one.		
		0	**OFF**	No output
		1	**ON**	Output
(2)	**HDMI or DVI(0-2)**	HDMI is converted to DVI by cable. This is the setting in that case.		
		0	**HDMI**	HDMI full function can be used.
		1	**DVI**	It is different from HDMI about below items. InfoFrame and packet are not sent. Audio is not supported. Max. 8BIT. Deep Color is not supported.
		2	**Auto**	By confirming the EDID of the connected Monitor, it selects either DVI or HDMI automatically.
(3)	**Video Format (0-3)**	Sets the color space of the output from HDBaseT.		
		0	**RGB**	Video is output by RGB.
		1	**YCbCr4:4:4**	Video is output by YCbCr4:4:4.
		2	**YCbCr4:2:2**	Video is output by YCbCr4:2:2.
		3	**YCbCr4:2:0**	Video is output by YCbCr4:2:0.

<table>
<tr><td>(4)</td><td>Width(0-4)</td><td colspan="3">The bit length of the images output from HDbaseT is set here. A setting independent of the bit length for pattern drawing can be selected or the same bit length can be selected automatically.
* The portion by which the bit length for pattern drawing exceeds the bit length which has been set here is discarded. A deficient portion is filled with zeros.
Refer to “10.2.6 Setting the color depth (tone) for pattern drawing.”</td></tr>
<tr><td rowspan="5"></td><td rowspan="5"></td><td>0</td><td>Auto</td><td>8, 10, 12 or 16 bits are selected here automatically depending on the bit length for pattern drawing.</td></tr>
<tr><td>1</td><td>8bit</td><td>8-bit output</td></tr>
<tr><td>2</td><td>10bit</td><td>10-bit output</td></tr>
<tr><td>3</td><td>12bit</td><td>12-bit output</td></tr>
<tr><td>4</td><td>16bit</td><td>16-bit output</td></tr>
<tr><td rowspan="3">(5)</td><td rowspan="3">Audio Output(0/1)</td><td colspan="3">The embedded audio output is set here.
*For the embedded audio settings, refer to “10.10 Digital audio.”</td></tr>
<tr><td>0</td><td>OFF</td><td>No embedded audio output</td></tr>
<tr><td>1</td><td>ON</td><td>Embedded audio output</td></tr>
<tr><td>(6)</td><td>InfoFrame/Packet</td><td colspan="3">When sending InfoFrame automatically in line with the color space and other settings, refer to “10.3.4 InfoFrame/Packet”
When sending InfoFrame with the data of the user’s choice, refer to “10.3.4 InfoFrame/Packet”, too.</td></tr>
</table>

10.9.4 InfoFrame / Packet

InfoFrame can send the values which are optimal for the video and audio output conditions.

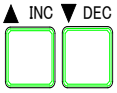
In addition, it is possible to send InfoFrame using values differing from the output conditions to reproduce illegal operation conditions.

Use one of the following operations to send InfoFrame:

a) Send the optimal values automatically.
b) Set separate InfoFrame values, and send them.

a) Sending the optimal values automatically

	MENU	⇒	Configuration	⇒	HDBaseT
MENU ⇒	Group Edit	SET ⇒	SDI	SET ⇒	**Auto Select**
	Auto Edit		V-by-One HS		Packet Changing
	DP Analysis		**HDBaseT**		Link Mode
	Data Copy/Erase		HDCP/EDID/CEC Check		
	Configuration		VM-1876-MX		

By using  or ▲ INC ▼ DEC  , select items.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**OFF**	The optimal value is not sent.
1	**ON**	The optimal value is sent.

《 List of automatically selected items 》

• If program data has been saved when Auto Select is set to ON, the values which were set by automatic selection will be saved.

• A dash ("-") denotes that the value of the original setting is used.

<table>
<tr><th>Item</th><th colspan="4">Setting/reference section</th></tr>
<tr><td>AVI InfoFrame</td><td colspan="4"></td></tr>
<tr><td></td><td colspan="3">AFD pattern (see "4.7 Aspect ratio patterns") now displayed</td><td>Setting other than the left.</td></tr>
<tr><td>Active Format Information</td><td colspan="3">Valid</td><td>—</td></tr>
<tr><td>Active Format Aspect</td><td colspan="3">The setting follows the AFD > Type setting.</td><td>—</td></tr>
<tr><td>Top Bar</td><td colspan="3" rowspan="4">Value calculated from AFD, Timing setting</td><td rowspan="4">—</td></tr>
<tr><td>Bottom Bar</td></tr>
<tr><td>Left Bar</td></tr>
<tr><td>Right Bar</td></tr>
<tr><td>RGB or YCbCr</td><td colspan="4">The setting follows the HDBaseT> Video Format.</td></tr>
<tr><td>Picture Aspect</td><td colspan="4">The setting follows the HDBaseT> AVI InfoFrame> Video Code. (EIA/CEA-861 conformed)</td></tr>
<tr><td>Repetition</td><td colspan="4">The setting accords with the H-Timing > Repetition setting.</td></tr>
<tr><td>Audio InfoFrame</td><td colspan="4"></td></tr>
<tr><td></td><td colspan="4">The setting accords with the Digital Audio > Source setting.</td></tr>
<tr><td></td><td>Ext.ANALOG to L-PCM
Int.L-PCM
Ext.I2S L-PCM
(Option)</td><td>Ext.ANALOG to DSD</td><td>Int.DSD
(Option)</td><td>Setting other than the left.</td></tr>
<tr><td>Sampling Frequency</td><td>—</td><td>44.1kHz</td><td>Follows the information of DSD File.</td><td>—</td></tr>
<tr><td>Channel Count</td><td colspan="3">The setting accords with the number of channels set to ON by Digital Audio > Output Channel.
<table><tr><td>0</td><td>1</td><td>2 to 8</td></tr><tr><td>Refer StreamHeader</td><td>2ch</td><td>2 to 8ch</td></tr></table></td><td>—</td></tr>
<tr><td>ACP Packet</td><td colspan="4"></td></tr>
<tr><td></td><td colspan="3">The setting accords with the ACP Packet > ACP_Type setting.</td></tr>
<tr><td></td><td colspan="2">DVD-Audio</td><td>Setting other than the left.</td></tr>
<tr><td>DVD-Audio_Type</td><td colspan="2">1</td><td>0</td></tr>
<tr><td>Copy_Permission</td><td colspan="2">—</td><td>0 (Copy Freely)</td></tr>
<tr><td>Copy_Number</td><td colspan="2">—</td><td>0 (1 copies)</td></tr>
<tr><td>Quality</td><td colspan="2">—</td><td>0</td></tr>
<tr><td>Transaction</td><td colspan="2">—</td><td>0 (Not Present)</td></tr>
<tr><td>ISRC Packet</td><td colspan="4"></td></tr>
<tr><td></td><td colspan="3">A The setting accords with the ACP Packet > ACP_Type setting.</td></tr>
<tr><td></td><td colspan="2">DVD-Audio</td><td>Setting other than the left.</td></tr>
<tr><td>OFF/ON ISRC1</td><td colspan="2">—</td><td>OFF</td></tr>
<tr><td>ISRC2</td><td colspan="2">The setting accords with the ISRC Packet > ISRC_Cont setting.
<table><tr><td>0</td><td>1</td></tr><tr><td>OFF</td><td>—</td></tr></table></td><td>OFF</td></tr>
</table>

b) Setting separate InfoFrame and Packet values and sending them

This setting can be performed when **"OFF"** is selected for Auto Select in **a) Sending the optimal values automatically**.

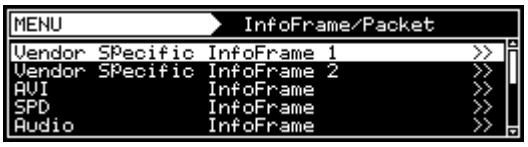
	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Output
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	HDMI
	Group Edit		**Output**		Analog Output		DP
	Auto Edit		Audio		**Digital Output**		SDI
	DP Analysis		Pattern		VBI Function		V-by-One HS
	Data Copy/Erase		Action				**HDBaseT**

By using ◎ or ▲ INC ▼ DEC buttons, select the item.

⇒	HDBaseT
SET ⇒	Video Format(0-3)
	Width(0-4)
	Audio Output(0/1)
	Scramble (0/1)
	InfoFrame/Packet

By using ◎ or ▲ INC ▼ DEC buttons, select the item.

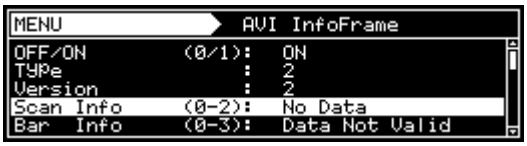
The [InfoFrame/Packet] screen is displayed:



<Selecting the items>
Select the items of InfoFrame/Packet using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Example: When AVI-Info Frame is selected:



For further details on the settings, refer to **<InfoFrame and Packet setting parameters>** below.

<Setting the HDbaseT output when making changes to InfoFrame/Packet>

When making changes to InfoFrame/Packet, users can select either to turn off the synchronization of the HDbaseT output or establish the settings or change only the packets without turning off the synchronization.

	MENU	⇒	Configuration	⇒	HDBaseT
MENU ⇒	Group Edit	SET ⇒	SDI	SET ⇒	Auto Select
	Auto Edit		V-by-One HS		**Packet Changing**
	DP Analysis		**HDBaseT**		Link Mode
	Data Copy/Erase		HDCP/EDID/CEC Check		
	Configuration		VM-1876-MX		

By using or ▲ INC ▼ DEC buttons, select the item.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**Normal Mode**	The HDbaseT output synchronization is turned off, and the InfoFrame/Packet changes are made.
1	**Game Mode**	Changes are made to Packet only (the synchronization is not turned off).

<InfoFrame and Packet setting parameters>

Listed below are the 10 InfoFrame and Packet setting parameters.

- Vendor Specific InfoFrame1, 2
- AVI InfoFrame
- SPD InfoFrame
- Audio InfoFrame
- MPEG InfoFrame
- NTSC VBI InfoFrame
- ACP Packet
- ISRC Packet
- Gamut Metadata Packet

Caution

Regulations to send packet numbers

Due to the limitations by the installed chips, the maximum number of packets which can be sent simultaneously is limited.

VG can send **maximum 7 packets** at a time except AVI InfoFrame.
However, the below packets cannot be sent together.

(1) ACP Packet and SPD InfoFrame
(2) ISRC2 Packet and NTSC VBI InfoFrame
(3) ISRC1 Packet and Vendor Specific InfoFrame1

In case the output of combination is “ON”, priority is shows below.

(1) ACP Packet has priority to be sent.
(2) ISRC2 Packet has priority to be sent.
(3) ISRC1 Packet has priority to be sent.

■ Vendor Specific InfoFrame1, 2

The vendor specific information is stored in Vendor Specific InfoFrame, and sent.
Note) Vendor Specific InfoFrame 1 and 2 have the same setting menu. It is possible to set them differently.

(1)	**OFF/ON(0/1)**	This setting determines whether Vendor Specific InfoFrame is to be sent.		
		0	**OFF**	The Vendor Specific InfoFrame is not sent.
		1	**ON**	The Vendor Specific InfoFrame is sent.
Listed below are the Vendor Specific InfoFrame settings. Note) These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the Vendor Specific InfoFrame type setting.		
		1		"Type" is displayed only. It cannot be changed.
(3)	**Version**	This is the Vendor Specific InfoFrame version setting.		
		1		"Version" is displayed only. It cannot be changed.
(4)	**IEEE RegID Sel(0-2)**	This selects the format setting for the IEEE Registration ID and the items after it.		
		0	**Other**	Any IEEE Registration ID can be selected. The Payload is set after the IEEE Registration ID.
		1	**H14b**	The IEEE Registration ID is set to 000C03h. After the IEEE Registration ID, the setting is established using the format that supports HDMI 1.4.
		2	**HF-VSIF**	The IEEE Registration ID is set to C45DD8h. After the IEEE Registration ID, the setting is established using the format that supports HDMI 2.0.
1. IEEE RegID Sel: Other				
1-(1)	**IEEE Regist. ID**	This is the IEEE Registration ID setting.		
		000000h to **FFFFFFh**		
1-(2)	**Payload Length**	This is the Payload length setting.		
		0 to **24**		
1-(3)	**Payload 1 to 24**	This is the Payload data setting.		
		00h to **FFh**		
2. IEEE RegID Sel: H14b				
2-(1)	**IEEE Regist. ID**	This indicates the IEEE Registration ID. (It cannot be changed.)		
		000C03h		
2-(2)	**Video Format(0-2)**	This is the HDMI Video Format setting.		
		0	**None**	No additional HDMI video format is presented in this packet.
		1	**Ext. Resolution**	Extended resolution format present.
		2	**3D**	3D format indication present.
2-1. Video Format: Ext. Resolution				
2-1-(1)	**HDMI VIC(0-3)**	This is the HDMI VIC setting.		
		0	**4Kx2K 29.97/30Hz**	
		1	**4Kx2K 25Hz**	
		2	**4Kx2K 23.98/24Hz**	
		3	**4Kx2K 24Hz(SMPTE)**	

2-2. Video Format： 3D (Option)				
2-2-(1)	**3D Structure(0-7)**	this is the 3D Structure setting.		
		0	**Frame Packing**	
		1	**Field Alternative *1**	
		2	**Line Alternative**	
		3	**Side-by-Side(Full)**	
		4	**L + depth**	
		5	**L + d + G + G-d**	(L + depth + graphics + graphics-depth)
		6	**Side-by-Side(Half)**	
		7	**Top & Bottom**	
2-2-(2)	**3D Ext Data(0-7)**	this is the 3D Ext Data setting.		
		0 ***2**	**Horizontal O/L,O/R**	Horizontal sub-sampling Odd/Left picture, Odd/Right picture
		1 ***2**	**Horizontal O/L,E/R**	Horizontal sub-sampling Odd/Left picture, Even/Right picture
		2 ***2**	**Horizontal E/L,O/R**	Horizontal sub-sampling Even/Left picture, Odd/Right picture
		3 ***2**	**Horizontal E/L,E/R**	Horizontal sub-sampling Even/Left picture, Even/Right picture
		4	**Quincunx O/L,O/R**	Quincunx matrix Odd/Left picture, Odd/Right picture
		5	**Quincunx O/L,E/R**	Quincunx matrix Odd/Left picture, Even/Right picture
		6	**Quincunx E/L,O/R**	Quincunx matrix Even/Left picture, Odd/Right picture
		7	**Quincunx E/L,E/R**	Quincunx matrix Even/Left picture, Even/Right picture
2-2-(3)	**3DMeta Present(0/1)**	this is the 3D Meta present (whether the following 3D metadata is present or not) setting.		
		0	**0 (Not Present)**	3D metadata not present
		1	**1**	3D metadata present
2-2-(4)	**Metadata Type**	this indicates the 3D Metadata type. (it cannot be changed.)		
		0		
2-2-(5)	**Metadata Length**	this is the 3D Metadata Length setting.		
		0 to **21** ***3**		
2-2-(6)	**Metadata 1 to 21 *3**	this is the 3D Metadata data setting.		
		00h to **FFh**		
3. IEEE RegID Sel： **HF-VSIF**				
IEEE Regist. ID		This shows the IEEE Registration ID (it cannot be changed).		
		C45DD8h		
Version		This is the HF-VSIF version.		
		1		The version is only displayed. It cannot be changed.
3D Valid(0/1)		This is the 3D Valid setting.		
		0	**0**	Disables 3D data
		1	**1**	Enables 3D data

3-1. 3D Valid: Enabled				
3-2-(1)	**3D F Structure(0-7)**	This is the 3D F Structure setting.		
		0	**Frame Packing**	
		1	**Field Alternative *1**	
		2	**Line Alternative**	
		3	**Side-by-Side(Full)**	
		4	**L + depth**	
		5	**L + d + G + G-d**	(L + depth + graphics + graphics-depth)
		6	**Side-by-Side(Half)**	
		7	**Top & Bottom**	
3-2-(2)	**3D F Ext Data(0-7)**	This is the 3D F Ext Data.		
		0 ***2**	**Horizontal O/L,O/R**	Horizontal sub-sampling Odd/Left picture, Odd/Right picture
		1 ***2**	**Horizontal O/L,E/R**	Horizontal sub-sampling Odd/Left picture, Even/Right picture
		2 ***2**	**Horizontal E/L,O/R**	Horizontal sub-sampling Even/Left picture, Odd/Right picture
		3 ***2**	**Horizontal E/L,E/R**	Horizontal sub-sampling Even/Left picture, Even/Right picture
		4	**Quincunx O/L,O/R**	Quincunx matrix Odd/Left picture, Odd/Right picture
		5	**Quincunx O/L,E/R**	Quincunx matrix Odd/Left picture, Even/Right picture
		6	**Quincunx E/L,O/R**	Quincunx matrix Even/Left picture, Odd/Right picture
		7	**Quincunx E/L,E/R**	Quincunx matrix Even/Left picture, Even/Right picture
3-2-(3)	**Additional info Pre (0/1)**	This is the Additional info Present (enables or disables the Dual View, View Dependency, and Preferred 2D View settings below) setting.		
		0	**0 (Not Present)**	Disabled
		1	**1**	Enabled
3-2-(4)	**Dual View(0/1)**	This is the Dual View setting.		
		0	**0 (Normal 3D)**	Normal 3D setting
		1	**1 (Dual View)**	Enables the Dual View setting
3-2-(5)	**View Dependency (0-3)**	This is the View Dependency settings.		
		0	**No Indication**	
		1	**Right Originate**	
		2	**Left Originate**	
		3	**Both**	
3-2-(6)	**Preferred 2D View (0-2)**	This is the Preferred 2D View setting.		
		0	**No Indication**	
		1	**Right View**	
		2	**Left View**	

3-2-(7)	**Disparity Present (0/1)**	This is the Disparity Present (enables or disables Disparity data below) setting.		
		0	**0 (Not Present)**	Disables Disparity data
		1	**1**	Enables Disparity data
3-2-(8)	**Disparity Version (0 to 3)**	This is the Disparity Version setting.		
		0 to 3		
3-2-(9)	**Disparity Length**	This is the Disparity Length (length of Disparity data) setting. Changes depending on the first byte settings of Disparity Version and Disparity data.		
		Disparity Version : 0		
		0		
		Disparity Version : 1		
		3		
		Disparity Version : 2		
		Disparitydata1 : 2	**3**	
		Disparitydata1 : 3	**4**	
		Disparitydata1 : 4	**5**	
		Disparitydata1 : 5	**6**	
		Disparitydata1 : 10	**11**	
		Disparitydata1 : 17	**18**	
		Disparitydata1 : Others	**1**	
		Disparity Version : 3		
		Disparitydata4 : 0	**4**	
		Disparitydata4 : 2	**6**	
		Disparitydata4 : 3	**7**	
		Disparitydata4 : 4	**8**	
		Disparitydata4 : 5	**9**	
		Disparitydata4 : 10	**14**	
		Disparitydata4 : Others	**4**	
3-2-(10)	**Disparitydata 1 to 20 *3**	This is the Disparity data setting.		
		00h to **FFh**		
3-2-(11)	**Meta Present(0/1)**	This is the 3D Meta Present (enables or disables 3D metadata below) setting.		
		0	**0 (Not Present)**	Disables 3D metadata
		1	**1**	Enables 3D metadata
3-2-(12)	**Metadata Type**	This shows the 3D Metadata type (it cannot be changed).		
		0		
3-2-(13)	**Metadata Length**	This is the 3D Metadata Length (length of 3D Metadata) setting.		
		0 to **20** ***3**		
3-2-(14)	**Metadata 1** to **20 *3**	This is the 3D Metadata setting.		
		00h to **FFh**		

Caution

***1**

The output signals differ from the ones in the standards. Currently, the DE signal is high for Vblank3 periods of the Field Alternative.

Caution

***2:**

The 3D Ext Data values of 0 to 3 have all been made consistent with “Horizontal sub-sampling” in HDMI Ver.1.4a standard.

With this generator, the old expressions are used to differentiate the drawing method used with optional pattern 101 and to provide compatibility.

Caution

***3**

If the setting value of 3D Structure is "Side-by-site (Half)", the maximum data of 3D Metadata is 20 bytes.

If you set "21" in Metadata Length, the last data (21st byte) is not sent.

Please refer to the below list.

Packet Byte#	7	6	5	4	3	2	1	0
PB 0	Checksum							
PB 1	24bit IEEE Registration Identifier (000C03h) (least significant byte first)							
PB 2								
PB 3								
PB 4	HDMI_Video_Format (010b(3D))			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 5	3D_Structure				3D_Metadata_ Present	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 6	3D_Metadata_Type			3D_Metadata_Length				
PB 7	3D_Metadata_1							
PB 8	3D_Metadata_2							
PB 9	3D_Metadata_3							
:	:							
PB 26	3D_Metadata_20							
PB 27	3D_Metadata_21							

Example 1: Packet data mapping except Side-by-Side(Half).

Packet Byte#	7	6	5	4	3	2	1	0
PB 0	Checksum							
PB 1	24bit IEEE Registration Identifier (000C03h) (least significant byte first)							
PB 2								
PB 3								
PB 4	HDMI_Video_Format (010b(3D))			Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 5	3D_Structure (1000b(Side-by-Side(Half)))				3D_Metadata_ Present	Rsvd (0)	Rsvd (0)	Rsvd (0)
PB 6	3D_Ext_Data				Reserved (0)			
PB 7	3D_Metadata_Type			3D_Metadata_Length				
PB 8	3D_Metadata_1							
PB 9	3D_Metadata_2							
PB 10	3D_Metadata_3							
:	:							
PB 26	3D_Metadata_19							
PB 27	3D_Metadata_20							

Example 2: Packet data mapping except Side-by-Side(Half).

■ AVI InfoFrame

"AVI InfoFrame" stands for Auxiliary Video Information InfoFrame. The information (including the color space and aspect ratio) of the transmission images is stored in it, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the AVI InfoFrame is to be sent.		
		0	**OFF**	The AVI InfoFrame is not sent.
		1	**ON**	The AVI InfoFrame is sent.
Listed below are the AVI InfoFrame settings. * These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the AVI InfoFrame type setting.		
		2	*"Type" is displayed only. It cannot be changed.	
(3)	**Version(1-3)**	This is the AVI InfoFrame version setting.		
		1	**Version 1**	
		2	**Version 2**	
		3	**Version 3**	
(4)	**Scan Info(0-2)**	This sets the Scan Information. (It sets whether processing is required for the transmitted images.)		
		0	**No Data**	No Data
		1	**Overscanned**	Composed for an overscanned display.
		2	**Underscanned**	Composed for an underscanned display.
(5)	**Bar Info(0-3)**	This sets the Bar Info (valid/invalid for the Bar Information described later).		
		0	**Data Not Valid**	Bar Data not valid
		1	**Vertical Valid**	Vert.Bar info valid
		2	**Horizontal Valid**	Horiz.Bar info Valid
		3	**Vert. & Horiz. Valid**	Vert. And Horiz. Bar Info valid
(6)	**ActiveF Info(0/1)**	This is the Active Format Information Present setting (valid/invalid for the Active Format Aspect Ratio described later).		
		0	**No Data**	No Data
		1	**Valid**	Active Format Information Valid
(7)	**RGB or YCbCr(0-7)**	This is the RGB or YCbCr (color space of transmitted images) setting.		
		0	**RGB**	
		1	**YCbCr 4:2:2**	
		2	**YCbCr 4:4:4**	
		3	**YCbCr 4:2:0**	
		4	**(reserved1)**	
		5	**(reserved2)**	
		6	**(reserved3)**	
		7	**IDO-Defined**	

(8)	**AvtiveF Aspect(0-9)**	This is the Active Format Aspect Ratio (aspect ratio of the video parts (excluding Bar of letter box, etc.)) setting.		
		0	**Same Picture**	
		1	**4:3(center)**	
		2	**16:9(center)**	
		3	**14:9(center)**	
		4	**Box 16:9(top)**	
		5	**Box 14:9(top)**	
		6	**Box > 16:9(center)**	
		7	**4:3(14:9 center)**	
		8	**16:9(14:9 center)**	
		9	**16:9(4:3 center)**	
(9)	**Picture Aspect(0-2)**	This is the Picture Aspect Ratio (aspect ratio of the video parts including Bar of letter box, etc.) setting.		
		0	**No Data**	No Data
		1	**4:3**	4:3
		2	**16:9**	16:9
(10)	**Scaling(0-3)**	This is the Non-Uniform Picture Scaling (direction in which transmitted images have been scaled) setting.		
		0	**No Known**	No Known non-uniform Scaling
		1	**Horizontal**	Picture has been scaled horizontally
		2	**Vertical**	Picture has been scaled vertically
		3	**Horiz. & Vert.**	Picture has been scaled horizontally and vertically
(11)	**Colorimetry(0-3)**	This is the Colorimetry (the standard whose coefficients were used for conversion into color difference signals) setting.		
		0	**No Data**	No Data
		1	**SMPTE170M/ ITU601**	SMPTE170M/ITU601
		2	**ITU709**	ITU709
		3	**Extended Valid**	Extended Colorimetry Information Valid
(12)	**Video Code**	This is the Video Format Identification Code setting.		
		0 to 107	For further details on the timings indicated by Code, refer to CEA-861-F.	
(13)	**Repetition**	**1 to 10**	This is the Pixel Repetition Factor setting.	
(14)	**Top Bar**	**0 to 65535**	This is the Line Number of End of Top Bar setting (letter box top bar size setting).	
(15)	**Bottom Bar**	**0** to **65535**	This is the Line Number of Start of Bottom Bar setting (letter box bottom bar size setting).	
(16)	**Left Bar**	**0** to **65535**	This is the Pixel Number of End of Left Bar setting (pillar box left bar size setting).	
(17)	**Right Bar**	**0** to **65535**	This is the Pixel Number of Start of Right Bar setting (pillar box right bar size setting).	
(18)	**RGB Quan.Range(0-2)**	This is the RGB Quantization Range setting (quantization range when RGB images apply for Colorimetry).		
		0	**Default**	
		1	**Limited Range**	

		2	**Full Range**
(19)	**YCC Quan.Range(0/1)**	This is the YCC Quantization Range setting (quantization range when YCC images apply for Colorimetry).	
		0	**Limited Range**
		1	**Full Range**
(20)	**Extended Colo.(0-6)**	This is the Extended Colorimetry setting. (This is referenced when Extended Valid has been set as the Colorimetry setting.)	
		0	**xvYCC601**
		1	**xvYCC709**
		2	**sYCC601**
		3	**AdobeYCC601**
		4	**AdobeRGB**
		5	**BT2020 YcCbcCrc**
		6	**BT2020 RGBorYCbCr**
(21)	**IT content(0/1)**	This is the IT Content (whether the transmitted images are IT content) setting.	
		0	**No Data**
		1	**IT content**
(22)	**IT Content Type(0-3)**	This is the IT Content Type setting.	
		0	**Graphics**
		1	**Photo**
		2	**Cinema**
		3	**Game**

■ SPD InfoFrame

"SPD InfoFrame" stands for Source Product Description InfoFrame. The information of the transmission device is stored in it, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the SPD InfoFrame is to be sent.		
		0	**OFF**	The SPD InfoFrame is not sent.
		1	**ON**	The SPD InfoFrame is sent.
Listed below are the SPD InfoFrame settings. *These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the SPD InfoFrame type setting.		
		3	*"Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the SPD InfoFrame version setting.		
		1	Version1	*"Version" is displayed only. It cannot be changed.
(4)	**Vendor Name**	This is the Vendor Name (name of the transmission device vendor) setting.		
		Maximum 8 characters		For further details on the input method, refer to steps (2) and following in section "2.3 Setting the names"
(5)	**Product Description**	This the Product Description (name of the transmission device (model name, etc.)) setting.		
		Maximum 16 characters		For further details on the input method, refer to steps (2) and following in section "2.3 Setting the names"
(6)	**Source Device(0-D)**	This is the Source Device Information (the type of transmission device) setting.		
		0	**Unknown**	
		1	**Digital STB**	
		2	**DVD Player**	
		3	**D-VHS**	
		4	**HDD Video recorder**	
		5	**DVC**	
		6	**DSC**	
		7	**Video CD**	
		8	**Game**	
		9	**PC general**	
		A	**Blue-Ray Disc**	
		B	**Super Audio CD**	
		C	**HD DVD**	
		D	**PMP**	

■ Audio InfoFrame

The transmission audio information is stored in the Audio InfoFrame, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the Audio InfoFrame is to be sent.		
		0	**OFF**	The Audio InfoFrame is not sent.
		1	**ON**	The Audio InfoFrame is sent.
Listed below are the Audio InfoFrame settings. *These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the AVI Audio InfoFrame type setting.		
		4	*"Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the Audio InfoFrame version setting.		
		1	*"Version" is displayed only. It cannot be changed.	
(4)	**Coding Type(0-F)**	This is the Audio Coding Type setting.		
		0	**Refer StremHeader**	Refer to Stream Header
		1	**IEC60958 PCM**	
		2	**AC-3**	
		3	**MPEG1(Layers 1&2)**	
		4	**MP3(MPEG1 Layer 3)**	
		5	**MPEG2(multi ch.)**	
		6	**AAC**	
		7	**DTS**	
		8	**ATRAC**	
		9	**One Bit Audio**	
		A	**Dolby Digital +**	
		B	**DTS-HD**	
		C	**MLP**	
		D	**DST**	
		E	**WMA Pro**	
		F	**Refer Extension**	
(5)	**Coding Ext Type(0-9)**	This is the Audio Coding Ext Type setting.		
		0	**(not use1)**	
		1	**(not use2)**	
		2	**(not use3)**	
		3	**HE-AAC**	
		4	**HE-AACv2**	
		5	**AAC LC**	
		6	**DRA**	
		7	**HE-AAC Surround**	
		8	**(reserved)**	
		9	**AAC-LC Surround**	
(6)	**Channel Count(0-7)**	This is the Audio Channel Count setting.		
		0	**Refer StreamHeader**	Refer to Stream Header
		1	**2ch**	
		↓	↓	
		7	**8ch**	

(7) **Sampling Freq(0-7)**

This is the Sampling Frequency setting.

0	**Refer StreamHeader**	Refer to Stream Header
1	**32kHz**	
2	**44.1kHz**	
3	**48kHz**	
4	**88.2kHz**	
5	**96kHz**	
6	**176.4kHz**	
7	**192kHz**	

(8) **Sample Size(0-3)**

This is the Sample Size setting.

0	**Refer StreamHeader**	Refer to Stream Header
1	**16bit**	
2	**20bit**	
3	**24bit**	

(9) **Speaker Placement (0-50)**

This is the Channel/Speaker Allocation setting.

	8ch	7ch	6ch	5ch	4ch	3ch	2ch	1ch
0		-	-	-	-	-	FR	FL
1		-	-	-	-	LFE	FR	FL
2		-	-	-	FC	-	FR	FL
3		-	-	-	FC	LFE	FR	FL
4		-	-	RC	-	-	FR	FL
5		-	-	RC	-	LFE	FR	FL
6		-	-	RC	FC	-	FR	FL
7		-	-	RC	FC	LFE	FR	FL
8		-	RR	RL	-	-	FR	FL
9		-	RR	RL	-	LFE	FR	FL
10		-	RR	RL	FC	-	FR	FL
11		-	RR	RL	FC	LFE	FR	FL
12		RC	RR	RL	-	-	FR	FL
13		RC	RR	RL	-	LFE	FR	FL
14		RC	RR	RL	FC	-	FR	FL
15		RC	RR	RL	FC	LFE	FR	FL
16	RRC	RLC	RR	RL	-	-	FR	FL
17	RRC	RLC	RR	RL	-	LFE	FR	FL
18	RRC	RLC	RR	RL	FC	-	FR	FL
19	RRC	RLC	RR	RL	FC	LFE	FR	FL
20	FRC	FLC	-	-	-	-	FR	FL
21	FRC	FLC	-	-	-	LFE	FR	FL
22	FRC	FLC	-	-	FC	-	FR	FL
23	FRC	FLC	-	-	FC	LFE	FR	FL
24	FRC	FLC	-	RC	-	-	FR	FL
25	FRC	FLC	-	RC	-	LFE	FR	FL
26	FRC	FLC	-	RC	FC	-	FR	FL
27	FRC	FLC	-	RC	FC	LFE	FR	FL
28	FRC	FLC	RR	RL	-	-	FR	FL
29	FRC	FLC	RR	RL	-	LFE	FR	FL
30	FRC	FLC	RR	RL	FC	-	FR	FL
31	FRC	FLC	RR	RL	FC	LFE	FR	FL

		32	-	FCH	RR	RL	FC	-	FR	FL
		33	-	FCH	RR	RL	FC	LFE	FR	FL
		34	TC	-	RR	RL	FC	-	FR	FL
		35	TC	-	RR	RL	FC	LFE	FR	FL
		36	FRH	FLH	RR	RL	-	-	FR	FL
		37	FRH	FLH	RR	RL	-	LFE	FR	FL
		38	FRW	FLW	RR	RL	-	-	FR	FL
		39	FRW	FLW	RR	RL	-	LFE	FR	FL
		40	TC	RC	RR	RL	FC	-	FR	FL
		41	TC	RC	RR	RL	FC	LFE	FR	FL
		42	FCH	RC	RR	RL	FC	-	FR	FL
		43	FCH	RC	RR	RL	FC	LFE	FR	FL
		44	TC	FCH	RR	RL	FC	-	FR	FL
		45	TC	FCH	RR	RL	FC	LFE	FR	FL
		46	FRH	FLH	RR	RL	FC	-	FR	FL
		47	FRH	FLH	RR	RL	FC	LFE	FR	FL
		48	FRW	FLW	RR	RL	FC	-	FR	FL
		49	FRW	FLW	RR	RL	FC	LFE	FR	FL
		50	Reserved							

(10)	**Level Shift Value**	This is the Level Shift Value setting.		
		0 to 15	The decibel (dB) level is set here.	
(11)	**Down-mix(0/1)**	This is the Down –mix Inhibit Flag setting.		
		0	**Permitted / No Info**	Permitted or no information about any assertion of this
		1	**Prohibited**	Prohibited
(12)	**LFE PB Level(0-2)**	This is the LEF Playback Level setting.		
		0	Unknown	
		1	0dB Playback	
		2	+10dB Playback	

■ MPEG InfoFrame

If the original source of the data prior to its conversion to HDMI is MPEG data, its information is stored in MPEG InfoFrame, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the MPEG InfoFrame is to be sent.		
		0	**OFF**	The MPEG InfoFrame is not sent.
		1	**ON**	The MPEG InfoFrame is sent.
Listed below are the MPEG InfoFrame settings. *These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the MPEG InfoFrame type setting.		
		5	*"Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the MPEG InfoFrame version setting.		
		1	*"Version" is displayed only. It cannot be changed.	
(4)	**Bit Rate**	**0 to 4294**M **967**k **295**Hz		This is the MPEG bit rate setting.
(5)	**Field Repeat(0/1)**	This is the Field Repeat setting.		
		0	**New Field(picture)**	
		1	**Repeated Field**	
(6)	**Frame(0-3)**	This is the MPEG Frame setting.		
		0	**Unknown(No Data)**	
		1	**I Picture**	
		2	**B Picture**	
		3	**P Picture**	

■ NTSC VBI InfoFrame

The vertical blanking interval (VBI) information is stored in NTSC VBI InfoFrame, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the NTSC VBI InfoFrame is to be sent.		
		0	**OFF**	The NTSC VBI InfoFrame is not sent.
		1	**ON**	The NTSC VBI InfoFrame is sent.
Listed below are the NTSC VBI InfoFrame settings. *These settings are not related to the video and audio output settings.				
(2)	**Type**	This is the NTSC VBI InfoFrame type setting.		
		6	*"Type" is displayed only. It cannot be changed.	
(3)	**Version**	This is the NTSC VBI InfoFrame version setting.		
		1	*"Version" is displayed only. It cannot be changed.	
(4)	**PES Length**	0 to 27		This sets the PES length.
(5)	**PES 1 to 5/6 to 10/11 to 15/16 to 20/21 to 25/26 to 27**	00h to FFh		This sets the PES data.

■ Dynamic Range and Mastering InfoFrame

Dynamic Range and Maserting InfoFrame contains the information that is related to the Dynamic Range of video stream, and send it out.

(1)	**OFF/ON(0/1)**	The setting determines whether HDR Metadata InfoFrame is sent or not.		
		0	**OFF**	HDR Metadata InfoFrame is not sent.
		1	**ON**	HDR Metadata InfoFrame is sent.
(2)	**Type**	The setting determines the type of HDR Metadata InfoFrame.		
		7	* display only. Cannot be changed.	
(3)	**Version**	Set version of HDR Metadata InfoFrame.		
		1	Version1	* display only. Cannot be changed.
(4)	**EOTF(0-3)**	Set EOTF.		
		0	SDR Range	
		1	HDR Range	
		2	SMPTE ST2084	
		3	Future EOTF	
(5)	**Metadata ID**	Set Static Metadata Descriptor ID.		
		0	Metadata Type1 * display only. Cannot be changed.	
(6)	**Disp Primaries x0**	Set display_primaries_x[0].		
		0 .00000~ 1.00000 (0.00002 Step)		
(7)	**Disp Primaries y0**	Set display_primaries_y[0].		
		0 .00000~ 1.00000 (0.00002 Step)		
(8)	**Disp Primaries x1**	Set display_primaries_x[1].		
		0 .00000~ 1.00000 (0.00002 Step)		
(9)	**Disp Primaries y1**	Set display_primaries_y[1].		
		0 .00000~ 1.00000 (0.00002 Step)		
(10)	**Disp Primaries x2**	Set display_primaries_x[2].		
		0 .00000~ 1.00000 (0.00002 Step)		
(11)	**Disp Primaries y2**	Set display_primaries_y[2].		
		0 .00000~ 1.00000 (0.00002 Step)		
(12)	**White Point x**	Set White_point_x,		
		0 .00000~ 1.00000 (0.00002 Step)		
(13)	**White Point y**	Set White_point _y,		
		0 .00000~ 1.00000 (0.00002 Step)		
(14)	**Max Disp Mastering**	Set max_display_mastering_luminance.		
		1~ 65535		
(15)	**Min Disp Mastering**	Set min_display_mastering_luminance.		
		0 .0001~ 6.5535		
(16)	**Content Light LV**	Set Maximum Content Light Level.		
		1~ 65535		
(17)	**Frame-ave Light LV**	Set Maximum Frame-average Light Level.		
		1~ 65535		

■ ACP Packet

"ACP Packet" stands for Audio Content Protection Packet. The copyright protection information added to DVD-Audio and Super Audio CD contents is stored in it, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the ACP Packet is to be sent.			
		0	**OFF**	The ACP Packet is not sent.	
		1	**ON**	The ACP Packet is sent.	
Listed below are the ACP Packet settings. *These settings are not related to the video and audio output settings.					
(2)	**ACP_Type(0-3)**	This is the ACP Type setting.			
		0	**Generic Audio**		
		1	**IEC60958 Audio**		
		2	**DVD-Audio**		
		3	**Super Audio CD**		
(3)	**DVD-Audio Type(0/1)**	This is the DVD-Audio_Type_Dependent_Generation setting.			
		0	*This must be set to 1 when "DVD-Audio" has been selected as the ACP_Type setting.		
		1			
(4)	**CopyPermission(0-3)**	Audio_Copy_permission (the information concerning the permission to copy DVD-Audio content) is set here.			
		0	**Copy Freely**		
		1	**(reserved)**		
		2	**Specify CopyNumber**		
		3	**No More Copies**		
(5)	**Copy_Number(0-7)**	Audio_copy_number (the number of times DVD-Audio content may be copied) is set here.			
		0	**1 copies**		
		1	**2 copies**		
		2	**4 copies**		
		3	**6 copies**		
		4	**8 copies**		
		5	**10 copies**		
		6	**3 copies**		
		7	**Copy OneGeneration**		
(6)	**Quality(0-3)**	Audio_Quality (the quality in which DVD-Audio content is to be copied) is set here.			
			No. of channels	Sampling frequency	Bit width
		0	2 channels or less	Lower than 48 kHz	16 bits or less
		1	2 channels or less	No restrictions	No restrictions
		2	No restrictions	No restrictions	No restrictions
		3	No restrictions	Lower than 48 kHz	16 bits or less
(7)	**Transaction(0/1)**	Audio_Transaction (whether the status of optional access control is contained in the DVD-Audio data) is set here.			
		0	**Not Present**	not present	
		1	**(reserved)**	Reserved for copyright management system use	

(8)	**Count_A(0-255)**	Count_A (the number of times the Super Audio CD contents can be copied by an approved secure recorder) is set here.	
		0	Prohibited
		1 to 254	Allowed from 1 to 254 times
		255	No restrictions
(9)	**Count_S(0-255)**	Count_S (the number of times the Super Audio CD contents can be copied by a secure recorder) is set here.	
		0	Prohibited
		1 to 254	Allowed from 1 to 254 times
		255	No restrictions
(10)	**Count_U(0-255)**	Count_U (the number of times the Super Audio CD contents can be copied by an unlisted recorder) is set here.	
		0	Prohibited
		1 to 254	Allowed from 1 to 254 times
		255	No restrictions
(11)	**CCI_Flags_Q_A(0/1)**	CCI_Flags_Q_A (the quality in which Super Audio content is to be copied by an approved secure recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(12)	**CCI_Flags_Q_S(0/1)**	CCI_Flags_Q_S (the quality in which Super Audio content is to be copied by a secure recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(13)	**CCI_Flags_Q_U(0/1)**	CCI_Flags_Q_U (the quality in which Super Audio content is to be copied by an unlisted recorder) is set here.	
		0	**CD Quality**
		1	**Unlimited DSD Quality**
(14)	**CCI_Flags_Move_A (0/1)**	CCI_Flags_Move_A (whether copying of Super Audio content by individual track onto an approved secure recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**
(15)	**CCI_Flags_Move_S (0/1)**	CCI_Flags_Move_S (whether copying of Super Audio content by individual track onto a secure recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**
(16)	**CCI_Flags_Move_U (0/1)**	CCI_Flags_Move_U (whether copying of Super Audio content by individual track onto an unlisted recorder is allowed) is set here.	
		0	**Not Allowed**
		1	**Allowed**

■ ISRC Packet

"ISRC Packet" stands for International Standard Recording Code Packet. The sound source identification codes and other information are stored in it, and sent.

(1)	**OFF/ON ISRC1(0/1)**	Whether to send the ISRC1 Packet is set here.		
		0	**OFF**	The ISRC1 Packet is not sent.
		1	**ON**	The ISRC1 Packet is sent.
(2)	**OFF/ON ISRC2(0/1)**	Whether to send the ISRC2 Packet is set here.		
		0	**OFF**	The ISRC2 Packet is not sent.
		1	**ON**	The ISRC2 Packet is sent.
Listed below are the ISRC Packet settings. *These settings are not related to the video and audio output settings.				
(3)	**ISRC_Cont(0/1)**	This is the ISRC Continued setting.		
		0	ISRC2 is not sent.	
		1	ISRC2 is sent.	
(4)	**ISRC_Valid(0/1)**	This is the ISRC Valid setting. (ISRC Valid indicates whether data has been set to the ISRC_Status in the ISRC Packet and whether the UPC_EAN_ISRC_XX field is valid.)		
		0	Invalid	
		1	Valid	
(5)	**ISRC_Status(0-2)**	This is the ISRC_Status setting. (ISRC_Status indicates the position on the current track.)		
		0	**Starting**	
		1	**Intermediate**	
		2	**Ending**	
(6)	**Validity Info(0-3)**	This is the Validity information setting. (This indicates whether the ISRC and UPC/EAN data is valid or invalid.)		
		0	**No Validity**	
		1	**ISRC**	
		2	**UPC/EAN**	
		3	**UPC/EAN and ISRC**	
(7)	**Catalogue Code**	This is the Catalogue Code (UPC/EAN #1 - 13) setting.		
		Number consisting of 13 digits		
(8)	**Country Code**	This is the Country Code (ISRC #1 - 2) setting.		
		Character string consisting of 2 letters		
(9)	**First Owner Code**	This is the First Owner Code (ISRC #3 - 5) setting.		
		Character string consisting of 3 alphanumeric		
(10)	**Year of Rec. Code**	This is the Year-of-recording code (ISRC #6 - 7) setting.		
		Number consisting of 2 digits		
(11)	**Recording-item Code**	This is the Recording code / Recording-item code (ISRC #8 -12) setting.		
		Number consisting of 5 digits		

■ Gamut Metadata Packet

If the transmission images have been sent by xvYCC, their color space information (range, etc.) is stored in the Gamut Metadata Packet, and sent.

(1)	**OFF/ON(0/1)**	This setting determines whether the Gamut Metadata Packet is to be sent.		
		0	**OFF**	The Gamut Metadata Packet is not sent.
		1	**ON**	The Gamut Metadata Packet is sent.
Listed below are the Gamut Metadata Packet settings. * These settings are not related to the video and audio output settings.				
(2)	**Next-Field(0/1)**	This is the Next_Field setting. (This indicates whether GBD (Gamut Boundary Description) sent in this Gamut Metadata Packet is applicable to the next video field.)		
		0	Not applicable	
		1	Applicable	
(3)	**No_Current_GBD(0/1)**	This is the No_Current_GBD setting. (This indicates whether GBD sent in this Gamut Metadata Packet is valid or invalid.)		
		0	Invalid	
		1	Valid	
(4)	**GBD_Profile(0-3)**	This is the GBD_Profile setting.		
		0	P0	
		1	P1	
		2	P2	
		3	P3	
(5)	**AffectedGamutSeqNum**	**0 to 15**	This is the Affected_Gamut_Seq_Num setting. (This indicates the number of GBD (Gamut boundary description) sent in this Gamut Metadata Packet.)	
(6)	**Current_GamutSeqNum**	**0 to 15**	This is the Current_Gamut_Seq_Num setting. (This indicates the number of the GBD that applies to the current video field.)	
(7)	**Packet_Seq(0-3)**	This is the Packet_Seq setting. (This identifies what this Gamut Metadata Packet is in the Gamut Metadata Packet Sequence.)		
		0	**Intermediate**	Intermediate packet in sequence
		1	**First**	First packet in sequence
		2	**Last**	Last packet in sequence
		3	**Only**	Only packet in sequence
(8)	**Format_Flag(0/1)**	This is the Format_Flag setting. (This indicates the format of the GBD sent.)		
		0	**Vertices/Facets**	Vertices/Facets description
		1	**Range**	Range description
(9)	**Colorprecision(0-2)**	This is the GBD_Color_Precision setting. (This indicates the precision (bit width) of the vertex and range data in GBD.)		
		0	**8bit**	
		1	**10bit**	
		2	**12bit**	

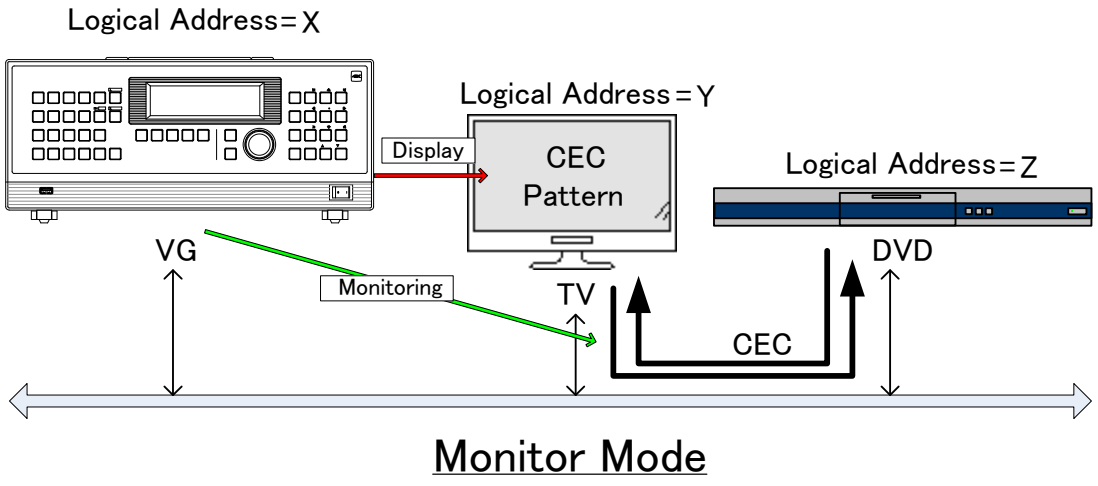
<table>
<tr><td rowspan="10">(10)</td><td rowspan="10">Color_Space(0-3)</td><td colspan="3">This is the GBD_Color_Space setting.
■ When Vertices/facets (0) has been selected as the Format_Flag setting</td></tr>
<tr><td>0</td><td>ITU-R BT.709</td><td>ITU-R BT.709 (using RGB)</td></tr>
<tr><td>1</td><td>xvYCC601</td><td>xvYCC601 (IEC61966-2-4-SD) (using YCbCr)</td></tr>
<tr><td>2</td><td>xvYCC709</td><td>xvYCC709 (IEC61966-2-4-HD) (using YCbCr)</td></tr>
<tr><td>3</td><td>XYZ</td><td>XYZ</td></tr>
<tr><td colspan="3">■ When Range (1) has been selected as the Format_Flag setting</td></tr>
<tr><td>0</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>1</td><td>xvYCC601</td><td>RGB expression of xvYCC601 coordinates</td></tr>
<tr><td>2</td><td>xvYCC709</td><td>RGB expression of xvYCC709 coordinates</td></tr>
<tr><td>3</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>(11)</td><td>Number_Vertices</td><td colspan="3">This is the Number_Vertices setting.
*This is displayed only when Vertices/facets (0) has been selected as the Format_Flag setting.</td></tr>
<tr><td></td><td></td><td colspan="3">Colorprecision =
8bit : 4 to 8
10bit : 4 to 6
12bit : 4 to 5</td></tr>
<tr><td rowspan="5">(12)</td><td colspan="2">Packed_GBD_ Vertices_Data</td><td colspan="3">This is the Packed_GBD_Vertices_Data setting.
*This is displayed only when Vertices/facets (0) has been selected as the Format_Flag setting.</td></tr>
<tr><td rowspan="4"></td><td>Data1</td><td rowspan="4">Colorprecision =
8bit : 0 to 255
10bit: 0 to 1023
12bit: 0 to 4095</td><td colspan="2" rowspan="4">The Y, Cb and Cr values of the colors (Data) are set here.</td></tr>
<tr><td>Data2</td></tr>
<tr><td>Data3</td></tr>
<tr><td>Data4</td></tr>
<tr><td rowspan="7">(13)</td><td colspan="2">Packed_Range_ Data</td><td colspan="3">This is the Packed_Range_Data setting.
*This is displayed only when Range (1) has been selected as the Format_Flag setting.</td></tr>
<tr><td rowspan="6"></td><td>Min_Red</td><td rowspan="6">Colorprecision =
8bit : -3.96875 to +3.96875
10bit: -3.9921875 to +3.9921875
12bit: -3.998046875 to +3.998046875</td><td colspan="2" rowspan="6">The Range Data of the colors (Red, Green and Blue) are set here.</td></tr>
<tr><td>Max_Red</td></tr>
<tr><td>Min_Green</td></tr>
<tr><td>Max_Green</td></tr>
<tr><td>Min_Blue</td></tr>
<tr><td>Max_Blue</td></tr>
</table>

10.9.5 CEC Function

HDbaseT can send and receive the CEC commands, and display them on the screen. The CEC function has three operation modes.

a) Monitor mode (Monitor)

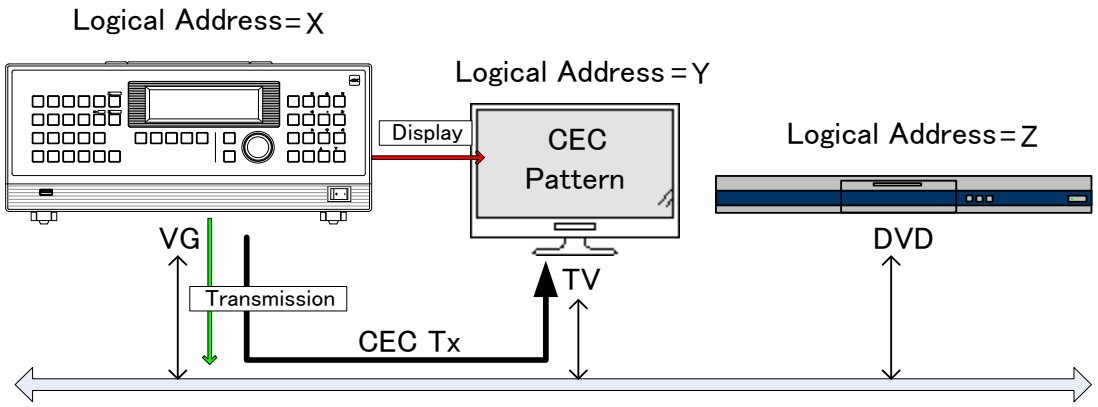
In this mode, the sending and receiving of the commands generated between the equipment connected to CEC are displayed on the screen.



Monitor Mode

b) Transmission mode (Transmission)

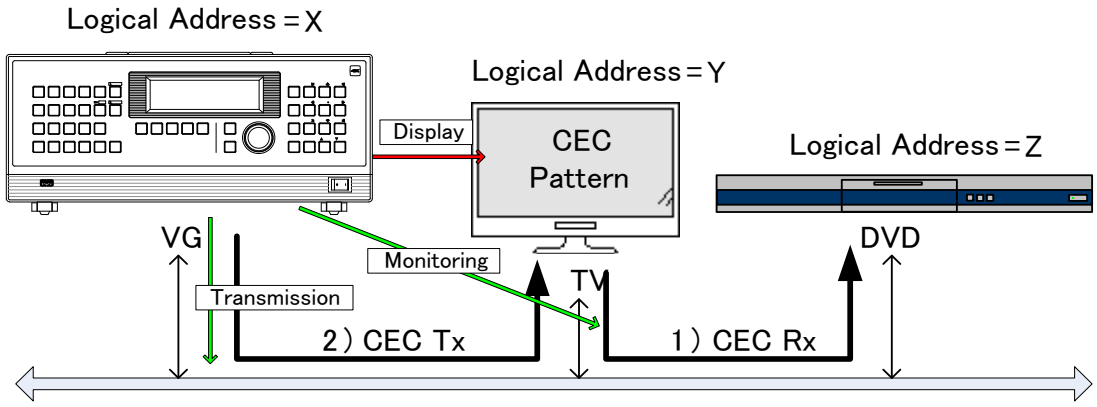
In this mode, the commands are sent from the generator to the designated logical address.



Transmission Mode

c) Response mode (Response)

In this mode, the commands are sent as responses when the designated commands have been transmitted.



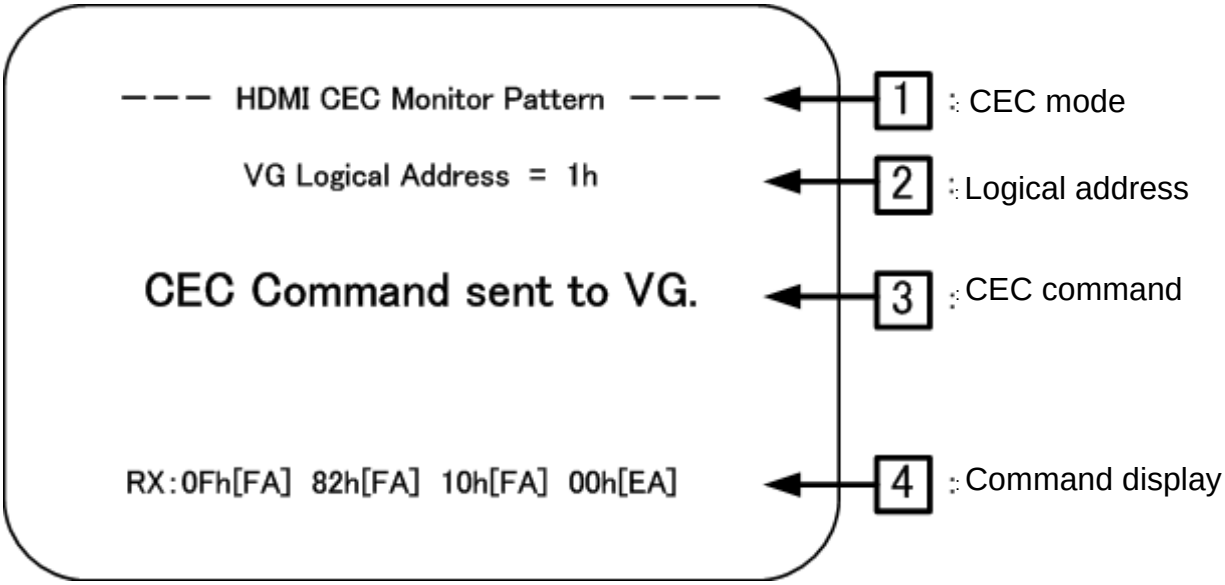
Response Mode

<CEC Display Procedure>

①	NAME/LIST DETAIL → NAME/LIST DETAIL	
②	**<Selecting the CEC>** Select the **CEC** using or ▲ INC ▼ DEC, Select **CEC** → SET	
③	**<Detailed setting: Selecting EDIT>** Select **EDIT** using or ▲ INC ▼ DEC, Select **EDIT** → SET Alternatively, select EDIT using 0/STATUS After the setting items have been edited, select EXECUTE, and press the SET key to enable the settings.	

<Table of CEC setting items>

(1)	**VG Logical Address**	This sets the logical address of the VG generator. (0 to F)		
(2)	**Port(0/1)**	This sets the port used for Audio Return Channel execution.		
		0	**HDMI**	CEC is executed using the HDMI port.
		1	**HDBaseT**	CEC is executed using the HDbaseT port.
(3)	PortNo	This sets the port used for CEC execution.		
			1 to 16	CEC is executed using the HDMI port that has been set.
(4)	**Mode(0-2)**	This sets the operation mode.		
		0	**Monitor**	The CEC commands are monitored.
		1	**Transmission**	The CEC commands set using items (4) to (7) are transmitted.
		2	**Response**	When commands have been received under conditions (8) to (12), the CEC commands set using items (4) to (7) are transmitted.
Set here the CEC commands to be sent from the VG-876. The following items are set when **Transmission** or **Response** has been selected as the **Mode setting**.				
(5)	**Tx** | Destination	-	This sets the address of the **destination** (transmission destination of CEC commands).	
(6)	**Tx** | Opcode	-	This sets the OPCode.	
(7)	**Tx** | Data Length	0 to14	This sets the length of the **Tx** | data.	
(8)	**Tx** | Data [H] 1-6 /7-12/13-14	-	This sets the CEC command data.	
Set here the CEC commands to be received from the VG-876. The following items are set when **Response** has been selected as the **Mode setting**.				
(9)	**Rx** | Initiator	0h to Eh	This sets the address of the initiator.	
(10)	**Rx** | Destination	0h to Fh	This sets the address of the **destination**. This can also be set using a **logical address** other than the one set using item (1).	
(11)	**Rx** | Opcode	-	This sets the OPCode.	
(12)	**Rx** | Data Length	0 to 14	This sets the length of the **Rx** | data.	
(13)	**Rx** | Data [H] 1-6 /7-12/13-14	-	This sets the CEC command data.	



(1)	CEC Mode	"HDMI CEC Monitor Pattern": Monitor mode "HDMI CEC Transmission Pattern": Command transmission mode "HDMI CEC Response Pattern": Command response mode
(2)	Logical Address	VG logical address which has been set
(3)	Display of CEC command transmission/ reception status	"CEC Command send to Device Xh" : The command has been transmitted to the unit (Destination Logical Address Xh) which has been set. "CEC Command sent to VG" : The generator has received a command. (Command destined to the VG logical address which has been set.) "CEC Command sent to Other Devices" : A command has been transferred to a unit other than the generator. (A command to a VG logical address other than the one which has been set) "Waiting Command …" : Command wait status (which is established when a command is not transmitted or received for 5 or more seconds)
(4)	Command display	When the corresponding command has been transmitted or received, it is displayed. **XXh[FA] XXh[FA] XXh[FA] XXh[EA]** Acknowledge A: provided N: not provided End of Message E: provided F: not provided Data part TX is a command which is transmitted by the generator; RX is a command which is received by the generator. *Commands sent to the destination address of Fh are judged to be broadcast messages and indicated using the polarity which is the reverse of regular ACK polarity.

10.9.6 EDID

For further details on the setting procedure, refer to **“4.13.3 EDID.”**

10.9.7 HDCP

For further details on the setting procedure, refer to **“6.1 HDCP settings.”**

10.9.8 DDC/CI

For further details on the setting procedure, refer to **“4.13.4 DDC/CI.”**

10.9.9 LipSync

For further details on the setting procedure, refer to **“5.9 LipSync.”**

10.9.10 Long Reach Mode

	MENU	⇒	Configuration	⇒	HDBaseT
MENU ⇒	Group Edit	SET ⇒	SDI	SET ⇒	Auto Select
	Auto Edit		V-by-One HS		Packet Changing
	DP Analysis		**HDBaseT**		**Link Mode**
	Data Copy/Erase		HDCP/EDID/CEC Check		
	Configuration		VM-1876-MX		

Select items by using or ▲ INC ▼ DEC buttons.

The [Long Reach Mode] screen is displayed.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

0	**Normal Mode**	Outputs by normal HDBaseT output mode.
1	**Long Reach Mode**	This is the setting that can output up to 150m cable length. ***1**

*1: In “Long Reach Mode”, the HDMI signal supports up to 148.5MHz.

10.10Digital audio

10.10.1 Digital audio

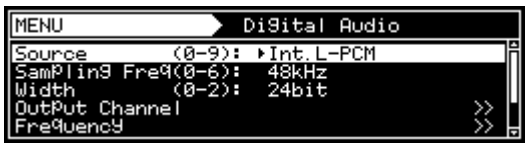
The operation procedure is described below.

Setting the sound source, frequency, level, etc.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	Digital Audio
MENU ⇒	**ProgramEdit**	SET ⇒	Timing	SET ⇒	**Digital Audio**	SET ⇒	**Source**
	GroupEdit		Output		Audio Sweep		Sampling Freq
	AutoEdit		**Audio (TIM)**				Width
	Data Copy/Erase		Pattern				Output Channel
	Configuration		Action				Frequency

Select item using or ▲ INC ▼ DEC

The [Digital Audio] screen is displayed:



<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Source>

0	**OFF**	No output.
1	**Ext. COAXIAL**	Digital input (L-PCM) audio is output. * Refer to <Ext. COAXIAL setting parameters> for further details.
2	**Int. L-PCM**	Sine waves are output by the internal L-PCM. For further details, refer to <Int. L-PCM setting parameters>.
3	**Int. Non L-PCM** **OPTION**	Non Linear PCM that is saved in internal memory is output. For further details, refer to <Int. Non L-PCM setting parameters>.
4	**Int. DSD** **OPTION**	DSD audio that is saved in internal memory is output. For further details, <Int. DSD setting parameters>.

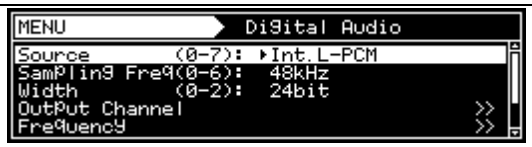
* When Ext. COAXIAL is selected as Source, input stable audio first, after that change the setting of source.

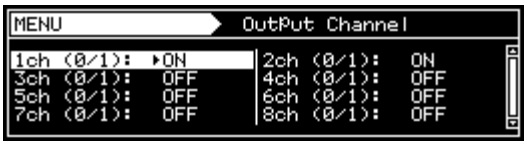
elow are the setting parameters associated with each sound source.

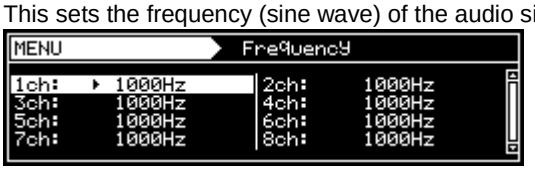
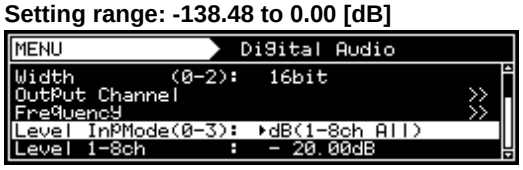
< Ext. COAXIAL setting parameters>

	Setting menu display			
(1)	**Sampling Frequency (0-6)**	This sets the sampling frequency of digital input (L-PCM).		
		0	**32KHz**	This outputs the signals at a 32 kHz sampling frequency.
		1	**44.1KHz**	This outputs the signals at a 44.1 kHz sampling frequency.
		2	**48KHz**	This outputs the signals at a 48 kHz sampling frequency.
		3	**88.2KHz**	This outputs the signals at a 88.2 kHz sampling frequency.
		4	**96KHz**	This outputs the signals at a 96 kHz sampling frequency.
		5	**176.4KHz**	This outputs the signals at a 176.4 kHz sampling frequency.
		6	**192KHz**	This outputs the signals at a 192 kHz sampling frequency.

<Int. L-PCM setting parameters>

	Setting menu display			
(1)	**Sampling Frequency (0-6)**	This sets the sampling frequency.		
		0	**32 KHz**	This outputs the signals at a 32 kHz sampling frequency.
		1	**44.1 KHz**	This outputs the signals at a 44.1 kHz sampling frequency.
		2	**48 KHz**	This outputs the signals at a 48 kHz sampling frequency.
		3	**88.2 KHz**	This outputs the signals at a 88.2 kHz sampling frequency.
		4	**96 KHz**	This outputs the signals at a 96 kHz sampling frequency.
		5	**176.4 KHz**	This outputs the signals at a 176.4 kHz sampling frequency.
		6	**192 KHz**	This outputs the signals at a 192 kHz sampling frequency.
(2)	**Width (0-2)**	This sets the bit length of the audio data.		
		0	**16 BIT**	The audio data is output with 16 bits.
		1	**20 BIT**	The audio data is output with 20 bits.
		2	**24 BIT**	The audio data is output with 24 bits.

<table>
<tr><td>(3)</td><td>Output Channel</td><td colspan="3">Whether to set ON or OFF for channels 1 to 8 of the embedded audio are set here.
 

Note) In SD output of SDI unit, odd number channel and even number channel become opposite.
e.g. 1ch=ON means play audio of 2ch,
4ch OFF means stop playing audio of 3ch.</td></tr>
<tr><td></td><td></td><td>0</td><td>OFF</td><td>No output.</td></tr>
<tr><td></td><td></td><td>1</td><td>ON</td><td>Output.</td></tr>
<tr><td>(4)</td><td>Frequency</td><td colspan="3">This sets the frequency (sine wave) of the audio signals to be output.
 
</td></tr>
<tr><td></td><td></td><td colspan="2">20 - 95980</td><td>The parameter can be set up to a value that is equal to half of the sampling frequency minus 20 Hz.
Example: When the sampling frequency is 48 kHz
This sets a frequency in the 20 to 23980 ranges</td></tr>
<tr><td>(5)</td><td>Level InpMode</td><td colspan="3">This sets the level input method.</td></tr>
<tr><td></td><td></td><td>0</td><td>dB (1-8ch All)</td><td>This sets all the channels 1 to 8 as a dB display.
Setting range: -138.48 to 0.00 [dB]
 
</td></tr>
<tr><td></td><td></td><td>1</td><td>BIT (1-8ch All)</td><td>This sets all the channels 1 to 8 as a bit display.
Setting range: 0 to 7FFFFFh
 
</td></tr>
<tr><td></td><td></td><td>2</td><td>db (1-8ch Separate)</td><td>This sets channels 1 to 8 separately as a dB display.
Setting range: -138.48 to 0.00 [dB]
 

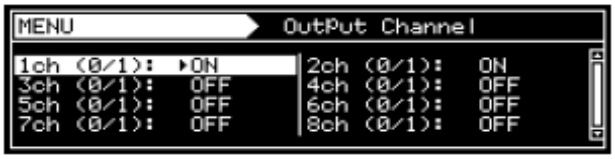
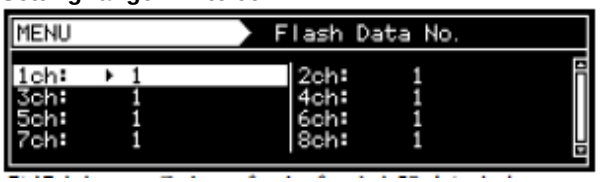
Select the level here.
 
</td></tr>
</table>

		3	**bit (1-8ch Separate)**	This sets channels 1 to 8 separately as a bit display. **Setting range: 0 to 7FFFFFh**  Select the level here. 

<Int. Non L-PCM setting parameters> (option)

	Setting menu display	
(1)	**Flash Data No.**	Set audio data. Setting range: **1 to 99** It sets the audio data that has been registered previously. Refer to “10.7.3 Flash Data Entry (option).”

<Int. DSD setting parameters> (Option)>

	Setting menu display		
(1)	**Output Channel**	This sets valid or invalid of embedded audio CH1 to CH8. 	
		0	**OFF** — No output
		1	**ON** — Output
(2)	**Flash Data No.**	This sets audio data that is output from each CH. **Setting range: 1 to 99**  Set the audio data that has been registered. Refer to “10.7.3 Flash Data Entry (option).”	

10.10.2 Audio sweep settings

When **Internal PCM** is selected by the **Digital Audio > Source** setting, the audio sweep function is available, and the audio output frequency is incremented at the specified interval.

For further details on the audio sweep settings, refer to “10.2.9 Audio sweep settings.”

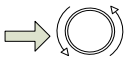
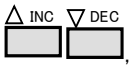
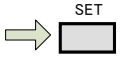
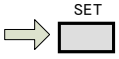
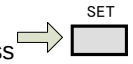
10.10.3 AAC,AC3 Audio Data Entry

Save audio data of AAC and AC3 in VG-876.

(1)	**Preparations** <u>Store audio data in a USB memory, and insert the card into VG-876.</u>	* **Audio data and a sample program are saved in the SP-8870 (CD).** Audio data should be stored by below procedures. 1. Copy audio folder in the ¥SampleData¥Audio in CD to USB memory. 2. Insert USB memory to VG, and follow from (2) procedures.
(2)	Select **Audio Flash Data Entry** using MENU, or INC DEC, and then press SET	
(3)	Select the parameters using or INC DEC, and then press SET	 **Note) Set "No.1" as Group No.**
(4)	Select **EXECUTE** using or INC DEC, and then press SET to store the data.	 **Note: Do not take out USB memory or turn off the power of the VG-876 until "Complete" appears on the screen.**

10.10.4 Flash Data Entry

Audio data (VT-8500-0006/0008) can be stored in theVG-876.

(1)	**Preparations** Store audio data in a USB memory, and insert the card into VG-876.	*** Audio data and a sample program are saved in the VT-8500-0006/0008 (CD).** For further details on audio data storing procedures, refer to the VT-8500-0006/0008 (CD) instruction manual.
(2)	Select **Audio Flash Data Entry** using  or  , and then press 	
(3)	Select the parameters using  or   , and then press 	 Specify the number of the Group No. of the audio data.
(4)	Select **EXECUTE** using  or   and then press  to store the data.	 **Note: Do not take out USB memory or turn off the power of the VG-876 until "Complete" appears on the screen.**

* Groups of audio data up to 64MB created by SP-8870 software can be saved in the VG-876.

10.11Analog Audio

10.11.1 Connectors and output signals

Connector	Signal
R	Audio right (R) channel
L	Audio left (L) channel

10.11.2 Analog audio signals

Analog audio signals can be output.

The operation procedure is described below.

a)Set the analog audio to enable.

b)Set the sound source, frequency, level, etc.

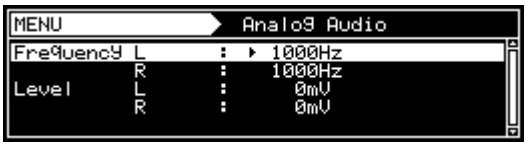
a)Set the analog audio to enable.

Refer to “10.8.5 Audio OFF/ON setting”.

b) Set the sound source, frequency, level, etc.

	MENU	⇒	ProgramEdit	⇒	Output
MENU [ ] ⇒	**Program Edit**	SET [ ] ⇒	Timing	SET [ ] ⇒	**Analog Audio**
	Group Edit		Output		Digital Audio
	Auto Edit		**Audio**		Audio Sweep
	DP Analysis		Pattern		
	Data Copy/Erase		Action		
Select items by using ◯ or ▲ INC ▼ DEC [ ] [ ] .					

By operating above procedure, [Analog Audio] menu appears.



<Selecting the items>
Select the items of SDI using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Refer to below list about setting details.

This sets frequency and level.	
Frequency L	The left channel frequency is set. **Setting range: 100 Hz to 20,000 KHz (100 Hz Step)**
Frequency R	The right channel frequency is set. **Setting range: 100 Hz to 20,000 KHz (100 Hz Step)**
Level L	The left channel level is set. **Setting range: 0 to 4,000 [mV] (50 mV Step)**
Level R	The right channel level is set. **Setting range: 0 to 4,000 [mV] (50 mV Step)**

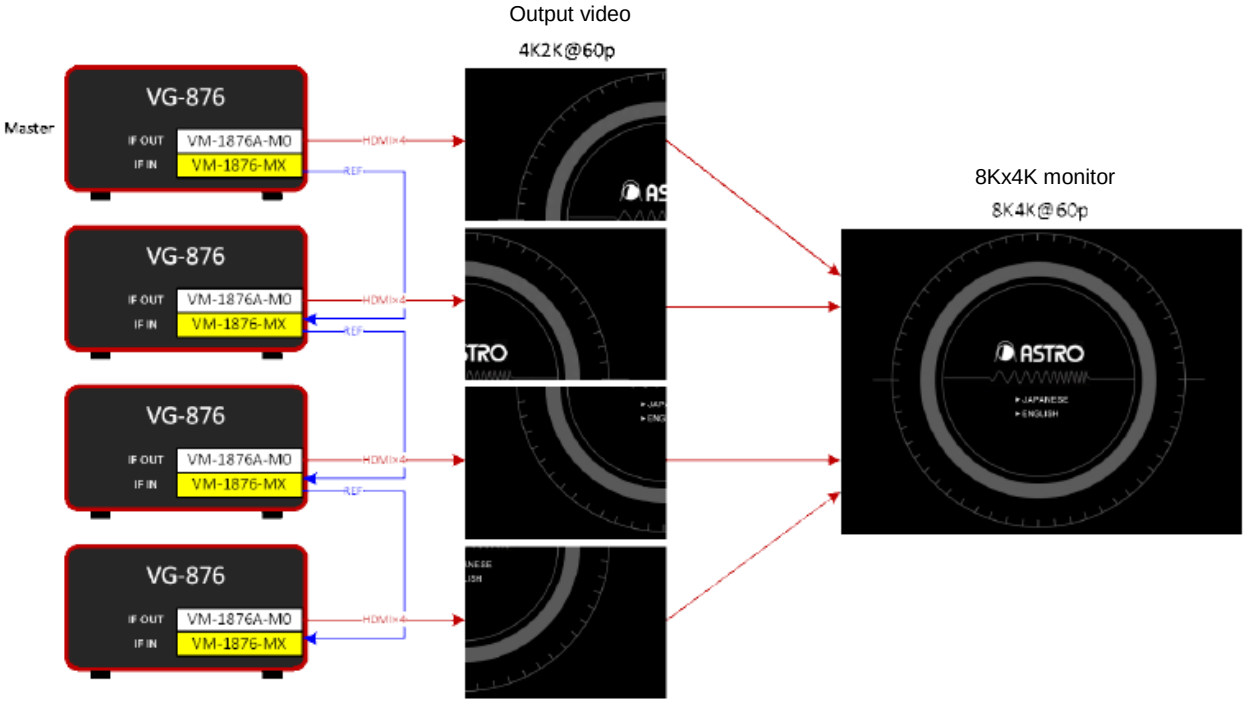
10.12 Synchronization by several units operation

10.12.1 Outline

By using VM-1876-MX Synchronization units, VG-876 can output resolution such 8Kx4K@60p by synchronizing 2 or 4 sets of VG-876.

<HDMI output 8Kx4K@60p operation by using 4 sets of VG-876>

- VM-1876-MX should be inserted to “IF IN” slot of VG-876.



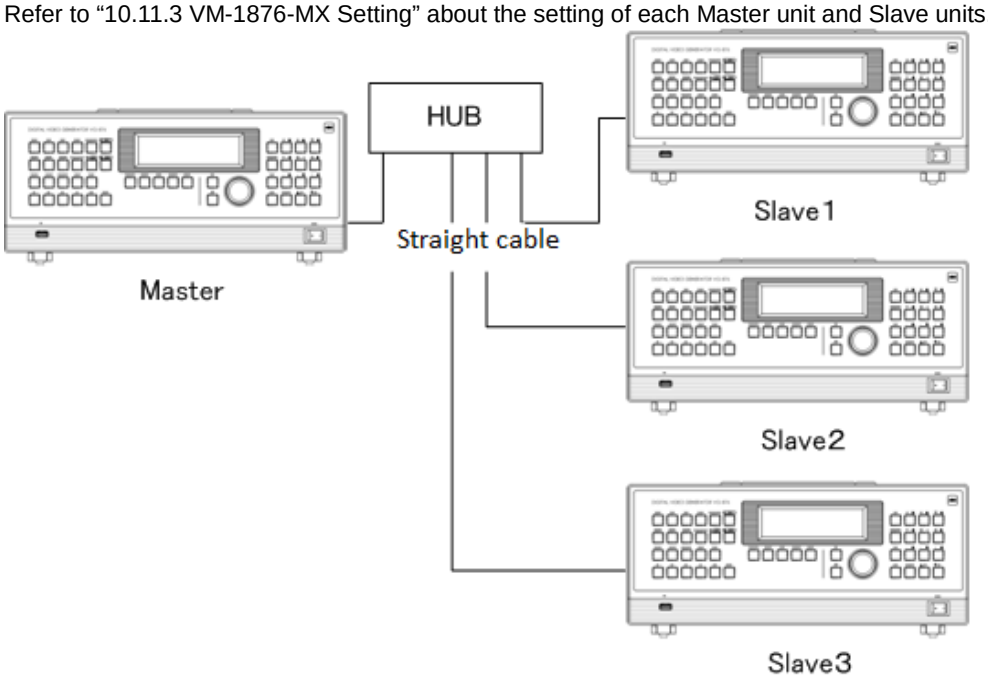
Note) VM-1876-MX is installed in the slot of “IF IN”.

10.12.2 Connection

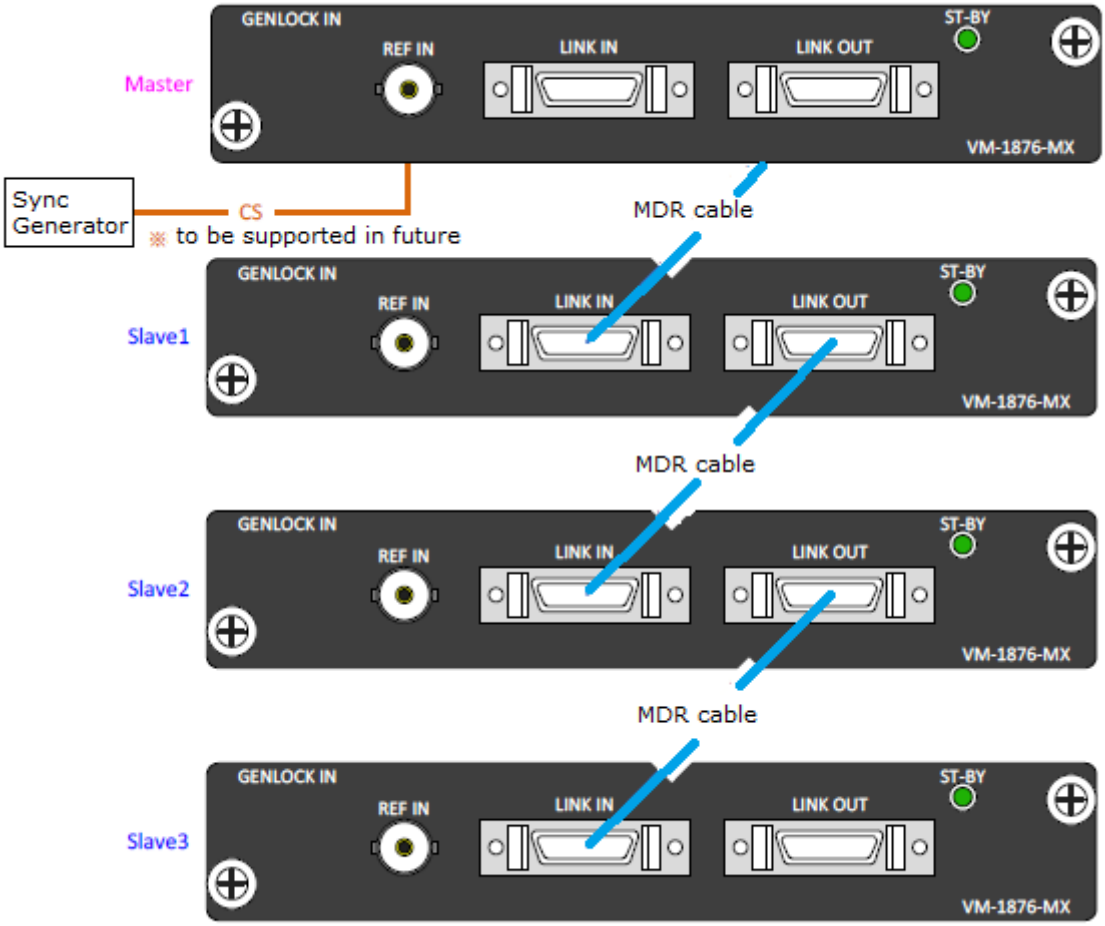
Multi-link connection is described as below.

- Connection figure of VG-876's.

Master unit and Slave units are connected by LAN (Straight cable) via HUB.
Refer to "10.11.3 VM-1876-MX Setting" about the setting of each Master unit and Slave units.



- Connection figure of VM-1876-MX's



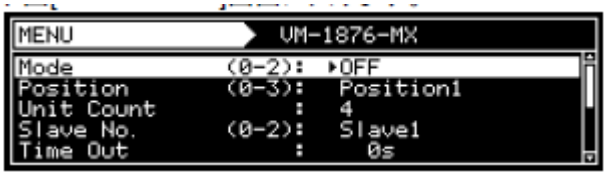
10.12.3 VM-1876-MX setting

<VG Config setting>

To operate synchronization of several VG units, set Configuration. All VG needs to be set.

	MENU	⇒	Configuration
MENU ⇒	GroupEdit	SET ⇒	HDMI
	AutoEdit		DP
	DP Analysis		**SDI**
	Data Copy/Erase		HDCP/EDID/CEC check
	Configuration		VM-1876-MX
Select item using ◯ or ▲ INC ▼ DEC			

By operating as above, the below menu [VM-1876-MX] appears.



<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<VM-1876-MX setting parameter>

(1)	Mode (0-2)	0	OFF	Synchronization mode is not selected.
		1	Master	Synchronization mode is performed as Master.
		2	Slave	Synchronization mode is performed as Slave.
(2)	Position (0-3)	Set drawing position of VG. * It follows the setting of “All Output” – “Multi VG Mode”. * when Multi VGMode is set as “V2Div,” do not set this item as “Position 3” or “Position 4”. Refer to “10.11.5 Split Mode Image of 4 sets synchronization” or “10.11.6 Split Mode Image of 2 sets synchronization” about output details.		
		0	Position1	Drawing position is at Position1.
		1	Position2	Drawing position is at Position2.
		2	Position3	Drawing position is at Position3.
		3	Position4	Drawing position is at Position4.
(3)	Unit count	Set number of VG that synchronize. Setting range : 1 – 4 * Currently, only “1” and “4” can be set.		
(4)	OFF/ON (0/1)	0	Slave 1	When Mode is set as Slave, this is set as 1st Slave.
		1	Slave 2	When Mode is set as Slave, this is set as 2nd Slave.
		2	Slave 3	When Mode is set as Slave, this is set as 3rd Slave.
(5)	Time out	Set Time out time. Setting range : 0-255 * Do not change setting value from “0”.		

(6)	Reverse mode	Drawing direction is reversed. For details about output, refer to “10.12.7 Image of scanning direction”		
		0	No Reverse	Normal operation.
		1	Left Right	Reverse direction of left and right.
		2	Top Bottom	Reverse direction of top and bottom.
		3	LR & TB	Reverse direction of left and right, top and bottom.
(7)	Slave Control Cnt	Set number of Slave Control. Setting range: 0 – 3 Currently, only 0, 1 and 3 settings are available. When using 2 units synchronization, set “1”. When using 4 units synchronization, set “3”.		
(8)	Slave1 IP Address Slave2 IP Address Slave3 IP Address	Set IP address of Slave Control. (XXX, XXX, XXX, XXX) Setting range : 0-255		

10.12.4 Control operation

The program data that has been set by users is output by operation of front keys or remote box.

<Split Output Setting>

Set split mode.

	MENU	⇒	ProgramEdit	⇒	Output	⇒	All Output
MENU ⇒	**Program Edit**	SET ⇒	Program Name	SET ⇒	**All Output**	SET ⇒	HDCP
	Group Edit		Timing		Analog Output		Level Mode
	Auto Edit		**Output**		Digital Output		DotClk Mode
	DP Analysis		Audio		VBI Function		(Split Mode)
	Data Copy/Erase		Pattern				**Multi VGMode**

Select item using ◯ or ▲ INC ▼ DEC.

By operating as above, the below menu [All Output] – [Multi VGMode] appears.

<Selecting the items>

Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>

Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

Multi VGSplit	Set drawing position of 4 VG units.		
	0	**Auto**	If DotClock is over 1320MHz, square-split is executed. If DotClock is under 1320MHz, it does not split.
	1	**2H/2VDiv**	Square-split is executed.
	2	**4VDiv**	Vertically 4 split is executed.
	3	**V2Div**	Vertically 2 split is executed. (VG-876 x 2 units synchronization)

Refer to “10.11.5 Split Mode Image of 4 sets synchronization” or “10.11.6 Split Mode Image of 2 sets synchronization” about output details.

Caution

The below restriction is applied when synchronizing several VG-876.

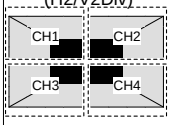
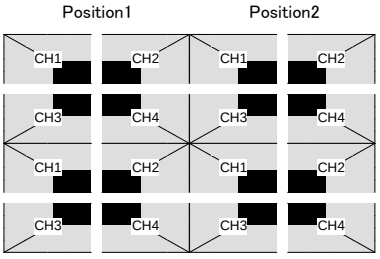
Item	Restriction
Scroll	**“Pause” cannot be operated in all units. Only Master unit stops, and after you release “pause”, the scroll positions of slave units are all reset.**
M-Blur	**The Random action cannot be operated together in all units.**
Cursor	**The cursor movement cannot be operated together in all units.**
List display	**List display of HDCP, EDID, DDC and CEC is not displayed.**
APDC	**Not supported.**
3D pattern	**Not supported.**
Sync on/off	**This function cannot be operated together in all units.**
HDCP on/off	**This function cannot be operated together in all units.**
Audio Mute on/off	**This function cannot be operated together in all units.**
Video Level operation	**This function cannot be operated together in all units. The level of only Master unit is changed. Note) the digital video level of the following program is reflected in slave units.**
Audio Level operation	**This function cannot be operated together in all units.**
Image	**The user made patterns, such as Image, OPT-USER and Subtitles should be saved and registered in each VG-876 units that are synchronized.**

10.12.5 Split Mode Image of 4 units synchronization

When synchronizing 4 units of VG-876, the below split mode is supported.
Refer to “10.16 Relationships between the pattern drawing bit length, the dividing mode and the dot clock frequency”.

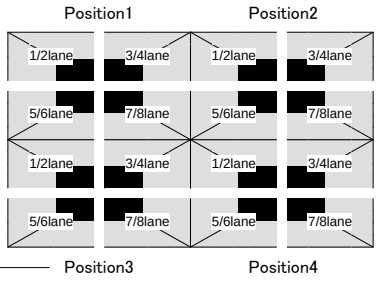
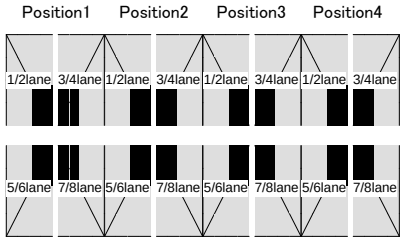
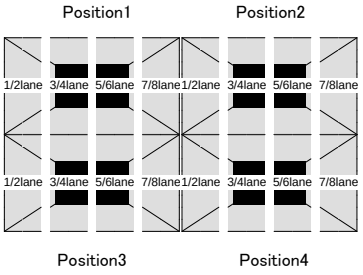
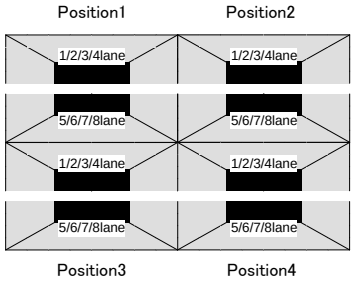
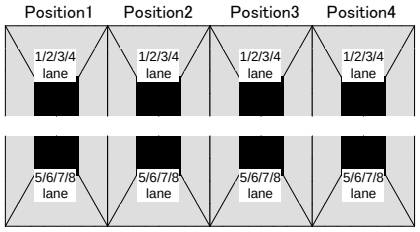
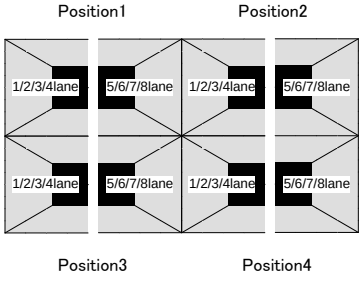
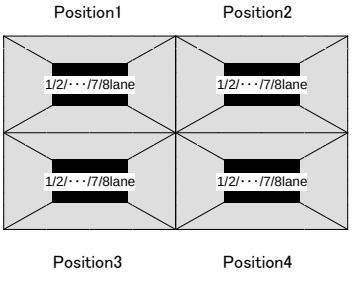
The supported interface units are:
・VM-1876A-M0 ・VM-1876-M2 ・VM-1876-M5
・VM-1876A-M6 ・VM-1876-M7 ・VM-1876-M8

《VM-1876A-M0, VM-1876-M7》
Note) Dual clock mode is not supported.

DotClk Mode	Split Mode Mode1, 3-10 are not supported.	Multi VGMode	Pattern Image	Multi VGMode	Pattern Image
Quad	Mode0,2 (H2/V2Div) 	H2/V2Div	 Note) One connector output: 1920x1080 60Hz or 120Hz 2048x1080 60Hz or 120Hz (Set arbitrary VIC.)	V4Div	

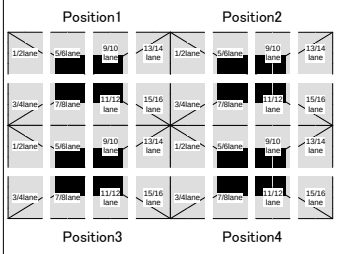
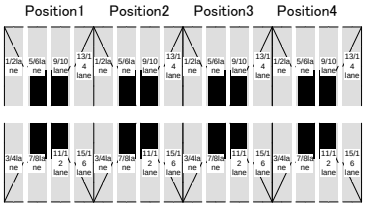
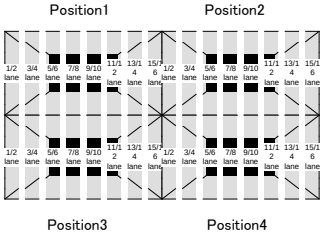
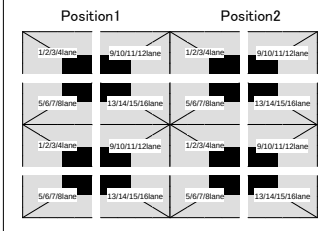
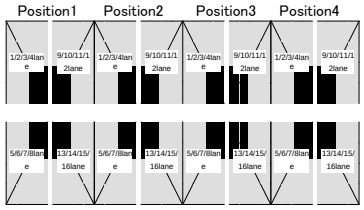
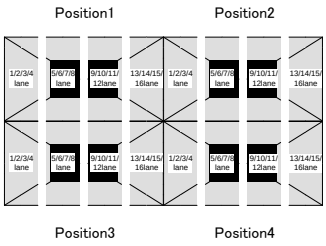
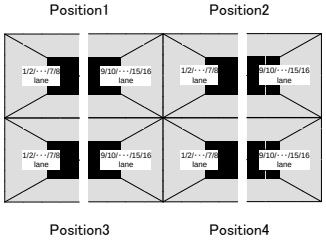
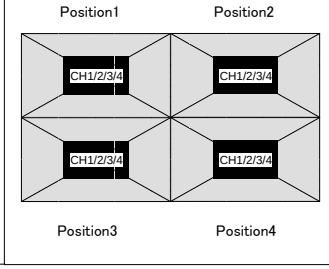
《VM-1876-M2》

●Number of Lane = 8 lanes x 4 (8K4K 60Hz)

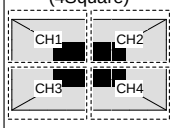
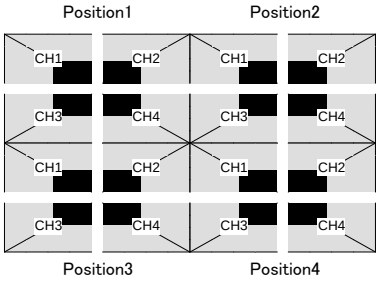
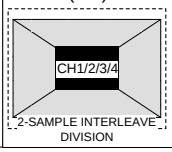
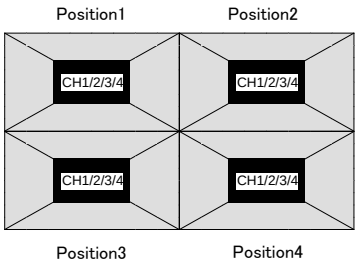
DotClk Mode	Split Mode	Multi VGMode	Pattern Image	Multi VGMode	Pattern Image
Dual (8 lanes)	Mode0	H2/V2Div		V4Div	
	Mode1				
	Mode2				
	Mode3,8,9				
	Mode4,5,6,7				

CH3/4 outputs the same picture as CH1/2

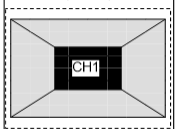
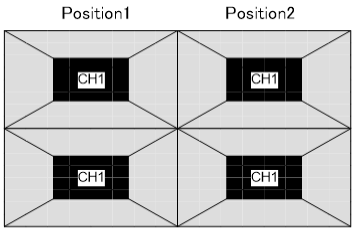
●Number of Lane = 16 lanes x 4 (8K4K 120Hz)

DotClk Mode	Split Mode *Mode10 is not supported.	Multi VGMode	Pattern Image	Multi VGMode	Pattern Image
Quad (16 Lanes)	Mode0	H2/V2Div		V4Div	
	Mode1				
	Mode2				
	Mode3,7,8				
	Mode4,5,6				
	Mode9				

《VM-1876-M5》
*** Dual Clock Mode is not supported.**

DotClk Mode	Split Mode *Mode1-9 is not supported.	Multi VGMode	Pattern Image	Multi VGMode	Pattern Image
Quad	Mode0 (4Square) 	H2/V2Div	 Note) One connector output: 1920x1080 60Hz,2048x1080 60Hz	V4Div	
	Mode10 (2SI) 		 Note) One connector output: 1920x1080 60Hz, 2048x1080 60Hz		

《VM-1876A-M6, VM-1876-M8》
***Quad Clock Mode is not supported.**

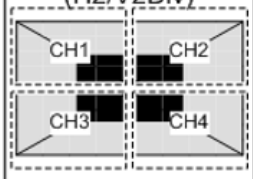
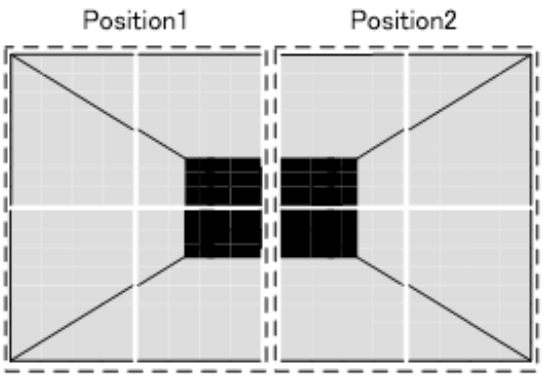
DotClk Mode	Split Mode *Mode0,2, 4-9 is not supported.	Multi VGMode	Pattern Image	Multi VGMode	Pattern Image
Dual	Mode1,3 (VDiv) 	H2/V2Div	 * One connector output: 3840x2160 60Hz 4096x2160 60Hz (Set arbitrary value for VIC)	V4Div	

10.12.6 Split Mode Image of 2 units synchronization

When synchronizing 2 units of VG-876, the below split mode is supported.
Refer to “10.16 Relationships between the pattern drawing bit length, the dividing mode and the dot clock frequency”.

The supported interface units are:
・VM-1876A-M0 ・VM-1876-M2 ・VM-1876-M7

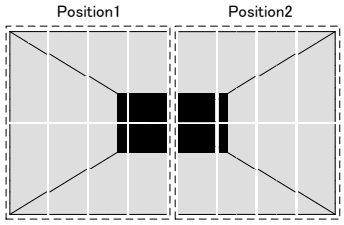
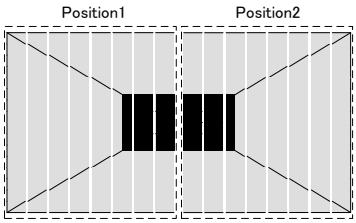
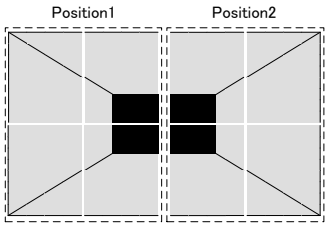
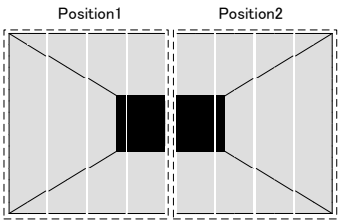
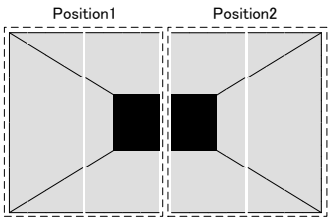
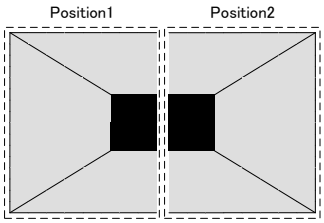
《VM-1876A-M0, VM-1876-M7》
Note) Dual clock mode is not supported.

DotClk Mode	Split Mode *Mode1, 3 to 10 are not supported.	Multi VGMode	Pattern Image
Quad	Mode0,2 (H2/V2Div) 	V2Div	 * One connector output: 1920x1080 60Hz 2048x1080 60Hz (Set arbitrary value for VIC)

* Position 3, 4 can not be set.

《VM-1876-M2》

Note) Dual clock mode is not supported. ●Number of Lane = 16 lanes x 2 (8K4K 60Hz)

DotClk Mode	Split Mode ***Mode 10 is not supported.**	Multi VGMode	Pattern image
Quad (16 Lanes x 2)	Mode0	V2Div	
	Mode1		
	Mode2		
	Mode3,7,8		
	Mode4,5,6		
	Mode9		

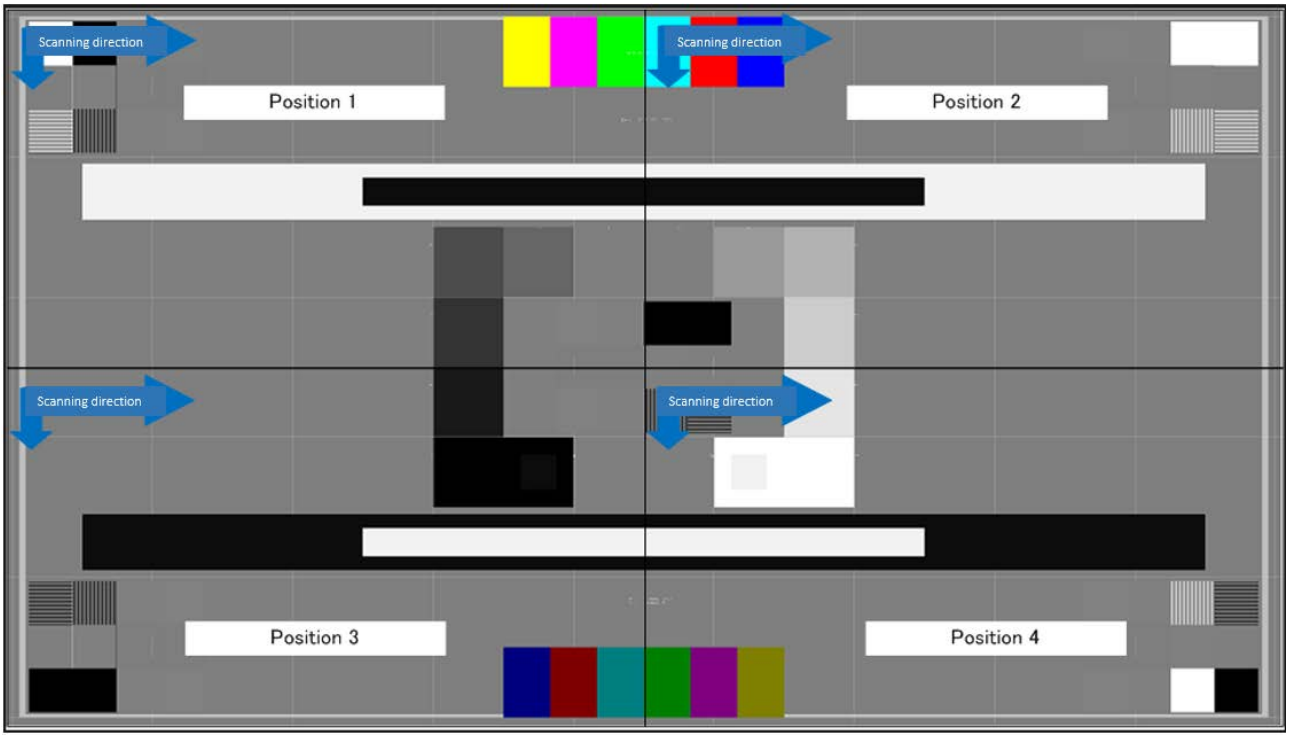
*Positions 3 and 4 cannot be set.

10.12.7 Image of scanning direction

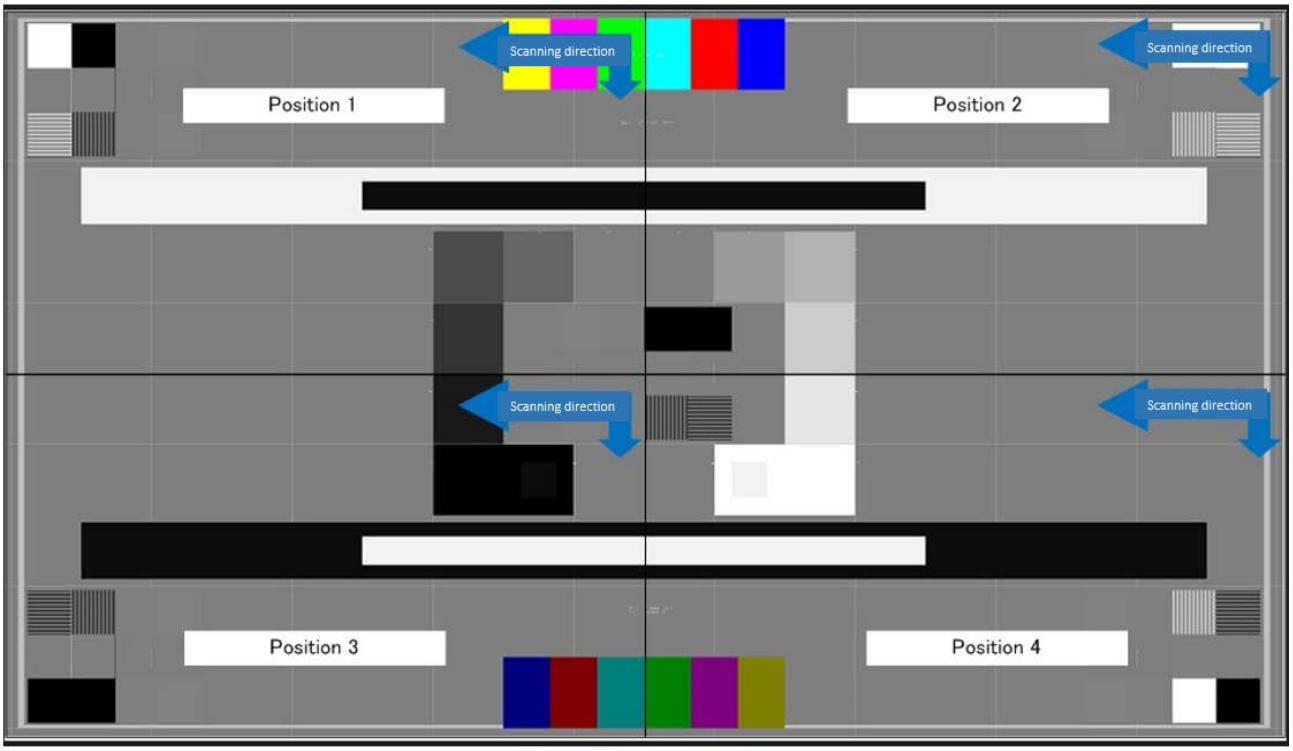
The scanning direction of “Reverse Mode” in the “Config” setting is described below.
The scanning direction can be set in each unit independently. The below images are the image that 4 units are set in the same mode.

《Multi VGMode = H2V2Div(Cross-split)》

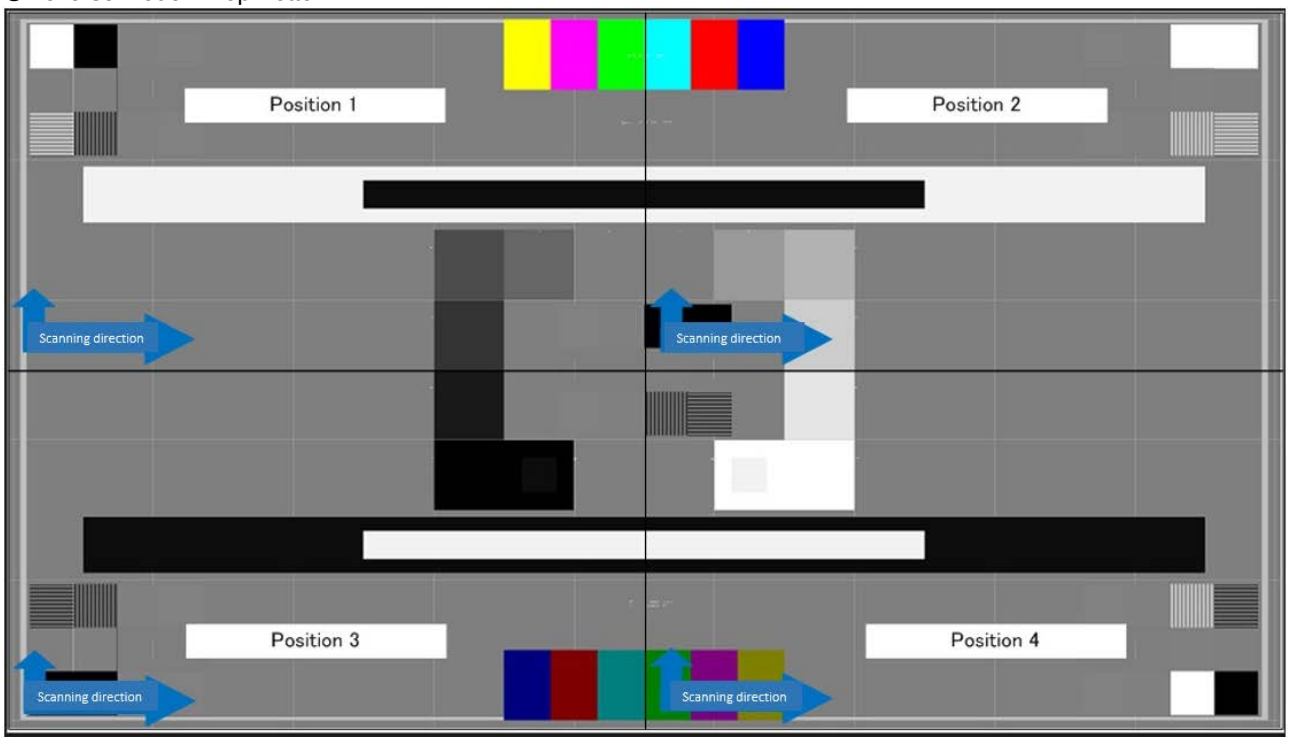
●Reverse Mode = No Reverse



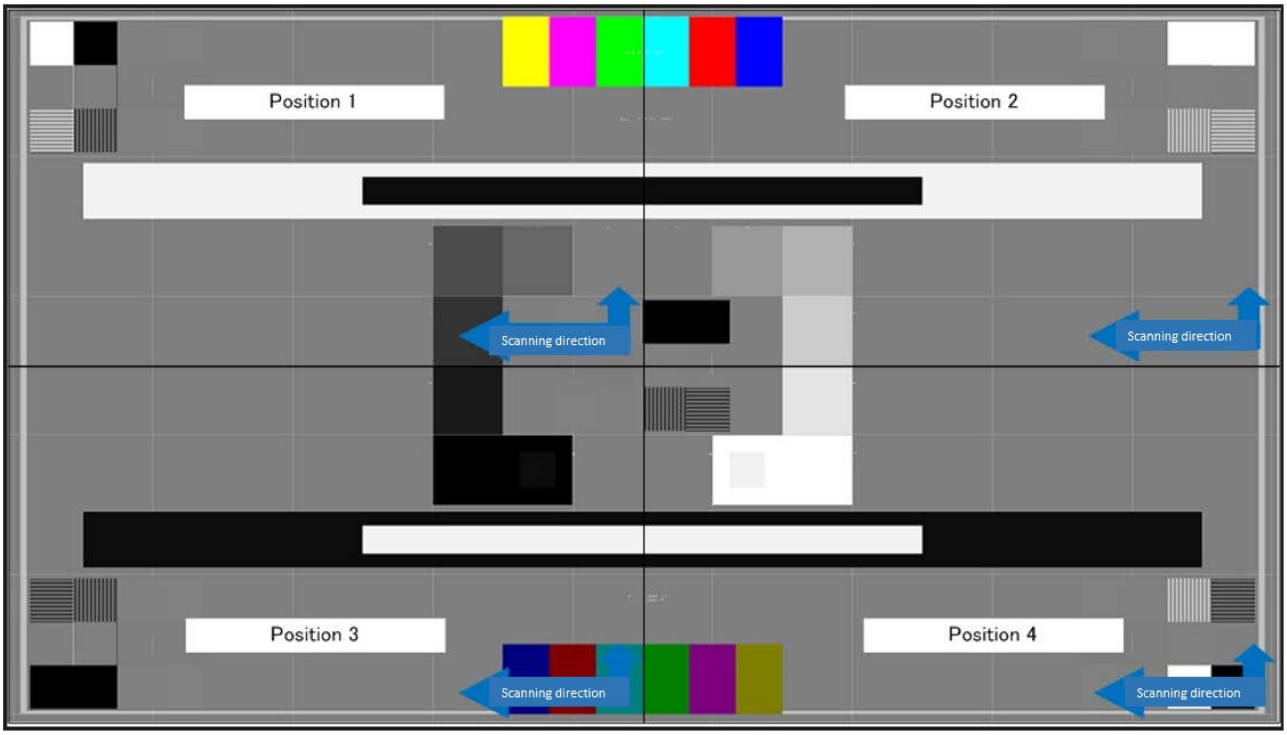
●Reverse Mode = Left Right



●Reverse Mode = Top Bottom

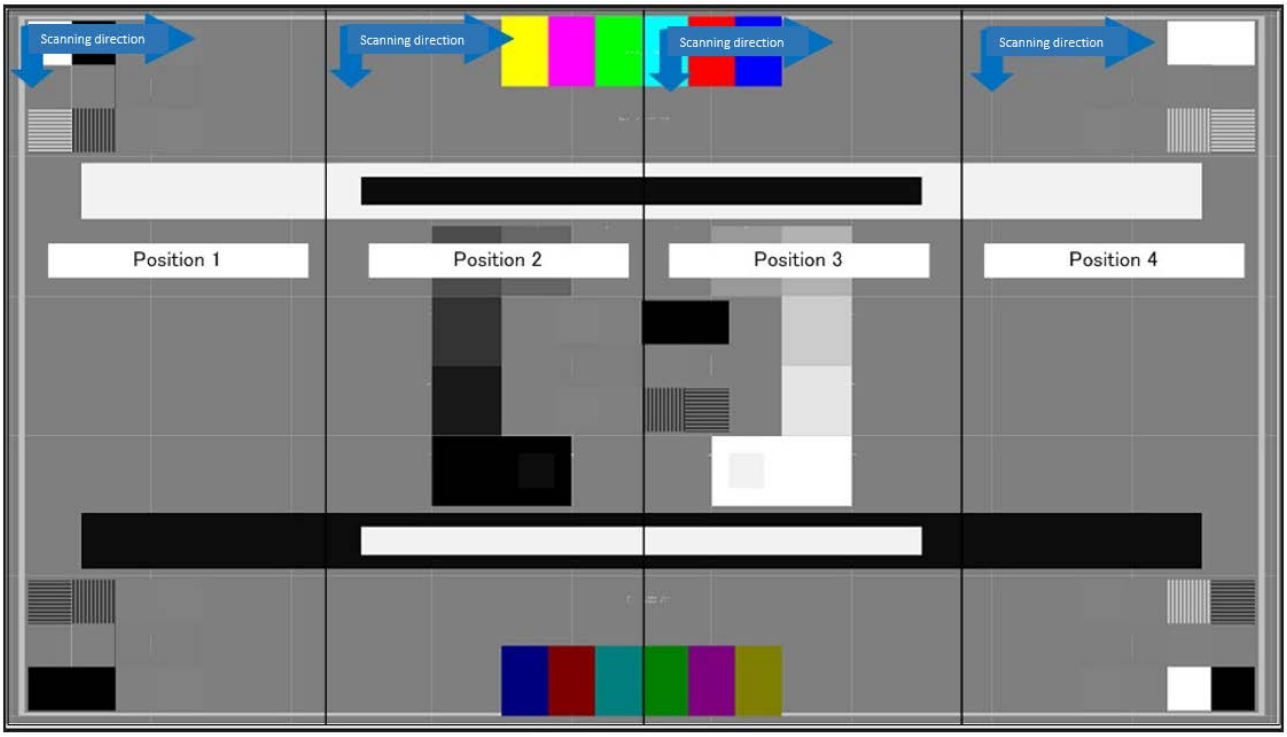


●Reverse Mode = LR & TB

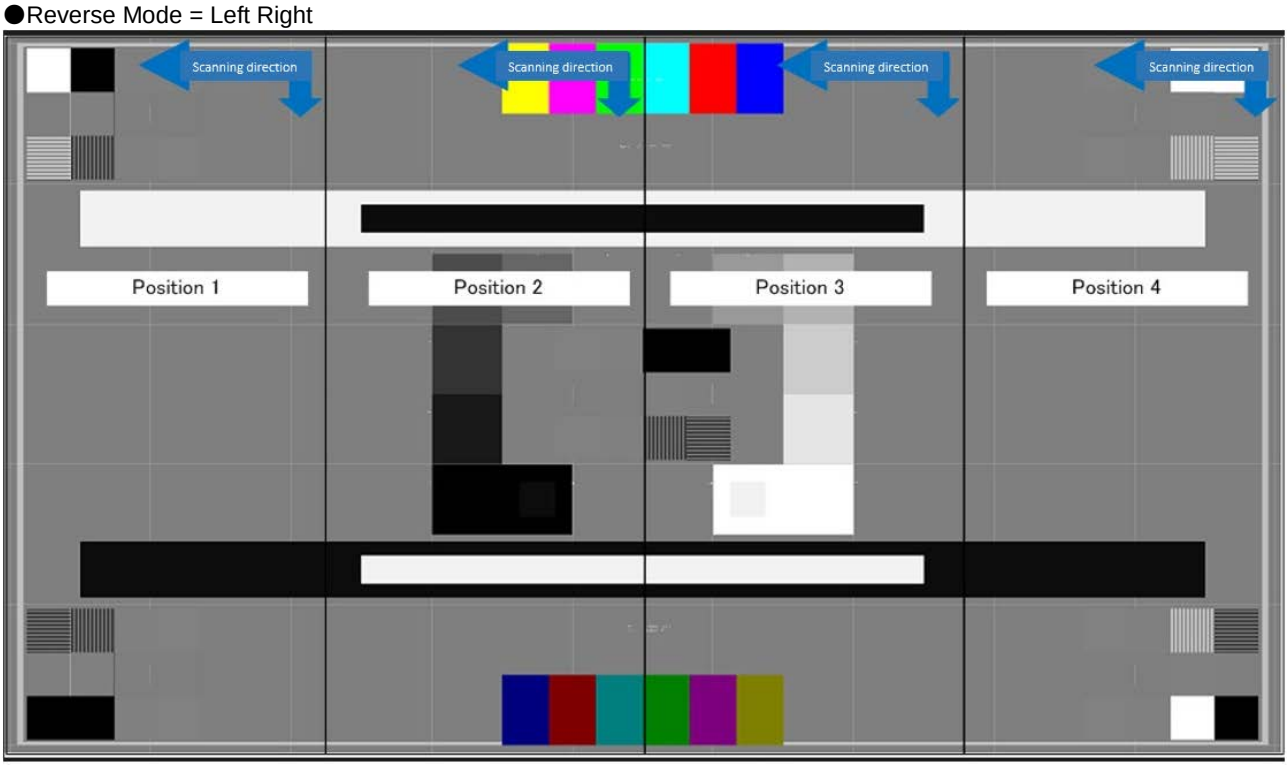


《Multi VGMode = V4Div(Vertical Split)》

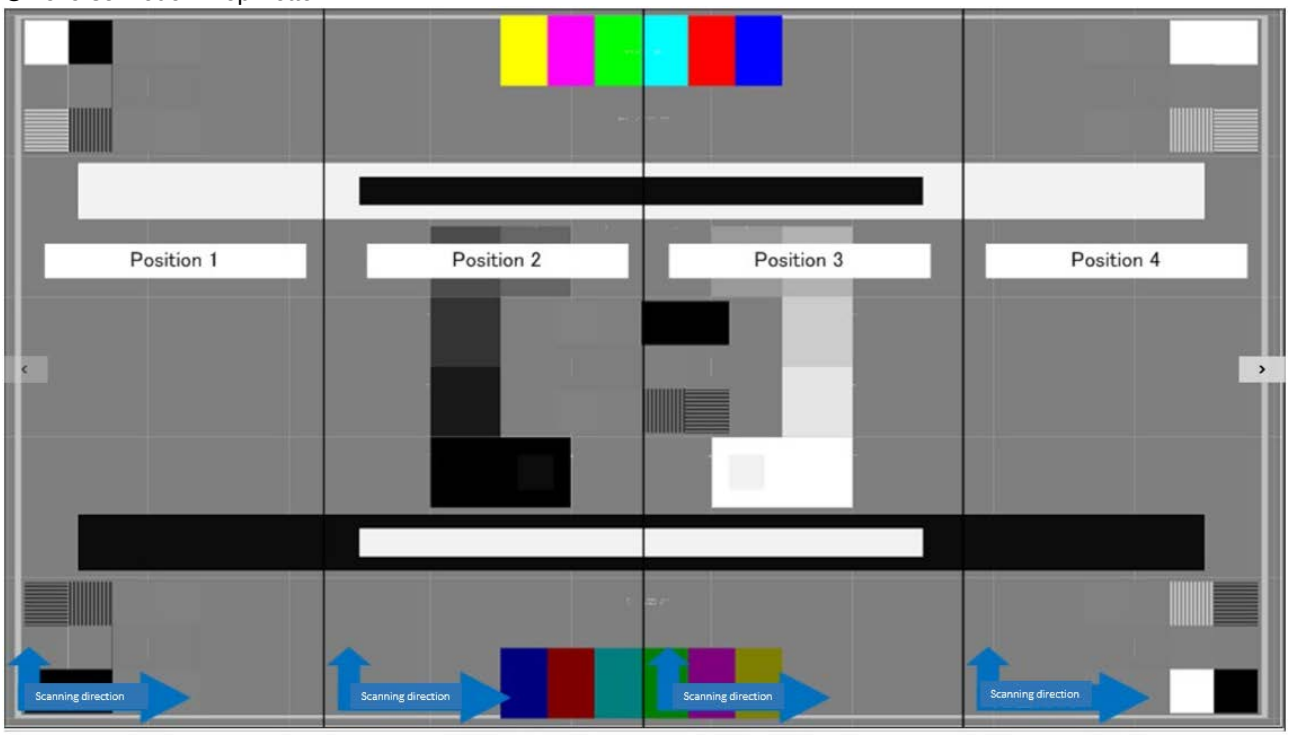
●Reverse Mode = No Reverse



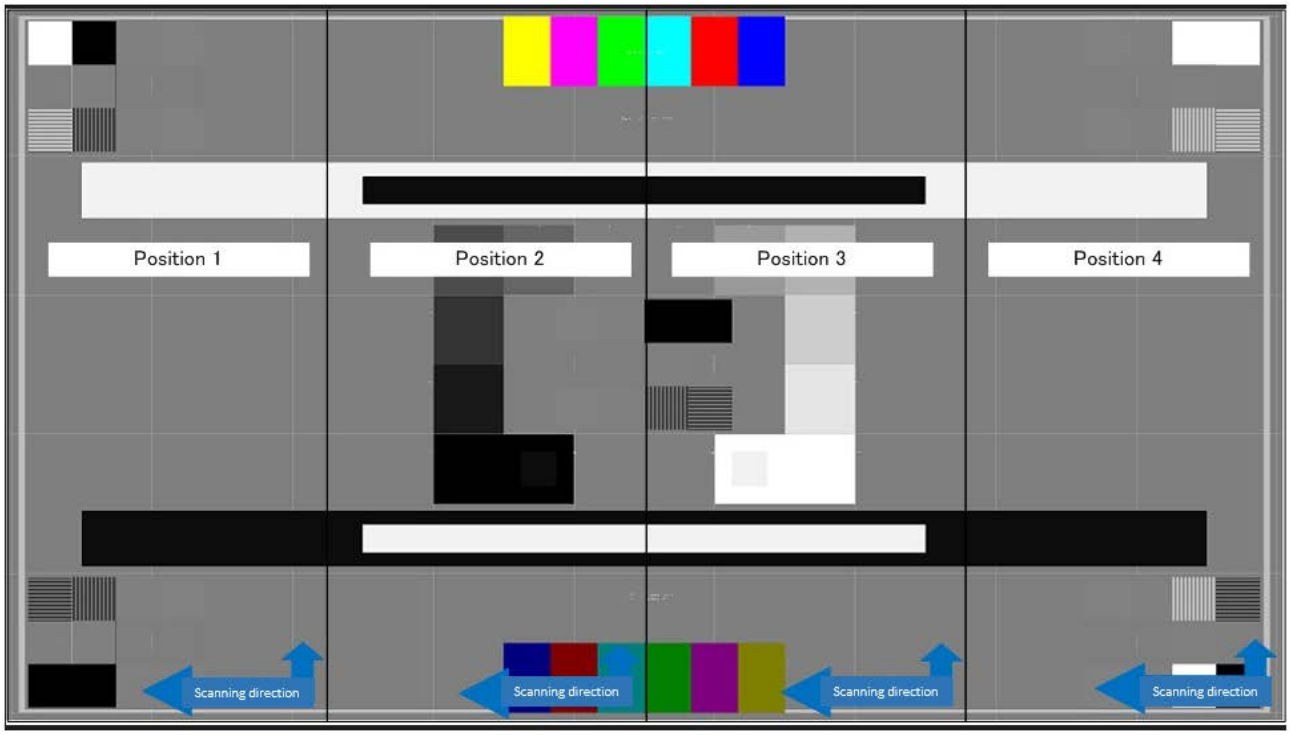
●Reverse Mode = Left Right



●Reverse Mode = Top Bottom

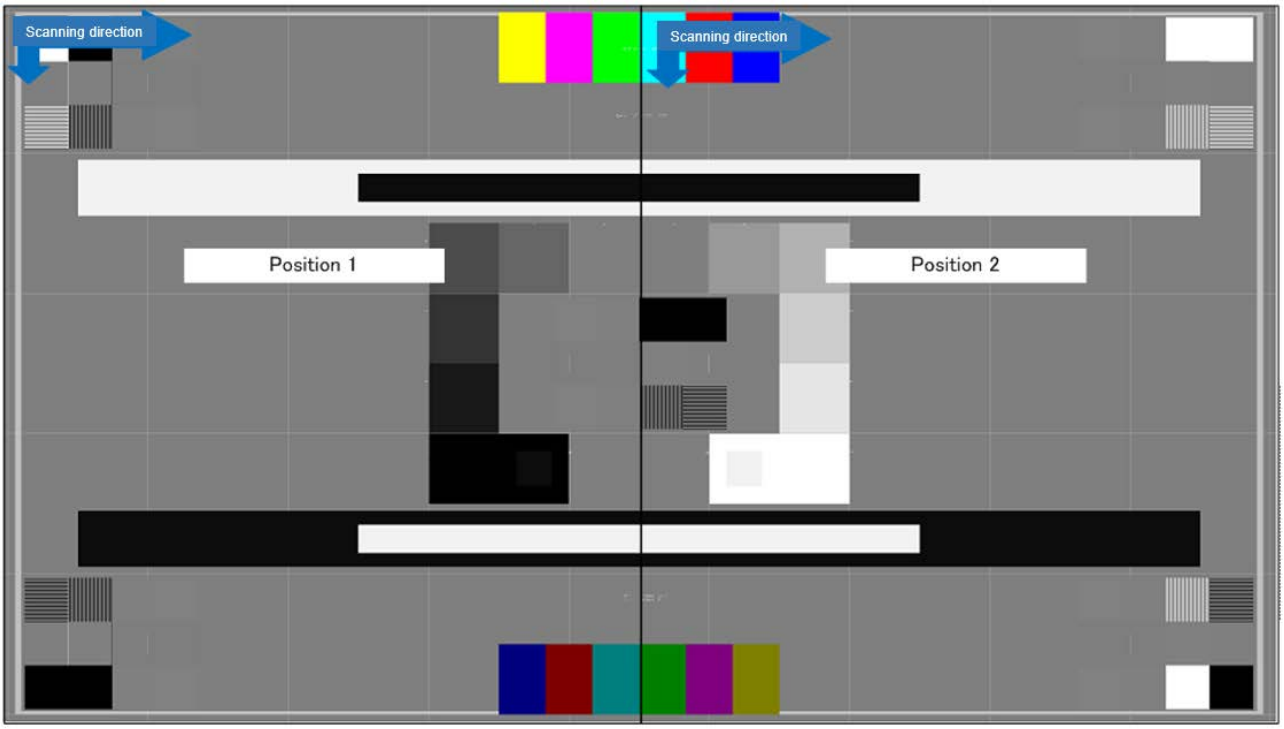


●Reverse Mode = LR & TB

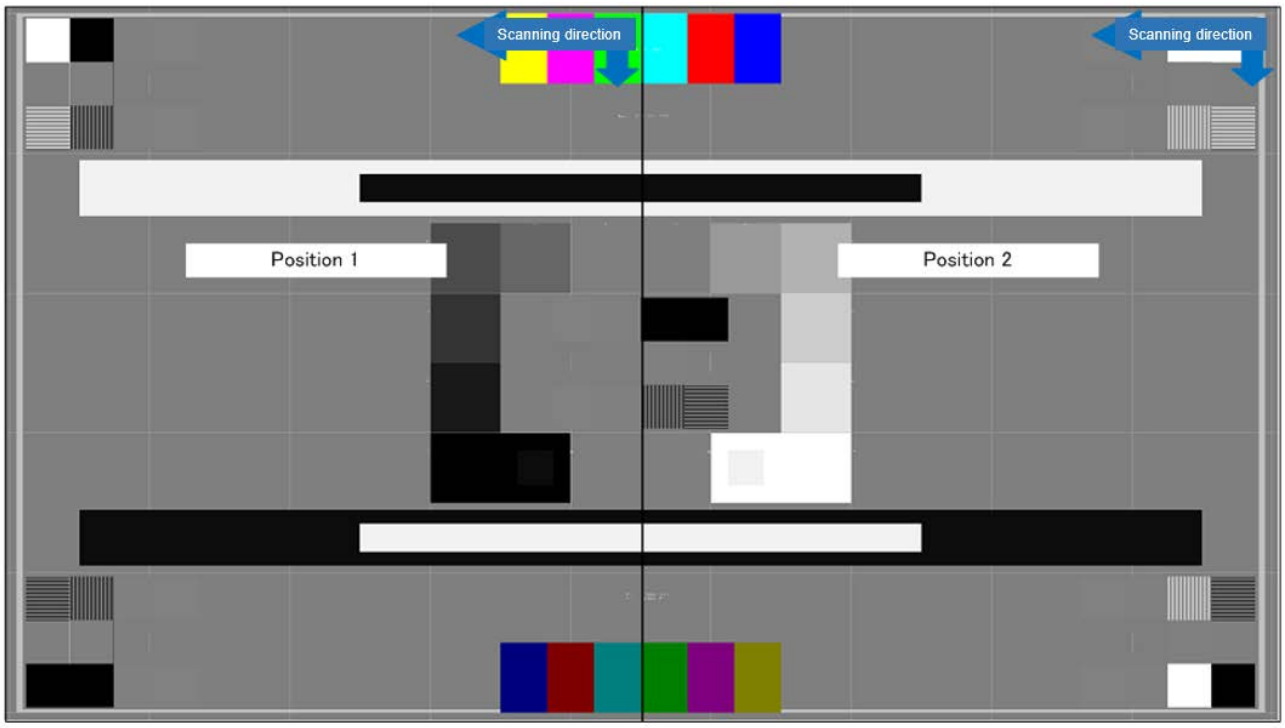


《Multi VGMode = V2Div(Vertically 2 split)》

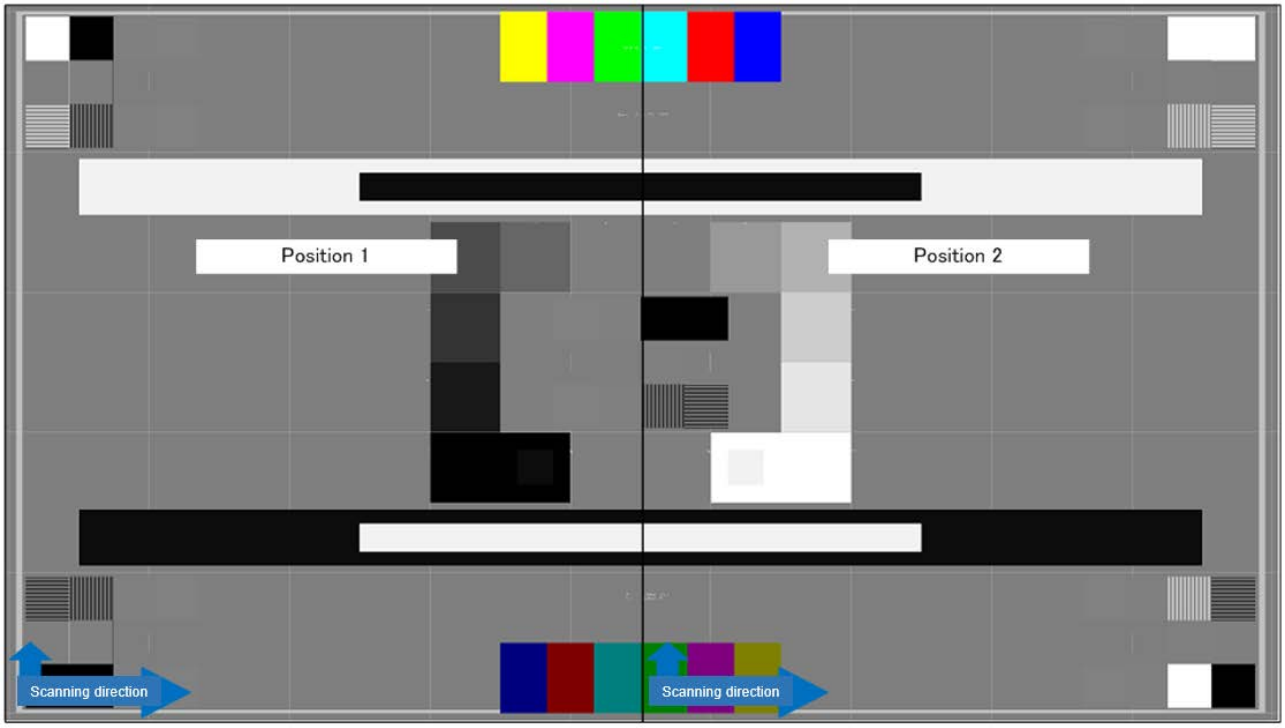
●Reverse Mode = No Reverse



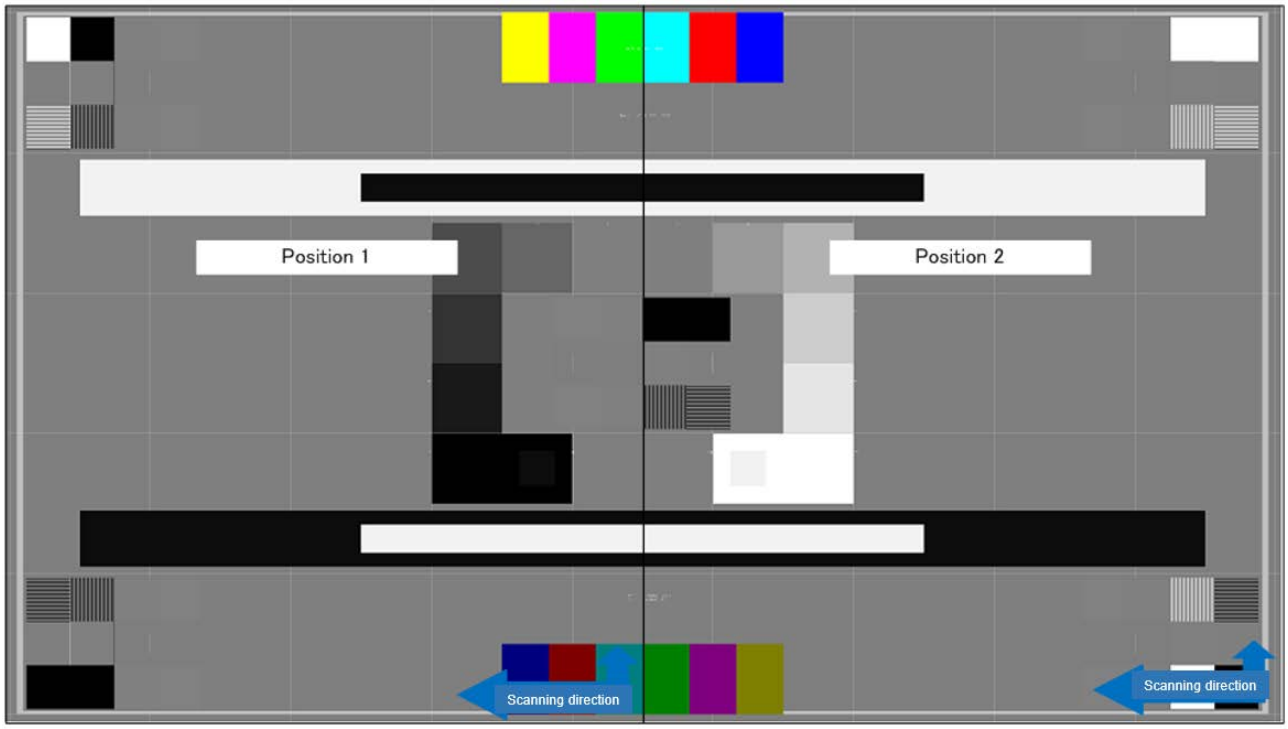
●Reverse Mode = Left Right



●Reverse Mode = Top Bottom



●Reverse Mode = LR & TB



10.13Main specifications

10.13.1 Common specifications

Dot clock frequencies	Single Clock mode ***1**	8 - 10 bit: 0.100 - 340.000 MHz 11 - 12 bit: 0.100 - 320.000 MHz 13 - 16 bit: 0.100 - 240.000 MHz
	Dual Clock mode ***2**	8 - 10 bit: 0.100 - 680.000 MHz 11 - 12 bit: 0.100 - 640.000 MHz 13 - 16 bit: 0.100 - 480.000 MHz
	Quad Clock mode ***3**	8 - 10 bit: 0.100 - 1360.000 MHz 11 - 12 bit: 0.100 - 1280.000 MHz 13 - 16 bit: 0.100 - 960.000 MHz
Horizontal frequency		Max. 300 kHz, 9998 dots
Number of vertical scanning lines		Max. 8192 lines
Video memory		8192 dots × 4096 dots
Scanning		Progressive (non-interlaced), interlaced, segmented frame, interlace (sync)

***1** The dot clock that is actually possible to output is different from each VM video unit (VM-1876 series.)

***2** The units used to edit the horizontal and vertical timings are 2 dot and 2H respectively.

***3** The units used to edit the horizontal and vertical timings are 4 dot and 4H respectively.

10.13.2 HDMI unit

HDMI CH1 CH2 CH3 CH4	Connectors		HDMI × 4	
	Dock		Single Clock mode	<RGB/YCbCr444> 8 bit: 25 - 300 MHz (TMDSCLK 3GHz) 10 bit: 25 - 240 MHz (TMDSCLK 3GHz) 12 bit: 25 - 200 MHz (TMDSCLK 3GHz) 16 bit: 25 - 150 MHz (TMDSCLK 3GHz) <YCbCr422> 8 bit: 25 - 300 MHz (TMDSCLK 3GHz) 10 bit: 25 - 300 MHz (TMDSCLK 3GHz) 12 bit: 25 - 300 MHz (TMDSCLK 3GHz)
			Dual Clock mode ***1**	<RGB/YCbCr444> 8 bit: 50 - 600 MHz (TMDSCLK 3GHz) 10 bit: 50 - 480 MHz (TMDSCLK 3GHz) 12 bit: 50 - 400 MHz (TMDSCLK 3GHz) 16 bit: 50 - 300 MHz (TMDSCLK 3GHz) <YCbCr422> 8 bit: 50 - 600 MHz (TMDSCLK 3GHz) 10 bit: 50 - 600 MHz (TMDSCLK 3GHz) 12 bit: 50 - 600 MHz (TMDSCLK 3GHz) <YCbCr420> 8 bit: 50 - 600 MHz (TMDSCLK 3GHz) 10 bit: 50 - 480 MHz (TMDSCLK 3GHz) 12 bit: 50 - 400 MHz (TMDSCLK 3GHz) 16 bit: 50 - 300 MHz (TMDSCLK 3GHz)
			Quad Clock mode ***2**	<RGB/YCbCr444> 8 bit: 100 - 1200 MHz (TMDSCLK 3GHz) 10 bit: 100 -960 MHz (TMDSCLK 3GHz) 12 bit: 100 - 800 MHz (TMDSCLK 3GHz) 16 bit: 100 - 600 MHz (TMDSCLK 3GHz) <RGB/YCbCr422> 8 bit: 100 - 1200 MHz (TMDSCLK 3GHz) 10 bit: 100 -1200 MHz (TMDSCLK 3GHz) 12 bit: 100 - 1200 MHz (TMDSCLK 3GHz)
	Number of colors generated			8, 10, 12 or 16 bits each for R, G and B (RGB, YCbCr444, YCbCr422 and YCbCr4240 supported)
	Audio output	HDMI	L-PCM	Sampling frequency: 32, 44.1, 48, 88.2, 96, 176.4, 192 kHz Output frequency: 100 to 20KHz No. of bits: 16, 20 or 24 bits
			Compressed	AC3, AAC
			Options	Next-generation audio technologies supported DSD, Dolby Digital Plus, Dolby True HD, DTS HD (High Resolution Audio), DTS HD (Master Audio), etc. This is the license option.
		COAX		Sampling frequency: 32, 44.1, 48, 88.2, 96, 176.4, 192 KHz
	Copy protection			HDCP Ver1.4
	Additional functions			E-EDID Ver1.4 (DDC2B), xvYCC, CEC

***1** Output in parallel using two HDMI ports (CH1-2 / CH3-4). In case of YCbCr420, same signal is output from each CH.

***2** Output in parallel using four HDMI ports (CH1-2 / CH3-4).

10.13.3 DisplayPort Unit (VM-1876A-M1)

<table>
<tr><td rowspan="11">DisplayPort
CH1
CH2</td><td colspan="3">Standard</td><td colspan="2">VESA DisplayPort Standard Ver1.2a</td></tr>
<tr><td colspan="3">Connector</td><td colspan="2">DisplayPort x 2</td></tr>
<tr><td colspan="3" rowspan="2">Transport Mode</td><td colspan="2">SST (Single Stream Transport)</td></tr>
<tr><td colspan="2">MST (Multi Stream Transport) Max. 2 streams</td></tr>
<tr><td rowspan="9">Video
Out</td><td rowspan="9">Dot
Clock</td><td rowspan="7">SST</td><td>Single Clock mode
(*1)</td><td><RGB/YCbCr444>
6 bit : 25 - 340 MHz
8 bit: 25 - 340 MHz
10 bit: 25 - 340 MHz
<YCbCr422>
6 bit: 25 - 340 MHz
8 bit: 25 - 340 MHz
10 bit: 25 - 340 MHz
12 bit: 25 – 320MHz</td></tr>
<tr><td>Dual Clock mode
(*2)</td><td><RGB/YCbCr444>
6 bit: 50 - 680 MHz (600MHz) *2
8 bit: 50 - 680 MHz (600MHz) *2
10 bit: 50 - 680 MHz (576MHz) *2
<YCbCr422>
6 bit: 50 - 680 MHz (600MHz) *2
8 bit: 50 - 680 MHz (600MHz) *2
10 bit: 50 - 680 MHz (600MHz) *2
12 bit: 50 – 640MHz (600MHz) *2</td></tr>
<tr><td>Quad Clock mode
(*1)</td><td><RGB/YCbCr444>
6 bit: 100 - 1200 MHz
8 bit: 100 - 1200 MHz
10 bit: 100 - 1200 MHz
<YCbCr422>
6 bit: 100 - 1200 MHz
8 bit: 100 - 1200 MHz
10 bit: 100 - 1200 MHz
12 bit: 100 – 1200 MHz</td></tr>
<tr><td rowspan="2">MST</td><td>Single Clock mode</td><td>Output OFF</td></tr>
<tr><td>Dual Clock mode</td><td><RGB/YCbCr444>
6 bit: 50 - 600 MHz
8 bit: 50 - 600 MHz
10 bit: 50 - 576 MHz
<YCbCr422>
6 bit: 50 - 600 MHz
8 bit: 50 - 600 MHz
10 bit: 50 - 600 MHz
12 bit: 50 – 600MHz</td></tr>
</table>

				Quad Clock mode	<RGB/YCbCr444> 6 bit : 50 - 600 MHz 8 bit : 50 - 600 MHz 10 bit : 50 - 576 MHz <YCbCr422> 6 bit : 50 - 600 MHz 8 bit : 50 - 600 MHz 10 bit : 50 - 600 MHz 12 bit : 50 - 600 MHz
		Levels and format		RGB, YCbCr444	6bit, 8bit, 10bit
				YCbCr422	6bit, 8bit, 10bit, 12bit
		Link rate		RBR : 1.62Gpbs HBR : 2.7Gpbs HBR2 : 5.4Gbps	
	Audio out (*3)	L-PCM		Number of channel	8CH
				Sampling frequency	32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz
				Output frequency	20 to (1/2 of sampling frequency)Hz
	AUX CH	Transfer rate		1Mbps	
		Functions		DPCD, E-EDID: Ver1.4, MCCS (DDC/CI) :Ver1.1	
	External supply voltage			3.3V / 500mA each channel	
	Copy Protect (HDCP)			Not supported	

***1 Refer to "10.4.2 Split setting" for details.**
***2 The values in parenthesis ( ) are max. dot clock when outputting one picture from one connector.**
***3 Audio is not supported by MST mode.**

■ **Unsupported Timing**

Due to product spec, the interlace timing whose V-total (Field-1 Total1 + Field2 Total2) is even number cannot be output. Therefore, the below internal timing cannot be supported by VG-876/879.

Sample Timing No.	Timing
1075	EIA1920x1080i@50

■ **The data amount (upper limit of pixel clock) that can be transmit**

Link Configuration		Maximum Pixel Clock			
Link Rate	**Lane Count**	**18bpp**	**24bpp**	**30bpp**	**36bpp**
HBR2 (5.4Gbps)	4 lanes	960MHz	720MHz	576MHz	480MHz
	2 lanes	480MHz	360MHz	288MHz	240MHz
	1 lane	240MHz	180MHz	144MHz	120MHz
HBR (2.7Gbps)	4 lanes	480MHz	360MHz	288MHz	240MHz
	2 lanes	240MHz	180MHz	144MHz	120MHz
	1 lane	120MHz	90MHz	72MHz	60MHz
RBR (1.62Gbps)	4 lane	288MHz	216MHz	172.8MHz	144MHz
	2 lane	144MHz	108MHz	86.4MHz	72MHz
	1 lane	72MHz	54MHz	43.2MHz	36MHz

Note) The value in this list is standard value (logical value). The pixel clock which is over VG-876's main unit specification cannot be output. Refer to "10.17.3 DisplayPort Unit (VM-1876A-M1)" for details.

10.13.4 V-by-One ®HS Unit

V-By-One®HS CH1 CH2 CH3 CH4	Connector	V-by-One®HSx4 (16Lane)	
	Dot clock	Number of data lane 1lane Single clock mode	8 bit : 20 to 85 MHz 10 bit : 20 to 85 MHz 12 bit : 20 to 75 MHz
		Number of data lane 2lanes Single clock mode	8 bit : 40 to 170 MHz 10 bit : 40 to 170 MHz 12 bit : 40 to 150 MHz
		Number of data lane 4lanes Single clock mode	8 bit : 80 to 340 MHz 10 bit : 80 to 340 MHz 12 bit : 80 to 300 MHz
		Number of data lane 8lanes Dual clock mode *1	8 bit : 160 to 680 MHz 10 bit : 160 to 680 MHz 12 bit : 160 to 600 MHz
		Number of data lane 16lanes Quad clock mode *2	8 bit : 320 to 1360 MHz 10 bit : 320 to 1360 MHz 12 bit : 320 to 1200 MHz
	Output color numbers		RGB each 8/10/12bit（RGB/YCbCr supported）

*1 By using 2 channles:CH1-CH2（CH3-CH4）, 8 lanes are output.
*2 By using 4 channels: CH1-CH2-CH3-CH4, 16 lanes are output.

10.13.5 SDI Unit

SDI output is available for the below standard timings only.

SMPTE259M, SMPTE 274M, SMPTE 296M

270Mb/s	SMPTE259M SD-SDI Interlace	720 x 480, 720 x 525 YCbCr 4:2:2 10bit 525/59.94i,625/50i
1.485Gb/s	SMPTE274M HD-SDI Interlace Progressive Segmented Frame	1920 x 1080 YCbCr 4:2:2 10bit 60i, 59.94i, 50i 30p, 29.97p, 25p, 24p, 23.98p 30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF
	SMPTE296M HD-SDI Progressive	1280 x 720 YCbCr 4:2:2 10bit 60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p

1080Line source image format

1.485Gb/s x2	SMPTE372M HD-SDI DUAL LINK Progressive	1920 x1080 60p, 59.94p, 50p	YCbCr 4:2:2 10bit
	SMPTE372M HD-SDI DUAL LINK Interlace Progressive Segmented Frame	1920 x1080 60i, 59.94i, 50i 30p, 29.97p, 25p, 34p, 23.98p 30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF	YCbCr 4:2:2 12bit YCbCr 4:4:4 12bit YCbCr 4:4:4 10bit RGB 4:4:4 12bit RGB 4:4:4 10bit
1.485Gb/s x2	SMPTE428-1M HD-SDI Progressive	2048 x 1080 24p	YCbCr 4:2:2 12bit
2.97Gb/s	SMPTE425M 3G-SDI Progressive	1920 x 1080 60p, 59.94p, 50p	YCbCr 4:2:2 10bit
	SMPTE425M 3G-SDI Interlace Progressive Segmented Frame	1920 x 1080 60i, 59.94i, 50i 30p, 29.97p, 25p, 24p, 23.98p 30PsF, 29.97PsF, 25PsF, 24PsF, 23.98PsF	YCbCr 4:2:2 12bit YCbCr 4:4:4 12bit YCbCr 4:4:4 10bit RGB 4:4:4 12bit RGB 4:4:4 10bit
2.97Gb/s	SMPTE425M 3G-SDI ST-2048-2 Progressive	2048 x 1080 60p, 59.94p, 50p, 48p, 47.95p	YCbCr 4:2:2 10bit
2.97Gb/s	SMPTE428-1M 3G-SDI Progressive	2048 x 1080 24p	YCbCr 4:2:2 12bit
2.97Gb/s x2	SMPTE425-3M 3G-SDI DUAL LINK Progressive	1920 x 1080 60p, 59.94p, 50p	YCbCr 4:4:4 12bit YCbCr 4:4:4 10bit RGB 4:4:4 12bit RGB 4:4:4 10bit
		2048 x 1080 60p, 59.94p, 50p, 48p, 47.95p	YCbCr 4:4:4 12bit YCbCr 4:4:4 10bit RGB 4:4:4 12bit RGB 4:4:4 10bit

2160Line source image format DUAL LINK

1.485Gb/s x4	SMPTE435-1M HD-SDI DUAL LINK Progressive	3840 x 2160 30p, 29.97p, 25p, 24p, 23.98p 30PsF, 29.97PsF, 25PsF, 24PsF	YCbCr4:2:2 10bit
		4096 x 2160 30p, 29.97p, 25p, 24p, 23.98p 30PsF, 29.97PsF, 25PsF, 24PsF	YCbCr 4:2:2 10bit
2.97Gb/s x2	SMPTE425-3M 3G-SDI DUAL LINK Progressive	3840 x 2160 30p, 29.97p, 25p, 24p, 23.98p	YCbCr4:2:2 10bit
		4096 x 2160 30p, 29.97p, 25p, 24p, 23.98p	YCbCr4:2:2 10bit
2.97Gb/s x 4	SMPTE425-5M 3G-SDI QUAD LINK Progressive	3840 x 2160 60p, 59.94p, 50p	YCbCr 4:2:2 10bit
		4096 x 2160 60p, 59.94p, 50p, 48p, 47.95p	YCbCr 4:2:2 10bit
		3840 x 2160, 4096 x 2160 30p, 29.97p, 25p, 24p, 23.98p	YCbCr 4:4:4 12bit YCbCr 4:4:4 10bit RGB 4:4:4 12bit RGB 4:4:4 10bit

10.13.6 HDMI 6G Unit

<table>
<tr><td rowspan="9">HDMI
CH1
CH2</td><td colspan="3">Connector</td><td>HDMI×2</td></tr>
<tr><td rowspan="2">Dot Clock *1</td><td colspan="2">Single Clock Mode</td><td><RGB/YCbCr444>
8bit : 25 - 300MHz
10bit : 25 - 240MHz
12bit : 25 - 200MHz
16bit : 25 - 150MHz
<YCbCr422>
8bit : 25 - 300MHz
10bit : 25 - 300MHz
12bit : 25 - 300MHz</td></tr>
<tr><td colspan="2">Dual Clock Mode *2</td><td><RGB/YCbCr444>
8bit : 597MHz
<YCbCr422>
12bit : 597MHz
<YCbCr420>
8bit : 50 - 600MHz
10bit : 50 - 480MHz
12bit : 50 - 400MHz
16bit : 50 - 300MHz</td></tr>
<tr><td colspan="3">Number of generated colors *3, *4</td><td>RGB each 8 / 10 / 12bit / 16bit
(RGB / YCbCr444 / YCbCr422 / YCbCr420)</td></tr>
<tr><td rowspan="4">Audio out</td><td rowspan="3">HDMI</td><td>L-PCM</td><td>Sampling: 32K / 44.1K / 48K / 88.2K / 96K / 176.4K / 192K
Output frequency: 100Hz to 20KHz
Bit number: 16 / 20 / 24bit</td></tr>
<tr><td>Com-pressed</td><td>AAC, AC3</td></tr>
<tr><td>Option</td><td>Next generation audio
DSD, Dolby Digital Plus, Dolby True HD,
DTS HD（High Resolution Audio）, DTS HD(Master Audio）</td></tr>
<tr><td colspan="2">COAX</td><td>Sampling: 32K / 44.1K / 48K / 88.2K / 96K / 176.4K / 192K</td></tr>
<tr><td colspan="3">HDCP</td><td>HDCP Ver1.4</td></tr>
<tr><td colspan="3">Other functions</td><td>E-EDID Ver1.4 (DDC2B), xvYCC, CEC</td></tr>
</table>

*1 It does not support Quad Clock mode.
*2 . CH1 and CH2 always output same data. Screen split is not supported.
*3 In case of YCbCr4:2:0, it supports up to 8-bit.
*4 4K output supports up to 12-bit.

10.13.7 HDMI HDCP2.2 Unit

<table>
<tr><td rowspan="11">HDMI
CH1
CH2
CH3
CH4</td><td colspan="3">Connector</td><td colspan="2">HDMI x 4</td></tr>
<tr><td colspan="3" rowspan="3">Dot clock</td><td>Single Clock mode</td><td><RGB/YCbCr444>
8 bit: 25 – 300 MHz (TMDSCLK 3GHz)
10 bit: 25 – 240 MHz (TMDSCLK 3GHz)
12 bit: 25 - 200 MHz (TMDSCLK 3GHz)
<YCbCr422>
8 bit: 25 – 300 MHz (TMDSCLK 3GHz)
10 bit: 25 – 300 MHz (TMDSCLK 3GHz)
12 bit: 25 – 300 MHz (TMDSCLK 3GHz)</td></tr>
<tr><td>Dual Clock mode
***1**</td><td><RGB/YCbCr444>
8 bit: 50 - 600 MHz (TMDSCLK 3GHz)
10 bit: 50 – 480 MHz (TMDSCLK 3GHz)
12 bit: 50 - 400 MHz (TMDSCLK 3GHz)
<YCbCr422>
8 bit: 50 - 600 MHz (TMDSCLK 3GHz)
10 bit: 50 - 600 MHz (TMDSCLK 3GHz)
12 bit: 50 - 600 MHz (TMDSCLK 3GHz)
<YCbCr420>
8 bit: 50 - 600 MHz (TMDSCLK 3GHz)
10 bit: 50 - 480 MHz (TMDSCLK 3GHz)
12 bit: 50 - 400 MHz (TMDSCLK 3GHz)</td></tr>
<tr><td>Quad Clock mode
***2**</td><td><RGB/YCbCr444>
8 bit: 100 – 1200 MHz (TMDSCLK 3GHz)
10 bit: 100 – 960 MHz (TMDSCLK 3GHz)
12 bit: 100 - 800 MHz (TMDSCLK 3GHz)
<YCbCr422>
8 bit: 100 - 1200 MHz (TMDSCLK 3GHz)
10 bit: 100 - 1200 MHz (TMDSCLK 3GHz)
12 bit: 100 – 1200 MHz (TMDSCLK 3GHz)</td></tr>
<tr><td colspan="3">Number of colors generated</td><td colspan="2">RGB each
8/10/12bit（RGB/ YCbCr444/ YCbCr422/ YCbCr420(8bit only) support）</td></tr>
<tr><td rowspan="4">Audio Out</td><td rowspan="3">HDMI</td><td>L-PCM</td><td colspan="2">Sampling: 32kHz, 44.1kHz, 48kHz, 88.2kHz. 96kHz, 176.4kHz, 192kHz
Output frequency : 100Hz to 20kHz
Bit : 16/20/24-bit</td></tr>
<tr><td>Com-pressed</td><td colspan="2">AAC, AC3</td></tr>
<tr><td>Option</td><td colspan="2">Next generation audio
DSD, Dolby Digital Plus, Dolby True HD,
DTS HD (High Resolution Audio), DTS HD(Master Audio)
This is the license option.</td></tr>
<tr><td colspan="2">COAX</td><td colspan="2">Sampling frequency: 32, 44.1, 48, 88.2, 96, 176.4, 192 kHz</td></tr>
<tr><td colspan="3">Copy protection</td><td colspan="2">HDCP Ver2.2 or Ver1.4 (depends on Sink device)</td></tr>
<tr><td colspan="3">Other functions</td><td colspan="2">E-EDID Ver1.4(DDC2B), xvYCC, CEC</td></tr>
</table>

***1** Output in parallel using two HDMI ports (CH1-2 / CH3-4). In case of YCbCr420, same signal is output from each CH.

***2** Output in parallel using four HDMI ports (CH1-2-3-4).

[Supported Format]

2D Video Resolution	Pixel Format	Color Depth (bits per pixel)	Maximum Frame Rate (Hz)
VGA	RGB	24	60
WVGA	RGB	24	60
SVGA	RGB	24	60
XGA	RGB	24	60
UXGA	RGB	24	60
WUXGA	RGB	24	60
QXGA	RGB	24	60
WQXGA	RGB	24	60
480p/i	RGB YCbCr 4:4:4	24, 36	60
	YCbCr 4:2:2	16, 24	
576p/i	RGB YCbCr 4:4:4	24, 36	50
	YCbCr 4:2:2	16, 24	
720p	RGB YCbCr 4:4:4	24, 36	50/60
	YCbCr 4:2:2	16, 24	
1080i	RGB YCbCr 4:4:4	24, 36	50/60
	YCbCr 4:2:2	16, 24	
1080p	RGB YCbCr 4:4:4	24, 36	50/60
	YCbCr 4:2:2	16, 24	
4K x 2K	RGB YCbCr 4:4:4	24, 36	24/25/30
	YCbCr 4:2:2	16, 24	
	YCbCr 4:2:0	12	50/60

Note)
1. Depends on users' own edit format, there is the case output cannot be confirmed.
2. The format except the above list may not output because of hardware regulation.

10.13.8 HDMI 6G HDCP2.2 unit

<table>
<tr><td rowspan="8">HDMI
CH1
CH2</td><td colspan="3">Connector</td><td colspan="2">HDMI×2</td></tr>
<tr><td colspan="3" rowspan="2">Dot Clock
*1</td><td>Single Clock Mode</td><td><RGB/YCbCr444>
8bit ： 25 - 300MHz
10bit ： 25 - 240MHz
12bit ： 25 - 200MHz
16bit ： 25 - 150MHz
<YCbCr422>
8bit ： 25 - 300MHz
10bit ： 25 - 300MHz
12bit ： 25 - 300MHz</td></tr>
<tr><td>Dual Clock Mode
*2</td><td><RGB/YCbCr444>
8bit ： 597MHz
<YCbCr422>
12bit ： 597MHz
<YCbCr420>
8bit ： 50 - 600MHz
10bit ： 50 - 480MHz
12bit ： 50 - 400MHz
16bit ： 50 - 300MHz</td></tr>
<tr><td colspan="3">Number of colors Generated
*3, *4</td><td colspan="2">RGB each 8 / 10 / 12bit / 16bit
(RGB / YCbCr444 / YCbCr422 / YCbCr420 supported.)</td></tr>
<tr><td rowspan="3">Audio Out</td><td rowspan="3">HDMI</td><td>L-PCM</td><td colspan="2">Sampling: 32K / 44.1K / 48K / 88.2K / 96K / 176.4K / 192K
Output Frequency: 100 - 20KHz
Bit number: 16 / 20 / 24bit</td></tr>
<tr><td>Com-pressed</td><td colspan="2">AC3, AAC</td></tr>
<tr><td>Option</td><td colspan="2">Next generation audio
DSD, Dolby Digital Plus, Dolby True HD,
DTS HD（High Resolution Audio）, DTS HD（Master Audio）
This is the license option.</td></tr>
<tr><td colspan="3">Copy protection</td><td colspan="2">HDCP Ver2.2 or Ver1.4</td></tr>
<tr><td colspan="3">Other functions</td><td colspan="2">E-EDID Ver1.4（DDC2B）, xvYCC, CEC</td></tr>
</table>

*1 Quad Clock Mode is not supported.
*2 The same data is output from CH1 and CH2. However, it does not support split mode.
*3 In case of YCbCr4:2:0, it supports up to 8-bit.
*4 4K output supports up to 12-bit.

［VESA format supported by HDMI 6G HDCP2.2 Unit］

PrgNo	Program Name	PrgNo	Program Name	PrgNo	Program Name
1602	VESA640x400@85	1628	VESA1280x800@60	1652	VESA1600x1200@65
1603	VESA720x400@85	1629	VESA1280x800@75	1653	VESA1600x1200@70
1604	VESA640x480@60	1630	VESA1280x800@85	1654	VESA1600x1200@75
1605	VESA640x480@72	1631	VESA1280x800@120CVT	1655	VESA1600x1200@85
1606	VESA640x480@75	1632	VESA1280x960@60	1656	VESA1600x1200@120CVT
1607	VESA640x480@85	1633	VESA1280x960@85	1657	VESA1680x1050@60CVT
1608	VESA800x600@56	1634	VESA1280x960@120CVT	1658	VESA1680x1050@60
1609	VESA800x600@60	1635	VESA1280x1024@60	1659	VESA1680x1050@75
1610	VESA800x600@72	1636	VESA1280x1024@75	1660	VESA1680x1050@85
1611	VESA800x600@75	1637	VESA1280x1024@85	1661	VESA1680x1050@120CVT
1612	VESA800x600@85	1638	VESA1280x1024@120CVT	1668	VESA1920x1200@60CVT
1613	VESA800x600@120CVT	1639	VESA1360x768@60	1669	VESA1920x1200@60
1614	VESA848x480@60	1640	VESA1360x768@120CVT	1670	VESA1920x1200@75
1615	VESA1024x768@43	1641	VESA1400x1050@60CVT	1671	VESA1920x1200@85
1616	VESA1024x768@60	1642	VESA1400x1050@60		
1617	VESA1024x768@70	1643	VESA1400x1050@75		
1618	VESA1024x768@75	1644	VESA1400x1050@85		
1619	VESA1024x768@85	1645	VESA1400x1050@120CVT		
1620	VESA1024x768@120CVT	1646	VESA1440x900@60CVT		
1622	VESA1280x768@60CVT	1647	VESA1440x900@60		
1623	VESA1280x768@60	1648	VESA1440x900@75		
1624	VESA1280x768@75	1649	VESA1440x900@85		
1625	VESA1280x768@85	1650	VESA1440x900@120CVT		
1627	VESA1280x800@60CVT	1651	VESA1600x1200@60		

10.13.9 iTMDS Unit

iTMDS CH1 CH2	Connector	DVI Connector (x2)		
	Dot Clock	DVI MODE	8bit	25 - 165MHz (Single) 50 - 330MHz (Dual) 297 - 660MHz (Quad) 594 - 1320MHz (Octal)
			10bit	25 - 165MHz (Single(16bit)) 50 - 330MHz (Dual(16bit))
			12bit	25 - 165MHz (Single(16bit)) 50 - 320MHz (Dual(16bit))
			16bit	25 - 165MHz (Single(16bit)) 50 - 240MHz (Dual(16bit))
		iTMDS MODE	8/10bit	25 - 165MHz (Single) 50 - 330MHz (Dual) 297 - 660MHz (Quad) 594 - 1320MHz (Octal)
			12bit	25 - 150MHz (Single) 50 - 300MHz (Dual) 297 - 600MHz (Quad) 594 - 1200MHz (Octal)
	Link Rate (R) (for iTMDS MODE)	R=225MHz (max) 8bit：DotCLK=R 、10bit：DotCLK=R/1.25、12bit：DotCLK=R/1.5		
	Video Format	RGB、YCbCr 4：4：4		
	E-EDID	Ver1.3 (DDC2B)		

10.13.10 Analog Unit

VGA	DotCLK	5 - 165MHz
	Number of colors Generated, BIT depth	RGB each 8-bit
	Connector	Dsub x 1
YPbPr	Resolution	HDTV, SDTV
	Number of colors Generated, BIT depth	YPbPr each 8-bit
	Connector	RCA x 3
CVBS	解像度	NTSC-M/J/443、PAL（B/D/G/H/I）/M/Nc
	Number of colors Generated, BIT depth	YPbPr each 8-bit
	Connector	CVBS (RCA) ×1
	Functions	Teletext、ClosedCaption、Vchip、Macrovision（※）
AUDIO L/R	Output frequency	100 - 20KHz (Sampling frequency: 48KHz)
	Output level	0 - 2000mV
	Connector	RCA x 2

Note) Macrovision function is a license option.

10.13.11 HDBaseT Unit

<table>
<tr><td rowspan="11">HDBaseT
CH1
CH2
CH3
CH4</td><td colspan="3">Connector</td><td colspan="2">HDMI x 4</td></tr>
<tr><td colspan="3" rowspan="10">Dot Clock
*4</td><td>Single Clock Mode</td><td><RGB/YCbCr444>
8 bit : 25 to 300 MHz
10 bit : 25 to 240 MHz
12 bit : 25 to 200 MHz
16 bit : 25 to 150 MHz
<YCbCr422>
8 bit : 25 to 300 MHz
10 bit : 25 to 300 MHz
12 bit : 25 to 300 MHz</td></tr>
<tr><td>Dual Clock Mode
*1</td><td><RGB/YCbCr444>
8 bit : 50 to 600 MHz
10 bit : 50 to 480 MHz
12 bit : 50 to 400 MHz
16 bit : 50 to 300 MHz
<YCbCr422>
8 bit : 50 to 600 MHz
10 bit : 50 to 600 MHz
12 bit : 50 to 600 MHz
<YCbCr420>
8 bit : 50 to 600 MHz
10 bit : 50 to 480 MHz
12 bit : 50 to 400 MHz
16 bit : 50 to 300 MHz</td></tr>
<tr><td>Quad Clock Mode
*2</td><td><RGB/YCbCr444>
8 bit :100 to 1200 MHz
10 bit :100 to 960 MHz
12 bit :100 to 800 MHz
16 bit :100 to 600 MHz
<RGB/YCbCr422>
8 bit :100 to 1200 MHz
10 bit :100 to 1200 MHz
12 bit :100 to 1200 MHz</td></tr>
<tr><td colspan="3">Output colors</td><td colspan="2">RGB each 8/10/12/16bit（RGB/ YCbCr444/ YCbCr422/ YCbCr420）</td></tr>
<tr><td rowspan="3">Audio Out</td><td rowspan="3">HDMI</td><td>L-PCM</td><td colspan="2">Sampling：32K/ 44.1K/ 48K/ 88.2K/ 96K/ 176.4K/ 192K Hz
Output frequency：100Hz to 20KHz
Bit number：16/20/24bit</td></tr>
<tr><td>Compre-ssion</td><td colspan="2">AC3, AAC</td></tr>
<tr><td>Option</td><td colspan="2">Next generation audio (*3)
DSD, Dolby Digital Plus, Dolby True HD,
DTS HD (High Resolution Audio), DTS HD(Master Audio) etc.</td></tr>
<tr><td colspan="3">HDCP</td><td colspan="2">HDCP Ver1.4</td></tr>
<tr><td colspan="3">Other functions</td><td colspan="2">E-EDID Ver1.4(DDC2B), xvYCC, CEC</td></tr>
</table>

*1 By using CH1 and CH2 (CH3 and CH4), signal is parallel-output. In case of YCbCr4:2:0, each port outputs the same data.
*2 By using CH1 to 4, signal is parallel-output.
*3 License Option
*4 TMDS Clock 3GHz

10.13.12 Synchronization Unit

REF IN	Connector	BNC x 1
	Signal level	To be supported in future
	Signal standard	To be supported in future
LINK IN/OUT	Connector	MDR-26pin connector each 1 line
	Signal level	LVDS

10.14External Control

Dedicated remote controllers	RB-1870, RB-1871
Serial control	RS-232C
LAN	10/100BASE-T

10.15General specifications

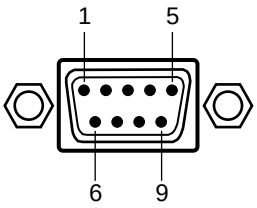
Supply voltage	AC100 to 240 V
Power line frequency	50/60 Hz
Power consumption	200 VA MAX
Dimensions	430 (W) × 177 (H) × 310 (D) mm (excluding protrusions)
Weight	Approx. 7 kg (when 4 units have been installed)
Operating temperature range	5 to 40°C
Operating humidity range	20 to 80%RH (no condensation)

10.16Trademark

・HDMI,the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

10.17Connector specifications

10.17.1 RS232C-Connector



Pin no.	I/O	Signal
1	-	NC
2	O	TXD (transmitted data)
3	I	RXD (received data)
4	-	Shorted with pin 6
5	-	FG (frame ground)
6	-	Shorted with pin 4
7	I	CTS (clear to send)
8	O	RTS (request to send)
9	-	NC

10.17.2 Trigger-Connector

Pin no.	I/O	Signal
1	O	TRIG_OUT3
2	O	TRIG_OUT2
3	O	TRIG_OUT1
4	-	GND
5	O	TRIG_OUT0
6	-	GND
7	I	RESERVE
8	-	GND

*** The output of trigger is an open-collector output. It is pulled up by 10 KΩ, 5 V internally.**

10.17.3 S-Trigger-Connector

Pin no.	I/O	Signal
1	O	STRIG_OUT0
2	—	GND
3	—	GND
4	O	STRIG_OUT1
5	O	STRIG_OUT2
6	O	STRIG_OUT3
7	—	GND

*** This is CMOS output operated by 0V to 2.5V.**

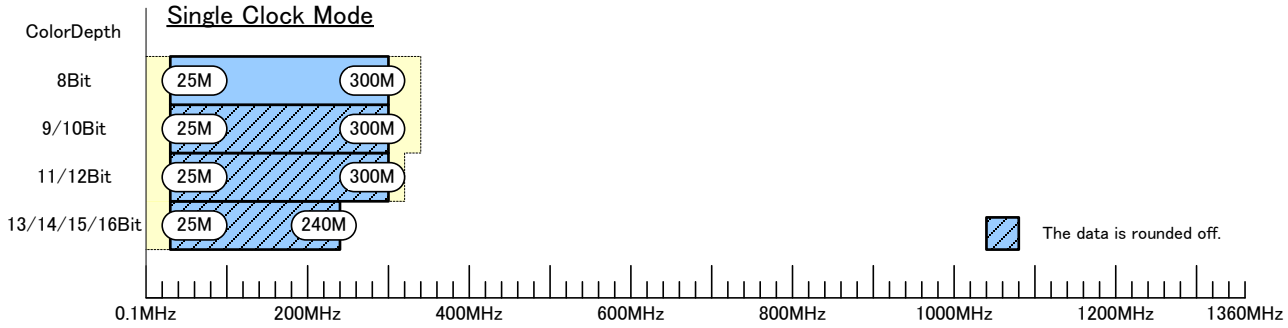
10.18 Relationships between the pattern drawing bit length, the dividing mode and the dot clock frequency

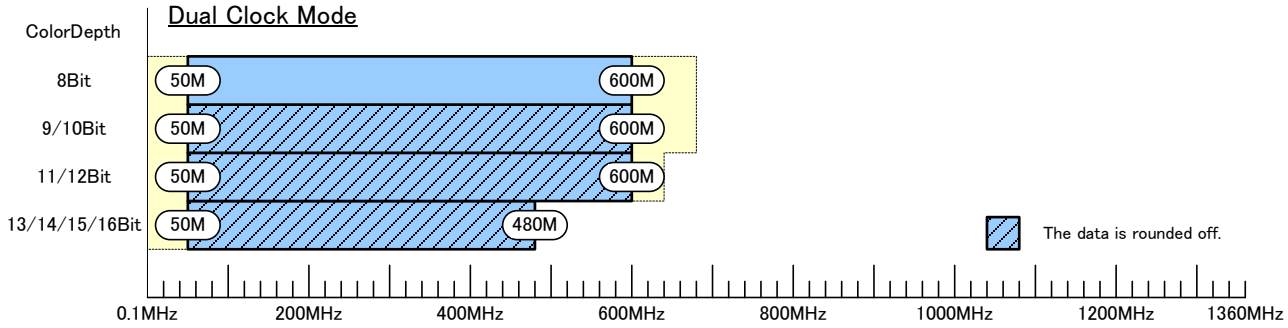
There are dependence relationships between the pattern drawing bit length (color depth), the dot clock operation mode (Dotclk Mode), and the dot clock frequency. Pattern drawing bit lengths, dot clock operation modes and dot clock frequencies outside the limits of these relationships cannot be set. These relationships also differ depending on the output video bit length of each unit. They are shown in the following figures.

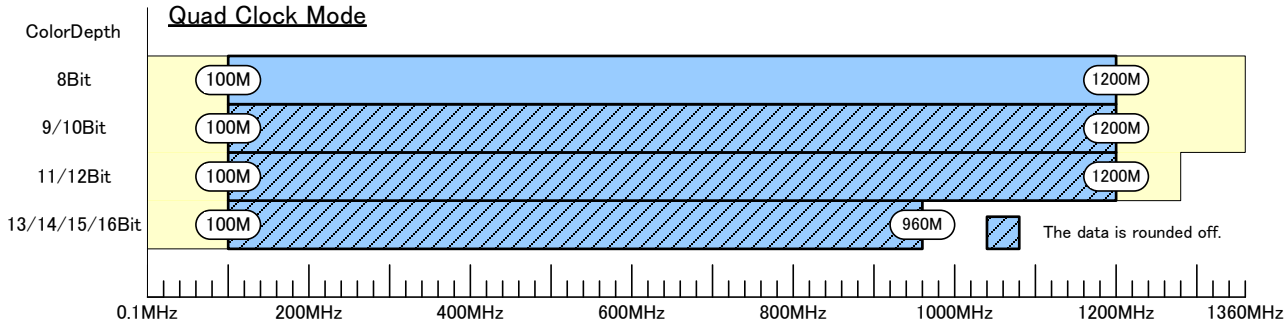
10.18.1 HDMI Unit

The dot clock frequency is restricted by the pattern drawing bit length (Color Depth) and the dividing mode (Split Count) as shown in the figure below. Data skipping occurs when the output video bit length (Video Width) at this time is less than the pattern drawing bit length (Color Depth).

1) When the output video bit length (video width) is 8-bit.

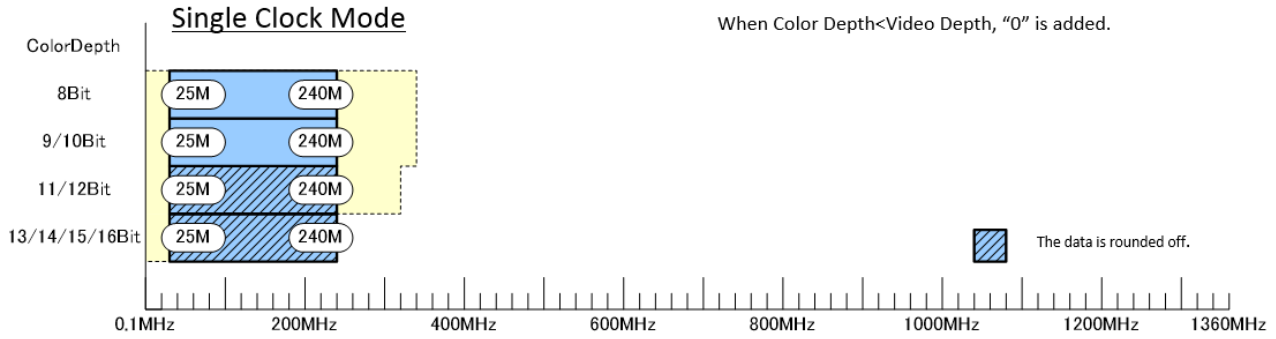


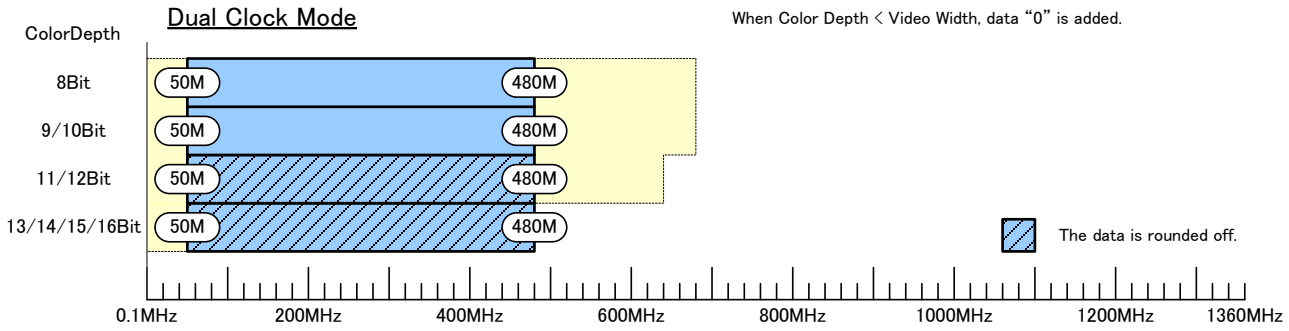


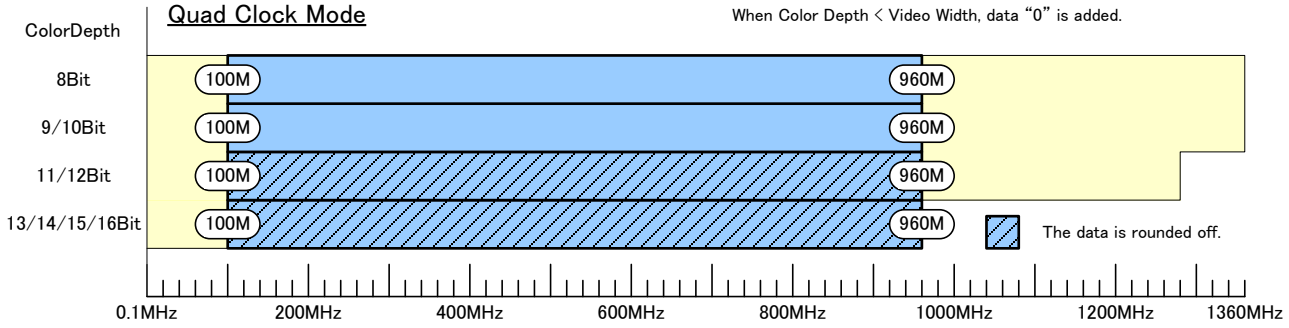


Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.3.2 HDMI data transmission method

2) When the output video bit length (video width) is 10-bit.

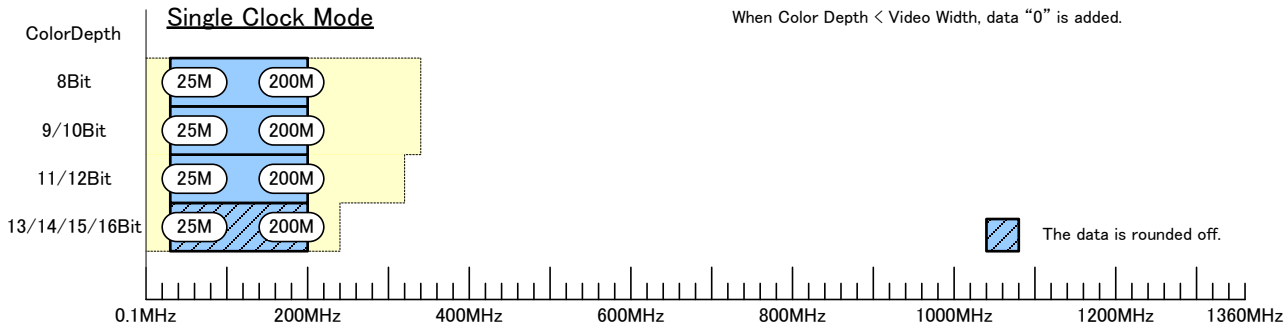


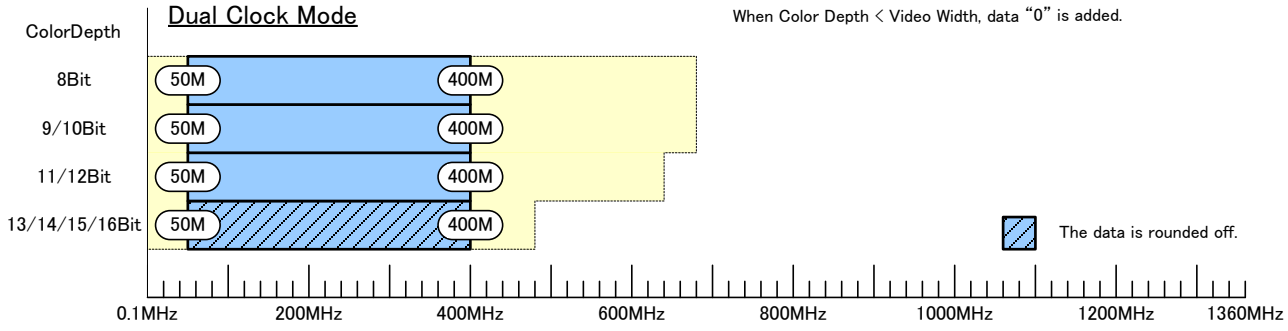


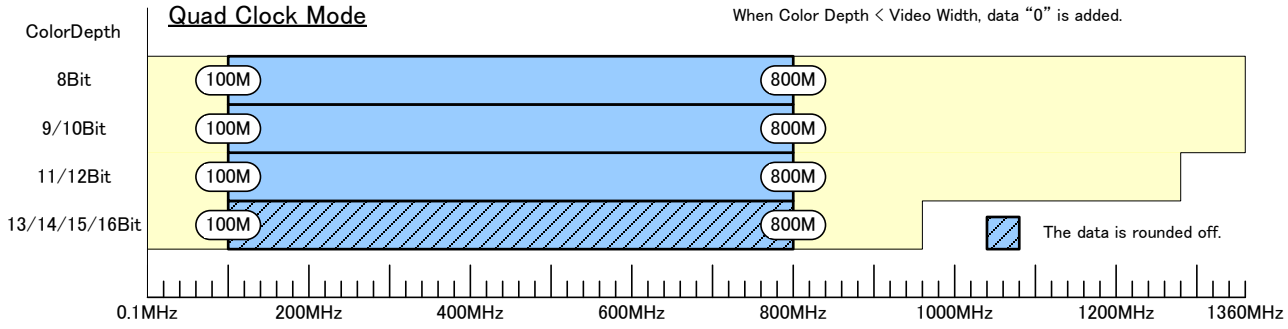


Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.3.2 HDMI data transmission method

3) When the output video bit length (video width) is 12 bit.

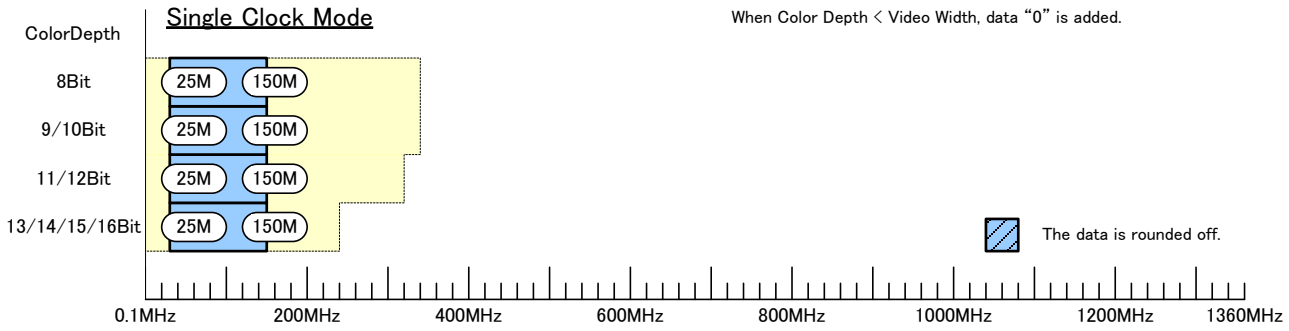


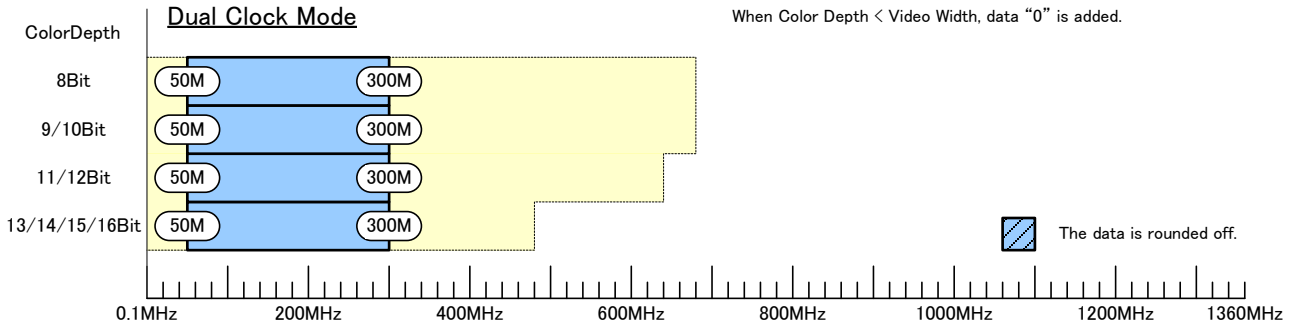


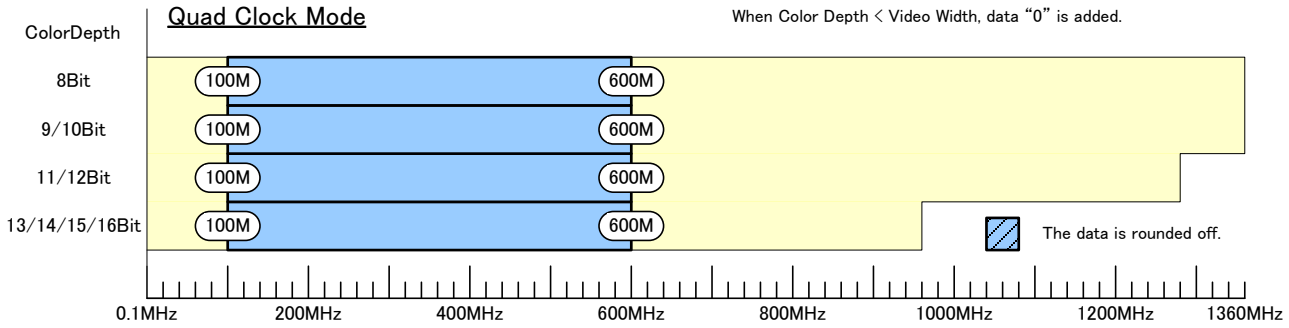


Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.3.2 HDMI data transmission method

4) When the output video bit length (video width) is 16-bit.







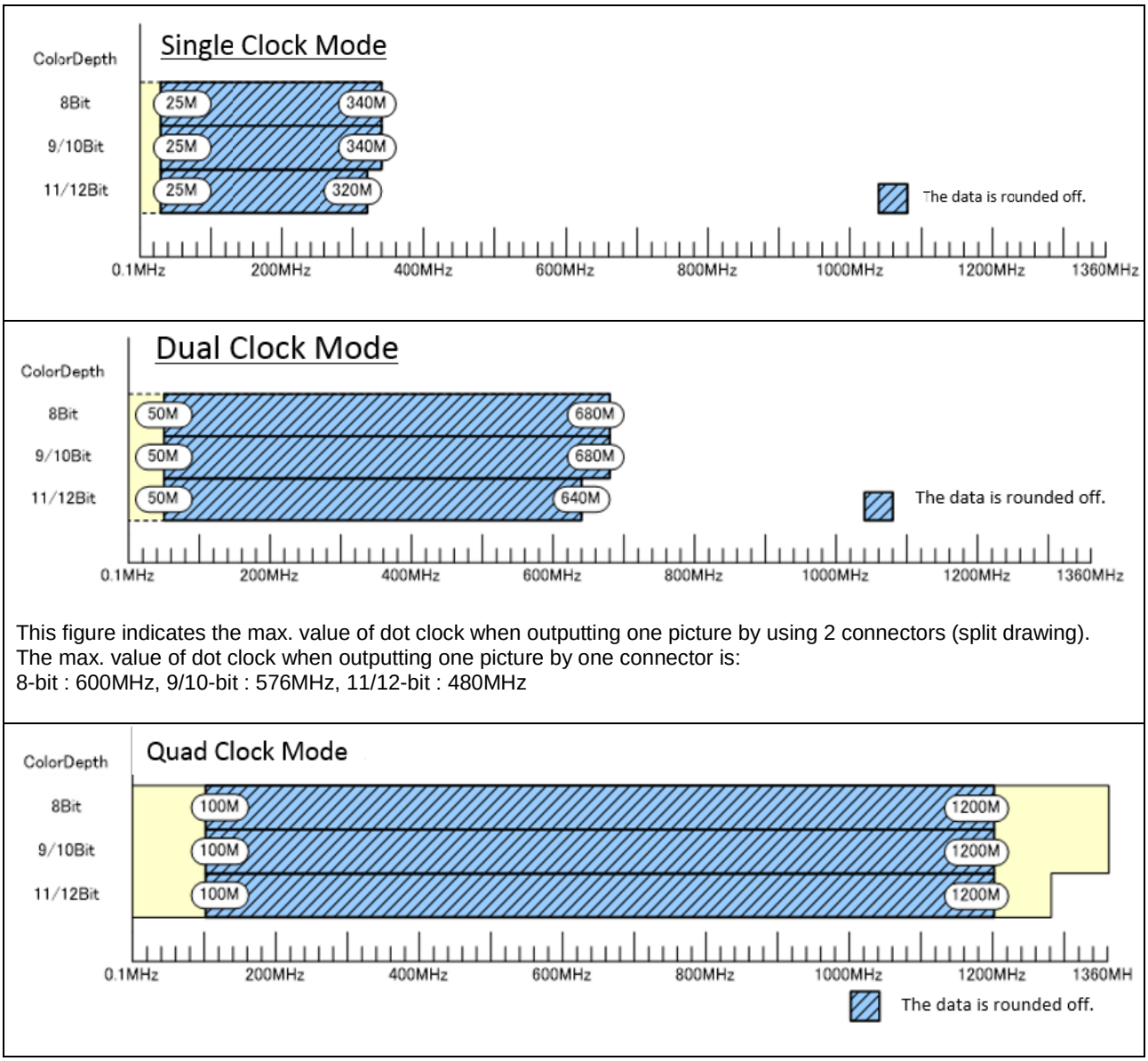
Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.3.2 HDMI data transmission method

10.18.2 DisplayPort Unit (VM-1876A-M1)

The dot clock frequency is restricted by the pattern drawing bit length (Color Depth) and the dividing mode (Split Count) as shown in the figure below. Data skipping occurs when the output video bit length (Video Width) at this time is less than the pattern drawing bit length (Color Depth).

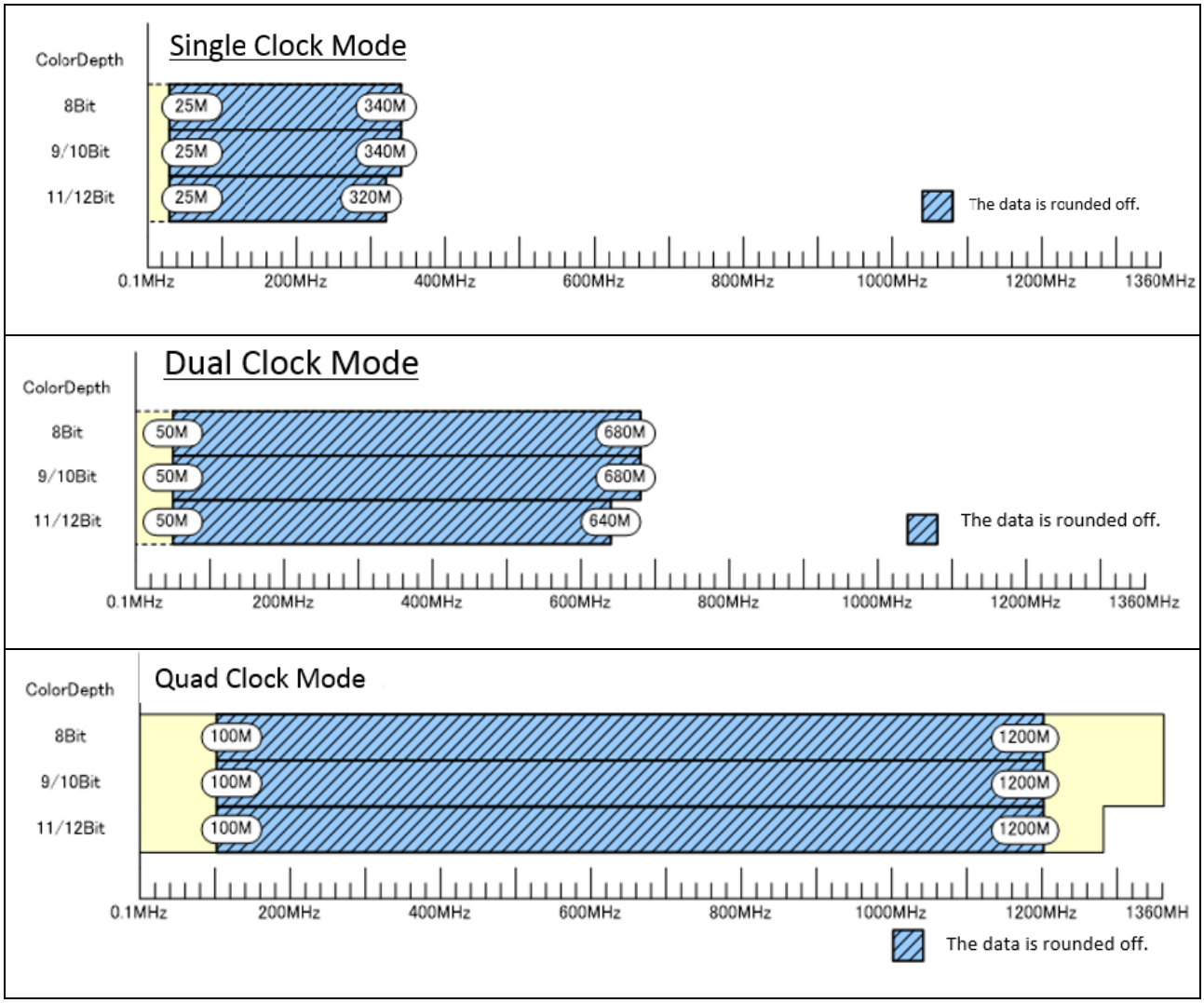
* Refer to “10.2.6 Color Depth (level) setting of Pattern drawing” about Color depth.
* Refer to “10.4.3 DisplayPort Setting” about Video width.
* Maximum data amount (maximum value of Dot Clock) differs from the combination of Link Rate and Lane Count. Refer to “10.12.4 DisplayPort Unit (VM-1876A-M1)” about

1) When Output Video Width is 6-bit.

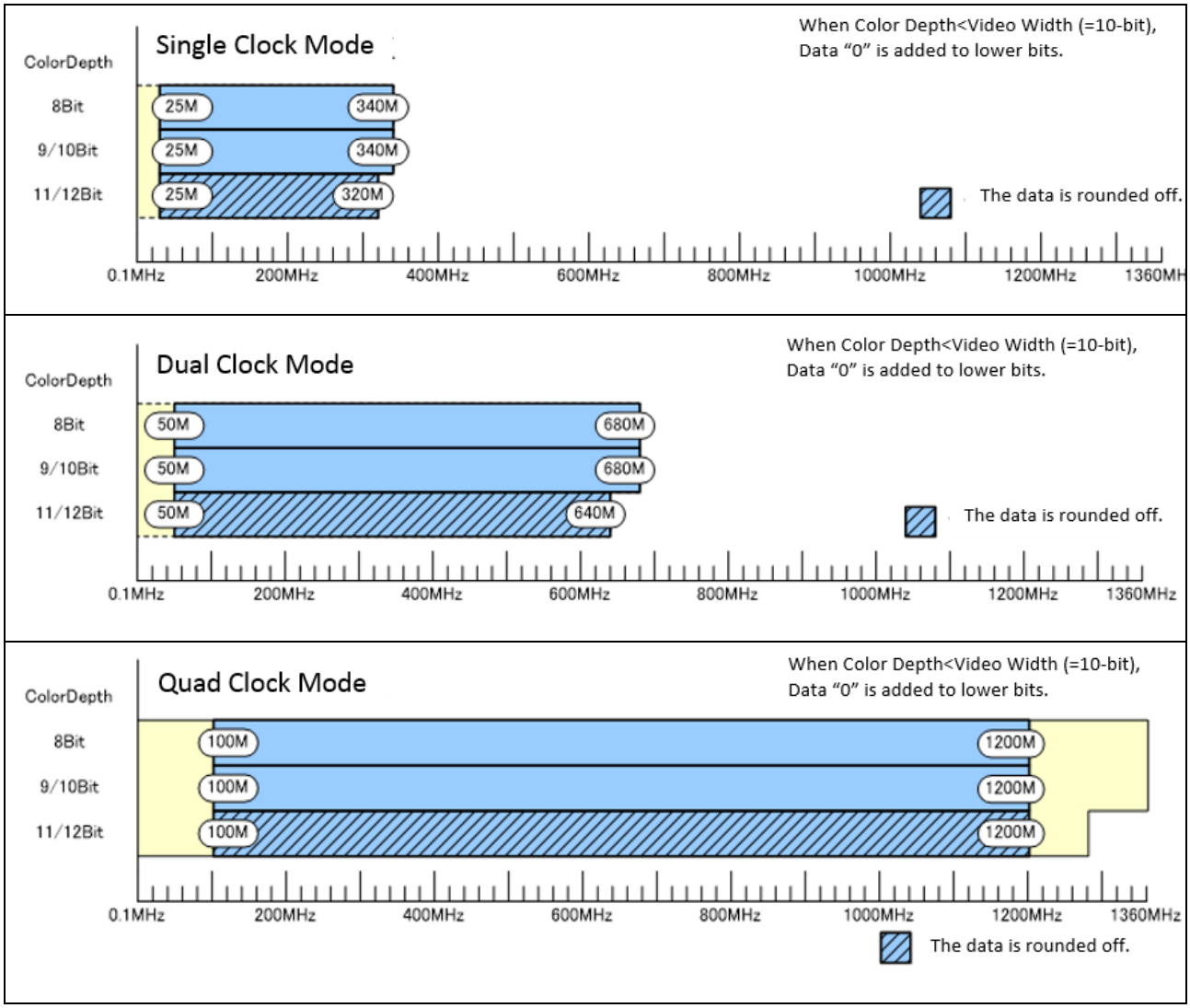


This figure indicates the max. value of dot clock when outputting one picture by using 2 connectors (split drawing).
The max. value of dot clock when outputting one picture by one connector is:
8-bit : 600MHz, 9/10-bit : 576MHz, 11/12-bit : 480MHz

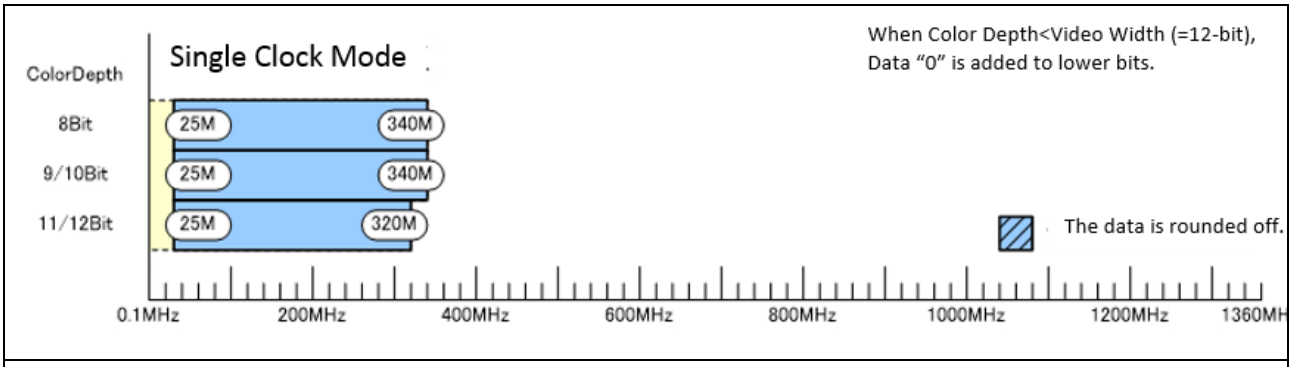
2) When Video Width is 8-bit.

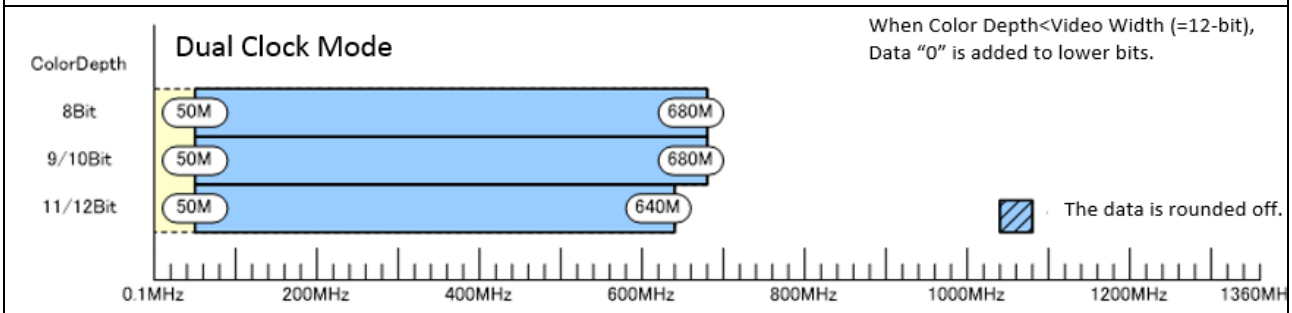


3) When Video Width is 10-bit.

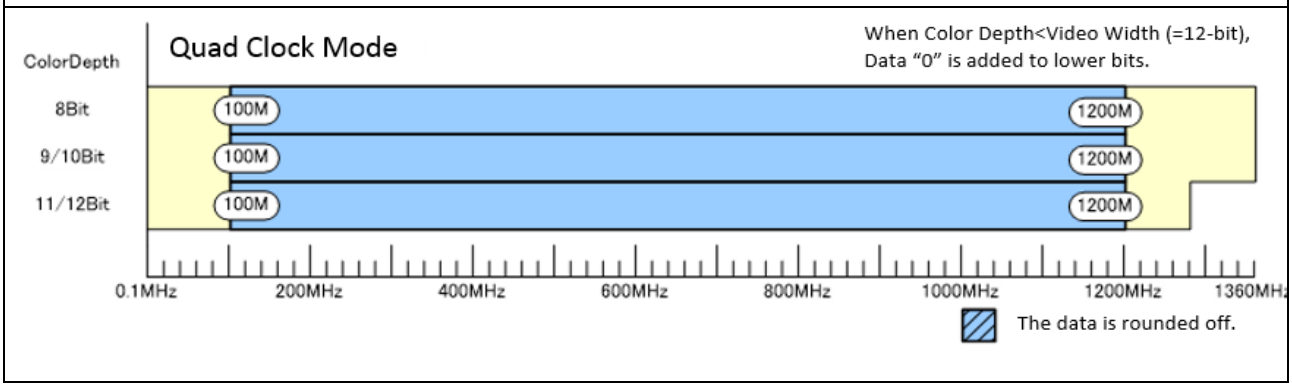


4) When Video Width is 12-bit





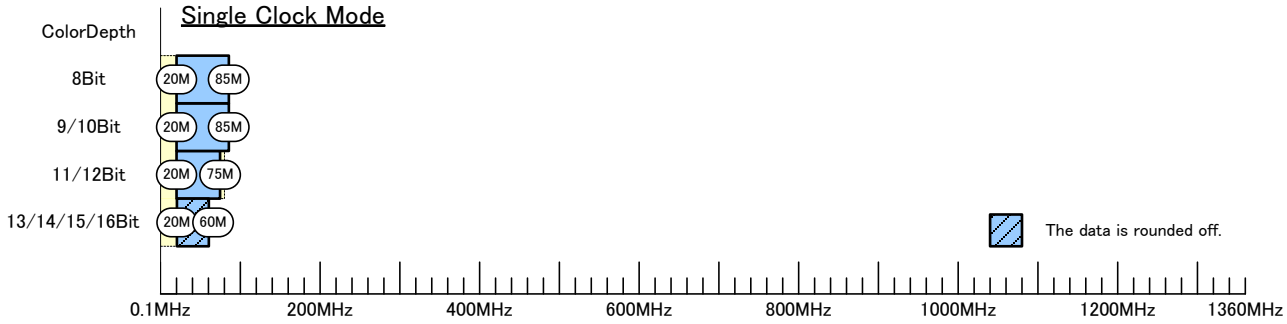
This figure indicates the max. value of dot clock when outputting one picture by using 2 connectors (split drawing).
The max. value of dot clock when outputting one picture by one connector is:
8-bit : 600MHz, 9/10-bit : 576MHz, 11/12-bit : 480MHz



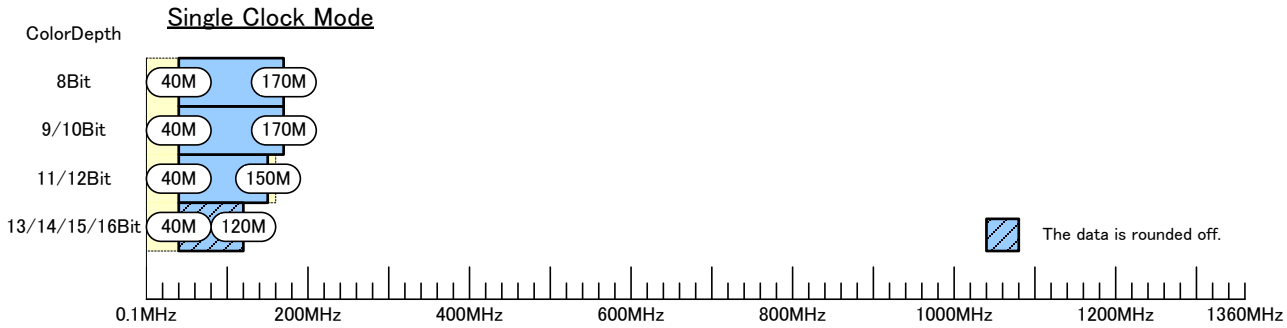
10.18.3 V-by-One ® HS Unit

The dot clock frequency is restricted by the pattern drawing bit length (Color Depth) and the dividing mode (Split Count) as shown in the figure below. Data skipping occurs when the output video bit length (Video Width) at this time is less than the pattern drawing bit length (Color Depth).

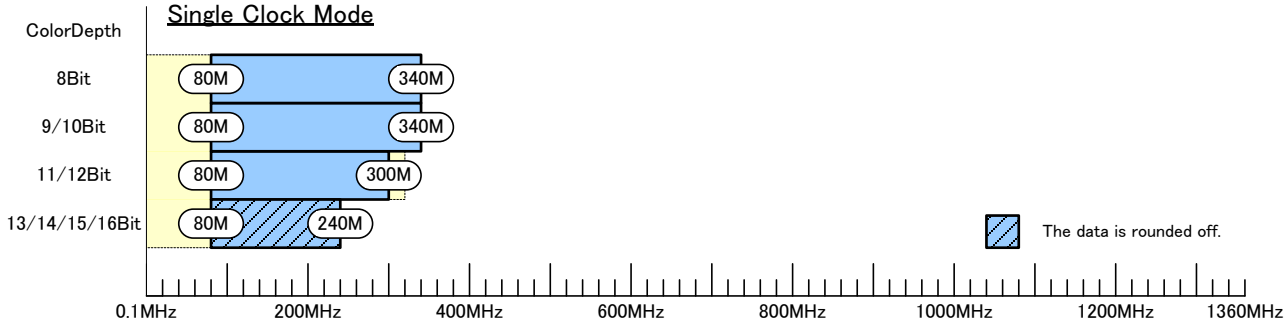
1) When the data lane number is 1 Lane.



2) When the data lane number is 2 Lanes.

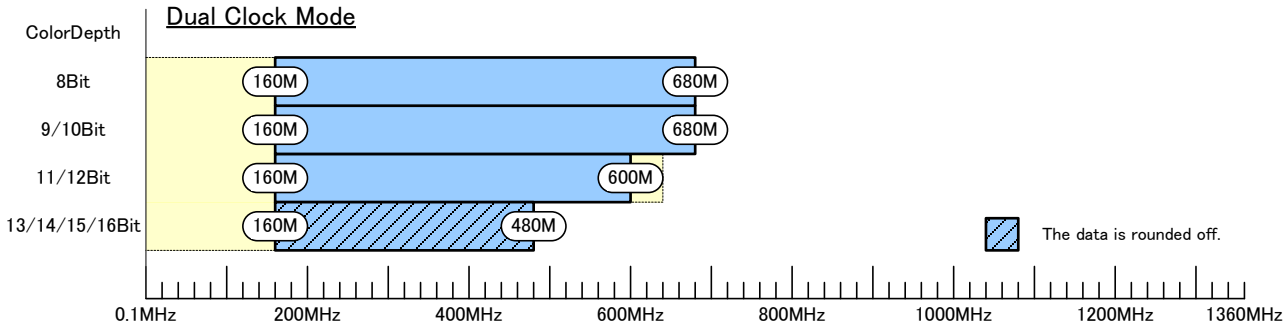


3) When the data lane number is 4 Lanes.

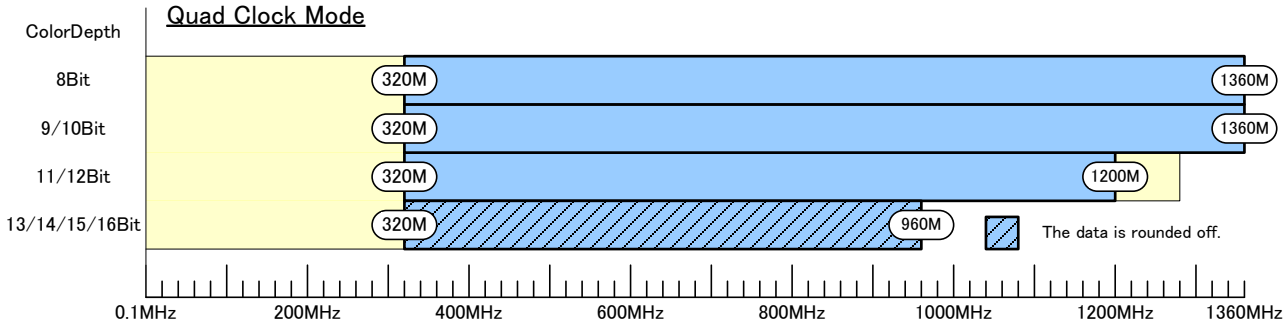


Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.5.2 V-by-One ® HS Setting procedure

4) When the data lane number is 8 Lanes.



5) When the data lane number is 16 Lanes.

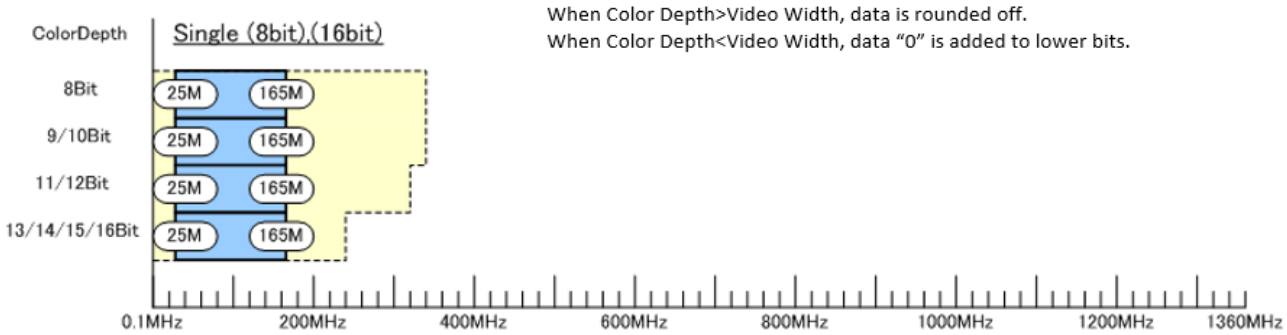


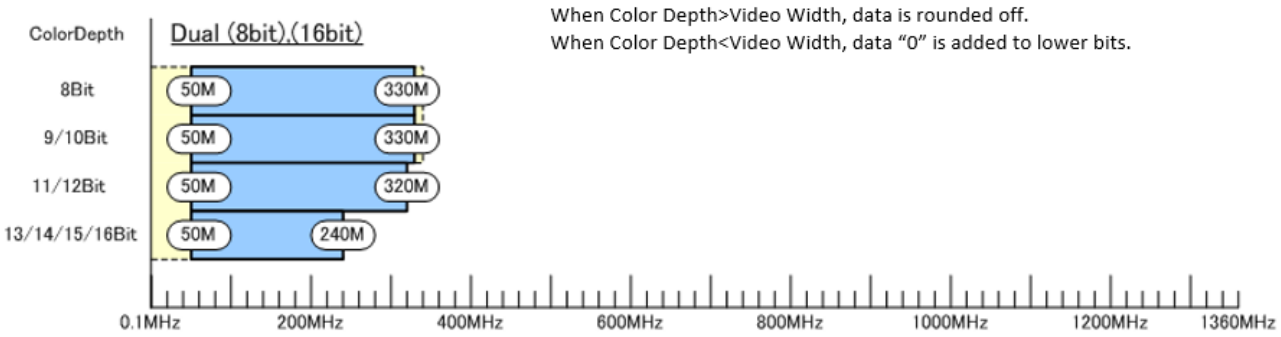
Note) Refer to the following section about each detail.
10.2.4 Setting of Dot Clock Operation Mode (DotClk Mode)
10.2.6 Setting the Color Depth (gray scale) for the pattern drawing
10.5.2 V-by-One ® HS Setting procedure

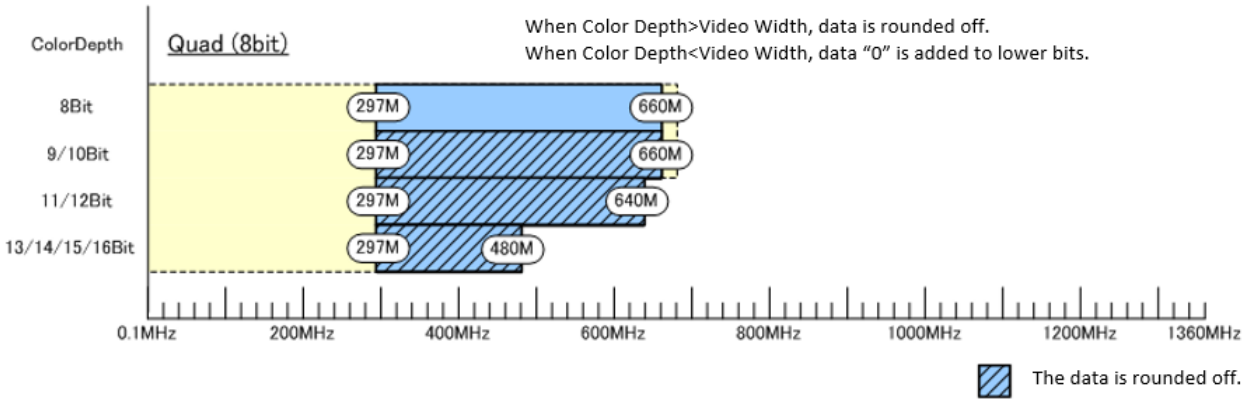
10.18.4 iTMDS Unit

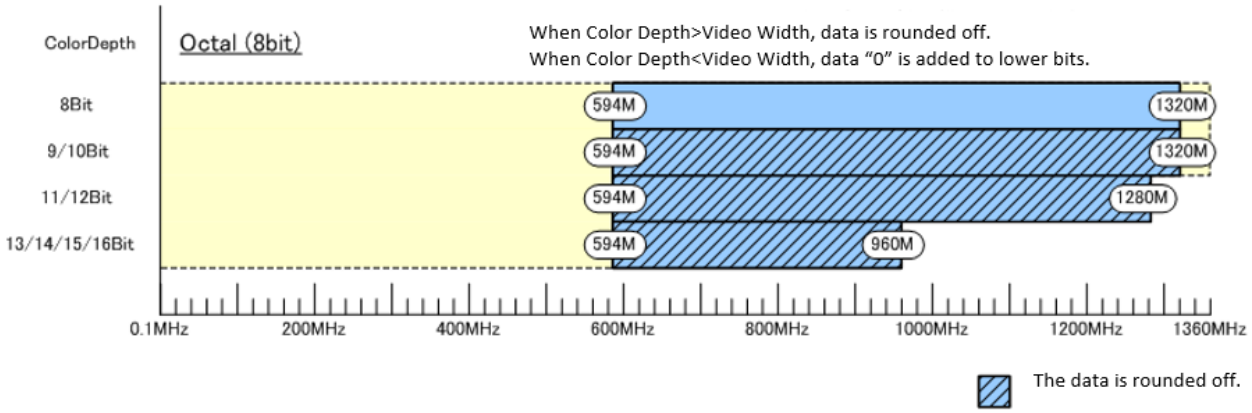
The dot clock frequency is restricted by the pattern drawing bit length (Color Depth) and the Dot Clock Operation mode (DotClk Mode) as shown in the figure below. Data lane numbers are determined by Dot Clock Operation Mode (DotClk Mode).

1) When DVI output

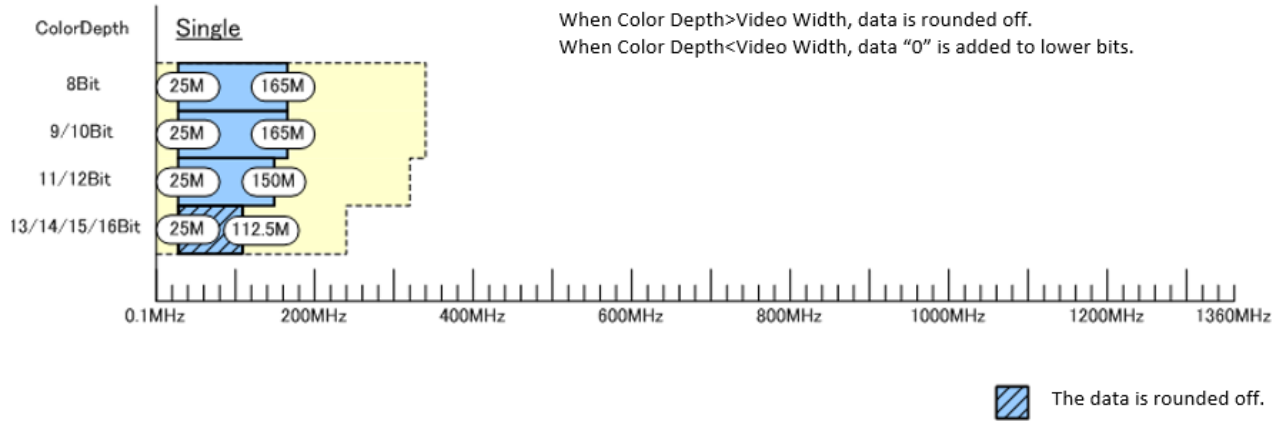


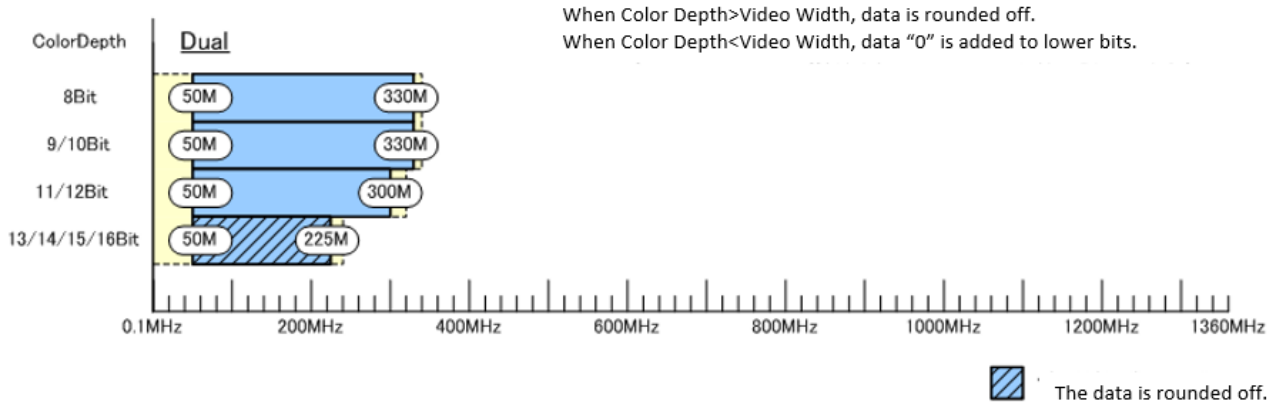


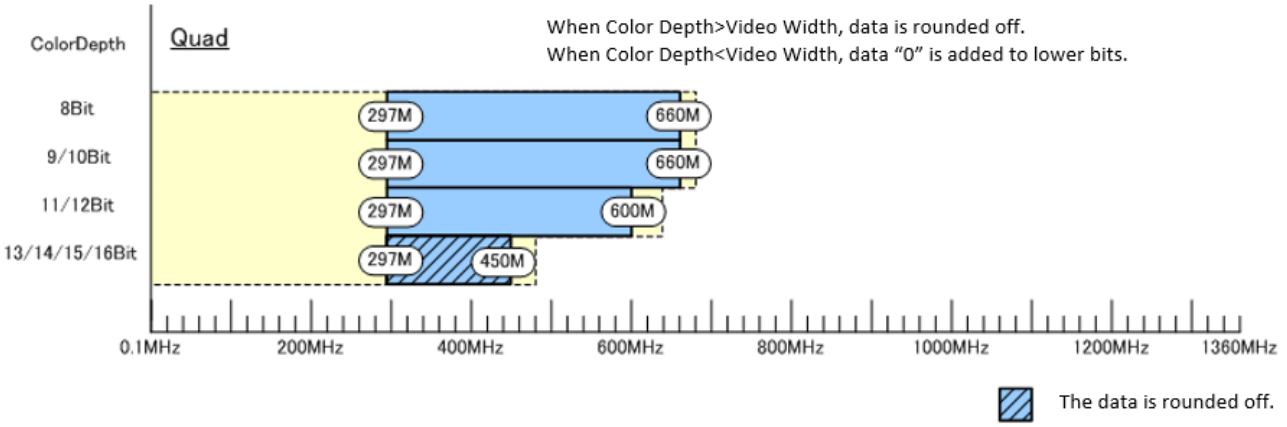


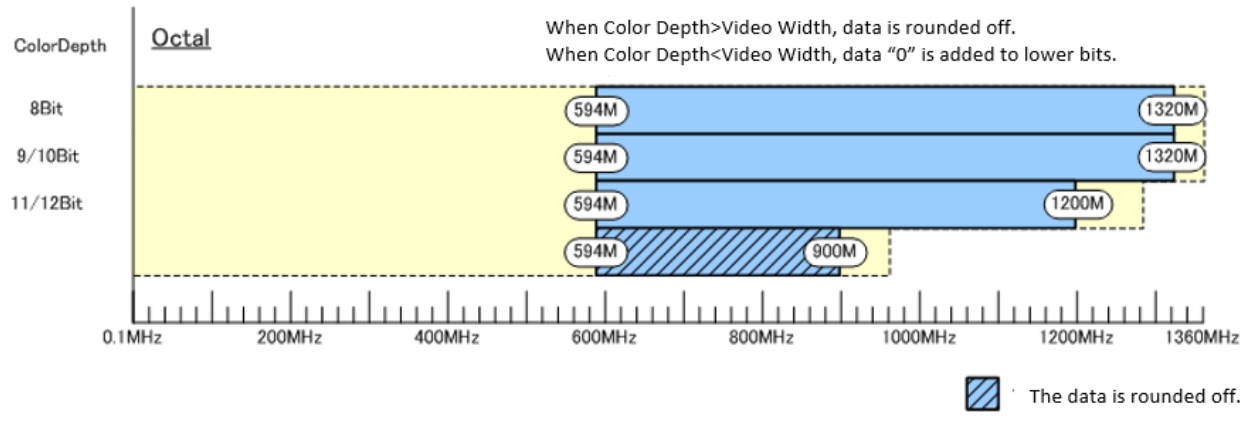


2) When iTMDS output









10.18.5 SDI Unit

Only the timing that is written in “10.13.5 SDI Unit” is available.

10.18.6 HDBaseT Unit

The output timing that is written in “10.13.11 HDBaseT Unit” is supported.

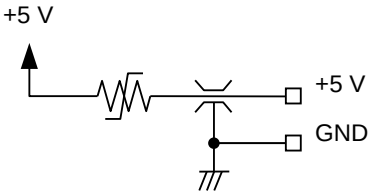
10.19 Concerning the maximum current consumption of the DDC (DP_PWR) power supply

DDC power is supplied to the outputs of the VG-876.

The maximum currents supplied by the DDC power supply are as listed below.

- HDMI output: total 0.05 A by 2CH
- DVI output: total 0.5A by 2CH
- Analog output: 0.5A from VGA output

1) The DDC supply voltage is output as shown in the figure below.



DDC power supply output circuit

2) The supply voltage differs depending on the output connector.

- HDMI output: Fixed at +5V.
- DVI output: Fixed at +5V.
- Analog (D-sub) output: Fixed at +5V.

CAUTION

- The DDC power supply incorporates an overcurrent protection device, but do not use a current which exceeds the rating.
- Do NOT supply power from a connected device to the VG-876 DDC power supply. If such power is supplied, both the VG-876 and the connected device may be damaged.

10.20 License list

License		Description
Pattern	01	DTV card for China (VT-8500-0004/0013)
	02	10/12 bit images (VT-8001)
	03	DTV card (VT-8500-0007)
	04	APDC Pattern 1
	05	APDC Pattern 2,3,4
	16	4K images (VT-7004)
	17	Max. 16-bit tiff conversion (SP-8871)
	18	8K, 4K ITU-BT.2020 pictures (VT-7007)
	19	HDR ramp patterns (VT-8500-0018)
	20	8K/4K HDR Evaluation Image Libraries (VT-7009)
0.25dot Scroll		Scroll function in 0.25 dot units
0.125dot Scroll		Scroll function in 0.125 dot units
High Bit Rate Audio		Height Bit Rate Audio function
Scroll Trigger		Scroll trigger function
Frame Trigger		Single moving image frame trigger function
HDMI CTS		CTS function

Text, data, copy prevention information and other data are superimposed in the vertical blanking interval (VBI) of the TV standard signals, such as NTSC and PAL, and transmitted as multiplexed broadcasts.

The VG-876 supports the following functions.

(1) Macrovision (Option)
(2) Closed caption/V-Chip
(3) Teletext
(4) WSS
(5) CGMS-A/ID-1

The TV standard signals and functions supported are summarized in the table below.

	Macrovision	Closed caption V-chip	Teletext	WSS	CGMS-A ID-1
NTSC-J	YES	YES	-	-	YES
NTSC-M	YES	YES	-	-	YES
NTSC-443	YES	YES	-	-	YES
PAL-M	YES	YES	-	-	YES
PAL(-BDGHIK)	YES	YES	YES	YES	-
PAL-Nc	YES	YES	-	YES	-

Caution

The Macrovision, Closed caption (V-Chip) and Teletext functions cannot be executed at the same time.

11 FUNCTIONS AVAILABLE WITH TV STANDARD SIGNALS

11.1 Macrovision

11.1.1 Description and specifications

■ **What is “Macrovision”?**

Macrovision is a copy prevention system developed by ROVI Corporation (previously Macrovision Corporation).

Widely used by video sources such as VHS and DVD-Video on the market and by satellite broadcasts, for instance, the system ensures that, by causing the automatic gain control (AGC) of the video decks to malfunction, users will not be able to record properly the video output sources which are protected by the system.

The AGC circuit is designed to adjust the gain of the input signals automatically and maintain the appropriate sensitivity, and almost all consumer-use VTRs now feature it. It serves to make dark images a little brighter and excessively light images darker and keep them this way.

While keeping the luminance and chrominance signal components of the video signals unchanged, Macrovision’s copy prevention signals cause the AGC to malfunction by mixing signals with non-standard levels in the vertical blanking interval. This is why the brightness of the images will fluctuate even when the images are recorded. These signals also have the effect of causing trouble for the sync signals and disturbances in the images.

The trouble caused ensures that content is unwatchable even when it has been copied.

■ What does the “color stripe” function do?

This function is part of the Macrovision standard, and it provides color stripes to overlap with the regular Macrovision signals.

It constitutes a method of superimposing the modulated color burst signal onto the video signals, and it is also referred to as a means of color burst copy prevention.

The color stripe function inserts thin horizontal lines into the copied images and, like the Macrovision system, it makes the images unwatchable.

* The color stripes are provided only in the Type 2 and 3 modes of the NTSC-M and J systems.

■ Macrovision specifications

Macrovision supports the TV signals of the following systems.

Its signals are superimposed onto the composite signals and Y/C signals.

• NTSC-M, NTSC-J, NTSC-443

• PAL, PAL-M, PAL-Nc

■ **Notice**

This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Use of this copyright protection technology must be authorized by ROVI Corporation, and is intended for commercial testing purposes only unless otherwise authorized by ROVI. Reverse engineering or disassembly is prohibited.

Caution

- Macrovision is an option. Contact ASTRODESIGN or your dealer.
- The Macrovision signals have different effects depending on the type of VHS or DVD player. When using the system, please check the terms and conditions of the agreement with ROVI Corporation.

11.1.2 Setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	**Macrovision**
	Group Edit		**Output**		Analog Output		Closed Caption
	Auto Edit		Audio		Digital Output		V-Chip
	DP Analysis		Pattern		**VBI Function**		Teletext
	Data Copy/Erase		Action				WSS

Select items by using or ▲ INC ▼ DEC .

By operating as above, the “Macrovision” menu appears.

<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

The selection options for Mode differ depending on the TV signals. (OFF is set for any timing format not listed below.)	
NTSC-M	
0	OFF
1	Type1 (AGC only)
2	Type2 (AGC + 2Line Colorstripe)
3	Type3 (AGC + 4Line Colorstripe)
4	VHS USA
5	VHS US obs.
NTSC-J	
0	OFF
1	Type1 (AGC only)
2	Type2 (AGC + 2Line Colorstripe)
3	Type3 (AGC + 4Line Colorstripe)
4	VHS Japan1
5	VHS Japan2
NTSC-443,PAL-60,PAL-M	
0	OFF
1	Type1,2,3 (AGC only)
PAL,PAL-Nc	
0	OFF
1	Type1,2,3 (AGC only)
2	VHS

11.2 Closed captions/V-Chip

11.2.1 Description and specifications

■ **What does the closed caption (CC) function do?**

Closed captioning was developed in the United States, and it provides broadcasts with subtitles for the hearing impaired so that people who are deaf or hard of hearing can enjoy movies and news programs.

The captions are “closed” in the sense that they are not displayed on the screen during normal playback. Conversely, the Japanese-language subtitles and other such characters used with video content which are “burned into” the images from the start are referred to as “open captions.”

Although closed captioning was originally developed as a technology for the hearing impaired, it is currently attracting the attention of educators and language learners as a tool which helps develop “listening.”

The CC subtitle data is superimposed onto line 21 (first field) and line 284 (second field) of the NTSC output signals, and output. The subtitle data has two modes, captions and text. Another available service is the Extended Data Service (EDS) which transmits titles, ratings and other program information using line 284 (second field). The V-Chip described below uses the EDS function.

A total of 32 characters can be displayed per line by CC. There are 15 lines, but the maximum number of lines is limited to 4 in the caption mode (CC1 to 4). All 15 lines can be displayed in the text mode (T1 to 4).

■ What does the V-Chip do?

The V-Chip refers to a semiconductor chip that blocks out TV programs containing violence, bad language and sex situations. “V” refers to violence, and the viewing of programs is blocked out according to the ratings which are categorized by the extremity of the program content. Once the ratings are set in a receiver (TV set) which incorporates the V-Chip function, the rating information of EDS is decoded, and whether the programs is to be output to the screen is automatically determined.

■ Specifications of closed caption/V-Chip

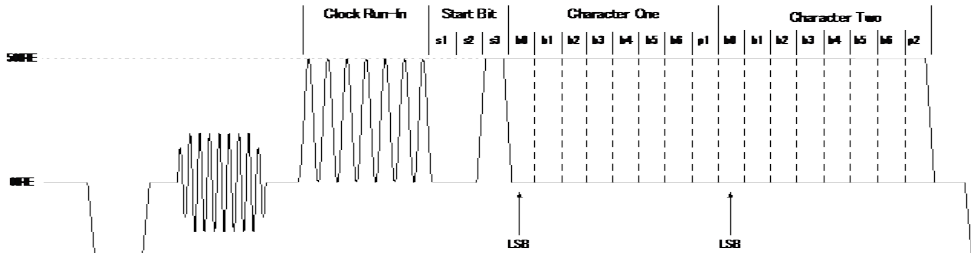
Closed caption/V-Chip supports the TV signals of the following systems.

Closed caption/V-Chip is superimposed onto the composite signals and Y/C signals.

- NTSC-M, NTSC-J, NTSC-443
- PAL, PAL-M, PAL-Nc

Note) When 625-line timing (PAL, PAL-Nc) is output, the caption data is superimposed on the 21st line (334-line).

The closed caption/V-Chip waveform is shown below. Following the color burst come a sine wave known as Clock Run-In and continues to the start bit. The start bit is always “001.” Two bytes of data (Char1, Char2) are sent for each line. Char1 and Char2 are decoded from LSB, and an odd parity is usually added to MSB (bit 8).



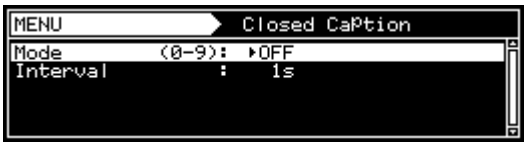
Closed Caption / V-Chip (21Line System)

11.2.2 Closed caption settings

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	Macrovision
	Group Edit		**Output**		Analog Output		**Closed Caption**
	Auto Edit		Audio		Digital Output		V-Chip
	DP Analysis		Pattern		**VBI Function**		Teletext
	Data Copy/Erase		Action				WSS

Select items by using or ▲ INC ▼ DEC .

By operating as above, the “Closed Caption” menu appears.



<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Table of closed caption setting items>

(1)	**Mode(0-9)**	The **mode** is set here.		
		0	**OFF**	The captions are set to OFF.
		1	**CC1**	Closed caption mode 1 is selected here.
		2	**CC2**	Closed caption mode 2 is selected here.
		3	**CC3**	Closed caption mode 3 is selected here.
		4	**CC4**	Closed caption mode 4 is selected here.
		5	**T1**	Text data mode 1 is selected here.
		6	**T2**	Text data mode 2 is selected here.
		7	**T3**	Text data mode 3 is selected here.
		8	**T4**	Text data mode 4 is selected here.
		9	**USER Data**	The user data is selected here. Up to 20 user data can be registered using SP-8870.
(2)	**Interval**	0-60	**Interval**	The interval at which the closed caption data is transmitted is set. (in 1-second increments)
(3)	**USER Data No.**	1-20		The user data number is set. This is valid when **USER Data** has been selected as the **Mode** setting in (1).

Listed below are the types of closed caption services available.

CC1 - Primary Synchronous Caption Service
(caption service for primary language)
CC2 - Special Non-Synchronous Use Caption
(service which does not need to be synchronized with the sound, etc.)
CC3 - Secondary Synchronous Caption Service
(caption service for secondary language)
CC4 - Special Non-Synchronous Use Caption
(service which does not need to be synchronized with the sound, etc.)
T1 - First Text service (text service)
T2 - Second Text service (text service)
T3 - Third Text service (text service)
T4 - Fourth Text service (text service)

■ The content of Closed caption internal data (1/3)

Service	Caption style, Line, Color, Option setting, etc	Character
CC1 to CC4	Roll-up2 ROW2 Background: black, transparence Text: white	Primary Synchronous Caption Service -- CC1 (CC1) Secondary Synchronous Caption Service -- CC2 (CC2) Special Non-Synchronous Use Captions -- CC3 (CC3) Special Non-Synchronous Use Captions -- CC4 (CC4)
	Roll-up3 ROW10 Background: blue, transparence Text: yellow	Roll-up Style characters are always displayed immediately. Each time a Carriage Return is received, the text is scrolled up one row.
	Roll-up4 ROW15, indent Background: cyan, transparence Text: Red	Standard characters 0123456789 ABCDEFGHIJ áàâçéèêíîÑñóôúû !, . ; : 7” #% &@/ () []+−÷<=>? Music note, solid block, Transparent space,solid block, Music note, solid block, Transparent space
	Pop-on ROW1 ROW2 ROW3 Background: red, half transparence Text: cyan	Pop-on Style Caption data are loaded into a non-displayed memory.
	Pop-on ROW4 ROW5 ROW6 Background: green, half transparence Text: blue, flash	End of Caption command (EOC) “flips” displayed and non displayed memory.
	Pop-on ROW7 indent ROW8 indent ROW9 indent Background: magenta, non transparence Text: green, italic	ABCDEFGHIJ 0123456789 Å Ø ┌┐ └┘

■The content of Closed caption internal data (2/3)

Service	Caption style, Line, Color, Option setting, etc	Character
CC1 to CC4	Pop-on ROW12 indent ROW13 indent ROW14 indent ROW15 indent Background: white, non transparence Test: red, underline	ÁÉÓÚÜü, opening single quote, inverted exclamation mark ÀÂÇÈÊËëÎÏïÔÙùÛ《》 Ãã Íì ìÒòÕõ{}＼^_|~ Ä ä Õöß¥¤|
	Paint-on ROW1 ROW3 ROW4 ROW6 ROW7 ROW9 Background: yellow, half transparence Text: blue	Paint-on Style Characters are always displayed immediately. Characters on next row will be erased by Backspace. ABCDEFGH (A to H is deleted by Backspace)
	Paint-on ROW5 ROW6 ROW7 ROW8 ROW9 ROW10 ROW12, indent ROW14, indent Background: yellow, half transparence Text: blue	Once the cursor reaches the 32nd column position on any row, all subsequent characters will be displayed In that column replacing any previous character. ABCDEFGHIJKLMNOPQRSTUVWXYZ (S to Y are replaced by Z) Abcdefghijklmnopqrstuvwxyz (n to y are replaced by z)
T1	−−	First Text Service -- T1 Text Mode is a data service, generally not program related, which may be transmitted using either field of line21. Text Mode data are always displayed as soon as they are received and are intended to be displayed in a manner which isolates them from the video program used to transmit the data. Once the display window is filled these data are always scrolled upward through the display window provided by the decoder.
T2	−−	Second Text Service -- T2 ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 01234567890123456789 !"#$%&' ()á+,-./ :;<=>?@[é]íóú *.-©℠•"" ¥

■The content of Closed caption internal data (3/3)

Service	Caption style, Line, Color, Option setting, etc	Character
T3	−−	Third Text Service -- T3 A Text Mode may be used that consists of data formatted to fill a box which in height is not less than 7 rows and not more than 15 rows (all of which should be contiguous), and in width is not less than 32 columns. Text should be displayed over a solid background to isolate it from the unrelated program video. Each row of text contains maximum of 32 characters.
T4	−−	Fourth Text Service -- T4 ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 012345678901234567890 !″#$%&’ ()á+, −. / : ;<=>?@[é]íóú ∗. -©℠·“” ¥

11.2.3 V-Chip settings

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	Macrovision
	Group Edit		**Output**		Analog Output		Closed Caption
	Auto Edit		Audio		Digital Output		**V-Chip**
	DP Analysis		Pattern		**VBI Function**		Teletext
	Data Copy/Erase		Action				WSS

Select items by using or ▲ INC ▼ DEC .

By operation as above, the “V-chip” menu appears.

<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Table of V-Chip setting items>

(1)	**System(0-4)**	The rating system is selected here.		
		0	**OFF**	The V-Chip is set to OFF here.
		1	**MPAA**	MPAA is set here.
		2	**U.S.TV**	U.S.TV is set here.
		3	**English**	Canadian English is set here.
		4	**French**	Canadian French is set here.

The names of the rating systems and a brief description of each are presented below.

MPAA: Motion Picture Association of America
This organization was set up in order to promote the spread of American movies. It is active in many fields such as promoting exports overseas and cracking down on pirated movies. On the U.S. domestic front, it helps viewers exercise voluntary controls by establishing a rating system for violence, sexual content and discriminatory content, for example. Its rating standards are strict and its screening targets images and language that would hardly raise an eyebrow in Japan.
U.S.TV: U.S. TV Parental Guideline Rating System
This rating system is incorporated in ordinary TV sets installed in American homes.
English: Canadian English Language Rating System
This rating system targets Canadian English.
French: Canadian French Language Rating System
This rating system targets Canadian French.

(2)	**MPAA (0-7)**	These ratings which apply when **MPAA** has been selected as the **System** setting in (1) above are set here.		
		0	**G**	“General Audience” is set as the MPAA rating.
		1	**PG**	“Parental Guidance” is set as the MPAA rating.
		2	**PG-13**	“Parents Strongly Cautioned” is set as the MPAA rating.
		3	**R**	“Restricted” is set as the MPAA rating.
		4	**NC-17**	“No One 17 and Under Admitted” is set as the MPAA rating.
		5	**X**	“Adult Movie” is set as the MPAA rating.
		6	**Not Rated**	“Not Submitted For MPAA Review” is set as the MPAA rating.
		7	**N/A**	“N/A” is set as the MPAA rating.

The names and descriptions of the MPAA ratings are presented below.

G: General Audience
For general audience.
PG: Parental Guidance
Contains scenes unsuitable for young children.
PG-13: Parents Strongly Cautioned
Contains scenes unsuitable for children aged 13 and under.
R: Restricted
Permission of a parent or guardian required for children up to 17 years of age.
NC-17: No One 17 and Under Admitted
Cannot be viewed by anyone aged 17 years and under.
X: Adult Movie
For adults only.
Not Rated
Not Submitted For MPAA Review
N/A
No applicable restrictions

(3)	**U.S.TV (0-7)**	These ratings which apply when **U.S.TV** has been selected as the **System** setting in (1) above are set here.		
		0	**TV-Y**	“All children” is set as the U.S.TV rating.
		1	**TV-Y7**	“Directed to older children” is set as the U.S.TV rating.
		2	**TV-G**	“General Audience” is set as the U.S.TV rating.
		3	**TV-PG**	“Parental Guidance Suggested” is set as the U.S.TV rating.
		4	**TV-14**	“Parents Strongly Cautioned” is set as the U.S.TV rating.
		5	**TV-MA**	“Mature Audience Only” is set as the U.S.TV rating.
		6	**Not Rated 1**	“Not Rated” is set as the U.S.TV rating. (Code = 000)
		7	**Not Rated 2**	“Not Rated” is set as the U.S.TV rating. (Code = 111)
(4)	**USTV Extension**	The extension bits for U.S. TV are set. The bits which can be set differ depending on the U.S. TV ratings. For further details, refer to **“U.S. TV rating system extension bit settings.”**		

The names of the U.S. TV ratings and a description of each are presented below.

TV-Y: All children
Suitable for all children.
TV-Y7: Directed to older children
Suitable for children aged 7 and above.
TV-G: General Audience
Suitable for audiences of all ages (must not contain violent scenes, objectionable language or sexual content).
TV-PG: Parental Guidance Suggested
Contains scenes involving some violence and sexual content unsuitable for young children or situations that may induce foul language or incite delinquency.
TV-14: Parents Strongly Cautioned
Contains scenes involving violence and sexual content unsuitable for children aged 14 or below or situations that may induce foul language or incite delinquency.
TV-MA: Mature Audience Only
For adults only; programs with this rating are hardly ever broadcast.
Not Rated1/2
No applicable restrictions

[U.S. TV rating system extension bit settings]

	FV	V	S	L	D
TV-Y	Cannot be set.				
TV-Y7	0:- / 1:*	Cannot be set.			
TV-G	Cannot be set.				
TV-PG	Cannot be set.	0:- / 1:*	0:- / 1:*	0:- / 1:*	0:- / 1:*
TV-14	Cannot be set.	0:- / 1:*	0:- / 1:*	0:- / 1:*	0:- / 1:*
TV-MA	Cannot be set.	0:- / 1:*	0:- / 1:*	0:- / 1:*	Cannot be set.
Not Rated 1	Cannot be set.				
Not Rated 2	Cannot be set.				

* “-” denotes OFF, and “*” ON.

The names of the U.S. TV rating extension service ratings and a description of each are presented below.

FV: Fantasy Violence
Acts of fantasy violence = violence in animated features and comics.
V: Violence
Violence
S: Sexual Situations
Sexual content
L: Adult Language
Foul language
D: Sexually Suggestive Dialog
Sexually suggestive dialog

(5)	**English (0-6)**	These ratings which apply when **English** has been selected as the **System** setting in (1) above are set here.		
		0	**E**	"Exempt" is set as the English rating.
		1	**C**	"Children" is set as the English rating.
		2	**C8+**	"Children eight years and older" is set as the English rating.
		3	**G**	"General Programming, suitable for all audiences" is set as the English rating.
		4	**PG**	"Parental Guidance" is set as the English rating.
		5	**14+**	"Viewers 14 years and older" is set as the English rating.
		6	**18+**	"Adult Programming" is set as the English rating.

The names of the Canadian English ratings and a description of each are presented below.

E: Exempt
No age restrictions apply.
C: Children
Programming may be viewed by all children.
C8+: Children eight years and older
Programming may be viewed by children aged 8 and above.
G: General Programming, suitable for all audiences
General programming
PG: Parental Guidance
Permission of a parent required to view programming.
14+: Viewers 14 years and older
Programming may be viewed by children 14 years and older.
18+: Adult Programming
Programming for adults only.

(6)	**French (0-5)**	These ratings which apply when **French** has been selected as the **System** setting in (1) above are set here.		
		0	**E**	"Exempt" is set as the French rating.
		1	**G**	"General" is set as the French rating.
		2	**8ans+**	"Not recommended for young children" is set as the French rating.
		3	**13ans+**	"Programming may not be suitable for children under 13" is set as the French rating.
		4	**16ans+**	"Programming is not suitable for children under 16" is set as the French rating.
		5	**18ans+**	"Programming restricted to adults" is set as the French rating.

The names of the Canadian French ratings and a description of each are presented below.

E : Exempt
No age restrictions apply.
G : General
General programming.
8ans+ : Not recommended for young children
Programming unsuitable for young children
13ans+ : Programming may not be suitable for children under 13
Programming unsuitable for children aged 13 and under
16ans+ : Programming is not suitable for children under 16
Programming unsuitable for children aged 16 and under
18ans+ : Programming restricted to adults
Programming for adults only.

(7)	**Interval**	0-60	**Interval**	The interval at which the V-chip data is transmitted is set. (in 1-second increments)

11.3 Teletext

11.3.1 Description and specifications

■ What is “Teletext”?

Teletext is the name of a system used to send still picture program data of text and graphics after multiplexing it in the vertical sync blanking interval of the TV signals. Programs broadcast in Teletext include subtitled broadcasts, news broadcasts, weather forecasts and stock market information. Teletext has achieved a high penetration rate in various countries in Europe and Southeast Asia where the 625/50i system is used.
With Teletext, a total of 40 characters × 25 lines can be contained on a page (per screen), and between 100 and 899 pages of information can be displayed.

■ Teletext specifications

Teletext supports the following TV signals.

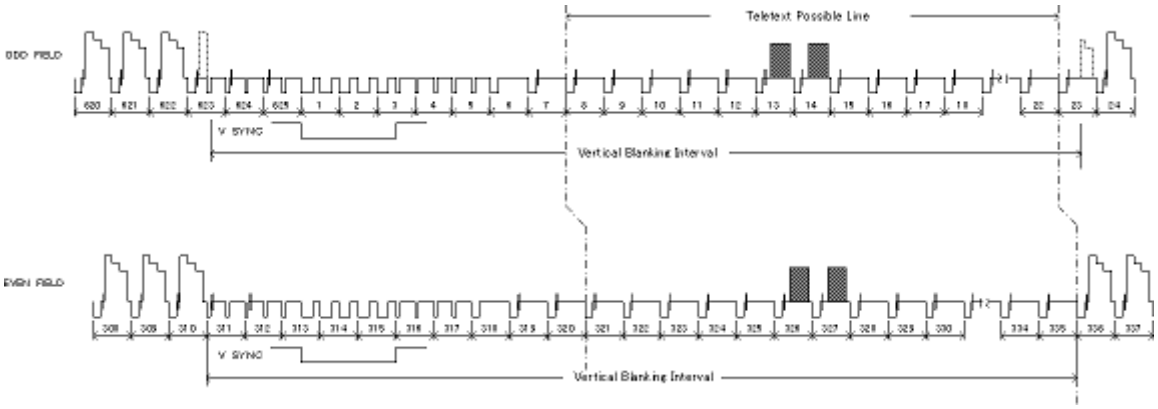
Teletext is superimposed onto the composite signals and Y/C signals.

- PAL (but PAL-Nc are not included.)

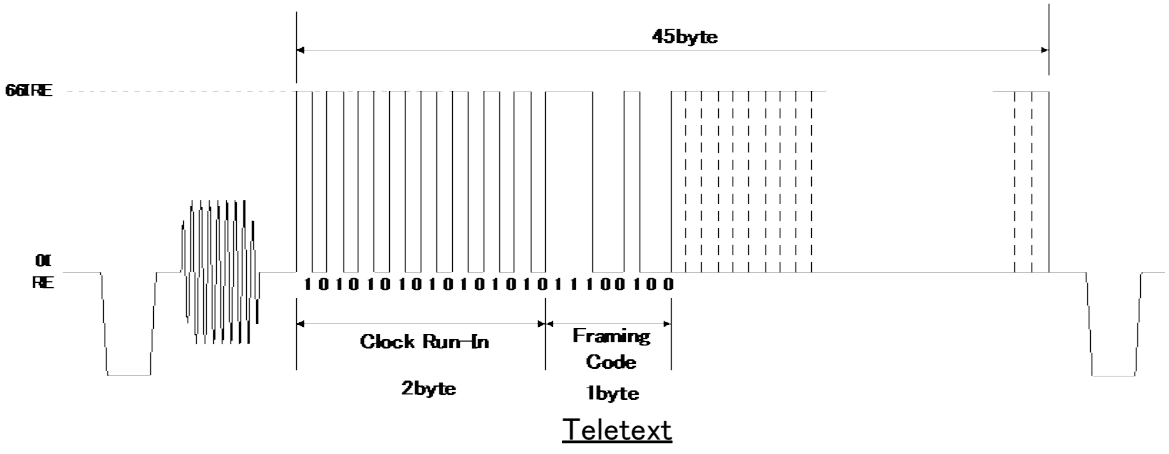
The vertical sync blanking interval (VBI) and Teletext waveforms are shown below.

The Teletext data can be output in lines 8 to 22 (first field) and lines 321 to 335 (second filed) in the vertical sync blanking interval of the PAL signals.

A total of 45 bytes consisting of the Clock Run-In, Framing Code and data bytes (42 bytes) are superimposed in one line.



VBI waveforms



Teletext waveforms

11.3.2 Setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	Macrovision
	Group Edit		**Output**		Analog Output		Closed Caption
	Auto Edit		Audio		Digital Output		V-Chip
	DP Analysis		Pattern		**VBI Function**		**Teletext**
	Data Copy/Erase		Action				WSS

Select items by using or ▲ INC ▼ DEC .

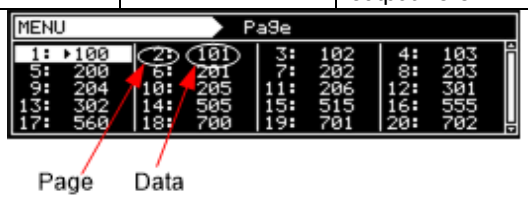
By operation as above, the “Teletext” menu appears.

<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

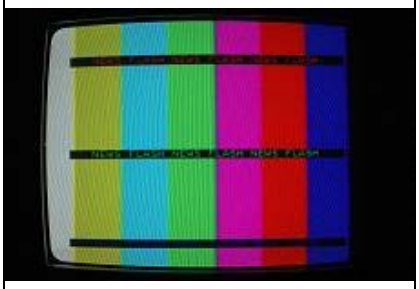
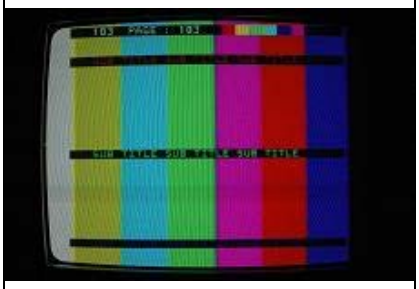
For further details on the settings, refer to the lists of setting parameters below.

<Table of teletext setting items>

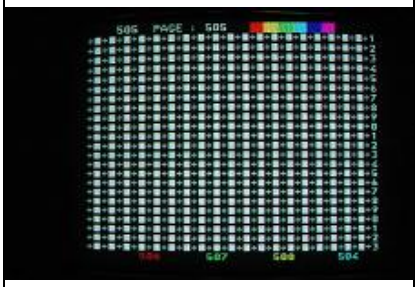
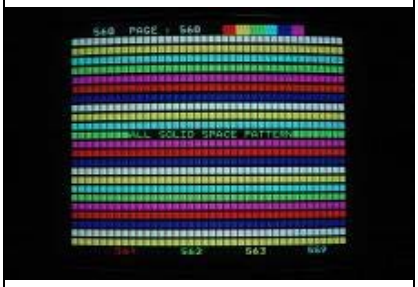
<table>
<tr><td rowspan="4">(1)</td><td rowspan="4">Mode(0-2)</td><td colspan="4">The Teletext operation mode is selected here.</td></tr>
<tr><td>0</td><td colspan="2">OFF</td><td>Teletext OFF.</td></tr>
<tr><td>1</td><td colspan="2">Default</td><td>The default pages are output.
For further details, refer to the teletext default on next pages</td></tr>
<tr><td>2</td><td colspan="2">Page Select</td><td>The pages selected by page in (2) below is output here.</td></tr>
<tr><td>(2)</td><td>Page
Press SET to display the setting menu.</td><td colspan="4"> 

This generator enables up to 20 pages of teletext screens to be registered.
Numbers for the internal data are set on each page.
100-899 can be set as page data.</td></tr>
<tr><td rowspan="6">(3)</td><td rowspan="6">Line</td><td colspan="4">The lines in which the Teletext data is to be output are set here.
The figure indicates the line numbers in the first field and second field.</td></tr>
<tr><td rowspan="2">8,321</td><td>0</td><td>Disable</td><td>The data is not output in line 8 and line 321.</td></tr>
<tr><td>1</td><td>Enable</td><td>The data is output in line 8 and line 321.</td></tr>
<tr><td>9,322</td><td colspan="3">Same setting as above.</td></tr>
<tr><td>10,323</td><td colspan="3">Same setting as above.</td></tr>
<tr><td colspan="4">.
.</td></tr>
<tr><td>22,335</td><td colspan="3">Same setting as above.</td></tr>
</table>

■ Teletext default pages (page 1 of 2)

Page No.	Description	Screen	Page No.	Description	Screen
100	Index Page		101	Test Page	 Including FLASH, CONCEAL
102	Newsflash		103	Subtitle	
200	Character (English)		201	Character (German)	
202	Character (Swedish /Finnish /Hungarian)		203	Character (Italian)	
204	Character (French)		205	Character (Portuguese /Spanish)	

■ Teletext default pages (page 2 of 2)

Page No.	Description	Screen	Page No.	Description	Screen
206	Character (Czech /Slovak)		301	Colors	
302	White Flat		505	Clock Cracker	
515	Multi Page	 4 sub-pages	555	Test Pattern1	
560	Test Pattern2		-	Other pages	 Screen which appears for page 700

11.4 WSS

11.4.1 Description and specifications

■ What is WSS (Wide Screen Signaling)?

"WSS (Wide Screen Signaling)" is a system for multiplexing the aspect ratio information of the images in the vertical sync blanking interval, and sending it.

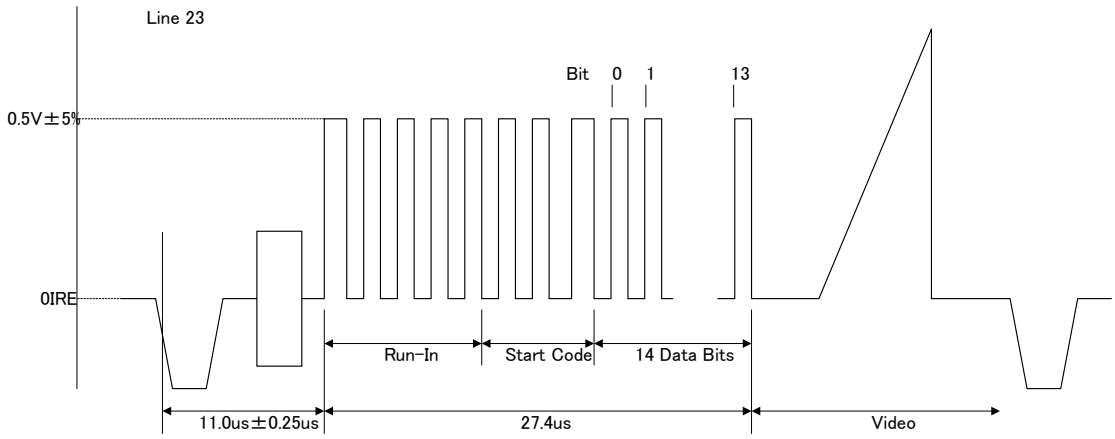
■ WSS specifications

WSS supports the following TV signals.

WSS is superimposed onto the composite signals and Y/C signals.

•PAL, PAL-Nc

The aspect ratio information of WSS is superimposed on line 23 of the first field. The WSS waveform consists of Run-In, Start Code and the 14-bit data. This waveform and the bit allocation are shown below.



WSS(Widscreen Signaling)

・Bit0-3 : Aspect

Bit		Aspect	Full format or	Position
0 1 2	3	Ratio	Letterbox	
0 0 0	1	4:3	Full format	Not applicable
1 0 0	0	14:9	Letterbox	Center
0 1 0	0	14:9	Letterbox	Top
1 1 0	1	16:9	Letterbox	Center
0 0 1	0	16:9	Letterbox	Top
1 0 1	1	>16:9	Letterbox	Center
0 1 1	1	14:9	Full format	Center
1 1 1	0	16:9	Full format	Not applicable

Bit 3 is the parity bit.

•Bit4-13: Other service information (not supported by the VG-876)

11.4.2 Setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	Macrovision
	Group Edit		**Output**		Analog Output		Closed Caption
	Auto Edit		Audio		Digital Output		V-Chip
	DP Analysis		Pattern		**VBI Function**		Teletext
	Data Copy/Erase		Action				**WSS**

Select items by using or ▲ INC ▼ DEC .

By operation as above, the “WSS” menu appears.

<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Table of WSS setting items>

(1)	**OFF/ON (0/1)**	Whether the WSS information is to be output is set here.		
		0	**OFF**	The WSS information is not output.
		1	**ON**	The WSS information is output.
(2)	**Aspect Ratio(0-7)**	The aspect ratio is set here.		
		0	The aspect ratio is set to **Full Format 4:3**.	
		1	The aspect ratio is set to **LB 14:9 center**.	
		2	The aspect ratio is set to **LB 14:9 top**.	
		3	The aspect ratio is set to **LB 16:9 center**.	
		4	The aspect ratio is set to **LB 16:9 top**.	
		5	The aspect ratio is set to **LB >16:9 center**.	
		6	The aspect ratio is set to **Full Format 14:9**.	
		7	The aspect ratio is set to **Full Format 16:9**.	

11.5 CGMS-A/ID-1

11.5.1 Description and specifications

■ **What is CGMS-A (Copy Generation Management System)?**

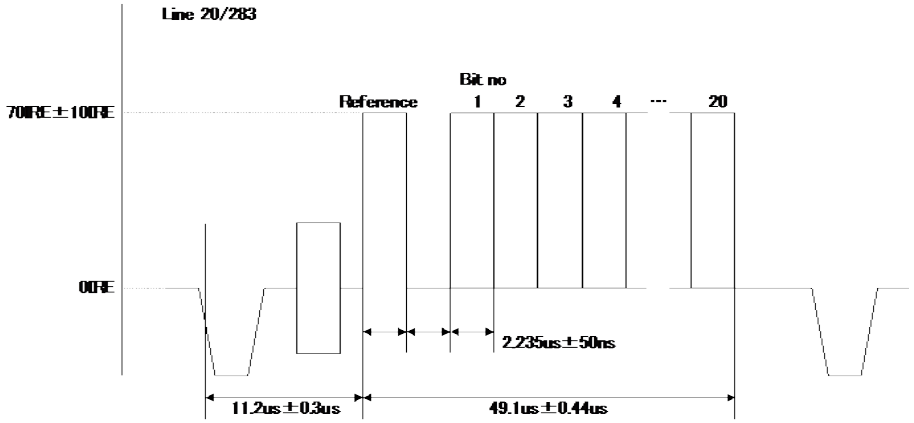
CGMS-A is a system of multiplexing the copy control information in the vertical sync blanking intervals, and sending it.

■ **What is ID-1?**

ID-1 is a system of multiplexing the aspect ratio information in the vertical sync blanking intervals, and sending it.

- NTSC, NTSC-M, NTSC-443
- PAL-60, PAL-M

CGMS-A and ID-1 are superimposed onto line 20 (first field) and line 283 (second field). The CGMS-A and ID-1 waveform consists of the reference bit and 20-bit data. This waveform and the bit allocation are shown below.



CGMS-A / ID-1

・ Bit1-0 : Aspect (ID-1)

Bit		Applications	
1	2	Aspect ratio	Picture display format
0	0	4:3	Normal
1	0	16:9	Normal
0	1	4:3	Letter Box
1	1	Not Defined	

・ Bit6-2: Fixed at “0000”

・ Bit8-7 : CGMS-A

Bit		Application
7	8	
0	0	Copy is permitted without restriction
1	0	Condition not to be used
0	1	One generation of copies may be made
1	1	No copying is permitted

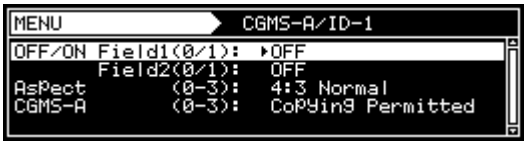
・ Bit14-9 : Other service information (not supported by the VG-876)
・ Bit20-15 : CRC

11.5.2 Setting procedure

	MENU	⇒	ProgramEdit	⇒	Output	⇒	VBI Function
MENU ⇒	**Program Edit**	SET ⇒	Timing	SET ⇒	All Output	SET ⇒	Closed Caption
	Group Edit		**Output**		Analog Output		V-Chip
	Auto Edit		Audio		Digital Output		Teletext
	DP Analysis		Pattern		**VBI Function**		WSS
	Data Copy/Erase		Action				**CGMS-A/ID-1**

Select items by using ◯ or ▲ INC ▼ DEC .

By operation as above, the “CGMS-A/D-1” menu appears.



<Selecting the items>
Select the items of Source using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the items using the number keys [0/STATUS] to [9/F], and then press [SET] key.

<Setting the parameters>
Select the parameters using [Rotary switch] or [INC]/[DEC] key and then press [SET] key.
Alternatively, select the parameters using the number keys [0/STATUS] to [9/F], and then press [SET] key.

For further details on the settings, refer to the lists of setting parameters below.

<Table of the CGMS-A and ID-1 setting items>

(1)	**OFF/ON Field1(0/1)**	Whether to output the data to line 20 of the first field is set here.		
		0	**OFF**	The data is not output.
		1	**ON**	The data is output.
(2)	**OFF/ON Field2(0/1)**	Whether to output the data to line 283 of the second field is set here.		
		0	**OFF**	The data is not output.
		1	**ON**	The data is output.
(3)	**Aspect (0-3)**	The aspect ratio setting is selected here.		
		0	**4:3 Normal**	The aspect ratio is set to 4:3.
		1	**16:9 Normal**	The aspect ratio is set to 16:9.
		2	**4:3 Letter Box**	The aspect ratio is set to 4:3 letter box.
		3	**Not Defined**	The aspect ratio is left undefined.
(4)	**CGMS-A (0-3)**	Copy protection is set here.		
		0	**Copying Permitted**	Copying is permitted.
		1	**Not Used Condition**	The CGMS-A is left undefined.
		2	**Copy Once**	Copy-once is set.
		3	**No Copying Permitted**	Copying is not permitted.

*The same data is superimposed onto line 20 and line 283.

12 LIST OF ERROR MESSAGES

12.1 Media-related error

Code (HEX)	Error message	Description
217	Flash ROM(User) Full	There is not enough free space in the internal memory.
228	No USB Memory	The USB Memory has not been inserted.
229	USB Memory Unformatted	The USB Memory has not been formatted.
22A	USB Memory Full	There is not enough free space on the USB Memory.
22C	OPT Data File Error	Error in the optional pattern data.
22F	Image Data File Error	Error in the image data.
233	Audio Flash Data Already Exist	The audio data has already been registered.
235	Audio Flash File Error	Error in the audio data.
236	Audio Flash Data Full	The maximum amount of audio data which can be registered has been exceeded.

12.2 General error

Code (HEX)	Error message	Description
302	‘H-Timing DotClock’ Over Limit	Dot clock in the horizontal timing data is outside the setting range.
303	‘H-Timing Frontp’ Over Limit	Frontp in the horizontal timing data is outside the setting range.
305	‘H-Timing HD’ Over Limit	HDstart+Hdwidth in the horizontal timing data is outside the setting range.
307	‘H-Timing Period’ Over Limit	Period in the horizontal timing data is outside the setting range.
308	‘H-Timing Disp’ Over Limit	Disp in the horizontal timing data is outside the setting range.
309	‘H-Timing Sync’ Over Limit	Sync in the horizontal timing data is outside the setting range.
30A	‘H-Timing Backp’ Over Limit	Backp in the horizontal timing data is outside the setting range.
30B	‘H-Timing Blanking’ Over Limit	Blanking in the horizontal timing data is outside the setting range.
30C	H-Frequency Over Limit	The horizontal sync frequency in the horizontal timing data is outside the setting range.
30D	‘H-Timing’ Data Error	Error other than those described above in the horizontal timing data.
310	‘Output’ Data Error”	Error in the output condition data.
311	‘Character’ Data Error”	Error in the character pattern data.
312	‘Cross Hatch’ Data Error”	Error in the crosshatch pattern data.
313	‘Dot’ Data Error”	Error in the dot pattern data.
314	‘Circle’ Data Error”	Error in the circle pattern data.

Code (HEX)	Error message	Description
315	‘Burst’ Data Error”	Error in the burst pattern data.
316	‘Window’ Data Error”	Error in the window pattern data.
317	‘Color Bar’ Data Error”	Error in the color bar pattern data.
318	TERMINAL) Parameter Error	Error in a parameter in the terminal mode.
319	TERMINAL) Data Error	Error in the data in the terminal mode.
31B	‘Video/Setup/Sync Level’ Error	The video level (Video), setup level (Setup) and sync signal level (Sync) are outside the setting range. (Setting range: [Video ≥ Setup] and [Video ≥ Sync] and [Video ≥ (Setup + Sync)])
31E	TERMINAL) Communication Timeout	Time-out has occurred in the data during communication in the terminal mode.
31F	TERMINAL) Undefined Command	An undefined command was received in the terminal mode.
321	‘Program No.’ Error”	Error in the program number.
322	‘Group No.’ Error”	Error in the group number.
323	‘Character Code’ Error”	Error in a user character code.
32B	‘OPT No.’ Error”	Error in the optional pattern number.
32D	OPT Data File Not Found”	The optional pattern has not been registered.
32E	‘Image No.’ Error”	Error in the image pattern number.
330	Image Data File Not Found”	The image pattern has not been registered.
333	CURSOR Not Selected	The cursor pattern has not been selected (when SP-8870 Cursor Tool is used).
334	EDID Read Port Not Found	The EDID read port is not found. (The unit has not been installed.)
338	‘Gray Scale’ Data Error	Error in the gray scale pattern data.
339	‘OPT/Image’ Data Error”	Error in the optional pattern or image pattern data.
33B	‘Cursor’ Data Error	Error in the cursor pattern data.
33C	‘Program Name’ Data Error	Error in the program name data.
33D	‘□×[ABC] Color’ Data Error	Error in the □ × [ABC] color data.
33E	‘Action’ Data Error”	Error in the action data.
340	‘V-Timing Total’ Over Limit	Total in the vertical timing data is outside the setting range.
341	‘V-Timing Disp’ Over Limit”	Disp in the vertical timing data is outside the setting range.
342	‘V-Timing Sync’ Over Limit	Sync in the vertical timing data is outside the setting range.
343	‘V-Timing Backp’ Over Limit	Backp in the vertical timing data is outside the setting range.
344	‘V-Timing Frontp’ Over Limit	Frontp in the vertical timing data is outside the setting range.
345	‘V-Timing Blanking’ Over Limit	Blanking in the vertical timing data is outside the setting range.
346	V-Frequency Over Limit	The vertical sync frequency in the vertical timing data is outside the setting range.
347	‘V-Timing VD’ Over Limit	Vdstart+Vdwidth in the vertical timing data is outside the setting range.

Code (HEX)	Error message	Description
348	'V-Timing EQP-Fp' Over Limit	EQP-FP in the vertical timing data is outside the setting range.
349	'V-Timing EQP-Bp' Over Limit	EQP-BP in the vertical timing data is outside the setting range.
34A	'V-Timing' Data Error	Error other than those described above in the vertical timing data.
34E	DDC2 Line Error	ACK was not received in DDC2.
352	EDID Header Error	Error in the EDID header.
353	EDID Check Sum Error	EDID checksum error.
354	EDID Header & Check Sum Error	Errors in both the EDID header and checksum.
355	User YPbPr Coefficient Error	Error in the color difference coefficients.
358	Audio Data No. Error	Error in the audio data number.
35A	Audio Data File Not Found	The audio data has not been registered.
35D	Lip Sync Invalid EDID Latency	Error in the EDID at the connection destination (when Mode:EDID has been selected with LipSync).
35F	Lip Sync 'EDID Port' Error	The HDMI unit is not installed (when Mode:EDID has been selected with LipSync).
360	Image License Error	The image data license has not been supplied.
361	Data File Not Found	The data (other than the optional pattern and image data) cannot be found.
362	Copy Condition Error	・The copy source data and copy destination data are identical. ・The number of copy source data and number of copy destination data are different.
363	Image RAM Full	There is not enough free space in the image memory. Set the high-speed drawing mode in 7.1.16 to OFF or reduce the number of data specified.

12.3 HDCP-related error

Code (HEX)	Error message	Description
403	HDCP) Transmitter KSV Error	KSV of the transmitter does not contain twenty ‘0’s and ‘1’s.
404	HDCP) Receiver KSV Error	KSV of the receiver does not contain twenty ‘0’s and ‘1’s.
405	HDCP) Link Check Error	During initial validation, the values did not match (R0 ≠ R0’).
406	HDCP) Encryption Error	Encryption was not completed.
407	HDCP) Hot Plug Error	The device to be connected is not connected.
408	HDCP) Ri Ready Error	The ready bit of the receiver was not set high.
412	HDCP) I2C Line Error	The I2C line is not working properly.
414	HDCP) Receiver Not HDMIMode	The connected device (receiver) was not set to the HDMI mode when the HDCP version was identified as 1.1 as a result of HDCP version:1.1 or HDCP version: EDID check.
415	HDCP) Ri NG	The values of Ri and Ri’ do not match.
416	HDCP) FIFO Ready Time-out	FIFO Ready fails to occur within restricted time limit.
417	HDCP) DEPTH Error	The depth number has exceeded ‘7’.
418	HDCP) DEVICE_COUNT Error	The count number has exceeded ‘127’.
419	HDCP) List Error (V’!=V)	The values of V and V’ do not match.

12.4 User-generated optional pattern-related error

Code (HEX)	Error message	Description
501	OPT Program Not Found	The user-generated optional pattern is not found.
502	Variables Stack Error	Variable stack error.
503	Register Stack Error	Register stack error.
504	Call Stack Error	Function stack error.
505	Illegal Instruction Code	Illegal instruction code.
506	Divide by Zero	An attempt was made to divide a number by zero.
539	OPT-USER License Error	The user-generated optional pattern license has not been supplied.

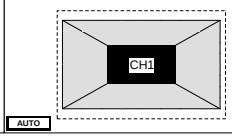
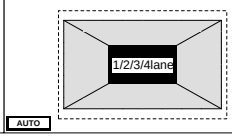
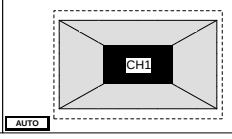
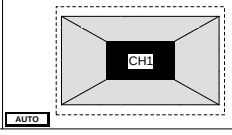
13 SCREEN SPLIT IMAGE LIST

VG-876 supports various image split mode to display4K2K and other high resolution.
These image split is different according to the dot clock operation mode.
Here, it explains the each image split with pictures.

13.1 Single clock mode　Image split

When the dot clock operation mode is single clock mode, below image split is supported.

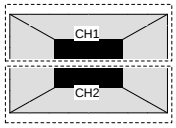
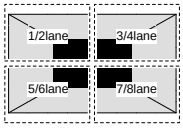
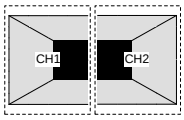
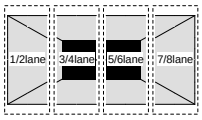
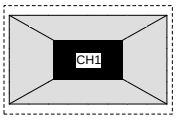
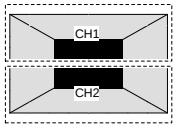
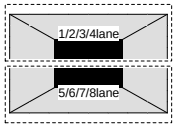
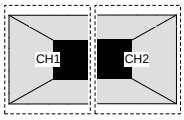
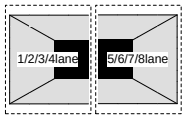
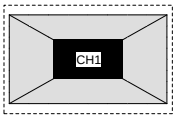
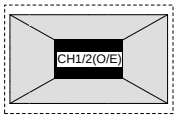
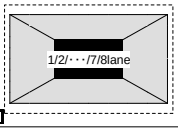
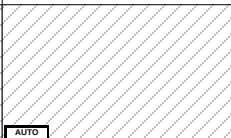
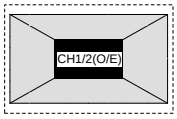
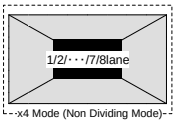
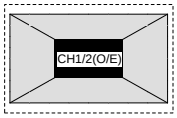
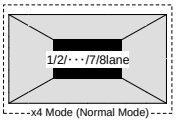
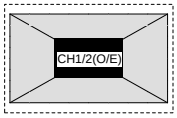
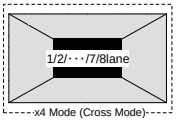
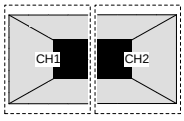
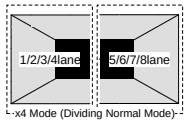
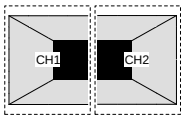
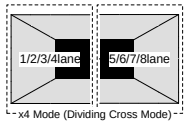
When the dot clock is under 340MHz, this is selected.

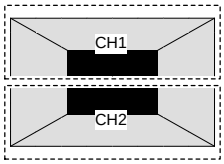
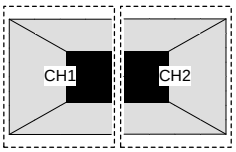
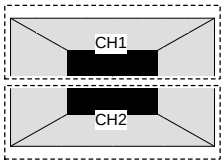
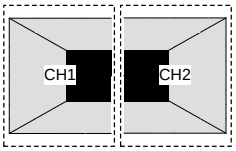
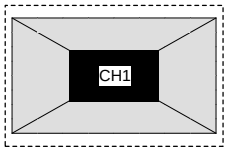
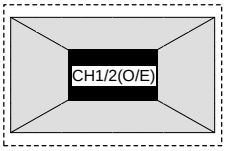
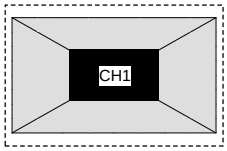
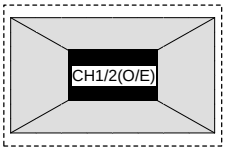
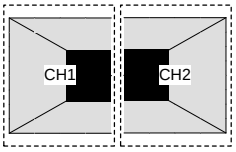
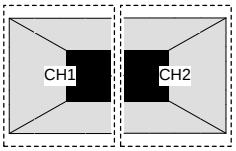
DotClk Mode	Mode	VM-1876-M0 (HDMI) VM-1876-M1 (DisplayPort) VM-1876-M7(HDCP2.2)	VM-1876-M2 (V-by-One®HS)	VM-1876-M5 (SDI)	VM-1876-M6 (HDMI 6G) VM-1876-M8 (6G HDCP2.2)
Single	–				
		*CH2/3/4 output same picture as CH1.	*CH2/3/4 output same picture as CH1.	*CH2/3/4 output same picture as CH1.	*CH2 output same as CH1.

13.2 Dual clock mode　Image split

When the dot clock operation mode is dual clock mode, below image split is supported.

When the dot clock is under 680MHz, this is selected.

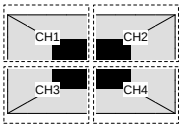
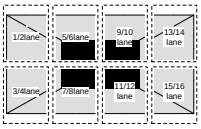
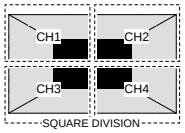
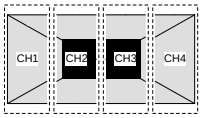
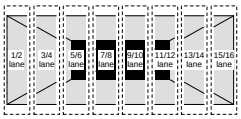
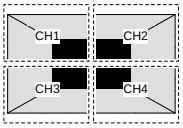
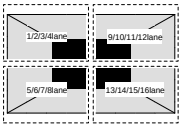
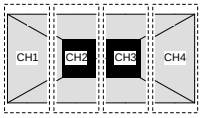
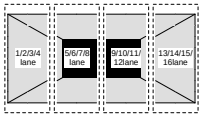
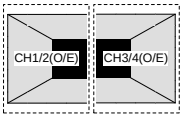
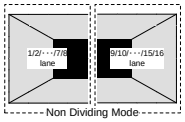
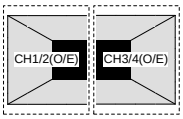
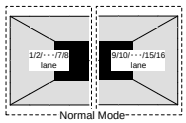
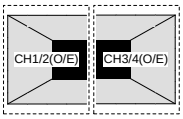
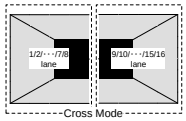
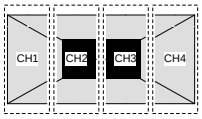
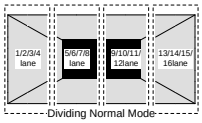
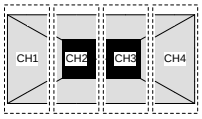
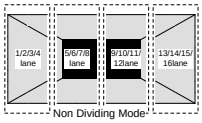
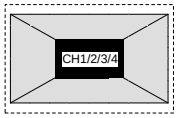
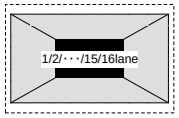
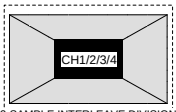
DotClk Mode	Mode	VM-1876-M0 (HDMI) VM-1876-M1 (DisplayPort) VM-1876-M7(HDCP2.2)	VM-1876-M2 (V-by-One®HS)	VM-1876-M5 (SDI)	VM-1876-M6 (HDMI 6G) VM-1876-M8 (6G HDCP2.2)
Dual	Mode0 (HDiv)				
	Mode1 (VDiv)				
	Mode2 (HDiv)				
	Mode3 (VDiv)			Lane 1 : 0, 4, 8, Lane 2 : 2, 6, 10, Lane 3 : 1, 5, 9, Lane 4 : 3, 7, 11, Lane 5 : 2048, 2052, 2056, Lane 6 : 2050, 2054, 2058, Lane 7 : 2049, 2053, 2057, Lane 8 : 2051, 2055, 2059,	
	Mode4 (No Div)			Lane 1 : 0, 8, 16 Lane 2 : 4, 12, 20 Lane 3 : 2, 10, 18 Lane 4 : 6, 14, 22 Lane 5 : 1, 9, 17 Lane 6 : 5, 15, 21 Lane 7 : 3, 11, 19 Lane 8 : 7, 15, 23 AUTO	
	Mode5 (No Div)			Lane 1 : 0, 8, 16 Lane 2 : 4, 12, 20 Lane 3 : 1, 9, 17 Lane 4 : 5, 15, 21 Lane 5 : 2, 10, 18 Lane 6 : 6, 14, 22 Lane 7 : 3, 11, 19 Lane 8 : 7, 15, 23	
	Mode6 (No Div)			Lane 1 : 0, 8, 16 Lane 2 : 1, 9, 17 Lane 3 : 2, 10, 18 Lane 4 : 3, 11, 19 Lane 5 : 4, 12, 20 Lane 6 : 5, 15, 21 Lane 7 : 6, 14, 22 Lane 8 : 7, 15, 23	
	Mode7 (No Div)			Lane 1 : 0, 8, 16 Lane 2 : 2, 10, 18 Lane 3 : 1, 9, 17 Lane 4 : 3, 11, 19 Lane 5 : 4, 12, 20 Lane 6 : 6, 14, 22 Lane 7 : 5, 15, 21 Lane 8 : 7, 15, 23	
	Mode8 (VDiv)			Lane 1 : 0, 4, 8, Lane 2 : 1, 5, 9, Lane 3 : 2, 6, 10, Lane 4 : 3, 7, 11, Lane 5 : 2048, 2052, 2056, Lane 6 : 2049, 2053, 2057, Lane 7 : 2050, 2054, 2058, Lane 8 : 2051, 2055, 2059,	
	Mode9 (VDiv)			Lane 1 : 0, 4, 8, Lane 2 : 2, 6, 10, Lane 3 : 1, 5, 9, Lane 4 : 3, 7, 11, Lane 5 : 2048, 2052, 2056, Lane 6 : 2050, 2054, 2058, Lane 7 : 2049, 2053, 2057, Lane 8 : 2051, 2055, 2059,	
		*CH3/4 output same as CH1/2.	*CH3/4 output same as CH1/2.	*CH3/4 output same as CH1/2.	*CH2 output same as CH1.

DotClk Mode	Mode	VM-1876A-M1 (DisplayPort)	
Dual	Mode0 (HDiv)		
	Mode1 (VDiv)		
	Mode2 (HDiv)		
	Mode3 (VDiv)		
	Mode4 (No Div)	 AUTO ※CH2は CH1と同じ出力になります	CH2 is same output as CH1.
	Mode5 (No Div)		
	Mode6 (No Div)	 ※CH2は CH1と同じ出力になります	CH2 is same output as CH1.
	Mode7 (No Div)		
	Mode8 (VDiv)		
	Mode9 (VDiv)		

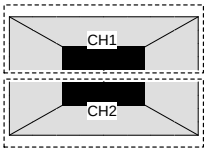
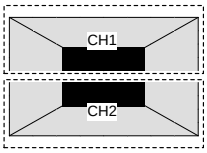
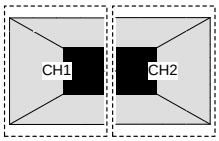
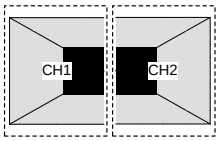
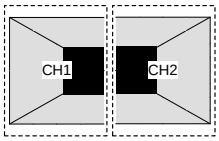
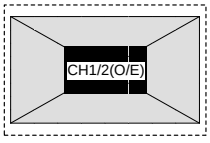
13.3 Quad clock mode　Image split

When the dot clock operation mode is quad clock mode, below image split is supported.

When the dot clock is under 1360MHz, this is selected.

DotClk Mode	Mode	VM-1876-M0 (HDMI) VM-1876-M7(HDCP2.2)	VM-1876-M2 (V-by-One®HS)	VM-1876-M5 (SDI)	VM-1876-M6 (HDMI 6G) VM-1876-M8 (6G HDCP2.2)
Quad	Mode0 (H2/V2Div)			 SQUARE DIVISION	
	Mode1 (V4Div)				
	Mode2 (H2/V2Div)				
	Mode3 (V4Div)				
	Mode4 (V2Div)		 Non Dividing Mode	Lane 1 : 0, 8, 16 Lane 2 : 4, 12, 20 Lane 3 : 1, 9, 17 Lane 4 : 5, 13, 21 Lane 5 : 2, 10, 18 Lane 6 : 6, 14, 22 Lane 7 : 3, 11, 19 Lane 8 : 7, 15, 23 Lane 9 : 2048, 2056, 2064 Lane10 : 2052, 2060, 2068 Lane11 : 2049, 2057, 2065 Lane12 : 2053, 2061, 2069 Lane13 : 2050, 2058, 2066 Lane14 : 2054, 2062, 2070 Lane15 : 2051, 2059, 2067 Lane16 : 2055, 2063, 2071	
	Mode5 (V2Div)		 Normal Mode	Lane 1 : 0, 8, 16 Lane 2 : 1, 9, 17 Lane 3 : 2, 10, 18 Lane 4 : 3, 11, 19 Lane 5 : 4, 12, 20 Lane 6 : 5, 13, 21 Lane 7 : 6, 14, 22 Lane 8 : 7, 15, 23 Lane 9 : 2048, 2056, 2064 Lane10 : 2049, 2057, 2065 Lane11 : 2050, 2058, 2066 Lane12 : 2051, 2059, 2067 Lane13 : 2052, 2060, 2068 Lane14 : 2053, 2061, 2069 Lane15 : 2054, 2062, 2070 Lane16 : 2055, 2063, 2071	
	Mode6 (V2Div)		 Cross Mode	Lane 1 : 0, 8, 16 Lane 2 : 2, 10, 18 Lane 3 : 1, 9, 17 Lane 4 : 3, 11, 19 Lane 5 : 4, 12, 20 Lane 6 : 6, 14, 22 Lane 7 : 5, 15, 21 Lane 8 : 7, 15, 23 Lane 9 : 2048, 2056, 2064 Lane10 : 2050, 2058, 2066 Lane11 : 2049, 2057, 2065 Lane12 : 2051, 2059, 2067 Lane13 : 2052, 2060, 2068 Lane14 : 2054, 2062, 2070 Lane15 : 2053, 2061, 2069 Lane16 : 2055, 2063, 2071	
	Mode7 (V4Div)		 Dividing Normal Mode	Lane 1 : 0, 4, 8, Lane 2 : 1, 5, 9, Lane 3 : 2, 6, 10, Lane 4 : 3, 7, 11, Lane 5 : 1024, 1028, 1032 Lane 6 : 1025, 1029, 1033 Lane 7 : 1026, 1030, 1034 Lane 8 : 1027, 1031, 1035 Lane 9 : 2048, 2052, 2056 Lane10 : 2049, 2053, 2057 Lane11 : 2050, 2054, 2058 Lane12 : 2051, 2055, 2059 Lane13 : 3072, 3076, 3080 Lane14 : 3073, 3077, 3081 Lane15 : 3074, 3078, 3082 Lane16 : 3075, 3079, 3083	
	Mode8 (V4Div)		 Non Dividing Mode	Lane 1 : 0, 4, 8, Lane 2 : 2, 6, 10, Lane 3 : 1, 5, 9, Lane 4 : 3, 7, 11, Lane 5 : 1024, 1028, 1032 Lane 6 : 1026, 1030, 1034 Lane 7 : 1025, 1029, 1033 Lane 8 : 1027, 1031, 1035 Lane 9 : 2048, 2052, 2056 Lane10 : 2050, 2054, 2058 Lane11 : 2049, 2053, 2057 Lane12 : 2051, 2055, 2059 Lane13 : 3072, 3076, 3080 Lane14 : 3074, 3078, 3082 Lane15 : 3073, 3077, 3081 Lane16 : 3075, 3079, 3083	
	Mode9 (No Div)	 AUTO	 AUTO	Lane 1 : 0, 16, 32 Lane 2 : 1, 17, 33 Lane 3 : 2, 18, 34 Lane 4 : 3, 19, 35, Lane 5 : 4, 20, 36, Lane 6 : 5, 21, 37 Lane 7 : 6, 22, 38 Lane 8 : 7, 23, 39, Lane 9 : 8, 24, 40 Lane10 : 9, 25, 41 Lane11 : 10, 26, 42 Lane12 : 11, 27, 43 Lane13 : 12, 28, 44 Lane14 : 15, 29, 45 Lane15 : 14, 30, 46 Lane16 : 15, 31, 47 AUTO	AUTO
	Mode10 (2SI)			 2-SAMPLE INTERLEAVE DIVISION	

*Ch3/4 in 3D SDI(dual) is same as CH1/2.

DotClk Mode	Mode	VM-1876A-M1 (DisplayPort)
Quad	Mode0 (H2/V2Div)	
	Mode1 (V4Div)	
	Mode2 (H2/V2Div)	
	Mode3 (V4Div)	
	Mode4 (V2Div)	
	Mode5 (V2Div)	
	Mode6 (V2Div)	
	Mode7 (V4Div)	
	Mode8 (V4Div)	
	Mode9 (No Div)	 AUTO
	Mode10 (2SI)	

14 Revision history

Ver.	Date	New functions	Item	Content
1.00	2013/9/19			First edition
1.10	2013/11/8	Yes	7.1.10	Add “Sync trigger (S-TRIG)” function.
			10.8.1	Explain “data round off” more clearly.
			10.8.1	Explain “data round off” more clearly.
			10.8.1	Explain “data round off” more clearly.
		Yes	10.4.	Add “V-By-One®HS Unit (VM-1876-M2)”
			10.2.4	Correct and add description of “Dot Clock Operation Mode Dot Clk Mode.”
			All	Change description from “Split Count” to “DotClk Mode.” Correct related figures.
			10.11	Correct description of DDC supply voltage from “±5V” to “+5V.”
1.20	2013/12/10	Yes	1.6.6	Add “Audio Flash Data Entry menu”
		Yes	4.9.6	Add explanation of “BMP file setting and output.”
		Yes	10.5.1	Correct and add the value of “Source” of “Digital Audio.”
		Yes	10.5.3	Add explanation of “Flash Data Entry.”
1.30	2014/2/13		1.4.5	Input audio (L-PCM) supported.
			10.4.2	V-by-One ® HS setting menu and description
			10.5	SDI unit
			10.6	Input audio (L-PCM)
1.40	2014/3/14		1.5	Add explanation of VG-876 series
			10.1.4	HDMI 6G unit
			10.3.3	Scramble setting (Program data)
			10.3.5	Scramble setting (Config data)
			10.3.6	SCDC support
			10.6	Internal DSD support
			12	
1.60	2014/6/11		10.1.4	Add description of Deep Color for the timing over 3G.
			10.3.4	Add parameter for Speaker Placement in Audio Infoframe.
1.70	2014/7/3		4.15	Add description for Simple Animation function
			10.3.4	Correct description of 3-2-(9) Vendor Specific InfoFrame
		Yes	10.4	Add DisplayPort description
1.80	2014/7/22	Yes	4.13.5	Add description of VM-1876-M7 in HDCP part. Add description of HDCP2.2.
		Yes	6.1	Add setting item of Content Type.
		Yes	10.1.6	Add description of “VM-1876-M7”.
		Yes	10.8.7	Add description of “HDMI HDCP2.2 unit”.
1.90	2014/8/4		4.13.5	Correct description of HDCP2.2.
			10.8.7	Correct specifications of Dot clock spec.
			12	Add description of VM-1876-M7.
2.00	2014/9/19		10.6.2	Correct setting parameter of SDI Payload identification data.

2.10	2014/10/17		4.13.6	Correct list of HDMI List example.
			4.13	Add SCDC to NAME/LIST.
			4.13.1	SCDC and SCDC(HEX) is added to Type of Name/List.
		Yes	4.13.11	Add SCDC pattern.
			10.6.2	Add HEX setting to SDI Payload setting.
2.20	2014/11/7	Yes	10.1.7	Add “VM-1876-MX”
		Yes	10.8	Add description for operating by 4 units synchronization.
		Yes	10.9.8	Add description of Synchronizing unit.
			10.6.2	Add description of setting parameter of SDI Payload.
			10.7.1	Add description of SDI output of Int.L-PCM setting parameter.
2.30	2014/12/5		10.6.2	Description of “Audio Copy” is added.
			10.6.5	In SD Clock Delay, description that SD output cannot use it is added.
			10.6.6	Only L-PCM 48KHz is available for audio output.
			10.7.1	Regulation of DisplayPort is deleted.
			10.9.3	Channel number of DisplayPort is changed to 8ch.
			10.9.5	Correct regulation of SDI output.
			10.13.2	Delete notice of timing edit of DisplayPort is deleted.
2.40	2015/1/9		4.5.1	Add regulation of output timing of SDI CheckField.
			4.13.1	Add description of display of output BIT in NAME pattern.
			4.13.2	
			4.13.5	Add description of AV Mute Mode of HDCP pattern.
			6.2.1	Add caution of HDCP2.2 execution.
2.50	2015/04/16		4.13.5	Change from HDCP1.0, 1.1/1.2 to 1.4.
			6.1	Add Auth Version in HDCP setting item. Change “Version” to “AV-Mute Mode”.
			6.2.1	Add Auth Version in HDCP Program execution.
			10.1.7	Add description of VM-1876-M8. VM-1876-MX is moved to 10.1.8.
			10.2.5	Add description of 21:9 setting method.
			10.3.3	Add Scramble setting of ON and Refer EDID in HDMI unit setting.
			10.3.5	Add ON and Refer EDID.
			10.6.4	Add description that Time code is not output in SD timing.
			10.8	Change from 4 units to several units.
			10.8.3	Add description of setting method of VM-1876-MX.
			10.8.5	Add split image.
			10.8.6	Add scanning direction image.
			10.9.2 10.9.6 10.9.7	Change E-EDID version to 1.4.
			10.9.8	Add HDMI 6G HDCP2.2 unit.
			12.2	Add Lane division of V-by-One Mode3 of dual clock. Change to “from 2048” in Lane5-8 in V-by-one Mode 8,9 in dual clock.
2.60	2015/4/14		10.3.3 10.3.5	Add description that the settings of “ON” and “Refer EDID” of Scramble setting are available only for VM-1876-M8.
			10.3.4	Add “Dynamic Range and Mastering InfoFrame” in the InfoFrame/Packet.
			10.3.13	Add explanation of “HPD Negate”.
			10.8.4	Add “V2Div” in the Multi VGSplit.
			10.8.5	Change title of split image as 4 sets synchronization.

			10.8.6	Add split image of 2 sets synchronization.
			10.8.7	Move “Scanning direction image” to 10.8.7.
			10.9.2 10.9.6 10.9.8	Delete 16-bit from 4:2:2 output of HDMI unit.
2.70	2015/7/6		4.9.6	Add description that 64 pcs of 4K2K BMP files can be read in the caution of BMP file output setting.
			4.10.2	Add 32x32 and 64x64 in the <Character setting item list>.
			4.13.2	Add 32x32 and 64x64 in the <Name setting item list>.
		Yes	7.1.20	Add the setting of bit number display or not in the Name Pattern.
		Yes	10.5.2	Add Control Mode, HTPDN Ctrl and LOCKN Ctrl in the <V-by-One®HS setting parameter>.
		Yes	10.5.5	Add setting of the “V-by-One®HS Config”.
			10.6.5	Modify the max value of “Time” in the SDI ClockDelay.
2.80	2015/10/16		3.2.6	Add explanation of Serration/EQP.
			3.2.7	Add explanation of EQP-Fp/EQP-Bp.
			4.15.1	Add explanation of making simple moving picture when Dotclk Mode = Dual or Quad situation.
			10.2.2	Add explanation of CV setting in the Sync signal ON/OFF and polarity setting.
			10.7	Add Analog output.
			10.9	Add Analog Audio.
			10.16	Add analog output (D-SUB) in the max. value of the power supply current value.
			11	Add TV standard signal function.
2.90	2015/12/8		9.6	Add this item.
			10.7	Add explanation of iTMDS output.
			10.9.3	Add operation of “Audio Data Entry” of AAC and AC3.
			10.15	Add this item.
			10.17.5	Add explanation of relation between output bit length and dot clock of iTMDS.
			10.1.3	Add this item.
			10.4.3	Add the following item of VM-1876A-M1. ・Trans Mode ・Setting item when Trans Mode=SST is set. (DotClk Range, Output Mode) ・Setting item when Trans Mode=MST is set. (Stream Count、Output Mode) ・Add description that Nvid is not supported in VM-1876A-M1.
			10.4.4	・Add Function display of VM-1876A-M1. ・Add explanation of data detail of Main Stream Attribute. ・Add explanation of how to judge PASS/FAIL of Clock Recovery and Channel EQ.
			10.4.5	Add explanation of the difference of AUD_MUTE function between VM-1876-M1 and VM-1876A-M1.
			10.4.6	Add audio output spec of VM-1876A-M1.

			10.4.8	Add explanation that HDCP is not supported in VM-1876A-M1.
			10.4.10	Add this item.
			10.12.4	Add VM-1876A-M1 support.
			10.17.3	Add VM-1876A-M1 support.
			13.2	Add image split drawing of VM-1876A-M1.
			13.3	Add image split drawing of VM-1876A-M1.
3.00	2016/3/4		3.2.2 10.2.4	The description about setting unit of Dot Clock Mode that is described in 3.2.2 is shift to 10.2.4.
			10.12.8	Correct the spec of HDMI HDMI2.2 unit
			10.15	10.15 describes trademark. 10.16 describes connectors.
3.10	2016/4/1		2.4.3	Add description of display type of Group execution.
			3.1.2	The description about setting unit of Dot Clock Mode that is described in 3.1.2 is shift to 10.2.4.
			10.11.1	Delete description of “it supports 4 units synchronization”. Now it supports 2 units synchronization.
3.20	2016/8/23		10.4.3	Add description of setting in Configuration →DP→Select Function
			10.4.6	Add description of setting in Configuration →DP→Select Function
			10.12.4	Add max dot clock value when outputting one picture by one connector by Dual clock mode. Add description of max dot clock of MST> Update the timing list that is not supported.
			10.17.3	Add max dot clock value when outputting one picture by one connector by Dual clock mode.
3.30	2016/9/20		1.3	Correct internal memory from 100MB to 60MB.
3.40	2016/12/21		6.2.3	Delete “license option” description of HDCP/CEC/EDID/
			10.12.9	Add VESA format.
			10.12.11	Delete description of sampling frequency except 48kHx of L/R Audio.
3.50	2017/10/18			Delete the description about VM-1876-M1
			10.3.4	Add Vendor Specific InfoFrame 1, 2.
			10.4.2	Correct description about split setting.
			10.4.3	Correct and add the setting value.
			10.4.4	Add “InfoFrame/Packet”
			10.12.3	Correct setting value
3.60	2018/7/20	Yes	4.13.3	Add HDBaseT in the port for getting EDID.
		Yes	4.13.4	Add HDBaseT in the port for getting DDC/CI.
		Yes	4.13.5	Add HDBaseT in the port for HDCP.
		Yes	5.9	Add HDBaseT in the port for getting EDID.
		Yes	6.1	Add Ake Init Reset.
		Yes	6.1	Add Ake Init Interval.
		Yes	6.2.1	Add setting of HDBaseT.
		Yes	6.2.3	Add VM-1876-MC in the display item.
		Yes	7.1.17	Add GCP Set AV-MUTE and GCP Clear AV-MUTE in Custom Key2.
		Yes	10.1.11	Add VM-1876-MC.
		Yes	10.9	Add HDBaseT
		Yes	10.13.11	Add HDBaseT.
		Yes	10.18.6	Add HDBaseT

VG-876

Instruction Manual Ver. 3.40

- An incorrectly collated manual or a manual with missing pages will be replaced.
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- The contents of this manual are subject to change without prior notice due to improvements.
- The manufacturer will not be liable for any effects caused by incorrect operation.
- All inquiries concerning this product should be addressed to your dealer or to the manufacturer at the contact numbers given below.
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